

Precision Timing in Mining and Construction Equipment:

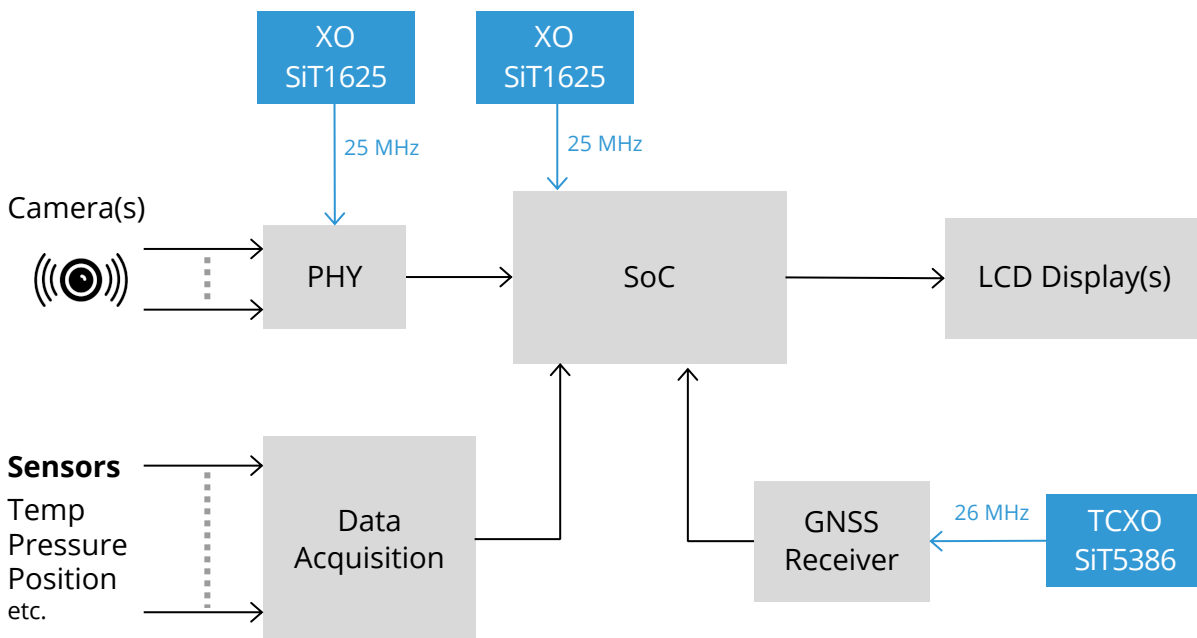
Loaders, excavators and drill equipment operating in close proximity to blasts from explosives are subjected to shock and vibration that can adversely affect the electronics. SiTime’s family of MEMS timing solutions have proven 4x better vibration resistance and 20x better shock survivability than crystals.

Key Considerations

- Reliability
- Low jitter
- Low phase noise
- Fast system start-up
- EMI

Shown below is a block diagram of a sensing unit in a remotely operated loader benefiting from SiTime’s portfolio of products which are nearly impervious to shock and vibration.

Block Diagram



Factors besides shock and vibration, such as thermal and flicker noise can cause phase noise aberrations. Performance of wireless systems can be adversely affected with jitter and cause safety problems, especially if a wireless interface (WiFi or other) is being used to control and monitor remote equipment. Mitigating both phase noise and jitter is an important consideration and selecting the right components can alleviate costly design workarounds, save time and improve system performance and reliability. With a vibration resistance of 0.1ppb/g (typical) and reliability of >2.2 billion hours MTBF, SiTime’s products are ideal for applications in harsh environments.

Featured products – please refer to the [Selector Guide](#) for more options

Type	Product	Frequency	Key Features	Key Values
Single-ended oscillator	SiT8021	1 to 26 MHz	<ul style="list-style-type: none"> -40°C to +85°C ±20 ppm stability 1.5 x 0.8 mm package 	<ul style="list-style-type: none"> High reliability Extended temperature range Small footprint
	SiT1602	3.57 to 77.76 MHz	<ul style="list-style-type: none"> -40°C to +85°C ±20 ppm stability 2.0 x 1.6 mm package 	<ul style="list-style-type: none"> Programmable drive strength Fast startup time of 5 ms 100% pin-to-pin replacement to quartz XO
	SiT1625	44 standard frequencies	<ul style="list-style-type: none"> -40°C to +125°C ±25, ±30, ±50 ppm stability 1612, 2016, 2520, 3225 packages 500 fs RMS jitter¹ 2.3 mA typ. current consumption 	<ul style="list-style-type: none"> High reliability Extended temperature range EMI reduction features Small footprint Low power Low jitter enables highest speed links
	SiT9025	1 to 150 MHz	<ul style="list-style-type: none"> Up to -55°C to +125°C Spread spectrum Configurable rise / fall times 2016, 2520, 3225 packages 	<ul style="list-style-type: none"> High reliability Extended temperature range EMI Reduction
Spread Spectrum oscillator	SiT9002	1 to 220 MHz	<ul style="list-style-type: none"> Low jitter: <150 fs RMS¹ ±30 ppm or ±50 ppm stability LVPECL, LVDS, HCSL, Low-power HCSL, FlexSwing™ 	<ul style="list-style-type: none"> High reliability Low jitter
	SiT9003	220 to 920 MHz	<ul style="list-style-type: none"> -40°C to +125°C 2016, 2520, 3225 packages 	

¹ 12 kHz to 20 MHz integration range



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