

## Detailed Specifications

| Subsystem           | Item   | jetlab II  |
|---------------------|--|--|
| Motion              | Substrate Size (max)   | 200 × 200 mm<br>300 x 300 mm (xl-300 version)<br>Option: custom  |
|                     | X-Y Stage Travel   | 300 mm (400 mm xl-300 version)   |
|                     | Z Stage Travel   | 40 mm  |
|                     | X, Y Encoder Resolution  | 0.1 μm   |
|                     | Positioning Accuracy   | ±15 μm<br>Option: ±4 μm with mapping   |
|                     | Positioning Repeatability  | ±5 μm<br>Option: ±2 μm with mapping  |
|                     | Compensation for Thermal Effects                                   | Option: with mapping   |
|                     | X & Y Stage Travel Speed   | 100 mm/s   |
|                     | X & Y Stage Acceleration   | 400 mm/s <sup>2</sup>  |
|                     | X & Y Stage Payload, maximum                                       | 20 kg  |
|                     | Z Stage Travel Speed   | 10 mm/s  |
|                     | Z Stage Payload, maximum   | 5 kg at 75 mm from carriage  |
|                     | Material Load/Unload   | manual   |
| Vision              | Downward-looking Camera (CCD)                                      | For alignment to fiducials and inspection of printed features; includes coaxial illumination and zoom lens |
|                     | Alignment Method   | Program-assisted manual<br>Option: teach/semiautomatic   |
|                     | Post-printing Visual Inspection                                    | Option: manual survey  |
|                     | Jet Observation Camera (CCD)                                       | Includes zoom lens & synchronized LED strobe   |
|                     | Jet Set-up Method  | Manual<br>Option: semiautomatic measurement / monitoring   |
|                     | Field of View - vertical   | Min 0.7 mm x 0.5 mm<br>Max 8.3 mm x 6.2 mm   |
|                     | Field of View - horizontal   | 2.7 mm x 2.0 mm  |
| Thermal & Pneumatic | Pneumatics Control Circuit   | Three state pneumatic control  |
|                     | Operating Pressure Control   | Manual vacuum / pressure fine adjust to 2 mbar<br>Option: electronic control                               |
|                     | Pressure Gages   | digital  |
|                     | Number of Pressure Outputs (includes control and display for each) | 1<br>Option: up to 4   |
|                     | Pneumatic State Control Method                                     | Manual<br>Option: electronic   |
|                     | Pressure Input   | 60 psig [420 kPa]<br>20 scfm [0.6 scmm]  |
|                     | Vacuum Input   | below -20 in Hg  |
|                     | Temperature Controllers  | Option: 1-4  |

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| Mechanical, Electrical & Environ.    | Work Surface   | Honeycomb with threaded holes  |
|                                      | Workpiece holder (not included in base price)  | Options: vacuum platen; heated vacuum platen; fixtures for microscope slides, MALDI plates, microtitre plates, etc.; custom  |
|                                      | Vibration Isolated Work Surface  | Newport ND-01A vibration isolators   |
|                                      | Enclosed Work Area   | Standard   |
|                                      | HEPA Filters Overhead  | Option   |
|                                      | HEPA Blower Unit   | Option   |
|                                      | Solvent Ventilation  | Optional duct connection   |
|                                      | Footprint  | Tabletop, 44"x28" [112 cm x 71 cm]<br>XL-300: floor, 48"x32" [120 cm x 75 cm]  |
|                                      | Safety   | CE approved  |
|                                      | Power  | 220-240V, 6A, 50-60Hz<br>Option: 120V, 6A, 50-60Hz   |
|                                      | Clean Room Compatibility   | no   |
| Printing Control & Drive Electronics | Stationary Printhead   | Standard (xl-300, moving)  |
|                                      | Motorized Z-Axis Control of Print Head   | Standard   |
|                                      | Point-to-Point Operation   | Standard   |
|                                      | Print-on-the-Fly Operation   | Standard, printing at any angle, all stages moving; curvilinear motion   |
|                                      | Jet Drive Electronics  | JetDrive V: bipolar and arb mode<br>Option: multi-channel JetDrive III-(n)   |
|                                      | Drive Electronics Multiplexer  | Option: integrated   |
|                                      | TTL control signals  | Option: 8 outputs minus number of multiplexed jets; on/off and timed   |
|                                      | Jet On-Line / Off-Line Selection   | Through user interface, scripts  |
|                                      | Operating Frequency  | Up to 30 kHz   |
| Print Pattern                        | Built in Patterns  | Line, rectangular border, array, array-of-arrays (arbitrary angle)   |
|                                      | Rotation Correction  | Standard   |
|                                      | Multiple Fluid Control   | Standard   |
|                                      | Print Pattern Import   | GDS II & Gerber converter; monochrome BMP  |
| Complex Print Jobs                   | Script file: nesting, repetition with offsets, wait states, maintenance, & TTL controls, arbitrary printing resolution and direction |  |
| Printheads                           | Select one or more (not included in base price)  | Mounts all MicroFab standard printheads; Interchangeable   |
| Jetting Devices                      | Select one or more (not included in base price)  | Standard orifice diameters, 20-80 um in 5 um increments; 10, 15, & 90-120 um specials.   |
| Control system                       | Computing hardware   | Panel PC, 1GHz Atom, 1 GB RAM 160+ GB HD, Ethernet port, USB 2.0 port; RS-232 ports, keyboard, monitor, mouse.   |
|                                      | Operating system   | Microsoft Windows 10   |
|                                      | Machine control program  | Integrated control program for (multiple) jet setup and selection, positioning calibrations, pattern printing and surveying, TTL-controllable auxiliary equipment, depending on and supporting <i>all</i> hardware and software options on <i>all</i> jetlab models. |