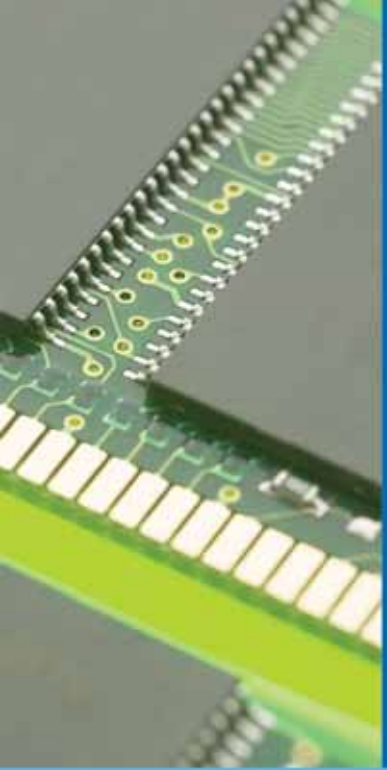

Field Hardware

CRIB NOTES

PERPETUAL INNOVATION

LENEL

Field Hardware Crib Notes

revision 29

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Lenel OnGuard Field Hardware Crib Notes DOC-602, revision 29, July 2013

Warranty

Lenel warrants that the product is free from defects in material and workmanship under normal use and service with proper maintenance for one year from the date of factory shipment. Lenel assumes no responsibility for products damaged by improper handling, misuse, neglect, improper installation, over-voltages, repair, alteration, or accident. This warranty is limited to the repair or replacement of the defective unit. In no event shall Lenel Systems International be liable for loss of use or consequential damages of any kind, however occasioned.

There are no expressed warranties other than those set forth herein. Warranty expressly excludes third party additions, deletions and/or upgrades to this product, including those contained herein. Lenel does not make, nor intends, nor does it authorize any agent or representative to make any other warranties or implied warranties, and expressly excludes and disclaims all implied warranties of merchantability or fitness for a particular purpose.

Returned units are repaired or replaced from a stock of reconditioned units. All returns must be accompanied by a return authorization number (RMA) obtained from the Lenel customer service department prior to returning or exchanging any product. The RMA number must appear on the outside of the shipping box and on the packing slip. Any items returned without an RMA number will not be accepted and will be returned at the customer's expense. All returns must have transportation, insurance, and custom brokers' fees prepaid.

Liability

It is expressly understood and agreed that the interface should only be used to control exits from areas where an alternative method for exit is available. This product is not intended for, nor is rated for operation in life-critical control applications. Lenel Systems International is not liable under any circumstances for loss or damage caused by or partially caused by the misapplication or malfunction of the product. Lenel's liability does not extend beyond the purchase price of the product.

Table of Contents

Hardware Basics

Power Supplies

Field hardware power supplies and enclosures

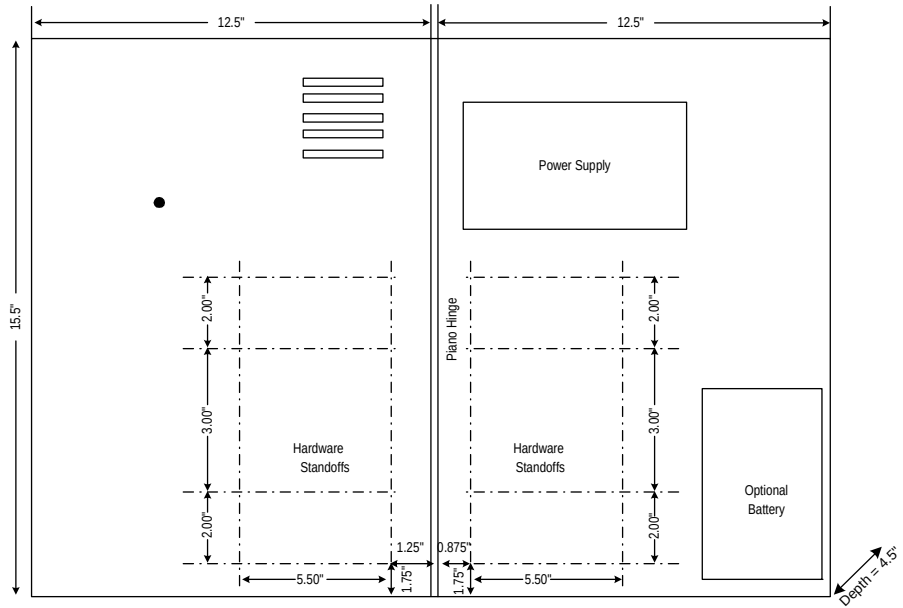
Part #	Description
LNL-AL400ULX	UL Listed power supply - 12 VDC (4A output, 9.7 - 13.5 VDC, 12 VDC nominal), 120 VAC input, continuous supply current with enclosure, lock, UPS capable (battery optional). Operating temperature: 0° to +49° C (32° to 120° F). Humidity: 0 to 85% RHNC. BTU output: 33 BTU.
LNL-400X-CE220	CE marked power supply - 12 VDC (4A output), 230 VAC input, continuous supply current with enclosure, lock, UPS capable (battery optional). Operating temperature: 0° to +49° C (32° to 120° F). Humidity: 0 to 85% RHNC. BTU output: 33 BTU.
LNL-AL600ULX-4CB6	UL Listed power supply - 12 VDC (6A output, 9.7 - 13.5 VDC, 12 VDC nominal), 120 VAC input, continuous supply current with enclosure, lock, UPS capable (battery optional). Operating temperature: 0° to +49° C (32° to 120° F). Humidity: 0 to 85% RHNC. BTU output: 49 BTU.
LNL-600X6-CE220	CE marked power supply - 12 VDC (6A output), 230 VAC input, continuous supply current with enclosure, lock, UPS capable (battery optional). Operating temperature: 0° to +49° C (32° to 120° F). Humidity: 0 to 85% RHNC. BTU output: 49 BTU.
LNL-CTX	Hardware enclosure (12 x 16 x 4.5 inches [304.8 x 406.4 x 114.3 mm]) with lock and tamper switch support up to two Lenel access hardware modules (UL approved).
LNL-CTX-6	Hardware enclosure (18 x 24 x 4.5 inches [457.2 x 609.6 x 114.3 mm]) with lock and tamper switch support up to six Lenel access hardware modules (UL approved).
ABT-12	Battery Kit, 12 VDC, 12AH Battery (PS-12120).

Mounting

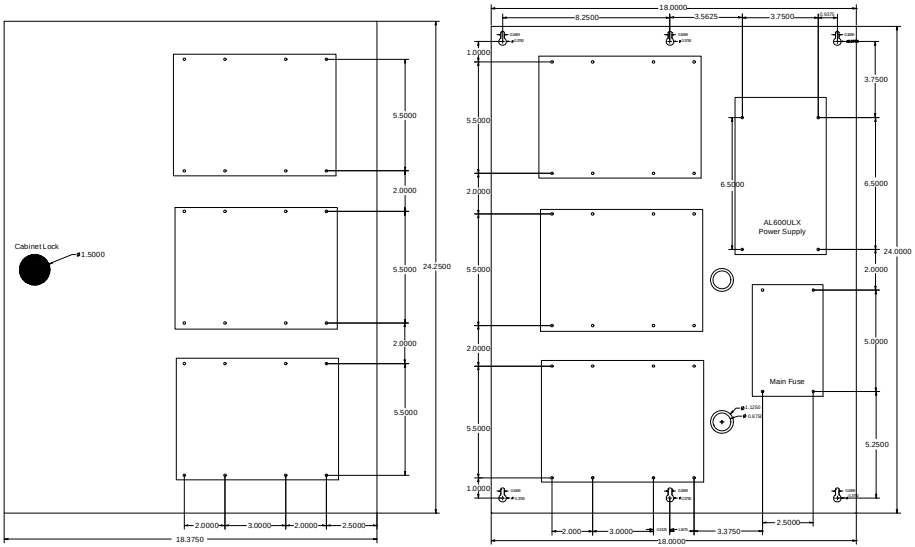
Most modules are 6 x 8 inches in size, with mounting holes along the long edge. Up to two (2) units can be

mounted in a single LNL-CTX enclosure. The LNL-CTX-6 allows for up to six (6) modules.

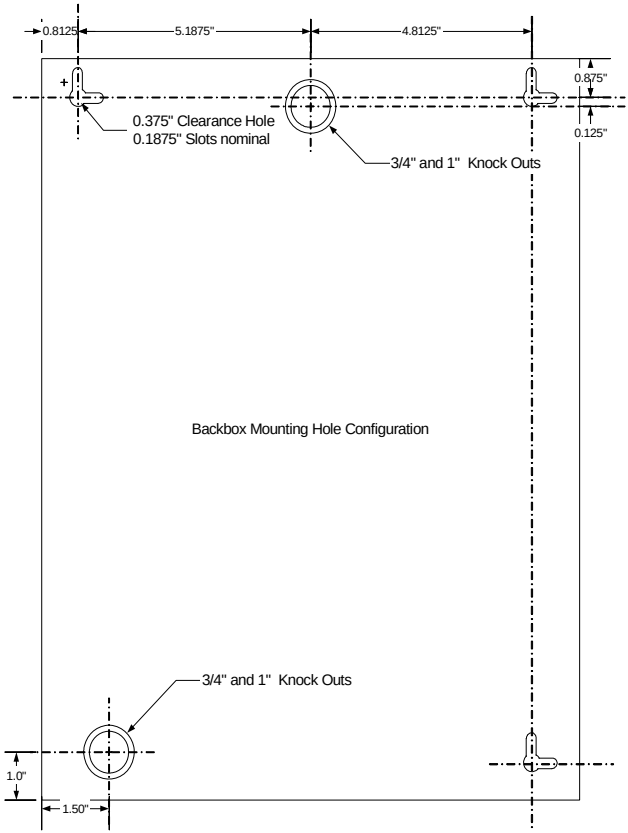
Inside view of the LNL-CTX

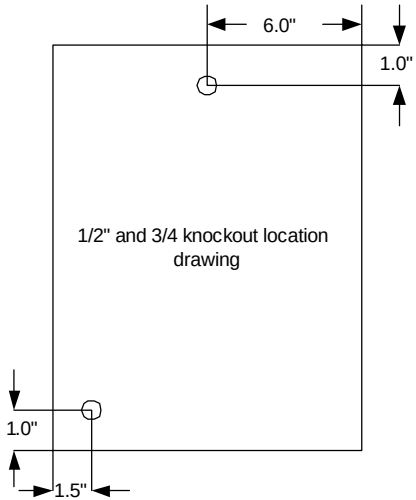


Inside view of LNL-CTX-6



Knockout diagram

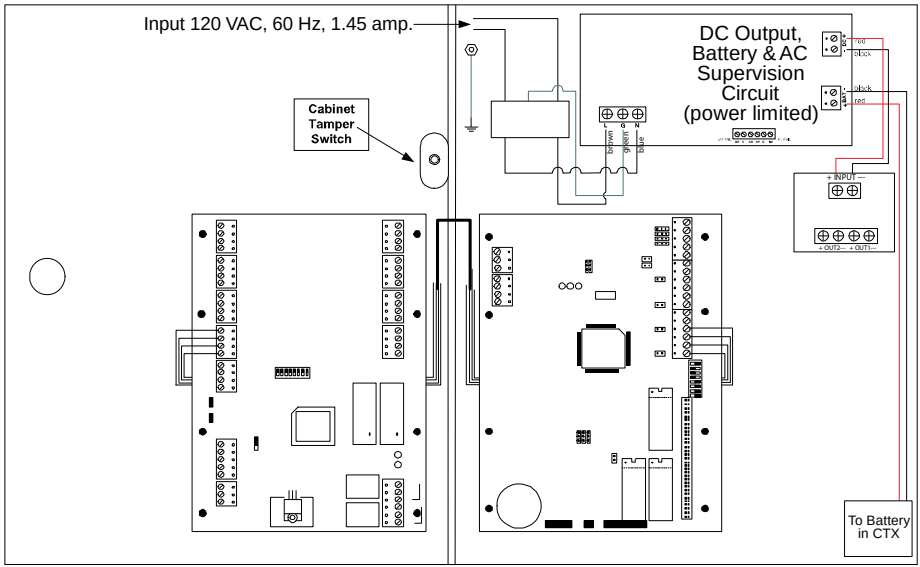




LNL-AL400ULX Installation

The LNL-AL400ULX should be installed in accordance with article 760 of the National Electrical Code and NFPA70 as well as all applicable local codes.

1. Mount the enclosure in desired location.
2. Connect unswitched AC power (120 VAC/60 Hz) to terminals marked L, G, N, dedicated to the Burglar Alarm/Access Control Subsystem.



3. Secure the green wire lead to earth ground. Use 18 AWG or larger for all power connections (Battery, DC output). Keep power limited wiring separate from non-power limited wiring (120 VAC/60 Hz Input, Battery Wires). A minimum of 0.25 inch spacing must be provided between power wires.
4. Keep power limited wiring separate from non-power limited wiring (115 VAC/60 Hz Input, Battery wires). Minimum 0.25 inch spacing must be provided between power wires.
5. Connect devices to be powered to terminals marked -out1+; -out2+. Each output is rated to 2 amps max.

Note: It is important to measure output voltage before connecting devices. This helps avoid potential damage.

6. For UL Access Control applications, batteries are required. When batteries are not used, a loss of AC will result in the loss of output voltage. When using stand-by batteries, they must be lead acid or gel type. Connect battery to terminals marked + BAT – (battery leads included).

7. Connect appropriate trouble reporting devices to AC Fail and Low Battery supervisory relay outputs marked NC, C, NO. Use 22 AWG to 18 AWG for AC Fail and Low Battery reporting. AC Failure will will report in 2 minutes; 2 hours if jumper is cut. For a six-hour delay on reporting, cut resistor R1.
8. Wire routing note: UL two panel installation instructions for LNL-CTX enclosures

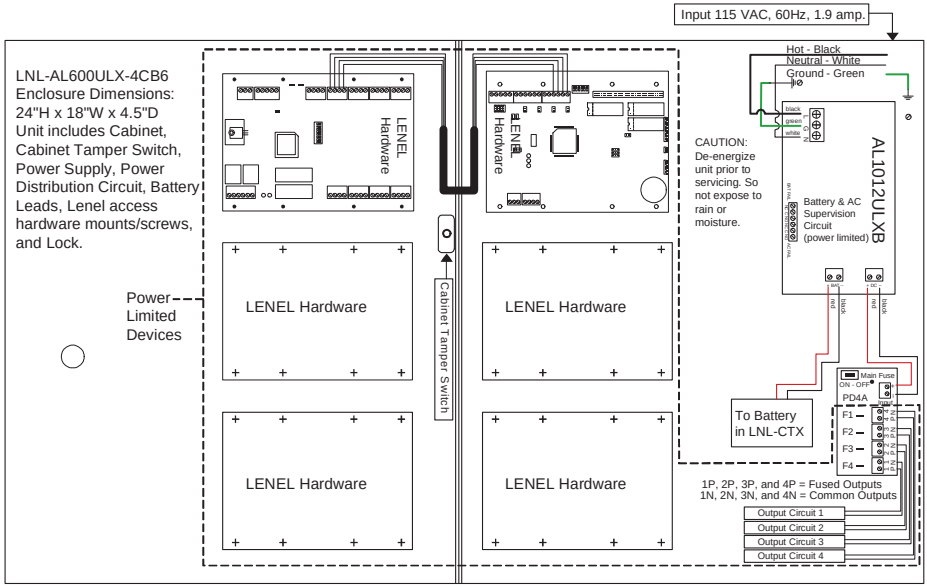
   To install multiple Lenel hardware panels into a single enclosure, the following guidelines must be used for certified UL installations.

   - All wire connections that cross over the hinge side of the door must be wire wrapped or tie wrapped together.
   - All wire must be routed behind the hardware panel so that the wires are secure from movement when opening and closing the door.
   - All connections for the lock side of the enclosure must come from behind the Lenel hardware devices.

LNL-AL600ULX-4CB6 Installation

The LNL-AL600ULX-4CB6 should be installed in accordance with article 760 of the National Electrical Code of NFPA70 as we as all applicable local codes. If you are located in Canada, refer to the Canadian Electrical Code.

1. Mount the enclosure in desired location.
2. The power supply is pre-wired to the ground (chassis). Connect main incoming ground to the provided green grounding conductor lead. Connect unswitched AC circuit (115 VAC/60 Hz) dedicated to the Burglar Alarm/Access Control Subsystem to terminals marked L, G, N.



3. Keep power limited wiring separate from non-power limited wiring (115 VAC/60 Hz Input, Battery wires). Minimum 0.25 inch spacing must be provided between power wires.
4. Connect devices to be powered to terminals marked (1P-1N, 2P-2N, 3P-3N, 4P-4N) and distribute evenly. Each output is rated at 1.5 amps max.

Note: It is important to measure output voltage before connecting devices. This helps avoid potential damage. Use 18 AWG or larger wire for all power connections (battery, DC outputs).

For UL Access Control applications, batteries are required. When batteries are not used, a loss of AC will result in the loss of output voltage. When the use of stand-by batteries is desired, they must be lead acid or gel type. Connect battery to terminals marked + BAT – (battery leads included).

5. Connect appropriate trouble reporting device to the Battery Fail and AC Fail supervisory relay outputs marked NC, C, NO. Use 22 AWG or 18 AWG for AC Fail/Battery Fail reporting. AC Failure will report in 2 minutes; 2 hours if jumper is cut. For a six-hour delay on reporting, cut resistor RL1.
6. Connect cabinet tamper switch to cabinet tamper circuit on the Lenel access hardware.
7. Wire routing note: UL six panel installation instructions for LNL-CTX enclosures

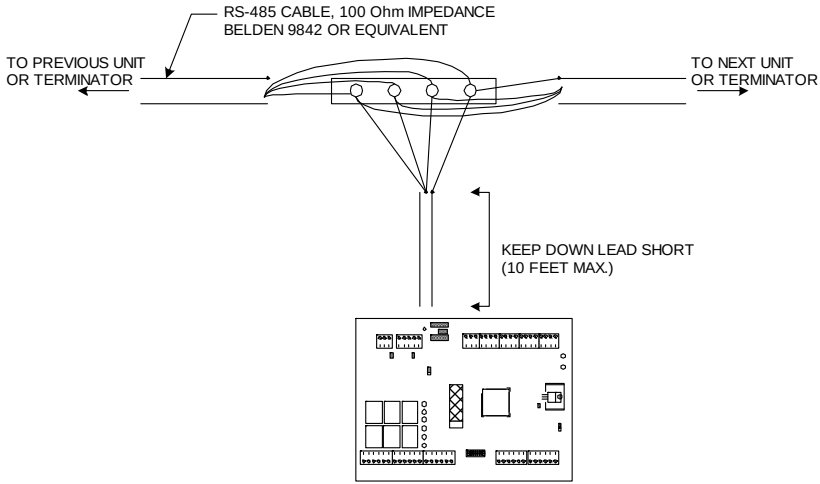
   To install multiple Lenel hardware panels into a single enclosure, the following guidelines must be used for certified UL installations.

   - All wire connections that cross over the hinged side of the door must be wire wrapped or tie wrapped together.
   - All wire must be routed behind the hardware panels so that the wires are secured from movement when opening and closing the door.
   - All connections from the lock side of the enclosure must come from the Lenel hardware devices.

RS-485 Communication Wiring

Proper wiring for RS-485 communication interfaces is critical for successful system turn-up and operation. The following guidelines apply for all RS-485 wiring.

1. Use low capacitance shielded cable with 2 twisted pairs, characteristic impedance 120 ohms (Belden9842 or equivalent) for the main RS-485 run.
2. Keep the main run maximum end-to-end distance below 4000 feet.
3. Use daisy chain configuration, NOT star configuration, to connect devices.
4. Use shielded 24 AWG cable with 2 twisted pair (Belden 9502 or equivalent) for down leads (drops or stubs).
5. Keep down leads as short as possible (no longer than 10 feet).

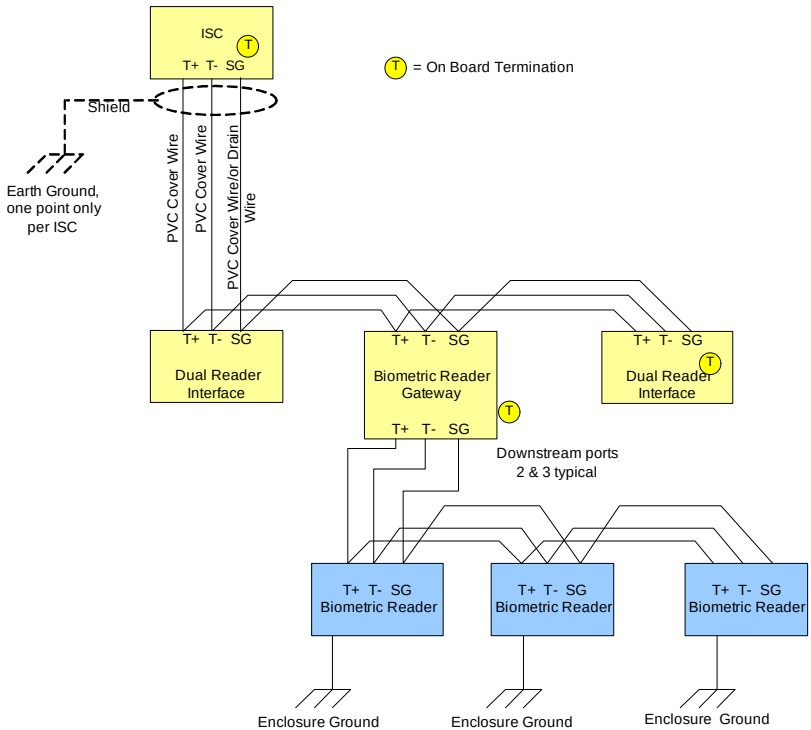


6. Terminate cables at both ends with RS-485 terminators (hardware has on-board terminators for RS-485 termination).
7. Always use the signal ground (SG) connection. Carefully insulate the SG wire for a reliable installation. Use 24 GA plastic sleeving over the SG wire when terminating the cable to the 5-position insulation displacement mating connector.

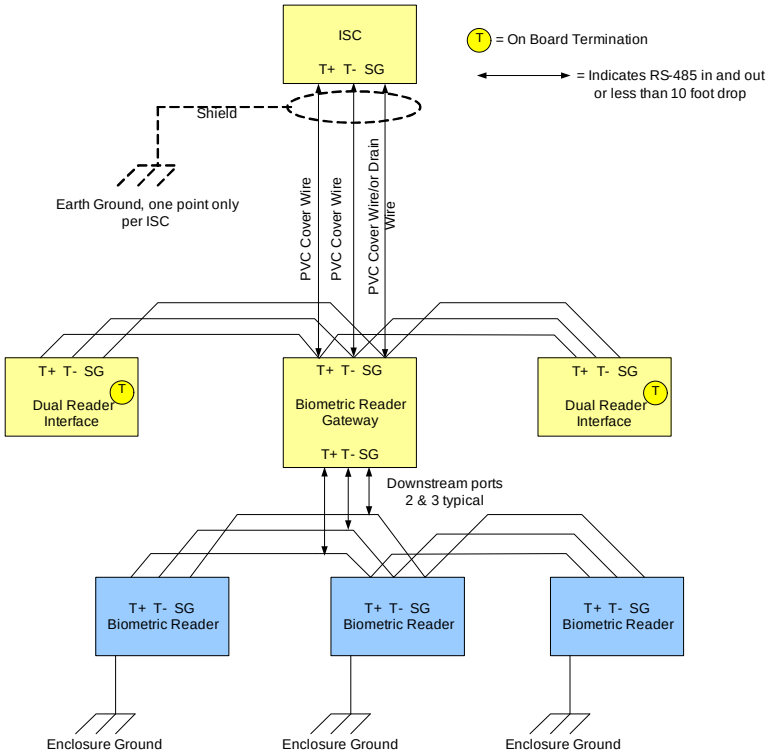
Each RS-485 communication line can have any number of DEPENDENT devices, but must have only one MASTER device. The transmit lines of the MASTER device are connected to the receive lines of the DEPENDENT devices and the receive lines of the MASTER device are connected to the transmit lines of the DEPENDENT devices. Observe the + and the - of each pair (NOTE: only applies to 4-wire RS-485 wiring).

Refer to the following diagrams for RS-485 Signal Ground and Termination.

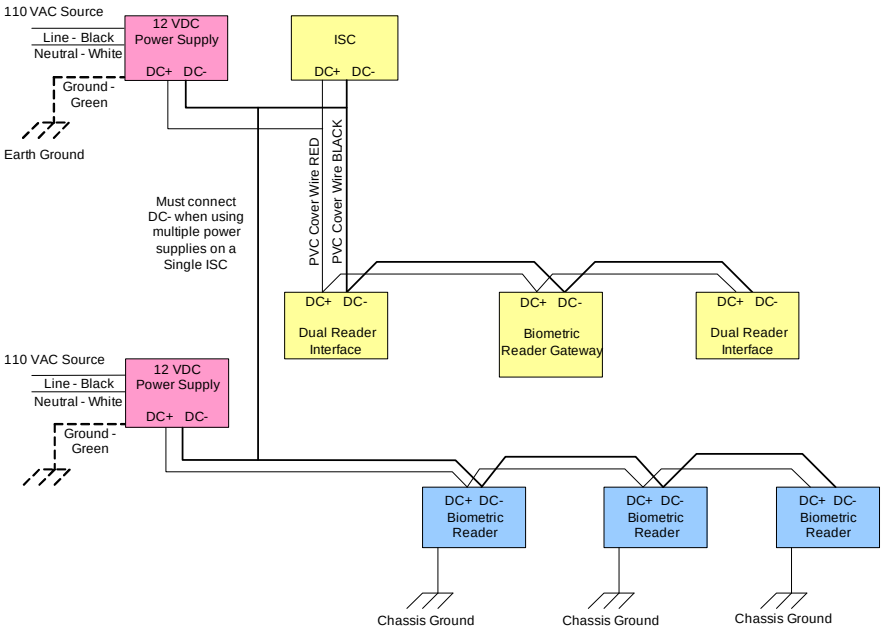
RS-485 Multi-drop Wiring and EOL Termination



RS-485 Multi-drop Wiring and EOL Termination
ISC and Biometric Gateway Mid RS-485



Multiple Power Supplies on Single ISC



Relay Contact Protection

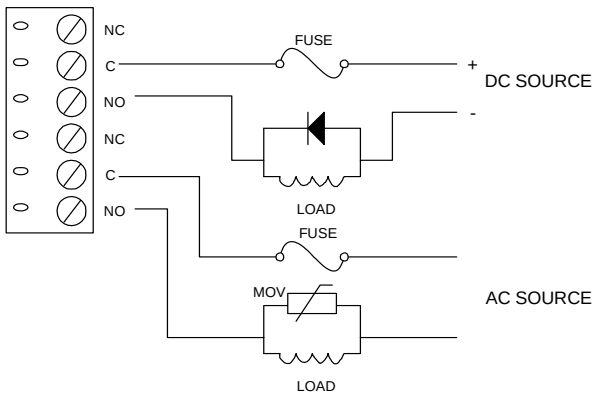
DC Inductive Load

Contacts for DC inductive loads can be effectively protected using clamp diodes. Select diodes with reverse breakdown voltage 10 times the circuit voltage.

AC Inductive Load

Contacts for AC inductive loads can be protected using metal-oxide varistors (MOVs). MOVs are effective when the load voltage is 100 V to 200 V. (MOVs are also suitable for DC operation).

MOVs must be installed as close to the load as possible (within a few inches) to be effective. Mounted in this fashion, MOVs can also reduce the effects of EMI on sensitive electronic circuits.



System Turn-Up Considerations

1. Make sure that no power is applied to any device.
2. Check all wiring and device switch settings.
3. Disconnect all devices from the RS-485 communication line.
4. Power up the controller. Be sure to check voltage requirement first.
5. Configure the controller and verify that it is working properly.

6. Connect one port of the RS-485 communication line to the multiplexer.
7. Power up a DEPENDENT device, and verify that it passes its own power-up self-test. Again, be sure to check voltage requirement first.
8. Check for ground fault between the DEPENDENT device and the RS-485 communication line. If applicable, find the fault and clear it.
9. Connect the DEPENDENT device to the RS-485 line and bring it on-line.
10. Verify all functions of the DEPENDENT device.
11. Verify the RS-485 line voltage in reference to the signal ground.
12. For each additional DEPENDENT device, repeat steps 7 through 11.
13. Verify the RS-485 line voltage for the controller, and mark the readings on the inside of the controller panel for future reference.

Device Configuration Checks

System programming must include the order of priority signals described below:

1. Hold-up or panic alarm or duress.
2. Burglar alarm.
3. Burglar alarm supervision.
4. Industrial supervision where a risk of injury to persons, or damage or destruction of property will not be involved.
5. Other supervisory services.

Items (1) and (2) may have equal priority. Items (4) and (5) may have equal priority.

Ground Potential Difference Checks

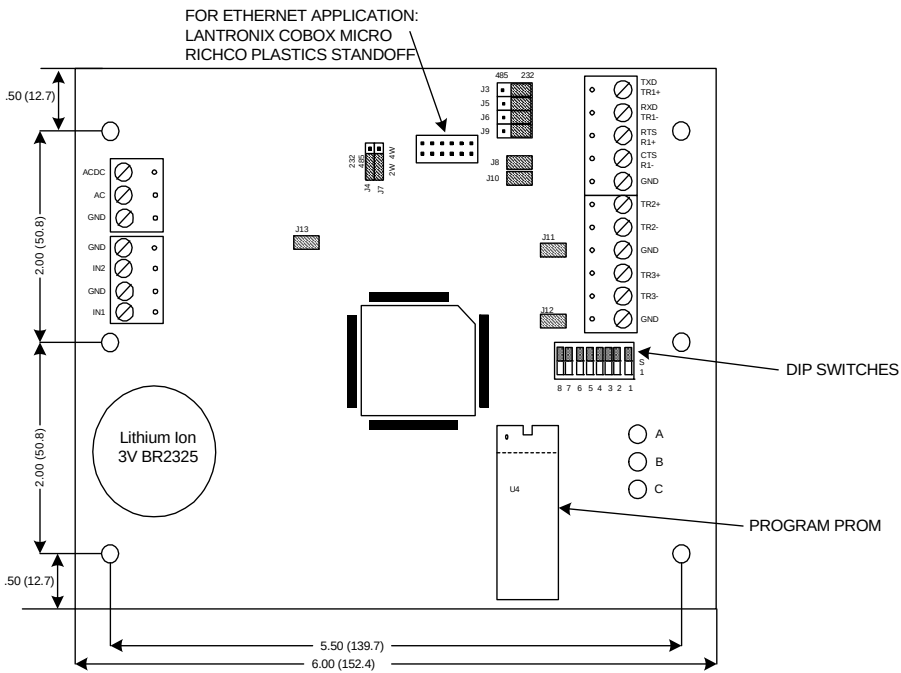
To check if there is ground fault for a new unit,

1. Apply power to all devices already successfully connected to the RS-485 line.
2. Power up the new unit, but DO NOT connect it to the RS-485 line.
3. Connect the signal ground (SG) of the RS-485 line through a 10K limiting resistor.
4. Measure the AC and DC voltage across the resistor. There should NOT be more than one volt across the resistor. Otherwise, find and clear the fault.
5. Connect the new unit to the RS-485 line if no ground fault is found.

Intelligent System Controller LNL-500

The Intelligent System Controller (ISC) interfaces upstream with the access control software on the host system. It provides real time processing for the I/O interfaces to which it is connected. Multiple combinations of Input Control Modules, Output Control Modules, and Reader Interface Modules can be connected. The ISC can have two downstream 2-wire RS-485 channels or one 4-wire RS-485 channels. In either configuration, you may connect up to 32 readers or 16 devices on a single ISC.

LNL-500 Components



Alarm Inputs

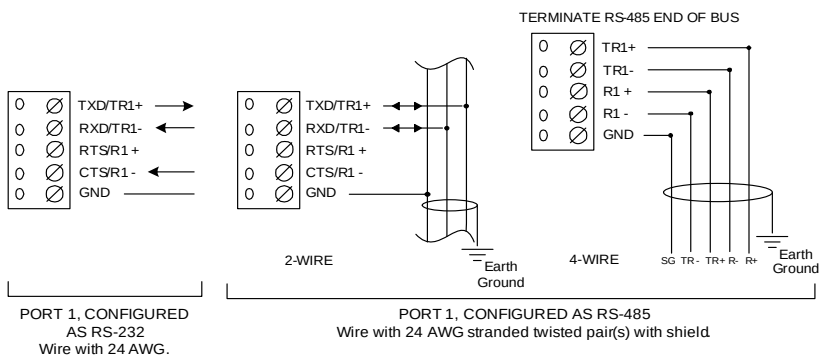
If either of these inputs is not used, install a shorting wire.

Unsupervised Alarm Input Wiring

Upstream Host Communication

The ISC uses Port 1 to communicate to the host system. Port 1 can be wired as an RS-232 interface for direct one-to-one (or modem) communication, or as an RS-485 interface for multi-drop or extended distance communication. If RS-485 communication is used, an RS-232 to RS-485 converter is required at the host workstation.

Upstream Host Communication Wiring (Port 1)



Port 1 - wiring configuration. This configuration will work for direct connect (RS-232) and Lantronix Ethernet network communications.

With direct connect DIP switch 5 needs to be OFF and with Lantronix 5 needs to be ON.

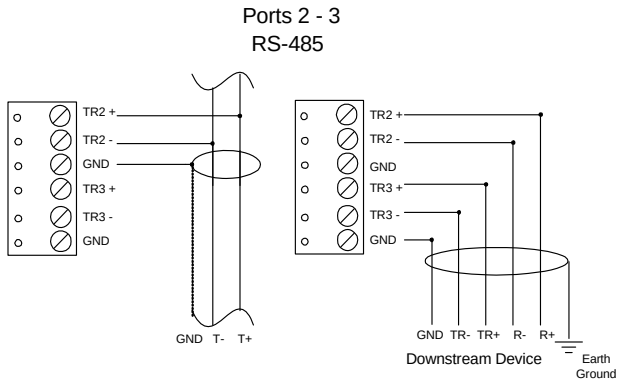
ISC	9-pin connector	25-pin connector
TXD/TR1+	pin 2	pin 3
RXD/TR1-	pin 3	pin 2
RTS/R1+	not used	not used
CTS/R1-	pin 7	pin 4
GND	pin 5	pin 7
Jumper together	4, 6 & 8	5, 6 & 20

Downstream Device Communication

The ISC can be configured to communicate downstream with up to 8 input/output devices, using Port 2 and Port 3. Each of these ports can be wired only as an RS-485 interface, for multi-drop communication on a single bus of up to 4000 feet.

For Ports 2-3, the following type of RS-485 cable is required: 24 AWG (minimum) twisted pair (with shields.) Either 2-wire or 4-wire RS-485 cable configuration can be used. The main run RS-485 cable should be no longer than 4000 feet (1219 m), 100 ohms maximum (Belden 9842 4-wire or 9841 2-wire,

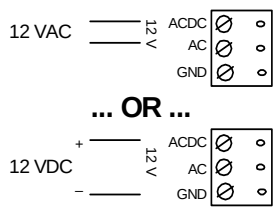
plenum cabling Belden 88102 or equivalent). The drop cables (to readers and other devices) should be kept as short as possible, no longer than 10 feet.



Power

The ISC accepts either a 12 VDC or 12 VAC ± 15% power source for its power input. If using a 12 VDC power source, be sure to observe polarity. The power source should be located as close to the ISC as possible. Wire the power input with 18 AWG (minimum) twisted pair cable.

Power Source Wiring



DIP Switches

DIP switches must be configured appropriately for your system.

Processor Address

Address	DIP SWITCH			
	1:	2:	3:	4:
0 (default)	off	off	off	off
1	ON	off	off	off
2	off	ON	off	off
3	ON	ON	off	off
4	off	off	ON	off
5	ON	off	ON	off
6	off	ON	ON	off
7	ON	ON	ON	off

Communication Handshake Status

HANDSHAKE STATUS	DIP SWITCH 5:
Transmit enable by CTS	ON
None	off

Communication Baud Rate

BAUD RATE	DIP SWITCH	
	6:	7:
38400 bps	ON	ON
19200 bps	off	ON
9600 bps	ON	off

DIP switch 8 controls the utilization of encryption. The ISC supports encryption with use of AES firmware. The controller must have a 256 KB chip.

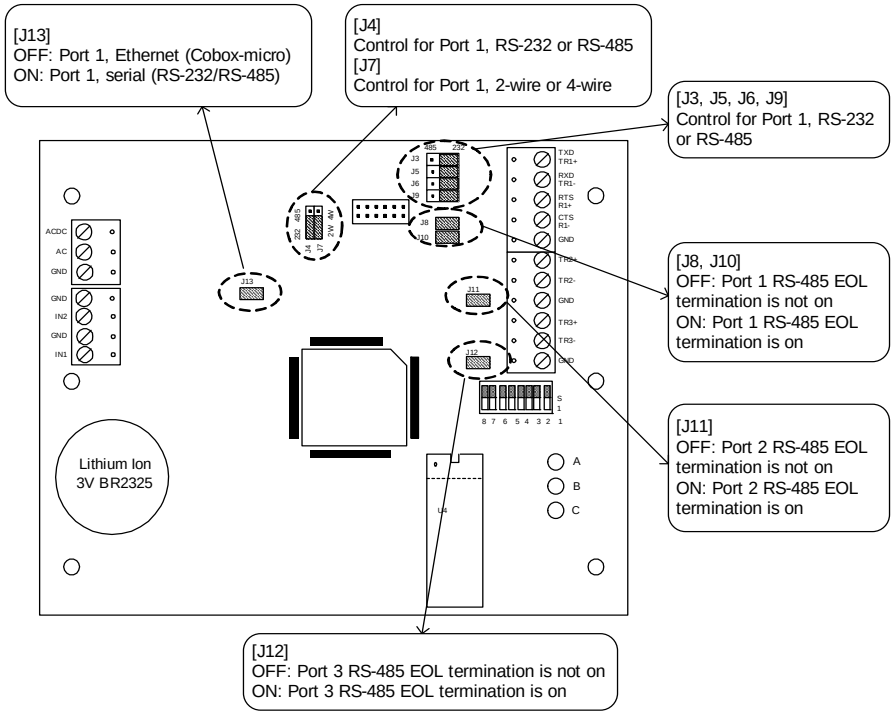
Communication Password Status

PASSWORD STATUS	DIP SWITCH 8:
Encryption is optional	off
Encryption is required	ON

The controller only reads DIP switch settings when it is powered up. If DIP switch settings are changed, the controller must go through a power cycle before the changes are seen.

Installing Jumpers

The jumpers must be configured appropriately for your system.


[J13]
OFF: Port 1, Ethernet (Cobox-micro)
ON: Port 1, serial (RS-232/RS-485)
[J4]
Control for Port 1, RS-232 or RS-485
[J7]
Control for Port 1, 2-wire or 4-wire
[J3, J5, J6, J9]
Control for Port 1, RS-232 or RS-485
[J8, J10]
OFF: Port 1 RS-485 EOL termination is not on
ON: Port 1 RS-485 EOL termination is on
[J11]
OFF: Port 2 RS-485 EOL termination is not on
ON: Port 2 RS-485 EOL termination is on
[J12]
OFF: Port 3 RS-485 EOL termination is not on
ON: Port 3 RS-485 EOL termination is on
Lithium Ion
3V BR2325
ACDC
AC
GND
GND
IN2
GND
IN1
TXD
TR1+
RXD
TR1-
RTS
R1+
CTS
R1-
GND
TR2+
TR2-
GND
TR3+
TR3-
GND
A
B
C

Specifications

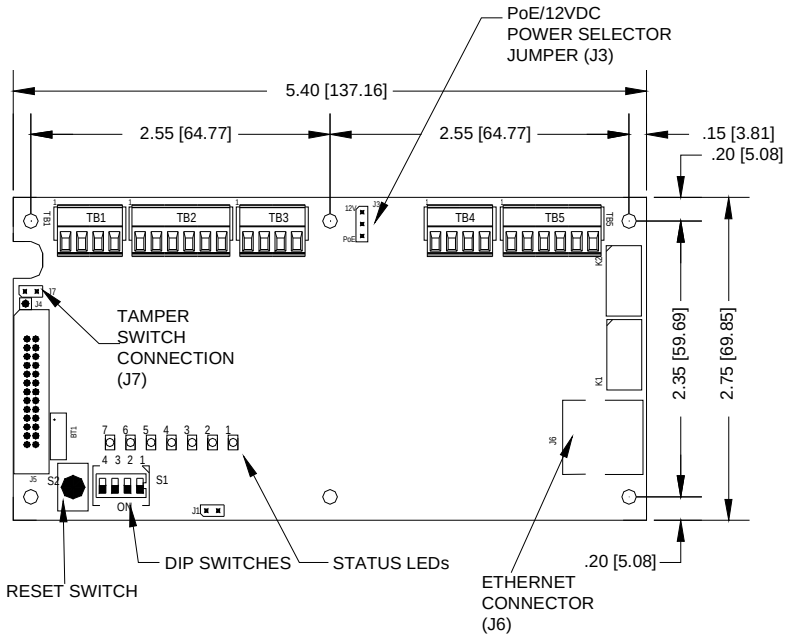
The LNL-500 is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary power: (DC or AC)
  - DC input: 12 VDC ± 10%, 250 mA
  - AC input: 12 VAC ± 15%, 400 mA RMS
- Memory and clock backup: 3 volt Lithium (Rayovac BR2325 or Wuhan Lixing CR2330)
- Communication ports:
  - Port 1: RS-232 or RS-485 (2-wire or 4-wire), 9600 to 38400 bps async
  - Port 2-3: RS-485 (2-wire), 9600 to 38400 bps async
- Inputs:
  - Cabinet Tamper Monitor: unsupervised, dedicated
  - Power Fault Monitor: unsupervised, dedicated
- Wire requirement:
  - Power: 1 stranded twisted pair, 18 AWG
  - RS-485: 24 AWG stranded twisted pair(s) with shield, 4000 feet (1219 m) max.
  - RS-232: 24 AWG stranded, 50 feet (15.24 m) maximum
  - Inputs: 1 stranded twisted pair, 30 ohms maximum
- Environmental:
  - Temperature: 32 to 158° F(0 to 70° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC
- Mechanical:
  - Dimensions: 6 x 5 x 1 in. (152 x 127 x 25 mm)
  - Weight: 8 oz. (227 g) nominal
- Data memory: 512 KB
- Certifications:
  - UL294 and UL1076 Listed, ULC Listed
  - FCC Part 15
  - C-Tick
  - FIPS 197 Certificate #305
  - CE marking
  - RoHS compliant
  - WEEE

Intelligent Single Door Controller LNL-2210

This controller provides a single door solution with either a single reader or two readers for ingress/egress operation. The board contains the following components: one (1) host Ethernet interface, one (1) power-in input, two (2) unsupervised/supervised inputs, two (2) reader interfaces, two (2) output relays, four (4) DIP switches, seven (7) jumpers, seven (7) status LEDs, and one (1) reset switch.

LNL-2210 Board



Wiring and Setup

Refer to the following table for wiring and setup of the LNL-2210.

Connections		
TB1-1	IN1 IN1	Input 1
TB1-2		
TB1-3	IN2 IN2	Input 2
TB1-4		
TB2-1	VO	Reader 1 Power Output – 12VDC
TB2-2	LED	Reader 1 LED Output
TB2-3	BZR	Reader 1 Buzzer Output
TB2-4	CLK	Reader 1 CLK/Data 1/TR+
TB2-5	DAT	Reader 1 DAT/Data 0/TR-
TB2-6	GND	Reader 1 Ground
TB3-1	LED	Reader 2 LED Output
TB3-2	BZR	Reader 2 Buzzer Output
TB3-3	CLK	Reader 2 CLK/Data 1/TR+
TB3-4	DAT	Reader 2 DAT/Data 0/TR–
TB4-1	VO	Auxiliary Power Output – 12VDC
TB4-2	GND	Auxiliary Power Output Ground
TB4-3	VIN	Input Power – 12VDC (from local power supply)
TB4-4	GND	Input Power Ground

Connections (Continued)		
TB5-1	NO	Relay K1 – Normally Open Contact
TB5-2	1-C	Relay K1 – Common Contact
TB5-3	NC	Relay K1 – Normally Closed Contact
TB5-4	NO	Relay K2 – Normally Open Contact
TB5-5	2-C	Relay K2 – Common Contact
TB5-6	NC	Relay K2 – Normally Closed Contact

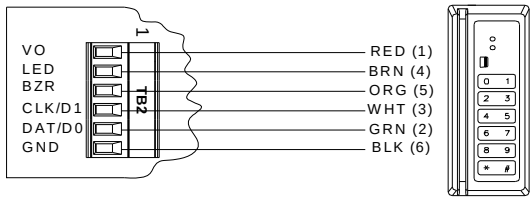
Communication Wiring

The controller communicates to the host via the onboard 10-BaseT/100Base-TX Ethernet interface (port 0).

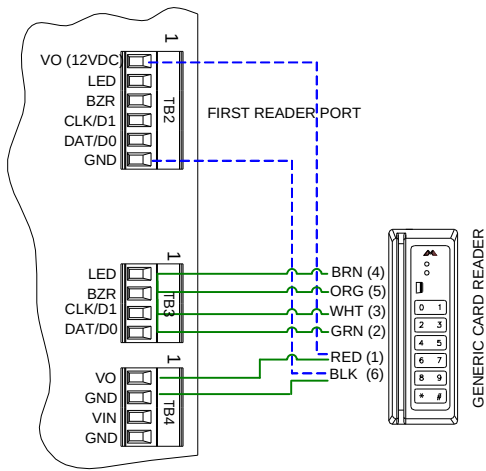
Reader Wiring

The first reader port supports readers that utilize D1/D0, Clock/Data, or OSDP 2-wire RS-485 electrical signaling. The second reader port supports readers that utilize D1/D0, Clock/Data. Power to the first reader is 12VDC and is current limited to 150mA. The second reader may be powered from the auxiliary power output on TB4-1 and TB4-2. Readers that require different voltage or have high current requirements should be powered separately. Refer to the reader manufacturer specifications for cabling requirements. In the 2-wire LED mode, the Buzzer output is used to drive the second LED. Reader port configuration is set via the host software.

Reader wiring



FIRST READER PORT
DATA1/DATA0 OR CLOCK/DATA



SECOND READER PORT
DATA1/DATA0 OR CLOCK/DATA

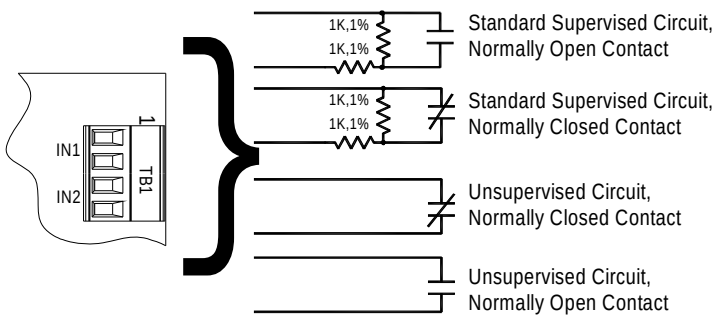
Input Circuit Wiring

Typically, these inputs are used to monitor door position, request to exit, or alarm contacts. Input circuits can be configured as unsupervised or supervised. When unsupervised, reporting consists of only the open or closed states.

When configured as supervised, the input circuit will report not only open and closed, but also open circuit, shorted, grounded*, and foreign voltage*. A supervised input circuit requires two resistors be added to the circuit to facilitate proper reporting. The standard supervised circuit requires 1K Ohm, 1% resistors and should be located as close to the sensor as possible. Custom end of line (EOL) resistances may be configured via the host software.

* Grounded and foreign voltage states are not a requirement of UL 294 and therefore not verified by UL.

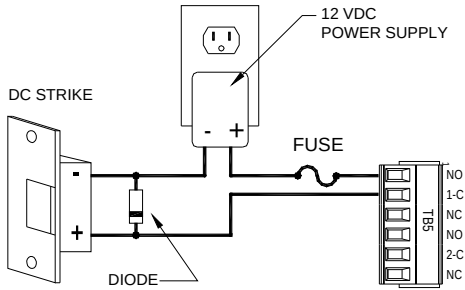
The input circuit wiring configurations shown are supported but may not be typical:



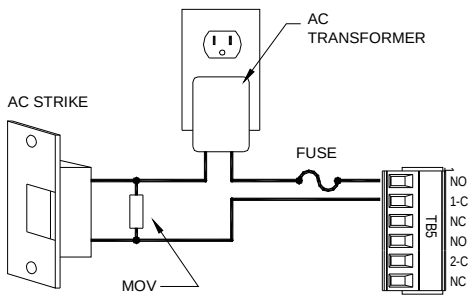
Relay Circuit Wiring

Two relays are provided for controlling door lock mechanisms or alarm signaling. The relay contacts are rated at 2A @ 30 VDC, dry contact configuration. Each relay has a Common pole (C), a Normally Open pole (NO) and a Normally Closed pole (NC). When you are controlling the delivery of power to the door strike, the Normally Open and Common poles are used. When you are momentarily removing power to unlock the door, as with a mag lock, the Normally Closed and Common poles are used. Check with local building codes for proper egress door installation.

Inductive door locking devices may induce relay contact arcing as the contact opens that can cause damage and premature failure of the relay. For this reason, it is recommended that either a diode or MOV (metal oxide varistor) be used to protect the relay. Wire should be of sufficient gauge to avoid voltage loss.



- **Diode Selection:** Diode current rating: 1x strike current. Diode breakdown voltage 4x strike voltage. For 12 VDC or 24 VDC strike, diode 1N4002 (100V/1A) typical.



- **MOV Selection:** Clamp voltage: 1.5x VAC RMS. For 24 VAC strike, Panasonic ERZ-C07DK470 typical.

Power

The LNL-2210 is powered in one of two ways:

- Power can be supplied via Ethernet connection using PoE, fully compliant to IEEE 802.3af.
- Or power can be supplied by a local 12 VDC power supply. Connect power with minimum of 18AWG wire at TB4-3 and TB4-4.

Installing Jumpers

Jumpers	Set at	Description
J1	n/a	Factory use only
J2	n/a	Factory use only
J3	PoE	The board is powered from the Ethernet connection.
	12V	The board is powered from an external 12VDC power source connected to TB4-3 (VIN), TB4-4 (GND).
J4	n/a	Factory use only
J5	n/a	Factory use only
J6	n/a	10Base-T/100Base-Tx Ethernet Connection (Port 0)
J7		Cabinet Tamper: normally open switch

Setting Dip Switches

The switches on S1 DIP switch configure the operating mode of the processor. DIP switches are read on power-up except where noted. Pressing switch S2 causes the board to reset.

Switch	Selection:
SW1	When SW1 is on, use the default login user name and password. (This can be changed without resetting the board.) User name: `admin` Password: `password`
SW2	During power up, when SW2 is on (and SW1 is off) for the first 10 seconds, the static IP address is 192.168.0.251, and the primary path is configured for IP Server.
SW3	By default this switch is off and SSL is enabled. Turn SW3 ON to disable SSL settings.
SW4	Not used.

Configuration via Web Page

The Configuration Web Page can be launched from within System Administration (only if an IP address or host name is specified) or by using a browser to access the programmed IP address. Depending on your proxy settings, you may have to allow this web page. (For more information, consult your browser's documentation or system administrator for assistance.)

1. In System Administration in the Access Panels folder, click [Configuration Web Page]. This page will launch in a browser. (You may also access this page by going to the device IP address from within the browser.)
2. Click the link to go to the login page. Log in using your user name and password. If DIP switch 1 is ON, then the default user name and password is used (`admin`, `password`). If DIP switch 1 is off, use the login that was programmed in the device. Click [Login].
3. The Home page indicates the type of device and has a Notes field. You may type in a description here. Click [Save Notes].
4. To configure network settings, click [Network].
   - If you are using DHCP, specify a host name. By default, the host name consists of “MAC” followed by the numbers of the device MAC address. With DHCP, IP settings will be configured automatically.
   - For a static IP address, specify the IP address, subnet mask, and default gateway.
   - Click [Accept].
5. To configure the host, click [Host Comm].
   a. Specify the controller’s communication address.
   b. Configure the following under Primary Host Port:
      – **Connection Type**: IP Server.
      – **Data Security**: The controller is capable of Password/AES encryption.
      – **Port Number** (default 3001) Must match setting in the access control software.

      When using an IP Server connection, the controller may be configured to allow all IP addresses or only authorized IP addresses.
   c. Click [Accept].
6. To view information, click [Device Info].

   You may view the time and product ID, as well as properties that have been configured, such as firmware version, serial number, device name, DIP switches, etc.
7. For users configuration, click [Users].

   User accounts may be created, edited or deleted. Each user account has an associated user name and password, as well as a level and notes.
   a. One of three different levels may be assigned to users.

– Level 1 — Full control
– Levels 2 and 3 have the following permissions:

Access	View allowed	Edit allowed
Home page	Level 2: Yes (cannot edit notes) Level 3: Yes (cannot edit notes)	Level 2: No Level 3: No
Network page	Level 2: Yes Level 3: No	Level 2: No Level 3: No
Host Port page	Level 2: Yes Level 3: No	Level 2: No Level 3: No
Device Info page	Level 2: Yes Level 3: Yes	n/a
Users page	Level 2: No Level 3: No	Level 2: No Level 3: No
Restore/Default page	Level 2: No Level 3: No	Level 2: No Level 3: No
Apply Setting page	Level 2: No Level 3: No	Level 2: No Level 3: No

For pages that cannot be viewed, the message is displayed when users attempt to access the page: “This page is unavailable due to one of the following reasons: your user level is not authorized to view this page, or another level 1 user is logged in at this time.”

b. Select the password strength.
   – Low - The minimum password length must be six characters. None of the password strength criteria will be enforced.
   – Medium - The minimum password length must be six characters. Two of the password strength criteria must be met.

– High - The minimum password length is eight characters. Three of the password strength criteria must be met. Additionally, strong passwords are checked to make sure that they are not based on the user name.

Password strength criteria:

– Uppercase alphabet characters
– Lowercase alphabet characters
– Arabic numerals (0-9)
– Non alphanumeric characters ` ! ? $ ^ * ( ) _ - + = { [}] : ; @ ~ # | < , > . ? /

Characters " , \, &, = and % are invalid characters and cannot be used for passwords.

c. Specify the Session Timer (5 to 60 minutes). Click [Save].

d. You may disable the web server by selecting the check box. When this option is selected and SW1 is off, all ports except for the host communication port will be disabled. The configuration web page cannot be used to access the device.

e. Select the **Enable door forced open filter** check box if you do not want a forced open alarm generated if the door is opened within three seconds of it being closed.

8. For configuration of auto-save, click [Auto-Save].

   a. On this page, you may restore the last save or clear all the settings.

   b. Choose to disable or enable Auto-Save. If Auto-Save is enabled, volatile memory is written to flash. The frequency of this action is specified in the timer (30 seconds to 30 minutes). Click [Save Settings].

9. You may click [Restore/Default] if you need to reload the factory settings or the current operating settings.

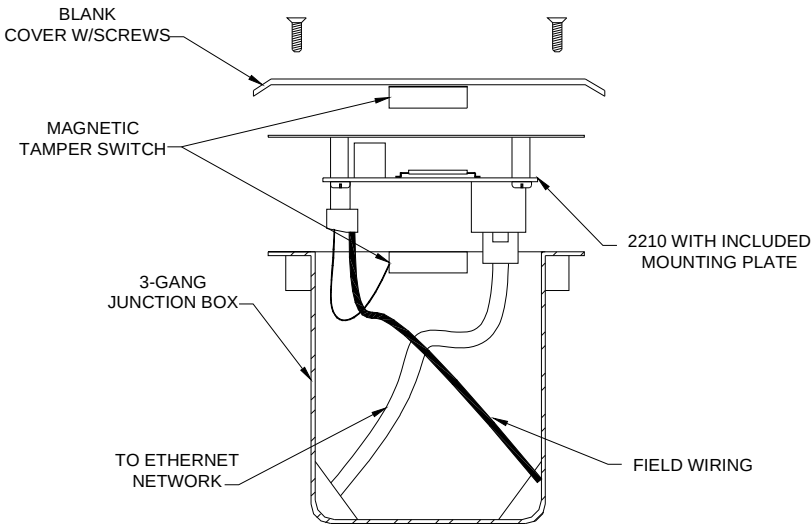
10. When you have completed configuring the device, click [Apply Settings], [Apply Settings, Reboot], and then [Log Out].

Additional Mounting Information

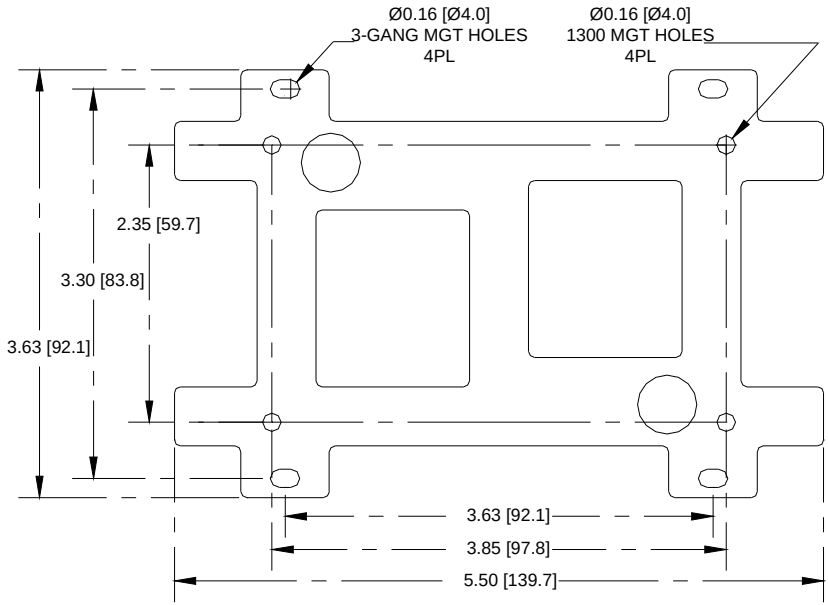
Sources for the optional items shown below:

- 3-gang stainless steel blank cover: Leviton part number 84033-40. Available from Graybar, part number 88158404
- Magnetic switch set: G.R.I. part number: 505

Side view


BLANK
COVER W/SCREWS
MAGNETIC
TAMPER SWITCH
2210 WITH INCLUDED
MOUNTING PLATE
3-GANG
JUNCTION BOX
TO ETHERNET
NETWORK
FIELD WIRING

Mounting plate dimensions



Status LEDs

Power-up: All LEDs OFF.

Initialization: LEDs 1, 2, 3, 4, 5, 6, and 7 are sequenced during initialization. LEDs 1, 3, and 4 are turned ON for approximately four seconds after the hardware initialization has completed, then the application code is initialized. The amount of time the application takes to initialize depends on the size of the database, about 3 seconds without a card database. Each 10,000 cards will add about 3 seconds to the application initialization. When LEDs 1, 2, 3 and 4 flash at the same time, data is being read from or written to flash memory, do not cycle power when in this state. If the sequence stops or repeats, perform the Bulk Erase Configuration Memory procedure. If clearing the memory does not correct the initialization problem, contact technical support.

Running: After initialization is complete, the LEDs have the following meanings: At power up, LEDs 2 through 7 are turned ON then OFF in sequence.

LED	Description
1	Off-line/On-line and battery status
	Off-line = 20% ON, On-line = 80% ON
	Double flash if battery is low
2	Host communication activity
3	Readers (Combined) Reader 1: Clock/Data or D1/D0 Mode = Flashes when Data is Received, Either Input. RS-485 Mode = Flashes when Transmitting Data
4	Input IN1 Status: OFF = Inactive, ON = Active, Flash = Trouble
5	Input IN2 Status: OFF = Inactive, ON = Active, Flash = Trouble
6	Cabinet tamper
7	Not used
YEL	Ethernet Speed: Off = 10Mb/S, ON = 100Mb/S
GRN	Off = no link, ON = good link, Flashing = Ethernet activity

Specifications

The interface is for use in low voltage, class 2 circuits only, and it is for use with UL Listed access control power limited power supplies. The installation of this device must comply with all local fire and electrical codes. These specifications are subject to change without notice.

- Power Input:
  - PoE power input 12.95 W, compliant to IEEE 802.3af or
  - 12 VDC ± 10%, 90 0mA maximum

Note: For UL installations, PoE powered devices shall not be used; power for these devices must be provided by a UL294 listed source (12VDC).

- Power Output (thermally protected)
  - Reader port 1:12 VDC @ 150 mA
  - Reader port 2: use AUX power port
  - AUX power port: used to power reader 2 and/or strike, not to exceed 650 mA
- SRAM Backup Battery: rechargeable battery, with battery life up to 10 years (not field replaceable)
- Host communication: Ethernet: 10Base-T/100Base-TX
- Inputs: 2 supervised, programmable end of line resistors, 1k/2k – ohm, 1% 1/4W watt standard, and dedicated tamper input.
- Relays: 2 outputs, Form-C contacts: 2 A @ 30 VDC
- Reader interface:
  - Reader power: 12 VDC ± 10% or local power supply (12 VDC). (PTC limited 150 mA max)
  - Reader data inputs: Two TTL reader ports
  - RS-485 mode: 9600 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit. Maximum cable length: 4000 feet (1,200 m).
  - LED output: TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum.
  - Buzzer output: Open collector, 5 VDC open circuit maximum, 10 mA sink maximum.
- Cable Requirements:
  - Power: 1 stranded twisted pair, 18 AWG
  - Ethernet: CAT 5 (minimum)
  - RS-485: 24AWG, 4,000 feet (1,200m) maximum, stranded twisted pair(s) with an overall shield.
  - Alarm Input: 1 stranded twisted pair per input, 30 ohm maximum loop resistance.
  - Reader data (TTL): 18 AWG stranded, 6 conductors, 500 feet (150 m) maximum

- Reader data (RS-485): 24 AWG, 120-ohm impedance, stranded twisted pair with shield, 4000 feet (1,219 m) maximum

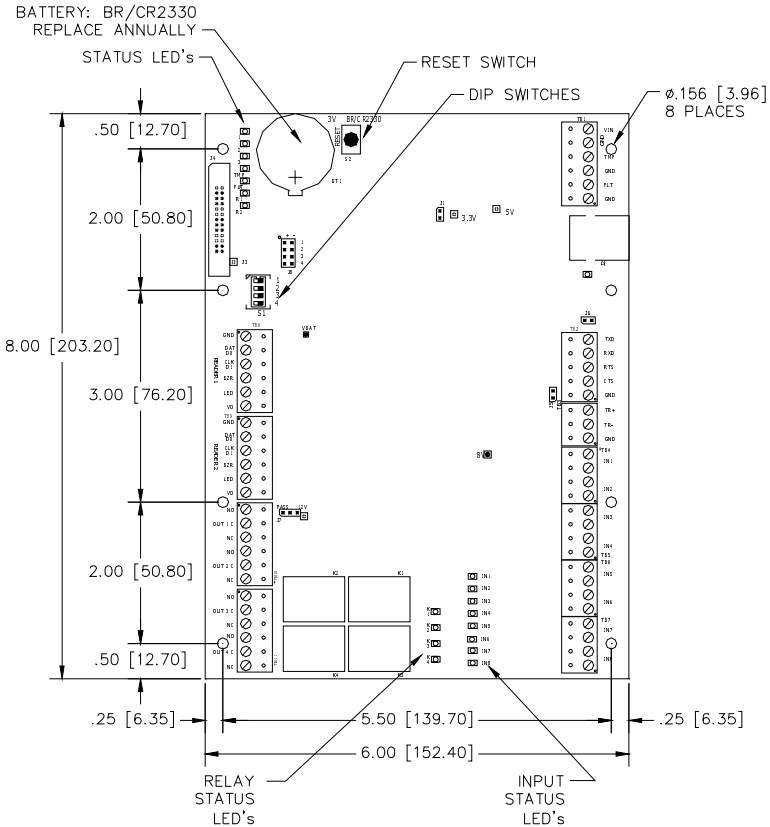
• Environmental:
  - Temperature: Operating: 0° to +70° C (32° to 158° F), Storage: -55° to 85° C (-67° to 185° F)
  - Humidity: 0 to 95% RHNC

• Mechanical:
  - Dimensions: 5.5 x 2.75 x 0.96 in. (140 x 70 x 24 mm)
  - Weight: 3.8 oz. (106.35 g) nominal, board only, 4.7 oz. (133.28 g) with bracket

• Certifications:
  - UL294 Recognized Component
  - FCC Part 15
  - CE marking
  - RoHS compliant
  - WEEE

Intelligent Dual Reader Controller LNL-2220

The Intelligent Dual Reader Controller (IDRC) provides a single board solution to control two doors. It holds the database for the hardware configuration, and card holder database in nonvolatile memory. The event log buffer is stored in battery backed memory. Two physical barriers can be controlled with the IDRC. Each reader port can accommodate a readhead that utilizes wiegand, magnetic stripe, or 2-wire RS-485 electrical signaling standards, one or two wire LED controls, and buzzer control (one wire LED mode only). Four form-c relay outputs may be used for strike control or alarm signaling. The relay contacts are rated at 5A @ 30 VDC, dry contact configuration. Eight supervised inputs are provided for monitoring the door contacts, exit push buttons and alarm contacts. Inputs can be configured to meet Grade A Supervision requirements. The LNL-2220 requires 12-24 VDC for power. It is recommended that the board be mounted 0.25 inch minimum above any conductive surface.


BATTERY: BR/CR2330
REPLACE ANNUALLY
STATUS LED's
RESET SWITCH
DIP SWITCHES
ø.156 [3.96]
8 PLACES
.50 [12.70]
2.00 [50.80]
8.00 [203.20]
3.00 [76.20]
2.00 [50.80]
.50 [12.70]
.25 [6.35]
5.50 [139.70]
.25 [6.35]
6.00 [152.40]
RELAY
STATUS
LED's
INPUT
STATUS
LED's

Wiring and Setup

Connection		
TB1	Power input	VIN: 12 to 24 VDC
		GND
	Cabinet tamper input	TMP
		GND
	Power fault input	FLT
		GND
TB2	Host port 1	TXD (RS-232)
		RXD (RS-232)
		RTS (RS-232)
		CTS (RS-232)
		GND (RS-232)
TB3	Downstream port	TR+ (2-wire RS-485)
		TR- (2-wire RS-485)
		GND(2-wire RS-485)
TB4	Input 1	IN 1 Door 1 door contact
	Input 2	IN 2 Door 1 REx

Connection (Continued)		
TB5	Input 3	IN 3 Door 1 Aux 1
	Input 4	IN 4 Door 1 Aux 2
TB6	Input 5	IN 5 Door 2 door contact
	Input 6	IN 6 Door 2 REx
TB7	Input 7	IN 7 Door 2 Aux 1
	Input 8	IN 8 Door 2 Aux 2
TB8	Reader 1 (current maximum: 150mA)	GND: Ground
		Data/Data 0/RS-485 TR-
		Clock/Data 1/RS-485 TR+
		BZR: Reader buzzer/LED 2
		LED: Reader LED 1
		VO: Reader power

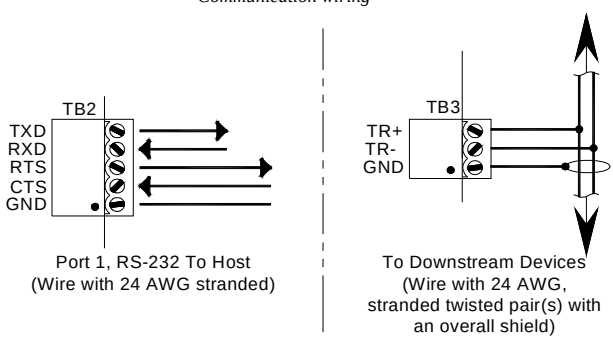
Connection (Continued)		
TB9	Reader 2 (current maximum: 150mA)	GND: Ground
		Data/Data 0/RS-485 TR-
		Clock/Data 1/RS-485 TR+
		BZR: Reader buzzer/LED 2
		LED: Reader LED 1
		VO: Reader power
TB10	Out 1 Door 1 strike	NO: Normally open contact
		C: Common
		NC: Normally closed contact
	Out 2 Door 1 Aux	NO: Normally open contact
		C: Common
		NC: Normally closed contact
TB11	Out 3 Door 2 strike	NO: Normally open contact
		C: Common
		NC: Normally closed contact
	Out 4 Door 2 Aux	NO: Normally open contact
		C: Common
		NC: Normally closed contact

Communication Wiring

The controller communicates to the host via the on-board 10Base-T/100Base-TX Ethernet interface (port 0) and/or RS-232 interface (port 1). The RS-232 interface is for direct one to one connection to a host computer port or via modem, 50 feet maximum. The downstream communication port (TB3) is a 2-wire RS-485 interface which can be used to connect additional I/O panels. The interface allows multi-drop communication on a single bus of up to 4000 feet (1200 m). Use twisted pairs (minimum 24 AWG) with an overall shield for communication.

Install the termination jumper ONLY on the panel at each end of the RS-485 bus. Failure to do so will compromise the proper operation of the communication channel!

Communication wiring



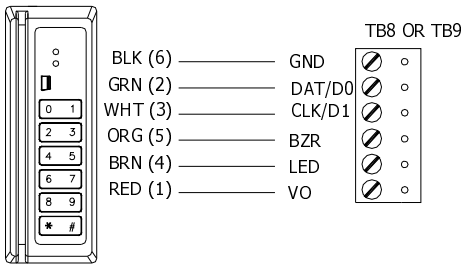
Reader Wiring

Each reader port supports wiegand, magnetic stripe, and 2-wire RS-485 electrical interfaces. Voltage at the reader port (VO) is passed-through from the input voltage of the controller (TB1-VIN) and is current limited to 150mA for each reader port. Readers that require different voltage or have high current

requirements should be powered separately. In the 2-wire LED mode, the Buzzer output in used to drive the second LED. Reader port configuration is set via the host software.

12V	12 VDC is available on reader ports (VIN is greater than or equal to 20 VDC).
PASS	VIN power is “passed through” to reader ports.

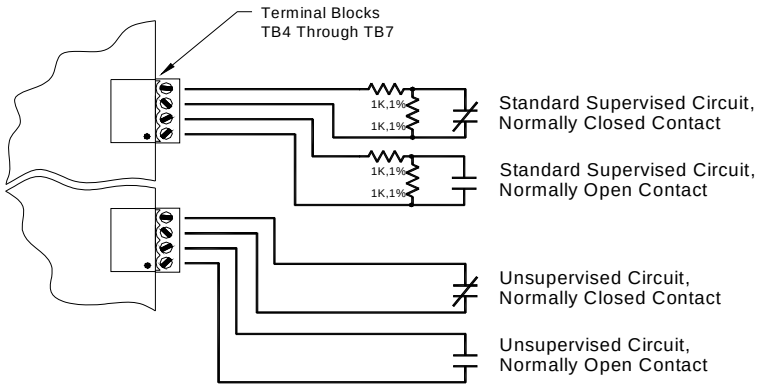
DATA1/DATA0 – CLOCK/DATA



Input Circuit Wiring

Typically, these inputs are used to monitor door position, request to exit, or alarm contacts.When unsupervised, reporting consists of only the open or closed states. When configured as supervised, the input circuit will report not only open and closed, but also open circuit, shorted, grounded, and foreign voltage.

A supervised input circuit requires two resistors be added to the circuit to facilitate proper reporting. The standard supervised circuit requires 1K Ohm, 1% resistors and should be located as close to the sensor as possible. Custom EOL resistances may be configured via the host software.



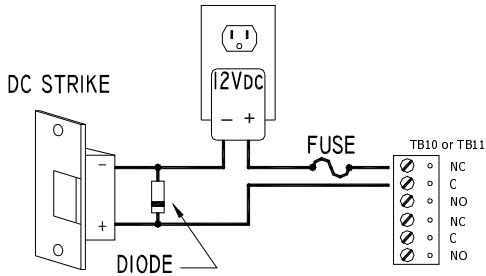
Wire with 22 AWG stranded twisted pair.

Relay Circuit Wiring

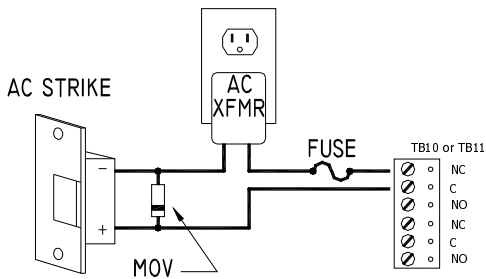
Four relays are provided for controlling door lock mechanisms or alarm signaling. The relay contacts are rated at 5A @ 30 VDC, dry contact configuration. Each relay has a Common pole (C), a Normally Open pole (NO) and a Normally Closed pole (NC). When you are controlling the delivery of power to the door strike, the Normally Open and Common poles are used. When you are momentarily removing power to unlock the door, as with a mag lock, the Normally Closed and Common poles are used. Check with local building codes for proper egress door installation.

Door lock mechanisms can generate feedback to the relay circuit that can cause damage and premature failure of the relay. For this reason, it is recommended that either a diode or MOV (metal oxide varistor) be used to protect the relay.

Wire should be of sufficient guage to avoid voltage loss.



- **Diode Selection:** Diode current rating: 1x strike current. Diode breakdown voltage 4x strike voltage. For 12 VDC or 24 VDCstrike, diode 1N4002 (100V/1A) typical.



- **MOV Selection:** Clamp voltage: 1.5x VAC RMS. For 24 VAC strike, Panasonic ERZC07DK470 typical.

Power and Alarm Inputs

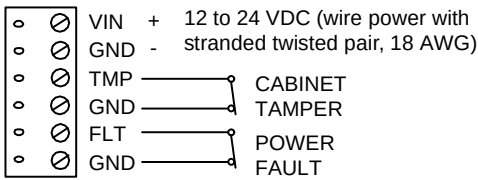
The LNL-2220 requires 12-24 VDC power. Locate power source as close to the unit as possible. Connect power with minimum of 18AWG wire.

Note: Connect the GND signal to earth ground in ONE LOCATION within the system! Multiple earth ground connections may cause ground loop problems and is not advised.

Observe POLARITY on 12-24 VDC input!

There are two dedicated inputs for cabinet tamper and UPS fault monitoring. Normal (safe) condition is a closed contact. If these inputs are not used, install a jumper wire.

Wiring for power, power fault, and cabinet tampering



Setting DIP Switches

Switch	Selection:
SW1	When SW1 is on, use the default login username and password. (This can be changed without resetting the board.) Username: `admin` Password: `password`
SW2	During power up, when SW2 is on (and SW1 is off) for the first 10 seconds, the default static IP address is 192.168.0.251, and the primary path is configured for IP Server, and the secondary path is configured for RS-232 at 38400 bps. When powering up the board with both SW1 and SW2 set to on for 10 seconds, the default communication setting for Lenel's OEM code is DHCP enabled.
SW3	When SW3 is on, it is used to disable SSL settings.
SW4	Not used.

Note: To clear the flash and ram on the board using DIP switches, set SW1 and SW2 to on and power up the board. Within 10 seconds, drop either of the switches (SW1 or SW2) to off.

Installing Jumpers

Jumpers	Set at	Description
J1	n/a	Factory use only
J2	n/a	10base-T/100base-Tx Ethernet Connection (Port 0)
J3	n/a	Factory use only
J4	n/a	Factory use only
J5	off	Port 2 RS-485 EOL terminator is off.
	ON	Port 2 RS-485 terminator is ON.
J6	n/a	Factory use only
J7	Reader power select * See Note 1 *	
	12V	12 VDC at reader ports
	PASS	VIN pass through to reader ports
J8-1	n/a	Remote status LED #1 ** See Note 2 **
J8-2	n/a	Remote status LED #2 ** See Note 2 **
J8-3	n/a	Remote status LED #3 ** See Note 2 **
J8-4	n/a	Remote status LED #4 ** See Note 2 **

* Note 1: The input power (VIN) must be 20 VDC minimum if the 12 VDC selection is to be used.

** Note 2: Observe POLARITY connection to LED. External current limiting is not required.

Configuration via Web Page

The IDRC is configured through the web interface.

The Configuration Web Page can be launched from within System Administration (only if an IP address or host name is specified) or by using a browser to access the programmed IP address. Depending on your

proxy settings, you may have to allow this web page. (For more information, consult your browser's online help or system administrator for assistance.)

1. In System Administration in the Access Panels folder, click [Configuration Web Page]. This page will launch in a browser. (You may also access this page by going to the device IP address from within the browser.)
2. Click the link to go to the login page. Log in using your username and password. If DIP switch 1 is ON, then the default username and password is used (`admin`, `password`). If DIP switch 1 is off, use the login that was programmed in the device. Click [Login].
3. The Home page indicates the type of device and has a Notes field. You may type in a description here. Click [Save Notes].
4. To configure network settings, click [Network].
   a. If you are using DHCP, specify a host name. By default, the host name consists of "MAC" followed by the numbers of the device MAC address. With DHCP, IP settings will be configured automatically.
   b. For a static IP address, specify the IP address, subnet mask, and default gateway.
   c. Click [Accept].
5. To configure the host, click [Host Comm].
   a. Specify the controller's communication address.
   b. Configure the following:
      – **Connection Type**: Choose IP Server, Serial-RS232, or Serial-modem. Currently the IP Client connection type is not supported.
      – **Data Security**: The controller is capable of Password/AES encryption.
      – **Port Number** (default 3001) Must match setting in the access control software.

      When using an IP Server connection, the controller may be configured to allow all IP addresses or only authorized IP addresses.
   c. Click [Accept].
6. To view information, click [Device Info].

   You may view the time and product ID, as well as properties that have been configured, such as firmware version, serial number, OEM code, device name, DIP switches, etc.

7. For users configuration, click [Users].

   User accounts may be created, edited or deleted. Each user account has an associated username and password, as well as a level and notes.

   a. One of three different levels may be assigned to users.

      – Level 1 — Full control
      – Levels 2 and 3 have the following permissions:

Access	View allowed	Edit allowed
Home page	Level 2: Yes (cannot edit notes) Level 3: Yes (cannot edit notes)	Level 2: No Level 3: No
Network page	Level 2: Yes Level 3: No	Level 2: No Level 3: No
Host Port page	Level 2: Yes Level 3: No	Level 2: No Level 3: No
Device Info page	Level 2: Yes Level 3: Yes	n/a
Users page	Level 2: No Level 3: No	Level 2: No Level 3: No
Restore/Default page	Level 2: No Level 3: No	Level 2: No Level 3: No
Apply Setting page	Level 2: No Level 3: No	Level 2: No Level 3: No

   For pages that cannot be viewed, the message is displayed when users attempt to access the page: “This page is unavailable due to one of the following reasons: your user level is not authorized to view this page, or another level 1 user is logged in at this time.”

   b. Select the password strength.

   c. Specify the Session Timer (5 to 60 minutes). Click [Save]

   d. You may disable the web server by selecting the check box. When this option is selected and SW1 is off, all ports except for the host communication port will be disabled. The configuration web page cannot be used to access the device.

e. Select the **Enable door forced open filter** check box if you do not want a forced open alarm generated if the door is opened within three seconds of it being closed.

8. For configuration of auto-save, click [Auto-Save Config].
   a. On this page, you may restore the last save or clear everything.
   b. Choose to disable or enable Auto-Save. If Auto-Save is enabled, volatile memory is written to flash. The frequency of this action is specified in the timer (30 seconds to 30 minutes). Click [Save Settings].
9. You may click [Restore/Default] if you need to reload the factory settings or the current operating settings.
10. When you have completed configuring the device, click [Apply Setting], [Apply, Reboot], and then [Log Out].

Verification

Power-up: All LEDs OFF.

Initialization: LEDs are sequenced during initialization.

The following chart describes the purpose of each LED on the IDRC board.

LED	Description
1	Off-line/On-line and battery status
	Off-line = 20% ON, On-line = 80% ON
	Double flash if battery is low
2	Primary host communication activity (serial port 1)
3	Internal downstream communication activity
TMP	External downstream communication activity
FLT	Undefined
R1	Reader 1: Clock/Data or D1/D0 mode = flashes when data is received, either input. RS-485 mode = flashes when transmitting data

LED	Description
R2	Reader 2: Clock/Data or D1/D0 mode = flashes when data is received, either input. RS-485 mode = flashes when transmitting data
D16	Flashes with host communication (Ethernet port 0)
YEL	Ethernet Speed: OFF = 10Mb/S, ON = 100Mb/S
GRN	Off = no link, ON = good link, Flashing = Ethernet activity
IN1	Input IN1 Status: Off = Inactive, ON = Active, Flash = Trouble
IN2	Input IN2 Status: Off = Inactive, ON = Active, Flash = Trouble
IN3	Input IN3 Status: Off = Inactive, ON = Active, Flash = Trouble
IN4	Input IN4 Status: Off = Inactive, ON = Active, Flash = Trouble
IN5	Input IN5 Status: Off = Inactive, ON = Active, Flash = Trouble
IN6	Input IN6 Status: Off = Inactive, ON = Active, Flash = Trouble
IN7	Input IN7 Status: Off = Inactive, ON = Active, Flash = Trouble
IN8	Input IN8 Status: Off = Inactive, ON = Active, Flash = Trouble
K1	Relay K1: ON = energized
K2	Relay K2: ON = energized
K3	Relay K3: ON = energized
K4	Relay K4: ON = energized

Specifications

The IDRC is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary Power: 12 to 24 VDC ±10%, 500 mA maximum (plus reader current)
  - 12 VDC @ 250 mA (plus reader current) nominal
  - 24 VDC @ 150 mA (plus reader current) nominal
- Memory and Clock Backup: 3 V Lithium (Rayovac BR2325 or Wuhan Lixing CR2330)
- Host communication: Ethernet: 10Base-T/100Base-TX, and RS-232 9600 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit.
- Downstream communication: 2-wire RS-485, 2400-38400 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit.
- Inputs:
  - 2 unsupervised, dedicated for tamper and UPS fault monitoring
  - 8 unsupervised/supervised, standard EOL: 1k/1k ohm. Four custom EOL's are available (host software dependent).
- Relays: Four, Form-C, 5 A @ 30 VDC, resistive
- Reader interface:
  - Reader power (jumper selectable): 12 VDC ±10% regulated, current limited to 150mA for each reader or 12 to 24 VDC ±10% (input voltage passed through) current limited to 150mA for each reader.
  - Data inputs: TTL compatible inputs, mag stripe and wiegand standards supported
  - RS-485 mode: 9600 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit.
  - LED output: TTL levels, high > 3V, low < 0.5 V, 5mA source/sink max.
  - Buzzer output: TTL levels, high > 3V, low < 0.5 V, low=active, 5mA source/sink max.
- Cable Requirements:
  - Power: 1 stranded twisted pair, 18 AWG
  - Ethernet: Cat 5
  - RS-485: 24 AWG, stranded twisted pair(s) with an overall shield, 4000 feet (1219 m) maximum
  - RS-232: 24 AWG stranded, 50 feet (15.24 m) maximum
  - Alarm Input: stranded twisted pair, 30 ohms maximum, typically 22 AWG @ 1000 feet (300 m)
- Environmental:
  - Temperature: 32 to 158° F(0 to 70° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC

- Mechanical:
  - Dimensions: 8 x 6 x 1 in. (203.2 x 152.4 x 25 mm)
  - Weight: 9 oz. (255 g) nominal, board only
- Certifications:
  - UL294 and UL1076 Listed, ULC Listed
  - FCC Part 15
  - C-Tick
  - FIPS 197 Certificate #766
  - CE marking
  - RoHS compliant
  - WEEE

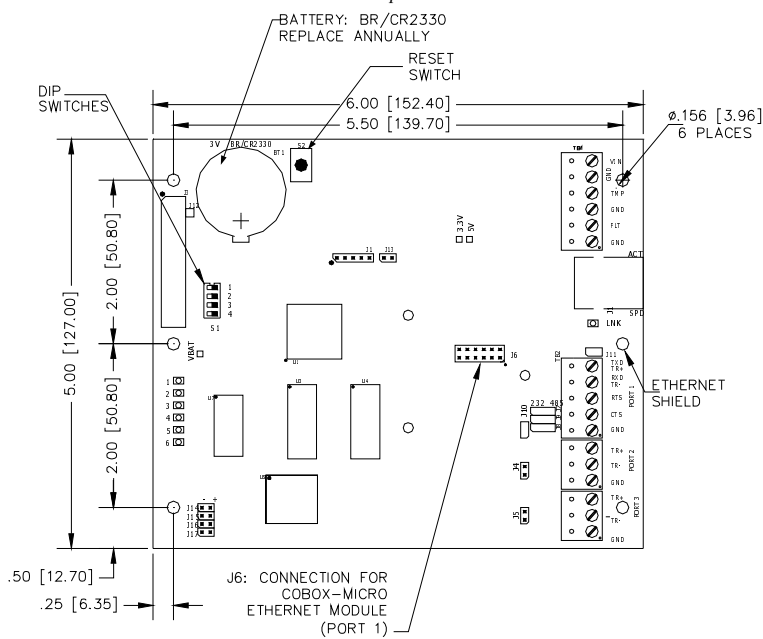
Intelligent System Controller LNL-3300

The LNL-3300 provides the real time processing for the I/O interfaces connected to it. The database for the subsystem configuration and card holders are stored in flash memory. The event log buffer is stored in battery backed memory. Configuration data and event/status reports are communicated to the host via on-board 10BaseT/100BaseTX Ethernet port or port 1.

The ISC interfaces upstream with the access control software on a host system. This communication occurs through an on-board 10BaseT/100BaseTX Ethernet port or port 1. Port 1 may be set up as RS-232, 2-wire RS-485 or an optional 10BaseT/100BaseTX using a Lantronix CoBox-Micro interface daughter board.

Downstream devices are connected via ports 2 and 3 using 2-wire RS-485.

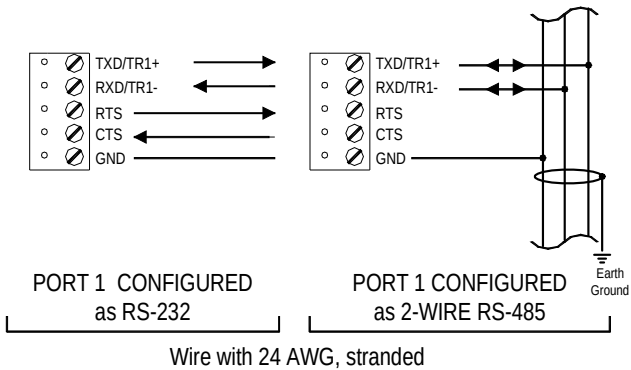
LNL-3300 Components



Communication Wiring

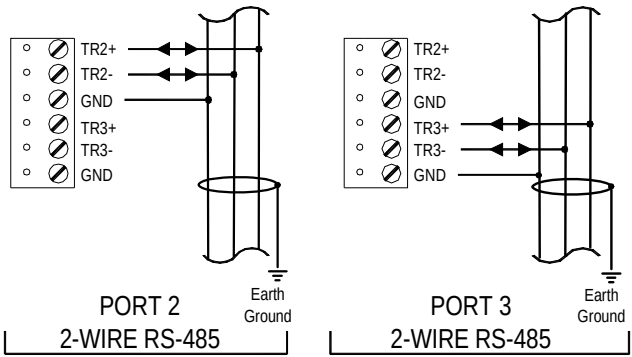
The ISC communicates to the host via: on-board Ethernet 10Base-T/100Base100-TX port or on port 1. Port 1 may be configured as RS-232, 2-wire RS-485 or optional Lantronix Ethernet 10baseT/100Base-TX CoBox-Micro interface. RS-232 interface is for direct one to one connection to a host computer port, or a modem.

Wiring port 1



Ports 2 and 3 utilize 2-wire RS-485 interface only. The interface allows multi-drop communication on a single bus of up to 4,000 feet (1,200 m). Use twisted pair (minimum 24 AWG) with shield for the communication with 120 ohm impedance. Install termination jumpers only at the end of line unit.

Wiring ports 2 and 3



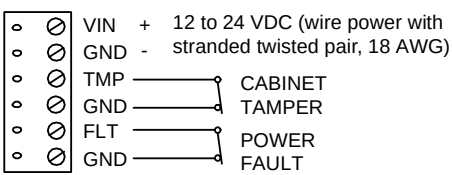
Wire with 24 AWG, stranded

Power and Alarm Inputs

The LNL-3300 accepts 12 to 24 VDC for power. Locate power source as close to the unit as possible. Connect power with minimum of 18 AWG wires. Inputs TMP and FLT are used for monitoring cabinet tamper and power failure with normally closed contacts. These two inputs are for contact closure monitoring only, and do not use EOL resistor(s). If these inputs are not used, install a short piece of wire at the input to indicate safe condition.

Observe POLARITY on VIN!

Wiring for power, power fault, and cabinet tampering



Setting DIP Switches

Switch	Selection:
SW1	When SW1 is on, use the default login username and password. (This can be changed without resetting the board.) Username: `admin` Password: `password`
SW2	During power up, when SW2 is on (and SW1 is off) for the first 10 seconds, the default static IP address is 192.168.0.251, and the primary path is configured for IP Server, and the secondary path is configured for RS-232 at 38400 bps. When powering up the board with both SW1 and SW2 set to on for 10 seconds, the default communication setting for Lenel's OEM code is DHCP enabled.
SW3	When SW3 is on, it is used to disable SSL settings.
SW4	Not used.

Note: To clear the flash and ram on the board using DIP switches, set SW1 and SW2 to on and power up the board. Within 10 seconds, drop either of the switches (SW1 or SW2) to off

Installing Jumpers

Jumpers	Set at	Description
J2	n/a	Factory use only
J3	n/a	Factory use only
J4	off	Port 2 RS-485 EOL terminator is off.
	ON	Port 2 RS-485 terminator is ON.
J5	off	Port 3 RS-485 EOL terminator is off.
	ON	Port 3 RS-485 terminator is ON.
J6	n/a	Lantronix CoBox-micro connection - port 1
J7, J8, J9	232	Port 1 is RS-232
	485	Port 1 is RS-485
J10	off	Port 1 RS-485 EOL terminator is off.
	ON	Port 1 RS-485 terminator is ON.
J11	n/a	Factory use only
J12	n/a	Factory use only
J13	n/a	Factory use only
J14	n/a	Remote status LED #1 (see note below)
J14	n/a	Remote status LED #2 (see note below)
J15	n/a	Remote status LED #3 (see note below)
J16	n/a	Remote status LED #4 (see note below)

Note: Observe POLARITY connection to LED. External current limiting is not required.

Configuration via Web Page

The Configuration Web Page can be launched from within System Administration (only if an IP address or host name is specified) or by using a browser to access the programmed IP address. Depending on your proxy settings, you may have to allow this web page. (For more information, consult your browser's online help or system administrator for assistance.)

1. In System Administration in the Access Panels folder, click [Configuration Web Page]. This page will launch in a browser. (You may also access this page by going to the device IP address from within the browser.)
2. Click the link to go to the login page. Log in using your username and password. If DIP switch 1 is ON, then the default username and password is used (`admin`, `password`). If DIP switch 1 is off, use the login that was programmed in the device. Click [Login].
3. The Home page indicates the type of device and has a Notes field. You may type in a description here. Click [Save Notes].
4. To configure network settings, click [Network].
   a. If you are using DHCP, specify a host name. By default, the host name consists of "MAC" followed by the numbers of the device MAC address. With DHCP, IP settings will be configured automatically.
   b. For a static IP address, specify the IP address, subnet mask, and default gateway.
   c. Click [Accept].
5. To configure the host, click [Host Comm].
   a. Specify the controller's communication address.
   b. Configure the following:
      – **Connection Type**: Choose IP Server, Serial-RS232, or Serial-modem, Serial-RS485 (LNL-3300 only) and Serial-Cobox (LNL-3300 only). Currently the IP Client connection type is not supported.
      – **Data Security**: The controller is capable of Password/AES encryption.
      – **Port Number** (default 3001) Must match setting in the access control software.

      When using an IP Server connection, the controller may be configured to allow all IP addresses or only authorized IP addresses.
   c. Configure an alternate host port if needed. If you opt NOT to use dual path communication, set this to **Disabled**.

d. Click [Accept].

6. To view information, click [Device Info].

   You may view the time and product ID, as well as properties that have been configured, such as firmware version, serial number, OEM code, device name, DIP switches, etc.

7. For users configuration, click [Users].

   User accounts may be created, edited or deleted. Each user account has an associated username and password, as well as a level and notes.

   a. One of three different levels may be assigned to users.

      – Level 1 — Full control
      – Levels 2 and 3 have the following permissions:

Access	View allowed	Edit allowed
Home page	Level 2: Yes (cannot edit notes) Level 3: Yes (cannot edit notes)	Level 2: No Level 3: No
Network page	Level 2: Yes Level 3: No	Level 2: No Level 3: No
Host Port page	Level 2: Yes Level 3: No	Level 2: No Level 3: No
Device Info page	Level 2: Yes Level 3: Yes	n/a
Users page	Level 2: No Level 3: No	Level 2: No Level 3: No
Restore/Default page	Level 2: No Level 3: No	Level 2: No Level 3: No
Apply Setting page	Level 2: No Level 3: No	Level 2: No Level 3: No

For pages that cannot be viewed, the message is displayed when users attempt to access the page: “This page is unavailable due to one of the following reasons: your user level is not authorized to view this page, or another level 1 user is logged in at this time.”

b. Select the password strength.

c. Specify the Session Timer (5 to 60 minutes). Click [Save]

d. You may disable the web server by selecting the check box. When this option is selected and SW1 is off, all ports except for the host communication port will be disabled. The configuration web page cannot be used to access the device.

e. Select the **Enable door forced open filter** check box if you do not want a forced open alarm generated if the door is opened within three seconds of it being closed.

8. For configuration of auto-save, click [Auto-Save Config].

   a. On this page, you may restore the last save or clear everything.

   b. Choose to disable or enable Auto-Save. If Auto-Save is enabled, volatile memory is written to flash. The frequency of this action is specified in the timer (30 seconds to 30 minutes). Click [Save Auto-Save Timer].

9. You may click [Restore/Default] if you need to reload the factory settings or the current operating settings.

10. When you have completed configuring the device, click [Apply Setting], [Apply, Reboot], and then [Log Out].

Verification

The ISC board contains six status LEDs that can be used to verify correct installation after power up.

The following chart describes the purpose of each LED on the ISC board.

Initialization :

LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	Purpose
ON	off	off	off	off	off	Basic processor initialization
ON	ON	off	off	off	off	Internal SRAM test
ON	off	ON	off	off	off	External flash test
ON	ON	ON	off	off	off	External SDRAM, first chip test
ON	off	off	ON	off	off	External SDRAM, second chip test
ON	ON	off	ON	off	off	External SRAM test
ON	off	ON	ON	off	off	External EEPROM test
ON	ON	ON	ON	off	off	External RTC test
ON	off	off	off	ON	off	Backup battery ABD reset circuit test
ON	ON	off	off	ON	off	UART test
ON	off	ON	off	ON	off	Ethernet interface, MII

Run time :

LED	Description
1	Off-line/on-line and battery status
	Off-line = 20% ON. On-line = 80% ON
	Double flash if battery is low
2	Primary host communication activity (Ethernet or port 1)
3	Port 2 communication activity
4	Port 3 communication activity
5	ON = writing to flash memory. *Do not remove power when ON*.
6	TBD
SPD	On-board Ethernet speed: off = 10 Mb/S, ON = 100 Mb/S
ACT	Off = no on-board Ethernet activity, ON = Ethernet activity (yellow LED)
LNK	Off = no link, ON = good link (green LED)

Specifications

** The ISC is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

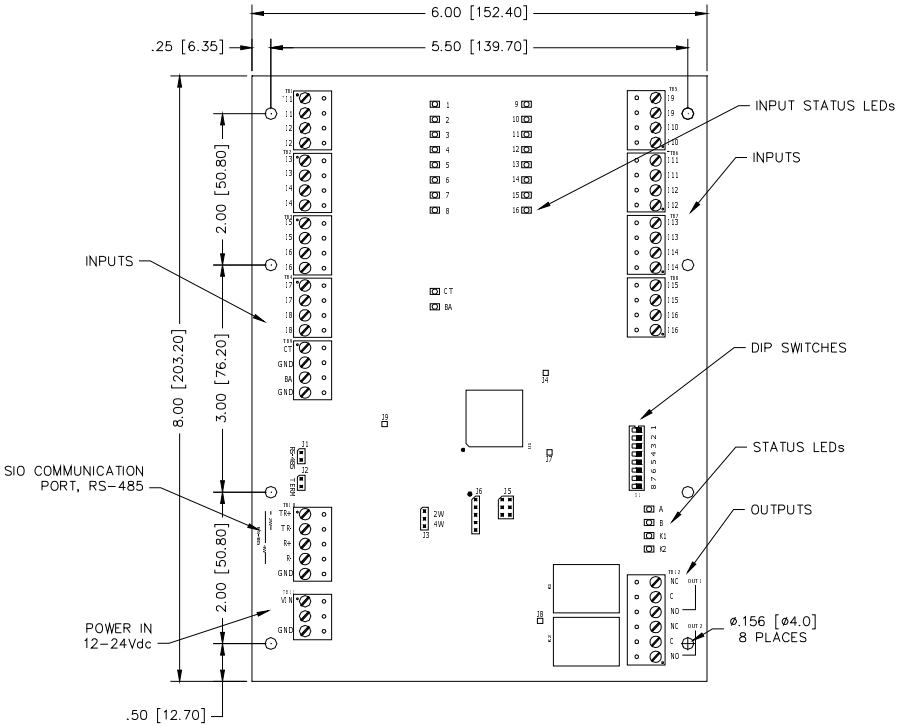
- Primary Power: 12 to 24 VDC ±10%, 300 mA maximum
  - 12VDC @ 240 mA (325 mA with CoBox-Micro) nominal
  - 24VDC @ 135 mA (175 mA with CoBox-Micro) nominal
- Memory and Clock Backup: 3 V Lithium (Rayovac BR2325 or Wuhan Lixing CR2330)
- Communication Ports:
  - Port 1: RS-232 or 2-wire RS-485: 9,600 to 115,200 bps, async
  - Ports 2 and 3: 2-wire RS-485: 2,400 to 38,400 bps, async
- Inputs: two non-supervised, dedicated for cabinet tamper and power fault monitoring
- Cable Requirements:
  - Power: 1 stranded twisted pair, 18 AWG
  - RS-485: 24 AWG stranded twisted pair(s) with shield, 4000 feet (1219 m) maximum, 120 Ohm
  - RS-232: 24 AWG stranded, 50 feet (15.24 m) maximum
  - Ethernet: Cat 5
  - Alarm inputs: stranded twisted pair, 30 ohms maximum
- Environmental:
  - Temperature: 32 to 158° F(0 to 70° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC
- Mechanical:
  - Dimension: 5 in. x 6 in. x 1 in. (127 x 152.4 x 25mm)
  - Weight: 4.1 oz. (115 g) nominal
- Lantronix NIC support: Standoff size - Diameter .125 inch x 7/16 inch long. Richco Plastics part number LMSP-7-01, 3 pieces (Not supplied)
- Certifications:
  - UL294 and UL1076 Listed, ULC Listed
  - FCC Part 15
  - C-Tick
  - FIPS 197 Certificate #767
  - CE marking
  - RoHS compliant
  - WEEE

Input Control Module LNL-1100 Series 2

The Lenel Input Control Module (ICM) provides the access control system with high-speed acknowledgement of critical alarm points in monitored areas. The ICM communicates directly with the Intelligent System Controller (ISC) either by RS-485 communication. The ICM has 16 configurable input control points and 2 output control relays. It supports normally open, normally closed, supervised and non-supervised circuits.

The input circuits are scanned using an analog to digital converter. The digitized input status signal is software monitored and controlled, so that each input point can be programmed as a supervised or non-supervised alarm point.

LNL-1100 Components



Status LEDs

The series 2 Input Control Module contains LEDs that can be used to verify correct installation after power up.

Power-up: All LED's OFF.

Initialization: Once power is applied, initialization of the module begins.

The A LED is turned on at the beginning of initialization. If the application program cannot be run, the A LED will flash at a rapid rate. The ICM is waiting for firmware to be downloaded.

When initialization is completed, LEDs 1 through 16, CT and BA are briefly sequenced ON then OFF.

Run time: After the above sequence, the LEDs have the following meanings:

A LED: Heartbeat and On-Line Status:

- Off-line: 1 second rate, 20% ON
- On-line: 1 second rate, 80% ON

B LED: Communication Port Status:

- Indicates communication activity on the communication port

1 LED: Input Status: 1
2 LED: Input Status: 2
3 LED: Input Status: 3
4 LED: Input Status: 4
5 LED: Input Status: 5
6 LED: Input Status: 6
7 LED: Input Status: 7
8 LED: Input Status: 8
9 LED: Input Status: 9
10 LED: Input Status: 10
11 LED: Input Status: 11
12 LED: Input Status: 12
13 LED: Input Status: 13
14 LED: Input Status: 14
15 LED: Input Status: 15
16 LED: Input Status: 16
CT: Cabinet Tamper
BA: Power Fault

Input in the inactive state: OFF (briefly flashes ON every 3 seconds)

Input in the active state: ON (briefly flashes OFF every 3 seconds)

Input in a fault state: Rapid Flash

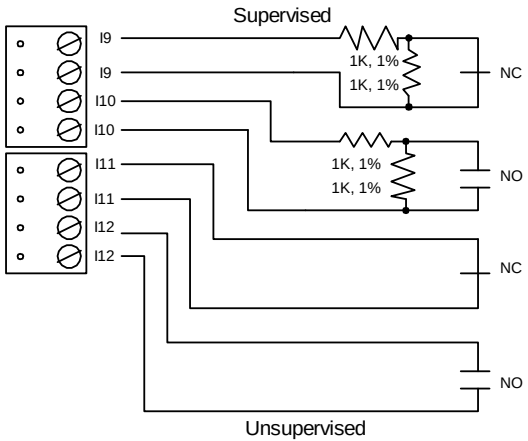
LED K1 and K2: correspond to output relay RLY 1 (K1) or RLY 2 (K2) is energized.

Unsupervised Alarm Inputs

Wire the BA (power fault) and CT (cabinet tamper) inputs using a twisted pair cable, 30 ohms maximum (no EOL resistors required). If either of these inputs is not used, a shorting wire should be installed.

Software Configurable Alarm Inputs

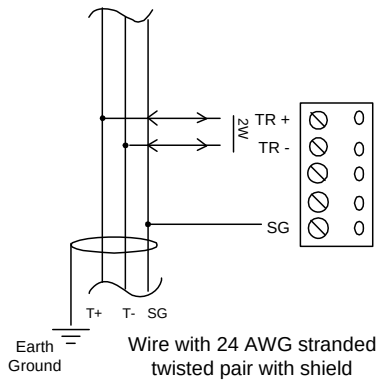
Each input that is configured as a supervised alarm must be terminated with two (2) 1000-ohm resistors (1% tolerance - 0.25 watt. N/O and N/C alarms are terminated identically).



Upstream Controller Communication

The Input Control Module uses Port 1 to communicate to the Intelligent System Controller. The RS-485 is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit.

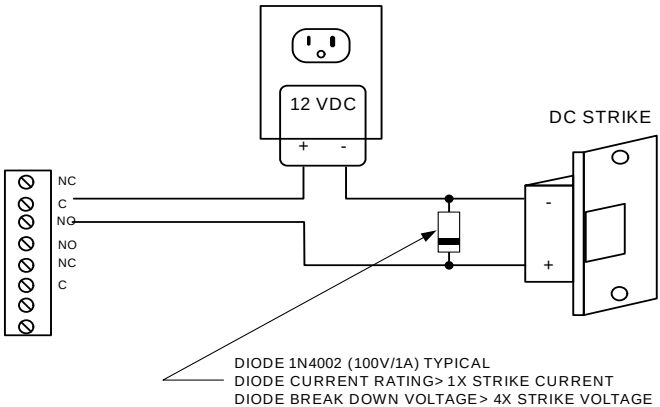
RS-485 2-WIRE COMMUNICATIONS

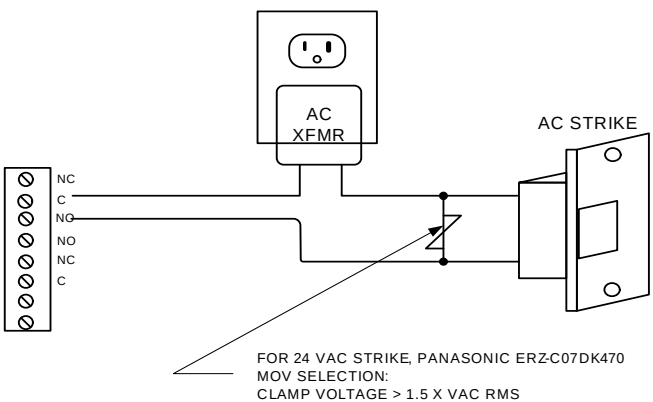


Relay Outputs

Two form-C contact relays are provided for controlling door strikes or other devices. Load switching can cause abnormal contact wear and premature contact failure. Switching of inductive loads (strike) also causes EMI (electromagnetic interference) which may interfere with normal operation of other equipment. To minimize premature contact failure and to increase system reliability, contact protection circuit must be used. The following two circuits are recommended. Locate the protection circuit as close to the load as

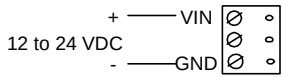
possible (within 12 inches [30cm]), as the effectiveness of the circuit will decrease if it is located further away. Use sufficiently large gauge of wires for the load current as to avoid voltage loss.





Power

The ICM accepts 12 to 24 VDC for power. Locate power source as close to the unit as possible. Connect power with minimum of 18AWG wires.



Wire with 18 AWG
stranded twisted pair.

DIP Switches

Device Address

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
0	off	off	off	off	off
1	off	off	off	off	ON
2	off	off	off	ON	off
3	off	off	off	ON	ON
4	off	off	ON	off	off
5	off	off	ON	off	ON
6	off	off	ON	ON	off
7	off	off	ON	ON	ON
8	off	ON	off	off	off
9	off	ON	off	off	ON
10	off	ON	off	ON	off

Device Address (Continued)

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
11	off	ON	off	ON	ON
12	off	ON	ON	off	off
13	off	ON	ON	off	ON
14	off	ON	ON	ON	off
15	off	ON	ON	ON	ON
16	ON	off	off	off	off
17	ON	off	off	off	ON
18	ON	off	off	ON	off
19	ON	off	off	ON	ON
20	ON	off	ON	off	off
21	ON	off	ON	off	ON
22	ON	off	ON	ON	off
23	ON	off	ON	ON	ON
24	ON	ON	off	off	off
25	ON	ON	off	off	ON
26	ON	ON	off	ON	off
27	ON	ON	off	ON	ON
28	ON	ON	ON	off	off

Device Address (Continued)

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
29	ON	ON	ON	off	ON
30	ON	ON	ON	ON	off
31	ON	ON	ON	ON	ON

Communication Baud Rate

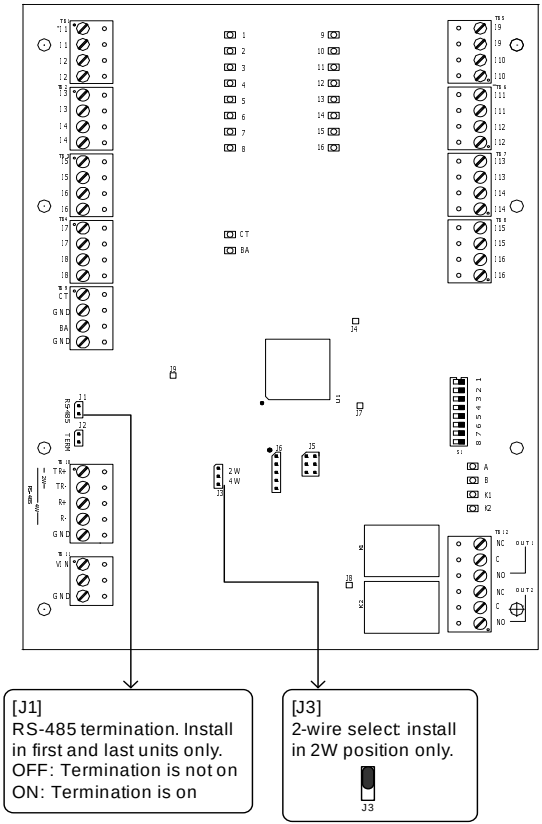
BAUD RATE	DIP SWITCH 6:	DIP SWITCH 7:
38,400 bps	ON	ON
19,200 bps	off	ON
9600 bps	ON	off
115,200 bps	off	off

DIP switch 8 controls the utilization of encryption. When DIP switch 8 is ON, communication will not be allowed unless the access panel supports downstream encryption and is configured to enable encryption to this device. When DIP switch 8 is off, the device will accept either encrypted or unencrypted communication. It must be off if the access panel does not support downstream encryption, or if downstream encryption is disabled for this device.

PASSWORD STATUS	DIP SWITCH 8: (OnGuard 2009 or later)	DIP SWITCH 8: (prior to OnGuard 2009)
Encryption is optional	off	Normal operation
Encryption is required	ON	Not allowed

Installing Jumpers

The jumpers must be configured appropriately for your system.



Specifications

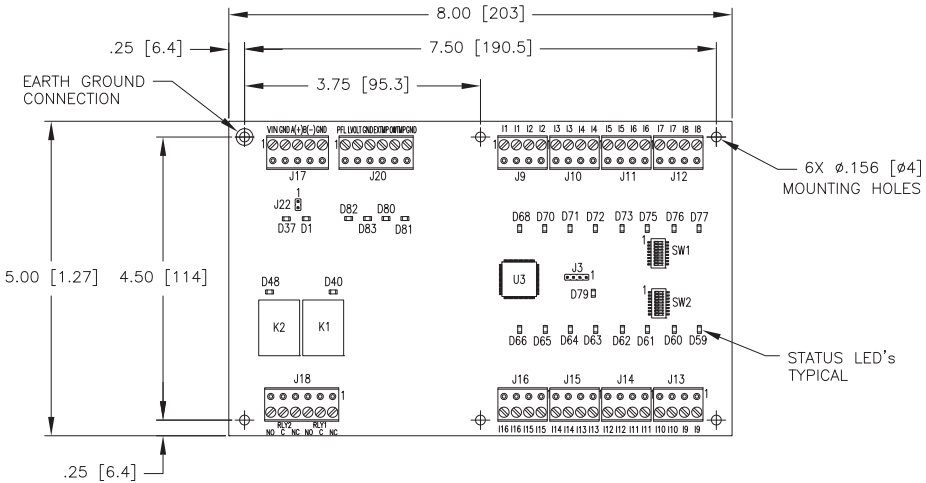
The LNL-1100 is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary power: 12 to 24 VDC ± 10%, 350 mA maximum
  - 12 VDC @ 300 mA nominal
  - 24 VDC @ 220 mA nominal
- Output: Two (2) outputs, Form-C, 5 A @ 28 VDC resistive
- Inputs:
  - Sixteen (16) unsupervised/supervised, standard EOL: 1k/1k ohm, 1%, 1/4 watt
  - Two (2) unsupervised, dedicated for cabinet tamper and UPS fault monitoring
- Communication: RS-485, 2-wire, 9600 to 115,200 bps
- Cable requirements:
  - Power: 18 AWG, 1 stranded twisted pair
  - RS-485: 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
  - Alarm inputs:1 stranded twisted pair, 30 ohms maximum
  - Outputs: as required for the load
- Mechanical:
  - Dimension: 6 x 8 x 1 in. (152 x 203 x 25 mm)
  - Weight: 9 oz. (280 g) nominal
- Environmental:
  - Temperature: 32 to 158° F(0 to 70° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC
- Certifications:
  - UL294 and UL1076 Listed, ULC Listed
  - FCC Part 15
  - C-Tick
  - CE marking
  - RoHS compliant
  - WEEE

Input Control Module LNL-1100-U

The Input Control Module (ICM) board contains the following components: sixteen (16) software configurable alarm inputs, two (2) unsupervised alarm inputs, two (2) alarm output relays, one (1) RS-485 interface, power input, DIP switches, and jumpers.

ICM board (Dimensions are in inches [mm])



Installation

1. Set baud rate (SW1), address (SW2), and LED control switches.
2. Install jumpers.
3. Mount the board in the enclosure.

Note: The LNL-CONV-U1 Universal Mounting Plate is required when installing the board into a CTX enclosure. For more information, refer to Mounting on page 97.

4. Wire the unsupervised alarm inputs for power fault and cabinet tamper.
5. Wire the supervised alarm inputs.

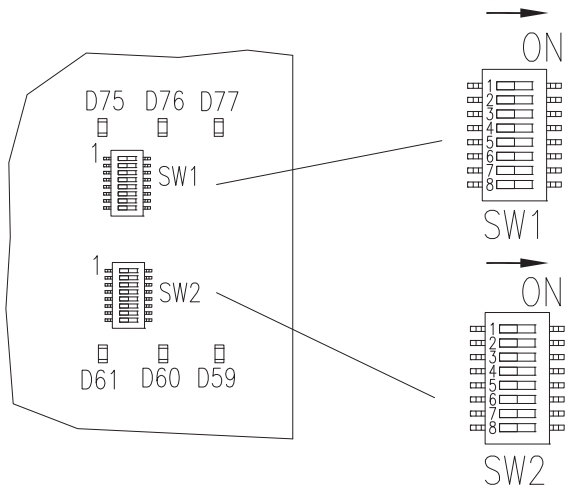
6. Wire the upstream host communication.
7. Wire the relay outputs.
8. Wire the power and communications inputs.
9. Validate proper operation on power up.

Configuration

The Input Control Module board contains two (2) 8-position DIP switches that are user-selectable to control addressing, baud rate, and other user functions, and one (1) RS-485 termination jumper used to configure the system.

Setting DIP Switches

ICM DIP switches



Communication Baud Rate (SW1)

Configure the baud rate using SW1 switches 1-4. (Switch 5 is used for LED control. Switches 6-8 are not used).

Baud rate	SW1 switch for host		SW1 switch for OSDP readers (Aux ports)	
	1:	2:	3:	4:
2400 bps	off	off	off	off
9600 bps	ON	off	ON	off
19200 bps	off	ON	off	ON
38400 bps	ON	ON	ON	ON

LED Mode

SW1 switch 5 is used for LED control. It is read at boot time. If you make a change to this setting, be sure to restart.

Note: The status LEDs only function when the cabinet tamper switch is open (cabinet door is open). When the cabinet tamper switch is closed (cabinet door is closed), the status LEDs are off.

SW1 Switch 5	State
ON	LEDs behave as the Access (LNL) series module.
off	LED behavior is in Normal Mode

Device Address (SW2)

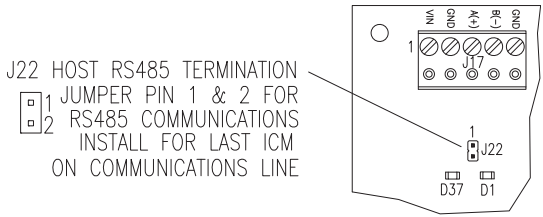
Configure the board address using SW2. (Switches 6-8 are not used.)

Address	SW2 switch				
	1:	2:	3:	4:	5:
0	off	off	off	off	off
1	ON	off	off	off	off
2	off	ON	off	off	off
3	ON	ON	off	off	off
4	off	off	ON	off	off
5	ON	off	ON	off	off
6	off	ON	ON	off	off
7	ON	ON	ON	off	off
8	off	off	off	ON	off
9	ON	off	off	ON	off
10	off	ON	off	ON	off
11	ON	ON	off	ON	off
12	off	off	ON	ON	off
13	ON	off	ON	ON	off
14	off	ON	ON	ON	off
15	ON	ON	ON	ON	off
16	off	off	off	off	ON

Address	SW2 switch				
	1:	2:	3:	4:	5:
17	ON	off	off	off	ON
18	off	ON	off	off	ON
19	ON	ON	off	off	ON
20	off	off	ON	off	ON
21	ON	off	ON	off	ON
22	off	ON	ON	off	ON
23	ON	ON	ON	off	ON
24	off	off	off	ON	ON
25	ON	off	off	ON	ON
26	off	ON	off	ON	ON
27	ON	ON	off	ON	ON
28	off	off	ON	ON	ON
29	ON	off	ON	ON	ON
30	off	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

Installing Jumpers

Jumper configuration



Host Communications: Jumper J22 pins 1 & 2 for RS-485 communications termination. Install jumper on the last ICM on the communications line for proper termination of the communications bus. (For more information, refer to the ICM upstream wiring diagram.)

Status LEDs

Note: The status LEDs only function when the cabinet tamper switch is open (cabinet door is open). When the cabinet tamper switch is closed (cabinet door is closed), the status LEDs are off.

LED Table for Series 2 LNL-1100 Mode

When switch 5 is in the ON position, the LEDs behave like the series 2 LNL-1100.

Indication	LED	State
Power-up	ALL	Off
Initialization	D79	Flashing
After initialization	D79	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON
Communications	D1	ON

LED Table for Normal Mode

When SW1 switch 5 is in the off position, the LEDs operate in Normal Mode.

External tamper (cabinet tamper) must be open for Input LEDs to be on. When tamper is closed (cabinet door closed) Input LEDs will be off.

Indication	LED	State
RS-485 panel communication	D1	ON - Yellow
Power on	D37	ON - Green
Relay 1	D40	ON - Green
Relay 2	D48	ON - Green
Supervised input I1-I16	D59-66, D68, D70-D73, D75-D77	Active: ON - Yellow Inactive: ON - Green Foreign: ON - Red Cut: Flashing - Green Short: Flashing - Red Ground: Flashing - Yellow
Unsupervised I1-I16	D59-66, D68, D70-D73, D75-D77	Closed ON - Red, Open - Off
CPU status	D79	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON
External (cabinet) tamper	D80	Open ON - Red
Power fail	D82	ON - Red

CPU status LED D79 possible module error conditions for LED Normal and Series 2 modes:

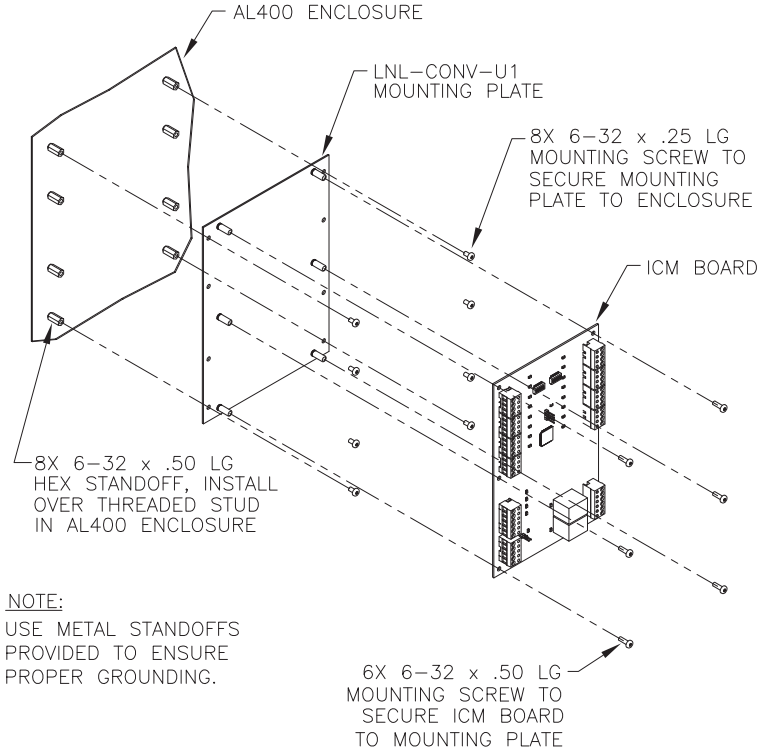
Error condition	Flashing pattern	Description
No valid application firmware	3 Red, 2 Green	The module is not operational. Firmware must be loaded using a console, e.g. HyperTerminal with Xmodem.
Boot loader waiting on firmware file	3 Red, 1 Green	Console boot loader is waiting on start of firmware file.
Boot loader loading firmware file	2 Red, 2 Green	Console boot loader is loading a firmware file.
Invalid EFL file	1 Red, 2 Green	The EFL specified to be loaded using the console loader is not a valid EFL file.
Invalid Xmodem packet	1 Red, 1 Green	The console loader received an invalid Xmodem packet and terminated the firmware download operation.
Invalid Application firmware for module CPU	3 Red, 0 Green	The module is not operational. Application firmware loaded on the module will not run properly. Requires new firmware be loaded using the console boot loader or the module must be returned for repair.
Invalid Boot firmware for module CPU	2 Red, 3 Green	The module is not operational. Boot loader firmware loaded on the module will not run properly. The module must be returned for repair.
Firmware update failed	1 Red, 3 Green	Firmware update operation was unsuccessful. Retry and if it fails continuously, load a different firmware file.
No valid primary firmware copy	3 Green, 2 Red	The firmware flash contains 2 copies of the application firmware. The primary copy is not valid so the backup copy will be loaded into the primary copy and executed.

Error condition	Flashing pattern	Description
No valid backup firmware copy	3 Green, 1 Red	The firmware flash contains 2 copies of the application firmware. The backup copy is not valid so the primary copy will be loaded into the backup copy.
No valid manufacturing parameters	3 Green, 0 Red	The manufacturing parameters which include the serial number, etc. are invalid. The module must be returned for repair.

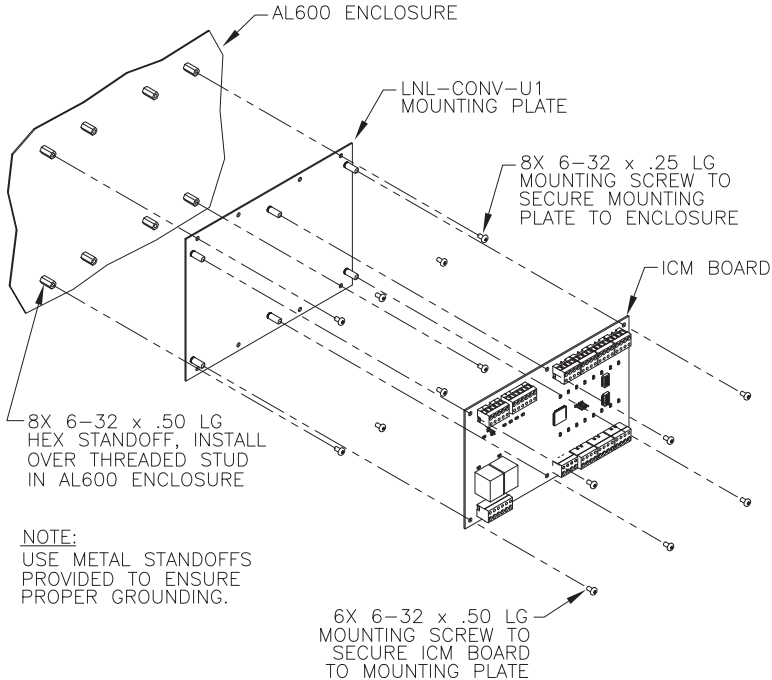
Mounting

The ICM can be mounted in the LNL-AL400ULX or LNL-AL600ULX-4CB6 and the LNL-CTX or LNL-CTX6 enclosure using the Universal Mounting Plate (UMP) LNL-CONV-U1.

Mounting the ICM in the LNL-AL400ULX and LNL-CTX



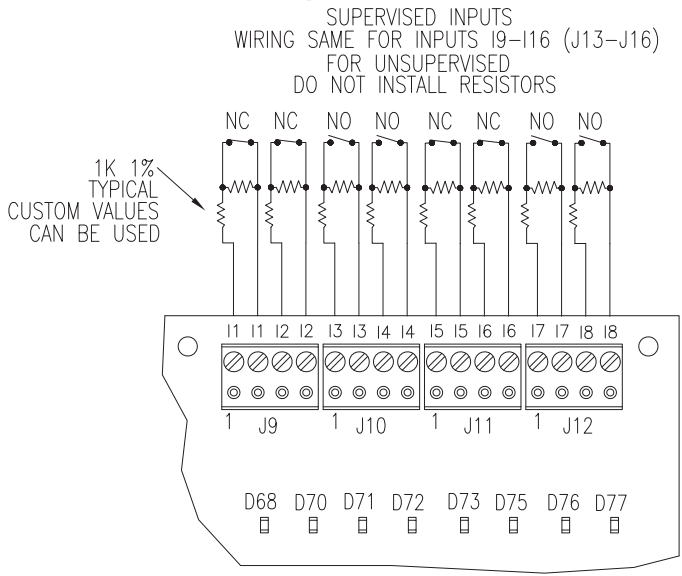
Mounting the ICM in the LNL-AL600ULX-4CB6 or LNL-CTX6



Wiring

Wire inputs I1 through I16 (J9 - J16) using a twisted pair cable, 30 ohms maximum, 24 AWG minimum.

ICM input wiring



Note: See Input Resistor Table for termination resistor values.

Supervised (Software Configurable) Alarm Inputs

The 16 inputs available on the ICM are software configurable alarm inputs that can be used for alarm device monitoring. Each of these inputs can be configured, via the Access Control software, as either N/O (normally open) or N/C (normally closed) in combination with either supervised or unsupervised wiring. These alarm inputs are connected using Inputs 1 - 16.

Each input that is configured as a supervised alarm must also be terminated with two (2) 1K (1000) ohm resistors (1% tolerance - 1/4 (0.25) watt. N/O and N/C alarms are terminated identically). Resistors are provided with the module.

Install the resistors as close to input device as possible. For cable length limitations, see Specifications.

Input Resistor Table

	Alarm Zone Contact NC	Alarm Zone Contact NO
Normal	1K ± 10%	2K ± 10%
Alarm	2K ± 10%	1K ± 10%
Fault – Line Short	0 – 50	0 – 50
Fault – Line Open	15K – ∞	15K – ∞
Fault – Foreign Voltage	50 – 750 1250 – 1500 2500 – 15K	50 – 750 1250 – 1500 2500 – 15K

Unsupervised Alarm Inputs: Power Fail and External (Cabinet) Tamper

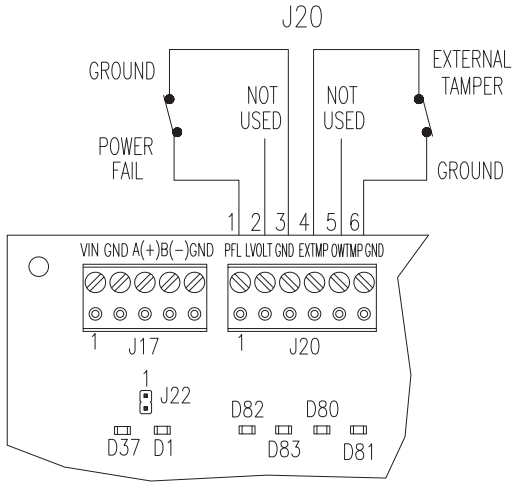
The Input Control Module features two (2) unsupervised alarm inputs that can be used for power fail and cabinet tamper monitoring. These inputs are connected using the power fail and external (cabinet) tamper contact terminals on the Input Control Module board.

The power fail and external tamper inputs are simple N/C (normally closed) contact closure monitors. Connect the power fail monitoring device to J20 pins 1 & 3 and to External Tamper (cabinet tamper) pins 4 & 6. If not used, a jumper must be installed across pins 1 & 3 and 4 & 6.

Note: Input Status LEDs will be off when the tamper device is in the closed position or the jumper is installed.

Wire the power fail and external tamper inputs using twisted pair cable, 30 ohms maximum. (No EOL resistors are required.)

Unsupervised alarm input wiring (Power Fail and External Tamper contacts)



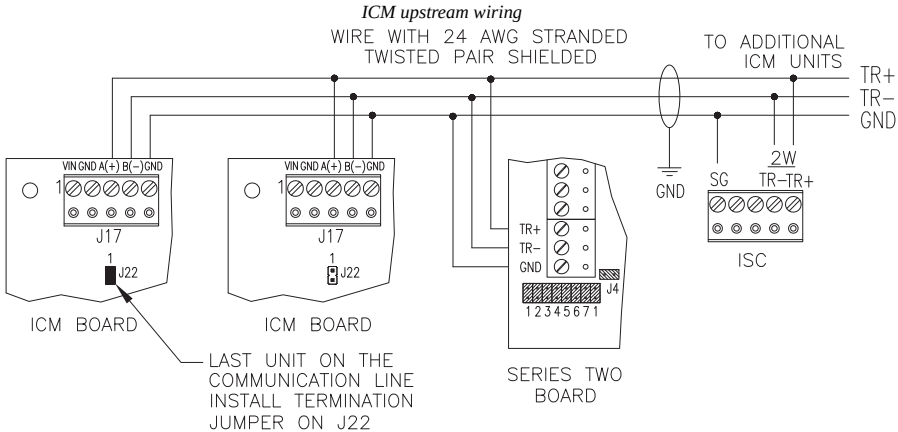
Upstream Controller Communication

The ICM uses Port 1 to communicate to the Intelligent System Controller.

Port 1 is a 2-wire RS-485 interface, that requires the following type of RS-485 cable: 24 AWG (minimum) twisted pair (with shields). The main run RS-485 cable should be no longer than 4000 feet [1219 m], 100 ohms maximum (Belden 9841, West Penn, or equivalent). The drop cables (to downstream devices) should be kept as short as possible, no longer than 10 feet [3.048 m].

The RS-485 communication is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit.

Note: RS-485 communication is supported for upstream communication only.



To enable RS-485 termination, install jumper on pin header J22 (on the last unit on the communication line).

Notes: The (EIA) Electronic Industries Association standard defines RS-485 as an electrical interface for multi-port communications on a bus transmission line. It allows for high-speed data transfer over extended distances (4000 feet [1219m]). The RS-485 interface uses a balance of differential transmitter/receiver to reject common mode noise. For increased reliability over the extended distances, End-Of-Line (EOL) termination is required.

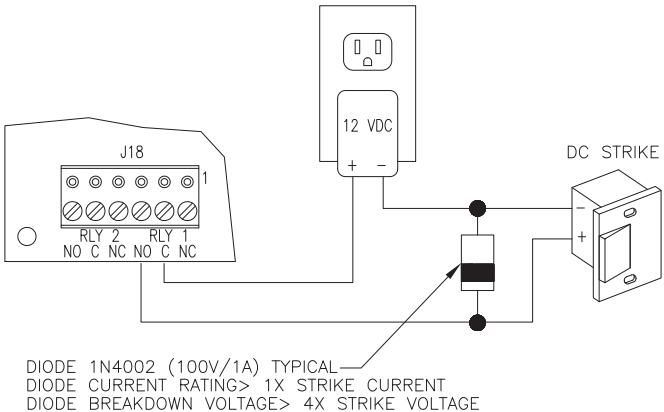
RS-485 must be terminated at both ends of the RS-485 line (bus). Terminating the line provides a more reliable communication by minimizing the signal reflection and external noise coupling. Each component provided has an on-board terminator. The installer should determine which device is at the end of the communication line.

Control Output Wiring

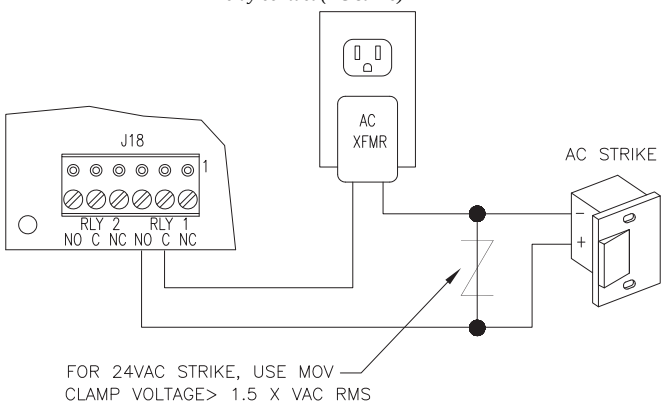
Contact protection circuit must be used. The following two circuits are recommended. Locate the protection circuit as close to the load as possible (within 12 inches [30cm]), as the effectiveness of the circuit will decrease if it is located farther away.

Relay Outputs

Relay contact (DC strike)



Relay contact (AC strike)



Elevator Control

OnGuard hardware is capable of supporting elevator control for up to 128 floors. An elevator reader has an input/output module that controls the access to floors via an elevator.

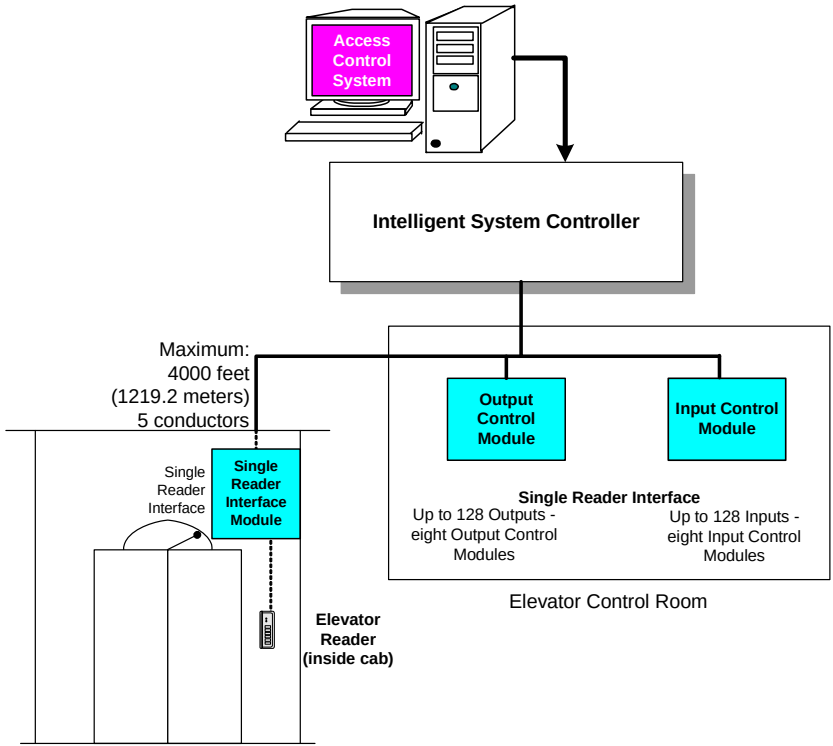
The OnGuard software must be configured for elevator control. This can be done from System Administration by selecting the **Elevator** check box on the General tab in the Readers and Doors form. The reader's type, name, port, address, and access panel can all be defined here as well.

Note: In order for this check box to be available, the access panel to which this reader module is connected must have **Elevator support** enabled on the Options tab.

With elevator control on the LNL-1300 reader, door strike and contact are not available, and REX (Request to EXit) is disabled.

Addresses assigned to input/output panels do not need to be consecutive. On the first panel, the inputs/outputs represent the first sixteen floors (e.g.: Input 1 = first floor, Input 2 = second floor, etc.). The second panel represents the next sixteen floors (floor 17 through 32), etc.

Overview of elevator control



Power and Communications

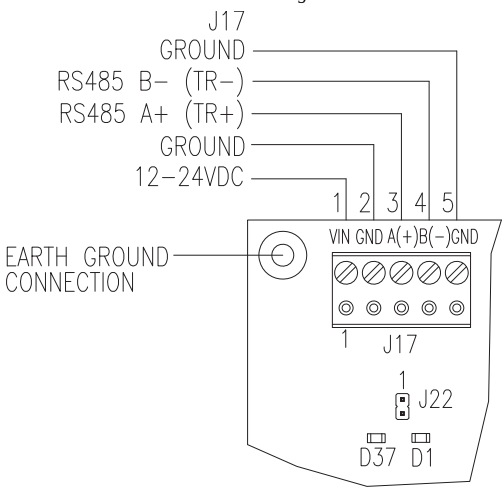
The Input Control Module requires a 12 to 24 VDC ± 10% power source for its input power.

Wire the Power In input with 18 AWG (minimum) twisted pair cable.

Power Source	Requirements	Current
DC power source	Isolated, non-switching, regulated DC power	300mA for 12VDC 150mA for 24VDC

Note: Be sure to observe polarity.

Power source wiring



Specifications

The LNL-1100-U is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary power: 12 to 24 VDC ± 10%
  - 12 VDC @ 300 mA nominal
  - 24 VDC @ 150 mA nominal
  - 12.3 BTU/hour
- Output: Two (2) outputs, Form-C contacts: Relay 1 and 2 (K1 and K2), 5 A @ 30 VDC
- Inputs:
  - Sixteen (16) unsupervised/supervised, standard EOL: 1k/1k ohm, 1%, 1/4 watt
  - One (1) unsupervised, dedicated external (cabinet) tamper
  - One (1) unsupervised, AC power fail
- Upsteam communication: RS-485, 2-wire, 2400 to 38400 bps
  - Does not support encryption
- Cable requirements:
  - Power: 18 AWG, 1 stranded twisted pair
  - RS-485: 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
  - Alarm inputs: 1 stranded twisted pair, 30 ohms maximum
  - Outputs: as required for the load
- Mechanical:
  - Dimension: 5 x 8 x 1.25 in. (127 x 203 x 32 mm)
  - Weight: 6.2 oz. (188 g) nominal
- Environmental:
  - Temperature: -10 to +70°C (14 to 158° F) operating, -40 to +85°C (-40 to 185°F) storage
  - Humidity: 10% at 93°C (199°F) non-condensing operating, 10 to 95% at 85°C (185°F) non-condensing storage
- Certifications:
  - FCC compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency

energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

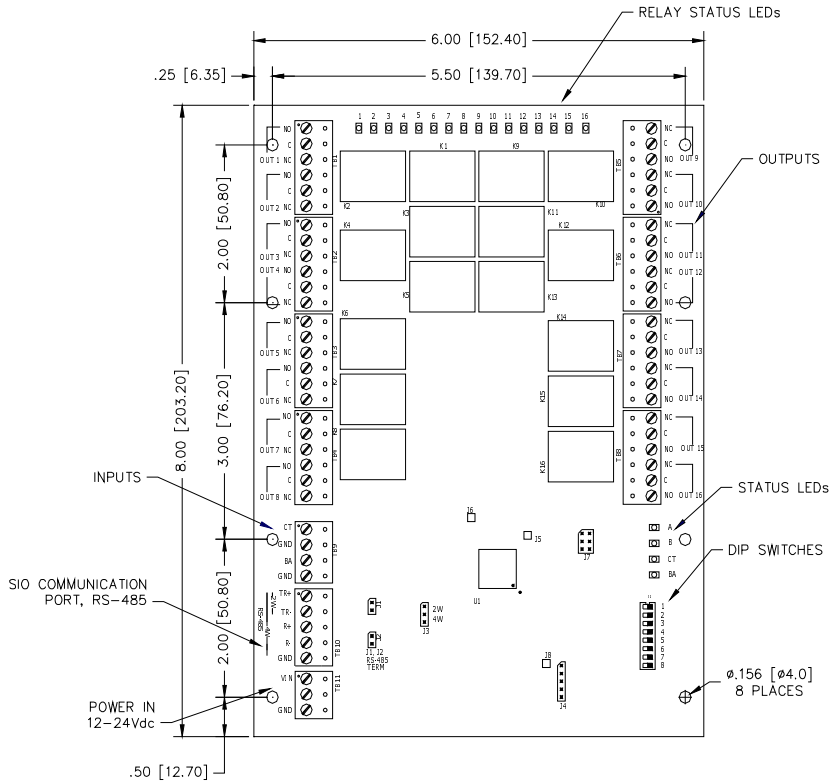
- UL294, UL1076, and S319 Listed
- ULC Listed
- C-Tick N22193
- CE marking
- RoHS
- Environmental class: Indoor dry
- WEEE

European Union directives: 2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Output Control Module LNL-1200 Series 2

The Lenel Output Control Module (OCM) communicates directly with the Intelligent System Controller (ISC) by RS-485 communication. Each OCM is an individually addressed device, and counts as a single device on all ISCs.

LNL-1200 Components



Status LEDs

The series 2 Output Control Module contains a total of 20 LEDs to verify correct installation after power up.

Power-up: All LED's OFF.

Initialization: Once power is applied, initialization of the module begins.

The A LED is turned on at the beginning of initialization. If the application program cannot be run, the A LED will flash at a rapid rate. The OCM is waiting for firmware to be down loaded.

When initialization is completed, LEDs A, B, CT and BA are briefly sequenced ON then OFF.

Run time: After the above sequence, the LEDs have the following meanings:

A LED: Heartbeat and Online Status:

- Offline: 1 second rate, 20% ON.
- Online: 1 second rate, 80% ON.

B LED: Communication Port Status:

- Indicates communication activity on the communication port.

CT: Cabinet Tamper.

BA: Power Fault.

Input in the inactive state: OFF (briefly flashes ON every 3 seconds).

Input in the active state: ON (briefly flashes OFF every 3 seconds).

LEDs 1 through 16: correspond to output relay OUT 1 (K1) through OUT 16 (K16).

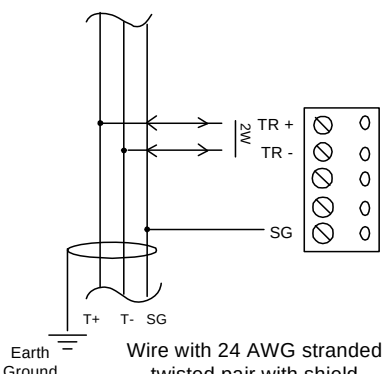
Unsupervised Alarm Inputs

Wire the BA (power fault) and CT (cabinet tamper) inputs using a twisted pair cable, 30 ohms maximum (no EOL resistors required). If either of these inputs is not used, a shorting wire should be installed.

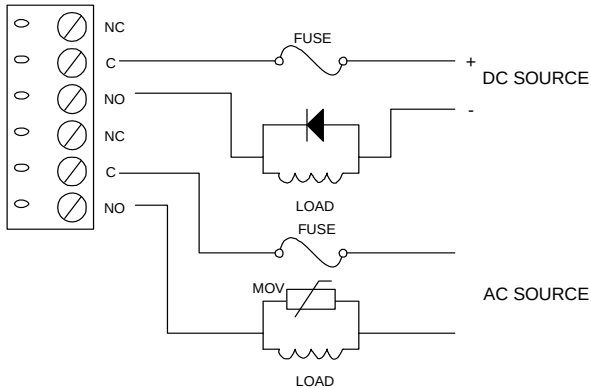
Upstream Controller Communication

The Output Control Module uses Port 1 to communicate to the Intelligent System Controller. The RS-485 is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit.

RS-485 2-WIRE COMMUNICATIONS

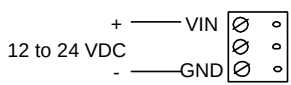


Relay Outputs



Power Source Wiring

The power source should be located as close to the Output Control Module as possible. Be sure to observe polarity.



Wire with 18 AWG
stranded twisted pair.

DIP Switches

Device Address

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
0	off	off	off	off	off
1	off	off	off	off	ON
2	off	off	off	ON	off
3	off	off	off	ON	ON
4	off	off	ON	off	off
5	off	off	ON	off	ON
6	off	off	ON	ON	off
7	off	off	ON	ON	ON
8	off	ON	off	off	off
9	off	ON	off	off	ON
10	off	ON	off	ON	off
11	off	ON	off	ON	ON
12	off	ON	ON	off	off
13	off	ON	ON	off	ON
14	off	ON	ON	ON	off
15	off	ON	ON	ON	ON
16	ON	off	off	off	off

Device Address (Continued)

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
17	ON	off	off	off	ON
18	ON	off	off	ON	off
19	ON	off	off	ON	ON
20	ON	off	ON	off	off
21	ON	off	ON	off	ON
22	ON	off	ON	ON	off
23	ON	off	ON	ON	ON
24	ON	ON	off	off	off
25	ON	ON	off	off	ON
26	ON	ON	off	ON	off
27	ON	ON	off	ON	ON
28	ON	ON	ON	off	off
29	ON	ON	ON	off	ON
30	ON	ON	ON	ON	off
31	ON	ON	ON	ON	ON

Communication Baud Rate

BAUD RATE	DIP SWITCH 6:	DIP SWITCH 7:
38,400 bps	ON	ON
19,200 bps	off	ON
9600 bps	ON	off
115,200 bps	off	off

DIP switch 8 controls the utilization of encryption.

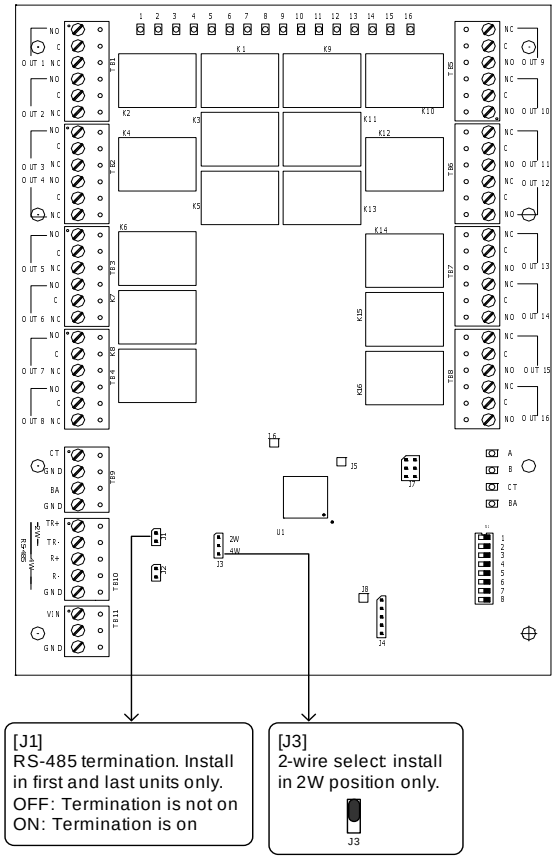
PASSWORD STATUS	DIP SWITCH 8: (OnGuard 2009 or later)	DIP SWITCH 8: (prior to OnGuard 2009)
Encryption is optional	off	Normal operation
Encryption is required	ON	Not allowed

When DIP switch 8 is ON, communication will not be allowed unless the access panel supports downstream encryption and is configured to enable encryption to this device.

When DIP switch 8 is off, the device will accept either encrypted or unencrypted communication. It must be off if the access panel does not support downstream encryption, or if downstream encryption is disabled for this device.

Installing Jumpers

The jumpers must be configured appropriately for your system.



Specifications

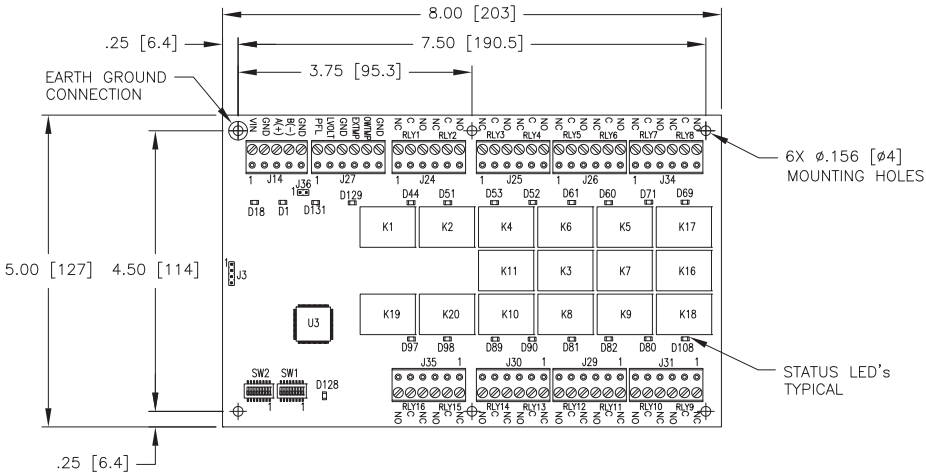
The Output Control Module is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary Power:
  - 12 to 24 VDC ± 10%, 1100 mA maximum
  - 12 VDC @ 850 mA nominal
  - 24 VDC @ 450 mA nominal
- Relay contacts: 16 Form-C, 5 A @ 28 VDC, resistive
- Inputs: 2 unsupervised, dedicated for cabinet tamper and UPS fault monitoring
- Communication: RS-485, 2-wire, 9600 to 115,200 bps async
- Cable Requirements:
  - Power: 1 stranded twisted pair, 18 AWG
  - RS-485: 24 AWG, 120 ohm impedance, stranded twisted pair(s) with shield, 4000 feet (1200 m) maximum
  - Inputs: stranded twisted pair, 30 ohms maximum
  - Outputs: as required for the load
- Mechanical:
  - Dimension: 6 x 8 x 1 in. (152 x 203 x 25 mm)
  - Weight: 14 oz. (435 g) nominal
- Environmental:
  - Temperature: 32 to 158° F(0 to 70° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC
- Certifications:
  - UL294 and UL1076 Listed, ULC Listed
  - FCC Part 15
  - C-Tick
  - CE marking
  - RoHS compliant
  - WEEE

Output Control Module LNL-1200-U

The Output Control Module (OCM) board contains the following components: sixteen (16) alarm output relays with sixteen (16) corresponding status LED's, two (2) unsupervised alarm inputs, one (1) RS-485 interface, one (1) power input, two (2) DIP switches, jumpers, and status LEDs.

OCM board (Dimensions are in inches [mm])



Installation

To install the Output Control Module, perform the installation procedures described in the following sections, in the order in which they are presented.

1. Set baud rate (SW1), address (SW2), and LED control switches.
2. Install jumpers.
3. Mount the board into the enclosure.

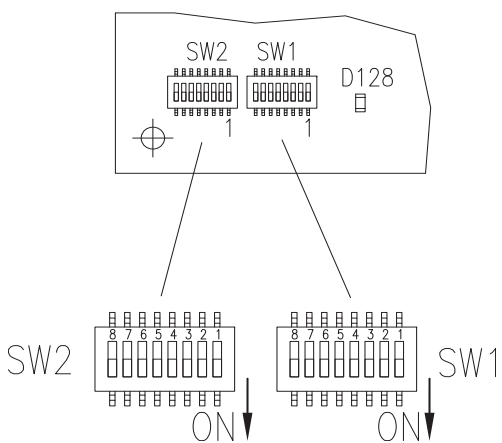
Note: The LNL-CONV-U1 Universal Mounting Plate is required when installing the board into a CTX enclosure. For more information, refer to Mounting on page 128.

4. Wire the unsupervised alarm inputs for power fail and external (cabinet) tamper.
5. Wire the upstream host communication.
6. Wire the relay outputs.
7. Wire the power and communications inputs.
8. Validate proper operation on power up.

Configuration

The Output Control Module board contains two (2) 8-position DIP switches that are user selectable to control addressing, baud rate, and other user functions, and one (1) RS-485 termination jumper used to configure the system.

Setting DIP Switches



Communication Baud Rate (SW1)

Configure the baud rate using SW1 switches 1 and 2. (Switches 3 through 8 are not used.)

Baud rate	SW1 switch for host	
	1:	2:
2400 bps	off	off
9600 bps	ON	off
19200 bps	off	ON
38400 bps	ON	ON

Device Address (SW2)

Configure the board address using SW2. (Switches 6-8 are not used.)

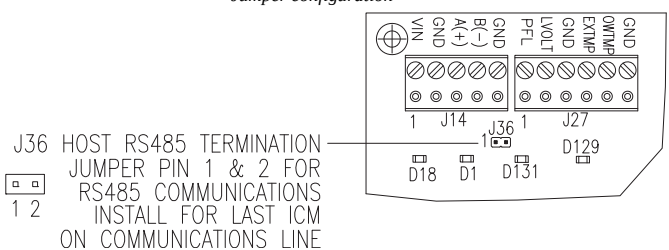
Address	SW2 switch				
	1:	2:	3:	4:	5:
0	off	off	off	off	off
1	ON	off	off	off	off
2	off	ON	off	off	off
3	ON	ON	off	off	off
4	off	off	ON	off	off
5	ON	off	ON	off	off
6	off	ON	ON	off	off
7	ON	ON	ON	off	off

Address	SW2 switch				
	1:	2:	3:	4:	5:
8	off	off	off	ON	off
9	ON	off	off	ON	off
10	off	ON	off	ON	off
11	ON	ON	off	ON	off
12	off	off	ON	ON	off
13	ON	off	ON	ON	off
14	off	ON	ON	ON	off
15	ON	ON	ON	ON	off
16	off	off	off	off	ON
17	ON	off	off	off	ON
18	off	ON	off	off	ON
19	ON	ON	off	off	ON
20	off	off	ON	off	ON
21	ON	off	ON	off	ON
22	off	ON	ON	off	ON
23	ON	ON	ON	off	ON
24	off	off	off	ON	ON
25	ON	off	off	ON	ON
26	off	ON	off	ON	ON

Address	SW2 switch				
	1:	2:	3:	4:	5:
27	ON	ON	off	ON	ON
28	off	off	ON	ON	ON
29	ON	off	ON	ON	ON
30	off	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

Installing Jumpers

Jumper configuration



To enable RS-485 termination, install jumper on pin header J36. For more information, refer to the Upstream Communication section.

Host Communications: Jumper J36 pins 1 & 2 for RS-485 communications. Install the jumper on the last OCM on the communications line.

Status LEDs

LED Table

Indication	LED	State
RS-485 panel communication	D1	ON - Yellow
Power on	D18	ON - Green
Relay 1	D44	ON - Green
Relay 2	D51	ON - Green
Relay 3	D53	ON - Green
Relay 4	D52	ON - Green
Relay 5	D61	ON - Green
Relay 6	D60	ON - Green
Relay 7	D71	ON - Green
Relay 8	D69	ON - Green
Relay 9	D108	ON - Green
Relay 10	D80	ON - Green
Relay 11	D82	ON - Green
Relay 12	D81	ON - Green
Relay 13	D90	ON - Green
Relay 14	D89	ON - Green
Relay 15	D98	ON - Green
Relay 16	D97	ON - Green

LED Table (Continued)

Indication	LED	State
CPU status	D128	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON
External (cabinet) tamper	D129	Open ON - Red
Power fail	D131	ON - Red

CPU status LED D128 possible module error conditions:

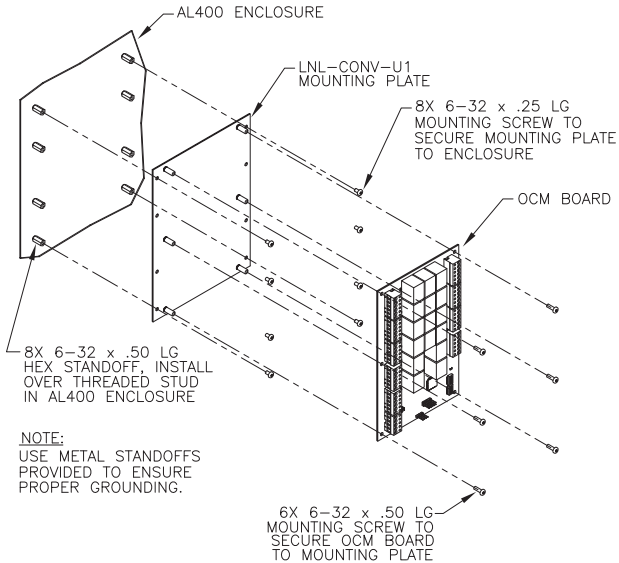
Error condition	Flashing pattern	Description
No valid application firmware	3 Red, 2 Green	The module is not operational. Firmware must be loaded using a console, e.g. HyperTerminal with Xmodem.
Boot loader waiting on firmware file	3 Red, 1 Green	Console boot loader is waiting on start of firmware file.
Boot loader loading firmware file	2 Red, 2 Green	Console boot loader is loading a firmware file.
Invalid EFL file	1 Red, 2 Green	The EFL specified to be loaded using the console loader is not a valid EFL file.
Invalid Xmodem packet	1 Red, 1 Green	The console loader received an invalid Xmodem packet and terminated the firmware download operation.
Invalid Application firmware for module CPU	3 Red, 0 Green	The module is not operational. Application firmware loaded on the module will not run properly. Requires new firmware be loaded using the console boot loader or the module must be returned for repair.
Invalid Boot firmware for module CPU	2 Red, 3 Green	The module is not operational. Boot loader firmware loaded on the module will not run properly. The module must be returned for repair.

Error condition	Flashing pattern	Description
Firmware update failed	1 Red, 3 Green	Firmware update operation was unsuccessful. Retry and if it fails continuously, load a different firmware file.
No valid primary firmware copy	3 Green, 2 Red	The firmware flash contains 2 copies of the application firmware. The primary copy is not valid so the backup copy will be loaded into the primary copy and executed.
No valid backup firmware copy	3 Green, 1 Red	The firmware flash contains 2 copies of the application firmware. The backup copy is not valid so the primary copy will be loaded into the backup copy.
No valid manufacturing parameters	3 Green, 0 Red	The manufacturing parameters which include the serial number, etc. are invalid. The module must be returned for repair.

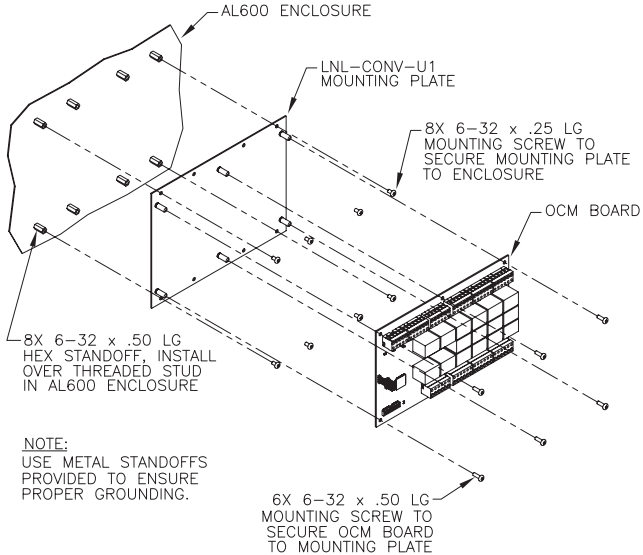
Mounting

The OCM can be mounted in the LNL-AL400ULX or LNL-AL600ULX-4CB6 and the LNL-CTX or LNL-CTX6 enclosure using the Universal Mounting Plate (UMP) LNL-CONV-U1.

Mounting the OCM in the LNL-AL400ULX and LNL-CTX



Mounting the OCM in the LNL-AL600ULX-4CB6 or LNL-CTX6



Wiring

Unsupervised Alarm Inputs: Power Fail and External (Cabinet) Tamper

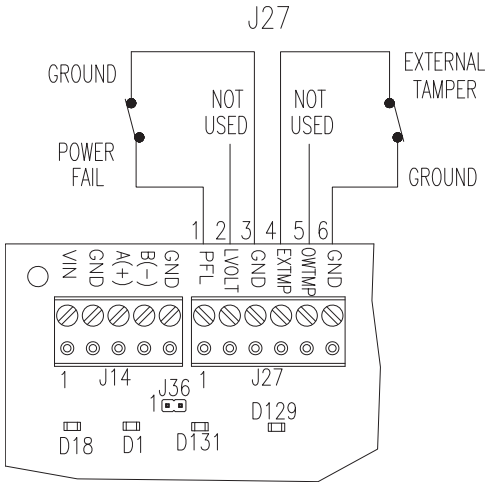
The Output Control Module features two (2) unsupervised alarm inputs that can be used for power fail and external (cabinet) tamper monitoring. These inputs are connected using the power fail and external tamper contact terminals located on the Output Control Module.

The power fail and external tamper inputs are simple N/C (normally closed) contact closure monitors.

Wire the power fail and external tamper inputs using twisted pair cable, 30 ohms maximum (No EOL resistors are required).

Connect the power fail monitoring device to J27 pins 1 & 3 and the External Tamper (cabinet tamper) pins 4 & 6. If not used, a jumper must be installed across pins 1 & 3 and 4 & 6.

Unsupervised alarm input wiring (power fail & external tamper contacts)



Note: Input Status LEDs will be off when the tamper device is in the closed position or the jumper is installed.

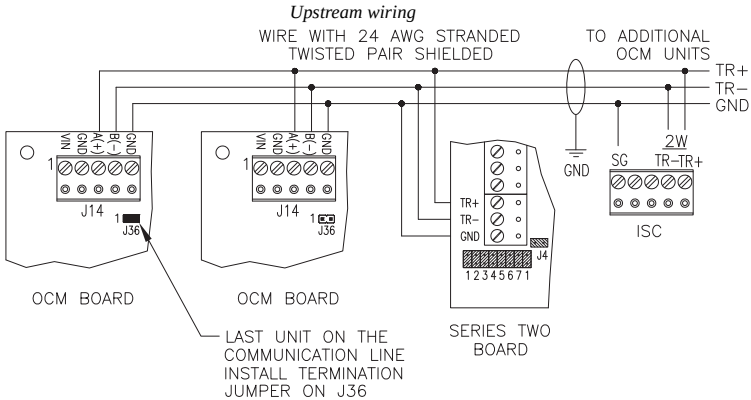
Upstream Communication

The OCM uses Port 1 to communicate to the Intelligent System Controller.

Port 1 is a 2-wire RS-485 interface, that requires the following type of RS-485 cable: 24 AWG (minimum) twisted pair (with shields). The main run RS-485 cable should be no longer than 4000 feet [1219 m], 100 ohms maximum (Belden 9841, West Penn, or equivalent). The drop cables (to downstream devices) should be kept as short as possible, no longer than 10 feet [3.048 m].

The RS-485 communication is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit.

Note: RS-485 communication is supported for upstream communication only.



To enable RS-485 termination, install jumper on pin header J36.

Notes: The (EIA) Electronic Industries Association standard defines RS-485 as an electrical interface for multi-port communications on a bus transmission line. It allows for high-speed data transfer over extended distances (4000 feet/1219 m). The RS-485 interface uses a balance of differential transmitter/receiver to reject common mode noise. For increased reliability over the extended distances, End-Of-Line (EOL) termination is required.

RS-485 (2-wire or 4-wire) must be terminated at both ends of the RS-485 line (bus). Terminating the line provides a more reliable communication by minimizing the signal reflection and external noise coupling. Each component provided has an on-board terminator. The installer should determine which device is at the end of the communication line.

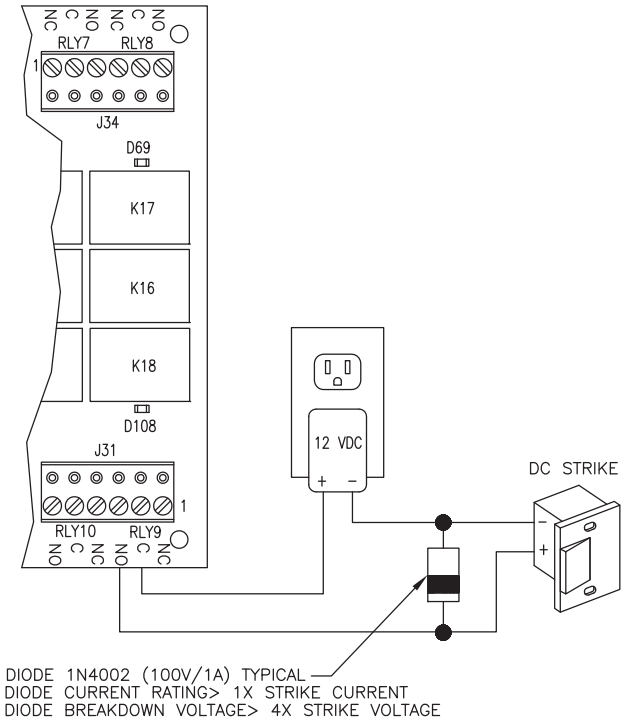
Relay Outputs

The Output Control Module contains sixteen (16) form-C dry-contact relay outputs, Relay 1 through 16 (K1-K11 & K16-K20). Each is rated at 5A 30VDC.

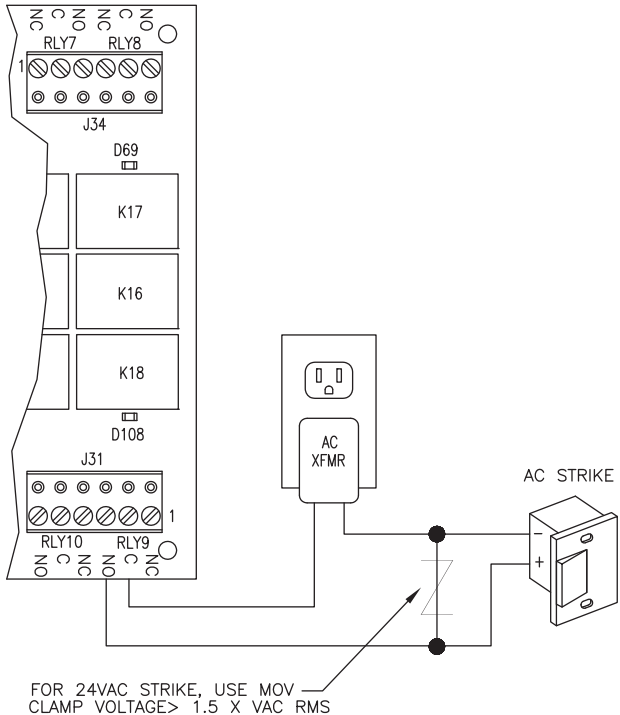
Transient clamping must be provided to protect the output contacts and to reduce EMI emissions.

For AC-powered devices, use MOV across the load. For DC-powered devices, use a diode across the load

Relay contact (DC strike)



Relay contact (AC strike)



Elevator Control

OnGuard hardware is capable of supporting elevator control for up to 128 floors. An elevator reader has an input/output module that controls the access to floors via an elevator.

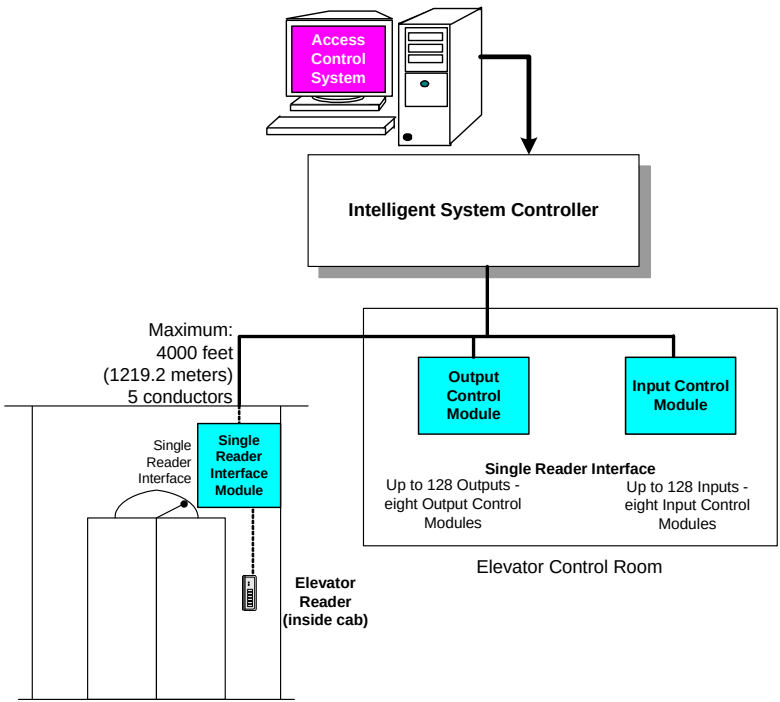
The OnGuard software must be configured for elevator control. This can be done from System Administration by selecting the **Elevator** check box on the General tab in the Readers and Doors form. The reader's type, name, port, address, and access panel can all be defined here as well.

Note: In order for this check box to be available, the access panel to which this reader module is connected must have **Elevator support** enabled on the Options tab.

With elevator control on the LNL-1300 reader, door strike and contact are not available, and REX (Request to EXit) is disabled.

Addresses assigned to input/output panels do not need to be consecutive. On the first panel, the inputs/outputs represent the first sixteen floors (e.g.: Input 1 = first floor, Input 2 = second floor, etc.). The second panel represents the next sixteen floors (floor 17 through 32), etc.

Overview of elevator control



Power and Communications

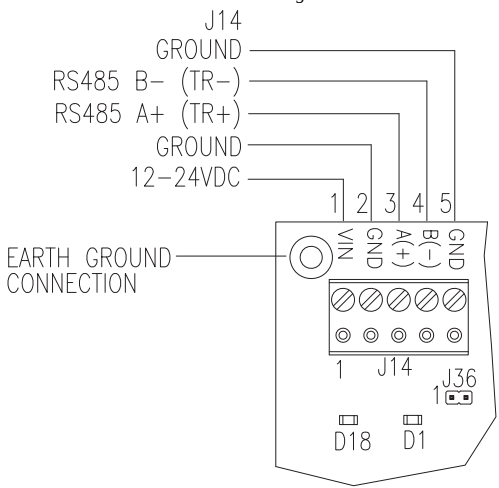
The Output Control Module requires a 12 to 24 VDC ± 10% power source for its input power.

Wire the Power In input with 18 AWG (minimum) twisted pair cable.

Power Source	Requirements	Current
DC power source	Isolated, non-switching, regulated DC power	805mA for 12VDC 407mA for 24VDC

Note: Be sure to observe polarity.

Power source wiring



Specifications

The LNL-1200-U is for connection to low voltage, class 2 power-limited circuits only. These specifications are subject to change without notice.

- Primary Power: 12 to 24 VDC ± 10%
  - 12 VDC @ 805 mA nominal
  - 24 VDC @ 407 mA nominal
  - 33 BTU/hour
- Relay contacts: 16 Form-C contacts: Relay 1-16 (K1-K11, K16-K20), 5 A @ 30 VDC
- Inputs:
  - One (1) unsupervised, dedicated external (cabinet) tamper
  - One (1) unsupervised, AC power fail
- Upstream communication: RS-485 2-wire, 2400 to 38400 bps
  - Does not support encryption
- Cable Requirements:
  - Power: 1 stranded twisted pair, 18 AWG
  - RS-485: 24 AWG, 120 ohm impedance, stranded twisted pair(s) with shield, 4000 feet (1219 m) maximum
  - Inputs:1 stranded twisted pair, 30 ohms maximum
  - Outputs: as required for the load
- Mechanical:
  - Dimension: 5 x 8 x 1.25 in. (127 x 203 x 32 mm)
  - Weight: 12.2 oz. (346 g) nominal
- Environmental:
  - Temperature: -10 to +70°C (14 to 158° F) operating, -40 to +85°C (-40 to 185°F) storage
  - Humidity: 10% at 93°C (199°F) non-condensing operating, 10 to 95% at 85°C (185°F) non-condensing storage
- Certifications:
  - FCC Part 15
  - FCC compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency

energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

- ETL 294, s319
- UL294, 1076
- C-Tick N22193
- CE marking
- RoHS
- Environmental class: Indoor dry
- WEEE

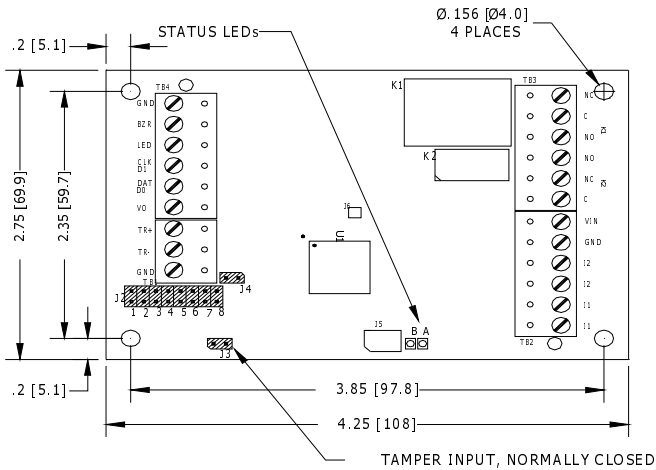
European Union directives: 2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Single Reader Interface Module LNL-1300 Series 2

The Single Reader Interface (SRI) supports access control card readers, keypads, or readers with keypads that use standard Wiegand Data1/Data0 or Clock/Data communications. Lock, unlock, and facility code offline access modes are supported on all readers connected to the SRI.

The SRI provides a vital link between the Intelligent System Controller (ISC) and the card reader attached to the interface. As many as 32 SRI modules can be multi-dropped using RS-485 2-wire communication, up to 4000 feet per port away from the ISC. Each SRI module is individually addressed for increased reporting capabilities with OnGuard Access Control software applications. The SRI includes two inputs that support normally open, normally closed, supervised, and non-supervised circuits. Two output relays support fail-safe or fail-secure operation.

LNL-1300 Components



Status LEDs

The series 2 Single Reader Interface Module board contains two (2) status LEDs.

Power-up: All LEDs off.

Initialization: Once power is applied, initialization of the module begins.

The A LED is turned ON at the beginning of initialization. If the application program cannot be run, the A LED will flash at a rapid rate. The MR-50 is waiting for firmware to be down loaded.

Run time: After a successful initialization, the LEDs have the following meanings:

A LED: Heartbeat and On-Line Status:

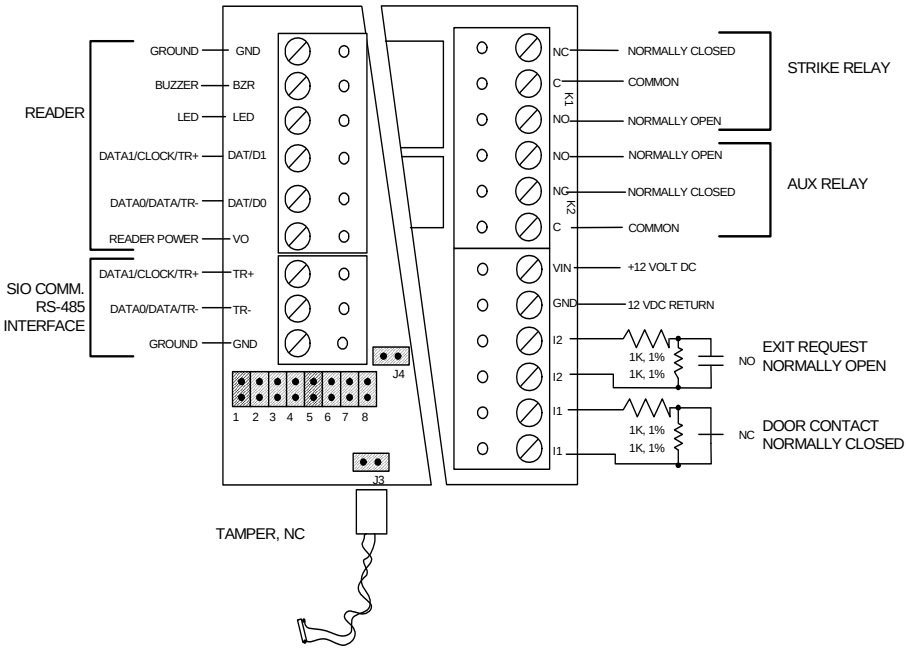
- Offline: 1 second rate, 20% ON
- Online: 1 second rate, 80% ON

B LED: Communication Port Status:

Indicates communication activity on the communication port

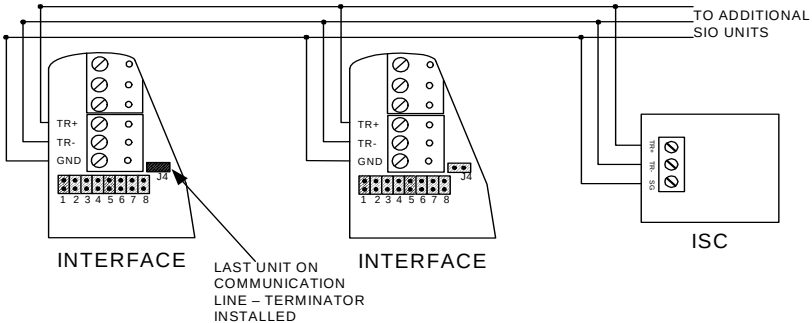
Wiring

The Single Reader Interface Module contains two (2) supervised alarm inputs that can be used for door position and REX exit push button monitoring. Wire the I1 and I2 inputs using a twisted pair cable, 30 ohms maximum. Terminate each of these inputs with two (2) 1000-ohm resistors (1% tolerance - 0.25 watt).



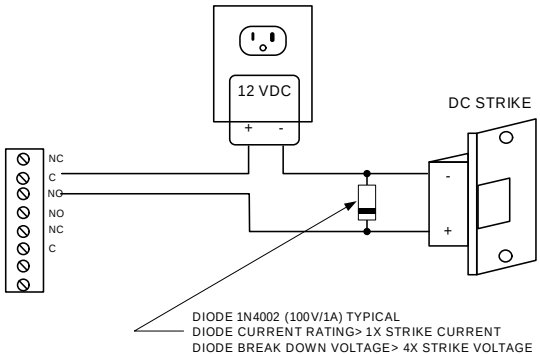
Upstream Controller Communication

The Single Reader Interface Module uses Port 1 to communicate to the Intelligent System Controller.

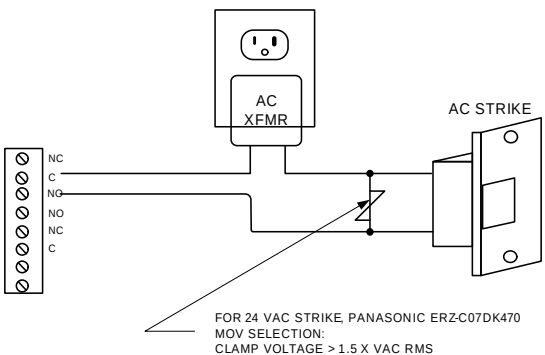


Relay Outputs

Relay contact (DC strike)

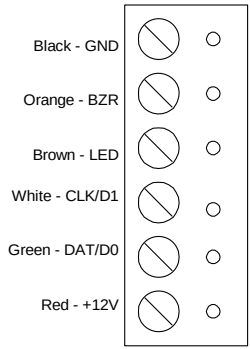


Relay contact (DC strike)



Downstream Reader Communication

The Single Reader Interface Module can communicate downstream with one (1) keypad or card reader. Power, reader, and door hardware wiring:



Cabinet Tamper

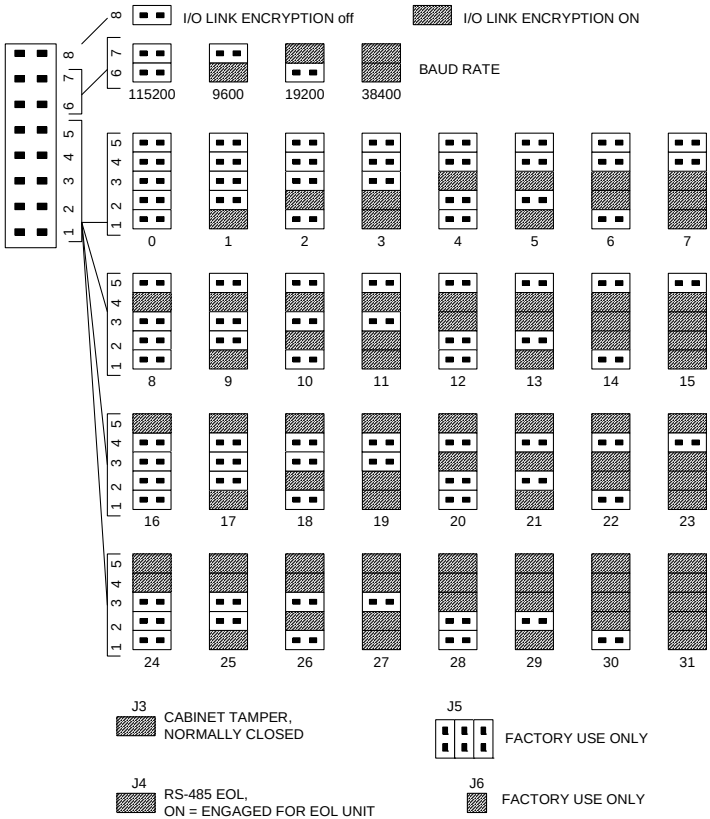
Jumper J3 must be configured for Cabinet Tamper. There are two possible configuration options: On or Off. When J3 is on, cabinet tamper is bypassed. When it is off, it must be wired in order to work.

Power

The Single Reader Interface Module requires a filtered 12VDC ± 15% power source for its power input. The power source must provide isolated and non-switching, linear regulated DC power, with 125 mA current.

Installing Jumpers

Jumper(s) configuration for the device communication address, communication baud rate, and RS-485 termination status:



Specifications

The LNL-1300 is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary power:
  - 12 to 24 VDC ± 10%, 150 mA maximum (plus reader current)
  - 12 VDC @ 110 mA (plus reader current) nominal
  - 24 VDC@ 60 mA (plus reader current) nominal
- Outputs: Form-C contacts: K1: 5 A @ 28 VDC, K2: 1 A @28 VDC
- Inputs:
  - 2 supervised, End of Line resistors, 1k/1k ohm, 1% 1/4 watt standard
  - 1 unsupervised, dedicated for cabinet tamper
- Reader Interface:
  - Reader power: 12 to 24 VDC ± 10% (input voltage passed through)
  - Reader LED output: TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
  - Buzzer output: Open collector, 5 VDC open circuit maximum, 10 mA sink maximum
  - Reader data inputs: TTL compatible inputs or 2-wire RS-485
- Communication: RS-485, 2-wire. 9600, 19200, 38400, or 115200 bps
- Cable requirements:
  - Power: 18 AWG, 1 stranded twisted pair
  - RS-485 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
  - Alarm Inputs: 1 stranded twisted pair per input, 30 ohms maximum
  - Outputs: As required for the load
  - Reader data (TTL): 18 AWG stranded, 6 conductor, 500 feet (150 m) maximum
  - Reader data (RS-485): 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 (1,219 m) maximum
- Mechanical:
  - Dimension: 4.25 x 2.75 x 1.4 in. (108 x 74 x 36 mm)
  - Weight: 4 oz. (120 g) nominal
- Environmental:
  - Temperature: -31 to +167° F (-35 to +75° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC
- Certifications:

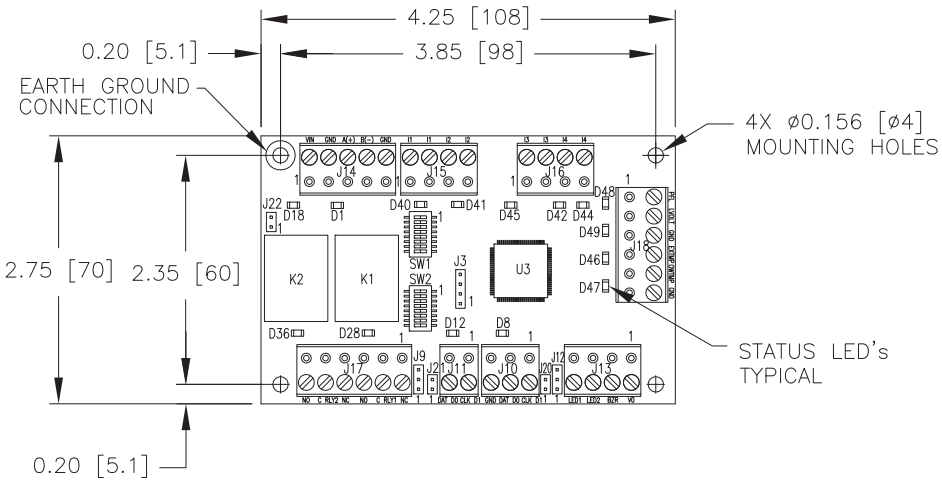
- UL294 and UL1076 Listed, ULC Listed
- FCC Part 15
- C-Tick
- CE marking
- RoHS compliant
- WEEE

Single Door Controller Module LNL-1300-U

The LNL-1300-U provides a solution for interfacing to a Wiegand/RS-485 type reader and door hardware. It can accept data from a reader with clock/data, wiegand signaling or 2-wire RS-485 (OSDP), and provides a tri-stated LED control and buzzer control. Two form-C relay outputs may be used for strike control or alarm signaling. Two supervised inputs are provided for monitoring the door contact and exit push button.

Communication to the interface is accomplished via a 2-wire RS-485 interface. It requires a 12 to 24 VDC power source.

SDC board (Dimensions are in inches [mm])



Installation

1. Set baud rate (SW1), address (SW2), and LED control switches.
2. Install jumpers.
3. Mount the board into the enclosure.

Note: The LNL-CONV-4 Universal Mounting Plate is required when installing the board into a CTX enclosure. For more information, refer to Mounting on page 173.

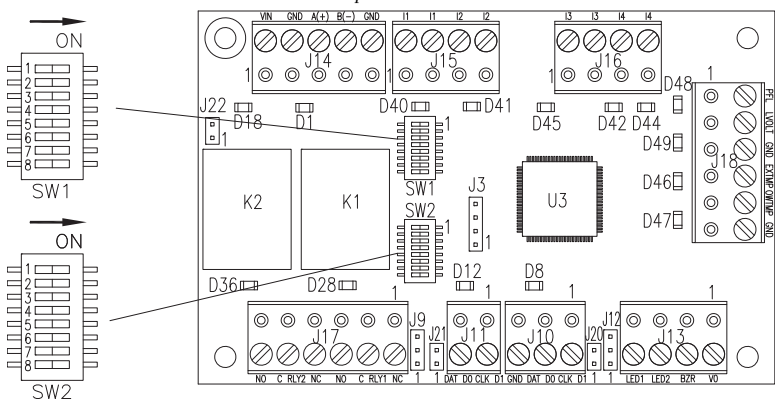
4. Wire the supervised alarm inputs for door position and REX exit push button monitoring.
5. Wire the upstream host communication.
6. Wire the relay outputs for door strike and AUX.
7. Wire the downstream interface for the keypad or card reader.
8. Wire tamper input.
9. Wire power and communications inputs.
10. Validate proper operation on power up.

Configuration

The Single Door Controller (SDC) board contains two (2) 8-position DIP switches that are user-selectable to control addressing, baud rate, and other functions, and four jumpers used to configure your system.

Setting DIP Switches

SDC dip switches



Communication Baud Rate (SW1)

Configure the baud rate using SW1 switches 1-4. (Switch 5 is used for LED control. Switches 6-8 are not used.)

Baud rate	SW1 switch for host		SW1 switch for OSDP readers (Aux ports)	
	1:	2:	3:	4:
2400 bps	off	off	off	off
9600 bps	ON	off	ON	off
19200 bps	off	ON	off	ON
38400 bps	ON	ON	ON	ON

Note: If you are not using OSDP readers, SW1 switch 3 & 4 do not need to be set as indicated here.

LED Mode

SW1 switch 5 is used for LED control. It is read at boot time. If you make a change to this setting, be sure to restart.

Note: The status LEDs only function when the cabinet tamper switch is open (cabinet door is open). When the cabinet tamper switch is closed (cabinet door is closed), the status LEDs are off.

SW1 Switch 5	State
ON	LEDs behave as the Access (LNL) series module.
off	LED behavior is in Normal Mode

Device Address (SW2)

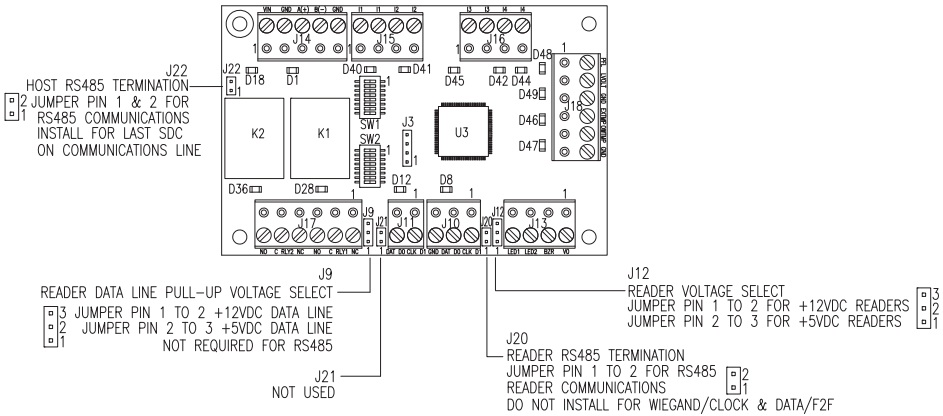
Configure the board address using SW2. (Switches 6-8 are not used.)

Address	SW2 switch				
	5:	4:	3:	2:	1:
0	off	off	off	off	off
1	off	off	off	off	ON
2	off	off	off	ON	off
3	off	off	off	ON	ON
4	off	off	ON	off	off
5	off	off	ON	off	ON
6	off	off	ON	ON	off
7	off	off	ON	ON	ON
8	off	ON	off	off	off
9	off	ON	off	off	ON
10	off	ON	off	ON	off
11	off	ON	off	ON	ON
12	off	ON	ON	off	off
13	off	ON	ON	off	ON
14	off	ON	ON	ON	off
15	off	ON	ON	ON	ON
16	ON	off	off	off	off

Address	SW2 switch				
	5:	4:	3:	2:	1:
17	ON	off	off	off	ON
18	ON	off	off	ON	off
19	ON	off	off	ON	ON
20	ON	off	ON	off	off
21	ON	off	ON	off	ON
22	ON	off	ON	ON	off
23	ON	off	ON	ON	ON
24	ON	ON	off	off	off
25	ON	ON	off	off	ON
26	ON	ON	off	ON	off
27	ON	ON	off	ON	ON
28	ON	ON	ON	off	off
29	ON	ON	ON	off	ON
30	ON	ON	ON	ON	off
31	ON	ON	ON	ON	ON

Installing Jumpers

Jumper configuration



Host communications:

- Jumper J22 pins 1 & 2 for RS-485 reader communications. Install the jumper on last the SDC on the communications line.

Reader output voltage selection:

- Jumper J12 pins 1 & 2 for +12 VDC readers
- Jumper J12 pins 2 & 3 for +5 VDC readers

Reader RS-485 termination:

- Jumper J20 pins 1 & 2 for RS-485 reader communications

Note: Do NOT install the jumper for Wiegand/Clock & Data/F2F Reader Communications.

Reader data line pull-up voltage selection:

- Jumper 9 pins 1 & 2 for +12 VDC data lines
- Jumper 9 pins 2 & 3 for +5 VDC data lines

Notes: Some readers have data lines pulled up to +5 while the data lines of other readers are pulled up to +12 VDC. Therefore, you need to set these to match your reader.

NOT required for RS-485 communications.

Jumper J21 is not used.

Status LEDs

Note: The status LEDs only function when the cabinet tamper switch is open (cabinet door is open). When the cabinet tamper switch is closed (cabinet door is closed), the status LEDs are off.

LED Table for Series 2 LNL-1300 Mode

When switch 5 is in the ON position, the LEDs behave like the series 2 LNL-1300.

Indication	LED	State
Power-up	ALL	Off
Initialization	D45	Flashing
After initialization	D45	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON
Communications	D1	ON

LED Table for Normal Mode

When SW1 switch 5 is in the off position, the LEDs operate in Normal Mode.

External tamper (cabinet tamper) must be open for Input LEDs to be on. When tamper is closed (cabinet door closed) Input LEDs will be off.

Indication	LED	State
RS-485 panel communication	D1	ON - Yellow
Reader 1 RS-485 communication	D8	ON - Yellow

Indication	LED	State
Power on	D18	ON - Green
Relay 1	D28	ON - Green
Relay 2	D36	ON - Green
Supervised input I1-I2	D40, D41	Active: ON - Yellow Inactive: ON - Green Foreign: ON - Red Cut: Flashing - Green Short: Flashing - Red Ground: Flashing - Yellow
Unsupervised I1-I2	D40, D41	Closed ON - Red, Open - Off
CPU status	D45	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON Flash Green - Badge Read
External (cabinet) tamper	D46	Open ON - Red

CPU status LED D45 possible module error conditions for LED Normal and Series 2 modes:

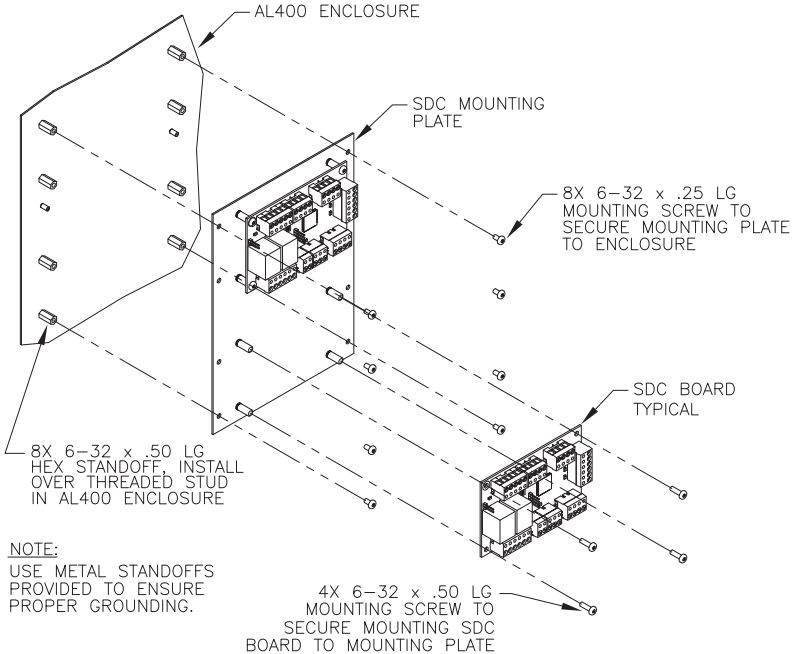
Error condition	Flashing pattern	Description
No valid application firmware	3 Red, 2 Green	The module is not operational. Firmware must be loaded using a console, e.g. HyperTerminal with Xmodem.
Boot loader waiting on firmware file	3 Red, 1 Green	Console boot loader is waiting on start of firmware file.
Boot loader loading firmware file	2 Red, 2 Green	Console boot loader is loading a firmware file.

Error condition	Flashing pattern	Description
Invalid EFL file	1 Red, 2 Green	The EFL specified to be loaded using the console loader is not a valid EFL file.
Invalid Xmodem packet	1 Red, 1 Green	The console loader received an invalid Xmodem packet and terminated the firmware download operation.
Invalid Application firmware for module CPU	3 Red, 0 Green	The module is not operational. Application firmware loaded on the module will not run properly. Requires new firmware be loaded using the console boot loader or the module must be returned for repair.
Invalid Boot firmware for module CPU	2 Red, 3 Green	The module is not operational. Boot loader firmware loaded on the module will not run properly. The module must be returned for repair.
Firmware update failed	1 Red, 3 Green	Firmware update operation was unsuccessful. Retry and if it fails continuously, load a different firmware file.
No valid primary firmware copy	3 Green, 2 Red	The firmware flash contains 2 copies of the application firmware. The primary copy is not valid so the backup copy will be loaded into the primary copy and executed.
No valid backup firmware copy	3 Green, 1 Red	The firmware flash contains 2 copies of the application firmware. The backup copy is not valid so the primary copy will be loaded into the backup copy.
No valid manufacturing parameters	3 Green, 0 Red	The manufacturing parameters which include the serial number, etc. are invalid. The module must be returned for repair.

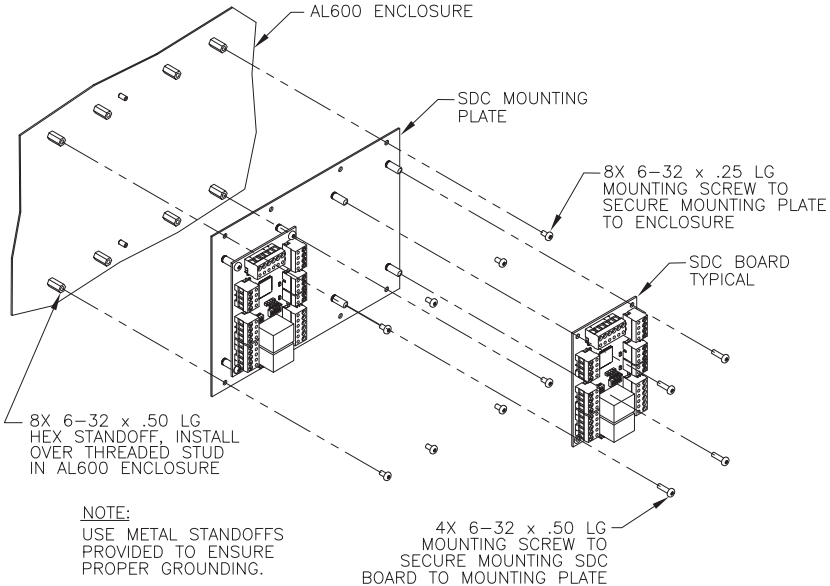
Mounting

The SDC can be mounted in the LNL-AL400ULX or LNL-AL600ULX-4CB6 and the LNL-CTX or LNL-CTX6 enclosure using the Universal Mounting Plate (UMP) LNL-CONV-U2. The universal mounting plate can hold up to two (2) LNL-1300-U modules.

Mounting the SDC in the LNL-AL400ULX and LNL-CTX



Mounting the SDC in the LNL-AL600ULX-4CB6 or LNL-CTX6



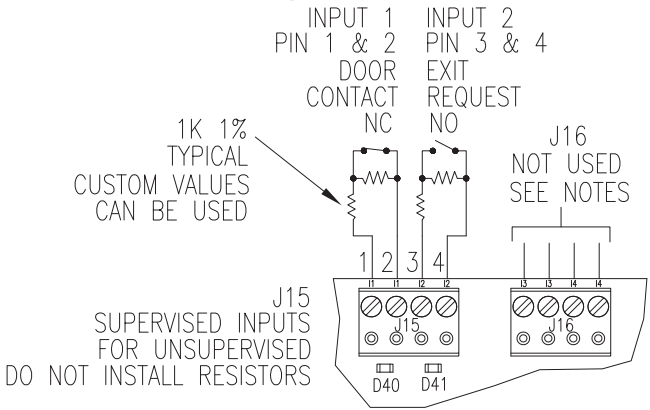
Wiring

Supervised (Software Configurable) Alarm Inputs

Wire the I1 and I2 inputs across pins 1 & 2 and 3 & 4 of J15 using a twisted pair cable, 30 ohms maximum. Terminate each of these inputs with two (2) 1k (1000) ohm resistors (1% tolerance - 0.25 watt).

Note: Resistors must be installed as shown in the SDC wiring diagram if the installation requires supervision.

SDC input wiring



The two (2) inputs available on the SDC are software configurable alarm inputs that can be used for alarm device monitoring. Each of these inputs can be configured, via the Access Control software, as either N/O (normally open) or N/C (normally closed) in combination with either supervised or unsupervised wiring. These alarm inputs are connected using Inputs 1 and 2.

Each input that is configured as a supervised alarm must also be terminated with two (2) 1K (1000) ohm resistors (1% tolerance - 1/4 (0.25) watt. N/O and N/C alarms are terminated identically). Resistors are provided with the module.

Install the resistors as close to input device as possible. For cable length limitations, refer to Specifications.

Input Resistor Table

	Alarm Zone Contact NC	Alarm Zone Contact NO
Normal	1K ± 10%	2K ± 10%
Alarm	2K ± 10%	1K ± 10%

Input Resistor Table (Continued)

	Alarm Zone Contact NC	Alarm Zone Contact NO
Fault – Line Short	0 – 50	0 – 50
Fault – Line Open	15K – ∞	15K – ∞
Fault – Foreign Voltage	50 – 750 1250 – 1500 2500 – 15K	50 – 750 1250 – 1500 2500 – 15K

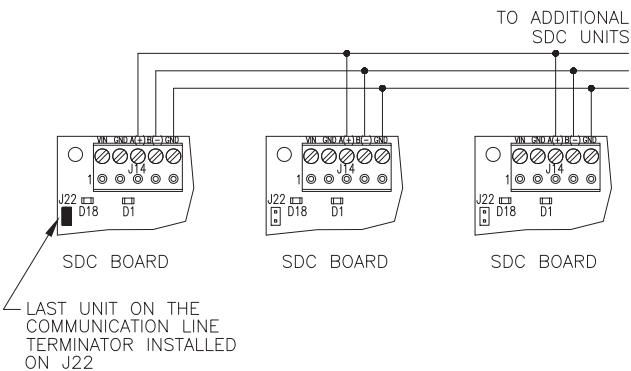
Upstream Communication

The Single Reader SDC Interface Module uses Port 1 to communicate to the Intelligent System Controller.

Port 1 is a 2-wire RS-485 interface, that requires the following type of RS-485 cable: 24 AWG (minimum) twisted pair (with shields). The main run RS-485 cable should be no longer than 4000 feet [1219 m], 100 ohms maximum (Belden 9841, West Penn, or equivalent). The drop cables (to downstream devices) should be kept as short as possible, no longer than 10 feet.

The RS-485 communication is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit.

Note: RS-485 communication is supported for upstream communication only.



Notes: The (EIA) Electronic Industries Association standard defines RS-485 as an electrical interface for multi-port communications on a bus transmission line. It allows for high-speed data transfer over extended distances (4000 feet [1219 m]). The RS-485 interface uses a balance of differential transmitter/receiver to reject common mode noise. For increased reliability over the extended distances, End-Of-Line (EOL) termination is required.

RS-485 must be terminated at both ends of the RS-485 line (bus). Terminating the line provides a more reliable communication by minimizing the signal reflection and external noise coupling. Each component provided has an on-board terminator. The installer should determine which device is at the end of the communication line.

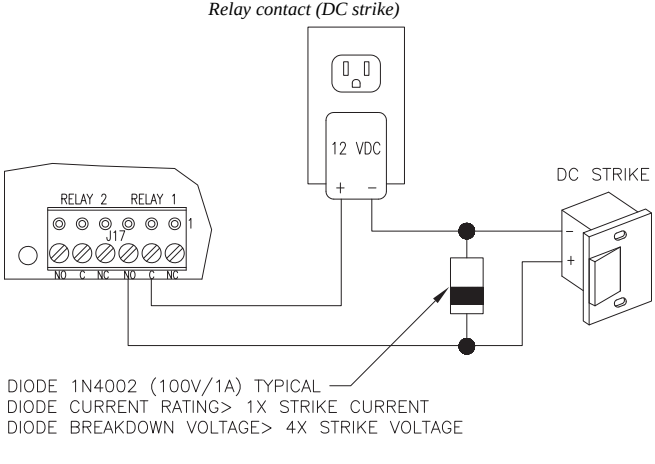
Relay Outputs

The Single Reader SDC Interface Module contains two (2) form-C dry-contact relay outputs, Relay 1 & 2 (K1 & K2). K1 is rated at 5A 30 VDC; K2 is rated at 1A 30 VDC.

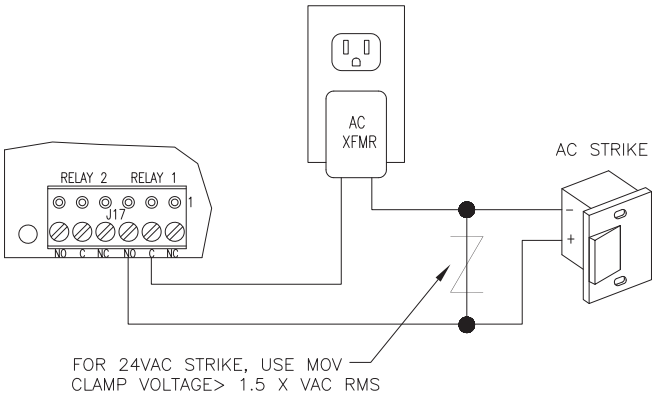
To wire the K1 and K2 outputs, use sufficiently large wires for the load to avoid voltage loss.

Transient clamping must be provided to protect the output contacts and to reduce EMI emissions. For AC-powered devices, use MOV across the load. For DC-powered devices, use a diode across the load.

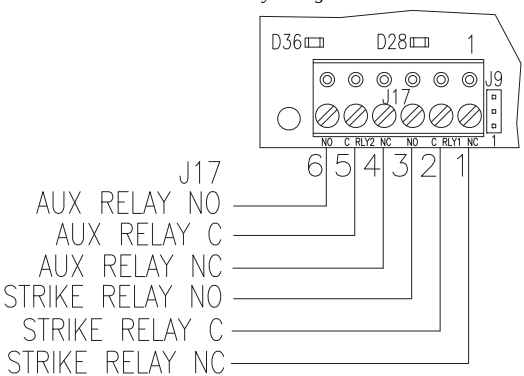
Relay contact (DC strike)



Relay contact (AC strike)



SDC AUX relay wiring



Downstream Reader Communication

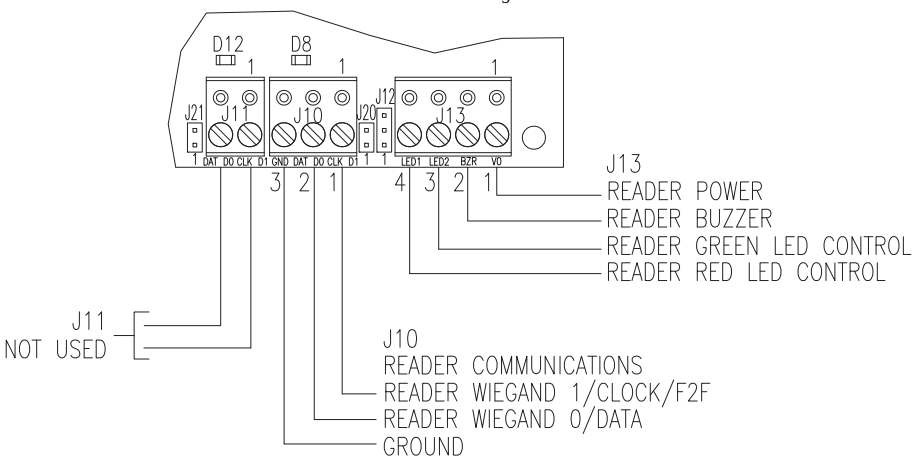
The Single Reader SDC Interface Module can communicate downstream with one (1) card reader. The interface is six wire that includes buzzer and LED control. The LED and buzzer are both open collector types switching (sinking) 10mA maximum.

Note: The LNL-1300-U does not support Bioscrypt readers or the LNL-CK keypad.

Use 18 AWG wire minimum and maximum length of 500 feet [150m].

Reader power: Voltage 12 VDC +/-10% (optional 5 VDC +/-5% jumper selectable, current 400 mA maximum to 50°C, derate to 300 mA for 70°C).

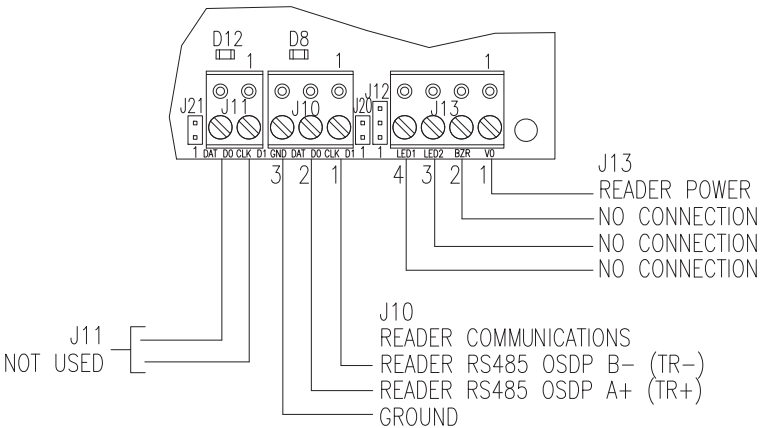
Reader wiring



Open Supervised Device Protocol

Open Supervised Device Protocol (OSDP) uses bi-directional communications between readers and the reader interface, providing constant monitoring of reader health, improved control of reader operation and configuration in real-time, and additional communications capabilities over a single connection, including LCD reader display control.

Wiring for OSDP readers



Elevator Control

OnGuard hardware is capable of supporting elevator control for up to 128 floors. An elevator reader has an input/output module that controls the access to floors via an elevator.

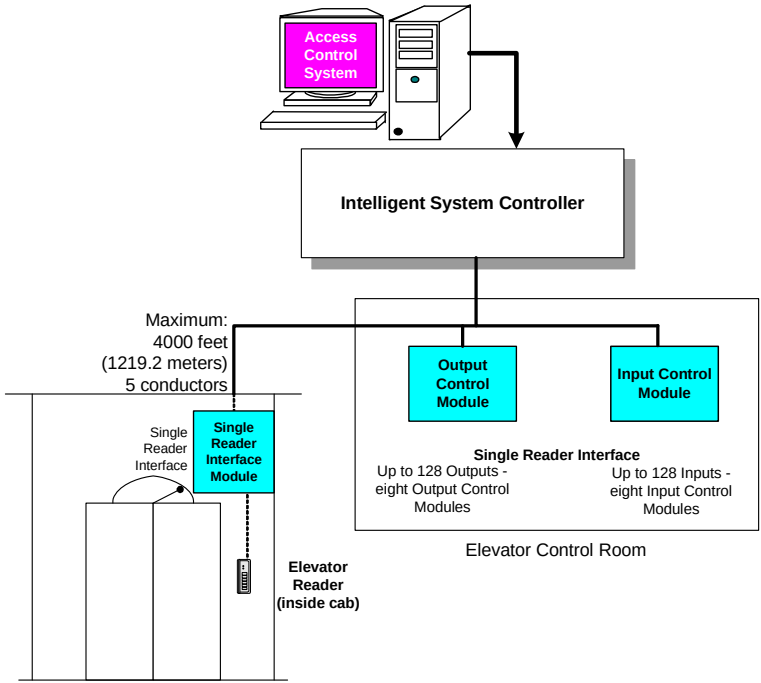
The OnGuard software must be configured for elevator control. This can be done from System Administration by selecting the **Elevator** check box on the General tab in the Readers and Doors form. The reader's type, name, port, address, and access panel can all be defined here as well.

Note: In order for this check box to be available, the access panel to which this reader module is connected must have **Elevator support** enabled on the Options tab.

With elevator control on the LNL-1300 reader, door strike and contact are not available, and REX (Request to EXit) is disabled.

Addresses assigned to input/output panels do not need to be consecutive. On the first panel, the inputs/outputs represent the first sixteen floors (e.g.: Input 1 = first floor, Input 2 = second floor, etc.). The second panel represents the next sixteen floors (floor 17 through 32), etc.

Overview of Elevator Control

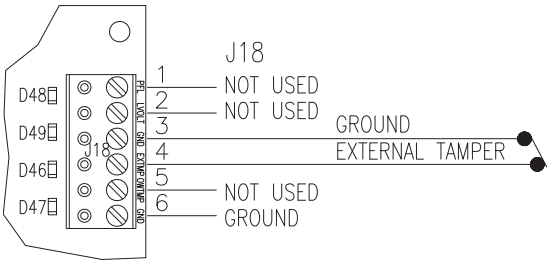


External (Cabinet) Tamper

An external cabinet tamper is configured by connecting a tamper device across pins 3 & 4 of J18 on the SDC. If not used, a jumper must be installed across pins 3 & 4 of J18.

Note: Power fail is not supported on the SDC; therefore no jumper is required. This is labeled in the diagram as “NOT USED.”

External tamper wiring



Note: Input status LEDs will be off when the tamper device is in closed position or the jumper is installed.

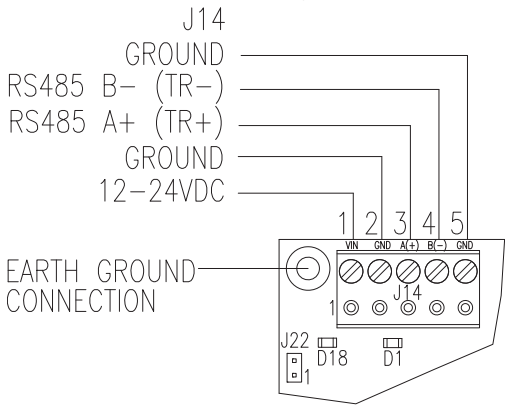
Power and Communications

For its power input, the SDC requires a 12 to 24 VDC ± 10% power source for it input power.

Wire the power input with 18 AWG (minimum) twisted pair cable.

Power Source	Requirements	Current
DC power source	Isolated, non-switching, regulated DC power	700mA for 12VDC 350mA for 24VDC

Power source wiring



Notes: Be sure to observe polarity.

Do not use an AC transformer to directly power the Single Door SDC Interface Module.

Specifications

The LNL-1300-U is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary power:
  - 12 to 24 VDC + 10%
  - 12 VDC @ 700 mA (includes reader current) nominal
  - 24 VDC@ 350 mA (includes reader current) nominal
  - 28.7 BTU/hour
- Outputs: Form-C contacts: Relay 1 and 2 (K1 and K2): 5 A @ 30 VDC
- Inputs:
  - Two (2) supervised, End of Line resistors, 1k/1k ohm, 1% 1/4 watt standard
  - One (1) unsupervised, dedicated for external (cabinet) tamper
- Reader Interface:
  - Reader power: voltage 12 VDC +/-10% (optional 5 VDC +/-5% jumper selectable, current 400 mA maximum to 50°C, derate to 300 mA for 70°C)
  - Reader LED output: open collector type switching (sinking) 10 mA each
  - Buzzer output: open collector type switching (sinking) 10 mA each
  - Reader data inputs: 2-wire RS-485, Wiegand, Clock and Data
- Upstream communication: RS-485, 2-wire. 2400 to 38400 bps
  - Does not support encryption
- Downstream communication:
  - Does not support RS-485
- Cable requirements:
  - Power: 18 AWG, 1 stranded twisted pair
  - RS-485 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
  - Alarm Inputs: 1 stranded twisted pair per input, 30 ohms maximum
  - Outputs: As required for the load
  - Reader data (Wiegand, Clock and Data): 18 AWG stranded, 6 conductor, 500 feet (150 m) maximum
  - Reader data (RS-485): 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 (1,219 m) maximum
- Mechanical:

  - Dimension: 4.75 x 2.75 x 1.25 in. (121 x 70 x 32 mm)
  - Weight: 3.5 oz. (100 g) nominal
- Environmental:
  - Temperature: -10 to +70°C (14 to 158°F) operating, -40 to +85°C (-40 to 185°F) storage
  - Humidity: 10% at 93°C (199°F) non-condensing operating, 10 to 95% at 85°C (185°F) non-condensing storage
- Certifications:
  - FCC Part 15
  - FCC compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
  - ETL 294, s319
  - UL294, UL1076
  - C-Tick N22193
  - CE marking
  - RoHS
  - Environmental class: Indoor dry
  - WEEE

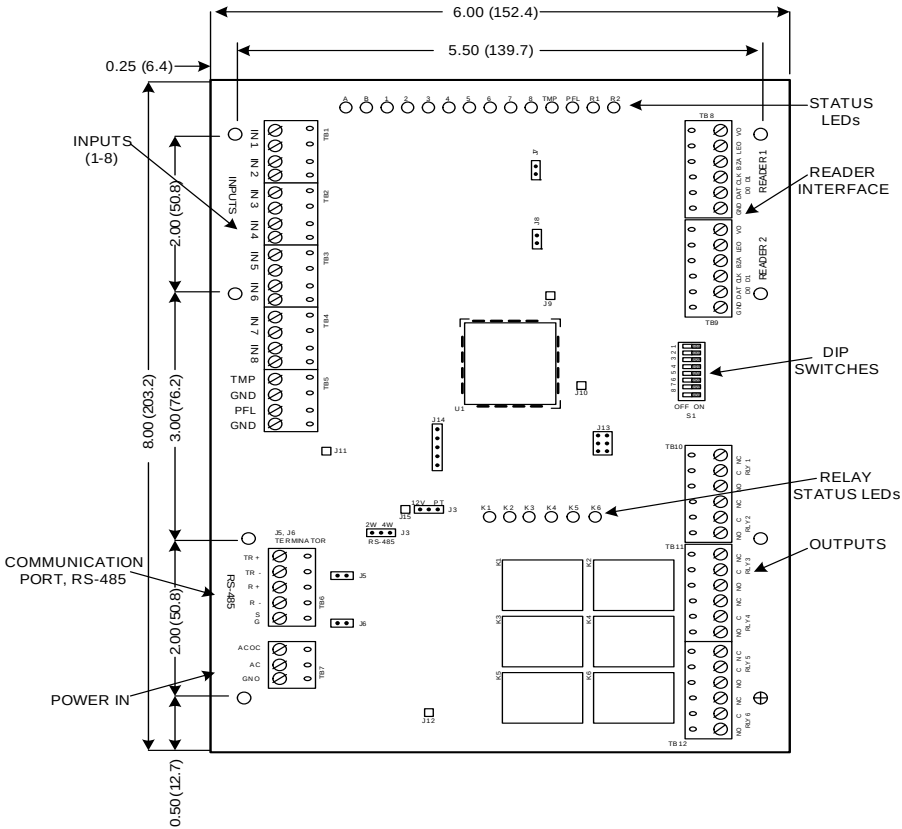
European Union directives: 2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Dual Reader Interface Module LNL-1320 Series 2

The Dual Reader Interface (SDRI) supports most access control card readers, keypads, or readers with keypads that use standard Wiegand Data1/Data0 or Clock/Data communications. Lock, unlock, and facility code offline access modes are supported on all readers connected to the DRI.

The DRI provides a vital link between the Intelligent System Controller (ISC) and the card reader attached to the interface. As many as 32 DRI modules can be multi-dropped using RS-485 2-wire communication, up to 4000 feet per port away from the ISC. Each DRI module is individually addressed for increased reporting capabilities with OnGuard Access Control software applications. The DRI includes eight inputs that support normally open, normally closed, supervised, and non-supervised circuits. In addition, six output relays support fail-safe or fail-secure operation.

LNL-1320 Components



Status LEDs

The series 2 Dual Reader Interface Module board contains LEDs that can be used to verify correct installation after power up.

The A LED is turned on at the beginning of initialization. If the application program cannot be run, the A LED will flash at a rapid rate. The dual reader interface module is waiting for firmware to be downloaded.

When initialization is completed, LEDs A through R2 are briefly sequenced ON then OFF.

After the above sequence, the LEDs have the following meanings:

LED	Purpose
A	This LED is the heartbeat and online status. Offline: 1 second rate, 20% ON, Online: 1 second rate, 80% ON
B	Indicates communication activity on the communication port.
1	IN1 input status
2	IN2 input status
3	IN3 input status
4	IN4 input status
5	IN5 input status
6	IN6 input status
7	IN7 input status
8	IN8 input status
TMP	Cabinet tamper
PFL	Power fault

Input in the inactive state: OFF (briefly flashes ON every 3 seconds).

Input in the active state: ON (briefly flashes OFF every 3 seconds).

Input in a trouble state (default): Rapid Flash.

R1: reader port 1:

- Clock/Data Mode: Flashes when data is received, either input.
- Data 0/Data 1 Mode: Flashes when data is received, either input.
- RS-485 Mode: Flashes when transmitting data.

R2: reader port 2:

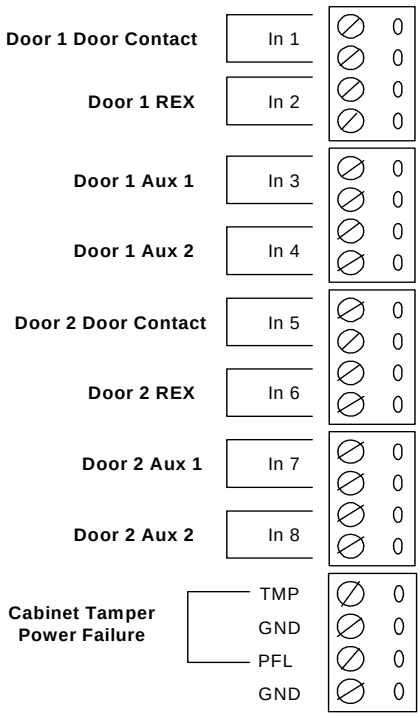
- Clock/Data Mode: Flashes when data is received, either input.
- Data 0/Data 1 Mode: Flashes when data is received, either input.
- RS-485 Mode: Flashes when transmitting data.

LED K1 through K6: Illuminates when output relay RLY 1 (K1) through RLY 6 (K6) is energized.

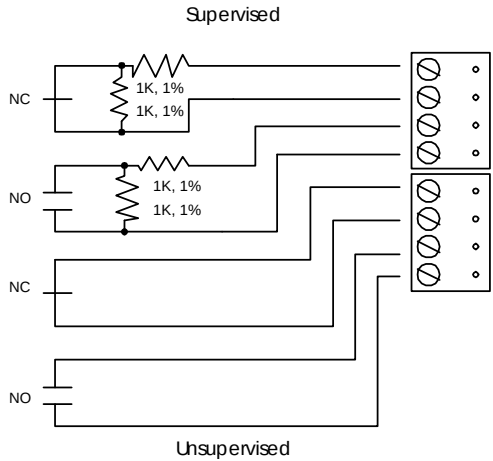
Wiring

Supervised Alarm Inputs - Standard wiring configuration is as follows (Alarm Contacts 1-4 are for Door #1, Alarm Contacts 5-8 are for Door #2):

DRI Alarm Input Contact Wiring



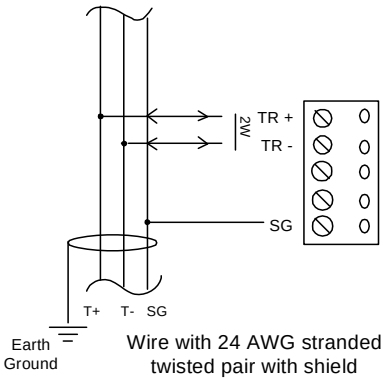
Wire the IN1 - IN8 inputs using a twisted pair cable, 30 ohms maximum. Terminate each of these inputs with two (2) 1000-ohm resistors (1% tolerance - 0.25 watt) for supervised inputs.



Upstream Controller Communication

The Dual Reader Interface Module uses Port 1 to communicate to the Intelligent System Controller.

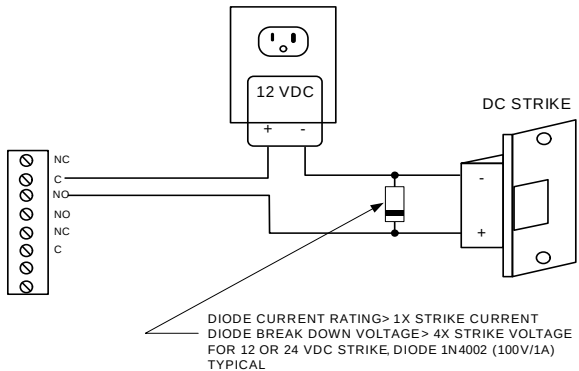
RS-485 2-WIRE COMMUNICATIONS

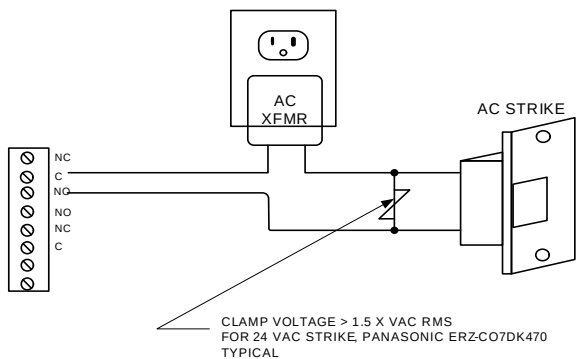


The RS-485 is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit.

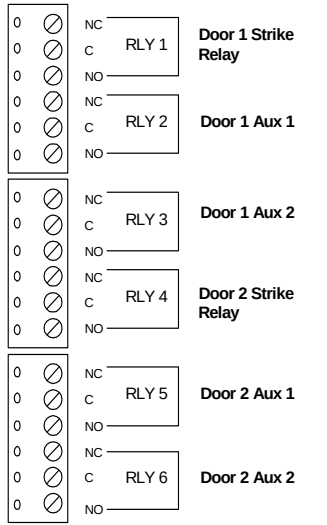
Output Wiring

Contact protection circuit must be used. The following two circuits are recommended. Locate the protection circuit as close to the load as possible (within 12 inches [30cm]), as the effectiveness of the circuit will decrease if it is located further away.



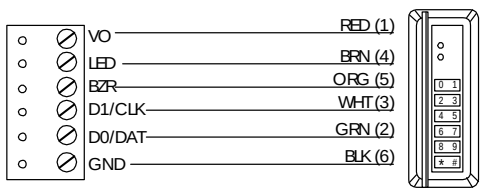


DRI Alarm Output Contact Wiring



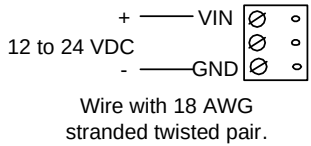
Downstream Reader Communication

The Dual Reader Interface Module can communicate downstream with two (2) keypads or card readers. Wire the J1 interface using a 24 AWG (minimum) cable.



Power

Wire the power input with an 18 AWG (minimum) twisted pair cable.



DIP Switches

DIP switches must be configured appropriately for your system.

Device Address

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
0	off	off	off	off	off
1	off	off	off	off	ON
2	off	off	off	ON	off
3	off	off	off	ON	ON
4	off	off	ON	off	off
5	off	off	ON	off	ON
6	off	off	ON	ON	off
7	off	off	ON	ON	ON
8	off	ON	off	off	off
9	off	ON	off	off	ON

Device Address (Continued)

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
10	off	ON	off	ON	off
11	off	ON	off	ON	ON
12	off	ON	ON	off	off
13	off	ON	ON	off	ON
14	off	ON	ON	ON	off
15	off	ON	ON	ON	ON
16	ON	off	off	off	off
17	ON	off	off	off	ON
18	ON	off	off	ON	off
19	ON	off	off	ON	ON
20	ON	off	ON	off	off
21	ON	off	ON	off	ON
22	ON	off	ON	ON	off
23	ON	off	ON	ON	ON
24	ON	ON	off	off	off
25	ON	ON	off	off	ON
26	ON	ON	off	ON	off
27	ON	ON	off	ON	ON

Device Address (Continued)

Address	DIP SWITCH				
	5:	4:	3:	2:	1:
28	ON	ON	ON	off	off
29	ON	ON	ON	off	ON
30	ON	ON	ON	ON	off
31	ON	ON	ON	ON	ON

Communication Baud Rate

BAUD RATE	DIP SWITCH 6:	DIP SWITCH 7:
38,400 bps	ON	ON
19,200 bps	off	ON
9600 bps	ON	off
115,200 bps	off	off

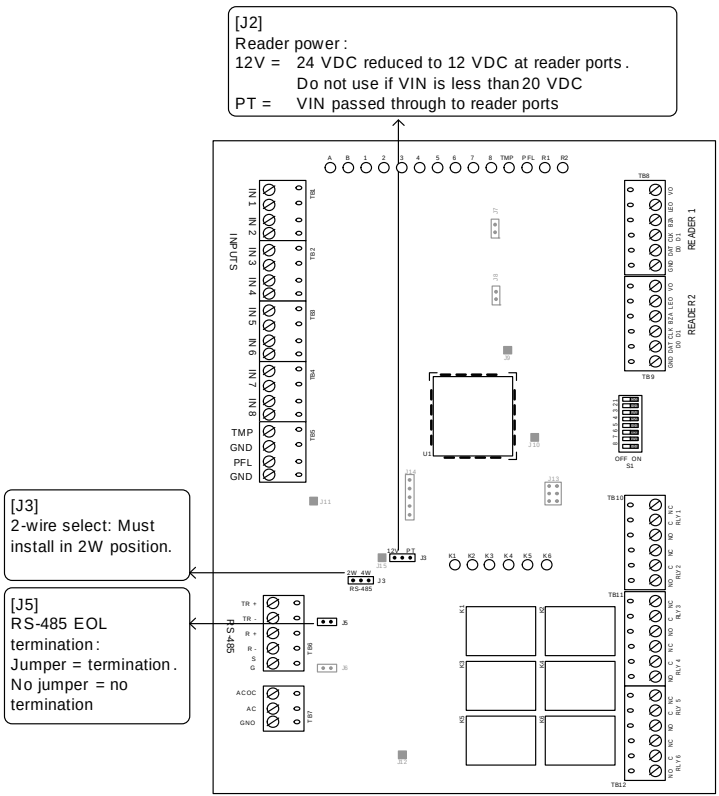
DIP switch 8 controls the utilization of encryption.

PASSWORD STATUS	DIP SWITCH 8: (OnGuard 2009 or later)	DIP SWITCH 8: (prior to OnGuard 2009)
Encryption is optional	off	Normal operation
Encryption is required	ON	Not allowed

When DIP switch 8 is ON, communication will not be allowed unless the access panel supports downstream encryption and is configured to enable encryption to this device.

When DIP switch 8 is off, the device will accept either encrypted or unencrypted communication. It must be off if the access panel does not support downstream encryption, or if downstream encryption is disabled for this device.

Installing Jumpers



Specifications

The LNL-1320 is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

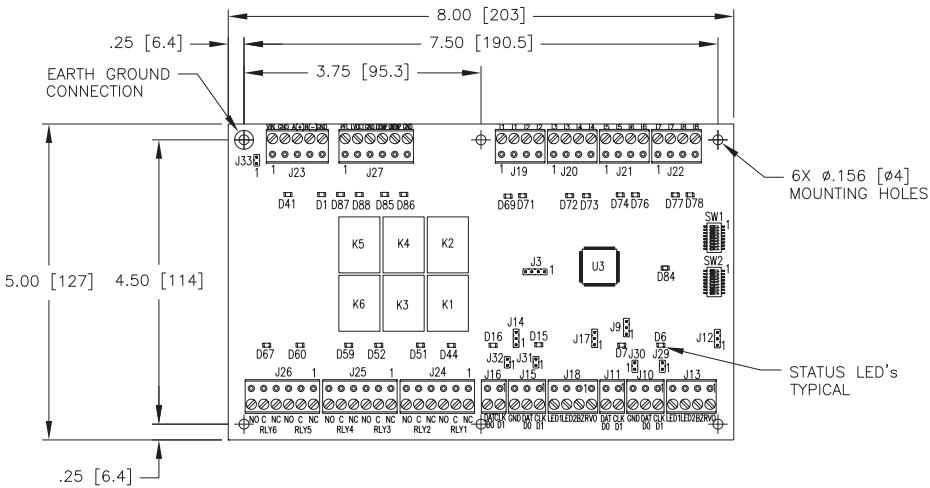
- Primary power: 12 to 24 VDC ± 10%, 550mA maximum (plus reader current)
  - 12 VDC @ 450mA(plus reader current) nominal
  - 24 VDC @ 270mA (plus reader current) nominal
- Outputs: Six outputs, Form-C, 5A @ 28 VDC resistive
- Inputs:
  - Eight (8) unsupervised/supervised, standard EOL, 1k/1k ohm, 1% 1/4 watt
  - Two (2) unsupervised, dedicated for cabinet tamper and UPS fault monitoring
- Reader interface:
  - Reader power (jumper selectable): 12 VDC ± 10% regulated, 125mA maximum each reader or 12 to 24 VDC ±10% (input voltage passed through) 125mA maximum each reader
  - Reader LED output: TTL compatible, high > 3V, low < 0.5V, 5mA source/sink maximum
  - Reader buzzer output: Open collector, 5 VDC open circuit maximum, 10mA sink maximum
  - Reader data inputs: TTL compatible inputs or 2-wire RS-485
- Communication: RS-485 two-wire, 9600 to 115,200 bps
- Cable requirements:
  - Power: 18 AWG, 1 stranded twisted pair
  - RS-485: 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
  - Alarm inputs: 1 stranded twisted pair per input, 30 ohms maximum
  - Outputs: As required for the load
  - Reader data (TTL): 6 conductors, 18 AWG stranded, 500 feet (150 m) maximum
  - Reader data (RS-485): 24AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
- Mechanical:
  - Dimension: 6 x 8 x 1 in. (152 x 203 x 25 mm)
  - Weight: 11 oz. (312 g) nominal
- Environmental:
  - Temperature: 32 to 158° F(0 to 70° C) operating, -67 to +185° F (-55 to +85° C) storage
  - Humidity: 0 to 95% RHNC
- Certifications:

- UL294 and UL1076 Listed, ULC Listed
- FCC Part 15
- C-Tick
- CE marking
- RoHS compliant
- WEEE

Dual Door Controller Module LNL-1320-U

The Dual Door Controller (DDC) provides a solution for interfacing to Wiegand Data1/Data0 and Magnetic Clock/Data readers or keypads (4/8 bit), and door hardware. It can accept data from a reader with clock/data, Wiegand signaling, or 2-wire RS-485, provides a tri-stated LED control and buzzer control. Six form-C relay outputs may be used for strike control or alarm signaling. Eight inputs are provided for monitoring the door contact and exit push button, and auxiliary inputs (supervised or unsupervised). Communication to the host controller and other modules is done via a 2-wire RS-485 interface. It requires 12 to 24 VDC for power.

DDC board



Installation

1. Set baud rate, address, and LED control switches.
2. Install jumpers.
3. Mount the board in the enclosure.

Note: The LNL-CONV-U1 Universal Mounting Plate is required when installing the board into a CTX enclosure. For more information, refer to Mounting on page 197.

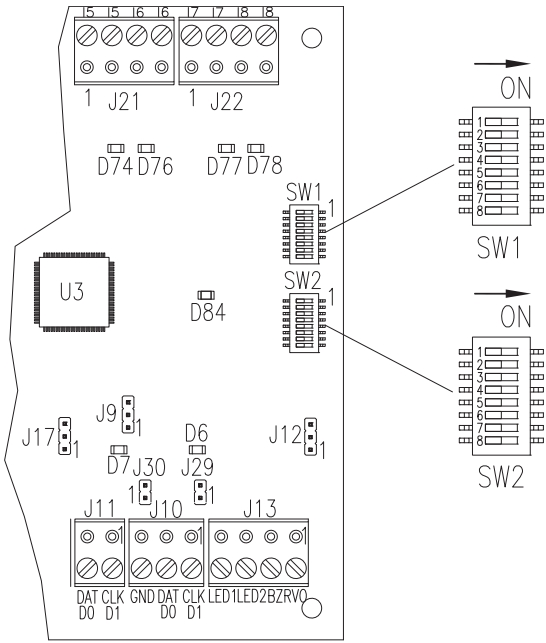
4. Wire the supervised alarm inputs.
5. Wire the upstream host communication.
6. Wire the relay outputs for door strike and AUX.
7. Wire the downstream interface for the keypad or card reader.
8. Wire the unsupervised alarm inputs for power fail and cabinet tamper.
9. Wire the power and communications inputs.
10. Validate proper operation on power up.

Configuration

The Dual Door Controller (DDC) Interface Module board contains two (2) 8-position DIP switches that are user-selectable to control addressing, baud rate, and other functions, and seven (7) jumpers used to configure your system.

Setting DIP Switches

DDC dip switches



Communication Baud Rate (SW1)

Configure the baud rate using SW1 switches 1-4. (Switch 5 is used for LED control. Switches 6-8 are not used.)

Baud rate	SW1 switch for host		SW1 switch for OSDP readers (Aux ports)	
	1:	2:	3:	4:
2400 bps	off	off	off	off
9600 bps	ON	off	ON	off
19200 bps	off	ON	off	ON
38400 bps	ON	ON	ON	ON

LED Mode

SW1 switch 5 is used for LED control. It is read at boot time. If you make a change to this setting, be sure to restart.

Note: The status LEDs only function when the cabinet tamper switch is open (cabinet door is open). When the cabinet tamper switch is closed (cabinet door is closed), the status LEDs are off.

SW1 Switch 5	State
ON	LEDs behave as the Access (LNL) series module.
off	LED behavior is in Normal Mode

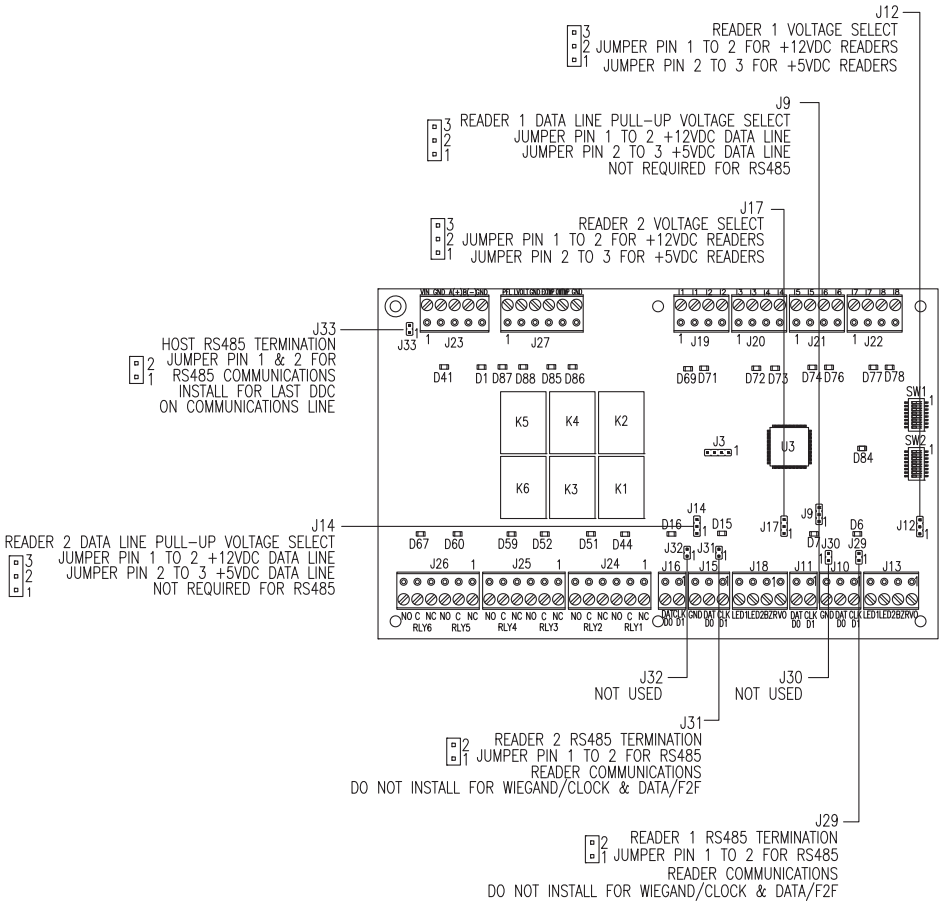
Device Address (SW2)

Configure the board address using SW2. (Switches 6-8 are not used.)

Address	SW2 switch				
	1:	2:	3:	4:	5:
0	off	off	off	off	off
1	ON	off	off	off	off
2	off	ON	off	off	off
3	ON	ON	off	off	off
4	off	off	ON	off	off
5	ON	off	ON	off	off
6	off	ON	ON	off	off
7	ON	ON	ON	off	off
8	off	off	off	ON	off
9	ON	off	off	ON	off
10	off	ON	off	ON	off
11	ON	ON	off	ON	off
12	off	off	ON	ON	off
13	ON	off	ON	ON	off
14	off	ON	ON	ON	off
15	ON	ON	ON	ON	off
16	off	off	off	off	ON

Address	SW2 switch				
	1:	2:	3:	4:	5:
17	ON	off	off	off	ON
18	off	ON	off	off	ON
19	ON	ON	off	off	ON
20	off	off	ON	off	ON
21	ON	off	ON	off	ON
22	off	ON	ON	off	ON
23	ON	ON	ON	off	ON
24	off	off	off	ON	ON
25	ON	off	off	ON	ON
26	off	ON	off	ON	ON
27	ON	ON	off	ON	ON
28	off	off	ON	ON	ON
29	ON	off	ON	ON	ON
30	off	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

Installing Jumpers



Host Communications

- Jumper J33 pins 1 & 2 for RS-485 communications termination. Install jumper on the last DDC unit on the communications line for proper termination of the communications bus. For more information, refer to the DDC upstream communication diagram.

Reader 1 output voltage selection:

- Jumper J12 pins 1 & 2 for +12VDC readers
- Jumper J12 pins 2 & 3 for +5VDC readers

Reader 2 output voltage selection:

- Jumper J17 pins 1 & 2 for +12VDC readers
- Jumper J17 pins 2 & 3 for +5VDC readers

Reader 1 RS-485 termination:

- Jumper J29 pins 1 & 2 for RS-485 reader communications.

Note: Do NOT install the jumper for Wiegand/Clock & Data/F2F Reader Communications.

Reader 2 RS-485 termination:

- Jumper J31 pins 1 & 2 for RS-485 reader communications.

Note: Do NOT install the jumper for Wiegand/Clock & Data/F2F Reader Communications.

Reader 1 data line pull-up voltage selection:

- Jumper J9 pins 1 & 2 for +12VDC Data Line
- Jumper J9 pins 2 & 3 for +5VDC Data Lines

Note: Not required for RS-485 communications.

Reader 2 data line pull-up voltage selection:

- Jumper J14 pins 1 & 2 for +12VDC Data Lines
- Jumper J14 pins 2 & 3 for +5VDC Data Lines

Note: Not required for RS-485 communications.

Jumpers J30 & J32 not used.

Status LED Table for Series 2 LNL-1320 Mode

Note: The status LEDs only function when the cabinet tamper switch is open (cabinet door is open). When the cabinet tamper switch is closed (cabinet door is closed), the status LEDs are off.

When switch 5 is in the ON position, the LEDs behave like the series 2 LNL-1320.

Indication	LED	State
Power-up	ALL	Off
Initialization	D84	Flashing
After initialization	D84	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON
Communications	D1	ON

Status LED Table for Normal Mode

When SW1 switch 5 is in the off position, the LEDs operate in Normal Mode. External tamper (cabinet tamper) must be open for Input LEDs to be on. When tamper is closed (cabinet door closed) Input LEDs will be off.

Indication	LED	State
RS-485 panel communication	D1	ON - Yellow
Reader 1 RS-485 communication	D6	ON - Yellow
Reader 2 RS-485 communication	D15	ON - Yellow
Power on	D41	ON - Green
Relay 1	D44	ON - Green
Relay 2	D51	ON - Green
Relay 3	D52	ON - Green
Relay 4	D59	ON - Green

Indication	LED	State
Relay 5	D60	ON - Green
Relay 6	D67	ON - Green
Supervised input I1-I8	D69, D70-D74, D76-D78	Active: ON - Yellow Inactive: ON - Green Foreign: ON - Red Cut: Flashing - Green Short: Flashing - Red Ground: Flashing - Yellow
Unsupervised I1-I8	D69, D70-D74, D76-D78	Closed ON - Red, Open - Off
CPU status	D84	Offline: 1 second rate, 20% ON Online: 1 second rate, 80% ON Flashing Green - Badge Read
External (cabinet) tamper	D85	Open ON - Red
Power fail	D87	ON - Red

CPU status LED D84 possible module error conditions for LED Normal and Series 2 modes:

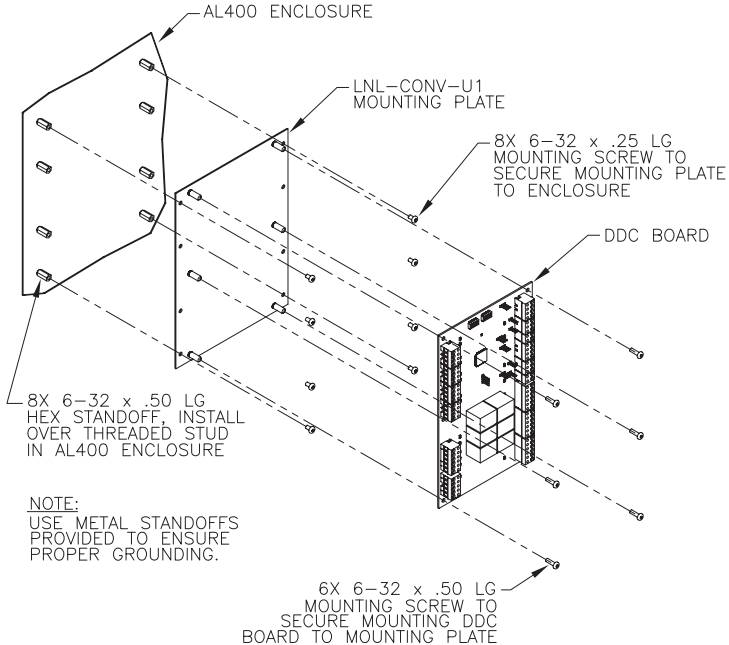
Error condition	Flashing pattern	Description
No valid application firmware	3 Red, 2 Green	The module is not operational. Firmware must be loaded using a console, e.g. HyperTerminal with Xmodem.
Boot loader waiting on firmware file	3 Red, 1 Green	Console boot loader is waiting on start of firmware file.
Boot loader loading firmware file	2 Red, 2 Green	Console boot loader is loading a firmware file.
Invalid EFL file	1 Red, 2 Green	The EFL specified to be loaded using the console loader is not a valid EFL file.

Error condition	Flashing pattern	Description
Invalid Xmodem packet	1 Red, 1 Green	The console loader received an invalid Xmodem packet and terminated the firmware download operation.
Invalid Application firmware for module CPU	3 Red, 0 Green	The module is not operational. Application firmware loaded on the module will not run properly. Requires new firmware be loaded using the console boot loader or the module must be returned for repair.
Invalid Boot firmware for module CPU	2 Red, 3 Green	The module is not operational. Boot loader firmware loaded on the module will not run properly. The module must be returned for repair.
Firmware update failed	1 Red, 3 Green	Firmware update operation was unsuccessful. Retry and if it fails continuously, load a different firmware file.
No valid primary firmware copy	3 Green, 2 Red	The firmware flash contains 2 copies of the application firmware. The primary copy is not valid so the backup copy will be loaded into the primary copy and executed.
No valid backup firmware copy	3 Green, 1 Red	The firmware flash contains 2 copies of the application firmware. The backup copy is not valid so the primary copy will be loaded into the backup copy.
No valid manufacturing parameters	3 Green, 0 Red	The manufacturing parameters which include the serial number, etc. are invalid. The module must be returned for repair.

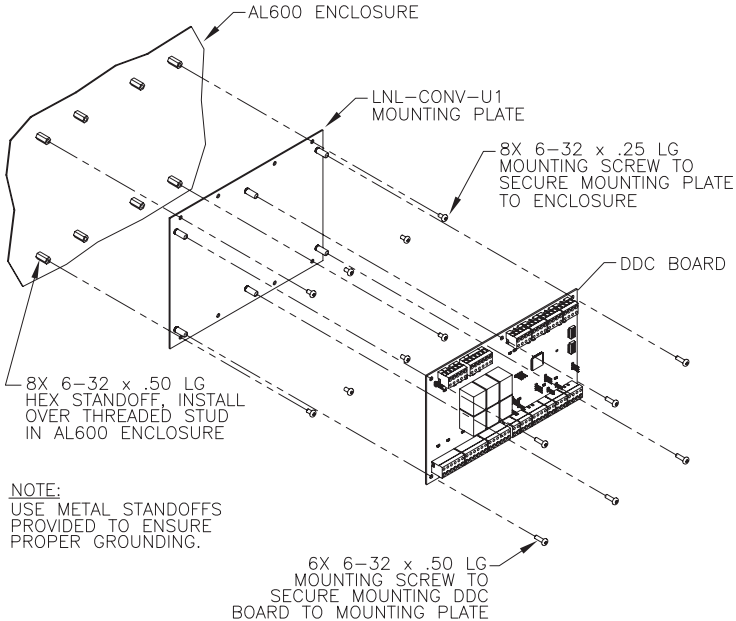
Mounting

The DDC can be mounted in the LNL-AL400ULX or LNL-AL600ULX-4CB6 and the LNL-CTX or LNL-CTX6 enclosure using the Universal Mounting Plate (UMP) LNL-CONV-U1

Mounting the DDC in the LNL-AL400ULX and LNL-CTX



Mounting the DDC in the LNL-AL600ULX-4CB6 or LNL-CTX6

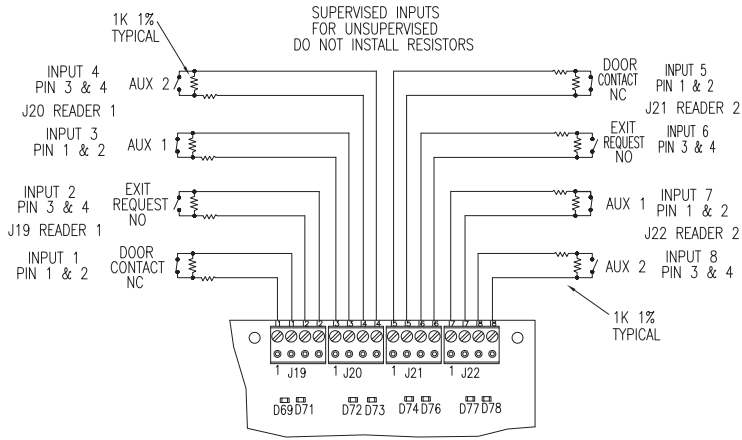


Wiring

Wire inputs I1 through I8 (J19 - J22) using a twisted pair cable, 30 ohms maximum, 24 AWG minimum.

Supervised (Software Configurable) Alarm Inputs

DDC input wiring



Note: See the Input Resistor Table for termination resistor values.

The eight (8) inputs that are available on the DDC are software configurable alarm inputs that can be used for alarm device monitoring. Each of these inputs can be configured, via the Access Control software, as either N/O (normally open) or N/C (normally closed) in combination with either supervised or unsupervised wiring. These alarm inputs are connected using Inputs 1 - 8. Inputs 1 and 6 are used for the door contacts, inputs 2 and 5 are used for request to exit switches, and inputs 3, 4, 7, and 8 are available for auxiliary inputs points.

Each input that is configured as a supervised alarm must be terminated with two (2) 1K (1000) ohm resistors (1% tolerance - 1/4 (0.25) watt. N/O and N/C alarms are terminated identically.)

Install the resistors as close to input device as possible. For cable length limitations, refer to Specifications.

Input Resistor Table

	Alarm Zone Contact NC	Alarm Zone Contact NO
Normal	1K ± 10%	2K ± 10%
Alarm	2K ± 10%	1K ± 10%
Fault – Line Short	0 – 50	0 – 50
Fault – Line Open	15K – ∞	15K – ∞
Fault – Foreign Voltage	50 – 750 1250 – 1500 2500 – 15K	50 – 750 1250 – 1500 2500 – 15K

Upstream Communication

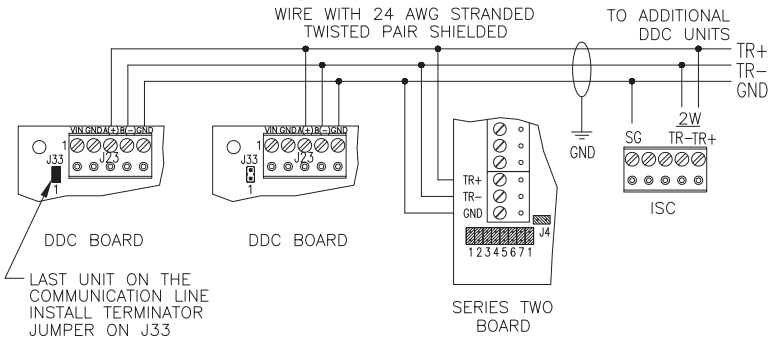
The DDC uses Port 1 to communicate to the Intelligent System Controller.

Port 1 is a 2-wire RS-485 interface, that requires the following type of RS-485 cable: 24 AWG (minimum) twisted pair (with shields). The main run RS-485 cable should be no longer than 4000 feet [1219 m], 100 ohms maximum (Belden 9841, West Penn, or equivalent). The drop cables (to downstream devices) should be kept as short as possible, no longer than 10 feet [3.048 m].

The RS-485 communication is asynchronous, half-duplex, using 1 start bit, 8 data bits, 1 stop bit

Note: RS-485 communication is supported for upstream communication only.

DDC upstream communication



To enable RS-485 termination, install jumper on pin header J33 (on the last unit on the communications line).

Notes: The (EIA) Electronic Industries Association standard defines RS-485 as an electrical interface for multi-port communications on a bus transmission line. It allows for high-speed data transfer over extended distances (4000 feet [1219m]). The RS-485 interface uses a balance of differential transmitter/receiver to reject common mode noise. For increased reliability over the extended distances, End-Of-Line (EOL) termination is required.

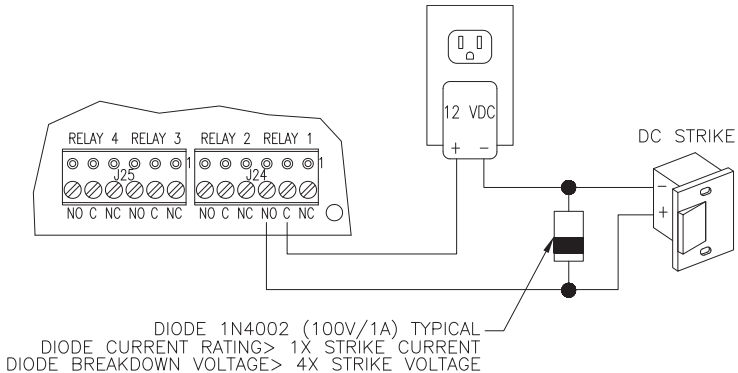
RS-485 must be terminated at both ends of the RS-485 line (bus). Terminating the line provides a more reliable communication by minimizing the signal reflection and external noise coupling. Each component provided has an on-board terminator. The installer should determine which device is at the end of the communication line.

Control Output Wiring

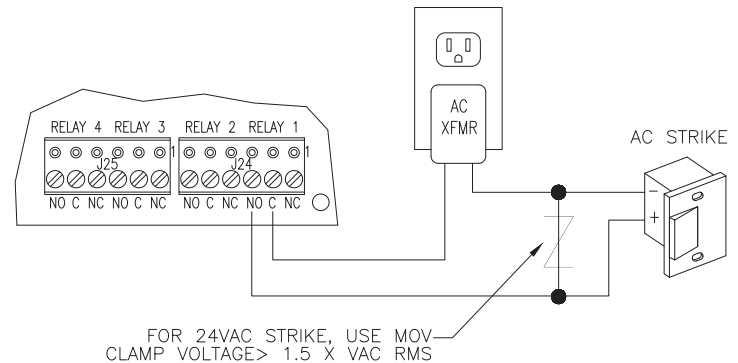
Contact protection circuit must be used. The following two (2) circuits are recommended. Locate the protection circuit as close to the load as possible (within 12 inches [30cm]), as the effectiveness of the circuit will decrease if it is located farther away.

Relay Outputs

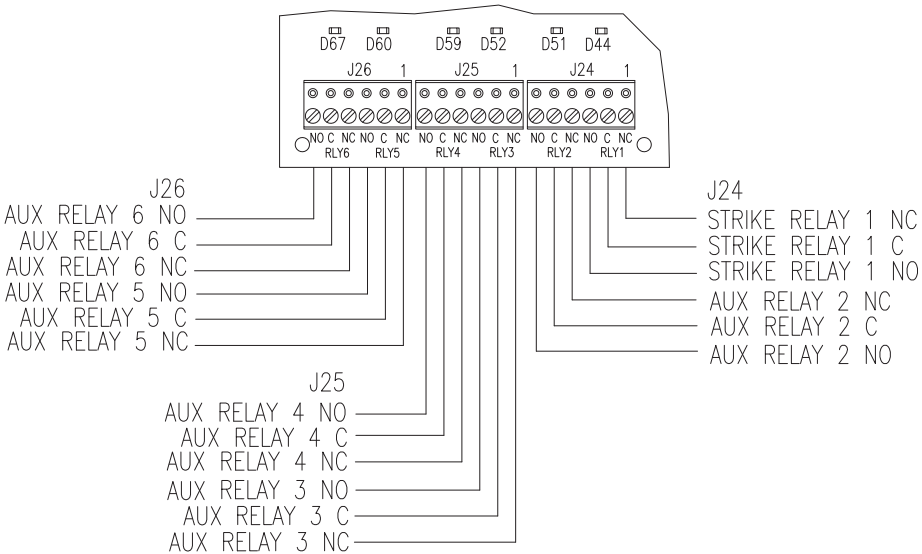
Relay contact (DC strike)



Relay contact (AC strike)



DDC AUX relay wiring



Downstream Reader Communication

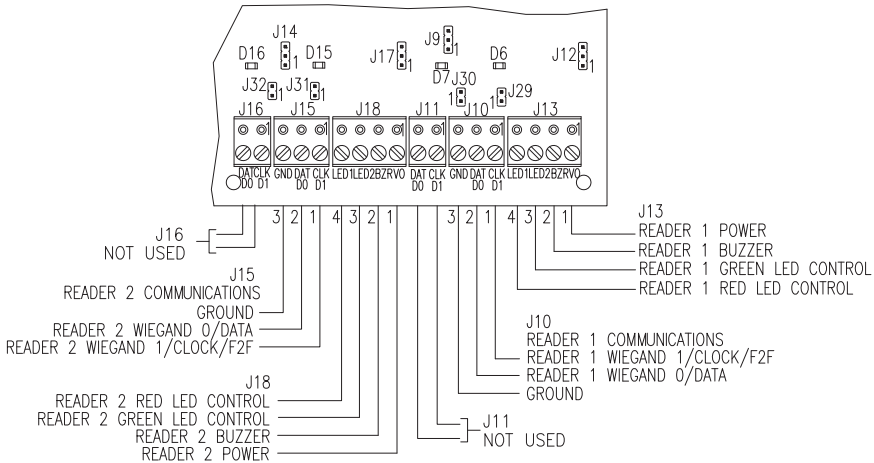
The DDC can communicate to two (2) card readers. The interface is six-wire that includes buzzer and LED control. The LED and buzzer are both open collector type switching (sinking) 10 mA maximum.

Note: The LNL-1320-U does not support Bioscrypt readers or the LNL-CK keypad.

Wire using 18 AWG wire minimum and maximum length of 500 feet [152.4m].

Reader power: Voltage 12 VDC +/-10% (optional 5 VDC +/-5% jumper selectable, current 400 mA maximum to 50°C, derate to 300 mA for 70°C.

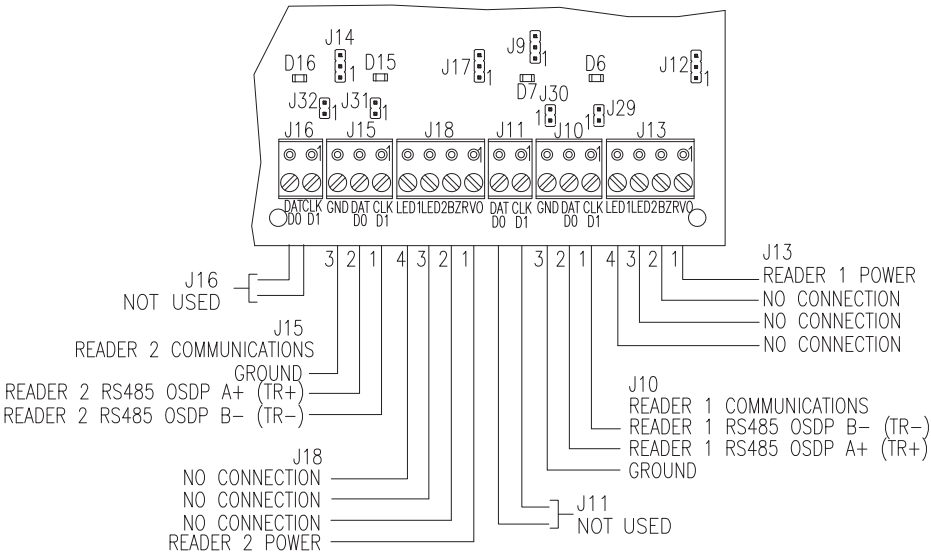
DDC reader wiring



Open Supervised Device Protocol

Open Supervised Device Protocol (OSDP) uses bi-directional communications between readers and the reader interface, providing constant monitoring of reader health, improved control of reader operation and configuration in real-time, and additional communications capabilities over a single connection, including LCD reader display control.

Wiring for OSDP readers



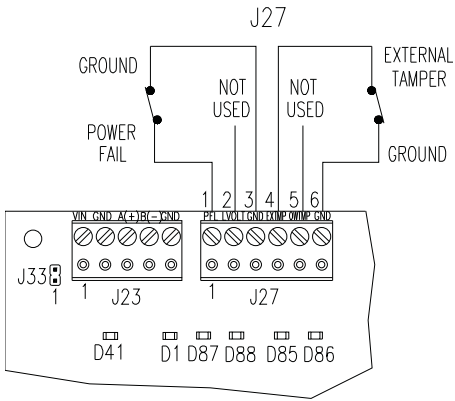
Unsupervised Alarm Inputs: Power Fail and External (Cabinet) Tamper

The Dual Door Controller (DDC) features two (2) unsupervised alarm inputs that can be used for power fault and external (cabinet) tamper monitoring. These inputs are connected using the power fail and external (cabinet) tamper contact terminals located on the Dual Door Controller.

The power fail and external tamper inputs are simple N/C (normally closed) contact closure monitors.

Wire the power fail and external tamper inputs using twisted pair cable, 30 ohms maximum (No EOL resistors are required).

Note: Input status LEDs will be off when the tamper device is in the closed position or the jumper is installed



External (cabinet) tamper: Configure by connecting a tamper device across pins 3 & 4 of J27 on the DDC. If not used, a jumper must be installed across pins 3 & 4 of J27.

Power fail: Configure by connecting pins 1 & 6 of J27 to power fail device. If not used, a jumper must be installed across pins 1 & 6 of J27.

Power and Communications

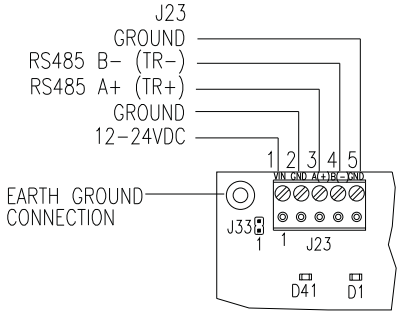
The Dual Door Controller requires a 12 to 24 VDC ± 10% power source for its input power.

Wire the Power In input with 18 AWG (minimum) twisted pair cable.

Power Source	Requirements	Current
DC power source	Isolated, non-switching, regulated DC power	1200mA for 12VDC 600mA for 24VDC

Note: Be sure to observe polarity.

Power source wiring



Specifications

The LNL-1320-U is for connection to low voltage, class 2 power-limited circuits only. These specifications are subject to change without notice.

- Primary power: 12 to 24 VDC ± 10%
  - 12 VDC @ 1200 mA (includes reader current) nominal
  - 24 VDC @ 600 mA (includes reader current) nominal
  - 49.1 BTU/hour
- Outputs: Form-C contacts, Relays 1-6 (K1-K6), 5 A @ 30 VDC
- Inputs:
  - Eight (8) supervised, End of Line resistors, 1k/1k ohm, 1% 1/4 watt standard
  - One (1) unsupervised, dedicated external (cabinet) tamper
  - One (1) unsupervised, AC power fail
- Reader interface:
  - Reader power (per reader): voltage 12 VDC +/-10% (optional 5 VDC +/-5% jumper selectable, current 400 mA maximum to 50°C, derate to 300 mA for 70°C)
  - Reader LED output: open collector type switching (sinking) 10 mA each
  - Reader buzzer output: open collector type switching (sinking) 10 mA each
  - Reader data inputs: 2-wire RS-485, Wiegand Data1/Data0, Clock and Data
- Upstream communication: RS-485, 2-wire, 2400 to 38400 bps
  - Does not support encryption
- Downstream communication:
  - Does not support RS-485
- Cable requirements:
  - Power: 18 AWG, 1 stranded twisted pair
  - RS-485: 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
  - Alarm inputs: 1 stranded twisted pair per input, 30 ohms maximum
  - Outputs: As required for the load
  - Reader data (Wiegand, Clock and Data): 6 conductors, 18 AWG stranded, 500 feet (152.4 m) maximum
  - Reader data (RS-485): 24 AWG, 120 ohm impedance, stranded twisted pair with shield, 4000 feet (1219 m) maximum
- Mechanical:

- Dimension: 5 x 8 x 1.25 in. (127 x 203 x 32 mm)
- Weight: 7.3 oz. (207 g) nominal

• Environmental:
  - Temperature: -10 to +70°C (14 to 158°F) operating, -40 to +85°C (-40 to 185°F) storage
  - Humidity: 10% at 93°C (199°F) non-condensing operating, 10 to 95% at 85°C (185°F) non-condensing storage

• Certifications:
  - FCC Part 15
  - FCC compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
  - ETL 294, s319
  - UL294, 1076
  - C-Tick N22193
  - CE marking
  - RoHS
  - Environmental class: Indoor dry
  - WEEE

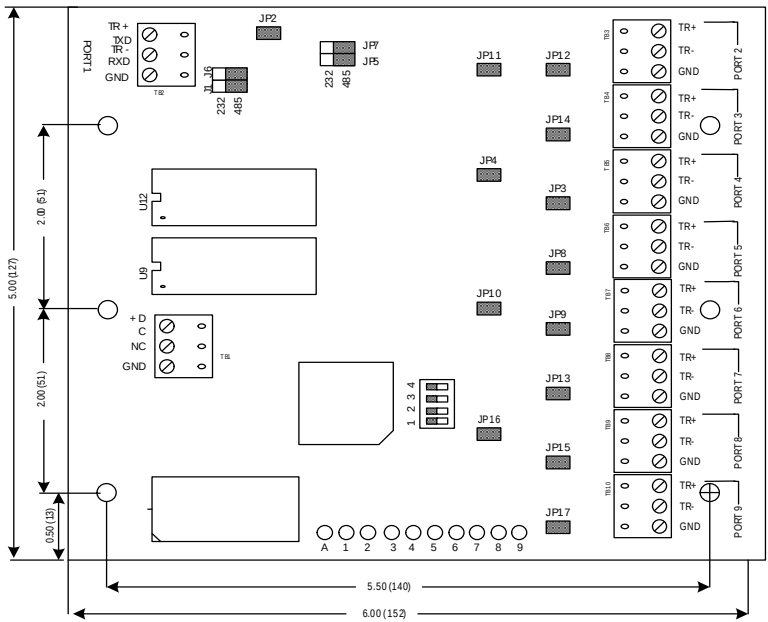
European Union directives: 2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Star Multiplexer LNL-8000

The Star Multiplexer was designed to implement star topology on a single downstream port (ports 2 through 5 of any of the Intelligent System Controllers (ISC) or on any host communication port of any OnGuard server) to eight RS-485 (2-wire) ports or four RS-485 (4-wire) channels. It allows conversion of communication protocol, and provides connection with alternate communication devices to extend effective distances.

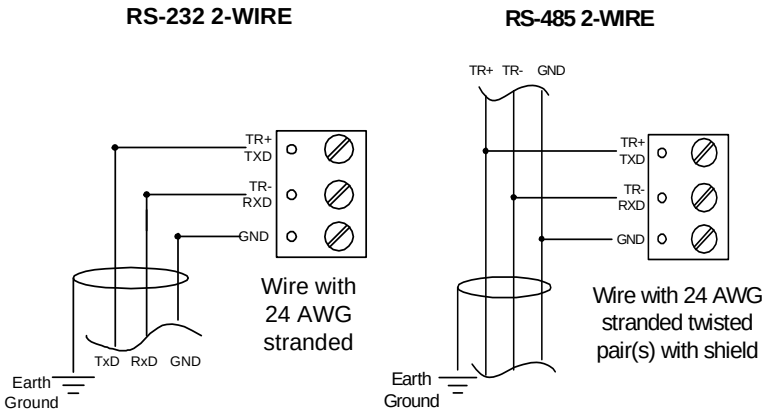
The host interface can be either RS-232 or RS-485 (2-wire) communication. The Star Multiplexer interfaces upstream with the ISC, and downstream with one or many Lenel RS-485 products on each downstream port (ports 2-9). A maximum of eight devices are allowed per downstream port.

LNL-8000 Components



Upstream Controller Communication

The Star Multiplexer can communicate to the Intelligent System Controller by one of four downstream ports, either by RS-485 (2-wire) communications or RS-232 to RS-485 converters

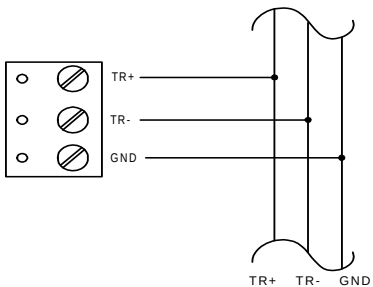


Downstream Communications

The Star Multiplexer topology is capable of eight different downstream directions in RS-485 (2-wire) communications (using Belden 9841 or equivalent) or four different downstream directions with RS-485 (4-wire) communications (using Belden 9842 or equivalent).

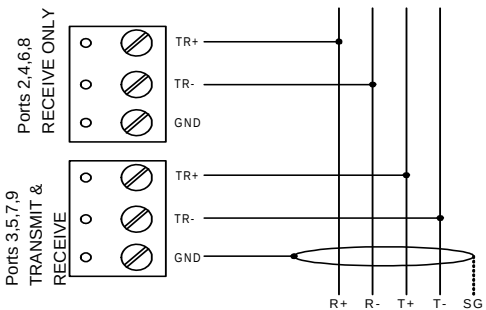
Each leg of the star, in either configuration, has a maximum wire distance of 4000 feet. Each leg supports up to eight (8) Lenel hardware RS-485 devices in many configurations.

RS-485 2-WIRE



Wire with 24 AWG stranded twisted pair(s) with shield

RS-485 4-WIRE



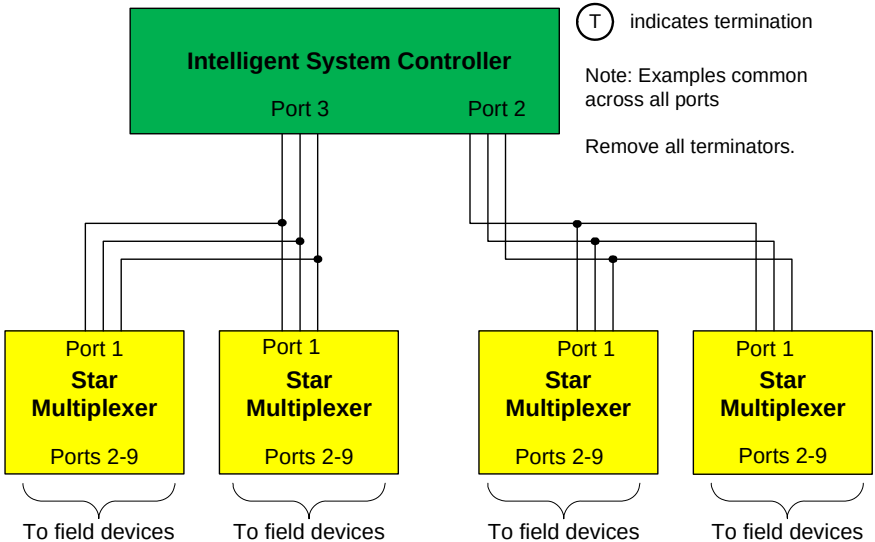
Wire with 24 AWG stranded twisted pair(s) with shield

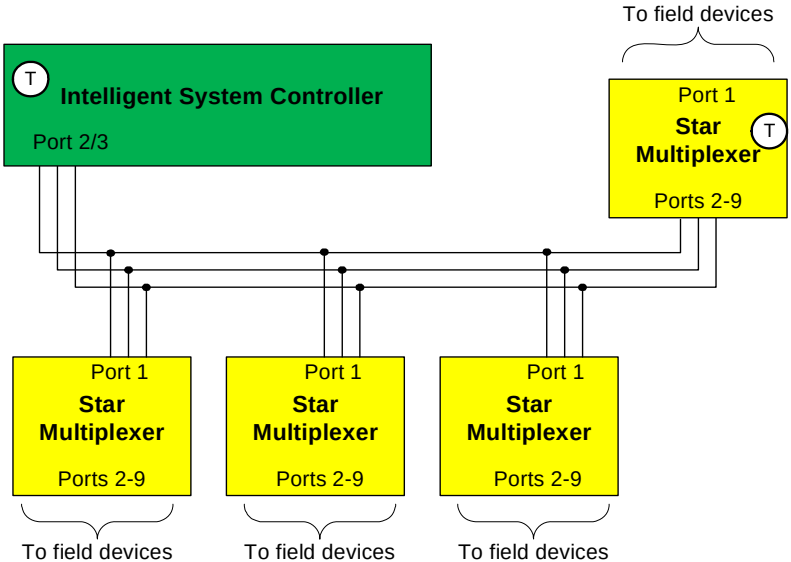
Power

The Star Multiplexer accepts a 12 VDC ± 15% power source for its power input. The power source should be located as close to the Star Multiplexer as possible. Wire the power input with an 18 AWG (minimum) twisted pair cable.

When using a 12 VDC power source, be sure to observe polarity.

Wiring and Termination





T indicates termination

Note: Examples common across all ports

Only terminate the last units of the multi-drop line.

DIP Switches

The communication speed is determined by the speed at which the Intelligent System Controller is communicating to the downstream devices.

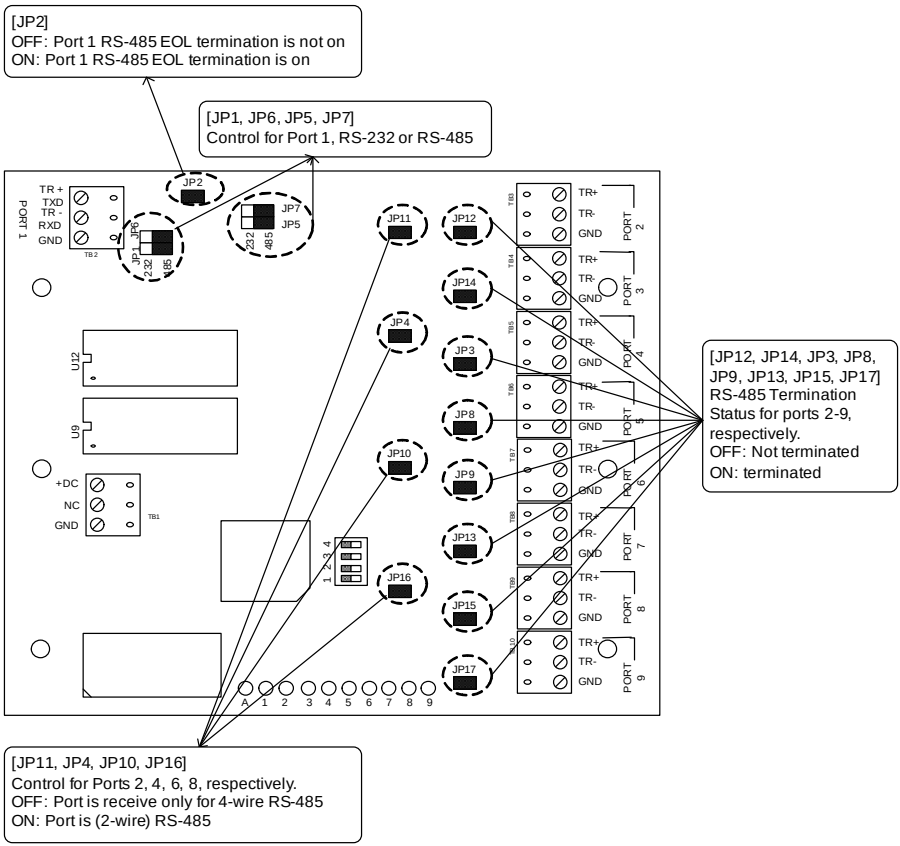
S1	S2	S3	S4	Speed
OFF	ON	OFF	OFF	2400 bps
ON	ON	OFF	OFF	4800 bps
OFF	OFF	ON	OFF	9600 bps
ON	OFF	ON	OFF	19200/ 38400 bps

Currently, OnGuard only supports 38400 bps. Set the communication speed DIP switches in the default position of 38400 bps.

When connecting the star multiplexer directly to a host computer for multi-drop configuration, the DIP switch settings should be set to all ON - this setting is 38400 BPS Fast.

Installing Jumpers

The jumpers must be configured appropriately for your system.



Specifications

The Star Multiplexer is for use in low voltage, class 2 circuits only. These specifications are subject to change without notice.

- Primary Power:
  - DC input: 12 VDC ± 15%. 250 mA
- Interfaces:
  - Port 1: RS-232/RS-485, selectable
  - Ports 3, 5, 7, 9: RS-485, Transmit/Receive
  - Ports 2, 4, 6, 8: RS-485, Transmit/Receive or Receive Only
- Wire Requirements:
  - Power: 1 stranded twisted pair, 18 AWG
  - RS-485:24 AWG stranded twisted pair(s) with shield, 4000 feet (1219 m) maximum
  - RS-232: 24 AWG stranded, 50 feet (15 m) maximum
- Environmental:
  - Temperature:0 to 70°C, operating, -55 to +85°C storage
  - Humidity: 0 to 95% RHNC
- Mechanical:
  - Dimensions: 5 x 6 x 1 in. (127 x 152 x 25 mm)
  - Weight: 4 oz. (114 gm) nominal
- Certifications:
  - UL294 and UL1076 Listed, ULC Listed
  - FCC Part 15
  - CE marking
  - RoHS compliant
  - WEEE

LenelProx Readers

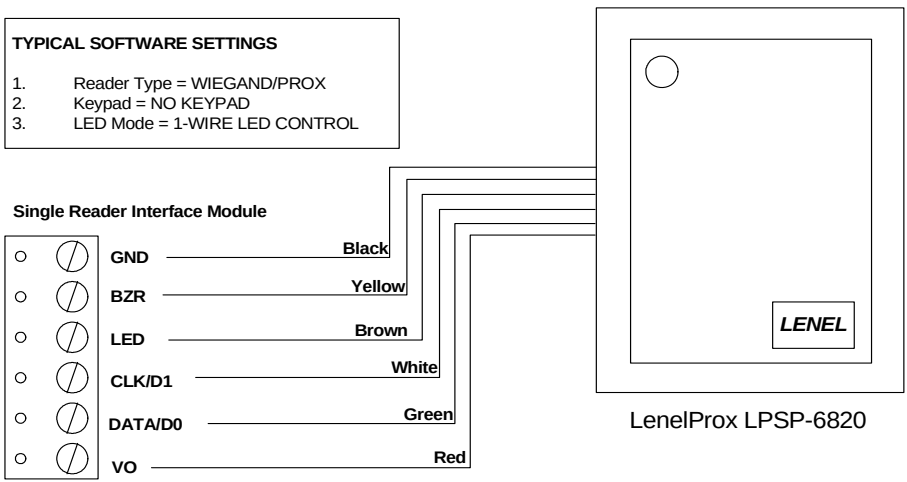
LenelProx readers are radio-frequency proximity readers (with or without integrated keypads). OnGuard currently supports the following models:

- LPMM-6800
- LPSP-6820
- LPKP-6840 and BT-LPKP-NDK
- LPSR-2400
- LPRKP-4600
- LPMR-1824 and LPMR-1824 MC
- LPLR-911

General Wiring

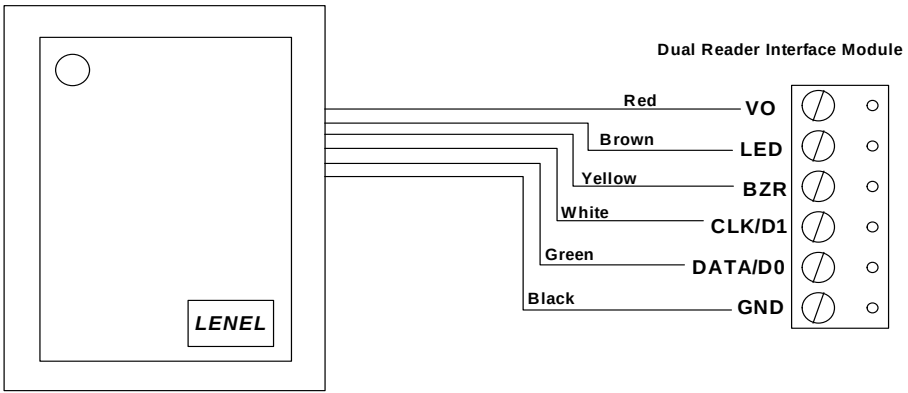
The following diagrams address general wiring for the LenelProx readers. For specific instructions regarding wiring, installation, and configuration, consult the *Hardware Installation Guide*.

Example wiring: the LPSP-6820 and the LNL-1300



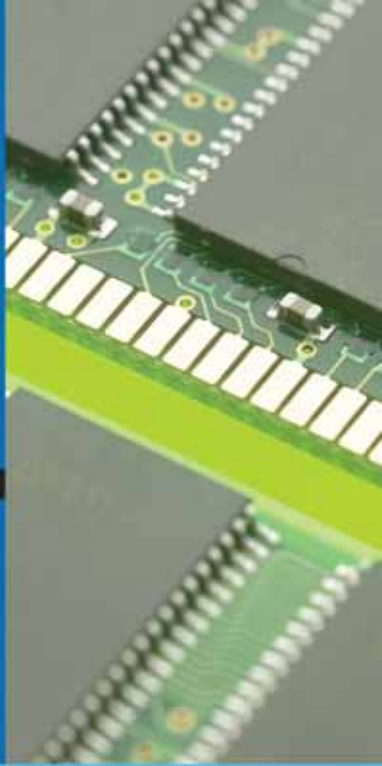
For the Dual Reader Interface Module, make sure that jumper J2 is set to unregulated power mode. This will allow the maximum amount of current for the readers.

Example wiring: the LPSP-6820 and the LNL-1320



TYPICAL SOFTWARE SETTINGS

1. Reader Type = WIEGAND/PROX
2. Keypad = NO KEYPAD
3. LED Mode = 1-WIRE LED CONTROL



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