

Deuteron Technologies Ltd

Electronics for Neuroscience

Neural File Explorer Reference Manual Version 2.7

23 November 2023

Contents

1. Getting started with recordings – overview	3
2. File compression	4
2.1 Event Compression	4
2.2 GPS compression	5
2.3 Sorting neural data by channel	5

1. Getting started with recordings – overview

Congratulations! You have your first Deuteron recordings, which are probably a few gigabytes in size. To start dealing with your data, we have provided a utility that performs various types of compression by reorganizing your data into easy to manage formats. Using the utility `Neural_File_Explorer_v2_7.exe`, you can view your files sorted into recordings.

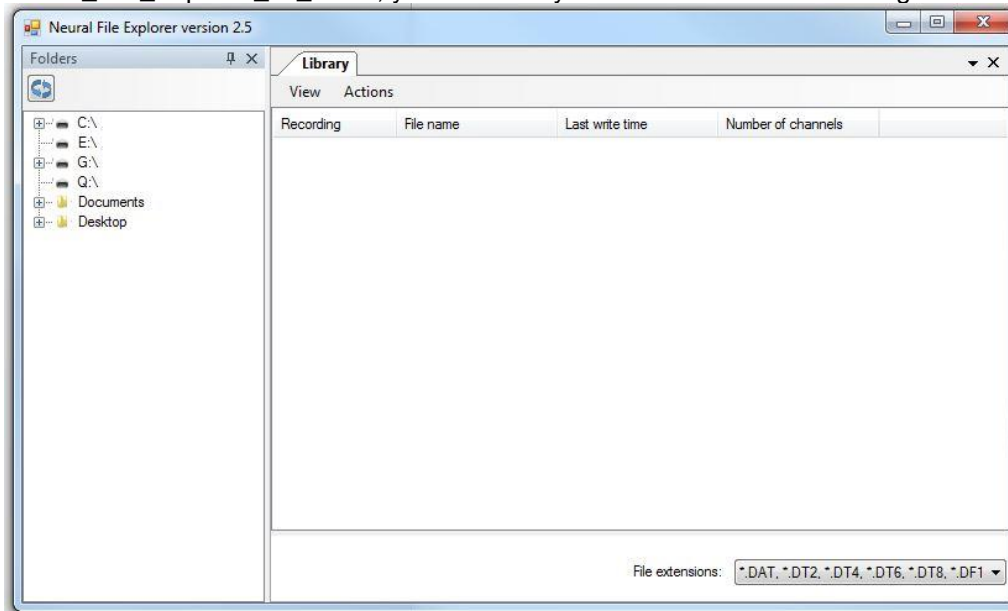


Fig 1. The welcome screen of the Neural File Explorer

In the left panel you can click on drives or folders to show which Deuteron data files are contained in the folder. Clicking the expand button (+) on the left of the name of the folder or drive will expand the folder and display all of its contents in the left panel, while displaying the list of Deuteron data files in the right panel. Clicking on the folder name will display the list of Deuteron data files in the right panel without showing the other contents of the folder on the left panel. The Deuteron data files in the right panel will be displayed sorted by recordings (see fig. 2).

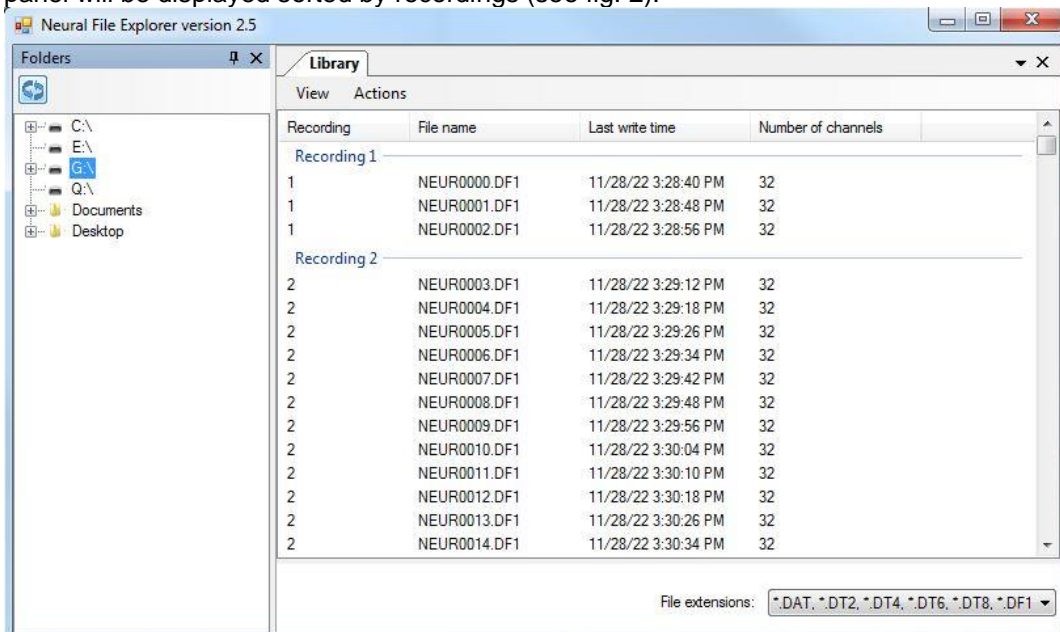


Fig 2. Neural file exploring showing the list of recordings and files contained in the G:\drive

To view only basic details about each recording, click View -> Recordings. This view will display information about each recording, including date, start and end time, number of channels, etc. (see fig. 3).

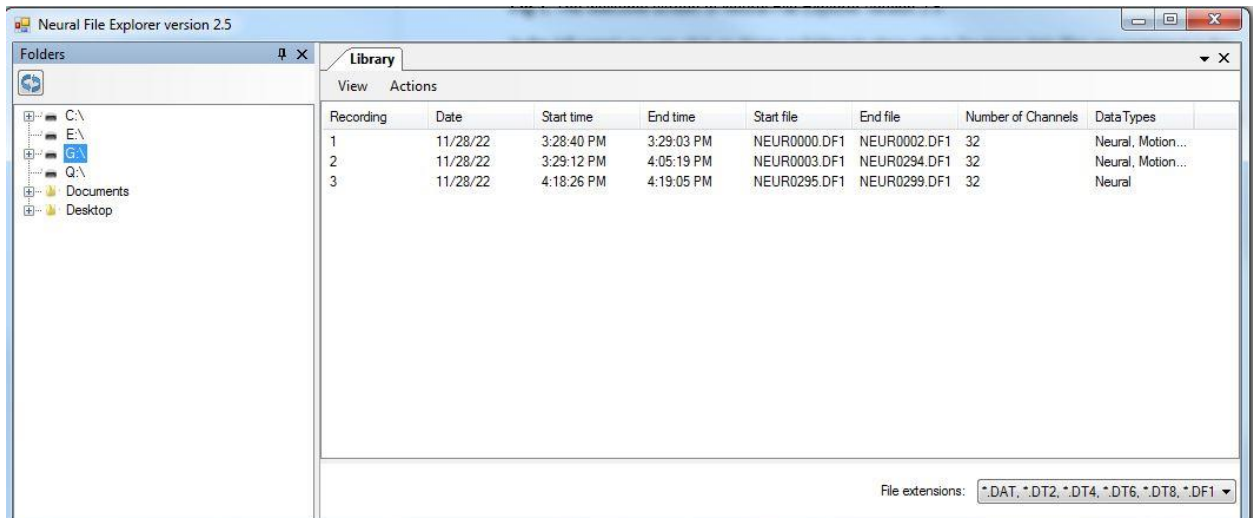


Fig. 3 Recordings view of files contained in this folder.

You can export this information about files or recordings to a CSV file using Actions->Export->To CSV

2. File compression

To perform any of the actions listed in the next paragraph, you will need to make sure you are in the "Files" view (View->Files).

Currently the program allows you to perform three possible actions: compress events, compress GPS, or sort neural data into channels. These can all be found under the Actions category in the right panel. You can click on the name of the recording to select all files in that recording, or hold Ctrl+shift while clicking on all files you would like to be included. When the files you select are highlighted, click Actions-> select the action you would like to perform.

2.1 Event Compression

Event compression retrieves events from all data files and store them in a single (or perhaps 2) 16MB files), which will dramatically reduce the processing time of events in the future. The software will ask for the folder you would like to save the compressed event files in and will name the event files as EVNT000x.DF1 where x is 0 for the first file, and if your events exceed 16MB then in the next compressed event file, x will be 1, etc. This step is highly recommended if you have more than ~10 files.

2.2 GPS compression

Compress GPS allows you to retrieve all GPS data from .DF1 files and store them in binary format. First it will ask if you would like to perform a checksum on your GPS data, offering you three options: to skip the checksum, to perform it using NMEA format, or to perform it using UBX format. When you have made your selection and clicked OK, it will ask which folder you want to save the compressed GPS data in and what to name the file. It will then open a log where notes and comments will be written, and it will store the data in a binary format which can be viewed using u-center software from <https://www.u-blox.com/en/product/u-center>.

2.3 Sorting neural data by channel

Sorting neural data by channel will retrieve all the neural data from the files and save them in binary format to a collection of files, one file for each channel's data. You will be asked for the location to save the files, and a folder in this location will be created and named as follows: yyyy_mm_dd_sssss where yyyy is the year, mm is the month, dd is the day, and sssss is the seconds from midnight at the time of saving the file. Inside this folder there will be n files, where n is the number of channels. The folders will be titled ch_xxxx where xxxx is the zero-padded channel number. These files can be read directly into Matlab as 16 bit signed integers using the fread function, and converted to physical units (volts) using the formula described in DeuteronDataFileManual7_1.pdf in section 5.2, Neural data.