

# UNICLAMP<sub>USB</sub>

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)





## Amplifier control

Displays for voltage, current & resistance

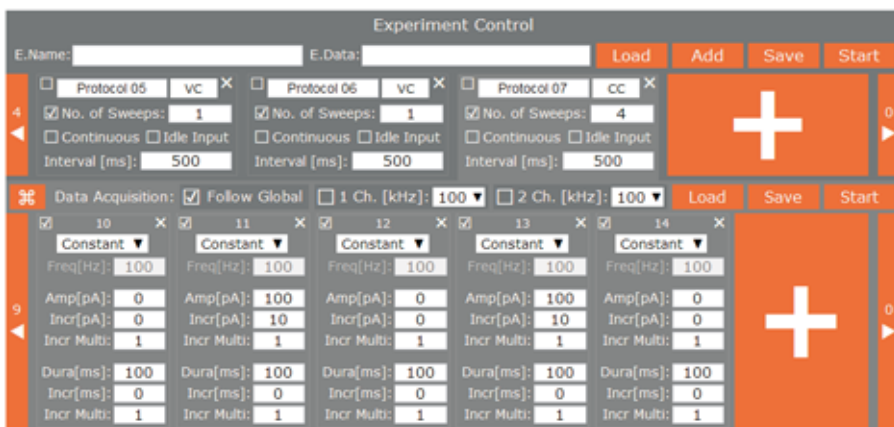
All settings adjustable as direct input or by scrolling with mouse wheel

## UNICLAMP<sub>USB</sub> control

Intuitive graphic software

Different colors for VC and CC

Store and recall amplifier settings and experimental setup



## Experiment control

Pulse protocols in VC & CC

Time & ampl. increments

Different wave forms

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

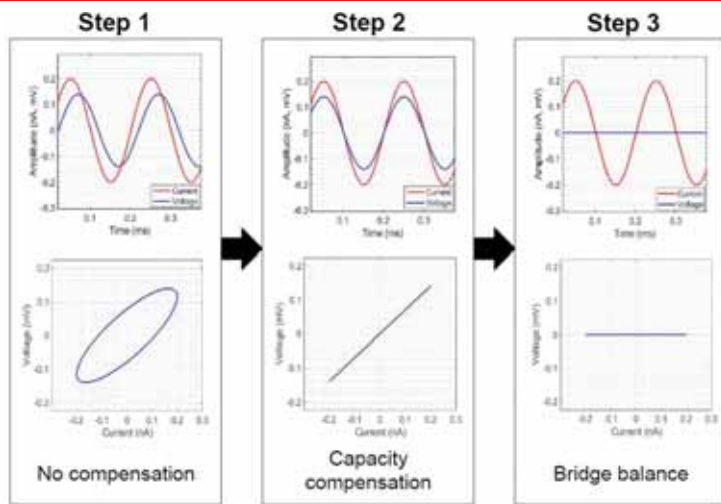
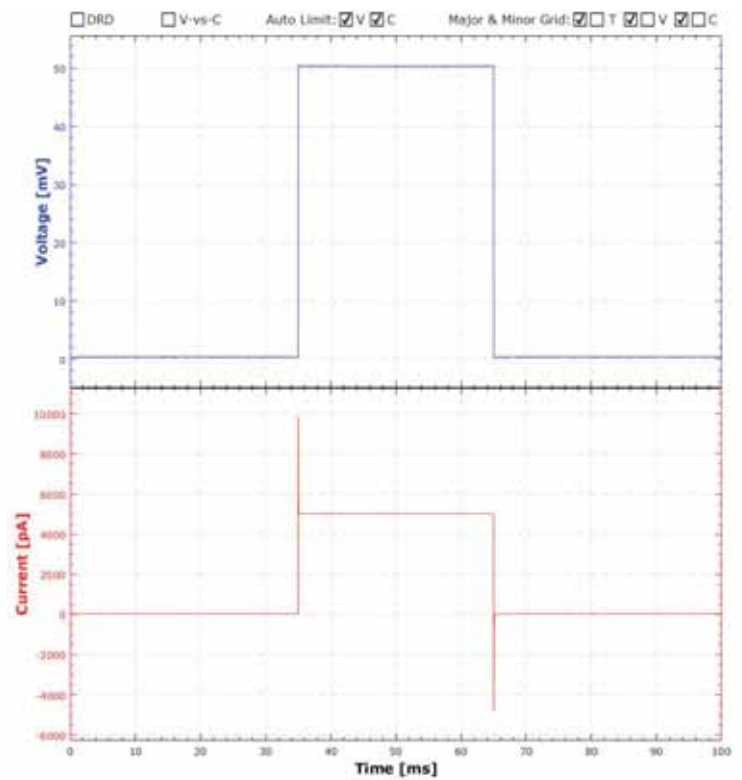
Data as ASCII, CSV, Matlab

# 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>

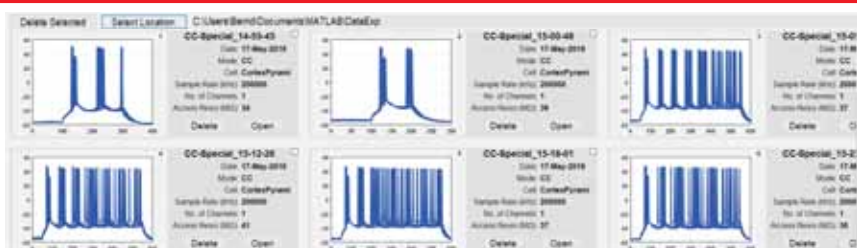
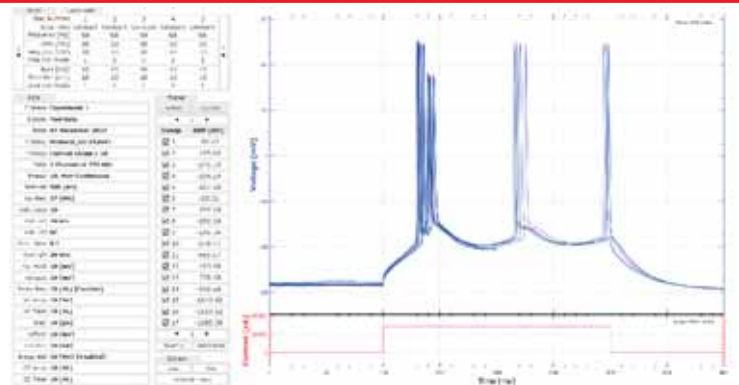
Figure from: Jha et al., Poster at DPG meeting in Ulm, 2019: Universal amplifier with automatic compensation of series resistance and capacitance in whole cell recordings using an active-bridge circuit and phase-sensitive technique

# Data display

Selectable number of traces

Meta-data and all amplifier settings

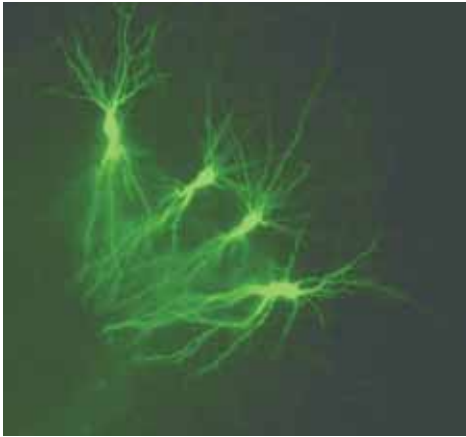
Data analysis



# Data explorer

Preview of recorded traces and meta-data

# UNICLAMP<sub>USB</sub> features



Picture kindly provided by Dr. Lessmann and Dr. Brigadski

## Single cell electroporation

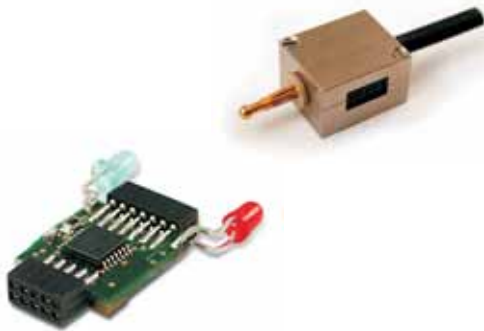
Electroporate and fill cells with DNA

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 ( $\mu\text{A}$  range,  $\pm 15\text{ V}$ )
- ➔ **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 Skłodowska-Curie grant agreement No 722053.



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

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