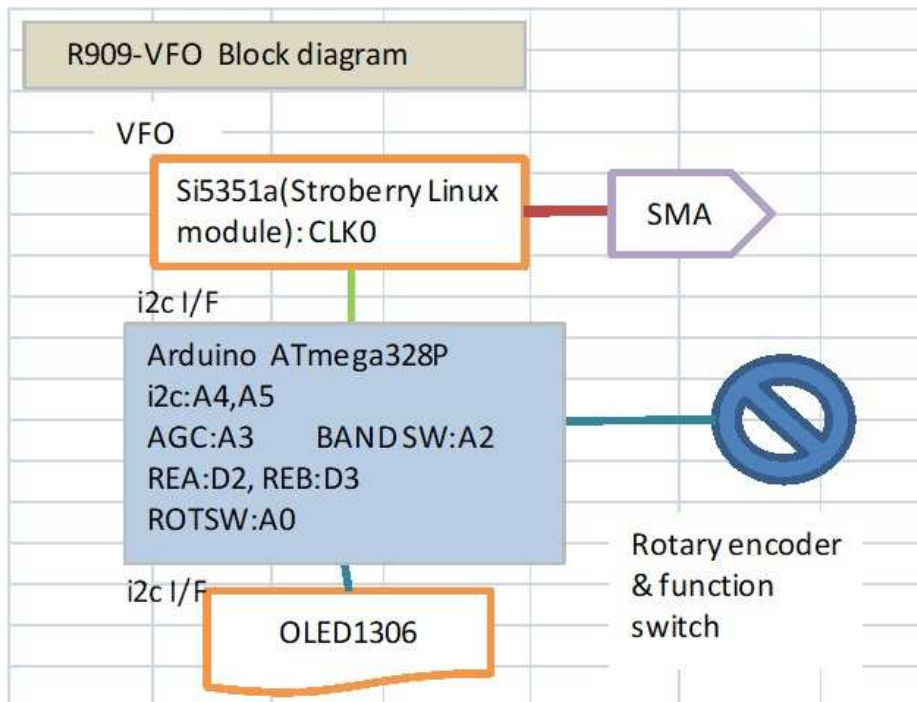


(V1. 1 2024. 08. 12)**Preface**

R909-VFO is designed for the local oscillator. Si5351a module is controlled by an Arduino. This one is composed with ATmega328P, OLED, A rotary encoder, switches, LEDs, and Si5351a module.



Appearance

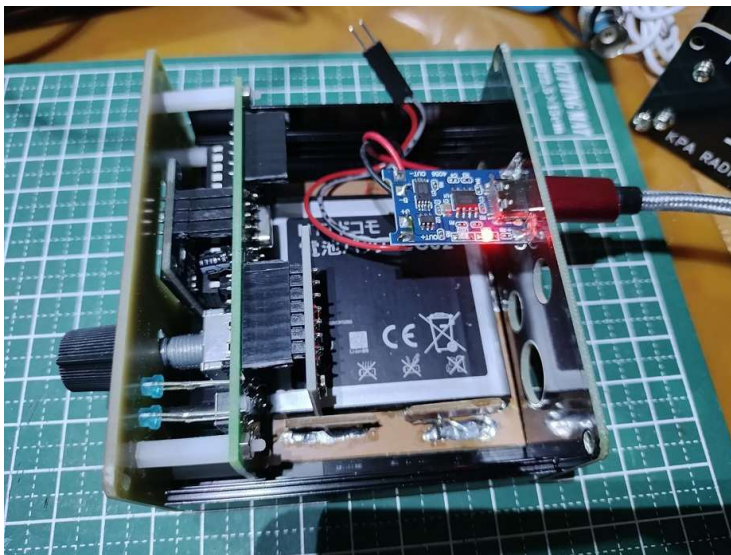


Block diagram

The circuit

The R909-VFO is originally the heart of R909-DSP controlled under Arduino sketch, which can be diverted for the RF signal generator or the digitalized LO remodeling.. I will introduce how to assemble it and how to compose the sketch hereafter. There is a circuit diagram on GITHUB. “R909-VFO_scm_rev.jpg”

#Frequency range: 100kHz-225MHz, #Signal level: about +1dB, #Power charge: USB-C, #50channel memory



Inside

Parts

I resumed full parts list. You shall assemble R909-DSP_Panel PCBs with some trained soldering. You shall use temperature control soldering 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 register for PCGGOGO via below address and order for them.

<https://www.pcbgogo.jp/promo/nobcha>

Please refer the errata. R909-VFO_errata.jpg

How to assemble

At first lower height 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 the ATmega329P with the Arduino IDE via USB, you shall assemble the 6p headers to connect the USB serial module.

To connect the OLED and the Si5351a module you shall solder the male pin headers of 4P or 7P.

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

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.

Test Sketches

If you check to be completed assembling PCB, it is useful of i2c address scanning tool. You can utilize i2c address scanning tool to confirm soldering and assembling. 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 well.

Sketches

You can use R909-VFO sketch to be diverted from R909-DSP with the memory channels and Si5351a frequency calibration.

You can also port CesarSound's sketch posted on Hackster by changing 2 kinds of port address. This can act as VFO from 10kHz to 225MHz. The changing port address are BAND:A1->A2,, rx_tx:A2->D4

<https://www.hackster.io/CesarSound/10khz-to-225mhz-vfo-rf-generator-with-si5351-version-2-bfa619>

Accordingly I will option the other VFO sketches remodeling the older machines. Please follow my blog as below.

nobcha23 DIY air band receiver BLOG: <https://nobcha23.hatenadiary.com/>

How to operate R909-VFO original sketch

Rotary encoder: To increase or decrease the parameters. See below.

Rotary encoder push switch: See below.

Mode	FUNC select	FREQ	STEP	MEM	SCN	F_COR
Rotary encoder	[FUNC/FREQ] [FUNC/STEP] [FUNC/MEM] [FUNC/SCN] [FUNC/F_COR]	To increase or decrease the frequency by step	1Hz 10Hz 100Hz 1kHz, 10kHz 100kHz, 1MHz, 25kHz	To increment or decrement the channel number	To increment or decrement the channel number and set the frequency as stored	To increase or decrease the value by step (1,10,100,1000)
RE-SW single click	To go to every function	To go out to FUNC select				
RE-SW double click	none	To store the parameter in EEPROM		To store the frequency in defined EEPROM	To go into AUTOMATIC scan channel mode	To store the parameter in EEPROM

SW1: To go into FREQ mode

SW2: To go into SCN mode

Files list uploaded on GITHUB

<https://github.com/Nobcha/R909-VFO/>

#	File application	Files name
1	R909-VFO technical manual (Japanese edition)	R909-VFO_Manual_ja_1.pdf
2	R909-VFO technical manual (English edition)	R909-VFO_Manual_en_1.pdf
3	Gerber file of the R909-DSP_Panel PCB	5531_ATm_25.kicad_pcb.zip
4	Gerber file of the R909-DSP_front&back-panel PCB	front-back-p.kicad_pcb.zip
5	100kHz to 200MHz VFO sketch(R909-DSP RX modified)	R909-VFO_UNIV0307.ino
6	i2c address scanner sketch	i2c_scanner_R909PANEL-OLED_4732.ino
7	Schematic	R909-VFO_scm_rev.jpg
8	Bill of Materials	R909-VFO_BOM_en.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.