TELGUARD

AMETEK®

TG-7FEM Dual Path Communicator
Installation & Operation Guide

December 18, 2024

Part Number 56055201 – Rev. A

SECURITY SIGNALING

UL LISTED

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 alarm communicators for the quality, features and total value they represent. The Telguard TG-7FEM meets UL standards for Commercial Fire, Commercial Burglary, and combination fire/burglary systems. The TG-7FEM offers cellular and Internet pathways for signal transmission. Cellular can be configured as the sole communication path, when applicable features are enabled.

Telguard communicators are protected by U.S. Patent 8,854,187. Additional patents pending.

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 TG-7FEM 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 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-7FEM 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 and/or the Local Area Network (LAN), needed to transmit alarm signals from protected premises to a central monitoring station, may be inoperable or temporarily out of service. Cellular radio networks and LANs 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, it is recommended 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.

INDEMNIFICATION OF TELGUARD

YOU SHALL INDEMNIFY, DEFEND, AND HOLD HARMLESS TELGUARD FOR ANY OF THE COST, INCLUDING REASONABLE ATTORNEYS' FEES, AND FROM CLAIMS ARISING OUT OF YOUR, YOUR CLIENTS' OR OTHER THIRD PARTIES' USE OR OPERATION OF THE PRODUCT: (i) FOR MISUSE OR IN A MANNER NOT CONTEMPLATED BY YOU AND TELGUARD OR INCONSISTENT WITH THE PROVISIONS OF THIS MANUAL; (ii) IN AN ILLEGAL MANNER OR AGAINST PUBLIC POLICY; (iii) IN A MANNER SPECIFICALLY UNAUTHORIZED IN THIS MANUAL; (iv) IN A MANNER HARMFUL OR DANGEROUS TO THIRD PARTIES; (v) FROM CLAIMS BY ANYONE RESPECTING PROBLEMS, ERRORS, OR MISTAKES OF THE PRODUCT; OR (vi) COMBINATION OF THE PRODUCT WITH MATERIAL MODIFICATION OF THE PRODUCT OR USE OF THE PRODUCT IN AN ENVIRONMENT NOT PROVIDED, OR PERMITTED, BY TELGUARD IN WRITING. THE PARTIES SHALL GIVE EACH OTHER PROMPT NOTICE OF ANY SUCH COST OR CLAIMS AND COOPERATE, EACH WITH THE OTHER, TO EFFECTUATE THIS INDEMNIFICATION, DEFENSE AND HOLD HARMLESS.

WARRANTY and LIMITATIONS

TELGUARD WILL REPAIR OR REPLACE (OUR OPTION) INOPERATIVE UNITS FOR UP TO TWO YEARS FROM DATE OF MANUFACTURE. EXCLUDES DAMAGE DUE TO LIGHTNING OR INSTALLER ERROR AS WELL AS UNITS THAT INCORPORATE MATERIAL, OR USED IN A MANNER OR ENVIRONMENT, NOT SPECIFICALLY AUTHORIZED IN THIS MANUAL. UNAUTHORIZED MODIFICATIONS VOID THIS WARRANTY. NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. LIABILITY LIMITED TO PRICE OF UNIT. THIS IS THE EXCLUSIVE WARRANTY, IN LIEU OF ALL OTHER WARRANTIES INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, DELIVERY, INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND NO OTHER WARRANTIES WILL BE HONORED, WHETHER EXPRESSED OR IMPLIED.

Table of Contents

General Description and Operation

The Telguard® TG-7FEM communicator is an alarm transmission device that facilitates the use of either a cellular network or an internet-connected LAN (Ethernet) for signal delivery for commercial alarm panels. The TG-7FEM supports multiple modes of operation, including:

- Dual Path Cellular and LAN, with one set as primary and the other backup
- Cellular Only (used for Sole Path)

In Dual Path mode, the communicator can use either the cellular or LAN path to transmit an event from the panel and fail over to the other path when the primary becomes unavailable. In Cellular Only mode, the communicator will not monitor for a LAN connection and strictly use cellular for transmission. This mode also offers the ability to supervise the connection to meet specific fire or intrusion requirements.

The TG-7FEM includes Multi-carrier technology from Telguard. With Multi-carrier, the communicator is pre-configured for operation on the cellular networks of AT&T, T-Mobile, and Verizon. When the TG-7FEM is first connected to a power source, the Carrier Selection Process (CSP) determines the signal strength of each carrier for that location. The communicator is set to the carrier with the strongest signal. The CSP ranking is used to determine the carrier network to switch to should an outage be detected with the selected carrier. This behavior occurs automatically and no action by the installer is necessary.

In a typical alarm installation, the communicator is installed in the same area as the host alarm system and is connected directly to the dialer of the host alarm panel via the **communicator's** telephone jack (black RJ-45). The TG-7FEM transmits alarm, trouble, and supervisory signals from the panel via a cellular radio or via an Ethernet cable that connects the Ethernet jack (silver RJ-45) with an Internet-enabled premises LAN.

Two programmable System Trouble Condition (STC) relays are available for connection to the host **alarm panel's trip zone input terminals in order to provide Telguard trouble signals to the alarm** panel. The communicator supports several 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 12VDC or 24VDC regulated power supplied by the connected alarm panel. The TG-PEM Accessory is also available for cases where a DACT connection is not available or more inputs are required (with panel power connection only).

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 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-7FEM adheres to the UL requirements for fire and intrusion systems:

Model	Application	UL Standards
TG-7FEM	Dual Path Communication for Fire and Burglary Systems in United States*	UL 864 and UL 1610

* 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.

Information Related to Software Settings

<table>
<tr><td colspan="2">NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, OTHER INVOLVED PARTIES</td></tr>
<tr><td colspan="2">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.</td></tr>
</table>

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	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	3-, 5- 10-, 20-, 30-, 45-, 60-, 1440- minutes	3 minutes

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

The TG-7FEM 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 TG-7FEM shall have cellular connection supervision enabled).

Additionally:

- When the heartbeat transmission is enabled, the communicator can provide Standard Line Security over the cellular channel.
- The communicator shall be powered from the 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.

Features

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

Operating Mode

The TG-7FEM Dual Path Communicator is installed at protected premises to provide signal transmission over cellular and Internet-enabled LAN connections for alarm systems. The communicator transmits alarm signals over an automatically-selected nationwide digital cellular network if the premises Internet connection has been disrupted or compromised, when there is no LAN connection available, or when set for primary or sole path use of the cellular pathway. When set in LAN primary mode, the communicator will first attempt to transmit alarm signals over the LAN pathway.

Multiple Alarm Format Support

The Telguard TG-7FEM 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 connection to the alarm panel and the cellular and LAN (when not set in cellular-only mode) 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.

LAN Failure Condition (LANFC)

The communicator monitors the LAN connection by verifying that messages can be sent to the Telguard Communications Center (TCC) and an acknowledgment returned. If an initiated message cannot reach the TCC, a LAN Failure Condition (LANFC) is declared and the LEDs indicate the type of trouble condition. The System Trouble Condition LED (STC LED 2) will flash 3 times, and the STC relay will trip after a programmable period of time. LED 6 (LAN STC LED) will also flash in a specific pattern to indicate the possible cause of the LANFC issue:

- Single flash: LAN connection not detected. *Check the wiring connection between the communicator's silver RJ-45 and premises LAN port (typically a router or switch).*

- Two flashes: Unable to obtain IP Address from LAN. *Check with the System Administrator for the premises. A static IP address may be needed.*

- Three flashes: Unable to reach Internet. *Check with the System Administrator for the premises. The Gateway Address may be incorrect.*

- Four flashes: Expected TCC acknowledgement not received. *Call Telguard Technical Support as additional troubleshooting will be required.*

NOTE: When the communicator is configured to use a sole communications path (cellular), the LAN Failure Condition (LANFC) is not applicable and LED 6 will remain off.

No Service Condition (NSC)

A no service condition (NSC) occurs when the TG-7FEM is unable to register with a 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 a 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.

NOTE: When End-to-End acknowledgement 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 <u>Disabled</u> and needs to be Enabled for its use.

UL Compliance Note: If the wiring distance between the panel and the communicator is greater than 20 ft. or the connection is not mechanically protected, PPF must be enabled. Since fire systems must comply with these restrictions (UL 864), PPF is not required for fire systems.

Link Supervision

In order to satisfy UL requirements, the TG-7FEM can enable link supervision at preset intervals. Once the TG-7FEM is provisioned with the Link Supervision option, the TCC constantly monitors all the enabled pathways 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.

Standard Line Security (UL Burglary Systems Only)

The TG-7FEM is rated single/dual line transmission, Standard Line Security. For dual line transmission, the primary path is connected to the panel's DACT for Line 1; the communicator's cellular path is secondary and is connected to the panel's DACT for Line 2.

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 also supervised. Furthermore, the communicator can report on low voltage events when powered from a DC source at 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 (≥8VDC), the Power LED turns on immediately and the STC trip output restores after 60 seconds.

Dial Tone Failure (DTF)

The TG-7FEM 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-7FEM will supply 30VDC by default but can be configured to supply 40VDC as needed. A Dial Tone Failure (DTF) occurs when the communicator is unable to provide proper telephone signaling to the panel (voltage supplied drops while the alarm panel is on-hook). The STC LED will flash 6 times and the STC relay will trip.

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

Catastrophic Failure (CF)

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

Telguard Automatic Self-Test Report

The automatic self-test signal schedule for reporting to the central station is programmable as prescribed when the communicator is registered. 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:

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

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 Compliance Notes:
- *In Fire installations, STC2 (normally closed) cannot be used for communicating with the alarm panel; only STC1 (normally open) can be used.*
- *In Burglary installations, when an alternate communications path is connected to another alarm panel-Telco interface or DACT, an STC relay shall be programmed to trip on NSC and wired to an available zone on the panel.*

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-7FEM, 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. The alarm system should be placed in test mode with the central station.

Diagnostic and Status LEDs

Eight 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 communications. They can also provide a cellular 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-7FEM 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-7FEM 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 again operate the way they did prior to installation.

UL Compliance

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

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

Getting Ready

The communicator can only be activated when all necessary accounting information has been added to the TCC customer database (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 prior to going to the job site. The following items are shipped with each TG-7FEM:

- Telguard Cellular Communicator
- Cellular Antenna
- Antenna Cable and Mounting Bracket
- AC Power Adapter
- Battery Connection Cable
- Pluggable screw terminal blocks (2-, 3-, & 6- position)
- Enclosure Key
- Quick Install Guide

PRINTED CIRCUIT BOARD (PCB)
INSIDE METAL ENCLOSURE

MOUNTING BRACKET

12FT ANTENNA CABLE

LTE ANTENNA

ENCLOSURE KEY

AC ADAPTER

TERMINAL BLOCKS

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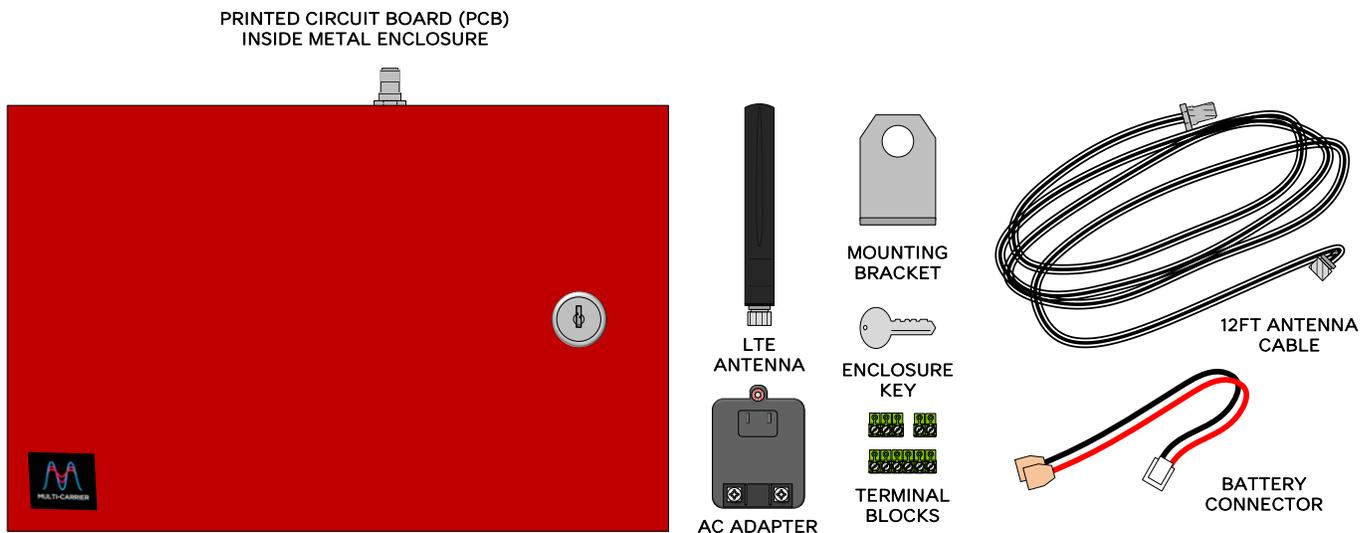
NOTE: The communicator registration should be completed in advance to avoid installation delays

You must also have certain installation test tools:

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

PCB Layout
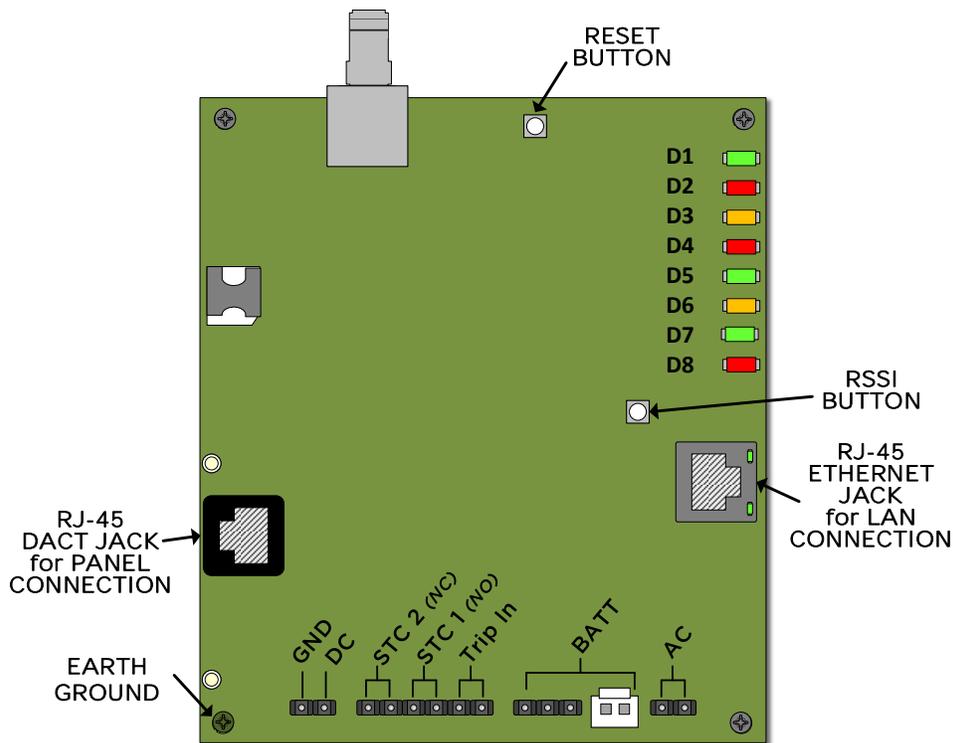
Installation

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-7FEM communicator
3. Connect to panel auxiliary power to start Carrier Selection Process
4. Determine best antenna placement
5. Connect to panel DACT, to LAN, and activate
6. Connect supervisory trip outputs

Optional Connections:

- Trip Input
- Tamper Switch (required for burglary systems)

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

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

Step 1: Register the TG-7FEM Communicator

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

The registration form must be completed online in the 24/7 dealer portal at 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.

Select the Mode of Operation

The TG-7FEM has three modes of operation:

- Dual Path – Cellular primary, LAN backup
- Dual Path – LAN primary, Cellular backup
- Sole Path – Cellular only

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

NOTE: When an alternate communications pathway is connected to another alarm panel DACT interface (usually a Telco connection), the TG-7FEM can be used as either a Primary or Secondary Path. In such cases, panel settings determine the whether the DACT connected to the TG-7FEM or the DACT connected the alternate pathway will be used.

LAN (Ethernet) Configuration

The communicator is set to automatically configure a LAN connection using DHCP. If a static IP address is required for the premises where the alarm is located, it can be configured from the Telguard portal at portal.telguard.com. If the system administrator of the premises requires MAC address information, it can be found on a label on the communicator or in the portal.

UL Commercial Fire Sole Path (Cellular Only Mode) Features

- Link Supervision: When registering a TG-7FEM device for commercial fire applications, use the link supervision option in accordance with local requirements (5-minute or 60-minute).
- 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 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.
- LANFC: Trips after a 60-second delay (delay is programmable) on a failure of the LAN connection. Restores automatically after LAN connection is reestablished.
- NSC: Trips after a 3-minute 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 Notes:

- *In Fire installations, STC2 (normally closed) cannot be used for communicating with the alarm panel; only STC1 (normally open) can be used.*
- *ACFC/LPF trigger must be set in the range of 1 to 3 hours in accordance with UL 864.*
- *NSC delay must not be more than 3 minutes in accordance with UL 864.*

Optional Trip Input

When the input is tripped, a supervisory message is sent to the central station. 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 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-7FEM in Desired Location

Identify Location for Placing the TG-7FEM Device and Mount

Do not install the communicator in an area where the general public could reasonably be within 8 inches/20 cm 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.

Prior to mounting, determine how you will make all power and signal connections. There are several available knockouts on the TG-7FEM enclosure for accepting ½" conduit connectors. Punch out the needed knockouts by placing a screwdriver in the center of the knockout and strike the screwdriver with a hammer. Conduit hubs must be connected to the conduit before the hub is connected to the enclosure.

Care should be taken to ensure that a large metal object such as a refrigerator or a metal cabinet is not located on the opposite side of the wall. If moving the communicator to a different location is not practical, you may need to purchase an extension cable to remote the antenna in order to receive adequate radio signal strength (see Appendix 7). 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 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.

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

- Install mounting screw (not supplied).
- Slide the enclosure onto the screw.
- Verify communicator 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 in intrusion systems for adding 8 24-hour dry contact zones.

- The TG-PEM Accessory can be used in fire systems where the panel does not have a DACT/dialer. In that case, the panel relays for Alarm, Trouble, and Supervision will be connected to individual zones on the TG-PEM.

- The TG-PEM 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.*

Connect Antenna

In most cases, the supplied antenna can be mounted directly to the TG-7FEM. If necessary, the antenna may be moved to a better signal location using an extension cable and bracket accessory (not included; see Appendix 7). 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.

Make sure the antenna is connected before proceeding.

Step 3: Connect to Panel Auxiliary Power to Start Carrier Selection Process

Complete Power-Related Wiring Connections

The communicator can be powered by AC (from a 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:

Recommended Wire Size	Length Not to Exceed
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 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.**

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

Recommended Wire Size	Length Not to Exceed
22 ga	10 ft
20 ga	20 ft
18 ga	60 ft (20 ft max. for fire systems)

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

Allow the Carrier Selection Process to Run

Once power has been supplied, the TG-7FEM completes a brief initialization and then begins the Carrier Selection Process (CSP). The CSP evaluates the three carriers to determine the best signal by connecting to each carrier and measuring characteristics of that connection. The initialization and CSP generally takes 4-6 minutes (it may take a little longer in areas with limited service). It is important that the antenna remain in the same location throughout the CSP.

During the CSP, LED 5 (representing Cellular Radio Activity) and LED 4 (representing Waiting for Response) will alternately illuminate. Following the evaluation, the TG-7FEM is set to the carrier with the strongest signal and only LED 8 (Power) will remain on.

Step 4: Determine Antenna Placement for Best Performance

Measure Received Signal Strength (RSSI)

While the CSP sets the TG-7FEM to the strongest carrier, antenna adjustments may improve the reception further. 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 communicator (see LED Indicator Guide – RSSI Mode), you will need to use an extension cable (not included, see 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 communicator 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 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.

Return to regular operating mode by pressing and releasing one of the RSSI buttons. The communicator will automatically switch back to operating mode after five minutes in RSSI mode.

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.

Deciding Whether to Repeat the Carrier Selection Process

Making an antenna adjustment does not change the selected carrier since, in most cases, the strongest carrier at the premises will not change. If desired, you can repeat the Carrier Selection Process prior to fully activating the communicator in Step 5. To repeat the CSP, press and release the Reset button. It will take an additional 4-6 minutes to restart the TG-7FEM and run the CSP.

Step 5: Connect to Panel DACT, to LAN, and Activate

Connect 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 TG-7FEM. Connect a cable from a router or other premises LAN port to the silver RJ-45 jack of the communicator; the LEDs on the jack should illuminate or flash to indicate the LAN port is active. Consult PCB Layout section above for jack guidance. 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.

UL Compliance Note: *For Commercial Fire systems, all connections from the alarm panel and the Telguard communicator must be mechanically protected and no greater than 20 feet in distance.*

Trip a zone on the alarm panel and confirm that the TG-7FEM enables the alarm panel to transmit alarm events over the selected cellular radio network. During processing, the communicator and the TCC will exchange data to complete the configuration. Once this process is complete, the TCC transmits a message back to the TG-7FEM 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 <u>NOT</u> be transmitted to the central station.

Special LED Indications during Activation

The results of the activation process will be displayed on the LEDs.

System Status LEDs	Activation Indications
LED 1 ON	Activation Successful
LED 6 ON	LAN Connection Validated
LED 1-5 FLASHING (or LED 1 & LED 4 flashing)	Failed – Unit Not Registered or Cellular Service Problems (see below)
LED 1 FLASHING (only LED 1 flashing)	Can't Activate – Unit is Disabled Call Customer Service for Assistance

When multiple LEDs—including LED 1—are flashing, activation did not complete. Make sure the unit is registered at portal.telguard.com. Then, clear the fault by pressing the RSSI button twice 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 assistance.

LED 6 should remain on unless the TG-7FEM was set to Cellular Only, in which case it should remain off. If LED 6 is flashing in a regular pattern, refer to the Troubleshooting Guide in Appendix 2.

Verify Alarm Signal Transmissions Over Cellular

To test the cellular connection, start by temporarily disconnecting the LAN cable connection from **the communicator's silver** RJ-45 jack that goes to the host router or switch. 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-7FEM.

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, 800-229-2326 option 9.

Once the cellular connection is verified, reconnect the LAN cable to the silver RJ-45 jack.

Verify Alarm Signal Transmissions Over LAN Path

This step is necessary when the communicator is in dual path mode with LAN either primary or secondary. To test the LAN pathway, start by temporarily disconnecting the antenna from the communicator Trip several alarms on the alarm panel and verify that the central station received them by calling the central station operator.

Once the LAN pathway is verified, reconnect the communicator antenna.

Step 6: 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 Compliance Note: *The communicator will at a minimum have the trip output connected to the alarm panel to indicate A/C failure (ACFC) and low battery (LBC) conditions when the communicator is using its own power supply and not powered by the panel.*

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.

- AC Failure Condition (ACFC): Disconnect the provided power adapter and check to see that the AC POWER LED goes out and the STC LED 2 flashes once indicating that AC power is missing. Reconnect the AC adapter and check to see that the AC POWER LED goes on and the STC LED 2 goes off indicating that AC power has been restored. No transmissions will be sent to the Central Station. The AC power must be off, continuously, for 2 hours before the STC relay causes the alarm panel to send a trouble code. 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 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 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.

- LAN Failure Condition (LANFC): Disconnect Ethernet LAN cable from the silver RJ-45 jack. LED 2 flashes 3 times to indicate LAN failure, and LED 6 will flash 1 time to indicate the LAN failure reason being a disconnected cable. If monitored, after configured period the panel transmits the STC trouble code (over cellular) to the Central Station indicating the LAN connection is not available. Reconnect LAN cable and check to see that LAN restoral is indicated by STC LED 2 turning off after the configured period.

- No Service Condition (NSC): Disconnect the antenna and the Ethernet LAN cable from the communicator. 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. Reconnect LAN cable following the NSC test.

   There are two items to keep in mind when conducting the NSC test. First, in some locations, the cellular signal may be strong enough to reach the communicator even though the antenna is removed. Placing a barrier over—not touching—the antenna connector that contains metal (such as a small can) may help block the signal.

   Second, the loss of cellular signal for an extended period will cause the communicator to change the selected carrier in an attempt to restore service. When the antenna is replaced, the TG-7FEM will remain on the last selected carrier.

Optional Connections

Trip Input

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

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

Tamper Switch

A tamper switch is required when installing TG-7FEM for Commercial Burglary or combination Fire and Burglary Applications (not included). Its use is optional in Fire-only applications. The TG-TAMPER Accessory is available for this purpose. Wire the Tamper switch to a zone on the panel that is designated for Tamper Protection.

Wiring Diagrams

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

- Dual Path with Cellular and LAN *(one is primary with the other as backup)*
- Cellular Only where the TG-7FEM is the only communication path connected to the panel *(fire systems require Link supervision set to 5-minutes or 60-minutes)*
- Cellular Only where the fire panel also uses a second communication path

Scenario 1: Dual Path Wiring—Applicable to Cellular or LAN Primary

Physical installation is the same for either Dual Path mode of operation. The configuration chosen during registration is what determines which is the primary and which is the secondary path. In this configuration, the LAN connection will be monitored by the communicator.
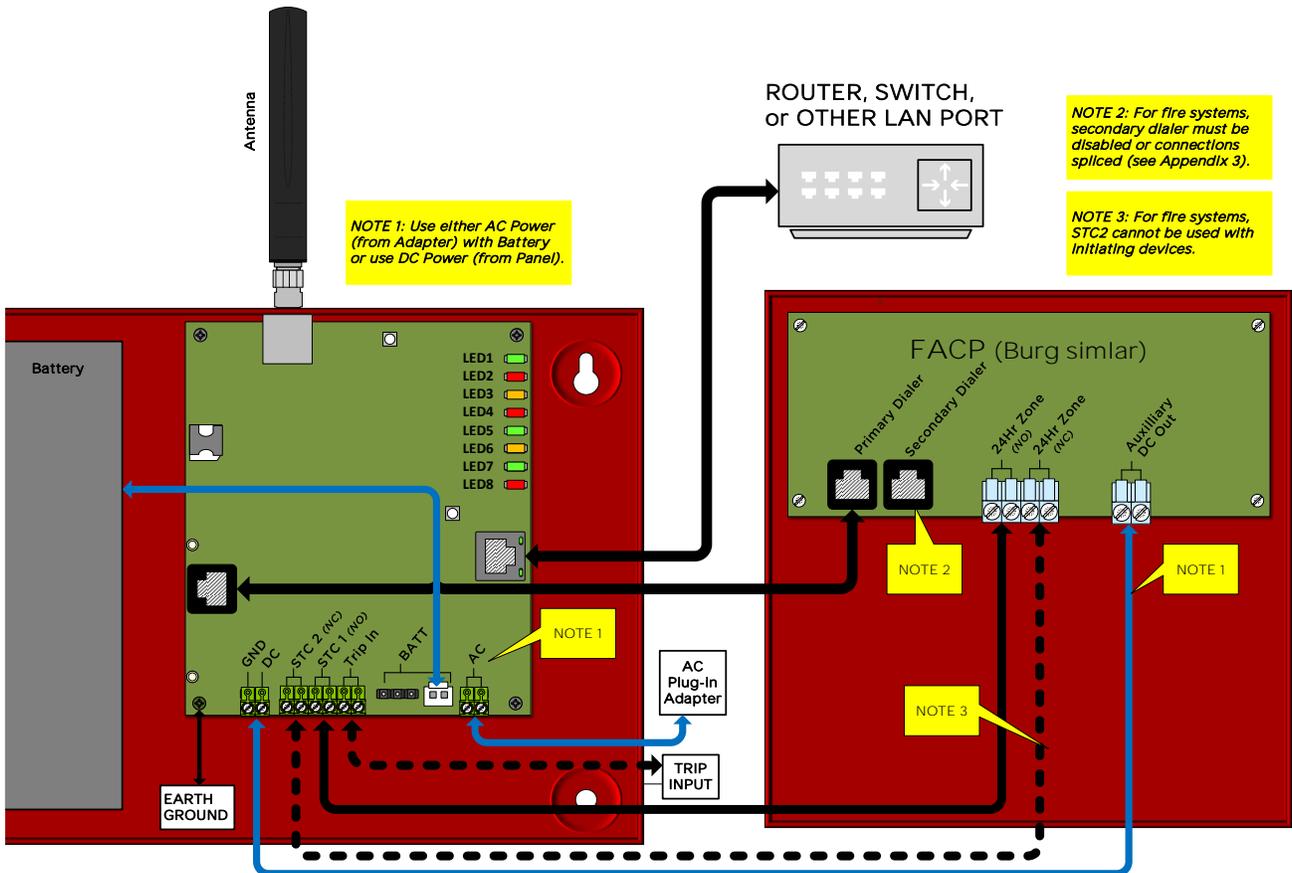
Scenario 2: Cellular-Only Wiring (When Communicator is Only Path Used)

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 form of communication that is active. For commercial fire installations, a specific level of link supervision may be required (generally 5 minutes or 60 minutes).

In this configuration, the LAN connection is not being used or monitored by the communicator.
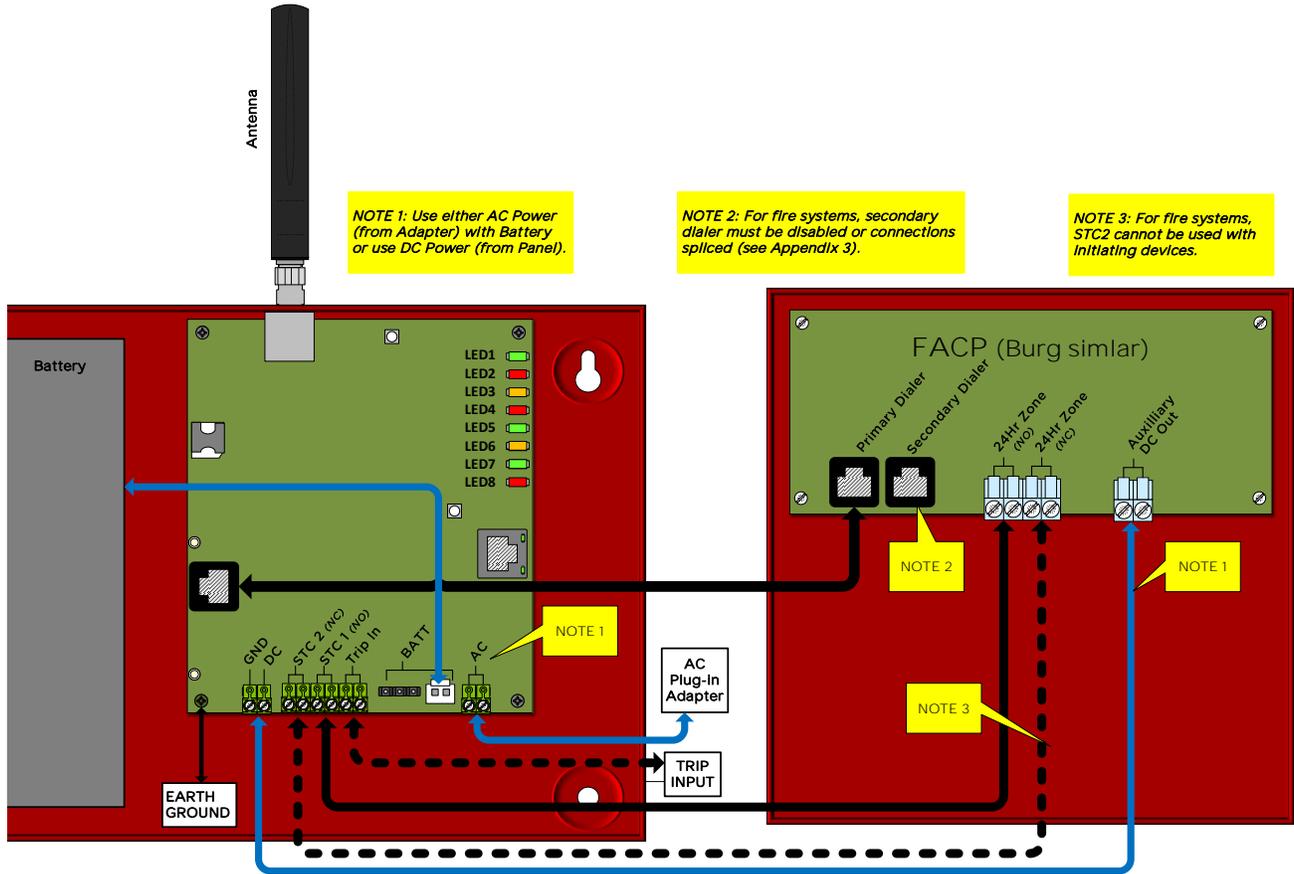
Scenario 3: Cellular-Only Wiring (When Second Communication Path to FACP is Used)

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 communicator. 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.
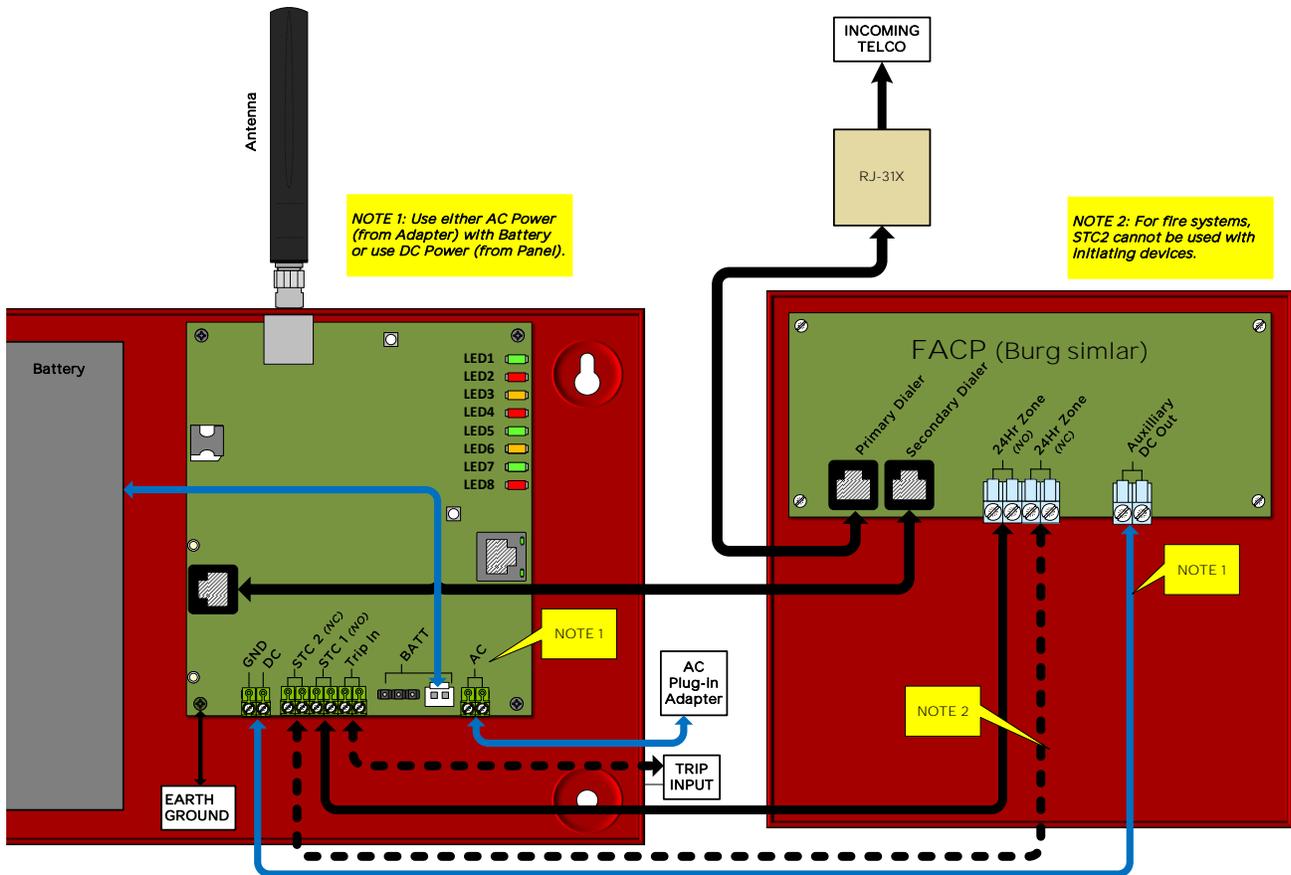
Installation of AC Adapter

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.

COVER

8 IN.

8 IN.

FRONT VIEW

6 IN.

SIDE VIEW

LISTED PULL BOX WITH LISTED OUTLET BOX AND RECEPTACLE

WALL

LISTED PULL BOX

LISTED TRANSFORMER

LISTED OUTLET BOX AND RECEPTACLE

ULTPDE.VSD
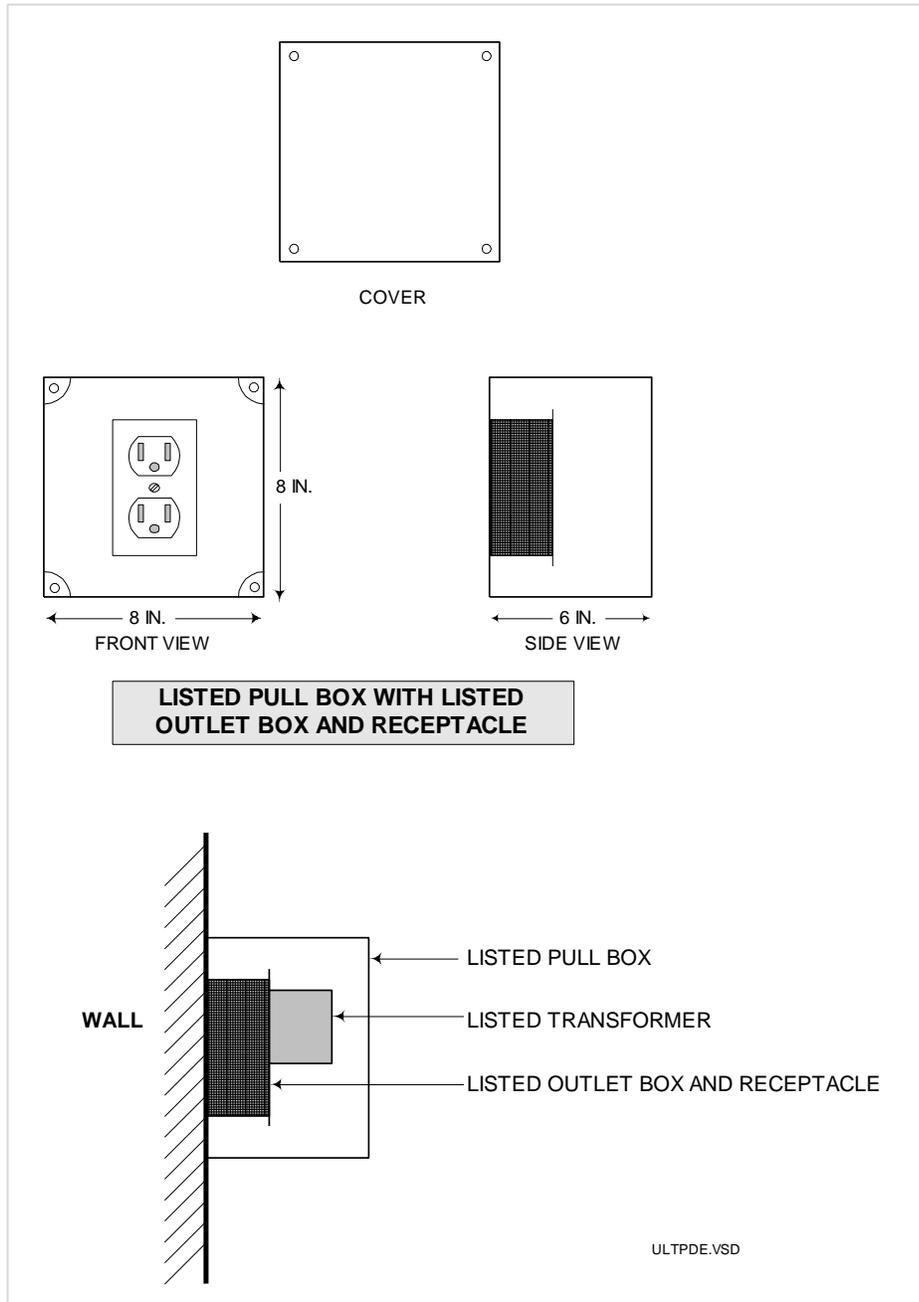
RJ-45 Jack Pin Assignments

Jack	Connects To	Pin Assignment	Function	Status LED Reference
Black	Digital Dialer input/output of host alarm panel.	1 = Brown R1 2 = Blue 4 = Green R (Ring) 5 = Red T (Tip) 7 = Orange 8 = Gray T1	Connects alarm panel to TG-7FEM for transmitting alarm signals.	If PPF is ENABLED, STC LED 2 will flash 7 times when alarm panel is not detected.
Silver	Router, Switch, or other LAN port.	Per CAT-5 or higher standard. Crossover cables and PoE not supported.	Connect communicator to premises LAN for transmitting alarm signals.	LED 6 stays illuminated for verified connection. Otherwise, STC LED 2 will flash 3 times and flash pattern on LED 6 will indicate reason.

DC Terminal Strip Pin Assignments

Terminal Strip Pin	Definition	Connects To	Function	Note
1 GND 2 DC	Power input	Regulated 12VDC or 24VDC Source	Supplies electric power to the communicator	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	Trip Ground	External trip relay.	Allows an external relay to trigger an alarm signal.	LED 7
6 IN	Trip Input			

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 Listed alarm panel that supports one of the formats listed below is compatible and may be used with the TG-7FEM:

In order for the alarm panel to be compatible with the TG-7FEM, 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/IIIa[2]/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-7FEM 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.*

This section provides a summary of all LED indications and their meanings, as well as the expected behavior of the TG-7FEM under various exception conditions.

Troubleshooting Quick Reference Table

Telguard Event		LED Indication	Relay Output	Radio Message	Internal Action
STC * (System Trouble Conditions)	ACFC or LPF	PWR LED 8 is off. STC LED 2 flashes continuously 1 time.	Optional	Optional	Use standby battery if present, monitor battery, monitor AC for restoral. Or, wait for panel power.
	LANFC	STC LED 2 flashes continuously 3 times. LED 6 indicates cause.	Optional	Yes	Wait for LAN restoral.
	NSC	STC LED 2 flashes continuously 4 times.	Optional	None	Continue to validate RSSI, 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.
LANFC (Local Area Network Failure Condition)	LAN not detected	LED 6 flashes continuously 1 time.	Optional	Yes	A cable must connect the communicator to an operational LAN port, router, or switch.
	LAN IP Address not set	LED 6 flashes continuously 2 times.	Optional	Yes	Consult System Admin for premises. Static IP address may be required.
	Unable to reach TCC	LED 6 flashes continuously 3 times.	Optional	Yes	Consult premises System Admin. Gateway info may be incorrect.
	No TCC response	LED 6 flashes continuously 4 times.	Optional	Yes	Validation error. Contact Telguard Technical Support for assistance.
Carrier Selection Process Running		LED 4 alternates flashing with LED 5.	No	Yes	Stops flashing when complete and carrier set.
Not Activated		Activation LED 1 off.	Yes	None	TG-7FEM will not function until first signal is sent to TCC to activate.
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	Con-figuration Data	TG-7FEM sends configuration data 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 disabled until further notice. The TG-7FEM can still receive radio signals from the TCC.

* *The STC LED will flash all applicable indications in sequence and then repeat the sequence.*

LED Indicator Guide – Normal Operating Mode

LED Symbol	Color	Showing	Indication
LED 1 Activation	Green	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*	ACPC — AC Power Condition *or* LPF – Low Power Failure
		2 Flashes*	LBC – Low Battery Condition
		3 Flashes*	LFC – LAN Failure Condition (see LED 6)
		4 Flashes*	NSC – No Service Condition
		5 Flashes*	RFC – Radio Failure Condition
		6 Flashes*	DTF – Dial Tone Failure
		7 Flashes*	PPF – Panel Presence Fail
LED 3 Panel Connection	Yellow	Off	Idle / on-hook
		Flash	In Use
		Flash (2 per 6 secs)	Panel Connection Supervised
LED 4 Waiting for Response	Red	On	TG-7FEM waiting for acknowledgement from the TCC
		Off	Idle state
		Flash	When alternating flashing with LED 5, CSP Running
LED 5 Radio Status	Green	On	TG-7FEM initializing with cellular network
		Off	TG-7FEM initialized
		Flash (2 per 6 secs)	Link Supervision enabled
		Flash (rapid)	Sending/Receiving activity
		Flash	When alternating flashing with LED 4, CSP Running
LED 6 LAN Pathway	Yellow	On	LAN connected and operational
		Off	Pathway not in use
		1 Flash*	Disconnected from LAN
		2 Flashes*	Network not detected
		3 Flashes*	TCC could not be reached
		4 Flashes*	TCC did not acknowledge
		Flash (1 per 4 secs)	LAN pathway initializing
LED 7 Trip Input	Green	On	Trip Input activated
		Off	Trip Input not activated or is restored
LED 8 Power	Red	On	Panel power or AC power connected to unit
		Off (+other activity)	Operating from communicator backup battery

* The STC LED will flash all applicable indications in sequence and then repeat the sequence.

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.

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 values are presented for the currently selected carrier only. LED 7 indicates the current carrier. Go to portal.telguard.com to review carrier information, including recent RSSI values.

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 (Min. 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.

Information provided by other LEDs in RSSI Mode:

LED	Pattern Displayed	Indication
LED 1	ON	More than one cell tower within range
LED 7 Current Cellular Carrier	1 flash repeating	AT&T
	2 flashes repeating	T-Mobile
	3 flashes repeating	Verizon

Appendix 3 – Commercial Fire Sole Path Installation

The TG-7FEM is suitable for use as a sole path for fire communications. By following the 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-7FEM Signal Strength

Installation instructions for the Telguard TG-7FEM 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 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-7FEM having a single RJ-45 Jack for connecting to the panel, one of these DACT connections is not necessary for UL 864 compliance when using the TG-7FEM as the sole path of communication. 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 can provide 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". 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-7FEM thoroughly. Make sure the panel does not report a problem with the second line, especially when reporting to the central station.
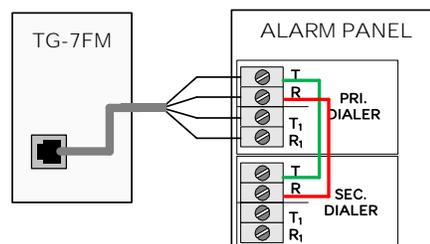
Appendix 4 – Commercial Fire 6-hour Supervision

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 later editions (2016, 2019, and 2022) 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 Comm Burg	UL Comm Fire	UL Comm Fire/Burg
UL Listed Bell and Bell Housing *	Yes	Optional	Yes
Enclosure tamper Switch connected to 24-hour circuit	Yes	Optional	Yes
Antenna cable in flexible conduit concealed	Yes	Yes	Yes
Flexible or Rigid conduit required to protect connections #	Optional	Yes	Yes

 * *Use Mercantile Listed bell and bell housing*

 # *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 Requirements

| Input Voltage (source)	Current Draw		
	Idle No Supervision	Idle w/Link Supervision	Max during Transmission
12VDC regulated (from panel)	125mA	128mA	148mA
24VDC regulated (from panel)	64mA	68mA	77mA
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
AC Input: J20

Not Power Limited Circuits
Battery Charging: J15 & J19
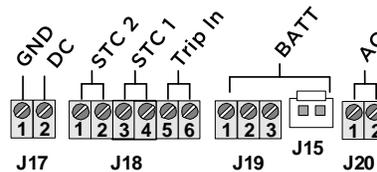
UL Compliance NOTE: *Wiring in circuits that are power limited must be separated from wiring in circuits that are not power limited by at least ¼ inch.*

System Faults Impedance
Trip Input: < 750 Ω considered short circuits and > 10 kΩ considered open circuits

Digital Cellular Radio and Other Specifications

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

- AT&T service bands: 2, 4, 12
- T-Mobile service bands: 2, 4, 12, 66
- Verizon service bands: 4, 13
- FCC ID: N7NHL78M
- Antenna Port: TNC connector (female), 50-ohm
- RF performances are compliant with 3GPP recommendation TS 36.101
- Physical Size: 11.5 x 7.5 x 3.5 inches (exclusive of antenna)
- Shipping weight: 7.8 lbs.
- Operating Environment: 0° C to +49° C; 0 - 93% humidity (non-condensing)

Appendix 7 – Accessories

Part Number	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