

- [1. Introduction to FMList Scanner](#)
- [2. Setup](#)
 - [2.1.1 Setup Operating System onto the Raspberry Pi](#)
 - [2.1.2 Setup Operating System onto the Orange Pi 3 LTS](#)
 - [2.1.3 Setup Operating System onto the Orange Pi Zero 2](#)
- [2.2 Setup on a pre-installed Pi or PC](#)
- [2.3 System configuration after Setup of Operating System](#)
- [3. Installation & setup of scanner software](#)
- [4. Setup wiring: ATX-buttons, LEDs and Piezo-buzzer on Raspberry](#)
- [5. Software hints for operation](#)
- [6. Problems and possible solutions](#)
- [7. Operation](#)

3. Installation & setup of scanner software

Installation of the software

after login with the dedicated *scanner* user

```
sudo apt install -y git
cd $HOME
git clone https://github.com/hayguen/fmlist_scan.git
cd fmlist_scan
cp setup.sh my_setup.sh
```

copying `setup.sh` to `my_setup.sh` isn't strictly necessary, but it will easen later update

```
nano my_setup.sh
```

check the documented/commented options and configure your values, save the file and quit nano editor.

now, you are ready to start the setup with

```
sudo ./my_setup.sh
```

with an additional *SSH* connection on a Pi, you might check/watch the CPU temperature - while the setup is running

```
while true; do cat /sys/class/thermal/thermal_zone*/temp | tr "\n" " " ;
echo "" ; sleep 3 ; done
```

the setup takes a while; go get a coffee .. or tea or .. !

when finished, you need to reboot, that udev rules for user access of the RTLSDR dongle

```
sudo reboot now
```

Prepare the result directory

PC

On a PC, you can also use a regular directory, which has to be configured with the scanner settings

```
nano ~/.config/fmlist_scan/config
```

check and configure the lines

```
export FMLIST_SCAN_MOUNT="0" # "0" or "1"; default is
"1". saving results requires successful mount of /mnt/sda1
export FMLIST_SCAN_RESULT_DEV="" # which device to mount
export FMLIST_SCAN_RESULT_DSK="" # which device (for fdisk)
to check disk identifier
export FMLIST_SCAN_RESULT_DIR="/home/scanner/results" # where to save
results - in subfolder fmlist_scanner
```

Pi

On a Pi, you should have an additional external micro SD card for the results. the internal SD card with the operating system shouldn't be trashed.

edit the settings with

```
nano ~/.config/fmlist_scan/config
```

check and configure the lines - especially the device name /dev/sda

```
export FMLIST_SCAN_MOUNT="1" # "0" or "1"; default is
"1". saving results requires successful mount of /mnt/sda1
export FMLIST_SCAN_RESULT_DEV="/dev/sda1" # which device to mount
export FMLIST_SCAN_RESULT_DSK="/dev/sda" # which device (for fdisk)
to check disk identifier
export FMLIST_SCAN_RESULT_DIR="/mnt/sda1" # where to save results - in
subfolder fmlist_scanner
```

Setup Flash-Friendly-File-System aka F2FS

Despite the non-existing 'quality' of most USB memory sticks, you can extend their lifetime by using a special filesystem for Flash drives: F2FS.

Micro-SD cards generally have a superior quality - compared against USB memory sticks. But there are differences also. Prefer SD cards labelled with *Max/High Endurance* , which should have superior quality.

Anyway, you will also extend SD cards' lifetime utilizing F2FS

```
scanner_format_f2fs.sh
```

see also [Flash Friendly File System \(F2FS\)](#)

Review & configure all settings

```
nano ~/.config/fmlist_scan/config
```

you might want to check following entries for the upload

- FMLIST_USER : your account at <https://www.fmlist.org/>
- FMLIST_RASPI_ID : to distinguish several scanners
- FMLIST_OM_ID : also from <https://www.fmlist.org/>
- FMLIST_UP_COMMENT : some comment, e.g. your antenna ..
- FMLIST_SCAN_GPS_* : your static GPS coordinates, if scanner is placed at a fixed place

the RTLSDR sometime freezes/hangs. to prevent an infinite unproductive loop, check following entries

- FMLIST_SCAN_DEAD_* : especially the REBOOT
- FMLIST_SCAN_RESET_DEVICE: check, if USB device reset works - especially with an USB-Hub
- FMLIST_FM_RTLSDR_DEV
- FMLIST_DAB_RTLSDR_DEV

you need to enter the serial of the used RTL-SDR, that an USB reset can take place. without, a reboot would be necessary!

you can determine the serial number of an RTLSDR dongle with

```
rtl_test
```

press *Ctrl-C* to abort sample loss check

and surely very important for automatic start of the scanner

- FMLIST_SCAN_AUTOSTART

Calibrate your RTLSDR dongle

Actual dongles with an error < 1 ppm won't make a big difference .. but for other dongles, the calibration will be important - especially for DAB.

```
kal.sh
```

this takes some minutes. the results are saved in the configuration file.

Setup automatic upload of scan results

Check/uncomment automatic upload with

```
crontab -l
crontab -e
```

Setup Remote, Monitoring or Service connection

Using the scanner at home in your local network, you should always be able to connect with SSH.

In following cases, it is more difficult:

- you want to connect from outside (you would need to configure your modem's firewall rules)
- with a so-called *DS-Lite*, connecting from outside will get impossible
- when the Pi uses mobile internet, e.g. LTE from your cell phone, you usually *DS-Lite*

In any of above cases, *SideDoor* service might be helpful. Sidedoor is a so-called *revers-ssh* protocol:

- the Pi automatically connects to a 'server'-computer (in my home), and waits
- the device, e.g. smartphone, that wants to establish a connection the that Pi, connects over the waiting connection over my 'server'

setup of sidedoor

```
cd ~/fmlist_scan/src
sudo -E ./setup_sidedoor 8001
```

you need to replace the 8001 by a unique port number! simply send me an email request to h_ayguen@web.de

after activation, you can test with

```
ssh -p 9001 scanner@hayguen.hopto.org
```

again, you need to replace the 9001 by 1000 + the port number, your Pi got assigned.

you can control the sidedoor service with following commands:

```
sudo systemctl status sidedoor
sudo systemctl stop sidedoor
sudo systemctl disable sidedoor
sudo systemctl enable sidedoor
sudo systemctl start sidedoor
```

Oliver and me gain access to the Pi by installing ssh public keys into a new user account `fmlist_service` with sudo rights! This is intended as a service - in case you need some (configuration) help.

if you don't trust us, simply don't install the sidedoor!

Setup control webserver

Many configuration and monitoring operations can also get carried out through a simple webserver. It is automatically installed, but not activated.

For activation perform

```
cd ~/fmlist_scan
sudo ./my_setup.sh wsrsv
```

You can control the service with following commands - if necessary

```
sudo systemctl status scan-webserver.service
sudo systemctl start scan-webserver.service
sudo systemctl stop scan-webserver.service
```

The webserver is only accessible from your home network (LAN).

You can connect with your browser on port 8000 - knowing the IP address or hostname of your Pi/scanner:

- <http://192.168.178.191:8000/>
- <http://raspberrypi:8000/>
- <http://scannerNN:8000/>

connection with hostname requires a network router which does provide DNS. you can simply check with ping

```
ping raspberrypi
ping scannerNN
```

Another alternative is, to allow allow reporting FMLIST the local IP address of your Pi with

- edit/enable the configuration entry `FMLIST_SCAN_AUTO_IP_INFO`
- uncomment (remove the # at start) the line with
`/home/scanner/bin/scanner_auto_config.sh` of your crontab (`crontab -e`)

```
nano ~/.config/fmlist_scan/config
crontab -e
```

and connect with the IP address reported in the **myURDS...** menu at <https://www.fmlist.org/urds/>

Despite the fact, that your local IP address and the link to the webserver is listed on FMLIST, access is restricted to your home network (LAN).

The initial/default password is `scanner123`, which is to be changed.

Setup Boot Target Console/GUI

With new OS, remote X isn't activated by just setting DISPLAY, if the local GUI is active. The GUI needs to be deactivated, that DISPLAY can work.

Use following command to check boot-mode:

```
sudo systemctl get-default
```

to boot into console login:

```
sudo systemctl set-default multi-user.target
```

to boot into GUI:

```
sudo systemctl set-default graphical.target
```

From:

<https://codingspirit.de/dokuwiki/> - coding spirit

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