Product Overview

Our OSA 5401 Syncplug™ is a highly accurate and uniquely efficient small form-factor pluggable (SFP) grandmaster clock and Global Navigation Satellite System (GNSS) receiver, with the smallest footprint and most compact design on the market. It brings precise IEEE 1588v2 Precision Time Protocol (PTP) frequency and phase synchronization as well as Synchronous Ethernet deeper into access networks, including radio access and small cell networks.

With its miniature form factor and low-touch provisioning, this new synchronization solution can be deployed in the most space-restrictive environments. No additional power source or real estate is needed, since it can be easily integrated into existing network elements.

The timing-optimized, dual-frequency GNSS receiver achieves excellent performance even in urban canyons. Design and network redundancy techniques provide resilience against local GNSS jamming.

Versatile Deployment Options

Major deployment scenarios include small cell, LTE, LTE-TDD, LTE-A, and 4G networks. Our OSA 5401 also provides a cost effective upgrade solution for legacy 2G and 3G networks – supporting SDH replacement scenarios. The OSA 5401 functions as a Synchronous Ethernet source as well as a grandmaster (GM) clock and conforms to the IEEE1588 2008 PTP standard and the relevant industry profile specifications.

While the OSA 5401 supports the ITU-T telecoms profiles, it can also support profiles from other industries.

OSA 5401 Applications

One of the most common applications of the OSA 5401 is delivering accurate frequency and phase synchronization to base stations. In order to do this the OSA 5401 is plugged into the aggregation-switch and distributes Layer-2 PTP, Layer-3 PTP or synchronous Ethernet to connected base stations. If the base stations support multiple PTP slaves, this model may be extended by plugging OSA 5401 units at cell-site locations, to provide additional resilience and GNSS jamming protection.

There are many other possible applications. The optimal deployment solution for a given network depends on the network capabilities, the balance of system-level costs and the required level of resilience.
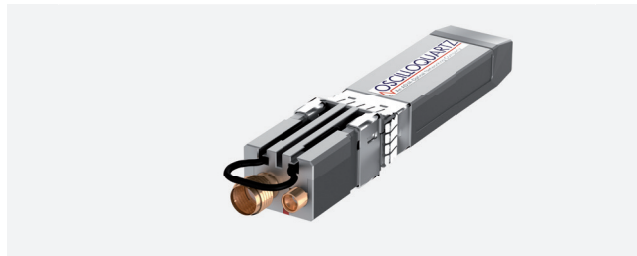
Small Size – High Performance

Our OSA 5401 is designed to take into account its role as a critical timing source reference. The OSA 5401 has an exceptionally good multi-GNSS engine that enables high performance, G.8272 PRTC-compliant operation even in urban canyons, where many small-cell deployments have to be made.

Profiles and Defaults

Our OSA 5401 is able to support both Layer-2 and Layer-3 PTP transport and can both unicast and multicast simultaneously. By default, the OSA 5401 operates as a Layer-2 multicast GM with Sync-E enabled (G.8275.1 Telecoms profile). When additionally configured as a Layer-3 GM our OSA 5401 also concurrently responds to service requests from slave devices.

Features & Benefits

- Syncplug™ technology for highly accurate timing distribution with smallest footprint. Compatible with SFP electrical MSA

- Built-in GNSS receiver supporting fully-featured PRTC and IEEE 1588-2008 (PTP) grandmaster

- Brings precise IEEE 1588v2 PTP frequency and phase synchronization to radio access networks and small cells

- Easily plugs into hosting devices. No additional power or space is required

- OEM product customization for host vendor branding

- Decouples development of network element from implementation of GNSS receiver

- Robust design with local Stratum 3E oscillator and Sync-E input; fallback in case of GNSS outage

- Extended operating temperature range

Technical Information

Main Applications
- 1588v2 PTP grandmaster clock (up to 32 PTP unicast clients)
- GNSS receiver operating as PRTC and PRC

PTP Modes of Operation
- Fully compatible with ITU-T G.8265.1 frequency delivery profile and Telecom2008 phase delivery extensions
- Fully compatible with ITU-T G.8275.1 time/phase delivery profile (full timing support)
- Designed to support ITU-T G.8275.2 time/phase delivery profile (assisted partial timing support) as well as IEEE1588v2 default PTP profiles, power and enterprise profiles

PTP Features
- Full featured IEEE 1588-2008 PTP grandmaster clock
- ITU-T G.8265.1 (IP/unicast) Telecom profile for frequency and time distribution with up to 32 PTP-slaves support (32 packets/second)
- ITU-T G.8275.1 (Eth/multicast) Telecom profile frequency and time distribution
- Simultaneous support of ITU-T G.8265.1 and G.8275.1 grandmaster
- 1-step clock
- PTP/Sync-E hybrid (Sync-E for frequency and PTP for time)
- Dedicated or common IP PTP interface
- VLAN (IEEE 802.1Q) or untagged

Ethernet Interface
- SFP or SFP+ 1000BaseX (MSA compliant)

Synchronous Ethernet (Sync-E)
- Compliant to the relevant sections of ITU-T G.8261/G.8262/G.8264
- Supported on ingress and egress
- G.811 compliant Sync-E primary reference clock (PRC) when locked to GNSS
- Ethernet synchronization message channel (ESMC)
- Sync-E for time holdover during GNSS outage and in congruent with PTP

1PPS out
- 1 x 1PPS
- RP-MMCX connector

GNSS Receiver
- 72-channel multi-GNSS engine
- Concurrent GNSS (dual frequency)
- Supports fixed location (single satellite timing mode)
- GPS/QZSS L1 C/A and GLONASS L10F, BeiDou B1
- Supported modes: GPS/GLONASS/BeiDou/GPS+ GLONASS/GPS+ BeiDou
- HW ready to support (software update required)
  – GLONASS L10F
  – BeiDou B1
  – SBAS L1 C/A: WAAS, EGNOS, MSAS
  – Galileo
- User configurable antenna cable delay compensation
- Voltage to antenna +3.3VDC
- Antenna connector SMA-F (50 Ohms)

Internal Oscillator
- OCXO Stratum 3E (20-55°C, ΔT=+/-20ºC)

Frequency Accuracy
- G.811 compliant PRC while locked to GNSS or in backup operation using Sync-E

Time and Phase Accuracy
- G.8272/G.8273.1 compliant PRTC (±100nsec from UTC, MTIE<100nsec) while locked to GNSS
- During GNSS outage: time holdover using a G.811 PRC/G.8272 PRTC Sync-E/Ext clock:
  – Based on G.811 PRC: TimeError <UTC +/-1µsec for 24 hrs
  – Based on G.8272 PRTC: TimeError < UTC +/- 1µsec for 72 hrs

Indications
- GNSS operation and general fault indication status LED

Management
- In-band management (over PTP/Sync-E port)
- Remote CLI – SSH & Telnet
- Separate MGMT IP & PTP address
- VLAN or untagged
- System software download via SCP & TFTP
- Enable to disable each of the protocol via CLI
- SNMP v2/v3
- Managed as a generic SNMP device by ADVA NMS (FSP NM)
- Alarms reporting to NMS

Regulatory and Standards Compliance
- ITU-T G.8261, G.8262, G.8264
- ITU-T G.8272, G.811
- ITU-T G.8265.1, G.8275.1
- IEEE 1588v2 (PTP)
- ETSI EN 300 386 V1.6.1
- EN55024
- EN 55022 Class-B
- AS/NZS CISPR 22
- FCC CFR 47 Part 15 Subpart B
- ANSI C63.4 Class-B
- IEC/EN 61000-3-2
- IEC/EN 61000-3-3
- IEC/EN 61000-4-2 (ESD): ±15 kV/±8 kV (air/contact)
- IEC/EN 61000-4-3 (RI)
- IEC/EN 61000-4-4 (EFT): 1 kV/50 A (5/50 ns)
- IEC/EN 61000-4-5 (Surge): 4KV (10/700 µs)
- IEC/EN 61000-4-6 (CI)
- EN 60950-1:+A11, +A12, +2 (SAFETY)
- ROHS 6 compliance

Power Consumption
- <1.5W

Environmental
- Operating temperature: -40 to +80°C (-40 to 176°F)
- Storage temperature: -40°C to +85°C (-40 to 185°F)
- Humidity: 5 to 95% (non-condensing)

Optional Accessoires
- GNSS (GPS/GLONASS/DEIDOU) antenna kits 10/20/60/120/150m (32.8ft/65.6ft/196.85ft/393.7ft/492.1ft), including indoor and outdoor cables, roof antenna, lighting protector and mounting kit
- Patch window antenna
- 1:2/1:4/1:8 GNSS (GPS/GLONASS) splitters
- RP-MMCX to SMA adapter cable

For more information please visit us at www.oscilloquartz.com

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