

### Internal automatic mode switch

Instantly switch recording modes by using the membrane potential as the trigger. Pre-set a voltage threshold in current-clamp mode, and the MultiClamp 700B amplifier will automatically switch to voltage-clamp when the membrane potential reaches that voltage level. A user-specified delay will allow you to perform creative new experiments.

### Oscillation suppression

Sudden changes in membrane or pipette parameters may result in undesirable oscillations during whole cell recording. The MultiClamp 700B amplifier will detect current or voltage oscillations and automatically disable or intelligently reduce compensation settings to protect your cell from damage.

### Slow current injection

Slight voltage drift—often due to changing electrode properties—may contaminate an otherwise decent current-clamp recording. In order to maintain the membrane potential at a consistent level, the MultiClamp 700B amplifier will automatically inject compensatory current over a user-defined time course.

# Axon CNS amplifiers for the quietest recordings.



## MultiClamp 700B Amplifier

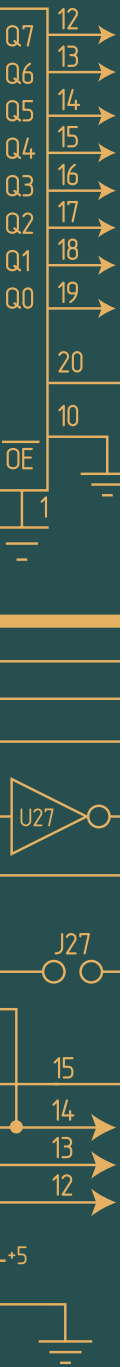
Computer-Controlled Dual Channel Resistive-Feedback Patch Clamp and High-Speed Current Clamp Amplifier

The MultiClamp 700B amplifier is useful for a wide variety of intracellular or extracellular recording, including:

- High-speed Current Clamp (sharp-electrode or field potentials)
- Patch Clamp (whole-cell, macro-patch or excised patch)
- Voltammetry / Amperometry
- Ion-selective measurement
- Bilayer recording

### Software Control

Instead of the usual front panel knobs and switches, the MultiClamp 700B amplifier is controlled by the MultiClamp 700B Commander, a program that runs on a host computer and communicates with the amplifier via a USB cable. This control interface provides automation of bridge balance, pipette offset, pipette and whole-cell capacitance compensation, in addition to "smart" features such as protection from oscillations and threshold-based mode change. Amplifier settings such as gain, filter frequency, whole-cell capacitance, recording mode and also input / output scale factors are automatically telegraphed to the data acquisition software via "messaging" through the computer operating system.



## Optional SoftPanel Controller

Although the MultiClamp 700B amplifier is a computer-controlled amplifier, the mouse and/or keyboard is not the only means of controlling the instrument. The optional SoftPanel controller was designed for those who prefer a more conventional feel to amplifier control. By way of a USB connection, the SoftPanel controller physically replicates all essential amplifier functions by acting as a hardware extension of the MultiClamp 700B Commander software. SoftPanel knobs replicate continuous mouse controls ("gliders"), while buttons replicate single-click mouse controls.

## Headstages



The MultiClamp 700B amplifier comes standard with two identical but independent CV-7B headstages, each of which contains both current-to-voltage and voltage-following circuitry. This design allows the user to rapidly switch between patch clamp recording and true high-speed current clamp recording. Thus, with two headstages, the MultiClamp 700B amplifier can perform the function of two patch clamps, two current clamps, or a combination of patch and current clamp amplifiers. Furthermore, two optional voltage-follower headstages (HS-2 type) can be connected to auxiliary inputs to allow third and fourth-point voltage recording.

The MultiClamp 700B amplifier supports up to four simultaneous headstages. Two CV-7B headstages come standard; the HS-2A headstages are optional.

The CV-7B headstage was designed for low noise and flexible recording features. However, some specialized applications require even more flexibility. For example, the rather large membrane capacitance in bilayer recording demands greater capacitance compensation. The optional CV-7B/BL headstage was developed for this purpose. Another optional headstage, the CV-7B/EC, was designed for large ( $\pm 2$  V) commands required during electrochemistry recording (amperometry, voltammetry).

## Requirements:

### Computer Control

The MultiClamp 700B Commander program runs on the Windows Vista/XP/2000/ME/98/7/10 32- or 64-bit operating systems,

A USB port is required to connect the MultiClamp 700B amplifier. An additional USB port is required if the optional SoftPanel controller is used to control the amplifier.

### Experimental Control and Data Acquisition

Although the MultiClamp 700B amplifier is controlled by a software interface, it remains a conventional analog input/output amplifier. Thus, it requires a system for controlling your stimulus protocols and recording the output.

Our pCLAMP software and Digidata 1550B digitizer provide the most complete, integrated solution. Note: pCLAMP 9 or higher is required for automatic telegraphing.



## Specifications

### Analog Inputs

- Input channels: 8 single-ended
- ADCs: 8
- Sampling rates\*\*: 1 Hz - 500 kHz
- Resolution: 16-bit
- Input range: -10 to +10 V
- Input resistance: >1 M $\Omega$
- Gain value: 1

\*\*Maximum aggregate throughput rate is 500 kHz x 8 input channels = 4 Megasamples/sec

### Analog Outputs

- Channels: 8
- DACs: 8
- Sampling rates: 1 Hz - 500 kHz
- Resolution: 16-bit
- Output range: -10 to +10 V
- Output impedance: < 0.5  $\Omega$
- Output short circuit to signal ground:  $\pm 25$  mA

### Digital Inputs

- Input type: TTL compatible
- Trigger Inputs
- Input type: TTL compatible
- TAG: rising-edge sensitive
- START: rising-edge sensitive

### Digital Outputs

- Number of bits: 8 (of 16) supported in software
- SCOPE: dedicated trigger output
- Output driver: advanced CMOS (AC) compatible
- Output current:  $\pm 4$  mA source,  $\pm 32$  mA sink

### Cable

Type: USB 2.0 braided  
Length: 3 meters

## AxoScope

AxoScope software is turn-key data acquisition and analysis software for Windows, designed to replace oscilloscopes, chart recorders, and FM tape recorders. AxoScope software provides up to sixteen channels of analog acquisition and four different acquisition modes. Acquire data continuously in Gap-Free mode with simultaneous display, at up to the speed of the digitizer. Set a trigger threshold for the Fixed-Length Events, Variable-Length Events or High-Speed Oscilloscope modes. Tag and add comments to the data in real time. Set analog output holding values. Open Axon-format ABF data files and quickly analyze sections of interest with an array of browsing and basic analysis tools. Preview data and page layout before printing. Additional features include voice tags, which allow tagging of data with spoken comments (requires a microphone and sound card), low-pass and high-pass digital filtering of incoming data, and Store Trace, which freezes a snapshot of a waveform on the screen for comparison with subsequent input.

### The Digidata 1550B rack mountable main unit comes standard with:

- USB 2.0 cable
- External auto-switching power supply
- Power cable
- AxoScope 10 software CD
- Printed manual

## Ordering Information

Part No.	MDS Analytical Technologies/Axon CNS
MultiClamp	MultiClamp 700B computer-controlled current & patch clamp amp
Axoclamp	Axoclamp 900A computer-controlled current & voltage clamp
Axopatch	Axopatch 200B-2 capacitor feedback patch clamp amp
SoftPanel	SoftPanel (USB) optional control panel
Digidata 1550B0	Digidata 1550B0 data acquisition system
Digidata 1550B1	Digidata 1550B1 data acquisition system with 1x HumSilencer
Digidata 1550B4	Digidata 1550B4 data acquisition system with 4x HumSilencer
pCLAMP	pCLAMP 11 Standard electrophysiology software (Windows)
pCLAMP Upgd	pCLAMP 11 Upgrade available for previous versions of pCLAMP
Mo-1-CV-7B	Headstage CV-7B patch clamp (standard) for MultiClamp 700B
Mo-HL-U	Electrode holder for all Universal (U)-type headstages
Mo-HS-9A-x10U	HS-9A headstage for Axoclamp 900A (choose x0.1, x1, x10 U)
HL-U	Electrode Holder for 1.0-1.7 mm glass
	Complete Axon CNS cellular neuroscience product line avail.

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.



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