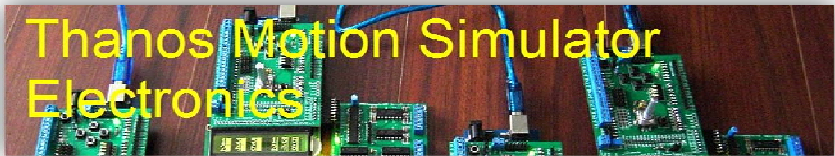




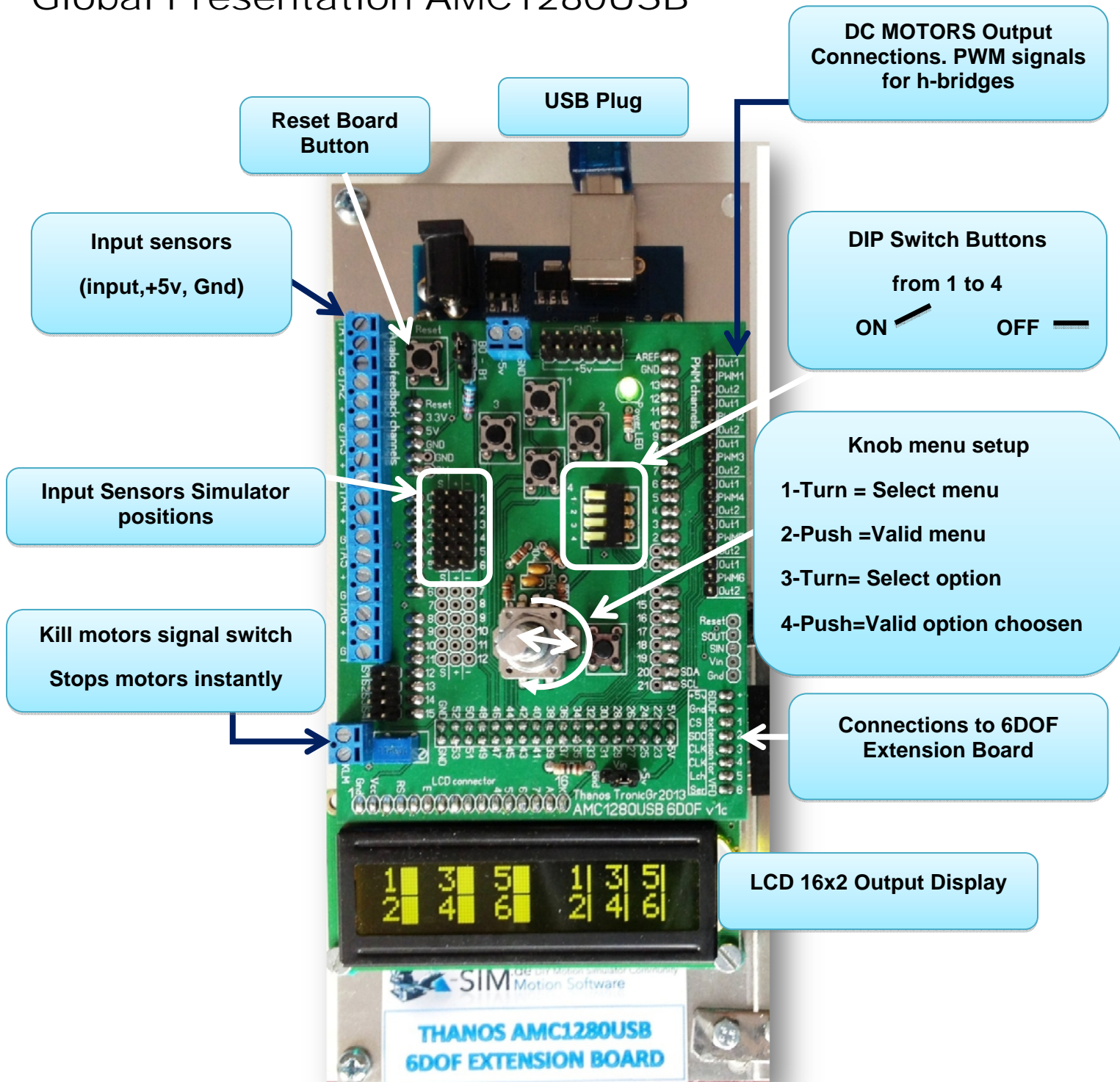
6DOF Extension board



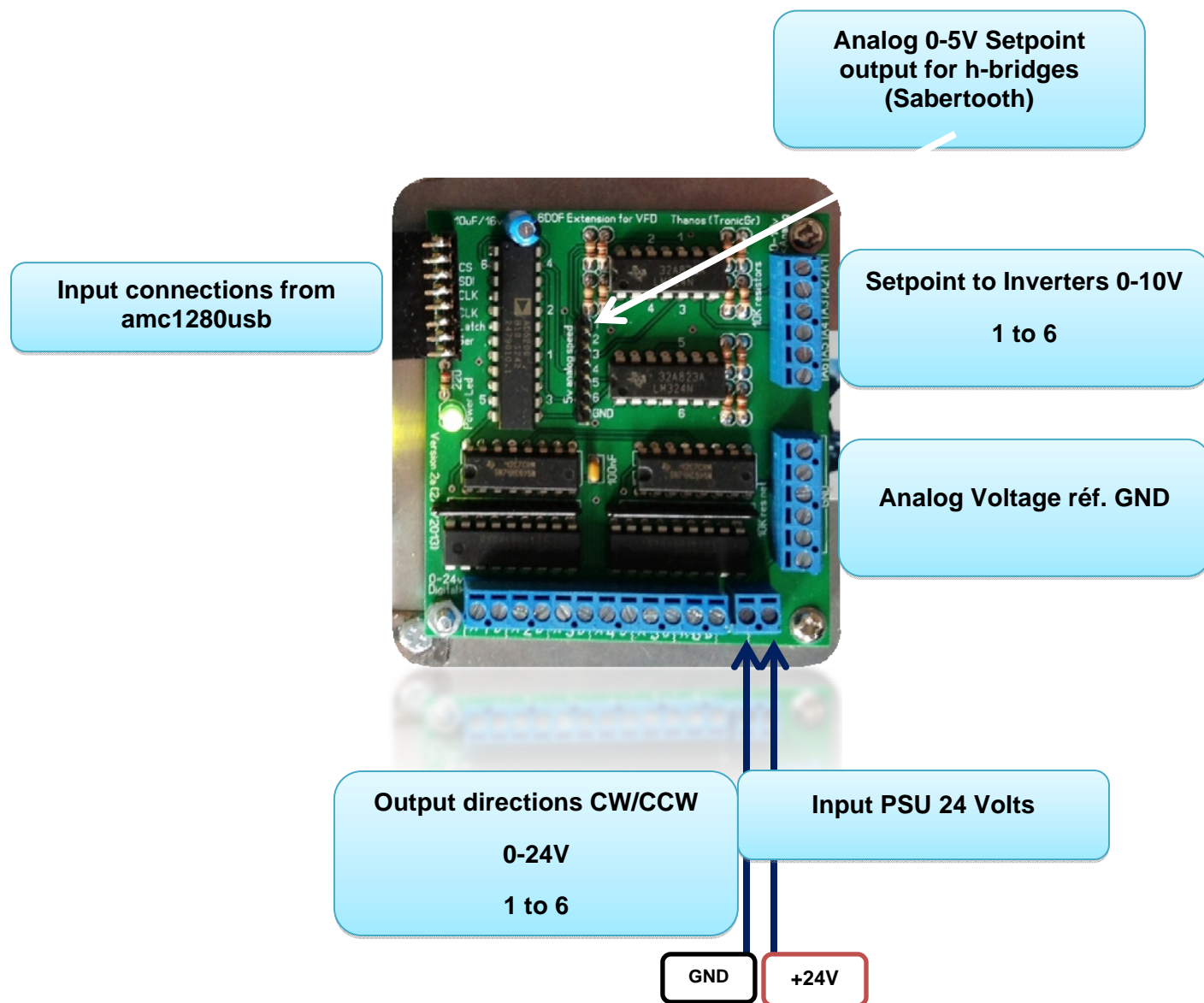
SUMMARY :

- 1- Global Presentation AMC1280USB ----- page 3
- 2- Global Presentation 6DOF Extension Board -----page 4-6
- 3- Menus Presentation -----pages 7-8
- 4- Schematic diagram wiring DC Motors -----page 9
- 5- Schematic diagram wiring AC Motors -----page 10
- 6- Disclaim

Global Presentation AMC1280USB



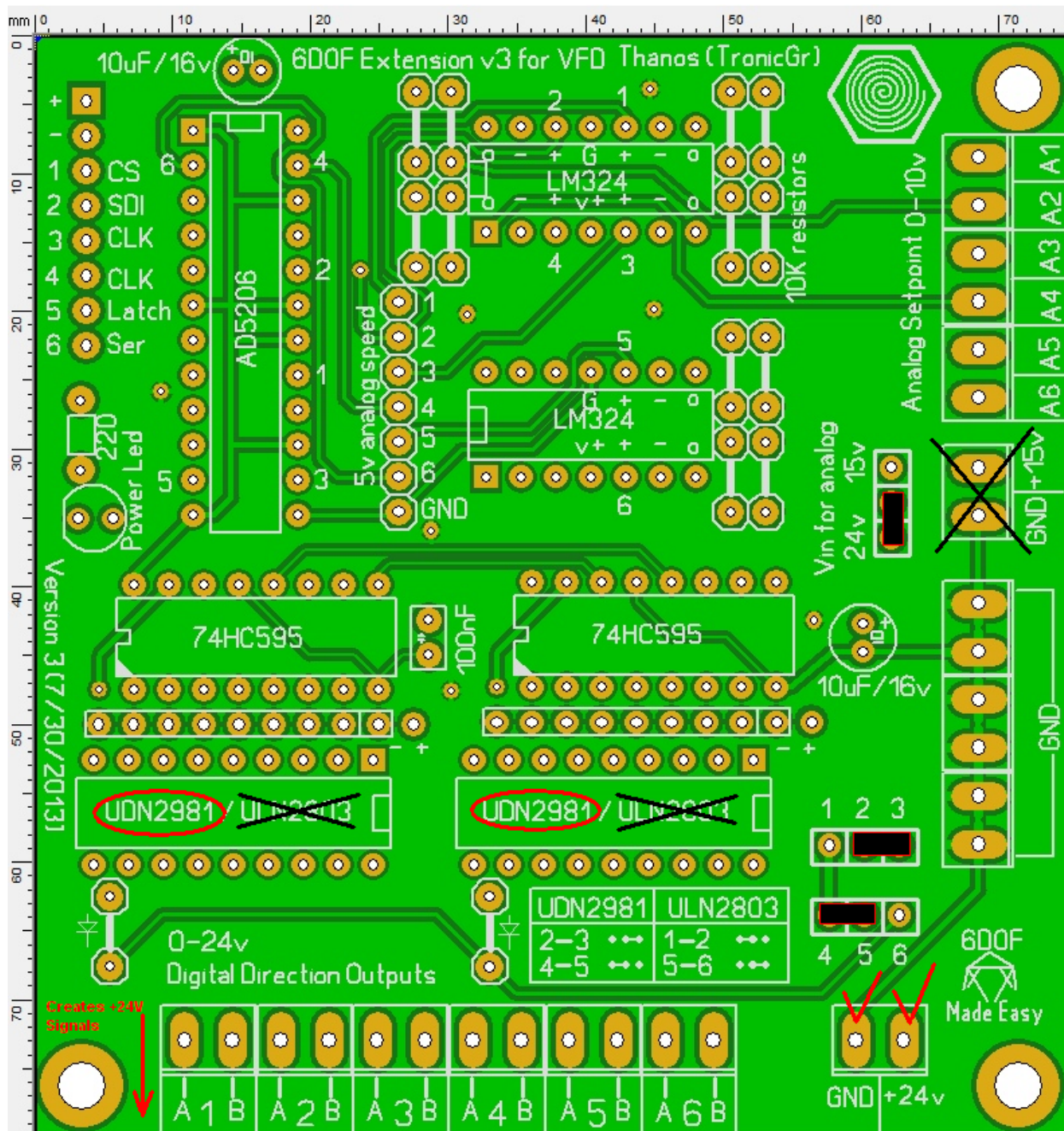
Global Presentation 6DOF Extension Board



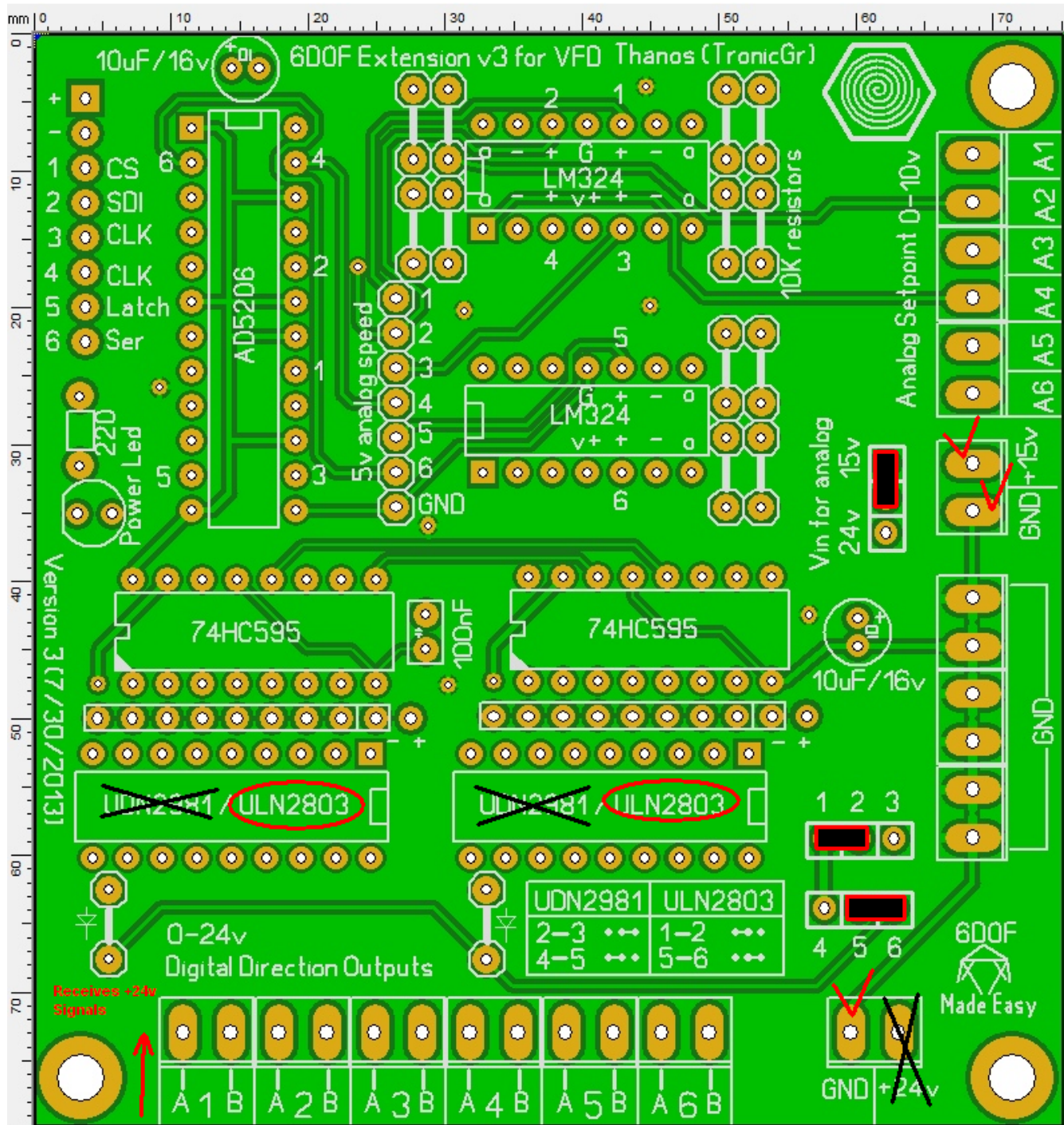
AMC1280usb Manual
July 2013 v1.0

The new version of 6DOF ext v3 board has some new features. It can be now configured to be connected to VFD inverters with either Sourcing or Sinking signals. Sourcing signals means that the 6DOF ext board is creating the +24v signals and the VFD is referencing them to Gnd. Sinking signals means that the VFD inverter outputs the +24v signals and the 6DOF ext board is sinking them to Gnd.







Below you can see how you can setup the 6DOF ext v3 for Sourcing Signals (Default setting).

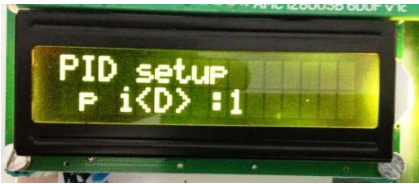
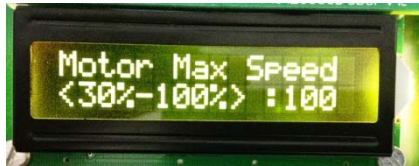




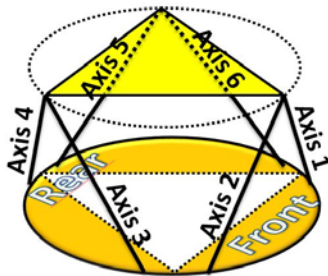



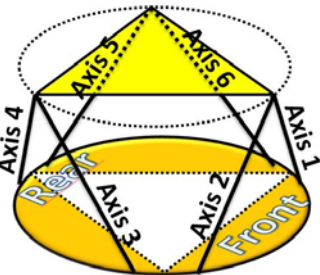
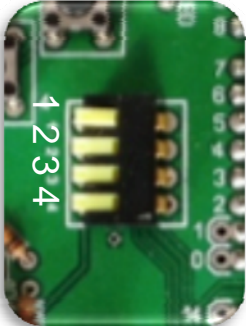
Below you can see how you can setup the 6DOF ext v3 board to receive Sinking signals for VFD inverters that only Output signals and they need to be sink to Gnd. In this case you have to replace the UDN2981 chips with the ULN2803 ones and change the position of the jumpers. Also you have to provide the 15v separately for the analog speed stage (0-10v).



Menus Presentation

Screen Menu	Explanation	
	The first 6 bargraph represent the setpoints values ; The second 6 bargraph represent the sensors positioning values	
	Other display with the same explanation as above : -first 6 numbers = Percent representation of the setpoints values -second 6 numbers = Percent representation of the sensors positioning values	
	Choose here the number of axis you want to drive from 2 axis (2DOF) to 6 axis (6DOF). X-sim3 plugin requires this setting to be 6DOF to see the interface.	
	Which data format you want to use to drive your simulator. 8 bit : "AB" followed by 6 bytes, each byte for each axis (0-256) AB~a01~~a02~~a03~~a04~~a05~~a06~ 16 bit : "AB" followed by 12 bytes, every two bytes pair forms a 16-bit value for each axis (0-65535). String is the same but each parameter is 2 bytes long : AB~a01~~a02~~a03~~a04~~a05~~a06~	
	Tune here the PID – value P Proportional (smallest valid value 2, 1 means disabled!)	
	Tune here the PID – value I Integral (same as above)	

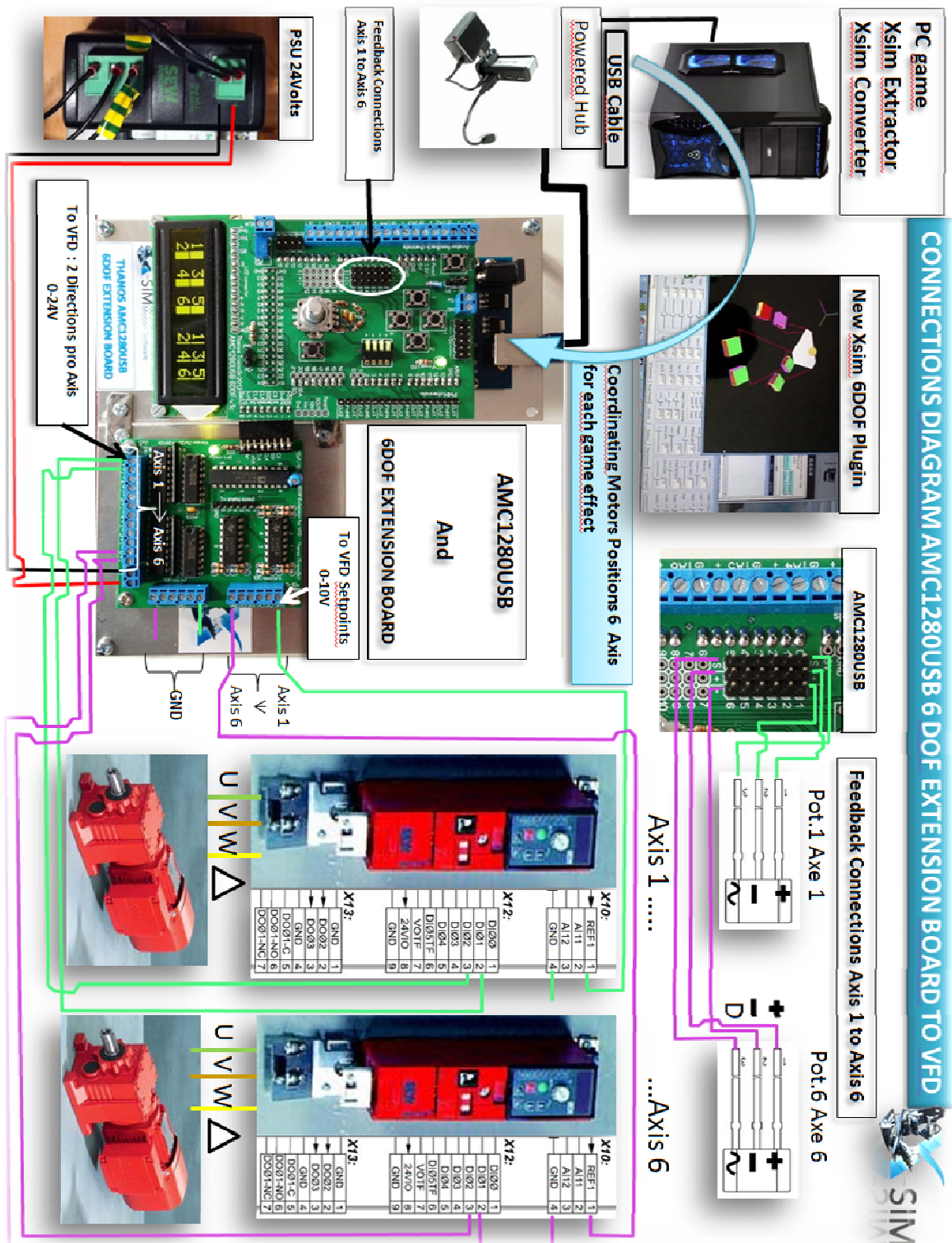
Screen Menu	Explanation	
	Tune here the PID – value DI Derivative (same as above)	
	Setup the Max Speed all axis Decreasing this can help if your motor RPM is over 20rpm output or overpowered!	
	Setup the min Speed all axis (better leave this in 1 for PID stability under load)	
	Setup the Feedback limits. Increasing this value will increase the positioning sensors dead zone and reduce the maximum angle course	
	Setup the Feedback sensors direction. This menu means if sensors connected as identical all axis CW and CCW run in the same direction	
	 <p>Setup the Feedback sensors direction. This menu means if sensors connected as identical: -axis 1,3,5 CW - axis 2,4,6 CCW</p>	

Screen Menu / Board	Explanation	
	 <p>Setup the Feedback sensors direction. This menu means if sensors connected as identical :</p> <p>-axis 1,3,5 CCW – axis 2,4,6 CW</p>	
	<p>DIP Switch Buttons :</p> <p>-DIP SW1: ON position, enables LCD menu and realtime values on the LCD. OFF position, Disables LCD menu and allows the controller to do even more calculation per second. Its recommended to set this Dip Sw1 to OFF position after you done tuning or changing configuration values.</p> <p>-DIP SW2: ON position, Sets Serial speed 125000bps OFF position, Sets Serial speed 250000bps</p> <p>-DIP SW3: ON position, Sets Unidrive method where the analog output signal provides both direction and speed OFF position, Sets Bi-directional method that is most common for VFD inverters.</p> <p>-DIP SW4: ON position, enables the DC motor PWM outputs. (6DOF ext is disabled) OFF position, enables the 6DOF extension board outputs.</p>	

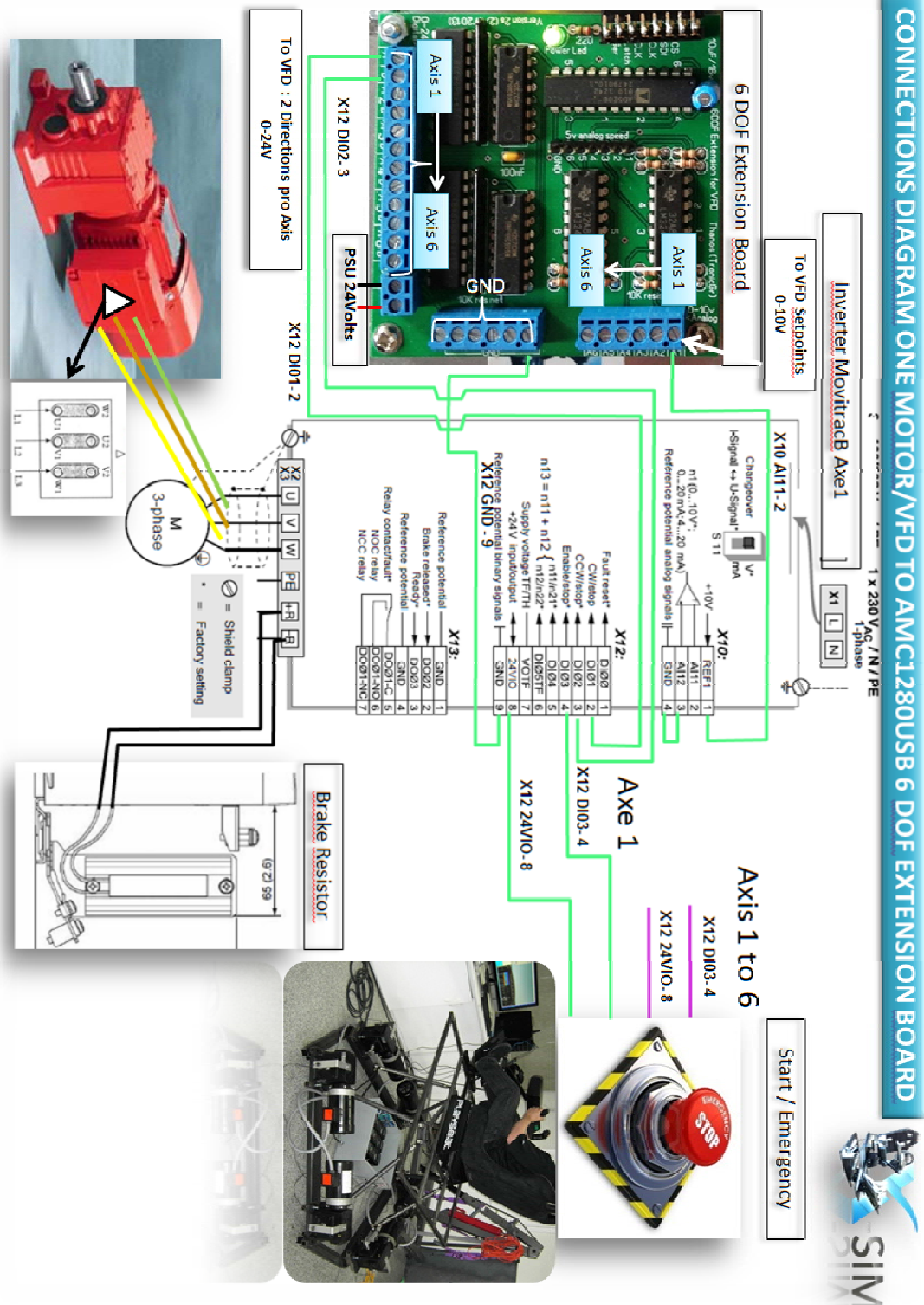


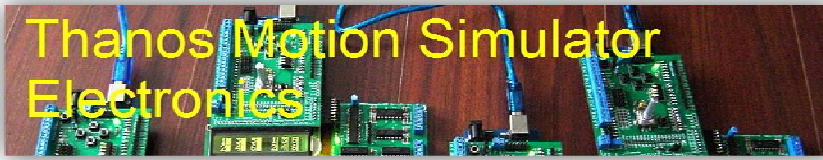
Schematic diagram wiring DC Motors

Schematic diagram wiring AC Motors



Schematic diagram wiring AC Motors



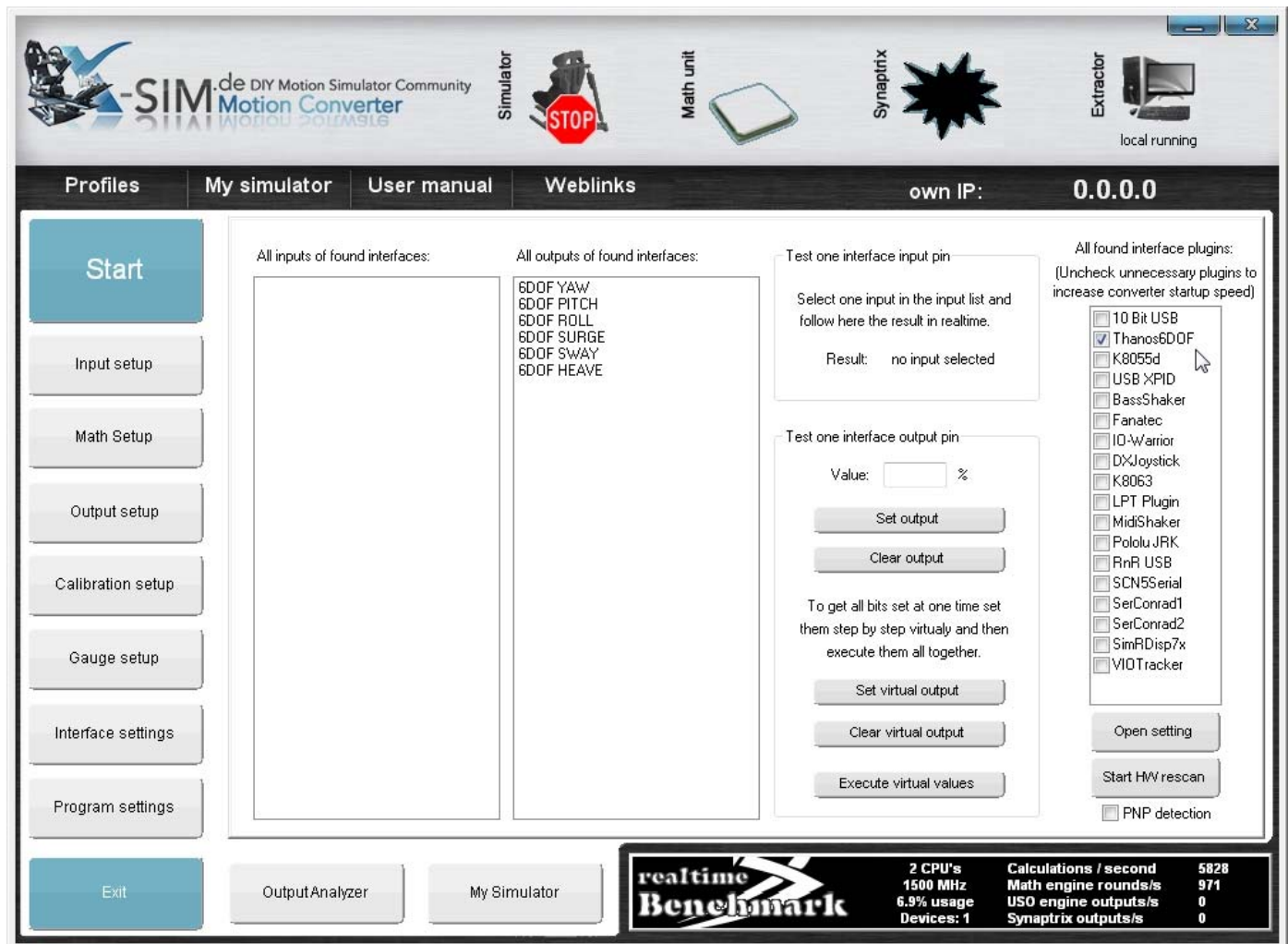


6-Disclaim

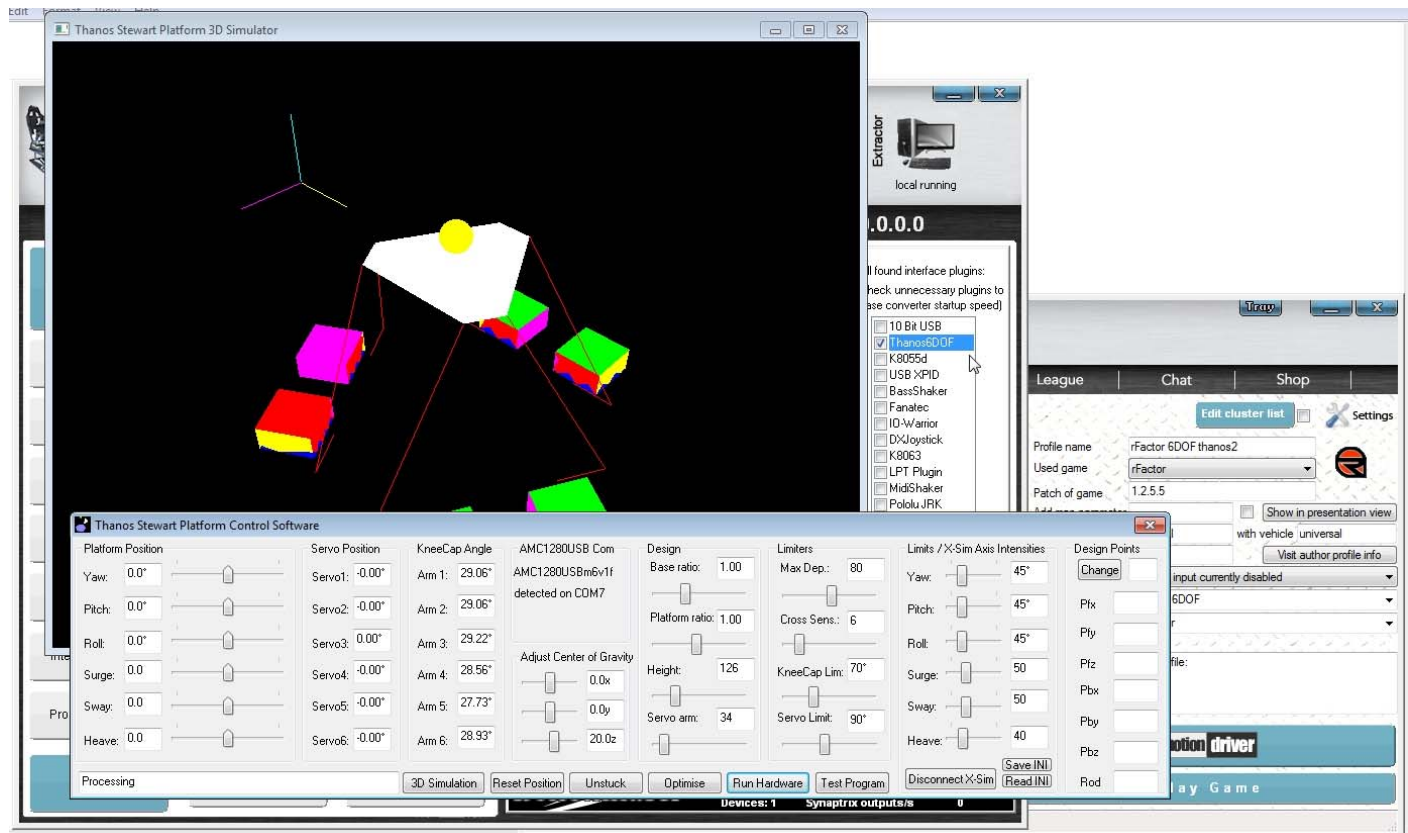
Software setup and use:

The AMC280USB uses FTDI Chipset USB serial driver that has to be installed correctly in order for the controller to obtain a COM port and speak correctly to the software. Windows7 and windows8 install automatically a compatible driver but it's always preferable to use the latest one from the [FTDI website](http://www.ftdichip.com/).

The AMC1280USB communicates with the computer software with speed of 250KBps (250000). You should not forget to add this speed in the software you are using for motion if it does not support autodetection of the interface. [X-sim3](#) (Thanos 6DOF plugin) detects automatically the AMC180USB and the comport that uses.



Once the AMC1280USB interface is detected in X-sim3 software you can select it (Thanos6DOF) and then click on the “Open setting” button that is located below the list of interfaces, to open the 6DOF control panel and setup the correct dimensions for your platform and test the platform manually as well (click on the “Disconnect from x-sim” for manual testing).



After dimensions were entered you should click on the “Save Ini” button to save it. The last saved dimensions are loaded automatically upon program start.

The 6 degrees of freedom are defined as 6 separate axis in the x-sim3 software that allows you to assign them to any available axis are provided from the supported games. Some old games does not provide all 6DOF data but they can provide 4DOF data for example. The 6DOF plugin will convert the 4DOF data to 6DOF automatically. You still have to manually assign each axis from the game to represent the correct axis assignment and direction as well the amount of force (range of motion).



In the following example you can see how you assign the Pitch axis from the game data to the 6DOF PITCH of the 6DOF plugin (Math setup page):

The screenshot shows the 'Math Setup' page in the x-sim3 Motion Converter software. The 'Axis 2 - Pitch' setup is active. The 'Found math plugins' list includes: 1. Output 1:1 (GForce), 2. Smoothness filter, and 3. Calibration offset. The 'Step by step calculation table' shows the following data:

#	math plugin	result	slider	value	invert	value	minimum
1	Output 1:1 (GForce)			34	n.a.	true	n.a.
2	Smoothness filter			80	n.a.	true	n.a.
3	Calibration offset			0	n.a.	true	n.a.

The 'Axisname' dropdown menu is open, showing the following options: 6DOF PITCH, 6DOF YAW, 6DOF ROLL, 6DOF SURGE, 6DOF SWAY, 6DOF HEAVE. The '6DOF PITCH' option is selected. The 'Realtime result analyzer' table is empty. The 'Benchmark' section at the bottom shows the following data:

2 CPU's	Calculations / second
1500 MHz	8782
14.7% usage	Math engine rounds/s: 976
Devices: 1	USD engine outputs/s: 0
	Synaptix outputs/s: 0

I won't get in depth here of how you setup x-sim3 with various games. There is complete manual about the procedure here: <http://www.x-sim.de/software.php?lang=eng&page=documentation>

And here: <http://www.x-sim.de/manual/index.html>

Ian's 6DOF BFF software is a little less complicated as it written for a few specific Flight Simulator games. It uses config files that has to be adjusted manually with the speed and the compost that is used. Here is an example:

; COM port and Baud rate for cue output
; Output is 8 bit, no parity, stop bits 1, flow control off
; Output Mode is either BIN, HEX2 or BIN2TH for Thanos 6 DOF driver

Port=COM2
Baud=250000
Mode=BIN2TH

Again, you have to define the dimensions of you 6DOF platform in the appropriate "config.bff" file. An example can be found here in this file library: <https://www.dropbox.com/sh/641qkq11p3prar1/HzVrdDiu3q>

