

The MotionMonitor xGen Hardware Guide: Digital Delsys Trigno Centro EMG Device Configuration

Overview

- This guide outlines the steps required to configure digital Delsys Trigno Centro EMG systems in **The MotionMonitor xGen** software. This includes Delsys Trigno Centro systems and Trigno base station systems configured to run through the Delsys Discover application.
- **The MotionMonitor xGen** communicates directly with the Delsys Trigno system through the Delsys API.
- Supported sensors include Trigno Avanti sensors, and all Trigno EMG sensors, including Quattro, FSR, Goniometer, Mini and Duo sensors. Old button-operated sensors are not compatible.
- This document is divided into 3 sections:
 1. Delsys Trigno Discover Settings.
 2. Configuring **The MotionMonitor xGen** to Connect to the digital Delsys Trigno Centro EMG system.
 3. Configuring a synchronizing pulse for the digital Delsys Trigno Centro EMG system in **The MotionMonitor xGen**.
- Assumptions:
 - Delsys Trigno Discover software version 2.0.1.3 or later has been installed and an account for the Trigno Discover software has been created and logged into on the computer running **The MotionMonitor xGen**.
 - The Delsys Trigno Centro EMG system is powered on and connected to the computer running **The MotionMonitor xGen** via USB.
 - The Delsys Trigno Centro EMG system is recognized by the computer running **The MotionMonitor xGen** in device manager and the appropriate drivers have been installed.

Section 1: Delsys Trigno Discover Settings.

Preconditions:

- Delsys Trigno Discover software version 2.0.1.3 or later has been installed and an account for the Trigno Discover software has been created and logged into on the computer running **The MotionMonitor xGen**.

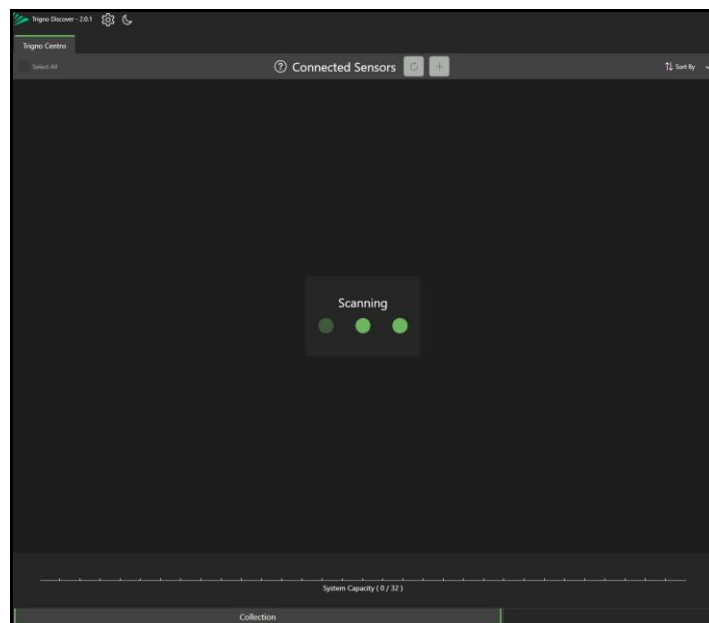
The Trigno Discover software is used to configure the Delsys Trigno Centro sensors and their settings. This process only needs to be performed if the sensor configuration or the sensor settings need to be initially configured or subsequently modified.

1. Detecting Connected Sensors.

- Launch the **Delsys Trigno Discover** software.
- If the Delsys Trigno Centro system is not turned on, the Centro device and sensors will not be discovered.



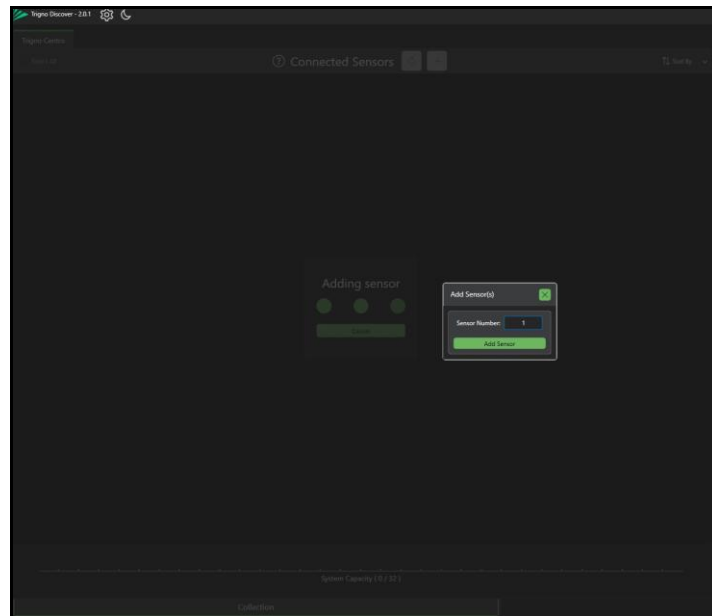
- The Trigno Discover application will automatically connect to the Trigno Centro system and find paired sensors that have been powered on. **Note:** A sensor is turned on by removing it from the base station and placing it over a magnet before the sensor LED turns off.



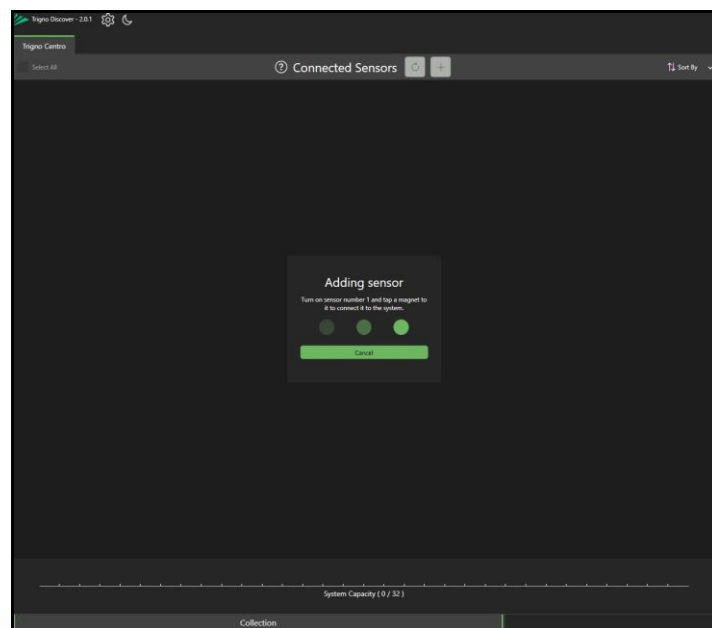
- After sensors have been powered on, confirm they are detected in the application. If a paired sensor is not detected, click on the Connected Sensors “**Scan for Sensors**” button or perform the pairing procedure.

2. Pairing and configuring sensors.

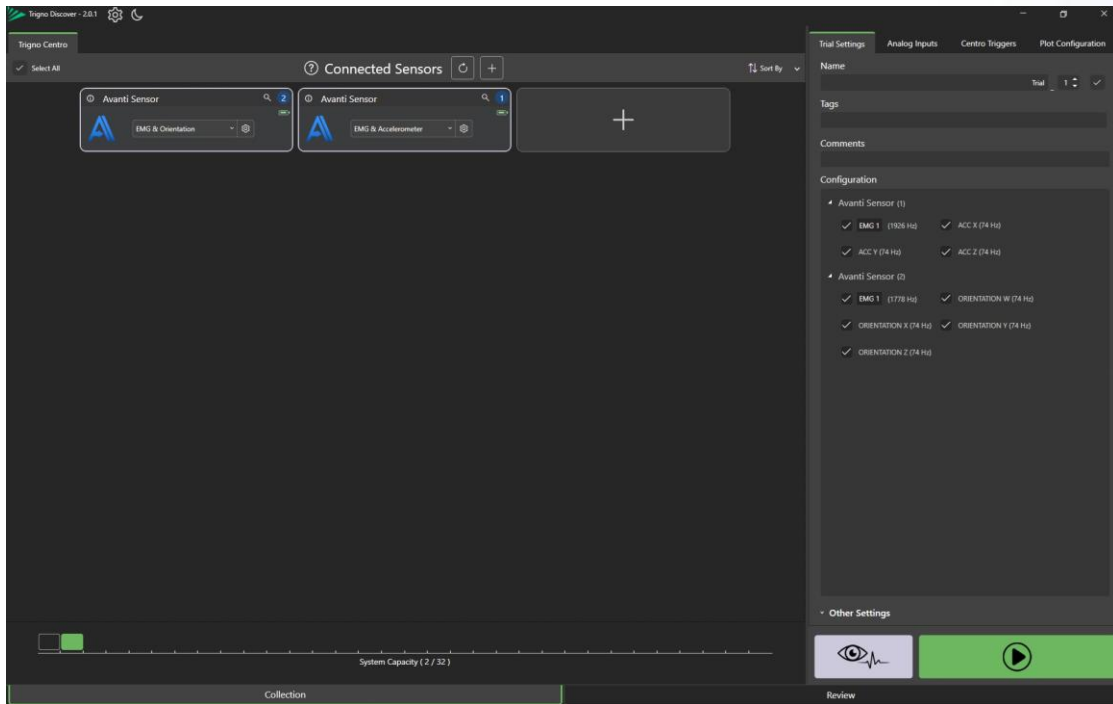
- A sensor needs to be paired when it’s added to a Trigno Centro system.
- Click the Connected Sensors “**Add new sensor**” button and enter the sensor number for the sensor to be added.



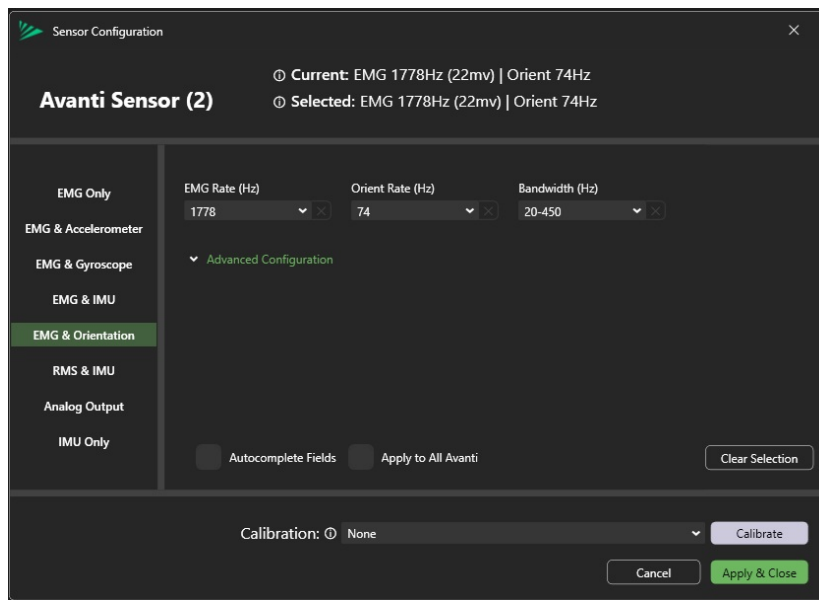
- With a sensor that has been powered on, place it over a magnet to enter the pairing mode.



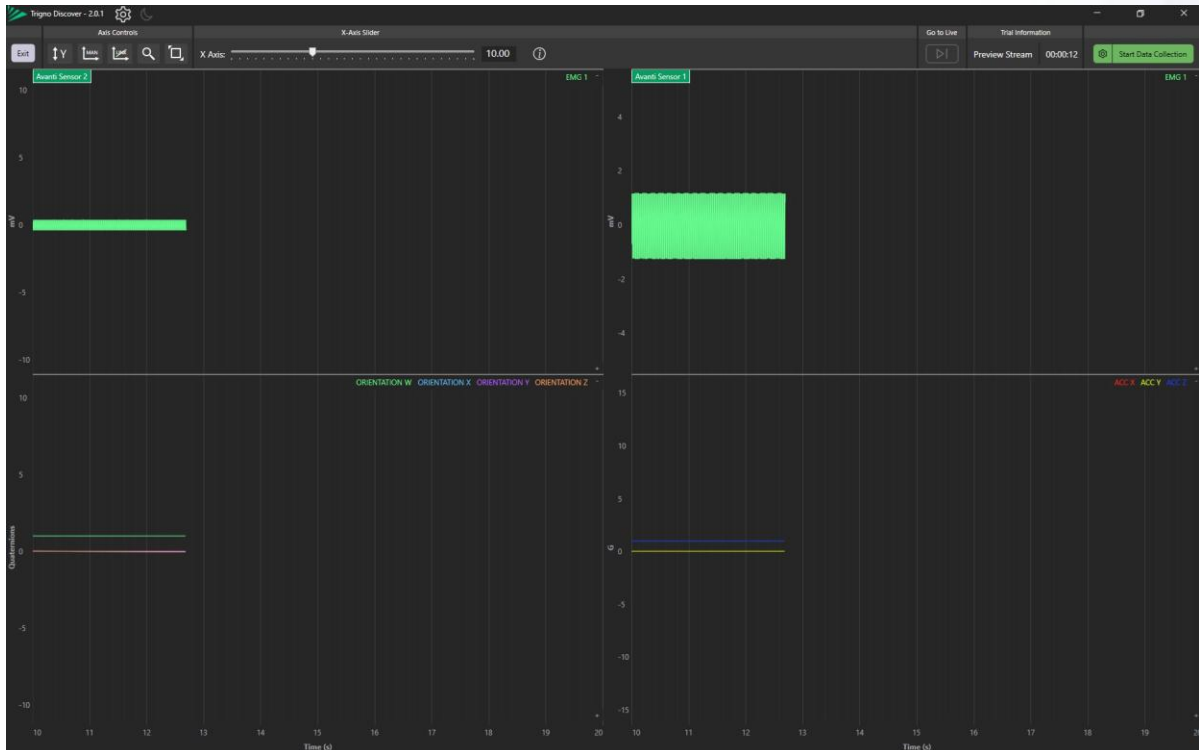
- After a sensor is paired, it will be displayed in the Connected Sensors section of the application.



- Click on the drop list for a sensor to select the type of data the sensor is streaming (i.e. EMG Only, EMG & Accelerometer, EMG & Orientation).
- Click on the **Configuration** button for a sensor to modify the sensor's parameters, including the measurement rate, ranges and bandwidths. Select **"Apply and Close"** to save these updated settings.



- After pairing sensors or modifying any of their settings, view the data signals through the “**Preview Signals**” button.



- Exit the **Preview Signals mode** and close the application before proceeding to **The MotionMonitor xGen**.
- The updated settings will now be used when streaming to **The MotionMonitor xGen**. The specified names of the sensors provided in the Delsys Discover application will be carried through to **The MotionMonitor xGen**.

Note: If the **Preview Signals mode** is not accessed after pairing sensors or updating their settings, any modifications made during the current Trigno Discover session will not be retained or applied to data streaming to **The MotionMonitor xGen**.

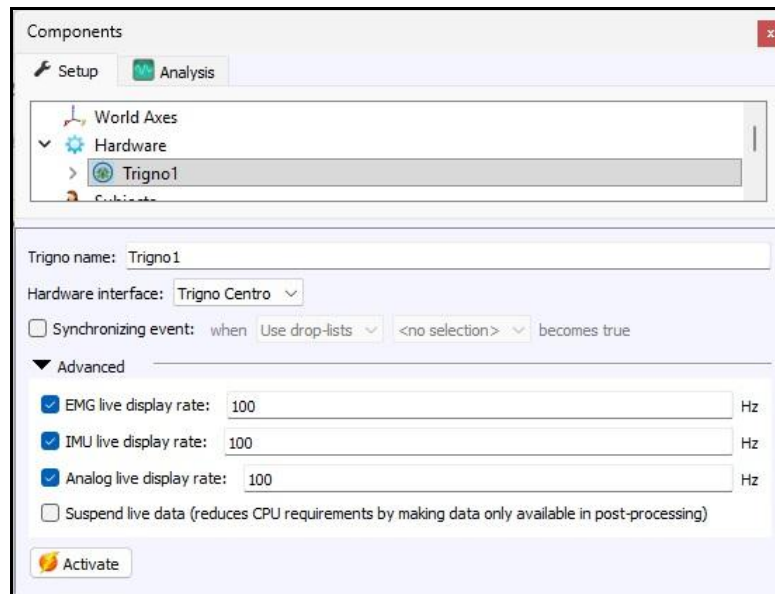
Section 2: Configuring *The MotionMonitor xGen* to Connect to the digital Delsys Trigno Centro EMG system.

Preconditions:

- The Delsys Trigno Centro EMG system sensors have been configured in the Delsys Trigno Discover software and this application has been closed.

1. Configure Trigno hardware.

- In *The MotionMonitor xGen*, go to the **Components Window** -> **Setup tab** -> **Hardware**, and add or click on the **Trigno** hardware component.
- Select **Trigno Centro** from the Hardware interface drop-list.



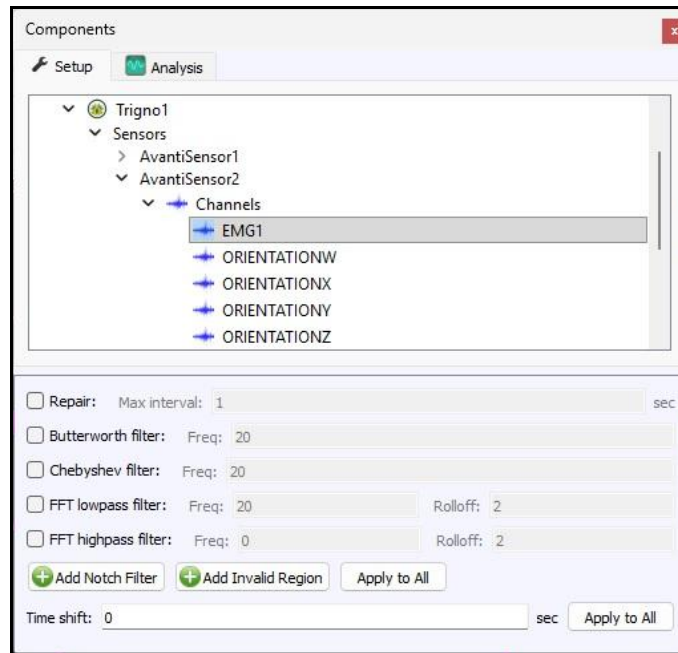
- Click the **Activate** button to initialize communication with the Trigno device.

2. Optional settings.

- Enable **Suspend Live data** to conserve computer resources.
- Apply **live display rates** for EMG, IMU and Analog data types being used in the live window for computations or within graphs. **Note:** *The full measurement rate will be captured when performing recordings.*
- Enable a **Synchronizing event** for active synchronization with other data streams.

3. Verify Device Activation and Apply Filters.

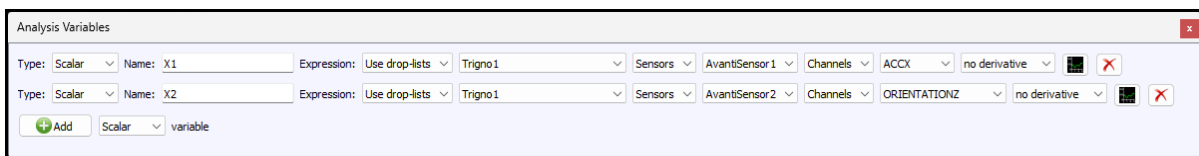
- After successfully activating the Trigno device, the sensors and their channels will populate under the Trigno hardware device.
- Filter and RMS settings and time shifts can be enabled or disabled here, pre or post data collection.



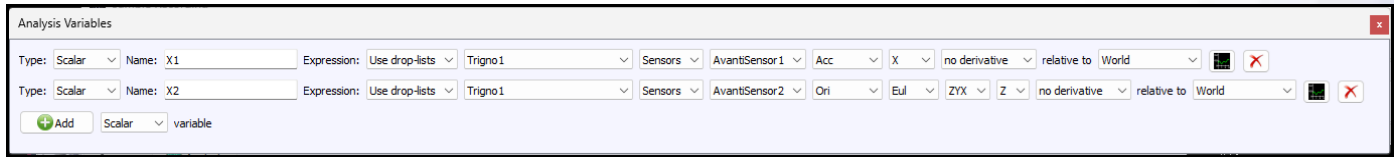
4. Once the device has been activated, data is available and can be displayed in graphs or used in formulas. The following image shows the Raw EMG Voltage defined for AvantiSensor1.



The following image shows Acceleration and Orientation data from the sensors.



The following image shows Acceleration and Orientation data from the sensors, which are reported in coordinate system for the world axes in **The MotionMonitor xGen**.



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 Sensor 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. Mean Frequency and Median Frequency for the voltage can also be selected.

5. Save your setup in a Workspace for easy reloading in the future:
 - Save the Workspace using the File|Save Workspace As menu item.
 - Load the Workspace later with File|Open Workspace menu item.

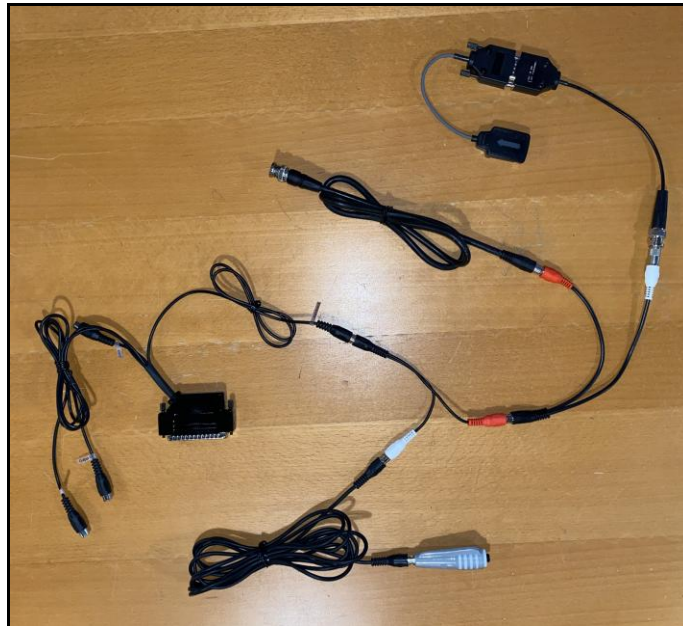
Section 3: Configuring a synchronizing pulse for the digital Delsys Trigno Centro EMG system in *The MotionMonitor xGen*.

Preconditions:

- The Delsys Trigno Centro EMG system sensors have been configured in the Delsys Trigno Discover software and this application has been closed.

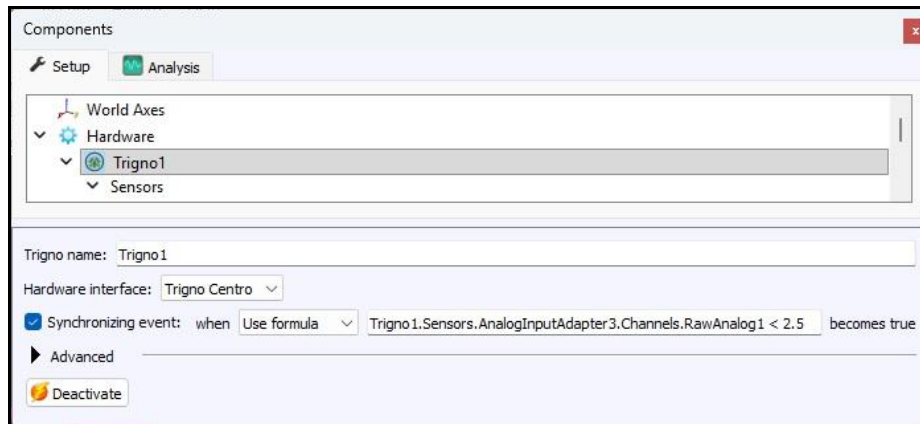
1. **Ensure the Delsys sensor is properly connected to the event marker or signal generating the synchronizing pulse.**

- For active synchronization, a common signal must be received by multiple hardware devices in *The MotionMonitor xGen*. Commonly this is done by splitting the output signal from a handheld event marker with the signal being split between a Delsys Analog Sensor and another hardware's analog input signal. The image below shows a Delsys Trigno Avanti Analog Adapter with BNC input connected to an event marker for a Measurement Computing A/D device.

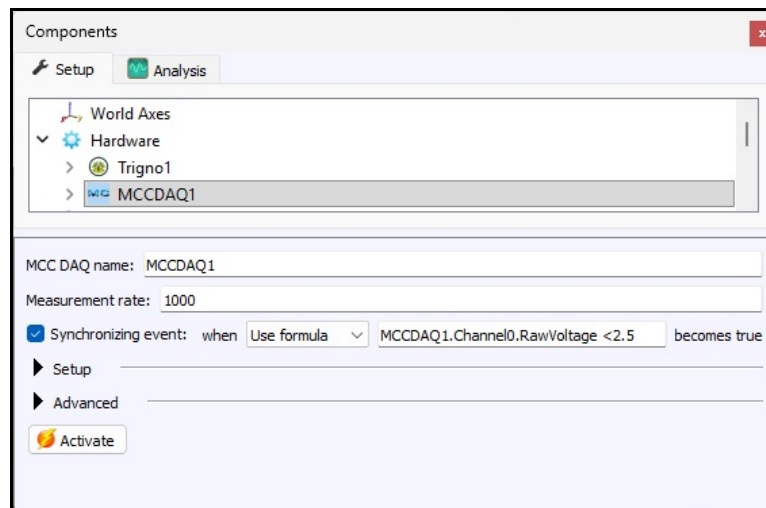


2. Enable the synchronizing event.

- From the **Components Window** -> **Setup tab** -> **Hardware**, click on the **Trigno** hardware component.
- Enable the Synchronizing event from the parameters panel.



- Specify the Boolean condition for the synchronization pulse. For instance, if the synchronizing event is a signal that goes from 5 volts to 0 volts, the Boolean condition might be defined as
Trigno1.Sensors.AnalogInputAdapter3.Channels.RawAnalog1 < 2.5



- Set a similar event for other hardware devices that are receiving the common synchronization signal.
- **Note:** *The synchronizing event for each hardware must be defined using data from that hardware device.*