# Plexon Data File Import For Matlab

This package allows importing the data from Plexon .plx or .ddt files into the Matlab workspace. It also allows writing continuous data from Matlab into a .ddt file. The package contains Matlab Executable files (mex files) that can be used in Windows (mexPlex.mexw32 and mexPlex.mexw64). The package also contains Matlab subroutine definition .m files and the source code that is used to compile Matlab Executable files in Windows or in Lunux.

The Matlab Executable files contain fast C++ code for converting .plx and .ddt files to a data format understandable to Matlab.

Matlab Executable files and the .m files need to be installed in a path known to Matlab.

The following routines provide basic functionality to read plx and ddt files. Where they overlap with previous script-based routines, they are 'drop-in' replacements for them.

See the .m files for usage and additional notes.

**plx_info** – Reads count information about a plx file.
**plx_information** - Reads extended header information from a .plx file
**plx_chan_filters** - Read channel filter settings for each spike channel
**plx_chan_gains** - Read channel gains for each channel from a .plx file
**plx_chan_thresholds** - Read channel thresholds from a .plx file
**plx_chan_names** - Reads spike channel names from a .plx file
**plx_chanmap** – Returns DSP channel number for each spike channel

**plx_ts**– Reads spike timestamps for the specified DSP channel and unit
**plx_waves-** Reads waveform data for the specified DSP channel and unit.
**plx_waves_v -** Reads waveform data for the specified DSP channel and unit. Waveform data are represented in millivolts.

**plx_vt_interpret** - takes output of **plx_event_ts** and produces an array of coordinates.

**plx_adchan_freqs** - Reads the per-channel frequencies for analog channels
**plx_adchan_gains** - Reads analog channel gains from a .plx file
**plx_adchan_names** - Reads analog channel names from a .plx file
**plx_adchan_samplecounts** - Reads analog channel sample counts for .PLX file.
**plx_ad_chanmap** – Returns raw channel number for each analog channel

**plx_ad** – Reads A/D data for the specified A/D channel
**plx_ad_span** - Reads a span of the A/D data for the specified A/D channel
**plx_ad_v** - Reads A/D data for the specified A/D channel. A/D data are represented in millivolts.

**plx_ad_span_v**  - Reads a span of the A/D data for the specified A/D channel. A/D data are represented in millivolts.

**plx_ad_gap_info** – Similar to **plx_ad**/**plx_ad_v** but returns only general information without A/D data.

**plx_event_names** - Reads event type names from a .plx file

**plx_event_ts**- Reads event data for the specified external event

**plx_event_chanmap** – Returns raw channel number for each event channel

**plx_close**  - Closes any open .plx files

**ddt**  - Reads data from a .ddt file..

**ddt_v**  - Reads data from a .ddt file. A/D data are represented in millivolts.

**ddt_write_v -** Writes data to .ddt file. A/D data are represented in millivolts.

**Notes :**
1. The previous versions of the MATLAB file import routines were written as pure .m scripts, with no underlying DLL. The new DLL-based approach is thus several hundred times faster than the previous .m script-based approach. These old .m scripts are included into this distribution as the old_scripts.zip file. These old .m files may be useful for instructive purposes or for those running MATLAB on non-Windows platforms. Otherwise, there is no reason to unzip the file. Note that these old .m files are no longer maintained, and new features and bug fixes will be not be added to them. Also note: when reading .plx or .ddt files into MATLAB on non-Windows platforms, be aware that there may be a byte-ordering issue. Plexon files are written with little-endian byte ordering, and MATLAB by default expects binary files with the system native byte-ordering, which may be big-endian on Mac platforms.
2. Conceptually, channels in .plx data files will be 'collapsed' into a contiguous block of n channels, regardless of their original numbering, and n is reported back as a return value in some calls. All access to the channel's data through the API is via its new, 'collapsed' index 1..n. If there are gaps in the channel numbers in the original .plx file, the channels names returned from plx_chan_names (which have also been collapsed) can be used to identify the channel.

**Changes:**

Version 1.1.0, 5/10/04
- Initial release of dll-based package

Version 1.1.1, 1/7/05
- Update to handle version 105 .plx files.

Version 1.2.0, 2/7/05
- Changed plx_ad: before this version plx_ad returned each data block as a separate fragment, now each fragment is a collection of data blocks without time gaps
- Added plx_ad_v: functionality is similar to plx_ad but it returns A/D samples converted to millivolts
- Added plx_ad_span_v: functionality is similar to plx_ad_span but it returns A/D samples converted to millivolts
- Routines that return [n, arrayOfData] now will always create arrayOfData. If they cannot fill it (e.g. calling plx_chan_thresholds on a data file that has no spike channels), they will print an error message, set n=0, and set arrayOfData to some nonsense value. Routines affected: plx_adchan_freqs, plx_adchan_gains, plx_adchan_names, plx_chan_filters, plx_chan_gains, plx_chan_names, plx_chan_thresholds, plx_event_names.

Version 1.2.1, 5/10/05
- Added plx_waves_v: functionality is similar to plx_waves but it returns waveform samples converted to millivolts.
- Added missing argument to the comment that defines plx_information.

Version 1.3.0, 11/17/05
- Added plx_vt_interpret: takes output of plx_event_ts and produces an array of coordinates.
- Added ddt_v: functionality is similar to ddt but it returns samples converted to millivolts.

Version 1.4.0, 1/10/06
- Added plx_close: closes any open .plx files
- Added plx_adchan_samplecounts: reads analog channel sample counts for .PLX file.

Version 1.4.1, 2/21/06
- Added processing of disabled channels in .DDT files.
- Added support of arbitrary spike channels to .PLX processing.

Version 1.4.2, 3/13/06
- Added plx_ad_gap_info: reads information on A/D channel.
- Fixed bug in ddt_v that caused voltages to be 2x too small

Version 1.4.3, 3/28/06
- Fixed bug in ddt_v for DDT v103

Version 1.4.4, 4/4/06

- Added ddt_write_v

Version 1.4.5, 10/23/06
- Added plx_chanmap: returns map of raw DSP channel numbers
- Allow up to 256 analog channels

Version 1.5.0, 1/3/07
- Added plx_ad_chanmap: returns map of raw analog channel numbers

Version 1.6.0,  4/2/10
- Added large channel count support (which changed syntax of plx_info command), added plx_ev_chanmap, added R2010a and 64-bit support.

Version 1.7.0, 10/5/11
- Added more checking of input parameters. Refactored C++ source code so that it compiles in Windows and Linux. Added source code and verification tests.
- Added Matlab Executable file for 32-bit Linux

Version 1.7.1, 2/8/12
- Changed error checking for the plx file header. Plx files with invalid file header waveform frequency can now be opened. Added verification tests.
- Matlab Executable file for Linux is not included.