



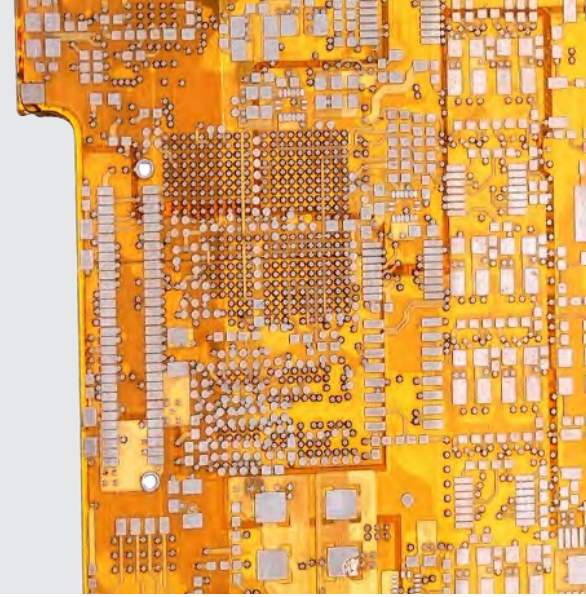
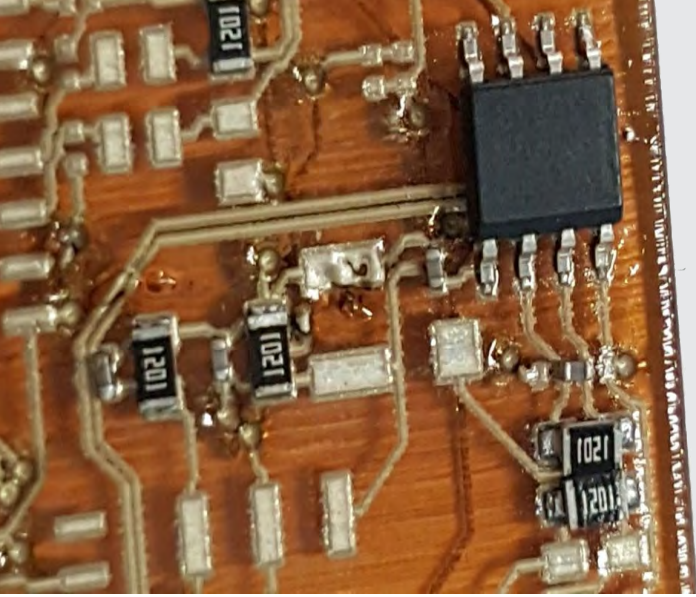
DragonFly™ Pro System

Precision Additive Manufacturing of Printed Electronics

Nano Dimension's DragonFly Pro is transforming additive manufacturing for electronics development. We empower companies to take control of their entire development cycle by 3D printing their own professional circuit boards.

From proofs of concept and design validation to test fixtures and functional circuits, the DragonFly Pro enables precision, in-house 3D printing of multilayer Printed Circuit Board (PCB) prototypes, sensors, antennas, experimental electronic circuits and more. Printing in-house shortens design and test cycles from months or weeks to just days or hours.





Save Time and Innovate with Less Risk

The DragonFly Pro precision system overcomes many of the complexities and bottlenecks inherent in outsourced traditional prototyping and custom manufacturing, enabling in-house agile, time and cost-effective processes providing many benefits:

- **Time savings** – forget lengthy design cycles; print on-site in days, even for the most complex designs
- **Cost savings** – no more large order minimums and costly mistakes: discover design errors earlier in the design cycle
- **New complex geometries** – push design boundaries and innovate freely to try new concepts
- **Redesign for mechatronics** - bring better electronics to the market in terms of size, weight and environmental impact
- **Confidentiality** – keep sensitive and valuable IP in-house during development
- **Streamlined processes** - added agility means designing, testing and iterating on the fly, on-site.

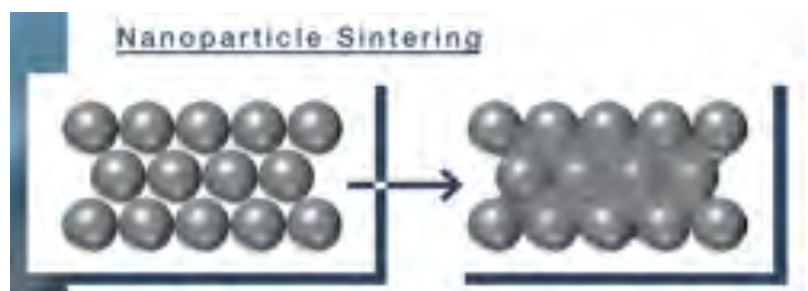
Endless Application Possibilities:

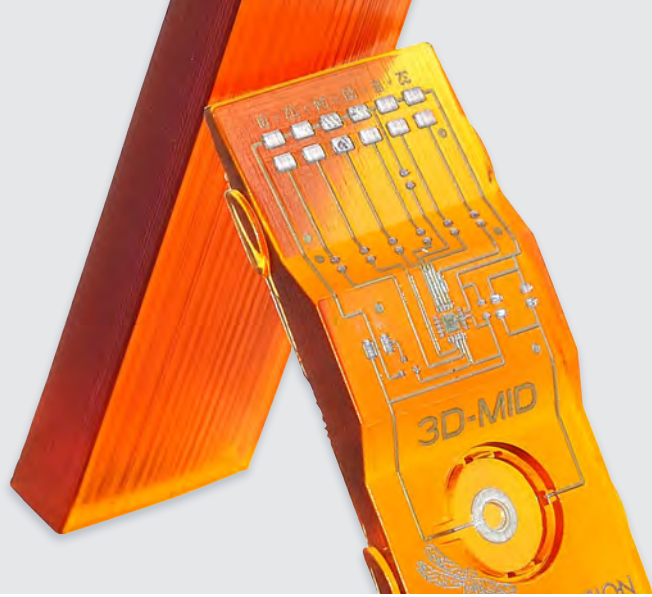
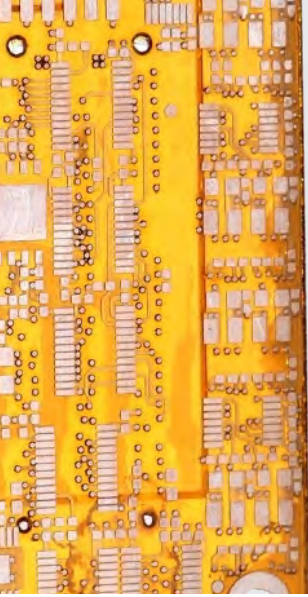
- Radio-frequency (RF) /antenna
- Sensors
- Multilayer PCBs including flexible, rigid
- Mechatronics (non-planar)
- Electromagnetic components
- Molded Interconnect Devices (MIDs)

Multi-Material Additive Manufacturing: Metals and Polymers in One Print Job

The DragonFly Pro is a multi-material precision 3D electronics printer that brings together extremely precise inkjet deposition, a dedicated conductive nanoparticle silver ink printed simultaneously with a proprietary dielectric ink and novel software. The DragonFly Pro enables designers and engineers to effortlessly and accurately print conductive and insulating materials in one print job, setting new standards for accuracy, complexity and speed in the field of both additive manufacturing and professional electronics development. Upon completion of a 3D print job there is no need for post-processing.

Multi-material 3D electronics printing is game-changing, allowing designers and engineers to print polymers and metals together to create a functional part. This revolutionary approach offers the potential for electronics to be more compact, denser and, ultimately, non-planar. With the DragonFly, it is possible to print even more complex geometries and features like non-vertical vias, embedded components, passives and more. Nano Dimension is thus blazing the path forward by electrifying additive manufacturing.





AgCite™ Conductive Ink for Inkjet

An advanced silver nanoparticle ink designed specifically for the DragonFly Pro. The size and distribution of the silver nanoparticles are optimized for the printing of highly conductive traces.

Dielectric Ink

This polymer material mimics the dielectric properties of industry FR4. The ink insulates the conductive inks and gives structure to the PCB, enabling the printing of the entire circuit in one process. The material is stable across large frequency ranges. It is designed for compatibility with Nano Dimension's AgCite™ conductive ink.

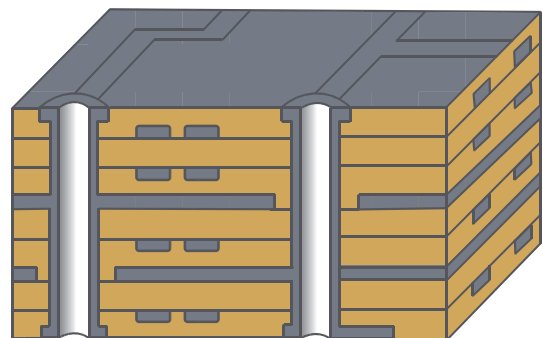
Decomposition temperature	Td 2%-341°C, 5%-376°C
Dielectric Constant	Dk (Permittivity) 3.2@1 MHz, 2.9@1 GHz
Dielectric Loss	Df (Loss tangent) 0.02@1 MHz, 0.02@ 1GHz

Switch Software

Nano Dimension directly imports standard Gerber files through its proprietary Switch software, enabling seamless transition into an additive manufacturing workflow. Multilayer 3D files can be prepared from standard file formats, with the software allowing for adjustments in numerous parameters such as layer order and thickness. When the job is ready simply load the design file from Switch straight into the DragonflyPro.

How It Works

- Two printheads jet both conductive and dielectric materials simultaneously
- Both conductor and substrate are printed in a fully additive process
- The object is built up, layer by layer
 - Conductive layers
 - Dielectric layers
 - Drill and filled vias, no electroplating
 - Solder mask
 - Annotation
- The full range of PCB features can be 100% 3D printed including interconnections such as vias, through-holes (blind, buried) and complex geometries



Conductive material Dielectric material

DragonFly Pro Specifications (*Subject to change)

Deposition Technology	Piezo Drop on Demand inkjet printing
Number of Printheads	2 (One per material)
Print Trace/Space	100/125 Micron (4/5 mil)
Build Volume XYZ	200mm x 200 mm x 3 mm (8" x 8" x 1/8")
Software	Proprietary SWITCH software
Dimensions	1400mm x 800mm x 1800mm
Weight	520 kg (1150 lbs) TBD
Power Supply	200-240V AC; 50-60 Hz; 20A
Mechanical Accuracy	0.001 mm (1 micron)
Build Plate	200mm x 200mm (8" x 8")
Operating System	Windows
Material Compatibility	Nano Dimension's conductive and Dielectric inks
Network Connectivity	Ethernet TCP/IP 10/100/1000
File Compatibility	Gerber (ODB++, IPC 2581 in process)
Regulatory Compliance	CE/FCC; EAC/UL (in process)
Operational Environment	Air-conditioned room Operating Temperature – 64°F (18°C) to 72°F (22°C) Humidity – 45–50% non-condensing

Electrifying Additive Manufacturing

Nano Dimension (Nasdaq, TASE: NNDM) is a leading additive electronics provider of 3D printed electronics that is disrupting, reshaping, and defining the future of how functional and connected products are made. With its unique additive manufacturing technologies, Nano Dimension targets the growing demand for electronic devices that require sophisticated features. Demand for circuitry, including PCBs, sensors and antennas - which are the heart of electronic devices - cover a diverse range of industries, including consumer electronics, medical devices, defense, aerospace, automotive, IoT and telecom. These sectors can all benefit greatly from Nano Dimension's products and services for short-run manufacturing and rapid prototyping. For more information, please visit www.nano-di.com



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