

# Sabray—fs Micromachining System

## Ultra-precision Micromachining tools

### FEATURES

- Industrial grade and field-proven long-life femtosecond system
- Modular design of the laser processing head
- Marble base and gantry structure, high reliability and stability
- High moving precision and large scanning range
- Compatible with other ultrafast laser system

### APPLICATIONS

- Ultrafast laser etching
- Touchscreen ITO cutting
- Surface preparation or 3D surface engraving
- Ultra-precision drilling and cutting



Sabray fs Micromachining System is an ultra-precision micromachining tool, which is mainly based on UpTek Solutions Corp's Phidia femtosecond laser system, Spearay series laser processing module, German Scoroff high-end cabinet, and with the features of compact structure. Sabray is proven for high reliability and stability in industrial grade long time application.

The ultrashort pulse laser, Phidia, which emits 120fs to 40fs pulses of 0.1mJ to 2.0mJ high energy laser. Sabray is able to process almost all of the materials efficiently.

The marble base and gantry structure of the Sabray ensure the system very stable in processing. High moving precision and large scanning range of the translate platform provide extensive area for ultra-precision processing.

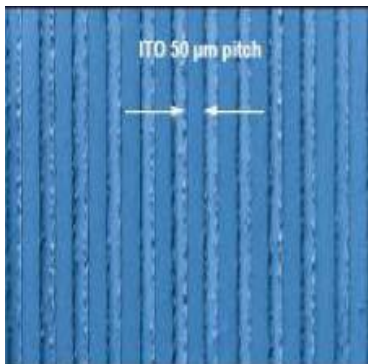
UpTek Solutions' fs ultra-precision micromachining system provides optimum solutions for scientific as well as industrial customers in many applications, such as ultrafast laser etching, surface preparation or 3D surface engraving, touch screen ITO cutting and materials' ultra-precision drilling or cutting, etc.

# Typical application



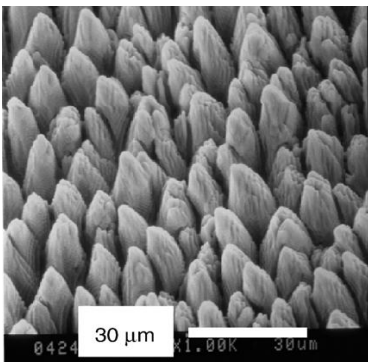
## Ultrafast laser etching

Sabray femtosecond laser micromachining system equip with Scanlabs' large field high-speed scanning galvanometer can be used for super precision engraving, etching, also can realize the 3D high precision engraving in the transparent material .



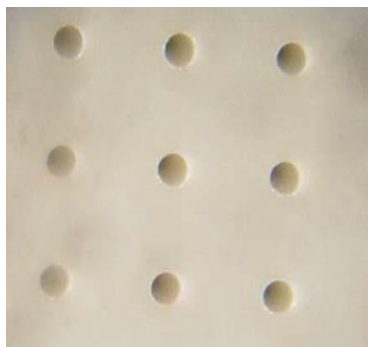
## High precision scribing and cutting

Sabray femtosecond laser micromachining system can output high energy laser, by adopting the focusing objective lens with suitable numerical aperture, Sabray can be used for many kinds of materials processing, such as high efficiency and ultra precision mobile phone screen cover glass and ITO conductive film scribing and cutting, this is especially suitable for industrial users.



## 2D and 3D micro-structure fabrication

Sabray femtosecond laser micromachining system is used not only in the 2D surface structure fabrication, but also to produce 3D microstructure with the size of nanometer scale .



## Brittle materials drilling and cutting

Sabray femtosecond laser micromachining system can drilling and cutting on the brittle materials such as SiC、 semiconductor、 ceramics and sapphire . By adopting the trepanning processing head, Sabray can realize high aspect ratio microporous fabrication .

## Phidia parameters

	Phidia-10-FS/HFS	Phidia-10-SP/HSP	Custom
Pulse Width (FWHM)	<120 fs	<40 fs	500fs to 35fs
Output Power	1.0/1.5 W	1.0/1.5 W	Up to 20W
Repetition Rate	Up to 10 KHz	Up to 10 KHz	Up to 100KHz
Center Wavelength	790 ± 10 nm	800 ± 20 nm	266, 400, 800, 1030, 1550nm
Spatial Mode	M <sup>2</sup> <1.3 (TEM <sub>00</sub> )	M <sup>2</sup> <1.3 (TEM <sub>00</sub> )	M <sup>2</sup> <1.4 (TEM <sub>00</sub> )
Energy Stability	<0.75% RMS	<0.75% RMS	~
Contrast Ratio	>1000:1 pre pulse >150:1 post pulse	>1000:1 pre pulse >150:1 post pulse	~
Beam Pointing Stability	<20 ìrad/ °C	<20 ìrad/ °C	<50 ìrad/ °C
Beam Size (1/e <sup>2</sup> )	~ 6 mm	~ 6 mm	<10mm
Polarization	Linear, Horizontal	Linear, Horizontal	~
Dimensions	1234*768*305 mm <sup>3</sup>	1234*768*305 mm <sup>3</sup>	~

## Spearay parameters

	Spearay-S	Spearay-H	Spearay-U
	X,Y,Z	X,Y,Z	X,Y,Z
Travel Range	150 mm, 150 mm, 50 mm	150 mm, 150 mm, 50 mm	160 mm, 160 mm, 50 mm
Accuracy	0.09% , 0.09% , 0.09%	~	±0.3ì m, ±0.3ì m, ±1.5ì m
Repeatability	±2.5ì m, ±2.5ì m, ±2.5ì m (Bi-Directional)	±0.1ì m, ±0.1ì m, ±0.1ì m (Uni-Directional)	±0.025ì m, ±0.025ì m, ±0.5μ m (Uni-Directional)
Resolution	~	8.5nm, 8.5nm, 8.5nm	1nm, 1nm, 100nm
Load Capacity	20 kg, 20 kg, 5 kg	20 kg, 20 kg, 5 kg	12 kg, 12 kg, 2.5 kg
Dimensions	490mm*450mm*645mm	490mm*450mm*645mm	490mm*450mm*645mm

## Optional accessories and typical parameters

### Scanlabs scanning galvanometer (for laser marking)

Aperture	10 mm
Marking speed	3 m/s
Positioning speed	12 m/s
Step response time	0.35 ms
Typical field size	110×110 mm <sup>2</sup>
Long-term drift	<100 μrad
Temperature drift	<25 μrad/k

### Trepanning processing head (for precision drilling)

Optical rotation speed	3000 rpm
Aspect ratio	1:20
Expansion ratio	1:2
Beam inclination angle ( $f=100$ mm)	0~5°
Helical diameter	1~400 μm
Achievable drilling tolerance	±1 μm

### High NA objective (for scribing and cutting)

NA	Magnification	Resolving Power (μm)	Depth of Focus (μm)	Working Distance (mm)	Focal Length (mm)
0.14	5	2	14	34	40
0.28	10	1	3.5	33.5	20
0.42	20	0.7	1.6	20	10
0.55	50	0.5	0.9	13	4
0.42	50	0.7	1.6	20.5	4
0.5	80	0.6	1.1	15	2.5
0.7	100	0.4	0.6	6	2
0.55	100	0.5	0.9	13	2
0.62	200	0.4	0.7	13	1

