

TELGUARD® DIGITAL

TG-1

RESIDENTIAL PRIMARY CELLULAR
ALARM COMMUNICATOR

INSTALLATION AND OPERATING
INSTRUCTIONS



COMPANY CONFIDENTIAL
For use by TELGUARD® customers only.
Distribution to other parties strictly
prohibited.

August 17, 2017



TELGUARD

Important Note

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

Foreword

Dealers purchase Telguard® cellular communicators for the quality, features and total value they represent. The Telguard TG-1 model (part #s TG1LA002B) is UL Listed for Household Burglary systems, Household Fire systems, Commercial Burglary and depending on the model, Commercial Fire systems. The Telguard TG-1 model may be used in Household Burglary systems, Household Fire systems or combined Household Burglary & Fire systems as the primary communication path.

Technical Support

Technical support for all Telguard products is available:

Monday-Saturday 8am-8pm ET

Toll Free: 800-229-2326, option 9

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

Repair and Warranty

If you experience trouble with the *Telguard Cellular Alarm Communicator* please contact Telguard Technical Support for trouble shooting, 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@telguard.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 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 unit 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.

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 your 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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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.

Table of Contents

Important Note	i
Foreword	i
Table of Contents	iv
General Description and Operation	1
Features	2
<i>Operating Mode</i>	2
<i>Multiple Alarm Format Support</i>	2
<i>Complete Supervision of Communication Path</i>	2
<i>Complete Power Supervision</i>	3
<i>Telguard Automatic Self-test Report</i>	4
<i>Telguard Remote Query Capability</i>	4
<i>Programmable Supervisory Trip Output (STC) Relays</i>	4
<i>Diagnostic and Status LEDs</i>	4
<i>Optional DC Operation (12VDC)</i>	5
<i>Complete Factory Reset Option</i>	5
<i>UL and ULC Listings</i>	5
Getting Ready	6
<i>Dealer Account Establishment</i>	6
<i>Pre-Installation Checklist</i>	6
Installation	7
<i>Summary</i>	7
<i>Step 1: Register the Telguard Unit</i>	7
<i>Step 2: Locate Unit and Measure Signal Strength (RSSI)</i>	8
<i>Step 3: Program, Activate & Transmit Alarms over Cellular Network</i>	10
<i>Step 4: Connect Supervisory Trip Outputs</i>	11
<i>Step 5: Connect and Test the Trip Input (optional)</i>	12
<i>Step 6: Complete the Telguard Installation</i>	12
Appendix 1 - Connection Guide	13
<i>Wiring Diagrams</i>	13
<i>Jack Assignments</i>	14

<i>Main Terminal Strip Pin Assignments</i>	14
<i>DC Terminal Strip Pin Assignments</i>	14
<i>A/C Terminal Strip Pin Assignments</i>	14
<i>Compatible Alarm Panels</i>	15
Appendix 2 - Troubleshooting Guide	16
<i>LED Indicator Guide - Normal Operating Mode</i>	16
<i>LED Indicator Guide - RSSI Mode</i>	17
<i>Troubleshooting Quick Reference Table</i>	18
Appendix 3 - Detailed Specifications	19
<i>Dialer to Interface Electronics</i>	19
<i>Power</i>	19
<i>Digital Cellular Radio</i>	19
Appendix 4 - Accessories	20

General Description and Operation

The Telguard® TG-1 (Part # TG1LA002B) 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 obtains its data from the Household 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 causing it to transmit the alarm data. The Telguard encodes the alarm data and transmits to the Telguard Communication Center (TCC) over the digital 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 to the appropriate alarm company monitoring station for action.

In a typical alarm installation, the Telguard is installed in the same area as the Household alarm panel and is connected directly to the Household alarm panel via Telguard's RJ-45 jack. Two programmable System Trouble Condition (STC) relays provide supervisory trip outputs for connection to the alarm panel's trip zone input terminals in order to provide a Telguard trouble signal to the alarm panel. Additionally, automatic self-test and remote query signals are transmitted exclusively over the cellular network with all Telco line and cellular monitoring, switching and supervisory functions built in. No extra modules are required. The Telguard has its own power supply which keeps the Telguard battery charged.

The UL Listed equipment at the TCC plays a key role in the operation of every Telguard. All Telguards 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 Telguard's operating conditions. These conditions include programming setup information, cellular alarm transmission information, supervisory trouble information, remote query information, and automatic self-test information.

Features

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

Operating Mode

The Telguard is a digital cellular Data/SMS transmission device that is installed at the protected premises to provide alarm transmission for security systems.

Multiple Alarm Format Support

The Telguard TG-1 supports multiple alarm communication formats.

Note: The Telguard unit's default program setting is for auto detection of the panel alarm format.

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

In order for the alarm panel to be compatible with the Telguard, 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)
- 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).

Complete Supervision of Communication Path

The Telguard TG-1 continuously supervises the cellular communication path. If the cellular communication path becomes inoperative, the Telguard generates 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)

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

NSC is programmable to trip the supervisory relay output (STC relay) after a variable period of time. The STC LED will flash 4 times immediately after losing cellular service and 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) is declared when the Telguard is unable to transmit over the cellular network even with acceptable signal strength.

When RFC is declared, the STC LED will flash 5 times and the STC relay will trip. Restoral of this condition occurs when a message is received from the TCC.

Panel Presence Failure (PPF)

Panel presence failure condition (PPF) is declared when the Telguard 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. In order 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.

Complete Power Supervision

The Telguard supervises and reports status of the backup battery and AC power source. The Telguard has an integrated control and power module which also keeps the Telguard battery charged. This battery charger function is also supervised.

Low/Missing Battery Condition (LBC)

The Telguard checks the backup battery voltage on initial power-up and every 60 seconds thereafter. If the battery voltage is less than 11.6 volts, it changes from 'good' to 'bad' state and a LBC is declared whereby the STC LED blinks twice, and the STC relay trips. When the battery voltage increases to 12.1 volts, the STC LED and STC relay restore. The Telguard also indicates Low/missing Battery Condition (LBC) when the battery charger fails.

AC Failure Condition (ACFC)

AC failure condition (ACFC) is detected immediately when the AC power drops below 102 VAC. When this condition is detected, the STC LED blinks once, the AC Power LED turns off, and the STC trip output is activated after 2 hours. When AC power returns to normal (≥ 106 VAC), the AC Power LED turns on immediately and the STC trip output restores after 60 seconds.

Note: If the Telguard is being powered through its DC connection, a Low Power Failure (LPF) will occur if the DC power drops below 5.1VDC and restore after reaching >5.6 VDC. LPF will present itself in the same manner as the ACFC.

Dial Tone Failure (DTF)

The Telguard continuously monitors the 30V supply circuit that provides dial tone to the alarm panel. A Dial Tone Failure (DTF) is declared when the 30V supply drops to 20V or less while the alarm panel is on-hook. The STC LED will flash 6 times and the STC relay can be programmed to trip.

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

Catastrophic Failure (CF)

Catastrophic Failure (CF) is any condition that causes the Telguard to stop functioning at all levels. The most common CF is AC power failure followed by a complete discharge of the backup battery. The STC1 and STC2 trip outputs are activated and the visible indication is loss of all LED activity. Total loss of power to the Telguard does not prevent transmission of alarm messages from the alarm panel "through" the Telguard and out over an operative phone line.

Telguard Automatic Self-test Report

The automatic self-test signal is programmed to a daily, weekly or monthly schedule as prescribed when the Telguard 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 Telguard when it processes the automatic self-test signal. This data contains current operational status (COS) of the Telguard such as "All OK", "AC fail condition", "low/missing battery condition", or any combination of these 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 remote query report signal was transmitted. This data includes the number of occurrences of AC fail conditions, low battery conditions, line fault conditions, communications failure conditions and no cellular service conditions. This additional information is available by contacting Telguard Technical Support or by visiting www.telguard.com (dealer log-in credentials required).

Telguard Remote Query Capability

Although the Telguard has the capability for a daily, weekly, or monthly automatic 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 the Telguard on-demand. It is useful in resolving STC events that are reported by the alarm panel to the central station. The Remote Query is available via www.telguard.com. The Remote Query causes the 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 TCC for review and is not forwarded on to the central station.

Programmable Supervisory Trip Output (STC) Relays

The Telguard 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. 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 STC relays are programmable, using a standard touch-tone telephone (or butt-set) or during registration on www.telguard.com, to meet virtually any installation requirement.

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

- Trips on AC fail condition (ACFC)
- Trips on low or missing battery condition (LBC)
- Trips on no service condition (NSC)
- Trips on radio failure condition (RFC)
- Trips on dial tone failure (DTF)

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

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

Diagnostic and Status LEDs

Six 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, AC power, and communication

indicators. They can also be used to provide a signal strength indication, similar to the signal strength bars on a cellular phone. See the installation section for details.

Optional DC Operation (12VDC)

The Telguard can be operated solely by DC Power Source (for example, power coming from an alarm panel's auxiliary 12V output). This will eliminate the need for a separate AC outlet at the protected premises. Connect the panel power to DC Input and ground on the Telguard and the Telguard will operate normally. The Telguard's operational range is 6.2V - 16V DC.

Note: When using DC power, the Telguard should not be connected to a battery or AC power source. Because there is no AC connection, the AC LED will be OFF when operating in DC mode. Battery will not charge on DC power.

Complete Factory Reset Option

A special function within the Telguard allows you to perform a complete Factory Reset on the unit. This reset will change all unit settings back to a factory default configuration.

Note: Never attempt to do a Complete Factory Reset on an active account.

To begin the factory reset, wait for the unit to initialize and 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 that the factory reset is taking place. After the unit resets, the LEDs will go back to normal status (deactivated, factory default configuration).

UL and ULC Listings

The Telguard meets the requirements for all Household Burglary and Household Fire installations.

Note: The alarm panel must also be UL or ULC Listed for the appropriate categories above.

Getting Ready

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

Dealer Account Establishment

A Dealer Account must be established prior to registration of any Telguard unit. This can be accomplished by visiting www.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. Telguards are available for registration and activation once the Dealer Account has been established.

Pre-Installation Checklist

Before attempting to connect the Telguard 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 Telguard:

- Telguard Cellular Communicator
- UL Listed plug-in transformer
- Cellular Antenna
- Rechargeable 12V battery
- Pluggable screw terminal blocks (2, 3 & 6 position)
- Quick Install Guide
- Registration Form

Note: The Telguard registration must 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 Telguard to the wall.
- In order to connect the STC relay outputs and trip input to the alarm panel, solid or stranded electrical wire will be required. The terminal strips can accommodate solid or stranded wire from 14 to 22 gauge in size.
- A standard telephone or lineman's butt-set is recommended for verifying communication between the panel and the Telguard.

Installation

Summary

The following are steps necessary to install the Telguard 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. Locate unit and measure signal strength
3. Activate and transmit alarm panel alarm messages over cellular connection
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 a Telguard. 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 (see Section 3).

Step 1: Register the Telguard Unit

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 our 24/7 dealer portal www.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.
- ACFC: Trips 2 hours (programmable for up to 24 hours) after loss of AC power. Restores 60 seconds after AC power is restored.
- LBC: Trips within 60 seconds on low battery condition. Restores when battery voltage ≥ 12.1 vdc.
- NSC: Trips after specified delay time (determined by POTS programming value 852) 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
- DTF: Trips on an internal failure in the dial tone circuitry within the Telguard

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 Telguard unit 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 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 with the butt-set 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.

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

Temporarily place the Telguard unit near the alarm panel. Permanent mounting should only be done after determining the optimum cellular reception location.

Connect Power

Option 1: Backup Battery and AC Power Transformer

To apply power to the Telguard, attach a battery to the battery connector jack using the supplied battery cable. If the need for a different size cable arises, the Telguard provides an alternate screw-in terminal connection for the battery. Backup battery must be sized appropriately to meet installation requirements.

Connect the Telguard AC power transformer (see A3.2 for acceptable UL Listed transformers) to AC terminals using stranded copper insulated wire following wire gauge and length recommendations below:

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

Option 2: DC Power

To apply DC power to Telguard from a host alarm panel, connect the panel power and ground connections into the respective DC and GND connections on the Telguard. When using this option, no other power connections (battery or AC) should be wired.

Connect Antenna and Temporarily Place Unit

The Telguard unit is supplied with an antenna. In most cases the antenna can be mounted directly to the unit. If necessary, the antenna may be moved to a better signal location using optional cable and bracket accessories. 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.

Do not install the Telguard 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's antenna near other electronic devices.

NOTE 3: The Telguard's 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 to a different location is not practical, you may need to get an extension cable and remote the antenna in order to receive adequate radio signal strength. Pick a high, visually secure spot using the guidelines below.

Tips for Improved Radio Signal Reception

- The higher the antenna the better. Start in the drop ceiling above the unit and proceed from there, up 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.

Measure Received Signal Strength (RSSI) for Best Antenna Placement

Measure the received signal strength by pressing the RSSI button. This switches the LEDs to signal strength mode. Now, slowly move the unit or remote antenna to achieve maximum signal strength. Pick a spot where the most LEDs (up to four) are illuminated.

LED Function Table - View RSSI Mode (RSSI button)

RSSI Value	Illuminated LEDs	RF dBm
NO SVC	LED 5 = slow flash, LED 4-2	n/a
1	LED 5 = on, LED 4-2 = off	≤ -111
1½	LED 5 = on, LED 4 = slow LED 3-2 = off	≥ -110
2	LED 5-4 = on, LED 3-2 =	≥ -100 (<i>Minimum acceptable signal</i>)
2½	LED 5-4 = on, LED 3 = slow LED 2 = off	≥ -90
3	LED 5-3 = on, LED 2 = off	≥ -80
3½	LED 5-3 = on, LED 2 = slow	≥ -70
4	LED 5-2 = on	≥ -60

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

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

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 listed in Appendix 6.

Step 3: Program, Activate & Transmit Alarms over Cellular Network

Confirm that the Telguard enables the alarm panel to transmit alarm events over the cellular radio network. The Telguard will confirm activation with the TCC if the registration form was submitted prior to installation. Make sure that there is no Telco connection for the panel to use, and trip a zone on the alarm panel. During processing of the first alarm signal over the cellular network the Telguard will transmit all programming parameters 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 indicating that the unit is activated. Once this message is received the LEDs on the unit will begin operating in normal mode; Activation LED 1 will be on.

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

Special LED Indications during Activation

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

- If LED 1 and LED 4 are flashing, the Telguard 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 Telguard 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, STEPS 3 AND 4 MUST BE REPEATED OR THE TELGUARD 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

System Trouble Condition, STC (LED 2) Table

Status LED 2	Indication
1 FLASH	ACFC - A/C Low or Missing
2 FLASH	LBC - Low Battery and/or Battery Charger Failure
3 FLASH	LFC - Line Fault

4 FLASH	NSC - No Service
5 FLASH	RFC - Radio Failure
6 FLASH	DTF - Dial Tone Failure
7 FLASH	PPF - Panel Presence Failure

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

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 transmission. Also, check antenna connector and make sure it is seated correctly.
- **Call Telguard Technical Support, 1-800-229-2326 option 9.**

Step 4: 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 host control/communicator at the same time. If both a local signal and a control trip input 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 Telguard's supervisory output. Program zone restoral 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.

- **Low Battery Condition (LBC):** Disconnect the battery and during the next 60 seconds check to see that the STC LED 2 flashes 2 times indicating that the battery is missing. Check to see that the alarm panel indicates the STC trouble code on the STC LED. Reconnect the battery and check during the next 60 seconds to see that the STC LED 2 goes off, indicating the missing battery condition has been restored.
- **No Service Condition (NSC):** Disconnect the antenna from the Telguard. Check to see that the STC LED 2 flashes 4 times and in 60 seconds and the alarm panel transmits the STC trouble code over the Telco line indicating loss of RF signal strength. Reconnect the antenna and check to see that the STC LED 2 goes off within 30/60 seconds indicating RF signal strength resorted.
- **AC Fail Condition (ACFC):** Disconnect the 12VAC, 10VA transformer and check to see that the AC POWER LED goes out and the STC LED 2 flashes once indicating that AC power is missing. Reconnect the AC transformer and check to see that the AC POWER LED goes on and the STC LED 2 goes off indicating that AC power has been restored. No transmissions will be sent to the central station. The AC power must be off, continuously, for 2 hours before the STC relay causes the alarm panel to send a trouble code.

Step 5: 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 6) of the terminal block, and the other side to either the TRIP GND terminal of the same block (pin 5) or to the chassis ground on the Telguard circuit board.

Note that trip inputs are normally wired such that there is a 2.2k Ω resistor in parallel with the external relay, 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 to send a message to the TCC, which in turn will cause the TCC to send a message to the central station. If the Telguard is configured to report restorals, the contact opening will also be reported.

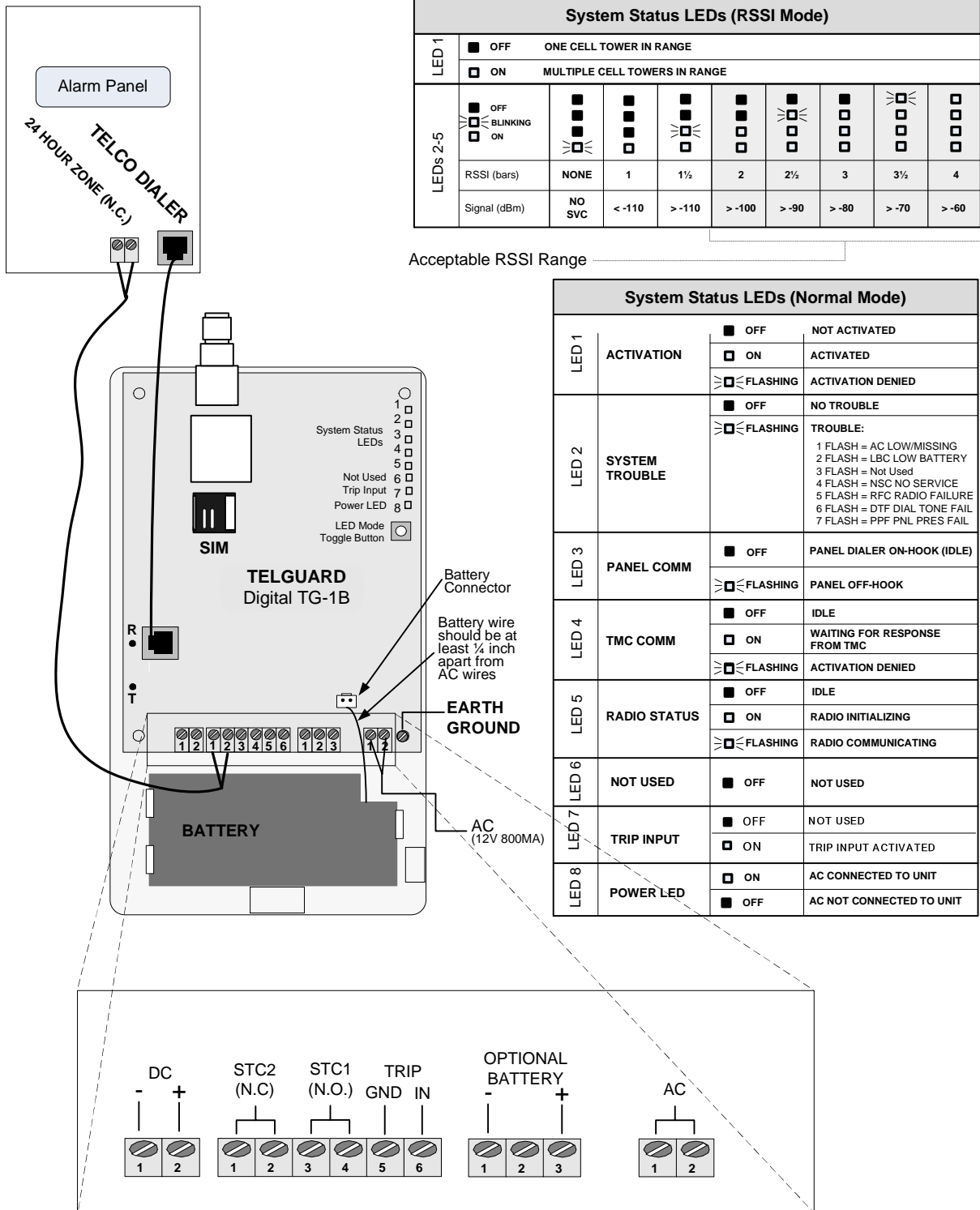
Step 6: Complete the Telguard Installation

The last step is to permanently mount the Telguard.

1. Attach earth ground to the grounding screw located on lower right-hand corner of printed circuit board assembly and permanently mount the Telguard enclosure.
2. Install mounting screws.
3. Slide the enclosure onto these screws.
4. Close the enclosure door and lock it

Appendix 1 - Connection Guide

Wiring Diagrams



Jack Assignments

Jack	Connects To	Pin Assignment	Function	Status LED Reference
Black (J13)	Digital Dialer input/output of host alarm panel.	1 = Brown R1 2 = Blue 4 = Green R (Ring) 5 = Red T (Tip) 7 = Orange 8 = Gray T1	Connects alarm panel to the Telguard for transmitting alarms to central station.	If PPF is ENABLED, STC LED 2 will flash 7 times when alarm panel is not detected and PPF enabled.

Main Terminal Strip Pin Assignments

Terminal Strip Pin	Definition	Connects To	Function	Status LED Reference
1 STC2 2 STC2	Supervisory Relay Trip output for programmable 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 programmable 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 GND	Trip Ground	External trip relay.	Allows an external relay to trigger an alarm signal.	
6 IN	Trip Input	External trip relay.	Allows an external relay to trigger an alarm signal.	

DC Terminal Strip Pin Assignments

Terminal Strip Pin	Definition	Connects To	Function	Note
1 GND 2 DC	DC Power input	12VDC Power Source	Powers up the unit	DC power up should not be paired up with AC or battery connections.

A/C Terminal Strip Pin Assignments

Terminal Strip Pin	Definition	Connects To	Function	Status LED Reference
1 AC 2 AC	AC power input. 12 VAC 10VA.	120 VAC 60Hz un-switched circuit.	Provides primary operational power to the Telguard and battery charging circuit.	AC Power LED ON when AC is normal. AC power LED OFF And STC LED 2 Flashes 1 time when AC is low.

Compatible Alarm Panels

Any UL Listed alarm panel that supports one of the following formats is compatible and may be used with the Telguard:

- 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)
- DMP

The installer should verify compatibility at the time of installation.

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 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 message center and enabled
		Off	Unit not activated at message center (and disabled)
		Flash*	Unit is disabled
LED 2 STC (System Trouble Condition)	Red	Off	ALL OK
		1 Flash*	System Trouble Condition - Low/Missing AC Power
		2 Flashes*	System Trouble Condition - Low/Missing Battery Condition AND/OR Battery Charger Failure
		3 Flashes*	Unused
		4 Flashes*	System Trouble Condition - NSC
		5 Flashes*	System Trouble Condition - RFC
		6 Flashes*	System Trouble Condition - DTF
		7 Flashes*	System Trouble Condition - PPF
LED 3 MODE	Yellow	Off	Alarm panel idle (Telguard is primary or Sole Path)
		Flash *(1 sec)	Alarm panel off-hook to transmit signals over cellular.
		On	Unused
LED 4 Acknowledgement	Red	Solid On	The Telguard is waiting for acknowledgement from the TCC
		Off	Idle state
		Flash*	When flashing with LED 1, unit has failed activation due to the programming of the panel, CALL TELGUARD TECHNICAL SUPPORT
LED 5 Radio	Green	Off	Telguard initialized
		On	Telguard 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 restored
LED 8 AC Power	Red	Solid On	AC power connected to unit

Note: * means that the LED will continuously flash.

LED Indicator Guide - RSSI Mode

RSSI Value	LED's Lighted	RF dBm
NO SVC	LED 5 = slow flash, LED 4-2 = off	n/a
1	LED 5 = on, LED 4-2 = off	≤ -111
1½	LED 5 = on, LED 4 = slow flash LED 3-2 = off	≥ -110
2	LED 5-4 = on, LED 3-2 = off	≥ -100 (Minimum acceptable signal strength)
2½	LED 5-4 = on, LED 3 = slow flash LED 2 = off	≥ -90
3	LED 5-3 = on, LED 2 = off	≥ -80
3½	LED 5-3 = on, LED 2 = slow flash	≥ -70
4	LED 5-2 = on	≥ -60

Troubleshooting Quick Reference Table

Telguard Event		LED Indication	Relay Output	Radio Message	Internal Action
STC Telguard System Trouble Conditions	ACFC	AC LED off. STC LED 2 flashes continuously 1 time.	Optional	None	Switch to standby battery if present, monitor battery, monitor AC for restoral.
	LBC	STC LED 2 flashes cont. 2 times.	Optional	None	Wait for LBC restoral, charge battery.
	NSC	STC LED 2 flashes cont. 4 times.	Optional	None	Continue to validate signal strength, NSC will restore when signal returns.
	RFC	STC LED 2 flashes cont. 5 times.	Optional	None	Wait for RFC restoral.
	DTF - Dial Tone Failure	STC LED 2 flashes cont. 6 times.	Yes	Yes	Internal 30V supply circuit failure.
	PPF	STC LED 2 flashes cont. 7 times.	No	Yes	Wait for PPF restoral.
Not Activated		Activation LED 1 off.	Yes	None	The Telguard will not function until the first signal is sent through the Telguard to activate the unit
Automatic Self-Test		Radio LED 5 flashes during transmit.	None	Yes (Self-test)	Send Self-test information to central station via TCC, return to ready state.
Telguard Remote Query - Communication Center Activated by Customer Service.		Radio LED 5 flashes during transmit.	None	Yes (Status data)	Send Status data to the TCC for review customer service.
Telguard Enable and Configuration Upload -		Radio LED 5 flashes during transmit.	None	Configuration Data (Setup data)	The Telguard sends setup configuration to the TCC and switches to READY state to begin operation.
Disable TX - Communication Center initiated.		Radio LED 5 flashes when transmitting.	Yes	Yes (Status data)	TX capability is disabled until further notice. The Telguard can still receive radio signals from the TCC.

Note: If several trouble conditions are present, the STC LED will flash all of the indications in sequence.

Appendix 3 – Detailed Specifications

Dialer to Interface Electronics

The patented 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.
- 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.

Power

- Maximum AC current draw:
 - 125mA (battery charged)
 - 350mA (battery charging)
- Battery Supply:
 - Maximum full charge DC voltage = 13.8V +/- 0.2V.
 - Battery charging system: Constant current, Electronic short circuit protection
 - Maximum charging current of 240mA
- Transformer Supplied: 12 VAC 10VA, UL, plug-in; acceptable transformers:
 - GlobTek part number: WA1E800J00-N-GTGTAB
 - Tri-Mag part number: WTD-1208-C
- Average DC Current Draw:
 - 6.2VDC 64mA (idle), 265mA (transmitting)
 - 12VDC 34mA (idle), 121mA (transmitting)
 - 16VDC 28mA (idle), 117mA (transmitting)

Digital Cellular Radio

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

- Supported Bands: 3G B2/B5, LTE B2/B4/B5/B17
- Antenna Port: TNC connector (female), 50-ohm
- RF performances are compliant with 3GPP recommendation TS 36.101
- FCC ID: N7NHL7688
- IC ID: 2417C-HL7688
- Physical Size: 11.4" x 7.75" x 3.3"
- Shipping weight: 5 lbs.
- Operating Environment: 0° C to +49° C; 0 - 85% humidity (non-condensing)

Appendix 4 – 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	External Omni-Directional Antenna