

Precision Timing in Military Tactical Communications

Precision timing enables tactical communication systems to align data streams, modulate signals correctly, minimize transmission errors, and ensure seamless and efficient data flow. Achieving high data rate is particularly challenging in rough environments where vibrations can wreak havoc on frequency stability resulting in increased error rate, loss of signal or worse, inability to connect. Endura Super-TCXO® overcome these challenges with excellent performance under shock and vibration.

Key Considerations

- Phase noise
- Vibration
- Frequency stability over temperature
- Reliability

Endura[™] Ruggedized Super-TCXOs deliver the robustness and reliability of silicon MEMS timing for RF systems. In addition to ultra-low *g*-sensitivity. The Super-TCXO phase noise is virtually insensitive to vibration. With frequency stability across temperature as low <u>+</u>5 ppb, the SiT5543 Super-TCXO can replace a quartz OCXO for time synchronization, reducing power consumption by 50% and size by 95%.

Endura Super-TCXO Key Features:

- <u>+</u>5 to 500 ppb frequency stability (up to -55°C to 105°C)
- No frequency jumps, near linear and repeatable frequency compared to quartz
- 0.009 ppb/g max *g*-sensitivity
- Low ADEV to 1E-11 at 1 and 10 sec
- Low aging, as low as 150 ppb over 20 years
- 30,000 g shock survivability
- Optional voltage control or high resolution I2C/SPI frequency pull
- >1B hours MTBF

System benefits:

- Maintains signal lock in rough environments
- Speeds up signal acquisition
- Reduces bit error rate, even for signals with long integration time
- Improves resistance to jamming
- Maintains system performance over its lifetime
- Eliminates aging compensation
- Eliminates the need for vibration compensation
- Simplifies design due to small size and low power compared to OCXO, insensitivity to board bending and to EMI due to onboard LDOs.



Typical Block Diagram



Endura Timing Solutions

Endura products are factory programmed to customer-specific configurations, eliminating the long lead times and customization costs associated with quartz products. All Endura oscillators are 100% screened through the SiTime Endura process flow to guarantee performance at off-the-shelf pricing and are warrantied for aerospace and defense applications.

Featured products – please refer to the <u>Selector Guide</u> for more options. For clock generator and OCXO, <u>contact SiTime</u>.

Endura Base Part Number	Output Frequency (MHz)	Stability Over Temperature Range	Temp. Range (°C)	Allan Deviation	Jitter / Phase Noise fc=10 MHz (dBc/Hz)	Package (mm)	g-sensitivity
Low Noise Su	uper-TCXO I2C and	SPI frequency pull	option LVCN	/IOS or Clipped Si	ne 1.8 V, 2.5 V, 3.3 V sup	ply voltage	
<u>SiT7201</u>	10 to 60	±100E-9, ±250E-9	-40 to 105	10 s: 1E-11	1 Hz: -90 10 Hz: -119 100 Hz: -141 1 kHz: -151 10 kHz: 165	5.0 x 3.5 CER	1E-11/g
<u>SI17202</u>	60 to 220				100 kHz: -176		
Ultra-low Stability Super-TCXOs Voltage control or I2C frequency pull option LVCMOS or Clipped Sine 2.5 V, 3.3 V supply voltage							
<u>SiT5543</u>	1 to 60	±5E-9 ±10E-9, ±20E-9	-40 to 95	10 s: 1.5E-11	1 Hz: -80 10 Hz: -108 100 Hz: -127 1 kHz: -148 10 kHz: -154 100 kHz: -154	7.0 x 5.0 CER	1E-11/g
<u>SiT5541</u>	1 to 60		-40 to 105				
Super-TCXOs Voltage control or I2C frequency pull option LVCMOS or Clipped Sine 2.5 V, 3.3 V supply voltage							
<u>SiT5348</u>	1 to 60	±50E-9 ±100E-9, ±250E-9	-40 to 105	10 s: 1.5E-11	1 Hz: -80 10 Hz: -108 100 Hz: -127 1 kHz: -148 10 kHz: -154 100 kHz: -154	5.0 x 3.2 CER	9E-12/g
<u>SiT5349</u>	60 to 220						
<u>SiT5346</u>	1 to 60						
<u>SiT5347</u>	60 to 220						
32 kHz TCXO 1.8 V to 3.3 V supply voltage							
<u>SiT7910</u>	32 kHz	±100E-9	-55 to 105	10 s: 5E-8	2.1 ns _{RMS} IPJ	2.5 x 2.0 CER	2E-8/g
Low Jitter Differential Oscillators LVPECL, LVDS, HCSL, Low-power HCSL and FlexSwing™ signaling options							
<u>SiT9551</u>	25 to 644 select frequencies	±20, ±30, ±50 ppm	-55 to 125	N/A	70 fs IPJ	2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5 QFN	4E-11/g
<u>SiT9356</u>	1 to 220				150 fs IPJ		
<u>SiT9357</u>	220 to 920						
Low g-sensit	<u>vity Oscillator</u> LVC	MOS or LVTTL outp	out Program	mable Drive Stren	gth 1.8 V to 3.3 V output	voltage	
<u>SiT8944/45</u>	1 to 137	± 20, ± 25, ± 30, ± 50 ppm	-55 to 125	N/A	1 ps IPJ	2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0 QFN	1E-10/g
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