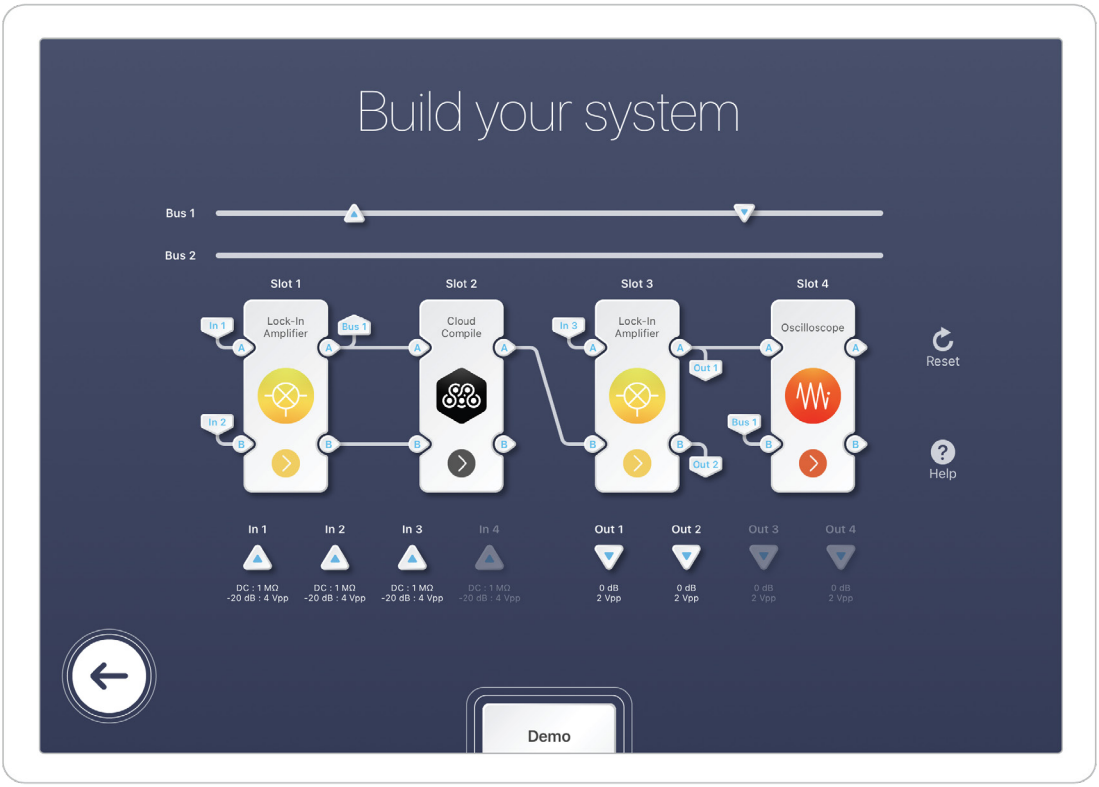
Multi-Instrument Mode

Build your customized test system on Moku:Pro

Multi-instrument Mode on Moku:Pro allows users to run up to four instruments simultaneously to create custom test sequences. Each instrument has full access to the analog inputs and outputs along with adjacent instrument slots. The slots are connected by a low-latency, real-time 30 Gb/s signal path, so instruments can run independently or be connected together to build sophisticated signal processing pipelines. Instruments can be dynamically swapped in and out without interrupting adjacent instruments. Advanced users can deploy their own custom algorithms in Multi-instrument Mode using Moku Cloud Compile.



Hardware Highlights

- 0.3 ppm stability onboard clock
- < 650 ns input-to-output latency

Analog Front-end

Four Analog Inputs

- 10-bit and 18-bit ADCs with frequency-dependent blending
- 1.25 GSa/s sampling rate
- Input noise: 30 nV/√Hz at 100 Hz
- 300/600 MHz analog bandwidth
- AC or DC coupling, 50 Ω or 1 MΩ input impedance
- 400 mVpp, 4 Vpp, or 40 Vpp input range

Four Analog Outputs

- 16-bit, 1.25 GSa/s DACs
- 10 Vpp at < 100 MHz, 2 Vpp at < 500 MHz

Deployable Instruments

- Arbitrary Waveform Generator
- Moku Cloud Compile
- Data Logger
- Digital Filter Box
- Frequency Response Analyzer
- Laser Lock Box
- Lock-in Amplifier
- Oscilloscope
- Phasemeter
- PID Controller
- Spectrum Analyzer
- Waveform Generator

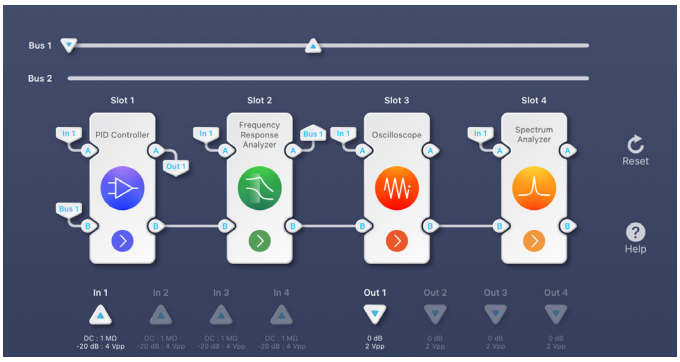
Applications

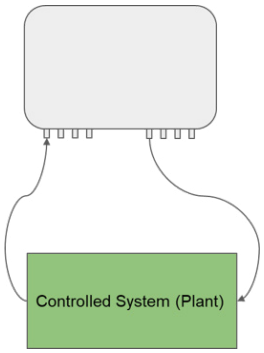
- Automated test sequence
- System prototyping and simulation
- Closed loop control design
- Optical metrology and spectroscopy
- Control hub for optics, imaging, and other custom-made systems
- Quantum computing

Application Highlights

Low-latency closed-loop control design and characterization

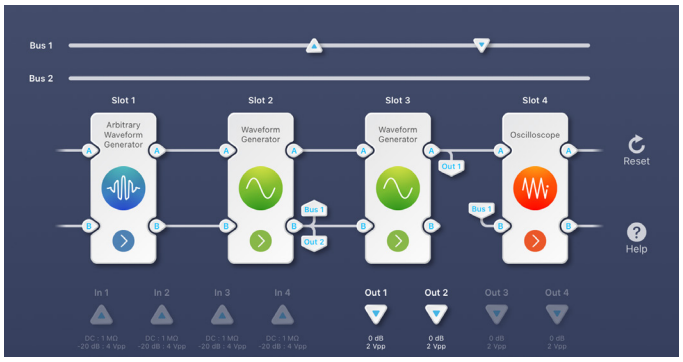
Moku:Pro's PID Controller provides a sub-µs input-to-output delay, ideal for high-speed closed-loop controller applications. The controller's transfer function and impulse response can be observed and measured in real-time by adding a Frequency Response Analyzer using Multi-instrument Mode. The system's response can also be measured in both time and frequency domains using the Oscilloscope and Spectrum Analyzer. Any adjustments in the controller are reflected in real-time in the monitoring instruments.

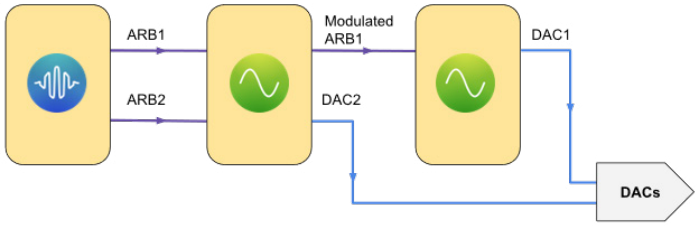




Generate signals with arbitrary modulation

Combine the Arbitrary Waveform Generator with multiple Waveform Generators to output high-stability complex signals. Arbitrary waveforms can be connected to the input of the Waveform Generators as the modulation source. Frequency, phase, and amplitude modulation can also be added to the signal. This removes the look-up table calculations and provides better control over the modulation and output signal. An Oscilloscope or Spectrum Analyzer can also be added to one of the slots to measure the signals.





Multi-demodulator Lock-in Amplifier

Moku:Pro's Multi-instrument Mode allows up to four Lock-in Amplifiers to run simultaneously. Each of the Lock-in Amplifiers can demodulate the signal at the fundamental, second, or higher harmonics. Measured R/θ or X/Y components from each of the Lock-in Amplifiers can also be compared in the Oscilloscope in the final instrument slot, or driven to the analog outputs.