Reservoir Arrays: Universal

Item # R-0001

The Reservoir chips are ~1 cm^2, and fit easily onto the sample puck and stage of the DPN 5000, NSCRIPTOR™ and NLP 2000 systems. Universal reservoir chip have six reservoirs and two different channel configurations, corresponding to different pen types.

The reservoirs are filled with solution using a micropipette. Use of several reservoirs allows the probe arrays to be coated with the same or different inks depending on the probe and Reservoir chosen. The reservoirs supply solution to the microreservoirs by capillary wicking in micron-sized conduits, or "microchannels." The microchannels run from individual reservoirs to different parts of the Reservoir chip, where they feed the microreservoirs. The system was designed to keep the microreservoirs full of solution, even as the solution supply slowly evaporates from the reservoir (Figure 1).

Reservoirs are used to selectively coat the pen tips with ink material. Probes Arrays are dipped into micron-sized cavities (or "microwells") containing different inks for coating the probe array tips (see Figure 2). The Universal reservoir Arrays is designed to meet the needs of inking of many of the different probes.

The design accommodates the following probes all in one chip: passive probe Types A, B, C, D, E, and F. Figure 3 shows the details and measurements of the Universal reservoir Array chip.

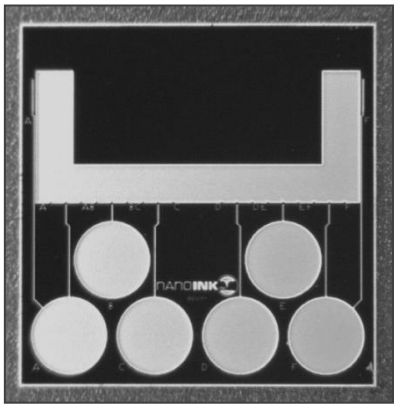

Figure 1: Universal Inkwell Array Chip.

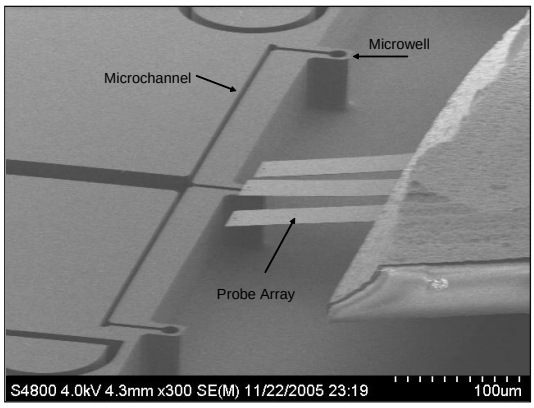

Figure 2: SEM image of a pen tip dipping into the microreservoir for probe coating.

Features of the Passive Probe Area

- The "A" and "F" reservoirs also feed the passive probe section of the Reservoir Chip. To use the "A" passive probe section of the chip, rotate 90 degrees counter-clockwise. (Clockwise for "F.") These areas include the regular microreservoir array for one-step coating of probe arrays (see Figure 3a).
- InkTroughs enable quick and easy coating of passive probe arrays with the same solution. 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 probe chips for massively parallel probes (see Figure 3c).
- The passive microreservoir arrays contain 24 microreservoirs spaced 35 µm 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 probe array of the Type F probes. Additionally, single probes can be coated using the microreservoirs of the Active Probe Area (see Figure 3).

Features of the Active Probe Area

- Microreservoirs protrude from the surrounding chip to isolate the ink dipping and prevent wicking or contamination (see Figure 3b).
- The microreservoir pitch is 400 µm. Each writer probe is dipped in succession and the 400 µm pitch between same reservoir microreservoirs ensures that other probes in the array will not be inadvertently coated (see Figure 3b).
- The InkCliff area extends to the back edge of the chip. This larger region provides ample clearance for the probe chip during coating (see Figure 3a).

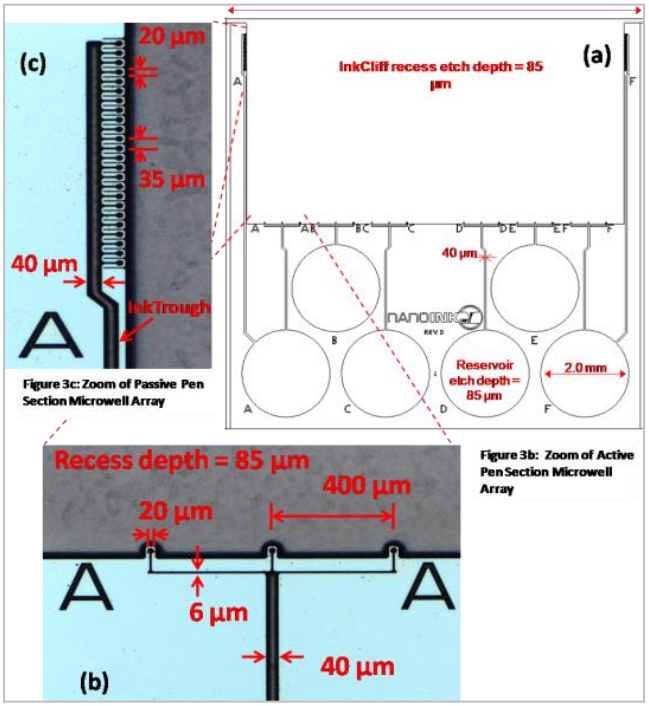

Figure 3: (a) The six reservoirs, A-F, are each clearly labeled and have a diameter of 2 mm and a depth of 85 µm. Each of the reservoirs has a 40 µm channel running to the Active Probe section and splitting into three microchannels and 3 microreservoirs (b). (c) Reservoirs A and F have channels running to similar arrays of microreservoirs.

Reservoir Arrays: 66 x 12 reservoirs

Item # R-0002

Reservoir Arrays are used to coat probe tips with solution of interest. The probe array is dipped into the terminal side of the micron-sized channels, containing different solutions for coating the tips of the probe array. There is a series of reservoir arrays were designed to meet the needs of coating the different types of probe arrays that are available for use.

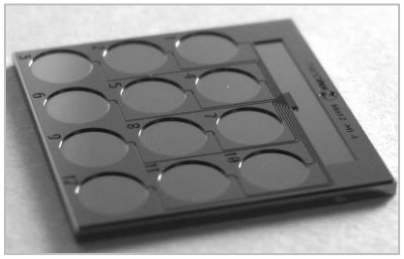

Figure 1: The 66x12-M2-1 Inkwell array

The reservoir arrays are ~1 cm^2, easily fitting onto the sample puck of the DPN 5000, NSCRIPTOR™ Systems, as well as the stage of the NLP 2000 System. The 66x12 Reservoir arrays are designed specifically to be used with side 2 of Type-M probe arrays. The spacing between the microchannels is 66 µm, corresponding exactly to the spacing between each probe of side 2 of the Type-M probe array.

The 66x12 Reservoir feature twelve 2 mm diameter reservoirs with a depth of 85 µm. Each reservoir is connected to 40 µm wide channel that leads to the loading area where channels taper to 10 µm across. Further details of the measurements of the twelve reservoir chips are shown in Figure 1 and 2.

The un-etched surface around the reservoirs and microchannels is coated with a hydrophobic coating (Teflon®) that prevents solutions from spreading to other reservoirs or channels and causing cross contcontamination. The reservoirs supply solution to the loading area by capillary wicking in the microchannels. The reservoirs are filled with solution using a micropipette, usually 0.3-0.5 µL (a small drop). When used with the pairing probe array (Type M probe array, side 2) the reservoirs can be filled with the same solution for throughput experiments or different solutions for multiplexing experiments. The system was designed to keep the microwells full of solution, even as the solution supply slowly evaporates from the reservoir.

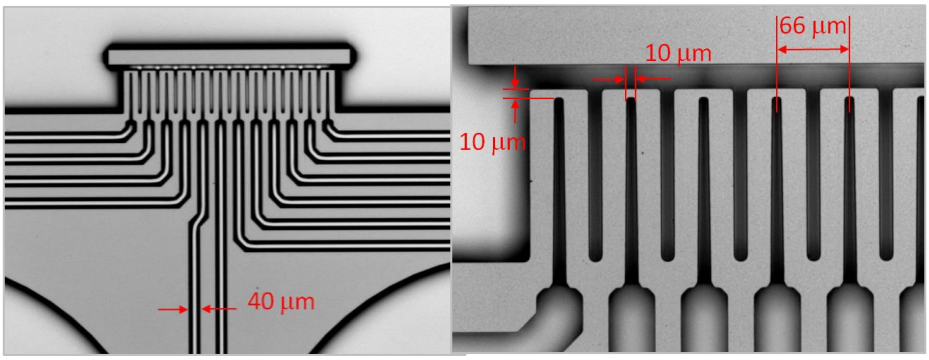

Figure 2: Optical microscope images showing (a) a view of the loading area with 12 microwells, and (b) the critical dimensions of the microchannels and microwells.

Reservoir Arrays: 66 x12 CC reservoirs

Item # R-0003

Reservoir Arrays are used to coat probe tips with solution of interest. The probe array is dipped into the terminal side of the micron-sized channels, containing different solutions for coating the tips of the probe array. There is a series of reservoir arrays were designed to meet the needs of coating the different types of probe arrays that are available for use.

The reservoir arrays are ~1 cm^2, easily fitting onto the sample puck of the DPN 5000, NSCRIPTOR™ Systems, as well as the stage of the NLP 2000 System. The 66x12 Reservoir arrays are designed specifically to be used with side 2 of Type-M probe arrays. The spacing between the microchannels is 66 µm, corresponding exactly to the spacing between each probe of side 2 of the Type-M probe array.

The 66x12 Reservoir feature twelve 2 mm diameter reservoirs with a depth of 85 µm. Each reservoir is connected to 40 µm wide channel that leads to the loading area where channels taper to 10 µm across. Further details of the measurements of the twelve reservoir chips are shown in Figure 1.

The un-etched surface around the reservoirs and microchannels is coated with a hydrophobic coating (Teflon) that prevents solutions from spreading to other reservoirs or channels and causing cross contcontamination. The reservoirs supply solution to the loading area by capillary wicking in the microchannels. The reservoirs are filled with solution using a micropipette, usually 0.3-0.5 µL (a small drop). When used with the pairing probe array (Type M probe array, side 2) the reservoirs can be filled with the same solution for throughput experiments or different solutions for multiplexing experiments. The system was designed to keep the microwells full of solution, even as the solution supply slowly evaporates from the reservoir.

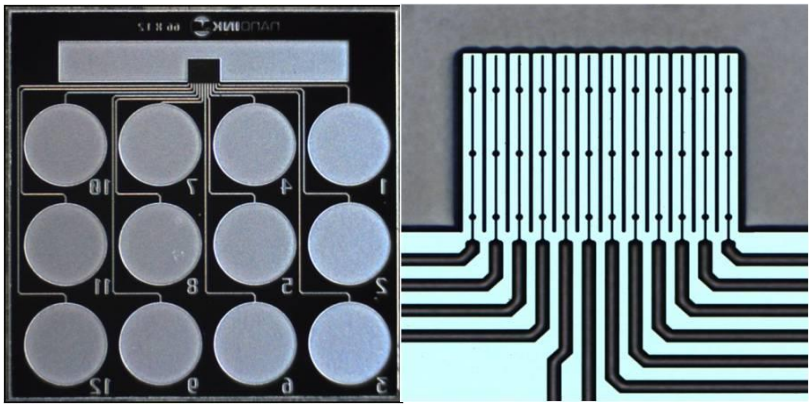

Figure 1: Optical microscope images showing low magnification view of the Reservoir Chip and high magnification of 12 microchannels and microwells.

Item #	Type	Description
R-0004	69 x 12 reservoirs	Inkwell array with 12 microwells to be used with Side 2 of Type F pen array, 69 um pitch. Use with every other probe
R-0005	70 x 12 reservoirs	Reservoir with 12 microwells to be used with Side 1 of Type F pen array, 70 um pitch. Coating every second probe
R-0007	100 x 12 reservoirs	12 microwells to be used with Side 2 of Type F pen array, 69 um pitch. Use with every other probe

Reservoir Arrays: 66 x 6 reservoirs

Item # R-0008

Reservoir Arrays are used to coat probe tips with solution of interest. The probe array is dipped into the terminal side of the micron-sized channels, containing different solutions for coating the tips of the probe array. There is a series of reservoir arrays were designed to meet the needs of coating the different types of probe arrays that are available for use.

The reservoir arrays are ~1 cm^2, easily fitting onto the sample puck of the DPN 5000, NSCRIPTOR™ Systems, as well as the stage of the NLP 2000 System. The 66x6 Reservoir arrays are designed specifically to be used with side 2 of Type-M probe arrays. The spacing between the microchannels is 66 µm, corresponding exactly to the spacing between each probe of side 2 of the Type-M probe array.

The 66x6 Reservoir feature twelve 2 mm diameter reservoirs with a depth of 85 µm. Each reservoir is connected to 40 µm wide channel that leads to the loading area where channels taper to 10 µm across. Further details of the measurements of the twelve reservoir chips are shown in Figure 1.

The un-etched surface around the reservoirs and microchannels is coated with a hydrophobic coating (Teflon®) that prevents solutions from spreading to other reservoirs or channels and causing cross contcontamination. The reservoirs supply solution to the loading area by capillary wicking in the microchannels. The reservoirs are filled with solution using a micropipette, usually 0.3-0.5 µL (a small drop). When used with the pairing probe array (Type M probe array, side 2) the reservoirs can be filled with the same solution for throughput experiments or different solutions for multiplexing experiments. The system was designed to keep the microwells full of solution, even as the solution supply slowly evaporates from the reservoir.

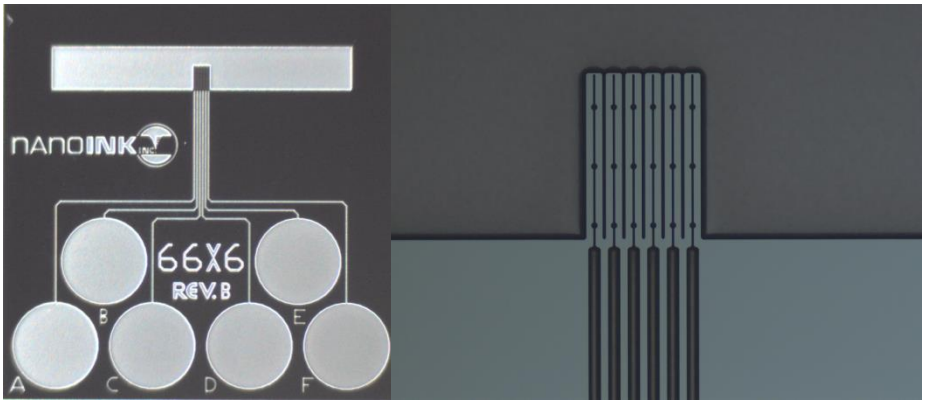

Figure 1: Optical microscope images showing low magnification view of the Reservoir Chip and high magnification of 12 microchannels and microwells.