

Solutions



Formfactor Quantum Solutions offer Cryogenic Chip-scale Probe Stations that tackle problems like long turnaround times, high noise, and low signal capabilities providing accurate measurements at cryogenic temperatures.

The Kilimanjaro series of probe stations provide fully isolated experiment space for true 4K temperatures during probing, cryogenic positioners to provide large travel ranges without warming up the device, integrated helium pot for high temperature stability of the device under test, fully dry cryogen-free cooler eliminates the need for expensive helium circulation systems and a rapid cool liquid nitrogen option for faster cool down times

The IQ1000 is a new scanning SQUID¹ microscope used to study the dynamics of trapped magnetic flux (magnetic vortices) in superconducting circuits which can negatively impact circuit operation. This microscope enables superconducting device design teams to image magnetic vortices in devices cooled through the superconducting transition temperature in controlled magnetic fields.

Learn more: https://www.formfactor.com/products/probe-systems/?probe_systems=systems-products-chip-scale-cryo



AR RF/Microwave Instrumentation provides Total RF Test Solutions, key in many Quantum application when high power RF pulses of energy are required. RF & Microwave Solid State Amplifiers ranging from 1 - 50,000 W of output power, with 10 Hz - 50 GHz of frequency range.

Learn more: <https://www.arworld.us/>



Tabor's new Proteus RF Arbitrary Waveform Transceiver offers unparalleled RF and Microwave control and readout capability for Quantum systems. With direct to microwave pulse generation and analysis up to 10GHz, combined with a powerful user programmable FPGA System, Proteus offers 16bits of resolution, sample rates up to 9GS/s and a deep 16GS memory making it the ultimate quantum system driver.

Proteus is design for system scaling, moving from a single channel up to hundreds of channels. Proteus is designed to have high fidelity time aligned multi-channel outputs, ensuring that you can get the best measurement results from your Quantum system.

Tabor has been serving the Quantum Market for over a decade, with applications in NMR, Computing, Communications and Metrology – proving stimulus to both Semiconductor and NV Diamond based systems.

Learn more: <https://www.taborelec.com/A-New-Paradigm-for-the-Classical-to-Quantum-Computing-Interface>



When you need to extend the frequency range of your control and readout system Holzworth offer a range of multi-channel frequency synthesizer to be used in combination with an Arbitrary waveform generator/transceiver and IF Mixer, or IQ Modulator. High output power, excellent phase noise and industry leading spectral purity ensures that your control and readout pulse have the highest possible fidelity.

The HSY Series is a YIG based architecture also enhances spectral purity performance coupled with a highly accurate dynamic range of up to +20dBm and down to -110dBm. The HSX utilizes a broadband PLL based frequency sources that offer excellent noise and spectral purity performance coupled with a highly accurate dynamic range. Both families have a 1U high form factor offers 1, 2, 3 or 4 channel configurations.

The HS9000 Series Multi-Channel Synthesizers, allowing the user to specify anywhere from 1 to 8 independent channels (per 1U chassis) with any combination of frequencies spanning from 250kHz to 6.7GHz.

Learn more: <https://www.holzworth.com/products/rf-synthesizers>



Understanding the behavior of control pulses as they propagate through cables, amplifiers, filters, and attenuators is key to ensuring pulse and ultimately Qubit fidelity.

Anritsu's family of Vector Network Analyzers (VNA) and Spectrum Analyzers are designed to measure common RF and microwave signal fidelity issues in Physics such as frequency response, cable matching and spectral purity. Whether it's an economical, portable 1-port product VNA/Spectrum Analyzer or a full-featured solution that provides best-in-class performance.

Learn more: <https://www.anritsu.com/en-us/test-measurement/support/resource-center/shockline>



As well as RF and Microwave Control and Readout capability a Quantum system often needs a low noise DC source to initialize Qubits, or other Quantum devices.

Yokogawa's GS200 is a low voltage/current DC source with high accuracy, high stability, and high resolution, making for an ideal DC current source. With its excellent traceability, stability, and 5 1/2-digit resolution, the GS200 generates extremely low-noise DC voltage and current signals that are required for many applications. Additionally, the optional monitoring feature turns the GS200 into a voltage and current measuring instrument.

Learn more: <https://tmi.yokogawa.com/us/industries/quantum-computing/>

Resources

Advanced Microwave Topics for Quantum Physicists - <https://www.taborelec.com/Advanced-Microwave-Topics-for-Quantum-Physicists>

A Case Study in Nuclear Magnetic Resonance - <https://www.taborelec.com/Nuclear-Magnetic-Resonance-NMR-Spectroscopy-Case-study-UC-Berkeley-in-California-2020>

Initializing Quantum Devices - <https://tmi.yokogawa.com/us/library/resources/application-notes/initialising-quantum-computers/>

Quantum Communication - <https://www.taborelec.com/Quantum-Communication>

Experiment design considerations for real-time, closed-loop pulse streaming -

<https://www.taborelec.com/Quantum-bits-Solution-Note>

Coherent Multi-Channel RF Synthesis - <https://www.holzworth.com/resource-library/white-papers/artmid/2501/articleid/1420/coherent-multi-channel-rf-synthesis>

Cryogenic / Magnetic Probing - <https://www.formfactor.com/test-expertise/measureone/cryogenic-magnetic-probing/>

High-Power Solid-State Pulsed Amplifiers - <https://www.arworld.us/appnotes/High-Power-Solid-State-Pulsed-Amplifiers.asp>

Application Advantages of Modular VNA Architectures - <https://www.anritsu.com/en-us/test-measurement/video-gallery/application-advantages-of-modular-vna-architectures>