NLP 2000 System

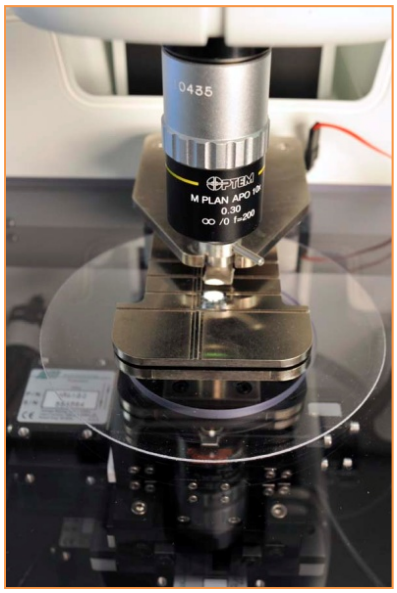
desktop nanolithography platform

The NLP 2000 System is a versatile desktop nanolithography platform designed for patterning a variety of materials using the proven technique of Dip Pen Nanolithography® (DPN®). An extensive catalog of materials including biological molecules, nanoparticles, and small molecules such as SAM forming thiols may be deposited on many different kinds of substrates. Arrays of nanoscale and microscale lines and dots can be rapidly generated inside the environmentally controlled work area with the simple and intuitive software interface. Multiplexed arrays are easily created using NanoInk's inkwells that bridge macroscale dispensing with micro- and nanoscale patterning.

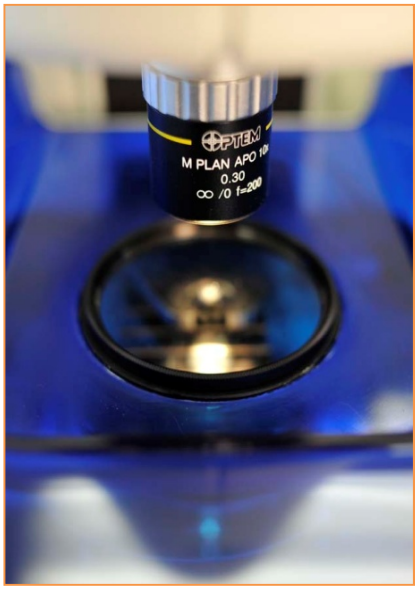
NLP 2000 System

5 Axis Nano Positioning Stage with High Resolution Optical Encoders

The NLP 2000 employs a 5 axis stage system to achieve nanometer XYZ precision printing with NanoInk's multi-pen arrays. The assembly is comprised of three piezo-driven linear stages (X, Y, Z) and 2 goniometer stages (T_x and T_y) all with optical encoders.



- XY Stage Travel Range: 40 mm x 40 mm
- Z Travel Range: 10 mm
- X- and Y-axis Resolution: +/- 25 nm
- Z-axis Resolution: +/- 75 nm
- T_x and T_y Goniometer Stages: +/- 5°
- T_x and T_y Goniometer Resolution: +/- 0.00025°
- Substrate Holder: Capable of accommodating microscope slides, petri dishes, and samples up to 4 inches in diameter
- Pen Holder: For NanoInk multi-pen arrays



NLP 2000 Optical System

The NLP 2000 features integrated high resolution optical imaging for simultaneous visualization of pens and substrate.

- 10x Objective M Plan APO
  - 33.5 mm working distance
  - 0.30 numerical aperture
- Optical Resolution: < 1 µm
- Motorized Digitally Controlled 6x Zoom
- Digitally Controlled Halogen Illumination System
- High Resolution CCD Camera
  - 1.4 Megapixel Sensor
- Field of View
  - 0% Zoom: 844 µm x 629 µm
  - 100% Zoom: 143 µm x 110 µm
- Video Magnification : (280x -1700x)

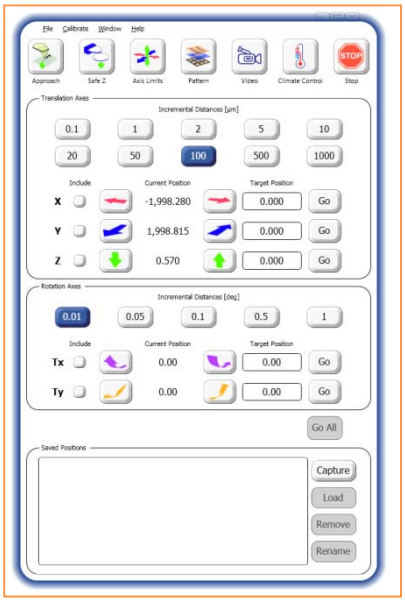
Localized Environmental Chamber

User control of temperature and humidity within the printing environment.

- Software Controlled Temperature & Humidity
- Heating Temperature Range: (Ambient + 20°C)
- Cooling Temperature Range: (Ambient – 2°C)
- Temperature Stability: +/- 0.5 °C
- Humidity Range: (10-90% RH)
- Humidity Stability: +/- 5% RH

NLP 2000 System

NLP 2000 Software

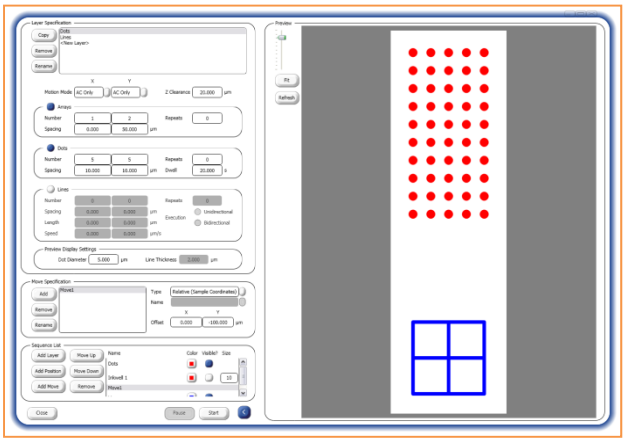


Main Window

- X, Y, Z Axis Stage Movement: Preset or User Defined
- Tip and Tilt Goniometers Control : Preset or User Defined
- Ability to Capture and Store X, Y, Z, T_X and T_Y Stage Positions
- Tip Approach Wizard

Stage Leveling Wizard

- 3 point capture function allows the user to optically define the substrate surface plane

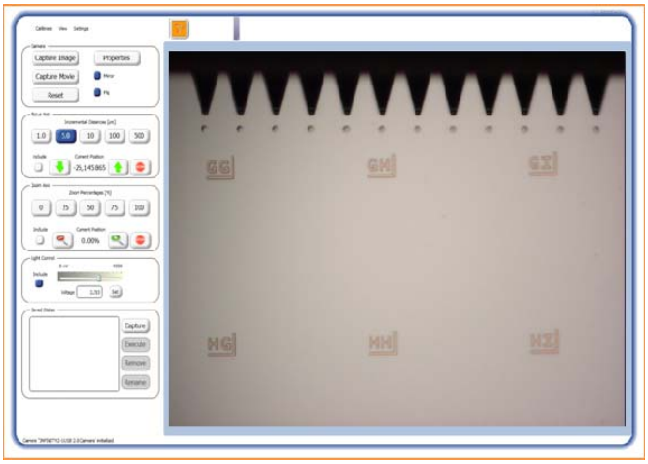


Pattern Creation Window

- Patterning of orthogonal dots and lines
- User specified dot and line spacing
- Arrays of lines and dots
- User defined line length and patterning speed
- User defined dwell time for dots
- User controlled pattern sequencing
- Pattern preview window

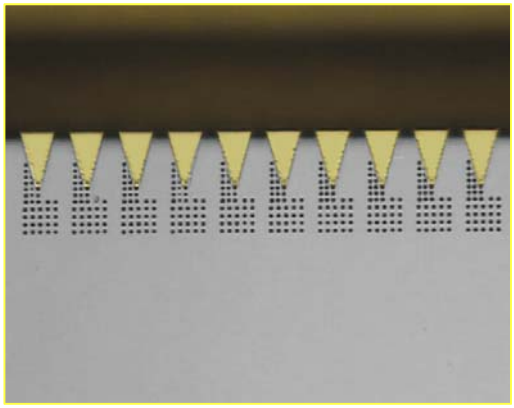
Optical Imaging Interface

- Integrated focus control
- Integrated zoom control
- Integrated light intensity control
- Ability to capture, store, and rename unlimited combinations of focus, zoom, and light intensity levels



NLP 2000 System

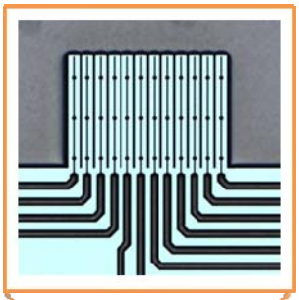
NLP 2000 Getting Started Kit



The NLP 2000 comes complete with all of the tools you need to create micro- and nanostructures using DPN. The Getting Started Kit includes everything needed for DPN experimentation.

- Pens, Type-M Multi-Pen Arrays, qty 20
- Pens, Type-F Multi-Pen Arrays, qty 10
- Inkwell Arrays: Universal, M-6MW, M-12MW, qty 10 each
- Substrates, SiO_2 Pre-marked Substrates, qty 10
- Substrates, Gold Pre-marked Substrates, qty 4
- Printing Solution, Bio-A and Bio-B, 1 vial each
- Biological Printing Solution User Manual
- Printing Solution, MHA-Octanol, 1 vial
- Micropipette and Tips, 0.1-2.0 µL

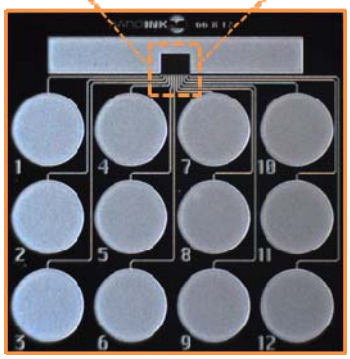
DPN Multi-Pen Arrays



NanoInk's multi-pen arrays allow for deposition of a variety of materials. Features include:

- Silicon nitride pens
- Large-area coverage and/or multi-ink patterning
- A-frame or diving board shaped cantilevers

Inkwells

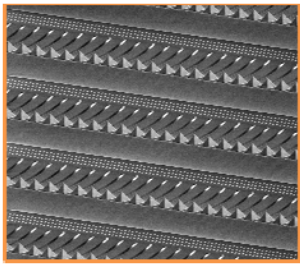


NanoInk's inkwells are specifically designed to deliver a solvent-based ink to one or several tips among a pen array without cross-contamination.

- With inkwells, an ink/solvent solution is delivered to one of the inkwell reservoirs via a micropipette
- Up to twelve unique molecular inks are possible on each inkwell chip
- Ink is guided through microchannels to the microwell, where the tip will dip and be coated with ink

System Options

2D nano PrintArray™ Kit



The 2D nano PrintArray Chip provides a high-throughput solution to flexibly pattern nanoscale features. The 2D nano PrintArray retains the direct write, high resolution, ambient deposition, and chemical and material flexible attributes of DPN, while multiplying the desired pattern 55,000 times across a 1 cm^2 area.

Extended Service Package

Receive an additional 1 year of service and warranty beyond the standard 1 year.

NLP 2000 System

Vibration Isolation

The NLP 2000 has an integrated passive vibration isolation system.

- Vistek bearings isolate horizontal and vertical vibration components
- No external air source required
- System Footprint: 30” (76 cm) L x 22” (56 cm) W

NLP 2000 Controller

- Digital Closed Loop XYZ Stage Motion Control
- Digital Control Electronics for Optical system and Environmental Chamber
- Dimensions: 24” (61 cm) L x 13” (33 cm) W x 25” (64 cm) H

PC Workstation

- Dell® Computer Workstation with Pentium® 4 Processor
- 2 GB RAM
- 160 GB HDD
- 24“ Widescreen LCD Monitor

Warranty & Support

- On-site System Installation
- 2 Days User Training
- NLP Getting Started Guide & CD
- Full Access to DPNForum.com
- 1 Year Warranty Parts & Labor

Learn more about NanoInk products and services at www.nanoink.net. Or call us at 847-679-NANO (6266).