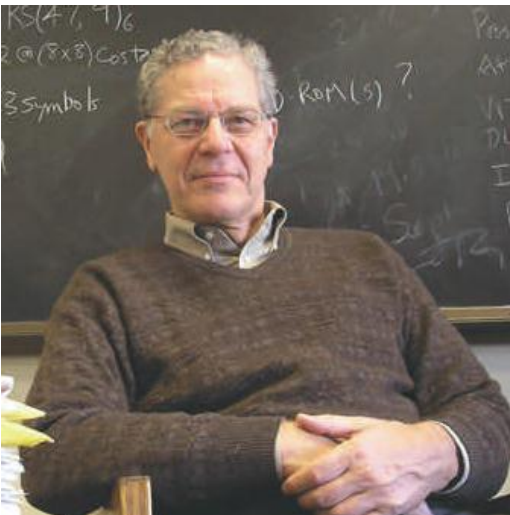


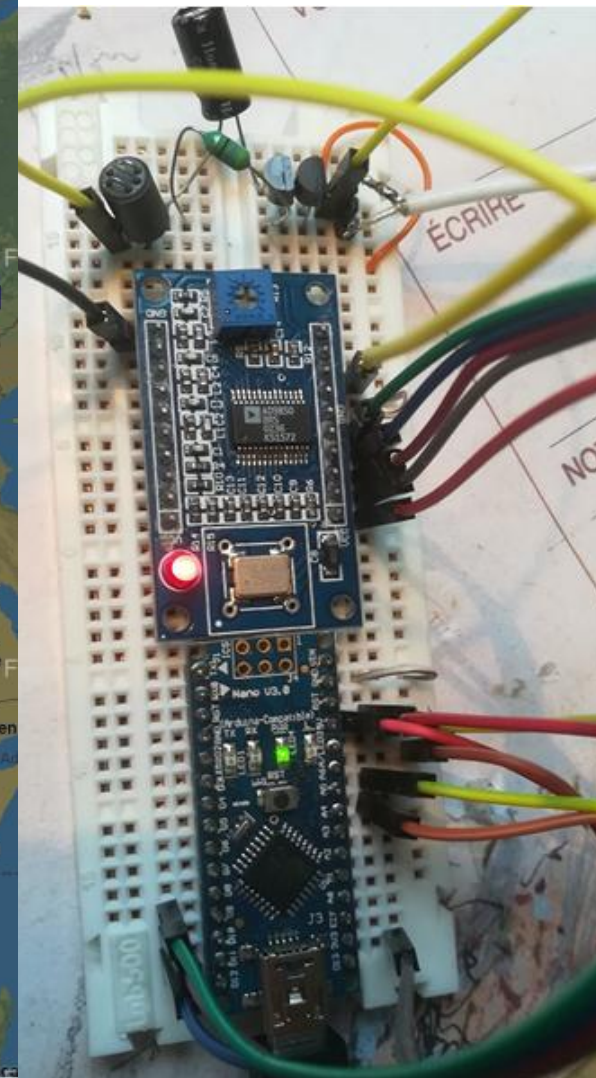
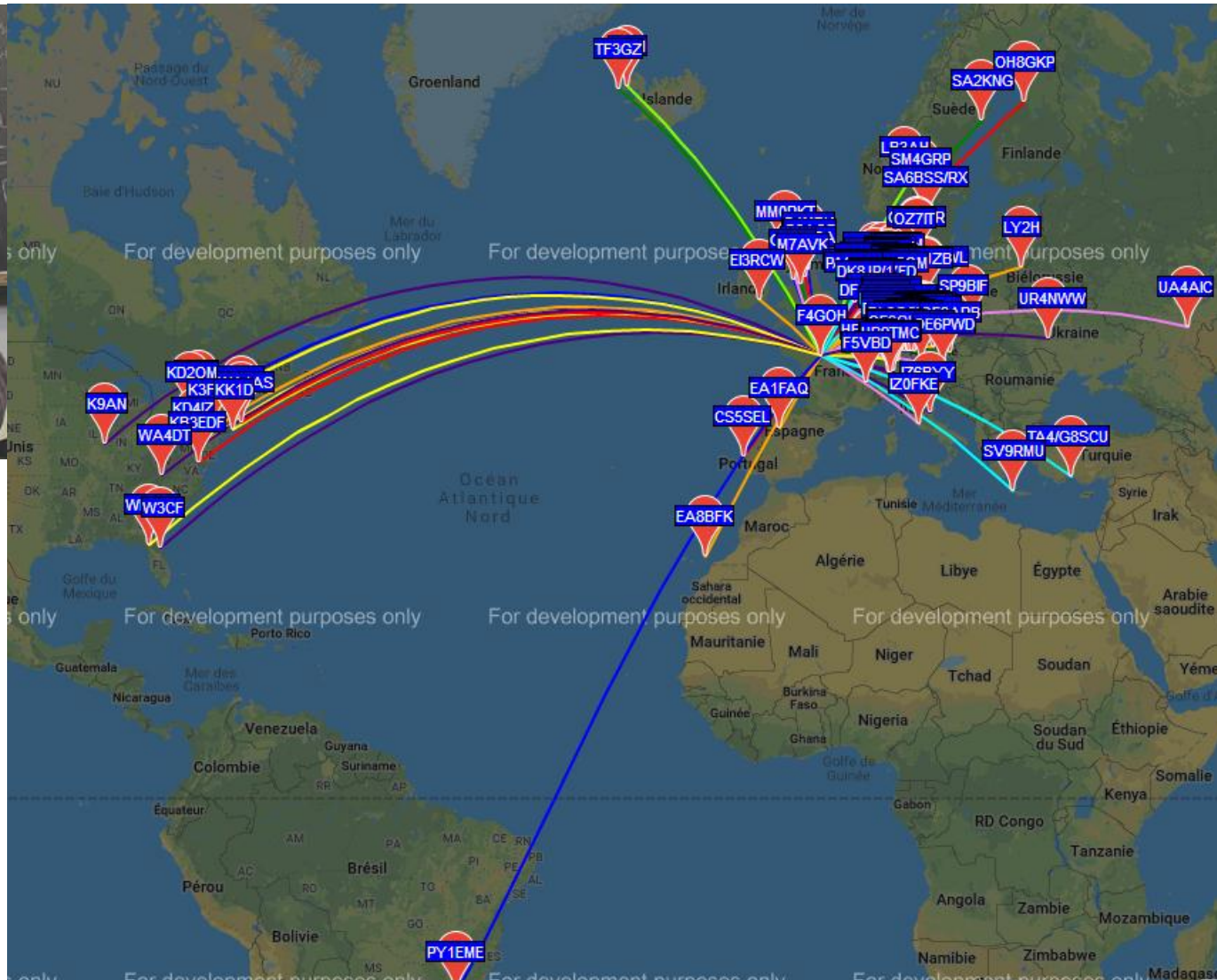
WSPR_{whisper} : Weak Signal Propagation Reporter



Joe Taylor (K1JT)

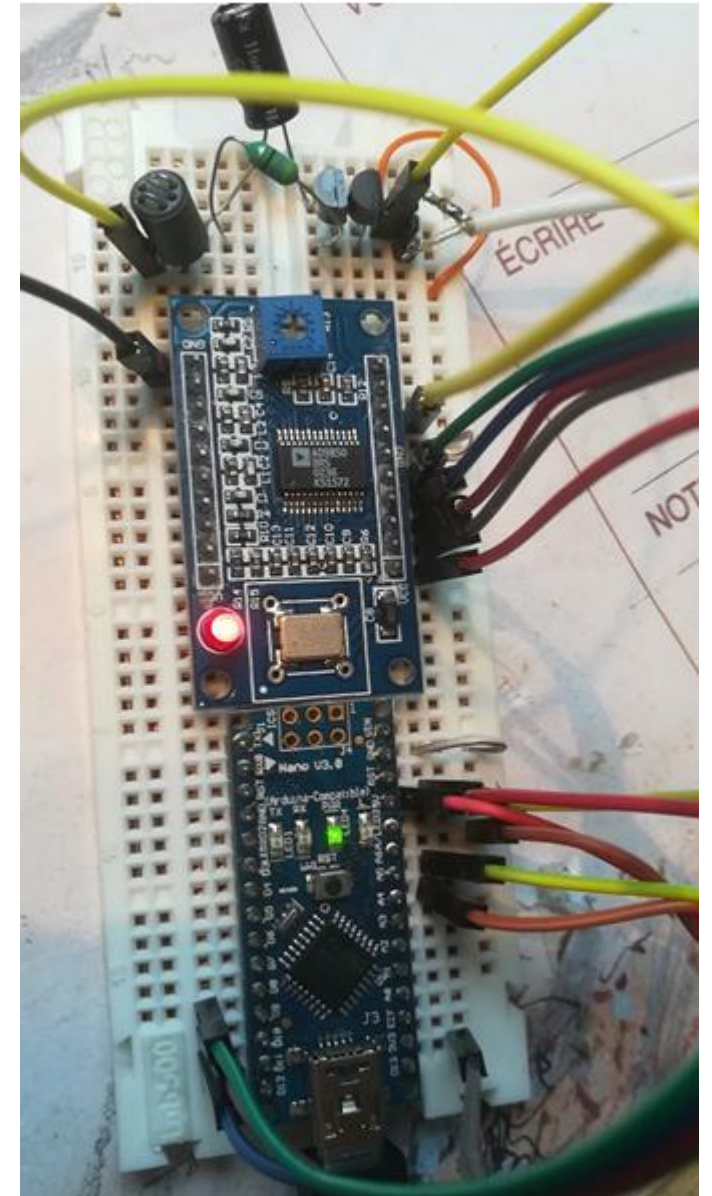
Astrophysicien américain

Prix Nobel de physique
(1993)



WSPR Le développement

- 1) Présentation du projet WSPR
- 2) Utilisation de l'Arduino Nano et de son IDE (integrated development environment) BUS I²C, OLED, RTC
- 3) Fonctionnement du DDS (AD9850) et protocole WSPR
- 4) PA et filtre passe bas
- 5) Assemblage et test du PCB final



WSPR : Pourquoi faire ?

- Protocole écrit par Joe Taylor, K1JT,
- TX RX en faible puissance ,
- Test de la propagation.

Emission :

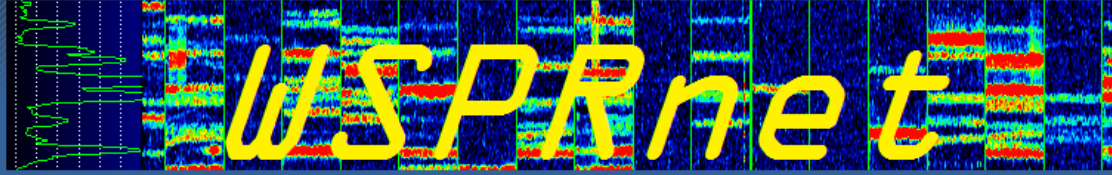
- INDICATIF,
- LOCATOR,
- PUISSANCE dbm.
- Durée : 110 secondes toutes les minutes paires
- Besoin d'une horloge

Réception :

- Décoder des signaux S/B= -28 dB ,
- Les stations envoient les rapports de transmission via internet dans une base de donnée WSPRnet,
- Cartographie .

WSPR : Cartographie

<http://wsprnet.org/drupal/>



WSPRnet

Welcome to the Weak Signal Propagation Reporter Network

[Activity](#) **Map** [Database](#) [Stats](#) [Forum](#) [Downloads](#)

User login

Username *

Password *

[Create new account](#)
[Request new password](#)

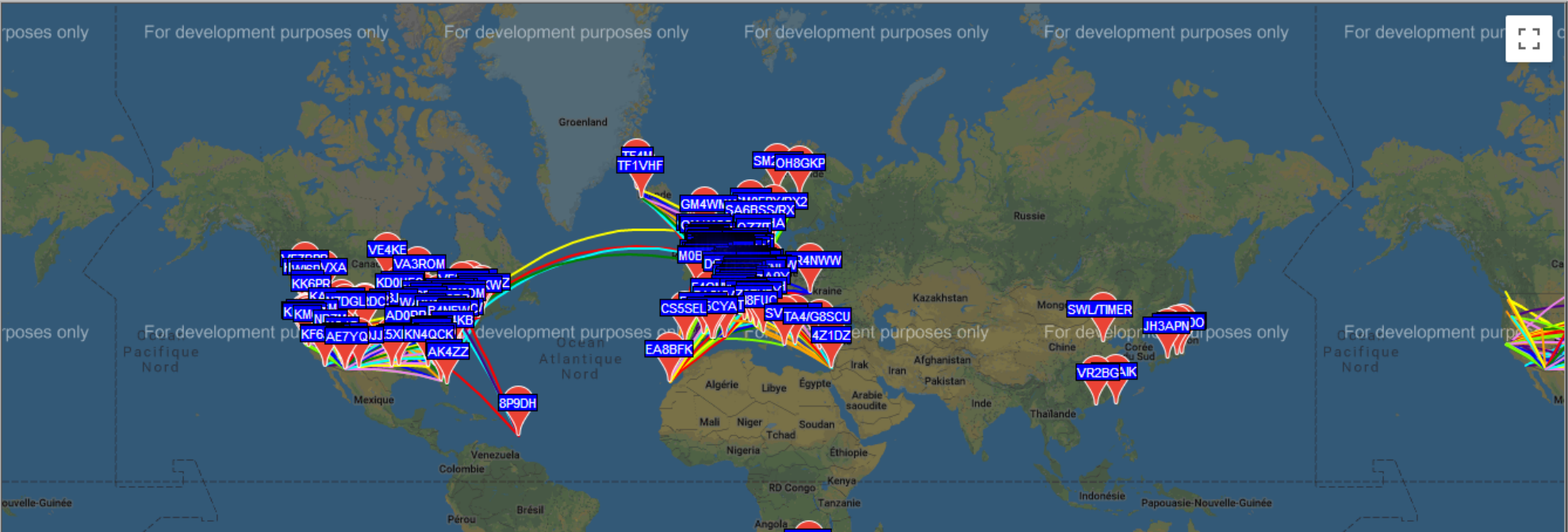
Frequencies

USB dial (MHz): 0.136, 0.4742, 1.8366, 3.5686, 5.2872, 7.0386, 10.1387, 14.0956, 18.1046, 21.0946, 24.9246, 28.1246, 50.293, 70.091, 144.489, 432.300, 1296.500

Spot Count

1,336,122,828 total spots
1,395,827 in the last 24 hours
55,165 in the last hour

Map



WSPR : Emission/Réception

<https://physics.princeton.edu/pulsar/k1jt/wsjsx.html>

Logiciel WSJT-X intègre

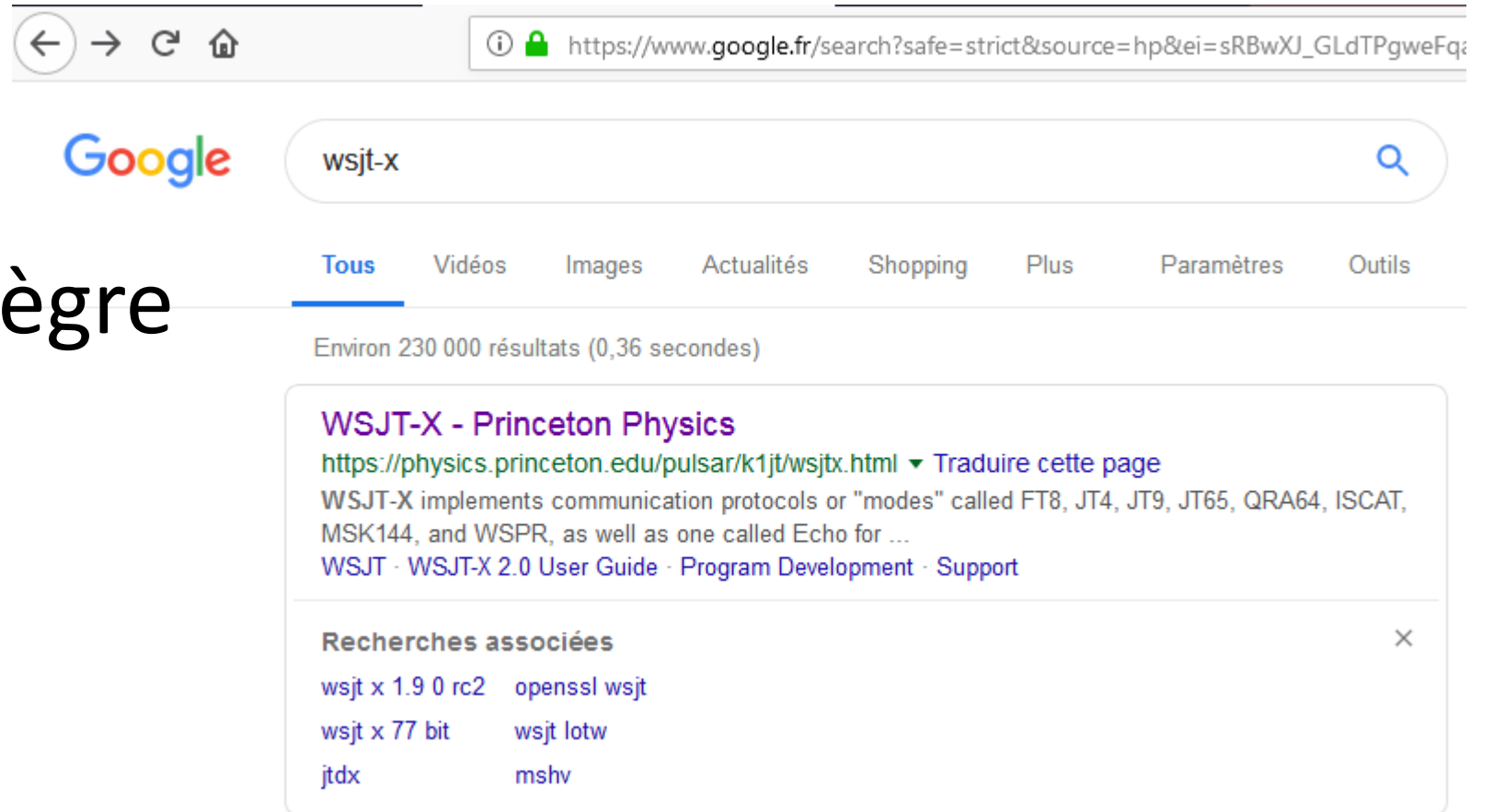
- WSPR

- FT8

- JT65

- JT9

Etc...



WSJT-X : Comment télécharger et installer le programme

Installation packages for WSJT-X 2.0

■ Windows:

- Version 2.0.0 [wsjtx-2.0.0-win32.exe](#) runs on Vista, Win 7, Win 8, Win10, both 32- and 64-bit).

■ Linux:

Installation instructions for Linux can be found [here](#) in the User Guide. Download the package file appropriate for your system, from the list below. (Versions installable with "apt-get" and "yum" will be made available as soon as our package maintainers create the packages.)

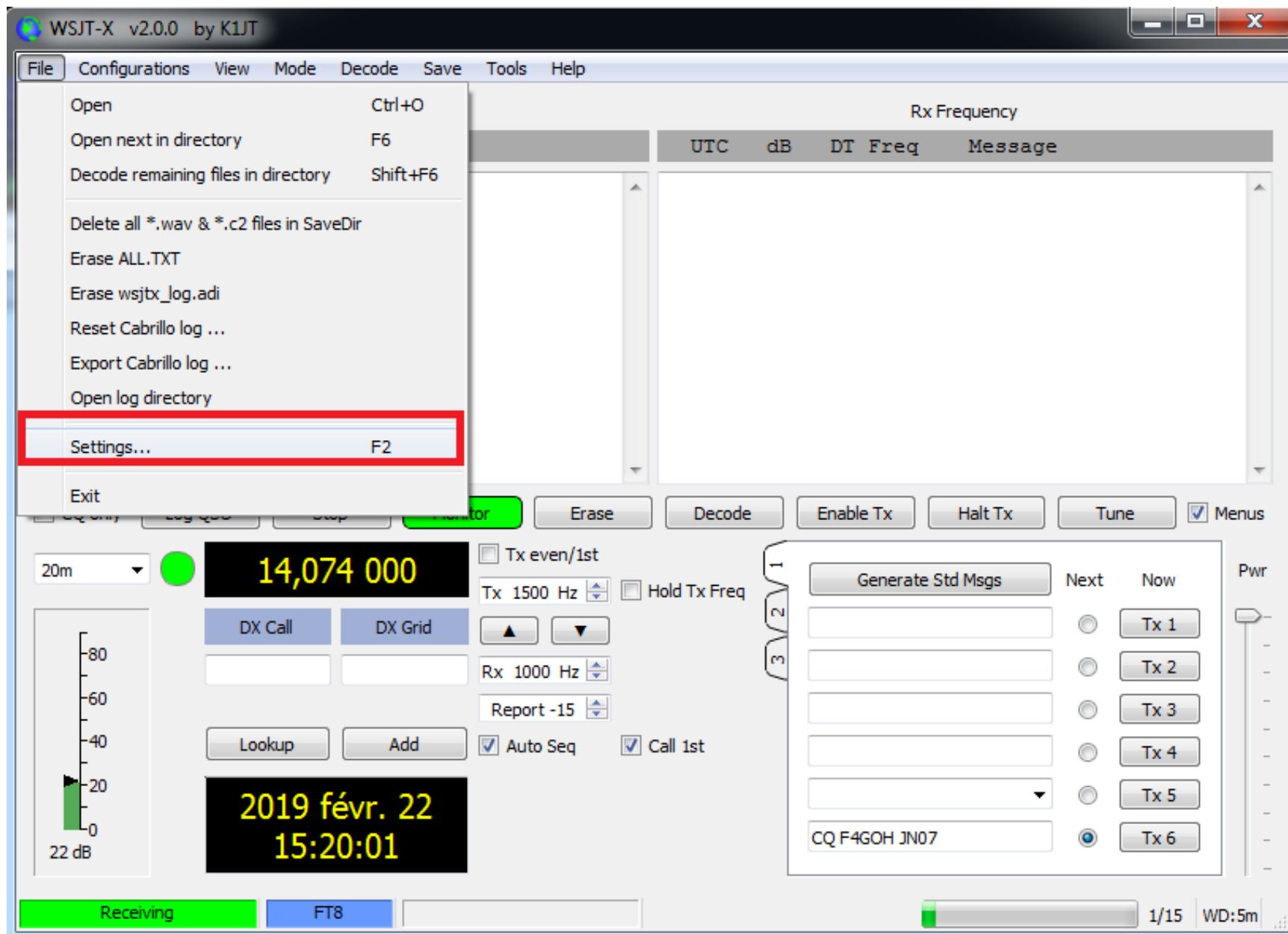
- Version 2.0.0
 - Debian, Ubuntu 18.04 LTS, ... (32-bit): [wsjtx_2.0.0_i386.deb](#)
 - Debian, Ubuntu 18.04 LTS, ... (64-bit): [wsjtx_2.0.0_amd64.deb](#)
 - Fedora 29, RedHat, ... (32-bit): [wsjtx-2.0.0.i686.rpm](#)
 - Fedora 29, RedHat, ... (64-bit): [wsjtx-2.0.0.x86_64.rpm](#)
 - Raspbian Stretch, ARMv6, ... : [wsjtx_2.0.0_armhf.deb](#)

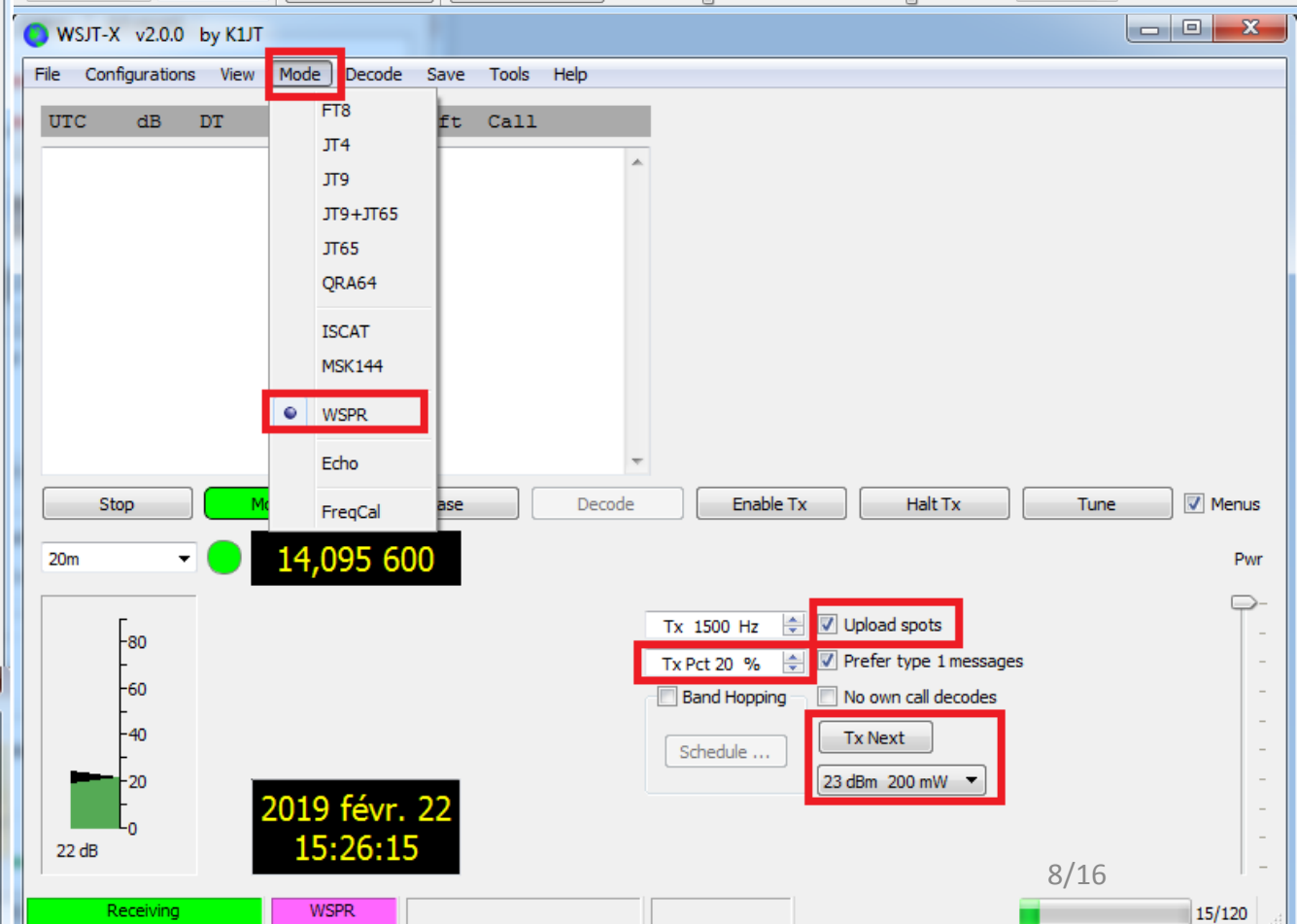
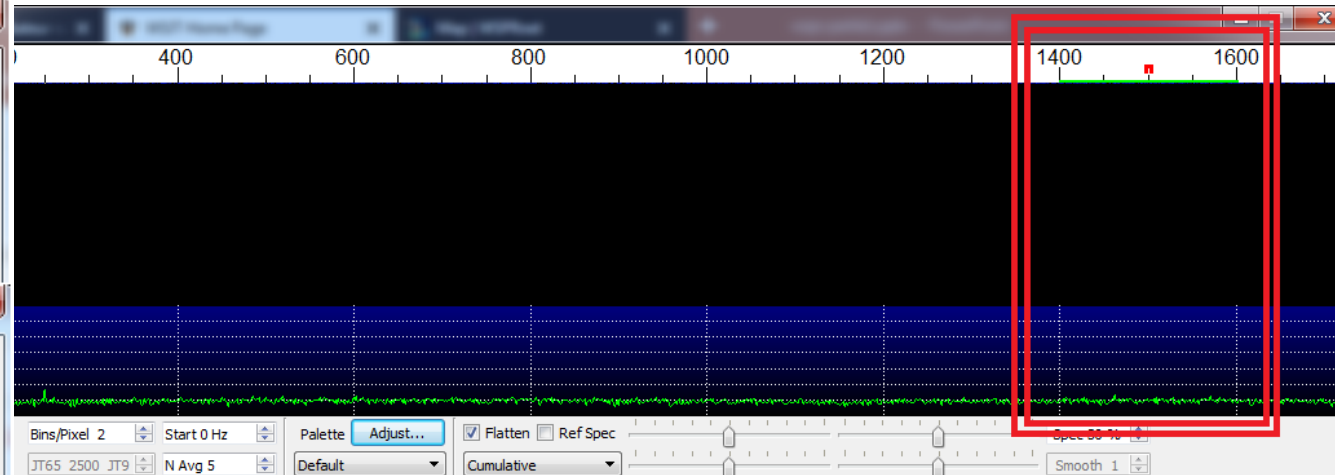
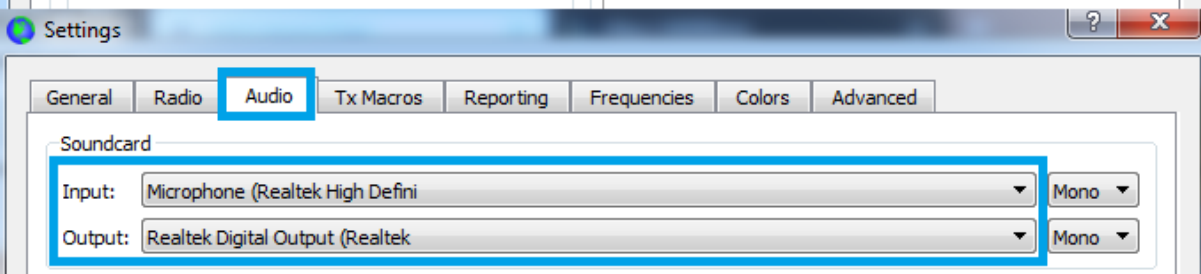
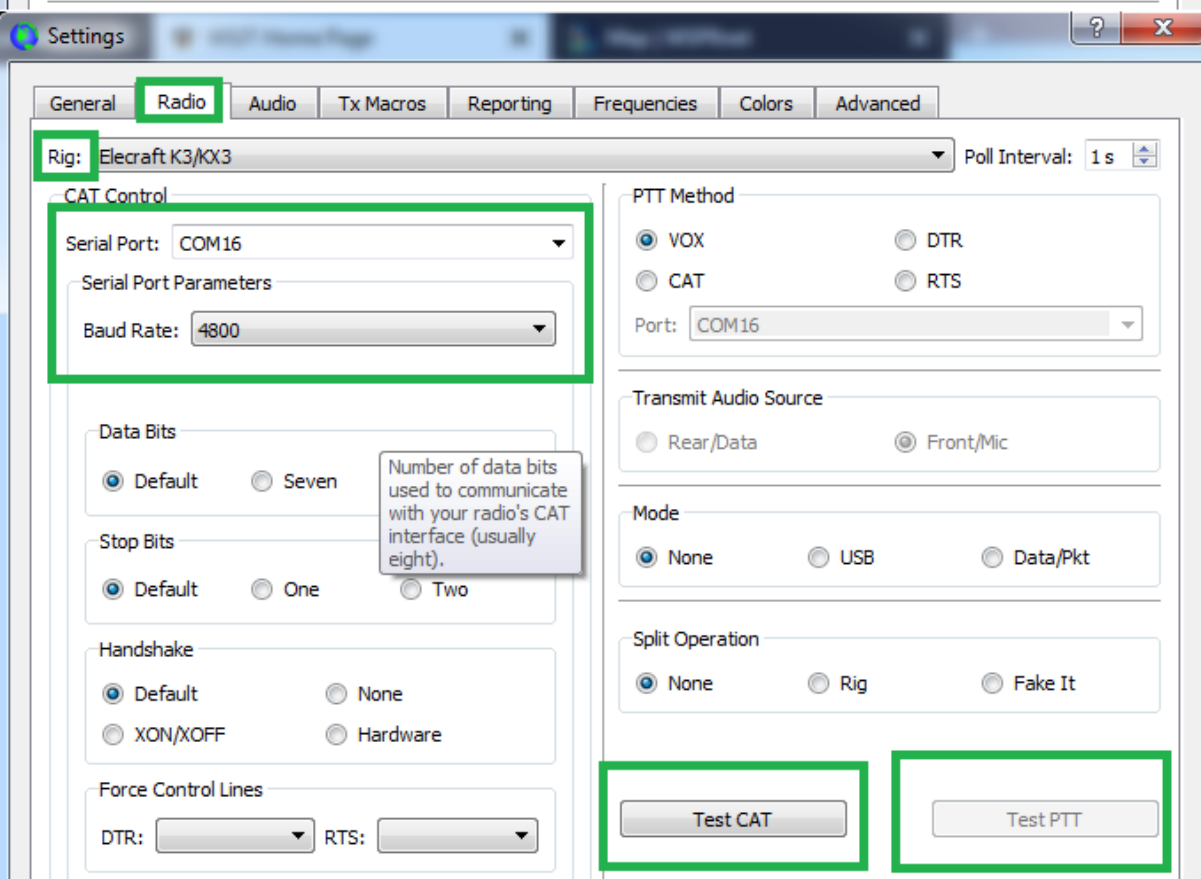
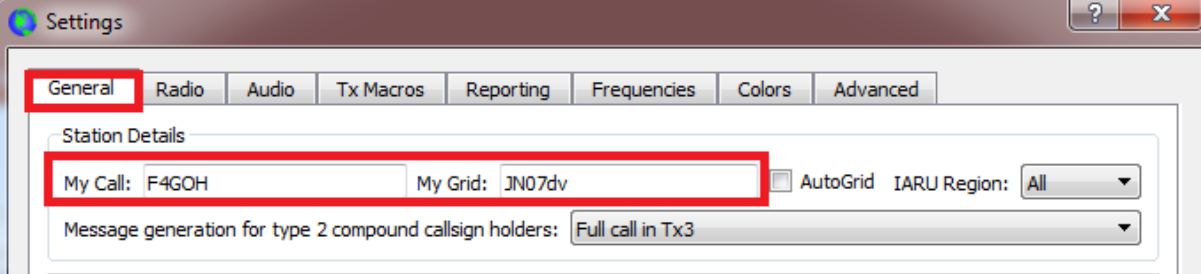
Note: these packages are unlikely to install properly on Linux distributions with required dependencies at lower versions than those on the named distributions. In such cases building from source is the correct way to install WSJT-X 2.0.

■ Macintosh macOS:

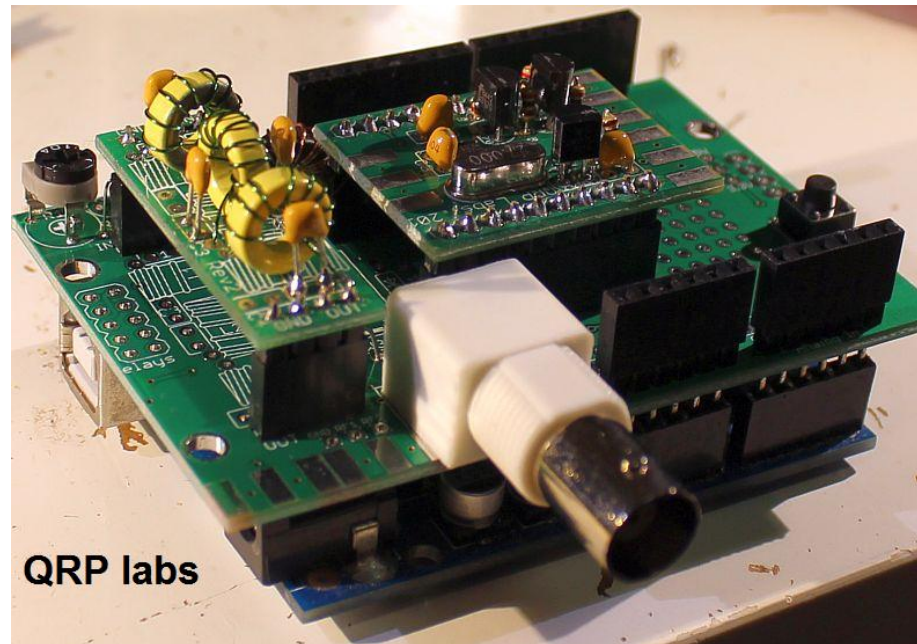
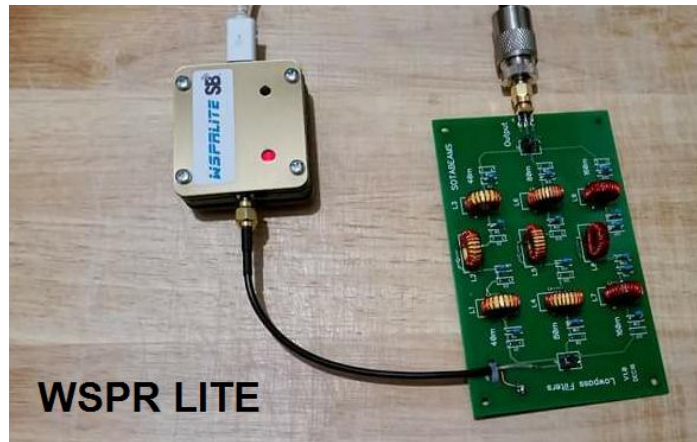
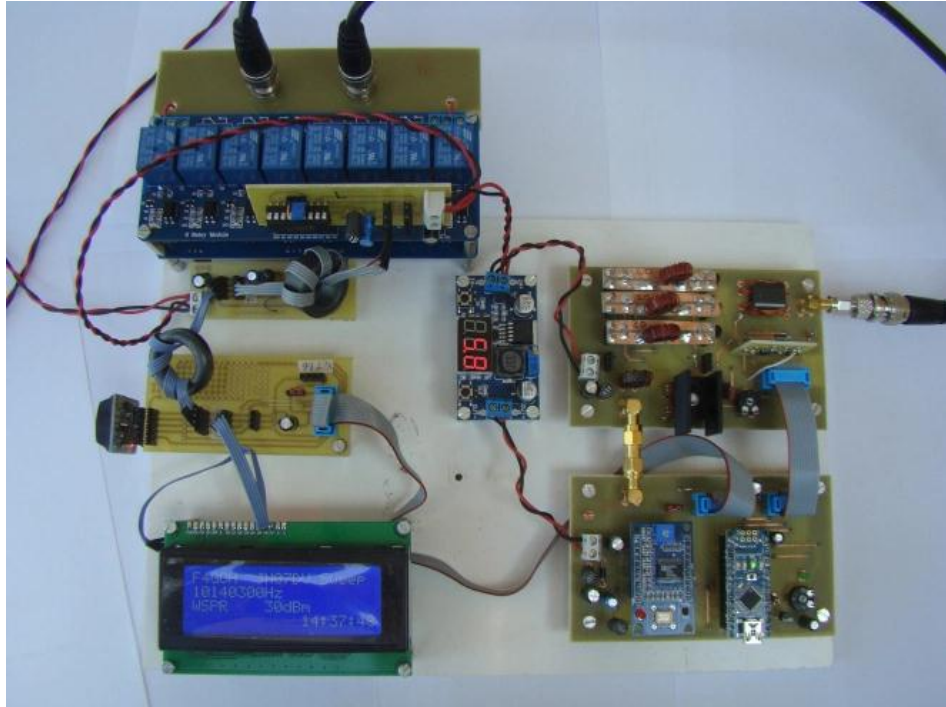
Installation instructions for version 2.0.0 can be found [here](#) in the User Guide.

- Version 2.0.0 for OS X 10.10 and later: [wsjtx-2.0.0-Darwin.dmg](#)

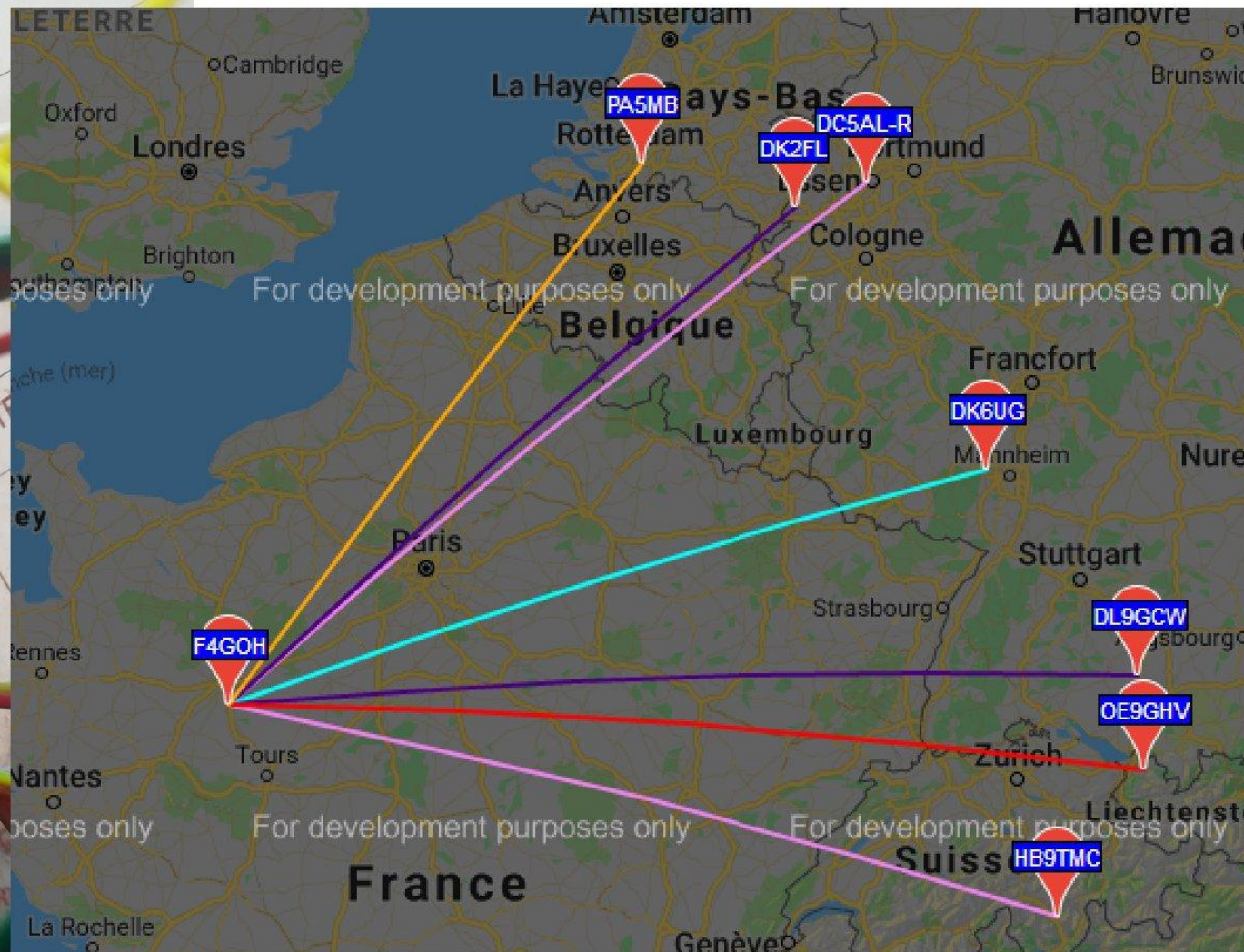
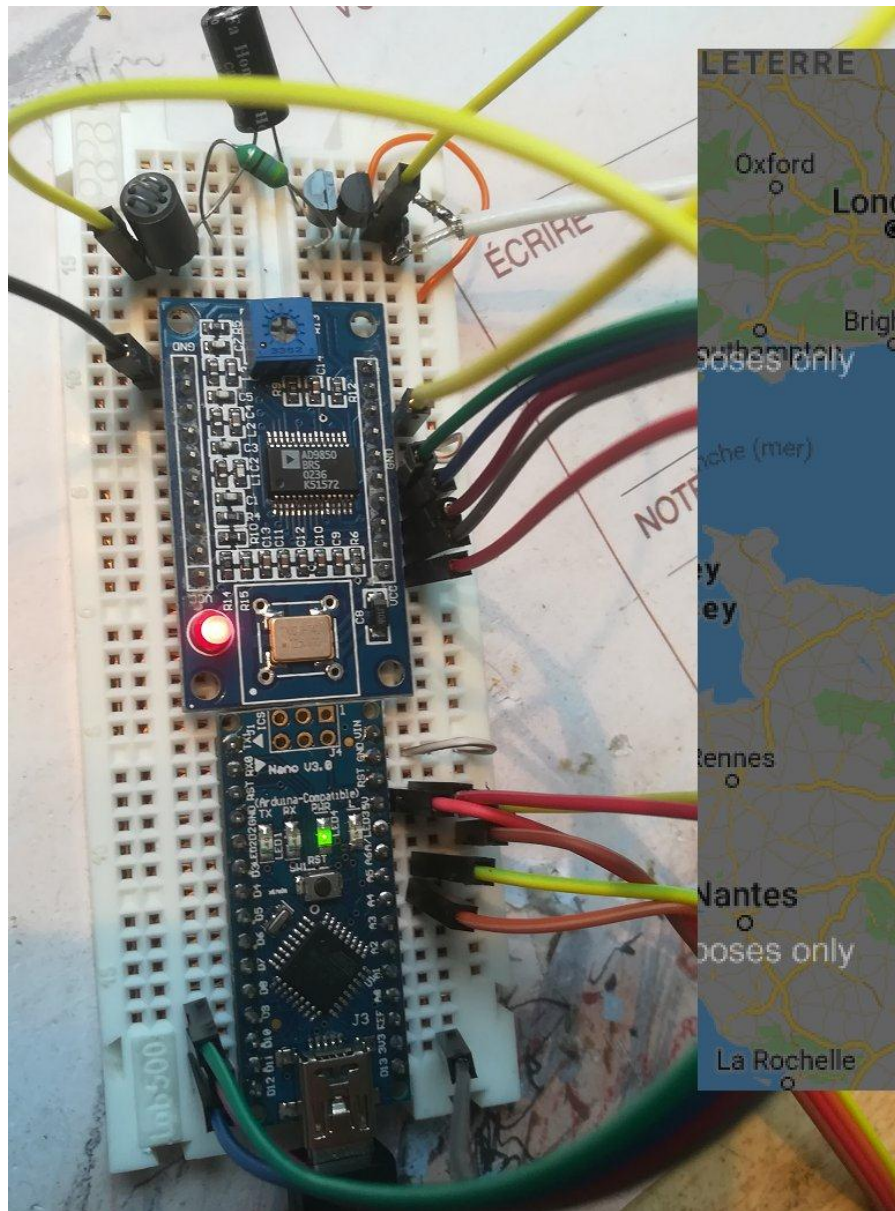




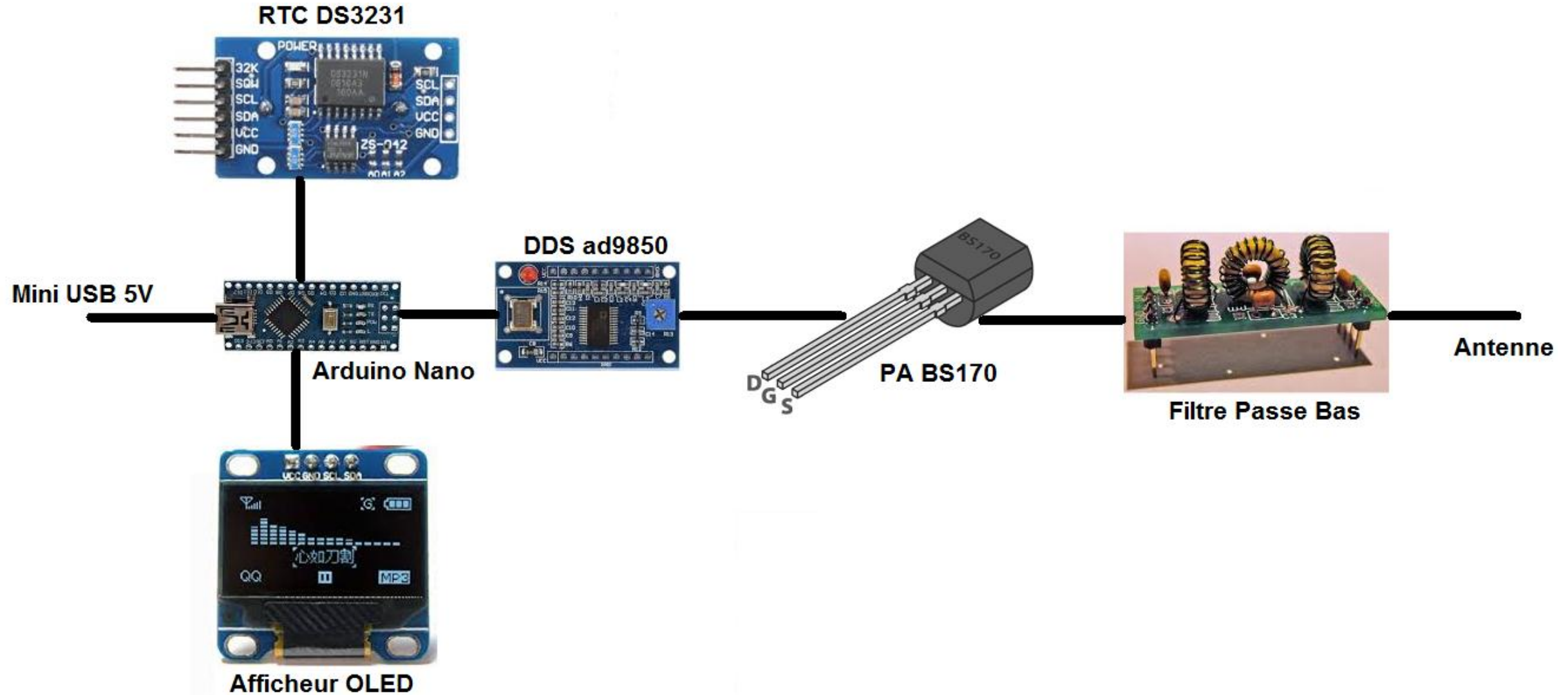
WSPR Emetteurs autonomes



WSPR Emetteur autonome



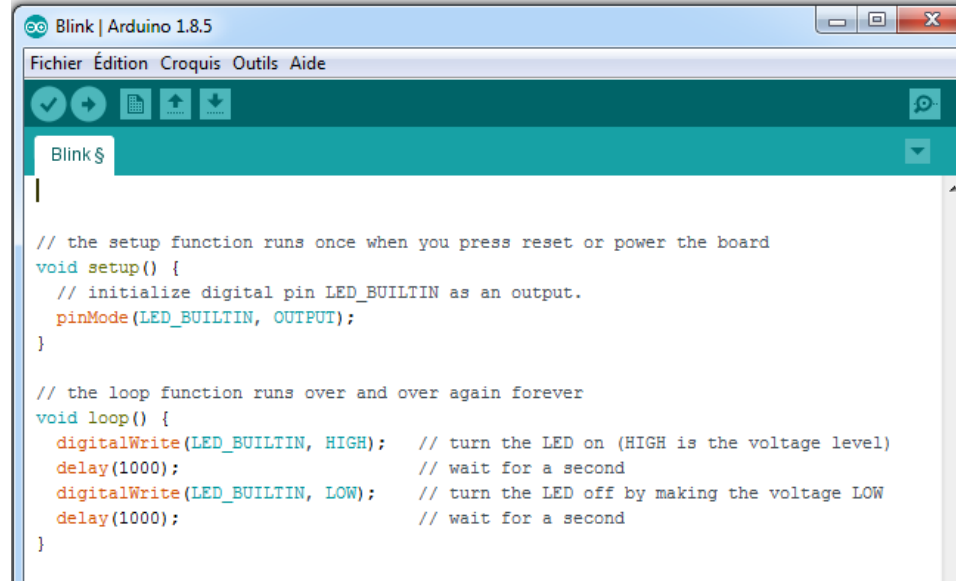
WSPR Synoptique



WSPR Partie 2

Utilisation de l'Arduino Nano et de son IDE

- Présentation du BUS I²C
- Afficheur OLED et RTC

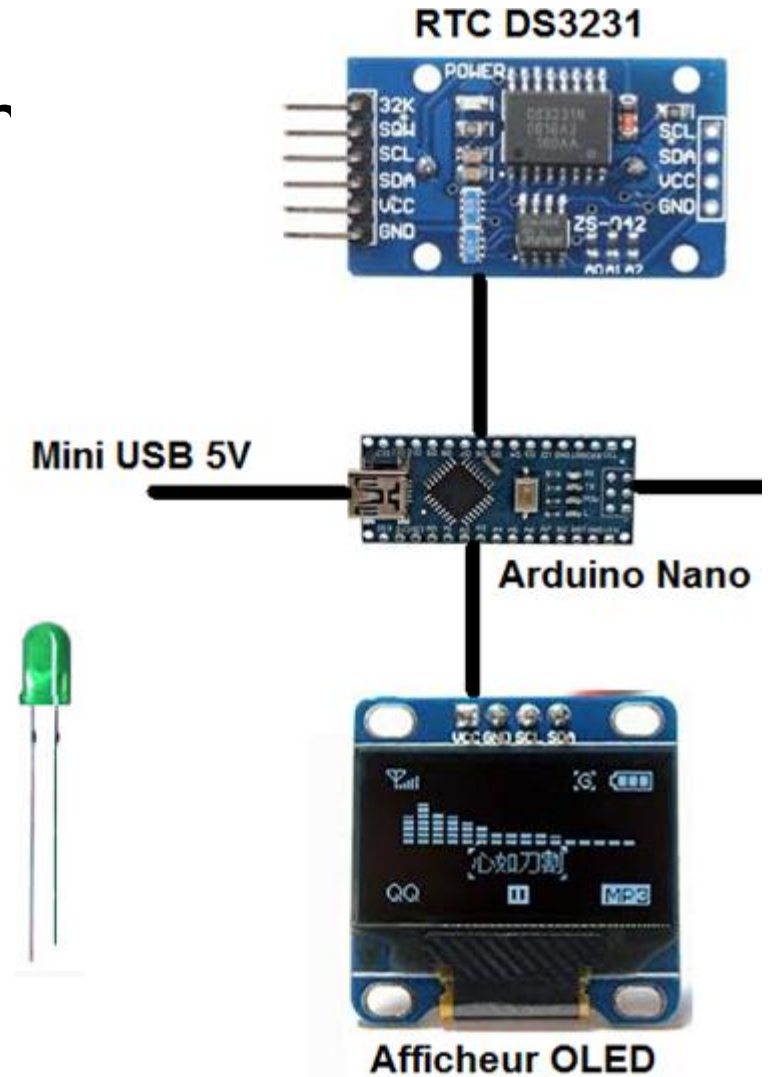


```
// Blink | Arduino 1.8.5
Fichier Édition Croquis Outils Aide

Blink $

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}

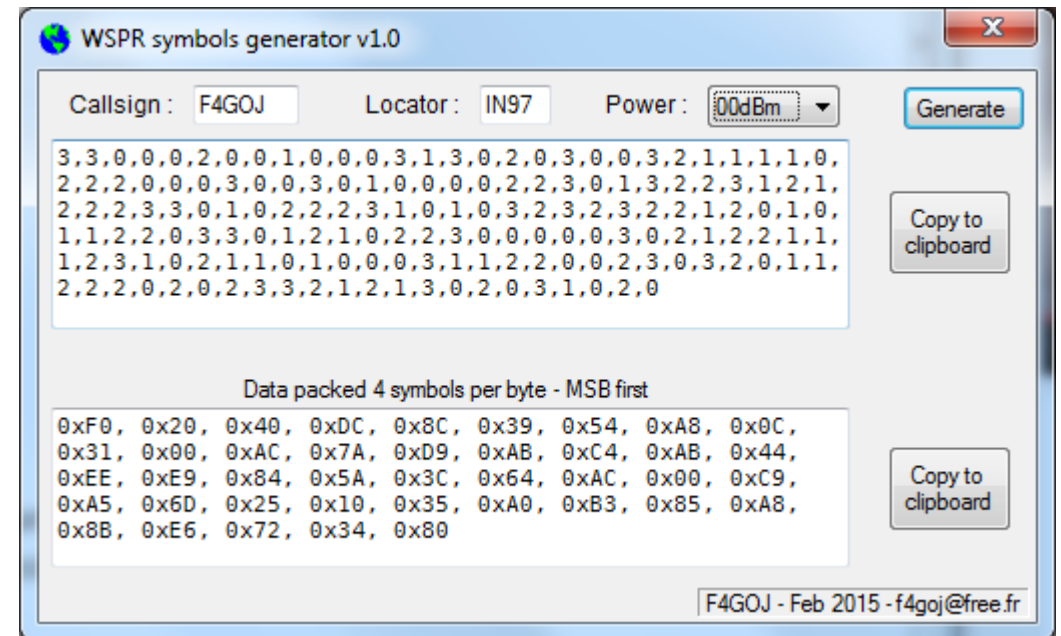
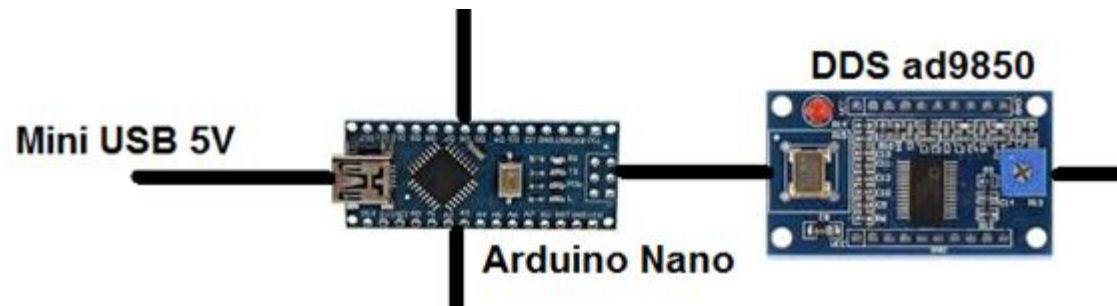
// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000); // wait for a second
  digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}
```



WSPR Partie 3

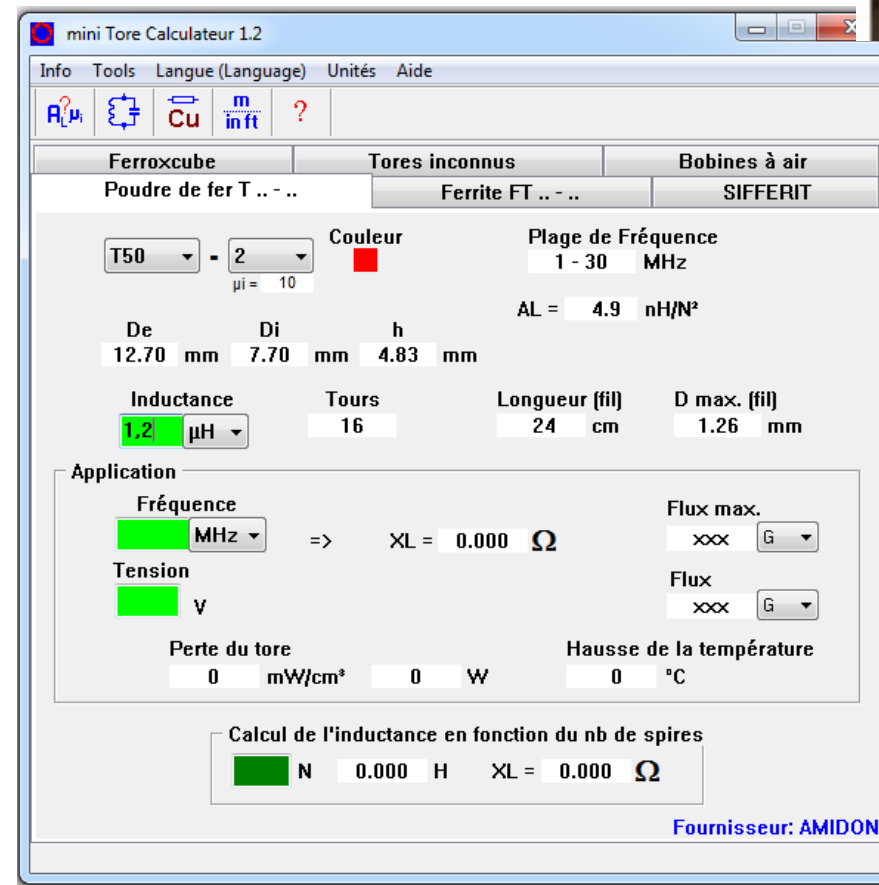
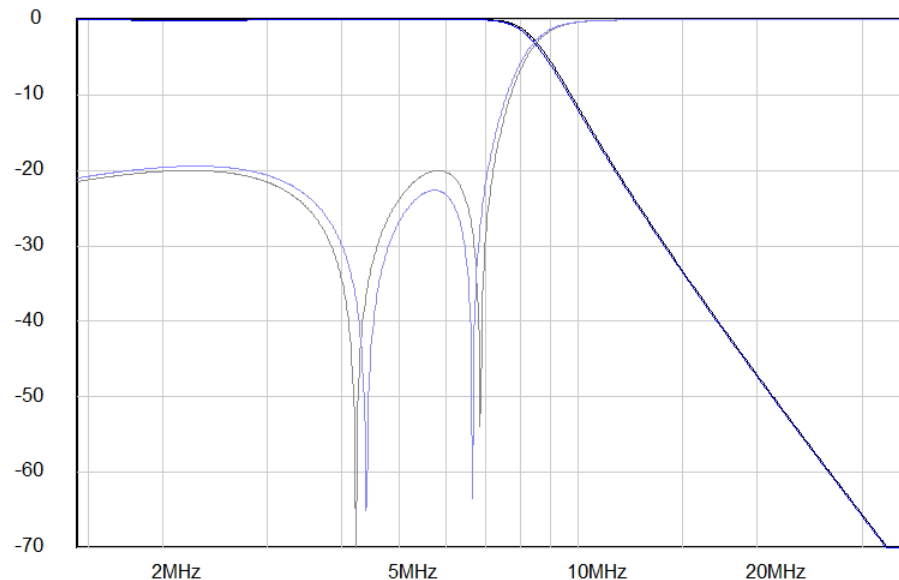
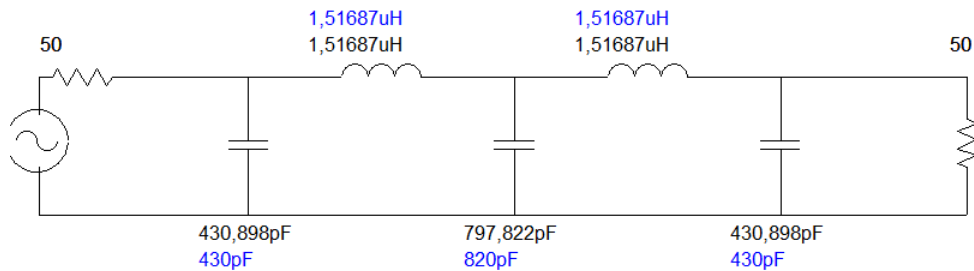
Fonctionnement du DDS (AD9850)

- Protocole WSPR
- Analyse fréquentielle avec le CMU



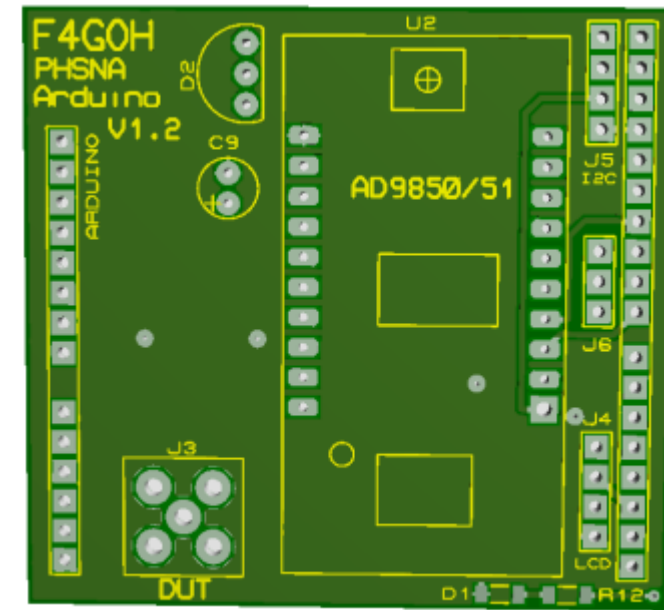
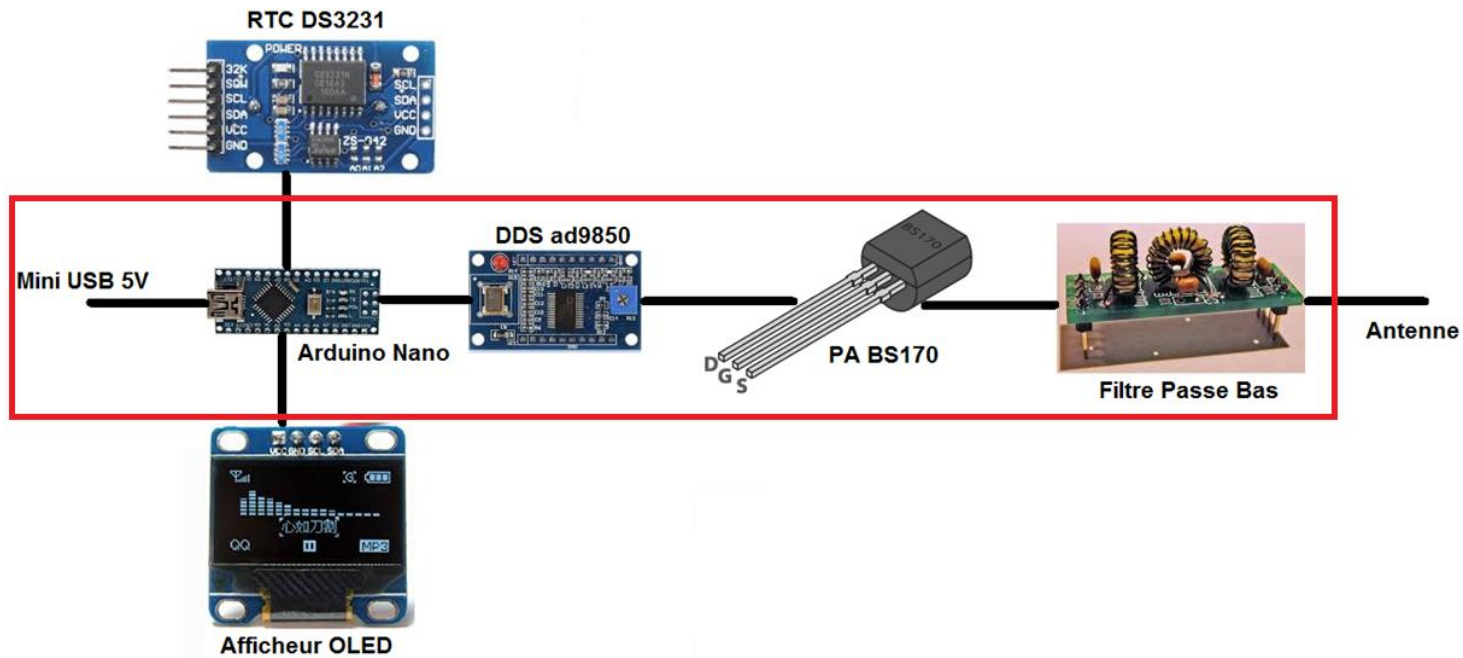
WSPR Partie 4

PA et filtre passe bas (SVC Filter designer, VNA)



WSPR Partie 5

Assemblage et test du PCB final



exemple

