

# CHAPTER 2 LASERS

# MICROMACHINING WORKSTATION

## Fully-integrated system including:

- Field-proven laser source technology (Model CPA-Series)
- Multi-axis positioning system
- Beam delivery system
- Selection of processing parameters
- Class I enclosure
- Integrated, intelligent, on axis machine vision and inspection system
- Motion control
- Pulses “on-demand” (1, 2, ... 64,000 at user- selectable repetition rate)<sup>a</sup>
- Optional Digital and/or Analog IO
- Complete computer control
- Granite base mounted on pneumatic
- vibration isolators
- Small footprint

Twenty years of experience with ultrashort pulse lasers combined with hundreds of real-world projects and years of processing know-how has led to our latest generation of femtosecond micromachining workstations. The UMW-Series includes everything you need to start micromachining with ultrashortpulsed lasers. This design benefits from our nine years of experience learning the right combination of components, performance parameters, and software needed to micromachine materials with ultrashort pulses of light. The Model UMW-Series provides ample space for custom beam delivery and manipulation, includes a sophisticated machine vision and inspection system, and complete computer control. The software interface provides powerful and intuitive access to all system functionality including the laser, motion, and machine vision systems and provides advanced intercommunication between them.



Made with a CPA-Series Ti:Sapphire Regenerative Amplifier

## Performance Parameters

### Positioning System: 1

#### X,Y Axis:

-Max Travel:	300 mm
-Repeatability:	0.5 $\mu\text{m}$
-Accuracy	1.0 $\mu\text{m}$
-Orthogonality	5 arc sec
-Max. Velocity	5 cm/sec

#### Z Axis:

-Max Travel	100 mm
-Repeatability	1.0 $\mu\text{m}$
-Accuracy	+/- 1 $\mu\text{m}$
-Max Velocity	5 cm/sec

### Vision System:

Zoom Lens:	12x
Resolution: <sup>2</sup>	1 $\mu\text{m}$
Field of View: <sup>2</sup>	4 mm
Lighting:	LED Ring and Coaxial Light
Inspection System:	Pattern recognition, edge location, part rotation, part measurement.

### Laser:

(See Model CPA-2101, and CPA-2110 Brochures for performance parameters and features).

### Enclosure:

Class I Laser Enclosure

a. TTL-0,+1  $\Delta T = 1/\text{repetition rate}$

1. Values are for the base system. Other configurations are available upon request.

2. Resolution is for maximum magnification and depends on focusing objective, FOV is for minimum magnification.