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Origin Quantum

ORIGIN QUANTUM PRODUCTS AND SOLUTIONS HANDBOOK

Scan the QR code for more product details



Origin Quantum Computing Technology (Hefei) Co., Ltd.

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- China's First Quantum Computing Company
- **China's Only Quantum Computing Company on the U.S. Entity List**
- China's Highest-Valued Quantum Computing Company
- **First in China to Develop Engineering-Grade Quantum Computers**
- First in China to Deliver Complete Superconducting Quantum Computer Systems
- **First in China to Provide Commercial Domestic Quantum Computing Power to 100+ Countries**
- China's First Self-Developed Quantum Computer Manufacturing Chain
- **China's First Quantum Chip Production Line**
- China's First Self-Developed Quantum Computer Operating System
- **China's First Quantum Cloud Platform with Real Quantum Hardware**
- China's Leading Company by Quantum Computing Patent Count
- **China's First Superconducting Quantum Computer for Education & Research**
- China's First Quantum-Supercomputer Fusion Software
- **China's First Quantum Computing Financial Application**
- China's First PQC Shield Against Quantum Computer Attacks
- **China's First Quantum Computing Aerospace & Aviation Application**
- China's First Quantum Computing Medical Application
- **China's First Quantum Computing Power Grid Application Platform**
- China's First Quantum Computing Think Tank: "Quantum Computing Observer"
- ……

ABOUT US

Established in 2017, Origin Quantum traces its technology to the CAS Key Laboratory of Quantum Information.

Focused on building a quantum computing ecosystem, the company develops independently controllable quantum computers and full-stack products — chips, measurement & control systems, OS, software, cloud platform, and science education. It serves biotech, chemicals, finance, shipbuilding, and big data industries, actively building core quantum computing patents.

FOUNDER

Academician Guo Guangcan

Chief Advisor & Co-Founder



- CAS Academician; Professor, USTC; Director, CAS Key Laboratory of Quantum Information
- Pioneer and founder of quantum optics and quantum information in China; mentored multiple CAS Academicians
- Long-term researcher in quantum optics, communication, and computing theory and experiments; Academic Leader of the NSFC Innovation Research Group
- Former Chief Scientist of MoST 973 Project "Quantum Communication and Quantum Information Technology" and other major national projects
- Recipient of the State Natural Science Award (2nd Class) and CAS Natural Science Award (2nd Class); Elected CAS Academician in 2003.

Professor Guo Guoping

Chief Scientist & Founder



- Professor, USTC; Deputy Director, CAS Key Laboratory of Quantum Information; Vice Dean, School of Microelectronics, USTC
- NSFC Distinguished Young Scholars recipient; National "Ten Thousand Talents Program" Science & Technology Innovation Leader; Cheung Kong Young Scholar
- Chief Scientist of MoST 973 Projects including "Solid-State Quantum Chips" and "Quantum Chips" since 2010
- Studied physics at USTC (1996–2005), earning B.S. and Ph.D. degrees; Professor at USTC since 2009
- Recipient of the 14th China Youth Science and Technology Award; selected for national talent programs including "Ten Thousand Talents" Youth Top Talents.

CHINA'S FOURTH-GENERATION INDEPENDENTLY DEVELOPED SUPERCONDUCTING QUANTUM COMPUTER "ORIGIN WUKONG"

On May 9, 2026, the fourth-generation superconducting quantum computer "Origin Wukong-180", with a self-developed 180-qubit chip, was launched globally — marking China's entry into reproducible, engineering-grade hundred-qubit production.

On January 6, 2024, China's third-generation superconducting quantum computer "Origin Wukong" launched, equipped with the 72-qubit "Wukong" chip. Hardware, chip, OS, and software are independently controllable with >80% localization — marking China's self-developed quantum computer supply chain as basically "formed".

Since launch, the "Origin Wukong" series has been accessed by users in 192 countries with over 55 million visits and 1.2 million tasks completed (as of Sept 2026).



BUILD A FULL-STACK "THREE HARDWARE, THREE SOFTWARE" TECHNOLOGY SYSTEM

Build a full-stack system: three hardware pillars (quantum chips, measurement & control, environment support) and three software pillars (OS & software, cloud platform, application software).

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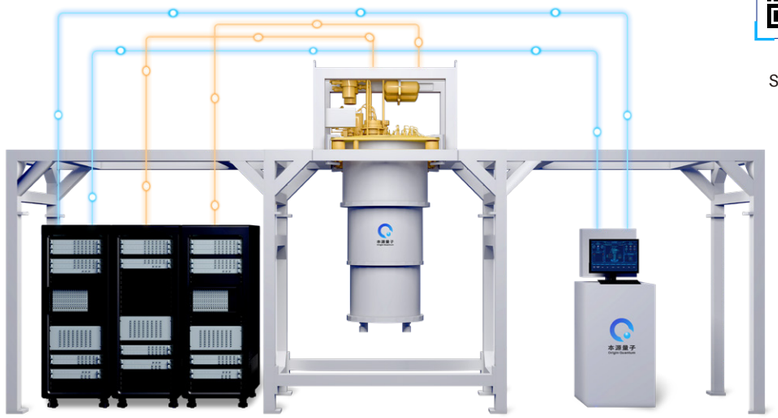


"Origin Wukong" Series Superconducting Quantum Computer



ORIGIN QUANTUM SERVICE



Customized quantum computer solutions in different scales and configurations based on user needs.

QUANTUM CHIPS

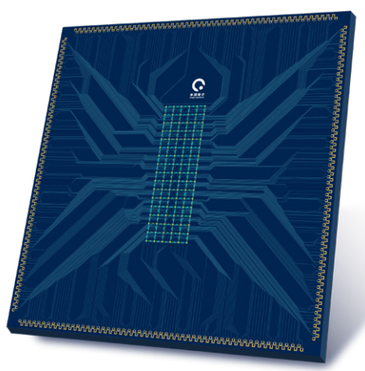
FROM CHIP DESIGN, MANUFACTURING, AND TESTING TO PACKAGING AND STORAGE

QUANTUM COMPUTING CHIP

The "Wukong" chip (cQED-based) is the core of the "Origin Wukong" quantum computer. With 100+ qubits and frequency-tunable technology, it delivers high flexibility and gate fidelity for accurate, efficient quantum computing.

FEATURES

- The effective coupling strength between neighboring qubits is highly controllable and adjustable.
- Ultra-fast gate operation speed as low as tens of nanoseconds.
- Supports independent or joint readout of qubits.
- Professional chip packaging technology effectively suppresses crosstalk between channels.



CORE PARAMETERS

Parameter	Typical Value
Number of Computing Qubits	Supports a Maximum of 180 Qubits
Relaxation Time T1	40 μs
Decoherence Time T2 echo	20 μs
Single Qubit Gate Fidelity	99.9%
Double Qubit Gate Fidelity	99.0%
Readout Fidelity	99.0%

SUPERCONDUCTING QUANTUM CHIP PACKAGING MODULE

Connects quantum chip signal electrodes to peripheral circuits while protecting the chip — provides signal connections, thermal contact, ground plane, and shielding.

FEATURES

- Supports superconducting quantum chips of up to 180 qubits.
- Its unique structural design can effectively improve the decoherence performance and suppress crosstalk.
- The overall external magnetism does not exceed 1 nT.
- The packaging box's ground network uses superconducting materials, providing lower signal transmission delay.



CORE PARAMETERS

Supported Superconducting Quantum Chip Qubits	Supports a Maximum of 180 Qubits				
Channel DC Resistance (at Room Temperature)	⩽0.15 Ω				
Operating Frequency	300 KHz-6 GHz	6-8 GHz	8-12 GHz	12-16 GHz	16-20 GHz
Insertion Loss	＜8.5 dB	＜12 dB	＜14 dB	＜18 dB	＜14 dB
Adjacent Channel Crosstalk	≥52 dB	≥45 dB	≥41dB	≥40 dB	≥45 dB
Diagonal Channel Crosstalk	≥75 dB	≥81 dB	≥73 dB	≥71 dB	≥75 dB
Far-End Channel Crosstalk	≥92 dB	≥93 dB	≥84 dB	≥79 dB	≥72 dB
Interface Type	SSMP				

NONDESTRUCTIVE PROBE STATION

Semi-automatic device for precise micron-level measurement of superconducting quantum chip electrical parameters at room temperature — measures qubit parameters without affecting performance; also suitable for semiconductor wafer testing.

Scan for more

FEATURES

- Compatible with wafer size ≤ 4 inches
- Equipped with a multi-degree-of-freedom controllable vacuum chuck platform with high stability and high motion precision, supporting XYZ linear motion and horizontal rotation.
- Features a variable-magnification microscope, with the minimum measurable area reaching the micrometer scale
- The indentation diameter on the sample film can directly penetrate a thickness of 2–3 μm
- Built-in high-performance active vibration isolation system to ensure system stability during testing
- Semi-automated control with user-friendly human-machine interaction (HMI)



TYPICAL APPLICATIONS

01 SUPERCONDUCTING QUANTUM CHIP TESTING

02 SEMICONDUCTOR CHIP TESTING

03 SEMICONDUCTOR DEVICE TESTING

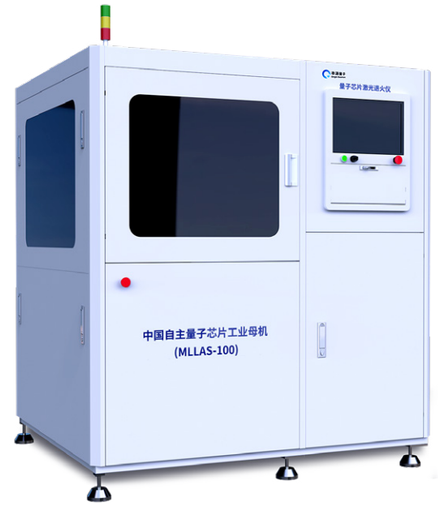
MICRON LOCAL LASER ANNEALING INSTRUMENT

Directionally modifies qubit frequency parameters, improving chip yield and solving frequency crowding in multi-qubit expansion. Configurable with high-vacuum and inert gas chambers; also applicable to semiconductor and surface modification.

Scan for more

FEATURES

- Qubit frequency trimming accuracy exceeds 95%
- Laser power adjustable from 0 to 3 W, with power stability (RMS) better than 1% within 4 hours
- Ultra-high positioning accuracy at the hundred-nanometer scale for annealing target areas
- Fully automated system control supporting one-click multi-point annealing, with user-friendly human-machine interaction
- Micrometer-scale laser spot, with customizable spot shape and size

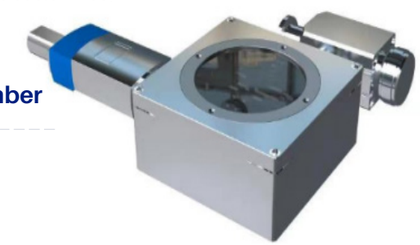


OPTIONAL ACCESSORIES

High-Vacuum Chip Annealing Chamber

Provides high-vacuum annealing to prevent atmospheric impurity damage during laser annealing.
System vacuum degree: 1 × 10^-4 Pa (higher vacuum levels can be customized)

High-Vacuum Low-Temperature Annealing Chamber



High-vacuum annealing prevents atmospheric impurity damage while inhibiting Josephson junction aging.

· System vacuum degree: 1 × 10^-4 Pa

· Temperature: ＜ 0 °C

HIGH VACUUM QUANTUM CHIP STORAGE BOX

Quantum chip surfaces are environmentally sensitive and react with air molecules, causing degradation. The storage box provides a stable high-vacuum environment to preserve chip performance.

FEATURES

- The system is equipped with three storage chambers, each of which can be operated independently
- Cavity vacuum ≤ 8 × 10^-4 Pa (after 3 hours of no-load operation)
- Equipped with an intelligent monitoring system, which can monitor the vacuum degree in real time
- Equipped with a human-machine interaction interface to realize full-automatic operation of the equipment



CORE PARAMETERS

Performance Parameters	
Vacuum	≤ 8 × 10^-4 Pa (no-load running for 3 hours)
System vacuum leak rate	＜ 10^-7 Pa·L/s
Vacuum alarm threshold	80Pa
Each chamber size	580 mm × 500 mm × 180 mm (width×depth×height)
Other	
Power supply	200-230 V 50 Hz
Overall dimensions	100 cm x 90 cm x 190 cm

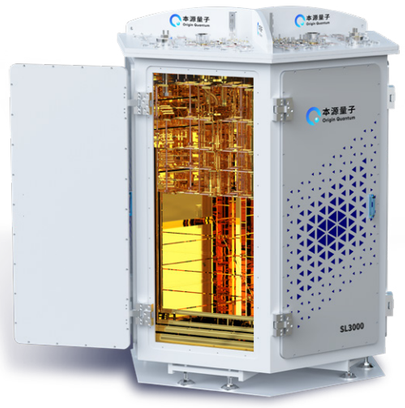
DILUTION REFRIGERATORS AND CRYOGENIC SYSTEMS

BUILD A STABLE AND RELIABLE MILLIKELVIN-LEVEL OPERATING ENVIRONMENT FOR QUANTUM CHIPS

ORIGIN-SL3000 DILUTION REFRIGERATOR

PRODUCT ADVANTAGES

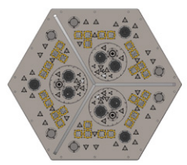
- Optimized spatial design with 30 sets of 100 mm cable interfaces, easily addressing the wiring requirements of large-scale scenarios.
- An integrated valve plate design is adopted to reduce leakage risks and enhance system hermeticity and long-term reliability.
- Equipped with a split-type pulse tube refrigerator, combined with flexible cooling transfer assemblies, it achieves better vibration damping performance and minimizes disturbances to the cryogenic environment.
- Equipped with dual internal and external cold traps to effectively ensure long-term stable operation of the system.
- A 4th-generation cryogenic ruthenium oxide temperature sensor is employed, featuring anti-interference capability and improved signal stability.
- The refrigeration unit is modularly integrated and fitted with single-person detachable side-mounted baffles, facilitating rapid maintenance and component replacement.
- Supports custom scripts, with a low learning curve and high flexibility, adapting to diverse experimental workflows.
- Allows interconnection of multiple systems, providing flexible expandability to meet the needs of larger-scale experiments.



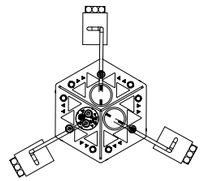
PARAMETERS

Minimum Temperature (no-load)	≤12 mK
Cooling Power at 20 mK	≥90 μW
Cooling Power at 100 mK	≥3000 μW
MC Cold Plate Area	1.6 m^2
Maximum Payload Weight	500 kg
ISO100 Side-mount Interface (Straight-through Type)	30
KF40 Connector	24
Dimensions and Weight	Cryostat: 2.6m×2.3m×3.5m, 7300 kg GHS (Gas Handling System): (1.2 m × 0.8 m × 1.8 m, 400 kg) × 3 CU (Control Unit): 0.8 m × 0.6 m × 1.5 m, 100 kg
Installation Space	Ceiling height not less than 5 m; floor space not less than 6 m × 6 m

DIMENSIONS



SL3000 Room Temperature Flange



SL3000 Layout Diagram

ORIGIN-SL1000 DILUTION REFRIGERATOR

PRODUCT ADVANTAGES

- **Abundant Ports:** Provides 6 ISO-K100 ports (each can be converted into 3 KF40 ports), plus 6 additional KF40 ports.
- **Real-Time Monitoring:** Fully self-developed temperature controller and ruthenium oxide temperature sensors enable real-time monitoring across the full temperature range.
- **Efficient Cooldown:** Equipped with professional control software, enabling one-click automated cooldown within 40 hours.
- **Flexible Configuration:** Customization services based on user requirements, with optional components including Active Vibration Isolation (AVI) System, Superconducting Magnet, Magnetic Shielding Cylinder, signal transmission modules, and Chiller Unit.

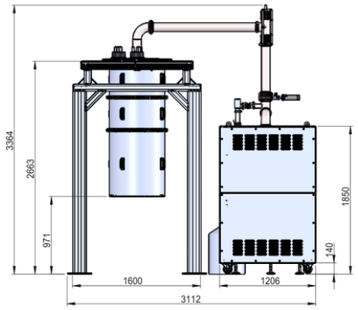


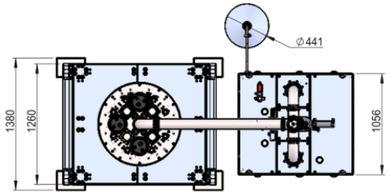


PARAMETERS

Minimum Temperature (no-load)	≤10 mK
Cooling Power at 20 mK	≥30 μW
Cooling Power at 100 mK	≥1200 μW
Cooldown Time	≤40 h
Rewarming Time	≤30 h
MC Cold Plate Size	Φ≥500 mm
Number of Side-Loading Ports	6
Channels per Side-Loading Port	168
Dimensions and Weight	Cryostat: 1.6 m × 1.3 m × 3.5 m, 800 kg GHS (Gas Handling System): 1.3 m × 1.1 m × 2 m, 600 kg CU (Control Unit): 0.8 m × 0.6 m × 1.5 m, 100 kg
Installation Space	Ceiling height not less than 5 m; floor space not less than 4 m × 6 m

DIMENSIONS

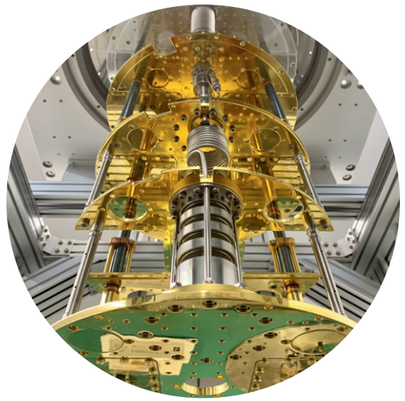




ORIGIN-SL400 DILUTION REFRIGERATOR

PRODUCT ADVANTAGES

- **Abundant Ports:** provides 2 ISO-K100 ports (each can be converted into 3 KF40 ports), plus 4 additional KF40 ports.
- **Real-Time Monitoring:** fully self-developed temperature controller and ruthenium oxide temperature sensors enable real-time monitoring across the full temperature range.
- **Efficient Cooldown:** equipped with professional control software, enabling one-click automated cooldown within 30 hours.
- **Flexible Configuration:** customization services based on user requirements, with optional components including Active Vibration Damping Component, Superconducting Magnet, Magnetic Shielding Cylinder, signal transmission modules, and Chiller Unit.

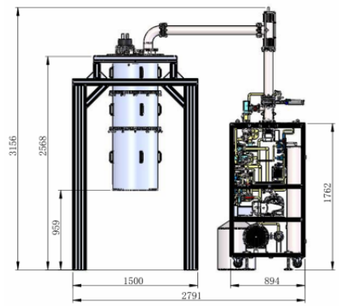


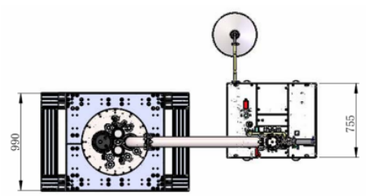


PARAMETERS

Minimum Temperature (no-load)	⩽10 mK
Cooling Power at 20 mK	⩾15 μW
Cooling Power at 100 mK	⩾600 μW
Cooldown Time(300 K to 10 mK)	⩽30 h
Rewarming Time	⩽24 h
MC Cold Plate Size	Φ⩾300 mm
Number of Side-Loading Ports	2
Channels per Side-Loading Port	168
Dimensions and Weight	Cryostat: 1.6 m × 1 m × 3.5 m, 600 kg GHS (Gas Handling System): 1.2 m × 0.8 m × 1.8 m, 400 kg CU (Control Unit): 0.8 m × 0.6 m × 1.5 m, 100 kg
Installation Space	Ceiling height not less than 5 m; floor space not less than 4 m × 6 m

DIMENSIONS





TEMPERATURE CONTROL AND ULTRA-LOW TEMPERATURE SENSING PRODUCTS

◎ SL-311 Bridge-type Temperature Controller

Designed for temperature measurement and control in dilution refrigerator systems — 8 channels (50 mK–873 K) and 4 heating channels; software supports real-time reading, heating control, and data storage.



Scan for more

FEATURES

- Standard configuration includes 8 temperature scanning channels, compatible with resistance-type temperature sensors such as platinum resistors, Cernox, ruthenium oxide, rhodium-iron, and germanium resistors.
- Standard configuration includes 4 channels of isolated low-noise heating power supplies, supporting heating powers from 1 μW to 1 W, suitable for thermal switches in dilution refrigerators and heating of stills and mixing chambers (MC).
- Equipped with user-friendly control software that supports local storage of temperature data.
- Designed in a standard 1U rack-mountable chassis for easy integration.

◎ Ruthenium Oxide Temperature Sensor

Ultra-low temperature sensor (10 mK–100 K) with ±1.5 mK accuracy at ~10 mK; customizable connectors and cables for easy installation in dilution refrigerators.



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◎ Temperature Signal Filter

A low-pass filter for temperature sensors, suitable for ruthenium oxide ultra-low temperature sensors.

· Starting frequency: -3 dB @ 300 kHz

· Off-band rejection: -30 dB @ 1–8 GHz



MEASUREMENT AND CONTROL SYSTEM OF QUANTUM COMPUTING

REALIZING PRECISE CONTROL, SIGNAL READOUT, AND AUTOMATIC CALIBRATION OF QUBITS

"ORIGIN TIANJI" MEASUREMENT AND CONTROL SYSTEM OF QUANTUM COMPUTING (TJ-SQMC-300)

Dedicated superconducting quantum chip control system with RF, digital, DC voltage, and sync modules — controls and reads multiple qubits; modular, highly integrated, and expandable.
Customization services — users can flexibly select specs and functions.



FEATURES

High Integration, Strong Performance

- Integration of multiple modules and functions, capable of independently completing superconducting quantum measurement and control tasks
- Low phase noise and low spurious, enabling fast, high-fidelity qubit control and readout

Modular Design, Strong Expansibility

- Standard cabinet-mounted chassis design for convenient operation and maintenance
- The system can be extended from 8 qubits to 100+ qubits

Professional Measurement and Control Software

- Visual GUI interface, easy to operate
- Supports parameter cycling and traversal, waveform editing and import, and more
- Supports automatic testing and calibration of superconducting quantum chips
- Provides a standard experiment library for superconducting quantum measurement and control, and supports custom

TYPICAL APPLICATIONS

01 SUPERCONDUCTING QUANTUM COMPUTATION

02 DEVELOPMENT AND TEST OF SUPERCONDUCTING QUANTUM CHIP

03 DEVELOPMENT AND TEST OF QUANTUM ALGORITHM

04 QUANTUM COHERENT MEASUREMENT AND CONTROL

PARAMETERS

RF Module	
Output Frequency	4–8 GHz, step 1 kHz
Output Power Dynamic Range	30 dB, step 0.1 dB
Input IF Signal Resolution and Sampling Rate	12 bit, 3.2 GSPS
Instantaneous Bandwidth	500 MHz
Spurious Suppression	≥ 55 dBc
Phase Noise (@6 GHz)	⩽-90 dBc/Hz@1 KHz ⩽-120 dBc/Hz@1 MHz
AWG Module	
Sampling Rate	1.2 GSa/s
Vertical Resolution	16 bit
Instantaneous Bandwidth	DC–300 MHz
Pulse Amplitude Range	-0.5 V to +0.5 V
Rise Time	< 1 ns
DC Voltage Source Module	
Vertical Resolution	20 bit
Output Range	-9.9 V to +9.9 V, continuously adjustable, step 0.1 mV
Voltage Accuracy	≤ 0.1 mV
Noise Power	< -70 dBm (10 Hz–3 GHz)
Voltage Noise	Proportional limit of 0.1–10 Hz voltage noise to voltage setting: < 1.5 ppm
Long-Term Stability	Voltage fluctuation limit within 3 hours: < 0.01%
Signal Acquisition Module	
Sampling Rate	3.2 GSa/s
Vertical Resolution	11 bit
Analog Bandwidth	500 MHz
Signal Frequency	800 MHz–1300 MHz

OQVS-300 SERIES HIGH PRECISION VOLTAGE SOURCE

Low-noise, high-stability precision voltage source for superconducting and silicon-based quantum computing — widely used in IC R&D, production, and lab research.



FEATURES

- Low frequency (0.1–10 Hz) voltage noise as low as 3.9 μV
- 24 h Stability ≤ 35 μV (room temperature)
- 20-bit vertical resolution
- Supports programming control
- Supports real-time temperature monitoring

TYPICAL APPLICATIONS

1. Enterprise IC research and design
2. Laboratory basic research
3. Industrial production, testing

PARAMETERS

Performance Parameters	
Channels	16
Output Voltage Swing	±10 V
Low frequency (0.1–10 Hz) voltage noise	≤ 3.9 μV
24 h Stability	≤ 35 μV (±10 V, tested at room temperature)
Voltage Step	19 μV
Other	
Ambient Temperature	0 °C to 45 °C
Ambient Humidity	5%–80% RH, no condensation
Storage Environment Temperature	-25 °C to 60 °C
Preheating Time	30 min
Cooling Requirement	When running, the back of the instrument must be able to guarantee at least 80 mm of isolation space

8-CHANNEL RF SIGNAL CONVERTER

Superheterodyne signal converter: IF input 0.8–1.3 GHz, RF output 3.75–8.25 GHz — wide bandwidth, adjustable power, excellent flatness, low spurious and phase noise.



FEATURES

- 8 microwave transmission channel outputs
- Adjustable frequency range of the output signal: 3.75–8.25 GHz
- Adjustable power range of the output signal: -40 to -10 dBm, step size 0.5 dB
- Power Flatness of the Transmitted Full Bandwidth: ≤1.5 dB
- In-band Spurious Suppression of the Output Signal: ≥70 dBc
- Harmonic Suppression of the Output Signal: ≥40 dBc

PARAMETERS

Number of Transmitting Channels	8
Transmit Signal Frequency Range	3.75–8.25 GHz
Transmit Signal Power Adjustable Range	-40 to -10 dBm, step size 0.5 dB
Power Stability	≤0.1 dB (after starting for half an hour and stabilizing, continuous test for 1 min)
Power Flatness of the Transmitted Full Bandwidth	≤1.5 dB
Transmitting Instantaneous Bandwidth	500 MHz
Instantaneous Bandwidth Flatness of the Transmitter	≤2.5 dB
In-Band Spurious Suppression of Transmitted Signals	≥70 dBc
Harmonic Suppression of Transmitted Signal	≥40 dBc
Output Signal Phase Noise	≤-110 dBc/Hz @ 1 kHz; ≤-140 dBc/Hz @ 1 MHz (carrier signal frequency 8 GHz, provided the phase-noise Parameters of the LO signal and IF input signal are sufficient)
IF Input Signal Frequency Range	0.8–1.3 GHz (8 input ports)
IF Signal P1dB-in	≥0 dBm
Input Local-Oscillator Frequency Range	LO1: 5.9/8.1 GHz; LO2: 10.85–13.05 GHz

CLOCK, POWER-DIVIDER AND SIGNAL-SWITCHING COMPONENTS

◎ Microwave Signal Matrix

Specialized microwave signal switching/distribution device — wide frequency, low loss, high isolation; reduces required signal sources and connector handling for efficient testing.



FEATURES

- Each channel operates independently with an isolation greater than 70 dB
- Wide frequency range: 0–8 GHz

◎ 100MHz Clock Power Divider

Low-noise, high-stability 20-channel power divider with amplification — for RF R&D, production, and lab research.



FEATURES

- Typical gain of output signal: 2 dB
- Phase difference fluctuations between channels: ≤0.2° (within a temperature change of 5°C)

◎ Clock Source with High Stability and Low Phase Noise

100 MHz, 20-channel clock source with high stability, low phase noise, and excellent harmonic suppression — for quantum measurement and RF R&D.

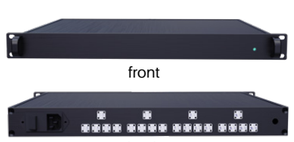


FEATURES

- Output Power: ≥5.5 dBm
- Harmonic Suppression: ≥70 dBc

◎ High-Frequency Signal Power Divider Amplifier

Low-noise, high-stability divider: 4 independent 1-to-4 modules (4 inputs, 16 outputs) with amplification — for RF R&D, production, and lab research.



FEATURES

- Isolation Degree between Output Ports: ≥35 dBc
- 6 GHz–8 GHz Output Signal Gain: 2–2.2 dB

WAVEFORM AND RF SIGNAL GENERATION COMPONENTS

◎ 16-channel Arbitrary Waveform Generator

The 16-channel Arbitrary Waveform Generator is modular and has 16-channel output. It is capable of generating DC pulse signals within the bandwidth range of DC to 400 MHz.



- Inter-channel Crosstalk ≥ 60 dBc
- It can output any signal within the bandwidth range from DC to 400 MHz

◎ 168-channel Arbitrary Waveform Generator

The 168-channel Arbitrary Waveform Generator adopts a card-type chassis and supports up to 168-channel output. It can generate DC-pulsed signals within the bandwidth range of DC to 400 MHz.



- It can output any signal within the bandwidth range of DC–400 MHz
- Inter-channel Crosstalk ≥ 65 dBc

◎ 16-channel RF Signal Generator

The 16-channel RF Signal Generator is a modular 16-channel RF arbitrary waveform generation unit. This unit can generate low-noise and highly-stable RF signals in the 4–6 GHz frequency band.



- Inter-channel Crosstalk ≥ 60 dBc
- The stability of phase difference between channels ≤2° at a carrier frequency of 6 GHz

◎ 112-channel RF Signal Generator

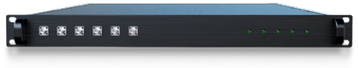
The 112-channel RF Signal Generator adopts a card-inserted chassis design and supports a maximum of 112-channel output. This device can generate low-phase-noise and highly-stable RF signals in the 4–6 GHz frequency band.



- Inter-channel Crosstalk ≥75 dBc
- Power variation across the entire frequency band <4 dB

◎ Multi-channel Low-noise Pumping Source

The Multi-channel Low-noise Pumping Source is a 4-channel tunable microwave signal source in the 12 GHz–16 GHz range.



- Ultra-low power step: 0.1 dB
- Phase noise: ≤-105 dBc/Hz @ 1 kHz, carrier signal frequency 12 GHz

MEASUREMENT AND CONTROL CABLES

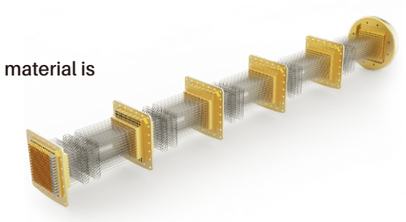
◎ High-Density Microwave Interconnect Module

Provides microwave signal channels for high-qubit chips across temperature zones in dilution refrigerators. Components: sealed modules (vacuum), heat sink modules (integrated attenuators), and 12-channel transmission line modules.

Scan for more

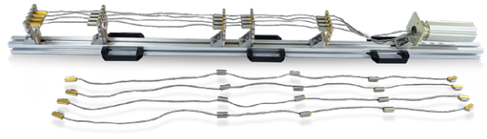
FEATURES

- High channel density, up to 168 cable channels fully equipped (customized)
- The heat sink microwave integrated module integrates the attenuator, and the specification of the attenuator can be customized
- Both ends of the system adopt SSMP interface, and the cable material is CuNi semi-rigid wire and NbTi semi-rigid wire
- System Vacuum Leak Rate ≤1×10^-9 Pa·m^3/s



◎ High-Density DC Interconnect Module

Provides DC signal channels for quantum chips and cryogenic devices in dilution refrigerators — sealed, heat sink, and DC cable modules ensure stable cross-temperature transmission.



Scan for more

FEATURES

- Compatible with 40 mm line holes: fully equipped with 24×4 DC channels, customizable for the number of channels
- Heat sink DC integrated module: customizable spiral winding heat sinks, with a default of 4 sets @ RT-4K and 3 sets @ 4K-MC
- Cable material: Cu @ RT-4K, NbTi/CuNi mix @ 4K-MC, with the option for pure copper
- Sealing flange vacuum leak rate ≤1×10^-9 Pa·m^3/s

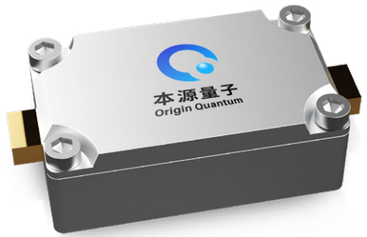
ELECTRONIC DEVICES

◎ Impedance Matched Parametric Amplifier (IMPA)

Highly integrated, operates at 10–200 mK with low power consumption; as front-end amplifier, improves system SNR by 5–20×.

FEATURES

- Typical gain ≥12 dB
- Typical gain bandwidth >350 MHz
- Typical noise temperature <400 mK
- Adapts to 10 mK–200 mK ultra-low-temperature working environment
- Supports performance-index customization



◎ Diamagnetic Impedance-Matched Parametric Amplifier

Front-end amplifier for semiconductor quantum computers — dual-layer magnetic shielding avoids interference; improves system SNR by 5–20×.

CORE SPECIFICATIONS

Magnetic shielding performance (vertical mounting)	≥120 Gauss (Z-axis)
	≥150 Gauss (X-axis)
	≥200 Gauss (Y-axis)
Center Frequency	6.2–7.3 GHz
Typical gain	≥12 dB
Typical gain bandwidth	400±50 MHz
Typical saturation power	>-125 dBm
Typical noise temperature	<400 mK

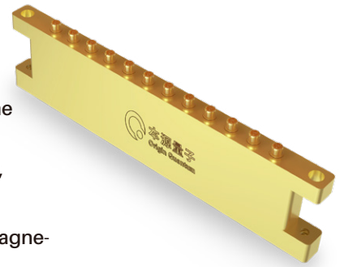


◎ Multi-channel Integrated Infrared Filter

This infrared filter comes with 12 integrated channels by default. It can be used for filtering and attenuation in the measurement-and-control link of a superconducting quantum computer in the ultra-low-temperature (20 mK temperature zone). It can simultaneously handle the XY control signals for qubit-rotation operations, the Z control signals for qubit-frequency readout input-channel signals.

FEATURES

- By default, it has 12-channel filtering and supports customization of the number of channels
- The outer shell and flange of the filter are made of oxygen-free copper, ensuring good thermal contact
- The surface features non-magnetic plating to avoid the influence of magnetism on quantum chips
- It uses SSMP connectors and supports assembly with the single-row interface of high-density microwave cable MC cold plate



◎ Single-channel SMA Infrared Filter

This single-channel infrared filter is used for filtering and attenuation in the ultra-low-temperature (20 mK temperature region) measurement-and-control link of superconducting quantum computers. It can simultaneously accommodate the XY control signals for qubit-rotation operations, the Z control signals for qubit-frequency adjustment, and the readout input channel signals.

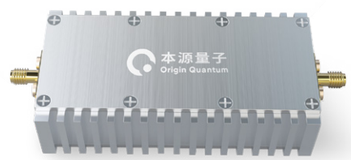
FEATURES

- The SMA connector features wide compatibility
- The filter housing and flange are machined from oxygen-free copper, ensuring excellent thermal contact
- Non-magnetic plating is applied to the surface to avoid magnetic interference with the quantum chip



◎ Room Temperature Low Noise Amplifier

The room-temperature low-noise amplifier works in the 4–8 GHz band, using a standard SMA connector and a 1.0 lying pin seat for easy installation. It features high gain and low noise, and is widely used in superconducting quantum computing.



Scan for more

◎ Bias-Tee Signal Synthesizer

A high-reliability T-type biaser that provides ideal DC/RF signal mixing, specially designed for applications requiring a fast rising edge and large DC bias.

FEATURES

- Mixed output of DC/RF signal
- Adapts to fast rising edge and large DC bias
- Meets mK-level ultra-low-temperature working environment

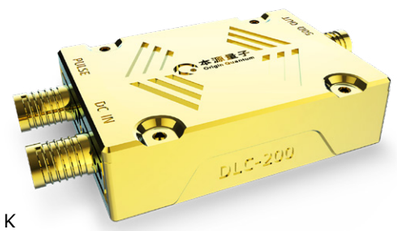


◎ DC-Pulse Synthesis Function Module

Low-temperature device that filters DC and pulse signals separately, then performs synthesis.

FEATURES

- Features DC filtering and low-pass filtering functions
- Outputs pulses with overshoot optimization
- Meets the low-temperature working environment of 3 K–320 K



KEY SPECIFICATIONS

- Gain: 70 dB (TYP.) @ 4–8 GHz
- P1dB-in: -50 dBm (Max.)
- Noise figure: 1.1 dB (TYP.); 1.4 dB (MAX.)
- Power consumption: ≤0.75 W

◎ IR Infrared Filter



- Passband Frequency: DC–0.8 GHz
- Passband Insertion Loss: ≤2.8 dB (TYP.); 3 dB (MAX.)
- Out-of-Band Rejection: ≥40 dB @ 6 GHz; ≥60 dB @(8 GHz–20 GHz)
- Operating Temperature: 10 mK–320 K

◎ DC Filter



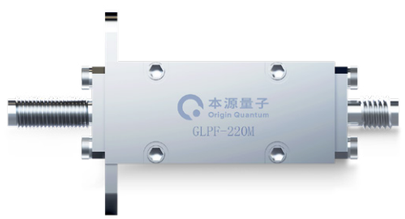
- Passband: DC
- Out-of-Band Rejection: ≥30 dB @ 500 MHz; ≥60 dB @ (1 GHz–8 GHz)
- Operating Temperature: 10 mK–320 K

◎ RC Low-Pass Filter



- Passband: DC
- Out-of-Band Rejection: ≥30 dB @ 1 MHz; ≥60 dB @ 2 GHz
- Operating Temperature: 10 mK–320 K

◎ 220M Gaussian Low-Pass Filter



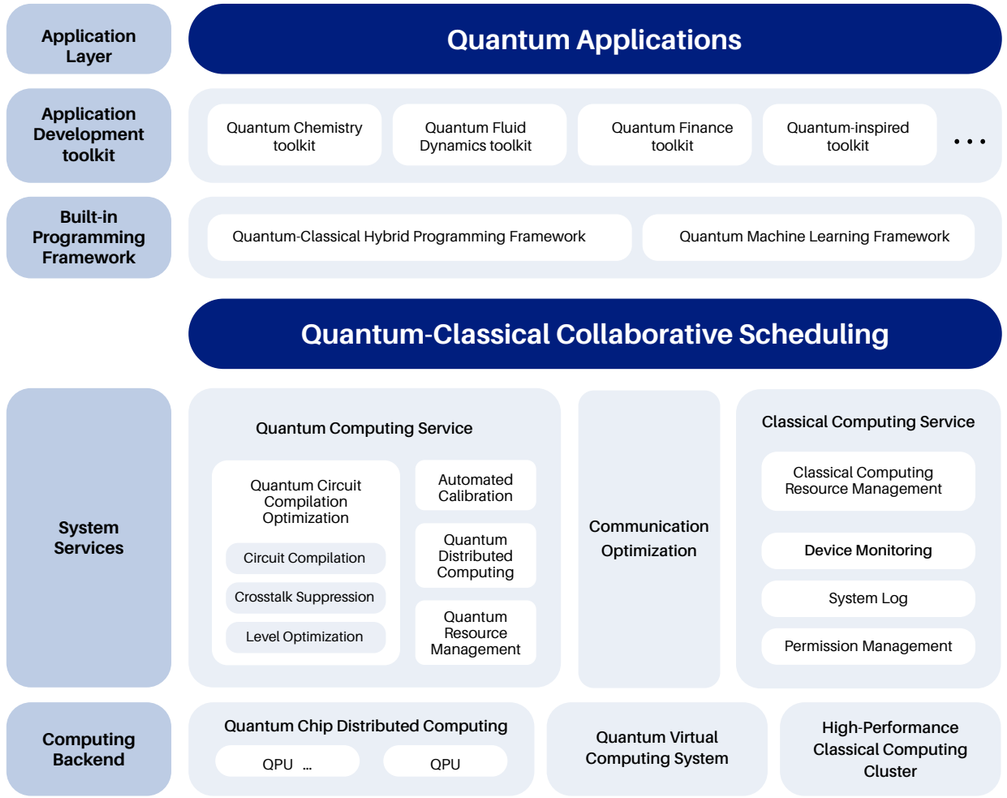
- Passband Frequency: DC–220 MHz
- Passband Insertion Loss: ≤4 dB
- VSWR: ≤1.5
- Port Impedance: 50 Ω
- Out-of-Band Rejection: ≤-24 dBc @ 600 MHz; ≤-50 dBc @ 2 GHz
- Operating Temperature: -10°C to +40°C
- Interface Type: SMA-F

QUANTUM COMPUTER OPERATING SYSTEM

UNIFIED MANAGEMENT, SCHEDULING, AND OPTIMIZATION OF QUANTUM COMPUTING SOFTWARE AND HARDWARE RESOURCES

DOMESTIC QUANTUM COMPUTER OPERATING SYSTEM — ORIGIN PILOT

The OS manages quantum hardware and software, determining performance. If the chip is the heart, the OS is the brain, and applications are the flesh and blood — a good OS ensures efficient, stable operation.



CORE ADVANTAGES

Domestically Self-developed

Independently Controllable Quantum Computer Operating System

Multi-system

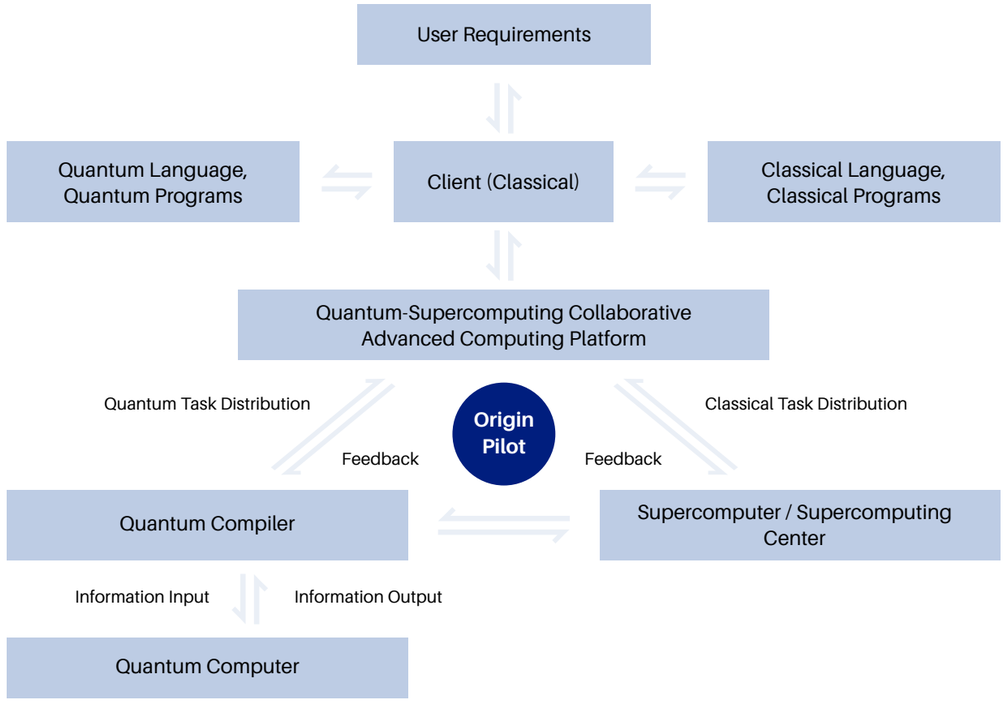
Unified Access and Scheduling for Multi-physics Quantum Computers

Quantum-Supercomputing Fusion

Hybrid Computing Synergy for Quantum-Supercomputing Fusion

QUANTUM-SUPERCOMPUTING COLLABORATIVE ADVANCED COMPUTING PLATFORM AND TASK SCHEDULING

Decomposes, schedules, and distributes tasks between quantum and supercomputers — leverages both strengths while saving resources.



ORIGIN PILOT QUANTUM-SUPERCOMPUTING COLLABORATION FLOWCHART

SOLUTION FEATURES

- Using quantum computers and classical high-performance computing clusters as computing backends, it executes quantum computing tasks and classical computing tasks.
- The system can schedule "classical + quantum" computing tasks while managing quantum computing devices and classical supercomputing clusters.
- A complete software system encompassing quantum computing basic software, application software, and cloud service software, to build a comprehensive quantum-supercomputing fusion computing service platform.

QUANTUM CLOUD PLATFORM

OPEN REAL QUANTUM COMPUTING POWER, CONNECTING SCIENTIFIC RESEARCH, EDUCATION, AND INDUSTRIAL APPLICATIONS

COMPUTING POWER FOUNDATION

Serves developers, universities, and researchers — provides real quantum computers, virtual machines, online programming, task management, and algorithm verification for research, teaching, and application development.

Scan for more

◎ Multi-System Quantum Computing Power Resources



Superconducting Quantum Computer

Photonic Quantum Computer

Ion-Trap Quantum Computer

Semiconductor Quantum Computer

◎ 4 Types of Quantum Virtual Machines



Full-Amplitude Quantum Virtual Machine

Fully simulates quantum state evolution



Single-Amplitude Quantum Virtual Machine

Calculates the probability amplitude of a specified basis state



Partial-Amplitude Quantum Virtual Machine

Reduces resource consumption for large-scale simulation



Noisy Quantum Virtual Machine

Supports custom noise models

CORE FUNCTIONS



Online Submission of Quantum Programs



Computing Task Execution and Management



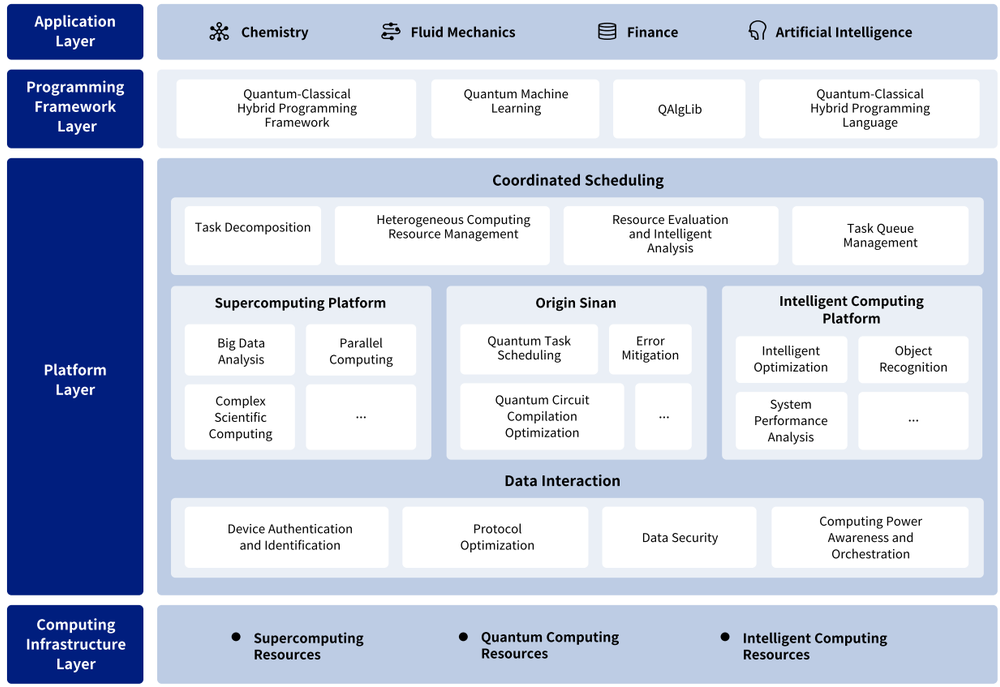
Running Status and Result Retrieval



Support for Scientific Research, Education, and Application Verification

QUANTUM-SUPERCOMPUTING-INTELLIGENT CONVERGENCE CLOUD SERVICE

Connects quantum, supercomputing, and AI resources via Origin Pilot — unified access, resource management, and task scheduling for complex problems and industry applications.





Application Layer Convergence



Programming Framework Layer Convergence



Platform Layer Convergence



Computing Power Foundation Layer Convergence

COLLABORATION CASES

Cooperation Cases;National Supercomputing Internet;Shanghai Supercomputer Center;National Supercomputing Center in Zhengzhou;National Supercomputing Center in Chengdu;Wuhu Big Data Construction Investment and Operation Co., Ltd.;Hefei Big Data Asset Operation Co., Ltd.



DEDICATED QUANTUM CLOUD SERVICE

For enterprises, universities, and computing centers — provides an exclusive quantum cloud platform deeply integrated with existing IT, based on computing, security, and management needs.

Customized Platform Development

Based on computing power scale, business scenarios, and application goals, it provides personalized platform design and technical solutions.

Private and Dedicated Deployment

Establishes an independent quantum computing environment to meet internal usage and data management requirements.

IT Infrastructure Integration

Integrates with users' existing computing, network, storage, and identity authentication systems.

User and Permission Management

Supports unified management of organizations, users, roles, computing permissions, and computing power resources.

Flexible Expansion

Adds computing power resources, software modules, and application services according to user needs.

Continuous Upgrade and Services

Provides platform upgrades, O&M support, technical training, and ecosystem collaboration services.

TYPICAL CASES

Quantum Finance Cloud Platform

Supports risk management, asset allocation, and financial algorithm research

Quantum Power Cloud Platform

Supports power dispatch, load forecasting, and new energy application exploration

Research and Education Quantum Cloud Platform

Provides quantum computing power, teaching experiments, and research environments for universities and research institutions

SOFTWARE, AI, AND APPLICATION ECOSYSTEM

Integrates quantum OS, programming frameworks, runtime tools, ML frameworks, and algorithm packages — enhanced by Origin Brain for knowledge Q&A, code development, and quantum connectivity.

◎ Quantum Software Tools

Origin Pilot

Quantum resource access, task scheduling, and hybrid computing collaboration

QPanda3

High-performance quantum programming and circuit simulation framework

VQNet (Variable Quantum Net)

Unified quantum-classical machine learning framework

◎ Origin Brain Intelligent Assistant

Origin Quantum's AI assistant — built on LLMs and a professional knowledge base for one-stop knowledge Q&A and quantum programming; makes quantum computing accessible.

◎ Quantum Applications and Resources

APPLICATION AREAS

FinTech · Biomedicine · Artificial Intelligence · Computational Chemistry · Scientific Simulation · Information Security

LEARNING RESOURCES

Fundamental Courses · Programming Courses · Technical Documentation · Pilot Cup Question Bank · Popular Science Comics · Competitions and Events

QUANTUM APPLICATION SOFTWARE

SOLVING CHALLENGES IN CHEMISTRY, FINANCE, ENGINEERING, AND AI WITH QUANTUM ALGORITHMS

QPANDA QUANTUM COMPUTING PROGRAMMING TOOLS

Origin Quantum's proprietary quantum programming toolkit covering development, simulation, algorithm invocation, task execution, and real quantum resource access — full-stack support from coding to application building.

◎ QPanda3 High-Performance Quantum Programming Framework

Open-source framework for efficient quantum program development — supports circuit construction, simulation, analysis, and software-hardware co-optimization.

- High-Performance Quantum Circuit Simulation
- Clean, User-Friendly API
- Quantum Circuit Construction & Analysis
- Software-Hardware Co-Optimization
- Quantum Virtual Machine & Real Backend Support

◎ QPanda3 Runtime Quantum Task Execution & Management Toolkit

Built on QPanda3 for high-level quantum programs and tasks — integrated support for execution, tracking, and resource connection.

- A Quantum Task Integration & Packaging
- B Task Submission & Management
- C Runtime Status Tracking
- D CheckPoint Snapshot Saving
- E Task Pre-Verification
- F Reduced Traffic & Latency

◎ pyqpanda-algorithm Quantum Algorithm Software Package

Integrates common algorithms, modules, and utility functions — boosts development efficiency with cross-platform support.

- A Common Quantum Algorithms & Function
- B Rich Example Programs
- C Comprehensive API Docs
- D High-Performance Algorithm Optimization
- E Stable, Reliable Software Components
- F Cross-Platform Porting

VQNET QUANTUM MACHINE LEARNING FRAMEWORK AND APPLICATIONS

◎ VQNet Unified Quantum-Classical Machine Learning Framework

Integrated toolkit for quantum AI — from model construction, autodiff, and training to quantum hardware execution; rapidly build quantum ML and hybrid models.

- **Quantum-Classical Unification:** Supports quantum ML, classical ML, and hybrid models in one framework.
- **Efficient Model Development:** Python API with dynamic graphs and autodiff — low barrier to entry.
- **Quantum Hardware Access:** Integrates QPanda; simulates circuits and connects to real quantum computers.
- **Open & Compatible:** Works with other ML frameworks and scientific computing tools.

◎ VQNetVision Quantum Machine Learning Vision Algorithm SDK

Quantum neural layers, parameter-learning components, and hybrid vision algorithms for image recognition, object detection, and segmentation.

Quantum Linear Layer → Quantum Parame-ter-Learning Linear Layer → Quantum 2D Convolutional Layer → Quantum Parame-ter-Learning Convolutional Layer → Modular Variational Quantum Circuit → Custom Quan-tum-Classical Hybrid Algorithm

PRODUCT ADVANTAGES

01 Flexible
Multiple quantum ML vision algorithms; supports customi-zation

02 Efficient
Dedicated capabilities for classification, detection, segmentation

03 Easy to Use
Python Wheel package with examples and docs

TYPICAL APPLICATIONS

Image Classification · Object Detection · Image Segmentation · Breast Imaging Recognition · Kidney CT Image Segmen-tation

QUANTUM COMPUTING FINTECH SOLUTION

Hybrid quantum-classical financial engine addressing computing bottlenecks in portfolio optimization and risk pricing — empowers high-frequency trading and intelligent risk control.

CORE ADVANTAGES

Parallel Computing
Quantum parallelism accelerates high-dimensional model solving and simulation.

Global Optimization
Quantum algorithms efficiently search multi-constraint asset allocations.

Correlation Mining
Quantum ML mines high-dimensional correlations — improves anti-fraud, credit assess-ment, and market prediction.

Enhanced Expressiveness
Complex modeling with fewer parameters — stronger time-series forecasting for quant trading.

APPLICATION SOFTWARE

Portfolio Optimization · Derivatives Pricing · Risk Detection

QUANTUM COMPUTING BIOPHARMACEUTICAL SOLUTION

Integrates quantum chemistry, quantum ML, and quantum optimization — targets drug discovery, lead compound development, and clinical diagnostics; builds a closed loop from algorithm R&D to deployment.

CORE ADVANTAGES

Hybrid Architecture

"Classical feature extraction + quantum optimization" — combines deep learning expressiveness with quantum high-dimensional modeling.

Quantum Optimization Acceleration

QAOA efficiently explores molecular docking and RNA structure prediction spaces — shortens lead compound discovery.

QML Accuracy

Quantum neural networks process molecular sequences and medical images — stronger nonlinearity with fewer parameters.

Few-Shot Learning for Lower Training Cost

Transfer learning + quantum variational networks — better generalization with less labeled data.

APPLICATION SOFTWARE

Target Prediction · Drug Screening · Drug Risk Prediction · Medical Diagnostics

QUANTUM COMPUTING ENERGY & POWER SOLUTION

Addresses power forecasting, power flow computation, and storage siting challenges in new power systems — integrates quantum ML, quantum optimization, and hybrid computing to help grids operate safely and efficiently.

CORE ADVANTAGES

Heterogeneous Computing

Integrates superconducting quantum and classical resources — flexible scheduling for both verification and engineering.

Full-Stack Architecture

From computing power to applications — shields hardware differences, connects quantum technology with power business.

Unified Framework

Standardized quantum toolchain integrating programming, ML, and scientific computing — lowers barriers, speeds deployment.

Multi-Algorithm Integration

Quantum ML + quantum optimization for large-scale power flow and multi-objective optimization — dual gains in accuracy and speed.

APPLICATION SOFTWARE

PV Power Forecasting · Grid Load Forecasting · Large-Scale Power Flow Computation · Energy Storage Siting Optimization

QUANTUM COMPUTING CHEMISTRY SOLUTION

Quantum computing naturally simulates quantum behaviors like electron entanglement, breaking classical limits. Hybrid quantum-classical architecture with variational quantum algorithms collaborates with classical HPC to solve complex chemistry problems.

CORE ADVANTAGES

High-Precision Simulation

Natural quantum state evolution accurately simulates entanglement — breaks classical approximation limits for strongly correlated systems.

Hybrid Architecture

Classical-quantum collaborative solving — alleviates scale pressure, significantly improves efficiency for complex molecular and material models.

Open Collaboration

Standardized interfaces from algorithm verification to model development — supports joint research, accelerates translation.

CORE PRODUCTS

ChemiQ (Application Software)

pyChemiQ (Software)

APPLICATION SCENARIOS

Molecular Electronic Structure Computation

Chemical Reaction Mechanism Research

New Materials & New Energy R&D

Molecular Spectroscopy & Property Prediction

QUANTUM COMPUTING ENGINEERING SIMULATION SOLUTION

For multi-physics, multi-scale engineering problems — leverages quantum computing's potential in system modeling, linear algebra acceleration, and combinatorial optimization via a hybrid architecture; provides new capabilities for mechanics, meteorology, and aerospace.

CORE ADVANTAGES

Fluid Dynamics

Quantum finite volume method and subspace HHL — supports compressible/incompressible flow and turbulence simulation.

Linear Algebra Acceleration

HHL, VQLS, and more — connects with existing engineering software for potential quantum speedup.

Global Optimal Search

Quantum optimization for high-dimensional multi-constraint problems — supports aircraft design and satellite scheduling.

Heterogeneous Collaboration

PC, supercomputer, and quantum computer — full-process collaborative scheduling from verification to engineering simulation.

CORE PRODUCTS

OriginQ-QCFD

Quantum Linear Algebra Solver Library

APPLICATION SCENARIOS

Fluid Simulation & Aircraft Design

Structural Optimization & Engineering Design

Climate Simulation & Environmental Prediction

Seismic Wave Propagation & Disaster Simulation

Energy & Transportation Network Optimization

QUANTUM COMPUTING AI SOLUTION

Fuses quantum computing with classical AI via a hybrid architecture — leverages quantum advantages in high-dimensional mapping, combinatorial optimization, and probabilistic modeling; builds an integrated system from data processing through training to inference deployment.

CORE ADVANTAGES

Hybrid Computing

Integrates quantum, supercomputing, and AI resources — heterogeneous scheduling for high-dimensional tasks.

High-Dimensional Mapping

PQC extracts nonlinear features in high-dimensional space — better expressiveness with fewer parameters.

Lightweight Deployment

Quantum parallelism improves search/training efficiency — supports edge devices and "low-carbon AI".

Modular Extension

Quantum convolution, quantum attention, and more — seamlessly embeddable into classical neural networks for classification, regression, generation.

CORE PRODUCTS

VQNetVision (Quantum ML Vision Algorithm VQNetVision)

VQNet (Quantum ML Framework VQNet)

VQNetTimeSeries (Quantum Time-Series Prediction Algorithm VQNetTimeSeries)

APPLICATION SCENARIOS

Image Processing & Computer Vision

Natural Language Processing

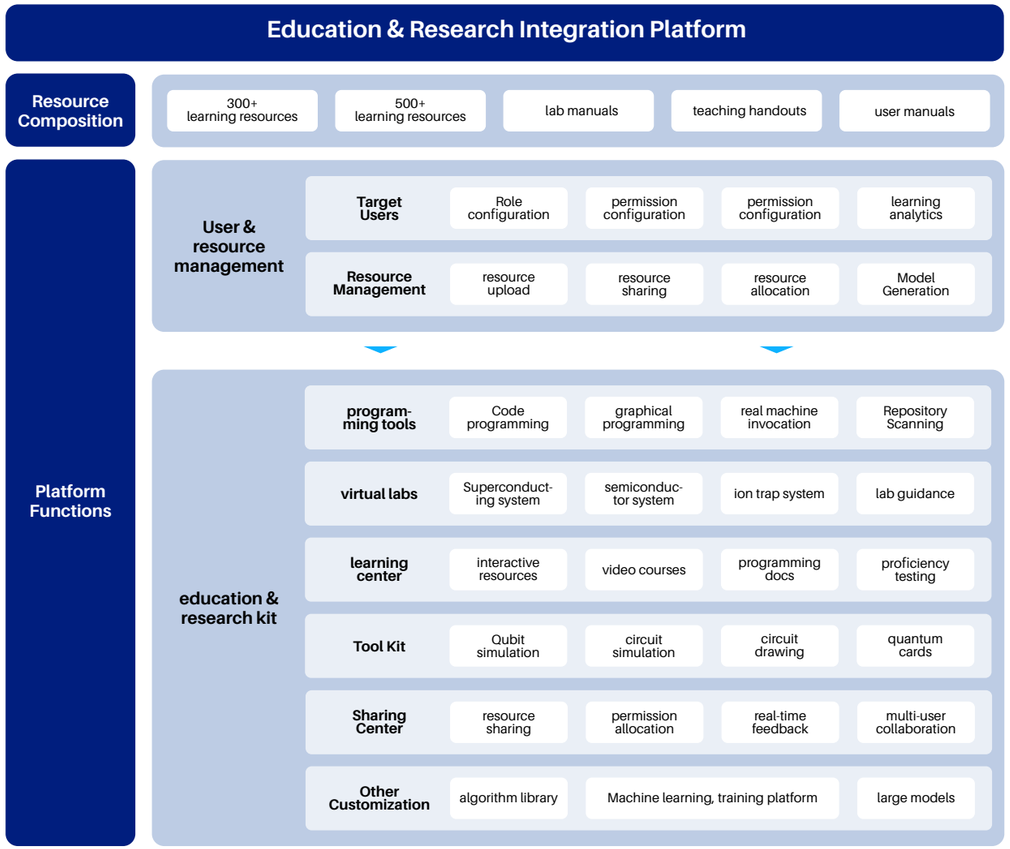
Time-Series Prediction

QUANTUM EDUCATION

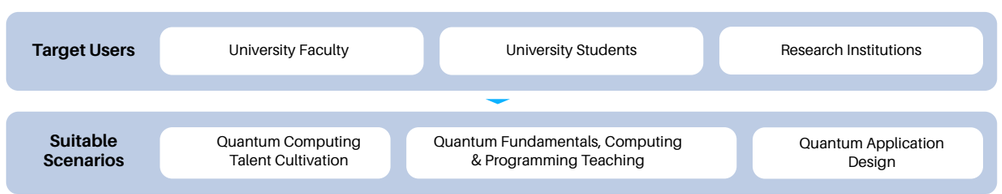
BUILDING A TALENT CULTIVATION SYSTEM FROM POPULAR SCIENCE EXPERIENCE AND TEACHING PRACTICE TO COLLABORATIVE RESEARCH

QUANTUM COMPUTING EDUCATION & RESEARCH INTEGRATION PLATFORM

University-oriented quantum computing education platform — full-process solution from learning center, graphical circuit practice, and coding labs to algorithm analysis and resource management; combines theory with projects to cultivate practical talent.



APPLICATION SCENARIOS



COMMON ISSUES & NEEDS

- Students absorb theory well but lack practical application and teamwork skills.
- Teaching resources are scarce, scattered, and lack unified management.
- Competitions, experiments, and training lack standardized processes and platform support.

QUANTUM COMPUTING IMMERSIVE EXPERIENCE SYSTEM

Combines VR with quantum computing — builds a highly realistic training environment in virtual space; provides universities with low-cost, safe virtual simulation teaching.

KEY FUNCTIONS

- **Computer Construction**
  Life-scale reproduction; closely observe structure and experience assembly in VR.
- **Circuit Construction**
  Build quantum circuits in VR; observe qubit state evolution and gate effects.
- **Quantum State Evolution**
  Observe qubit state evolution and Bloch sphere changes in VR.

APPLICATION SCENARIOS



Science Exhibition

Visitors quickly experience superconducting quantum computer composition and principles.



Professional Teaching

Virtual simulation aligned with talent cultivation — meets training needs; provides universities with low-cost, safe, reliable teaching methods.

QUANTUM COMPUTING TEACHING INSTRUMENT

Full-stack experimental teaching platform for quantum computing education — integrates qubit simulation, visualized resources, and interactive labs; supports university programs and algorithm verification from theory to practice.



CORE VALUE

- Paradigm shift from theory lecture to hands-on practice.
- Integrated solution covering teaching, learning, and research.
- Out-of-the-box; no additional course development needed.

Audience	Core Need	Value Provided
University/Research Learners	Systematically master theory and experimental skills	Full-chain teaching support from theory to practice, supporting quantum algorithm experiments and course design
K12/Popular Science Audiences	Stimulate interest, build intuitive understanding	Gamified, visualized, zero-barrier interactive experience, making complex concepts fun and easy to understand
Public/Social Learners	Low-barrier access to frontier technology	Immersive exhibition, challenge levels, 5-minute flash experiences, bringing quantum technology beyond the ivory tower

ORIGIN QUANTUM FULL-PHYSICS-SYSTEM LEARNING MACHINE

Progressive quantum popular science education system — covers quantum history, fundamental theory, virtual labs, programming practice, and quantum games; low-barrier, immersive learning for science venues and universities.

FEATURES



- **Software-Hardware Integration:** Intuitive display, smooth operation
- **Interactive:** Smooth touchscreen + 3D virtual simulation
- **Resources:** Rich quantum knowledge and development timeline
- **Hands-On:** Manual circuit building + competitive quantum games
- **Security:** Unique activation code per device
- **Customization:** Supports personalized feature customization

Low-barrier, easy-to-operate quantum science education — for audiences from no-background to knowledgeable; deepens understanding of quantum computing.

APPLICATION SCENARIOS

Science venues and teaching labs — for exhibitions, demonstrations, and fundamental teaching.

TARGET USERS

For audiences with no or weak quantum background — easy entry into the quantum world.

POST-QUANTUM SECURITY

BUILDING A SECURITY DEFENSE LINE COVERING CRYPTOGRAPHIC INFRASTRUCTURE, NETWORK TRANSMISSION, AND MOBILE TERMINALS

THE THREAT OF QUANTUM COMPUTING TO EXISTING PUBLIC-KEY CRYPTOGRAPHY

The digital economy relies on RSA, ECC, and SM2. A 2048-bit RSA key takes classical computers millions of years to crack — a quantum computer might need only hours.

Threat Target	Quantum Algorithm	Threat
(RSA/ECC/SM2) Asymmetric Cryptography	Shor's Algorithm	Like a "universal key" — rapidly cracks authentication and digital signatures, rendering them invalid
(AES/SM3) Symmetric Crypto & Hash	Grover's Algorithm	Reduces cracking difficulty to square root level, forcing key length doubling

"Harvest now, decrypt later" is a real threat: attackers store encrypted data today for future quantum decryption. Full cracking capability may arrive by the early 2030s.

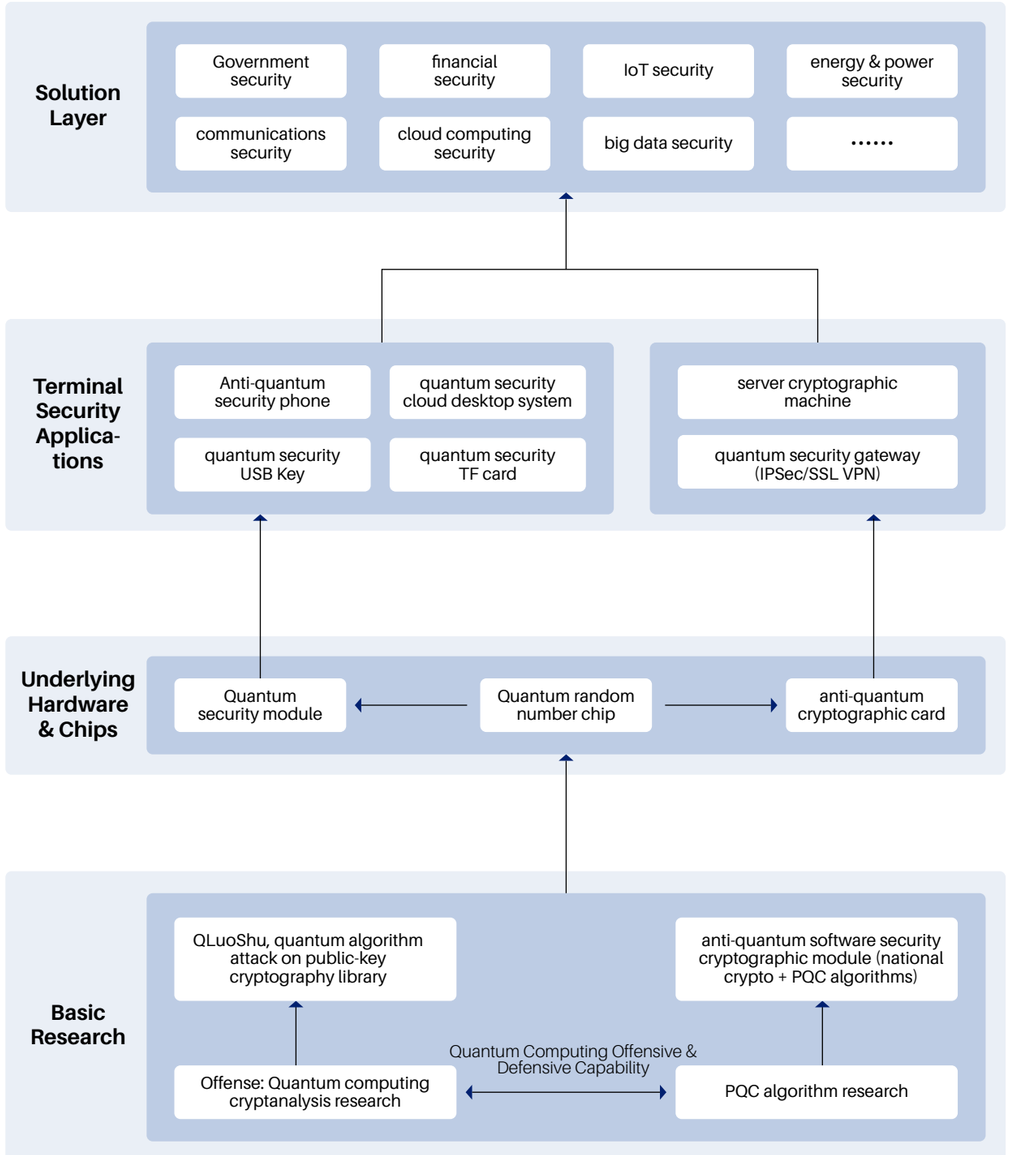
POST-QUANTUM CRYPTOGRAPHY (PQC) IS THE KEY PATH AGAINST QUANTUM COMPUTING ATTACKS

PQC and QKD are two main approaches. PQC is the internationally recognized mainstream migration path due to compatibility and cost-efficiency.

Technology Path	PQC	QKD
Technical Principle	Based on mathematical hard problems quantum computers cannot solve	Relies on quantum mechanics principles, secure key exchange between two parties via quantum channels
Deployment Cost	Low (compatible with communication infrastructure, no special requirements for wired/wireless network quality, high network reachability)	High (single-photon source/dedicated fiber/relays)
Security	Resists quantum computing attacks	Theoretically unconditionally secure, but depends on physical link being tap-free
Applicable Scenarios	Large-scale, wide-area networks (internet, mobile communications, cloud services)	Dedicated, point-to-point high-security lines
International Landscape	Mainstream path; NIST has published standards; Europe and America have clear migration roadmaps and timelines	Due to engineering challenges, no security standards formed yet

ORIGIN QUANTUM'S "OFFENSIVE & DEFENSIVE" CAPABILITY AND PRODUCT SYSTEM

Origin Quantum has established quantum computing "offensive and defensive" capabilities — products span from algorithm research to security products, from chips to networks, from data centers to mobile terminals.



ANTI-QUANTUM SOFTWARE SECURITY CRYPTOGRAPHIC MODULE

Supports SM series, NIST PQC algorithms (ML-KEM, ML-DSA, SLH-DSA), and domestic PQC (Scloud+, Aigis) — provides "national crypto + anti-quantum" encryption for terminal apps; enables software-level security upgrades.

FEATURES

- **Dual Security:** SM2/SM3/SM4 + ML-KEM/ML-DSA/SLH-DSA.
- **Out-of-the-Box:** Atomic interfaces; no need to study hybrid logic; supports secondary encapsulation.
- **Full-Stack Compatible:** Windows/Linux/Android/iOS + Kylin/Anolis OS; C/C++/Python/Java/JS.
- **Seamless Integration:** Interface-aligned with hardware HSMs; supports mutual encryption and verification.

ANTI-QUANTUM CRYPTOGRAPHIC CARD

A cryptographic card is a PCI/PCIe-based hardware encryption device in PKI systems with crypto operation, key management, RNG, and self-protection capabilities.

The Origin Rock anti-quantum cryptographic card provides high-performance crypto operations and secure storage for digital signatures and data encryption. Compliant with GM/T 0018-2023; smoothly integrates into various platforms.



FEATURES

- **Embedded QRNG:** Provably true RNG — unpredictable, non-traceable, pattern-free; information-theoretic security.
- **Multi-Algorithm:** RSA/AES, SM1/SM2/SM3/SM4, ML-KEM (Kyber)/ML-DSA (Dilithium).

- **High-Speed:** High-performance chips for fast encryption/decryption.

- **High Usability:** Supports 32-bit and 64-bit Linux/Unix/FreeBSD operating systems, Loongson,Phytium, Sunway, HiSilicon, Kunpeng.

TECHNICAL PARAMETERS

Algorithm		Performance
SM1 Encryption/Decryption		2300
SM2	Key Pair Generation	36000 Tps
	Sign/Verify	33000/25000 Tps
	Encrypt/Decrypt	25000/35000 Tps
SM3(Mbps)		1900
SM4(Mbps)		2300

PQC Algorithm Performance

Algorithm		Performance(Tps)
Kyber512/768/1024	Key Pair Generation	32000/28000/21000
	Key Encapsulation	36000/28600/22000
	Key Decapsulation	34600/25500/18800
Dilithium2/3/5	Key Pair Generation	28000/21000/13700
	Signing	17900/8100/5500
	Verification	28400/20000/13600
QRNG Generation(Mbps)		20

TYPICAL APPLICATIONS

General-Purpose Cryptographic Device,Identity Authentication Device,Network Security Device,Storage Encryption Device

ANTI-QUANTUM SERVER CRYPTOGRAPHIC MACHINE

High-performance cryptographic device supporting PQC, QRNG, and SM1/SM2/SM3/SM4 — meets signature/verification and encryption/decryption needs. Compliant with GM/T 0030-2014, GM/T 0028-2024, and GM/T 0018-2023.



FEATURES

- **Comprehensive Algorithm Support**
  - Supports SM2 national standard asymmetric algorithms;
  - SM1/SM4 national standard symmetric algorithms;
  - SM3 hash algorithms;
  - ML-KEM512/768/1024 PQC key encapsulation algorithms;
  - ML-DSA44/65/87 PQC signature/verification/identity authentication algorithms;
  - QRNG for true quantum random numbers.

- **Comprehensive Access Control**
  - Divided into administrator, auditor, operator roles;
  - management role is USBKEY (smart cryptographic key);
  - identity-based authentication.

- **High Availability**
  - Optional redundant power supply for operational continuity;
  - network ports support active-backup bonding for network redundancy;
  - load balancing at interface layer is transparent to upper-layer applications, with simple deployment.

- **High Maintainability**
  - Log audit, status monitoring, SNMP, SYSLOG, NTP.

- **Secure Key Storage**
  - Three-tier protection; keys never appear in plaintext; encrypted backups.

- **Secure Access Control**
  - IP whitelist, connection password;
  - SM2/PQC secure channel access.

PARAMETERS

Product Model	Anti-Quantum Server Cryptographic Machine
Form Factor	2U Rackmount
Appearance	 Front View  Back View
Dimensions	560 mm x 440 mm x 89 mm (width×depth×height)
Power	200V, 550W Redundant power
Network Interfaces	2× GbE electrical, 2× 10GbE optical
IPMI	1× IPMI port
USB	1× USB 2.0, 1× USB 3.0
Crypto Implementation	Anti-quantum cryptographic card
MTBF	≥50000 hours
Operating Temperature	0 °C~40 °C
Storage Temperature	-40 °C~60 °C
Non-condensing Operating Humidity	0%~90%

ANTI-QUANTUM SECURITY GATEWAY

High-speed network security device safeguarding data via "quantum encryption" tunnels. Simple deployment, flexible configuration, no network changes required — for government, public security, energy, transportation, taxation, and enterprises.



FEATURES

- Embedded high-performance PCI-e anti-quantum crypto card.
- ML-KEM/Scloud+ and hybrid encapsulation (ML-KEM+SM2 / Scloud+ + SM2) for IPSec/SSL.
- Industrial-grade, 24/7 operation; IPSec auto-recovery in 60s; dual hot standby; load balancing.
- Bypass deployment; seamless integration with existing networks.

TECHNICAL PARAMETERS

Type	Functions & Parameters	Anti-Quantum Security Gateway
Hardware Parameters	Dimensions	1U Rackmount
	Network Interfaces	2.5G ports×6 10G optical ports×2
	Power	Rated 250W, 100-240V wide voltage
	Operating Temperature	0 °C - 50 °C
	Storage Temperature	5 °C - 90 °C
	Humidity	10%-90%
	Security Device	Optional Origin Quantum proprietary anti-quantum crypto card hardware
Performance Parameters	PQC Performance	Key Generation Rate≥20000 Tps Key Encapsulation Rate≥20000 Tps Key Decapsulation Rate≥20000 Tps QRNG Generation Rate≥20 Mbps
	Number of Tunnels	≥1000
	Throughput	≥2.0 Gbps
	Link Aggregation Throughput	Single link：2.35 Gbps Dual link：4.59 - 4.69 Gbps Triple link：6.72 - 6.79 Gbps

APPLICATION CASE

A medical institution deployed quantum security gateways to build a quantum-secure link from offices to the data center. Data is encrypted in real time at the sending end, transmitted as ciphertext, and decrypted with integrity verification at the receiving end — end-to-end encryption counters quantum threats, ensuring hospital data confidentiality and integrity.

ANTI-QUANTUM SECURITY MODULE

High-performance security component fusing quantum technology with encryption — provides "secure today, quantum-resistant tomorrow" dual protection for finance, government, and IoT.



FEATURES

- **Built-in QRNG Chip, Ensures root-level random source security**
- **Dual Algorithm Balances compliance and quantum resistance**

• **National Crypto:** SM2/SM4/SM3 compliant — fits existing systems without major changes.

• **PQC Algorithms:** NIST-recommended ML-KEM, ML-DSA — resists future quantum threats; "deploy once, secure long-term."

Lightweight Design

• Miniaturized packaging (as small as 25×25×3mm); integrates into USB Keys, TF cards, terminals, servers; UART/SPI/USB interfaces.

QUANTUM

QUANTUM SECURITY USB KEY

New-generation identity authentication product based on quantum security module — national crypto + PQC hybrid encryption at financial security level; supports mainstream browsers for secure web login, information exchange, and VPN certificate login.



FEATURES

- Embedded QRNG chip
- Supports HID, CCID, USB Mass Storage
- Windows 10/Linux
- CFLD/Kylin domestic OS

QUANTUM SECURITY TF CARD

Identical to standard TF card in form factor; built-in quantum security module integrates quantum encryption keys into phones and tablets — protects sensitive data with 4G-16G secure storage and quantum-encrypted mobile security.



FEATURES

- Embedded QRNG chip
- TF Interface
- High-capacity secure data storage
- GM/T 0016-2012 compliant

ANTI-QUANTUM SECURITY CLOUD DESKTOP OPERATING SYSTEM

Co-developed with CFLD — integrates PQC+QRNG with cloud virtualization for full-chain quantum security: terminal access, data transmission, storage encryption, and identity authentication; provides "quantum-immune" office environments for government, finance, and energy.



FEATURES

- **Quantum Auth**

  PQC signature + QRNG multi-factor authentication.

- **Full-Chain Encryption**

  With quantum gateway — "quantum-level" data transmission security.

- **Compatible**

  Hygon, Zhaoxin, Phytium, Loongson, Sunway, Kunpeng + Intel/AMD; desktops, laptops, all-in-ones.

- **Rich Apps**

  CFLD Software Center; WPS Office, Yozosoft Office, LibreOffice.

ANTI-QUANTUM SECURITY PHONE

Jointly launched by China Unicom and Origin Quantum — comprises "Quantum Yaotan" APP and Quantum Super SIM Card; encrypted secure messaging for government scenarios.



Quantum Yaotan APP

- Deeply integrates PQC + national crypto;
- resists quantum attacks and eavesdropping;
- end-to-end encrypted.



Quantum Super SIM

- Dual-chip architecture: SM security chip + QRNG chip;
- Real-time generation of quantum-mechanically true random keys;
- Secure key lifecycle: storage, generation, distribution, destruction.

PRODUCT ADVANTAGES

- **Finance Sector: Transaction and Data Security Protection:** PQC and quantum keys build a dual defense — PQC resists quantum attacks; quantum keys provide true randomness and unconditionally secure distribution; together they address quantum-era security challenges.

- **Insight-Driven, Richer Functions:** Quantum Yaotan features encrypted audio/video calls, encrypted messaging, file encryption, single/group chat, access authentication, anti-screenshot/recording — plus customizable device management, terminal hardening, and enterprise content customization.

- **Authoritative Certification, Guaranteed Security:** Anti-quantum attack capability certified by CAS Key Laboratory of Quantum Information; embedded quantum devices meet national standards; Quantum Super SIM and Quantum Yaotan certified by Ministry of Public Security, MIIT, SCA, and China Academy of Information and Communications Technology (CAICT).

QUANTUM SUPER SIM CARD

SM security chip + QRNG chip in SIM card; SM2/SM3/SM4 + PQC; CA-interfaced; identity verification, encryption, digital signature, network access control.



ORIGINO

ORIGINO

China's First Quantum Computing Industry Alliance

Quantum Computing Upstream & Downstream Manufacturing Alliance

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Quantum Computing Popular Science Education Alliance

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南开大学 湖北大学 郑州轻工业大学 陕西科技大学 安徽大学 中国矿业大学 上海海事大学 南京师范大学 重庆邮电大学 合肥工业大学

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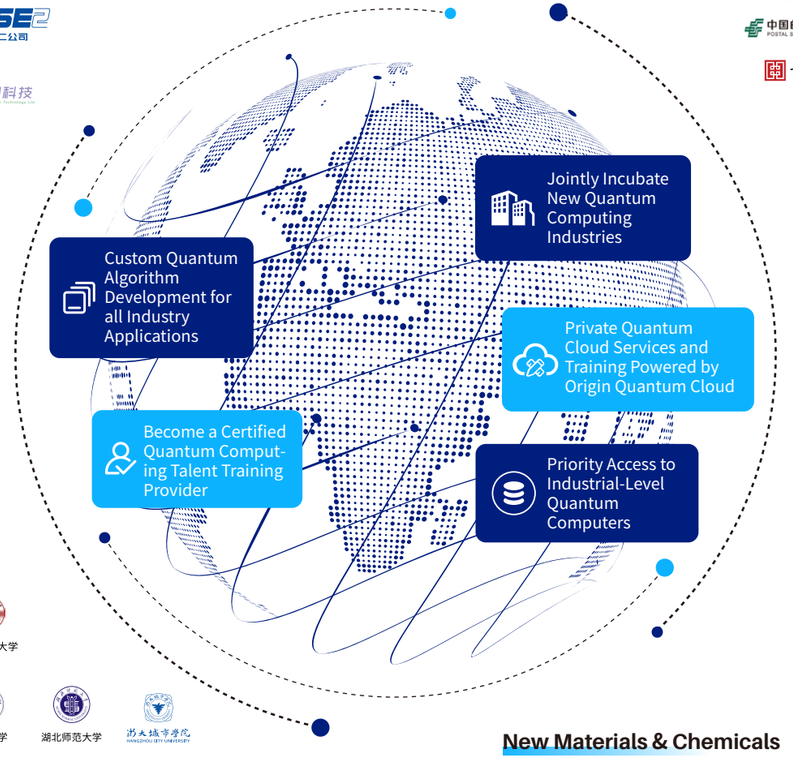
浙江金融职业学院 蚌埠医科大学 合肥师范学院 上海城建职业学院 吉林工程技术师范学院 韶关学院 拉合尔管理科学大学 CCF量子计算专业委员会 安徽省量子计算工程研究中心


Custom Quantum Algorithm Development for all Industry Applications
Jointly Incubate New Quantum Computing Industries
Private Quantum Cloud Services and Training Powered by Origin Quantum Cloud
Become a Certified Quantum Computing Talent Training Provider
Priority Access to Industrial-Level Quantum Computers

Quantum Computing Application Ecosystem Alliance

Finance

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中国邮政储蓄银行 中国光大银行 中信银行 中国民生银行 平安银行 太平洋保险 东方证券

华安期货 滨湖金融小镇 翼支付 中国平安 上海技术交易所 红馬投资集团 天阳科技

AI & Big Data

云从科技 leinao 中科类脑 星汉数智 合肥市大数据资产运营有限公司 EDREAM FITBR

哈工大机器人集团 中科智驰 JUCHE EACOMP 屹良 合肥智能机械研究所 华途智能网联产业技术研究院 DOMANSMART 喜拓信息

熙菱信息 中兵数科 浙文智算(浙江)科技有限公司 玖铭远扬(北京)信息科技有限公司

Biomedicine

瑜海博兴 BIOX-VISION 金斯瑞生物科技 科丞智能健康 LTHINK MEDICAL INSTITUTE 华大生命科学研究院 BGI·Research

gentum 长泰药业 PharmaMax 中国·眼谷 Eye Valley

Computing Power Platforms

移动云 国家超级计算郑州中心 江西省科技基础条件平台中心

CCDC 甘肃省计算中心 国超集团 Gopha 笑湖大数据 华超数据谷 巢湖明月

Support Services

ALLBRIGHT 智天链 中新动能

New Materials & Chemicals

Dymatic 德美 天原集团 CKS 科顺 龍華 Longhua

Telecom Operators

中国联通 China unicom

Electric Power

SGIT 国网信通股份公司 安徽继远软件有限公司

Aerospace

星际原点航天科技(上海)有限公司

Others

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