

# Analog Output Integration in Cortex (OPTIMA or GEN 5 users)

Note: Before beginning, complete the *Quick Start Guide (OPTIMA/Gen 5 users)*

## Configure the 'Fully Conditioned' analog mode in NetForce

- Double click NetForce to run.
- Select **'Setup'** then **'Hardware Installation'**, and click on **'Modify'** to open the **'AMTI System Configuration'** window.
- Under **'Global Settings'**, select **'Metric Units'** for the **'Digital Outputs'**, setting. You must use metric units when integrating with Cortex.
- Set the **'Analog Outputs'** to **'Fully Conditioned'**. If you are using an Optima system this is the only option that will work.
- For the force plate and amplifier of interest, click on the button under **'Configure'** in the list of **'Installed Amplifiers'**. This will open the **'Amplifier Configuration SN:XXXX'** window (see image below).
- The gain and excitation should have been selected already, if not return to step 6 of the *Quick Start Guide (OPTIMA/Gen5 users)*
- Once the Gain and Excitation have been set, click the **'Analog Adjust'** button. This will set the **'Analog Scale Factor'** such that the **'Analog Outputs'** for each channel match the **'Amplifier Range'** (see below). This ensures that the +/- 5V output of the amplifier corresponds to the working range of the system (defined by the gain settings).

**NOTE:** If your version of NetForce does not have an **'Analog Adjust'** button simply enter in values for the **'Analog Scale Factor'** and press apply. Adjust the values until the **'Analog Outputs'** are similar to the **'Amplifier Range'**

- Record the values for the **'Analog Scale Factor'** for each channel.

The image shows two overlapping software windows. The background window is 'AMTI System Configuration'. In the 'Global Settings' section, 'Analog Outputs' is set to 'Fully Conditioned'. In the 'Installed Amplifier' table, the 'Configure' button for the first amplifier (Index 1) is highlighted with a red box. A red arrow points from this button to the foreground window, 'Amplifier Configuration SN: 2186'. This window has two tabs: 'Configuration Information' and 'Current Configuration'. The 'Current Configuration' tab shows various settings for six channels (Fx, Fy, Fz, Mx, My, Mz). The 'Analog Scale Factor' row is highlighted with a red box, showing values: 6.9, 6.9, .87, 6.85, 8.6, 16.4. Below this row is an 'Analog Adjust' button, also highlighted with a red box.

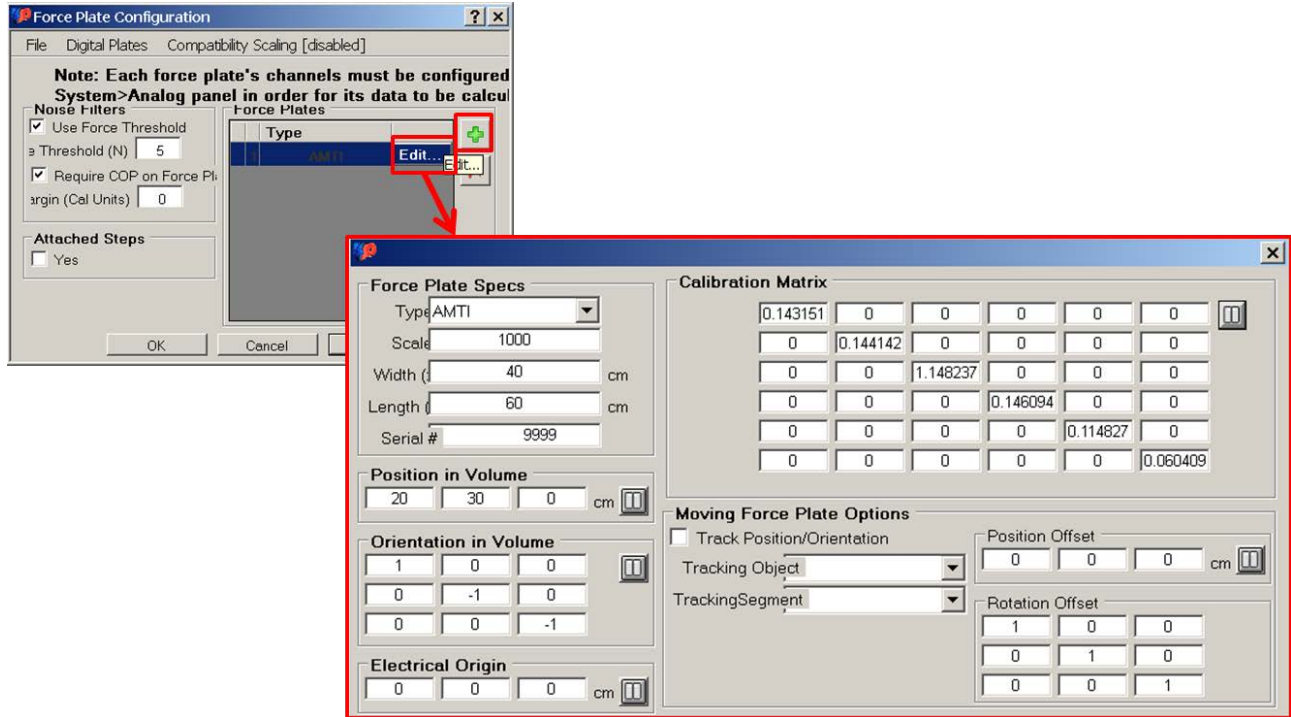
	Fx	Fy	Fz	Mx	My	Mz
Platform Capacity	4448.22	4448.22	8896.44	2666.44	1785.16	1333.22
Amplifier Range	715.76	720.71	5741.50	730.47	574.14	302.04
	-715.76	-720.71	-5741.50	-730.47	-574.14	-302.04
Analog Outputs	724.64	724.64	5747.13	729.93	581.40	304.88
	-724.64	-724.64	-5747.13	-729.93	-581.40	-304.88

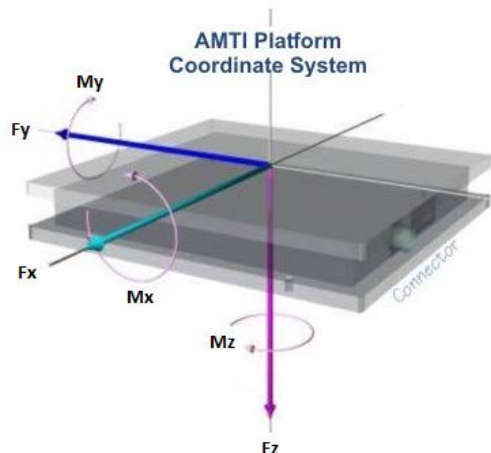
	Fx	Fy	Fz	Mx	My	Mz
Excitation	10.0	10.0	10.0	10.0	10.0	10.0
Gain	2000	2000	1000	1000	1000	1000
Zero Setpoint	0	0	0	0	0	0
Units	mV/N	mV/N	mV/N	mV/(N-m)	mV/(N-m)	mV/(N-m)
Analog Scale Factor	6.9	6.9	.87	6.85	8.6	16.4

## Integrate the force plate into Cortex

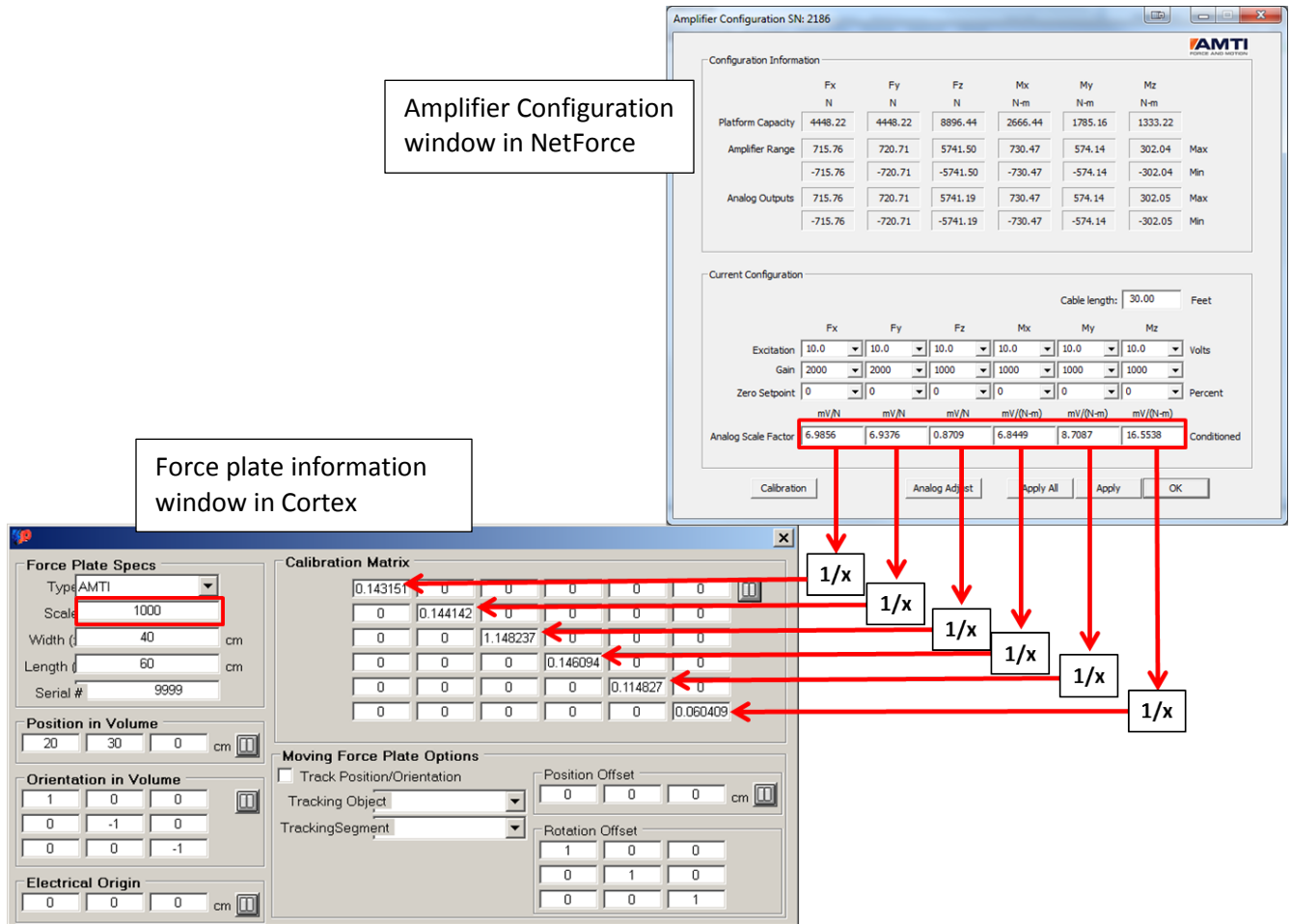
- a. Make sure the amplifier and A/D board is connected to the motion capture system as indicated in the *Cortex Reference Manual* (Appendix B).
- b. In Cortex click on **'Tools'** then **'Force plate Configuration...'**
- c. In the window (image below) click the green plus sign to add a force plate then click on **'Edit...'**



- d. In the new window choose the force plate Type as 'AMTI'
- e. Set the **'Scale Factor'** to 1000. This accounts for the conversion from V to mV
- f. Enter the force plate's dimensions, serial number, position in your Motion capture volume, and orientation.
  - i. For an Optima amplifier the electrical origin is always 0, 0, 0; for a Gen 5 check your calibration information for these offsets
  - ii. To set the orientation of the force platform in your volume, remember that the force plate's coordinate system has Positive Z down, Positive Y away from the connector and Positive X to the left when standing behind the connector (see image below)



- g. To fill the 'Calibration Matrix' take the inverse of each 'Analog Scale Factor' that you recorded from NetForce and place it along the diagonal leaving the rest of the matrix as zeros (see image below).
  - i. This will provide the correct conversion from the fully conditioned analog signal to forces and moments (for more detail on how the fully conditioned analog output mode works consult the Technical note *Gen 5/Optima Setup and Optimization*)



- h. Once you have filled the Calibration matrix, close this window.
- i. In the 'Force plate Configuration...' window click 'Apply' then 'OK'
- j. Verify that the forces are correct by clicking on 'Force Plate Forces...' in the 'Analog' tab of the main Cortex window.
- k. You have completed the Fully Conditioned analog integration into Cortex.