



TELGUARD

Telguard TG-7 Cellular Series Installation & Operating Guide for models TG-7, TG-7FS, TG-7A, and TG-7UB



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Important Note

The registration form must be completed before leaving for the job site to install the Telguard product. Use our dealer portal at portal.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-7 Cellular Series devices (TG-7, TG-7A, TG-7FS, and TG-7UB) are UL Listed for Commercial Burglary and, depending on the model, Commercial Fire systems. The Telguard TG-7 Series communicator may be used in Retail or Commercial Burglary/Fire systems as the sole, primary or secondary communication path.

Technical Support

Technical support for all Telguard products is available:

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

About this Manual

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

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

It is our goal at Telguard to always supply accurate and reliable documentation. If a discrepancy is found in this documentation, please send an email message to:

CustomerService.Telular@ametek.com

Or, write to:

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

NOTE: References in this manual to the TG-7 Cellular Series product should be construed to apply equally to all models unless otherwise indicated. Similarly, unless otherwise indicated, all information applies equally to either the AT&T or Verizon model of any given product. The TG-7UB should be treated as the TG-7, TG-7A, or TG-7FS product that is being updated; follow the Install instructions provided with the TG-7UB to upgrade to the new board, then consult this Guide.

Repair and Warranty

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

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

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

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

Future Testing and Limitations on Use

The Telguard TG-7 Cellular Series communicator is part of an advanced design alarm communication system. It does not offer guaranteed protection against burglary and fire. Any alarm communication system is subject to compromise or failure.

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

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

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

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

Terms and Conditions for Use of Telguard Product

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

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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 Cellular Series communicator is an alarm transmission device that facilitates the use of the cellular network for the delivery of signals for commercial alarm panels, providing the following three modes of operation:

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

Depending on the TG-7 Cellular Series model and configuration (as set in the dealer portal), the alarm panel will utilize the cellular network as a sole, primary or back-up (secondary) transmission path to deliver alarm messages. In primary/backup mode, the communicator can use either the cellular or Telco path to transmit an event from the panel and will fail over to the other path should the primary become unavailable. In Cellular Only mode (Sole Path), the communicator will not monitor for a Telco connection and strictly use cellular as the means of communication. The sole path mode also offers the ability to supervise the connection to meet specific burg and fire requirements. In each case, the communicator is connected to a panel Telco interface (DACT) with a cable that connects to the communicator's black RJ-45 jack. The communicator can also be used as either a Primary or Secondary Path device when an alternate communications path is connected to another Panel DACT. In such cases, panel settings determine the alarm reporting path.

When transmitting an alarm signal via cellular, the Telguard communicator obtains its data from the alarm panel by way of the DACT interface, a process sometimes referred to as dial-capture. The communicator will obtain all alarm signal information including monitoring station phone number, account number and all zones for every alarm transmission. The communicator handshakes with the alarm panel and causes it to transmit the alarm data. The communicator encodes the alarm data and securely transmits it to the Telguard Communication Center (TCC). The TCC performs a function similar to a central station receiver and issues the transmission acknowledgment when the last message in the transmission is received. After decoding and reformatting, the alarm signal is routed to the desired alarm company monitoring station for action. For installations in Canada, a required End-to-End Acknowledgment feature shall be enabled. This feature will cause a Radio Failure Condition when an acknowledgment cannot be relayed from the central station to the communicator. This feature is optional for the United States.

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 communicator trouble signal to the alarm panel. Additionally, automatic self-test and Check Status signals are transmitted exclusively over the cellular network with all Telco line and cellular monitoring, switching and supervisory functions built in. The communicator supports two power supply options: the communicator can be plugged into a standard AC outlet (120 volts/60Hz) and will keep a dealer-supplied battery charged, or the communicator can operate on either 12VDC or 24VDC regulated power supplied by the connected alarm panel.

Telguard offers the ability to establish an override of the central station telephone and account numbers stored in the panel by providing alternate central station values in the dealer portal: portal.telguard.com. This can be useful in situations where the installer codes are not known or the panel cannot otherwise be reprogrammed. When the communicator is configured with override values, all signals, whether alarm, trouble, or supervisory, will be sent to the override central station. To be able to send different types of signals to different locations, the central station data for each type of signal will need to be programmed into the panel and the override values left blank in the dealer portal. This will cause the communicator to use the central station values as transmitted by the panel.

The UL Listed equipment at the TCC plays a key role in the operation of every Telguard device. 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 Telguard accounts and a complete history of every Telguard unit's operating conditions. These conditions include programming setup information, alarm transmission information, supervisory trouble information, Check Status information, and automatic self-test information.

TG-7 Cellular Series communicators come in several versions configured to meet the needs of various applications, to work either with the AT&T or Verizon networks, and to adhere to the UL and ULC requirements for burglary or fire systems:

Model	Version	Application	UL/ULC Standards
TG-7	TG-7-A (AT&T)	Communication for Commercial Burglary Systems in United States and Canada	UL 1610, ULC-S304
	TG-7-V (Verizon)	Communication for Commercial Burglary Systems in United States	UL 1610
TG-7A	TG-7A-A (AT&T)	Communication for Retail and Financial Commercial Burglary Systems in United States and Canada	UL 1610, ULC-S304
	TG-7A-V (Verizon)	Communication for Retail and Financial Commercial Burglary Systems in United States	UL 1610
TG-7FS	TG-7FS-A (AT&T)	Communication for Commercial Burglary and Commercial Fire Systems in United States and Canada	UL 1610, ULC-S304, UL 864, ULC-S559
	TG-7FS-V (Verizon)	Communication for Commercial Burglary and Commercial Fire Systems in United States	UL 1610, UL 864
TG-7UB	TG-7UB-A (AT&T)	TG-7 Cellular Series Upgrade Board for Legacy TG-7 Cellular Series Communicators for Commercial Burglary and Commercial Fire Systems in United States and Canada	UL 1610, ULC-S304, UL 864, ULC-S559
	TG-7UB-V (Verizon)	TG-7 Cellular Series Upgrade Board for Legacy TG-7 Cellular Series Communicators for Commercial Burglary and Commercial Fire Systems in United States	UL 1610, UL 864

NOTE: TG-7 Cellular Series communicators can be used as either a Primary or Secondary Path device when an alternate communications path is connected to another alarm panel DACT connection. In such cases, the panel determines the alarm reporting path.

NOTE: While working in Canada, the communicator may use Rogers Wireless, Bell Mobility, Telus, or SaskTel cellular networks.

Information Related to Software Settings—Fire Systems

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, OTHER INVOLVED PARTIES

FIRE SYSTEM INSTALLATIONS IN THE UNITED STATES: This product incorporates field-programmable software. In order to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below.

Program feature or option	Permitted in UL 864 (Y/N)	Available settings	Settings permitted in UL 864
Link Supervision when used as a Sole Path	Y	Disabled, 200 seconds, 5 minutes, 60 minutes	200 seconds, 5 minutes, 60 minutes
Automatic Self-Tests when used with an alternate communication path	Y	Disabled, 6 hours*, Daily, Weekly, Monthly	6 hours
AC Failure Condition (ACFC)/Low Power Failure (LPF)	Y	Disabled, any number of hours up to 24	1 hour, 2 hours, 3 hours
No Service Condition (NSC) delay	Y	30 seconds, 60 seconds, 3-, 5-, 10-, 20-, 30-, 45-, 60-, 1440-minutes	30 seconds, 60 seconds, 3 minutes

* 6 hours is specified in 2013 and later editions of NFPA 72; the 2010 edition specified 24 hours (daily).

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, OTHER INVOLVED PARTIES

FIRE SYSTEM INSTALLATIONS IN CANADA: This product incorporates field-programmable software. In order to comply with the requirements in the Standard for Equipment for Fire Signal Receiving Centres and Systems, ULC-S559, certain programming features or options must be limited to specific values or not used at all as indicated below.

Program feature or option	Permitted in ULC-S559 (Y/N)	Possible settings	Settings permitted in ULC-S559
Link Supervision	Y	Disabled, 180 seconds	180 seconds
End-to-End Acknowledgment	Y	Disabled, Enabled	Enabled
No Service Condition (NSC) delay	Y	30 seconds, 60 seconds, 3-, 5- 10-, 20-, 30-, 45-, 60-, 1440- minutes	No more than 60 seconds
AC Failure Condition (ACFC)/ Low Power Failure (LPF)	Y	Disabled, any number of hours up to 24	1 hour, 2 hours, 3 hours

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, OTHER INVOLVED PARTIES

BURGLARY SYSTEM INSTALLATIONS IN THE UNITED STATES: In order to comply with the requirements in the Standard for Central-Station Burglar-Alarm Units, UL 1610 and Standard Line Supervision, the communicator must meet these requirements:

The TG-7 Cellular Series communicator must be used in one of the following configurations:

- As a primary communicator, single line-200 second supervision; or
- As a secondary communicator line for a DACT (supervision not required). Every 24 hours, a check-in signal must be sent from the communicator to the central station over the primary dialer and each communication path shall be monitored for integrity (DACT shall have line monitoring enabled and the communicator shall have cellular connection supervision enabled).

Additionally:

- When the heartbeat transmission is enabled, the communicator can provide Standard Line Security over the LTE-M channel.
- The communicator shall be connected to a UL Listed alarm control panel.
- A tamper switch on the communicator shall be connected directly to an input zone on the control panel, and the zone shall be designated as the zone for Tamper Protection. Tamper wires and all other wires connecting the communicator to the panel shall be in rigid or flexible metal conduit unless supervised.
- The PPF panel presence failure feature must be enabled if the wiring distance between the panel and the communicator is greater than 20 feet or the connection is not mechanically protected; setting is accessible in the online portal.

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, OTHER INVOLVED PARTIES

BURGLARY SYSTEM INSTALLATIONS IN CANADA: In order to comply with the requirements in the Standard for Control Units, Accessories and Receiving Equipment for Intrusion Alarm Systems, ULC-S304, the communicator must meet these requirements (Security Level I or II):

The TG-7 Cellular Series communicator must be used as a Passive communication system line security level P1 (single communication channel) for Security Level I.

Additionally:

- Every 24 hours, a test transmission must be sent to the signal receiving centre over the cellular communication path.
- The communicator shall be used in conjunction with a ULC or cUL Listed Control Unit/Alarm Panel.
- STC1 and STC2 shall be connected from the communicator to the control panel and designated for general trouble conditions.
- A tamper switch on the communicator shall be connected directly to an input zone on the control panel, and the zone shall be designated as the Tamper Protection zone. Tamper wires and all other wires connecting the communicator to the panel shall be in rigid or flexible metal conduit.
- The PPF panel presence failure feature must be enabled if the wiring distance between the panel and the communicator is greater than 18m or in different rooms or if the connection is not mechanically protected in metal conduit; setting is accessible in the online portal.

Features

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

Operating Mode

The TG-7 Cellular Series is comprised of transmission devices that are installed at protected premises to provide signal transmission over a cellular connection for alarm systems. The communicator transmits alarm signals over the nationwide digital cellular network if the telephone line has been disrupted or compromised, or when set for primary or sole path use of the cellular pathway.

Multiple Alarm Format Support

The Telguard TG-7 Cellular Series communicators support multiple alarm communication formats.

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

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

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

Complete Supervision of Communication Path

The communicator continuously supervises the connection to the alarm panel and the cellular pathways. If any of these pathways becomes inoperative, the communicator can generate a relay trip output that can be connected to a zone input of the host alarm panel. These System Trouble Conditions (STCs) are described below.

Line Fault Condition (LFC)

The communicator 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 communicator is configured to use a sole communications path (cellular), the Line Fault Condition (LFC) is not applicable.

No Service Condition (NSC)

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

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

Radio Communications Failure Condition (RFC)

Radio communications failure condition (RFC) occurs when the communicator is unable to receive a response from the TCC. When RFC is declared, the STC LED will flash 5 times, dial-tone will cease,

and the STC relay will trip as programmed. Restoral of this condition occurs after 10 minutes or when a message is received from the TCC.

NOTE: When End-to-End acknowledgment feature is enabled, a message that fails to deliver to the Central Station will trigger an RFC condition.

Panel Presence Failure (PPF)

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

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

UL/ULC Compliance Note: If the wiring distance between the panel and the communicator is greater than 20 ft. (18m or in different rooms in Canada) or the connection is not mechanically protected (metal conduit required in Canada), PPF must be enabled. Since fire systems must comply with these restrictions (UL 864, ULC-S559), PPF is not required for fire systems.

Control Failure to Communicate (CFC)

The Control Failure to Communicate (CFC) feature allows the Telguard unit to monitor the number of communication attempts the alarm panel makes over Telco before the unit 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, the unit seizes the line and takes over as the main communication path for the alarm panel. If the unit 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 unit to redirect communications to the cellular channel, but it is not indicated on the STC LED, nor does it cause the external relays to be tripped.

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

Link Supervision and Standard Line Security

In order to satisfy UL and ULC requirements, the communicator can enable link supervision at preset intervals. When this feature is enabled, TG-7 Cellular Series communicators also meet the requirements for Standard Line Security when used with a UL Listed compatible alarm panel. Once the communicator is provisioned with the Link Supervision option, the TCC constantly monitors all the enabled communicator pathways and sends a specific message to the Central Station if a path is broken or a compromise attempt is made. After the initial account activation has completed, 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 communicator 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 communicator as marked on the alarm panel and as indicated in the manufacturer's installation instructions.

Complete Power Supervision

The communicator can supervise and report status of the backup battery and AC power source when powered from the AC adapter. It has an integrated control and power component which keeps the communicator's battery charged and is supervised. Furthermore, the communicator can report on low voltage events when powered from a DC source from the alarm panel.

Low/Missing Battery Condition (LBC)

When using AC as the main power source, the communicator 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 an LBC occurs 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 communicator also indicates Low/missing Battery Condition (LBC) when the battery charger fails, or the battery fails the periodic load test.

AC Failure Condition (ACFC)

AC failure condition (ACFC) is detected immediately when the AC power-driven input from the plug-in adapter drops below 8 VAC. When this condition is detected, the STC LED blinks once, the Power LED turns off, and the STC trip output is activated after a preset time (default 2 hours). When AC power returns to normal (at least 10 VAC), the Power LED turns on immediately and the STC trip output restores after 60 seconds. When ACFC occurs, you may want to verify both the power at the outlet and that coming from the adapter.

Low Power Failure (LPF)

If the communicator is being powered through the DC connection, a Low Power Failure condition (LPF) is detected immediately when the DC power drops below 7.5VDC. When this condition is detected, the STC LED blinks once, the Power LED turns off, and the STC trip output is activated after a preset time (2 hours). When DC power returns to normal (≥ 8 VDC), the Power LED turns on immediately and the STC trip output restores after 60 seconds.

Dial Tone Failure (DTF)

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

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

Catastrophic Failure (CF)

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

Telguard Automatic Self-Test Report

The automatic self-test signal schedule is programmable as prescribed when the communicator is registered. The Central Station receives the automatic self-test report in the same format that the

alarm panel normally uses for communication over the Telco line. The self-test code and testing frequency are set during registration and can accommodate any code the Central Station expects.

The TCC captures all current and historical data pertaining to the operation of the communicator when it processes the automatic self-test signal. This data contains current operational status (C.O.S.) of the communicator such as "All OK", "AC fail condition", "low/missing battery condition", or any combination of identified trouble conditions as well as the current cellular signal strength. In addition, the data also contains historical data for supervisory events that occurred since the last self-test or Check Status report signal was transmitted. This data includes the number of occurrences of AC fail conditions, low battery conditions, line fault conditions, and no cellular service conditions. This additional information is available by visiting portal.telguard.com (dealer log-in credentials required).

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

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

Programmable Supervisory Trip Output (STC) Relays

The communicator has two supervisory relay trip outputs available (STC1—normally open and STC2—normally closed) 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 trouble conditions that trigger the STC relays are programmable via portal.telguard.com (dealer log-in required) to meet virtually any installation requirement.

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

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

- AC Failure Condition (ACFC) or Low Power Failure condition (LPF)
- Low or missing Battery Condition (LBC)
- No Service Condition (NSC)
- Radio Failure Condition (RFC)
- Line Fault Condition (LFC)

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

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

UL/ULC Compliance Notes:

- *In Fire installations, STC2 (normally closed) cannot be used for communicating with the alarm panel; only STC1 (normally open) can be used.*

ULC Compliance Notes:

- *For Commercial Burglary installations, STC1 shall be connected to the panel's 24hr zone and shall be designated only as Low Power Condition. Other failure conditions shall be triggered through STC2 and shall be treated as general trouble conditions.*
- *For Commercial Burglary installations which use the optional TG-PEM accessory, consult the TG-PEM Manual for the configuration of STC1.*

- For all installations in Canada, the End-to-End Acknowledgment feature is required. When an acknowledgment for a message cannot be relayed from the central station to the communicator, the Radio Failure Condition will be triggered.
- *In Canada, TG-7 Cellular Series devices are suitable for use in Security Level 1 applications.*

Post-Installation Remote Programming

To continue to meet compliance requirements, once a unit is installed it cannot be remotely reprogrammed or receive updated firmware from Telguard Technical Support without manual on-site action. To change the device settings or accept updated firmware, follow these steps:

- Locate and press the RSSI button on the communicator, holding it for at least 5-7 seconds.
- LED 5 will flash, indicating that a message has been sent to initiate a Maintenance Window.
- The maintenance window will last for 10 minutes after receipt of the device message.
- Log into the portal.telguard.com dealer portal and make the necessary configuration changes to the device, within the observed maintenance window (10 minutes).
- No device configuration changes can be made outside of the maintenance window.

NOTE: All alarm functions and transmissions will continue to operate during the Maintenance Window. The alarm system should be placed in test mode with the central station.

Diagnostic and Status LEDs

Seven active LEDs are provided as a useful aid during installation and give installers an immediate visual indication of system status. The LEDs serve as indicators for activation, system trouble conditions, power, and communication indicators. They can also provide a signal strength indication, similar to the signal strength bars on a cellular phone. See Appendix 2 or the installation section for details.

Optional DC Operation (12VDC or 24VDC)

The TG-7 Cellular Series communicators can be operated solely by DC power provided by an alarm panel. This eliminates the need for a separate AC outlet at the protected premises. To use, connect 12VDC or 24VDC regulated power from the panel's Auxiliary Output to DC Input and ground on the communicator. LED 8 will illuminate to indicate the communicator has a valid power source. The provided AC adapter should NOT be used when powering the communicator from the alarm panel.

NOTE: When using TG-PEM accessory, the panel's auxiliary output should be connected to the TG-PEM and the TG-PEM Telguard Power connection should go to the DC input on the communicator. See Installation Guide for the TG-PEM for more details.

NOTE: When using DC power from an alarm panel (with or without TG-PEM), the communicator should not be connected to an AC power source or to a battery. The panel's backup battery powers the communicator when the panel loses AC power. Be sure to account for this load when determining how to supply power to the communicator.

Complete Factory Reset Option

A special function within the TG-7 Cellular Series communicators 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 because the unit will need to be re-activated.

To begin the factory reset, follow these steps:

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

UL and ULC Compliance

The TG-7 Cellular Series communicators are certified as complying with UL and ULC Standards for Commercial Fire and Commercial Burglary installations. The chart on Page 1 shows the associated UL and ULC Standards. Certificates of Compliance are available at portal.telguard.com.

UL/ULC Compliance Note: *The alarm panel must also be UL, ULC, or cUL Listed for commercial fire and/or commercial burglary use as appropriate.*

ULC Compliance Notes:

- For Commercial Fire installations in Canada, the radio frequency warning label (supplied) must be affixed to the outside front cover of the communicator to maintain compliance.
- Communicator is suitable for Active communication in fire installations (ULC-S559) and for Passive Level 1 (P1) Line Security in burglary installations (ULC-S304).

Getting Ready

The communicator can only be activated when all necessary accounting information has been added to the TCC customer database (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

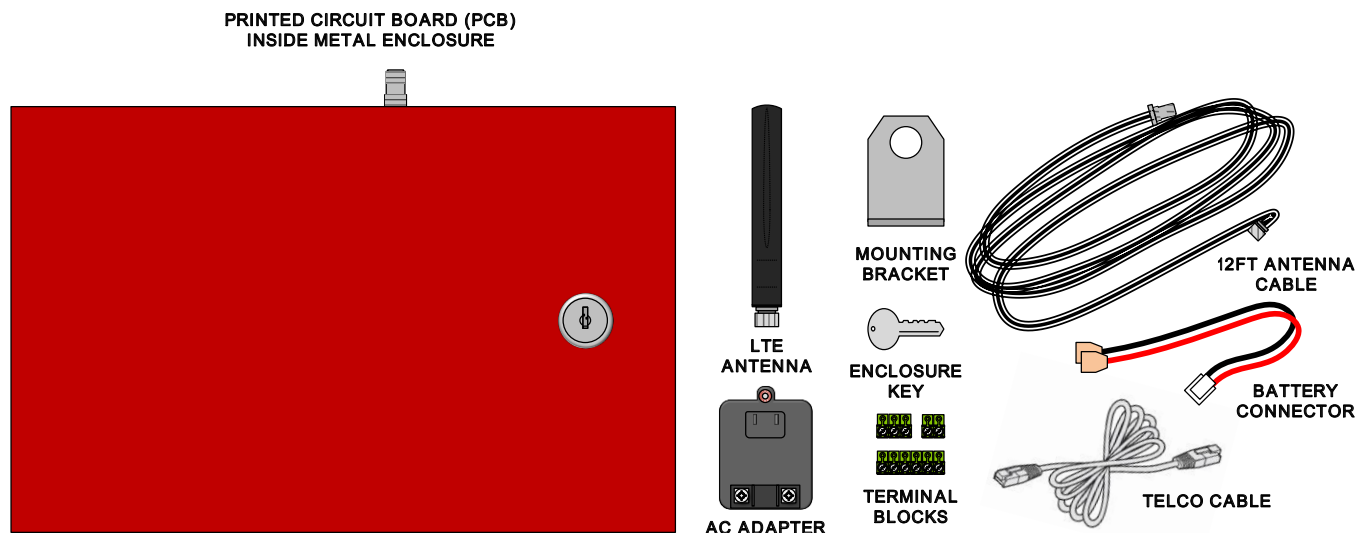
A Dealer Account must be established prior to registration of any Telguard unit. This can be accomplished by visiting portal.telguard.com and completing the necessary information under “Dealer Signup”. This is a one-time event and an acknowledgment from Telguard Customer Service will include a Dealer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

Pre-Installation Checklist

Before attempting to connect the communicator to the alarm panel, please make sure you have all the proper parts prior to going to the job site. The following items are shipped with each TG-7 Cellular Series product:

- Telguard Cellular Communicator
- Cellular Antenna
- Antenna Extension Cable and Mounting Bracket
- AC Power Adapter
- Battery Connection Cable
- Telco Connection Cable
- Pluggable Screw Terminal Blocks (2-, 2-, 3-, & 6- position)
- Enclosure Key
- Quick Install Guide
- Frequency Warning Label to be applied for installations in Canada (AT&T models only)
- Tamper Switch Easy-Attach Assembly (TG-7 and TG-7A only or when purchased as an accessory)

Note: When upgrading an existing communicator using the TG-7UB, continued use of some existing items is necessary. See the instructions provided with the TG-7UB for further details.



The following items may be needed and are not included with the communicator:

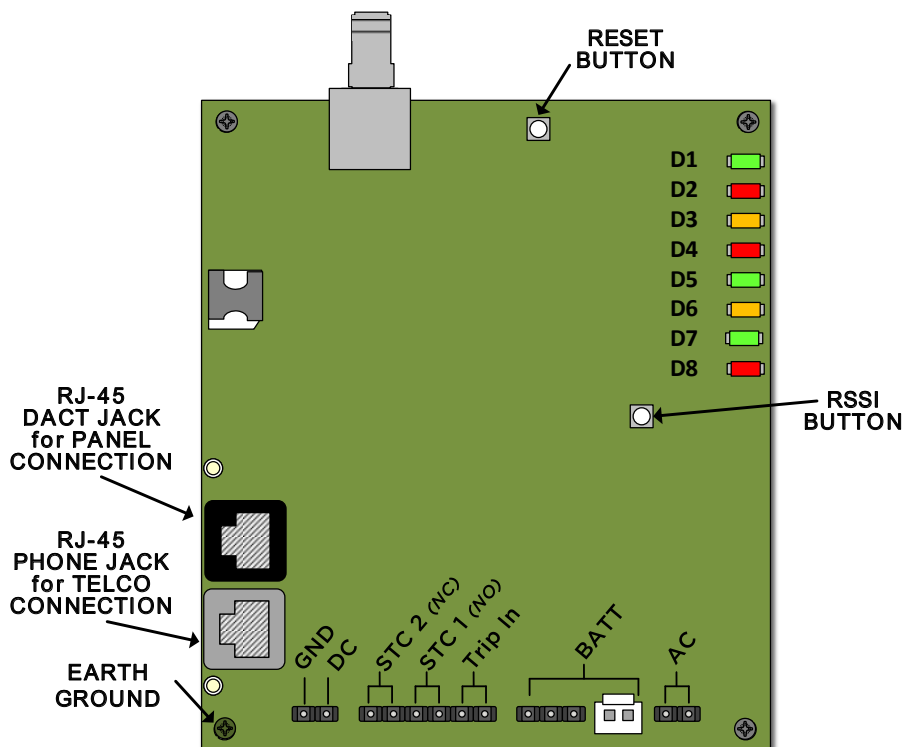
- Screws or nails for mounting the communicator enclosure and antenna to the wall
- Solid or stranded electrical wire for connecting the STC relay outputs, trip input, or tamper to the alarm panel. The terminal blocks can accommodate solid or stranded 16 to 22 gauge wire.
- Conduit and connectors for protecting wiring
- Lead acid backup battery (7Ah recommended/4Ah minimum) when installation will use the AC power adapter

Finally, certain installation and testing tools may be needed or helpful:

- Screwdrivers for mounting and making connections
- Standard telephone or lineman's butt-set for verifying communication between the panel and the communicator

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

PCB Layout



Summary

The following are steps necessary to install the communicator properly.

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

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

1. Register the communicator
2. Physically install the communicator
 - Mount the communicator in desired location
 - Complete all power-related wiring connections
3. Determine antenna placement for best performance
 - Connect antenna
 - Measure Received Signal Strength (RSSI)
 - Consider other antenna options
4. Make communications connections and activate by causing an alarm signal
5. Connect supervisory trip outputs
6. Connect Tamper Switch if applicable

When the Trip Input feature will be used, it can be installed after the six steps above have been completed.

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

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

Step 1: Register the Communicator

The registration form may be completed online in the 24/7 dealer portal at portal.telguard.com. Register for Telguard service prior to going to the job site to avoid a second trip.

The desired features and programmable options for any installation are selected during the registration process. This includes Mode of Operation, STC strategy, Trip-Input enabling, and added value services like Standard Line Security and Link Supervision, when applicable.

Select the Mode of Operation

The TG-7 Cellular Series communicators offer three modes of operation:

- Cellular primary/Telco backup
- Telco primary/Cellular backup
- Cellular only — Sole Path

Selecting Cellular Only mode may require enabling other features to remain in UL/ULC compliance.

NOTE: When an alternate communications pathway is connected to another alarm panel DACT interface (usually a Telco connection), the communicator can be used as either a Primary or Secondary Path. In such cases, panel settings determine the whether the DACT connected to the Telguard communicator or the DACT connected the alternate pathway will be used.

UL/ULC Commercial Fire Sole Path (Cellular Only Mode) Features

- Link Supervision: If registering communicator to use cellular as the sole path of communications for commercial fire applications, use the link supervision option in accordance with local requirements (5-minute supervision or 60-minute supervision in the U.S., or 180-second supervision in Canada).
- End-to-End Acknowledgment feature: When enabled, an RFC condition will occur when an acknowledgment to a message is not relayed from the Central Station as expected. This feature must be enabled for installations in Canada.

Decide on a STC Trip Output Strategy

The communicator provides the host alarm panel with two supervisory trip outputs for reporting a Telguard system trouble code to the Central Station. The supervisory trip outputs are programmable to suit various installation requirements. The programming options for these supervisory trip outputs can be any combination of the following:

- Always Off: Disables all relay supervisory functions.
- ACFC/LPF: Trips 2 hours (programmable for up to 24 hours) after low power failure is detected. Restores 60 seconds after power is restored.
- LBC: Trips within 60 seconds on low battery condition. Restores when battery voltage ≥ 12.1 VDC.
- LFC: Trips after 60 seconds on Telco line fault condition (delay is programmable). Restores 60 seconds after Telco line restores.
- NSC: Trips after a 60-second delay (delay is programmable) on no service condition due to loss of RF signal strength. Restores after RF signal strength is available.
- RFC: Trips on radio failure to communicate with the TCC. Restores after 10 minutes.

UL/ULC Compliance Note: *In fire systems, ACFC/LPF trigger must be set in the range of 1 to 3 hours in accordance with UL 864/ULC-S559. NSC delay must be 45 minutes or less in accordance with UL 864 or 60 seconds or less in accordance with ULC-S559.*

NOTE: *When the TG-PEM accessory is used, it can be configured to use STC1. This TG-PEM configuration will limit Telguard supervisory trip output options to STC2 only. The TG-PEM should be used with either a fire system or burglary system; it should not be used in a combination system.*

Optional Trip Input

When the input is tripped, a supervisory message is sent to the Central Station via the TCC. This allows an external relay, separate from the alarm panel, to be connected to the communicator.

The message that is sent from the TCC to the Central Station is configurable in portal.telguard.com. The communicator will automatically be configured with a unit template that allows configuration of the trip input feature, including the message that is sent to the Central Station. If the communicator is configured to report restorals, the contact closure will also be reported.

Swinger Function

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

ULC Compliance Note: *The Swinger Function does not meet the requirements of burglary systems in Canada and must be disabled (set to Off).*

Step 2: Physically Install the Communicator in Desired Location

Identify Location for Placing the Communicator and Mount

Do not install the communicator in an area where the general public could reasonably be within 8 inches/20cm 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 communicator's antenna and the outside of the premises.

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

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

Care should be taken to ensure that a large metal object such as a refrigerator or a metal cabinet is not located on the opposite side of the wall. If moving the communicator to a different location is not practical, you may need to use the provided extension cable to remote the antenna in order to receive adequate radio signal strength. Choose a high, visually secure spot using the guidelines below.

Tips for Improved Radio Signal Reception

- The higher the antenna the better. 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 all sources of RF interference, including pumps, compressors, ovens, etc., or where metal objects can shield it or otherwise block the cellular radio RF signal.
- Place the antenna perpendicular to the ground, pointing either straight up or down. Do not mount the antenna horizontally.

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

- Attach earth ground to the grounding screw located on lower left-hand corner of printed circuit board assembly and permanently mount the Telguard enclosure.
- Install mounting screws (not supplied) for upper enclosure mounting holes.
- Slide the enclosure onto the screws and tighten screws.
- Verify unit is secured by placing additional screws in lower mounting holes.

Install Optional TG-PEM Accessory into Enclosure (if using)

The TG-PEM Accessory can be used to add 8 24-hour dry contact zones to a TG-7 Cellular Series communicator.

The TG-PEM Accessory should be installed after the communicator has been mounted to the wall or other surface. Follow the instructions in the TG-PEM manual to install it, including programming requirements. After installation of the TG-PEM, proceed to Option 2 in the next section.

NOTE: When the TG-PEM is used, the communicator cannot have an AC power adapter or backup battery connected. The communicator will use the power provided by the TG-PEM connected to the alarm panel.

Complete All Power-Related Wiring Connections

The communicator can be powered by AC (from the provided plug-in adapter) or DC (from the alarm panel) power. All wires connecting with the communicator should be in conduit or otherwise protected, but no segregation of circuits is necessary. Follow the instructions for the chosen power option.

Option 1: AC Power Adapter and Backup Battery

To apply power to the communicator, attach a battery (not included) to the battery connector jack using the supplied battery cable. If the need for a different size cable arises, the communicator has an alternate screw-in terminal connection for the battery. Backup battery must be sized appropriately to

meet installation requirements. A 12-volt minimum 4Ah (7Ah preferred) lead acid battery should be used.

NOTE: It is important to follow battery manufacturer's instructions for maintaining the battery, including replacing the battery when it can no longer operate at the specified voltage level.

Connect the Telguard AC power adapter (supplied) 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

Check with the AHJ to determine whether the adapter needs to be secured to the outlet (generally required for Canadian installations) or otherwise protected.

Option 2: DC Power from Panel

When using this option, no other power connections (battery or AC) should be used.

Power to the communicator may be sourced from the host alarm panel's regulated 12VDC or 24VDC power limited auxiliary output. Connect the power and ground connections into the respective DC and GND connections on the communicator using a supplied 2-position terminal block. If the TG-PEM Accessory is being used, the auxiliary output from the panel shall be connected to the TG-PEM and the TG-PEM power output shall be connected to the communicator's DC and GND connections using the terminal block.

UL/ULC Compliance Note: All wiring connections shall be in accordance with NFPA 72, NFPA 70, and/or C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 32.

Step 3: Determine Antenna Placement for Best Performance

Connect Antenna

The communicator 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 an extension cable and bracket (supplied). The performance of the antenna may be affected by the wall or materials contained within the wall chosen for mounting. These effects may not be clearly identified by RSSI monitoring alone. The wall materials may have a more pronounced effect on the antenna transmit band performance.

Measure Received Signal Strength (RSSI)

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

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

Optimizing Antenna Performance

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 7.

If a connected antenna is earth grounded and the communicator is powered from the panel, a ground fault at the alarm panel may occur. If using panel power, do not earth ground any part of the antenna connection (the external antenna accessory offered by Telguard is specifically designed for ungrounded installation). Alternatively, power the communicator with the AC adapter or use a TG-PEM accessory to avoid the ground fault condition.

Step 4: Make Communications Connections and Activate

Connect the alarm panel to the communicator by connecting a cable from the modular telephone jack (DACT) of the alarm panel into the black RJ-45 jack of the communicator. All wires connecting with the communicator should be in conduit or otherwise protected, but no segregation of circuits is necessary. The communicator is now ready for activation. If using a TG-PEM to connect an alarm panel that does not have a DACT, refer to the instructions supplied for the TG-PEM to complete the activation step.

UL Compliance NOTE: *For Fire System installations, all wiring connections from the alarm panel (FACP) and the communicator must be mechanically protected and no greater than 20 feet in distance.*

ULC Compliance NOTE: *For Fire System installations, all wiring connections between the alarm panel and the communicator must be in metal conduit and no greater than 18 meters in distance. The FACP and the communicator must both be located in the same room.*

Temporarily disconnect any Telco or other pathway from the alarm panel, leaving only the Telguard communicator connected. Trip a zone on the alarm panel and confirm that the communicator enables the alarm panel to transmit alarm events. The communicator will transmit the initial activation signal over the cellular network and confirm activation with the TCC (if registration was completed prior to installation).

During processing of the first alarm signal over the cellular network, the communicator and the TCC will exchange data to complete the configuration, including the Central Station number and account code from the alarm panel. Once this process is complete, the TCC transmits a message back indicating that the unit is activated. When this message is received, the LEDs on the communicator will begin operating in normal mode and Activation LED 1 will remain on.

NOTE: *The initial alarm is to confirm registration and activate the communicator. This alarm will NOT be transmitted to the Central Station.*

Special LED Indications During Activation

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

- If LED 1 and LED 4 are flashing, the communicator has failed activation. Most likely, the serial number is not in the database at the TCC. Clear the fault (see note below) and call Telguard Technical Support to verify proper registration before resending an alarm signal.
- If LEDs 1-5 are flashing, there is an activation error. The activation message was NOT received at the TCC. Clear the fault (see note below) and retry transmitting an alarm signal. If the communicator fails a second time to activate, check signal strength. If signal strength is OK, then call Telguard Technical Support for further assistance.

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

System Status LEDs Table:

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

Verify Alarm Signal Transmissions Over Cellular Path

Trip several alarms on the alarm panel and verify that the Central Station received them by calling the Central Station operator. Use a lineman's butt-set in *MONITOR MODE* connected to the communicator's "T" and "R" test pins to "listen" to communications between the alarm panel and the communicator.

Once you have verified the cellular pathway, reconnect any other pathways that were temporarily disconnected from the alarm panel.

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

- Recheck signal strength. You need at least RSSI = 2 (*TWO LEDS ON SOLID*) for adequate signal transmission in a system with a Telco connection or 2 ½ (*TWO LEDS ON SOLID AND A THIRD FLASHING*) for Sole Path cellular mode. Also, check antenna connector and make sure it is seated correctly.
- Call Telguard Technical Support, 1-800-229-2326 option 9.

Step 5: Connect Supervisory Trip Outputs

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

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

UL/ULC Compliance Note: *The communicator will at a minimum have the trip output connected to the alarm panel to indicate AC failure (ACFC) and low battery (LBC) conditions when the communicator is using its own Power Supply and not powered by the panel.*

ULC Compliance Note: *For Commercial Burglary installations, STC1 shall be connected to the panel's 24hr zone and shall be designated only as Low Battery Condition if using an AC power source, or Low Power Failure if getting power from the panel. Other failure conditions shall be triggered through STC2 and shall be treated as general trouble condition.*

Reprogram Alarm Panel to Send Proper Code

If necessary, reprogram the alarm panel to send proper alarm code when tripped by the communicator's supervisory output. Program zone restoral as desired.

Check Proper Operation of Supervisory Output

Check for proper operation of each programmed supervisory output by causing it to trip the alarm panel. Make sure the proper LED illuminates and the proper trouble code is reported to the Central Station. Skip the testing of any supervisory functions that have not been enabled. Note that yellow LED 3 will start flashing when the alarm panel goes off-hook to report the signal.

- AC Failure Condition (ACFC): Disconnect the provided power adapter and check to see that AC POWER LED 8 goes out and the STC LED 2 flashes once indicating that AC power is missing. Reconnect AC adapter and check to see that the AC POWER LED 8 goes on and the STC LED 2

goes off indicating that AC power has successfully 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. When power is provided by a DC source, the Low Power Failure (LPF) condition applies and would present itself in the same manner as this ACFC.

- **Low Battery Condition (LBC):** Disconnect the communicator's battery and check within 60 seconds 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 successfully restored. When power is provided by a DC source, LBC does not apply.
- **Low Power Failure (LPF):** If the communicator is powered through its DC connection, a Low Power Failure (LPF) will occur if the DC power into the communicator drops below 5.1VDC and restore after reaching at least 5.6VDC. LPF will present itself in the same manner as the ACFC.
- **Line Fault Condition (LFC):** Disconnect Telco cable from the gray RJ-45 jack. LED 2 flashes 3 times to indicate the fault. If monitored, after configured period the panel transmits the STC trouble code (over cellular) to the Central Station indicating the Telco line is not working. Reconnect Telco cable and check to see that Telco line restoral is indicated by STC LED 2 turning off after the configured period.
- **No Service Condition (NSC):** Disconnect the antenna from the communicator. Check to see that STC LED 2 flashes 4 times and, if configured, alarm panel will detect the tripped STC after the selected period of time indicating loss of RF signal strength. Reconnect antenna and check to see that STC LED 2 goes off within the configured period indicating RF signal strength restored.

Step 6: Connect Tamper Switch (required for burg/optional in fire-only systems)

The TG-7 and TG-7A require a tamper switch be connected (easy-attach assembly included); it is optional on the TG-7FS. Telguard produces the tamper switch as an accessory (listed in Appendix 7) that can be used when needed for communicators not generally requiring the switch. Note that the tamper switch will not connect to the circuit board of the communicator.

Mandatory for Commercial Burg Use

When installing the TG-7 or TG-7A, a tamper switch is used to monitor the enclosure opening. The tamper switch needs to be connected to a zone on the panel and that zone shall be designated for Tamper Protection. Follow the instructions included with the Tamper Switch Assembly for easy attachment. All Canadian Installations shall also meet the installation requirements of CAN/ULC-S302 Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults.

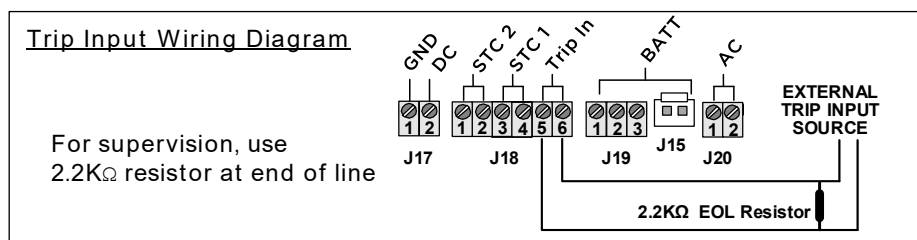
Optional Use or As Required by AHJ

For other installations, a tamper switch can be used to report unauthorized alarm system access by connecting it to a zone on the panel and designating the zone as Tamper Protection. Some local enforcing authorities may require the tamper feature be used. If a tamper switch is not included with a particular model, the Telguard TG-TAMPER Accessory, available from most distributors, can be used. Follow the included instructions for easy attachment.

Optional: Connect and Test the Trip Input

The trip input is connected to the external relay by wiring the external relay to the TRIP IN terminal of the terminal block, and the other side to the TRIP GND terminal of the same block (pins 5 & 6 on J18). See Wiring Diagram below.

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 (e.g., a cut wire) can be detected. When the trip input functionality is being used, closing the trip contact will cause the communicator to send a message that the TCC will relay to the Central Station. If the communicator is configured to report restorals, the contact opening will also be reported.



NOTE: Be sure to use a UL-approved 2200-ohm resistor if the trip input circuit will be supervised (e.g., Bosch P110BL, Bosch EOL-22K, Elk ELR 22). The trip input circuit is not supervised for ground conditions.

UL/ULC Compliance Note: *The trip input feature shall only be used for supplementary signaling. Initiating zones shall not be connected to the trip input.*

Appendix 1 – Connection Guide

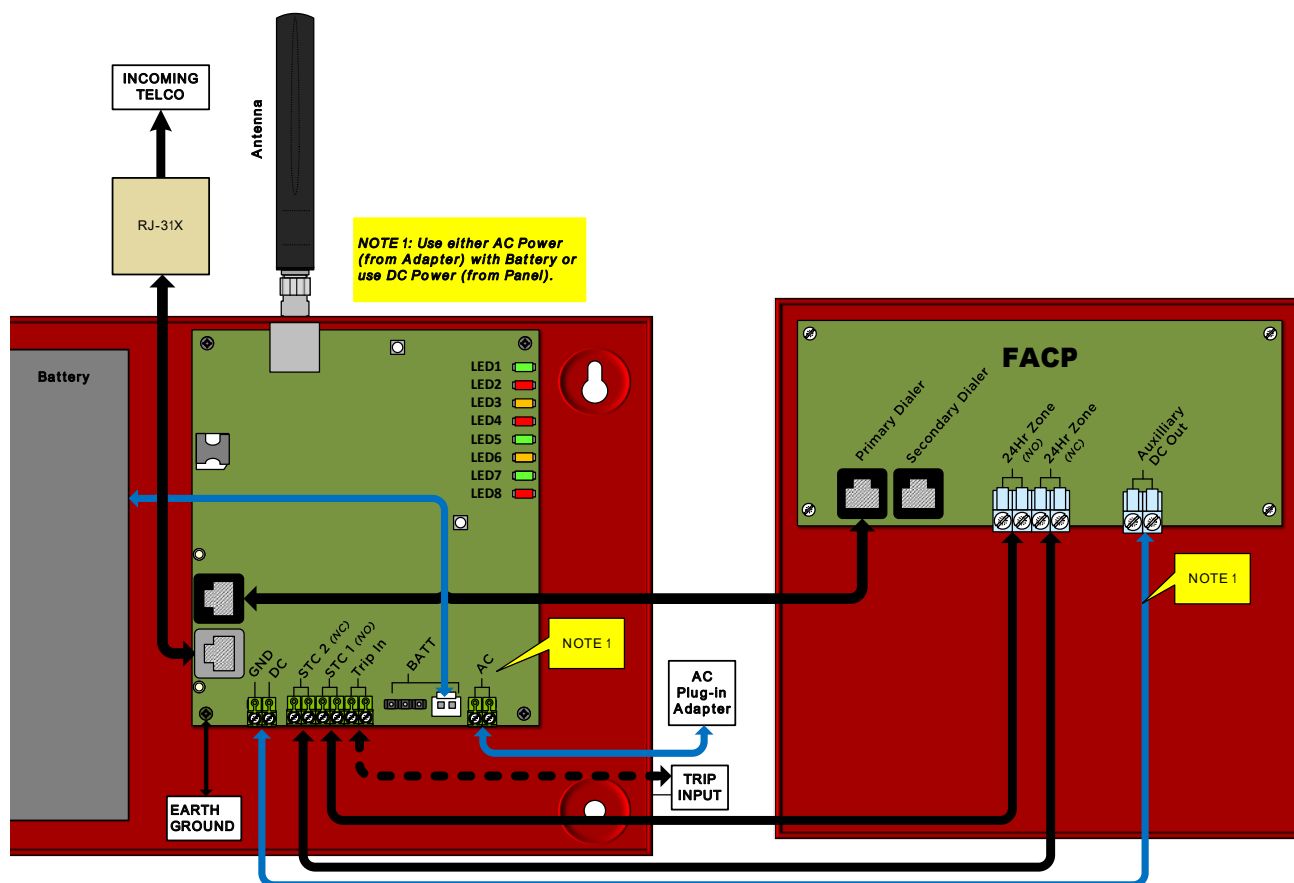
Wiring Diagrams

The following wiring diagrams show the scenarios in which the communicator can be used. These diagrams apply to both fire and burglary systems in both U.S. and Canada (unless noted).

Telco Connection through the Communicator (Backup or Primary Mode):

Used when the TG-7 Cellular Series communicator is working in a system that involves a Telco connection. In this case, the Telco is connected through the communicator. The communicator monitors the Telco and cellular connection and controls which communication path is used for signal delivery.

ULC Compliance Note: *This configuration cannot be used with alarm systems in Canada.*

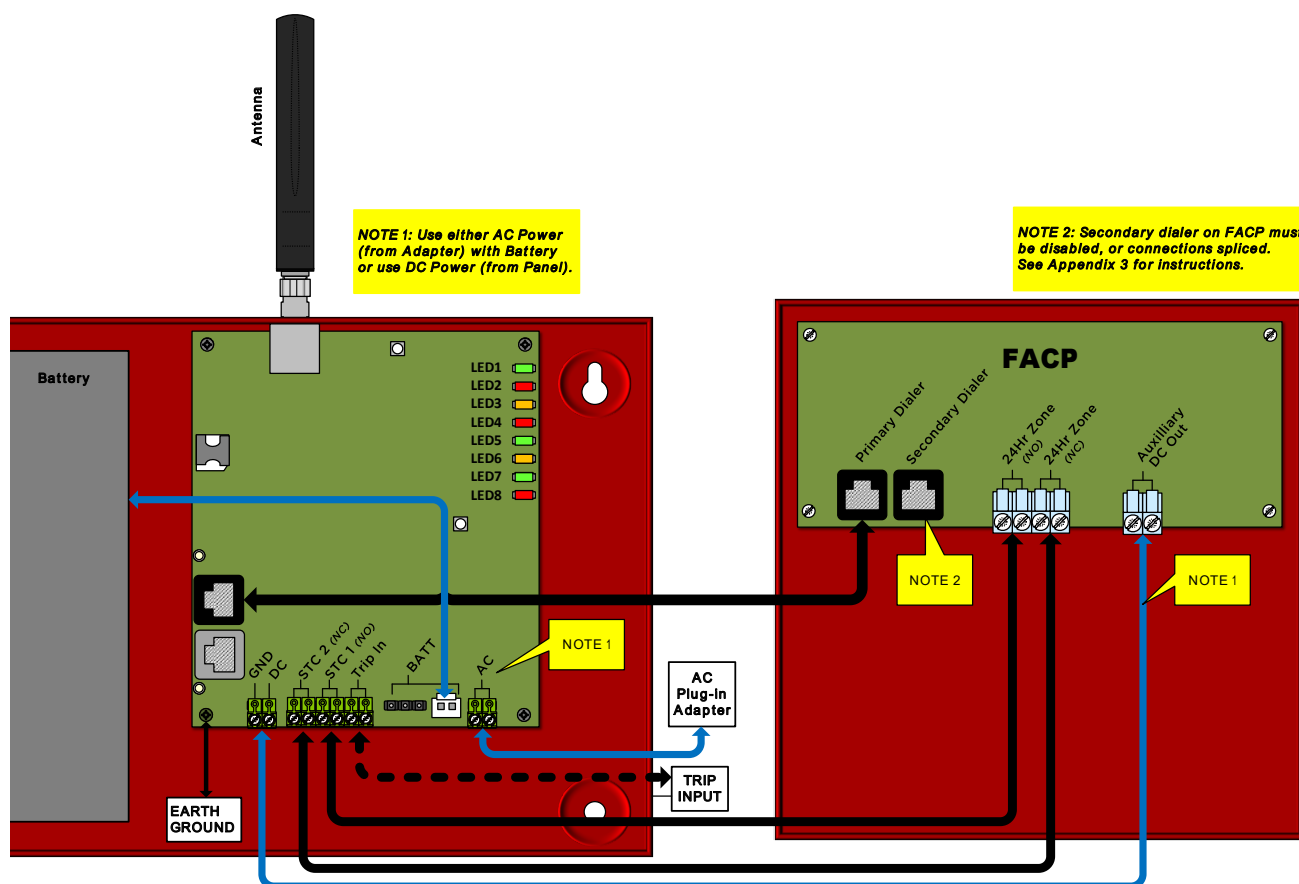


Note: When using this scenario, the programming of the communicator is what determines whether the Telco path is meant to work as back-up or primary.

Cellular-Only Wiring (When Communicator is Only Path Used):

This configuration is used when the communicator is set to cellular only mode and is working in a system that does not involve a Telco connection or a secondary path. In this case, the alarm panel is connected directly to the communicator, and there is no other communication pathway that is active. For commercial fire installations, a specific level of link supervision may be required (frequencies of 180 seconds, 5 minutes, or 60 minutes).

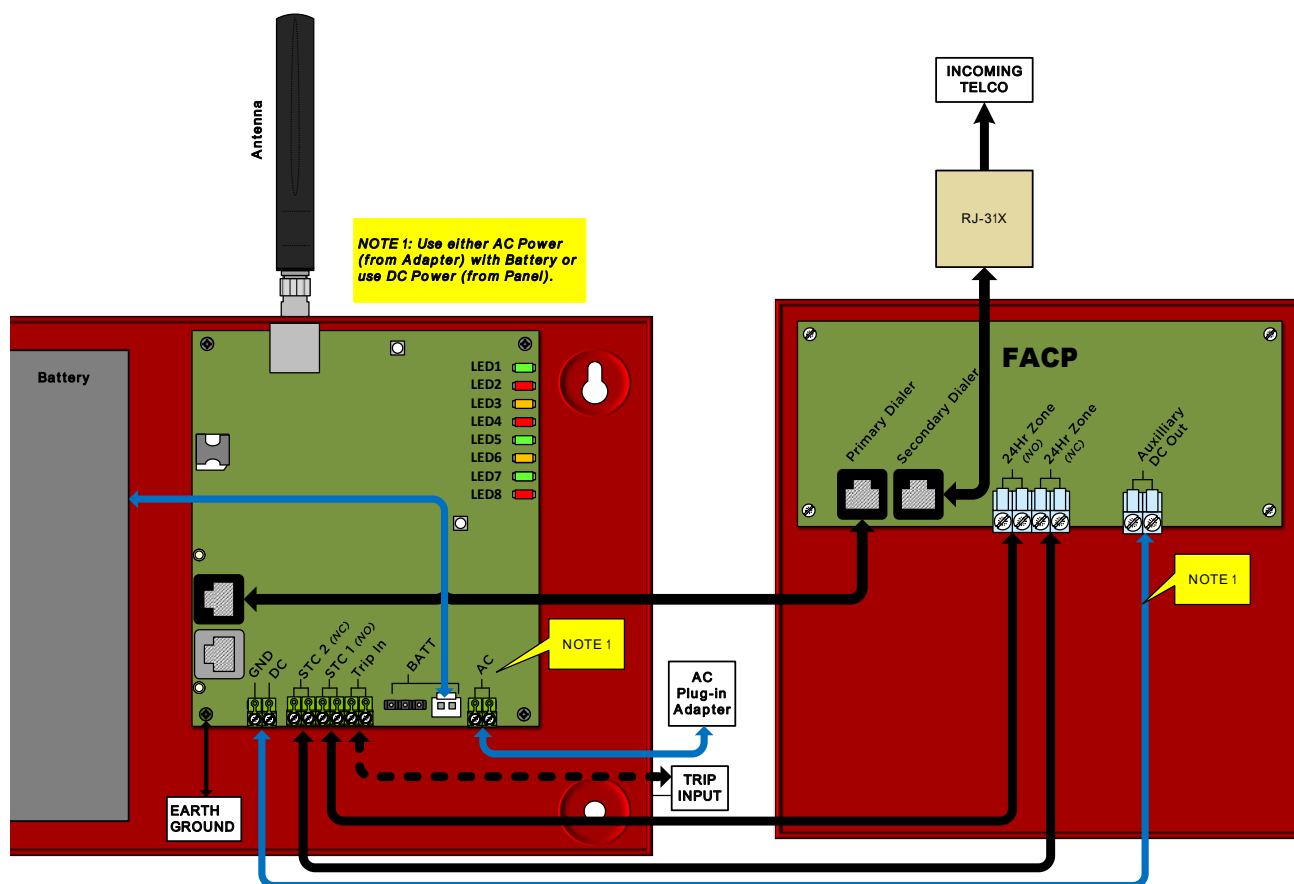
In this configuration, the Telco connection is not being used or monitored by the communicator. This configuration provides for Active communication for Canadian fire systems and P1 line security for Canadian burglary systems.



Cellular-Only Wiring (With Telco Connection Through Second Panel DACT):

This configuration is used when the communicator is working in a system that also involves a Telco connection or another communication path not connected through the Telguard communicator (generally limited to fire systems). In this case, both the communicator and the alternate connections are being monitored by the alarm panel. It is the alarm panel that determines which communication connection to use for signal delivery.

ULC Compliance Note: *This configuration cannot be used with systems in Canada.*

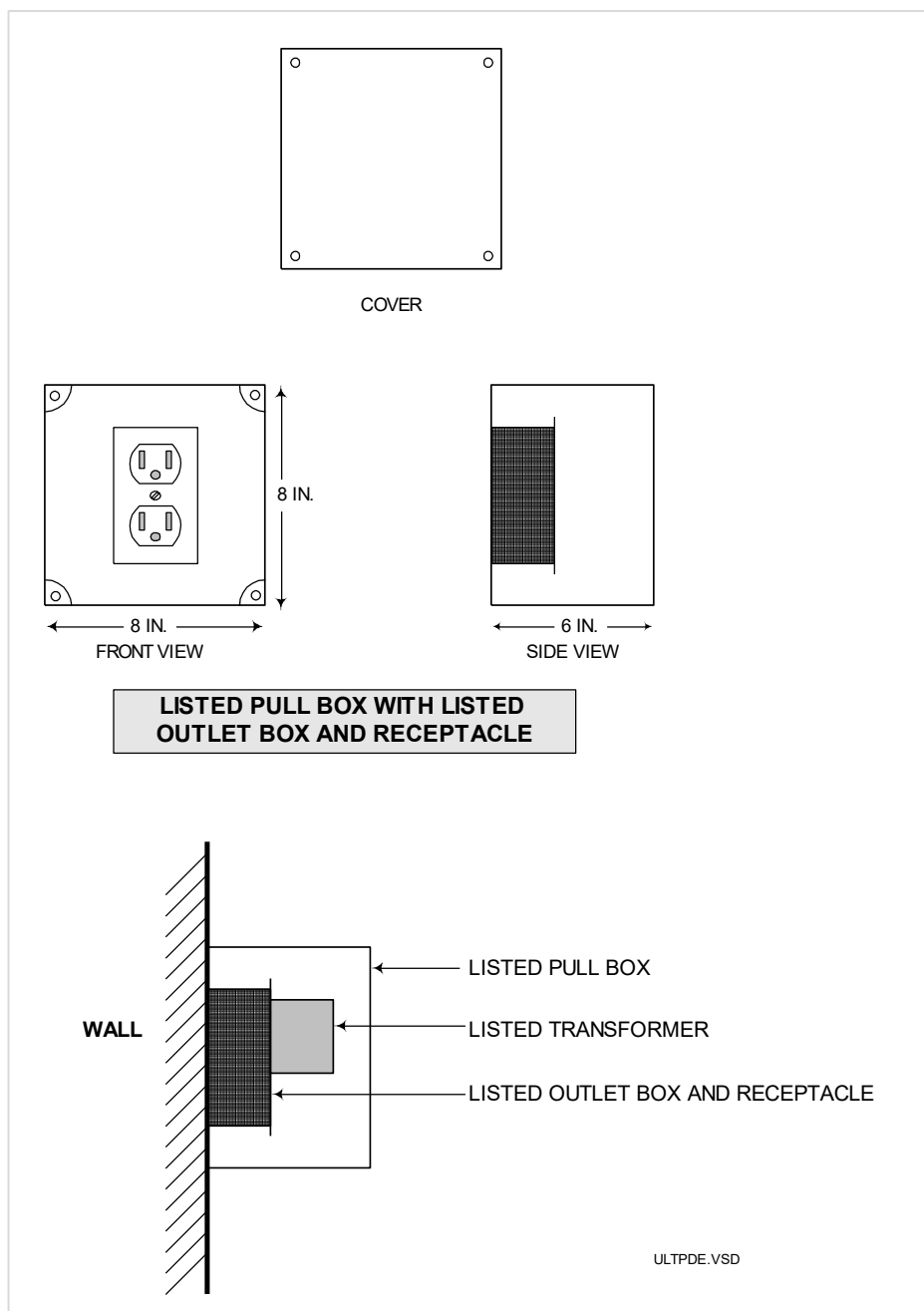


Note: When using this scenario, the programming of the panel is what determines whether the communicator is meant to work in a back-up or primary mode.

Installation of AC Adapter

The plug-in AC Adapter, when used, must be installed in a protected metal housing. It is important to use only the adapter (sometimes referred to as a transformer) that is supplied with the communicator. Wiring from the adapter to the communicator must run through metal conduit. The adapter itself is plugged into a conventional 120-volt/60 Hz outlet connected to a dedicated circuit for the security system.

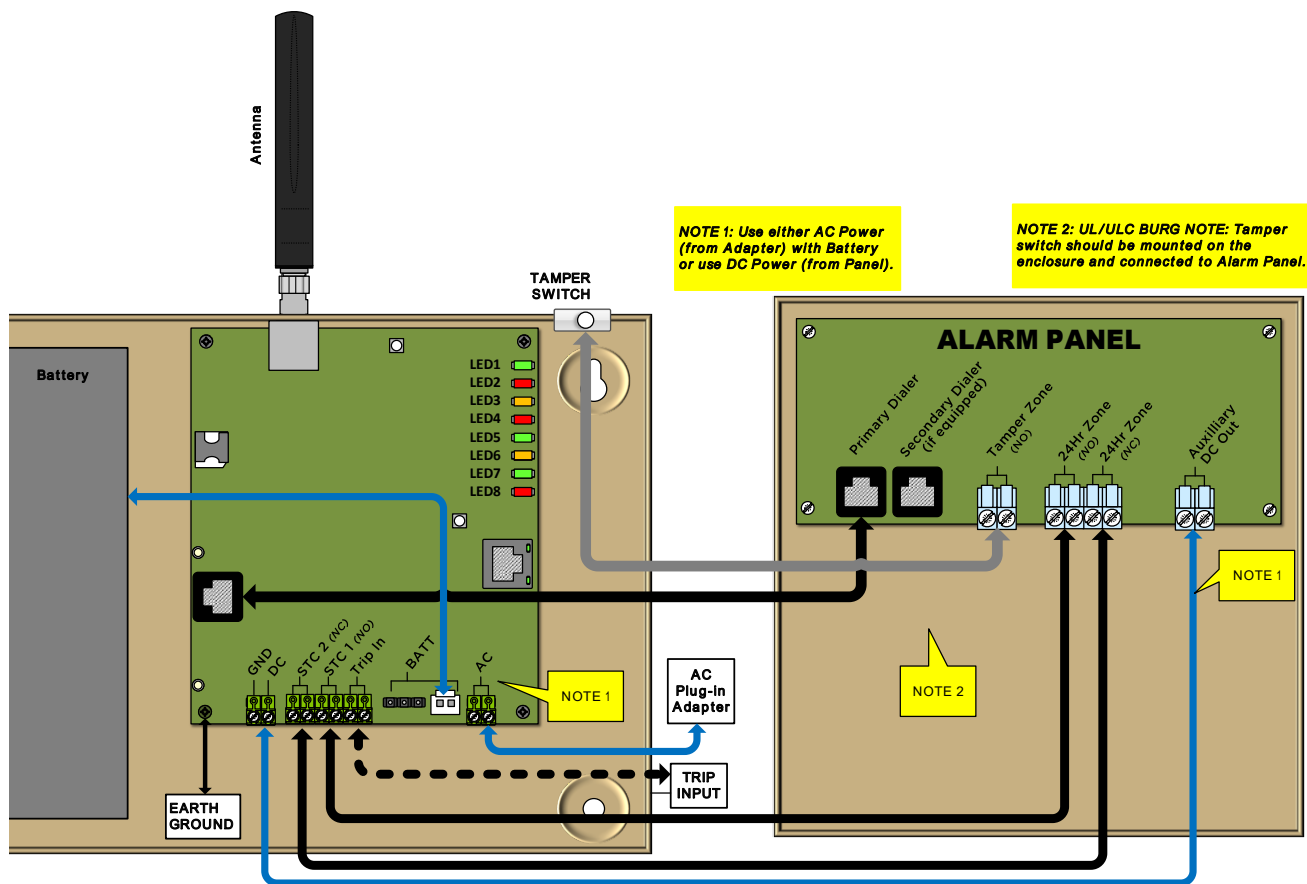
The diagram below should be consulted as a reference.



Tamper Switch Installation

For all UL/ULC Commercial Burglary Installations, a tamper switch must be wired to monitor the communicator enclosure. The wiring from the tamper switch assembly to the panel shall be in a rigid or flexible metal conduit or be supervised along with other wiring from the communicator to the panel. The tamper switch does not connect to the communicator circuit board.

An easy-attach tamper switch assembly is included with the TG-7 and TG-7A communicator products and contains installation instructions. If a tamper switch is needed for a TG-7FS or TG-7UB product, the TG-TAMPER Accessory can be purchased from most Telguard distributors. Note that a tamper switch is required when using the TG-7FS in a combination fire and burglary system.



RJ-45 Jack Pin Assignments

Jack	Connects To	Pin Assignment	Function	Status LED Reference
Black (J13)	Digital Dialer input/output of host alarm panel (DACT).	1 = Brown R1 2 = Blue 4 = Green R (Ring) 5 = Red T (Tip) 7 = Orange 8 = Gray T1	Connects alarm panel to communicator for transmitting alarm signals to TCC.	If PPF is ENABLED, STC LED 2 will flash 7 times when alarm panel is not detected.
Gray (J14)	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 communicator.	STC LED 2 will flash 3 times when Telco voltage is lost.

DC Terminal Strip Pin Assignments

Terminal Strip Pin	Definition	Connects To	Function	LED Reference	Note
1 GND 2 DC	DC Power input	12- or 24-VDC Regulated Source (or TG-PEM)	Provides power to communicator	Power LED 8 on for valid power	Consumption rates vary based on input voltage used

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 6 IN	Trip Ground and Trip Input	External trip relay.	Allows an external relay to trigger an alarm signal.	LED 7

AC Terminal Strip Pin Assignments

Terminal Strip Pin	Definition	Connects To	Function	Status LED Reference
1 AC 2 AC	AC Power input	Provided AC adapter (120V, 160mA)	Provides power to communicator and battery-charging circuit.	Power LED 8 ON when AC is normal, OFF and STC LED 2 flashes 1 time when AC is low.

Compatible Alarm Panels

Any UL/ULC/cUL Listed alarm panel that supports one of the following formats is compatible and may be used with the TG-7FE:

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

The installer should verify compatibility at the time of installation.

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).

UL Compliance Note: While TG-7 Cellular Series communicators support the above formats, some formats may not meet the requirements for fire systems set in UL 864. Contact ID and SIA2 are the only formats identified as complying beginning with UL 864 10th Edition. If in doubt, check with your AHJ.

Appendix 2 – Troubleshooting Guide

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

LED Indicator Guide – Normal Operating Mode

LED Symbol	Color	Showing	Indication
LED 1 Activation	Green	Off	Unit not activated at TCC
		Solid On	Unit is activated at TCC and enabled
		Flash*	Unit is disabled
LED 2 STC (System Trouble Condition)	Red	Off	ALL OK
		1 Flash*	ACPC — AC Power Condition <i>or</i> LPF — Low Power Failure
		2 Flashes*	LBC — Low Battery Condition
		3 Flashes*	LFC — Line Fault Condition
		4 Flashes*	NSC — No Service Condition
		5 Flashes*	RFC — Radio Failure Condition
		6 Flashes*	DTF — Dial Tone Failure
		7 Flashes*	PPF — Panel Presence Failure
LED 3 Connected Panel	Yellow	Off	Alarm panel idle—communicator is primary or sole path
		Solid On	Alarm panel idle—communicator is backup path
		Flash* (1 sec)	Alarm panel off-hook
LED 4 Acknowledgment	Red	Off	Idle state
		Solid On	Unit waiting for acknowledgment from the TCC
		Flash*	When flashing with LED 1, unit has failed activation. <i>CALL TELGUARD TECHNICAL SUPPORT</i>
LED 5 Communications	Green	Off	Communicator initialized
		Solid On	Communicator initializing with cellular network
		Flash (1x per sec)	Communicator receiving message
		Flash (2x per sec)	Communicator sending message
		Flash (2x per 6 sec)	Link Supervision Mode
LED 6 — <i>Not Used</i>			
LED 7 Trip Input	Green	Off	Trip Input not activated or is restored
		Solid On	Trip Input activated
LED 8 Power	Red	Off (w/other LED activity)	Operating from communicator backup battery
		Solid On	Panel power or AC power connected to unit

NOTE: * indicates that the LED will continuously flash.

Troubleshooting Quick Reference Table

Telguard Event		LED Indication	Relay Output	Message Sent	Internal Action
STC * (System Trouble Conditions)	ACFC or LPF	Power LED 8 is off. STC LED 2 flashes continuously 1 time.	Optional	Optional	Switch to standby battery if present, monitor battery, monitor AC for restoral. No action on Panel Power.
	LBC	STC LED 2 flashes continuously 2 times.	Optional	Optional	Wait for LBC restoral, charge battery.
	LFC	STC LED 2 flashes continuously 3 times.	Optional	Yes	Telco path not fully working.
	NSC	STC LED 2 flashes continuously 4 times.	Optional	None	Continue to validate signal strength, NSC restores when signal returns.
	RFC	STC LED 2 flashes continuously 5 times.	Optional	None	Wait for RFC restoral.
	DTF	STC LED 2 flashes continuously 6 times.	Yes	Yes	Internal dial tone voltage supply circuit failure.
	PPF	STC LED 2 flashes continuously 7 times.	No	Yes	Wait for PPF restoral.
Not Activated		Activation LED 1 off.	Yes	None	Communicator will not function until a signal is sent to the TCC to activate.
Automatic Self-Test		LED 5 flashes during transmit.	None	Yes (Self-test)	Send Self-Test data to Central Station via TCC, return to ready state.
Telguard Check Status		LED 5 flashes during transmit.	None	Yes (Status data)	Send Status data to the TCC for review.
Telguard Enable and Configuration Update		LED 5 flashes during transmit.	None	Configuration Data	The unit sends setup configuration to the TCC and switches to READY state to begin operation.
Disable TX (Initiated by TCC)		LED 5 flashes during transmit.	Yes	Yes (Status data)	TX capability is disabled until further notice. The unit can still receive radio signals from the TCC.

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

LED Indicator Guide – RSSI Mode

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

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

RSSI Value	LED Illumination Pattern	RF dBm
0-½	LED 5 = slow flash, LEDs 4-2 = off	N/A (No cellular service)
1	LED 5 = on, LEDs 4-2 = off	≤ -111
1½	LED 5 = on, LED 4 = slow flash, LEDs 3-2 = off	≥ -110
2	LEDs 5-4 = on, LEDs 3-2 = off	≥ -100 (Minimum recommended w/Telco line present)
2½	LEDs 5-4 = on, LED 3 = slow flash, LED 2 = off	≥ -90 (Minimum recommended for sole path)
3	LEDs 5-3 = on, LED 2 = off	≥ -80
3½	LEDs 5-3 = on, LED 2 = slow flash	≥ -70
4	LEDs 5-2 = on	≥ -60

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

Appendix 3 – Commercial Fire Single DACT Installation

The TG-7FS is suitable for use as a sole path cellular communicator. The TG-7FS can also be utilized with a Telco connection. By following Telguard's installation guidelines, the installer can provide the best conditions for a stable, sole path cellular or cellular plus Telco 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 above.

Cellular Signal Strength

Installation instructions for the TG-7 Cellular Series fire communicators indicate that a cellular signal strength of -90dBm (RSSI LEDs 4 and 5 on, with LED 3 flashing) is sufficient. While this is suitable for "normal" use, an additional level of signal integrity will minimize false alarm supervision failures caused by interference and atmospheric fading. Because of this, it is always recommended that the device should be installed in a location that provides the best signal strength possible.

Configure Fire Alarm Panel to Use Single Communication Device

Fire panels are typically provided with two Telco connections in order to provide multiple reporting paths. With the TG-7 Cellular Series communicators having a single RJ-45 jack for connecting to the panel, one of these DACT connections is not necessary for UL 864 and ULC-S559 compliance. However, the panel will continue to supervise that unused line unless changes are made at installation time. It is also possible to have a Telco line being used with one of the DACT connections. In that case, it is the panel settings that determine whether that Telco line would be used as the primary or backup communication path.

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

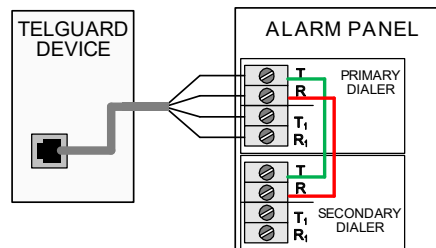
1. Disabling the Second Telco Connection

Some 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.

Test the communicator thoroughly when using this method. Verify the panel does not report problems with the second line, especially when the panel is reporting to the central station.



Appendix 4 – Commercial Fire 6-hour Supervision

The NFPA 72 2013 Edition updated the requirement to supervise the transmission path to at least once every 6 hours, from an earlier version of 24 hours. This requirement is upheld in 2016 and 2019 edition as well. Telguard commercial fire products support this feature, and it must be enabled by selecting 6-hour supervision during registration.

Appendix 5 – Compliance with UL and ULC Standards

	UL Comm Burg	UL Comm Fire	UL Comm Fire/Burg	ULC Comm Burg	ULC Comm Fire
Enclosure Tamper Switch connected to 24-hr circuit	Yes	Optional	Yes	Yes	Optional
AC adapter lines in conduit (length limits apply)	Optional	Yes	Yes	Optional	Yes
AC adapter plugged into un-switched outlet (if used).	Yes	Yes	Yes	Yes	Yes
AC adapter plugged into dedicated branch circuit.	Optional	Yes	Yes	Optional	Yes
Antenna cable in flexible conduit concealed	Yes	Yes	Yes	Yes	Yes
Battery Backup requirement if using AC	24hr	24hr	24hr	24hr	24hr
Radio Frequency warning label placed on outside of front cover	No	No	No	Optional	Yes
Flexible or Rigid conduit required to protect connections #	Optional	Yes	Yes	Optional	Yes

All conductors of a fire alarm system shall be installed in metal raceway of the totally enclosed type or incorporated in a cable having a metal armor or sheath; these metal elements must be grounded

Appendix 6 – Detailed Specifications

Dialer to Interface Electronics

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

- Line voltage: -30 VDC (default) or -40VDC (option) into standard telephone device when on-hook.
- Dial tone: Precision 350 + 440Hz +/- 1%. 10 digits dial out capability.
- Mode: Loop start only. 25mA +/- 10% off-hook.

Power Requirements

Input Voltage (source)	Current Draw		
	Idle No Supervision	Idle w/Link Supervision	Max during Transmission
12VDC regulated (from panel)	80mA	83mA	230mA
24VDC regulated (from panel)	27mA	42mA	110mA
12VAC (from plug-in adapter)	400mA	420mA	490mA

Field Wiring Electrical Ratings

STC 1 relay: 30VDC/120mA Max Load (Resistive)

STC 2 relay: 30VDC/100mA Max Load (Resistive)

Trip Input: 30VDC/100mA Max Load

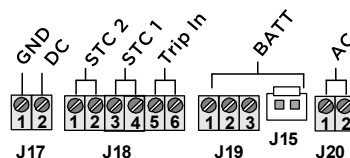
Power Limited Circuits

DC Input: J17

STC1, STC2, and Trip Input: J18

Battery Charging: J15 & J19

AC Input: J20



UL Compliance NOTE: Wiring in power limited circuits shown must be separated from wiring in non-power limited circuits by at least ¼ inch.

System Faults Impedance

Trip Input: < 750 Ω considered short circuits and > 10 k Ω considered open circuits

Digital Cellular Radio and Other Specifications

The Telguard TG-7 Cellular Series radio provides data connectivity on LTE-M networks. The transceiver is FCC compliant, meeting all requirements of Part 15 and 27 testing. It is also certified as compliant to PTCRB requirements. This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

- Supported Bands on units with AT&T service: 2, 4, 12
- Supported Bands on units with Verizon service: 4, 13
- FCC ID: N7NHL78M
- IC ID: 2417C-HL78M
- Antenna Port: TNC connector (female), 50-ohm
- RF performances are compliant with 3GPP recommendation TS 36.101
- Physical Size: 11.4 x 7.75 x 3.3 inches (exclusive of antenna)
- Shipping Weight: 7 lbs.
- Operating Environment: 0° C to +49° C; 0 - 93% humidity (non-condensing)

Appendix 7 – Accessories

P/N	Description
TG-PEM	Adds 8 dry contact zone inputs; also allows connection to panels without DACTs
TG-TAMPER	Easy-attach Tamper Switch Assembly compatible with Telguard metal enclosures
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