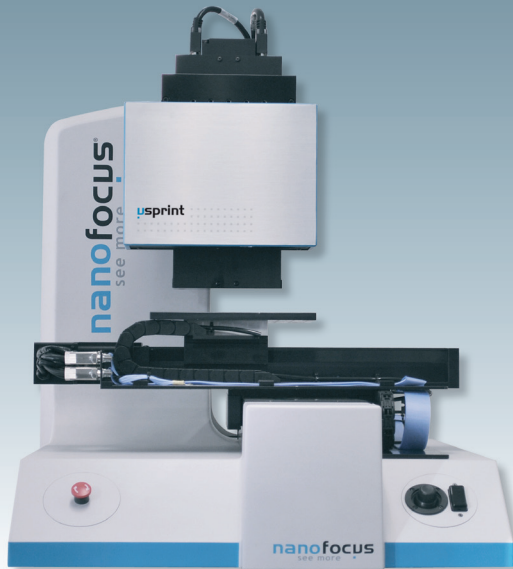


μsprint topographer



With excellent precision the μsprint topographer acquires profile data from any surface with high accuracy.

The μsprint topographer reliably measures topographies in the μm-range. That's why it is the ideal tool for quality assurance and process control requiring large area scanning accompanied with precise and reliable measurement results.

The μsprint topographer is a stand-alone desktop 3D measurement system. The stage is the base for the x,y table and the 3D sensor and provides the stability essential for high precision data acquisition. The control cabinet, which serves as the table for the μsprint, contains the electronics and the PC. The μsprint software provides a multitude of possibilities for scanning and data analysis.

By combining the principle of confocal microscopy with the patented μsprint principle, true 3D information is recorded and analyzed with unprecedented speed and accuracy.

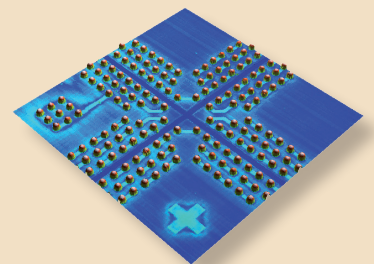
The μsprint technology is suitable for a variety of applications ranging from inspection of wafer bumps and high precision components to laser weld seam and spot weld inspection.

The sensor principle has proven its unique capabilities on highly reflective as well as on extremely light absorbing and rough surfaces in the semiconductor, electronics, automotive, aerospace and medical industries.

- ▶ High-speed area scanning
- ▶ Wide measurement range
- ▶ Excellent accuracy
- ▶ High aspect ratio for depth measurement
- ▶ Large numerical aperture
- ▶ Independent of surface properties
- ▶ Simple operation

Applications:

Electronics
Semiconductor
Medical
Metal/Mechanics
Automotive
Glass/Optical
Paper



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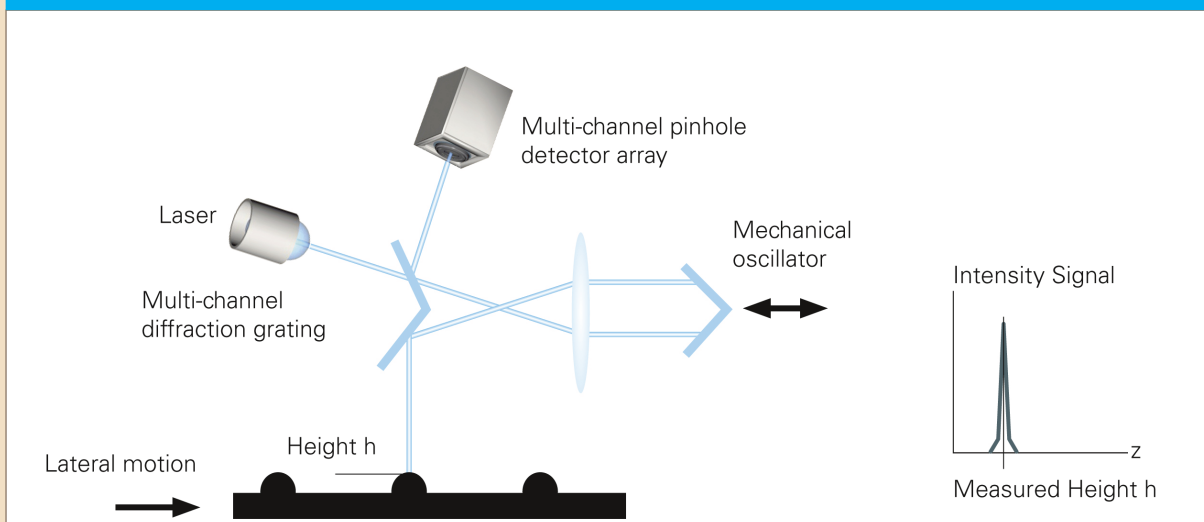
Proven principle

Confocal measurement techniques are well known for offering various unique characteristics such as high resolution, accuracy and reliability while being virtually free of optical artifacts even for different surface properties and shapes. In order to take the technology from the laboratory directly to the manufacturing environment, for production support applications, a method for operating a confocal measurement system at unique high speed was invented. The multi-channel 3D μ sprint sensors incorporate a tuning fork which oscillates at a high frequency. This oscillation is transferred to the image of the light source located on the

object, thus allowing scanning over a distinct height measurement range.

Additionally, a beam splitter generates multiple homogeneous laser beams in a parallel order. Consequently, height data from multiple points of the object's surface are acquired in parallel. Moreover, the sensor's high sample rate allows moving the object or the sensor at a high speed, thereby making large area scans possible in a short amount of time. All acquired height and intensity data are merged into a 3D topographical image as well as an intensity image.

μ sprint Technical Principle



Fast Data Acquisition

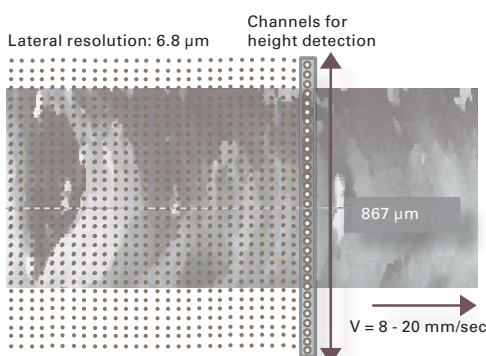
The multi-channel 3D sensor, μ sprint, employs signal pre-processing, which simultaneously detects the height-peak of each of the channels in real time. In parallel, the peak intensity is measured and saved as it represents the surface reflectivity.

Both signal data – height as well as intensity – are transferred via an interface to a host computer for further data processing. The data is transferred to

the PC by either a standard PCI line camera interface board or an USB port.

The data from all channels is acquired 8000 times per second by the multi-channel μ sprint sensor. It operates similar to a line inspection camera. I.e. for the image acquisition of an area, either the sensor or the object has to be moved. Both are possible.

μ sprint Scanning Principle

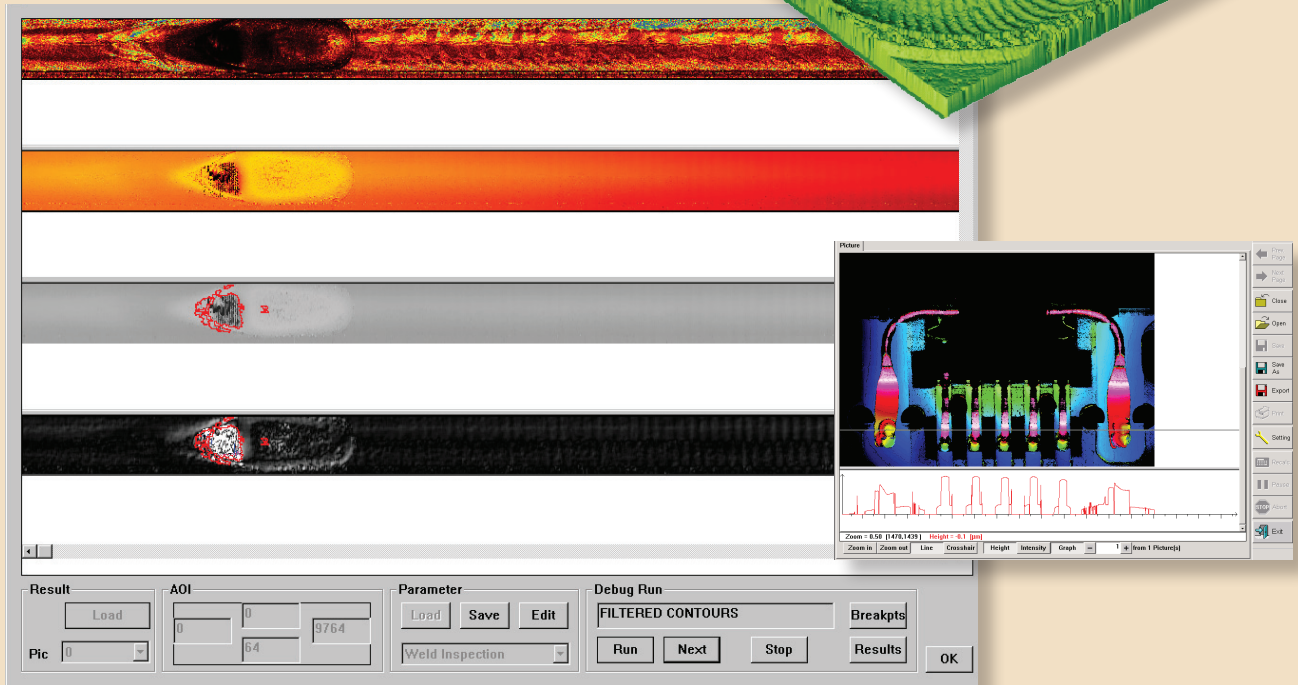
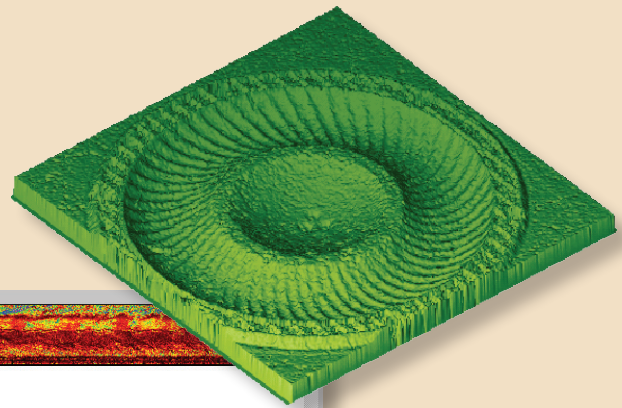


Precision every second

The ultra-fast, highly accurate scanning of surfaces is made possible by the combination of a laser with up to 128 channels and a vertically oscillating tuning fork.

Comprehensive software for operation and evaluation

The μ sprint topographer is delivered with the μ sprint software for operation and customized inspection solutions. For general purpose 3D analysis the comprehensive μ soft analysis software from NanoFocus is available optionally.



Software Features

Graphical user interface	According to the SEMI Standard
User management	Basic users are the <i>Operator</i> , <i>Engineer</i> and <i>Service</i> mode, the access rights are editable. More user levels can be created and edited.
Interactive operation	Scanning of user-defined areas and display of height and intensity image
Creation of receipts	Allows to define the scanning area and optional the inspection items and parameters for an inspection job.
Inspection job	Bump inspection: bump height, bump diameter, bump position, missing bumps; customized inspection algorithm: spot welds, weld seams, flatness, defects
Result display	3D viewer, Area scan: height image, intensity image, horizontal and vertical height and intensity profile; Inspection cycle results, graphical display <i>ok</i> or <i>not ok</i> , numerical values, statistics of the measurement cycle
Result output	*.txt and *.xls files
Data formats	Following formats of the height and intensity images are possible: *.sip (Siemens proprietary), *.xdt, *.tif, *.frt
Sensor linearization	Acquisition and calculation of linearization table
Automatic alignment (optional)	With the optional alignment camera, a fiducial mark can be detected and its position can be precisely calculated.

Sensors

	standard	high resolution	custom
Numerical aperture	0.6	0.8	
Working distance	8 mm	8 mm	0.5 - 30 mm
Height range	400 µm	330 µm	100 µm - 2.5 mm
Resolution in z-direction	0.2 µm	0.15 µm	0.05 - 1.3 µm
Resolution in x,y-direction	6.8 µm	5.1 µm	3.4 - 17 µm
Scan width	867 µm	650 µm	435 µm - 2.5 mm
Scan speed	54 mm/s	40 mm/s	8 - 200 mm/s
Spot diameter	1 µm	1 µm	1 - 2.5 µm
Wavelength of laser diode		830 nm	
Laser class		1 M	
Number of channels		128	
Sample Rate (per channel)		8000 s ⁻¹	
Dimensions (LxHxW)		260 x 194 x 99 mm	
Integration		High-Speed USB 2.0 port	
Power supply		110/230 V AC, 15 W	

Topographer

Base frame	Rugged base frame with positioning stage (x,y and z); Dimensions (WxHxD): 620 x 800 x 690 mm; Weight: approx. 180 kg
Stages	The precision mechanical bearings ball-screw-driven stages provide x-,y- and z-axes.
Travel ranges	x: 250 mm, y: 200 mm, z: 100 mm
Control cabinet	Control cabinet designed according to industrial standards with an industrial PC and the motion controller; Dimensions (WxHxD): 605 x 680 x 605 mm; Weight approx. 100 kg

Options

Alignment camera	Field of view: 3 mm x 2.25 mm, pixel resolution: 4.75 µm (VGA)
Alignment Kit WD 15/WD 57	USB camera with lighting; The camera is used interactively for definition of the measurement area. In automatic operation of a system it is used for detection of fiducial marks. Two models available for short and long working distance.
µsoft analysis	Software to analyze 3D measurement data, layout function, templates for series measurement and analysis

Environment

Operating temperature	20 to 30° C (68 to 86° F); Variation ± 2° C (± 3,6° F)
Humidity	< 45% non-condensing
Vibration	inadmissible up to 5000 Hz
Miscellaneous	Do not expose to direct sun light or spot light.

Are you interested in other NanoFocus Technologies?
Please call us or write an email to sales@nanofocus.de

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