

# Intelligent Controller LNL-M2210 with Paired Reader Interface for One Physical Barrier Quick Reference

## General

The LNL-M2210 intelligent controller provides decision making, event reporting and database storage for the LenelS2 hardware platform. Two reader interfaces configured as paired or alternate readers provide control for one physical barrier.

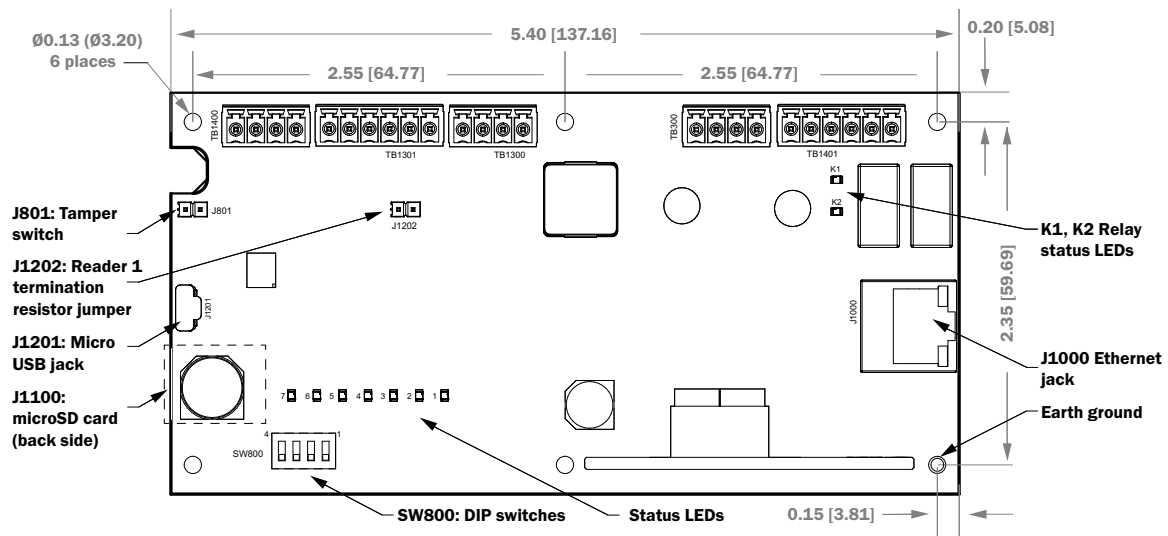
Host communication is via the on-board 10Base-T/100Base-TX Ethernet port.

**Reader port 1** (TB1301) can accommodate a reader that uses TTL (D1/D0, Clock/Data), F/2F, or 2-wire RS-485 device signaling (for example an OSDP reader) and provides tri-state LED control and buzzer control (one wire LED mode only). This port can also use multiple 2-wire RS-485 multi-dropped devices, such as up to two OSDP readers or up to eight remote serial I/O devices.

**Reader port 2** (TB1300 and TB300) can accommodate a reader that uses TTL (D1/D0, Clock/Data), or F/2F signaling. Reader port 2 also provides tri-state LED control and buzzer control (one wire LED mode only). Two Form-C contact relay outputs may be used for door strike control or alarm signaling. The relay contacts are rated at 2 A @ 30 VDC, dry contact configuration. Two inputs are provided that may be used for monitoring the door contact, exit push button or alarm contact. Input circuits can be configured as unsupervised or supervised.

The LNL-M2210 requires Power over Ethernet (PoE or PoE+) or 12 VDC for power. For PoE, UL compatibility was verified and tested with Phihong, Model POE29U-1AT (Primary Rated: 100-240 V AC, 0.8 A, 50/60 Hz; Secondary rated: 56 V DC, 0.536 A, 30 W). Only 12 VDC input was evaluated by UL by connection to the separately UL Listed power supplies. The LNL-M2210 can be mounted in a 3-gang switch box; a mounting plate is supplied with the unit, or the LNL-M2210 may be mounted in an enclosure; the supplied mounting plate has mounting holes that match the LNL-M2210 mounting footprint.

## LNL-M2210 Hardware



## LNL-M2210 Wiring

Terminal Block Connections		
TB1400-1	IN1	Input 1 - Inputs used for Access Control only, not Burglar Alarm inputs
TB1400-2	IN1	
TB1400-3	IN2	Input 2 - Inputs used for Access Control only, not Burglar Alarm inputs
TB1400-4	IN2	
TB1301-1	VO	Reader 1 Power Output – 12 VDC
TB1301-2	LED	Reader 1 LED Output
TB1301-3	BZR	Reader 1 Buzzer Output
TB1301-4	CLK	Reader 1 CLK/Data 1/TR+ (A) *
TB1301-5	DAT	Reader 1 DAT/Data 0/TR- (B) *
TB1301-6	GND	Reader 1 Ground
TB1300-1	LED	Reader 2 LED Output
TB1300-2	BZR	Reader 2 Buzzer Output
TB1300-3	CLK	Reader 2 CLK/Data 1 Input
TB1300-4	DAT	Reader 2 DAT/Data 0 Input
TB300-1	VO	Auxiliary Power Output – 12 VDC
TB300-2	GND	Auxiliary Power Output Ground
TB300-3	VIN	Input Power – 12 VDC (from local power supply)
TB300-4	GND	Input Power Ground
TB1401-1	NO	Relay K1 – Normally Open Contact
TB1401-2	1-C	Relay K1 – Common Contact
TB1401-3	NC	Relay K1 – Normally Closed Contact
TB1401-4	NO	Relay K2 – Normally Open Contact
TB1401-5	2-C	Relay K2 – Common Contact
TB1401-6	NC	Relay K2 – Normally Closed Contact

\*Terms A & B are from the RS-485 standard.

## Jumpers

Jumper	Set	Description
J801		Cabinet Tamper Switch Input: short = tamper secure
J1000	N/A	10Base-T/100Base-TX Ethernet connection
J1100	N/A	microSD card
J1201	N/A	Micro USB port (2.0)
J1202	Open	Reader 1 RS-485 termination jumper. Link jumper to enable termination resistor.

## DIP Switches

The four switches on SW800 DIP switch configure the operating mode of the LNL-M2210 processor. DIP switches are read on power-up except where noted.

1	2	3	4	Definition
OFF	OFF	OFF	OFF	Normal operating mode.
ON	X	X	X	After initialization, enable default User Name (admin) and Password (password). The switch is read on the fly, no need to re-boot. For more information, refer to <a href="#">IT Security</a> on page 8.
OFF	ON	X	OFF	Use factory default communication parameters.
ON	ON	X	OFF	Use LenelS2 default communication parameters. Contact system manufacturer for details. See <a href="#">Bulk Erase Configuration Memory</a> on page 3.
ON	ON	OFF	OFF	Bulk Erase prompt mode at power up. See <a href="#">Bulk Erase Configuration Memory</a> on page 3.
X	X	X	ON	Makes the LNL-M2210 report and function like an LNL-X2210. To be used in situations where the host software has not been updated to support the LNL-M series product line.

X = ON or OFF. All other switch settings are unassigned and reserved for future use.

### Factory Default Communication Parameters

Interface 1 (NIC1)

- Network: static IP address: 192.168.0.251
- Subnet Mask: 255.255.0.0
- Default Gateway: 192.168.0.1
- DNS Server: 192.168.0.1
- Primary Host port: IP server, Data Security: TLS if Available, port 3001, communication address: 0
- Alternate Host Port: Disabled

## Bulk Erase Configuration Memory

The bulk erase function can be used for the following purposes:

- Erase all configuration and cardholder database (sanitize board)
- Update OEM default parameters after OEM code has been changed
- Recover from database corruption causing LNL-M2210 board to continuously reboot

If clearing the memory does not correct the initialization problem, contact LenelS2 OnGuard Technical Support.

### Bulk Erase Steps

**Important:** Do not remove power during steps 1-5.

1. Set DIP switches to: 1 & 2 "ON," 3 & 4 "OFF."
2. Apply power to the LNL-M2210 board. LED 1 will flash during boot up.
3. After the LNL-M2210 boots up, watch for LEDs 1 & 2 and 3 & 4 to alternately flash at a 0.5 second rate. Within 10 seconds after the above pattern starts, change switch 1 to "OFF."
4. When complete, only LEDs 1 and 4 will flash for about three (3) seconds.
5. The LNL-M2210 reboots and will be available at the default IP address (192.168.0.251).

## Input Power

The LNL-M2210 is powered by one of two ways:

- Power is supplied via the Ethernet connection using PoE or PoE+
- Or local 12 VDC power supply, TB300-3 (VIN), TB300-4 (GND)

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**Note:** For UL compliance, only 12 VDC was evaluated.

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## Communication Wiring

The LNL-M2210 controller communicates to the host via the on-board 10Base-T/100Base-TX Ethernet interface.

## Reader/Serial I/O Device Wiring

Reader port 1 supports TTL (D1/D0, Clock/Data), F/2F, or 2-wire RS-485 device(s). Reader port 2 supports TTL (D1/D0, Clock/Data), or F/2F. Power to reader port 1 is 12 VDC at 600 mA maximum per port. The reader connected to reader port 2 may be powered from the 12 VDC auxiliary power supply output; TB1301-1 and TB1301-2. Readers that require different voltage or have high current requirements should be powered separately. Refer to the reader manufacturer’s 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 port 1 can support up to eight 2-wire RS-485 remote serial I/O devices using MSP1 protocol or up to two OSDP devices. If two OSDP devices are used, reader port 2 will not support a third reader. If only one OSDP device is configured, then reader port 2 is available for a second reader. The maximum cable length is 2000 ft (610 m). Do not terminate any RS-485 devices connected to reader port 1.

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**Note:** Data 0 and Data 1 wires for Wiegand may be reused for OSDP. However, standard Wiegand cable may not meet RS-485 twisted pair recommendations. The reuse of cable works best on shorter cable lengths at lower data rates.

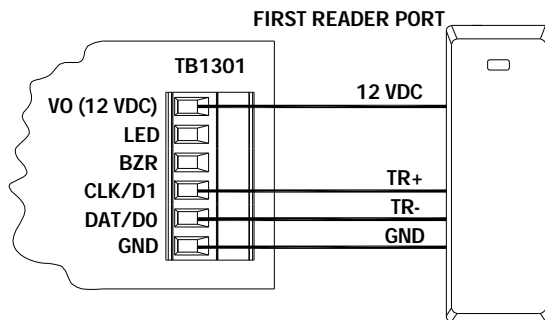
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**Important:** Failure to correctly set the OSDP jumper settings can cause communication issues.

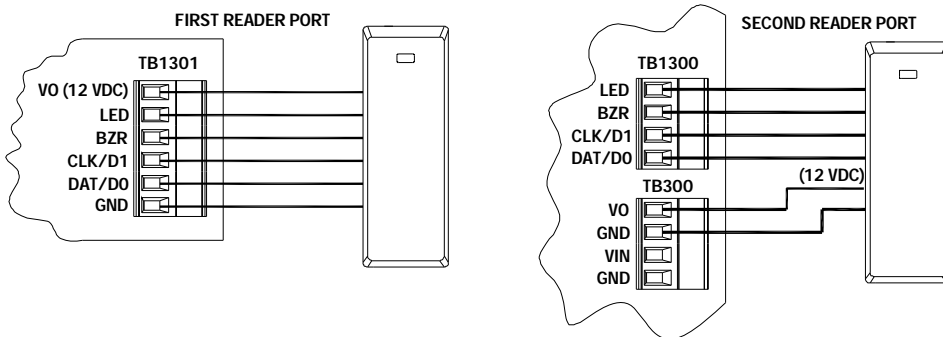
**Important:** When powering remote device(s) from the LNL-M2210, be cautious not to exceed the maximum current limit. Cable gauge must also be evaluated. See “Specifications” on page 9 for details.

## Reader Wiring Diagrams

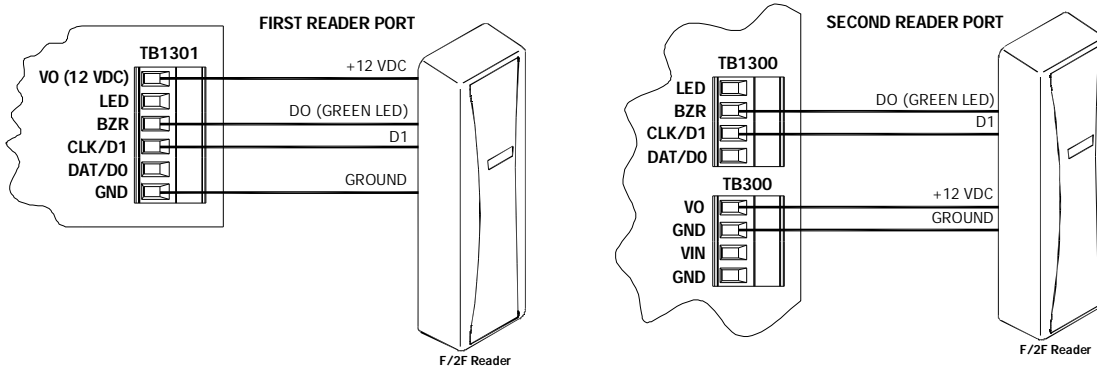
*Typical Reader 1 (OSDP Installation)*



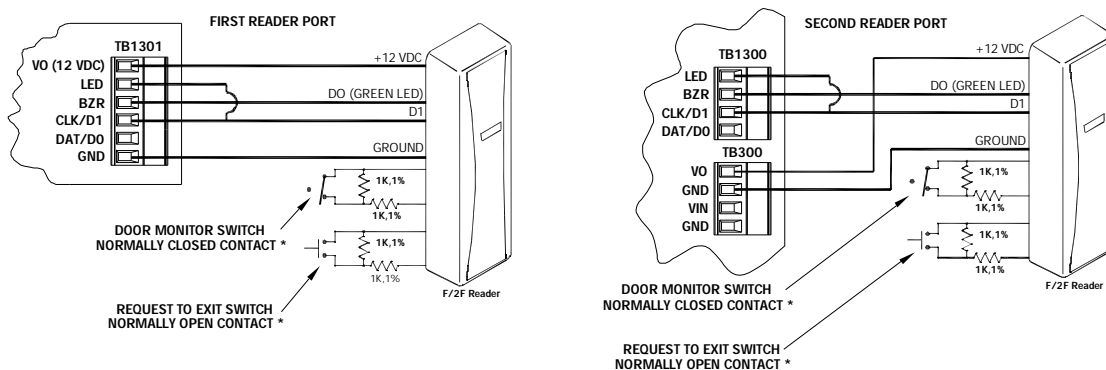
Typical D1/D0 or Clock/Data Reader Ports 1 and 2



Typical Unsupervised F/2F Reader Ports 1 and 2



Typical Supervised F/2F Reader Ports 1 and 2

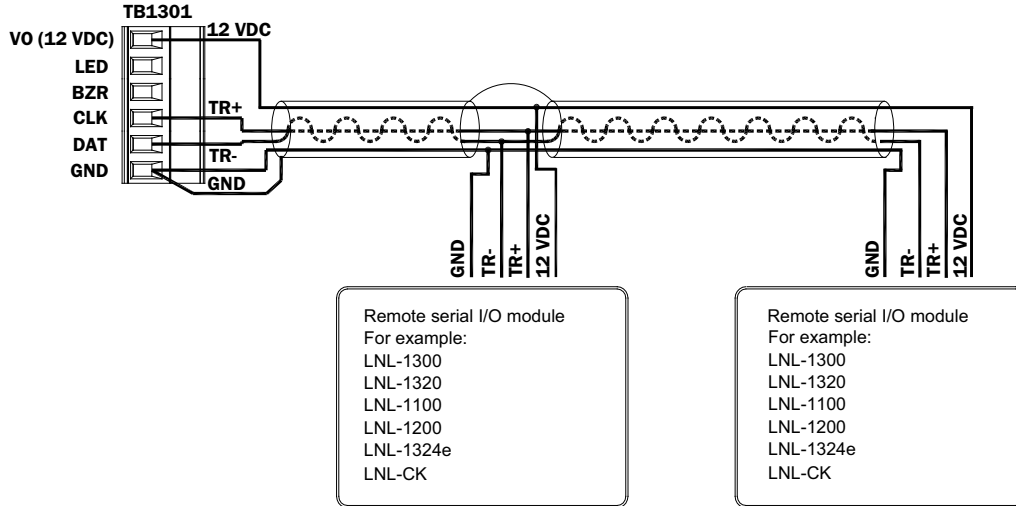


\* Inputs on supervised F/2F readers may be unsupervised or supervised (supervised shown).

**Note:** Jumper: Connect D1 and LED on supervised F/2F reader.

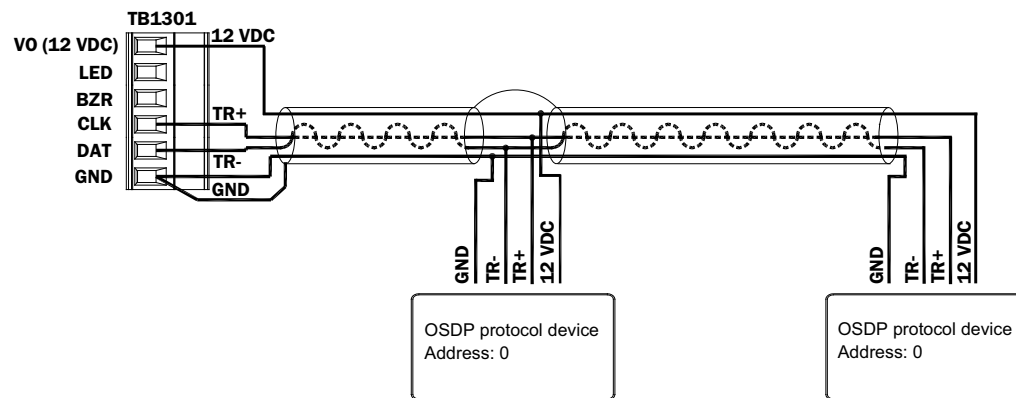
*Reader Port 1 Remote Serial I/O Devices using MSP1 Protocol (2-Wire RS-485)*

Refer to the appropriate remote serial I/O device installation manual for address and baud rate settings. 120 ohm end-of-line termination should only be added at each end of the RS-485 bus. If an LNL-M2210 is at one end of the RS-485 bus, jumper J1201 can be installed to enable the termination resistor. Each remote serial I/O device must be configured with a unique communication address. A maximum of eight (8) remote serial I/O devices can be connected to reader port 1. **Cable shield:** only ground one end.



*Reader Port 1 OSDP Protocol Devices (2-Wire RS-485)*

Refer to the appropriate remote serial I/O device installation manual for address and baud rate settings. 120 ohm end-of-line termination should only be added at each end of the RS-485 bus. If an LNL-M2210 is at one end of the RS-485 bus, jumper J1201 can be installed to enable the termination resistor. Each OSDP device must be configured with a unique communication address. A maximum of two OSDP devices can be connected to reader port 1. **Cable shield:** only ground one end.

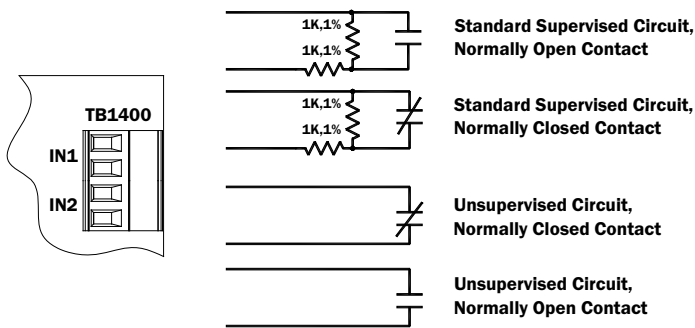


## Input Circuit Wiring

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 Form-C contact relays are provided for controlling door lock mechanisms or alarm signaling devices. The relay contacts are rated at 2 A @ 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 momentarily removing power to unlock the door, as with a magnetic lock, the Normally Closed and Common poles are used. Check with local building codes for proper egress door installation.

Door lock mechanisms can generate EMF feedback to the relay circuit that can cause damage and premature failure of the relay plus affect the operation of the LNL-M2210. 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.

### CAUTION

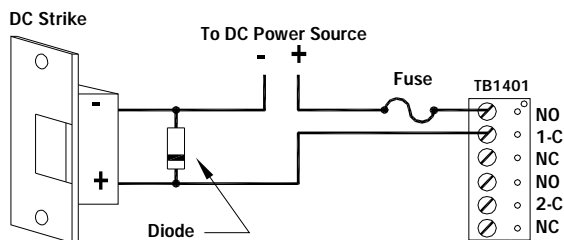
From the Auxiliary output, the LNL-M2210 can provide 12 VDC power for external devices provided that the maximum current is not exceeded. See “Specifications” on page 9 for details. If a local power supply is used, it must be UL Listed Class 2 rated.

### PRÉCAUTION

Depuis la sortie auxiliaire, le LNL-M2210 peut fournir une alimentation 12 Vcc aux équipements externe pourvu que le courant maximum n’est pas dépassé. Se référer à la section sur les spécifications pour plus de détails. Si une alimentation locale est utilisée, elle doit être homologué UL de classe 2.

## 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.



## Memory Backup Battery

The real time clock is backed up by a super capacitor when power is interrupted. All other data is stored in non-volatile memory.

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**Note:** Data is stored in flash memory to prevent loss of data in the case of power interruption.

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## IT Security

When installing the LNL-M2210, it is important to ensure that it is done in a secure manner.

Create user accounts to the web configuration page using secure passwords.

Ensure all DIP switches are in the OFF position for the normal operating mode.

The LNL-M2210 is shipped from the factory with a default login account, which is enabled when DIP 1 is moved from OFF to ON. The default login user name (admin) and password (password) will be available for five minutes once the DIP switch is toggled. Therefore, it is important that at least one user account is defined, and the DIP switches are set to OFF before the LNL-M2210 is commissioned. It is also highly recommended not to configure the LNL-M2210 with an IP address that is accessible from the public Internet.

To further enhance network security, options are available to disable SNMP, Zeroconf discovery, as well as the web configuration module itself. Additionally, data encryption can be enabled over the host communication port.

## Status LEDs

### Power-up

NIC LED blinks and all other LEDs are off.

### Initialization

The initialization process has several stages, each stage is represented by a different LED pattern in the following sequence:

- LED 1 is on for about 10 seconds.
- LED 2 is on for 25 seconds.
- LED 3 flashes slowly for 15 seconds.
- LED 3 flashes quickly for 1 second. LED 3 may continue flashing for an additional 60 seconds if the controller firmware is being updated.
- LED 1, LED 2, and LED 3 are off as the application starts.
- LED 4 is then on for 15 seconds indicating a successful initialization.

When LEDs 1 through 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 “[Bulk Erase Steps](#)” on page 3. If clearing the memory does not correct the initialization problem, contact LenelS2 OnGuard Technical Support.

### Running

After initialization is complete, the LEDs have the following meanings:

LED	Description
1	Off-Line / On-Line: Off-Line = 20% ON, On-Line = 80% ON
2	Host Communication Activity



LED	Description
3	Readers (combined): Clock/Data or D1/D0 Mode = Flashes when Data is Received, Either Input. RS-485 Mode = Flashes when Transmitting Data F/2F Mode = Flashes when Data/Acknowledgment is Received
4	Input IN1 Status: OFF = Inactive, ON = Active, Flash = Fault *
5	Input IN2 Status: OFF = Inactive, ON = Active, Flash = Fault *
6	Cabinet Tamper
7	Reserved for Future Use
K1	Relay K1: ON = Energized
K2	Relay K2: ON = Energized
YEL	Ethernet Speed: OFF = 10 Mb/S, ON = 100 Mb/S
GR	OFF = No Link, ON = Good Link, Flashing = Ethernet Activity

\*If this input is defined, every three seconds the LED is pulsed to its opposite state for 0.1 seconds, otherwise, the LED is Off.

## Specifications

The interface is for use in low voltage, Class 2 circuits only. All output circuits (except POE, which was not evaluated by UL) are Class2/Power Limited.

The installation of this device must comply with all local fire and electrical codes. Units are to be installed in accordance with NFPA 70. The unit is to be powered with a UL-listed UL 294 approved power supply with a class 2 power limited output.

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**Note:** Only 12 VDC input was evaluated by UL by connection to the separately UL Listed power supplies.

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Primary Power: PoE (12.95 W), compliant to IEEE 802.3af  
or  
PoE+ (25 W), compliant to IEEE 802.3at  
or  
12 VDC ± 10%, 1.8 A maximum

Power Output: PoE: Powered via PoE max = 625 mA including reader and auxiliary power output \*  
PoE+ or external 12 VDC: 12 VDC @ 1.25 A including reader and Auxiliary Power output \*

\* Excluding Micro USB port

**CAUTION** PoE power is to be supplied by a Listed ITE or Access Control System Unit (ALVY), power limited, PoE+ injector or PoE+ Ethernet switch providing 42.5 – 57 VDC, 25.5W for maximum output.

**PRÉCAUTION** L'alimentation PoE doit être fournie par un équipement de technologie de l'information (ITE) listé ou une unité de système de contrôle d'accès (ALVY), limitée en puissance, interrupteur injecteur PoE+ ou PoE+ Ethernet fournissant une sortie maximale entre 42,5 et 57 Vcc, 25,5 W.

Micro USB Port:	5 VDC maximum (deduct 270 mA from reader and Auxiliary Power output) Not Evaluated by UL
RTC Back up	Super capacitor
microSD Card	Format: microSD or microSDHC; 2GB to 8GB.
Host Communication:	Ethernet: 10Base-T/100Base-TX and Micro USB port (2.0) with optional adapter: pluggable model USB2-OTGE100
Inputs:	Two unsupervised/supervised, Programmable End of Line resistors, 1k/1k ohm, 1%, ¼ watt standard One unsupervised input dedicated for cabinet tamper
Outputs:	Two relays: Form-C contacts: 2 A @ 30 VDC, resistive
Reader Interface:	
Power:	12 VDC ± 10%: PoE, PoE+ or local power supply, 600 mA maximum per port
Data Inputs:	Reader port 1: TTL compatible, F/2F or 2-wire RS-485 Reader port 2: TTL compatible or F/2F
LED Output:	TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
Buzzer Output:	Open collector, 12 VDC open circuit maximum, 40 mA sink maximum
Cable Requirements:	
Power:	1 twisted pair, 18 AWG (when using local 12 VDC power supply)
Ethernet:	CAT-5, minimum
Reader data (TTL):	6-conductor, 18 AWG, 500 ft. (152 m) maximum
Reader data (F/2F):	4-conductor, 18 AWG, 500 ft. (152 m) maximum
Reader data (RS-485):	1 twisted pair, shielded, 24 AWG, 120 ohm impedance, 2000 ft. (610 m) maximum
Alarm Input:	1 twisted pair per input, 30 ohm maximum
Outputs:	As required for the load
Environmental:	
Temperature:	Storage: -55 to +85 °C (-67° to 185° F) Operating: 0 to +70 °C (32° to 158° F)
Humidity:	5 to 95% RHNC
Mechanical:	
Dimension:	5.5 in. (140 mm) W x 2.75 in. (70 mm) L x 0.96 in. (24 mm) H without bracket 5.5 in. (140 mm) W x 3.63 in. (92 mm) L x 1.33 in. (34 mm) H with bracket
Weight:	3.6 oz. (103 g) without bracket 4.43 oz. (125.5 g) with bracket

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**Note:** Outputs are Power limited/class 2 when powered by external power limited/class 2 power supply model LNL-AL400ULX or LNL-AL600ULX-4CB6.

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These specifications are subject to change without notice.

UL 294 Performance Levels Indoor use:

Feature	Level
Standby Power	I
Endurance	IV
Line Security	I
Destructive Attack	I

## UL Listed Installations

- PoE is only for use with Access control-only installations and not for use with burglar installations.
- For access control-only installations using DC power, power shall be provided by a UL 294 or UL 603, class 2 power supply with appropriate ratings.
- For burglar alarm installations, backup power is not provided. A UL 603 listed, class 2 power supply with appropriate ratings shall be used that provides a minimum four hours of standby power after notification of loss of AC power.
- Locations and wiring methods shall be in accordance with the National Electrical Code, ANSI/NFPA 70.
- Only 12 VDC input was evaluated by UL by connection to the separately UL Listed power supplies. Testing with PoE not required.
- Reader Ports are Special Applications rated: 11.06 – 12 VDC (Reader 1) and 11.18 – 12 VDC (Reader 2)
- The following readers are to be connected:
  - BlueDiamond models: LNL-R11330-05TB, LNL-R11320-05TB, LNL-R11325-05TB
  - HID Signo models: 20, 20K, 40, 40K

For UL installations, the following must be observed:

- PoE power is to be supplied by an Access Control System Unit (ALVY), power limited, PoE injector (PSE) providing 44-57VDC and 15W for maximum output, and PoE+ injector (PSE) providing 42.5 – 57 VDC, 25.5W for maximum output).
- This product is not intended for outside wiring as covered by Article 800 in the National Electrical Code, NFPA 70.
- Category 5e cabling is the minimum performance category recommended.
- The minimum conductor gauge permitted to connect between the PSE or power injector and the PD shall be 26 AWG (0.13 mm<sup>2</sup>) for patch cords; 24 AWG (0.21 mm<sup>2</sup>) for horizontal or riser cable.
- Connected through standard eight-pin RJ-45 connectors.
- Compliance with IEEE 802.3 (at or af) specifications was not verified as part of UL 294.
- Use inputs on downstream SIO device for cabinet tamper and UPS fault monitoring.

## Firmware Revision

In Alarm Monitoring, the firmware revision can be displayed in the System Status Tree by selecting **Display Device Firmware Version** from the **Options** menu.

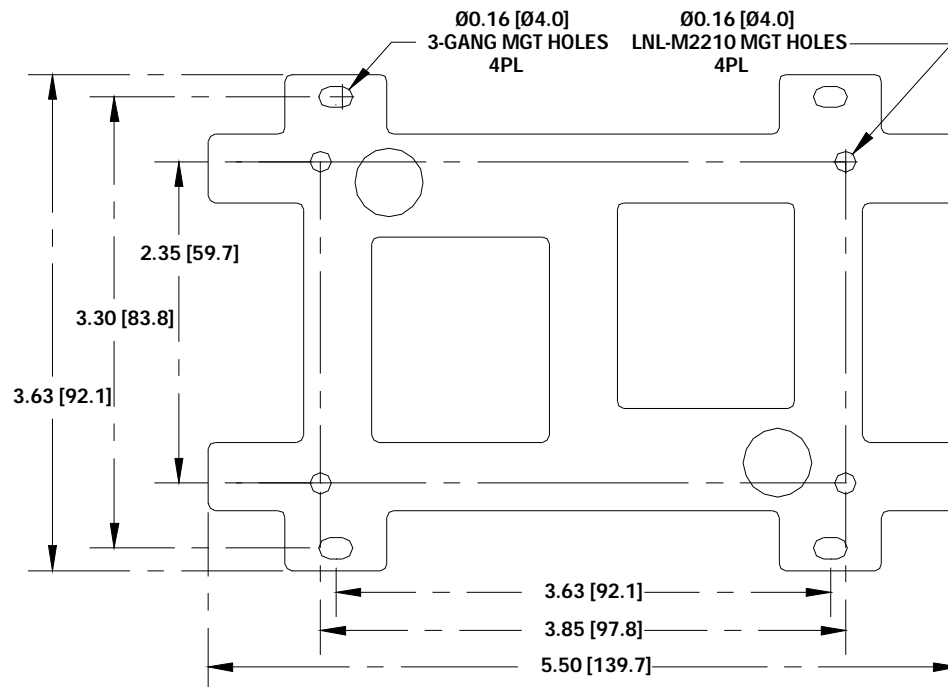
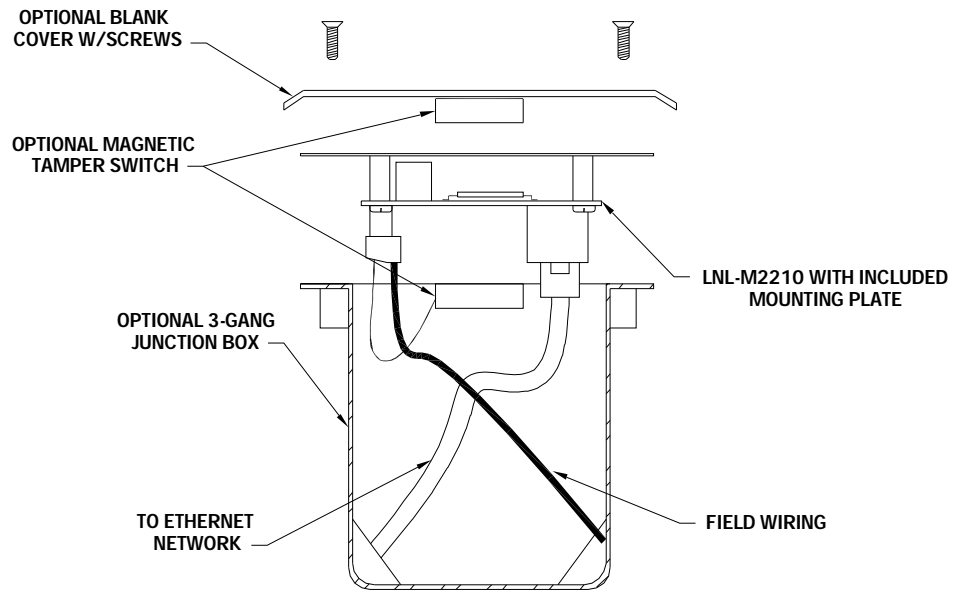
In the Controller Web Page, select **Device Info**. For more information, refer to the Controller Web Page Configuration chapter in the Hardware Installation Guide (DOC-600).

## Additional Mounting Information

Sources for the optional items:

- 3-gang stainless steel blank cover. Available from:
  - Leviton: part number 84033-40
  - Graybar: part number 88158404

- Magnetic switch set: G.R.I. part number: 505



## Regulatory Information

### FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### 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. LenelS2 is not liable under any circumstances for loss or damage caused by or partially caused by the misapplication or malfunction of the product. LenelS2's liability does not extend beyond the purchase price of the product.

### Certifications

For certification information, refer to the hardware documentation for the host application.

### Product Warnings and Disclaimers

THESE PRODUCTS ARE INTENDED FOR SALE TO, AND INSTALLATION BY, AN EXPERIENCED SECURITY PROFESSIONAL. LENEL S2 CANNOT PROVIDE ANY ASSURANCE THAT ANY PERSON OR ENTITY BUYING ITS PRODUCTS, INCLUDING ANY "AUTHORIZED DEALER", IS PROPERLY TRAINED OR EXPERIENCED TO CORRECTLY INSTALL SECURITY RELATED PRODUCTS.

FOR MORE INFORMATION ON PRODUCT WARNINGS AND DISCLAIMERS, SEE THE "LENEL S2 PRODUCT WARNINGS AND DISCLAIMERS" KNOWLEDGE BASE ARTICLE IN THE LENEL S2 KNOWLEDGE BASE. THIS INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

