

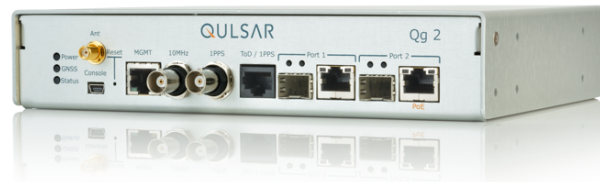
# Qg 2

## Multi-Sync Gateway

### APPLICATIONS

Precision sync platform designed for:

- Small cell clusters, C-RAN & neutral host deployments
- Smart grid transmission & distribution substations
- Datacenters & financial segments
- Industrial IoT applications



### BENEFITS

- Easy to deploy and cost-effective small form-factor solution
- Highly scalable slave capacity
- Low power consumption
- High performance PTP clock
- Simple, easy manageability
- Configurable to operate in multiple modes: PTP Grand Master, APTS boundary and slave clock

### FEATURES

- Multiple holdover options
- Full IEEE 1588-2008 (PTP) Grand Master
- Telecom BC functionality
- Supports G.8262 Synchronous Ethernet
- ITU-T G.8265.1 Frequency, ITU-T G.8275.1 & G.8275.2 Time & Phase Profiles
- ITU-T G.8272 and G.8273.2 (T-BC)
- IEEE PC37.238 Power profile
- Supports 1-step & 2-step clock
- -48V DC power
- Remote provisioning & management (CLI, HTTP and SNMP)

Mobile operators are deploying LTE small cells in traffic hotspots and coverage holes. This occurs in a variety of locations such as in urban canyons and indoors, where GNSS signals are weak or intermittent. Qulsar's Qg 2, a Multi-Sync Gateway addresses this challenge of providing reliable and precise synchronization everywhere leveraging IEEE 1588-2008 (PTP) and by using multiple sync references.

Qg 2 is designed for deployment in distributed clustered-sync architectures. In such deployments, timing resources are deployed close to the edge of the network in order to meet the phase and frequency precision requirements at the small cell or remote radio head (RRH). Deploying a centralized Grand Master with full on-path support to deliver high precision synchronization involves higher cost. Next generation networks need to handle rapidly growing traffic and require a more decentralized approach. The Assisted Partial Timing Support (ATPS) architecture is designed for these networks to deliver precise phase and frequency to small cells. To support the increasing scale in such rapidly growing networks, Qg 2 is highly field-scalable.

Qg 2 provides IEEE 1588-2008 (PTP) Grand Master and Boundary Clock functionality at low total cost of ownership. It leverages Qulsar's unique industry-leading PTP algorithms to deliver stringent timing for LTE, including LTE-A and LTE-TDD architectures and supports ITU-T G.8265 and G.8275 frequency and phase profiles. The product features multiple oscillator options to deliver a range of holdover performance at different price points. The Qg 2 has an elegant and simple management interface.

Qg 2 utilizes GNSS (GPS, Beidou & GLONASS), PTP and Synchronous Ethernet as input references and generates PTP, SyncE and timing signals (frequency, 1PPS and ToD) as outputs. The Multi-Sync Gateway features dual gigabit Ethernet ports and a small form-factor pluggable (SFP) module port for optical connections. It provides all the relevant timing interfaces such as GNSS, 1 Pulse Per Second (1PPS) and Time of Day (ToD) input/output.

The true innovation in this product lies in its simplicity, high performance, scalability and cost effectiveness. The Qg 2 has some unique features designed to make it easily manageable and provide resilient performance when reference sources are lost.

# Technical Specifications



## Synchronization Interfaces

- 1x GNSS L1 Antenna (SMA); 50  $\Omega$  impedance, 5V
- 1x 1PPS out (BNC)
- 1x Synchronized programmable frequency out (BNC)
  - 8 KHz, 1.544 MHz, 2.048 MHz, 10 MHz, 20 MHz, 25 MHz
- 1x Time of Day (ToD) + 1PPS in/out (RJ45/RS442)
  - ToD Format – configurable (ASCII (YYYY-MM-DD HH:MM:SS), NMEA, or China Mobile Binary format)
- 2x IEEE 1588-2008 (PTP) 100Base-TX, 1000Base-T & 1000Base-X with Synchronous Ethernet (electrical RJ45 & optical SFP)

## IEEE 1588-2008 (PTP) Profiles

- PTP: L2: Ethernet; L3: UDP IPv4 / IPv6
- Default profile
- ITU-T G.8265.1 frequency delivery profile
- ITU-T G.8275.1 & G.8275.2 time/phase delivery profile
- IEEE PC37.238 Power profile
- TSN (802.1AS)\*
- Enterprise profile\*
- SMPTE\*

## Synchronous Ethernet

- SyncE for phase holdover during GNSS outage congruent with PTP
- Ethernet Synchronization Message Channel (ESMC)
- Support on both Ethernet interfaces (electrical and optical)

## GNSS

- GPS-only or GPS + Beidou/GLONASS/Galileo (ready)
- Phase accuracy ( $\pm 100$ nsec from UTC) as per G.8272

## Scalability

- 450 [license/SKU options] slaves @ 128 packets per sec in unicast mode

Grade	Oscillator type	1.5 us	5 us	Frequency 16 ppb
Standard	OCXO	4 hr	10 hrs	1 week
Superior	Super OCXO	8 hrs	15+hrs	1 month

*Note: These are approximate values assuming constant temperature and assuming equipment is in normal operation mode for considerable time.*

## Software Features

- DHCP client
- SSH server
- Serial terminal (Console/Craft)
- Remote firmware upgrade

## Management

- 1x Management (100Base-TX/1000Base-T, RJ45)
- CLI, HTTP, SNMP
- Remote login via SSH/Ethernet
- 1x mini USB console for local CLI access (Craft interface)

## LEDs

- Power status, GNSS acquisition & Sync Status

## Power Supply

- Supply: 28 - 40 VAC or 36 - 60 VDC
- Power consumption: variable (depending on holdover grade), typically 9W to 22W

## Operating Specifications

- Operating temperature: 0°C to 50°C
- Storage temperature: -40°C to 70°C
- 6/6 RoHS and WEEE compliant
- Size: 218 mm (W) X 159 mm (D) X 44 mm (H)

## Certifications

- FCC Part 15B (Class A) / CISPR 22 / EN 55022 (Class A)
- EN-61000-4-2 ESD
- EN 60960-1 Safety
- EN 300 386 Telecommunications Network Equipment (EMC)

## Ordering Information

[http://qulsar.com/Products/Overview/Product\\_Part\\_Numbers.html](http://qulsar.com/Products/Overview/Product_Part_Numbers.html)

