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RTL SDR to Raspberry Pi Connection and Datalogging

Goals

The goal for this section is to setup SDR on Raspberry Pi. The Raspberry Pi 3 has USB connection with RTL2832U. It also has software support with SDR. We need to install SDR on Raspberry Pi.

Problem

Need to familiar with RTL28832U. Learn the software run on Linux kernel which support RTL SDR. Without the SDR card to play with, we start with the SDR installation tutorial. After we get the SDR card, we can put it in use in very short time.

General approach

Figure: RTL SDR connect to Raspberry Pi [1]

The Raspberry pi has USB support to connected to RTL2832U. The Raspberry Pi also has software support for the RTL2832U. After connected the RTL2832U to Raspberry Pi. We need to install it on Pi to make sure the Raspberry Pi can active its functions. When we turn on Raspberry Pi, we need to download the driver for RTL2832U. There are a lot of driver online for RTL2832U. After we installed the driver, we are able to use RTL SDR on Raspberry Pi. We follow the instruction by video tutorial. [2]

Code-level problems and solutions, and empirical testing

Start by downloading the latest full version of the Raspbian Desktop from the raspberrypi.org web site. It's a zip file, so once it's downloaded, unzip it. I'm using my laptop running Korora 24 linux for this.

```
unzip 2016-05-27-raspbian-jessie.zip
```

This results in a file of about 4 gigabytes called **2016-05-27-raspbian-jessie.img** which needs to be copied to the micro SD card.

Before you plug the micro SD card into your computer, run the **df** command to see what block devices are mounted. Then plug the card in and run **df** again. The extra device that's listed is your card, possibly something like **/dev/sdb1**. Unmount the card if it auto-mounted.

```
umount /dev/sdb1
```

Use the **dd** command to copy the image file to the card. Recent versions of **dd** support the handy **status=progress**option which lets you easily keep tabs on how it's going. It will take a few minutes to do and don't forget to let the sync finish before you unplug the card.

```
sudo dd if=2016-05-27-raspbian-jessie.img of=/dev/sdb
bs=4M status=progress && sync
```

Now the fun stuff begins. Plug the micro SD card into its slot on the Raspberry Pi, Connect the HDMI, keyboard, mouse and finally connect the power. With any luck, you'll see the Pi booting up and it should go straight to a desktop. Click on the network icon at the top right of the screen, select your network and give it your network password to get connected. Open a terminal and:

```
sudo su -

raspi-config
```

Out of the box the raspbian OS is set up for a UK locale and keyboard, so I use the **raspi-config** tool to set my AU locale and US keyboard layout. Then select the 'resize root file system' option to maximise the use of the SD card, exit the tool and reboot.

Once it's rebooted, update the Operating System.

```
sudo su -

apt-get update && apt-get dist-upgrade -y
```

Now install the stack of dependencies that the DAB+ software needs in order to build:

```
apt-get install -y vim qt5-default qt5-qmake libusb-1.0-0
libusb-1.0-0-dev \

portaudio19-dev faad libfaad-dev libsndfile1-dev \

sndfile-tools librtlsdr0 librtlsdr-dev libfftw3-3
libfftw3-dev
```

The SDR-J software

The DAB+ receiver software is the Open Source SDR-J project. It's author, Jan van Katwijk, has a range of interesting software tools that you can read about on his site. We want the Raspberry Pi version of his DAB+ software.

```
git clone https://github.com/JvanKatwijk/dab-rpi

cd dab-rpi
```

There are quite a few README files. It may be useful to read a few of them.

The last piece of config is done by editing the **dab-rpi.pro** file.

```
vim dab-rpi.pro
```

Just comment out the lines for sdrplay and airspy because they're other (more expensive) SDR devices that we're not setting up here.

Finally, it's time to build the software.

```
qmake

make
```

Watch a great deal of compiler output streaming past for a few minutes. Once it's finished (hopefully without major errors)…

```
cd linux-bin

./dab-rpi-0.997
```

You should see a bunch of text stream past in the console, then a GUI should open that you can navigate with a mouse.

Select dabstick as your input source, select your audio device, select your channel group and click Start. I used the Wikipedia DAB+ page to work out that the channel group I need for Canberra is 10B. If you exit the app via the Quit button, it will write a config file to **~/.dab-rpi.ini** with your settings so that the next time you run it you won't need to set it up again.[3]

Planned Course of Action

Keep working on SDR, get SDR card as soon as possible and to do data transfer test on SDR.

Resources and relevant Forum Posts

[1] "RTL-SDR Blog silver dongle first impressions, compared to NooElec blue dongle"https://medium.com/@rxseger/rtl-sdr-blog-silver-dongle-first-impressions-compared-to-nooelec-blue-dongle-4053729ab8c7
[2] "VIDEO TUTORIAL: INSTALLING GQRX AND RTL-SDR ON A RASPBERRY PI"https://www.rtl-sdr.com/video-tutorial-installing-gqrx-and-rtl-sdr-on-a-raspberry-pi/
[3] "DIGITAL RADIO WITH A RASPBERRY PI" http://www.michaelcarden.net/?p=48