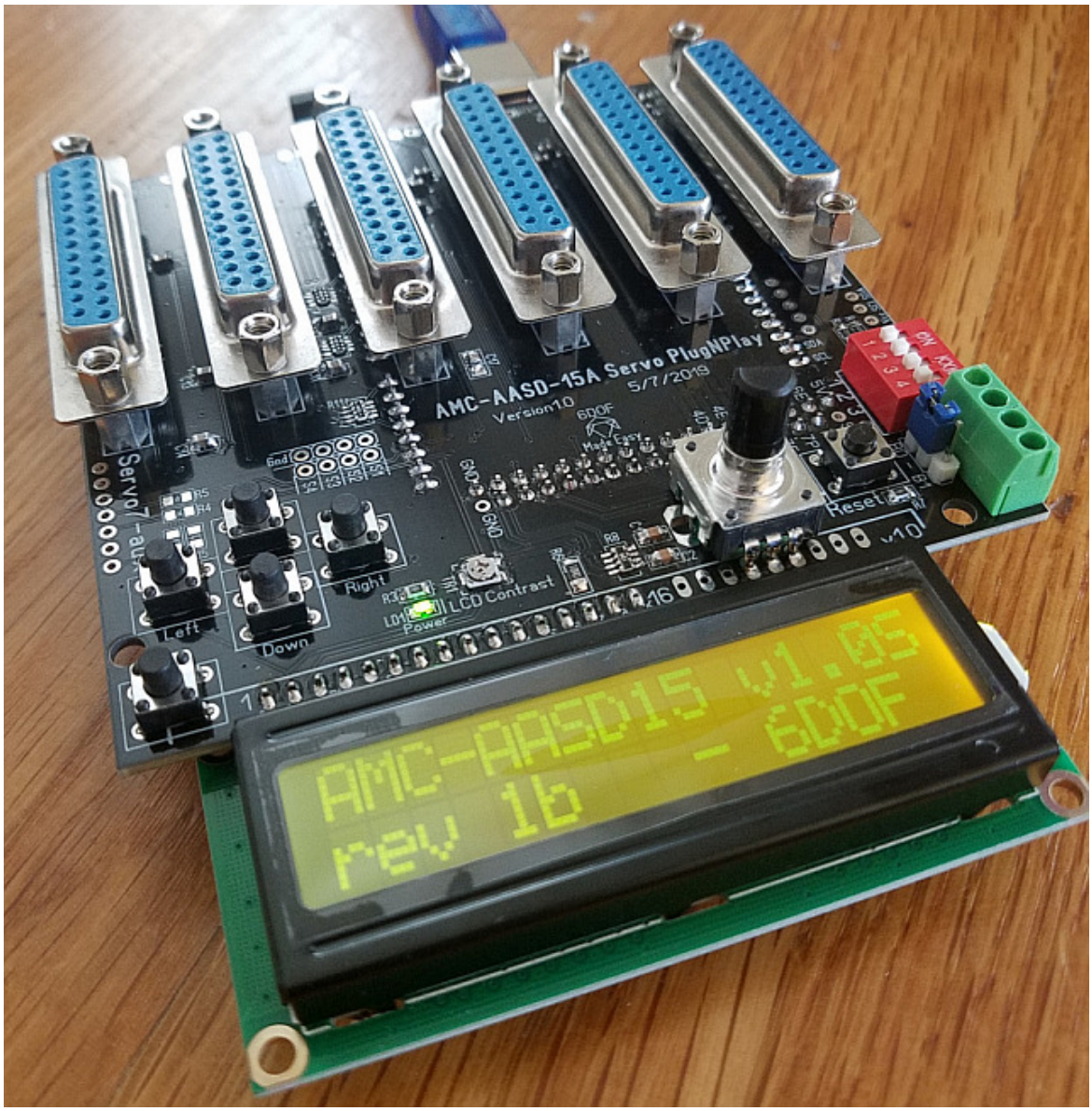
AMC-AASD15A servo controller Manual v2.1

for 4DOF + TL Servo Kit



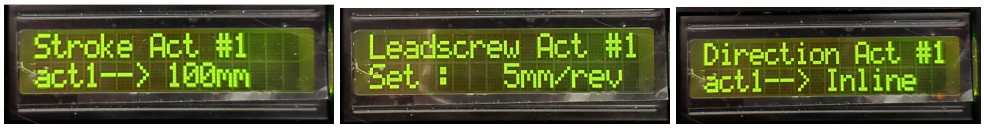
This manual is written for firmware v2.04

AMC-AASD15A Interface information

The AMC-AASD15A servo controller allows seamless and fast interface between the PC and the MDBOX servo drives. Using the AMC-AASD15A controller you can interface your linear servomotors to Simtools, X-sim and Ian's 6DOF BFF motion software. The connection to PC is a simple USB connection and the connection to the AASD-15A drives is via straight DB25 cables, one for each drive.

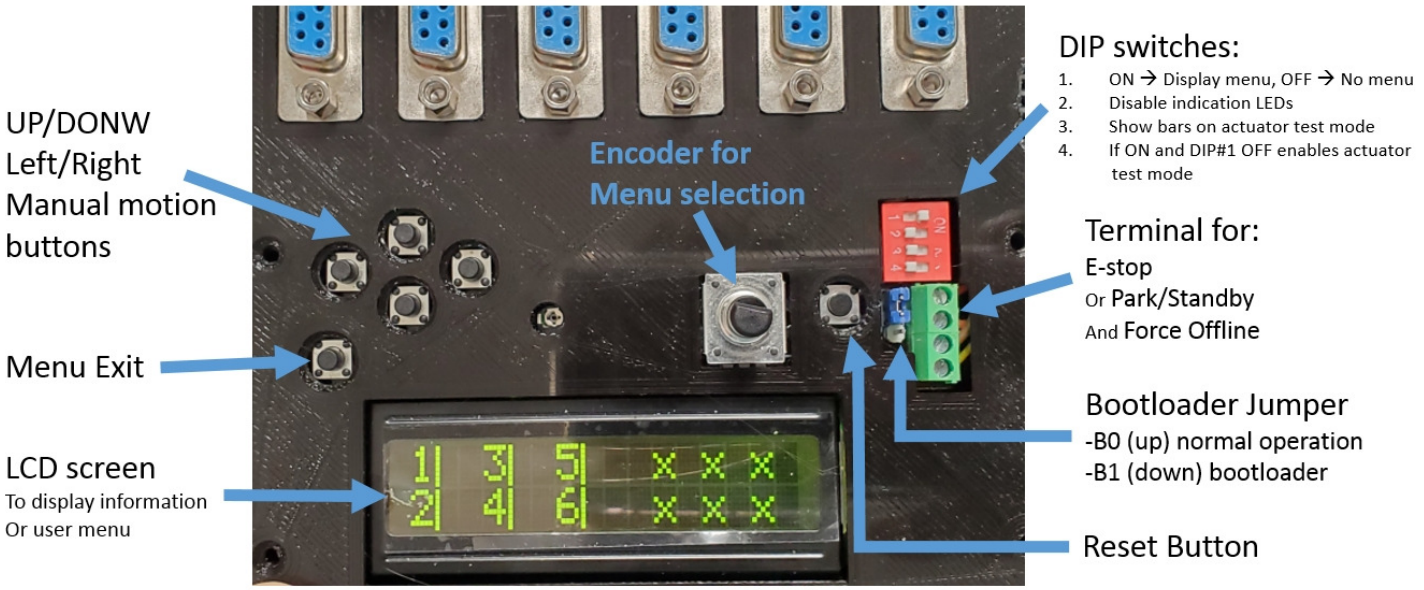
In the LCD menu of the AMC-AASD15A, you can set the following to match your simulator platform (Other settings are not so much important):

- Number of motors → **5axis** (for 4DOF + TL) or **4axis** (if just 4DOF)
- Auto-Park function → **4DOF +TL +Surge** (to disable park on TL axis)
- Actuator Stroke → set to **100mm** (for SFX100 DIY actuators) or **150mm** (for PT-actuator)
- Lead screw → set to **5mm/rev** (for 250mm/s speed SFX100 DIY actuators) or **10mm/rev** for 500mm/s actuators
- Motor Direction →Set to **Inline** (for SFX100 DIY actuators) or **Backfold** (for TL actuators)



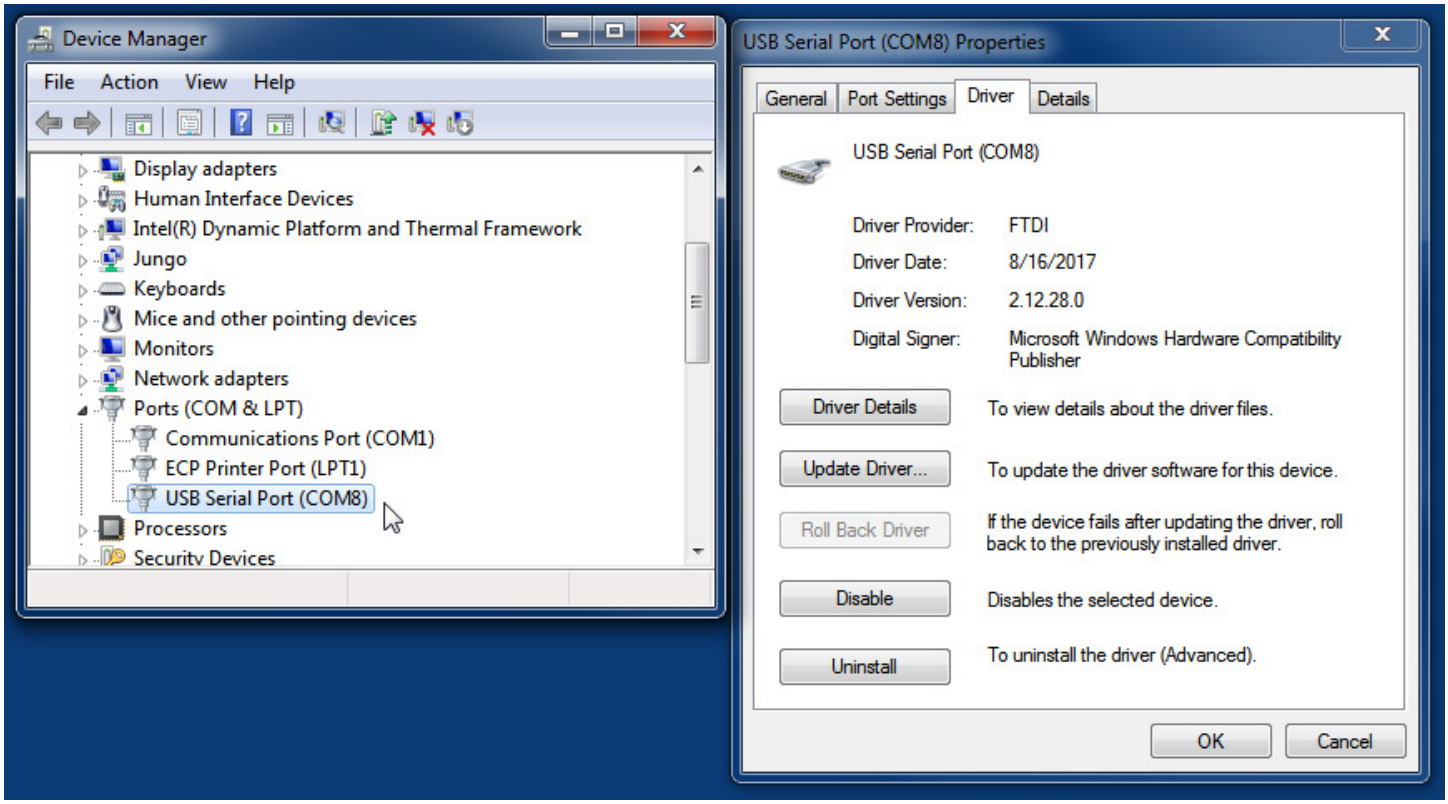
At any point you can restore default parameters by holding the "Menu Exit" button and pressing Reset. Keep holding the "Menu Exit" button until you see the message "Restoring Defaults" appear on the LCD.

For detailed guide on setting up the parameters and options for 4DOF+TL on the AMC-AASD15A controller see this video: https://www.youtube.com/watch?v=HhyF4e7gGWU



The USB Data connection requires FTDI driver that can be downloaded from the FTDI website:
http://www.ftdichip.com/Drivers/VCP.htm

The device appears in the PC Device manager as COM Serial interface device that then can be defined for use with Simtools or any other motion software that provides interface support for the AMC-AASD15A.



If your controller has older firmware you can visit the Github and get the latest firmware to update the controller.

https://github.com/tronicgr/AMC-AASD15A-Firmware

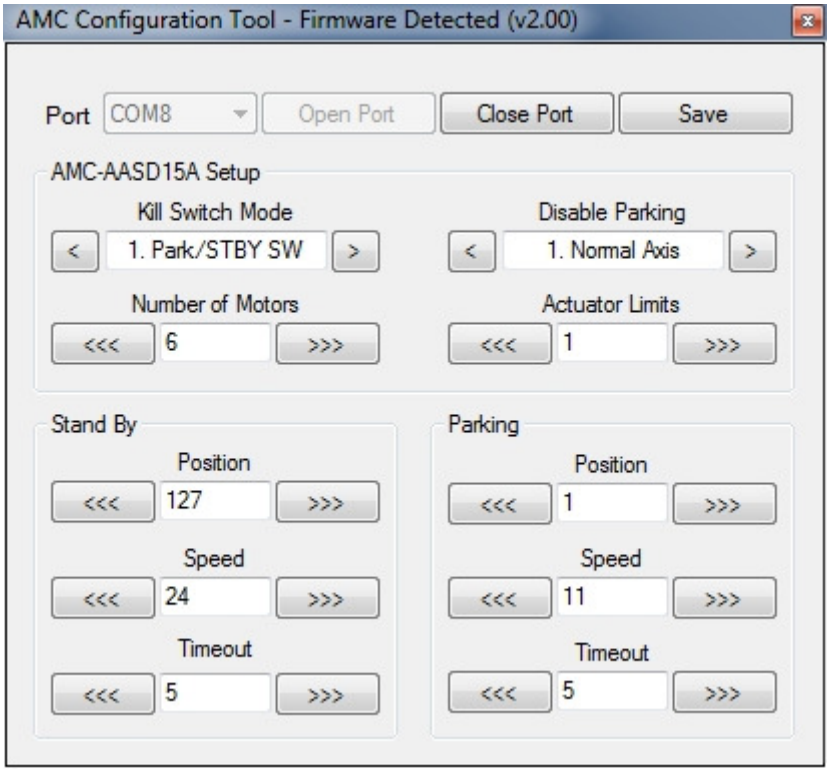
https://github.com/tronicgr/AMC-AASD15A-Firmware/tree/master/Latest_firmware

Firmware Update procedure video

https://www.youtube.com/watch?v=WkAm-MI0xbo

You can use the AMC config tool to access and modify the parameters in the AMC-AASD15A:

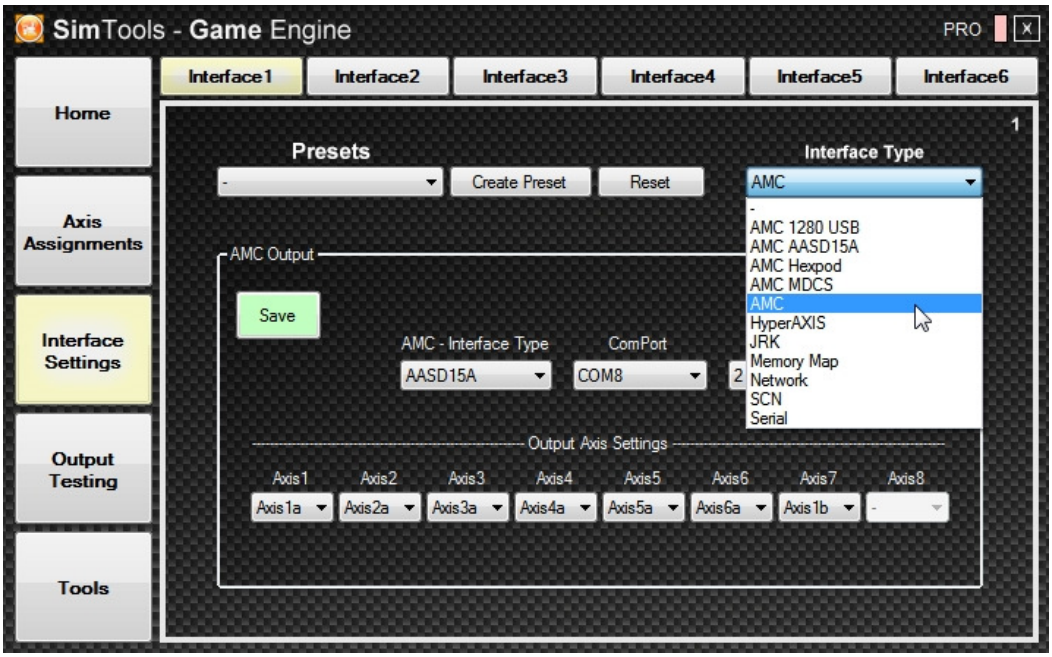
https://github.com/tronicgr/AMC-AASD15A-Firmware/blob/master/Simtools_interface_plugin/AMC_Config_Tool_1_1.zip



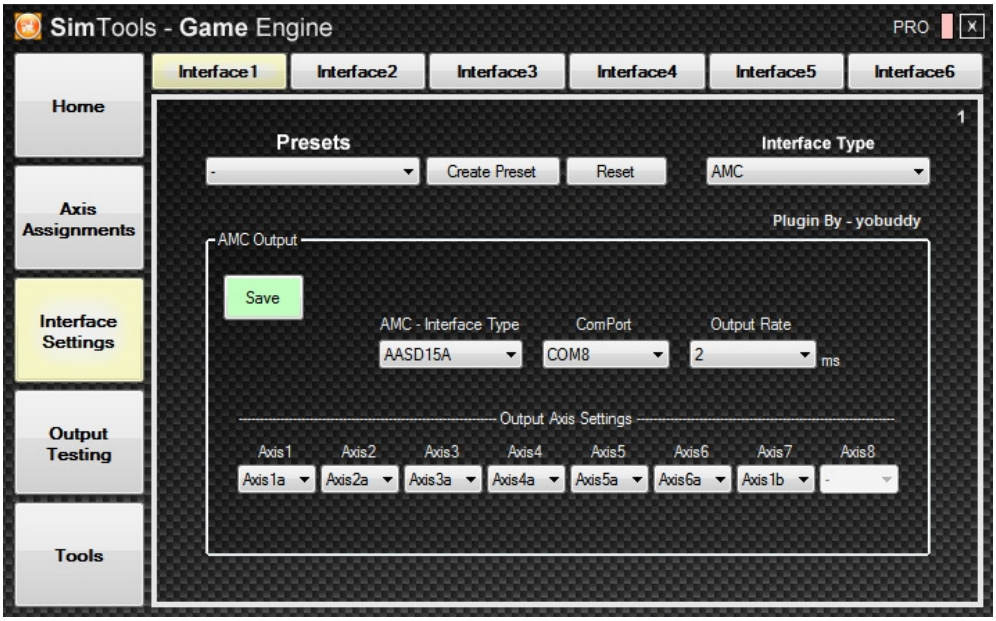
Software Setup

Simtools:

The Simtools v2.4 should already include the AMC interface plugin, if not you can find it on the Github and simply drag and drop the "AMC_InterfacePlugin.dll" into the Simtools PluginUpdater.
Start Simtools, you should see 8axis available now for the AMC1280USB interface plugin.



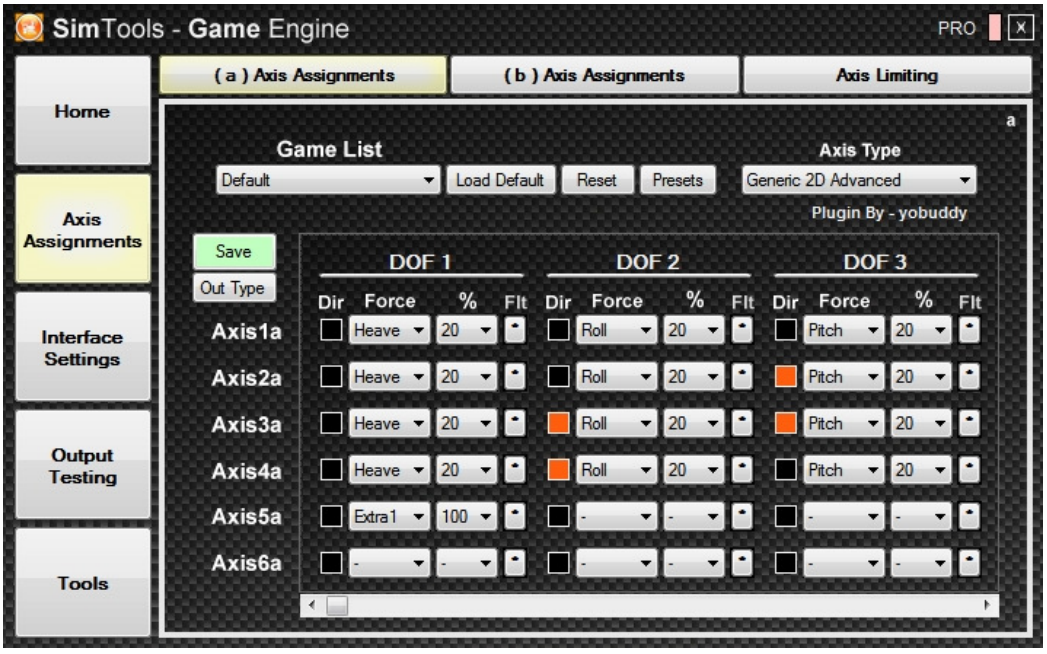
Interfacing the Simtools with direct axis is simple as seen on the below capture. It requires to select the AMC interface plugin, select the AASD15A interface type and select the COM Port that is assigned to the AMC-AASD15A in the PC device manager.

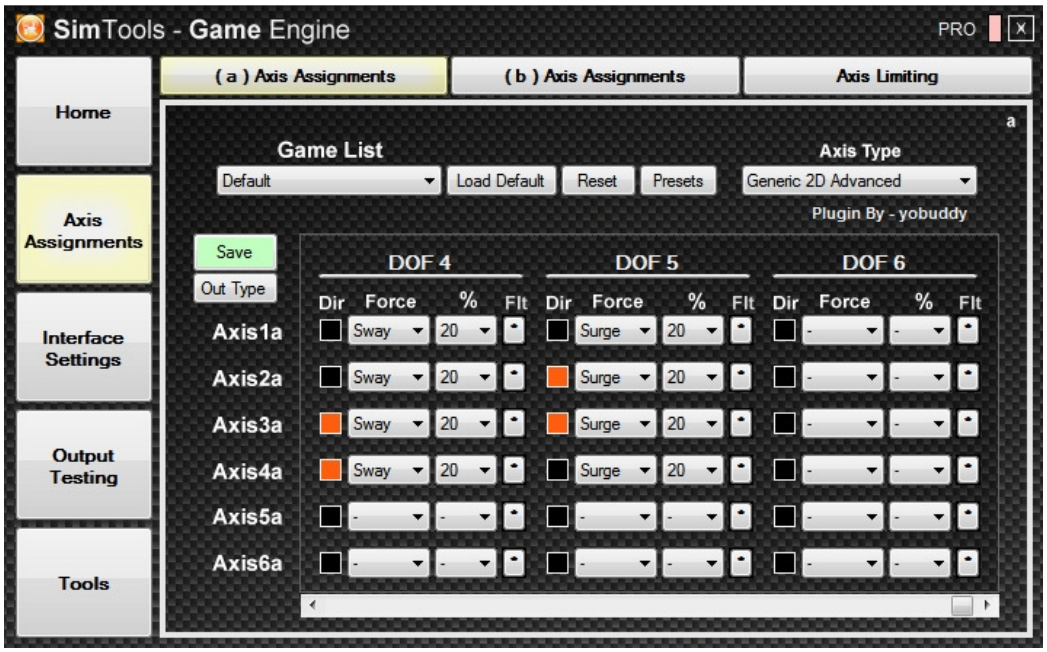


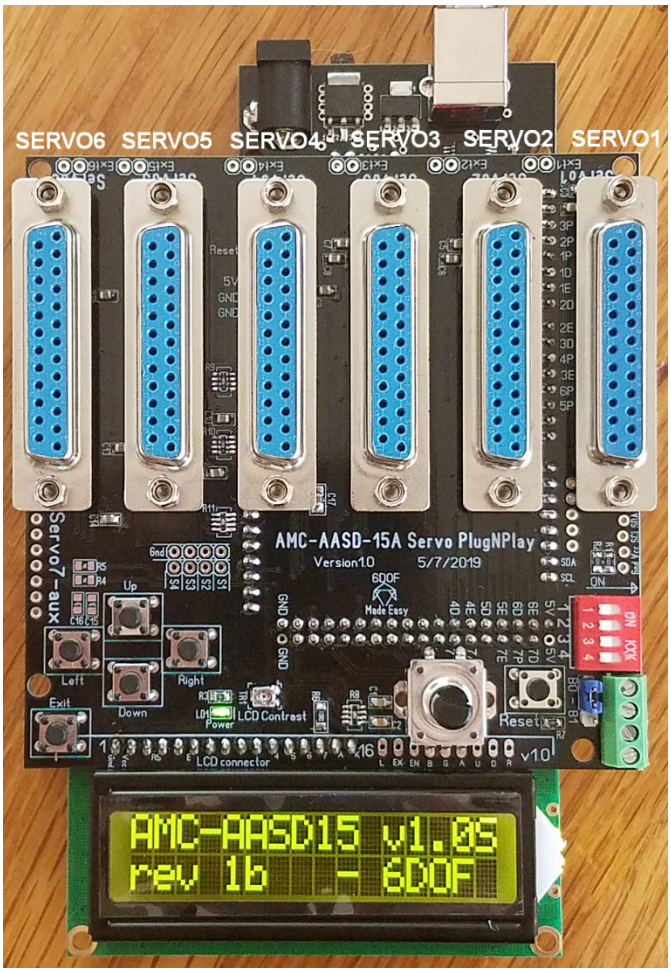
The axis assignments for each DOF provided is up to the use to mix and use as needed. The AMC-AASD15A can be configured to use any of the 3axis, 4axis or 5axis outputs.

To get the desired motion from the computer game to the actuators, you will have to create some profiles that mix the axis information from the game to the axis setup of the actuators. This can be done in the Axis Assignments section of the Game Engine of Simtools. If additional traction loss actuator is used, it can be assigned to Axis5a (extra1 for many games).

Setup example of the Axis assignments with various DOF (degrees of freedom) motion cues data inputs for combined motion. The axis5a on the example uses just the “Extra1” that is traction loss usually:







Physically you will need to arrange the order of connection of each actuator to the AMC-AASD15A controller to correspond to correct order described to the Axis assignments of Simtools. For 5DOF platform the order of connection of each actuator 1-5 is:

Rear left - Servo 1 connector of AMC-AASD15A

Front left - Servo 2 connector of AMC-AASD15A

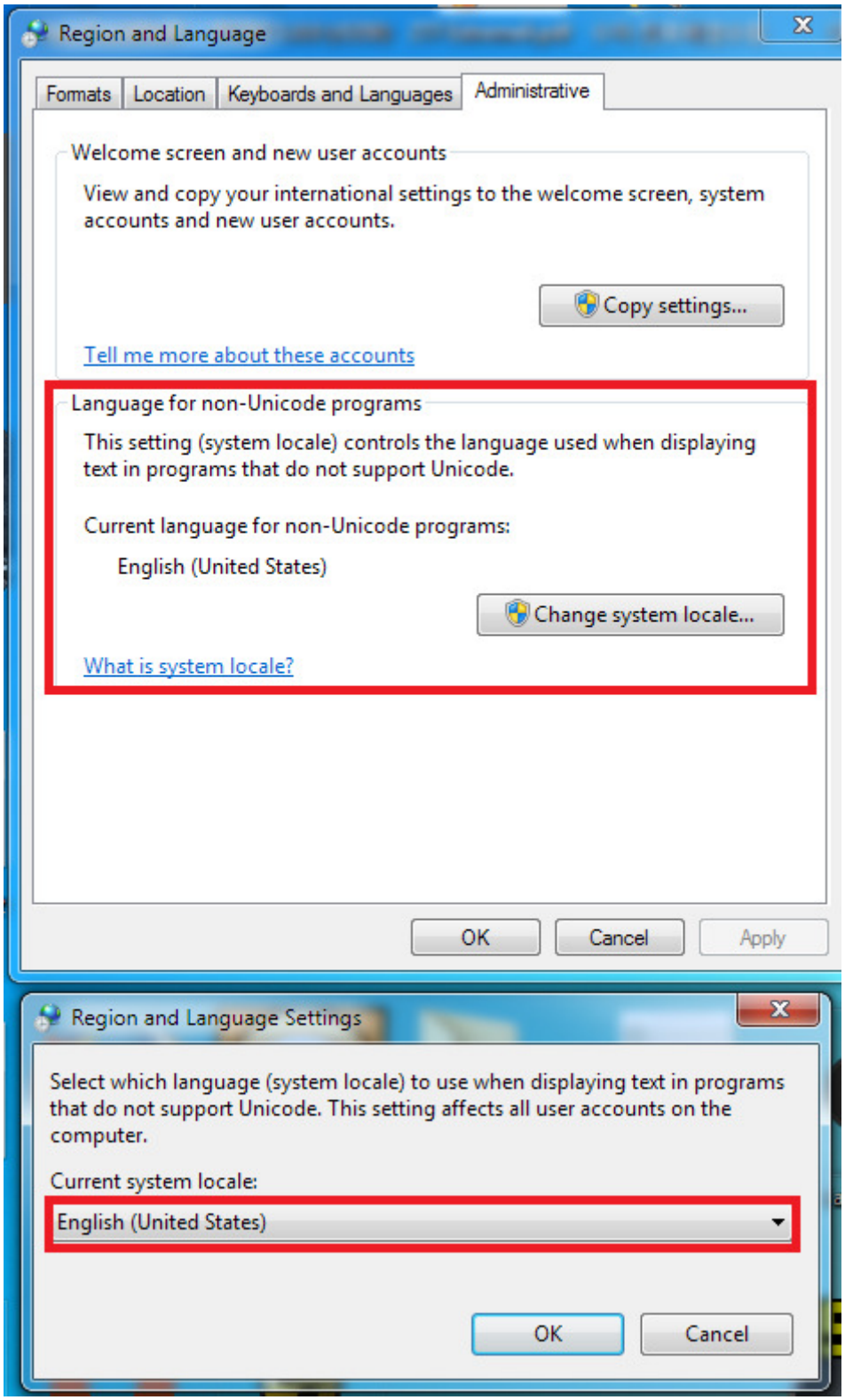
Front right - Servo 3 connector of AMC-AASD15A

Rear right - Servo 4 connector of AMC-AASD15A

Traction loss - Servo 5 connector of AMC-AASD15A

Troubleshooting:

If no there is no motion when you test manually the sliders in Simtools, please change the computer Region and Language settings as below:



Here are some examples of platforms for use with the AMC-AASD15A:

Programmer’s information:

The data packet string now is 20 bytes long and includes additional spare motion data slots for up to 8axis

The ID is byte values 0xFF + 0xFF
Each Axis is 16bit wide.
LF+CR is required in the end (0x0A + 0x0D)

ID AXIS1 AXIS2 AXIS3 AXIS4 AXIS5 AXIS6 AXIS7 AXIS8 LF/CR

The parameters can be changed via terminal (250000 bps)

---List of commands---

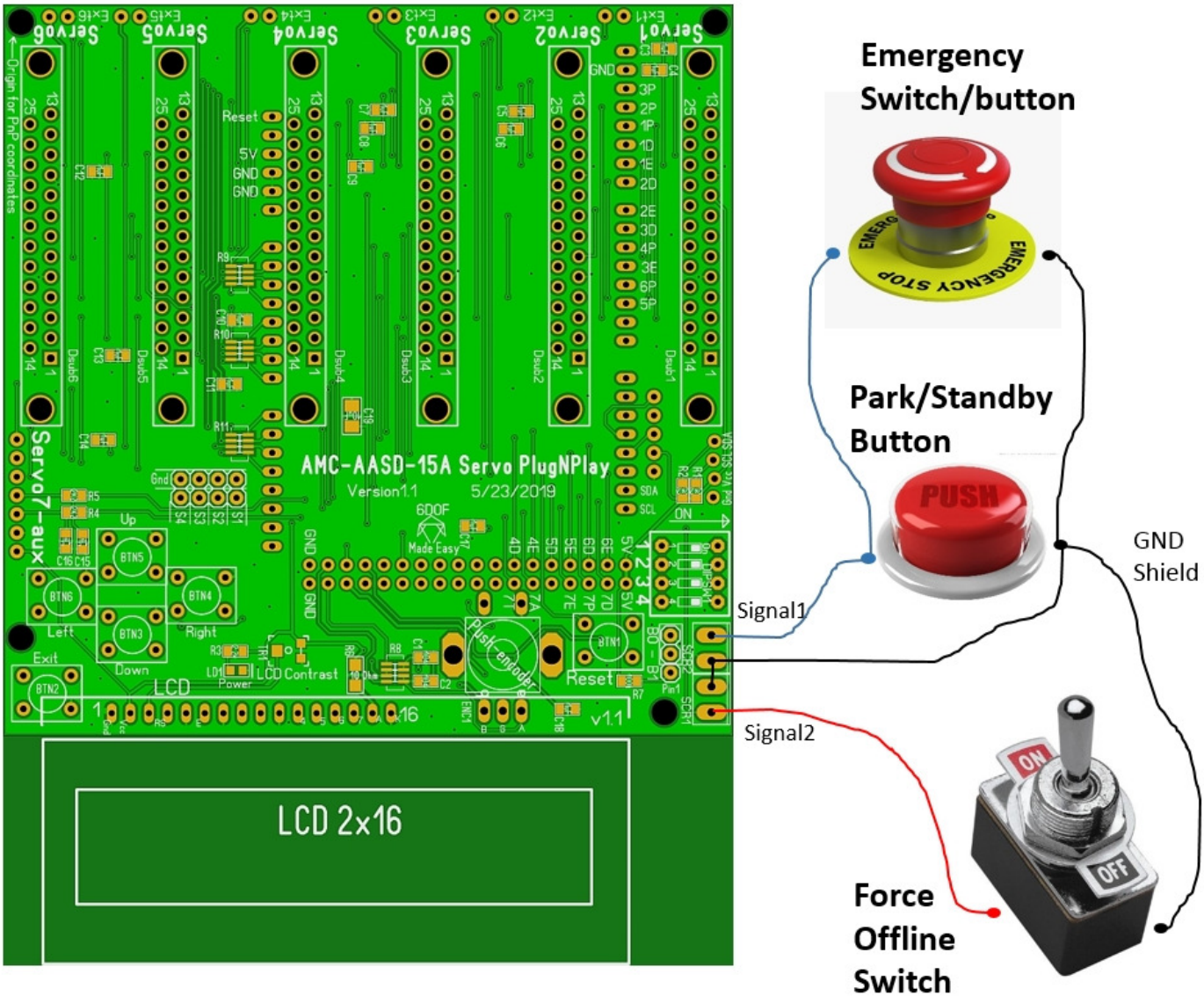
Command Number	Display Parameter	Save Parameter
CMD01	Motornumber:	spv012-spv018
CMD04	Park Position:	spv04001-spv04254
CMD05	Park Move Speed:	spv05001-spv05100
CMD06	Park Move Timeout:	spv0601-spv0690
CMD07	Standby Position:	spv07010-spv07245
CMD08	Standby Speed:	spv08000-spv08100
CMD09	Standby Timeout:	spv0901-spv0990
CMD10	Disable park type:	spv111-spv115
CMD13	Actuator Limits:	spv1300-spv1350
CMD14	Kill switch mode:	spv141-spv142
CMD44	Display all parameters	

Command Number	Display Parameter	Save Parameter
CMD45	Print this help page	
CMD55	Print delimited parameter list for simtools	
spv45	Saves all parameters at once	
RQM	Displays model,revision and number of motors	
Park	Parks the actuators if in standby mode	

```
  Some Commands may not change value - locked

The CMD$$ displays each parameter, and spv$$### saves each parameter with the value indicated.
To actually store the parameters in the flash memory you need to send "spv45" to save all
parameters at once. The "$$" on the spv is the command number, and the "###" is the value,
Some parameters have single digit value, some two digit value and some 3 digit value.
All values are characters!

Here is a list of the default parameters values you should get when you issue the CMD44 command
(if not like this, you may reset the default parameters via button combination)

01.Motornumber 2-8: 4
04.Park Position 0-254: 1
05.Park_Move_Speed 1-100%: 11
06.Park_Move_Timeout 1-90: 5
07.Standby Position 10-245: 127
08.Standby Speed 0-100%: 24
09.Standby Timeout 1-90: 5
10.Disable park type 1-5: 1
13.Actuator Limits 0-50%: 1
14.Kill switch mode 1-2: 1

CMD55 returns the following numeric values separated by colon ( : ) punctuation mark:
"data:" <Motornumber> ":" <Parkposition> ":" <Parkmovespeed> ":" <Parkmovetimeout> ":"
<StandbyPosition> ":" <StandbySpeed> ":"<StandbyTimeout> ":" <Disableparktype> ":"
<ActuatorLimits> ":" <Killswitchmode> ":" <Firmwareversion> ":" <AMCModel>
```

Wiring Button – E-STOP switch – Force Offline switch

Note that the switches/buttons must be “NO” type (Normally Open)



Wiring DB25 female connector on Servo7-aux pins

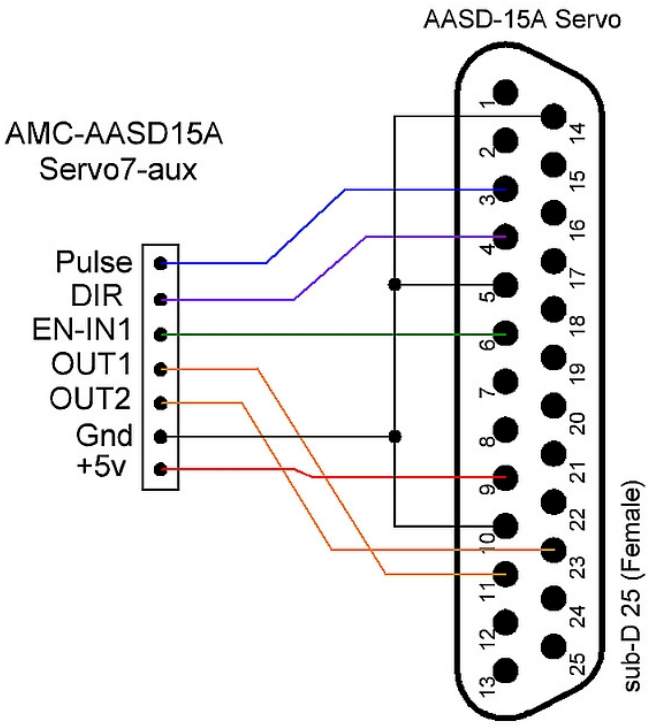
If you need more that 6 axis, you can add a DB25 female connector and plug a 7th servo in the controller. Possible uses are 4DOF+TL+Surge+Belt tension, or 6DOF+rotation axis…

See the videos for details on wiring

https://www.youtube.com/watch?v=CT7M-8LCCwc

https://www.youtube.com/watch?v=pVbQSvhRTq4

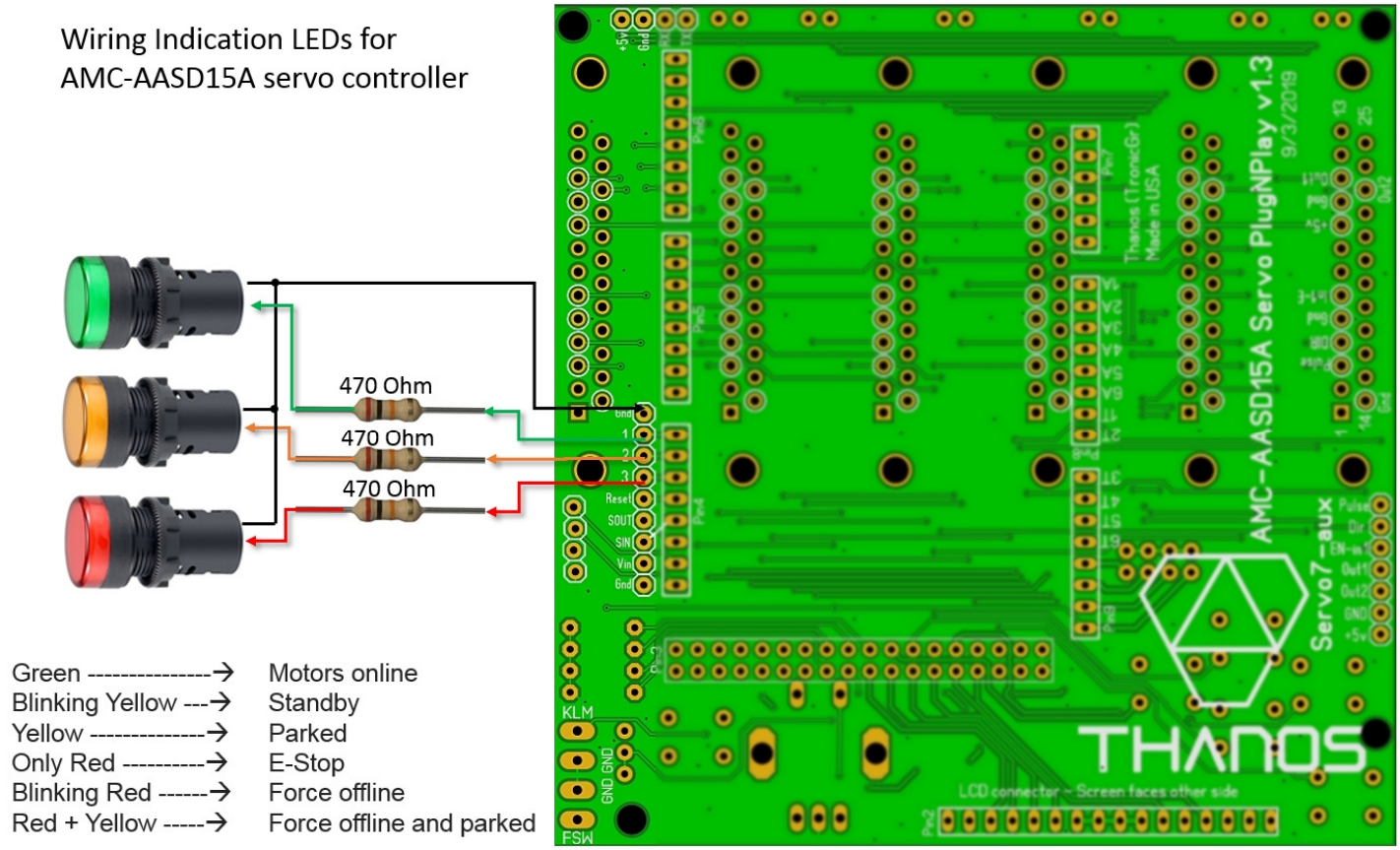
https://www.youtube.com/watch?v=gEhakHadHmc



Wiring indication LEDs on AMC-AASD15A

You may need LED indication for the state of the controller from within the cockpit, in that case you can wire some simple LEDs if you don't have access to the LCD display of the controller.

```
Meaning of LED indications depending on the state of the controller:
Green ------------->     Motors online
Blinking Yellow --->     Standby
Yellow ------------>     Parked
Only Red ---------->     E-Stop
Blinking Red ------>     Force offline
Red + Yellow ------>     Force offline and parked
```



AASD-15A Servo drives SETUP

The AMC-AASD15A can be interfaced to all models of AASD that have the DB25 connector and are compatible. Example servo and drive below.

80ST-M02430 220V 0.75W AC Servo Motor 2.4N.M 3000RPM Servo Motor Single-Phase AC Drive Permanent Magnet Matched Driver AASD-15A
https://www.aliexpress.com/item/80ST-M02430-220V-0-75W-AC-Servo-Motor-2-4N-M-3000RPM-Servo-Motor-Single-Phase/32973113245.html

Or visit PT-Actuator for selection of servos on various actuators that may fit your motion simulator type:
http://www.pt-actuator.com/index.asp

The AASD-15A drives need some parameters before they are ready to be used. Most of the parameters are same as SFX100 DIY but some additional one are required.

AASD-15A Servo Settings:
Push MOD until you see Pn000. This enters the parameter mode.
Change and check these settings on all motors:

Pn8 = 300
Pn9 = -300
Pn51 = 3000
Pn98 = 20 - Pulse Multiplier (electronics gear)
Pn109 = 1 - smoothing, 1=fixed smoothing, 2=s-Shaped smoothing
Pn110 = 30 - Smoothing Filter Time
Pn113 = 20 - Feedforward %
Pn114 = 10 - Feedforward Filter Time (ms)
Pn115 = 100 - Gain %
---Extra parameters needed---
Pn24 = 100
Pn52 = 1
Pn60 = 2
Pn61 = 6

Contact for inquiries or questions: Tronicgr@gmail.com