Timing test E-Prime Markers package

# Summary

Timing of the E-Prime markers package was tested by comparing the onset and offset of pulses sent with the markers package to the UsbParMarker, with the onset and offset of pulses sent to the LPT port. Both signals were recorded with BIOPAC AcqKnowledge (LPT with Digital input, UsbParMarker in Analog channel 1).

A total of 90 pulses were sent to both devices. On average, a delay of 183.3 us was found when comparing both onsets and offsets, with a maximum delay of 550 us.

Breaking it down, pulses were sent in three different ways, 1) first to the UsbParMarker, then to the LPT port, 2) first to the LPT port, then to the UsbParMarker, 3) both pulses were set as task events of a stimulus, and thus were set high at the onset of the stimulus, and low at the offset of the stimulus.

1. When sending a pulse first to the UsbParMarker and then to the LPT port, an average difference of 301.7 us (max 550 us) was found when comparing the onset of the pulses and an average difference of 187.7 us (max 250 us) was found when comparing the offset of the pulses (tested with 30 pulses).
2. When sending a pulse first to the LPT port and then to the UsbParMarker, an average difference of 108.3 us (max 150 us) was found when comparing the onset of the pulses and an average difference of 203.3 us (max 350 us) was found when comparing the offset of the pulses (tested with 30 pulses).
3. When sending pulses as task events, an average difference of 198.3 us (max 250 us) was found when comparing the onset of the pulses and an average difference of 101.7 us (max 150 us) was found when comparing the offset of the pulses (tested with 30 pulses).

# E-Prime task

In the E-Prime Markers\_Package\_Timing\_Test task a total of 30 pulses with a value of 255 was sent to the UsbParMarker with the markers package and the LPT port. The first 10 pulses were sent to the UsbParMarker first, then to the LPT port. The second 10 pulses were sent to the LPT port first, then to the UsbParMarker. The final 10 pulses were set as Task Event and coupled to the Onset and Offset of the Stimulus object.

# AcqKnowledge template and analysis

In AcqKnowledge, the UsbParMarker signal was recorded in analog channel A1 and the LPT signal was recorded in Digital input channels D8-D15 and calculated in calculation channel C0. Signals were recorded with a sampling rate of 20000 Hz. The delays of the onset and offset of the pulses were calculated with channel C10C4. Calculation channel C1 was set to value 1 when UsbParMarker (A1) was high and LPT (C0) was low. Calculation channel C2 was set to value 1 when UsbParMarker (A1) was low and LPT (C0) was high. In calculation channel C3 the number of samples of the difference identified in channel C1 was counted. In calculation channel C4 the number of samples of the difference identified in channel C2 was counted. After recording the data the peaks of channels C3 and C4 were exported to Excel by going to Analysis 🡪 Find Cycle and using a Threshold of 0.1 V. The max of each peak represents the number of samples of each delay. Multiplying this with the sample duration, gave the delay duration.