

n.jet EHD

NOTION
SYSTEMS



ADDITIVE DIGITAL PRINTING AT THE MICRON SCALE

NOTION & SCRONA PARTNERSHIP

Both companies combine Notion's expertise in developing and manufacturing high-end printing systems for functional materials with Scrona's novel multi-nozzle EHD MEMS printheads. The partnership between Notion and Scrona promotes this new technology in various applications such as display, electronics or semiconductor manufacturing. Notion Systems manufactures and services the n.jet EHD lab printer, primarily for high-level research and development facilities.

ADVANTAGES OF HIGH RESOLUTION EHD PRINTING

Electrohydrodynamic (EHD) printing is a new high resolution printing technology enabling maskless, direct-write, 3D, non-contact, conformal and additive patterning at the micron scale with a variety of ink systems and materials.

The printing resolution exceeds conventional ink-jetting by an order of up to 20 times, paving the way of additive printing into applications dominated by photolithographic micro-fabrication and enabling completely new devices consisting of micron scale building blocks.

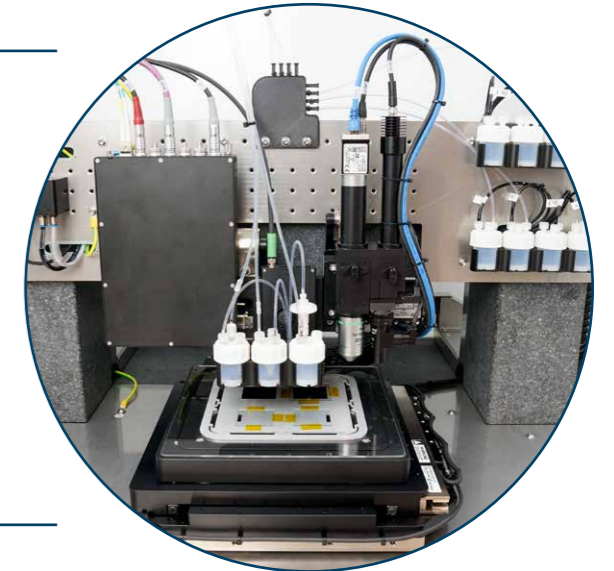
EHD printing is used to replace established subtractive process sequences and reduces waste and energy consumption, which makes electronics production more ecological and economical at the same time.

THE SCRONA EHD ENGINE

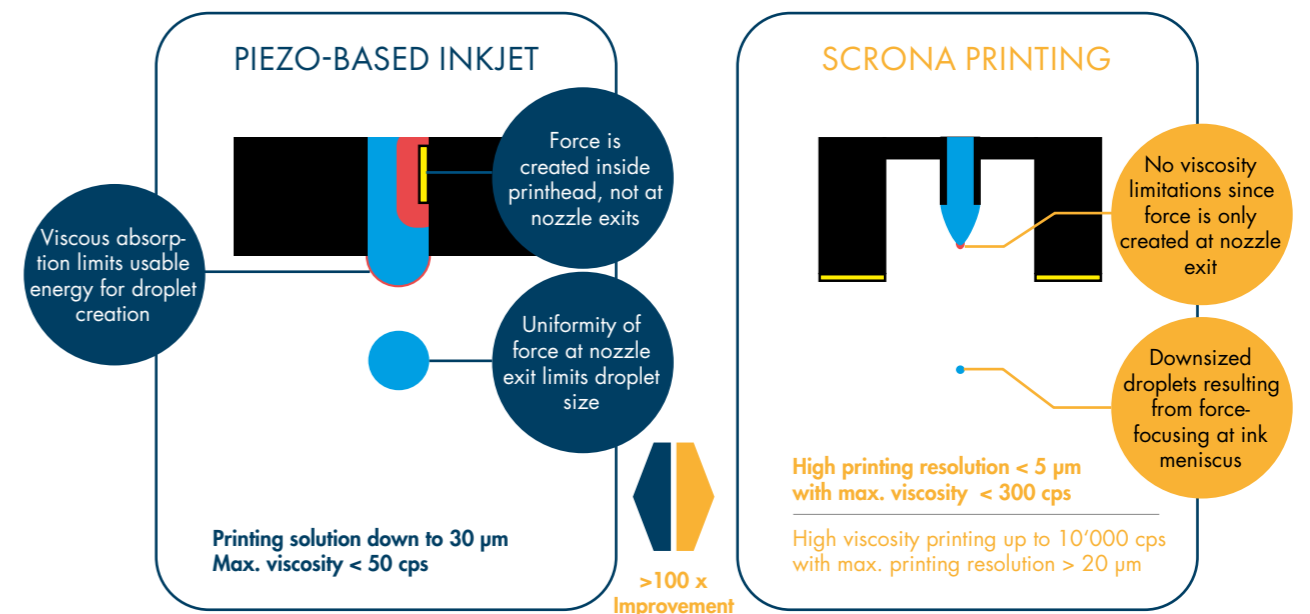
Scrona develops multi-nozzle MEMS printheads with ultra-high printing resolution capabilities < 5 µm (depending on ink, substrate and wetting properties). This R&D tool is targeted to advanced development labs in various fields of micro-fabrication and digital additive manufacturing.

Scrona print engine advantages

- Additive technology that allows < 5 µm resolution from multi nozzle MEMS printheads
- Multimaterial technology
- Delivered with GEN3-8 printheads, designed for future printhead generations
- Dedicated solutions for printing high viscosity materials on request



COMPARISON BETWEEN INKJET & EHD PRINTING



n.jet EHD SYSTEM

n.jet EHD SYSTEM

Main features

- Substrate size up to 150 mm
- Precision granite base on vibration isolation platform
- FFU with HEPA filter
- Precision down to 1 μm
- Motion system with 7 different motorized axes
- Encoder resolution 10 nm
- Ethercat based unified motion platform control with high resolution triggering and synchronization of motion and printhead actuation
- High resolution top and bottom video microscope units

Software

- User friendly,
- Multinozzle bitmap printing,
- Python scripting,
- Substrate alignment,
- Waveform tuning

GEN3 MEMS PRINT HEAD

The GEN3 MEMS print head includes the following features:

- Starting from 8 nozzles (GEN3-8)
- Nozzle level ink circulation
- Print head heating up to 75 °C
- Typical drop-on-demand frequency up to 20 kHz (Depending on viscosity and ink conductivity, lower values may be resolved)
- Typical nozzle pitch 150 μm
- Typical drop volume 0,1 femto liter
- Dedicated printheads for high viscosity available on request
- Adjustable droplet size (on the same printhead) with InkLogic™ tech platform

EHD ink compatibility:

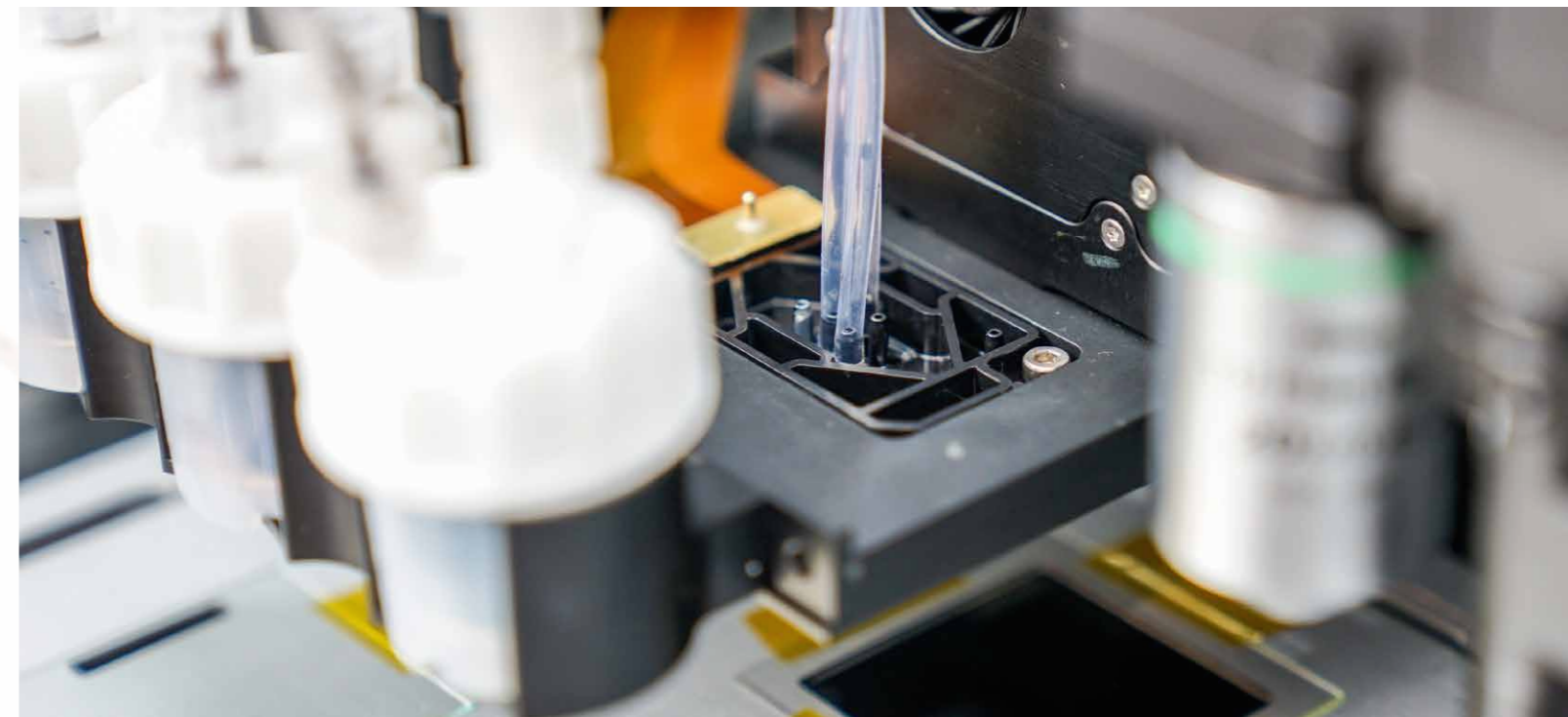
- **Nanoparticle inks:** Silver, Gold, copper, quantum dots, oxides, graphene, PTFE
- **Small molecules, monomers, oligomers:** Cyclotene, acrylics, epoxy, pentacene, dyes, etc.
- **Metal salts:** Gold/silver metal salts (reduced on substrate to pure metal)
- **Melts:** Paraffin/stearic acid
- **Biomolecules:** Proteins, etc.



GEN3-8

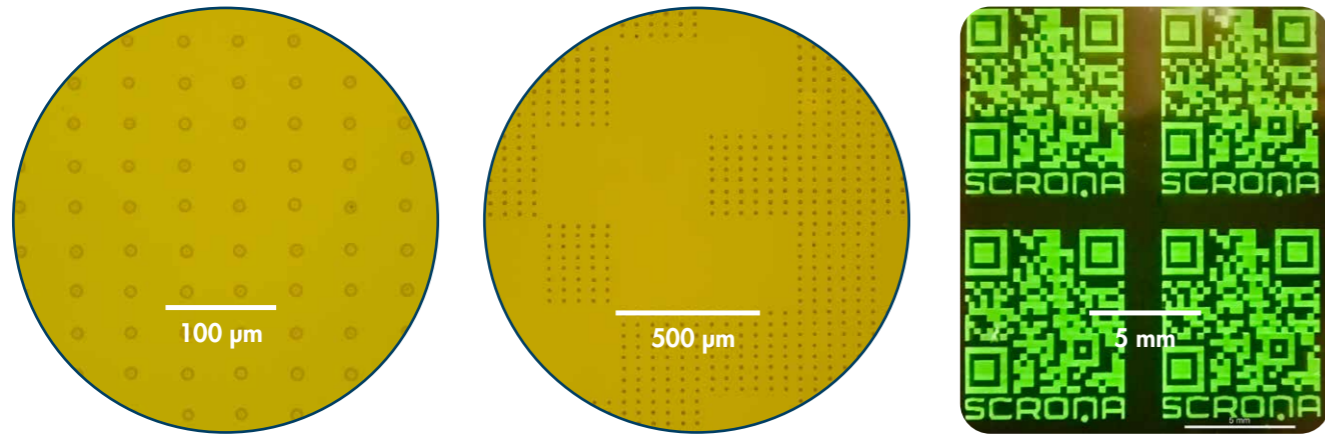


GEN3-128

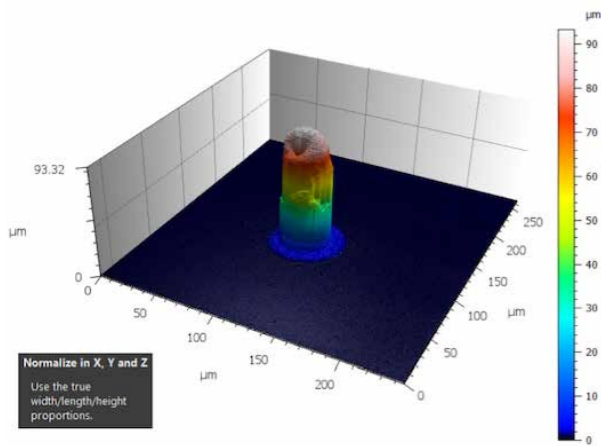


APPLICATION RESULTS

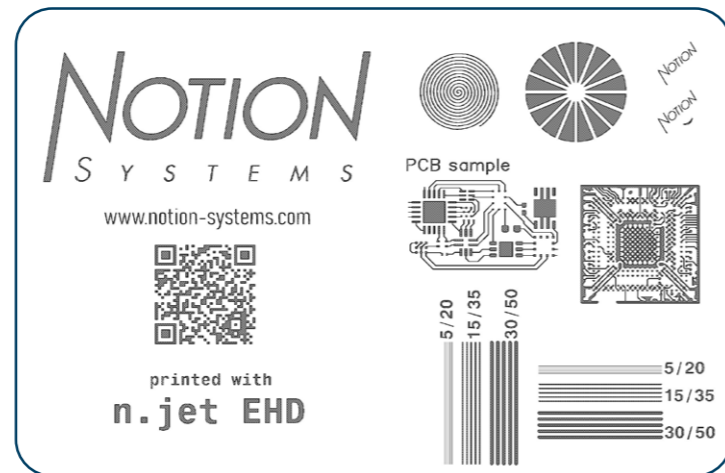
Digital bitmap printing of quantum dot material in high resolution for color conversion (e.g. for microLED applications)



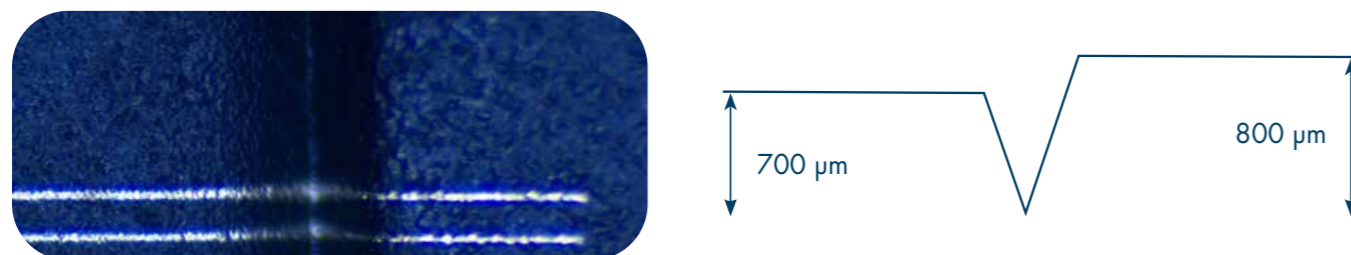
High aspect ratio printing of copper pillars for advanced interconnect applications



Multi nozzle digital bitmap printing high resolution fan-out pattern | Material: silver nano particle ink



Printing of typography



NAAC - NOTION ADVANCED APPLICATION CENTER

The Notion advanced application center plays a crucial role, as it offers several important functions and benefits for research, development and industrial practice.



CUSTOMER DEMONSTRATION



KNOWLEDGE TRANSFER AND TRAINING



TECHNOLOGY DEVELOPMENT AND INNOVATION



TEST ENVIRONMENT FOR INDUSTRIAL PRODUCTION PROCESSES



PROTOTYPING, BENCHMARKS AND TESTING

Our application center is equipped with the latest n.jet systems and offers a wide range of possibilities for customer developments. The systems are configured with different inks and printheads to match our customers' requirements. Additional test equipment ensures that the printed structures can be measured and tested immediately after printing.



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S Y S T E M S



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