

Build

U3 needs a steady hand and good eyes. If U3 is a bridge too far there's the option to exclude U3 and related parts, and install C8 & RV1. U3 is the best option. Refer to schematic for more info.

1. Install U3, the SN74LVC1G125
2. Install the 5V regulator and associated parts
3. Test 5V and 12V are where you'd expect
4. Install all the remaining parts

Winding T1

Wind 10 turns bifilar onto the toroid.

A - A is one winding (wire)

B - B is the other winding (wire)



Building a LPF

The design uses the QRP Labs LPF, see <https://qrp-labs.com/lpokit.html> for detail.

Configure

There are three parts to configuration:

1. Program the ESP8266
2. Establish a Wi-Fi connection
3. Calibrate the Si5351 frequency to 10MHz (or as close as you can)

Program the ESP8266

There are two options here:

1. Use the Arduino IDE
2. Use <https://esptool.spacehuhn.com/>

Both methods require the ESP8266 to be connected to a computer via USB. Do not connect 12V.

Use the Arduino IDE

Open and compile the .ino.

The board manager settings are noted in the comment at the top of the .ino.

The required libraries are noted next to the #include statements in the .ino.

If you get really really stuck, email marcbranch22@gmail.com.

Use <https://esptool.spacehuhn.com/>

This is a web tool, all you need is the .bin.

Follow your nose with the web tool, it's pretty intuitive.

If you get really really stuck, email marcbranch22@gmail.com.

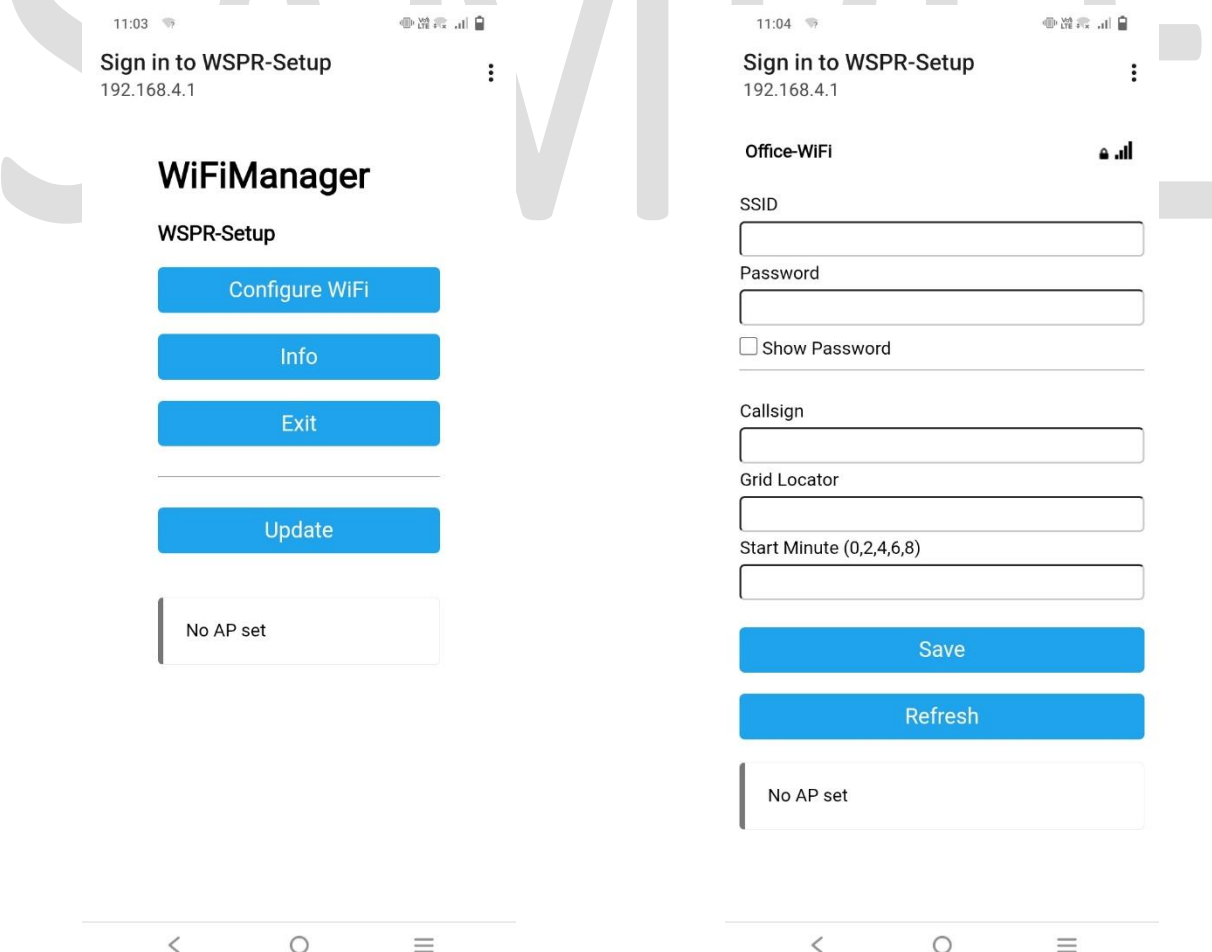
Wi-Fi connection

The Wi-Fi needs to be setup first. The software will not proceed until the ESP8266 has connected to your Wi-Fi. This is a one time job, the ESP8266 saves the connection info after successfully connecting.

While the ESP8266 is establishing a connection a blue LED will blink on the ESP8266, once connected the blue LED goes out.

First, connect power. This can be via the 12V connector or via the USB on the ESP8266, but don't have both power sources connected ... 5V from the U3 regulator will feed 5V back to whatever the USB is connected to (computer/laptop?) and offers the possibility of damaging the USB device. Unlikely but not impossible.

To connect the ESP8266 to Wi-Fi you need to configure via a device that is already connected to the Wi-Fi, your phone is a good option. On your device (eg phone) go to settings etc, to the place you add a Wi-Fi connection. You will see a new device called "WSPR-Setup", click on it. That will open WiFiManager, click/tap Configure WiFi, that will open a page where you enter the Wi-Fi and WSPR info.



SSID and Password are what they are on your Wi-Fi.

Callsign and Grid are your details. WSPR uses a 4 char Grid (not 6 char).

Start Minute

WSPR messages can be transmitted every two minutes, on any even minute, at second zero. It was decided that transmitting every two minutes is a bit silly so the software only transmits every ten minutes.

The Start Minute box sets the even minute, eg 4 means transmit on minutes 4, 14, 24, etc.

Save

When all entered, click/tap Save, the ESP8266 will connect to your Wi-Fi.

The LED will stop blinking and likely turn off. Perfect, you're connected.

If, by chance, the LED goes from blinking to on, have a look at the time. You've connected to Wi-Fi on the even minute that matches your transmit start minute. Have a chuckle, no problem, the LED will turn off after 110 seconds.

SAMPLE

Calibrate the Si5351

Set the band jumpers to Calibrate.

Connect the ESP8266 to a computer via USB. Do not connect 12V.

Connec

SAMPLE

Use

Blue light

Setting the Si5351 Calibration Factor:

1. Do NOT connect power
2. Connect USB cable between transmitter and computer
3. Compile sketch
4. Click on tools->serial monitor
5. Press (click) the tiny reset button on the edge of the ESP8266 module
6. Follow onscreen instructions
7. Connect power after USB cable removed

Setting the Si5351 Calibration Factor:

1. Compile sketch
2. Click on tools->serial monitor
3. Press (click) the tiny reset button on the edge of the ESP8266 module
4. Follow onscreen instructions

Current ... approx. 130mA, 60mA is the ESP WiFi, 20mA is the resistor divider.