

# OSA 5405 SyncReach™ Series

Mini in-/outdoor GNSS antenna with SB/MB GNSS receiver, PTP grandmaster



5G Mobile



Telecom



Defense



Data center



Smart grid



Transportation



Financial



Broadcast

## Benefits

- **Unique indoor dual GNSS antenna**  
Built-in single or dual GNSS receivers and antennas enabling NTP and PTP IEEE 1588v2 time servers
- **PRTC-B accuracy at the edge**  
Cost-efficient multi-band GNSS receiver achieves PRTC-B 40nsec absolute time accuracy to UTC for even the most demanding 5G applications
- **Advanced jamming and spoofing detection**  
Advanced jamming and spoofing detection on device and management levels
- **Simple installation and maintenance**  
Powered over Ethernet, no need for RF cables and cable delay correction due to integrated antennas, SyncJack™ monitoring and assurance
- **Application-optimized variants**  
Perfectly matching specific requirement of market verticals with multiple PTP profiles, segment-specific interfaces, and a variety of receiver types
- **Compact and green design**  
Distribution of accurate timing with the smallest size, cost and power footprint on the market

## Overview

From 4G and 5G mobile networks, through power utilities to modern broadcast services, mission-critical applications demand ultra-compact and cost-effective synchronization solutions for deployment deep in the network with minimal footprint and power consumption. Our OSA 5405 SyncReach™ Series covers a range of application-optimized products for in-/outdoor installation at service providers, power utilities and enterprises, among many others. With cost-efficient GNSS receivers integrated with a PTP grandmaster and NTP server in the GNSS antenna, this unique solution for accurate and reliable synchronization addresses a wide range of use cases. What's more, the OSA 5405 SyncReach™ Series significantly reduces the installation complexity and cost traditionally associated with the use of GNSS.

Our OSA 5405, a smart GNSS antenna with integrated GNSS receivers and PTP/NTP stacks, can be deployed in deep urban canyons closer to where end applications require tight synchronization. This avoids the archaic and expensive RF cable feeds of typical GNSS installations. Instead, the OSA 5405 uses cost-effective Ethernet cabling and offers both electrical and optical interfaces. A variant with IRIG-B interfaces and support of PTP power profile is ideal for substations and edge sites of the power grid. For high timing accuracy under even the most unfavorable conditions, a variant with a multi-band receiver communicates with the satellite in different frequency bands, eliminating the impact of ionospheric disturbances.



Oscilloquartz multisource aPNT+™ platform

# OSA 5405 SyncReach™ Series

## High-level specifications

### OSA 5405 series highlights

- Cost-effective sync delivery
- Small form factor PRTC-A/B, PTP grandmaster, GNSS receiver and NTP server
- T-BC class C
- Robust design
- Fiber and copper Ethernet interfaces

### Indoor/power utility variant

- Cost-effective indoor installation
- Enhanced indoor reception
- Optional external antenna input
- Small footprint for window-, wall-, DIN- or rack-mounting
- IRIG-B DCLS/AM option

### Outdoor/multiband variant

- Ruggedized IP66-compliant outdoor housing for harsh environments
- Extended temperature range
- Excellent performance even at ground level
- Wall, pole and cabinet mount

### GNSS receivers

- Single- and multi-band receiver options
- Simultaneous usage of dual GNSS frequency bands (MB version)
- GPS, GLONASS, BeiDou, GALILEO and NavIC (for MB L1+L5 version)

### PTP profiles & operation modes

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

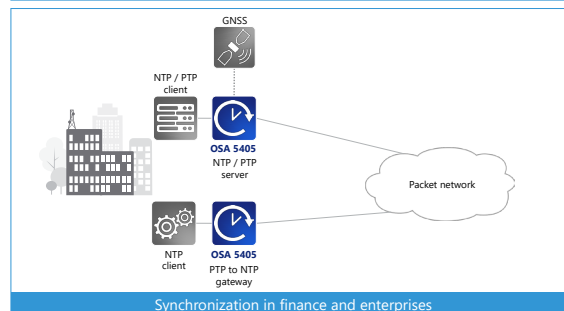
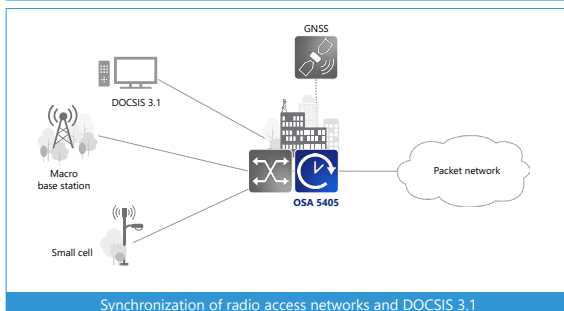
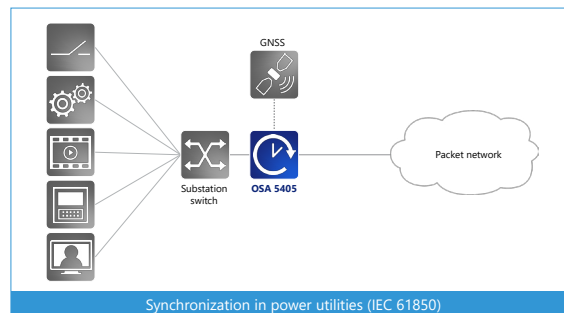
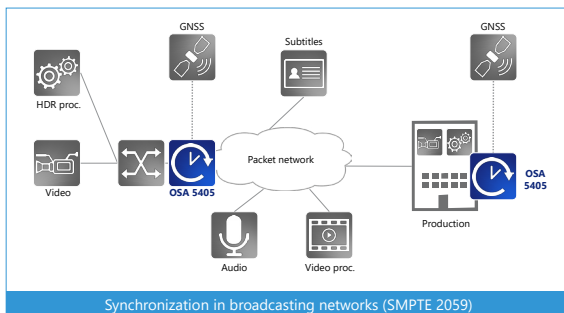
### Management

- In-band management over IPv4 and IPv6
- Remote and secure CLI-Telnet and SSH
- Separate management and PTP IP address
- Ensemble network management and control

## Applications in your network

### Highly precise GNSS-sourced synchronization with network-based PTP backup



- Radio access network synchronization including 4G, 5G (femtocells and small cells as well as macro cells)
- Cable networks (DOCSIS 3.1, 4.0), time-sensitive networks and PON synchronization
- Modernizing synchronization of power utilities and media broadcast networks
- Time-as-a service into data center, financial, health and multi-media networks
- Field add-on option to enable latest ITU-T PRTC-B specification to existing network





# OSA 5405 SyncReach™ Series

## Product specifications

### Indoor versions

	OSA 5405-Indoor (-I)	Compact, cost optimized window mountable PTP grandmaster and NTP server for indoor deployment.	Featuring dual integrated L1 GNSS receivers and antennas. Support external GNSS antenna option.
	OSA 5405-Power (-P)	Compact, cost optimized PTP grandmaster and NTP server for indoor deployment in power utilities.	Featuring integrated L1 GNSS receiver, PPS+ToD, alarm relay and IRIG interfaces. Uses external GNSS antenna

### Outdoor versions

	OSA 5405-Outdoor (-O)	Environmentally hardened compact PTP grandmaster and NTP server for outdoor deployment.	Featuring dual integrated L1 GNSS receivers and antennas
	OSA 5405-Multiband (-MB)	Environmentally hardened compact PTP grandmaster and NTP server for outdoor deployment.	Featuring Multiband (L1+L2 or L1+L5) GNSS receiver and antenna. Optimal for high accuracy PRTC-B

### 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
- Sync-E 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 telecom profiles:
  - ITU-T G.8265.1 & Telecom2008 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 power and utilities profiles
  - IEC/IEEE 61850-9-3
  - IEEE C37.238-2011
  - IEEE C37.238-2017
- PTP Broadcast profiles:
  - SMPTE ST 2059-2
  - AES67 media profile

- PTP AVB/TSN profile: IEEE 802.1AS
- IEEE1588v2 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 telecom profiles:
  - ITU-T G.8265.1 & Telecom2008 frequency delivery 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)
- IEEE1588v2 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) port
- 1000BaseX (SFP fiber) port
- Fiber port support SM/MM colored/non-colored SFP and single fiber SFP

### Synchronous Ethernet (Sync-E)

- Compliant to the relevant sections of ITU-T G.8261/G.8262/G.8264
- Supported on ingress and egress
- Ethernet synchronization message channel (ESMC)
- Sync-E input for time holdover during GNSS outage

# OSA 5405 SyncReach™ Series

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## 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

## OSA 5405 I/O/P GNSS receiver

- Provide high accuracy for PRTC-A applications
- Accuracy within +/-100nsec from UTC
- OSA 5405-I/O: dual-, independent 72-channel multi-constellation GNSS receivers and antennas
- OSA 5405-P: single 72-channel multi-constellation GNSS receiver
- 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 L1OF, BeiDou B1, Galileo E1, SBAS (QZSS, WAAS, EGNOS, MSAS)
- Up to three concurrent GNSS constellations

## OSA 5405 MB GNSS receiver

- Provide enhanced accuracy for ePRTC and PRTC-B applications
- Accuracy within +/-40nsec from UTC
- Multi-GNSS engine and antenna
- Multi-band (L1+L2 or L1+L5), multi-constellation 184-channel GNSS receiver
- 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 NMS/ENC GNSS assurance

- GPS (L1C/A L2C), Galileo (E1B/C E5b), GLONASS (L1OF, L2OF), Beidou (B1I, B2I), QZSS (L1C/A L2C), SBAS (L1C/A: WAAS, EGNOS, MSAS, GAGAN), NavIC
- Up to 4 concurrent GNSS constellations

## NTP Server

- Smallest NTP server formfactor
- 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 & daytime protocols
- Hardware-based timestamping
- Within +/-100nsec from UTC
- 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

## External antenna (OSA 5405-I/P)

- User-configurable antenna cable delay compensation
- Voltage to antenna
  - OSA 5405-I: +3.3VDC
  - OSA 5405-P: +5 VDC
- Antenna connector SMA-F (50 ohms)

## OSA 5405-I Programmable I/O

- User-configurable 1PPS/10MHz/2.048MHz input/output
- SMA-F connector (50 ohms)

## OSA 5405-P programmable I/O:

- CH1: SMA-F IRIG-B DCLS/AM 5V output, CLK/PPS/2M I/O
- CH2: SMA-F IRIG-B AM 5V output
- Optical ST connector – fiber 62/125um, 820nm multimode IRIG-B-DCLS output
- Serial RS422 over RJ-45 – PPS/IRIG-B-DCLS
- Alarm/pulse relay
- Timecodes DCLS (B000 – B007); AM (B120 – B127)
- Support for IEEE1344 and IEEE C37.118

## Internal oscillator

- OCXO Stratum 3E

## Management and security

- 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)
- Enable to disable each of the protocol via CLI
- Alarm log

# OSA 5405 SyncReach™ Series

- 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 authentication and encryption
- LLDP
- Alarms, inventory and traps reporting to NMS
- Managed by Adtran Ensemble Controller and Ensemble Sync Director, including GNSS assurance toolkit

## 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 C63.4:2014
  - CISPR 32, CISPR 35:
  - IEEE 1613 (OSA 5405-P/MB)
  - IEC 61850-3 (OSA 5405-P/MB)
- 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 compliance
  - CE
  - UL
  - FCC
  - WEEE

## Power consumption

- Max. power consumption: 3W (without SFP)
- IEEE 802.3at type 1 powered device
- PoE class 0

## Mechanical

- OSA 5405-I:
  - Size: 105mm (W) x 105mm (H) x 25mm (D)
  - Weight: 220g
- OSA 5405-O:
  - Size: 109mm (W) x 146 mm (H) x 45 mm (D)
  - Weight: 490g
- OSA 5405-MB:
  - Size: 109mm (W) x 146 mm (H) x 44 mm (D)
  - Weight: 490g
- OSA 5405-P:
  - Size: 103.4mm (W) x 22.1mm (H) x 100.1mm (D)
  - Weight: 400g

## Environmental

- OSA 5405-I/P:
  - Enclosure sealing: IEC 60529, IP20
  - Operating temperature: -25 to +65°C
  - Storage temperature: -40 to +70°C (GR-63-CORE, ETS 300 019-1-1)
  - Humidity: 5 to 95% (non-condensing)
- OSA 5405-O/MB:
  - Enclosure sealing: IEC 60529, IP66
  - Operating temperature: -40 to +70°C
  - Storage temperature: -40 to +70°C (GR-63-CORE, ETS 300 019-1-1)
  - Humidity: < 5% to 100% condensing (GR-3108-CORE Class 2,3,4, ETSI EN300 019-1-3.3, 3.4, 4.1E, 4.2H)

## Installation

- OSA 5405-Indoor: window-, wall- or rack-mount
- OSA 5405-Power: DIN, table, wall, rack-mount
- OSA 5405-Outdoor/MB: wall-mount or pole-mount on roof or cabinet
- Stationary or moving platforms

## Optional accessories

- PoE injector AC/DC and wide range DC
  - AC: 90 to 264VAC / 47 to 63Hz
  - DC: 47 to 57 Vdc
  - Wide range DC: 80 to 320VDC
- SM or MM SFPs
- GNSS (GPS/GLONASS/BeiDou/Galileo) 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
- Lightning protector

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