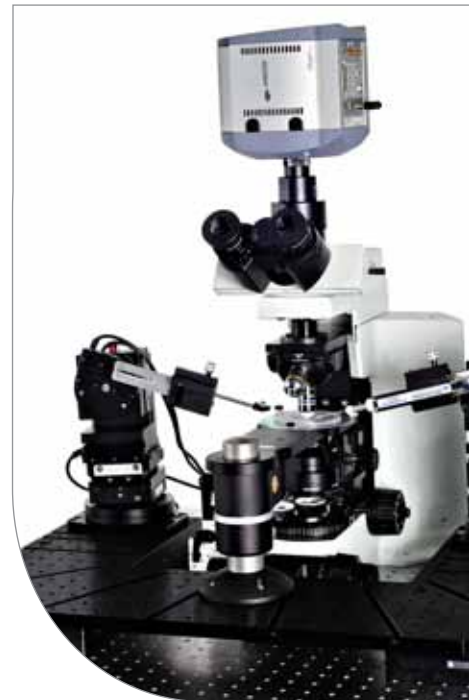


## PatchPro

### Electrophysiology & Imaging Systems



**For integration with existing:  
Nikon, Leica, Zeiss or Olympus microscopes**

[www.scientifica.uk.com/patchpro](http://www.scientifica.uk.com/patchpro)

## PatchPro Systems

### Any microscope, coupled with superior engineering

Scientifica's PatchPro systems are a range of fully integrated patch clamping solutions that work in conjunction with a wide range of microscopes from Olympus, Zeiss, Nikon and Leica. The systems allow users to control manipulators, mounting platforms, microscope focus and temperature control- all from simple, user consoles.

Options are available to work with both upright and inverted microscopes to suit a broad range of electrophysiology and imaging applications. All systems come with a 2 year warranty.



#### Flexible software control

All motorised items can be linked together via Scientifica's free customisable, LinLab, software. It allows the user to accurately control distance and speed, as well as record unlimited memory positions for quick and precise translation around the sample.

The unique 'Follow' function allows the user to virtually link manipulators and stages to effortlessly keep pipettes in the field of view, whilst searching for areas of interest.

#### Choice of controllers

Scientifica offer a diverse range of control options including Cube, PatchPad, Joystick and Touchscreen PatchPad. This provides the user the opportunity to choose the most comfortable device for them.

Each control option is supported with further flexibility, via the free LinLab software.

#### Value for money

Scientifica offer a complete solution for manipulators, mounting solutions, translation stages and temperature control within one neat package.

By offering these items together the user saves money compared to purchasing these items individually. Depending on preference and budget, packages are available including either manual or motorised mounting systems.

#### Setup and service

Scientifica provide installation of all equipment at no extra cost and continued after sale support. The modular nature of all equipment and systems provides the opportunity to easily upgrade in the future.

If the user's requirements demand a different design, Scientifica's highly-qualified team of product specialists can work with them to create purpose-built rigs, suited exactly to individual needs.

PatchPro 2000 system,  
shown with a Zeiss Axio Examiner



**PatchPro systems typically include:**

- Two micromanipulators (either PatchStars or MicroStars)
- A manipulator and sample mounting system
- A motorised microscope stage, where relevant
- A choice of control hardware
- Two ultra low noise, 1U racked controllers
- Linlab software for customisation and PC control

**Optional items include:**

- A Z-focus module, upgrading manual adjustment of microscope focus
- A heated perfusion tube, for accurate temperature control



Z-focus module

## Which system?

Pro System	Microscope		Sample Navigation <sup>2</sup>		Mounting System	Page
	Upright <sup>1</sup>	Inverted	Moving Microscope	Moving Sample		
1000	Yes	-	Yes	-	Post & Platform	6
2000	Yes	-	Yes	-	Fixed SlicePlatform	8
3000	Yes	-	-	Yes	Moveable top plate	10
4000	-	Yes	Yes	-	Fixed Platform	12
5000	-	Yes	-	Yes	Moveable top plate	14
6000	Yes	-	-	Yes	Low-level moveable base plate	16

<sup>1</sup> All Patch Pro systems (for upright microscopes) are also available as SliceScope Pro systems, featuring Scientifica's slimline motorised microscope developed for electrophysiologists. For more information, visit [www.scientifica.uk.com](http://www.scientifica.uk.com)

<sup>2</sup> This is a key consideration if the user is undertaking imaging techniques such as confocal or multiphoton, as these techniques restrict the movement of the microscope. The sample and manipulators should therefore be translated as one relative to a fixed position scope.

## Choose from a range of control options

### Control Cube

Compact and comfortable to use, this popular wheeled design gives fingertip control and excellent functionality.

It also provides fast access to a variety of functions, including activating the 'approach' axis, adjusting speed, setting and recalling memory positions and more.



### PatchPad

With this flat panel design, each axis of movement is allocated a wheel on the panel. The full array of features are conveniently accessed and customisable.



It includes the same easy access buttons and switches as the Control Cube. Additionally a touch screen variant is available for switching between more than two devices.

### Joystick

The joystick's ergonomic design offers intuitive directional control in all three axes.

With movement speed proportional to the amount of deflection applied, a speed change button enables the user to customise this device to their exact preference.



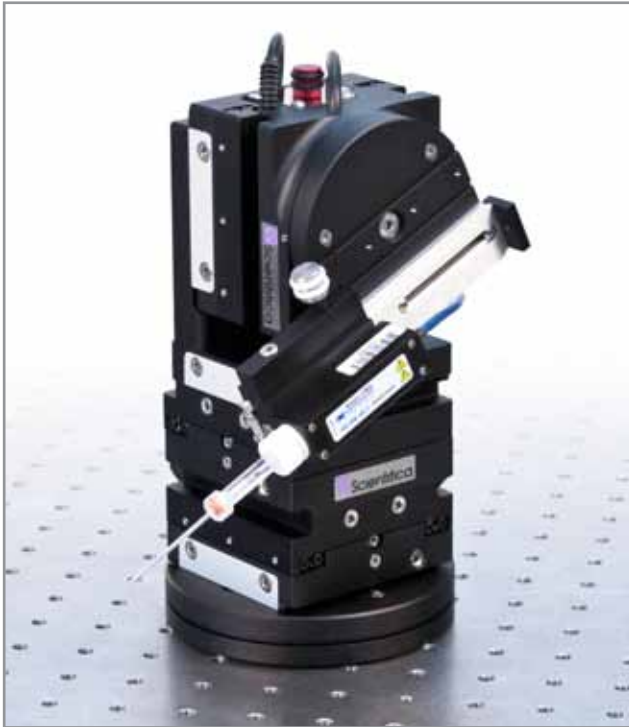
### LinLab Software

Scientifica's free software offers the user the option to customise and adapt their system. It allows them to set movement speed, direction, step sizes and memory positions and **store unlimited memory positions**.

The unique 'Follow' function allows the user to virtually link manipulators and stages to keep pipettes in the field of view, whilst searching for areas of interest.

## Smooth & stable micromanipulators

Scientifica micromanipulators are renowned for their stability, smooth motion, low noise and superior materials. Choose any combination of PatchStars and MicroStars to integrate into the system.



### PatchStar Micromanipulators

The PatchStar is an ultra-stable, micromanipulator with extremely low electrical noise.

The 20nm resolution provided by the stepper motor drives smooth, precise movement preventing damage to the sample.

It features four axes of movement (three orthogonal and a further virtual 'approach' axis). The approach angle is read and set by a smart sensor, removing the need for measuring or calibration and allowing accurate sub-surface positioning of patch pipettes.

The modular design allows the PatchStar to be configured for left or right-handed use and easily switches between the two for added versatility.

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Super smooth motion: 20 nm resolution, 20 mm of travel

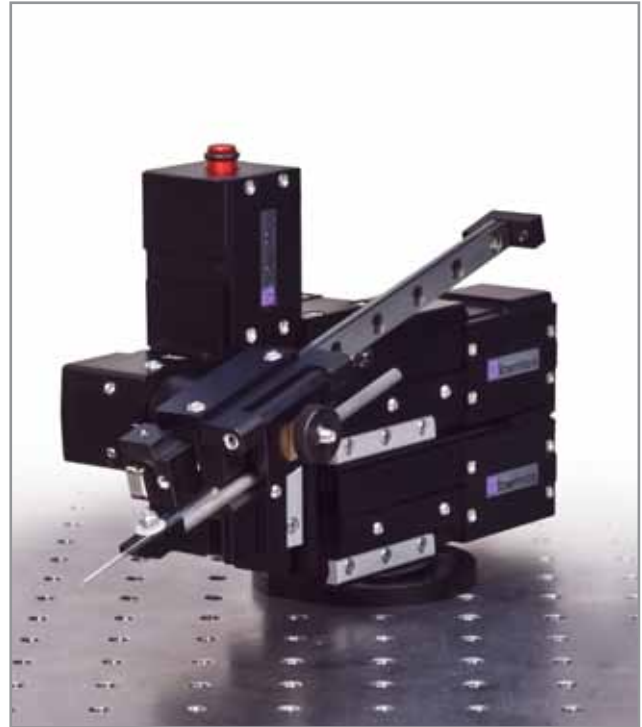
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Ultra-stable: Less than 1 micron of drift in 2 hours, allows long term experiments

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Versatile: a range of accessories available to customise the PatchStar to the users needs.

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### MicroStar Micromanipulators

Based on the same solid engineering principles as the world leading PatchStar micromanipulator, the MicroStar's compact design enables the user to arrange up to eight electrodes around a sample.

This is ideal for studies of synaptic connectivity and networks that require multiple, concurrent recordings.

The slim design is also an advantage when space around the sample is at a premium, and additional equipment is required.

Scientifica's real success, in the design of this product, is the impressive travel achieved, despite the compact dimensions.

The MicroStar offers four axes of motorised motion in X, Y, Z and virtual 'Approach' dimensions.

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Impressive travel: 20 mm in X & Z axes, and 14 mm in the Y axis

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Compact Design: allows arrangement of more electrodes around a sample

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## PatchPro 1000

The PatchPro 1000 is an upright microscopy system ideal if users prefer the flexibility of mounting manipulators and other devices on a post and platform, which can be placed anywhere on the anti-vibration table. The system includes a Universal Motorised Stage (UMS) and allows the user to move the microscope relative to a fixed sample.

### A standard system features:

2x Micromanipulators  
 2x Post & Platform Manipulator Mount  
 1x Post & Platform Sample Plate holder  
 1x Universal Motorised Stage (UMS)  
 2x Control devices (see page 4)  
 1x Sample Plate & Slice Recording Kit

### Considerations:

PatchStar or MicroStar - 4 axes of smooth movement  
 Screw down & magnetic bases available  
 Also accepts 108 and 110 mm chamber adaptors  
 50 mm travel in X & Y axes, Z-axis module optional  
 1<sup>st</sup> switchable between manipulators, 2<sup>nd</sup> for 'UMS'  
 Shallow-walled recording chamber & perfusion tools



This is a very popular approach to tissue slice recording as it offers the freedom to position the manipulators anywhere on the table surface. It also gives plenty of open space around the microscope for sample access and additional equipment.



### Smooth microscope translation

The combination of Scientifica's Post and Platforms with Universal Motorised Stage (UMS) creates a very stable yet versatile mounting system.

The UMS provides ultra-smooth and precise translation of the microscope, allowing the user to easily navigate around their sample.

Offering 50 mm of motorised, remotely controlled microscope movement in X and Y (there is the option of an additional Z focus module compatible with some microscope models).

By utilising the memory function, areas of interest can be stored and effortlessly returned to later at the click of a button.

The low electronic noise of the motors ensures that movement of the UMS will not interfere with delicate electrophysiological signals and there is no need to switch off the system during recordings.



## PatchPro 2000

The PatchPro 2000 is a moving upright microscope system, ideal if the user prefers a large fixed platform for mounting a variety of manipulators and other devices close to the sample chamber. In this configuration the microscope is moving relative to the fixed sample.

### A standard system contains:

2x Micromanipulators  
 1x SlicePlatform fixed mounting system  
 1x Universal Motorised Stage (UMS)  
 2x Control devices (see page 4)  
 1x Sample Plate & Slice Recording Kit

### Considerations:

PatchStar or MicroStar - 4 axes of smooth movement  
 Height adjustable legs, includes sliding carriages  
 50 mm travel in X & Y axes, Z-axis module optional  
 1<sup>st</sup> switchable between manipulators, 2<sup>nd</sup> for 'UMS'  
 Shallow-walled recording chamber & perfusion tools





The system offers excellent stability and large surface area for placing manipulators and equipment close to the sample.

The height adjustable legs ensure compatibility with a range of microscopes to meet present and future needs.



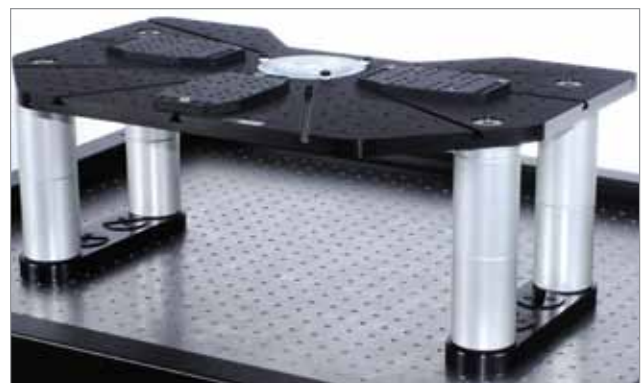
### Convenient operation

The PatchPro 2000 utilises the SlicePlatform, with its height-adjustable legs and large surface area for mounting manipulators and equipment, fixed relative to the sample.

The SlicePlatform top plate features a tapped hole pattern for mounting micromanipulators and other devices.

In addition, sliding carriages give complete freedom of movement in order to precisely position the manipulators.

For this setup, PatchStars will be shipped with shallow brackets to enable an appropriate approach angle.



## PatchPro 3000

The PatchPro 3000 translates the sample and manipulators as one, relative to a fixed upright microscope. This makes it an ideal set-up for combined cell imaging and patch clamp applications.

### A standard system contains:

2x Micromanipulators

1x Motorised Moveable Top Plate

2x Control devices (see page 4)

1x Sample Plate & Slice Recording Kit

### Considerations:

PatchStar or MicroStar - 4 axes of smooth movement

25 mm travel in X & Y axes, Z-axis module optional

1<sup>st</sup> switchable between manipulators, 2<sup>nd</sup> for top plate

Shallow-walled recording chamber & perfusion tools



The Motorised Movable Top Plate (MMTP) featured in the PatchPro 3000 allows the user to search the whole sample whilst keeping the microscope in a fixed position. This is vital for confocal, multiphoton and other imaging techniques where laser inputs restrict any microscope movement.



### **Ideal cell imaging system**

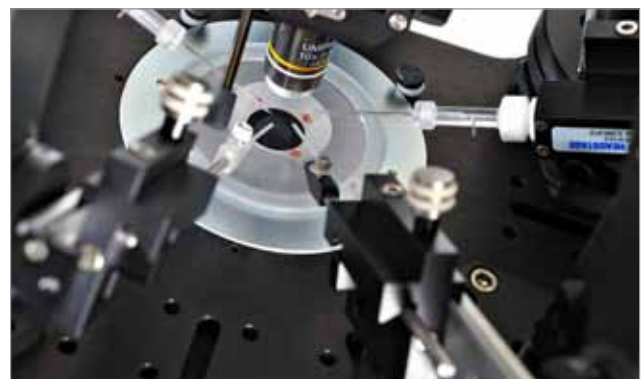
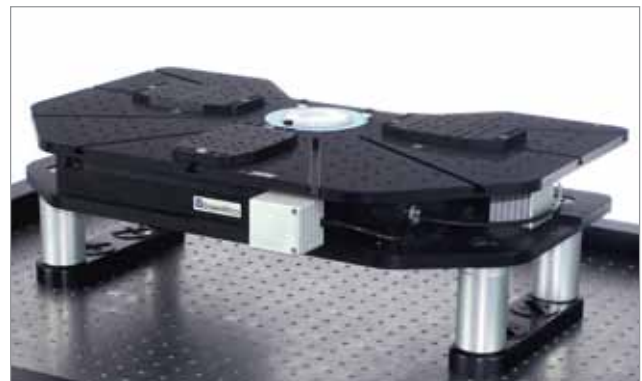
In order to explore the complexities and interactions across larger samples, the MMTP offers 25 mm of ultra smooth motorised movement.

In addition to operation via the control devices, the MMTP can also be driven in pre-defined steps or through pre-programmed routines through the Linlab software.

By moving the sample and manipulators as one, an established patch can be maintained during the search for a second site of interest.

Superior engineering ensures translating to a site of interest is smooth and prevents sample damage from jerky, lagged movements.

The system can be used with the supplied magnetic sample plate or replaced with any standard 108 or 110 mm chambers.



## PatchPro 4000

The PatchPro 4000 is a moving microscope system for inverted set-ups, featuring Scientifica's Universal Motorised Stage (UMS) and a large inverted fixed platform for the sample and manipulators.

### A standard system contains:

2x Micromanipulators  
 1x Inverted fixed platform  
 1x Universal Motorised Stage (UMS)  
 2x Control devices (see page 4)  
 1x Slice Recording Kit

### Considerations:

PatchStar or MicroStar - 4 axes of smooth movement  
 Height adjustable legs, includes sliding carriages  
 50 mm travel in X & Y axes, Z-axis module optional  
 1<sup>st</sup> switchable between manipulators, 2<sup>nd</sup> for 'UMS'  
 Quick and easy placement of perfusion cannulae



Vastly improving on the awkward operation of many other inverted electrophysiology systems, the PatchPro 4000 ensures recordings or images can be made from several widely spaced areas of interest across the sample.



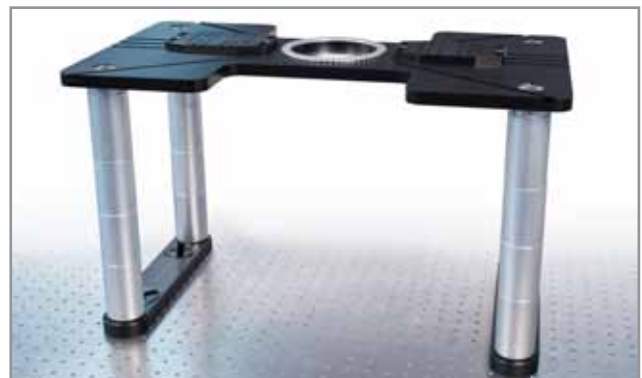
### Stable and convenient mounting

The system incorporates a specially designed Inverted Fixed SlicePlatform featuring stable, height adjustable legs and UMS with memory functions.

The highly flexible PatchStar manipulators are shipped with two shallow brackets for low profile approach to the sample.

To further simplify setup, the Inverted Fixed Platform features a sample chamber integrated into the top plate and is supplied with a ferromagnetic outer ring for easy placement of perfusion equipment. Standard 108 mm and 110 mm chamber adaptors are also compatible.

The deep sample chamber is suitable for techniques using cultured or dissociated cells. A chamber locking mechanism keeps the sample plate secure.



## PatchPro 5000

The PatchPro 5000 is a fixed-position inverted microscope system that overcomes the limitations imposed by confocal or multiphoton techniques which require a stationary microscope. The system uses an Inverted Motorised Moveable Top Plate (IMMTP) to translate the sample and manipulators as one; relative to the microscope.

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### A standard system contains:

2x Micromanipulators  
 1x Inverted Motorised Moveable Top Plate  
 2x Control devices (see page 4)  
 1x Slice Recording Kit

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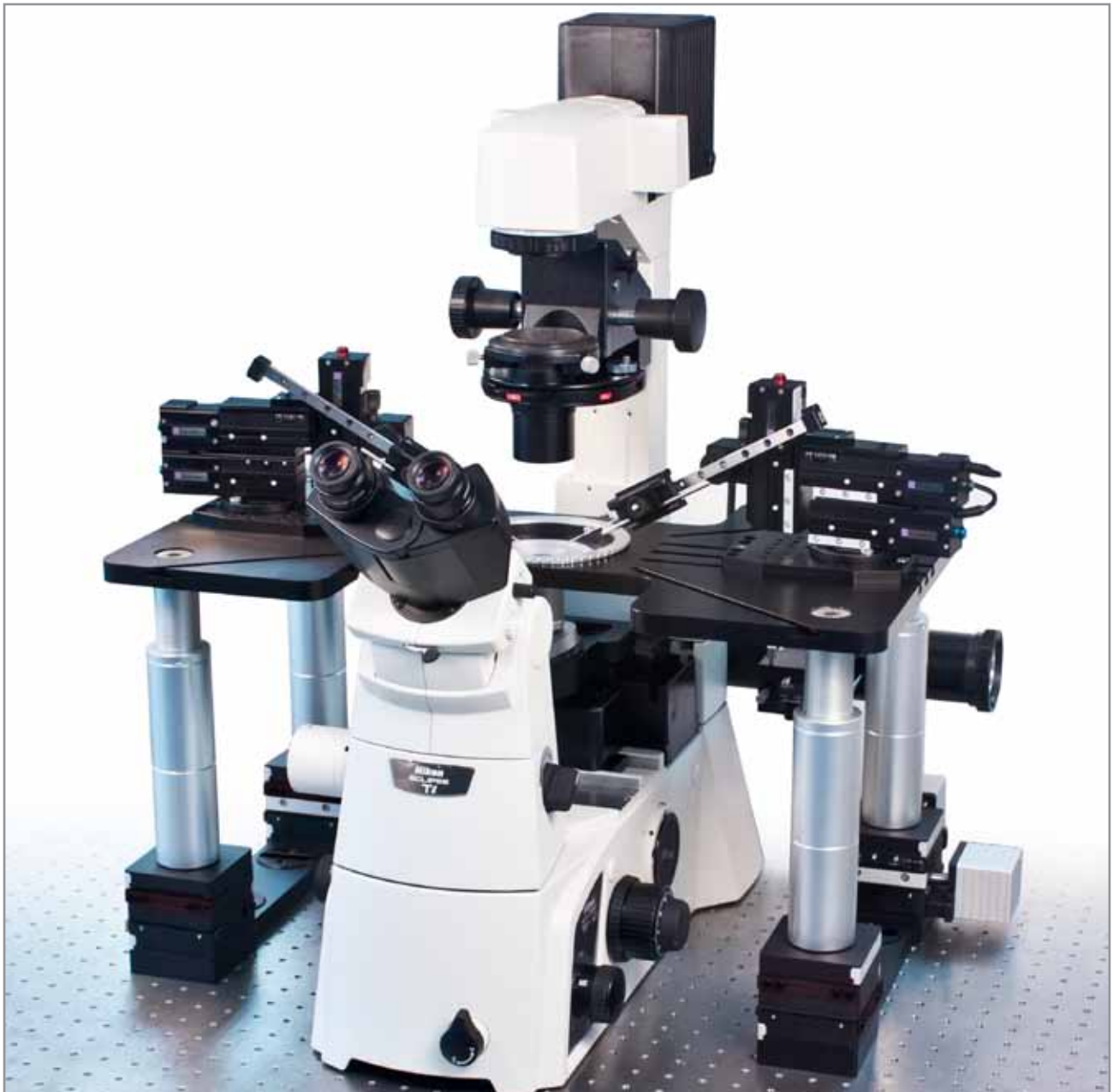


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### Details:

PatchStar or MicroStar - 4 axes of smooth movement  
 25 mm travel in X & Y axes, Z-axis module optional  
 1<sup>st</sup> switchable between manipulators, 2<sup>nd</sup> for top plate  
 Quick and easy placement of perfusion cannulae

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An ideal workstation for advanced imaging techniques, the PatchPro 5000's IMMTP allows the user to search the whole sample whilst keeping the microscope in a fixed position.



### Convenient operation

The PatchPro 5000 features a large mounting surface and carriage system to attach manipulators and other equipment. The adjustable height legs ensure compatibility and optimum working distances with all major inverted microscopes.

The smooth movement of this system is key to preventing established patches being dislodged. In addition, the ultra-low electronic noise means that recordings can be made while moving the platform.

The sample chamber integrated into the top plate is supplied with a ferromagnetic outer ring for easy placement of perfusion equipment. Standard 108 mm and 110 mm chamber adaptors are also compatible.

The deep sample chamber is suitable for techniques using cultured or dissociated cells. A chamber locking mechanism keeping the sample plate secure.



## PatchPro 6000

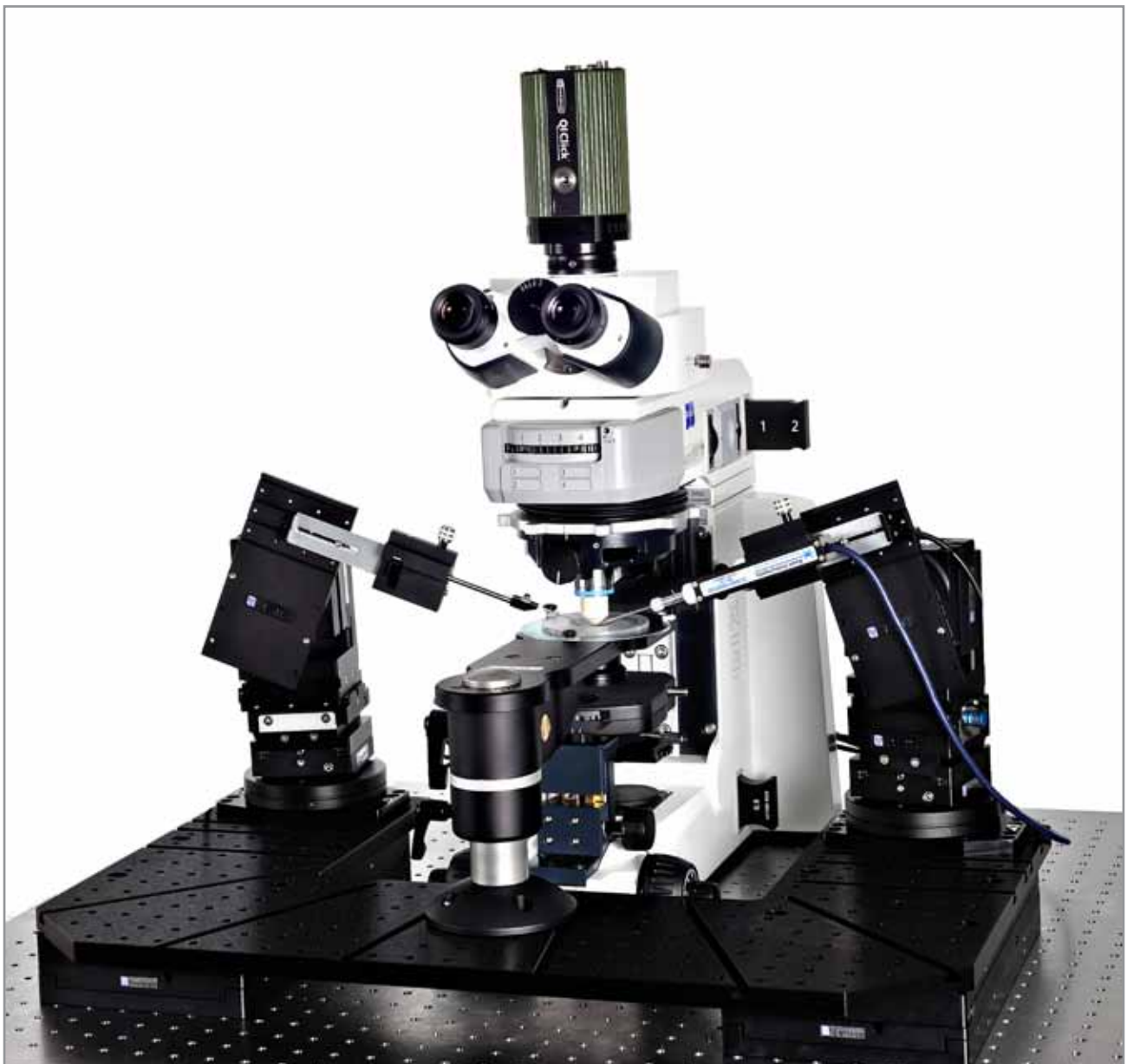
The PatchPro 6000 is a unique low-level translation system, offering unrivalled flexibility for mounting equipment, around fixed position upright microscopes.

### A standard system contains:

2x Micromanipulators  
 1x Motorised Moveable Base Plate  
 1x Post and Platform sample plate holder  
 2x Control devices (see page 4)  
 1x Sample Plate & Slice Recording Kit

### Details:

PatchStar or MicroStar - 4 axes of smooth movement  
 50 mm travel in X & Y axes, Z-axis module optional  
 Adjustable height lockable platform  
 1<sup>st</sup> switchable between manipulators  
 2<sup>nd</sup> for base plate translation and optional Z-axis  
 Shallow-walled recording chamber & perfusion tools





The PatchPro 6000 offers outstanding sample access and space for substage equipment such as detection units or optical elements.



### Complete versatility

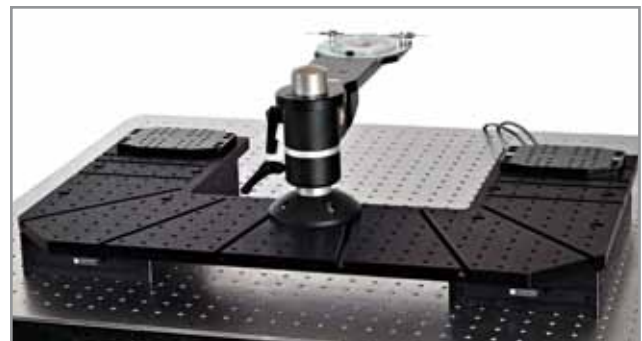
The PatchPro 6000 moves the sample and manipulators as one relative to the fixed microscope. This makes it ideal for imaging techniques which demand a stationary laser input point.

With the mounting plate barely more than 60 mm above the table surface, the PatchPro 6000 can also solve many of the problems associated with side mounted detectors that can interfere with travel or mounting.

The MMBP is perfect for both *in vitro* and *in vivo* studies, offering ample space around the sample area. An alternative mounting plate can be provided to accept stereotaxic equipment.

Users find the extra space around the sample ideal for life support, external stimulus and behavioural tracking equipment.

With this system, PatchStars are shipped as standard with steep brackets to ensure a suitable approach angle.



## Key Product Specifications

Please refer to individual product manuals for more detailed specifications

### PatchStar

Number of axis	3 with virtual 4 <sup>th</sup> axis
Travel distance	20 mm in X & Z axis, 14mm in Y axis
Step size	0.1 $\mu$ m
Bearings	Crossed roller
Speed	(minimum) 1 $\mu$ m per second (maximum) 4 mm per second
Electronic Resolution	20 nm
Load Capacity	200 gm
Memory Positions	Up to 50 (unlimited via Linlab)
Software	Linlab for Windows

### MicroStar

Number of axis	3 with virtual 4 <sup>th</sup> axis
Travel distance	20 mm in X & Z axis, 14mm in Y axis
Step size	0.1 $\mu$ m
Bearings	Crossed roller
Speed	(minimum) 1 $\mu$ m per second (maximum) 4 mm per second
Electronic Resolution	20 nm
Memory Positions	Up to 50 (unlimited via Linlab)
Software	Linlab for Windows

### Universal Motorised Stage

Number of axis	2
X + Y Travel	50 mm
Step size	20 nm
Bearings	Crossed roller
Speed	(minimum) 0.1 $\mu$ m per second (maximum) 4 mm per second
Mechanical Resolution	20 nm
Load Capacity	<1 $\mu$ m
Surface Material	Anodised Aluminium
Weight	15.3kg

### MMTP

X + Y Travel	25 mm
Electronic Resolution	20 nm
Weight	25kg
Top Plate Material	Anodised Aluminum
Leg Material	Anodised Aluminum

### MMBP

X + Y Travel	50 mm
Electronic Resolution	20 nm
Top Plate Material	Anodised Aluminum
Leg Material	Anodised Aluminum
Mechanical Resolution	100 nm



## Ordering Information

Product Option	Code
PatchPro 1000	PRO-1000 or PRO-1100
PatchPro 2000	PRO-2000 or PRO-2100
PatchPro 3000	PRO-3000 or PRO-3100
PatchPro 4000	PRO-4000 or PRO-4100
PatchPro 5000	PRO-5000 or PRO-5100
PatchPro 6000	PRO-6000 or PRO-6100

These order numbers should be appended with two initials denoting the type of controllers the user wants with their system:

C = Control Cube  
 J = JoyStick  
 P = PatchPad  
 PT = PatchPad Touch

Each system is available with or without temperature control and this is represented in the code with either a 0 or 1 following the Pro series number.

Please speak to a member of Scientifica's product specialist team if further assistance is required to select the most appropriate equipment.

## Warranty

Scientifica's success is founded on supplying superior support and application of our significant manufacturing experience. We would therefore really value the opportunity to understand your applications better and to offer no obligation advice on equipment, configurations and compatibility.

All Scientifica instruments are sold with a two-year warranty giving you complete peace of mind. This covers all defects in manufacturing and materials. In this unlikely event, Scientifica will remedy either by repair or replacement.

Our team of customer support engineers is dedicated to providing you with the very best advice and support, should you experience any difficulties with our products.

With all products we offer a complete installation support service.

## Youtube Channel

Find out more about the Scientifica range of products and interviews on our channel:

[www.youtube.com/scientificauk](http://www.youtube.com/scientificauk)

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Revision 1.1

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