# **DIY wind-simulation with Simhub**

## Required/recommended parts (incl. Amazon links):

#### Arduino Uno:

https://www.amazon.de/gp/product/B008GRTSV6 1x



**140mm PWM Fans (Noctua NF-A14 iPPC 3000 PWM 12V):** https://www.amazon.de/gp/product/B00KFCRF1A

2x



#### 12V-5A power supply:

https://www.amazon.de/gp/product/B07L5GP7SD

1x

(5A is not really required, a 12V-1.5A power supply will be sufficient)



Mount for Rig & GoPro-Mount:

https://www.amazon.de/dp/B08XQ93281

2x

(the GoPro-counterpart is included in the 3D-printed Honeycomb below)



**3D-Print parts (honeycomb for 140mm fans) with connector to GoPro-mount:** <u>https://www.thingiverse.com/thing:4137804</u>



## Wiring / Setup:

Make sure you wire the fans and the power supply as depicted in the below diagram:

GND from the power supply to the fans must go through the Arduino GND pins, otherwise the fans will run permanently once the power supply is plugged in.

The PWM signal from one fan needs to go to Pin 9 of the Arduino Uno and the PWM signal from the other fan needs to be connected to Pin 10 in preparation to the next step (configuring/flashing the Arduino with the correct sketch from within Simhub)



## Arduino configuration and flashing in Simhub:

Connect your Arduino Uno via USB to your PC. To be on the safe side unplug other Arduinos if you are using multiple.

Launch Simhub, go to "Arduino" on the left menu pane and navigate to the tab "My Hardware". **IMPORTANT**: If you have only one Arduino connected to your system make sure to choose "Single arduino". If you have more than one Arduino it's crucial to select "Multiple arduinos"

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\Rightarrow Shakelt Wind					Open arduino setu	ıp tool							
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Property Server	Sim3D-Rumble Unique ID : d11c3cfa-2dbf-47eb-a1ad-cc54	8afe16ce										•• 💽 🔐	
J SimHaptics	Motors from 3 to 6												
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						14:00:49 COM5						Connected	
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Next, click on "Open Arduino setup tool" which will open in a separate window:

SKETCH SETUP		_ = ×
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SKETCH SETUP		COMPILE AND UPLOAD
Search General	Component elp	Board Listen Striat per listed Arduino UNO (ATMega328p) COM14 - (US8 Serial Device)
Device name, make sure to use a unique name when using multiple arduinos	WindSim	Safety first ! Put your seatbelt : to avoid uploading to the wrong denies the highly obtained to unplug any arduino based device (motion, button box, windsim etc) and only keep your target arduino plugged. By doing this you will be sure to upload using the correct serial port.
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Enable arduno micro gamepad output for all the activated buttons/encoders	OFF	ADVANCED UPLOAD TO ARDUINO
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MAX7221 7 Segments Modules MAX7219 / MAX7221 7 Segment modules connected Multiple modules can be cascaded connected module extraction and module input	Component help	

Make sure you pick the correct board model (Arduino Uno) and the correct COM-port in the top right. In the left pane two things need to be configured, ignore all other options.

- 1) Name the device under "General" so you can identify it later. Use something like "WindSim".
- 2) Scroll down on the left options until you get to "SHAKEIT PWM FANS Outputs"

Set the number of fans to 2 and remove the checkmarks from the relay option as we are not using any relays here. Leave the rest as default like depicted below:

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Search     X       Or any PWM driven custom boards     Ardui       SHAKEIT PWM FANS Outputs     Component help       ShakeIT direct PWM fans enabled (25khz PWM) Arduino Uno: pins 9 or 10 Arduino Lenardo pins : 9, 10 or 11 Arduino Lenardo pins : 9, 10 or 11 Arduino Mega pins : 11, 12 or 13     0 +       PWM Output 1 pin     9 +       PWM Output 1 min (lower values will disable output)     0 +	Arduino serial port inc UNO (ATMega328p)
PWM     Safety       SHAKEIT PWM FANS Outputs       Component help       Image: ShakeIT direct PWM fans enabled (25khz PWM)       Arduino Una: pins 9 or 10       Arduino Leanardo pins : 9, 10 or 11       Arduino Leanardo pins : 9, 10 or 11       Arduino Leanardo pins : 11, 12 or 13       PWM Output 1 pin       PWM Output 1 min (lower values will disable output)       0 +       PWM Output 1 max	first I Put your seatbelt : to avoid uploading to the wrong device it's highly advised to unplug any to based device (motion, button box, windsim et) and only keep your target arduino plugged. By this you will be sure to upload using the correct serial port. I understand that uploading this sketch will replace any existing firmware on the arduino and I've made sure that I'm using the correct serial port. UPLOAD TO ARDUINO
PWM Output 1 optional on/off relay pin       233 + -         PWM Output 1 optional relay off delay (ms)       4 + -         PWM Output 1 optional relay reversed logic       0FF         When disabled relay pin will be LOW when the relay       0FF         Otherwise when enabled the pin will be HIGH when the relay is off       10 + -         PWM Output 2 pin       10 + -         PWM Output 2 min (lower values will disable output)       0 + -         PWM Output 2 max       255 + -         PWM Output 2 optional on/off relay pin       5 + -         PWM Output 2 optional relay off delay (ms)       2000 + -         PWM Output 2 optional relay reversed logic       0FF	IRREF RESET 3V3 SV GND GND GND GND GND GND GND GND GND GND

When done, go back to the top right, check the "I understand that uploading...." checkbox and click on "UPLOAD TO ARDUINO":

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You are done with the hardware setup. As a last step you need to configure Shakelt Wind:

### ShakeIt Wind configuration in Simhub:

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=	Shakelt Wind	
Dashboard	Wind profile Output	it configuration Controls
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∠ Statistics		
Dash Studio		· · · ·
Ardui	Idle wind When not in race	
🚔 Shakelt Wind	Wind power	Target idle wind channels
	Idle wind power	💽 Left 🛛 💽 Right 🔵 Center
(())) Shakelt Motors	15 +	
UDP Relay	Speed based wind	
ল্পে Controllers	When in race	
o Property Server	Wind power	Left/right wind curving
🛄 SimHaptics	Speed based wind power range	C Left/Right curving effect (when available)
Controls and events		50 +
Available properties	Maximum car speed	Drafting effect
System log	Maximum speed mode : Automatic Manual	C Draft effect intensity (when available))
	310 + -	
	Measured car max speed 0km/h, Used max speed 0km/h	
	Cockpit mode	
	Cockpit ventilation mode : Apply wind power range 'minimum' as soon as engine or ignition are ON, otherwise keep the fan OFF as long as you are not moving	
Settings		
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Click on "Shakelt Wind" in the left menu pane of Simhub:

Here you can define the wind behavior, like static wind on/off, min/max speed (of your car) and the according fan-level you want to assign, curving etc. The Noctua iPPC fans are very strong so it's most likely enough to set the maximum power to somewhere between 70-85% which will still give you a lot of wind but reduce the fan noise significantly (they do get loud when on 90-100% power)

Then move on to the "Output configuration" tab within Shakelt Wind to define the left and right fan:

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≡		Shakelt Wind		
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	Car settings			
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$\bowtie$	Statistics	Channel 1 Channel 2 Channel 3	Channel 4 Channel 5 Channel 6	Channel 7 Channel 8
2	Dash Studio	Left • Right • Unused •	Unused   Unused   Unused   Unused	Unused • Unused •
8	Arduino	Channel 9 Channel 10 Channel 11	Channel 12	
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As an optional step you can move to the "Controls" tab to configure manual controls:

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≡	Shakelt Wind	_	
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Car settings	Global controls		
🜵 Devices	Switch wind activation		
∠ Statistics	Increment / Decrement steps		
🕐 Dash Studio	<b></b> 5 + -		
Arduino	Current active mode controls		
🚔 Shakelt Wind		Click to configure	
()) Shakelt bass Shakers			
(()) Shakelt Motors	Decrease current wind mode effect gain		
💑 UDP Relay	Switch current wind mode activation	Click to configure	
(🔫) Controllers	Idle Wind controls		
Property Server		ShortPress Jovstick/Nulin Generic USB Jovstick 1 801	
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Controls and events	Decrease effect gain	SKRIVINU KOJAKONANI OKTINIKOSOJUJALILISUU	
System log	Switch static wind activation		
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	Increase effect gain	ShortAndu JoystickPlugin Generic_US8_Joystick_1.803	
	Decrease effect gain	ShortAndu Joyzád/Plugin Generic_US8_Joyztick_1_802	
	Switch speed based wind activation		
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Here you can define switches/buttons to turn on/off the Wind sim and define controls for increasing / decreasing the Wind sim. (In the example above, I have mapped some buttons of my simrig button boxes to increase/decrease wind.)

That's all and you are now ready to enjoy the added immersion of a wind sim in your simracing.