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# Setting up SheepShaver for OSX/macOS

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(Last updated April 28, 2021)

(You can also set up SheepShaver versions for Mac OS X on PPC, for Windows, and for Linux)

## Introduction

This manual is revised for use with our July 2018 and later builds of SheepShaver.
For older SheepShaver builds that will run on PPC Macs, see this older setup guide.

**Download both SheepShaver Folder and SheepShaver application from this forum topic.**
**Please read the information on that page, newer information may not yet be included in this manual.**

**Classic setup:** We start with the description of a classic setup with all files together in a folder named "SheepShaver". That folder can be anywhere you like, for instance in your Applications folder or in your Home folder. In this setup, with the needed files together with the SheepShaver application in the SheepShaver folder, full paths are not required for configuration, just file names will work.
However, files and folders can be renamed and/or moved to different locations, provided you make sure the file names and/or full paths to the files are entered in SheepShaver preferences.

**Changing settings:** After saving changes in preferences, always quit the SheepShaver application, shut down the emulated machine, and launch SheepShaver again. Only then will the changes take effect, after only a restart of the emulated machine new settings will not be used.

**CD-ROMs:** Up to Mac OS X 10.7, physical CD-ROMs can be mounted within SheepShaver. Just insert the CD on the host system and the CD will be mounted on the guest desktop. OS X 10.8 and later prevents mounting of physical CD-ROMs in SheepShaver but disk images created from CD-ROMs will work fine.

As most users will now use disk image files instead of physical CD-ROMs, this guide will describe a setup with installation of the Mac OS using a disk image file created from a system install CD.

*(Alternative instructions for using a real physical install CD are added throughout this guide in italics between brackets.)*

Please post questions and comments on E-Maculation SheepShaver forum: https://www.emaculation.com/forum/.

## Setting up SheepShaver

### You need a Mac OS install CD

You will need a compatible Mac OS install CD, or a disk image created from a compatible Mac OS install CD, to be able to install a Mac OS in the SheepShaver emulated machine. Depending on the used ROM file (see below for more info on ROM files), SheepShaver can run System 7.5.3 through Mac OS 9.0.4. SheepShaver cannot run 9.1 or later.

Only general retail Mac OS install CDs are fully compatible with SheepShaver. A system install CD that was originally provided with a new Mac will only install on that specific model. *

> * You may be able to install in SheepShaver from a model-specific install CD using a special hack and you may be able to use a restore CD by copying the system manually. However, with both procedures, the installed system may or may not work and when it works, it may not be fully functional.
> See discussion in this forum topic:
> https://www.emaculation.com/forum/viewtopic.php?t=3119

This guide assumes that you own a suitable retail Mac OS install CD and that you can create a disk image from it.
Install CD image files can also be downloaded from various places on the internet. Make sure the image is indeed created from a general retail Mac OS install CD.

A retail international English Mac OS 9.0.4 install CD image can be downloaded from the Macintosh Garden site. Go to macintoshgarden.org. On that page scroll down to find and click the "Mac OS 9.x (Main Page)" link. There you will find the "Download (Mac_OS_9.0.4.toast_.zip (393.05 MB))" link.

Any usual disk image file format will do (dmg, cdr, iso, toast, img) as long as it is not a read-only, compressed, or encrypted format.

You can create disk images from CD-ROMs using Disk Utility in macOS 10.14 (Mojave) and earlier:
- Mount the CD in OSX/macOS
- Start Disk Utility (in the /Applications/Utilities/ folder))
- Select the CD volume (not the drive) in the list on the left
- Click New Image in the tool bar or in newer Disk Utility versions use New Image from the File menu
- Choose DVD/CD master for the format
- Save the image file. It will have a .cdr extension.

This does not work with these older CD-ROMS in macOS 10.15 (Catalina) and later because HFS volumes cannot be mounted there. A workaround for creating a disk image from the HFS volume on the CD is described here:
https://www.emaculation.com/forum/viewtopic.php?f=1&t=10709

### The files you need in your SheepShaver folder

#### 1. The SheepShaver application

The SheepShaver application and the SheepShaver folder are presented as separate downloads. First download and expand the SheepShaver application in a different location (like the Downloads folder or the Desktop) and then drag the application into the SheepShaver folder.

(Do not download the application or expand the zip archive directly into the SheepShaver folder. If you do that, a security feature in macOS may prevent running the application.)

#### 2. A compatible ROM file

**SheepShaver will not run without a compatible ROM file. If SheepShaver does not find a compatible ROM file, it will immediately quit on launch.**

It may be difficult to get hold of a compatible ROM file as distributing bare ROM files violates Apple license agreements. Emaculation.com site policy is still to not offer or link directly to bare ROM files, although Apple seems to have stopped taking action against distribution of ROM files.

The ROM file from a 9.0.4 system CD will not work with any version of SheepShaver. ROM files from a 8.5 or 8.6 system CD may work with SheepShaver for Windows, but do not work with SheepShaver for OSX/macOS (with a few specific exceptions that are beyond the scope of this manual).

ROM files that will work with SheepShaver for OSX/macOS are either an "old world" rom image grabbed from an actual hardware PowerMacintosh ROM, or the "new world" rom file extracted from the "Mac OS ROM Update 1.0" using TomeViewer. The "Mac OS ROM Update 1.0" can be downloaded from Apple, but you need to have a working Mac OS system (or Classic in Mac OS X) to run TomeViewer.

Extracting the ROM file from the Mac OS ROM Update
Extracting a ROM for use in SheepShaver using Basilisk II
Download TomeViewer

**However, to make it easier:**
You can find compatible ROM files when you search the web for "redundant robot sheepshaver" (without the quotes).

With the old world rom file SheepShaver can run System 7.5.3 through Mac OS 9.0.4, with the new world rom file SheepShaver can run Mac OS 8.5 through 9.0.4.

If you want to install 8.6 through 9.0.4, best use the new world rom.

When you have acquired a compatible ROM file, **rename it "Mac OS ROM"**. Best do that in Finder Info for the file: Select the icon and hit Command-I. The Finder Info panel will appear. Under "Name & Extension" edit the file name to "Mac OS ROM" (without the quotes) and make sure to remove the file name extension.
(Renaming is needed because without configuration SheepShaver will still recognize a ROM file with the name Mac OS ROM in the same folder.)

#### 3. A keycodes file

The keycodes file is needed with other than US-English QWERTY keyboard layouts. It is not needed (but does no harm either) if you have a US-English keyboard. The keycodes file is already present in the download SheepShaver folder.

#### 4. The install CD image file

If you are going to use an install CD image file for installing the Mac OS in SheepShaver, you may want to place also that image file inside the SheepShaver folder.

### The shared folder

From within SheepShaver you will have access to a folder on the OSX/macOS side. That folder will appear on the SheepShaver desktop as a disk named "Unix". Files copied or saved in SheepShaver to the "Unix" disk, will appear in the shared folder on the OSX/macOS side and files placed in the shared folder on the OSX/macOS side will appear in the "Unix" disk in SheepShaver.

Before you start configuring SheepShaver, create a folder that can serve as shared folder. The folder can be anywhere it is convenient for you and it can have any name you like, but do not use the SheepShaver folder as your shared folder. Below I describe configuring SheepShaver for a shared folder that I created on my OSX/macOS desktop and that I named "Shared".

**Note:** Although serious bugs that plagued the shared folder feature in early versions of SheepShaver have been solved, we still advise to not use folders like your Documents folder or your Home folder as shared folder and not keep the existing copy of a file in the shared folder.

**Note:** Applications cannot run properly from the "Unix" disk.
See further below in this guide how to use the shared folder / "Unix" disk feature.

### Configuring SheepShaver

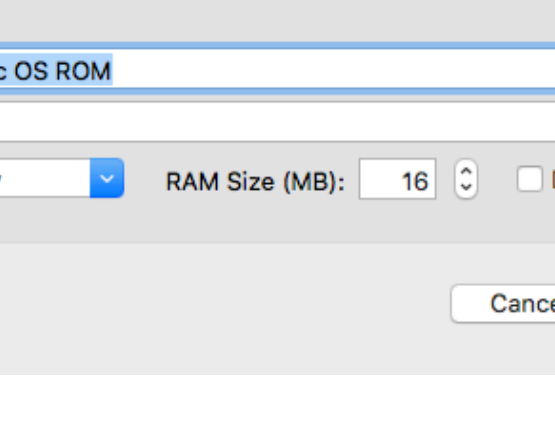
When the needed files are in the SheepShaver folder and when you have created a shared folder, you can start configuring SheepShaver.

#### 1. Start SheepShaver

Recent SheepShaver builds are notarized. If you use a build that is not notarized, the first time you launch SheepShaver you may need to right-click or control-click its icon to open it from the contextual menu.

If SheepShaver does not find a compatible ROM file, it will immediately quit on launch.

If a compatible ROM file with the name "Mac OS ROM" or "ROM" is present in the same folder, SheepShaver will launch and show in its window the grey floppy icon with blinking "?", indicating that the emulated Mac has not found a startup volume.



**Note:** At this stage you can only hard shut down SheepShaver by pressing Control-Escape.

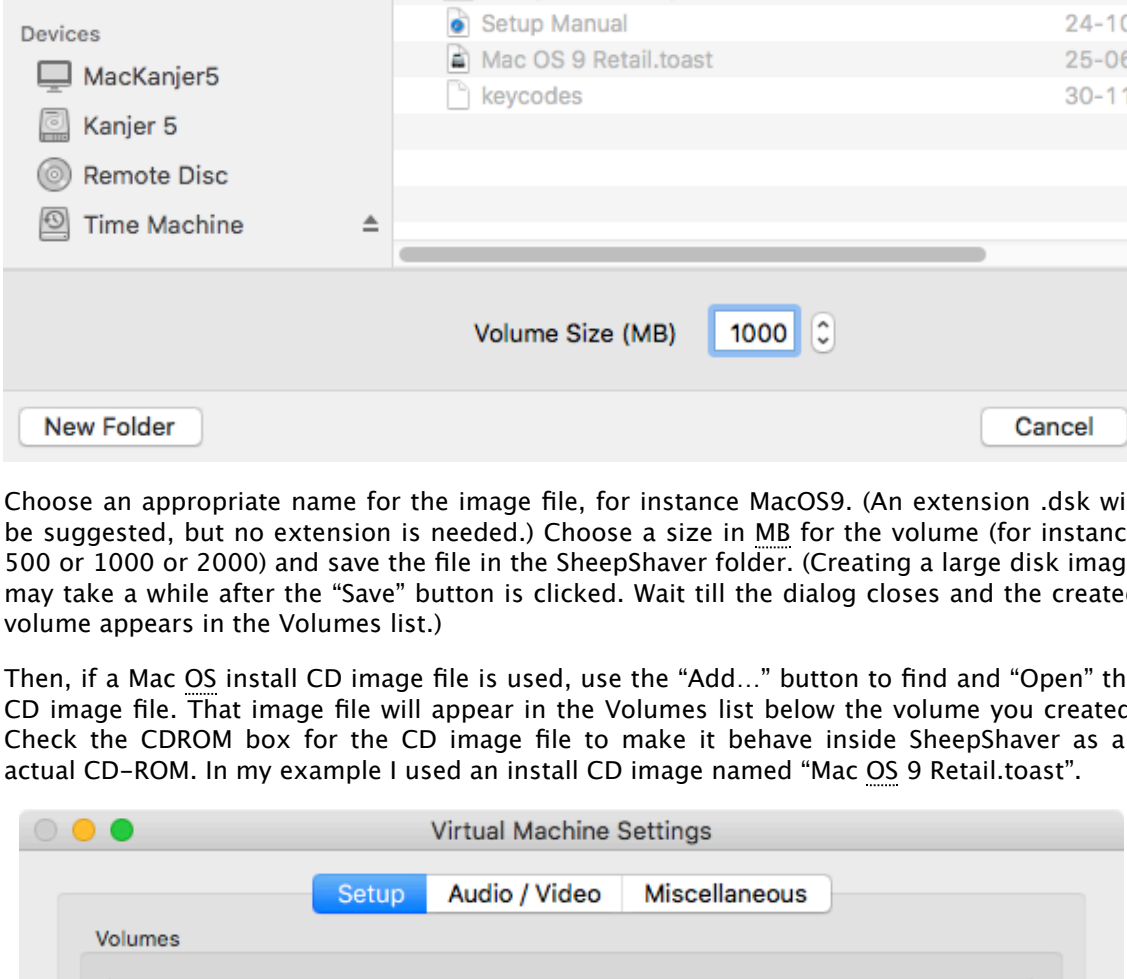
#### 2. Open Preferences from SheepShaver application menu

Choose Preferences from the SheepShaver menu to open the preferences (Virtual Machine Settings) window.

(The preferences settings will be saved in an invisible file .sheepshaver_prefs in your Home folder. The following description assumes that SheepShaver is set up for the first time and that there is no pre-existing ~/.sheepshaver_prefs file.)

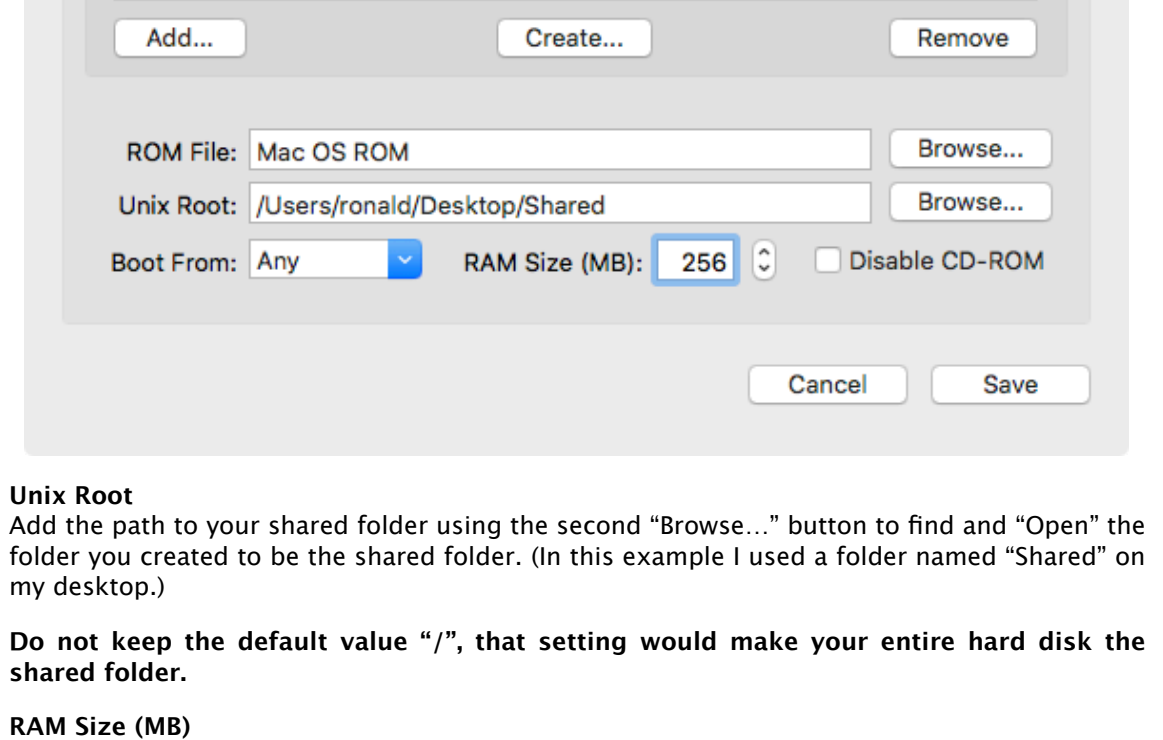
#### 3. Configure preferences in Setup tab

**ROM File**
First add the ROM file name using the "Browse…" button to find and "Open" the ROM file.



ROM File: Mac OS ROM
Unix Root: /
Boot From: Any
RAM Size (MB): 16
☐ Disable CD-ROM

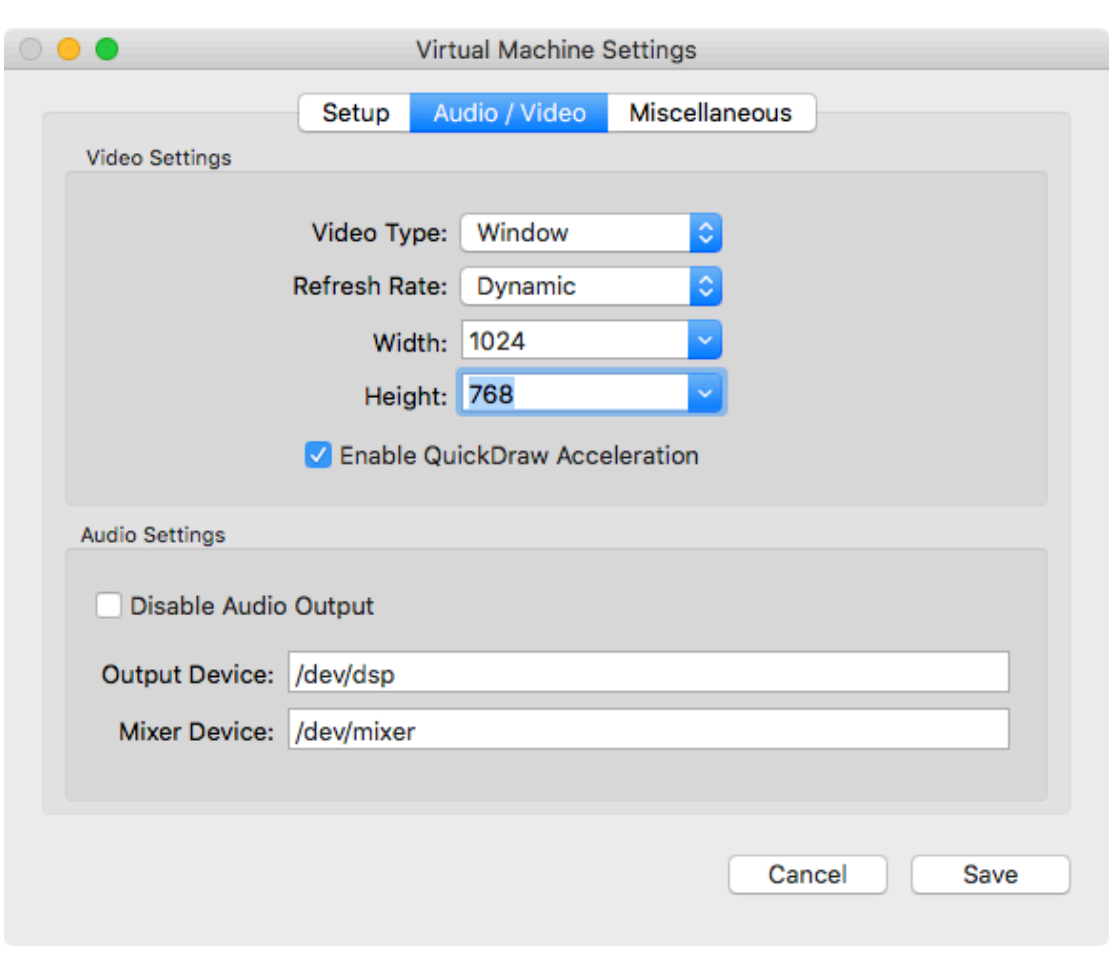
**Volumes**
You can now proceed with creating the disk image file that will be the virtual hard disk on the emulated Mac. Click the "Create…" button.



Save As: MacOS9
Tags:
Volume Size (MB): 1000

Choose an appropriate name for the image file, for instance MacOS9. (An extension .dsk will be suggested, but no extension is needed.) Choose a size in MB for the volume (for instance 500 or 1000 or 2000) and save the file in the SheepShaver folder. (Creating a large disk image may take a while after the "Save" button is clicked. Wait till the dialog closes and the created volume appears in the Volumes list.)

Then, if a Mac OS install CD image file is used, use the "Add…" button to find and "Open" the CD image file. That image file will appear in the Volumes list below the volume you created. Check the CDROM box for the CD image file to make it behave inside SheepShaver as an actual CD-ROM. In my example I used an install CD image named "Mac OS 9 Retail.toast".



MacOS9 ☐
Mac OS 9 Retail.toast ☑
ROM File: Mac OS ROM
Unix Root: /Users/ronald/Desktop/Shared
Boot From: Any
RAM Size (MB): 256
☐ Disable CD-ROM

**Unix Root**
Add the path to your shared folder using the second "Browse…" button to find and "Open" the folder you created to be the shared folder. (In this example I used a folder named "Shared" on my desktop.)

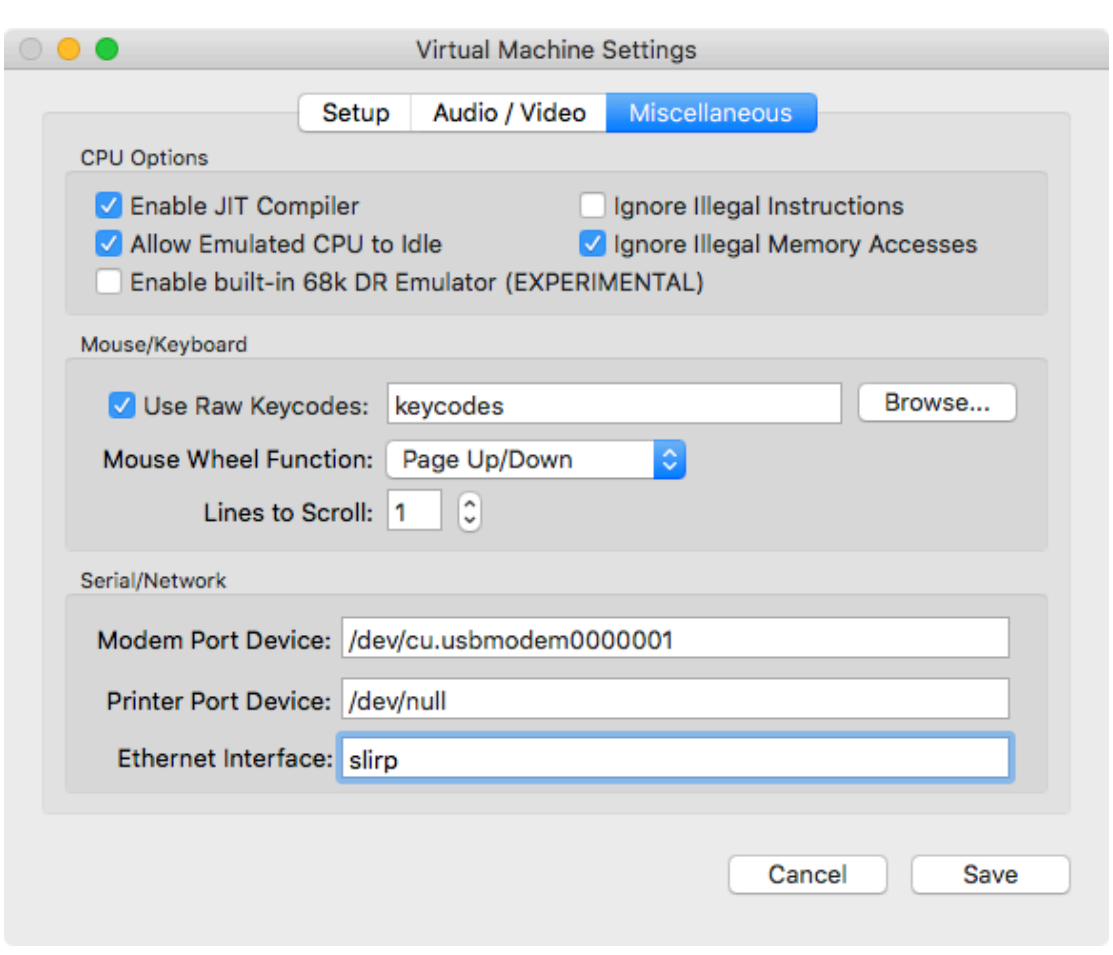
**Do not keep the default value "/", that setting would make your entire hard disk the shared folder.**

**RAM Size (MB)**
Enter a value for the amount of RAM that the virtual Mac will have. For instance 128 or 256 or 512.

Leave **Boot From** set to "Any".

Leave **Disable CD-ROM** unchecked.

#### 4. Configure preferences in Audio / Video tab



Video Type: Window
Refresh Rate: Dynamic
Width: 1024
Height: 768
☑ Enable QuickDraw Acceleration
☐ Disable Audio Output
Output Device: /dev/dsp
Mixer Device: /dev/mixer

**Video Type**
Set Video Type to "Window". (Do not use "Fullscreen" at initial set up. We will discuss using full-screen mode later.)

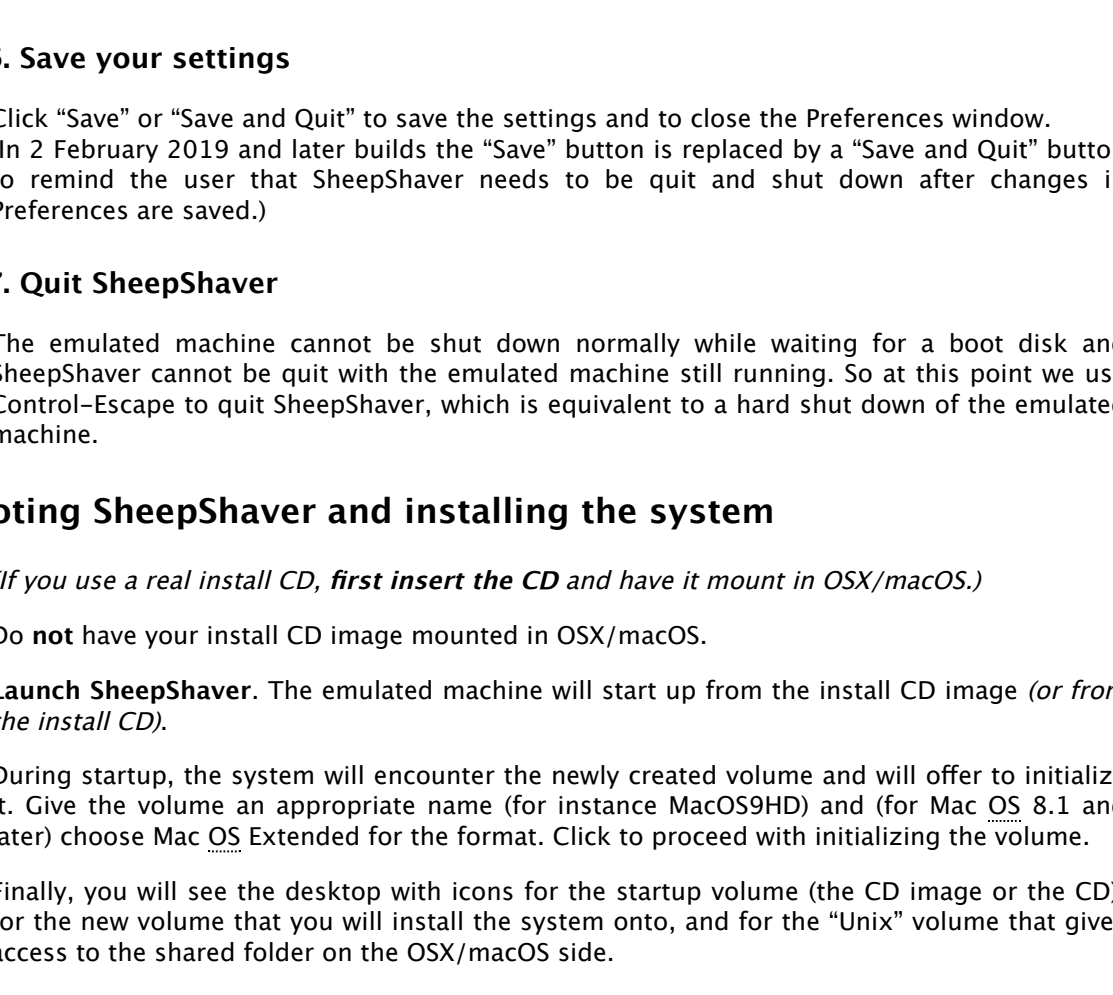
**Refresh Rate**
On fast Intel machines always choose "Dynamic". Lower settings will make the emulated machine appear sluggish.

**Width and Height**
Set Width and Height for the window to lower values than the width and height of your screen. If you have a large screen, you can enter higher values than the presets in the menu, for instance 1280 x 800.

Check **Enable QuickDraw Acceleration**.

The **Audio Settings** can be ignored.

#### 5. Configure preferences in Miscellaneous tab



☑ Enable JIT Compiler
☑ Allow Emulated CPU to Idle
☐ Enable built-in 68k DR Emulator (EXPERIMENTAL)
☐ Ignore Illegal Instructions
☑ Ignore Illegal Memory Accesses
☑ Use Raw Keycodes: keycodes
Mouse Wheel Function: Page Up/Down
Lines to Scroll: 1
Modem Port Device: /dev/cu.usbmodem0000001
Printer Port Device: /dev/null
Ethernet Interface: slirp

**CPU Options**
Check "Enable JIT Compiler", "Allow Emulated CPU to Idle", and "Ignore Illegal Memory Accesses".
**Note:** JIT Compiler is not functional anymore on Apple Silicon, JIT settings will be ignored.

**Mouse/Keyboard**
Check "Use Raw Keycodes" and browse for the keycodes file in the SheepShaver folder if your keyboard lay-out is not US-English.

"Mouse Wheel Function" and "Lines to Scroll" is a matter of taste. The image shows my preference.
In 17 March 2021 and later builds, a negative value can be entered in the "Lines to Scroll" box, thus reversing the scroll direction.

**Serial/Network**
You can ignore "Modem Port Device" and "Printer Port Device".

For "Ethernet Interface" enter "slirp" (without the quotation marks).

#### 6. Save your settings

Click "Save" or "Save and Quit" to save the settings and to close the Preferences window.
(In 2 February 2019 and later builds the "Save" button is replaced by a "Save and Quit" button to remind the user that SheepShaver needs to be quit and shut down after changes in Preferences are saved.)

#### 7. Quit SheepShaver

The emulated machine cannot be shut down normally while waiting for a boot disk and SheepShaver cannot be quit with the emulated machine still running. So at this point we use Control-Escape to quit SheepShaver, which is equivalent to a hard shut down of the emulated machine.

### Booting SheepShaver and installing the system

*(If you use a real install CD, **first insert the CD** and have it mount in OSX/macOS.)*

Do **not** have your install CD image mounted in OSX/macOS.

**Launch SheepShaver**. The emulated machine will start up from the install CD image *(or from the install CD).*

During startup, the system will encounter the newly created volume and will offer to initialize it. Give the volume an appropriate name (for instance MacOS9HD) and (for Mac OS 8.1 and later) choose Mac OS Extended for the format. Click to proceed with initializing the volume.

Finally, you will see the desktop with icons for the startup volume (the CD image or the CD), for the new volume that you will install the system onto, and for the "Unix" volume that gives access to the shared folder on the OSX/macOS side.

Proceed with the system installation by starting (double-clicking) the installer "Mac OS Install".

> In some configurations the system installation may stall at the very beginning while "Updating Apple hard disk drivers". It seems to happen especially with some system install CD disk images.
>
> Wait at least several minutes to be sure that installation is indeed not proceeding past this stage, then cancel the operation and quit the installer. You may need to force quit SheepShaver as well.
>
> Then start again, but in the screen where the actual installation can be started (usually the first screen after the software license agreement), click the "Options…" button and uncheck the option to "Update Apple Hard Disk Drivers". Installation should now proceed normally.

When the installation is completed, you can quit the installer.

Open SheepShaver Preferences and **remove the CD disk image file from the volumes list**, select it and click the Remove button.

Save the change and shut down the emulated machine to quit SheepShaver.

*(If you used a real install CD, you can now remove it in OSX/macOS.)*

## Running Mac OS in SheepShaver

### First run, setup, basic functions

**The Configuration Assistant**
When you launch SheepShaver, the emulated machine will boot from the installed system. The Configuration Assistant will guide you through the configuration of the new system. However, in SheepShaver **the Configuration Assistant will lock-up while configuring network settings**. Better quit the Assistant before it arrives at the network settings and do the remaining configuration manually in the various control panels.

**The Startup Disk control panel is not functional in SheepShaver**
SheepShaver will startup from the first bootable volume in the Volumes list, or from a bootable CD if no bootable volume is in the list, or always from a bootable CD when "Boot From" is set to CD-ROM in Preferences. Trying to use the Startup Disk control panel may cause SheepShaver to crash.

**Enable sound in SheepShaver**
In "Sound" control panel, select "built-in" for the output device. In Mac OS 8.5/8.6, and sometimes in 8.1, the Sound control panel is installed in the "Apple Extras" folder. You can use it there to select the built-in output device. In Mac OS 9 the Sound control panel is again installed with the other control panels and can be accessed in the Apple menu. If the "Apple Audio Extension" happens to be installed in the Extensions folder, remove it.

**Enable network access**
Set the TCP/IP control panel to Ethernet and DHCP. As soon as you start using IP network access, for instance with a web-browser, the IP addresses will become visible in the control panel.

**QuickTime**
The latest version of QuickTime that is compatible with SheepShaver is version 4.1.2. Note that it is not possible to downgrade QuickTime by simply installing an earlier version. If you happened to have installed a later version, you will need to remove all QuickTime related files first.

QuickTime 4.1.2 can be downloaded here: http://macintoshgarden.org/apps/quicktime-4

**CD-ROM**
You can use a CD-ROM in SheepShaver on MacOSX 10.7 and earlier. SheepShaver will only recognize CD-ROMs, no other disk formats like Audio CDs or DVDs.

OSX 10.8 and later prevents mounting physical CD-ROMs in SheepShaver. Use disk images instead.

**Additional volumes**
In Preferences you can create additional volumes (disk image files) or add existing compatible disk image files as additional volumes. The next time you start SheepShaver, all volumes in the volumes list will appear on the SheepShaver desktop. If a volume needs to be mounted as CD-ROM, check the CDROM box for that volume in the list. SheepShaver will startup from the first bootable volume in the list.

Most 'Classic' Mac disk images can be mounted in SheepShaver. Also disk images created with Disk Utility in OSX/macOS can be mounted, provided the format chosen while creating the image is either "read/write" (.dmg) or "DVD/CD Master" (.cdr). Compressed or read-only formats will not work.

Note that after any change in preferences SheepShaver needs to be quit and launched again.

### The shared folder / "Unix" disk

**Transferring files**
As explained above, the shared folder that you created in OSX/macOS will appear on the SheepShaver desktop as a disk (a volume) named "Unix". Files copied or saved in SheepShaver to the "Unix" disk, will appear in the shared folder on the OSX/macOS side and files placed in the shared folder on the OSX/macOS side will appear in the "Unix" disk in SheepShaver. That way you can use the shared folder and the "Unix" disk to transfer or exchange files in both directions.

Exchanging files via the shared folder used to be crippled by many bugs. The most serious bugs have been solved but you may still encounter occasional unexpected behaviour while copying folders to and from the "Unix" disk.

**Applications cannot run properly from the "Unix" disk**
If you use the shared folder and "Unix" disk to transfer applications for use in SheepShaver, always copy the applications and related files within SheepShaver from the "Unix" disk to the startup system volume (or to another mounted disk image volume) before actually using them.

Note that moving files directly from the "Unix" disk onto the SheepShaver desktop, does not copy them to the startup system volume. Those files will still be on the "Unix" disk, in fact inside the folder "Desktop Folder" in the shared folder. If you want to copy files from the "Unix" disk to the desktop, hold the Option key while dragging the file. That way the file will be copied to the desktop of the startup system volume.

**Trashing files**
Trashing files from the shared folder should be done at the OSX/macOS side. On the Mac OS side, the trash cannot be emptied when it contains files from the "Unix" disk.

### Printing

See this guide: Printing from SheepShaver and BasiliskII

### AppleTalk

See this guide: Appletalk for SheepShaver/Basilisk in Leopard, Snow Leopard or Lion (32 and 64 bit)

### Running in full-screen mode

SheepShaver can run full-screen. **Using Control-Return, you can toggle between window mode and full-screen mode.** The resolution settings in Preferences (Width and Height) will be respected and SheepShaver will fill the available screen optimally while retaining proportions. Depending on the screen size and resolution, the OSX/macOS version, and the SheepShaver version, SheepShaver may be displayed with black bars at the left and right sides and/or at the top and bottom of the screen. With the resolution in SheepShaver preferences set to "Maximum", the native resolution of the screen will be used optimally.

While SheepShaver is running full-screen, the OSX/macOS environment cannot be accessed. That includes the OSX/macOS menu bar and thus SheepShaver preferences. If you want to make changes to SheepShaver preferences you need to go back to running SheepShaver in window mode.

In SheepShaver Preferences, in the Audio / Video tab, you can set SheepShaver to start up in full-screen mode by setting "Video Type" to "Fullscreen". Control-Return toggling between full-screen mode and window mode will then also work.

**Mission Control and Spaces** The 64-bit 2.5 version SheepShaver builds (Mac OS X 10.7 and later only) will behave much like other applications in full-screen mode. It is compatible with Mission Control and you can easily switch between SheepShaver in full-screen mode and other applications in full-screen mode or the desktop using the swipe gesture that moves between spaces.

## Virtual machines

### Self-contained virtual machines

SheepShaver for OSX/macOS supports self-contained virtual machines. These virtual machines are packages with all needed files inside. They are portable to any compatible OSX/macOS system. Multiple virtual machines can be created, each with its own settings, and they can coexist with a 'classic' setup as described above in this guide.

Apart from the .sheepvm package creation, the setup is identical to the 'classic' SheepShaver setup:

**1. A SheepShaver application needs to be present on your machine.**

**2. In the Finder:**
- Create a folder with an appropriate name for the virtual machine you want to set up
- Add a compatible ROM file named "Mac OS ROM" (no extension!) to the folder
- Add a keycodes file if you use other than US-English QWERTY keyboard layouts
- Add an empty file named "prefs" (no extension!) to the folder *
- Add a .sheepvm extension to the folder name

As soon as you add the extension, the folder will change into a package with a SheepShaver icon. I will refer to it as the VM.

**3. Double-click the VM icon.**
SheepShaver will start and you can set up the VM in SheepShaver preferences as you would a 'classic' SheepShaver setup as described above in this setup manual. The settings will not affect other existing SheepShaver setups on your machine. Note that, when using the Create, Browse, Add, etc. buttons, the Open/Save dialogs can access packages. Create the disk image that will be the Mac OS startup disk inside the VM package.

VMs are portable and will work on any compatible OSX/macOS system that has SheepShaver installed. If a SheepShaver.app is added to the VM, it is portable as one single package to machines that do not have SheepShaver installed. * *

You can add or remove files to/from the VM by opening it in the Finder: Select the VM, right-click (or control-click) on the icon and choose "Show Package Contents" from the contextual menu.

> ** The empty "prefs" file needs to be added because SheepShaver will not create a new prefs file in the VM if no prefs file is present (no doubt not intended behavior). The empty file can be created in a text editor. Make sure it has no file name extension, which can be checked and corrected in the Finder Info panel for the file.*
>
> ** * Note that the VM will not necessarily use the SheepShaver application inside. The VM behaves as a SheepShaver document that will be opened with the "default" SheepShaver application or with the SheepShaver application that is chosen using "Open with" from the contextual menu. This can be the SheepShaver.app inside that VM, or a SheepShaver.app in a different VM, or a SheepShaver.app installed elsewhere on your machine. If any SheepShaver.app is launched directly, also when it resides inside a VM, it will run in 'classic' setup and it will thus use the hidden .sheepshaver_prefs file in the Home directory. Each copy of SheepShaver can open only one VM or setup at the same time.*

## Additional features

Some features are not mentioned elsewhere in this manual:

**Grabbing mouse cursor toggle**
Control-F5 will contain the mouse cursor within the SheepShaver window. This may be useful with some games.

Cursor grab is fully functional in version 2.4 builds. In 2.5 version builds it will only work with the (default) software cursor, not if the hardware cursor is enabled (see below under Advanced features).

## Advanced features (Version 2.5 builds only)

**These features can be activated by manually editing the preferences file (~/.sheepshaver_prefs in a classic setup or prefs in a VM).**

• **Hardware cursor in window mode**
The version 2.5 builds use a different way to display the cursor in window mode, they use the software cursor that is also used in full-screen mode. If you prefer the hardware cursor in window mode, you can add this line to the preferences file:

```
hardcursor true
```

However, with the hardware cursor only in window mode, the cursor issues in version 2.4 when switching between window mode and full-screen mode will also return. (See below under Known issues.)

• **Hardware cursor in both window mode and full-screen mode** (29 March 2019 and later builds)
The hardware cursor can also be used in full-screen mode if integer scaling is used. You can enable the hardware cursor in both window mode and full-screen mode by adding these lines to the preferences file

```
hardcursor true
scale_integer true
scale_nearest true
```

See also "Changing scaling algorithm" below.

• **Changing the hotkey**
By default, the hotkey used with window/full-screen toggle and mouse grabbing toggle is the Control key (Control-Return and Control-F5). You can change the hotkey by adding a "hotkey" item to the preferences file:

1: control(default)
2: option
3: control+option
4: command
5: control+command
6: option+command
7: control+option+command

For instance, you can set the hotkey to Control-Command by adding this line to the preferences file:

```
hotkey 5
```

• **Changing reported CPU speed** (16 January 2019 and later builds)
SheepShaver identifies itself as a 100MHz machine to software running on it. Although the reported 100MHz is unrelated to the actual speed, some software may show a message that it will not run because it needs a faster machine. The reported CPU speed can be changed by adding a cpuclock item to the preferences file:

```
cpuclock 200
```

This line wil make SheepShaver identify itself as a 200MHz machine.
**Note:** This setting does not change the actual speed!

• **Offset date in years and/or days** (20 February 2019 and later builds)
The date inside SheepShaver can be set in the past or in the future, in years and/or days. This may be needed for using some specific software. Adding these lines to the preferences file will set the date to 25 February 1989 when the actual date on the host is 20 February 2019:

```
yearofs -30
dayofs +5
```

**Note:** This feature can mix up relations between older files and newer files and between files' creation dates and modification dates. It should only be used by experienced users who know what they are doing, preferably in a separate (sheepvm VM) setup.

• **Changing scaling algorithm** (Works as intended in 24 February 2019 and later builds)
Using nearest-neighbour or integer scaling will improve display quality when a low resolution emulator screen is displayed on a high resolution monitor (Retina screen). Nearest-neighbour or integer scaling can be applied by adding one or both of these lines to the preferences file:

```
scale_integer true
```

```
scale_nearest true
```

• **Enlarging window size** (22 September 2020 and later builds)
Enlarge SheepShaver window while preserving guest screen resolution. At next launch, the window will appear twice the set resolution when this line is added to the preferences file:

```
mag_rate 2
```

• **Guest gamma ramp pass on to the host** (22 September 2020 and later builds)
With this feature enabled, the guest gamma settings will be passed on to the host. This could improve color and brightness accuracy, but only when guest gamma settings and host screen properties match. The guest gamma settings will usually not match with modern screens. There are three possible settings:

```
gammaramp off
```

```
gammaramp on
```

```
gammaramp fullscreen
```

The default is "off". When set to "fullscreen", the feature works only in full-screen mode.

• **Port forwarding in slirp networking**
For instance:

```
redir tcp:8000:10.0.2.15:80
```

See this forum topic: https://www.emaculation.com/forum/viewtopic.php?f=6&t=7782

• **Set custom window title** (27 February 2021 and later builds)
By adding a prefs item title one can choose a different title for the SheepShaver window. For instance:

```
title SheepShaver Mac OS 9.0.4
```

• **Shorten the sound buffer** (17 March 2021 and later builds)
Shortening the the length of the sound buffer can prevent delayed and choppy sound in some applications but will increase CPU use. The default setting is:

```
sound_buffer 0
```

Setting the value to 1 will halve the length of the sound buffer, setting the value to 2 will again halve the length, and so forth.

• **File name encoding in "Unix" (shared folder)** (21 April 2021 and later builds)
Classic MacOS files in the shared folder with non-MacRoman file names will show incorrect or garbled file names in the "Unix" volume in SheepShaver, even if the MacOS installed in SheepShaver uses the corresponding language and encoding. This may be corrected with an additional prefs item "name_encoding":

1: Japanese
2: Chinese Traditional
3: Korean
4: Arabic
5: Hebrew
6: Greek
7: Cyrillic
25: Chinese Simplified

For instance, adding this line to the preferences file will correct Japanese characters:

```
name_encoding 1
```

When "name_encoding" is not specified, the default MacRoman will be used.
A full list of encodings can be found here: https://opensource.apple.com/source/CF/CF-550/CFStringEncodingExt.h.auto.html

## Uninstalling SheepShaver

To uninstall SheepShaver, simply remove all files in your SheepShaver folder and remove the folder itself. If your shared folder is also in that folder, you might want to move some files from that folder somewhere else first (that is, if you want to keep them).

Then remove the two hidden files from your Home folder. Open Terminal (in Applications/Utilities) and enter:

```
rm .sheepshaver_prefs
rm .sheepshaver_nvram
```

Or use the two scripts that are included in the SheepShaver folder download.

That's it!

## Known issues

### All 2018 and later builds

**Crash at startup**
On some host machines and/or with some configurations in the installed Mac OS system, SheepShaver will crash during Mac OS startup. In the crash log you will then typically find a line that ends with "SIGSEGV".

Most of these crashes can be prevented by checking "Ignore Illegal Memory Accesses" in Miscellaneous tab in SheepShaver preferences as advised in the configuration directions above. When it is impossible to start SheepShaver because of the crash, you can move the startup volume temporarily to a different location. Then you can launch SheepShaver to the screen with blinking question mark and access the Preferences.

**Bug with the mount image as CD-ROM feature**
Unintended behavior when you try to remove/eject a virtual CD-ROM from within SheepShaver which under some circumstances can only be resolved by quitting SheepShaver.

This issue can be avoided by only adding and removing disk images as CD-ROM in the Volumes list in SheepShaver Preferences. (As always: After a change in preferences settings quit SheepShaver and launch it again for the change to take effect.)

### Version 2.4 (9 July 2018) build

**Cursor issues when switching between window mode and full-screen mode**
When you switch from window to full-screen mode using Control-Return before you used the mouse cursor in the emulator at least once, you may loose the cursor. One click on the desktop or pressing the control key suffices to bring back the cursor.

When you switch from full-screen to window mode using Control-Return, the cursor may be displayed twice. Also here, one click on the desktop or pressing the control key will solve the issue.

### Version 2.5 builds

**CapsLock issue**
If SheepShaver is launched while CapsLock is active, typed text may not correctly reflect the CapsLock status.

One press on the CapsLock key will correct the issue.

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