

Qg 2

Multi-Sync Gateway

APPLICATIONS

Precision sync platform designed for:

- 5G, ORAN, small cell clusters, C-RAN & neutral host deployments
- Suited to any S-plane LLS C1 - C4 5G ORAN configurations & different functional splits of RU/DU/CU in the RAN & edge evolution
- Smart grid transmission & distribution substations
- Mobile edge computing & enterprise
- Industrial IoT & factory automation applications
- Datacenters & financial applications

BENEFITS

- Small form-factor, designed for indoor deployments
- Highly scalable slave capacity
- Low power consumption
- High performance PTP clock
- Easy to deploy, user friendly management
- Configurable to operate in multiple modes: PTP Grand Master, boundary and slave clock
- Position and location information to aid SAS and other location-based services

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
- SNTP (NTP Stratum 1) Server
- Remote provisioning & management (CLI, HTTP(S) and SNMP)
- Receives and displays both time and location information from GNSS



Mobile operators are deploying small cells to build out their LTE and 5G networks. This is occurring 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 the challenges of providing reliable and precise synchronization everywhere through IEEE 1588-2008 (PTP) and leveraging multiple sync references.

As 5G evolves from non standalone (NSA) supporting 4G today, to standalone (SA) architecture with 5G NR, the support for massive MIMO radios, network slicing, low latency and tight synchronization are critical considerations. In order to meet phase and frequency requirements for applications in the 5G service-based architecture, deploying more GMs (PRTC) in RAN and at the Edge is the only optimal solution that helps in future proofing the deployment and associated investment. The low cost, small footprint Qg 2 is the natural choice for all networks - carrier, cloud provider and private networks.

With virtualization and decomposition of 4G/5G base stations, the newly designed data-centers and CORDs (Central Office Re-architected as Data Centers) require a very high capacity, easily scalable PTP master (T-GM, T-BC) in providing synchronization to hundreds of PTP slave devices. Qg2 with its rich set of features easily meets this challenge.

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-A, LTE-TDD, CBRS (USA), SxGP (Japan), private LTE and 5G architectures (both operator and private) 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.

Qg 2 utilizes GNSS (GPS, Beidou, GLONASS, QZSS and Galileo) to receive and display both timing and location information. Qg 2 also utilizes 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 1 GbE ports for both copper RJ45 and optical connections. It provides all the relevant timing interfaces such as GNSS, 1 Pulse Per Second (1PPS), Time of Day (ToD) (input / output) and frequency (programmable 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 Ω impedance, 5V
- 1x 1PPS out (BNC)
- 1x Synchronized programmable frequency out (BNC)
 - 1.544 MHz, 2.048 MHz, 10 MHz
- 1x Time of Day (ToD) + 1PPS in/out (RS422 ITU-T G.703)
 - 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
- Power profiles: IEEE PC37.238 & IEEE 61850
- SMPTE
- TSN (802.1AS)*
- Enterprise profile*

SNTP (NTP Stratum-1) Server, when in GM mode

Synchronous Ethernet (SyncE)

- Ethernet Synchronization Message Channel (ESMC)
- Support on both Ethernet interfaces (electrical and optical)

GNSS

- GPS-only or GPS + [QZSS / Beidou / GLONASS / Galileo]
- Phase accuracy (under ± 100 nsec from UTC) as per G.8272

Holdover Performance

- Phase holdover during GNSS outage achieved using a combination of PTP (in BC mode), syncE or local oscillator (details below):

Grade	Oscillator	1.5 μ s	5 μ s	Frequency 16 ppb
Standard	OCXO	4 hours	10 hours	1 week
Superior	Super OCXO	8 hours	15+ hours	1 month

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

Scalability

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

Software Features

- DHCP client
- SSH server
- Serial terminal (console/craft)
- Remote firmware upgrade

Management

- 1x Management (10/100 Mbps, RJ45)
- CLI, HTTP(S), 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: depends on holdover grade, typically 9W - 22W

Operating Specifications

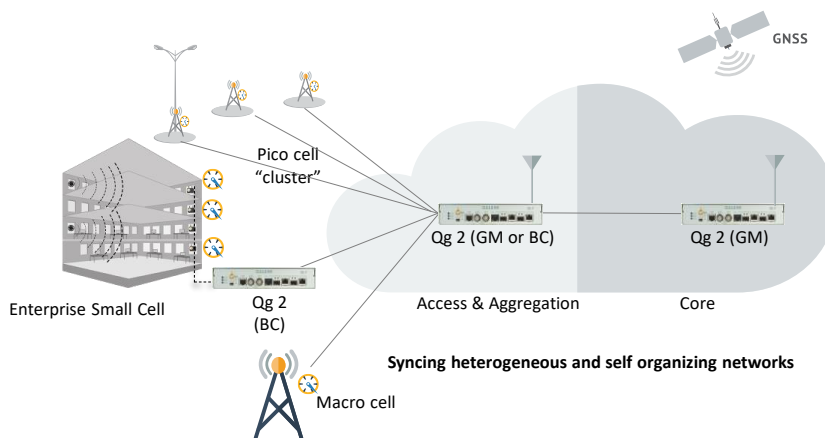
- Operating temperature: 0°C to 50°C
- Storage temperature: -40°C to 70°C
- 6/6 RoHS and WEEE compliant
- Size: 218 mm (W) X 159 mm (D) X 44 mm (H)

Certifications

- FCC Part 15B (Class A) / CISPR 22 / EN 55022 (Class A)
- EN-61000-4-2 ESD
- EN 62368-1 Safety
- EN 300 386 Telecommunications Network Equipment (EMC)

Ordering Information

http://qulsar.com/Products/Overview/Product_Part_Numbers.html



* Available in future with SW upgrade