operation manual

2021

Advanced servo motor control device for up to 7 motors

Motion4Sim

For AASD Series servomotors

July 27, 2021

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1 Introduction

The M4S-AASD15A servo controller enables the fast and seamless transfer of movement information from the PC simulation to the servo motor. The data exchange takes place between the interface programs such as Simtools, FLyPT Mover, BFF, etc. and the simulation.

The interface software calculates the motion vectors and forwards the values to the M4S servo controller via the USB interface. This controls the servomotors and also offers the option of calculating and smoothing motion cues yourself. The servo motor output stages are connected with DB25 cables.

All necessary parameters for operating the many actuators and actuator types are freely adjustable and configurable. All common servomotors that support STEP / DIR can be used.

2. Features

The controller was mainly designed for the AASD servos. However, other servomotors can also be operated with it. It can be used to operate all servomotors whose amplifiers are operated via the Step / Dir function. Also stepper motors that are equipped with Puls Dir.

The controller provides the following properties and functions:

2.1. Hardware functions

1. Control of 6 + 1 servomotors (optional)
2. Pulse speed up to 550 kHz
3. Step / Dir fashion
4th Query and evaluation of torque (for calibration) as well as error status,
5. display of parameters via LC display 16x2, full menu
6th Operation via rotary encoder with pushbutton
7th switch for signal reception
8th Emergency stop switch for the servo functions.
9. Serial USB connection for data transfer
10. 32 bit processor
11. Save the settings
12. Control of LEDs for status display (external handheld)
13. Case (diy 3d print)
14. Control unit can be installed 3m away (optional)
15. LC display and encoder can also be installed on the mainboard
16. Automatic Home calibration on power up or re-connection without limit switches
17. Limit switches can be optionally installed for home calibration
18. Protection from exceeding physical limits of the actuator
19. Optional Platform Health check, to ensure all actuators are active during gaming
20. Latency as low as 1 ms for internal filtering
21. E-stop, Force Offline buttons and switches
22. USB power supply

2.2. S.Osoftware functions

1. Software is menu-driven and easy to use
2. All functions can be parameterized to meet your own requirements
3. Monitoring the status of the motors
4. Automatic calibration of the zero position servomotors
5. Calibration also possible via limit switches
6. Service function for repairing or checking the engines
7. Manual control of each motor individually for testing and maintenance
8. Adjustable direction for inline or foldback placement of servomotor
9. Adjustable screw lead pitch advance freely adjustable per revolution
10. Adjustable stroke unlimited
11. Selection of belt reduction ratios or gear ratios freely adjustable
12. Rotating and linear actuators are supported
13. Scaling the input signals (master gain)
14. Real exponential moving average filter for anti-vibration and smooth pulses on the actuator
15. advanced full adjustable spike filter to automatically eliminate jolts during crashes or unwanted motion cues
16. Offset for each motor (especially for rotating actuators)
17. Variable parking position
18. Actuators individually adjustable (electronic translation, length of the act., DOF system)
19. Speeds for calibration, slow speed and high speed freely adjustable (max. 550 kHz)
20. Inverse kinematics with> 1000 calculations per second (for linear and non-linear actuators)
21. Geometry for steward platforms with 6 DOF and 6 actuators individually adjustable
22. Wash-out filter for each axis (can only be set with inverse kinematics)
23. Evaluation of 24 bit input data (Simtools / Mover)
24. Calculation in 32/64 bit for maximum smoothness of movement
25. 4 different operating modes: direct or inverse kinematics, float, srs
26. Actuators can be operated in an infinite loop (like YAWVR)

2.3. Motion cueing software

As an interface between the simulation / games or telemetry data supplier, a motion cueing interface is required to control the platform. This software receives the data, converts it as required, filters it and sends this data to the controller, which then calculates and converts the data / position of the motors.

With the Motion 4 Sim Controller it is possible to transfer different data. If you have your own protocols, these can be implemented.

Motion cueing apps currently supported are:

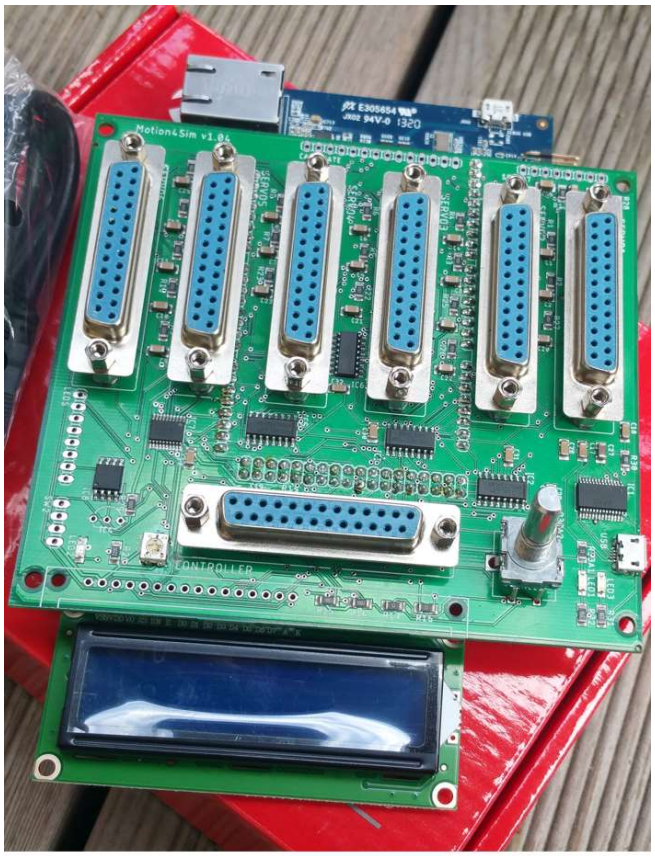
Flypt movers	https://www.flyptmover.com/ https://www.xsimulator.net/simtools-
Simtools	motion-simulator-software/ https://eu.sim-motion.com/software/
SimMotion	
Sim Racing Studio	https://www.simracingstudio.com/ http://
BFF Motion software	bffsimulation.com/6DOF-Motion-Software.php

Direct access can also take place via a terminal program.

3. Board and connectors

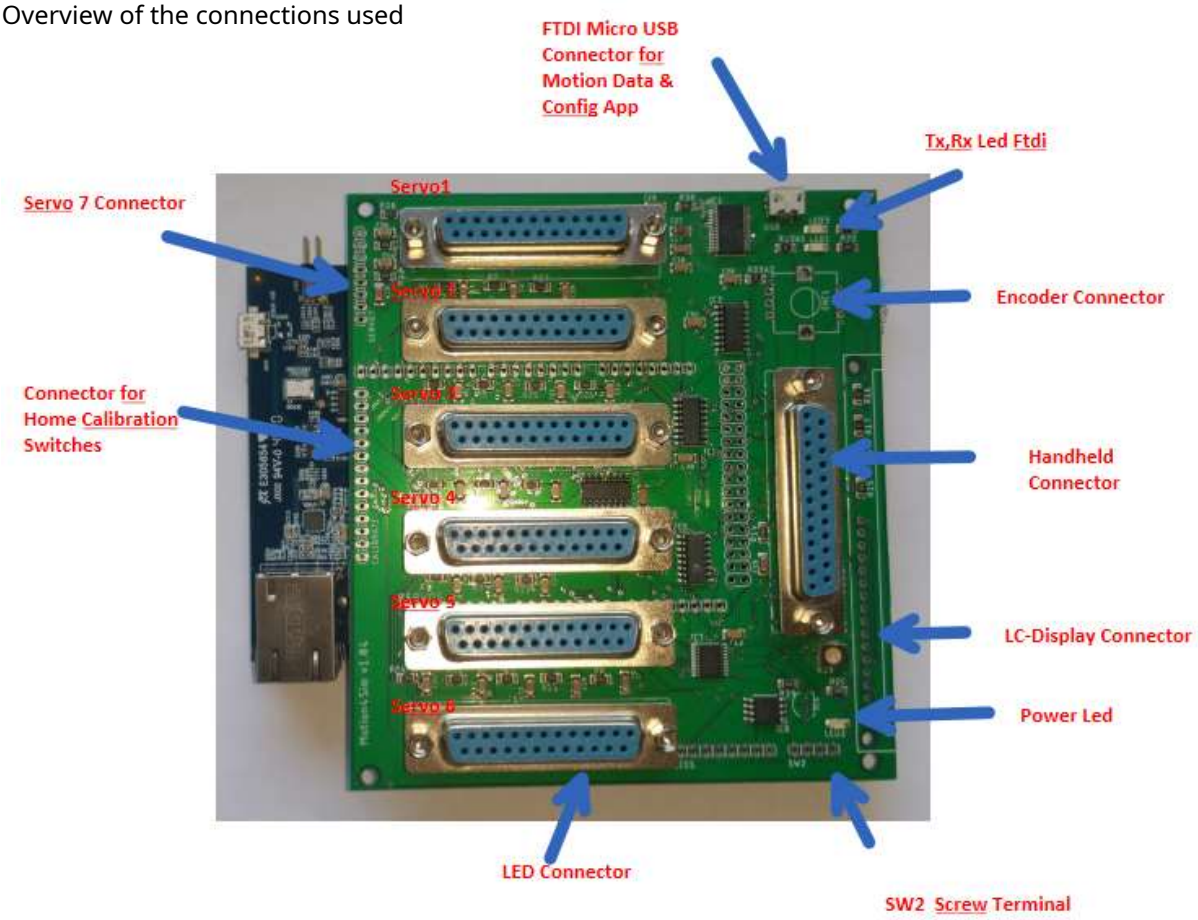
The current version of the controller consists of a SAM E70 Xplained Evaluation Kit and the Motion4Sim Breakout Board.

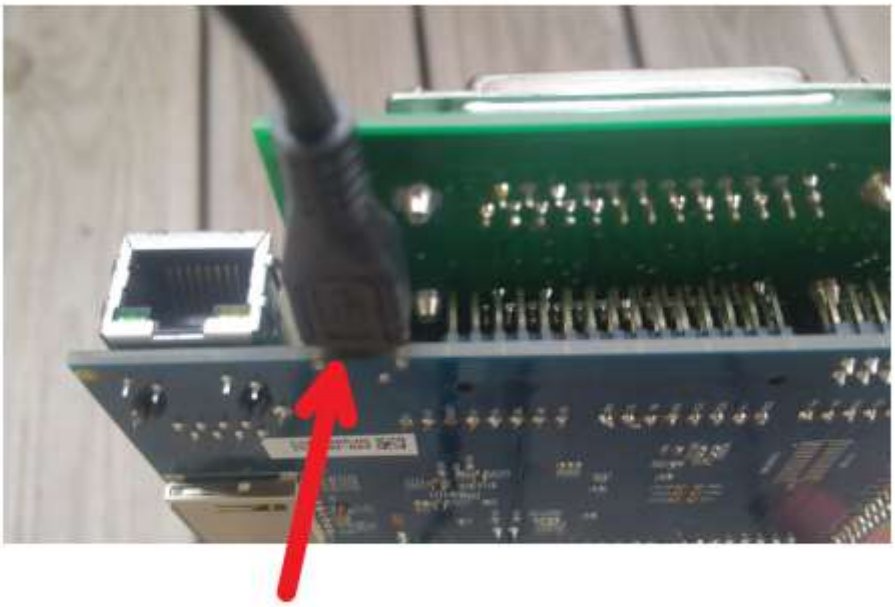
There are a total of 2 micro USB connectors on the SAM E70 board and one micro USB connector on the Motion4Sim breakout board. There are 6 Sub D25 connectors for connecting 6 AASD servos and a Sub-D25 connector for connecting the controller. Pin strips are provided for connecting Servo 7 and for integrating homing switches for each motor. There are also pins for connecting LEDs as well as online switches and emergency stop switches.



Controller with display and encoder

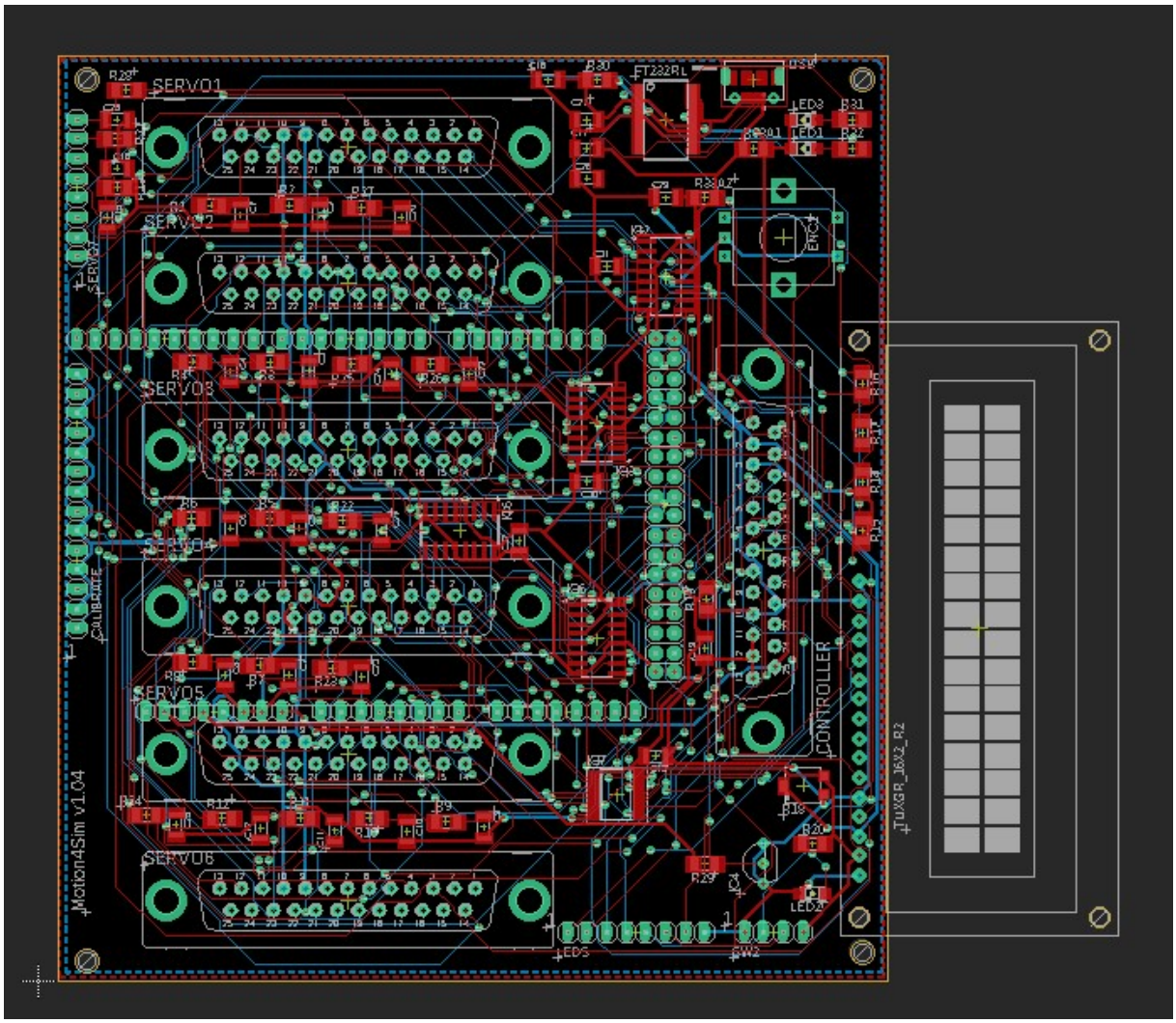
Overview of the connections used



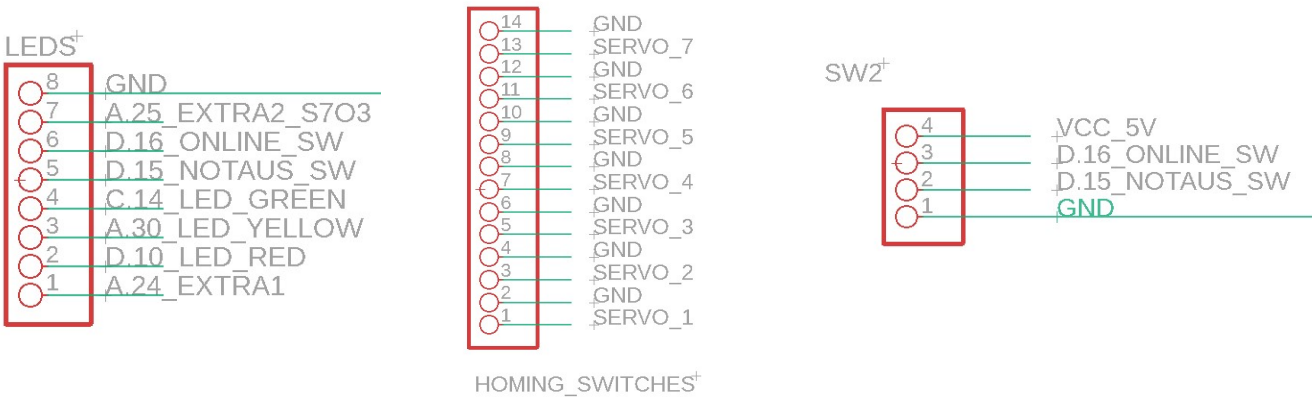


Bossa Program Micro USB Port

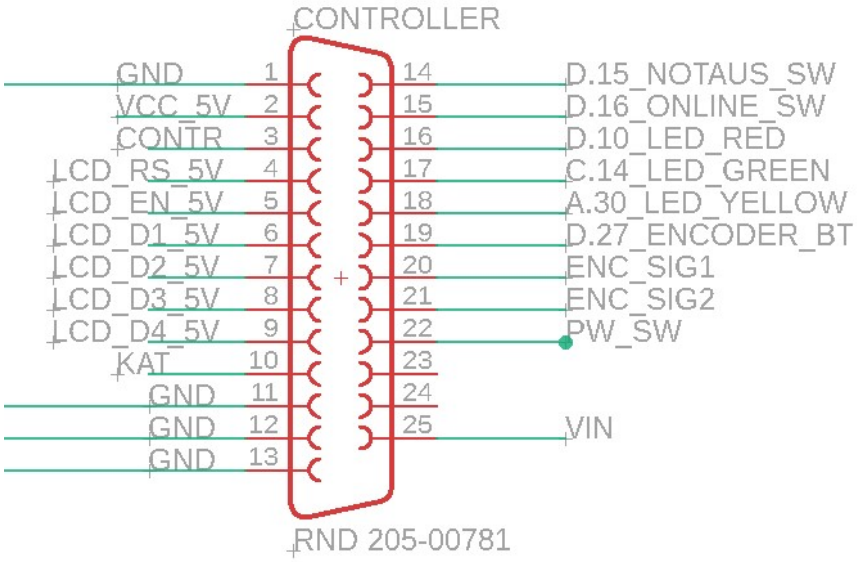
Used for Firmware Flashing and M4S Handheld App



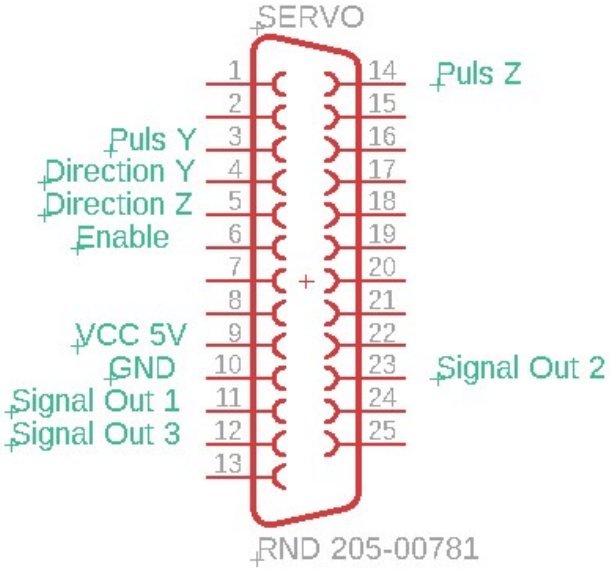
PCB layout V1.04



LEDs are switched with 3.3 volts without a series resistor. The homing switches switch their signal when they contact GND. The emergency stop switch is "normally closed" and the online switch is "normally open". These settings can be configured in the software.



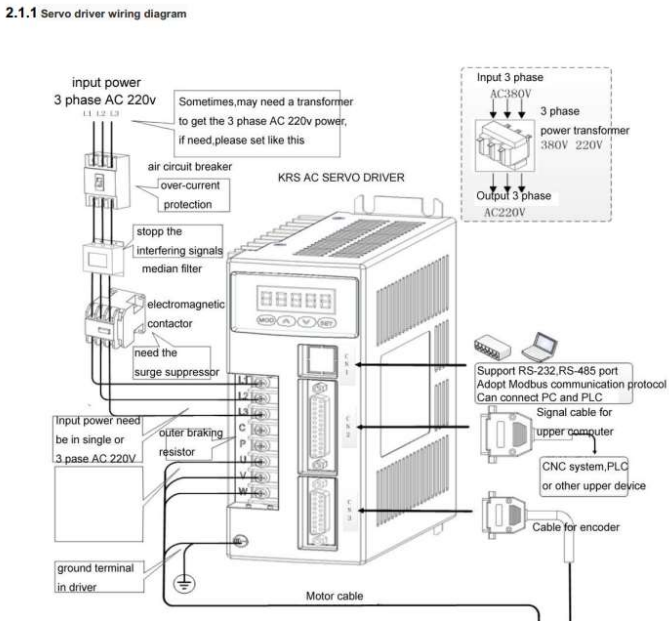
Handheld connector pin assignment



Pin assignment of the Servo Connector

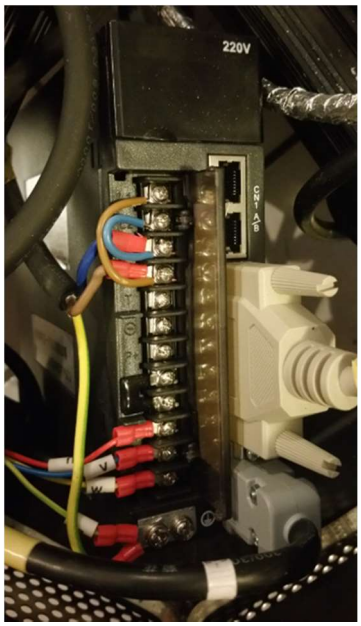
4. Hardware cabling

4.1. Servo motor amplifier wiring



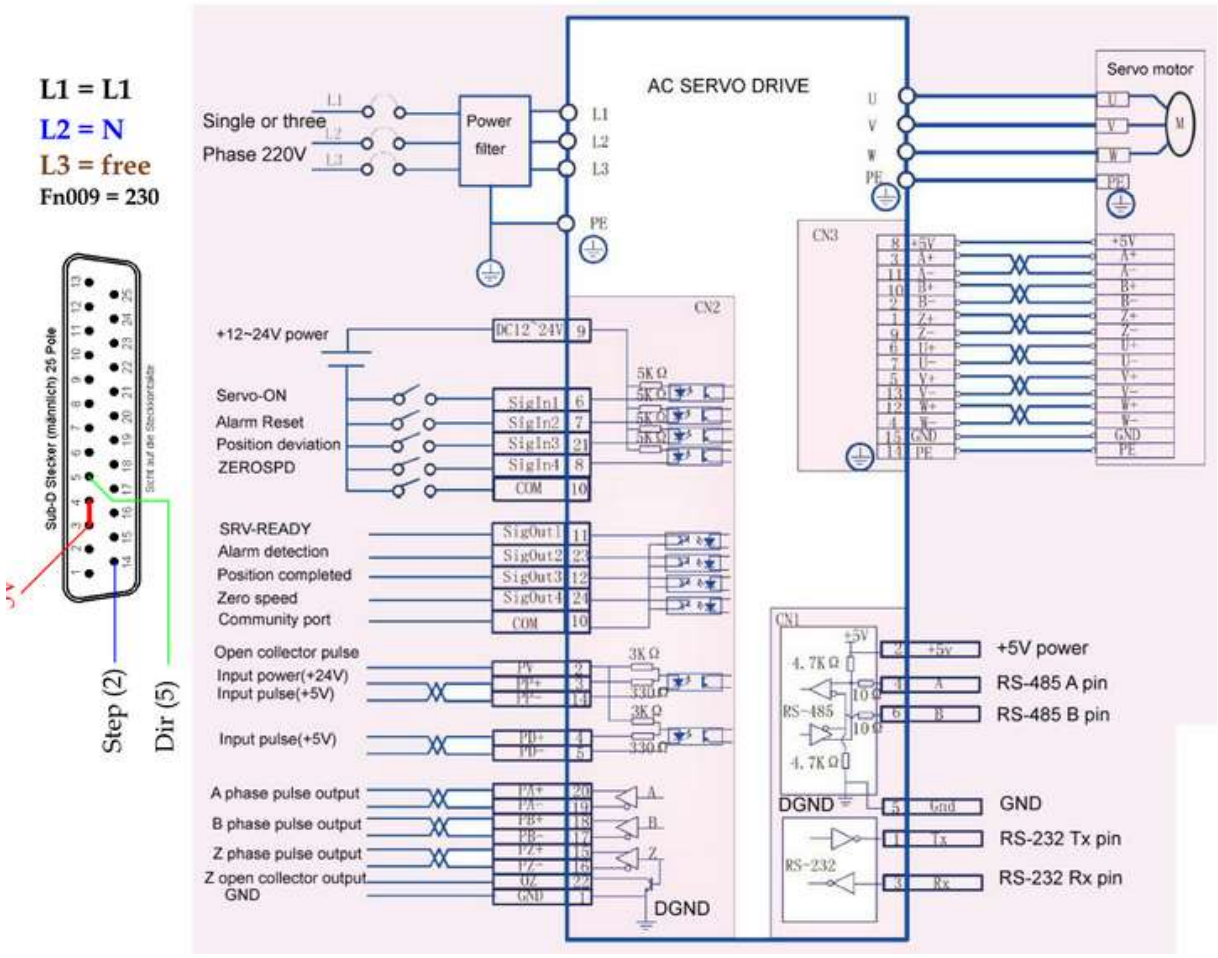
The mains voltage connections are partly different, please always consult the manufacturer's data sheet. For example, see also:

https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/tree/master/Manuals



2.3 Standard connection

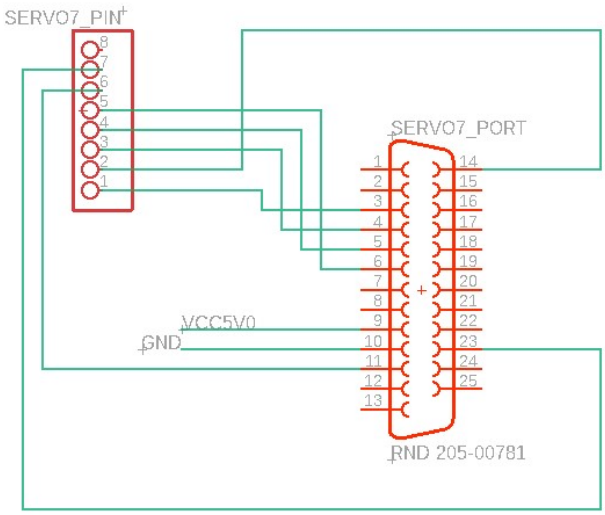
2.3.1 Position control wiring diagram

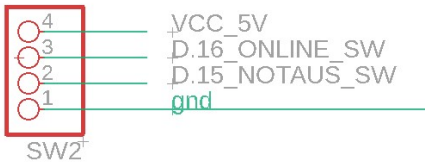


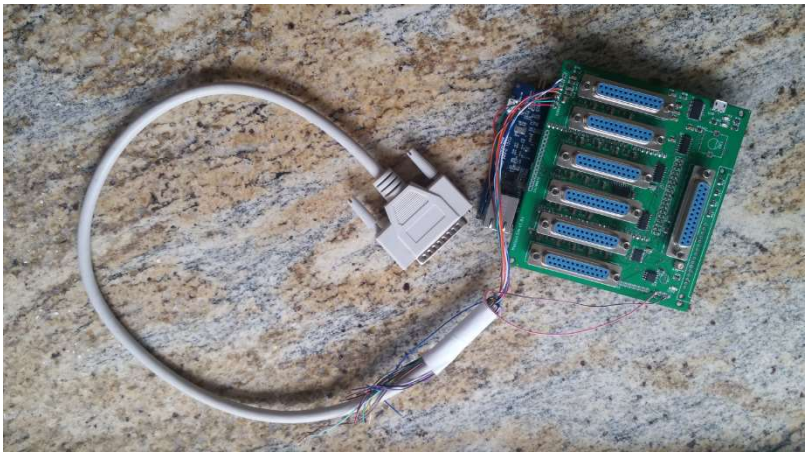
4.2. Wiring servo 7 connection

Wiring of the pins for the 7th servo motor. It can either be installed directly on a Db25 cable or a female Sub DB25 connector can be wired for soldering

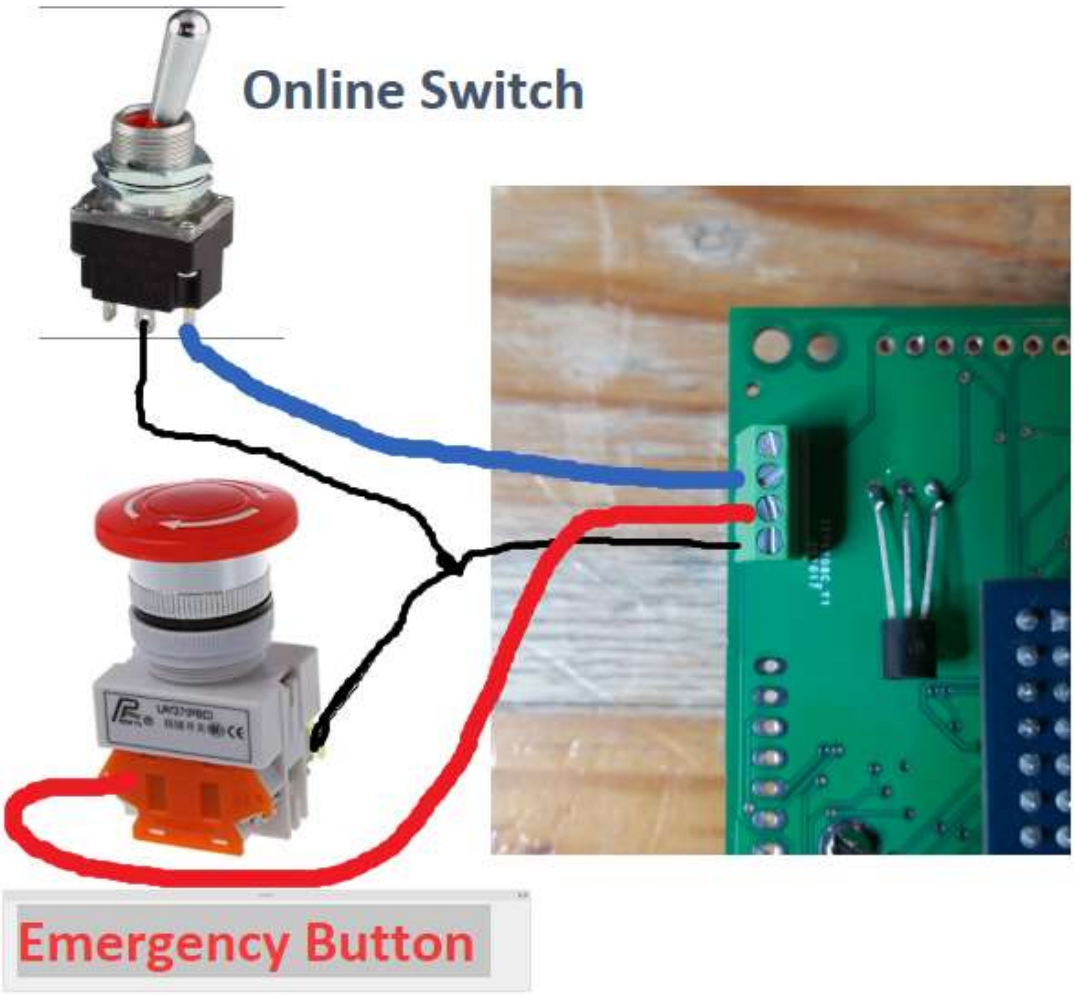
In addition, + 5Volt and ground are required that can be used by the SW2.







4.3. Cabling online switch and emergency stop switch



5. Settings of the servo amplifier

The controller can be connected to all servos that have a DB25 connection. It is also possible to manufacture your own adapter cables. Ask about compatibility.

AASD-15A Servo Settings:

Push MOD until you see Pn000. This enters the parameter mode.

Change and check these settings on all motors:

FN9 = 230 (230Volts recommend to set this value) Check this value if you get errors

With FN9 the comparison voltage is measured and saved.

Pn8 = 300
Pn9 = -300
Pn51 = 3000
Pn98 = 1-20 - Pulse Multiplier (electronics gear) different to Thanos and SFX for higher resolution

Typically on M4S you can set this to PN98 = 2

PN98 = 1 has to test with EMV interference of your construction by pulsing higher than 300 kpps

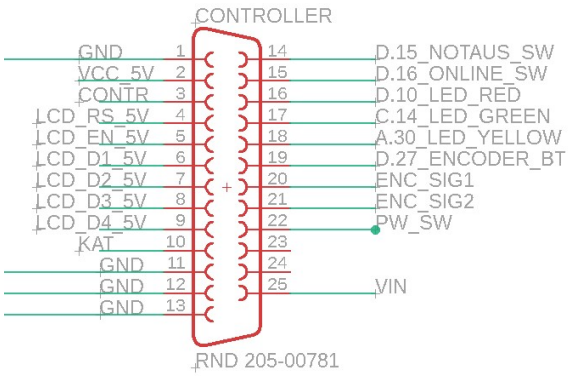
Pn109 = 1 - smoothing, 1 = fixed smoothing, 2 = s-Shaped smoothing
Pn110 = 30 - Smoothing Filter Time
Pn113 = 20 - Feedforward%
Pn114 = 10 - Feedforward Filter Time (ms)
Pn115 = 100 - Gain%
Pn24 = 100

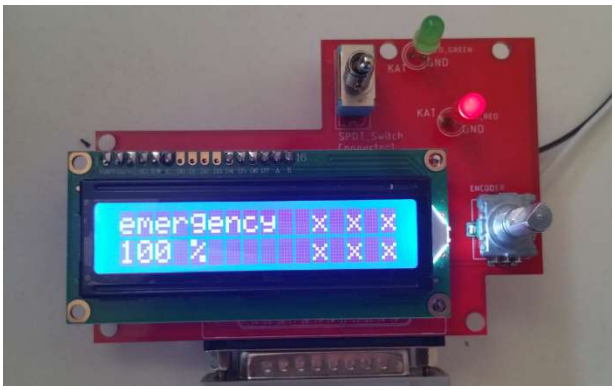
Pn51 = 3000 motorspeed (2500 or 3000 mainly)
Pn52 = 1 signal port 1 servo enable
Pn60 = 2 Sigout Port 1 Servo ready
Pn61 = 6 Sigout Port 2 Servo Treach

Pn62 = 4 Sigout Port 3 Servo Preach

Please also read the manual for the AASD servo amplifier

6. Handheld device





For more information see also

https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/tree/master/handheld

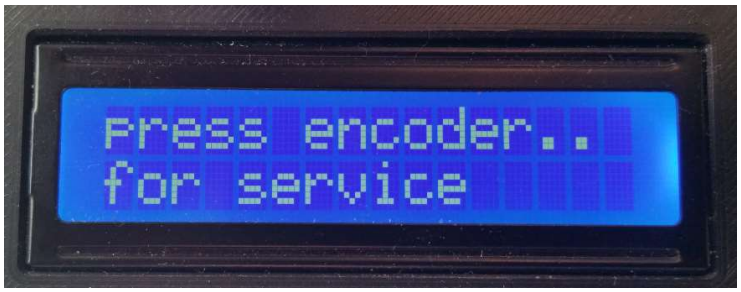
and

https://www.thingiverse.com/thing:4641555

7. Setting the controller / menu control

When you switch on the controller or supply it with USB voltage, the display is activated and the last settings used are loaded from the memory. It then waits for user input. When you press the encoder, the automatic calibration is started.

It is also possible to turn the encoder to the left. This enables you to access the service menu without performing the calibration. (2nd picture) if you turn the encoder further to the left, there is still the option of performing a firmware reset. (Image 3 + 4) Caution, all settings will be lost and
Standard settings are loaded



factory reset for rotating actuators

factory reset for linear actuators

In the first case you get to the main screen after pressing the encoder button. Here the status of the first 6 actuators is shown on the right.

Possible act uator states:

X	is	Offline
P.	is	Preparing (search for the homeing position)
!	is	Moving to the offsets / safety parking
R.	is	position Ready for use

The status of the rig system and the movements are shown in the top line of the display
the machine executes.

preparing ..	calibrate and move to offset position
emergency ..	Emergency stop switch activated
offline..	Offline switch off, parking position
wait uart ..	Moving to home position / standby position waiting for serial Data
on-line..	Serial data is received and movement takes place

Functions of the encoder on the main screen:

The status of the master gain controller is displayed at the bottom left. (100%)
If you turn the encoder to the left or right, you reduce or increase the amplification of the pulses in 10% steps. The gain has a range of 10% - 400%. The gain can also be changed in online mode.

If you press the encoder you activate the submenu structure. The menu structure is divided as follows.

1. Calibrate	- automatic recalibration
2. Filters	- Output filters
3. Service	- Menu for manual actuator movements
4. Actuators	- Actuator settings
5. Setup	- Settings of the controller
6. Rig	- Settings for Stewart geometry
7. Kinematic	- Input filter for DOF data
8. Reset	- Restart the controller
9. Save and return	- Save the current settings and close the menu

You can navigate through the menu structure by turning the encoder to the left or right. Activate the respective menu item by pressing the encoder.

7.1. Filter menu

The following options can be set.

Filter enabled:	Switch the filter on or off
Filter Type:	EMALP Exponential Moving Average Low Pass Filter (as in Mover) EMALP & SPIKE
Filter samples:	Strength of the selected filter. The larger the value, the smoother the movement
Spike filter :	This filter is designed for excessively strong unwanted movements. Spike Window which, if exceeded, activates the filter. 100 corresponds approximately to the pulse spacing of half of all possible pulses of the actuator. Try it out for an optimal setup. The lower the value, the sooner the filter is activated. With 1, all pulses are filtered. _bithalf * RIG.Spikewindow * RIG.Spikewindow * RIG.Spikewindow / 10000000;
Spike Strength:	This value influences the smoothing of the pulses if the spike filter was activated by exceeding the limit. The strength increases exponentially (Filter ^ 4) the greater the overshoot of the window.
Sp.Filter smooth:	The spike filter operates dynamically and changes the smoothing accordingly. Therefore, another EMA filter was built in for the dynamic change, which is controlled by this value. Small value Spike filter increases quickly and jerkily when triggered and also returns quickly and jerkily after the end of the spike. Value large spike filter increases more gently when triggered and also returns more gently on the Output filter value .

7.2. Service menu

This menu is intended for testing the actuators and for moving the actuators to special service positions. All actuators can be moved simultaneously or each one individually. After activating the respective submenu, the value of the actuator can be increased or decreased by turning the encoder to the right or left. The value is changed by the value saved in "Multiplier". This menu can also be accessed directly when starting the controller without calibrating the actuators. This can be used, for example, to “jack up a Stewart platform” in the event of a repair. A calibration is carried out when the menu is exited.

This function can also be used to save the offset of the individual actuators and all actuators. For Change Offset, set "Yes" with the encoder and confirm with Push.

7.2.1. Repair - moving without calibration

Attention be careful:

Start the controller, note that the emergency stop button is not pressed is.

Choose

Move the encoder right or left and select one or all of the actuators to move.

Attention after exiting the menu a calibration is carried out.

If you press the emergency stop button the servos are deactivated depending on the setting in the setup.

7.3. Actuators

The parameters of the actuators used are set here. Save after changes and restart the controller so that the new values are calculated correctly.

Actuator	:	Linear or rotary These values are used for the calculations of the inverse kinematics as well as for calculating the resolution of the actuator.
Encoder PPR	:	Number of encoder positions depending on the servo motor, with AASD15 10000
Electronics. Gear	:	Required for the calculation of the actuator resolution PN (98) Value from the servo output stage

These global properties overwrite the values of the individual actuators in the actuator Submenus.

Gearbox ratio	:	Ratio of used gears. Only reduction possible.
Leadscrewpitch	:	Pitch of the trapezoidal thread spindle 5, 10.25 ... in mm per revolution (only linear actuators)
Actuator length	:	Length of the linear actuator in mm (only linear actuators)

Red.Range	:	"Range" for rotating actuators in degrees. Half a turn is a 180 degree safety distance
Lin. Act. Safety	:	to the actuator limits in mm for linear actuators. Will be deducted from the actuator length on both sides.
Actuators	:	Submenu for actuator 1-8 Activate by pressing the encoder button

(Submenu for actuator 1-8)

rotation	:	Direction of rotation of the actuator, CW
Park enable	:	vs CCW if you activate this option, the actuator is not parked
Cal. Offset	:	Offset in pulses is set after calibration. And used as the lower zero point of the actuator. (plus parking position only for rotating actuators)
elect. Gear	:	see above
mech gear	:	Ratio of used gears. Only reduction possible.
Encoder pos	:	see above
Parking position	:	Offset from the lower zero point (calibration point) of the actuator as the parking position. The total offset is calculated individually for each actuator Park position + actuator Cal.
LS Length	:	(only rotating actuators) Length of the linear actuator in mm (only linear actuators)
LS pitch	:	Pitch of the trapezoidal thread spindle 1... 1000... in mm per revolution (linear actuators only)

LS Safety	:	Safety distance to actuator limits in mm for linear actuators. Will be deducted from the actuator length on both sides. Type. 2-5 mm
red.Range	:	"Range" for rotating actuators in degrees. Half a turn are 180 degrees
Limitless	:	special function for e.g. 360 ° actuators for endless YAW. This makes it possible to turn beyond the actuator end without having to take the long way, best watch the video on Youtube Infinite loop on actuators https://www.youtube.com/watch?v=wvK86g H9gZg

// End of actuator sub menu

Calib. speed	:	Pulse speed for calibration in Hz values for red.
Low speed	:	Pulse speed for the slow speed, travel to and from the home position
High speed	:	Operating speed, should be at least 253 kHz with PN98 = 2
Number actuators	:	Number of connected motors, the number is controlled, checked if the actuator check is "enabled".
multiplier	:	The multiplier is used for value changes where numbers have to be changed in large amounts. So that the encoder does not have to be turned 1000 times, the multiplier is set to 1000 and turns just one click.

ie with multiplier = 1, 1 is always added / subtracted from the value per encoder lock. If the multiplier = 500, 500 is added or subtracted in each case.

For offset and speeds

7.4. SET UP

FPS LC display : Sets the refresh rate of the display.

Should be 5-10. Values above 10 are not tested.

LCD online : allows the display to be updated in online mode.

Emergency Stat : Specifies how the motors are controlled after the emergency stop switch has been activated.

ON Servos are switched off (RIG falls down) OFF

Servos stop but are energized

Emergency NC : Normaly open or normaly closed

Actuator check : Checks all actuators when the servomotors are online. If a fault occurs, no more signals are sent to the motors. Please note that all servo ports one after the other

and all of the motors that have been set must also be connected. That means, for example, port 1-4. If ports 1-3 and 5 are occupied, this results in an error if the actuator check is "enabled".

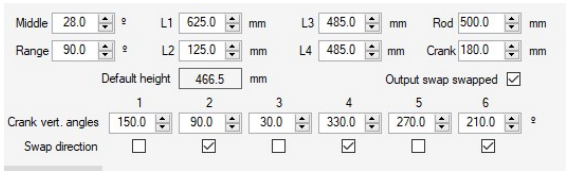
After pressing the encoder, all motors that are online are then calibrated in the event of a fault.

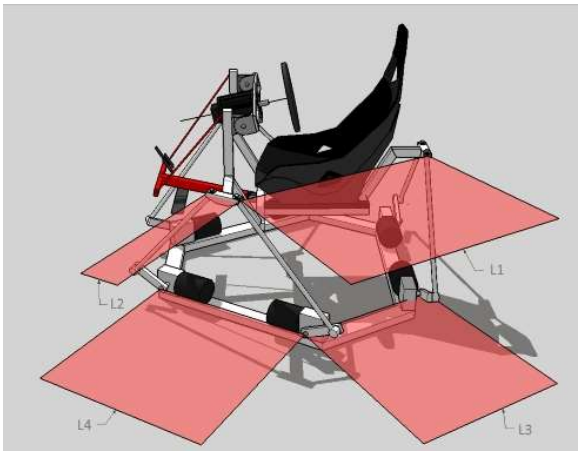
Encoder direction	:	As determined, some encoder types deliver the signals in the wrong direction. If an encoder switches the wrong way round, this option can be used to change the direction of rotation.
Build rate	:	Transmission speed for the FTDI port. see
Multi	:	multiplier

7.5. RIG

Parameters for the inverse kinematics. Please configure your rig with mover to understand how the inverse kinematics works. The value entries are based on movers and can be taken over directly.

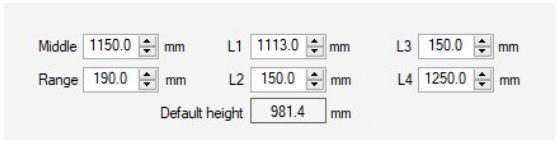
For rotating actuators and 6dof Stewart platforms

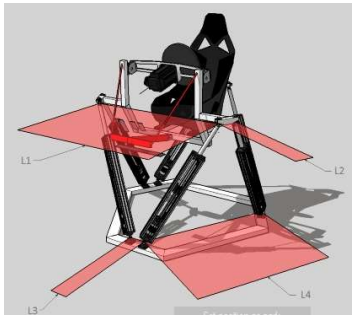




Source: FLypt "Mover" https://www.flyptmover.com/

For linear actuators





Source: FLypt "Mover" https://www.flyptmover.com/

List of values:

Base L3 short	short side of the lower platform in mm long side of the
Base L4 long	lower platform in mm long side of the upper platform in
Rig L1 long	mm short side of the upper platform in mm Length of
Rig L2 short	the crank arm in red. Platforms Length of the actuator
Crank / Range len	from the middle position to the stop of the actuator in
	mm for linear actuators

Rod / Middle len	Length of the connecting rod in red. Platforms Length of the actuator in the middle position for lin. Actuators in mm
Middle Angle	only with rotating actuators, angle of the crank arm in standby position of the actuator "determine by measuring"
Crank Angle 1	Angle of the motor rotation axes in the base plane The angles are measured counterclockwise. It is best understandable if you paint it on.
Reversed 1	Angle + 180 °,
Crank Angle 2	
Reversed 2	
Crank Angle 3	
Reversed 3	
Crank Angle 4	
Reversed 4	
Crank Angle 5	
Reversed 5	
Crank Angle 6	
Reversed 6	
XY orientation	With this option you can rotate the axes in the XY plane, given in degrees
COR X / sway	X value for the Center of Rotation calculation in mm from the center
COR Y / surge	Y value for the Center of Rotation calculation in mm from the center
COR Z / heave	Z value for the Center of Rotation calculation in mm from the center

7.6. Kinematic menu

In this menu, various functions for the telemetry data in the kinematic mode

To be hired.

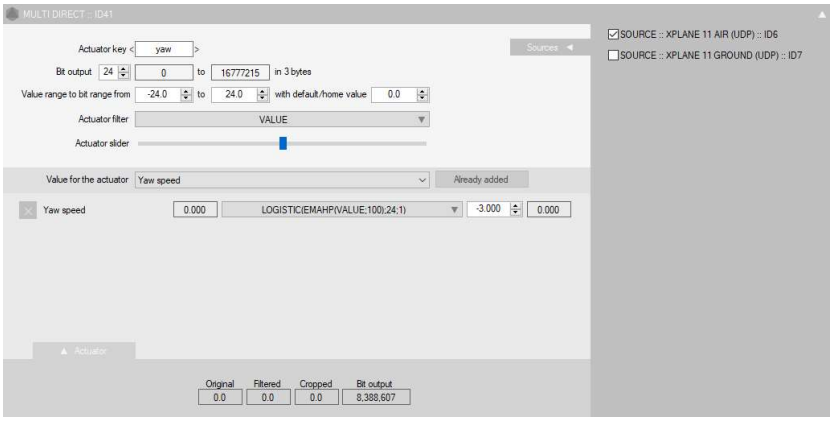
Axis 1 sway-lat

Washout enabled	:	Washout function based on time for 6dof data
Washout Strength	:	Duration of the washout effect
Range	:	Value for the scaling of the 6dof telemetry data

Attention

If you use the inverse kinematics, note the setting in your motion cue program (Mover / Simtools etc) there you scale the range of values that you e.g. from Xplane for Yaw

received from eg + -24 degrees to 24bit so that the controller knows how to evaluate the input data, please adjust the value under Range in the Axis menu. In this case the 48 would be for + -24 degrees. See also chapter "Position Mode"



Swap Axis : Inverting the axis values * -1

Axis 2 surge-lo

Axis 3 heave-ve

Axis 4 yaw

Axis 5 roll

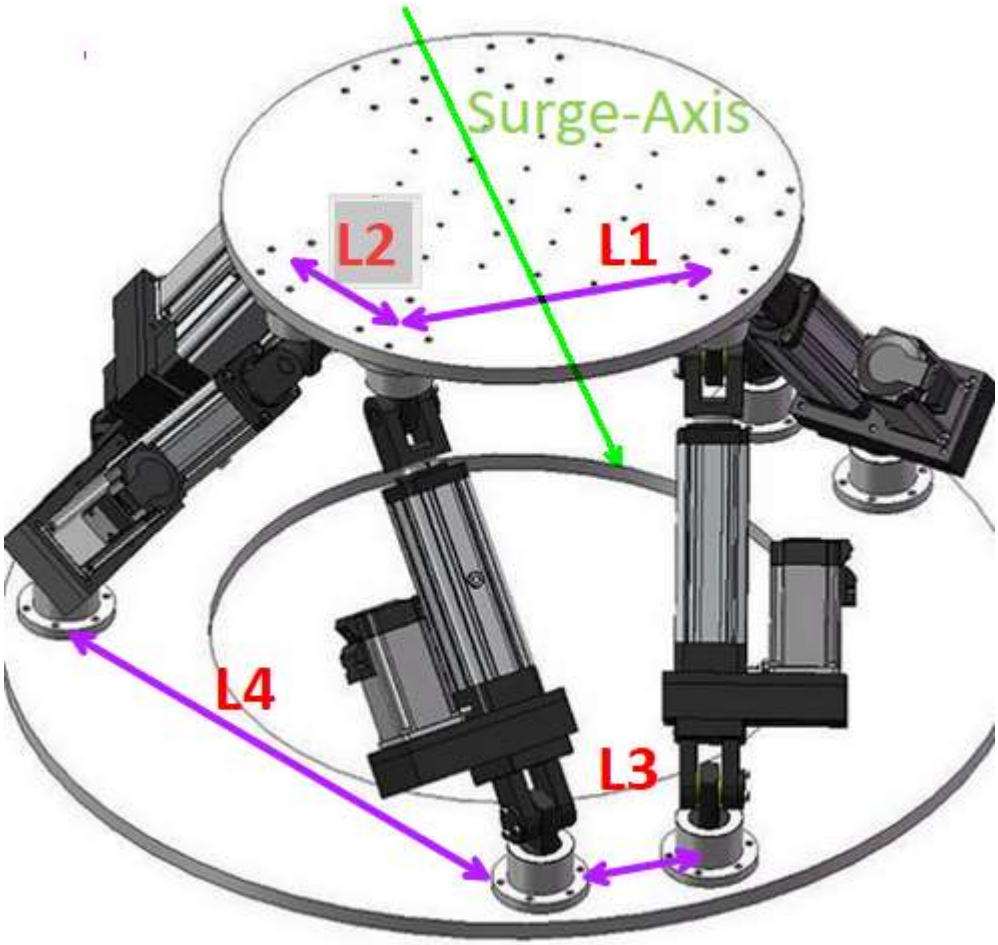
Axis 6 pitch

8. Geometry of the kinematics WIP

For calculations of the inverse kinematics of the Stewart platform, the geometric values of the platform are stored in this menu. These are queried as follows

Basic platform: Length L3 and L4

The basis for this is a regular or irregular hexagon

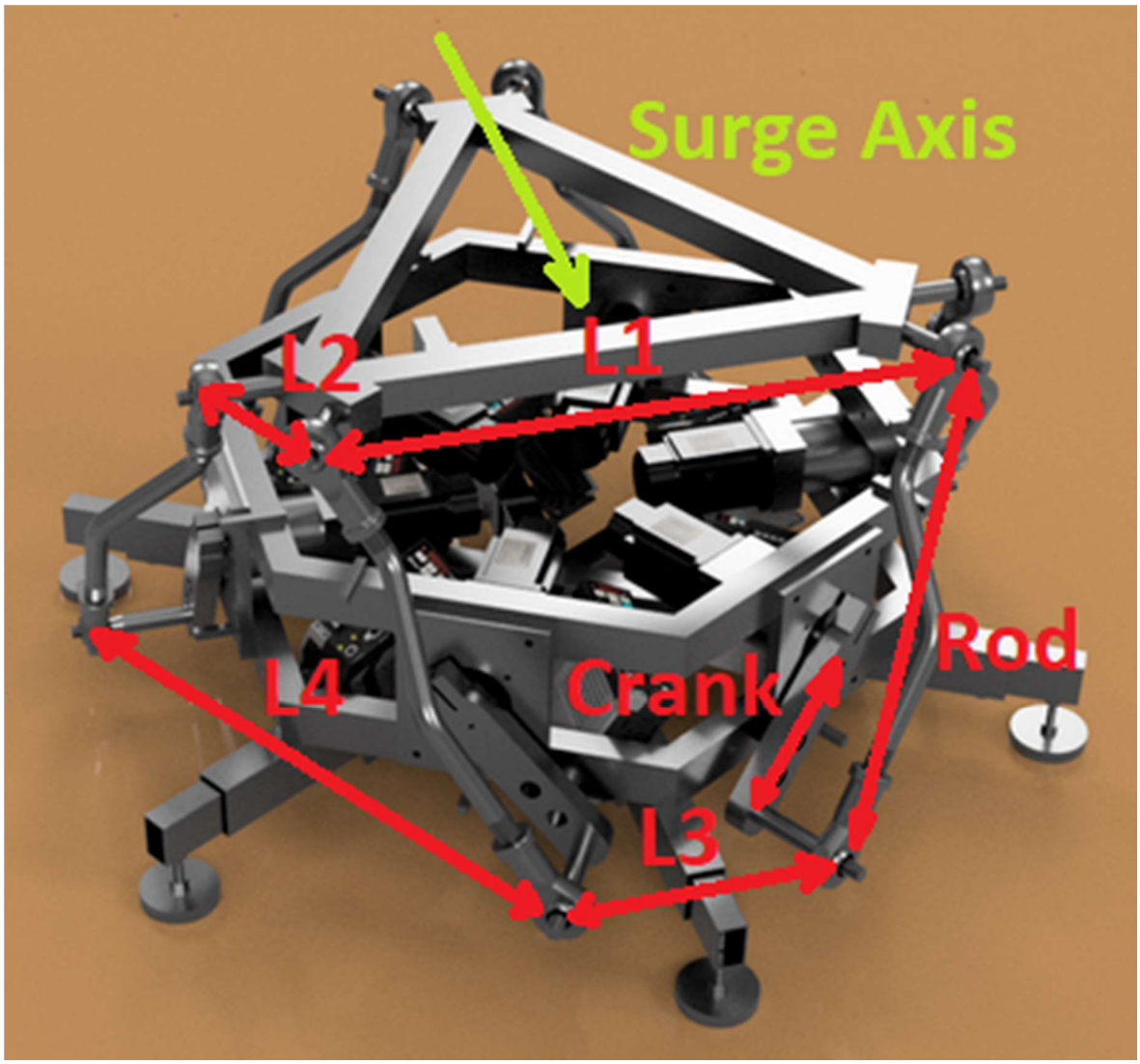


The same geometric basis also applies to the upper platform (the movement platform), but here an unequal-sided hexagon is almost always used as the geometric basis. The corners of which are rotated by 60 degrees to the base.

Overview of the geometry:

Base L3 (shorter side), L4 (longer side)

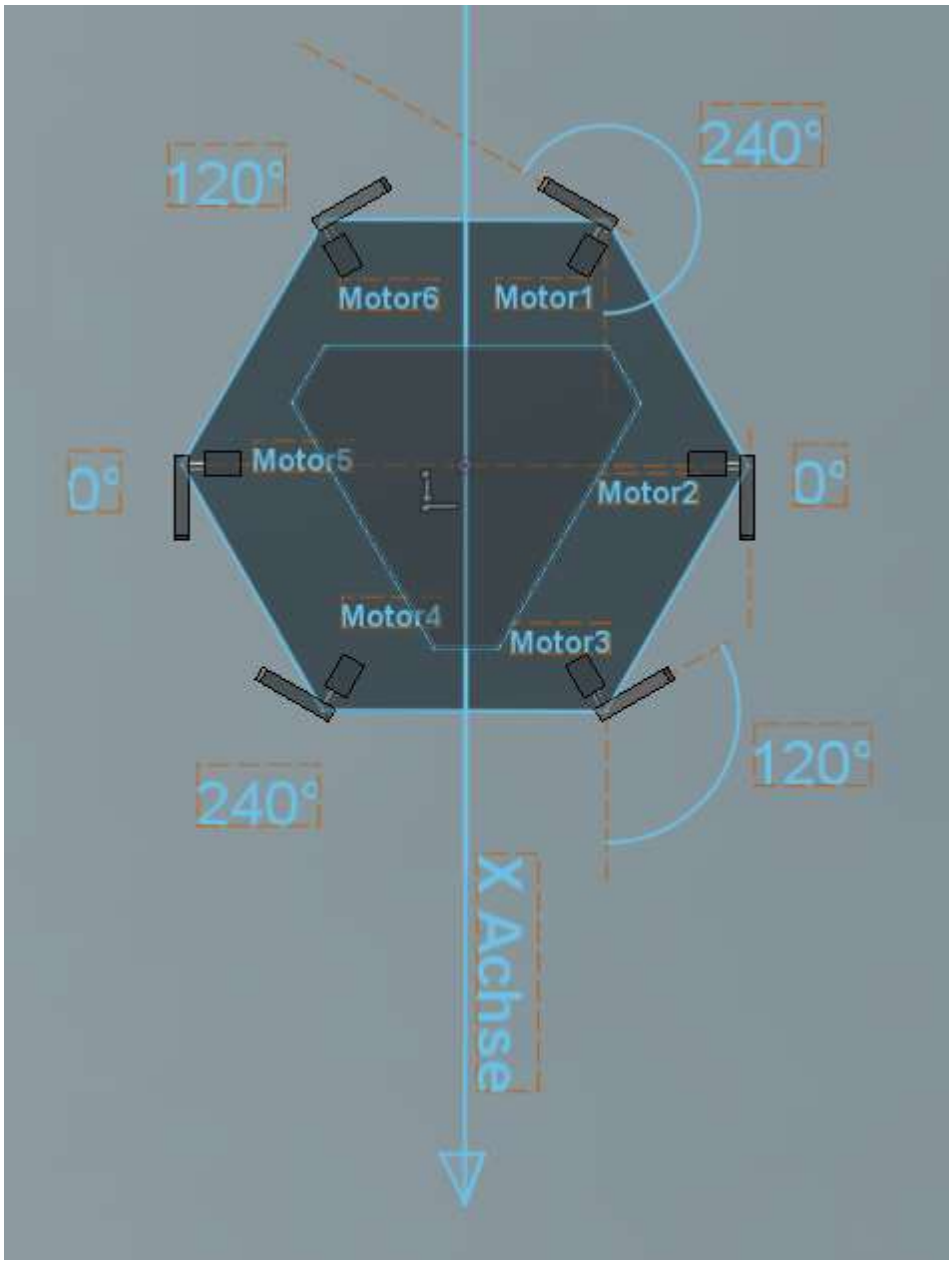
cockpit L1 (longer side), L2 (shorter side)

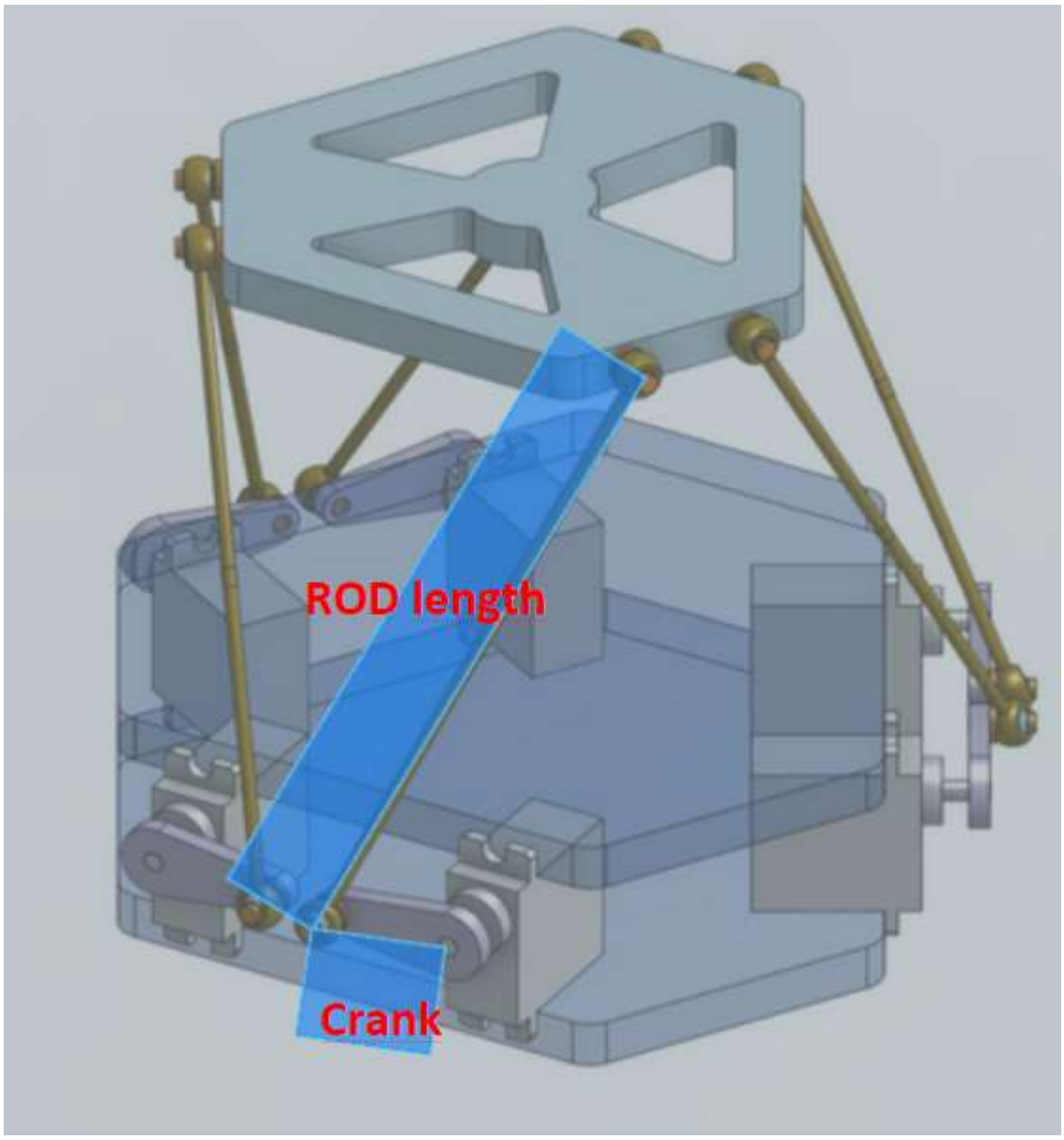


Uneven base: Linear Hexpod

For the calculations with linear actuators, you still need the total length of the actuator in the home position "Rod Length". The value of the range of the actuator is taken from the "Actuator" menu. For rotating actuators you also need the angle of the lever arms of the motors in relation to the X-axis according to the following sketch. These are stored in Crank Angel [1..6]. In addition, the length of the connecting rods "Rod Length" and the length of the lever arms "Crank"

For the geometric definition of the home position, you also need the angle of the lever arm in the home position. This can be determined arithmetically (18 ° -29 °).


120°
240°
Motor6
Motor1
0°
Motor5
Motor2
0°
Motor4
Motor3
120°
240°
X Achse


ROD length
Crank

9. Linear and rotating actuators

9.1. Rotating actuators

MaxPulse = RIG.ppr * RIG.mechanik_GearRatio_Servo

/ RIG.elektrik_GearRatio_Servo

/ (360 / RIG.Rank factor);

For example: (rotating)

AASD15A 10000 ppr

Encoder Gearbox 1:50

Range 180 °

PN98 = 2

= 10000 * 50/2 / (360/180)

= 125000 positions per half round

resolution depends on the arm length

Cal. Offset:

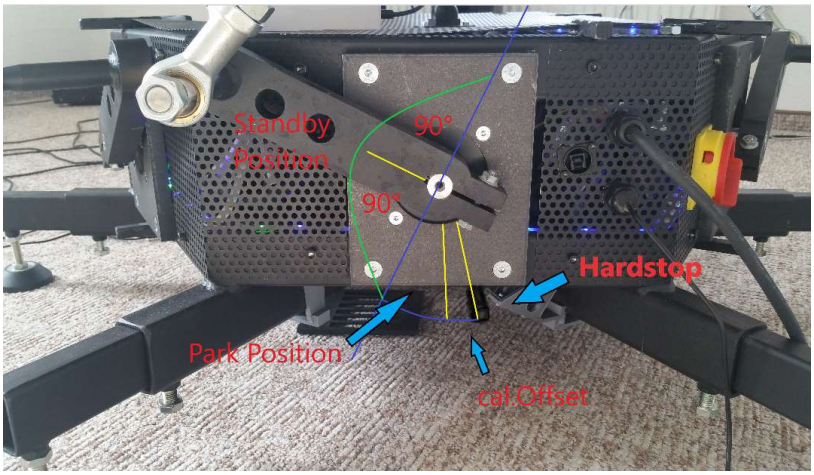
This offset is specified and approached individually for each actuator. It indicates the number of pulses that are approached after calibration. This offset is used to compensate for possible geometrical inaccuracies of the hard stop or the limit switch

Parking position:

The parking position indicates the number of pulses that all actuators travel after calibration. This offset is used to uniformly define the parking position. Calculation: see above 62500 pulses would be a 90 degree rotation, for example

PS: With the help of the service menu you can calibrate the actuators very well.

Standby position: Is calculated from half the range in pulses.



9.2. Linear actuators

MaxPulse = RIG.ppr * RIG.mechanik_GearRatio_Servo / RIG.elektrik_GearRatio_Servo * ((RIG.leadscrew_length - RIG.lin_act_safety * 2) / RIG.leadscrew_pitch

SFX 100 type

AASD15A 10000 ppr Encoder

Gearbox 1: 1

PN98 = 2

Leadscrew = 5

Leadscrew length = 100 mm

Linear Safety = 5 mm

= 10000 * 1/2 * ((100 -2 * 5) / 5) =

90000 positions / 100 mm

resolution = 0.0011 mm

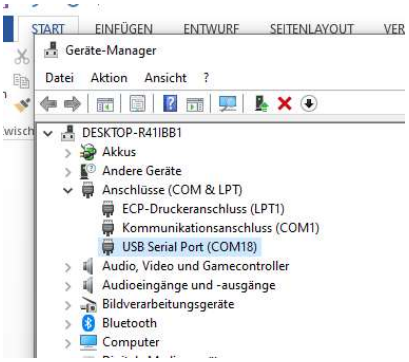
10. FTDI USB interface for motion data

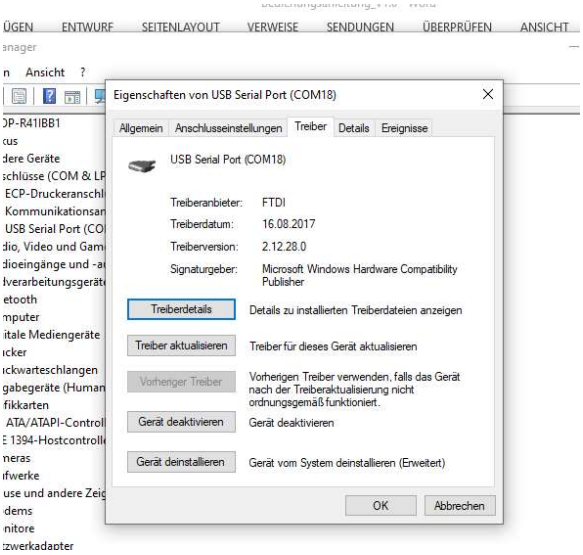
The controller contains an FTDI FT232 RL chip that is installed via USB.

The drivers required for this are usually installed automatically under Windows. But these can also be done via:

https://www.ftdichip.com/Drivers/

VCP.htm to be downloaded and installed.





11. Data transfer

The data transfer is established via the standard USB interface. There are 3 modes to transfer the data

The data packet string now is 28 bytes long and includes additional spare motion data slots for up to 8axis

The serial interface can be configured as follows

Data output	binary
speed	250,000 baud
Databits	8 bit
Stop bits	1
Parity	None

11.1. Actuator mode

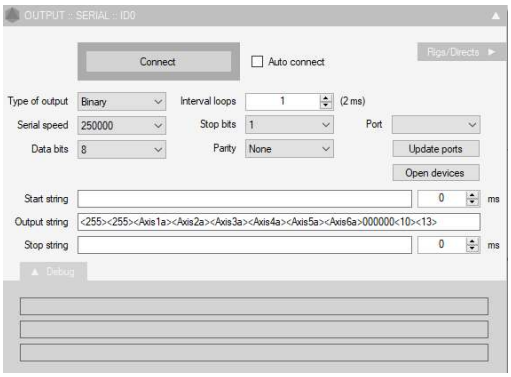
This is the direct mode in this mode all actuators are controlled individually.

The ID is byte values 0xFF + 0xFF
Each axis is 24 bit wide. (3byte)
LF + CR is required in the end (0x0A + 0x0D)

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

Data format

2 start bytes	<255> <255>
24 data bytes	3 bytes (24bit) per channel / actuator 8 channels
2 stop bytes	<10> <13>



11.2. Position mode"6dof mode"

The start bytes <253> <253> activate the "inverse kinematics" here, the values for inverse kinematics, i.e. acceleration, speed or position / degree, must be transferred. The values must be transferred standardized to a range. For further information see chapter "Inverse Kinematics"

Sway Surge Heave in mm

Yaw Roll Pitch in degrees

The values must be transferred scaled to 24 bits!

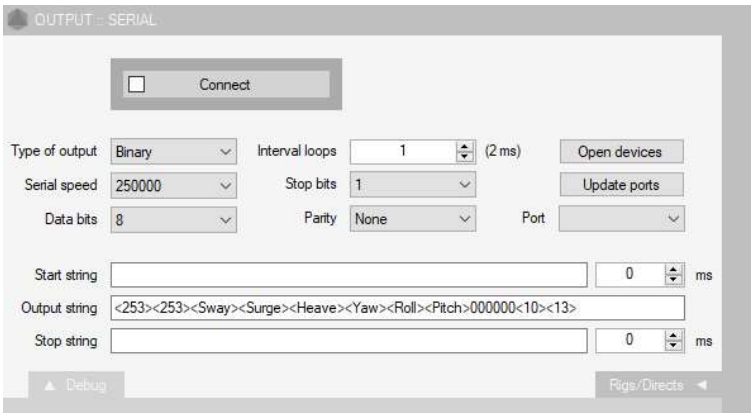
In the controller under the menu Kinematics, the value Range must be specified for each axis

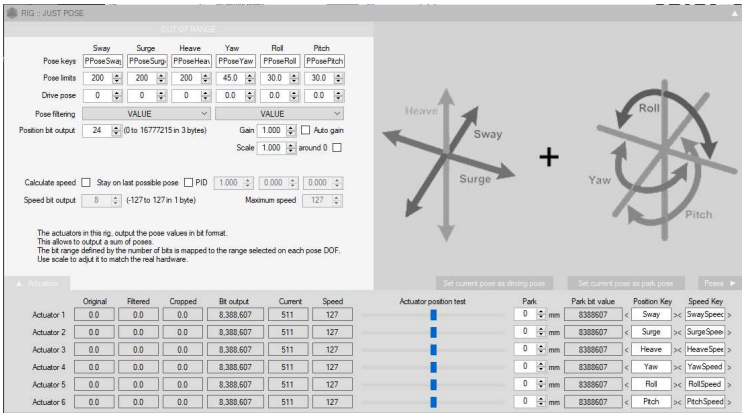
For example, this corresponds to an actuator length of 400 mm 1677725 (24bit) (Justpose or Multidirect fromMover)

Or + - 30 degrees -> Set Range for Yaw to 60 degrees 1677725 (24bit)

<253><253><Sway><Surge><Heave><Yaw><Roll><Pitch>000000<10> <13>

The values for the axes are again 3 bytes (24 bits) wide, so 28 bytes are also transferred here.





11.3. Advanced, Float Position Mode"6dof mode float"

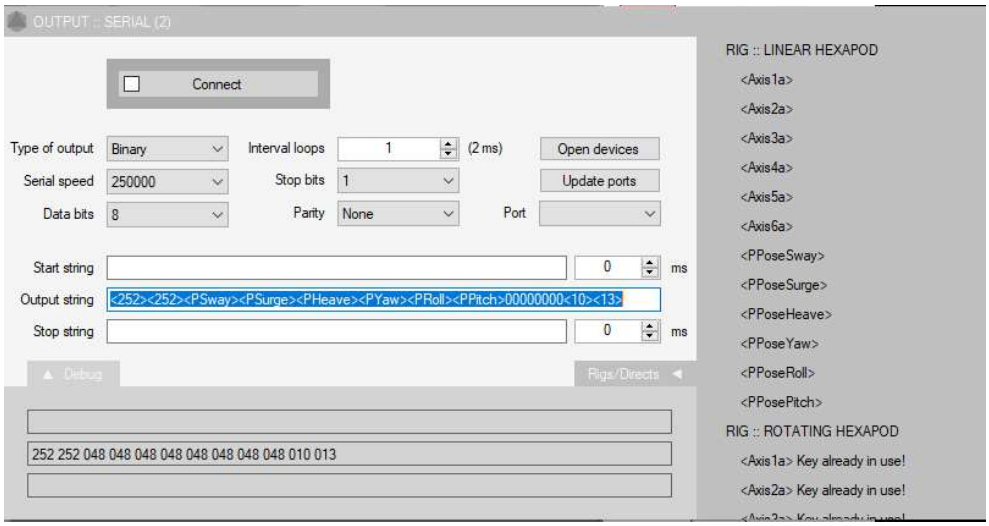
The same mode as before, however, floating point numbers are used here (from Mover 3.4.2). The advantage is that the values no longer have to be scaled.

Sway Surge Heave as 4 byte float in mm Yaw Roll Pitch as 4 byte float in degrees

<252><252><PSway><PSurge><PHeave><PYaw><PRoll><PPitch>00000000<10> <13>

The values of the axes are now 4 bytes (32 bits) wide, and the fill values for axes 7 and 8 are thus transferred in total to 36 bytes.

Settings in the kinematics menu for scaling are no longer required.

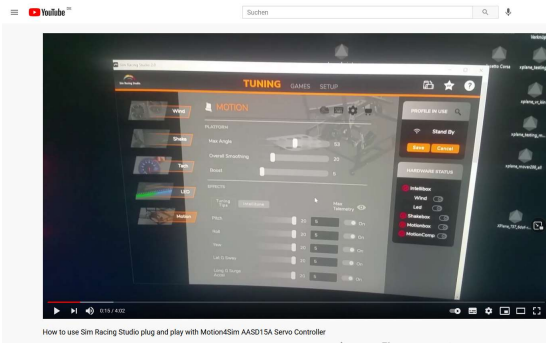


11.4. SRS mode- Sim Racing Studio

There is another mode, this mode provides an interface to automatically connect to SRS - Sim Racing - Studio. It works “Plug & Play”. The data transmitted by SRS is expanded from 16 bits to 24 bits.

Video explanation:

https://www.youtube.com/watch?v=BZgPRXhlQf8&t=15s



12th LED display

Meaning of the ads	
Green LED lights up	Controller online and receiving data
The red LED lights up	Controller offline, calibration or Moves to the parking position
Green and red light up, green and red flashes	Moves to the home position to wait for online data Spike filter active

13. Factory reset

Sometimes it is necessary to reset the data in the controller memory to the original state. To do this, use the following instructions

1. Restart the controller
2. Wait until the message "press encoder to calibrate ..." appears in the display
3. Then turn the encoder to the left to open further menu entries

4. Turn until "factory reset" appears in the display. Press the encoder to do this.

   From firmware 1.41 there are 2 options for a factory reset. The settings are adapted as a basis for linear and rotating actuators.
   Wait about 10 seconds and then turn the encoder to the right and restart the controller.

5. The data has been reset.

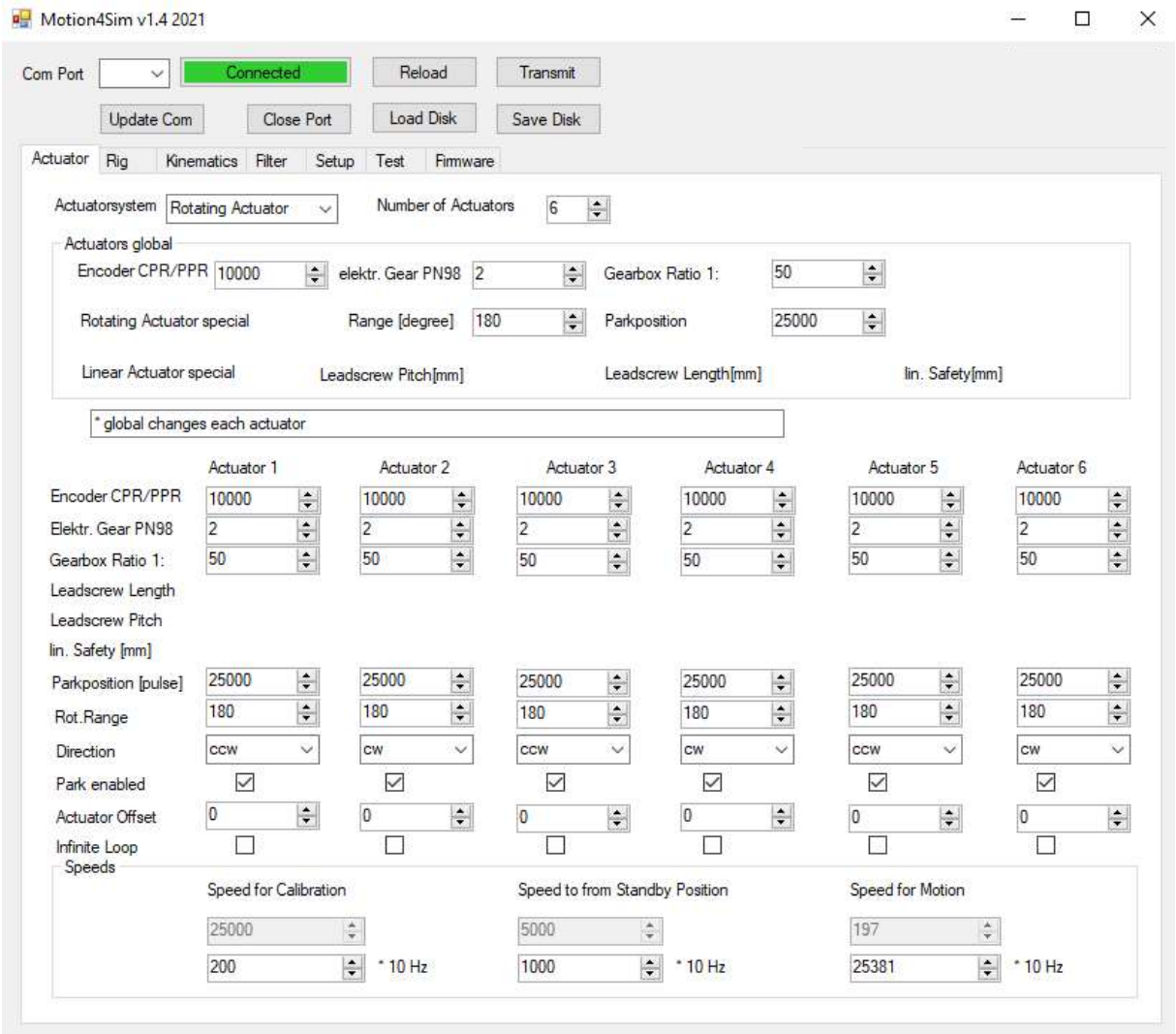
14th Remote Config APP

There is now a new smart remote APP for easy editing of the controller configuration. With this, the most important data can be downloaded from the controller, modified, saved and written back.

Download from Gitub:

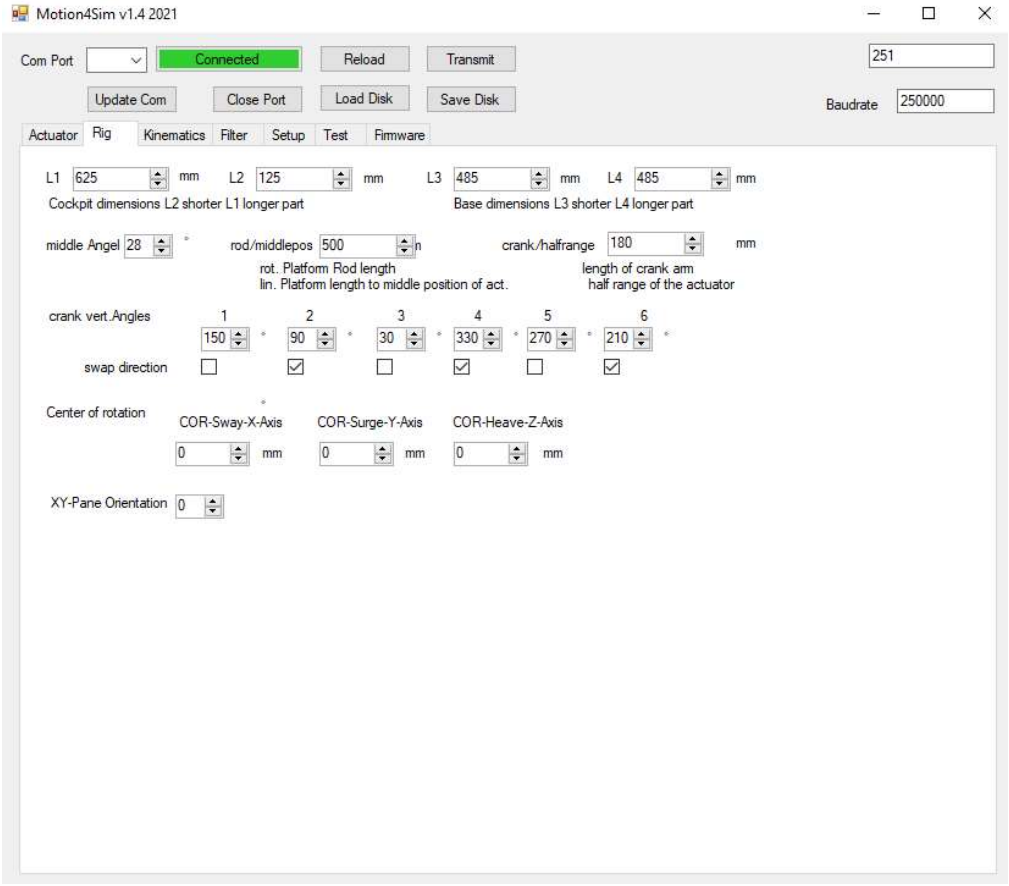
https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/blob/master/remote_app

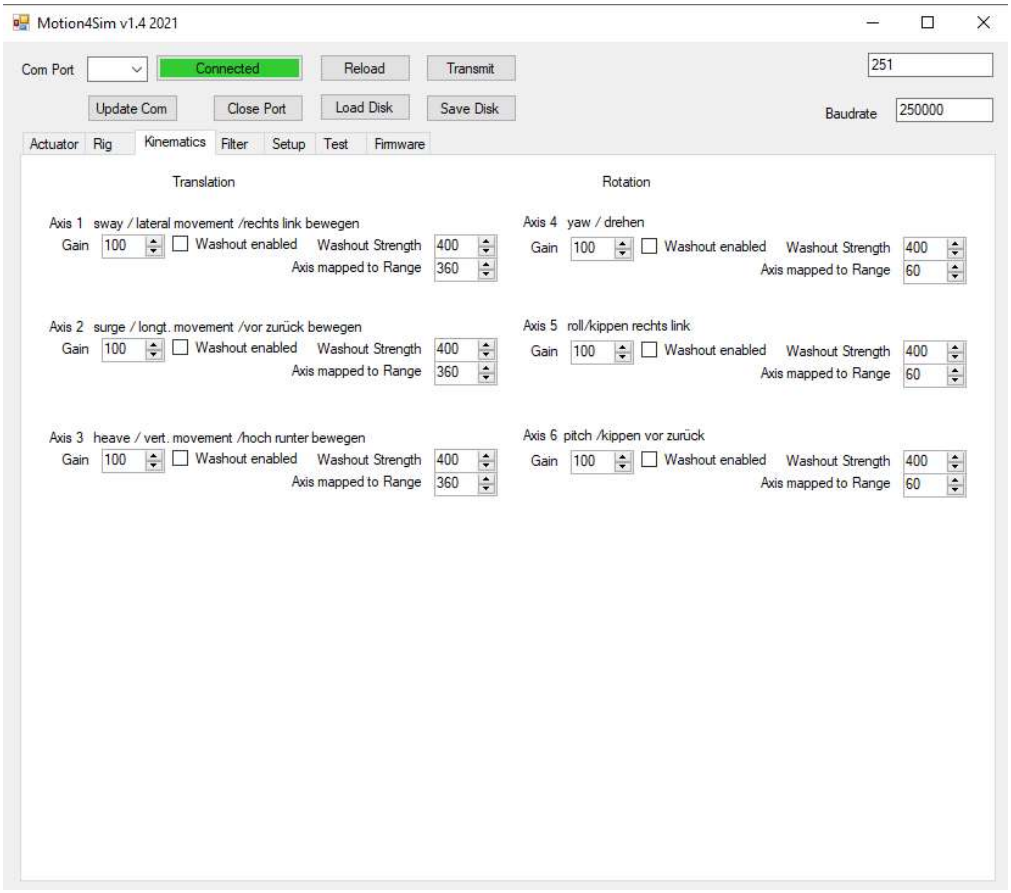
If the controller is connected to the Motion Data Port, the port is automatically set when the app is started and the app connects. If this does not work, for example if SRS is installed, please stop the port scanning software and possibly manually set and connect the port.

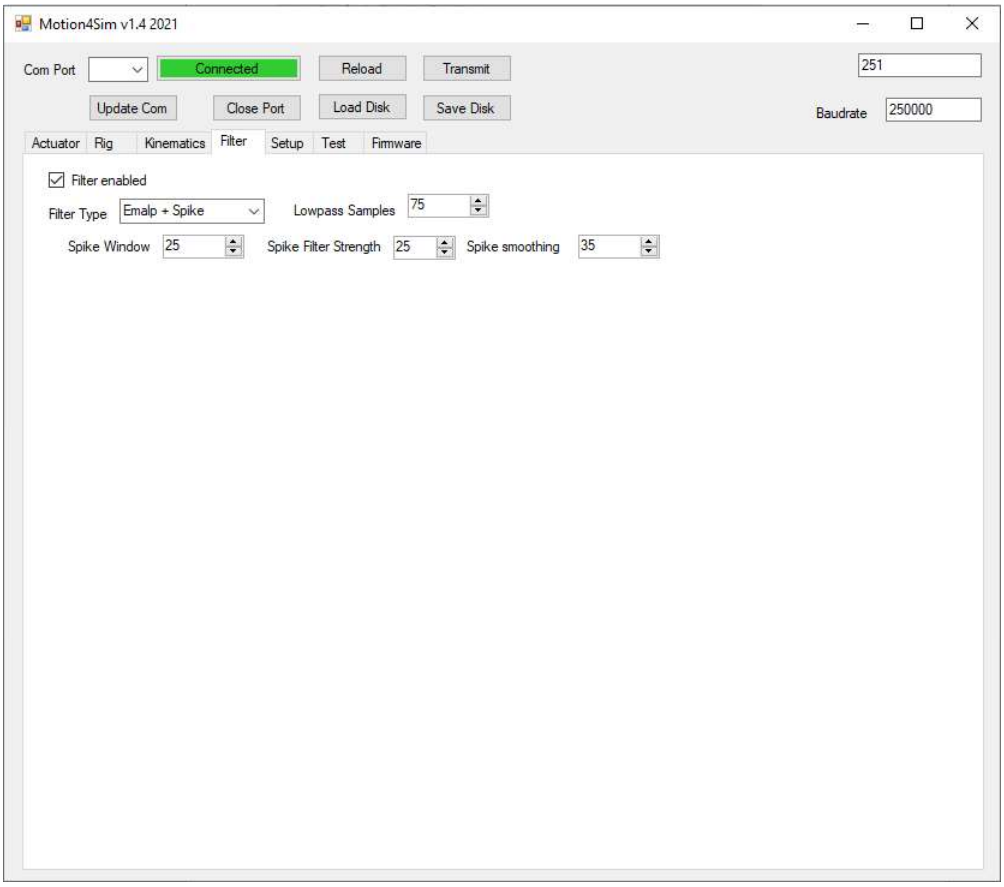


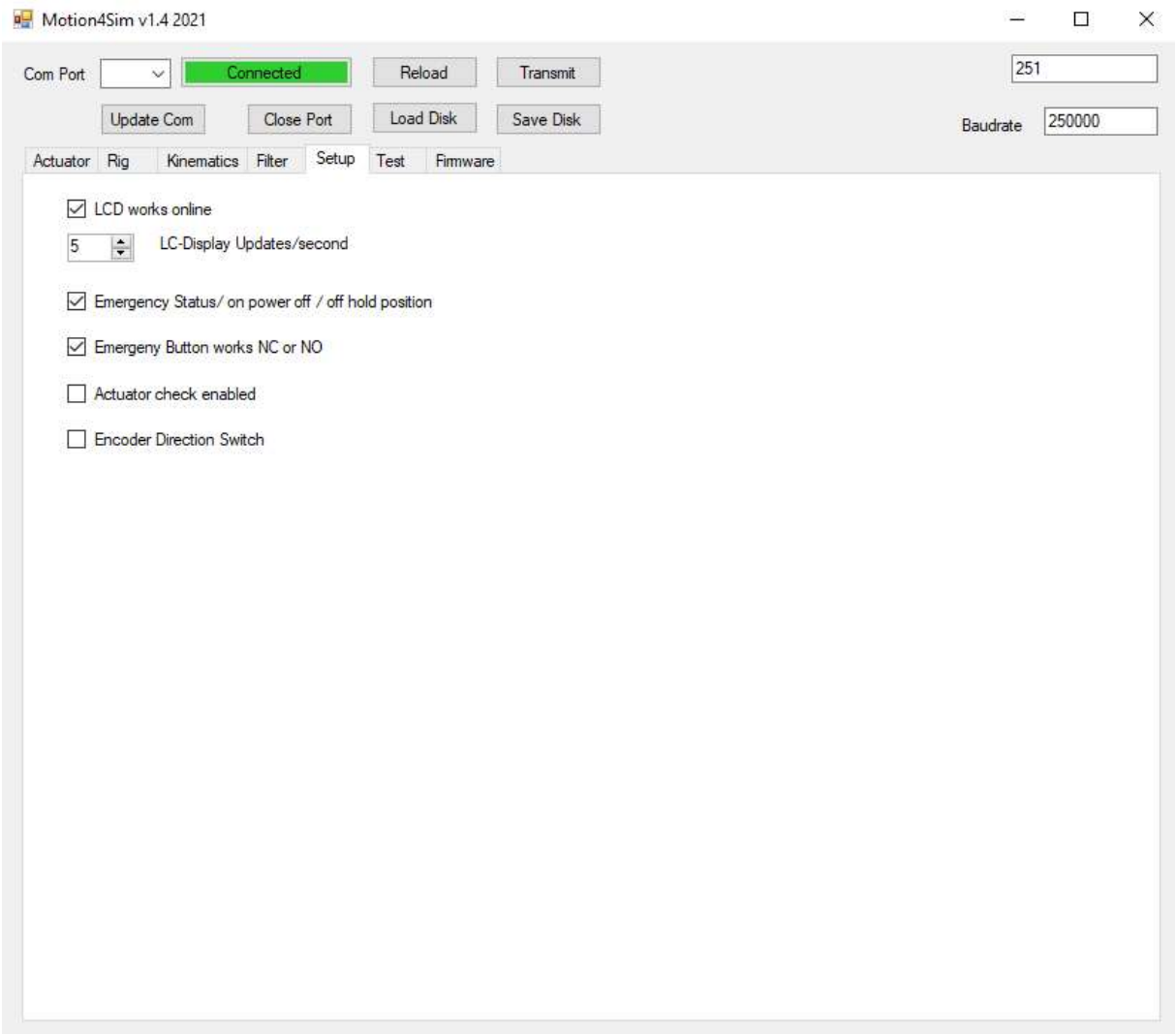
The other buttons are self-explanatory. To save the data back to the controller, select "Transmit". The values can be saved locally with “Load and Save Disk”.

Attention the data will be transferred and written to the EEprom. The controller then performs a reset. Please never do this in operation.




Motion4Sim v1.4 2021
Com Port
Connected
Reload
Transmit
251
Update Com
Close Port
Load Disk
Save Disk
Baudrate
250000
Actuator
Rig
Kinematics
Filter
Setup
Test
Firmware
Translation
Rotation
Axis 1 sway / lateral movement /rechts link bewegen
Gain 100
Washout enabled
Washout Strength 400
Axis mapped to Range 360
Axis 4 yaw / drehen
Gain 100
Washout enabled
Washout Strength 400
Axis mapped to Range 60
Axis 2 surge / longt. movement /vor zurück bewegen
Gain 100
Washout enabled
Washout Strength 400
Axis mapped to Range 360
Axis 5 roll/kippen rechts link
Gain 100
Washout enabled
Washout Strength 400
Axis mapped to Range 60
Axis 3 heave / vert. movement /hoch runter bewegen
Gain 100
Washout enabled
Washout Strength 400
Axis mapped to Range 360
Axis 6 pitch /kippen vor zurück
Gain 100
Washout enabled
Washout Strength 400
Axis mapped to Range 60


Motion4Sim v1.4 2021
Com Port
Connected
Reload
Transmit
251
Update Com
Close Port
Load Disk
Save Disk
Baudrate
250000
Actuator
Rig
Kinematics
Filter
Setup
Test
Firmware
Filter enabled
Filter Type
Emalp + Spike
Lowpass Samples
75
Spike Window
25
Spike Filter Strength
25
Spike smoothing
35



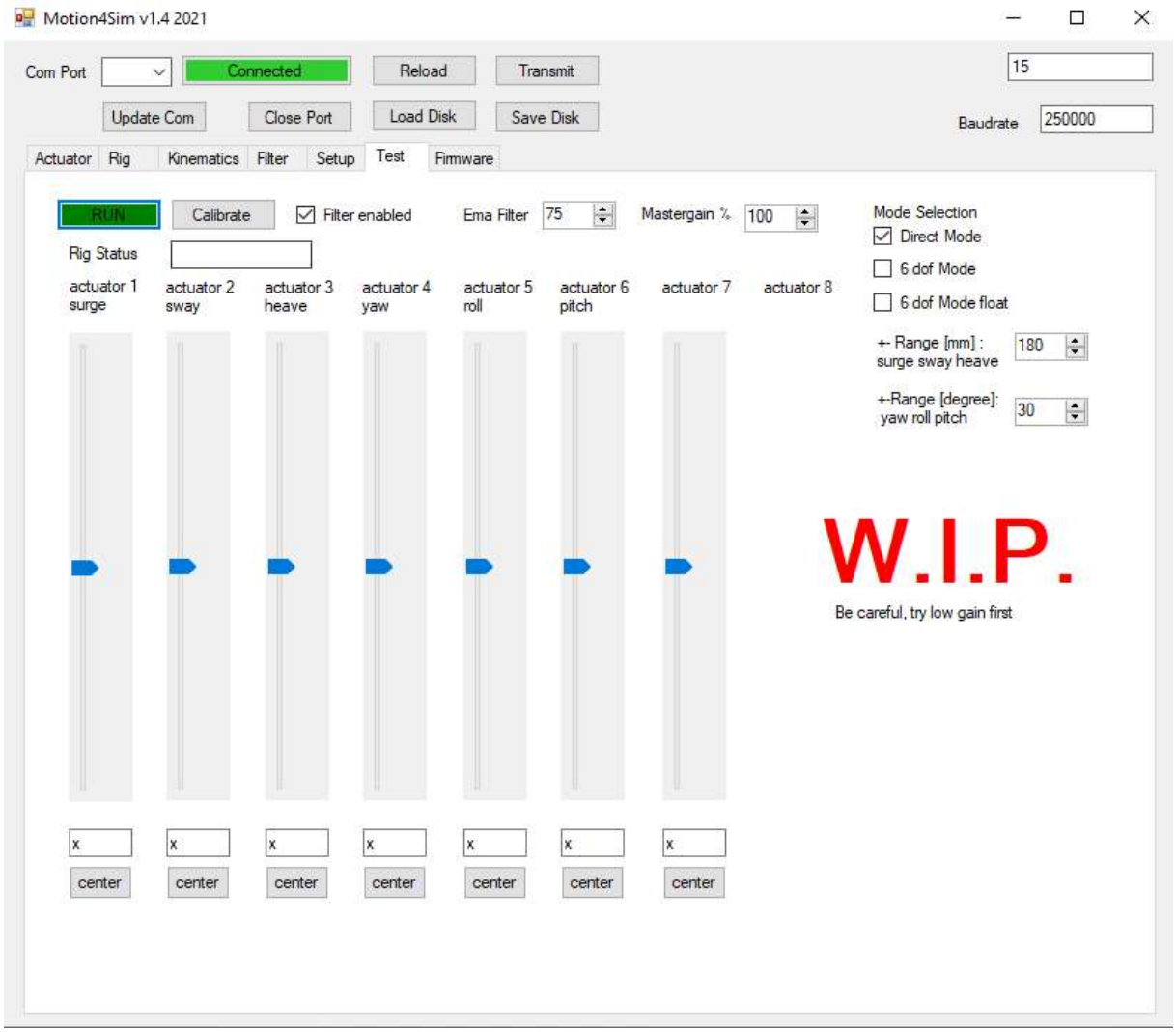
Attention, the APP is WIP, no plausibility check is carried out for the values entered.

14.1. Actuator test functions

The "test page" enables the actuators to be tested. If the controller is "connected", you can switch to the "Test" page tab and press the "RUN" button. The app starts sending the set values for the actuators. The actuators should be calibrated and online.

The scaling set in the controller is used in 6dof mode. For the "6dof mode float" the specified values for range are used.

The other functions are self-explanatory.

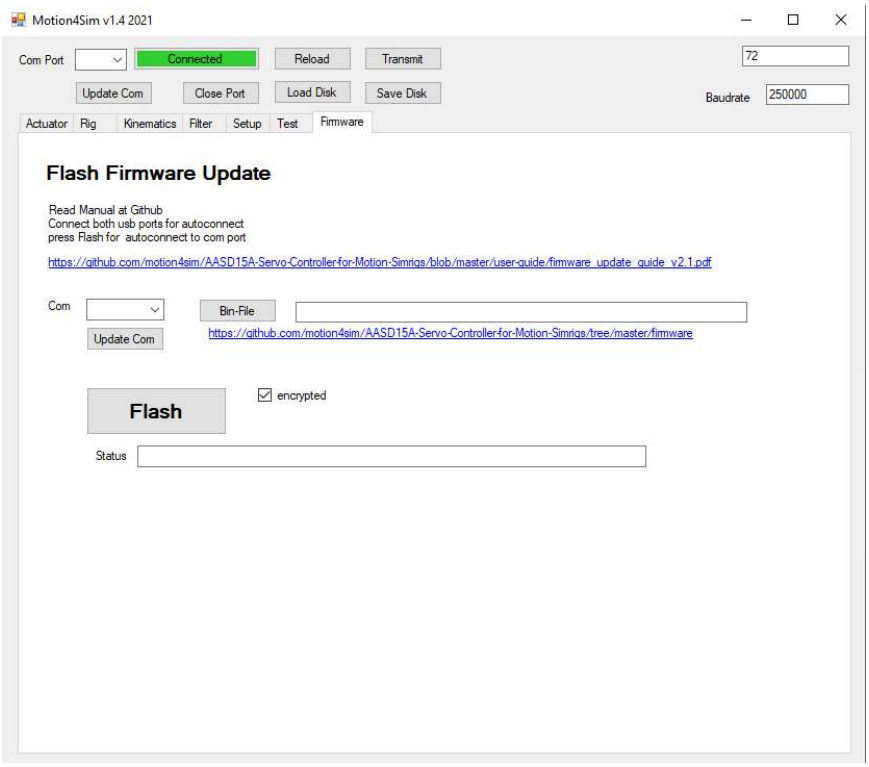


15th Firmware update

Flashing the firmware has been very easy since firmware 1.41. It is possible to connect both USB ports at the same time via a hub. Then just select the bin file, activate "encrypted" and press the "Flash" button. The firmware is transferred to the controller.

The controller models that were delivered with FW1.41 contain a modified bootloader, which enables you to automatically enter the bootloader mode. To do this, the Ftdi USB port and the Bossa program port must be connected to the USB at the same time.

This function is not yet completely stable then please follow the steps below.

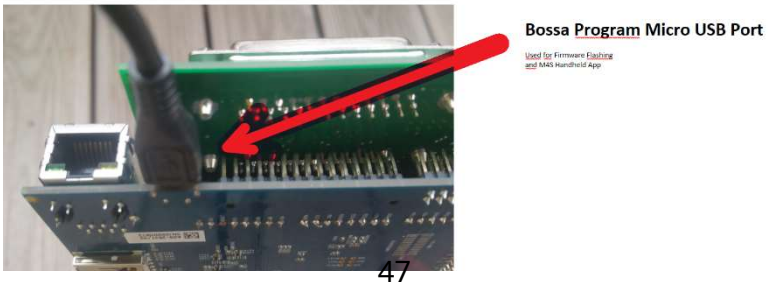


Video tutorial:

https://www.youtube.com/watch?v=sPiSgAtpf4k&t=181s

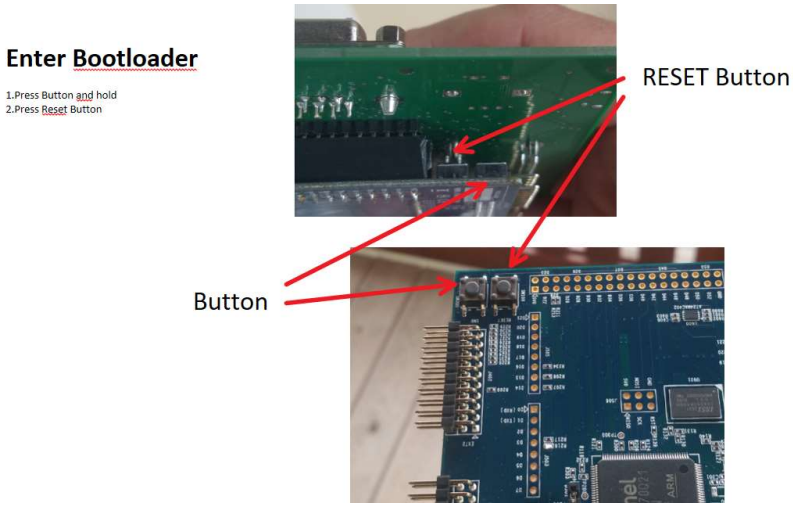
For controllers with an older boot loader, carry out the following steps to flash the firmware.

1. Connect Bossa program port to USB

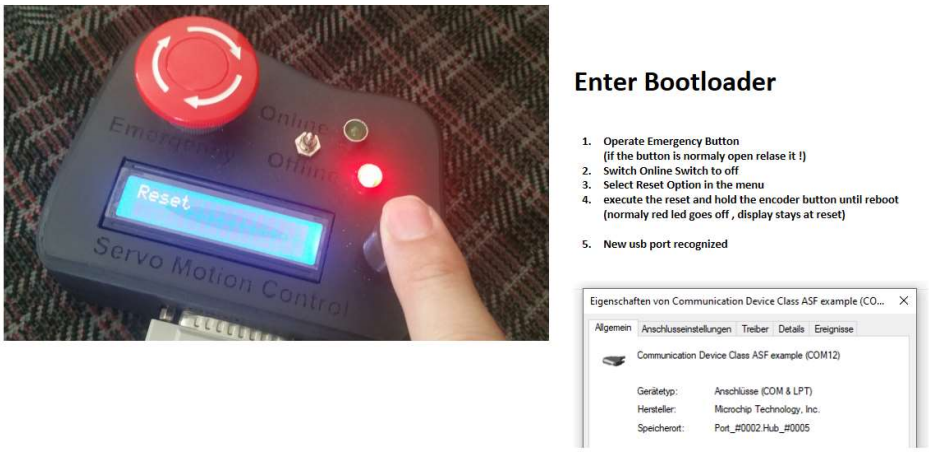


2. Enter Bootloader Mode

Variant 1. without handheld



Variant 2. With handheld



3. Select the update bin file, select the "encrypted" checkbox and press the flash button. The firmware is now flashed on the device. The comport is determined automatically.

   If there are problems with the automatic port selection, select this manual and try again.

4. It is essential to perform a factory reset after the firmware update. The settings should be saved in advance.

15.1. Firmware update (out of date)

If necessary, firmware updates are delivered on a regular basis. You can find this under

https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/tree/master/firmware

download and install on the controller according to the separate instructions. It's very easy.

The following video explains the update process.

https://www.youtube.com/watch?v=c0Djy7tlofE

The update instructions can also be found under

https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs/tree/master/userguide

A bootloader tool is required for the update process. You can download it here

https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/tree/master/bootloader

Attention: before you update the firmware you can save the data with the new remote app.You can find this app here:

https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/blob/master/remote_app/

Attention, please reset the controller to the factory settings after every firmware update.

16. Handheld app

To use this app, you also connect the “Bossa Program” USB port of the controller.

Download the app here:

https://github.com/motion4sim/AASD15A-Servo-Controller-for-MotionSimrigs/tree/master/remote_app

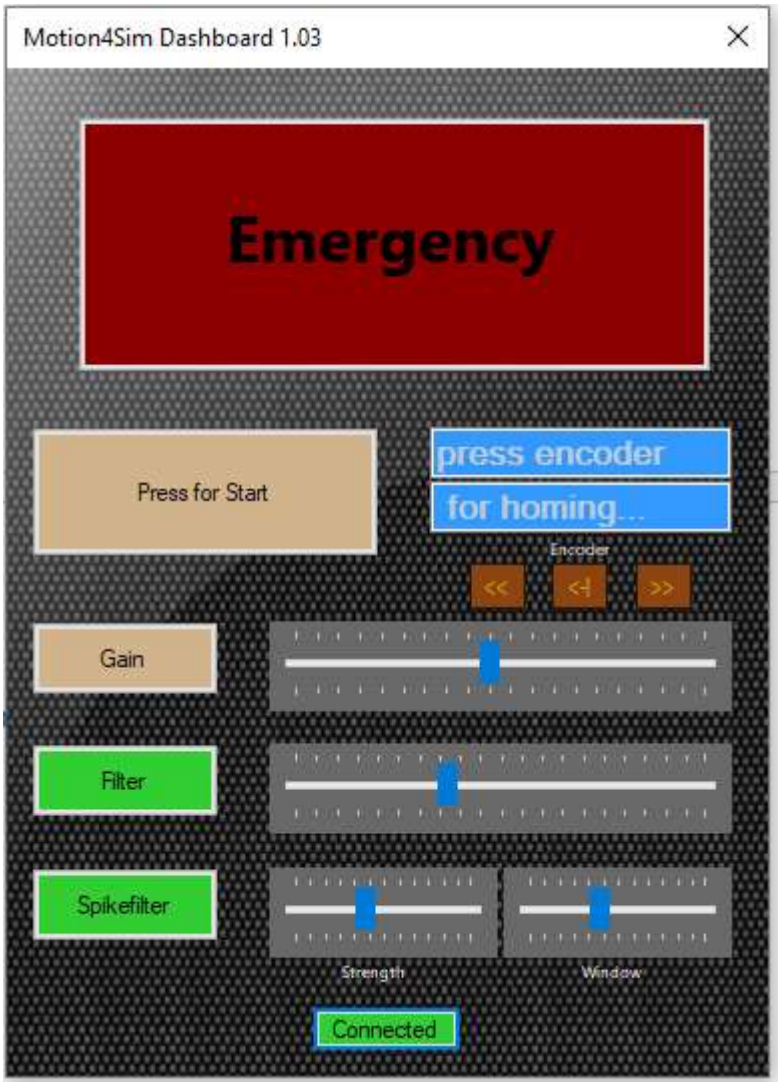
Start the handheld app, it will automatically connect to the controller. If a handheld is installed, the app and the handheld device can be operated in parallel.

Only the "emergency stop" switch on the handheld device has priority over

the app. Gain and filter can be easily operated via the app. How it works

explained on Youtube.

https://www.youtube.com/watch?v=hUnLz29yCMw&t=469s



Have fun

Motion4SIM

Braunsdorf July 26, 21

Update follows.