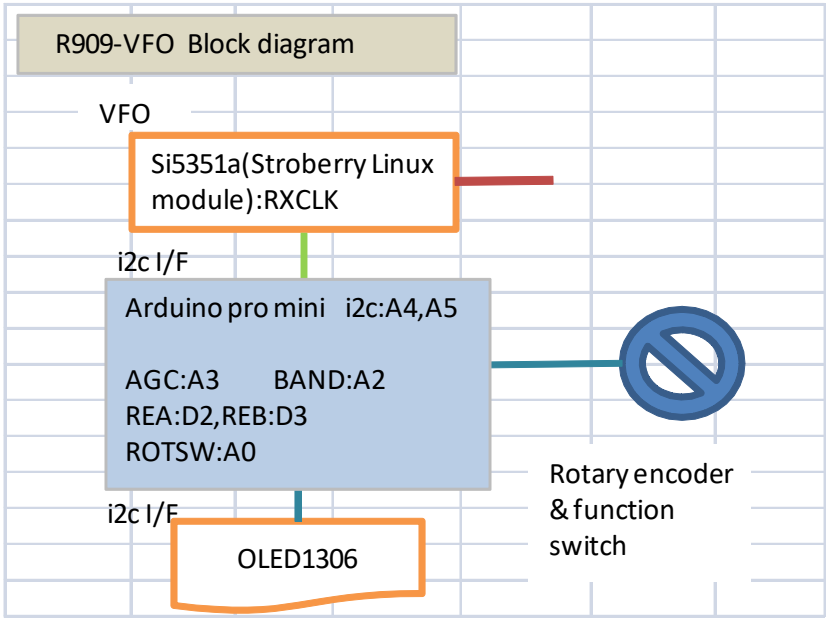
R909-VFO Instruction Manual V1.0 2024.06.09 ©nobcha

Preface

R909-VFO is an Arduino controlled Si5351a PCB circuit identified from R909-DSP radio. This one is composed with ATmega328P, OLED, A rotary encoder, switches, LEDs, and Si5351a module.

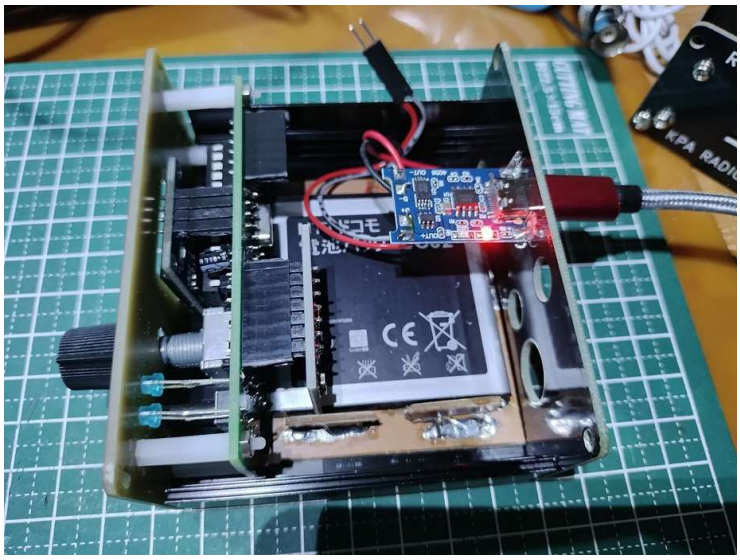
Appearance



Block diagram

The circuit

The portion of R909-DSP radio controlled under Arduino sketch, can be used for the RF signal generator or the digitalized LO remodeling. I will introduce how to assemble it and how to compose the sketch hereafter.



Inside

Parts

I resumed full parts list. You shall assemble R909-DPS_Panel PCBs with some trained soldering. You shall use temperature control iron to mount CRs on surface. Also for Si5351a module you must fix IPEX receptacle and chip CRs to be added. After soldering PCB, you assemble the battery, USB module, toggle switch, and cable in the case with the front and back PCB panels as described on photo. M2 screws, nuts, and stand offs are needed.

Refer P1 and P2 of parts list

Printed circuit boards

PCBGOGO helped me to produce the PCBs, so Gerber data is PCBGOGO formatted. If you use the data, please resister for PCGGOGO via below address and order for them.

https://www.pcbgogo.jp/promo/nobcha23

How to assemble

At first lower parts as chip CRs shall be soldered. Next you shall solder IC socket, aluminum chemical capacitors, LEDs, the switches, and pin headers.

If you connect ATmega329P with Arduino IDE via USB, you shall assemble the 6p headers for USB serial module.

On OLED and Si5351amodule you shall solder the male pin headers of 4P or 7P.

We use SMA receptacle for signal output which is IPEX pig tale cable. It is hard to fix the IPEX receptacle on Si5351a module. You may solder the coaxial cable directly on Si5351a module instead of using IPEX connecter..

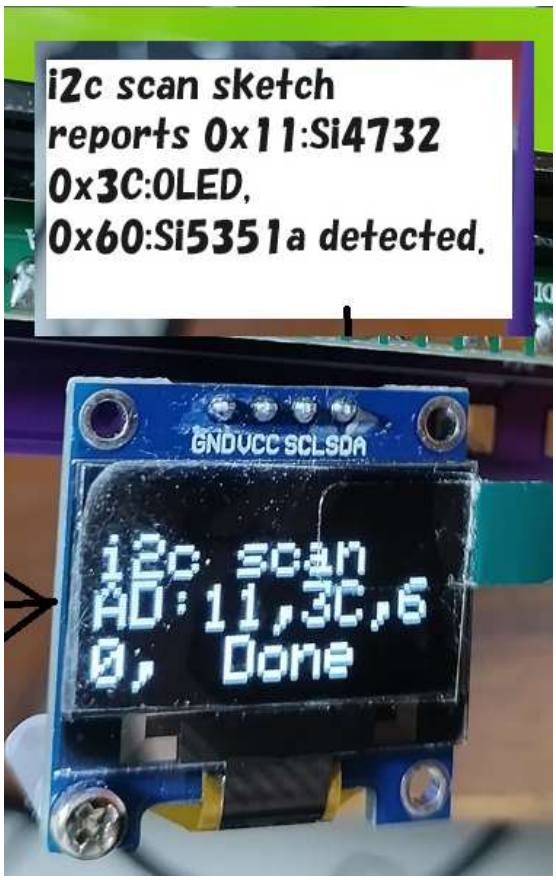
As PCB size of width is very critical to be slid in case slot, you may shave PCB.

We use the aluminum extracted case of 88x38x70 on Aliexpress. You may use 88x38x100 to install larger battery.

I diverted the smart phone's used out battery which holds protecting circuit. You shall solder USB-PCB on the back panel PCB with wire to combining with the window.

Sketches

We can utilize i2c address scanning tool to confirm completing assembly. ATmega328P is driving i2c address and display the address which she gets the response. When she displays OLED address itself and Si5351a module address your assembling is OK!.



I had ported CeserSound's sketch posted on Hackster to change 2 kinds of port address. This can act as VFO from10kHz to 225MHz. The changing port address are BAND:A1->A2,, rx_tx:A2->D4

I'm editing R909-DSP radio sketch to divert this VFO with the memory channels and Si5351a frequency calibration. I also plan to adopt this VFO for remodeling analog radio. Accordingly I will report those later.
Please follow my blog as below.
nobcha23 DIY air band receiver BLOG:https://nobcha23.hatenadiary.com/

Operation

Rotary encoder: To increase or decrease the frequency by STEP frequency.
Rotary encoder push switch: To select STEP frequency
SW1: To select frequency band

Files list uploaded on GITHUB

#	File application	Name
1	R909-VFO technical manual (Japanese edition)	R909-VFO_Manual_ja.pdf
2	R909-VFO technical manual (English edition)	R909-VFO_Manual_en.pdf
3	Gerber file of the R909-DSP_Panel PCB	5531_ATm_25.kicad_pcb.zip
4	Gerber file of the R909-DSP_front-panel PCB	front-p.kicad_pcb.zip
5	Gerber file of the R909-DSP_back-panel PCB	back-p.kicad_pcb.zip
6	i2c address scanner sketch	i2c_scanner_R909PANEL-OLED_4732.ino
7	Modified 10kHz to 225MHz VFO sketch (originally CeserSound made)	Changed to KPA-5351 sketch.txt
8	Schematic	R909-VFO_scm_rev.jpg
9	Page 1 of Bill of Materials	R909-VFO_BOM_1_2_ja.jpg
10	Page 2 of Bill of Materials	R909-VFO_BOM_2_2_ja.jpg

Note and thanks

This trial and design was intended for nobcha(JA3KPA)s interesting and usage personally. I shall not assure the result.

To follow this trial you shall prepare a certain knowledge and skill to produce, assemble, and solder. After you understand the contents of the schematic and the parts on the BOM, you shall start experiment.

I' m much thanking for peoples who are providing WEB information and the libraries of Arduino.