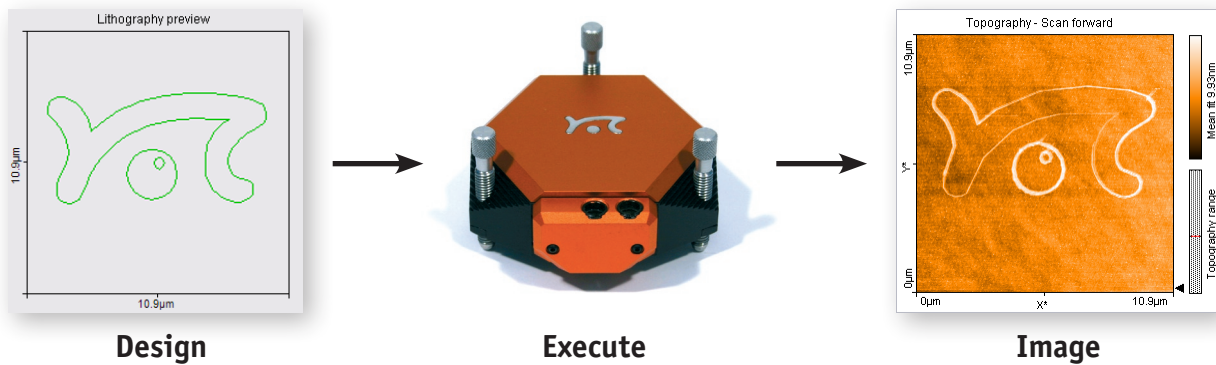


Nanosurf Lithography Option

Transform Your AFM/STM into a Surface Manipulation Tool



As of Version 2.0, all Nanosurf control software contains a dedicated lithography module. With the traditional Nanosurf ease of use, this module can turn your microscope from a surface visualization tool into a surface manipulation tool that can write complex patterns or execute direct freehand tip manipulations.

Features and Benefits:

- **Control software integration:**
Easy handling and quick results for beginners
- **Direct, mouse-controlled, freehand tip movement:**
Scratch patterns, draw oxidation lines, push particles
- **Even more possibilities with the licensed *Lithography Option*:**
Use multi-layered vector graphics or multi-level pixel graphics to create complex patterns on your sample surface with just a few mouse clicks

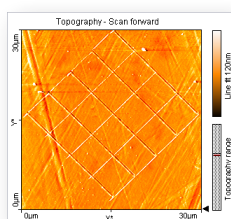
Scratch, Draw, Push — Some Examples

“Lithography” refers to a broad range of operations that all modify the sample surface. The modification you induce depends on the type of tip–surface interaction and the operating parameters you select. You can for instance scratch a surface with varying forces and study the local hardness and plasticity of the material by looking at the resulting depths and deformations. Or you can create a grid of indentations with the intention of trapping nanoparticles inside for easier size and contour determination.

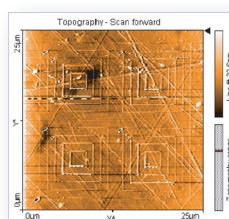
You can also draw contact pads for nanowires or other small connectors on a conducting surface such as a titanium thin film on silicon. If you move a conductive tip over such a surface while applying a high voltage, you can draw lines by local oxidation and split the surface into electrically isolated areas. Or you can use the freehand manipulation mode to push and arrange particles on a surface, or to cut nanowires and other small structures.

If you own a Nanosurf AFM or STM, all of this is available to you for free! But with the licensed *Nanosurf Lithography Option*, you can do so much more: design complex, multi-layered vector objects with the supplied CAD software and implement these on any surface, write your name or your logo between two DVD tracks, or use a pixel graphics image to draw the world’s smallest Mona Lisa, just for fun!

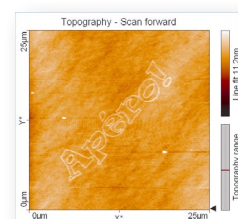
Lithography only ends with your imagination!



Static force mode scratches in plastic



Dynamic force mode lithography in plastic



Dynamic force mode oxidation on titanium

It's Easy — Three Steps to Results

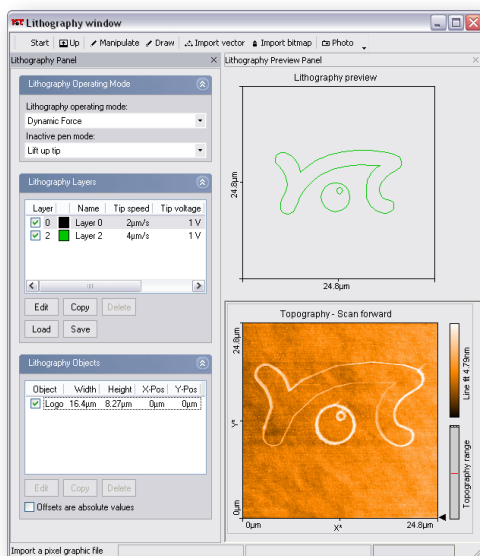
Step one: Create your design as a vector graphic with the included CAD design software, or as a pixel graphic with any standard pixel graphics editing software. When you import the design into the lithography module, you can assign different operating parameters to each individual layer or color.

Step two: Push the start button. The microscope begins to write the image, with a real-time plot showing you the current status of the lithography process.

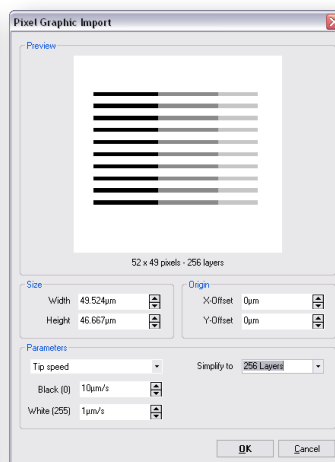
Step three: Push the “Up” button to re-image the surface and see the results of your lithography!

The freehand drawing mode offers a shortcut past the design step: you can draw your pattern directly in the software. If you operate in manipulation mode you can even combine steps one and two, because the tip is directly coupled to the mouse pointer, which you can move across the sample surface — live!

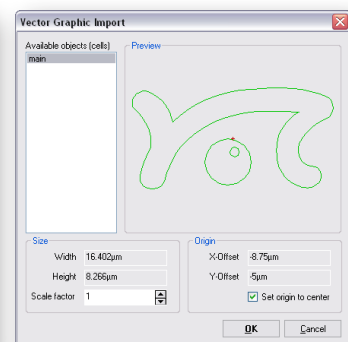
Both freehand drawing and manipulation are included in the free control software update (version 2.0). To design and use vector graphics, or to use the pixel graphics functionality of the lithography module, the licensed *Nanosurf Lithography Option* is required. Contact a Nanosurf sales representative for a personal offer.



Lithography window

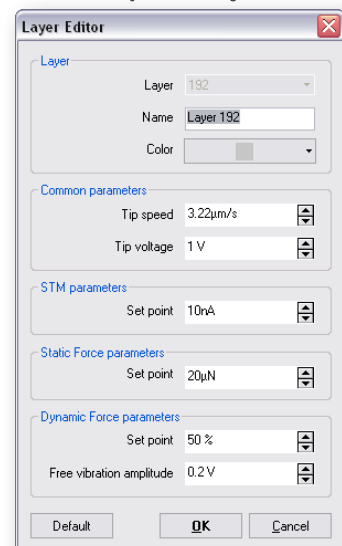


Pixel Graphics Import dialog



Vector Graphics Import dialog

Layer editor dialog



Technical Data	
Manual drawing modes	Freehand drawing / Real-time tip manipulations with mouse
Automated drawing modes ⁽¹⁾	Through vector graphics file or pixel graphics file import
Supported file formats ⁽¹⁾	Vector graphics import: GDS II (DXF, CIF, OAS, OASIS through conversion) Pixel graphics import: BMP, DIB, TIFF, PNG, JPEG, GIF
Vector graphics lithography	Unlimited objects, 256 parameter sets, object scaling and translation
Pixel graphics lithography ⁽¹⁾	Color to parameter mapping, layer reduction, layer selection
Scripting interface lithography ⁽²⁾	Write your own complex lithography patterns, modes, and sequences
Lithography modes	STM: Tunneling Current; AFM: Static Force and Dynamic Force Lithography
Parameters	Tip speed, Tip voltage, Current (STM), Nominal force and Amplitude (AFM)
Visualization	Graphical preview of objects, real-time plotting, re-imaging of results
⁽¹⁾ Requires Nanosurf Lithography Option	
⁽²⁾ Requires Nanosurf Scripting Interface	

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