BITSTREAM®
Leader of time synchronization & data transmission solutions

Monitoring probe
QUAZAR-700

Precise monitoring of the quality of synchronisation signals and time server function.

Multitasking

Stable

Guaranteed data monitoring

Robust

QUAZAR-700

Manageable probe to monitor network synchronization quality with time server function

✓ Manageable monitoring probe equipped depending on version with interfaces 4 or 8 SFP+ 1/2.5/10Gbps slots and 1x or 2x RJ45 10/100/1000Mbps ports; 1x PPS IN; 1 or 4x PPS OUT; 1x 10MHz IN/10MHz OUT; 1 x E1 G703/G.704; 1x ToD IN/ToD OUT;

✓ Supported PTP profiles: PTPv2 default IEEE 1588; ITU-T G.8275.1; ITU-T G.8275.2; ITU-T G.8265.1; IEC 61850-9-3; IEEE C37.238-2011 and 2017

✓ High-performance CPU for system management

✓ Built-in LCD display for reading selected parameters

✓ Qualitative analysis of up to 4 IEEE1588 PTPv.2 clock domains for G.8275.1 (Telecommunications) and C37.238 (Energy) profiles

✓ Qualitative analysis of up to 2 clock domains of Synchronous Ethernet with analysis of SSM ITU.T - G8264 messages.

✓ Monitoring of TE (Time error) and MTIE (Time Interval Error) and possibility of graphical presentation of TE and MTIE graphs

✓ The precision of the reference base of the 1PPS signal from the GNSS receiver is +/- 15 ns (Clear sky), while maintaining a temperature change gradient of 2°C per 2 hours,

✓ Mutisystem receiver for GPS, Gallileo, Glonass, Beidou, QZSS systems

✓ Built-in precision local oscillator depending on version OCXO, DOCXO, RUBID* for long term holdover state support

✓ Supported synchronization protocols PTPv.2, NTP, SNTP, ToD, SSM, SyncE, Sabits, NEMEA, NTRIP, RTCM

✓ Automatic creation of measurement data files for local data archiving

✓ IEEE802.1x authentication, Radius, Tacacs+ - AAA

✓ IPv4, IPv6, Http, Https, SSH and local CLI console management, SNMP v1/v2c/v3,

✓ Operating temperature: -5 to +60°C

✓ Redundant power supply 80-350 V DC, 75-240 V AC or 45 - 60V DC with optional power connector on the front of the device

Features of Quazar-700

Multitasking

The Quazar-700 managed monitoring probe in its basic version offers the ability to monitor parameters such as PTP 2WAY TE, PTP datasets, SyncE TIE, SyncE MTIE, SyncE TDEV, SSM (change logging). In addition, the ability to work as a time server enables network synchronization using the following signals: Ethernet; PPS; 10MHz; E1 G703/G.704; ToD and additionally IEEE 1588-2008 v2 PTP with MC or BC modes,

Easy to set up

In creating the devices, BitStream could not forget to provide the user with intuitive and simple configuration. Thanks to the built-in HTTP server, SSH, RS232 console and SNMPv.3 agent, configuration of the device's parameters can be done via a web browser or using the CLI command line.

Stable

The VH version of the Quazar-700 time servers feature a high-precision local DOCXO generator with a stability over the -40 to +85°C temperature range of ±0.03 ppb and a holdover time of ±1.5 µs at constant temperature for a minimum of 54 hours. RUBID* or OCXO oscillators are also available.

Precise

The Quazar-700 time server is designed to guarantee the highest possible time precision. The precision of the reference base 1PPS signal from the GNSS receiver is +/-15ns (Clear sky), while maintaining a temperature change gradient of 2°C per 2 hours.

Guaranteeing data monitoring

The Quazar-700 has built-in memory for data archiving allowing local storage of measurement statistics for up to 72h. A built-in LCD display allows reading selected parameters directly on the device. BitStream also offers dedicated QUAZARNET software for presentation of results in the form of statistics, logs and graphs.

Solid

The Quazar-700 device is designed to work in harsh conditions. The durable IP-30 enclosure provides protection against external factors, in addition, the device is designed to operate in a temperature range of -5°C to +60°C. Optional redundant power supply ensures stable operation in case of failure of one of the power supplies, further supported by Load Balance function.

General specification of supported standards and protocols

- ✓ IEEE 802.3u 100Base-TX Ethernet,
- ✓ IEEE 802.3ab 1000Base-T,
- ✓ IEEE 802.3z Gigabit Fiber,
- ✓ IEEE 802.3ae 10GBASE-SR/LR/ER/ZR (SFP+) 10 Gigabit Ethernet.

Network Monitoring and Network Synchronization

- ✓ The device can be equipped with an on-board generator OCXO or DOCXO or RUBID
- ✓ Synchronization signals
  - 1 x PPS_IN and 1 or 4 x PPS_OUT;
  - 1 x 10MHz_IN and 10MHz_OUT
  - 1 x E1 G703/G.704
  - 1x ToD_IN/ToD_OUT
- ✓ Supported synchronization protocols
  - NTP and SNTP ; ToD; SSM; Sabits; NEMEA; NTRIP; RTCM;
- ✓ The following IEEE1588 v.2 (PTPv.2)-based precision time synchronization profiles are hardware-supported on the device: Default1588, G.8265.1, G.8275.1 and G.8275.2
  - MC (Master Clock) with time error typically 40ns
  - BC (Boundry Clock) with time error with synchronization by SyncE typically < 50ns
  - SC (Slave Clock) with time error with synchronization by SyncE typically < 50ns
  - TC (Transparent Clock)
- ✓ Monitoring of possible Spoofing and Jamming interference for GNSS module
- ✓ PTP datasets (logging minimum: GrandmastrID, clock class, clock accuracy, priority2, steps removed)
- ✓ Real-time monitoring of TE (Time error) and MTIE (Time Interval Error) for PTPv2 and SyncE,
- ✓ Presentation of real-time TE (time error) graphs in GUI (www) for PTP and SyncE
- ✓ Automatic creation of measurement data files with the possibility of archiving the data in the local memory of the device.
- ✓ Dedicated QUAZARNET software - optional system to extend diagnostics and visualization of measurement data
- ✓ The following features are available under the license :
  - 1PPS & ToD format monitoring in ITU G.827
  - RFC2544 performance tests and ITU-T Y.1564 service tests with MPLS-TPa protocol support
  - PTP v2 synchronization with IEC 61850-9-3, IEEE C37.238-2011 or 2017 profiles
  - Synchronous Ethernet, G.8261, G.8262, G.8264

GNSS module

- ✓ Built-in 184-channel multi-band GNSS receiver compatible with GPS, GLONASS, BeiDou, Galileo, QZSS systems
- ✓ Antenna input with support for active antennas with SMA connector
- ✓ RS422 interface of ToD (Time-of-Day) signal with RJ45 connector, input and input signal
- ✓ Coax interface (PPS) with SMA connector, input and input signal
- ✓ GPS receiver sensitivity: -167dBm/-160dBm with LNA option.
- ✓ High precision GNSS PPS receiver: +/-15ns (Clear sky), while maintaining a temperature change gradient of 2°C per 2 hours.
- ✓ Can be equipped with stable on-board generators with different parameters:
  - o OCXO generator with stability in the temperature range of -40 to +85°C of +/-1 ppb and holdover time of ±1.5 µs at constant temperature for 8 hours, within ±8 µs at constant temperature for 12 hours,
  - o OCXO generator with a stability over the temperature range of -40 to +85°C of +/-0.2 ppb and a holdover time of ±1.5 µs at constant temperature for a minimum of 24 hours,

- o DOCXO generator with -40 to +85°C stability of ±0.03 ppb and holdover time of ±1.5 μs at constant temperature for a minimum of 54 hours,
- o RUBID* generator with stability over the temperature range -40 to +85°C of ±0.5 ppb and holdover time of ±1.5 μs at constant temperature for a minimum of 83 hours

Network security

- ✓ EAP, RADIUS

Ethernet synchronization interface

- ✓ Ethernet connectors in 19" RACK 1U chassis: 4 slots or 8 SFP+ 1/2.5/10Gbps slots and 1x RJ45 1Gbps port depending on the version selected
- ✓ Ethernet connectors in 19" RACK 2U chassis: 4 slots or 8 SFP+ 1/2.5/10Gbps slots and 1x 1Gbps RJ45 port depending on the version selected

Management

- ✓ IPv4, IPv6, ARP, ICMP, TCP, UDP, DNS
- ✓ NTP server/client
- ✓ SSH, http, https, SNMP v1/v2c/v3
- ✓ Local (Ethernet/RS-232) and remote CLI
- ✓ System log of events and alarms
- ✓ Readout of selected parameters on the built-in LCD display

Work environment requirements

- ✓ Operating temperature: -5 to 60°C
- ✓ Standard ambient humidity during operation: 5%-95%
- ✓ 1U chassis weight: 3 kg,
- ✓ Dimensions for 1U version [mm]: 450 x 355 x 44
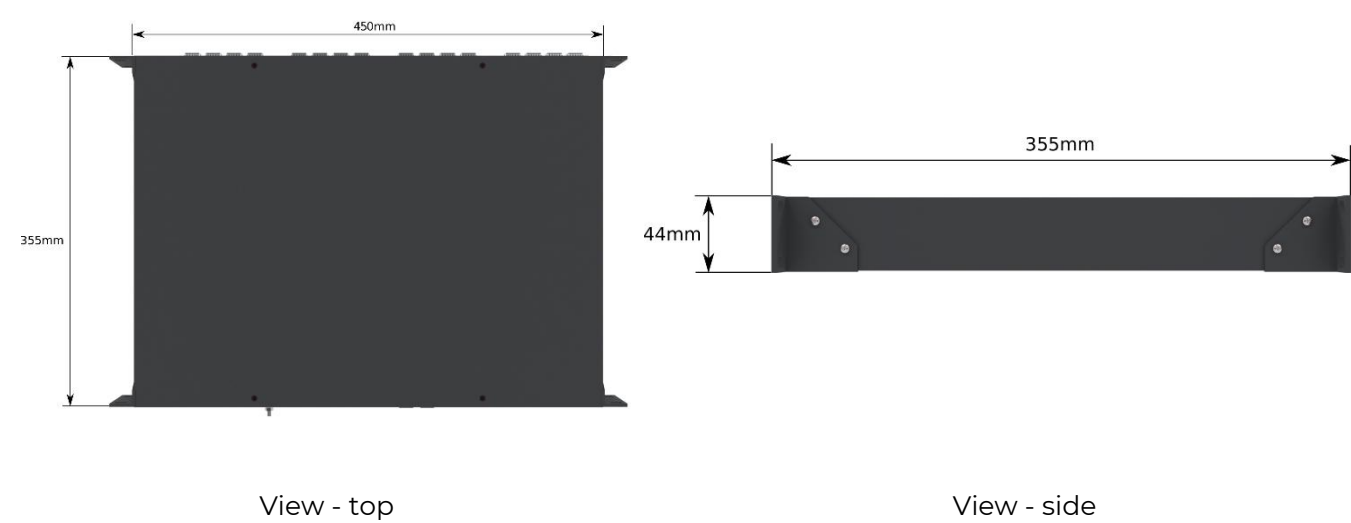- ✓ Dimensions for 2U version [mm]: 450 x 355 x 88

Power supply

- ✓ Voltage range: 80-350VDC, 75-240VAC
- ✓ Voltage range: 45-60 V DC
- ✓ Connector: screw - Terminal block
- ✓ Optional power connector on the front of the device
- ✓ With power redundancy version, Load Balance support

EN 61000-4-2:2009	Electromagnetic compatibility (EMC)	Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.
EN IEC 61000-4-3:2020	Electromagnetic compatibility (EMC))	Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4:2012	Electromagnetic compatibility (EMC)	Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
EN 61000-4-5:2014	Electromagnetic compatibility (EMC)	Part 4-5: Testing and measurement techniques - Surge immunity test.
EN 61000-4-6:2014	Electromagnetic compatibility (EMC)	Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8:2010	Electromagnetic compatibility (EMC)	Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
EN IEC 61000-4-11:2020	Electromagnetic compatibility (EMC)	Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase
EN 61000-4-16:2016	Electromagnetic compatibility (EMC)	Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz
EN 61000-4-17:1999/A2:2009	Electromagnetic compatibility (EMC)	Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test
EN 61000-4-18:2007	Electromagnetic compatibility (EMC)	Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test
EN 61000-4-29:2000	Electromagnetic compatibility (EMC)	Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests
EN 61850-3:2014	Electromagnetic compatibility (EMC)	Communication networks and systems for power utility automation - Part 3: General requirements

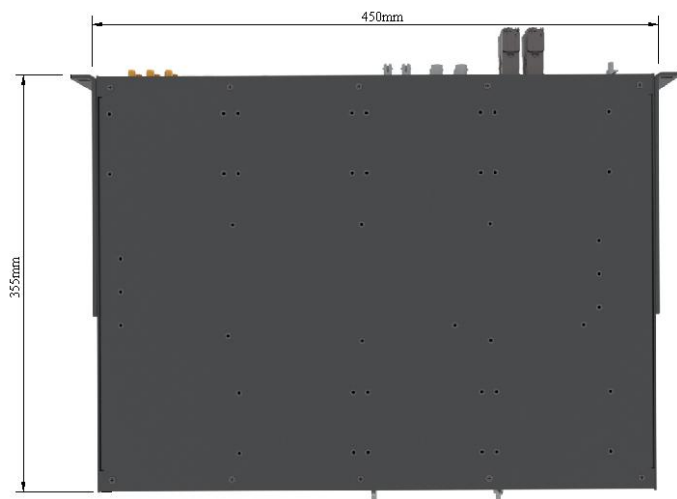[&] - The scope and list of supported standards may change as the device evolves

Mechanical drawings
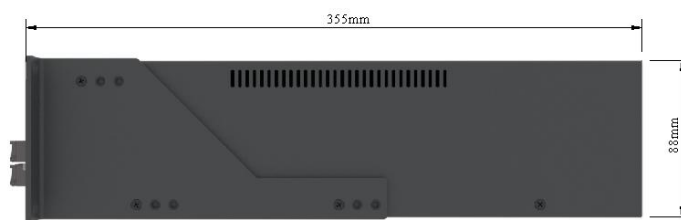
Dimensions for 1U version

View - top

View - side

Dimensions for 2U version

View - top

View - side

QUAZAR-700-X-D-Y-U

Quazar-700	700	X	D	Y	U
Device in 1U 19" housing	700				
Device in 2U 19" housing	702				
Device version					
4x SFP+ 1/2.5/10G slot and 1x RJ45 10/100/1000Mbps port		3			
8x SFP+ 1/2.5/10G slot and 2x RJ45 10/100/1000Mbps port		4**B**			
Generator model					
Built-in OCXO generator			OCXO		
Built-in DOCXO generator			DOCXO		
Built-in RUBID generator			RUBID**A**		
Generator version					
OCXO generator with ±1 ppb stability and a holdover of ±1.5 µs for 8 hours,				M	
OCXO generator with ±0.2 ppb stability and holdover of ±1.5 µs for **24** hours				H	
DOCXO generator with ±0.03 ppb stability and holdover of ±1.5 µs for 54 hours				VH	
RUBID* generator with ±0.5 ppb stability and holdover of ±1.5 µs for 83 hours				VVH	
Power version					
power supply 80-350VDC, 75-240VAC					C
Redundant power supply 80-350VDC, 75-240VAC					CCp
power supply 45-60 VDC					7
redundant power supply 45-60 VDC					77p
power supply 45-60 VDC with an additional power connector on the front of the device					7z2

A - option available only in QUAZAR-702-3 2U enclosure

* - Option available by contacting the manufacturer   V 2.15

Example designations:

- ✓ Quazar-700-3-OCXO-M-7
- ✓ Quazar-700-4-OCXO-H-7
- ✓ Quazar-700-3-OCXO-M-7z2

Licenses

Summary of licenses that extend the capabilities of the QUAZAR-700 device

- ✓ **LICENSE 1P1T1E -** license to extend the functionality of the GNSS module with additional output signals 1x 1PPS signal input and 1x 1PPS signal output, 1x 10Mhz signal input and 1x 10Mhz signal output, 1x TOD (Time-of-Day) signal input and 1x E1 G.703, G.704 signal output for synchronization in power networks, among others; with support for IEEE 1588 v2 Precision Time Protocol and SyncE,

- ✓ **SYNCE LICENSE - Synchronous Ethernet G.8261 -** a license to add Synchronous Ethernet G.8261 (Timing and synchronization aspects in packet networks) functionality, providing precise synchronization of internal clocks of devices using frequencies for use in power generation, among other applications.

- ✓ **PTP SYNCHRONIZATION LICENSE with POWER PROFILE** - License to extend in the IEEE1588 PTPv2 protocol with POWER PROFILE - IEEEC37.238-2011, IEEEC37.238-2017 and IEC61850-9-3 for precise time synchronization among others for use in the power industry

Summary of additional software for QUAZAR-700 device

- ✓ **QuazarNet** is software that is used to collect measurement data from monitored nodes and to manage and monitor the entire system. More information is available in the datasheet for QuazarNet.

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