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SLE-IMAX2-CB & SLE-IMAX2CB-TF StarLink™ Sole/Dual-Path Alarm Communicators

INSTALLATION INSTRUCTIONS



WI2827LF 1/25

INTRODUCTION

The StarLink™ **IMAX2** Series Sole/Dual-Path Dual SIM Commercial / Residential Burg, Residential Fire alarm capture IP communicators are fully supervised, wireless digital two-way subscriber units. The **SLE-IMAX2-CB** and **SLE-IMAX2CB-TF** communicators are equipped with two network carrier SIM cards (for Verizon and AT&T) and are configured to automatically use the carrier with the strongest signal. Both models utilize CAT-M1 technology and support both Sole Path and Dual Path communication. Sole Path communication is cellular only and Dual Path communication is cellular and IP which requires connection to the local network using the on-board Ethernet jack or via Wi-Fi using the optional **SLE-WIFI-MODULE**. The communication mode (Sole Path or Dual Path) requires selection of the appropriate service plan at the point of communicator activation. All models are compatible with most 12VDC alarm control panels (always adhere to the documentation provided by the control panel manufacturer). These communicators are for use as the primary means of communication with the central station and does not have backup mode capability. No POTS (Telco Line) connection permitted (this communicator model only emulates a telephone line to the control panel and is not equipped with hardware that can monitor a live POTS telephone line). To accommodate the two network SIM cards, several feature settings are provided in the NAPCO NOC **Radio Carrier** screen (www.NapcoNOC.com). In addition, LEDs and a manual pushbutton, if so equipped, are provided on the radio PCB (see page 4 for details). For Commercial Burglary installations, under the armed condition, any loss of communication must be treated as a Burglary Alarm at the Central Station. **See WI2140 for programming information.**

SLE-IMAX2-CB: Commercial / Residential Burglary, Residential Fire CAT-M1 TCP/IP Communicators in white metal housing.

SLE-IMAX2CB-TF: Commercial / Residential Burglary, Residential Fire CAT-M1 TCP/IP Communicators in white metal housing with SLE-ULPS-R power supply and 16.5V UL Certified Class 2 transformer.

The following features are included with models that include the **SLE-ULPS-R** power supply:

- Power limited output to the StarLink communicator PC board 12V input terminals
- Battery connection red and black flying leads
- Monitored battery charging and Active battery test circuits
- StarLink communicator trouble input (from StarLink PC board **PGM1** terminal to detect StarLink communicator trouble)

- Requires a sealed lead acid min 4AH / max 7AH battery for minimum 24-hour standby time (max charge current 200mA).
- Trouble relay output (**C**, **N/O** and **N/C** terminals) to wire to a panel zone dedicated to "Communicator Trouble" (dry contacts). Remove jumper "**J2**" to isolate relay OUT1 common from ground
- Green **AC ON** LED visible from the exterior housing
- Yellow **TROUBLE** LED "**D4**" on PC board. Flashes signify:

One flash: AC fail / brownout

Two flashes: Low battery

Three flashes: Charging circuit trouble

Four flashes: StarLink communicator trouble

The StarLink **IMAX2** Series of Communicators are provided with two antennas. Only one antenna is active at a time, and should the communicator have a loss of adequate signal strength, the communicator will connect to the tower via the other antenna. If neither antenna can connect to the tower within 200 seconds, a trouble output will be activated. If using an external antenna such as from the NAPCO StarLink **SLE-ANTEXTXXX** Series of Extended Antenna Kits, connect it to the left antenna connector.

ADDITIONAL COMPONENTS

In addition to the models listed above, the following sub-assemblies are available:

SLE-ULPS-R - Power Supply. Required for installations where the control panel cannot provide the Auxiliary power required to operate the StarLink communicator. Uses a standard 4AH / 12V minimum (7AH maximum, required with optional Wi-Fi Module) rechargeable battery to provide communicator standby power. Requires connection to the model NAPCO TRF12/T123 (16.5V / 20VA) external plug-in transformer (see wiring diagrams further in this manual). **Note:** For models without the SLE-ULPS-R, connect the communicator terminals 1 and 2 to the control panel Aux Power terminals (observing polarity).

SLE-WIFI-MODULE - Allows your NAPCO StarLink™ device to connect to the Internet by means of a wireless (Wi-Fi)

AGENCY LISTINGS



- ETL Listed: All Models Conform to UL Standards: UL 2610, UL 985, UL 1023
- New York City Certificate of Approval 2023-TMCOAP-010503-CERT
- CSFM LISTING No.: Pending

link, eliminating a wired Ethernet cable connection. **Note:** 7AH battery required when using the **SLE-WIFI-MODULE**. For more information, see WI2191. Not UL Certified for Commercial or Residential Burglary.

SLE-DLCBL - Download Cable, 6 feet

SLE-ANTEXT30 – Antenna kit* with 30 feet of LMR 300 cable.

SLE-ANTEXT50 - Antenna kit* with 50 feet of LMR 300 cable.

SLE-ANTEXT75 - Antenna kit* with 75 feet of LMR 400 cable.

SLE-ANTEXT100 - Antenna kit* with 100 feet of LMR 400 cable.

SLE-ANTEXT04 - Antenna kit * with 4 feet of LMR 300 cable. Ideal for installations that may require a few extras dBs of gain but running the external cable may not be practical.

GEM-Tamperkit - Tamper switches and screws to protect metal housing (see page 13).

SPECIFICATIONS

The following specifications apply to all StarLink communicator models unless otherwise stated:

Electrical Ratings for 120VAC, 60Hz

For Models with Transformer (SLE-IMAX2CB-TF supplied with Class 2, UL Certified power supply rated 16.5VAC output)

- Input Voltage: 120VAC nominal
- Input Current:
 - 12VDC = 101mA
 - 15VDC = 92mA
- Maximum Charging Current: 200mA

Electrical Ratings for +12V

For Models without Transformer (SLE-IMAX2-CB)

- Input Voltage: 10-15VDC regulated (power-limited output from UL Certified control panel Aux).
 - Input Current:
 - 10VDC standby: 115mA
 - 12VDC standby: 101mA
 - 15VDC standby: 92mA
- Wi-Fi Module:** (Optional) Add 45mA to the above.
(With peak RF transmission current of 325mA).

Electrical Ratings for the IN 1 Input:

- Input Voltage: 9-15VDC.
- Maximum Input Current: Up to 2mA from control panel circuit

Electrical Ratings for IN 2, IN 3, IN 4, and IN 5:

(Inputs **IN 2, IN 3, IN 4, and IN 5** are Class B)

- Maximum Loop Voltage: 15VDC.
- Maximum Loop Current: 1.7mA
- End of Line Resistor (EOLR) Value: 10K

Electrical Ratings for PGM3 Output:

- Open Collector Output: Maximum Voltage 3V when active; 15VDC maximum when not active.
- Maximum PGM Sink Current: 50mA (up to 15VDC)

Physical (W x H x D)

- Metal Housing: 11½ x 9½ x 3½" (29.2 x 24.1 x 8.9cm)
- Mounting: Metal housing includes two keyhole slots for wall mounting (see measurements on page 7)
- Antenna Length: 8.25" (21cm)

Environmental

- Operating Temperature: 0°C - 49°C (32°F - 120°F)
- Humidity: Maximum 93% Non-Condensing
- Indoor / dry location use only

TERMINAL DESCRIPTIONS

Configure all inputs and outputs using the Management Center screen (located at www.NapcoNOC.com). Located at the bottom of the StarLink communicator PC board, the 17 terminals are described as follows:

TB1: PWR (+) 10-15VDC (Refer to section "**STEP 4: APPLY POWER**")

TB2: PWR GND (-)

(Refer to section "**STEP 4: APPLY POWER**")

TB3: PGM3 (-): Open collector output that goes active low when the dealer-defined option occurs; see the NAPCO NOC (www.NapcoNOC.com) to configure options for PGM activation.

TB4: IN 1 (+): Smart Channel input. Active high input for wiring to the control panel bell output. When this input detects a steady input, it sends a burglary alarm; a pulsing temporal 4 (CO Alarm), a CO alarm is sent.

TB5: IN 2 (+): Fire Trouble input**. Wire to control panel trouble relay. **Note:** With the use of two 10K EOL resistors, IN2 and/or IN3 can be supervised end-of-line resistor inputs that can be triggered with N/O or N/C relay contacts. See wiring diagrams.

TB6: IN 2 (-): Input 2 negative.

TB7: IN 3 (+): Burglary Alarm input**. Wire to control panel Burglary Alarm relay.

TB8: IN 3 (-): Input 3 negative.

Primary Telephone: RJ-45 socket for panel DACT connection.

TB9: IN 4 (+): User Defined Only**. Wire to panel relay.

TB10: IN 4 (-): Input 4 negative.

TB11: IN 5 (+): User Defined Only**. Wire to panel relay.

TB12: IN 5 (-): Input 5 negative.

TB13: GND: Earth ground terminal.

Ethernet: Connect the SLE Sole/Dual-Path communicator to your broadband modem, router or switch for dual path operation. **Note:** The cable modem / router and switch (if any) at the premises requires standby power, therefore an ITE (*Information Technology Equipment*) Certified UPS must be used at the premises to power these devices.

TB19: N/O OUT1: Normally open. Dry contact Form C relay. Add shunt to lower two pins of JP1 for wet contacts.

*All antenna kits include high quality/low loss LMR 300 or 400 Coax Type N male to SMA male terminated cable, all mounting hardware and StarLink SLE-ANTEXT-ISO Commercial Fire Ground Fault Isolation Plate to ensure that the external antenna will not cause ground fault system troubles. (Any suitable external cellular antenna is permitted by UL). Always follow the manufacturer's installation instructions. **Note:** Antennas are not Certified by UL.

**Factory programmed options; may be changed at the NOC website (www.NapcoNOC.com).

TB20: C OUT1: Common. Dry contact Form C relay. Add shunt to lower two pins of JP1 for wet contacts (connects relay Common to system ground). Relay rated 30V AC/DC, 500mA.

TB21: N/C OUT1: Normally closed. Dry contact Form C relay. Add shunt to lower two pins of JP1 for wet contacts.

TB22: N/O OUT2: Normally open. Dry contact Form C relay.

TB23: C OUT2: Common. Dry contact Form C relay. Relay rated 30V AC/DC, 500mA.

TB24: N/C OUT2: Normally closed. Dry contact Form C relay.

LED DESCRIPTIONS (MAIN PCB)

The main PC board contains several LEDs, as follows:

GREEN RF SIGNAL STRENGTH LED

Labeled "D3", this LED is located at the lower right corner of the PC board.

Every 30 seconds, the StarLink communicator receiver section turns on and listens to the cell tower. Depending on the signal strength detected, it will blink the Signal Strength LED from 1 to 5 times, providing a signal strength indicator that is updated constantly and is always displayed.

Green LED Operation

Signal strength (as received by the communicator) is displayed by this LED blinking 1 to 5 times at a constant rate (with a short delay between blink cycles). **Acceptable signal level is greater than or equal to 2 blinks.**

YELLOW OPERATIONAL STATUS LED

Labeled "D4", this LED is located at the bottom right of the PC board. Operation is as follows:

Normal Standby Condition:

- **Blinks on momentarily every 10 seconds:** Unit is in standby waiting for an alarm to report.

Processing Alarm Conditions:

- When processing an alarm, this LED will blink variably during each part of the process (dialing, handshaking, data transmission, etc.).

Scanning Each SIM Carrier for Signal Quality Switching from One SIM to the Other:

- **Blinks at the rate of one second on, one second off.** The unit is scanning each SIM slot and selects the carrier with the best signal quality. Also, if the radio PCB is equipped with a momentary pushbutton, press/release this button to switch between SIMs. See page 4 for more information.

RED TROUBLE LED

Labeled "D5", this LED is located at the bottom right of the PC board. Operation is as follows:

- **1 Blink:** Low Aux Power input voltage
- **2 Blinks:** Check Input Power
- **3 Blinks:** Alarm report Failed to Communicate (will restore only when the communicator path is restored)
- **4 Blinks:** RF trouble (antenna connection or cellular registration)

- **5 Blinks:** Communicator poll or check-in failure (cellular and/or IP). Either or both paths will trigger the trouble, but for the trouble to clear, unit requires that the previously active path(s) must restore (i.e. cellular if used as a Sole Path communicator, and both cellular and IP if unit is used as a Dual Path communicator)
- **6 Blinks:** Unit disabled (reporting or control panel downloading not allowed). Power cycle the unit and if it does not clear, then call for Technical assistance.
- **7 Blinks:** Unit was shut down and has no functionality; requires a restart (full power down and full power up sequence) to restore operation
- **8 Blinks:** Line Cut; check input wiring

RED DIAGNOSTIC LED

Labeled "D7", this LED is located in the middle of the PC board. One blink indicates a weak or non-existent signal from the network (green LED is off). If this red LED is blinking in any other manner, please contact technical support.

GREEN IP NETWORK CONNECTION LED

Labeled "D14" (or **DS14**), this LED is located to the right of the **ETHERNET** socket on the PC board. Operation is as follows:

Off = No network cable detected

Fast Flash = No IP connection (Occurs just after power on, while trying to obtain a IP address)

Slow Flash = Normal IP network operation

- **1 Blink:** Static IP
- **2 Blinks:** DHCP
- **3 Blinks:** Auto IP (if unable to acquire DHCP address, then after 5 minutes it will convert to Auto IP)

YELLOW IP NETWORK STATE LED

Labeled "D15" (or **DS15**), this LED is located to the right of the **ETHERNET** socket on the PC board. Operation is as follows:

Off = No power

Steady with 1 quick blink off every 1.7 seconds when reporting signal to NOC

Steady with 2 quick blinks off every 1.7 seconds when downloading to control panel or the module

Slow Flashing:

- **1 Blink:** Ethernet Available
- **2 Blinks:** Wi-Fi Station Mode (normal operation)

RED IP NETWORK TROUBLES LED

Labeled "D16" (or **DS16**), this LED is located to the right of the **ETHERNET** socket on the PC board. Operation is as follows:

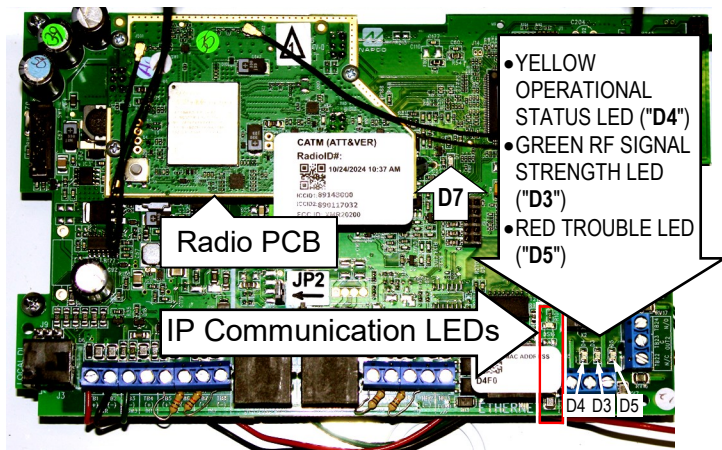
Off = No troubles

Fast Flash = No IP connection (occurs just after power on while trying to obtain a DHCP address)

Slow Flashing:

- **1 Blink:** No network cable detected
- **2 Blinks:** No access to the Internet
- **3 Blinks:** Ethernet failed to communicate
- **4 Blinks:** Ethernet poll / checkin fail

**Factory programmed options; may be changed at the NOC website (www.NapcoNOC.com).



LED LOCATIONS (See image at right for close-up of Radio PCB)
LED "D7" is the "RED DIAGNOSTIC LED" (see page 3)

- **5 Blinks:** Wi-Fi is enabled, but **SLE-WIFI-MODULE** is not detected
- **6 Blinks:** Wi-Fi no access to the Internet
- **7 Blinks:** Wi-Fi failed to communicate
- **8 Blinks:** Wi-Fi poll / checkin failure
- **9 Blinks:** Wi-Fi serial data error or no serial data response
- **10 Blinks:** Wi-Fi Security / Authentication failed

RED/BLUE RADIO CARRIER PCB LEDs

On top of the main PC board, a smaller radio PC board is mounted that includes an LED next to each SIM card slot (see above for images). When lit, the LED next to the SIM card slot indicates the currently active slot (blue LED for AT&T and red for Verizon). **Note:** The yellow LED (**D4**) on the main PCB indicates a SIM scan is in progress. See **YELLOW OPERATIONAL STATUS LED** on page 3.

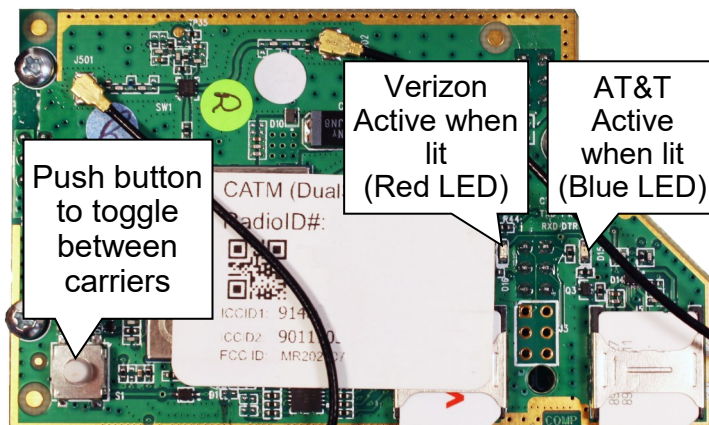
RADIO PC BOARD PUSHBUTTON (If Equipped)

If the radio PCB includes a momentary pushbutton, press/release this button to manually switch from one SIM slot to the other slot. This button functions in the same way as the **Switch SIM** button in the NOC's **Radio Carrier** screen. If during normal operation the current slot is determined to be non-functional, the other slot will automatically be used. The status of both slots will be re-evaluated upon the next scan. The LED color indicates the currently active carrier (blue for AT&T and red for Verizon).

SUPPLYING POWER

Control panels can provide power through their Auxiliary Power terminals if the available standby current is reduced by the SLE standby power (refer to Electrical Ratings for +12V for models without Power Supply on page 2). When there is insufficient standby current due to the application, the SLE-ULPS-R Charger Module must be used to charge an additional battery and to supply the power for the StarLink communicator. See WI2131 and **Ethernet** description on page 2.

**Factory programmed options; may be changed at the NOC website (www.NapcoNOC.com).



Radio PCB: Illuminated LED indicates carrier in use.

JUMPER DESCRIPTIONS

Jumper block labeled "**X5**"; from top to bottom, as detailed in the table below. **Note:** Contact ID is always available in response to a Contact ID handshake.

Jumper Block "X5" Options		
Jumper block labeled " X5 " contains 5 jumper terminals; from top (labeled "1") to bottom (labeled "5") as follows:		
Jumper ON	Jumper Number	Jumper OFF
Tech on site must temporarily remove to download	1	No Tech on site required
4/2 with Checksum Pulse Format	2	4/2 Pulse Format
Supervised inputs IN3 and IN2, respectively.	4 and 5	Unsupervised

The **IMAX2** Series Sole/Dual-Path communicators are compatible with 4/2 Pulse Dialing formats with 10pps, 20pps, and 40pps with and without checksum, either 1400Hz or 2300Hz handshake / kissoff. See table of formats on page 13.

Refer to WI2140 for selecting the required handshake / kissoff frequency in the NOC (www.NapcoNOC.com) setup screens (as required by the control panel).

NETWORK COVERAGE

The StarLink communicator constantly supervises the cell network coverage. When the StarLink communicator is configured for primary reporting, and the StarLink communicator detects a loss in network coverage, the StarLink communicator must be configured to prompt the control panel to announce a Telco Line Cut failure trouble using the Management Center screen (located at www.NapcoNOC.com).

INSTALLATION STEPS

STEP 1: ACCOUNT REGISTRATION

Create a new account and register specific StarLink communicator modules at www.NapcoComNet.com. Accounts and modules registered via the Internet are enabled for activation within 24 hours (usually within 30 minutes). **Note:** Activate radio before applying power.

STEP 2: SELECT A MOUNTING LOCATION

The mounting location should be indoors within the protected area and selected based on RF performance. It is **HIGHLY** recommended that the installer carefully adhere to the following recommendations **BEFORE** any wires are installed.

- Generally, high locations are best. DO NOT mount communicator in basements or below grade as unpredictable performance may result.
- DO NOT mount the communicator in non-climate controlled environments (i.e. attics may become extremely hot in summer, garages may become extremely cold in winter).
- Avoid mounting locations within 3 feet of AC power lines, fluorescent light fixtures, or large metal objects (air conditioners, metal garage doors, etc.) as these locations have been shown to have a detrimental effect on signal strength.
- A fair amount of care may be required to mount the StarLink communicator so as to achieve an optimal RF path. The installer should spend as much time as needed to obtain the highest signal level possible.
 - a. **Before applying power, be sure to connect the antenna.** Temporarily connect power to the StarLink communicator from a fully charged 12V (4AH minimum) battery. DO NOT mount the communicator at this time. Press **Tamper** switch to send a signal.
 - b. Position the unit in the desired mounting location, with antenna oriented vertically. The signal strength is displayed by the Green "Signal Strength LED" labeled "D3" (located at the lower right corner of the PC board). The tower signal strength may fluctuate from day to day, therefore it is best to try to find a mounting location where the LED provides a **minimum of 2 blinks**.
 - c. Once a location has been selected based on signal coverage, permanently secure the unit using #8 screws (not supplied) in the two mounting holes or to a UL Certified 1, 2 or 3 gang electrical box.

WARNING: To ensure user safety and to satisfy FCC RF exposure requirements, this unit must be installed so that a minimum separation distance of 60cm (24") is always maintained between the antenna of the transmitting device and nearby persons.

STEP 3: WIRING

22-gauge wire may be used if mounted up to 50 feet from the control panel, and 18-gauge wire should be used for up to 100 feet. Reference the wiring diagrams further in this manual. See the section **NAPCO GEMINI PANEL PROGRAMMING** further in this manual.

The wiring between the control panel and the StarLink communicator is over several wires, as follows:

- **TB1: PWR (+12V):** Regulated DC.
- **TB2: PWR GND (-)**
- **TB21: N/C OUT1:** Wired to the (+) of a zone dedicated to monitoring the communicator status. Should be pro-

grammed on Napco Gemini (GEM) control panels as Supervisory Zone.

- **TELCO PRIMARY** to control panel Telco 1 RJ-45 socket.
- (Place **JP1** shunt on bottom two pins)

Wiring Methods

- Strip wire carefully to avoid exposed conductors after installation, etc.
- Use UL Certified wire, ensuring that all conductors are to be insulated for the maximum voltage of any conductor in the enclosure
- All wiring methods must be performed in accordance with NFPA 70, Articles 725, and 800

STEP 4: APPLY POWER

- **Attach antennas before applying power !**
- Apply 12VDC to terminals 1 and 2. (For models without the charger board **SLE-ULPS-R**). For models with the **SLE-ULPS-R**, apply power to the unit.

STEP 5: SIGNAL VERIFICATION

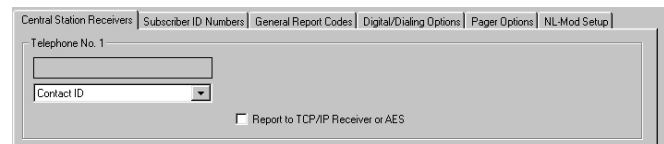
- **Verify Online:** To verify that the signals have been received by the StarLink communicator Network online, go to www.NapcoNOC.com, log in with your Username and Password, enter your **Company ID** number and the StarLink **Radio Number**, then click **Signal Log**.

IMPORTANT: Verify that the signals transmitted by the StarLink communicator have been properly received by your central station before leaving the premises.

NAPCO GEMINI PANEL PROGRAMMING

To program the central station receiver reporting format, use PCD-Windows Quickloader download software. Open the **Digital Communications** screen, **Central Station Receivers** tab, as shown in the following image:

A "Point ID" (also called "Contact ID") receiver format programming example is shown:



The communicators use proprietary data-capture technology that captures the alarm report from the control panel in CID, SIA or 4/2 (SIA only evaluated by UL) and transmits the alarm signals to the SLE Control Center. The alarm signals are then forwarded to ANY central station via Contact ID, (SIA is translated to CID by the communicator see WI2140 on the NOC) or 4/2 via DACT from the NOC or to the Napco Virtual IP Central Station Receiver (NCSR--CID only), or Sur-Gard System II, Sur-Gard System V, Bosch D6100IPV6 or Bosch D6600 Receiver (with ITS-D6686 Ethernet Adapter) via TCP/IP using standard line security (for Commercial Burglary installations only IP Receivers may be used). The SLE Control Center reports a trouble signal in the event that the network does not receive the expected supervision signal from the wireless communicator.

Note: A receiver reporting format must be entered for each telephone number used, but each telephone number may be assigned a different format. If the NOC account is programmed for "Dealer Entered Programming," the receiver formats must be the same.

CAUTION: The installer should always be certain an area code is programmed into the control panel.

Optional: If you wish the StarLink communicator to report a code and zone number (Contact ID by default) to the central station in response to a triggered input event, see accompanying table. **Note:** These event codes and zone numbers can be changed from the Management Center screen (located at www.NapcoNOC.com).

Upon alarm, the NOC can optionally send an SMS message to a third party that includes the appropriate Contact ID alarm code, including the zone or user number, if applicable. The **"STARLINK COMMUNICATOR RELATED EVENT REPORT CODES"** table also includes the most common Contact ID alarm codes.

Programming StarLink Communicator Troubles

It is required that if a StarLink communicator or control panel trouble is detected, that it is reported to the central station. When the StarLink communicator detects and sends a trouble to the control panel, the control panel must be programmed to annunciate this trouble. The communicator can detect multiple troubles as indicated by the "Red Trouble LED" ("D5"). For these troubles to be annunciated at the panel, there are several methods, some of them are configurable at the Management Center screen (www.NapcoNOC.com):

Wire the communicator **OUT1** relay to a dedicated control panel zone (input) to annunciate the trouble (activate a trouble sounder) when an open is detected. Two wiring options are available:

- Activate the trouble with an open by wiring the EOLR in series with the **Common** and **N/C** of the **OUT1** relay;
- Activate the trouble with a short by wiring the EOLR in parallel with the **Common** and **N/O** of the **OUT1** relay

STARLINK COMMUNICATOR RELATED EVENT REPORT CODES (Contact ID by default)

EVENT	AREA	CONTACT ID		PULSE 4/2
		CODE	ZONE #	
IN 1 Smart Channel Fire	0	E110	990	1A
IN 1 Smart Channel Burg	0	E130	991	31
IN 1 Smart Channel CO (Carbon Monoxide)	0	E162	998	18
IN 2 User Defined	0	E120	992	22
IN 3 User Defined	0	E300	993	F3
IN 4 User Defined	0	E160	974	44
IN 5 User Defined	0	E160	975	55
Low Battery/Voltage	0	E302	994	F4
Tamper Trouble	0	E341	995	F5
Reboot	0	E625	997	F7
Medical Alarm*		E100		
24 hour Aux. Alarm*		E150		
24 hour Aux. Restore*		R150		
Keypad Emergency Alarm*		E140		
A.C. Trouble*		E301		
Tel 1 Fail*		E351		
Polling Report		E780	999	F9
Supv Failure Report		E788	Zone 1 for radio/cell path fail. Zone 2 for IP path fail	D1 or D2
Tip/Ring Wiring Fault Report		E789	000	F2
Path Test Report		E602	890	77

*Not generated by the StarLink communicator.

SIGNALS ORIGINATED AT THE NOC

NOC Originated Alarms	Contact ID Event Data Sent	Pulse Format Event Code Sent	Initiated By	Comments
Supervisory Fail	E356 A00 Zn000	99	Automatically by NOC if fail to receive any signal from StarLink communicator within Supervisory Timeout duration.	For Auto Enroll, uses captured telephone number, Sub ID and format. For Dealer Programmed, uses entered telephone number, Sub ID and format.
Press to Send Test Signal	E601 A00 Zn000	98	Manually by dealer from the Management Center Signal Log screen (located at www.NapcoNOC.com). Sends test into CS receiver.	Same comment as above.
Press to Send Radio Path and IP Path Test	E602 A00 Z890	77	If enabled by dealer from the Management Center Advanced tab with Tel# (located at www.NapcoNOC.com). Sends a command to the StarLink communicator to force path tests from the NOC.	Same comment as above.

The communicator must also report this trouble to the central station. With NAPCO control panels, wire the zone as indicated in the wiring diagrams further in this manual. For models **with** the **SLE-ULPS-R** Power Supply, wire this Power Supply trouble output relay to the two terminals of the control panel zone dedicated to the trouble. With the Commercial control panels, use the dry contacts of the Power Supply relay by removing the jumper and using the contacts of the Power Supply relay (Common and N/O) in series with a 2.2k EOLR.

For communicator models **without** the **SLE-ULPS-R** Power Supply (powered by the control panel Aux Power terminals), wire the communicator directly to the 12V of the control panel. Program the communicator to report all troubles on **OUT1**, **Common** and **N/C**.

StarLink Communicator Supervision

If the Telco wire (DACT interconnect wiring to the communicator) between the StarLink communicator and the control panel are cut or otherwise disconnected, the control panel must detect and generate a local trouble indication. Program the control panel for telephone supervision. Program the StarLink communicator using the Management Center **Advanced Features** screen (at www.NapcoNOC.com) to enable **Tip/Ring Wiring Fault Report**. Refer to wiring diagram.

Supervision Time Schedule Considerations

If a status change (alarm trouble, etc.) is transmitted, the communicator supervision timer is restarted.

For example, if a status change is sent, the next regular supervision transmission will occur at the interval determined by your rate plan.

Configuration Download / Firmware Updates

Technician on site required.

For Commercial Installations a technician is required to be on site during any reprogramming of the communicator or control panel and must perform / re-perform acceptance testing. To perform a download or update the communicator firmware, jumper 1 must be removed. UL requires that the jumper be replaced after the download is complete. **Failure to replace the jumper would allow downloads to the communicator without a technician on-site.**

Note: Jumper 1 may be removed to permit uploading and downloading without a technician on site, however, the dealer is responsible for ensuring the system is operating correctly after any downloads or changes to the system.

Cover Tamper

The **IMAX2** series communicators in the metal housings may optionally have front and rear tamper switches installed (GEM-Tamperkit) and wired to the control panel (see page 13). **Note:** The tamper switch on the communicator PC board is not used in this housing (but continues to function if pressed).

Commercial Burglary "Ringback"

Wire a sounder rated for the input voltage (12VDC) rated max 50mA @ 12VDC to the positive input of the communicator and PGM3. See WI2140 for information about how to

use the NOC to program PGM3 to activate on Ringback.

Note: For Commercial Burglary installations, only IP Receivers may be used.

RADIO PCB "DUAL SIM" OVERVIEW

To enhance communication reliability, the StarLink communicator is equipped with two network carrier SIM card slots (for **Verizon** and **AT&T**) and is configured to automatically to use the carrier with the strongest signal. Fully activated from the factory, the network carrier SIM slots are configured using the www.NapcoNoc.com **Radio Carrier** screen (select **Checkins > Dual SIM Signal**). Various LEDs on the communicator PC boards also provide visual indications, described below.

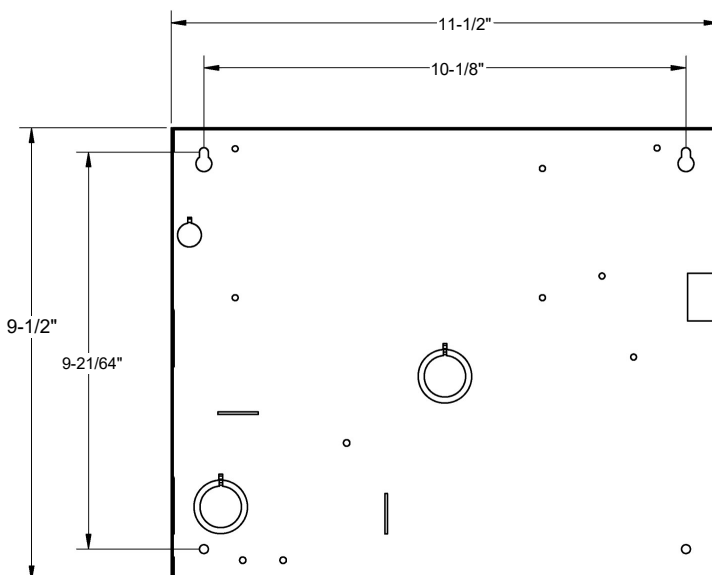
When the communicator is powered, the unit performs its standard "Checkin" with the NAPCO NOC using the carrier indicated by the lit LED located next to its SIM card slot. Five minutes after power up (this is the **Scan Delay After Power Up** NOC default setting, described below) the unit scans each SIM slot carrier, collecting and comparing various network signal quality parameters and selects the carrier with the best signal quality. During the scans, the yellow LED (**D4**) on the main PC board will flash at the rate of one second on, one second off.

The communicator will continue to use the selected carrier provided low noise/high signal strength communication is maintained. When the **Scan Periodicity** NOC selection expires (after 7 days by default), another scan and carrier selection will occur. The **Radio Carrier** NOC screen will be updated with a signal data entry report describing the scan results after every scan.

The following feature settings are provided in the NOC **Radio Carrier** screen to accommodate these two network SIM card slots:

Scan Delay After Power Up

By default, an initial signal scan of both slots automatically occurs 5 minutes after powering the unit; you can set the scan



Metal Housing Dimensions (inches)

delay via the drop down menu for **"NO Initial Scan"**, 5 and 15 minutes (select **"NO Initial Scan"** if no initial scan is desired). **Note:** When a scan is in progress, the yellow LED (D4) on the main PC board blinks at the rate of one second on, one second off. After the signal scan of both slots occurs, the **Active Slot** is then selected based on the stability of the cellular network connection and the better signal quality (based on both the average power received from a single signal and signal-to-noise ratio factors).

Scan Periodicity

Recurring automatic SIM slot scans can be set with this drop-down menu: **"Turn OFF Scanning"** and **"7 days"** (default). An automatic scan will occur every 7 days unless **"Turn OFF Scanning"** is selected.

The NOC **Radio Carrier** screen also includes the following buttons:

- **Scan SIMs:** Select to manually start a SIM scan.
- **Switch SIM:** Select to manually switch from one SIM card slot to the other slot. **Note:** Alternatively, if the radio PC board includes a momentary pushbutton, press/release this button to manually switch from one SIM slot to the other slot. This button functions in the same way as this **Switch SIM** button in the **Radio Carrier** screen.

Get SIM Status

Click to request the current status of both SIMs. The results of each status request are displayed in the **Radio Carrier** screen (see example image on this page). Each row displays specific dual SIM signal information sent from the StarLink communicator after every scan, every switch slot request, and after every status request. The columns in this table include:

- **Received Time:** To determine transmission order, this is

the timestamp the signal was received (displayed as **YYYY-MM-DD HH:MM:SS** in 24-hour notation)

- **SIM1/SIM2 ICCID:** Used for tracking, the **ICCID** (*Integrated Circuit Card ID*) is a unique identification number assigned to the specified SIM card in the radio PC board
- **SIM1/SIM2 IP** address: IP address assigned to the SIM by the carrier
- **Carrier:** Displays the previous column's carrier name
- **RSSI/Blinks:** RSSI (*Received Signal Strength Indicator*) and blink count for the previous column's SIM slot. The **dBm** units (signal level relative to 1 milliwatt) are expressed in negative numbers. Therefore, the higher the negative number, the weaker the signal. For example, a reading of -20 is stronger than -30. The **Blinks** "blink count" refers to the corresponding number of blinks on the **GREEN RF SIGNAL STRENGTH LED "D3,"** which represents the dBm level read at the time of the SIM scan.
- **Active Slot:** The slot/carrier used at the time.

BYPASS SCANNING

Although the automatic scanning of each integral SIM carrier slot is intended to increase the communication reliability of the StarLink communicator, if you wish to bypass the scan/selection process, or use a "single SIM" mode until communication is interrupted to force the use of the other carrier, set the NAPCO NOC **Scan Delay After Power Up** selection to **"NO Initial Scan"**, and set the **Scan Periodicity** to **"Turn OFF Scanning"**.

After the unit is in this mode, the only way to switch carriers is by manually initiating a **Switch SIM** at the NOC website or by pressing the radio PC board pushbutton (if so equipped). If at any time a failure of the current carrier network occurs, the unit will automatically switch to the second carrier. After switching,

Home
Radio Programming
Signal Log
Edit History
Checkins
Back

Radio ID# 12345678 | Radio Carrier

RADIO INFORMATION

Device ID# 00000801234567896410
Active ICCID# 81234567890940011307
Active IP Address: 10.0.0.1
Carrier Code: AT&T
Active Slot: 2

Scan Delay After Power Up: 5 Minutes
Scan Periodicity: 7 Days
Save Settings

Scan SIMs
Switch SIM
Get SIM Status

Received Time	SIM1 ICCID	SIM1 IP	Carrier	RSSI/Blinks	SIM2 ICCID	SIM2 IP	Carrier	RSSI/Blinks	Active Slot
2023-10-23 14:03:11	81234567890940011313	10.0.0.2	Verizon	-102dBm/2	81234567890940011307	10.0.0.1	AT&T	-100dBm/3	2
2023-10-23 13:32:14	81234567890940011313	10.0.0.2	Verizon	-100dBm/3	81234567890940011307	10.0.0.1	AT&T	-97dBm/3	2
2023-10-23 12:30:20	81234567890940011313	10.0.0.2	Verizon	-99dBm/3	81234567890940011307	10.0.0.1	AT&T	-102dBm/2	2
2023-10-23 11:30:10	81234567890940011313	10.0.0.2	Verizon	-98dBm/3	81234567890940011307	10.0.0.1	AT&T	-99dBm/3	2
2023-10-23 09:43:39	81234567890940011313	10.0.0.2	Verizon	-104dBm/2	81234567890940011307	10.0.0.1	AT&T	-101dBm/3	2

Page 1 of 2

the unit will not switch again unless another **Switch SIM** is manually triggered or another failure of the carrier network occurs.

MODEM II & MODEM III REPORTING FORMATS

In the main programming screen General tab (shown below), the Dealer entered programming section contains the two options, Modem II and Modem III to allow the NAPCO NOC to send the appropriate reporting formats for a Supervisory signal (select Modem III if the panel reports using Modem IIe or Modem IIIa2).

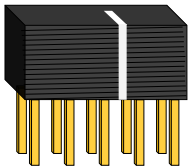
To ensure the dual path communicator provides the correct handshake, select desired Handshake Configuration options located at the bottom of the Advanced tab:

- HS7 110, Modem II (4)
- HS8 300, Modem III (5)
- HS9 SIA to CID (651)

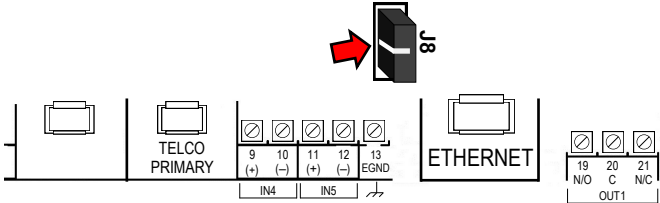
The table on the next page describes the reporting codes sent from the Dual Path communicator to the NAPCO NOC for MODEM II or MODEM III Supv. Signal formats.

If using SIA, MODEM II, MODEM IIe or MODEM IIIa² Reporting Formats

When the control panel is reporting with the formats **SIA, MODEM II, MODEM IIe** or **MODEM IIIa²**, if your jumper is not installed at the factory, insert the **SLE-MF-JMP** jumper into **J8** with the white line towards the left side of the Dual Path communicator as shown below. In addition, program the communicator in the **NAPCO NOC** (www.NapcoNOC.com) by selecting the format in the **Format for Reporting Radio Supv. Signal** pull-down, then download the programming to the communicator.



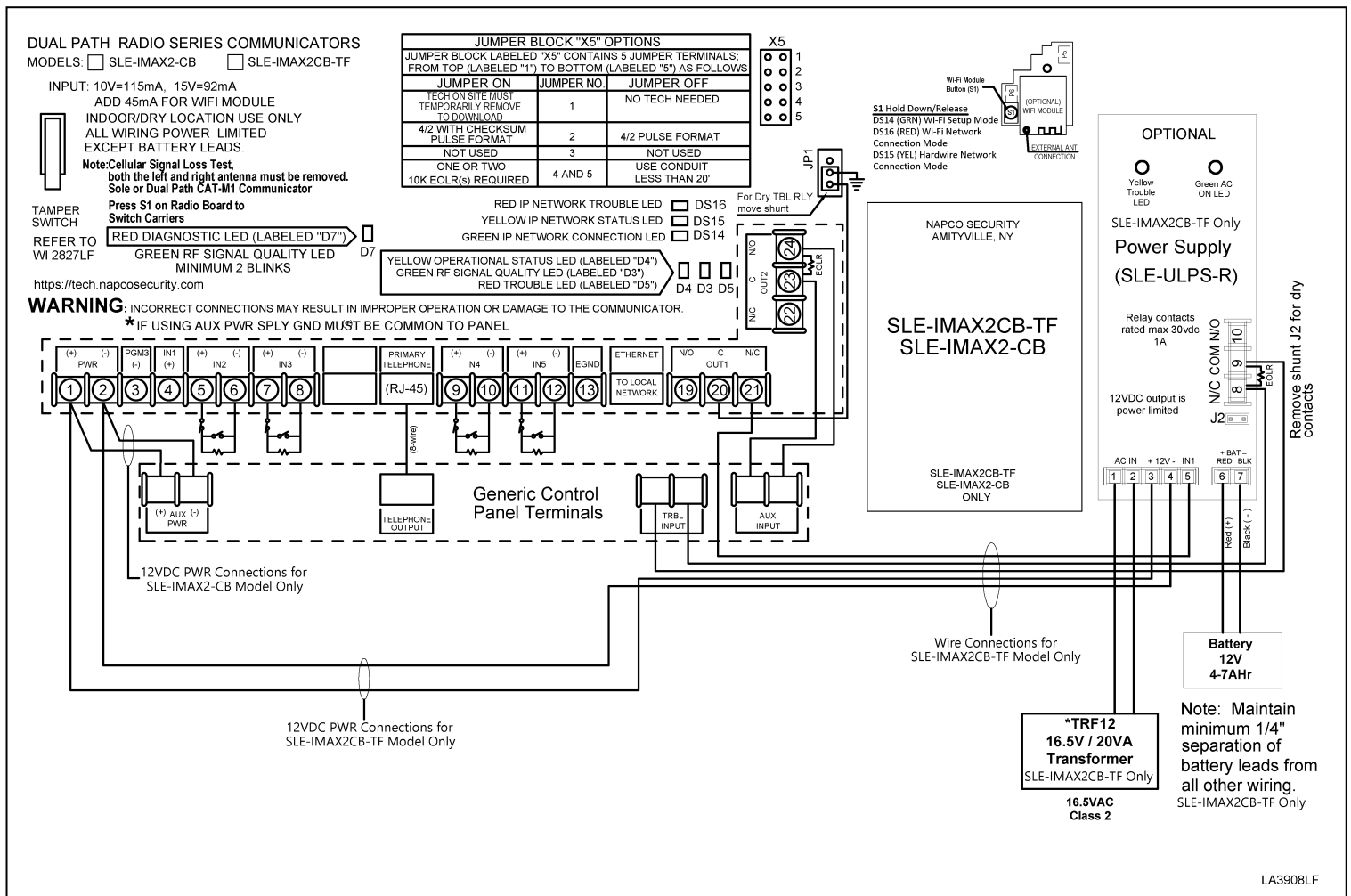
SLE-MF-JMP Jumper



Click "Manage SIA Code" to create the SIA to CID Conversion Table. Follow instructions on the NOC screen. **ALWAYS VERIFY SIA/CID CONVERSIONS BY TESTING BEFORE LEAVING PREMISES.**

The table below describes the reporting codes sent from the Dual Path communicator to the NAPCO NOC for MODEM II or MODEM III Supv. Signal formats.

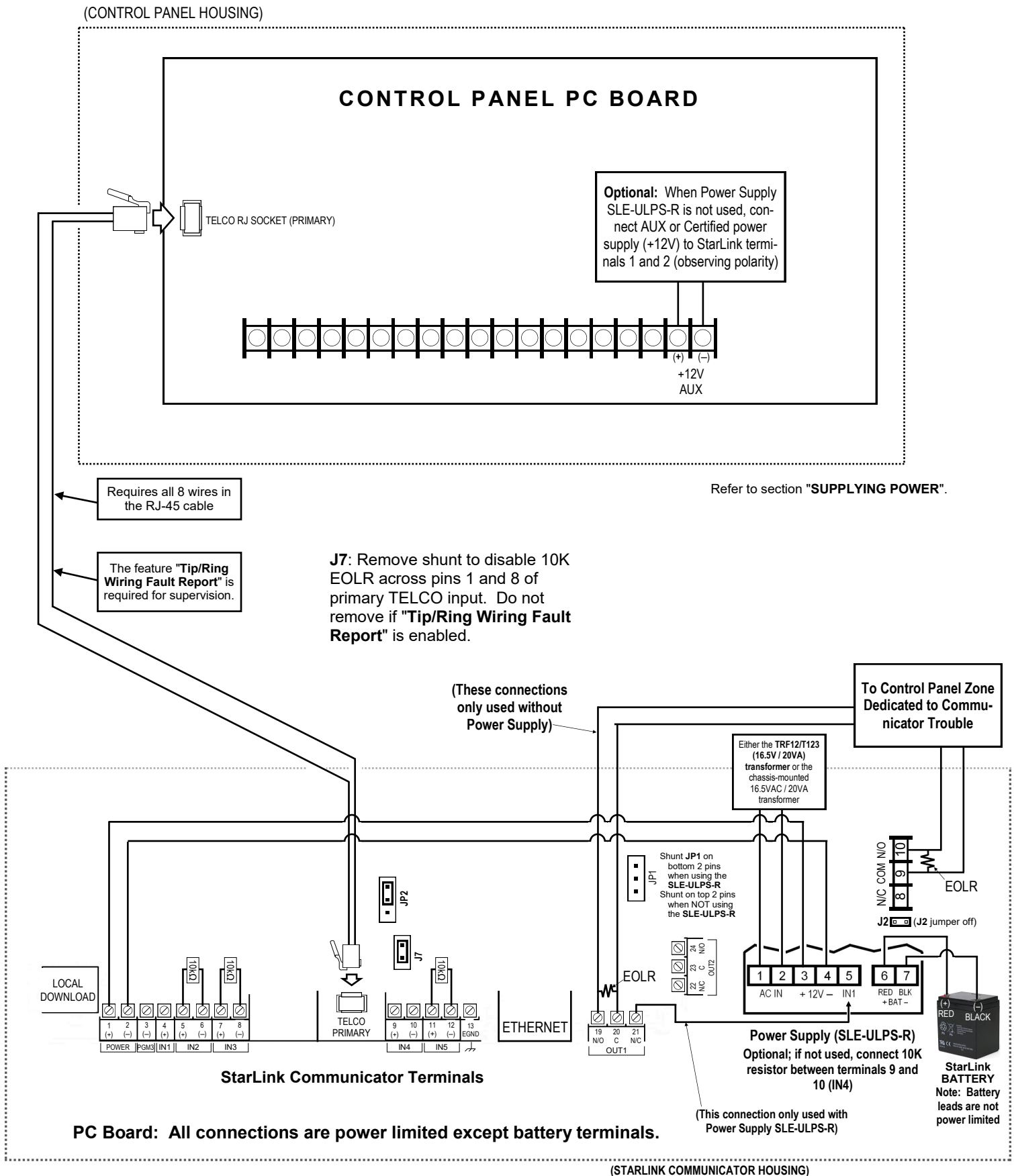
					MODEM II	MODEM IIe / IIIa ²
Event	NOC Location	Description of Event	Notes	Initiating Device	Report Description	Report Description
Radio Supv. Signal	Programming General Screen	Sent to CS from NOC when supervisory signal from Dual Path Communicator is not sent on time		NOC	Trouble Zone 0	Telco Fail
Radio Supv. Signal Restore	Programming General Screen	Sent to CS from NOC when supervisory signal from Dual Path Communicator is restored		NOC	Restore Zone 0	Telco Restore
Test Report	Signal Log	Sent when manual Test Signal in NOC Signal Log screen is selected	Also sent to CS for verification if phone number is new	NOC	Test Timer	Test Report
Program Change	Sent before Download to UL FIRE Panel	Sent before firmware download to Dual path is initiated from PCD-Windows Quick-loader		NOC	Trouble Zone 0	Parameter change
Monitor Voltage Report	Programming Advanced	Send when Dual path detects low voltage (low battery)	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Trouble Zone 0	Low Bat
Monitor Voltage Restore Report	Programming Advanced	Send when Dual path detects low voltage (low battery) restore	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Restore Zone 0	Panel Battery Restore
Tamper Report	Programming Advanced	Sent when the Dual Path integral tamper is released	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Trouble Zone 0	Tamper Alarm
Tamper Restore Report	Programming Advanced	Sent when the Dual Path integral tamper is depressed	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Restore Zone 0	Tamper Alarm Restore
Supv. Failure report	Programming Advanced	Sent from Dual Path to CS when Dual path determines that a reporting path is not working, radio or IP	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Trouble Zone 0	Telco Fail
Supv. Failure Restore Report	Programming Advanced	Sent from Dual Path to CS when Dual path determines that a reporting path is not working, radio or IP	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Restore Zone 0	Telco Restore
Tip/Ring Wiring Fault Report	Programming Advanced	Sent from Dual Path when an open or short is detected on the phone wiring from DP to panel primary phone line. Optional programming, typically not recommended.	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Trouble Zone 0	Telco Fail
Tip/Ring Wiring Fault Restore Report	Programming Advanced	Sent from Dual Path when phone line is restored	Dead end at NOC with CID if no phone # entered		Restore Zone 0	Telco Restore
Path Test Report	Programming Advanced	Sent from Dual Path to test a failed path. If IP path failed Dual Path sends this report to CS to restore	Dead end at NOC with CID if no phone # entered	Dual Path Radio	Test Timer	Test Report
IN 1-5 Open or Short	Programming Advanced	Sent from Dual Path on open or short on IN 1-5	IN 1-5 report CID and dead end at NOC	Dual Path Radio	X	X
IN 1-5 Restore	Programming Advanced	Sent from Dual Path on open or restore on IN 1-5	IN 1-5 report CID and dead end at NOC	Dual Path Radio	X	X
Reboot Report	Programming Advanced	Sent from Dual Path when power up or command from NOC always sends CID to phone #9999999999 to dead end at NOC	Never sent to CS	Dual Path Radio	X	X
Polling Report	Not shown	Sent from Dual Path to NOC for supervision. Displays the Signal Log Supervisory signals. Never sent to central station unless a polling failure occurs.	Never sent to CS	Dual Path Radio	X	X



Notes:

- Connect the StarLink communicator to the control panel output for Telco Trouble (this is the DACT interconnect wiring to the communicator). Remember to program the StarLink communicator module to report this **IN2** Telco Trouble and for line cut (EOLR) to the central station. In addition, always add an EOLR at the control panel Telco Trouble Output (Aux Relay for the control panels).
- Use EOLR value as specified by the control panel installation instructions.
- **IN1** not supervised. **IN2**, **IN3**, **IN4** and **IN5** can be supervised.
- Keep all non-power limited wiring separate from all power-limited wiring inside the housing by 1/4". In addition, maintain a minimum 1/4" separation of all primary wiring in the transformer compartment from the yellow secondary wires of the transformer.
- Remove shunt **J2** to isolate relay **OUT1** common from ground (i.e. jumper on = wet (circuit common); off = dry contact). When wet, configuration is used; the power should be derived from the alarm control panel.
- **J7**: Remove shunt to disable 10K EOLR across pins 1 and 8 of primary TELCO input. Do not remove if "Tip/Ring Wiring Fault Report" is enabled.
- **OUT1 N/C** (terminal 21) of the StarLink module must be programmed for any communicator trouble and wired to the control panel trouble input if **JP2** shunt is not removed and Telco 2 is not monitored.
- The Power Supply Relay Trouble Output must be wired to control panel Zone input dedicated to communicator trouble.

Wiring Diagram for Generic Control Panels with TELCO RJ Sockets



Tamper Switch Mounting Instructions

WIRING THE TAMPER SWITCHES

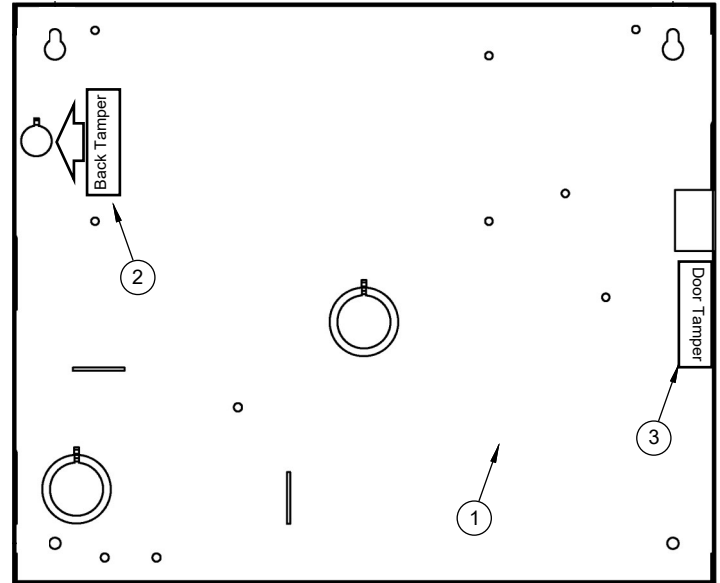
Before installation and wiring, the tamper switches (part **GEM-Tamperkit**) are normally open devices; when placed into the circuit and into operation, they are normally closed devices.

Tamper switches protect against the opening of the communicator cabinet door or the removal of the communicator enclosure from the wall or other mounting surface.

There are two places in the cabinet to mount tamper switches:
 (1) To prevent cabinet removal from the wall, located on the left side of the cabinet there is one knockout for the switch plunger and three mounting holes (in the enclosure sheet metal).
 (2) To protect the cabinet door, mount a tamper switch in the three mounting holes (in the enclosure sheet metal).
 When mounted, the switch button contacts the inside surface of the door. **Note:** Be sure to alert the user that opening the enclosure door will cause a tamper alarm.

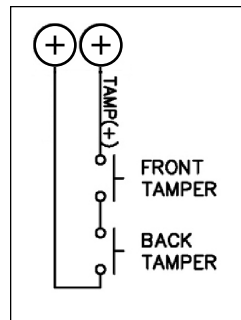
Wiring a normally closed sensor loop for tamper supervision, wire to a zone on the control panel.

See Page 7 for Commercial Burglary Ringback Wiring Instructions. **Note:** For Commercial Burglary installations, only IP Receivers may be used.



VIEW OF TAMPER SWITCHES:

(1) = ENCLOSURE BASE;
 (2-BACK) = TAMPER SWITCH TO PREVENT REMOVAL FROM WALL;
 (3-DOOR) = TAMPER SWITCH TO PROTECT THE ENCLOSURE DOOR



GEM-Tamperkit consists of	Description	QTY
SC206LF	Slotted Pan Head 6-32 x 3/4 Machine Screw	6
SW105	Tamper Switch	2

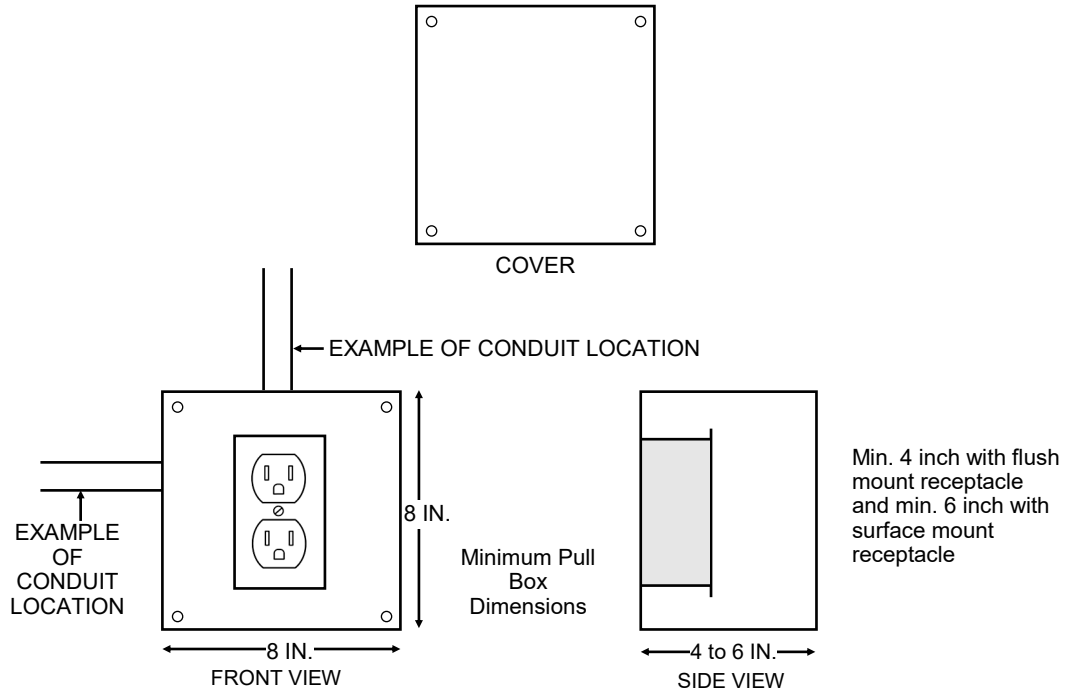
4/2 Pulse Dialing Format Compatibility

Note: The IMAX2 Sole/Dual-Path Series Communicators are compatible with any UL Certified 4/2 Receiver such as the Ademco 685.

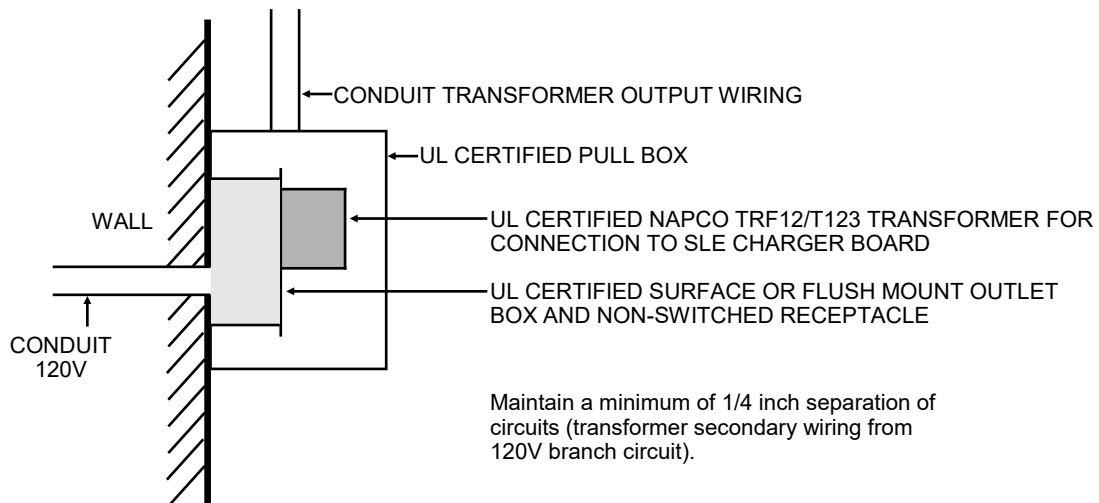
Name	Format Type	Handshake Frequency	Speed
Ademco Slow	4/2	1400 Hz or 2300Hz	10pps
Ademco Slow	4/2 checksum	1400 Hz or 2300Hz	10pps
Radionics Slow	4/2	2300Hz	10pps
Radionics Slow	4/2 checksum	2300Hz	10pps
Silent Knight Fast	4/2	1400 Hz or 2300Hz	20pps
Silent Knight Fast	4/2 checksum	1400 Hz or 2300Hz	20pps
Radionics Fast	4/2	2300Hz	40pps
Radionics Fast	4/2 checksum	2300Hz	40pps
Universal High Speed	4/2	1400 Hz or 2300Hz	40pps
Universal High Speed	4/2 checksum	1400 Hz or 2300Hz	40pps

Not for ULC S559 and ULC S527 Applications.

Optional Alternate Methods for Branch Circuit Power Connections to the SLE Charger Board



UL CERTIFIED ELECTRICAL PULL BOX WITH UL CERTIFIED OUTLET BOX AND NON-SWITCHED RECEPTACLE ON DEDICATED ALARM SYSTEM BRANCH CIRCUIT



TRANSFORMER SECONDARY WIRING CONDUIT LIMITED TO 20 FEET MAXIMUM LENGTH

NOTES

NAPCO LIMITED WARRANTY

NAPCO SECURITY TECHNOLOGIES, INC. (NAPCO) warrants its products to be free from manufacturing defects in materials and workmanship for **36 months** following the date of manufacture. NAPCO will, within said period, at its option, repair or replace any product failing to operate correctly without charge to the original purchaser or user.

This warranty shall not apply to any equipment, or any part thereof, which has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to acts of God, or on which any serial numbers have been altered, defaced or removed. Seller will not be responsible for any dismantling or reinstallation charges.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF NAPCO.

Any action for breach of warranty, including but not limited to any implied warranty of merchantability, must be brought within the six months following the end of the warranty period. IN NO CASE SHALL NAPCO BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT.

In case of defect, contact the security professional who installed and maintains your security system. In order to exercise the warranty, the product must be returned by the security professional, shipping costs prepaid and insured to NAPCO. After repair or replacement, NAPCO assumes the cost of returning products under warranty. NAPCO shall have no obligation under this warranty, or otherwise, if the product has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to accident, nuisance, flood, fire or acts of God, or on which any serial numbers have been altered, defaced or removed. NAPCO will not be responsible for any dismantling, reassembly or reinstallation charges.

This warranty contains the entire warranty. It is the sole warranty and any prior agreements or representations, whether oral or written, are either merged herein or are expressly cancelled. NAPCO neither assumes, nor authorizes any other person purporting to act on its behalf to modify, to

change, or to assume for it, any other warranty or liability concerning its products.

In no event shall NAPCO be liable for an amount in excess of NAPCO's original selling price of the product, for any loss or damage, whether direct, indirect, incidental, consequential, or otherwise arising out of any failure of the product. Seller's warranty, as hereinabove set forth, shall not be enlarged, diminished or affected by and no obligation or liability shall arise or grow out of Seller's rendering of technical advice or service in connection with Buyer's order of the goods furnished hereunder.

NAPCO RECOMMENDS THAT THE ENTIRE SYSTEM BE COMPLETELY TESTED WEEKLY.

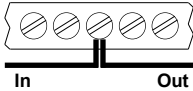
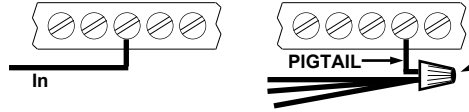
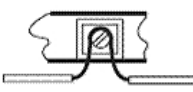
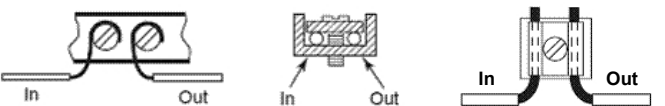
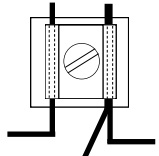
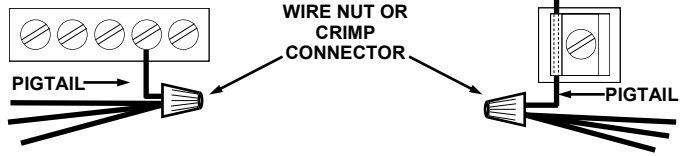
Warning: Despite frequent testing, and due to, but not limited to, any or all of the following; criminal tampering, electrical or communications disruption, it is possible for the system to fail to perform as expected. NAPCO does not represent that the product/system may not be compromised or circumvented; or that the product or system will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; nor that the product or system will in all cases provide adequate warning or protection. A properly installed and maintained alarm may only reduce risk of burglary, robbery, fire or otherwise but it is not insurance or a guarantee that these events will not occur. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE, OR OTHER LOSS BASED ON A CLAIM THE PRODUCT FAILED TO GIVE WARNING. Therefore, the installer should in turn advise the consumer to take any and all precautions for his or her safety including, but not limited to, fleeing the premises and calling police or fire department, in order to mitigate the possibilities of harm and/or damage.

NAPCO is not an insurer of either the property or safety of the user's family or employees, and limits its liability for any loss or damage including incidental or consequential damages to NAPCO's original selling price of the product regardless of the cause of such loss or damage.

Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, or differentiate in their treatment of limitations of liability for ordinary or gross negligence, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

NOTE: This equipment has been tested and found to comply with the limits for a Class B Unintentional Radiator, 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 Instruction Manual, 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 of more of the following measures: 1. Reorient or relocate the receiving antenna; 2. Increase the separation between the equipment and receiver; 3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; 4. Consult the dealer or an experienced radio/TV technician for help.

IMPORTANT WIRING METHODS

 For single-conductor terminal blocks (like the type shown at left), to terminate more than one conductor to a terminal, use the wiring methods shown at right:	 In Out Incorrect	 WIRE NUT OR CRIMP CONNECTOR PIGTAIL In Out Correct -- Single incoming and/or pigtail with UL Certified wire nut / crimp connectors
 For "barrier" type terminal blocks (like the type shown at left), to terminate two conductors to a terminal, use the wiring methods shown at right:	 Incorrect	 In Out Correct -- Separate incoming and outgoing conductors
To terminate more than two conductors or conductors of different wire sizes to a terminal, use the "pigtail" type wiring method as shown at right. Use insulated wire for the pigtail, and firmly secure the conductors to the pigtail using an appropriate wire nut or crimp connector for the number and gauge of conductors used.	 Incorrect	 WIRE NUT OR CRIMP CONNECTOR PIGTAIL PIGTAIL Correct -- Use UL Certified pigtail or wire nut / crimp connector