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## PL2 IS HERE! OMNIPLEX V1.9, OFS 3.3, AND NEUROEXPLORER 4.125 RELEASED

### PL2™ IS HERE! LOAD LARGE NEURAL DATA FILES FASTER THAN EVER!

If your lab generates large neural data files – you do not want to miss this! Introducing Plexon's new PL2™ format enabling much faster read-time over PLX files – 10, 100 or even 1000 times faster!

When continuous wideband data is being recorded at a 40KHz sample rate, the data rate for 16 bit samples is 288MB per hour per channel. That translates to 36.8 GB/hour for 128 channels and 73.7 GB/hour for 256 channels – not including other types of data or file system overhead. The file size can quickly become unwieldy. Even when not recording wideband data, the files can become quite large when the channel count is high. Accordingly, these large, high-resolution files can take a very long time to load for analysis.

To address this issue, Plexon has taken the lead, once again, and advanced its original industry-standard recording format to develop a game-changing new file format – PL2 – that significantly improves the efficiency of the analysis process.

#### The PL2 file format:

- Is significantly faster in single channel read time depending on file length, types of data, and number of channels. Individual channels can be loaded from files hundreds or even thousands of times faster.
- Enables up to 50% faster block level reads, as in reading the file sequentially.
- Is a more general format representing all existing PLX data plus more channels and additional types of data including system configuration and individual channel metadata.
- Generates a somewhat smaller file size compared to Plexon's previous PLX format.
- Is recorded in real time by Plexon's OmniPlex® Neural Data Acquisition System .
- Requires OmniPlex Software v1.9 or later.
- Is an option – researchers can choose to record using either the new PL2 format or the original PLX format.
- Can be created by converting an existing PLX file using PlexUtil 4.0.

According to researcher Nick Steinmetz, Stanford University, "For very large recordings I have made (32 channels, several hours duration,

40kHz sampling rate, as large as 50GB), reading data into MATLAB® was very time consuming using the old PLX data format. By converting to the new PL2 format, these files can now be read extremely efficiently, enabling some analyses I couldn't otherwise perform. Using PL2 has been a fantastic improvement!"

Learn more in our white paper *PL2 File System Overview*. The suite of PL2-compatible software (including OmniPlex 1.9, PlexUtil 4.0, Offline Sorter™ 3.3, NeuroExplorer® 4.125 and new PL2 SDKs ) is now available online and can be downloaded from the website's Support section, Software Downloads area. With the appropriate version license key for the corresponding software program, these PL2-compatible releases are available free of charge.

For more information, contact [info@plexon.com](mailto:info@plexon.com)

### RECORD PL2 FILES WITH OMNIPLEX V1.9

At the heart of the PL2 launch is the newest software release for the OmniPlex Neural Data Acquisition System. OmniPlex Software v1.9 now records files in the both the original PLX and new PL2 formats, and reduces client latency for DigiAmp™ systems to ~1ms! Researchers are empowered to acquire and analyze data faster than ever before!

The new PL2 format significantly improves efficiency of analysis of large, high-resolution neural data files. In tests, a file containing ten minutes of spike (SPK), wideband (WB), and field potential (FP) data from 256 channels was recorded in both PLX (13.8GB file) and PL2 (11.4GB file) formats. Single channel reads as performed by Offline Sorter™ and MATLAB® programs resulted in the following:

	PLX	PL2
SPK channel:	275.0s	0.18s
WB channel:	275.7s	2.50s
FP channel:	275.5s	0.08s

Not only does OmniPlex v1.9 now enable ultrafast data loading for analysis through PL2, but combined with a DigiAmp (64 through 256 channels) or MiniDigi™ (16 through 64 channels) Digitizing Amplifier, it yields an almost negligible system latency of ~1ms. This figure is the actual end-to-end latency through the entire OmniPlex System from spike input through an online user client program to a hardware output.

OmniPlex Software v1.9 further offers a breadth of added, expanded or improved functionality including new features for stereotrode and tetrode users. To compliment the significant advancement of the OmniPlex software, Plexon has developed the new *OmniPlex Neural Data Acquisition System User Guide* that offers a wealth of new information, step-by-step instructions and tips for better results.

The OmniPlex Software v1.9 release is available online at no charge to all customers with an OmniPlex System license key. For more information, email [info@plexon.com](mailto:info@plexon.com).

#### CONVERT PLX TO PL2 WITH PLEXUTIL 4.0

PlexUtil is Plexon's file utility program that permits the manipulation of neural data files such as creating subsets of data and/or merging data.

PlexUtil version 4.0 is an important component of the new, game-changing PL2 file format launch. PlexUtil 4.0 will enable researchers to convert their PLX files into PL2 files, accessing the ability to load large neural data files faster than ever. Researchers wishing to convert PLX to PL2 files will first need to do the following two things:

- Download PlexUtil 4.0, and
- Ensure that their OmniPlex and/or MAP System license keys have been upgraded (at no charge) to unlock access to the PL2 conversion functionality.

Upgrading the license keys is a simple process. Researchers should email [support@plexon.com](mailto:support@plexon.com) with their OmniPlex and/or MAP System license key serial numbers (found on the back of the key after the "SN:") and request the PL2 upgrade codes. Plexon will reply with the codes and further instructions. With the upgraded license keys and PlexUtil 4.0 running on the computer, researchers will be ready to convert files.

Both the latest PlexUtil release and the upgrades to the OmniPlex and/or MAP System license keys are free of charge. For more information, visit the PlexUtil webpage or email [info@plexon.com](mailto:info@plexon.com).

#### SORT PL2 FILES WITH OFFLINE SORTER 3.3

Offline Sorter is the most recognized and trusted offline spike sorting software in the industry today, with more than 800 publications specifically citing its use. In addition to reading Plexon file types, it reads file types from many data acquisition systems and software programs across the industry.

Its newest release necessary for reading PL2 files, Offline Sorter 3.3, now reads PL2 files! The PL2 format benefits will be most evident when loading large data into Offline Sorter becomes hundreds or even thousands of times faster.

In addition to the added PL2 functionality, Offline Sorter v3.3 is packed with new features and improvements including a new tool to invalidate high-amplitude artifacts; a completely re-written Waveforms View for much faster rendering of large numbers of waveforms; the addition of alignment during waveform extraction; support for enhanced PCA; the ability to define Time Segments interactively and invalidate waveforms in the current segment via the Timeline View right click menu; and much more.

Offline Sorter 3.3 can be downloaded online free of charge for those with an Offline Sorter v3 license key. If you do not have a license key for version 3, this is an excellent time to upgrade. Take advantage of the 30th Year Anniversary promotions . For more information, email [info@plexon.com](mailto:info@plexon.com).

#### ANALYZE PL2 FILES WITH NEUROEXPLORER 4.125

NeuroExplorer is the undisputed industry gold standard in neural data analysis programs, cited by more than 1,500 scientific publications – and it now reads PL2 files! The newest release, version 4.125, can be accessed through the Plexon website or directly on the NeuroExplorer website.

#### PLEXON CLOSED JULY 4TH

In observation of Independence Day, Plexon's world headquarters will be closed July 4, with standard operations resuming the next day on July 5th. Plexon Europe will remain open all of that week.

#### OFFLINE SORTERTM PROMOTION

Get in on our 30th Anniversary specials for Offline Sorter (OFS) version 3! When you purchase OFS v3, choose either a special pricing (~\$1,000 savings) or an extra license (\$2,000+ savings). Email [info@plexon.com](mailto:info@plexon.com) to request a quote or place an order. This promotion expires December 20, 2013.

## INNOVATION FOR THE NEXT 30 YEARS

Plexon continues to celebrate its 30th year serving researchers around the globe!

## RESEARCH SPOTLIGHT

Let us know about your 2013 publication citing Plexon and our equipment and we will send you a thank you award with a mug and a T-shirt! Send notices, address and T-shirt size to publications@plexon.com.

All articles listed are alphabetical based on first author within two categories: articles published online in electronic-only journals or ahead of print, and articles published in full print.

### Recent articles published online in electronic-only journals or ahead of print:

- Bissonette, Gregory B., Amanda C. Burton, Ronny N. Gentry, Brandon L. Goldstein, Taylor N. Hearn, Brian R. Barnett, Vadim Kashtelyan, and Matthew R. Roesch. "Separate Populations of Neurons in Ventral Striatum Encode Value and Motivation." *PLOS ONE* 8, no. 5 (2013): e64673.
- Bu, Jing-Yi, Hao Li, Hai-Qing Gong, Pei-Ji Liang, and Pu-Ming Zhang. "Gap junction permeability modulated by dopamine exerts effects on spatial and temporal correlation of retinal ganglion cells' firing activities." *Journal of Computational Neuroscience* (2013).
- Caracheo, Barak F., Eldon Emberly, Shirin Hadizadeh, James M. Hyman, and Jeremy K. Seamans. "Abrupt changes in the patterns and complexity of anterior cingulate cortex activity when food is introduced into an environment." *Frontiers in Neuroscience* 7 (2013).
- Cherian, Anil, Hugo L. Fernandes, and Lee E. Miller. "Primary motor cortical discharge during force field adaptation reflects muscle-like dynamics." *Journal of Neurophysiology* (2013).
- Dong, Qi, Liping Du, Liujing Zhuang, Rong Li, Qingjun Liu, and Ping Wang. "A Novel Bioelectronic Nose based on Brain-machine Interface using Implanted Electrode Recording in vivo in Olfactory Bulb." *Biosensors and Bioelectronics* (2013).
- Fanelli, Rebecca R., Jeffrey T. Klein, Rebecca M. Reese, and Donita L. Robinson. "Dorsomedial and dorsolateral striatum exhibit distinct phasic neuronal activity during alcohol self-administration in rats." *European Journal of Neuroscience* (2013).
- Hwang, Eun Jung, and Richard A. Andersen. "The utility of multichannel local field potentials for brain-machine interfaces." *Journal of Neural Engineering* 10, no. 4 (2013): 046005.

- Kim, B. J., J. T. W. Kuo, S. A. Hara, C. D. Lee, L. Yu, C. A. Gutierrez, T. Q. Hoang, V. Pikov, and E. Meng. "3D Parylene sheath neural probe for chronic recordings." *Journal of Neural Engineering* 10, no. 4 (2013): 045002.
- Kraus, Benjamin J., Robert J. Robinson II, John A. White, Howard Eichenbaum, and Michael E. Hasselmo. "Hippocampal "Time Cells": Time versus Path Integration." *Neuron* (2013).
- Suzuki, Ikuro, Mao Fukuda, Keiichi Shirakawa, Hideyasu Jiko, and Masao Gotoh. "Carbon nanotube multi-electrode array chips for noninvasive real-time measurement of dopamine, action potentials, and postsynaptic potentials." *Biosensors and Bioelectronics* (2013).
- Vazquez, Alberto L., Mitsuhiro Fukuda, Justin C. Crowley, and Seong-Gi Kim. "Neural and Hemodynamic Responses Elicited by Forelimb- and Photo-stimulation in Channelrhodopsin-2 Mice: Insights into the Hemodynamic Point Spread Function." *Cerebral Cortex* (2013).
- Viswanathan, Pooja, and Andreas Nieder. "Neuronal correlates of a visual "sense of number" in primate parietal and prefrontal cortices." *Proceedings of the National Academy of Sciences* (2013).
- Weng, Shijun, Maureen E. Estevez, and David M. Berson. "Mouse Ganglion-Cell Photoreceptors Are Driven by the Most Sensitive Rod Pathway and by Both Types of Cones." *PLOS ONE* 8, no. 6 (2013): e66480.
- Wu, Chaowen, Elena Ivanova, Yi Zhang, and Zhuo-Hua Pan. "rAAV-Mediated Subcellular Targeting of Optogenetic Tools in Retinal Ganglion Cells In Vivo." *PLOS ONE* 8, no. 6 (2013): e66332.
- Xie, Kun, Hui Kuang, and Joe Z. Tsien. "Mild Blast Events Alter Anxiety, Memory, and Neural Activity Patterns in the Anterior Cingulate Cortex." *PLOS ONE* 8, no. 5 (2013): e64907.
- Zhuang, Liujing, Ning Hu, Qi Dong, Qingjun Liu, and Ping Wang. "A high sensitive *in vivo* biosensing detection for odors by multiunit in rat olfactory bulb." *Sensors and Actuators B: Chemical* (2013).

### Recent articles published in full print:

- Lennert, Therese, and Julio C. Martinez-Trujillo. "Prefrontal Neurons of Opposite Spatial Preference Display Distinct Target Selection Dynamics." *The Journal of Neuroscience* 33, no. 22 (2013): 9520-9529.
- Li, Jennifer X., Takashi Yoshida, Kevin J. Monk, and Donald B. Katz. "Lateral Hypothalamus Contains Two Types of Palatability-Related Taste Responses with Distinct Dynamics." *The Journal of Neuroscience* 33, no. 22 (2013): 9462-9473.
- McGinty, Vincent B., Sylvie Lardeux, Sharif A. Taha, James J. Kim, and Saleem M. Nicola. "Invigoration of Reward Seeking by Cue and Proximity Encoding in the Nucleus Accumbens." *Neuron* 78, no. 5 (2013): 910-922.