

Next-Level Nanotechnology Tools  swiss quality

C3000i



 nanosurf

Standard functionality

Standard imaging modes	Static force, dynamic force, phase contrast, MFM, friction force, force modulation, spreading resistance
Imaging functions	Up to 8000×8000 data points with 24-bit zoom in 8 acquisition channels with dynamic digital filters X/Y sample slope correction
Standard spectroscopy modes	Force–distance, amplitude–distance, phase–distance Tip current–tip voltage
Spectroscopy functions	Setup wizard for each spectroscopy mode XY-position table: point, line, and grid (max. 64 positions) 3 distinct spectroscopy phases
Standard lithography modes	Free vector objects drawing or real-time drawing by mouse Tip lift or force control during movement from point to point
Sample approach	Fast home, retract, and advance movement Automatic approach with definable final end position Continuous or step-by-step approach mode

Hardware specifications

Spike-Guard	Supports Spike-Guard with compatible Isostages
Mini-DIN connector	Power for FlexAFM NIR SLD scan head Power and signal input for optional low current preamplifier
X/Y/Z-axis scan and position controller	3× 24-bit DAC (200 kHz)
Z-axis position measurement	1× 24-bit ADC (200 kHz)
Excitation & modulation outputs	2× 16-bit DAC (20 MHz)
Analog signal input bandwidth	0–5 MHz
Main input signal capturing	2× 16-bit ADC (20 MHz) 2× 24-bit ADC (200 kHz)
Additional user signal inputs	1× 24-bit ADC (200 kHz)
FPGA module and embedded processor	ALTERA FPGA, 32-bit NIOS-CPU, 80 MHz, 256 MB RAM, multitasking OS
Communication	USB 2.0 hi-speed to PC USB connector for AFM camera
System clock	Internal quartz (10 MHz)
Power	90–240 V AC, 70 W, 50/60Hz
Dimensions	288.5 mm x 282 mm x 43.5 mm (H x D x W)

Software options

Stage control option

Drivers	Direct control for all supported stage controllers
Manual move	Via buttons in the control software
Batch Manager	Automated movement via position list and scripts

Cantilever calibration option

Spring constant calibration	Free resonance detection via thermal tuning Q-Factor calculation Spring constant calculation by Sader method FFT spectrum analyzer, many windowing modes, averaging
Deflection sensitivity calibration	Wizard for deflection sensitivity calculation from force–distance measurements Automatic mode or user-defined parameters

Advanced spectroscopy option

Additional spectroscopy functions	Additional “Stop by input value reached” modulation mode Automatic cantilever drift recalibration Unlimited number of spectroscopy data points 5 distinct spectroscopy phases
--	--

Advanced lithography option

Additional lithography modes	Vector-based lithography with objects on layers with different lithography parameters Bitmap-based lithography Nano printing
-------------------------------------	--

Scripting interface option

Internal scripting	Visual Basic script editor Ribbon drop-down menu to access user scripts
COM-API	Control of measurement process and data analysis
Compatibility	All applications that support the Microsoft COM Automation standard: e.g. LabVIEW, C#, etc.

Advanced modes option

Additional operating modes	Enables advanced measurement modes via an additional digital 2-channel Lock-In. Measure amplitude and phase of an additional signal from many inputs. (e.g higher harmonics, higher resonances, torsional cantilever oscillations, tip voltage modulation, etc.) during imaging and spectroscopy
Secondary lock-in amplifier	Frequency range: 1 kHz–5 MHz Demodulation bandwidth: 11 Hz–23 kHz Amplitude resolution: 20 bit; Phase range: ±180° Reference phase shift: 0–360° (digital) Excitation: tip voltage, 2× user output

KPFM work package

Extends the advanced modes option with the Kelvin probe force microscopy (KPFM) mode. In addition to the Lock-In, it provides a tip voltage feedback controller through a special user interface. In addition to the standard signals, contact potential can be measured during imaging and spectroscopy.

PFM work package

Extends the advanced modes option with the Piezoresponse force microscopy (PFM) mode through a special user interface. In addition to the standard signals, amplitude and phase of the piezo response signal can be measured during imaging and spectroscopy

Advanced imaging

Unlocks the contour-following mode and advanced AFM parameter settings for the second scan pass

Hardware options

Signal I/O option

Digital synchronization	Sync Out 1/2: digital outputs, signal range 0/5V TTL pulses.
User output	User Out C: 24-bit DAC, signal range ±10V, 0–50kHz, for advanced modes and as modulation channel in spectroscopy
User input	User In B: 24-bit ADC, signal range ±10V, 0–50kHz.
Analog outputs	Deflection/Friction: 24-bit DAC, ±10V, 0–1MHz. Tip Voltage: 24-bit DAC, ±10V, 0–50kHz
Excitation input	Excitation In: Analog shaper piezo modulation input, ±10V, 1kHz–1MHz.
Data monitoring outputs	Monitor 1/2: 24-bit DAC, signal range: ±1V, 0–200kHz. Access to internal FPGA signals.

Security out option

The security out option is compatible with 3rd party stage controllers from Lang and SmarAct. It monitors the detector signal and stops stage movement upon loss of signal intensity.