

Specifications



| | |
|----------------------------------|---|
| Input Channels | 2 |
| Output Channels | 6 |
| Signal Bandwidth | > 1 GHz |
| Input Frequency Range | 10 MHz to 8.5 GHz |
| Output Frequency Range | 10 MHz to 8.5 GHz |
| Input Power Range | -40 dBm to +5 dBm |
| Output Power Range | -40 dBm to +5 dBm |
| Input Impedance | 50 Ω |
| Output Impedance | 50 Ω |
| D/A Conversion Resolution | 14-bit, 9.85 GSa/s |
| A/D Conversion Resolution | 14-bit, 2.5 GSa/s |
| Interfaces | SMA Female on front panel for control and readout LAN/Ethernet, Gigabit USB 3.0 |
| Power Supply | AC 100–240 V, 50/60 Hz |

Key Features

- Supports signal frequency range up to 8.5 GHz for high-fidelity qubit control and measurement
- Supports up to 6 Direct Digital Synthesis (DDS) DAC channels per device
- Applicable to superconducting, neutral atom, and diamond NV center qubit platforms
- Modular architecture enables flexible expansion of RF channels
- Enables remote qubit control and monitoring through cloud-based operation
- Provides a comprehensive Python library for streamlined workflow integration
- Built on SDT's proprietary patented IP, the system can be optimized for specific user environments

Introduction

The Qubit Controller Unit (QCU) delivers exceptional precision and reliability for qubit control and measurement, making it a core component of reliable quantum computing systems. Operating at frequencies up to 8.5 GHz, the QCU utilizes up to six RF channels per unit to flexibly support qubit control and readout, supporting the execution of advanced quantum algorithms and error-correction protocols.

Its integrated cloud capabilities allow for seamless remote operation and effortless channel scalability, streamlining workflows for both research institutions and commercial quantum platforms. Built on SDT's proprietary patented technology, the QCU offers flexible, customizable solutions for a wide range of quantum computing applications.

Certifications

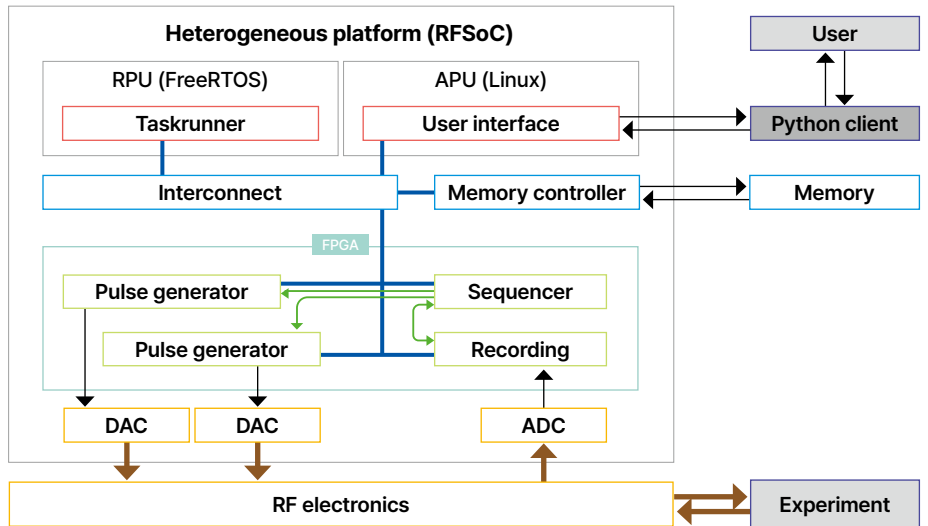
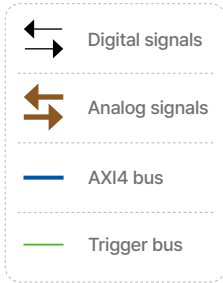


KC Certification
R-R-2Dt-SDT-Q-QCU-100



KC Test
DST-25E-2395

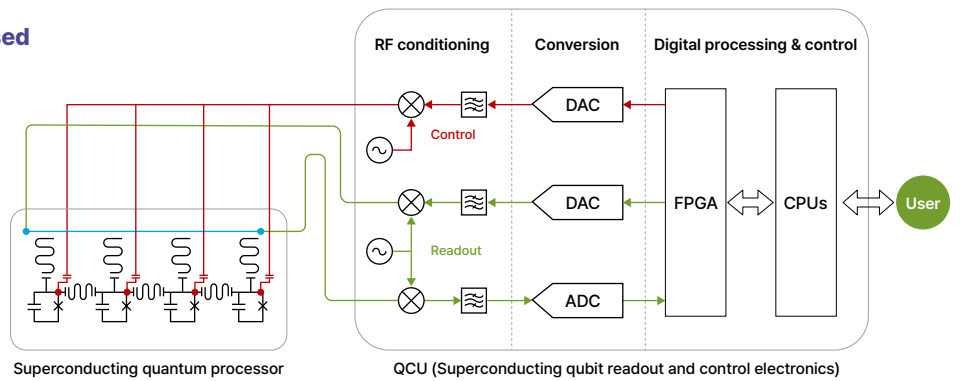
Functional Description



Applications

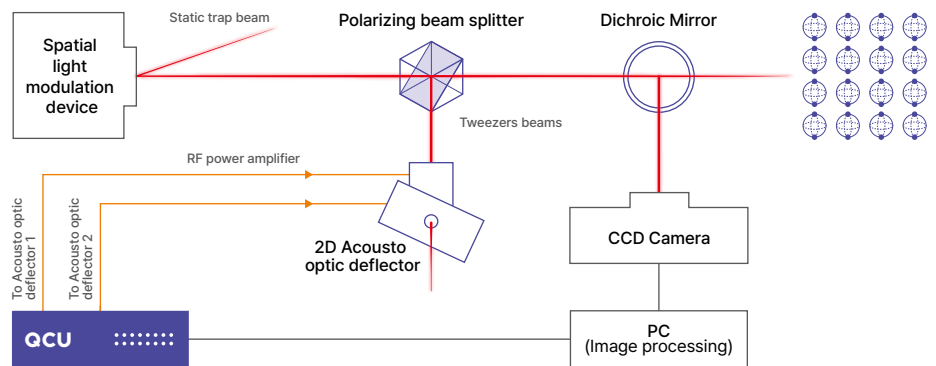
• Cryogenic microwave-based quantum computing

Generates and measures multi-GHz I/Q signals for superconducting and spin quantum computing systems



• Atomic and ion-based quantum computing

Operates as a high-performance AOM/AOD driver for neutral atom and trapped-ion quantum computing systems



Compatibility

- SDT's CryoRack, TTMU, PGU, and CCU
- Third-party qubit platforms, commercial quantum processors, and a broad range of quantum control devices
- C, C++, and Python (3.0 or higher)

