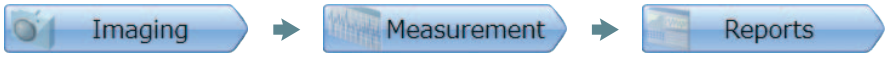
Systematic Workflow via Intuitive GUI

Easy operation accomplishes your goals faster than ever.

Easy Three-Step Process

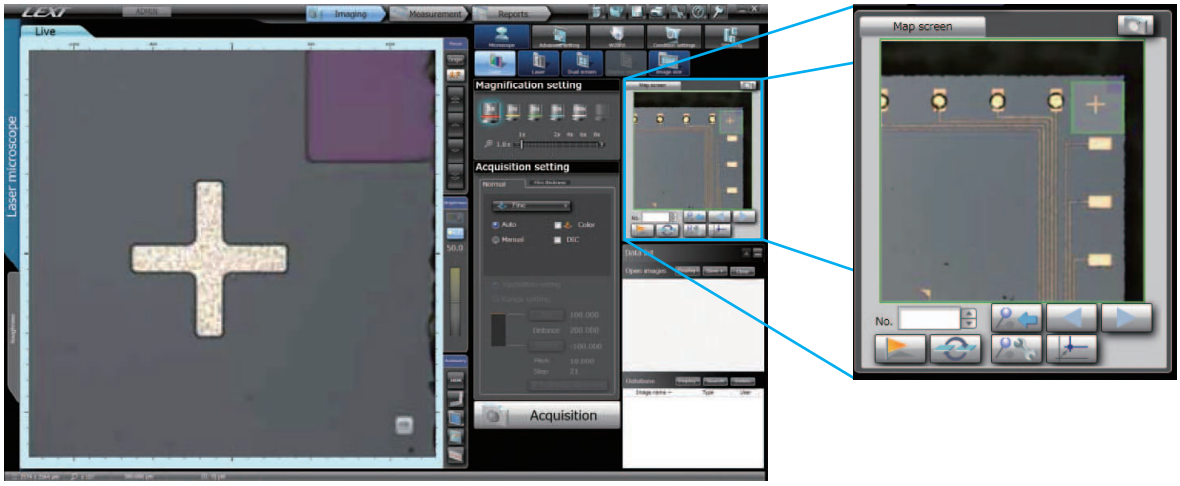
With the LEXT OLS4100, observation or measurement begins immediately once the sample is placed on the stage. Thanks to our easy three-step “Imaging, Measurement and Reports” process, measurement procedures can be quickly mastered, even by those not familiar with laser microscopy.



Keeping Track of the Sample

Macro Map Functionality

The OLS4100’s macro map function allows wide-field image display of a sample under low magnification, with a rectangular observation marker on the macro sample image. The field of view can be set up to 441 (21x21) times wider than the conventional view. When used with the motorized six-lens nosepiece, the macro map function allows smooth, convenient, one-click operation for stage movement and magnification. Accurate parfocality and objective centering can be preset and synchronized with one-click stage movement and magnification.



Fast Macro Map Stitching

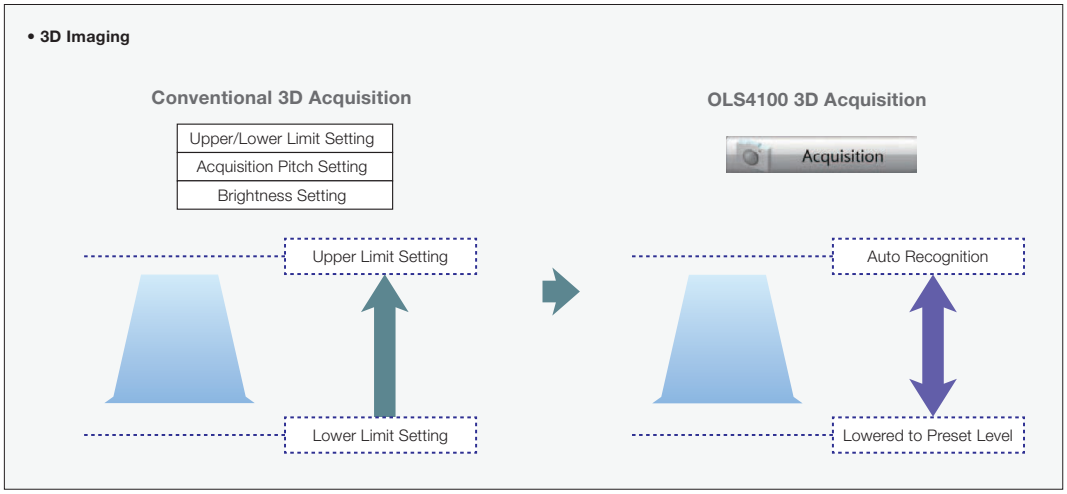
Two stitching methods are available for scanning large areas: Manual mode for live image acquisition and Automatic mode for faster image acquisition. Operation is quick and simple—2D stitching starts automatically at the touch of a single button, and wide area images are acquired immediately. The stitching size is available from five steps in 3x3, 5x5, 7x7, 9x9, and 21x21 in Automatic mode. Unnecessary parts of the acquired images can also be removed manually with simple mouse/joystick operation.

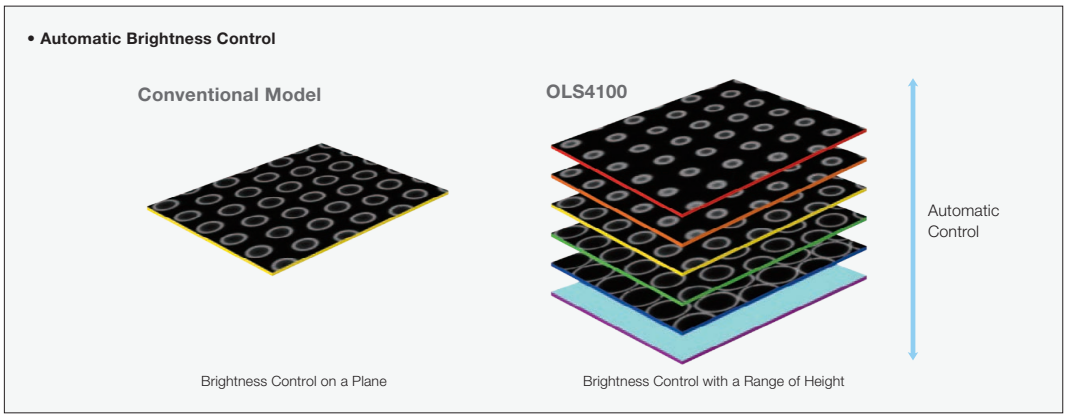
Smart Scan for Simple 3D Imaging

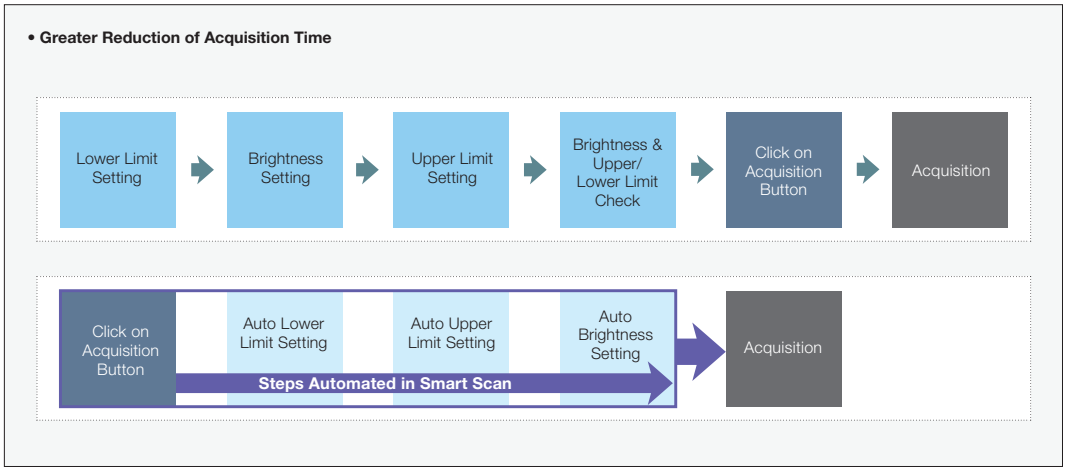
Speed of image acquisition is significantly increased, with automatic adjustments for brightness and position across the Z-axis direction and planar surface.

Automatic 3D Image Acquisition

Conventional 3D scanning requires complicated settings that are difficult for novice users. With the LEXT OLS4100's new Smart Scan mode, even first-time users can quickly acquire 3D images with a single click of a button. In addition to upper and lower limit settings, appropriate brightness level is automatically set up by the system based on the image to be captured, allowing even new users to obtain accurate height measurements and an optimized image.

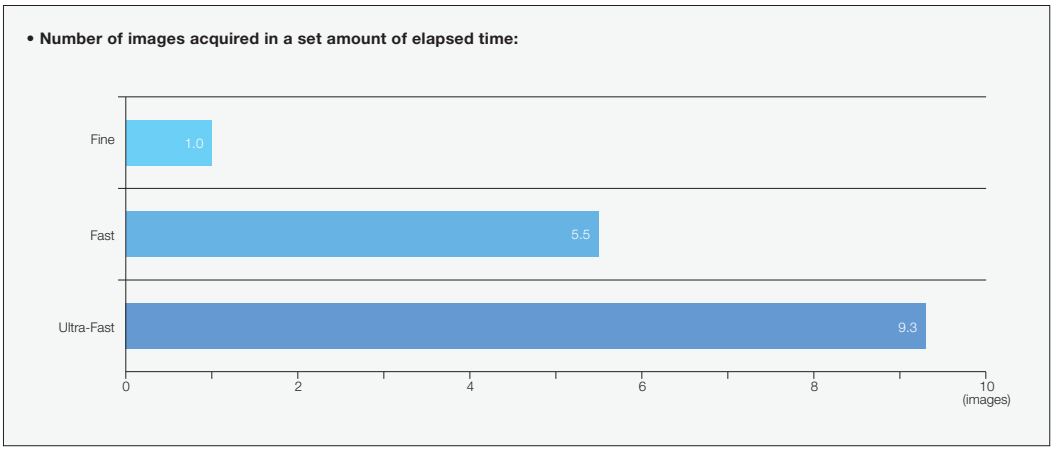






Improved Scanning Speed

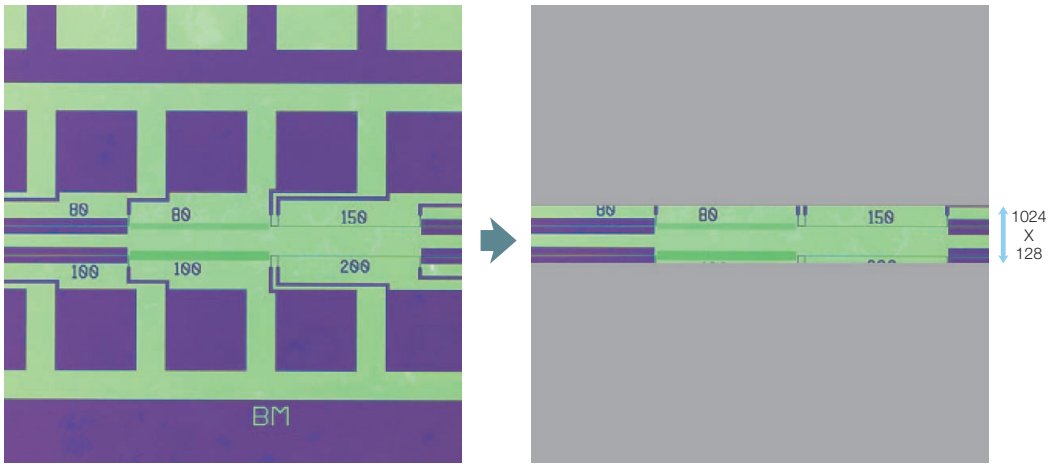
The new Ultra-Fast mode allows scanned image acquisition at twice the speed of conventional Fast mode, and approximately nine times the speed of Fine mode. This makes it possible to measure micro-samples with very steep angles, such as the tip of a knife, which is difficult to observe due to fine Z-step movement and high magnification.



Actual scanning time varies depending on magnification and Z-acquisition range.

High-Speed Acquisition of Required Areas Only

The OLS4100 also comes with a Band Scan mode for measurement of limited target areas, providing measurement performance 1/8th faster than conventional modes.



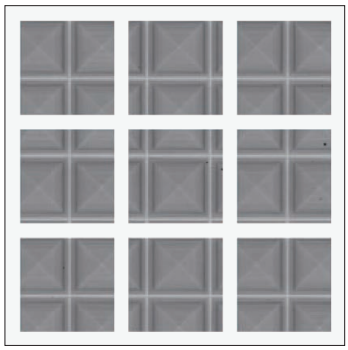
Acquisition with a Full Scan

Acquisition with Band Scan (1/8th)

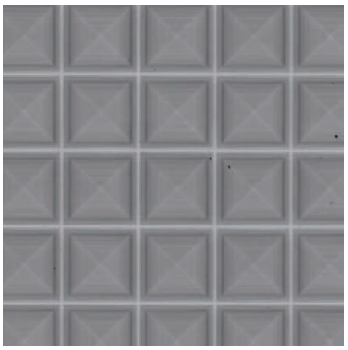
New High-Speed Stitching Mode

Specify Target Areas from Wider-Area Stitched Images

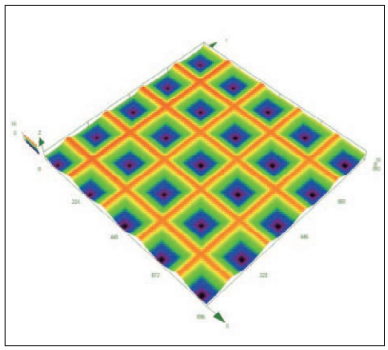
As in macro mapping, the area to be observed can be specified from a wide area map. In Automatic mode, an area map can be automatically generated in roughly half the time it normally takes by setting a rectangular stitching size of up to 625 images. Observation can begin immediately once the target area is specified on the area map.



Individual 2D Images Before Stitching (Simulation)



2D Image After Stitching



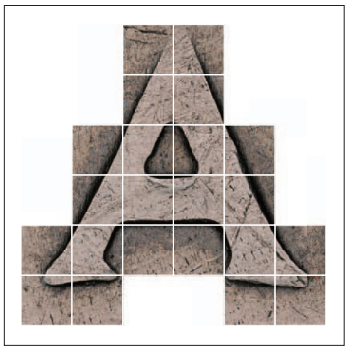
3D Image After Stitching

Stitching Area: Square (21x3) 63 Pieces

Stitching Area: Circle (3 Points)

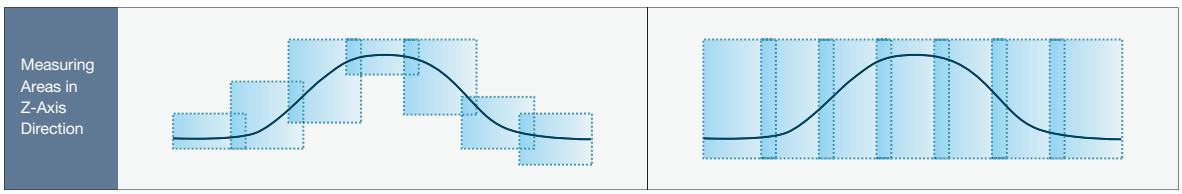
Manually Specifying Required Image Areas

In Live mode, the area to be observed can be selected manually by tracing the required region onscreen. This is ideal when the sample has an irregular shape.



Quick Image Acquisition

In Smart Scan mode, all it takes is the click of a button. As the location across the Z-axis is automatically adjusted, image acquisition in the Z-axis direction can be restricted to required areas only, for rapid high-power observation across a wide area.



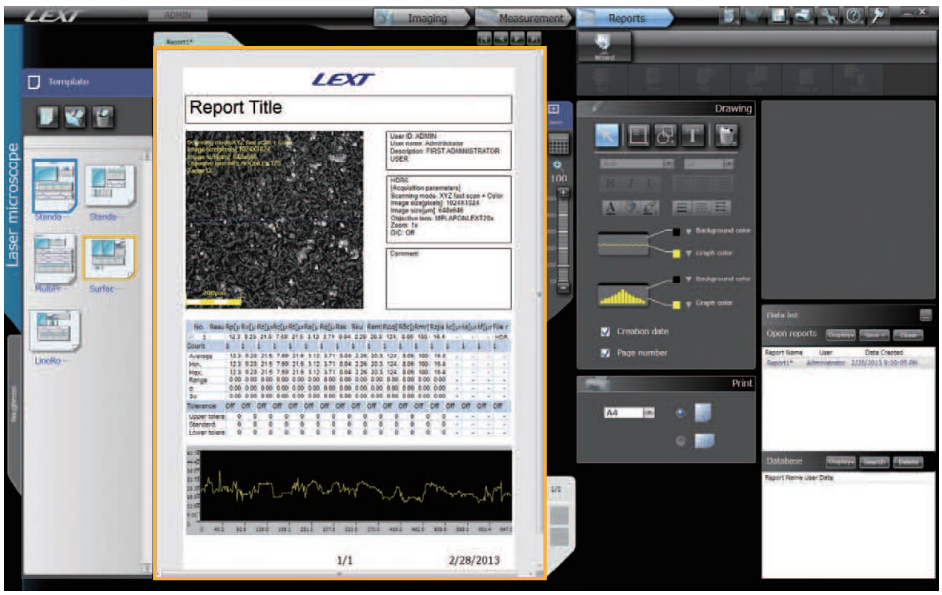
Smart Scan Mode

Conventional Acquisition Mode

Customizable Reports at the Touch of a Button

Report Creation

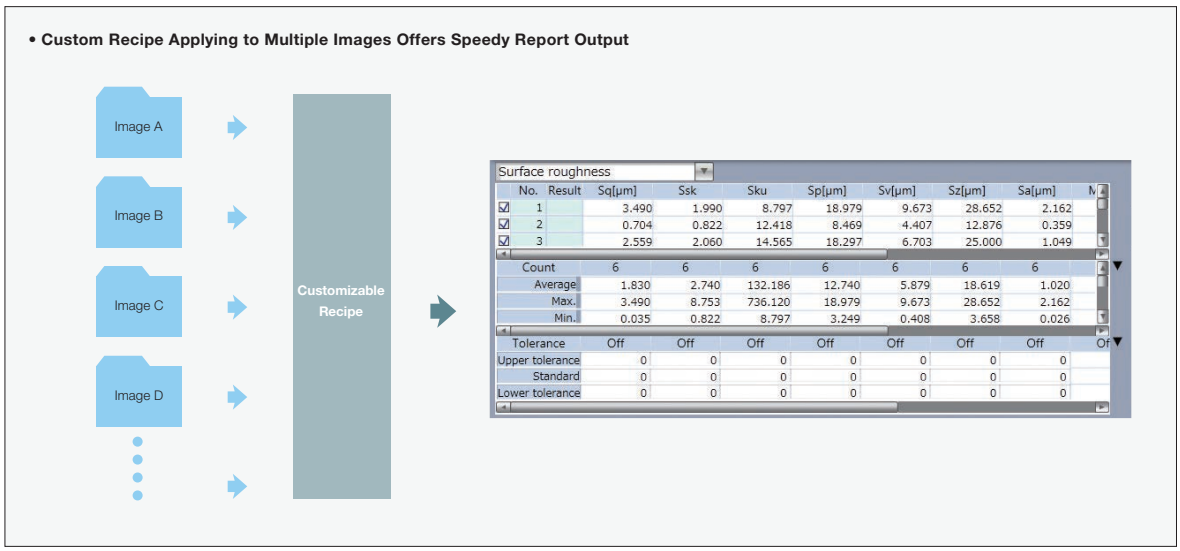
The OLS4100 generates reports at the touch of a button after measurement, and an edit function allows the operator to customize each report template. Copying and pasting measured results into a word processing/spreadsheet application is also quite simple, as is retrieving required images/reports from a database.



One-Click Solutions

Wizard Function

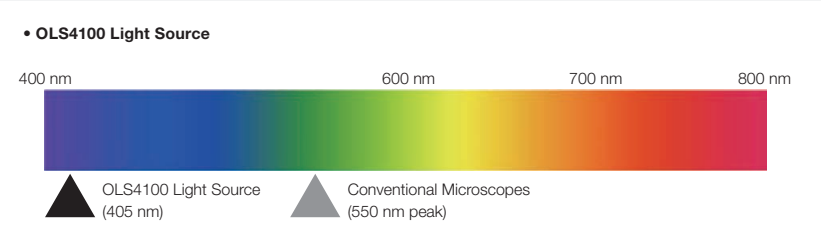
A detailed user-designed wizard function eliminates the need for lengthy training and allows quick and easy operation by new operators.



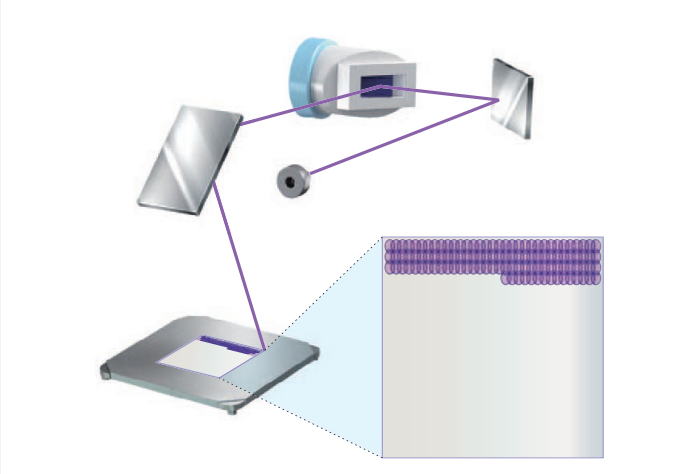
Basic Principles of the LEXT OLS4100

405 nm Laser Scan

The lateral resolution of an optical microscope is defined largely by the parameters of the optics and the wavelength of the light source. With a 405 nm short-wavelength semiconductor laser, the LEXT OLS4100 enjoys a high lateral resolution in comparison to a conventional microscope using visible light with a 550 nm peak.



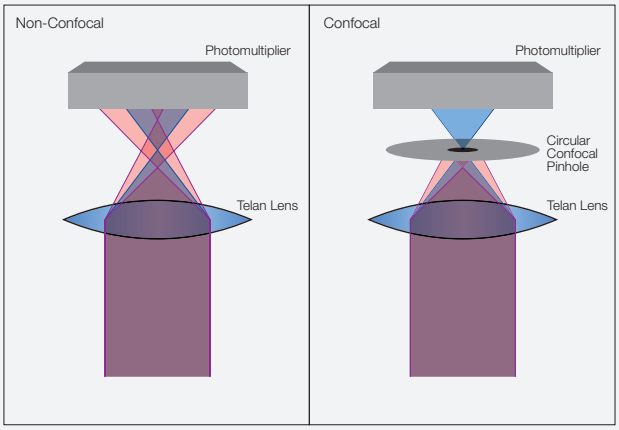
2D Scanning System



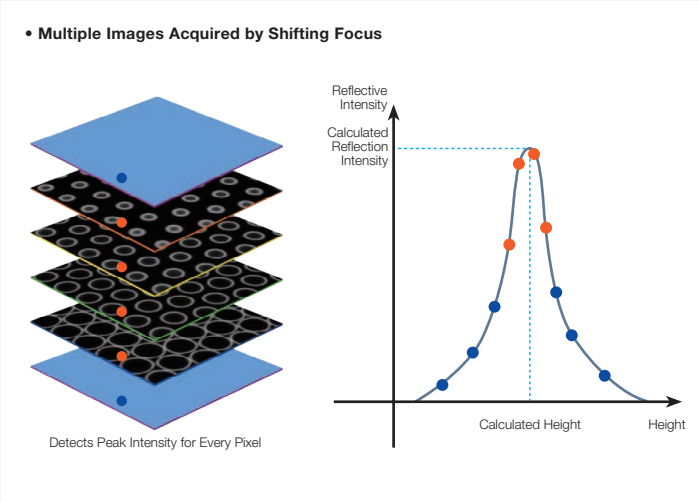
For 2D scanning, the OLS4100 incorporates an Olympus scanner-on-scanner. An electromagnetic MEMS scanner handles the X direction, while a high-precision Galvano mirror takes care of scanning in the Y direction. This innovative system enables the axis of the scanner and the exit pupil of the objective to be placed at an optically conjugate position. This ideal optical layout allows accurate high-speed, low-distortion X-Y scanning, enabling the OLS4100 to provide high-density scanning up to 4096 x 4096 pixels.

Confocal Optical System

A confocal optical system captures only the in-focus image while simultaneously eliminating flare. In addition, confocal technology can be used as a height sensor since only thin image planes of the same height are captured. The OLS4100 is equipped with an Olympus dual confocal system, enhancing optical performance for precise 3D images even with samples made up of materials with different reflectances. The circular pinhole point of laser light also produces a uniform confocal effect, enhancing contrast in every direction.

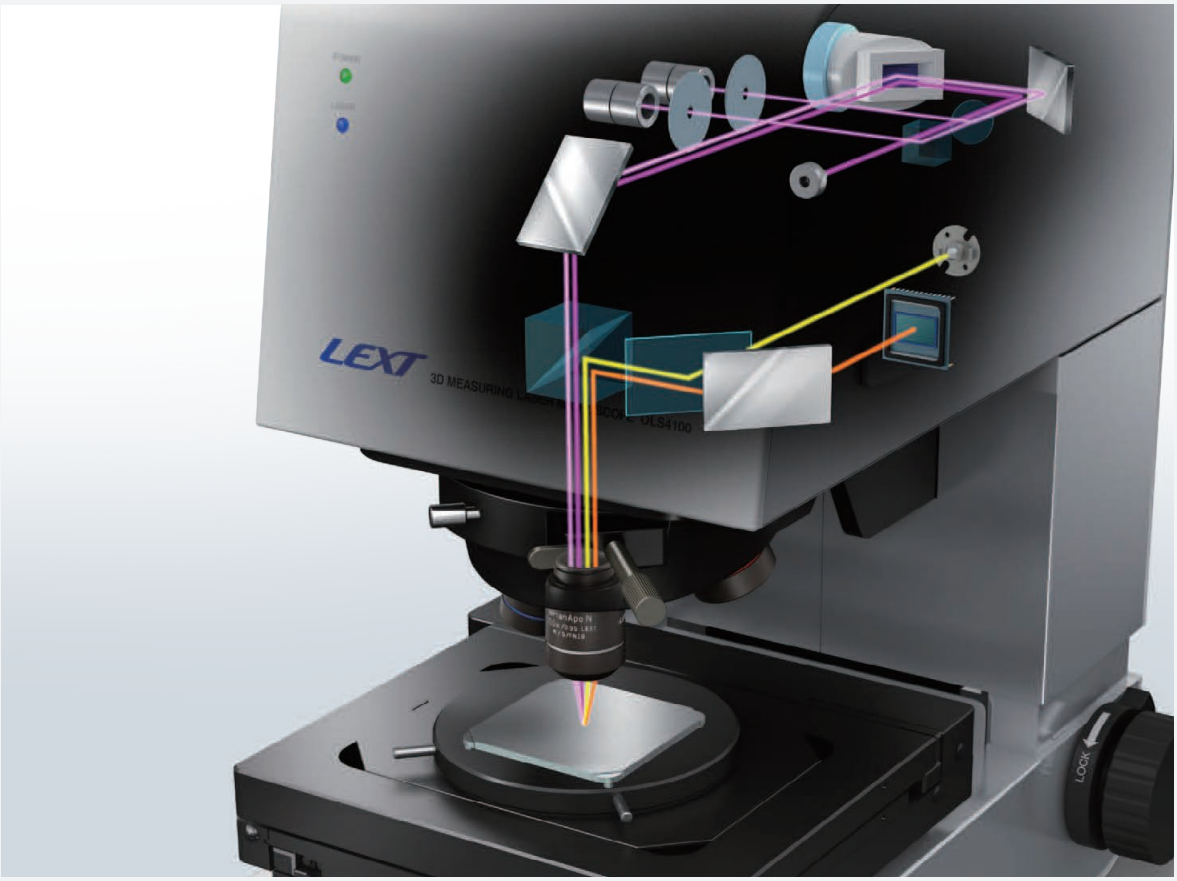


CFO Search



Obtaining height information is a primary function of the OLS4100 and is achieved by moving the objective upward to detect the change of light intensity along the Z-axis. Olympus CFO (calculated focus operation) technology detects light intensity automatically in order to obtain discrete height data. The approximate curve of an ideal I-Z curve is calculated alongside the maximum brightness value and Z-axis information, which define each image pixel. CFO search technology significantly improves repeatability—one of the most indispensable assets of a measurement tool.

OLS4100 Optical Path Diagram

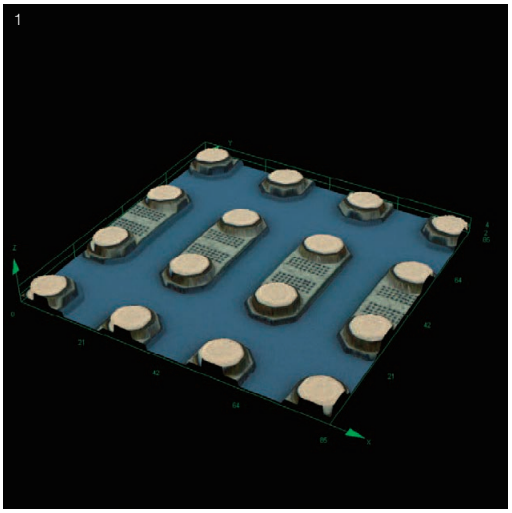


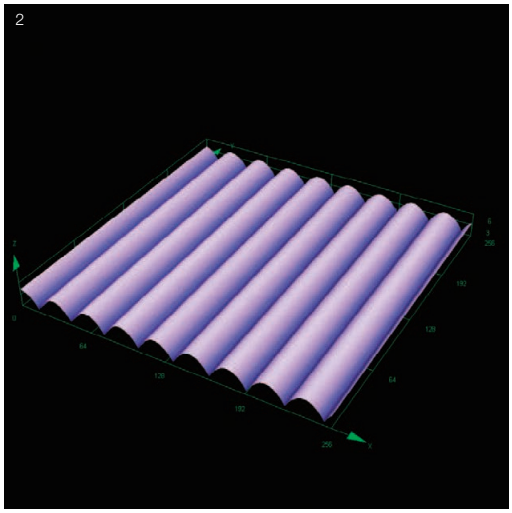
Based on these basic principles, the LEXT OLS4100 offers the following features:

- 10-nanometer resolution in the Z-axis direction to enable 3D surface contour measurement
- Horizontal (X-Y direction) resolution of 0.12 µm to enable high-definition image observation
- Violet laser enables non-contact observation and measurement

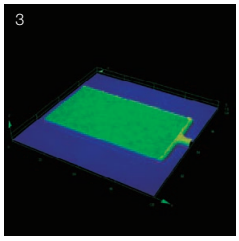
Sample Applications

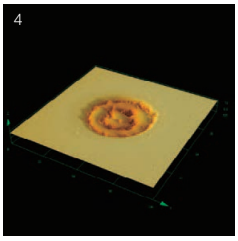
Semiconductor/FPD (Flat Panel Display)



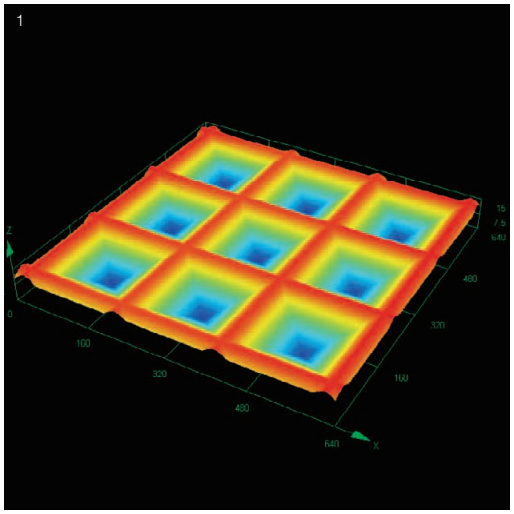


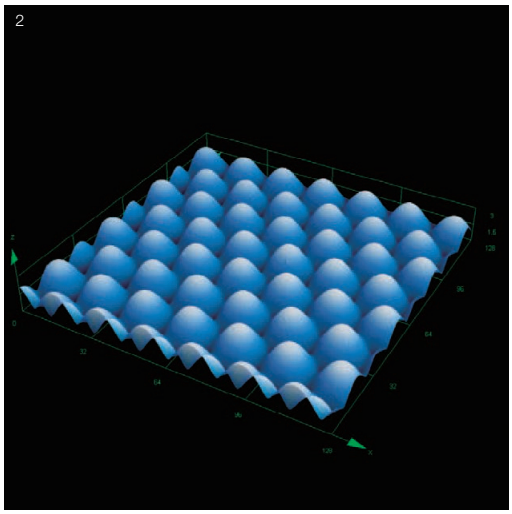
1 Wafer Bump
(objective 100x/optical zoom 1.5x/scanning area 85 µm x 85 µm)
2 Light Guide Panel
(objective 50x/optical zoom 1x/scanning area 256 µm x 256 µm)
3 Chip Pad
(objective 50x/optical zoom 2x/scanning area 128 µm x 128 µm)
4 Laser Dot on Light Guide Panel
(objective 100x/optical zoom 1x/scanning area 128 µm x 128 µm)



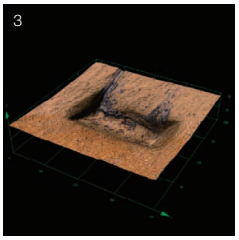


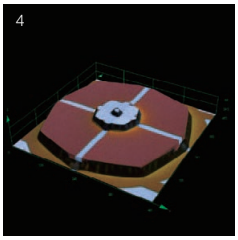
Electronic Component/MEMS (Microelectromechanical System)



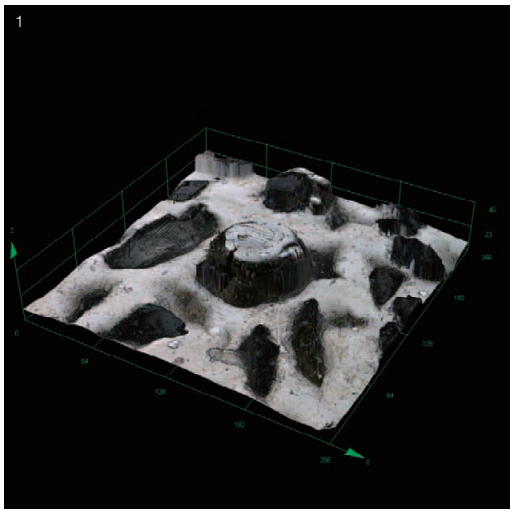


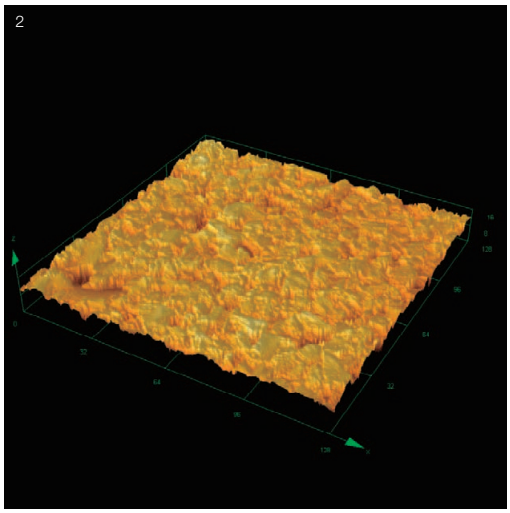
1 Photomask
(objective 20x/optical zoom 1x/scanning area 640 µm x 640 µm)
Sample provided by Koshibu Precision Co., Ltd. (P3,P24)
2 Micro Lens
(objective 100x/optical zoom 1x/scanning area 128 µm x 128 µm)
3 Flexible PCB Connector
(objective 50x/optical zoom 1x/scanning area 256 µm x 256 µm)
4 MEMS
(objective 20x/optical zoom 1.3x/scanning area 483 µm x 483 µm)



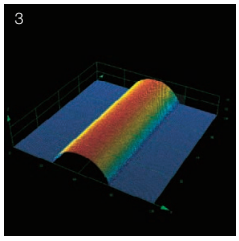


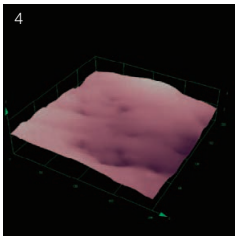
Material/Metal Processing

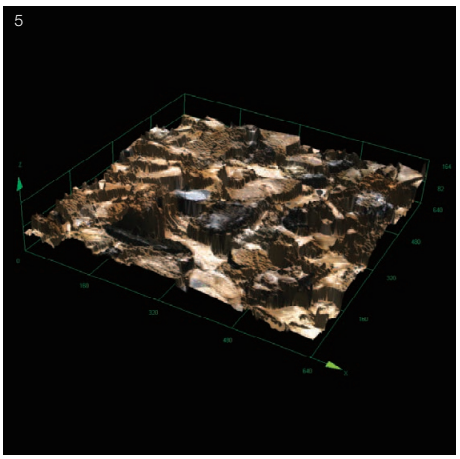


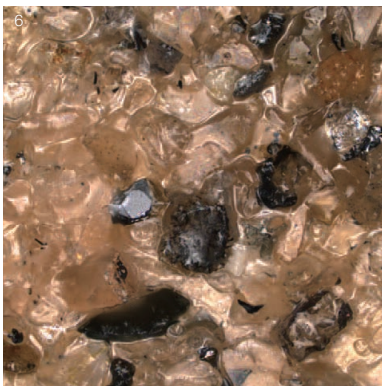


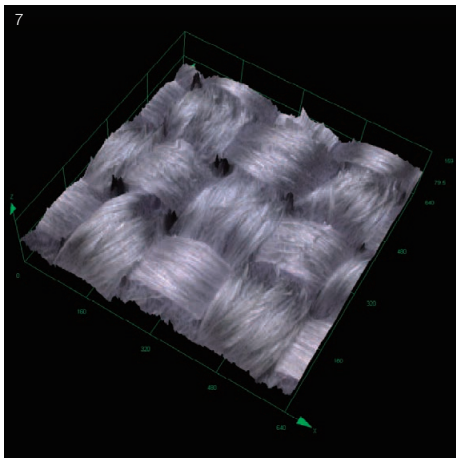
1 Diamond Electrocoating Tool
(objective 50x/optical zoom 1x/scanning area 256 µm x 256 µm)
2 Carbon
(objective 100x/optical zoom 1x/scanning area 128 µm x 128 µm)
3 Ultra-Thin Pipe
(objective 100x/optical zoom 1x/scanning area 128 µm x 128 µm)
4 Adhesive Tape
(objective 50x/optical zoom 2x/scanning area 128 µm x 128 µm)





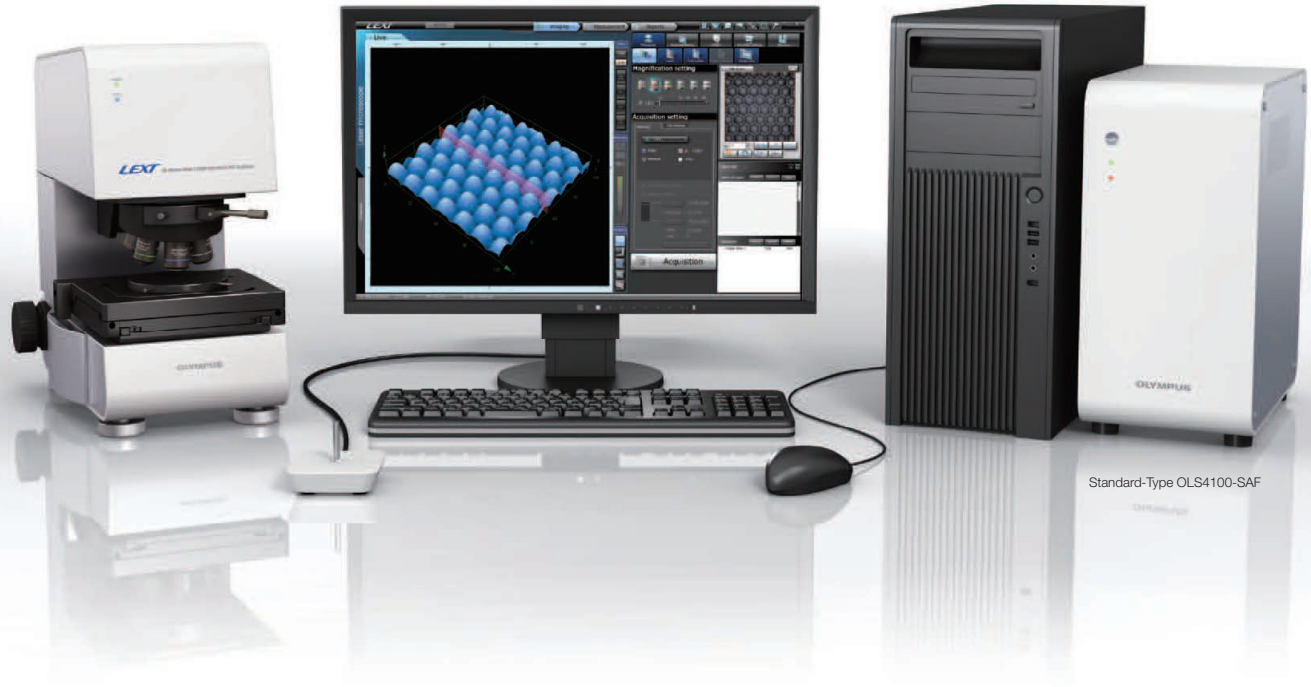






5 Sandpaper #400 (3D)
(objective 20x/optical zoom 1x/scanning area 640 µm x 640 µm)
6 Sandpaper #400 (2D)
(objective 20x/optical zoom 1x/scanning area 640 µm x 640 µm)
7 Super-Density Fabric (3D)
(objective 20x/optical zoom 1x/scanning area 640 µm x 640 µm)

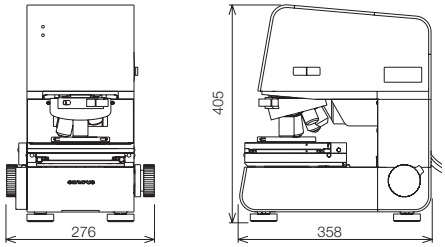
LINEUP



Standard-Type OLS4100-SAF

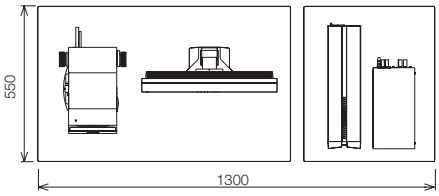
300mm-Stage-Type OLS4100-LAF

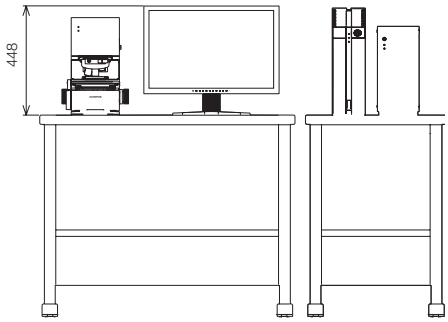
MAIN UNIT DIMENSIONS



Unit: mm

COMBINATION SYSTEM DIMENSIONS





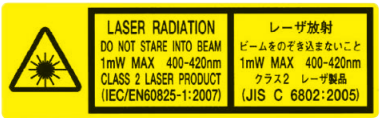
MAIN UNIT

LSM Section		Light Source/Detector	Light Source: 405 nm Semiconductor Laser, Detector: Photomultiplier
		Total Magnification	108x – 17,280x
		Zoom	Optical Zoom: 1x – 8x
Measurement	Planar Measurement	Repeatability	100x: $3\sigma_{n-1}$=0.02 µm
		Accuracy	Measurement Value ±2%
	Height Measurement	System	Revolving Nosepiece Vertical-Drive System
		Stroke	10 mm
		Scale Resolution	0.8 nm
		Movement Resolution	10 nm
		Display Resolution	1 nm
		Repeatability	50x: σ_{n-1}=0.012 µm
		Accuracy	0.2+L/100 µm or Less (L=Measuring Length)
Color Observation Section		Light Source/Detector	Light Source: White LED, Detector: 1/1.8-Inch 2-Megapixel Single-Panel CCD
		Zoom	Digital Zoom: 1x – 8x
Revolving Nosepiece			Motorized BF Sextuple Revolving Nosepiece
Differential Interference Contrast Unit			Differential Interference Contrast Slider: U-DICR, Polarizing Plate Unit Built-In
Objective			BF Plan Semi-apochromat 5x, 10x LEXT-Dedicated Plan Apochromat 20x, 50x, 100x
Z Focusing Unit Stroke			100 mm
XY Stage			100x100 mm (Motorized Stage), Option: 300x300 mm (Motorized Stage)

This product is designed for use in industrial environments for the EMC performance. Using it in a residential environment may affect other equipment in the environment

OBJECTIVE SPECIFICATIONS

Model	Magnification	Field of View	Working Distance (WD)	Numerical Aperture (NA)
MPLFLN5X	108x-864x	2,560-320 µm	20.0 mm	0.15
MPLFLN10X	216x-1,728x	1,280-160 µm	11.0 mm	0.30
MPLAPON20XLEXT	432x-3,456x	640-80 µm	1.0 mm	0.60
MPLAPON50XLEXT	1,080x-8,640x	256-32 µm	0.35 mm	0.95
MPLAPON100XLEXT	2,160x-17,280x	128-16 µm	0.35 mm	0.95



LEXT

- OLYMPUS CORPORATION is ISO14001 certified.
- OLYMPUS CORPORATION is ISO9001 certified.

- Images on the PC monitors are simulated.
- Specifications and appearances are subject to change without any notice or obligation on the part of the manufacturer.

www.olympus-ims.com

OLYMPUS®

For enquiries - contact
www.olympus-ims.com/contact-us

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OLYMPUS SCIENTIFIC SOLUTIONS AMERICAS CORP.
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102-B, First Floor, Time Tower, M.G. Road, Gurgaon 122001, Haryana, INDIA

OLYMPUS KOREA CO., LTD.
8F Olympus Tower, 446 Bongeunsa-ro, Gangnam-gu, Seoul, 135-509 Korea

OLYMPUS AUSTRALIA PTY. LTD.
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