XENOS Semiconductor Technologies GmbH

Advanced XENOS Nano-Lithography System
XeDraw 2

The XENOS *XeDraw 2* writer is a system that allows to design pattern data and to produce the respective deflection signals for beam steering of charged particle beams such as electron beams for semiconductor lithography applications or focused ion beam systems. Attached to a conventional scanning electron microscope, FIB, or dual beam tool, it upgrades the system to perform advanced nanolithography on semiconductor or other materials with this system.

The XENOS *XeDraw 2* consists of a fast pattern generator to produce the deflection signal data for the patterns to be written by the SEM, e-beam or FIB system, implementing intelligent writing schemes and shape primitives to take full benefit of limited deflection chain bandwidths. The system comes with the user-friendly and application based *ECP* design- and control software.

Features of the pattern generator hardware:

- Writing speed: up to 10 Mpixels/sec

- Resolution: 16 Bit, writing field size of 50000 x 50000 pixels

- Implemented shapes:
      dot, single pixel line, rectangular primitives (spiral or meander fill), trapezoids, triangles, parallelograms, arrays, 3rd order polynomials, circles, rings or ring segments
      import of image files (*.bmp, *.jpg ...), GDS II and AutoCad/ Autosketch *.dxf

- Writing clock: 10 kHz up to 10 MHz in 1 kHz increments

- Digital full bandwidth field correction:
      scaling, rotation, orthogonality, shift and trapezoidal correction

- Mark detection input:
	analog input for image detector output (adjustable gain and offset) with 12 Bit
	sampling, single line scan, selected area or full frame

- Deflection Outputs: Analog outputs up to +/- 10 V (galvanicaly isolated, adjustable)

- PC interface: USB 2.0 compliant

	*firmware boot via USB allows easy firmware updates and implementation of new features
	without actual hardware changes or flash reprogramming.*

- Blanker output: TTL output with adjustable polarity or optional fiber optics output

Features of the *XENOS ECP* software:

- exposure patterns:
	design of shapes (with hierarchical structures), dose and field size within the design

- batch processing files:
	design of size and position of multiple writing fields for larger areas (with stitching between
	fields), controls for writing scheme (calibration, alignment, beam current control, user
	breaks...), automated cutting of shapes

- stage control:
	mapping of user coordinates, homing, absolute and relative positioning, predefined positions

- focus, field and stage calibration:
	calibration of deflection and stage coordinates (relative to laser interferometer coordinates if
	installed), feedback of the mechanical stage misalignment

- mark detection and alignment:
	calculation of field correction parameters, scan control of the alignment marks