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2.1.1 Setup Operating System onto the Raspberry Pi

Download the image

I would recommend a 64-bit system, as Raspberry Pi 3B, 3B+ and 4B are 64 bit hardware.

Raspberry Pi Foundation provides a suitable system at <https://www.raspberrypi.com/software/operating-systems/#raspberrypi-os-64-bit> . I would recommend "Raspberry Pi OS Lite" 64-bit. The latest one was released April 4th 2022.

Write to micro-SD card

With this release, the default user *pi* was removed!

I would suggest to setup the user *scanner* - see

<https://www.raspberrypi.com/news/raspberrypi-bullseye-update-april-2022/>

Also don't forget to activate SSH daemon for remote (headless) setup.

You might follow the setup instructions at <https://www.raspberrypi.com/software/>

Details for writing from a Linux PC

check and verify your micro-SD cards' device name

verify to have the correct device name for the (new) SD card
for not overwriting and trashing your system
or overwriting relevant data!

- check for existing block devices with `lsblk` - before inserting the SD card to be written.
- on another terminal (SSH-session), you may check `dmesg -w` while inserting

- re-execute and compare output of `lsblk` to previous output

optionally, you might check existing contents by mounting - **replace** `/dev/sdb` with **YOUR** device!
but keep the digit after `/dev/sdb`, e.g. `/dev/sdb1` is changed into `/dev/sdc1`

```
sudo fdisk -l /dev/sdb    # lists partitions
mkdir /dev/shm/sdb1
sudo mount /dev/sdb1 /dev/shm/sdb1
```

check the contents, e.g. with `cd`, `ls`, `..` or `mc` and then unmount each checked partition

```
sudo umount /dev/shm/sdb1
```

(over)write the micro-SD card

don't forget to **replace** `/dev/sdb` with **YOUR** micro-SD cards' device name!

```
xzcat 2022-04-04-raspios-bullseye-arm64-lite.img.xz | sudo dd bs=4M
of=/dev/sdb
sync
```

unplug / eject the micro-SD card with the adapter

prepare auto-generating user and SSH activation

re-insert micro-SD card and mount
again: **replace** `/dev/sdb` with **YOUR** device!

```
sudo fdisk -l /dev/sdb
mkdir /dev/shm/sdb1
sudo mount /dev/sdb1 /dev/shm/sdb1
```

we need an encrypted version for the password scanner123 - you might change in following

```
echo 'scanner123' | openssl passwd -6 -stdin
```

there comes a huge alphanumeric string. copy it into your clipboard - or select for pasting with middle mouse button.

for later automatic generation of user scanner - you might change in following

```
echo
'scanner:$6$6t.t7wG2IkuS0IHn$COM.bQQWWbTYtLCkLf5Mk6PUUnpkZN7R0JLsXwUfHDPx6Hc
0jK77Ci28zR01rdyN.1jRQGuHnP1rq78I0xzF.0' >/dev/shm/sdb1/userconf.txt
```

and for later activation of SSH-daemon

```
touch /dev/shm/sdb1/ssh
```

you might setup / change other bootup options for the Raspberry Pi, e.g. display options, ..

when finished, unmount

```
sudo umount /dev/shm/sdb1
```

and unmount the micro-SD card from the PC

now, you are ready to insert the prepared SD card into the Pi and boot from it. using Pi headless over Ethernet network, you might lookup the IP address; the default hostname is raspberrypi

SSH Software hints

On a Windows PC, you can use one of the following programs to establish an SSH connection

- PuTTY: <https://www.putty.org/>
- MobaXterm: <https://mobaxterm.mobatek.net/>
- *Windows Subsystem for Linux* (WSL/LXSS) with Windows 10

for sure, there are other alternatives. i would recommend *MobaXterm*, which has a builtin X-server, that would allow to run GUI programs.

if really necessary, i would suggest JuiceSSH (<https://juicessh.com/>) for SSH from an Android smartphone or tablet.

System Update & Configuration

Please continue with [2.2 Setup on a pre-installed Pi or PC](#)

afterwards, check other configuration options - special for Raspberry Pi, e.g. speaker output:

```
sudo raspi-config
```

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