

NetworX Verizon LTE Module

INSTALLATION GUIDE

Introduction

Alarm.com's LTE module can be used on NetworX 4V2, 6V2, 8V2, and 8E panels. The module interfaces with the NetworX panel data bus and is powered by the panel. The Alarm.com bus module for NX is made of two parts: A bus module (NX-592E) that connects to the panel via 3 bus wires, and the LTE radio board that plugs onto the NX Gateway board. The LTE radio board is the only new part. *Figure 1* and *Table 1* describe the components' function and location.

Figure 1: NX-592E Gateway bus module, with LTE radio board on the right (in light gray).

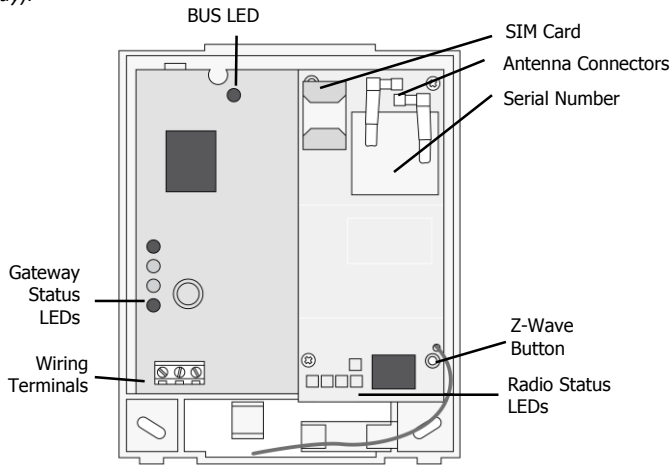


Table 1: Components description

Component	Function
Bus LED	Indicates data bus activity between the panel and the bus module.
Gateway status LEDs	Not used.
Wiring terminals	Provides wiring connection to the panel.
Antenna jack	Antenna connection for wireless data transceiver.
Radio Status LEDs	Indicates communication with the LTE network, report errors, and signal strength.
Serial number	A 15-digit number. Only the last 10 digits are used for account activation.

NOTE: You do not need to reference the Status LEDs on the left side of the bus device. Refer instead to the LTE Status LEDs at the bottom of the radio.

CAUTION: THE NX-208E TWO WIRE SMOKE EXPANDER MODULE IS NOT COMPATIBLE WITH ANY MODEL VARIANT OF THE INTERLOGIX NX-592E-XX NETWORKX CELLULAR MODULE OR THE ALARM.COM EVDU-A7ZDP6-B1-N-VZ CELLULAR MODULE. THE NX-208E AND ANY MODEL VARIANT OF THE INTERLOGIX NX-592E-XX NETWORKX CELLULAR MODULE OR THE ALARM.COM EVDU-A7ZDP6-B1-N-VZ CELLULAR MODULE SHOULD NOT BE INSTALLED WITHIN THE SAME SYSTEM.

Installation Tips

Use the following tips to help guarantee your success with the Alarm.com NetworX LTE Module:

- 1) Make sure you create the customer account on the Alarm.com dealer website at least 24 hours before installation.
- 2) Use the Radio Status LEDs on the module to check the signal strength before you permanently mount the module.
- 3) Do a phone test to initiate communication (see *Power up* on page 2).

Status LEDs

Figure 1 shows where the radio status LEDs are on the module and *Table 2* describes the LED functions. See *Radio Status LEDs* on page 3 for more information.

Table 2: LED Functions

LED	Function
L1	Error LED. Flashes 1 to 8 times in an 8-second interval to indicate specific error. See <i>Table 5</i> for errors and common fixes.
L2	Panel Communication and Z-Wave status messages. Flashes every time the module communicates with the panel and flashes in patterns to indicate Z-Wave status.
L3	LTE Communication. Flashes every time the LTE signal level is checked and when packets are exchanged with Alarm.com.
L4	LTE 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 Error LED. See <i>Table 6</i> for error descriptions.

Installation

Before you install the system, the module must be activated (see *Account Creation* on page 5). The account creation process automatically activates the module within 24 hours. Installation consists of finding a good mounting location for the module to optimize wireless signal strength, mounting the module, wiring the module, and installing a case tamper (if necessary).

Installation Guidelines

Use the following installation guidelines:

- 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 your panel documentation).
- Use three-conductor, 22 or 18 gauge stranded wire to connect the module to the panel. *Table 3* shows the maximum wire length for each gauge.

Table 3: Maximum wire length

22 gauge	40 ft. (12.2 m)
18 gauge	90ft. (27.4 m)

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.
- Three-conductor, 22-gauge or larger stranded wire.
- #6 panhead screws (4 included).
- Wall anchors (4 included).
- Eight 3.3kΩ resistors (if using wireless module).

Module Location Guidelines

Use the following guidelines to choose a location for the module:

- Check the signal strength before choosing a location. Do a walking signal strength test by powering the module off the battery directly (connect the COM and POS terminals). After two minutes, the radio status LED 4 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.

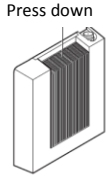
- Locate the module near an outside wall, preferably on an upper level.
- Leave 12 to 18 in. (30 to 45 cm) of open space above the module for the antenna.
- For homes or businesses located in canyons or with hills nearby, it is necessary to place the antenna higher in the building.

Mounting

To mount the module, do the following:

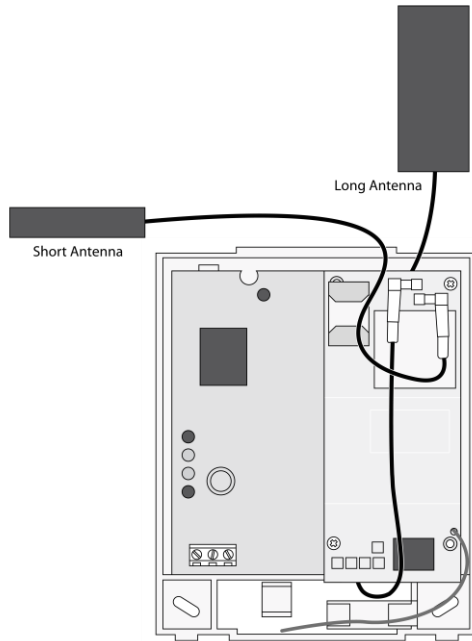
- 1) Press down on the top of the enclosure cover (Figure 2) and set it aside.

Figure 2: Enclosure Cover



- 2) 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 3.

Figure 3: Antenna wire orientation



- 3) 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 3). Be sure to leave at least 12 to 18 in. (30 to 45 cm) above the back plate for the antenna.
- 4) Set the back plate aside and drill holes at the mounting and wire access area locations.
- 5) Use wall anchors where studs are not present and secure the back plate to the wall with the enclosed screws.

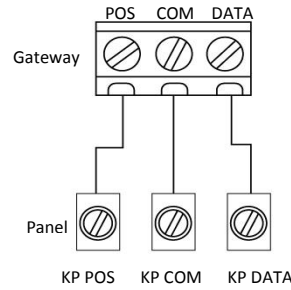
CAUTION: You must be free of static electricity before handling electronic components. Touch a grounded metal surface before touching the board.

Wiring

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

- 1) Remove panel AC Power and disconnect the backup battery.
- 2) Wire the module to the panel POS, COM and DATA terminals (as shown in Figure 4).

Figure 4: Wiring Terminals



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 any module is added or changed, you must remove panel power and reapply it for the panel and module to communicate successfully.
- 3) Verify that radio status LED 1 is not flashing any errors (see [Radio Status LEDs](#) on page 3). Also, verify that LED 4 is flashing a signal level of two or higher. Otherwise, relocate the module. If LED 1 and LED 4 are not flashing, and LED 2 and LED 3 are flashing together, the module is in PowerSave mode and the battery needs to be charged.
- 4) Perform a manual phone test by pressing *44 while the system is disarmed (**Make sure that panel's Location 37, Segment 2, Bit 7 is set**).

Note: if Location 37, Segment 2, Bit 6 is set, performing the phone test will trigger the local siren. To avoid triggering the siren when performing the phone test, make sure Bit 6 is OFF.

The panel will not show any indication that the phone test signal has been sent. You can check the radio status LEDs L3 and L4: L4 should be blinking on for 2 seconds and off for 2 seconds. L3 will blink once briefly as soon as you press *44. If the account is reporting to a Central Station, wait for a minute and check with the Central Station to see if the phone test signal was received correctly. The phone test is also used by Alarm.com to set the module's parameters the first time the module is powered up. It ensures that Alarm.com will receive the sensors list and any other information required for proper signaling.

Enrolling the Module

The NetworX control panels have the ability to automatically find and store in memory the presence of all keypads, zone expanders, wireless receivers, output modules, and any other device on the keypad bus. This allows these devices to be supervised by the control panel. To enroll the devices, enter Program Mode using the procedure outlined in the control panel installation manual. When you exit Program Mode, the control panel will automatically enroll the devices. The enrolling process takes about 12 seconds, during which time the "Service" LED will illuminate. User codes will not be accepted during the enrolling process. Once a module is enrolled, if it is not detected by the control, the "Service" LED will illuminate. When initially powering up, the control panel automatically performs the device enrollment process.

Radio Status LEDs

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

Table 4: LED Functions

LED	Function
L1	Error LED. Flashes 1 to 8 times in an 8-second interval to indicate specific error. See Table 5 for errors and common fixes.

L2	Panel Communication and Z-Wave status messages. Flashes every time the module communicates with the panel and flashes in patterns to indicate Z-Wave status.
L3	LTE Communication. Flashes every time the LTE signal level is checked and when packets are exchanged with Alarm.com.
L4	LTE 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 Error LED. See <i>Table 6</i> for error descriptions.

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	Module cannot communicate with the panel. Perform a power cycle on the panel. If the error persists lift the module out of the panel and re-insert it. If the error is still observed try a different module. Finally, if that does not fix the problem try a different panel.
2 then 4	The module provisioning process could not be completed.
2 then 5	The module provisioning process could not be completed because the module is currently roaming on the carrier's network.
3	The module is trying to register on the LTE network. If it persists for more than a few minutes, the module is having problems registering with the LTE 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 LTE network that does not partner with our LTE providers.
4	The module is registered on the LTE network but cannot connect with Alarm.com. Contact Alarm.com Technical Support.
5	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 LTE network.
7	There are bit sets in Location 21 that prevent Alarm.com from getting the sensor list from the panel. In Location 21, segment 1, if bits 5 and 6 are set the module can not retrieve the sensor list. Note that bit 7 will prevent location 21 from being displayed at the keypad. Bits 5, 6 and 7 can only be set via the Downloader program. This could also mean that 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. Normal pattern calls for a series of quick flashes every two seconds in Idle Mode or four seconds in PowerSave Mode. It also occasionally flashes in patterns to indicate Z-Wave status. See *Table 6* for a description of various possibilities.

Table 6: Z-wave LED status indicators

LED 2	LED 5	Device status or error	Description
4-blink		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
2-blink		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
Solid		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
Solid with one blink		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
	2-blink	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 LTE module yet. See above for instructions on how to add devices
	5-blink	Learn mode error (lasts 60 seconds)	The device was not successfully added to the Z-Wave network.
	6-blink	No Home ID present (lasts until the module connects to Alarm.com and is configured)	When the LTE module first connects to Alarm.com it is configured with a necessary unique network ID

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 LTE 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. 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 LTE coverage in the area. **Alarm.com recommends a steady**

signal level of 2 or higher for proper operation of the module.

In Connected Mode, the LED toggles on and off.

LED L5 (yellow)

L5 indicates Z-Wave errors. See [Table 6](#) above for more details.

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.

LED 1. Flashes errors, if any.

LED 2. Indicates communication with the panel.

LED 3. Indicates communication with the radio unit.

LED 4. Indicates the signal level (1 to 5 bars).

PowerSave mode

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. Doing a manual phone test will switch the module into Idle mode and update the signal level reading.

LED 1. Inactive.

LED 2. Indicates communication with the panel.

LED 3. Same flashing pattern as LED 2.

LED 4. Inactive.

Connected mode

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.

LED 1. Flashes errors, if any.

LED 2. Indicates communication with the panel.

LED 3. Indicates communication with Alarm.com.

LED 4. Alternates two seconds on, then two seconds off.

Module Troubleshooting Information

During account creation and other troubleshooting it may be necessary to know the serial number, the SIM card number, or the types of reports that the LTE module is allowed to transmit. These can be found using the following procedure on an LCD keypad (Skip this section if there is no LCD keypad connected to the panel):

The LTE module will record its serial number and list of allowed reports into the name fields of zones 190 and 192 of the LCD keypad. These zone names can be viewed on any LCD keypad, even if the panel doesn't support 192 zones. To access these zone names, press *92 + installer code to enter Zone Name Programming Mode. Then enter 192# for the module serial number or 190# for the reports list.

By default, the keypad shows "Zone 190" or "Zone 192". To tell the LTE module to show its information in place of these zone names, add a space in front of the zone names by pressing the Stay button, followed by * (star button) and # (pound button) to validate the entry. When you are done with all 3 zones, press Exit to leave programming mode.

Within 1 to 2 minutes, the module will update the zone names that start with a space with the required information. Zone 192 will show the updated serial number, zone 191 will show the updated SIM card number, and zone 190 will

show the updated list of allowed reports. You can tell that the module updated the fields by the fact that the leading space will have been removed.

[Table 7](#) describes the reporting bits as indicated in the text field for zone #190:

Table 7: Reporting Bits

B	Phone Test	M	Panel programming
E	Alarms	N	Tamper
F	System trouble	O	Cancel
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)		

Equipment List and Zones

On NX, the Alarm.com module cannot automatically determine how many zones are installed. The module assumes that the first 20 zones are installed by default. The module needs to know the highest numbered zone installed in order to send an accurate equipment list to Alarm.com. The equipment list is used for alarm reporting to the Central Station and is displayed on the Alarm.com websites.

The number of zones can be changed via one of these 4 methods:

- Trip the highest zone installed (put the zone in alarm or do the Walk-Test procedure). This method can only increase the number of zones. To decrease the number of zones, use one of the alternative options below.
- Send the "Highest Zone Number" command from the Equipment page on the Dealer Web Site.
- Enter the max zone number in location 189 of the main LCD keypad (see procedure below)
- Zones that are not installed should be skipped by setting their partition to 0 (locations 26, 28, 32...) or else they will be listed in the equipment list on the web site.

Note: NX-8E supports up to 192 Zones. Alarm.com can monitor any of the first 120 zones for Normal Activity (non-alarm sensor activity - subject to the limitations of the Alarm.com service plan). All 192 zones are monitored for Alarms and troubles.

Procedure for displaying or for changing the number of zones via location 189 of an LCD keypad:

- 1) Type *92 + installer code to enter Zone Name Programming Mode.
- 2) Enter 189#.
- 3) Press the STAY button to add a space at the beginning of the zone name.
- 4) Press * to validate the space.
- 5) Press # and EXIT to exit Zone Name Programming Mode.

Wait one minute and then repeat the steps above. You should see "ZMAX:xxx", with no space at the beginning, and with xxx being the highest zone number that the LTE module is going to list in the equipment list. To change this number of zones, do the following:

- 1) Press the STAY button to add a space at the beginning of the zone name.
- 2) Press * to move over the ":".
- 3) Press "Chime" to remove the ":".
- 4) Press * to move over the digit you want to change.
- 5) Press the up or down arrow to change the digit.
- 6) Press * to validate the new digit.
- 7) Repeat steps 4, 5, and 6 with the other digits.
- 8) Press # and EXIT to exit Zone Name Programming Mode.

Within one minute, the LTE module will update its equipment list according to the number of zones you specified. This equipment list will be sent with the next phone test or alarm.

Local Zones

Bit 8, segment 1 of the Zone Type Characteristic Select locations determines whether the LTE module will report alarms for this sensor type (See locations 111, 113, ..., 169).

If bit 8 is set, the panel and the module consider this sensor type as “local” and will not report an alarm (The alarm will be “reported” locally via the siren if so programmed).

Bypassed Zones

The LTE module will report bypass on a zone only when the zone is in an “armed” state. The arming level of a zone is determined by 4 bits of segment 1 of the Zone Type Characteristic Select locations:

- Bit 1:** Fire zone – Bypass is sent regardless of panel arming state
- Bit 2:** 24 Hour zone – Bypass is sent regardless of panel arming state
- Bit 7:** Interior zone – Bypass is sent only when panel is armed away
- Bit 8:** Local zone – Bypass is never sent

Troubleshooting/Testing

Check the radio status LED 1 to see if it is flashing any errors. See *Table 5* on page 3 for descriptions of the errors indicated.

Check radio status LED 4 for signal strength (if it is toggling on and off it is connected). If signal strength is less than 2, do a walking signal strength test (see *Module Location Guidelines* on page 1).

If touchpads/sirens are beeping even though the system is not armed, press * 2 to display the trouble condition. Refer to specific touchpad manual for more details.

Account Creation

Before installing the Alarm.com LTE Module in a NetworX 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.

Specifications

Table 8: Technical Specifications

Compatibility	NetworX 4, 6, 8 and 8E. (Note: certain older V1 NX4, 6 and 8 may not be fully supported).
Power requirements	5 to 15 VDC, 12 V nominal, 65 mA (continuous) 1600 mA (instantaneous peaks) maximum (from panel or auxiliary power supply)
Cellular network	Verizon LTE
Listings	FCC Part 15, Verizon Certified
Power/data bus	One three-wire NetworX power/communication data bus
Indicators	One module/panel communication status LED, one module power LED, one automation LED, three

	wireless communication status LEDs, and 4 GSM status 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 noncondensing
Case color	Belgian gray
Case material	High-impact, ABS plastic
Dimensions	5.25 x 4.125 x 1 in. (H x W x D).
Installation	Wall Mount

Regulatory Information

Table 9: Regulatory Listings

Listings	FCC ID: YL6-143450L, IC: 9111A-143450L
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FCC Compliance

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 from 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.