



TELGUARD

Telguard TG-7 CDMA Series Installation and Operating Guide

(TG-7 CDMA, TG-7A CDMA, TG-7FS CDMA, and TG-KIT CDMA)



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Distribution to other parties strictly prohibited.

September 15, 2014



Important Note

The registration form must be completed before leaving for the job site to install the Telguard product.

There are two ways to register a Telguard:

- Register online at www.TelguardOnline.com (preferred method),
- Send the electronic registration form at www.telguard.com

Foreword

Dealers purchase Telguard® cellular communicators for the quality, features and total value they represent. The Telguard TG-7 models (p/n TG7V0004, TG7VFS04, TG7VA004, and TGKITV04) are UL Listed for Household Burglary systems, Household Fire systems, Commercial Burglary and depending on the model, Commercial Fire systems. The Telguard TG-7 models may be used in Household Burglary/Fire systems and Retail or Commercial Burglary/Fire systems as the sole, primary or secondary 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 SE
Suite 300
Atlanta, GA USA 30339
Fax: 678-945-1651

Repair and Warranty

If trouble is experienced 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. Telguard is not responsible for incidental or consequential damages. Liability is limited to the 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-7 CDMA Series 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 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 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.

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General Description and Operation

The Telguard® TG-7 CDMA Series is a line of digital cellular radio alarm transmission devices used to provide the following three methods of communications for alarm panels via a cellular network:

- **Sole** path (*Cellular Transmission Only*)
- **Primary** path (*Cellular Primary & Telco Backup*)
- **Back-up** path (*Telco Primary & Cellular Backup*)

Depending on the TG-7 CDMA Series and configuration (determined at time of installation), the alarm panel will use the PSTN line or cellular as sole, primary or back-up (secondary) transmission path to deliver alarm messages. When it is configured as a backup, it will provide transparent access from the alarm panel to the central station. When transmitting an alarm signal using the cellular path, the Telguard obtains its data from the alarm panel by way of a Telco line 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 cellular back up alarm installation, the incoming Telco line is connected from the premises' RJ-31x jack to the Telguard and then from the Telguard's RJ-45 jack to the alarm panel in the normal fashion. 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 TG-7 CDMA Series 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 Telguard units 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.

The TG-7 CDMA Series is offered in several models designed and configured to meet various applications and UL requirements as listed below.

MODEL	APPLICATION	UL LISTINGS
TG-7 CDMA (Standard)	Commercial, Industrial, Retail & Financial Markets	UL 365, UL 985, UL 1023, UL 1610
TG-7A CDMA (Attack Resistant Enclosure)	Retail & Financial Markets	UL 365, UL 985, UL 1023, UL 1610, and UL Bank, Safe & Vault applications
TG-7FS CDMA (Commercial Fire)	Fire Systems	UL 365, UL 985, UL 1023, UL 1610, and UL 864
TG-KIT CDMA (Board Upgrade Kit)	All listed above	UL 365, UL 985, UL 1023, UL 1610, and UL 864 (TG-7FS installations) and UL Bank, Safe & Vault applications (TG-7A installations).

Features

This section summarizes the key features of the Telguard TG-7 CDMA Series.

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. The Telguard TG-7 CDMA Series transmits alarm signals over the nationwide digital cellular network if the telephone line or data network has been disrupted, compromised or when there is no wire line service available.

Multiple Alarm Format Support

The Telguard TG-7 CDMA Series 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; 10pps, 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 or IIIa²
- 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 IIe or IIIa² (4 or 10 digits for Contact ID, 4 digits for Modem IIe or IIIa²).

Complete Supervision of Communication Path

The Telguard TG-7 CDMA Series continuously supervises both the Telco and cellular communication paths. If either 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.

Line Fault Condition (LFC)

The Telguard monitors voltage on the incoming Telco line. If an inoperative Telco line is identified, (voltage below -20vdc, on hook) a Telco line fault condition (LFC) is declared. The System Trouble Condition LED (STC LED) will flash 3 times and the STC relay will trip after a programmable period of time. Upon Telco restoral, the relay and STC LED are returned to normal.

NOTE: When the Telguard is configured as the Sole communications path, the Line Fault Condition (LFC) is disabled.

No Service Condition (NSC)

The Telguard declares a no service condition (NSC) when 1 of the following occurs.

- The Telguard device is unable to register with the cellular network.
- The Telguard device has registered with the cellular network and the measured "receive" cellular radio signal strength at the protected premises drops to -114 dBm or less.

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. NSC restoral occurs immediately after cellular service has been acquired.

Radio 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. RFC is indicated by the STC LED flashing 5 times. RFC is cleared when communication with the TCC is restored.

Panel Presence Failure Condition (PPFC)

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

NOTE: The factory default for PPFC is Disabled and needs to be Enabled for its use.

Control Failure to Communicate (CFC)

The Control Failure to Communicate (CFC) feature is an option that allows the Telguard unit to monitor the number of communication attempts the alarm panel makes over Telco before the Telguard becomes the main path of communication. This feature works by monitoring the alarm panel from the time it goes off-hook, and attempts to communicate, to on-hook status, and comes off-hook again. Each change in state by the alarm panel from off-hook to on-hook to off-hook again is considered an attempt. If this continually happens for a specified number of times within a specific time period, then the Telguard seizes the line and takes over as the main communication path for the alarm panel. If the Telguard goes into CFC, then it will not allow the panel to communicate via Telco again until the panel has been on-hook for 10 consecutive minutes.

Note that the CFC condition causes the Telguard to redirect communications to the cellular channel, but it is not indicated on the STC LED, nor does it cause either of the external relays to be tripped.

NOTE: The factory default for CFC is Disabled and needs to be Enabled for its use. When the TG7 CDMA Series is configured as the Sole Path, the CFC function is not applicable.

Link Supervision and Standard Line Security

In some high security commercial burglary applications, the communication path needs to be monitored periodically. TG-7 CDMA models support those applications when Link Supervision feature is enabled. When this feature is enabled, TG-7 CDMA models also meet the requirements for Standard Line Security (equivalent to previously known AA Grade security) when used with a UL Listed compatible alarm panel. Once the TG-7 CDMA model is provisioned with the Link Supervision option, the TCC constantly monitors the cellular path and sends a specific message to the central station if the path is broken or a compromise attempt is made. After the initial account activation is done, the installer must verify the Link Supervision by turning off the device and making sure an alarm with the specific code is delivered.

WARNING: Standard Line Security has only been evaluated between the TG-7 CDMA Series and the TCC. It is the responsibility of the installer to verify Standard Line Security from the Listed alarm panel to the Listed receiver through the TG-7 CDMA models as marked on the alarm panel and as indicated in the manufacturer's installation instructions.

Please note that Link Supervision is supported by all TG-7 CDMA models. However, only the TG-7FS CDMA has the UL Listing for Commercial Fire applications.

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.

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. If power is connected properly to the unit when a CF occurs, please contact Telguard Technical Support for resolution.

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 (C.O.S.) 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.TelguardOnline.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.TelguardOnline.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.TelguardOnline.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 line fault condition (LFC)
- 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.

Complete Factory Reset Option

A special function within the TG-7 CDMA Series allows you to perform a complete Factory Reset on the unit. This reset will change all unit settings back to a defaulted configuration as well as remove the network provisioning that may have taken place.

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 reset has concluded, the LEDs will go back to normal (deactivated, factory-defaulted) status and the unit will attempt cellular provisioning.

Note: Cellular provisioning will fail every time unless the unit is registered and pending activation (status can be verified via www.TelguardOnline.com).

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.TelguardOnline.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 units are available for registration and activation once the Dealer Account has been established.

Subscriber Account Registration

A completed Registration Form is required by Telguard to register the Telguard prior to leaving for the job site.

There are two ways to register a Telguard:

- Register online at www.TelguardOnline.com (preferred method)
- Email the electronic registration form at www.telguard.com

Service registration is available 24/7 using TelguardOnline. Email requests take 30 minutes after receipt of the registration form during Telguard business hours. The subscriber record will be created and the Telguard device will be ready for activation. Activation occurs automatically upon transmission of the first alarm signal.

Note: During high traffic periods, some cellular network providers may experience a delay in activation for up to 30 minutes. It is important that you register the Telguard device prior to leaving for the job site to ensure that the TG-7 CDMA Series is fully functional when installed.

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
- 9 inch dipole Antenna
- 12-foot antenna cable with mounting bracket
- 7 foot RJ 45 plug-to-plug cord
- 20-inch battery cable assembly with connector plug
- Enclosure key lock
- Pluggable screw terminal blocks (2,3,6 position)
- Quick Install Guide
- Registration Form
- Tamper switch (applicable to TG-7A CDMA)

Note: The Telguard registration must be completed in advance to avoid installation delays

You must also have certain installation test tools:

- A standard telephone or lineman's butt-set is required for programming the Telguard.
- Screws and a screwdriver will be required to attach the Telguard and antenna 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.

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. Transmit an alarm over the Telco connection
4. Program, activate and transmit alarm panel alarm messages over cellular connection
5. Connect supervisory trip outputs
6. Connect trip input (optional)
7. Complete installation

Note: Step 3 not necessary for Sole Path installations.

This seven 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.

Step 1: Register the Telguard Unit

There are two ways to register a Telguard:

- Register online at www.TelguardOnline.com (preferred method),
- Send the electronic registration form at www.telguard.com,

Note: During high traffic periods, some cellular network providers may experience a delay in activation for up to 30 minutes. It is important that you register the Telguard device prior to leaving for the job site to ensure that the TG-7 CDMA Series is fully functional when installed.

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 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 (3-pin terminal block labeled BATT - +). Backup battery must be sized appropriately to meet installation requirements.

Connect the Telguard AC power transformer (see A5 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

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 unit's antenna near other electronic devices.

NOTE 3: The Telguard unit's dipole 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 = 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
2½	LED 5-4 = on, LED 3 = slow flash LED 2 = off	≥ -90 dBm (<i>Minimum signal strength with Telco</i>)
3	LED 5-3 = on, LED 2 = off	≥ -80 dBm (<i>Minimum signal strength as Sole Path</i>)
3½	LED 5-3 = on, LED 2 = slow flash	≥ -70 dBm
4	LED 5-2 = on	≥ -60 dBm

If you cannot obtain a signal strength reading of 2½ (TWO LEDS ON SOLID AND THE THIRD LED ON SLOW FLASH), 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: Verify Panel sends alarms over the Telco Connection for Back-up Path

Connect alarm panel and Telco line to the Telguard. Plug the modular jack of the alarm panel into J16 (black jack) of the Telguard and the incoming Telco connection into J17 (gray jack). Trip a zone on the alarm panel and transmit over the Telco line. This step is important to verify the panel is programmed with a valid account code and central station information before transmitting signals through the cellular network.

Step 4: Program, Activate & Transmit Alarms over Cellular Network

When first powered on, the Telguard will attempt to get provisioned by the CDMA network. During this process, LED #5 will go into a fast flashing pattern, which could last up to 60 seconds. Confirm the Telguard has been provisioned by the CDMA network by verifying LED #5 is off. If instead of turning off, LED #5 begins to slow flash, the provisioning process has failed.

Installation Tip: To reattempt the Cellular provisioning, press and hold the RSSI button for five seconds until you see the fast flashing pattern on LED #5. If the unit continues to fail provisioning, call Telguard Technical Support.

After the unit is provisioned by the Cellular network, the unit can activate. The Telguard unit will confirm activation with the Telguard Communication Center if the registration form was submitted prior to installation. During the processing of the first alarm signal over the cellular network the Telguard will transmit all of 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 indicating that the unit is activated. Once this message is received the LED'S on the unit will begin operating in normal mode; LED #1 will be on solid.

The first alarm is to confirm registration and activate the Telguard unit. The first 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	PPFC – Panel Presence Failure Condition

Setup & Programming the Operating Parameters in the Telguard

When the Telguard is received from the factory and is powered up for the first time, it is ready for installation, provided the default settings are what you want. The STC LED 2 will flash to indicate any failure conditions. The yellow LED 3 will be on (Telco primary) and both of the STC relays will be tripped. If changes are required to the default settings, the Telguard can be locally programmed using a line-mans butt-set connected to T & R Test Points or a POTS phone connected to J16 (where the alarm panel is normally connected).

Command Key Sequences for POTS Programming Table

Key Sequence	Description
### *	Enters the programming Mode
#*	Begins programming
*	Saves and stores changes

Telguard Programming Steps

1. Make sure the Telguard has finished initialization and is idle.
2. Connect a POTS phone or lineman's butt set on the alarm panel jack (J16).
3. Take the POTS phone off hook or put the butt set in talk mode. You should hear dial tone.
4. Dial ###*, and you should hear two (2) beeps.
5. Dial #*, and you should hear two (2) beeps.
6. Dial the memory location number (8XX) to be changed; you should hear two (2) beeps.
7. Enter the data value; you should hear two (2) beeps.
8. After the last data value is entered, dial *; you should hear two (2) beeps. Hang up to terminate POTS session.

Mem Loc.	Field	Default Value	Setting
831	Mode of operation	01	1 = Telco Primary/Cellular Backup 2 = Cellular Primary/Telco Backup 3 = Cell ONLY (Sole Service, no Telco hook-up)
833	C/C Reporting Format	09	01 = 4x2 pulse, 40pps 2300 hz 02 = 4x2 pulse, 20pps 2300 hz 03 = 4x2 pulse, 10pps 1400 hz 04 = 3x1 pulse, 40pps, 2300 hz 05 = 3x1 pulse, 20pps, 2300 hz 06 = 3x1 pulse, 10pps, 1400 hz 07 = Modem IIe or IIIa ² 08 = Contact ID 09 = Auto Format Detect 10 = Sonitrol 11 = SIA2 (300 Baud) 12 = DMP
845	Manual Battery Test	N/A	Initiates the on-demand battery test.
850	STC1 Trip Output Reporting Normally Open	04(only LFC)	Enter the SUM TOTAL of the events that you wish to trip the STC relay by ADDING the corresponding values: 00 = STC Trip Input Not Used 01 = AC Failure 08 = NSC 63 = ALL 02 = Low Battery 16 = RFC 04 = LFC 32 = DTF
851	STC2 Trip Output Reporting Normally Open	59(All but LFC)	Enter the SUM TOTAL of the events that you wish to trip the STC relay by ADDING the corresponding values: 00 = STC Trip Input Not Used 01 = AC Failure 08 = NSC 63 = ALL 02 = Low Battery 16 = RFC 04 = LFC 32 = DTF
852	STC Trip Delay for NSC/LFC* *LFC delay can only be 30/60 seconds	2	1=30 seconds* 6=30 minutes 2=60 seconds* 7=45 minutes 3=3 minutes 8=60 minutes 4=10 minutes 9=24 hours 5=20 minutes
858	STC History	N/A	0 = terminate STC history display mode 1 = start STC history display mode 2 = clear STC history
861	CFC Number of Events	0	0 = disabled 2 = 4 attempts 1 = 2 attempts 3 = 8 attempts
862	CFC Between Events	1	1 = 30 seconds 3 = 70 seconds 5 = 90 seconds 2 = 60 seconds 4 = 80 seconds 6 = 99 seconds
868	PPFC Delay	0	0 = disabled , 1 = 10 seconds, 2=20 seconds, ... 15=150 seconds
872	AC Failure Delay	02	0-24 hours, default = 2 hours

Mem Loc.	Field	Default Value	Setting
873	Trip Input Reporting	0	0 = no report 1 = report trip
874	Trip Input Restoral Reporting	0	0 = no report 1 = report restoral
875	Trip Input Swinger Function	0	0 = swinger function disabled 1 = swinger function enabled
899	Factory Default Unit	N/A	Resets all settings to factory defaults.

Example:

To change the Telguard factory default for STC 1 Trip Output reporting from only LFC to include all system trouble conditions the installer would perform steps 1-5 from the Telguard Programming Steps listed above.

Then press 850, the Telguard will respond with 1 beep, then press 63, the Telguard will respond with 2 beeps, then press *, you will hear 2 beeps then hang up (this will change STC 1 trip output to report all system trouble conditions). The Telguard will automatically transmit a message to update the Telguard Communication Center.

Notice to Users, Installers, Authorities having Jurisdiction, and other involved parties:

This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL864, the following programming settings must be limited to specific values or not used as indicated below.

Memory Location	Permitted in UL 864? (Y/N)	Possible Settings	Settings Permitted by UL
852 STC Trip Delay for NSC/LFC* *LFC delay can only be 30/60 seconds	Yes	1=30 seconds 2=60 seconds* 3=3 minutes 4=10 minutes 5=20 minutes 6=30 minutes 7=45 minutes 8=60 minutes 9=24 hours	1=30 seconds 2=60 seconds 3=3minutes
872 AC Failure Delay	Yes	0 – Immediate 1 – 24 : from 1 Hour to 24 hours	1 – 1 Hour 2 - 2 Hours 3 – 3 Hours

Verify Alarm Signal Transmissions over Cellular

Before beginning this step, make sure that the Telco line from the TG-7 CDMA jack J17 (gray connector) that goes to the RJ-31x Jack at the premise for Back-up Communication is disconnected.

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 = 2½ (TWO LEDS ON SOLID AND THE THIRD LED FLASHING)** 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 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.

NOTE: UL Listed installation of the TG-7 CDMA Series will at a minimum have the trip output to the alarm panel to indicate low A/C (ACFC) and low battery (LBC) conditions.

Decide on a STC Trip Output Strategy

The Telguard provides the alarm panel with two supervisory trip outputs for reporting a Telguard system trouble code to the central station. The supervisory trip outputs are programmable via a touch-tone telephone or butt-set 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 \geq 12.1 VDC.
- **LFC:** Trips after 60 seconds on Telco line fault condition. Restores 60 seconds after Telco line restores.
- **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 TG-7 CDMA.

Use the butt-set programming instructions outlined in the previous step to program the STC trip output strategy.

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, however, an alarm/event will only be transmitted if the STC is being monitored by an available zone in the panel.

- **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.
- **Line Fault Condition (LFC):** Disconnect Telco cable at J17. LED 2 flashes 3 times and after 60 seconds the STC relay goes active indicating the incoming Telco line is disconnected. Check to see that the alarm's supervising zone detects the STC relay going active. Reconnect Telco cable and check to see that the STC LED 2 goes off in 30/60-seconds indicating Telco line restored.
- **No Service Condition (NSC):** Disconnect the antenna from the Telguard. Check to see that the STC LED 2 flashes 4 times and that the STC relay went active in the programmed period of time (default is 60 seconds) indicating loss of RF signal strength. Check to see that the alarm panel's supervising zone detects the STC relay going active. Reconnect the antenna and check to see that the STC LED 2 goes off within 30/60 seconds indicating RF signal strength resorted.

Note: The Received Signal Strength (RSSI) must be less than -114 dBm in order to cause a NSC condition. If the Telguard is located in a high signal strength area (close to a cellular tower), it is possible for the signal strength to be greater than -114 dBm even with the antenna disconnected.

- **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 goes active and causes the alarm panel's supervising zone to send a trouble code.

Verify the STC History

The POTS command 858 was designed to display STC history for troubleshooting purposes. This feature increases in-field efficiency by eliminating the need for installers to call Telguard for STC report data.

To access the STC history, enter the POTS programming mode as described in Step 4 above. Enter the POTS command 858, and wait for the confirmation tone (2 beeps). Enter "1" to start the history display. The STC LED will light for 3 seconds, and then each STC in the history log will be displayed as a series of flashes of the STC LED. At the end of the history, the STC LED will again light for 3 seconds, denoting the end of the history log. After the STC history is displayed, the STC LED will return to normal operation. To cancel the history playback at any time, use the POTS command 858 with a parameter value of "0".

The STC history log can be cleared by using the POTS command 858 with a parameter value of "2". The STC history log is also cleared when the Telguard is reset or power cycled.

Step 6: 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. When the input is tripped, an alarm 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 in order to provide independent sensor input for other functions, such as tamper detection.

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 2.2kΩ resistor in parallel with the external relay, so that a tamper condition (i.e. a cut wire) can be detected.

The functionality of the trip input can be customized at installation time using an ordinary phone set or a lineman's butt-set, in a similar manner to other Telguard programming options. The relevant POTS programming commands are:

Mem Loc.	Field	Default	Setting
873	Trip Input Reporting	0	0 = no report 1 = report trip
874	Trip Input Restoral Reporting	0	0 = no report 1 = report restoral
875	Trip Input Swinger Function	0	0 = swinger function disabled 1 = swinger function enabled

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.

The message that is sent from the TCC to the central station is configurable in Telguard Online, or by a Telguard Customer Service Representative. 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.

UL NOTE: For UL installations, burglary zones shall not be connected to the Trip Input.

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 will resume sending trip input messages to the TCC after a 10 minute period without trip events.

Step 7: 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

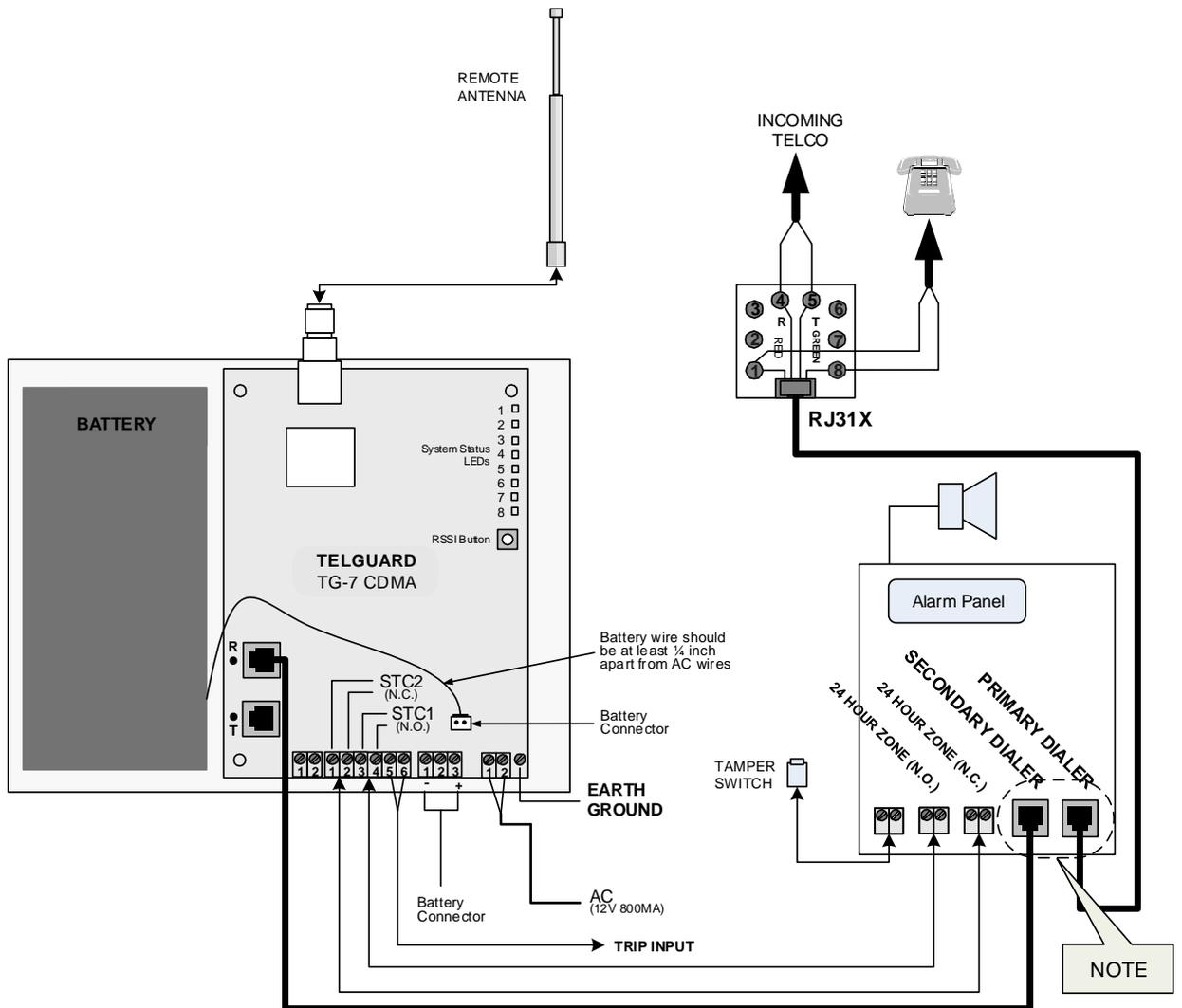
Wiring Diagrams

The following wiring diagrams are for the Telguard TG-7 CDMS Series used for:

- **Back-up** path (*Telco Primary & Cellular Back-up*)
- **Primary** path (*Cellular Primary & Telco Back-up*)
- **Sole** path (*Cellular Transmission Only*)

Scheme 1: Telco Connection through the Alarm Panel (Backup or Primary Mode)

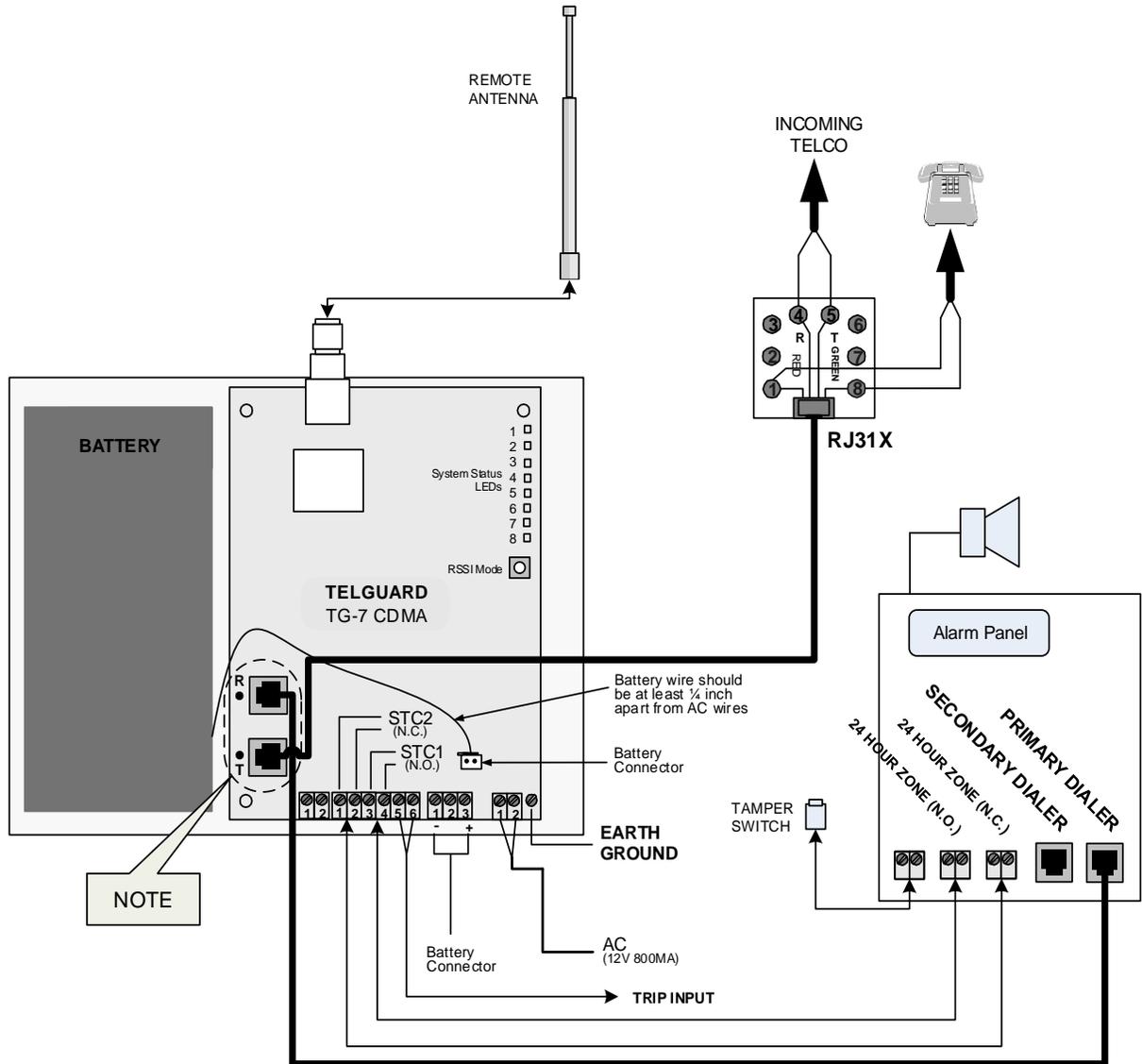
Used when the TG-7 CDMA unit is working in a system that involves a Telco connection. In this case, both the Telco and the TG-7 CDMA connections are being monitored by the Alarm Panel. It is the alarm panel that makes the decision of which communication path to use for signal delivery.



NOTE: When using this scheme, the use of the primary or secondary dialer to connect to Telco is what determines whether the TG-7 CDMA is meant to work as a back-up or primary communicator.

Scheme 2: Telco Connection through the Telguard (Backup or Primary Mode)

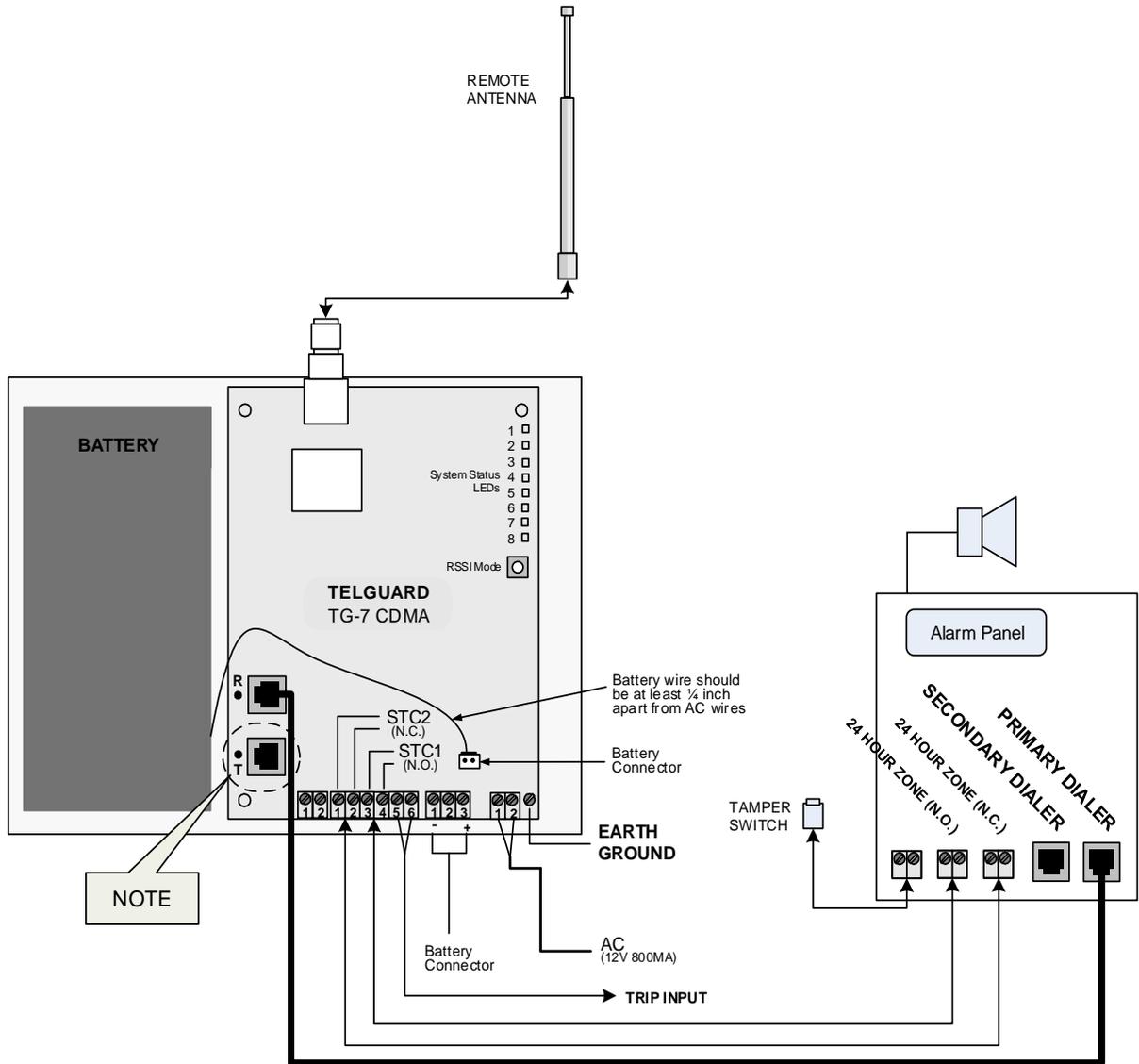
Used when the TG-7 CDMA unit is working in a system that involves a Telco connection. In this case, the Telco is connected through the Telguard unit, and it is the TG-7 CDMA that monitors the Telco and cellular connection. It is the TG-7 CDMA that makes the decision of which communication path to use for signal delivery.



NOTE: When using this scheme, the programming of the TG-7 CDMA is what determines whether the TG-7 CDMA is meant to work as a back-up or primary communicator.

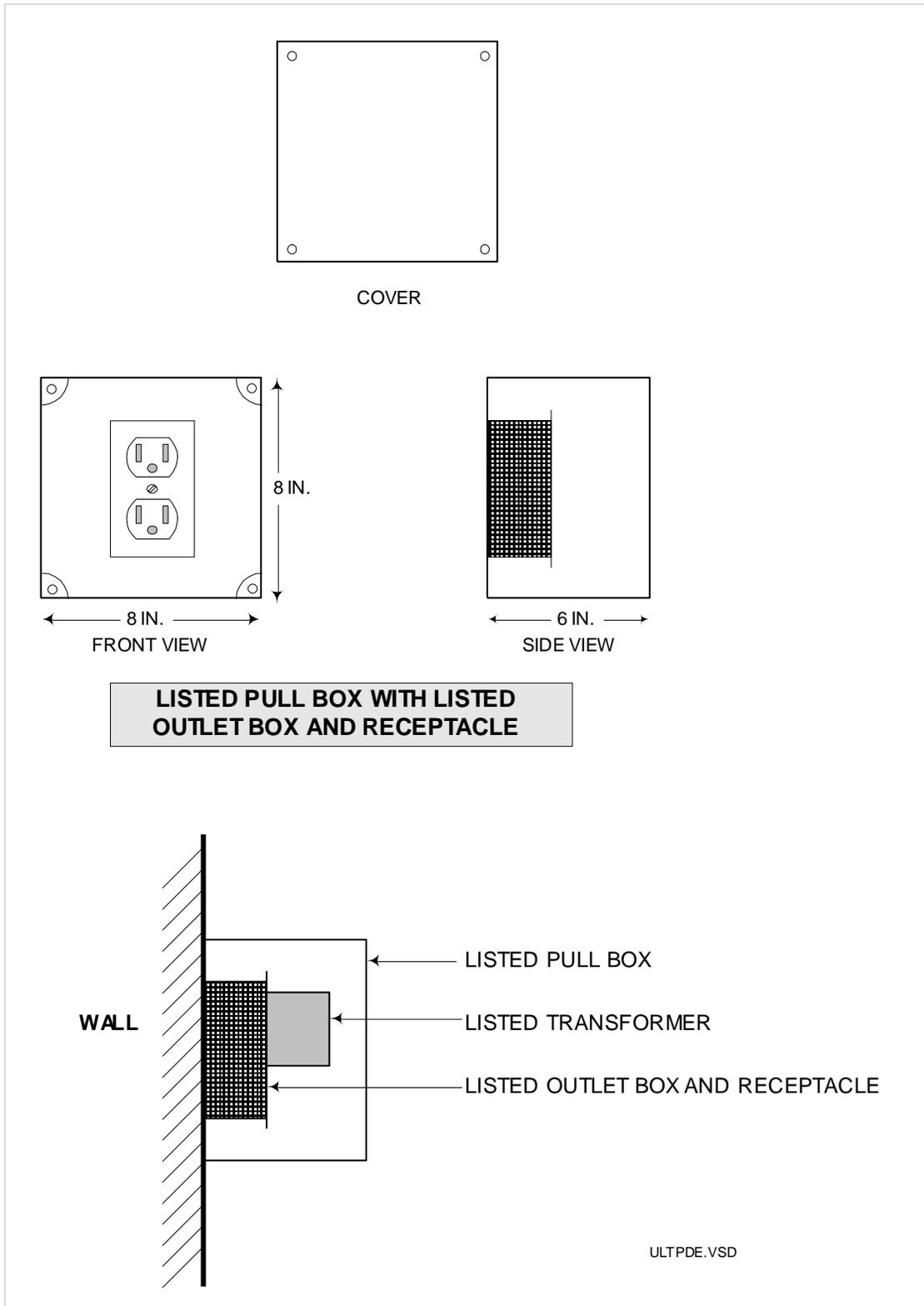
Scheme 3: No Telco connection (Cellular Only Mode)

Used when the TG-7 unit is working in a system that does not involve a Telco connection. In this case, the Alarm Panel is connected directly to the TG-7, and there is no other connection for communication.



NOTE: Since there is no Telco connection, there is a single connection for communication—between the Alarm Panel and the TG-7 CDMA.

Installation Using Conduit



Jack Assignments

Jack	Connects To	Pin Assignment	Function	Status LED Reference
J17 (Gray)	Incoming Telco RJ-45 jack.	1 = Brown R1 2 = Blue 4 = Green R (Ring) 5 = Red T (Tip) 7 = Orange 8 = Gray T1	Connects Telco line to TG-7 CDMA Series.	STC LED 2 will flash 3 times when Telco voltage is lost.
J16 (Black)	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 TG-7 CDMA Series for transmitting alarms to central station.	If PPFC 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 PWR	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	NOT used	NOT used	These pins are not used in TG-7 CDMA models.

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 TG-7 CDMA Series:

- 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; 10pps, 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 or IIIa²
- SIA2 (SIA-DC-03 level 2 release at 300 baud)
- Sonitrol
- 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 TCC and enabled
		Off	Unit not activated at TCC (and disabled)
		Flash*	Unit is disabled / Activation failed
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*	System Trouble Condition – LFC
		4 Flashes*	System Trouble Condition – NSC
		5 Flashes*	System Trouble Condition – RFC
		6 Flashes*	System Trouble Condition – DTF
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	Alarm panel idle (Telguard is backup)
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	Idle, properly provisioned by the CDMA network
		Fast Flash (½ sec)	CDMA network provisioning in progress
		Slow Flash (2 sec)	If repeating indicates CDMA network provisioning is required, otherwise indicates radio is receiving a message
		Long Flash (3-6 sec)	Radio sending message
		Flash (2 flashes every 6 sec.)	Link Supervision Mode
		Solid On	Telguard initializing
LED 6	Not used		
LED 7	Not used		
LED 8 AC Power	Red	Solid On	AC power connected to unit
		Off	AC power not connected. Unit may be receiving DC power from panel or running on battery.

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 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
2½	LED 5-4 = on, LED 3 = slow flash LED 2 = off	≥ -90 dBm (Minimum signal strength required when Telco is involved)
3	LED 5-3 = on, LED 2 = off	≥ -80 dBm (Minimum signal strength when used as a Sole Path)
3½	LED 5-3 = on, LED 2 = slow flash	≥ -70 dBm
4	LED 5-2 = on	≥ -60 dBm

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.
	LFC	STC LED 2 flashes cont. 3 times .	Optional	None	Transmit alarm via radio if necessary. When Telco is restored, remove LFC condition.
	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. Return unit for repair on RMA.
	PPFC	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 it is activated	
Activation Failed	LED 1 and LED 4 flashing.	No	None	Press RSSI button twice to clear fault and verify registration.	
CDMA Network provisioning failed	LED 5 flashing slowly.	No	None	Press and hold RSSI button for 5 seconds to restart provisioning.	
Automatic Self-Test	Radio LED 5 flashes on transmit.	None	Yes (Self-test)	Send Self-test information to central station via TCC, return to ready state.	
Telguard Remote Query (Activated by Customer Service)	Radio LED 5 flashes on transmit.	None	Yes (Status data)	Send Status data to the TCC for review customer service.	
Telguard Enable and Configuration Upload	Radio LED 5 flashes on transmit.	None	Configuration Data	The Telguard sends setup configuration to the TCC and switches to READY state to begin operation.	
Disable TX (TCC initiated)	Radio LED 5 flashes on transmit.	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 – Commercial Fire Sole Path Communicator Installation

The 2010 edition of NFPA 72 allows the TG-7FS to be utilized as the sole path for fire communications. By following Telguard's installation guidelines, the installer can provide the best conditions for a stable, sole path connection. In order to ensure that the cellular path to be used for signaling has the highest reliability possible, it is necessary to confirm two additional conditions, beyond what is outlined in the TG-7 Installation Guide.

Configuring the TG-7FS

1. Insure Optimal Signal Strength

Installation instructions for the Telguard TG-7 Series indicate that a signal strength of -90dBm is sufficient. While this is suitable for "normal" use, i.e. daily, weekly or monthly supervision, an additional level of signal integrity will minimize the false alarms supervision failures caused by interference and atmospheric fading. Because of this, a signal strength of -80dBm, as indicated by at least 3 illuminated LEDs (LEDs 3, 4 and 5), is the recommended minimum for TG-7FS units installed as sole path communicators.

2. Configure as Cell-Only

By default, the TG-7FS is configured as Telco Primary with Cellular Backup. If the unit is being used as Cell-only (with the telco jack unused) then registration through www.TelguardOnline.com will force mode of operation into Cell-Only Mode. If a device needs to be reprogrammed locally, the POTS command interface should be used to set the mode of operation (memory location 831) to Cell Only (value 3), by performing the following steps:

1. Connect a POTS phone to J16
2. Dial "****", listen for two beeps
3. Dial "**", listen for two beeps
4. Dial "831", and listen for two beeps
5. Dial 3, and listen for two beeps
6. Dial "**", listen for two beeps and then hang up.

To provide optimal signal conditions to the Telguard communicator, it may be necessary to boost the signal strength by installing an external antenna. Telguard provides a variety of antenna options as accessories; consult your local distributor for more information.

Configuring a Sole Path at the Panel

Fire panels are typically provided with two Telco connections, in order to provide multiple reporting paths. With the TG-7FS configured as a sole path communicator, one of these Telco connections is no longer necessary for UL 864 compliance. However, the panel will continue to supervise that line unless changes are made at installation time.

There are two methods for removing supervision alarms at the panel caused by disconnecting the second Telco connection. **Either method can be used.**

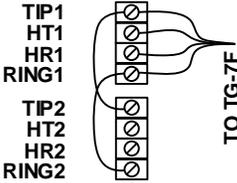
1. Disabling the Second Telco Connection

Most fire panels have a configuration mechanism to disable the second Telco connection. Once the second Telco connection is disabled, the panel will no longer supervise the connection. **This is the preferred method of removing supervision alarms** at the panel caused by removal of the second Telco connection.

2. Connecting the Telco Connections Together

The Telguard communicator is capable of providing dial tone to both Telco connections, if the Telco connections are connected together, such that "TIP" is connected to "TIP", and "RING" is connected to "RING". The two

connections will receive dial tone in much the same way that multiple extensions in a household are connected together. **If this method is used, the installer must take care to ensure that dual path reporting is not enabled on the panel,** or else simultaneous alarm reports from the two Telco connections may interfere with each other.



Appendix 4 – Compliance for UL Listed Installations

UL Installation Requirements Summary

Household Burglary	Household Fire	Household Burg/Fire Combination	Central Station Burg	Central Station Burg	Police Connect Burg Grade A	Bank, Safe and Vault	Commercial Fire	Commercial Fire & Central Station Burg	
TG-7 CDMA	TG-7 CDMA, TG7FS CDMA	TG-7 CDMA, TG-7FS CDMA	TG-7A CDMA	TG-7A CDMA	TG-7A CDMA	TG-7A CDMA	TG-7FS CDMA	TG-7A CDMA	Telguard Model
O	O	O	Y	Y	Y	Y+	O	Y	UL Listed Bell and Bell Housing **
O	O	O	O	O	O	Y	Y	Y	AC transformer lines in flexible conduit.
Y	Y	Y	Y	Y	Y	Y	Y	Y	AC transformer plugged into un-switched outlet.
O	O	O	O	O	O	Y	Y	Y	AC transformer plugged into dedicated branch circuit.
-	-	-	N	N	N	N	N	N	PBX connection to RJ31X jack.
O	O	O	Y	Y	Y	Y	O	Y	Enclosure Tamper Switch connected to 24-hour circuit.
O	O	O	O	Y	Y	Y	Y	Y	Antenna cable in flexible conduit concealed or covered by motion detector.
O	O	O	Y	Y	Y	Y	O	Y	Attack resistant enclosure (APC-32S).
24 hrs. Use 7ah.	24 hrs. Use 7ah.	24 hrs. Use 7ah.	24 hrs. Use 7ah.	24 hrs. Use 7ah.	24 hrs. Use 7ah.	72 hrs. Use 7ah	24 hrs. Use 7ah.	24 hrs Use 7ah.	12V. Battery backup requirement.

* Must be connected to alarm panel UL Listed for Bank and Vault

** Use Mercantile Listed bell and bell housing

O=Optional (Not Required)

Y=Yes (Required)

N=No (Not Allowed)

Appendix 5 – 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.
- 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:
 - Hon-Kwang part number: A12083CEC
 - GlobTek part number: WA1E800J00-N-GTG TAB
 - Tri-Mag part number: WTD-1208-C
- Average DC current draw:
 - 6.2VDC: 73mA (idle), 100mA (Link Supervision enabled), 450mA (transmitting)
 - 12VDC: 46mA (idle), 61mA (Link Supervision enabled), 250mA (transmitting)
 - 16VDC: 36mA (idle), 50mA (Link Supervision enabled), 240mA (transmitting)

Digital Cellular Radio

The Telguard TG-7 CDMA Series is a wireless device that supports CDMA.

- Frequency range:
 - 850MHz Cellular band
 - 1900MHz PCS band
- Antenna Port: TNC connector (female), 50-ohm
- Receiver Sensitivity:
 - Cellular band -107dBm
 - PCS band -107 dBm
- Transmit Power:
 - Cellular 850MHz: Class 3 (200mW)
 - PCS band 1900MHz: Class 2 (200mW)
- FCC ID: N7NSL5011
- Supplied Antenna: Dipole
- Physical Size: 11.4" x 7.75" x 3.3" (TG7VA004 12.5" x 12.5" x 4.25")
- Shipping weight: 5 lbs. (TG7VA004 14 lbs.)
- Operating Environment: 0° C to +49° C; 0 - 85% humidity (non-condensing).

Telco Interface

- Ringer equivalence: 0.3B REN

Appendix 6 – 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
HGD-0	High Gain Directional Antenna
EXD-0	External Omni-Directional Antenna