

SiM : STM iMproved

*nanoREV*TM Specification Sheet
Version 4.2.0



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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, 9.0W		
Power Supply outputs	+5V DC, ±15V DC, 110V DC, 110V AC		
Computer Interface	Parallel Port		
Measurement Channels	Single channel 16-bit A/D converter		
Scan generator	4-channel 12-bit D/A converter		
Scan speed	51ms/line (max) for 256 data-points in each line (Dual imaging mode)		
Scan drive signals	±110V DC		
Slope compensation	Both Hardware and Software horizontal & vertical Slope Compensation		
Tunnel Current Set Point Adj.	-5nA to +5nA in steps of 0.1nA (Option 1) -25nA to +25nA in steps of 0.5nA (Option 2) (Any one of the option is provided as per user requirement)		
Servo Control	Analog Feedback Parameter (Gain, Time Constant, T.C. Setpoint) 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 1024 data points, <i>I/V</i> , <i>dI/dV</i> & Normalized <i>dI/dV</i> plots, Export to ASCII option available		
I-V Spectroscopy Modes	- Point mode - Line mode - Grid mode		
I-Z Spectroscopy	Tunneling Current vs Distance plots, Conductance vs Distance plots (Normal & Semilog), Export to ASCII option available		
STM Measurements			
Sizes	Min. Area	Max. Area	X/Y Resolution (min.)
XL Area	$34.6 \times 34.6nm^2$	$2.6 \times 2.6\mu m^2$	0.675nm
Large Area	$17.3 \times 17.3nm^2$	$260 \times 260nm^2$	67.5pm
Small Area	$34.5 \times 34.5\text{\AA}^2$	$51.8 \times 51.8nm^2$	13.5pm
Z-resolution	Analog Mode : 0.008 – 0.01nm Digital : 0.025 – 0.05nm (Using 12-bit DAC)		
Scan orientation	Horizontal and Vertical		
Max Z Range	±350 to ±500nm (Full-Stretch and Full-Retract)		
Imaging modes	Constant Current, Constant Height and Dynamical Conductance Imaging		

Software	
Image Display	Dual Imaging Window for Scan and Retrace Image Display
CRO	In-built software CRO plotting imaging signal during scans
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.
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	Spatial and Fourier Low-Pass Filtering, Background Subtraction, Histogram Equalization, Zooming, Contrast, Slope Correction etc.
Image Viewing	Independent <i>nanoREV</i> TM images (*.npic) viewing & processing software for both Windows® & Linux platforms
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)
Base Operating System	Linux OS kernel (2.6.17)
System Requirements	
Processor	Pentium4 ($\geq 2.4\text{GHz}$), Pentium M ($\geq 1.70\text{ GHz}$), AMD Athlon/Sempron 2800+ or above
Graphics	OpenGL compatible Graphics Card, Minimum Resolution 1024×768 , RAM ($> 1\text{ GB}$)
Computer Interface	Parallel port
Operating system	Runs from Kewti Linux Live CD/USB (Can also be installed onto the hard disk)
Other Features	
Spectroscopy modes	Current-Voltage, Current-Distance
Sample approach	Piezo-tube Walker, Illuminated junction view
Sample size	Sample disc dia. 10mm