

OBJECTIVE MOVES 22mm IN X, Y, AND Z

OBJECTIVE ROTATES ABOUT OPTICAL AXIS FOR IMAGING OF NON-HORIZONTAL SURFACES AND VOLUMES

CUSTOMIZABLE OPEN PLATFORM DESIGN

CAMBRIDGE TECHNOLOGY XY SCANNERS

TWO OR FOUR CHANNEL DETECTOR SYSTEM WITH HAMAMATSU PMTS AND PREAMPLIFIERS

SUTTER PS-2/PS-2 LV DUAL CHANNEL PMT POWER SUPPLY

NATIONAL INSTRUMENT / MEASUREMENT COMPUTING BASED DATA ACQUISITION SYSTEM



(Shown with optional trinocular head and CCD camera. Objective not included)

MOM[®] MOVABLE OBJECTIVE MICROSCOPE[®]

The Movable Objective Microscope[®] (MOM[®]) is a two-photon microscope capable of imaging deep within living specimens when combined with a Ti:Sapphire laser. The MOM design is unique in providing 3-dimensional objective movement and rotation allowing the specimen to remain stationary. Many highly regarded imaging laboratories around the world use Sutter MOM and we constantly work with our customers to adapt the design for their changing needs.

MOM Opto-mechanical Design

The MOM consists of two independent microscopes. The wide-field half of the microscope consists of an Olympus vertical illuminator, Sutter Xenon arc lamp and camera mount to provide standard epifluorescence. The two-photon side of the microscope provides the optical pathway for guiding the excitation laser light from the table up into the

scanning galvanometric mirrors and then expanding the beam through the scan lens and directing into the back of the objective. Following two-photon excitation, the emitted photons are directed by a dichroic mirror immediately above the objective into the detection pathway. The main body of the microscope moves backwards on a rail system allowing easy access to the specimen prior to imaging.

The objective translates in X, Y and Z as well as rotates around the X axis. Two moving mirrors allow the microscope to maintain efficient delivery of the excitation light to the back aperture of the objective regardless of movement or orientation. The X, Y and Z movements used are the same as that in our MP-285 micromanipulator so you know the movements are smooth, fine in scale, drift-free and highly reproducible. These movements permit Z-stacks and mosaic images of large regions of tissue to be recorded without the need for a moving stage.

The horizontal light path allows for rotation of the objective away from the standard vertical position. As a result of this rotation, the MOM can easily be converted from an upright to an inverted microscope and the objective positioned from 0 to 180 degrees. This positional freedom permits the imaging of non-horizontal surfaces and volumes.

MOM Scanning Systems

During the last 10 years, scanning technology has changed dramatically: objectives changed requiring larger beam sizes and scanner technology advanced providing dependable resonant scanners. Unlike other two photon microscope designs, the MOM has lived through and adapted to changes in scanning technology. Throughout this development, Sutter has maintained two principles. First, existing

– CONTINUED ON BACK –

SUTTER INSTRUMENT[®]

One Digital Drive • Novato • CA 94949 • Phone 415.883.0128
Fax 415.883.0572 • Web www.sutter.com • Email info@sutter.com

scopes can be upgraded to new technology as it becomes available. Many original scopes with 3mm galvo scanners have been upgraded to either 6mm galvo scanners or resonant/galvo scanners. Second, Sutter continues to supply the original designs if they are needed for current research. We can provide a 3mm or 6mm conventional scanning **MOM**[®] or a resonant/galvo scanning **MOM** all at competitive prices.

Sutter **MOM** packages include all of the equipment (less the Ti:Sapphire laser and objective), needed for a complete imaging system.

- Cambridge Technology XY galvanometric and resonant scanners. (conventional with 3mm or 6 mm mirrors or resonant with 5mm mirrors).
- Hamamatsu photomultiplier tubes (PMTs): R6357 multialkali or H10770PA-40 (GaAsP) products. (Sutter is an authorized reseller for Hamamatsu).
- Power supplies for PMTs: Either a Sutter PS-2 (dual channel high-voltage power supply for R6357 PMTs) or Sutter PS-2LV (dual channel low-voltage power supply for H10770PA-40 (GaAsP) PMTs) can be ordered.
- Hamamatsu, Sigmann or FEMTO pre-amplifiers, selection varies with software and type of scan.
- Data acquisition: National Instruments and Measurement Computing systems.
- Conoptics Pockels Cells for laser intensity control.

APPLICATIONS

- *In vivo* two-photon imaging
- Electrophysiological recording and imaging (culture, large *in vivo* preparations, etc.)
- Immunology
- Embryology
- Non-horizontal surface microscope
- Simultaneous retinal stimulation and two photon microscopy*
- Whole animal imaging

* "Eyecup scope-optical recordings of light stimulus-evoked fluorescence signals in the retina", Euler et al, Pflugers Arch, 2008

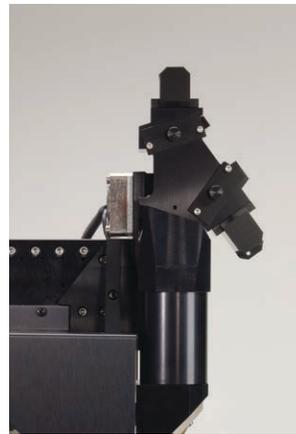
BASIC SYSTEM FOR 2-PHOTON MICROSCOPY

Includes Moving Objective Microscope[®], 2 channel detector with multialkali PMTs, preamps and PS-2 power supply, XY scanners with drive electronics, wide field fluorescence unit including vertical illuminator, **Lambda LS 300 Watt Xenon Arc lamp**, LLG and light guide adapter, C-mount for wide field camera, data acquisition system.

| | |
|---------------------------------|--|
| MOM-3MM ¹ | MOM System with 3mm XY scanners |
| MOM-6MM ¹ | MOM System with 6mm XY scanners |
| MOM-RES-MCS ¹ | MOM System with Resonant scanners and MScan 2.0 software |
| MOM-RES-SIP ¹ | MOM System with Resonant scanners and ScanImage Premium |



¹ Final pricing depends on detector path selected and does not include several devices necessary for a complete 2-photon microscope (i.e. Ti:Sapphire laser, objective, camera, trinocular head, table mount optics). Please phone Sutter for details.



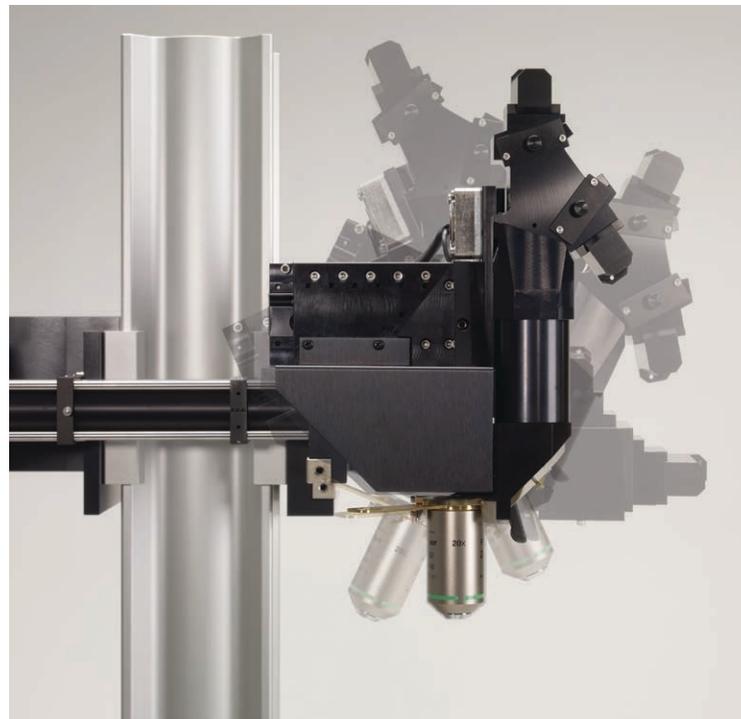
2 channel



4 channel



Short path (2 channel)



The MOM is both an inverted and upright microscope with 0 to 180° rotation