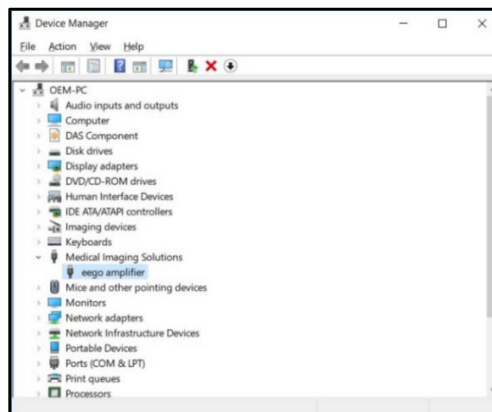


The MotionMonitor xGen Hardware Guide: USB based AntNeuro Eego Device Configuration

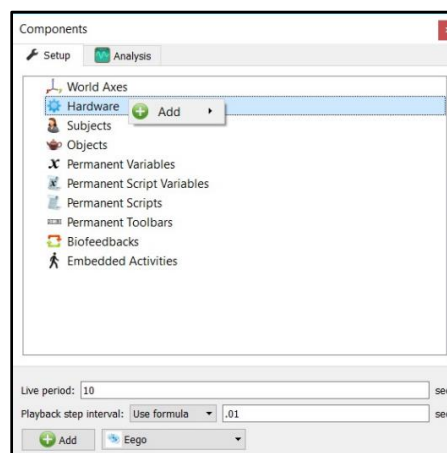
The following document outlines the steps required to configure and collect from an AntNeuro Eego EEG unit that is connected to *The MotionMonitor xGen* computer via a USB connection. The Eego drivers must first be installed on the computer before it is configured within *The MotionMonitor xGen*. The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

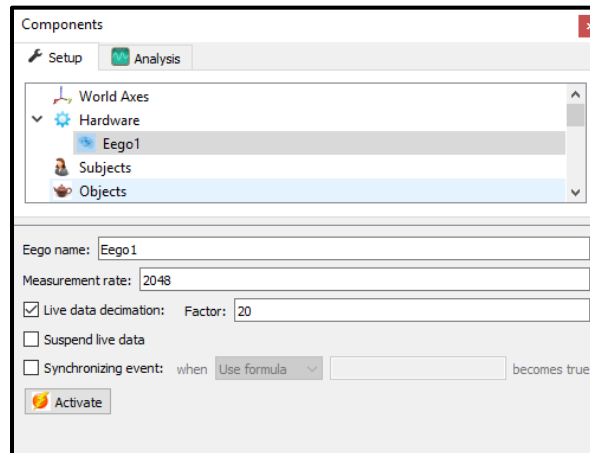
1. Connect the EEG IN 1 cable (connect cables 1 and 2 for 64-channel configurations), Trigger cable (if applicable), USB cable and Power cables to the amplifier (Disconnect the power before activating the device and recording data).
2. Connect the Amplifier USB cable to the computer and power on the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



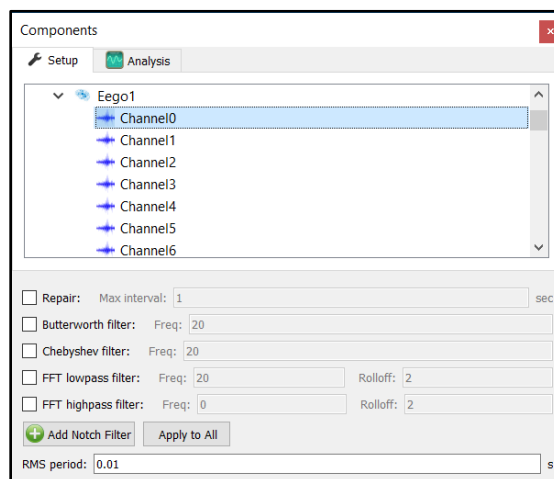
3. Start *The MotionMonitor xGen* and go to the Hardware node in the Setup Components window. Add an Eego device from the Add button in the parameters panel at the bottom of the Components window or by right clicking the Hardware node and adding the device through the cascading drop list.



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.



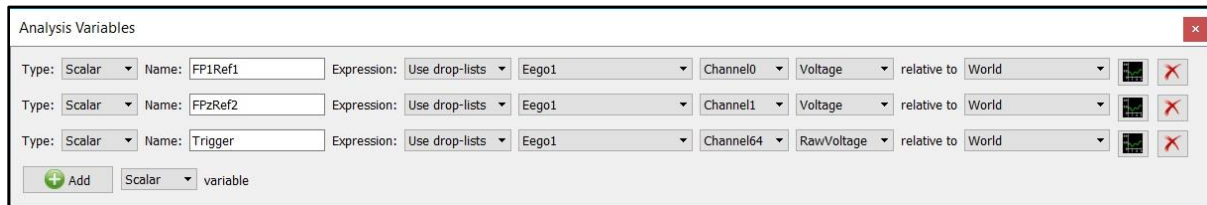
When the “Activate” button is clicked, the amplifier will be discovered and all of the EEG channels will be populated under the Eego hardware node. **Note:** EEG channels in *The MotionMonitor xGen* will start at 0. Please see the table at the end of this document for a full listing of the EEG channel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

<input checked="" type="checkbox"/>	Suspend live data
<input checked="" type="checkbox"/>	Synchronizing event: when Use formula <input type="text" value="if(Eego1.Channel64.RawVoltage >= 0.5 ,TRUE, FALSE)"/> becomes true
<input type="button" value="Activate"/>	

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	TTL Bit 1	Trigger
32		

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	TTL Bit 1	Trigger
64		