Countermanding file variable definitions

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This list represents a quick reference guide to the variables which are generated by file translation of strobed events by plx2mat.m, . It is intended that the list be maintained by individuals adding, deleting, or changing underscore variables calculated by this matlab function, although there is obviously no substitution for first-hand consultation of the code itself. Please note that:

* all times are relative to TrialStart\_ unless noted otherwise
* Strobed events (15 bit words) are sent from the TEMPO server to the MAP box in response to events occurring during recording sessions
* A complete understanding of these strobed events, and thus the underscore variables demands consultation of the TEMPO code
* Though they are not explicitly represented in underscore variables, the following strobed events characterize trials and help to construct several underscore variables;

1501 = cmanding session

1502 = mguided session

1503 = mapping task

Abort\_ = Strobed event # 2620. If the monkey does not attain fixation or the monkey broke fixation before the target came on, the trial is aborted. Abort\_ records the time in ms that a trial was aborted.

Correct\_ = Strobed event # 2600. Correct\_ records the time in ms that a trial was deemed correct by TEMPO online. Only 2 events, successful fixation in the fix window on canceled trials or successful fixation of the target in no stop trials, will cause this strobe to be sent.

Decide\_ = Strobed event # 2811. Decide\_ records the time in ms that the subject’s gaze entered the target window as recorded online by TEMPO.

Eot\_ = Strobed Event # 1667. (End of trial) Eot\_ records the time in ms that trial strobed events ended. Note: StartTrial\_ to Eot\_ will not be a constant even if trial length is held constant. This is b/c Eot\_ is sent before the inter trial interval is added to make the trial length constant.

EyeX\_

EyeY\_

FixSpotOff\_ = Strobed Event # 2300. FixSpotOff\_ records the time in ms at which the fixation spot was extinguished as judged online by TEMPO (not the photodiode marker).

FixSpotOn\_ = Strobed Event # 2301. FixSpotOn\_ records the time in ms at which the fixation spot was ignited. Note that this is calculated from the photodiode, and not from a strobed event.

Fixate\_ = Strobed Event # 2660. Fixate\_ records the time in ms at which fixation was achieved. This value is calculated as the first time the eyes entered the target window after FixSpotOn\_.

Header\_ =

GOCorrect = Array of trial indices indicating correct no stop trials. Array is x by y dimensions where x = # of correct trials and y = targets.

GOWrong = Array of trial indices indicating incorrect no stop trials. On these trials, the monkey failed to make a saccade to the target. Array is x by y dimensions where x = # of correct trials and y = targets.

Infos\_= These strobed event signal that a number will follow which corresponds to different aspects of the current trial. These numbers are then recorded in the appropriate columns of Infos\_ . The following are the events recorded in Infos\_ under the columns indicated.

1).NPOS = Strobed event 2721+1. The number of possible target locations on that trial.

2).Pos = Strobed event 2722+1. Target position (in 0, 1, 2, etc. convention)

3).SOUND = Strobed event 2723+1. Flag which indicates whether or not an acoustic stop signal was used.

4).ISNOTNOGO = Strobed event 2724+1. Flag which indicates when a stimulated No Stop trial occurred.

5).Empty for countermanding???

6).TrigChange = Strobed event 2726+1. Flag which indicates if color change was used as a stop signal.

7).REWARD VOLUME = Strobed event 2927 +1. Amount of time in ms that the juice solenoid was allowed to remain open.

8).REWARDRATIO = Strobed event 2728+1. The percentage of correct trial which are rewarded. Note that PDP files record these as an integer (1 over the said integer).

9).NOGO\_Ratio = Strobed event 2729 +1. The percentage of trial which include a stop signal. PDP files also record this as an integer where ratio is equal to 1 over the integer.

10).ISNOGO = Strobed event 2730+1. Flag which indicates if a trial includes a stop signal.

11).STOP ZAP = Strobed event 2731+1. Time that stimulation was applied relative to marker. Comment in protocol says to subtract 700 from this value, but this is incorrect.

12).Stimulation Duration (ms) = Strobed event 2731+1. In theory this column could contain the duration of injected current although in practice it currently records nothing.

13).EXPONENTIAL HOLDTIME = Strobed event 2733+1. Flag which indicates whether or not hold time is aging.

14).HOLDTIME = Strobed event 2734+1. Time between FixOff\_ and Target\_. Note that this name is misleading. It does NOT refer to time between FixOn\_ and Target\_.

15).HOLD JITTER = Strobed event 2735+1. Jitter that may be applied to the HOLDTIME above.

16).Column 16 is missing in the code

17).Current SOA = Strobed event 2737+1. SSD

18).MAX\_SOA = Strobed event 2738+1. Max SSD relative to trial start.

19).MIN\_SOA = Strobed event 2739+1. Min SSD relative to trial start.

20).SOA\_STEP = Strobed event 2740+1. SOA\_STEP relative to trial start.

NOTE: Strobed event # 7000 indicates that the last strobed event has been sent. This allows Infos\_ to reinitialize in the translation code. It also signals that a lot of strobed events relating to the trial are about to be sent.

MouthBegin\_ = Strobed event # 2655. MouthBegin\_ records the time in ms that mouth movements began relative to trial start. This is detected by a motion detector which sends an analog step function (0 or 10 volts). The strobe is sent when the code detects a change in the step function which allows for significant storage savings. The matrix is zero padded because multiple mouth movements may have been initiated on any given trial.

MouthEnd\_ = Strobed event # 2656. MouthEnd \_ records the time in ms that mouth movements ended relative to trial start. Same calculation methods and recording conventions as MouthBegin\_ above.

NotStim\_ = Strobed event # 667. NotStim\_ is an antiquated variable that records time in ms at which stimulation was supposed to be delivered but was not due to error (RT before SS) relative to trial start. Is no longer used, so will always = nan.

Reward\_ = Strobed event # 2727. Reward\_ records the time in ms when reward for a correct trial was delivered relative trial start. Column 2 includes the amount of time that the solenoid was open to deliver juice.

Saccade\_ = Strobed event #2810. Saccade\_ records the time in ms when gaze left the fixation window relative to trial start. Column 2 = 0 when a saccade occurred on a given trial. (May be useful to check if eye tracker is working since it may contain Nans if saccades are not detected).

Stim\_ = Strobed event #7000(all events sent)+1.

During Cmanding; Column 1 = the eccentricity of the target in degrees. Column 2 = the angle of the target with the x axis. Column 3 = the angle between target 0 and 1. Column 4 = the angle between targ 1 and 2. Note that during trials on which only 2 targets were presented 45 is arbitrarily entered into columns 3 and 4 regardless of whether or not 45 degrees really separated the targets.

During Mguided; Column 1 = Number of eccentricities. Column 2 = Minimum eccentricity in degrees. Column 3 = Size of step between eccentricity in degrees. Column 4 = Angle between targ 1and 2.

StimuS\_ = StimuS\_ is a flag which records when the current trial was supposed to be a stimulation trial and was not due to the monkey’s response.

Stimulus\_ = Stimulus is a row vector that is only constructed from the variable Stim\_ above if the values in Stim\_ remained unchanged during the recording session. Column 1 = the number of targets present during the session. Columns 2 through 5 correspond to columns 1 through 4 of Stim\_. Note: this variable is used to construct STIMFILE which is used as an addition to Header\_.

StopSignal\_ = StopSignal\_ records the time in ms that a stop signal was presented as measured by the photo diode. Column 2 = 1 when stop signal was presented.

Target2\_(1:N\_Trials,1:2) = Target2\_ records the time in ms that the target was reignited after a saccade during the memory guided saccade task. This presentation is measured by the photodiode. Column 2 = 1 when a second target was presented.

TargetWindow\_ = Strobed event # 2771. Same logic and conventions as

FixWindow\_ (see above).

Target\_ = Target\_ records the time in ms that the target was presented relative to trial start as measured by the photodiode. Column 2 = 1,2,3,4, etc. depending on which target was presented. Note that these numbers are presented in counter clockwise fashion. (These are Cartesian coordinates except target 1 may be presented anywhere. The angle in Stimulus\_ can be used figure out where target 1 was presented.)

TrialStart\_ = Strobed event # 1666. TrialStart\_ records the absolute trial start time in ms relative to session time. Calculated by multiplying TrialStart\_TimeStamps X 1000.

TrialType\_ = Strobed event # 2928. Historically, column 3 was used to indicate on what time bin the trial start occurred on since the PDP might not start 250hz sampling on the first ms. Column 4 indicates what trial number it is. (This must be manually reset at the beginning of each block, and it will also include nans when fixation doesn’t occur.)

Unit\_= Initialized and saved but never set.

Wrong\_ = I think it is during search when gaze shifts to the distractor window. Never happens in Cmanding. Initialized and saved but never set.

Zap\_ = Strobed event # 666. Zap\_ records the time in ms when stimulation was delivered relative to trial start. Currently, it only includes the onset, although other columns are added during initialization in the hopes that some day the variable will contain other attributes of the presented stimulation.