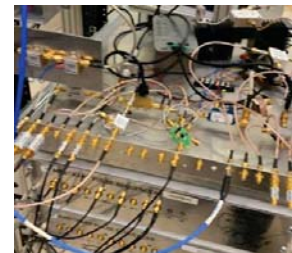


Simplifying Quantum Computing

Quantum Computing is evolving into its next chapter, sometimes referred to as the realization of Quantum Supremacy, which ultimately means experiments are moving from single Qubits to multiple Qubits and in some cases evolving from experiments to commercialized products for sale to end users. This evolution creates several new challenges;

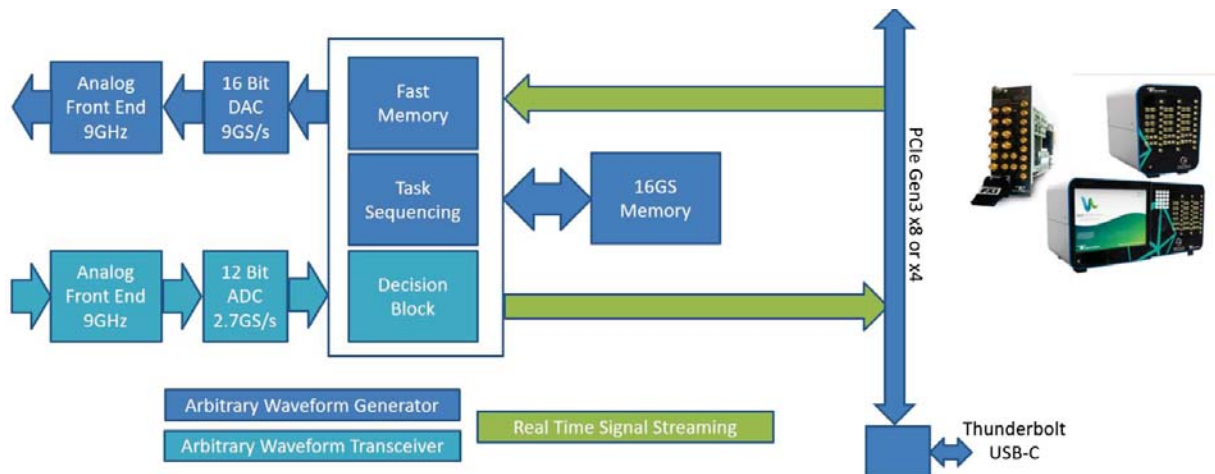
- Multiple Qubits – increase experiment/product complexity
- Reducing the noise issue – require real-time feedback systems

A 'classic' quantum experimental computing - for example a superconducting charge qubit system - usually consists of one or more qubits inside a dilution refrigerator, a series of amplifiers, a number of RF Signal Generators, multiple connectorized microwave components such as IQ mixers and Arbitrary Waveform Generators for pulse shaping. This type of architecture creates a complex hard to operate, calibrate and support system that is not easily scalable to the next generation. Tabor has created a commercial product to help solve these issues, simplify the experiment and help get products to market faster.



Proteus is a new product from Tabor that offers three operation modes;

- Microwave Arbitrary Waveform Generation – up to 9GHz of high-fidelity pulse generation
- Transceiver capable – the Microwave Arbitrary Waveform Generator can be enhanced with the addition of a high-speed digitizer and Programmable FPGA for real time measurement and feedback.
- Real Time Signal Streaming – Data can be streamed in and out of the instrument at 6GS/s providing real time control and analysis with Terabytes of waveforms, or time domain records.



The Proteus architecture in the diagram above provides high-fidelity waveform direct to microwave generation, combined with real-time feedback and high-speed data transfer system. This capability enhances your quantum computing application, while simplifying the design and eliminating many components such as RF signal Generators and Connectorized Components.



Simulate, Stimulate, Test...

For more information or to schedule a demo contact info@tabor.co.il | www.taborelec.com

Key Specifications

Arbitrary Waveform Generator		Digitizer	
Sample Rate	1.25GS/s, 2.5GS/s, 9GS/s	Sample Rate	2.75Gs/s
Channels	2 or 4	Channels	2
Resolution	16bits	Resolution	12Bit
Output	1.2Vp-p	Input voltage range full scale	±500 mV / ±1 V
Analog BW (Max)	9 GHz	Analog BW (Max)	9 GHz
Memory (Max)	16Gs ¹	FPGA	
Markers	4, 8, 12, 16 ¹	Type	Kintex Ultrascale KU060
		LUT's	331,680

Multiple-channels

When expanding to multiple Qubits the Proteus system can take advantage of the PXI modular system architecture. This provides a commercial industrial standard for expansion, avoid risks with custom multi- channels systems. Proteus provides the highest channel density with multiple transceiver channels in a compact 19in rack framework.



Since 1971 Tabor have specialized in Arbitrary Waveform Generation for the Physics Community. We identified a cost complexity issue in Quantum Computing Experiments with an approach that utilizes multiple connectorized filters, IQ Mixers, Synthesizers, Locking Amplifiers and Digitizers – which increases complexity and noise issues as systems scales. To address this need we invented Proteus. Direct to Microwave Generation and Analysis, with real-time control in an embedded FPGA.

