Advantages of Quantum Magnetic Resonator (YIG) Based Components and Sub-Assemblies For Defense Applications

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Spectral Purity: A cleaner Quantum Magnetic Resonator (QMR) defined signal generates less side-band noise, thereby helping prevent the enemy from characterizing and jamming the signal. In addition, superior signal to noise performance prevents self-jamming of co-located systems when a large number of radios engage in a continuous interchange. Excellent phase noise capability also supports the demanding requirements of 512 QAM . . . and greater . . . . . digital modulation.

High Performance Synthesizers: When incorporated in frequency synthesizers for use in surveillance microwave radios, QMR oscillators provide octave band (or greater) tunability, frequency step sizes as low as 1 Hz, and phase noise and phase hit performance better than any other competing technology.

Broad Tuning Range: Octave-plus tuning range allows reduction in the number of spares needed. One spare YIG Oscillator covers the same frequency range as 4 to 6 VCO equivalents . . . a major advantage for prime defense contractors tasked with providing around-the-clock . . . anywhere in the world . . . support. A broad tuning range allows frequency hopping across a much wider bandwidth, thereby improving resistance to enemy detection and jamming. Cognitive radios will require this type of performance

Low Power Requirements: VIDA's unique new design incorporates a shielded permanent magnet to reduce the power required to for frequency tuning. The VIDA Oscillator now tunes 9 times further (broader) in frequency for the same tuning power when compared to a conventional permanent magnet tuned oscillator. The result is a go-anywhere receiver with low power requirements and excellent tuning characteristics.

High Q Tuned Circuit Design: The Q of an oscillator's resonator determines the fundamental limit of the phase noise level in the generated signal. Maintaining high Q's as frequencies increase is a major challenge for DRO/VCO based designs. QMR technology has a distinct advantage over DROs or VCOs at higher frequencies because it's Q actually increases with frequency. For higher frequency applications, QMR devices do not require frequency doubling… thus avoiding the 6 dB doubling phase noise increase. The prime frequency plan avoids the cost escalation involved in compensating for spurious noise and harmonic interaction inherent in the multiplying mechanism.

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Temperature Hardened: Minimizing the required amount of tuning power reduces self-heating, which keeps junction temperatures low and heat sinking simple. VIDA offers YIG products that provide full . . . without heaters . . . performance over operating temperatures of –35 to +70 C. VIDA designs have successfully withstood the rapid thermal transitions imposed by demanding HALT testing.

Vibration Resistant: The vibration resistance of VIDA oscillators has been shown to be 10 dB greater than competitor's products at vibration rates up to 3 KHz. VIDA's products have been subjected to HALT vibration step stress testing over mil-spec temperature ranges without failure.

Lowest Cost - Highest Performance: VIDA's product designs for demanding military applications take advantage of experience gained from building thousands of extremely price competitive QMR-based components and sub-assemblies for the commercial broadband communications market.

Here and Now: QMR technology has seen combat duty in both Gulf Wars. Incremental improvements are continuously being made, resulting in increasingly robust product designs with proven performance characteristics.

VIDA's Technology Improvements: QMR historically has used YIG (Yttrium Iron Garnet) Technology which has always provided significant fundamental performance and reliability advantages. VIDA changes the rules by offering oscillator solutions that are economically feasible while maintaining the ability to meet the demanding needs of both fixed and mobile defense applications. The latest VIDA oscillator circuits will make use of Foundry Fabrication. Now for the first time, YIG (Yttrium Iron Garnet) oscillators can be produced in volume using conventional semiconductor manufacturing techniques. Size, weight, and cost have therefore been reduced to increase the applicability of YIG products to a wider range of new and previously unavailable or unattainable applications.

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