

QUANTUM COMPUTING

THE NEXT INDUSTRIAL REVOLUTION

CUTTING EDGE EFFORTS in physics, chemistry, and mathematics are at the core of quantum research, enabling the successful creation of quality qubits. But this requires high precision synchronization and calibration to maintain qubit coherence for as long as possible and keep error rate as low as possible.

WITH TEKTRONIX PRECISION SIGNAL GENERATION, complex measurement capability, and applications expertise, your next scientific breakthroughs and quantum innovations are more possible than ever.

Qubit Control

Qubit control (of superconducting qubits) requires complex (pulsed microwave) signals that are extremely stable and ultra-low noise to operate across multiple, highly synchronized channels.

[Tektronix high precision arbitrary waveform generators \(AWGs\)](#) provide superior signal fidelity with ultra-low noise designs that also provide superior sample rate, and waveform memory, making it ideal for qubit design experiments and systems. You can also choose from a full suite of waveform generation plugins for creating scripts in software such as MatLAB or Python to automate test setups.



Precision Calibration and Synchronization

Superconducting quantum bit controllers is based on wideband, coherent, multi-channel architecture. But traditional methods have posed major limitations due to calibration complexity and system cost. A new class of high-speed digital-to-analog converters (DACs) has emerged to enable multi-channel synchronization and calibration at a significantly lower cost. [Tektronix AWG5200 Series Arbitrary Waveform Generators](#) utilize these DACs to directly synthesize complex signals at microwave frequencies and offer up to eight synchronized channels per instrument. Also, with Tektronix patented waveform

generation, the output waveform can be pre-compensated to remove analog effects that are part of the signal path of the DUT being tested.



Qubit Readout and Measure

To extract the highest fidelity qubit readout, precise synchronization that provides low latency and low noise across a high dynamic bandwidth range is essential. As the number of qubits and channels increases, there is a need to scale with a more integrated, reliable electronic control solution to achieve quantum's computational potential. A high-speed digitizer can capture fast-changing electrical signals using Analog to Digital Converters and then store the digitized waveform data in fast memory. [Tektronix low-profile digitizers](#) offer high speed, accurate, and repeatable readout measurements every time.

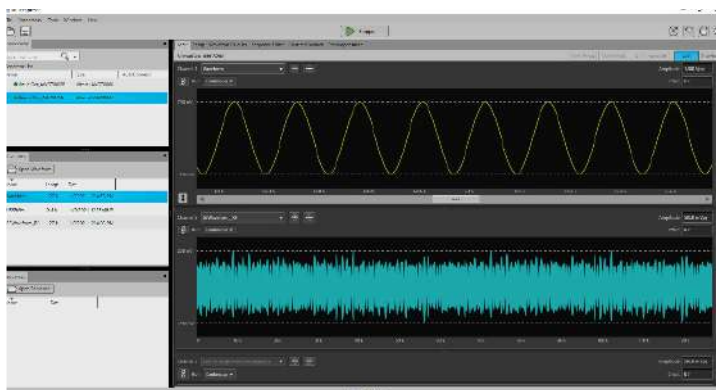


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CALIBRATION SOFTWARE

Quantum feedback is used in applications such as rapid qubit initialization, quantum state stabilization, and quantum error correction. Tektronix offers software tools that help you navigate through the complex task of calibrating and synchronizing the most challenging quantum experiments.



TOTAL PRODUCT PROTECTION

Save time, money, and hassle with a multi-year Total Product Protection plan.

INSTRUMENT CALIBRATION

Ensure that your results are accurate and maintain compliance with factory certified calibration from Tektronix.

Pre-compensation Plug-in Software

The pre-compensation software plug-in for the AWG5200 Series provides an automated method to characterize the frequency response of the AWG along with any added external components over a given center frequency and bandwidth and subsequently generates the FIR filter coefficients to get flat frequency and linear phase response.

API Software / Data Management

[TekDrive](#) is a cloud-based, data sharing and management web application for test and measurement that provides a secure location to store, share, and collaborate on waveform and analysis data. TekDrive lets you visualize data on a browser and easily share information between researcher – securely.

Advanced Remote Instrument Control and Waveform Generation

The [SourceXpress](#) platform brings AWG instrument control and waveform generation capabilities to your PC. Load waveforms, create sequences, and enable playback without even touching an AWG. All waveform creation plug-ins run natively on the SourceXpress platform, allowing you to quickly iterate through test signals remotely.

Multi-Channel Synchronize & Remote Control with TekScope

Synchronize, view, and analyze up to four instruments using a remote PC and Tektronix [TekScope Multi-Scope Software](#).

LEARN MORE ABOUT ADVANCED RESEARCH SOLUTIONS FOR QUANTUM COMPUTING.

