

# Synchronization

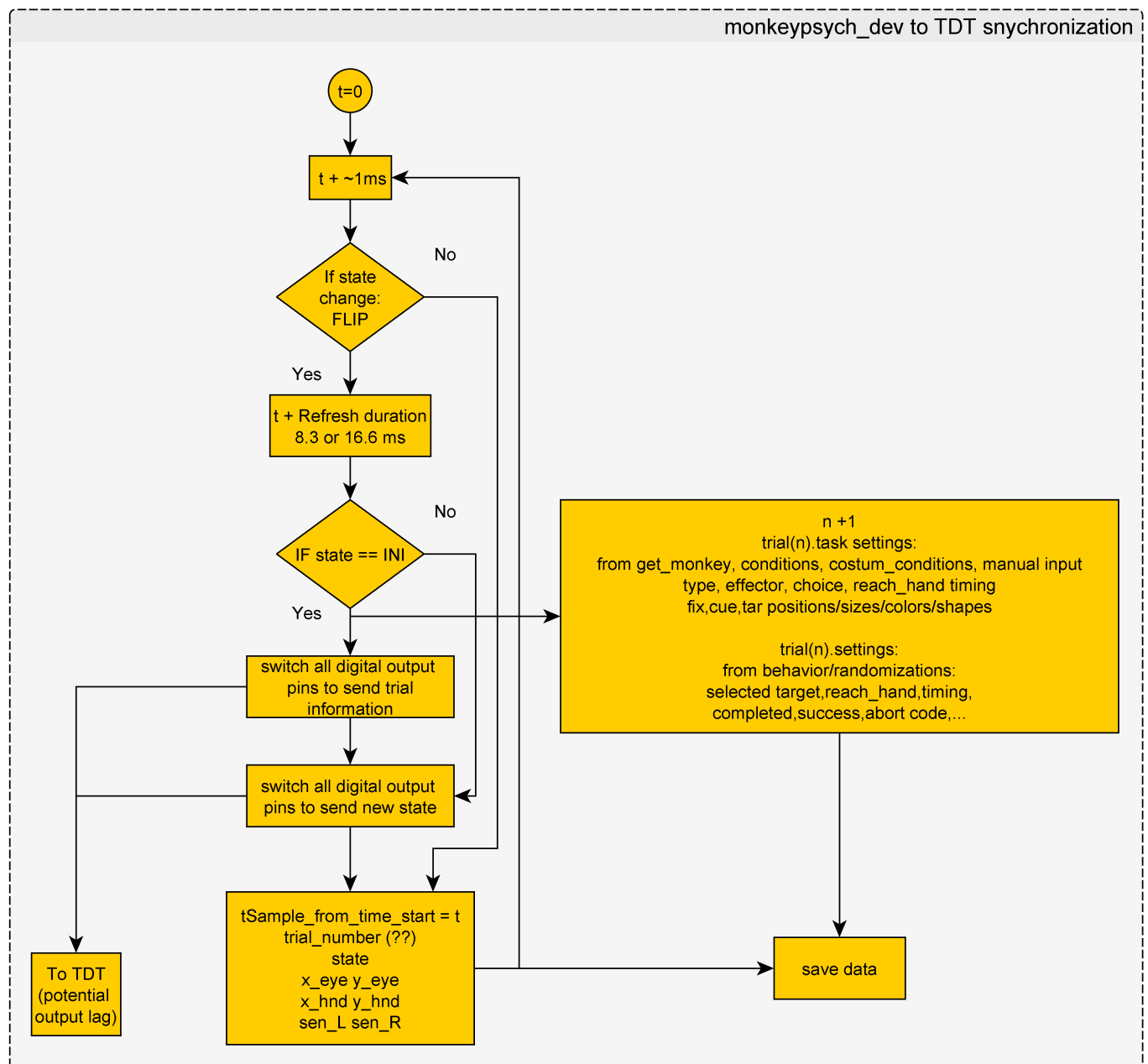
This section describes how synchronization is achieved.

- 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 epocs store (Tnum and SVal) information.

Note: There is a flag in TDT\_trial\_struct for using the continous 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 (see [RCO](#) ) But first things first, how do we make sure we CAN synchronize TDT and behavioral data?

## Synchronization during recording



Note that pins are only switched either to send trial information or after a state change (AND after the flip happened!) The idea is that both trial information and state information can be sent via the same channel. Details are described below.

## Resulting 8 pin state signal



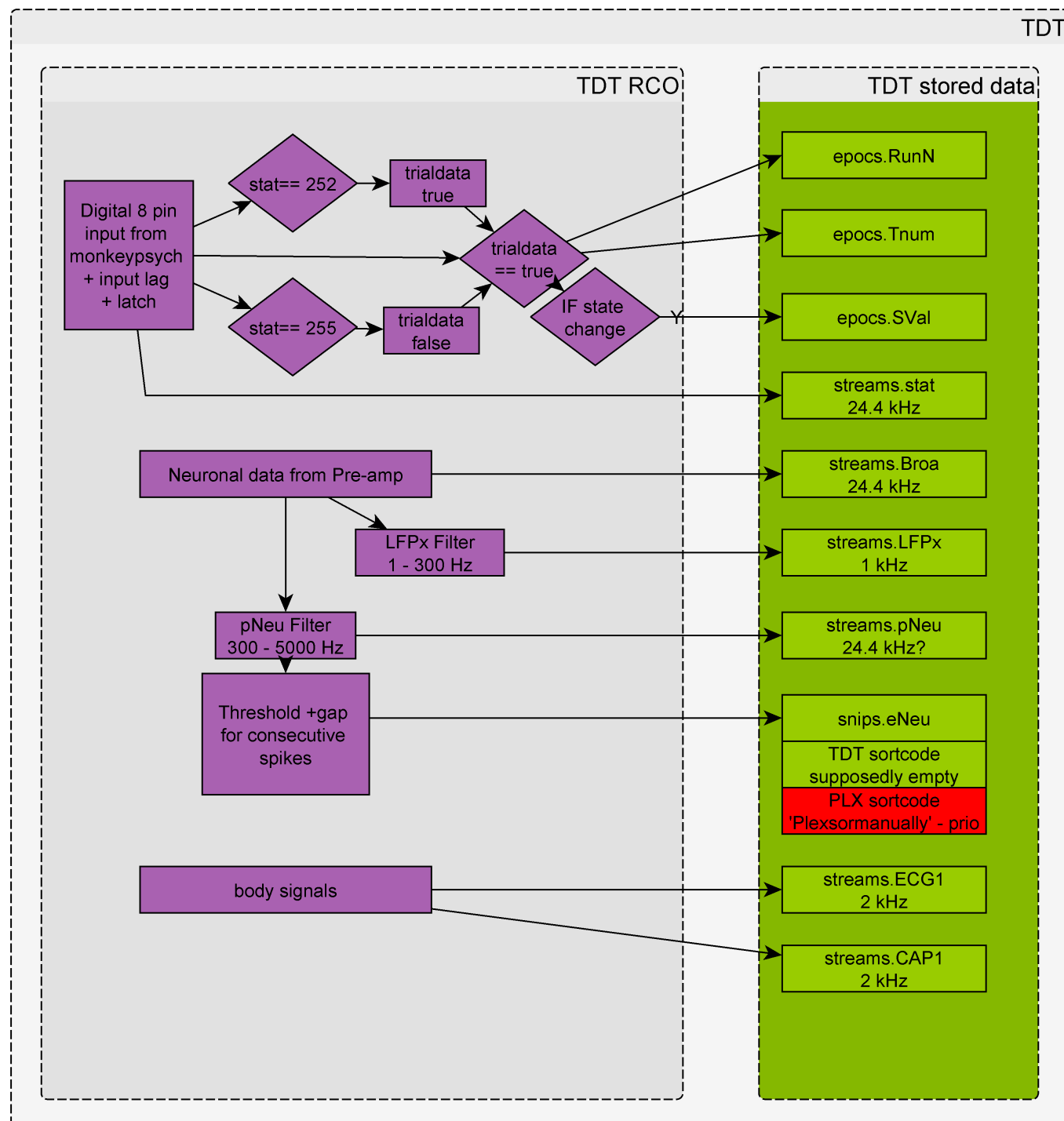
Values of 252 to 255 are preserved for indicating start of trial/state information and in-between trial information stoppers:

- 252: indicates start of trial information
- 254: in between trial information to define trialinfo packages

- 253: end of trial information
- 255: start of state information

Note that due to preserved values, a trial information package maximum value is limited. For example, to encode the date first package would be first 2 digits of the year, second package the last 2 digits of the year, third package the month and fourth package the day. That way none of the packages reaches a value of over 100. Trial information is sent during INI (state 1), during the other states the stat value reflects the current state.

## **Internal RCO deriving state onsets and trial information**



## Snippet and Stream synchronization in the combined trial structure



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. Everything before first trials INI is discarded.

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