

NanoScope 6 Controller

New Power and Capabilities for Bruker AFMs

The NanoScope® controller provides the driving power behind many of Bruker's proprietary AFM innovations over the past several decades, including PeakForce Tapping® technology. Building upon this legacy, the NanoScope 6 introduces a new high-speed, low-noise architecture that enables unprecedented levels of performance for Dimension Icon®, FastScan®, XR, HPI, Pro, and MultiMode® 8HR AFMs. Multiple high-speed 16-bit ADCs at 50 MHz and 10 MHz are combined with user-controllable digital filtering, digital signal normalization, and eight 20-bit ADCs at 500 kHz. High-speed data acquisition of the fastest events runs in parallel to the high-speed, low-noise feedback and acquisition of eight image channels at highest resolution and repeatability. Scan control occurs at 32-bit resolution with 2 MHz update rate for lowest noise even at high scan rates and without need for limit adjustments.

Only NanoScope 6:

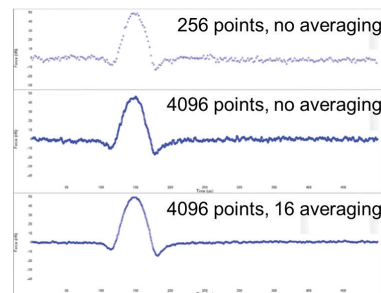
- Enables the next generation of PeakForce Tapping and more unique modes than any other platform, including AFM-nDMA, SECM, SS-PFM, and DataCubes for quantitative data in every application
- Utilizes an expandable open architecture for custom experiments and future developments with full signal access, real-time scripting, and Python data integration
- Provides ultimate ease of use with Bruker's exclusive ScanAsyst®, including complete self-optimization and elimination of cantilever tuning
- Delivers automation capability for QA/QC applications, with all advanced modes and full report generation

Next-Generation PeakForce Tapping

NanoScope 6 introduces the next innovation in Bruker's exclusive PeakForce Tapping technology. With several thousand publications and more than a dozen derivative modes since its inception in 2009, PeakForce Tapping is the fastest growing AFM mode today and arguably the biggest AFM advance in the last two decades. NanoScope 6 takes PeakForce Tapping to the next level of performance and capability with fully variable actuation rates, 4x faster DDS for precise high-speed actuation, and 20x faster deflection sampling capturing previously inaccessible high-speed data.

Unrivalled Range of Unique Capabilities

NanoScope 6 delivers 5k x 5k images, 8 data channels, and 50 MHz sampling rate for raw collection power. And the latest NanoScope software works in concert with the controller and microscope to fill this bandwidth with an unrivalled set of information, offering more unique modes than any other platform. Bruker-exclusive modes include the new SS-PFM, AFM-nDMA, SECM, and the expansive families of DataCube and PeakForce Tapping modes to give users a wealth of quantitative nanoelectrical and nanomechanical data, whether the application is in semiconductors, polymers, energy research, functional materials, or other nanoscale characterization.



Performance Improvements in PeakForce Tapping.

Open Architecture

NanoScope 6 provides an open hardware and software platform for implementation of custom experiments. Front panel BNCs on the controller afford easy access to most input and output signals. The optional signal access module expands access to all signal and control lines. The NanoScript™ software option provides an expansive set of SPM control functions for custom measurements, lithography, and manipulation. NanoScript commands can also be called from any programming client of Microsoft's Component Object Model, including Python, LabView, MatLab, and others. NanoScope data can easily be imported into Python using the Python Toolbox included with the software.

Beyond Easy to Operate

All NanoScope 6 systems come with Bruker's exclusive ScanAsyst. Building on PeakForce Tapping, ScanAsyst eliminates cantilever tuning and feedback adjustment entirely. ScanAsyst® self-optimizes on any sample surface without prior knowledge of any sample parameters. For full measurement automation, NanoScope 6 systems offer the optional AutoMET® accessory. AutoMET addresses QA/QC applications with intuitive generation of recipes and their simple execution in an operator mode that does not require any AFM knowledge. AutoMET is comprehensive with coordinate input, image recognition, automation of all advanced modes, automated analysis, and report generation.

NanoScope Controller Specifications

Electronics	Two high-speed (50 MHz) 16-bit ADCs sample and digitize cantilever deflection signal
	High-speed (10 MHz) 16-bit ADC supports high-speed acquisition for PeakForce Tapping, contact mode, STM, and electrical modes, with adjustable digital filtering for additional speed/resolution options
	Eight mid-speed (500 kHz) 20-bit ADCs enable eight data channels without data limits
	Two high-speed (50 MHz) 16-bit DACs provide sinusoids (≤ 20 Vpp), plus 16-bit offset bias superposed (± 10 V, adjustable ≤ 2 MHz)
	Eight mid-speed (2 MHz) 16-bit DACs provide ± 10 V for utility and user outputs
	Three-axis 32-bit scan control at 2 MHz update rate enables high-speed scanning at highest resolution without adjustable limits
	Two high-speed lock-ins (10 Hz to 10 MHz) and one mid-speed lock-in (0.1 Hz to 50 kHz)
Front Panel Access	Two high-speed lock-ins (10 Hz to 10 MHz) and one mid-speed lock-in (0.1 Hz to 50 kHz) provide wide-band support of resonant modes at multiple simultaneous frequencies
	Two general-purpose low-speed ADCs (500 kHz)
	One mid-speed ADC (10 MHz) and two high-speed ADCs (50 MHz) for use with lock-ins
	Two digital inputs, two digital outputs (TTL compatible)
Hardware Options	Three mid-speed (2 MHz) and two high-speed DACs (50 MHz)
	Signal access modules (SAMIII for MultiMode 8HR, SAM6 for Dimension)
Software	Application modules and accessories per system price list
	Data-focused user interface with linear, guided workflow, instant access to online help, and experiment selector for presetting modes and parameters
	Single ease-of-use interface covers all standard and optional modes, including imaging, point-and-shoot spectroscopy, force volume, and high-speed data capture
	Highly customizable with single vs multiple data channel views and simple vs advanced parameter selection in every mode
	Complete offline analysis package included for images, point spectroscopy, and force volume data
	Optional MIROView interface integrates video view with all types of AFM data in a single canvas and single, programmable acquisition sequence
Optional AutoMET interface provides complete automation of all modes and automated report generation	

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Bruker Nano Surfaces and Metrology Division

Santa Barbara, CA • USA
Phone +1.805.967.1400

productinfo@bruker.com

www.bruker.com/NanoScope6