23 – 03 – 2021

Synchronising Xsens Systems with AMTI force plate

Step – by – step manual

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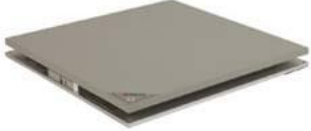
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1 Synchronization Workflow

The steps described below show how to configure the Xsens systems to control start and stop of a recording of the AMTI Force plate.

1. Perform the calibration and get both systems fully set.
2. Set the specifications for synchronization in both systems and connect sync cable(s)
3. Start the recording on the slave software. The slave software will wait for a trigger from the Master software to start recording.
4. Start the recording on the Master software. Then, both systems will start recording at the same time.
5. Stop recording on the master software. Then both systems will stop recording at the same time.

Depending on the type of synchronization performed different specifications are required for both systems. A detailed explanation of the different characteristics according to the desired synchronization are described below.

This document is written to synchronize the Xsens Awinda system. However, most of the steps performed in the MVN software are the same for the MVN Link system. You can see the differences in the setup of the system in the last chapter of this document "Using MVN Link to synchronize".

2 Required Hardware

AMTI Hardware	Xsens Hardware
• AMTI force plate(s)	• MVN Awinda or MVN Link
	• Awinda station/sync station
	Figure 1 - Awinda Station. 4 BNC ports: SYNC IN 1, SYNC IN 2, SYNC OUT 1, SYNC OUT 2.
• BNC – BNC cable • Male. -RCA, Fem.-BNC converter	

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3 Hardware connections scheme

Awinda Station/Sync Station
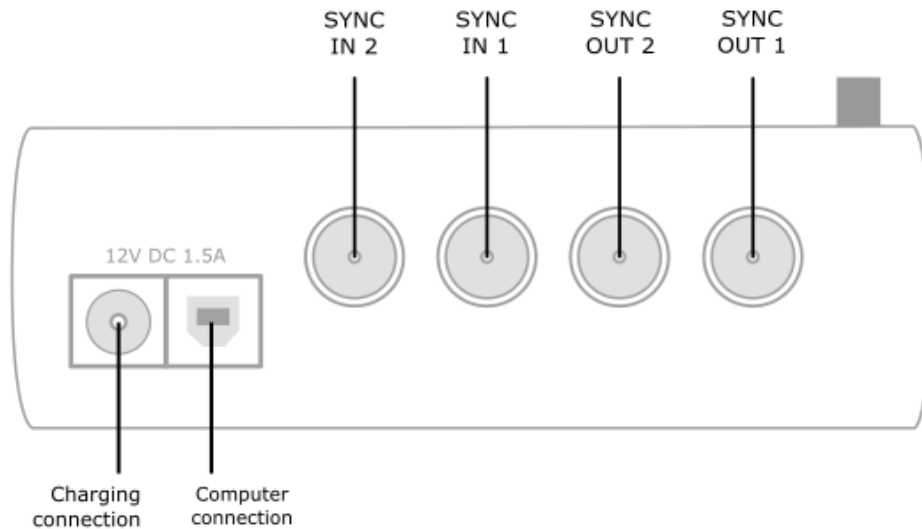
The Xsens Awinda and Sync Stations have four BNC connectors, with two Sync IN and two Sync OUT possibilities. These hardware connections are shown in Figure 1.

3.1 Sync IN

The Sync IN ports are for a third party device to send a signal to the Awinda or Sync Station. The Awinda or Sync Station can detect polarity changes on the input lines. When a trigger is detected on one of the input lines, the Awinda or Sync Station can be configured to perform a specific action.

3.2 Sync OUT

Sync OUT enables the Xsens system to send a trigger pulse via the Awinda or Sync Station to third party hardware. As with Sync IN, a combination of events are possible, based on a number of parameters.

3.3 Pulse Polarity

A trigger may be a rising or falling edge, as illustrated in the figure below.
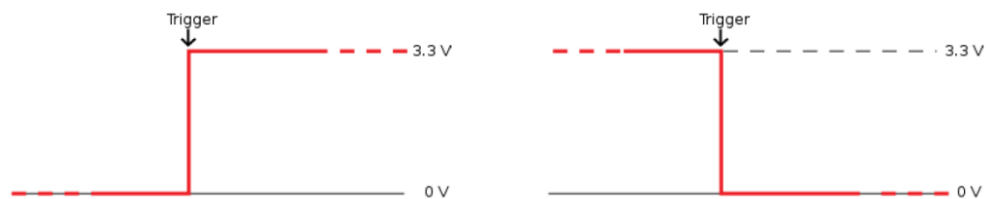

Figure 2 - Polarity: Rising/ falling edge (Sync IN) or positive / negative pulse (Sync OUT).

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4 MVN Analyze as Master and AMTI-Netforce as slave

4.1 Start and Stop a recording

4.1.1 Hardware connections

To synchronise the Xsens system with AMTI Force plate, the AMTI Force plate must be enabled as the slave. Connect the BNC cable with the help of the RCA converter directly to the AMTI force plate and to SYNC OUT 1 of the Awinda or Sync Station.

4.1.2 Xsens Software

1. In the Configuration window, in the Sync tab you should select:

Strat recording (Out)	Stop Recording (Out)
• Out 1 • Polarity: Rising Edge • Skip Factor = 0 • Skip First = 0 • Delay = 5 ms • Trigger once: uncheck	• Out 1 • Polarity: Rising Edge • Skip Factor = 0 • Skip First = 0 • Delay = 5 ms • Trigger once: uncheck

4.1.3 AMTI-Netforce Software

In the AMTI-Netforce software, go to the settings tab and open the Tigger method settings. In Event Type check "by External Source". Make sure the Edge in the Level Event is set as "Rising" and the Trigger Position in the Acquisition Parameters is set at "0.0% of duration". When all parameters are set click "OK".
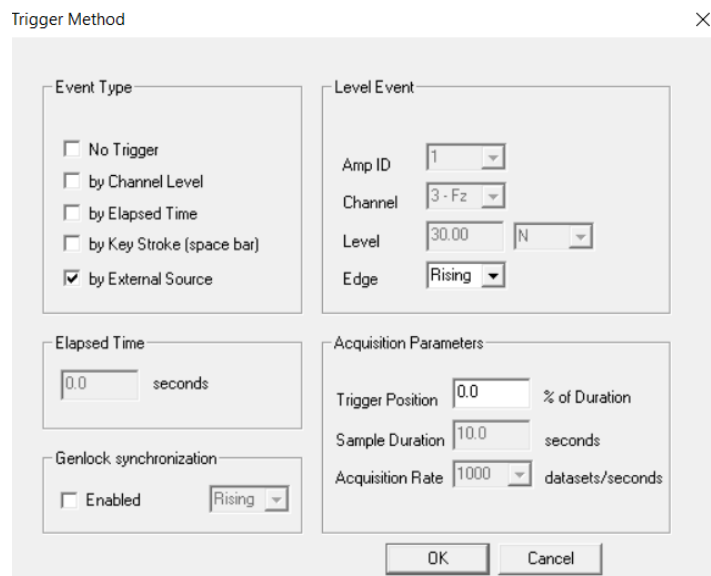

Figure 3- Trigger Method settings window

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Additionally, go the Acquisition Settings. Here the acquisition duration and other parameters can be set. Click "OK" when all parameters are set correctly.
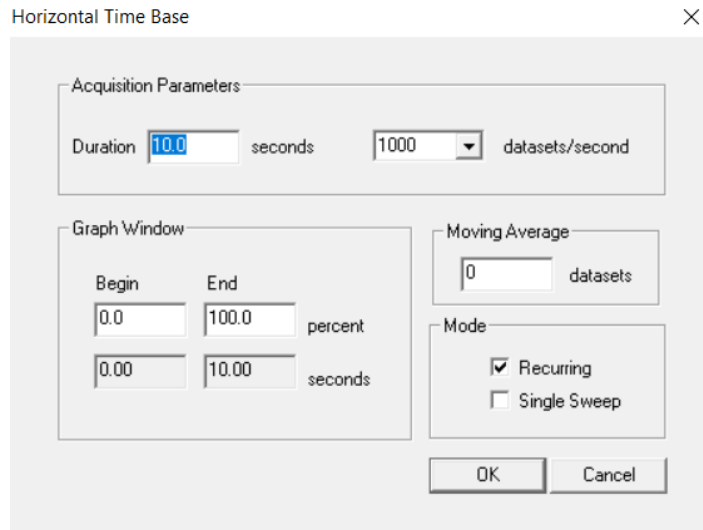

Figure 4- Acquisition settings window

In the main view, the setting of the graph can be adjected. To see the curves in the first graph, select 1 in the Amp ID under the graph.
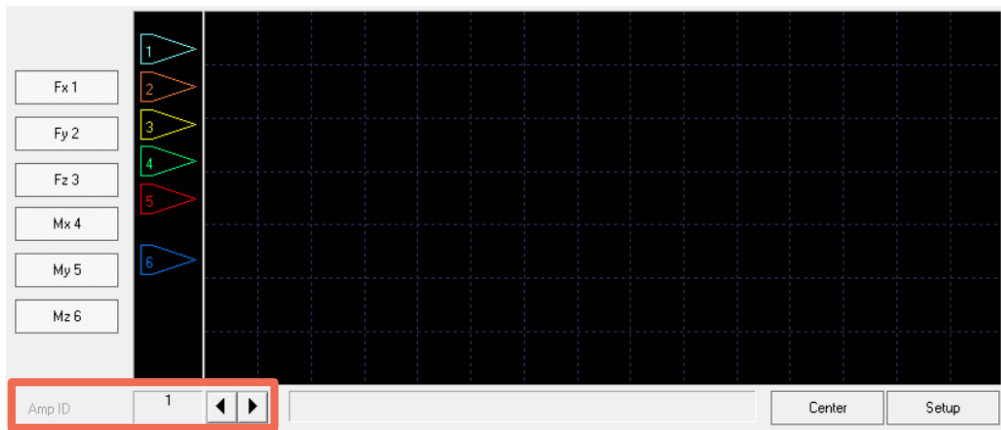

Figure 5- First graph of the main view. Amp ID outlined in red

Once all the settings are selected in the AMTI-Netforce software, First click the "start" button followed by clicking the "Arm" button. The software is now set to receive the external pulse from MVN software. When the recording is started in the Xsens software, the green progress bar in the AMTI-Netforce software will turn purple.

NOTE: Before every new recording the "Start" and "Arm" button in the AMTI-Netforce software needs to be selected before starting the recording in the Xsens Software.

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5 Using the Link System

To use the XSens Link system instead of the Awinda system you need to have an Awinda Station/sync station. Then you should activate the Awinda station in the "Motion Capture Configuration window" by turn on the bottom on the sync station configuration tab. In this tab you can find all the details described above.
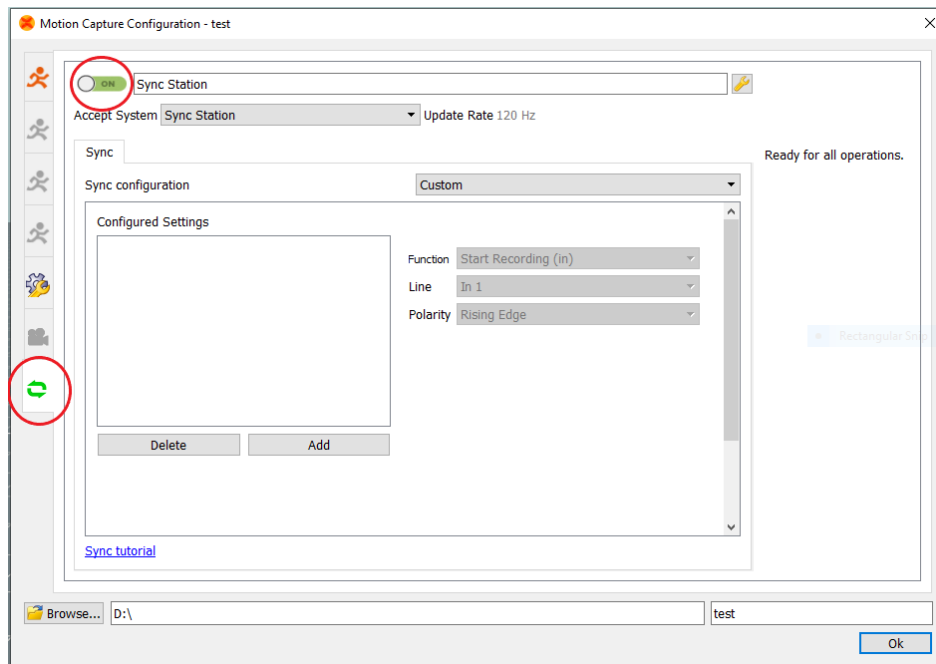

Figure 3 - Motion Capture configuration window in MVN Analyze. Indications to activate the Awinda station as sync station with the Link system.

Note: When using the Xsens Link system, which has an output rate of 240Hz, you will still need to use an Awinda Station/ sync station to send synchronization signals. As our Awinda station/ sync station has a maximum frame rate of 120Hz, you will realise that the maximum frame rate that the output signal will have is 120Hz. Practically, this entails that every other frame of Xsens will be synchronize with the frame of the other party system. This still gives an optimal synchronization between both systems.

If you would like to have both systems with the same sampling frequency you should downsample the file while export. To do so follow the following steps:
- Go to "File" tab - > "Export"
- Select the format you would like to export the data
- Click "Show options" and select the right "Exporter frame skip (for downsampling)" value.