Mircom™

OpenBAS BUILDING AUTOMATION SYSTEM

OpenBAS-LC-NX12R

Lighting Controller

Installation Manual

LT-6180 Rev. 2.4
October 2017

Table of Contents

List of Figures

List of Tables

1.0 Introduction

This document provides information on installing the OpenBAS-LC-NX12R lighting controller.

1.1 OpenBAS-LC-NX12R Lighting Controller

The OpenBAS-LC-NX12R Lighting Controller can control up to 12 external lighting relays with bipolar 24 VAC/VDC coils, and it can connect to mainstream BAS (building automation system) protocols.

It has an input for an external AUTO / OFF / MANUAL switch for local operation, as well as a universal input for 0-10 V, 4-20 mA, or resistive temperature sensor inputs.

1.2 Features

The OpenBAS-LC-NX12R Lighting Controller integrates into Mircom's unified platform for automating HVAC and mechanical rooms as well as incorporating energy management features and lighting control to offer building owners and managers a seamless operation with the following features:

- Modular design to cover any small, medium or large project.
- Industry standard field bus protocols to integrate into any existing BAS system such as BACnet, Modbus, Optomux, N2-Open, and ASCII.
- Advanced Networking to integrate into IP networks and use the most advanced features and protocols such as distributed computing, USB and Cloud storage, HTML5, JavaScript, XML, Ajax, SMS, and GSM.
- Universal inputs to connect any industry standard sensors.
- Modular add-ons for every Building Automation System solution.
- The OpenBAS software which provides owners and managers a single solution for managing all their building's automation needs.

2.0 Overview

2.1 OpenBAS-LC-NX12R Components

2.1.1 Controller

Table 1 OpenBAS-LC-NX12R Controller

Picture	Model	Description
	OpenBAS-LC-NX12R	Lighting controller • programmable logic controller and scheduler • 12 outputs to control latching 24 V lighting relays • expandable to up to 48 zones • USB and I²C buses • 1 RS-485 field bus connection with support for multiple protocols • 1 universal input and 2 local override inputs • LED display

2.1.2 Accessories

Accessories are powered from the controller.

Table 2 OpenBAS-LC-NX12R Accessories

Model	Description
OBS-ACC-32K128	128KB EEPROM plus 32 KB non-volatile RAM memory expansion
OpenBAS-ACC-TE1K	1000 Ω resistive silicon temperature sensor
OpenBAS-HV-RF433R	Wireless 433 MHz RF receiver that integrates up to 10 wireless transmitters and thermostats into OpenBAS-LC-NX12R controllers Mounts in a DIN rail-mounted box

2.1.3 Compatible modules

Compatible modules are mounted separately from the controller.

Table 3 OpenBAS-LC-NX12R Compatible Modules

Model	Description
OpenBAS-NWK-ETH3	Ethernet controller with support for multiple protocols • 2 field bus connections • Mounts in a DIN rail-mounted box • Powered separately

3.0 Installation

Note: Installation of OpenBAS-LC-NX12R controllers should be in accordance with the Canadian Electrical Code or the National Electrical Code, and comply with all local regulations. Final acceptance subject to the Local Authority Having Jurisdiction (AHJ).

3.1 Parts of the Enclosure

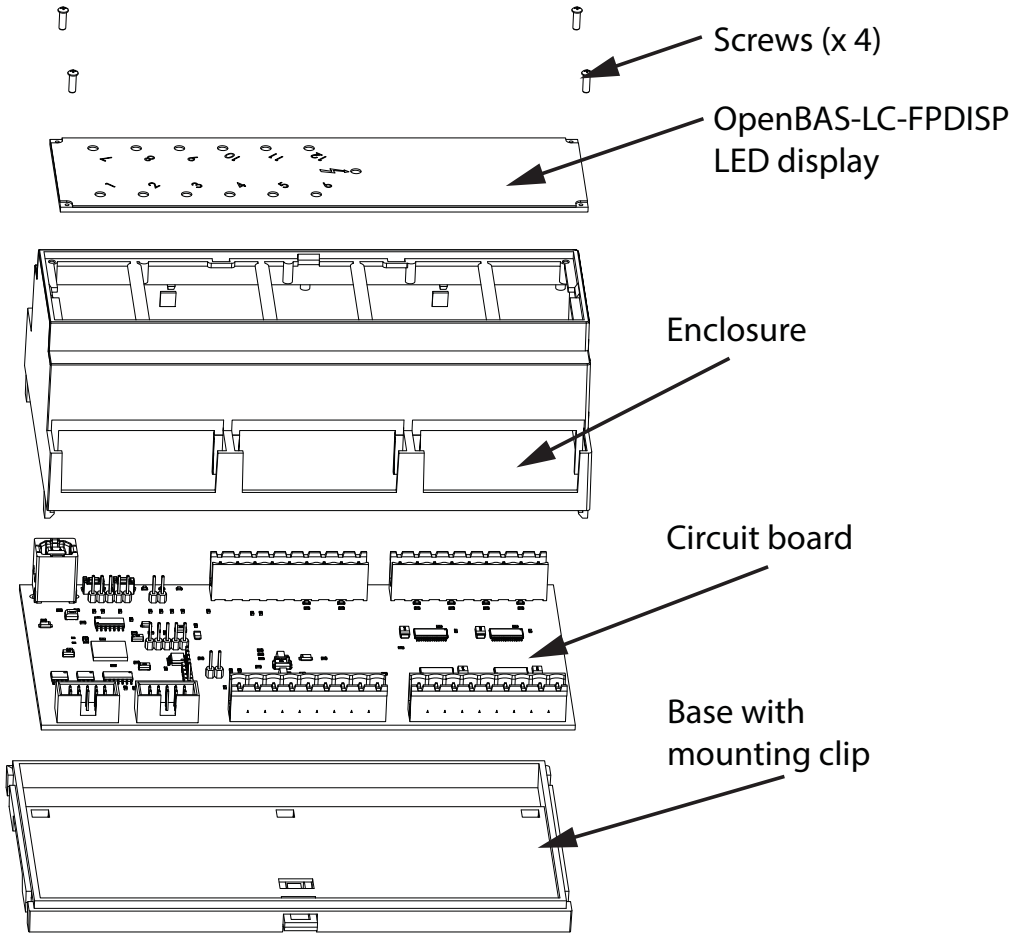


Figure 1 Parts of the enclosure

To remove the circuit board from the enclosure

Caution: **Risk of Electric Shock.** Disconnect the mains power and disconnect the controller from all wiring before opening the enclosure.

Attention: **Always hold circuit boards by the edges to prevent damage from static electricity. Always wear an anti-static bracelet when handling circuit boards.**

1. Remove the 4 screws and then remove the display.
2. Insert a flathead screwdriver under the tabs on the enclosure, shown in Figure 2, in order to lift the tabs and remove the base.

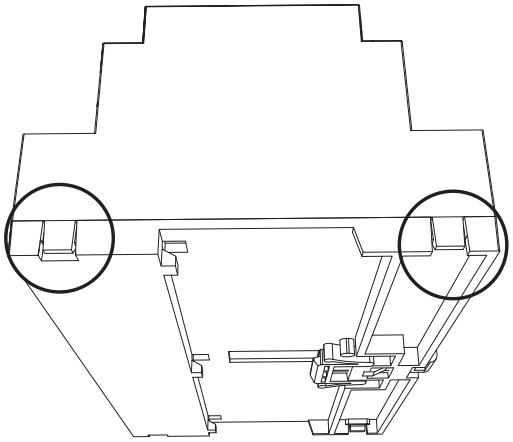


Figure 2 Tabs on enclosure

3. Hold the circuit board with one hand, and with the other hand lift the tabs so that you can remove the circuit board from the enclosure. See Figure 3.

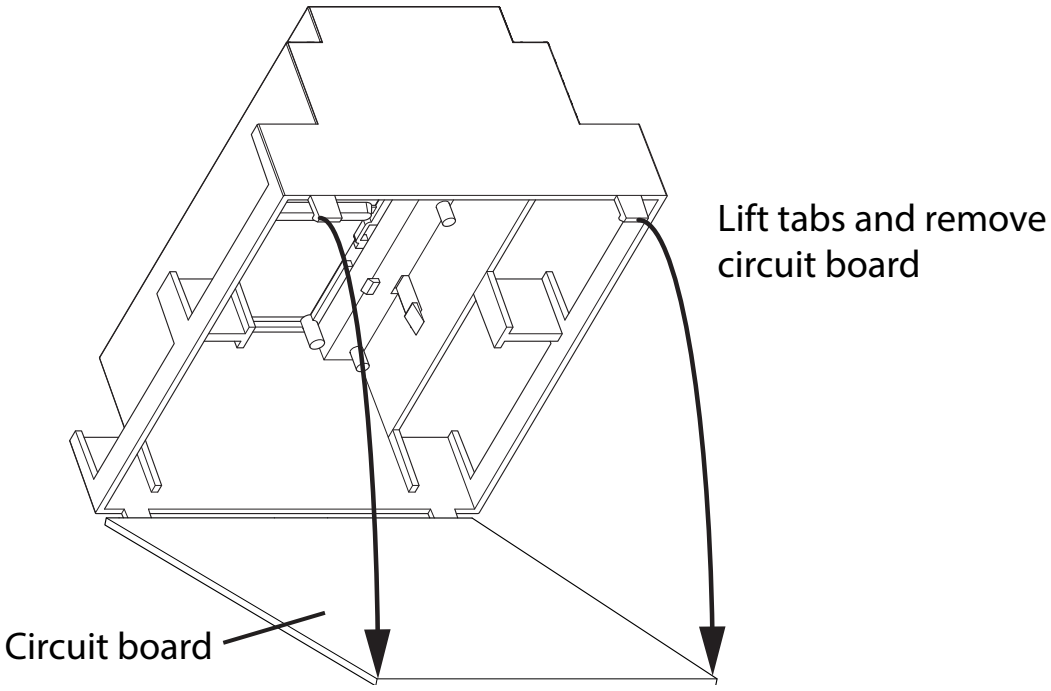


Figure 3 Lift tabs and remove circuit board

Attention: Be careful not to break the tabs. Do not apply excessive force.

3.2 Controller Board Connections

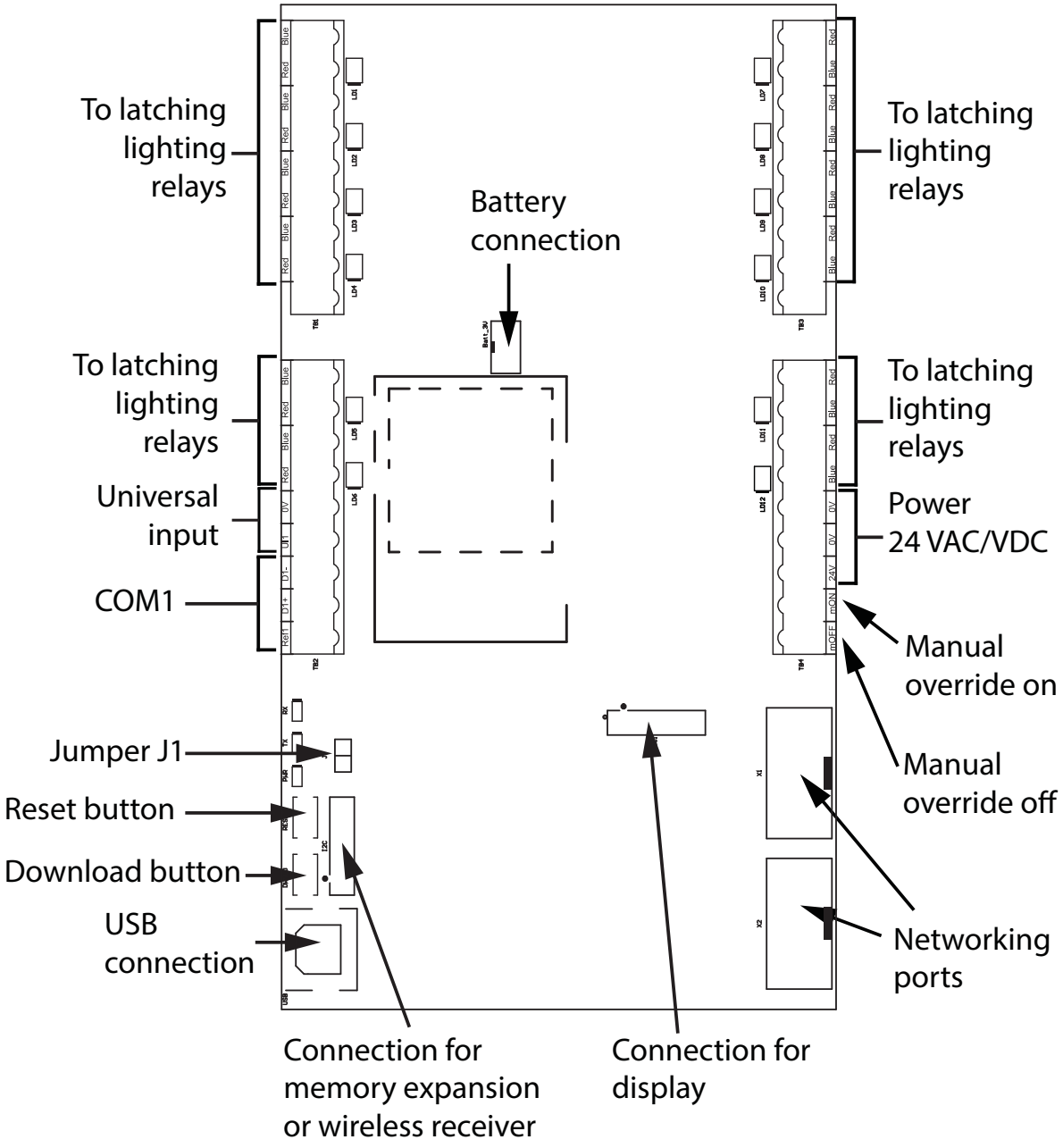


Figure 4 Controller board connections

3.3 Installing Accessories

Attention: **This job must be performed only by a certified technician as dangerous voltages might be present inside of the enclosure.**
Always disconnect the power before installing the communication cards.

3.3.1 Memory Expansion Card (OBS-ACC-32K128) and Wireless Receiver (OpenBAS-HV-RF433R)

Note: When connecting the I2C ports on 2 devices, make sure to connect pin 1 on the first device to pin 1 on the second device. Pin 1 is marked by a dot or a “1”.

Connect the memory expansion card to I2C.

Connect the display to I2C1.

Connect the OpenBAS-HV-RF433R wireless receiver to I2C, so that it is accessible when the board is in the enclosure.

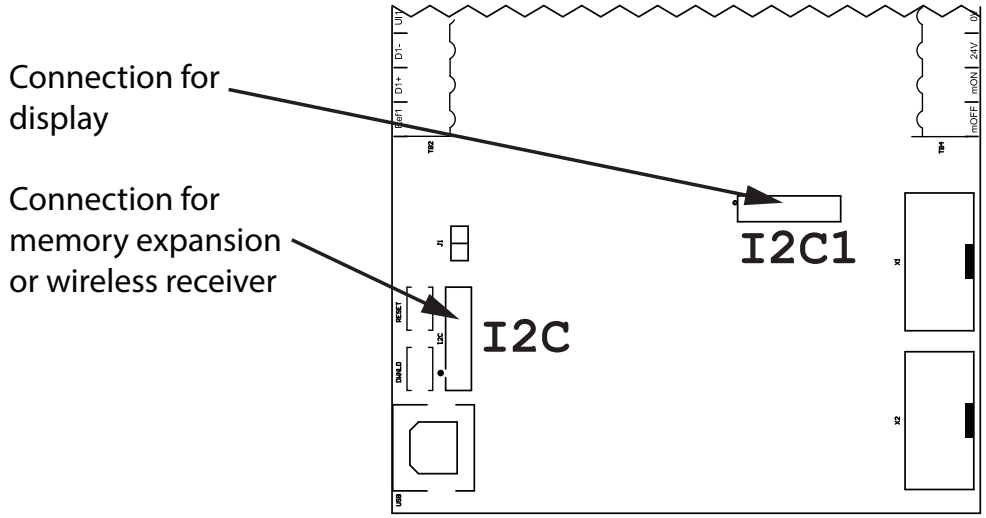


Figure 5 Connections for display, memory expansion cards, and wireless receiver

3.4 Reset and Download Buttons

Press the **RESET** button to restart the controller.

The **DWNLD** button is used for loading firmware on to the controller.

Refer to the OpenBAS Programming Manual for information on upgrading controllers.

3.5 USB

The USB 2.0 connection is shown in Figure 4. Connect a computer to this port in order to configure the controller.

3.6 Battery

Attention: Caution – The battery used in this device may present a risk of fire or chemical burn if mistreated. Do no disassemble, heat above 60°C (140°F), or incinerate. Replace battery with FDK Corporation ML2430 batteries only. Use of another battery may present a risk of fire or explosion.

The battery is used only during power outages for real time clock and data retention. The Mircom part number for the battery is BT-025.

Install the battery before mounting the controller.

To install or replace the battery

1. Disconnect the mains power and open the mains breaker.
2. Disconnect all wiring from the unit.
3. Remove the top cover as described on page 10.
4. Disconnect the old battery.
5. Dispose of the used battery promptly. Keep away from children. Do not disassemble and do not dispose of in fire.
6. Connect the new battery to the connector shown in Figure 4. The battery wire can be connected only one way.

3.7 Enclosure Dimensions

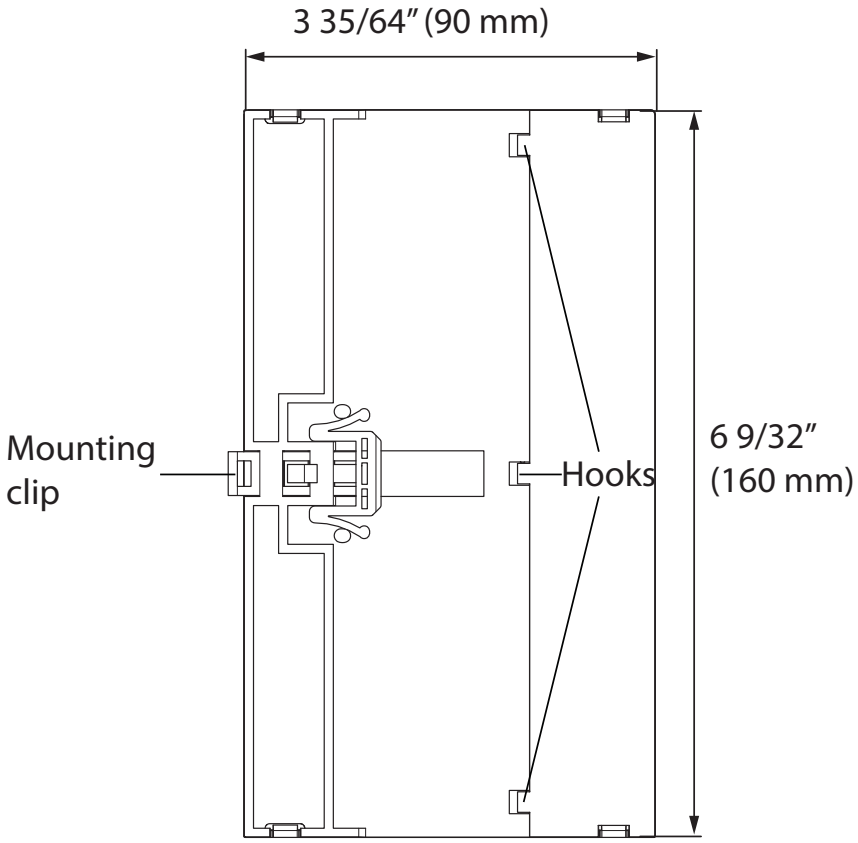


Figure 6 Enclosure (back view)

3.8 Assembly

To put the circuit board in the enclosure

1. Hold the circuit board with one hand, and with the other hand lift the tabs so that you can fit the circuit board into the enclosure as shown in Figure 7.

Note: Make sure that the board is the right way up: the terminal labels on the enclosure must match the terminal labels on the circuit board.

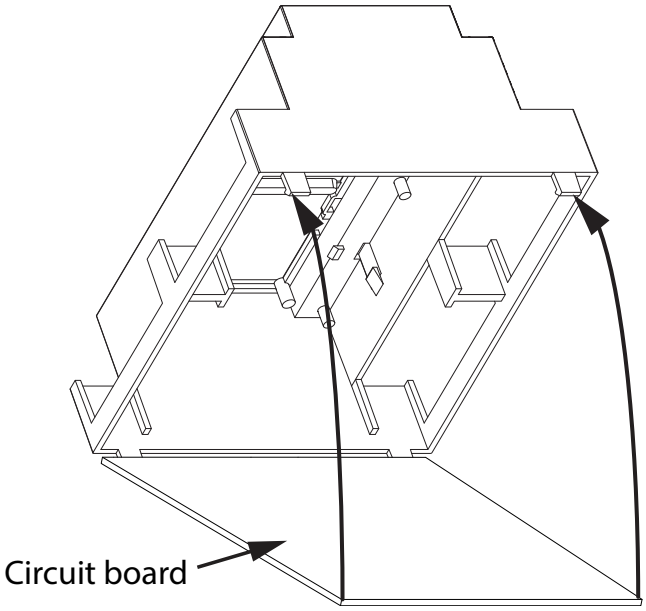


Figure 7 Fit the circuit board in enclosure

2. Snap the base onto the enclosure. Make sure that the mounting clip is on the right as shown in Figure 8.
3. Connect the display to the connection labeled I2C1. Make sure that the display is oriented as shown in Figure 8.
4. Secure the display with the 4 screws.

Attention: Always hold circuit boards by the edges to prevent damage from static electricity. Always wear an anti-static bracelet when handling circuit boards.

3.9 Mounting the Enclosure

Attention: Mount the enclosure on a DIN rail in a UL-compliant metal box. Do not drill holes in the enclosure or modify the enclosure in any way.

Mount the enclosure with the Mircom logo the right way up, the mounting clip on the right, and the outputs on top, as shown in Figure 8.

The controller can also be mounted horizontally with the mounting clip on the bottom.

To mount the enclosure on a DIN rail

1. Mount a section of DIN rail vertically so that there is enough space for the enclosure to be mounted.
2. Slide the hooks under the rail and push the enclosure to secure it on the DIN rail. The mounting clip locks it in place.
3. Install a DIN rail stopper to prevent the unit from falling.

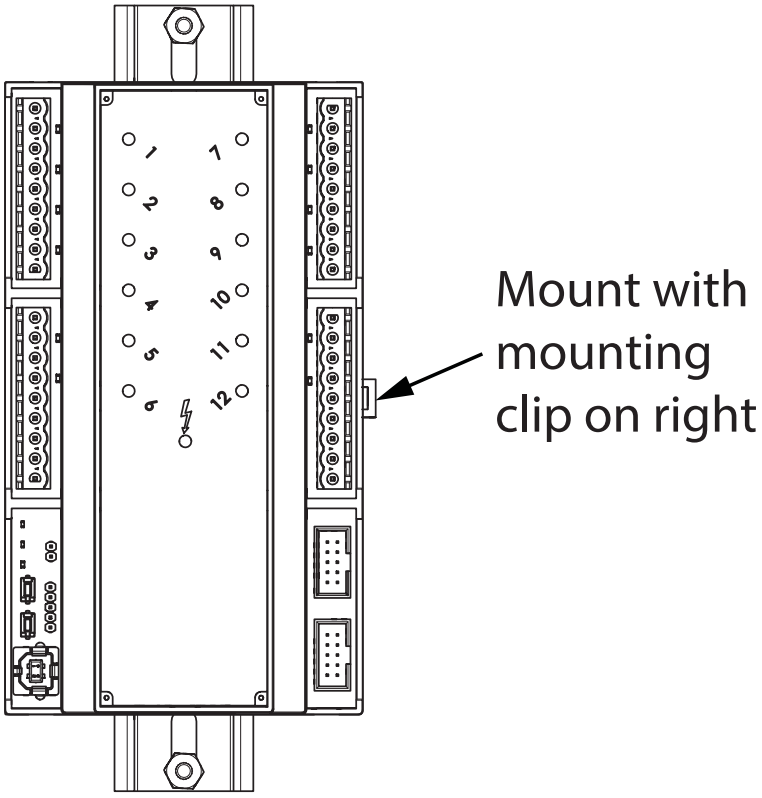


Figure 8 Enclosure mounted on DIN rail

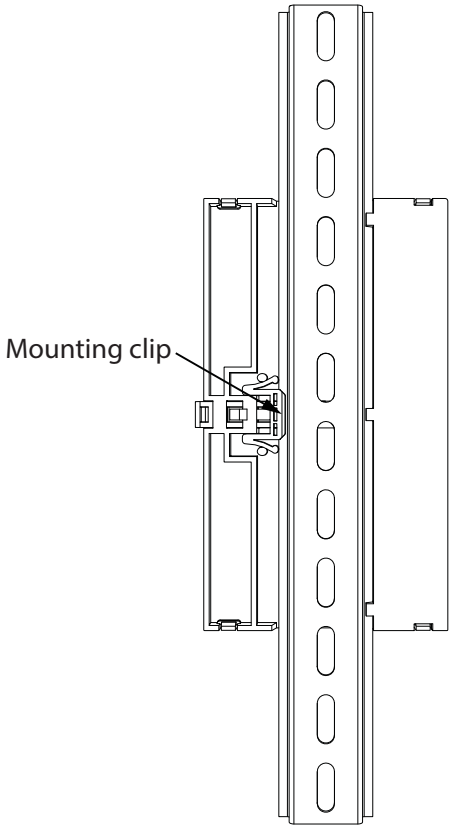


Figure 9 Enclosure mounted on DIN rail (back view)

To remove the enclosure from the DIN rail

- Pull the mounting clip to release the enclosure from the DIN rail, and carefully pull the enclosure off the DIN rail.

4.0 Field wiring

Note: Installation of OpenBAS-LC-NX12R controllers must be in accordance with the Canadian Electrical Code or the National Electrical Code, and comply with all local regulations. Final acceptance is subject to the Local Authority Having Jurisdiction (AHJ).

4.1 To Wire the Terminals

Figure 4 on page 12 shows the location of the terminals. The terminals are depluggable for ease of wiring.

4.1.1 Required Tools

Tools needed:

- Precision or jeweler's screwdriver set
- Wire cutter
- Wire stripper

4.1.2 Installation Tips

- Perform visual inspection of circuit board and parts for obvious issues.
- Use a wire tie to group wires for easy identification and neatness.

4.2 Power Supply Connection

- 24 Vdc, 400 mA max.
- 24 Vac, 500 mA max.

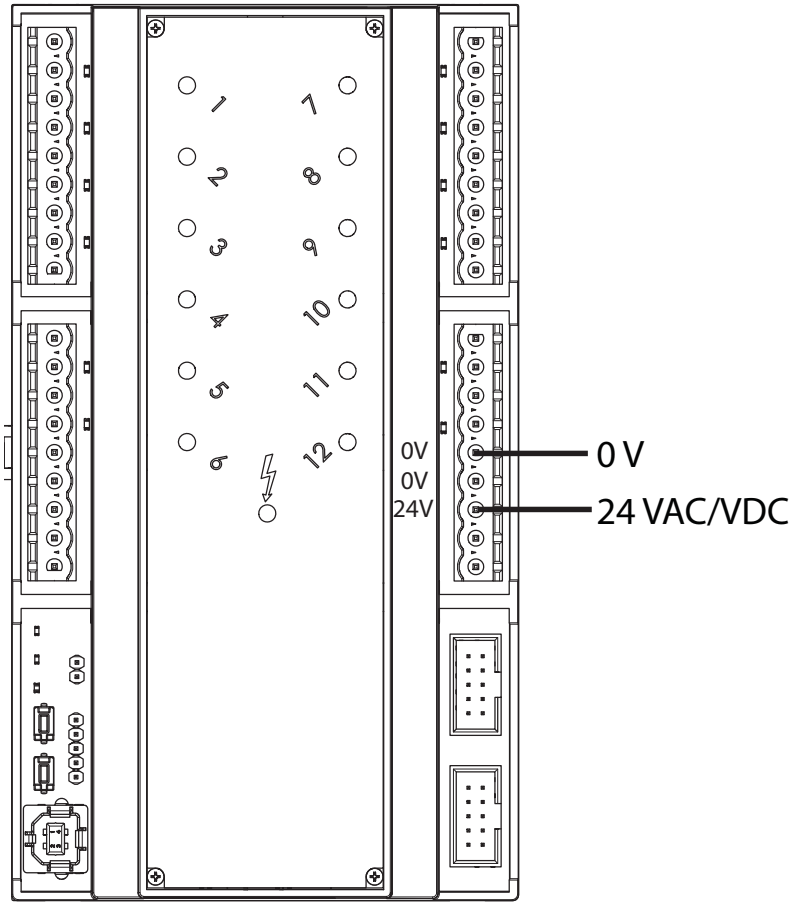


Figure 10 Power supply - 24 VAC or 24 VDC

Caution: An appropriate UL listed class 2 power supply or transformer with necessary protection devices such as fuses or breakers should be used to limit the risk of fire. All local codes and regulations for installation must be observed.

- Use either of the terminals labeled **0V** to connect the negative side of the power supply.

4.3 Manual Override Terminals

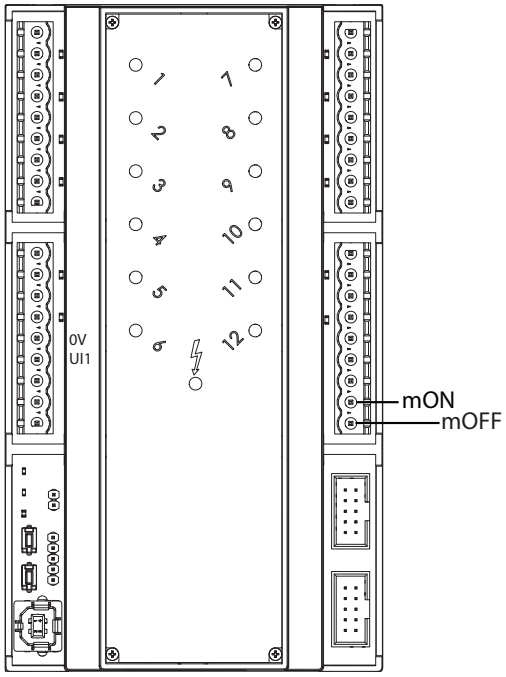


Figure 11 Manual Override Terminals

The mOFF and mON terminals provide a way to manually override the lighting controls. They are inputs that receive 24 VAC or VDC only.

Connect a 3 position switch to these terminals. The switch can be powered from the same power source that powers the controller, as shown in Figure 12.

When the switch is set to OFF, the controller turns all relays off.

When the switch is set to ON, the controller turns all relays on.

When the switch is set so that both OFF and ON are open (AUTO state), then the controller turns the relays to their previous state. While the switch is the this state, the controller's programming and schedules can control the relays. Refer to the OpenBAS Programming Manual for information.

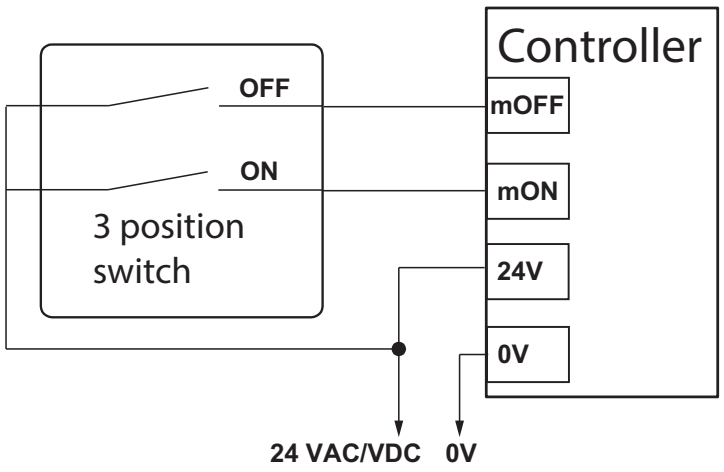


Figure 12 Manual override switch wiring

4.4 Jumper J1

Short jumper J1 ONLY when the universal input is connected to a resistive 1000 Ω temperature sensor (for instance, OpenBAS-ACC-TE1K or a positive temperature coefficient thermistor).

In all other cases, make sure that J1 is open.

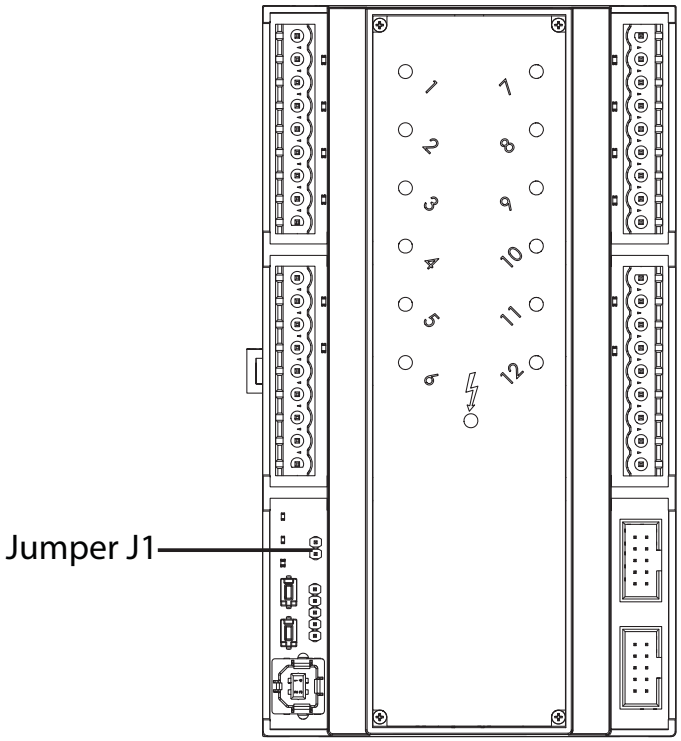


Figure 13 Jumper J1

4.5 Universal Input

The controller has 1 universal input. Depending on the application, the universal input can be used as:

- Analog Input (section 4.5.2 on page 24) — 0-10 VDC
0-5 VDC
0.5-4.5 VDC ratiometric
0-20 mA
4-20 mA
Thermocouple input with x200 amplifiers
- Input for a resistive 1000 Ω temperature sensor (section 4.5.3 on page 26)
- Measuring 24 VDC (section 4.5.4 on page 27)
- Digital (binary) input (section 4.5.5 on page 27) — for dry contacts being fed by 12 VDC
- Pulse counter (section 4.5.5 on page 27) — active PNP 12 VDC
for dry contacts being fed by 12 VDC

See section 4.5.2 on page 24 for its use as an analog input, and section 4.5.5 on page 27 for its use as a digital input.

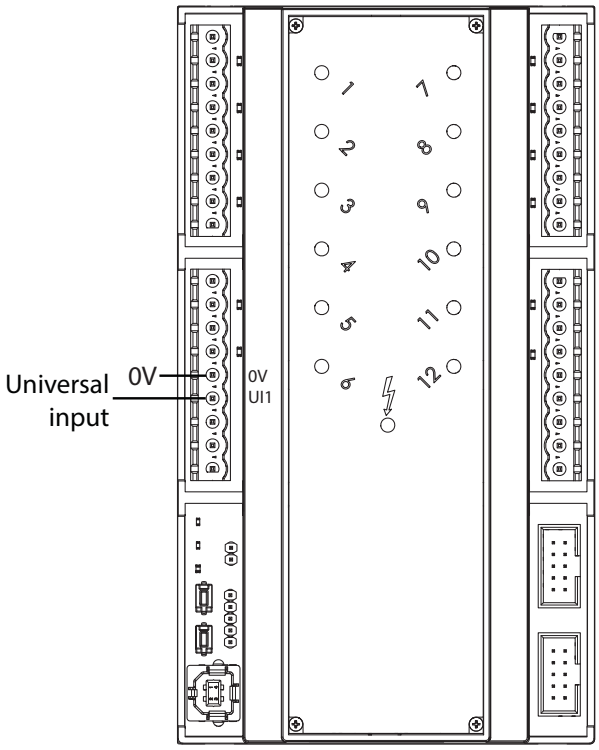


Figure 14 Universal input

4.5.1 Tips for the universal input

- Use 18 AWG stranded wire.
- The absolute maximum voltage is 15 VDC.
- Fit the end of the wire with terminal connectors to provide a solid connection that can withstand temperature changes and vibration without becoming loose.
- Connect the common wires of sensors to the **0V** terminals.
- Short jumper J1 ONLY when using a resistive 1000 Ω temperature sensor. See section 4.4 on page 22.
- When using 2 or more external power supplies, connect the negatives or commons of both power supplies to the 0V terminal of the controller.

To ensure that the universal input operates correctly, follow these guidelines:

- Limit the distance between the analog sensor and the controller to 10 m (30 ft). Mircom recommends shielded wire for noisy environments.
- If this distance is not possible, longer wire runs with shielded wire are allowed up to 30 m (100 ft). Connect the shield to any **0V** terminal on the controller, making sure to isolate the shield on the other end. Failing to do so creates ground loops.
- When possible, route the wiring inside metal piping and ground the piping for better results.
- Avoid running any analog signals near of sources of electric noise such as: motors, ballasts, fluorescent lamps, variable frequency drives, high energy contacts, RF (radio

frequency) transmitters, microwave ovens, and any other equipment that generates electromagnetic interference.

- Keep a minimum distance of 30 cm (1 ft) between analog input wiring and any conductor carrying more than 24 VAC.
- Follow good wiring and installation practices, and follow all local regulations and electrical codes

4.5.2 Analog Input

Connect any sensor or transducer that outputs 0-5 V, 0.5-4.5 V ratiometric, or 0-10 V directly to the universal input when it is configured as an analog input.

To use the universal input as an analog input

1. Connect the appropriate analog signal to the universal input according to the diagrams below.
2. Configure the analog input type and then calibrate using the OpenBAS software.

Terminal Labeling on Field Devices

The positive terminal on field devices might be labeled one of the following:

+ +24 +PWR 24 +DC AC PWR

The negative terminal on field devices might be labeled one of the following:

- 0V GND Neg COM

Table 4 shows how to connect different devices to the analog inputs.

Attention: When using 2 or more external power supplies, connect the negatives or commons of both power supplies to the 0V terminal of the controller.

Table 4 Analog Input Wiring

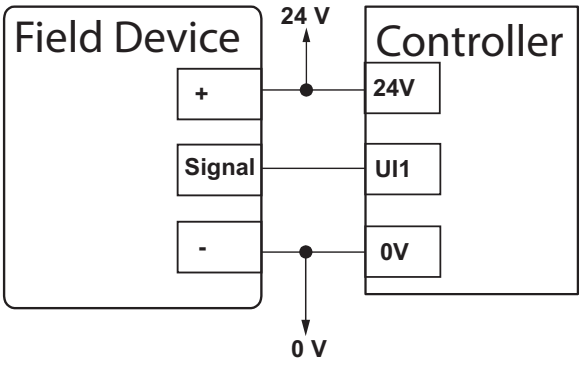
Type of field device	Power source	Wiring diagram
24 V powered transducer with 0-10 VDC output	24 V power supply common to field device and controller. Power can be 24 VDC or VAC as required by the field device.	

Table 4 Analog Input Wiring (Continued)

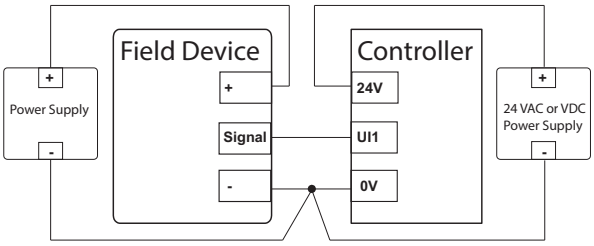
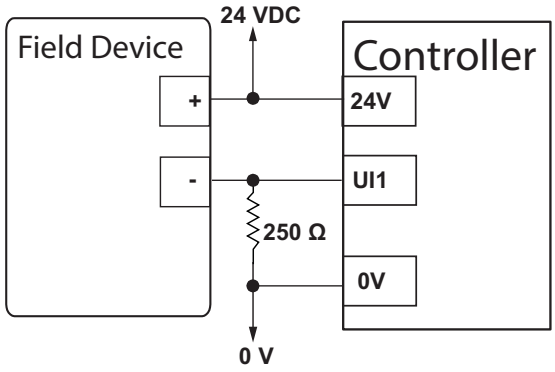
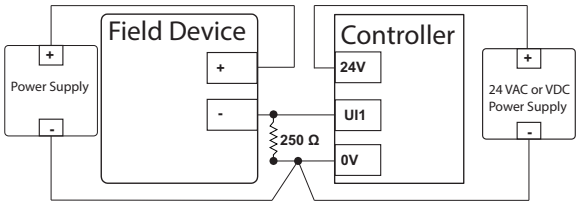
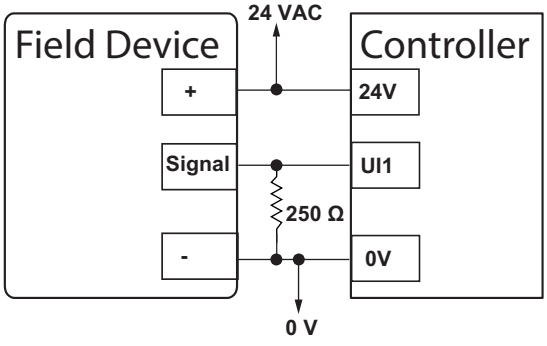
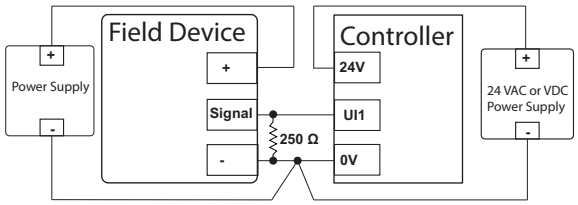
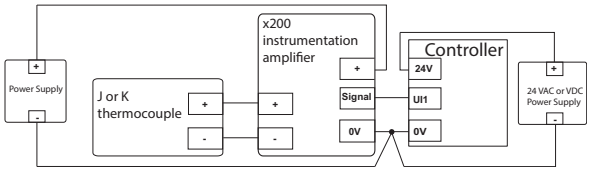
Type of field device	Power source	Wiring diagram
Transducer with 0-10 VDC output	External power supply for field device (depends on field device requirements) and 24 V external power supply for controller. Connect the negatives or commons of both power supplies to the 0V terminal of the controller.	
2-wire transducer with 4-20 mA or 0-20 mA output Connect an external 250 Ω ½ Watt 1% load resistor in parallel between the universal input terminal and **0V** to provide a return path for the transducer signal current.	24 VDC power supply common to field device and controller.	
2 wire transducer with 4-20 mA or 0-20 mA output Connect an external 250 Ω ½ Watt 1% load resistor in parallel between the universal input terminal and **0V** to provide a return path for the transducer signal current.	External power supply for field device (depends on field device requirements) and 24 V external power supply for controller. Connect the negatives or commons of both power supplies to the 0V terminal of the controller.	
3 wire transducer with 4-20 mA or 0-20 mA output Connect an external 250 Ω ½ Watt 1% load resistor in parallel between the universal input terminal and **0V** to provide a return path for the transducer signal current.	24 VAC power supply common to field device and controller.	

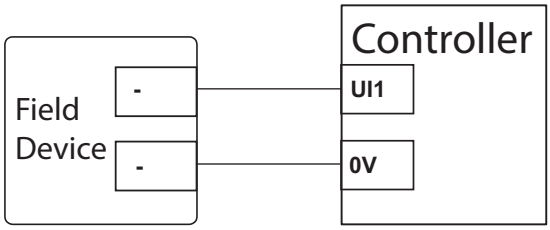
Table 4 Analog Input Wiring (Continued)

Type of field device	Power source	Wiring diagram
3 wire transducer with 4-20 mA or 0-20 mA output Connect an external 250 Ω ½ Watt 1% load resistor in parallel between the universal input terminal and **0V** to provide a return path for the transducer signal current.	External power supply for field device (depends on field device requirements) and 24 V external power supply for controller. Connect the negatives or commons of both power supplies to the 0V terminal of the controller.	
J or K Thermocouples When using J or K thermocouples, install a x200 low offset amplifier.	External power supply for field device (depends on field device requirements) and 24 V external power supply for controller. Connect the negatives or commons of both power supplies to the 0V terminal of the controller.	

4.5.3 Resistive 1000 Ω Temperature Sensor

For resistive temperature sensors, the jumper J1 must be shorted. See section 4.4 on page 22. For all other devices, the jumper must be open.

Table 5 Analog Input Wiring

Type of field device	Power source	Wiring diagram
Resistive 1000 Ω 21° C silicon temperature sensor	N/A	

4.5.4 Measuring 24 VDC with the Analog Input

If you want to measure 24 VDC voltages, add a 15 kΩ ½ Watt 1% resistor in series with the higher voltage to be measured. See Figure 15.

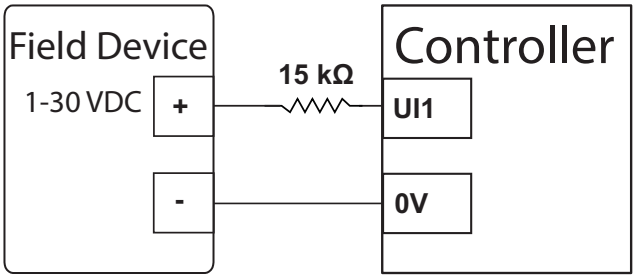


Figure 15 Measuring VDC

Caution: **You can measure up to 30 VDC. A higher voltage will damage the controller.**

Only DC voltages can be input to the universal input. Applying AC voltages or inverting the polarity can damage the controller.

4.5.5 Digital Input

The universal input can receive digital signals. These are signals that represent only two states.

When used as a digital input, the universal input has the following ranges:

- **ZERO (0)** is valid for an input voltage between 0 to 4 VDC
- **ONE (1)** is valid for an input voltage between 8 to12 VDC

Any voltage that lies between 4.1 to 7.9 V can give ambiguous results and must be avoided. See Figure 16.

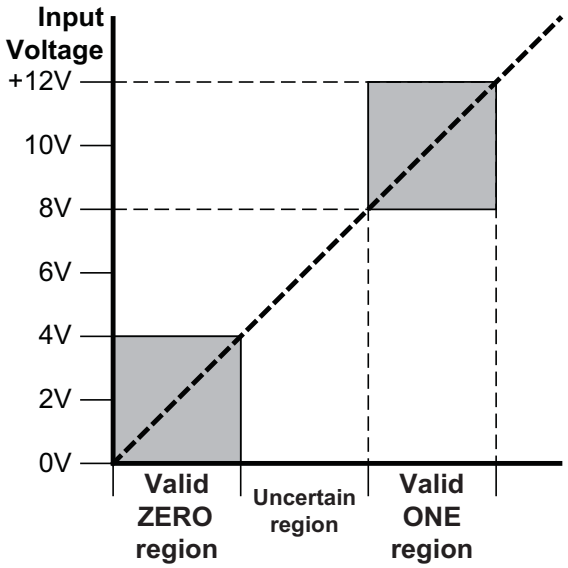


Figure 16 Digital input voltage range

When used as a digital input, the universal input can measure frequencies up to 10 Hz (600 pulses per minute). The minimum pulse width detectable is 50 milliseconds.

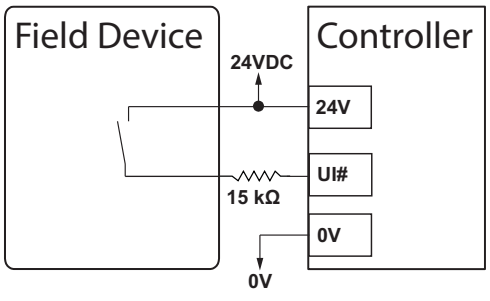
Dry contact, push buttons, magnetic reed switches or PNP transistors must supply voltage to the digital input for correct operation.

To use the universal input as a digital input

1. Connect the appropriate digital signal to the universal input according to the diagrams below.
2. Configure the digital input type and then calibrate using the OpenBAS software.

Table 6 shows how to connect a device to the digital input.

Table 6 Digital Input Wiring

Type of field device	Notes	Wiring diagram
Dry contact or high switched PNP transistor	24 VDC power supply to feed the dry contact switches	

4.6 Outputs

The 12 outputs labeled **Blue** and **Red** are shown in Figure 17. Connect these outputs to the 24 VAC or 24 VDC coils of latching 2 wire relays.

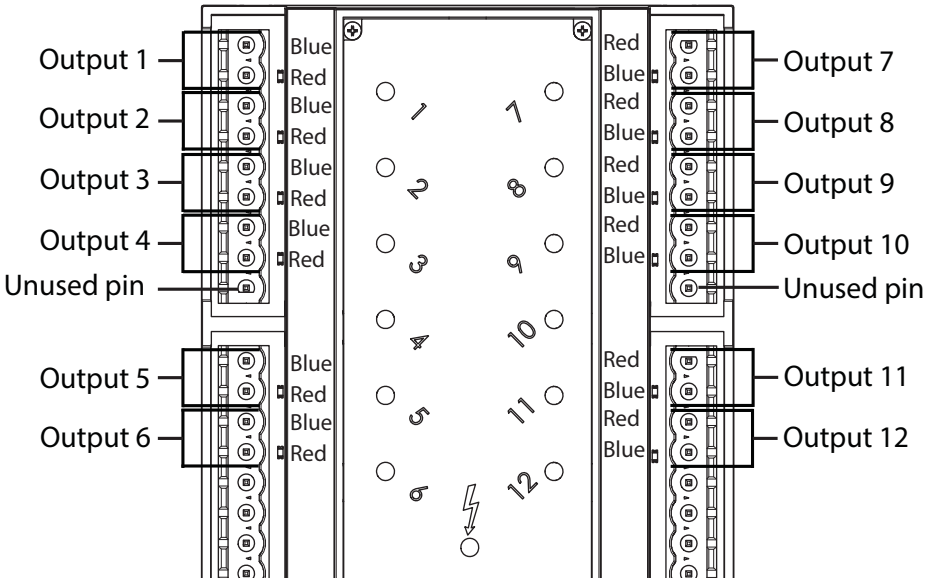


Figure 17 Outputs

Figure 18 shows a latching lighting relay connected to output 4.

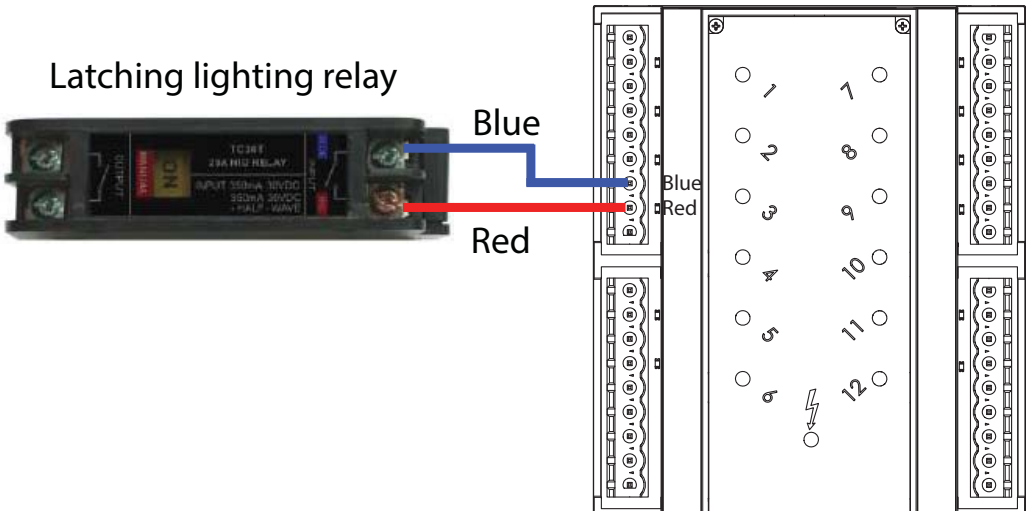


Figure 18 Connection to a latching lighting relay

Install the latching relays inside the power panel as shown in Figure 19. If you install the controller vertically, use DIN rail stoppers to prevent the units from falling.

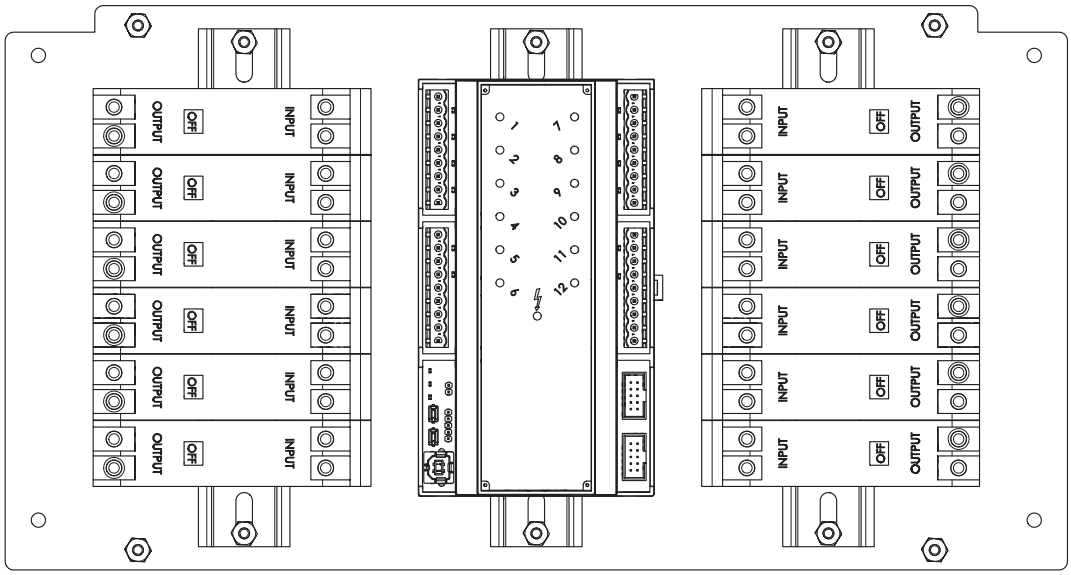


Figure 19 OpenBAS-LC-NX12R with 12 lighting relays

4.7 Adding OpenBAS-LC-NX12R to an Ethernet Network

Connect the RS-485 port of OpenBAS-LC-NX12R to OpenBAS-NWK-ETH3 as shown in Figure 20. OpenBAS-LC-NX12R and OpenBAS-NWK-ETH3 must be powered separately.

See section 4.8.2 on page 32 for information on the RS-485 port.

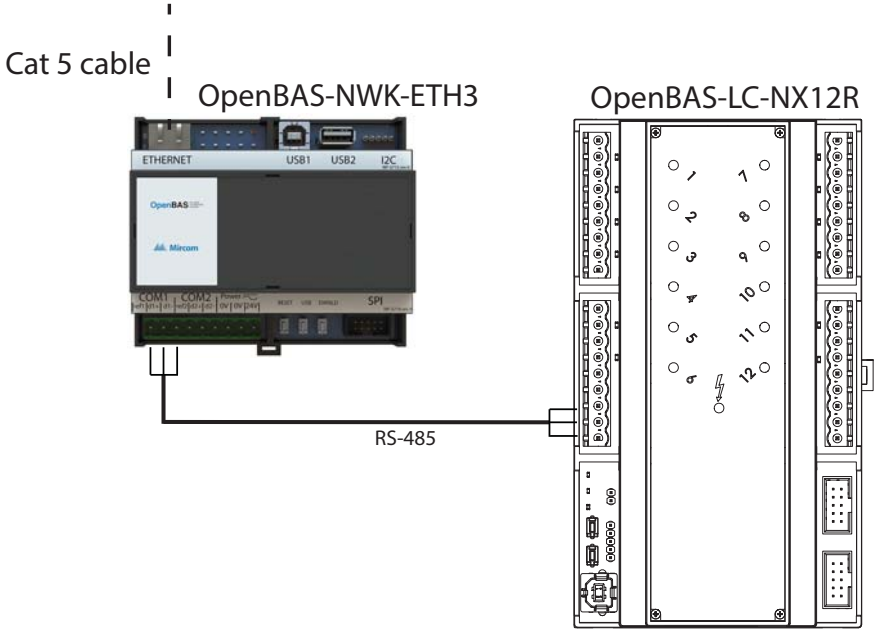


Figure 20 Connecting OpenBAS-NWK-ETH3 to OpenBAS-LC-NX12R

4.8 Networking OpenBAS-LC-NX12R Controllers together

Up to 4 OpenBAS-LC-NX12R controllers can be networked together, providing a total of 48 zones.

There are 2 options for networking: X1 and X2 ports, or RS-485.

4.8.1 X1 and X2 Ports

The OpenBAS-LC-NX12R controller comes with a cable for connecting it to another OpenBAS-LC-NX12R controller using the X1 and X2 ports. Use the X1 and X2 ports when the maximum distance between the controllers is 1 m (3 feet).

Figure 21 shows 3 OpenBAS-LC-NX12R controllers networked with the X1 and X2 ports. The first controller is the master and the others are slaves. Only the master controller requires power.

You can network a maximum of 4 OpenBAS-LC-NX12R controllers (1 master and 3 slaves) with the X1 and X2 ports.

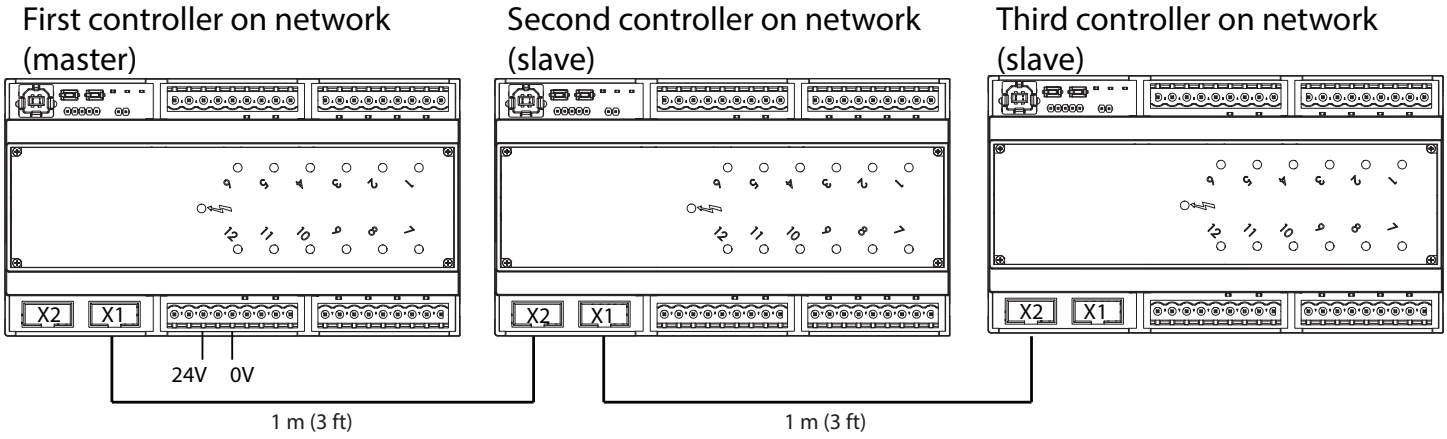


Figure 21 Networking with the X1 and X2 ports

4.8.2 Field Bus Connection

The RS-485 connection is labeled COM 1 in Figure 4. Figure 22 shows 3 controllers networked with RS-485. The list of supported protocols is in chapter 5.

- 22 AWG twisted pair
- Maximum length: 1219.2 m (4000 feet)
- Mircom recommends shielded cable

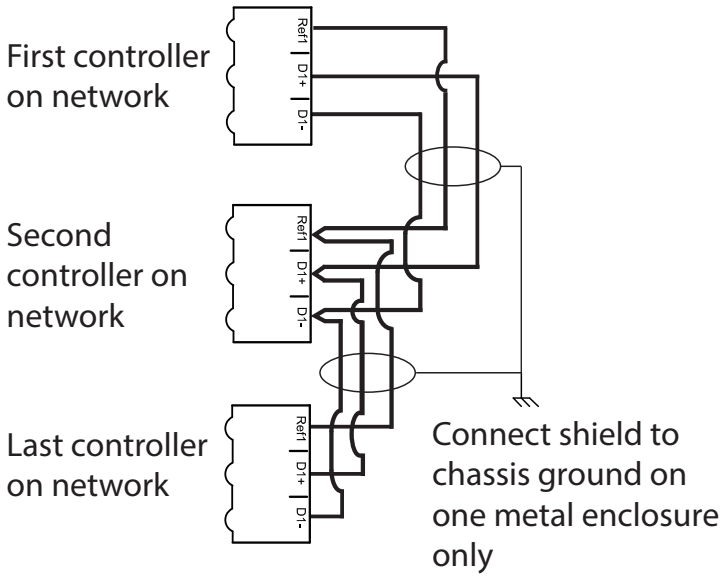


Figure 22 Networking with RS-485

5.0 Specifications

Standards:	UL 60730-1
Input:	24 Vdc, 400 mA max., or 24 Vac, 500 mA max.
Power Supply Protection:	Resettable Fuse 1.1 A
Battery:	FDK Corporation ML2430 Type: lithium Nominal capacity: 100 mAh Nominal voltage: 3 V Mircom part number: BT-025
1 Universal Input:	**Analog Input:** • 0-10 VDC • 0-5 VDC • 0.5-4.5 VDC ratiometric • 0-20 mA • 4-20 mA • 1000 Ω temperature sensor • Thermocouple input with x200 amplifiers **Digital (binary) input:** • For dry contacts being fed by 12 VDC **Pulse counter:** • Active PNP 12 VDC • For dry contacts being fed by 12 VDC
12 Outputs:	24 Vdc, 350 mA nominal, 500 mA max., pulsed every 100 ms to relays
2 Manual Override Inputs:	24 VAC/VDC

Communication Ports:	1 RS-485 port supporting the following protocols: • BACnet/MSTP • Modbus/RTU-Slave • Modbus/RTU-Master • N2-Open • Optomux BAUD Rate: 2400, 4800, 9600, 19200, 38400, 76800 1 USB 2.0 port supporting the following protocols: • Optomux • ASCII 2 I^2C ports for memory expansion, LCD display, and OpenBAS-HV-RF433R 2 ports (X1 and X2) only for networking up to 4 OpenBAS-LC-NX12R controllers (1 master and 3 slaves) supporting the following protocols: • N2-Open • Optomux • N2/O22-master • ASCII • ECM
Physical Characteristics:	Weight: 260 g (9.6 oz) Enclosure dimensions: 6 9/32” x 3 35/64” x 2 17/64” (160 mm x 90 mm x 58 mm)
Ambient Conditions:	Operating Temperature: 0° to 40°C (32° to 104°F), 10% to 90% RH noncondensing Indoor Use Only
Purpose of Control:	Operating Control
Construction of Control:	Independently Mounted, for Panel Mount
Action Type and additional features:	Type 1.C
Pollution Degree:	2
Software Class:	Class A
Rated Impulse Voltage:	24V circuits: 330V

6.0 Warranty and Warning Information

WARNING!

Please read this document **CAREFULLY**, as it contains important warnings, life-safety, and practical information about all products manufactured by the Mircom Group of Companies, including Mircom and Secutron branded products, which shall include without limitation all fire alarm, nurse call, building automation and access control and card access products (hereinafter individually or collectively, as applicable, referred to as "**Mircom System**").

NOTE TO ALL READERS:

1. **Nature of Warnings.** The within warnings are communicated to the reader out of an abundance of caution and create no legal obligation for Mircom Group of Companies, whatsoever. Without limiting the generality of the foregoing, this document shall NOT be construed as in any way altering the rights and obligations of the parties, governed by the legal documents that apply in any given circumstance.
2. **Application.** The warnings contained in this document apply to all Mircom System and shall be read in conjunction with:
   a. the product manual for the specific Mircom System that applies in given circumstances;
   b. legal documents that apply to the purchase and sale of a Mircom System, which may include the company's standard terms and conditions and warranty statements;
   c. other information about the Mircom System or the parties' rights and obligations as may be application to a given circumstance.
3. **Security and Insurance.** Regardless of its capabilities, no Mircom System is a substitute for property or life insurance. Nor is the system a substitute for property owners, renters, or other occupants to act prudently to prevent or minimize the harmful effects of an emergency situation. Building automation systems produced by the Mircom Group of Companies are not to be used as a fire, alarm, or life-safety system.

NOTE TO INSTALLERS:

All Mircom Systems have been carefully designed to be as effective as possible. However, there are circumstances where they may not provide protection. Some reasons for system failure include the following. As the only individual in contact with system users, please bring each item in this warning to the attention of the users of this Mircom System. Failure to properly inform system end-users of the circumstances in which the system might fail may result in over-reliance upon the system. As a result, it is imperative that you properly inform each customer for whom you install the system of the possible forms of failure:

4. **Inadequate Installation.** All Mircom Systems must be installed in accordance with all the applicable codes and standards in order to provide adequate protection. National standards require an inspection and approval to be conducted by the local authority having jurisdiction following the initial installation of the system and following any changes to the system. Such inspections ensure installation has been carried out properly.
5. **Inadequate Testing.** Most problems that would prevent an alarm a Mircom System from operating as intended can be discovered by regular testing and maintenance. The complete system should be tested by the local authority having jurisdiction immediately after a fire, storm, earthquake, accident, or any kind of construction activity inside or outside the premises.

The testing should include all sensing devices, keypads, consoles, alarm indicating devices and any other operational devices that are part of the system.

NOTE TO USERS:

All Mircom Systems have been carefully designed to be as effective as possible. However, there are circumstances where they may not provide protection. Some reasons for system failure include the following. The end user can minimize the occurrence of any of the following by proper training, testing and maintenance of the Mircom Systems:

6. **Inadequate Testing and Maintenance.** It is imperative that the systems be periodically tested and subjected to preventative maintenance. Best practices and local authority having jurisdiction determine the frequency and type of testing that is required at a minimum. Mircom System may not function properly, and the occurrence of other system failures identified below may not be minimized, if the periodic testing and maintenance of Mircom Systems is not completed with diligence and as required.
7. **Improper Operation.** It is important that all system users be trained in the correct operation of the alarm system and that they know how to respond when the system indicates an alarm. A Mircom System may not function as intended during an emergency situation where the user is unable to operate a panic or emergency switch by reason of permanent or temporary physical disability, inability to reach the device in time, unfamiliarity with the correct operation, or related circumstances.
8. **Insufficient Time.** There may be circumstances when a Mircom System will operate as intended, yet the occupants will not be protected from the emergency due to their inability to respond to the warnings in a timely manner. If the system is monitored, the response may not occur in time enough to protect the occupants or their belongings.
9. **Carelessness or Safety Hazards.** Moreover, smoke detectors may not provide timely warning of fires caused by carelessness or safety hazards such as smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits or children playing with matches or arson.
10. **Power Failure.** Some Mircom System components require adequate electrical power supply to operate. Examples include: smoke detectors, beacons, HVAC, and lighting controllers. If a device operates only by AC power, any interruption, however brief, will render that device inoperative while it does not have power. Power interruptions of any length are often accompanied by voltage fluctuations which may damage Mircom Systems or other electronic equipment. After a power interruption has occurred, immediately conduct a complete system test to ensure that the system operates as intended.
11. **Battery Failure.** If the Mircom System or any device connected to the system operates from batteries it is possible for the batteries to fail. Even if the batteries have not failed, they must be fully charged, in good condition, and installed correctly. Some Mircom Systems use replaceable batteries, which have a limited life-span. The expected battery life is variable and in part dependent on the device environment, usage and type. Ambient conditions such as high humidity, high or low temperatures, or large temperature fluctuations may reduce the expected battery life. Moreover, some Mircom Systems do not have a battery monitor that would alert the user in the event that the battery is nearing its end of life. Regular testing and replacements are vital for ensuring that the batteries function as expected, whether or not a device has a low-battery monitor.
12. **Physical Obstructions.** Motion sensors that are part of a Mircom System must be kept clear of any obstacles which impede the sensors' ability to detect movement. Signals being communicated by a Mircom System may not reach the receiver if an item (such as metal, water, or concrete) is placed on or near the radio path. Deliberate jamming or other inadvertent radio signal interference can also negatively affect system operation.

13. **Wireless Devices Placement Proximity.** Moreover all wireless devices must be a minimum and maximum distance away from large metal objects, such as refrigerators. You are required to consult the specific Mircom System manual and application guide for any maximum distances required between devices and suggested placement of wireless devices for optimal functioning.
14. **Failure to Trigger Sensors.** Moreover, Mircom Systems may fail to operate as intended if motion, heat, or smoke sensors are not triggered.
    a. Sensors in a fire system may fail to be triggered when the fire is in a chimney, walls, roof, or on the other side of closed doors. Smoke and heat detectors may not detect smoke or heat from fires on another level of the residence or building. In this situation the control panel may not alert occupants of a fire.
    b. Sensors in a nurse call system may fail to be triggered when movement is occurring outside of the motion sensors' range. For example, if movement is occurring on the other side of closed doors or on another level of the residence or building the motion detector may not be triggered. In this situation the central controller may not register an alarm signal.
15. **Interference with Audible Notification Appliances.** Audible notification appliances may be interfered with by other noise sources such as stereos, radios, televisions, air conditioners, appliances, or passing traffic. Audible notification appliances, however loud, may not be heard by a hearing-impaired person.
16. **Other Impairments.** Alarm notification appliances such as sirens, bells, horns, or strobes may not warn or waken a sleeping occupant if there is an intervening wall or door. It is less likely that the occupants will be alerted or awakened when notification appliances are located on a different level of the residence or premise.
17. **Software Malfunction.** Most Mircom Systems contain software. No warranties are provided as to the software components of any products or stand-alone software products within a Mircom System. For a full statement of the warranties and exclusions and limitations of liability please refer to the company's standard Terms and Conditions and Warranties.
18. **Telephone Lines Malfunction.** Telephone service can cause system failure where telephone lines are relied upon by a Mircom System. Alarms and information coming from a Mircom System may not be transmitted if a phone line is out of service or busy for a certain period of time. Alarms and information may not be transmitted where telephone lines have been compromised by criminal tampering, local construction, storms or earthquakes.
19. **Component Failure.** Although every effort has been made to make this Mircom System as reliable as possible, the system may fail to function as intended due to the failure of a component.
20. **Integrated Products.** Mircom System might not function as intended if it is connected to a non-Mircom product or to a Mircom product that is deemed non-compatible with a particular Mircom System. A list of compatible products can be requested and obtained.

Warranty

Purchase of all Mircom products is governed by:

https://www.mircom.com/product-warranty

https://www.mircom.com/purchase-terms-and-conditions

https://www.mircom.com/software-license-terms-and-conditions

Mircom™

www.mircomgroup.com

CANADA - Main Office
25 Interchange Way
Vaughan, ON L4K 5W3
Tel: (905) 660-4655
(888) 660-4655
Fax: (905) 660-4113

U.S.A
4575 Witmer Industrial Estates
Niagara Falls, NY 14305
Tel: (905) 660-4655
(888) 660-4655
Fax: (905) 660-4113