# #1055 Multi-Band WSPR Receiver - Quick Guide

Connecting the WSPR Receiver to a computer.

1. Connect an antenna to the Antenna port on the receiver
2. Connect the USB cable between the receiver and your computer.
   This cable will both power the receiver and be used to set the frequency of the receiver.
   The green power LED in the receiver should go on as soon as it is connected to the computer.


3. Connect the audio cable between the receiver and your computer.
   If there is a microphone or line input on the computer use that.
   If there is no Audio-In port on your computer you can use a USB Sound card to get the Audio in to the computer.
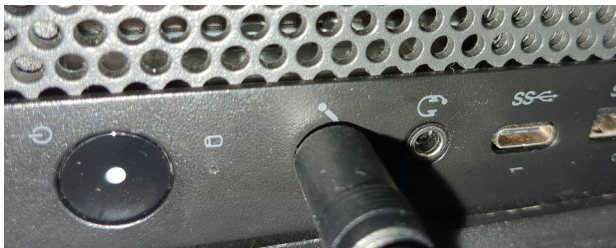
Configure the computer software WSJT-X

1. Prerequisite – having the correct time on your computer.
   To receive the WSPR signals properly you need to have and keep the correct time on your computer. You can check it on this web page https://time.is/
   Preferably it should be within half a second or better although the hard limit is two seconds of error,
2. Download and install WSJT-X on your computer.
3. Once you have started it, use the Menu : File, settings
   On the "General" tab enter your call sign and Maidenhead grid.
4. In the "Radio" Tab set the Radio to be IC-746 and the Baud Rate to be 9600.
5. Set the Serial port to one of the available ports in the list.
6. Set the other setting to the default setting or to the same settings shown in the screenshot below.
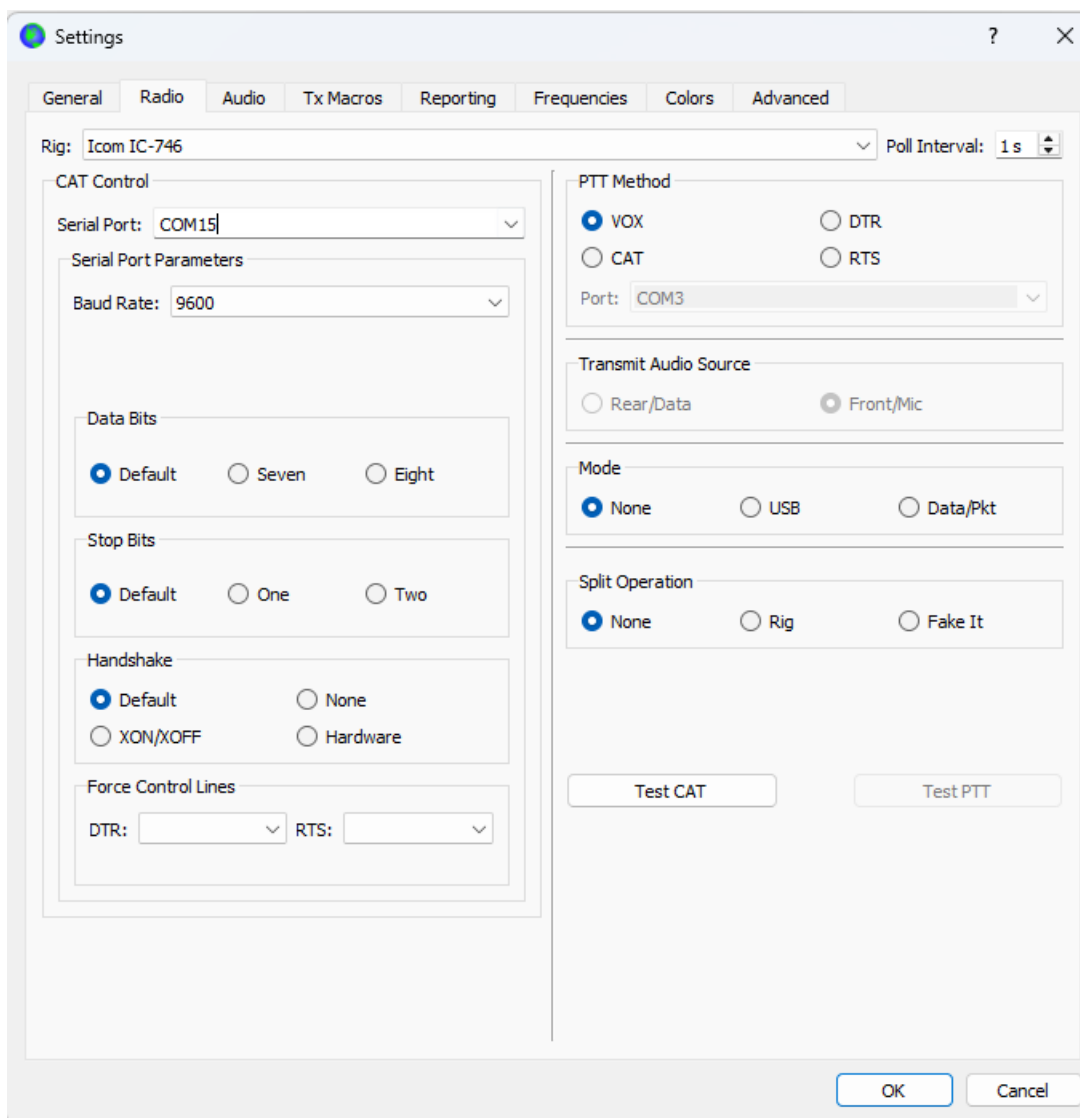
7. Click the "Test CAT" button. If the correct serial port was picked it will turn green to indicate that it has a connection to the receiver.
If it does not turn green – pick another serial port and try again until it turns green.
If you are unable to make the Test CAT button to turn green go to the Trouble shooting section at the end of this document for tips how to fix the problem.

8. Go to the Audio Tab and pick the correct Sound card for the input, you don't have to set the output.

9. Click the OK button.

10. Make sure the Waterfall window is displayed, if it isn't use the menu "View, Waterfall" to display it.
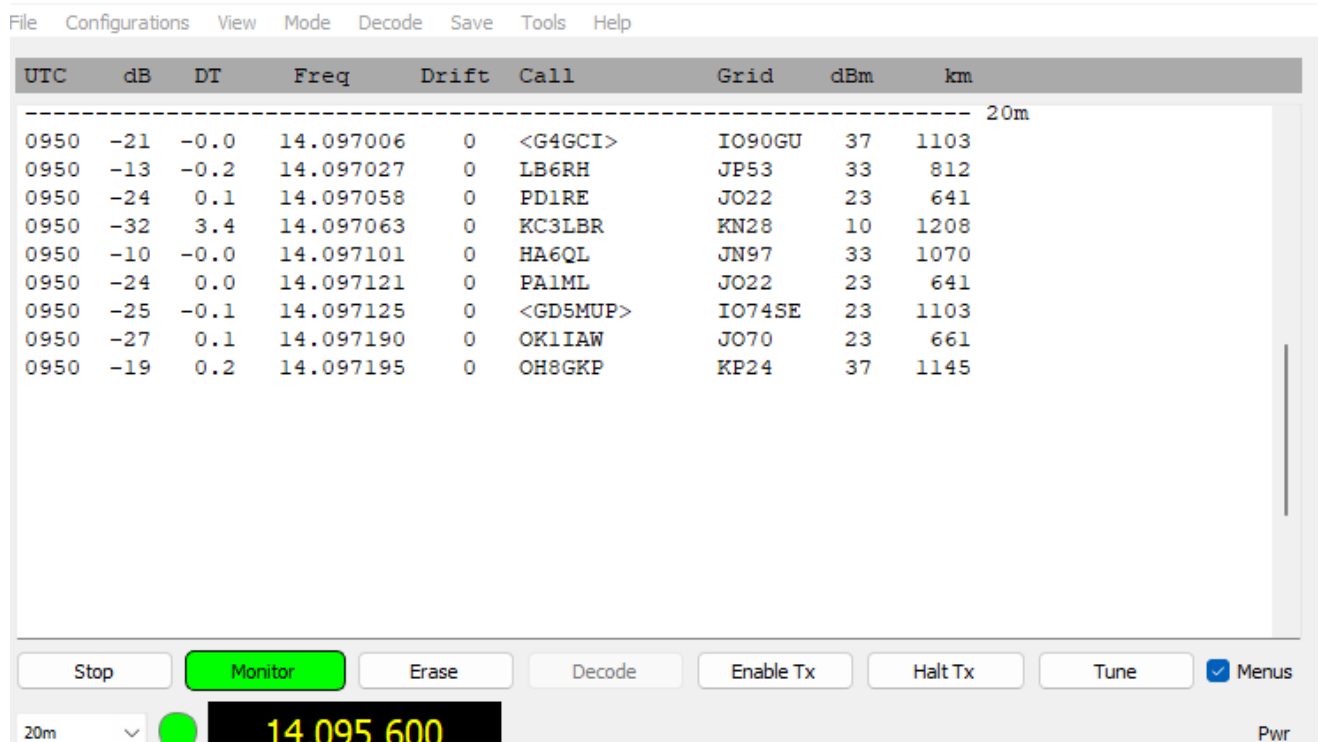Check to see if there are signals shown around 1500Hz.
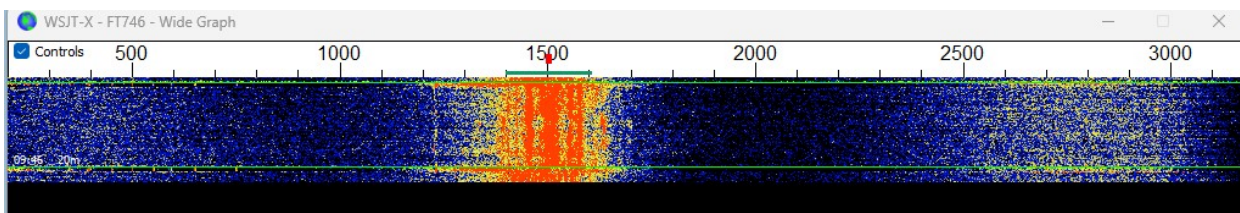
If you don't see any signals first check that you have an antenna connected, secondly open the Audio settings again and pick another Sound input until you find the correct one coming from the receiver.

11. Tell WSJT-X to listen for WSPR signals by using the menu "Mode, WSPR"

12. Make sure the "Monitor" button is green, if not click it once to make it go green.
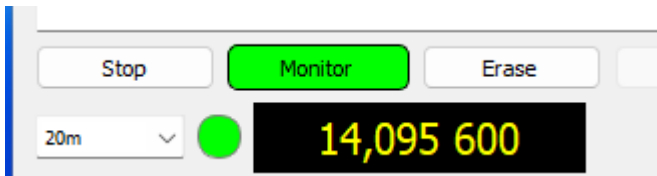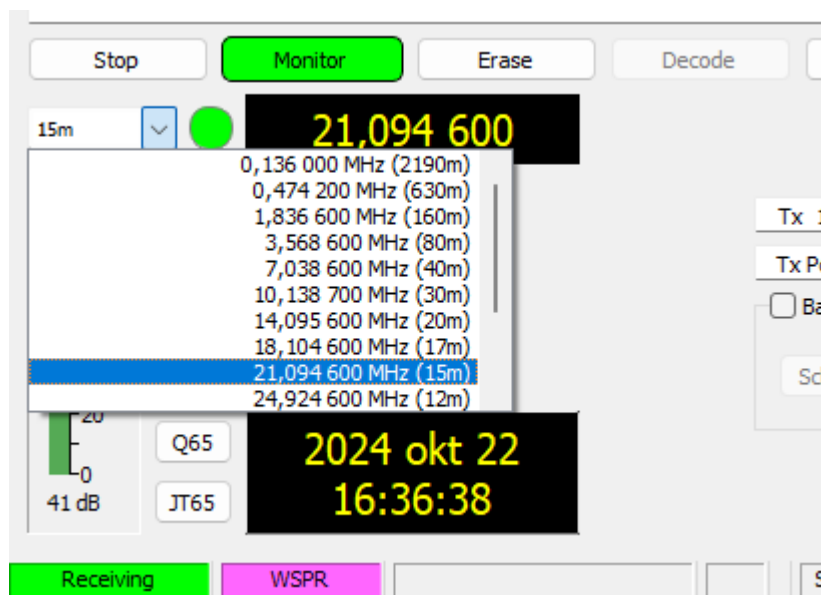
13. You are now receiving WSPR signals.
It takes two minutes to receive the WSPR signals, the green progress bar in the lower right shows the progress, at the end of the cycle the "Decode" button will turn Cyan for a bit while it processes the received signals.
If any signals were received it will show up as text in the main windows.

```
File   Configurations   View   Mode   Decode   Save   Tools   Help

UTC     dB     DT      Freq      Drift  Call          Grid    dBm    km
                                                                          ------ 20m
0950   -21   -0.0   14.097006    0    <G4GCI>        IO90GU   37    1103
0950   -13   -0.2   14.097027    0    LB6RH          JP53     33     812
0950   -24    0.1   14.097058    0    PD1RE          JO22     23     641
0950   -32    3.4   14.097063    0    KC3LBR         KN28     10    1208
0950   -10   -0.0   14.097101    0    HA6QL          JN97     33    1070
0950   -24    0.0   14.097121    0    PA1ML          JO22     23     641
0950   -25   -0.1   14.097125    0    <GD5MUP>       IO74SE   23    1103
0950   -27    0.1   14.097190    0    OK1IAW         JO70     23     661
0950   -19    0.2   14.097195    0    OH8GKP         KP24     37    1145
```

| Stop | Monitor | Erase | Decode | Enable Tx | Halt Tx | Tune | ☑ Menus |

20m   🟢   **14.095 600**   Pwr

14. **Picking what band to receive.**
You can pick what band to listen to by using the band selector on the left side of WSJT-X

| Stop | Monitor | Erase | Decode |

15m   🟢   **21,094 600**

```
0,136 000 MHz (2190m)
0,474 200 MHz (630m)
1,836 600 MHz (160m)
3,568 600 MHz (80m)
7,038 600 MHz (40m)
10,138 700 MHz (30m)
14,095 600 MHz (20m)
18,104 600 MHz (17m)
21,094 600 MHz (15m)
24,924 600 MHz (12m)
```

Tx 1
Tx Pc
☐ Ba
Sch

Q65   **2024 okt 22**
JT65   **16:36:38**
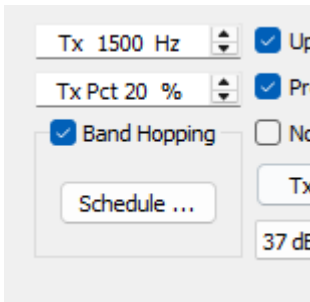
41 dB

| Receiving | WSPR | | S |

15. When you change band WSJT-X will communicate with the receiver and set it's frequency to what WSJT-X wants.
Once you have picked a band it will stay on this frequency unless you have ticked the Band Hopping option.

16. **Band Hopping**
To listen to more than one band in a sequence as determined by WSJT-X you can use the Band hopping Feature.

If you tick this option WSJT-X will change what band it listen to every two minutes. You can set what bands it will use by clicking the "Schedule…" button.

17. **Uploading spots.**
Tick the Upload spots to continuously transfer your received "Spots" to the wsprnet.org database.
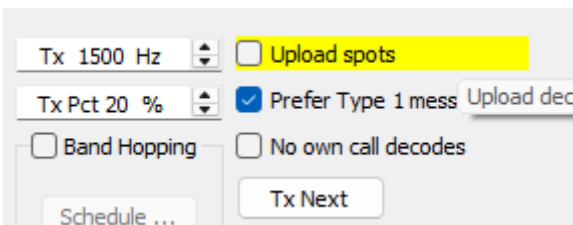
This will happen in the background and there is no indication if it works or not.

18. **Checking the results on a webpage.**
You can check the results by going to https://www.wsprnet.org/ or https://wspr.rocks/ sites. The wspr.rocks site have many advanced features that one can use to compare receivers or antennas, visualize the direction of the receiving stations, see how propagation changes over time for different bands … and many, many other useful things.

Tips and Tricks.

Adjusting the Audio signals.
Check the Audio indicator on the left in WSJT-X , it should be green.
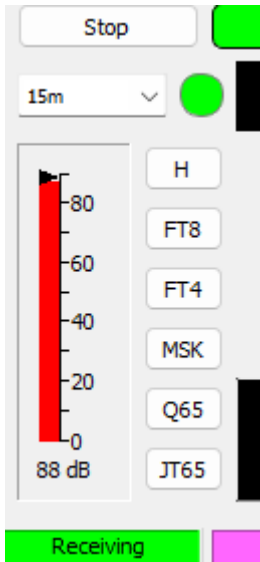
If it is red it means the volume is to loud and clipping is occurring, to correct that you need to adjust the audio-in volume, it can not be done in WSJT-X – it must be done in the Operating System.

In MS Windows there are many ways to set the volume on the input and output devices.
I prefer to use the old Sound Control Panel, Microsoft has tucked it away in favor of new sound settings so the fastest way to get to it is to start it directly by its name mmsys.cpl.

Here is how you do it:
Hold down the Windows Key on the Keyboard and press the R key.
In the dialog that pops up write MMSYS.CPL and press Enter or click the OK Key.
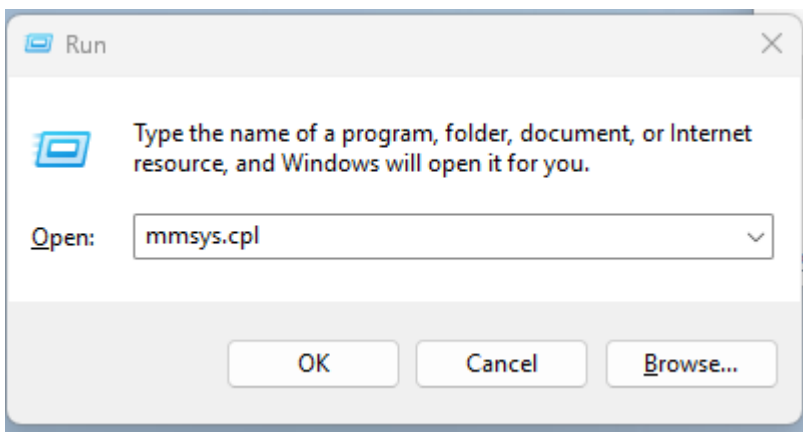
In the Sound control panel that show up first click the "Recording" tab and then find the correct audio device, in the screen shot below you can see that the device at the bottom called "Mikrofon" is showing full a full volume bar indicating to much Audio level. Click it once and then click the "Properties" button.
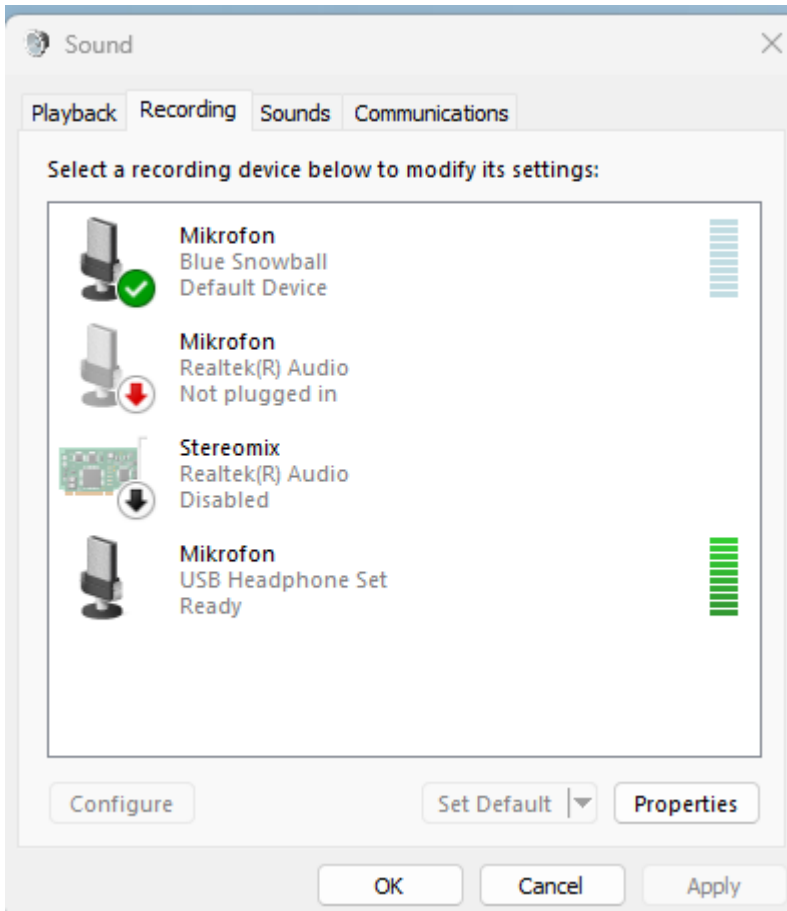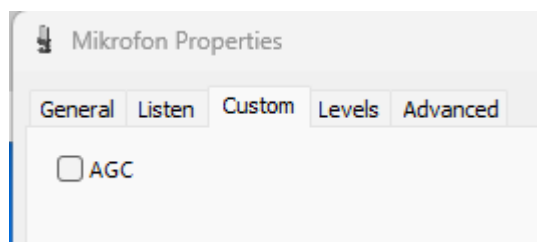

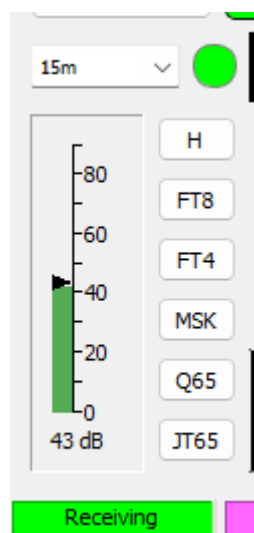In the dialog that pops up you can change the name on the General tab if you want.
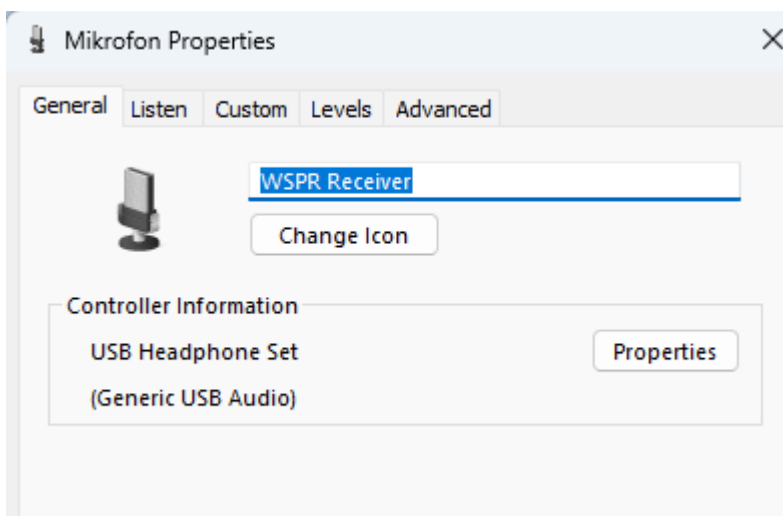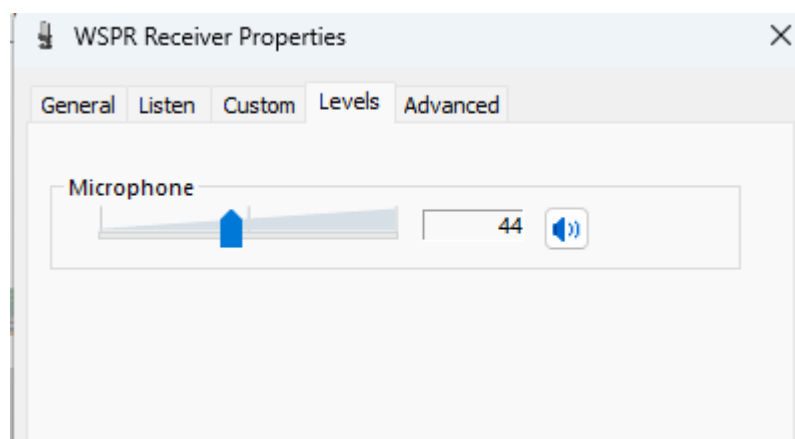
The important tabs are the "Custom" and "Level" tabs.
The Custom Tab don't exist on all sound cards but if it does on yours go in there and make sure that the "AGC" property is not selected.

Now go in to the Levels tab and adjust the slider while watching the WSJT-X Audio Level indicator

Set the volume so the WSJT-X level indicator is at about 60%. This is not critical and anything between 30% and 75% is fine.
As there is no Automatic Gain Control level in the receiver the level changes somewhat between bands and time of day.
The lower bands like 80m and 40m will be among the strongest especially at night so you might have to tweak the volume level to make sure that the 40m band during the night does not cause clipping of the volume.

Adjusting the waterfall for WSPR signals

The Waterfall normally displays all signals in the 300-3000Hz bandwidth of a receiver but as WSPR is only using a 200Hz segment you can adjust the waterfall to be better suited for WSPR signals.

The first setting to change in the waterfall settings is the "Bin/Pixel", set it to 1. Then set the Start frequency to 1200Hz and the "N avg" to 6.

Optionally if you don't care for the spectrum analyzer in the lower portion and only want to show the waterfall you can set the "Spec" setting in the lower right corner to 0% to remove the spectrum analyzer and have the entire window for waterfall.

If you want to show a longer time period you can increase the "N avg" value and/or make the window taller.
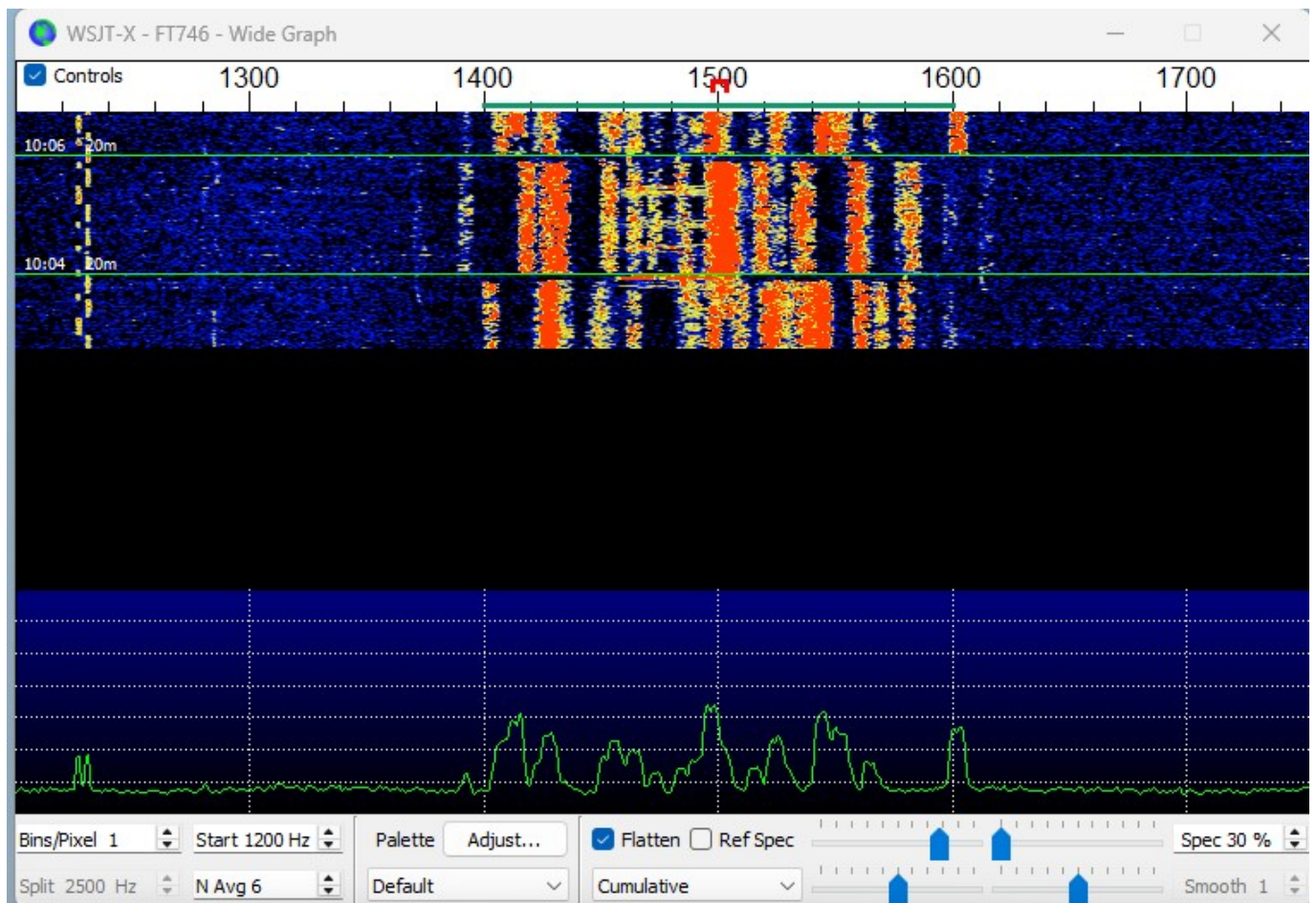
Trouble shooting serial ports connection.

If you are unable to find the correct serial port the receiver is using you should be aware that WSJT-X do not update the list of available serial ports when the software is running.

That means that if you connect the Receiver while WSJT-X is running you need to close WSJT-X and start it again to be able to find the Serial port to the receiver in the list of available Serial ports in WSJT-X.

If you are unsure what port to use you can try them out one after each other and use the "Check CAT" button to see if it you got the correct one.

If you prefer to know specifically what serial port the receiver happens to use in your computer without going thru all of them you can start WSJT-X without having the receiver connected and make a note of all serial ports that is shown - then close WSJT-X, plug in the receiver, start WSJT-X and see what new Serial Port have turned up.

If no new serial port shows up when you plug in the receiver then something is amiss and as a first measure I recommend simply to restart your computer and redo the test.

If there are no new serial port showing up after a reboot you may need to install a driver for my hardware.

This is unusual as all Windows versions should have the driver already installed but in some rare case you may have to download and install it by hand, in that case download in my web page here:
https://www.zachtek.com/download

Scroll down to the "Windows Drivers" section and click the "Download driver" button.

After installation you may need to restart your computer before the device shows up.

Trouble shooting CAT control problems.

In case you see that you get an extra serial port whenever the Receiver is plugged in but you can not get a connection with it when clicking the "CAT Test button" you need to check an internal switch in the receiver.

Open the lid on the receiver by removing the top Philips screws at the front and back.

Lift the lid of it and check the switch next to the USB connector.

Make sure it is in the "Normal (CAT)" position.
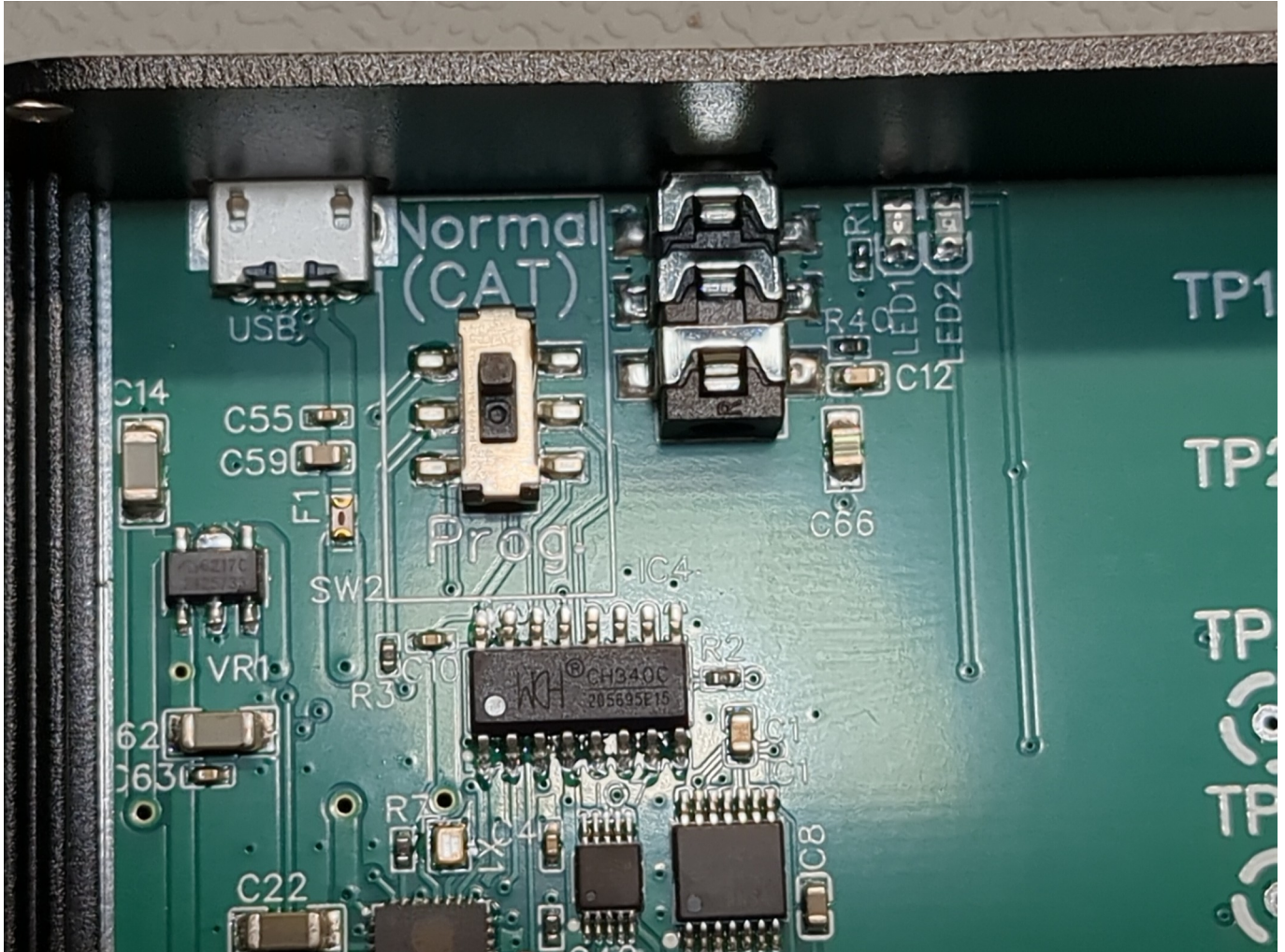
If not, slide it to the Normal Position.

If you have power attached you can check the yellow LED called LED2.

If it is in CAT mode it will be off only blinking briefly whenever it gets a CAT command. In "Prog" position it will blink on and off every second.

This switch should always be in "Normal (CAT)" unless you intend to upload a new firmware to it using the Arduino IDE or you want to run the calibration and setup for it.

In Normal Mode it will listen to ICOM CAT commands.

In Prog mode it will listen to ZachTek API commands, this is only used to calibrate the Internal TCXO reference oscillator and to set the startup frequency.

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