



TELGUARD

AMETEK®

TC-1 Express

Sole Path Residential Communicator Installation & Operation



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Important Note

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

Foreword

Dealers purchase Telguard cellular communicators for the quality, features and total value they represent. The Telguard TG-1 Express cellular alarm communicator is UL and ULC 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 sole communication path.

Technical Support

Technical support for all Telguard products is available:

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 information. To report a discrepancy you find in this documentation, please send an email message to:

Customerservice.telular@ametek.com

Or, write to:

Telguard Technical Services
3225 Cumberland Blvd
Suite 300
Atlanta, GA USA 30339

Repair and Warranty

If trouble is experienced with the *Telguard Cellular Alarm Communicator* please contact Telguard Technical Support for troubleshooting, repair, and/or warranty information. The dealer or end user should not attempt any repair to the *Telguard Cellular Alarm Communicator*. Repair of this equipment should only be referred to qualified technical personnel.

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.

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.

NOTE: RMA number must be on the outside of box or product will not be accepted.

Future Testing and Limitations on Use

The Telguard TG-1 Express 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 communicator 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 inoperative 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.

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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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General Description and Operation

The Telguard® TG-1 Express is a cellular radio alarm transmission device used to provide a sole transmission path (cellular) for household alarm panels. When transmitting an alarm signal, the TG-1 Express communicator obtains its data from the alarm panel by way of the DACT interface. The communicator will obtain all alarm signal information including monitoring station phone number, account number and all zones for every alarm transmission. The communicator handshakes with the alarm panel and causes it to transmit the alarm data. The communicator encodes the alarm data and transmits it to the Telguard Communication Center (TCC) over the cellular network. The TCC performs a function similar to 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 a telco line (Public Switched Telephone Network - PSTN) or via the Internet (IP) to the desired alarm company central station for action.

In a typical alarm installation, the TG-1 Express communicator is installed in the same area as the host alarm system and is connected directly to the host alarm panel via the communicator's RJ-45 jack. Two programmable System Trouble Condition (STC) relays are available for connection to the host alarm panel's trip zone input terminals in order to provide Telguard trouble signals to the alarm panel. Additionally, automatic self-test and check status request signals are transmitted exclusively over the cellular network to the Telguard Communication Center. The communicator receives operating power from the host alarm panel (regulated 12-volt DC), and all cellular monitoring and supervisory functions are built in. No extra modules are required.

The UL Listed equipment at the Telguard Communication Center plays a key role in the operation of every Telguard device. All Telguard communicators utilize the TCC due to the panel alarm signal format encoding and decoding requirements used in packet-data transmissions over the digital cellular network. The TCC also manages the real-time databases for cellular accounts and a complete history of every communicator's operating conditions. These conditions include programming setup information, cellular alarm transmission information, supervisory trouble information, status information, and automatic self-test information.

The TG-1 Express is offered in two versions configured to work either with the AT&T or Verizon networks:

Model	Application	UL/ULC Standards
TG-1X-A (AT&T)	Sole Path Communication for Household Fire and Burglary Systems in United States and Canada	UL 985, UL 1023, ULC-S545, ULC-C1023
TG-1X-V (Verizon)	Sole Path Communication for Household Fire and Burglary Systems in United States	UL 985, UL 1023

NOTE: While working in Canada, TG-1X-A may use Rogers Wireless, Bell Mobility, Telus, or SaskTel networks.

Features

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

Operating Mode

The TG-1 Express communicator is a sole path cellular Data/SMS transmission device that is installed at the protected premises to provide alarm transmission for household fire and/or burglary alarm systems over the applicable cellular network where there is no wireline service available.

Multiple Alarm Format Support

The Telguard TG-1 Express supports multiple alarm communication formats.

NOTE: The communicator's default program setting is for auto detection of the panel alarm format.

Auto Format Detect feature allows the communicator to adapt to receive any listed format. If the alarm panel's format is changed for any reason, the communicator will adjust to accept the new format.

See Appendix 1 for a list of compatible alarm formats and compliance requirements.

Panel-Supplied Power

The Telguard TG-1 Express has an extremely low power profile, allowing it to draw on the alarm panel for power. 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 alarm system's maximum 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-4 communicator should be used, as it utilizes 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.

Another use of a SLIC is to allow STC2 to be connected through the cable to the alarm panel. Pins 3 and 6 of the RJ-45 connector can be used instead of using the connections in the terminal block.

See Appendix 1 for a wiring diagram using a SLIC for power and/or STC2.

Complete Supervision of Communication Path

The communicator continuously supervises the cellular communication path. If communication path becomes inoperative, the communicator can generate a relay trip output that can be connected to a zone input of the host alarm panel and/or used to control remote annunciation devices.

No Service Condition (NSC)

A no service condition (NSC) occurs when the communicator is unable to register with the cellular network.

NSC can be configured to trip the supervisory relay output (STC relay) after a programmable period of time. The STC LED will flash 4 times immediately after losing cellular service and dial-tone will cease to be provided, independent of the STC assertion and programmed assertion delay. NSC restoral occurs immediately after cellular service has been acquired.

Radio Communications Failure Condition (RFC)

Radio communications failure condition (RFC) occurs when the communicator is unable to transmit over the cellular network even with acceptable signal strength. When RFC is declared, the STC LED will flash 5 times, dial-tone will cease, and the STC relay will trip as programmed. Restoral of this condition occurs after 10 minutes or when a message is received from the TCC.

Panel Presence Failure (PPF)

Panel presence failure condition (PPF) occurs when the communicator is unable to detect the presence of the alarm panel. PPF is indicated by the STC LED flashing 7 times. A supervisory report is generated and sent to the TCC for Central Station delivery upon detection of PPF. Restoral of this condition occurs when the alarm panel is detected as present for the selected delay time.

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 communicator.

Complete Power Supervision

Low Power Failure (LPF)

Low Power Failure condition (LPF) is detected immediately when the DC power drops below 5.1VDC. When this condition is detected, the STC LED blinks once, the Power LED turns off, and the STC trip output is activated after a preset time (2 hours). When DC power returns to normal (≥ 5.5 VDC), the Power LED turns on immediately and the STC trip output restores after 60 seconds.

Dial Tone Failure (DTF)

The communicator provides a voltage supply and other signaling to the panel like a telephone central office. It continuously monitors the circuit that provides dial tone to the alarm panel, supplying 30VDC by default but can be configured to supply 40VDC, as needed. A Dial Tone Failure (DTF) occurs when the communicator is unable to provide proper telephone signaling to the panel (voltage supplied drops while the alarm panel is on-hook). The STC LED will flash 6 times and the STC relay will trip.

NOTE: This condition will require contacting Telguard Technical Support for resolution.

Catastrophic Failure (CF)

Catastrophic Failure (CF) is any condition that causes the communicator to stop functioning at all levels. The most common CF is a power failure event. The STC1 and STC2 trip outputs are activated and the visible indication is loss of all LED activity.

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 automatic self-test signal schedule is programmable as prescribed when the communicator is registered. 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 communicator when it processes the automatic self-test signal. This data contains current operational status (C.O.S.) of the communicator such as "All OK" or any combination of identified 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 or check status report signal was transmitted. This additional information is available by visiting portal.telguard.com (**dealer log-in credentials required**).

Telguard Check Status Capability

Although the communicator has the capability for an automatic self-test, a separate feature is provided for determining the current operational status of every Telguard communicator. This feature is called Check Status and is used to provide real-time operational status for the communicator on-demand. It is useful in resolving STC events that are reported by the alarm panel to the central station. Check Status is available via portal.telguard.com.

Check Status causes the communicator to upload current operational status data and historical data, just as the automatic self-test described above, except that the resulting status is held in the database at the TCC for review and is not forwarded on to the central station.

Programmable Supervisory Trip Output (STC) Relays

The communicator has two supervisory relay trip outputs available (STC1 normally open and STC2 normally closed). Both are energized in a powered-up state when no system troubles exist. This 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 trouble conditions that trigger the STC relays are programmable via the dealer portal: portal.telguard.com, to meet any installation requirement.

Note: If using a supervised zone to monitor for the STC relay, please make sure that you follow resistance requirements of the alarm panel for supervision. Refer to manual supplied with the panel for further guidance.

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

- Low Power Failure condition (LPF)
- No Service Condition (NSC)
- Radio Failure Condition (RFC)

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

- Dial Tone Failure (DTF): *insufficient voltage on connection to panel DACT*
- Communicator not activated at TCC: *communicator requires activation for use*
- Catastrophic Failure (CF): *all power is lost*
- Transmit Disable command received from TCC: *used when a runaway dialer situation is detected or by Customer Service, for example*

Diagnostic and Status LEDs

Seven active 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, power, and communication indicators. They can also provide a signal strength indication, similar to the signal strength bars on a cellular phone. See Appendix 2 or the installation section for details.

Complete Factory Reset Option

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

NOTE: Only attempt to do a Complete Factory Reset on an active account as a last resort because the communicator 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 communicator shows this pattern, press and hold the RSSI button. After 15 seconds of button press, the LEDs will begin to sequentially turn on and off in a cascading pattern, indicating the factory reset is taking place.
- Release the button. After the factory reset concludes, the LEDs will go back to normal status.

UL and ULC Compliance

The TG-1 Express is certified as complying with UL and ULC Standards for Household Fire and Burglary installations. The chart on Page 1 shows the associated UL and ULC Standards. Certificates of Compliance are available at portal.telguard.com.

To maintain compliance, the alarm panel must also be UL, ULC, or cUL Listed for household fire and/or burglary use as appropriate.

Getting Ready

The communicator can only be activated when all necessary accounting information has been added to the customer database located at the TCC (i.e., the communicator has been registered). The database includes information about the customer account, communicator location, and system test plan information.

Dealer Account Establishment

A Dealer Account must be established prior to registration of any Telguard communicator. This can be accomplished by visiting portal.telguard.com and completing the necessary information under "Dealer Signup". This is a one-time event and an acknowledgment from Telguard Customer Service will include a Dealer Account Number that will be used for all Telguard Digital registrations. Telguard communicators can be registered and activated once the Dealer Account has been established.

Pre-Installation Checklist

Before attempting to connect the communicator to the alarm panel, please make sure you have all the proper parts before you go to the job site. The following items are shipped with each TG-1 Express:

- Telguard Cellular Communicator
- Cellular Antenna
- Pluggable 7-position screw terminal blocks
- Quick Install Guide

NOTE: The communicator registration should be completed in advance to avoid installation delays

You must also have certain installation test tools:

- Screws and a screwdriver will be required to attach the communicator and antenna to the wall.
- To connect the STC relay outputs, trip input, or tamper to the alarm panel, solid or stranded electrical wire will be required. The terminal strips can accommodate solid or stranded wire from 16 to 22 gauge in size.
- A standard telephone or lineman's butt-set is recommended for verifying communication between the panel and the communicator.

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.

Summary

The following are steps necessary to install the communicator properly.

NOTE: IF YOU DO NOT PROCEED IN THE ORDER AND MANNER PRESCRIBED, YOU MAY NOT COMPLETE THE INSTALLATION IN THE TIME DESIRED.

These steps are summarized below and explained in detail in the remainder of this manual.

1. Register for Telguard service
2. Physically install the TG-1 Express communicator
 - Mount the communicator in desired location
 - Complete all power-related wiring connections
3. Determine antenna placement for best performance
 - Connect antenna
 - Measure Received Signal Strength (RSSI)
 - Consider other antenna options
4. Connect to Panel DACT and Activate
5. Connect supervisory trip outputs
6. Connect trip input (optional)

This installation approach provides the alarm installer with the easiest and fastest method of properly installing a TG-1 Express communicator. Please follow the instructions carefully and if you should need assistance or have any questions, please call Telguard Technical Support at 1-800-229-2326 extension 9.

NOTE: Dealer Account Establishment and Telguard Registration must be complete prior to Installation.

Step 1: Register the Telguard Communicator

Installation Tip: Register for Telguard service prior to leaving for the job site to avoid a second trip.

The registration form may be completed online through the 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 communicator 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.
- LPF: Trips two hours after low power failure is detected. Restores 60 seconds after power is restored.
- NSC: Trips after a 60-second delay (delay is programmable) on no service condition due to loss of RF signal strength. Restores after RF signal strength is available.
- RFC: Trips on radio failure to communicate with the TCC. Restores after 10 minutes.

Optional Trip Input

When the input is tripped, 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 communicator in order 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 in portal.telguard.com. The communicator will automatically be configured with a template that allows configuration of the trip input feature, including the message that is sent to the central station. If the communicator 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 communicator will resume sending trip input messages to the TCC after a 10-minute period without trip events.

Step 2: Physically Install the TG-1 Express in Desired Location

Identify Location for Placing the Communicator and Mount

It is recommended that the communicator be installed close to the alarm panel for best performance and ease of connection.

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

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

NOTE 3: The communicator's dipole antenna is designed for indoor installations only.

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 communicator to a different location is not practical, you may need to purchase an extension cable to remote the antenna in order to receive adequate radio signal strength. Choose a high, visually secure spot using the guidelines below.

Tips for Improved Radio Signal Reception

- The higher the antenna the better.
- 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, pointing either straight up or down. Do not mount the antenna horizontally.

Mount the communicator to the wall or other surface near the alarm panel. Care should be taken to avoid equipment that may make receiving a clear cellular signal difficult.

- Install mounting screw (not supplied).
- Slide the enclosure onto the screw.

Complete All Power-Related Wiring Connections

Power to the communicator is sourced from the host alarm panel 6-16VDC output. Before making connections, make sure the alarm panel's power source and battery are disconnected.

Connect the power and ground connections into the respective DC and GND connections on the TG-1 Express.

OPTION 1: 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 communicator is illuminated.

OPTION 2: To connect power to the Telguard TG-1 Express using a SLIC connection:

1. Using a standard RJ-45 to spaded lead cable (not provided), 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.

The wiring used for power and other connections on the communicator can be either solid or stranded and should adhere to the following recommendations:

<u>Recommended Wire Size</u>	<u>Length Not to Exceed</u>
22-20 ga	10 ft.
18-16 ga	20 ft.

NOTE: Do not use a plug-in adapter or other non-panel power source on the TG-1 Express.

Step 3: Determine Antenna Placement for Best Performance

Connect Antenna

The Telguard communicator is supplied with an antenna. In most cases the antenna can be mounted directly to the communicator. If necessary, the antenna may be moved to a better signal location using an extension cable and bracket accessory (not included). One or more adapters may also be needed to complete the connection of the extension cable. See Appendix 4 for all the accessories that work with the TG-1 Express.

The performance of the antenna may be affected by the wall or 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 transmit band performance.

Measure Received Signal Strength (RSSI)

Measure the received signal strength by pressing and releasing the RSSI button on the side of the communicator. This switches the LEDs to signal strength mode. If you do not obtain the recommended minimum signal strength with the antenna mounted directly to the communicator (see [LED Indicator Guide – RSSI Mode](#)), you will need to use an extension cable (not included) to locate the antenna in an area with better reception. Generally, the higher the antenna the better.

If necessary, attach the extension cable to the communicator on one end and the antenna on the other (one or more adapters may be needed), then slowly move the antenna to achieve maximum signal strength by pausing at each location for 6 seconds to allow enough time for the TG-1 Express to present an updated signal strength. Pick a spot where the most LEDs (up to four) are lit.

Consider Other Antenna Options

Antenna issues are unlikely unless the premises are located in a fringe network coverage area, in a building below ground level, or in a metal structure. Telguard offers a variety of high-quality low-loss antenna cables as well as high gain antennas. These accessories are listed in Appendix 4.

Step 4: Connect to Panel DACT and Activate

Connect alarm panel to the communicator. Plug the cable from the RJ-45 jack of the communicator to the modular jack of the alarm panel (DACT). This connection may have been made earlier if powering the communicator power is provided through the RJ-45 cable (the SLIC option).

Trip a zone on the alarm panel and confirm that the communicator enables the alarm panel to transmit alarm events over the cellular radio network. The communicator will confirm activation with the TCC if the registration form was completed prior to installation.

During processing of the first alarm signal over the cellular network, the communicator will transmit to the TCC all programming parameters along with the information (e.g., Central Station number and account code) from the alarm panel. Once this information is received, the TCC transmits a message back indicating that the communicator is activated. When this message is received the LEDs on the communicator will begin operating in normal mode and Activation LED 1 will remain on.

NOTE: The initial alarm is to confirm registration and activate the communicator. This alarm will NOT be transmitted to the central station.

Special LED Indications During Activation

If the communicator fails the activation process, it will be displayed on the LEDs.

- If LED 1 and LED 4 are flashing, the communicator 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 the communicator fails a second time to activate, check signal strength. If signal strength is OK, then call Telguard Technical Support for further assistance.

NOTE: In order to clear the faults listed above, the *RSSI* button must be pressed twice. After the issue has been resolved and the unit cleared, **STEP 4 MUST BE REPEATED TO ACHIEVE SUCCESSFUL ACTIVATION OR THE COMMUNICATOR WILL NOT TRANSMIT ANY SIGNALS.**

System Status LEDs Table:

System Status LEDs	Activation Indications
LED 1-5 FLASHING	Failed Activation – Signal Too Weak
LED 1 & LED 4 FLASHING	Activation Error – Call Telguard Technical Support
LED 1 ON	Activation Successful

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** connected to the communicator's "T" and "R" test pins to "listen" to communications between the alarm panel and the communicator.

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

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

Step 5: Connect Supervisory Trip Outputs

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

Enabling of a local alarm or strobe light may be desirable when a trip is declared. The STC trip output can be used directly to activate a local signaling device, provided that the trip output is not needed to trip the alarm panel at the same time. If both a local signaling device and an alarm panel are required, then external relays are needed to provide additional uncommitted contacts.

Reprogram Alarm Panel to Send Proper Code

If necessary, reprogram the alarm panel to send proper alarm code when tripped by the communicator's supervisory output. Program zone restoration 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 making 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 LED 3 starts to flash when the alarm panel goes off-hook to report the alarm signal over cellular.

To check for No Service Condition (NSC): Disconnect the antenna from the TG-1 Express. Check to see that the STC LED 2 flashes 4 times and if configured, alarm panel will detect the tripped STC after the selected period of time indicating loss of RF signal strength. Reconnect the antenna and check to see that the STC LED 2 goes off within the configured period indicating RF signal strength restored.

Step 6: Connect and Test the Trip Input (optional)

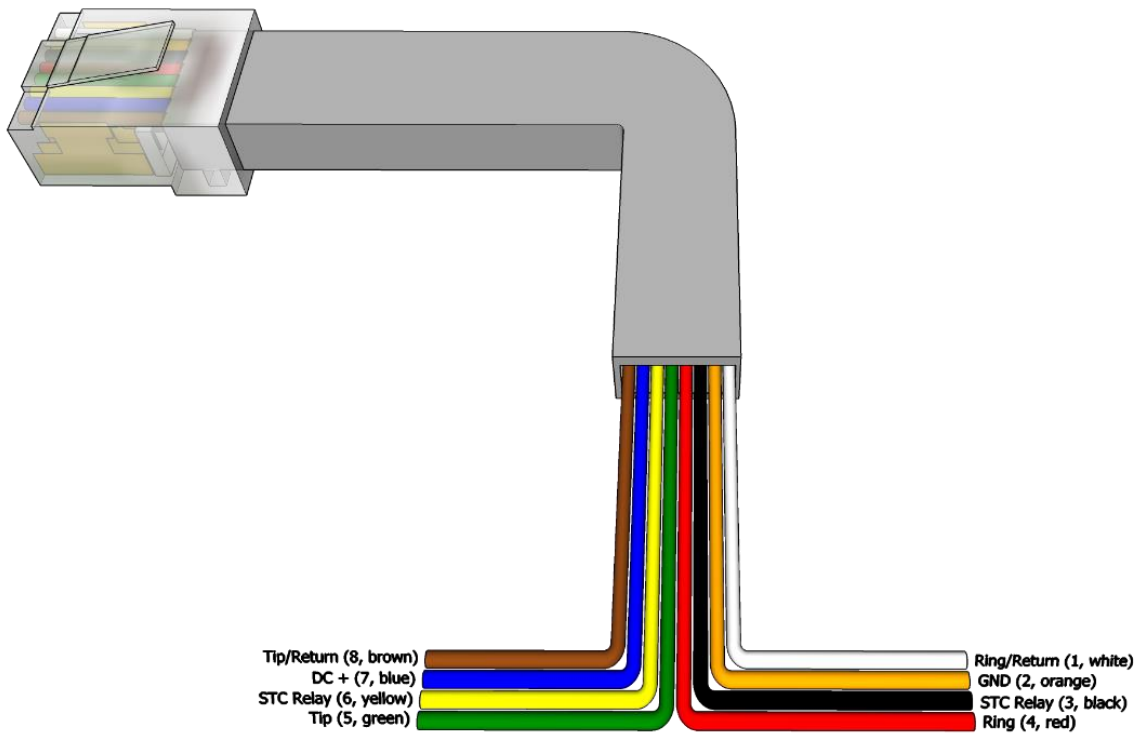
The trip input is connected to the external relay by wiring the external relay to the TRIP IN terminal (pin 5) of the terminal block, and the other side to the GND terminal (pin 6) of the block. Pin 6 also serves as the Power (-) connector when not using the SLIC option for powering the TG-1 Express.

Note that trip inputs are commonly wired such that there is a 2.2kΩ resistor in parallel with the external relay, so that a tamper condition (e.g., a cut wire) can be detected. When the trip input functionality is being used, closing the trip contact will cause the communicator to send a message to the TCC, which in turn will cause the TCC to send a message to the central station. If the communicator is configured to report restorals, the contact opening will also be reported.

Appendix 1 – Connection Guide

RJ-45 Jack

The RJ-45 cable to the alarm panel can be attached to the 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 cover of the communicator to be closed properly.



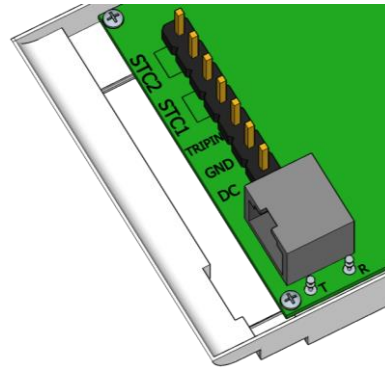
RJ-45 Pin Assignments

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

The terminal strip along the bottom on the circuit board supports seven wiring connections (see diagram at right). This is where power and relay connections can be made.

Note that power can be supplied via the RJ-45 cable (SLIC option) or via the GND and DC pins. See Installation Step 2 for more detail.



Terminal Strip Pin	Definition	Connects To	Function	Status LED Reference
1 STC2 2 STC2	Supervisory Relay Trip output for programmed trouble conditions. Normally Closed.	24-hour trip zone input on alarm panel.	Enables transmission of programmed supervisory trouble code (see diagram or installation section).	STC LED 2
3 STC1 4 STC1	Supervisory Relay Trip output for programmed trouble conditions. Normally Open.	24-hour trip zone input on alarm panel.	Enables transmission of programmed supervisory trouble code (see diagram or installation section).	STC LED 2
5 TRIP IN	Trip Input	External trip relay OR to panel for HomeControl Flex.	Allows an external relay to trigger an alarm signal or can be used for HCF.	
6 GND 7 PWR	DC Power Input from panel	Alarm panel DC auxiliary power source	Primary power source for TG-1 Express	LED 7

Compatible Alarm Panels

Any UL/ULC/cUL Listed alarm panel that supports one of the formats listed below is compatible and may be used with the TG-1 Express communicator:

In order for the alarm panel to be compatible with the communicator, the alarm 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, 1400 Hz ack
 - 3+1 pulse; 20pps, Double Round, 2300 Hz ack
 - 3+1 pulse; 40pps, Double Round, 2300 Hz ack
 - 4+2 pulse; 20pps, Double Round, 1400 Hz ack
 - 4+2 pulse; 20pps, Double Round, 2300 Hz ack
 - 4+2 pulse; 40pps, Double Round, 2300 Hz ack
- Contact ID
- Modem IIe/IIIa²/4
- SIA2 (SIA-DC-03 level 2 release at 300 baud)
- Sonitrol
- DMP

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

Appendix 2 – Troubleshooting Guide

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

LED Indicator Guide – Normal Operating Mode

LED Symbol	Color	Showing	Indication
LED 1 Activation	Green	Solid On	Unit is activated at the TCC and enabled
		Off	Unit not activated at TCC (and disabled)
		Flash*	Unit is disabled
LED 2 STC (System Trouble Condition)	Red	Off	ALL OK
		1 Flash*	System Trouble Condition – LPF Low Power Failure
		2 Flashes*	NOT APPLICABLE
		3 Flashes*	NOT APPLICABLE
		4 Flashes*	System Trouble Condition – NSC No Service
		5 Flashes*	System Trouble Condition – RFC Radio Failure
		6 Flashes*	System Trouble Condition – DTF Dial Tone Failure
		7 Flashes*	System Trouble Condition – PPF Panel Presence Fail
LED 3	Yellow	Off	Alarm panel idle (communicator on-hook)
		Flash* (1 sec)	Alarm panel off-hook to transmit signals over cellular
LED 4 Acknowledgement	Red	Solid On	Device waiting for acknowledgement from the TCC
		Off	Idle state
		Flash*	When flashing with LED 1, unit has failed activation. CALL TELGUARD TECHNICAL SUPPORT
LED 5 Radio	Green	Off	Communicator initialized
		On	Communicator initializing with cellular network
		Flash (1 sec)	Radio receiving message
		Flash (2 sec)	Radio sending message
LED 6	Not used		
LED 7 Trip Input	Green	Solid On	Trip Input activated
		Off	Trip Input not activated or is restored
LED 8 Power	Red	Solid On	Sufficient DC power connected to unit

*** LED will continuously flash a sequence of all conditions that apply.**

LED Indicator Guide – RSSI Mode

This communicator has a Received Signal Strength Indication (RSSI) Mode that works similarly to the bars on a cellular telephone. LEDs 2 through 5 will illuminate to represent the quality of the connection: the more LEDs illuminated (i.e., the higher the number of bars), the better.

To enter RSSI mode, press the RSSI button on the circuit board. A simple press and release of the button will place the communicator in RSSI mode and another simple press will exit RSSI mode. Note that while the RSSI button is held in, LEDs 2-5 will blink in unison once per second.

RSSI Value	LED's Lighted	RF dBm
NO SVC	LED 5 = slow flash, LEDs 4-2 = off	N/A
1	LED 5 = on, LEDs 4-2 = off	≤ -111
1½	LED 5 = on, LED 4 = slow flash, LEDs 3-2 = off	≥ -110
2	LEDs 5-4 = on, LEDs 3-2 = off	≥ -100 (Min. recommended)
2½	LEDs 5-4 = on, LED 3 = slow flash, LED 2 = off	≥ -90
3	LEDs 5-3 = on, LED 2 = off	≥ -80
3½	LEDs 5-3 = on, LED 2 = slow flash	≥ -70
4	LEDs 5-2 = on	≥ -60

NOTE: When LED 1 is on in RSSI mode, it indicates more than one cellular tower within range.

Troubleshooting Quick Reference Table

Communicator Event		LED Indication	Relay Output	Radio Message	Internal Action
STC * (System Trouble Conditions)	LPF	STC LED 2 flashes continuously 1 time . PWR LED 8 is off.	Optional	Optional	Verify connection from panel auxilliary power and correct.
	NSC	STC LED 2 flashes continuously 4 times .	Optional	None	Continue to validate signal strength, NSC will restore when signal returns.
	RFC	STC LED 2 flashes continuously 5 times .	Optional	None	Wait for RFC restoral.
	DTF	STC LED 2 flashes continuously 6 times .	Yes	Yes	Internal dial tone voltage supply circuit failure.
	PPF	STC LED 2 flashes continuously 7 times .	No	Yes	Wait for PPF restoral.
Not Activated		Activation LED 1 off .	Yes	None	Communicator will not function until the first signal is sent to the TCC to activate it.
Telguard Check Status		Radio LED 5 flashes during transmit.	None	Yes (Status data)	Send Status data to the TCC for review.
Communicator Enable and Configuration Update		Radio LED 5 flashes during transmit.	None	Configuration Data	Communicator sends setup configuration to the TCC then switches to READY state.
Disable TX (Initiated by TCC)		Radio LED 5 flashes when transmitting.	Yes	Yes (Status data)	Transmit capability is disabled indefinitely. Radio signals can be received from the TCC.

*** If several trouble conditions are present, the STC LED will flash all applicable indications in sequence.**

Appendix 3 – Detailed Specifications

Dialer to Interface Electronics

The integrated interface by Telguard allows digital dialers to dial into the cellular radio network.

- Line voltage: -30 VDC into standard telephone device when on-hook.
- Dial tone: Precision 350 + 440Hz +/- 1%. 10 digits dial out capability.
- Mode: Loop start only. 25mA +/- 10% off-hook.

Power

Regulated Input Voltage (Power Limited)	Current Draw	
	Idle	Max during Transmission
6 VDC	40mA	500mA
12VDC	20mA	250mA
16VDC	15mA	180mA

Digital Cellular Radio and Other Specifications

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

- TG-1X-A (AT&T service) Supported Bands: 2, 4, 12
- TG-1X-V (Verizon service) Supported Bands: 4, 13
- FCC ID: XMR2020BG95M1
- IC ID: N/A
- Antenna Port: SMA connector (female), 50-ohm
- RF performances are compliant with 3GPP recommendation TS 36.101
- Physical Size: 5.6 x 2.9 x 1.3 inches (exclusive of antenna)
- Shipping weight: 1.1 lbs.
- Operating Environment: 0° C to +49° C; 0 - 85% humidity (non-condensing)

Appendix 4 – Accessories

P/N	Description
CTXL-12	12 feet SMA/TNC antenna cable and mounting bracket. <i>The CTXL-12 is required for all antenna accessories with the TG-1 Express</i>
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	External Omni-Directional Antenna