



TELGUARD

AMETEK®

TG-7FX Sole Path Communicator Installation & Operation Guide

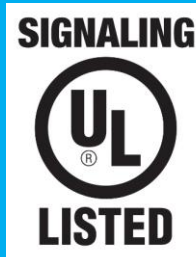


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Important Note

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

Foreword

Dealers purchase Telguard cellular communicators for the quality, features and total value they represent. The Telguard TG-7FX meets UL standards for Commercial Fire systems when installed in an appropriate UL Listed enclosure.

Technical Support

Technical support for all Telguard products is available:

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

About this Manual

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

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

It is our goal at Telguard to always supply accurate and reliable information. To report a discrepancy you find in this documentation, please send an email message to:

Customerservice.telular@ametek.com

Or, write to:

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

Repair and Warranty

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

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

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

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

Future Testing and Limitations on Use

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

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

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

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

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

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General Description and Operation

The Telguard TG-7FX communicator is a cellular radio alarm transmission device used to provide a sole transmission path (cellular) for commercial alarm panels. The communicator is connected to an alarm panel DACT (telephone dialer) for signal communication to a central station. It can be set up in a highly supervised mode to meet all sole path requirements. If the panel supports additional transmission paths—such as a fire panel with two DACTs—the TG-7FX can set for periodic testing to meet dual path requirements (in such cases, panel settings determine which path is primary and which is backup).

Two programmable System Trouble Condition (STC) relays are available for connection to the alarm panel's trip zone input terminals in order to provide Telguard trouble signals to the alarm panel. Additionally, automatic self-test and check status request signals are transmitted exclusively over the cellular network with all cellular monitoring and supervisory functions built in. The TG-7FX receives operating power from the host alarm panel (either regulated 12- or 24-volt DC).

Telguard offers the ability to establish an override of the central station telephone and account numbers stored in the panel through the dealer registration portal: portal.telguard.com. This can be useful in situations where the installer codes are not known. When override values are used, all signals—alarm, trouble, or supervisory—will be sent to the override central station. 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.

The Telguard Communication Center (TCC) manages the real-time databases for cellular accounts and a complete history of every communicator's operating conditions. These conditions include programming setup information, cellular alarm transmission information, supervisory trouble information, Check Status information, and automatic self-test information.

The TG-7FX communicator is offered in two versions configured to work either with the AT&T or Verizon networks. To comply with NFPA72 standards, the communicator must be installed in an enclosure that meets the requirements (see Appendix 5).

Model	Application	UL Standards
TG-7FX-A (AT&T Service)	Sole Path Communication for Fire Systems in United States	UL 864
TG-7FX-V (Verizon Service)	Sole Path Communication for Fire Systems in United States	UL 864

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

FIRE SYSTEM INSTALLATIONS: 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)	Possible 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 [#]
No Service Condition (NSC) delay	Y	30 seconds, 60 seconds, 3-, 5- 10-, 20-, 30-, 45-, 60-, 1440- minutes	No more than 3 minutes

[#] **6 hours is specified in UL 864 10th Edition (published in 2014); the 9th Edition (published in 2003) specified 24 hours (daily).**

Features

This section summarizes the key features of the Telguard TG-7FX cellular communicator.

Operating Mode

The TG-7FX communicator is a sole path cellular Data/SMS transmission device that is installed at the protected premises to provide alarm transmission for fire alarm systems over the applicable cellular network where there is no wireline service available. The TG-7FX can also be used as either a Primary or Secondary Path device when an alternate communications path is connected to another alarm panel DACT interface. In such cases, the panel determines the alarm reporting path.

Multiple Alarm Format Support

The Telguard TG-7FX supports multiple alarm communication formats.

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

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

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

Complete Supervision of Communication Path

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

No Service Condition (NSC)

A no service condition (NSC) occurs when the TG-7FX is unable to register with the cellular network.

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

Radio Communications Failure Condition (RFC)

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

Panel Presence Failure (PPF)

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

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

UL Compliance Note: PPF must be enabled if the wiring distance between the panel and the communicator is greater than 20 ft., in different rooms, or the connection is not mechanically protected. Since none of these are true for UL 864-compliant fire systems, PPF is not required.

Link Supervision

In order to satisfy UL requirements, the TG-7FX can enable link supervision at preset intervals. Once the TG-7FX 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 communicator and making sure an alarm with the specific code is delivered.

Complete Power Supervision

Low Power Failure (LPF)

Low Power Failure condition (LPF) occurs when the DC power drops below 10VDC. When this condition is detected, the STC LED blinks once, the Power LED turns off, and the STC trip output is activated after 3 minutes. When DC power returns to normal ($\geq 10.5\text{VDC}$), the Power LED turns back on and the STC trip output restores (if it was tripped). The TG-7FX will not operate when the DC power input drops below 9VDC.

Dial Tone Failure (DTF)

The TG-7FX provides a voltage supply and other signaling to the panel like a telephone central office. The communicator continuously monitors the circuit that provides dial tone to the alarm panel. The TG-7FX will supply 30VDC by default but there is an option in the dealer portal to change this to 40VDC, if needed. A Dial Tone Failure (DTF) occurs when the communicator is unable to provide proper telephone signaling to the panel (voltage supplied drops while the alarm panel is on-hook). The STC LED will flash 6 times and the STC1 relay will trip.

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

Catastrophic Failure (CF)

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

Telguard Automatic Self-Test Report

The automatic self-test signal schedule is programmable as prescribed when the communicator is registered. The central station receives the automatic self-test report in the same format that the alarm panel normally uses for communication over the Telco line. The self-test code and testing frequency are set during registration and can accommodate any code the Central Station expects.

The TCC captures all current and historical data pertaining to the operation of the communicator when it processes the automatic self-test signal. This data contains current operational status (C.O.S.) of the communicator such as "All OK" or any combination of identified trouble conditions as well as the current signal strength. In addition, the data also contains historical data for supervisory events that occurred since the last self-test or check status report signal was transmitted. This additional information is available by visiting portal.telguard.com (dealer log-in credentials required).

Telguard Check Status Capability

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

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

Programmable Supervisory Trip Output (STC) Relays

The communicator has two supervisory relay trip outputs available (STC1 normally open and STC2 normally closed). Both are energized in a powered-up state when no system troubles exist. This enables a supervisory trouble code to be transmitted to the central station when connected to an alarm panel's 24-hour instant input zone. The trouble conditions that trigger the STC relays are programmable via the dealer portal, portal.telguard.com, to meet any installation requirement.

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

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

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

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

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

UL Compliance Notes:

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

Post-Installation Remote Programming

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

- Locate and press the RSSI button on the TG-7FX, 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 dealer portal at portal.telguard.com 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.

Diagnostic and Status LEDs

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

Complete Factory Reset Option

A special function within the TG-7FX allows you to perform a complete Factory Reset on the communicator. This reset will change all communicator settings back to a factory default configuration.

NOTE: Never attempt to do a Complete Factory Reset on an active account because the communicator will need to be re-activated.

To begin the factory reset, follow these steps:

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

UL Compliance

The TG-7FX is certified as complying with UL Standards for Commercial Fire installations. The chart on Page 1 shows the associated UL Standards. Certificates of Compliance are available at portal.telguard.com.

To maintain compliance, the TG-7FX enclosure and alarm panel must also be UL Listed for commercial fire use as appropriate. The TG-7FX must be installed in an enclosure that meets the requirements listed in Appendix 5.

Getting Ready

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

Dealer Account Establishment

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

Pre-Installation Checklist

Before attempting to connect the communicator to the alarm panel, please make sure you have all the proper parts before you go to the job site. The following items are shipped with each TG-7FX:

- Telguard Cellular Communicator
- Cellular Antenna Adapter Cable
- Pluggable screw terminal block (7-position)
- Quick Install Guide

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

The communicator is designed to be mounted into a UL listed enclosure as specified in Appendix 5. You will need to have the enclosure ready and have determined how the TG-7FX will be mounted into it and how the enclosure will be mounted to the wall.

You must also have certain installation test tools:

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

Installation

Summary

The following are steps necessary to install the communicator properly.

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

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

1. Register for Telguard service
2. Physically install the TG-7FX device
 - Mount the TG-7FX device inside approved enclosure
 - Complete all power-related wiring connections
3. Determine antenna placement for best performance
 - Connect antenna adapter cable and route outside of panel
 - Attach antenna to cable
 - Measure Received Signal Strength (RSSI)
 - Consider other antenna options
4. Connect to Panel DACT and Activate
5. Connect supervisory trip outputs
6. Connect trip input (optional)

This approach provides the alarm installer with the easiest and fastest method of properly installing a TG-7FX device. Please follow the instructions carefully and if you should need assistance or have any questions, please call Telguard Technical Support at 1-800-229-2326 extension 9.

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

Step 1: Register the Telguard Communicator

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

The registration form may be completed online through our 24/7 dealer portal portal.telguard.com.

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

UL Commercial Fire Sole Path Features

- Link Supervision: When registering a TG-7FX device for commercial fire applications, use the link supervision option in accordance with local requirements (5-minute supervision or 60-minute supervision).
- End-to-End Acknowledgment feature: When enabled an RFC condition will occur when the captured signal is not delivered to the Central Station as expected.

Decide on STC Trip Output Strategy

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

- Always Off: Disables all relay supervisory functions.
- LPF: Trips two hours after low power failure is detected. Restores 60 seconds after power is restored.
- NSC: Trips after a 60-second delay (delay is programmable) on no service condition due to loss of RF signal strength. Restores after RF signal strength is available.
- RFC: Trips on radio failure to communicate with the TCC. Restores after 10 minutes.

UL Compliance Note: *NSC delay must be 3 minutes or less in accordance with UL 864.*

Optional Trip Input

When the input is tripped, a supervisory message is sent to the central station via the TCC. This allows an external relay, separate from the alarm panel, to be connected to the communicator in order to provide independent sensor input for other functions, such as tamper detection.

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

Swinger Function

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

Step 2: Physically Install the TG-7FX into Approved Enclosure

Identify Location and Mount

The TG-7FX should be installed in a UL Listed enclosure that meets the requirements listed in Appendix 5. Begin by securing the enclosure to the wall within 20 feet of the alarm panel and in the same room. The location should allow for conduit to be connected between the panel and the enclosure and should avoid any items that may cause radio interference, such as large metal equipment or power circuitry.

Use the provided template to identify a set of enclosure pems (threaded attachment points) that will hold the TG-7FX and allow the antenna adapter cable to reach the outside of the enclosure with the least amount of bending or tight turns. Secure the TG-7FX to the enclosure using pan-head screws of the size indicated by the enclosure manufacturer—generally #6-32 x 3/8". If necessary, drill holes in the enclosure and secure #6-32 x 1/2" pan-head screws using #6-32 nuts.

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.

Tips for Improved Radio Signal Reception

- The higher the antenna the better. Start in the drop ceiling above the communicator 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, pointing either straight up or down. Do not mount the antenna horizontally.

Complete All Power-Related Wiring Connections

Power to the communicator is sourced from the host alarm panel 12VDC or 24VDC auxiliary output. There are two ways to make power and other connections between the panel and the TG-7FX communicator. One method is to make power and ground connections to the respective DC and GND connections on the last two slots on the supplied 7-position terminal block. The other method is via the telephone interface cable as described in Appendix 1. Similarly, a designated trouble zone should be wired to the TG-7FX STC1 terminals or via the telephone interface cable for reporting system trouble conditions from the communicator.

NOTE: Do not use a plug-in adapter or other non-panel power source on the TG-7FX.

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

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

UL Compliance Note: *All wiring shall be in accordance with NFPA 72 and NFPA 70.*

Step 3: Determine Antenna Placement for Best Performance

Connect Antenna

The Telguard communicator is supplied with an indoor antenna and an adapter cable for routing the antenna to the outside of the enclosure. The cable will connect to the TG-7FX at one end and, after routing the cable through an opening or knockout on the enclosure being used, connect to the antenna at the other end. Do not install the antenna in an area where the general public could reasonably be within 8 inches/20 cm.

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.

While the TG-7FX is supplied with an antenna for mounting to the outside of an approved enclosure, better reception may be obtained with the use of an antenna extension accessory (see Appendix 7).

Measure Received Signal Strength (RSSI)

Measure the received signal strength by pressing and releasing the RSSI button on the side of the TG-7FX. This switches the LEDs to signal strength mode. If you do not obtain the recommended minimum signal strength with the antenna mounted directly to the communicator (see [LED Indicator Guide – RSSI Mode](#)), you will need to use an extension cable (see Accessories in Appendix 7) 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 end of the antenna adapter cable, then slowly move the antenna to achieve maximum signal strength by pausing at each location for 6 seconds 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.

Consider Other Antenna Options

Antenna issues are unlikely unless the premises are located in a fringe network coverage area, in a building below ground level, or in a metal structure. Telguard offers a variety of high quality, low-loss antenna cables as well as high gain antennas. These accessories are listed in Appendix 7.

Step 4: Connect to Panel DACT and Activate

Connect alarm panel to the communicator. Plug the cable from the modular jack or Tip and Ring of the alarm panel (DACT) into the RJ-45 jack of the communicator.

UL Compliance Note: *For Commercial Fire installations, all connections from the alarm panel and the Telguard communicator must be mechanically protected and within 20 feet in the same room.*

Trip a zone on the alarm panel and confirm that the TG-7FX enables the alarm panel to transmit alarm events over the cellular radio network. The TG-7FX will confirm activation with the TCC if the registration form was completed prior to installation.

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

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

Special LED Indications during Activation

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

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

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

System Status LEDs Table:

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

Verify Alarm Signal Transmissions Over Cellular

Trip several alarms on the alarm panel and verify that the central station received them by calling the central station operator. Use a lineman's butt-set in **MONITOR MODE** connected to the communicator's "T" and "R" test pins to "listen" to communications between the alarm panel and the TG-7FX.

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

- Recheck signal strength. You need at least **RSSI = 2 ½ (TWO LEDS ON SOLID AND THIRD 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 alarm panel at the same time. If both a local signaling device and an alarm panel are required, then external relays are needed to provide additional uncommitted contacts.

Reprogram Alarm Panel to Send Proper Code

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

- **No Service Condition (NSC):** Disconnect the antenna from the TG-7FX. Check to see that the STC LED 2 flashes 4 times and if configured, alarm panel will detect the tripped STC after the selected period of time indicating loss of RF signal strength. Reconnect the antenna and check to see that the STC LED 2 goes off within the configured period indicating RF signal strength restored.

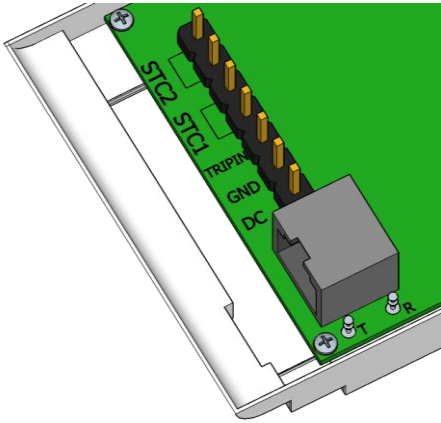
Step 6: Connect and Test the Trip Input (optional)

The trip input is connected to the external relay by wiring the external relay to the TRIP IN terminal (pin 6) of the terminal block, and the other side to the TRIP GND terminal of the same block (pin 5).

Note that trip inputs are commonly 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 to the TCC, which in turn will cause the TCC to send a message to the central station. If the communicator is configured to report restorals, the contact opening will also be reported.

UL 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



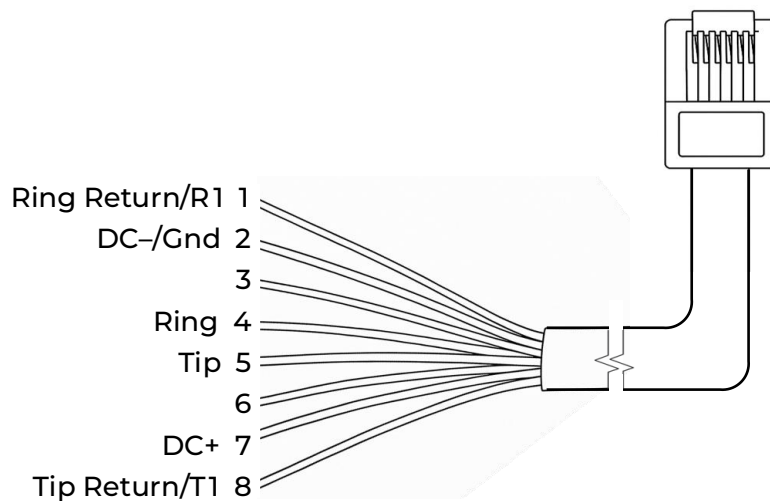
The TG-7FX has connections to the alarm panel for:

- Power (12 or 24 VDC)
- Dialer (DACT)
- Trouble (STC1)
- Supplemental Conditions (STC 2 and Trip Input)

For convenience, both the tip/ring and power connections can be made through a RJ-45 cable. While the Dialer (Tip and Ring) connection must be made through the RJ-45 cable, power can be supplied through either the RJ-45 cable or the terminal pins along the bottom edge of the TG-7FX board.

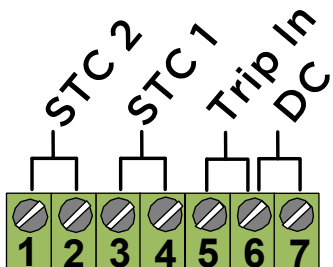
RJ-45 Connections

In addition to the tip and ring connections, the RJ-45 jack can be used to connect the panel's auxiliary DC power to the TG-7FX. The cable should be routed through the rear opening to allow the plastic lid to be closed properly.



Main Terminal Strip Connections (Connector Block)

The 7-position connector block provided with the TG-7FX can be used to make all connections except Tip and Ring, which use a RJ-45 cable. Power connections should be made either via the terminal strip or RJ-45 cable, but do not use both. Pin 6 is a shared ground connection available for both the Trip Input (if used) and the negative side of the DC power from the panel (if connected via the terminal strip).



Main Terminal Strip Pin Assignments

The following connections are available via the main terminal strip:

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 supplementary 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 TRIP IN	Trip Input	External trip relay.	Allows an external relay to trigger a zone on alarm panel.*	LED 7
6 GND	Ground	Ground side of panel Aux DC Power.	Ground connection for Trip Input and Power.	LED 7, 8
7 DC	DC power source	Positive side of panel Aux DC Power.	Regulated 12 or 24 VDC input to power TG-7FX.	LED 8

*** UL Compliance Note:** The STC2 and trip input features shall only be used for supplementary signaling. **Initiating zones shall not be connected to STC2 or trip input.**

Compatible Alarm Panels

Any UL Listed alarm panel that supports one of the formats listed below is compatible and may be used with the TG-7FX.

In order for the alarm panel to be compatible with the TG-7FX, the alarm panel must be programmed to transmit alarm messages to the central station using one of the following non-extended formats:

- Pulse Formats:
 - 3+1 pulse; 10pps, Double Round, 1400 Hz ack
 - 3+1 pulse; 20pps, Double Round, 2300 Hz ack
 - 3+1 pulse; 40pps, Double Round, 2300 Hz ack
 - 4+2 pulse; 20pps, Double Round, 1400 Hz ack
 - 4+2 pulse; 20pps, Double Round, 2300 Hz ack
 - 4+2 pulse; 40pps, Double Round, 2300 Hz ack
- Contact ID
- Modem IIe/IIla²/4
- SIA2 (SIA-DC-03 level 2 release at 300 baud)
- Sonitrol
- DMP

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

UL Compliance Note: *While the TG-7FX supports 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 TG-7FX under various exception conditions.

LED Indicator Guide – Normal Operating Mode

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

*** LED will continuously flash each pattern**

Troubleshooting Quick Reference Table

Telguard Event		LED Indication	Relay Output	Radio Message	Internal Action
STC * (System Trouble Conditions)	LPF	PWR LED 8 is off. STC LED 2 flashes continuously 1 time .	Optional	Optional	Verify connection from panel aux power and correct.
	NSC	STC LED 2 flashes continuously 4 times .	Optional	None	Continue to validate signal strength, NSC will restore when signal returns.
	RFC	STC LED 2 flashes continuously 5 times .	Optional	None	Wait for RFC restoral.
	DTF	STC LED 2 flashes continuously 6 times .	Yes	Yes	Internal dial tone voltage supply circuit failure.
	PPF	STC LED 2 flashes continuously 7 times .	No	Yes	Wait for PPF restoral.
Not Activated		Activation LED 1 off .	Yes	None	The communicator will not function until the first signal is sent to the TCC to activate the unit.
Automatic Self-Test		Radio LED 5 flashes during transmit.	None	Yes (Self-test)	Send Self-test information to central station via TCC, return to ready state.
Telguard Check Status		Radio LED 5 flashes during transmit.	None	Yes (Status data)	Send Status data to the TCC for review.
Telguard Enable and Configuration Update		Radio LED 5 flashes during transmit.	None	Configuration Data	The TG-7FX sends setup configuration to the TCC and switches to READY state to begin operation.
Disable TX (Initiated by TCC)		Radio LED 5 flashes when transmitting.	Yes	Yes (Status data)	TX capability is disabled until further notice. The TG-7FX 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 connection: the more LEDs illuminated (i.e., the higher the number of bars), the better.

To enter RSSI mode, press the RSSI button on the side of the communicator. A simple press and release of the RSSI button will place the TG-7FX in RSSI mode and another simple press will exit RSSI mode. Note that while the RSSI button is held in, LEDs 2-5 will blink in unison once per second.

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

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

Appendix 3 – Commercial Fire Sole Path Installation

Starting with the 2010 edition of NFPA 72, the TG-7FX can 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 above.

TG-7FX Signal Strength

Installation instructions for the Telguard TG-7FX indicate that a signal strength of -90dBm (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 communicator and antenna be installed in a location that provides the best signal strength possible.

Configure Alarm Panel for Sole Path

Fire panels are typically provided with two Telco connections in order to provide multiple reporting paths. With the TG-7FX having a single RJ-45 Jack, one of these Telco connections is no longer necessary for UL 864 compliance when using the TG-7FX as the sole path of communication. However, the panel will continue to supervise that unused 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.

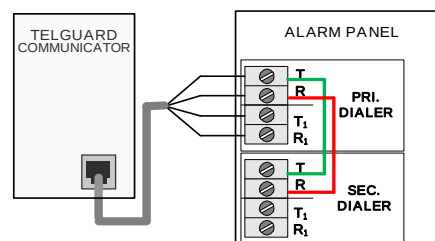
1. Disabling the Second Telco Connection

Some fire panels can be configured to disable the second Telco connection. Once the second Telco connection is disabled, the panel no longer supervises 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.

When using this method, it is important to test the TG-7FX device thoroughly. Make sure the panel does not report a problem 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 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 for each panel that uses more than one path, by selecting 6-hour supervision during registration.

Appendix 5 – Compliance with UL Standards

	UL Commercial Fire
Installation in an enclosure that is UL Listed in category UOXX and at least 13-3/8" x 12-7/8" x 3-1/4" (e.g., Altronix BC300)	Yes
Antenna cable outside of panel in flexible conduit concealed	Yes
Flexible or Rigid conduit required to protect connections #	Yes

NOTES: # 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 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

Operating power is derived from the auxiliary DC output of the alarm panel.

UL Compliance Note: *The DC power used must come from a regulated UL Listed Class 2 power-limited source.*

Regulated Input Voltage (Power Limited)	Current Draw		
	Idle No Supervision	Idle w/Link Supervision	Max during Transmission
24VDC	45mA	50mA	160mA
12VDC	75mA	80mA	300mA

Field Wiring Electrical Ratings

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

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

Trip Input: 30V/100mA Max Load

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-7FX radio provides data connectivity on LTE networks. The TG-7FX transceiver is FCC compliant, meeting all requirements of Part 15 and 27 testing. It is also certified as compliant to PTCRB requirements.

For TG-7FX-A units using AT&T service:

- Supported LTE Bands: 2, 4, 5, & 17
- FCC ID: N7NHL7688
- IC ID: 2417C-HL7688

For TG-7FX-V units using Verizon service:

- Supported LTE Bands: 4 & 13
- FCC ID: N7NHL7518
- IC ID: 2417C-HL7518

For all TG-7FX units:

- Antenna Port: SMA connector (female), 50-ohm
- Antenna Adapter Cable: SMA to TNC, 3 feet
- Antenna Type: TNC, 8 inches
- RF performances are compliant with 3GPP recommendation TS 36.101
- Physical Size: 5.6"H x 2.9"W x 1.3"D inches
- Shipping weight: 1.1 lbs.
- Operating Environment: 0° C to +49° C; 0 - 93% humidity (non-condensing)

Appendix 7 – Accessories

P/N	Description
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