

# E-Prime® integration in OpenSignals

## Quick Start Guide

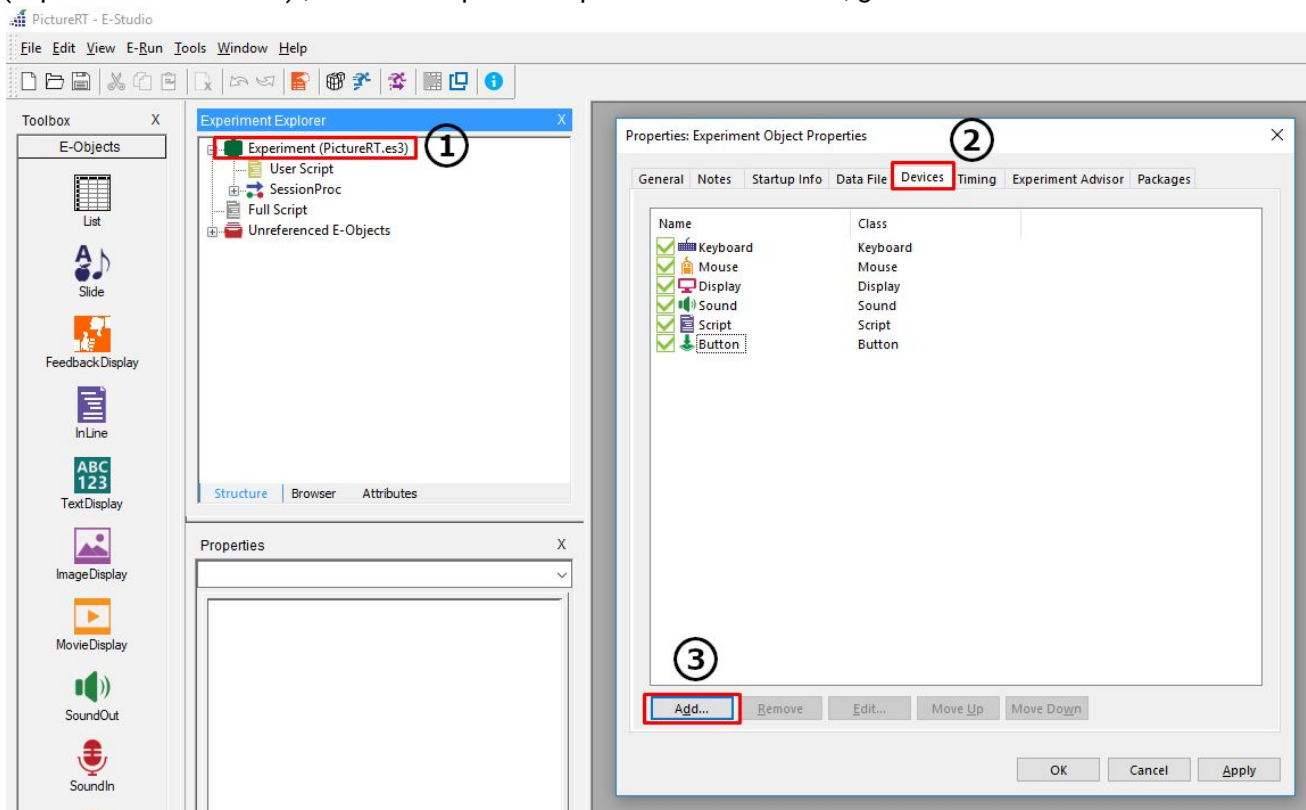
E-Prime 07062019

### INTRODUCTION

E-Prime is a software used to design and run psychological experiments, with a focus on psychological and cognitive science. The integration of E-Prime in Opensignals allows researchers to synchronize physiological data with stimuli, providing insights on psychological reflexes. To achieve this, both softwares need to be configured.

### CONFIGURING E-PRIME

1 - Firstly, you will need to add and configure a websocket. To do so, double click in "Experiment (experiment\_name.es3)", which will open a Properties window. Then, go to "Devices" and click "Add...":



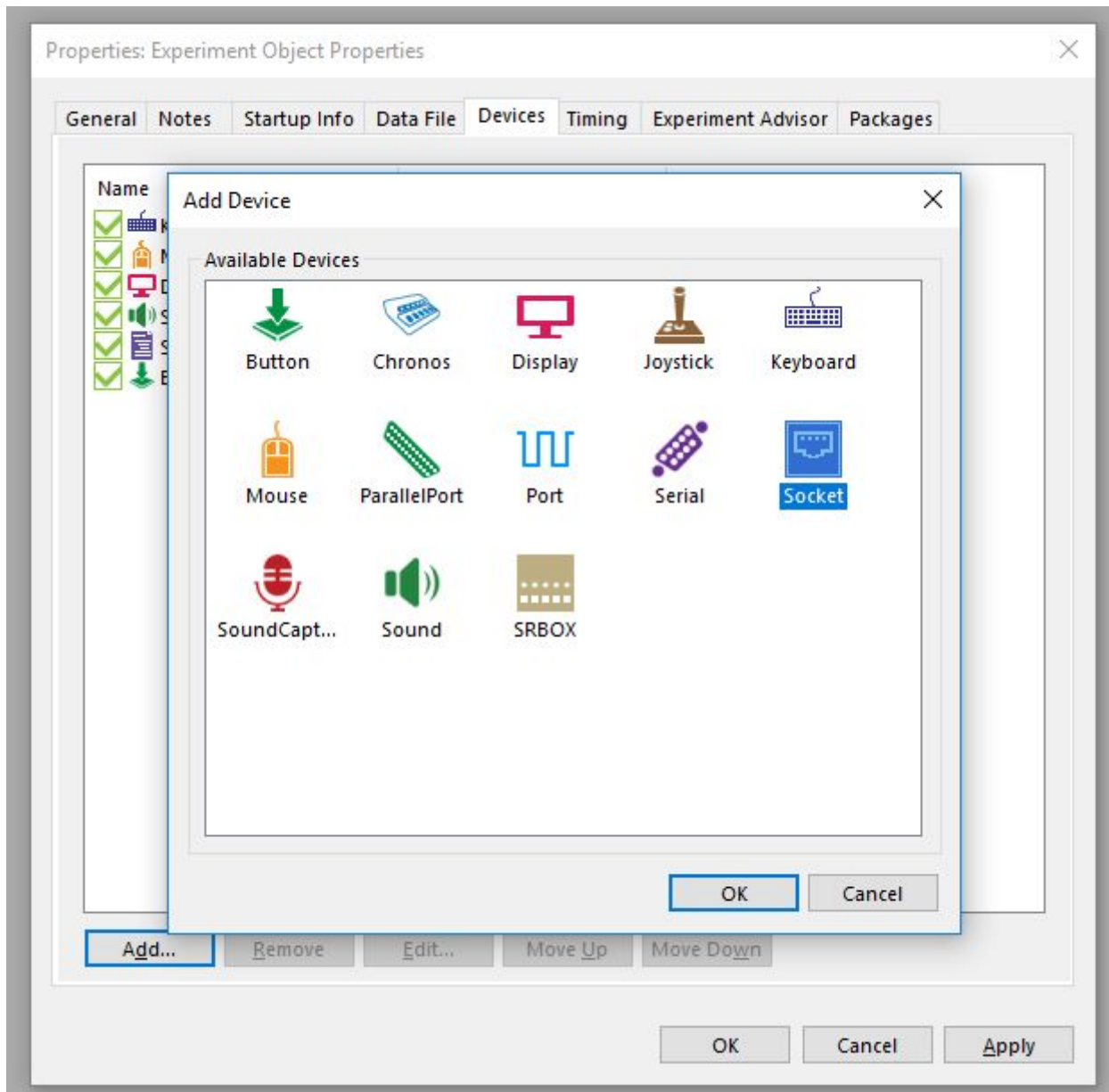
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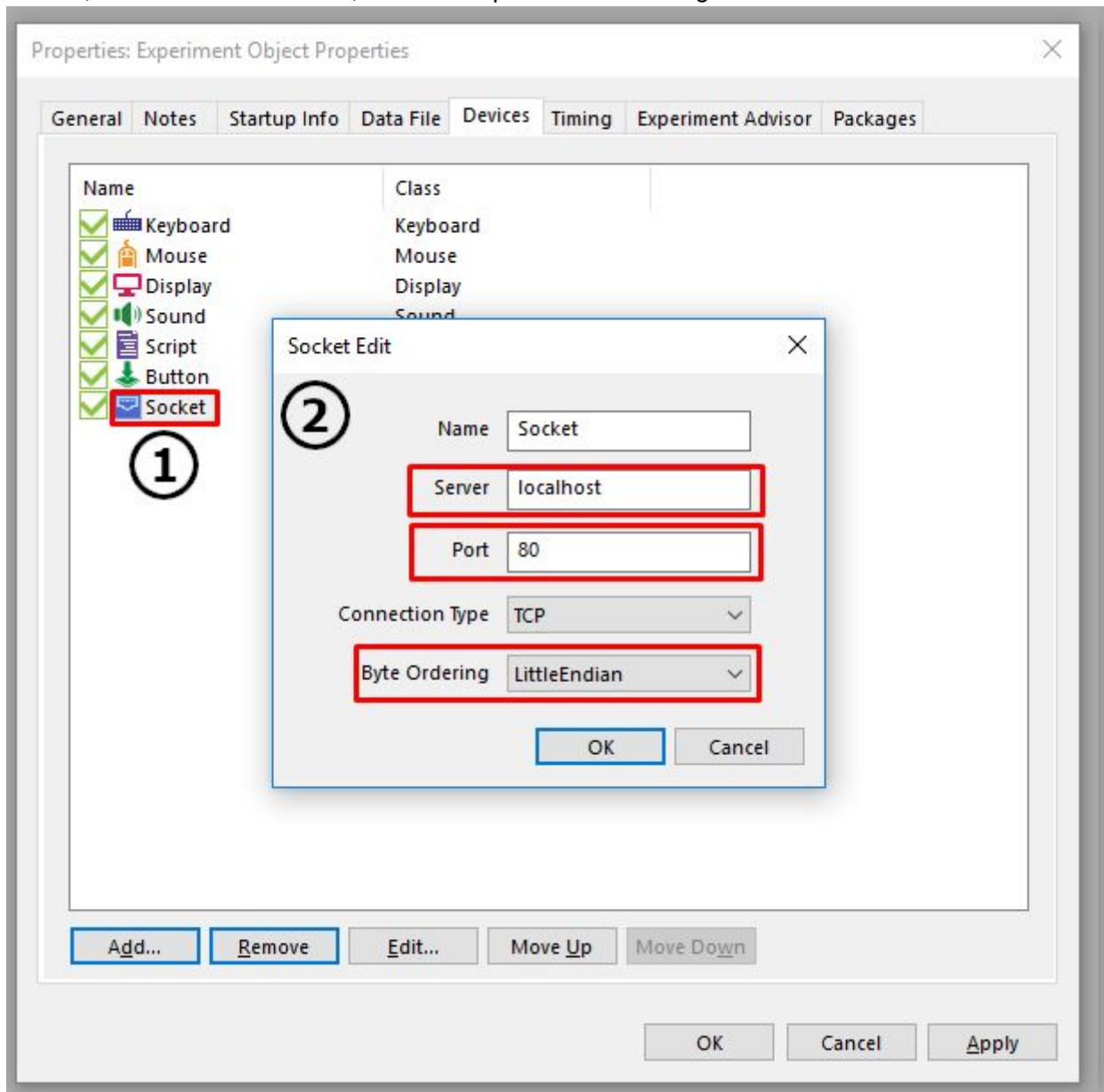
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### 2 - Add the Socket:



3 - Then, double click in "Socket", which will open a socket configuration window:



4 - Here you must change the Byte Ordering to Little Endian. If needed, you may also want to edit the Server host IP and Port. The Server host IP and port must be that of the computer running OpenSignals. If you are running E-Prime in the same computer as OpenSignals, you can simply use localhost as the server host. Otherwise, in Windows 10, you can find a computer's IP at Settings > "Network & Internet" > "View your network properties". The IP should be under Wi-Fi's IPv4 address:

## View your network properties

Name:	Wi-Fi
Description:	Intel(R) Dual Band Wireless-AC 8265
Physical address (MAC):	a0:c5:89:a4:7a:81
Status:	Operational
Maximum transmission unit:	1500
Link speed (Receive/Transmit):	400/400 (Mbps)
DHCP enabled:	Yes
DHCP servers:	192.168.1.1
DHCP lease obtained:	04 June 2019 11:29:08
DHCP lease expires:	04 June 2019 23:29:08
IPv4 address:	192.168.1.4/24
IPv6 address:	2001:818:dd32:4700:8541:3b5f:8e9

(make sure to include only the values before the "/"). Regarding the port, it can be any available port.

Furthermore, you may also need to add an exception to the Windows Firewall, in order to make sure the computer running OpenSignals can successfully connect with the computers running E-Prime. To add this exception, search for "Windows Defender Firewall". Then, go to "Advanced Settings" > "Inbound Rules" > "New Rule". Under Rule Type, select a "Custom" rule. Then, move to the "Scope" page, select the "These IP addresses" radio button and click "Add". Finally, add the IP address from the computer running E-Prime.

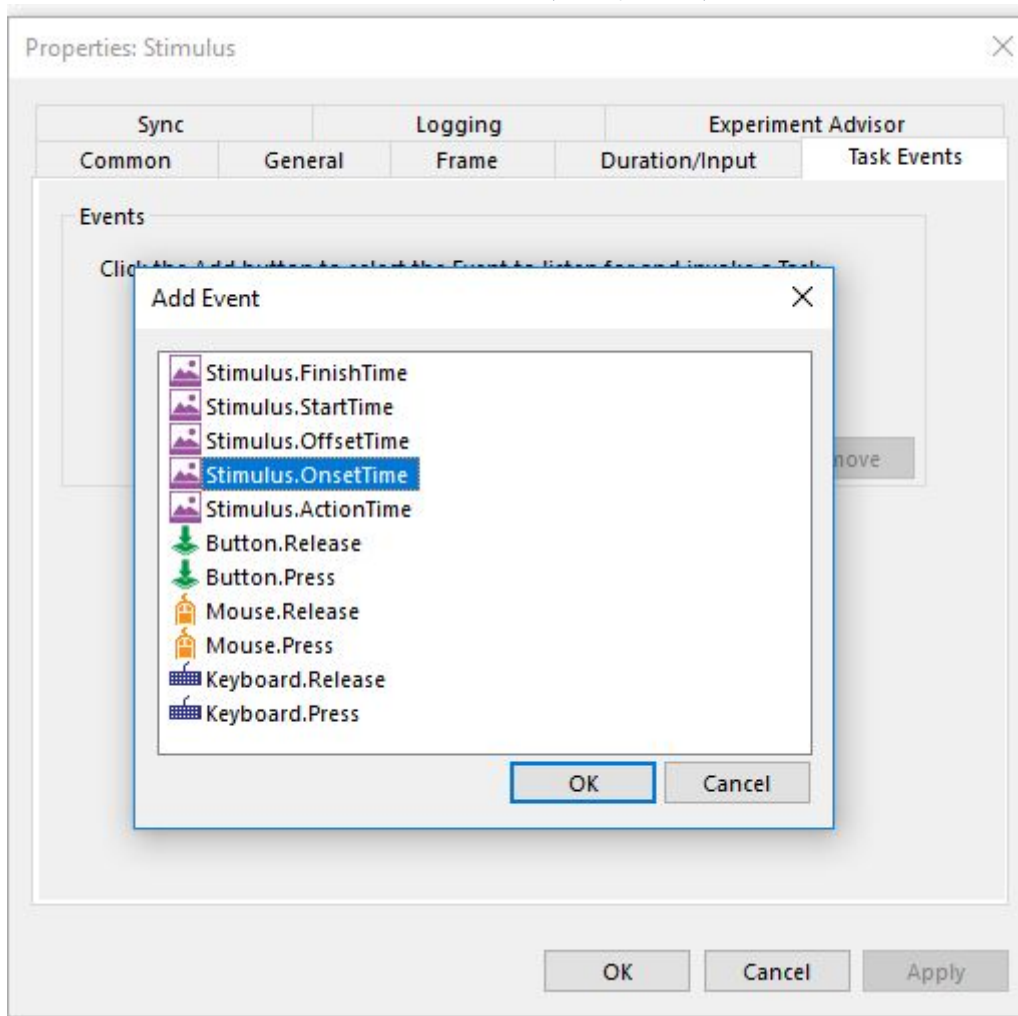
5 - After completing this, you are ready to configure the events you want to send to OpenSignals. This is done through E-prime's Task Events. Task Events are configured on the object to which they are related, which is determined by the needs of the experiment. For example, if you would like to send a signal from E-Prime to OpenSignals at the time the stimulus is displayed, the Task Event should be configured on the object presenting the stimulus. If the desired Event is related to the participant's response, the Task Event should be configured on the object that enables the Input Mask (i.e., collects the input).

The following is an example showing how to send an event at the time a stimulus is present:

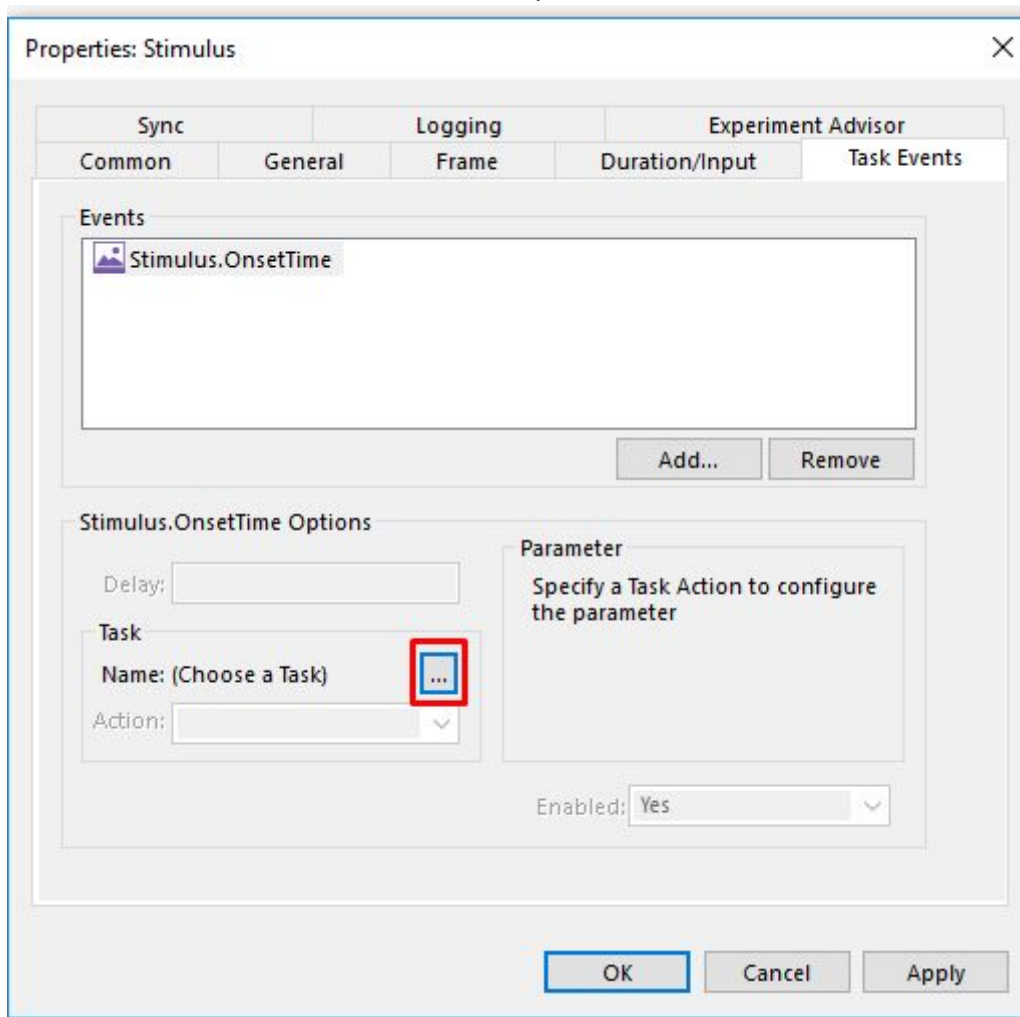
### 5.1 - Open the stimulus properties window, go to "Task Events" and click "Add...":

The screenshot shows the E-Prime software interface. On the left is the 'Toolbox' with various E-Objects like List, Slide, Feedback Display, InLine, Text Display, Image Display, Movie Display, SoundOut, SoundIn, Wait, and Label. The 'Experiment Explorer' in the center shows a tree view of the experiment structure, with 'Stimulus' highlighted under 'TrialProc' and circled with a '1'. A red box with a '2' highlights the 'Properties' button in the top toolbar. The 'Properties: Stimulus' dialog box is open, with the 'Task Events' tab selected and circled with a '3'. Inside this dialog, the 'Add...' button is highlighted with a red box and circled with a '4'. The dialog contains instructions: 'Click the Add button to select the Event to listen for and invoke a Task' and 'Select an Event in the list above to edit its properties'. At the bottom of the dialog are 'OK', 'Cancel', and 'Apply' buttons. A blue text annotation on the right side of the dialog reads: 'Your image [Stimulus] will appear here'.

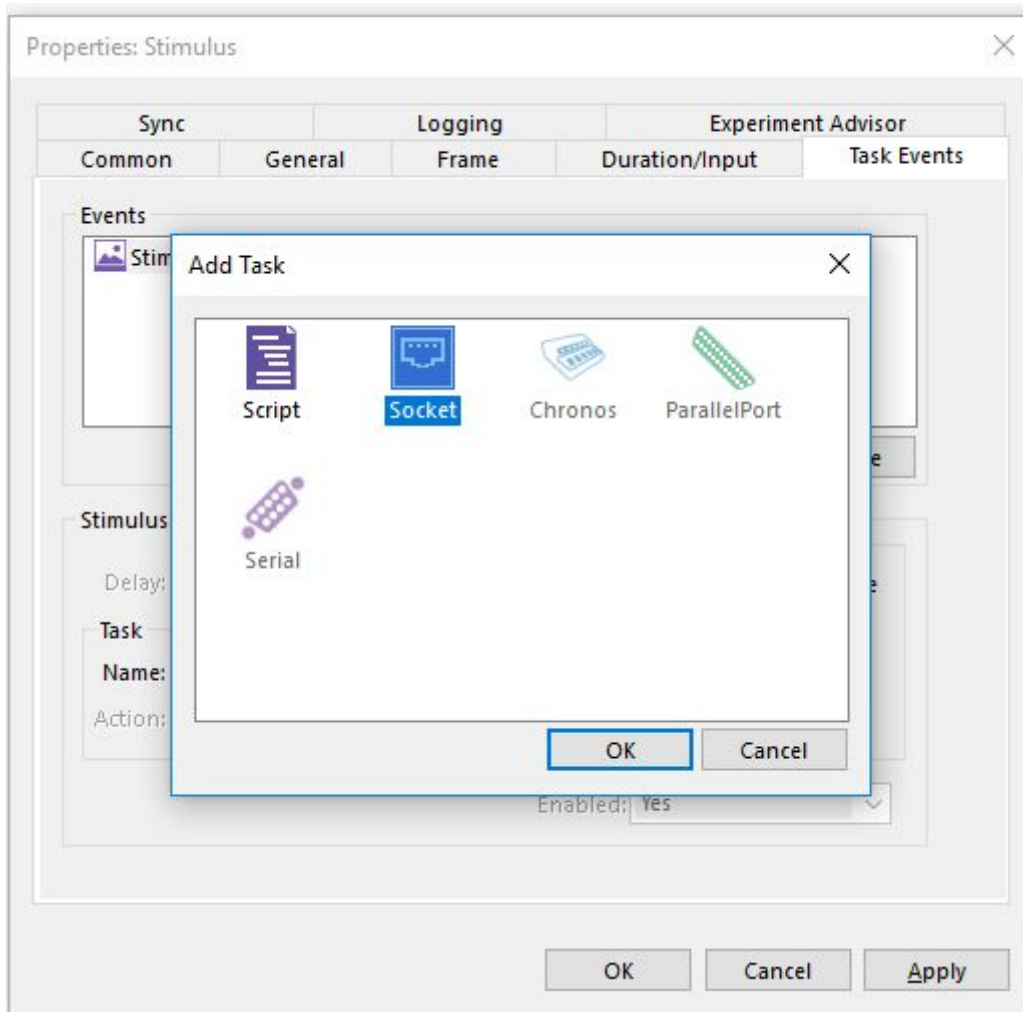
5.2 - Select the event "Stimulus.OnsetTime" (or any other):



### 5.3 - Click '...' under "Stimulus.OnsetTime Options":



### 5.4 - Select Socket:



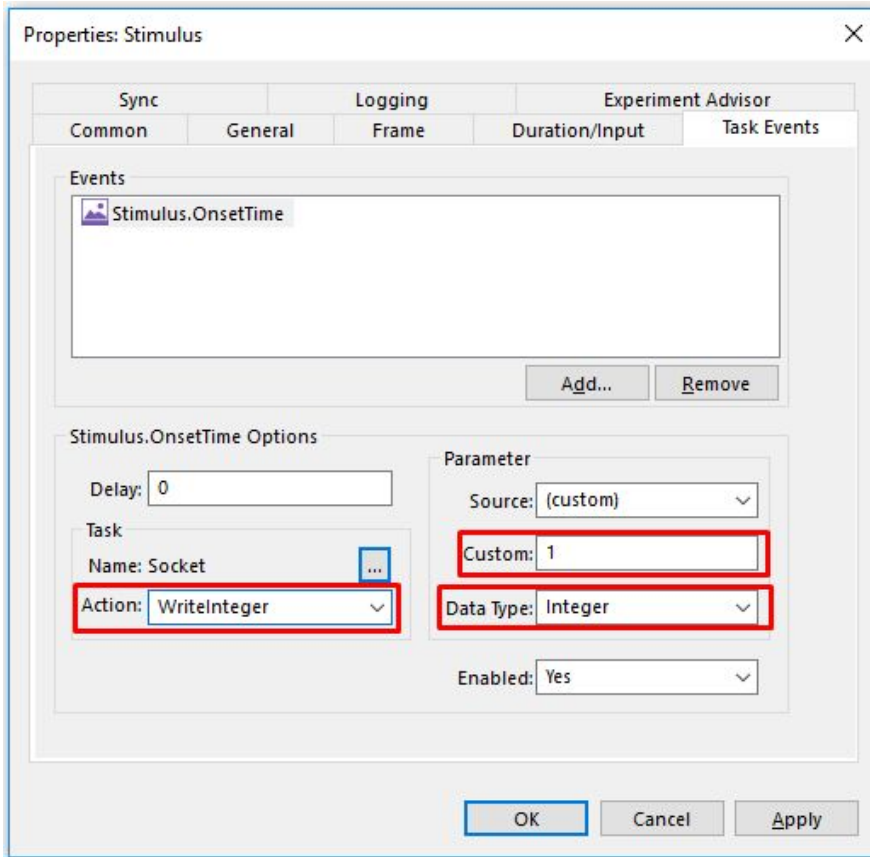


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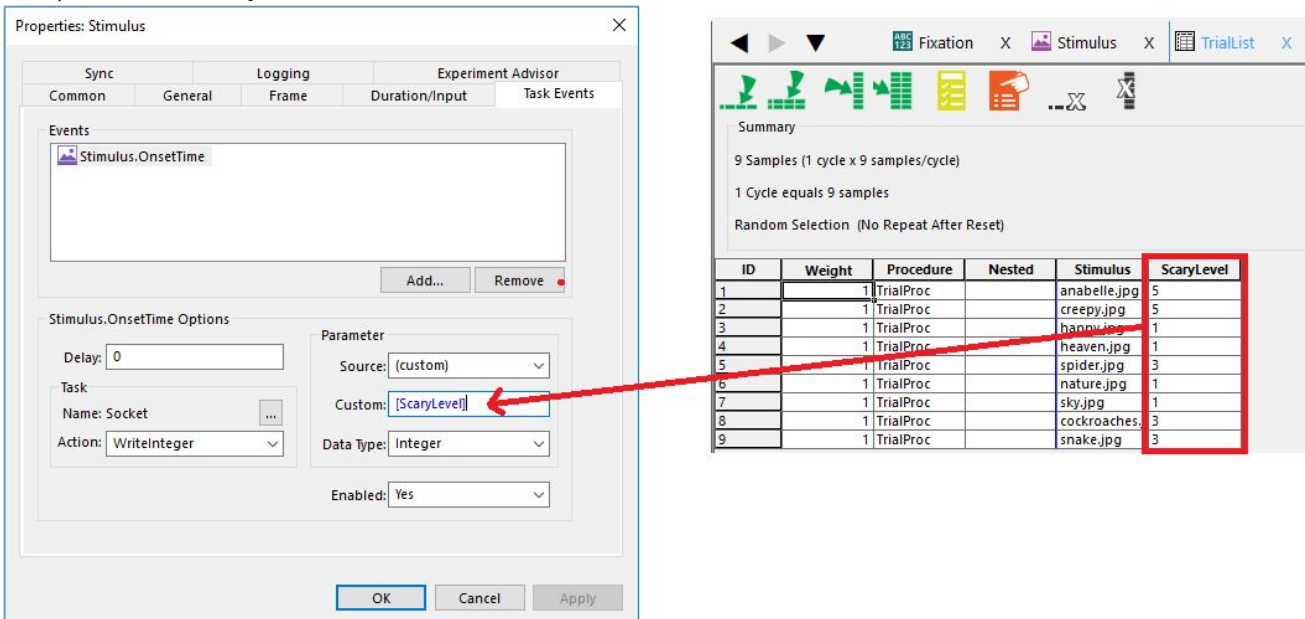
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5.5 - And configure the Task event. Given that OpenSignals only accepts positive integers from E-Prime, you must select the action 'Write Integer' and Data Type 'Integer'. Finally, the value sent to OpenSignals is configured in 'Custom':



The custom value can be specified as a single value (as depicted above), or as a variable (e.g. defined in a list), which allows you to define different values for different event values:



After having the experiment fully configured, you are ready to configure the virtual device in OpenSignals.

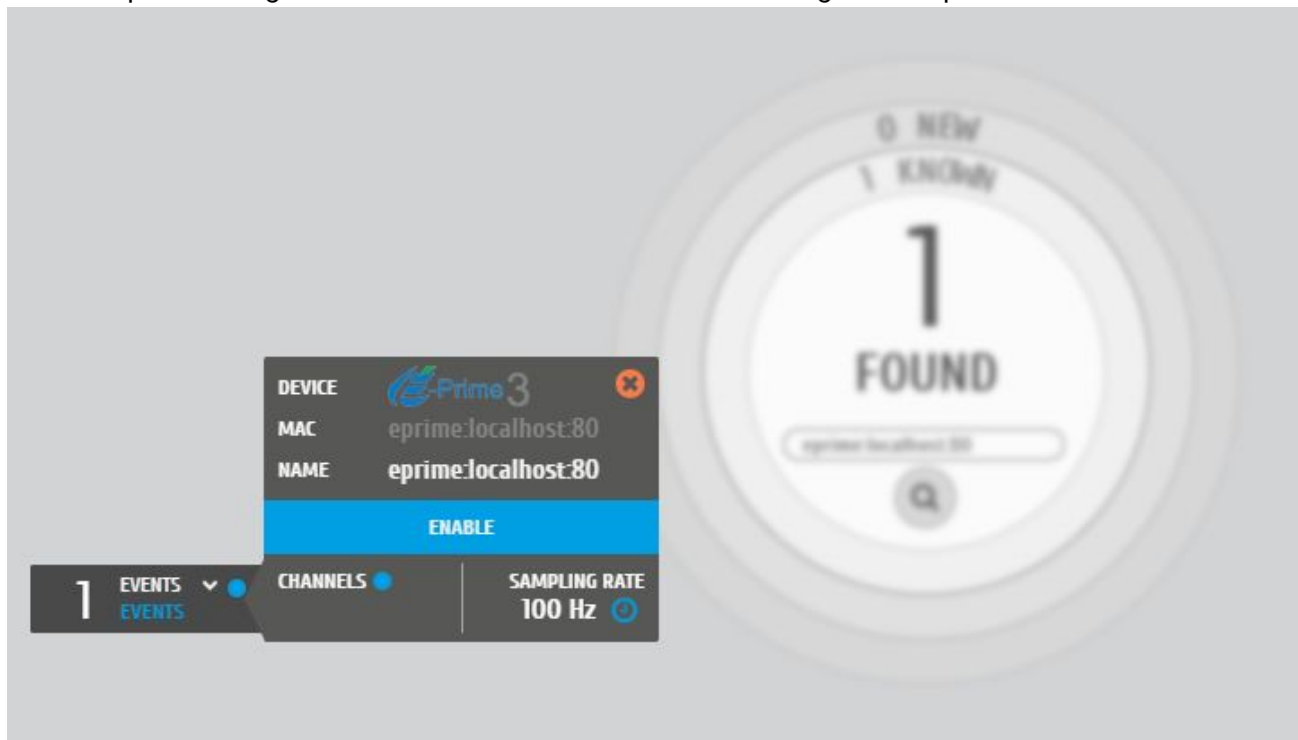
## CONFIGURING OPENSIGNALS

6 - Open OpenSignals, go to the device configuration window, and add your device manually with the following configuration: `eprime:XXXX:YYYY`, where `XXXX` is the Server host and `YYYY` is the port, that were defined in E-Prime in step 4:



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This will open a configuration window with the virtual device configuration options:



In case some error appears when adding E-Prime to OpenSignals, it may be due to wrong IP/port configuration. Make sure you insert the IP from the computer running OpenSignals, and make sure you use an available port.

By this time you may also want to add and/ or enable a PLUX device in order to record biosignal data during the E-Prime experiment. PLUX's devices can be configured normally (as indicated in OpenSignals' user manual) and independently from E-Prime (e.g., E-Prime and PLUX devices can be configured with different sampling rates).

7 - You are now ready to start using OpenSignals with E-Prime. To do so, you must first start an acquisition, and then start the E-Prime experiment. An example acquisition is the following:



Before starting the E-Prime acquisition, it is also advised to adjust OpenSignals' event visualization window to make sure the events can be well visualised.

In case there's some error by this time, it may be due to:

- Different Server host/ port configurations in E-Prime and OpenSignals;
- Windows Firewall blocking websocket connection between the two computers. To make sure this doesn't happen, add an exception to the Firewall, as explained in Step 4.

The separation between different types of events (e.g. separation between stimulus and user inputs) can be achieved by configuring different websockets (with different Server ports) in E-Studio (and associating the corresponding events to each websocket) and by adding different E-Prime virtual devices in OpenSignals.