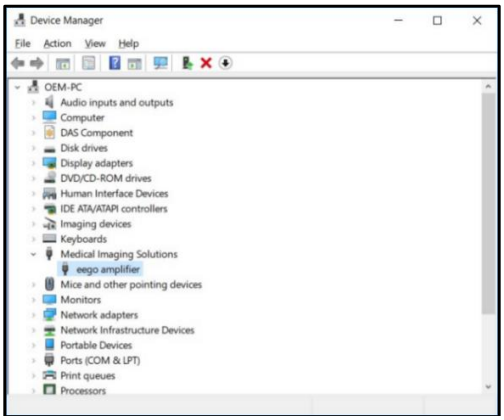
# *The MotionMonitor xGen Hardware Guide: USB based AntNeuro EEG Device Configuration*

The following document outlines the steps required to configure and collect from an AntNeuro Eego EEG unit that is connected to *The MotionMonitor xGen* computer via a USB connection. The Eego drivers must first be installed on the computer before it is configured within *The MotionMonitor xGen* The AntNeuro Eego EEG system is only supported in The MotionMonitor xGen on Windows 10 Operating Systems.

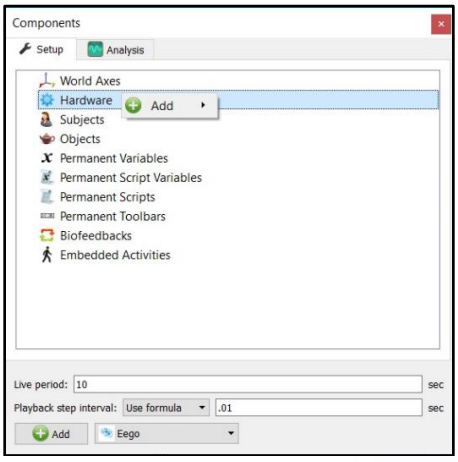
***Note***: In order to reduce noise in the EEG signal it's strongly recommended that the AntNeuro Eego EEG system be disconnected from an external power source and run on battery power.

1. Connect the EEG IN 1 cable (connect cables 1 and 2 for 64-channel configurations), Trigger cable (if applicable), USB cable and Power cables to the amplifier (Disconnect the power before activating the device and recording data).

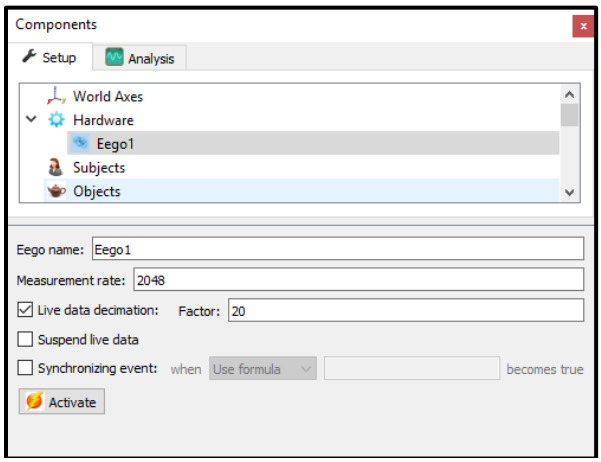
2. Connect the Amplifier USB cable to the computer and power on the EEG unit. The device should automatically be recognized in device manager under Medical Imaging Solutions. If the device is not recognized after a power cycle, contact a Client Support Engineer for assistance. When the device is powered on and connected to the computer the LED color on the amplifier should be a solid or slowly pulsing green.



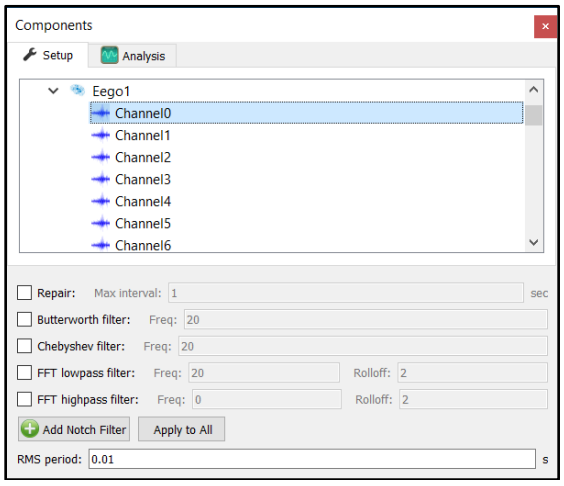

3. Start *The MotionMonitor xGen* and go to the Hardware node in the Setup Components window. Add an Eego device from the Add button in the parameters panel at the bottom of the Components window or by right clicking the Hardware node and adding the device through the cascading drop list.



4. Click on the Eego device to bring up the Eego parameters panel. Accepted Measurement rates are *500Hz, 512Hz, 1000Hz, 1024Hz, 2000Hz, 2048Hz, 4000Hz, 4096Hz, 8000Hz, 8192Hz, 16000Hz or 16384Hz*. ***Note***: Available Measurement rates are dependent on the AntNeuro Amplifier model. Please confirm supported measurements rates for your amplifier through its manual or by contacting a Client Support Engineer. The "suspend live data" checkbox will suppress any data from the Eego device from being used in the Live Window. However, the data will immediately be available and presented in a recorded activity. This is a means for limiting the computer resources being used while running in the Live Window. ***Note***: A default decimation factor of 20 should be used in order to reduce the real time processing demands of the computer. When enabled, the decimation factor will reduce the real time sampling frequency by the specified factor, however, data for the specified measurement rate will be available in post processing.




When the "Activate" button is clicked, the amplifier will be discovered and all of the EEG channels will be populated under the Eego hardware node. ***Note***: EEG channels in *The MotionMonitor xGen* will start at 0. Please see the table at the end of this document for a full listing of the EEG channel mappings for both 32 and 64 channel configurations.




Smoothing parameters can be enabled or disabled at any time through the Channels under the Eego Hardware device in the Setup Components tab, as shown above.

5. Click on the “Activate” button in the Eego parameters panel or the “Activate/Deactivate Hardware” icon in the Setup toolbar to activate the Eego hardware.

6. Sample data definitions for EEG data are displayed below.

   The following image shows the Voltage being defined for the first 2 EEG channels and the Raw Voltage for the Trigger Input channel, which comes in on the last channel in *The MotionMonitor xGen*, either 32 or 64, depending on the hardware configuration. **Note:** If plotting the trigger channel in a graph, make sure that the sampling interval is set to a low enough resolution to display the event.


   RMS Voltage, Raw Voltage and Voltage can be selected from the drop-list. RMS voltage calculates the RMS for the defined variable using the smoothing settings enabled for that Channel under the Setup Components Hardware node. Raw Voltage will always return the raw voltage, regardless of any enabled smoothing parameters. Voltage will report the voltage including any smoothing, if enabled.

## *Synchronizing the AntNeuro EEG Device With Other Hardware Devices*

1. To actively synchronize the AntNeuro EEG Device with other data, you will need an Event Marker and the AntNeuro Eego Trigger module hardware (pictured below). The Trigger will be collected on Channel 64 of the Eego device when using EEG IN 1 and EEG IN 2 or on Channel 32 of the Eego device when only configured for EEG IN1. If you are uncertain about the channel that your Trigger is coming in on or for assistance with the Trigger input voltage, please contact a Client Support Engineer.

Trigger Adapter Cable Connector (to Amplifier)

Trigger Adapter BNC Connector (Trigger Input)

2. The Synchronizing event will be based on the channel that the Eego Trigger is coming in on.

   ***Note:*** Remember that the first Channel for Eego hardware is always Channel #0. In a configuration using EEG In1 and EEG In2, we should expect to see the Trigger pulse come in on Eego Channel #64. In the image below, the Raw Voltage was selected in order to avoid any possible filtering settings from interfering with the identification of our event and threshold value of 0.5 was selected because the Trigger will pulse from 0 to 1 when the Trigger is detected by the AntNeuro Eego Amplifier. The AntNeuro Eego Amplifier will detect a trigger on the rising edge of a pulse that settles at a voltage greater than 2 volts.


   Similarly, the common event marker signal should be configured for each applicable hardware's Synchronizing event Boolean expression. These events will then be used to force an alignment between the hardware devices.

Pinning table for Eego amplifier connectors (32-pin high density connector)

EEG IN 1 Connector

| MotionMonitor xGen Channel | Eego Amplifier Pin | Electrode |
|---|---|---|
| 0 | Ref 1 | Fp1 |
| 1 | Ref 2 | Fpz |
| 2 | Ref 3 | Fp2 |
| 3 | Ref 4 | F7 |
| 4 | Ref 5 | F3 |
| 5 | Ref 6 | Fz |
| 6 | Ref 7 | F4 |
| 7 | Ref 8 | F8 |
| 8 | Ref 9 | FC5 |
| 9 | Ref 10 | FC1 |
| 10 | Ref 11 | FC2 |
| 11 | Ref 12 | FC6 |
| 12 | Ref 13 | M1 |
| 13 | Ref 14 | T7 |
| 14 | Ref 15 | C3 |
| 15 | Ref 16 | Cz |
| 16 | Ref 17 | C4 |
| 17 | Ref 18 | T8 |
| 18 | Ref 19 | M2 |
| 19 | Ref 20 | CP5 |
| 20 | Ref 21 | CP1 |
| 21 | Ref 22 | CP2 |
| 22 | Ref 23 | CP6 |
| 23 | Ref 24 | P7 |
| 24 | Ref 25 | P3 |
| 25 | Ref 26 | Pz |
| 26 | Ref 27 | P4 |
| 27 | Ref 28 | P8 |
| 28 | Ref 29 | POz |
| 29 | Ref 30 | O1 |
| 30 | Ref 31 | O2 |
| 31 | Ref 32 | EOG |

Eego Amplifier 8-bit Trigger (Triggers on the rising edge that settles at a voltage greater than 2 volts)

| MotionMonitor xGen Channel | | |
|---|---|---|
| 32 | TTL Bit 1 | Trigger |

Pinning table for Eego amplifier connectors (68-pin high density connector)

EEG IN 1 Connector

| MotionMonitor xGen Channel | Eego Amplifier Pin | Electrode |
|---|---|---|
| 0 | Ref 1 | Fp1 |
| 1 | Ref 2 | Fpz |
| 2 | Ref 3 | Fp2 |
| 3 | Ref 4 | F7 |
| 4 | Ref 5 | F3 |
| 5 | Ref 6 | Fz |
| 6 | Ref 7 | F4 |
| 7 | Ref 8 | F8 |
| 8 | Ref 9 | FC5 |
| 9 | Ref 10 | FC1 |
| 10 | Ref 11 | FC2 |
| 11 | Ref 12 | FC6 |
| 12 | Ref 13 | M1 |
| 13 | Ref 14 | T7 |
| 14 | Ref 15 | C3 |
| 15 | Ref 16 | Cz |
| 16 | Ref 17 | C4 |
| 17 | Ref 18 | T8 |
| 18 | Ref 19 | M2 |
| 19 | Ref 20 | CP5 |
| 20 | Ref 21 | CP1 |
| 21 | Ref 22 | CP2 |
| 22 | Ref 23 | CP6 |
| 23 | Ref 24 | P7 |
| 24 | Ref 25 | P3 |
| 25 | Ref 26 | Pz |
| 26 | Ref 27 | P4 |
| 27 | Ref 28 | P8 |
| 28 | Ref 29 | POz |
| 29 | Ref 30 | O1 |
| 30 | Ref 31 | O2 |
| 31 | Ref 32 | EOG |

EEG IN 2 Connector

| MotionMonitor xGen Channel | Eego Amplifier Pin | Electrode |
|---|---|---|
| 32 | Ref 33 | AF7 |
| 33 | Ref 34 | AF3 |
| 34 | Ref 35 | AF4 |
| 35 | Ref 36 | AF8 |
| 36 | Ref 37 | F5 |
| 37 | Ref 38 | F1 |
| 38 | Ref 39 | F2 |
| 39 | Ref 40 | F6 |
| 40 | Ref 41 | FC3 |
| 41 | Ref 42 | FCz |
| 42 | Ref 43 | FC4 |
| 43 | Ref 44 | C5 |
| 44 | Ref 45 | C1 |
| 45 | Ref 46 | C2 |
| 46 | Ref 47 | C6 |
| 47 | Ref 48 | CP3 |
| 48 | Ref 49 | CP4 |
| 49 | Ref 50 | P5 |
| 50 | Ref 51 | P1 |
| 51 | Ref 52 | P2 |
| 52 | Ref 53 | P6 |
| 53 | Ref 54 | PO5 |
| 54 | Ref 55 | PO3 |
| 55 | Ref 56 | PO4 |
| 56 | Ref 57 | PO6 |
| 57 | Ref 58 | FT7 |
| 58 | Ref 59 | FT8 |
| 59 | Ref 60 | TP7 |
| 60 | Ref 61 | TP8 |
| 61 | Ref 62 | PO7 |
| 62 | Ref 63 | PO8 |
| 63 | Ref 64 | Oz |

Eego Amplifier 8-bit Trigger (Triggers on the rising edge that settles at a voltage greater than 2 volts)

| MotionMonitor xGen Channel | | |
|---|---|---|
| 64 | TTL Bit 1 | Trigger |