

made to measure

Flexible Extra and Intracellular Recording Systems

Differential Intracellular Recording and up to 16 Additional Extracellular Recording Channels for Field Potentials or Single Units



TMR-02M
Timer
Module

DPA-2FS
Amplifier/Filter Modules
for Extracellular Signals

BF-48DGX

ELC-01MX
ELC Amplifier
Module

AUDIS-03/8M
Audio Monitor
Module

Ref.: Lapray et al., Nature Neuroscience. 2012. 15(9):1265-1271



Example of Headstage and Breakout Box for 6 extracellular and 1 juxtacellular Channel

- ⇒ TMR-02M for gating juxtacellular current trains
- ⇒ DPA and BESSEL modules for amplification and filtering of extracellular signals
- ⇒ Extracellular signals can be measured single-ended or differential
- ⇒ ELC-01MX for intracellular recording in bridge mode or juxtacellular recording and stimulation
- ⇒ AUDIS-03/8M for acoustic monitoring of intracellular or extracellular signals
- ⇒ One miniature headstage for recording all signals and for stimulation



Miniature Headstage
e.g. 6 + 1 channels



Standard Headstage



Amplifiers for Tetraode Recording

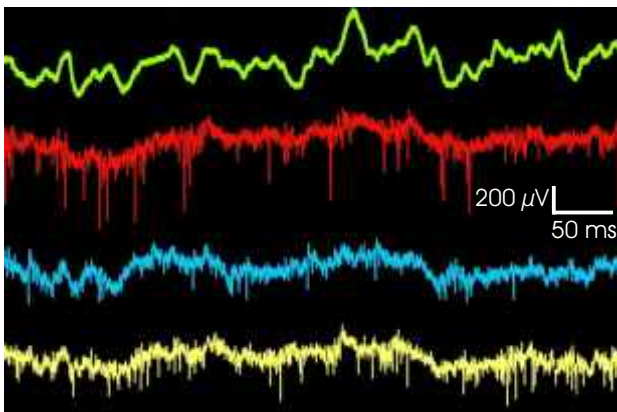
Sample Configuration



ISO-STIM 01M
Isolated Stimulator
Module

DPA
 μ V Amplifier/Filter
Modules

EXT-T1M
Tetraode
Module



dentate gyrus of the hippocampus (0.1 - 800 Hz)
electrode tip diameter: ~15 micrometers

different locations in the dorsal thalamus (0.1 - 6000 Hz)
electrode tip diameter: 3-6 micrometers

Tetraode recordings (sampling rate: 10 kHz) of rat hippocampus and dorsal thalamus
(adult rat under light anesthesia)

Data kindly provided by Didier Pinault, Univ. Strasbourg

Recording with Two Tetraodes



EXT-T2

- ⇒ One headstage for each tetraode
- ⇒ Lowpass filter: 500, 2k, 7k Hz, set internally by DIL switches
- ⇒ Highpass filter: 0.24, 0.3, 1 Hz, set internally by DIL switches
- ⇒ Gain: x200, x500, x1000, set internally by DIL switches
- ⇒ Headstage with x10 amplification for low-noise operation
- ⇒ Two BNC OUTPUTs for each channel



Modular Tetrode Recording



- ⇒ Customized configurations
- ⇒ Module for stimulation (up to ± 280 nA, bipolar) and electrode resistance meter
- ⇒ Current injection frequency and amplitude set by 10-turn potentiometers
- ⇒ Electrode resistance test separately for each tetrode unit (selected by switch)
- ⇒ Low pass filters, high pass filters and gain to be set internally by DIL switches
- ⇒ Can be combined with audio module or high voltage modules for setting lesions



Tetrode Headstage

EXT-T1M

Tetrode
Amplifier

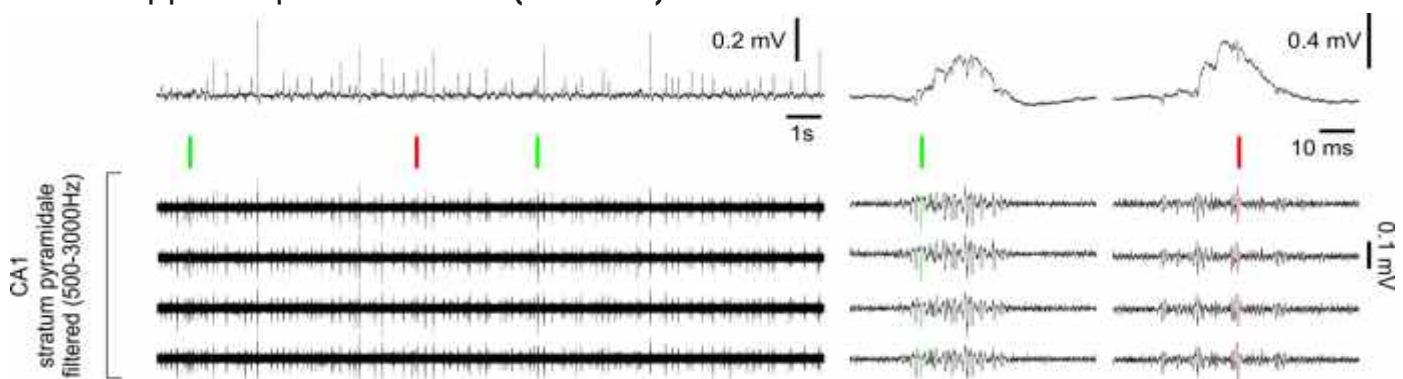
R/I-T1M

Resistance Test,
Current Injection



Tetrode recordings *in vitro* from the CA1 region (stratum pyramidale) of a hippocampal mouse slice (raw data)

500 ms



Further analysis (PCA, Klustakwik, (Harris, JNeuroSci 84, 2000)) reveals well separated single-unit signals

Data kindly provided by Susanne Reichinnek, INMED, Marseille

Ref.: Reichinnek, et al., J Neurosci. 2010. 17;30(46):15441-15449



Amplifier for Multiple Site Recording



R/I-T1DX - EXT-16DX

Extracellular Amplifier - Electrode Resistance Meter / Current Injection Unit

- ⇒ Extracellular recordings with up to 16 channels
- ⇒ Up to 16 gain stages, 16 high pass and 16 low pass filter corner frequencies; set by rotary switch
- ⇒ Customized configuration for each channel (set by factory)
- ⇒ Digital display of selected channel, gain, high pass and low pass filter corner frequency
- ⇒ Remote operation with digital I/O card or manual operation with rotary switches and push buttons
- ⇒ Brightness of displays adjustable
- ⇒ Referenced or single ended recording mode (set by switch)
- ⇒ External npi power supply or rechargeable batteries
- ⇒ Extracellular signals available at BNC connectors or at SCSI/SubD connector for direct linking to data acquisition card
- ⇒ Electrode resistance test separately for each electrode

Suitable for:

- ⇒ NeuroNexus Electrodes



- ⇒ PlasticsOne Electrodes



- ⇒ Tucker Davis Electrodes



Ref.: Stroh et al., Neuron. 2013. 20;77(6):1136-1150

Justus et al., Nature Neuroscience. 2016. 20(1): 16-19

Ejector / Extracellular Amplifier



PEXT-01

Pneumatic Drug Ejector and Extracellular Amplifier

- ⇒ Pneumatic drug ejection and extracellular recording with the same or different electrodes
- ⇒ INPUT with BNC connectors or small headstage with high impedance
- ⇒ OUTPUT: DC with OFFSET control or AC FILTERED (x10 to x10k); with AUDIO monitor



Extracellular Recording Systems

For Recording Field Potentials or Single Units



EXT-02B

Dual Channel Amplifier with Headstages. Adjustable Gain and Filters, Notch Filter. Additional Input for Stimulator. With External Power Supply. Electrode Resistance Meter and Audio Monitor Optional. For up to 8 Channels



EXT standard headstage



Miniature EXT headstage without housing

Miniature Headstages for Recording in Freely Moving Animals Available with or without Housing



Miniature EXT headstage with housing and gold pin for electrode holder



EXT-02F/1

Single Channel Amplifier with Optional Headstage. Adjustable Gain and Filters. Notch Filter optional. Audio Monitor with Threshold for Removing Background Noise



EXT-02F/2

Dual Channel Amplifier with Optional Headstage. Adjustable Gain and Filters. Notch Filter optional. Audio Monitor with Threshold for Removing Background Noise



Modular Extracellular Recording and Signal Processing



EXT 10-2F

Single Channel Amplifier with Headstage, Gain and Filters



EXT-10C

Single Channel Amplifier with Headstage, Gain and Capacity Compensation



DPA-2FX/2FS

Amplifier with High/Low Pass Filters and Gain



DPA-2FL

Extra Low-Noise Amplifier with High/Low Pass Filters and Gain



LPBF-01GX

Amplifier with Low Pass BESSEL Filter and Gain



BF-48DGX

Amplifier with High Low Pass BESSEL Filters and Gain



DI-01NX

Differentiator with Integrator



WD-01

Window Discriminator

General:

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

