TG7-FP

TELGUARD COMMUNICATOR FOR COMMERCIAL FIRE APPLICATIONS

ARCHITECTURAL AND ENGINEERING SPECIFICATION

TELGUARD

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1 General

1.1 Purpose

When preparing a specification or quotation for the use of a Telguard cellular device in a commercial fire application, it may be necessary to supply a detailed functional description of the equipment. The architectural and Engineering Specifications presented in this publication cover such information for the TG-7FP models—indiscriminate of carrier variance—and are intended to be used for this purpose as required.

1.2 Scope

Although the hardware carrier is different, the hardware is constant for all TG-7FP models. This Architectural and Engineering Specification document contains detailed functional description for the following Telguard units to work in conjunction with FACP systems with DACT connections:

- TG-7FP for AT&T Wireless (Model No. TG-7FP-A)
- TG-7FP LTE for Verizon (Model No. TG-7FP-V)

1.3 Warranty

Telguard sells its hardware through authorized distributors. As such, Telguard has a responsibility to repair or replace (our option) inoperative units for up to a specified time from date of manufacture. The warranty period is agreed upon by the distributor upon purchase. This excludes damage due to lightning or installer error. Unauthorized modifications void this warranty. Telguard is not responsible for incidental or consequential damages. Liability is limited to price of unit to the distributor.

2 System Summary

2.1 Unit Description

The Telguard TG-7FP is a digital cellular radio alarm transmission device intended to be used as a communication path for FACP units via a cellular network:

2.2 System Overview

Depending on the configuration (determined at time of installation), the FACP will use the TG-7FP as sole transmission path to deliver alarm messages. When transmitting an alarm signal using the cellular path, the Telguard obtains its data from the alarm panel by way of a Telco line interface. The Telguard will obtain all alarm signal information including monitoring station phone number, account number and all zones for every alarm transmission. The Telguard handshakes with the FACP causing it to transmit the alarm data. The Telguard encodes the alarm data and transmits to the Telguard Communication Center (TCC) over the digital cellular network. The TCC performs a function similar to a central station receiver and issues the transmission acknowledgement when the last message in the transmission is received. After decoding and reformatting, the alarm signal is routed to the appropriate alarm company monitoring station for action.

If used as a second communication path for a fire system, the incoming Telco line is connected from the premises' RJ-31x jack directly into one of the RJ connections of the panel, while the Telguard connects to the second RJ connection on the alarm panel in the normal fashion. Two programmable System Trouble Condition (STC) relays provide supervisory trip outputs for connection to the FACP's trip zone input terminals in order to provide a Telguard trouble signal. Additionally, automatic self-test and remote query signals are transmitted exclusively over the cellular network. No extra modules are required. The Telguard TG-7FP will connect to the FACP's auxiliary power connection for power.

2.2 Approvals

- UL: Underwriters Laboratories Inc
- ULC: Underwriters Laboratories of Canada
- CSFM: California State Fire Marshall
- FDNY: Fire Department of New York

2.2.1 UL Listings

- UL 864: Standard for Control Units and Accessories for Fire Alarm Systems
- UL 1610: Standard for Central-Station Burglar-Alarm Units
- ULC S559: Fire Signal Receiving Centres and Systems
- ULC S304: Central and Monitoring Station Burglar Alarm Units

3 Functional Description

3.1 Signal Transmission from FACP to Central Station

The path of a signal from the FACP to the Central Station receiver through the TG-7FP unit has three main stages:

1. Local capture of the signal: Using dialer capture technology
2. Data delivery to the TCC: By means of the carrier for the particular model
3. Delivery of the signal from the TCC to the Central Station: Through a choice of IP or PSTN connection

3.1.1 Dialer Capture

The TG-7FP unit has a patented integrated interface that allows digital dialers to dial into the unit using the following specifications:

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

As long as the TG-7FP unit has a proper connection to the wireless network, it will provide a dial tone for the FACP to use. Once the FACP has dialed in, the TG-7FP will interact with the panel by providing handshakes and kiss-offs, similar to a Central Station receiver. Provided that the alarm data received is valid per the alarm format protocol, the TG-7FP will capture the message and pertinent information for delivery, while the FACP will be satisfied with the received kiss-off. If an invalid format, or invalid data is captured, no kiss-off will be provided.

Compatible formats for the TG-7FP units are:

- Pulse Formats (Hexadecimal account numbers can be used):
  - 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 (Hexadecimal account numbers can be used, 4 or 10 digits in length)
- Modem IIe/IIIa2/4 (Hexadecimal account numbers can be used, 4 digits in length)
- SIA2 (SIA-DC-03 level 2 release at 300 baud)
- Sonitrol
- DMP

3.1.2 Cellular Transmission

Once the signal is obtained by the TG-7FP, it is encrypted (128-bit AES) and packetized for digital delivery via the cellular network. The version of the TG-7FP used will indicate the carrier (Verizon or AT&T) that will be used. All transmissions between the TG-7FP and the TCC will occur via the best available technology at the time, with data sessions being the primary delivery path and SMS being the secondary option. The TG-7FP will work on different bands depending on the carrier of the selected model:

- TG-7FP-A for AT&T supported bands: 2, 4, 12
- TG-7FP-V for Verizon supported bands: 4, 13

Similar to the way a central station receiver operates, the TG-7FP will not be satisfied until there is an acknowledgment of receipt from the TCC. If acknowledgment is not received by the TG-7FP, a failure will be created and annunciated via suppression of the dial tone.

3.1.3 Delivery to Central Station

After the TCC receives the data, it will be processed for delivery. Based on the subscription options chosen during the registration of the TG-7FP, the TCC can either use the captured phone number and account number to deliver the signal or use a predetermined phone number and account number to redirect the signal. A third option that is available to companies that have set up a connection with a Central Station ahead of time is to use IP delivery rather than POTS to send signals to Central Station. The TCC can deliver signals via IP using the Fibro protocol (for Contact ID and SIA formats) to Surgard receivers, as well as using DMP protocol to send to DMP receivers, or XML posting directly to automation software (e.g., Stages) Whether using POTS or IP for delivery, the TCC uses an acknowledgment-based retry sequence, where it requires receiver acknowledgment.

3.2 Link Supervision for Sole Path installations

3.2.1 NFPA 72 requirement

The TG-7FP unit provides a feature known as “Link Supervision” that complies with NFPA 72, editions 2010-2019 for use a sole path communicator. Link Supervision is a feature by which the TCC checks the unit’s connectivity and will create a signal to be delivered to the Central Station if a disruption in service is discovered, lasting 5 minutes (per 2010 edition requirements), 60 minutes (per 2013 and 2016 edition requirements), or 180 seconds (ULC specification).

3.2.2 Link Supervision

Link Supervision must be enabled from the online portal. It will reprogram the device to initiate check-in signals over the data network, at a frequency that is much higher than the disruption timeout (5 min, 60 min, or 180 sec). If the TCC detects that there has been no communication for the predetermined disruption timeout, it will create a

signal (customized during registration) that will be delivered to the Central Station. Once the check-ins resume, a restoral signal will be created and delivered as well. The check-in signals are between the TG-7FP and the TCC and are therefore not visible to the FACP or the Central Station.

4 Physical Description

4.1 Plastic Enclosure

- Locking Mechanism: Two screws secure the cover (plus tamper switch)
- Physical Size: 8.25” x 5.75” x 2” (210mm x 147mm x 51mm)
- Shipping weight: 2.2 lbs.

4.2 PCB

The TG-7FP unit has I/O connections for communication and power, as well as LEDs to display device status.

4.2.1 I/O Connections

- Antenna port: TNC female connection, 50 ohms
- RJ connections: One black RJ-45 connector jack for communication from the panel.
- Pin connectors and terminal blocks: There are three sets of pins, with three available terminal blocks.
    - DC-GND pins: 12/24VDC in. Used to receive power from an FACP with an auxiliary output within that range.
    - STC and Trip In pins: There are two pairs of STC pins. STC 1 acts as a Normally Open relay that will trip on a programmed Telguard failure, whereas STC2 will trip as a Normally Closed relay. There is also a pair of Trip Input connections labeled as Trip and Gnd, which can be optionally used to monitor a dry contact device, with the capability of sending an event to Central Station or provide customer notification on that trip closure/restoral.
    - Tamper pins: There is a set of two pins that connect to the tamper switch located on the PCB. This is an optional connection that can be wired to the panel for supervising the TG-7FP. The tamper switch circuit is closed when the cover is secured.

4.2.2 LED Display

LED Symbol	Color	Pattern	Indication
LED 1 Activation	Green	Solid On	Unit is activated
		Off	Unit not activated
		1 Flash*	Unit is disabled
LED 2 STC (System Trouble Condition)	Red	Off	All OK
		1 Flash*	System Trouble Condition – LPF
		2 Flashes*	Not applicable
		3 Flashes*	Not applicable
		4 Flashes*	System Trouble Condition – NSC
		5 Flashes*	System Trouble Condition – RFC
		6 Flashes*	System Trouble Condition – DTF
		7 Flashes*	System Trouble Condition – PPF
LED 3 Mode	Yellow	Off	FACP idle
		Flash	FACP off-hook
LED 4 Acknowledge	Red	Solid On	Waiting for acknowledgement from TCC
		Off	Idle state
		1 Flash*	Unit has failed activation
LED 5 Radio	Green	Off	Telguard initialized
		On	Telguard initializing
		Flashing	Radio communicating
		2 flashes every 6 sec*	Link Supervision Mode
LED 7 Trip Input	Green	Solid On	Trip Input activated
		Off	Trip Input restored
LED 8 Power	Red	Solid On	Power connected to unit

*Note: * means that the LED pattern will repeat until condition clears.*

4.3 Accessories

4.3.1 Included with TG-7FP

- Cellular antenna: 8in, 50-ohm nominal, omni-directional antenna with knuckle and male TNC connector. 2dBi gain.
- Terminal blocks: Pluggable screw terminal blocks, 3.5mm pitch. Set of 6-, 2-, and 2-position blocks.
- RSSI button activation tool

4.3.2 Optional Accessories

- ACD-35 antenna cable: RG-8 UL approved cable in PVC jacket with 50-ohm TNC male connector and TNC female bulkhead. 35ft in length.
- ACD-50 antenna cable: RG-8 UL approved cable in PVC jacket with 50-ohm TNC male connector and TNC female bulkhead. 50ft in length.
- ACD-100 antenna cable: RG-8 UL approved cable in PVC jacket with 50-ohm TNC male connector and TNC female bulkhead. 100ft in length.
- HGDL-0: High gain directional LTE antenna, wideband 690-2700MHz, 50-ohm. U-bolts for up to 1.75" pole-mount outdoor use. 8-10dBi. 11.575" x 8" x 2.375" (294mm x 203mm x 60mm). Type-N female connection, comes with adapter to TNC
- EXDL-0: Omnidirectional LTE antenna, 698-960MHz, 1700-2700MHz, 50-ohm. No ground plane, 3dBi. 3.45" x 1.45" diameter (88mm x 37mm). Type-N female connection, comes with adapter to TNC.

5 Sole Path Installation

5.1 Power Up Requirements

The TG-7FP unit must comply with the NFPA 72 requirements which state that the unit will have a secondary power source besides the main power source, that will allow it to operate uninterrupted for 24 hours at the end of which period it should be able to handle 5 minutes of signal transmission on the secondary power source. Since the TG-7FP unit connects directly to the auxiliary power of the FACP, the following consumption rates must be used when calculating power supply capabilities of the FACP.

Regulated Input Voltage (Power Limited)	Current Draw		
	Idle No Supervision	Idle w/Link Supervision	Max during Transmission
12VDC	20mA	40mA	201mA
24VDC	13mA	18mA	109mA

5.2 Signal Strength Requirements

It is recommended that the signal strength during the time of installation follows our guidelines to reduce the amount of perceived network issues. Having a lower signal strength than recommended may result in a higher number of incidents as it is the nature of the cellular network to fluctuate in quality and bandwidth.

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

Approved accessories as previously listed can be used to relocate or change the type of antenna used.

5.3 Communication and Supervision Requirements

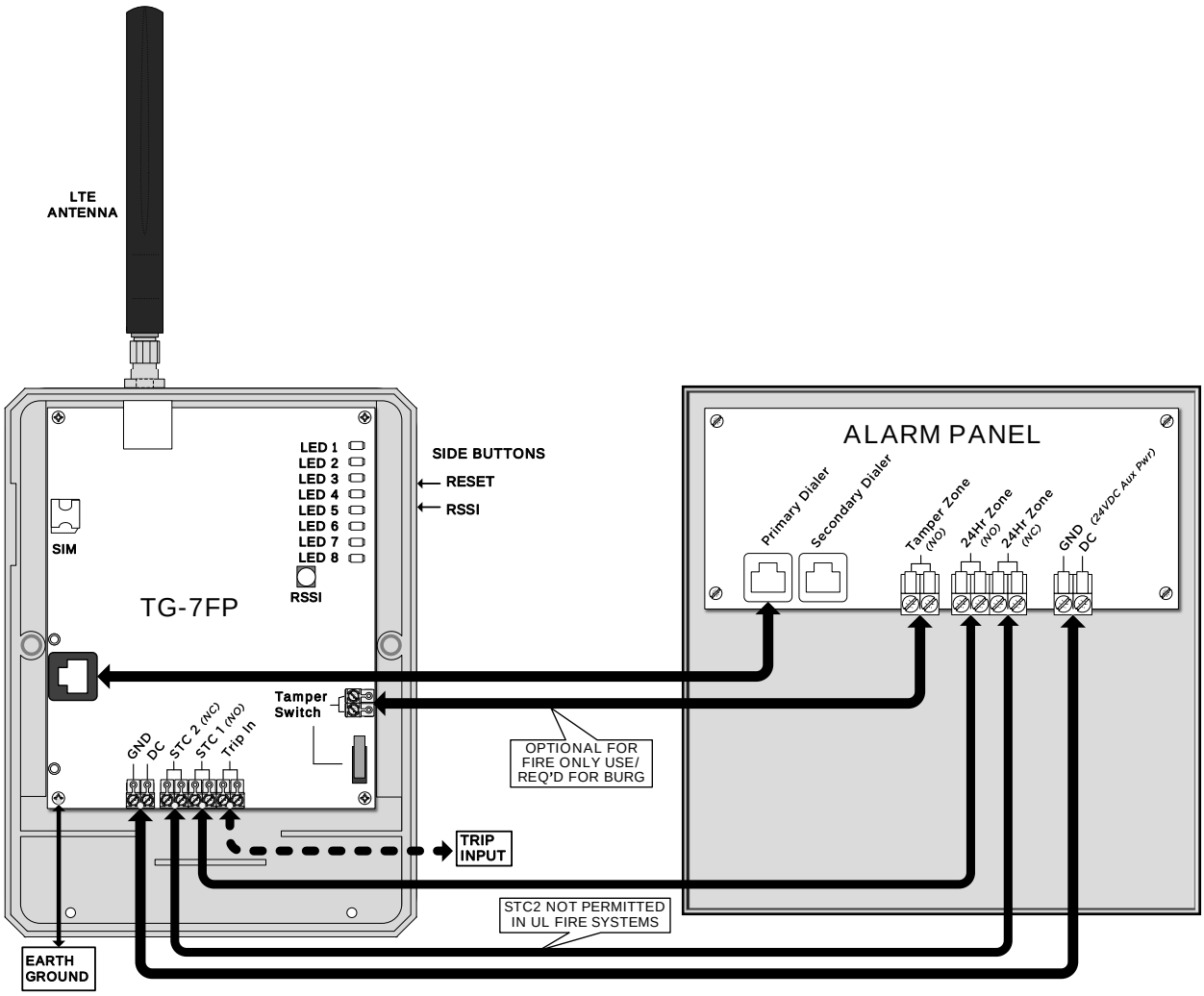
If using the TG-7FP unit as the sole path of communication for the FACP, it will be necessary for the TG-7FP unit to provide dial tone to both Telco connections on the panel, unless one can be disabled. To do this, the Tip and Ring connection on the FACP must be connected in parallel for both Telco connections.

As far as supervision of the TG-7FP, there are two System Trouble Condition relays that can be used to locally annunciate to the panel of any issues, as programmed during registration. However, the TG-7FP will also announce through the suppression of the dial tone to the panel of any issues caused by No Service or Radio Failure conditions.

5.4 Other UL Installation Requirements

UL Comm Burg	UL Comm Fire	UL Comm Fire/Burg	ULC Comm Burg	ULC Comm Fire	
Yes	Optional	Yes	Optional	Optional	UL/ULC/cUL Listed Bell and Bell Housing *
Optional	Optional	Optional	Yes	Optional	Enclosure tamper Switch connected to 24-hour circuit
Yes	Yes	Yes	Yes	Yes	Antenna cable in flexible conduit concealed
No	No	No	Optional	Yes	Radio Frequency warning label placed on outside of front cover
Optional	Yes	Yes	Optional	Yes	Flexible or Rigid conduit required to protect connections #

5.5 Wiring Diagram



Note: Drawing available as a CAD file.