

Sub-QRP WSPR Magic

A whopping 3 milliwatt output!

My previous WSPR experience, based on a QST article, (see Jan. 2022 Communicator) used a computer to command the WSPR signals to some external hardware. A desire to go mobile and self-contained (without computer) led to an interesting challenge. Time synchronization. The WSPR transmission starts one second after the even minute mark.

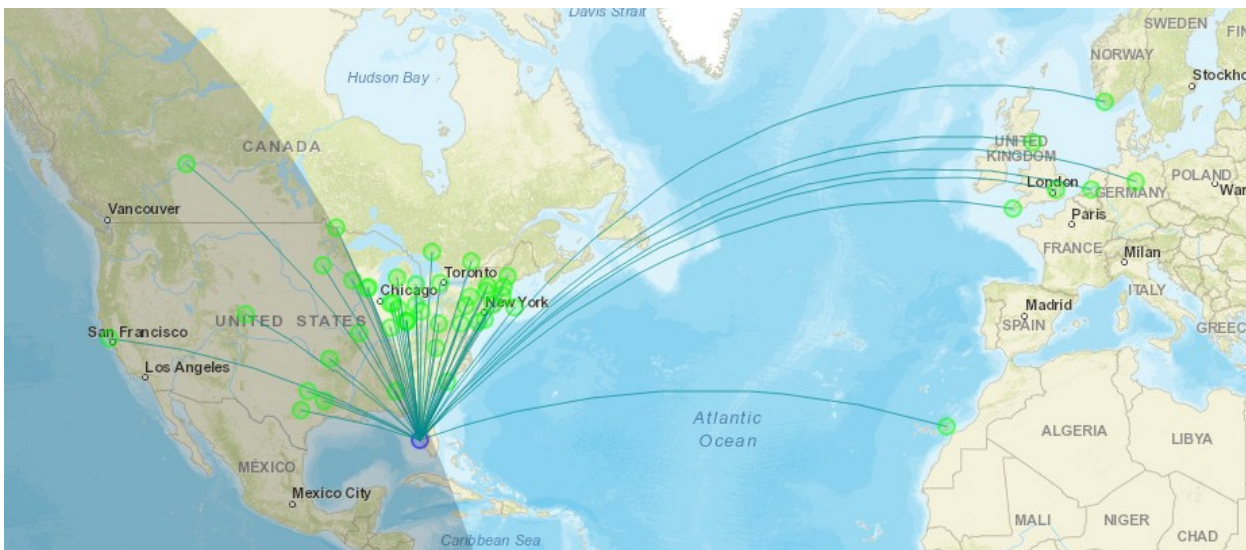
There are some small microcontroller boards, other than Arduino, that can be programmed as you would program an Arduino. The ESP32 and ESP8266 being the most popular. One of their big advantages is onboard Wi-Fi. I am a terrible programmer so I look for examples from those much more skilled than myself. The first example tried used Wi-Fi to time sync from a time server, just like your computer does. It worked! But – not really self-sufficient since it relied on a Wi-Fi connection.

So -Let's get time from outer space! For \$7 you can get a GPS receiver and patch antenna that outputs serial data including a great time signal. After several hours scratching my head, I was able to combine the WSPR'ing example and a GPS clock example to make it work.

Hmmm? Now that GPS is used, it also provides location – so let's calculate the Maidenhead grid square that gets included in the WSPR transmission. This way it will automatically configure the transmission text, no matter where the transmitter is used. Since there was a tiny OLED display in the junk box, and it uses very little power, it was added as an indication of UTC time, how many satellites are being tracked, the band in use, the calculated grid square, and the current transmitter status. Good to know type stuff. Future improvements may include a switchable low pass filter. I will post a crude schematic and program to the TARC website Elmer page for the brave tinkerers among us.

Special thanks to Chet KG4IYS for helping with some coding and education.

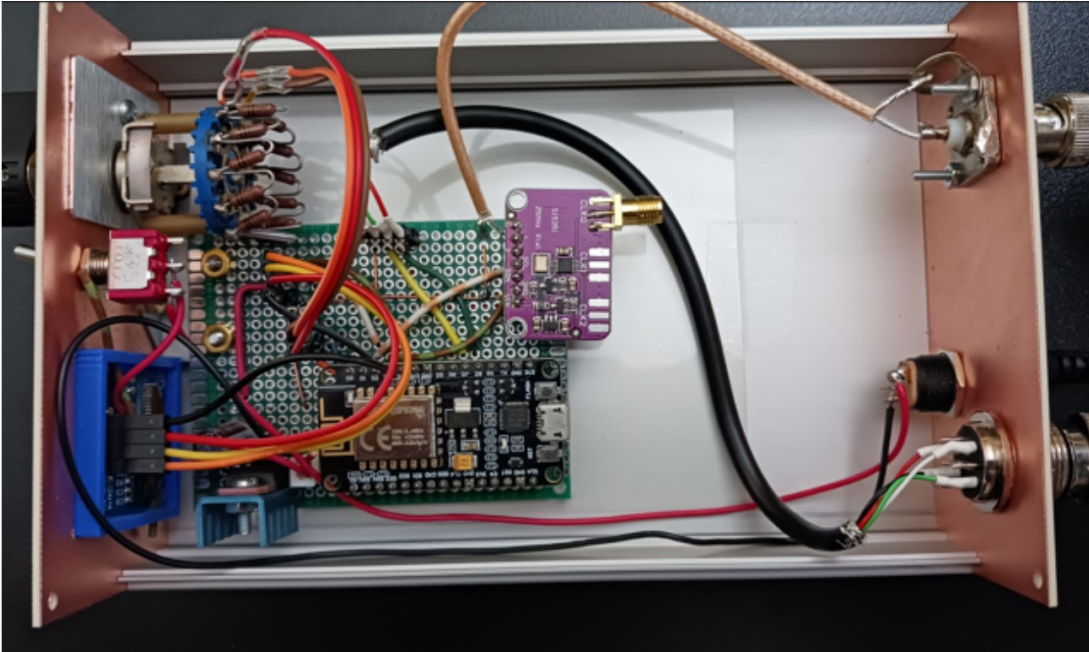
What's really amazing – With all the RF noise being generated these days, a 3 milliwatt signal can still travel thousands of miles and be deciphered!



WAITING
FOR GPS
1 MINUTE
20M

13:36:40
SATS = 6
NO XMT YET
K7ONE 20M

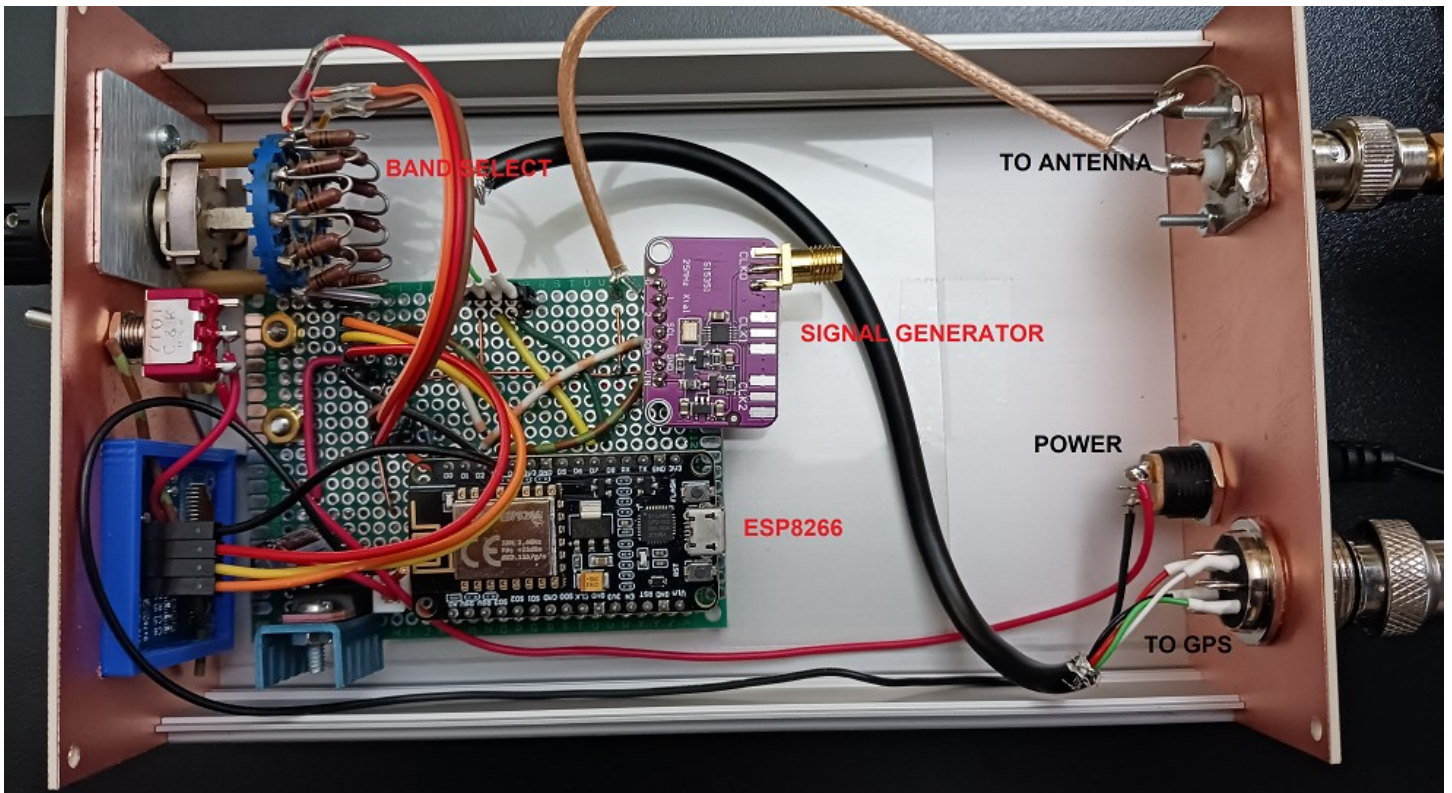
13:37:00
SATS = 7
TX ON NOW
K7ONE 20M



WAITING
FOR GPS
1 MINUTE
20M

13:36:40
SATS = 6
NO XMT YET
K7ONE 20M

13:37:00
SATS = 7
TX ON NOW
K7ONE 20M



GPS Receiver and Antenna