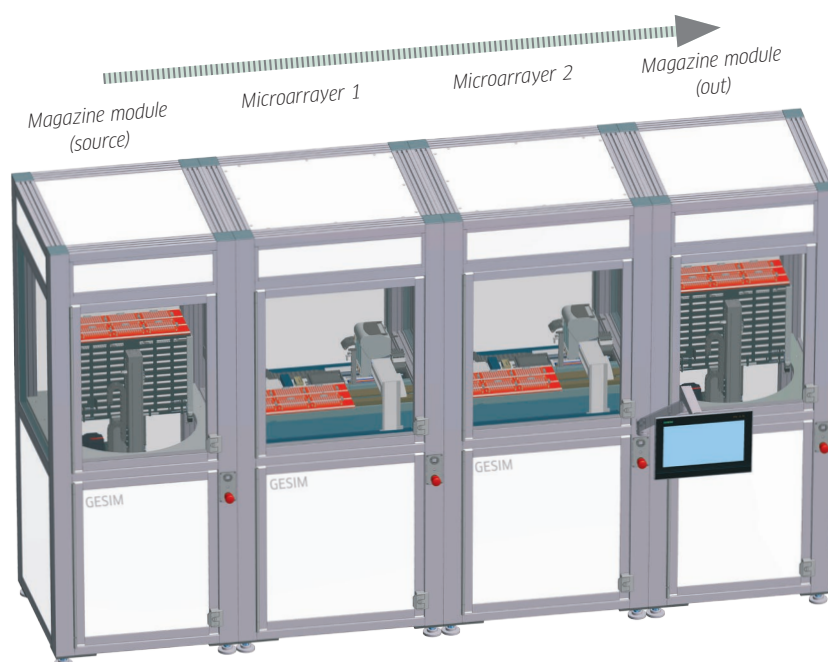
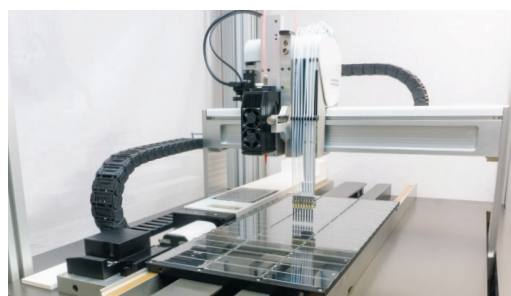


Production Line – 24/7 Bulk Microarray Manufacturing

The new GeSiM NP7 for the mass production of biochips

GeSiM's new non-contact microarray spotting system, Nano-Plotter NP7 'High volume', matches the needs for 24/7 production of microarray slides, biosensors or other biochips, thus replacing the Nano-Plotter NP2.1, of which hundreds of systems have been installed worldwide.

GeSiM's piezoelectric pipetting tips, micromachined from silicon, with droplet volumes from 0.05 to 0.4 nl, have made their way because they are highly dependable. Over the years, we have added other tools, such as solenoid valve dispensers for volumes > 20 nl and third-party adhesive dispensers. All these dispensers and many other tools can also be used in the new GeSiM NP7, which is based on the modular, freely configurable **GeSiM Robotics** platform.



NP7 with two microarray printers and two stackers for empty and printed substrates. The machine can be used with only one stacker (see photos). Work flow (arrow) is from left to right. Dimensions (L×W×H): 78×78×195 cm³ (magazine module) and 78×88×195 cm³ (printer).

NP7 – cascadable microarraying and micropipetting platform

- In-line, expandable, free-standing, modular production system for various substrates (slides, micro-well plates, membranes, microfluidic cartridges etc.)
- The production line consists of one or more NP7 units with linear motors and one or two rotating magazine modules (substrate tray stackers) for empty and printed objects (slides, MTPs etc.), connected by a conveyor belt.
- Each NP7 can be equipped with GeSiM piezoelectric pipettes, solenoid valve dispensers, displacement pipettes or other tools (up to eight per print head).
- Up to two 384 well SBS microtitre plates (MTPs) for samples per unit
- Further tools (e.g. Z-sensor, cameras, cartridge piezo dispenser, UV lamp, disposable tips and many others used in the other *GeSiM Robotics* systems) can be mounted on additional Z-drives.
- Stacker, revolvable, for up to 10 substrate trays for long unattended runs
- Tray capacity: 2×3 MTPs, 3×18 slides or an equivalent area of other (custom) chips → 60 MTPs or 540 slides per stacker
- Image processing can be added for better spot positioning using e.g. fiducials.
- Our new safety cabinets can also accommodate other instruments – for 3D bio-printing, microcontact printing, chemical synthesis or foil cutting.

GeSiM Nano-Plotter NP7

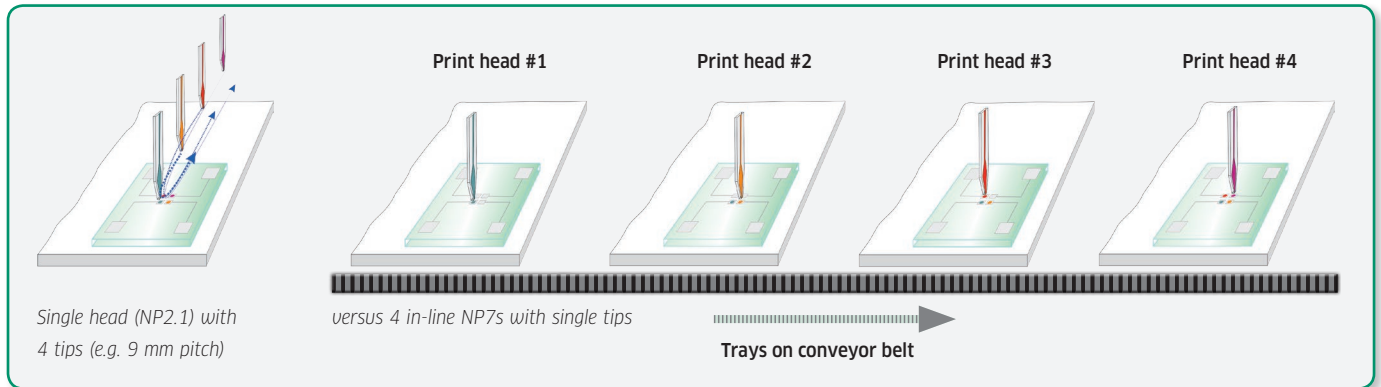
Production Line

Improving throughput in microarray printing using cascaded NP7 units

Multiple in-line NP7 dramatically **speed up high-density sample deposition** on objects such as slides, MTPs, microfluidic cartridges or biosensor chips, as different tasks are distributed over several machines working in parallel.

Each spot is printed by just one pipette at a time, so the pipette head must travel to each new spot and the overall speed is low. This regime, however, is the only choice if high positional accuracy (enhanced by image recognition on custom chips) is required. Additional tips on the print head reduce the time for washing and sample uptake, but **not** the time for travelling/printing. → Throughput is increased only slightly.

In the NP7 product line, more tips mean more units of single-tip NP7s, and each unit works autonomously. → Throughput increases with the number of units:

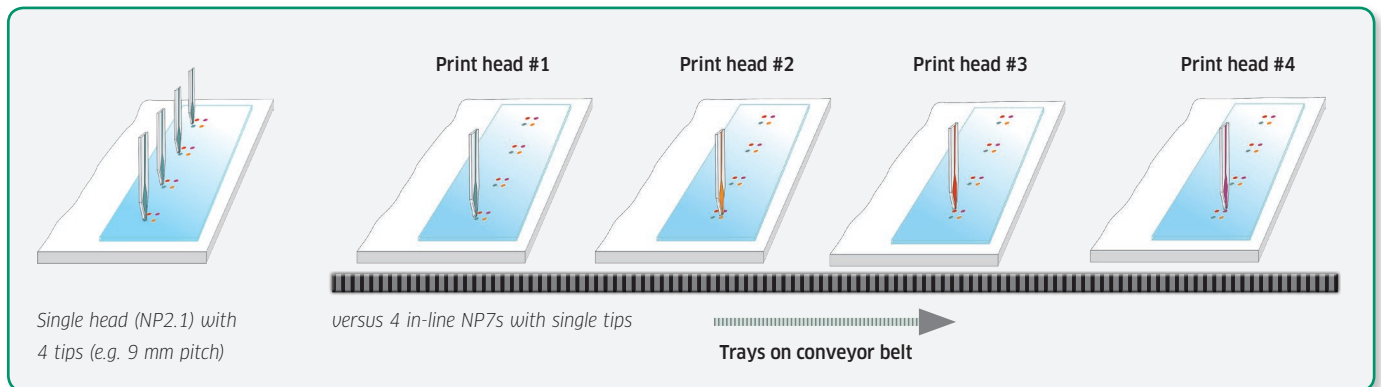


Example 2: Simultaneous spotting

As said, sequential spotting can be important when sample volumes are limited. The standard spotting mode of course is **simultaneous**. Here, multiple pipettes are installed on the print head, and all of them work **in parallel** in each spotting cycle. The throughput increases proportionally with the pipette number, but you may need to split samples → More throughput means more sample consumption.

In the NP7 production line, samples do not need to be split, as every pipette prints a different sample; the higher throughput stems from the parallel arrangement of systems. But if you really want to increase throughput, mount more tips per NP7 unit.

Please note that the smallest configuration consists of one stacker and one Nano-Plotter NP7. In this case empty and printed decks are stored in the same stacker. But the batch size is much higher than in the standard Nano-Plotter (NP2.1/E: 96 slides).



Gesellschaft für Silizium-Mikrosysteme mbH
Bautzner Landstraße 45
01454 Radeberg, Germany
Tel. +49-351-2695 322
Fax +49-351-2695 320
contact@gesim.de
www.gesim.de

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For more information or to see the latest product changes and enhancements, please visit our website or call.