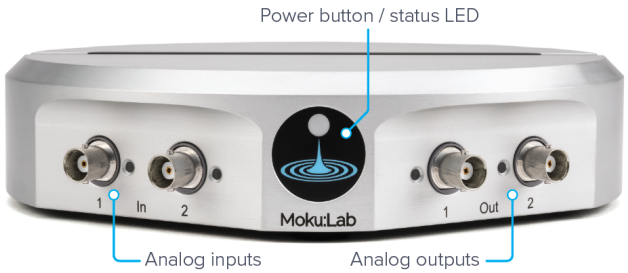
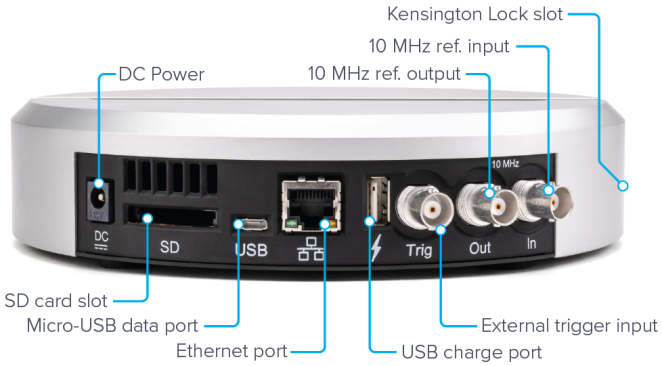
Moku:Lab

Twelve Instruments, One Hardware Platform

Moku:Lab is a reconfigurable hardware platform that combines the digital signal processing power of an FPGA with versatile analog inputs and outputs. This simplifies your workflow by giving you access to 12 high-performance instruments that enable you to measure what you need when you need. The analog front-end is designed for maximum versatility. Its two 500 MSa/s inputs can be configured for AC or DC coupling, 50 Ω or 1 MΩ impedance, and an input voltage range of 1 Vpp or 10 Vpp. Moku:Lab also features two 1 GSa/s outputs with 300 MHz anti-aliasing filters, allowing you to generate two high-precision waveforms while measuring on its inputs. Powered by the Xilinx Zynq 7000, Moku:Lab provides unprecedented flexibility for your test and measurement workflow.





Analog Inputs	Input Bandwidth	Analog Outputs	Output Bandwidth	Onboard FPGA
2-channel, 500 MSa/s	**200 MHz**	**2-channel, 1 GSa/s**	**300 MHz**	**Xilinx Zynq 7000 Series**

12 Powerful Instruments

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

Highlights

- Better than 30 nV/√Hz noise performance above 100 kHz
- 500 ppb stability onboard clock
- < 1 µs input to output latency
- Class-leading, multi-touch user interface with the option for wireless connection

Specifications

Two Analog Inputs

- 12 bit, 500 MSa/s ADCs
- 200 MHz input bandwidth
- AC or DC coupling
- 50 Ω or 1 MΩ input impedance
- 1 Vpp or 10 Vpp input range

Two Analog Outputs

- 16 bit, 1 GSa/s DACs
- ± 1 V output range into 50 Ω

Additional I/O

- Dedicated trigger input
- 10 MHz synchronization in and out
- Onboard Wi-Fi, Ethernet, and USB
- SD Card for data storage

Programming Environment

- API support for Python, MATLAB, and LabVIEW

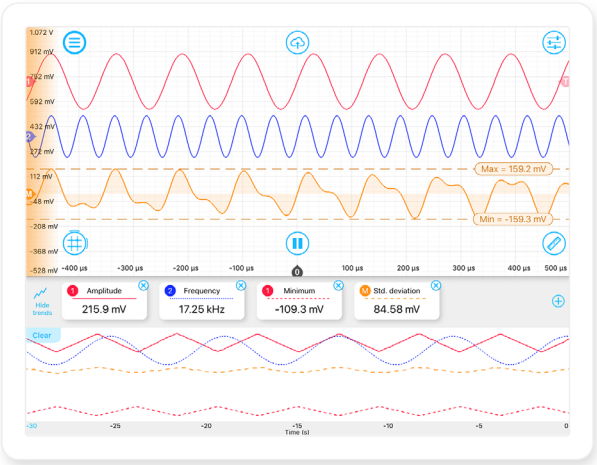
Applications

- Signal monitoring and analysis
- Automated test sequence
- Circuit design and characterization
- Frequency domain signal analysis
- Complex impedance measurement
- System prototyping and simulation
- Closed loop control design
- Optical metrology and spectroscopy

For full specifications, please visit www.liquidinstruments.com

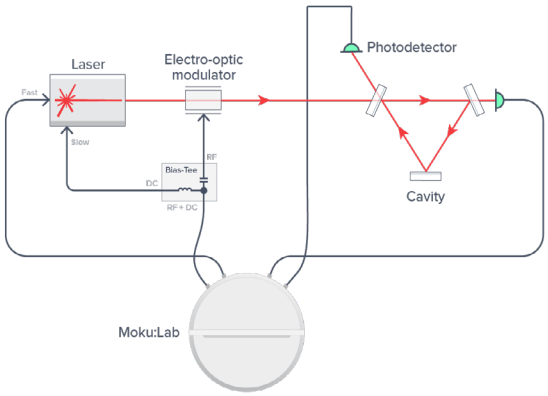
Intuitive User Interface

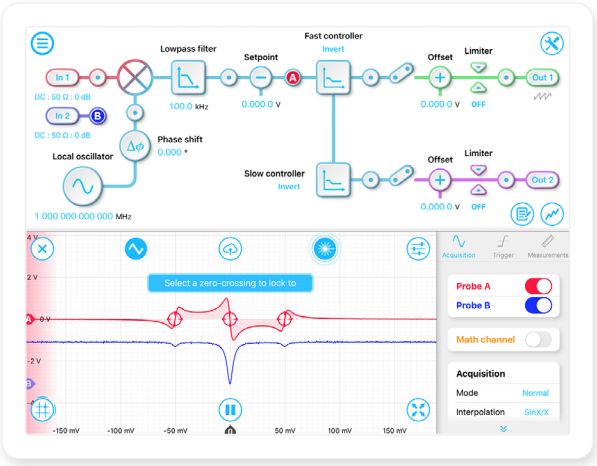
Moku:Lab's iPad App is designed to elevate the user experience, streamline workflows, and maximize productivity. Each instrument shares common elements and integrations to ensure working with the instruments is easy and intuitive. Touch-and-zoom capabilities bring a more dynamic and interactive experience to test and measurement. In addition, Python, MATLAB, and LabVIEW API support takes Moku:Lab hardware to the next level, turning it into an automated test, measurement, and control device for your lab.



Integrated Laser Lock Box

The Pound-Drever-Hall (PDH) technique is a widely used method to match the emitting optical frequency of a laser to an optical cavity. When laser light is directed into a cavity, it is reflected, transmitted, or absorbed. The closer the length of the cavity is to a precise number of half wavelengths of the laser, the more of the laser's energy is transmitted. PDH locking uses light reflected from the cavity to create an error signal that can be used to make small changes in either the length of the cavity or of the frequency of the laser so that they remain matched and transmission is maximized. To perform PDH locking, several dedicated and custom-made electronic instruments are required including signal generators, mixers, and low pass filters. Moku:Lab's Laser Lock Box integrates most of the PDH electronics into a single, compact, easy-to-use instrument which provides high-precision laser frequency locking.





200 MHz Lock-in Amplifier

Moku:Lab's digital Lock-in Amplifier supports dual-phase demodulation (XY/RΘ) from DC to 200 MHz, with more than 120 dB of dynamic reserve. Demodulatino signals can be generated by the onboard waveform generator or from an external signal. The two high-speed analog outputs can be assigned to output X, Y, R, θ, and local oscillator to drive an external device. The built-in probe points allow you to monitor and log the signal at various DSP stages. Optional PID controllers are available for closed-loop control and phase-locked loop applications.