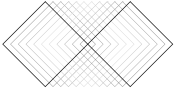


QBoard-II

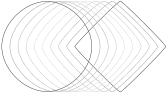
Modular, PCB-Based Sample Holder for Low-Temperature Spin-Qubit Experiments, Quantum Transport, and Superconducting Circuits

Highlights



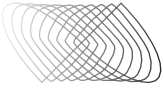
- 16 high-density RF lines up to 8 GHz, and 48 low-frequency DC lines
- Advanced PCB design that minimizes losses and crosstalk
- Versatile mounting bracket system, compatibility with all major dilution refrigerators
- Fits in 60 mm sample spaces, both horizontal and vertical
- Optimized thermalization path to the sample
- Possibility to mount several QBoards in quick sample exchange systems
- All materials are non-magnetic

Benefits

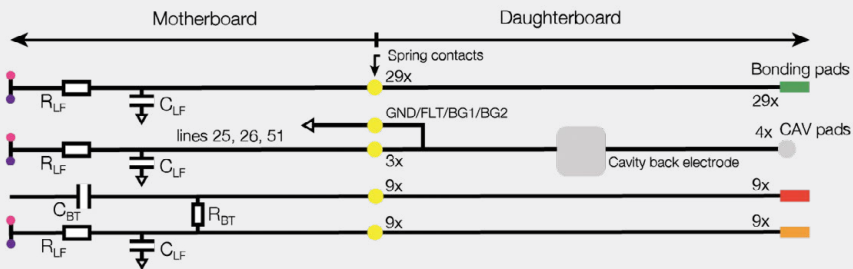


- Eliminates the need to design and manufacture custom chip carriers for complex microwave experiments
- Smooth scalability, QBoard-II grows with your experimental needs
- Easy exchange and re-use of different chips
- Increased number and types of experiments possible
- Smooth upgrade from QBoard-I without changing connector configurations

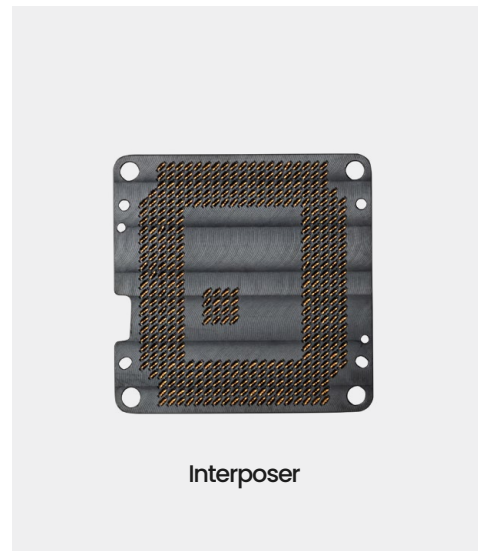
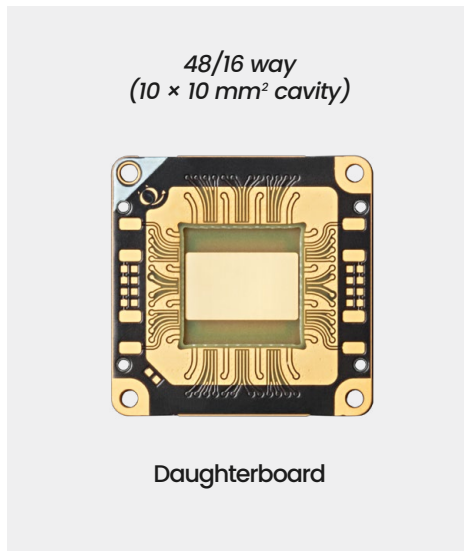
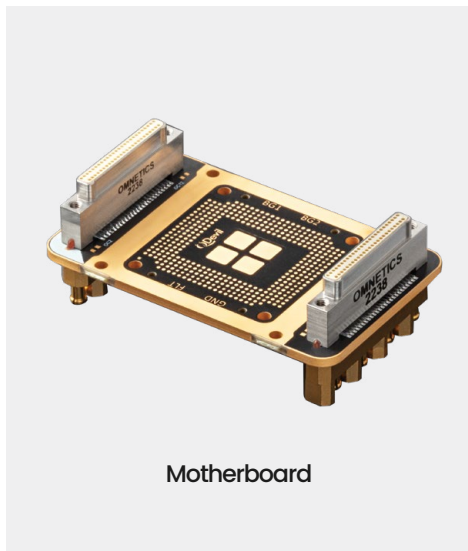
Applications



- Up to 8 spin qubits
- Superconducting circuits
- Fundamental research, such as quantum transport experiments
- Low-temperature materials science



Schematic of the motherboard circuit with RC filters and bias-tees, not including the optional tank circuits on the daughterboard.



Specifications

Motherboard

With two 51-pin nano-D connectors, wired in parallel for ESD protection

48 RC-filtered low-frequency lines (1.2k Ω , 1.0nF)

16 RF lines via two 8-way mini-coax connectors

Bias tees for all RF lines

Made of non-magnetic materials

NEW More compact design: 28x45 mm

NEW Four dedicated high current lines with the option for RC filter bypass

NEW Two lines designed for high voltage backgates

Interposer

Non-magnetic interposer for fast sample exchange

NEW Rotation of the interposer defines the daughterboard cavity connectivity (ground, float, or one of two dedicated high voltage DC lines)

Shielding **NEW**

Complete protection for both the quantum chip and electrical components

The shielding lid fully encloses the sample for proper radiation shielding

Shields RC filter components for the lowest noise environment

Operating environment

This device has been designed for use in cryogenic environments below 20 mK. High voltage applications in the range ± 200 V are supported below 4 K.

Mounting

Gold-plated copper-beryllium brackets available in nine different configurations

Full compatibility with popular dilution refrigerators (Oxford Instruments, Bluefors), but custom solutions are possible

Prepared for parallel and perpendicular mounting in fast sample exchange pucks

Daughterboards

Daughterboards included for the following chip sizes: 6x6 mm, 10x10 mm, 11x14 mm

NEW Optimized thermalization and grounding path

0.5 mm deep gold-plated cavity

4-frequency multiplexed tank circuits

Cables and other accessories

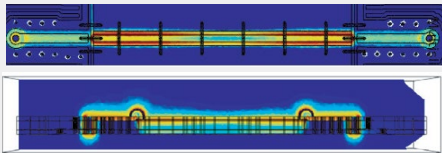
Brackets - see our Accessories datasheet for more information

Grounding plate for wire bonding available

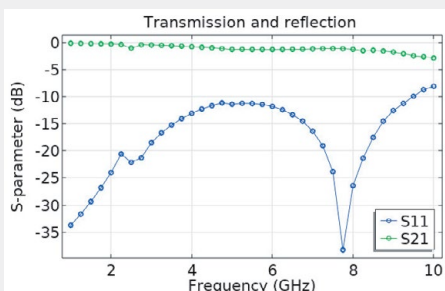
Titanium and gold-plated copper-beryllium screws

Custom 51-pin nano-D to micro-D cables

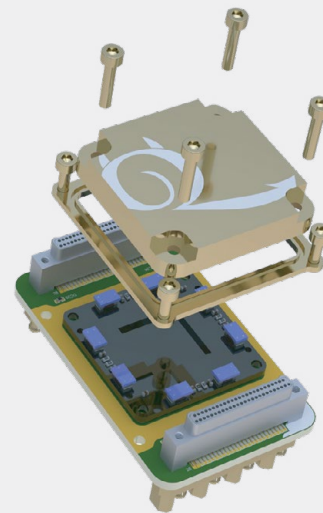
Eight-way mini coaxial RF cables terminated with SMA or SMP connectors



Simulated 8 GHz mode shapes of transmission through daughterboard with a 10 mm on-chip transmission line connected through wire bonds.



Corresponding S-parameter curves for transmission and reflection - results from COMSOL Multiphysics.



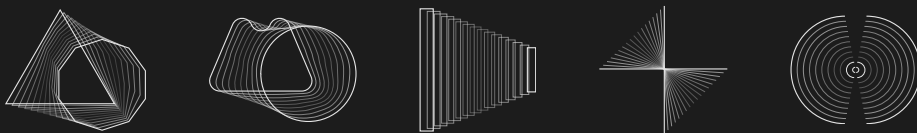
Shielding lid introduced to facilitate higher measurement bandwidth with well-controlled microwave field boundary conditions.

About Quantum Machines

Quantum Machines (QM) is driving the future of quantum computing through Hybrid Control, seamlessly integrating quantum and classical computing. Conventional controllers struggle with disjointed operations, creating friction that limits scalability. The Pulse Processing Unit (PPU), at the core of QM's innovation, is a special processor for quantum control, designed to eliminate this barrier by bringing classical computing closer to qubits, reducing latency and enabling real-time execution of quantum error correction, and other advanced algorithms. The hybrid development platform further streamlines development, empowering quantum computer builders to create efficient quantum-classical programs. OPX1000, QM's flagship controller, embodies this hybrid approach. It is a modular, high-density control platform with a cutting-edge quantum-led analog front end. OPX1000 is tailored for large-scale quantum computers, offering unparalleled performance, scalability, and ready HPC integration, including an ultra-fast interface to GPU/CPU accelerators for boosting quantum control. With hundreds of deployments worldwide, Quantum Machines' solutions are trusted by quantum computer builders, research labs, and HPC centers. For more information, visit quantum-machines.co.

* These specifications are given as-is and to the best of our knowledge. The full spec document, including relevant legal information and disclaimers is available upon request

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QBoard-II

Modular, PCB-Based Sample Holder for Low-Temperature
Spin-Qubit Experiments, Quantum Transport, and Superconducting Circuits

Contact us: sales@quantum-machines.co | quantum-machines.co |   