

UNICLAMP usb npi's first digital amplifier



With all proven features of the universal amplifier **ELC-03XS** controlled by npi's new software.

- Automated capacitance compensation
- → Automated series resistance compensation

Recording hardware and software included: npi E-Phys

➡ Program stimulus protocols

Record traces with up to 250 kHz

Compatible with standard recording hard- and software (e.g. pClamp, PatchMaster, Signal, WinWCP)



man man and a second and the second

UNICLAMP_{USB} control software

User Set	tings Data	Exp. S	plit UI	Mode:	VCx10	VC		OFF	СС	CCx10		
Voltage [mV] Voltage Cur				rent Resistance Test								
0.00 Gain:		10 -	Gain:	1	-	10.00 MO						
Current [nA]	Lowpass:	20 Hz 🔻	Lowp	ass: 20 Hz	-		τu	.00	1412	2		
0.00	Highpass:	DC *	Highp	ass: DC	•	5 mV	\$ 5 m	5 ms 🗘 Zap Start				
✓ Manual: Voltage				Manual: Vo	ltage Clam	np Comper	nsation					
Pipette Hold [mV]	V	Series Res	. [%]	Amplitude [%] Time [%]								
-100 0	+100 -1000	0 +	-1000) 0	+100	0	0	+100	0	0 +100		
0.00		0.00		0.0	0.00			0.00				
Coarse	0 0	Coarse	0	Coa	rse 🖯	0	Coars	e O	Co	arse		
Default Lo	ck 🗌 🗌 De	fault Lo	ock 🗌	Default	Lock	Def	ault	Lock	Default	Lock		
Manual: Current				Manual: Cu	urrent Clarr	np Compe	nsation					
			+10		+100			+100		0 +100		
O Coarse	0 0		0	Coa	rse 🕀	0		e	0 0	arse 🖨		
Default Lo												

Amplifier control

Displays for voltage, current & resistance

All settings adjustiable as direct input or by scrolling with mouse wheel

Intuitive graphic software

Different colors for VC and CC

Store and recall amplifier settings and experimental setup

Experiment Name										
← ✓ Protocol 1	×	Protocol 2	×	+					\rightarrow	
Number of Sweep	Number of Sweeps: 15 🗘 Continuous 🗌 Idle Input Sweep Interval: 500 ms 🗘									
			Value		Incr.		Incr.	Multi.	^	Experiment control
✓ Step 1	Remove	Duration:	500 ms	¢ (0 ms	\$	1.00	\$		
Voltage [AO-0]:	Constant 🔻	0.00 Hz	100 mV	\$	10 mV	\$	1.00	-		Pulso protocols in $VC & CC$
Aux. Ch. [AO-2]:	Sine 🔹	50.00 Hz 🗘	50 mV	\$	5 mV	\$	1.00	\$		Puise protocois in vC & CC
✓ Step 2	Remove	Duration:	1000 ms	¢ (0 ms	\$	1.00	\$		Time & ampl. increments
Voltage [AO-0]:	Constant 🔹	0.00 Hz	50 mV	•	10 mV	\$	1.00	\$		
Aux. Ch. [AO-2]:	Constant 💌	0.00 Hz	100 mV	\$	0 mV	\$	1.00	\$	~	Different wave forms
Channel: Voltage [A	0-0] 🔹 Sam	ppling Freq: 100	kHz 🗘			\$	1	L		

Optional I/O box available: analog and digital in- and outputs

Allows control and recording of external devices (light sources, valves, amplifiers, ...)

Data recording

Record data with:

250 kHz in one channel

125 kHz in two channels

Data as ASCII, CSV, Matlab

Scope Window

Preview of pulse protocols Scalable (also automatic)

Lissajous-plots





Automatic compensation of capacity and bridge balance using the phase sensitive method

Ref: Riedemann, T., Polder, H.R. & Sutor, B. Pflugers Arch - Eur J Physiol (2016) 468: 1725. https://doi.org/10.1007/s00424-016-1868-8

Figure from: Jha et al., Poster at DPG meeting in Ulm, 2019: Universal amplifier with automatic compensation of series resistance and capacitance in whole cell recordings using an active-bridge circuit and phase-sensitive technique

Data display

Selectable number of traces

Meta-data and all amplifier settings

Data analysis





Data explorer

Preview of recorded traces and meta-data

UNICLAMP_{USB} features



Picture kindly provided by Dr. Lessmann and Dr. Brigadski

Single cell electroporation

Electroporate and fill cells with DNA

Juxtacellular recording, transfection and dye filling

Ca3 pyramid neurons of the rat GFP labelled *in vitro* in cultured hippocampal slices

Ref.:Daniel J., et al.: (2013) Single-cell juxtacellular transfection and recording technique *Pflugers Arch*

- Extracellular recording with high and low pass filters, gain up to 1000
 - Precise, "single-cell" stimulation with current or voltage (µA range, ±15 V)
 - Intracellular recording with sharp microelectrodes

Patch clamp recording in perforated and whole-cell configuration



In vivo recording

Optional miniature headstages

Record with freely moving animals

Juxtacellular labeling in vivo

Software development is part of the PhD thesis of Chaitanya Jha. This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No 722053.



All hardware is designed and built by npi electronic in Tamm, Germany.

Special thanks to Frank Kirchhoff, Therese Riedemann and Bernd Sutor for their input and support.

For more information contact:

<u>General:</u> npi electronic GmbH Phone: +49-7141-9730230 Fax: +49-7141-9730240 sales@npielectronic.com www.npielectronic.com North America: ALA Scientific Instruments Phone: +1-631-393-6401 Fax: +1-631-393-6407 sales@alascience.com www.alascience.com Switzerland: Science Products Trading AG Phone: +41-43-4880561 Fax: +41-43-4880562 info@science-products.com www.science-products.ch