

# MPC-SERIES MULTIPHOTON MICROSCOPES

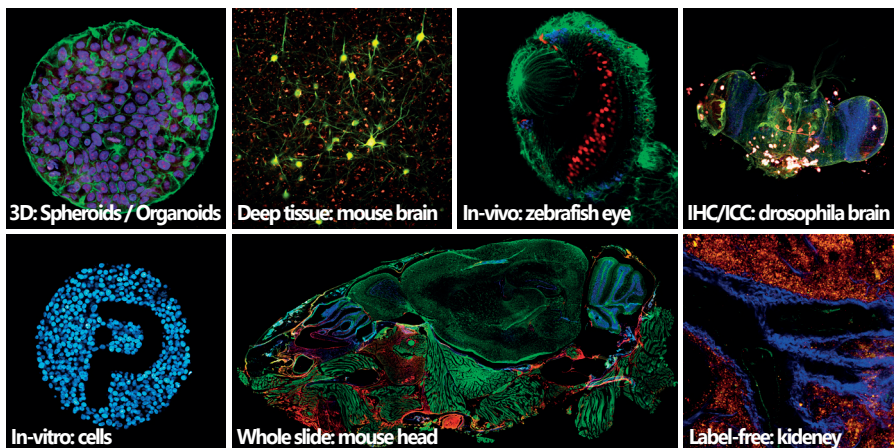
TURN-KEY - FLEXIBLE - MULTIMODAL - COMPACT



- Highly customizable
- 3-Photon and THG-ready
- Fully custom-designed laser scanning optics, achromatically compensated from 680nm to 1700nm, covering the full range of Ti:Sapphire lasers, fiber lasers as well as OPO/OPA/OPCPA systems up to 1700nm.
- Up to 4 ultra sensitive GaAsP PMTs with low dark count rate in epi or transmission
- Compatible with Evident (Olympus) epi-fluorescence OEM products
- Open frame for later upgrades
- Optimized fluorescence detection through large collection angle and 2" optics

The MPC-series **multiphoton multimodal imaging platform** is highly modular, allows interfacing with any femto-second laser for 2- or 3-Photon-Imaging. Alternatively it can be supplied with Prospective Instruments' integrated femtosecond laser (fixed or tunable wavelength). The scanhead can be installed on a XYZ-Stage and in any direction (upright, inverted or even oblique angles). Users have the flexibility to design a **multiphoton microscope that suits their specific needs and budget**. The scanhead can be easily configured in various positions, and the modular design allows for future upgrades and the addition of extra features on the same platform.

The MPC-series combines the integrated design of our MPX-series with the flexibility of fluorescence microscopes. It utilizes the Evident® (Olympus) fluorescence illuminator, which allows the users to add various parts from the Evident® (Olympus) universe, e.g. tube lens or filter wheels.



## Broad range of applications:

- 2D/3D/4D imaging
- In-vitro & in-vivo
- Whole slide imaging
- Label-free & IHC/ICC
- Non-destructive
- Deep tissue imaging
- Pathology & Cancer
- Neuroscience
- Optogenetics
- Tissue Engineering & Bioprinting
- Spheroids/Organoids

# SPECIFICATIONS

## Compatible Laser sources

The MPC scan optics is fully custom designed and covers the entire range from 680nm to 1750nm. It is therefore well suited for 2P, 3P and 4P, as well as label free SHG, THG, CARS, SRS and FLIM imaging.

The MPC is compatible to all Prospective Instruments FSX ultrafast lasers, as well as suitable laser models from all other major ultrafast laser manufacturers.

## (I) Multiphoton fluorescence imaging

Motorized laser power control	0.5 % - 100 %	
Scan path	Galvo-galvo or resonant-galvo-galvo scanner*	
Scan speed (galvo-galvo / resonant-galvo-galvo)	4.6 fps at 512 x 512 pixels	30 fps at 512 x 512 pixels
	0.3 fps at 2048 x 2048 pixels	(8 kHz resonant galvo CRS8K)
	Pixel dwell time: 0.8 to 32 $\mu$ s	Pixel dwell time: 44 ns
Field of view (FOV)	20 mm diagonal square (max) at the intermediate image plane	
Beam diameter @ objective back aperture	22 mm	
Point spread function	Depending on installed objective	
Scan zoom (digitally via ScanImage)	1x to 99x	
Scan size	Up to 2048 x 2048 pixels (both bi- and unidirectional)	

## Multiphoton signal detection

Detection	Non-descanned fluorescence excitation detection, up to 4 PMTs, HDDs, SiPMs or SPADs in epi or transmission.
Collection optics	Extra-large highly efficient 2" achromatically compensated detection optics, collection of fluorescence photons within +/- 12° from objective back aperture.

## (II) Widefield fluorescence imaging

Lightsources	White-light LED or up to 9 channel solid-state based illumination.
Filter set	Excitation, dichroic and emission filter sets individually selectable, matching illumination light source option. sCMOS monochrome, 6.5 $\mu$ m pixel size, readout noise 2.1 med e-, q.e. up to 80 %, spectral range 370 nm - 1100 nm, dark current (typ.) 15 e- / pixel / s. All other major fluorescence camera models can be integrated.
Fluorescence camera	Olympus OEM catalogue, such as binoculars, trinoculars, Köhler illumination, multiple camera ports. Wide selection of evident. Olympus of OEM catalogue possible.
Widefield options	

## Software

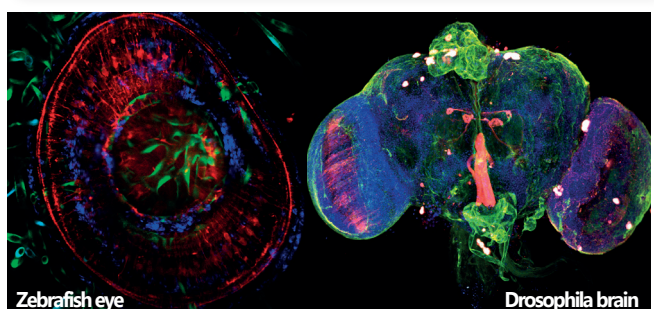
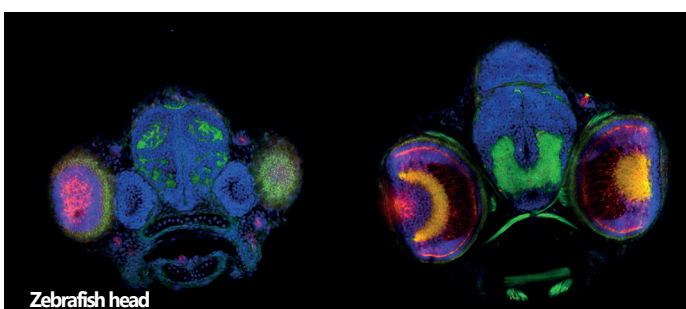
ScanImage Basic or Premium	Laser scanning
Chromogazer™	System monitoring & modality change
MS Windows™	PC operating system
ImageJ / Fiji	Image post-processing
Matlab	Scanimage API and acquisition scripts for fully autonomous imaging

## Controller

Umbilical	Non-detachable umbilical between controller and scanhead, >2.0 m length.
Embodiment	Stand-alone controller on wheels.
Cooling	No chiller, fully aircooled.
Power	Single phase, 85 - 240 VAC, 10 A max (max 800 W total power consumption).
Built-in PC hardware	ATX gaming board, AMD Ryzen, 64 GB RAM, 500 GB SSD, 4 TB HDD, Quadro RTX GPU. High performance PC platform or better.
Size scanhead	50 cm x 40 cm x 15 cm (WxHxD)
Operating environment	18°C - 27°C. Extended operating conditions available.
Storage temperature	-15°C to +50°C.
Humidity	10% - 90% (non condensing)

## Objectives

Turret	3-positions, motorized & software controlled
Turret threadings	M32 x 0.75
Objectives	Scan optics compatible to all major objective manufacturers. Optimized for state-of-the-art high-NA objectives.



# OPTIONS / MODALITIES

## Resonant-galvo-galvo

*Resonant-galvo-galvo	30 fps at 512 x 512 pixels (8 kHz resonant galvo CRS8K)  @ full FOV	* up to 100 Hz  @ line scan
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## Motion control / upright and inverted

Microscope body (scanhead) motion	Fully flexible 360° scanhead for inverted, upright or oblique angle imaging. Scanhead can be mounted on a fix stand or xyz-stage.	
Piezo objective scanner	Various piezo objective scanners can be integrated for fast z-scanning.	

## Adaptive optics

Adaptive optics transmissive wavefront modulator (Phaseform) for enhanced image quality and penetration depth with up to 7th radial order Zernikes, 63 actuators.

## Neuroexplorer bundle

The Neuroexplorer, has been unveiled for deep tissue imaging. This device combines various imaging techniques to simplify functional and intravital imaging, and it offers bundles tailored for awake and sleeping mouse experiments, including features like stable head fixation and wireless vital signs monitoring during in vivo imaging.

## Optogenetics

Photostimulation via dual-path galvo-galvo beam steering for simultaneous imaging and stimulation.

## THG & 3P imaging

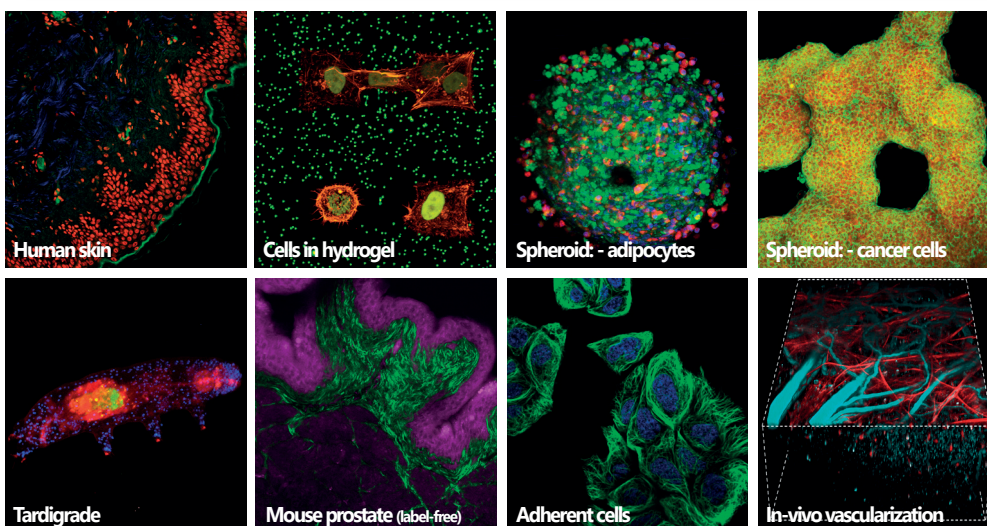
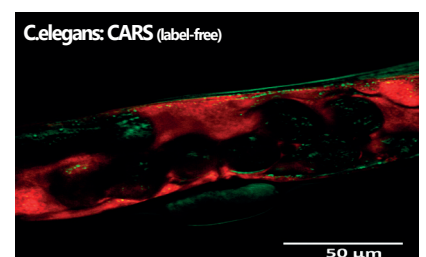
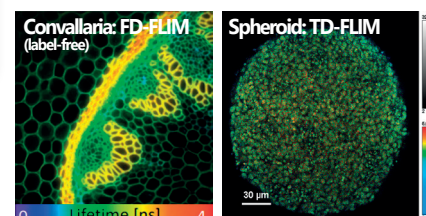
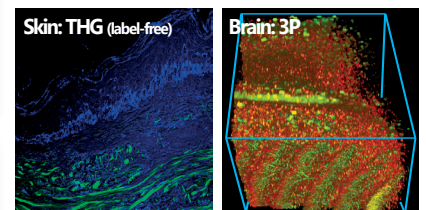
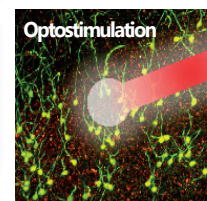
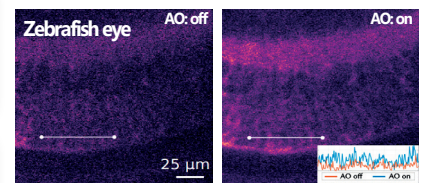
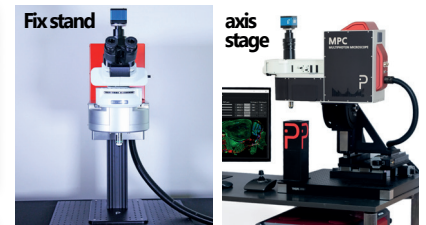
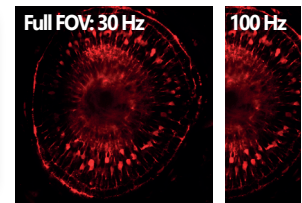
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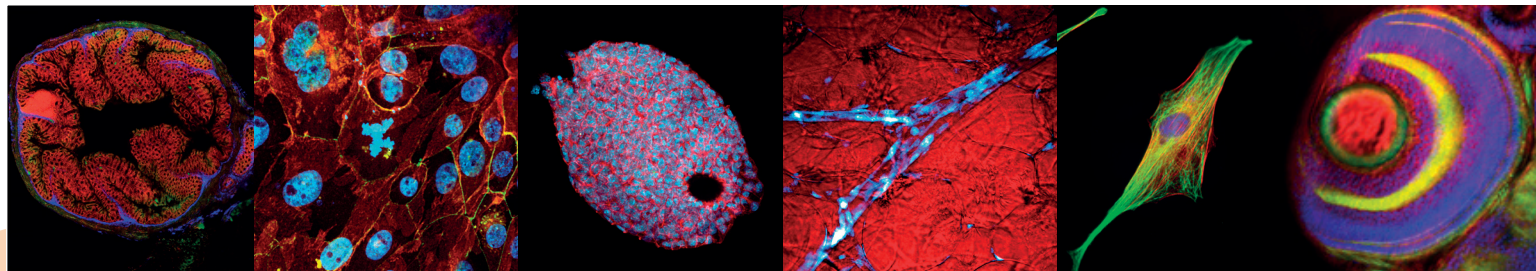
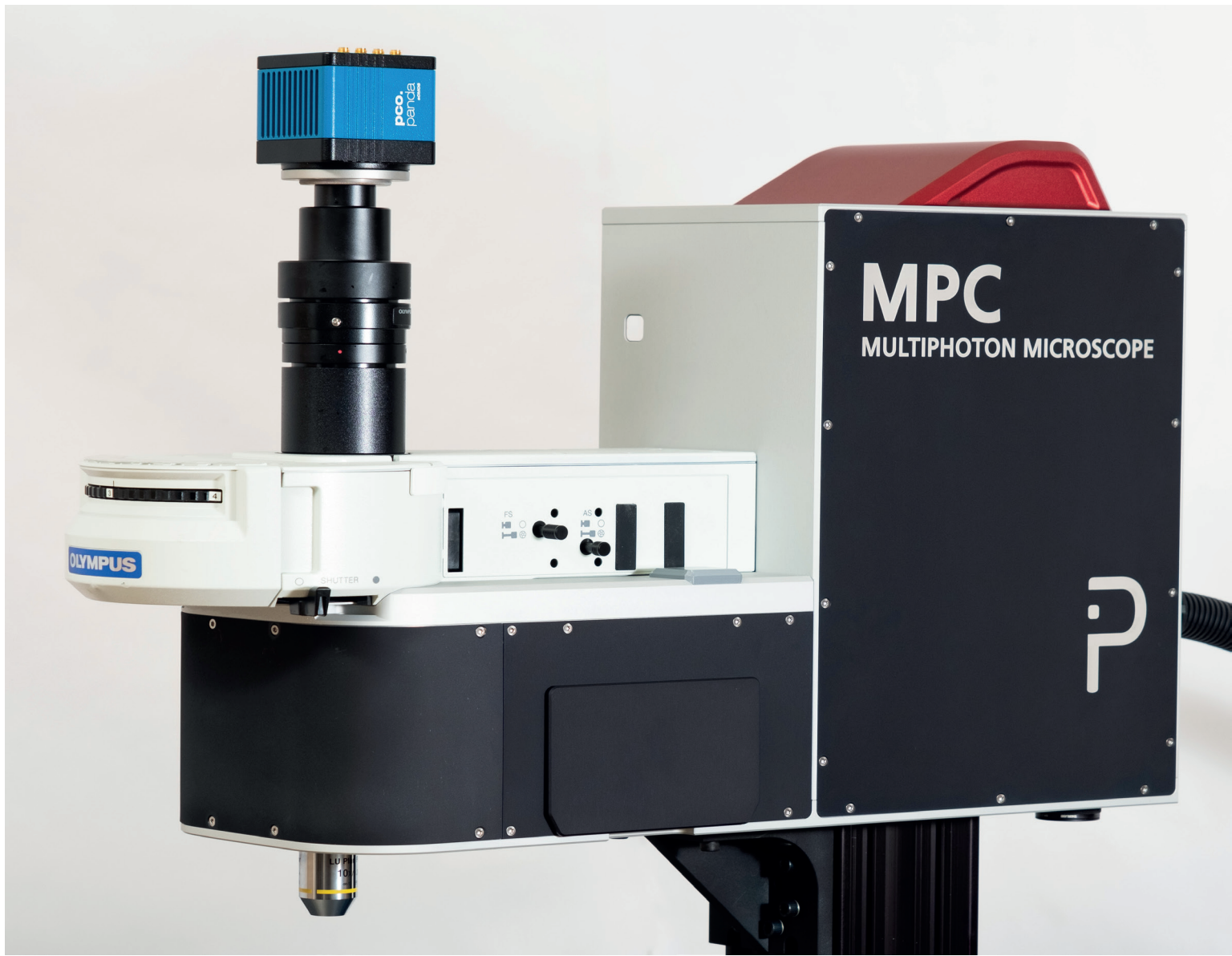
## FLIM

Providing pixel, line, frame clocks and laser synchronization for FLIM imaging. Detectors can be upgraded to single-photon counting. Easy upgradeable to widefield FD-FLIM.

## CARS & SRS

MPC scan optics is optimized for label free coherent Raman imaging. The MPC can be easily modified for CARS/SRS microscopy by using free-space external Laser coupling to the microscope body, detectors in transmission and by providing work space for additional components e.g. time-delay, mirrors and other optics and electronics.





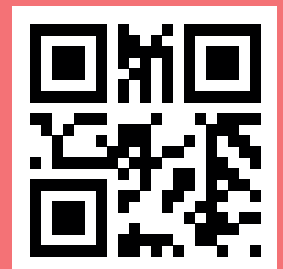
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