

# OSA 3230B Cesium Clock

## The OSA 3230B as G.811 Reference Clock Source using the Digital Cesium technology

### Introduction

Telecommunication networks require highly accurate clocks for the effective transmission of digital signals. One of the primary objectives of telecommunication networks is to guarantee, at the connection between different networks, a slip rate of less than one slip in 72 days.

Meeting these stringent specifications requires the implementation of a Primary Reference Clock (PRC) that must generate signals with an accuracy better than  $1E-11$ , at all times. Generally, this is achieved using Cesium clock technology, often combined with GPS receivers as backup sources. Unlike off-air receivers, Cesium clocks are autonomous, self-contained primary references immune from external influences.

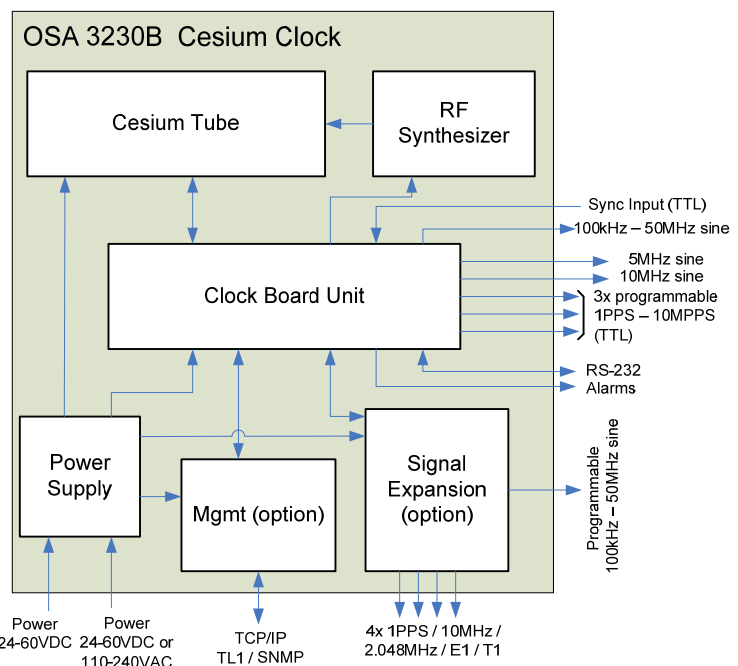
### Highlights

The **Oscilloquartz's 3230B** Cesium Clock is specifically designed and produced with the latest technology to serve complex applications where an extremely accurate reference signal is needed in a minimum size.

The **OSA 3230B** Cesium Clock offers a unique set of operational features and performance, including greatly enhanced and easy integration into industrial, professional time and frequency host systems. With its long life cesium tube and its extremely high flexible output type capacity, the **OSA 3230B** is the most flexible and the most compact Primary Reference Clock Source available on the market, which will meet the most stringent requirements where any type of clock signal with G.811 performances is needed over a long period.

### Features

- Performances exceeding ITU-T G.811 / Stratum 1 PRC
- Accuracy better than  $\pm 1 \times 10^{-12}$  during entire life
- Long life 10 years cesium tube
- Extremely compact size — 4U high (176mm) ETSI 240mm depth with front access connector, or 3U (132mm) 19" standards 400mm depth with rear access connectors
- 10 MHz and 5MHz low noise output
- 100kHz to 50MHz programmable sine wave analog output
- 3x outputs configurable between 1PPS / 1MHz / 5MHz / 10MHz — TTL level
- 1 PPS external synchronization input
- Optional Signal Expansion, providing 5 additional outputs: 4x configurable between 1PPS / 10MHz / 2MHz (G703) / 2Mbits/s E1 (G703) with SSM / T1, + 1x programmable sine wave 100kHz to 50MHz
- Redundant DC power supply inputs or mixed AC+DC power supply (AC+DC only available on 19" version)
- Control and monitoring via alarm contacts and RS232 communication
- TCP/IP Remote management port for TL1 and/or SNMP management



### Typical Applications

- Primary Reference Source for PRC system requiring a signal conform to G.811 / Stratum 1
- Wireline / Wireless Operators
- Railways / Energy Companies
- Utilities



OSA 3230B ETSI version



OSA3230B 19" version

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### Typical Characteristics

#### Cesium performances characteristics

Frequency accuracy	$\pm 1 \times 10^{-12}$
Reproducibility	$\pm 1 \times 10^{-12}$
Settability:	Resolution $< 1 \times 10^{-15}$
	Range $\pm 1 \times 10^{-9}$

Wander generation

MTIE	$0.05s \leq \tau < 33s$	10ns
	$33s \leq \tau < 1'000s$	$3 \times 10^{-10} \tau$
TDEV	$1'000s \leq \tau < 30'000s$	300ns
	$30'000s \leq \tau$	$1 \times 10^{-11} \tau$

TDEV	$0.1s \leq \tau < 1s$	3ns
	$1s \leq \tau < 2.5s$ <td><math>3.2 \times 10^{-9} \tau^{0.5}</math></td>	$3.2 \times 10^{-9} \tau^{0.5}$
	$2.5s \leq \tau < 44s$ <td>2ns</td>	2ns
	$44s \leq \tau < 10'000s$ <td><math>3 \times 10^{-10} \tau^{0.5}</math></td>	$3 \times 10^{-10} \tau^{0.5}$

Warm-up time 45 minutes @ 25°C

#### Outputs

##### Direct frequency outputs

Number	2	
Output frequency	1x 5MHz + 1x 10MHz	
Level & connectors:	13dBm @ 50Ω, BNC	
Output phase noise:	<b>5 MHz</b>	<b>10 MHz</b>
1 Hz	-95 dBc	-90 dBc
10 Hz	-125 dBc	-120 dBc
100 Hz	-140 dBc	-135 dBc
1 kHz	-150 dBc	-145 dBc
10 kHz	-154 dBc	-145 dBc
100 kHz	-154 dBc	-145 dBc

Distortion: Harmonics	≤40 dBc
Spurious	≤80 dBc

**Analog output:** 1x programmable 0.1 to 50 MHz sine wave output, BNC 50 ohms, +7dB

##### Digital outputs:

Number	3
Frequency	1PPS / 1 / 5 / 10 MHz
Output level	≥ 3V @ 50Ω
Output shape	square
Connector	BNC

#### Synchronization input

Type & connector: 1PPS TTL (≥ 3V) — BNC (1x on rear side + 1x on front side in 19" version)

#### Power Supply

Voltage	48V DC nominal floating (24V to 60V)
Power feeds	Dual
Power consumption	50W @25°C (warm-up max. 60W)
Optional mixed configuration 1x AC+ 1x DC power supply with OSA 3230B 19" subrack version (AC: 110-240VAC 50-60Hz)	

#### Management / User interface

Management port RS-232C on DB-9 for local management and / or remotely using SyncView Plus™ (1x connector on rear side + 1x connector on front side in 19" version)

Alarms 3 x relay contacts

LED Monitoring 3x LED's on front plate for monitoring power supply status, operation and alarms (3x LED's on front side + 3x LED's on rear side in 19" version)

#### Mechanical

ETSI: 4U 176 x 436 x 240 mm (H x W x D) with front access connectors, adapters for 19" rack standard

19": 3U 132 x 436 x 400 mm (H x W x D) with rear access connectors, adapters for 23" rack standard

Weight <15kg (excluding packing)

#### Telecom Signal expansion (optional)

Number	4
Frequency	Configurable: 2.048 MHz / E1 / T1 / 1PPS / 10MHz
Output level	According to G703
Connector	BNC 75Ω or DB9 120Ω (T1: DB-9 100Ω)

#### Analog output

1x programmable 0.1 to 50 MHz sine wave output, BNC 50 ohms, +7dB

#### Remote management port (optional)<sup>1</sup>

Management Port Ethernet TCP/IP port on RJ45 for management over TL1 and/or SNMP

#### Environmental Conditions

Operating conditions	EN 300 019-1-3, class 3.2 (temperature range extended from - 5°C to +55°C)
Transportation	EN 300 019-1-2, class 2.2
Storage	EN 300 019-1-1, class 1.1
Humidity	Up to 95%
Altitude (operating)	0 — 15'000m
DC magnetic field	±2 Gauss maximum
Safety	EN 61010-1
EMC & ESD	EN 50081-1, EN 50082-1 IEC 801 parts 2, 3, 4, 5 and 6 CE compliant

<sup>1</sup>Consult factory for availability

Subject to change without prior notice.

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