

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 two grades of Rubidium vapor atomic frequency standards are available to upgrade the basic temperature-compensated crystal oscillator (TCXO). The RTM3205 Precision Timing Module can be configured with any of the OCXOs. 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.

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 deliver 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 provides sinewave outputs with the highest spectral purity for

demanding applications such as satellite communications, signal intelligence, and radar.

Rubidium Options

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. A standard, compact rubidium oscillator is also available for holdover applications that do not require US-Rubidium performance.

Oscillator Options - Summary Performance Data

	TCXO*	MS-OCXO	HS-OCXO	US-OCXO	Rubidium*	US-Rubidium*
Temp Stability	2.5 x 10 ⁻⁶	4 x 10 ⁻⁹	1 x 10 ⁻⁹	5 x 10 ⁻¹⁰	1 x 10 ⁻⁹	2 x 10 ⁻¹⁰
Temp. Range °C	-20 to +70	0 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	1 x 10 ⁻⁹	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	3.0 x 10 ⁻¹¹	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	1.0 x 10 ⁻¹¹	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	3.0 x 10 ⁻¹²	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	1.4 x 10 ⁻¹²	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	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	6.0 x 10 ⁻¹⁴
Phase Noise dBc/Hz:						
10MHz		10 / 5MHz	10 / 5MHz	10 / 5MHz	10 / 5MHz	10 / 5MHz
1 Hz	-70	-95 / -100	-105 / -110	-113 / -118	-80 / -80	-92 / -92
10 Hz	-100	-120 / -130	-130 / -135	-138 / -143	-100 / -100	-135 / -135
100 Hz	-125	-135 / -140	-140 / -145	-148 / -152	-135 / -135	-148 / -148
1 kHz	-135	-145 / -150	-150 / -155	-152 / -155	-145 / -145	-154 / -154
10 kHz	-140	-145 / -150	-150 / -155	-153 / -155	-145 / -145	-155 / -155
100 kHz	-145	-145 / -150	-150 / -155	-153 / -155	-145 / -145	-155 / -155

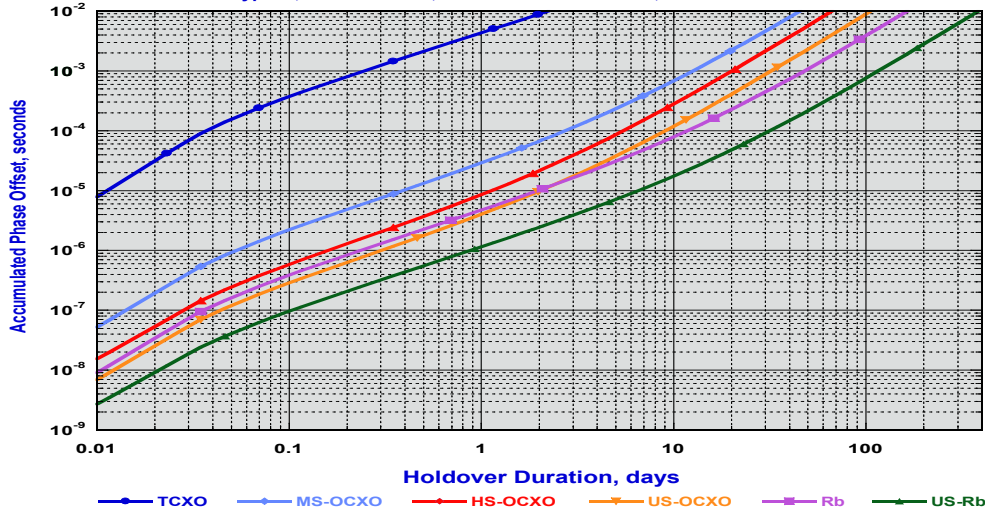
NOTE: OCXO and Rubidium phase noise specifications are guaranteed on Low-Phase-Noise Module. TCXO phase noise specifications are typical.

* Not available in the RTM3205.

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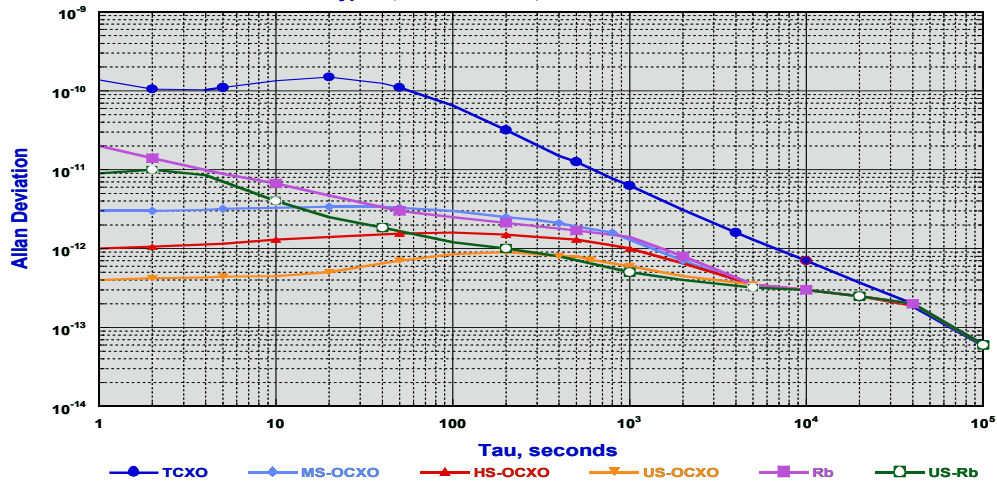
Holdover Performance

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 - 10 MHz

