

operation manual

2020

Advanced servo motor control unit for up to 7 motors



**For AASD Series
Servomotors**

Motion4Sim

11/20/2020

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

Functions

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.

The following functions are operated by the controller:

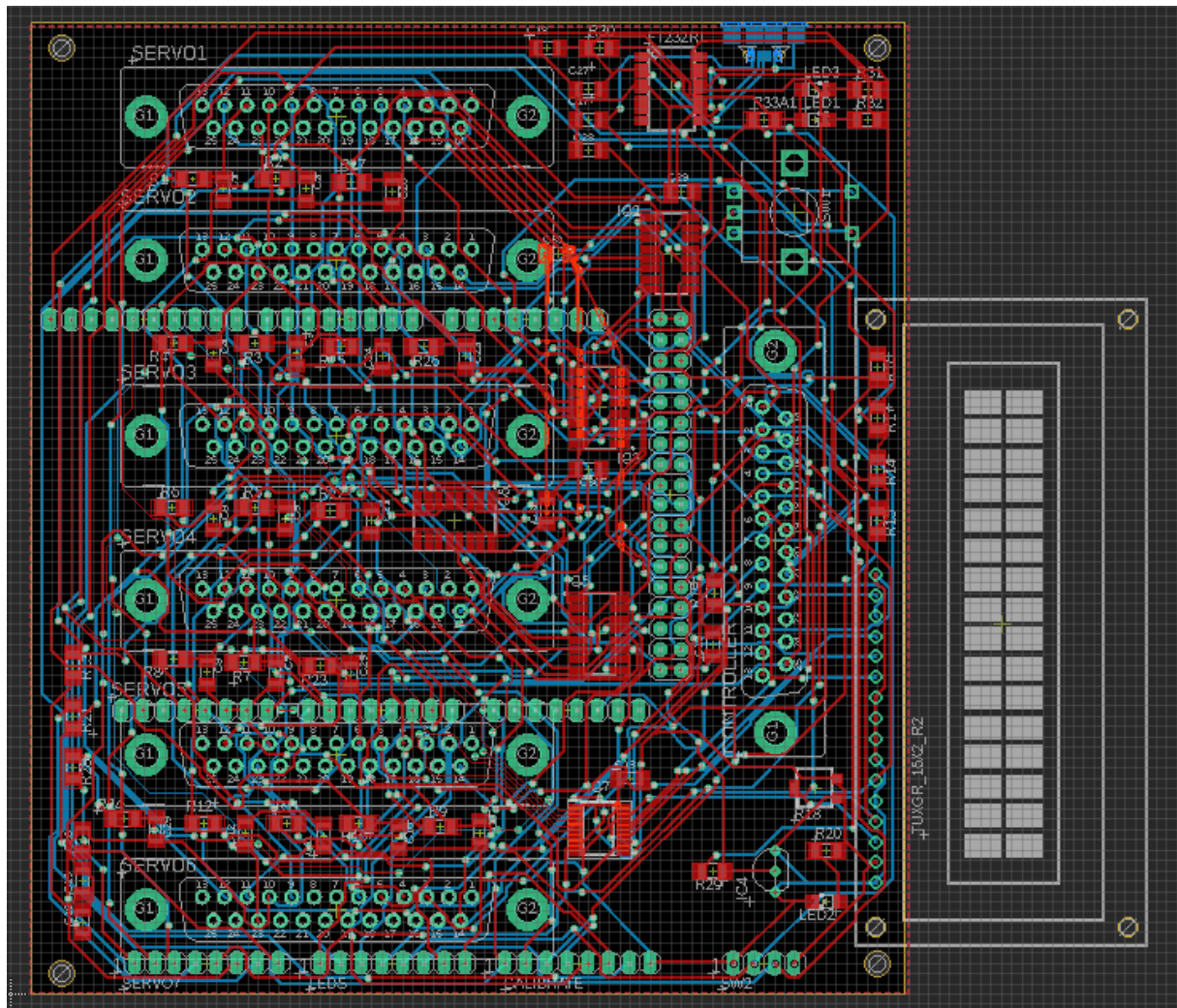
Hardware functions

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. Housing (to be printed by yourself)
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 1ms in Mover and Simtools or faster if some tool will support
21. E-stop, Force Offline buttons and switches
22. Usb power supply

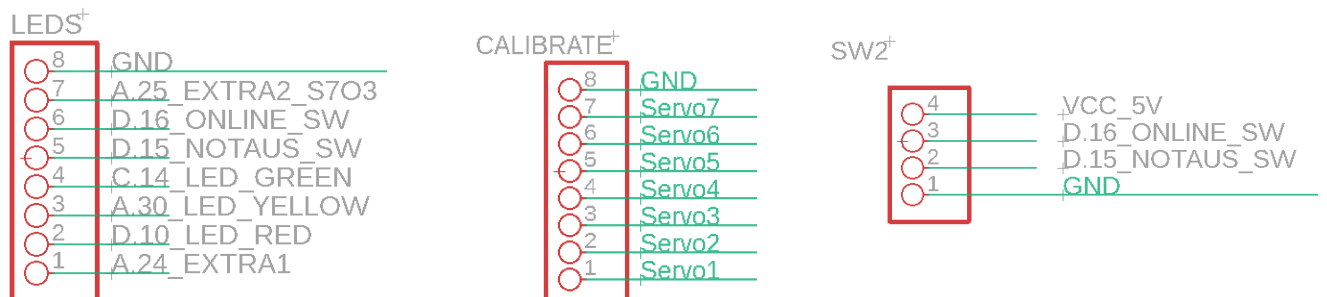
Software functions

1. Software is menu-driven and easy to use
2. All functions can be parameterized to meet your own
3. requirements. Monitoring of the status of the motors
- 4th Automatic calibration of the zero position Servomotors
5. calibration also possible via limit switches
- 6th Service function for repair or control position of the motors Manual
- 7th control of each motor individually, for testing and maintenance
- 8th Adjustable direction for Inline or Foldback placement of servomotor
9. Adjustable screw lead pitch advance per revolution freely adjustable
10. Adjustable stroke unlimited
11. Selection of belt reduction ratios or gear ratios freely adjustable
12. Rotating and linear actuators are supported
13. Scaling of 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. 2 different operating modes: direct or inverse kinematics

PCB and connectors



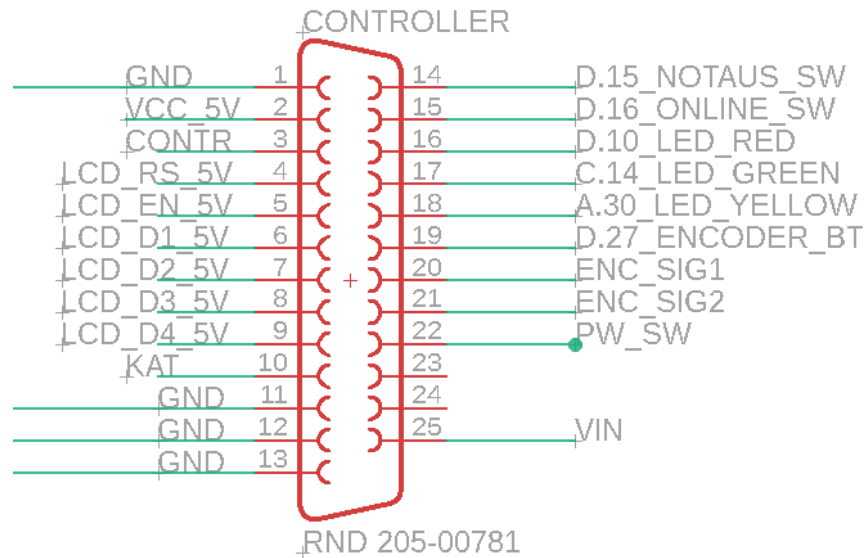
PCB layout V1.04



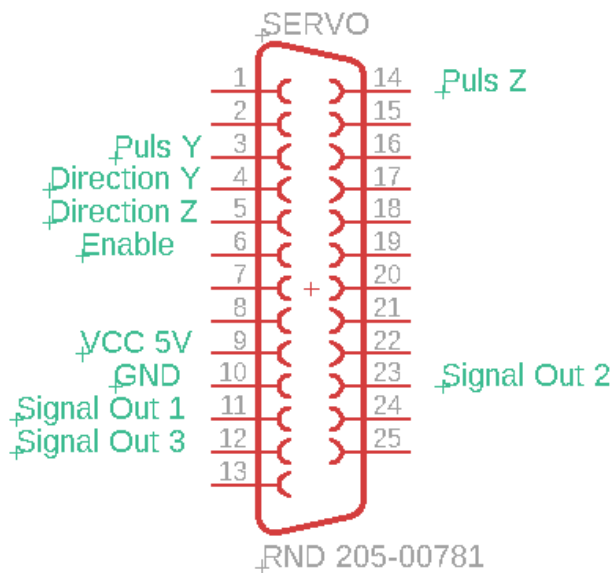
LEDs are switched with 3.3 volts without a series resistor. The calibration switches respond to contact with GND. Emergency stop is "normally closed" and online switch is "normally open". These settings can be configured in the software.

Danger:

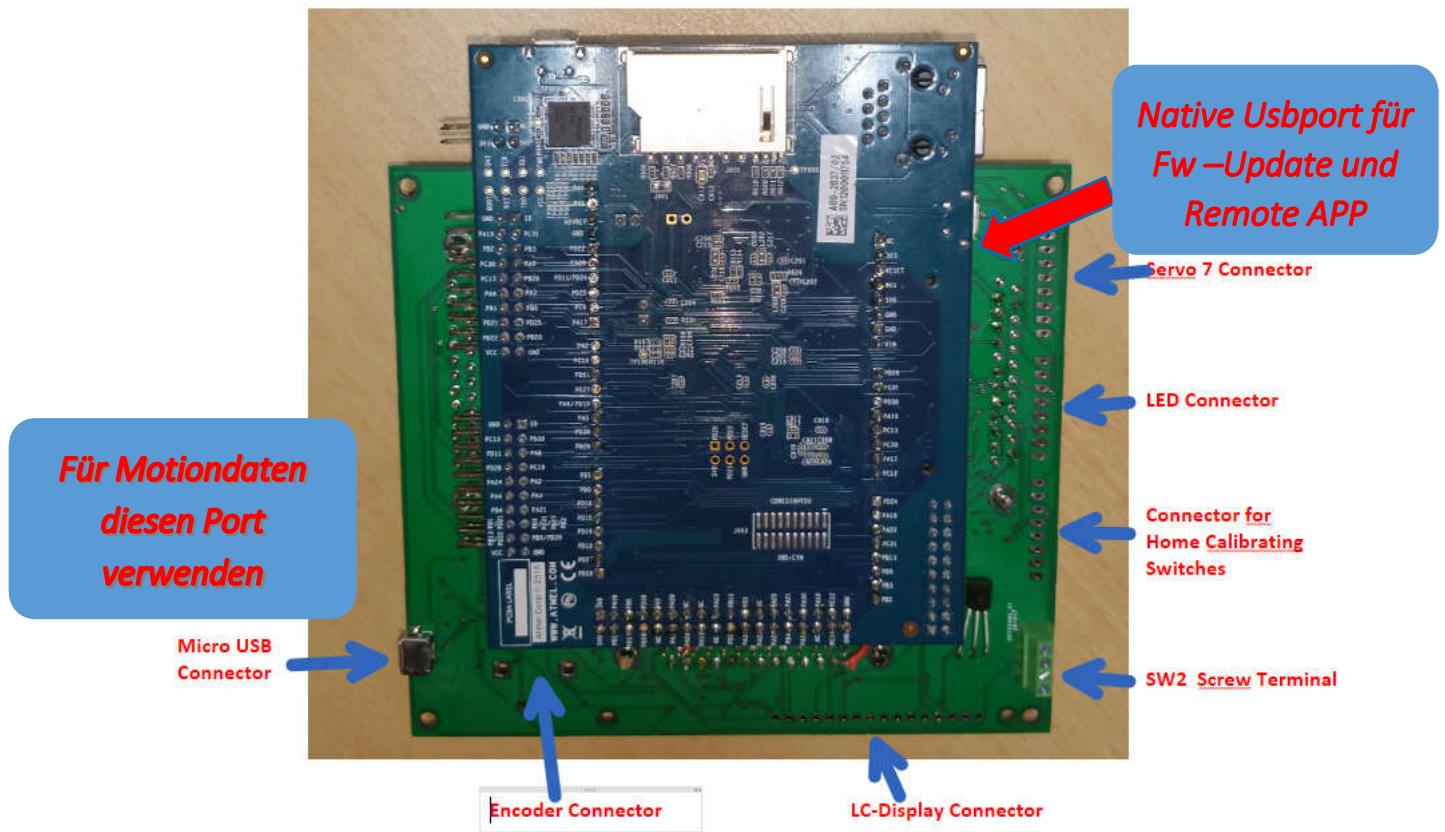
The micro USB port is sensitive to mechanical stress, please work with caution when trying it out.



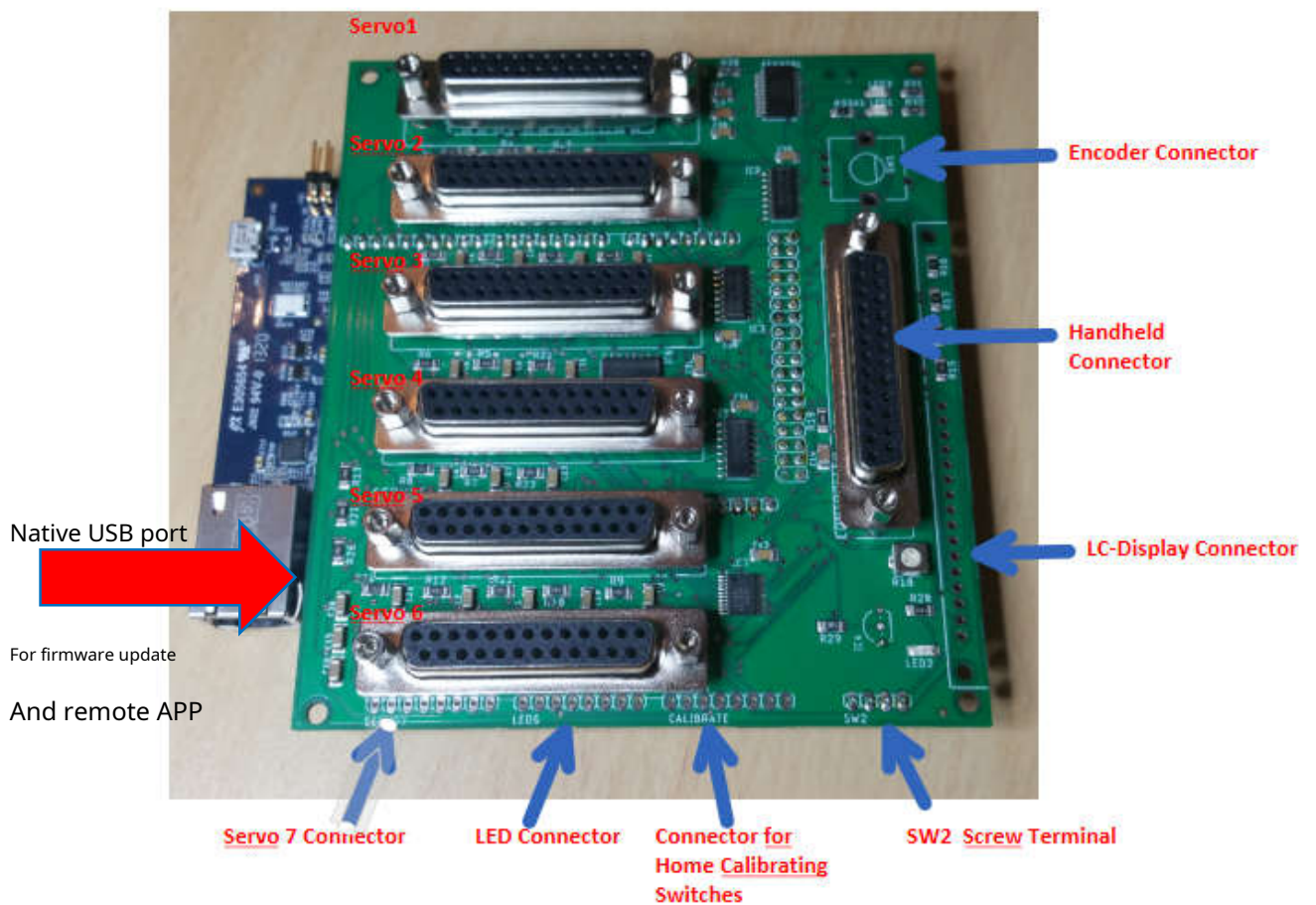
Handheld Connector



Servo connector



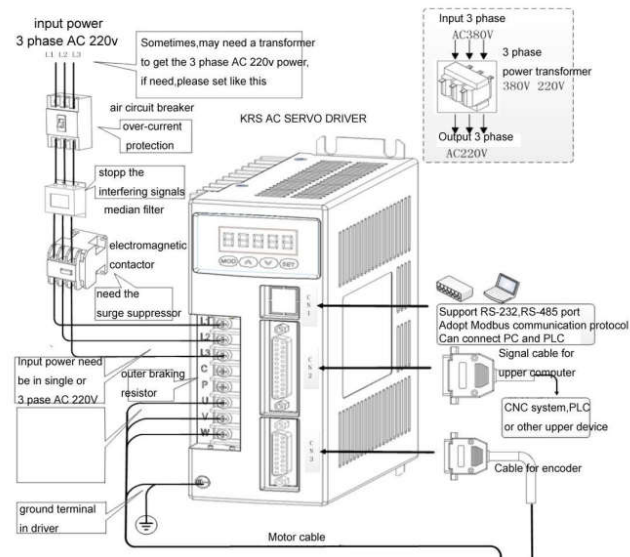
S.



Hardware cabling

Servo motor amplifier wiring

2.1.1 Servo driver wiring diagram

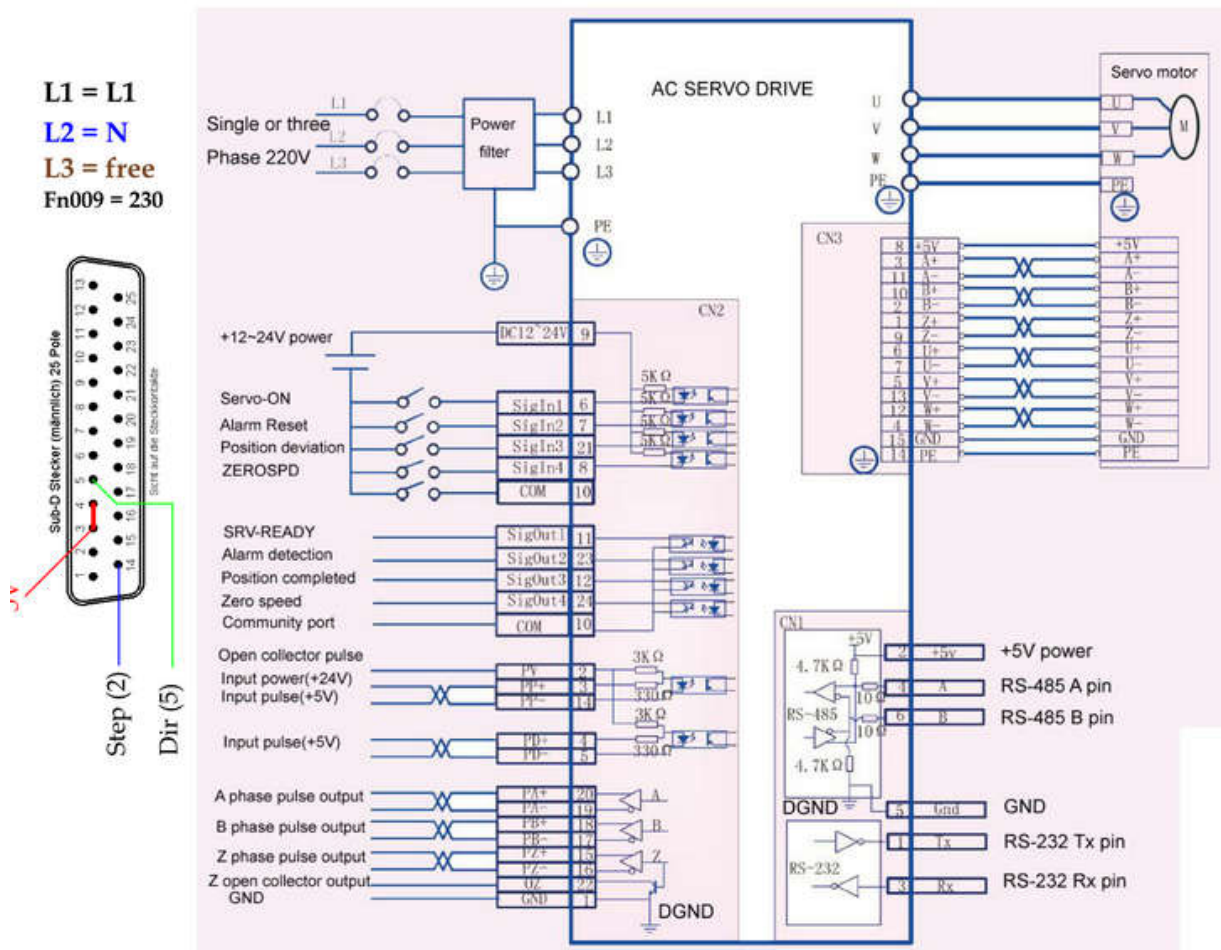


The mains voltage connections are partly different, please always consult the manufacturer's data sheet. For example, see also:

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



2.3.1 Position control wiring diagram



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) Check this value if you get errors

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

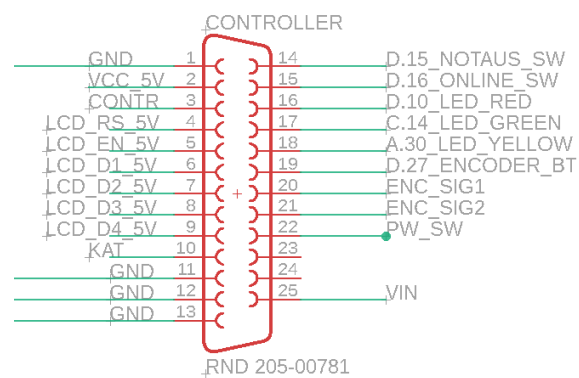
Pn60 = 2 Sigout Port 1 Servo ready

Pn61 = 6 Sigout Port 2 Servo Treach

Pn62 = 4 Sigout Port 3 Servo Preach



Handheld device



For more information see also

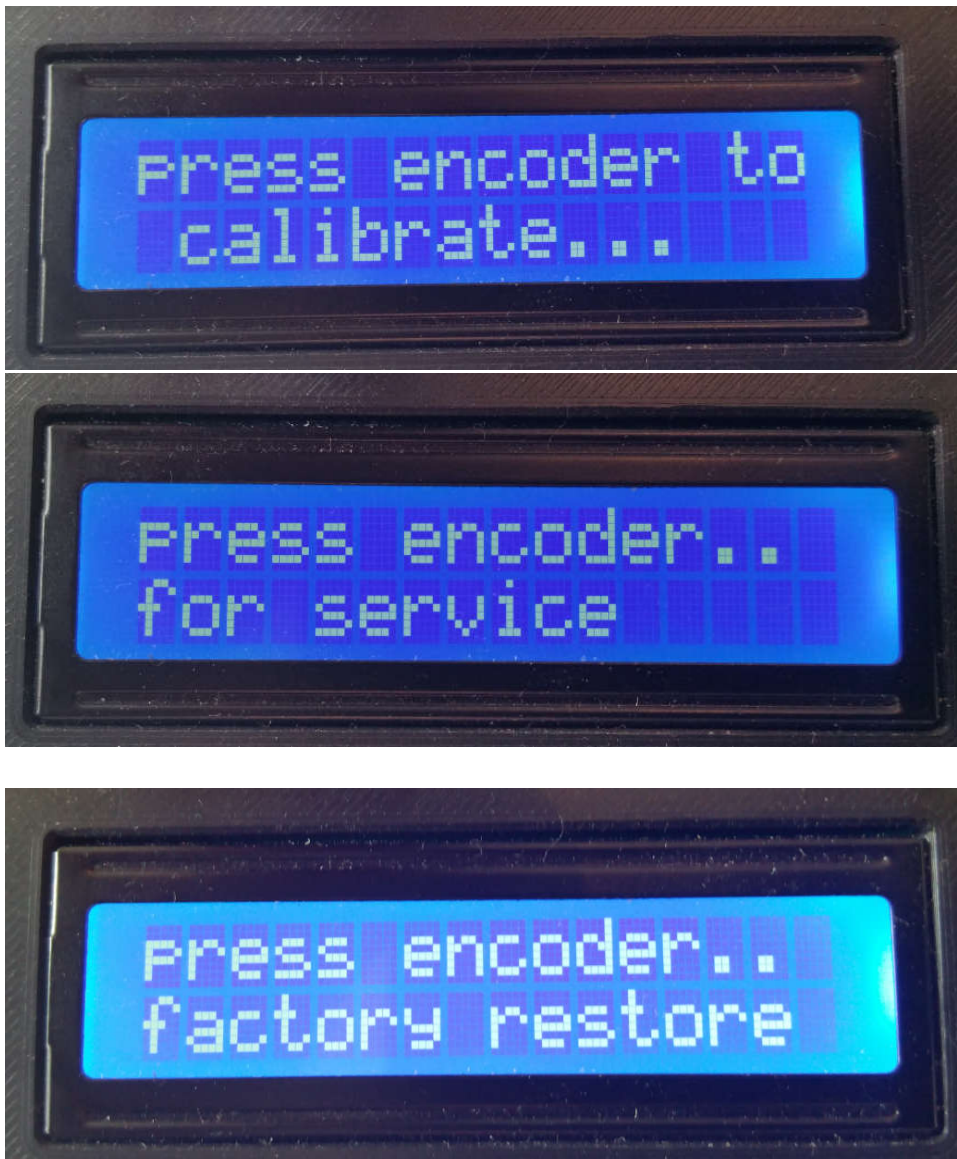
<https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs/tree/master/handheld>

and

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

Setting the controller / menu control

When you switch on the controller or supply it with USB voltage, the display is activated and loads the last settings used from the memory. It then waits for user input. When you press the encoder, the automatic calibration is started. There is also the option 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. (Fig. 3) Caution, all settings will be lost.



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.

X	is	Offline
C.	is	Calibrate
P	is	Preparing (moves to the parking position after calibration)
!	is	Employed
R.	is	Ready to use for motion data

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

to parkpos ..	moves to the parking position
preparing ..	calibrate and move to offset position
emergency ..	Emergency stop switch activated
offline..	Offline switch activated according to online status
ready ..	System fully calibrated
standby ..	Moving to the home position
wait uart ..	in home 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.

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.

$_bithalf * \text{RIG} . \text{Spikewindow} * \text{RIG} . \text{Spikewindow} * \text{RIG} . \text{Spikewindow} / 10000000;$

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.

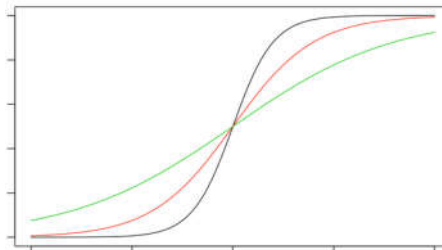
Small value Spike filter increases quickly and jerkily when triggered and also returns quickly and jerkily after the end of the spike.

Value large Spike filter increases more gently when triggered and also returns more gently to the initial filter value.

Logistic factor:

(deactivated)

Logistics filter compresses the pulses for the actuator using the factor



Larger value Steeper rise (blue) Smaller
value weaker rise (green)

With a smaller increase, the maximum also becomes logistically smaller

Back :

Closes the submenu and returns to a level above

Service menu

This menu is 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 sub-menu, 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 reached 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.

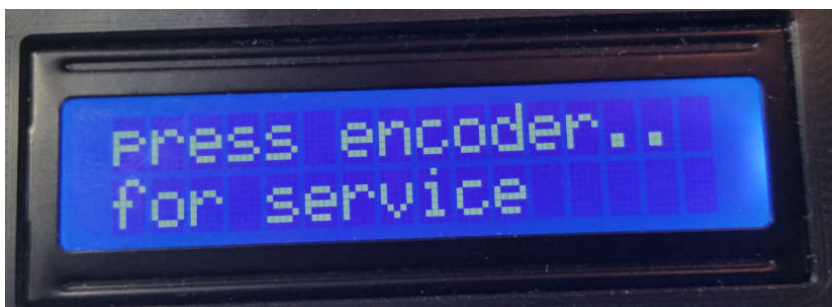


Repair - moving without calibration

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.

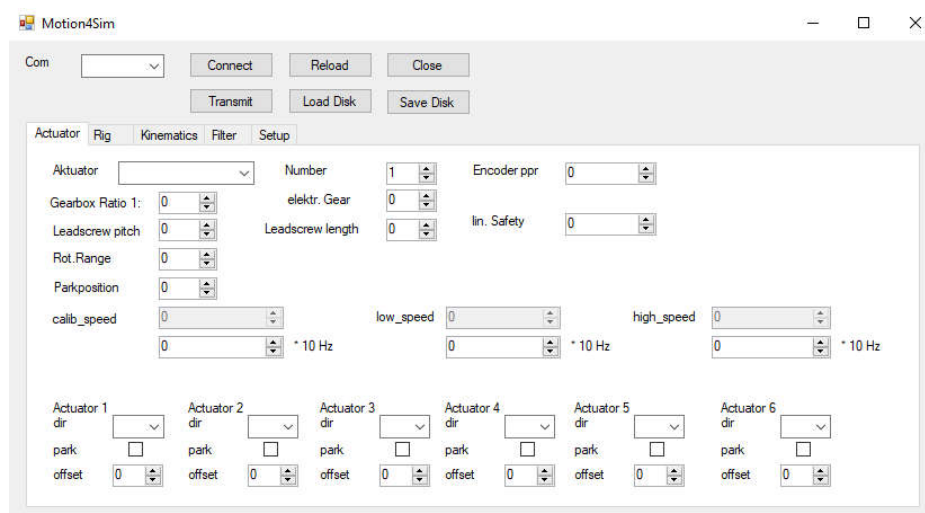
Attention after exiting the menu a calibration is carried out.

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

Actuators

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 must be the same for all actuators.
		
Gearbox ratio	:	Ratio of used gears. Only reduction possible. Pitch of the
Leadscrewpitch	:	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 180 degrees (WIP)
Lin. Act. Safety	:	Safety distance to actuator limits in mm for linear actuators. Is deducted from the actuator length on both sides.
Actuators	:	Activate by pressing the encoder button
(Submenu for actuator 1-8)		

rotation	:	Direction of rotation of the actuator, CW vs CCW
Park enable	:	if you activate this option the actuator will not be parked
Cal. Offset	:	Offset in pulses is set after calibration. And used as the lower zero point of the actuator. (rotating actuators only)
Park position	:	Offset from the lower zero point (calibration point) of the Actuator as a parking position. The total offset is calculated individually for each actuator Park position + actuator Cal. (rotating actuators only)
Calib. speed	:	Pulse speed for calibration in Hz Pulse speed for
Low speed	:	slow speed Moving from and to the home position
High speed	:	Operating speed, should be at least 250 kHz for PN98 = 2
Number actuators	:	Number of connected motors, the number is controlled, checked.
multiplier	:	The multiplier is used for values where numbers are changed in large amounts. 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



Formula rotating actuators

$$\text{MaxPulse} = \frac{\text{RIG} . \text{ppr} * \text{RIG} . \text{mechanik_GearRatio_Servo}}{\text{RIG} . \text{elektrik_GearRatio_Servo} / (360 / \text{RIG} . \text{Range factor})};$$

So for example:

AASD15A 10000 ppr Encoder

Gearbox 1:50

Range 180 °

PN98 = 2

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

$$= 125000 \text{ positions per half round}$$

resolution depends on the arm length

At 180 mm



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 position limit switch

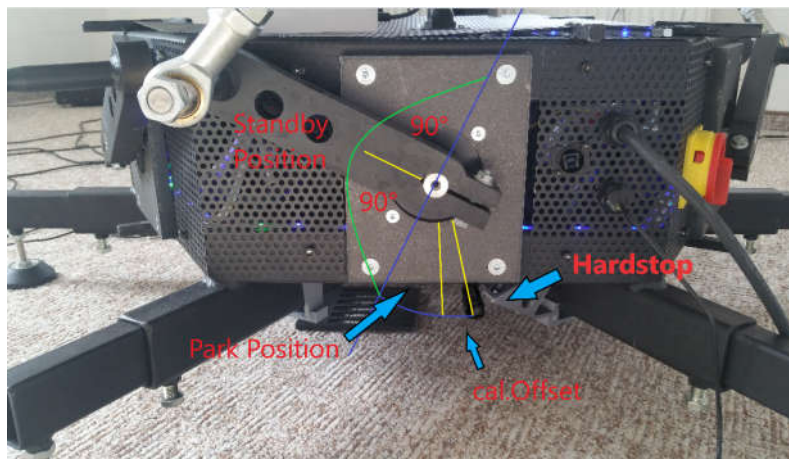
Parking position:

The parking position indicates the number of pulses that all actuators travel after calibration. This offset is used to uniformly determine the position of the parking position.

Calculation: see above 62500 pulses would be, for example, a 90 degree rotation

PS: The actuators can be calibrated with the help of the service menu. Standby position:

Is calculated from half the range in pulses.



Formula linear actuators

$$\begin{aligned} \text{MaxPos} &= \text{RIG} . \text{ppr} * \text{RIG} . \text{mechanik_GearRatio_Servo} \\ &/ \text{RIG} . \text{elektrik_GearRatio_Servo} \\ &* ((\text{RIG} . \text{leadscrew_length} - \text{RIG} . \text{lin_act_safety} * 2) \\ &/ \text{RIG} . \text{leadscrew_pitch}) \end{aligned}$$

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

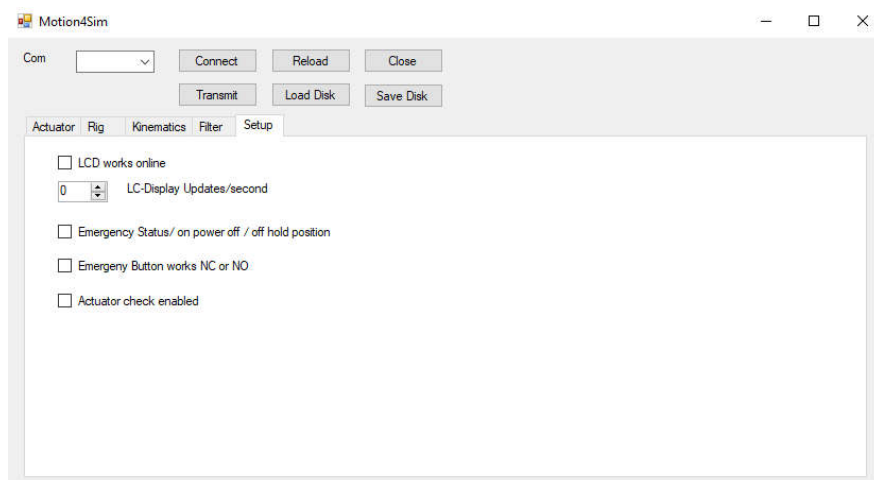


SET UP

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. Should be off for no interruptions in operation ON
Emergency Stat	:	Servos are switched off (RIG falls down) OFF Servos stop but are on.
Emergency NC	:	Normally open or normally closed (included in next
Actuator check	:	FWupdate) Checks all actuators when the servomotors are online. If a fault occurs, no more signals are sent to the motors.

It is recommended to deactivate the display in game. The movement is much smoother and softer. The reason for this is that the display needs wait states and thus disrupts the interrupts for pulsing the actuators.

Edit: Has been revised and the display imperceptibly disturbs the movement. Nevertheless, the recommendation is to only leave the display activated for settings during operation.



kinematics

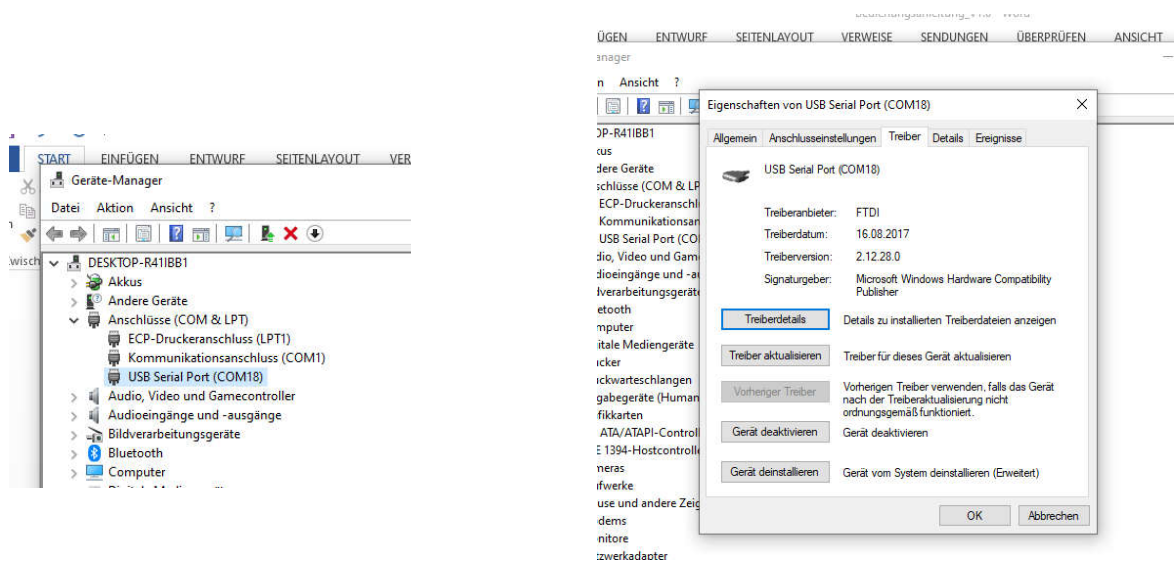
FTDI USB interface

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>

downloaded and installed.



Data transfer / interface information

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

Actuator mode

The ID is byte values 0xFF + 0xFF

Each axis is 24 bit wide.

LF + CR is required in the end (0x0A + 0x0D)

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

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

Data format

2 start bytes	<255> <255> or for inverse kinematics <253> <253> 3 bytes
24 data bytes	(24bit) per channel / actuator 8 channels
2 stop bytes	<10> <13>

DANGER:

The start bytes <255> <255> activate the direct data mode, i.e. the positions of the actuators from Simtools or Mover are transmitted directly.

OUTPUT :: SERIAL :: ID0

Connect ☐ Auto connect Ports/Directs ▶

Type of output: Binary ▼ Interval loops: 1 ▼ (2 ms)

Serial speed: 250000 ▼ Stop bits: 1 ▼ Port: ▼

Data bits: 8 ▼ Parity: None ▼ Update ports

Open devices

Start string: 0 ▼ ms

Output string: <255><255><Axis 1a><Axis 2a><Axis 3a><Axis 4a><Axis 5a><Axis 6a>000000<10><13>

Stop string: 0 ▼ ms

▲ Debug

SimTools - Game Engine DEMO

Interface 1 Interface 2 Interface 3 Interface 4 Interface 5 Interface 6

Home

Axis Assignments

Interface Settings

Output Testing

Tools

Presets ▼ Create Preset Reset Interface Type: Serial ▼

Plugin By - yobuddy

Serial Output

Save ComPort: COM3 ▼ BitsPerSec: 250000 ▼ Data Bits: 8 ▼ Parity: None ▼ Stop Bits: 1 ▼

Output - Bit Range: 24 ▼ Output - Type: ☐ Binary ☒ Decimal ☐ Hex

Startup - Output: ms HW Start

Interface - Output: k255><255><Axis 1a><Axis 2a><Axis 3a><Axis 4a><Axis 5a><Axis 6a>000000<10><13> 2 ▼ ms Output Rate

Shutdown - Output: ms HW Stop

Position 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

scaled to 24 bit

For example 400 mm • 1677725 (24bit) (Justpose or Multidirect from Mover)

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

Actuator	Original	Filtered	Cropped	Bit output	Current	Speed
Actuator 1	0.0	0.0	0.0	8,388,607	511	127
Actuator 2	0.0	0.0	0.0	8,388,607	511	127
Actuator 3	0.0	0.0	0.0	8,388,607	511	127
Actuator 4	0.0	0.0	0.0	8,388,607	511	127
Actuator 5	0.0	0.0	0.0	8,388,607	511	127
Actuator 6	0.0	0.0	0.0	8,388,607	511	127

Actuator	Park	Park bit value	Position Key	Speed Key
0	mm	8388607	< Sway >	< SwaySpeed >
0	mm	8388607	< Surge >	< SurgeSpeed >
0	mm	8388607	< Heave >	< HeaveSpeed >
0	mm	8388607	< Yaw >	< YawSpeed >
0	mm	8388607	< Roll >	< RollSpeed >
0	mm	8388607	< Pitch >	< PitchSpeed >

Advanced Position Mode

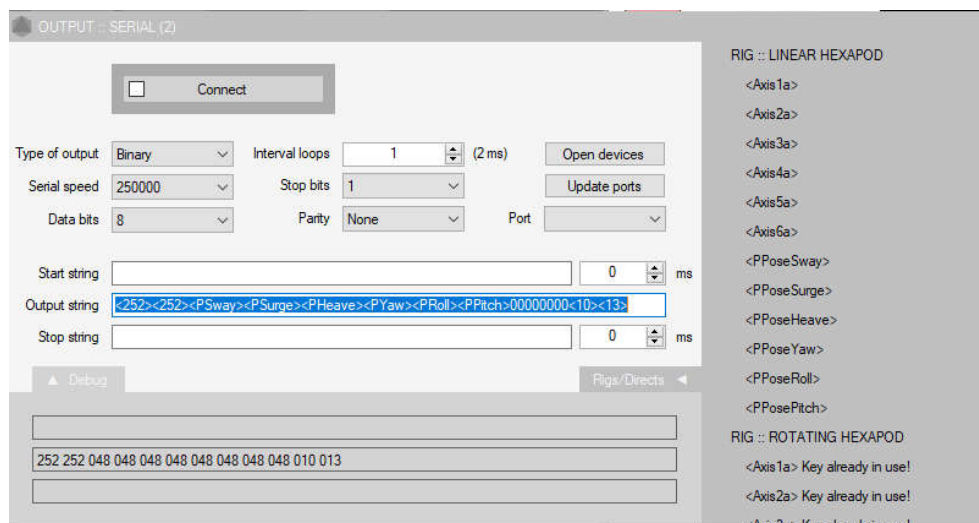
The same mode as before but floating point numbers are used here (from Mover 3.4.2). The advantage is that the values no longer have to be scaled.

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>

Settings in the kinematics menu are no longer required.



Kinematics menu

The entries here are recorded individually for each DOF

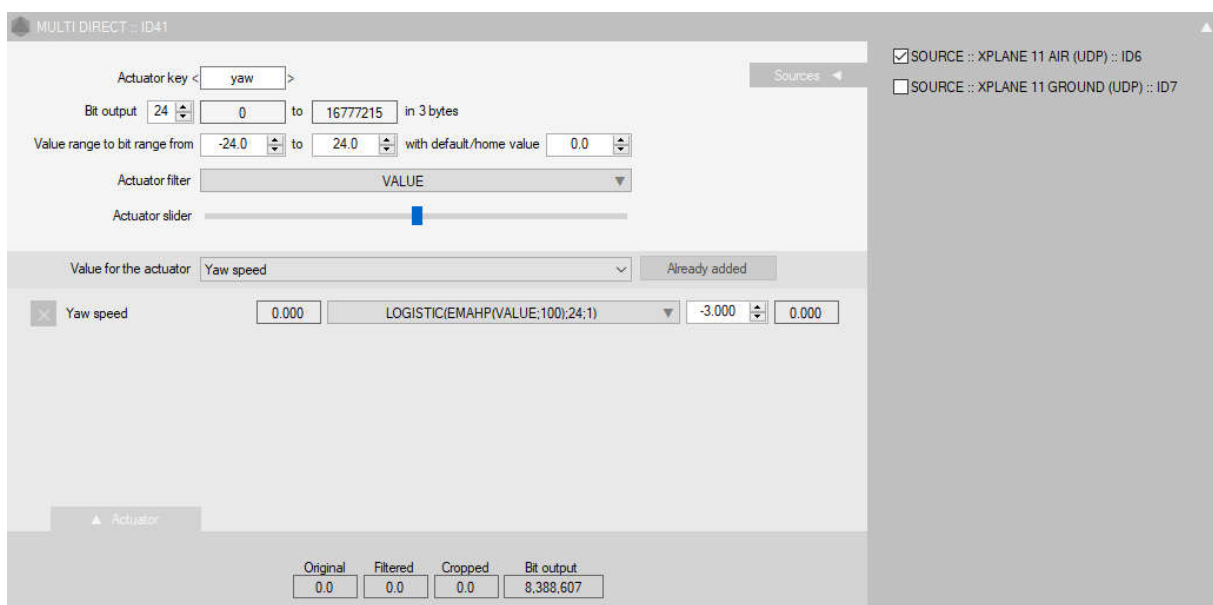
1. Surge Longitudinal Movements
2. Sway Laterold Movements
3. Heave Vertical Movements
4. Yaw Z-axis rotation angle
5. Roll X-axis rotation angle
6. Pitch Y-axis rotation angle

The following settings can be made for the input values. In addition, the output filters can and are activated if set.

1. Gain of the input signals
2. Range of values (scaling to the 24-bit input)
3. Activate the washout effect of the axis (high-pass filter)
4. Strength of the washout effect
5. Smoothing of the input values (EMALP filter)
6. Strength of smoothing
7. Activate the logistics filter
8. Factor for the logistics filter

Danger

If you use the inverse kinematics, note the setting in your Motion Cue program (Mover / Simtools etc) there, scale the value range that you receive from Xplane for Yaw to e.g. + -24 degrees to 24 bits 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.



Firmware update

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

[https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs / tree / master / firmware](https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs/tree/master/firmware)

download and install it on the controller according to the separate instructions. It's very easy. The update process is explained in the following video.

<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/user- guide](https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs/tree/master/user-guide)

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

[https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs / tree / master / bootloader](https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs/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-Motion-Simrigs / blob / master / remote_app /](https://github.com/motion4sim/AASD15A-Servo-Controller-for-Motion-Simrigs/blob/master/remote_app/)

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

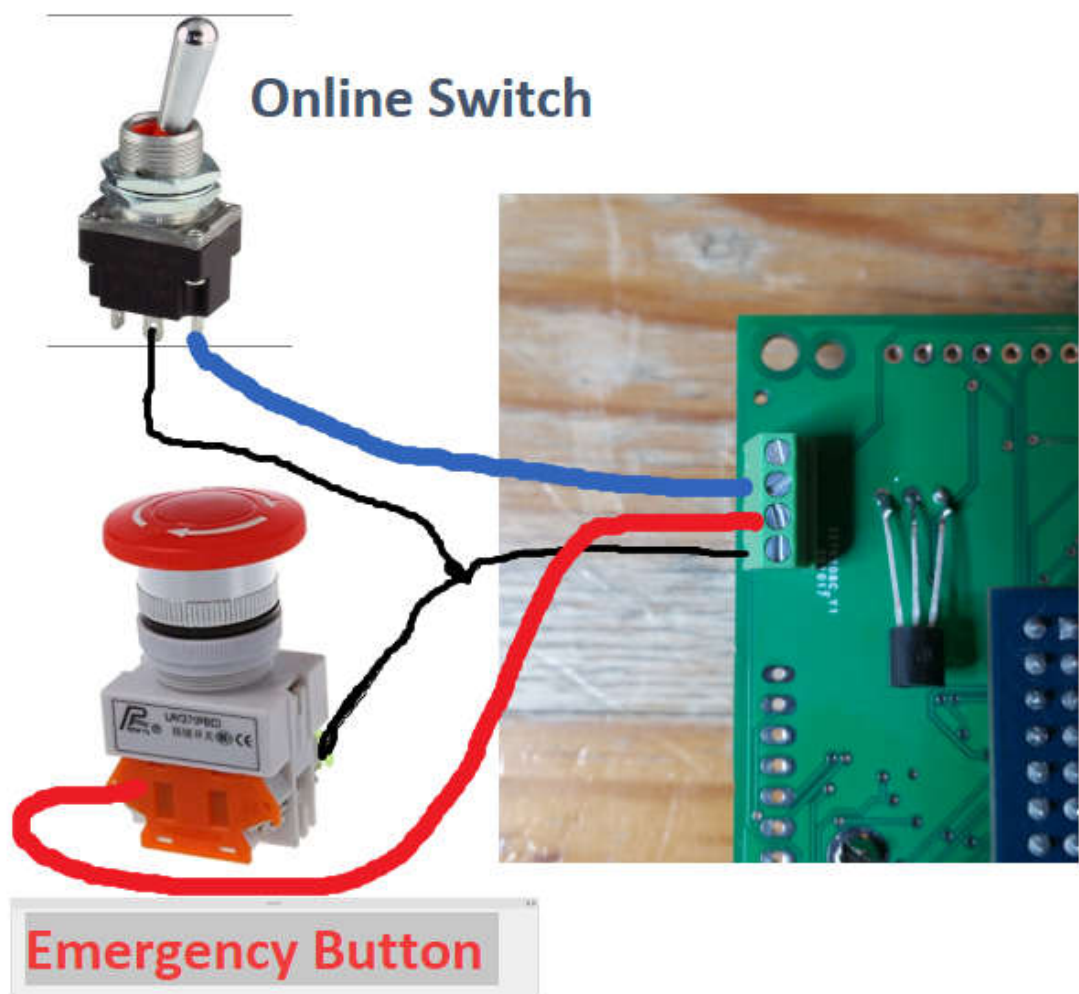
You can find instructions on how to do this later in this document.

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 will light up, green and red will flash	Moves to the home position to wait for online data Spike filter active

Wiring of the emergency stop switch and online switch



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



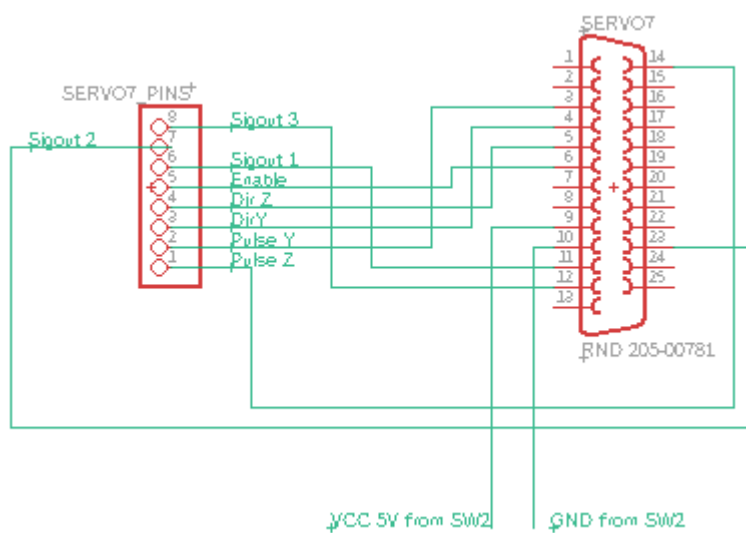
4. Turn until "press encoder .. factory restore" appears in the display. Press the encoder to do this.



5. The data has been reset.

Connection servo 7

The 7th servomotor can optionally be connected in this way.

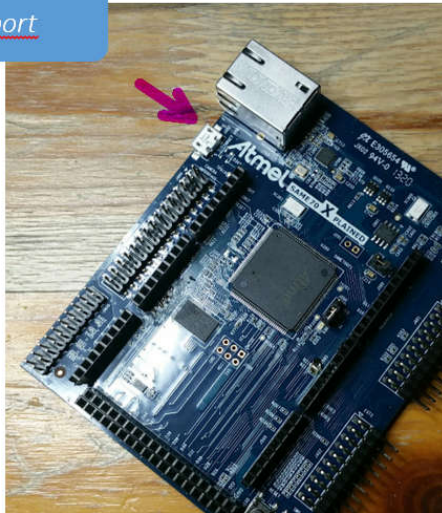


The Vcc 5V and GND must be shared by another connector (SW2 or display). In future PCB layout there will be 2 extra contacts for GND and VCC 5V

NEW - Native USB Port - FW-Flash, Remote, Motion

From FW version 1.17b, the native USB port has received additional functions

Use native
USB port



The following functions are now possible through this port.

1. As before, firmware update of the MCU
2. Access to the Eeprom as well as reading and writing of the controller variables
3. Works as a USB CDC device and also receives telemetry data for standard mode and inverse kinematics.
4. In FLYpt Mover, for example, simply set the port and set the baud rate as high as possible.

Disadvantages of motion data via this port:

The execution of the pulse engine in the controller is irregularly interrupted by the software Usbstack, which leads to micro-jerking. It is possible that this feature can be eliminated in future firmwares.

Remote 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 Github:

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

To read out the data, select the appropriate COM port and click "Connect".

Motion4Sim

Com: COM23 [Connect] [Reload] [Close] [Transmit] [Load Disk] [Save Disk]

Actuator: Rotating Actuator Number: 6 Encoder ppr: 10000

Gearbox Ratio 1: 50 elektr. Gear: 2

Leadscrew pitch: 5 Leadscrew length: 150 lin. Safety: 5

Rot. Range: 180

Parkposition: 25000

calib_speed: 25000 low_speed: 5000 high_speed: 197

200 * 10 Hz 1000 * 10 Hz 25381 * 10 Hz

Actuator 1 dir: ccw park: ☒ offset: 0

Actuator 2 dir: cw park: ☒ offset: 0

Actuator 3 dir: ccw park: ☒ offset: 0

Actuator 4 dir: cw park: ☒ offset: 0

Actuator 5 dir: ccw park: ☒ offset: 0

Actuator 6 dir: cw park: ☒ offset: 0

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

Com: COM23 [Connect] [Reload] [Close] [Transmit] [Load Disk] [Save Disk] Enter Message Hi: 194

Rig: L1: 485 mm L2: 485 mm L3: 125 mm L4: 625 mm

middle Angel: 28 ° rod/range: 500 mm crank/middle range: 180 mm

crank vert. Angles: 1: 150 ° 2: 90 ° 3: 30 ° 4: 330 ° 5: 270 ° 6: 210 °

swap direction: ☐ ☒ ☐ ☒ ☐ ☒

XY-Plane Orientation: 0 °

Center of rotation: Sway: 0 Surge: 0 Heave: 0

Yaw COR displacement: 0

Roll COR displacement: 360

Pitch COR displacement: 360

Motion4Sim

Com: COM23 Connect Reload Close Enter Message Hk 194

Transmit Load Disk Save Disk

Actuator Rig Kinematics Filter Setup

Translation

Axis 1 sway / lateral movement / rechts link bewegen
 Gain 100 ☐ Washout enabled Washout Strength 400
 Axis mapped to Range 360

Axis 2 surge / longt. movement / vor zurück bewegen
 Gain 100 ☐ Washout enabled Washout Strength 400
 Axis mapped to Range 360

Axis 3 heave / vert. movement / hoch runter bewegen
 Gain 100 ☐ Washout enabled Washout Strength 400
 Axis mapped to Range 360

Rotation

Axis 4 yaw / drehen
 Gain 100 ☐ Washout enabled Washout Strength 400
 Axis mapped to Range 60

Axis 5 roll / kippen rechts link
 Gain 100 ☐ Washout enabled Washout Strength 400
 Axis mapped to Range 60

Axis 6 pitch / kippen vor zurück
 Gain 100 ☐ Washout enabled Washout Strength 400
 Axis mapped to Range 60

Motion4Sim

Com: COM23 Connect Reload Close Enter Message Hk 194

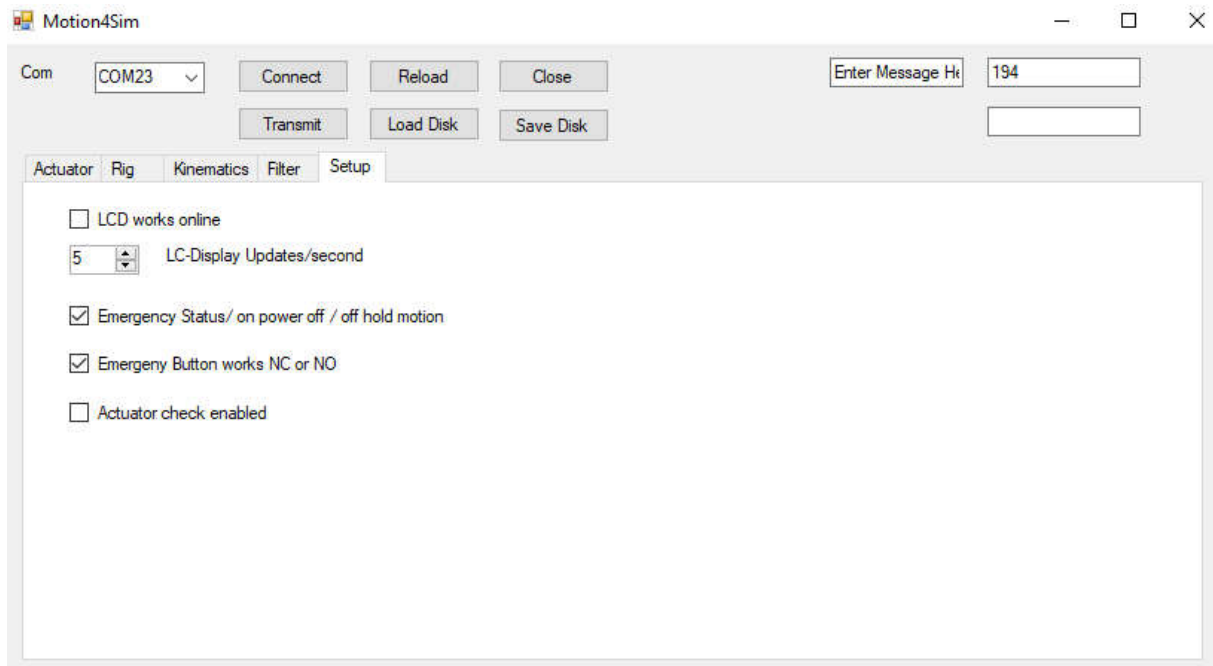
Transmit Load Disk Save Disk

Actuator Rig Kinematics Filter Setup

☒ Filter enabled

Filter Type: Emalp + Spike Lowpass Samples: 50

Spike Window: 25 Spike Filter Strength: 25 Spike smoothing: 35



Attention, the APP is WIP and still contains a number of errors. In addition, no plausibility check is carried out for the values entered.

Have fun

Motion4SIM

Braunsdorf April 8, 21

Update follows.