OSCILLOQUARTZ

OSA 3030B EUDICS

European Digital Cesium Frequency Standard

TIME & FREQUENCY

Atomic clocks standards are needed to generate highly accurate frequencies. These are typically used as Primary Reference in telecommunications networks, navigations systems, ground stations (LORAN C, GPS, GLONASS, GALILEO, etc...), long wave and medium wave broadcasting stations. Atomic clocks can also be used for specific inertial navigation systems where external "time reference signals" are not available or insufficiently protected regarding transmission risks. Another field of application is for astrophysics, where very high precision atomic clocks can be used for long-baseline interferometers. The Oscilloquartz's 3030B Eudics is specifically designed and produced with the latest technology to serve these complex applications. Highly compact, the OSA 3030B EUDICS offers a unique set of operational features and performance, including greatly enhanced and easy integration into industrial, professional and time and frequency host systems.

Precision, Stability, Innovation, Support

A COMPANY OF THE SWATCH GROUP

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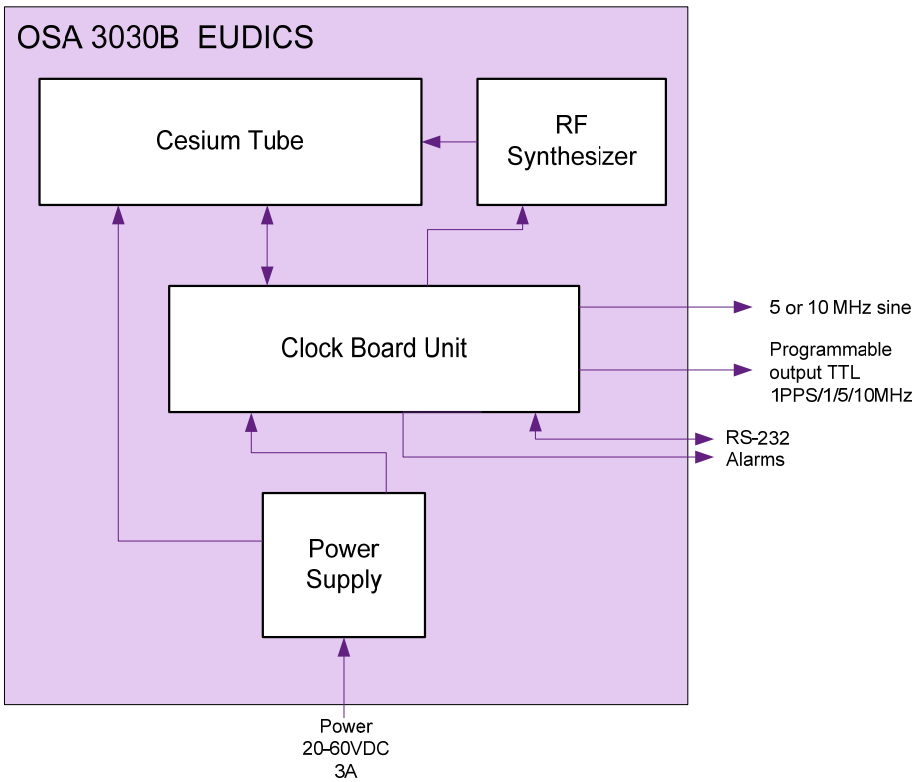
HIGHLIGHTS

- Smallest volume/foot print in its class in rugged housing.
- Excellent frequency accuracy over a large temperature range.
- Monitoring and control available via RS232 making the 3030B extremely easy to operate.

Applications

- Navigation System Ground Stations (Loran C, GPS, Galileo, GLONASS)
- Long and medium wave broadcasting stations
- Localization
- Large base Interferometry



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The Oscilloquartz's 3030B EUDICS 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 3030B EUDICS 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 3030B is the most flexible and the most compact Primary Reference Clock Source available on the market, meeting the most stringent requirements where any type of clock signal is needed over a long period.

Principle of operation

The OSA 3030B EUDICS frequency standard consists of a Quartz oscillator frequency-locked to the hyperfine resonance of free Cesium atoms. The Cesium atomic beam resonator provides an output signal which is strongly peaked around the central frequency f_0 = 9.192631770 GHz, the width of the resonance being about 500 Hz.

The stability of the resonance frequency with time and its insensitivity to environmental variations, especially to temperature, are the main reasons for the long-term stability and accuracy of the Oscilloquartz Cesium standard.

In order to lock the Quartz oscillator to the atomic resonance, an interrogating signal near f_0 is derived from the output of a Quartz oscillator and RF synthesis and fed to the atomic resonator. Under control of the microprocessor, the synthesized frequency is switched from one side of the atomic resonance to the other. The ouput signal is processed by a digital synchronous detector to provide a correction signal to the voltage-controlled Quartz oscillator. The locked condition is reached when the two frequencies are symmetric about the resonance ($f_i = f_0$).

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Outline and electrical connections

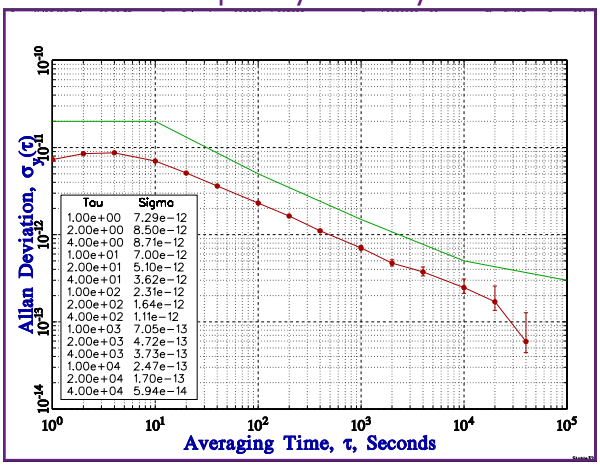
Power Supply	
Input Voltage	20V to 60V (50W @ 25°C (warm-up max. 60W)
Warm-Up time @ 25°C (Cold-Start)	45 min typical
Environmental	
Operating Temperature Range	-5°C to 55°C
In-use Humidity	Up to 95%
Atmospheric pressure	70 kPa to 106 kPa
DC magnetic field	+/- 2Gauss maximum
Shock / Vibration	IEC 60068-2-27:1987 / IEC 60068-2-6:1982
Mechanical	
Size h x w x d mm (inch)	187.5x124x366 mm / 7.4"x4.9"x14.4" without connectors or 187.5x124x381.7 mm / 7.4"x4.9"x15" including connectors.
Weight	# 10Kg
Connector Access	All connectors are placed on Front Panel

Technical specification

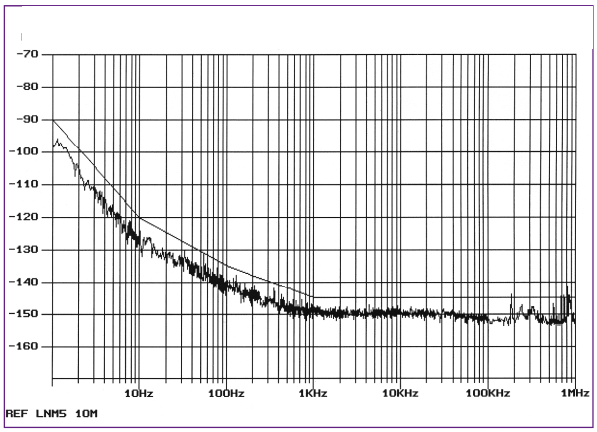
Output Signal		
	Frequency	10MHz or 5MHz
	Level value	1Vrms ± 0.2Vrms/50Ω
	Accuracy	± $1x10^{-12}$
	Reproducibility	± $1x10^{-12}$
Stability (Allan standard deviation)		
	Navigation	**Metrology**
1 s	$2x10^{-11}$	$1.2x10^{-11}$
10 s	$2x10^{-11}$	$8.5x10^{-12}$
100 s	$5x10^{-12}$	$2.7x10^{-12}$
1000 s	$1.5x10^{-12}$	$8.5x10^{-13}$
10 000 s	$5x10^{-13}$	$2.7x10^{-13}$
100 000 s	$3x10^{-13}$	$8.5x10^{-14}$
Floor	$3x10^{-13}$	$5x10^{-14}$
Fractional frequency deviation		
	Temperature -5°C + 55°C	± $2x10^{-12}$
Settability		
	Resolution	< $1x10^{-15}$
	Range	± $1x10^{-9}$
SSB phase noise spectral density (BW 1Hz)		
	5MHz	**10MHz**
1Hz	-95dBc/Hz	-90dBc/Hz
10Hz	-120dBc/Hz	-120dBc/Hz
100Hz	-135dBc/Hz	-135dBc/Hz
1kHz	-145dBc/Hz	-145dBc/Hz
Programmable output		
	Frequencies	10MHz, 5MHz, 1MHz
	Level value	Square 0/5V HCMOS

Performance data

Short term frequency stability



Phase noise



Subject to change without prior notice.

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