

# The smallest multi-function patch clamp system available



## PatchMAX 100A

### Incredibly small footprint

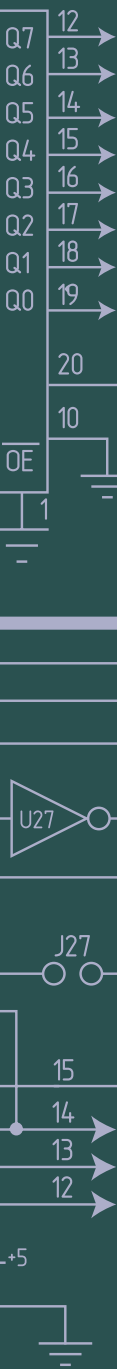
This patent-pending design has an 8" x 8" footprint; it is the smallest multi-function patch clamp system available. The automated patch clamping system replaces the microscope and the manipulator in the traditional rig. Complete with one automated manipulator, a manual XY stage, a data acquisition board & control system, and a perfusion chamber with the platform, this system can automatically guide electrode to make a seal on oocytes, suspended cells and cells on cover slips.

### Automatic membrane detection

The specially designed perfusion chamber guarantees that when oocyte or cells are dropped into the chamber, it always reaches the known position. The tip of the pipette can reach this position with an accuracy of 0.05 mm. The movement of the patch pipette is controlled by a computer and can be programmed to stop when the tip touches the cell membrane.

### High seal success rate

The pipette positioning system provides widely different approach speeds and proximity criteria, allowing the researcher to fine tune the process for the perfect seal. The computer controlled system eliminates human errors so the success rate of making gigaohm seals using the PatchMAX 100A is over 90%.



### Save and reuse sealing parameters

The approach and sealing parameters can be saved and reused. Once you have found the perfect set of parameters, you can save it to a file for use at other times, or by other researchers.

### Noise-free recording

The system is noise-free during recording. The motorized stage is tuned so that the electrode is stationary when the power is turned off. You will be able to do single channel recording without worrying about noise from the motor.

### Low drift

The two modular dovetail linear stages allow you to set, lock and forget. They are less susceptible to shock and vibration. The motorized stage can hold its micro-step position (50 nm resolution) overnight, even without current! The patch pipette is fixed by a supporting arm so even when the electrode holder is touched, the tip of the patch pipette does not move much.

### Less labor-intensive and vibration free

With the PatchMAX 100A, patch clamp experiments become less stressful and labor-intensive. Since the manipulator is controlled by a computer, you do not need to touch the manipulator during the experiment. Your computer will control the process of excising a patch in a manner that is precise and always reproducible.

### Use standard glass electrodes

Unlike the conventional high-throughput systems, this system does not use expensive "seal chips." Instead, standard glass electrodes are used. All of your techniques with fabricating patch pipettes still apply, and the cost of the experiment is low.

### Manual control mode

Not only can you run the protocol for making a seal, but you can also control the manipulator manually as easily as clicking a mouse. Thus the manipulator can act like a traditional manual manipulator. The manipulator comes with a standard mount so it can be removed for other type of experiments.

### Rapid solution change

Two specially designed perfusion chambers allow fast solution change.

## PatchMAX 100A Ordering Information

Part No.	Product Description	
Ne-ezPATCH 100A	ezPATCH 100A	
Ne-PatchMAX 100A	PatchMAX 100A	
	Complete NeoBiosystems product line available.	

U.S./Canada prices shown. International prices add 10%. Email or visit web store for latest prices.

## Specifications

### Major Components

- One micro-manipulator, which includes a motorized linear stage and a manual XY stage
- Perfusion chamber I and platform
- One PCI data acquisition board with BNC interface
- Mechanical error:  $< \pm 0.05$  mm
- Dimension: 8 in x 8 in x 9.5 in
- Weight: 8 lb
- Line voltage: 100 VAC to 120 VAC, or 220 VAC to 240 VAC

### Motorized Stage

- Travel: 28 mm
- Resolution: 0.05  $\mu$ m
- Maximum speed: 4 mm/s
- Lowest speed: 0.5  $\mu$ m/s
- Serial/USB interface

### Manual XY Stage

- Modular Dovetail Linear Stages
- Set, lock, and forget; less susceptible to shock and vibration
- 0.5 in travel

### Data Acquisition Board

- Sixteen analog Inputs, 16-bit, 250 kS/s, Input Impedance:  $> 10$  G $\Omega$  in parallel with 100pF
- Two 16-bit analog outputs, 740 kS/s per channel. Output impedance: 0.2 $\Omega$
- 24 digital I/O lines, 32-bit counters; digital triggering
- Analog input range:  $\pm 10$  V
- Analog output range:  $\pm 10$  V

### Perfusion Chamber

- Accepts 1/16" tubing

### Computer Requirements

- Windows 2000 or XP with 2.0 GHz CPU
- At least 1 USB port
- 1 PCI slot



## Specifications

### Major Components

- Two micro-manipulators, each one includes a motorized linear stage and a manual XY stage
- One perfusion chamber I and platform
- One PCI data acquisition board with BNC interface
- Mechanical error:  $< \pm 0.05$  mm
- Dimension: 8 in x 12 in x 9.5 in
- Weight: 10 lb
- Line voltage: 100 VAC to 120 VAC, or 220 VAC to 240 VAC

### Motorized Stage

- Travel: 28 mm
- Resolution:  $0.05 \mu\text{m}$
- Maximum speed: 4 mm/s
- Lowest speed:  $0.5 \mu\text{m/s}$
- Serial/USB interface

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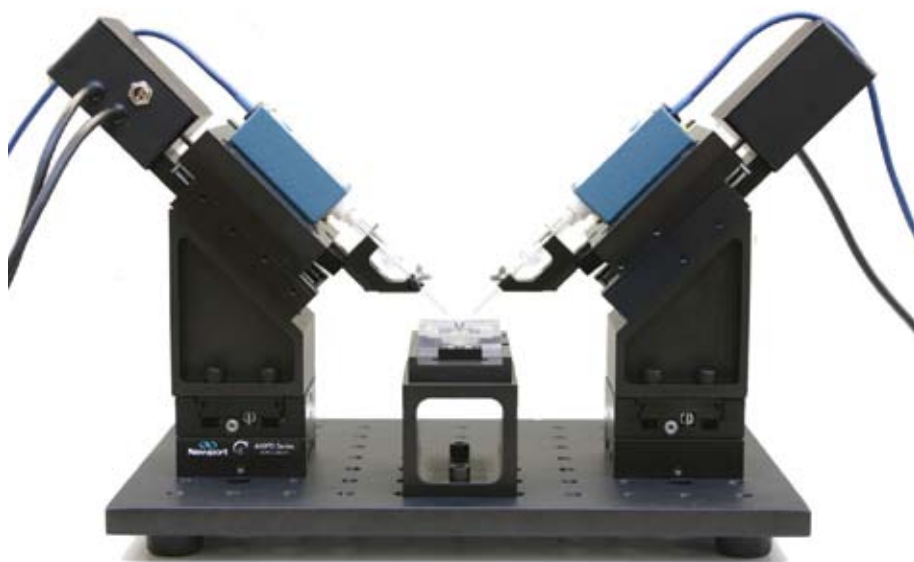
### Perfusion Chamber

- Accepts  $1/16$ " tubing

### Computer Requirements

- Windows XP with 2.0 GHz CPU
- At least 1 USB port
- 1 PCI slot

# Faster automated patch clamping without a microscope.



## ChannelMAX 100A Mini and Twin + ez-gSEAL Pressure Controller

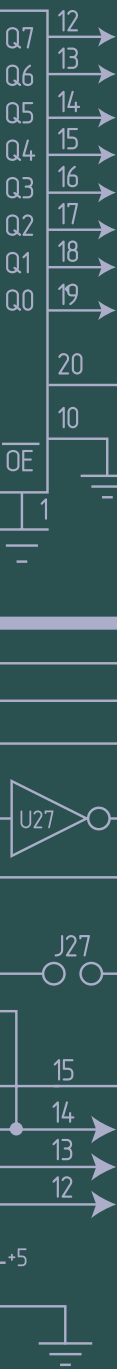
### ChannelMAX 100A Mini

A system for both oocyte and cell patch clamp and two-electrode voltage clamp

This patent-pending design is based on the PatchMAX 100A, but comes with two computer controlled manipulators. With the additional micromanipulator, the system can do two patch clamp experiments simultaneously, or one two-electrode voltage clamp experiment. With this new design, the system increases efficiency, decreases equipment cost, and saves space. As the system is controlled by computer, experiments become less labor intensive.

### Run two patch clamp experiments simultaneously

The ChannelMAX 100A Mini comes with two computer-controlled manipulators, allowing users to run two patch clamp experiments simultaneously. Doing two experiments at the same time allows for better decision making: Single channel activities are random events. It is difficult to understand what is going on by looking at the channel open and close, especially when you are working on a new channel. For example, it is hard to



distinguish a channel with two open stages from two channels in the same patch. With two patches that are treated with the same conditions you have more information that could be critical in making the right decisions while working on the precious seals.

### High quality patch clamp

As in the PatchMAX 100A, the ChannelMAX 100A patch clamp is noise free and low drift. The computer controlled system eliminates human errors so the success rate of making gigaohm seals using the ChannelMAX 100A is over 90%.

### Run two independent patch clamp experiments

It is very easy to change the configuration to run two independent experiments. You can easily have two perfusion chambers on the same setup.

### Automated two-electrode voltage clamp

For two-electrode voltage clamp, impalement is controlled by computer so no microscope is needed. When the electrode enters the oocyte, the membrane potential changes and the movement is stopped. The user can define the membrane potential threshold and the delay to stop movement after the electrode enters the oocyte.

### Save on equipment cost & space

This system is more cost effective than a traditional electrophysiology setup. The equipment cost would be much higher to achieve the same functionality and productivity using a traditional setup. Lower cost and better quality.

### Save space

As the system can be used for both two-electrode voltage clamp and patch clamp, less lab space is required. You do not need two data acquisition systems. All the data is on one computer, so it is easy for you to compare.

### Switching between patch clamp and two-electrode voltage clamp is easy

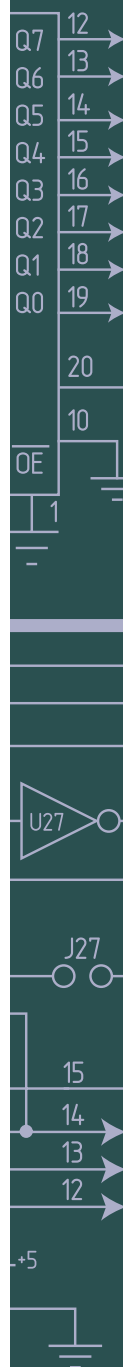
The system is designed so that it can switch from patch clamp to two-electrode voltage clamp easily. With all of the adjustable parts, the system can easily be adapted to different glass electrode lengths and sizes, and different amplifiers.

### Use with traditional two-electrode voltage clamp experiments

It is possible to use the ChannelMAX 100A Mini with a traditional two electrode voltage clamp to run two two-electrode voltage clamp experiments simultaneously.

### High efficiency, less labor-intensive

As the system is automated, it is easy to run experiments in parallel to increase efficiency. Patch clamp and two-electrode voltage clamp should not be labor-intensive. Let the equipment do the hard work for you!



## Specifications

### Major Components

- Four micro-manipulators, each one includes a motorized linear stage and a manual XY stage
- Two perfusion chamber I and platform
- One PCI data acquisition board with BNC interface
- Mechanical error:  $< \pm 0.05$  mm
- Dimension: 12 in x 12 in x 9.5 in
- Weight: 15 lb
- Line voltage: 100 VAC to 120 VAC, or 220 VAC to 240 VAC

### Motorized Stage

- Travel: 28 mm
- Resolution: 0.05  $\mu$ m
- Maximum speed: 4 mm/s
- Lowest speed: 0.5  $\mu$ m/s
- Serial/USB interface

### Manual XY Stage

- Modular Dovetail Linear Stages
- Set, lock, and forget; less susceptible to shock and vibration
- 0.5 in travel

### Data Acquisition Board

- Sixteen analog Inputs, 16-bit, 250 kS/s, Input Impedance:  $> 10$  G $\Omega$  in parallel with 100pF
- Two 16-bit analog outputs, 740 kS/s per channel. Output impedance: 0.2 $\Omega$
- 24 digital I/O lines, 32-bit counters; digital triggering
- Analog input range:  $\pm 10$  V
- Analog output range:  $\pm 10$  V

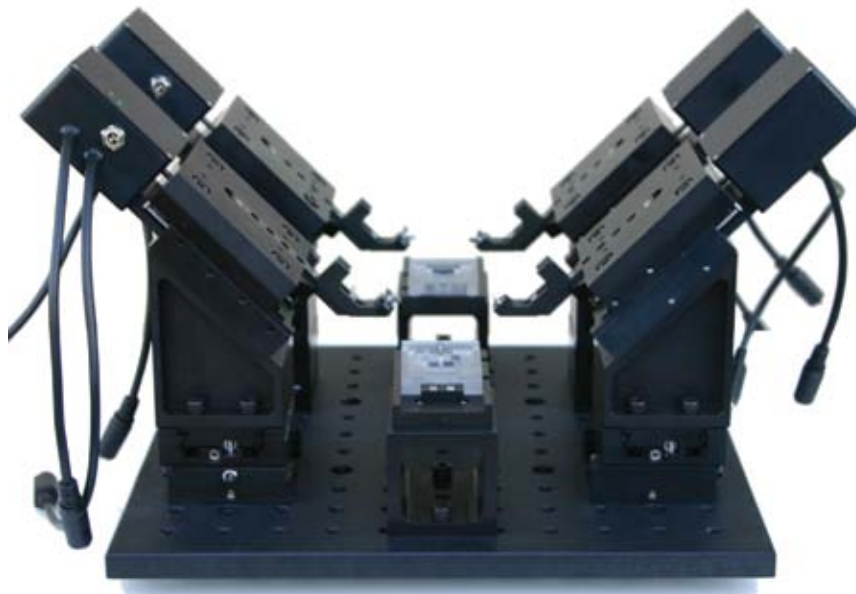
### Perfusion Chamber

- Accepts 1/16" tubing

### Computer Requirements

- Windows 2000 or XP with 2.0 GHz CPU
- At least 1 USB port
- 1 PCI slot

## ChannelMAX 100A Twin



This system is similar to the ChannelMAX 100A Mini except it can be used for doing two two-electrode voltage clamp experiments or up to four patch clamp experiments simultaneously.

### Key Features

#### Run dual two-electrode voltage clamp or four patch experiments simultaneously

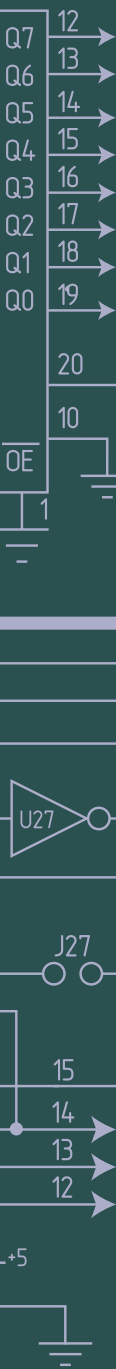
With two additional micromanipulators, the system can do dual two-electrode voltage clamp (TEVC) experiments simultaneously. Designed to be affordable to the scientific community, this system increases productivity significantly. Additional units can be run in parallel to further increase TEVC throughput. As each manipulator can do one patch clamp experiment, the ChannelMAX 100A Twin can run up to four patch clamp experiments at the same time. This system significantly increases productivity for patch clamping.

#### High quality single channel recording

Since the computer controlled manipulators guide the patch pipettes to touch the cell membrane in a more precise and consistent manner than manually controlled manipulators, the success rate of making seals is over 90%. The system possesses the same high quality, noise free, low drift and vibration free data acquisition as the PatchMAX 100A system.

#### Best value

This system is more cost effective than a traditional electrophysiology setup. In order to reach the same functionality and productivity using a traditional setup, the equipment cost is more expensive, plus labor cost. Lower cost and better quality. If you work on 50 oocytes per week using a traditional two-electrode voltage clamp system, now you can extract data from 100 oocytes per week.



## ez-gSEAL Pressure Controller



The ez-gSEAL 100B pressure controller is designed mainly for automated patch clamping, but it can also be used for many other applications. With the ez-gSEAL, patch clamping becomes as easy as a click of a button. You can use it with our automated clamp systems for fully automated experiments, or use it as a stand-alone product on a traditional rig. You can also use the controller for puffing drugs or studying stretch channels. The software-controlled pressure controller comes with pumps so air tanks are not required.

### Key Features

The ez-gSEAL pressure controller makes patch clamping easy. Click the first button to set the positive pressure, the second button to set negative pressure for making seals, and the third button to set the holding pressure for long-lasting seals. By clicking a single button, you apply pulses to break into the cell.

The ez-gSEAL control software helps you measure the pressure you use for making seals and breaking in. In addition, many types of cells and tissues, such as HEK293 cells, brain slice and oocytes, have been tested and seal parameters are available for them. New users can usually use these parameters to make seals and break on the first attempt.

When used with the ezPATCH 100A manipulator, all you need to do is to aim the patch pipette at the cell you want to patch. After you click a button, it will touch the cell and make seal, or even go whole cell automatically.

### ChannelMAX 100A & ez-gSEAL Ordering Information

Part No.	Product Description
Ne-ChannelMAX 100A Twin	ChannelMAX 100A Twin
Ne-ChannelMAX 100A Mini	ChannelMAX 100A Mini
Ne-ez-gSEAL	ez-gSEAL Pressure Controller
	Complete NeoBiosystems product line available.

U.S./Canada prices shown. International prices add 10%. Email or visit web store for latest prices.

800.998.MATE | www.autom8.com | 812 Page Street, Berkeley, CA 94710 USA  
tel 510.845.6283 | fax 510.280.3795 | e-mail info@autom8.com

### Specifications

- Pressure range: -250 mmHg to 250 mmHg
- Pressure resolution: +/- 1.5 mmHg
- Minimal pulse duration: 7 ms
- Minimal pulse interval: 7 ms
- Computer interface: USB
- Line voltage: 110 to 240 VAC
- Dimensions: 17"x14"x3.5" rack mount or desktop
- Weight: 10 lbs

### Computer Requirements

- 32-bit Windows 2000, XP, Vista, or Win 7 with 2.0 GHz CPU
- 1 USB port

### Pressure control for stretch channel study

The ez-gSEAL pressure controller can be used for pressure clamping for stretch channel study. The pressure sensitivity is 1.5 mmHg and the pressure range is from -250 mmHg to 250 mmHg — good enough for most stretch channels.

### Pressure control for drug application

The ez-gSEAL pressure controller can also be used for local drug application. A series of pressure pulses can be given at defined pressures for defined durations.

### PatchXpress Testing

The auto-seal algorithm is similar to what is used in the PatchXpress® automated patch-clamp system. PatchXpress users can use it to test their seal parameters under a microscope for easier trouble shooting and lower costs.

