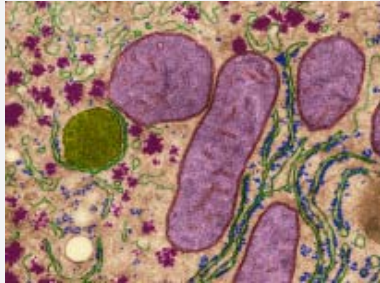


MICROPOINT[®] Computer Controlled Laser Illumination & Ablation



MICROPOINT Computer Controlled Systems

MICROPOINT makes possible simultaneous and precise illumination and ablation of multiple regions of interest. It also uniquely makes possible user viewing of the laser marking/

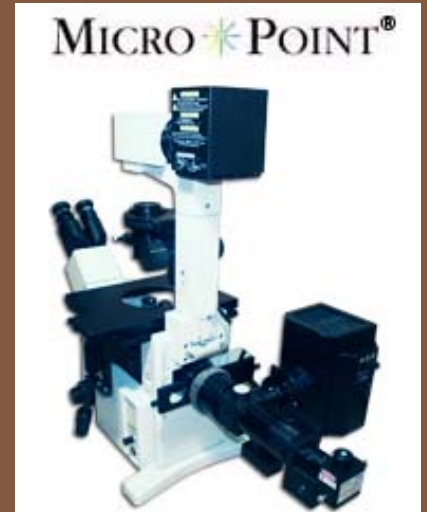
cutting process or fluorescence excitation through the microscope eyepiece in real time. These capabilities minimize collateral sample damage. Systems consist of a tunable, fiber optic pumped laser source, coupling and galvanometer beam steering optics, a microscope adapter, and a selection of beam splitters and interference filters. The angular alignment of the pulsed dye laser illumination is controlled via a 2-axis joy stick. The spatial alignment of is computer controlled via galvanometer beam steering system. The focus in the z-direction is controlled with a knurled focus ring. A motorized optical attenuator precisely adjusts power at the sample plane. The computer controlled MICROPOINT is available with a USB or Bluetooth interface.

Semiconductor Processing

- Laser Ablation
- Circuit Isolation
- LCD Repair
- Marking
- Micro-machining
- Navigation
- Micro-machining microfluidics
- Removal of Passivation
- Removal of Photoresist
- Semiconductor Failure Analysis
- Probe Stations
- Hard Disk/Media Processing

Life Sciences

- Laser Ablation
- FRAP
- FRET
- Photoactivation
- Photobleaching
- Photoswitching
- Cell Degeneration/Regeneration
- Release of Caged Compounds
- Drug Delivery
- Thrombosis
- Free Radical Release
- CALI



FEATURES AND BENEFITS

- Simultaneous laser delivery, microscope viewing and image acquisition
- Precise illumination of areas of interest that protects target specimen
- Low maintenance and safe with fiber optic delivery that maintains alignment when system is moved
- Quick set-up with manual beam positioning or automatic pattern generation
- User control of ablation and illumination plane provided by z-axis telescope
- Precise control of energy provided by motorized variable attenuator slide

Photonic Instruments, LLP

2435 Dean Street, Unit A
St. Charles, IL 60175
Phone: 1-630-587-1890
FAX: 1-630-587-1892

Email: info@photonic-instruments.com

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PHOTONIC INSTRUMENTS, INC.



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MICROPOINT

USB or Bluetooth[®] Computer Controlled

HARDWARE SPECIFICATIONS

Model

The system is available optimized for a factory set range of focus.

Model	2203EBD	2204EBD	2205EBD	2206EBD
Range of focus (mm)	-38 to +500	+38 to +∞	-30 to +400	-450 to -350

Optical

Transmission	365nm to 700nm
Spectral bandwidth	4nm FWHM (typical)
Attenuation options	Motorized, 90 steps, 0.1%-100% transmission
Resolvable spot size	diffraction limited w/100x objective

Tunable, Fiber Optic Pumped Dye Laser Source

Average power	750 μ W @ 15Hz
Peak power	12kW
Pulse energy	50 μ J
Stability	+/- 3%
Pulsewidth	3 to 5 nsec
Pulse repetition rate	0 to 15Hz
CDRH	IIIb

Illumination Port Options

Dichroic beamsplitter	Single pass, specify wavelength Multi pass, specify wavelength
Beamsplitter	450nm to 750nm, R = 100, 70, 50 or 30%
Excitation filter	360nm / 40nm (DAPPI)
	480nm / 20nm (GFP)
	470nm / 40nm (FITC)
	535nm / 40nm (Rhodamine)
Additional illumination port options on request	

Mechanical / Electrical

Illumination port clear aperture	Ø22mm or Ø34mm
Illumination port filter size	Ø25mm or Ø38mm
Dimensions	10.0" (l) x 6.0" (w) x 4.0" (h)
	11.5" (l) x 6.0" (w) x 5.0" (h)
Weight (laser head)	4 pounds
Lifetime	20,000,000 laser pulses
	30,000 laser pulses per refillable dye cell

Controller

Connectivity	USB or Bluetooth
USB control features	Beam pointing, x and y
	Attenuation
	Laser fire command
Digital resolution	10 bit equivalent with FOV range switching
Field of view range switching	100%, 80%, 60%, 40%, 30% (selectable)
Dimensions	10.0" (l) x 8.0" (w) x 3.0" (h)
Weight	4.5 pounds

Adapters

Adapters are available for retrofit to the epi-port or video port of commercially available microscopes.

Flange	Part No.
Leica	2237
Nikon	2235
Olympus	2236
Zeiss	2238
C-mount video port	2230C

INTEROPERABILITY

- Compatible with microscopes platforms
 - point & slit scan confocal
 - spinning disk confocal
 - wide field
- Custom OEM systems available for High Content Screening and other fluorescence based imaging instrumentation
- Compatible with control and acquisition software from market leading microscope manufacturers including Carl Zeiss, Leica, Nikon and Olympus
- Drivers available for market leading bioimaging software including MetaMorph[®], Volocity[®] and SlideBook[™]
- Lowest cost to add wavelengths in the field - change a dye cell and tune system within the visible spectrum

USB or Bluetooth Computer Controlled

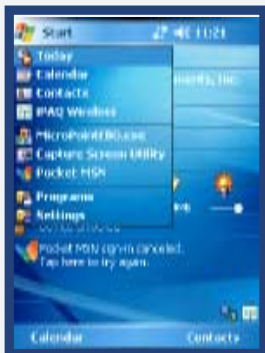
SOFTWARE SPECIFICATIONS

SOFTWARE DEVELOPER'S

KITS

SDKs are available for Original Equipment Manufacturers (OEMs) to develop software to control integrated MICROPOINT systems. The SDK includes:

- MICROPOINT optical head with galvanometers and USB controller
- Software drivers
- Instructions and sample C++ code

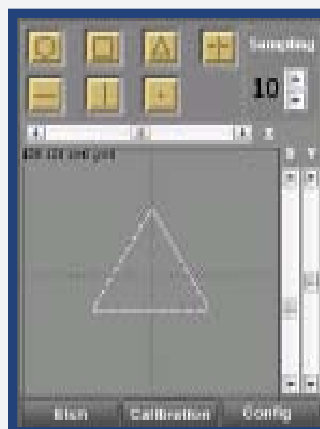


Bluetooth Connectivity

Software

The MICROPOINT system includes software that controls calibration and enables the user to graphically or numerically define and edit the shape and characteristics of the illumination at the target.

Release	MicroPoint Laser Galvo Mosaic Ver 1.1
Driver	FTDI FTD2xx Driver
Calibration	User controlled automated OCR Correction to polynomial 3rd order Implementation via 4 scrollbars
File Functions	Import (*.dxf, *.bmp, *.msk); Save *.msk
Drawing Editor Shapes	Line Paintbrush Rectangle Oval Freehand polyshape Text
Drawn Shape Characteristics	Positive, negative (erase) Shape decimation (density) Number of pulses and location Linewidth, paintbrush size Color and opacity of defined regions Specify shapes by color for Mosaic* Click and drag shapes and edges Cut, copy, paste, delete shape Group, ungroup shapes
Controls	Engage mask pattern Go dark (global) Stop Snapshot video

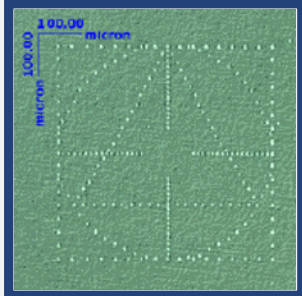


Drawing Editor



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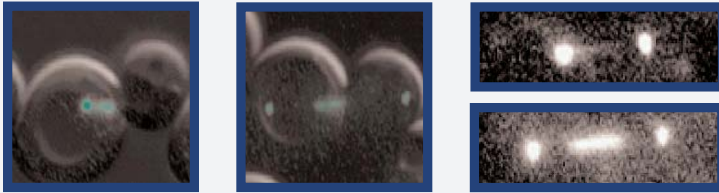
APPLICATIONS



Navigation of Hard Disk Media

Disk media and other very homogenous, flat surfaces pose a difficult challenge for e-beam imaging device users. The MICROPOINT system attached to an optical microscope allows for sub-micron noncontact marking of features - eliminating time consuming methods in locating defects when the media is transferred to another imaging device. Additionally, the computer controlled beam steering systems enable precise patterns to precisely identify or index marked features.

Fluorescence Recovery after Photobleaching (FRAP)



Yeast cells are labeled with Nuf2p::GFP to mark the spindle pole bodies and Ase1p::GFP in the mitotic spindle mid-zone. They are observed in DIC and fluorescence microscopy. 1.) Metaphase spindle before elongation. 2.) Telophase spindle at the end of Anaphase. Note that Ase1p::GFP remains localized to the spindle mid-zone throughout mitosis. 3.) Ase1p::GFP was photobleached on the metaphase spindle. 4.) Ase1p::GFP completely recovers within 20 minutes as the spindle elongate.

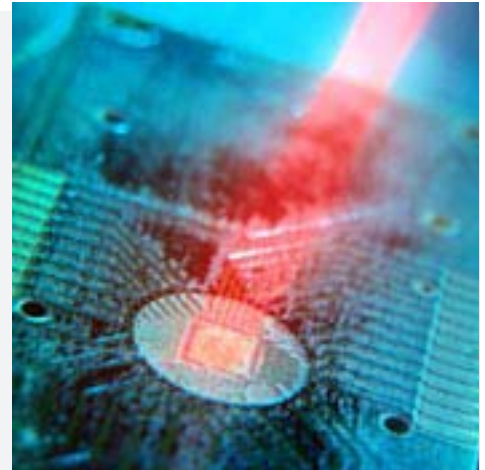
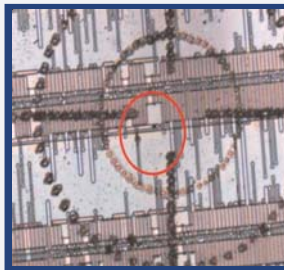


Release of Caged Compounds

1.) Labeled single cell of a germ-ring stage (6 hpf) zebrafish embryo (5X mag). 2.) Labeled single cell of 40% epiboly (5 hpf) zebrafish embryo. 3.) Labeled Tier one marginal cells of a 40% epiboly (5 hpf) zebrafish embryo. 4.) Single (of two) labeled notochord cells of a 5-somite at 12 hpf zebrafish embryo (40x mag).

Height Selective Circuit Isolation & Marking Multilayer ICs

An inherent challenge of e-beam device imaging is locating structures hidden beneath surface layers. Using the MICROPOINT diffraction limited system and an optical microscope, marking of both surface and subsurface features is realizable. Select the focus plane and place a mark on the level containing the structures of interest, then focus on the top surface and place marks without changing the lateral (X,Y) position of the sample.



Computer Controlled Galvanometer Platform

Computer controlled galvanometer beam steering in combination with custom optics optimized for diffraction limited spot size enable precise and repeatable laser illumination and ablation for a plethora of semiconductor and life sciences imaging applications.

Multiplex with MOSAIC Digital Illumination

For applications requiring both ablation and zero delta time fluorescence excitation of multiple regions with complex geometries, multiplex the computer controlled MICROPOINT and MOSAIC Digital Illumination System.

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Photonic Instruments, LLP

2435 Dean Street, Unit A

St. Charles, IL 60175

Phone: 1-630-587-1890

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www.photonic-instruments.com