wavetel
a simac group company

OSCILLOQUARTZ
A division of Adtran

Oscilloquartz coreSync™

Data sheet

OSA 3300

Science | Metrology | Research | Ground station | Time scale

Benefits

- **Ultra-high stability and longevity**
  Offers a 10-year warranty with superior frequency stability and twice the lifespan of traditional magnetic cesium atomic clocks
- **Unique innovation**
  First commercial cesium atomic clock utilizing optical pumping technology for high-performance applications
- **Compact and modern design**
  Features an intuitive LCD touch screen and Ethernet connectivity for simplified 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

Overview

Incriticalapplications such as metrology labs, timekeeping systems, satellite navigation and communication, an ultra-stable and precise frequency source is essential to ensure reliable performance. The OSA 3300 HP/SHP is the industry's first commercial optical cesium atomic clock, delivering nanosecond precision and unmatched long-term accuracy. With an Enhanced Short Term Unit (ESTU) option, it sets new benchmarks in short-term stability and drives innovation in timekeeping and scientific research.

Engineered for demanding environments, the OSA 3300 HP/SHP provides highly precise synchronization over an extended lifetime, making it ideal for metrology institutes, mission-critical networks and defense operations. Its advanced optical cesium technology delivers significantly higher accuracy, stability and a robust design compared to legacy magnetic cesium clocks. What's more, it's well-suited for GPS/GNSS backup-as-a-service, ensuring continuity in critical applications.

Compact and portable, the OSA 3300 HP/SHP supports space-constrained environments while maintaining exceptional stability. The ESTU option further enhances its suitability for ground-based space stations and defense radar systems, offering exceptional short-term stability comparable to hydrogen masers. What's more, the OSA 3300 HP/SHP with ESTU option is well-suited for ground-based space stations and defense radar systems, offering exceptional short-term stability comparable to that of hydrogen masers.

Front view


Rear view

Metrology cesium clock

OSA 3300

High-level technical specifications

Optical pumping benefits

- No magneticselection; optical preparation of atoms instead
- 100 times more atoms can be measured
- 10 times higher clock stability
- Simpler mechanical design
- Higher product reliability

Longest lifetime

- Optical cesium has much higher efficiency in utilizing cesium atoms
- Double lifetime compared with legacy magnetic cesium clocks
- No compromise between lifetime and performance

Highest accuracy

- Superior short-term and long-term stability compared to magnetic cesium clocks
- Tenfold accuracy improvement over 10 years

Robust design

- Buildingonourlongstanding 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 with touch screen
- Remote (IP) and local (RS232) management via Windows GUI
- Syslog: alarm log, audit log, security log and clock data
- Simple integration with any host infrastructure

Applications in your network

Metrology, time keeping institutes and science labs

- Provides highlystable, low-noisefrequencyoutputsfor precise measurements
- Supports national time scales with significantly higher accuracy and stability, ideal for applications like GPS/GNSS backup-as-a-service (GBaaS)

Defense communication and space navigation

- Deliverssuperiorshort-term stability toenhancenavigation 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 applications

OSA 3300

Product specifications

Frequency accuracy

- Frequency accuracy:≤+/- $5x10^{-13}$
- Frequency reproducibility after power cycle ≤ +/- $1x10^{-13}$

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)	HP/10Y	SHP/10Y
1s	≤$5x10^{-12}$	≤$3x10^{-12}$
10s	≤$3.5x10^{-12}$	≤ $1.5x10^{-12}$
100s	≤$8.5x10^{-13}$	≤ $4.5x10^{-13}$
1,000s	≤$2.7x10^{-13}$	≤ $1.5x10^{-13}$
10,000s	≤$8.5x10^{-14}$	≤ $4.5x10^{-14}$
100,000s	≤$2.7x10^{-14}$	≤ $1.5x10^{-14}$
10 days	≤ $1x10^{-14}$	≤ $8x10^{-15}$
30 days	≤ $1x10^{-14}$	≤ $8x10^{-15}$
Floor (guaranteed)	≤ $1x10^{-14}$	≤ $8x10^{-15}$
Floor (typical)	≤$5x10^{-15}$	≤ $5x10^{-15}$

- Warm-up time: 60 minutes at 25°C (Typical 30 minutes)

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

- Numberof 1PPSoutputs: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: 20µs

Synchronization input

- Numberof 1PPSinput: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

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

OSA 3300

Power supply and battery options

- Numberof powersupplymodules: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 25ºC ≤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:10ºC to +50ºC
- Non operating temperature: -40ºC to +70ºC
- Operating relative humidity: 10% - 90% non condensing
- Operating DC magnetic field: 0 Gauss to 2 Gauss any direction
- 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. IEC 60825-1
- EMC and ESD:
  - EN 55032, CISPR 32, 47 CFR, Part 15, Sub part B
  - ICES - 003 Issue 7
  - EN 55035, CISPR 35,
  - EN 61326-1, IEC 61326-1
  - CE & UL compliant
- 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: 25Kg (with battery, 20 without)

Management features

Status LED

- 3LEDs on front panel
- Type: Alarm, status, power

Alarm relay

- Maximum rating: U= 50VDC, I = 250mA
- Connector: SUB-D 9/F

Graphical touch screen display

- Management functions
- Alarm and status
- Monitoring
- Parameter setting

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)
- Management software: Mosaic Network Controller and Sync Director
- Syslog: alarm log, audit log, security log and clock data

OSA 3300

Enhanced Short Term Unit (ESTU)

Orderable option

ESTU option

Frequency accuracy

- Frequency accuracy:≤+/- $5x10^{-13}$
- Frequency reproducibility after power cycle ≤ +/- $1x10^{-13}$

Frequency offset adjustments

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

Short-term stability (frequency outputs), Allan Deviation

Tau(T)	HP/10Y/ESTU-20	SHP/10Y/ESTU-15
1s	**≤$2x10^{-13}$**	**≤$1.5x10^{-13}$**
10s	**≤$2x10^{-13}$**	**≤$1.5x10^{-13}$**
100s	**≤$2x10^{-13}$**	**≤$1.5x10^{-13}$**
1,000s	**≤$2x10^{-13}$**	**≤$1.5x10^{-13}$**
10,000s	≤$8.5x10^{-14}$	≤$4.5x10^{-14}$
100,000s	≤$2.7x10^{-14}$	≤$1.5x10^{-14}$
10 days	≤$1x10^{-14}$	≤$8x10^{-15}$
30 days	≤$1x10^{-14}$	≤$8x10^{-15}$
Floor (guaranteed)	≤$1x10^{-14}$	≤$8x10^{-15}$
Floor (typical)	≤$5x10^{-15}$	≤$5x10^{-15}$

Low noise frequency outputs/ESTU-option

- 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	-117dBc/Hz	-115dBc/Hz	-85dBc/Hz
10Hz	-137dBc/Hz	-135dBc/Hz	-110dBc/Hz
100Hz	-145dBc/Hz	-145dBc/Hz	-120dBc/Hz
1,000Hz	-150dBc/Hz	-150dBc/Hz	-125dBc/Hz
10,000Hz	-154dBc/Hz	-150dBc/Hz	-125dBc/Hz
Floor	-154dBc/Hz	-150dBc/Hz	-125dBc/Hz

wavetel a simac group company

Contact US

WAVETEL
PARIS I RENNES I LARMOR-PLAGE I LANNION

sales@wavetel.fr - www.wavetel.fr - +33(0)2 99 14 69 65

simac

Updated May 7, 2025