Product News

SoftPanel News
Free SoftPanel Winners Selected!

Congratulations to Drs. Kimberle Jacobs and Sandra Kuhlman, each a winner of a **free** SoftPanel ($900 value). Both participated in a survey announced in a recent customer-update email. To enter the drawing, we simply asked MultiClamp 700A users how this amplifier has improved their scientific progress.

Dr. Jacobs (Virginia Commonwealth University) proclaims that the MultiClamp 700A "is one of the easiest amplifiers that I've ever used. The AUTO functions have greatly reduced the time that we would normally spend in achieving correct capacitance and Series Resistance compensation. Altogether, data collection is much more efficient using the MultiClamp 700A."

Dr. Kuhlman (Cold Spring Harbor Laboratory) considers the MultiClamp 700A advantageous because "It is more efficient to switch between current-clamp and voltage clamp…because settings do not have to be changed so much."

We are happy for Drs. Jacobs and Kuhlman, as well as every other MultiClamp 700A customer who benefits from the advanced features of this state-of-the-art amplifier. As always, we appreciate your feedback and suggestions to improve this or any other Axon product. To keep informed about Axon products on a regular basis, sign up for one of our email lists at www.axon.com/mr_Join_Email_Lists.

Using SoftPanel with USB 2.0

When the SoftPanel was originally released, USB version 1.0 was the standard in computers. Since then, USB version 2.0 has been released to allow faster transfer rates with many peripheral computer products. As computers with USB 2.0 ports became available , we discovered problems detecting the SoftPanel via the MultiClamp Commander interface. We have since re-programmed the SoftPanel to be compatible with USB 2.0. If you encounter problems detecting a SoftPanel in a computer with USB 2.0 ports, call Axon Technical Support or email axontech@axon.com. For only the minimal cost of shipping, we will arrange to re-program your SoftPanel to be compatible with the new USB standard.

Questions?

Axon's Knowledge Base has the answers!

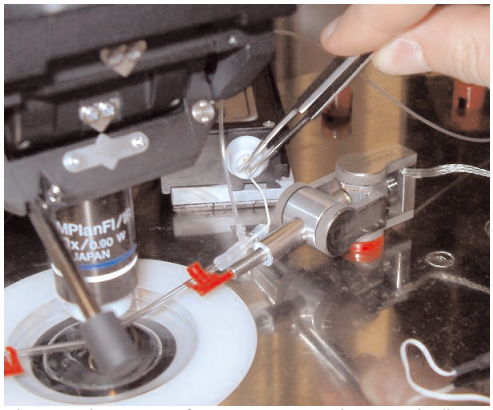
www.support.axon.com

A new drift-free generation of micromanipulators

kleindiek nanotechnik
www.nanotechnik.com

Micropipette drift of the tiniest amount can be disastrous for whole-cell patch recordings. Therefore it is imperative that the micropipette positioning platform is as drift free as possible. An innovative new micromanipulator from Kleindiek Nanotechnik successfully addresses drift, and other problems, for micropipettes.

Typically, the micropipette is inserted into a holder, the holder is mounted to a headstage, and the headstage is mounted to a micromanipulator. Axon Instruments' HL-U micropipette holder, with a threaded collar design, offers time-tested mechanical stability. An alternative employs a quartz rod to secure the portion of the micropipette that extends from a conventional holder[1]. However, the ultimate configuration is one where the micropipette is mounted directly on a precision manipulator through a short-lever arm. In this case a short wire connects the micropipette to the headstage, which is mounted independent of the manipulator. There are several commercial micromanipulators of this sort. Separation between the micropipette and headstage can increase the capacitance and thus the noise of recording, but work to date indicates that this noise is usually the same for conventional whole-cell experiments.[2]



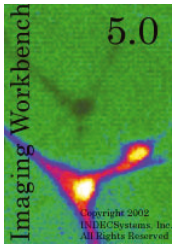
Photograph courtesy of Dr. Jörg Geiger and Dr. Henrik Alle, MPI for Brain Research, Frankfurt, Germany.

The MM3A micromanipulator from Kleindiek Nanotechnik incorporates all of the ideal characteristics of a micromanipulator. Weighing just 30g with short-lever arms (less than 5 cm), the MM3A is virtually immune to vibration. An extremely simple headstage and pressure tube connection fixed directly to the micropipette, and a fork-like holder, ensure that all standard micropipettes are easily, securely, and accurately held in their designated positions. Micropipettes can be exchanged with very little vibration. With an operating range of 100 cm^3, the MM3A is capable of approaching a sample at nearly any angle along the X, Y and Z axes. The micromanipulator can be manually pre-positioned, held in place anywhere on a microscope stage with its strong magnetic base. The MM3A exhibits virtually no drift at all—even during

long recording sessions—and absolutely no backlash on reversal, or other play, such as is found with conventional micromanipulators. And finally, on top of all these features, the MM3A is essentially immune to temperature fluctuations.

1. Sachs F. A low drift micropipette holder. Pflugers Arch. 1995 429(3):434-5.
2. Communication courtesy of Dr. Matthew Larkum, Max Plank Institute for Medical Research, Cell Physiology, Heidelberg, Germany.

Imaging Workbench 5 Getting Results



INDEC Biosystems' Imaging Workbench 5.0 incorporates many crucial improvements, while maintaining all of the best features of AIW v4. IW 5.0 can acquire images more rapidly, with improved control and synchronization of peripheral devices. IW 5.0 also substantially broadens the control of multiple wavelength-selectors and multiple parallel-ports. This greatly improves control of excitation and emission wavelengths, making IW 5.0 an ideal choice for FRET experiments.

Imaging Workbench remains the tool of choice for simultaneous imaging and electrophysiology, with its coordinated acquisition and analysis, and its interoperability with Axon Instruments pCLAMP, v8 and 9. And of course, Imaging Workbench 5.0 is compatible with Windows 98, 2000, and XP.

Development continues on v5.1, with improvements to IW's analytical tools, along with support for additional hardware.

See IW 5.0 at the upcoming Society for Neurosciences conference (booth 2440). For more information, visit www.imaging-workbench.com or contact michael@imagingworkbench.com for further details, pricing, and availability.

Researcher Contributions

In each issue of AxoBits, we provide at least one Focus on Methods article that discusses a topic of general interest to researchers using one or more of our product groups. We have also dedicated a portion of our web site to profile innovative uses of our products.

To see innovative uses of microelectrode amplifiers, go to: www.axon.com/mr_Innovative_Uses_Amplifiers.html

To see innovative uses of GenePix scanners, go to: www.axon.com/gn_Innovative_Uses_GenePix.html

If you wish to submit an article to AxoBits or the web site, please contact axobits@axon.com.

Liquid Junction Potential Corrections

Toni Figl, Ph.D.
Axon Instruments, Inc
Trevor M. Lewis, Ph.D.
NHMRC Senior Research Officer
Peter H. Barry, DSc
Emeritus Professor, Dept of Physiology and Pharmacology,
School of Medical Sciences
University of New South Wales, Sydney, NSW 2052, Australia

Overview

Liquid junction potentials (LJPs) arise between two different solutions when the two solutions:

- are in contact,
- have ions present at different concentrations , and
- contain ions of different mobilities.

This article presents an overview of liquid junction potentials and discusses their measurement and calculation using Clampex's Junction Potential Calculator. In order to qualitatively understand liquid junction potentials, imagine a patch pipette in contact with a bath solution:

- the pipette contains unbuffered 100 mM NaCl solution
- the bath solution is unbuffered 10 mM NaCl solution.

The solutions contain ions at different concentrations, and sodium and chloride have different mobilities (chloride mobility is significantly greater than that of sodium). When the patch pipette comes into contact with the bath solution, sodium and chloride ions move down their concentration gradients—in this case from the pipette into the bath. The chloride ions move faster than the sodium ions. As the negative chloride ions move ahead of the positive sodium ions, a potential difference is set up, making the bath negative with respect to the pipette. The electric field slows the chloride ions and accelerates the sodium ions till they both move at the same rate, but the initial advantage that the chloride ions had is maintained. Provided the pipette is of reasonable volume and its tip not too large, the potential difference between the solutions—the liquid junction potential—remains steady.

By convention (a convention maintained in Clampex's Junction Potential Calculator) LPJs are in the direction of the bath with respect to the pipette. In the example above, the bath is negative with respect to the pipette. Note, however, that when the junction potential is measured by an amplifier attached to the pipette, the pipette would be positive with respect to the bath.

The magnitude of the junction potential depends on the ions present in the pipette and bath solutions, together with their relative concentrations, valencies and mobilities. In some cases, the junction potential is small and can be ignored. In most cases however, command voltages in voltage clamp or measured voltages in current clamp need to be corrected. The confusing part is determining the sign of the correction.