OSCILLOQUARTZ
A division of Adtran

Oscilloquartz coreSync™

Data sheet

OSA 3200

Optical pumping cesium clock

Science | Metrology | Research | Ground station | Time scale

Benefits

- **Unique innovation**
  First commercial cesium atomic clock utilizing optical pumping technology
- **High stability and long lifetime**
  12-year lifespan
- **Compact and modern design**
  Compact design with Ethernet interface enabling local and remote configuration
- **Proven physics**
  Builds on and improves widely deployed magnetic cesium atomic clock technology
- **Technology leadership**
  Developed by the only company with deep expertise in both synchronization and photonic solutions, pioneering optical pumping cesium technology
- **RoHS-compliant**
  Fully compliant with the latest RoHS standards, meeting strict EU demands
- **Secure and remote management**
  Featuring SNMPv3 support, fully integrated with Adtran's Mosaic Network Controller management system for enhanced security
- **Comprehensive logging**
  Includes SSH, syslog, alarm log, audit log and security log for full operational visibility

Overview

In critical applications such as metrology labs, ground stations, satellite navigation and communication, and timekeeping systems, an ultra-stable and precise frequency source is essential to ensure reliable performance.

The OSA 3200 SP is the industry's first commercial optical cesium atomic clock. Engineered for demanding environments, it provides highly precise synchronization, making it ideal for metrology institutes, mission-critical networks and defense operations.

With its uniquely compact design, the OSA 3200 SP offers a combination of features and performance unmatched in the market. Equipped with a long-life cesium tube, it meets long-term operational demands where sustained accuracy is critical. The OSA 3200 SP provides a highly stable and accurate frequency source with an accuracy better than $\pm 1 \times 10^{-12}$ Hz and excellent frequency stability.

Compact and portable, the OSA 3200 SP is well suited for space-constrained environments while maintaining exceptional stability.

Front view

Rear view

OSA 3200

High-level technical specifications

Optical pumping benefits

- No magnetic selection; optical preparation of atoms instead
- 100 times higher Atoms flux
- Simpler mechanical design
- Higher product reliability

Longest lifetime

- Optical cesium has much higher efficiency in utilizing cesium atoms
- No compromise between lifetime and performance

Highest accuracy

- Superior short-term and long-term stability compared to magnetic cesium clocks
- Tenfold Stability improvement over 12 years lifespan

Robust design

- Building on our longstanding and field-proven competence with magnetic clock and photonic technology
- Reusing unique cesium tube assembly competence
- Operating critical components outside vacuum tube

Modular design

- 3RU 19'' rack-mounting shelf
- Hot-swappable power supplies and battery modules
- Wide range of synchronization input and ultra-low noise output interfaces

Common management

- Easy to use with automated startup and an intuitive menu
- Remote (IP) and local (RS232) management via Windows GUI
- Simple integration with any host infrastructure
- SSH
- Syslog, alarm log, audit log, security log and clock data

Applications in your network

Metrology, time keeping institutes and science labs

- Provides highly stable, low-noise frequency outputs for precise measurements

Defense communication and space navigation

- Delivers superior short-term stability to enhance navigation precision
- Offers longer holdover for frequency and timekeeping, ensuring consistent long-term performance
- Produces ultra-stable carrier frequencies with low phase noise, optimizing communication systems for critical application

Product specifications

Frequency accuracy

- Frequency accuracy: ≤ +/- 1x10^{-12}
- Frequency reproducibility after power cycle ≤ +/- 1x10^{-12}

Frequency offset adjustments

- Resolution: +/-1x10^{-15}
- Range: +/-1x10^{-9}

Frequency stability versus magnetic field

- Versus +/- 1 Gauss: ≤ +/- 10^{-13}

Short-term stability (frequency outputs), Allan Deviation

Tau(T)	SP
1s	≤1.2x10^{-11}
10s	≤8.5x10^{-12}
100s	≤2.7x10^{-12}
1000s	≤8.5x10^{-13}
10,000s	≤2.7x10^{-13}
100,000s	≤8.5x10^{-14}
10 days	≤5.0x10^{-14}
30 days	≤5.0x10^{-14}
Floor (guaranteed)	≤5.0x10^{-14}
Floor (Typical)	≤4.0x10^{-14}

Low noise frequency outputs

- Number of 10MHz outputs: 2
- Number of 5MHz outputs: 1
- Number of 100 MHz output: 1
- Signal format: sine wave
- Connector: SMA/F
- Load impedance: 50Ω
- Amplitude: 13dBm +/- 1dBm
- Harmonics: ≤ -40dBc
- Non-harmonics (spurious) ≤ -80dBc
- Isolation between outputs: -110dB

SBB phase noise	5MHz output	10MHz output	100MHz output
1Hz	-106dBc/Hz	-100dBc/Hz	-70dBc/Hz
10Hz	-136dBc/Hz	-130dBc/Hz	-90dBc/Hz
100Hz	-145dBc/Hz	-145dBc/Hz	-105dBc/Hz
1,000Hz	-150dBc/Hz	-150dBc/Hz	-115dBc/Hz
10,000Hz	-154dBc/Hz	-154dBc/Hz	-120dBc/Hz
Floor	-154dBc/Hz	-154dBc/Hz	-120dBc/Hz

Timing digital outputs

- Number of 1PPS outputs: 4
- Frequency: 1 Hz
- Connector: BNC/F
- Signal format: pulse LVCMOS
- Load impedance: 50Ω
- Amplitude: 2.5Vpp with 50Ω load
- Jitter ≤1ns RMS
- Rising edge ≤5ns (10% to 90%)
- Output shape pulse
- Output timing signal significant slope: positive
- Pulse width: 100µs (adjustable)

Synchronization input

- Number of 1PPS input: 1
- Frequency: 1 Hz
- Connector: BNC/F
- Signal format: pulse LVCMOS
- Load impedance: 50Ω or 1MΩ (programmable)
- Amplitude: min. 2.5V; max. 5V
- Pulse width: 100ns-100µs
- Input timing signal significant slope: positive or negative (programmable)

Synchronisation of 1PPS timing outputs

- Synchronisation range: +/- 500µs
- One shot external sync resolution (sync on 1PPS Input) ≤ ± 10 ns
- Manual phase adjustment of 1PPS outputs
- 4 outputs adjustable independently
- Resolution of manual adjustment: 1 ns

OSA 3200

Power supply and battery options

- Number of power supply modules: 2
- Redundant and hot swappable
- Automatic switching
- Option 1
  - AC 110-240V, C15 connector
  - Range 88V up to 264V
  - Range 45Hz up to 65Hz
- Option 2
  - DC +24V (range 18V up to 30V)
- Option 3
  - DC-48V (accepted range -36V up to -72V)
- Power consumption steady state at 25°C ≤50W
- Power consumption at warm-up ≤90W
- Battery option: 60 minutes operation (full charge)
- Charge time from empty load: 4 hours

Environment and compliance

- Operating temperature: 10°C to +50°C
- Non operating temperature: -40°C to +70°C
- Operating relative humidity: 10% - 90% non condensing
- Vibration/Stationary - IEC 60068-2
- Basis ETSI EN 300019-2-3:2015 Stationary use Test specification T3.2 Environmental Class 3.2
- Random Vibration / Storage / Transportation / Drop
  - IEC 60068-2
  - Basis ETSI EN 300019-2 Storage Test specification T1.1 Environmental Class 1.1
  - Basis ETSI EN 300019-2 Transportation Test specification T2.2 Environmental Class 2.2
- Altitude: 0 to 15.000m
- Safety: IEC 62368-1:2023
- EMC and ESD
  - EN / IEC 61326-1:2020 Group 1, class A
  - CISPR 11:2024
  - CISPR 32:2015/AMD:2019
  - CISPR 35:2016
  - 47 CFR, Part 15, Subpart B, class A
  - ICES-003 Issue 7, class A
  - ICES-001 Issue 5, & 3.2.1 &3.2.2
  - EN 55011:2026
  - EN 55032:2015
  - EN 55035:2017/A11:2020
  - IEC 61000-3-2:2018/AMD2:2024
  - IEC 61000-3-3:2013/AMD2:2021
  - IEC 61000-3-11:2017
  - IEC 61000-3-12:2011/AMD12021
- RoHS 10/10
- Comply with Directive 2011/65/EU of the European Parliament and Commission Delegated Directive (EU) 2015/863

Mechanical

- Table top
- 19'' rack mountable, 19'' 3RU
- Width/with rack ears: 450mm/482.6 mm
- Depth: 510mm
- Height: 132mm
- Weight: 22Kg (with battery, 17 without)

Management features

- Status LED
  - 3 LEDs on front panel
  - Type: Alarm, status, power
- Alarm relay
  - Maximum rating: U= 50VDC, I = 250mA
  - Connector: SUB-D 9/F
- Local management port
  - Connector: SUB-D9/M
  - Port configuration: 115200bps, 8bits, 1 stop bit
  - Management commands: CLI
  - Management software: Windows GUI
- Remote management port
  - Remote management port: Ethernet - TCP-IP Connector: RJ45
  - Management commands: SNMP v3 (including authentication and encryption)
  - SSH
  - Management software: Mosaic Network Controller
- System logging
  - Configurable system timing source – local/NTP/SNTP
  - User configurable time zone and daylight saving time (DST)
  - Syslog, alarm log, audit log, security log and clock data

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