

Disciplined Oscillator *Options*

For GPS-Synchronized Time & Frequency Standards

EndRun's Meridian II and Tycho II can be upgraded with OCXO and Rubidium oscillators to improve holdover accuracy, short-term stability, and phase noise. Three grades of oven-controlled crystal oscillators (OCXOs) and an Ultra-Stable Rubidium frequency standard are available to upgrade the basic temperature-compensated crystal oscillator (TCXO). For state-of-the-art, industry-leading performance, the oscillators are individually characterized and hand-selected. We guarantee our OCXOs are free of sudden frequency steps - an industry exclusive. For optimal oscillator stability, these products can be configured with the [Real-Time Ionospheric Corrections \(RTIC\) Option](#).

KEY BENEFITS

- Industry-leading Phase Noise
- Industry-leading Short-Term Stability
- No Frequency Steps (OCXOs)
- Improved Holdover Accuracy



OCXO Options

The OCXO options are: Medium-Stability (MS), High-Stability (HS), and Ultra-Stable (US). These proprietary OCXOs feature SC-cut crystals for fast warmup, low ageing and phase noise. By using premium, high-Q 5 MHz crystals and a frequency doubler, 5 and 10 MHz outputs are provided with exceptional close-in phase-noise performance, stability, and state-of-the-art long term ageing.

Relative to the basic TCXO, the cost-effective MS-OCXO provides two orders-of-magnitude improvement in temperature stability, ageing, short-term stability and phase noise performance. The HS-OCXO has additional stability and phase noise performance. The US-OCXO provides industry-leading close-in phase noise, and sinewave outputs with the highest spectral purity for demanding applications such as satellite communications, signal intelligence, and radar.

Rubidium Option

Rubidium atomic frequency standards excel in temperature stability, ageing, and medium-term stability. For the ultimate in long-term holdover performance and medium-term stability with very good phase noise, the Ultra-Stable Rubidium option is the right choice. The US-Rubidium is based on an industry-leading rubidium frequency standard that delivers true, uncompromised rubidium performance. An integrated SC-cut crystal output enables low phase noise as well.

Oscillator Options - Summary Performance Data

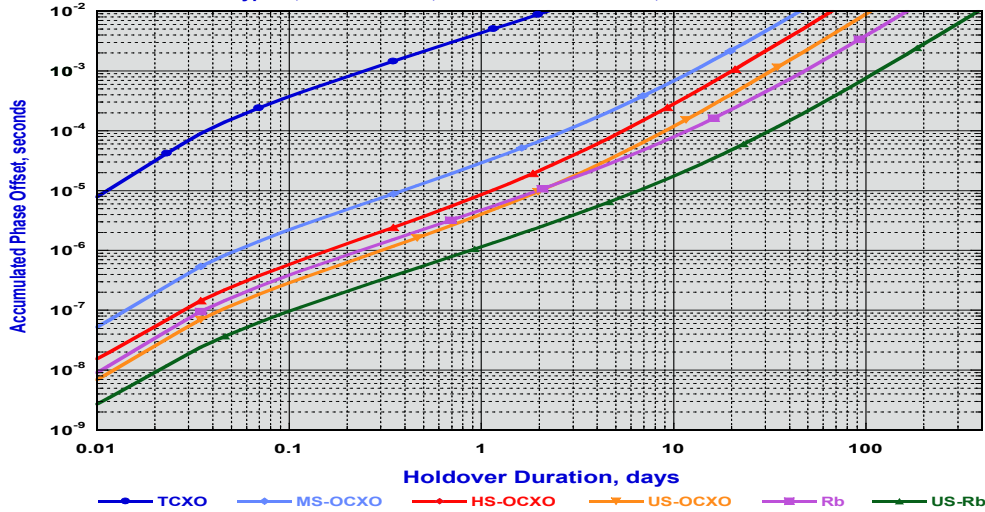
	TCXO*	MS-OCXO	HS-OCXO	US-OCXO	US-Rubidium
Temp Stability	2.5 x 10 ⁻⁶	4 x 10 ⁻⁹	1 x 10 ⁻⁹	5 x 10 ⁻¹⁰	2 x 10 ⁻¹⁰
Temp. Range °C	-20 to +70	0 to +70	0 to +70	0 to +70	-20 to +65
Ageing Rate/Year	1 x 10 ⁻⁶	3 x 10 ⁻⁸	3 x 10 ⁻⁸	3 x 10 ⁻⁸	5 x 10 ⁻¹⁰
Allan Deviation @ 1 sec	2.0 x 10 ⁻¹⁰	3.0 x 10 ⁻¹²	1.0 x 10 ⁻¹²	4.0 x 10 ⁻¹³	1.5 x 10 ⁻¹¹
10 sec	2.0 x 10 ⁻¹⁰	3.9 x 10 ⁻¹²	1.3 x 10 ⁻¹²	5.0 x 10 ⁻¹³	5.0 x 10 ⁻¹²
100 sec	8.0 x 10 ⁻¹¹	3.0 x 10 ⁻¹²	1.7 x 10 ⁻¹²	8.5 x 10 ⁻¹³	1.4 x 10 ⁻¹²
1k sec	8.0 x 10 ⁻¹²	2.0 x 10 ⁻¹²	1.5 x 10 ⁻¹²	8.0 x 10 ⁻¹³	7.0 x 10 ⁻¹³
10k sec	8.0 x 10 ⁻¹³	4.0 x 10 ⁻¹³	4.0 x 10 ⁻¹³	4.0 x 10 ⁻¹³	4.0 x 10 ⁻¹³
100k sec	6.0 x 10 ⁻¹⁴	6.0 x 10 ⁻¹⁴	6.0 x 10 ⁻¹⁴	6.0 x 10 ⁻¹⁴	6.0 x 10 ⁻¹⁴
Phase Noise dBc/Hz:					
10MHz		10 / 5MHz	10 / 5MHz	10 / 5MHz	10 / 5MHz
1 Hz	-70	-95 / -100	-105 / -110	-113 / -118	-92 / -92
10 Hz	-100	-120 / -130	-130 / -135	-138 / -143	-130 / -130
100 Hz	-125	-135 / -140	-140 / -145	-148 / -152	-145 / -135
1 kHz	-135	-145 / -150	-150 / -155	-152 / -155	-150 / -135
10 kHz	-140	-145 / -150	-150 / -155	-153 / -155	-153 / -135
100 kHz	-145	-145 / -150	-150 / -155	-153 / -155	-153 / -135

NOTE: OCXO and Rubidium phase noise specifications are guaranteed on Low-Phase-Noise Module. TCXO phase noise specifications are typical.

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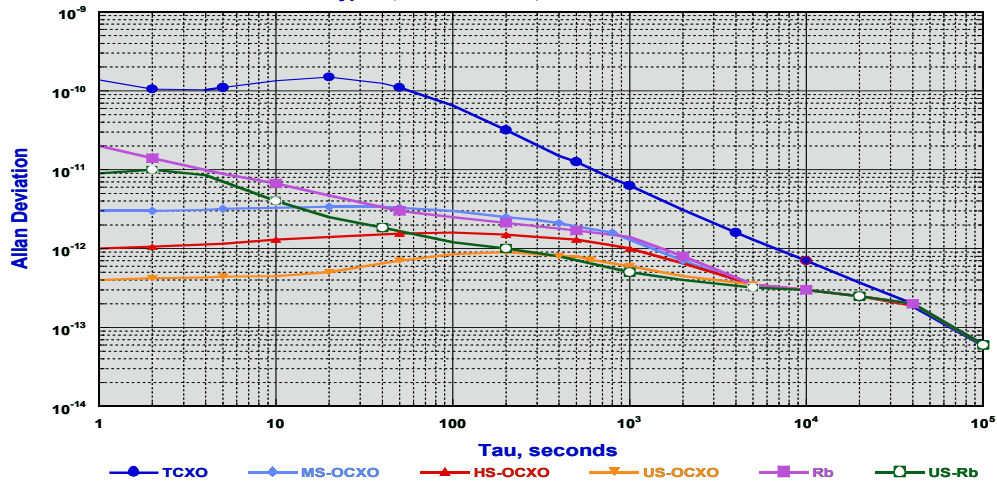
Holdover Performance

Typical, 5°C Max Delta, 7.5°C/Hr Max Slew Rate, 72 Hrs of GPS Lock



Time Domain Stability 10 MHz

Typical, 5° C Max Delta, 7.5° C/hr Max Slew Rate



Phase Noise Performance - Oscillator Options

Low Phase Noise Output Option @ 10 MHz

