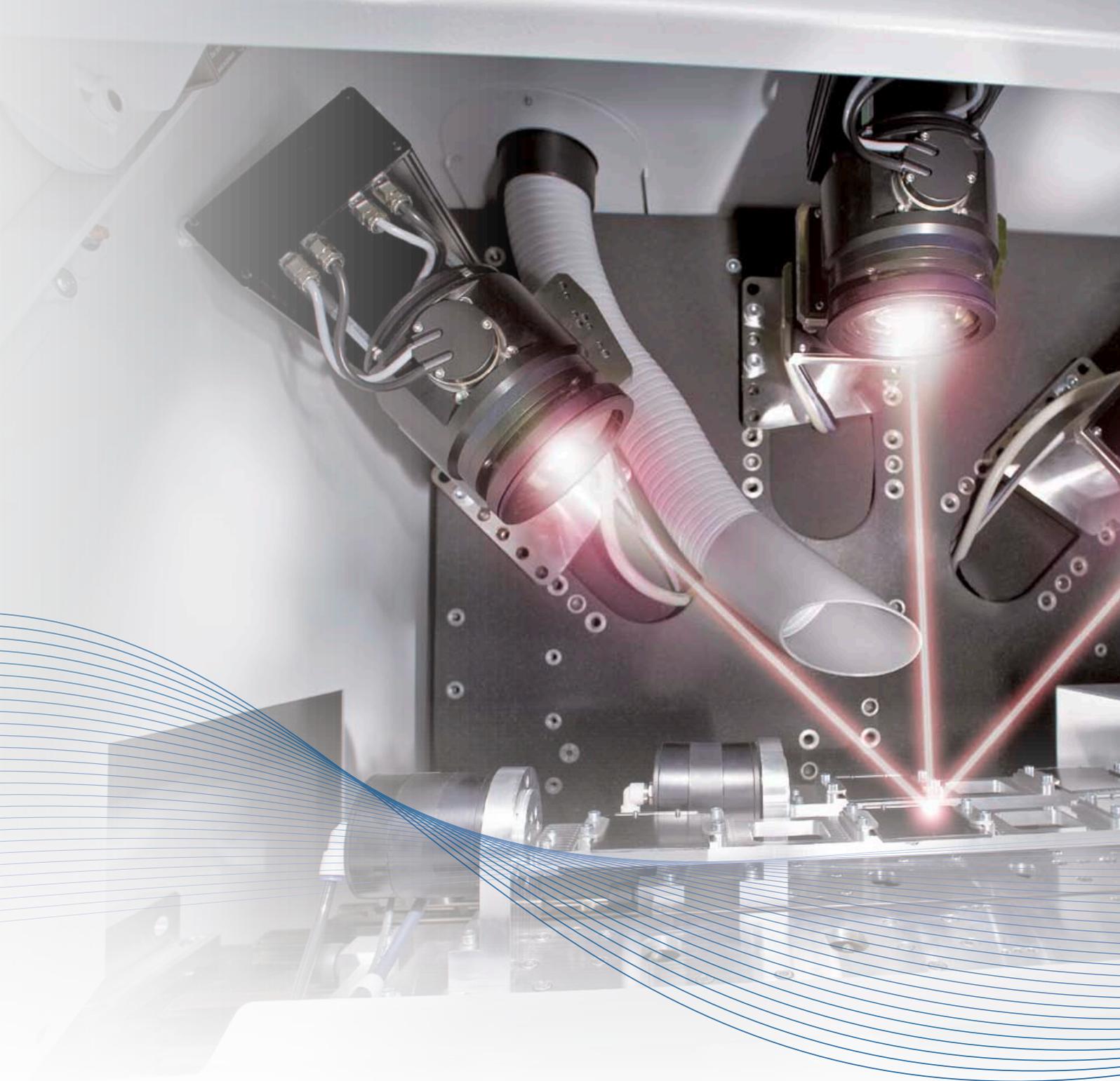


# Large Components in LDS Processing

## LPKF Fusion3D 1500





## Step by step ...

In the last two years, laser direct structuring (LDS) has proven itself in series production a million times over. The technology has been continuously refined and developed and is now overcoming previous limitations related to component length. The LPKF Fusion3D 1500 maximizes the benefits of cutting edge LDS technology by combining the capability of the LPKF high-performance structuring unit with the flexibility of a compact system.



### LDS technology advantages:

- For large components
- Flexible production planning
- Fewer parts required
- Upgrade options available

### **New Layout**

Manufacturers benefit when components can be omitted. This reduces production costs and minimizes assembly outlays. But above all, it saves space. LDS proved its capability to eliminate components long ago with smart phone antennas. Now, a new application is emerging.

LDS technology enables designers to meet ongoing demands for integrating more functions in ever-smaller spaces. With the LDS process, already existing plastic components take on electronic functions in addition to their mechanical tasks.

Almost any plastic components can have strip conductors precisely and reliably integrated.

A retaining clip thus becomes the WLAN antenna, and active components can be placed on the back of the screen cover. The entire laser system is optimized for this application, with precise linear actuators, a high-quality laser processing unit and room for further upgrades.

# LPKF Fusion3D 1500



## Key features:

- Working range: max. 400 mm x 78 mm x 80 mm (L x W x H)
- Precise linear actuators
- Simple fixture design
- Upgrade option for multiple processing unit controller (MPC)

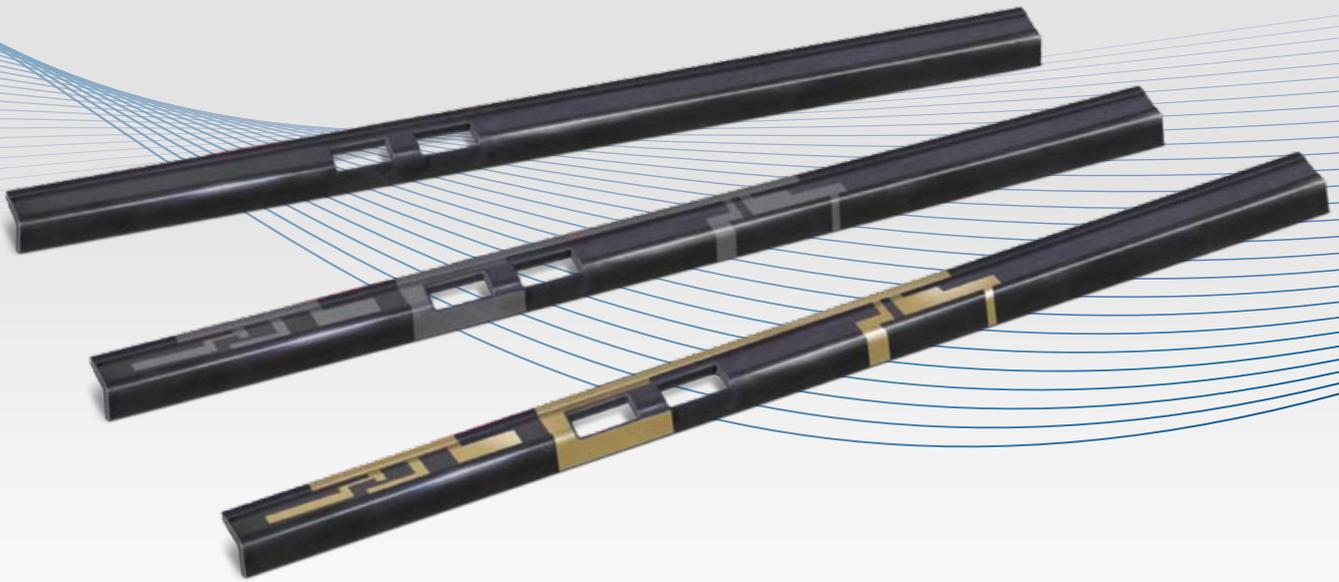


### **Proven Technology**

The LPKF Fusion3D 1500 is a system that transfers the proven LDS technology of smart phone antennas to larger components. The whole system comes in a compact enclosure with handling module and linear actuators that offer precise motion and control.

Components are moved into the processing area by a linear system with two drives. Structures can be produced up to 400 x 78 mm large and with a maximum height of 80 mm one after another. While one train is processed with the laser, the second moves into position, almost completely eliminating non-production time.

A multi-head configuration of the laser system gives further performance gains. With an optional upgrade to a multiple processing unit controller (MPC), up to three processing units can be installed to share the structuring tasks – with considerable advantages for the system's throughput.



### Simple Component Support

The laser process itself is contact-free and has no appreciable heat input. Thus the requirements for the component supports are slight in comparison to the tools needed for other processes. The component supports merely have to ensure the exact infeed of the component to the laser beam. Fixing of the components takes place via clamps or by low pressure; alignment pins give precise positioning. In practice, repeat accuracies of  $\pm 25 \mu\text{m}$  are achieved over the entire structuring process.

LPKF provides advice on component support design. Production services are also available. Each support set is extensively tested and delivered with a test record.

### Low-Maintenance Linear Actuators

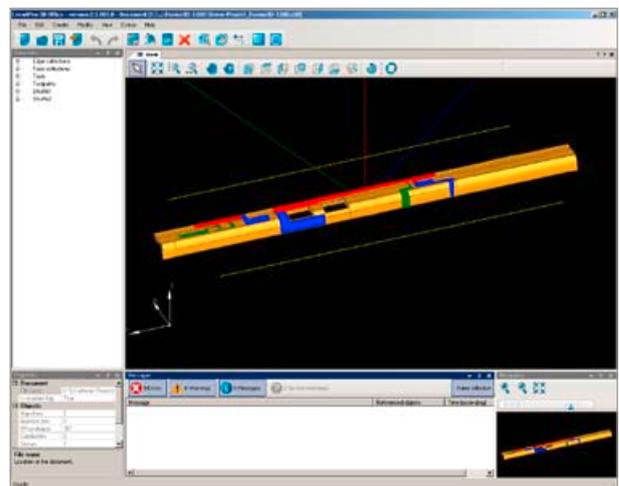
Exceptionally precise and economical, the linear actuators used are exactly coordinated with the laser process and impress with their long service life and minimal maintenance requirement.

### Safety First

In normal operation with a closed hood, the LPKF Fusion3D 1500 laser structuring unit conforms to laser class 1. The equipment opening of the handling module is secured with a light curtain to protect against manual intervention during movement of the linear axes.

### High-Performance System Software

From the layout program onto the component – the LPKF CircuitPro3D system software controls all laser structuring units in the LPKF Fusion3D line. It transfers data from the layout programs and allows optimization of the process sequence, eliminating non-productive time and increasing throughput.



## Structuring Large Components

The laser is a precision tool that runs in a defined operating range. High-frequency applications like complex antennas depend on an exact correspondence between the layout and processing result. The scanning field of the processing unit is limited to 160 x 160 x 80 mm (x, y, z). With a double feed, a width of 78 mm is available. Lengths that exceed the scanning field are processed by stitching together several structuring processes.

In this additive process the metallization is built up on the structured surfaces and seamlessly bridges the connection areas, a key advantage of LDS technology.



## The LDS Process at a Glance

More than ten years of development work lie behind the idea of laser direct structuring (LDS). To make high-quality electronic components from simple injection-molded components, LPKF uses a special process.



An additive is combined with the plastic during manufacturing. The mechanical component develops from this compound during injection molding.



The subsequent laser process in the LPKF Fusion3D 1500 activates the additive and leaves behind a micro-rough surface.



Copper, nickel or gold is built up on the activated structures in current-less metallization baths.

## Faster Product Development

24/7 industrial design cycles are no problem for the proven laser direct structuring unit from LPKF. Trained service personnel are available worldwide for start-up and servicing. An application center helps with feasibility studies and machine design, and job-order manufacturing helps with production peaks and series start-up: LPKF is committed to working with its customers to create solutions for any product need.

Technical Data: LPKF Fusion3D 1500	
<b>Structuring area (X/Y/Z)</b>	400 mm x 78 mm x 80 mm (15.8" x 3.0" x 3.1")
<b>Number of processing units (PU)</b>	1 – 3
<b>Accuracy*</b>	± 25 µm (±1 mil)
<b>Max. structuring speed</b>	4,000 mm/s (157" per second)
<b>Input data formats</b>	IGES, STEP
<b>Software</b>	LPKF CircuitPro3D
<b>Laser wavelength</b>	1,064 nm
<b>Laser pulse frequency</b>	10 kHz – 200 kHz
<b>Machine dimensions (W x H x D)</b>	1,740 mm x 1,880 mm x 1,680 mm (68.5" x 74" x 66")
<b>Machine weight</b>	approx. 1,600 kg (3,527 lbs), excluding exhaust unit
<b>Operating conditions</b>	
<b>Electric supply</b>	400 V single phase, 50/60 Hz, max. 7.2 kVA. Not supporting exhaust supply
<b>Cooling</b>	air-cooled
<b>Ambient temperature</b>	22° C ± 2.5° C (71.6° F ± 4° F)
<b>Humidity</b>	max. 70 %
<b>Exhaust unit</b>	
<b>Volume flow</b>	max. 320 m <sup>3</sup> /h for 1 PU, 600 m <sup>3</sup> /h for 2 to 3 PUs, max. suction 21,000 PA
<b>Filter</b>	Active charcoal filter and F8 fine filter

\* Calibrated scanfield

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