The MotionMonitor xGen Hardware Guide: ATI Force/Torque Transducer Configuration

The following document outlines the steps required to configure and collect from an AMTI force/torque transducer for data collection. Before any data can be collecting using the ATI transducer, the ATI software and calibration files need to be installed.

1. Insert the ATI software CD and wait for the CD to launch. If the CD does not launch automatically, go to the CD drive and run “daq_autorun.exe”. This application will open the ATI CD menu.

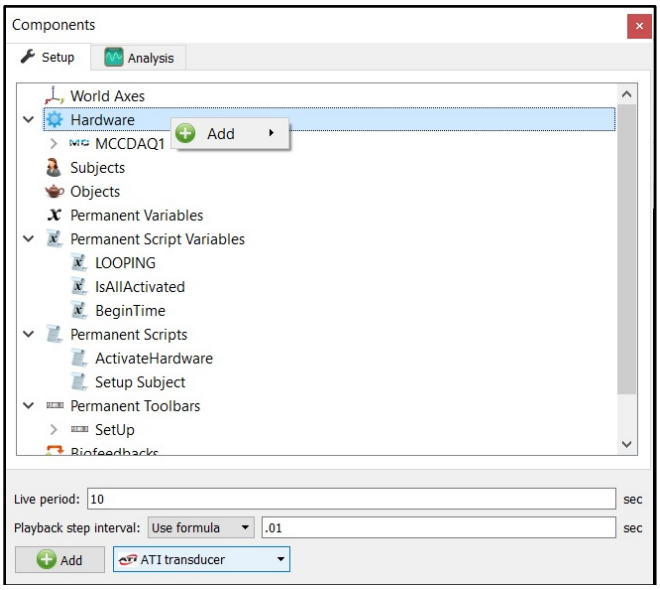
2. From the CD menu select Install NI-DAQmx F/T Software. This software can also be launched from the CD drive directory by running “Setup.exe”. Be sure to install for everyone who uses this computer.

3. After the ATI software has been installed you will need to locate the transducer calibration file, which can be located in the Calibration folder on the CD drive directory. The calibration file name is based on the transducer’s serial number and is in the following format, FTxxxx.cal. Each transducer will have a unique calibration file.

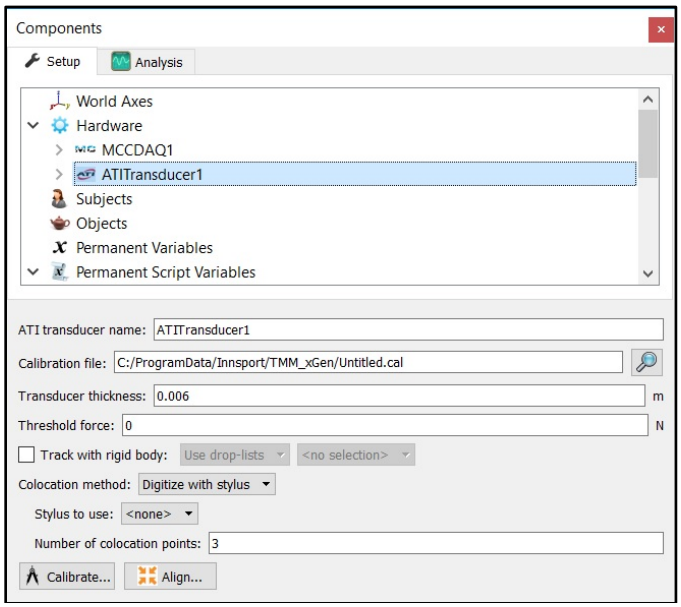
4. The calibration file will need to be copied into both of the following directories: the ATI folder, which was installed in step 2 (C:\Program Files\ATI Industrial Automation\ATIDAQFT.NET); and The MotionMonitor folder (C:\ProgramData\Innsport\TMM_xGen).

5. The ATI software setup is now complete.

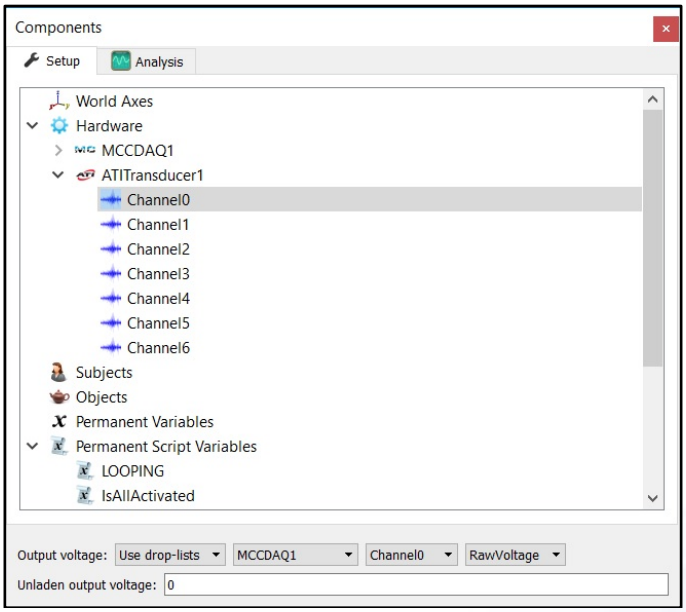
6. Start The MotionMonitor xGen and go to the Hardware node in the Setup Components window. Add an ATI transducer device set from the Add button in the parameters panel at the bottom of the Components window or by right clicking the Hardware node and adding the device through the cascading drop list.



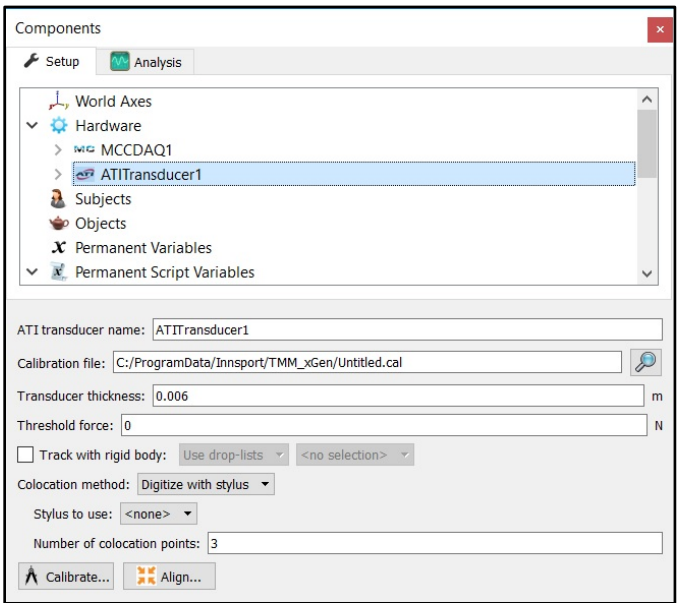
7. Click on the ATITransducer component to bring up the parameters panel. Browse to the calibration file provided with the force/torque transducer by clicking on the browse button (from Step 4 above). The Transducer thickness can be set for any materials added to the surface of the transducer and the Threshold force should be set for the minimum allowable force for force derived and Center of Pressure data. The Track with rigid body provides a means for selecting a rigid body axes that the transmitter will move rigidly with, such as a hand or instrumented cane or walker. The "Colocation method" can be selected as either "Digitize with Stylus" or "Use Expressions". The preferred and recommended method for alignment is the "digitize with Stylus" option. This method requires that a stylus be configured using a kinematic tracking system. Select the stylus from the "Stylus to use" drop-list and specify the number of points to use in the colocation points.



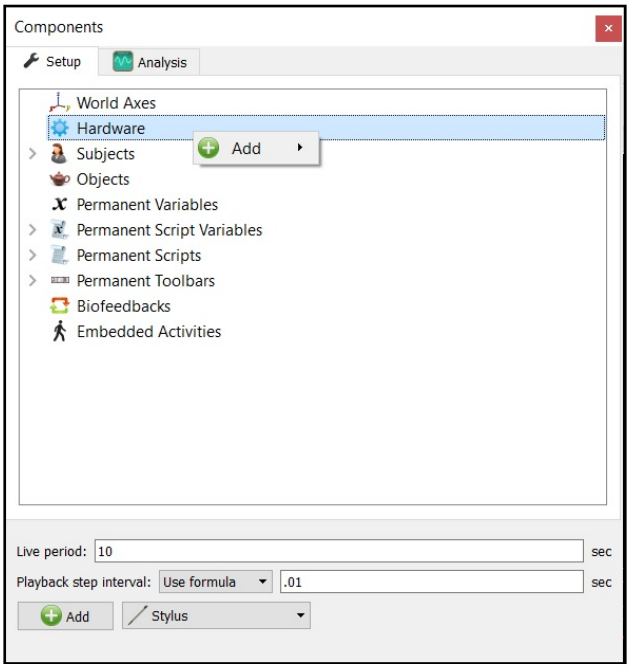
8. Expanding the ATITransducer node will show each of the transducer channels. The mapping of an input voltage needs to be selected for each ATI channel. The unladen voltage will be updated with the Calibrate button is clicked in the ATITransducer's parameters panel.



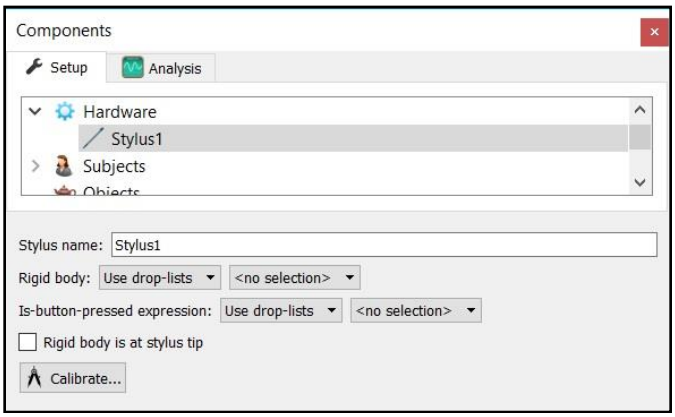
9. The align button can be clicked to begin the alignment procedure based on the selected colocation method. The Calibrate button performs a software calibration and captures the unladen voltages for the force/torque transducer channels. This process needs to be performed for each force/torque transducer. A tutorial video for configuring force plates can be found at https://themotionmonitor.com/support/.



10. If a stylus is not already defined in the current Workspace, go to the Hardware node in the Setup Components window and add the Stylus device through Add button at the bottom of the Components window or right-click on the Hardware node to add the device.

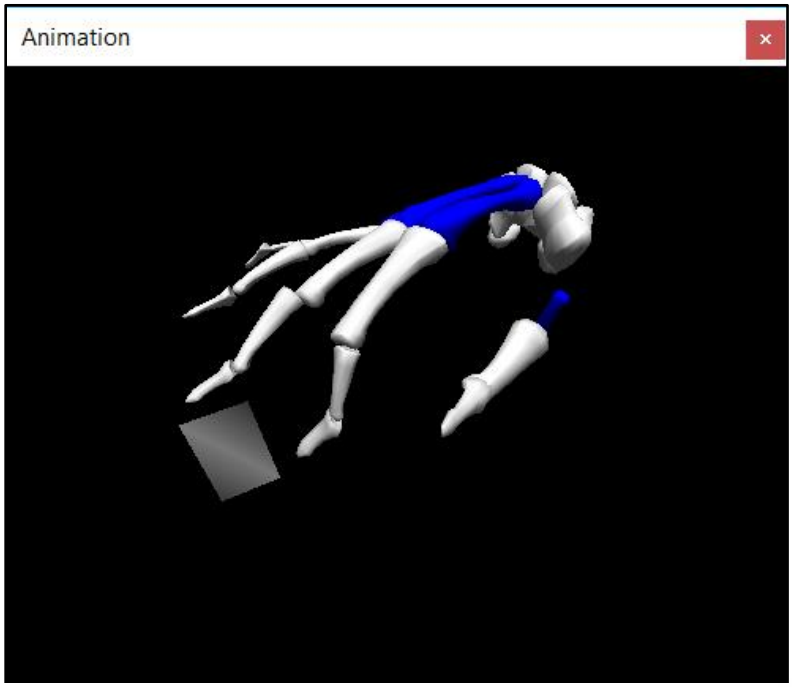


11. Before calibration of the stylus can be performed, the rigid body affixed to the object being used as the stylus needs to be selected through the “Rigid body” drop-list menu. If a remote OK button is to be used during the digitizing process, that Boolean expression would need to be defined through the “Is-button-pressed expression” drop-list menu or formula field. If the origin for the rigid body is at the tip of the stylus, as can be the case for certain kinematic tracking systems, the “Rigid body is at stylus tip” check box should be enabled.

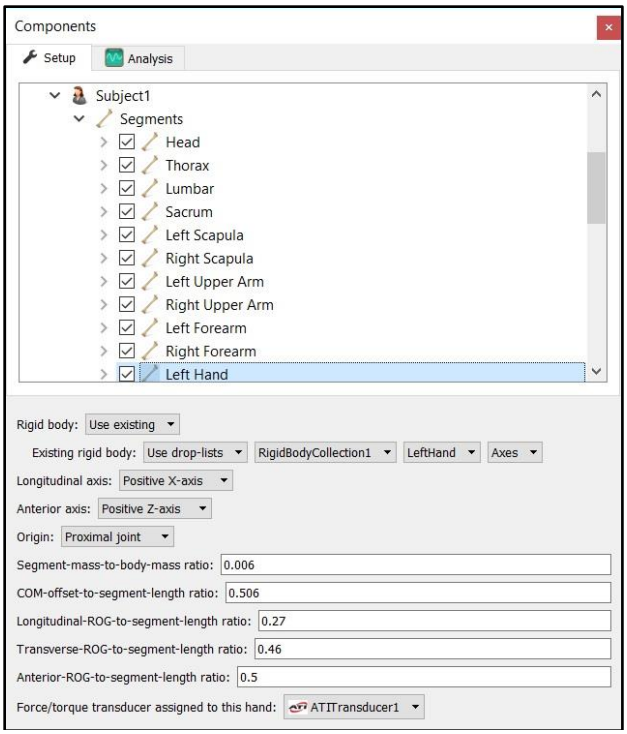


Once all parameter fields are completed, click the “Calibrate” button and follow the prompts to calibrate your stylus. A tutorial video for configuring the stylus can be found at https://themotionmonitor.com/support/.

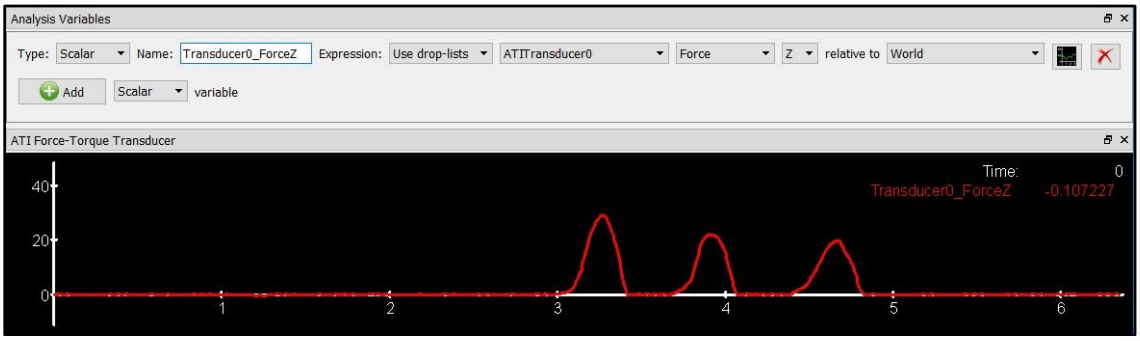
12. Once the Calibration and Alignment procedures have been completed, the force vector should appear in the Animation window.

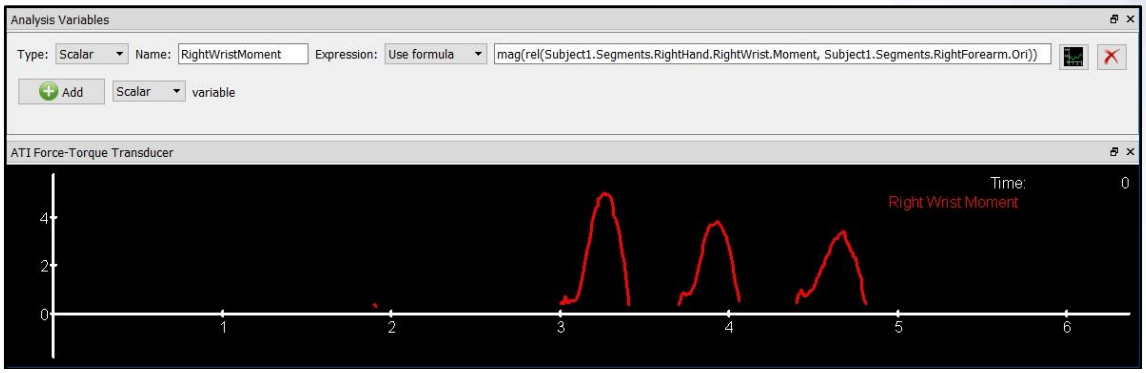


13. For performing upper extremity inverse dynamics calculations, the transducer will need to be assigned to a hand. From the hand segment in the Subject Segments node in the Setup Components window, select the Force/Torque transducer assigned to this hand from the drop list in the properties panel for the hand segment.



14. Force/Torque transducer data can be defined as Analysis Variables and plotted in Graphs as seen in the image below. Tutorial videos for adding variables and graphs can be found at https://themotionmonitor.com/support/.




Analysis Variables
Type: Scalar
Name: RightWristMoment
Expression: Use formula
mag(rel(Subject1.Segments.RightHand.RightWrist.Moment, Subject1.Segments.RightForearm.Ori))
Add
Scalar
variable
ATI Force-Torque Transducer
Time:
0
Right Wrist Moment
4
2
0
1
2
3
4
5
6