

SiM : STM iMproved

*nanoREV*TM Specification Sheet
Version 5.6



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Cover Image: Royal Poinciana (Delonix Regia), popularly known here as the Gulmohar tree is a flamboyant flaming tree blooming in the summers, a sheer delight to the eyes in an otherwise scorching city heat. It is such a wonderful tree, but its numbers are dwindling in the Capital, we would love to see them flourishing always!

Specifications of *nanoREV*TM : Air STM

Electronics

Main Power Supply input	220-240V AC/50 Hz, 15 W
Power Supply outputs	+5V DC, ±15V DC, 110V DC, 110V AC
Computer Interface	USB 2.0 Port
Measurement Channels	4-channels, 16-bit simultaneous sampling ADC
Scan generator	4-channels, 12-bit D/A converter
Scan speed	51ms/line (max) for 256 data-points in each line (Dual imaging mode)
Scan drive signals	±100V DC
Slope compensation	Both Hardware and Software horizontal & vertical Slope Compensation
Tunnel Current Set Point Adj.	±10nA in steps of 5pA
Servo Control	Analog Feedback Parameter (Gain, Time Constant) Adjustments
Walker Display	LCD Display of piezo-electric walker's direction and no. of steps
Bias Settings	-10,000mV to +10,000mV in steps of 5mV
I-V Spectroscopy	5mV bias resolution for 750 data points, Multi-point mode
I-V Spectroscopy Modes	<i>I/V</i> , <i>dI/dV</i> & Normalized <i>dI/dV</i> plots, Export to ASCII option available
I-Z Spectroscopy	Tunneling Current vs tip-sample distance plots, Conductance vs Distance plots (Normal & Semilog), Export to ASCII

STM Measurements

Sizes	Max. Area	Min. Area	X/Y Resolution (min.)
XL Area	2.0μm × 2.0μm	20nm × 20nm	0.1/0.5nm
Large Area	200nm × 200nm	10nm × 10nm	50pm
Small Area	20nm × 20nm	20Å × 20Ånm	10pm
Z-resolution	Analog Mode : 8 – 10pm Digital : 5pm (Using 16-bit DAC)		
Scan orientation	Horizontal and Vertical		
Max Z Range	±350 to ±500nm (Full-Stretch and Full-Retract)		
Imaging modes	Topographic imaging with sub-atomic resolution in: - Constant Current (CC) Mode - Constant Height (CH) Mode Simultaneous imaging besides topography, with Lock-in Amplifier: - Dynamical Conductance or Local density of states (LDOS) imaging - Local barrier height imaging (LBH Imaging)		

Software	
Image Display	Dual Imaging Window for Scan and Retrace
CRO	Image Display (Image size: 256×256 to 750×750 pixels) In-built software CRO plotting imaging signal during scans
Movie Mode	Repetitive scan of same area upto ten frames, Movie files can be later split into individual images.
Sample Navigator	Graphical assistant for localized zooming w.r.t. a large area scan
3D	Colored 3D renderings, selection of color look-up tables
Data Export	Export to standard image file formats like jpg, png, ASCII, postscript format. Split simultaneous channel data into individual image files.
Analysis Functions	Line (Single line profile) Extraction, localized Zooming, Roughness Display, Measure length & angles on the images, 2D Fast Fourier Transformation.
Calibration	X/Y/Z-Calibration Utility
Image Processing Tool	Slope and Z-drift Correction, Spatial and Fourier Low-Pass Filtering, Background Subtraction, Histogram Equalization, Zooming, Contrast, Contrast, Invert, Spike-noise Filter etc.
Image Viewing	Independent <i>nanoREV</i> TM images (*.npic) viewing & processing software (optional)
Tip Locator Window	Displays current position of the tip over the sample
Nano-Lithography	In-situ tip cleaning & restructuring utility by applying voltage pulses to the sample (-10V to +10V)
Color Mode Selection	Customizable color modes for the image (both in 2D and 3D)
Computer Requirements (<i>not supplied</i>)	
System Configuration	RAM ≥2GB, Min. Resolution 1024 × 768, DVD Drive
Computer Interface	USB 2.0 port
Operating system	Runs from <i>Ubuntu Linux</i> distribution, DVD included Separate Installer CD for <i>nanoREV</i> TM packages
Other Features	
Spectroscopy modes	Current-Voltage, Current-Distance
Sample approach	Piezo-tube Walker, Illuminated tip-sample junction view Camera attachment for coarse approach assistance
Sample size	Sample disc dia. 10mm