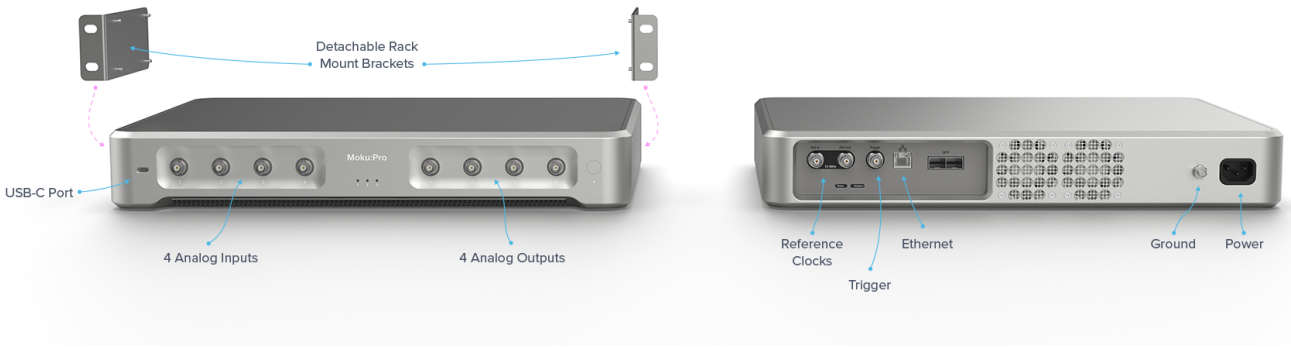
# Moku:Pro

## The Ultimate Test and Measurement Solution

Moku:Pro combines high-performance hardware with the versatility of software-defined instrumentation to deliver the ultimate test and measurement solution. A powerful Xilinx Ultrascale+ FPGA is coupled with a high-bandwidth analog front-end and robust networking and storage. Moku:Pro's suite of software-defined instruments support high speed data acquisition, processing and visualization, waveform generation, and real-time control applications. An innovative hybrid front-end design performs frequency-dependent signal blending from multiple ADCs, delivering exceptional noise performance from acoustic to radio frequencies.




| Analog Inputs | Input Bandwidth | Analog Outputs | Output Bandwidth | Deep Memory & Storage |
|---|---|---|---|---|
| **4 channel, up to 5 GSa/s** | **Up to 600 MHz** | **4 channel, 1.25 GSa/s** | **Up to 500 MHz** | **120 GB SSD** |

## 11 Powerful Instruments

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

## Hardware Highlights

- Exceptional low-frequency noise performance: 500 µV RMS noise at full input bandwidth
- 0.3 ppm stability onboard clock
- < 650 ns input to output latency

## Specifications

**Four Analog Inputs**

- 10-bit and 18-bit ADCs with frequency-dependent blending
- 5 GSa/s sampling rate with 1 channel, 1.25 GSa/s with 4 channels
- Input noise: 30 nV/√Hz at 100 Hz
- User selectable 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
- ± 1 V up to 500 MHz, ± 5 V up to 100 MHz

**Additional I/O**

- Dedicated trigger input
- 10 MHz reference input and output
- Onboard Wi-Fi, Ethernet, and USB-C
- 120 GB high-speed SSD

**Programming Environment**

- API support for Python, MATLAB, and LabVIEW
- Class-leading, multi-touch user interface
- Windows and Mac app available

## Applications

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

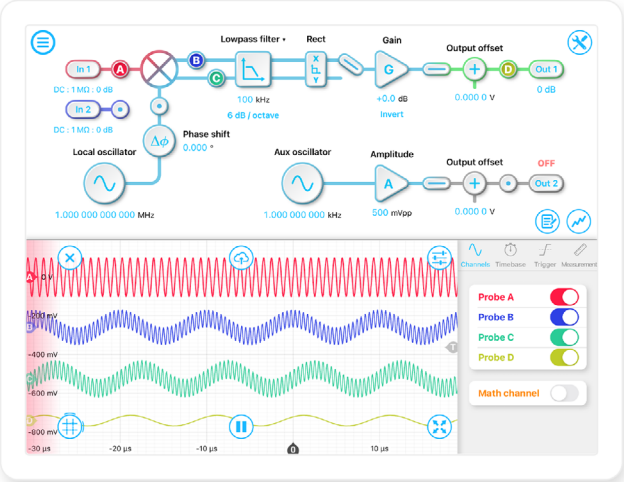
For full specifications and ordering please contact sales@liquidinstruments.com

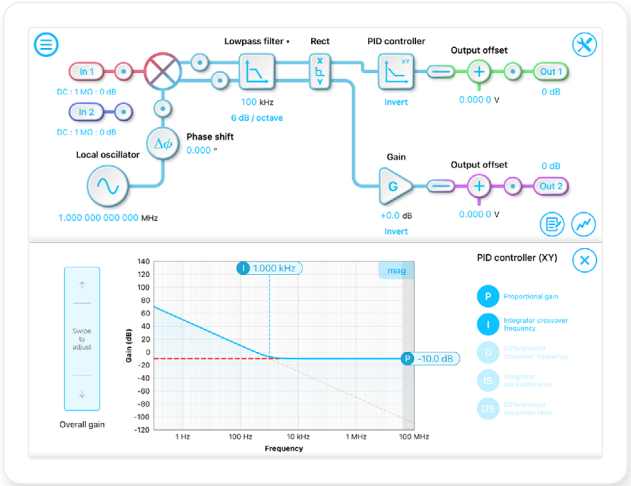
# Multi-Instrument Mode

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 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.


# 600 MHz Lock-in Amplifier

Moku:Pro's digital Lock-in Amplifier supports dual-phase demodulation (XY/RΘ) from DC to 600 MHz, with more than 120 dB of dynamic reserve. Local oscillators can be generated by its onboard waveform generator or an external device. Blended ADC technology provides a low noise floor across the entire 600 MHz input bandwidth. The built-in probe points allow you to monitor and log the signal at various stages of signal processing. A PID controller can be used for closed-loop control and phase-locked loop applications.




# Blended ADCs

Moku:Pro is equipped with a 10 MSa/s, 18-bit ADC and a high-speed, 5 GSa/s 10-bit ADC. With the powerful FPGA, the system combines the information from the ADCs, providing class-leading input noise performance over the entire 600 MHz bandwidth. Our innovative blending algorithm ensures that the signal-to-noise ratio is optimized across all Fourier frequencies without impacting latency, or signal bandwidth.