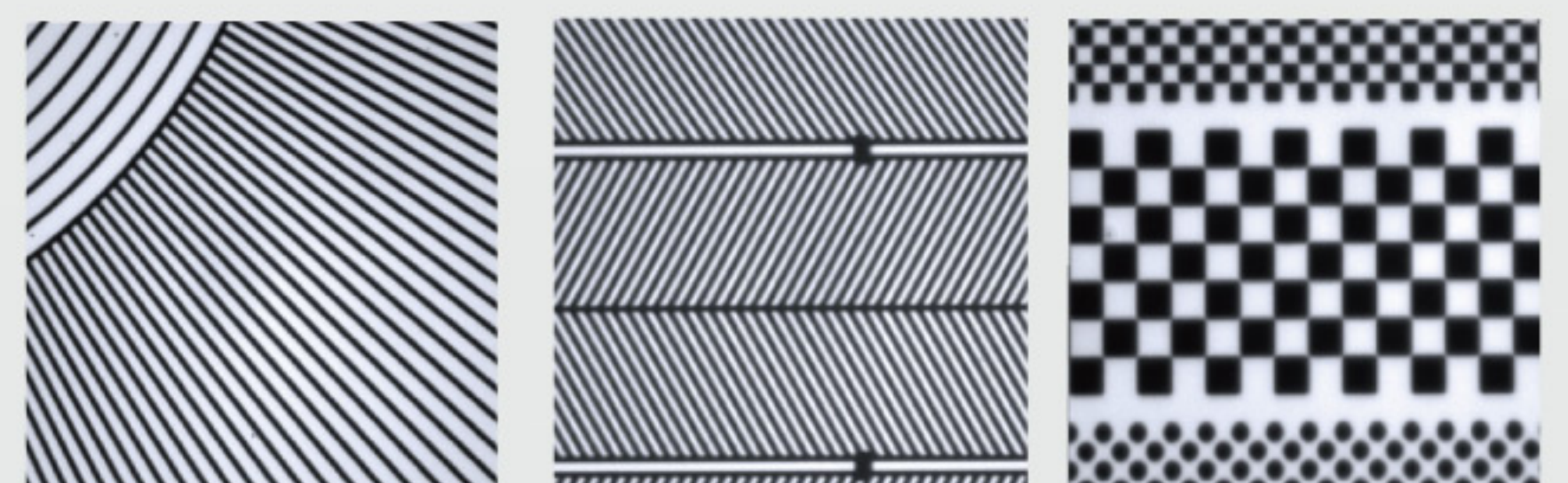


VPG⁺ 200 / VPG⁺ 400

THE SMALL-AREA MULTIPURPOSE VOLUME PATTERN GENERATORS



VPG⁺ 200 / VPG⁺ 400

THE SMALL-AREA MULTIPURPOSE VOLUME PATTERN GENERATORS

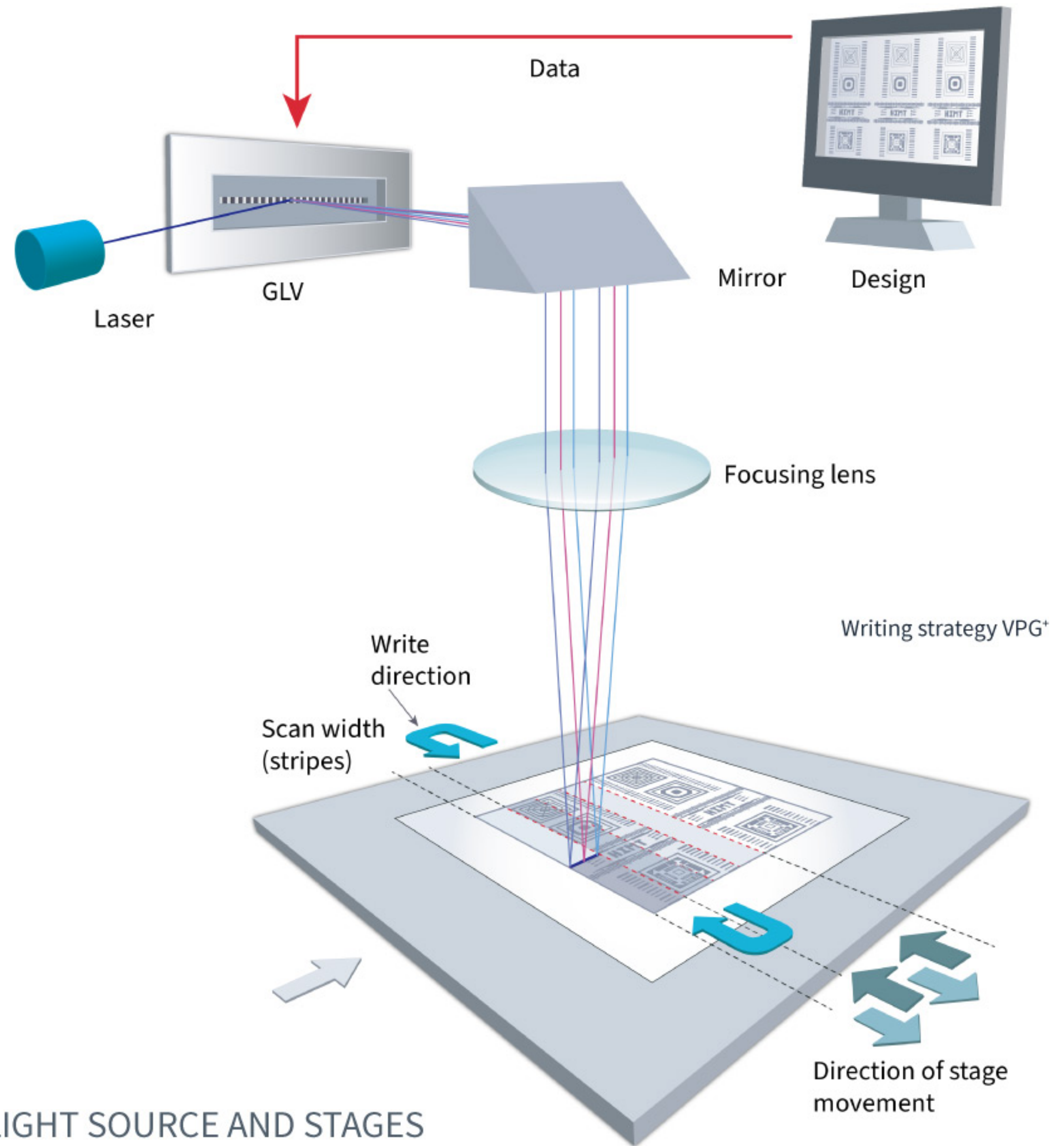
Our small-area multipurpose Volume Pattern Generators VPG⁺ 200 and VPG⁺ 400 are perfectly suited for the production of standard photomasks as well as for i-line resist applications. An ultra-high-speed exposure engine and automated alignment capability both contribute to systems that excel through high resolution, outstanding image quality, and fast throughput.

THE SMALL AREA VOLUME PATTERN GENERATORS

The VPG⁺ 200 and 400 family of systems have always benefitted from Heidelberg Instruments' vast experience in small area lithography; and just as much from the field-proven technology employed on the company's industry standard large area VPG⁺ platforms. VPG⁺ systems both large and small share the same powerful technology.

EVEN HIGHER EXPOSURE SPEED

The „plus“ has been added ever since the series has been featuring an even 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.

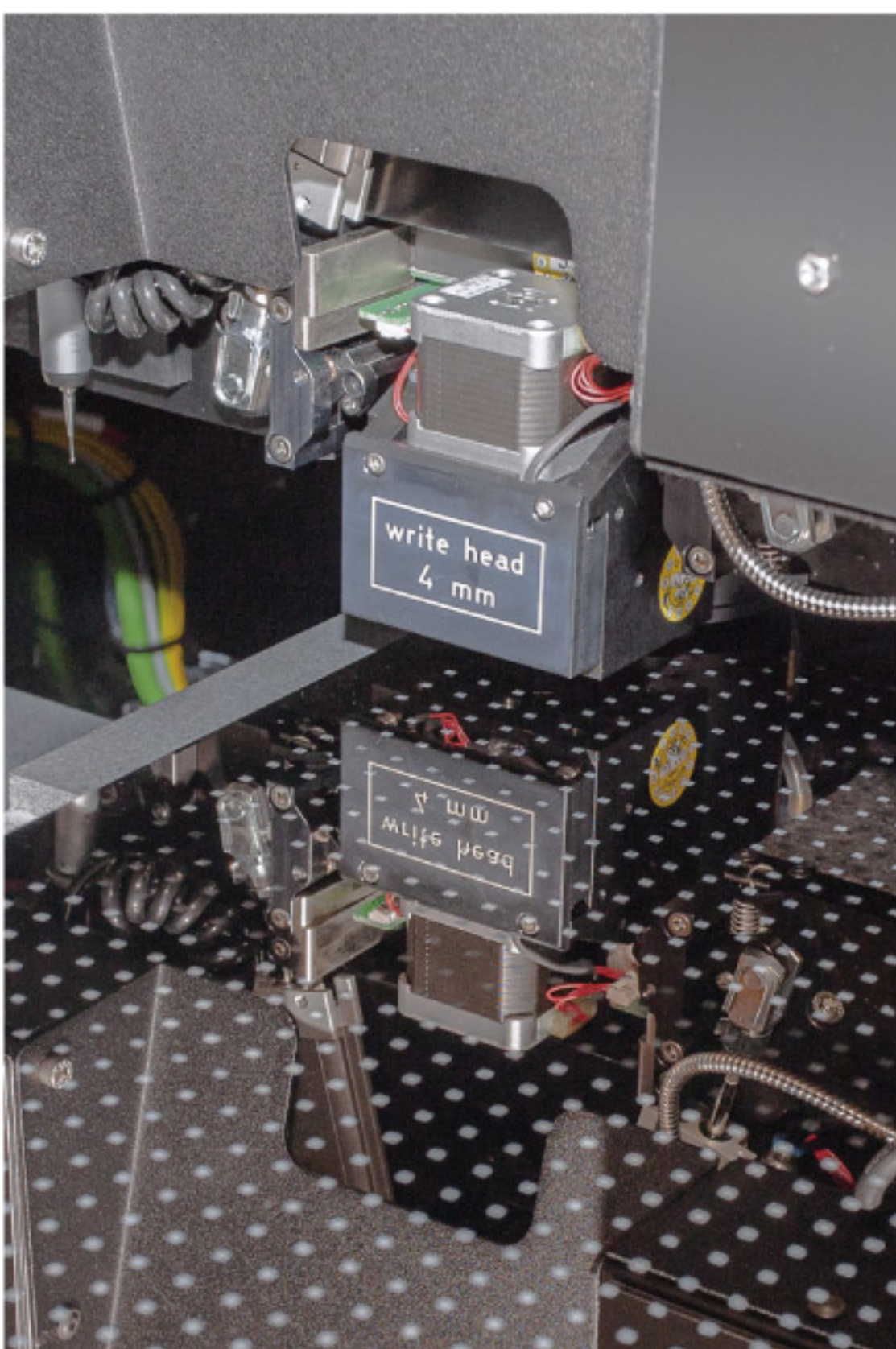


LIGHT SOURCE AND STAGES

The VPG⁺ small-area systems operate with a high-power pulsed UV laser source with a wavelength of 355 nm. The systems can be equipped with air-bearing stages designed to accommodate substrates of up to 9" (VPG⁺ 200) and 17" (VPG⁺ 400) respectively.

THE SMALL-AREA VPG⁺ IN A NUTSHELL

- Ultra-high-speed exposure engine
- Real time auto focus system
- High power DPSS laser with 355 nm
- Exchangeable write modes
- Camera system for metrology and alignment
- Closed-loop climate chamber
- Automatic substrate loading system including pre-alignment
- Stage map correction
- Edge detector system
- Multiple data input formats
- User programmable interface
- Backside and IR alignment options
- Special chucks
- Labelling options
- Optional Zerodur™ chuck
- Minimum structure size down to 0.75 μm



Photograph courtesy of IMS Chips

ALIGNMENT AND CALIBRATION

System features include automated alignment capabilities allowing multilayer exposures with excellent overlay accuracy and repeatability. The alignment functionality includes distortion compensation and field-by-field alignment. The 2D Stage Map Correction automatically calibrates stage positioning improving registration of the written structures.

ENVIRONMENTAL CONTROL

Rigorous environmental monitoring and feedback control ensure the specified overlay accuracy: software corrections based on precise measurements compensate for any variations in environmental parameters. An integrated metrology system enables self-calibration functions and various critical dimension measurements. Standard data formats are supported.

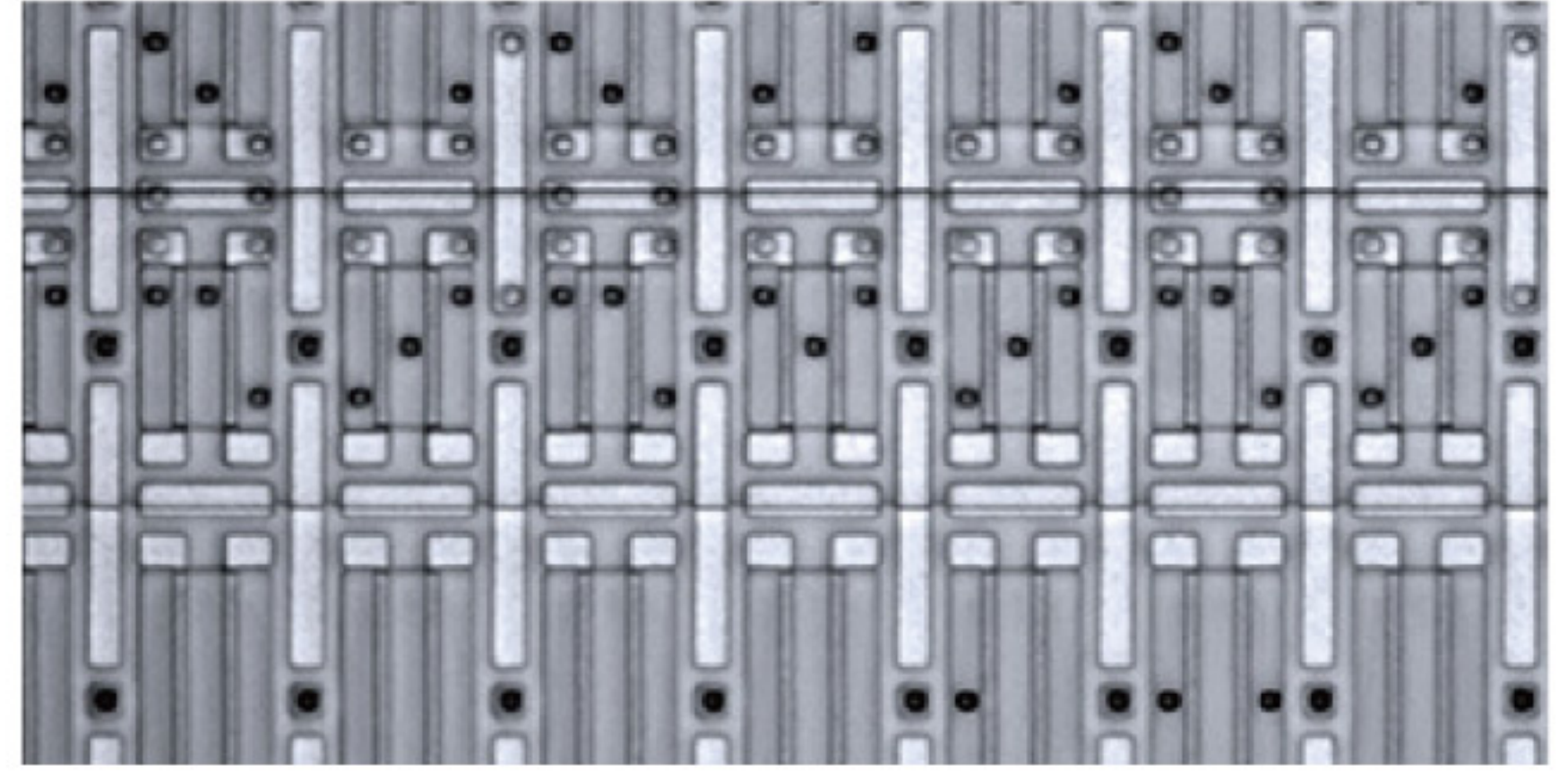
APPLICATIONS

The VPG⁺ 200 and VPG⁺ 400 are perfectly suited for the production of standard photomasks and also for applications that use i-line resists such as SU-8 and IP 3500. The ability to expose SU-8 in fact makes the VPG⁺ a perfect solution for rapid prototyping of microfluidics or in other areas where thick negative resists are required. In effect, the Heidelberg Instruments small-area VPG⁺ systems represent an excellent alternative to any i-line stepper. The systems can be used in a range of demanding fields that require microstructures: Typical applications include MEMS, advanced packaging, 3D integration, LED production and compound semiconductors.

APPLICATIONS IN A NUTSHELL

- Photomask writing
- Rapid prototyping
- Microfluidics, MEMS
- Advanced packaging
- 3D integration
- LED production
- Compound semiconductors
- Particularly suitable for i-line resists such as SU-8 and IP 3600
- Direct write on i-line resists for industrial R&D
- Mix-and-match with e-beam

MIX-AND-MATCH APPLICATIONS

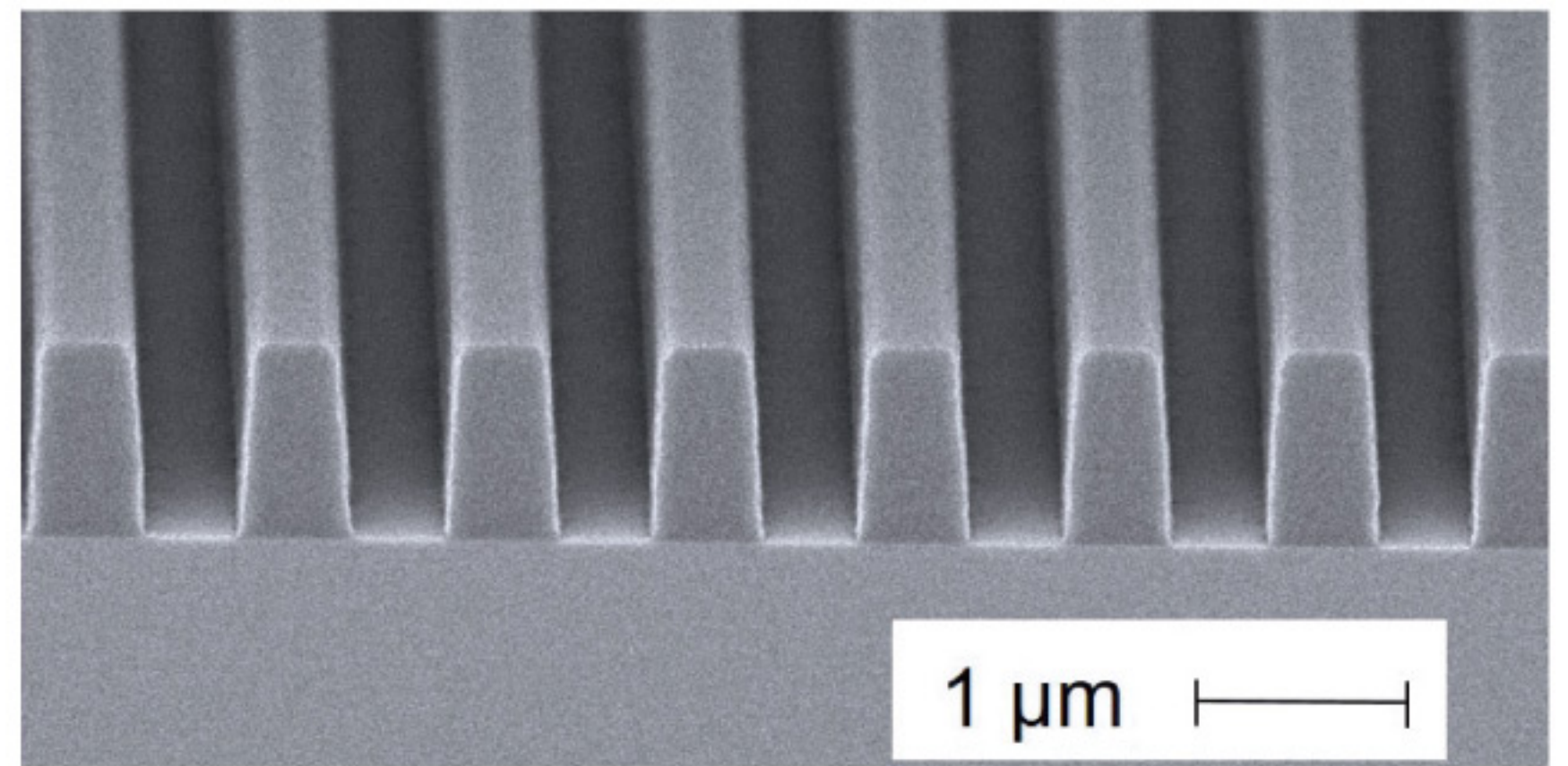


Mixed-signal gate array.

Courtesy of IMS Chips.

The example shows a “sea-of-gates” type mixed-signal gate array (IMS Gate Forest[®] technology) which allows the integration of analog and digital functionality on a single chip. The microelectronic elements on the master can be individually configured by adding the respective contacts. In a Mix-&Match-approach, IMS Chips fabricated the CMOS masters by stepper lithography and added the personalized contacts and metallization layers with direct write laser lithography, using a VPG 400.

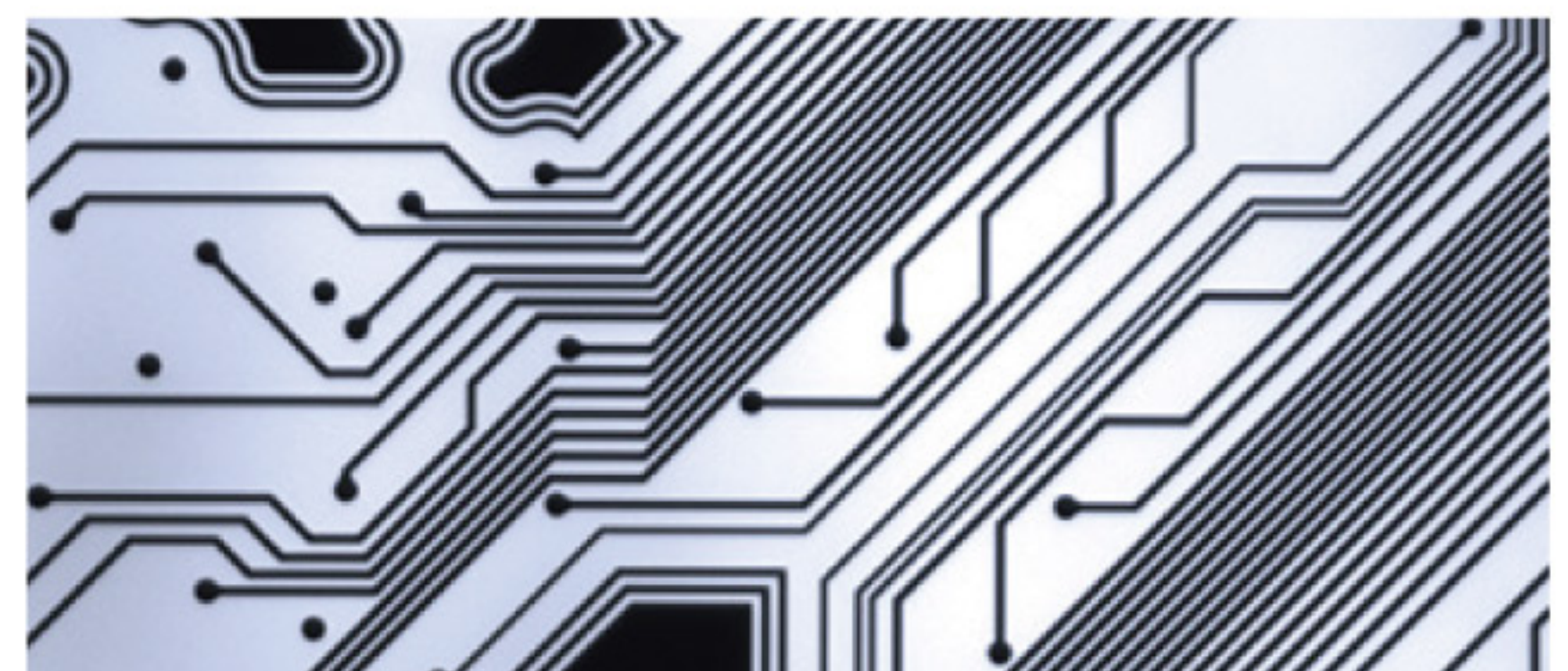
HIGH-RESOLUTION STRUCTURES



Structures created with IP3250 (1 µm thickness).

Courtesy of IMS Chips.

ADVANCED PACKAGING



The VPG⁺ series presents the solution for the fabrication of the high-quality photomasks or direct writing required for advanced packaging applications. For some critical applications direct write lithography is currently the only available solution. The VPG⁺ series of maskless lithography systems offer high speed, automatic distortion compensation, and excellent resolution in order to master these applications.

VPG⁺ 200 / VPG⁺ 400

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
Stitching [3σ , nm]	60	70	100
2nd layer alignment [3σ , nm]	225	350	500
Write speed [mm^2/min]	970	3150	6400
System features			
Light source	High-power DPSS laser with 355 nm		
Maximum substrate sizes	9" x 9" / 17" x 17"		
Substrate thickness	0 to 12 mm (other thicknesses on request)		
Maximum exposure area	205 mm x 205 mm / 410 mm x 410 mm		
Autofocus	Realtime autofocus system (optical and pneumatic)		
Autofocus compensation range	Up to 150 μm		
Flowbox	(Closed-loop) temperature controlled environmental chamber		
Alignment	Camera system for metrology and alignment; backside and IR alignment options		
Other features and options	Stage map correction, Mura correction, Edge detector system, Multiple data input formats (DXF, CIF, GDSII and Gerber files); full automatic wafer and mask handling options including prealigner, optional Zerodur™ stage and special chucks		
System dimensions			
	System	Electronic rack	
Width [mm]	2605	800	
Depth [mm]	1652	650	
Height [mm]	2102	1800	
Weight [kg]	3000	180	
Installation requirements			
Electrical	400 VAC \pm 5 %, 50/60 Hz, 32 A		
Compressed air	6 - 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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