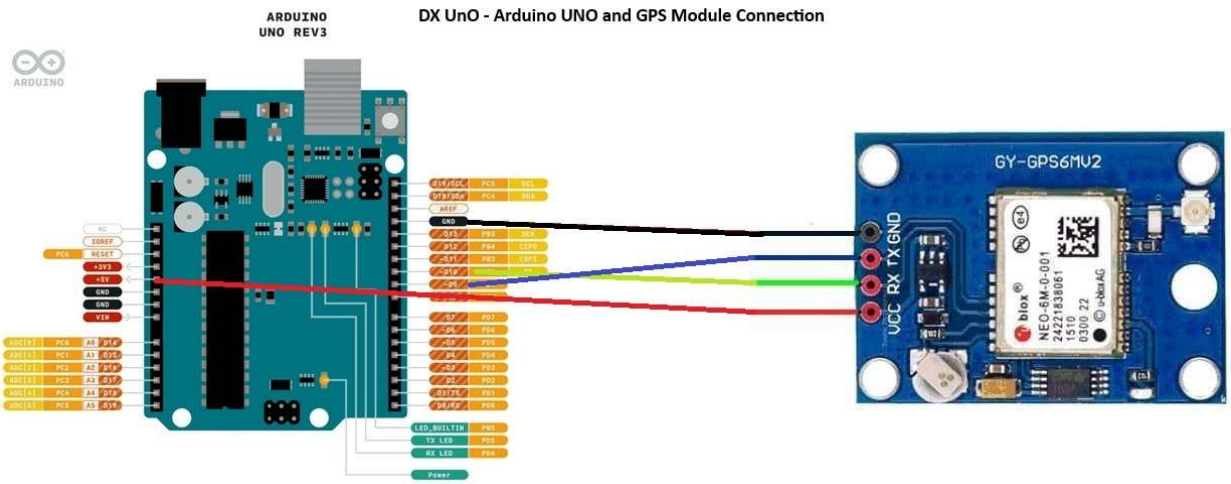
HOW TO CONVERT DX UnO TRANSCEIVER INTO 5 BAND STANDALONE WSPR TRANSCEIVER

By only adding a GPS MODULE and replacing firmware of DX UnO with Standalone WSPR firmware we can convert DX UnO to a Stand Alone WSPR transceiver that can transmit on 20m,17m,15m,12m and 10m Bands WSPR frequency back-to-back in 2 minutes intervals.

For this modification we need to do:

1- HARDWARE MODIFICATION
2- FIRMWARE MODIFICATION

1- HARDWARE MODIFICATION:



For HARDWARE MOIFICATION a GPS Module need to be added. This GPS MODULE helps in two points. Getting the maiden grid location and Time synchronization.

Any GPS MODULE will work as long as it's a +5V module and we know the baud rate of GPS UART.

For adding GPS Module there needs to be 4 main connections between GPS Module and Arduino Uno. These are:

1- GPS GND to ARDUINO UNO GND
2- GPS VCC to ARDUINO UNO +5V
3- GPS TX to Arduino Uno D10 Pin
4- GPS RX to Arduino Uno D9 Pin

2- FIRMWARE MODIFICATION:

To achieve standalone DX UnO WSPR TRANSCEIVER, we need to replace DX UnO Firmware with Standalone WSPR firmware.

DX UnO Standalone WSPR firmware is modified WSPR Multiband firmware by Roel Kroes, https://github.com/RoelKroes/wsprbeacon

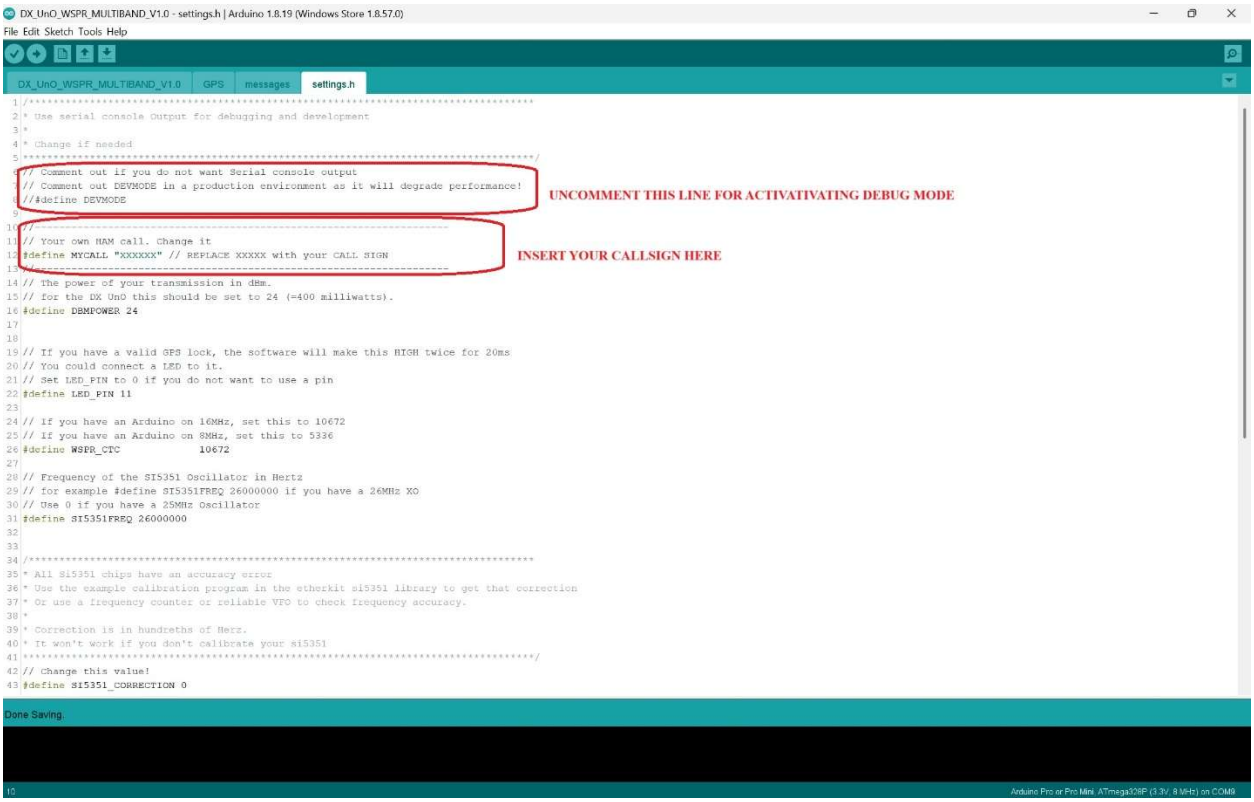
I modified slightly this Arduino sketch to work with DX UnO.

1- Download:

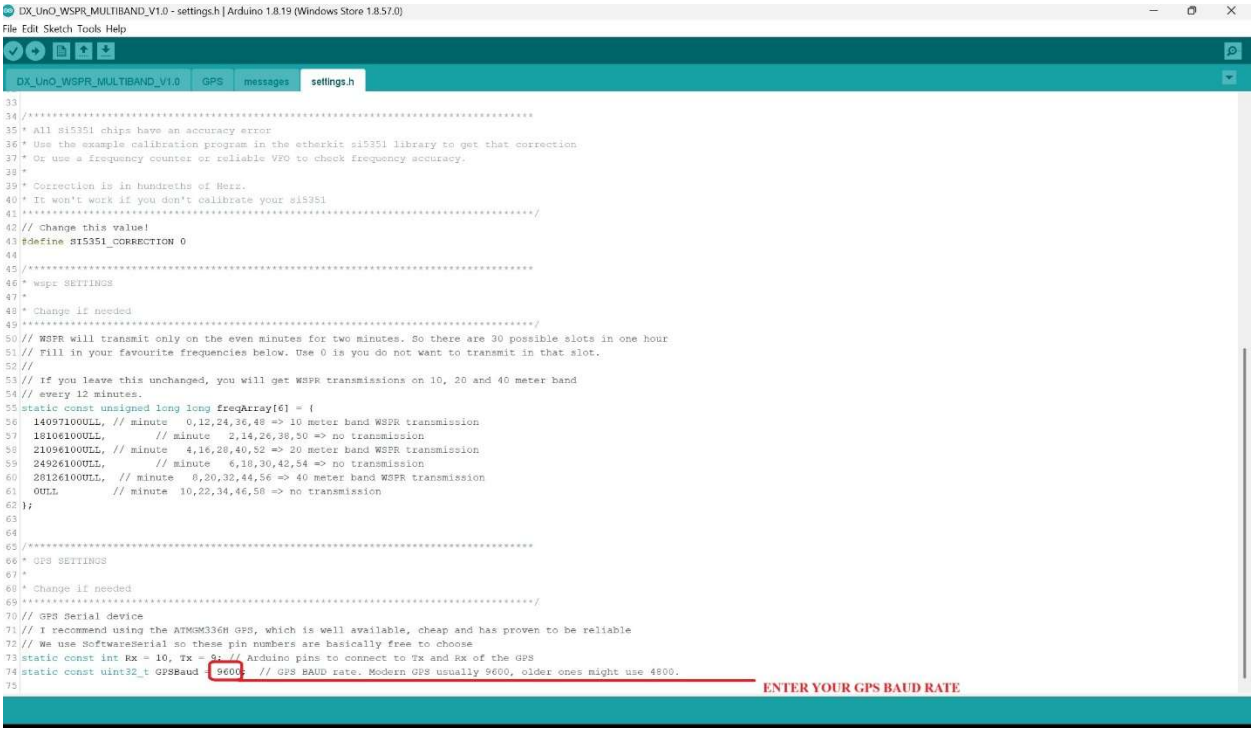
DX_UnO_WSPR_MULTIBAND_V1.0.ino,
GPS.ino
Messages.ino
Settings.h

files from DX UnO github page and save all in the same directory

2- Modify settings.h after opening all files on Arduino IDE like in below photos:
   - Enter Your Callsign
   - Enable Debug mode if you wish to monitor what is Standalone WSPR doing with Serial monitor. If not needed just comment it.



Modify GPS Baud Rate inline with your GPS baud rate.



Now upload your modified and saved DX UnO standalone WSPR firmware to your DX UnO as you upload to any Arduino Uno via Arduino IDE.

That's all needed to run DX Uno Standalone WSPR.

When you first power on DX UnO WSPR nothing will happen until GPS receives data.

When GPS starts getting GPS data Blue CAT led blinks intermittently. This means GPS data is received and valid.

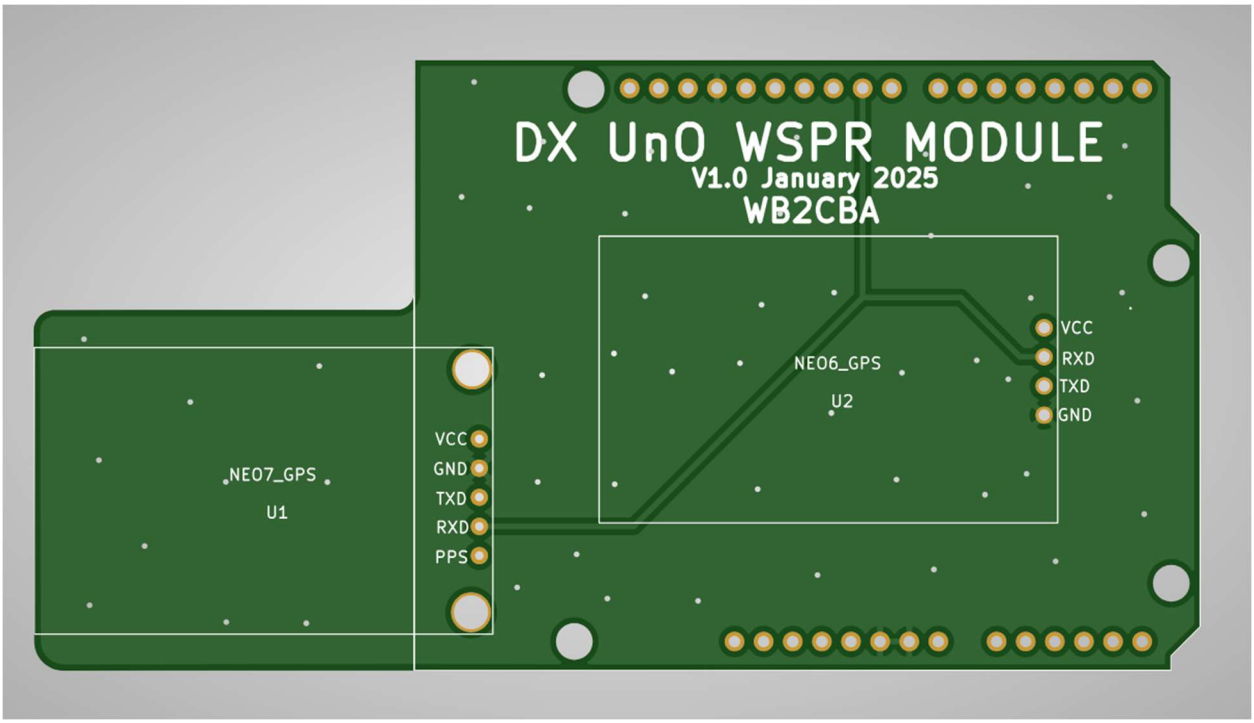
When TX times comes Blue LED will be off and Red TX led will be on for2 minutes.

At the end of TX, Red LED will be off and Blue LED will blink intermittent.

This loop continues like that. In every TX sequence DX Uno WSPR will switch to a different band.

This will give you a nice clue about your antenna efficiency in different bands

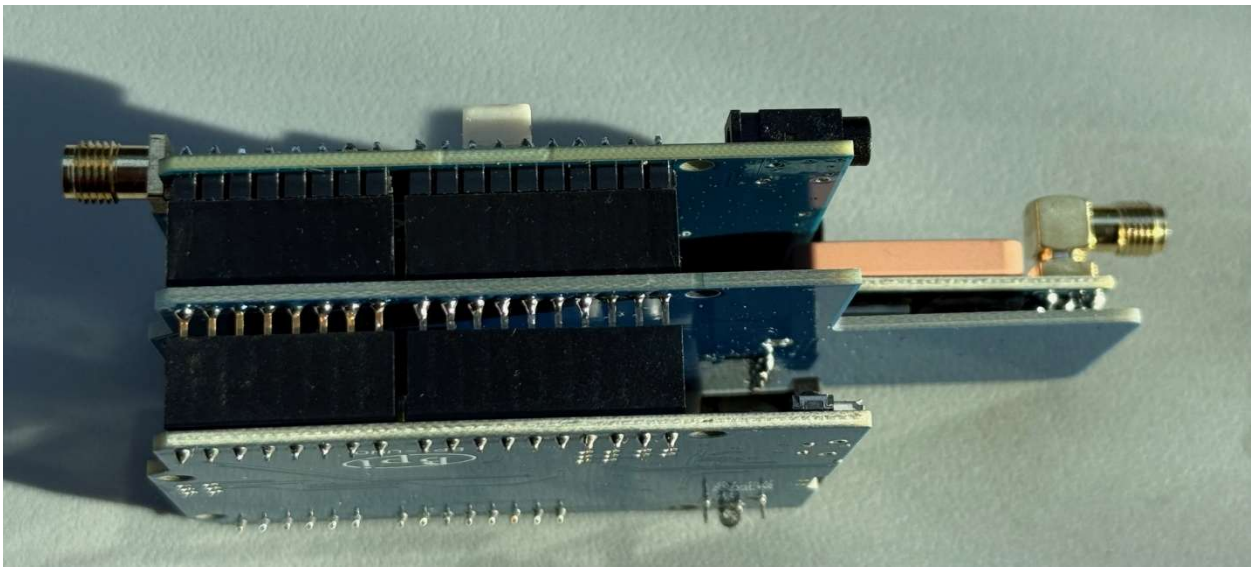
If you want this DX UnO WSPR conversion a bit more neat and elegant you can also use this PCB module which is a GPS Carrier board:

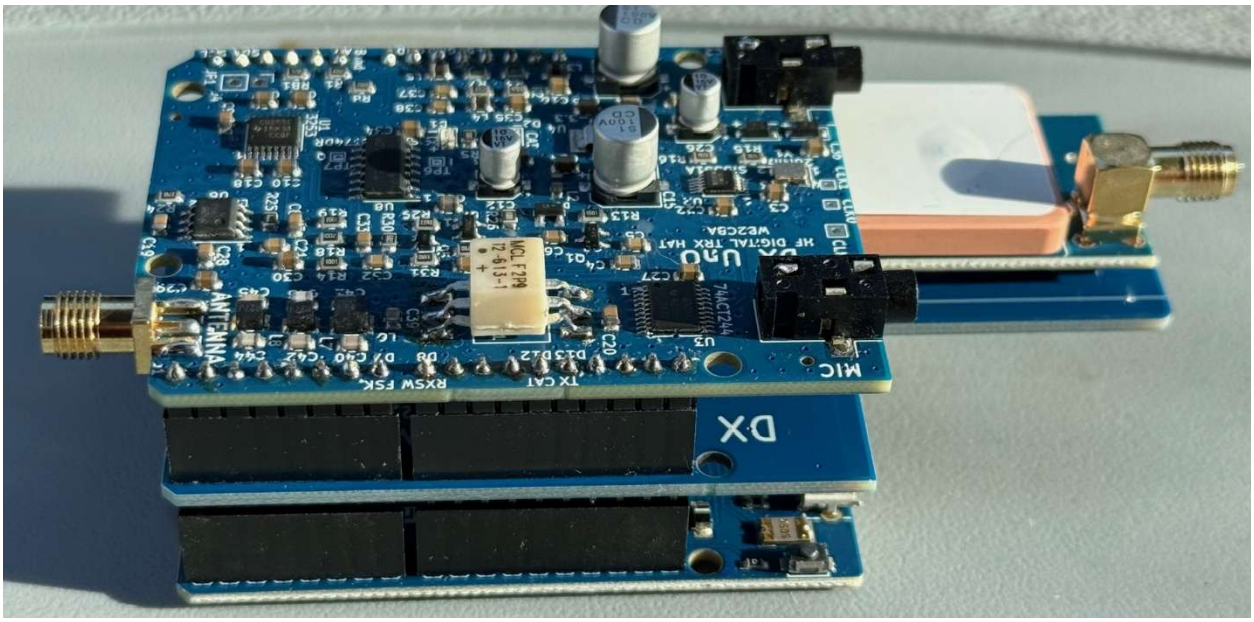


This has two GPS type you can solder on. This pcb stacks between Arduino Uno and DX UnO which creates a three pcb sandwich like rig. **Use long pin Arduino Shield headers.**

Gerber file of this GPS Carrier PCB is in DX UnO Github page:
https://github.com/BluQRP/DX_UnO

Here is couple of photos how this setup looks like from side:




DX
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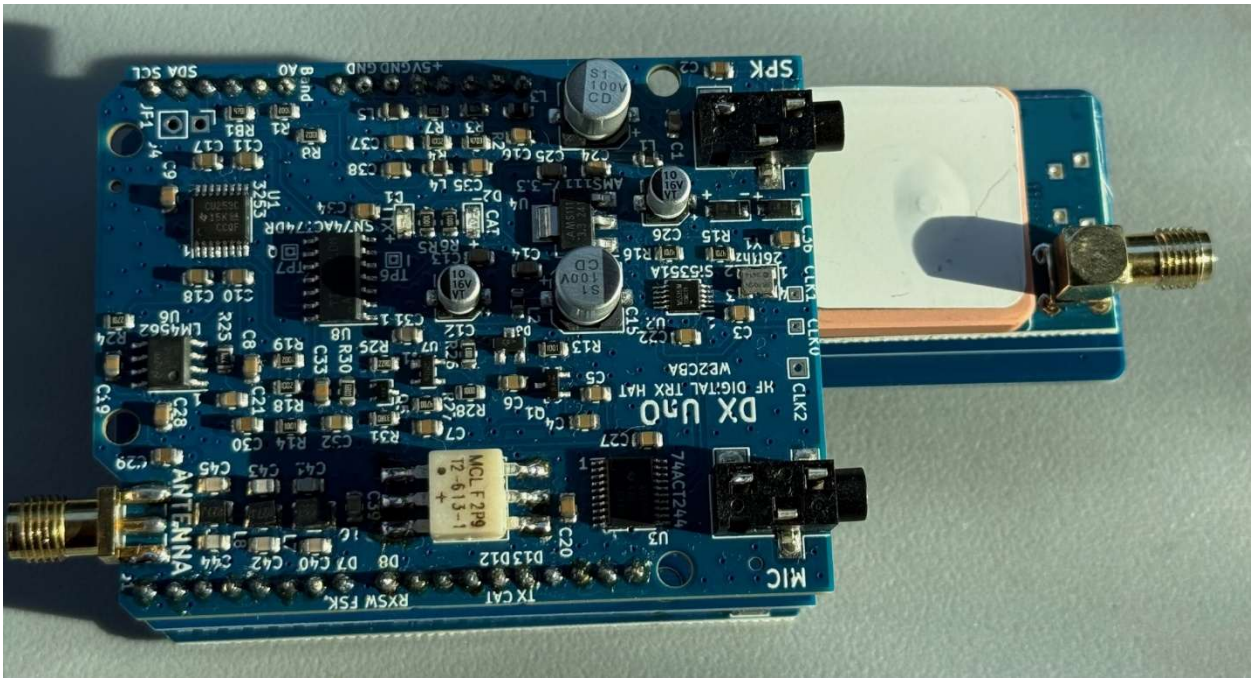
RXSW FSK
TX CAT
74ACT244
MCL F2P9
T2-613-1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ANTENNA
RXSW FSK
TX CAT
74ACT244
MCL F2P9
T2-613-1
SN74ACT74DR
LM4562
Si5351A
CLK1
CLK0
CLK2
SDA SCL
Band
+5V GND GND