



MAGIC PHOTOELECTRIC TECHNOLOGY
Micro Laser Processing Equipment
R-LAS100

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Micro Laser Processing Equipment 型号: R-LAS100
Specifications and appearance are subject to change
without prior notice

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Micro Laser Processing Equipment
R-LAS100

MAGIC PHOTOELECTRIC TECHNOLOGY R-LAS100 Micro Laser Processing Equipment, It is mainly composed of a microscope stand, motorized stage, laser, imaging and processing optical path, control handle and other components.



R-LAS100 Micro Laser Processing Equipment

Main Applications

Ultrafast Laser Precision Microfabrication, Repair & Probe Station System

· Chip R&D Patterning Verification for Feasibility Assessment:

Feasibility verification for the R&D of various μm -scale linewidth chips, especially GaAs/SiC/GaN RF chips and optoelectronic chips: first perform surface stripping(exclusive capability to strip insulating layers with a thickness of $\geq 10 \mu\text{m}$) \rightarrow then conduct μm -scale circuit microfabrication via laser cutting on chips \rightarrow followed by probe electrical testing...

This solution can effectively reduce the high costs and waste of valuable time and effort caused by multiple tape-outs, thus significantly saving R&D costs and shortening the development cycle, and facilitating the early achievement of mass production.

· Failure Analysis (FA) for Diagnostic Inspection of Circuit Defects:

It excels at stripping insulating layers with a thickness of over $10 \mu\text{m}$ on chips/devices (the previous-generation laser microfabrication technology can only strip around $2 \mu\text{m}$), and is capable of precision processing with a minimum line width of $0.5 \mu\text{m}$.

· Process Optimization:

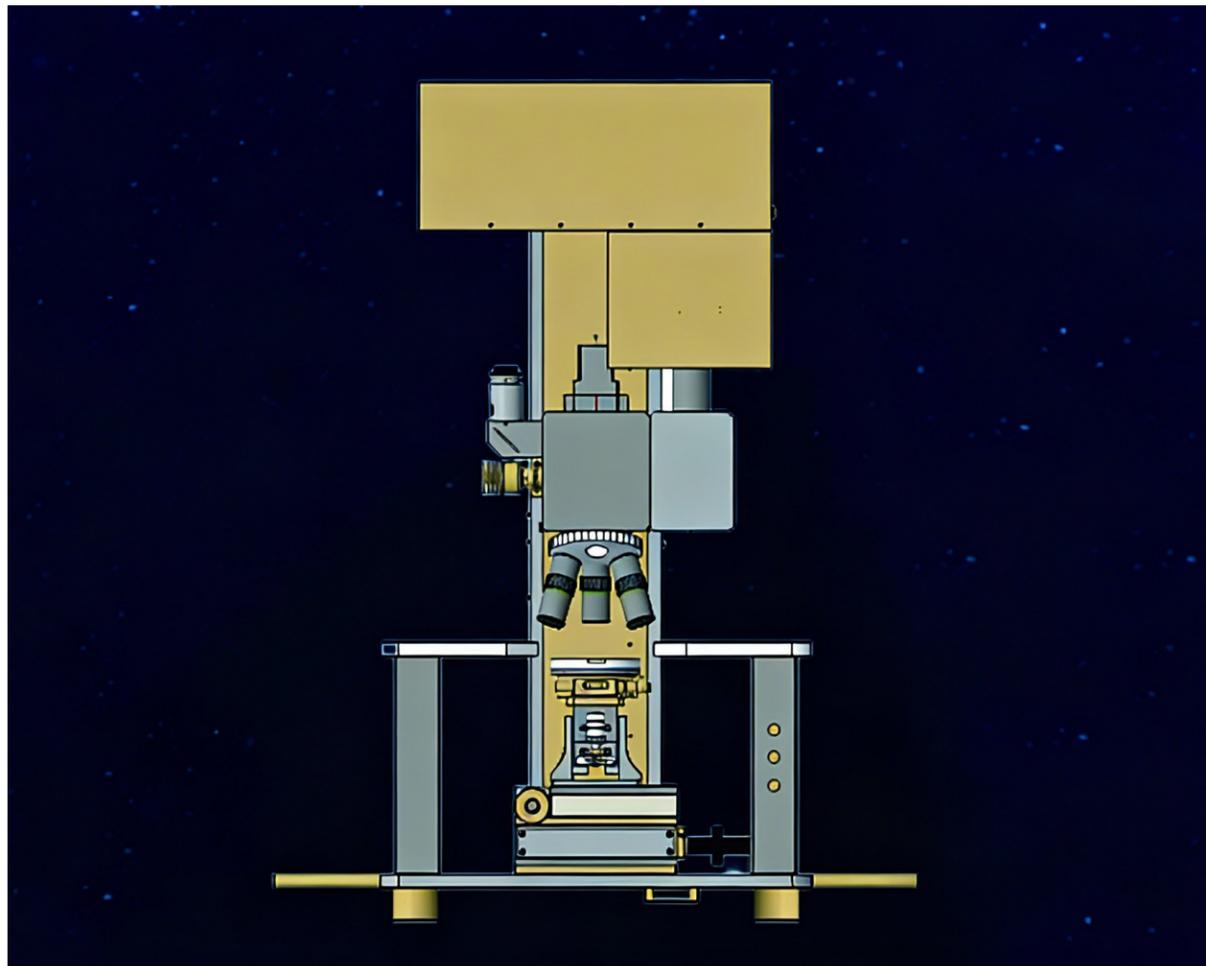
In the new-generation flexible OLED repair process, it can penetrate the $13 \mu\text{m}$ -thick organic layer and cut the underlying circuits with a precision of $1.5 \mu\text{m}$.

★Main Application Objects and Functions:

※LCVD for Cutting and Repairing Metal Circuits on Photomasks/Masks

※Chip Thinning + Metal Wire Laser Cutting & Welding

※Laser Repair for OLED, Mini LED & Micro LED

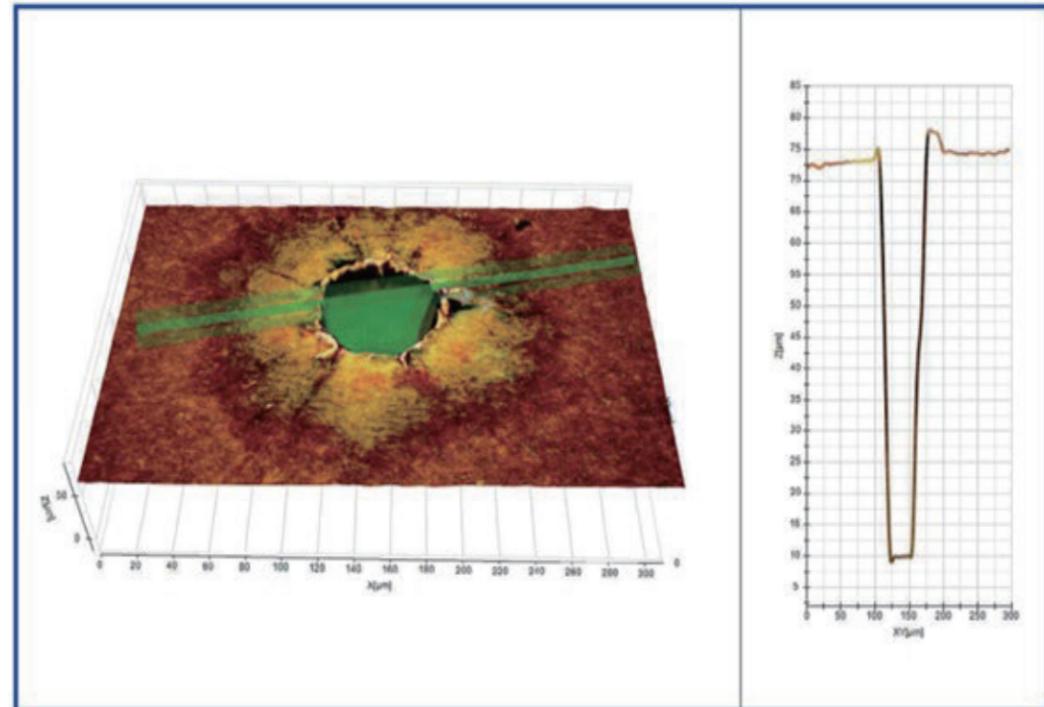
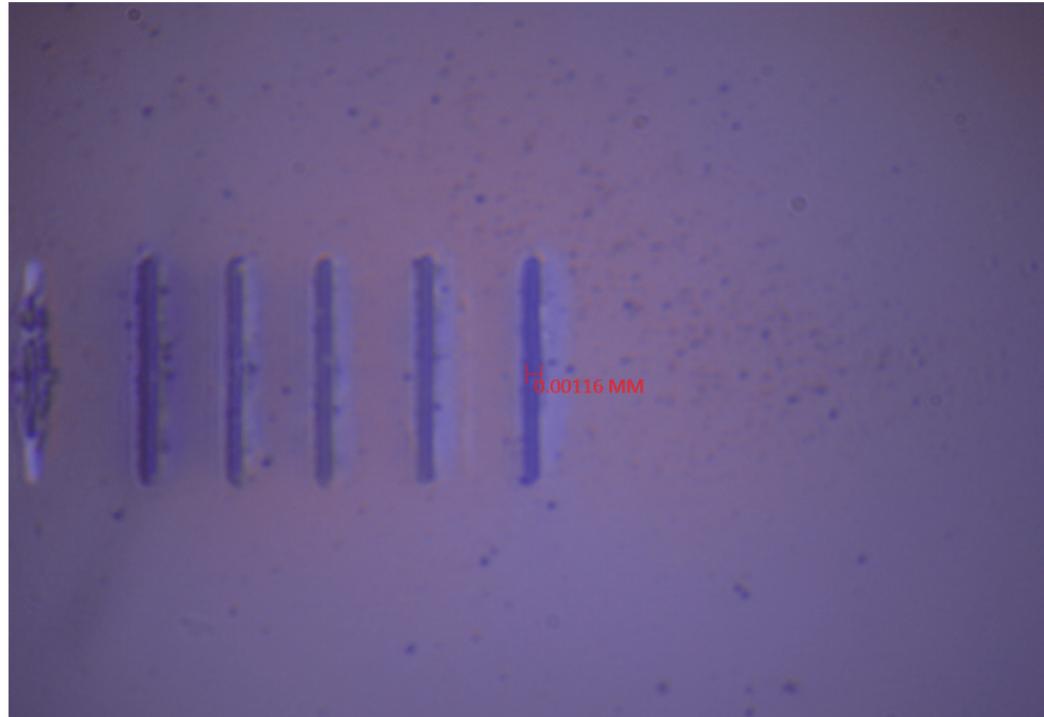


Laser 超快激光精细微加工修复·探针台系统



Technological Upgrading

- The laser system adopts a special optical design, which optimizes the cutting performance for a variety of materials and greatly reduces the edge thermal effect; the laser cutting width ranges from 0.5 μm to 3.0 μm (depending on the material).
- It mitigates the laser diffraction issue and can penetrate thick organic translucent layers to cut through the underlying metal layers.
- A 3D ultra-depth of field function is optionally available for the system, enabling 3D profile measurement of samples without repositioning after processing.

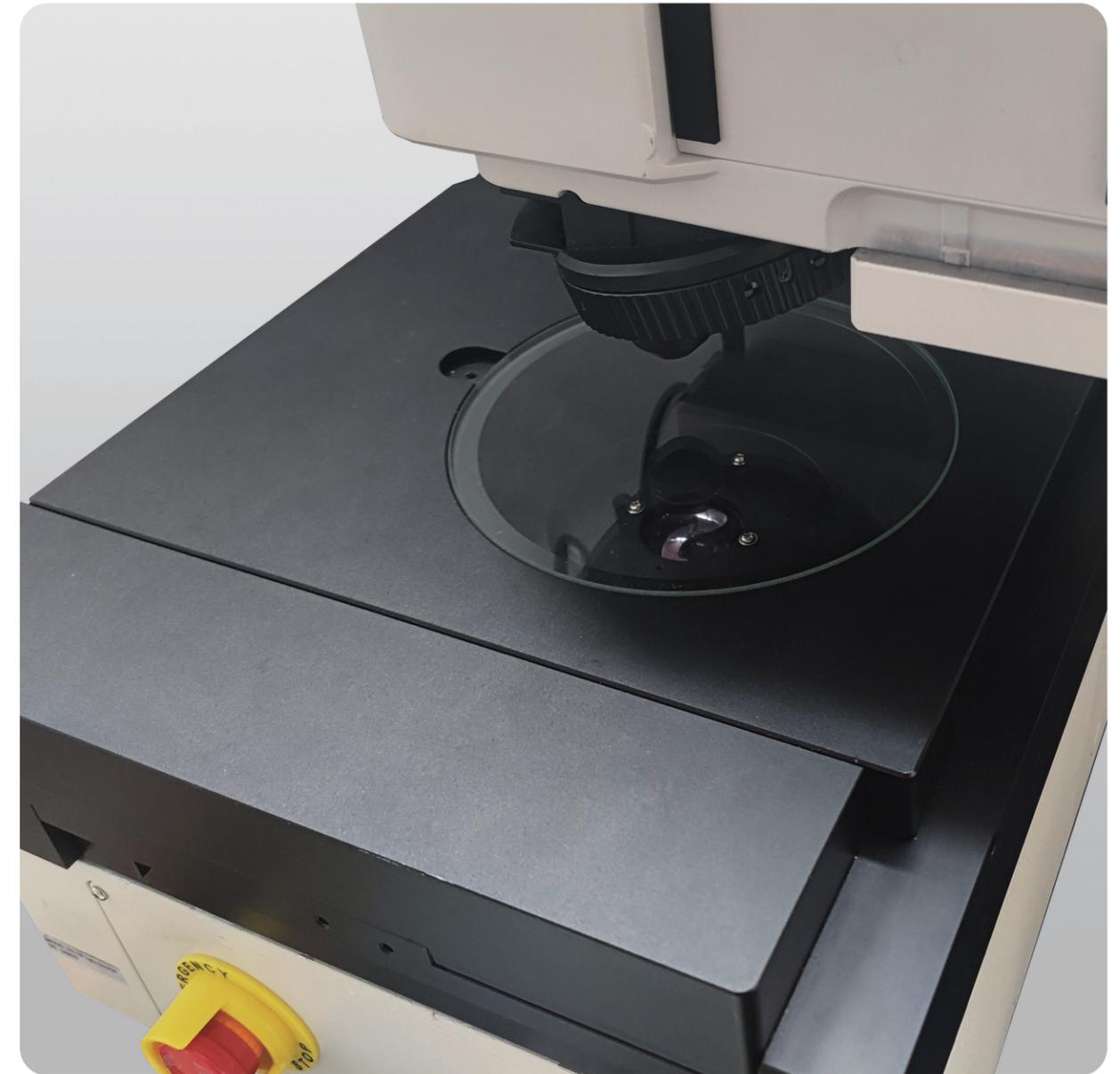


Core Component - Motorized Stage

Motorized Stage

Motor-driven Focus Adjustment: Equipped with three electric adjustment gears (low/medium/high) for focus speed, and a knob for Z-axis focus control.

- Standard Configuration: Travel ranges of 100 \times 100 mm, 200 \times 200 mm and 300 \times 300 mm
- Positioning Accuracy: $\leq \pm 1 \mu\text{m}$; Repeat Positioning Accuracy: $\leq \pm 1 \mu\text{m}$
- Linear Encoder: Built-in linear encoder with a resolution of 0.1 μm
- Motion Adjustment: 3 adjustable speed gears (high/medium/low), Maximum Moving Speed: $\geq 20 \text{ mm/s}$
- Customization: Customizable according to requirements, maximum travel range up to 1500 \times 1000 mm



Core Component - Laser

The self-developed nanosecond laser integrates the CCD observation optical path and the laser processing optical path into a single unit, with a built-in motorized slit that enables electric adjustment of the processing range. Supported wavelengths: 1064 nm/532 nm/355 nm/266 nm



Model	MG-S20				MG-S50			
	RG	RGB	GB	RGV	RG	RGB	GB	RGV
Wavelength (nm)	1064nm 532nm	1064nm 532nm 355nm	532nm 355nm	1064nm 532nm 266nm	1064nm 532nm	1064nm 532nm 355nm	532nm 355nm	1064nm 532nm 266nm
Energy (mj/pulse) (Exit Port)	5mj 4mj	4mj 3mj 2mj	3mj 2mj	4mj 3mj 1mj	5mj 4mj	4mj 3mj 2mj	3mj 2mj	4mj 3mj 1mj
Frequency (HZ)	1-20HZ				1-50HZ			
Cooling Method	Air Cooling				Liquid Cooling (Deionized Water)			
Laser Oscillation Type	Solid-State LD-Pumped ND:YAG							
Pulse Width (ns/pulse)	5-6ns							
LD Oscillation Lifetime	>2 Billion (G) pulses or 50,000 hours							
Output Stability	>2 Billion (G) pulses or 50,000 hours							
Slit Aperture	Motorized 2-Axis XY or Motorized 3-Axis XY with $\pm 45^\circ$ Rotation							
Minimum Processing Size	1064nm/1.5 μ m 532nm/1 μ m 355/0.8 μ m 266nm/0.5 μ m							
Laser Shots	Continuous or 1-99 Shots							
Dimensions/ Weight	Laser head	330(h)*150(w)*105(d) mm (excluding microscope interface) / 14kg						
	Power Supply	380(h)*240(w)*310(d)/6kg						
Power Supply Input	AC 100-240V 6.5A or DC 24V10A							
Notes	1: Laser base oscillation energy (before shaping) is 70mj; exit port energy can be customized per customer requirements. 2: Minimum processing size varies with different workpiece materials. 3: LD pump source uses the latest vertical cavity surface-emitting pump, with a lifespan 10 times that of conventional LD Bar pumps and 100 times that of flash lamp pumps, enabling maintenance-free operation. 4: Frequency is customizable, up to 1000Hz.							

Core Component - Objective Lens

Mitutoyo objective lenses are recommended for the system, featuring a long working distance and a high damage threshold. Among them, the 5X and 10X lenses are for observation, facilitating the location of processing areas, while the 20X and 50X lenses are near-infrared objective lenses dedicated to laser processing.



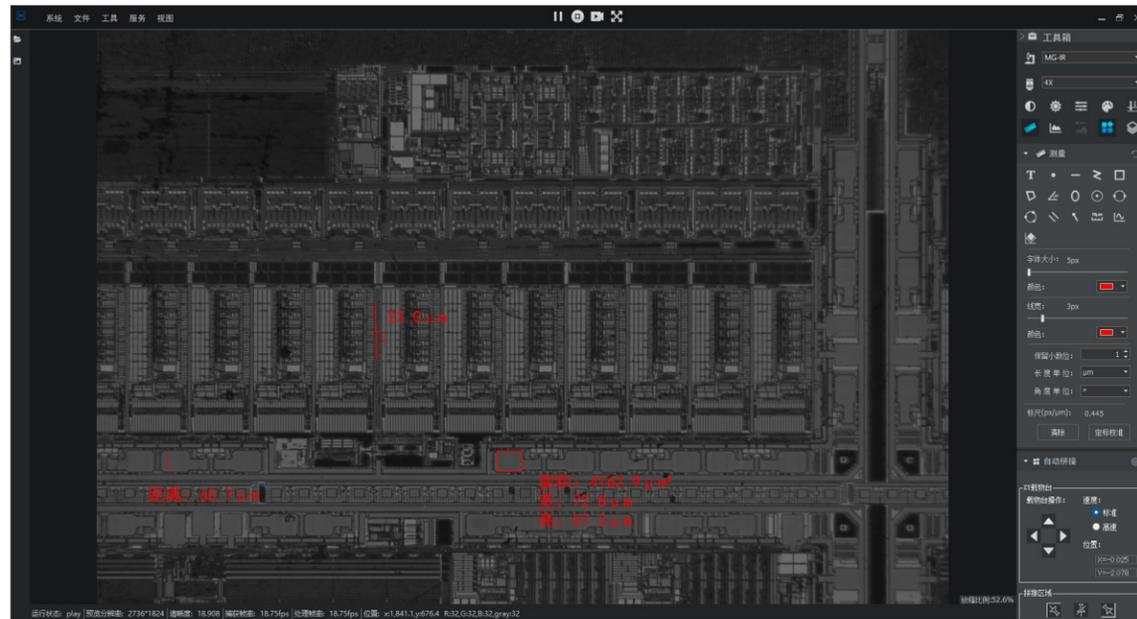
Common Objective Lens List:

Product Name	Working Distance	Numerical Aperture	Resolution	Beam Spot Diameter	Focal Length	Pupil Diameter	Depth of Field (DOF) of Objective Lens Alone $\pm D.F.(\mu\text{m})$	Operating Wavelength	Field Number (FN) of Objective Lens	Parfocal Distance	Thread Specification	Immersion Liquid	Coverslip Thickness
M Plan Apo 5 \times	34.0	0.14	2.0	4.8	40	11.2	14	436-656	4.8	95	M26	N/A	N/A
M Plan Apo 10 \times	34.0	0.28	1.0	2.4	20	11.2	3.5	436-656	2.4	95	M26	N/A	N/A
M Plan Apo NIR 20 \times	20.0	0.40	0.7	1.7	10	8.0	1.7	480-1800	1.2	95	M26	N/A	N/A
M Plan Apo NIR 50 \times	17.0	0.42	0.7	1.6	4	3.4	1.6	480-1800	0.48	95	M26	N/A	N/A
M Plan Apo NUV 20 \times	17.0	0.42	0.7	1.6	10	8.4	1.7	355-620	1.2	95	M26	N/A	N/A
M Plan Apo NUV 50 \times	15.0	0.44	0.6	1.5	4	3.52	1.6	355-620	0.48	95	M26	N/A	N/A
M Plan UV 20 \times	15.0	0.37	0.7	1.6	10	7.4	2.1	266&550	1.2	95	M26	N/A	N/A
M Plan UV 50 \times	12.0	0.41	0.7	1.5	4	3.28	1.6	266&550	0.48	95	M26	N/A	N/A

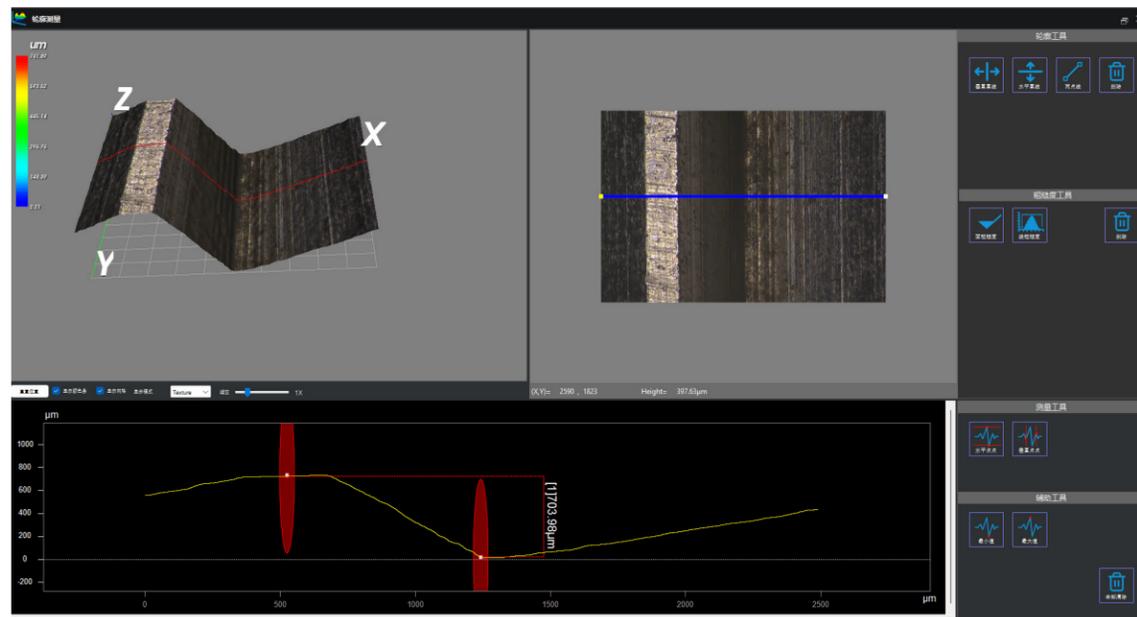
Software Introduction

M-SHOT Software Main Functions:

- Image Acquisition
- Dimensional Measurement Within Field of View
- Dimensional Measurement Outside Field of View
- XYZ Motion Control
- Laser Parameter Adjustment
- Customizable Motion Path (Optional)
- Automatic Image Stitching (Optional)
- 3D Ultra Depth of Field (Optional)



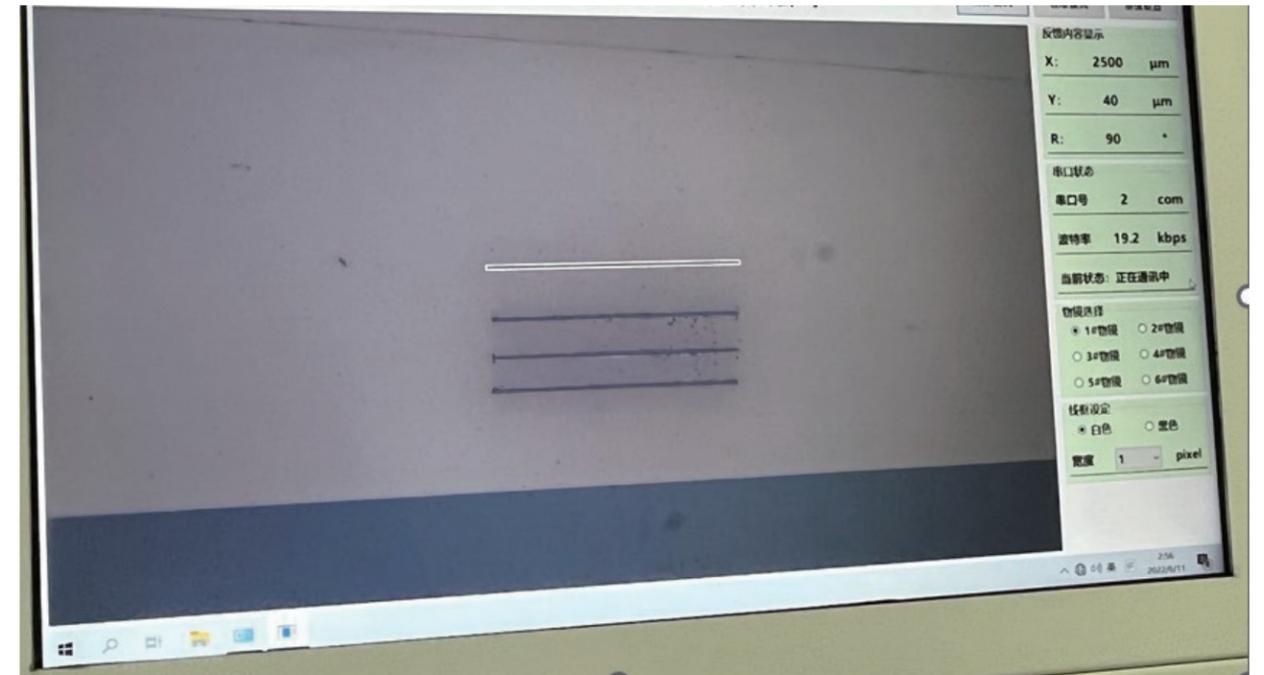
In-field Dimension Measurement Function



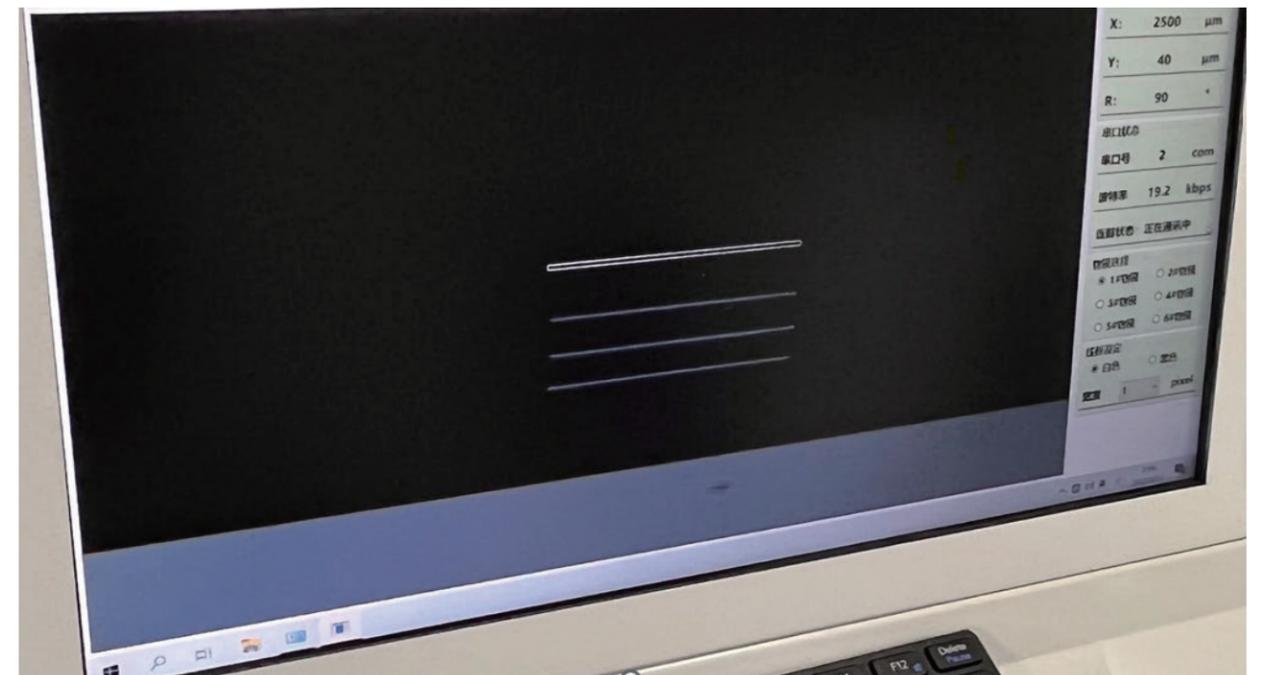
3D Imaging and Measurement Function

Application Examples

Stable laser energy, a precision slit and a dedicated optical path deliver welding and cutting results with minimal edge thermal effect, with the laser cutting width ranging from 0.5 μm to 3.0 μm (depending on the material). The slit virtual frame is highly consistent with the actual laser cutting pattern. The cutting process features no spattering, a smooth kerf and minimal edge thermal effect.

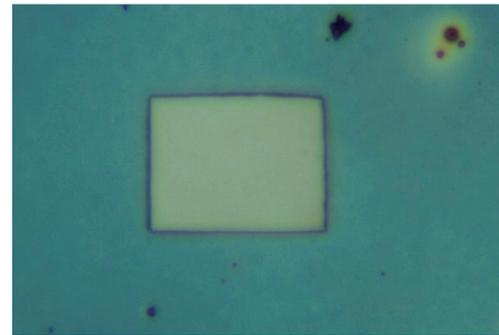
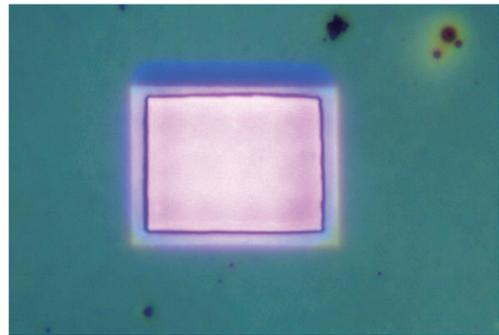


Observation of Reflected Light After Cutting

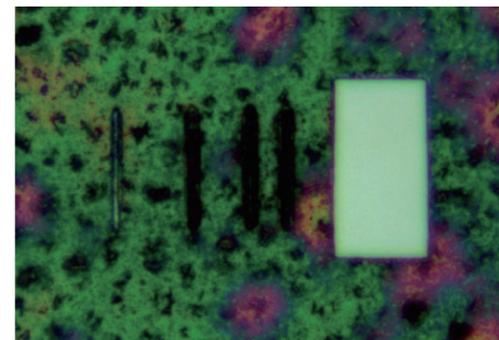
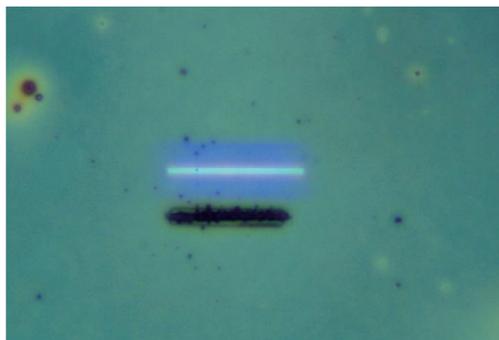


Observation of Transmitted Light After Cutting

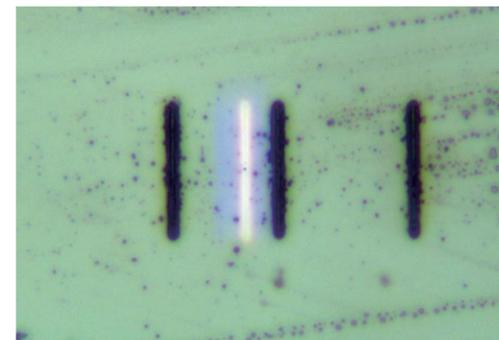
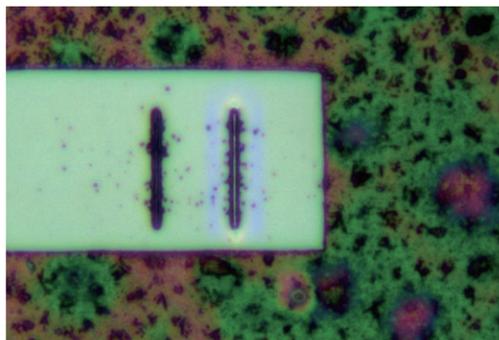
Application Examples



266 nm Peeling Effect (PI Film)



Multi-pulse Irradiation



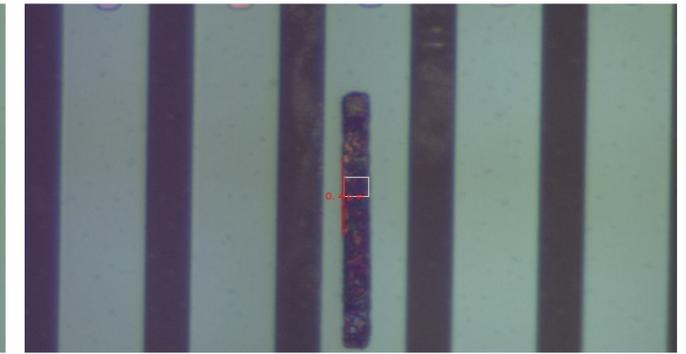
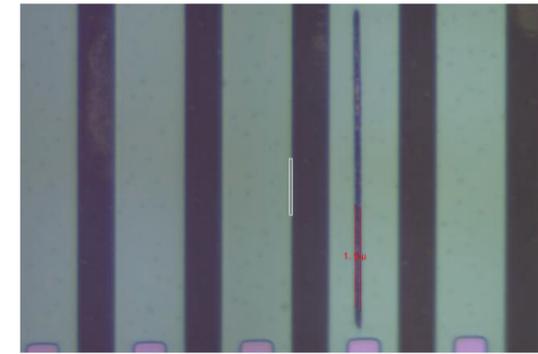
Silicon Substrate



Mark Positioning



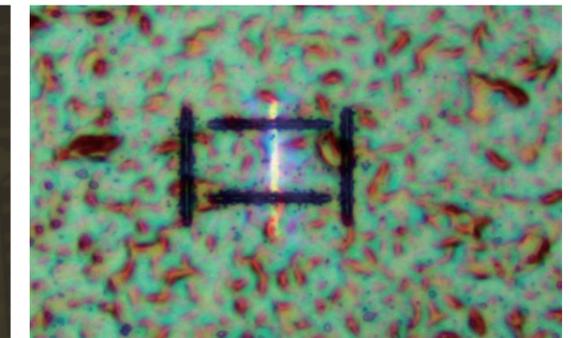
532nm (20x)



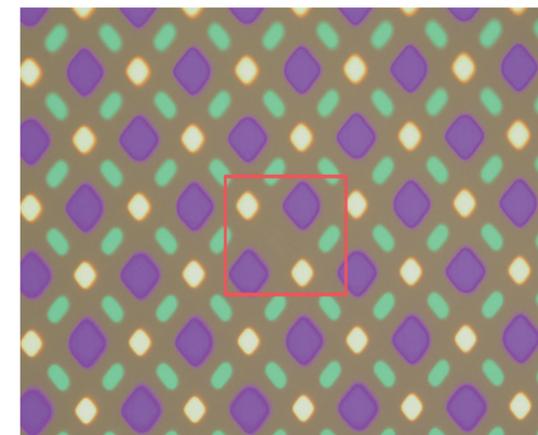
Panel Body



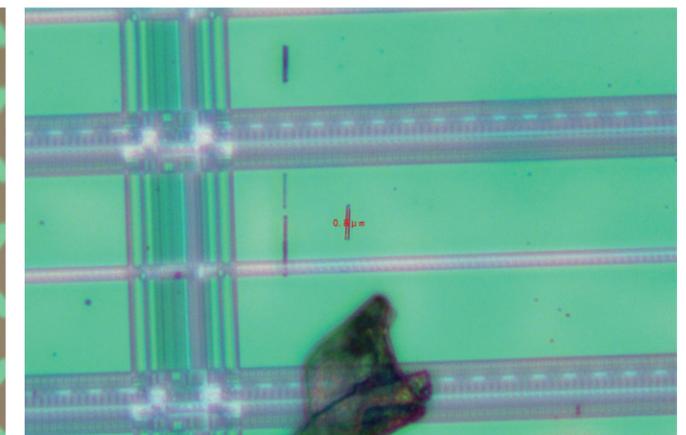
Organic Adhesive Peeling



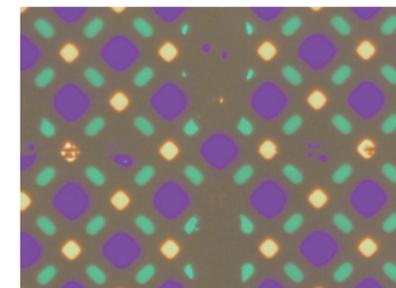
Through-adhesive Cutting



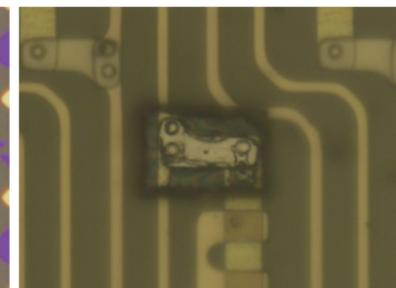
1064 nm Pixel Dot Ablation



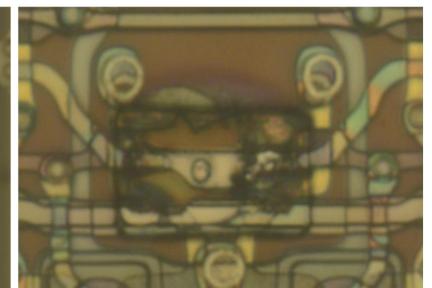
266 nm Cutting Line Width



Mark Pixel Dot Ablation



Organic Adhesive Peeling



Case Examples of Delivered Equipment

