

# SimTools

USER MANUAL v2.5

## Table of Contents

<b>Installing SimTools</b> .....	4
<b>Single Computer Installation (Recommended Setup)</b> .....	5
<b>Dual Computer Installation (Advanced Setup)</b> .....	9
<b>SimTools Registration</b> .....	19
<b>Game Engine</b> .....	22
<b>Game Engine GUI Overview</b> .....	23
<b>Game Engine GUI Status</b> .....	24
<b>Home</b> .....	25
<b>Axis Assignments</b> .....	27
Generic 2D Basic .....	29
Generic 2D Standard .....	33
Generic 2D Advanced .....	37
<b>Axis Limiting</b> .....	39
<b>Interface Settings</b> .....	41
Serial Interface .....	43
Network Interface .....	47
Memory Map Interface .....	51
SCN Interface .....	53
HyperAxis Interface .....	55
JRK Interface .....	57
AMC .....	58
<b>Output Testing</b> .....	61
Axis Testing .....	62
Virtual Axes .....	65
Directions of Movement in SimTools .....	67

<b>Tools</b> .....	71
Game Engine Tools.....	72
Tuning Center.....	77
Quick Links.....	83
Disclaimer .....	84
Logging.....	85
<b>Game Manager</b> .....	87
Game Manager GUI Overview.....	88
Game Manger GUI Status.....	91
Tools and Remote Profiling .....	93
Enable Game Vibe .....	96
Enable Game Dash .....	98
Patching a Game for Motion .....	100
Profile Editor (Create, Edit, Delete) .....	104
Main.....	105
Editor .....	107
More .....	108
<b>Installing Plugins</b> .....	110
<b>Appendix A: Output Type</b> .....	112
<b>Appendix B: User Formatted Output</b> .....	113
<b>Appendix C: Bit Resolution Chart</b> .....	114

## Installing Simtools

**Installing SimTools** – The current version of SimTools can be downloaded at <https://simtools.us/downloads-links/>. You can install SimTools for the first time or update SimTools to the newest version by simply installing the new version over the top of your installed version (unless otherwise noted in the update log for the new release).

We recommended disabling your antivirus before installing all versions of SimTools. SimTools has the ability to capture telemetry data we need from the memory space of a running game. Because of this ability, it wrongly gets detected as a problem by some antivirus. If you choose to leave your antivirus enabled, and you run into issues, you can tell your antivirus to add SimTools as an exception and it should leave it alone.

**Choosing an installation type** – A single computer installation of SimTools is the most common type of installation. We strongly suggest a single computer installation of SimTools if this is your first time using SimTools. A single computer installation will give you all of the tools needed to run your simulator from a single computer.

A dual computer installation of SimTools allows you to move some of the work required to run your simulator to a second computer to help prevent latency and free up some CPU. In this type of installation you will setup a Gaming Computer that will run your video games and Game Manager to manage game patching, profiling and data collection. The second computer will be used to control hardware that is connected to your simulator. This computer will run Game Engine and any other companion apps like Game Vibe, Game Dash, etc...

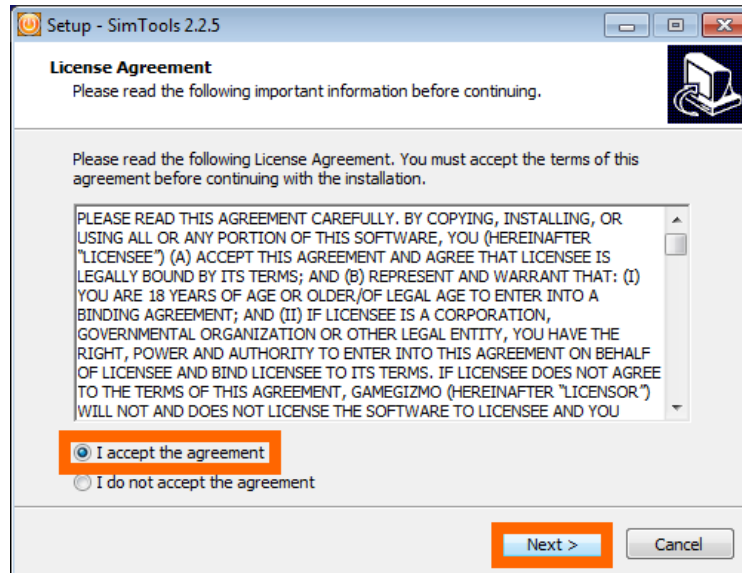
[Back to Table of Contents](#)



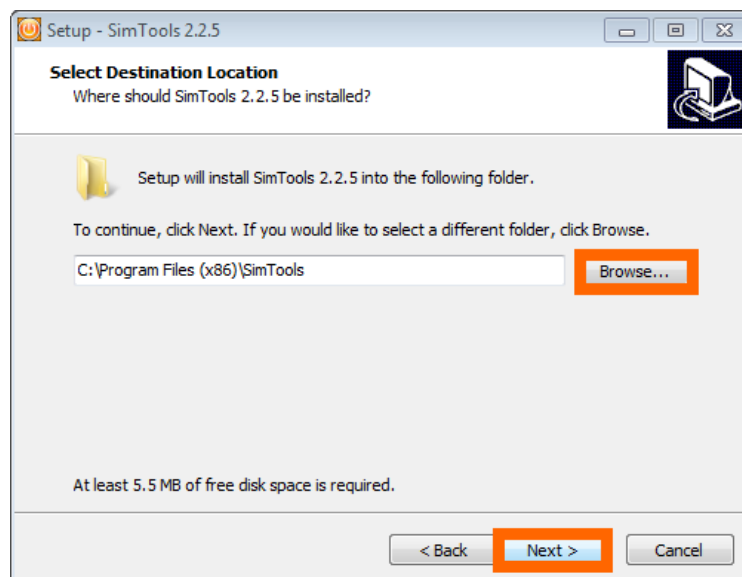
## Single Computer Installation (Recommended Setup)

If this is your first time installing SimTools, please make sure you read through [Installing SimTools](#) first. Follow the steps below to install SimTools for a single computer setup.

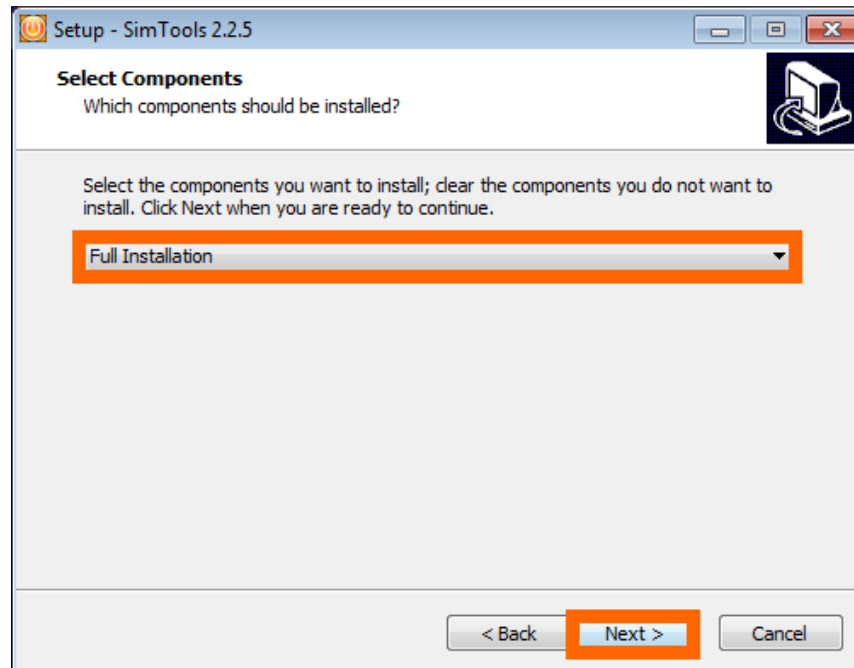
- 1) Launch the SimTools installer by double clicking the file you downloaded. Read through the license agreement, accept the agreement and click “Next”.



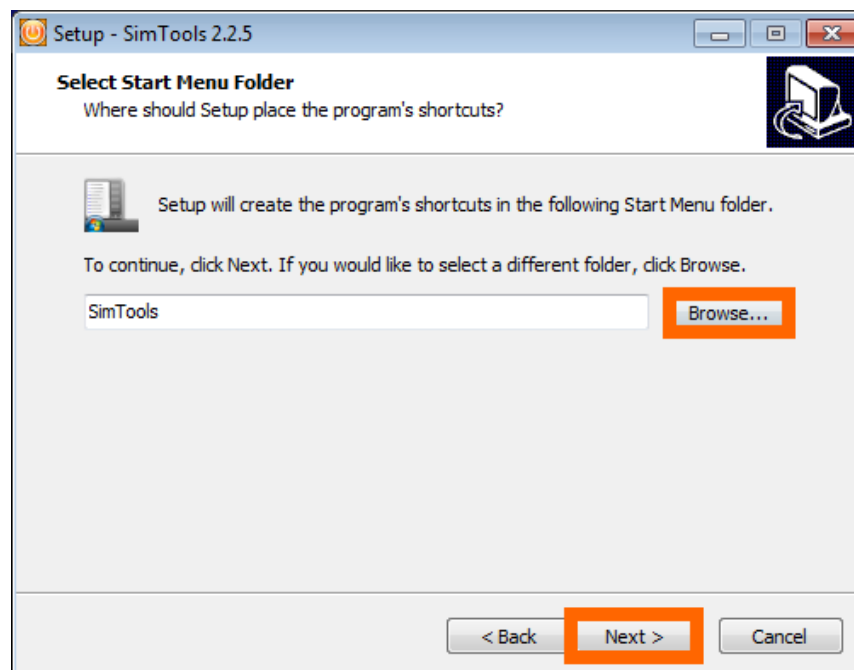
- 2) Use the default installation folder, or select where to install SimTools by clicking “Browse” and then click “Next”.



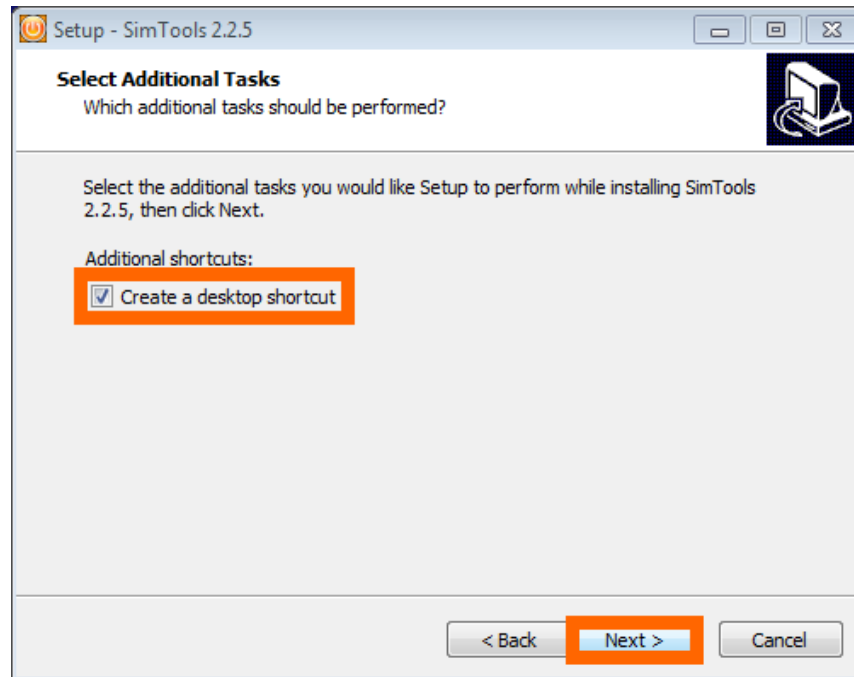
- 3) Select “Full Installation” from the drop down menu and click “Next”.



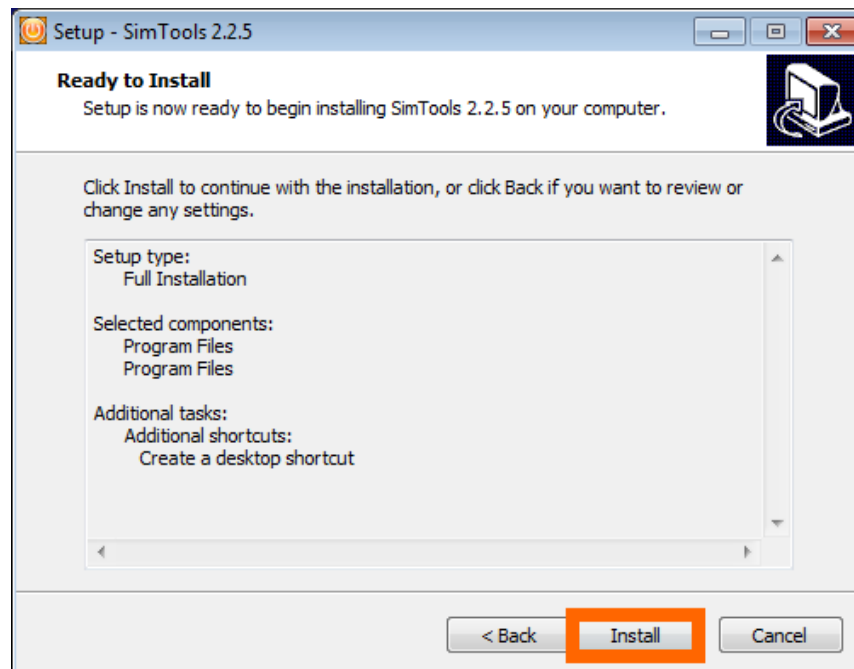
- 4) Use the default Start Menu folder, or select a Start Menu folder to install the SimTools shortcuts in by clicking “Browse” and then click “Next”.



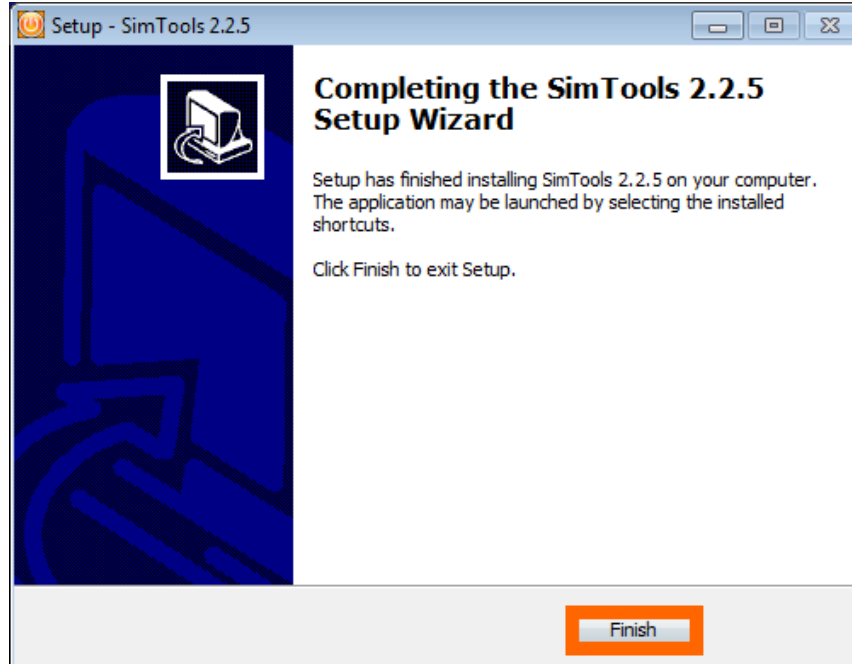
5) Choose to add a desktop shortcut and click “Next”.



6) Click “Install” when you are ready to proceed with the installation of SimTools.



7) Press finish when the installation is complete.



Note: A single computer installation will set the Game Engine IP address and Game Manager IP address to the default IP address of "127.0.0.1".

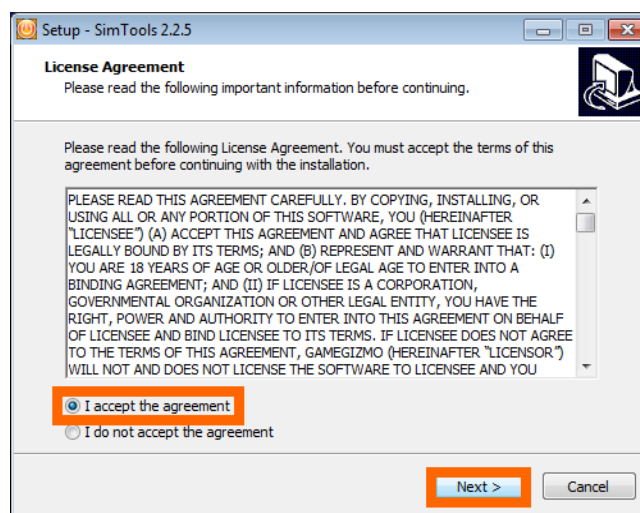
[Back to Table of Contents](#)

## Dual Computer Installation (Advanced Setup)

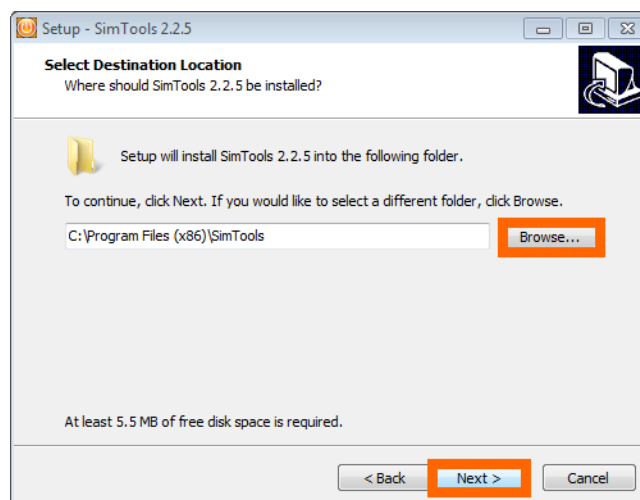
If this is your first time installing SimTools, please make sure you read through [Installing SimTools](#) first. For a dual computer setup we will install SimTools on the Gaming Computer and then again on the Second Computer. Follow the steps below to install SimTools for a dual computer setup.

### Installing SimTools on the Gaming Computer

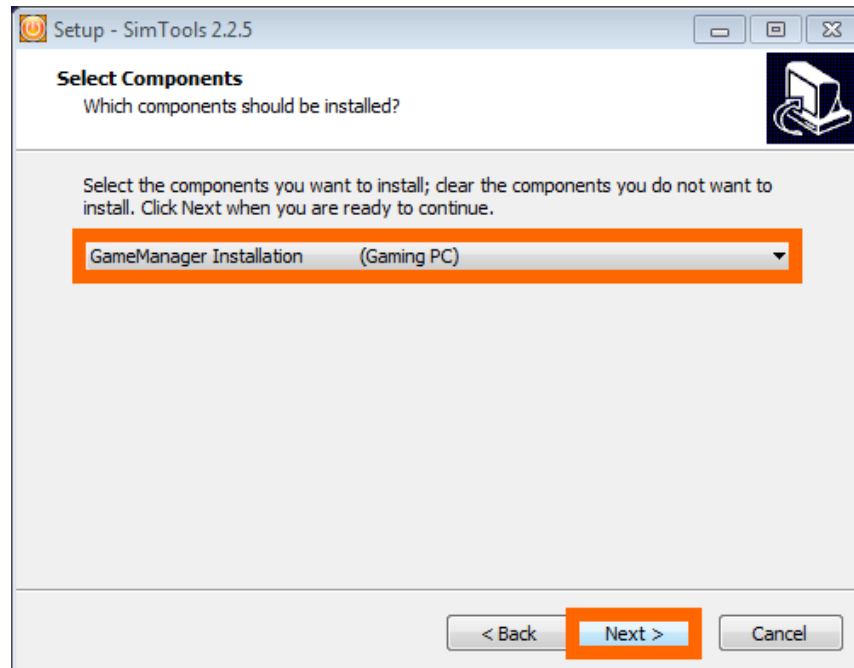
- 1) Launch the SimTools installer on your Gaming Computer by double clicking the executable you downloaded. Read through the license agreement, accept the agreement and click “Next”.



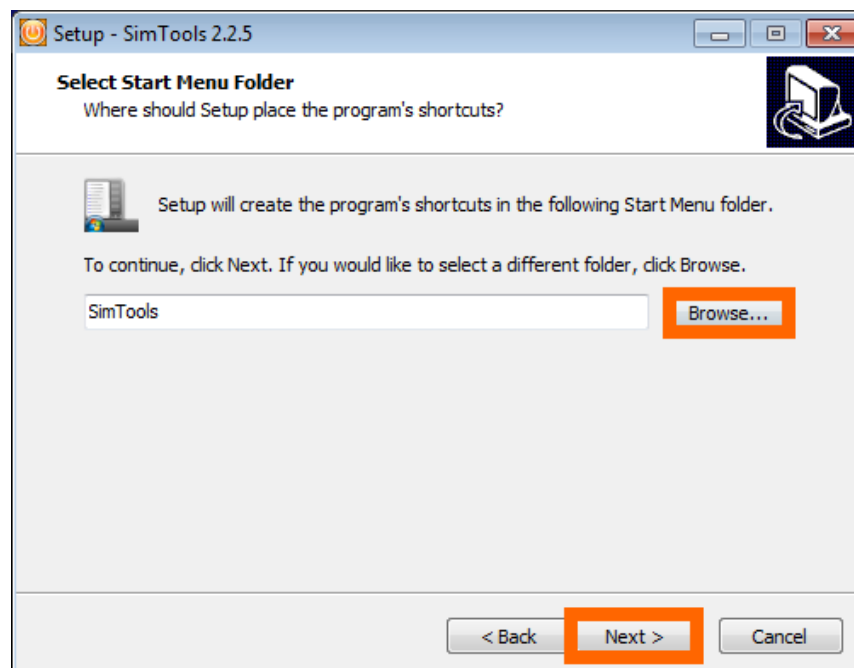
- 2) Use the default installation folder, or select where to install SimTools by clicking “Browse” and then click “Next”.



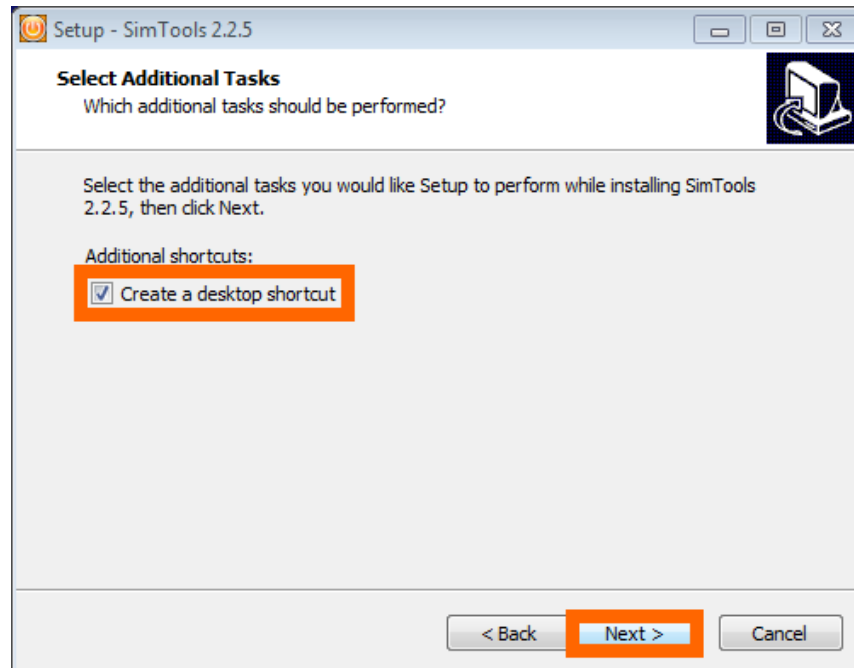
- 3) Select “GameManager Installation” from the drop down menu and click “Next”.



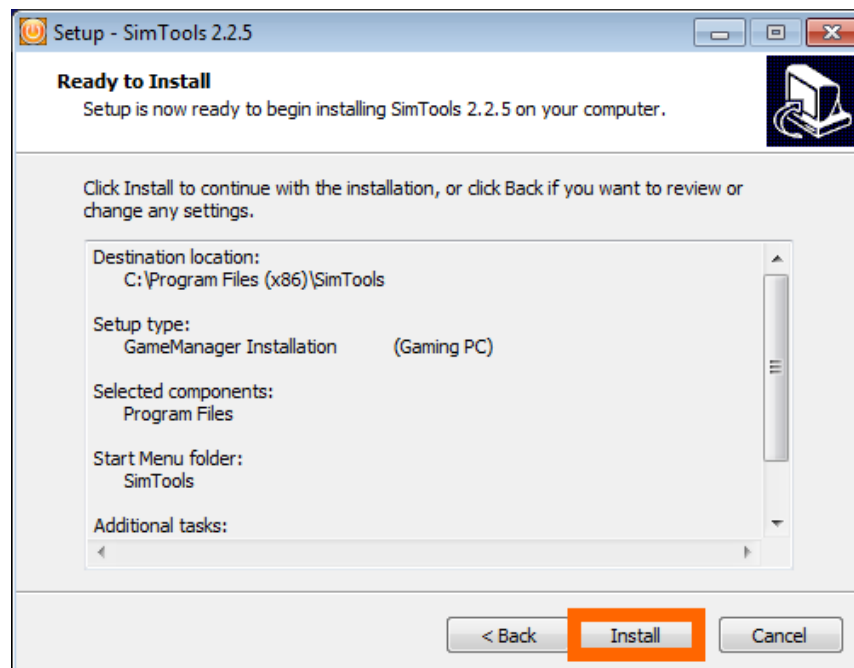
- 4) Use the default Start Menu folder, or select a Start Menu folder to install the SimTools shortcuts in by clicking “Browse” and then click “Next”.



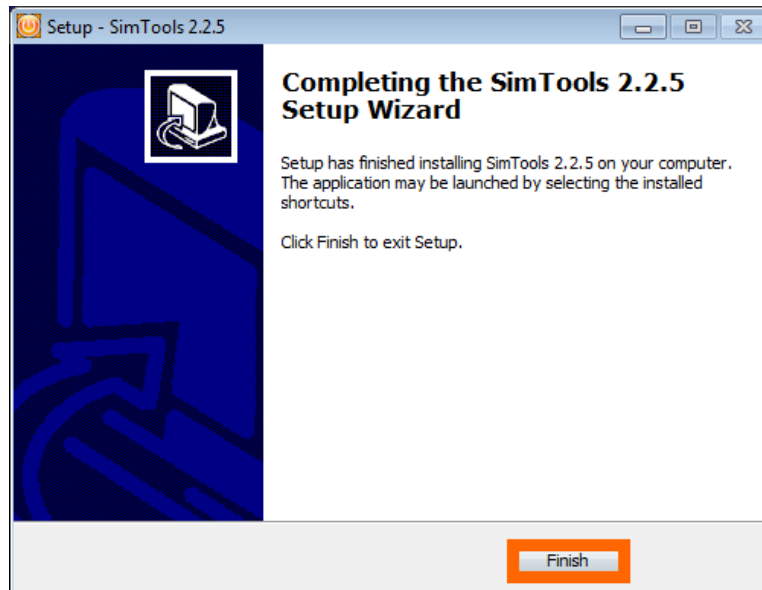
5) Choose to add a desktop shortcut and click “Next”.



6) Click “Install” when you are ready to proceed with the installation of SimTools.

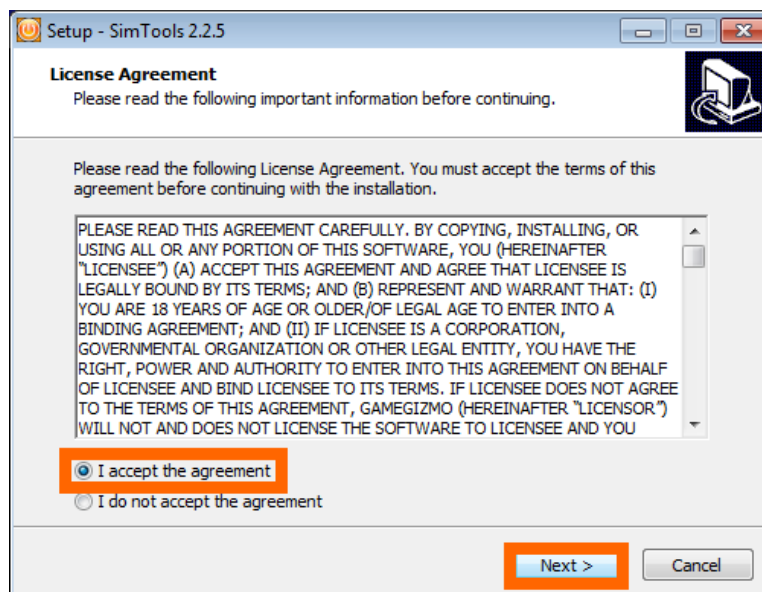


7) Click “Finish” when the installation is complete.



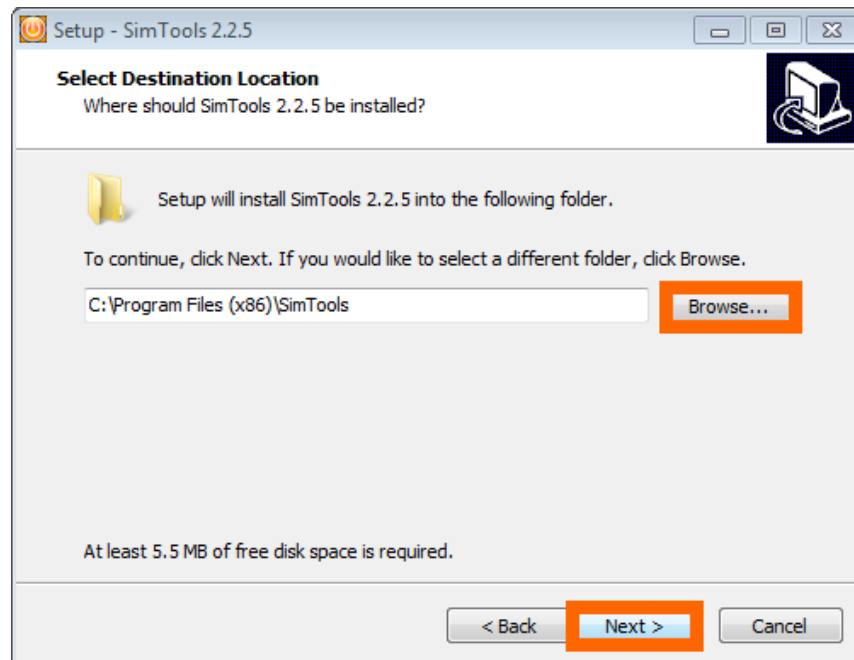
## Installing SimTools on the Second Computer

1) Launch the SimTools installer on your Second Computer by double clicking the executable you downloaded. Read through the license agreement, accept the agreement and click “Next”.

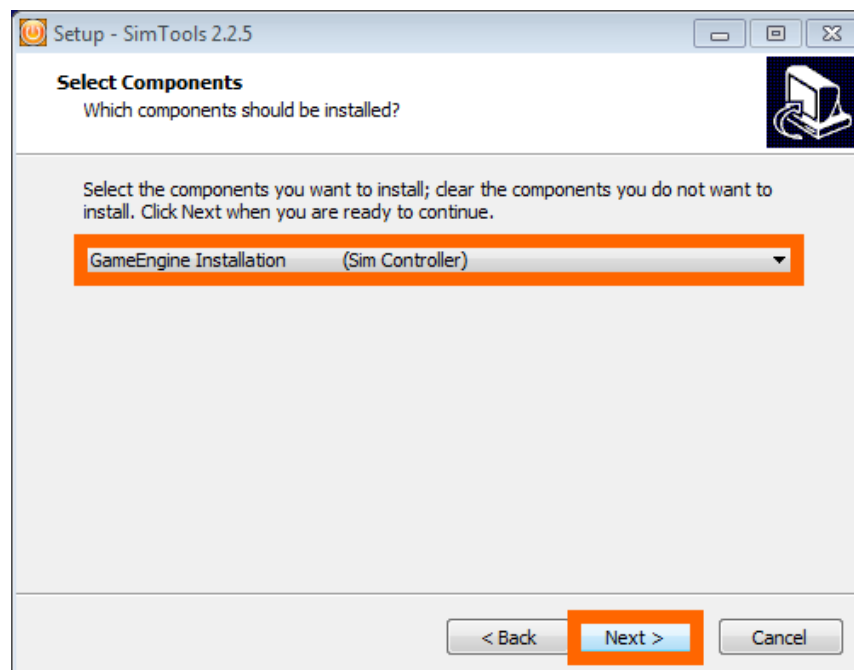




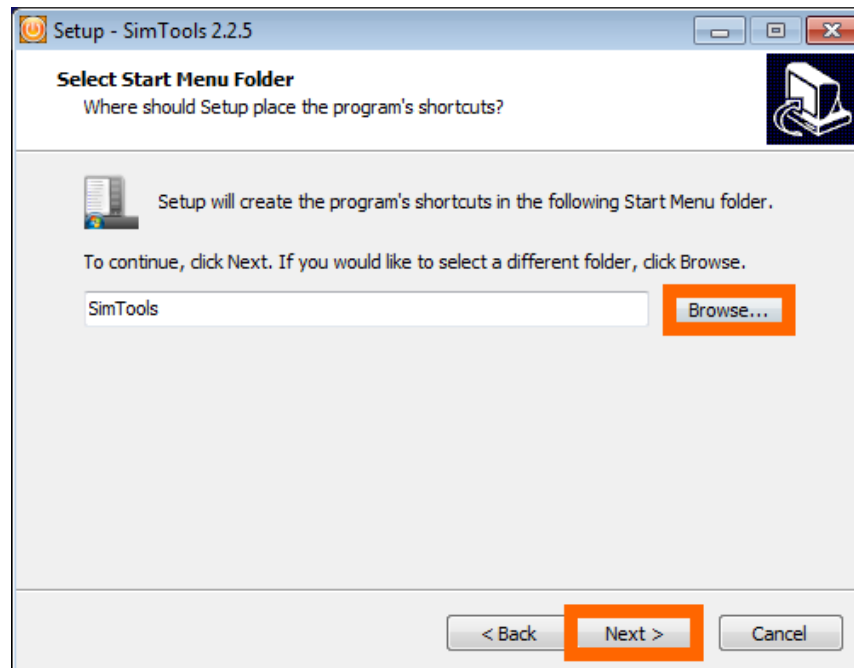
- 2) Use the default installation folder, or select where to install SimTools by clicking “Browse” and then click “Next”.



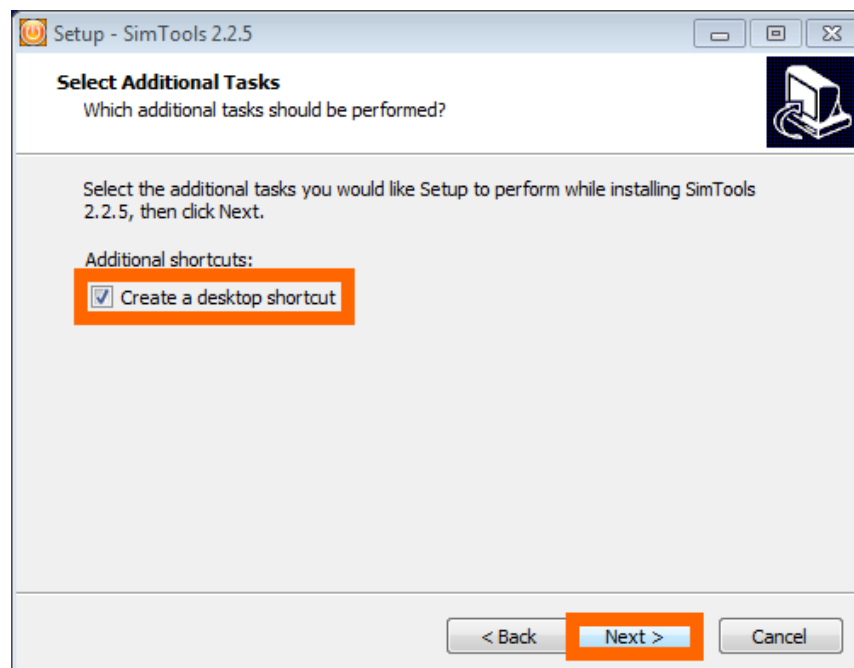
- 3) Select “GameEngine Installation” from the drop down menu and click “Next”.



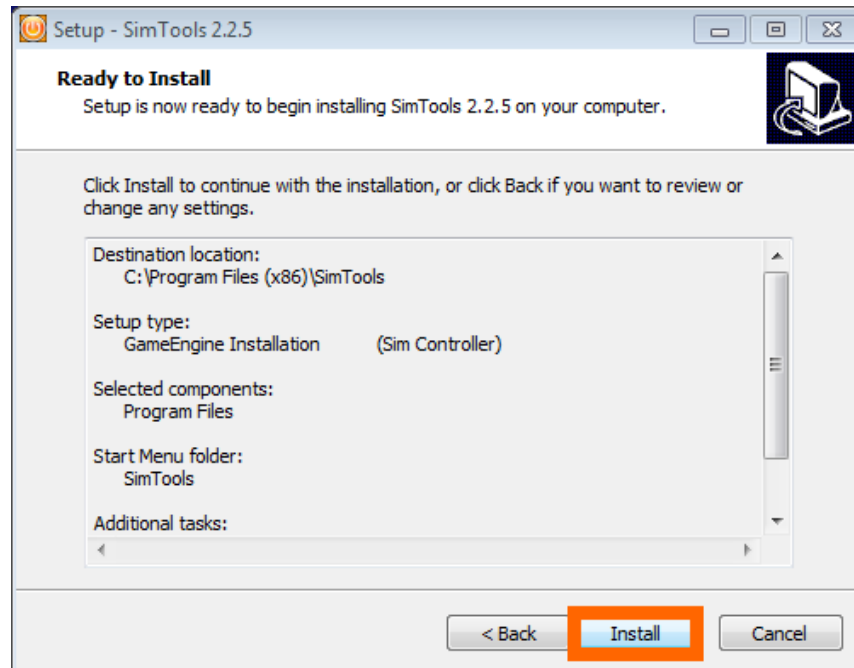
- 4) Use the default Start Menu folder, or select a Start Menu folder to install the SimTools shortcuts in by clicking “Browse” and then click “Next”.



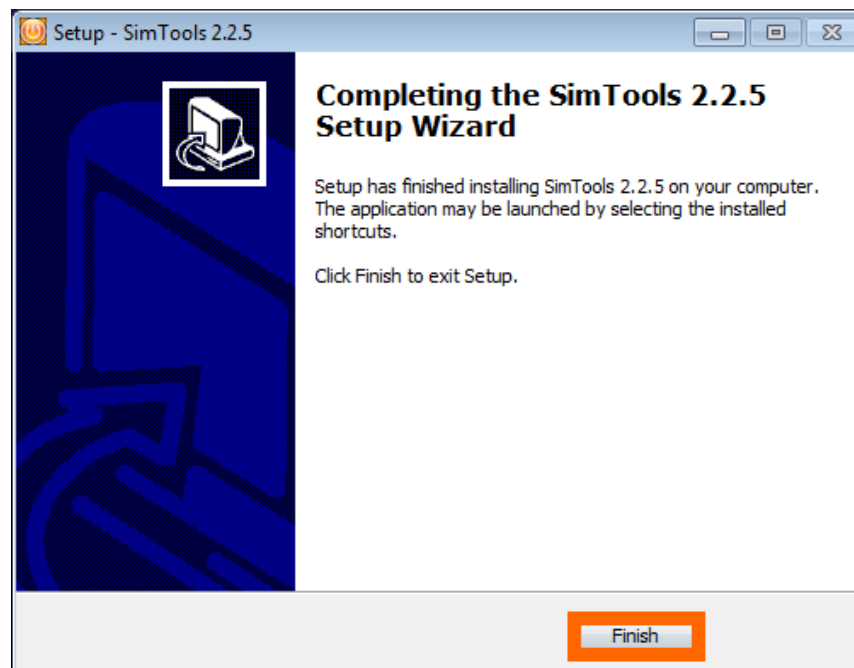
- 5) Choose to add a desktop shortcut and click “Next”.



6) Click “Install” when you are ready to proceed with the installation of SimTools.



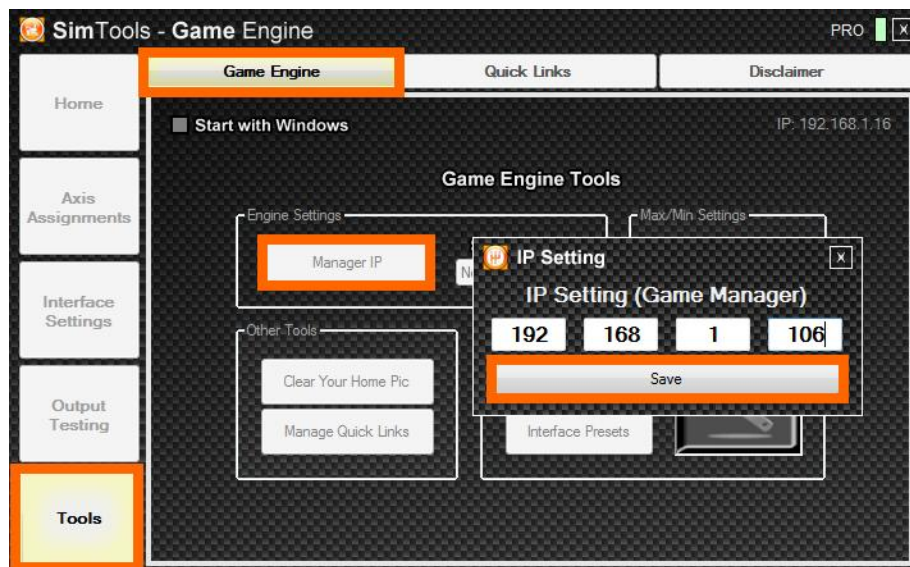
7) Click “Finish” when the installation is complete.



- 8) Next, we need to let Game Engine know where Game Manager is on your network. Open Game Manager on your Gaming Computer and click “Tools”. The IP address of the Game Manager is displayed as seen in the image below.



- 9) Open Game Engine on your Second Computer and click “Tools” and then click “Manager IP”. Update the Game Manager IP setting to reflect your Game Manager’s IP address.



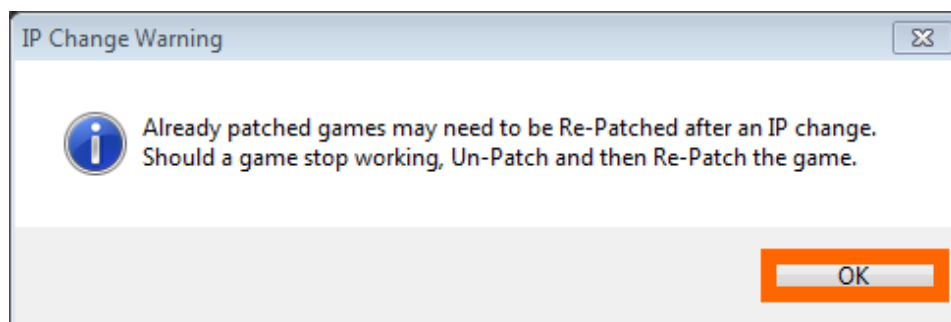
10) Finally, we need to let Game Manager know where Game Engine is on your network. Open Game Engine and click “Tools”. The IP address of Game Engine is displayed as seen in the image below.



11) Open Game Manager and click “Tools” and then click “Engine IP”.



- 12) A window will appear that says: “Already patched games may need to be Re-Patched after an IP change. Should a game stop working, Un-Patch and then Re-Patch the game.” Click “OK”.



- 13) Enter the IP address of Game Engine and click “Save”.



Once the IP addresses are properly configured, your dual computer setup of SimTools is complete!

Note: Game plugins need to be installed on both computers for a dual computer setup of SimTools. Interface and axis assignment plugins only need to be installed on the Second Computer.

[Back to Table of Contents](#)

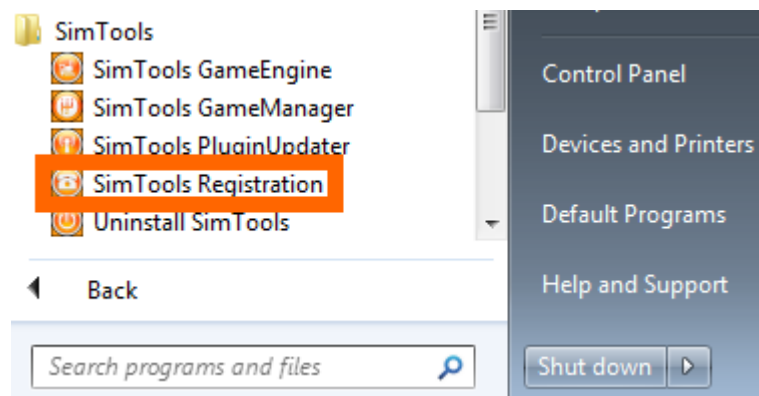
## SimTools Registration

SimTools will run in “Demo” mode until a valid license has been registered. The plugin for Live for Speed is fully operational for testing while SimTools is in demo mode. (The demo of Live for Speed will work for testing SimTools too.) You can find more information and download Live for Speed at <https://www.lfs.net/>

You can learn more about the different SimTools licenses and prices at <https://simtools.us/license/>

Here is a step by step on how to register SimTools v2.

- 1) Launch “SimTools Registration”. This should be in the **Start Menu shortcuts folder** you created during installation. You can find the default location by navigating to Start → All Programs → SimTools → SimTools Registration.



- 2) Enter the email address you purchased your license with into the Email Address text box.





3) Enter the license you received into the License Key text box.



4) Click "Activate License" to activate your license.



A message will appear confirming your license has been activated.





You can also check to see if your license is valid by clicking “Check License”.

A screenshot of a software registration window titled "SimTools - Registration". The window has a dark gray background with a checkered pattern. At the top, it says "SimTools v2.0 Professional License Found". Below this, there are two input fields. The first is labeled "Email Address" and contains the text "Dustin@SimTools.us". The second is labeled "License Key" and contains the text "5td\_FAKE\_8573\_KEY\_420". At the bottom of the window, there are two buttons: "Check License" and "Activate License". The "Check License" button is highlighted with a thick orange border.

**SimTools - Registration**

SimTools v2.0 Professional License Found

**Email Address**

Dustin@SimTools.us

**License Key**

5td\_FAKE\_8573\_KEY\_420

**Check License** **Activate License**

[Back to Table of Contents](#)

## Game Engine

Game Engine is a system-tray application with access to the tools needed to configure many different types of motion simulators. Game Engine can control a large number of hardware interfaces and can be configured to almost any type of build you can think of.

Game Engine must be running in the system-tray during game play to allow SimTools to communicate with the devices you have configured. You can still play a game after it is patched for motion output without your simulator. Simply exit Game Engine from the system-tray before you launch the game.

Game Engine needs to be installed on the computer that is connected to your motion simulator even if you are installing a dual computer setup for SimTools. (Note: If you are configuring a dual computer setup, please see the dual computer setup guide for more information.)

[Back to Table of Contents](#)

## Game Engine GUI Overview

Here is a quick breakdown of the GUI layout in Game Engine.

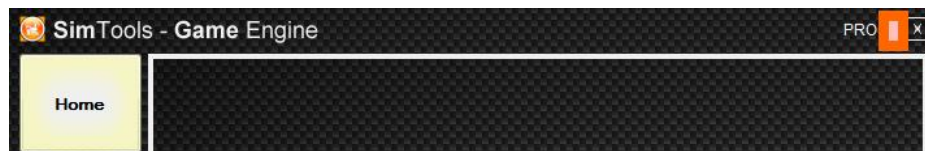
**Main Menu** – This is Game Engine’s main menu. (We will go into more detail on these items later in the manual.)



**License Marker** – This shows what license version the software is currently using.



**Connected Status** – This shows if we are connected to Game Manager or not.



[Back to Table of Contents](#)

## Game Engine GUI Status

Game Engine has three different modes that it can be in. The three different modes can be identified by the connection status as follows:

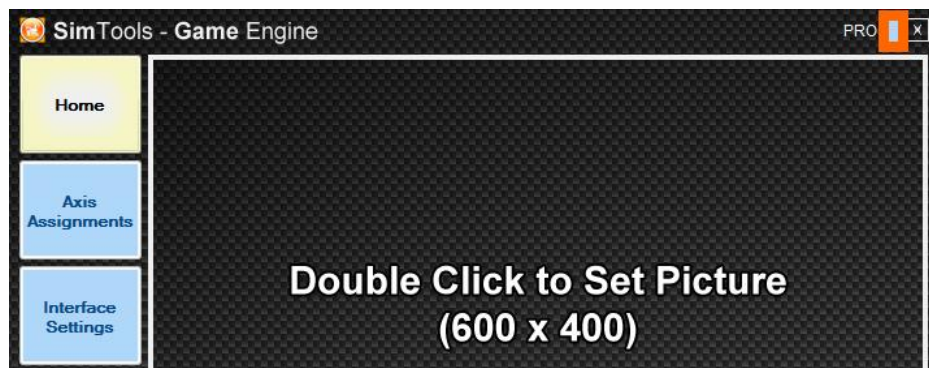
- **Not Connected** – (Red) identifies that Game Engine is not connected to Game Manager. This usually means that Game Manager is not running. Once you start Game Manager, Game Engine and Game Manager should automatically connect.



- **Connected** – (Green) identifies that we are connected to Game Manager and we are ready for action.



- **Game Running** – (Blue) identifies Game Engine has detected a patched game has started. Correctly configured SimTools modules and any associated hardware will start at this time. Notice Axis Assignments and Interface Settings change to blue. This means they are locked and cannot be modified while a game is running.



These three color coded indicator modes can help you quickly identify the current status of SimTools.

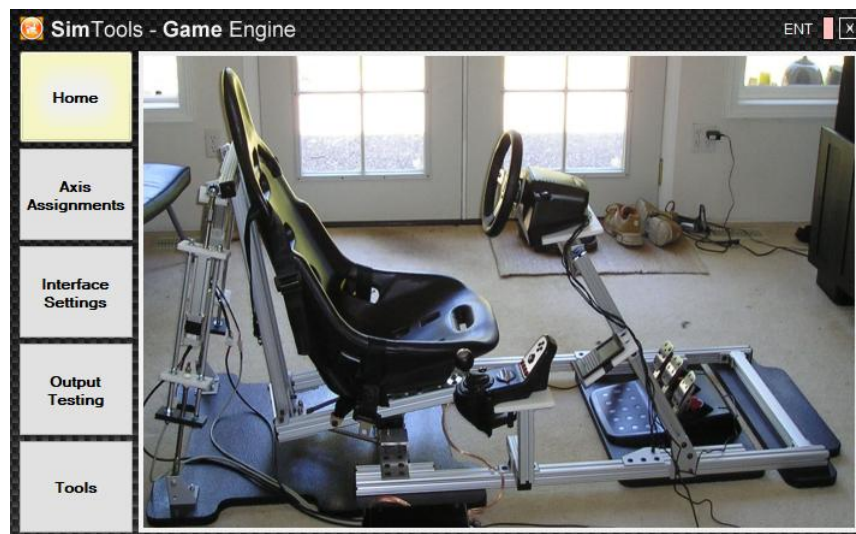
[Back to Table of Contents](#)

## Home

**Home** – The Home tab is displayed by default when you launch Game Engine. You can add a picture by simply double-clicking the picture area shown below and selecting a “.jpg” from your computer.



This is a great place to display your wiring diagram during setup, or to display a picture of your simulator once completed.



(Note: The home picture can be removed in the tools menu - see [Clear Your Home Pic](#))

[Back to Table of Contents](#)

## Conventions for Game Plugins

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

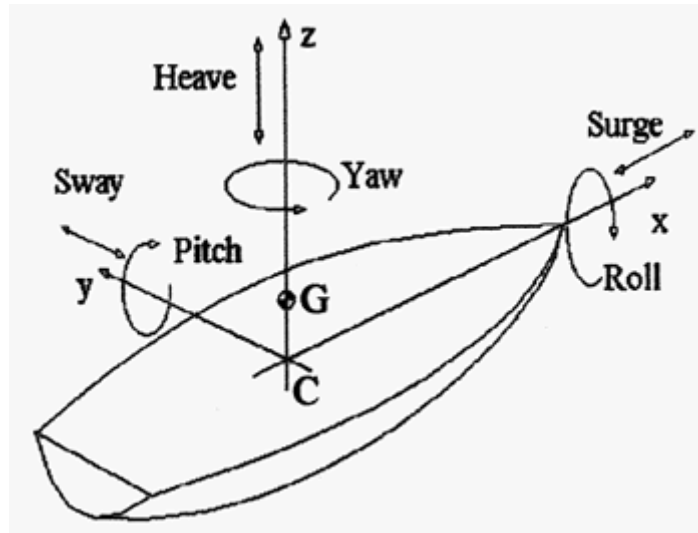
**Roll** is how much the vehicle is dipped to the left or right in degrees [°]

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

**Surge** means the acceleration of the vehicle in longitudinal direction in g-force [g]

**Sway** means the acceleration of the vehicle in lateral direction in g-force [g]

**Heave** means the acceleration up and down in g-force [g]

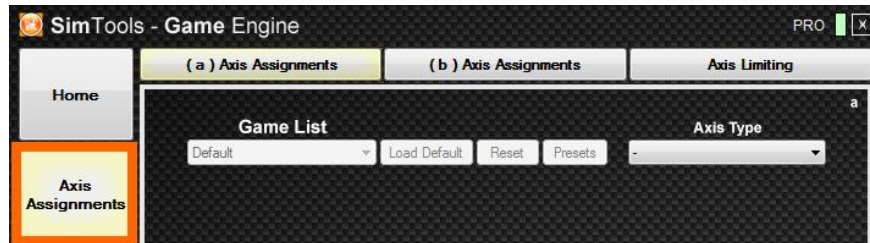


[Back to Table of Contents](#)



## Axis Assignments

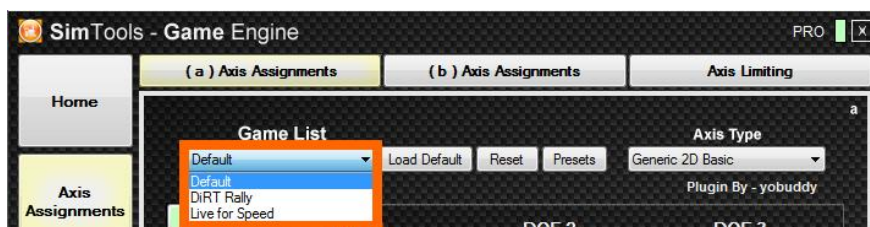
**Axis Assignments** – The Axis Assignments tab is where you configure the output from any game into logical motion for your simulator. The (a) Axis Assignments and (b) Axis Assignments pages each have six axes that can be configured. There are a total of 12 axes that can be configured as needed for your simulator. (Note: Most simulators will only use (a) Axis Assignments. You cannot modify options on these pages until you select an axis type.)



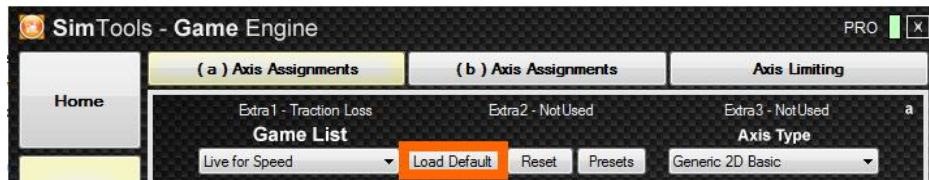
**Axis Type** – Select an axis type from the drop down menu shown in the picture below. The options below will be present with any axis type you select.



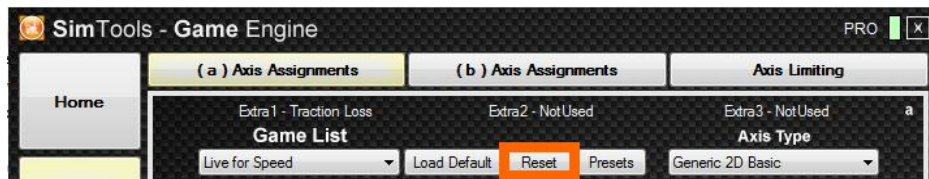
**Game List** – This is the list of installed game plugins that can be configured including a default profile.



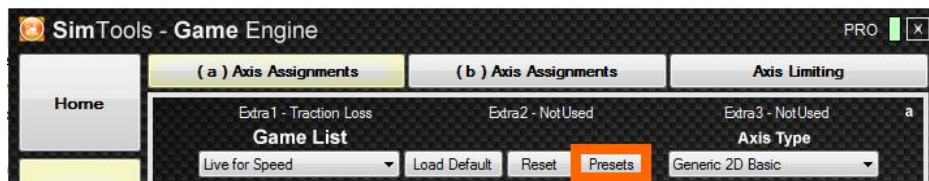
**Load Default** – Loads the default profile to the current game plugin selected in the Game List drop down menu.



**Reset** – Clears the form of any settings that have been selected.



**Presets** – This button opens a panel that allows you to create or load presets for the currently selected game plugin listed in the Game List drop down menu.



Select “Load a Preset” to choose from a list of presets, or click “Create a Preset” to name the preset you are creating.



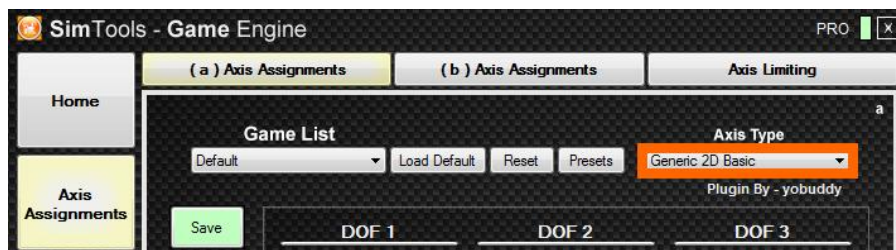
Each axis type listed in this section builds upon itself. Generic 2D Standard includes all the functions of Generic 2D Basic and Generic 2D Advanced includes all the functions of Generic 2D Standard. We will go through and explain what each setting does and show with examples how to configure each one.

[Back to Table of Contents](#)

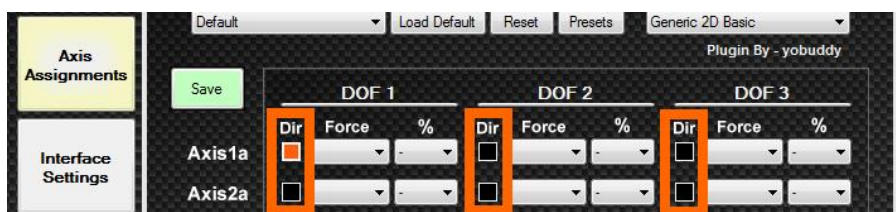


## Generic 2D Basic

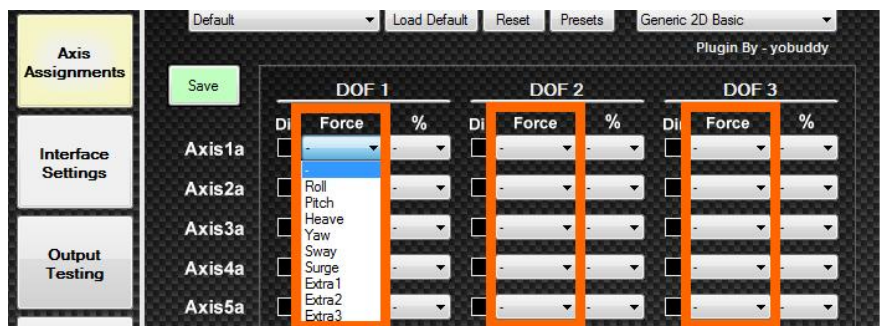
The “Generic 2D Basic” axis type allows you to configure a combination of forces for each axis in order to produce sensible motion for your simulator. It is always a good idea to configure the “Default” profile first, because these settings will be copied to any newly installed game plugin as a starting point.



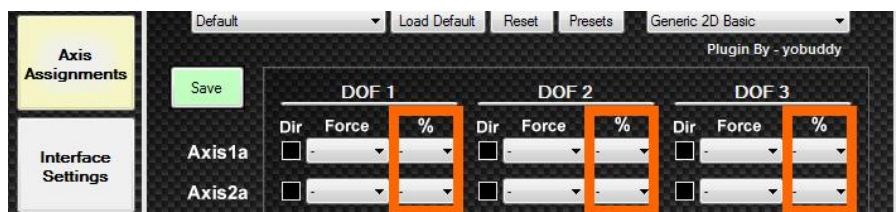
**Dir** – This is the direction the forces will be applied. Check this to change the direction of motion to the opposite direction for each DOF (degree of force).



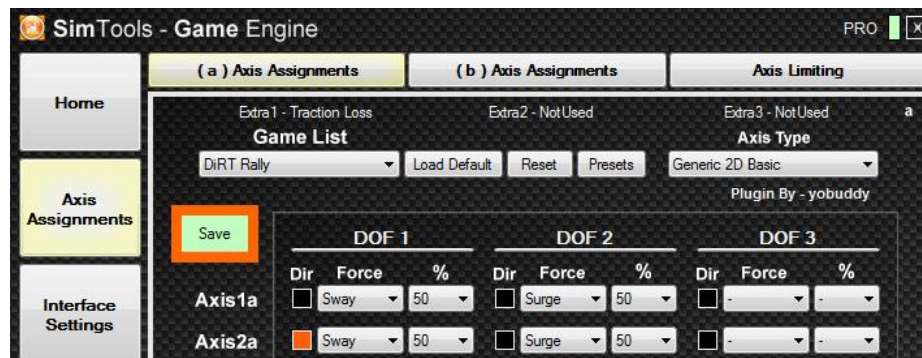
**Force** – This is the source of the input for this DOF setting.



**% (Percent)** – This is the amount of the selected force that will be combined into the final output for this axis.

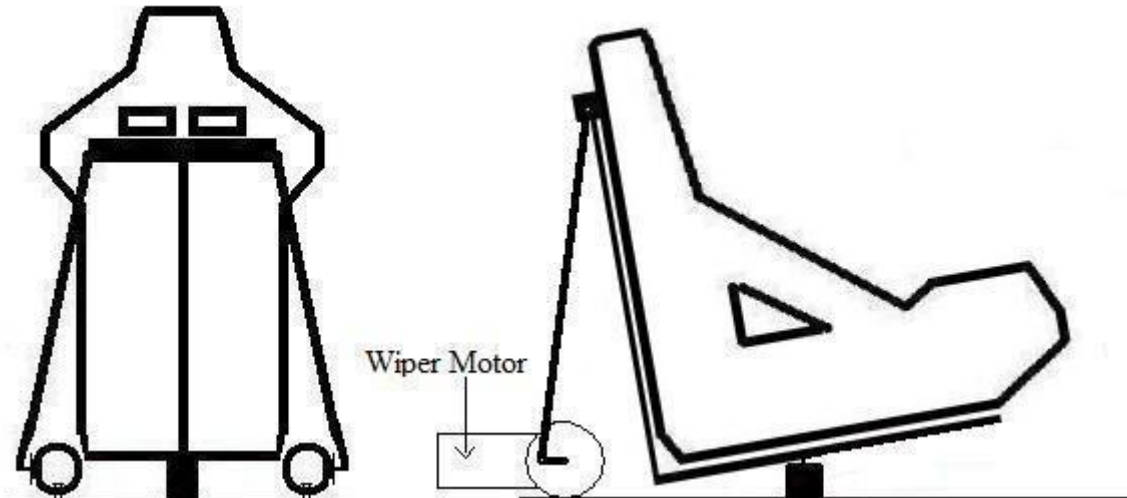


**Save** – Click “Save” to save the current axis assignments for the selected game plugin listed in the Game List drop down menu. These settings will be used the next time this game is launched.



### Example

This simulator uses two motors to power the chair from the rear corners. It will provide for a 2 DOF simulator including roll (leaning side to side) and pitch (leaning front to back). Each motor gets assigned half of its total movement for roll and half of its total movement for pitch. There are many examples on YouTube of this kind of simulator build. Simply search on YouTube for SimforceGT.



The picture below shows the axis assignment needed to move the example simulator pictured above.

Axis1a is assigned to sway at 50% and surge at 50%. Axis2a is assigned to sway at 50% with the “Dir” option selected to reverses output and surge at 50%.

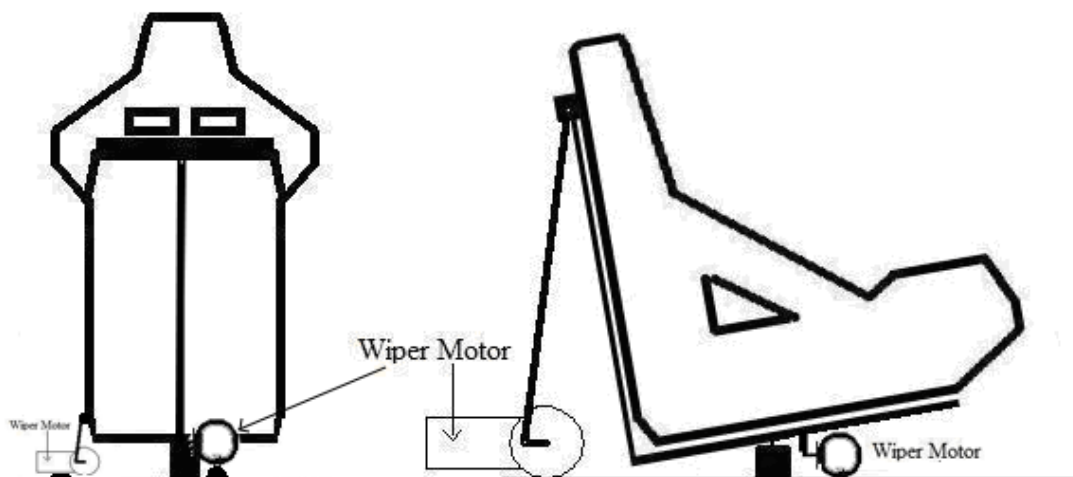
Half of each axis will respond to roll with the axes responding in opposite directions to one another. This gives us our roll output by moving our example simulator from side to side.

The other half of each axis will respond to pitch with the axes responding in unison to one another. This gives us our pitch output by tipping the example simulator forward and back.



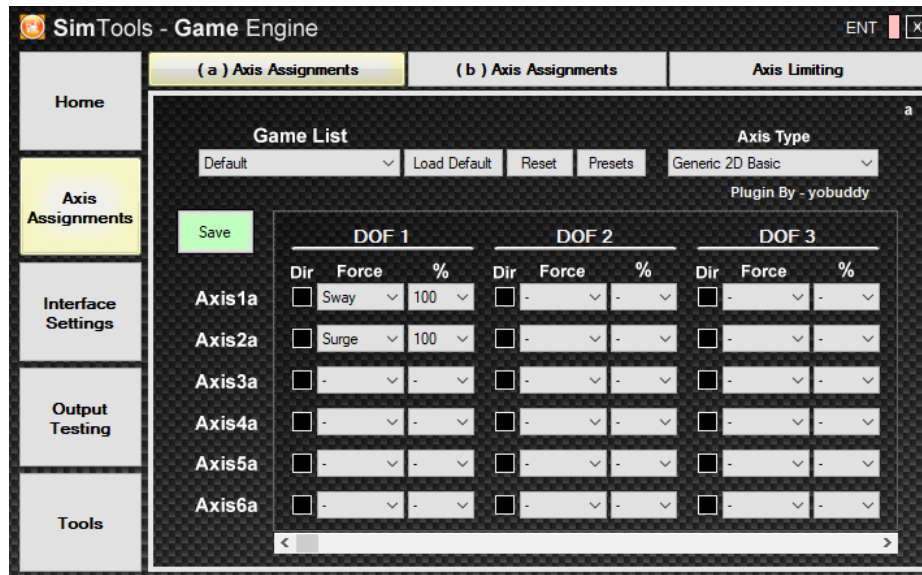
## Example

This simulator uses two motors to power the motion simulator; one in the rear and one on the side. It will provide for a 2 DOF simulator including roll (leaning side to side) and pitch (leaning front to back).



The picture below shows the axis assignment needed to move the example simulator pictured above.

Axis1a is assigned to roll at 100%. Axis2a is assigned to pitch at 100%. Each axis is only responsible for one force, so we suggest using the entire axis available for each one.

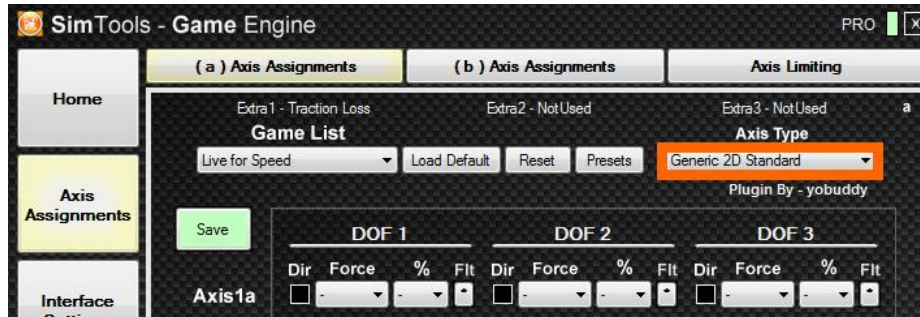


[Back to Table of Contents](#)



## Generic 2D Standard

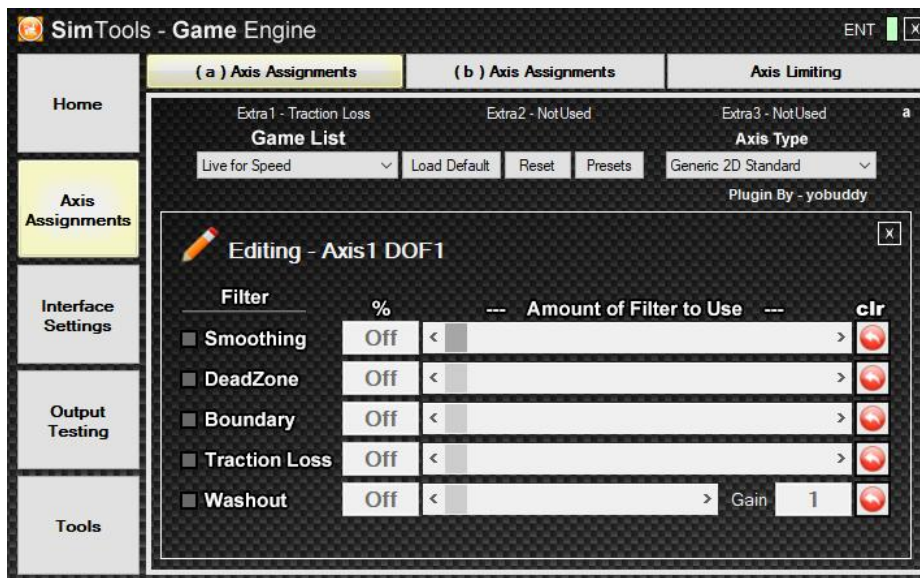
The Generic 2D Standard axis type builds upon the Generic 2D Basic axis type adding independent filtering for each of the settings.



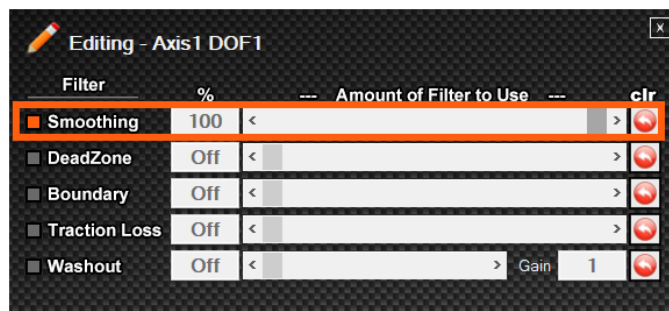
**Flt** – Click the “Flt” button next to any of the settings.



You will be presented with the following filter options.



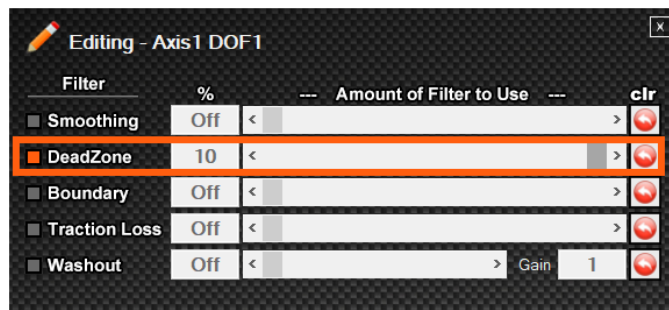
**Smoothing** – Is needed when you are experiencing a jumpy DOF input.



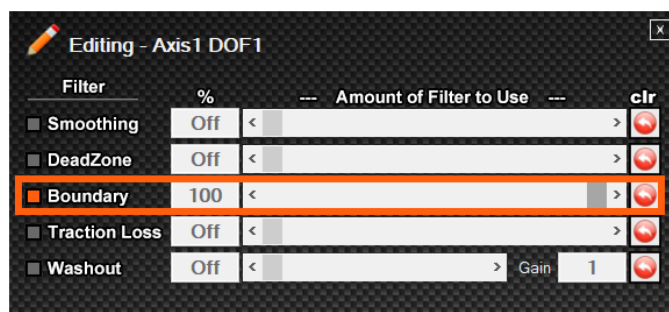
**Clr** – Clicking this button will turn off the filter.



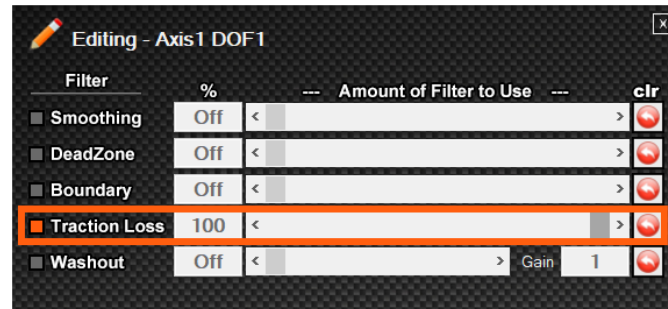
**Dead Zone** - Is for setting a dead zone around the center of the axis. You can eliminate any small twitches you feel from a particular game. For example, say your Max and Min settings in the tuning center are set to Max 10 and Min -10. If you do not want to feel the jittery motion between Max 3 and Min -3, then you can set a percent to represent these values and remove them. This will result in a dead zone on the center of your axis movements.



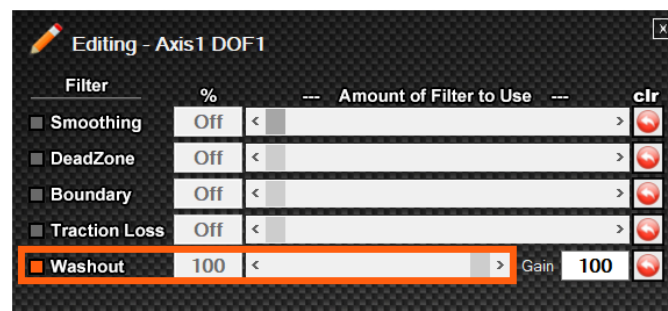
**Boundary** - Is to make sure the single DOF does not use more than X amount of the available axis. This allows you have a very sensitive axis while still making sure it does not take over the whole axis and leaves room for other DOFs.



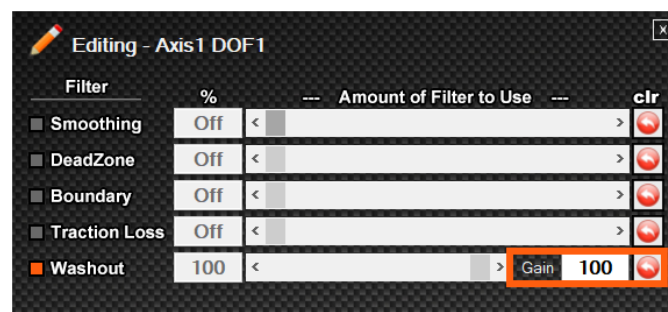
**Traction Loss** – This is where you feel the back end slide out when you go around a corner too fast. If your simulator is not homing (re-centering) fast enough after a movement, increase this value. The Traction Loss filter and the Washout filter cannot be used at the same time. You can only use one or the other.



**Washout** – This is how fast you try to return to zero after a movement has occurred. If your simulator is not homing (re-centering) fast enough after a movement, increase this value. The Washout filter and the Traction Loss filter cannot be used at the same time. You can only use one or the other.



**(Washout) Gain** – This is how much you will react to changes in the input from the game. If your simulator is not moving enough from the output from the game, increase this value. Gain can only be adjusted if you are using the Washout filter.



The Washout filter is particularly needed when your DOF input fails to return to center after the force is applied to the axis.

### ***Example***

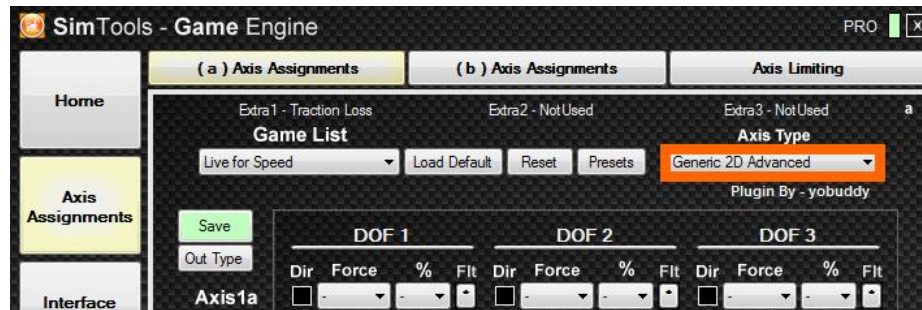
When a car's rear end slides out, the axis is left in a non centered position. If the car needs to slide out in the same direction again, there would be no room left for the needed travel. We use a washout filter to slowly move the axis back to center without the rider's knowledge of it occurring to overcome these circumstances. A gain of one or above must be used for the washout system to be considered active. A setting of 50% for both gain and return is a good place to start for any game.

**[Back to Table of Contents](#)**

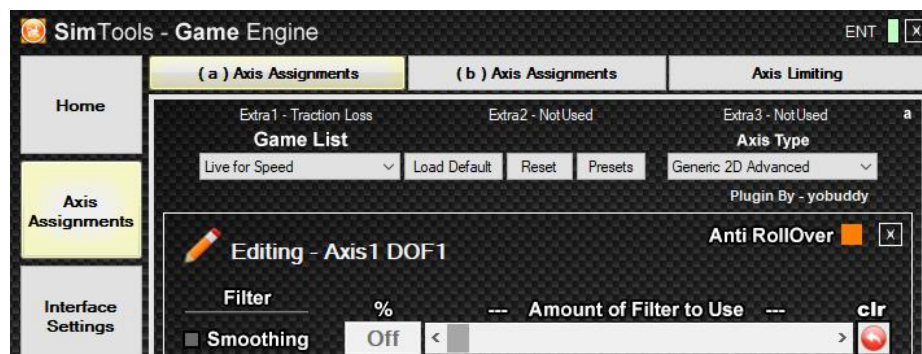


## Generic 2D Advanced

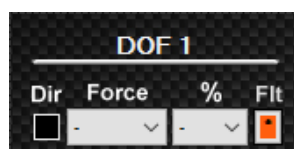
The Generic 2D Advanced axis type builds upon the Generic 2D Standard type by adding a new filter and settings for rotational to linear output correction.



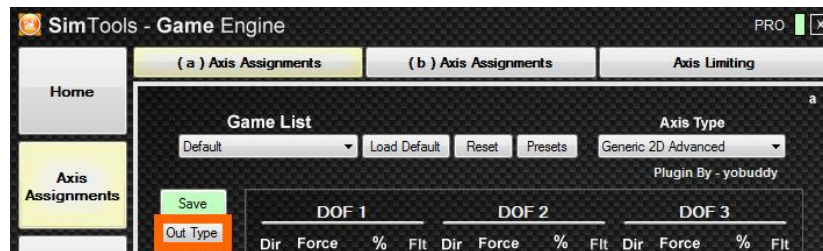
**Anti RollOver** – Click any of the “**Flt**” buttons to access the Anti RollOver setting for that axis and DOF. This setting returns the output value to zero when the input is at its max or min setting. For Instance, if we had a Max and a Min of 180°/-180° for an input and this setting was on, any values after 90° start counting back to zero. Making an input of 100° = 80°, 120° = 60°, and 180° = 0°. The same thing happens for the negative values also meaning that a -180° = 0°. (Note: This setting is only intended for the Roll and Pitch inputs from a game.)



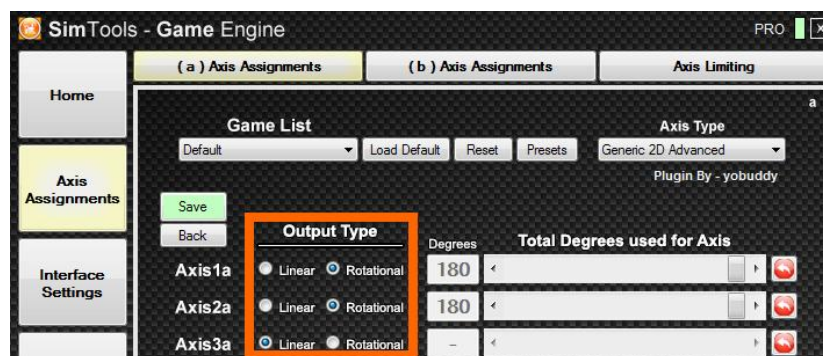
When Anti RollOver is selected, the Flt will turn orange as seen in the image below.



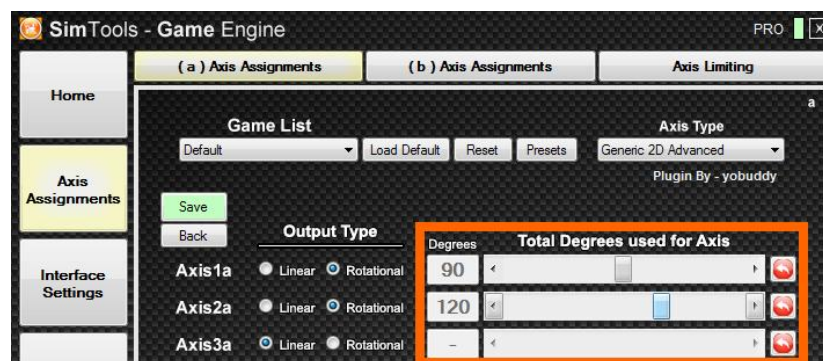
**Out Type** – You can get much better linearity from rotational connected equipment by using the rotational to linear output correction system. Click the “Out Type” button as seen in the image below to access these settings.



**Output Type** – This setting lets you select the output type you want for your axis. Linear output type is the default output type for SimTools and it can be selected here. Rotational output type can also be selected in order to make a rotational setup have a more linear output. (Note: The Total Degrees used for Axis should be set when using the rotational output type.)



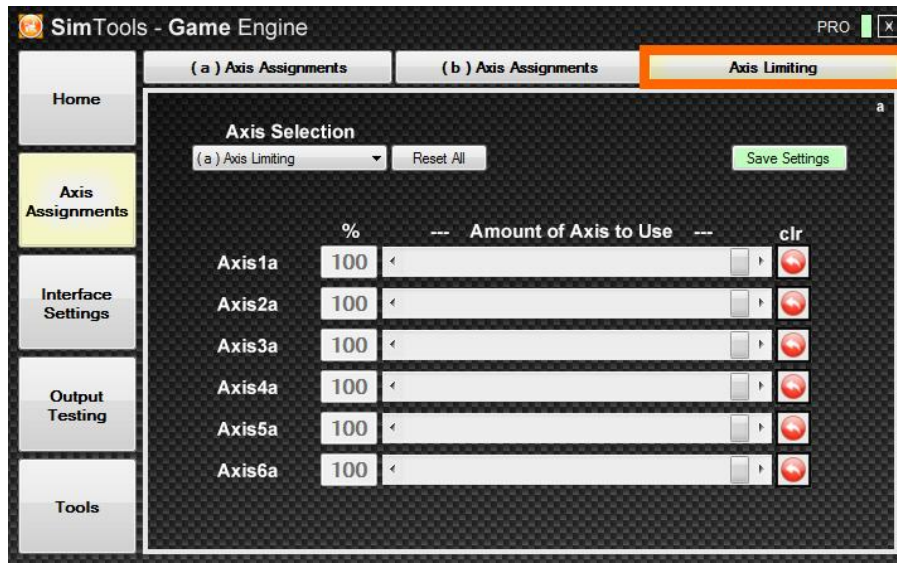
**Total Degrees used for Axis** – This is the total travel distance you have for the axis. In most cases the travel arm can swing 90° up to the sky and -90° down to the floor resulting in a setting of 180°. Be sure to also deduct any axis limiting you may be using from the axis. (Note: This setting is only available when Rotational Output Type is selected.)



[Back to Table of Contents](#)

## Axis Limiting

**Axis Limiting** – The Axis Limiting page will let you select the total percentage of an axis to use. This can be very helpful when you are worried your axis may hit its end limits. For example, setting the axis limiter to 90% will provide a 5% safety gap at each end of the axis. This means 10% of the axis will not be used. No clipping will occur from limiting an axis, because the output is remapped over the usable range.



You can also use this limiter to adjust for the amount of output you desire for a given simulator. For example, you can limit a 270° potentiometer to 180° of output, but this comes at a cost in resolution. Therefore, when possible potentiometer scaling should be done in the hardware you selected to run your simulator.

**Axis Selection** – Lets you select the (a) or (b) Axis Assignments axes for Limiting.



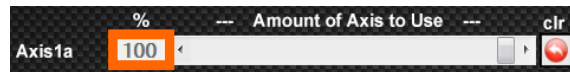
**Reset All** – Clears the form and sets all axes for the currently selected Axis Selection to 100%. (Default Value)



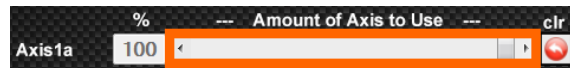
**Save Settings** – Saves the current selected settings.



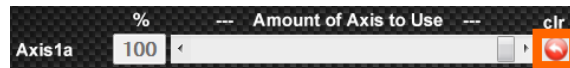
**% (Percent)** – This is the amount of axis to use as a percentage. This value changes when you move the Amount of Axis to Use slider bar.



**Amount of Axis to Use** – You can move the slider bar to adjust the amount of axis to use as a percentage. Axes are displayed in order from one to six.



**clr** – Click the “clr” button to reset the Amount of Axis to Use to the default value 100%.



[Back to Table of Contents](#)



## Interface Settings

The Interface Settings tab is where you can assign Axis Assignments to hardware connected to the computer. You can have up to six interfaces running hardware at the same time. (Although most people will only need one or two)



SimTools provides the following interfaces to be used with different hardware you might want to run with your simulator.

If the provided interfaces do not run the hardware you have, or you wish to build your own custom hardware for your project; you can learn about building a custom interface plugin with the SimTools Interface API here:

<https://www.xsimulator.net/community/threads/how-to-write-an-interface-plugin-for-simtools-2-0-api-documentation.8813/>

We will go over all of the interfaces provided with SimTools below. Please note that since anyone can build and share an interface plugin for SimTools, there may be more interface plugins posted that SimTools can use to connect to different types of equipment. You can look for more interface plugins for SimTools by looking in the interface plugin section on XSimulator.net found here:

<https://www.xsimulator.net/community/marketplace/categories/interface-plugins.35/>

The following settings and selections will be available for all interface type: (Note: Interface Type needs to be selected before anything on the page is accessible.)

**Presets** – You can select any presets you have available.



**Create Preset** – You can configure the settings for any interface type and save them as a preset to be used later.



**Reset** – Clears the form and deletes any saved settings for the current selected interface.



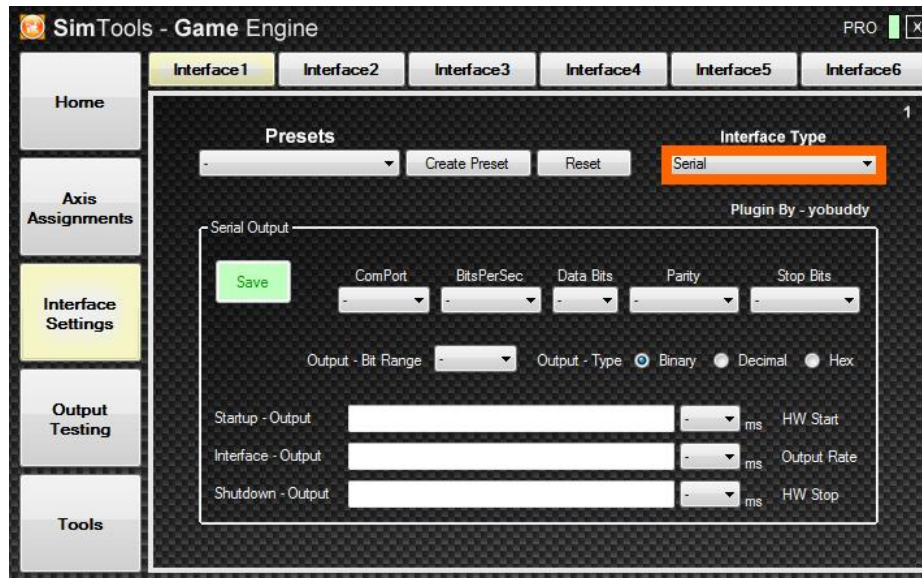
**Interface Type** – These are all the interface plugins available.



[Back to Table of Contents](#)

## Serial Interface

**Serial** – This Interface can be configured for many types of interfaces on the market where a serial connection is required. It can be configured to work with many interfaces whether they are a DIY solution or off the shelf part like an Arduino.



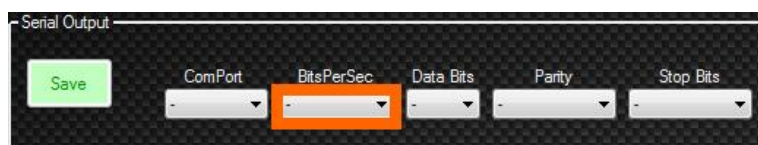
**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



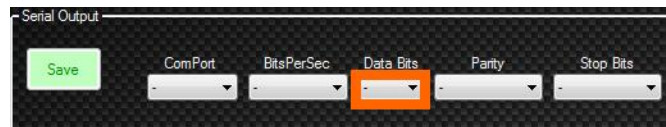
**ComPort** – Select the com port the interface is connected to.



**BitsPerSec** – Select the speed that the interface runs at. This is frequently set to “115200” bits per second.



**DataBits** – Select the number of data bits in each character. This is frequently set to “8” bits.

A screenshot of a 'Serial Output' configuration window. It features a 'Save' button on the left and five dropdown menus on the right labeled 'ComPort', 'BitsPerSec', 'Data Bits', 'Parity', and 'Stop Bits'. The 'Data Bits' dropdown menu is highlighted with an orange rectangle.

**Parity** – Select a parity bit. This is a method of detecting errors in data transmission and is frequently set to "None".

A screenshot of a 'Serial Output' configuration window, identical to the previous one. The 'Parity' dropdown menu is highlighted with an orange rectangle.

**StopBits** – Select the number of bits that will allow the hardware to detect the end of a character. This is frequently set to "1" bit.

A screenshot of a 'Serial Output' configuration window, identical to the previous ones. The 'Stop Bits' dropdown menu is highlighted with an orange rectangle.

**Output - Bit Range** – Select the number of bits the interface is expecting when setting a new target point. Most interfaces at this time use 8 bit or 0 to 255. The Output - Bits settings allows for interface target points to be from 8 to 32 bits.

A screenshot of an 'Output' configuration window. It has a dropdown menu for 'Output - Bit Range' and three radio buttons for 'Output - Type' labeled 'Binary', 'Decimal', and 'Hex'. The 'Output - Bit Range' dropdown menu is highlighted with an orange rectangle.

**Output - Type** – Select the format in which the new target points are presented to the interface. (Note: More information on Output - Type can be found in [Appendix A](#) of this manual.)

A screenshot of an 'Output' configuration window, identical to the previous one. The 'Binary' radio button under 'Output - Type' is highlighted with an orange rectangle.

**Startup - Output** – You may use <x> anywhere in the output string (where x = 0 through 255) to send an ASCII char for the value of <x>. Other than that, what you type here is exactly what is sent to the controller. This area can be left blank if no commands are needed before Interface output begins.

A screenshot of a 'Startup' configuration window. It contains three rows: 'Startup - Output', 'Interface - Output', and 'Shutdown - Output'. Each row has a text input field followed by a dropdown menu and a unit label ('ms'). The 'Startup - Output' text input field is highlighted with an orange rectangle.



**HW Start** - The number of milliseconds after the Startup output has been sent to continue with Interface Output. This selection is not needed if Startup Output is not used.

A screenshot of a control interface with three rows: 'Startup - Output', 'Interface - Output', and 'Shutdown - Output'. Each row has a text input field, a dropdown menu, and a unit label 'ms'. The 'HW Start' label is to the right of the first dropdown. The 'Output Rate' label is to the right of the second dropdown. The 'HW Stop' label is to the right of the third dropdown. The first dropdown menu is highlighted with an orange box.

**Interface - Output** – This is where you enter user formatted output. You are able to define a formatted output string of what the output will consist of. You can use the following to get any of the axis values: <Axis1a>, <Axis2a>, <Axis3a>, <Axis4a>, <Axis5a>, <Axis6a>, <Axis1b>, <Axis2b>, <Axis3b>, <Axis4b>, <Axis5b>, <Axis6b> anywhere in the output string you want. You can also use <x> anywhere in the output string (where x = 0 through 255) to send an ASCII char for the value of <x>.

A screenshot of the same control interface. The 'Interface - Output' text input field is highlighted with an orange box.

**Output Rate** – Select how often to send Interface Output data in milliseconds.

A screenshot of the same control interface. The 'Output Rate' dropdown menu is highlighted with an orange box.

**Shutdown - Output** – You may use <x> anywhere in the output string (where x = 0 through 255) to send an ASCII char for the value of <x>. Other than that, what you type here is exactly what is sent to the controller. This area can be left blank if no commands are needed after Interface output shuts down.

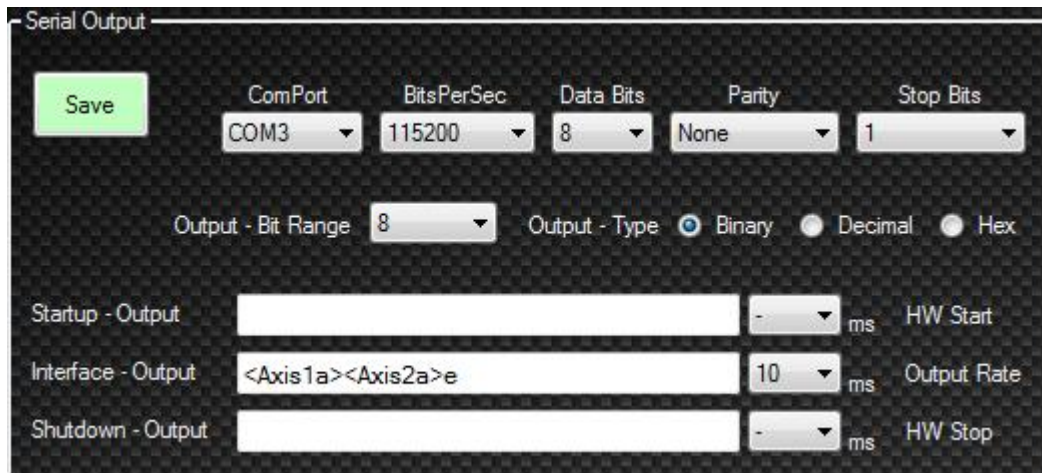
A screenshot of the same control interface. The 'Shutdown - Output' text input field is highlighted with an orange box.

**HW Stop** – Select the number of milliseconds after the Interface Output stops to continue with Shutdown Output. This selection is not needed if Shutdown Output is not used.

A screenshot of the same control interface. The 'HW Stop' dropdown menu is highlighted with an orange box.

## Example

In the picture below you can see that we use "<Axis1a><Axis2a>e" as the string for our Interface - Output. We have "Binary" selected for Output - Type and "8" bit selected for Output - Bit Range. We can expect our output to look like "cde" when Axis1a = 99 and Axis2a = 100. Remember Binary = one character between 0 and 255. When the interface receives this string "cde" it recognizes the "c" as 99 and the "d" as 100. Then finds the trailing "e", which for this example tells the interface it is a valid update.



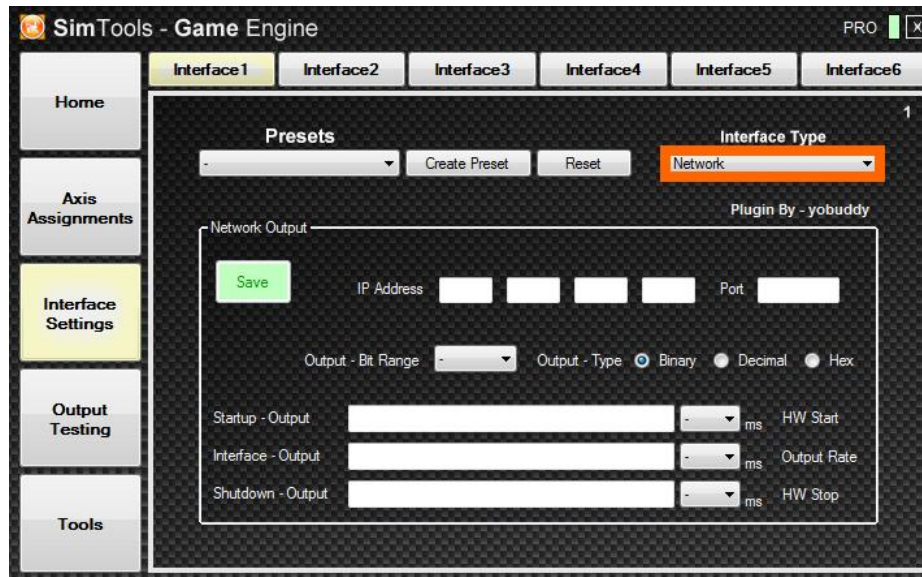
The screenshot shows a 'Serial Output' configuration window. It features a 'Save' button in the top left. Below it are several dropdown menus: 'ComPort' (set to COM3), 'BitsPerSec' (set to 115200), 'Data Bits' (set to 8), 'Parity' (set to None), and 'Stop Bits' (set to 1). Further down, there is an 'Output - Bit Range' dropdown (set to 8) and an 'Output - Type' section with three radio buttons: 'Binary' (selected), 'Decimal', and 'Hex'. At the bottom, there are three rows of configuration: 'Startup - Output' with a text field and a dropdown set to 'ms' and 'HW Start'; 'Interface - Output' with a text field containing '<Axis1a><Axis2a>e', a dropdown set to '10', 'ms', and 'Output Rate'; and 'Shutdown - Output' with a text field, a dropdown set to 'ms', and 'HW Stop'.

More information on User Formatted Output can be found in [Appendix B](#) of this manual.

[Back to Table of Contents](#)

## Network Interface

**Network** – This interface can be configured for many types of interfaces on the market where a UDP connection is required.



**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



**IP Address** – Enter the IP address of the target device you are trying to send the data to.



**Port** – Enter the port of the target device you are trying to send the data to.



**Output - Bit Range** – Select the number of bits the interface is expecting when setting a new target point. Most interfaces at this time use 8 bit or 0 to 255. The Output - Bits settings allows for interface target points to be from 8 to 32 bits.



**Output - Type** – Select the format in which the new target points are presented to the interface. (Note: More information on Output - Type can be found in [Appendix A](#) of this manual.)



**Startup - Output** – You may use <x> anywhere in the output string (where x = 0 through 255) to send an ASCII char for the value of <x>. Other than that, what you type here is exactly what is sent to the controller. This area can be left blank if no commands are needed before Interface output begins.



**HW Start** - The number of milliseconds after the Startup output has been sent to continue with Interface Output. This selection is not needed if Startup Output is not used.



**Interface - Output** – This is where you enter user formatted output. You are able to define a formatted output string of what the output will consist of. You can use the following to get any of the axis values: <Axis1a>, <Axis2a>, <Axis3a>, <Axis4a>, <Axis5a>, <Axis6a>, <Axis1b>, <Axis2b>, <Axis3b>, <Axis4b>, <Axis5b>, <Axis6b> anywhere in the output string you want. You can also use <x> anywhere in the output string (where x = 0 through 255) to send an ASCII char for the value of <x>.



**Output Rate** – Select how often to send Interface Output data in milliseconds.

Startup - Output	<input type="text"/>	-	ms	HW Start
Interface - Output	<input type="text"/>	-	ms	Output Rate
Shutdown - Output	<input type="text"/>	-	ms	HW Stop

**Shutdown - Output** – You may use <x> anywhere in the output string (where x = 0 through 255) to send an ASCII char for the value of <x>. Other than that, what you type here is exactly what is sent to the controller. This area can be left blank if no commands are needed after Interface output shuts down.

Startup - Output	<input type="text"/>	-	ms	HW Start
Interface - Output	<input type="text"/>	-	ms	Output Rate
Shutdown - Output	<input type="text"/>	-	ms	HW Stop

**HW Stop** – Select the number of milliseconds after the Interface output Stops to continue with Shutdown Output. This selection is not needed if Shutdown Output is not used.

Startup - Output	<input type="text"/>	-	ms	HW Start
Interface - Output	<input type="text"/>	-	ms	Output Rate
Shutdown - Output	<input type="text"/>	-	ms	HW Stop

## Example

In the picture below you can see that we use "<Axis1a><Axis2a>e" as the string for our Interface - Output. We have "Binary" selected for Output - Type and "8" bit selected for Output - Bit Range. We can expect our output to look like "cde" when Axis1a = 99 and Axis2a = 100. Remember Binary = one character between 0 and 255. When the interface receives this string "cde" it recognizes the "c" as 99 and the "d" as 100. Then finds the trailing "e", which for this example tells the interface it is a valid update.



The screenshot shows a configuration window titled "Network Output". It features a green "Save" button. The IP Address is set to 127.0.0.1 and the Port is 21. The Output - Bit Range is set to 8. The Output - Type is set to Binary (selected with a radio button), with Decimal and Hex as options. The Startup - Output field is empty, with a dropdown set to "-" ms and a label "HW Start". The Interface - Output field contains the string "<Axis1a><Axis2a>e", with a dropdown set to 10 ms and a label "Output Rate". The Shutdown - Output field is empty, with a dropdown set to "-" ms and a label "HW Stop".

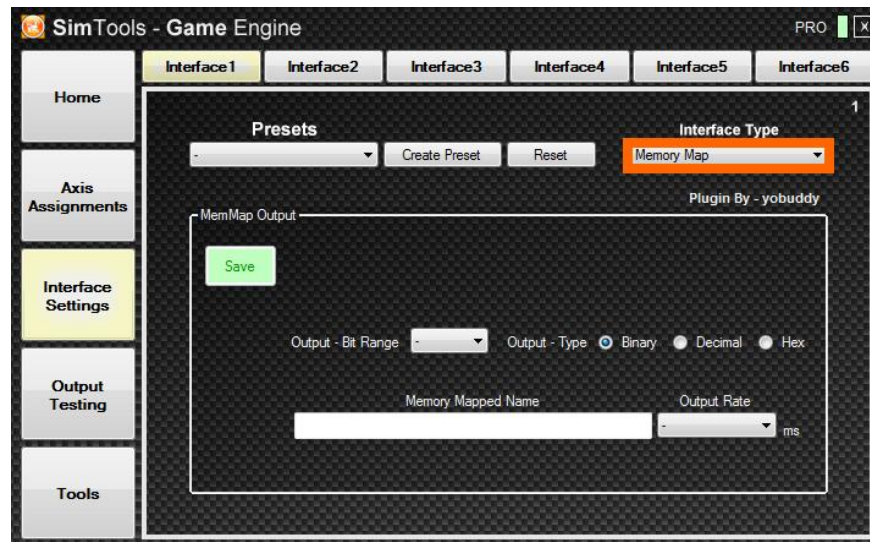
More information on User Formatted Output can be found in [Appendix B](#) of this manual.

[Back to Table of Contents](#)



## Memory Map Interface

**Memory Map** – This interface can be configured to place a string in memory that contains all 12 of the axis outputs from SimTools. The output placed in memory will be located at the Memory Mapped Name configured below.



**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



**Output - Bit Range** – Select the number of bits the interface is expecting when setting a new target point. Most interfaces at this time use 8 bit or 0 to 255. The Output - Bits settings allows for interface target points to be from 8 to 32 bits.



**Output - Type** – Select the format in which the new target points are presented to the interface. (Note: More information on Output - Type can be found in [Appendix A](#) of this manual.)



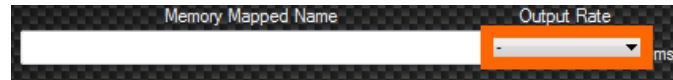


**Memory Mapped Name** – The name of the Memory Mapped file in memory.



A screenshot of a software interface showing two controls. On the left, a text input field labeled "Memory Mapped Name" is highlighted with an orange border. On the right, a dropdown menu labeled "Output Rate" is shown with a small arrow pointing down, and the unit "ms" is displayed to its right.

**Output Rate** – How often to send Interface Output data in milliseconds.



A screenshot of a software interface showing two controls. On the left, a text input field labeled "Memory Mapped Name" is shown. On the right, a dropdown menu labeled "Output Rate" is highlighted with an orange border, and the unit "ms" is displayed to its right.

[Back to Table of Contents](#)

## SCN Interface

**SCN** – This interface can be configured to drive two SCN actuators. All of the SCN actuators we have seen come from the factory with the ID = 0. If you change an actuator to be ID = 1 with the manufacturers provided tools, you can drive two SCN actuators per SimTools interface.



**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



**Assigned Axis ID = 0** – Select the output axis you want to tie to the actuator that has its ID equal to zero.



**ComPort** – Select the COM port the interface is connected to.



**Output Rate** – Select how often to send interface output data in milliseconds.



**Assigned Axis ID = 1** – Select the output axis you want to tie to the actuator that has its ID equal to one.



**Speed** - The top speed of the actuator, how quickly we try to follow our set target.



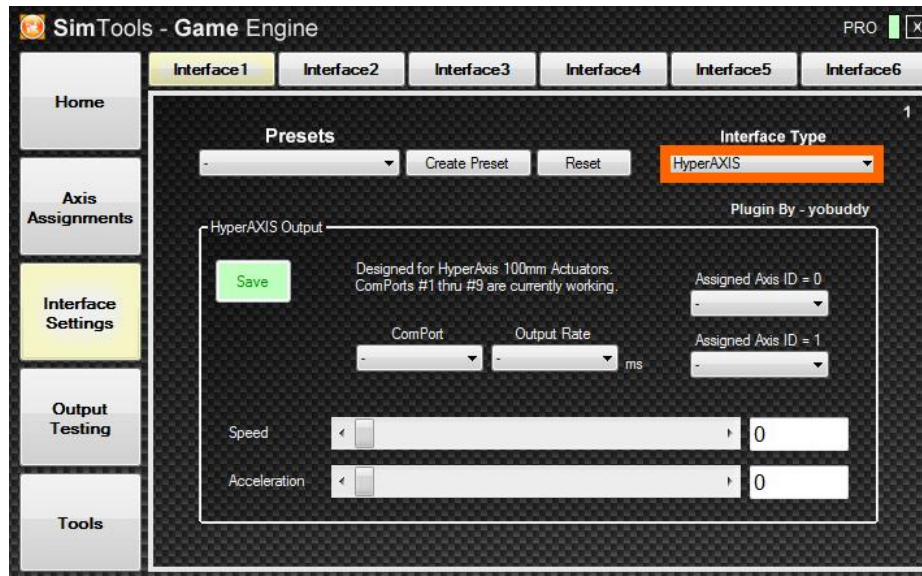
**Acceleration** - How quickly the actuators react to changes to its target location.



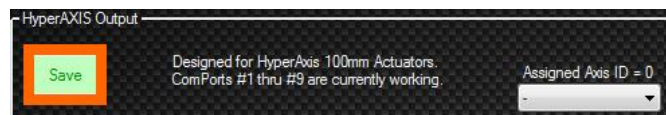
[Back to Table of Contents](#)

## HyperAxis Interface

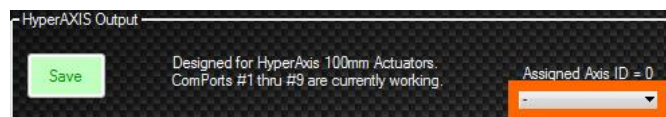
**HyperAXIS** – This interface is for fixed length HyperAXIS 100mm actuators. This Interface can be configured to drive up two HyperAXIS actuators. All of the HyperAXIS actuators we have seen come from the factory with the ID = 0. If you change an actuators ID = 1 with the manufacturers provided tools, you can drive two HyperAXIS actuators per SimTools interface.



**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



**Assigned Axis ID = 0** – Select the output axis you want to tie to the actuator that has its ID equal to zero.



**ComPort** – Select the COM port the interface is connected to.



**Output Rate** – Select how often to send interface output data in milliseconds.



**Assigned Axis ID = 1** – Select the output axis you want to tie to the actuator that has its ID equal to one.



**Speed** - The top speed of the actuator, how quickly we try to follow our set target.



**Acceleration** - How quickly the actuators react to changes to its target location.



[Back to Table of Contents](#)

## JRK Interface

**JRK** – This Interface can be configured to run many of the JRK line of motor driver/controllers. SimTools versions above v2.2.5 will also run the new G2 line of motor driver/controllers from this manufacturer.



**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



**Device Number** – Select the device number of an attached JRK device. (Note: JRK's will be listed in the dropdown box for easy user selection)



**Assigned Axis** – Select the output axis you want to tie to your equipment.



**Output Rate** – Select how often to send interface output data in milliseconds.

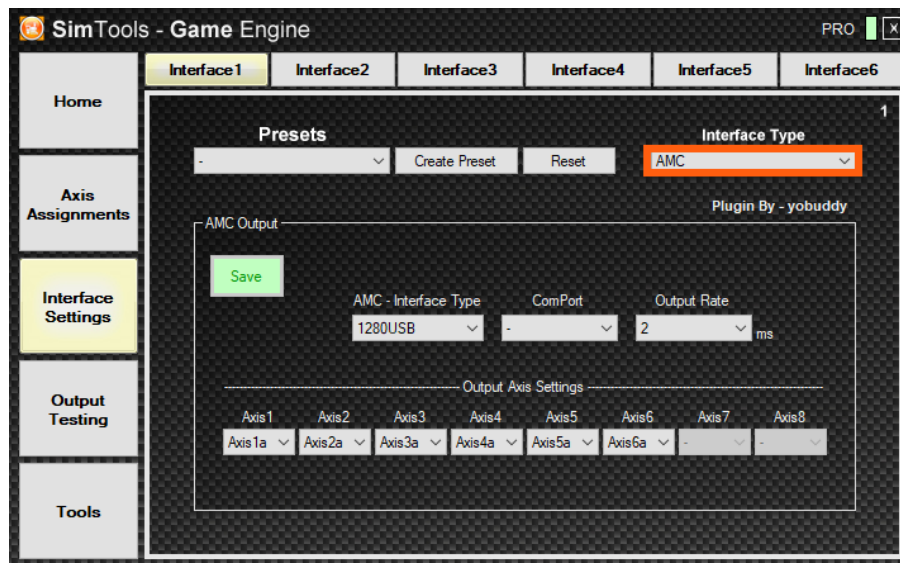


[Back to Table of Contents](#)



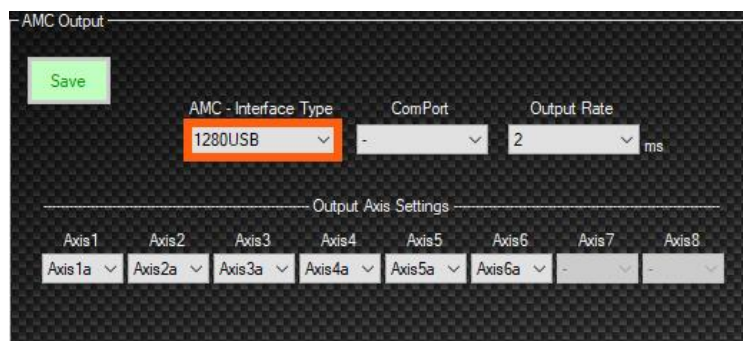
## AMC

The AMC universal Interface is designed to run all of Thanos's AMC interfaces. Depending on the "AMC – Interface Type" you select, the number of "Output Axis Settings" that are available will be configurable.



**AMC - Interface Type** – Select the AMC interface type that you are configuring the interface for. (All options are shown below)

**1280 USB** – This interface is designed to run Thanos's AMC 1280 USB.





**AASD15A** – This interface is designed to run Thanos’s AMC AASD15A.

The screenshot shows the 'AMC Output' configuration window. At the top left is a green 'Save' button. Below it, the 'AMC - Interface Type' dropdown is set to 'AASD15A' and is highlighted with an orange border. To its right, the 'ComPort' dropdown is set to '-' and the 'Output Rate' is set to '2' ms. Below these settings is a section titled 'Output Axis Settings' with eight columns labeled Axis1 through Axis8. Each column has a dropdown menu: Axis1 (Axis1a), Axis2 (Axis2a), Axis3 (Axis3a), Axis4 (Axis4a), Axis5 (Axis5a), Axis6 (Axis6a), Axis7 (Axis1b), and Axis8 (-).

**MDBOX** – This interface is designed for Thanos’s AMC MDBOX.

The screenshot shows the 'AMC Output' configuration window. The 'AMC - Interface Type' dropdown is set to 'MDBOX' and is highlighted with an orange border. The 'ComPort' dropdown is set to '-' and the 'Output Rate' is set to '2' ms. The 'Output Axis Settings' section has eight columns: Axis1 (Axis1a), Axis2 (Axis2a), Axis3 (Axis3a), Axis4 (Axis4a), Axis5 (Axis5a), Axis6 (Axis6a), Axis7 (Axis1b), and Axis8 (Axis2b).

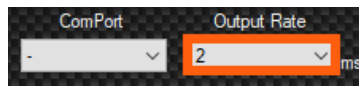
**NANO** – This interface is designed for Thanos’s AMC NANO.

The screenshot shows the 'AMC Output' configuration window. The 'AMC - Interface Type' dropdown is set to 'NANO' and is highlighted with an orange border. The 'ComPort' dropdown is set to '-' and the 'Output Rate' is set to '2' ms. The 'Output Axis Settings' section has eight columns: Axis1 (Axis1a), Axis2 (Axis2a), Axis3 (Axis3a), Axis4 (Axis4a), Axis5 (-), Axis6 (-), Axis7 (-), and Axis8 (-).

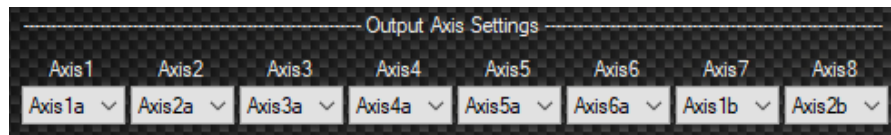
**ComPort** – Select the COM port the interface is connected to.

A close-up of the 'ComPort' and 'Output Rate' settings. The 'ComPort' dropdown is set to '-' and is highlighted with an orange border. The 'Output Rate' is set to '2' ms.

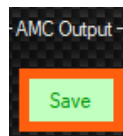
**Output Rate** – Select how often to send interface output data in milliseconds. The AMC default setting is 2 ms, so this setting is already selected for you.



**Output Axis Settings** – Reconfigure the output axis in any order needed for your simulator build.



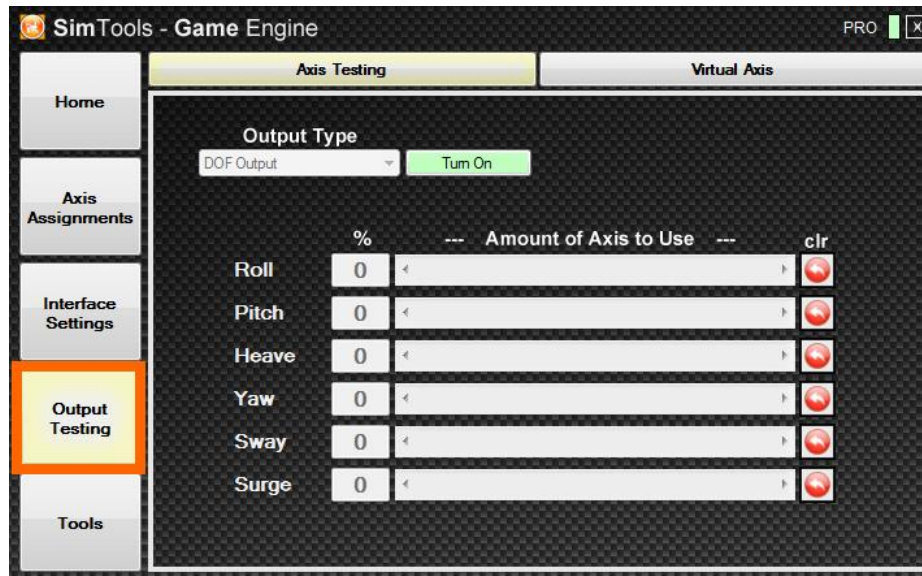
**Save** – Saves the current interface output selections to Game Engine. These settings will be used the next time a game launches.



[Back to Table of Contents](#)

## Output Testing

**Output Testing** – Once you have [Axis Assignments](#) and [Interface Settings](#) configured correctly, you can test output to your interfaces. This is very helpful for making sure your interfaces are working correctly. It also helps you understand how to mix DOFs (Degrees of Force) correctly to create the best possible experience on your motion simulator.



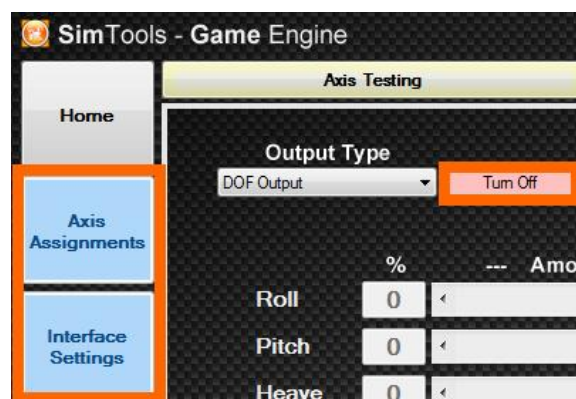
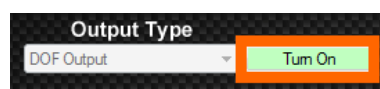
[Back to Table of Contents](#)

## Axis Testing

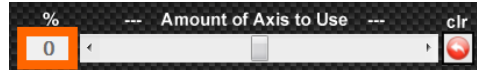
**Axis Testing** – This allows you to directly test your axes or Axis Assignments to make sure they are configured and working correctly.



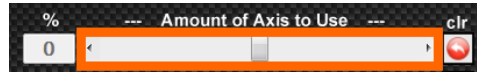
**Turn On/Off** – You must click “Turn On” to access options on this page. Notice that Axis Assignments and Interface Settings turn blue when Axis Testing is turned on. This means that you are not able to modify any Axis Assignments or Interface Settings during Axis Testing. Also, notice the “Turn On” button turns red and changes to “Turn Off”. If your Interface Settings are configured correctly, your interfaces should show they are receiving data and most will come to their center positions and await the next command.



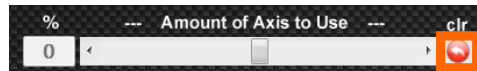
% – This displays the percent of change.



**Amount of Axis to Use** – This scroll bar allows you to test your axes or Axis Assignments by moving from -100% to 100% where zero is center.

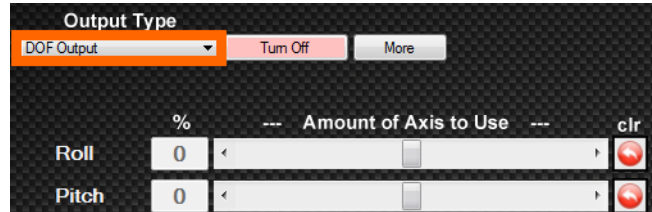


**clr** – The “clr” button resets the value to zero. This should be your center.

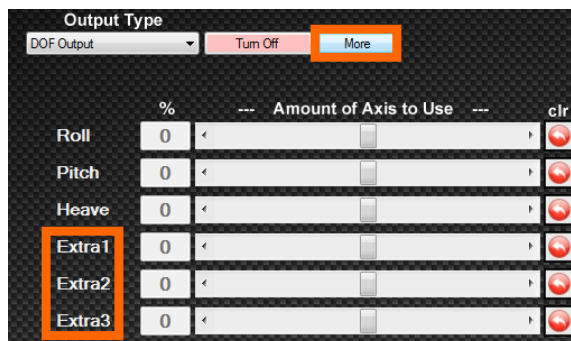


**Output Type** – Select the type of output you are testing. You are able to test output in two ways.

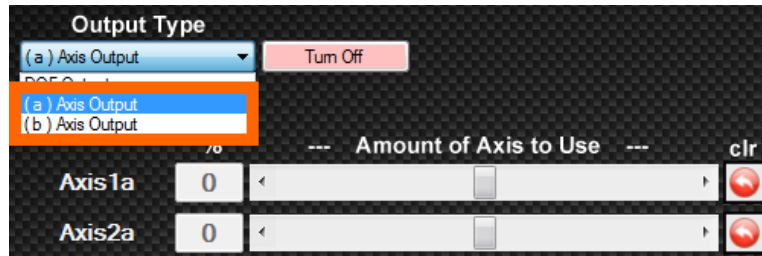
- 1) **DOF Output** – This is the default option that allows you to simulate Roll, Pitch, Heave, Yaw, Sway and Surge as if the simulator was receiving these values from a game plugin. Moving the Roll slider left and right should move your simulator from side to side. Moving the Pitch slider left and right should tip the simulator forward and back.



**More** – The “More” button only appears when DOF Output is selected. This allows you to test Extra1, Extra2 and Extra3 if they are setup and configured correctly.



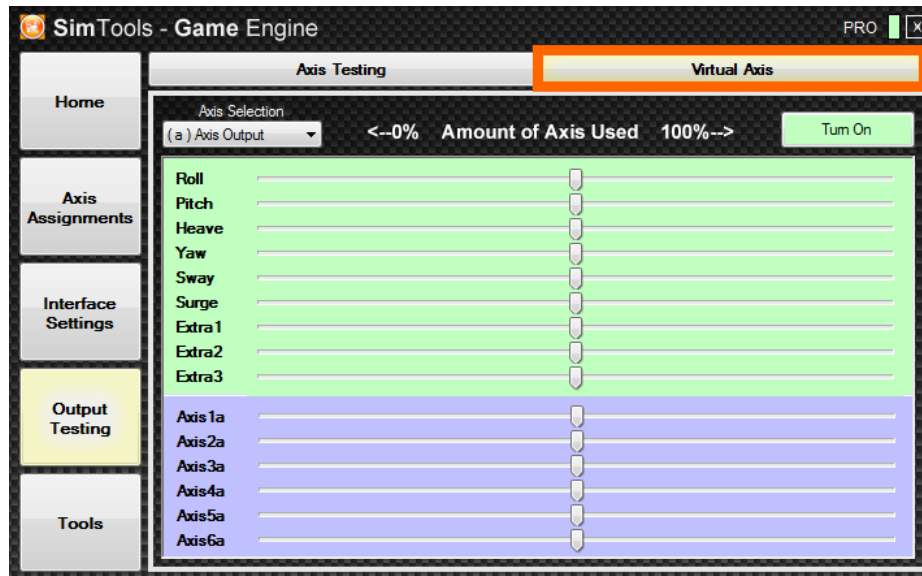
- 2) **(a) Axis Output or (b) Axis Output** – These selections provide simple per-axis output allowing you to move all individual axes independent of any DOF settings. This is simply direct output control to and from their configured limits. Moving the Axis1a slider left and right should move the configured axis accordingly. (Note: The output may skip some output numbers when the sliders are scrolled. This is normal behavior.)



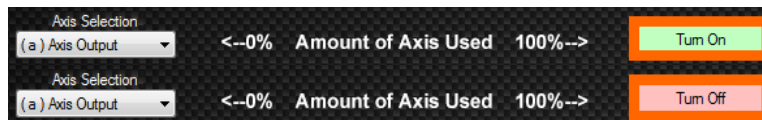
[Back to Table of Contents](#)

## Virtual Axes

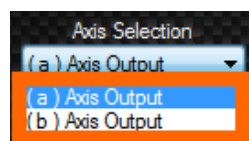
**Virtual Axis** – This allows you to verify that the data coming from a game plugin is actually moving your axes and axis assignments correctly. Virtual Axis only works with a game running. Once the game is running and Virtual Axis is turned on, you should be able to drive or fly in the game and see corresponding movements for each axis and DOF.



**Turn On/Off** – Click “Turn On” to receive data. Notice the “Turn On” button turns red and changes to “Turn Off”. Data should stop when the game ends or you click “Turn Off”.

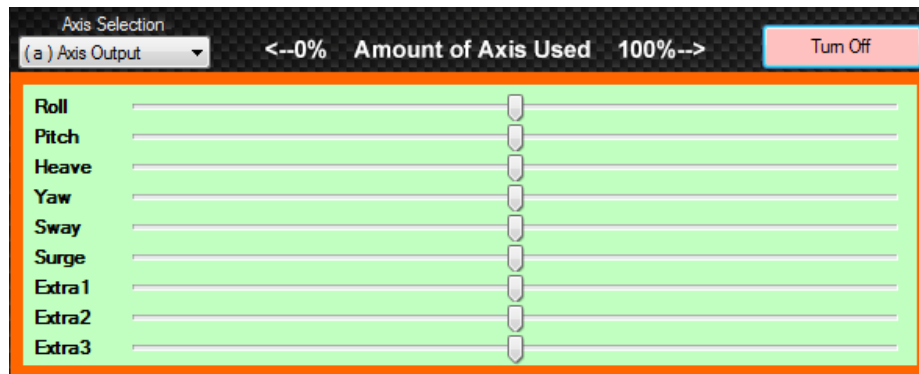


**Axis Selection** – Select the axis outputs (a) or (b) that you want to test.

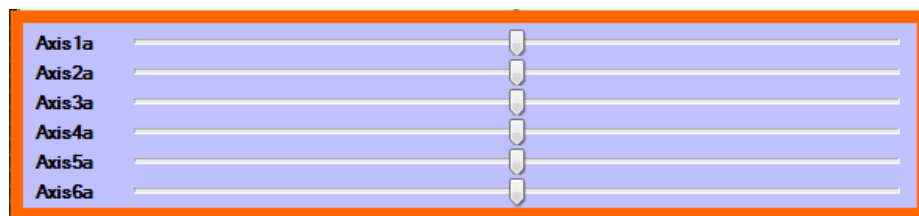




**0% Amount of Axis Used 100%** – The top green portion shows incoming telemetry data from the game that is currently running. You are able to see the DOF movement combined with any profile selections you are running at the time.



The bottom purple portion shows the axis mixing output you setup in the [Axis Assignments](#) section. You are able to see what the output of your axis assignments look like while a game is running. Make sure the output looks correct here before you try your first live run on any new simulator.



[Back to Table of Contents](#)

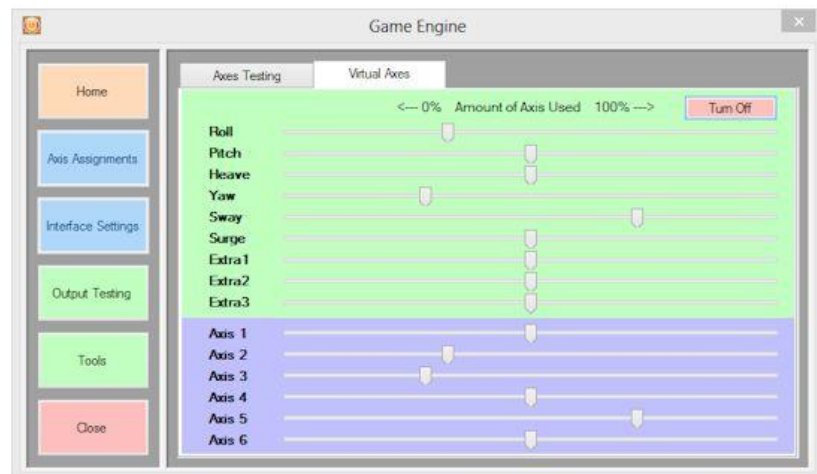
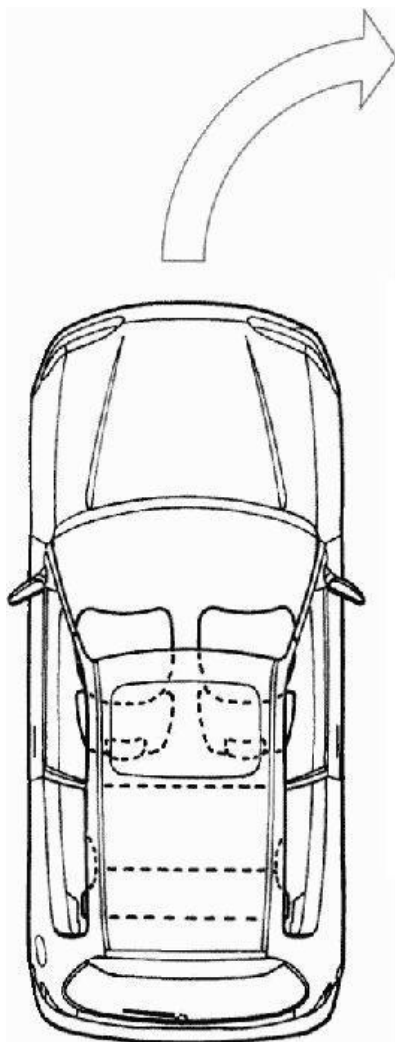
## Directions of Movement in SimTools

Below are example car movements and the corresponding direction each slider moves.

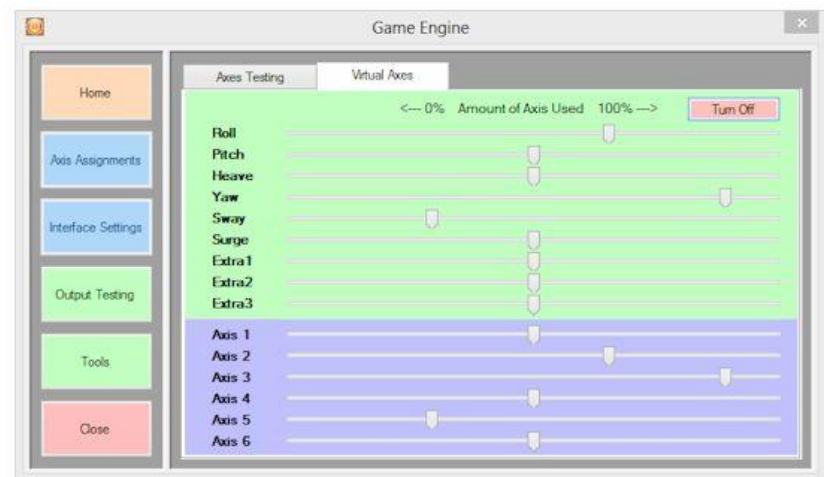
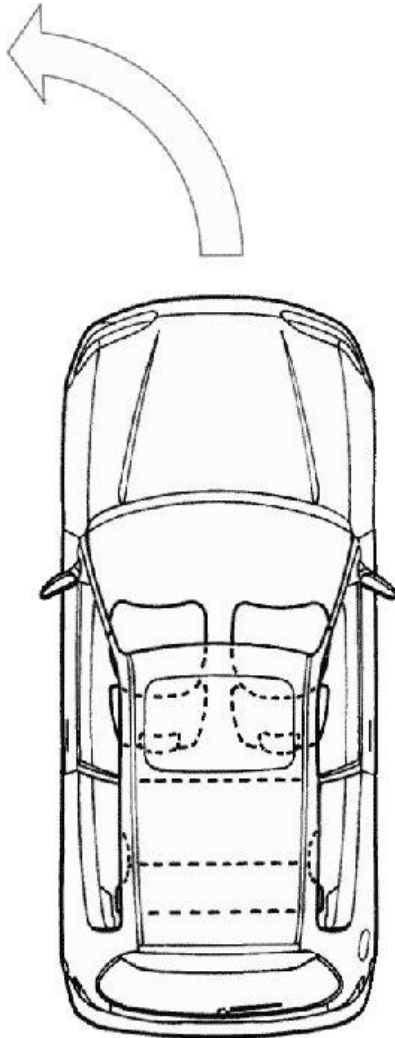
**Acceleration** – The Pitch Slider should move to the left and the Surge Slider should move to the right.

**Deceleration** (braking) – The Pitch Slider should move to the right and the Surge Slider should move to the left.

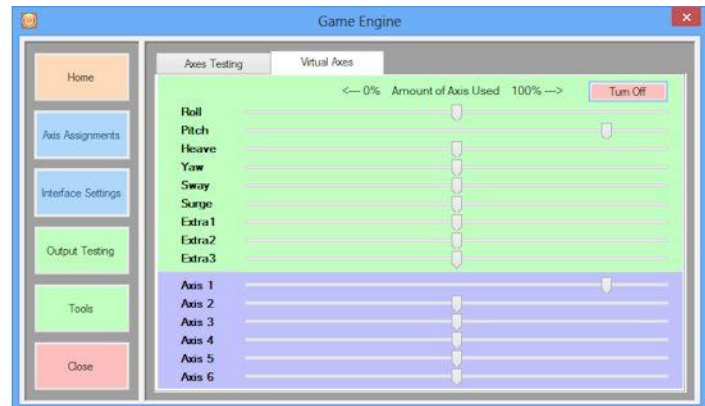
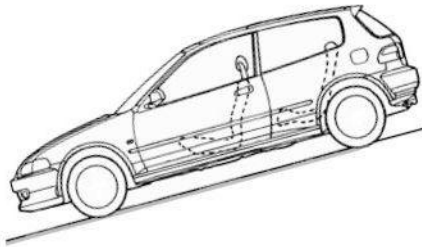
**Right turn** – The Roll Slider should move to the left, the Sway Slider should move to the right and the Yaw Slider should move to the left.



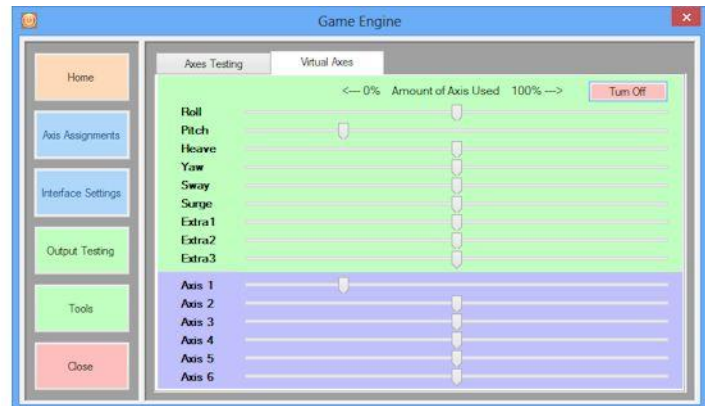
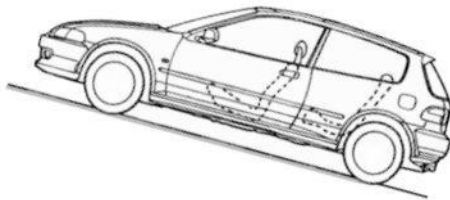
**Left turn** – The Roll Slider should move to the right, the Sway Slider should move to the left and the Yaw Slider should move to the right.



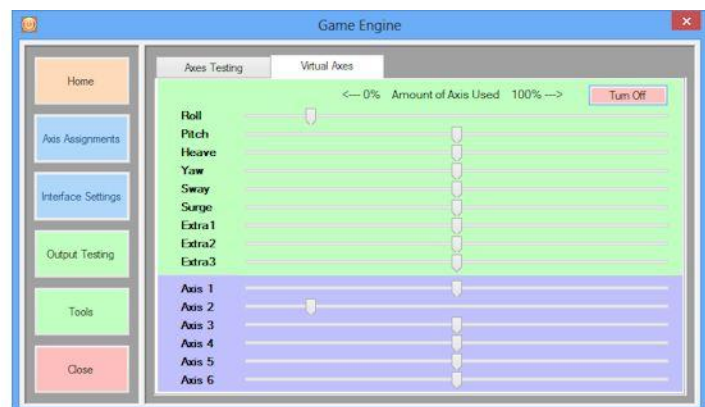
**Driving Downhill** – The Pitch Slider should move to the right.



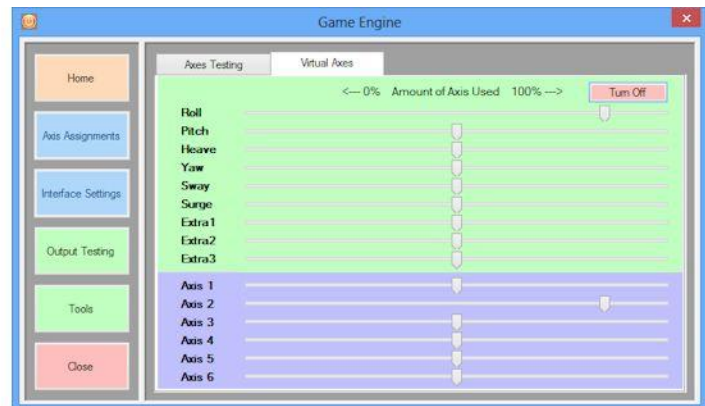
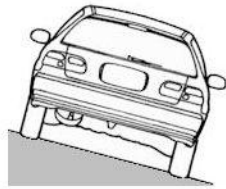
**Driving Uphill** – The Pitch Slider should move to the left.



**Tilted Left** – The Roll Slider should move to the left.



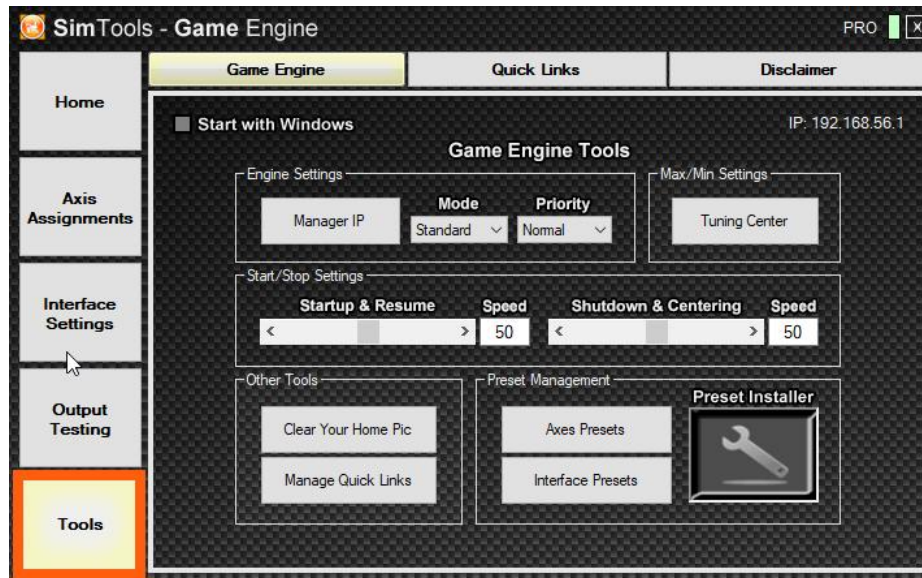
**Tilted Right** – The Roll Slider should move to the right.



[Back to Table of Contents](#)

## Tools

**Tools** – This section has a collection of helpful utilities for Game Engine, a Quick Links launching center and a basic Disclaimer where you can review some basic licensing information.

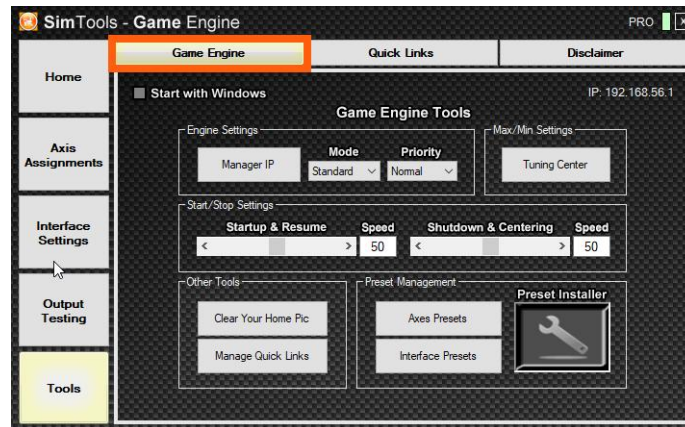


[Back to Table of Contents](#)



## Game Engine Tools

The Game Engine section of Tools is where you can manage presets and find IP settings, Tuning Center and other related tools.



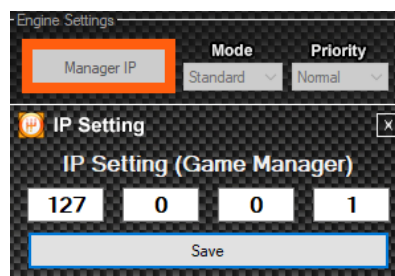
**Start with Windows** – Check this to start Game Engine when Windows starts up.



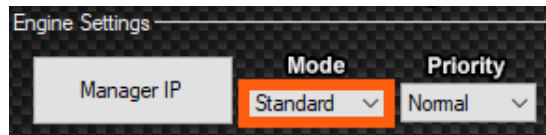
**IP** – This displays the IP of the computer running Game Engine.

IP: 192.168.56.1

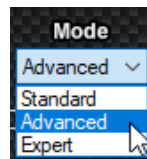
**Manager IP** – This is the IP address of the computer running Game Manager. This defaults to 127.0.0.1. If you are using a dual computer setup, then you need to change the IP address to the computer running Game Manager and click “Save”.



**Mode** – Game Engine has three different running modes to choose from. The mode you choose depends on the level of tuning you wish to do with your setup. You can change the Game Engine Mode at any time, so it is best to start with the Standard mode. (Standard mode is strongly suggested for new users.)

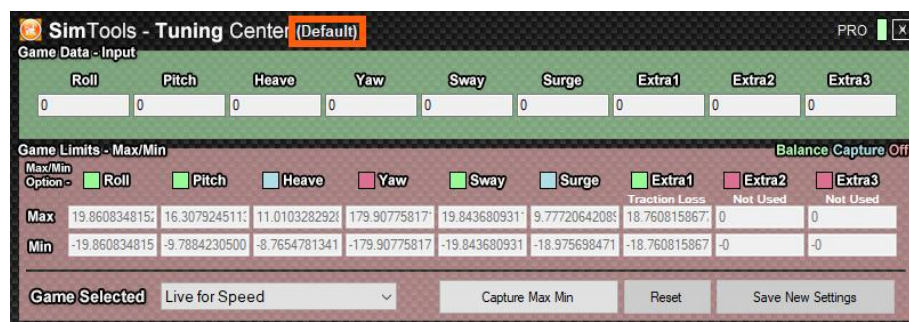


- 1) mode is shown above and is the default mode for SimTools. You will only have one Max/Min file per game plugin. In this mode you will only need to tune in a game one time with the SimTools tuning center. This mode is strongly suggested for all new users.
- 2) **Advanced** mode will allow you to set per “Game Manager Profile” Max/Min settings. For every Game Manager Profile you have for a game, you also have a separate Max/Min file that it is tied to. This can be helpful when you want to tune in each vehicle separately with its own set of Max/Min numbers.

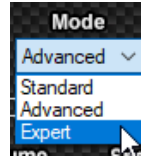


You adjust these settings in the Tuning Center. We will discuss this in more detail in the [Tuning Center](#) section below.

As you can see in the image below we are tuning the Max/Min settings for the “Default” Game Manager Profile. This name will change to the profile name you have selected in Game Manger.

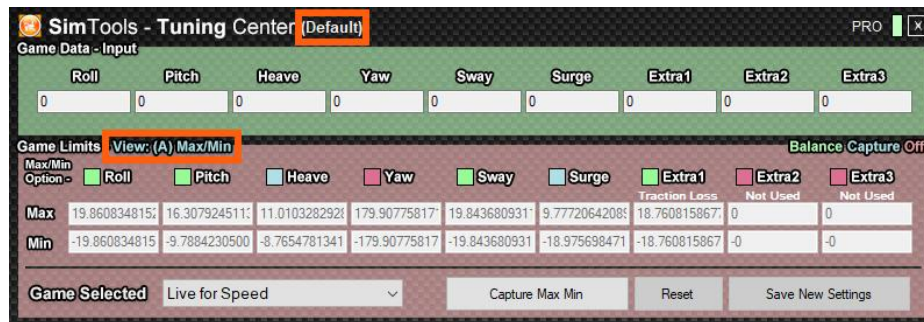


- 3) **Expert** mode will allow you to set per “Game Manager Profile” Max/Min settings. For every Game Manager Profile you have for a game, you also have a separate Max/Min file that it is tied to. Expert mode also allows you to have separate Max/Min files for Axis Assignments (a) and Axis Assignments (b).

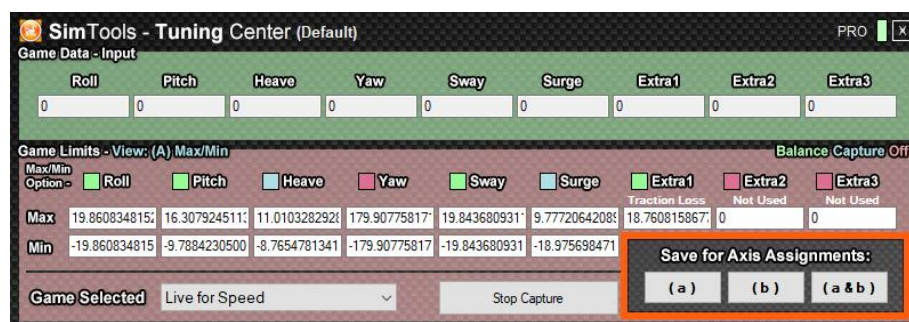
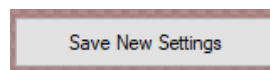


You adjust these settings in the Tuning Center. We will discuss in more detail in the [Tuning Center](#) section below.

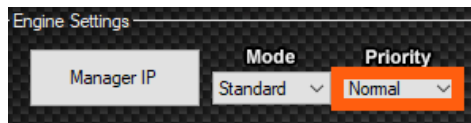
As you can see in the image below we are looking at the Max/Min settings for (A) Axis Assignments. You can also see that the “Default” profile is being displayed in the title bar.



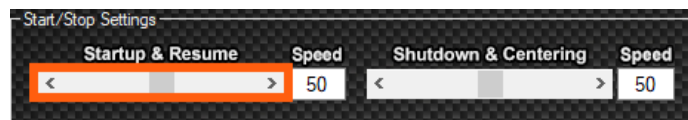
Click “Save New Settings” to select what Axis Assignments you want to save the new settings for.



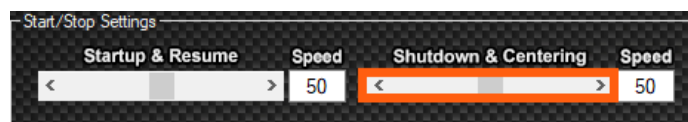
**Priority** – This informs Windows what priority Game Engine can run at. You can select “Normal”, “Medium” or “High” priority for Game Engine.



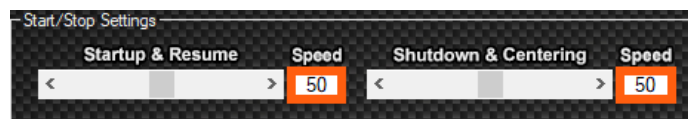
**Startup & Resume** – Adjusting this allows you to change how fast or slow your simulator gets up to speed when a game starts up or after unpausing a game. (Note: If a game continues to send packets when paused, the centering and resume will not take place. It simply depends on the game being played.)



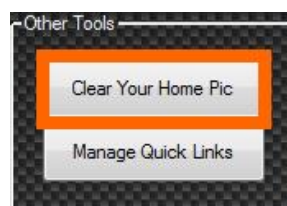
**Shutdown & Centering** – Adjusting this allows you to change how fast or slow your simulator returns to center after shutting it down or when the game is paused. (Note: If a game continues to send packets when paused, the centering and resume will not take place. It simply depends on the game being played.)



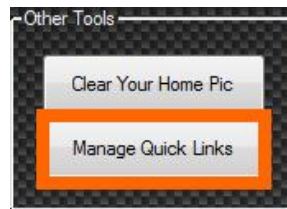
**Speed** – This value is the corresponding speed value for Startup & Resume or Shutdown & Centering as a percentage.



**Clear Your Home Pic** – Click the “Clear Your Home Pic” button to remove the picture displayed on the [Home](#) page of Game Engine.



**Manage Quick Links** – Click the “Manage Quick Links” button to add or delete shortcuts to any file or program on your computer. This opens the folder where shortcuts are located. These shortcuts are displayed on the “Quick Links” page of Tools.



**Axis Presets** – Click the “Axes Presets” button to open the folder that holds your axis presets. You can delete axes presets here. You can zip a preset file to send to a friend and name the zipped file anything you want, but do not change the name of the file.



**Interface Presets** – Click the “Interface Presets” button to open the folder that holds your interface presets. You can delete interface presets here. You can zip a preset file to send to a friend and name the zipped file anything you want, but do not change the name of the file.



**Preset Installer** – This is a drag and drop importer for axis and interface presets. There is no limit to how many profiles you can drop at one time. Presets that are emailed to you from a friend, or downloaded from the web can be imported here by simply dragging and dropping them into the box pictured below. You can change the name of the zipped file, but do not change the name of the file.



[Back to Table of Contents](#)

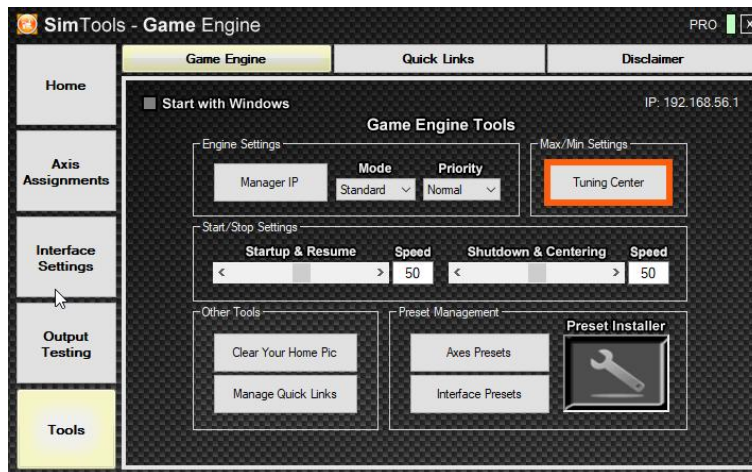


## Tuning Center

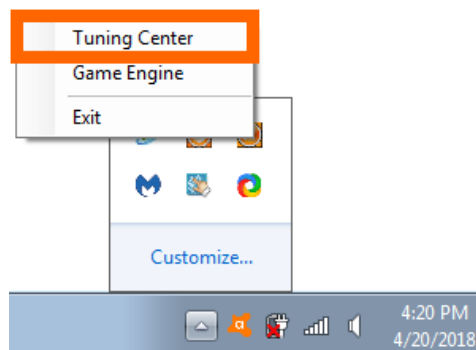
**Tuning Center** – Tuning the Max/Min values of a game ensures that the motion you output to your simulator is the best it can be! You only need to do this once per game and it can greatly improve the overall ride of your simulator.

You can get to the Tuning Center for Game Engine in two ways:

- 4) Click the “Tuning Center” button show in the picture below.



- 5) Right click on the “Game Engine” icon in the system tray and then select “Tuning Center” from the pop-up menu.



The tuning window allows you to set the max and min values that will be used by Game Engine to calculate how much of the axis is used. It does this by comparing the incoming value with either the max or the min value and then calculating the correct percentage needed for output.



Each game plugin allows up to nine DOFs (Degree of Force) to be sent and used for output to your simulator including: Roll, Pitch, Heave, Yaw, Sway, Surge, Extra1, Extra2 and Extra3. Each of these nine DOFs that are used for a game plugin should have a corresponding max/min value.

The screenshot shows the 'SimTools - Tuning Center' window. The 'Game Data - Output' section displays nine input fields for Roll, Pitch, Heave, Yaw, Sway, Surge, Extra1, Extra2, and Extra3, all currently set to 0. The 'Game Limits - Max/Min' section has checkboxes for each DOF, all of which are checked. Below the checkboxes are 'Max' and 'Min' value fields, all set to 0. At the bottom, there is a 'Game Selected' dropdown menu and three buttons: 'Capture Max Min', 'Reset', and 'Save New Settings'.

Increasing the max/min values to higher numbers will result in less movement. The game values will seldom reach their max or min values resulting in less overall movement, but they will in turn have more range overall for output.

Decreasing the max/min values to lower numbers will result in more movement. The game values will end up reaching those max/min settings a lot quicker resulting in faster and snapper movements, but they will have less overall range for output.

The primary goal of tuning the max/min values for a game is to have numbers that allow for enough range on the simulator to match what happens on the screen under normal circumstances, but not so much range that you lose all of the finer details from the game.

**Game Data - Output** – This is your output data. You are not able to modify the green values, because they are coming from the game. Roll, Pitch and Yaw are in degrees.

This close-up screenshot of the 'Game Data - Output' section shows the first three fields: Roll, Pitch, and Yaw. These fields are highlighted with orange boxes, indicating they are the focus of the explanation.

Heave, Sway and Surge are in g-force.

This close-up screenshot of the 'Game Data - Output' section shows the next three fields: Heave, Sway, and Surge. These fields are highlighted with orange boxes.

Extra1, Extra2 and Extra3 are in g-force.

This close-up screenshot of the 'Game Data - Output' section shows the final three fields: Extra1, Extra2, and Extra3. These fields are highlighted with orange boxes.

This gives you an idea of how to modify the values that are in the tuning center. You can also refer to the [Conventions for Game Plugin](#) for a directional diagram.

**GameSelected** – Select the game you want to create max and min limits for.

Game Selected: Live for Speed [dropdown] [Capture Max Min] [Reset] [Save New Settings]

**Capture Max Min/Stop Capture** – Select the “Capture Max Min” button to capture or modify max and min values for a selected game. Notice the “Capture Max Min” button turns into “Stop Capture” and the [Game Limits - Max/Min](#) values become editable.

Game Selected: Live for Speed [dropdown] [Capture Max Min] [Reset] [Save New Settings]

Game Selected: Live for Speed [dropdown] [Stop Capture] [Reset] [Save New Settings]

**Reset** – This resets the [Game Limits - Max/Min](#) values to zero.

Game Selected: Live for Speed [dropdown] [Capture Max Min] [Reset] [Save New Settings]

**Save New Settings** – Select the “Save New Settings” button to save your settings.

Game Selected: Live for Speed [dropdown] [Stop Capture] [Reset] [Save New Settings]

**Max/Min Options** – Select the color that correlates to the max/min option you want for each DOF. Selecting “green” (Balance) makes your max value equal to the opposite min value.

Max/Min Option	Roll	Pitch	Heave	Yaw	Sway	Surge	Extra1	Extra2	Extra3
Max	19.860834815	16.307924511	11.010328292	179.90775817	19.843680931	9.7772064208	18.760815867	0	0
Min	-19.860834815	-16.307924511	-11.010328292	-179.90775817	-19.843680931	-18.975698471	-18.760815867	0	-0

Selecting “blue” (Capture) captures the max/min values coming from the game.

Max/Min Option	Roll	Pitch	Heave	Yaw	Sway	Surge	Extra1	Extra2	Extra3
Max	19.860834815	16.307924511	11.010328292	179.90775817	19.843680931	9.7772064208	18.760815867	0	0
Min	-19.860834815	-16.307924511	-11.010328292	-179.90775817	-19.843680931	-18.975698471	-18.760815867	0	-0

Select “red” (Off) if you do not want to change the DOF while capturing live data.

Max/Min Option	Roll	Pitch	Heave	Yaw	Sway	Surge	Extra1	Extra2	Extra3
Max	19.860834815	16.307924511	11.010328292	179.90775817	19.843680931	9.7772064208	18.760815867	0	0
Min	-19.860834815	-16.307924511	-11.010328292	-179.90775817	-19.843680931	-18.975698471	-18.760815867	0	-0

**Game Limits - Max/Min** – You are able to modify the max and min values in this area after you select [Capture Max Min](#) values.

Game Limits - Max/Min Balance Capture Off

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

Max	19.860834815	16.307924511		179.90775817	19.843680931	9.7772064208	18.760815867	0	0
Min	-19.860834815	-9.7884230500	547813415528	907758171447	-19.843680931	-18.975698471	-18.760815867	-0	-0

Game Selected Live for Speed Stop Capture Reset Save New Settings

[Back to Table of Contents](#)

## Example

Below is an example of how to automatically capture max/min values with Tuning Center for the car game Live for Speed:

- 1) Start Game Engine and Game Manager. Game Manager needs to be on, connected and the game needs to be patched before you can retrieve data. Game Manager should be all green as seen in the image below.



- 2) Start the game you want to capture new max/min limits for. We suggest using a medium car on a somewhat curvy and hilly track if you can.



- 3) Press the **Capture Max Min** button.
- 4) Press the **Reset** button.
- 5) Drive around the track carefully not to bump walls or hit anything that will skew the results. You should see the new max/min values being captured in the Tuning Center window.

Below are example ways to capture valid max/min values from a car game.

**Surge and Pitch** – Step on the gas from a complete stop and continue full speed until you shift into third gear and then hit the brakes and you will capture surge and pitch. Do the same thing on the steepest hill or slope in the game and you can capture a more accurate pitch.

**Roll and Sway** – Driving around corners helps capture roll and sway.

**Heave** – You can capture good heave data by slightly running your wheels over the curb, but make sure not to drive into the grass or dirt as it will skew your data.

We suggest setting your DOF to “Balance” for Roll, Pitch, Yaw and Sway. We suggest using “Capture” for surge. This makes sense for surge as your engine could be more powerful than your breaks. Heave can be set to “Balance” or “Capture” depending on the game.



Game Limits - Max/Min										Balance Capture Off		
Max/Min Option	Roll	Pitch	Heave	Yaw	Sway	Surge	Extra1	Extra2	Extra3			
Max	19.860834815	16.307924511	11.010328292	179.90775817	19.843680931	9.7772064208	18.760815867	0	0			
Min	-19.860834815	-9.7884230500	-8.7654781341	-179.90775817	-19.843680931	-18.975698471	-18.760815867	-0	-0			
Game Selected	Live for Speed					Stop Capture	Reset	Save New Settings				

- 6) Once you feel you have received all the max/min values the game has to provide and you are happy with your new settings, click the [Save New Settings](#) button. The new max/min will be applied live while the game is running.
- 7) Press the [Stop Capture](#) button when you are finished altering the max/min limits.

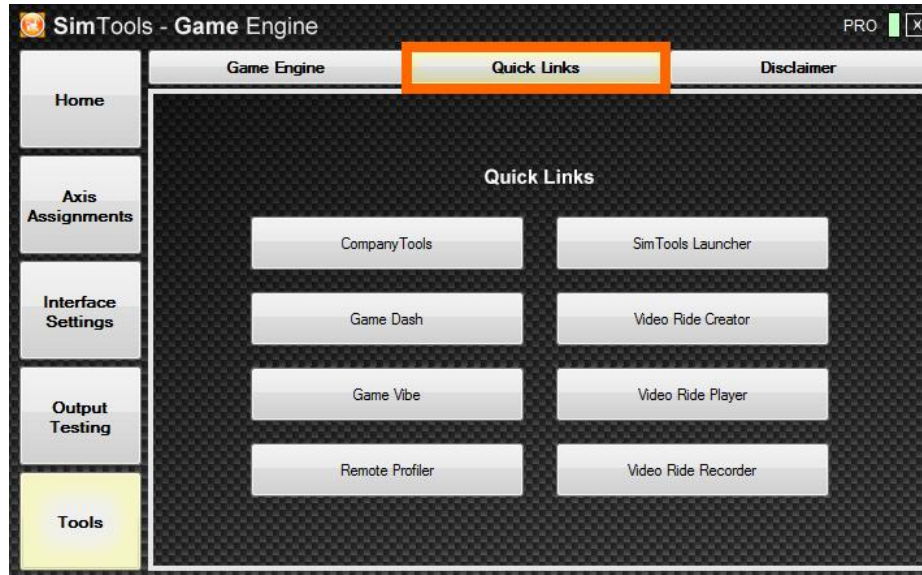
If you want to start over, you can re-install the original plugin and start again.

Fine tuning the max/min values for the game can provide a much more accurate ride on your simulator.

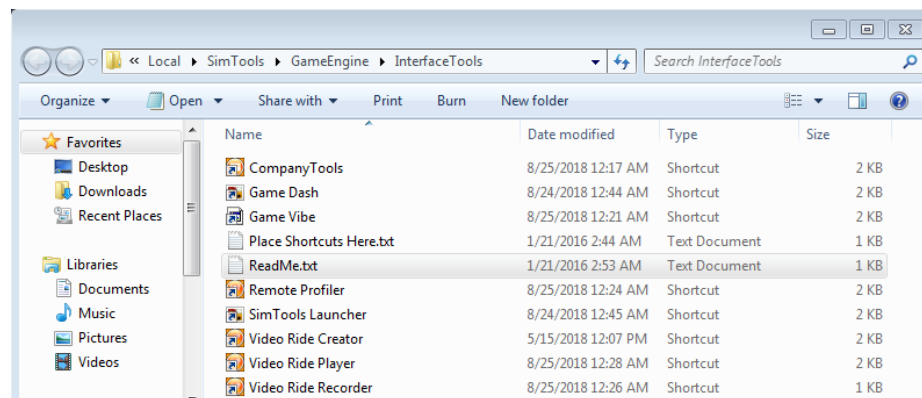
[Back to Table of Contents](#)

## Quick Links

**Quick Links** – This page shows a list of launchable shortcuts that have been placed in the [Manage Quick Links](#) folder.



This is the [Manage Quick Links](#) folder that holds your shortcuts

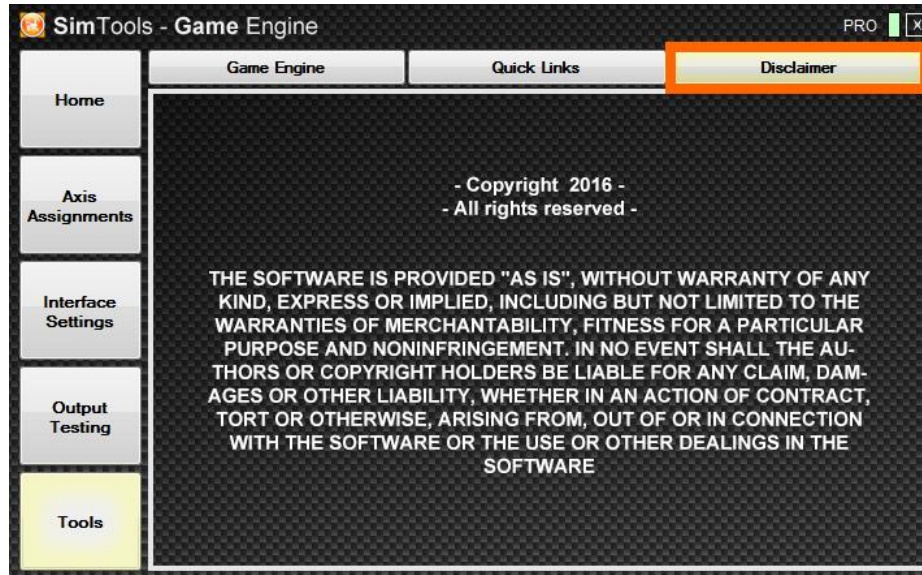


[Back to Table of Contents](#)



## Disclaimer

This page displays a condensed version of the usage agreement you accepted when you initially acquired the program.



[Back to Table of Contents](#)

## Logging

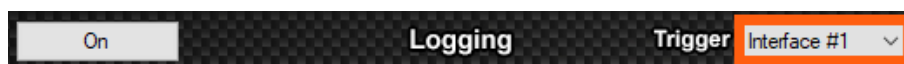
Logging ride times is only available with an Entertainment License for SimTools. It will automatically replace the “Disclaimer” page when a valid Entertainment license is detected. The Logging system is smart enough to only log ride time when the game is actually sending data and the simulator is connected and running.



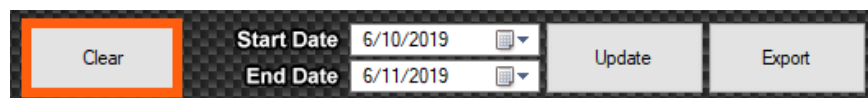
**On/Off** – This allows you to turn the logging system on or off.



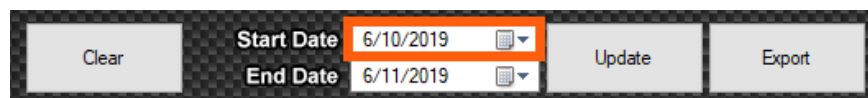
**Trigger** – This allows you to select an interface to log. A logging session will only take place if this interface is able to startup.




**Clear** – Press the Clear button to clear the displayed logging information.



**Start Date** – This is the start date you desire for your report.

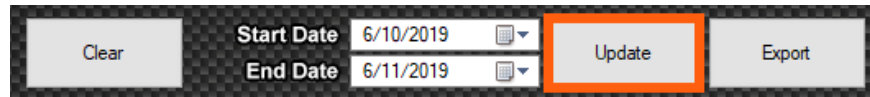


**End Date** – This is the end date you desire for your report.



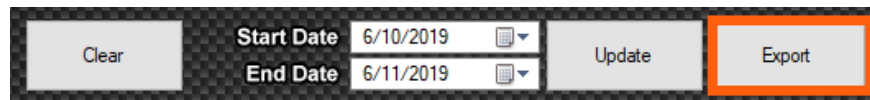
A screenshot of a report generation interface. It features a 'Clear' button on the left, followed by 'Start Date' and 'End Date' labels. The 'Start Date' is set to '6/10/2019' and the 'End Date' is set to '6/11/2019'. Both date fields have a calendar icon to their right. The 'End Date' field is highlighted with an orange border. To the right of the date fields are 'Update' and 'Export' buttons.

**Update** – Press the Update button to display the report in the logging window.



A screenshot of the same report generation interface. In this view, the 'Update' button is highlighted with an orange border. The 'Clear', 'Start Date', 'End Date', and 'Export' elements remain the same as in the previous screenshot.

**Export** – Press the Export button to export the current report in the logging window to a file on your desktop.



A screenshot of the same report generation interface. In this view, the 'Export' button is highlighted with an orange border. The 'Clear', 'Start Date', 'End Date', and 'Update' elements remain the same as in the previous screenshots.

[Back to Table of Contents](#)

## Game Manager

Game Manager is a system-tray application with quick access to the tools needed to manage your simulator experience. It provides an easy way to select the motion profile you want to use with any game supported by SimTools. Game Manager allows you to Create, Delete and Edit all profiles. It also provides access to Game Patching and any Extra Plugin Information and Settings used for a particular game.

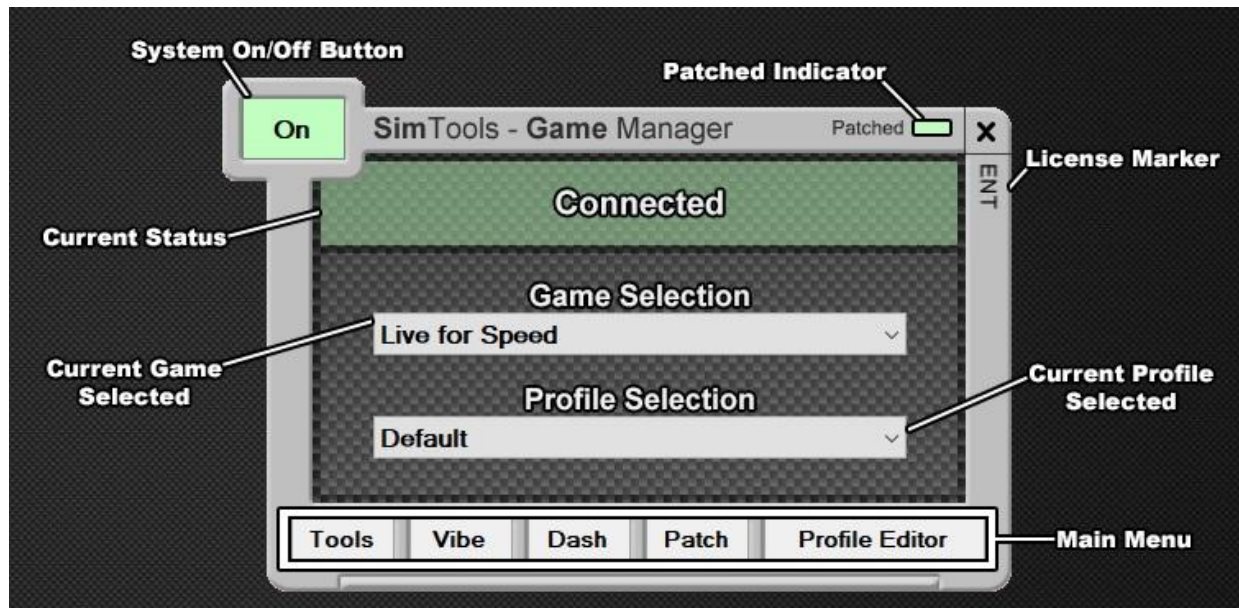
Game Manager must be running in the system-tray during game play to allow Game Engine to be initiated and begin outputting data. If you want to play a game after it is patched for Motion Output without your simulator, simply exit Game Manager from the system-tray before you launch the game.

Always install Game Manager on the computer where your games are installed even if you are installing a Dual Computer setup for SimTools. (Note: If you are installing a Dual Computer setup for SimTools, please see the Dual Computer setup Guide for more information.)

[Back to Table of Contents](#)

## Game Manager GUI Overview

Here is a quick overview of the GUI layout in Game Manger.



**System On/Off button** – This is the “STOP ALL” button for SimTools. If you want to keep SimTools running, but do not want it to react to anything launched on the computer, simply set this button to “Off”.



**Patched Indicator** – Helps you to quickly identify whether or not the current game selected has been patched.



**License Marker** – Shows what license version SimTools is currently using.



**Current Status** – Shows the current running state of the system. (Note: More information on this topic can be found in the next section.)





**Game Selection** – Shows the current game selected. (Note: This will automatically change to the current game launched when a patched game is running and the system is on.)



**Profile Selection** – Shows the profile that is currently selected for the game.



**Main Menu** – This is Game Manger's Main Menu. More information on these items will be provided later in the manual.



[Back to Table of Contents](#)

## Game Manger GUI Status

Game Manager has three different modes that it can be in. The three different modes can be identified by the Current Status as follows:

- **Not Connected** – (Red) identifies Game Manager is not connected to Game Engine. This usually means that Game Engine is not running yet. Once you start Game Engine, Game Manager and Game Engine should automatically connect.



- **Connected** – (Green) identifies we are connected to Game Engine and we are ready for action.



- **Game Running** – (Blue) identifies Game Manger has detected a patched game has started. Correctly configured SimTools modules and any associated hardware will start at this time.



These three color coded indicator modes can help you to quickly identify the current status of SimTools.

[Back to Table of Contents](#)

## Tools and Remote Profiling

Click the "Tools" button to access Game Manger's Tools menu. A drop down window will appear that contains the tools below. (Note: Remote Profiling only functions with Professional or Entertainment licenses.)



**Start with Windows** – This option will automatically start Game Manger when Windows boots up.



**Engine IP** – The IP Settings will automatically fill in for you if you are running both Game Manager and Game Engine on the same computer. (Note: The IP address should be 127.0.0.1 when both apps are installed on the same computer)



If Game Engine and Game Manager are installed on different computers, the IP address of the computer running Game Engine will need to be entered into IP Settings.

**Profiles** – Click to open the folder that holds all of your current game profiles. The folder that appears will contain a folder for each game you currently have profiles for. Profiles can be emailed to friends, or uploaded to the web for others to use.



**WARNING:** Do not use this feature to delete profiles. Only delete profiles from within the Profile Editor for safe operation.

**Profile Installer** – Drag and drop importer for game profiles. Profiles that are emailed to you from a friend, or downloaded from the web can be imported here. Simply drag and drop them into the box pictured below. There is no limit to how many profiles you can drop at a time.

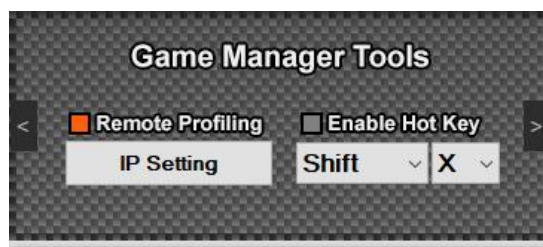


You can reveal the Remote Profiling output options and Hot Key configurations for Game Manager by clicking either of the arrows on the sides of the drop down window.





**Remote Profiling** – Check the Remote Profiling option shown in the Picture below to enable remote profiling. The Remote Profiling companion application can be downloaded at <https://simtools.us/downloads-links/>.

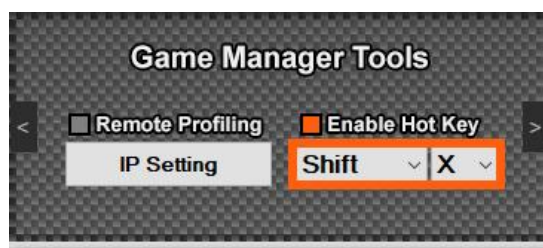


**IP Settings** – The IP Settings will automatically fill in for you if you are running both Game Manager and Remote Profiler on the same computer. (Note: The IP address should be 127.0.0.1 when both apps are used on the same computer)



If Remote Profiler and Game Manager are installed on different computers, the IP address of the computer running Remote Profiler will need to be entered into IP Settings.

**Enable Hot Key** – Check the Enable Hot Key option to enable a keyboard shortcut that will allow you to toggle the [System On/Off button](#) in Game Manager. You can configure the Hot Key shortcut with the options from the drop down menus below it.



[Back to Table of Contents](#)

## Enable Game Vibe

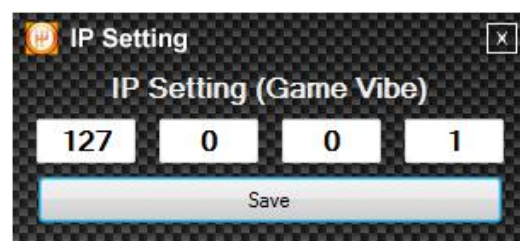
Click the "Vibe" button to access the Game Vibe Output Settings in Game Manger. A drop down window will appear that contains the tools below. (Note: Game Vibe only functions with Professional or Entertainment licenses.)



**Enabled** – Check the Enabled option shown in the picture below to enable Game Vibe output. The Game Vibe companion application can be downloaded at <https://simtools.us/downloads-links/>.



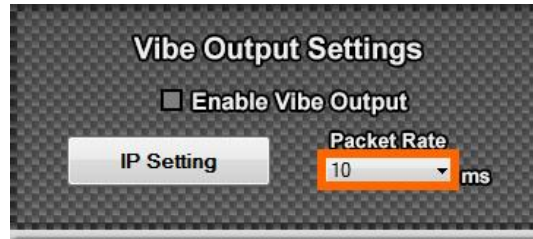
**IP Settings** – The IP Settings will automatically fill in for you if you are running both Game Manager and Game Vibe on the same computer. (Note: The IP address should be 127.0.0.1 when both apps are used on the same computer)





If Game Vibe and Game Manager are installed on different computers, the IP address of the computer running Game Vibe will need to be entered into IP Settings.

**Packet Rate** – This value determines how fast you want to send data to Game Vibe in milliseconds.



[Back to Table of Contents](#)

## Enable Game Dash

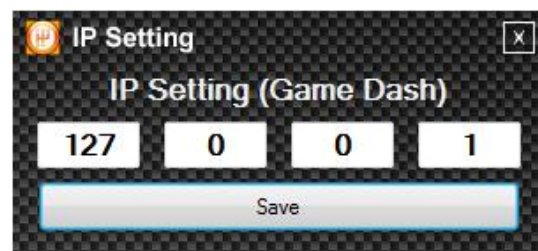
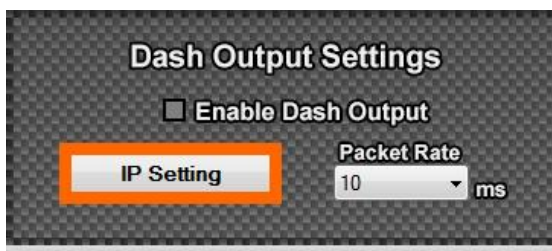
Click the "Dash" button to access the Game Dash output settings in Game Manger. A drop down window will appear that contains the tools below. (Note: Game Dash only functions with Professional or Entertainment licenses.)



**Enabled** – Check the Enabled option shown in the picture below to Enable Game Dash Output. The Game Dash companion application can be downloaded at <https://simtools.us/downloads-links/>.

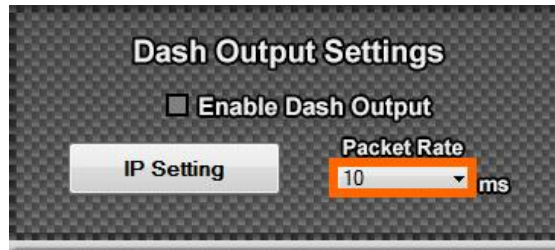


**IP Settings** – The IP Settings will automatically fill in for you if you are running both Game Manager and Game Dash on the same computer. (Note: The IP address should be 127.0.0.1 when both apps are used on the same computer)



If Game Dash and Game Manager are installed on different computers, the IP address of the computer running Game Dash will need to be entered into IP Settings.

**Packet Rate** – This value determines how fast you want to send data to Game Dash in milliseconds.



[Back to Table of Contents](#)

## Patching a Game for Motion

We must patch the game for motion in order to use the plugins we previously installed with the SimTools Game Plugin Updater. All game plugins require patching. This is how SimTools knows you want output for the game when the game is launched on the system.

Click the "Patch" button to access the Game Patching section of Game Manger. The Game Patching section of Game Manager will appear in a drop down window.



**Patching a Game** – Below is an example of patching the game “Live for Speed”.

- 1) Open Game Manager from the system-tray if not already open.
- 2) Select “Live for Speed” from the Game Selection drop box.
- 3) Click the “Patch” button as shown in the image above.

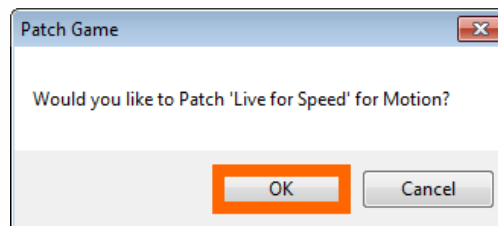
When the drop down window opens, you will notice that this game requires a patching path. This is shown with a “Path Required” in the text box below. (Note: Some games require no patching path, but they still must be activated “Patched” to enable them for use by SimTools.)



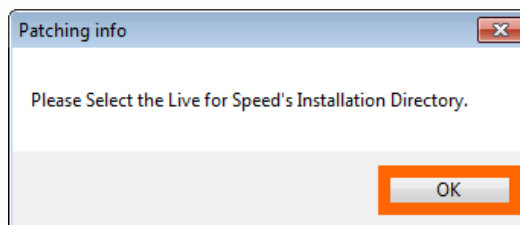
4) Click the “Patch Game” button to continue.



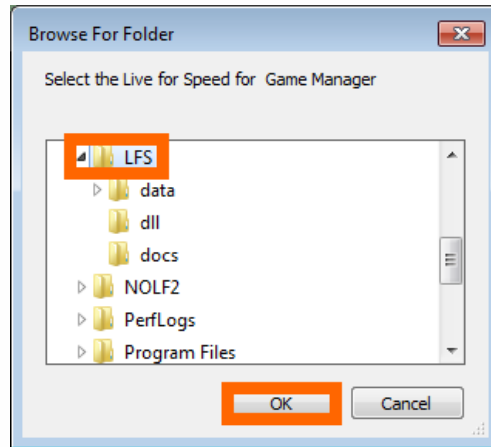
5) Click “OK” if you would like to patch the game for motion.



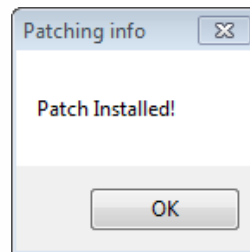
6) Click OK to browse for a folder.



- 7) In the “Browse for Folder” window select the “LFS” directory where you installed the game Live for Speed. (For example, mine was installed at C:\LFS)



- 8) After selecting a folder, click “OK” as shown in the image above. The path will be validated by the game plugin. If it passes validation, the game will be patched.



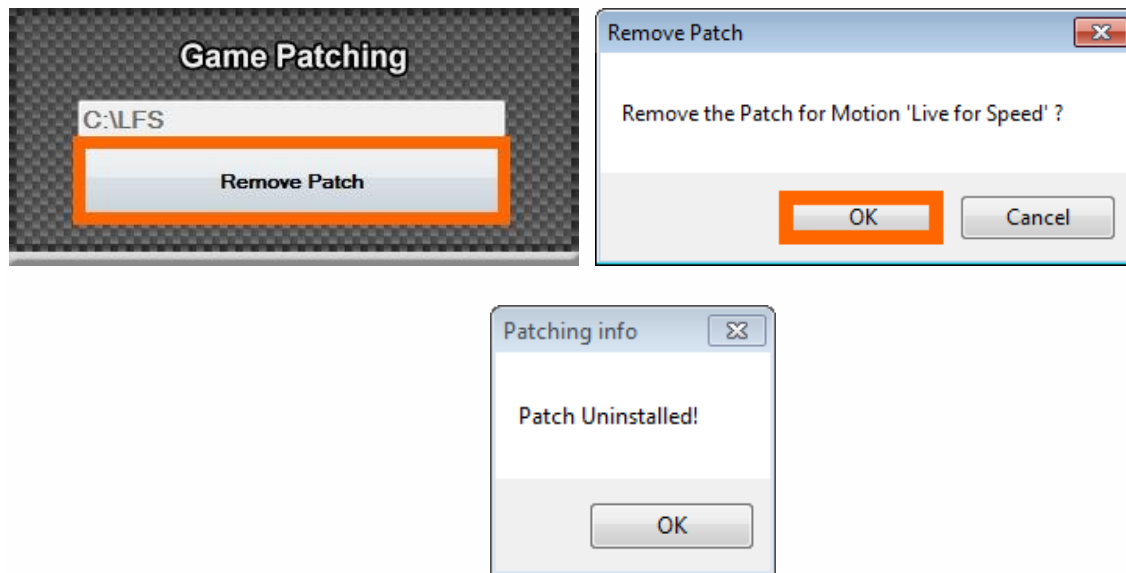
These steps should be repeated for any game plugin you installed with the Plugin Updater.

**Un-Patching a Game** – Please note if you change or update a game plugin, you might need to first remove the patch as follows: (Remember to Re-Patch after the change or update.)

- 1) Open Game Manager from the system-tray if not already open.
- 2) Select “Live for Speed” from the Game Selection drop box.
- 3) Click Patch.



4) Click “Remove Patch” and follow the prompts to un-patch a game.



You are now free to update the game plugin with the SimTools Plugin Updater.

[Back to Table of Contents](#)

## Profile Editor (Create, Edit, Delete)

All of the games listed in Game Manager will have their own set of motion profiles. Creating and editing motion profiles is very easy with Game Manager. Simply click the "Profile Editor" button shown in the picture below. You will be presented with the Game Manager Profile Editor for the currently selected game.

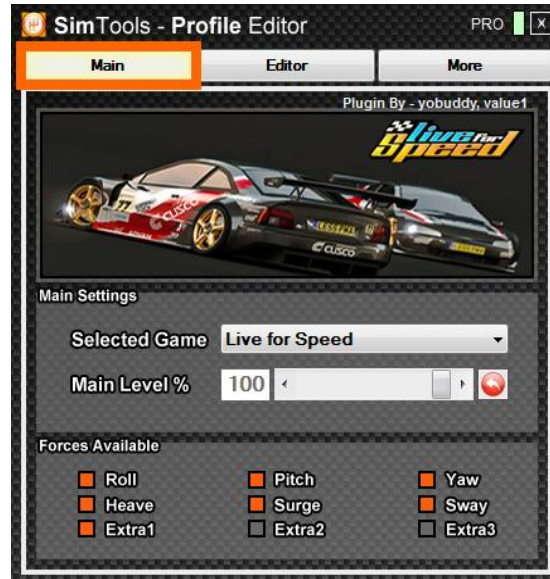


Remember that Game Manager Profiles can be changed at any time during a live game. There is no reason to stop the game first to change profiles.

[Back to Table of Contents](#)

## Main

Here you can select the game you want to create or edit profiles for. You can set the overall speed of the profile, which is an easy way to quickly adjust a profile for a rider.

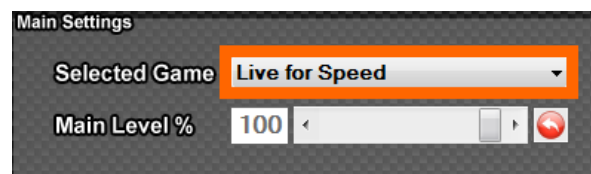


**Game Banner** – The Game Banner for the currently selected game is shown at the top of the Main tab.

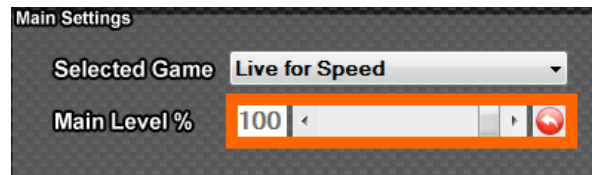


**Main Settings** – Main Settings are displayed in the middle of the Main tab.

1) **Selected Game** – Here you can change the game you are creating a profile for.



- 2) **Intensity Level** – This applies smoothing to all outputs from the game. If you have a game with jumpy outputs, or you wish to soften the ride for any reason, you can do this by lowering the Main Level value.



**Forces Available** – The bottom of the Main tab shows all of the forces available from the currently selected game. (The More tab will show more detail on what Extra1-3 can be used for)



[Back to Table of Contents](#)

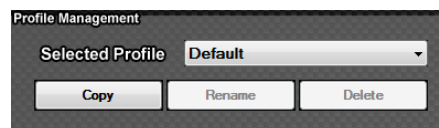
## Editor

Under the Editor tab you can fine tune any profile being used with your simulator. Here you can increase or decrease the max/min values for Game Engine that control the output of your simulator and even create individualized profiles for particular cars, tracks or aircraft. For example, if you are driving an off-road car, you may want more roll than you would with the stiff suspension of an on-road car.

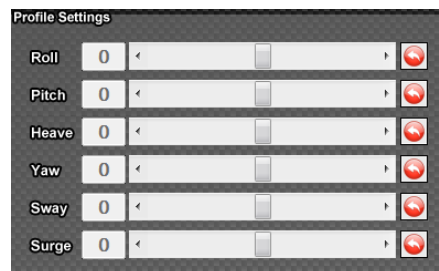
The Editor tab also gives you the ability to Copy, Rename and Delete profiles. (Note: All profiles except the Default profile can be deleted.)



**Profile Management** – The Profile management section at the top of the Editor tab allows us to select the profile we want to edit, copy, rename or delete.



**Profile Settings** – The bottom half of the Editor tab allows us to fine-tune any settings we want for our currently selected motion profile.



[Back to Table of Contents](#)

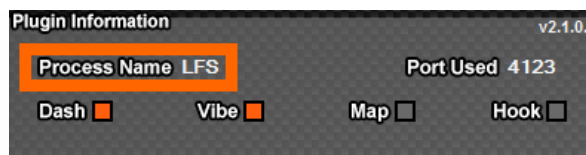
## More

On the More tab we can see in more detail what is contained within the game plugin. We can also adjust the profile settings for the Extra1-3 outputs for the currently selected game.



**Plugin Information** – This section will tell you a lot of information about how the plugin works and what it supports. (Note: The version number of the plugin is located in the upper right corner of the More tab.)

- 1) **Process Name** – This is the executable name SimTools is looking for when a game launches. This is also the same name that appears in the process section of the Task Manager for Windows when you launch a game.

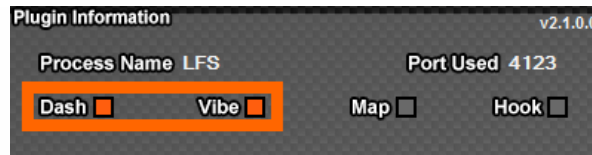


- 2) **Port Used** – This is the UDP port that the Game Plugin uses to send the data.





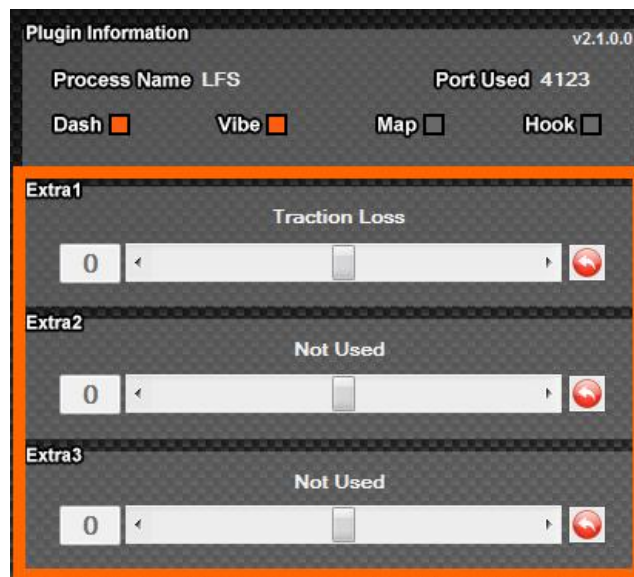
- 3) **Dash and Vibe** – These indicators tell you if the plugin supports Game Dash and/or Game Vibe.



- 4) **Map and Hook** – These indicators tell you if the plugin uses Memory Mapped files and/or Memory Hooks for collecting telemetry data.



**Extra1-3** – These panels allow you to see what data is being used for Extra1 through Extra3 from the game. It also allows you to edit these values for the currently selected profile.



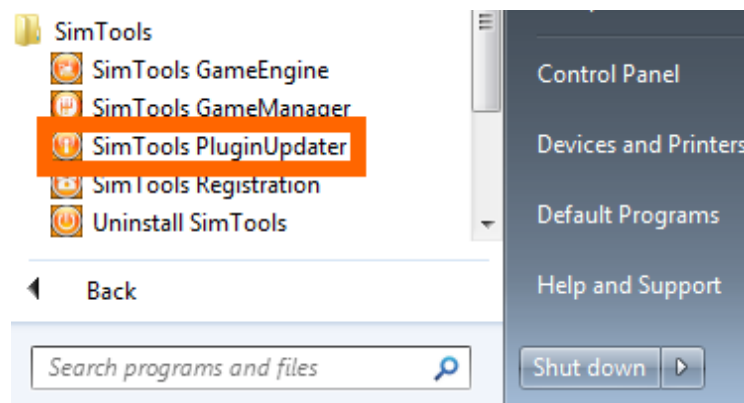
[Back to Table of Contents](#)

## Installing Plugins

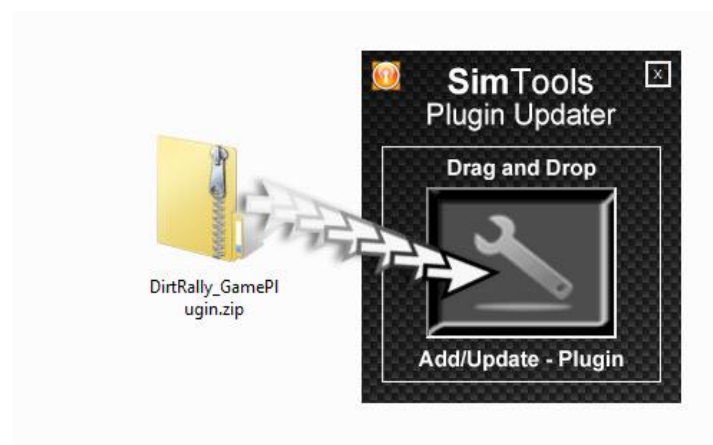
The SimTools Plugin Updater was created to make life easier for the end user. The Plugin Updater has the ability to absorb most SimTools files zipped or not. Simply drag the plugin zip file you want to install into the Plugin Updater and let go. It is that easy!

Please make sure Game Engine and Game Manager are not running in the system tray. The Plugin Updater will not start if they are running. You do not need to unzip the plugin files. You can drop the plugin zip files directly into the Plugin Updater.

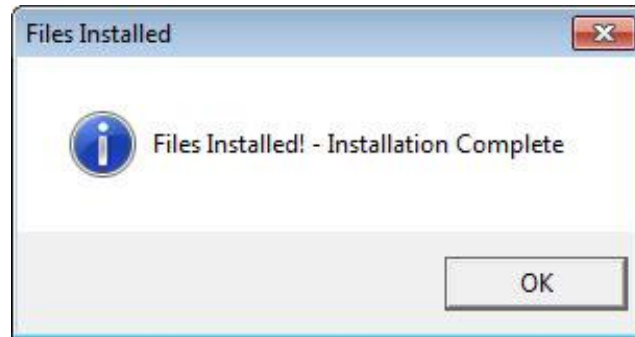
- 1) Make sure that Game Manager and Game Engine are not running in the system tray.
- 2) Launch "SimTools Plugin Updater". This should be in the **Start Menu shortcuts folder** you created during installation. You can find the default location by navigating to Start → All Programs → SimTools → SimTools PluginUpdater.



- 3) Drag and drop the plugin into the Plugin Updater.



- 4) If you are loading a game plugin you already have installed, the plugin updater will ask you if you want to replace the existing max/min file for the game.
- 5) You will receive this message when installation is complete.



This plugin will now be available. Remember to patch the games you want to play. Have fun!

Note: Game plugins need to be installed on both computers for a [dual computer setup](#) of SimTools. Interface and axis assignment plugins only need to be installed on the Game Engine Computer

[Back to Table of Contents](#)

## Appendix A: Output Type

There are three different output formats you can select from to send to an Interface. Decimal output is very straight forward. For example if an axis value equals "1127", then "1127" will be the output for that axis. No formatting change is done when Decimal Output Type is selected.

Binary Output Represented as a Char - Range of 0 to 255				
Char's Used to Represent the Axis Value	Char 4	Char 3	Char 2	Char 1
Char Weight (Value x Weight)	16777216	65536	256	1
Number of Bit's Used for Axis Output	32 to 25	24 to 17	16 to 9	8

Hex Output Range of 0 to 15								
Hex	8	7	6	5	4	3	2	1
Hex Weight	268435456	16777216	1048576	65536	4096	256	16	1
Bit's Used	32	28	24	20	16	12	8	-

[Back to Table of Contents](#)

## Appendix B: User Formatted Output

Output can be achieved to just about any serial device with some basic output formatting. Output formatting allows you to send both the axis information along with any additional information you need to send to your interface.

Take this interface for example; it requires a "Hello" to be sent at the beginning of every message to the interface. An "End" string is also required to be sent at the end of every message. If we were using Axis1 for our output, it would look like this.

Hello<Axis1a>End

If the value of Axis1 is "1123" and Decimal Type output is selected, the output would look like this "Hello1123End". The "1123" simply gets substituted for "<Axis1a>" when the string is sent to the interface.

[Back to Table of Contents](#)

## Appendix C: Bit Resolution Chart

Axis Resolution, or the number of stop points you have on your axis is based on the number of bits your interface accepts for an axis output. If your interface accepts 8 bits of resolution, then you will have 256 stop points on your axis with a range of 0 to 255. See chart below.

Bits Used	18	17	16	15	14	13	12	11	10	9	8
Stop Points	262144	131072	65536	32768	16384	8192	4096	2048	1024	512	256
Range 0 to n	262143	131071	65535	32767	16283	8191	4095	2047	1023	511	255

Bits Used	26	25	24	23	22	21	20	19
Stop Points	67108864	33554432	16777216	8388608	4194304	2097152	1048576	524288
Range 0 to n	67108863	33554431	16777215	8388607	4194303	2097151	1048575	524287

Bits Used	32	31	30	29	28	27
Stop Points	4294967296	2147483648	1073741824	536870912	268435456	134217728
Range 0 to n	4294967295	2147483647	1073741823	536870911	268435455	134217727

The formula for the center location for any bit range is:  $(\text{Stop Points} / 2) - 1$

### Example

For 8 bit:  $(256 / 2) - 1 = 127$

The value sent to the interface (for 8bit mode) would be the value 127 when roll is equal to zero in SimTools.

[Back to Table of Contents](#)