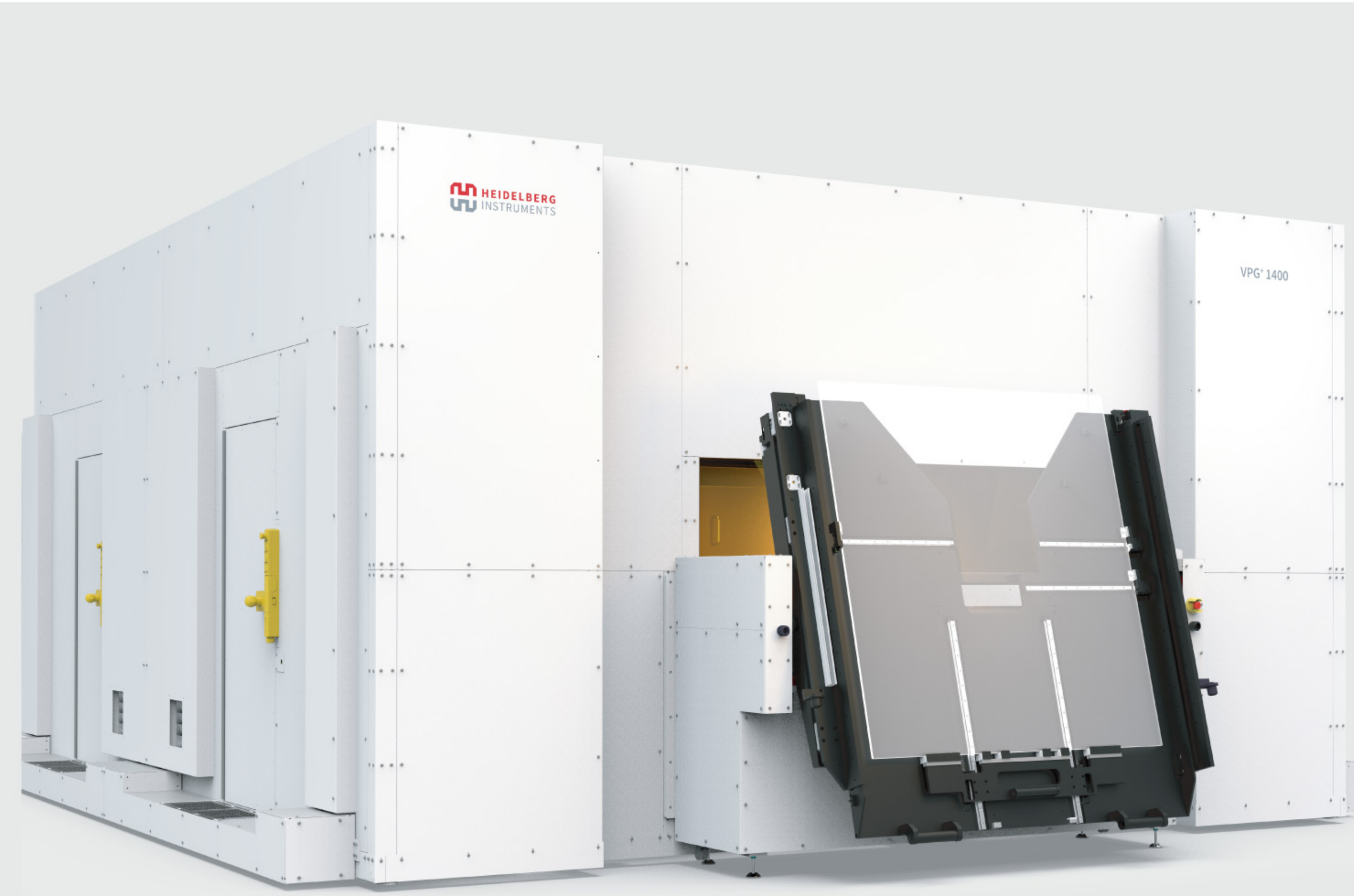
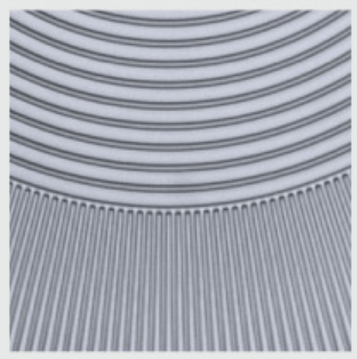
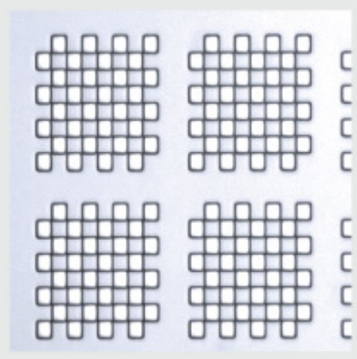
HEIDELBERG INSTRUMENTS

VPG+ 800 / VPG+ 1400

THE LARGE-AREA MULTIPURPOSE VOLUME PATTERN GENERATORS







VPG⁺ 800 / VPG⁺ 1400

THE LARGE AREA VOLUME PATTERN GENERATORS FOR FABRICATION OF MASKS AND DISPLAYS

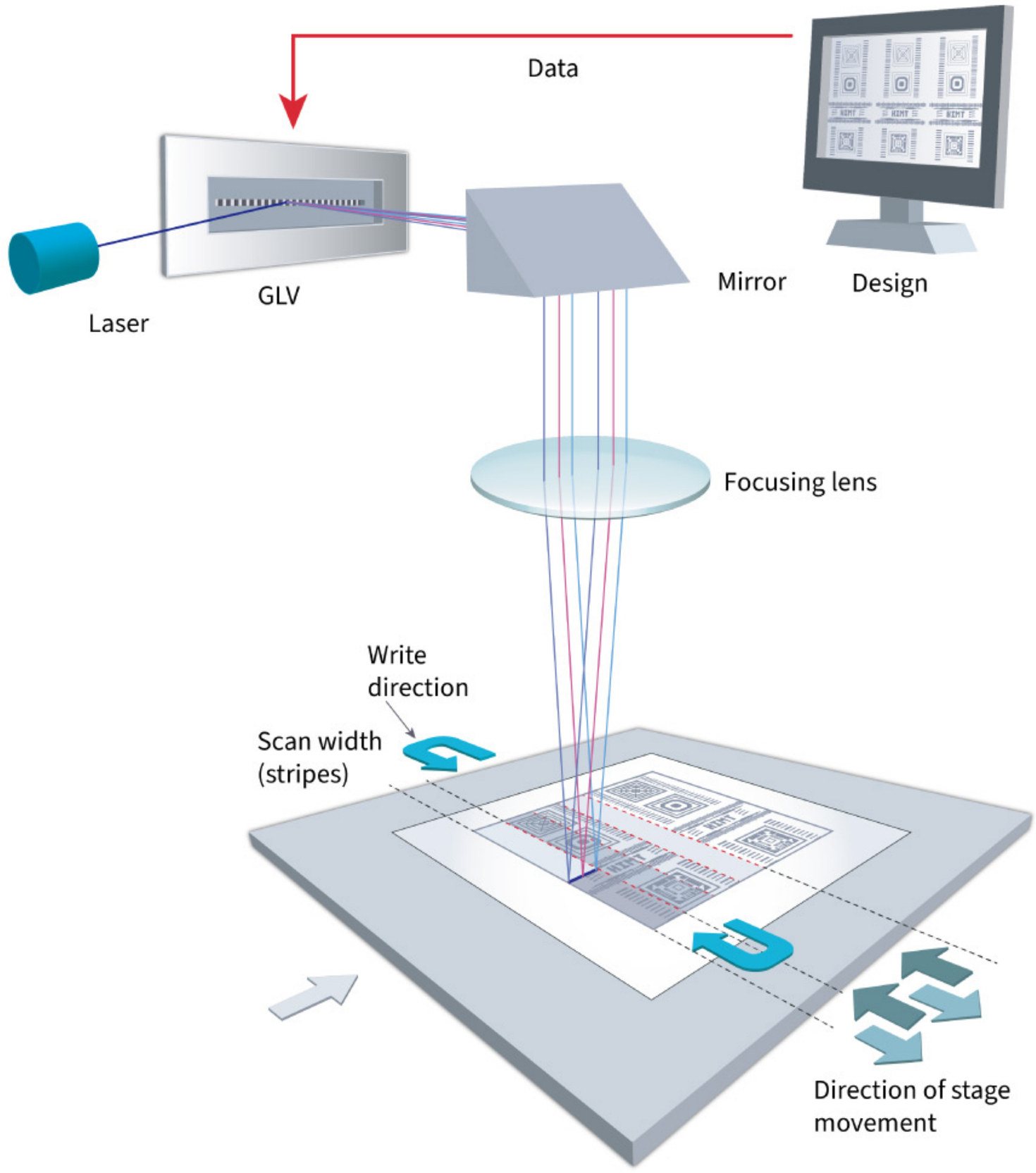
Photomask making at the cutting edge requires high speed, maximum stability and utmost precision and that is precisely what the VPG⁺ line of Volume Pattern Generators provides. High resolution, outstanding image quality, and fast throughput: This makes the VPG⁺ family the ideal systems for rapid photomask fabrication, particularly in the fields of electronic packaging, color filters, light emitting diodes, and touch panels.

THE LARGE AREA VOLUME PATTERN GENERATORS

The VPG line of lithography systems was originally introduced in 2007. The technology was based on a patented vast-exposure process parallelization and quickly became the industry standard. For fifteen years now, Heidelberg Instruments VPG (now VPG⁺) systems have proven to be the ideal solution for the high-volume production of demanding photomasks particularly in the fields of electronic packaging, color filters, light emitting diodes, and touch panels.

EVEN HIGHER EXPOSURE SPEED

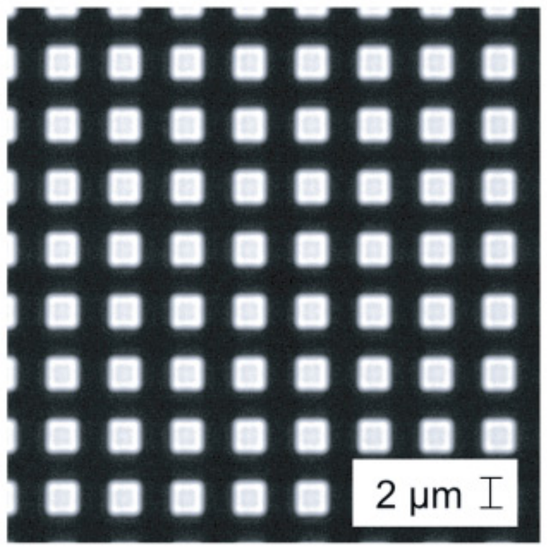
The VPG⁺ series meanwhile features a significantly faster high-speed spatial light modulator (custom-made for Heidelberg Instruments and therefore exclusive to this series). The entire exposure engine operates at a higher rate than ever before and the data path too has been vastly enhanced, making the VPG⁺ the fastest tool for mask-writing in this market-segment.



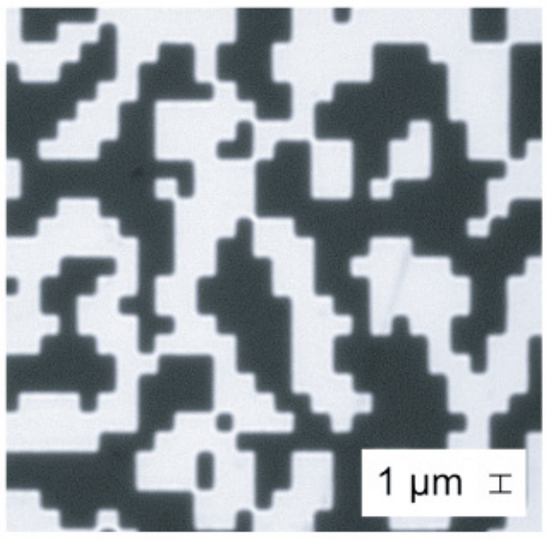
Writing strategy VPG⁺

THE LARGE-AREA VPG⁺ IN A NUTSHELL

- Ultra-high-speed exposure engine
- Real-time auto focus system
- High power DPSS laser with 355 nm
- Automatic write mode exchanger
- Camera system for metrology and alignment
- Closed-loop climate chamber
- Semi-automatic substrate loading system
- Stage map correction
- Mura correction, panel pitch optimization
- Edge detector system
- Multiple data input formats
- User-programmable interface



Photomask structures, 2 µm squares



Computer Generated Hologram

FEATURES AND OPTIONS

The VPG+ large-area systems are equipped with a semi- or fully automatic feeder for substrate loading, a high power pulsed UV laser source with a wavelength of 355 nm, and an air-bearing stage. Stages of varying dimensions are available to meet a wide range of requirements: VPG+ systems can be configured to accommodate substrate sizes of up to 800 mm (VPG+ 800) or 1400 mm (VPG+ 1400) respectively.

An automatic calibration tool enables superb registration and positioning of written structures; the small write grid ensures excellent edge roughness and stripe butting. The flexible system configuration also allows for the addition of an automated write mode exchanger unit. All industrial data formats are of course supported; and VPG+ systems offer mura and panel pitch optimization functions ensuring good mura conditions and therefore excellent CD uniformity and resolution.

A SYSTEM APART - THE VPG+ 1400

The predecessor of the VPG+ 1400, the VPG 1400, with a photomask

ENVIRONMENTAL CONTROL

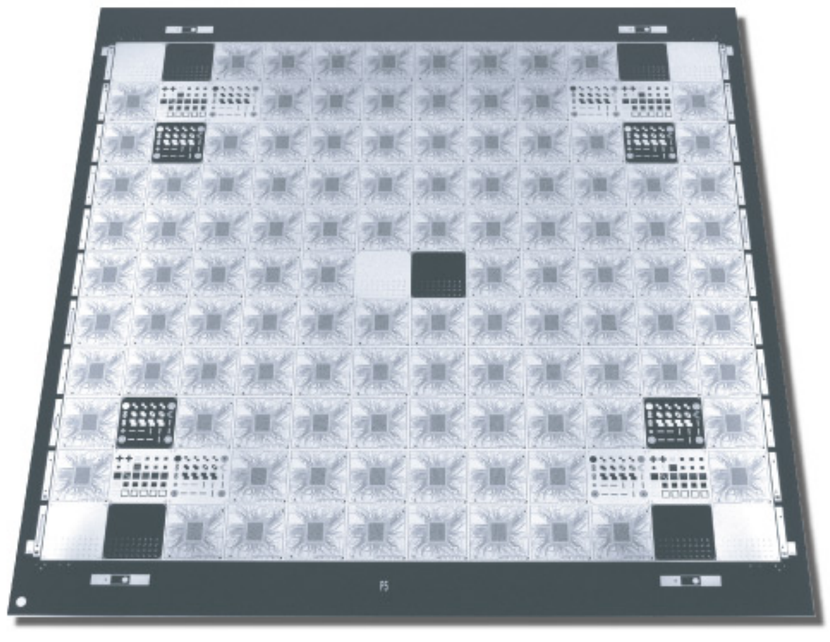
All VPG+ systems are housed in solid, state-of-the-art flow boxes: the VPG+ 800 in particular now boasts a cleverly redesigned chamber with a footprint considerably smaller than before. The closed-loop environmental chamber complies with the stringent requirements associated with advanced photomask technology. There is a continuous monitoring of ambient pressure, humidity and temperature to compensate any deviations and to minimize the influence on the beam- and stage positioning system.

The VPG+ 800

While all VPG+ systems share the same powerful technology at their core, each of them retains their own characteristics, specific applications, and areas of use. The VPG+ 1400 is our largest system and particularly aimed at applications in the display industry: FPD applications like TFT-arrays and color filters, ITO and so on. On the outside, the VPG+ 1400 features an extremely powerful, impressive environmental chamber; on the inside, a differential interferometer with a resolution down to 1.2 nm. In addition, these systems are equipped with advanced mura correction capabilities such as panel pitch optimization.

PHOTOMASK PRODUCTION

A photomask serves as a master template for photolithographic manufacturing and as such it has to fulfill highest requirements. Typical photomask specifications include line-width uniformity, pattern position accuracy, edge roughness and minimum feature size. To enable a large process window for the final process, the photomask specifications have to be considerably better than the target application. Our VPG and VPG+ systems have proven themselves to be the ideal solution for the high-volume production of demanding photomasks – particularly in the fields of electronic packaging, color filters, light emitting diodes, and touch panels. Options for emulsion photomasks are available.



VPG+ 800 / VPG+ 1400

SYSTEM SPECIFICATIONS

Write mode	I	II	III
Writing performance			
Minimum structure size [µm]	0.75	1	2
Address grid [nm]	12.5	25	50
Edge roughness [3σ, nm]	40	50	70
CD Uniformity [3σ, nm]	65	75	110
Plate-to-plate overlay [3σ, nm] VPG+ 800	160	160	220
Plate-to-plate overlay [3σ, nm] VPG+ 1400	250	250	300
Stitching [3σ, nm]	60	70	100
Registration [3σ, nm]	200	200	200
Write speed [mm²/min] VPG+ 800	1100	3925	7825
Write speed [mm²/min] VPG+ 1400	1125	4125	8250
System features			
Light source	High-power DPSS laser with 355 nm		
Maximum substrate sizes	32" x 32" / 1400 x 1400 mm²		
Substrate thickness	0 to 13.2 mm		
Maximum exposure area	800 x 800 mm² / 1400 x 1400 mm²		
Autofocus	Realtime autofocus system (optical and pneumatic)		
Autofocus compensation range	150µm		
Automation	Semi-automatic loading system		
Flowbox	Closed-loop temperature controlled environmental chamber		
Alignment	Camera system for metrology and alignment		
Other features	Stage map correction, Mura and panel pitch optimization, Edge detector system, Multiple data input formats (DXF, CIF, GDSII and Gerber files) automatic writemode changer ; options for emulsion		
System dimensions			
Main unit (doors closed, loader extended)		VPG+ 800	VPG+ 1400
Width [mm]		3100	5370
Depth [mm]		4250	7000
Height [mm]		2700	2800
Weight [kg]		10,000	25,000
Installation requirements			
Electrical	400 VAC ± 5 %, 50/60 Hz, 32 A		
Compressed air	8 - 10 bar		

Please note: Specifications depend on individual process conditions and may very according to equipment configuration.
Write speed depends on exposure area. Design and specifications are subject to change without prior notice.

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