



V0.6 Raspberry Pi Image User Guide

March 2020

Overview

This brief document describes the purpose of the Raspberry Pi image, what it currently contains and some information on how to get the best from it. There is a current known issue with version of dump1090 and the RSPduo on this image. Please see the addendum for instructions on how to fix it.

Important notes:

Audio

During our testing on both RPi3 and RPi4, if a HDMI audio device is automatically discovered on bootup, this seems to disable the 3.5mm audio output. Nothing we did to try to enable the 3.5mm audio output worked. If no HDMI audio device is discovered (for example we connected the HDMI output to a DVI monitor input), then the 3.5mm audio output works fine. We also tested using a USB soundcard and that also worked fine.

OpenGL Hardware Acceleration

CubicSDR uses OpenGL and the Raspbian OS includes experimental hardware acceleration of these libraries. We enable these when a HDMI video device is detected. However, in our testing, enabling these libraries when using an LCD video device causes the OS not to boot. This would appear to be an issue with the new Raspbian OS "Buster", as this worked fine for the previous Raspbian OS "Stretch". If this issue is resolved in a future OS build, we will enable these libraries for when an LCD video device is detected in a future release of the image.

1. Purpose

The purpose of providing this image is twofold. Firstly, it saves SDRplay customers time trying to figure out how to build some of the 3rd party applications. Secondly, customers can be confident that the software is built correctly and has been tested by us. We only add software to the image that has been shown to work well with the RSPs. This image will be updated as more software is available and tested.

2. Recommendations

The software provided on the image could make the RPi run at max CPU frequency for long periods. To avoid any overheating issues, it's recommended that your RPi has heatsinks and a cooling fan. If the temperature gets too high, it will cause the RPi to throttle back the CPU speed, so cooling the CPU will improve your experience considerably.

3. Image Contents

Some brief descriptions of what is contained on the image.

3.1 *Raspbian Buster*

The latest version of Raspbian Buster as of 23rd July 2019. Details of the original image are here...

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

3.2 *RSP Software and Information*

API 2.13 is pre-loaded as well as information regarding the API, RSP datasheets and the original ADS-B user guide in PDF format.

3.3 *SoapySDR & SoapyRemote*

The SoapySDR range of products is fully supported with the RSP through the SoapySDRPlay interface library. SoapyRemote allows the RSP IQ stream to be sent via the network to other SoapySDR aware applications.

More information on the SoapySDR range of products can be found on the Pothosware website...

<https://github.com/pothosware/SoapySDR/wiki>

3.4 *CubicSDR*

This spectrum receiver application is still in development, but works well across all platforms. It uses SoapySDR to communicate with the RSP and has several demodulation formats including AM, FM, LSB and USB

More information on CubicSDR and its author Charles J Cliffe, can be found on this website...

<http://cubicsdr.com>

3.5 Gnu Radio

This application allows for radio systems to be built in blocks and then compiled to run. Bespoke source blocks have been created for this by Frank Werner-Krippendorf. More information can be found on the Gnu Radio website and on Franks' Gitlab repository...

<https://gnuradio.org>

<https://gitlab.com/HB9FXQ/gr-sdrplay>

3.6 GQRX

GQRX is a Qt application based on Gnu Radio by Alex Csete. This application may have some audio issues that are a known issue with Raspberry Pi. More information can be found on the GQRX website...

<http://ggrx.dk>

3.7 RSP_TCP Server

A TCP server application compatible with applications that support the RTL-TCP format. More information can be found on the Github repository...

<https://github.com/SDRplay/RSPTCPServer>

3.8 ADS-B (dump1090)

This version of dump1090 has been derived from Oliver Jowett's mutability version. That in turn was derived from Malcolm Robb's dump1090. More information on dump1090 and Oliver Jowett can be found on github...

<https://github.com/mutability/dump1090>

ADS-B on the Raspberry Pi can be used standalone. There is a DUMP1090 bookmark set in the Chromium browser on the Raspberry Pi that will connect to dump1090's web server. This will enable you to view the aircraft details on a map. You can still setup Virtual Radar Server on a remote PC and receive the aircraft information from dump1090 on the Raspberry Pi – the information on how to do this is contained in the ADS-B user guide that is available from the EASYplay menu.

3.9 QT-DAB DAB Receiver

This DAB receiver works well with the RSPs and is cross platform. It also has a spectrum viewer.

More information on QT-DAB and its author Jan Van Katwijk, can be found on this website...

<https://www.sdr-j.tk>

4. Acknowledgements

SDRplay provides this image as a free tool to enable anyone easy access to the software provided as well as the RSP on the Raspberry Pi.

All software remains the property of the respective authors.

5. Addendum

RSPduo support for dump1090

Follow these instructions to enable RSPduo support for dump1090. This also fixes the issue with the missing files for the website support.

```
cd ~/Downloads
wget https://www.sdrplay.com/software/SDRplay_RSP_API-ARM32-3.07.1.run
chmod 755 ./SDRplay_RSP_API-ARM32-3.07.1.run
./SDRplay_RSP_API-ARM32-3.07.1.run

sudo apt install librtlsdr-dev
sudo ldconfig

cd ~/Dev
git clone -b api3 https://github.com/SDRplay/dump1090 ./dump1090_api3
cd dump1090_api3
make
sudo cp dump1090 /usr/local/bin/.
cp -rp ./public_html ~/.
cp ./EASYplay.py ~/SDRplay/.
```

Reboot the RPi or restart EASYplay from the main menu.

For more information contact <https://www.sdrplay.com/contact>

6. Legal Information

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