

Raspberry Pi

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Installation

Raspberry Pi Installation

USB to Ethernet Adapter

https://elinux.org/RPi_USB_Ethernet_adapters

- Not the Amazon one
- TP-Link UE300 parfait (<https://www.tp-link.com/en/home-networking/usb-ethernet-adapter/ue300/v4/>)

Cases

For RPi 1 B : <https://www.thingiverse.com/thing:4384009>

Operating System

- Install the official installer tool `Raspberry Pi Imager`
Depending on the OS, find the adapted software.
<https://www.raspberrypi.com/software/>
- For a USB boot, follow these steps :
 - Format a SD card as FAT 32 (can be a small 256Mb partition)
 - Copy the latest `bootcode.bin` on the partition
<https://github.com/raspberrypi/firmware/raw/master/boot/bootcode.bin>
 - If the RPi doesn't boot on the USB SSD disk after unplugging a USB keyboard, add a delay to the boot initialisation by creating a file named `timeout` on the same partition as `bootcode.bin`.
=> Required with Kingston A400S and Startech SATA to USB.
- Run the installer tool and configure the future OS
 - Depending on RPi model, choose an adequate OS

RPI Model	Specs	OS Recommended	PSU
RPi 1 B	700 Mhz - 256 MB	RPi OS Lite (32 bit)	>= 2.5A
RPi 3 B	1.2 Ghz - 1 GB	RPi OS Lite (64 bit)	>= 2.5A

- o To identify the model

```
cat /sys/firmware/devicetree/base/model
cat /proc/cpuinfo
# Check RAM
free -h
```

- o Set hostname (rpi-(dogname).local)
- o Enable SSH
 - o Pub Key : Use the RaspPI one
- o Define user
 - o name : rpi
 - o pass : rpi
 - o Set local settings
 - o timezone: America/Montreal
 - o Keyboard : ca

- SSH to board

- o Configure GPU memory to minimum

```
sudo raspi-config nonint do_memory_split 16
```

- Update the board completely

```
sudo apt update
sudo apt full-upgrade -y
reboot
```

- Optimization

```
# Increase swap file
sudo dphys-swapfile swapoff
CONF_SWAPSIZE=1024 # in file /etc/dphys-swapfile
sudo dphys-swapfile setup
sudo dphys-swapfile swapon

# Disable HDMI
/usr/bin/tvservice -o
# Doesn't work with latest version which uses `DRM VC4 V3D driver`
# Modify the line of the driver to disable HDMI :
dtoverlay=vc4-kms-v3d,nohdmi
# ref : https://github.com/raspberrypi/firmware/blob/master/boot/overlays/README#L4571C13-
```

L4571C13

```
# /boot/config.txt tweaks
# https://github.com/raspberrypi/firmware/blob/master/boot/overlays/README

## Disable splash screen
disable_splash=1

## Disable Bluetooth
# https://github.com/raspberrypi/firmware/blob/master/boot/overlays/README#L921
dtoverlay=disable-bt

## Disable WIFI if not used
# https://github.com/raspberrypi/firmware/blob/master/boot/overlays/README#L938
dtoverlay=disable-wifi

## Disable HDMI
dtparam=hdmi=off
## SD card working freq (default 50MHz)
dtparam=sd_oversample=100
## Disable SD card check
dtparam=sd_poll_once=on
## Disable audio
dtparam=audio=off

# then disable services
sudo systemctl disable hciuart.service
sudo systemctl disable bluealsa.service
sudo systemctl disable bluetooth.service
```

- Install ZRAM

https://github.com/novaspirit/rpi_zram

<https://haydenjames.io/raspberry-pi-performance-add-zram-kernel-parameters/>

Overclocking

Display frequencies

```
sudo cat /sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_max_freq # max
sudo cat /sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_min_freq # min
sudo cat /sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_cur_freq # current

# Get live metrics
watch -n1 vcgencmd measure_clock arm
watch -n1 vcgencmd measure_temp
```

<https://picockpit.com/raspberry-pi/overclock-raspberry-pi/>

<https://www.tomshardware.com/how-to/overclock-any-raspberry-pi>

<https://www.raspberrypi.org/documentation/configuration/config-txt/overclocking.md>

Model	config.txt settings
Raspberry Pi 1 Model A & B	arm_freq=1000
	core_freq=450
	over_voltage=6
	sdram_freq=450
Raspberry Pi 3 & Compute Module 3	arm_freq=1300
source: picockpit (heatsink compatible)	core_freq=500
	over_voltage=4
	sdram_freq=450

- Optional values to review

force_turbo=1# Prevent regulation of speed down to 600Mhz when idling

boot_delay=1 # Avoid sdcard corruption when force_turbo is enabled

Default configuration file

```
# Personal /boot/config.txt

# Presets RPI1 - Use at least a heatsink !!
# =====
# TYPE : ARM ; CORE ; RAM ; VOLT
```

```
# None : 700 ; 250 ; 400 ; 0
# Modest : 800 ; 250 ; 400 ; 0
# Medium : 900 ; 250 ; 450 ; 2
# High : 950 ; 250 ; 450 ; 6
# Tubro : 1000 ; 500 ; 600 ; 6
```

```
[pi1]
```

```
arm_freq=900 # CPU (default 700)
core_freq=250 # GPU (default 250) - Helps with L2 cache, better for RPI1
sdram_freq=450 # RAM (default 400)
over_voltage=2 # Overall voltage (default 0)
```

```
[pi3]
```

```
arm_freq=1200 # CPU (default 1200)
core_freq=400 # GPU (default 400) - Helps with L2 cache, better for RPI1
sdram_freq=450 # RAM (default 450)
over_voltage=0 # Overall voltage (default 0)
```

```
[all]
```

```
# Disable splash screen
disable_splash=1
# Disable serial
enable_uart=0
# Set GPU RAM to minimum (headless)
gpu_mem=16
# Give a small delay for the boot (better safe than sorry)
boot_delay=1
# Disable Bluetooth
dtoverlay=disable-bt
# Disable audio
dtparam=audio=off
# Disable HDMI
dtparam=hdmi=off
dtoverlay=vc4-kms-v3d,nohdmi
# Overclock SD Card controller in MHz - Enable this only if not booting on USB
# dtparam=sd_oversample=100 # default 50
# Disable SD Card polling once started
dtparam=sd_poll_once=on
## Disable WIFI if not used
```

```
# dtoverlay=disable-wifi
```

More optimizations

<https://picockpit.com/raspberry-pi/raspberry-pi-zero-2-battery/>

Resources

<https://feriman.com/raspberry-pi-optimization-hardware-and-software/>

https://di-marco.net/blog/it/2020-04-18-tips-disabling_bluetooth_on_raspberry_pi/

<https://pibenchmarks.com/latest/>

Docker Installation

Docker INstallation

<https://docs.docker.com/engine/install/raspbian/#install-using-the-repository>

```
sudo su -
apt-get install ca-certificates curl gnupg

# Install Docker repository
curl -fsSL https://download.docker.com/linux/raspbian/gpg | sudo gpg --dearmor -o
/etc/apt/keyrings/docker.gpg
chmod a+r /etc/apt/keyrings/docker.gpg

echo \
  "deb [arch="$(dpkg --print-architecture)" signed-by=/etc/apt/keyrings/docker.gpg]
https://download.docker.com/linux/raspbian \
  "$(. /etc/os-release && echo "$VERSION_CODENAME")" stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null

apt-get update

# Install Docker engine
apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-
plugin

# Check it works
docker run hello-world
```

- Configure your user into docker group

```
groupadd docker
```

Tips, tricks and hacks

<https://www.dzombak.com/blog/tag/raspberry-pi/>