coreSync™ | OSA 3350 ePRC+

Optical Cesium atomic clock with excellent frequency stability

An increasing number of networks and applications need to be precisely synchronized. Inaccurate timing can cause poor performance or even outages of complete systems. While GNSS provides excellent accuracy, satellite-based timing suffers from vulnerabilities such as jamming and spoofing and so cannot be relied on as the only synchronization technology. With their high levels of accuracy and outstanding availability, atomic clocks provide the ideal backup for GNSS.

Our OSA 3350 is the first commercial optical cesium atomic clock specifically designed for ePRC application that require excellent holdover. It enables highly stable synchronization over an extended lifetime. Thanks to its advanced optical cesium technology, it provides much higher accuracy, longer lifetime and a more robust design than legacy magnetic cesium clocks. With an outstanding frequency stability better than ePRC G.811.1 specification, our OSA 3350 enables the deployment of ePRTC solutions, which outperform even the most stringent recommendations. What's more, complementing satellite-based synchronization solutions with ultra-stable atomic clocks ensures the highest levels of availability. Combined with a highly scalable grandmaster, such as our OSA 5430 or 5440 series, our OSA 3350 enables a market-leading G.8272.1-compliant ePRTC solution with improved holdover, resolving GNSS dependency for 4G and 5G networks.

Your benefits

- **Ultra-high stability and long lifetime**
  Higher frequency stability and two times longer lifetime compared to legacy magnetic cesium atomic clocks
- **Unique innovation**
  First commercial ePRC+ product utilizing optical technology for highly efficient utilization of cesium atoms
- **Compact design**
  Compact and robust design for applications in the cloud, core networks and on enterprise sites
- **Technology leadership**
  Only company has proven, long-standing expertise in both synchronization and optical solutions
- **RoHS compliant**
  Fully compliant with latest RoHS standards for highest levels of environmental sustainability
- **Remote and secured management**
  Remote and secured management using SNMPv3 fully supported by ADVA Ensemble Controller management system

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High-level technical specifications

Highest Stability and Accuracy

- Both short- and long-term stability superior over magnetic cesium
- Outperform ITU-T G.811.1 ePRC specification
- When combined with OSA ePRTC solution can provide holdover of 35nsec for 14 days

Longest lifetime

- Optical cesium improves efficiency in utilizing CS atoms
- No compromise between lifetime and performance
- Higher performance operation within tight specifications over
- 10 rather than 5 years

Wide range of interface

- Four BITS outputs
- Four 1PPS outputs
- Two analogue outputs
- One 1PPS input

Robust design

- Improving established cesium atomic clock design practices
- Reusing unique cesium tube assembly competence
- Operating critical components outside vacuum tube
- Fully redundant and hotswapable PSUs

Modular design

- Standard 3RU shelf for both ETSI and 19" rack mounting
- Wide range of synchronization input and output interfaces
- Easy integration with grandmaster in ePRC/ePRTC applications

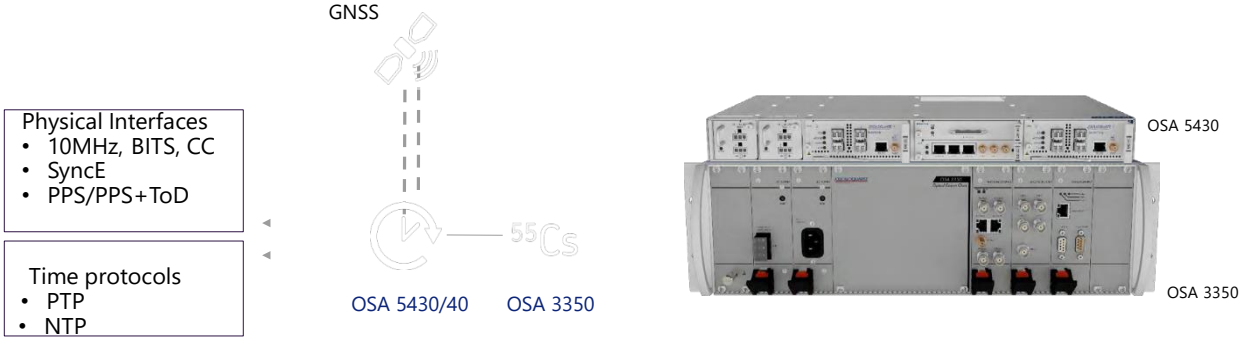
Common management

- Native support for remote and secured management
- Common Ensemble management suite for synchronization and transport networks
- Supporting SNMPv2/v3 for ease of integration into third-party NMS

Applications in your network

ePRC and ePRTC for communication and cloud service providers, power utilities, enterprises and governments

- Highly accurate and stable frequency source as per PRC G811 / ePRC G811.1
- ePRC+/ePRTC+ solutions for communication networks, in combination with satellite-based timing and grandmasters
- Replacement of magnetic cesium clocks for higher accuracy and longer lifetime
- Highly stable back-up to GNSS in cloud data centers and with power utilities
- Cloud service providers, enterprises as well as governments and defense organisations benefit from highest precision and an extended lifetime



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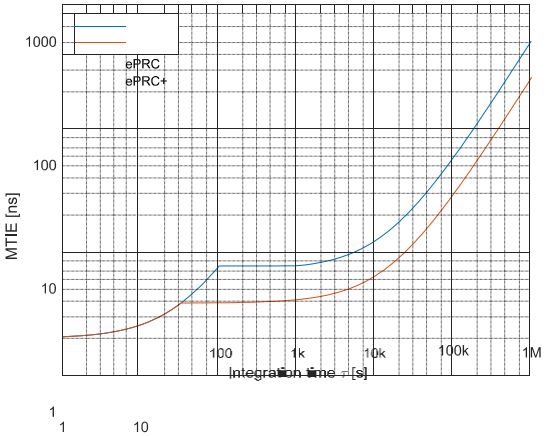
Frequency accuracy and settability

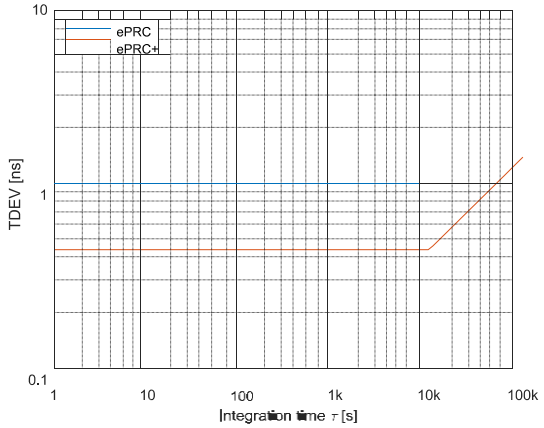
- Frequency accuracy at factory ≤ +/- $1x10^{-12}$
- Frequency reproducibility after power cycle ≤ +/- $1x10^{-12}$
- Frequency settability resolution: +/-$1x10^{-15}$
- Frequency settability range: +/- $1x10^{-9}$

Stability of frequency outputs outperforming ITU-T

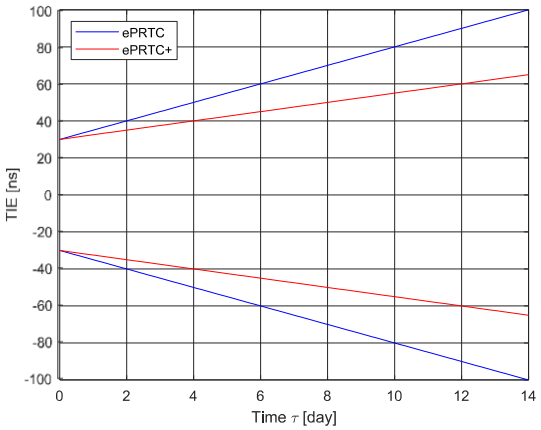
- The OSA 3350 ePRC+ is exceeding the G.811.1 ePRC specification and when combined with OSA ePRTC solution can provide holdover of up to 35nsec over 14 days vs the 70nsec specified in G.8272.1 ePRTC.
- G.811.1 MTIE ePRC vs OSA ePRC+ :



- G.811.1 TDEV ePRC vs OSA ePRC+ :



- G.8272.1 ePRTC holdover vs OSA ePRTC+ holdover



Warm-up time

- 60 minutes @ 25°C

Telecom BITS outputs

- Number of BITS outputs: 4
- Signal shape compliant with ITU-T G.703
- Signal type: E1
- Code type: HDB3
- Frame type: CAS with CRC4
- SSM support
- Connectors:
  - 2 x BNC for 2.048MHz
  - 2 x RJ-48 for E1
- Impedance:
  - 120Ω for RJ-48
  - 75Ω for BNC

Analog frequency outputs

- Number of analog outputs: 2
- Frequency: 5MHz and 10MHz
- Signal format: sine wave
- Connector: BNC
- Load impedance: 50Ω +/- 5%
- Amplitude: >10dBm min., 13dBm typical
- Harmonics: ≤-40dBc
- Non harmonics (spurious) ≤-70dBc

SBB Phase noise	5 MHz	10MHz output
1Hz	-95 dBc/Hz	-90 dBc/Hz
10Hz	-125 dBc/Hz	-120 dBc/Hz
100Hz	-140 dBc/Hz	-135 dBc/Hz
1.000Hz	-150 dBc/Hz	-145 dBc/Hz
10.000Hz	-150 dBc/Hz	-145 dBc/Hz
100.000Hz	-150 dBc/Hz	-145 dBc/Hz

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Digital frequency outputs

- Number of digital frequency outputs: 1
- Signal format: square wave
- Frequency: 2.048MHz
- Connector: SMA
- Amplitude: < 2.5VPP @ 50Ω load

Timing digital outputs 1PPS

- Number of 1PPS outputs: 4
- Frequency: 1 Hz
- Connector: BNC/F
- Signal format: square LVCMOS
- Load impedance: 50Ω
- Amplitude: 2.5 Vpp with 50Ω load
- Jitter ≤1ns RMS
- Rising edge ≤5ns (10% to 90%)
- Output shape square
- Output timing signal significant slope: positive
- Pulse width: 20 µs

Timing synchronization input 1PPS

- Number of 1PPS input: 1
- Frequency: 1Hz
- Connector: BNC/F
- Signal format: square 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

Power supply and battery option

- Number of power supply modules:
- 2 Fully redundant power blocks
- 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 @ 25°C ≤60W
- Power consumption at warm-up ≤90W

Environment

- Operating temperature: 10°C - +50°C
- Non-operating temperature: -40°C -+70°C
- Operating relative humidity: 10% - 90% non condensing
- Operating DC magnetic field: 0 Gauss to 2 Gauss any direction
- Stationary use at weatherprotected locations (operating): EN 300 019-1-3, class 3.2
- Transportation: EN 300 019-1-2, class 2.2
- Storage: EN 300 019-1-1, class 1.1
- Altitude: 0 - 15,000 m
- Safety: IEC 62368-1
- EMC&ESD: EN 50081-1, EN 50082-1, IEC 801 parts 2,3,4,5,6
- CE compliant
- Full RoHS compliant

Mechanical

- Table top or rack mountable 19"
- Width/with rack ears: 450mm/482.6mm
- Depth: 510mm Height: 132mm Weight: 20kg

Management features

Status LED

- 3x (ALARM-STATUS-POWER)
- On the front panel (Management card)

Alarm relay

- Alarm relay: 3
- Maximum rating: U= 50 VDC, I = 250 mA
- connector: SUB-D 9/F
- On the front panel (management card)

Local management port

- RS-232C
- Connector: SUB-D9/M
- Port Configuration: Baudrate 115200 bps
- Port Configuration: 8 databits, 1 StopBit
- Port Configuration: No Parity, No Handshake
- Management commands: CLI
- Management software: Windows GUI

Remote management port

- Remote management port: Ethernet - TCP-IP
- Connector: RJ45
- Management commands: SNMPv2/v3 (including authentication and encryption)
- Management software : Ensemble Controller, Ensemble Sync Director