

## WHAT DOES PURE SPECTRUM MEAN?

### New technologies that compete in the traditional crystal oscillator arena.



Pure Spectrum is a trademark used by Connor-Winfield to define that the "Pure Spectrum" line of oscillators and the modules containing these oscillators, use only fundamental or 3rd overtone quartz crystal technology designed to give the lowest noise, lowest jitter and most monotonic frequency response without spurs or enharmonics.

New technologies, such as digital synthesizers and MEMs, have emerged to compete in the traditional crystal oscillator space. Digital synthesizers and MEMs use technology that does not have the best noise performance or the lowest jitter. This technology may be usable for some applications but does not employ the best noise performance or low jitter necessary for most applications. The use of the 'Pure Spectrum' branding is to delineate between technologies and help define the position in the marketplace for each technology.

An example of the differences is: the line of digitally synthesized oscillators from Silicon Labs offers jitter in the range of .6 ps rms. **Pure Spectrum** oscillators have jitter numbers as low as .2 ps rms.

MEMs based oscillators, which make use of a special silicon electrostatic resonator built into the die, require a numerically controlled synthesizer to offset the wide frequency variation of each resonator and compensate the extreme temperature variations inherent in the MEMs resonator. **Pure Spectrum** products are inherently low noise, tightly calibrated and temperature stable devices because quartz crystals are naturally high Q and inherently self-compensating.

Synthesizers require thousands of gates to produce. MEMs require external compensation just to achieve the level of an uncompensated quartz crystal. Compensation and synthesis requires memory typically in the form of electrically erasable memory, which due to its vulnerability to cosmic rays, eliminates certain markets such as space and related military. The design of a crystal oscillator is many times simpler and thus more reliable.

The intent with **Pure Spectrum** is to brand and identify that which the industry has assumed for over 50 years. Quartz crystal oscillators are the best frequency devices for low noise, low jitter, and reliability.

Connor-Winfield makes quartz crystals up to 600-700 MHz in small volumes and 3-400 MHz in high volumes, creating a competitive edge by providing high frequency and **Pure Spectrum** in one product.

Additionally, Connor-Winfield makes crystals in very small sizes, thereby competing with MEMs in terms of size. Small size resonators can withstand great amounts of shock, enough to be shot out of artillery. Connor-Winfield gains another competitive edge by manufacturing **Pure Spectrum** crystals that withstand high shock and offer a high stability.

By providing information on **Pure Spectrum** products and the competitive edge that they offer both Connor-Winfield and our customers, we will further be able to provide superior products with the best quartz technology for best performance.

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