

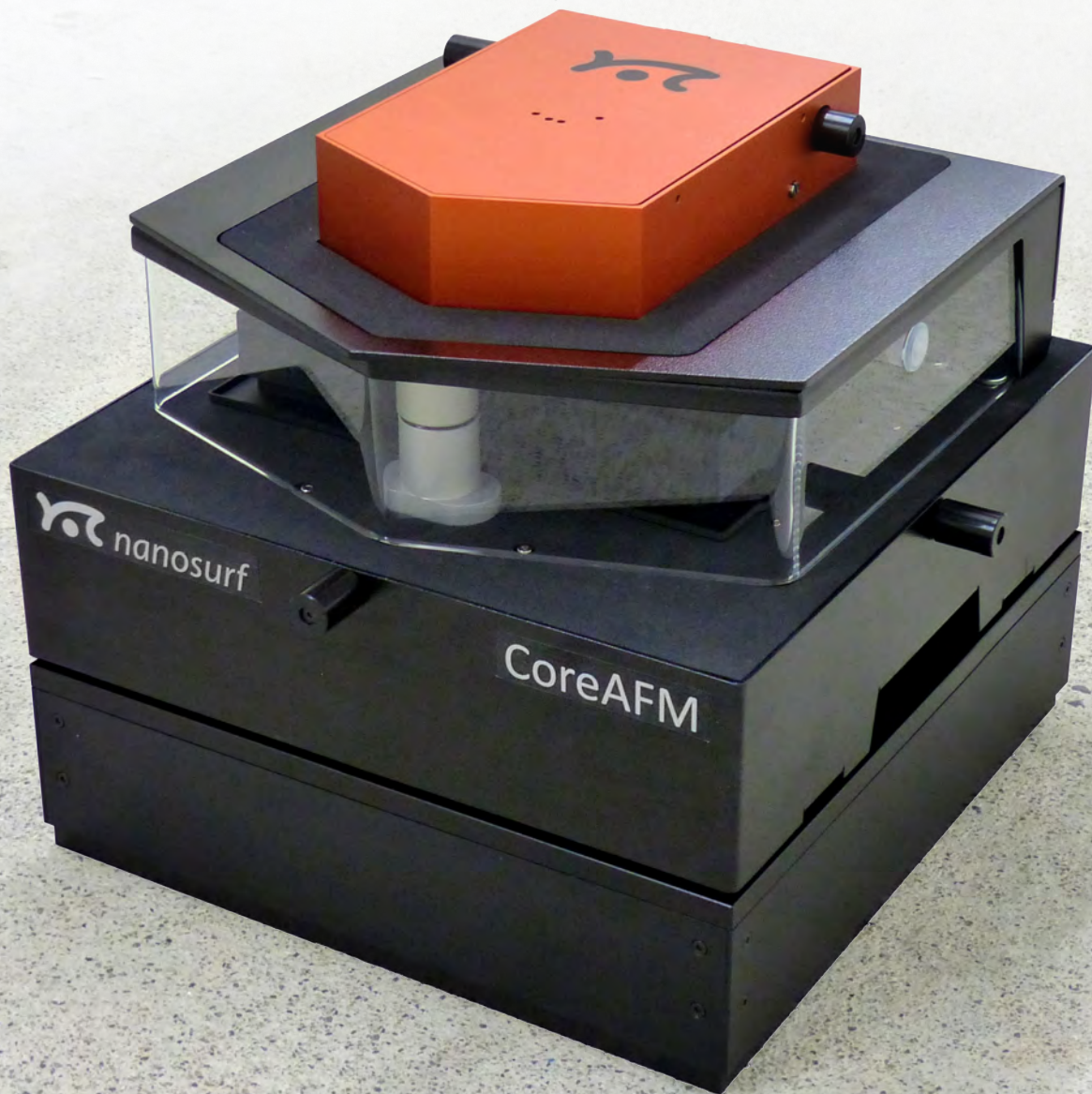
# CoreAFM

## The Essence of Atomic Force Microscopy

Powerful and versatile

Compact and complete

Value for money



## CoreAFM: The Essence of Atomic Force Microscopy

Intelligently combining the core components of AFM to achieve maximum versatility and user-friendliness resulted in the CoreAFM. Because of this fundamental design, the CoreAFM is streamlined to perform AFM at its best.

### Key features

- Compact by design, with a complete and streamlined feature set

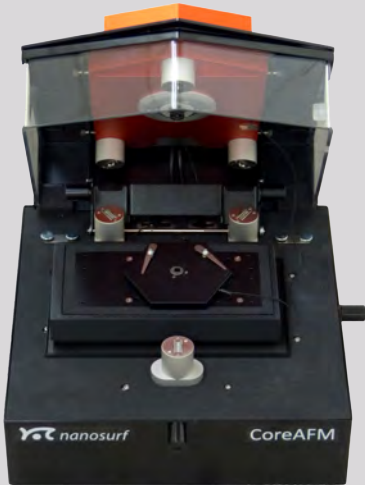
The fusion of a modern flexure-guided scanner, a fully digital 32-bit controller, XYZ sample stage, camera, and acoustic shielding in a single all-in-one unit results in a complete AFM system with an unparalleled compact footprint. All the essential functions of modern AFM are integral components of the CoreAFM system; thus, only connecting power and USB is all that is needed for a fully operational CoreAFM.

- A real performer that is both powerful and versatile

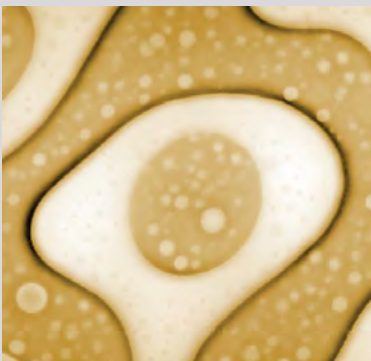
State of the art electronics with 24-bit ADC and DAC results in high-resolution XYZ driving of the 100×100×12 μm scanner and allows for low-noise force detection limited only by the cantilever. Thirty two standard and optional modes with fully compatible add-ons make the CoreAFM the tool of choice for applications ranging from materials research to life science and electrochemistry. Starting from the basic CoreAFM system its functionality can be seamlessly extended.

- Simplicity and functionality that offer top value for money

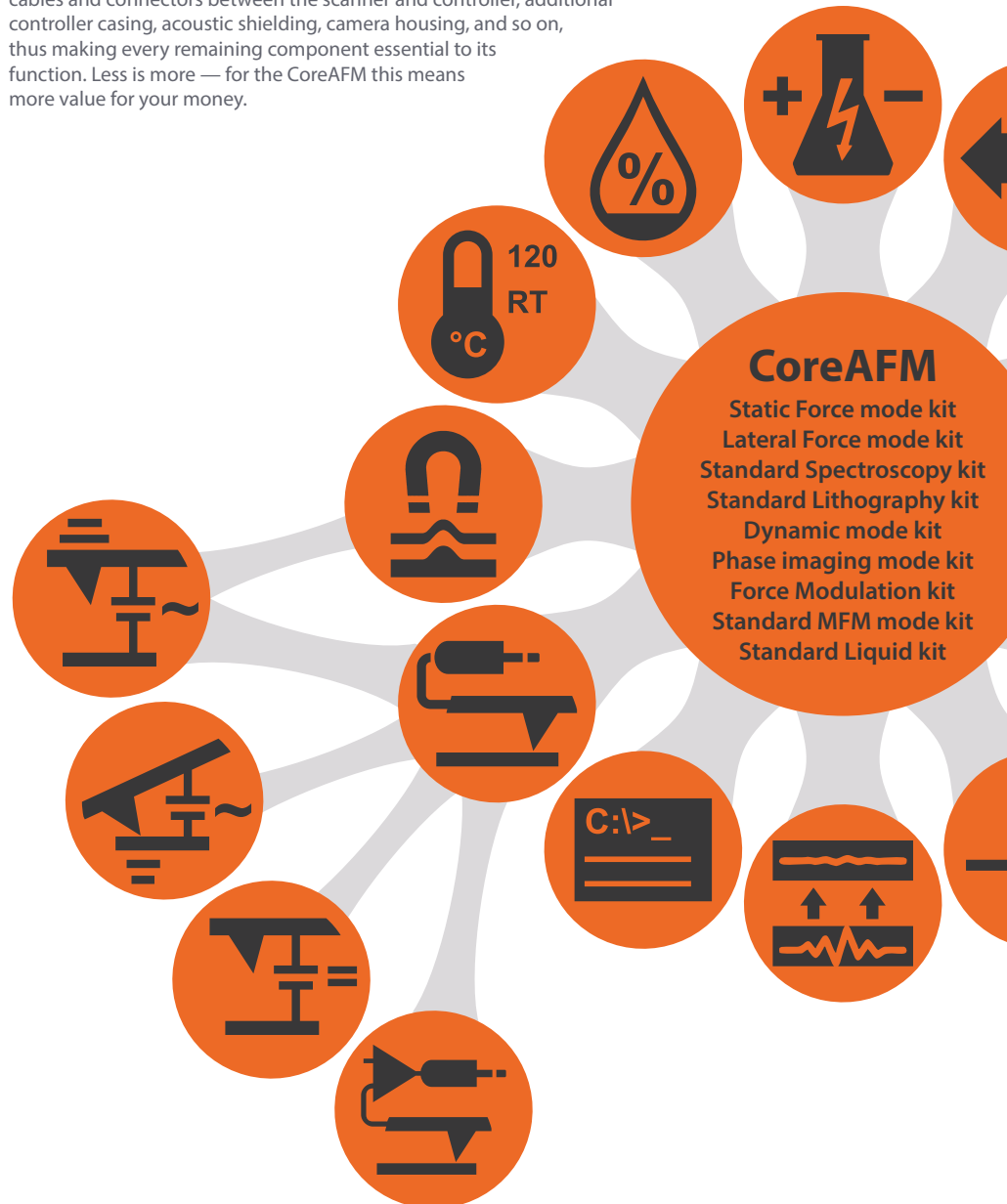
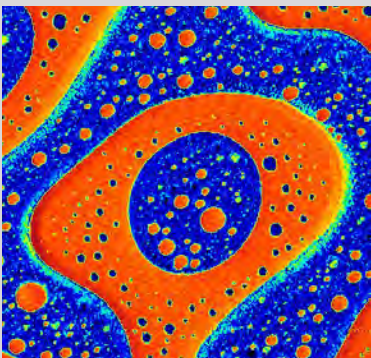
The minimalist and integrated design approach eliminates the need for cables and connectors between the scanner and controller, additional controller casing, acoustic shielding, camera housing, and so on, thus making every remaining component essential to its function. Less is more — for the CoreAFM this means more value for your money.



In its closed state (top), the CoreAFM's scanner compartment protects your scans from outside disturbances. It can easily be opened (bottom) to allow access to the scanner and sample stage, for example for placing a new sample.

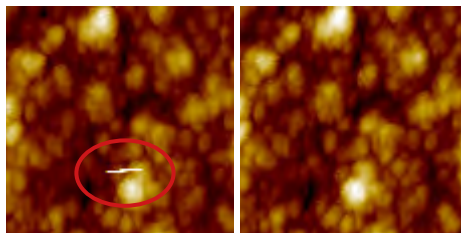


Topography and phase of a polymer mix

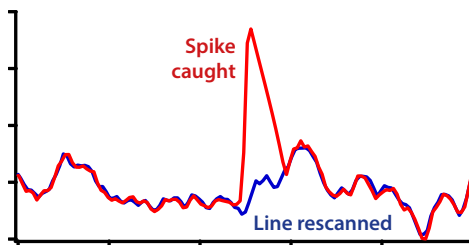


## SpikeGuard






A deeper system integration of the Isostage is also reflected in the unique *SpikeGuard*, which eliminates glitches during imaging. Although the Isostage is an active vibration isolation system, glitches can still occur when distortions are too severe. *SpikeGuard* detects such anomalies and rescans the line for a distortion-free image.











SpikeGuard turned OFF SpikeGuard turned ON



## Primary add-on functionality

-  Isostage 300H
-  Scripting interface
-  Conductive AFM mode
-  Advanced MFM
-  Temperature control
-  Environmental control
-  Electrochemistry option
-  Signal I/O option
-  Petri dish option
-  Basic FPM option
-  Advanced lithography
-  Advanced spectroscopy

## Secondary add-on functionality

-  Advanced conductive AFM
-  EFM mode kit
-  Advanced PFM
-  Advanced KPFM
-  Scanning thermal
-  Nano-thermal analysis
-  Bio sample heater
-  SICM option
-  Advanced FPM mode:
-  FluidFM nanolithography
-  FluidFM colloidal spectr.
-  FluidFM spotting

# CoreAFM

## Scanner

Maximum scan range	100 µm	< 5 nm flatness
Maximum Z-range	12 µm	closed loop
Detector noise (RMS)	typ. 60 pm	max. 100 pm
Sensor noise (Z, RMS)	typ. 180 pm	max. 250 pm
Dynamic noise (Z, RMS)	typ. 40 pm	max. 70 pm
Static noise (Z, RMS)	typ. 100 pm	max. 200 pm

## Controller

Scan control and inputs	24-bit ADC/DAC	200 kHz
Digital lock-in (2x)	16-bit ADC/DAC	20 MHz
User in/out, Excitation in	24-bit ADC/DAC	5 MHz, 10 V
Digital sync	2-bit line/frame sync out	5 V, TTL
Thermal tuning	10 Hz – 2 MHz	
FPGA, 32-bit CPU, 256 MB RAM	programmable	USB 2.0

## Primary CoreAFM add-on functionality

Isostage 300H	Active vibration isolation table with unique <i>SpikeGuard</i> feature
Scripting interface option	Enables AFM control via scripts, LabView, and other programming languages that support Microsoft COM automation
Conductive AFM mode option	Provides a conductive cantilever holder and current measurements from 10 nA to 100 µA to enable electrical AFM modes
Advanced MFM option	Adds a dual pass contour-following mode to improve MFM/EFM imaging quality
Temperature control package	Contains a sample holder and temperature controller to heat samples from room temperature up to 120°C
Environmental control option	A sealing ring and a flexible enclosure between scanner and sample holder allows control of the sample environment
Electrochemistry option	A sample holder with special designed cell and electrode pads allows electrochemical AFM experiments
Signal I/O option	Extension for user-defined experiments (24-bit ADC/DAC, digital sync output, excitation input, deflection/friction signal outputs, Z-feedback on user input)
Petri dish option	Sample holder for liquid or bio applications that use Petri dishes
Basic FPM option	FluidFM®-compatible cantilever holder to allow the use of FluidFM® probes from Cytosurge
Advanced lithography option	Adds the nano-printing mode and the possibility to read CAD vector data for lithography
Advanced spectroscopy option	Adds the possibility for large spec maps, real-time spec map analysis, spec curve process stop-by-value, and pause times

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## CoreAFM features

General design	Compact design with scanner, controller, sample stage, and scan protection in a single housing. Flexure XY-scanner with piezo Z-scanner.
Sample observation	Switchable, 5 MP color CCD, digital top or side view in air and liquid
Sample illumination	White LEDs (brightness 0–100%) for top and side view, with axial illumination for top view
Sample approach	Automated, parallel approach through integrated, motorized sample Z-stage (range: 5 mm)

## Included mode kits

## Additional standard mode kits

Static force mode kit	Lateral force mode kit
Dynamic mode kit	Standard spectroscopy kit
Phase imaging mode kit	Standard lithography kit
	Force modulation kit
	Standard MFM mode kit
	Standard liquid kit

## Secondary CoreAFM add-on functionality

Advanced conductive AFM option	Sample holder with built-in current pre-amplifier for low current measurement (down to pA range)
EFM mode kit	Provides a sample for EFM and KPFM measurements
Advanced FPM option	Enables a secondary lock-in to measure piezo forces while imaging
Advanced KPFM option	Enables a secondary lock-in and tip voltage feedback controller to measure kelvin forces while imaging
Scanning thermal option	Provides the cantilevers, cantilever holder, and electronics to perform SThM
Nano-thermal analysis	Provides the cantilevers, cantilever holder, and electronics to perform local heat dissipation measurements
Bio heater option	Adds heating electronics to the petri dish option to allow heating of fluids (up to 45°C)
SICM option	Adds a low-current, low-noise pre-amplifier and accessories that allow scanning ion current imaging to enhance resolution on soft materials in liquid
Advanced FPM mode option	Adds a FluidFM microfluidics control system from Cytosurge to enable pressure controlled FluidFM experiments (see FluidFM modes directly below)
FluidFM nanolithography	Allows you to perform nanolithography by dispensing liquids to create µm-sized structures
FluidFM colloidal spectroscopy	Allows you to perform colloidal spectroscopy in large measurement series via rapidly exchangeable spheres
FluidFM spotting	Allows you to perform spotting by dispensing liquids in the sub-femtoliter range

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