

SIMTOOLS

QUICK START MANUAL 1.32

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A LITTLE ABOUT SIMTOOLS...

SimTools was designed to be a simple set of tools that work together to get motion simulators up and running as fast as possible while still giving the user all of the customizations and flexibility they may be used too.

One really cool thing SimTools will allow you to do is "Live Tuning of Profiles"! Create a profile for a game and then tune the profile perfect while playing your game!
You don't have to stop the game to make changes to the profile!

A LITTLE ABOUT THIS GUIDE...

Just follow this step-by-step guide from 1 to 11 and you will make move your simulator accordingly to your game with a first basic functional setup ! Enjoy !

1- REQUIREMENTS

a) Mandatory :

- Windows XP, Windows 7, Windows 8
- Microsoft .NET 4

b) Optional :

- A second computer connected by LAN to your Game computer makes fine tuning very comfortable.

2- INSTALLATION TO DO LIST

You are invited to follow all this steps consecutively :

1- **WARNING :** Microsoft Dot Net 4.0 is mandatory.

So it is required that you start by installing it now.

<http://www.microsoft.com/en-us/download/details.aspx?id=17851>

2- Make sure your Windows screen text is set to 100%. (Instructions [here](#))

3- Install SimTools :

- download the latest version <http://www.x-simulator.de/forum/download/file.php?id=9297>

- Extract and run **[SimTools - Beta v3.0.exe](#)**

Typical installation directory is "*C:\Program Files (x86)\SimTools*".

- Select *Full Installation* if you run only one PC. (If you have a dual-PC setup, you have to run the installation program on both PCs individually. In that case select *GameManager installation* on the PC that runs the game; select *GameEngine installation* on the PC, where the controllers are connected to.)

- I suggest you unselect *Launch GameEngine* and *Launch GameManager* at this point in time prior to clicking *Finish* on the last screen of the installation routine.

You will get now 3 executables : Game Engine, Game Manager, Game PluginUpdater.

- 4- Download the Plugins related to your favorites Games : <http://www.x-simulator.de/forum/download/file.php?id=9297>

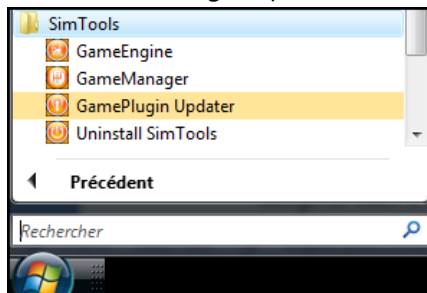
Do not unzip the plugin files ! They are used as it.

- 5- As "Life For Speed" is pre-setted in SimTools, you can download the demo version of Life For Speed here : <http://www.lfs.net/?page=downloads>

- 6- Your game must have been ran at least once.

3- PLUGIN IMPORT

- Check in the Tray that Game Engine and Game Manager are not running.
- Run the GamePlugin Updater.



This program can be found as well in the SimTools directory (most probably C:\Program Files (x86)\SimTools\ SimTools_PluginUpdate.exe)

- Drag&drop the plugin-zip file to the PluginUpdater. There will be a confirmation, if the plugin installed correctly.

Once the import is successful, the profile will be available within the Game Engine and Game Manager.

- Close SimTools GamePlugin Updater.

4- PATCHING THE GAME

- Run *GameManager* and *GameEngine* by right clicking on the icons and selecting "*Run as Administrator*".

- If the GamaManager window doesn't open automatically, double-click on the tray icon for the GameManager to open the GameManager window.
- Select the game you want to play from the *Game Selection* drop-down list.
- Press "Patching" to first patch the racing program. Follow the instructions of the individual plugin and then press *Patch Game*.
- There should be a confirmation message when the game is patched correctly ("Patch Installed!").



5- SETTING UP SIMULATOR AXIS

a) Definitions

Your simulator is powered by several actuators. Consider that each actuator is seen by SimTools as an Axis.

SimTools can extract up to 6 telemetry data ("DOF1" to "DOF6") from the games and can handle up to 6 actuators ("Axis1" to "Axis 6").

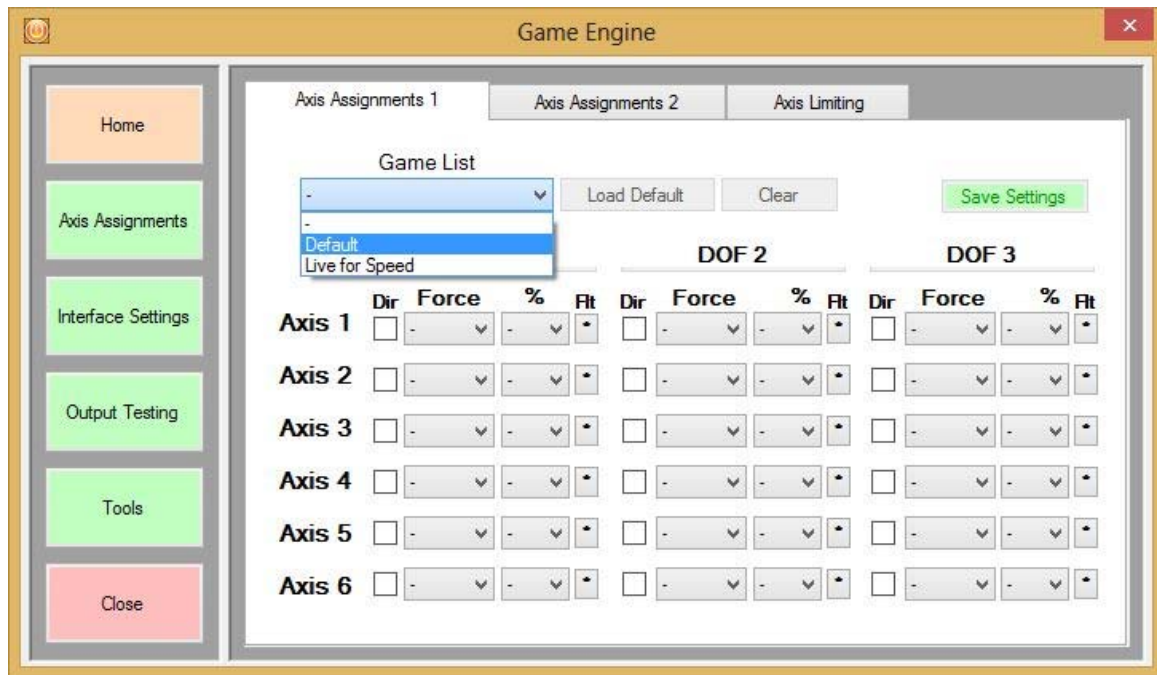
This step in the tutorial will let you indicate to SimTools the data mixing to operate before sending instructions to your simulator's interface along to your simulator configuration.

Some standard configuration are presetted : e.g "SimForce GT" is a seat mover with two motors connected to the back of your seat.

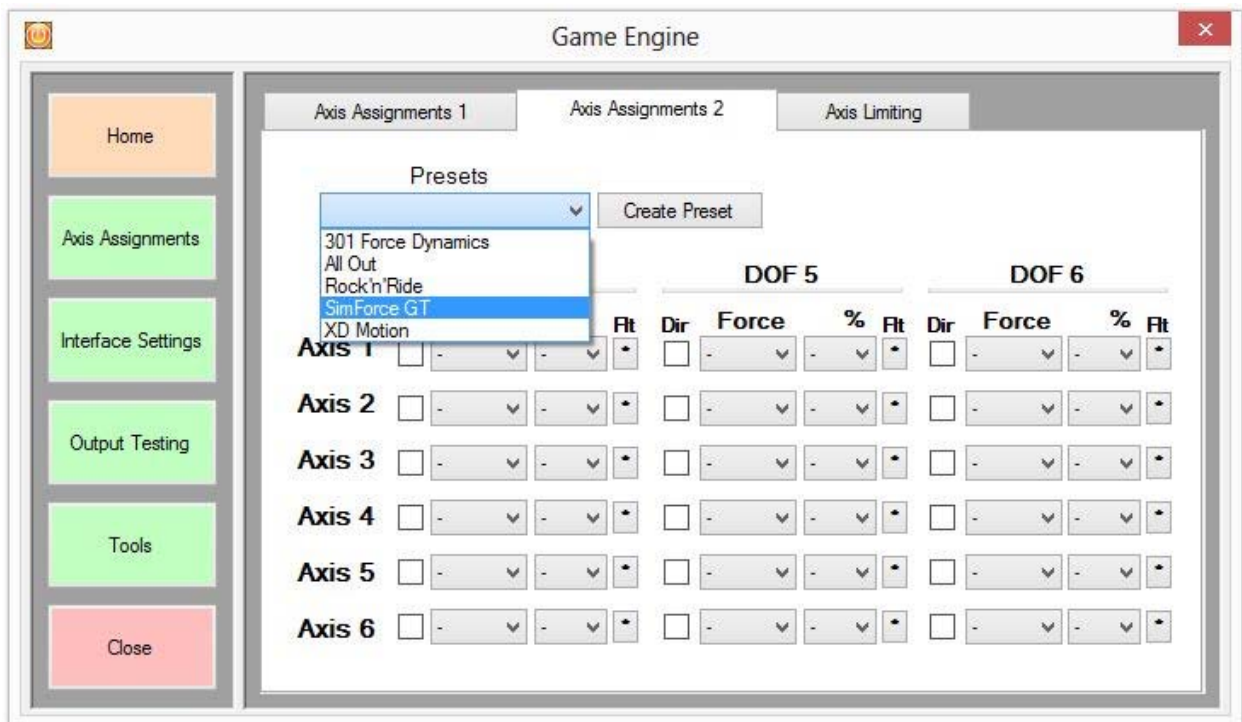
b) Setting up the "Default" axis assignments

Fisrt step, you have to define the "Default" settings.

- Right-click on the GameEngine tray icon
- Click on *Axis Assignments* button
- Under *Game List* drop-down (*Axis Assignment 1*) select *Default*

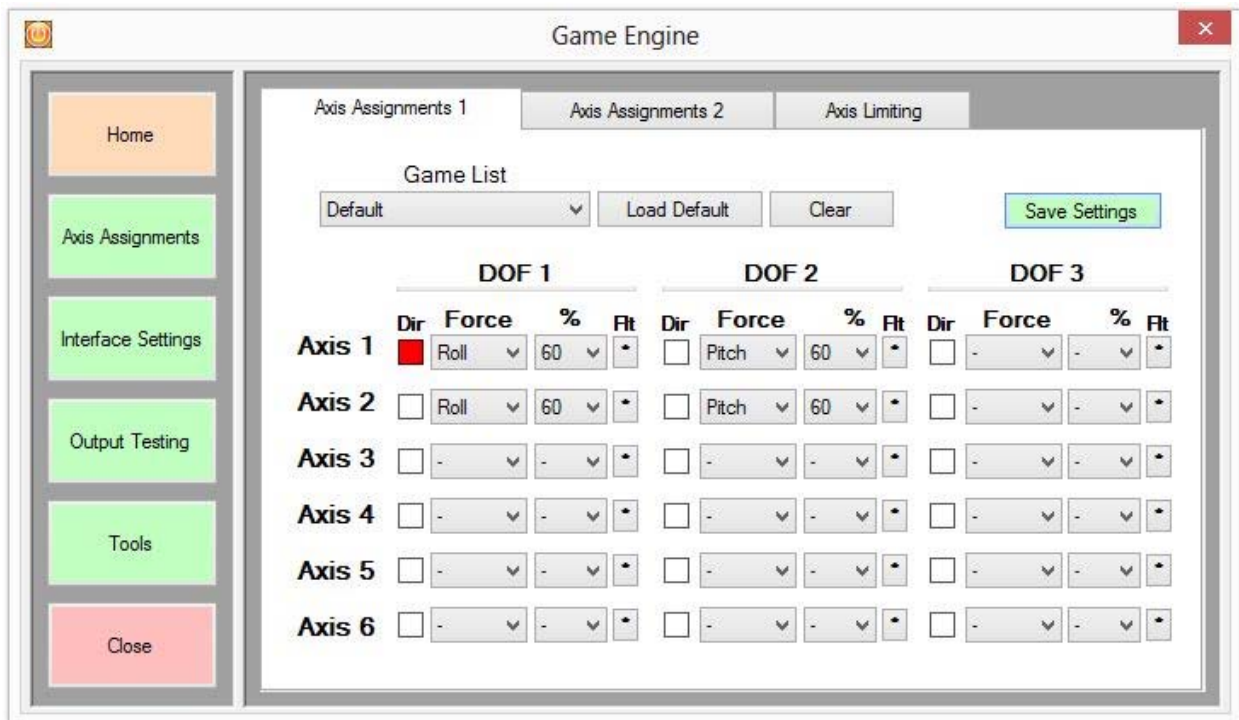


- Click on the *Axis Assignments* second tab
- Select a preset from the Presets drop-down list for your simulator.



The tab automatically switches back to *Axis Assignments Tab 1*

- Select *Default* from the *Game List* and click on *Save Settings*



Click *Save Settings*

This is a first very basic setup : you just apply the Roll and Pitch to your sim.

With more experience you can also add (for example) some % of *Surge* (to simulate acceleration and braking) or *Heave* for road bumpiness.

c) Warning

Be sure to setup your "Default" Axis Assignments profile :

- 1- When using Output Testing, the Axis Assignments Profile that is used is the "Default" profile. If you have not setup this profile, you will not get any output.
- 2- The "Default" profile is also copied for each new game installed as a starting place for the Axis Assignments for the new game.

Remember :

Axis 1 to 6 are the motors of your simulator

DOF 1 to 6 are the game data extracted by the plugin

6- COMMUNICATION WITH THE SIMULATOR

- SimTools supports up to 6 different interfaces. They are selectable in the 6 tabs *Interface 1 - Interface 6*.

a) How many interface do you need to setup in SimTools ?

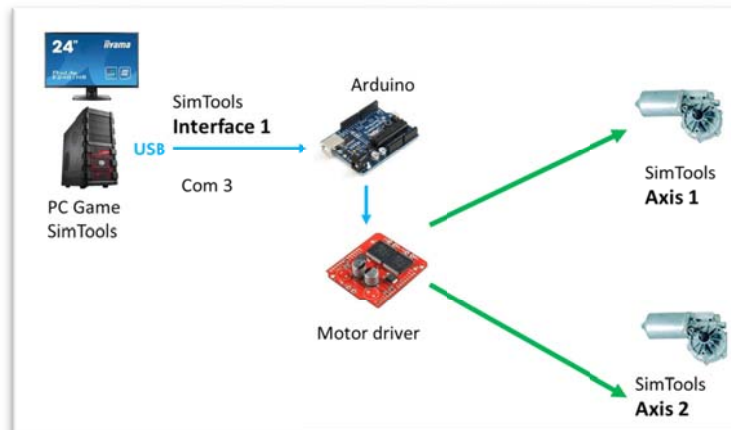
In the case of a 2 DOF "SimForce GT", you need

- only 1 interface to be setup if you use an arduino board that drives the 2 actuators.

Arduino is on windows COM3

SimTools "Interface 1" will sent to COM3 the information of Axis1 and of Axis2 concatenated.

Arduino will dispatch the data sending Axis 1 orders to Actuator 1 and Axis2 orders to



Actuator2.

- or 2 interfaces if you use 2 Jrk12v12 boards. And each JRK drives its own actuator.

JRK1 is on windows COM4

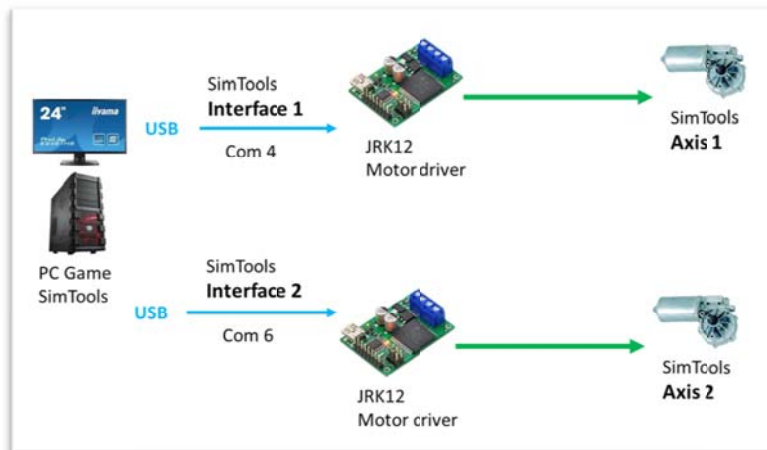
SimTools "Interface 1" will sent to COM4 the information of Axis1.

JRK1 will send Axis 1 orders to Actuator 1.

JRK2 is on windows COM6

SimTools "Interface 2" will sent to COM6 the information of Axis2.

JRK2 will send Axis2 orders to Actuator2.

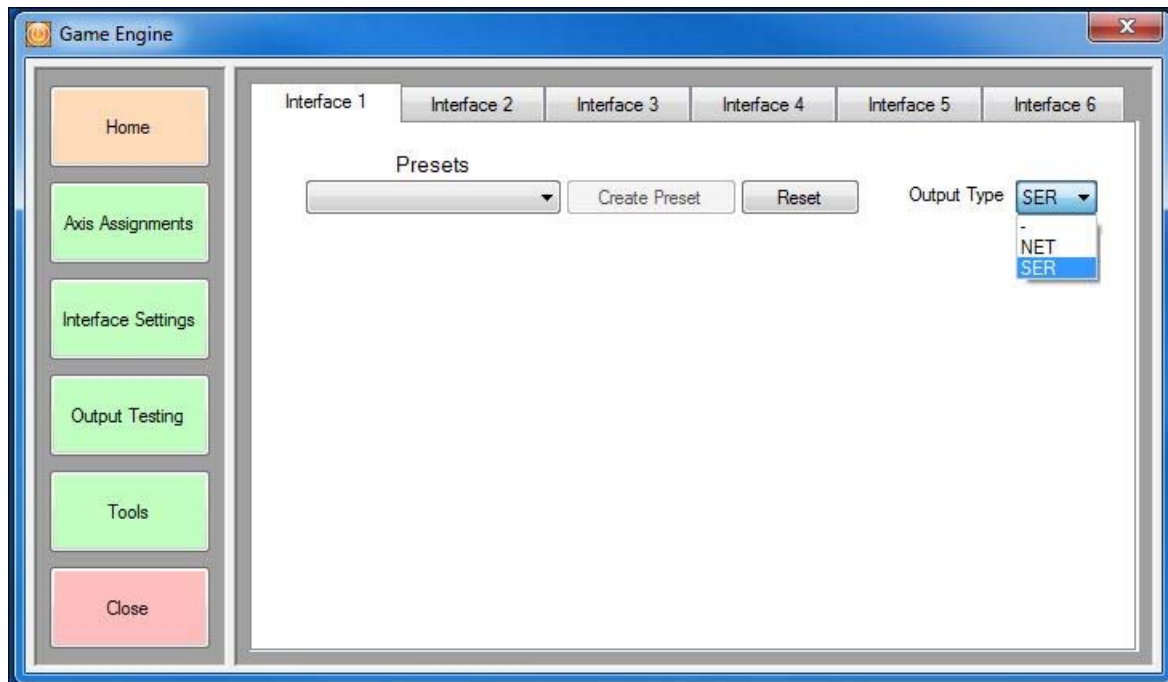


b) Type of interfaces (SER / NET)

Basically, you will use "USB Serial interface" to drive your Arduino or JRKs.

NET interface is used for LAN connected interface. It's not described in this Quick Starting Guide.

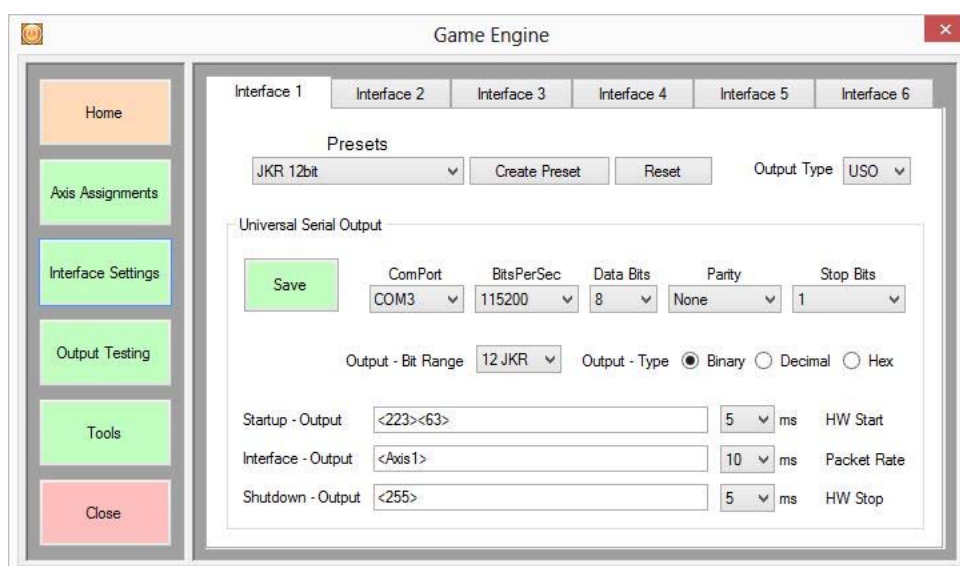
Now click on the *Interface Settings* button.



- Select *Interface 1* to setup your first interface.
- Select the *Output Type* – typically "SER"

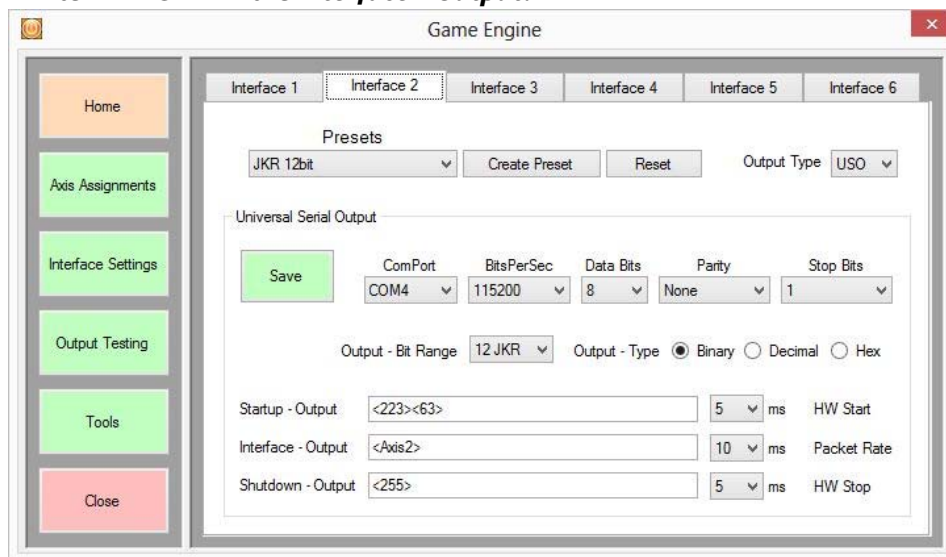
c) JRK example

- If you are using JRK's select *JRK 12bit* from the *Presets* drop-down list. Otherwise select the correct ComPort settings as provided by your controller manual.
- Select the ComPort your controller is connected to.



- Click on Save
- Select *Interface 2nd* tab

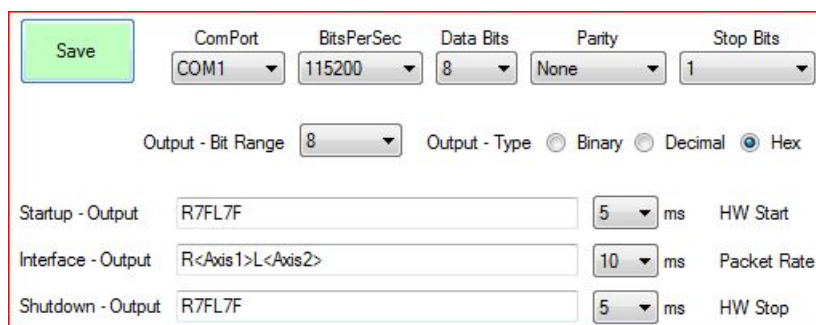
- Again, select *SER* and the correct ComPort settings as before with *Interface 1*
- Enter **<Axis2>** in the **Interface - Output!**



Click **Save**

d) ARDUINO example

Interface 1 only :



7- MOVING YOUR SIMULATOR (WITH YOUR MOUSE)

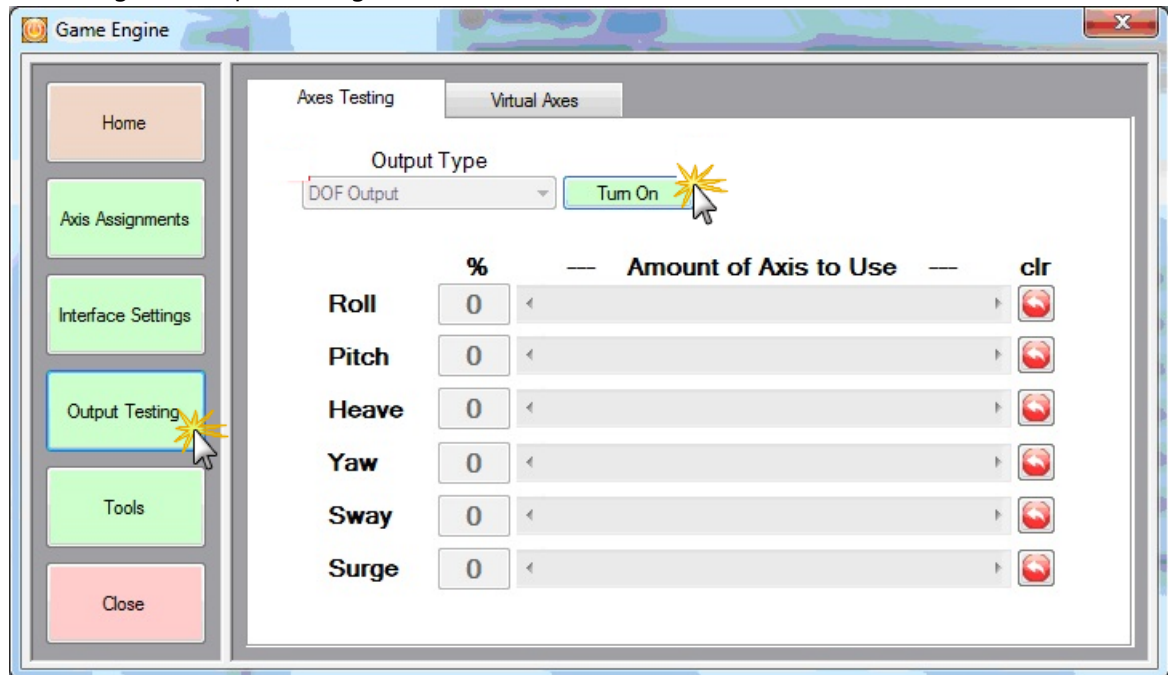
Let's move your simulator without a game input but simply with your mouse !

Its is recommended to first test manually your simulator before testing any game output.

- 1) Plug your serial connection between your computer and your simulator.

For example, a USB cable between your computer and your arduino/JRK

2) Game Engine / Output Testing



Click on Turn on
Select Axis Output

Now, choose an Axis and slide gently the slider with your mouse !
As an Axis corresponds to an actuator, you will see the selected actuator moving !
Axis limitation is not active for this testing purpose.

The smoothness depends on the refresh rate (try below 10 ms).

8- CHECKING THE DIRECTION OF MOVEMENTS

Now we need to test that the simulator behaves correctly : if the game plugin sends "tilt left", the simulator has to tilt left and not right !!

You can invert the motor wiring ... or invert the DOF in the "Axis Assignments" ☺.

With the slider, we will manually make sure that it is rolling and pitching in the right directions.

For this example we find

Roll : 100% - Tilts Left
Roll : - 100% - Tilts Right
Pitch : 100% - Tilts Forwards
Pitch : - 100% - Tilts Backwards

We have to follow the coordinate system that is in place in the Sim Tools Plugin API reference – see [APPENDIX 1](#).

We know from that in Virtual Axis when it Tilts Left - Roll is all the way Left
 Tilts Right - Roll is all the way Right
 Tilts Forward - Pitch is all the way Left
 Tilts Backwards - Pitch is all the way Right

Virtual Axis can be found next to the "Axis Testing" tab and needs to be turned on by pressing "Turn On"

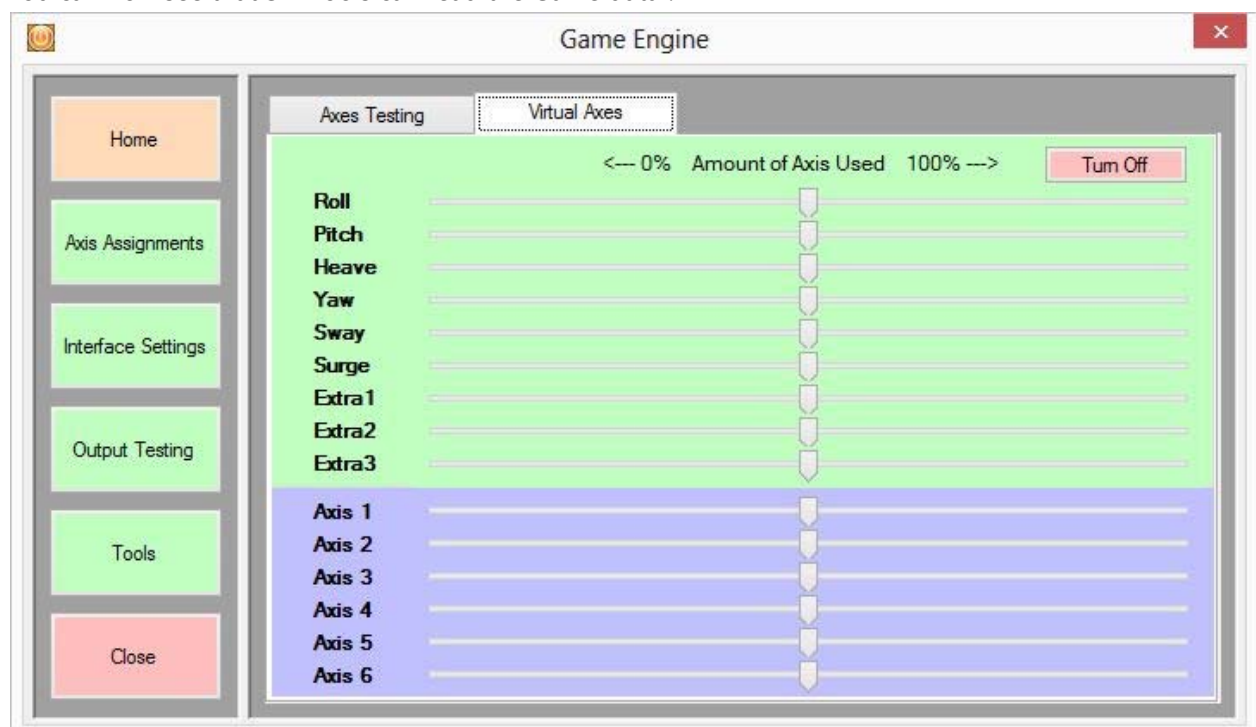
So to be correct to the coord's we need to invert the Roll and invert the Pitch or our games will not produce the right directions of movement.

Once we have this all set up including Heave , Sway and Surge we can then go on and patch a game and begin to test the motion and fine tune it to your Sim.

9- VISUALISING GAME'S DATA EXTRACTION

- Click on *Output Testing*.
 - **Don't connect the motors yet.**
 - Click on *Virtual Axes* and on *Turn on*.
 - Run the game.
- If everything is set-up correctly the sliders should be moving.

You can now see that SimTools can read the Game data !



Nota : If you only want to test the slider movements and don't have 6 ComPorts, just write
 <Axis1> <Axis2> <Axis3> <Axis4> <Axis5> <Axis6> into the *Interface - Output* line.

10- STARTING YOUR SIMULATOR

a) **Security** approach

First step, the Security approach : in order to preserve your hardware, begin the test by lowering the range and the intensity

- Via the GameEngine / Axis Assignments / Axis Limiting : reduced to 50%
- Via the GameManager, open the "Profile Editor" window
in the Game tab / Main settings : put the Main Level to 20% to preserve your actuators

b) **Second step, starting the sequence :**

Launch Game Engine

Launch Game Manager, select the Game Profile in the drop down menu

Launch the game, start a race ! and the playseat comes to life...

c) **Increase the levels :**

Last step, increase the levels until simulator's movements are satisfactory.

11- CONCLUSION

Congratulations, you have now completed the Quick Start Manual!

APPENDIX 1 - FINE TUNING

a) Generality

The GREAT point, is the opportunity to change the setting parameters in live.

If you have 2 computers, you can adjust **in live** the next parameters located in the Game Manager :

- Main level
- DOF Levels

b) Adjusting : Eaorobbie

Ok 2 ways of adjusting Pitch.

First in the Game Engine, Axis Assignments select the DOF for pitch and increase the % of Axis used.

Second if you find the Max Min Settings in the Tuning centre in a particular game is not too your liking it can also be changed there, by press capture to enter a Min Max setting manually , lower the value quicker the force reaches 100% of its axis. Bigger the less axis it will use.

Ok now for Rfactor I have not done a profile of such yet, just a quick test to look at directions of forces.

Be aware pitch now is the actual car angle in world terms represented by an angle. So lower the Min Max the sooner the sim reaches the % of axis you have set in the axis assignment.

So a balance can be found.

Now this is how I would deal with setting my pitch.

- 1. In Axis Assignments - Set all DOF to 0% if selected.*
- 2. In Axis Assignments - Set Pitch to 60%.*
- 3. Test in Output setting to see how far the max and min pitch will reach.*

Adjust in Axis Assignments till happy, beware don't use 100% of your axis travel, about 50-60%

you need the rest of the travel to factor in other force movements.

Once happy we can then test in game.

Once game is running, test by driving around a track to feel the reaction of the pitch movement knowing how far you max angle is you can gauge whether the values in the tuning centre of Game Engine suit what you want.

Pitch can be fairly placid until you hit a big bump, climb a steep hill, or roll over (Oh No). Try and test most situations before adjusting. If not reacting enough, not giving enough feel for the changes of pitch in the ground elevation, adjust your Max Min for pitch in the tuning centre down by 3 - 5 and continue to test, if too great of movements adjust the value up by 3 - 5.

This takes time after you have done a couple it becomes a lot faster.

This is a process I follow when building a base profile for a game.

Ok don't forget there is two more forces that effect the pitch of your simulator and need to be include in your Axis Assignment all to adjust pitch of the sim correctly.

Surge (Longitudinal) and Heave (Vertical). You need to do the above for theses two then mix all three together to find a nice in total pitch movement for your sim.

c) Adjusting : Value1

The pitch and roll sliders should not be 0 or 1 (so to speak) but move through the full range. You might have to increase the values for pitch and roll in the Tuning Centre

The screenshot shows the 'Game Engine Tuning Center' window. It has two main sections: 'Game Data - Input' and 'Game Limits - Max/Min'.

Game Data - Input

Roll	Pitch	Heave	Yaw	Sway	Surge	Extra1	Extra2	Extra3
-0.1088254426	1.88409689425	-4.1804441107	-89.305987284	0.00014231419	-6.7513126217	0	0	0

Game Limits - Max/Min

Max/Min balance -- ☒ Roll ☒ Pitch ☒ Heave ☒ Yaw ☒ Sway ☒ Surge ☒ Extra1 ☒ Extra2 ☒ Extra3

	Roll	Pitch	Heave	Yaw	Sway	Surge	Extra1	Extra2	Extra3
MAX	0.1090247388	1.8840968942	0.0011553958	89.305987284	0.0018168705	0.0005535013	0	0	0
MIN	-0.1090247388	-1.8840968942	-0.0011553958	-89.305987284	-0.0018168705	-0.0005535013	-0	-0	-0

Game Selected: Live for Speed

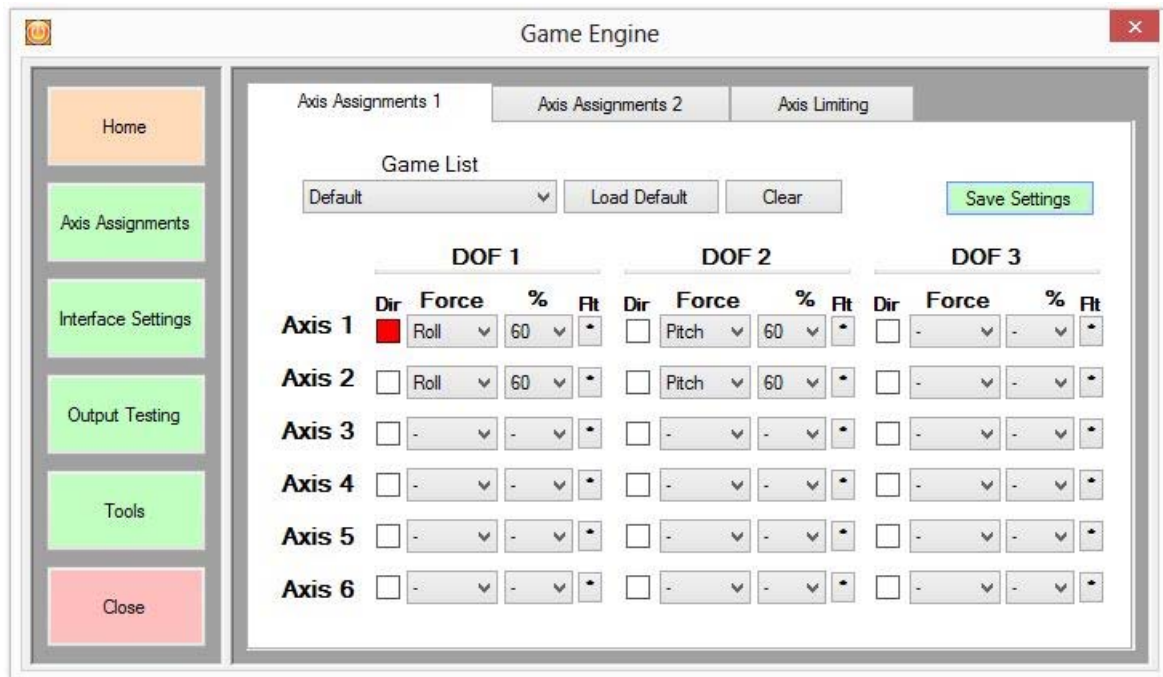
Buttons: Stop Capture, Reset, Save New Settings

. $\pm 25^\circ$ should be sufficient.

Now regarding the behaviour of roll and pitch:

Pitch and roll represent the orientation of the car in the world: up or down when uphill/downhill, tilted left or right on a bank. But also when the car leans into a curve, you should see this on the slider. Or when accelerating the car moves the hood up.

However as most of us only have 2 axes – representing 2DOF – we have to tweak a little here and add some surge and sway to the signal. This is why there is the possibility to mix DOF's in the Axis Assignment tab

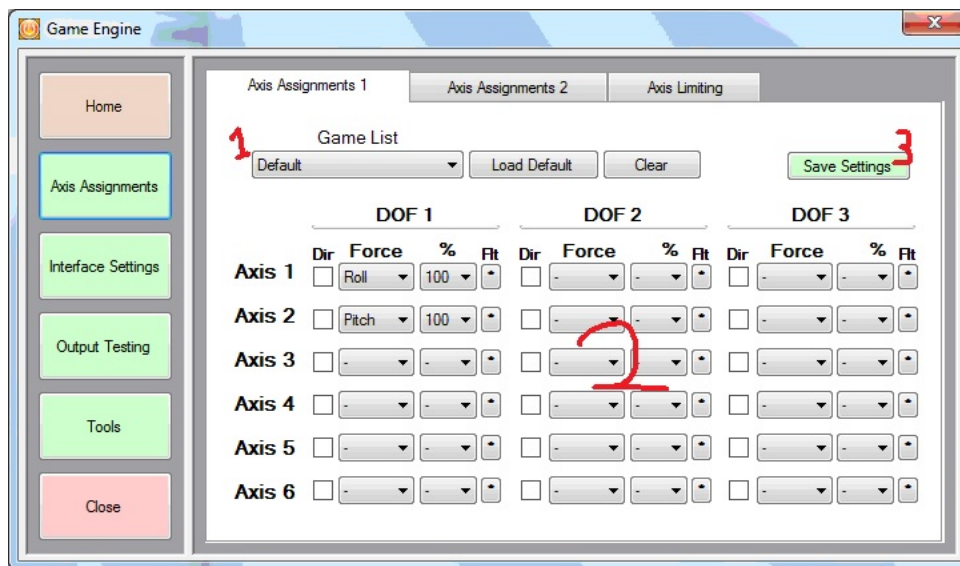


So instead of only assing pitch and toll to your axis you also add a few % of surge to the pitch axis and sway to the roll axis. And maybe some heave for the bumpiness of the track, up to your gusto

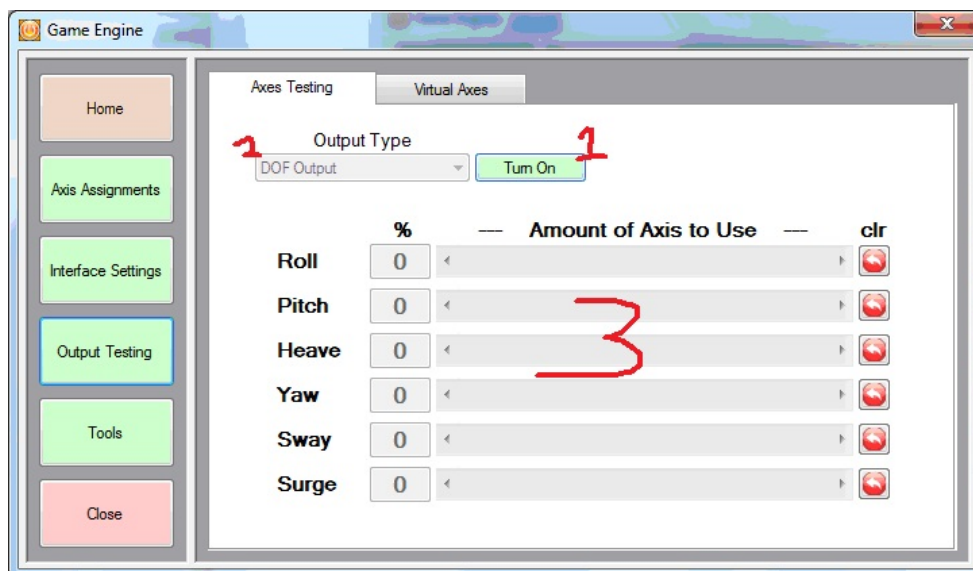
d) How to setup Axis Assignments for all your other games ?

To use Axis Assignments in simple mode for SimTools 3.1, do as follows.

Setup the "Default" profile in the 'Game List' and click 'Save'.

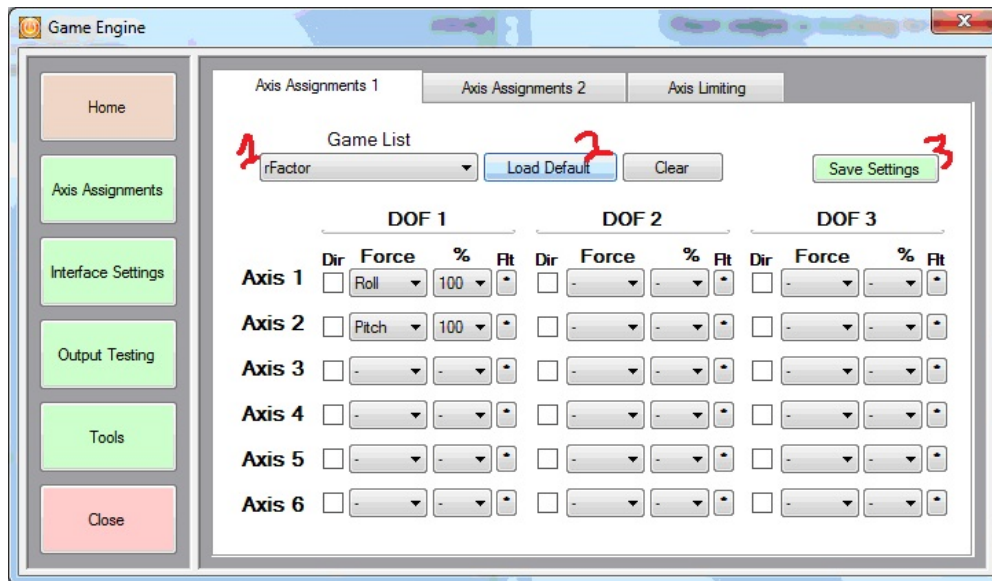


Then use the Output Testing in 'DOF Output' mode to check if it is working correctly.



Once output is working to your liking, copy the 'Default' profile to all games installed.

To do this, select the game from the drop down list, then press 'load Default' and then click 'Save'.

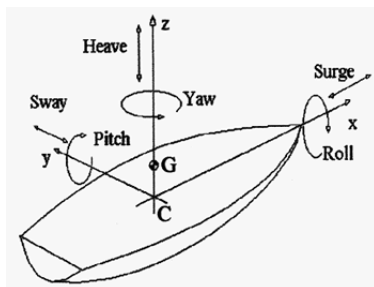


All new games added will automatically be installed with a copy of the default axis assignments profile.

APPENDIX 2 - PLUGIN COORDINATE SYSTEM

This is the reference used by the Plugin developpers.

a) Nomenclature of movements in SimTools



Pitch is the tilt of the car forwards or backwards in degrees [°]

Roll is how much the car is dipped to the left or right in [°]

Yaw is the heading of the car (north, east, south, west) in [°]

Surge means the acceleration of the car in longitudinal direction [g]

Sway means the acceleration of the car in lateral direction [g]

Heave means the acceleration up and down [g]

b) Direction of movements in SimTools

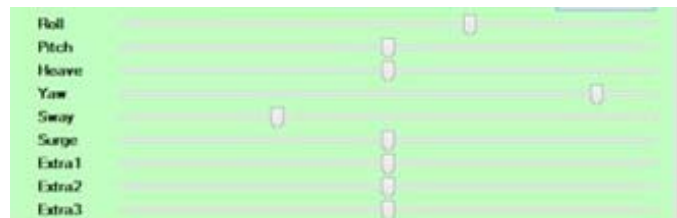
Acceleration → pitch slider moves to left,
surge slider moves to right

Deceleration (braking) → pitch slider
moves to right, surge slider moves to left

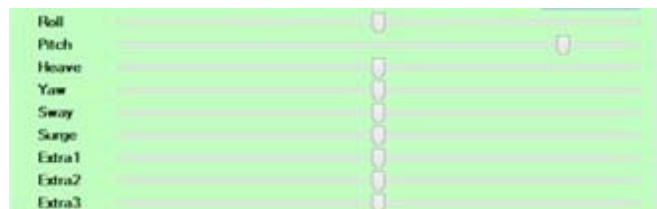
Right turn → roll slider moves to left, sway
slider moves to right, yaw slider moves to
left



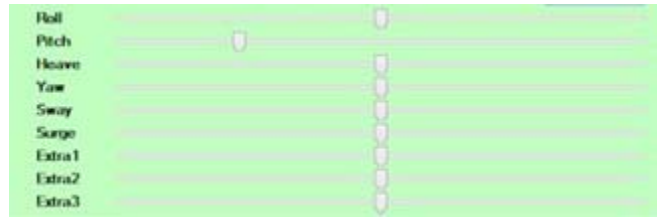
Left turn → roll slider moves to right, sway
slider moves to left, yaw slider moves to
right



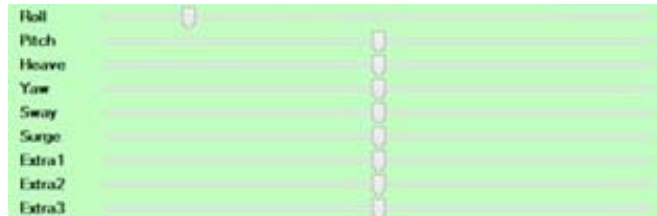
Driving downhill → pitch slider moves to
right



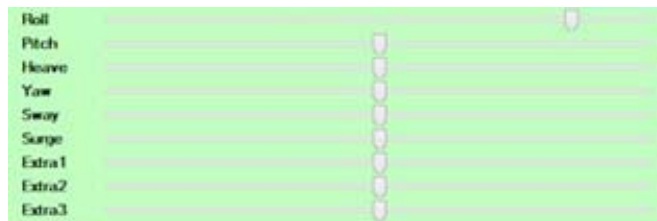
Driving uphill → pitch slider moves to left



Tilted to the left → roll slider moves to left



Tilted to the right → roll slider moves to right



Where available a plugin shall also issue Speed, RPM and Gear as a minimum for dashboard applications.

Extra1 data is Traction Loss per default. However this is not mandatory.

APPENDIX 3 - SIMTOOLS V3.0 ISSUES, BUGS, SUGGESTIONS

If you have a suggestion, an issue or a bug to report, please first read the following topic :

<http://www.x-simulator.de/forum/simtools-v3-0-issues-bugs-suggestions-t4615.html#p44014>