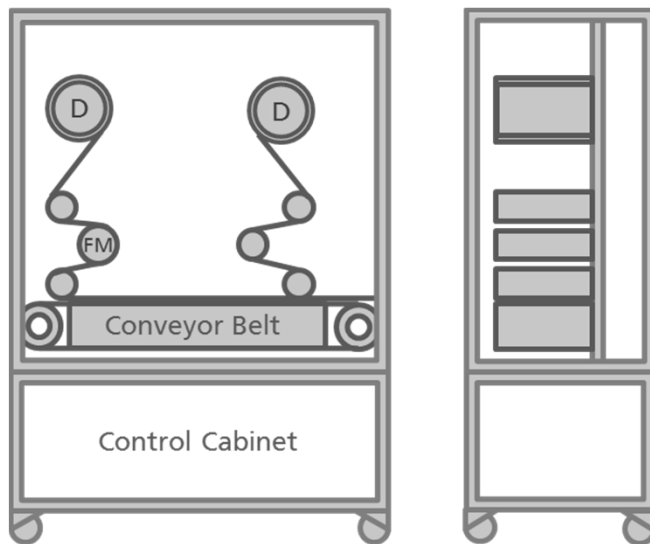




Concept of ML² production line

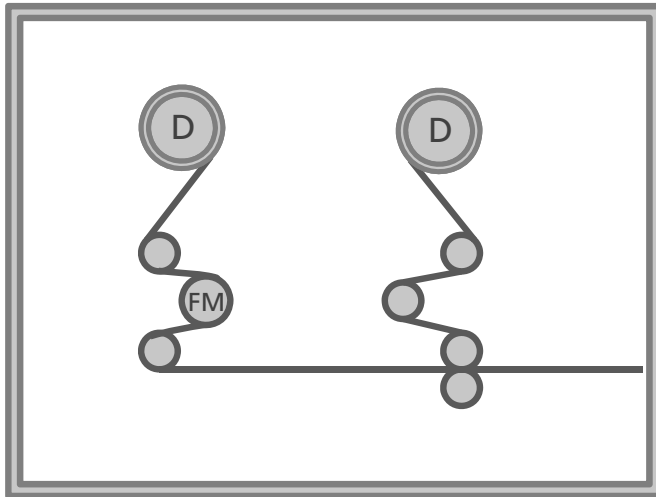
D10.1 – Concept for production line





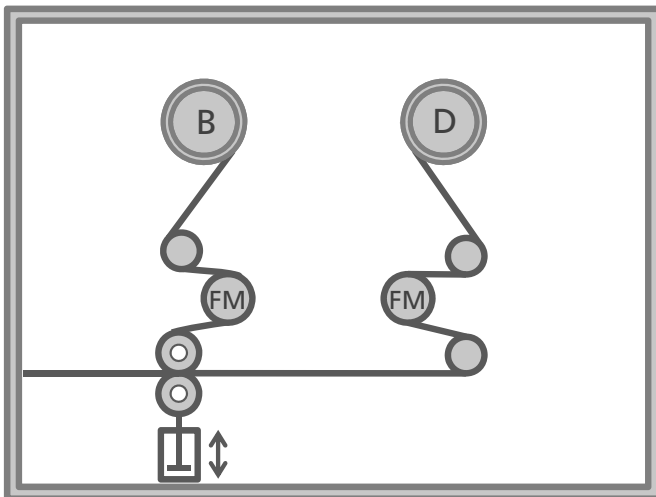
Design concept

- Processing of polymer films:
 - Max. 250 mm width
 - Max. 0,5 mm thickness
 - Max. reel diameter: 300 mm
 - Max. reel weight: 25 kg
 - Core diameter: 6" (3")
 - Totally transparent substrates
- Processing of plates:
 - Max. plate dimensions: 400 x 250 x 6 mm³
 - Transparent substrates
- Substrate speed: max. 50 m/min
- Substrate tension: 0,1 – 1 N/mm
- Modular test bench concept (functional modules)
- One-sided roller fixation
- Modular Control Concept



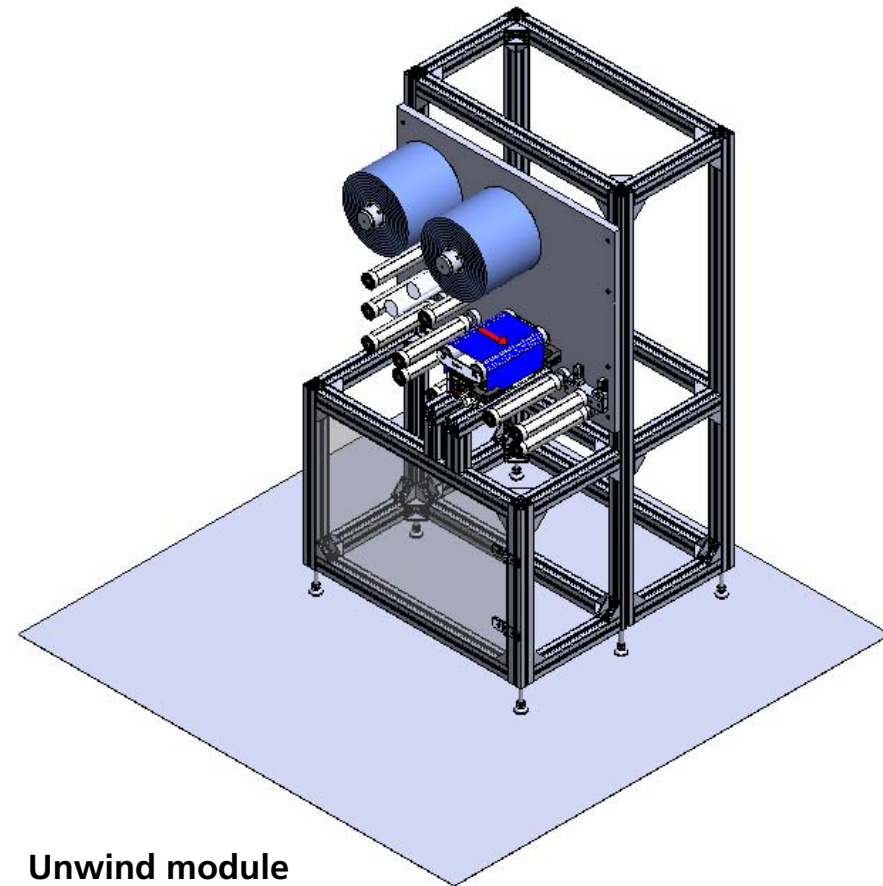
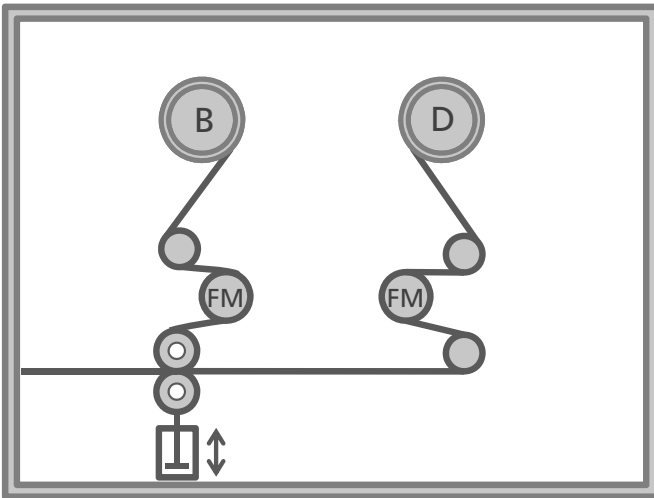
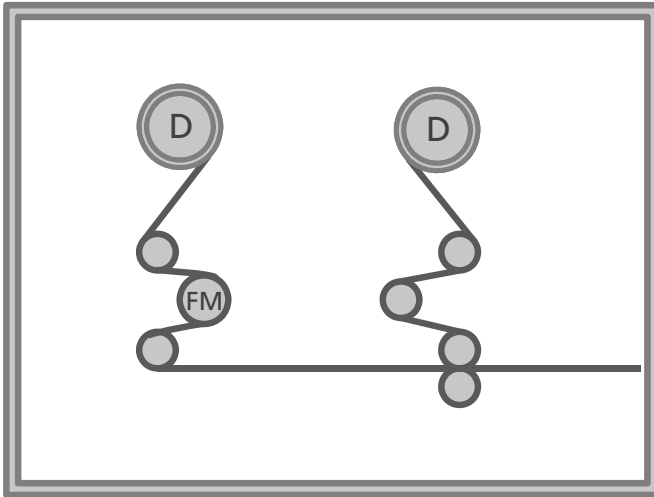
■ Functions:

- Unwinding of polymer substrate
- Delamination of protective liner
- Rewinding of protective liner
- Measurement of substrate tension
- Compensation of winding errors and substrate alignment

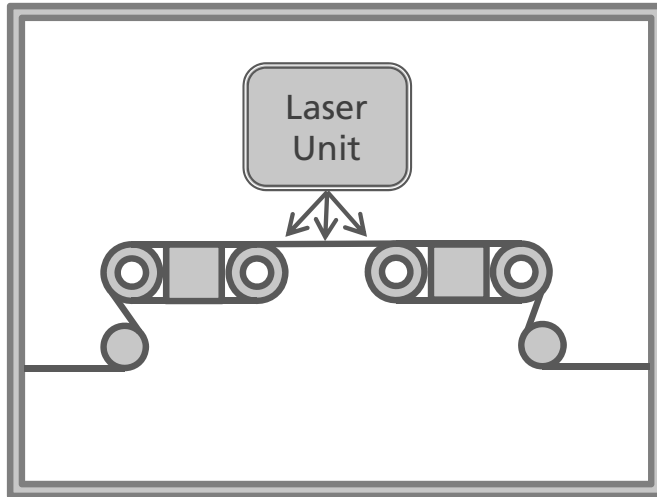


■ Functions:

- Rewinding of polymer substrate
- Unwinding of protective liner
- Lamination of protective liner
- Measurement of substrate tension
- Substrate alignment

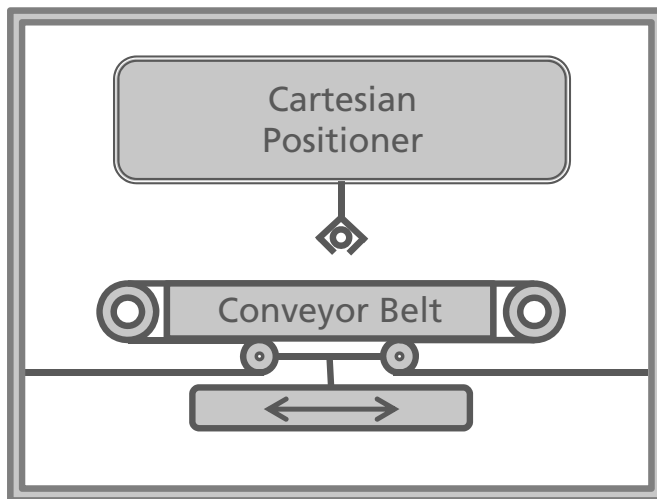


Unwind module



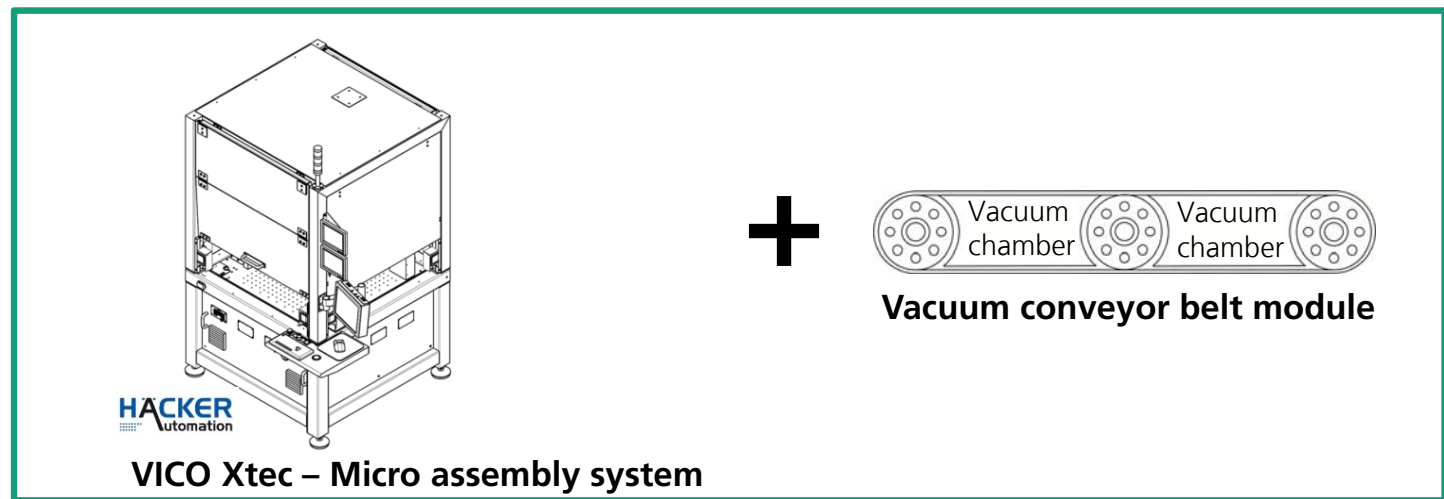
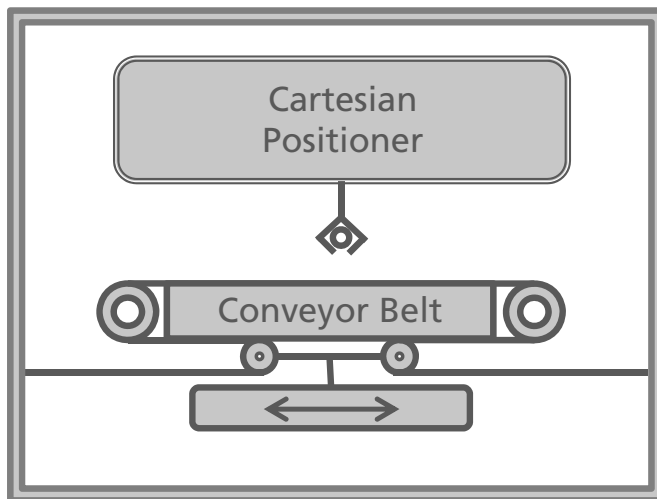
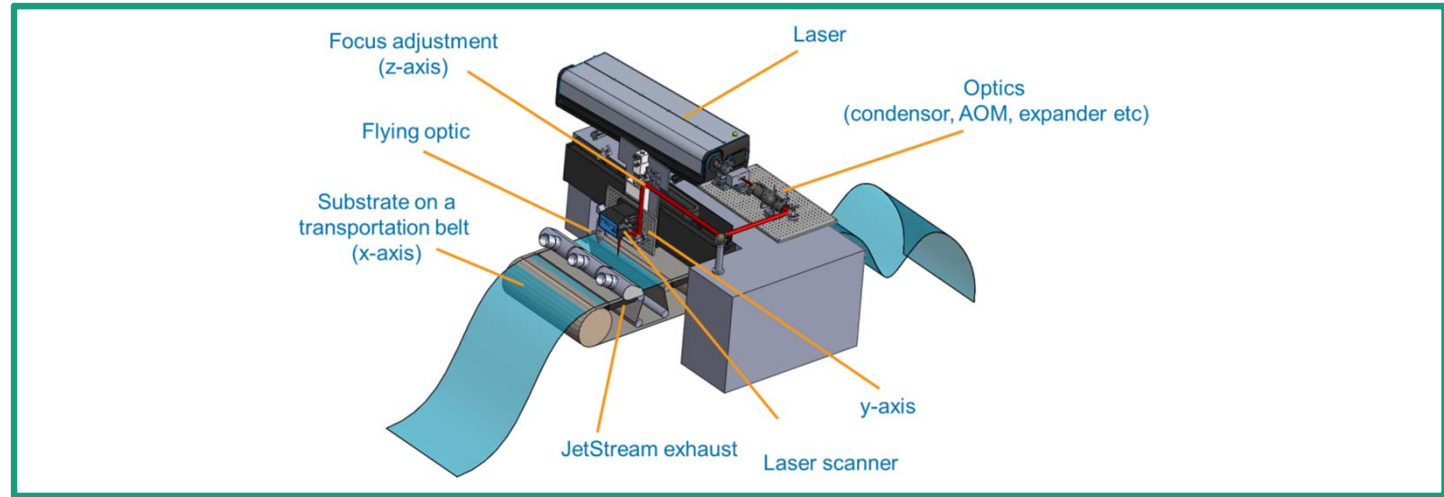
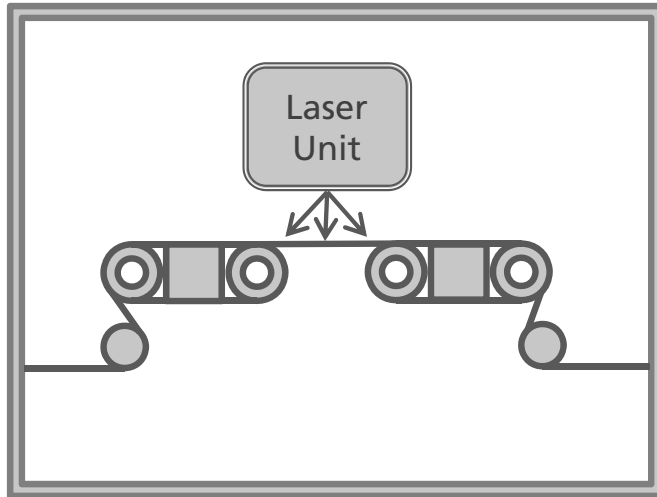
■ Functions:

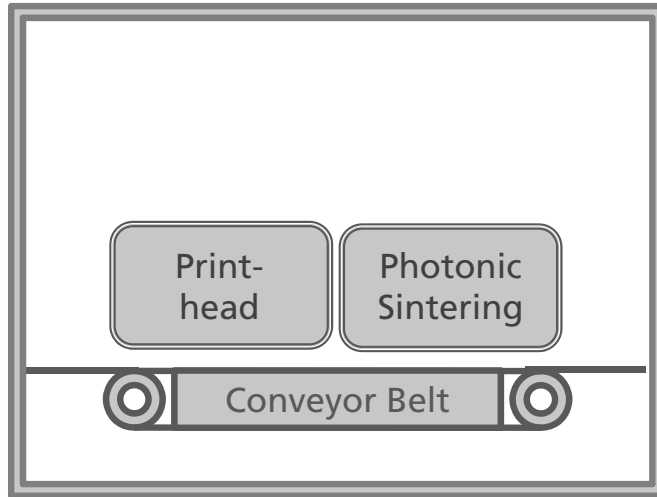
- Laser structuring of polymer surface
- Cutting of through holes (VIA)



■ Functions:

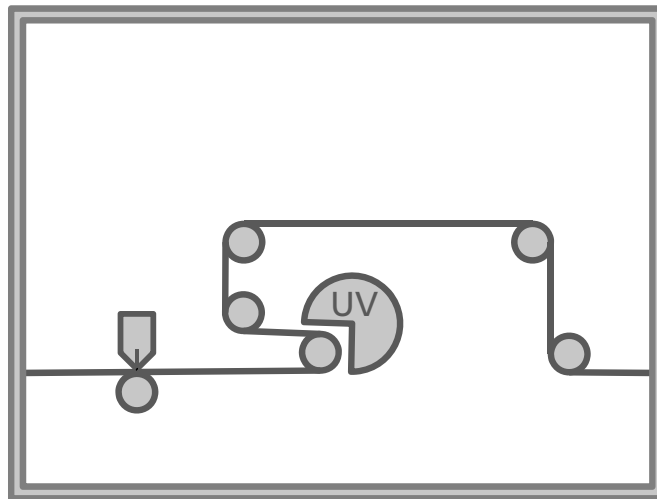
- Step-&-Repeat substrate transport
- Placement of bulky components on substrate
 - Component inspection
 - Component placement
 - Dispensing
 - Curing (UV, Laser)





■ Functions:

- Printing of electronic circuits path/ components
- Photonic sintering of printed structures

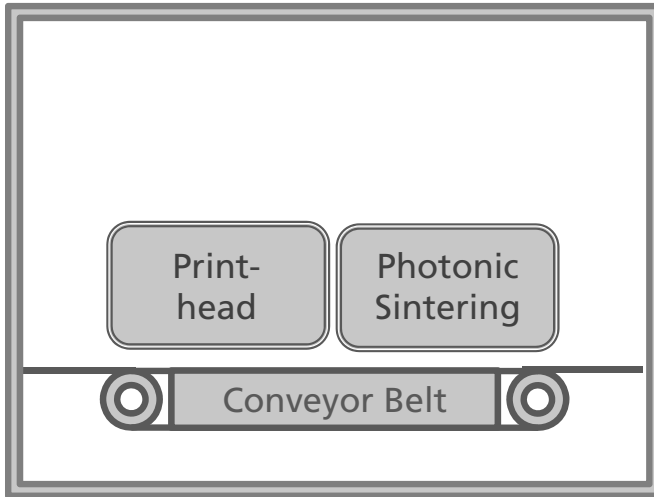


■ Functions:

- Coating of substrate (slot die, knife, dip coating)
- Replication of drum structures into UV-curable laquer
- UV-curing

R2R production test bench

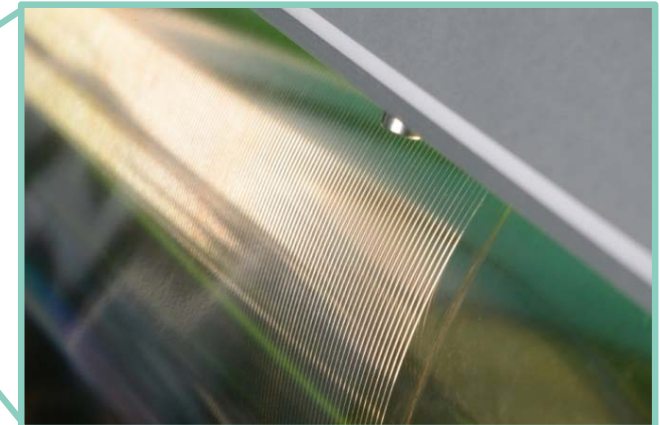
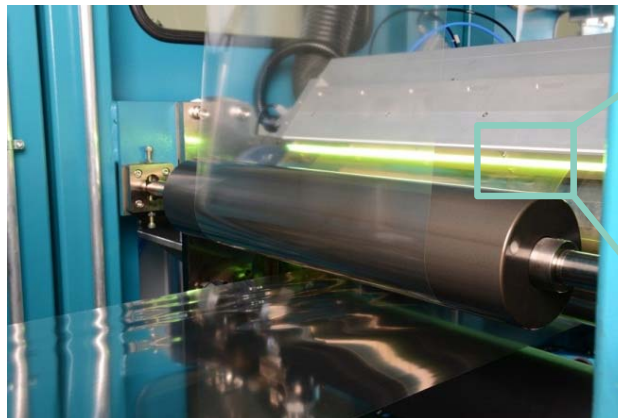
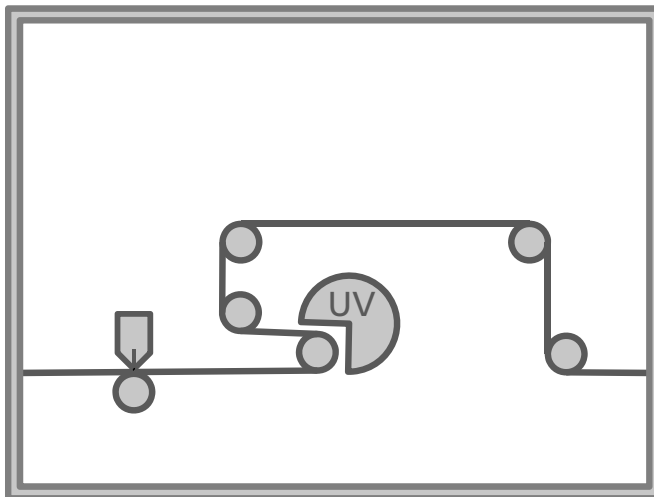
Printed electronics module

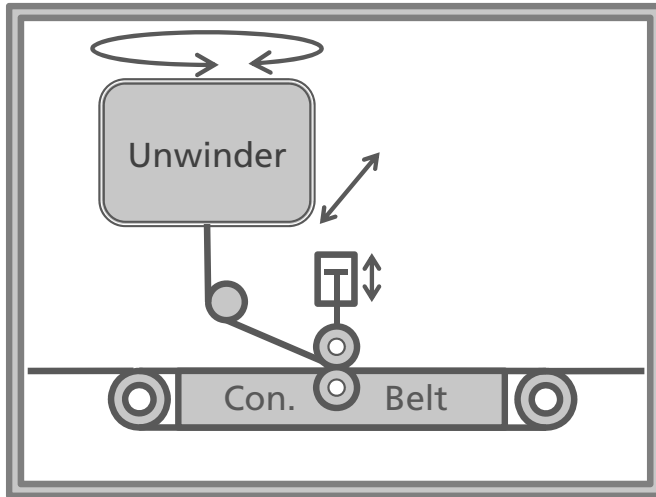


Drop-on-Demand print head
FujiFilm SAMBA Technologies



Photonic Sintering Module
NovaCentrix PulseForge 3200X2

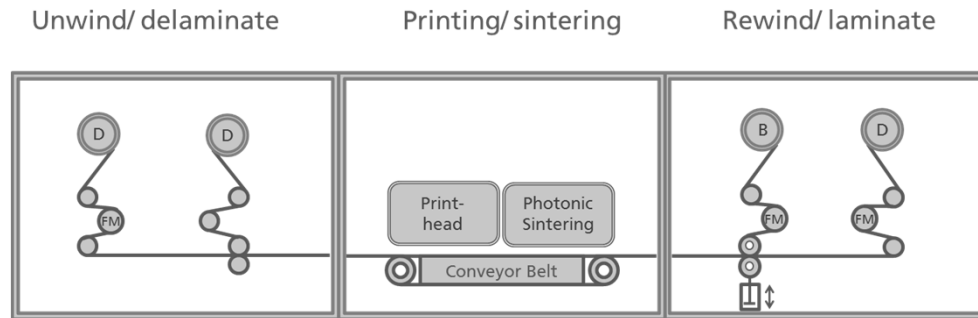




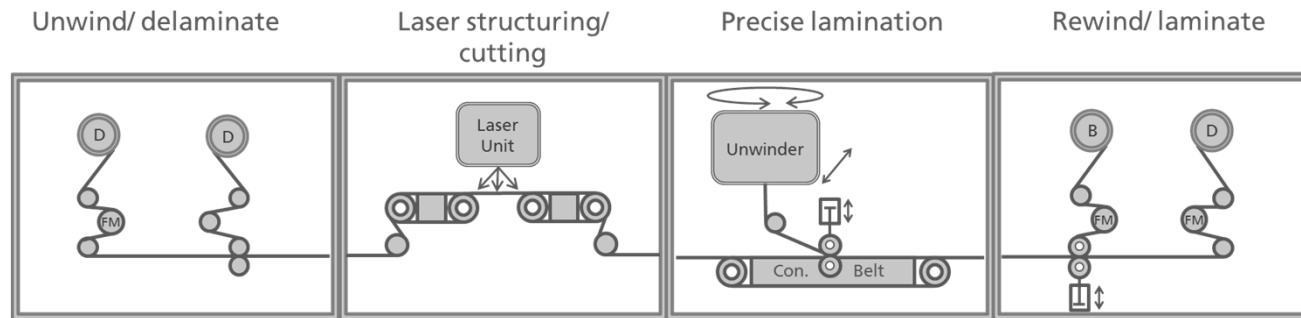
■ Functions:

- Transport of base layer
- Unwinding of attached layer
- Manipulation of attached layer
- Precise lamination of attached onto base layer ($\ll 50\mu\text{m}$)

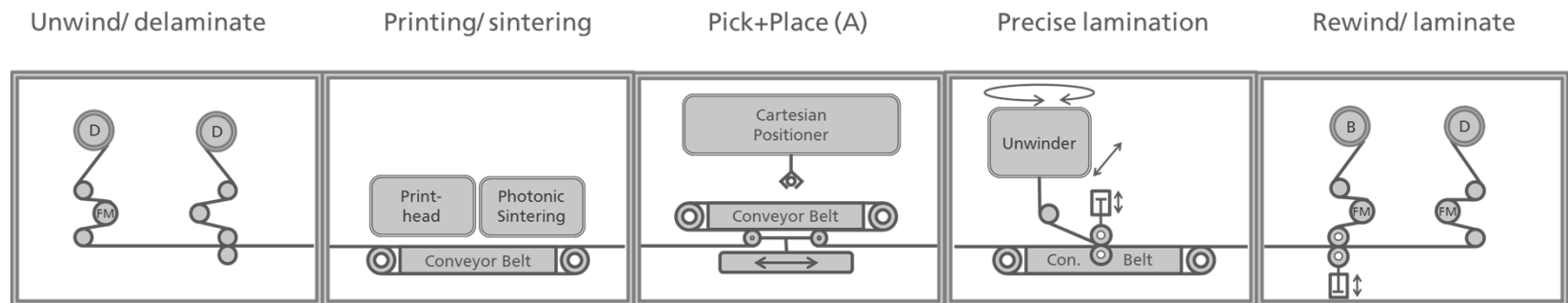
Flexible printed circuit boards



Surface structuring



Electronic functions





■ Modular control architecture:

- Decentralised control concept for flexible changes in production system and process structure
- n modules = $n \times$ (motion control units + periphery)
- Automated production system setup by communication protocol

