QBLOX

Control stack tailored for your qubits

SUPERCONDUCTING QUBITS

- Frequency range DC-18.5 GHz
- 1 ns pulse shaping and resolution
- Feedback latency under 400 ns

QBLOX

Hardware for superior analog performance

Gapless playback for predictable and reliable signal output, crucial for phase-coherent operations.

Short, parameterized pulses with industry's fastest parameter update rate of 4 ns.

Exceptional signal integrity, optimized for high SNR, high SFDR, and low phase noise.

Unrivaled time domain performance through short rise times and low ringing, enabling ultra-fast high fidelity gates.

QBLOX Scheduler

Software enabling instant results

Intuitive programming with built-in visualization tools, data analysis, and storage.

High-speed, large-scale experimentation through FPGA-based multi-dimensional real-time loops.

Extensive applications toolkit with plug-and-play qubit tune-up routines and the base for building advanced measurements.

Tighter integration with Qblox Instruments: Assembly-level software for advanced control and custom compilers.

Solution for high-fidelity quantum operations

Single-qubit gates

Manipulate quantum states precisely through high SNR and an exceptionally clean spectral response.

Push your gates into the <20 ns regime with 1 ns pulse-shaping precision, accurately executed through fast rise times and low analog ringing.

Benchmark qubit performance via single-qubit randomized benchmarking or gate-set tomography.

Speed up your experiment by leveraging active reset to initialize your qubit within 400 ns between consecutive runs.

QCM-RF II
2 - 18.5 GHz

QRC
100 MHz - 10.0 GHz

Two-qubit gates

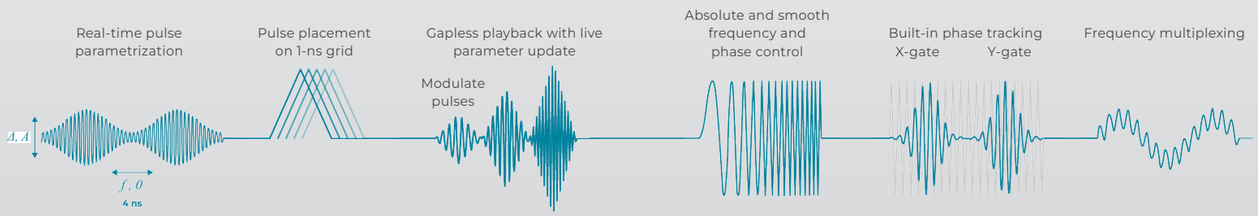
Control flux-tunable qubits and couplers from a single source, and say goodbye to bias-T distortions.

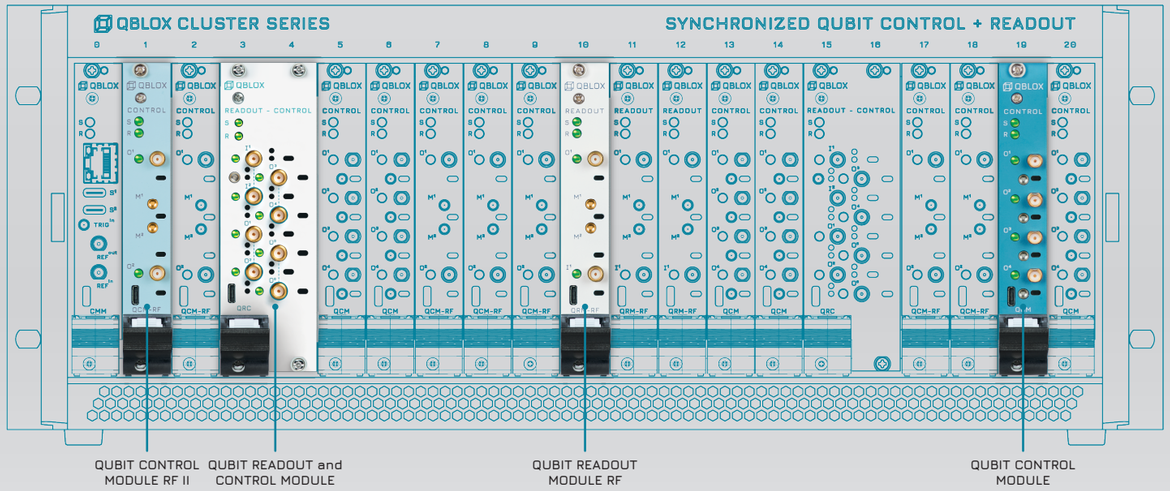
Elevate two-qubit gate fidelities by applying signal predistortion filters with net-zero gates for repeated gates.

Control, update, and sync the phase with extreme resolution across all channels in multi-cluster setups, enabling large-scale multi-qubit algorithms.

Benchmark two-qubit performance with randomized benchmarking routines.

QCM
DC - 400 MHz



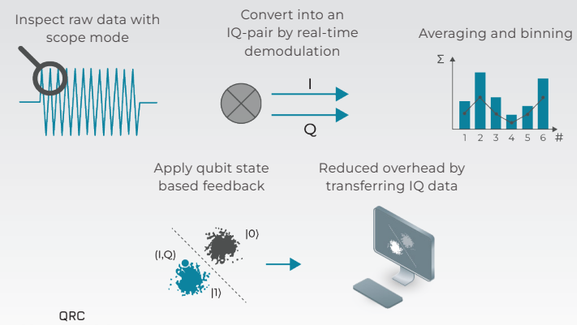


Optimal qubit readout

Scale by multiplexing your readout up to eight simultaneous tones within an 800 MHz frequency span.

Optimize readout fidelity by shaping the readout pulse and applying acquisition weights within the integration window.

Speed up your experiments with onboard data processing that supports real-time state-discrimination-based feedback.



QRM-RF
2 - 18.5 GHz

QRC
100 MHz - 10.0 GHz

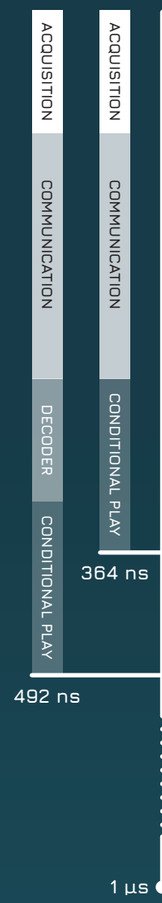
Quantum error correction

Achieve massively parallel real-time signal processing using 120 sequencer cores housed in a single 19″ rack.

Perform mid-circuit measurements and enable low-latency conditional feedback with all-to-all connectivity in under 400 nanoseconds.

Ensure clock synchronization accuracy within << 1 nanosecond across all processing units.

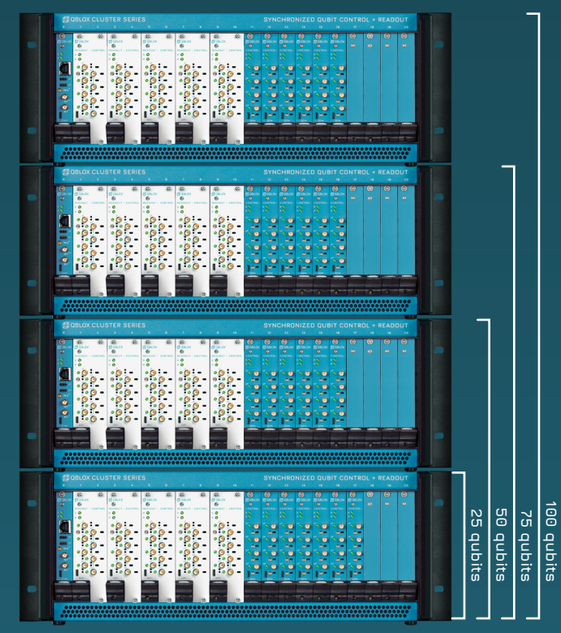
Integrate with real-time decoders for error correction and adapt with surface codes, stabilizer codes and others.



SYNQ — Automatic synchronization of all channels within < 1 ns with ps-level jitter.

LINQ — Built-in scalable feedback infrastructure with all-to-all connectivity under 400 ns for conditional playback and branching.

Future-proof scalability



Proven customer outcomes

“Since 2021, Qblox has been a vital partner in our mission to build a 100-qubit quantum computer for Swedish industry. Their robust, scalable control system delivers outstanding analog performance, allowing us to push quantum boundaries without hardware limitations. With unparalleled channel synchronization and fast real-time feedback, we can fully tune up our 20-qubit systems in under 30 minutes.”

Dr. Giovanna Sammarco Tancredi
Senior Researcher

CHALMERS

“Qblox support team’s expertise and quick response to our queries exceeded my expectations, making the setup process a breeze. Their continuous support allows our PhDs and postdocs to excel in their measurements without worrying about the control electronics. I’m very impressed by Qblox’s commitment to supporting their products and their users.”

Dr. Christopher Wilson
Professor

UNIVERSITY OF WATERLOO

“The Qblox cluster is easy and straightforward to configure, even for a large superconducting quantum processor. Qblox electronics stand out for their compactness, design, and scalability, giving us the flexibility to configure various aggregates of quantum gates for different algorithms running in parallel on more qubits of the chip.”

Dr. Halima Giovanna Ahmad
Assistant professor

Università degli Studi di Napoli Federico II

Scientific article highlights

Optical readout of a superconducting qubit enabled by Qblox real-time I-Q signal control.

T. C. van Thiel et al., Nat. Phys., 21, 401 (2025).

High EJ / EC transmon qudits up to D = 12 via Qblox IF multiplexing.

Z. Wang et al., Phys. Rev. Applied 23, 034046 (2025).

Achieving 99.5% operational fidelity in tunable couplers through Qblox driven crosstalk mitigation.

S. Vallés-Sanclemente et al., arXiv:2503.13225 (2025).

Want to accelerate your quantum computing research and development?

Prioritize your qubit research

High fidelity qubit control

Future ready system

Let’s build quantum, together!

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