# Tutorial

## How to install Windows 3.11 on 86Box for gaming (with Sound Blaster Pro 2 card)

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# Links for the files

**86Box**: https://86box.net/ (Click download stable – At the bottom of the page take the Windows-64 version)
**86Box roms**: https://github.com/86Box/roms (Click code and then Download ZIP)
**86Box Manager**: https://github.com/86Box/86BoxManager/releases
**MS-DOS 6.22**: https://winworldpc.com/product/ms-dos/622 (Click on Microsoft MS-DOS 6.22 Plus Enhanced Tools (3.5-1.44mb))
**MS CD Extensions (MSCDEX)**: https://winworldpc.com/product/ms-cd-extensions-msc/125
**CuteMouse**: https://cutemouse.sourceforge.net/ (Download version 2.1 for the wheel button handled by the BIOS)
**Sound Blaster Pro 2**: https://winworldpc.com/product/sound-blaster-drivers/sound-blaster-pro (Click on Sound Blaster Pro 2 Drivers (8-6-1992) (3.5-1.44mb))
**Tseng Labs ET4000 VLB**: https://oemdrivers.com/graphics-tseng-labs-et4000 (Click on Graphics Driver:>> Tseng ET4000 W32/W32i/W32P (VL BUS) Driver<<)
**IBM Joystick drivers (4 buttons)**: http://www.napostriouf.com/IBMJOY.zip
**VBRUN Files**: https://www.napostriouf.com/vbrun.zip
**Windows 3.11**: https://winworldpc.com/product/windows-3/311 (Click on Microsoft Windows 3.11 (Retail Full) (3.5))
**Race Track (shareware)**: https://archive.org/details/win3_RACETRK (Click on ZIP)
**Klik & Play (freeware)**: https://www.classicdosgames.com/game/Klik_%26_Play.html (Click on Klik & Play for Schools)

# Installation of 86Box

## (and its components)

1- Decompress the file 86Box-Windows-64-(version).zip to a new folder named 86Box on a SSD drive (to avoid latency problems later)
2- Open the file roms-master.zip and slide the folder roms-master inside the folder you just created for 86Box.
3- Rename the folder roms-master to roms. (Which will give you access to all the bios and more)
4- Open the file 86BoxManager(version).zip and slide the file 86Manager.exe inside the same folder of 86Box.
5- Run the file 86Manager.
6- If you don't get any prompt to set the locations of 86Box, go to Settings.
7- Set the 86Box path with the folder you just created. And set the VM path by creating a VM path inside the 86Box folder. Then click OK.
8- Click ADD and set a name (I suggest something like Windows 3.11 to make it easy to find).
9- Check the box Configure this virtual now. (If you already clicked OK, just select Windows 3.11 and click Configure)
10- Machine tab
Machine type: i486 (Socket 3)
Machine: [SiS 471] ASUS VL/I-486SV2G (GX4)
CPU type: Intel i486DX2
Speed: 66
Memory: 16 MB
11- Display tab
Video: [VLB] Tseng Labs ET4000/w32p Rev. D
12- Input devices tab
Mouse: Standard PS/2 Mouse (click configure and set it to Wheel; despite Windows 3.11 doesn't use the wheel some DOS program attached might use it)
Joystick: 2-axis, 4-button joystick (Basically games in Windows 3.11 only use 2 buttons, but some games will use the installed IBM Joystick drivers to make possible the use of 4 buttons. which is why setting it is set to 4-button instead of 2)
Click Joystick 1. Then chose your controller/gamepad, then set X with X, Y with Y, Button 1 with Button 1, Button 2 with Button 2, Button 3 with Button 3 and Button 4 with Button 4. Then click Ok!
13- Sound tab
Sound card: [ISA] Sound Blaster Pro v2
MIDI Out Device: System Midi
14- Storage controllers tab
HD Controller: [VLB] IDE Controller
15- Hard disks tab
Click new. Then click specify, name it boot drive and click save. Cylinders: 2080, Heads: 16, Sectors: 63 (it should give you a 1023 mb drivers which is fine for a C drive in Windows 3.11 contrary to Windows 95/98 because Windows 3.11 block proprietary disk checkup. But be aware the base OS that will format the disk still MS-DOS 6.22 so don't make the hard disk bigger.)
16- Floppy tab
Click on the first 5.25" 360k;  Type: 3.5" 1.44M

Click on the second 5.25” 360k; Type: None
In the CD-ROM drives: section click the first Disabled. Bus: ATAPI; Channel; 0:1 ; Speed: 72x.
Click OK.

# Setting up MS-DOS 6.22

## (and its drivers)

1- Click on Windows 3.11 and click Start
2- Press DEL to enter the BIOS
3- Go to IDE HDD AUTO DETECTION
4- Go to Primary Master and press “-” on the numpad (that will make type to user)
5- Press 1 then press enter.
6- Press ESC (6 times)
7- Go to BIOS Features Setup
8- Go to Boot Sequence and press “-” on the numpad (that will make A drive having the priority during when rebooting)
9- Press ESC and go to SAVE & EXIT SETUP. And type Y and press ENTER. (It’ll then reboot, you’ll be in 33 mhz instead of 66 mhz because of the turbo not loaded)
10- Click on the blue button on the right of the pause button (you’ll be back in 66 mhz)
11- Open your folder where you downloaded all the files and extract the files Microsoft MS-DOS 6.22, cutemouse21b4 and Microsoft MS-DOS CD-ROM in different folders.
12- Inside 86Box windows click on the little diskette on the bottom left and select existing image and then DISK1.img inside the MS-DOS 6.22 folder and then press enter.
13- Press ENTER three times (it will then reboot)
14- Set the country and keyboard layout to your preference. Keep in mind the Keyboard layout standards changed a lot depending the area you live in since the release of MS-DOS 6.22, which is why in this tutorial I’ll keep United States; making it easier to find the keys.
15- Press enter until it start to install the MS-DOS.
16- When prompted for the next diskette click on the diskette icon on the bottom left, eject and then choose DISK2.img same principle for the third diskettes.
17- Once installation completed, eject the diskette and then press ENTER twice. (It’ll then reboot, you’ll be in 33 mhz instead of 66 mhz because of the turbo not loaded, but that’s ok for now)
18- Click the diskette icon on the bottom left, go to the MS-DOS CD-ROM folder and then click on disk1.img. Click OK
19- Type A: then press enter! And then type Install. Press Enter!
20- When a windows with a path for the CDROM appear just press enter and wait the end of the installation. And press enter again!
21- Eject the diskette and then click on the blue button on the right of the pause button. (it’ll do a HARD RESET loading your CD-ROM and you’ll be back in 66 mhz.)
22- Click on the CD on the bottom left of the windows and then click folder. Then select the folder bin inside the cutemouse folder.
23- Type md ctmouse. Then type xcopy d: c:\ctmouse and then press enter.
24- Type edit autoexec.bat and then press enter.
25- Go to the bottom of the document (last line) and type cd ctmouse and then press enter. type ctmouse and then press enter. Type cd.. then press enter.
26- Press ALT and F simultaneously and save.
27- Press ALT and F simultaneously again and go to exit.
28- Eject the CD by pressing the CD icon on the bottom left and press eject.
29- Click on the blue button on the right of the pause button.

# Installation of Windows 3.11

## (and its drivers)

1- Open the folder where you downloaded all the files. Then extract in separate folder Tseng_Labs_ET4000, IBMJOY, Sound Blaster Pro 2 drivers, VBRUN and Microsoft Windows 3.11.
2- Click the diskette icon on the bottom left, go to the Windows 3.11 folder and then click on disk1.img. Click OK
3- Type A: then press enter! And then type setup and press enter!
4- Press Enter (twice) and let the file install until it ask for the next diskette. As usual insert the second diskette (DISK2.img) and press enter. Same principle for the following diskette.
5- Type your name and your brand. And click continue! (twice) It'll continue the installation follow like you did in step 4.
6- When prompter for Printer Installation chose No Printer Attached and click install.
7- Then click OK.
8- It'll do a system error, trying to read your drive D. Click the CD on the bottom left and click bin (folder you used to install the mouse earlier) and then click retry.
9- Skip Tutorial
10- Eject the diskette and then click Reboot (It'll then reboot, you'll be in 33 mhz instead of 66 mhz because of the turbo not loaded, but that's ok for now)
11- Type cd windows and then type win. (To make your first boot so everything BASIC is properly installed)
12- Click File and then exit windows.
13- Click the diskette icon on the bottom left, go to the Sound Blaster Pro 2 folder and then click on disk1.img. Click OK
14- Type A: then press enter! And then type inst-hd c and press enter!
15- Press ENTER (twice)
16- Press ENTER again (four times)
17- 220 hex then press ENTER (three times)
18- Interrupt 7 and then press ENTER (three times)
19- Channel 1 and then press ENTER (four times)
20- Eject the diskette and then Y (It'll then reboot, you'll be in 33 mhz instead of 66 mhz because of the turbo not loaded, but that's ok for now)
21- Click on the blue button on the right of the pause button. (it'll do a HARD RESET loading your CD-ROM and you'll be back in 66 mhz.)
22- Once rebooted, type cd windows and then type win.
23- In the MAIN program group go to Control Panel (double click on it)
24- Then drivers (double click on it)
25- Click Add and then chose Unlisted or Updated Driver and click OK.
26- Then click browser and then double click c:\ and then double click on sbpro and then double click on Win31 and then click OK (three times).
27- Click New and click OK. (Don't Restart Now)
28- Do again the pattern on #25, but this time chose auxiliary audio and then OK. (Don't Restart Now)
29- Do again the pattern on #25, but this time chose Wave and MIDI and then OK. (Restart Now)
30- Once Windows 3.11 relaunched with its audio, double on control pannel and double click on MIDI Mapper.
31- At the name section chose SBP2 ALL MIDI and then click close.

32- Double click on the minus button on the left of control panel to close it and do the same with the Main program group windows. Now double click on accessories and then press File and then chose New.
33- Program Item then click OK.
34- Click on browse and then double click on c:\ and then double click on sbpro and then double click on Win31 and then click once on sbpmixer.exe and then click OK.
35- Then click change Icon and press OK.
36- In the description line type Sound Blaster Pro 2 Mixer and then click OK.
37- Double click on the Sound Blaster Pro 2 Mixer and then raise all volume to the max excepted the Microphone one. (Otherwise in some games volume will be too low and click save and then exit.
38- Double click on the minus button on the left of accessories to close it and then double click on main and then double click on control panel and then double click on drivers.
39- Click the CD on the bottom left and then click folder and chose the IBMJOY folder and click OK.
40- Now double click on drivers, then add, then Unlisted or Updated Driver, then OK.
41- Type D:\ (if not already typed by default)
42- Driver for Joystick click OK (twice) and then close.
43- Double click on the minus button on the left of control panel to close it and double click on File Manager.
44- Click on the diskette on the bottom left and click existing image and then chose disk1 inside vbrun folder.
45- Now click on A and selection every files while pressing CTRL button and then press F8.
46- In the To line type c:\windows\system and then press OK.
47- Wait until it's done, now do the exact manoeuvre with disk 2 and 3.
48- Once completed, double click on the minus upper left and do the same with the Main program group windows and then file and then exit windows.
44- Click the CD on the bottom left and then click folder and chose the Tseng Labs ET4000 folder and click OK.
45- Type cd windows and then type setup
46- Go to display then press enter then go to bottom chose Other (Requires disk provided by a hardware manufacturer) and then press enter.
47- Type D:\ (then press enter)
48- You'll then have a list, I highly suggest to choose ET4-W32 640x480, 256 col. as most game are low resolution and if you chose too much colors, it won't look good as they use a palette. But if you have a game that need more, well, there's the list of compatible resolution you can set.
49- Press enter and the go to complete changes: Accept .... and then press enter.
50- It'll ask for the driver disk, just type D:\ and then press enter.
51- Then type win and press enter to make the first boot with the new graphic driver.
52- Once re-entered in the Windows click File and exit windows.
53- Type cd.. and then press enter and then type memmaker and press enter
54- Press ENTER then press SPACEBAR and then ENTER, then SPACEBAR then ENTER
55- Go to Optimize upper memory for use with Windows and press SPACEBAR and then ENTER (three times).
56- It will then reboot, when prompter press ENTER again for another reboot.
57- Press enter twice!
58- Type edit autoexec.bat and press enter
59- Go at the bottom and then type cd windows (press enter) and then type win (press enter)
60- Press ALT and F simultaneously and save.
61- Press ALT and F simultaneously again and go to exit.
62- Click on the blue button on the right of the pause button. (Windows is now properly installed)

# Let’s test some software

## (to be sure everything is ok!)

1- Open the folder where you downloaded all the files. Then extract in a folder RACETRK!
2- Slide KPSchool file in the same folder!
3- First, let’s test if the midi is properly installed with a shareware game know for its intense use of cymbal; Race Track by P.S. Neely! Click the CD on the bottom left, eject any CD and then click again the CD on the bottom left and click folder. Choose the RACETRK.
4- Double click main program group and double click on file manager!
5- Click on the C:\ and then click file and then click on Create a directory
6- Call it racetrk and click OK
7- Click on D drive and then selection all the files by pressing shift key and then unselect while ctrl botton is press kpschool.exe
8- Press F8 in the to section type c:\racetrk and then press OK
9- Go back to C drive and then inside the racetrk folder selection all the files and click on File and then properties.
10- Remove the X from the Read Only section and click OK.
11- Close file manager by double click the minus. Do the same with main program group. And then double click on Games.
12- Click file and then click new and then program item and then OK.
13- Click browse and then double click on c:\ and then double click on racetrk then click on racetrk.exe and then click OK.
14- Click change icon and then click OK
15- In description line type Race Track and then click OK.
16- Let’s try Race Track! (If cymbal don’t explode your hear, congrat the audio was well installed; and also ignore the alert, as you can hear the audio works not only fine but perfectly.)
17- Now, let’s try out if the joystick was properly installed. (Klik & Play for Schools have several mini games that we can use a joystick for.) As we have priory put the KPSchool in the CDrom, we can load the installer from by File then clicking run and then clicking Browse and the clicking on kpschool.exe and then clicking OK twice!
18- Click next and yes until it install. Wait for it to be completed!
19- Then click exit and register it (it’s a freeware so don’t worry)
20- Then click Play a Game and chose the game Romeo.
21- Click game, select players and tick the Joystick 1 square and click ok.
22- Press F8 to be full screen and press shift key to start the game and now, let’s try if your joystick work properly. Normally if it’s detect by your Windows 7, 10 or 11, it should works!
23- Congrats! You can now play games!

# F.A.Q.

## (Or might potentially be asked!)

Question: Why did you made this tutorial?
Answer: Well, despite that contrary to the Windows 98SE tutorial, most of tutorial I'm in seeing on the web about the Windows 3.1x are actually very well made, they all have little things that tickle me on the wrong side. Sometimes, it's because their installation is too minimalist and sometimes it's because they are using drivers from the wrong era which indeed cause heavy problems on older games. Like by example, the S3 card are know to be accelerator that "send all the juice" whatever the resolution, which make games likes Vindicator running at an insane speed while a Tseng Labs drivers give you some preset depending the resolution. So by example, if you use a 1024x768 resolution with more than 256 colors, there you'll have a lot of "juice" however, if your using a classic resolution like 640x480 256 colors (like 99% of Windows 3.1x games, well you'll have proportional performance. So for gaming with Windows 3.1x it's better to use Tseng Labs drivers than S3 ones. However, if at the time you were working in AUTOCAD or software like that, S3 ones would be ideal to have in comparison. But that's not why people need to use Windows 3.1x in 2023.

Question: Why you don't speak during the video going alongside this tutorial?
Answer: Because of the thematic of the channel. The idea is to show the product as they are. Giving an authentic experience to those who watch the videos! Which is also why, I try to minimize the director cut. And also, many people understand more easily while watching than hearing a voice over. I personally often cut the audio when somebody's voice annoy me. So the visual must speak for itself.

Question: Why did you use Sound Blaster Pro 2 instead of the classic Sound Blaster 16 or a more modern Sound Blaster?
Anwser: Despite the fact that this time, I actually did use the midi out which impose a common sound font for any card used, the Sound Blaster Pro 2 softwares don't have the "enhancements" of the ones that comes with the Sound Blaster 16. So, no effect is actually added to the midi cymbal. Which is why, I used the Sound Blaster Pro 2 drivers there, despite using the exact same sound font of the Sound Blaster 16. Aka, the audio is more accurate and authentic lookalike it was in 1993. I insist on the word, lookalike.

Question: Why did you use a 486 DX/2 66 mhz instead of a more modern CPU in the emulation?
Answer: Because, I wanted to present a gaming PC that represent the golden age era of the Windows 3.1x.

Question: What resolution do you suggest us to play?
Answer: 640x480, 256 colors. If your game need better resolution, it's probably a game made for Windows 95 that can still work in Windows 3.1x. So in that case, I highly suggest that you install a Windows 95 version C instead. Higher resolutions in Windows 3.1x at that era was mainly for non gaming workers.

Question: I don't have any keypad, so I can't press "-" like you do in the bios like you did in the tutorial! Do you have any advice on how to press it?
Answer: The first method is to temporary software rebind one of key on keyboard. Or the second method is using a virtual keyboard software that have a keypad on it, like the On-Screen Keyboard that

comes with Windows 10 and 11. Here's how to use it: https://www.makeuseof.com/tag/get-numeric-keypad-windows/

Question: HELP! My cursor is stuck on the screen I can't read the rest of your tutorial!
Answer: Don't panic, just press F8 and F12 simultaneously and your cursor gonna be unstuck from 86Box window!

Question: How to Fullscreen?
Answer: Press simultaneously CTRL ALT and PAGE UP. (do it twice to avoid keyboard problems) To return in window mode, CTRL ALT and PAGE DOWN simultaneously!

Question: Why during the emulation sometimes the 486 DX/2 66 mhz, lost its turbo to become 33 mhz?
Answer: Because when a soft reset happen, it just don't have the physical button pressed, so no signal is sent to add the turbo. Yes, I know that many big tech YouTubers are spreading that the turbo button was actually to slow down the PC. Despite that the purpose of why this button does exist, that statement is true, it's not however how it worked in the bios. The name turbo is not just marketing, it's actually a multiplier. So, if the multiplier there is nothing to control the multiplier, then you won't be in turbo mode, so you'll be at 33 mhz. Which is why in the emulation you must do a hard reset to get it detected by the bios.

Question: For some reasons, I have problems controlling the mouse, what I'm doing wrong?
Answer: Simple answer the DPI of your mouse is prolly set too high. By example, I personally use a Razer Viper Mini mouse. If my mouse is set higher than 1600 dpi, many pixel gonna get ignored, which make the mouse hell to control. So normally in-between 400 and 1600 dpi (depending the basic polling rate of your mouse), you should be ok.

Question: My emulation is never at 100% why?
Answer: Well, unless you have a very old computer or a ton of software in the background, the 486 emulation should be actually pretty much light to emulate. So maybe, be sure that you run in administrator mode and add priority process to 86Box. And, of course, if you're capturing with OBS within the same pc the emulation is made, be sure that OBS use your video card encoder such nvenc or h264 or AMD AV1, to avoid a fight in-between 86Box and OBS for exclusivity of the first processor thread.

Question: When gaming, sometimes a pop-up appear that says that my sound card might not work properly, should I worry?
Answer: Short response, no, you can tick the square to ignore that "error". Longer response is that since we are using the midi out with a sound font, we don't have to worry. All the midi will play perfectly as you have seen. If, we haven't added the midi out, then it would indeed be something to worry about. But that's part of the emulation limit. Well, for the moment, maybe in the future a solution to that will be found so we won't have to use external sound font!

Question: Is the emulation perfect?
Answer: Sadly no! Still little things to correct. But, the experience with 86Box is presently is by FAR and VERY FAR, the best one I got for a Windows 3.11. Yes, even better than in DOSBox as much for drivers management than for the timing and the stability.

Question: What to do if Windows is stuck in blue screen?

Answer: Despite it rarely happens, it sometimes do, as this is not Windows 95/98, you won't break anything if you hard reset unless when it blue screen you was working on Windows System files.

Question: Any reason why you didn't installed online functionally like you did in the Windows 98SE tutorial?
Answer: Yes, because during the Windows 3.11 era the only games played online didn't need a web browser and mostly because that's also the era where phone BBS were predominant, so no developer had actually any interest to work that way. Unless it's to make games for mIRC. And even then, it didn't started before 1995, so it's pretty much people on Windows 95 and 98 who mainly used it.

Question: If I install Windows in another language, will your tutorial still be valid?
Answer: Absolutely! My first language is French Quebecer, so I grown up using a French Windows 3.11 & a french MS-DOS 6.22 all the steps are the exact sames. That being said some games need a Windows in the foreign language to avoid symbols replacing text.

Question: Can I use your installation to try to use, midi session or an old version of Paint Shop Pro?
Answer: On the software side no problems, however, you might have problems to plug anything and make work. So if you use midi session you'll have to use your mouse to make the music instead of a Roland keyboard. And, if you want to use a drawing board, well in won't work as well, you'll be forced to use the mouse. Same thing about scanner, as at the time, JASC Paint Shop Pro forced only had a pre-selected of compatible scanner for the software. So, as these scanners are prior than the epoch of USB, well you won't be able to find one who can make even make a passthrough to simulate one of the epoch.

Question: If I have some more question not answered here, where I could ask it to you?
Answer: On the video associated to this tutorial there's a comment section! Ask it there, I'm on YouTube every day. And don't worry, I might look rude due to what I said about other tutorials. But I'm not a rude person, far from that. I'm just worried that we might lose some good talents with unique lost old obscurity if they can't properly use a Windows that run great. You know, when you show something that nobody know you try to show it in his best perspective.