



Technology for the Wireless Generation

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# Multi Raspberry PI & RTL-SDR2832U Application Mother Board for Raspberry Pi B+ / Pi 2 / Pi 3

## Introduction

Inexpensive Multi RTL-SDR Application Mother Board for Raspberry Pi B+ / Pi 2 / Pi 3 applications. Designed in the U.S.A. by WyJen Technologies. The mother board uses a dual USB port for two RTL-SDRs with but the bottom RTL-SDR configured to use a dedicated power supply separate from the Raspberry Pi. **Unlike the typical host device, the dedicated Mother Board's power source allows the RTL-SDR (and Raspberry Pi) to run continually without overloading the Raspberry Pi's standard USB supply which may cause the RTL-SDR to be interrupted.** One LED is provided on the mother board for status. Popular applications are:

1. TCP Raspberry Client for sending RTL-SDR receiver data to remote server
2. LTE Cell Scanner
3. FM Receiver for multiple frequencies
4. GPS Receiver
5. ADSB Receiver

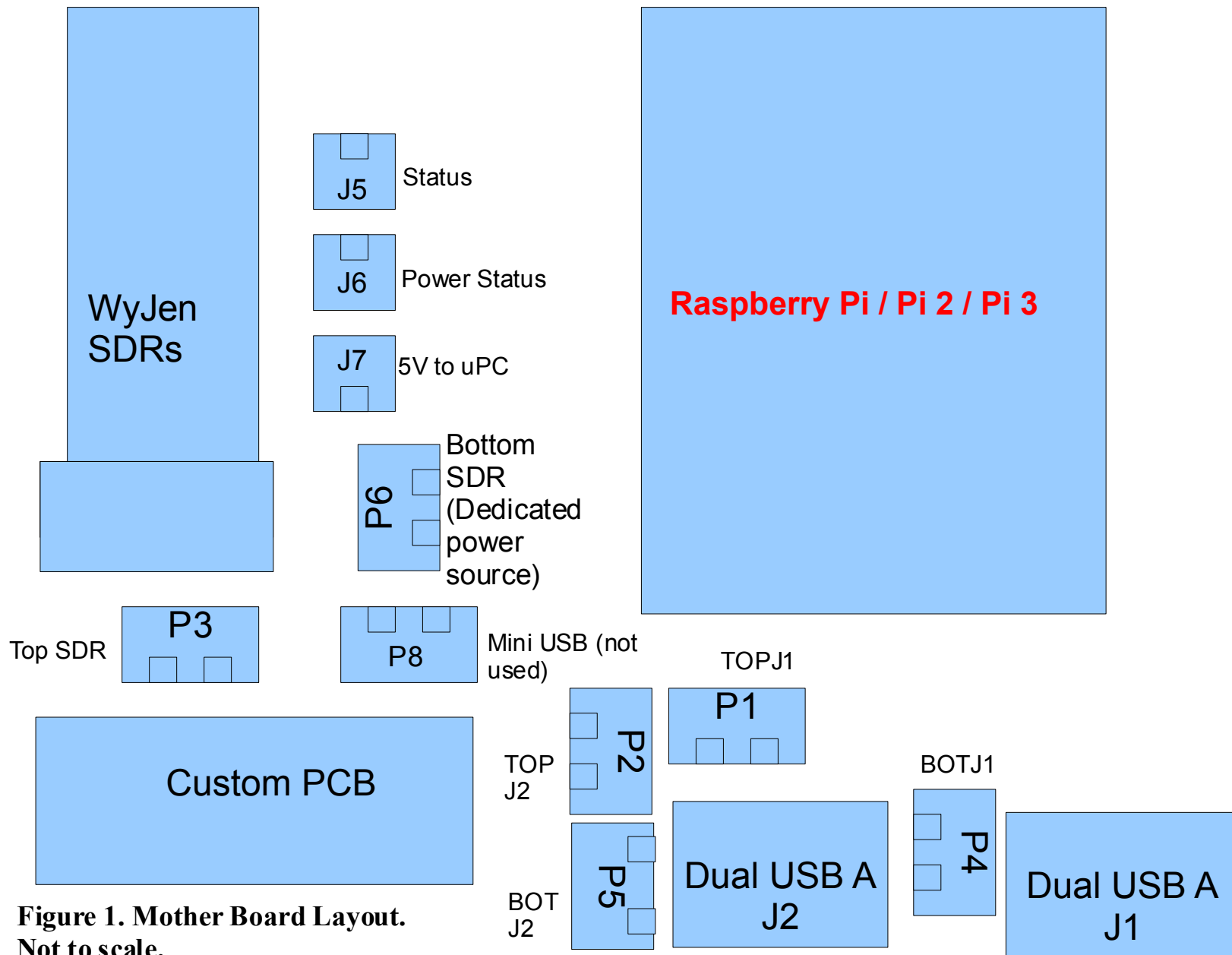
The package P/N comes with the following items (See Figures 1 & 2 below):

1. 8 Screws and 4 standoffs for attaching a /Raspberry PI +/PI 2 / PI 3 to the PCB mother board
2. Harness cable with 2 pin (2.54mm) connector jack to micro USB. The harness connects the mother board power power

supply to the raspberry micro USB power supply connector.

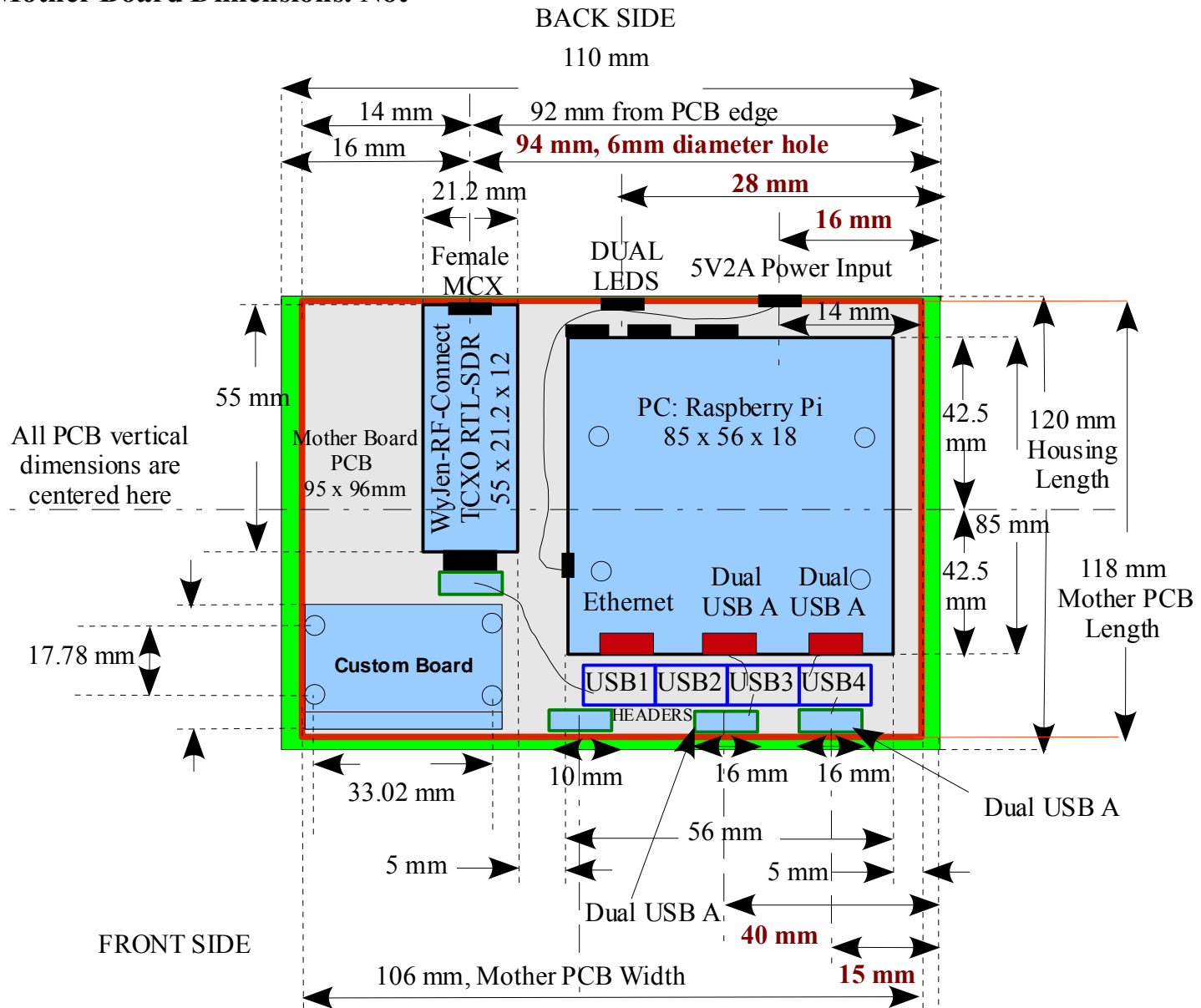
3. Three Harness cables from PCB USB connectors to selected three Raspberry Pi USBs
4. One 0.5 PPM WyJen RTL2832U/R820T RTL-SDR mother board with antenna
5. PCB Power Supply, 100-240V AC 50/60Hz, Output 5V/2A DC with 2.5\*0.7mm Male DC Plug
6. One WyJen Technologies Multi RTL-SDR Micro PC Application Mother Board Assembly(106mm x 118mm x 18mm = WxLxH), P/N WY-PCB106122-1

Note: The Raspberry Pi computer is not included!



**Figure 1. Mother Board Layout.**  
**Not to scale.**

**Figure 2. Mother Board Dimensions. Not to scale.**



## **Installation Method for Raspberry Pi Users**

### **Step 1. Update the Raspberry Pi to Latest Version**

```
sudo apt-get update
```

### **Step 2. Install the Required Utilities to Compile the RTL-2832U Driver on the Raspberry Pi**

```
sudo apt-get install git
```

```
sudo apt-get install cmake
```

```
sudo apt-get install libusb-1.0-0.dev
```

```
sudo apt-get install build-essential
```

### **Step 3. Install the RTL-2832U Driver Source Files and Compile on the Raspberry Pi**

```
git clone git://git.osmocom.org/rtl-sdr.git
```

Now enter the rtl-sdr directory, create the build directory, and create the rtl-sdr build environment.

```
cd rtl-sdr/
```

```
mkdir build
```

*cd build*

--- if user is not root type the following ----

*cmake ../ -DINSTALL\_UDEV\_RULES=ON*

--- else if user is root type the following ----

*cmake ../*

----- Time to build and install rtl-sdr

*make*

*sudo make install*

*sudo make install-udev-rules*

*sudo ldconfig*

## **Step 4. Reboot the Raspberry Pi**

When the build is successful, some users in the RTL-SDR community have report the that Raspberry may crash if not rebooted after the RTL-SDR build. So we add an extra step here to insure the reboot of the raspberry Pi:

*sudo reboot*

## Step 5. Test rtl-sdr

Just to make sure rtl-sdr communicates with your dongle, try to run the command `rtl_test`, and check the output

```
rtl_test -t
```

```
Found 1 device(s):
```

```
 0: Generic, RTL2832U, SN:77771111153705700
```

```
Using device 0: Generic RTL2832U
```

```
Found Rafael Micro R820T tuner
```

```
Supported gain values (29): 0.0 0.9 1.4 2.7 3.7 7.7 8.7 12.5 14.4 15.7 16.6 19.7 20.7 22.9 25.4 28.0  
29.7 32.8 33.8 36.4 37.2 38.6 40.2 42.1 43.4 43.9 44.5 48.0 49.6
```

```
Sampling at 2048000 S/s.
```

```
No E4000 tuner found ...
```

## Step 6. Test the Raspberry PI to Insure the USB Speakers Receive Sound

Connect USB speakers. Then test left and right channel using the following:

```
speaker-test -c2 -D hw:1,0
```

## Step 7. Start the RTL-SDR

Open up a terminal window in Raspberry, then test the RTL using a FM station in your area (here 90.9FM). The command line



should look something like the following.

```
rtl_fm -f 90.9e6 -M wbfm -s 200000 -r 48000 - | aplay -r 48k -f S16_LE -D plughw:1,0
```

If step 6 works you should be able to listen to a FM station For example, if in Jacksonville, FL, enter the following rtl\_fm command:

```
rtl_fm -f 96.9e6 -M wbfm -s 200000 -r 48000 - | aplay -r 48k -f S16_LE -D plughw:1,0
```

Found 1 device(s):

0: Generic, RTL2832U, SN: 77771111153705700

Using device 0: Generic RTL2832U

Found Rafael Micro R820T tuner

Tuner gain set to automatic.

Tuned to 98216000 Hz.

Oversampling input by: 6x.

Oversampling output by: 1x.

Buffer size: 6.83ms

Sampling at 1200000 S/s.

Output at 200000 Hz.

Playing raw data 'stdin' : Signed 16 bit Little Endian, Rate 48000 Hz, Mono

## **Step 8. Youtube Demo the Multi Raspberry RTL SDR2832 Application Mother Board**

The following video can be observed to witness the performance of the Multi Raspberry RTL-SDR2832U Application Mother Board:

[https://www.youtube.com/watch?v=OEa\\_24F3Jqs&feature=youtu.be](https://www.youtube.com/watch?v=OEa_24F3Jqs&feature=youtu.be)