



TELGUARD

TG-1 Express

Installation Guide



**SECURITY
SIGNALING**



LISTED

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Distribution to other parties strictly prohibited.

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Important Note

The registration form must be completed before leaving for the job site to install the Telguard product. Use our dealer site at portal.telguard.com to register the unit in real time.

Foreword

The Telguard model TG-1 Express (p/n TG1LX002) cellular alarm communicator is UL Listed for Household Fire systems and Household Burglary systems. This means that the TG-1 Express may be used in Household Burglary systems, Household Fire systems or combined Household Burglary & Fire system as the primary communication path.

Technical Support

Technical support for all Telguard products is available Monday through Saturday.

Toll Free: 800-229-2326, option 9
Monday - Friday 8am - 8pm ET
Saturday 9am - 5pm ET

About this Manual

This manual assumes that you have basic security system installation skills such as measuring voltages, stripping wire, properly connecting wires together, connecting wires to terminals, and checking phone lines. It also assumes that you have a familiarity with the proper installation and programming tasks related to various alarm panels.

The material and instructions covered in this manual have been carefully checked for accuracy and are presumed to be reliable. However, Telguard assumes no responsibility for inaccuracies and reserves the right to modify and revise this manual without notice.

It is our goal at Telguard to always supply accurate and reliable documentation. If a discrepancy is found in this documentation, please mail or fax a photocopy of the corrected material to:

Telguard Technical Support
3225 Cumberland Blvd
Suite 300
Atlanta, GA USA 30339
Fax: 678-945-1651

Repair and Warranty

If issues are experienced with the *Telguard@Cellular Alarm Transmission System* please contact Telguard Technical Support for troubleshooting. Repair of this equipment should only be referred to Telguard.

Telguard will repair or replace (our option) inoperative units for up to two years from date of manufacture. This excludes damage due to lightning or installer error. Unauthorized modifications void this warranty. Not responsible for incidental or consequential damages. Liability is limited to price of unit. This is the exclusive warranty and no other warranties will be honored, whether expressed or implied.

If a Telguard unit needs to be returned for repair, please return the product to the distributor that the unit was originally purchased from. If you are unsure of the distributor, please

contact the Telguard RMA Department at 800-229-2326 option 1 to provide the distributor who sold the unit. Distributor will contact Telguard to determine if the product is within the warranty period. Units without a serial number, damaged by lightning, damaged by vandalism or show signs of tampering will not be covered by warranty. Units returned for repair that are out of the warranty period or do not meet warranty criteria will be subject to a minimum repair charge.

An RMA must be assigned before returning product. You may obtain an RMA via phone at 800-229-2326 option 1, or via email at returns.telular@ametek.com.

The RMA number assigned must be on outside of box or product will not be accepted for return.

Future Testing and Limitations on Use

Telguard® is part of an advanced design alarm-communication system. It does not offer guaranteed protection against burglary and fire. Any alarm communication system is subject to compromise or failure.

The Telguard will not work without power. Electrically powered devices will not work if the power supply is off for any reason, however briefly.

The cellular radio network, needed to transmit alarm signals from protected premises to a central monitoring station, may be inoperable or temporarily out of service. Cellular radio networks are also subject to compromise by sophisticated methods of attack.

This equipment, like any other electrical device, is subject to component failure. Although this equipment is designed to be long lasting, the electrical components could fail at any time.

Due to these limitations, we recommend that if the automatic self-test feature is not enabled, other arrangements be made with the user to test the system at least once every three months. Moreover, arrangements should also be made for on-site inspection/test by a licensed alarm installer at least once each year.

Terms and Conditions for Use of Telguard Product

These Terms and Conditions are a legal contract between you and Telguard for the title to and use of the Product. BY RETAINING AND USING THE PRODUCT YOU AGREE TO THE TERMS AND CONDITIONS INCLUDING WARRANTY DISCLAIMERS, LIMITATIONS OF LIABILITY AND INDEMNIFICATION PROVISIONS BELOW. *IF YOU DO NOT AGREE TO THE TERMS AND CONDITIONS, DO NOT USE THE PRODUCT AND IMMEDIATELY RETURN THE UNUSED PRODUCT FOR A COMPLETE REFUND.* You agree to accept sole responsibility for any misuse of the Product by you; and, in addition, any negligent or illegal act or omission of you or your agents, contractors, servants, employees, or other users of the Product so long as the Product was obtained from you, in the use and operation of the Product.

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YOU SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS TELGUARD FOR ANY OF THE COST, INCLUDING REASONABLE ATTORNEYS' FEES, AND FROM CLAIMS ARISING OUT OF YOU, YOUR CLIENTS' OR OTHER THIRD PARTIES' USE OR OPERATION OF THE PRODUCT: (i) FOR MISUSE OR IN A MANNER NOT CONTEMPLATED BY YOU AND TELGUARD OR INCONSISTENT WITH THE PROVISIONS OF THIS MANUAL; (ii) IN AN ILLEGAL MANNER OR AGAINST PUBLIC POLICY; (iii) IN A MANNER SPECIFICALLY UNAUTHORIZED IN THIS MANUAL; (iv) IN A MANNER HARMFUL OR DANGEROUS TO THIRD PARTIES; (v) FROM CLAIMS BY ANYONE RESPECTING PROBLEMS, ERRORS OR MISTAKES OF THE PRODUCT; OR (vi) COMBINATION OF THE PRODUCT WITH MATERIAL, MODIFICATION OF THE PRODUCT OR USE OF THE PRODUCT IN AN ENVIRONMENT NOT PROVIDED, OR PERMITTED, BY TELGUARD IN WRITING. THE PARTIES SHALL GIVE EACH OTHER PROMPT NOTICE OF ANY SUCH COST OR CLAIMS AND COOPERATE, EACH WITH THE OTHER, TO EFFECTUATE THIS INDEMNIFICATION, DEFENSE AND HOLD HARMLESS.

WARRANTY and LIMITATIONS

TELGUARD WILL REPAIR OR REPLACE (OUR OPTION) INOPERATIVE UNITS FOR UP TO TWO YEARS FROM DATE OF MANUFACTURE. EXCLUDES DAMAGE DUE TO LIGHTNING OR INSTALLER ERROR AS WELL AS UNITS THAT INCORPORATE MATERIAL, OR USED IN A MANNER OR ENVIRONMENT, NOT SPECIFICALLY AUTHORIZED IN THIS MANUAL. UNAUTHORIZED MODIFICATIONS VOID THIS WARRANTY. NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. LIABILITY LIMITED TO PRICE OF UNIT. THIS IS THE EXCLUSIVE WARRANTY, IN LIEU OF ALL OTHER WARRANTIES INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, DELIVERY, INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND NO OTHER WARRANTIES WILL BE HONORED, WHETHER EXPRESSED OR IMPLIED.

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General Description and Operation

The Telguard® TG-1 Express is a digital cellular radio alarm transmission device used to provide a primary transmission path (cellular) for Household alarm panels. When transmitting an alarm signal, the Telguard unit obtains its data from the alarm panel by way of a telephone interface. The Telguard will obtain all alarm signal information including monitoring station phone number, account number and all zones for every alarm transmission. The Telguard handshakes with the alarm panel and causes it to transmit the alarm data. Telguard encodes the alarm data and transmits it to the Telguard Communication Center over the cellular network. The Telguard Communication Center performs a function like a central station receiver and issues the transmission acknowledgement when the last message in the transmission is received. After decoding and reformatting, the alarm signal is routed over the telco line (Public Switched Telephone Network - PSTN) or via the Internet (IP) to the appropriate alarm company central station for action.

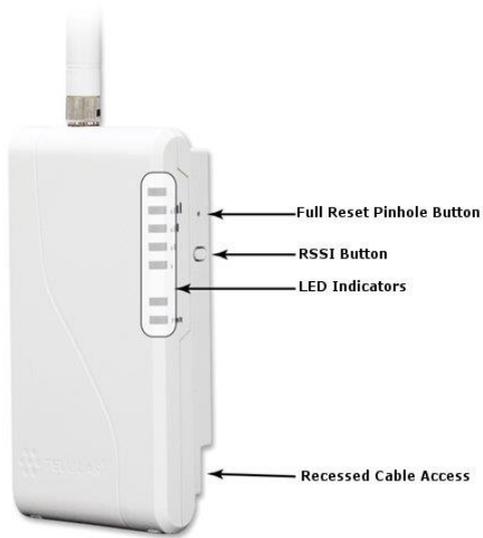
In a typical alarm installation, Telguard Digital TG-1 Express is installed in the same area as the host alarm system and is connected directly to the host alarm panel via the Telguard's RJ-45 jack in the normal fashion. Two programmable System Trouble Condition (STC) relays provide Telguard trouble signals to the alarm panel via supervisory trip outputs connected to the alarm panel's trip zone input terminals. Additionally, automatic self-test and remote query signals are transmitted exclusively over the cellular network to the Telguard Communication Center. The TG-1 Express receives operating power from the host alarm panel, and all cellular monitoring and supervisory functions are built in. No extra modules are required.

The UL Listed equipment at the Telguard Communication Center (TCC) plays a key role in the operation of every Telguard. All Telguard units are required to use the Communication Center because of the alarm panel alarm signal format encoding and decoding requirements used in packet-data transmissions over the digital cellular network. The

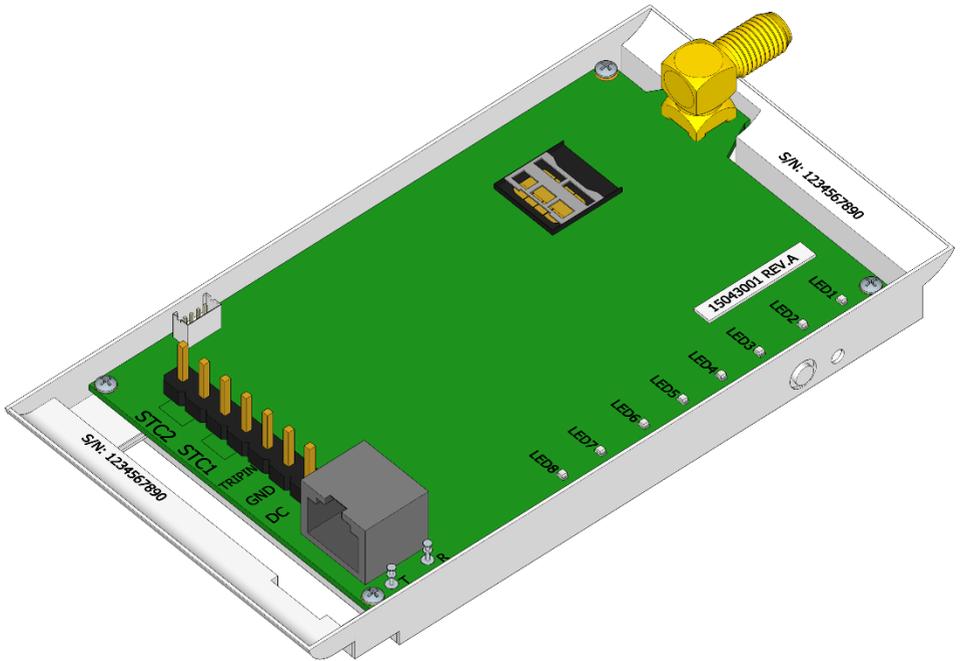
Communication Center also manages the real-time databases for cellular service and a complete history of every Telguard unit's operating conditions. These conditions include programming setup information, alarm transmission information, supervisory trouble information, status information, and automatic self-test information.

Visual Tour

TG-1 Express – First Look



Inside the TG-1 Express



Features

This section summarizes the key features of the Telguard TG-1 Express.

Operating Mode

The Telguard Digital TG-1 Express is a digital cellular transmission device that is installed at the protected premises to provide primary alarm transmission integrity for household burglary and fire systems.

Panel-Supplied Power

The Telguard TG-1 Express has an extremely low power profile, and as such can usually be powered from the panel to which it is connected. Refer to Appendix 3 for power consumption specifications.

Simply connect the Auxiliary power output from any voltage compatible (6V to 16V) panel to the DC input on the TG-1 Express. Using the panel to provide power for the TG-1 Express allows for a simpler installation, and eliminates the need for additional A/C outlets.

The installer shall verify that the control unit's alarm current is not exceeded when a bell and the TG-1 Express are simultaneously connected. For panels with very limited power capabilities, a Telguard TG-1B or TG-4 communicator should be used, both of which utilize a battery backed-up A/C power source, separate from the panel.

Single Line Interface Cable (SLIC)

To further simplify installation, the TG-1 Express can be connected to the panel power using pins 2 and 7 of the RJ-45 connector for Ground and Power respectively. This allows the installer to connect both the communication path as well as the power to the alarm panel using a single cable.

Multiple Alarm Format Support

The default program setting of the Telguard TG-1 Express is for Auto Detection of the panel alarm format. The Auto Format Detect feature allows the Telguard to adapt to receive any listed format on every alarm transmission. If the alarm format is changed for whatever reason, the Telguard will sense the new format and accept the alarm signal.

For the host alarm panel to be compatible with the Telguard, the panel must be programmed to transmit alarm messages to the central station using one of the following non-extended formats:

- Pulse Formats:
 - 3+1 pulse; 10pps, Double Round, 1400Hz ack
 - 3+1 pulse; 20pps, Double Round, 2300Hz ack
 - 3+1 pulse; 40pps, Double Round, 2300Hz ack
 - 4+2 pulse; 20pps, Double Round, 1400Hz ack
 - 4+2 pulse; 20pps, Double Round, 2300Hz ack
 - 4+2 pulse; 40pps, Double Round, 2300Hz ack
- Contact ID
- Modem IIe/IIIa²/4
- SIA2 (SIA-DC-03 level 2 release at 300 baud)
- DMP

Hexadecimal account numbers can be used with 3+1 or 4+2 formats, as well as Contact ID (4 or 10 digits) and Modem IIe or IIIa² (4 digits).

Complete Supervision of Communication Path

The Telguard TG-1 Express continuously monitors cellular network registration. When loss of cellular network registration is detected, the TG-1 Express generates a relay trip output that can be connected to a zone input of the host alarm panel and/or used to activate remote annunciation devices.

No Service Condition (NSC)

The Telguard TG-1 Express declares a no service condition (NSC) when the Telguard TG-1 Express is unable to register with the cellular network.

NSC is programmable to trip the supervisory relay output (STC relay) after a variable period. The STC LED will flash 4 times immediately after losing cellular. NSC restoral occurs immediately after cellular service has been acquired.

Radio Failure Condition (RFC)

Radio communications failure condition (RFC) is declared when the Telguard TG-1 Express is unable to transmit over the cellular network even with acceptable signal strength. RFC is indicated by the STC LED flashing 5 times. RFC restoral occurs when communication with the TCC is restored.

Panel Presence Failure Condition (PPF)

Panel presence failure condition (PPF) is declared when the Telguard TG-1 Express is unable to detect the presence of the host alarm panel. PPF is indicated by the STC LED flashing 7 times. PPF is restored immediately after the connection to the panel is restored and maintained for the delay period.

NOTE: The factory default for PPF is Disabled and needs to be Enabled for its use. For the PPF feature to work, Tip, Ring, and the return connections for Tip and Ring must be connected between the panel and the Telguard.

Dial Tone Failure (DTF)

The Telguard TG-1 Express provides a voltage supply and other signaling to the panel like a telephone central office. A Dial Tone Failure (DTF) is declared when unable to provide proper telephone signaling to the panel. The STC LED will flash 6 times and the STC relay will trip if programmed to do so. This condition requires contacting Technical Support for resolution.

Catastrophic Failure (CF)

Catastrophic Failure (CF) is any condition that causes the Telguard TG-1 Express to stop functioning at all levels, most commonly because of power failure. The STC trip output is activated and visible indication is loss of all LED activity. If power is connected properly to the unit when a CF occurs, please contact Telguard Technical Support for resolution.

HomeControl Flex

The feature comes as an added service that provides the flexibility of remote arming/disarming of the panel and end-user notification of events.

The HomeControl Flex service can work in conjunction with any single-partition security system provided the alarm panel and Telguard are wired properly and that the panel can be programmed with the following:

- Alarm reporting format must be programmed to Contact ID.
- A programmable output must be configured to switch to ground when the system is armed.
- An available zone must be programmed as a Momentary Keyswitch, so that a temporary short will cause the panel to switch states (from Armed to Disarmed and vice-versa).
- Opening and Closing reports must be enabled to report always.

For more detailed installation and programming instructions refer to the dealer site at portal.telguard.com.

Telguard Automatic Self-Test Report

The Telguard automatic self-test signal schedule is programmable as prescribed by contract. The central station receives the automatic self-test report in the same format that the alarm panel normally uses for communication over the

Telco line. The self-test code and testing frequency are set during registration, and can accommodate any code the Central Station expects. The TCC captures all current and historical data pertaining to the operation of the Telguard TG-1 Express when it processes the automatic self-test signal. This data contains current operational status (C.O.S.) of the Telguard TG-1 Express such as "All OK", current trip input status, or any combination of the system trouble conditions, as well as the current signal strength. In addition, the data also contains historical data for supervisory events that occurred since the last self-test signal was transmitted. This data includes the number of occurrences of communications failure conditions and no cellular service conditions. This additional information is available by contacting Telguard Technical Support or by visiting portal.telguard.com (dealer log-in credentials required).

Telguard Remote Query Capability

Although Telguard has the capability for a periodic self-test, a separate feature is provided for determining the current operational status of every Telguard. This feature is called Remote Query and is used to provide real-time operational status for Telguard on-demand. It is useful in resolving STC events that are reported by the alarm panel to the central station. Authorized personnel can initiate the Remote Query at any time by calling Customer Service or by visiting portal.telguard.com. The Remote Query causes Telguard to upload current operational status data and historical data, just as the automatic self-test described above, except that the query signal is controlled by the one who initiates it. The query signal is held in the Telguard database at the Communication Center for review and is not forwarded on to the central station.

Programmable Supervisory Trip Output (STC) Relays

The Telguard TG-1 Express has two supervisory relay trip outputs (STC1 normally open and STC2 normally closed) and both are energized in a powered-up state when no system troubles exist. It enables a supervisory trouble code to be

transmitted to the central station when connected to an alarm panel's 24-hour instant input zone. The STC relays are programmable to meet virtually any installation requirement.

The following supervisory features or combination of features are programmable to trip the STC relay to meet a variety of installation requirements:

- Trips on no service condition (NSC).
- Trips on radio communication failure condition (RFC).
- Trips on low power failure (LPF).
- Trips on dial tone failure (DTF).

The following system trouble features are embedded in the Telguard for tripping the STC relay and cannot be changed:

- Tripped when unit is not activated at the Telguard Communications Center (TCC)
- Trips on *catastrophic failure* (CF) if all power is lost.
- Trips on *transmit-disable command* from the Communication Center. This radio command disables only the Telguard transmitter and would be used, for example, to shut down the Telguard due to a runaway panel dialer.

Diagnostic and Status LEDs

Eight LEDs are provided as a useful aid during installation and give installers an immediate visual indication of system status. The LEDs serve as indicators for activation, system trouble conditions, and communication indicators. They also can be used to provide a signal strength indication, like the signal strength bars on a cellular phone. See the installation section for details.

Complete Factory Reset Option

A special function within the Telguard TG-1 Express allows you to perform a complete Factory Reset on the unit. This reset will change all unit settings back to a defaulted configuration.

Note: Never attempt to do a Complete Factory Reset on an active account, otherwise the unit will need to be re-activated.

To begin the factory reset, follow these steps:

- Power cycle the device. For the first three seconds after power up, all LEDs will be lit solid.
- While the unit shows this pattern, hold down the RSSI button for 15 seconds. After 15 seconds, the LEDs will begin to sequentially turn on and off in a cascading pattern. This is your indication of the factory reset taking place.
- Release the button. After the factory reset concludes, the LEDs will go back to normal status.

UL Listings

Model TG-1 Express meets the requirements for all Household Burglary, Household Fire, and Combined Household Burglary/Fire installations. It has a plastic enclosure and cellular antenna. TG-1 Express is UL Listed for the following:

- UL Household Burglary (UL 1023)
- UL Household Fire (UL 985)

Getting Ready

The Telguard TG-1 Express can only be activated when all the necessary accounting information has been added to the customer database located at the Telguard Communication Center. The database includes information about the customer account, unit location, and system test plan information.

Dealer Account Establishment

Prior to registration of any Telguard unit, a Dealer Account must be established. Once the Dealer Account has been submitted and approved by Telguard, a Telguard online service registration form may be submitted. Establish your Dealer Account by completing the Online Telguard Cellular Service Dealer Account Application at portal.telguard.com. Once the application has been completed you will receive an acknowledgment within 1 business day or sooner. This is a one-time event; the acknowledgment from the Telguard Customer Service will include a Dealer Account Number that will be used for all Telguard registrations.

Pre-Installation Checklist

Before attempting to connect the Telguard TG-1 Express to the host alarm panel, please note the following:

Be sure you have all the proper parts before you go to the job site. The following items are shipped with each Telguard unit:

- Basic Telguard TG-1 Express unit, with antenna.
- Telguard TG-1 Express Quick Install Guide

You must also have certain installation test tools:

- A standard telephone or lineman's butt-set is required at the job site for testing the unit.
- Screws and a screwdriver will be required to attach the unit and antenna to the wall.

- To connect the STC relay outputs to the alarm panel, stranded electrical wire will be required. The terminal strips can accommodate solid or stranded wire sizes from 14 to 22 gauge.
- A standard RJ45-to-spaded leads cable will be required to connect the Telguard TG-1 Express to the panel. These are usually supplied with the alarm panel.

Note: Your unit may be subject to airtime charges for unintended use. Telguard Cellular Service offers several cellular service rate plans.

Installation

Summary

There are six steps in installing Telguard properly. IF YOU DO NOT PROCEED IN THE ORDER AND MANNER PRESCRIBED, YOU MAY NOT COMPLETE THE INSTALLATION IN THE TIME ALLOCATED. These six steps are summarized below and then explained in detail in the remainder of this manual.

1. Register for Telguard service
2. Locate Unit and measure signal strength
3. Activate and transmit alarm panel alarms
4. Connect supervisory trip outputs
5. Connect trip input (optional)
6. Complete installation

This six-step installation approach provides the alarm installer with the easiest and fastest method of properly installing your Telguard TG-1 Express. Please follow the instructions carefully and if you should need assistance or have any questions, call Telguard TECHNICAL SUPPORT at 1-800-229-2326 option 9.

Step 1: Register the Telguard Unit for Service

The registration form must be completed before leaving for the job site to install the Telguard product. The registration form may be completed online through our 24/7 dealer portal: portal.telguard.com.

The desired features and programmable options for any installation are selected during the registration process. This includes STC strategy, Trip-Input enabling, and added value services like HomeControl Flex.

Decide on a STC Trip Output Strategy

The Telguard provides the host alarm panel with two supervisory trip outputs for reporting a Telguard system trouble code to the central station. The supervisory trip

outputs are programmable to suit various installation requirements. The programming options for these supervisory trip outputs can be any combination of the following:

- Always Off: Disables all relay supervisory functions.
- NSC: Trips after a 60 second delay (delay is programmable) on no service condition. Restoral of this condition occurs when a measurable signal strength greater than -114 dBm is obtained.
- RFC: Trips on radio failure to communicate with the Telguard Communication Center. Restores when TCC communicates with Telguard device.
- DTF: Trips on an internal failure in the dial tone circuitry within the Telguard TG-1 Express
- LPF: Low power failure is detected immediately input power drops below 5.1VDC. After a configurable delay the STC trip output will be activated. The STC trip output restores 60 seconds after DC power returns to normal (≥ 5.1 VDC).

Optional Trip Input Strategy

Conditions detected by the Trip Input are programmable from portal.telguard.com. When the configured condition is detected, a supervisory message is sent to the central station via the TCC. This allows an external relay, separate from the alarm panel, to be connected to the Telguard unit to provide independent sensor input for other functions, such as tamper detection.

The message that is sent from the TCC to the central station is configurable using Telguard Online. The Telguard will automatically be configured with a unit template that allows configuration of the trip input feature, including the message that is sent to the central station. There is a default event configured for each alarm format, so that if the Telguard is configured to send trip input events to the TCC, a default notification will be sent to the central station. If the Telguard is

configured to report restorals, the contact closure will also be reported.

Note: Trip Input option is only available when HomeControl Flex is not enabled.

Swinger Function

The swinger function is designed to reduce the incidence of excessive messaging and alarms due to faulty equipment or installation. If enabled, the swinger function will discontinue sending trip input messages to the TCC once 10 trip events are detected within a 10-minute period. The Telguard device will resume sending trip input messages to the TCC after a 10-minute period without trip events.

Step 2: Locate Unit and Measure Signal Strength (RSSI)

Locate Unit

Pick a spot next to the alarm panel where you think the Telguard TG-1 Express will be mounted and place the unit down temporarily in that spot. Do not mount it permanently now, since it may need to be moved to receive a better cellular radio signal or a remote high-gain antenna may be necessary.

Note that for a UL compliant installation, the Telguard TG-1 Express must be mounted in the same room as, and not more than 20ft from the alarm panel.

Connect DC Power

Before connecting the power cables to the alarm panel, make sure that the panel's power source and battery are disconnected.

To connect power to the Telguard TG-1 Express using terminal block:

1. Connect the leads to the GND (DC -) and DC (DC +) terminals of the alarm panel. The specific terminals used on the panel will depend on the panel make and model.
2. Connect the other end of the leads to the GND and DC terminals on the Telguard TG-1 Express respectively.
3. Reconnect the alarm panel's power supply, and ensure that the PWR light (LED 8) on the unit is illuminated.

To connect power to the Telguard TG-1 Express using the SLIC connection:

1. Using a standard RJ-45 to spaded lead cable, connect the orange (pin 2) and blue (pin 7) leads to the GND and PWR terminals of the alarm panel respectively.
2. Connect the remaining leads to the Telco terminals in the alarm panel, per the panel's instruction.
3. Connect the other end of the cable to the RJ-45 jack on the Telguard TG-1 Express.
4. Reconnect the alarm panel's power supply, and ensure that the PWR indicator (LED 8) on the Telguard TG-1 Express is illuminated.

| <u>Recommended Wire Size</u> | <u>Length Not to Exceed</u> |
|------------------------------|-----------------------------|
| 18 ga | 20 ft. |
| 16 ga | 40 ft. |
| 14 ga | 60 ft. |

Connect Antenna and Temporarily Place Unit

The Telguard unit is supplied with an antenna. In most cases the antenna may be mounted directly to the Telguard unit. If a stronger radio signal is required, the antenna must be moved to a better signal location using a Telguard antenna cable and bracket accessory (sold separately). The performance of the Telguard antenna may be affected by the wall material and materials contained within the wall chosen for mounting. These effects may not be clearly identified by RSSI monitoring alone. The wall materials may have a more pronounced effect on the antenna's transmit band performance.

When selecting a mounting location, do not mount this unit in an area where the general public could reasonably be within 20cm (8 inches) of the antenna.

Note 1: Optimum RF performance can usually be found at the highest point within a building with the fewest number of walls between the Telguard unit's antenna and the outside of the premises.

Note 2: To avoid interference with other electronic devices operating in the area, avoid mounting the Telguard unit's antenna near other electronic devices.

Note 3: The Telguard TG-1 Express with supplied antenna is designed for indoor installations ONLY.

These considerations should be coupled with the best RSSI indication obtainable. Care should be taken to ensure that a large metal object such as a refrigerator or a metal cabinet is not located on the opposite side of the wall.

If moving the Telguard unit to a different location is not practical, then you may need a cable and accessories (sold separately) to remote install the antenna to receive adequate radio signal strength. Pick a high, visually secure spot using the guidelines below. For remote antenna accessories see Appendix 4.

Tips for Improved Radio Signal Reception

- The higher the antenna the better. So, start in the drop ceiling above the unit and proceed up from there, to the roof if necessary.
- Remember, the antenna should be as inconspicuous as possible for greatest visual security.
- Try to keep the antenna away from sources of RF interference, including pumps, compressors, ovens, etc., or where metal objects can shield it or otherwise block the cellular radio RF signal.
- Place the antenna perpendicular to the ground, either right side up or upside down. Do not mount the antenna horizontally.

- Always use an antenna mounting bracket. Do not mount the antenna such that it is in contact with another object, as this may interfere with cellular reception and transmission.

Measure Received Signal Strength (RSSI) for Best Antenna Placement

Measure the received signal strength by pressing and releasing the RSSI button. This switches the LEDs to display signal strength (RSSI Mode). Slowly move the unit or remote antenna to achieve maximum signal strength. Pick the place where the most LEDs (up to four) are lighted.

| RSSI Value | Illuminated LEDs | Signal Level |
|------------|---|--|
| NSC | LED 5 = flash, LED 4-2 = off | n/a |
| 1 | LED 5 = on, LED 4-2 = off | ≤ -111 dBm |
| 1½ | LED 5 = on, LED 4 = flash LED 3-2 = off | ≥ -110 dBm |
| 2 | LED 5-4 = on, LED 3-2 = off | ≥ -100 dBm (Minimum signal strength required) |
| 2½ | LED 5-4 = on, LED 3 = flash LED 2 = off | ≥ -90 dBm |
| 3 | LED 5-3 = on, LED 2 = off | ≥ -80 dBm |
| 3½ | LED 5-3 = on, LED 2 = flash | ≥ -70 dBm |
| 4 | LED 5-2 = on | ≥ -60 dBm |

LED Function Table – View RSSI Mode (RSSI button)

If you cannot obtain a signal strength reading of 2 (TWO LEDs ON SOLID), you will probably need to move the unit and/or remote antenna higher, or switch to a special antenna as described below.

Antenna Options

Antenna problems are unlikely unless the premises is located in a fringe network coverage area, in a building below ground level, or in a metal structure. If you require a higher gain antenna or a longer cable assembly please contact your Telguard Sales Representative at 800-229-2326, option 5. Telguard offers a variety of high quality low loss antenna cables as well as high gain antennas.

Step 3: Activate & Transmit Alarms

The Telguard unit will confirm activation with the Telguard Communication Center if the registration form was submitted prior to installation.

Note: If the alarm panel and the Telguard TG-1 Express were not already connected in Step 2, plug the modular jack of the alarm panel to the RJ-45 jack on the Telguard unit.

During the processing of the first alarm signal over the cellular network the Telguard will transmit all the parameters from the Telguard along with the information (central station number and account code) from the alarm panel. Once this information is received, the TCC will transmit a message back to the Telguard unit indicating successful activation. Upon successful activation, **the LED'S on the Telguard unit will begin operating in normal mode; LED #1 will be on solid.**

The first alarm is to confirm registration and to activate the Telguard unit. The first alarm will NOT be transmitted to the central station.

Special LED Indications during Activation

If the Telguard unit fails the activation process, the following indications will be displayed on the LEDs.

- If LED 1 and LED 4 are flashing, the Telguard unit has failed activation. The serial number is not in the database at the TCC. Clear the fault (see note below) and call Telguard

Technical Support to verify proper registration before resending an alarm signal.

- If LEDs 1-5 are flashing, there is an activation error. The activation message was NOT received at the TCC. Clear the fault (see note below) and retry transmitting an alarm signal. If Telguard fails a second time to activate, check signal strength. If signal strength is OK, then call Telguard Technical Support for further assistance.

Note: To clear the faults listed above, the RSSI button must be pressed twice. After resolving the issue and clearing the unit, STEP 4 MUST BE REPEATED OR THE TELGUARD UNIT WILL NOT TRANSMIT ANY SIGNALS.

| Illuminated LEDs | Indication |
|--------------------|--|
| LED 1 & 4 flashing | Failed Activation - Call Technical Support |
| All LEDs flashing | Activation Error - Signal Too Weak |
| LED 1 On | Activation Successful |

System Status LEDs Table

| Status LED #2 | Indication |
|---------------|------------------------------|
| 1 FLASH | STC - Low Power Failure |
| 2 FLASH | N/A |
| 3 FLASH | N/A |
| 4 FLASH | NSC - No Service |
| 5 FLASH | RFC - Radio Failure |
| 6 FLASH | DTF - Dial Tone Failure |
| 7 FLASH | PPF - Panel Presence Failure |

System Trouble Condition, STC (LED #2) Table

If no LEDs besides the STC LED are lit or flashing, it may indicate insufficient power supplied from the alarm panel. Press and release the RSSI button to change the LEDs to RSSI mode. If still no LEDs are lit, then check the voltage being supplied to the Telguard unit and ensure that it is above 6V.

Verify Alarm Signal Transmissions over Cellular

Trip several alarms on the alarm panel and verify that the central station received them by calling the central station operator. Use a lineman's butt-set in *MONITOR MODE* and connected to Telguard unit's "T" and "R" test pins to "listen" to communications between the alarm panel and Telguard. After the alarm panel finishes communicating with the Telguard unit, LED #4 will come on solid while waiting for an acknowledgement from the Telguard Communication center.

If you are having problems getting reliable alarm signal transmissions, additional adjustments may be necessary.

- Recheck signal strength. You need RSSI = 2 (TWO LEDS ON SOLID) for adequate signal strength. Also, check antenna connector and make sure it is seated correctly.
- If problems persist, call Telguard Technical Support for troubleshooting at 1-800-229-2326, option 9.

Step 4: Connect the Supervisory Trip Outputs

Connect and test the supervisory trip outputs to the alarm panel.

Activation of a local alarm or strobe light may be desirable when a trip is declared. The STC trip outputs can be used directly to activate a local signaling device, if the trip output is not needed to trip the host alarm panel at the same time.

Reprogram Alarm Panel to Send Proper Code

If necessary, reprogram the alarm panel to send the proper alarm code when tripped by the Telguard unit's supervisory outputs. Program zone restorals as desired.

Check Proper Operation of Telguard Supervisory Output

Check for proper operation of each programmed supervisory output by causing it to trip the alarm panel and be sure the proper LED illuminates and that the proper trouble code is reported to the central station. Skip the testing of any supervisory functions that have not been enabled. Note that the yellow MODE LED #3 starts to flash when the alarm panel goes off-hook to report the alarm signal over cellular, however, an alarm/event will only be transmitted if the STC is being monitored by an available zone in the panel.

- No Service Condition (NSC): Disconnect the antenna from the Telguard. Check to see that the STC LED #2 flashes 4 times in the programmed period (default is 60 seconds) indicating loss of cellular service. Reconnect the antenna and check to see that the STC LED #2 goes off after a period, indicating cellular service has been restored.

Step 5: Connect and Test the Trip Input (optional)

In addition to the interface to the alarm panel, a single trip input may be connected to the terminal block of the Telguard TG-1 Express. When the input is tripped, a supervisory message is sent to the central station via the Telguard Communication Center. This allows an external input, separate from the alarm panel, to be connected to the Telguard unit to provide independent sensor input for other functions, such as tamper detection.

The trip input is connected to the external input by wiring one side of the external input to the TRIP IN terminal, and the other side to either the GND terminal or to the chassis ground on the Telguard TG-1 Express circuit board.

Note that trip inputs are normally wired such that there is a 2.2k Ω resistor in parallel with an external set of N.O. contacts, so that a tamper condition (i.e. a cut wire) can be detected.

When the trip input functionality is being used, closing the trip contact will cause the Telguard unit to send a message to the Telguard Communication Center, which in turn will cause the Telguard Communication Center to send a message to the central station. If the Telguard unit is configured to report restorals, the contact opening will also be reported.

UL Note: Trip input is not evaluated when connected to Burglary Zones on the panel. For UL installations, burglary zones shall not be connected to the Trip Input.

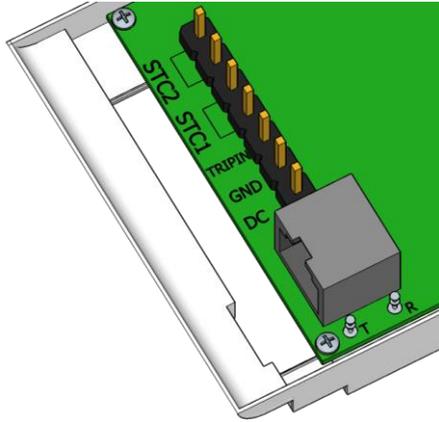
Step 6: Complete the Telguard Unit Installation

The last step is to permanently mount the Telguard unit.

1. Attach earth ground to the grounding screw located on lower left-hand corner of printed circuit board assembly and permanently mount the Telguard enclosure.
2. Install the mounting screws (not supplied). The “keyhole” mounting holes on the back of the Telguard TG-1 Express are 2.5” apart, center-to-center.
3. Slide the enclosure onto these screws.

Appendix 1 – Connection Guide

Wiring Diagram

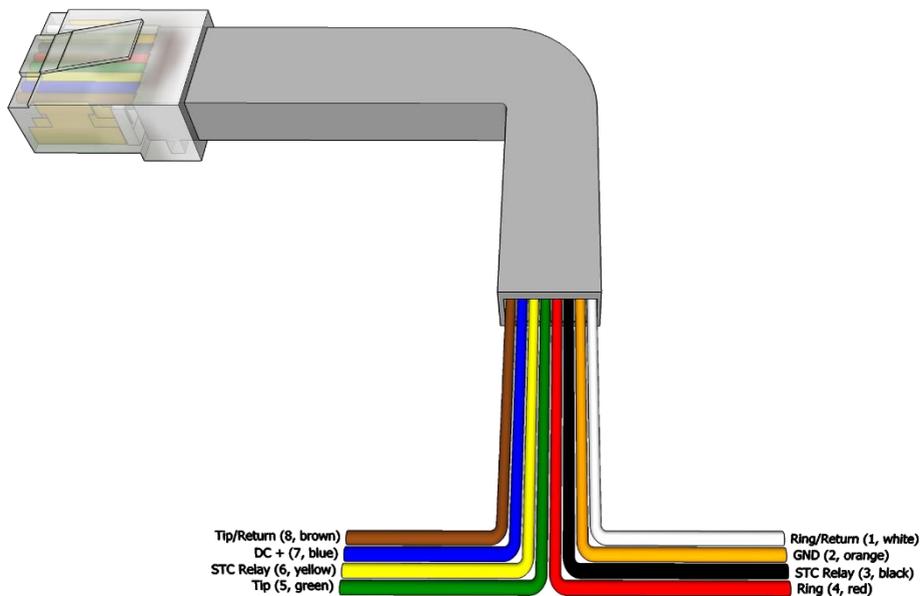


| Pin | Description |
|---------|---|
| STC2 | Connect to 24-Hour N.C. Zone on panel for supervision. |
| STC1 | Connect to 24-Hour N.O. Zone on panel for supervision |
| TRIP IN | Connect to external relay/sensor or to the panel for Home Control Flex. |
| GND | Connect to panel auxiliary ground. |
| DC | Connect to panel auxiliary power. |

Note: When HomeControl Flex is enabled on the TG-1 Express, STC2 is repurposed for keyswitch arming.

Attaching the RJ-45

The RJ-45 cable to the alarm panel can be attached to the Telguard TG-1 Express either with the enclosure open or closed. Note that, as with other Telguard products, the RJ-45 cable going to the alarm panel as well as all other wiring should be routed through the rear cable opening to allow the plastic lid of the Telguard TG-1 Express to be closed properly.



RJ-45 Pin Assignments

| Pin | Wire Color | Assignment |
|-----|------------|--------------------------------------|
| 1 | White/Gray | R1 |
| 2 | Orange | TG-1 Express GND (when using SLIC) |
| 3 | Black | STC2 |
| 4 | Red | R (Ring) |
| 5 | Green | T (Tip) |
| 6 | Yellow | STC2 |
| 7 | Blue | TG-1 Express Power (when using SLIC) |
| 8 | Brown | T1 |

Main Terminal Strip Pin Assignments

| Terminal Strip Pin | Definition | Connects To | Function |
|--------------------|--|--|---|
| 1 STC2 2 STC2 | Supervisory Relay Trip output for programmable trouble conditions. Normally Closed | 24-hour trip zone input on host alarm panel. | Enables transmission of programmed supervisory trouble code (see diagram or installation section) |
| 3 STC1 4 STC1 | Supervisory Relay Trip output for programmable trouble conditions. Normally Open | 24-hour trip zone input on host alarm panel. | Enables transmission of programmed supervisory trouble code (see diagram or installation section) |
| 5 TRIP IN | Trip input | External trip input | Allows an external input to trigger an alarm signal |
| 6 GND 7 PWR | DC power input | Auxiliary power and ground of alarm panel | Provides primary power to TG-1 Express |

Appendix 2 – Troubleshooting Guide

This section provides a summary of all LED indications and their meanings, as well as the expected behavior of the Telguard TG-1 Express under various exception conditions.

LED Indicator Guide – Normal Operating Mode

| LED Symbol | Color | Showing | Indication |
|---|--------|-----------|---|
| LED #1 <i>Activation</i> | Green | Solid On | Unit is activated at the message center and enabled |
| | | Off | Unit not activated at the message center (and disabled) |
| | | Flashing | Unit is disabled / Activation failed |
| LED #2 <i>STC (System Trouble Condition)</i> | Red | Off | <i>ALL OK</i> |
| | | 1 Flash | STC - Low Power Failure |
| | | 2 Flashes | N/A |
| | | 3 Flashes | N/A |
| | | 4 Flashes | STC - No Service |
| | | 5 Flashes | STC - Radio Failure |
| | | 6 Flashes | STC - Dial Tone Failure |
| LED #3 <i>Mode</i> | Yellow | Flashing | Telguard TG-1 Express communicating with alarm panel |
| | | Off | Idle state |
| LED #4 <i>Acknowledgement</i> | Red | Flashing | When flashing with LED #1 unit has failed activation. |
| | | Off | TG-1 Express initialized |
| | | On | TG-1 Express is waiting for response from the Telguard Communications Center. |

| LED Symbol | Color | Showing | Indication |
|-----------------------------|----------|----------|--|
| LED #5 <i>Radio</i> | Green | Off | Idle |
| | | Flash | Indicates radio is receiving a message |
| | | Solid On | TG-1 Express initializing with cellular network |
| LED #6 | Not used | | |
| LED #7 <i>Trip Input</i> | Green | Solid On | Trip input activated |
| | | Off | Trip input not active or restored |
| LED #8 <i>Power</i> | Red | Solid On | Power connected to unit |
| | | Off | Unit is not receiving adequate power and has shut down |

LED Indicator Guide – RSSI Mode

| RSSI Value | Illuminated LEDs | Signal Level |
|------------|---|--|
| NO SVC | LED 5 = slow flash, LED 4-2 = off | n/a |
| 1 | LED 5 = on, LED 4-2 = off | ≤ -111 dBm |
| 1½ | LED 5 = on, LED 4 = slow flash LED 3-2 = off | ≥ -110 dBm |
| 2 | LED 5-4 = on, LED 3-2 = off | ≥ -100 dBm (Minimum signal strength required) |
| 2½ | LED 5-4 = on, LED 3 = slow flash LED 2 = off | ≥ -90 dBm |
| 3 | LED 5-3 = on, LED 2 = off | ≥ -80 dBm |
| 3½ | LED 5-3 = on, LED 2 = slow flash | ≥ -70 dBm |
| 4 | LED 5-2 = on | ≥ -60 dBm |

Note: When LED 1 is on this indicates more than one cellular tower within range.

Troubleshooting Quick Reference Table

| Telguard Event | | LED Indication | Relay Output | Radio Message | Action |
|--|-----|---|--------------|-------------------|---|
| STC Telguard System Trouble Conditions | LPF | STC LED flashes 1 time. | Optional | Optional | Check input voltage of power supplied from the panel. |
| | NSC | STC LED flashes 4 times. | Optional | Optional | The Telguard will continue to validate signal strength, and remove NSC when signal returns. |
| | RFC | STC LED flashes 5 times. | Optional | Optional | Wait for RFC restoral. |
| | DTF | STC LED flashes 6 times. | Optional | Yes | Internal 30V supply circuit failure. Return unit for repair on RMA. |
| | PPF | STC LED flashes 7 times. | No | Yes | Wait for PPF restoral. |
| Not Activated | | Activation LED #1 off | Yes | None | Telguard will not function until unit is activated. |
| Activation Failed | | LED #1 and #4 flashing | No | None | Press RSSI button twice to clear fault. |
| Telguard Remote Query activated by Customer Service. | | Radio LED #5 long flashes during transmit | None | Yes (Status data) | Telguard will send Status data to Telguard customer service for review |
| Telguard Activation and Configuration Upload | | Radio LED #5 long flashes during transmit | None | Yes (Setup data) | Telguard sends setup configuration to the TCC and switches to READY state. |
| Disable TX - Communication Center Activated. | | Radio LED #5 long flashes when transmitting | Yes | Yes (Status data) | TX capability is disabled until further notice. |

Appendix 3 – Detailed Specifications

Dialer to Interface Electronics

- Line voltage: 30 VDC into standard telephone device when on-hook.
- Dial tone: 350 + 440Hz +/- 1%. 10 digits dial out capability.
- Mode: Loop start only. 25mA +/- 10% off-hook.
- Ringer equivalence: 0.3 REN
- Protected by U.S. Patents: 4,658,096; 4,775,997; 4,922,517; 4,737,975; 4,868,519; 5,134,644.

Digital Cellular Radio

The Telguard TG-1 Express radio provides data connectivity on LTE networks. The Telguard TG-1 Express transceiver is FCC compliant, meeting all the requirements of Part 15 and 27 testing. It is also compliant to the PTCRB requirements.

- LTE Bands: 4, 13
- Antenna Port: SMA, 50-ohm
- RF performances are compliant with 3GPP recommendation TS 36.101.
- Physical Size: 5.6"H x 2.9"W x 1.3"D.
- Shipping weight: 1.1 lbs.
- Operating Environment: 0° C to +49° C; 0 - 85% humidity (non-condensing).

Power Consumption

- 6 VDC, 30mA (idle), 90mA (transmitting)
- 12 VDC, 20mA (idle), 50mA (transmitting)
- 16 VDC, 15mA (idle), 40mA (transmitting)

Appendix 4 – Parts List

| Basic Hardware: | |
|------------------------------------|---|
| Model TG-1 Express (p/n: TG1LX002) | Model TG-1 Express (p/n: TG1LX002) is housed in a plastic enclosure with a cellular antenna. |
| General Accessories: | |
| CTXL-12 | 12 feet SMA/TNC antenna cable and mounting bracket. The CTXL-12 is required for all ACD and external antenna accessories. |
| ACD-12 | 12 feet of antenna cable and mounting bracket |
| ACD-35 | 35 feet of low loss high performance antenna cable and mounting bracket |
| ACD-50 | 50 feet of low loss high performance antenna cable and mounting bracket |
| ACD-100 | 100 feet of low loss high performance antenna cable and mounting bracket |
| HGDL-0 | High Gain Directional Antenna |
| EXDL-0 | Low profile, dual band antenna with integrated wire ground plane. |



Wirelessly Protected means that your customer's security system communicates with the alarm monitoring center using a robust and secure Telguard cellular communicator instead of a traditional landline. Wireless protection is the most reliable form of security because the communication path isn't susceptible to being cut or lost due to inclement weather.