

SiM : STM iMproved

*nanoREV*TM Specification Sheet
Version 6.0



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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!

Electronics

Main Power Supply input	220-240V AC/50 Hz, 15 W
Power Supply outputs	+5V DC, ± 15 V DC, 110V DC, 110V AC
Computer Interface	USB 2.0 Port
Measurement Channels	4-channels, 16-bit simultaneous sampling ADC
Scan generator	4-channels, 16-bit D/A converter
Scan speed	51ms/line (max) for 256 data-points in each line (Dual imaging mode)
Scan drive signals	± 100 V DC
Slope compensation	Both Hardware and Software horizontal & vertical Slope Compensation
Tunnel Current Set Point Adj.	± 10 nA 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	-10V to +10V in Steps of 0.3mV -100V to +100V in Steps of 3mV
I-V Spectroscopy	0.3mV bias resolution for 750 data points, - Numerical dI/dV & Normalized dI/dV plots - dI/dV with Lock-in Amplifier - Export to ASCII option available
I-V Spectroscopy Modes	- Point mode - Grid mode
I-Z Spectroscopy	Tunneling Current vs tip-sample distance plots, Conductance vs Distance plots (Normal & Semilog), Export to ASCII option available

STM Measurements

Sizes	Max. Area	Min. Area	X/Y Resolution (min.)
XL Area	$2.0\mu m \times 2.0\mu m$	$200nm \times 200nm$	$0.78nm$
Small Area	$200nm \times 200nm$	$0.77nm \times 0.77nm$	$3pm$
Z-resolution	Analog Mode : 8 – 10pm Digital : 15pm (Using 16-bit DAC)		
Scan orientation	Horizontal and Vertical		
Max Z Range	± 350 to $\pm 500nm$ (Full-Stretch and Full-Retract)		
Imaging modes	Topographic imaging with sub-atomic resolution in: - Constant Current (CC) Mode - Constant Height (CH) Mode Other imaging modes 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 Image Display (Image size: 256×256 to 750×750 pixels)
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 (-100V to +100V)
Color Mode Selection	Customizable color modes for the image (both in 2D and 3D)
Computer Requirements (not supplied)	
System Configuration	RAM ≥2GB, Min. Resolution 1024 × 768, DVD Drive
Computer Interface	USB 2.0 port
Operating system	Runs from <i>UbiKewti</i> © <i>Linux Live DVD/USB</i> (with installation option)
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