

**Requirements:****Computer Control**

The Axoclamp 900A Commander program runs on US Windows Vista/XP/2000 32-bit operating systems.

Two USB 2.0 ports are required to connect the computer to the Axoclamp 900A amplifier: one for amplifier control and one for Monitor signal display on the computer screen for discontinuous modes. An additional USB port is required if the optional SoftPanel controller is used to control the amplifier.

**Experimental Control and Data Acquisition\*\***

Although the Axoclamp 900A amplifier is controlled by a software interface, it remains a conventional analog input/output amplifier. Thus, it requires a separate system for controlling stimulus protocols and recording the output, such as a digitizer and data acquisition software. The Digidata 1440A digitizer and pCLAMP 11 data acquisition and analysis software from MDS Analytical Technologies, work together to provide the most complete, integrated solution.

\*\* Automatic telegraphing of the Axoclamp 900A amplifier requires pCLAMP 10 software and a Digidata 1440A or Digidata 1320 series digitizer.

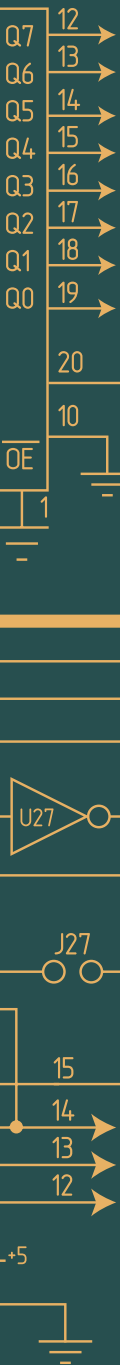
# A complete microelectrode current-clamp and voltage-clamp amplifier.

**Axoclamp 900A Amplifier**

The Axoclamp 900A amplifier is a complete microelectrode current-clamp and voltage-clamp amplifier, useful for a wide range of intracellular microelectrode recording techniques. Like its predecessor, the Axoclamp-2B amplifier, the Axoclamp 900A amplifier has a wide range of functionality and has many enhancements that improve amplifier recording capability, make the amplifier easier to use, and help your experiments last longer.

**The Axoclamp 900A amplifier has several modes of operation:**

- I-Clamp: two independent bridge amplifiers for voltage measurements
- DCC: discontinuous current clamp for accurate voltage measurements, even when electrode resistance changes
- TEVC: high-compliance two-electrode voltage clamp for oocytes and mammalian cells
- dSEVC: discontinuous single-electrode voltage clamp for small cells with large currents
- HVIC: high-voltage current clamp for extracellular applications such as iontophoresis



## Software Control

Instead of the usual front panel knobs and switches, the Axoclamp 900A amplifier is controlled by the Axoclamp 900A Commander, a program that runs on a Windows PC computer and communicates with the amplifier via a USB interface. This control interface reports resistance, voltage, and current measurements and provides automation of Bridge Balance, Pipette Offset, and Pipette Capacitance Neutralization. In addition it has "smart" features that protect cells from potentially damaging signal oscillations and automate mode changes based on internal signal thresholds or externally-applied signals. Amplifier settings such as gain, filter frequency, recording mode and input/output scale factors are automatically telegraphed to the pCLAMP 11 data acquisition software via the USB connection.

## Optional SoftPanel

Although the 900A amplifier is a computer-controlled amplifier, the mouse and/or keyboard is not the only means of controlling the instrument. The optional SoftPanel was designed for those who prefer the more conventional feel to amplifier control of knobs and buttons. By way of a USB connection, the SoftPanel controller physically replicates all essential amplifier functions by acting as a hardware extension of the Axoclamp 900A Commander software. SoftPanel knobs replicate continuous mouse controls ("gliders"), while buttons replicate single-click mouse controls.



## Comprehensive Manual

We also provide a detailed User Guide that serves as a handbook of procedures for microelectrode users. Tutorials written by MDS Analytical Technologies staff and scientific consultants provide a useful guide to the operation of the instrument and are informative references for several electrophysiological techniques.

## More Information

The Axoclamp 900A\* main unit comes standard with:

- One Remote BUZZ Box: works for both channels
- One Clamp-1U model cell
- Two HL-U electrode holders
- One Axoclamp 900A Commander software CD
- Two USB 2.0 cables
- Two headstage baseplates
- Theory and Operation User Guide (printed)

\* Two HS-9A headstages (e.g., HS-9A x0.1, HS-9A x1 or HS-9A x10) must be ordered with the Axoclamp 900A.



## 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
<b>MultiClamp</b>	<b>MultiClamp 700B</b> computer-controlled current & patch clamp amp
<b>Axoclamp</b>	<b>Axoclamp 900A</b> computer-controlled current & voltage clamp
<b>Axopatch</b>	<b>Axopatch 200B-2</b> capacitor feedback patch clamp amp
<b>SoftPanel</b>	<b>SoftPanel (USB)</b> optional control panel
<b>Digidata 1550B0</b>	<b>Digidata 1550B0</b> data acquisition system
<b>Digidata 1550B1</b>	<b>Digidata 1550B1</b> data acquisition system with 1x HumSilencer
<b>Digidata 1550B4</b>	<b>Digidata 1550B4</b> data acquisition system with 4x HumSilencer
<b>pCLAMP</b>	<b>pCLAMP 11 Standard</b> electrophysiology software (Windows)
<b>pCLAMP Upgd</b>	<b>pCLAMP 11 Upgrade</b> available for previous versions of pCLAMP
<b>Mo-1-CV-7B</b>	<b>Headstage CV-7B</b> patch clamp (standard) for MultiClamp 700B
<b>Mo-HL-U</b>	<b>Electrode holder</b> for all Universal (U)-type headstages
<b>Mo-HS-9A-x10U</b>	<b>HS-9A headstage</b> for Axoclamp 900A (choose x0.1, x1, x10 U)
<b>HL-U</b>	<b>Electrode Holder</b> 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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