

# Ephys pipeline overview

## Folder structure

- Y:\Data\TDTtanks\Monkey\_phys contains the Raw TDT data
- Y:\Data\Sortcodes\Monkey\_phys contains sorting related files
- Y:\Data\Monkey contains the behavioral data
- Y:\Data\Monkey\_phys\_mat\_from\_TDT contains recorded data, arranged in the same trial structure as the behavioral data
- Y:\Data\Monkey\_phys\_combined\_monkeypsych\_TDT contains trial structures with combined behavioral and ephys data
- Y:\Data\All\_phys\_preprocessing\_log\Monkey\_phys contains automatically created log files of all preprocessing performed
- \Dropbox\DAG\phys\Monkey\_phys\_dpz contains
  1. Electrode\_depths matfile
  2. Same\_cells matfile
  3. plx files excel table
  4. Sorted\_neurons excel table

## General Workflow

- Update Electrode depths matfile. Only block/channel combinations defined here will be processed (?)
- (Optional - Synapse only) Reformat Synapse tank folder format to match previous conventions
- (Optional - WC only) Run waveclus automatic sorting (Channels with electrodes in the same depth across blocks will be combined across blocks)
- (Optional - WC only) manually refine WC sorting
- (Optional - Plexon only) Create Plexon sortcodes
- (Optional - Plexon only) Manual Plexon sorting
- Update plx files excel table
- Combine TDT and behavioral data
  1. Create TDT trial structure
  2. Combine
- Update Same\_cells matfile
- Update sorted\_neurons excel table

Most of the steps above are automatized, check out phys\_gui page for details.

## Synchronization

- TDT data is stored as a continuous data (starting from start of recording)
- behavioral data is stored per trial (starting from first trial)

For combining both, we first convert TDT data to trial format (function TDT\_trial\_struct.m) preferentially using epochs store (Tnum and SVal) information.

Note: There is a flag for using the continuous state information stream (stream\_state\_info), but it is permanently turned off, as the epoc information is already extracted from the continuous state information within the TDT circuit.

Importantly, trial start reference is STATE 2 (fixation acquisition). Trial end is STATE 2 of the next trial. Therefore, ITI between trial 1 and 2 as well as STATE 1 (initiation) of trial 2 are found at the end of trial 1.

This also means that data recorded before 1st trial's state 2 can not be stored in the trial structure and is saved in a separate variable (First\_trial\_INI) instead.

## Associated code

The entire code related to phys preprocessing (not including Waveclus and Plexon) can be found on Github Phys\_preprocessing repository

- Core functions
  1. phys\_gui\_working.m
  2. phys\_gui\_execute.m
  3. TDT\_trial\_struct.m
  4. ph\_combine\_MP\_and\_TDT\_data
  5. DAG\_update\_sorting\_table.m
- Waveclus pipeline specific
  1. DAG\_WC3\_preprocessing.m
  2. DAG\_parse\_data\_tdt.m
  3. DAG\_SpikefilterChan.m
  4. WC32SPK\_directly.m
  5. ph\_readout\_broadband\_lag.m
- Plexon pipeline specific
  1. DAG\_create\_PLX.m
  2. DAG\_update\_plx\_file\_table.m
  3. ph\_get\_new\_plx\_extension.m
- Extra standalone functions
  1. DAG\_derive\_TDT\_streamer\_broadband\_lag.m
  2. ph\_debugging\_GUI.m
  3. DAG\_take\_over\_sortcode\_PLX2PLX.m
- Only of historical relevance
  1. DAG\_move\_sorting\_files.m Was used to transfer sortcodes to their current destination
  2. ph\_derive\_electrode\_depth.m Was used to create the first electrode\_depths file extracting from sorted\_neurons table
  3. ph\_derive\_same\_cells.m Was used to create the first same\_cells file extracting from sorted\_neurons table
  4. ph\_simulate\_history.m Was used to create the first log files

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