high-speed scanner for line-by-line processing

Polygon scanners are particularly advantageous for line-oriented full-surface processing of workpieces and surfaces. Due to the high scan speed, these systems can drastically reduce material processing times.

Polygon scanners typically achieve industrial-grade productivity by operating with ultra-short pulse lasers. This combination enables high-precision and ultra-fast micromachining of a vast range of materials.

Key Features

- Fully telecentric mirror based F-Theta optics
- Supports NIR/VIS and UV wavelengths
- Diffraction limited quality optics for small focused spot sizes
- Included control electronics for easy integration with lasers and linear stages

Typical applications

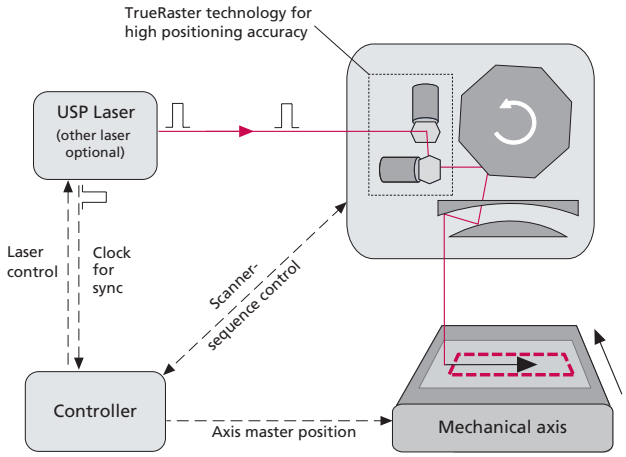
- Solar cells: Layer ablation
- Displays: Thin film patterning and surface treatment
- Flexible electronics: Roll-to-roll processing
- Semiconductors: Micro drilling, grooving and dicing of wafers

SCANLAB
innovators for industry

High Throughput Raster Processing

Polygon scanner systems from SCANLAB are optimized for highest scan speed and accuracy. The scan system employs a rotating polygon mirror for fast line scanning. With the aid of an external feed axis or web moving perpendicular to the polygon wheel's scan direction, a long area can be processed.

The scanner is typically used for full-surface processing in a regular raster. Individual exposure patterns can be produced by outputting a user defined bitmap for pixel-accurate control of the processing laser.



- **Polygon and Distortion Correction**
  TrueRaster technology: Compensation of polygon mirror inaccuracies as well as image field distortion. This delivers best in class calibrated accuracy and ensures a precise, high quality processing raster even under high-throughput conditions.

- **Synchronization Functionality**
  SuperSync: Triggers the laser to ensure the start of all lines are matched to each other – vital for high quality micro-machining.

- **Fully Telecentric Optics**
  The mirror-based F-Theta optics are fully telecentric over a scan range of 300 mm. Combined with a mechanical axis, this enables consistent processing of large areas with small spot diameters. Parallelization of multiple lineSCANs allows, for instance, the processing of panel-sized substrates.

- **Intelligent Control**
  Interleaving and Job-Dithering enhance processing quality where SuperSync and TrueRaster fulfill requirements regarding repeatability and accuracy, particularly crucial for requiring spatial separation of single pulses, high line straightness or identical repetitive processing.

Optical specifications

	lineSCAN 300
Minimum spot ($1/e^2$) [1]	
at 341–357 nm	15 µm
at 515–535 nm	22 µm
at 1030–1070 nm	45 µm
Input beam aperture ($1/e^2$)	11 mm
Input clear aperture	18 mm
Scan width	300 mm
Position accuracy	± 1.5 µm [2]
Line straightness	3 µm [2]
Spot repeatability	< 12 µm [3]
Input beam	parallel beam
System specifications	
Scan speed [lines per second]	56–400
Moving spot speed	25–170 m/s
Duty cycle	71%
Scanner to substrate clearance	26.5 mm
Weight	21 kg

[1] M^2 = 1.0, $D(1/e^2)$ = 1.7 x FWHM; larger spot sizes are possible using smaller diameter input beam.
[2] Requires TrueRaster technology and calibration - accuracy is determined as average of hundreds of dot location measurements. Calibration accuracy depends on measurement tool performance.
[3] 4σ deviation of hundreds of dot location measurements. Requires SuperSync control, see SCANLAB website for supported lasers.

SCANLAB GmbH · Siemensstr. 2a · 82178 Puchheim · Germany
Tel. +49 (89) 800 746-0 · Fax +49 (89) 800 746-199
info@scanlab.de · www.scanlab.de

SCANLAB America, Inc. · 100 Illinois St · St. Charles, IL 60174 · USA
Tel. +1 (630) 797-2044 · Fax +1 (630) 797-2001
info@scanlab-america.com · www.scanlab-america.com

SCANLAB innovators for industry