



MCI CleverExplore

Integrated Neuroscience Workstation



The CleverExplore Imaging and Electrophysiology Workstation

The investment that will give you the edge

The CleverExplore system is where MCI's core products overlap to form an integrated electrophysiology and imaging workstation, specifically developed for the neurophysiologist. When you invest in the CleverExplore, you will benefit from all the innovative aspects of the MCI CleverArm manipulator, CleverStage motorised stage and the CleverScope microscope in a synergistic package. Controlling your experiment through these motorised components means you can keep your experiment vibration-free and control everything more accurately. This enables you to increase your experimental throughput, improve the quality of your data and ultimately gives you the edge.

Purpose-built with a clear-defined philosophy

Fact is - the more MCI components you have in your laboratory, the better off you are! When you buy an MCI instrument, you enter into a relationship with us where we are committed to do anything in our power to become a contributor to the success of your research.

This philosophy is evident in the outcomes the CleverExplore offers you;

Performance

We continuously strive to optimise the key performance features of all our instruments. We run conservative tests to gradually improve on what was seen as the previous gold-standard in instrumentation. This means you can rest assured that our instruments are state of the art when it comes to accuracy, resolution, responsiveness and optical performance.

Reliability

Another key area of our commitment to you is reliability. We are so confident in our ability to deliver robust instruments that we are willing to commit to a 3-year warranty. We are also setting a new standard in supporting this warranty by offering a 48-hour replacement service during the warranty period!*

Price point

We offer the complete MCI package at a price point which makes it a more attractive solution compared to buying the individual components separately. This policy enables more laboratories to benefit from this technology.



The CleverExplore Imaging
and Electrophysiology
Workstation

Integration and Control

All devices on the CleverExplore system can be controlled via one or two CleverControl Cuboid interfaces.

The CleverControl Cuboid and CleverControl software embody MCI's global and diverse approach by having displays available in the 10 most-spoken languages**. We also know that 1 out of 10 scientists are left-handed so we have made it possible to reconfigure the CleverControl Cuboid from right-handed to left-handed in only 8 seconds (see online video for demonstration) which means left-handed users won't feel left out when sharing a rig. The CleverControl Cuboid can control up to 8 devices from a single interface which offers more upgrade options for future expansion.



Main interface for CleverControl

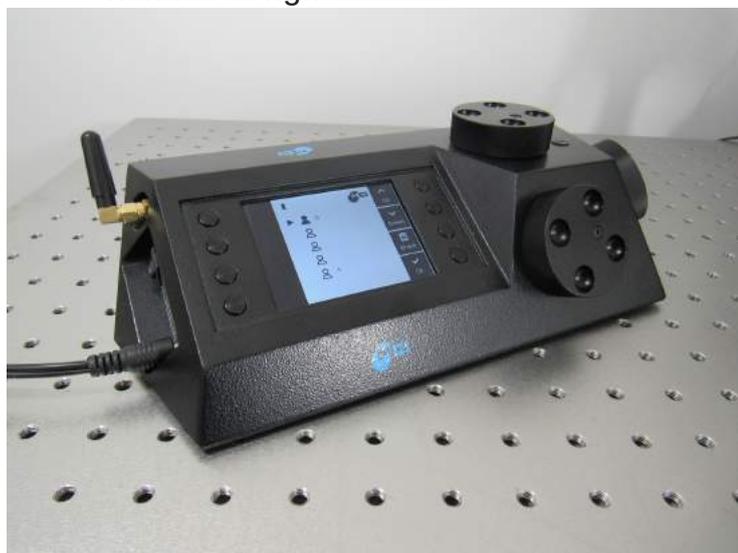


Changing the Cuboid from left-handed to right-handed

CleverControl Software offers a software interface with similar customisation features to the CleverControl Cuboid. In addition, you can calibrate the 'Stalker' function and use the flexible memory position library.

With MCI's focus on innovation, you can rest assured that a lifetime of free updates on CleverControl Software will keep your system up to date with the latest developments.

CleverControl Cuboid and CleverControl Software offer user logins to instantly reset settings according to individual user preferences. This feature is valuable on shared rigs or where work is being done on several different sample types.



Right-hand use



Left-hand use

Efficient use of space

At MCI we realise that enough space around your rig is essential. The integrated use of our instruments in the CleverExplore allow for easy access to sample area and controls on the microscope and ample space for manipulators and other devices. You won't struggle with the frustrations that typically occur when trying to integrate instruments from multiple sources.

Wireless technology

The wireless receivers on all devices means you only need a single power cable per device. This makes cable management around your rig an easy task and reduces the likelihood of electrical noise being picked up by a multitude of cables.

Innovation

The innovative design built into our instruments are the result of partnering with you, the neuroscience community. Your best ideas enable us to build on the input from others in order to offer instrument solutions that will advance the field for everyone's benefit. We are grateful for that!

MCI - Friendly commitment to innovation

If you would like to know more about the CleverScope, please get in touch with us at MCI. Our friendly team are always happy to arrange for demonstrations or loans. We also welcome feedback, suggestions and collaborations relating to instrumentation technology for neuroscience. Please get in touch if you think we have overlapping passions.



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* This means we will send an instrument/component via Express service from our demo stock if your manipulator is malfunctioning. We will pay for you to ship your instrument back to us if we can't service it in your lab.

** English, Chinese, German, French, Japanese, Spanish, Arabic, Russian, Hindi, Afrikaans

Instruments integrated into the CleverExplore system

The CleverScope - At the Centre:

This cost-effective motorised microscope is the ideal tool for the neuroscientist who needs flexibility and possibility but not at the expense of what is the essence of this microscope: to enable you to achieve superb images using conventional imaging methods.

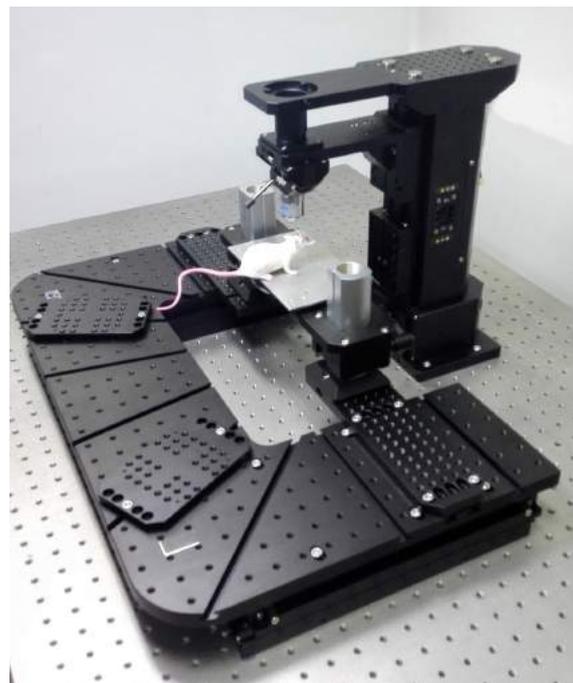
The Open Framework platform of the Microscopy World

Neuroscientists demand more from their microscopes today...Besides excellent stability and image quality, most labs now require the flexibility to adapt their microscope to be compatible with different imaging modalities specific to their research, in order to push the frontiers of neuroscience investigation. The CleverScope offers this flexibility through various innovations, including:

Exchangeable objective and condenser-focussing stepper motors

The objective focusing arm and condenser focusing arm are both mounted on MCI's precision stepper motor stages, giving you the ability to control your image focus precisely. The stepper motor technology we use in our CleverScope is similar to what we use in our electrophysiology manipulator, the CleverArm. This means that you can rest assured that you won't have issues with electrical noise, and that the robust motors have a resolution of 20nm, with a minimum step size of 100nm.

One major concern for many neuroscientists who are interested in the benefits of using a motorised microscope is that 'what if' factor...What if a motorised focus mechanism stops working? MCI addressed this concern by making these motors exchangeable by the user. We stand by our regular promise of supplying you with spare stages within 48 hours after we receive your emergency phone call.*



The CleverStage with the MCI CleverScope

Adjustable focal height

The objective and condenser stepper motors are mounted on dovetail rails which makes it easy to adjust the height of your optical system. This offers an extra level of flexibility in terms of customising your microscope. It also means that the condenser and objective focusing mechanisms can be set at a level where the motors run out of travel before you crash into the sample, protecting you from damaging your optics.

Removable substage optics

Many labs require only reflected light for their experiments. The flexible design of the CleverScope allows you to order the microscope without the substage components. This saves money and space. The substage optical block can easily be added at a later date and can be easily removed to create more space under the objective (ideal for in vivo experiments with larger animals or with the 'jet ball' configuration).

Small footprint

Besides saving space in your laboratory, a small footprint allows the patch-clammer to get more manipulators closer to the sample. The shorter the distance between your manipulator body and the sample, the more stability you'll achieve at electrode level.

Brackets for compatibility with Olympus components

The CleverScope frame is compatible with most components that are part of the widely used Olympus' BX51WI microscope range. This allows you to reuse components you already have in your lab.

MCI are supply you with the full complement of Olympus components for standard brightfield imaging, brightfield contrasting techniques (DIC, oblique etc.) and widefield epifluorescence.



CleverScope Motorised Microscope
With CleverControl Cuboid

Free SDK for motor control

You can easily integrate the motor control with your own software, since we provide a free software developers kit. This offers an extra level of flexibility, in addition to the CleverControl Software which accompanies all of our systems.

Specifications of the CleverScope	
Resolution/Smoothness	15nm
Travel	24mm
Maximum speed	2.3mm/s
Stability	Drift less than 0.5 $\mu\text{m/hr}$
Drive mechanism	Stepper motor
Dimension	A dimensional drawing is provided at the end of the brochure
Weight	TBC
Display size on Cuboid	3" LCD screen
Battery capacity, Cuboid	2000mAh
Carrying capacity	1000g ? 1kg?
Electrical noise	Less than 1pA

The CleverStage - the Solid Platform

Reliability and flexibility are the mantra's of this design. This platform is the solution for your lab if you are interested in:

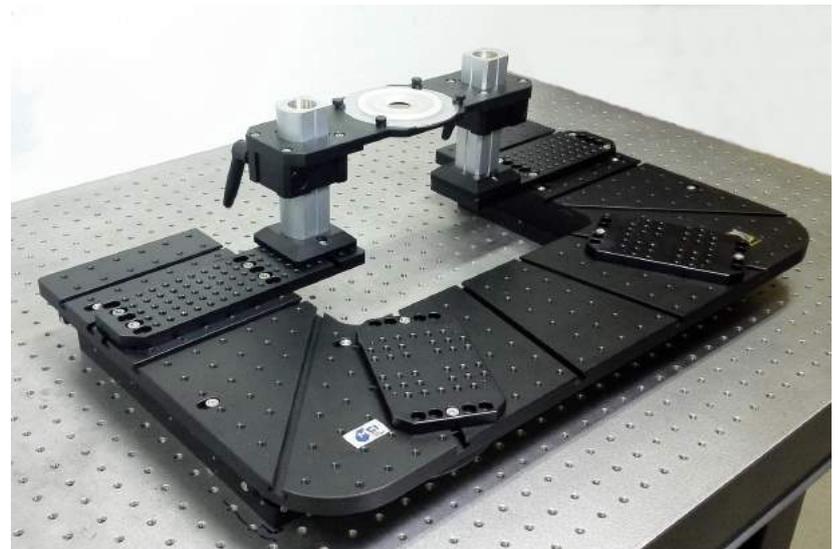
Space and flexibility

The two-tier design of the Cleverstage offers a large surface area for mounting manipulators and other devices, giving you more options as to where you position these devices. This large mounting area for the manipulators doesn't prevent you from having access to all essential optical components of your microscope, without bumping into the stage.

The height of the sample stage can be adjusted easily to suit your experiment. The slide mechanism allows you to have easy access for exchanging the sample in a few seconds or to swap to another sample stage in our range.

Because of this easy reconfiguration, the CleverStage is ideal for a wide range of samples, even for switching between in vivo and in vitro work.

Our design principle was to have a space-efficient system but not to compromise on stability of the sample. The sample platform proves to be optimally stable when it is mounted on two pillars, whilst the addition of a third appears to only take up space and does not improve stability.



The CleverStage

Smooth motion

Our stepper motors allow us to achieve a resolution of 20nm over the generous 50mm range of travel which means you can conveniently move the stage whilst maintaining a patch clamp experiment.

Specifications of the CleverStage	
Resolution/Smoothness	20nm
Travel	50mm
Maximum speed	2.3mm/s
Stability	Drift less than 0.5 $\mu\text{m/hr}$
Drive mechanism	Stepper motor
Dimension	A dimensional drawing is provided at the end of the brochure
Weight	TBC
Carrying capacity	30kg
Electrical noise	Less than 1pA

Memory positions

You can store memory positions of your most interesting fields of view as you hunt around for the best area to target for your experiments. The option to recall these positions saves time and hassle.

The CleverArm Manipulator - The next generation in micromanipulator technology

The best manipulator options designed for the electrophysiologist display some features that any experienced experimenter would expect from a leading brand. At MCI we build these essential elements into the genetic material of the CleverArm:

Stability

At MCI we conduct an individual drift-test on every manipulator before it gets sent out to your laboratory. You will receive your manipulator with a birth-certificate - a short video showing an electrode mounted onto your manipulator over a 2-hour period under a 40x objective. An MCI manipulator won't leave the factory without passing a stability test of less than 500nm in movement over an hour, using a real pipette holder and headstage used in a typical laboratory environment.

Low noise levels

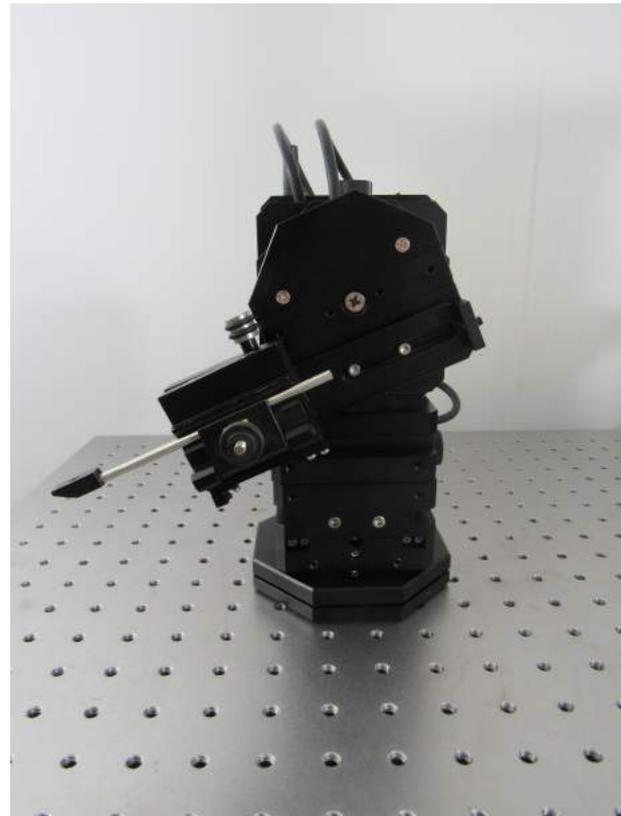
Our stepper motor technology is optimally shielded to prevent electrical noise. We also added a new level of innovation to further reduce potential sources of electrical noise (see section on 'Commitment to Innovation') which means you can confidently use the CleverArm for recording from single ion channels.

Smooth movement

The CleverArm's resolution of 20nm means you will be able to patch onto the smallest structures.

Modularity

All three manipulator stages are identical, making it very easy to reconfigure a right-handed manipulator into a left-handed manipulator. It also gives you more options with future additions and alterations to your setup. You can, for example, reuse a manipulator stage on the MCI CleverScope without any compatibility issues.



The CleverArm

Easy electrode exchange

The CleverArm manipulator body can rotate on its base and the headstage bracket allows you to slide the assembly away from the sample and rotate the headstage upwards to make the electrode exchanges quick and easy.

Home functions and repeatable stops

The CleverArm manipulator has integrated repeatable stops which makes electrode exchange easy and enables you to use the 'Working Position' function with confidence.



CleverArm

Virtual Electrode axis

The CleverArm has an angular detector on the vertical rotation plate which detects the angle that the electrode is locked at. When you enable the detector via enabling the Diagonal Angle button on the CleverControl Cuboid, combined movement of the x and z-axes moves the electrode along this angle which can be essential when working in tissue slices.

Specifications of the CleverArm	
Resolution/Smoothness	15nm
Travel	27mm
Maximum speed	2.3mm/s
Stability	Drift less than 0.5 $\mu\text{m/hr}$
Drive mechanism	Stepper motor
Dimension	A dimensional drawing is provided at the end of the brochure
Weight	TBC
Carrying capacity	500g
Electrical noise	Less than 1pA



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