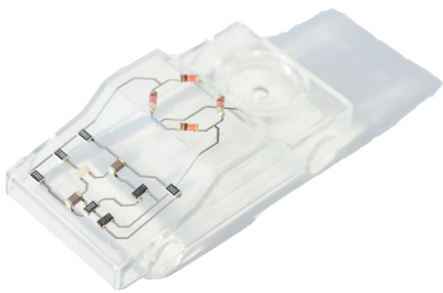
Neotech AMT

Advanced Manufacturing Technologies for 3D Printed Electronics

LBS 45XE

Photonic Sintering System for 3D Printed Electronics

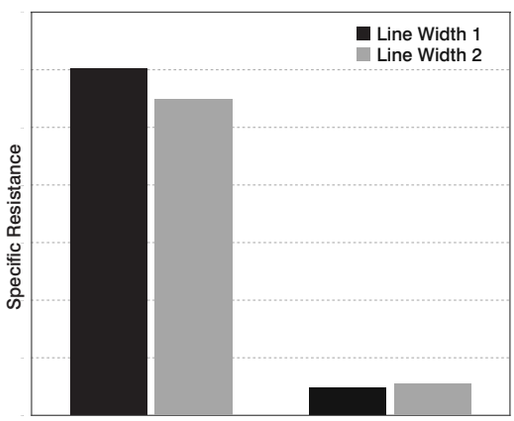
Light Beam Sintering (LBS) is a non-contact, photonic sintering technique that is applied to printed electronic circuits on “low temperature capable” substrates such as Polycarbonate (PC). Each sintering head consists of a specially selected light source with integrated air-cooled reflector and lens system. The projected light beam (tuned to the absorption wavelength of the printed media) is focussed on the printed trace where local heating and sintering takes place. The heat distribution is precise enough to sinter the printed structure whilst leaving the peripheral area of the substrate unaffected.



LBS sintered LED Circuit. Ag on PC

Performance of Sintered Structures

LBS is able to achieve much higher conductivity compared to standard oven sintering at the temperature limit of resins such as PC. Therefore 3D electrical circuits can be created using thinner printed layers saving material and processing costs. The high conductivity of LBS layers also enables 3D Printed Antenna structures on low cost PC to match the RF performance of LDS Cu Antenna. The adhesive and cohesive strength of the sintered layer is excellent with sintered structures passing ASTM Cross Cut Tape Test to EN ISO 2409 with best rating (GT0).



Performance of Ag on PC LBS vs. Oven Sintering @120oC/90min

LBS 45XE System

The LBS 45X E is a low cost, high throughput system for rapidly processing 3D Printed Electronic structures. With up to 4 LBS heads and 5 axes of simultaneous motion, parallel processing of multiple components is achieved. An integrated power sensor measures lamp output to ensure process consistency. The durability of the light source is maximised with automatic switching to low voltage in standby mode (lamp off).
The base platform is a robust steel-aluminium construction with low space requirement and is designed for low cost operation with minimal maintenance. The ball bearing guided linear axes and the multi-station 4-5th rotational axis operate with high precision and minimal vibration. “Look Ahead” path control with jerk compensation ensures harmonious movement and sinusoidal accelerations that guarantee sinter path accuracy. Furthermore, the machine utilises the standardised interface and control system that operate the Neotech’s range of 3D print systems, simplifying operator training and use. Sintering tool-paths are programmed using the standard Motion 3D software.

Neotech AMT GmbH
Petzoltstraße 3
90443 Nuremberg, Germany

+49 911 27 45 501
www.neotech-amt.com
info@neotech-amt.com

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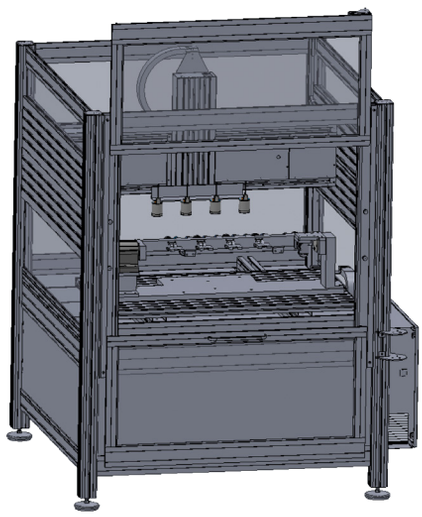
System Features

- Full 3D sintering capability
- Enables use of low cost PC substrates
- Excellent sintered structure properties
- Suitable for both thin and thick printed layers (<1μm to>10μm with complete sintering though the structure
- Non-contact, robust process with precise control of energy.
- Integrated Lamp Power Sensor to ensure consistent sintering process
- Unified software & control systems with Neotech's 3D Print Systems
- Utilises "Motion 3D" tool path generation software for sintering complex geometries
- Robust, low maintenance platform with industrially proven CNC technology
- Simple operator interface with remote service via Team Viewer
- Low operating & maintenance costs



Basic machine configuration

Specification Sintering Module

- Standoff Distance (sinter head to substrate): 30-50mm
- Spot Size: min. 2.5 – 3.0 mm
- Power Rating: up to 250W

Specification Motion Module

- Motion Speed: 100 mm/s max.
- Typical Sinter Speed 10-20mm/s for up to 10μm thicknesses.
- Motion Range: 1000-650-250mm (X-Y-Z).
- Motion Accuracy (Repeatability) X, Y and Z–Axes: +/-20μm
- Positioning Accuracy (A & B)–< 1,5 arcmin
- Repeatability (A & B) – < 6 arcsec
- System Dimensions (X-Y-Z) 1480 x 1510 x 2080mm plus control case Stand Alone System
- Weight: ca. 400kg

Note: Extraction/Filter System is required for safe working with nano-particle inks. If not already installed in customer facility, Neotech can provide details of a suitable stand alone models.

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