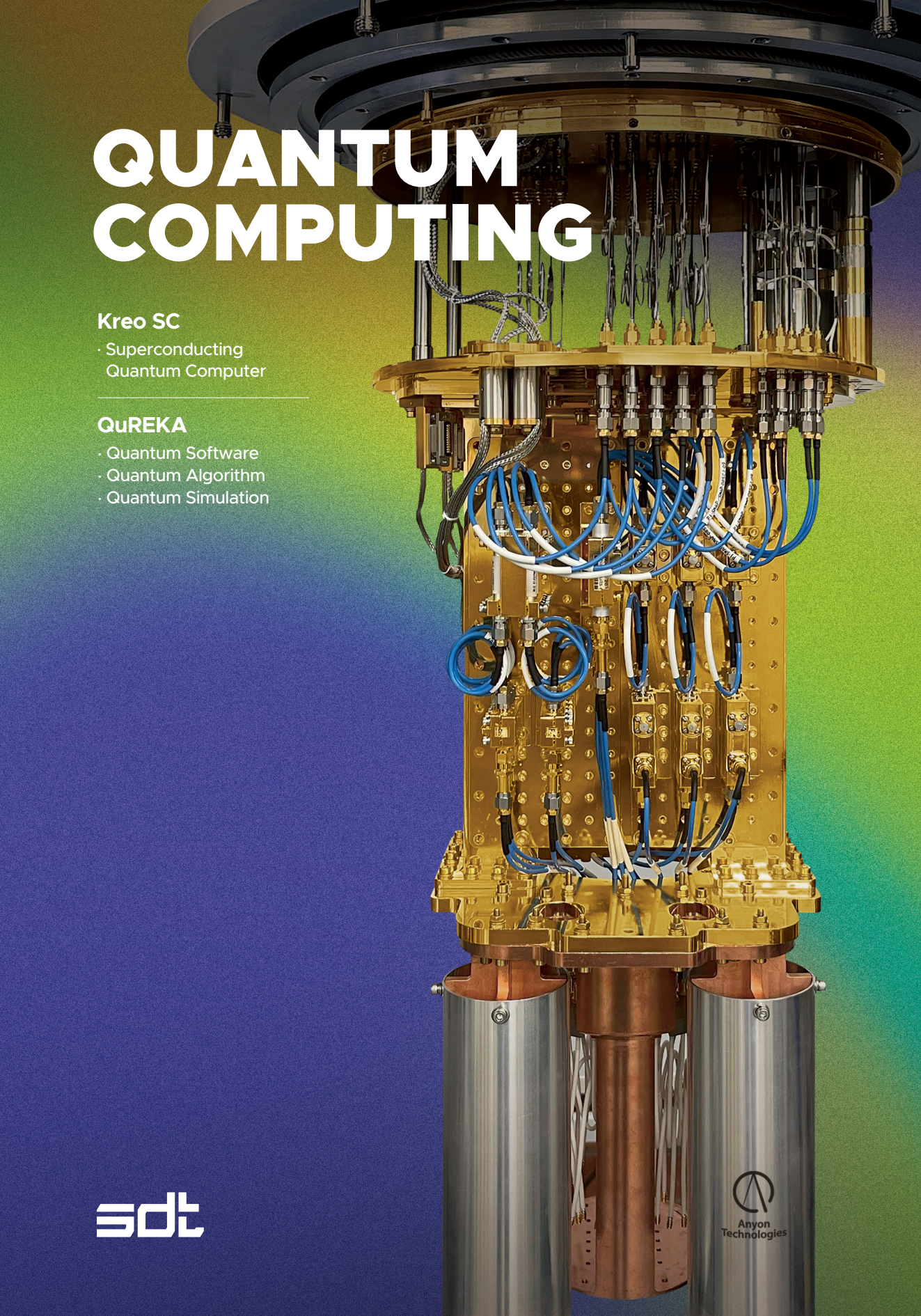


QUANTUM COMPUTING



Kreo SC

- Superconducting
Quantum Computer

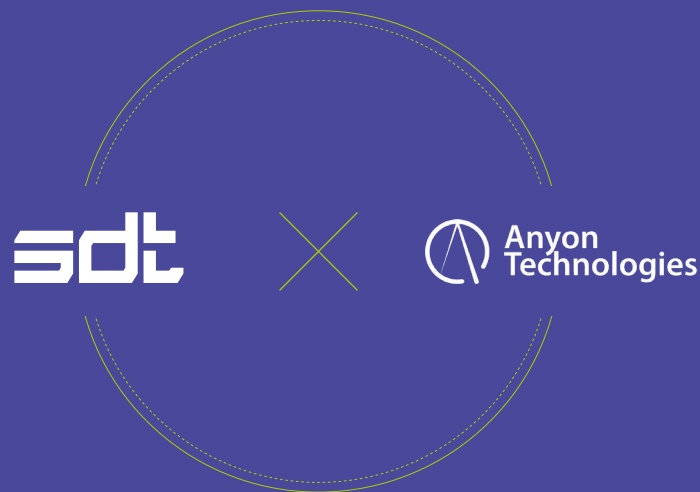
QuREKA

- Quantum Software
- Quantum Algorithm
- Quantum Simulation



Quantum Computing

SDT provides comprehensive quantum computing solutions with unparalleled expertise, incorporating superconducting QPUs from Anyon Technologies, as well as cryogenic manufacturing technologies and integrated computing platforms developed in-house.



Main Advantages

- 01

High-Performance Superconducting Quantum Processor

- **20-qubit superconducting transmon QPU**, ensuring stable, high-performance quantum computing
 - **Modular design**, customizable for diverse industrial needs
 - **Optimized Software Framework**, optimizing quantum algorithm development and deployment
- 02

Cryogenic Technology

- **Helium-3 dilution cooling system**, maintaining 10mK ultra-low temperatures for stable quantum operations
 - **Gold-plated shielding technology**, preventing signal degradation and reducing noise for precise data processing
- 03

Quantum Computing Platform, QuREKA

- **Intuitive and user-friendly interface**, enabling seamless execution of quantum algorithms and applications
 - **Integrated quantum and classical computing management**, with real-time system monitoring capabilities
 - **Cloud-connected hardware and software** reduce manual effort through seamless device orchestration and automation

Kreo SC : SDT Quantum Computing System

The SDT quantum computing system Kreo SC is a groundbreaking solution that combines cutting-edge 20-qubit QPU technology with a highly scalable architecture, redefining the future of quantum computing and positioning Kreo SC as the benchmark for innovation in the field.



20-Qubit QPU	Superconducting Transmon (4-8 GHz), 44L Package
Cryogenic Shielding	Gold-plated, oxygen-free copper with cold finger
Quantum Control Electronics	56 DAC, 10 ADC channels, 33 synchronized oscillators
Parametric Amplifier Array	5-channel quantum amplification
LTS400 Dilution Cooling System	Helium-3 cooling, 10 mK temperature
Signal Routing	RF signal filtering, amplification, and thermal control

Options		
Qubit Expansion	Expandable QPU	From 20 qubits to 50, 100, or more.
	Qubit Controller Unit	Precise control and state maintenance.
Advanced Control	Pulse Generator Unit	High-frequency pulse generation.
	Time Tagging Measurement Unit	Time sync and precision measurement.
	Coincidence Counting Unit	Quantum state validation and analysis.
Advanced Cooling	Performance Upgrade	Supports below 10 mK temperatures.
	Stabilization Technology	Ensures long-term cooling stability.
Customization	Software Integration	Seamless with customer environments.
	API Support	Workflow optimization.
	Custom Software	Tailored features for specific needs.

Benefits

Kreo SC : A Quantum Computing Solution Perfected Through SDT's Vertical Integration

SDT seamlessly combines innovation with manufacturing excellence, delivering fast, reliable, and cutting-edge quantum computing solutions. Through unified management of development, production, and distribution, we maximize efficiency and quality at every step. With proprietary technologies and world-class manufacturing expertise, SDT sets a new standard for quantum computing solutions.

01

Leading Scalable Quantum Computing



Scalable

- Superconducting systems with top-tier 2-qubit fidelity and entanglement gates.
- Modular architecture with multi-chiplet scalability.
- qLAN technology for large-scale quantum infrastructure.
- Multi-chiplet QPU design for high performance and scalability.

User-Centric

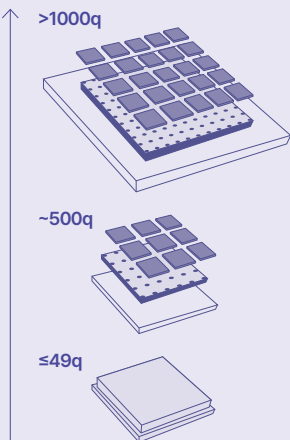
- Comprehensive direct support for end-users and developers.
- User-friendly environment with tailored assistance for diverse needs.

Deployable and Sustainable

- Efficient production system enabling rapid, cost-efficient delivery of tailored solutions.
- Tailored supply network designed for smooth implementation and ongoing reliability

02

Unlocking the Modular Quantum Computing



Scalability and Large-Scale System

- Networked multi-QPU systems enable large-scale quantum computing
- Scalable qubits boost computational power with modular design
- Nodes operate independently, allowing QPU replacement and upgrades

Yield Optimization and Performance Stability

- Minimized yield loss with modular maintenance at the unit level.
- Qubit-photon and qubit-qubit entanglement ensures result sharing and system stability.
- Maintains error resistance and performance during node expansion.

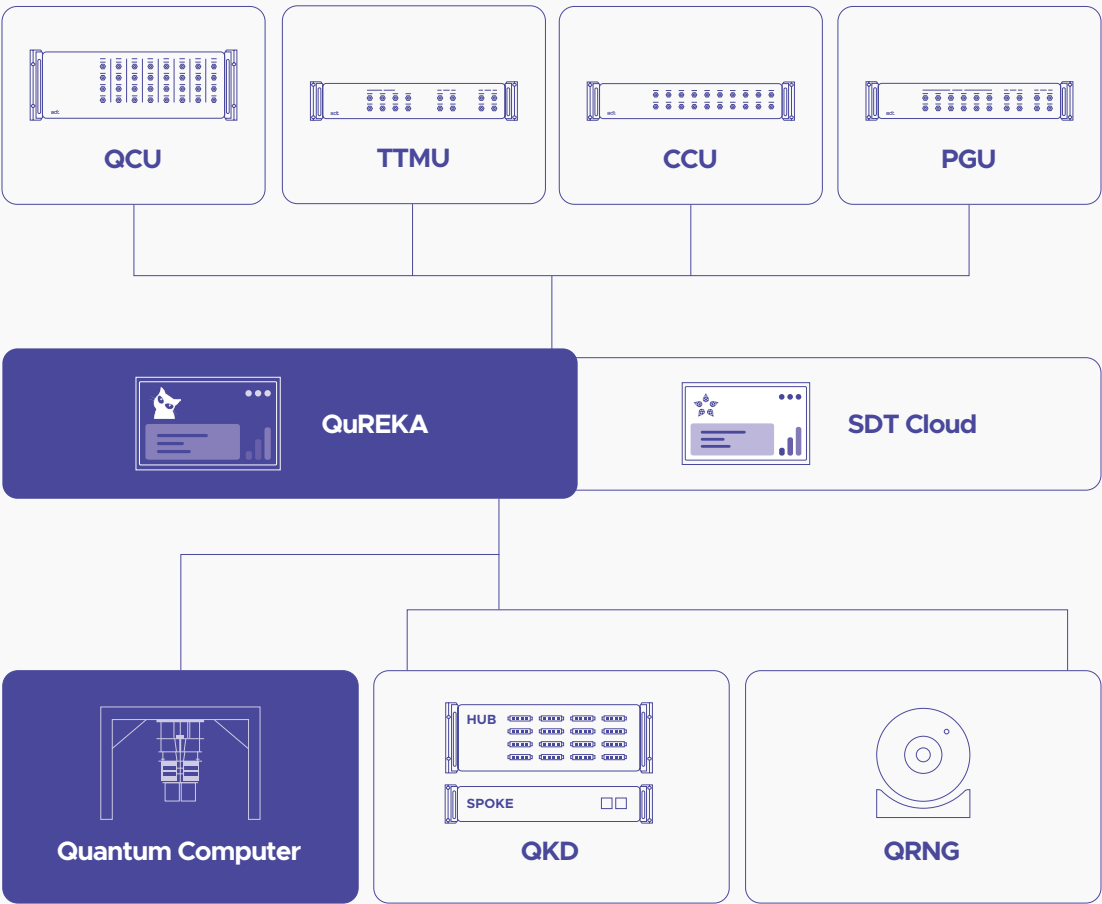
Distributed Quantum Computing and Cost Efficiency

- Modular maintenance minimizes yield loss
- Qubit-photon and qubit-qubit entanglement ensures result sharing and system stability
- Error resistance and performance remain during expansion

SDT Quantum Ecosystem

SDT Integrated Quantum Computing Ecosystem

Centered on QuREKA, SDT integrates computing and communication technologies to deliver complete quantum solutions, ensuring performance, scalability, and driving innovation in research and applications.



- **QCU** (Qubit Controller Unit)
Precise control and state maintenance for qubits
- **TTMU** (Time Tagging Measurement Unit)
Accurate time tagging and synchronization for qubit operations
- **CCU** (Coincidence Counting Unit)
Reliable control in cryogenic environments
- **PGU** (Pulse Generator Unit)
High-precision pulse generation for quantum gates
- **QuREKA**
Unified platform for experiment and data management
- **SDT Cloud**
Infrastructure for connecting and orchestrating quantum and classical devices
- **QKD / QRNG**
Secure technologies for quantum communication
- **Quantum Computer**
Scalable quantum operations and algorithm support

QuREKA : SDT Quantum Innovation Platform

Connecting Quantum Computing

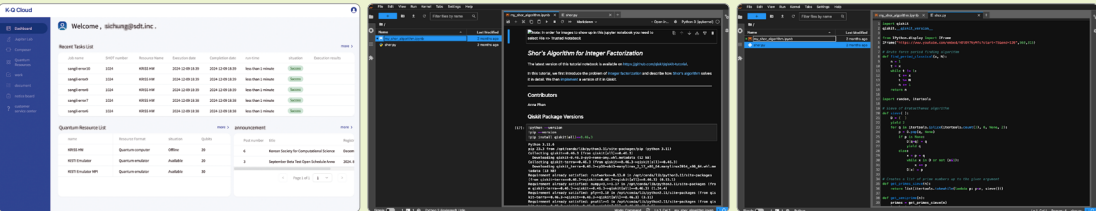
QuREKA simplifies complex quantum operations with seamless control and execution, supporting algorithm development, task management, and resource optimization to empower businesses and researchers.

Benefits



Algorithm Store & Task Management	Instant execution with real-time monitoring and task management
Experimental Environment & Development Tools	Python and API integration for flexible data handling
Resource Management & Optimization	Automated quantum resource optimization and real-time monitoring from KISTI, KRISS, SKKU, and more
Data Management & Analytics	Efficient analysis, storage, and management using Python and API tool
Platform Accessibility & Flexibility	Global access for experiments and data retrieval with reusable settings for streamlined workflows

Dashboard



References

Silicon Spin Qubit Research

Challenges	Silicon spin qubits are highly compatible with semiconductor technology, making mass production feasible and attracting academic interest. However, University S faced issues with frequent initialization due to single-electron setup and short coherence times. Inefficient data transfer and lack of compatibility caused difficulties with manual data conversion.
Solutions	• Remote Experiment Control Controlled fine voltage regulators and lock-in amplifiers remotely using QuREKA. • Automated Data Management Automatically stored experimental data in the cloud and enabled direct Python analysis without conversion. • Enhanced User Convenience Improved efficiency with real-time equipment monitoring, automated repetitive settings, and integrated data access.
Results	With QuREKA, experiment setup and initialization became more efficient, while data management gained consistency and accessibility.

Multi-Equipment Integrated Research

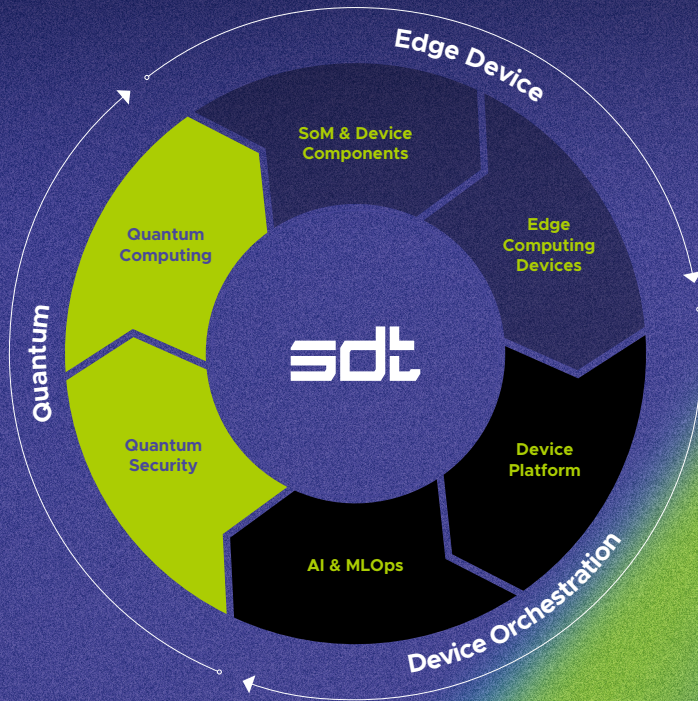
Challenges	Managing multiple devices simultaneously led to inefficiencies in individual control and data management.
Solutions	• Real-Time Monitoring Monitor equipment status and control devices remotely through a dashboard. • New Device Integration Easily add and configure new devices via the dashboard. • Unified Data Management Automatically collect and store experimental data with instant Python compatibility.
Results	With QuREKA, researchers efficiently controlled their experimental environment remotely, streamlined data collection and analysis, and managed complex multi-device experiments seamlessly.

Orchestration

Solving Compatibility Issues Effectively addresses software mismatches and data conversion challenges.	Efficient Experiment Management Automates setup and equipment control, saving time and resources.
Ensuring Data Reliability Improves consistency and accessibility, enhancing data reliability.	Ensuring Data Reliability Allows flexible addition of devices and configurations to expand the experimental environment.

Harnessing Quantum Computing Power for Your Operations

SDT leverages cutting-edge quantum computing technology to process and compute complex data faster and more accurately than ever, maximizing efficiency for both businesses and research.



QRNG IP Camera
Quantum Communication



Quantum Control Devices
Quantum Computing



Quantum Dot Sensor Camera
Quantum Sensing

SDT Inc. | Quantum Computing Brochure

info@sdt.inc · (+82)2 3453 7494

10F, 5, Teheran-ro 44-gil, Gangnam-gu, Seoul,
Republic of Korea 06211

This information is subject to change without notice.

©SDT Inc., January 2025



<https://sdt.inc/en>