



DUPLEX



# The new generation of FDM printers

If you can print in two-directions, why would you print in only one?

- › Real-size functional prototypes of complex shapes
- › Prints ready to use molds
- › Up to 15 times faster total production process
- › Environmentally friendly, due to low support material & energy need
- › Applicable for PLA, PET, ABS, ASA, PP, PA & CF/GF reinforced PA

Powered by:



In collaboration with:



## DUPLEX F2: the first two-way printing FDM printer

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DUPLEX F2 is developed based on the patented MAP™ technology, enabling the printing of an object from two different directions at the same time.

The new DUPLEX F2 printer is designed for heavy, industrial application, built from quality parts and assembled with precision to assure the long lasting quality and reliability this new technology truly deserves.

Thanks to the multi-directional part growing, the DUPLEX F2 is up to 15-times faster than similar FDM printers due to the combination of its unique features: two extruders working simultaneously on the same object; no, or minimal need of support printing; reduced time of post-processing.



## The birth of MAP™ technology

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3D printing technologies have not fundamentally improved since their inception in the early nineties. Productivity of 3D production systems are far too low to be able to live up to the promise of 3D printing disrupting the image of how we perceive traditional manufacturing.

MAP™ technology addresses the long-unchanged process of building three dimensional objects layer by layer, one on top of the other, resulting in an utterly slow process.



## What is the patented MAP™ technology?

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MAP™ technology introduces a completely new way of creating physical 3D objects, establishing a new standard in additive manufacturing resulting in higher productivity and ROI.

Using multiple build directions MAP™ technology can achieve unparalleled print speeds without any limitations on the 3D geometry being built.

It is a completely new approach, enabling extremely fast printing speed. It can be applied to various additive manufacturing technologies (e.g. FDM, SLS, SLA, DLMS) and its core principles allow printing with different types of materials including solid and liquid.

Although MAP™ is not restricted to filament based 3D printing, the first 3D printer utilizing MAP™ is an FDM, named DUPLEX F2.

## Rapid functional prototyping of complex, elongated shapes

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Functional prototyping is one of the key areas where 3D printing has been able to add great value to the innovation processes of several industries. However, the creation of ready-to-use, real-size functional prototypes of long and complex shapes was not possible without the use of extensive support structures requiring human labor intensive post processing.

The MAP™ powered two-directional printing – building the object from its mid-section – allows DUPLEX F2 to efficiently print elongated and curved shaped functional prototypes the same day it comes off the desk of the designers. Thanks to its effective heated chamber, DUPLEX F2 can print engineering plastics, such as PC, and even carbon- and glass reinforced PA materials, producing not only ready-to-use functional prototypes, but even end-parts.

## Easily create high-performance composite molds

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Conventional production processes such as CNC milling are generally costly and time consuming and they require a large amount of preparation time, therefore the industry is turning to AM to produce printed tools and fabrication molds, as 3D printing processes offer a great deal of freedom by liberating the design process of the conventional technologies' restrictions.

DUPLEX F2 takes 3D printing of molds a step further: it does not only make FDM considerably faster but – due to two-directional printing – also eliminates the need for most of the support structures, minimizing the need for post processing, making the overall 3D production process of complex shaped, high performance composite laminate molds up to 15 times more productive than any other FDM printer.

## Build jigs and fixtures flexibly next to the production line

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Fast response time on the factory or assembly floor is crucial in any manufacturing process. However, creating lasting fixtures and accurate jigs is mostly outsourced to reduce in-house complexities and the need for human labor-intensive post processing. This often creates loss of assembly line utilization, reducing overall factory production efficiency.

The easy to operate DUPLEX F2 is designed for building elongated, robust objects with high end part accuracy even out of engineering plastics giving an effective answer to any on-the-spot demands for jig and fixture parts. This allows production managers and engineers to build tools and parts in high engineering quality right next to the production line in a variety of sizes and quantities, flexibly.

## Creation of anatomical models with unparalleled speed

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Additive manufacturing increasingly supports various areas of industry in the production of high-added-value, unique geometries and primarily small-series products. Although medical use due to its patient-specific needs has an outstanding potential for the wider implementation of 3D printing, the technology's slowness, high costs, and the need of complicated post-process work significantly limits its use in medical application.

DUPLEX 3D reduces the production time and the number of points to be supported by orders of magnitude with its patented multi-directional layer construction solution and the unique spatial positioning of the form to be created. These advantageous technical properties, combined with the special geometrical requirements in medical applications, greatly increase the efficiency of the production of anatomical models.

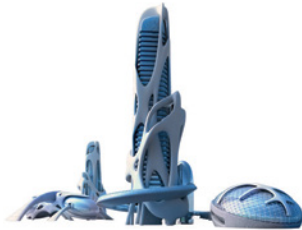
# Key Applications

## Rapid Prototyping



for R&D labs, Automotive and Technical Sports

## Vizualisation and Display



for Medical sector, Design and Film Production Studios

## Jigs and Fixtures



for Machinery and Manufacturing industries

## Ready to use Molds and Patterns



for Manufacturers

## Technical specs

<b>Build Volume</b>	∅ 400 mm x 1000 mm
<b>Machine Dimensions</b>	912 mm x 1176 mm x 2654 mm
<b>Custom build plate</b>	up to 130 C
<b>Heated Chamber</b>	up to 80 C
<b>Z layer resolution</b>	50 - 600 micron

Web-based remote software control

Fully automated thermal control system

Automated mid-section operation for high quality two-way printing



## Key Innovations

**MAP™ technology:** parallel, simultaneous printing from multiple directions of the same object

**AutoPlane System (APS):** APS automatically removes the base plate, allowing the bottom extruder to access the object for parallel printing from top and bottom at the same time

**Mesh auto calibration:** mesh plate calibration for perfect part orientation

**Proprietary DUPLEX software to handle unique MAP™ slicing needs:** the DUPLEX processing software is a powerful tool for 2-way part slicing

**Auto check system:** advanced part error recognition algorithm

**Remote support:** diagnostics and printing tech support carried out remotely by our DUPLEX specialists



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