

MicroPoint 4

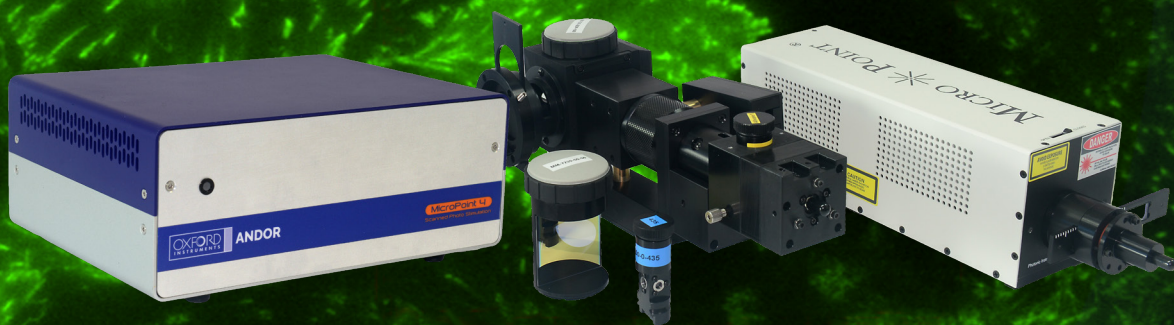
A Powerful Tool for Laser Photostimulation

Key Features

- ✓ Pulsed and CW lasers: flexible
- ✓ > 24 wavelengths: customisable
- ✓ Galvo or manual: budget friendly
- ✓ Fast galvos: agile point and scan
- ✓ Fits most microscopes: very configurable
- ✓ **NEW** Laser engine compatibility

Key Applications

- ✓ Ablate, Cut, Uncage
- ✓ Optogenetics, FRAP
- ✓ Neuroscience
- ✓ Cell and Developmental Biology
- ✓ Cancer Studies
- ✓ Semiconductor Marking



Introducing MicroPoint 4

MicroPoint 4 is the 4th generation of Andor's popular laser scanning-based illumination system for photostimulation applications. MicroPoint is a proven choice for hundreds of research studies around the world for applications that require precise illumination including:

- **Axotomy, microdissection and ablation:** study repair and regeneration processes.
- **Induce DNA damage:** for DNA repair, regulation and gene function.
- **Optogenetics:** study the role of individual neurons within complex networks.
- **Bleach and FRAP:** follow dynamics - trafficking, turnover and synthesis.
- **Uncaging:** study active biomolecules.

At the core of the MicroPoint system is a new smart microcontroller, supporting continuous and pulsed lasers. Our patented pulsed nitrogen-pumped dye laser has 24 laser dye cells from **365 to 656 nm** making it easy to change laser wavelengths to suit application needs. Add a continuous wave laser source such as [Andor's Versatile or High Power Laser engines](#) (VLE or HLE). There is easy integration into most popular microscope models, and a choice between **Manual** or PC-controlled **Galvo** models (see pages 8-9). Coming soon: a pulsed Pico laser which offers exceptional precision in **1 ns pulses**.

1 Smart controller - all new controller provides fast and responsive control.



2

Flexible illumination - pulsed Nitro or Pico lasers. Optional CW lasers e.g. Andor's VLE and HLE



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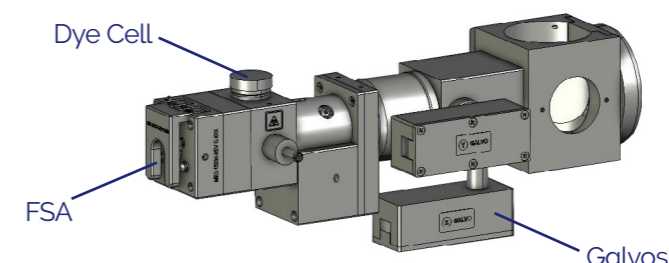
Intuitive control - select from manual or software-based control



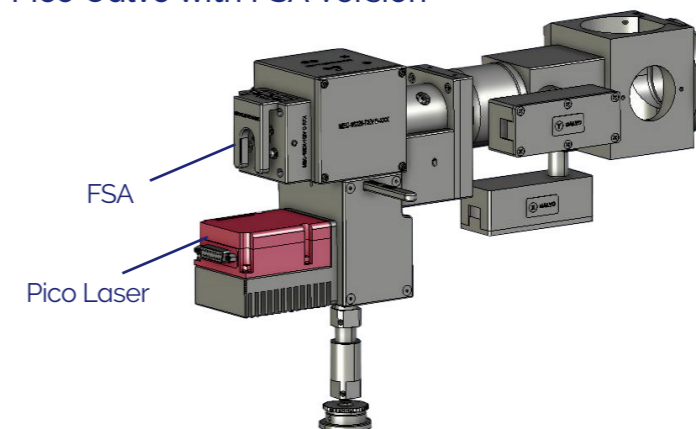
4

Modular design - easy integration and high performance

Nitro Galvo with FSA Version



Pico Galvo with FSA Version



Features	Benefits
New Andor laser engines	The focus spot adaptor (FSA) allows compatibility with a wide range of CW lasers including Andor's VLE and HLE. Enable high power densities across a wide 405-730 nm range.
Classic Nitro dye laser	Lowest costs for adding different wavelengths. Simple exchange of dye cells.
Easy integration	Compatible with spinning disc and point scanning confocal and widefield systems. Compatible with microscopes from Zeiss, Leica, Evident Olympus and Nikon.
New Enhanced optical design	Improved performance across the spectrum.
New Fast scanning galvos	High-speed and fast response for precise and accurate beam steering and scanning.
New Smart controller	Intelligent microcontroller supports fast response and on-board multi-region scanning and wavelength selection in real-time.
Intuitive, powerful software	Easy to control in Andor iQ via SDK. Virtual camera enables easy integration with third party software.
COMING SOON New Pico laser option	Ultra-compact, high performance - Take advantage of high speed scanning and cutting, delivering 355 and 532 nm, 1 ns pulses up to 5 kHz.

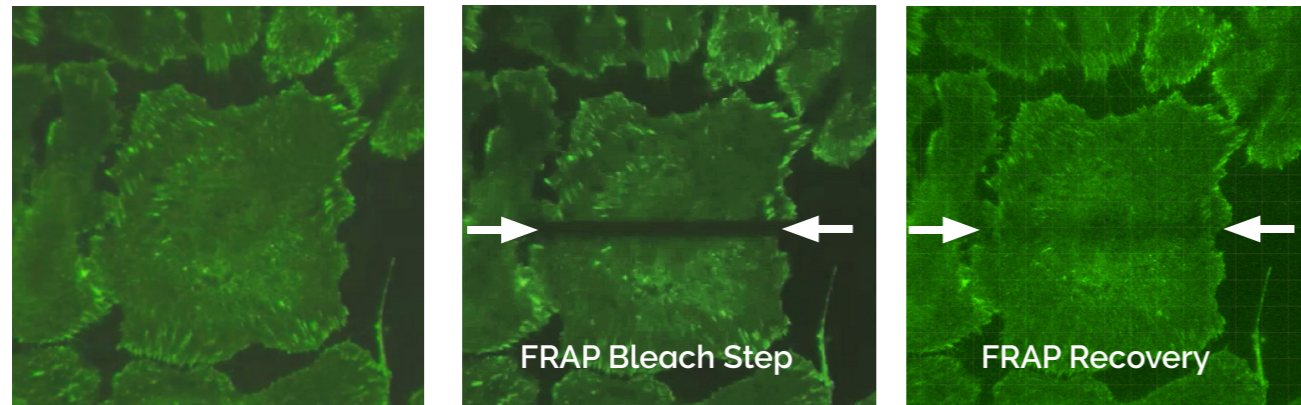
Application Focus

Illuminate your Research with MicroPoint 4

MicroPoint 4 can be used for a wide range of experiments that incorporate photostimulation based techniques. Study fundamental processes of cell biology within individual cells, tissues or in the full organism context within small animal models.

FRAP (Fluorescence Recovery After PhotoBleaching)

MicroPoint allows the desired region within a cell to be illuminated, bleaching can be induced and the subsequent fluorescence recovery studied. This example shows FRAP of GFP (Green Fluorescent Protein) fusion proteins, labelling plasma membrane of living cells.



Study Details

MicroPoint 4 scans the 488 nm laser, bleaching the region indicated. Fluorescence takes about 60 seconds to recover in this example, indicating relatively low diffusion of labeled proteins. Imaged on Dragonfly 600 in B-TIRF time-lapse with 2 s interval. Data courtesy of Felix Rivera-Molina, Yale University.



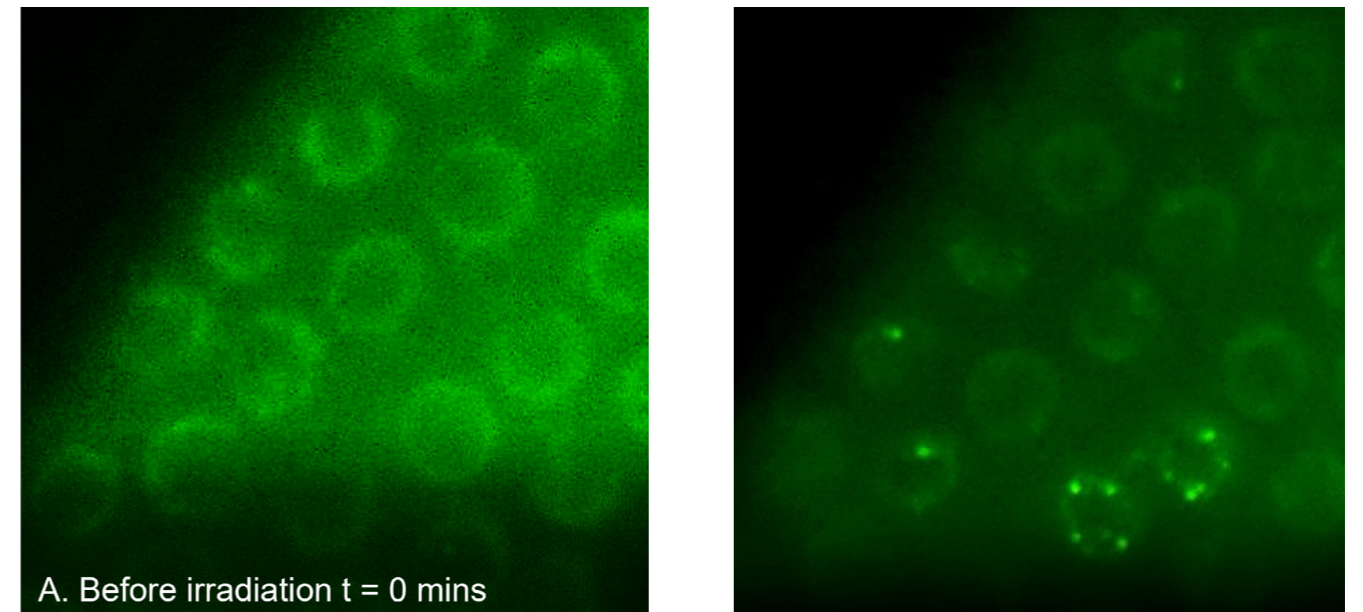
"Our lab performs fluorescence recovery after bleaching (FRAP) and fluorescent-light activation experiments at high temporal resolution to understand the protein dynamics at the cilia, cytoskeleton and the plasma membrane compartments in living cells. The MicroPoint 4 precision and fast bleaching capabilities are required for these experiments and will help us to explore deeper and with high throughput the changes in protein dynamics."

Dr Felix Rivera-Molina, Research Associate, Manager, Cinema Lab, Department of Cell Biology, Yale University.

Double Strand DNA Breakages - DNA Repair Studies

MicroPoint is ideal for supplying the precise, focused illumination needed for inducing double strand DNA damage and studies of the repair pathways.

In this example, MicroPoint was used to induce precise, double strand breaks to study DNA repair protein kinetics *in vivo* in *Caenorhabditis elegans*.



Study Details

Following microirradiation at 365 nm to induce DS DNA breakages, it was possible to visualise labeled repair proteins RPA-1 and RAD-51. Here, GFP-labeled RAD-51 can be observed as foci in image (B) for irradiated cells only.

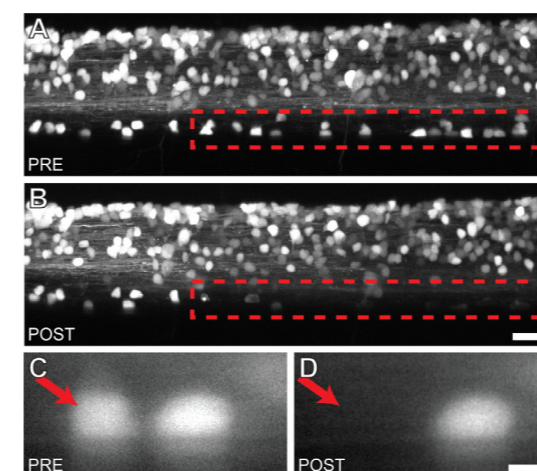
Image Max intensity projection of widefield stack Leica DMI8, 100X/1.4NA objective. Z stack every 2 mins for 60 mins, exposure selected for adequate signal at 488 nm. MicroPoint intensity setting 5-15%.

K. E. Harrell *et al.* Bio Protoc. 2018 Dec 20; 8(24): e3130

www.ncbi.nlm.nih.gov/pmc/articles/PMC6342474/

Ablation and Microdissection

MicroPoint can precisely focus and scan to cut organelles, such as axons and microtubules within cells. With higher powers whole cells can be damaged or ablated in embryos.



Study Details

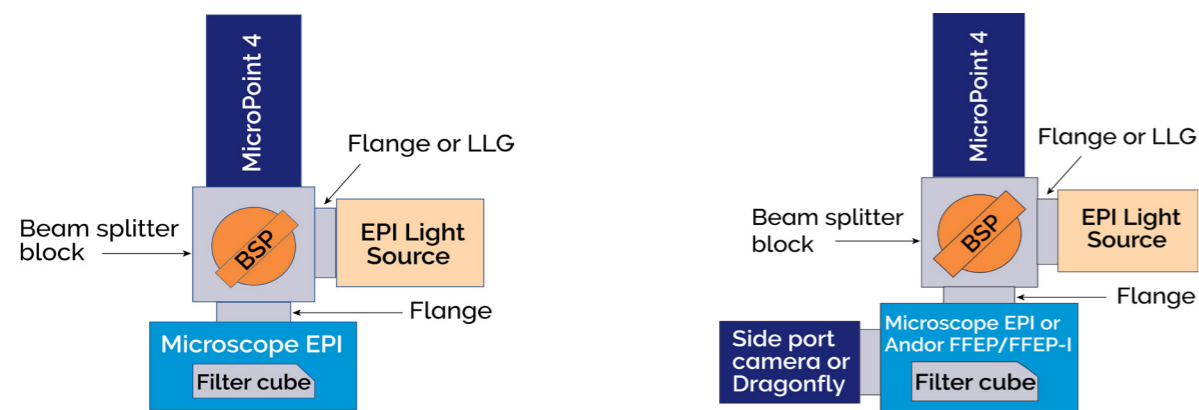
Acute ablation of V3-Interneurons (V3-Ins) in a Zebrafish model was performed using the MicroPoint at 435 nm in order to investigate their role during fictive motor activity required for swimming. It was possible to target the ablation of V3-Ins in the tissues efficiently and precisely with a series of pulses from the MicroPoint. This can be observed in the confocal stacks of the same zebrafish larva before (A) and 12 h after (B) laser ablation of the V3-Ins in the region indicated (red dashed lines). C, D, show a magnified view of two V3-Ins before (left) and after (right) a single cell laser ablation. Scale bars: 20 μ m (A, B) and 5 μ m (C, D).

See V3 Interneurons Are Active and Recruit Spinal Motor Neurons during *In Vivo* Fictive Swimming in Larval Zebrafish doi.org/10.1523/ENEURO.0476-21.2022

Flexible Configurations

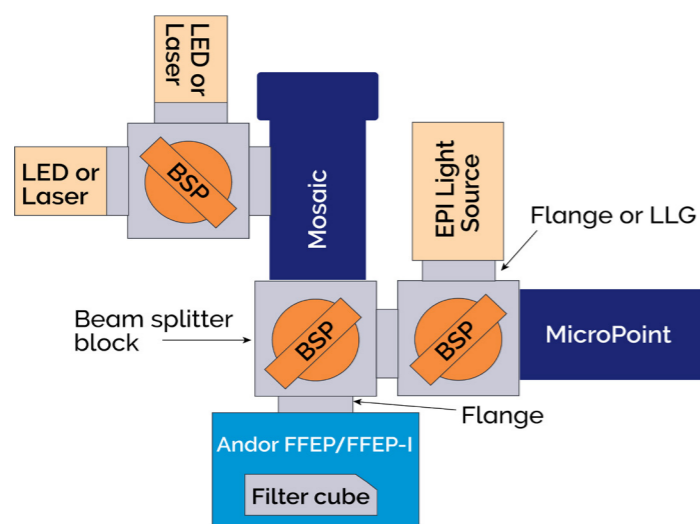
MicroPoint 4 can be configured with other light sources such as Epi illumination for fluorescence and even confocal and TIRF imaging setups. For ultimate flexibility, Andor's Mosaic DMD-based tool can be integrated for simultaneous multi-target optogenetics, photo-conversion and switching.

The images below shows basic configurations for MicroPoint 4. The BSP (beam splitter plugs) and MicroPoint filter cubes are used to mix light from the MicroPoint and EPI light sources for photostimulation and observation of the specimen. For successful operation, transmission and/or reflection of both wavelengths is needed. In the ordering table on pages 10 and 11, use steps 7, 8 and 9 to select components to achieve this. Our sales team will help.



MicroPoint 4 with an additional source of light.

MicroPoint 4 with an additional light source and a confocal microscope or camera.



MicroPoint 4 with multiple light sources and Andor's Mosaic for precise irradiation of multiple regions.

Technical Data

Control	Manual	Galvo
Controller	Smart controller with LCD touch screen	Smart controller with USB to PC
Triggering	Manual, Foot pedal, Ext TTL	Software, foot pedal Ext TTL
Field of Illumination	Fixed beam (user adjustable)	Approx 6 x 6 mm
Settling Time (ms)	N/A	1 - 5 (step size dependent)
Galvo Control Precision (bits)	N/A	16

Optical	Nitro Dye Laser	Pico Laser	CW Laser
Wavelengths	365 - 656 nm	355 nm and 532 nm selection via filter slider	400 - 780 nm
Attenuation MicroPoint 4	Motorised rotary ND: 30D, ninety steps, 0.1 - 100% Transmission (log scale)		
Attenuation at laser source	0.1 - 30D - 0.1 - 100% ND slider	N/A	2 - 100% electronic
Resolvable spot size	Near diffraction limited	Near diffraction limited	Approx 4 X PSF FWHM (~2 μm @ 60X/1.2NA)

Laser Sources	Nitro Dye Laser	Pico Laser	VLE option	HLE option
Average power	300 μW	4 mW @ 355 nm 20 mW @ 532 nm	30 - 200 mW	200 - 1200 mW
Peak power	7 kW	2 kW @ 355 nm 10 kW @ 532 nm	N/A	
Pulse energy	20 μJ	2 μJ @ 355 nm 10 μJ @ 532 nm	N/A	
Stability	± 3 %	± 1 %	± 3 %	
Spectral bandwidth	3 - 4 nm FWHM	~1 nm	1 - 2 nm FWHM	
Pulse width	3 - 5 nsec	~1 ns	1 ms - 10 s	
Pulse repetition rate	0 - 20 Hz	0.2 - 5 kHz	1 - 1000 Hz	
Lifetime	20 M laser pulses; 30,000 laser pulses per refillable dye cell	5000 hrs typical	5000 hrs typical	
IEC 60825-1 Classification	Class 3B	Class 3B	Class 3B	Class 4

Software Compatibility - Life Science Applications

MicroPoint 4 computer controlled systems are compatible with a wide range of life science imaging software as indicated in the table below.

Andor iQ Version 3.7 and above	Live cell multi-dimensional imaging with flexible control of MicroPoint 4
Software Development Kits (SDK)	SDKs are available to control within OEM or custom systems

Choose your Control Interface

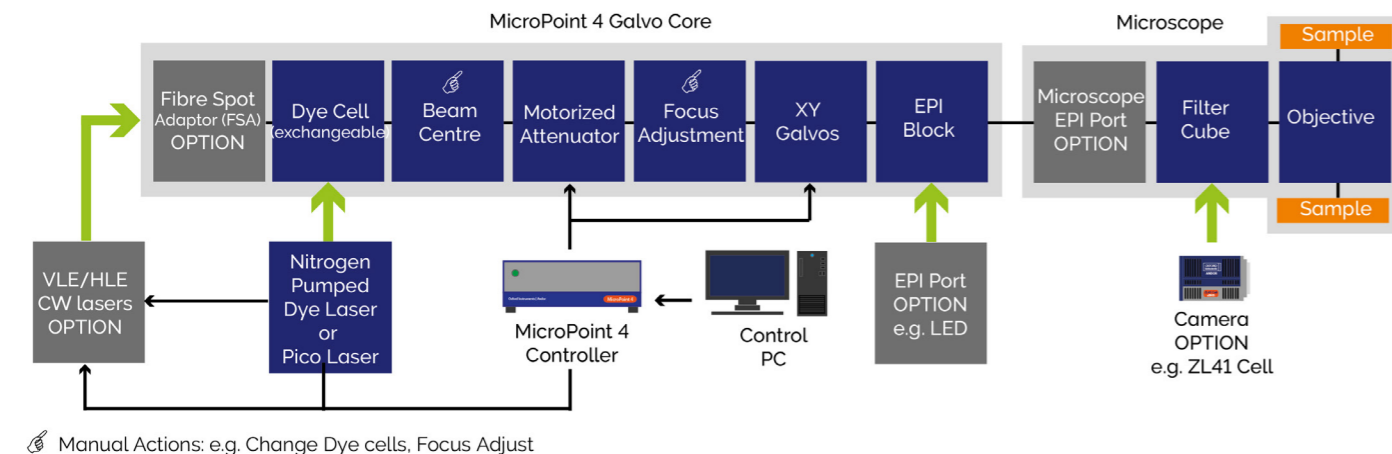
MicroPoint 4 Galvo - Flexible, Scanned Laser Illumination

Both Nitro and Pico versions can be configured with galvanometers. The laser dye cell provides multiple laser wavelengths. Galvo models can also be combined with a range of CW lasers using the fibre spot adaptor. MicroPoint 4 easily integrates with many supported microscopes with factory-installed focus modules enabling optimal performance. Beam steering and software gives exceptional flexibility and consistency of illumination control. Andor iQ and virtual camera provide easy interoperability with third party imaging tools. Almost any system can be enhanced with Andor's MicroPoint 4 and Mosaic.

Key Features of Galvo Models

- ✓ **Updated laser compatibility** - FSA option for CW lasers to FRAP, photoconvert or switch.
- ✓ **Galvo scanning** - Scan arbitrary patterns for cutting or bleaching or photoconversion.
- ✓ **Galvo beam positioning** - Fast sequential, DNA damage of multiple cells.
- ✓ **Arbitrary line scanning** - Cut one or more linear features at any angle.
- ✓ **Software protocol-based scanning** - Define and scan multiple regions in one execution.
- ✓ **Motorised attenuation** 0.1- 100% in 90 steps. Easy and precise control of laser intensity.
- ✓ **Smart USB controller** - Flexible software control with Andor iQ.

MicroPoint 4 Galvo



Manual Actions: e.g. Change Dye cells, Focus Adjust

Ordering Information: Galvo Core Parts

MicroPoint 4 Galvo	Select Core System based on your Microscope			
	Zeiss Axio, Leica DM, All Nikon models	Leica DMI8, Evident/Olympus IX/BX	Zeiss Axiovert 200	Evident/Olympus: BX51/WI model
MicroPoint 4 Galvo with Nitro Dye Laser	MP-4203-NGO	MP-4204-NGO	MP-4205-NGO	MP-4206-NGO
COMING SOON MicroPoint 4 Galvo with Pico Laser	MP-4203-PGO	MP-4204-PGO	MP-4205-PGO	MP-4206-PGO
FSA	MP-4210-FSA-S			

Andor iQ control and targeting software are supplied with all galvo models unless specified otherwise.

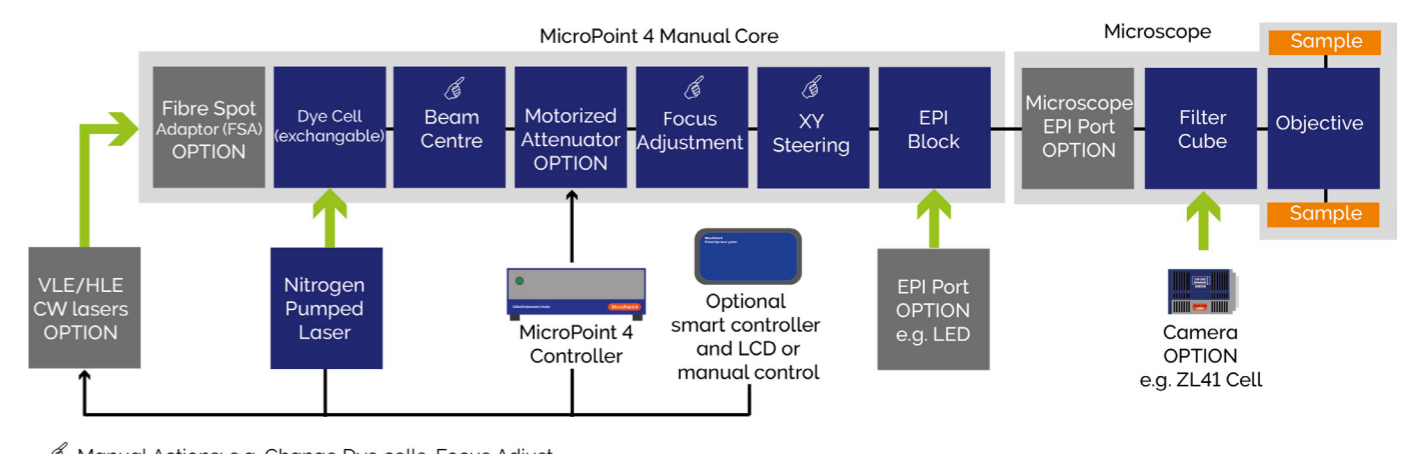
MicroPoint 4 Manual - Manually Controlled Laser Illumination

MicroPoint 4 Manual models provide the most cost effective way to add photostimulation capabilities to your microscope. Built around the dye laser, the MicroPoint 4 Manual is easy to control via an LCD touchscreen. Simply set the laser power through the LCD touchscreen, then move the microscope stage, to guide the specimen to the desired position. Start photo-stimulation with the foot pedal. Easy to integrate with popular microscopes and to combine with LED sources via the EPI port block. Exchangeable laser dye cells allow cost-effective addition of alternative laser wavelengths as your research needs evolve.

Key Features of Manual Models

- ✓ **LCD handset** - Ergonomic UI, store and recall favourite settings.
- ✓ **Motorised attenuation** - easy and precise control of laser intensity.
- ✓ **Manual beam steering with T-wrench** - Set beam to preferred position on specimen.
- ✓ **Manual beam centre with eyepiece target** - Use stage to centre and ablate.
- ✓ **Trigger with foot-pedal** - Hands-free operation for 'centre and fire'.

MicroPoint 4 Manual



Manual Actions: e.g. Change Dye cells, Focus Adjust

Ordering Information: Manual Core Parts

MicroPoint 4 Manual	Select Core System based on your Microscope			
	Zeiss Axio, Leica DM, All Nikon models	Leica DMI8, Evident/Olympus IX/BX	Zeiss Axiovert 200	Evident/Olympus: BX51/WI model
MicroPoint 4 Manual with Nitro Dye Laser	MP-4203-NMA	MP-4204-NMA	MP-4205-NMA	MP-4206-NMA
FSA	MP-4210-FSA-S			

Ordering your MicroPoint 4 System

Below is an overview of the system configuration options, your sales representative will discuss your application to ensure your configuration meets your needs

Step 1.	Choose your control interface, laser and microscope. Select one of these or none if FSA only	
Core Unit	Galvo for Nitro dye laser and/or FSA - see page 8	MP-4203-NGO to MP-4206-NGO
	COMING SOON Galvo for Pico laser - see page 8	MP-4203-PGO to MP-4206-PGO
	Manual for Nitro dye laser and/or FSA - see page 9	MP-4203-NMA to MP-4206-NMA
Step 2.	Add optional CW laser if required	
CW Lasers	See Laser Engine Specification Sheet to order CW lasers	
	FSA - supports CW laser input - optical fibre included	MP-4210-FSA-S
Step 3.	Select one pulsed laser (optional)	
Pulsed Lasers	Nitro for dye laser - galvo AND manual models	MP-N2CE-PSIA
	Pico laser for galvo model	MP-NDYAG-1NS
Step 4.	Choose one or more dye cells (for Nitro only).	
Dye Cells	Dye cell resonator for 435 nm dye laser	MP-4250-0-435
	Dye cell resonator for 365 nm dye laser	MP-4250-2-365
	Dye cell resonator for all other wavelengths	MP-4250-1-ALL
Step 5.	Select one or more pre-mixed laser dyes (50 ml) by wavelength	
Laser Dyes	MP-27-XXX-DYE where XXX= wavelength which must match dye cell in step 4	365, 388, 390, 404, 422, 435, 471, 481, 514, 521, 539, 543, 551, 576, 582, 590, 593, 613, 622, 626, 651 or 656.
Step 6.	Select laser interlock	
Laser Interlock	Laser interlock based on laser and system configuration	
Step 7.	Select L/R hand EPI combiner block, L/R from:	
EPI Blocks	Left-hand BSP block & heat filter	MM-7239-L-LLB
	Right-hand BSP block & heat filter	MM-7239-R-LLB
Step 8.	Beam splitters/combiners - combine PS & observation wavelengths - see MicroPoint 4 User Manual	
Beam Splitters	T100%, R50-T50%, R100%, R30-T70%, Target, Cross hair	MOS3-BSKIT-01
	T350-375 (50%), R390-415; T425-800 nm	MM-7246-3-BSP-405
	T>70%: 400-435; R470-700 nm	MM-7246-4-BSP-440
	R350-375, T395-415; R430-700 nm	MM-7246-5-BSP-405

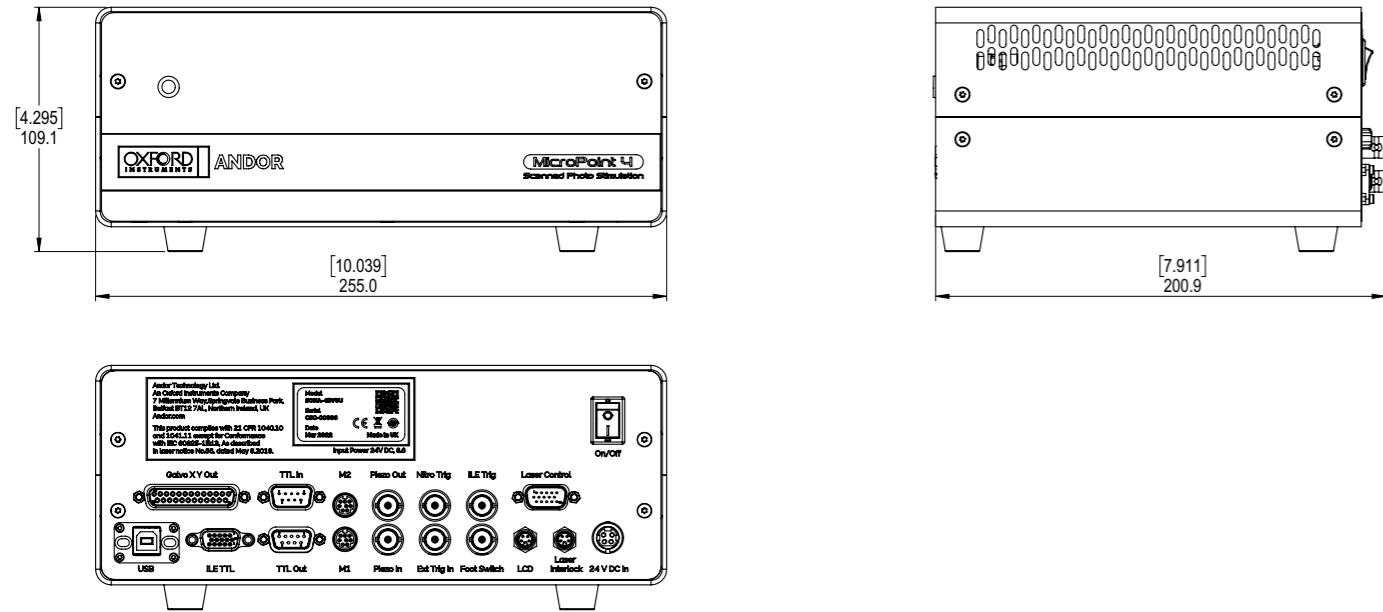
Step 9.	Select EPI excitation filters - for older arc lamp systems (optional)	
EPI Filters	38 mm filter & holder 480/20 excitation	MM-7253-GFP
	38 mm filter & holder 470/40 excitation	MM-7255-ET470/740
	38 mm filter & holder eGFP+mCherry	MM-7255-GFP/MCH
	38 mm filter & holder GFP+RFP	MM-7255-RG
Step 10.	Microscope and Light Source Accessories	
Accessories Including Lasers	ONE or TWO flange sets are required for i) scope connection and ii) existing epi light source if present. Select Spacer for Leica scopes.	MM-7235-NKF-HMX (Nikon pre-2022) MM-7236-OLF (Evident Olympus IX/BX set) MM-7237-LCF (Leica flange set) MM-7238-ZSF (Zeiss flange set)
	Leica spacer - 50 mm male-to female	MM-7237-LMS
	CoolLED 3 LED, pod, light guide, collimator	LS-PE300-LLG (Zeiss flange)
	See Laser Engine Specification Sheet to order CW lasers	
	3rd party LED and CW lasers by special request	Andor CSR - contact sales
Step 11.	Microscope Filter Cubes (more options available on request)	
Filter Cubes	Zeiss Axio 408 LP - with MP-4250-2-365	TR-FC-ZS-42-408DC
	Leica DMI8 460 LP - with MP-4250-0-435	TR-FC-LC-51-460DC
	Leica DM/I manual semiconductor marking	TR-FC-LC-24-505FS
	Nikon TI 375LP - with 365-DYE or Pico 355 nm	TR-FC-NK-32-375DC
	Evident Oly IX2/BX2 - laser safety set	TR-FC-OL-41-505FS
	Evident Oly IX3/BX3 laser T70% - R30%, 400 - 700 nm	TR-FC-OL-44-7030
Step 12.	Control and Targeting Software. Select a second monitor for best experience Select ALL 3 components for galvo models	
Software	Andor iQ control and targeting software is supplied with all galvo models unless specified otherwise. Select a second monitor for best experience (recommended)	IQ-AI
	Andor iQ virtual camera	IQ-VIRT-CAM
	24" High resolution monitor	IQ-MNTR-24
Need help? Contact your local sales team to discuss your requirements		

Product Drawings

Dimensions in mm (inches)

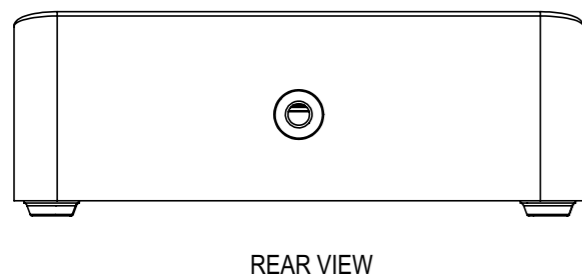
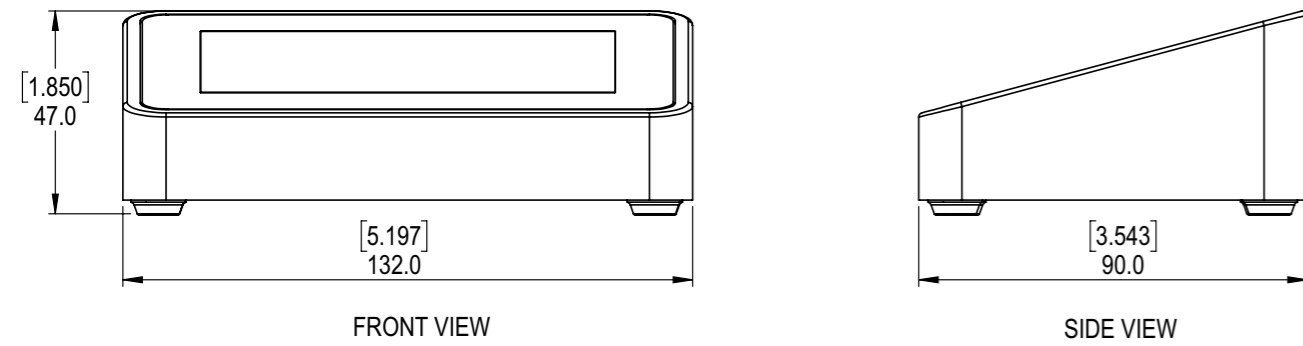
MicroPoint 4 Controller

Controller Weight 1.55 kg (3lb 3oz)



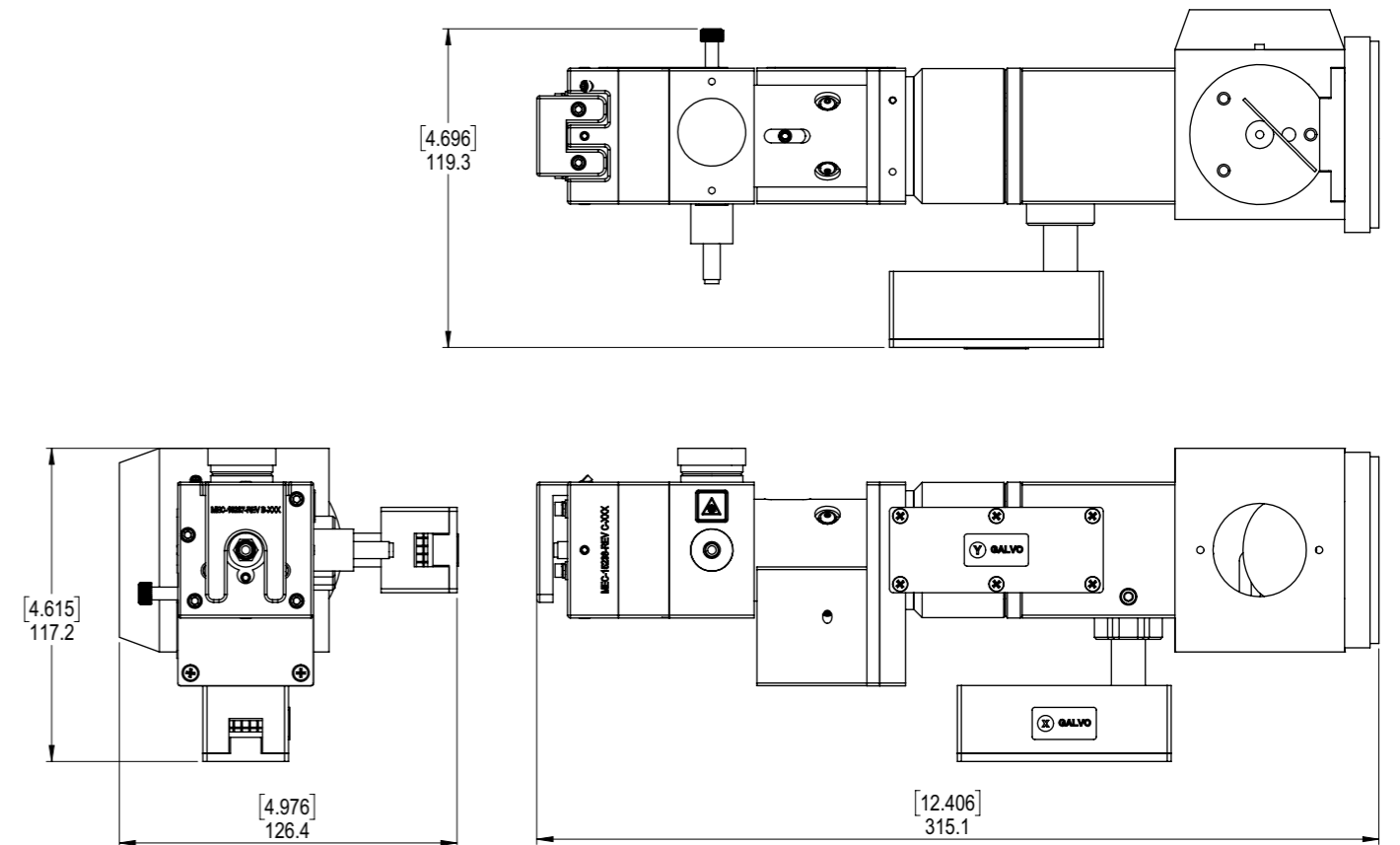
LCD Touchscreen Unit (for manual MicroPoint models only)

Manual Controller Weight 350 g (12 oz)



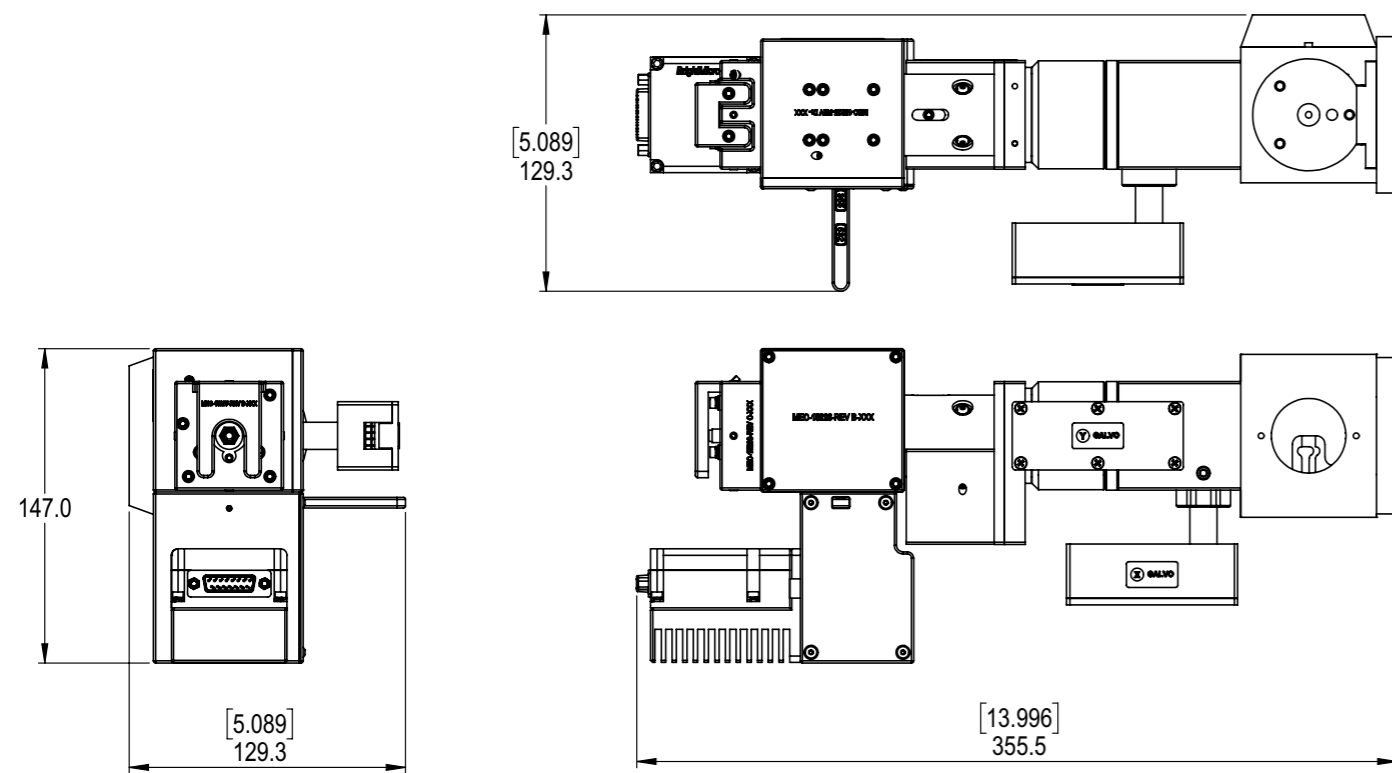
MicroPoint 4 Nitro Galvo with FSA

Optical Head Weight = 1.8 kg (4 lb 1oz)



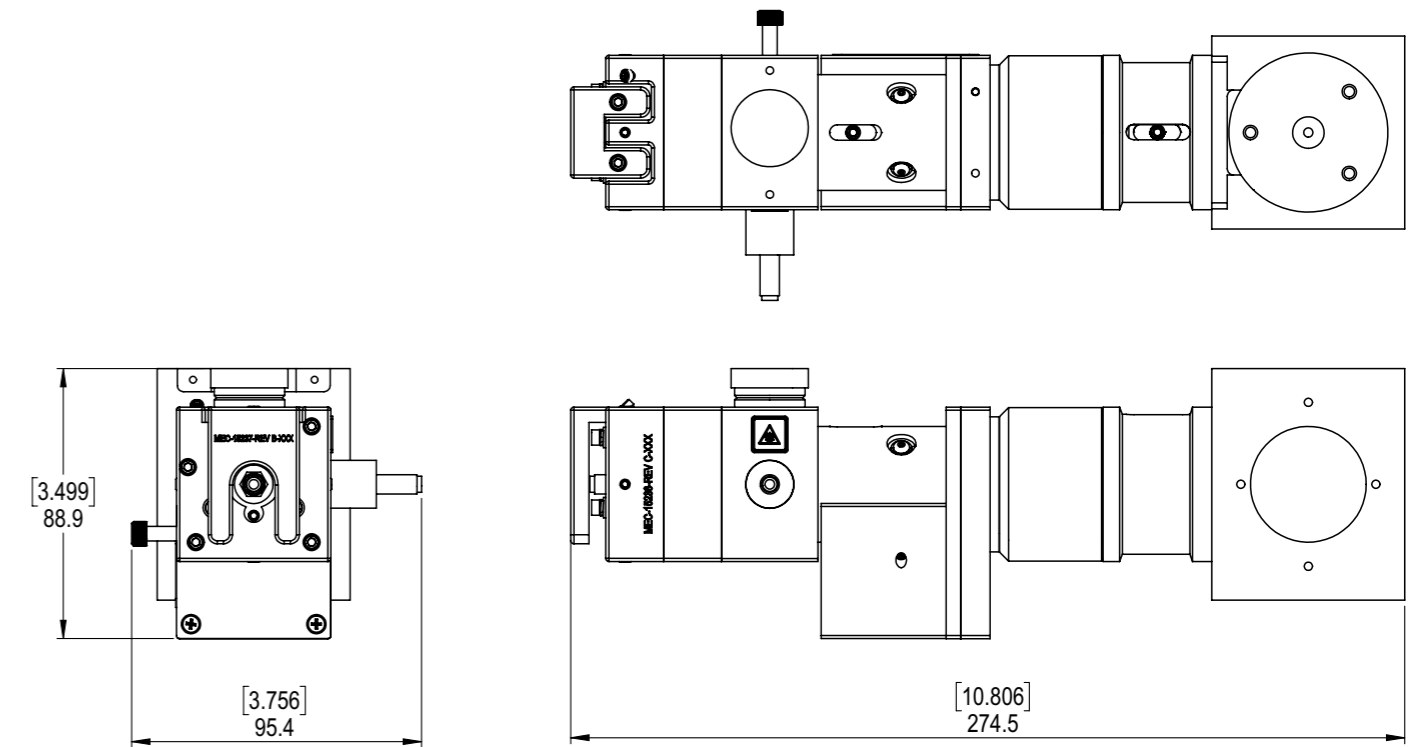
MicroPoint 4 Pico Galvo with FSA

Optical Head Weight = 2.8 kg (6.2 lb)
including laser



MicroPoint 4 Nitro Manual with FSA

Optical Head Weight = 1.4 kg (3.0 lb)



Order Today

Need more information? At Andor we are committed to finding the correct solution for you. With a dedicated team of technical advisors, we are able to offer you one-to-one guidance and technical support on all Andor products.

For a full listing of our local sales offices, please see: andor.oxinst.com/contact

Our regional headquarters are:

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Fax +44 (28) 9031 0792

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Fax +81 (3) 3446 8320

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Phone +1 (860) 290 9211
Fax +1 (860) 290 9566

China

Beijing | Shanghai | Guangzhou
Phone +86 (400) 678 0609
Fax +86 (10) 5884 7901

Items shipped with MicroPoint 4

- 1x surface mirror microscope slide
- 1x stained kidney tissue slide
- 1x hex key (0.05")
- 1x 24 VDC universal power supply
- 1x 3 m power cable for power supply
- 1x USB cable (galvo systems)
- 1x 2 m BNC cable (galvo systems)
- 1x 2 m HD15-HD15 for Pico laser (Pico systems)
- 1x 3 m USB cable
- USB with Andor iQ software

Minimum Computer Requirements:

- Windows 10 Pro or Windows 11 Pro
- Spare USB2 or USB3 port
- Minimum 8 GB RAM 256 GB storage
- Solid state drive recommended, not essential

Operating & Storage Conditions

- Operating Temperature: 18 °C to 28 °C ambient
- Relative Humidity: < 70 % (non-condensing)
- Storage Temperature: -20 °C to 50 °C

Power Requirements

- 120-240 VAC, 50-60 Hz, 1.0 A

System Power Consumption

- 30 W/50 W (Typ/Max)

Note Within the EU, MicroPoint 4 is only available for research and development purposes only as per the EU RoHS Directive.

Labels as required by IEC 60825-1 and U.S. CDRH Regulations.



MicroPoint 4 Class 3B laser safety classification label for Nitro Dye Laser (left). (Labels for Pico version to be included at Pico launch.)



HLE Class 4 laser safety classification labels



VLE Class 3B laser safety classification labels

Cover Image Credit: Felix Rivera-Molina of Yale University. Details of FRAP experiment are on Page 4.
US Patent US5933274

