VIRTUATILT BASIC CONFIGURATION AND SETUP

Following some basic instructions to have your VirtuaTilt up and running quickly.

VirtuaTilt controller is powered by FRDM KL25Z board with Pinscape software already installed.

Please always refer to official Pinscape build guide (the Bible) available here:
http://mjrnet.org/pinscape/BuildGuideV2/BuildGuide.php?sid=kl25zSoftwareSetup

KL25Z Software Setup

VirtuaTilt comes with a KL25Z "microcontroller", which is basically a tiny computer. **Pinscape firmware is already installed**. That serves as both the operating system and the application software. It controls all of the virtual pinball functions of the KL25Z, including the sensors, buttons, and feedback devices, and it handles communications with Windows.

In addition to the Pinscape firmware that runs on the KL25Z, there's a separate Pinscape program that runs on your Windows PC, called the **ConfigTool**. This provides an interactive interface for setting up the device, configuring it, and testing it. You don't need to leave the ConfigTool running all the time; it's only needed to set up and test the device. You can also run it again at any time to change options, update the firmware, or troubleshoot problems (it includes some testing features that can help debug the hardware setup).

The software installation process is all controlled from the PC. The Config Tool handles the KL25Z software setup, so the first step is to install the Config Tool on your PC. You can download it here:

PinscapeConfigTool.zip

To install, download the ZIP file above, unblock it (**very important!**) and unpack it into a folder on your hard disk. Use any location that's convenient. Open the folder and double-click the "**PinscapeConfigTool.exe**" application.

VirtuaTilt default config

Following is the default VirtuaTilt config in Pinscape. We recommend to leave it as-is for testing buttons, potentiometer, feedback devices, etc. You can obviously change it afterwards, according to your personal preferences. We also recommend to save it, in case you need to revert back to original configuration.

Pinscape Setup

Settings

Configuration settings for KL25Z CPU ID 0049-004E9002-53274E45

Memory used: 9.5K bytes of 16K bytes (6,672 bytes free) Explain

System type. Are you using this KL25Z on its own, or with a set of expansion boards? Help

◉ Stand-alone KL25Z
(or your own custom boards)

○ Pinscape Expansion Boards

○ Pinscape All-in-One

USB Identification. This is how the KL25Z identifies itself to Windows through the USB port.

LedWiz Unit 1 (USB Vendor ID FAFA, Product 00F0)

- If you have a **real** LedWiz unit in your system, choose **LedWiz Unit 8** for your first Pinscape unit, 9 for the second, etc.
- If you **don't** have any real LedWiz units, choose **LedWiz Unit 1** for the first unit, 2 for the second, etc.

I want more details!

Pinscape ID. This is a **separate** ID from the LedWiz unit number. DOF R3 and the DOF Config Tool use this ID to identify the unit. **Set this to 1 for your first unit,** 2 for the second, and s

You **don't** have to copy the LedWiz unit number here! This is completely unrelated to the LedWiz number. This setting **must always** be **1** for your first (or only) Pinscape unit, or DOF won

Pinscape Unit 1

Reset on disconnect. If the USB connection is broken, and can't be re-established within a time limit, the KL25Z can automatically reset itself as an attempt to fix whatever's wrong. Select

☑ Enabled

Time before reboot (seconds): 10

Details

TV ON switch. If one or more of your monitors needs to be turned on manually every time you power up your cabinet, you can use this feature to switch them on automatically. See the E

☐ Enabled

IR Remote Control. The controller can send and/or receive IR remote control signals if you attach some additional components. This can be used with the TV ON feature to turn your cab
details on the components required and how to connect them. If you don't have any IR components attached or wish to disable them, simply set the pin assignments here to "Not Connec

IR LED (transmitter) pin: Not Connected *Requires a PWM-capable pin*

IR receiver input pin: Not Connected *Requires an interrupt-capable pin*

Joystick input. The controller acts like a Windows USB Joystick in order to send the plunger position, accelerometer readings (for nudging), and button inpu

☑ Enable joystick input

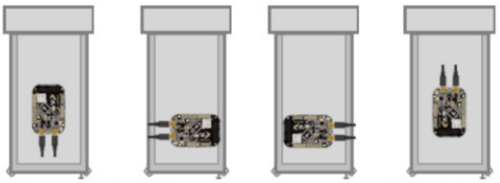
Why would I want to disable this?

Joystick axis format: X/Y/Z What's this?

Joystick report interval (milliseconds): 8.333 Explain

Accelerometer "stutter": 2 Explain

Accelerometer orientation. If you're using the accelerometer (for nudge sensing), the software needs to know how the KL25Z is oriented in the cabinet so t
below, level with the floor of the cabinet, with the chips and LEDs facing up.



○ Ports facing front ○ Ports facing left ○ Ports facing right ◉ Ports facing rear

Dynamic range. Select the range for accelerometer readings. Ranges above ±2G have lower precision. Details

◉ ±1G (original Pinscape setting, highest precision)
○ ±2G (same precision as ±1G but with wider range)
○ ±4G (reduced precision, wider range)
○ ±8G (lowest precision, widest range)

Auto-centering. The controller automatically zeroes the accelerometer after it's been sitting still for a while. This compensates for any tilt in the mounting pc
Joystick Viewer.

○ Manually center only (no auto-centering)
◉ Auto-center with default time (5 seconds)
○ Auto-centering with custom time

Plunger sensor setup

Sensor type: Potentiometer Live Sensor View

Potentiometer. This uses a slide potentiometer, which is a variable resistor with a control knob that moves linearly across the length of the device. Attach
pot's electrical resistance changes as the knob moves, proportionally to the position, so the controller can determine the plunger position by reading the v

Pin assignments:

Wiper: PTB0 *Requires an ADC (analog in) pin*

Plunger calibration button. If you wish, you can install a pushbutton in your cabinet to activate plunger calibration mode. This is optional, since you can a

Button input: PTE29 ☐ Enabled
Indicator lamp output: PTE23 ☐ Enabled

ZB Launch Ball setup. You can set up your mechanical plunger to act as a "virtual" Launch Ball button for tables that use a button instead of a plunger.

☐ Enabled

Button inputs. You can use the KL25Z as a key encoder to connect pinball-style buttons on your cabinet to the PC. Set up the wiring connections and key
pin or key assignment to change a setting.

Test Buttons

Shift button number: 0 Help

◉ Shift OR Key mode
○ Shift AND Key mode

Set standard joystick buttons | Set standard keyboard keys | View standard key assignments

No.	Port	PC Input	Options [?]	VP Usage
1	PTC2	1		Start Game
2	PTB3	Shift (Right)		Right Flipper
3	PTB2	Ctrl (Right)		Right MagnaSave
4	PTB1	Enter		Plunger/Launch Ball
5	PTE30	2		Extra Ball (Buy-In)
6	PTE22	6		-
7	PTE5	7		-
8	PTE4	+ =		VP Volume Down
9	PTE3	_ -		VP Volume Up
10	PTE2	End		Open/Close Coin Door
11	PTB11	) 0		Service Button "Enter"
12	PTB10	(9		Service Button "Up/+"
13	PTB9	* 8		Service Button "Down/-"
14	PTB8	& 7		Service Button "Cancel/Exit"
15	PTC12	% 5		Coin In (main/left slot)
16	PTC13	Esc		Exit to menu (PinballX/HyperPin front ends)
17	PTC16	Shift (Left)		Left Flipper
18	PTC17	Ctrl (Left)		Left MagnaSave
19	PTA16	19		-
20	PTA17	20		-
21	PTE31	21		-
22	PTD6	22		-
23	PTD7	23		-
24	PTE1	24		-
25	Not Connected			

TLC5940 (external PWM controller chip) setup What's this?

Number of TLC5940 chips: 0

TLC59116 (external PWM controller chip) setup What's this?

Disabled - Show Settings

74HC595 (external digital out chip) setup What's this?

Number of 74HC595 chips: 0

Pinscape After Dark. You can set up a button or switch to activate **Night Mode**, which disables the feedback device outputs that you designate as noise-makers, and neighbors. Details

Button input number: 7 *0 = no input button assigned*

Button type:  

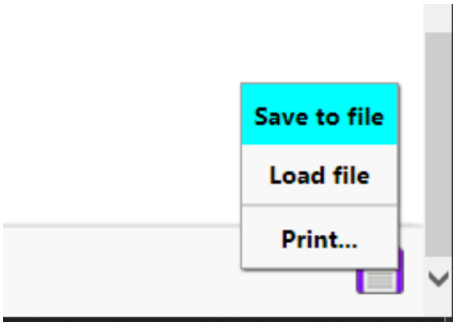
◉ Momentary button (Toggles mode when pushed) ○ On/off switch

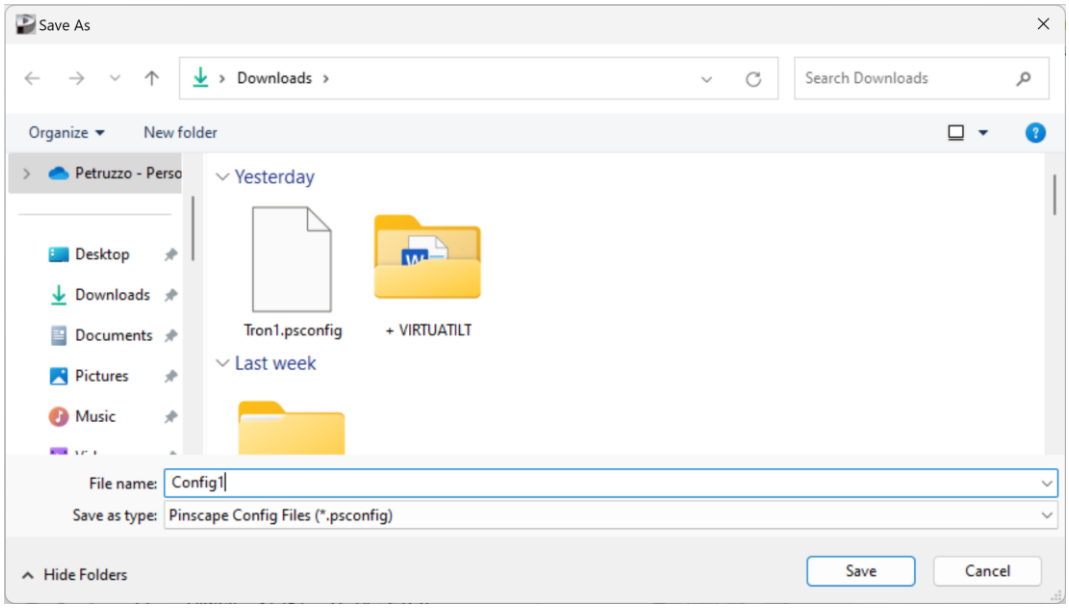
Indicator lamp output port: 0 *0 = no indicator output*

Feedback device outputs. Pinball software on the PC can control output devices connected to the KL25Z to create special effects during play, such as tactile fee
address the outputs. Use these port numbers when you set up your DOF configuration. For each port, you can select the physical output pin that the port is wire

Test Outputs

Port No.	Type	Location	Pin	Port	Options [?]	Description
1	Digital	KL25Z	J1-2	PTA1		Bumper
2	PWM	KL25Z	J1-4	PTA2		Shaker Motor
3	Digital	KL25Z	J1-6	PTD4		Flipper Left
4	Digital	KL25Z	J1-8	PTA12		Flipper Right
5	PWM	KL25Z	J1-10	PTA4		
6	PWM	KL25Z	J1-12	PTA5		
7	PWM	KL25Z	J2-2	PTA13		
8	PWM	KL25Z	J2-4	PTD5		
9	PWM	KL25Z	J2-6	PTD0		
10	PWM	KL25Z	J2-10	PTD3		
11	Digital	KL25Z	J2-8	PTD2		
12	Digital	KL25Z	J1-14	PTC8		
13	Digital	KL25Z	J1-16	PTC9		
14	Digital	KL25Z	J1-1	PTC7		
15	Digital	KL25Z	J1-3	PTC0		
16	Digital	KL25Z	J1-5	PTC3		
17	Digital	KL25Z	J1-7	PTC4		
18	Digital	KL25Z	J1-9	PTC5		
19	Digital	KL25Z	J1-11	PTC6		
20	Digital	KL25Z	J1-13	PTC10		
21	Digital	KL25Z	J1-15	PTC11		
22	Digital	KL25Z	J2-18	PTE0		





Installing DOF

Install DOF using following .msi files from Cleveland Software Github repository (latest versions, high compatibility. Thank you Phil for packing them!). Make sure you select the correct version based on VPX version installed on your PC (32 or 64 bit). **64bit versions only of both VPX and DOF are highly recommended.**

- **32bit DOF Installer**
- **64bit DOF Installer**

NOTE: unblock zipfiles after download (**very important!**)

Installing both 32 bit and 64 bit DOF

When installing the 64 bit version, make sure to place it in a different directory from the 32 bit version if you intend on running both at the same time. You will also need to manually update the **plugins shortcut** that is normally created for you when installing the 64 bit version if you want to be able to run both. The best process to follow for a successful install of both a 32 bit and 64 bit install is the following:

1. Install the 64 bit version of DOF.
2. After install, copy the entire folder (typically C:/DirectOutput) and rename the copy as **C:/DirectOutput64**
3. Now install the 32 bit version of DOF.
4. After install, check to ensure that the {Visual_Pinball_Install_Location}/tables/plugins directory has a shortcut to the **C:/DirectOutput** directory, and the {Visual_Pinball_Install_Location}/tables/plugins64 directory has a shortcut to the **C:/DirectOutput64** directory.

An official step-by-step guide for DOF configuration is available here: Pinscape Build Guide (mjrnet.org)

Configuring DOF for VirtuaTilt

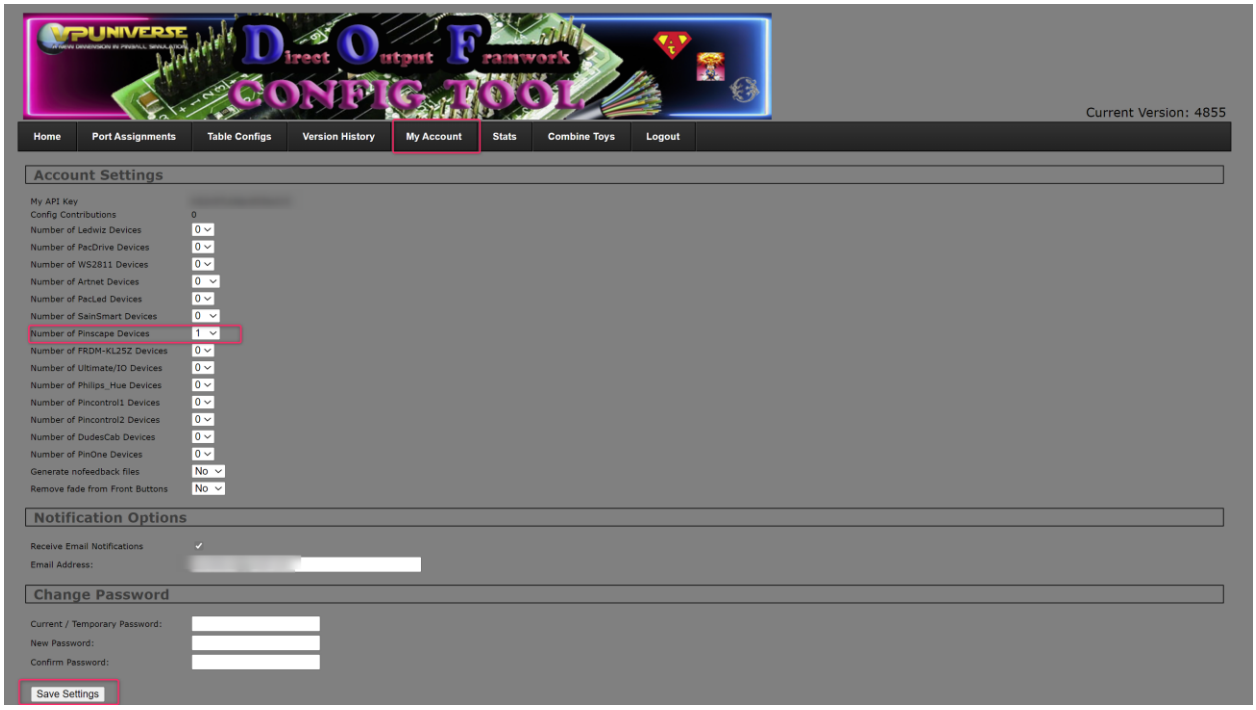
In order to configure DOF you need to setup a configuration file. You can create an account and login to the DOF Config tool or **you can just download provided config files from our GitHub repository** and copy/move the files into your **C:\DirectOutput64** or **C:\DirectOutput** directory (or wherever DOF is installed on your PC), overwriting existing files:

Changing DOF Configuration

Select your device

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

- Select **1 for Number of Pinscape Devices** and then **Save Settings**

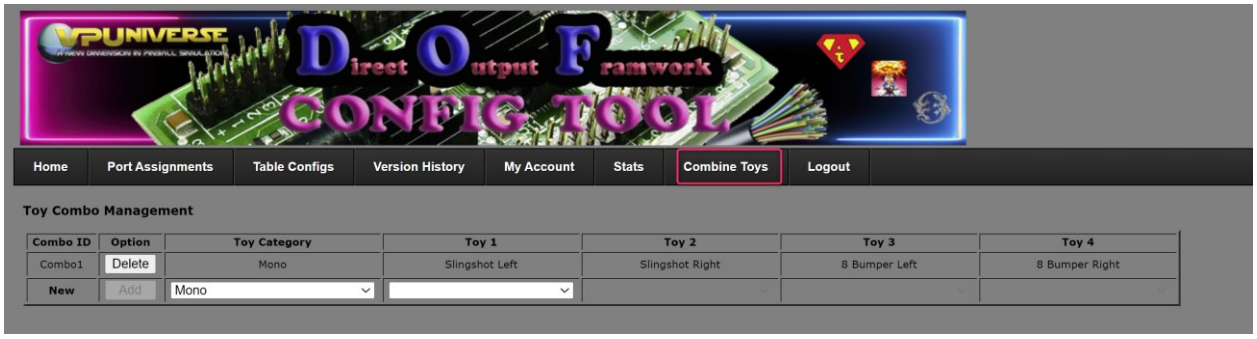


Creating a config file

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

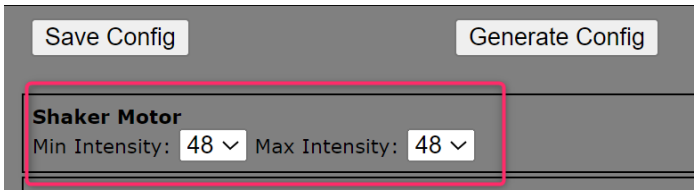
- **Port1** – Solenoid – Combo for bumpers and slingshots
- **Port2** – Shaker Motor
- **Port3** – Left Flipper Solenoid
- **Port4** – Right Flipper Solenoid

The **Combo1** config is assigned to slingshot and bumpers:



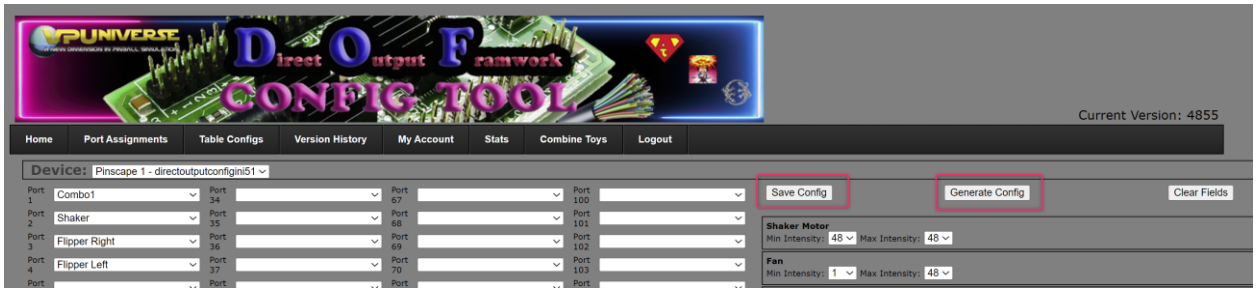
You can change it according to your personal preferences. To do this, simply navigate to the "**Combine Toys**" section in the config tool and enter your new combos.

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

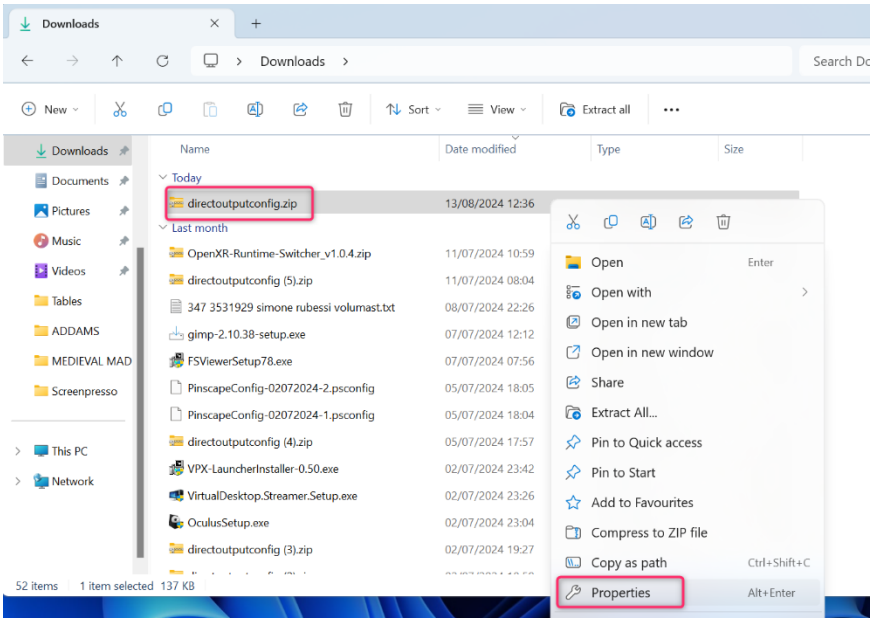


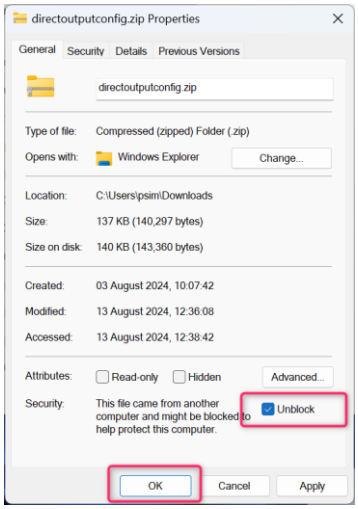
Setting your config in DOF

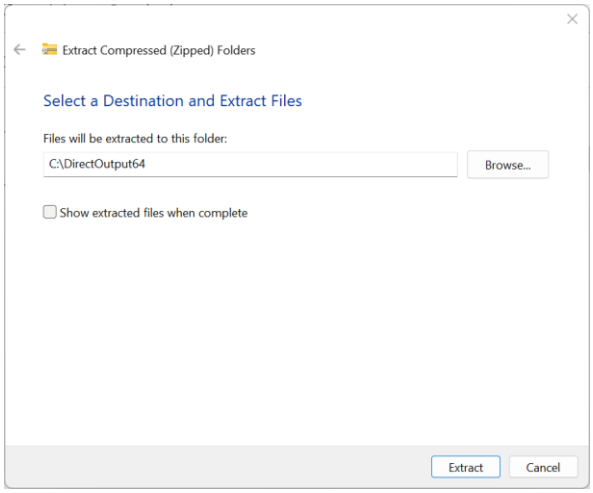
Once you have everything set in the config tool, click the **Save Config** button, then **Generate Config** button:

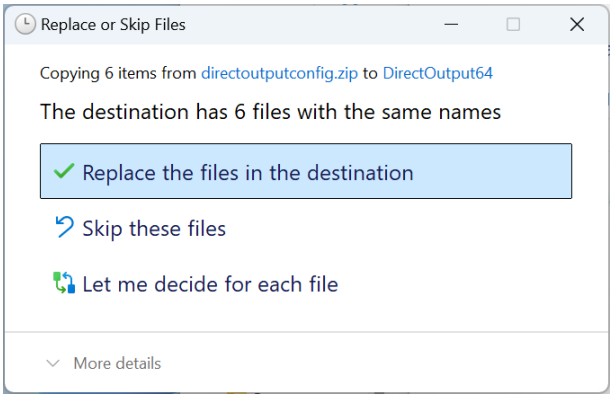


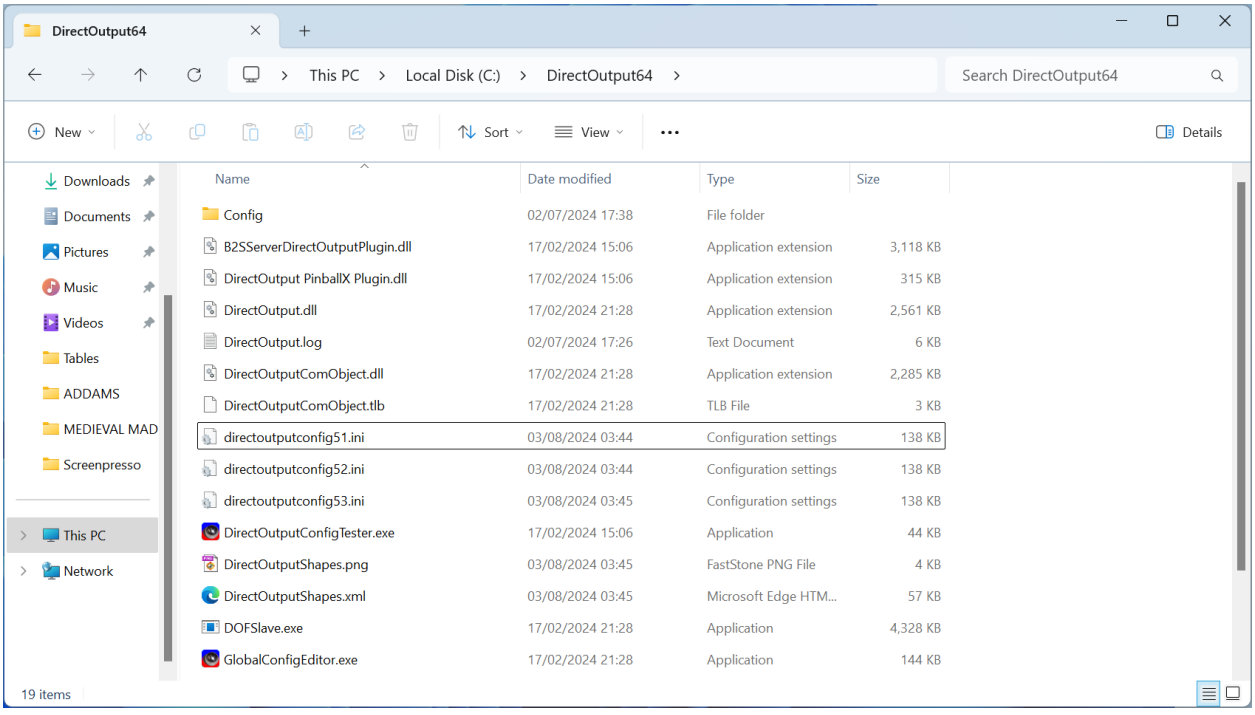
This will download a copy of the configuration files onto your PC. All you need to do now is move the files into your **C:\DirectOutput64** or **C:\DirectOutput** directory (or wherever DOF is installed on your PC) and overwrite all files:





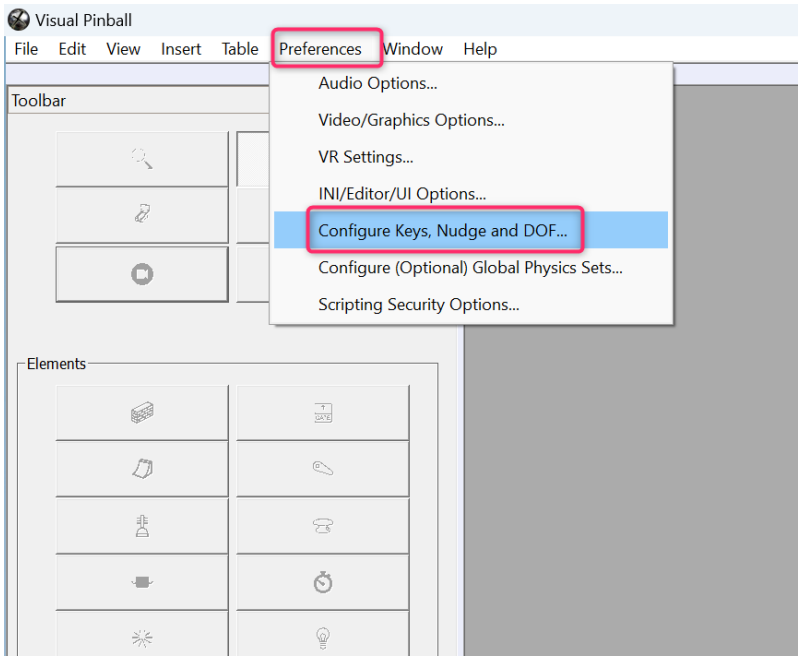

Extract Compressed (Zipped) Folders
Select a Destination and Extract Files
Files will be extracted to this folder:
C:\DirectOutput64
Browse...
Show extracted files when complete
Extract
Cancel

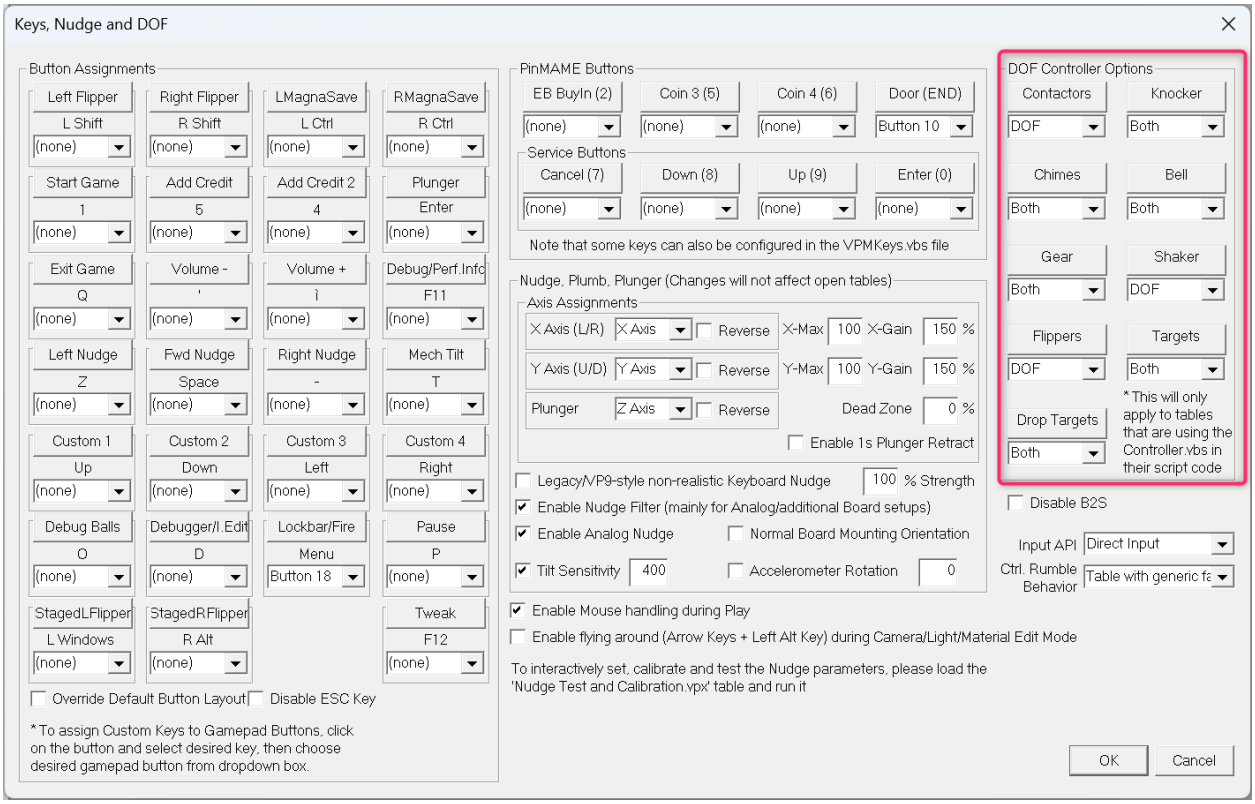

Replace or Skip Files
Copying 6 items from directoutputconfig.zip to DirectOutput64
The destination has 6 files with the same names
Replace the files in the destination
Skip these files
Let me decide for each file
More details


DirectOutput64
This PC
Local Disk (C:)
DirectOutput64
Search DirectOutput64
New
Sort
View
Details
Downloads
Documents
Pictures
Music
Videos
Tables
ADDAMS
MEDIEVAL MAD
Screenpresso
This PC
Network
Name
Date modified
Type
Size
Config 02/07/2024 17:38 File folder
B2SServerDirectOutputPlugin.dll 17/02/2024 15:06 Application extension 3,118 KB
DirectOutput PinballX Plugin.dll 17/02/2024 15:06 Application extension 315 KB
DirectOutput.dll 17/02/2024 21:28 Application extension 2,561 KB
DirectOutput.log 02/07/2024 17:26 Text Document 6 KB
DirectOutputComObject.dll 17/02/2024 21:28 Application extension 2,285 KB
DirectOutputComObject.tlb 17/02/2024 21:28 TLB File 3 KB
directoutputconfig51.ini 03/08/2024 03:44 Configuration settings 138 KB
directoutputconfig52.ini 03/08/2024 03:44 Configuration settings 138 KB
directoutputconfig53.ini 03/08/2024 03:45 Configuration settings 138 KB
DirectOutputConfigTester.exe 17/02/2024 15:06 Application 44 KB
DirectOutputShapes.png 03/08/2024 03:45 FastStone PNG File 4 KB
DirectOutputShapes.xml 03/08/2024 03:45 Microsoft Edge HTM... 57 KB
DOFSlave.exe 17/02/2024 21:28 Application 4,328 KB
GlobalConfigEditor.exe 17/02/2024 21:28 Application 144 KB
19 items

Visual Pinball configuration

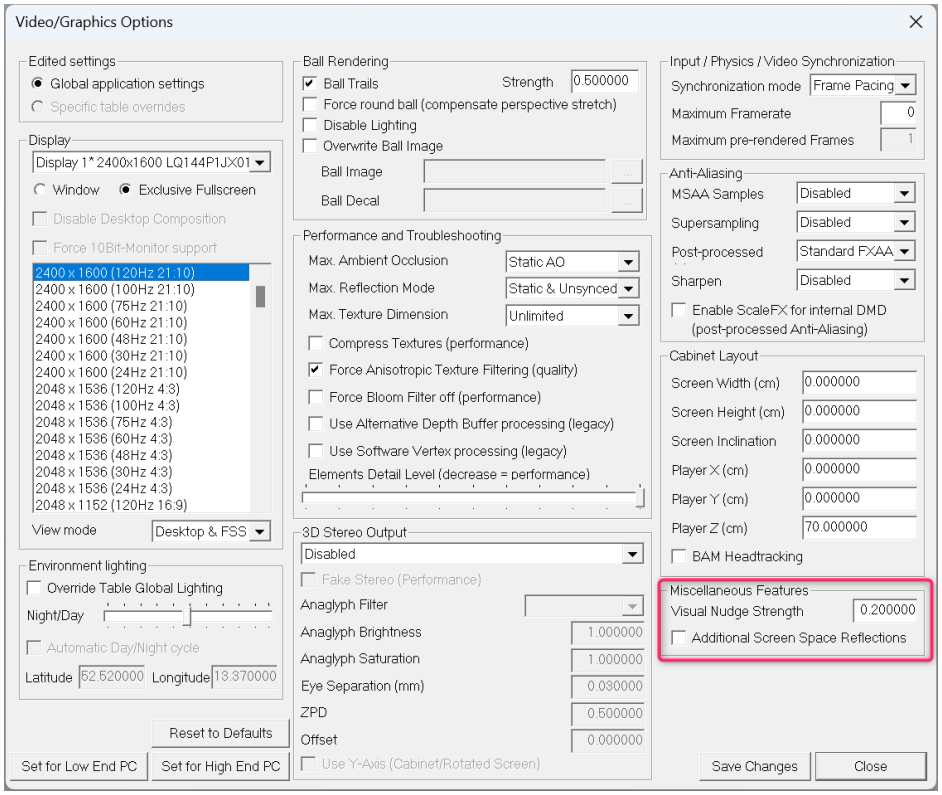
Replicate the following configuration in Visual Pinball settings:

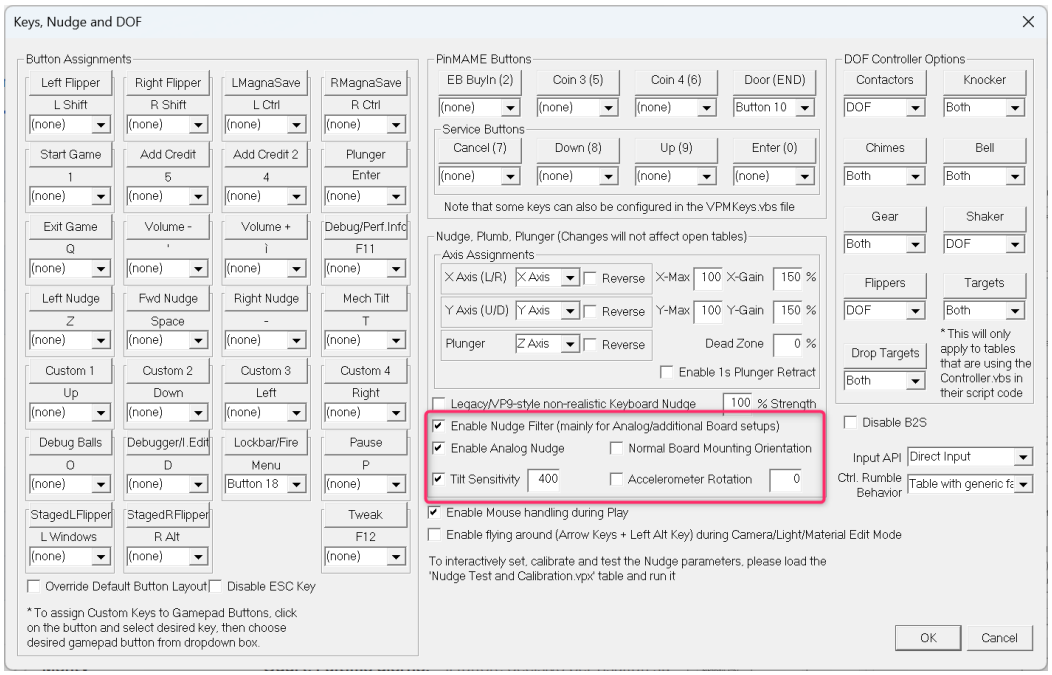




Nudge/Tilt configuration in Visual Pinball

We recommend starting with following values and modify them afterwards:





Your VirtuaTilt should now be able to play Visual Pinball and have feedback on all supported tables!