

Nano-Drive® Series

Features

- ▶ Nano-Drive® controller included with every Mad City Lab nanopositioning system
- ▶ Only controller that is PicoQ® sensor compatible for high stability and resolution
- ▶ Calibrated controller optimized for application specific performance
- ▶ Low noise performance
- ▶ Proportional integral feedback with closed loop control
- ▶ True USB 2.0 digital interface for positioning control
- ▶ High power models available for continuous high speed scanning
- ▶ USB enabled controllers ship with Nano-Route®3D software



Nano-Drive®1 and Nano-Drive®3 controllers. Nano-Drive® controllers are shipped with every nanopositioning system fully calibrated and optimized for each system. Single axis Nano-Drive®C controllers are shipped with selected nanopositioning systems.

Product Description

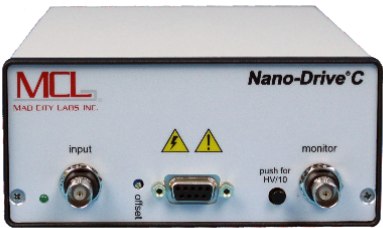
Every Mad City Labs nanopositioning system includes our calibrated, closed loop Nano-Drive® controller. The Nano-Drive® Series of controllers are complete electronic packages for sub-nanometer positioning and are optimized for your piezo nanopositioning stage.

All Nano-Drive® controllers include low noise, low drift amplifiers, absolute position control, PicoQ® sensor electronics, and closed loop feedback. Closed loop feedback ensures that the displacement as a function of input voltage is highly linear and free of positioning errors caused by inherent creep and hysteresis in the piezo actuators. Piezo nanopositioners combined with a Nano-Drive® controller form a calibrated nanopositioning system which is individually adjusted and optimized for the specific performance requested by the customer. Factors such as load (sample mass), type of motion (steps, scanning, etc.), and required positioning speed are all factored into the customized setup and is at no additional charge.

All Nano-Drive® controllers provide standard analog control inputs (0-10V) via front panel BNC's. Optional 16-bit or 20-bit USB digital control interfaces may also be included to provide true "Plug & Play" connectivity. Front panel output BNC's provide access to the real-time position sensor signal and the actuator drive signal (HV/10). A variety of options (see table) are available to enhance the control of the nanopositioning system and integration



with existing instrumentation. Upgrades to higher powered versions, the Nano-Drive®45 and Nano-Drive®85, for applications which demand continuous, high speed scanning and fast step response motions are also available. Consult with your local Mad City Labs sales engineers for more information. Select single axis nanopositioning systems include the Nano-Drive®C compact controller. This compact version of the Nano-Drive® controller provides the same performance as single axis Nano-Drive® controllers with an included 16 bit digital interface. Compact Nano-Drive®C controllers are not compatible with additional Nano-Drive® options. The Nano-Drive® is also available for OEM customers. Contact our technical sales engineers for further information about partnering with us for your precision motion needs.



Nano-Drive® Specifications

Analog Input (per axis)	0V to +10V
Input Connector	BNC
Command Signal Input Impedence	10 kΩ
Output Short Circuit Protection	YES
Closed Loop Feedback control	Proportional Integral
Output Signals	Sensor, HV/10
Output Connectors	BNC
Stage Connectors	DB-9
Operating Temperature	5°C to 40°C
Options	See Table
Maximum Drive Current (continuous)	
Nano-Drive®	50 mA
Nano-Drive®45	250 mA
Nano-Drive®85	500 mA

Compatible Software Packages



Examples, tutorial,
and Mad City Labs
Nano-Route® 3D
motion control software











Nano-Drive® Options

Option	Description
ND45-x	Upgrade to higher powered Nano-Drive®45 controller (x = number of axes). Consult technical sales to determine suitability.
NS85-x	Upgrade to higher powered Nano-Drive®85 controller (x = number of axes). Consult with technical sales to determine suitability.
USB16x	16 bit USB interface (x = number of axes). Features USB 2.0, 16 bit DAC/ADC for user friendly plug and play control. Supplied with Nano-Route®3D software.
USB20x	20 bit USB interface (x = number of axes). Features USB 2.0, 20 bit DAC/ADC for user friendly plug and play control. Supplied with Nano-Route®3D software.
AR-10	Analog input voltage range, -10V to +10V. Compatible with USB20x interface. Suitable for use with 3rd party data acquisition boards.
AR-6	Analog input voltage range, -6V to +6V. Compatible with USB20x interface. Suitable for use with 3rd party data acquisition boards.
AR-5	Analog input voltage range, -5V to +5V. Compatible with USB20x interface. Suitable for use with 3rd party data acquisition boards.
ISS	Image Scan Synchronization provides TTL compatible pixel clock, line clock, and frame clock. Compatible with both Becker and Hickl and PicoQuant TCSPC products. The ISS option requires Nano-Drive® controllers installed with either USB16x or USB20x options.
OCL	Front panel open loop/closed loop switch per axis.
RM	Rack mount hardware for Nano-Drive®.
PicoBOB	Breakout box to connect PicoQuant PicoHarp to Nano-Drive® controller with ISS option.

USB Computer Interfaces

- “Plug & Play” 16-bit and 20-bit digital USB 2.0 interfaces are Windows 10 (or newer) compatible (32-bit and 64-bit). USB drivers are included. 20 bit resolution is required to access the maximum available resolution of the nanopositioner. 16-bit resolution is sufficient for most optical microscopy applications
- LabVIEW compatible. Every USB enabled Nano-Drive® is supplied with Mad City Labs Nano-Route®3D motion control program, example VI's, and an extensive LabVIEW based tutorial. Nano-Route®3D is LabView based motion control software.
- DLL file supplied for compatibility with other programming languages, e.g. C#, Matlab, Python, Python examples provided.
- Easily synchronize the nanopositioning system with other external instrumentation.
- Computer waveform generation and position data logging with internal memory for up to 10,000 positions.
- Custom firmware available upon request.

