

## VIRTUATILT - VISUAL PINBALL X SETUP

Following some basic instructions to have your new VirtuaTilt up and running with Visual Pinball X.

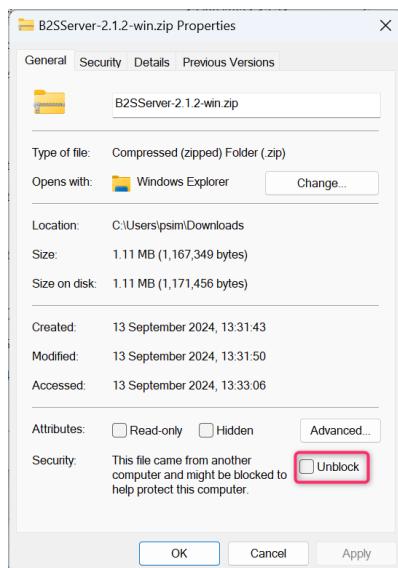
### DOF Installation

**IMPORTANT:** **DOF (Direct Output Framework) is needed if you want to experience a real pinball simulation with all feedback devices in Visual Pinball X. Latest DOF version is required for Pinscape**

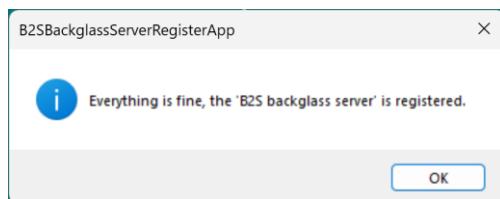
**Pico support:** <http://mjrnet.org/pinscape/dll-updates.html>

You need **B2S Server** installed first. If you have already installed it, skip this part.

For first-time users, download latest version from here: <https://github.com/vpinball/b2s-backglass/releases> and unblock it:

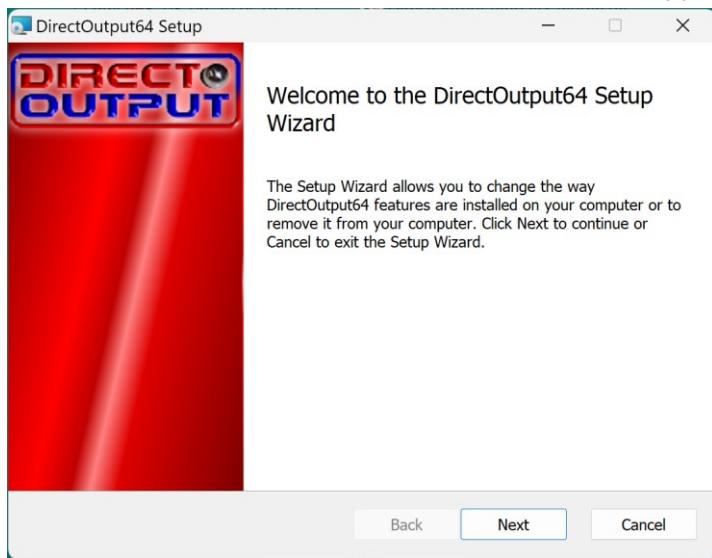


Unzip the B2SServer archive in VisualPinball folder (typically **C:\vPinball\VisualPinball\Tables**) and run the **B2SBackglassServerRegisterApp.exe** as Administrator (right-click). This registers the software as a COM object:

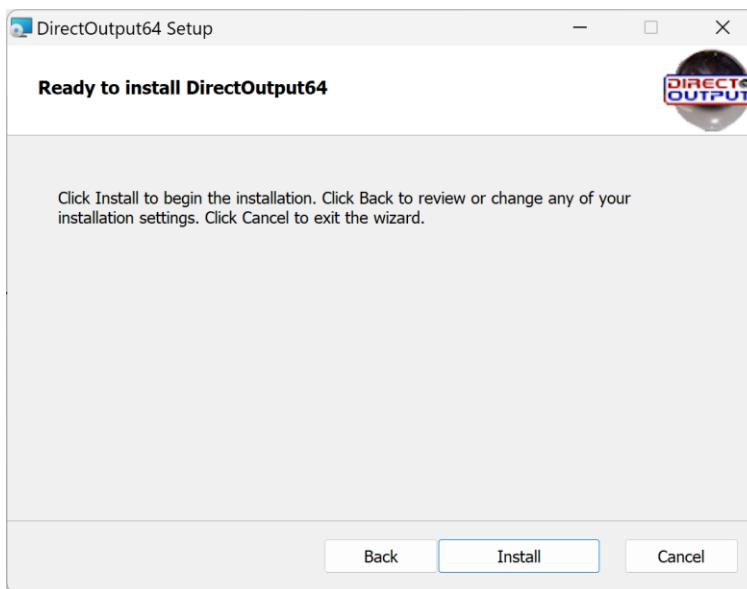
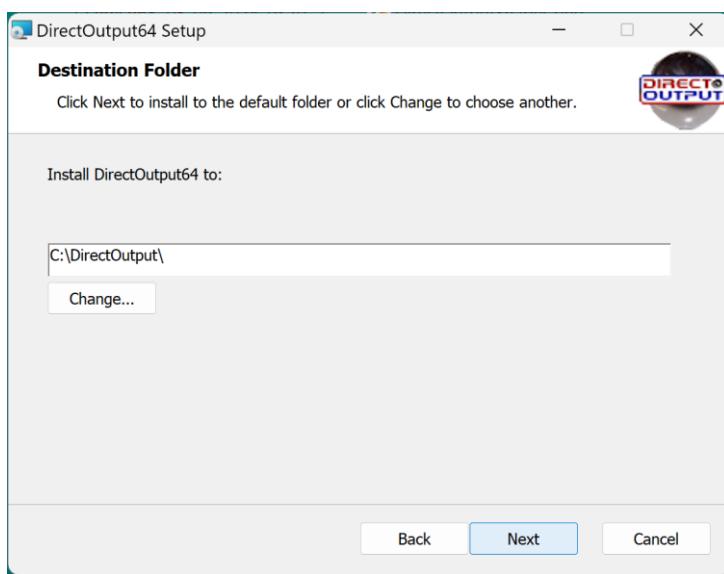


Latest version of DOF allows merging of X86 and X64 installs, so you can safely install both versions.

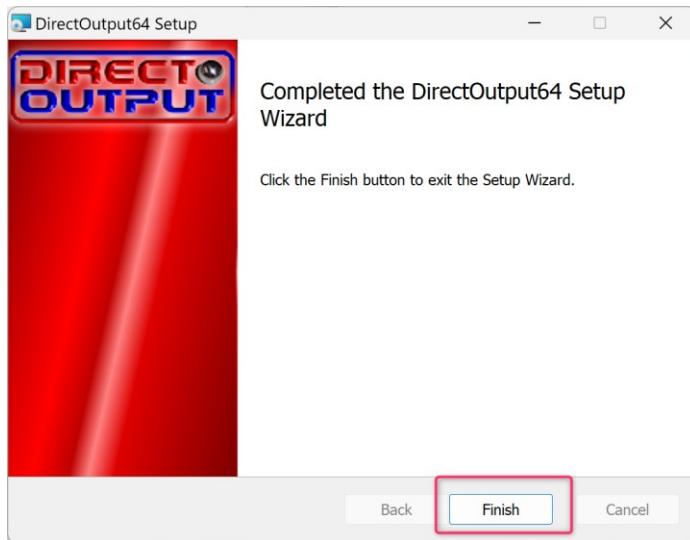
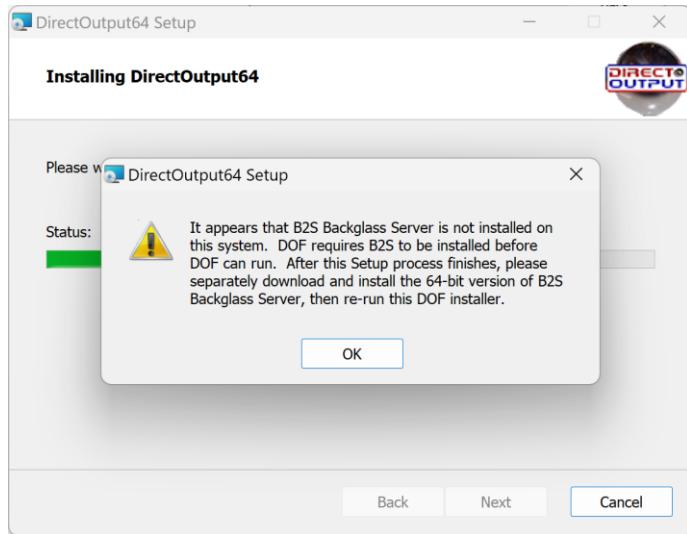
Install DOF using .msi files from official page: <http://mjrnet.org/pinscape/dll-updates.html> and launch it:



Leave installation folder as-is (**C:\DirectOutput**). Highly recommended:



Do not care about the following error (it should appear if you don't have B2S Server installed) and click OK:

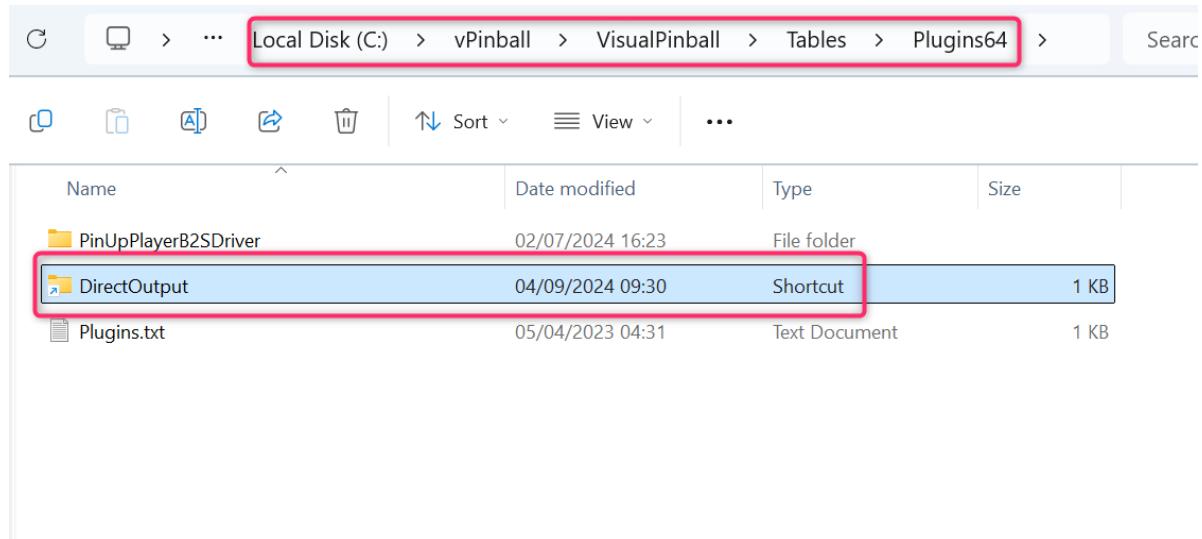


This is how the \DirectOutput folder will look like:

A screenshot of a Windows File Explorer window showing the contents of the "DirectOutput" folder on the C: drive. The path is "This PC > Local Disk (C:) > DirectOutput". The folder contains several files and subfolders: "Config", "x64", "DirectOutputShapes.png", "DirectOutputShapes.xml", and "LICENSE".

Name	Date modified	Type	Size
Config	13-Sep-24 12:46	File folder	
x64	13-Sep-24 12:46	File folder	
DirectOutputShapes.png	07-Mar-18 17:58	FastStone PNG File	6 KB
DirectOutputShapes.xml	07-Mar-18 14:59	XML File	40 KB
LICENSE	30-Jan-18 13:09	File	2 KB

A shortcut to DirectOutput folder in **\Plugins64** folder of B2SServer installation should be present (created by DOF setup):



If not, manually create a shortcut to **DirectOutput** folder and put it in **Plugins64** folder of B2SServer installation.

As a reference, the official step-by-step guide for DOF configuration is available here: [Pinscape Build Guide \(mjrnet.org\)](https://mjrnet.org/).

## Configure DOF for VirtuaTilt

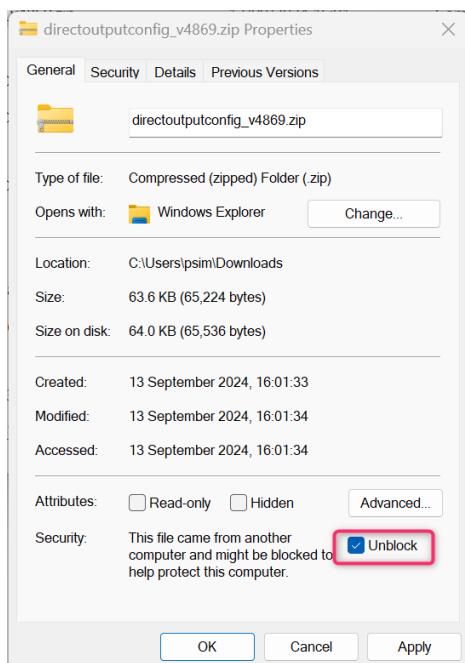
To configure DOF you need to set up a configuration file. You can create an account and login to the [DOF Config tool](#) webpage or [you can just download provided config files from our GitHub repository \(including cabinet file\)](#), unblock the file and copy/move the files into **C:\DirectOutput\** directory (or wherever DOF is installed on your PC), overwriting existing files:

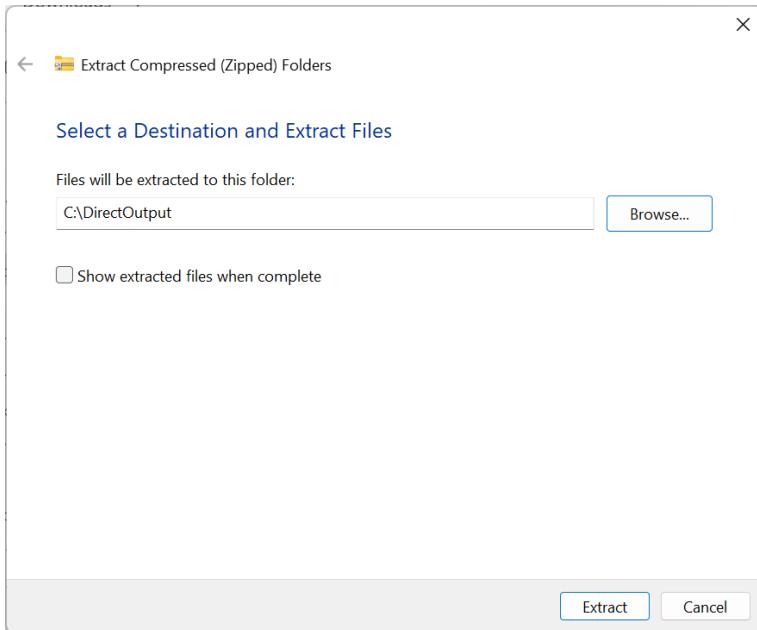
VirtuaTilt / DirectOutput /

Name	Last commit message	Last commit date
VirtuaTilt.json	Added VirtuaTilt cabinet file for DOF ConfigTool	3 months ago
directoutputconfig_v5213.zip	Updated to v5213	3 minutes ago
readme.md	Updated to v5213	now

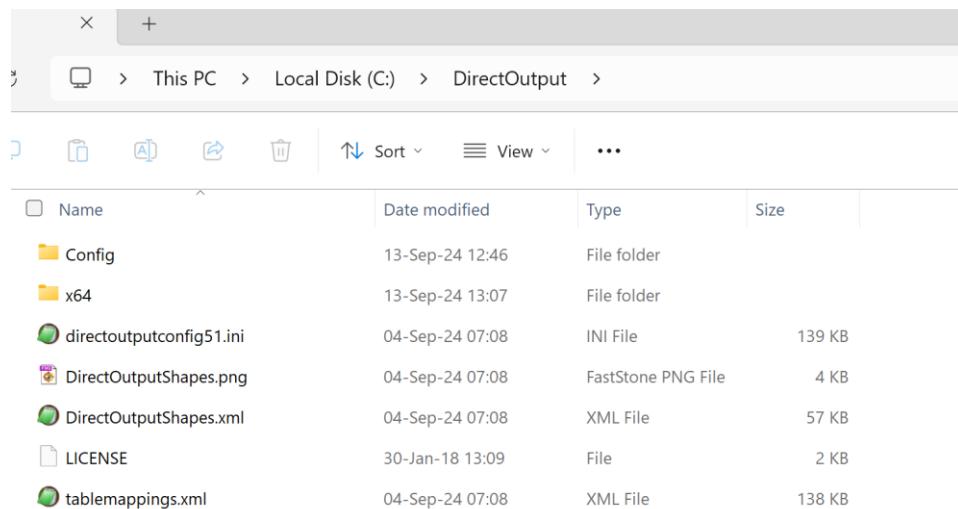
DOF config for VirtuaTilt. Current version: 5213

Version	Submitted By	Approved By	Table	Comment	Recorded
5213	Mecols	outhere	JAWS 50TH Anniversary	Jaws	Sep 7, 2025

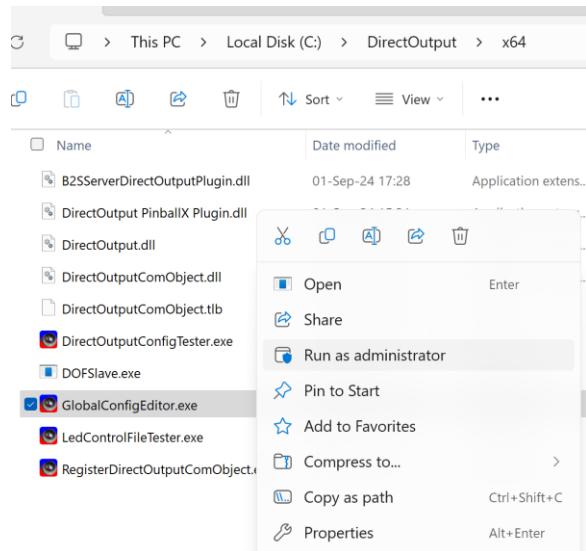




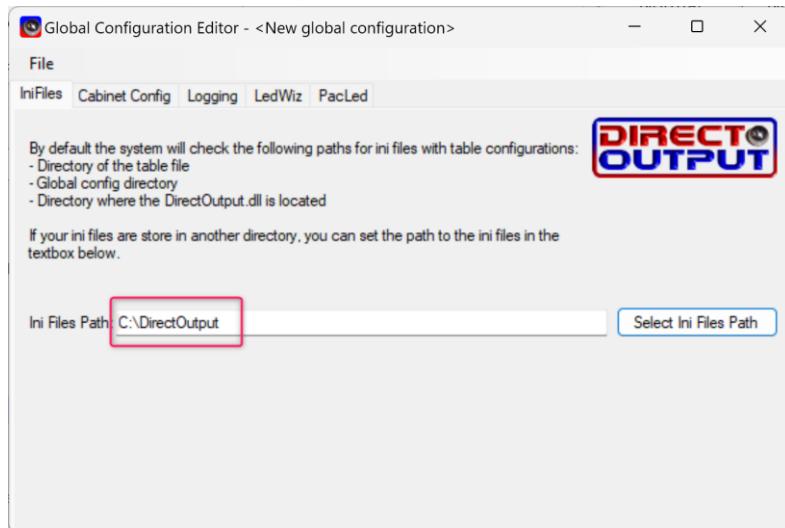
This is how the **DirectOutput** folder will look like:



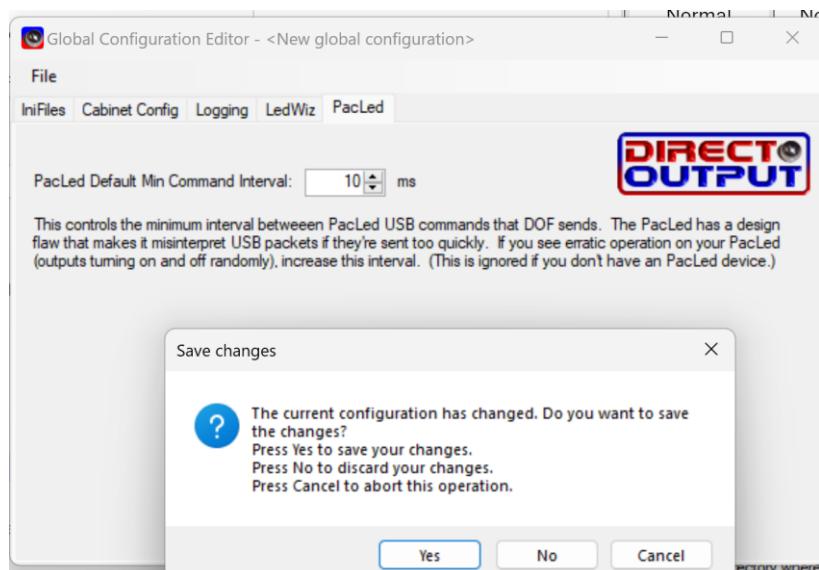
Now right-click **GlobalConfigEditor.exe** file in **/DirectOutput/X64** and in **/DirectOutput/X86** folder and launch it as Administrator:



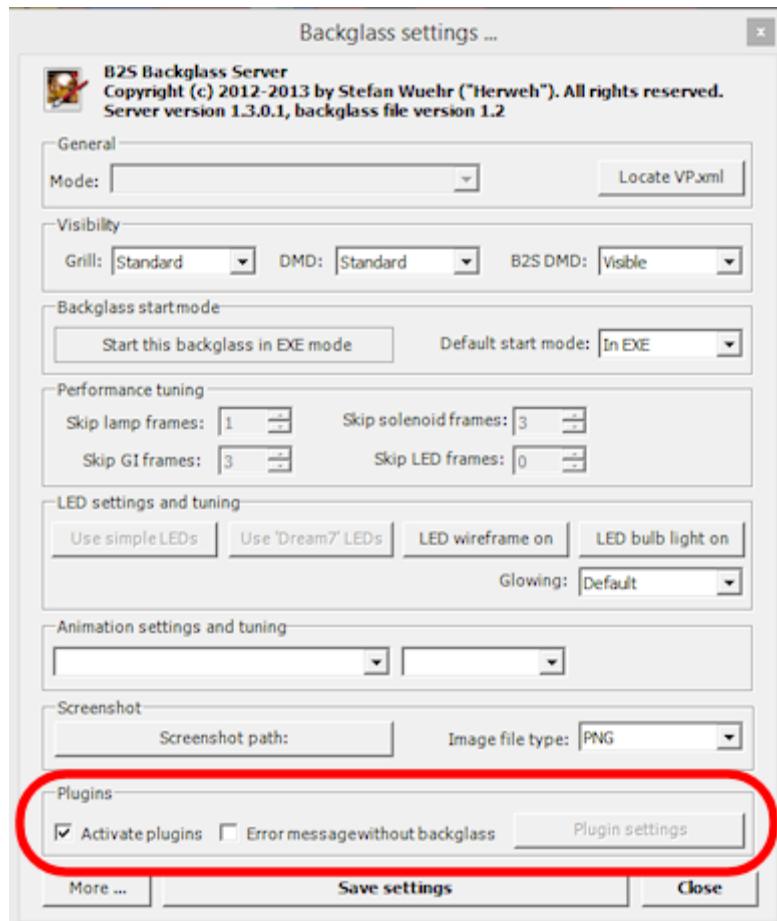
Configure .ini file path where you previously unzipped our config file (**C:\DirectOutput**):



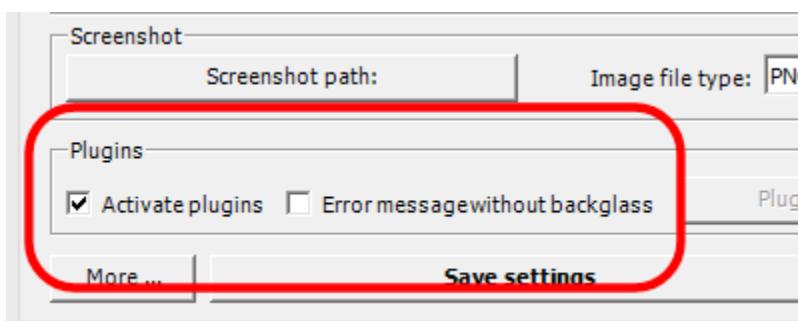
Close the window and press **Yes** to save all changes:



Start Visual Pinball and load a table that has a matching B2S backglass file installed; right-click the mouse anywhere in the backglass area to bring up the B2S options dialog:



Check the box **Activate plugins** and uncheck the box **Error message without backglass**.

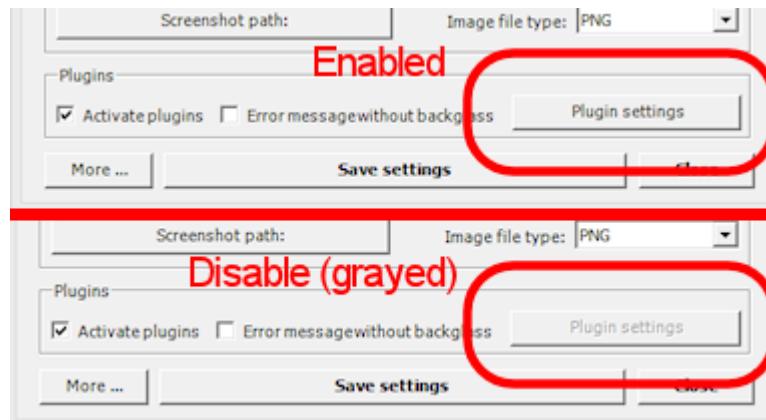


Make sure that **Activate plugins** flag is checked and **Error message without backglass** flag is un-checked

- Click Save Settings
- Exit the table (press "Q" and then "Q" again) and close VP

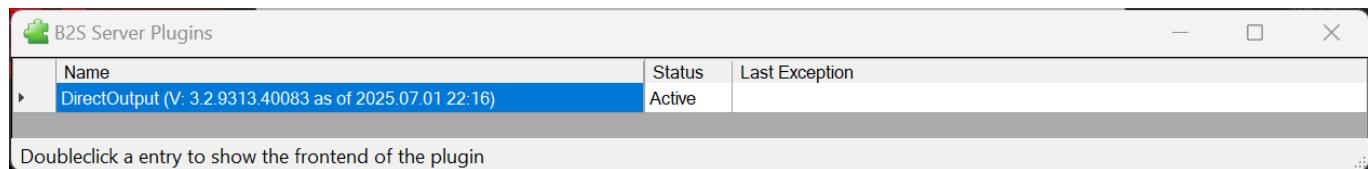
Now start VisualPinball and load a table that has a B2S backglass. You can use the same table you used during the setup procedure in the step where we updated the B2S backglass settings.

As before, when the backglass appears, right-click the mouse anywhere in the backglass display area to bring up the options dialog. Look to see if the **Plugins** button at the bottom is **enabled**:



If the button is disabled, DOF isn't getting loaded. Go to the official [troubleshooting](#) section for things to try.

If the button is enabled, click it. This will bring up a separate dialog that shows the status of each plugin.



Look for a **DirectOutput** entry in the list. If you don't see any such entry, it means the same thing as a disabled Plugin Status button, namely that DOF isn't being loaded. Go to the official [troubleshooting](#) section for help.

Finally, check the **Status** and **Last Exception** columns for the Direct Output entry.

If the Status is **Disabled**, or there's a message in the Last Exception box, see the official [troubleshooting](#) section for help.

If the Status is **Active** and the Last Exception column is empty, congratulations! Your DOF setup work was successful! DOF is loading and starting correctly.

## DOF Configuration Change

**IMPORTANT NOTE:** If you don't want to mess with following DOF configuration, you can just download

**VirtuaTilt cabinet file** from our GitHub and import it on DOF Config Tool:

<https://github.com/3DPTronics/VirtuaTilt/tree/main/DirectOutput>

The screenshot shows a GitHub repository for 'VirtuaTilt' with a 'DirectOutput' folder selected. Inside 'DirectOutput' are files: 'VirtuaTilt.json', 'directoutputconfig\_v5213.zip', and 'readme.md'. A modal window titled 'Import Cabinet...' is overlaid on the DOF Config Tool V3.0 interface. The modal has a 'Drag & Drop your files or Browse' input field and two buttons: 'Import Cabinet' (highlighted with a red box) and 'Cancel'.

Once imported, you can generate your updated config file which contains all latest tables:

The screenshot shows the 'Devices' page for the 'VirtuaTilt Pico' device in the DOF Config Tool V3.0. The 'Generate config' button is highlighted with a red box. The page displays configuration settings for various components like Ledwiz, FRCM-KL25Z, PinOne, PacDrive, Packed, Ultimate/I/O, WS2811, SainSmart, Pinscape, Philips\_Hue, Pincontrol1, Pincontrol2, and DudesCab. There are also sections for 'Options' and 'Buttons'.

## Select your device

If you want to change the default DOF configuration for VirtuaTilt, you need to create an account and login to the [DOF Config tool](#) page.

Once you have an account setup, go to **Devices** and select the number of devices for your setup.

- Select **1** for number of **PinscapePico** devices and then click on **Update**:

The screenshot shows the 'Devices' section of the DOF Config Tool. On the left, there's a sidebar with various navigation options like Home, Stats, History, Feedback, Tables, Configurations (0 modded), Templates (0), Cabinet (Manage, Variables, Combine Toys, Devices 1 selected), and Port Assignments. The main area is titled 'VirtuaTilt Pico' and contains a grid of device configuration fields. The 'PinscapePico' field is highlighted with a red border and has the value '1'. Other fields include Ledwiz, FRDM-KL25Z, PinOne, PacDrive, PacLed, Ultimate/IO, WS2811, SainSmart, Philips\_Hue, Pincontrol1, Pincontrol2, and DudesCab, all set to 0. Below the grid is an 'Options' section with 'Generate NoFeedback Files' and 'Remove Fade from Front Buttons' both set to 'No'. At the top right of the main area are 'Switch cabinet' and 'Generate config' buttons, and a large blue 'Update' button.

## Creating a config file

When creating a config file for your setup, it's simply a matter of selecting the outputs for each device in your cabinet. VirtuaTilt is already configured this way:

- **Port1** – Solenoid – Combo for bumpers and slingshots
- **Port2** – Shaker Motor
- **Port3** – Left Flipper Solenoid
- **Port4** – Right Flipper Solenoid

**Port Assignments**

VirtuaTilt Pico

Device: PinscapePico 1 - directoutputconfigini120

P:001	Combo1	P:033	P:065	P:097
P:002	Shaker	P:034	P:066	P:098
P:003	Flipper Left	P:035	P:067	P:099
P:004	Flipper Right	P:036	P:068	P:100
P:005		P:037	P:069	P:101
P:006		P:038	P:070	P:102
P:007		P:039	P:071	P:103
P:008		P:040	P:072	P:104
P:009		P:041	P:073	P:105
P:010		P:042	P:074	P:106
P:011		P:043	P:075	P:107
P:012		P:044	P:076	P:108
P:013		P:045	P:077	P:109
P:014		P:046	P:078	P:110
P:015		P:047	P:079	P:111
P:016		P:048	P:080	P:112
P:017		P:049	P:081	P:113

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The **Combo1** config is assigned to knocker, slingshots and bumpers:

**Toy Combo Management**

VirtuaTilt Pico

ID	Name	Toy Category	Toys
1001	Combo1	Mono	8 Bumper Center 8 Bumper Left 8 Bumper Right 8 Bumper Back Knocker Slingshot Left Slingshot Right 10 Bumper Back Left 10 Bumper Back Right 10 Bumper Middle Center

Create New Combo

Combo Name:

You can change it according to your personal preferences. To do this, simply navigate to the "**Combine Toys**" section in the config tool and enter your new combos.

**NOTE:** Shaker Motor Intensity is already set at Maximum (**48**). You can change it according to your personal preferences:

The screenshot shows the DOF Config Tool V3.0 interface. On the left, there's a sidebar with various sections like Home, Stats, History, Feedback, Tables, Configurations, Templates, Cabinet, Manage, and Devices. Under Manage, 'Variables' is selected and highlighted with a yellow box. The main area is titled 'Variables' and shows configuration for 'VirtuaTilt Pico'. It includes sections for Shaker Motor (Min: 48, Max: 48), Fan (Min: 1, Max: 48), Toy Durations (ms) (Chime: 60, Knocker: 60, Bell: 60), Custom Brightness (Strobe: 48, PF Strobe MX: FF, Flasher: FF, LED Strip Flasher: FF), and Contactor (Target Duration: 60, Target Intensity: 48, Drop Duration: 60, Drop Intensity: 48). A note at the bottom says 'Set Intensity and Duration to 0 if you don't want feedback to these events'. At the top right, there are 'Switch cabinet' and 'Generate config' buttons.

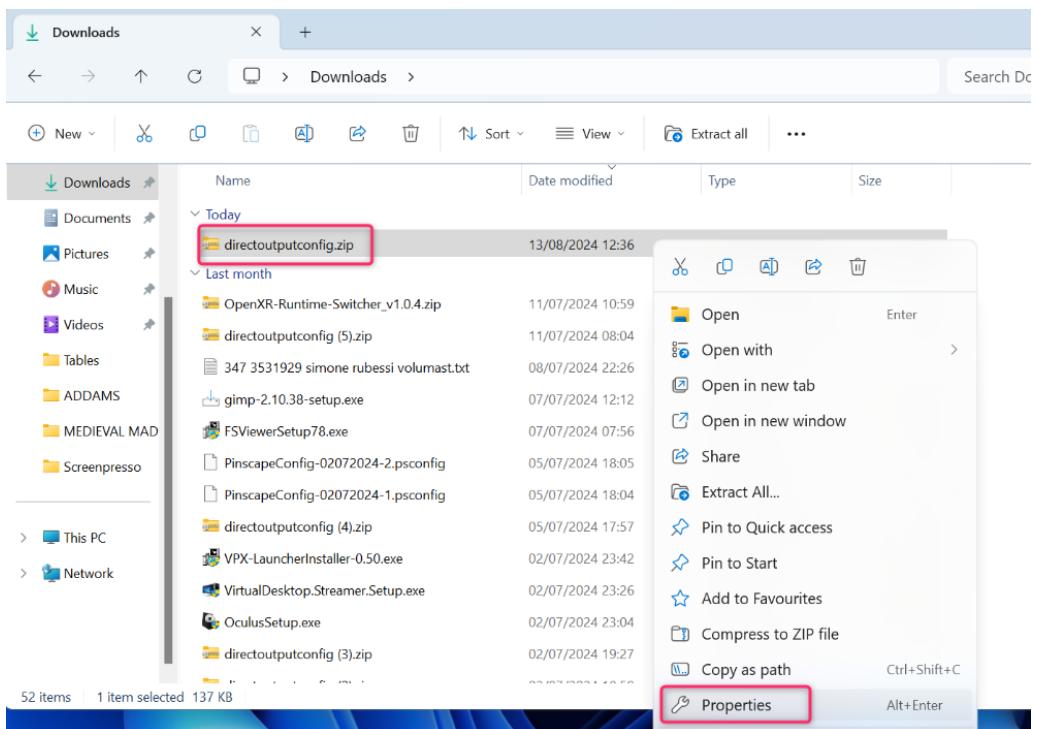
## Generate and Import your DOF config

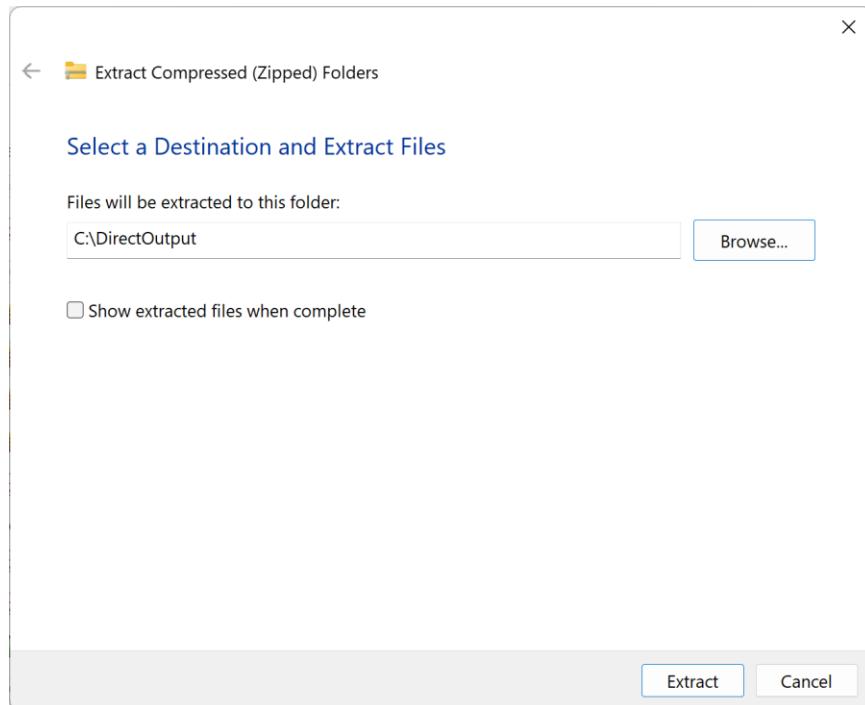
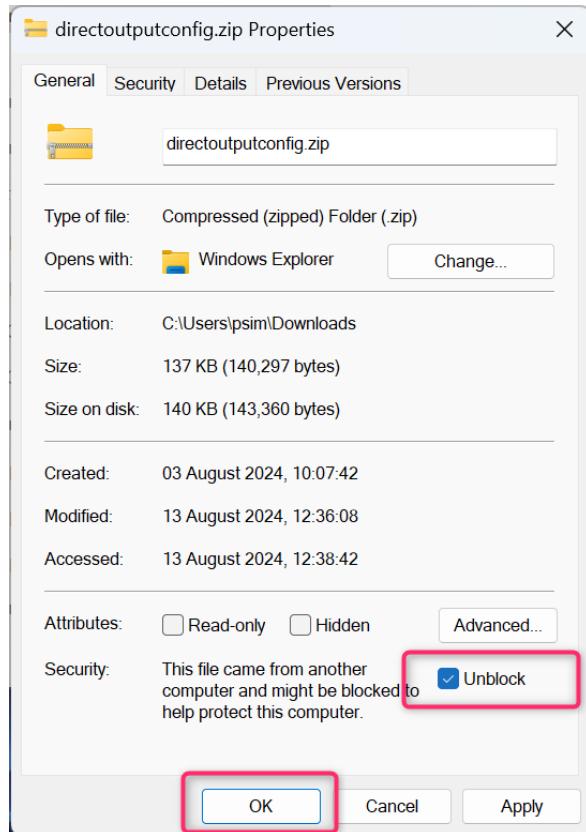
Once you have everything set in the config tool, click the **Update** button, then **Generate Config** button:

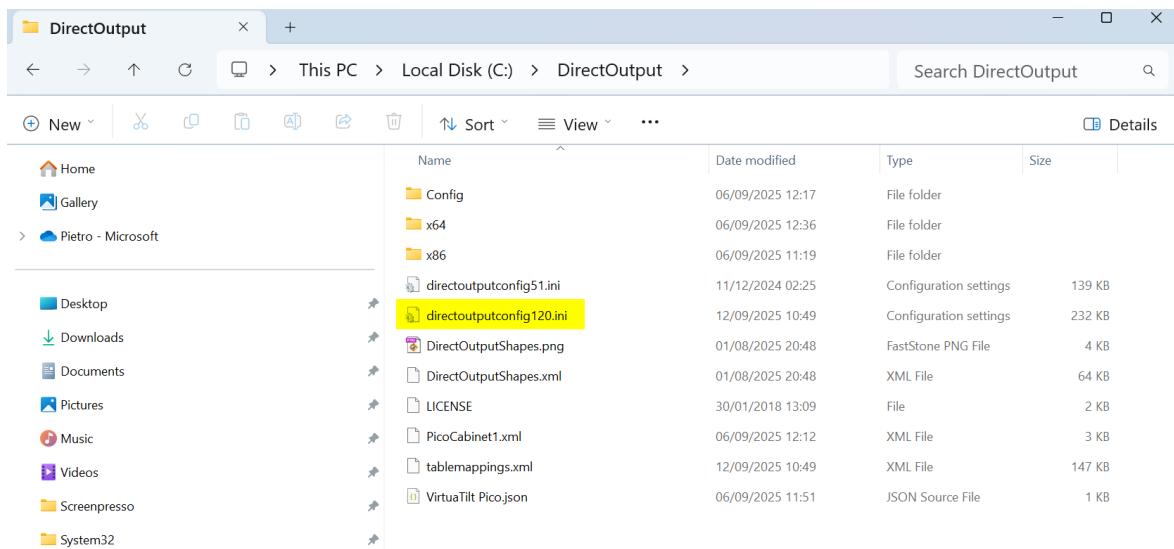
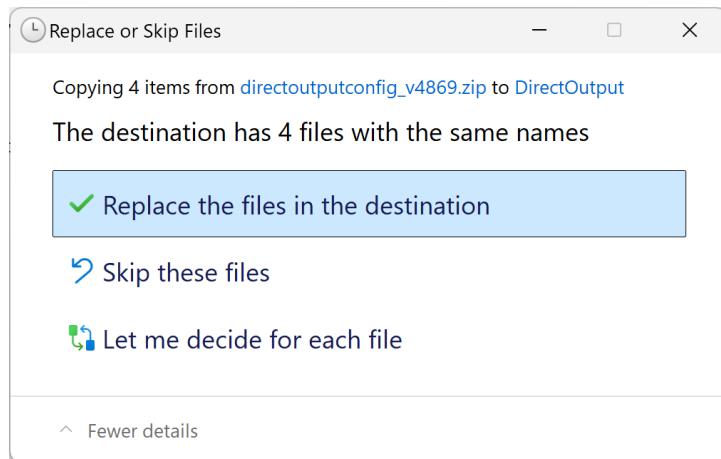
This screenshot is nearly identical to the one above, showing the DOF Config Tool V3.0 Variables page for 'VirtuaTilt Pico'. The configuration values remain the same: Shaker Motor (Min: 48, Max: 48), Fan (Min: 1, Max: 48), Toy Durations (ms) (Chime: 60, Knocker: 60, Bell: 60), Custom Brightness (Strobe: 48, PF Strobe MX: FF, Flasher: FF, LED Strip Flasher: FF), and Contactor (Target Duration: 60, Target Intensity: 48, Drop Duration: 60, Drop Intensity: 48). The 'Generate config' button at the top right is highlighted with a red box. The sidebar on the left shows the 'Variables' section is still selected.

The screenshot shows the DOF Config Tool V3.0 interface. At the top, it displays "Generating Configuration Files..." with a large circular progress bar. The left sidebar contains navigation links like Home, Stats, History, Feedback, Tables, Configurations (0 modded), Templates (0), Cabinet, Manage (2), Variables, Combine Toys (1), Devices (1), and Port Assignments. A "Donate" button is at the bottom of the sidebar.

This will download a copy of the configuration files onto your PC. All you need to do now is to extract the zipfile into your **C:\DirectOutput\** directory (or wherever DOF is installed on your PC) and overwrite all files:

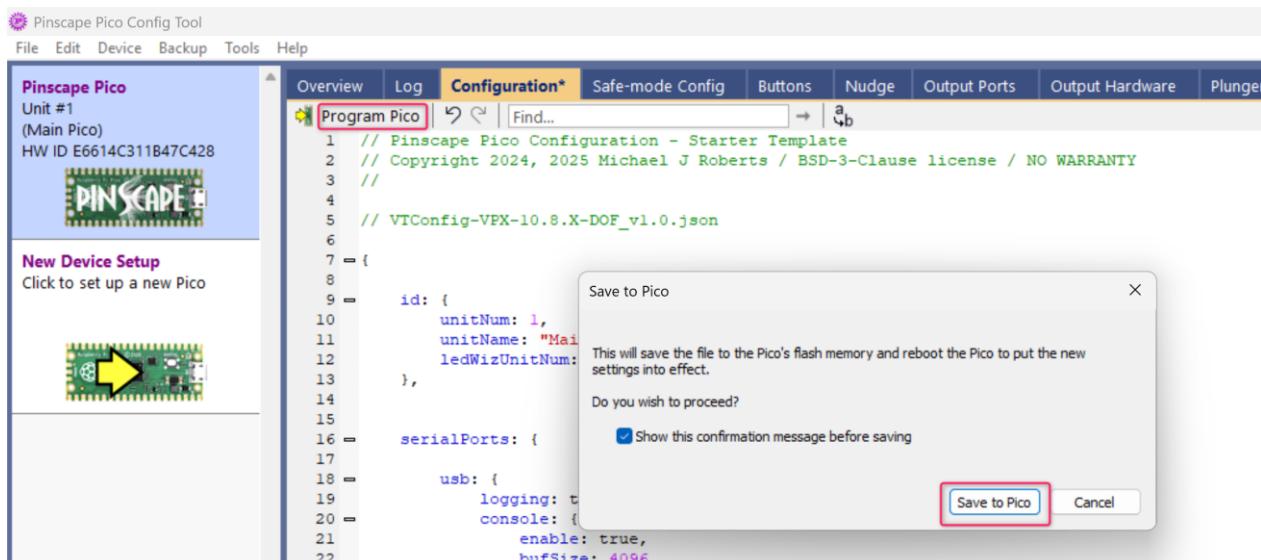
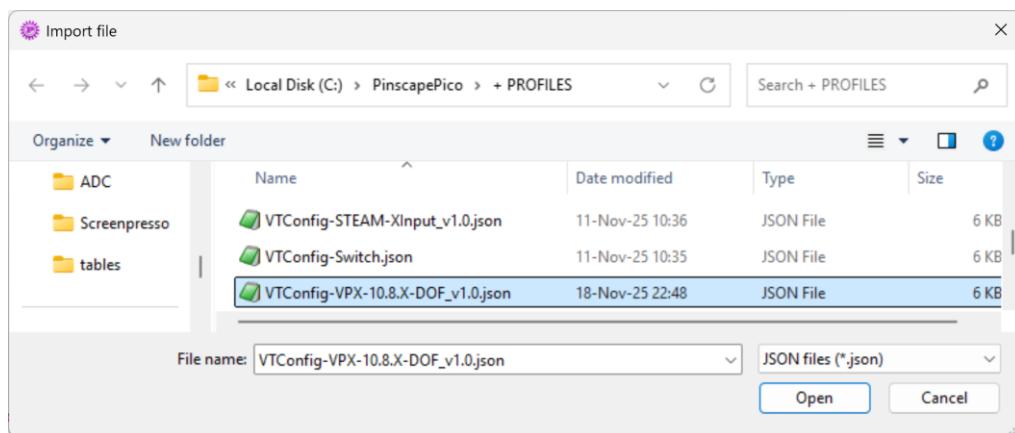
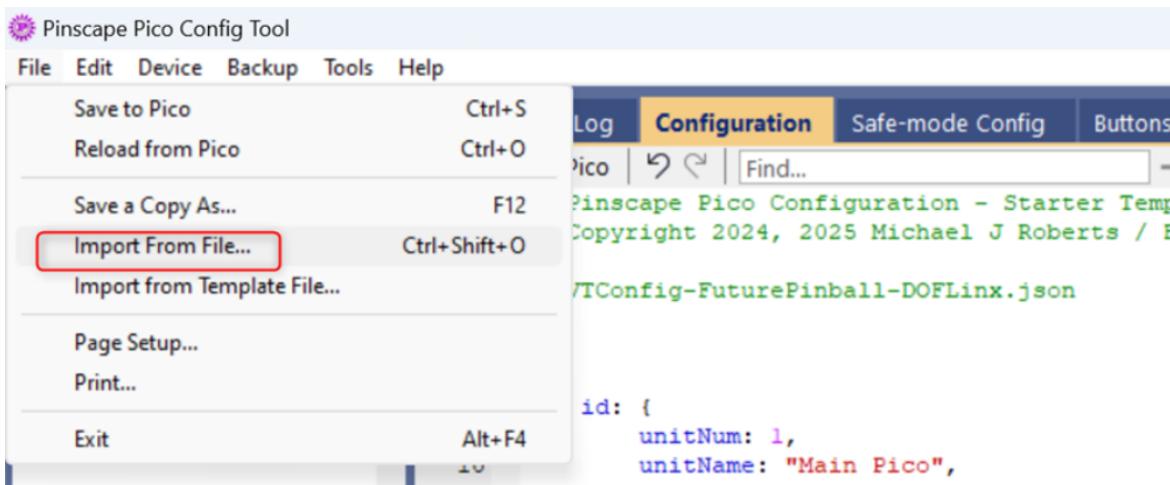




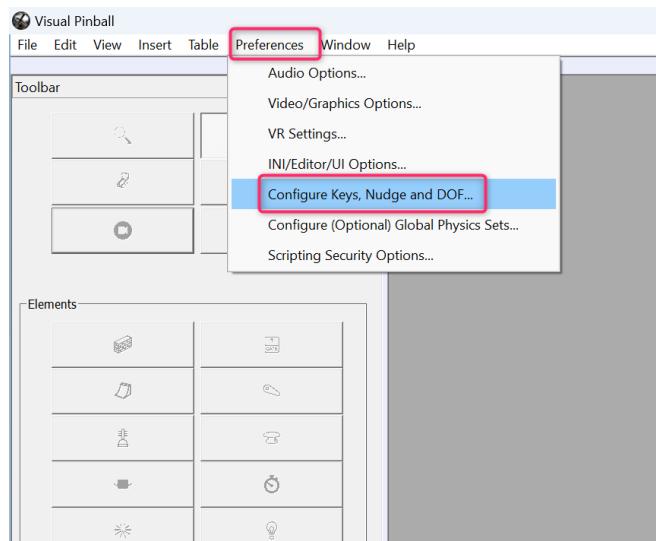


# Visual Pinball X - General Configuration

Load in Pinscape Pico Config Tool the **VTConfig-VPX-X.X.X-DOF.json** profile first (**valid for all VPX versions**):



Replicate the following configuration in Visual Pinball X settings:



## VPX 10.8.1.XXXX Settings

**Keys, Nudge and DOF v10.8.1.XXXX**

**Button Assignments**

Left Flipper	Right Flipper	LMagnaSave	RMagnaSave
L Shift	R Shift	L Ctrl	R Ctrl
Start Game	Add Credit	Add Credit 2	Plunger
1	5	4	Enter
Exit Game	Volume -	Volume +	Debug/Perf.info
Q	'	i	F11
Left Nudge	Fwd Nudge	Right Nudge	Mech Tilt
Z	Space	-	T
Custom 1	Custom 2	Custom 3	Custom 4
Up	Down	Left	Right
Debug Balls	Debugger/l.Edit	Lockbar/Fire	Pause
O	D	Menu	P
StagedLFlipper	StagedRFlipper	Tweak	F12
L Windows	R Alt	(none)	(none)

**PinMAME Buttons**

EB BuyIn (2)	Coin 3 (5)	Coin 4 (6)	Door (END)
(none)	(none)	(none)	(none)
Service Buttons	Cancel (7)	Down (8)	Up (9)
	(none)	(none)	(none)

Note that some keys can also be configured in the VPMKeys.vbs file

**Nudge & Plumb**

Enable Analog Nudge (hardware acceleration sensor)

X Axis (L/R)	X Axis	<input type="checkbox"/> Reverse	Max	100	Gain	150%
Y Axis (U/D)	Y Axis	<input type="checkbox"/> Reverse	Max	100	Gain	150%
<input checked="" type="checkbox"/> Board Mounted Face Up	<input type="checkbox"/> Accelerometer Rotation	0				
<input type="checkbox"/> Legacy/VP9-style non-realistic Keyboard Nudge	Strength :	100 %				
<input checked="" type="checkbox"/> Enable Nudge Filter (mainly for Analog/additional Board setups)						

Analog Nudge Input is Velocity

Simulate Tilt Plumb From Accelerator Sensor Threshold : 400 Inertia : 100.0

To interactively set, calibrate and test the Nudge parameters, please load the 'Nudge Test and Calibration.vpx' table and run it

**DOF Controller Options**

Contactors	Knocker
DOF	DOF
Chimes	Bell
DOF	DOF
Gear	Shaker
DOF	DOF
Flippers	Targets
DOF	DOF
* This will only apply to tables that are using the Controller.vbs in their script code	
<input type="checkbox"/> Drop Targets	
DOF	
<input type="checkbox"/> Disable B2S	
Input API Direct Input	
Ctrl.Rumble	Table with generic fa

**Plunger**

Enable 1s Plunger Retract

Position Axis	Z Axis	<input type="checkbox"/> Reverse	Dead Zone	10%
Speed Axis	(disabled)		Scaling	100%

Enable Mouse handling during Play

Enable flying around (Arrow Keys + Left Alt Key) during Tweak Mode

**Buttons**

Override Default Button Layout

Disable ESC Key

\* To assign Custom Keys to Gamepad Buttons, click on the button and select desired key, then choose desired gamepad button from dropdown box.

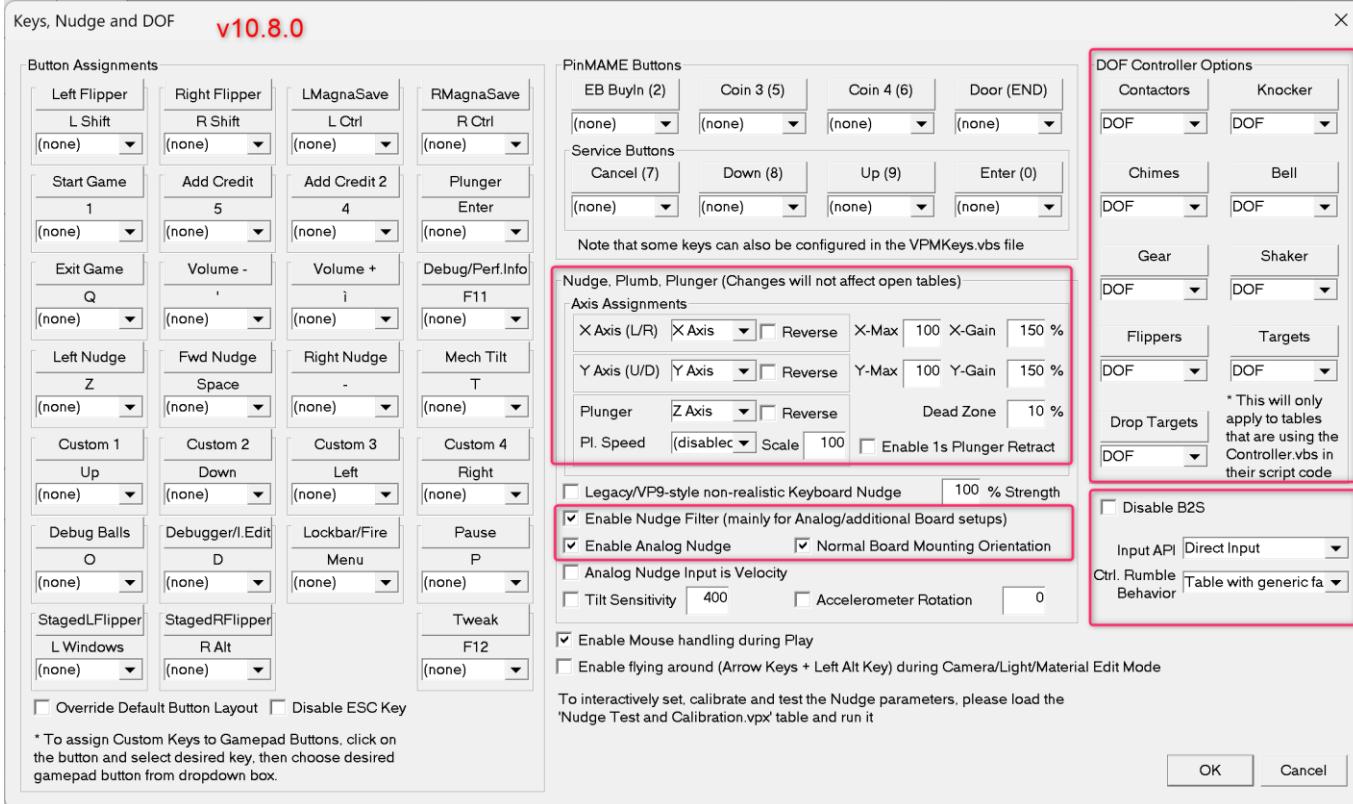
**Buttons**

Manage DI Devices...

OK

Cancel

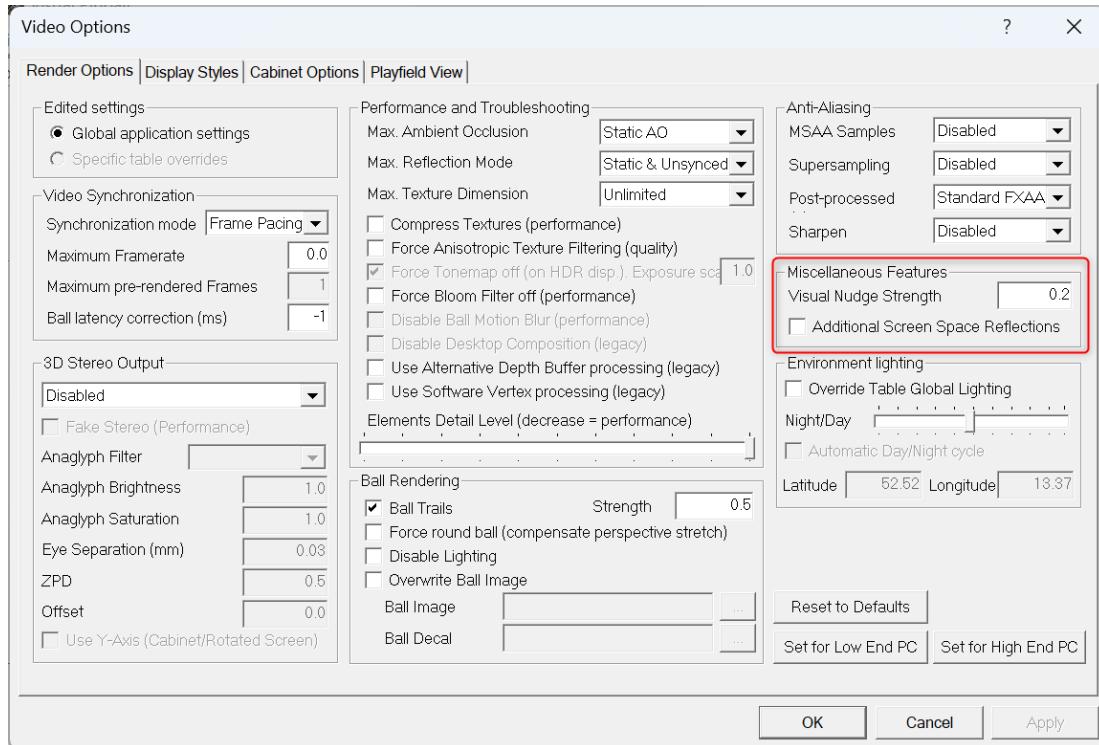
## VPX 10.8.0 Settings



**IMPORTANT NOTE:** Depending on VPX versions (<https://github.com/vpinball/vpinball/releases>), you **may** need to select/unselect “**Analog Nudge Input Is Velocity**” to get nudge working. You **may** also need to switch **Input API** setting between **SDL / DirectInput**.

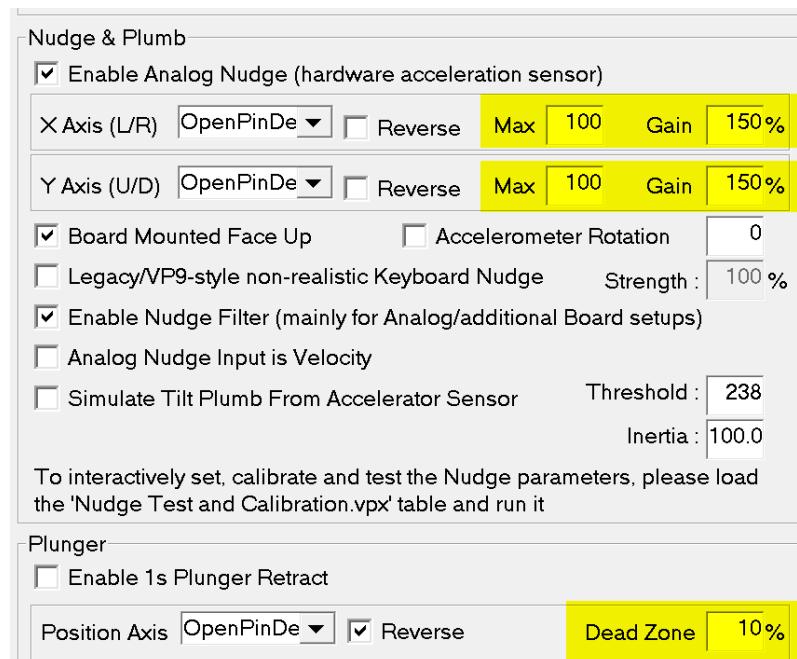
# Visual Pinball X - Nudge/Tilt configuration

We recommend starting with the following values and modifying them afterwards:



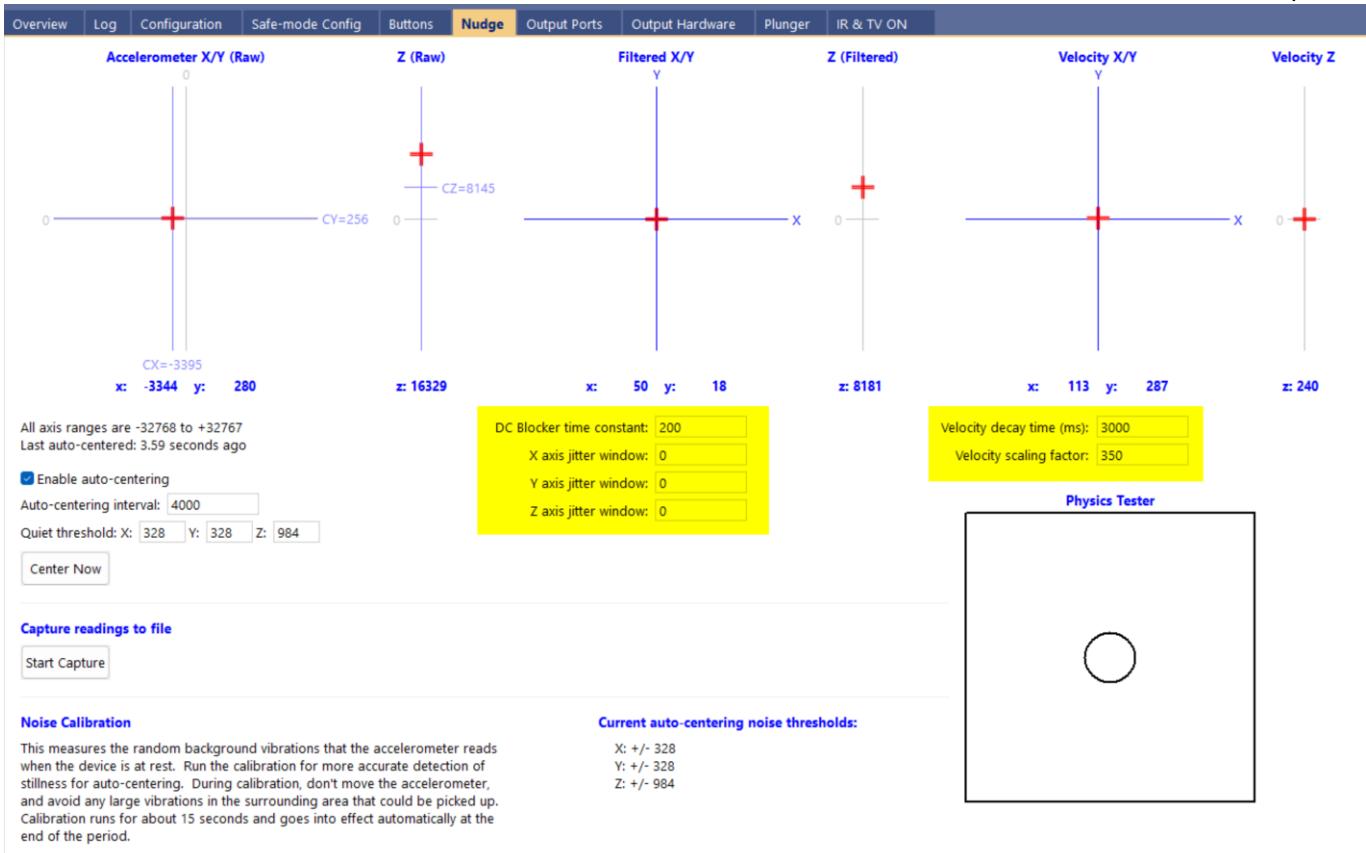
Visual Nudge Strength: **0.2**

**VERY IMPORTANT NOTE:** You need to find your right settings (according to your personal preferences) for nudging. You can adjust both Pinscape Pico accelerometer settings and VPX settings until you find your perfect spot:



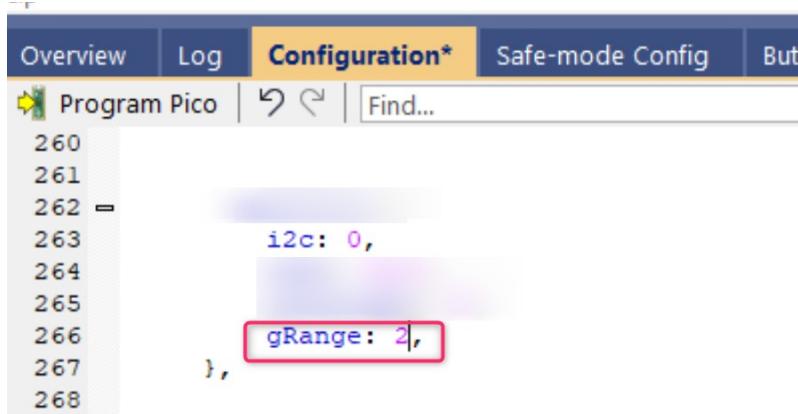
# 3DPTronics

VirtuaTilt RP2040–VPX Setup v1.5



Try to adjust **DC Blocker time constant**, **Velocity decay time** and **Velocity scaling factor**.

You can also increase accelerometer sensitivity by changing **gRange** value to **2** in any profile:

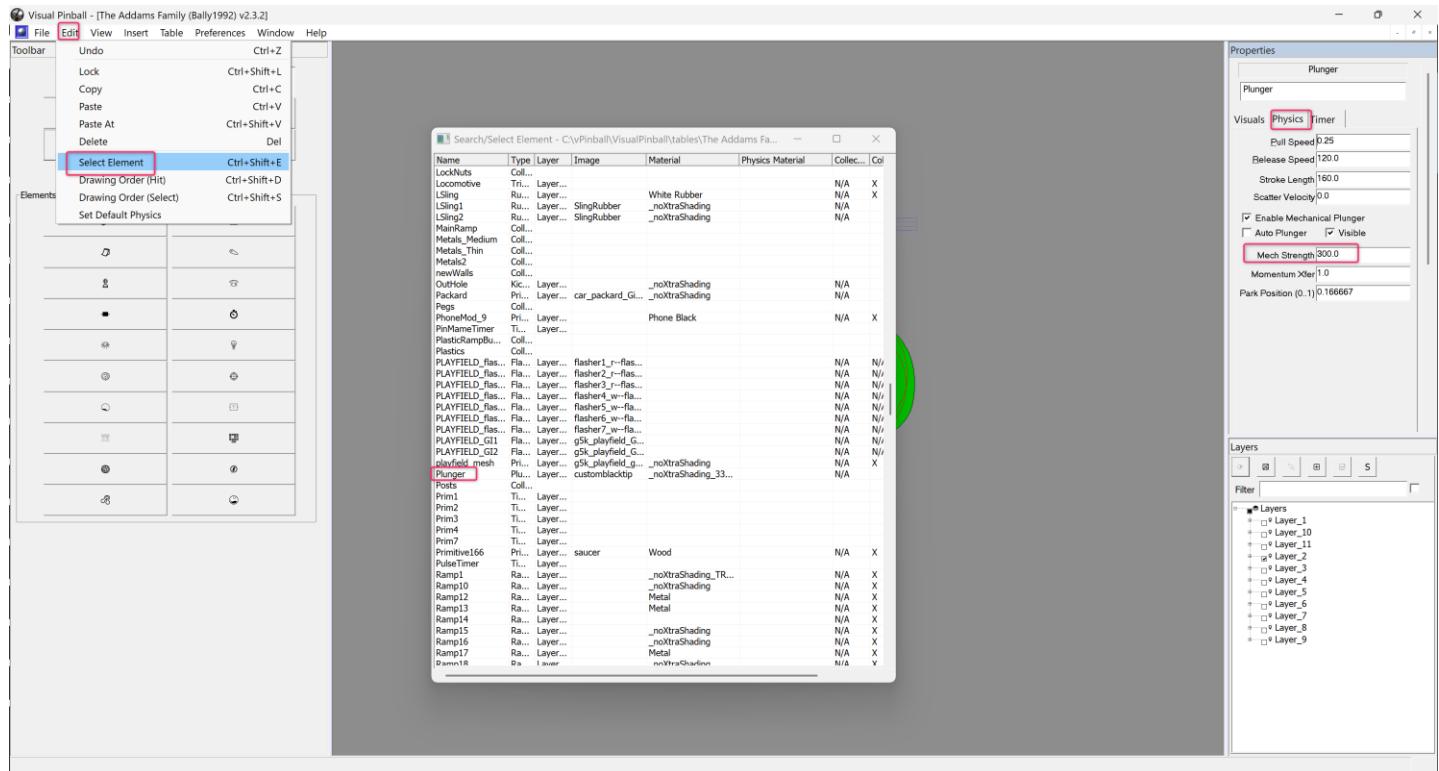


Please refer to the official Pinscape Pico reference for additional information about accelerometer parameters: <http://mjrnet.org/pinscape/PinscapePico/Help/NudgeWin.htm>

# Visual Pinball X - Plunger configuration

If you feel that plunger is not strong enough for some VP tables, you can raise its **mechanical strength** in any table via software:

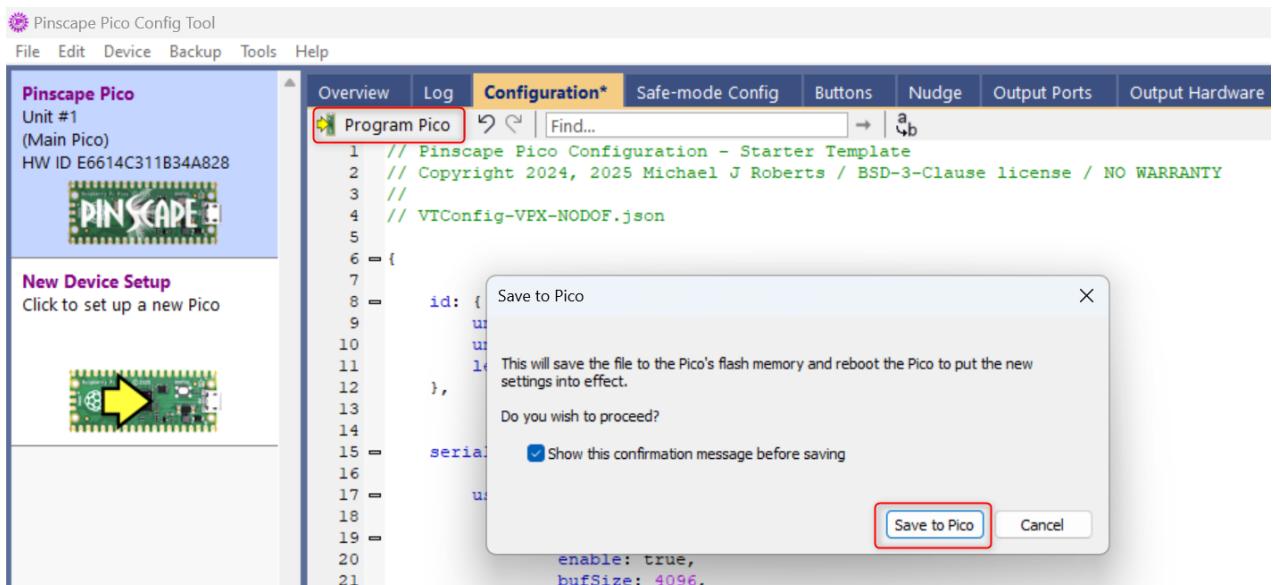
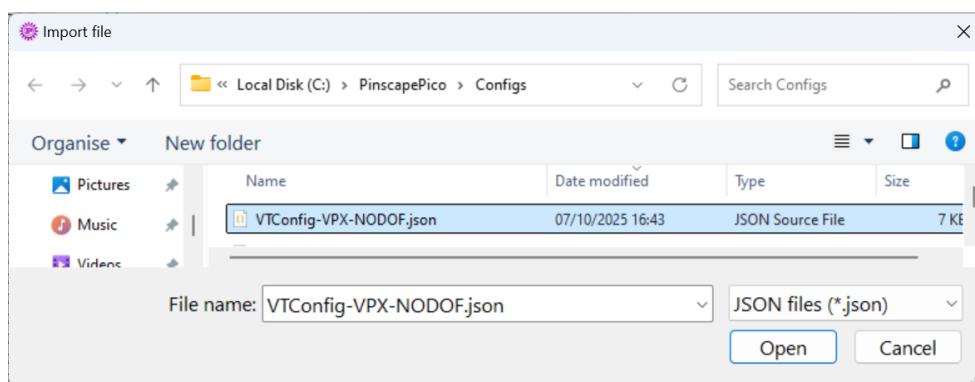
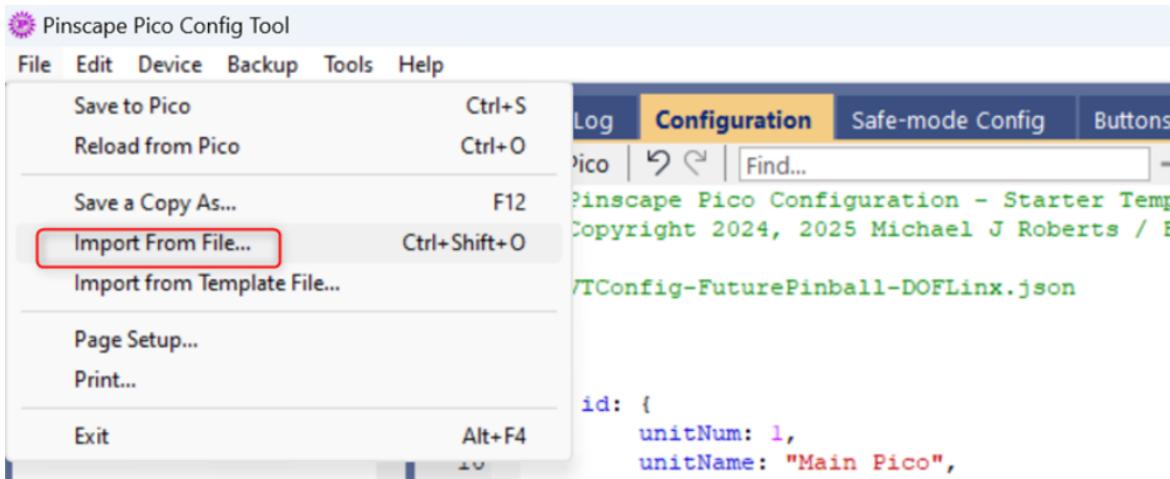
**Edit → Select Element → Plunger → Physics → Mech Strength**



# Play Visual Pinball X without DOF

The new upgraded VirtuaTilt allows you to enjoy feedback from flipper's solenoids and shaker motor even without DOF configured!

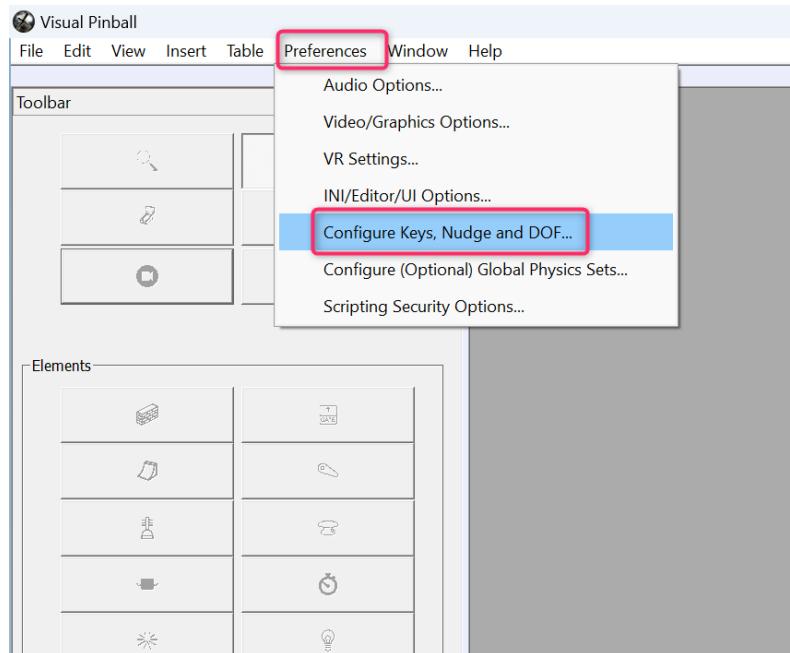
Load **VTConfig-VPX-NODOF.json** in Pinscape Pico Config Tool:

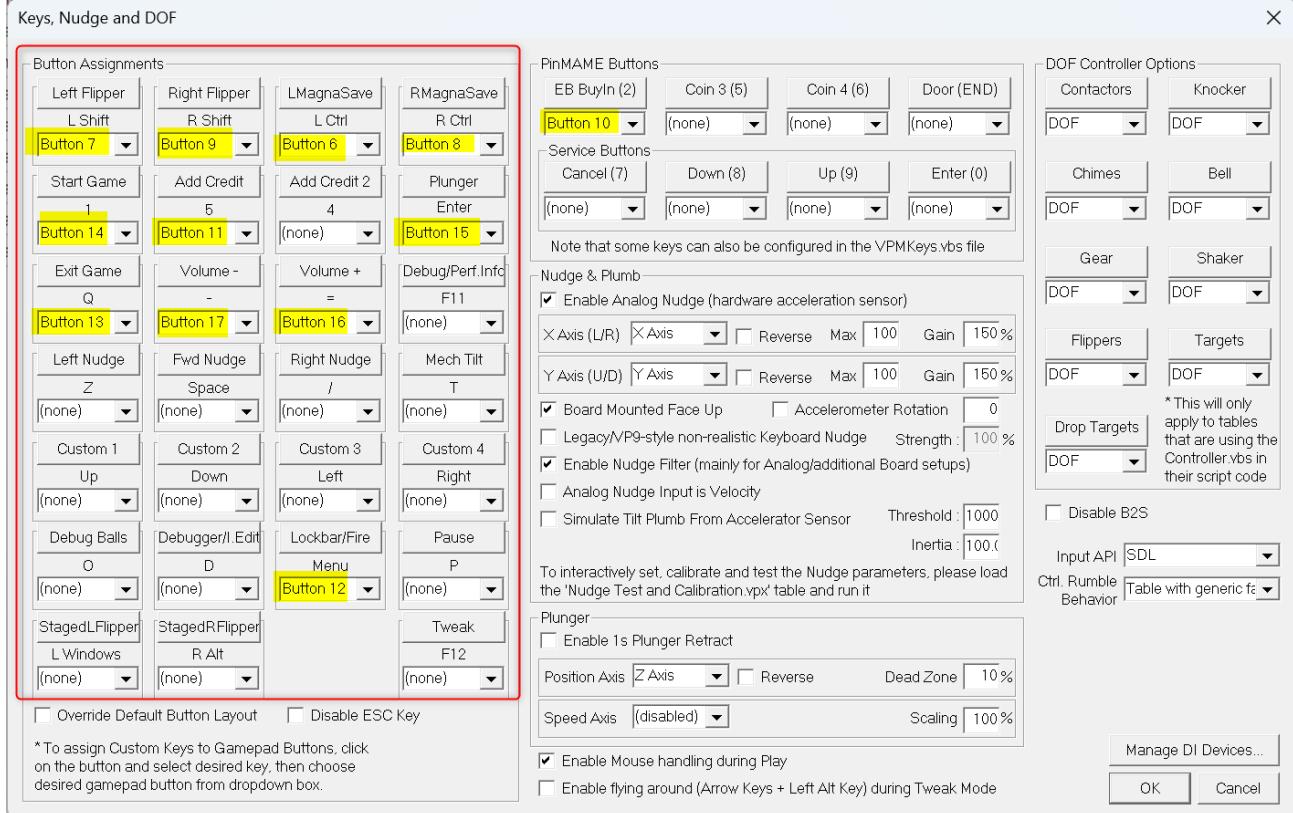


In Pinscape Pico config tool go to **Buttons** tab and note your buttons numbers (press every button):

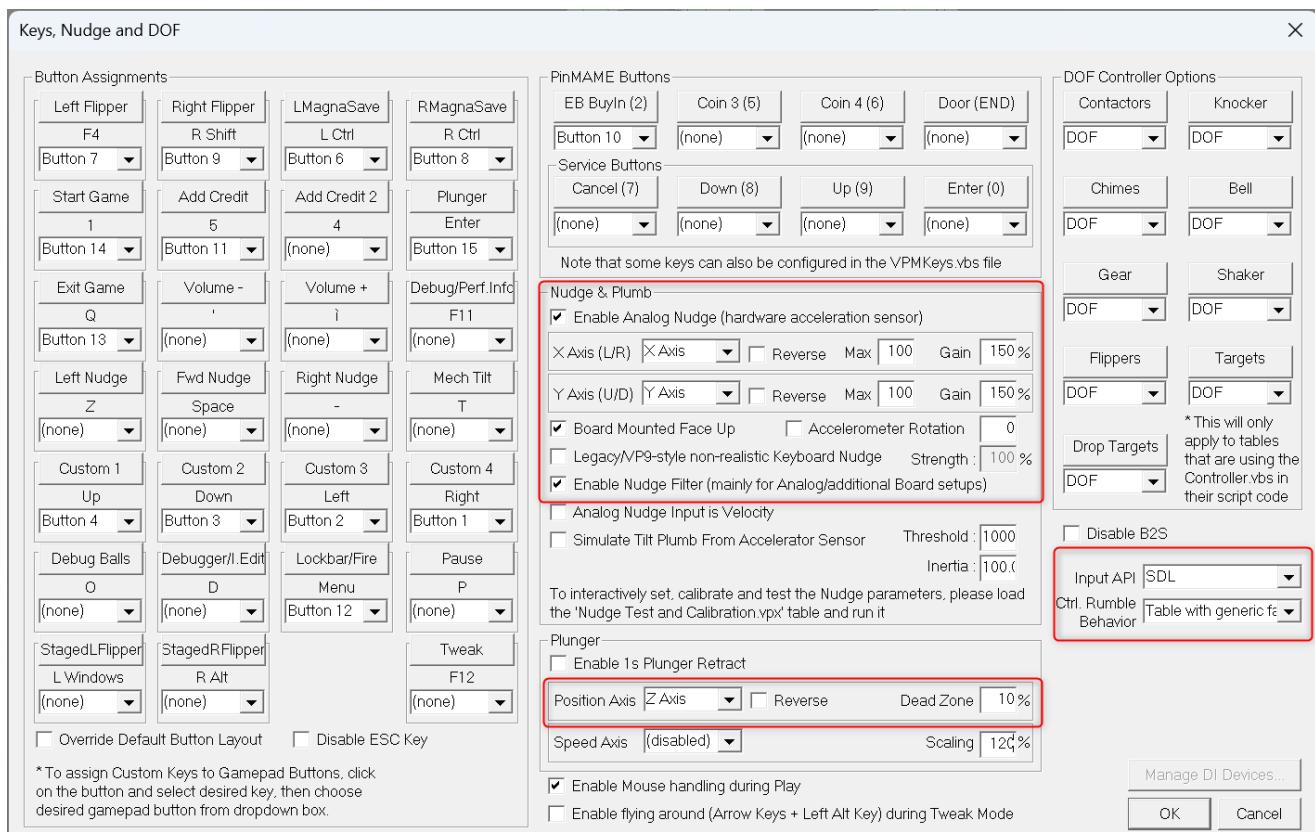
Logical Buttons
#0 Off Pushbutton GPIO (GP27) => Keyboard =
#1 Off Pushbutton GPIO (GP26) => Keyboard -
#2 Off Pushbutton GPIO (GP16) => Keyboard End
#3 Off Pushbutton GPIO (GP0) => Gamepad Button 5
#4 Off Pushbutton GPIO (GP1) => Gamepad Button 1
#5 Off Pushbutton GPIO (GP2) => Gamepad Button 2
#6 Off Pushbutton GPIO (GP3) => Gamepad Button 3
#7 Off Pushbutton GPIO (GP4) => Gamepad Button 4
#8 Off Pushbutton GPIO (GP10) => Gamepad Button 6
#9 Off Pushbutton GPIO (GP9) => Gamepad Button 7
#10 Off Pushbutton GPIO (GP18) => Gamepad Button 8
#11 Off Pushbutton GPIO (GP19) => Gamepad Button 9
#12 Off Pushbutton GPIO (GP13) => Gamepad Button 10
#13 Off Pushbutton GPIO (GP14) => Gamepad Button 11
#14 Off Pushbutton GPIO (GP11) => Gamepad Button 12
#15 ON Pushbutton GPIO (GP12) => Gamepad Button 13
#16 ON Pushbutton GPIO (GP15) => Gamepad Button 14
#17 Off Pushbutton GPIO (GP22) => Gamepad Button 15

Assign all buttons you need in VPX:



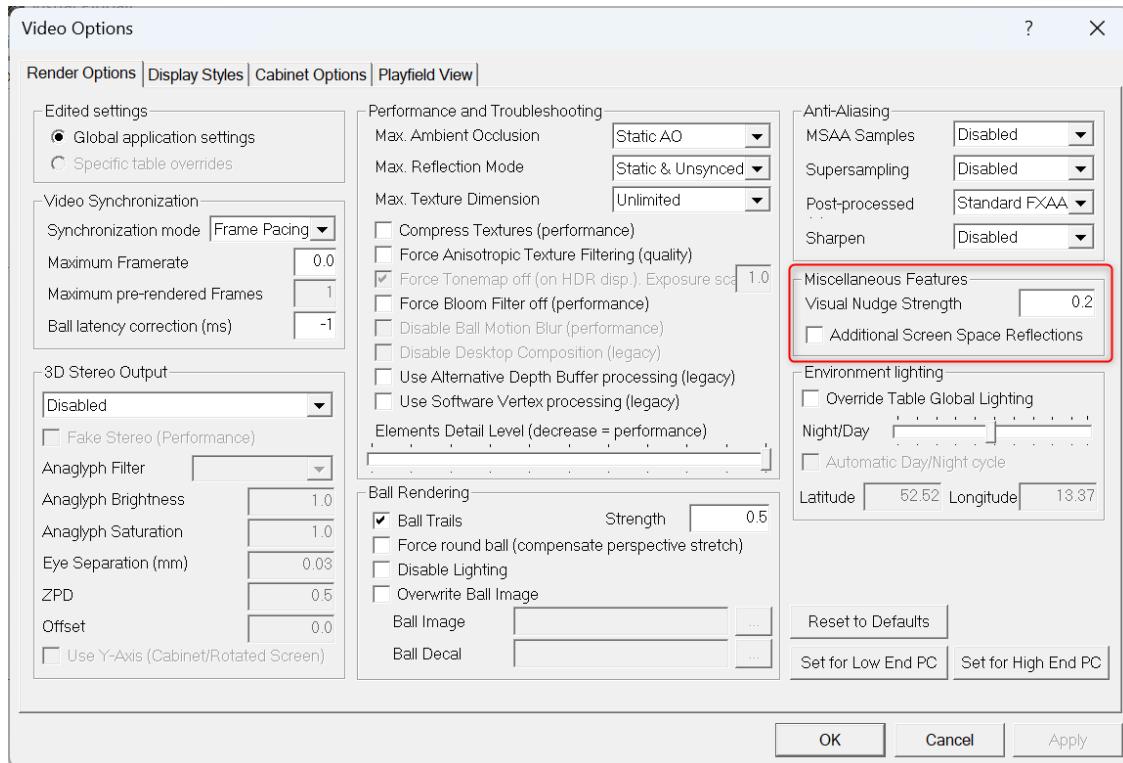


Replicate also the following configuration in Visual Pinball X settings (**VPX 10.8.1.XXXX**):



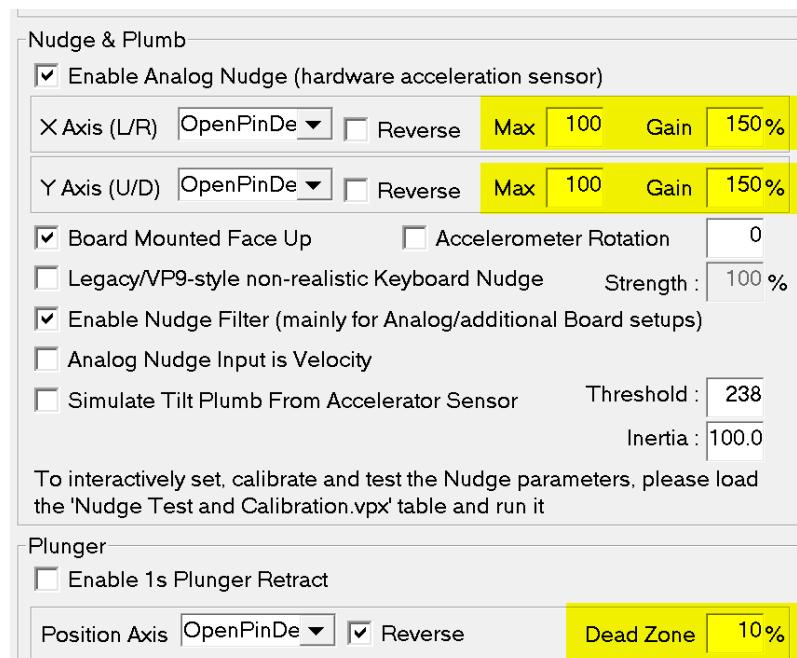
## Nudge/Tilt configuration

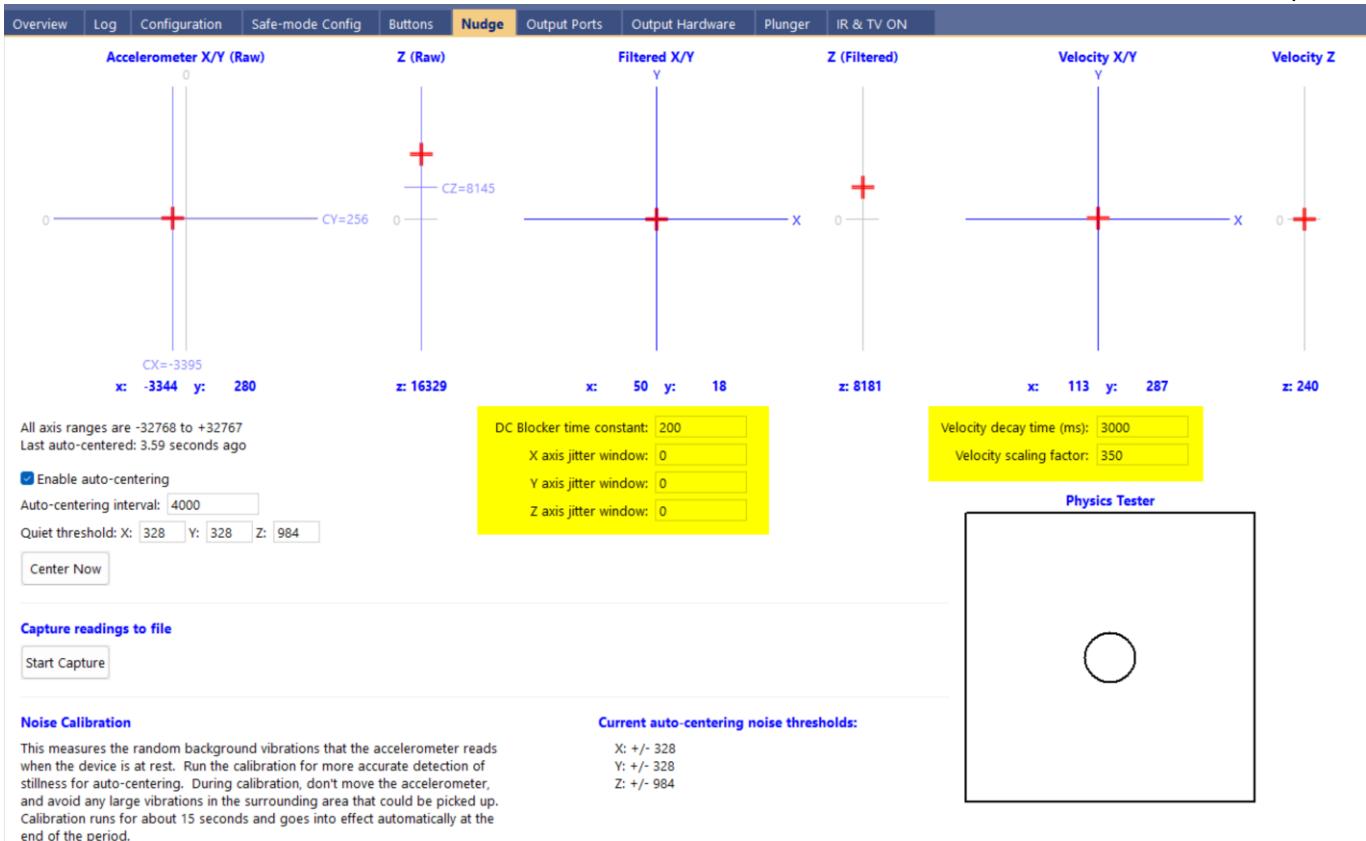
We recommend starting with the following values and modifying them afterwards:



Visual Nudge Strength: **0.2**

**VERY IMPORTANT NOTE:** You need to find your right settings (according to your personal preferences) for nudging. You can adjust both Pinscape Pico accelerometer settings and VPX settings until you find your perfect spot:





Try to adjust **DC Blocker time constant**, **Velocity decay time** and **Velocity scaling factor**.

You can also increase accelerometer sensitivity by changing **gRange** value to **2** in any profile:

The screenshot shows the 'Configuration\*' tab of the Pinscape Pico software. The code editor displays the following C-like pseudocode:

```

Overview | Log | Configuration* | Safe-mode Config | Buttons
Program Pico | Find...
260
261
262 =
263     i2c: 0,
264
265
266     gRange: 2,
267
268

```

The line `gRange: 2,` is highlighted with a red rectangle.

Please refer to the official Pinscape Pico reference for additional information about accelerometer parameters: <http://mjrnet.org/pinscape/PinscapePico/Help/NudgeWin.htm>