GP-Probe TGE2
Time Guard Edition 2

Three-channel probe for GNSS signal quality measurements and GNSS threat detection

The GP-Probe TGE2 is designed to protect time servers (PNT) against a GNSS threat such as cutting-edge intentional spoofing, jamming, ionospheric scintillation, system errors, for example. An embedded PPS phase error measurement function enables the reliable monitoring of the time server's health. The GP-Probe, in conjunction with the GP-Cloud, allows developing a robust and resilient clock synchronization system for critical infrastructure.

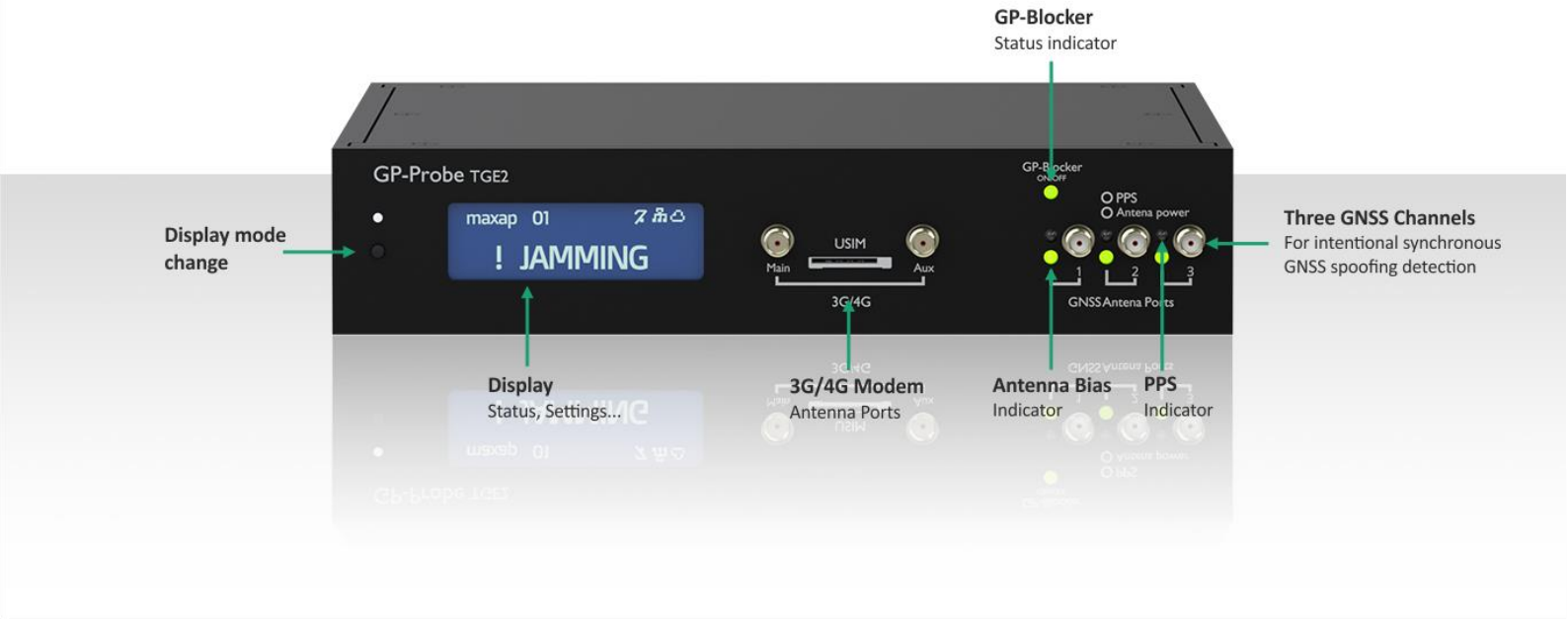
The GP-Probe measures GNSS satellite signals on 3 channels and transmits raw data to the GP-Cloud for real-time processing.

- 3 RF Channels
- PPS Offset Measurement
- Dual power module: 110/220 AC; 18 – 75 DC
- Secure firmware auto-update engine
- Optional GP-Blocker
- 19-inch rack half-size form factor
- Real-time operating system
- GPS, GLONASS, BeiDou, Galileo

Key Features

- Three RF channels for intentional, synchronous, multiple-TX GNSS spoofing detection.
- GNSS signal quality measurements: pseudorange errors, carrier phase, SNR, etc.
- Support GNSS: GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN.
- The embedded real-time operating system FreeRTOS guarantees high availability, reliability, and cybersecurity. The GP-Probe boots 3 seconds after power up!
- PPS input for the external time server health checking. The GP-Probe measures the time offset between internal and external PPS. PPS input supports low-current signals.
- Optional GP-Blocker with an embedded noise generator suppresses the most powerful counterfeit RF signals.

- Secure firmware auto-update engine. Update all connected GP-Probes in 40 seconds!
- Embedded self-diagnostic and dispatching all error messages to the cloud.
- PPS output for synchronization of external equipment.
- Optional RF power divider - GP-Divider enables to utilize one GNSS antenna for two receivers. The GP-Divider supports the GNSS antenna preamplifier current simulation.
- Form factor: 19-inch rack, half-size.
- Double power module: 110 – 220 AC, 18 – 75 DC.
- Active/passive GNSS antenna support.
- 4G modem and 100BASE-TX Ethernet for data transferring to the GP-Cloud.
- Web interface for configuration (HTTP or HTTPS).
- External devices can be controlled via remote interfaces: RS232/Telnet/SNMP with embedded Lua scripting language. GP-Probe can send commands to the connected time server for switching to holdover, etc. This facilitates integration with existing client infrastructure.



Specifications

Supported GNSS:	• GPS/QZSS L1 C/A • GLONASS L10F • BeiDou B1 • SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN • Galileo E1B/C
RF Channels:	Three GNSS RF channels for assured detection of intentional sophisticated synchronous spoofing attacks
Minimum Horizontal GNSS Antenna Separation:	1 m
Detected Threat Types:	All types of jamming 1 ch. – asynchronous spoofing 2 ch. – synchronous spoofing 3 ch. – synchronous multiple-TX spoofing
GP-Probe Configuration:	Browser-based configuration and monitoring, GP-Cloud
Display:	GP-Probe status Server connection settings and status GNSS channels status: satellites in view, RMS CN0
LEDs:	GNSS Antenna Power PPS
Mechanical	
Housing:	Aluminum, IP20
Size:	1 U half-size, rack mount, 211.0 x 203.0 x 44.0 mm
Weight:	2.0 kg
Environmental	
Operational Temperature:	0°C to +50°C
Storage Temperature:	-20°C ~ +85°C
Humidity:	0% – 95% RH non-condensing @ 40°C
Vibration and Shock:	15g/0.53oz, 11ms half-sine wave
Vibration:	10 – 55 Hz/0.07g, 55 – 500 Hz/1.0g
GNSS Antenna Inputs	
Connector:	SMA(F)
Impedance:	50 Ω
Antenna bias voltage:	3.3 VDC
ESD protection:	15 KV
PPS Input	
Connector:	SMA(F)
Impedance:	50 Ω, TTL compliant
High-Voltage Level (50 Ω):	1.3 Min 5.5 Max

PPS Output	
Connector:	SMA(F)
Impedance:	TTL into 50Ω
Typical Accuracy (clear sky):	< ±20 ns RMS to UTC (USNO), typical
I/O Connections	
Network Interface:	10/100BASE-T RJ45, 15KV ESD protection
RS232 interface:	HOST port for remote control of external equipment. 15KV ESD protection. Optical isolation 2.5KV.
Power supply	
AC:	100 - 240 VAC, 50/60 Hz IEC 60320 C14 connector
DC:	18 – 75 VDC
Power Consumption:	< 10 W
Supported Protocols	
GP-Cloud interaction:	HTTPS
Firmware Upgrade Server:	SFTP
Ethernet Protocol:	IPv4, DHCP (RFC 2131)
3G/4G modem	
Data transfer:	• LTE CAT4 Uplink up to 50Mbps / Downlink up to 150Mbps • HSPA+ Uplink up to 5.76Mbps / Downlink up to 42 Mbps • UMTS Uplink/Downlink up to 384Kbps • EDGE Uplink/Downlink up to 236.8Kbps • GPRS Uplink/Downlink up to 85.6Kbps
Available bands:	• EH – for EMEA/Korea/Thailand regions LTE-TDD B38/B40/B41 LTE-FDDB1/B3/B5/B7/B8/B20 UMTS/HSPA+ B1/B5/B8 GSM/GPRS/EDGEB3/B8 • AH – for North America LTE-FDDB2/B4/B12 UMTS/HSPA+ B2/B5 • SA – for Australia/New Zealand/South America LTE-TDDB40 LTE-FDDB1/B2/B3/B4/B5/B7/B8/B28 UMTS/HSPA+ B1/B2/B5/B8 GSM/GPRS/EDGE850/900/1800/1900MHz • JC – for Japan LTE-FDDB1/B3/B8/B18/B19/B26 • WO – without built-in modem
(U)SIM:	Mini-SIM (2FF) ISO/IEC 7810:2003, ID-000 Standard 3V/1.8V user card interface, 15KV ESD protection
Antenna connectors:	Main, Aux. SMA (f)

Regulatory Compliance

EMC:	EN 61000-3-2: 2014 EN 61000-3-3: 2013 EN 55022 EN 55024 ETSI EN 301 489-1
RF:	EN 301 511 EN 301 908 ETSI EN 301 489-52 ETSI EN 301 489-19
Safety:	EN 60950-1: 2006+A2: 2013
RoHS:	EN 50581: 2012

Warranty & Support

Warranty:	1 year Extended warranty is available
Support:	1 year of complimentary technical support

Package Content

GP-Probe:	1 pc. Rack mount hardware included (assembly required)
GNSS antenna:	3 pcs. BeiDou, Galileo, GLONASS, GPS magnet-mount antennas
3G/4G antenna:	2 pcs. Multiband antennas: 700 MHz, 800 MHz, 850 MHz, 900 MHz, 1.8 GHz, 1.9 GHz, 2.1 GHz, 2.3 GHz, 2.5 GHz, 2.6 GHz
Manuals:	Quick start guide
Power Lead:	1 pc. 1.7 m IEC power lead
Ethernet cable:	1 pc. 3 m length

Optional Accessories

GP-Blocker	An optional GNSS threat blocker. High isolation RF switch and an embedded noise generator can suppress the most powerful counterfeit RF signals. The ideal solution for protecting time servers against spoofing.
GP-Divider	GNSS power divider with GNSS antenna preamplifier current simulation. It allows you to use one GNSS antenna for two receivers at once.
GP-A-DOME	Dome antenna. BeiDou, Galileo, GLONASS, GPS. Panel Mount, IP67
GP-C-010	10 m RG58 Cable
GP-C-030	30 m RG58 Cable
GP-C-050	50 m LMR195 Equivalent Cable
GP-C-100	100 m LMR400 Equivalent Cable (*Custom cable lengths available on request)*
GP-SPP	A multi-strike maintenance-free surge suppressor
GP-AMP-20	GNSS Amplifier – 20db

Ordering Information

GP-Probe TGE2 model number definition

GP-Probe	TGE2	–	CH3	EH	OSP
Product	Product series		Number of channes	3G/4G modem bands	Onboard signal processing

Number of channels:

CH1 – asynchronous spoofing detection

CH2 – synchronous spoofing detection

CH3 – detection of synchronous multiple-TX spoofing. Uncompromising protection against all types of attacks

3G/4G modem bands:

EH – for EMEA/Korea/Thailand regions

AH – for North America

SA – for Australia/New Zealand/South America

JC – for Japan

WO – without a built-in modem

Onboard signal processing

The GP-Probe can work without connecting to the GP-Cloud servers.

Supports jamming and spoofing detection as well as signal quality analysis