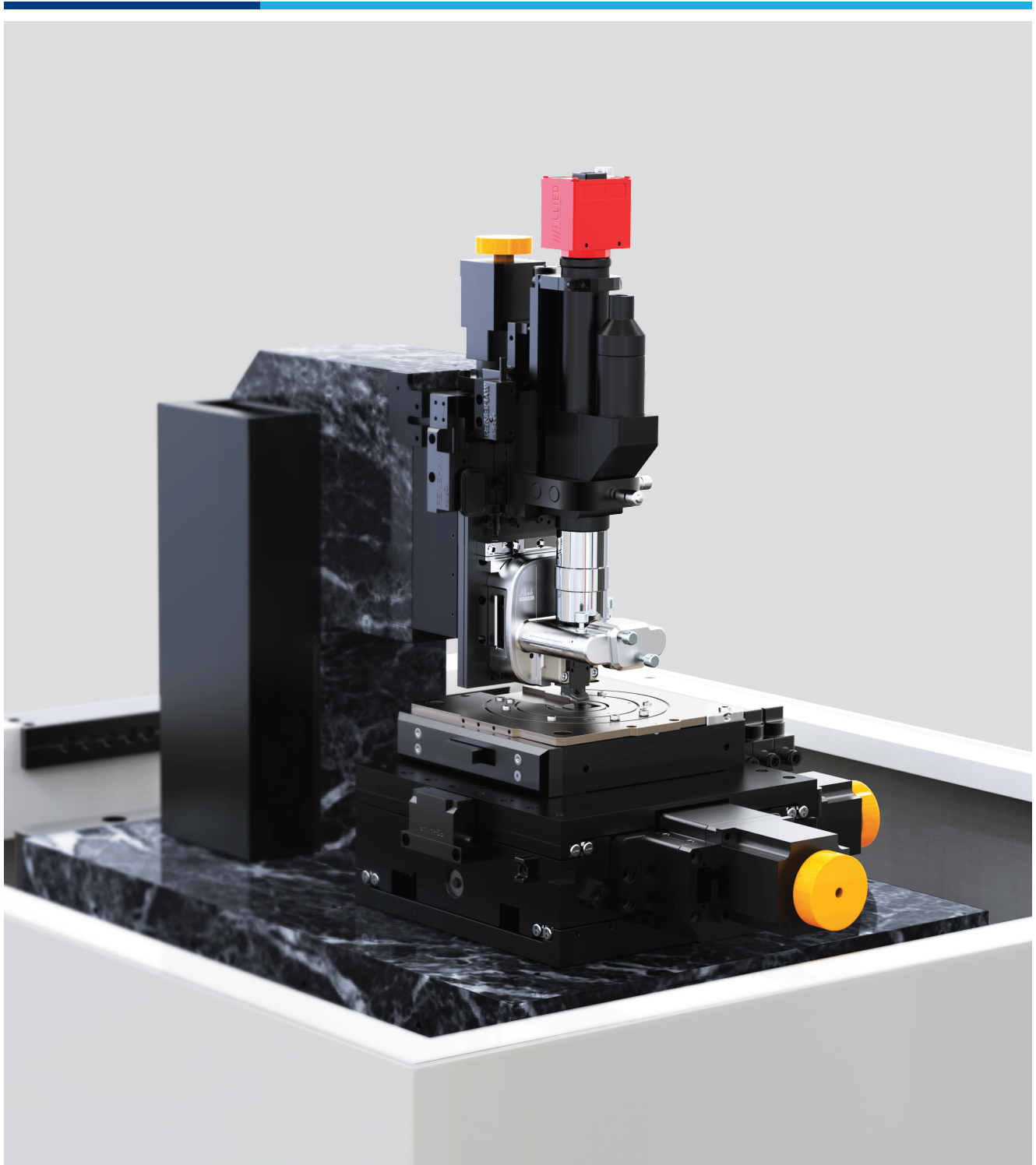


Enabling Nanoscale Advances



Park NX15

The most affordable AFM system for wafer measurement and analysis with the latest NX performance





Park NX15

Increase your productivity with our powerfully versatile AFM

The Most Convenient Sample Measurements with MultiSample Scan

- Automated imaging of multiple samples in one pass
- Specially designed multi-sample chuck for the loading of up to 16 individual samples (optionally available)
- Fully motorized XY sample stage travels up to 150 mm x 150 mm

Accurate XY Scan by Crosstalk Elimination

- Two independent, closed-loop XY and Z flexure scanners
- Flat and orthogonal XY scan with low residual bow
- More accurate height measurements enabled by NX electronic controller without any need for software processing

Best Tip Life, Resolution and Sample Preservation by True Non-Contact™ Mode

- Fast Z-servo speed enabling True Non-Contact™ Mode
- Minimum tip wear for prolonged high-quality and high-resolution imaging

Versatile Range of Modes and Options

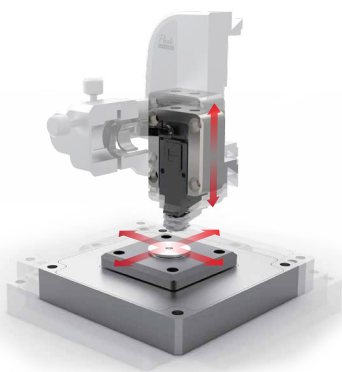
- Comprehensive set of measurement modes and characterizations
- Expanded capabilities with optional accessories and upgrades
- Advanced electrical measurements for failure analysis (FA)

Park NX15

AFM Technology

Flat Orthogonal XY Scanning without Scanner Bow

Park's Crosstalk Elimination scanner structure removes scanner bow, allowing flat orthogonal XY scanning regardless of scan location, scan rate, and scan size. It shows no background curvature even on flattest samples, such as an optical flat, and with various scan offsets. This provides you with a very accurate height measurement and precision nanometrology for the most challenging problems in research and engineering.



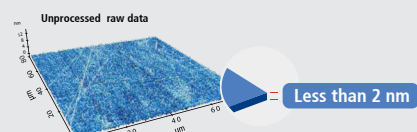
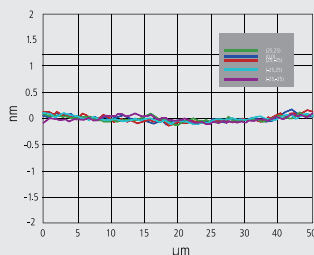
Decoupled XY and Z Scanners

The fundamental difference between Park and its closest competitor is in the scanner architecture. Park's unique flexure based independent XY scanner and Z scanner design allows unmatched data accuracy in nano resolution further improved with NX AFM Head (Z scanner) powered by NX AFM electronic controller.

Accurate Surface Measurement

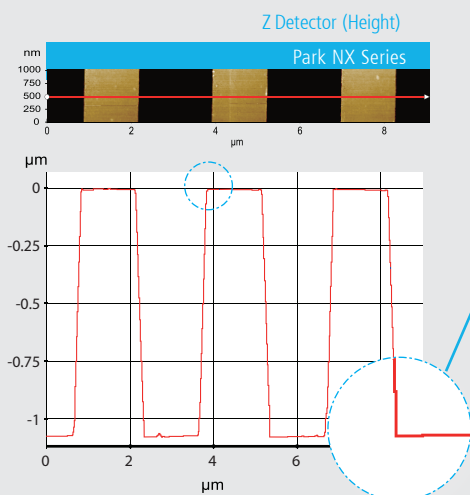
"Flat" sample surface as it is!

- Low residual bow
- No need for software processing
- Accurate results independent of scan location
- Less than 2 nm of out-of-plane motion with the NX electronic controller



Industry Leading Low Noise Z Detector

Park AFMs are equipped with the most effective low noise Z detectors in the field, with a noise of 0.02 nm over large bandwidth. This produces highly accurate sample topography and no edge overshoot. Just one of the many ways Park NX series saves you time and gives you better data.



No creep effect

Accurate Sample Topography Measured by Low Noise Z Detector

- Uses low noise Z detector signal for topography
- Has low Z detector noise of 0.02 nm over large bandwidth
- Has no edge overshoot at the leading and trailing edges
- Needs calibration done only once at the factory

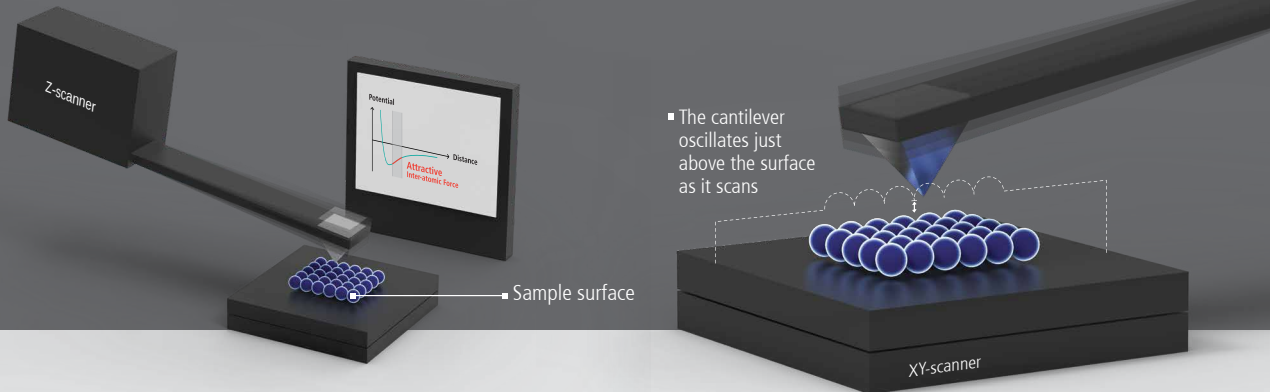
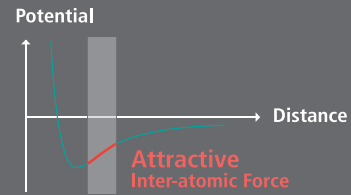
Sample: 1.2 μm Nominal Step Height
(9 μm x 1 μm , 2048 pixels x 128 lines)

True Non-Contact™ Mode

True Non-Contact™ Mode is a scan mode unique to Park AFM systems that produces high resolution and accurate data by preventing destructive tip-sample interaction during a scan.

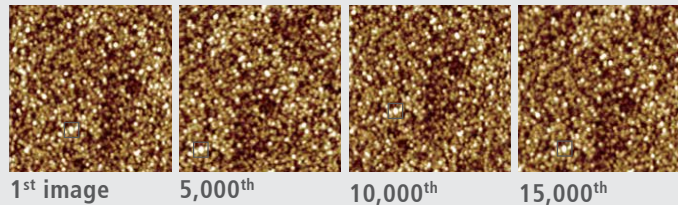
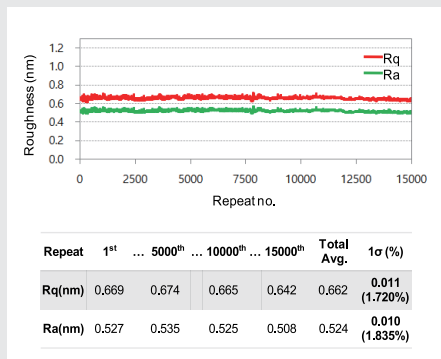
Accurate Feedback by Faster Z-servo enables True Non-Contact AFM

- Less tip wear → Prolonged high-resolution scan
- Non-destructive tip-sample interaction → Minimized sample modification
- Maintains non-contact scan over a wide range of samples and conditions

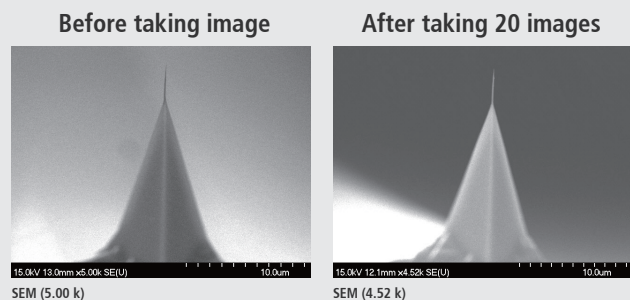
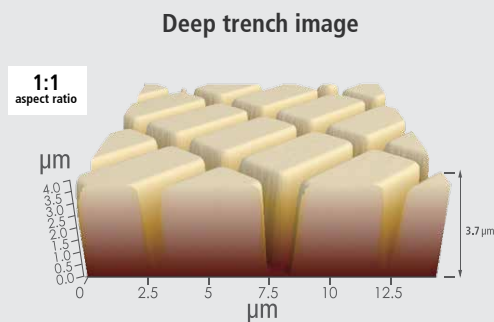


Unlike in contact mode, where the tip contacts the sample continuously during a scan, or in tapping mode, where the tip touches the sample periodically, a tip used in non-contact mode does not touch the sample.

Because of this, use of non-contact mode has several key advantages. Scanning at the highest resolution throughout imaging is now possible as the tip's sharpness is maintained. Non-contact mode avoids damaging soft samples as the tip and sample surface avoid direct contact.



Furthermore, non-contact mode senses tip-sample interactions occurring all around the tip. Forces occurring laterally to tip approach to the sample are detected. Therefore, tips used in non-contact mode can avoid crashing into tall structures that may suddenly appear on a sample surface. Contact and tapping modes only detect the force coming from below the tip and are vulnerable to such crashes.



Park SmartScan™

Park AFM Operating Software



Pixel / Scan size
Quality / Speed

Choose pixel density and scan size.

Start with sample A

- 1 SETUP
- 2 POSITION
- 3 IMAGE
- 4 END

Start with new sample B

Single-click Imaging with SmartScan™ Auto Mode

All you need to specify for AFM imaging are quality-speed preference, pixel density and scan size. Outside of those factors, you can leave all sophisticated AFM parameters up to the Auto mode of SmartScan™. The system will start a measurement with optimized conditions for imaging automatically at the click of a button.

Park SmartAnalysis™

The Park AFM Image Analytics Software



Park SmartAnalysis™ is an atomic force microscopy image processing and data analysis software for Park AFM. It is the next generation image analytics software with powerful features and newly added automated functions. Park SmartAnalysis enables users to swiftly prepare, analyze and publish their AFM acquired images and measurements.

Line	Min(nm)	Rpy(nm)	Rq(nm)	Ra(nm)
Top layer	10.265	6.825	0.795	0.667
Bottom layer	8.661	2.837	0.152	0.115
Substrate	-0.235	1.291	0.057	0.044

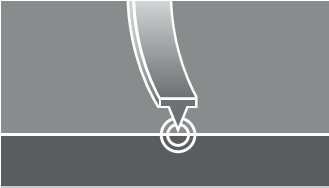
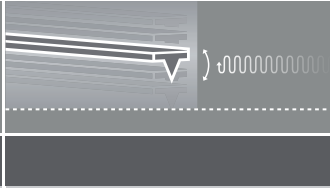
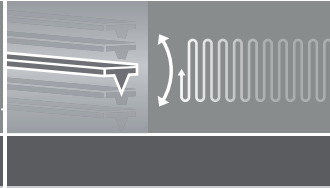
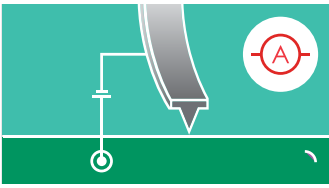
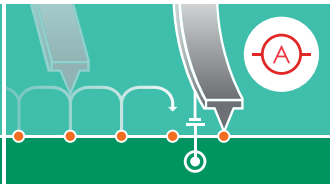
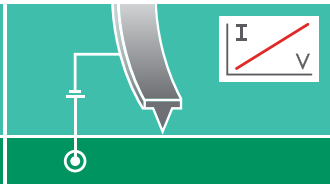
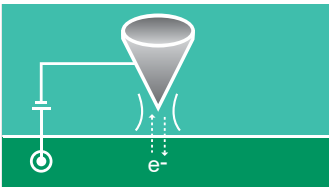
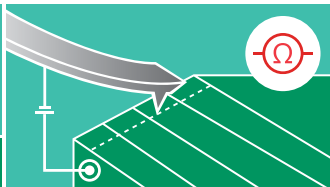
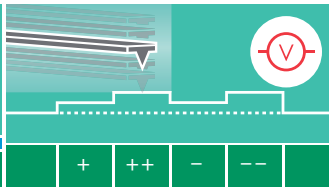
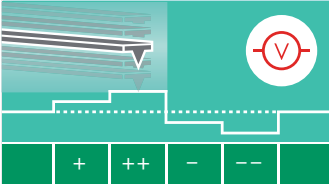
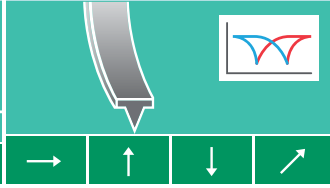
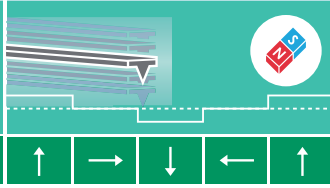
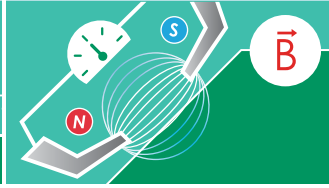
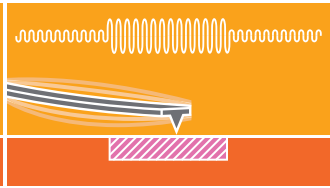
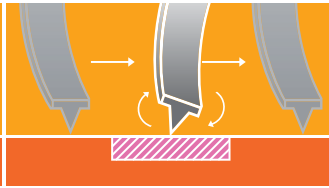
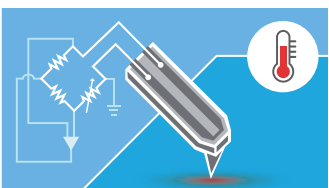
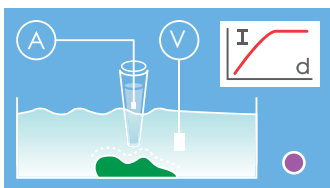
Before EZ Flatten

After EZ Flatten

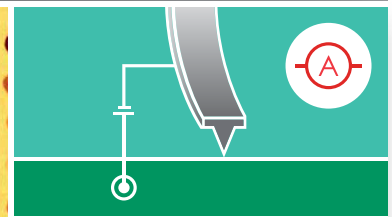
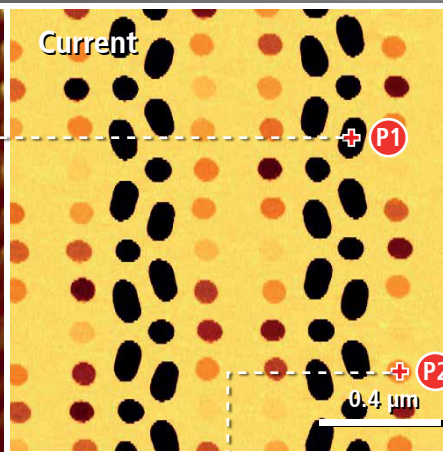
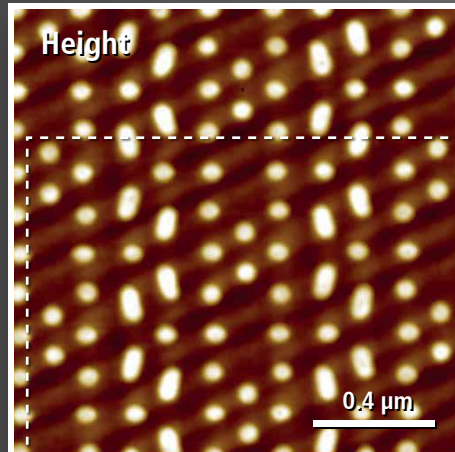
Excute

Park Atomic Force Microscopy Modes

Get the data you need with Park's selection of scanning modes

			
Contact	Non-Contact	Tapping	
			
Conductive AFM	PinPoint Conductive AFM	IV Spectroscopy	Photocurrent Mapping
			
Scanning Tunneling Microscopy	Scanning Spreading Resistance Microscopy	Scanning Capacitance Microscopy	Electrostatic Force Microscopy
			
Kelvin Probe Force Microscopy	Piezoresponse Force Microscopy	Magnetic Force Microscopy	Tunable Magnetic Field MFM
			
Force Distance Spectroscopy	PinPoint Nanomechanical	Force Modulation Microscopy	Lateral Force Microscopy
			
Nanoindentation	Nanolithography	Nanomanipulation	
		● NOT AVAILABLE FOR THIS PRODUCT	
Scanning Thermal Microscopy	Scanning Ion Conductance Microscopy		

SRAM



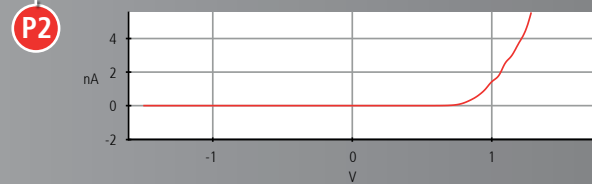
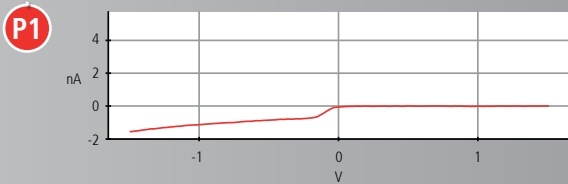
Scanning conditions

Scan Mode: C-AFM

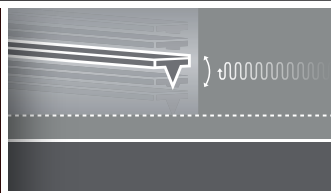
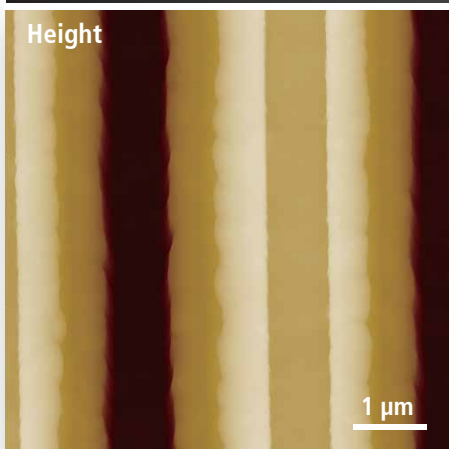
Scan Size: 1.5 μm x 1.5 μm

Cantilever: AD 2.8 AS ($k = 2.8$ N/m, $f = 65$ kHz)

Current measurement on SRAM with -1.5 V sample bias. P and N type of contact dot are well distinguished by IV spectroscopy measurements.



Trench Etch Profile on MESA



Top dielectric trench etch profile on MESA on Si wafer

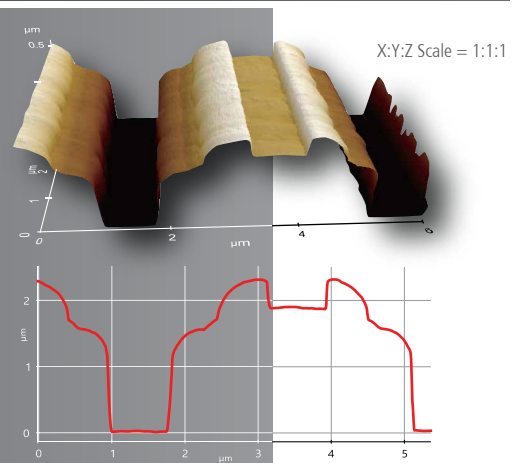
Scanning conditions

Scan Mode: Non-contact

Scan Size: 6 μm x 6 μm

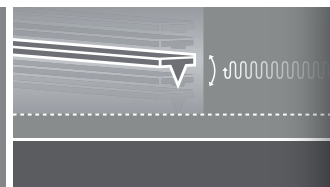
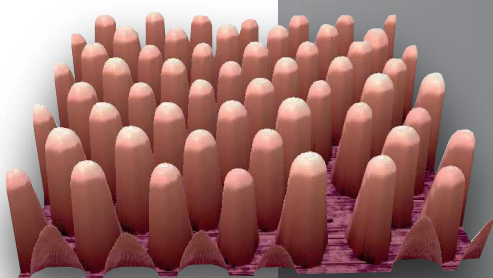
Cantilever: AR5T-NCHR ($k = 42$ N/m, $f = 300$ kHz)

Sample courtesy: Sang-Soo Je, Global Comm. Semiconductors, US



Gallium nitride (GaN) LED wire

3D X:Y:Z scale = 1:1:1



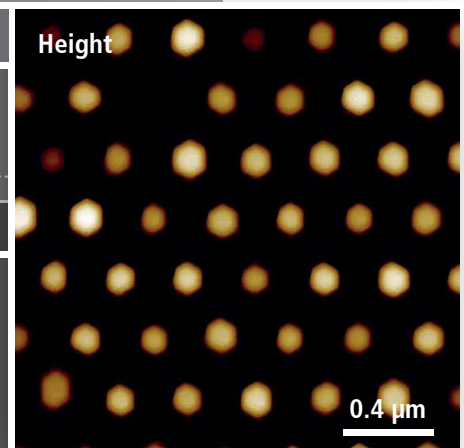
Peak to valley: 517.4 nm
RMS roughness: 184.7 nm

Scanning conditions

Scan Mode: Non-contact

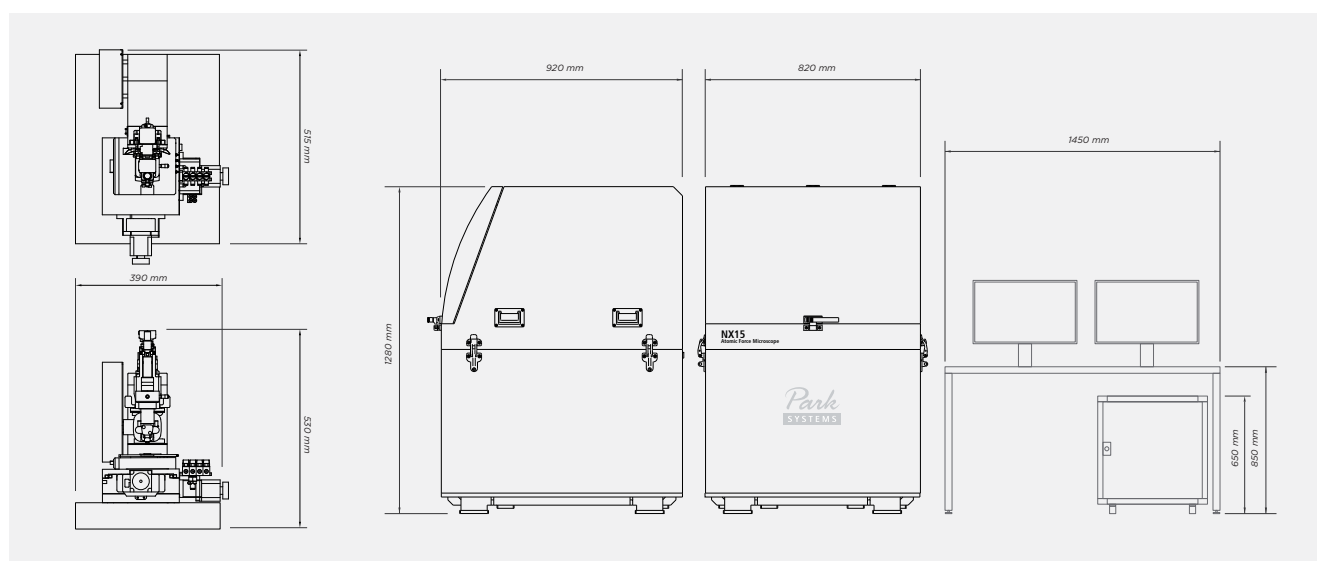
Scan Size: 2 μm x 2 μm

Cantilever: OMCL-AC55TS ($k = 85$ N/m, $f = 1.6$ MHz)



* optional

Scanner	Z scanner	XY scanner	Stage	XY stage travel range	Z stage travel range	Focus stage travel range
	Flexure guided high-force scanner Scan range: 15 μm (optional 30 μm)	Single module flexure XY-scanner with closed-loop control Scan range: 100 μm $\times$ 100 μm		150 mm (Motorized) (200 mm optional), optional precision encoders for better XY stage repeatability	25.5 mm (Motorized), optional precision encoder for better Z stage repeatability	8 mm (Motorized)
On-Axis Optics	Sample Mount		Sample size	Electronics	Integrated functions	
	10x (0.21 N.A.) ultra-long working distance lens (1 μm resolution) Direct on-axis vision of sample surface and cantilever Field-of-view : 480 $\times$ 360 μm (with 10 $\times$ objective lens)		CCD : 1.2 M pixel, 5 M pixel (optional) (optional; Field-of-view: 840 μm $\times$ 630 μm)	Up to 150 mm wafer sample (optional 200 mm Vacuum Sample Chuck)	4 channels of flexible digital lock-in amplifier Spring constant calibration (Thermal method) Digital Q control	
Options/Modes	Standard imaging		Dielectric/Piezoelectric properties		Electrical properties	
	- True Non-Contact - Contact - Tapping		- PinPoint™ - Lateral Force Microscopy (LFM) - Phase Imaging		- Electric Force Microscopy (EFM) - Piezoresponse Force Microscopy (PFM) - PFM with High Voltage*	
	- Magnetic Force Microscopy (MFM) - Tunable Magnetic Field MFM*		- Conductive AFM (C-AFM)* - IV Spectroscopy* - Kelvin Probe Force Microscopy (KPFM) - Sideband FM-KPFM - Scanning Capacitance Microscopy (SCM)* - Scanning Spreading-Resistance Microscopy (SSRM)* - Scanning Tunneling Microscopy (STM)* - Photo Current Mapping (PCM)*		- Force Modulation Microscopy (FMM) - Nanoindentation - Nanolithography* - Nanolithography with High Voltage* - Nanomanipulation*	
	- Chemical Force Microscopy with Functionalized Tip - Electrochemical Microscopy (EC-AFM)		- Force Distance (F/d) Spectroscopy - Force Volume Imaging			
Software	Park SmartScan™		Park SmartAnalysis™		Accessories*	
	- AFM system control and data acquisition software - Auto mode for quick setup and easy imaging - Manual mode for advanced use and finer scan control		- AFM data analysis software - Stand-alone design—can install and analyze data away from AFM - Capable of producing 3D renders of acquired data		- Universal Liquid Cell with Temperature Control - Temperature Controlled Stage 1, 2 and 3 - Electrochemistry Cell - High-field Magnetic Field Generator	



Committed to contributing to impactful science and technology

Park Systems Corporation is a leading manufacturer of nanoscale microscopy and metrology solutions that encompasses the atomic force microscopy, white light interferometry, infrared spectroscopy and ellipsometry systems. Its products are widely used for scientific research, nanoscale engineering, and semiconductor fabrication and quality assurance. Park Systems provides a full range of AFM products from desktop to fully automated systems with integrated robotic arms. Furthermore, its product line includes WLI AFM, Photo-induced Force Microscopy spectroscopy and ellipsometry systems for those in the chemistry, materials, physics, life sciences, and semiconductor industries. In 2022, Park Systems acquired and merged Accurion GmbH, a leader in high-end ellipsometry and active vibration isolation, to form Park Systems GmbH, Accurion Division.

Park Systems is a publicly traded corporation on the Korea Stock Exchange (KOSDAQ) with corporate headquarters in Suwon, Korea, and regional headquarters in Santa Clara, California, Mannheim, Germany, Paris, France, Beijing, China, Tokyo, Japan, Singapore, India, and Mexico. To learn more, please visit www.parksystems.com.

Park Systems Americas

+1-408-986-1110 (USA)
+52-55-7100-2354 (Mexico)

Park Systems Europe

+49 (0)-621-490896-50 (Germany)
+33 (0)-6-07-10-87-36 (France)
+44 (0)-115-784-0046 (UK&Ireland)

Park Systems GmbH - Accurion

+49-551-999600 (Germany)

Park Systems Japan

+81-3-3219-1001 (Japan)

Park Systems China

+86-400-878-6829 (Beijing, Shanghai, Guangzhou)
+886-3-5601189 (Taiwan)

Park Systems SE Asia

+65-6634-7470 (Singapore)

Park Systems Korea

+82-31-546-6800 (Republic of Korea)

Park Systems India

+91-96869 51464 (India)

Park Systems Corporate Headquarters

To learn more about Park Systems, please visit www.parksystems.com or e-mail inquiry@parksystems.com

KANC 15F, Gwanggyo-ro 109, Suwon 16229, Korea Tel. +82-31-546-6800

©2023 Park Systems Corp. All rights reserved. All products and features are subject to change.

All brand names and logos are trademarks of their respective companies.

No part of this publication may be reproduced or distributed without the express written permission of Park Systems Corp.

