# Concord 4 Dual-Path LTE Module
## INSTALLATION GUIDE

## Introduction

The Dual-Path LTE Module for Concord 4 enables wireless reporting of all alarms and other system events from the Interlogix Concord 4 control panel using the LTE wireless cellular network and optional Ethernet broadband network. The wireless alarm signaling and routing service is operated by Alarm.com, and the Concord 4 LTE module also features integrated support for Alarm.com's emPower™ solution with built-in Z-Wave capabilities.

The module interfaces with the Concord panel data bus and is powered by the panel battery or an auxiliary 12 VDC power supply. Status LEDs on the LTE module indicate bus and cellular network communications.

## Contact Information

For additional information and support on Alarm.com products and services, please visit www.alarm.com/dealer or contact Alarm.com Technical Support at 1-866-834-0470.

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## Compatibility

The module can be used on Concord 4.0 and higher to enable Alarm.com's interactive suite of services. This module is not compatible with Concord 3.x or below panels.

## Account Creation

Before installing the Alarm.com LTE Module in a Concord system, a new customer account needs to be created with Alarm.com. We recommend creating the account at least 24 hours in advance of installation to ensure that the radio is activated prior to installation.

To activate an account, go to www.alarm.com/dealer and login. Under the "Customers" heading at the top left of the page click on "Create New Customer". You will need the following customer information to create the account:

- Customer Name
- Customer Address
- Customer Phone Number
- Customer E-mail
- Preferred login name for the customer
- Alarm.com Module Serial Number

At the end of the account creation process you will be able to print a Welcome Letter for the customer that has their login information and temporary password for the Alarm.com website.

## Installation Overview & Guidelines

Before beginning the module installation, familiarize yourself with the following installation guidelines and the location of the module and troubleshooting LEDs and their function as shown in *Figure 1* and *Table 2*, as they are referenced throughout this guide. Using these tips will help guarantee a successful module installation.

1) Create the customer account on the Alarm.com Dealer Site at least 24 hours before installation. See *Account Creation above*.
2) Turn off the "Access Code Lock" feature on the panel. This feature *MUST* be off for the system to communicate with Alarm.com.
3) Installation consists of finding a mounting location for optimum wireless signal strength, mounting the module, wiring the module, and installing a case tamper (if necessary). Use the LTE Status LEDs on the module to check the signal strength before you permanently mount the module to avoid signaling issues after the installation is complete.
4) Power the module off of the battery, not off of the panel (see *Wiring* on page 2).
5) Perform a manual phone test (Comm Test) to initiate communication (see *Power up* on page 3.)
6) Observe panel power limitations as stipulated below:

- The module draws a maximum of 65 mA (continuous) in PowerSave Mode and 100 mA (continuous) in Idle Mode and Connected Mode from the panel. The module can draw up to 1600 mA (instantaneous peaks) from the panel.
- Do not exceed the panel total output power when using panel power for bus devices and hardwired sensors (refer to panel documentation).
- Use four-conductor, 22 or 18 gauge stranded wire to connect the module to the panel. *Table 1* shows the maximum wire length for each gauge.

*Table 1: Maximum wire length*

| Gauge | Maximum Wire Length |
|---|---|
| 22 gauge | 40 ft. (12.2 m) |
| 18 gauge | 90ft. (27.4 m) |

*Figure 1: Main module components*

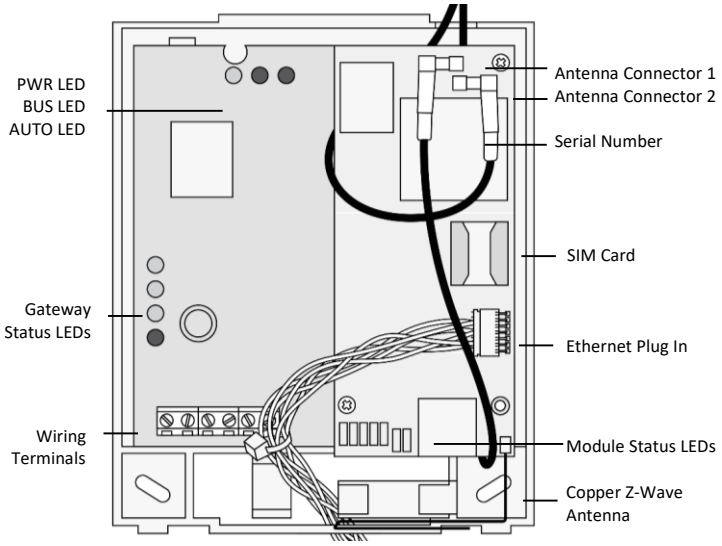
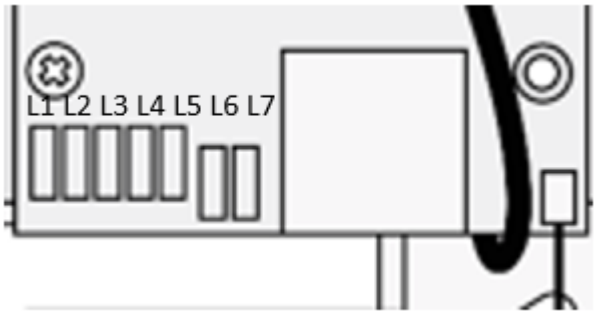



*Table 2: Component Descriptions*

| Component | Function |
|---|---|
| PWR LED | Indicates module power status. |
| BUS LED | Indicates data bus activity between the panel and module. |
| AUTO LED | Indicates module/data transceiver communication. |
| Gateway Status LEDs | Indicates the current signal and status of the wireless gateway module. Only the lower three LEDs are used (See *Gateway Status LEDs* on page 4 for more information.) |
| Wiring terminals | Provides wiring connection to the panel. |
| Antenna Connectors | Snap-in MMCX antenna connectors. The larger antenna connects to connector 1, the smaller antenna connects to connector 2. |
| Module status LEDs | Indicates communication with the LTE network, report errors, and signal strength. |
| Serial number | A 15-digit number. Only the last 10 digits (after the dash "-") are used for account activation. |
| SIM Card | Required for LTE communication. |

*Figure 2* on page 2 shows the LTE status LEDs and *Table 3* on page 2 describes the LED functions. See *Module Status LEDs* on page 4 for more information.

*Figure 2: LTE Status LEDs L1-L5*




*Bottom of LTE Module*

*Table 3: Module Status LED Functions*

| LED | Function |
|---|---|
| **L1** | Error LED: L1 will flash 1 to 8 times in a four-second interval to indicate specific error conditions such as a network error, panel communication error, or LTE radio error. See *Table 5* on page 4 for a list of the errors indicated by L1. |
| **L2** | Panel communication LED: L2 flashes every time a data packet is received from the panel |
| **L3** | LTE communication LED: L3 flashes every time a data packet is received from the LTE radio. |
| **L4** | LTE signal level LED: L4 flashes 0 to 5 times indicating the module signal strength, or toggles on/off when communicating with the Alarm.com servers. |
| **L5** | Z-Wave Error LED: See *Table 6* on page 4 for more information. |
| **L6** | Image Sensor |
| **L7** | Image Sensor |

# Module Installation

## Tools and Supplies Needed

You will need the following tools and supplies:

- Small blade and Phillips screwdriver
- Drill and bits for screws and/or anchors
- Wire cutter/stripper
- Four-conductor, 22-gauge or larger stranded wire
- #6 panhead screws (4 included)
- Wall anchors (4 included)
- 2 KΩ EOL resistor (included)
- Cat-5 Ethernet Cable (Optional)

## Module Location Guidelines

Prior to beginning installation, use the following guidelines to choose a location for the module:

- Check the signal strength before choosing a location. Perform a walking signal strength test by powering the module off the battery directly (connect the GND and +12V terminals). After two minutes, LTE status LED L4 will flash between one and five times to indicate the LTE signal strength level (where 5 is the strongest signal). Alarm.com recommends a signal level of two or higher for proper operation of the LTE Module.
- Avoid mounting the module in areas with excessive metal or electrical wiring, such as furnace or utility rooms.
- Locate the module near an outside wall, preferably on an upper level.
- Do not mount the module gateway inside of the panel's metal box. Doing so will negatively impact Z-Wave performance.
- For homes or businesses located in canyons or with hills nearby, it is necessary to place the antenna higher in the building.

## Mounting the Module and Connecting the Antenna

To mount the module:

**1)** Press down on the top of the enclosure cover (See *Figure* 3) and set it aside.

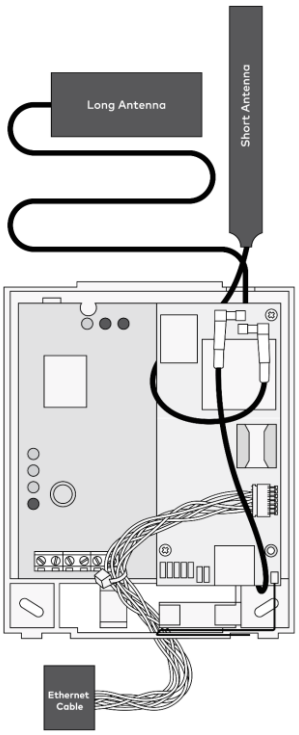
Figure 3: Enclosure Cover

**2)** The LTE module requires 2 antennas for proper operation. Both antennas are pre-installed for convenience. The larger antenna will be connected to antenna connector 1 and the smaller antenna will be connected to antenna connector 2.

**3)** The Ethernet port (optional) enables Dual-Path signaling to the Alarm.com cloud. If desired, the cable should be threaded through an opening in the gate way and plugged into the Ethernet connector on the module as show in Figure 4.

**4)** For optimal signal strength the antennas should be placed as far away from the module as possible and as far away from each other as possible. The recommended antenna orientation is shown in Figure 4.

*Figure 4: Antenna wire orientation*




**5)** Place the module back plate on the wall at the desired mounting location, check for level, and mark the three mounting holes and the wire access area (*Figure* 4). Be sure to leave room above the back plate to route the antennas.

**6)** Set the back plate aside and drill holes at the mounting and wire access area locations.

**7)** Use wall anchors where studs are not present and secure the back plate to the wall with the enclosed screws.

**CAUTION:** *You must be free of static electricity before handling electronic components. Touch a grounded metal surface before touching the circuit board.*

## Wiring

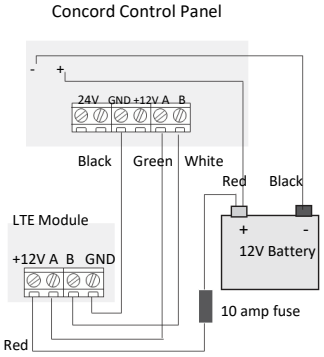
To wire the module to the panel, do the following:

**1)** Remove panel AC Power and disconnect the backup battery. This is necessary to prevent damaging the panel or module while making wiring connections.

**2)** Wire the module to the panel bus and to the battery terminals for power as shown in *Figure 5*.

***Note**: The module can also be powered off the SuperBus2000 two amp power supply (600-1019), but should not be powered directly off the panel.*

*Figure 5: Wiring Terminals*




**3)** If required, connect an input device to the module Z1 and ZCOM terminals.

### Case Tamper Switch Installation (Optional)

If the module is easily accessible, you can add case tamper detection to activate an alarm or trouble (depending on panel programming) when the cover is removed.

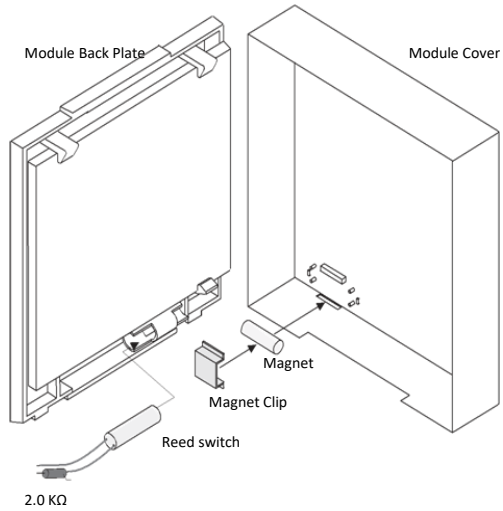
To install the tamper switch, see *Figure 6* and do the following:

1. Slide the reed switch into the plastic holder on the module back plate.

2. Connect a UL Listed reed switch (with a 2 KΩ EOL resistor 01-022) to the module zone input or to any unused hardwired input on the panel.

3. Insert the magnet into the nibs on the top cover and press the magnet clip down over the magnet until it clicks into place into the cover.

*Figure 6: Case tamper switch installation*




### Power Up

To power up the module and panel and start communication between them, do the following:

**1)** Verify that all wiring between the panel and module is correct.

**2)** Connect the backup battery and restore AC power to the panel.

**Note:** *Whenever the module is added or changed, you must remove panel power and reapply it for the panel and module to communicate successfully.*

**3)** Enter installer program mode and turn off the "Access Code Lock" feature (Security menu). This *MUST* be set to off for the system to communicate with Alarm.com. The module PWR LED should turn on. After a few seconds, the module BUS and AUTO LEDs should flash to indicate successful communication with the panel.

**4)** Verify that LTE status LED L1 is not flashing any errors (see *Module Status LEDs* on page 4). Also, verify that LED L4 is flashing an LTE signal level of two or higher. Otherwise, relocate the module. If LED L1 and LED L4 are not flashing, and LED L2 and LED L3 are flashing together, the module is in PowerSave Mode and the battery needs to be charged.

**5)** Perform an installer LTE manual phone test.
At a system touchpad,
- Enter "**8**" + [**installer code**] + "**3**"
- Disarm the panel by entering "**1**" + **[installer code]** within 10 seconds of starting the phone test. Before doing the manual phone test, the bottom red status LED should be on and the yellow status LED should be flashing. The yellow LED will stay on solid once the manual phone test is completed.

***Note:** Do not press any system touchpad buttons during the five to eight minutes or the time will not set. During this time, the keypad will go in and out of programming mode and will beep several times.*

## Gateway Status LEDs

The status LEDs, located on the left side of the module (*Figure 1* on page 1) indicate the current signal and status of the Wireless Gateway Module. The bottom red LED indicates if the module is in range and if it is registered. The yellow and green LEDs indicate the message status. The top LED is not used.

### Red LED

**On:** The module is in range and registered with the network.
**Off:** The module is out of range and not registered with the network.
**Blinks:** The module is registered with the network, but out of range.

### Yellow LED

**On:** LED on after the first message has been sent by the module and received by Alarm.com.
**Off:** LED off until a message has been sent by the module.
**Blinks:** The first message is being sent by the module.

### Green LED

**Off:** The LED is off as soon as Alarm.com receives a message from the module (off most of the time).
**Blinks:** A message is being sent by the module.

*Table 4: Status LED Condition Patterns*

| Condition Number | Red LED | Yellow LED | Green LED | Condition |
|---|---|---|---|---|
| **1** | Off | Off | Off | Module not powered up/not working |
| **2** | On | Off | Off | Module in range, first message not sent, not currently sending message. |
| **3** | On | On | Off | Module in range, first message sent, not currently sending message. |
| **4** | On | On | Blinks | Module in range, first message sent, currently sending message. |
| **5** | On | Blinks | Blinks | Module in range, sending first message, currently sending message. |
| **6** | Blinks | On | Blinks | Module out of range, first message sent, currently sending message. |

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| | | | | |
|---|---|---|---|---|
| **7** | Blinks | On | Off | Module out of range, first message sent, not currently sending message. |
| **8** | Blinks | Blinks | Blinks | Module out of range, sending first message, currently sending message. |

## Module Status LEDs

There are 7 small status LEDs, located at the base of the module (Figure 2 on page 2).

There are seven small radio status LEDs, located on the bottom of the module (see *Figure 1*). T*able 4* below describes the LED functions.

*Table 4: Radio Status LED Descriptions*

| LED | Function |
|---|---|
| L1 | General & Cellular Errors. Flashes 1 to 8 times in an 8-second interval to indicate specific error. See *Table 5* for errors and common fixes. |
| L2 | Broadband & Panel Communication. Flashes every time the module communicates with the panel and flashes in patterns to indicate broadband troubles. |
| L3 | Cell Radio Communication. Flashes every time the cellular signal level is checked and when packets are exchanged with Alarm.com. |
| L4 | Cellular Signal Level. Flashes 0 to 5 times to indicate signal strength, or toggles on/off slowly when communicating with Alarm.com servers. |
| L5 | Z-Wave Status & Error LED. See *Table 6* for error descriptions. |
| L6 | Image Sensor |
| L7 | Image Sensor |

### LED Details

#### LED L1 (red)

L1 flashes when there is an error. The number of flashes indicates the error number. If there are two or more errors at the same time, the errors will flash one after the other. The LED will stay off for at least four seconds between errors.

*Table 5: Errors flashed on L1 (red)*

| Number of flashes | Error and solution |
|---|---|
| 1 | The module cannot communicate with the panel. Perform a power cycle on the panel. If the error persists, rewire the power and RS232 connections and verify the connections are correct. If the error is still observed try a different module. Finally, if that does not fix the problem try a different panel. |
| 2 | The SIM card is missing or cannot be read. If the SIM card has been removed, re-insert the SIM card and power cycle the module. |
| 3 | The module is trying to register on the cellular network. If it persists for more than a few minutes, the module is having problems registering with the cellular network. Check L4 for signal level. If signal level is lower than 2 “bars”, change the panel’s location or use a remote antenna option. If the signal is good, the module may be roaming on a network that does not partner with Alarm.com’s cellular providers. |
| 4 | The module is registered on the cellular network but cannot connect with Alarm.com servers. Contact Alarm.com Technical Support. |
| 5 | The radio portion of the module is not working correctly. If this persists for more than a few minutes the module may need to be replaced. This error is extremely rare so verify that the module is flashing 5 times. |
| 6 | This is an error only if it persists for more than a minute. Otherwise, it’s just an indication that the module is fixing an unusual condition regarding communication with the cellular network. |
| 7 | The module is not compatible with the current panel type. |
| 8 | If it persists, the account may have been set up incorrectly. Contact Alarm.com Technical Support. You will be asked to check the serial number of the module. |

#### LED L2 (yellow)

L2 flashes with every communication between the module and the panel and flashes in patterns to indicate broadband troubles. Normal pattern calls for a flash about every 8 seconds.

*Table 6: Errors flashed on L2 (yellow)*

| Number of flashes | Error and solution |
|---|---|
| 1 | Flashes for each communication with the panel. |
| 2 | The module is unable to establish a connection with the router. Please verify the wiring and power-cycle the module. If this error still persists, power-cycle the router. |
| 3 | The module is unable to establish a internet communication. |
| 4 | The module is unable to establish communication with ADC. |
| 5 | Alarm.com is unable to reach the module, likely due to a local firewall. |

#### LED L3 (yellow)

L3 flashes with every communication between the module and its radio unit in Idle Mode, and with every communication with Alarm.com in Connected Mode. In PowerSave Mode, this LED flashes in unison with LED 2.

#### LED L4 (green)

L4 indicates the cellular signal level as a number of flashes (0 to 5 bars). The number of bars may not correspond to the bars shown on your cell phone, even if you have the same cellular carrier. A level of 5 bars is obtained only in the strongest signal conditions.

Signal level is updated every ten seconds if it fluctuates, or every 30 seconds if it is fairly stable.

If L4 is not flashing it indicates one of the following states:

- The module is in Powersave Mode
- The module just powered up
- There is no cellular coverage in the area***. Alarm.com recommends a steady signal level of 2 or higher for proper operation of the module.***

In Connected Mode, LED 4 toggles on and off.

#### LED L5 (yellow)

L5 indicates Z-Wave states and errors. See *Table 7* for more details.

*Table 7: Z-Wave LED status indicators*

| Number of flashes | Device status or error | Description |
|---|---|---|
| 1 | Successful add node/remove node/replication (lasts 60 seconds) | After receiving this signal leave all devices by the LTE module for 1 minute. Locks must be left next to the module for 4 minutes |

| | | |
|---|---|---|
| 2 | Delete Mode (lasts 120 seconds or until a device is deleted) | In this mode you can delete a device from a Z-Wave network. A device can only be in one network at a time, and must receive a "delete" command before it can be learned into a new network |
| 3 | Add node attempt failed because node already in network (lasts 60 seconds) | Device you attempted to add to a network is already in a network, and must be "deleted" before it can join a new network |
| 4 | Add Mode (lasts 120 seconds or until a device is added) | In this mode you can add a device to the local Z-Wave network. Devices cannot be added to a network if they are already a part of a network |
| 5 | Replicate Mode | |
| 6 | Learn mode error (lasts 60 seconds) | The device was not successfully added to the Z-Wave network. |
| 7 | No node info | |
| 8 | No other nodes are in the network (lasts until a device is added to the network) | No devices have been added that can be controlled by the module yet. See above for instructions on how to add devices |

## Module States (modes)

There are three module states (modes).

### Idle

In Idle Mode, the AC power is up, the battery level is greater than 11.5 volts, and the module is not currently connected to the Alarm.com servers. This is normal for the module and the most common state.

**L1** - Flashes errors, if any.
**L2** - Communication with panel
**L3** - Communication with radio unit
**L4** - Signal level (0 to 5 bars)
**L5** – Flashes errors, if any

### PowerSave

In PowerSave Mode, the module just powered up, AC power is down, or battery level is less than 11.5 volts. The radio part of the module draws 10 mA in PowerSave Mode. It is fully functional and will go into Connected Mode as soon as a signal needs to be sent. Performing a manual phone test will switch the module into Idle Mode and update the signal level reading.

**L1** - Inactive
**L2** - Communication with panel
**L3** - Same flashing pattern as L2
**L4** - Inactive
**L5** – Inactive

### Connected

In Connected Mode, the module is connected to the Alarm.com servers and reported an alarm or other condition. The module stays in Connected Mode for at least six minutes after the last message is exchanged. Entering Installer Programming mode will cause the module to go into Idle Mode.

**L1** - Flashes errors, if any
**L2** - Communication with panel
**L3** - Communication with Alarm.com
**L4** - Alternates two seconds on, then two seconds off
**L5** - Inactive

## Troubleshooting/Testing

### Tips

- Check LTE status LED L1 to see if it is flashing any errors. See *Table 5* on page 4 for descriptions of the errors indicated.
- If the power LEDs (the green LED at the top of the module in *Figure 1* on page 1) is not on, turn off the panel power and verify that all wiring is correct.
- If the Module status LEDs (on the left side of the module in *Figure 1* on page 1) do not turn on immediately after initial power up, be sure you have given enough time for the module to initiate communication with Alarm.com. You must wait 5 to 8 minutes after power up for the module to communicate with Alarm.com. Verify that the "Access Code Lock" feature (in panel memory) is turned off. "Access Code Lock" *MUST* be turned off for correct operation.

### Sensors 94, 95, 96

If sensors 94, 95, and 96 are not learned in, after doing a manual phone test, the text for these sensors will display important information for troubleshooting purposes. Alarm.com Technical Support staff may request this information during service calls.

- **Sensor 94 text:** IMSI number.
- **Sensor 95 text:** Type of central station reports enabled. See *Table 7* for a reference of the codes displayed.
- **Sensor 96 text:** Module serial number.

*Table 7: Central Station Reporting Bits*

| | | | |
|---|---|---|---|
| **B** | Phone Test | **M** | Panel programming |
| **E** | Alarms | **N** | Tamper |
| **F** | System trouble | **O** | Cancels |
| **G** | Sensor trouble | **P** | Normal activity |
| **H** | Arming/disarming | **Q** | Modem on line |
| **J** | Sensor bypass | **R** | Pings |
| **K** | AC power failure | **V** | Panel low battery |
| **L** | Phone failure (phone failure will always be reported for alarms and cancels) | | |

## Specifications

*Table 6: Technical Specifications*

| | |
|---|---|
| **Compatibility** | Concord panels with software versions 4.0 and higher |
| **Power requirements** | 12 V nominal, 65 mA (continuous) 1600 mA (instantaneous peaks) maximum (from panel or auxiliary power supply) |
| **Cellular network** | Verizon LTE; AT&T LTE; Telus LTE |
| **Power/data bus** | One 4-wire SuperBus 2000 auto addressing power communication data bus |
| **Indicators** | One module/panel communication status LED, one module power LED, one automation LED, three wireless communication status LEDs, 2 Image Sensor LEDs |
| **Operating Temperature** | 32 to 120°F (0 to 49°C) |
| **Storage Temperature** | -30 to 140°F (-34 to 60°C) |
| **Humidity** | 90% relative humidity non-condensing |
| **Case color** | Belgian gray |
| **Case material** | High-impact, ABS plastic |

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## Regulatory Information

*Table 7: Regulatory Listings*

| | |
|---|---|
| Listings | FCC ID: YL6-143470L<br>IC: 9111A-143470L<br>Model Number: ADC-470L |

Changes or modifications not expressly approved by Alarm.com can void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different form that which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

Operation is subject to the following two conditions:
(1) This device may not cause interference
(2) This device must accept any interference, including interference that may cause undesired operation of the device
This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

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