OSCILLOQUARTZ
A division of Adtran

Oscilloquartz accessSync™

Data Sheet

OSA 5405-S

Compact PTP grandmaster and STL receiver

5G Mobile | Telecom | Defense | Data center | Smart grid | Transportation | Financial | Broadcast

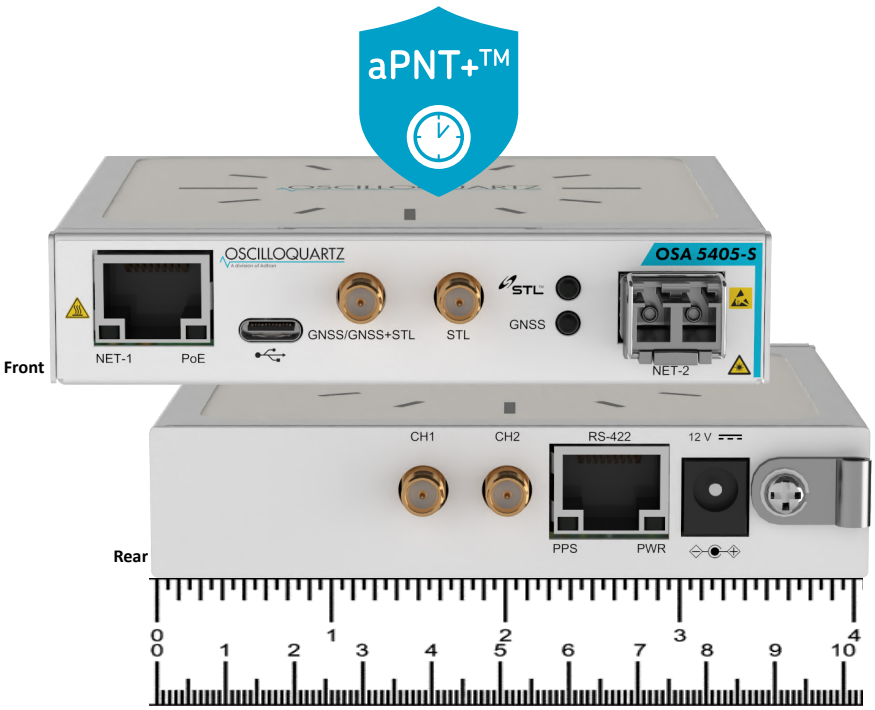
Benefits

- **Supports both low-earth orbit STL and multi-constellation GNSS timing sources**
- **Combining STL with GNSS minimizes the vulnerabilities of GNSS alone, making jamming very difficult and spoofing virtually impossible**
- **Managed by the Ensemble Controller for easy operation**
- **Simple and scalable, supporting multiple management mechanisms**
- **PTP support extends across all industries with multiple concurrent profiles and conversions**
- **Accurate timing delivery in a compact and carbon-friendly design with lowest power footprint on the market**

Overview

As the threat of jamming and spoofing attacks on GNSS systems increases, so does the need for assured synchronization. Assured PNT has become a requirement across many industries and a prerequisite for government and critical infrastructure. Resilient solutions need a second distinct source of time in addition to GNSS – and that's what STL provides.

Our OSA 5405-S is an integrated PTP grandmaster as well as an STL and GNSS receiver for deployment in a wide variety of environments and industries. From 5G to smart grids and data centers, the OSA 5405-S meets requirements for resiliency, reliability and accuracy. Supporting multiple PTP profiles, this solution can also be utilized as a synchronization gateway between service providers and utility networks.



Oscilloquartz multisource aPNT+™ platform

OSA 5405-S

High-level technical specifications

OSA 5405-S highlights

- Cost-effective sync delivery
- Small form-factor PRTC-A PTP grandmaster, GNSS and STL receivers, NTP server
- Robust design
- Dual Ethernet interfaces (fiber and copper)

STL receiver

- Resilient PNT from GNSS and STL gives assurance of dual satellite time sources
- STL-only mode available for indoor antenna locations where GNSS is not available
- Authenticated service

Universal applicability

- Flexibility with physical ports
- Network-delivered timing with PTP and NTP
- Widest range of PTP profiles
- Satellite delivered timing
- Small footprint for desk, wall, DIN or rack mounting

GNSS receivers

- Up to three concurrent GNSS constellation
- Supporting GPS, GLONASS, BeiDou, and GALILEO
- Hardware-supported jamming and spoofing detection
- Configurable fallback option

PTP profiles & operation modes

- GM-supported profiles: IEEE 1588 2008 L3/L2 and ITU-T
- 8265.1 / 8275.1 / 8275.2 / Power / Broadcast / Enterprise/TSN
- PTP over IPv4 and IPv6
- PTP and Sync-E fallback options

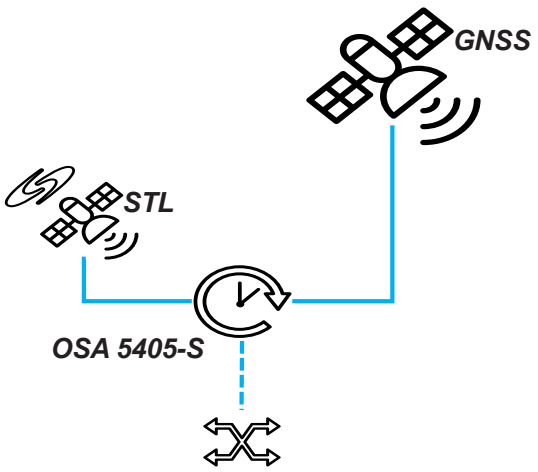
Management

- In-band IPv4/v6 management
- Remote and secure CLI-Telnet and SSH
- Separate management and PTP IP address
- Ensemble NMS suite

Applications in your network

Adding resiliency to an existing PTP network

- Local timing solution with STL satellite-delivered UTC-traceable time
- Local timing solution with GNSS satellite-delivered UTC-traceable time
- Combining satellite-delivered timing with network-delivered timing
- Network-delivered time as master and satellite-delivered time for assurance and backup (or vice versa)



Product specifications

Mini grandmaster

	OSA 5405-S	Compact, cost-optimized PTP grandmaster and NTP server for indoor deployment	Featuring integrated STL + GNSS receiver with external antenna, PPS, and Ethernet interfaces

PTP features

- Full-featured IEEE 1588-2008 PTP grandmaster, boundary and slave clocks
- Assisted partial timing support (APTS) – PTP input to backup GNSS outage over network with partial/ no timing support
- 1-step and 2-step clock
- Dedicated or common IP PTP interface
- VLAN (IEEE 802.1Q) or untagged
- SyncE input to PTP output (frequency) conversion
- Conversion between PTP profiles
- Maintain PTP slaves list
- Fixed and dynamic asymmetry compensation
- Hardware base DoS protection

PTP master modes of operation

- PTP power and utilities profiles
  - IEC/IEEE 61850-9-3
  - IEEE C37.238-2011
  - IEEE C37.238-2017
- PTP telecom profiles
  - ITU-T G.8265.1 & Telecom 2008 frequency delivery profiles
  - ITU-T G.8275.2 time/phase delivery profile (APTS & partial timing support)
  - ITU-T G.8275.1 time/phase delivery profile (full timing support)
- PTP enterprise profile (mixed IP multicast and unicast)
- PTP broadcast profiles
  - SMPTE ST 2059-2
  - AES67 media profile
- PTP AVB/TSN profile: IEEE 802.1AS
- IEEE 1588v2 default PTP profiles over L3 (Annex D and E) and L2 (Annex F)
- Up to 64 unicast slaves @ 128 pps

PTP slave modes of operation

- PTP power and utilities profiles
  - IEC/IEEE 61850-9-3
  - IEEE C37.238-2011
  - IEEE C37.238-2017
- PTP telecom profiles
  - ITU-T G.8265.1 & Telecom 2008 frequency profiles
  - ITU-T G.8275.2 time/phase delivery profile (APTS & partial timing support with BMCA and automatic asymmetry compensation to two remote masters)
  - ITU-T G.8275.1 time/phase delivery profile (full timing support)
  - IEEE 1588v2 default PTP profiles over L3 (Annex D) and L2 (Annex F)
  - PTP enterprise profile (mixed IP multicast and unicast)

Ethernet interfaces

- Hardware-based timestamping
- 100/1000BaseT (copper) and 1000BaseX (SFP fiber ports
- Fiber port support SM/MM colored/non-colored SFP and single fiber SFP
- Synchronous Ethernet (SyncE)
- Compliant to the relevant sections of ITU-T G.8261/ G.8262/G.8264
- Ethernet synchronization message channel (ESMC)
- SyncE input for time holdover during GNSS outage

OSA 5405-S

Syncjack™ monitoring and assurance tools

- Clock accuracy for up to two clock probes – computing TE and TIE of physical clocks
  - Calculation TE/TIE between physical source and reference signals
  - Programmable source and reference signals including SyncE, GNSS, PTP recovered clock.
  - TE/TIE raw data collection and export to server
- Clock analysis for up to two PTP clock probes – packet TE/TIE
  - Calculation of packet TE/TIE between physical reference signal and timestamps within the PTP packets
  - Programmable reference signals including SyncE and GNSS
  - TE/TIE raw data collection and export to server
  - Integrated with Ensemble Sync Director

GNSS receiver

- PRTC-A
- Accuracy within +/-100nsec from UTC
- Independent 72-channel multi-constellation
- Supports single satellite timing modes
- Survey fixed location
- Configurable fixed location
- Navigation mode
- Configurable satellites SNR and elevation masks
- Advanced spoofing and jamming detection on device level
- AI based spoofing and jamming detection based on Ensemble Controller featuring NMS GNSS assurance
- GPS/QZSS L1 C/A and GLONASS L10F, BeiDou B1, Galileo E1, SBAS (QZSS ,WAAS, EGNOS, MSAS)
- Up to three concurrent GNSS constellations
- User-configurable antenna cable delay compensation
- Voltage to antenna: 3.3V or 5V user configurable
- Antenna connector SMA-F (50 ohms)

STL receiver

- Provides authenticated timing / location from LEO satellites
- Accuracy within +/-100nsec from UTC (1-sigma) with outdoor antenna
- Position accuracy within 30 meters (1-sigma), after 1 hour survey, with outdoor antenna
- Operates with either outdoor or indoor antenna installations
- Unaffected by high multipath, urban canyon environments
- LEO high-power signal reception (resilient to
- spoofing)
- Authenticated signal (resilient to manipulation)
- Voltage to antenna: 3.3V or 5V user configurable
- Antenna connector SMA-F (50 ohms)

NTP server

- Smallest NTP server form factor
- Security-hardened NTP server with hardware-based responder
- Stratum 1 NTP server when locked to GNSS
- NTP v1, v2, v3, v4 and SNTP over IPv4 /IPv6
- Time and daytime protocols
- Hardware-based timestamping
- Hardware base DoS protection using NTP responder
- Up to 500,000 transactions per second
- Support PTP and NTP on same port
- PTP to NTP translation
- PTP backup in case of GNSS outage

Programmable I/O

- CH1: SMA-F IRIG-B AM/DCLS (TTL) output, CLK/PPS I/O
- CH2: SMA-F IRIG-B AM/DCLS (TTL) output, CLK/PPS I/O
- RS422: RJ45 PPS/TOD, IRIG-B DCLS I/O
- Timecodes DCLS (B000 - B007)
- Support for IEEE 1344 and IEEE C37.118
- Single or dual STL/GNSS antennas, user-configurable

Internal oscillator

- OCXO Stratum 3E

Operational accessories

- PoE injector AC/DC
  - AC: 90 to 264VAC / 47 to 63Hz
  - DC: 47 to 57 VDC
- SM or MM SFPs

- GNSS (GPS/GLONASS/BeiDou/Galileo) roof antenna kits
- STL+GNSS (GPS/GLONASS/BeiDou/Galileo) roof antenna kits
- STL (Indoor and outdoor) antenna cables, lighting protectors and mounting kits

Management and security

- Authentication and encryption
- LLDP
- Alarms, inventory and traps reporting to NMS
- Managed by Ensemble Controller and Ensemble Sync Director, including GNSS assurance toolkit
- In-band management (over PTP/Sync-E port)
- IPv4 and IPv6 supported
- Remote CLI - Telnet & SSH (Secure Shell)
- Separate MGMT IP & PTP address
- VLAN and untagged
- IGMP
- System software download via TFTP & SCP (secure copy)
- Alarm log
- Syslog
- Remote authentication via RADIUS
- Remote, secured backup and restore
- Remote, secured SW upgrade
- Low touch provisioning using configuration file
- Multi-Level user Access
- Access control list (ACL)

Full management using SNMP v2/v3 including Regulatory and standards compliance

- Safety
  - IEC/UL 62368-1
- EMC, environmental
  - EN 55032, EN 55035
  - ETSI EN 300 386
  - FCC CFR 47 Part 15 Subpart B
  - ANSI C63.4
  - CISPR 32, CISPR 35
  - IEEE 1613
  - IEC 61850-3
- Sync and time
  - ITU-T G.8261, G.8262, G.8264
  - ITU-T G.8272, G.811
  - ITU-T G.8265.1, G.8275.1, G.8275.2
  - IEC/IEEE 61850-9-3, IEEE C37.238-2011/2017
  - SMPTE ST 2059-2, AES67
  - IEEE 1588 2008 (PTPv2)
  - RFC 1059 (NTPv1), RFC 1119 (NTPv2), RFC 1305 (NTPv3), RFC 5905 (NTPv4), RFC 4330 (SNTPv4)
  - RFC868 (Time), RFC867(Daytime)
- Others
  - RoHS; WEEE

Power consumption

- Max. power consumption: 10W
- IEEE 802.3 at type 1 powered device
- PoE class 0

Mechanical

- Size: 103.4mm (W) x 22.1mm (H) x 100.1mm (D)
- Weight: 400g

Environmental

- Operating temperature: -25 to +65°C
- Storage temperature: -40 to +70°C
- Humidity: 5 to 95% (non-condensing)

Installation

- DIN, table, wall, rack-mount options