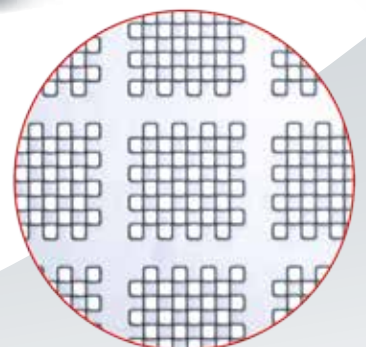
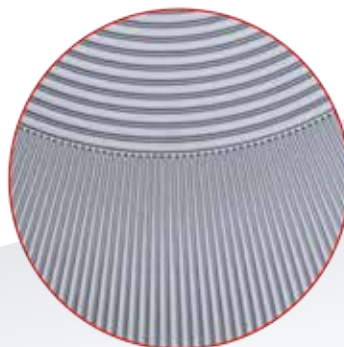
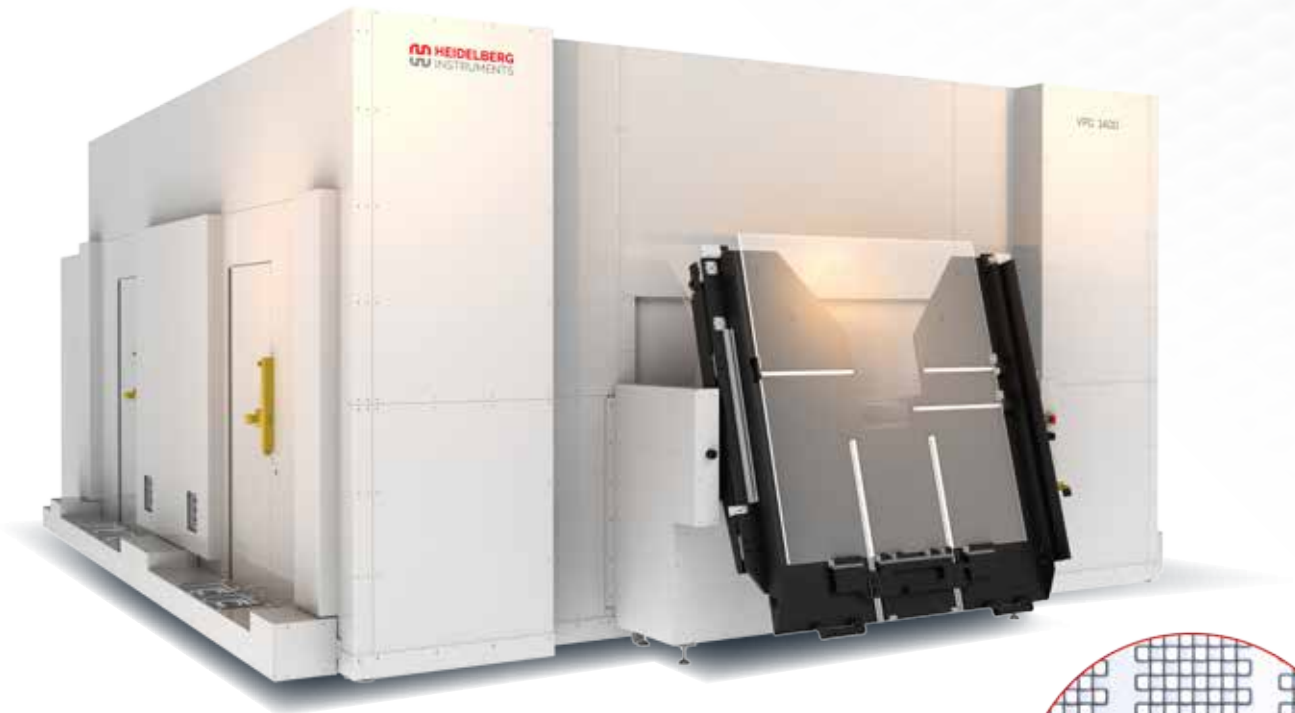


VPG⁺ 800 / 1100 / 1400

Large-Area
Volume Pattern Generators
for Fabrication of Masks and Displays



VPG⁺ 800 / 1100 / 1400

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



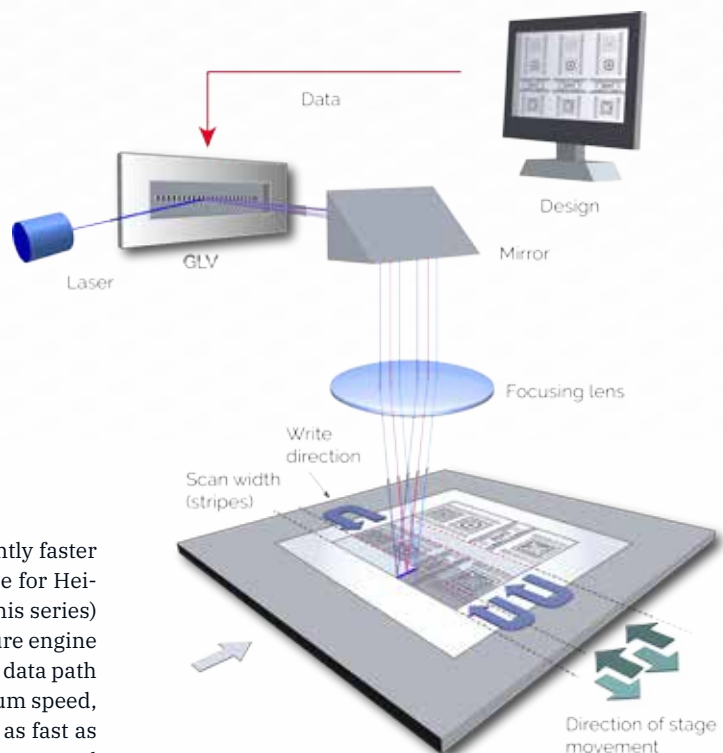
Photomask making at the cutting edge requires high speed, maximum stability and utmost precision and that is precisely what the VPG⁺ line of Volume Pattern Generators provides. High resolution, outstanding image quality, and fast throughput: This makes the VPG⁺ family the ideal systems for rapid photomask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

The Large Area Volume Pattern Generators

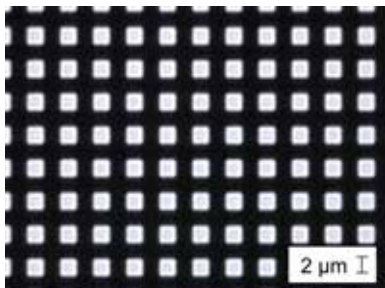
The VPG line of lithography systems was originally introduced in 2007. The technology was based on a patented vast-exposure process parallelization and quickly became the industry standard. For more than ten years now, Heidelberg Instruments VPG systems have proven themselves to be the ideal solution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

Even higher exposure speed

The series meanwhile features an even significantly faster high-speed spatial light modulator (custom-made for Heidelberg Instruments and therefore exclusive to this series) and is now known as the VPG⁺. The entire exposure engine operates at a higher rate than ever before and the data path too has been vastly enhanced. At the new maximum speed, an exposure can be completed up to three times as fast as with the original VPG: This makes the VPG⁺ the fastest tool for mask-writing in this market-segment.



Writing strategy VPG⁺



Photomask structures, 2 μm squares



Computer Generated Hologram

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
- Automatic substrate loading system
- Stage map correction
- Mura correction
- Edge detector system
- Multiple data input formats
- User programmable interface

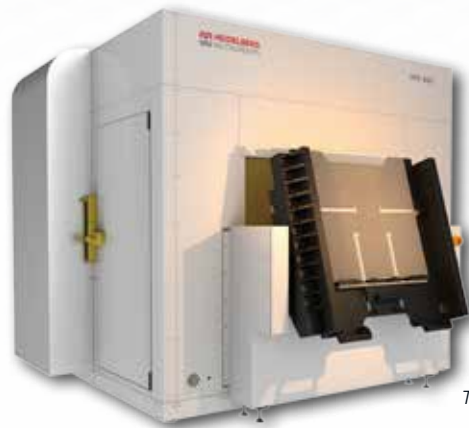
FEATURES AND OPTIONS

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), 1100 mm (VPG+ 1100), 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 optimization functions ensuring good mura conditions and therefore excellent CD uniformity and resolution.

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. Continuous monitoring of pressure, humidity, and temperature parameters means that any deviations can be compensated for and effects on the position measurement avoided.



The VPG+ 800

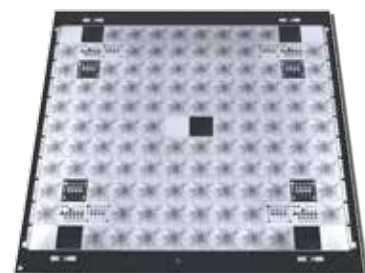
A SYSTEM APART - THE VPG+ 1400



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. (The photograph above shows the predecessor of the VPG+ 1400, the VPG 1400, with such a photomask).



VPG* 800 / VPG* 1100 / VPG* 1400

SYSTEM SPECIFICATIONS

Write mode	I	II	III	IV
Writing performance				
Minimum structure size [µm]	0.75	1	2	4
Address grid [nm]	12.5	25	50	100
Edge roughness [3σ, nm]	40	50	70	150
CD uniformity [3σ, nm]	65	80	110	300
Stitching [3σ, nm]	60	70	100	250
Registration [3σ, nm]	200	200	200	200
Write speed [mm ² /min]	1125	4125	8250	16500
System features				
Light source	High power DPSS laser with 355 nm			
Maximum substrate sizes	32" x 32" / 1100 x 1100 mm ² / 1400 x 1400 mm ²			
Substrate thickness	0 to 12 mm / 0 to 12 mm / 2 to 13.2 mm			
Maximum exposure area	800 x 800 mm ² / 1100 x 1100 mm ² / 1400 x 1400 mm ²			
Autofocus	Realtime autofocus system			
Autofocus compensation range	80 µm			
Automation	Automatic substrate loading system			
Flowbox	Closed-loop temperature controlled environmental chamber			
Alignment	Camera system for metrology and alignment			
Other features	Stage map correction, Mura correction, Edge detector system, Multiple data input formats (DXF, CIF, GDSII and Gerber files)			
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 vary according to equipment configuration. Write speed depends on exposure area. Design and specifications are subject to change without prior notice.

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