



## ZEUS

*Zeus* is a high-performance, scalable, low-cost data acquisition (DAQ) system for animal Neurophysiology experiments and advanced neural-interface applications. Its user-friendly software and plug & play hardware provide scientists and engineers with a sophisticated yet easy-to-use electrophysiology system at an affordable price. The *Zeus* Digital Signal Processor (DSP) and Software acquires, processes, and analyzes physiological signals (e.g., spikes, field potentials) together with experimental events from third-party equipment including behavior, electrical & optical stimulation, and video systems. *Zeus* also provides built-in, per-electrode stimulation & recording capability for up to 64 electrodes thereby eliminating the need for synchronizing bulky electrical stimulators from 3<sup>rd</sup>-party sources.

### Example Applications

- Systems Neuroscience
- Attention, learning & memory
- Cognition, decision making
- Pain
- Drug & toxin effects
- Neuroeconomics
- Epilepsy, Parkinson's disease
- BMI, BCI, Neuroprosthetics

**Miniature & Lightweight Headstages**  
(ideal for large & small animals such as non-human primates, birds & mice)



Zeus™ DAQ System



32 channels



16 channels

### Zeus Digital Signal Processor

- Ultra-compact design
- 512 electrode channels for recording
- 64 electrode channels for recording & stimulation
- 64 built-in, programmable electrical stimulators
- User-defined digital filters
- Flexible I/O for viewing & synchronization
- Real-time data access & closed-loop control
- Battery-power option (line-noise immunity)

### Miniature Digital Headstage

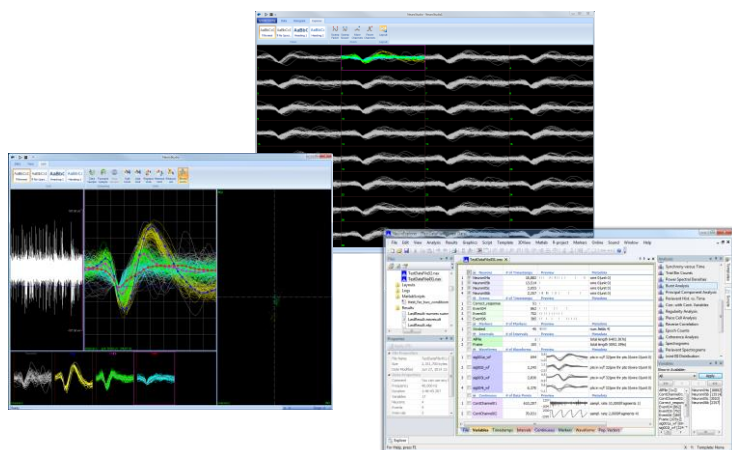
- 16/32/64/128 channels
- Onboard digitization (30/40 kHz, 16 bits)
- Wideband recording
  - ✓ Spikes
  - ✓ Field potentials
- Fast stimulus-artifact recovery
- Multiplexed, 12-wire LVDS cable
- Miniature size & ultra lightweight
- *In situ* impedance measurement
- Red & green LEDs for animal tracking
- 3-axis accelerometer for dynamical analysis

### World's Smallest Digital Headstage!

Our digital headstage provides a miniature, high-fidelity neural link. The onboard analog filters and digital circuitry facilitate a stable and noise-immune link to the brain. The multiplexed output allows just a few wires to carry signals from 16 to 128 electrodes making it ideally suited whether recording from small animals such as freely-behaving mice or non-human primates (NHPs). The headstage front end is compatible with individual microelectrodes, microelectrode arrays, microwire / optrode arrays, silicon probes, and subdural cortical (iEEG/ECoG) grids. We offer a wide range of headstage cables with lengths up to 10 m and wraps optimized for biting protection and transmission of rotational torque to commutators for freely-behaving subjects.



## ZEUS



### Software

- User-friendly GUI (interface)
- Multi-channel signal displays
- 2D/3D PCA analysis
- Manual & auto spike sorting
- Stereotrode & tetrode support
- Multiple data-file formats
- MATLAB/C/C++ SDKs
- Flexible I/O control

### Powerful & User-Friendly Software

Digital Headstage	Zeus Digital Signal Processor
Input Channels: 16/32/64/128	Headstage Recording (R) Channels : 512
Input Connector: 18/36 pin, Omnetics (16/32)	Headstage R Ports: 4 (aviation connector)
Size (L x W): 12mm x 15mm / 14mm x 15mm (16/32)	Headstage Stimulation/Recording (S/R) Channels : 64
Thickness (H): 2mm / 2mm (16/32)	Headstage S/R Ports: 2 (aviation connector)
Weight: < 0.6g / < 0.8g (16/32)	Size (L x W x H): 430mm x 320mm x 130mm
Noise: 2.4 $\mu$ V RMS (typical)	Analog Input: 32 $\pm$ 5V, 24 bits, 40 kHz (BNC, D-Sub)
Resolution: 0.25 $\mu$ V	Analog Output: 4 $\pm$ 5V (BNC)
Input Impedance: 1.3 G $\Omega$ @ 10 Hz, 13 M $\Omega$ @ 1kHz	Digital Input: 32 TTL/strobed, 40 kHz (BNC, D-Sub)
Input Range: $\pm$ 5mV	Digital Output: 16 TTL (BNC,D-Sub)
Sampling: 16 bits @ 30kHz (R), 40 kHz (S/R)	Audio Output: stereo line level (3.5mm jack)
Bandwidth: 0.3Hz (1p) – 7.5KHz (4p)	Audio Output Filter: selectable DC or 300 Hz high pass
Output Cable (LVDS): 12 wires, length to 10 m	PC Interface: USB 2.0/3.0, optical fiber
Power Supply: 3.3VDC	Power Supply: switchable 5VDC or 110-240 VAC
Tracking LEDs: red & green, selectable on/off	