

The MotionMonitor xGen Hardware Guide:

The MotionMonitor xGen Interface to Polhemus Viper Hardware

Overview

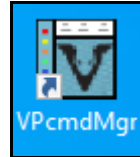
- This guide outlines the steps required to configure and collect from Polhemus **Viper** devices that are connected to The MotionMonitor xGen. If using other Polhemus devices such as the Liberty, Patriot, G4, or Fastrak, please see their respective guides.
- This document is divided into 4 sections:
 1. Configuring Polhemus Viper Hardware in Viper Command Manager
 2. Configuring Polhemus Viper Hardware in The MotionMonitor xGen
 3. Calibrating a Stylus
 4. Defining Biomechanical Model within The MotionMonitor xGen

Assumptions

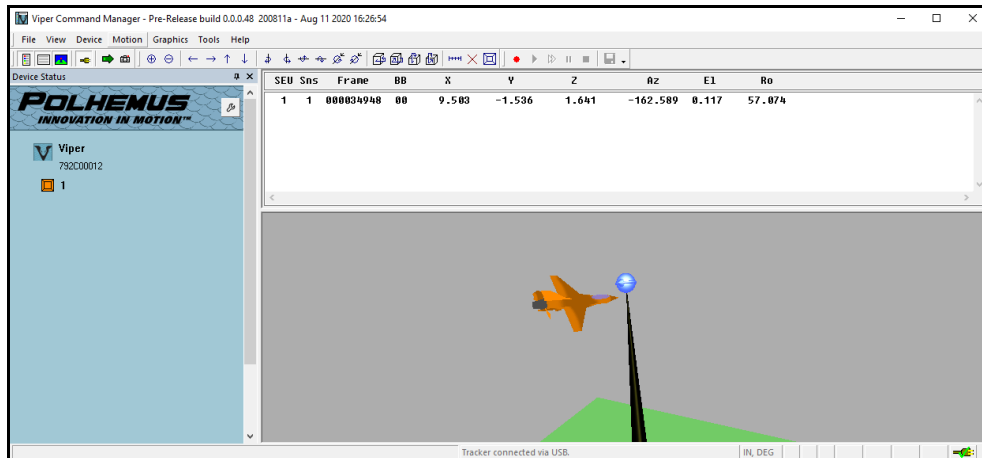
- The Polhemus Viper device is connected to The MotionMonitor xGen computer via USB.
- The Polhemus drivers and Polhemus Viper Command manager host software are installed using the installation CD and instructions provided by Polhemus.

Section 1: Configure Polhemus Viper Hardware in the Viper Command Manager

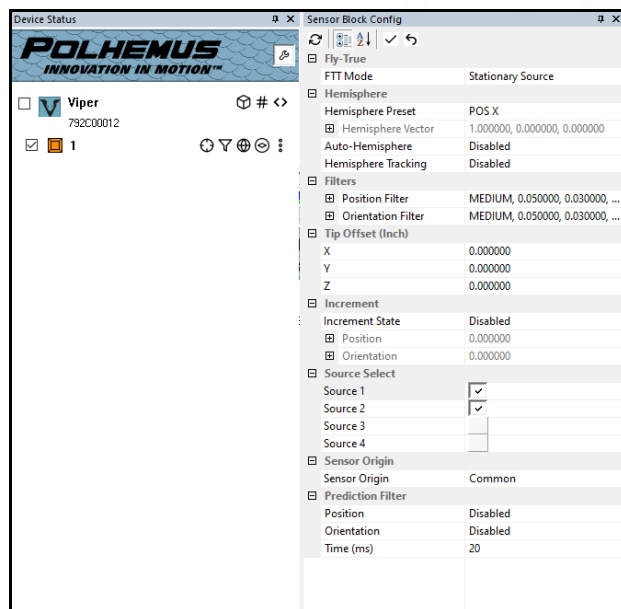
1. Ensure that the VPcmdMgr software is installed on the computer which the Viper device is connected to. Contact your [Client Support Engineer](#) if you require this installer.



2. Open Sensor Settings Options:
 - Within the command manager, select the “**Continuous mode**” stream icon () to stream and visualize sensor data as a plane.
 - Click the “**Edit Tracker Configuration**” icon () to bring up the settings options for the sensors.



3. Click on the “**All Sensor Settings**” icon () to bring up the Sensor Block Configuration menu.

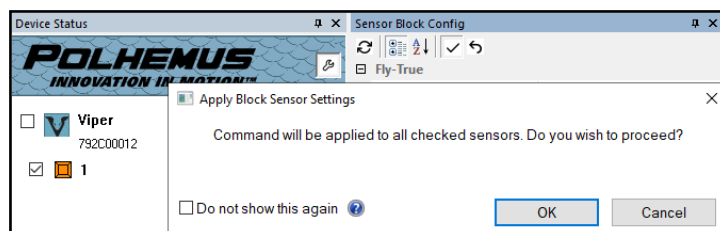


4. Configure Viper Settings (Before Collecting Data in The MotionMonitor xGen):

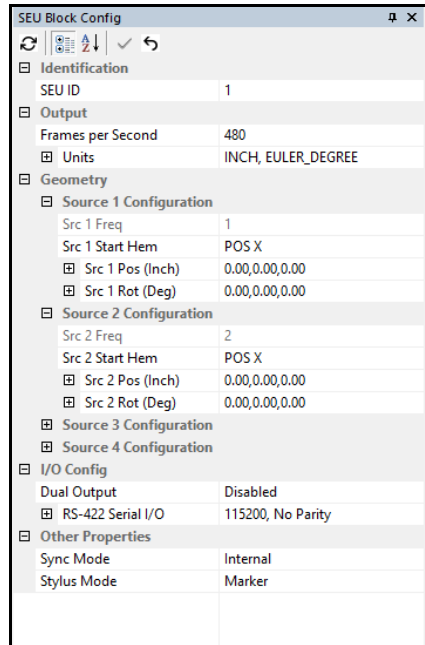
- For a full description of this menu, please see the Viper User Manual.
- Source Select
 - If multiple sources are used, override the default Source Selection settings.
- Hemisphere Tracking
 - Enable Hemisphere Tracking for tracking coverage around all sides of the source/sources.
- Filters and Prediction Filters (Optional)
 - Enable or Disable Prediction Filters for Position and Orientation readings
 - Specify the filter settings under Filters

5. Save Viper Sensor Settings:

- Click the Apply Changes (☒) to save the settings for these menus. The settings will be applied to any sensor with a check box next to it in the Status pane.

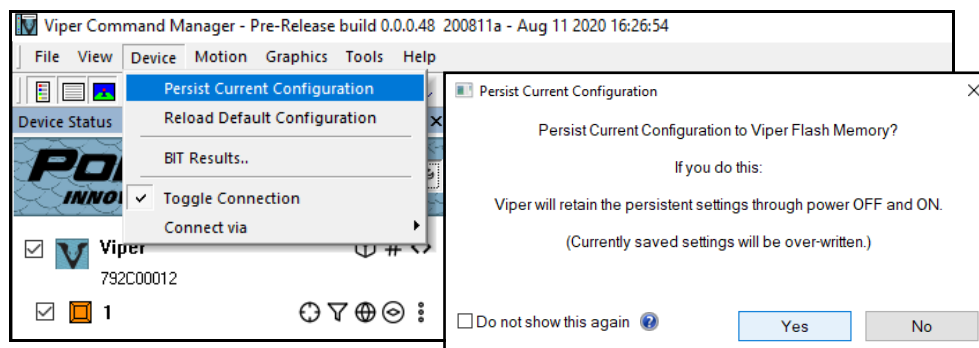


6. If using multiple source configurations, define the position and orientation of the transmitters in the SEU Block Configuration menu (). For a full description of this menu, please see the Viper User Manual.
- For the Output Units section, the Position Units must be set to “**CM**” and the Orientation Units must be set to “**QUATERNION**”.



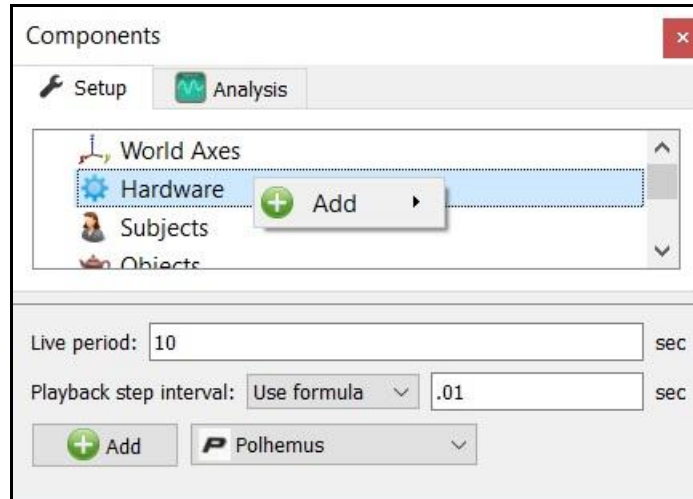
7. Save Viper Configuration Settings Before Exiting the Viper Command Manager:

- Go to Device > **Persist Current Configuration**
- This will prevent the settings from being overwritten when the console is power cycled.
- When prompted to confirm Persist Current Configuration to Viper Flash Memory, click **Yes**.



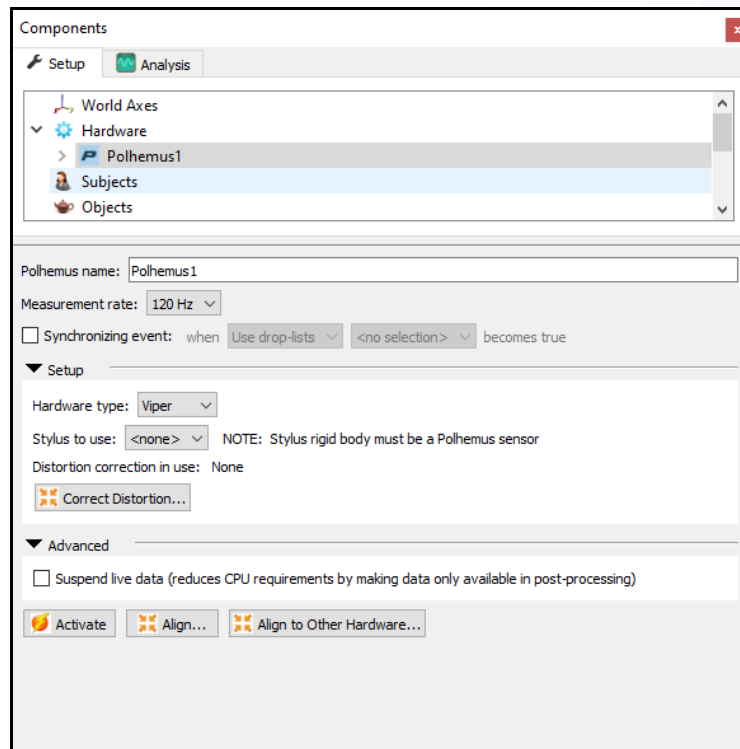
Section 2: Configure Polhemus Viper Hardware in The MotionMonitor xGen

1. Add Polhemus Device in The MotionMonitor xGen:
 - Go to Components window > Setup Tab > **Hardware**.
 - In the hardware node, add the Polhemus 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.



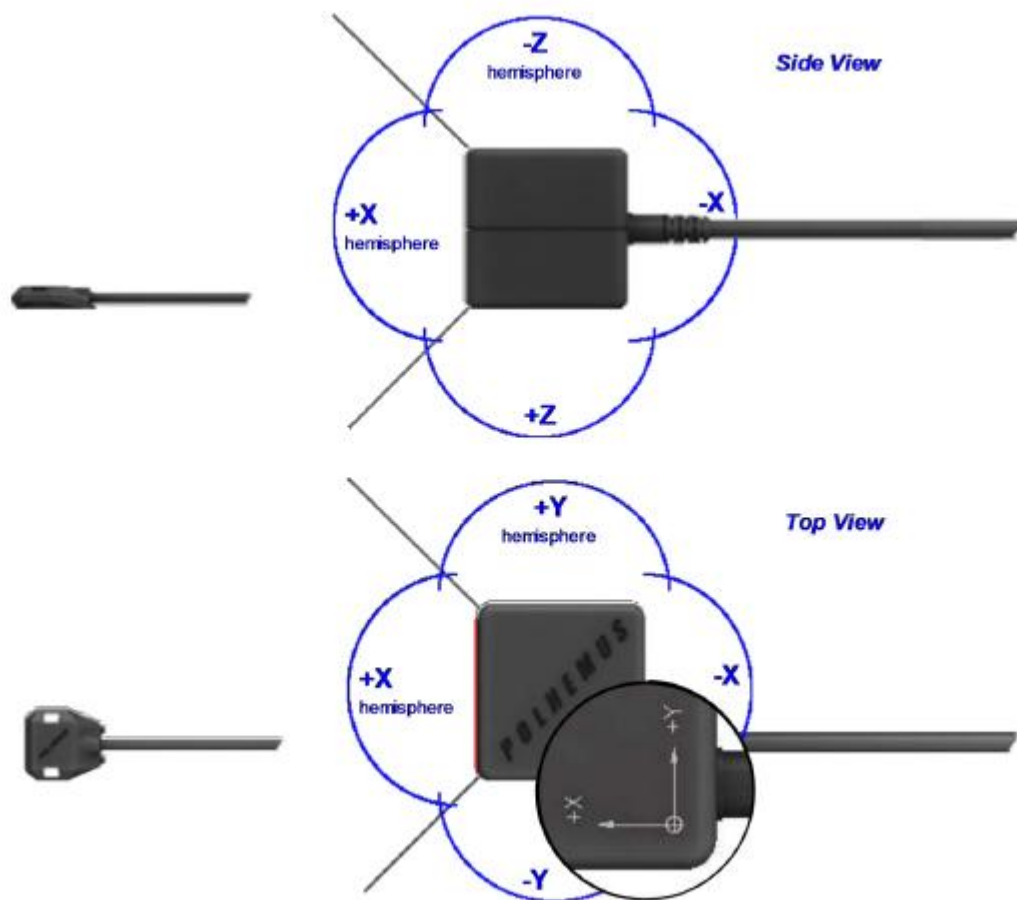
2. Configure Polhemus Device Parameters:

- Click on the Polhemus device to bring up the Polhemus parameters panel.
- Specify:
 - **Name** (optional)
 - **Measurement rate** (choose from supported measurement rates for the device)
 - **Synchronizing event** (Optional)
 - A Boolean event can be specified for performing an active alignment of the Polhemus data stream with synchronous events from other hardware data streams. The Synchronizing event here must be defined from the Polhemus data (i.e. the stylus pen button or event marker, which could be defined as Polhemus1.Sensor1.Event==1, for instance, if the synchronizing event were connected to the first sensor).
 - **Hardware type** (Viper)
 - **Stylus to use** (This stylus will be used for aligning this hardware device i.e. digitizing new world axes unique from the default transmitter coordinate system.)
 - **Suspend live data** (Optional)
 - The processing and display of data in a live mode uses computer resources, so this option allows the user to optimize computer resources and free up more processing power for data collection. This setting is independent for each hardware device and once an activity has been recorded data from the full measurement rate will be accessible for analysis.



3. Position Transmitter and Sensors:

- If enabled in the Viper Command Manager, data from the sensors can be taken from any side of the transmitter, but the sensors must be in the **positive X** hemisphere when the device is Powered on and activated. (See the default transmitter reference frame depicted below.)
- The Polhemus Viper Device also supports the use of multiple transmitters. However, the settings for each system must be configured prior to activating hardware in The MotionMonitor xGen. These settings are configured in the Viper command manager (see **Section 1**)

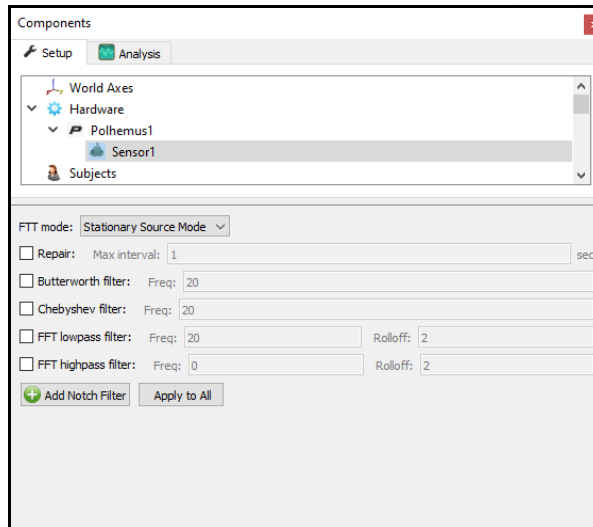


4. Activate the Device:

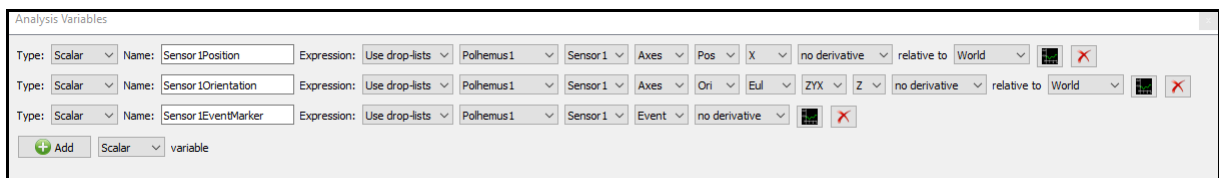
- Click **Activate** to initialize communication between The MotionMonitor xGen and Polhemus hardware.
- Optional Advanced Features:
 - Click **Align** to digitize a new world axes layout according to selections for the World Axes layout in the World Axes Setup Component. Align is used for hybrid configurations.
 - Click **Correct Distortion** to perform metal mappings.
 - Please contact your [Client Support Engineer](#) for more information regarding these advanced processes.

5. Verify Device Activation and Apply Filters:

- After successfully activating the Polhemus Device, the activated sensors will populate under the Polhemus Hardware node
 - Expand the Polhemus Hardware node to show the activated sensors.
- Selecting a Sensor brings up the Sensor parameters panel.
- **Before** data collection, you can enable Polhemus Fly True Technology (FTT) Mode. This feature allows for real time distortion mitigation during data collection. Only Viper FT sensors support FTT Mode.
 - The sensor LED on the electronics unit will turn Blue with the FTT is engaged.
 - There are two settings for the FTT:
 - **Stationary Source Mode** – Sources are mounted in a fixed position
 - **Moving Source Mode** – Sources may be used in dynamic conditions
 - Please refer to the Viper User Manual or contact your [Client Support Engineer](#) for more information on using the FTT Mode.
- Apply Data Repair and Filter Settings (Optional)
 - These settings can be enabled or disabled here, pre or post data collection.



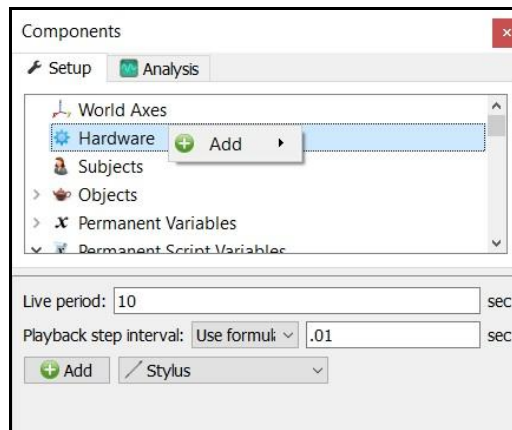
6. At this point, data available directly from the Polhemus hardware can be displayed in graphs or used in custom equations, as depicted below.



Section 3: Configure Stylus

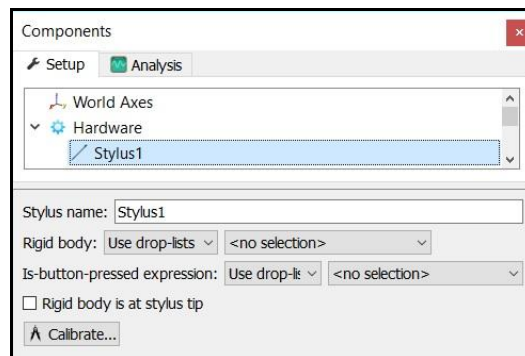
1. Add a Stylus:

- A Stylus will need to be configured for digitizing the alignment of the Polhemus hardware device, force plates, and defining joint centers or other landmarks of interest for your subject.
- Go to Components Window > Setup Tab > **Hardware**
- Add the Stylus 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.



2. Configure Stylus:

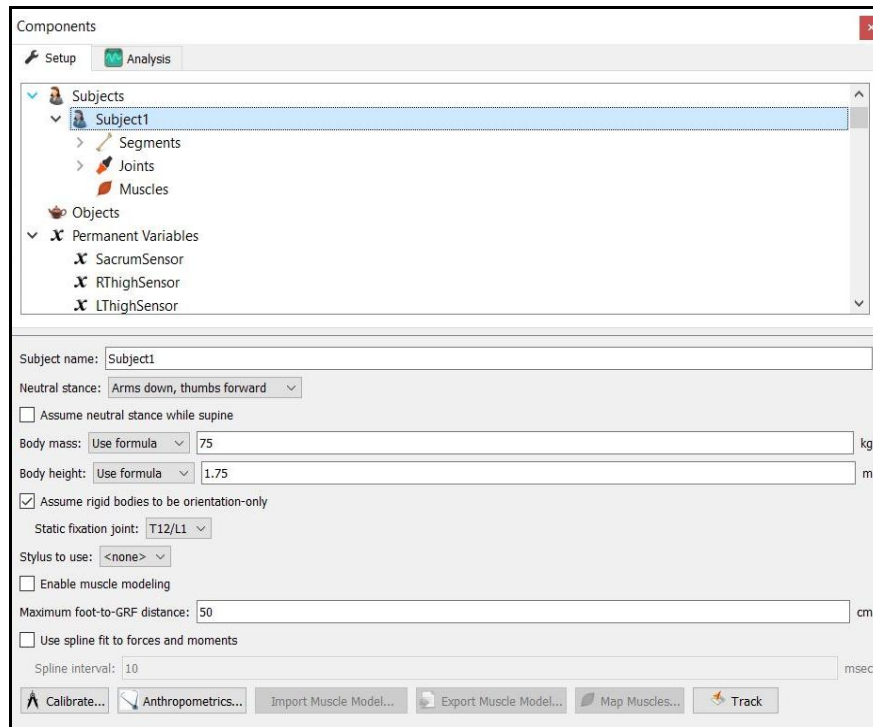
- Click on the Stylus device to bring up the Stylus parameters panel.
- Specify:
 - **Name** (Optional)
 - **Rigid body** sensor attached to the stylus
 - An **Is-button-pressed expression** (Optional)
 - Boolean value that allows for an external trigger to be used in the OK messages where the stylus is being used in the setup, such as when performing the alignment of a hardware device, aligning force plates or when digitizing a subject.
 - Check **Rigid body is at stylus tip** (If applicable)
 - Can be enabled when the origin of the Rigid body specified for the stylus is already located at the tip for the stylus being used, as in the example of Polhemus Stylus Pens.
- Click **Calibrate** to set Stylus tip position and orientation.
 - The Calibrate button walks through the procedure of calculating the vector offset from the Rigid body origin to the stylus tip or captures the orientation of the stylus if the “Rigid Body is at stylus tip” is selected.
 - A tutorial video for configuring and calibrating a stylus can be found at <https://themotionmonitor.com/support/>.



Section 4: Define Biomechanical Model within The MotionMonitor xGen

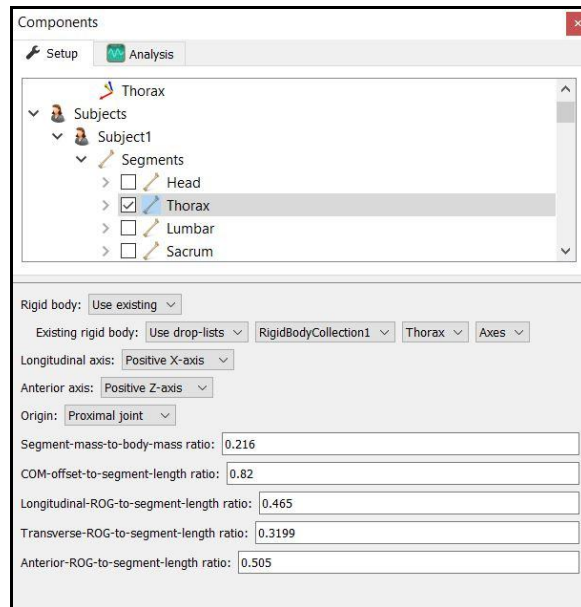
1. Set Up Subject:

- Right-click on the **Subjects** header within the Components Setup tab and add a new subject.
- Assign a name (Optional) and enter basic anthropometric data.
- Confirm subject orientation for **Neutral Stance** and **Stylus to use** for digitizing.



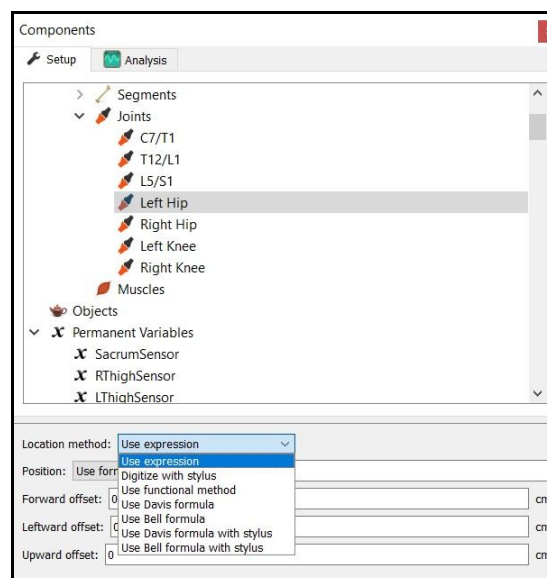
2. Set Up Subject Segments:

- Under the Subject > **Segments**, enable desired body segments to be tracked and assign rigid bodies to those segments. Additional basic anthropometric information can be defined here for each segment as well.



3. Define each segment's proximal and distal joint centers:

- The required joint centers will be automatically populated, under Subject > **Joints**, based on the selection of segments.
- Joint centers can be defined via digitizing, marker-based expressions, linear regression, or functional (rotational) methods.

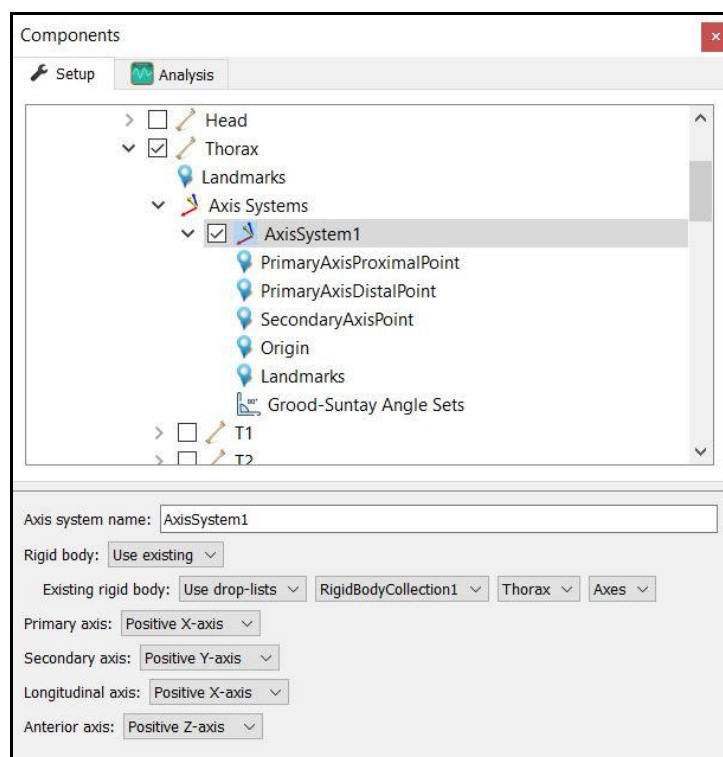


4. Calibrate Subject:

- Once the Subject Segments and Joints definitions are completed, click the Subject **Calibrate** button to complete the model setup following the on-screen prompts. A warning message will be displayed for any definitions that have not been appropriately defined.

5. Optionally, add anatomically based local coordinate systems to segments via adding an **Axis System**. Define axes based on sensor and landmark positions.

- Select the Rigid Body axes tracking the segment and general axes layout.
- Define points for the proximal and distal endpoints of the primary axis, a point along the secondary axis and a point for the Origin.
- The default local coordinate axes generated by **The MotionMonitor xGen** are defined as having a long axes through the joint centers and A/P and M/L axes being orthogonal to the long axes and parallel to the world when the subject was standing in the neutral position.



6. The subject model is now ready for data collection and computations.

7. Save your setup and subject definition as a workspace for easy reloading in the future:

- Go to File > **Save Workspace As**
- Load later with File > **Open Workspace**