

The MotionMonitor xGen Hardware Guide: Bertec Analog Force Plate Configuration

This document reviews the procedures for configuring a Bertec device in The MotionMonitor xGen software with analog outputs.

1. Place the force plate on a flat surface.
2. Identify the 8-pin female round connector on the force plate output cable. Match the keys of the plug and receptacle on the force plate. Push in the connector and rotate (about ¼ turn) clockwise until the two fully engage and lock.



3. Connect the other end of the force plate output cable to the "Input" 9-pin D-Sub connector on the Bertec Amplifier.
4. Connect the 6 channel BNC cable to the "Analog Output" 15-pin D-Sub connector the Amplifier, as shown below.

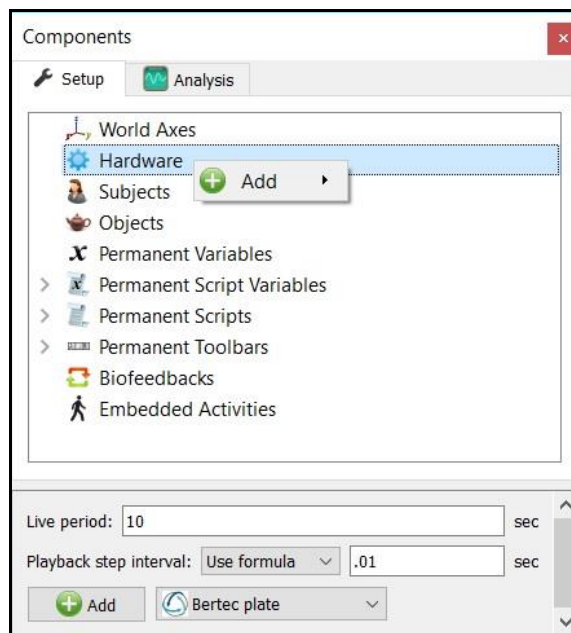


5. Connect the power supply to the Amplifier.

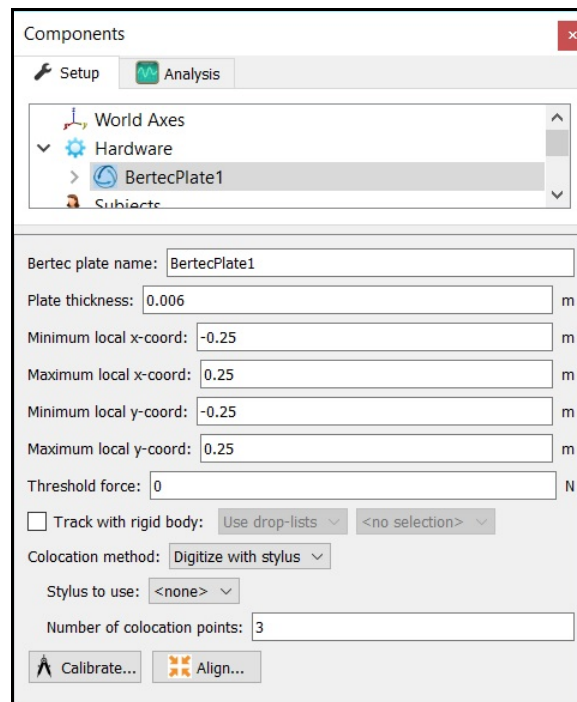
6. Connect all 6 BNC cables to the A/D Patch Panel as shown below (using Channel #0-#5 or the first set of consecutive 6 channels available) in the order: FX, FY, FZ, MX, MY, MZ



7. With no load on the force plate, push the “Zero” button on the Amplifier.
8. Start The MotionMonitor xGen and go to the Setup Components Window.
9. From the Hardware node in the Setup Components window add the Bertec plate through the Add button at the bottom of the Components window or right-click on the Hardware node to add the device.



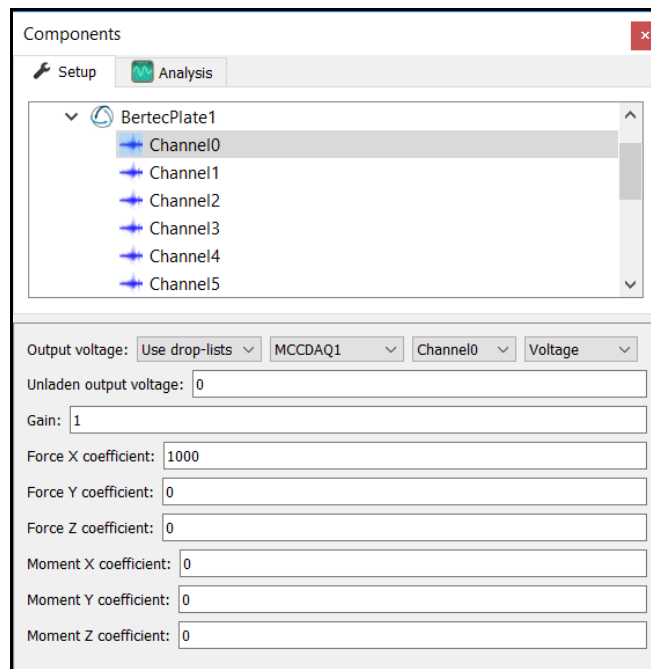
- From the Bertec plate parameters panel, specify the name for your force plate and the Plate thickness, which is the thickness of any material applied to the surface of the force plate. The min/max x and y coordinates refers to the dimensions for the plate, relative to its origin. This will control the footprint for the force plate in the animation window. The settings displayed in the image below would be for a 50cm x 50cm force plate. The “Threshold force” sets the minimal allowable force to be used in the software for computing force derived and Center of Pressure data. 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. After the remaining steps have been completed the “Calibrate” button performs a software zero of the force plate channels and the “Align” button will begin the procedure for aligning the force plate to the world axes. If an alignment is not performed, the force plate will report relative to its native coordinate system.



The screenshot shows the 'Components' window with the 'Analysis' tab selected. The 'Hardware' section is expanded to show 'BertecPlate1'. The configuration panel for 'BertecPlate1' includes the following fields and controls:

- Bertec plate name: BertecPlate1
- Plate thickness: 0.006 m
- Minimum local x-coord: -0.25 m
- Maximum local x-coord: 0.25 m
- Minimum local y-coord: -0.25 m
- Maximum local y-coord: 0.25 m
- Threshold force: 0 N
- Track with rigid body: Use drop-lists <no selection>
- Colocation method: Digitize with stylus
- Stylus to use: <none>
- Number of colocation points: 3
- Buttons: Calibrate... and Align...

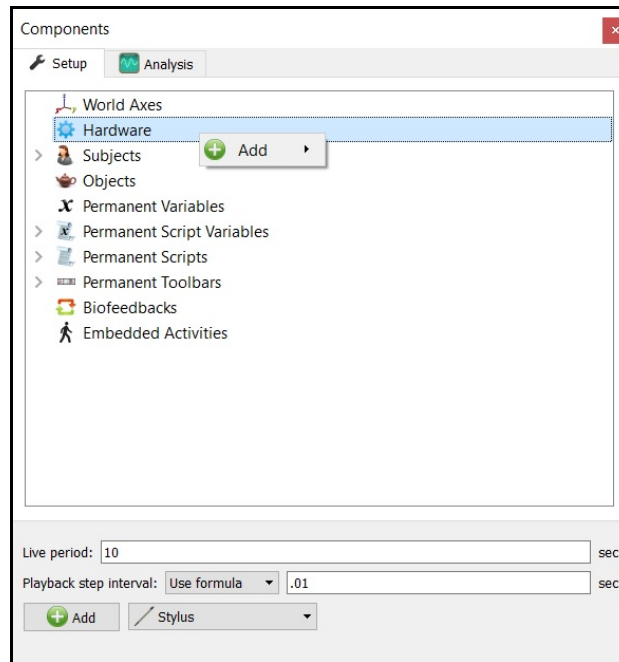
- Expanding the Bertec plate node will bring up the 6 channels that need to be configured (Channels 0,1,2,3,4,5, which typically map to Fx, Fy, Fz, Mx, My, Mz, respectively). The “Output voltage” should be configured to specify where the channel is getting its signal from (i.e Measurement Computing Device or other data acquisition device). The “Unladen output voltage” will be automatically updated when the “Calibrate” button is pressed for the force plate. Enter the “Gain” value based on the gain selected on the amplifier or 1 for a fixed gain amplifier. For the Force coefficients, insert the values from the calibration sheet provided by Bertec. When entering this, a single column from the matrix will be entered in the parameters panel for each channel. For instance, the first column from the calibration sheet has been entered for Channel 0 below.



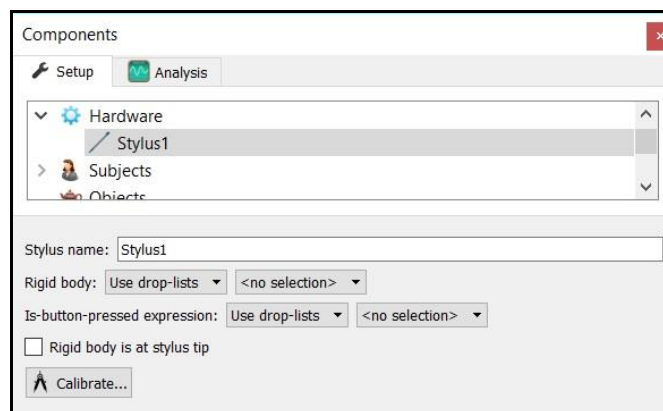
- From the Bertec plate parameters panel click the “Calibrate” button to perform a software zero and click on the “Align” button to begin the procedure for aligning the force plate to the world axes.

The colocation points should not be taken in the corners of the force plate, near a load cell or along the midline of two adjacent load cells. A steady strong force should be applied perpendicular to the surface of the force plate using the specified stylus. Stylus tip and CoP position data will then be used from each of the digitized readings to align the coordinate system of the force plate with that of the world. A tutorial video for configuring force plates can be found at <https://themotionmonitor.com/support/>. This process needs to be performed for each force plate.

13. If a stylus is not already defined in the current Workspace, go to the Hardware node in the Setup Components window 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.

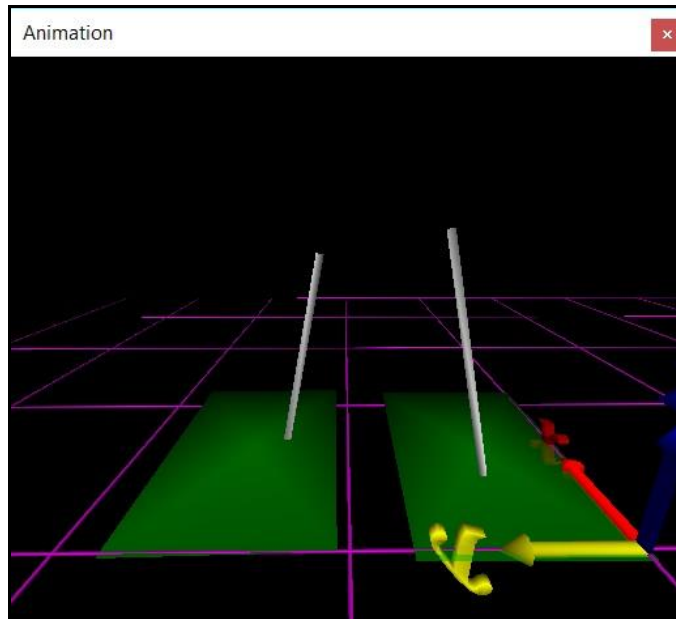


14. Before calibration of the stylus can be performed, the rigid body affixed to the object being used as the stylus needs to be selected through the “Rigid body” drop-list menu. If a remote OK button is to be used during the digitizing process, that Boolean expression would need to be defined through 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/>.

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



16. Force plate 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/>.

