TX3 Series

TX3-CX-1

Installation Manual

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Mircom TX3-CX-1 Installation Manual v.1.1

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Contents

List of Figures

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1 Welcome

This manual provides information about the installation of the TX3-CX-1 Single Door Controller, and must be read in its entirety before beginning any installation work.

Installation must be performed by a qualified technician and must adhere to the standards and special notices set by the local regulatory bodies.

Note:	**Mircom periodically updates panel firmware and Configurator Software to add features and correct any minor inconsistencies. For information about the latest firmware or software visit the Mircom website at www.mircom.com.**

This chapter explains

- The TX3-CX-1 Single Door Controller
- Features
- Configuration
- Card Formats
- Installer Responsibilities
- Typical Wiring Diagram
- About This Manual
- Additional Documentation

1.1 The TX3-CX-1 Single Door Controller

The TX3-CX Card Access System is part of the Mircom suite of products that provide building ready monitoring, control and integrated security solutions for use in the high end multi-tenant residential market.

The TX3-CX-1 Single Door Controller has all the features for an entry level access control application with the flexibility for scalability. It is an innovative PoE controller with a built-in proximity reader that can be used stand alone or networked using either RS-485 or TCP/IP.

Note: To comply with UL 294, use TX3-CX-1 as a standalone device.

1.2 Features

Simple - Simply mount TX3-CX-1 onto a single gang electrical box and connect CAT-5/6 cable for both power and network communication.

Flexible - Power the TX3-CX-1 by either 12 VDC, 24 to 48 VDC or PoE. Network the controller by RS-485 or TCP/IP.

Versatile - TX3-CX-1 has a built-in 125 kHz proximity reader for interior applications. A Wiegand card reader can be added for outside the door.

Scalable - The TX3-CX-1 may be used stand alone or networked to other TX3 platform devices for up to 63 nodes, if using the RS-485 network. There is no limit if TCP/IP is used.

1.3 Configuration

See LT-980 Card Access System Manual on the Mircom website for detailed information on the configurable features of the TX3-CX-1 and its modes of operation.

1.3.1 PC Configurator Software

Use the Configurator software to fully configure the system. See the following documentation:

- LT-995 Configuration and Administration Guide
- LT-973 TX3 Software Guide

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1.4 Card Formats

The following card formats are supported:

- 26-bit Wiegand SIA
- 32-bit CSN
- 34-bit Awid
- 35-bit HID corporate 1000
- 35-bit Indala
- 36-bit HID Simplex
- 36-bit Keyscan C15001
- 37-bit Cansec
- 37-bit HID 10304
- 37-bit Mircom
- 39-bit Kantech XSF
- 50-bit RBH

1.5 Installer Responsibilities

The installation and setup must be done by a qualified technician. The technician is responsible for installing all of the system components, connecting all of the input and output wiring for the appropriate door entry systems, and ensuring that the wiring adheres to the requirements of the system for proper operation using the Configurator software.

1.6 Typical Wiring Diagram

1. TX3-CX-1 Single Door Controller fits onto single gang electrical box
2. Electric Door Strike preferably with built-in door position switch
3. Door position switch
4. Power Supply with or without battery backup

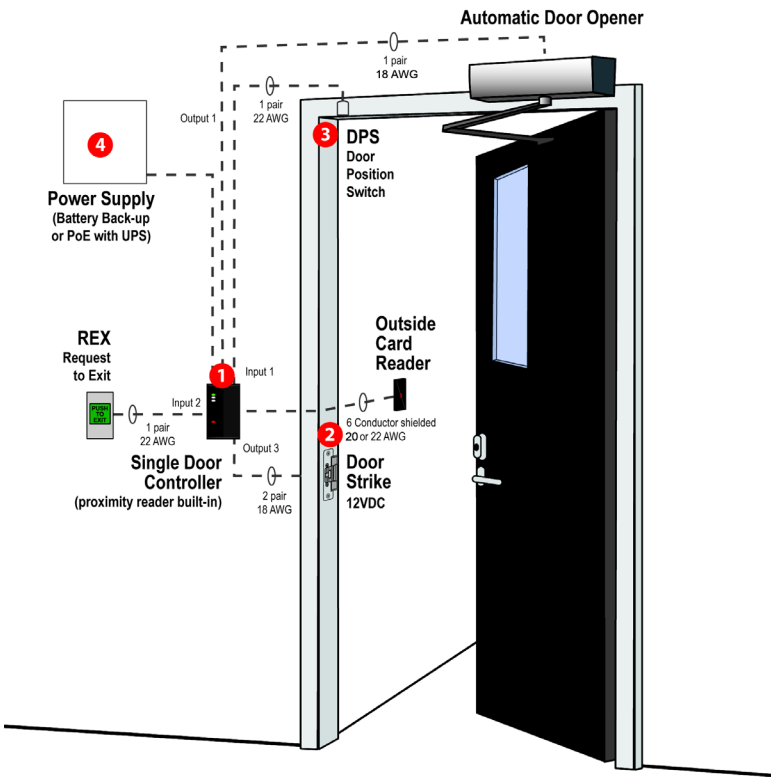

Figure 1. Typical wiring diagram for TX3-CX-1

1.7 About This Manual

This manual applies to the following models:

- TX3-CX-1 Single Door Controller

1.8 Additional Documentation

- LT-980 TX3 Card Access System Installation and Operation Manual
- LT-995 TX3 Configuration and Administration Manual
- LT-973 TX3 Software Guide
- LT-969 TX3 Telephone Access System Installation and Operation Manual
- LT-9940 TX3 Elevator Restriction Manual
- LT-1160 TX3-CX-A8 Aperio™ Door Controller System Installation and Operation Manual

2 Installation of TX3-CX-1

This manual describes the installation of the Single Door Controller.

This chapter explains

- Dimensions and Parts
- Wiring
- DIP Switches
- RS-485
- External Card Reader
- USB Port
- Inputs
- Outputs
- Power
- Mounting and Unmounting
- Status LEDs
- Card Reader Beeper

2.1 Dimensions and Parts

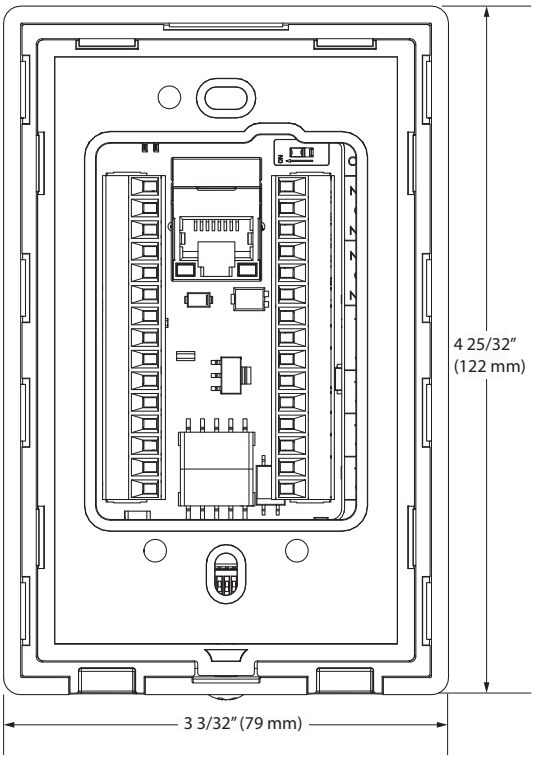

Figure 2. Dimensions of TX3-CX-1

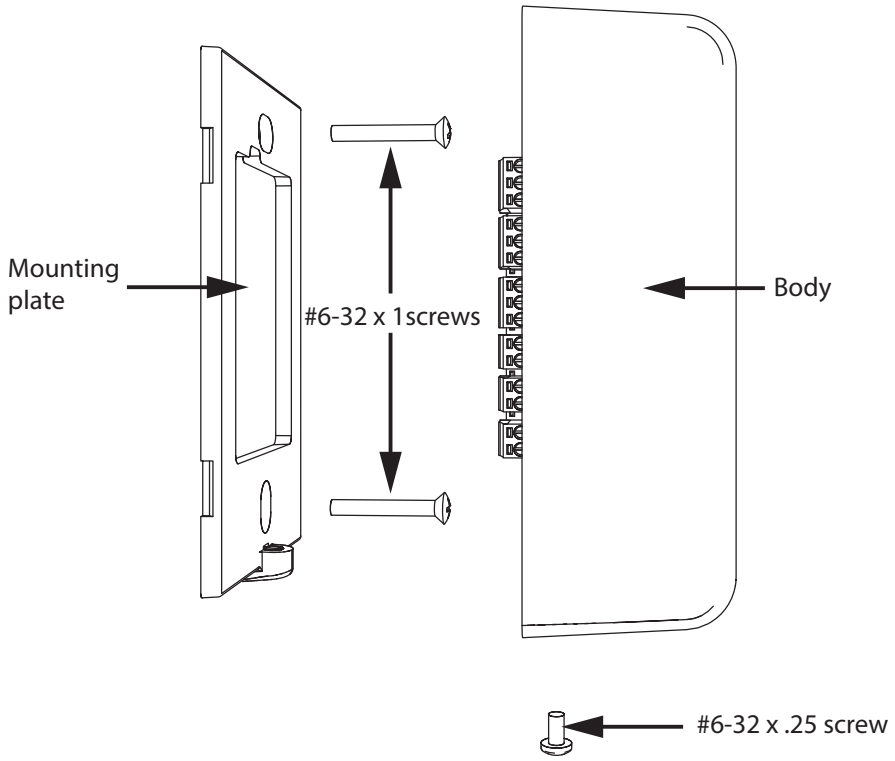

Figure 3. Parts of TX3-CX-1

2.2 Wiring

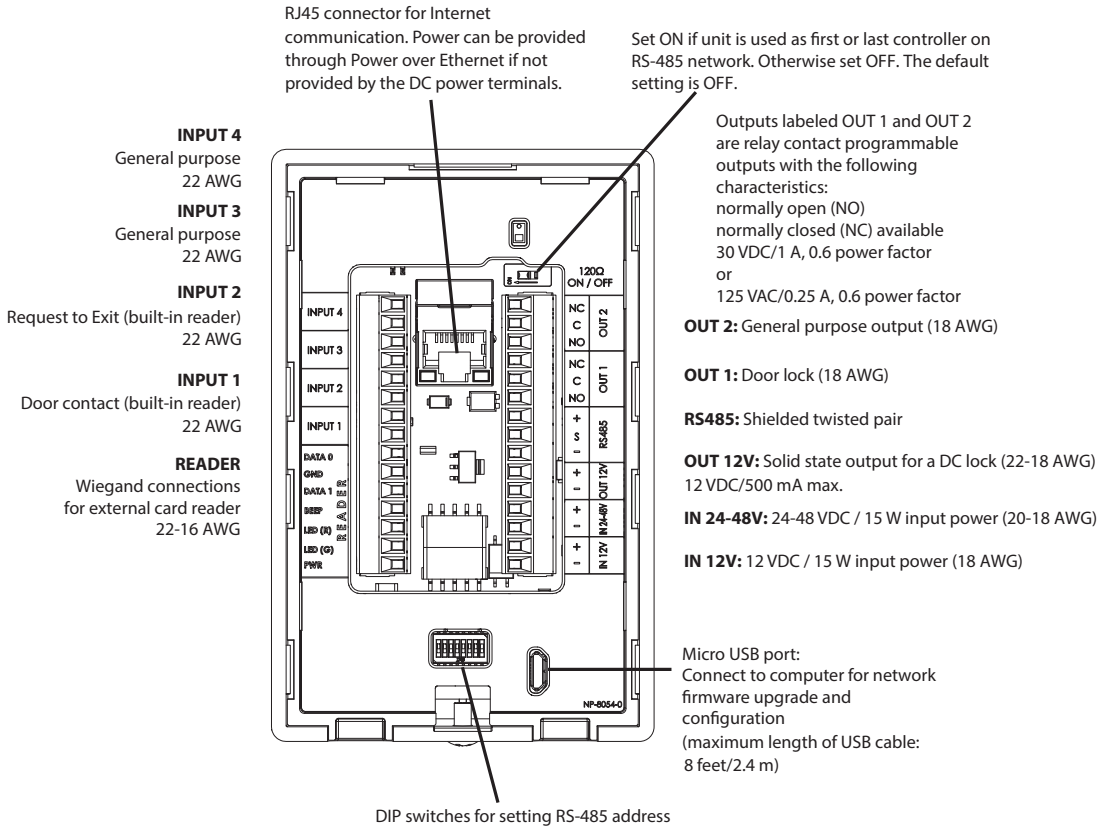

Figure 4. Terminal connections on TX3-CX-1

Note: Wiring must be accordance with the National Electrical Code, ANSI/NFPA 70.

Use the included screwdriver (part number HD-016) to wire the terminals.

2.3 DIP Switches

The location of the DIP switches is shown in Figure 4.

- DIP switches 1-6: use to set the RS-485 network address.
- DIP switch 7: leave off.
- DIP switch 8: Set open (off) to get an IP address from the DCHP server, and set closed (on) to set a fixed IP address using the TX3 Configurator software. The default setting is off.

See chapter 3 on page 28 for the list of RS-485 addresses.

Note: You must set the RS-485 address even if you are not using RS-485.

Figure 5. Setting the RS-485 address

2.4 RS-485

Note: To comply with UL 294, do not connect devices to the RS-485 port.

Connect the RS-485 input terminal to the RS-485 output terminal of another controller. See Figure 6.

Set the 120Ω switch ON if unit is used as first or last controller on RS-485 network. Otherwise set OFF. The default setting is OFF. Figure 4 shows the location of the 120Ω switch.

Note: Use twisted shielded pair.

Recommended cables:

- RS485 cables
  - Belden 3109A RS-485, (4 pr) 22 AWG (7x30) or equivalent
  - Belden 9842 RS-485, (2 pr) 24 AWG (7x32) or equivalent
  - Belden 9841 RS-485, (1 pr) 24 AWG (7x32) or equivalent
- CAT5 Cables
  - Belden 72001E ETHERNET Cat 5e 2 Pair, 24 AWG or equivalent
  - Belden 70006E Cat 5e, 100Mb/s, Quad, AWG 22 (1) or equivalent

Maximum total length:

- 4000 feet (1244 m) for 22 AWG
- 2500 feet (762.5 m) for 24 AWG

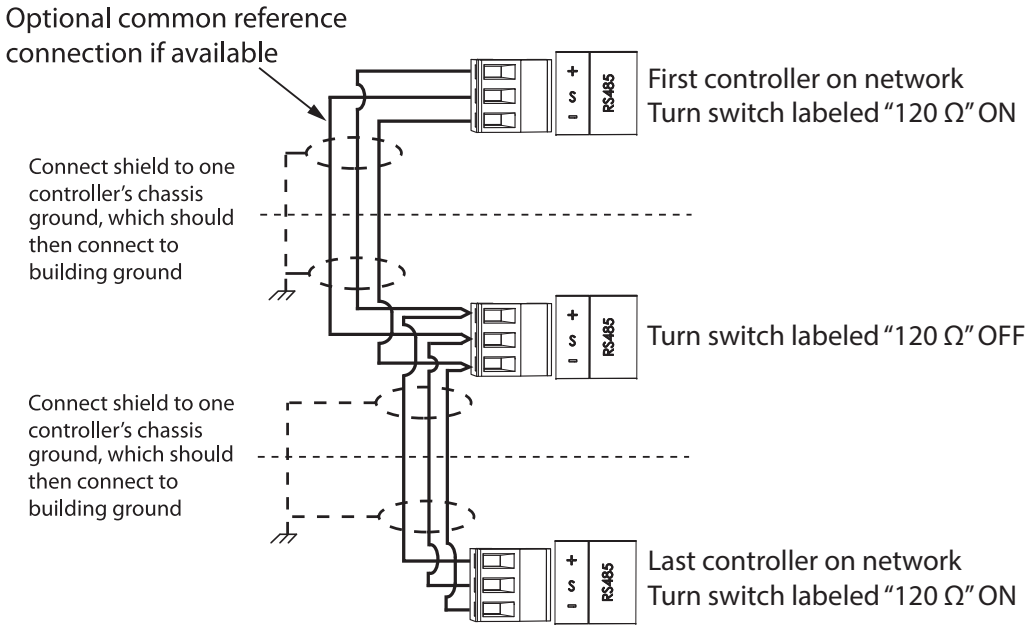

Figure 6. RS-485 Wiring

2.5 External Card Reader

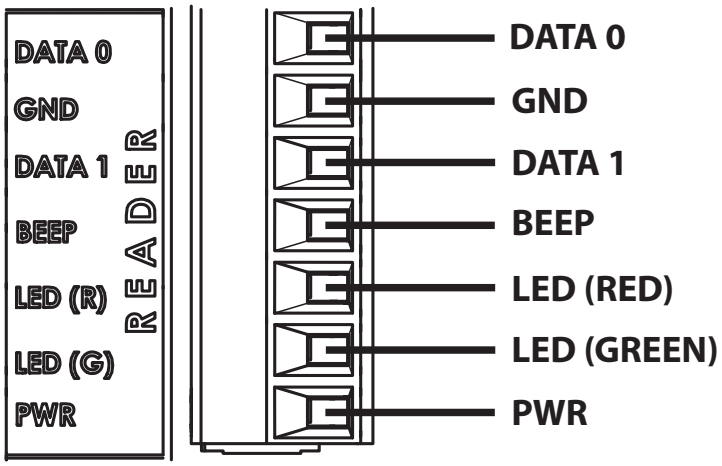

Figure 7. Card reader connections

Connect the readers to the terminals shown in Figure 7.

Table 1: Connections for the TX3-P300-HA and TX3-P500-HA readers

Color	Terminal
Green	DATA0
Black	GND
White	DATA1
Blue	BEEP
Brown	LED (R)
Orange	LED (G)
Red	PWR

Card readers supplied by Mircom require a foil shielded multiple conductor stranded cable, 22-16 AWG. For example, use Belden 9535 or a similar cable.

For other brands of card readers, follow the instructions in the manual for the card reader.

Note: Some card readers treat the green and red LED connections differently. You might need to switch the green and red LED connections for the LED to work properly. This note applies to both single line LED and dual line LED readers.

2.5.1 Card reader requirements

Card readers must meet the following minimum requirements in order to be compatible with Mircom's Card Access System:

- 26 bit standard SIA protocol
- Standard Wiegand interface
- LED status indicator
- Warning or alarm buzzer
- 12 Volt operation
- Maximum distance 152.4 m (500 ft)
- Use 20 AWG for 152.4 m (500 ft)
- Use 22 AWG for 76.2 m (250 ft)
- For other card readers, consult your reader installation manual for recommended distances and gauges

2.6 USB Port

The USB port provides a connection to a PC for configuring the Card Access System and upgrading the firmware.

2.7 Inputs

Inputs 1 to 4 are programmable inputs. In the TX3 Configurator software, the inputs are configured as follows by default:

- Input 1: Door contact
- Input 2: Request to Exit
- Input 3: General purpose
- Input 4: General purpose

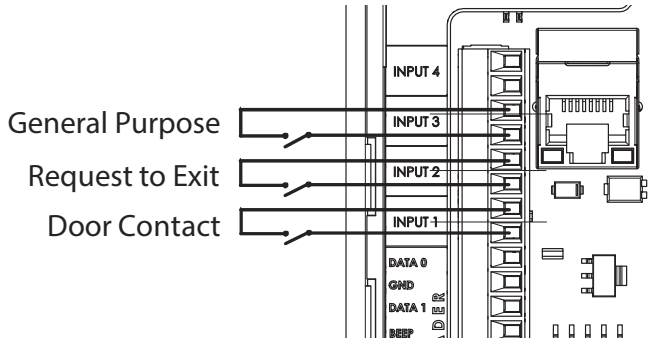

Figure 8. Input Terminal Sample Connections

For details on the active state and supervision of the inputs, see sections 2.7.1 to 2.7.6 below.

For details on programming the inputs, see LT-995.

2.7.1 Door contact

When the door is open this input is active and when the door is closed the input is inactive.

2.7.2 Request to Exit

Activation of this input unlocks the door and starts the door unlock timer.

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2.7.3 General purpose input

The general purpose input is mainly used for establishing a correlation with a specific output. When a general purpose input becomes active it is considered as an event that correlates to either turn on or off a general purpose output, or to turn on or off the high security mode. Other correlated events include different functions such as forced entry, auto relock or interlock.

2.7.4 Active state

An active state is when the input circuit is considered active and is configured as one of the following:

- open
- short (default)

There are some restrictions in configuring the active state depending on what kind of supervision is required.

If the input is not supervised the input is either ‘open’ or ‘closed’. If the input is supervised for ‘open’ the active state cannot be ‘open’.

If the input is supervised for both ‘open’ and ‘short’ the active state cannot be ‘open’.

2.7.5 Supervision requirement

Each input is configured for a specific type of supervision depending on your particular installation requirements as follows:

- no supervision
- supervise for open
- supervise for short
- supervise for both open and short

2.7.5.1 No Supervision

When inputs are configured with no supervision, the active state is either ‘open’ or ‘short’ as programmed.

2.7.5.2 Supervised for open

When configured as supervised for open, the active state is ‘closed’ (short). Open supervision uses a single 47K ohm resistor.

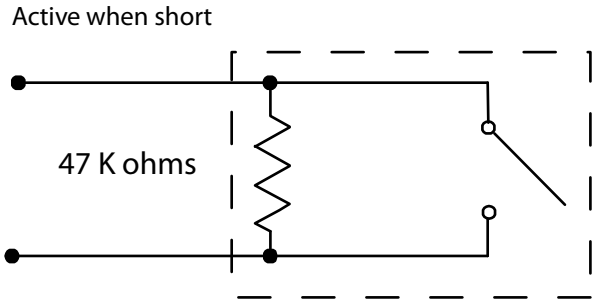

Figure 9. Input - Supervised for Open

Note: The active state cannot be an open state.

2.7.5.3 Supervised for short

When configured as supervised for short, the active state is open. A single 47K ohm resistor is required for short supervision.

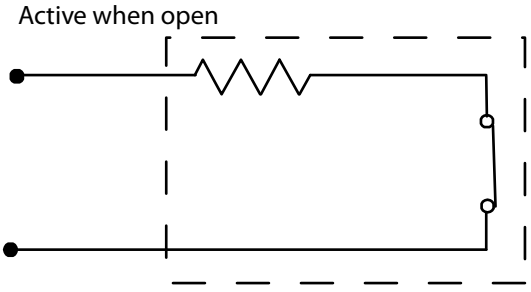

Figure 10. Input - Supervised for Short

Note: The active state cannot be a short state.

2.7.5.4 Supervise for open and short

When configured as supervise for both ‘open’ and ‘short’, the active state cannot be open, therefore the active state is closed.

Two 22K ohm resistors are required for supervision.

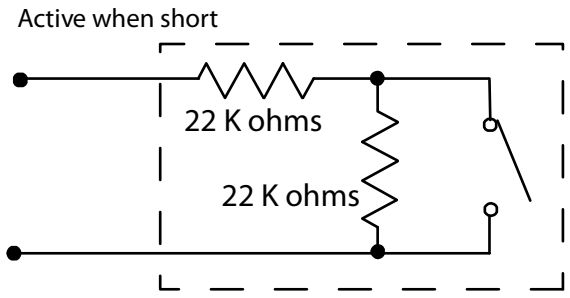

Figure 11. Input - Supervised for Open and Short

Note: The active state cannot be an open state.

2.7.6 Alarm Delay

Alarm delay is a Configurator defined parameter that specifies the amount of time before an input raises an alarm condition. For more information see LT-980 TX3-CX Card Access System Manual.

2.8 Outputs

There are 3 outputs, as shown in Figure 4. For details on programming the outputs, see LT-995.

2.8.1 Outputs 1 and 2

Outputs 1 and 2 are relay contact programmable outputs with the following characteristics:

- normally open (NO)
- normally closed (NC) available
- 30 VDC/1 A, 0.6 power factor

  or
- 125 VAC/0.25 A, 0.6 power factor

Outputs 1 and 2 are configured as follows by default:

- Output 1: Lock. Connect this output to a door strike. When access is granted, this output unlocks the door.

- Output 2: General purpose.

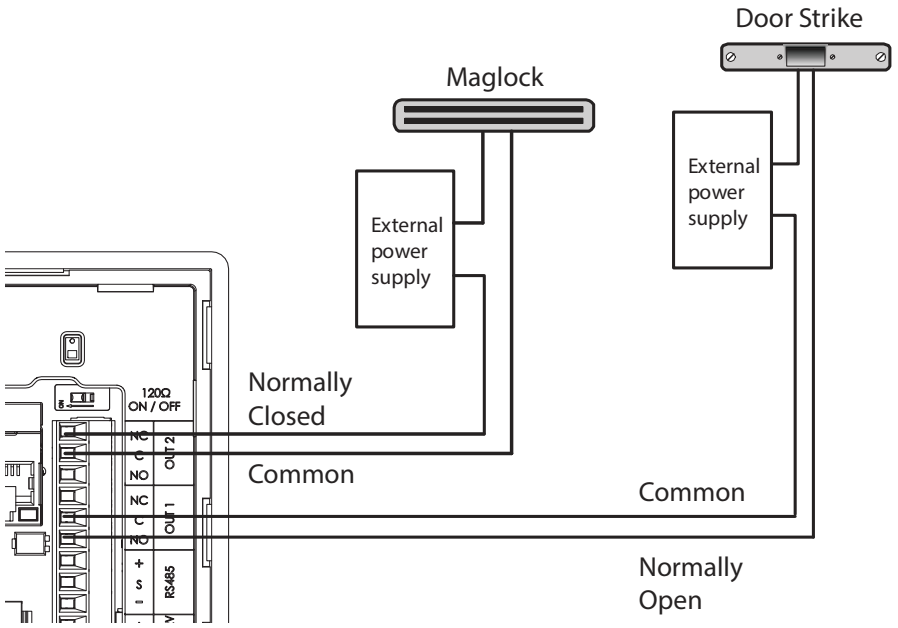

Figure 12. Outputs 1 and 2: Sample Connections

2.8.2 Output 3

Output 3 is a solid state output providing 12 V / 500 mA max. It can power a DC lock.

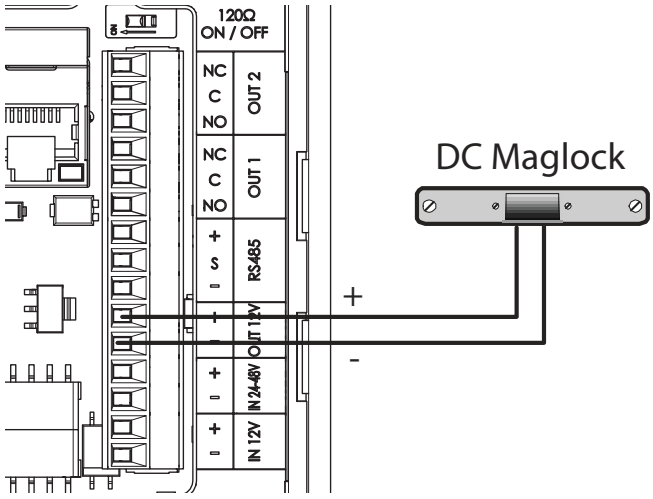

Figure 13. Output 3: Sample Connection

2.8.3 Active state

Outputs require active states. Each output is configured for the active state to indicate one of the following:

- energized
- de-energized

2.9 Power

The Single Door Controller can be powered in three ways:

- Power over Ethernet (PoE) - use Cat 5 cable
- 12 VDC/15 W (Class 2) - use 18 AWG
- 24-48 VDC/15 W (Class 2) - use 20-18 AWG

Use only one of the power inputs.

Note: **To comply with UL 294, if you are using the 12 VDC or 24-48 VDC power inputs, use a UL 294 listed power supply with Class 2 output.**

Note: **If you are using PoE, you must do the following to comply with UL 294:**

When the TX3-CX-1 is powered by PoE it must be powered by UL 294 or UL 294B compliant equipment.

Use a UL 294-compliant power supply, such as the RocketLinx ACS7106.

The PoE cable must be shielded. The length of the PoE cable must not be more than 30 m (98.5 ft).

Standby power is to be provided by the external power source.

2.10 Mounting and Unmounting

To mount TX3-CX-1

TX3-CX-1 mounts on a single or dual gang box. Use a dual gang box if you need more room for the wires. If you use a dual gang box, use a single gang box cover to cover the hole.

Mount TX3-CX-1 the right way up (the Mircom logo is on the bottom).

1. Attach the mounting plate to the single gang box with the two provided #6-32 x 1” screws.

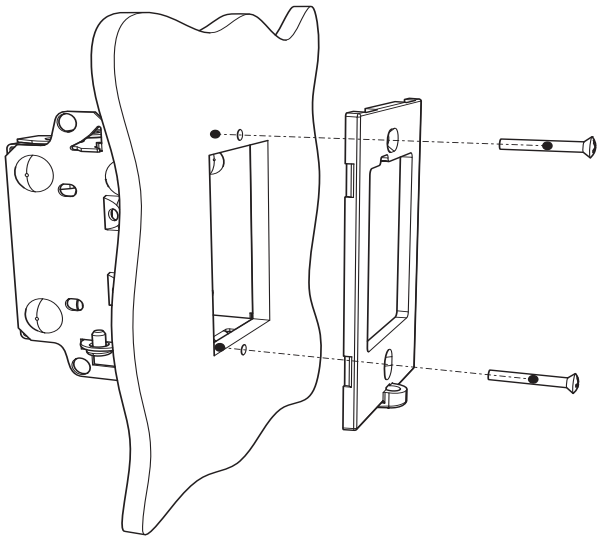

Figure 14. Attaching the mounting plate to the single gang box

2. Feed the wires through the hole in the mounting plate and connect them to TX3-CX-1. See section 2.2 on page 12.

3. Fit the top of the body onto the mounting plate. There are two hooks in the body that fit into grooves in the mounting plate.

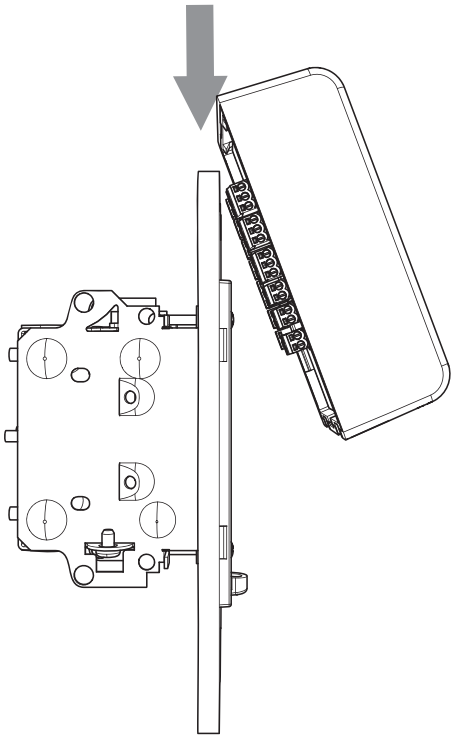

Figure 15. Fitting the body to the mounting plate

4. Press the body on to the mounting plate until you hear a click.

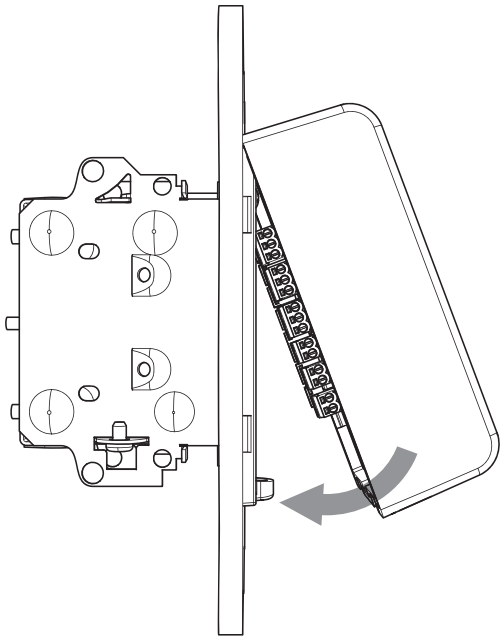

Figure 16. Fitting the body to the mounting plate

5. Secure the body to the mounting plate with the provided #6-32 x 0.25” screw.

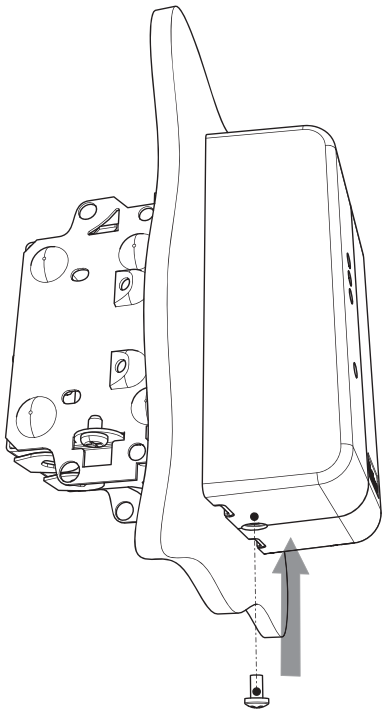

Figure 17. Securing the body to the mounting plate

To unmount TX3-CX-1

1. Remove the screw from the bottom of the unit.

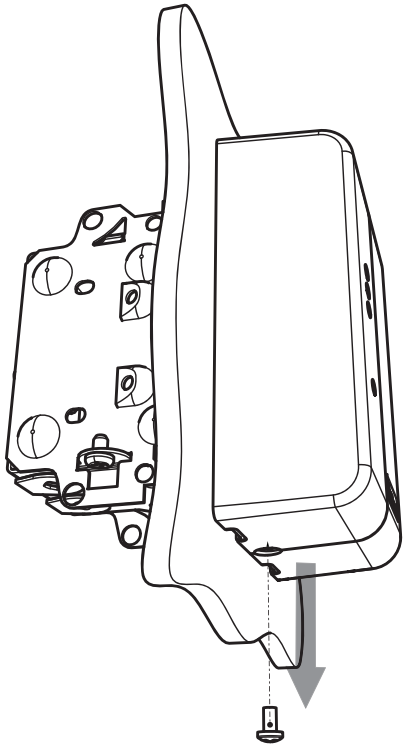

Figure 18. Removing the screw from the body

2. Insert a screwdriver into one of the two notches on the boot and use it as a lever to separate the body from the mounting plate.

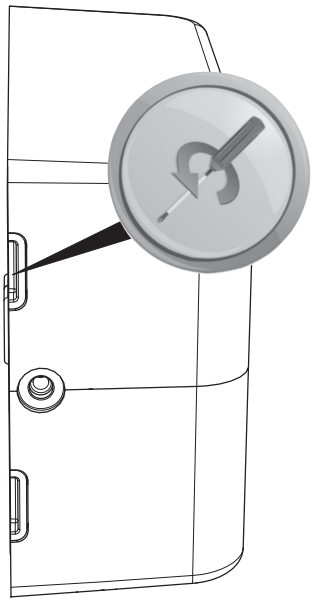

Figure 19. Notches on the bottom

Note: TX3-CX-1 has a tamper feature. When the body is separated from the mounting plate, a tone sounds. It stops sounding when the body is reattached.

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2.11 Status LEDs

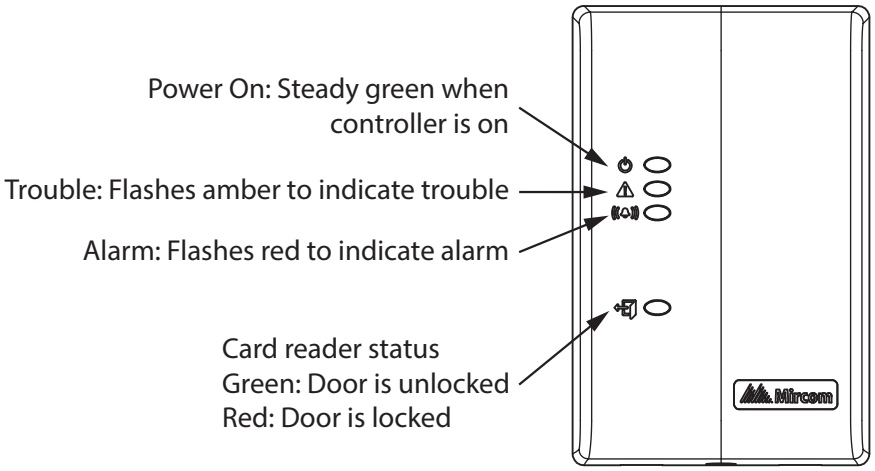

Figure 20. Status LEDs on TX3-CX-1

Power On. This LED illuminates steady green when AC power is present.

Trouble. This LED flashes amber at a slow rate when there is a common trouble condition in the system. Trouble consists of:

- any supervised input
- AC power/low battery
- door held open warning

Alarm. This LED flashes red at a fast flash rate when there is a forced entry or the door held open alarm timer expires.

2.12 Card Reader Beeper

The beeper indicates specific events at different beep rates as follows:

- **Card Presented.** One short beep.
- **Access Granted.** Two short beeps.
- **Access Denied**. One short beep and one long beep.
- **Mode of Operation Changed.** Three short beeps indicate a change in the on or off state for the high security or the unlock mode.
- **Alarm.** Continuous short beeps.

3 RS-485 Addresses

Table 2: DIP Switch Settings for RS-485 Network Addressing

ADDRESS	SWITCH 1	SWITCH 2	SWITCH 3	SWITCH 4	SWITCH 5	SWITCH 6
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF
17	ON	OFF	OFF	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF
20	OFF	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF
23	ON	ON	ON	OFF	ON	OFF
24	OFF	OFF	OFF	ON	ON	OFF
25	ON	OFF	OFF	ON	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF

Table 2: DIP Switch Settings for RS-485 Network Addressing (Continued)

ADDRESS	SWITCH 1	SWITCH 2	SWITCH 3	SWITCH 4	SWITCH 5	SWITCH 6
27	ON	ON	OFF	ON	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF
32	OFF	OFF	OFF	OFF	OFF	ON
33	ON	OFF	OFF	OFF	OFF	ON
34	OFF	ON	OFF	OFF	OFF	ON
35	ON	ON	OFF	OFF	OFF	ON
36	OFF	OFF	ON	OFF	OFF	ON
37	ON	OFF	ON	OFF	OFF	ON
38	OFF	ON	ON	OFF	OFF	ON
39	ON	ON	ON	OFF	OFF	ON
40	OFF	OFF	OFF	ON	OFF	ON
41	ON	OFF	OFF	ON	OFF	ON
42	OFF	ON	OFF	ON	OFF	ON
43	ON	ON	OFF	ON	OFF	ON
44	OFF	OFF	ON	ON	OFF	ON
45	ON	OFF	ON	ON	OFF	ON
46	OFF	ON	ON	ON	OFF	ON
47	ON	ON	ON	ON	OFF	ON
48	OFF	OFF	OFF	OFF	ON	ON
49	ON	OFF	OFF	OFF	ON	ON
50	OFF	ON	OFF	OFF	ON	ON
51	ON	ON	OFF	OFF	ON	ON
52	OFF	OFF	ON	OFF	ON	ON
53	ON	OFF	ON	OFF	ON	ON
54	OFF	ON	ON	OFF	ON	ON
55	ON	ON	ON	OFF	ON	ON
56	OFF	OFF	OFF	ON	ON	ON

Table 2: DIP Switch Settings for RS-485 Network Addressing (Continued)

ADDRESS	SWITCH 1	SWITCH 2	SWITCH 3	SWITCH 4	SWITCH 5	SWITCH 6
57	ON	OFF	OFF	ON	ON	ON
58	OFF	ON	OFF	ON	ON	ON
59	ON	ON	OFF	ON	ON	ON
60	OFF	OFF	ON	ON	ON	ON
61	ON	OFF	ON	ON	ON	ON
62	OFF	ON	ON	ON	ON	ON
63	ON	ON	ON	ON	ON	ON

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4 Specifications

Standards				
UL 294 Sixth Edition				
Performance Levels				
Feature	Access Control Performance Level			
Destructive Attack	Level 1 - No attack test			
Line Security	Level 1 - No line security			
Endurance	Level IV - 100,000 cycles of operation			
Standby Power	Level 1 - No secondary power source			
Power				
3 input power options: • Power over Ethernet (PoE) • 12 VDC/15 W (Class 2) • 24-48 VDC/15 W (Class 2) **Note:** Use a UL 294 listed power supply.				
Ratings for 12 VDC and 24-48 VDC inputs				
Input Voltage	**Operating Condition**	**Load Condition**	**mA**	**W**
12 VDC	Normal Standby	No Load	213	2.556
	Operating	Full Load	717	8.604
24 VDC	Normal Standby	No Load	134	3.216
	Operating	Full Load	442	10.608

Connections
• 1 Ethernet 10/100 port with PoE • 1 micro USB port for configuration • 1 RS-485 port **Note:** To comply with UL 294, do not connect devices to the RS-485 port) • 1 Wiegand connection for optional reader • 4 programmable inputs **Note:** The inputs have a maximum 4Ω line resistance. • 2 general purpose relay outputs rated at: 30 VDC/1 A, 0.6 power factor or 125 VAC/0.25 A, 0.6 power factor • 1 solid state output providing: 12 V / 500 mA max. **Note:** The 12 V output (Output 3) is regulated when it is powered by the 24-48 VDC input or by PoE. The 12 V output is not regulated (special applications) when it is powered by the 12 VDC input. Special Applications compatibility range is 9.5 to 12.8 VDC.
Card Readers
1 built-in 125 kHz proximity reader
Dimensions
122 mm x 79 mm x 41 mm (4 25/32” x 3 3/32” x 1 39/64”)
Operating Temperature
0° C - 49° C (32° F - 120° F) Indoor use only

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5 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