

diCaliber

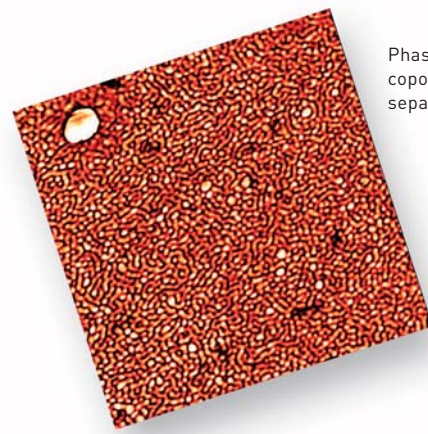
High-Value Scanning Probe Microscope

- Compact Stand Alone Microscope
- Flexible, Open-Hardware Architecture
- Closed-Loop Scanning
- Integrated Color Camera



Solutions for a nanoscale world.™

Phase image of the SBS tri-block copolymer revealing micro-phase separations. Scan size 2 μ m.



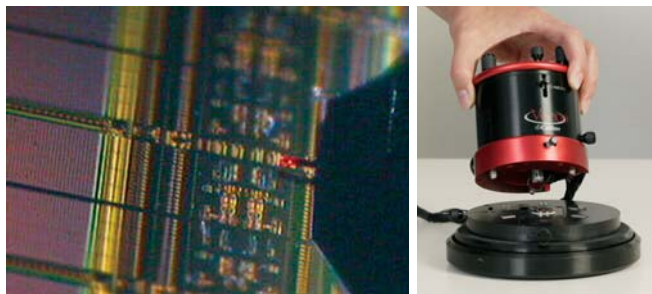
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Big SPM Functionality in a Tiny Footprint



The Caliber™ system is the result of many years of leading-edge scanning probe microscope (SPM) design. As such, Caliber delivers highly reliable functionality, performance, and tremendous value.

Caliber is able to perform a variety of distinct SPM applications on samples of various sizes. Designed to deliver dependable performance, this compact SPM provides a highly affordable research solution for materials and surface sciences, polymer studies, thin films and coatings, as well as biomaterials and inorganics. With exceptional surface-to-surface portability, open-hardware architecture, extensive software capabilities, and several image modes, the Caliber SPM offers truly outstanding value.



Tip view on semiconductor structure through the integrated video microscope.

Scanning Tip Technology

- Scans more than 90 x 90 μ m with a 10 μ m Z range
- Permits analysis of odd size samples

Closed-Loop Scanning

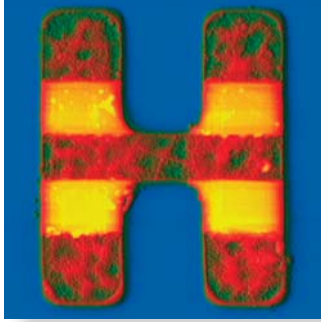
- Provides distortion-free zoom, pan at any scan angle
- Eliminates piezo nonlinearity, hysteresis, and creep
- Closed-loop Force Curves

Comprehensive SPM Software

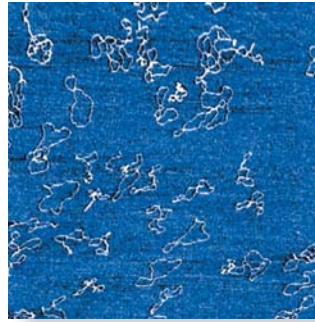
- Allows image analysis without interrupting scan
- All Digital Feedback Loops
- LiftMode™

Sensored Z

- Accurate height measurements
- Eliminates creep and hysteresis effects
- Precision Force Spectroscopy



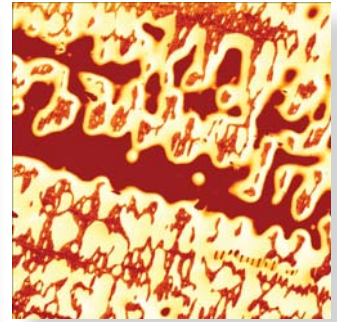
TappingMode image of implant region of SRAM device. Scan size 10 μ m.



DNA deposited on mica. TappingMode image showing individual DNA molecules. Scan size 2.5 μ m.



Native Collagen fibrils exhibiting the typical 67nm banding pattern. Scan size 8.5 μ m.



Polydiethylsiloxane on silicon. Phase image revealing the mesomorphic state of the polymer. Scan size 25 μ m.

MULTIFUNCTIONAL DESIGN

Caliber's open-platform design allows researchers to customize hardware and optimize electronics for excellent application versatility. Extremely compact and portable, the Caliber SPM can be utilized on practically any surface. Streamlined operational convenience facilitates a broad array of stand-alone experiments.

Caliber comes with its own controller that has a proprietary electronic control that provides low electronic noise as well as a three 24-Bit scan DACs and eight 16-Bit A/D converters.

ROBUST FLEXIBILITY

This compact, flexible instrument is capable of imaging topography on a wide range of spatial periods and feature heights. In order to satisfy a diverse set of application requirements, a variety of AFM probes is supported. Closed-loop XY scanning, a sample stage with a built-in XY translator, and the ability to scan 90 μ m all mean big utility in a tiny footprint.

EXTENSIVE SOFTWARE FUNCTIONALITY

Caliber software gives users complete, flexible control of data acquisition via a suite of wide-ranging features:

Real-time

- Line-by-line analysis of data without interrupting scan including Fast-Fourier Transform (FFT) and leveling (Offset and slope removal)
- Automatic Tuning finds the resonance spectrum of a TappingMode cantilever and adjusts drive amplitude and phase angle accordingly.
- Fully integrated nanolithography package with Postscript™ level-1 import capability

Off-line

- Shape analysis offers data on the average dimensions of various feature patterns, such as parallel line width, curve radius, step height, and angle.
- User defined vector shading with real time 24 bit color allows better visualization of three-dimensional features from any view, angle, or perspective.

- One- and two-dimensional fractal analyses using Lake/threshold calculations provide characterization of advanced surface metrology.

STREAMLINED EASE OF USE

The Caliber system has been engineered with you, the researchers in mind, thus affording a faster path to publishable data. The small, versatile Caliber can image large samples without having to cut them down. Also, the sample stage has a kinematic mount that allows users to scan and rescan the sample at the same location.

For the utmost convenience, Caliber uses pre-mounted tips that facilitate handling and laser alignment or un-mounted tips for an economical operation. The system also utilizes integrated optics with a color camera that enables easy judgment of tip-sample separation. The optics' large field of view allows researchers to find areas of interest quickly. Additionally, an intelligent tip-approach algorithm quickly and automatically approaches the surface at varying speeds.

APPLICATIONS

- Materials and surface sciences
- Polymers
- Thin films and coatings
- Biomaterials
- Inorganics
- Nanolithography
- Semiconductor
- Nanotubes and Nanoparticles

Contact Veeco to find out if Caliber is right for your application!

- Contact Mode
- TappingMode™
- PhaseImaging™
- LiftMode
- Force Modulation Microscopy (FMM)
- Force Distance Curves
- Nanolithography (optional)
- Magnetic Force Microscopy (optional)
- Electrostatic Force Microscopy (optional)
- Imaging in Liquids (optional)

Caliber Probes in Air For our full list of probes and accessories, please contact us at 1-800-715-8440 or visit www.veecoprobes.com.

Application/Sample Type	Probe Family/Model			AFM Mode					
	Material	Mounted	Unmounted	Tapping	Contact	Force Curves	EFM	MFM	Lithography
EFM & MFM & Lithography (anodic oxidation)	Cobalt/Chome Coated	1670-00	MESP	—	—	—	x	x	x
Lithography (anodic oxidation) wear-resistant coating	Doped Diamond Coated	—	DDESP-FM	—	—	—	x	—	x
EFM & Lithography (anodic oxidation)	Platinum/Iridium Coated	—	SCM-PIT	—	—	—	x	—	x
General purpose tapping applications	Silicon	1650-00	TESP	x	—	x	—	—	—
Tapping on some polymers & other materials with high adhesion	Silicon	1660-00	LTESP	x	—	x	—	—	—
Tapping, contact, force modulation on most polymers & soft materials	Silicon	FESP-CLBR	FESP	x	x	x	—	—	—
General purpose contact mode	Silicon Nitride	MLCT-EXMT	MLCT	—	x	x	—	—	—
General purpose contact mode	Silicon Nitride	—	NP	—	x	x	—	—	—

CALIBER SPECIFICATIONS

SCANNERS

Sample Size

Unlimited (without translation stage)
50mm diameter, 7mm high or 25mm diameter, 15mm high

Closed-Loop X-Y Scanner Range

>90µm

Closed-Loop X-Y Noise

<3nm (80Hz–1kHz bandwidth)

Z Scanner Range

>10µm typical

X-Y Linearity

1% typical, (integral)

X-Y Crosstalk

<1°

Z Noise Floor (system)¹

<0.10nm TappingMode

Linearizer Noise Z

<0.5nm (80Hz–1kHz)

AFM MODES

Contact, LFM, point spectroscopy (force distance), nanolithography (optional)
TappingMode and PhaselMaging

SPECTROSCOPY MODES

Single-point or multiple-point measurements in user-selectable locations

ELECTRONICS

Measurement Channels

8 dedicated 100kHz 16-bit A/D converters

Scan Resolution XYZ

24-bit for each axis

Data Channels

More than six images with 1024 x 1024 data points

OPTICS

Laser Power

1mW typical

Camera

Integrated CMOS color camera and software-controlled white LED light source

Field of View

1.5mm x 1.5mm, 45 degree viewing angle

Optical Resolution

12µm

SOFTWARE

Operating System

Windows XP®

1: Under appropriate isolation in air.

Note: Performance specifications are typical and subject to change without notice.

Warning: Product contains laser, <1mW at 670nm.

Cover image: Pentacene crystal imaged in TappingMode. Terraces separated by 1.5nm steps are clearly resolved. Scan size 6µm.

Cover image, middle, right: Phase image of multi-layer polyethylene clearly showing layers of high-and-low density PE and additional fine structure. Scan size 50µm.

Cover image, lower, right: Red blood cells on glass slide. Scan size 90µm.



Solutions for a nanoscale world.™

For more information visit www.veeco.com
or call 800-366-9956

B54, Rev A3

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Worldwide Customer Support form the Industry Leader

Veeco Instruments Inc. provides solutions for nanoscale applications in the worldwide semiconductor, data storage, HB-LED/wireless and scientific research markets. Our Metrology products are used to measure at the nanoscale and our Process Equipment tools help create nanoscale devices. Veeco's manufacturing and engineering facilities are located in New York, New Jersey, California, Colorado, Arizona and Minnesota. Global sales and service offices are located throughout the United States, Europe, Japan and Asia Pacific.