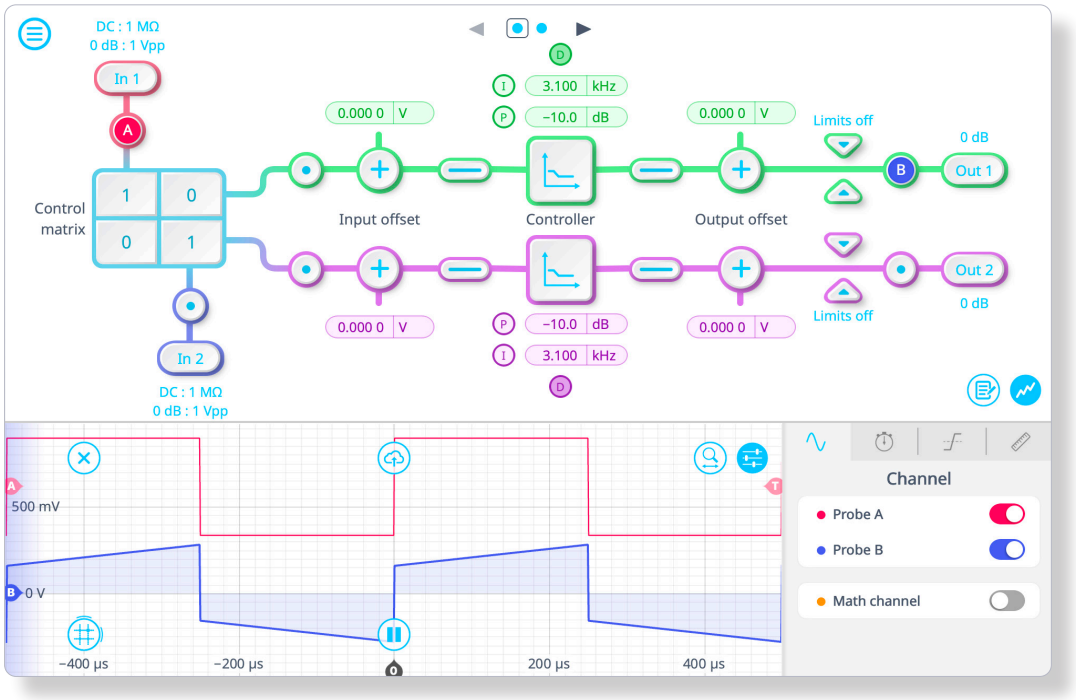
Moku:Delta Instrument Datasheet

PID Controller

The Moku:Delta PID Controller features four fully configurable PID controllers with MIMO support, sub-microsecond latency, and real-time control loop shaping. Each channel operates at 5 GSa/s with input-to-output latency under 1 µs and an ultra-low noise floor below 10 nV/√Hz. Designed for precision and performance, Moku:Delta enables advanced multi-loop feedback control for applications such as laser stabilization, active alignment, and dynamic system regulation.



Versatile input	Proportional gain	DAC resolution	Input-output latency	Gain configuration	Advanced mode
4 inputs with MIMO	**-60 dB to 60 dB**	**14-bits**	**< 1 µs**	**Real time**	**Multi-section builder**

Features

- 4 input channels, 4 output channels, and 4 independent PID Controllers with control matrix for MIMO
- Design your control system's frequency response using the interactive Bode plot in real time
- Block diagram view of the digital signal processing chain with built-in Oscilloscope probe points for real-time signal monitoring
- Advanced multi-section PID builder with single or double integrators and differentiators with low- and high-frequency gain saturation

Specifications

- Input voltage range: 100 mVpp, 1 Vpp, 10 Vpp, or 40 Vpp
- Control matrix linear gain: ± 0.1 to ± 20
- Input offset range: ± 500 mV
- Output offset range: ± 500 mV
- Offset precision: 100 µV
- Voltage limiter range: -500 mV to 500 mV
- Gain profiles: Proportional (P), integral (I), differential (D), double-integral (I+), integral saturation (IS), differential saturation (DS)
- Proportional gain: -60 dB to 60 dB
- Integrator crossover frequency: 3.125 mHz to 3.125 MHz
- Differentiator crossover frequency: 3.125 Hz to 31.25 MHz

Applications

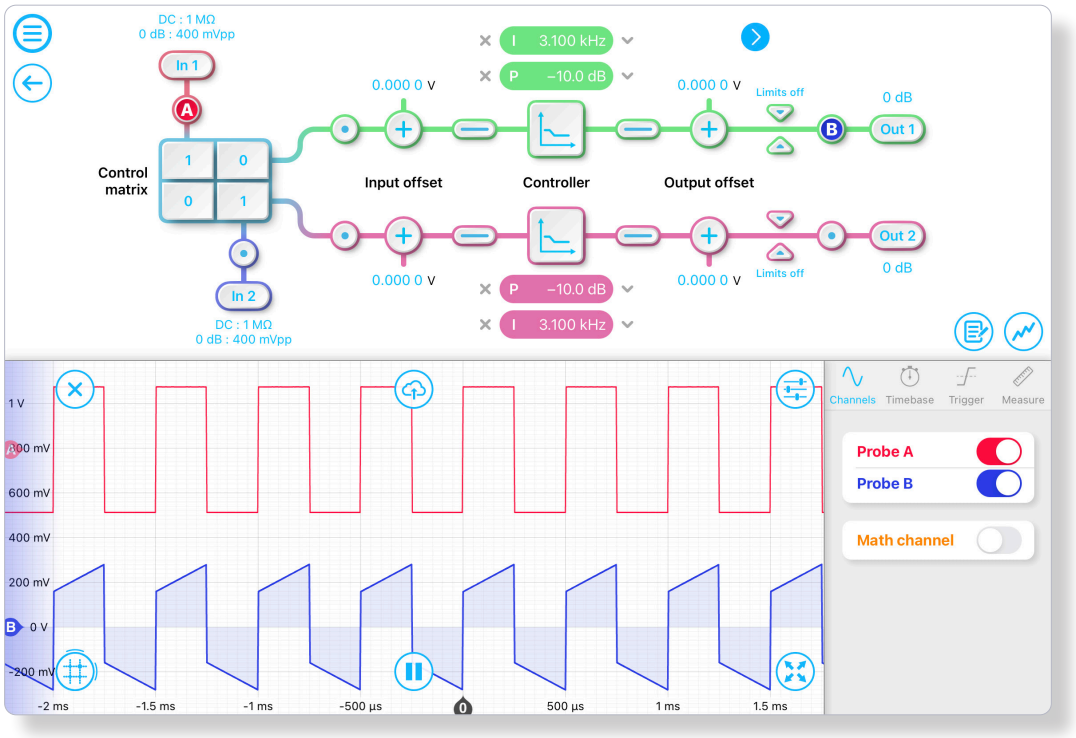
- Feedback and control systems design
- Laser frequency stabilization
- Cryogenic and quantum device control
- Magnetic/current control in plasma or fusion systems
- Scan heads/sample stage positioning
- Pressure, force, flow rate, and other controls

Note: All Moku:Delta specifications are subject to change.

Moku:Pro Instrument Datasheet

PID Controller

The Moku:Pro PID Controller features four fully configurable PID controllers with sub-microsecond latency. This enables them to be used in applications requiring both low- and high-feedback bandwidths such as laser temperature and current stabilization. The PID Controller can also be used as a lead-lag compensator by saturating the integral and differential controllers with independent gain settings.



Versatile input	Proportional Gain	DAC resolution	Input-output latency	Gain configuration	Advanced mode
4 inputs with MIMO	**- 60 dB to 60 dB**	**16-bits**	**<1 µs**	**Real time**	**Multi-section builder**

Features

- 4 input channels, 4 output channels, and 4 independent PID Controllers with control matrix for MIMO
- Design your control system's frequency response using the interactive Bode plot in real time
- Block diagram view of the digital signal processing with built-in probe points in signal processing chain
- Advanced multi-section PID builder with single or double integrators and differentiators with low- and high-frequency gain saturation

Specifications

- Input voltage range: 400 mVpp, 4 Vpp or 40 Vpp
- Control matrix linear gain: ± 0.1 to ± 20
- Input offset range: ± 1 V
- Output offset range: ± 5 V
- Offset precision: 100 µV
- Voltage limiter range: - 1 V to 1 V
- Gain profiles: Proportional (P), integral (I), differential (D), double-integral (I+), integral saturation (IS), differential saturation (DS)
- Proportional gain: -60 dB to 60 dB
- Integrator crossover frequency: 3.125 Hz to 312.5 kHz
- Differentiator crossover frequency: 31.25 Hz to 3.125 MHz

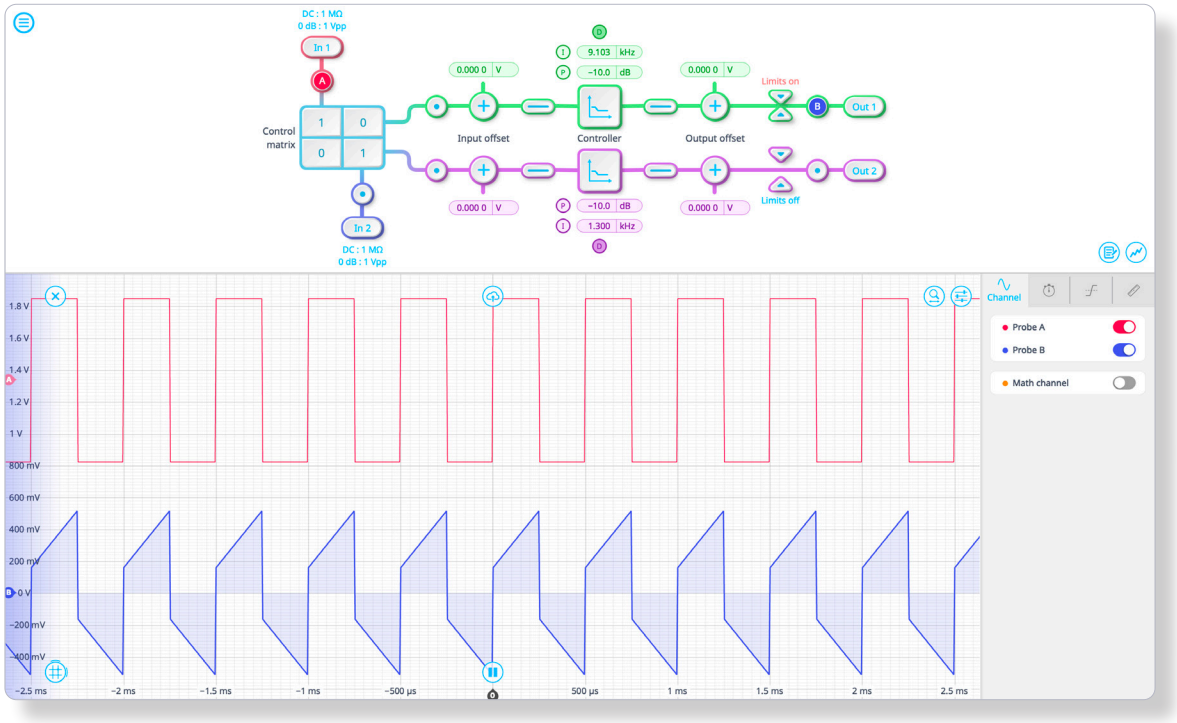
Applications

- Feedback and control systems design
- Laser frequency stabilization
- Temperature regulation
- Scan heads/sample stage positioning
- Pressure, force, flow rate, and other controls

Moku:Lab Instrument Datasheet

PID Controller

The Moku:Lab PID Controller features two fully configurable PID controllers with a DAC sampling rate of 1 GSa/s. This enables them to be used in applications requiring both low- and high-feedback bandwidths such as laser temperature and current stabilization. The PID Controller can also be used as a lead-lag compensator by saturating the integral and differential controllers with independent gain settings.



Versatile input	DAC sampling rate	DAC resolution	Phase lag	Gain configuration	Advanced mode
2 inputs with MIMO	**1 GSa/s**	**16-bits**	**30° at 100 kHz**	**Real time**	**Multi-section builder**

Features

- 2 input channels, 2 output channels, and 2 independent PID controllers with control matrix for MIMO
- Design your control system's frequency response using the interactive Bode plot in real time
- Block diagram view of the digital signal processing with built-in probe points for signal monitoring
- Advanced multi-section PID builder with single or double integrators and differentiators with low- and high-frequency gain saturation

Specifications

- Input voltage range: 1 Vpp or 10 Vpp
- Control matrix linear gain: -20 to +20
- Input/output offset range: -1 to +1 V
- Offset precision: 100 µV
- Gain profiles: Proportional (P), integral (I), differential (D), double-integral (I+), integral saturation (IS), differential saturation (DS)
- Proportional gain: -60 dB to 60 dB
- Integrator crossover frequency: 1.25 Hz to 125 kHz
- Differentiator crossover frequency: 12.5 Hz to 1.25 MHz

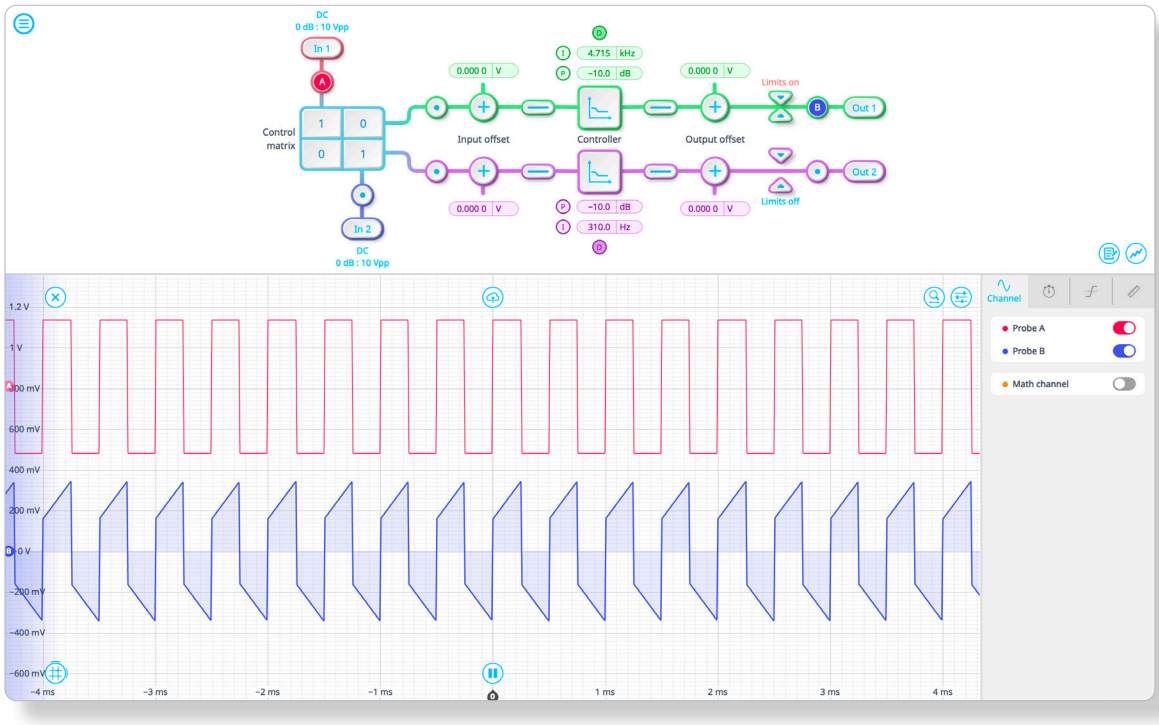
Applications

- Feedback and control systems design
- Laser frequency stabilization
- Temperature regulation
- Scan heads/sample stage positioning
- Pressure, force, flow rate, and other controls

Moku:Go Instrument Datasheet

PID Controller

The Moku:Go PID Controller instrument features two fully configurable PID controllers with an output sampling rate of >2.5 MSa/s. This enables them to be used in various applications such as current or robotic arm control. The intuitive graphical user interface allows you to directly adjust the PID parameters on the Bode plot. Users are able to monitor the effects of the change with the built-in Oscilloscope in real time, which makes the Moku:Go PID Controller ideal for control system labs.



Versatile input	DAC sampling rate	DAC resolution	Phase lag	Gain configuration	Advanced mode
2 inputs MIMO	**>2.5 MSa/s**	**12-bits**	**<30° at 20 kHz**	**Real-time**	**Multi-section builder**

Features

- 2 input channels, 2 output channels, and 2 independent PID Controllers with control matrix for optional blending
- Design your control system's frequency response using the interactive Bode plot in real time
- Block diagram view of the digital signal processing chain with built-in probe points
- Advanced multi-section PID builder with single or double integrators and differentiators with low- and high-frequency gain saturation

Specifications

- Input voltage range: 10 Vpp or 50 Vpp
- Control matrix linear gain: ± 0.1 to ± 20
- Input offset range: -2.5 to +2.5 V
- Output offset range: -2.5 to +2.5 V
- Voltage limiter range: -5.0 to +5.0 V
- Gain profiles: Proportional (P), integral (I), differential (D), double-integral (I+), integral saturation (IS), differential saturation (DS)
- Proportional gain: -60 dB to 60 dB
- Integrator crossover frequency: 312.5 mHz to 31.25 kHz
- Differentiator crossover frequency: 3.125 Hz to 312.5 kHz

Applications

- Feedback and control systems design
- Laser frequency stabilization
- Temperature regulation
- Scan heads/sample stage positioning
- Pressure, force, flow rate, and other controls