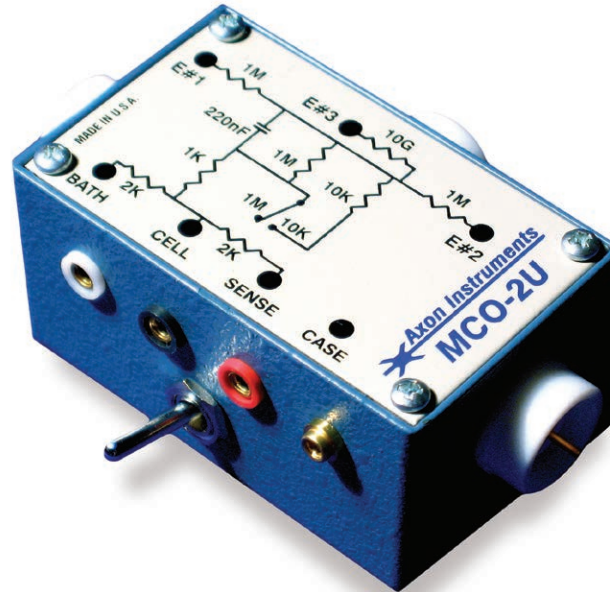# Genuine Axon CNS components for every experiment.

Optional CV-5 Series Headstages for the GeneClamp 500B amplifier

- CV-5-100GU patch-clamp headstage (100 mV/pA)
- CV-5B-100GU bilayer patch-clamp headstage (100 mV/pA)
- CV-5-1GU macro-patch headstage (1 mV/pA)
- CV-5-100MU voltammetry headstage (100 mV/nA)

CV-5 headstages operate with the GeneClamp 500 amplifier. Each headstage has one feedback resistor for current-to-voltage conversion. The transfer resistance of the 100G, 1G and 100M versions are 100 GΩ, 1 GΩ and 100 MΩ, respectively. The "B" version has an extended capacitance compensation range suitable for bilayers. The 100G version is ideal for single-channel recording and vesicular-release amperometry. The 1G version is suitable for macropatch applications. The 100M version is used for fast cyclic voltammetry using carbon-fiber microelectrodes.

Headstages, holders, model cells, cables, odd bits

Headstages

HS-2 and HS-2A unity-gain headstages

The HS-2 and HS-2A headstages are used with Axoclamp 2 and GeneClamp amplifiers. They are all unity-gain voltage recording headstages but they come in a variety of different current-passing gains for applications as diverse as extracellular recording, bath-potential recording, ion-sensitive recording, ionophoresis and intracellular recording from small or large cells. For ultra-high impedance electrodes, special circuitry inside the headstage prevents any DC current from leaking into the input through the capacitance neutralization circuit.

HS-4-x1MGU relay-switched unity-gain headstage

HS-4 headstages may be used with Axoclamp 2 amplifiers to maximize the voltage across the electrode during two-electrode voltage clamp. In all other modes the HS-4 acts like an HS-2 headstage. Available only with current-passing gain x1MG. The VG-2 headstage must be used for current measurement.

VG-2 virtual-ground headstage

The VG-2 virtual ground headstage may be optionally used with Axoclamp 2 amplifiers to measure whole-bath current. Standard current-measurement gains are x0.1, x1 and x10. x100 is also available. Current recording ranges for these virtual ground headstages are: ±0.1 µA (x0.1), ±1 µA (x1), ±10 µA (x10), ±100 µA (x100).

VG-2A-x100 bath clamp headstage

The VG-2A-x100 bath-clamp headstage may optionally be used with Axoclamp 2 or GeneClamp amplifiers to clamp the bath potential at zero volts. This eliminates the effect of series resistance in the bath grounding electrode and the bath solution. It can also minimize the extent of DC voltage shifts resulting from changes in the bath solution or temperature.

Holders

Headstage pipette holders and replacement parts available for all Axon CNS Instruments headstages. Please see our web page: https://www.autom8.com/mdcaxon-instruments-overview/headstages-holders/ for complete parts list.

Model Cells

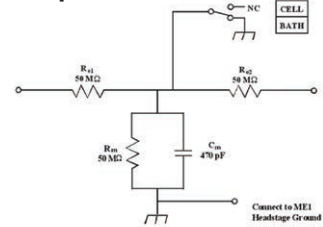| Model Cell	Headstages		
	HS non-U type 2 mm socket	CV non-U type 1 mm socket	HS & CV U type 1 mm socket
Non-U type 2 mm pins Clamp-1, MCB-1,MCO-1 E1,E2*,MCW-1	No adapter needed	2 mm socket to 1 mm pin APN 1-2200-063	2 mm socket to 1 mm pin APN 1-2200-063
Non-U type,recessed 1 mm pins MCO-1 E3*,Patch-1	1 mm socket to 2 mm pin APN 1-2200-083	1 mm socket to 1 mm pin APN 1-2200-062	1 mm socket to 1 mm pin APN 1-2200-062
U type 1 mm pins Clamp-1U, MCB-1U,MCO-1U E1,E2,E3*,MCW-1U, Patch-1U	1 mm socket to 2 mm pin APN 1-2200-083	1 mm socket to 1 mm pin APN 1-2200-062	No adapter needed

*E - electrode input # All ground connections on model cells and headstages have 2 mm sockets, except the CV203BU headstage, which has a 1 mm ground socket.
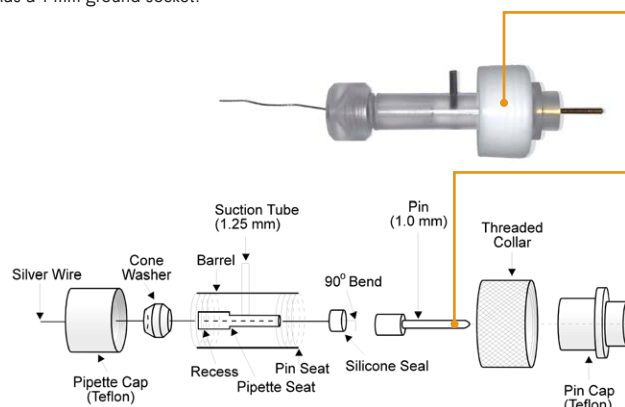
Mechanical Mounting Options

A 4" (102 mm) long removable insulated mounting rod is provided at no charge with most headstages. Diameter is 5/16" (7.9 mm) unless 1/4" or 3/8" (6.3 or 9.5 mm) is specified by purchaser. Additionally, all headstages include an insulated mounting plate. Many manufacturers of micromanipulators provide custom mounting brackets for Axon CNS headstages.
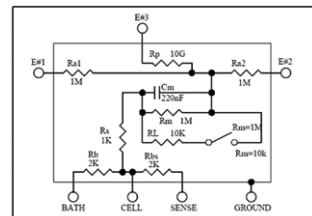
Clamp 1U-model cell

Patch 1U-model cell

ACTUAL CIRCUIT   EQUIVALENT CIRCUIT
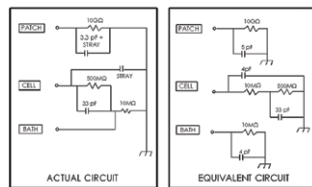
MCO 2U-oocyte model cell

Electrode Holders

HL-U: Connects to all U-type headstages. How to know which pipette holder you need:

- Is the collar (where the holder attaches to the headstage) threaded or smooth?
- If it is threaded, then you need the HL-U (most common)
- If it has threads, then you need need to measure the input pin on the headstage (you can measure from your old electrode holder)
- If it is 1 mm diameter, then you need HL-1
- If it is 2 mm diameter, then you need HL-2. HL-1 and HL-2 are only for smooth collets, not threaded

Silver Wire | Pipette Cap (Teflon) | Cone Washer | Recess | Barrel | Pipette Seat | Suction Tube (1.25 mm) | Pin Seat | 90° Bend | Silicone Seal | Pin (1.0 mm) | Threaded Collar | Pin Cap (Teflon)

DIGIDATA ACQUISITION

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 MΩ
- 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 Ω
- Output short circuit to signal ground: ±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: ±4 mA source, ±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.