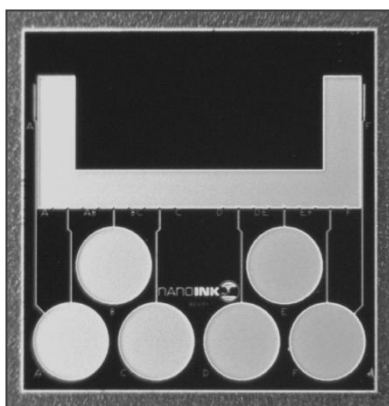


## DPN Inkwell Arrays: Universal

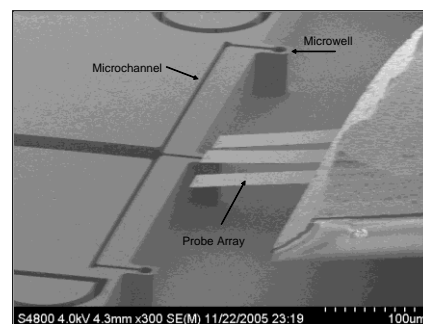
Ink wells are used to selectively coat the pen tips with ink material. DPN<sup>®</sup> Pen Arrays are dipped into micron-sized cavities (or “microwells”) containing different inks for coating the pen array tips (see Figure 1). NanoInk has designed the Universal Inkwell Arrays to meet the needs of inking of many of the different DPN pens that are provided by NanoInk.

The Inkwell chips are  $\sim 1 \text{ cm}^2$ , and fit easily onto the sample puck and stage of the DPN 5000, NSCRIPTOR<sup>™</sup> and NLP 2000 systems. Universal Inkwells have six reservoirs and two different channel configurations, corresponding to different pen types.

The reservoirs are filled with ink using a micropipette. Use of several reservoirs allows the pen arrays to be coated with the same or different inks depending on the pen and Inkwell chosen. The reservoirs supply ink to the microwells by capillary wicking in micron-sized conduits, or “microchannels.” The microchannels run from individual reservoirs to different parts of the Inkwell chip, where they feed the microwells. The system was designed to keep the microwells full of ink, even as the ink supply slowly evaporates from the reservoir.



**Figure 2:** Universal Inkwell Array Chip.



**Figure 1:** SEM image of a pen tip dipping into the microwell for inking.

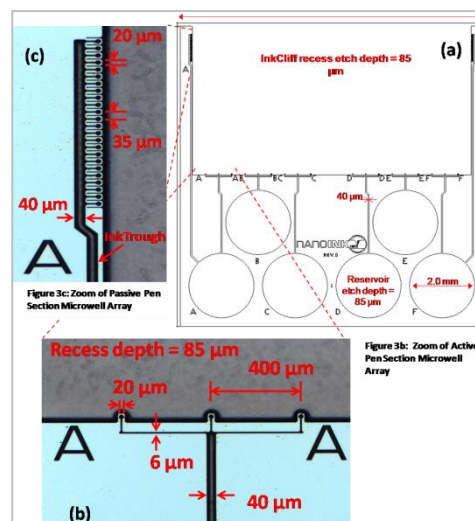
The design accommodates the following NanoInk DPN Pens all in one chip: Active Pen<sup>™</sup> Arrays and passive pen Types A, B, C, D, E, and F. The chip has separate Active Pen and passive pen dipping areas. Figure 3 shows the details and measurements of the Universal Inkwell Array chip.

# Inkwell Arrays: Universal

(continued)

## Features of the Passive Pen Area

- The “A” and “F” reservoirs also feed the passive pen section of the Inkwell Chip. To use the “A” passive pen section of the chip, rotate 90 degrees counter-clockwise. (Clockwise for “F.”) These areas include the regular microwell array and InkTrough™ for one-step inking of pen arrays (see Figure 3a).
- InkTroughs enable quick and easy inking of passive pen arrays with the same ink. Positioning the InkTrough near the edge of an InkCliff prevents ink from wicking to the underside of the pen arrays. The InkTrough is long enough to accommodate multiple adjacent pen chips for massively parallel DPN (see Figure 3c).
- The passive microwell arrays contain 24 microwells spaced 35  $\mu\text{m}$  apart. This array accommodates the Type D, E and F pen arrays. The InkTrough is available for inking larger pen arrays such as the 52 pen array of the Type F pens. Additionally, single pens can be inked using the microwells of the Active Pen Area (see Figure 3).



**Figure 3:** (a) The six reservoirs, A-F, are each clearly labeled and have a diameter of 2 mm and a depth of 85  $\mu\text{m}$ . Each of the reservoirs has a 40  $\mu\text{m}$  channel running to the Active Pen™ section and splitting into three microchannels and 3 microwells (b). (c) Reservoirs A and F have channels running to similar arrays of microwells.

## Features of the Active Pen Area

- Microwells protrude from the surrounding chip to isolate the ink dipping and prevent wicking or contamination (see Figure 3b).
- The microwell pitch is 400  $\mu\text{m}$ . Each writer pen is dipped in succession and the 400  $\mu\text{m}$  pitch between same reservoir microwells ensures that other pens in the array will not be inadvertently inked (see Figure 3b).
- The InkCliff area extends to the back edge of the chip. This larger region provides ample clearance for the pen chip during inking (see Figure 3a).

Item Name: Inkwell Arrays, Universal

Item Number: IWL-0009-03

Compatible with the NSCRIPTOR™ DPN System, DPN 5000 System, and NLP 2000 System

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