

## OmniPlex® Neural Data Acquisition System

30 years of experience and innovation with thousands of labs comes together in the OmniPlex® Neural Data Acquisition System, Plexon's flagship electrophysiology research system. This system combines front-end amplification and acquisition with intuitive and powerful control and visualization software.



The OmniPlex System incorporating Plexon's Digital Headstage Processor (DHP) subsystem and digital headstages offers:



- ◆ Up to 512 neural recording channels
- ◆ Real-time upsampling to 40kHz and adjustment of multiplexer timing offsets (equivalent to simultaneous sampling) for improved sorting quality, tetrode acquisition, and software referencing – unlike other digital headstage based systems,
- ◆ Up to 250kHz per channel digitizing rate for high-frequency, non-neural experimental data such as audio signals,
- ◆ Decreased sensitivity to ambient electrical noise and lighter headstages

With the DHP subsystem, researchers now have access to Plexon quality at very high channel counts with more affordable prices.

### Features

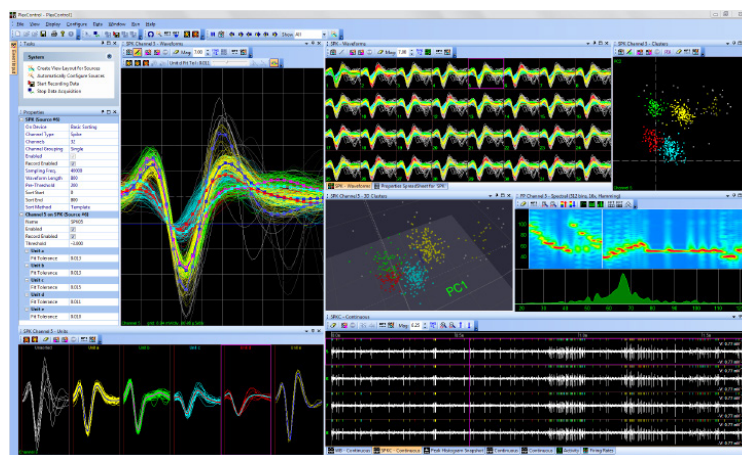
- ◆ **NEW** Spectral 3D view
- ◆ **NEW** Online spike sorting quality metrics
- ◆ **NEW** Peak-seeking automatic spike sorting
- ◆ **NEW** Interspike-interval and autocorrelation unit histograms
- ◆ MultiPlex graphical display combines a selected set of spike, continuous, and event channels into a single, configurable view
- ◆ 16 bit A/D conversion and continuous wide-band recording on all neural channels with electrical signal isolation
- ◆ Power and data combined on a single link cable which allows the input to be over 35 feet from the computer
- ◆ 25µs (40kHz) timestamping of neural and event data
- ◆ Up to 64 channels of digital input via four 16 channel ports – individual TTL inputs and/or strobed word data
- ◆ 32 additional channels of 16 bit A/D conversion for auxiliary non-neural signals, or four channels at up to 250 kHz/channel
- ◆ Software selectable digital filtering for isolation of field potential and spike frequency bands
- ◆ Digital referencing for online noise and artifact removal, including Common Average Referencing (CAR) and Common Median Referencing (CMR)
- ◆ **NEW** Adaptive power line noise filter
- ◆ **NEW** Highpass and lowpass filters on all continuous sources
- ◆ **NEW** Live adjustment of filters using Filter Control Panel
- ◆ Audio monitoring of wideband or spike-continuous signals through PC audio headphone or speaker outputs
- ◆ Online tetrode and stereotrode sorting
- ◆ Low end-to-end latency for real-time, closed-loop experiments
- ◆ Reliable online sorting in waveform space (time/voltage, using boxes, templates, lines, or bands) or directly in 2D/3D feature space (PCA, peak/valley, and more)
- ◆ Automatic online spike sorting
- ◆ Powerful graphical tools for manually defining and adjusting sorting parameters online
- ◆ User-definable channel mapping
- ◆ Records .PL2 and .PLX file formats
- ◆ Timed/event-triggered multiple-file recording
- ◆ Compatible with Plexon MATLAB®/C++ online and offline SDKs, PlexNet (TCP/IP or UDP), and NeuroExplorer® online link

## Subsystem Features

Features	DHP subsystem	DigiAmp subsystem
Channels	Up to 512 neural input channels	Up to 256 neural input channels
Acquisition processor	Digital Headstage Processor (DHP)	- MiniDigi™ (16 to 64 channels) - DigiAmp™ (64 to 256 channels)
Headstage compatibility	8, 16, 32 and 64 channel Plexon digital headstages	8, 16, 32 and 96 channel Plexon analog headstages, including biopotential headstages
Commutator compatibility	Carousel™ Commutator	- PlexBright Dual LED + 16 Channel Commutator - Standard Motorized Commutator - Standard Commutator
Electrode testing	Internal electrode impedance measurement	External impedance measuring instrument
Suggested application	Neural recording with digital headstages	Neural recording with analog headstages and/or when using biopotential headstages

## PlexControl

- ◆ Powerful online software for the OmniPlex System
- ◆ Easy-to-use signal visualization, spike detection and sorting algorithms
- ◆ Continuous spike, field potential, and wide-band signal displays in PlexControl's flexible, customizable user interface
- ◆ Detected spike waveform segment visualization and associated 2D and 3D feature space clusters for online spike-sorting
- ◆ Many online spike-sorting methods (box, template, line, band-sorting in time/voltage space, and contour-sorting in PCA feature space)
- ◆ Flexible unit definition based upon snapshots of live data or "drawing" directly on live data in real-time
- ◆ Automatic setting of thresholds and spike sorting (clustering) to facilitate rapid setup of large numbers of channels
- ◆ Each data type may be recorded to disk on a per-channel basis (e.g. continuous spike, field potential and wide-band signals, thresholded spike waveform segments and digital event data)



## OmniPlex Server

- ◆ The "engine" under PlexControl
- ◆ Based on a modular, extensible architecture of hardware and software devices, interconnected in a dataflow topology
- ◆ Topology Wizard allows users to easily define custom configurations without tedious low-level editing
- ◆ Online client programs may access real-time data
- ◆ Compatible with Plexon's existing online MATLAB and C/C++ APIs and Client Development Kits, and the online NeuroExplorer link – enabling low-latency, closed-loop experiments and online analysis of live data
- ◆ Remote online data access across any TCP/IP or UDP network using PlexNet
- ◆ Flexible digital filtering functionality in OmniPlex is also incorporated in the Offline Sorter program, enabling the user to apply the same filters offline to continuously sampled data as is used online

A demo version of the OmniPlex software is available on the Plexon website (<https://plexon.com/products/omniplex-software/>)  
No OmniPlex hardware is required.

