

# **PMON** for **Raspberry Pi**

## **PRIMER**

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## Introduction

**PMON** is a **PACTOR®** Monitoring Utility for Linux.

PMON allows the thorough observation and documentation of all presently available PACTOR-1/2/3 transmissions. PMON covers all PACTOR levels with the appropriate Speedlevels and packet variations. PMON will read in parallel PACTOR-2 and PACTOR-1. The very wide receiving range (frequency offset  $\pm 200$  Hz), as well as the automatic sideband recognition, ease routine operation of PMON with PACTOR-2 and PACTOR-3 considerably.

PMON automatically decompresses **LZHUF compressed messages on the fly**. This is very useful for **monitoring Winlink** email transfers.

**Note:** LZHUF compression is not inherent to PACTOR, it is not the internal PACTOR Huffman/PMC compression but an external compression variant utilized by some application software, e.g. Winlink. Nevertheless, as LZHUF is widely used, PMON supports decompression even of that third-party compression type.

**This tool is strictly for private use only (non-commercial application, by private persons, e.g. radio amateurs)! The monitored data may be published without restriction by those users – if not prohibited by law.**

## Prerequisites

Hardware you need for using PMON:

- **HF hardware receiver (RX)** that provides an “analog” RX audio signal.
- **Raspberry Pi Model 4B** (1 GB RAM) or, if not available, Model **3B+**.
- **Micro SD card** (8 GB sufficient, for installing Linux as well as PMON)
- **USB Power supply (>15 W)** and cable with micro USB (Pi 3B+) or USB-C (Pi 4B) connector. Be aware that some USB power supply will make significant radio “hash”. In our experience, for example, the power supplies from Apple are very good.
- **USB keyboard**
- **HDMI monitor (micro HDMI on Model 4B!)**
- **Phone jack cable** from RX to Raspberry Pi audio interface.
- **Audio interface**

We have tested PMON thoroughly with the following audio interfaces:

1) HiFiBerry DAC+ ADC

<https://www.hifiberry.com/shop/boards/hifiberry-dac-adc/>

For integrating the HiFiBerry on the Raspberry Pi, you must add one configuration line to the end of the file **config.txt** on the Raspbian operating system, e.g. using “nano” text editor, type:

```
sudo nano /boot/config.txt
```

Append the following, and store config.txt again:

```
# enable HiFiBerry  
dtoverlay=hifiberry-dacplusadc
```

2) microHAM USB Interface III

[http://www.microham.com/contents/en-us/d158\\_U3.html](http://www.microham.com/contents/en-us/d158_U3.html)

3) various cheap USB sound dongles

If you own a modern radio with built in USB audio capabilities like for example the ICOM IC-7300, this should work too.

As **operating system** for the Raspberry Pi we recommend the current **Raspbian Lite** but the other versions of Raspbian should work too (not tested).

## Setting up a new Raspberry Pi (4B) for PMON use

First of all, you need to install Raspbian (Debian Linux for Raspberry Pi) on the micro SD card. The complete image of the operating system can be found on the Raspberry Pi website:

<https://www.raspberrypi.org/downloads/raspbian/>

“**Raspbian Buster Lite**” will be sufficient. Download the .ZIP file to your local Windows computer. The computer must provide a slot for the micro SD card.

You will then have a file like **2019-09-26-raspbian-buster-lite.zip** on your computer.

In order to get a bootable micro SD card, you cannot simply copy the .img file (contained in the .zip file) to the SD card but you need special software for that purpose. A very popular software for doing that job is “balenaEtcher”, it is a free software:

<https://www.balena.io/etcher/>

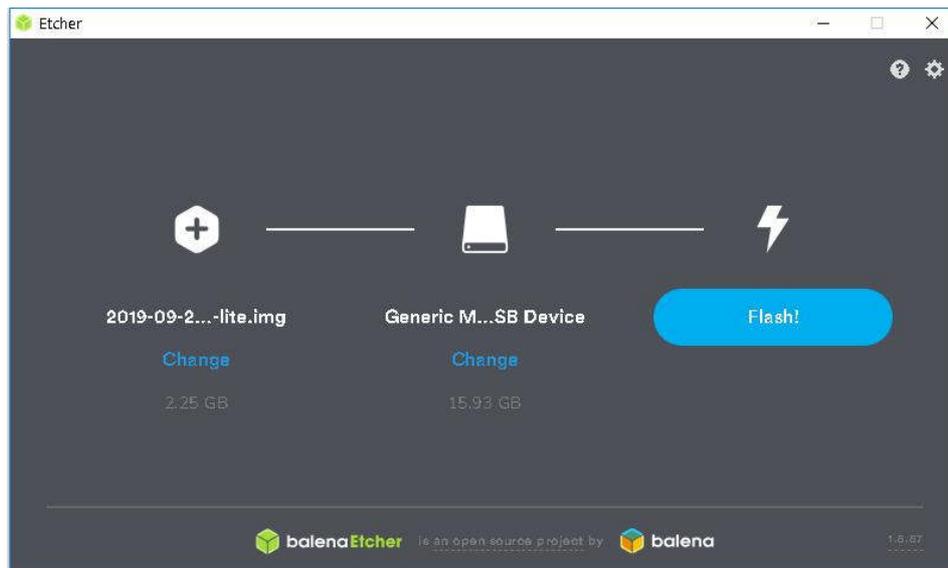
Just install the latest version for this software to your local computer.

Start **balenaEtcher** for generating the bootable micro-SD card.

Choose the .zip file you just downloaded as input file (on the left, will be then displayed as .img file).

Choose the micro SD card (you inserted to the micro SD card slot) as target. (Be careful not to choose a wrong target! The target will be completely overwritten.)

Press “Flash!” and wait.



**DONE!**

## Starting your Raspberry Pi the first time

Insert the new micro-SD card (modified by balenaEtcher) into your new Raspberry Pi.

Attach a keyboard as well as a monitor (you need a micro HDMI cable / adaptor on Model 4B) to your Raspberry Pi.

Attach a network cable in order to allow the Raspberry Pi to access the internet.

Attach the sound device.

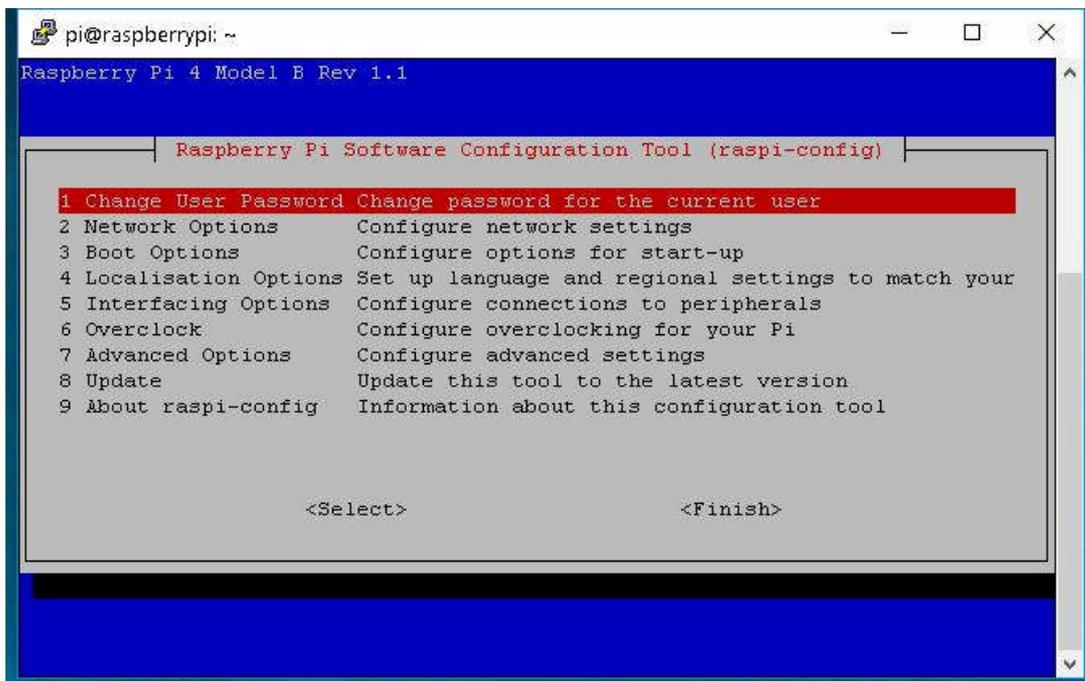
Plug in the power supply cable!

The system now will boot Linux (Raspbian Lite) and finally requires entering a password for “logging in” on the “console”

The standard **user** is “pi” and the standard **password** “raspberrypi”.

Change everything you want (e.g. password) using the raspi-config utility.

For that just type **sudo raspi-config** on the console and press <Enter>. (**sudo** means that you execute the command as so-called “super user”.)



You should at least change the “user password”.

More details as well as a “headless installation” (without local monitor and keyboard)

<https://www.raspberrypi.org/documentation/configuration/wireless/headless.md>

are beyond this Primer.

## Installing PMON on a Raspberry Pi (Raspbian)

You have the choice of different installation methods, see **SCS** website for more information. We recommend the:

### One-step automated installation using our APT repository

The advantage of using the **SCS** APT repository is that you can easily update PMON if a new version is available using the well-known commands:

```
sudo apt update
sudo apt upgrade
```

### One-Step Automated Installation

```
wget -qO - https://www.scs-ptc.com/repo/packages/installpmon | bash
```

(Simply copy this line from the website, typing it on the keyboard is not recommended.)

Downloading from the internet and piping directly to bash is a bit controversial. But you can easily check the script by entering the URL <https://www.scs-ptc.com/repo/packages/installpmon> into your favorite browser. The script consists only of a few lines and is well commented.

## Starting PMON, First Steps

Please read the license!

```
pmon --license
```

Please read the manual

```
man pmon
```

After reading all the material, the first step is to check the audio devices available on your system

```
pmon -a ?
```

You will get a list of available sound devices capable of capturing audio. This list will consist of a single entry in case of a single available audio device:

```
hw:1,0 - sndrpihifiberry [snd_rpi_hifiberry_dacplusadc], HiFiBerry DAC+ADC
HiFi multicodec-0 [ ]
```

In order to use the HiFiBerry device, simply choose “hw:1,0” as hardware in this example:

```
pmon -a hw:1,0
```

**pmon** uses the **left channel** of the stereo **audio input signal**. The left channel usually is the tip of the stereo jack.

## **Uninstall**

Uninstalling PMON is pretty straight forward. If you installed PMON via our APT repository, do

```
sudo apt purge pmon
```

# SCS

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