

10Ghz – Q65 decoding

Introduction.

I wanted a simple and cheap system to be able to decode Q65 signals on 10Ghz EME.

A simple LNB is good to convert the signals down to an acceptable level for a RTL dongle but the stability is by far not good for decoding SSB or CW signals. So maybe this instability will also not work out properly for digital signals.

The RTL dongle can be connected to HSDR, but this program is not able to decode digital signals. So a connection must be made from HSDR to WSJT-x.

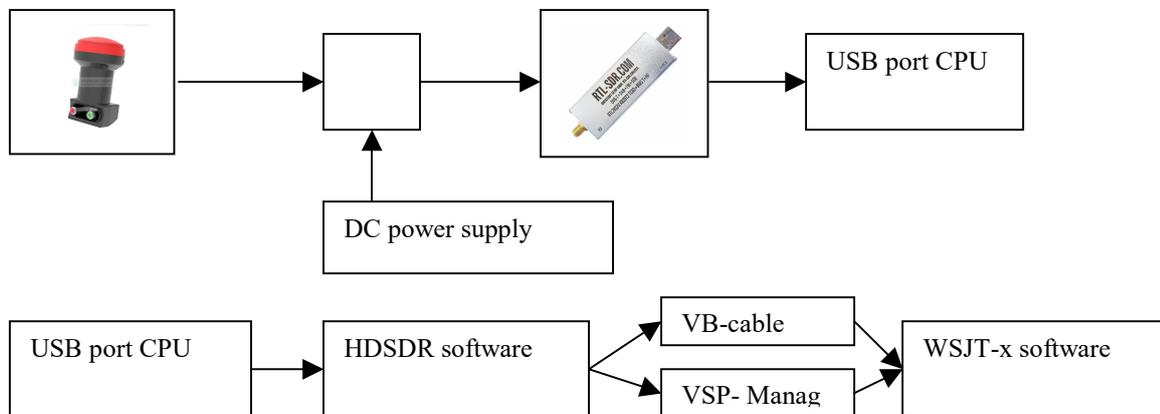
As both programs run on the same computer, virtual connections must be made to get is working.

I took me a while to understand how I should proceed to get a good working system.

Below you will find my steps and notes.

The scheme for connection.

Below the initial set-up for the receiver system.



Bullseye LNB PLL TCXO.

This LNB is perfect to convert the 10Ghz signals into a frequency range for the RTL dongle.

Using a DC splitter the DC power can be fed through the coaxial line. Depending on the voltage one can select the polarity in case it was mounted in the wrong way.

	<p>Specification: PLL: 2 PPM* TCXO 25Mhz Output 1 (green): 739Mhz for QO-100 use on the primary female F connector (green) Output 2 (red): 25 MHz on the secondary female F connector (red) Input frequency: 10489 - 12750 MHz LO frequency 9750/10600 MHz LO frequency stability at 23°C: +/- 10 kHz / or +/- 30 kHz LNB gain: 50 - 66 dB Output frequency: 739 - 1950 MHz (low band) and 1100 - 2150 (high band) Return loss: 8dB (739 - 1950 MHz) and 10dB (1100 - 2150 MHz) Noise factor: 0.5dB Vertical polarization voltage: 11.5 to 14V Horizontal polarization voltage: 16 to 19V LNB support diameter: 40mm Red cover diameter: 64mm</p>
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VB-cable.

This program is used to route the audio from HSDR into WSJT-x
It is a simple program for just 2 connections, which fits our needs here.
It can be downloaded from: www.VB-cable.com



VSP-manager.

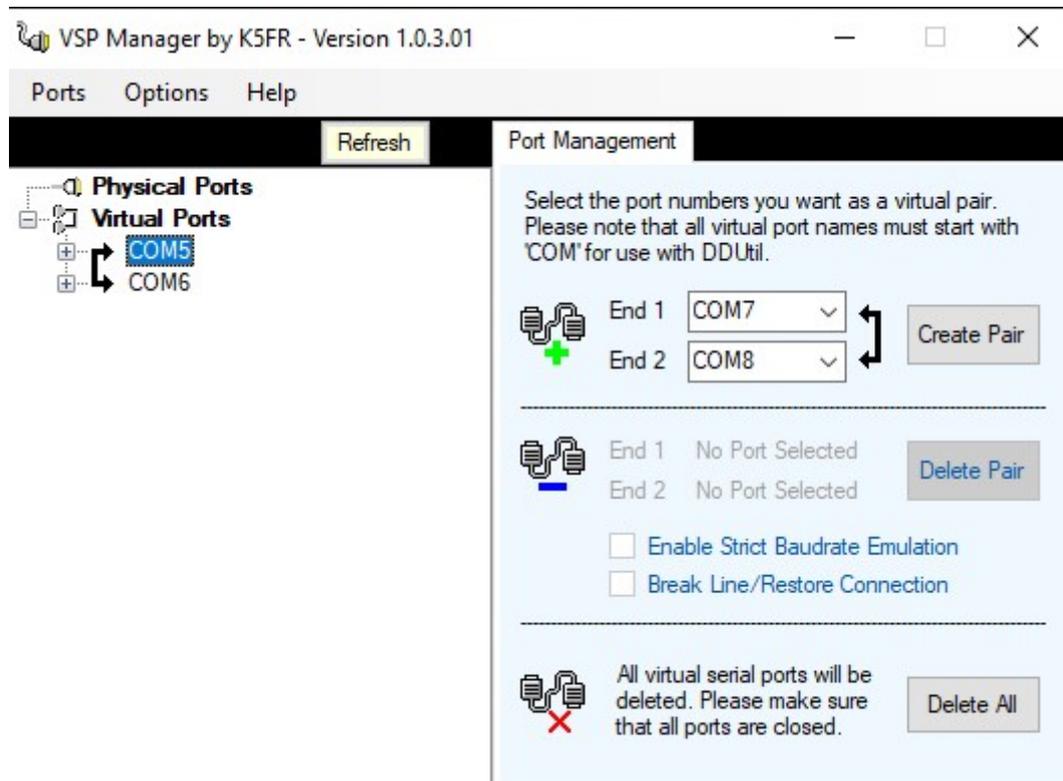
Today's computers use USB ports, rather than COM ports. In case your computer does not have COM ports, you will have to create them.

This program is used to create two virtual COM ports, connected together.

After defining the ports they can be used in the settings for HSDR and WSJT-x.

Here I created COM-5 and COM-6. Make sure you use port numbers which don't exist already.

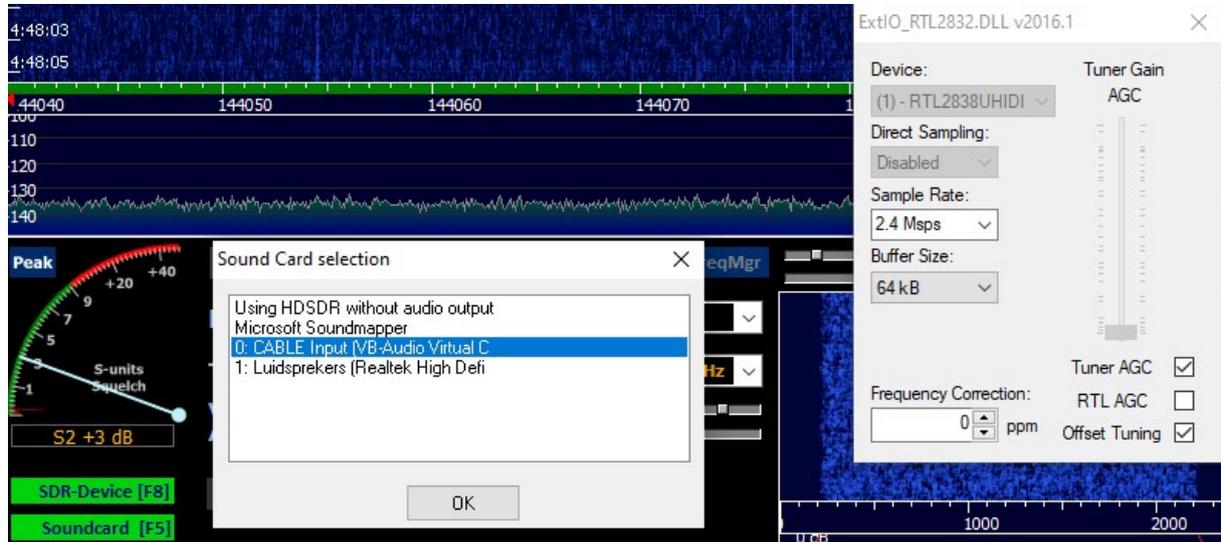
The software can be downloaded from: www.k5fr.com



HSDR settings.

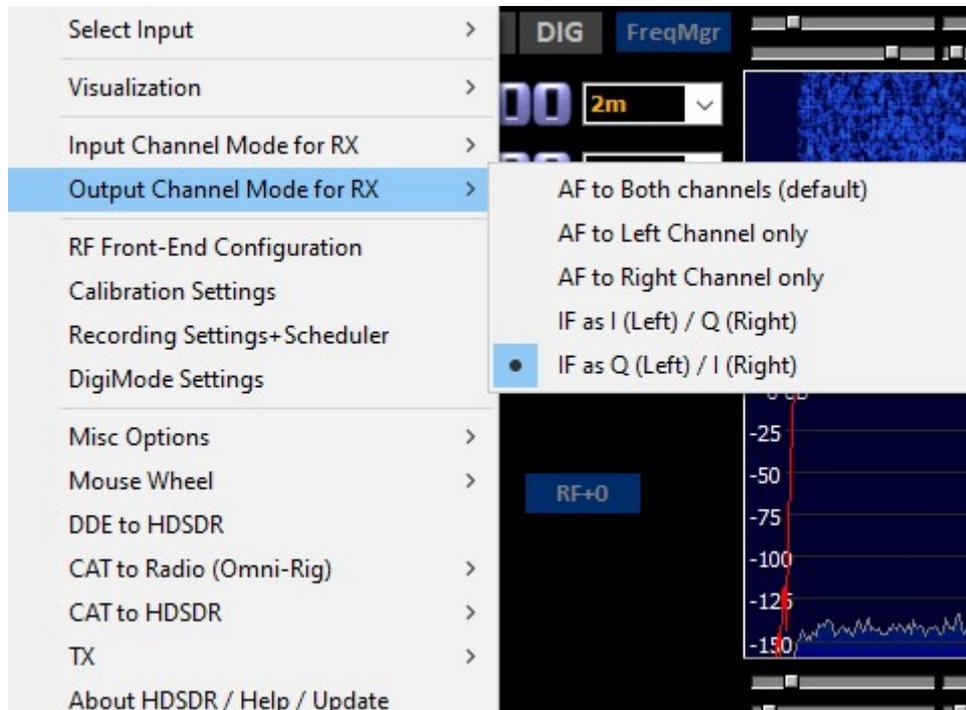
Make sure the RTL dongle is recognised by HSDR. If not then you might use ZADIG to install the correct drivers for the RTL dongle. If you push F8 or SDR device on the screen, the RTL dongle interface will pop-up.

Using the Soundcard section select the virtual audio cable. See below screen-copy.

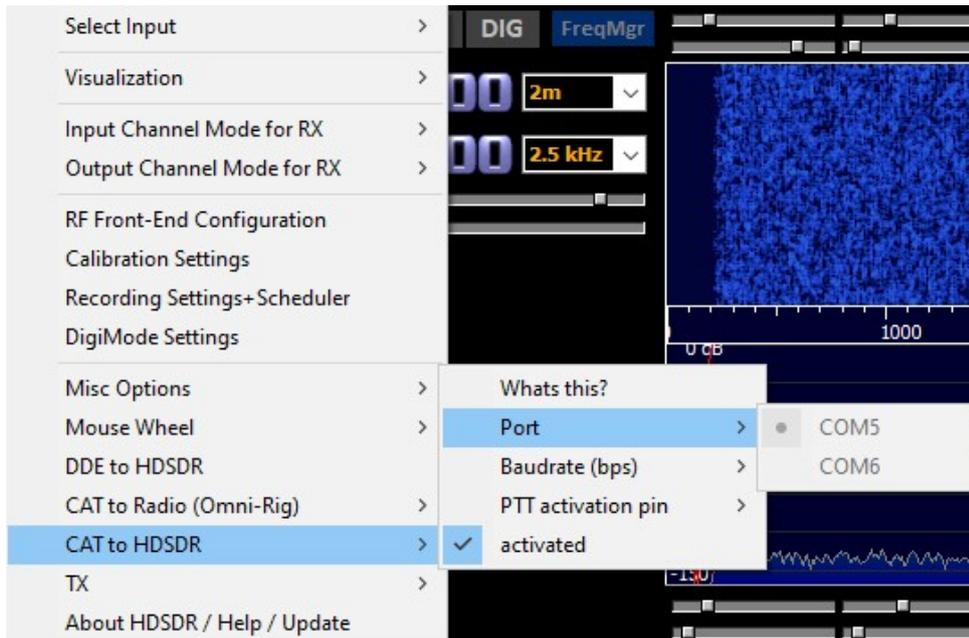


Set the output audio channel as below.

If you select the audio as the output, be sure you move the slider to the right and unlock the MUTE button on the main screen. You may also select I/Q output, that will work as well but seems it have less sensitivity, compared to the audio setting.



Then make the Com port selection in the option menu [F7], as below

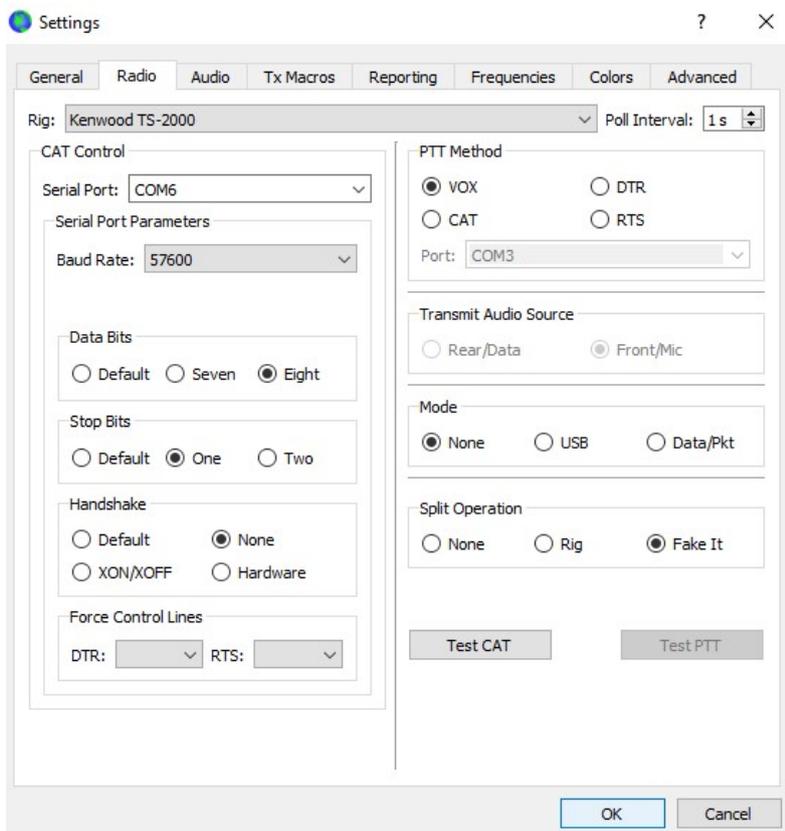


If you do not find the “>”sign left of the port selection, you did not create the com port yet

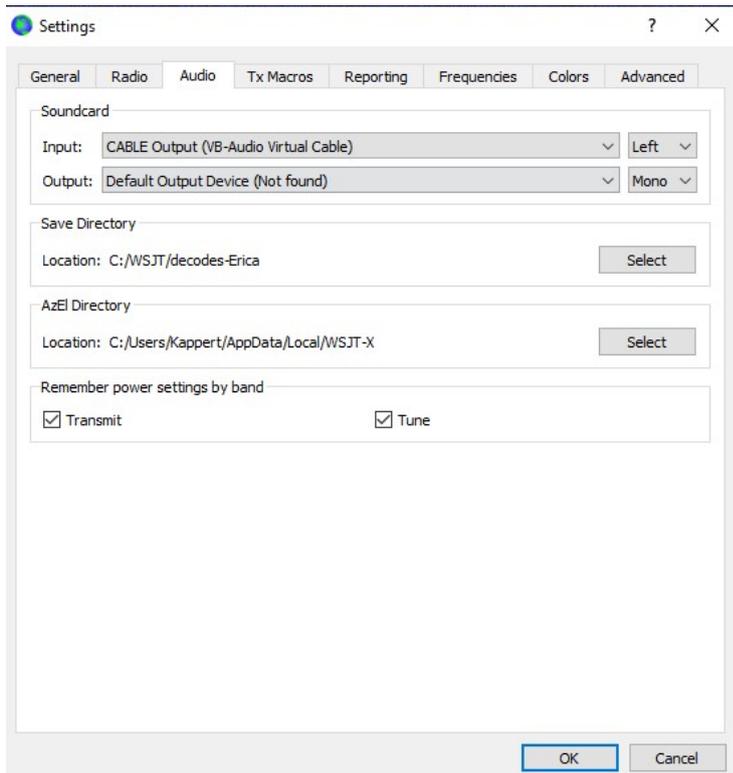
WSJT-x settings.

Launch the program and go to the settings menu **RADIO**.

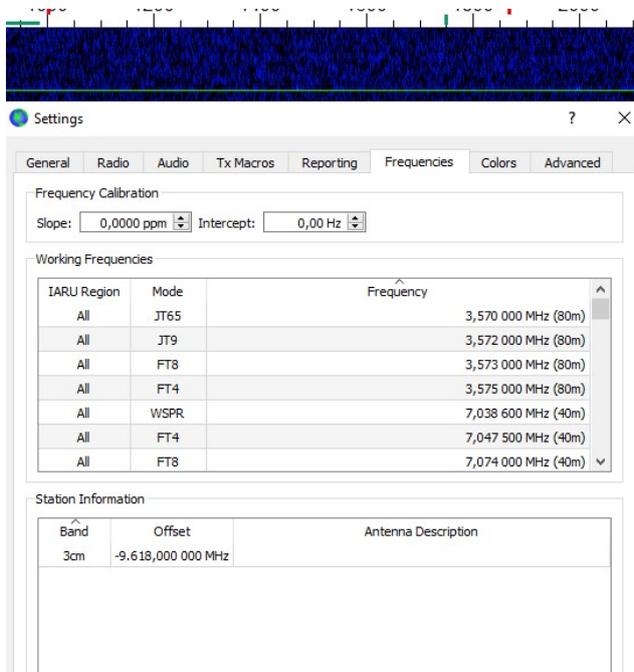
Select TS-2000 radio and add the COM port information as below.



Go to the **Audio** menu, to set the audio input.



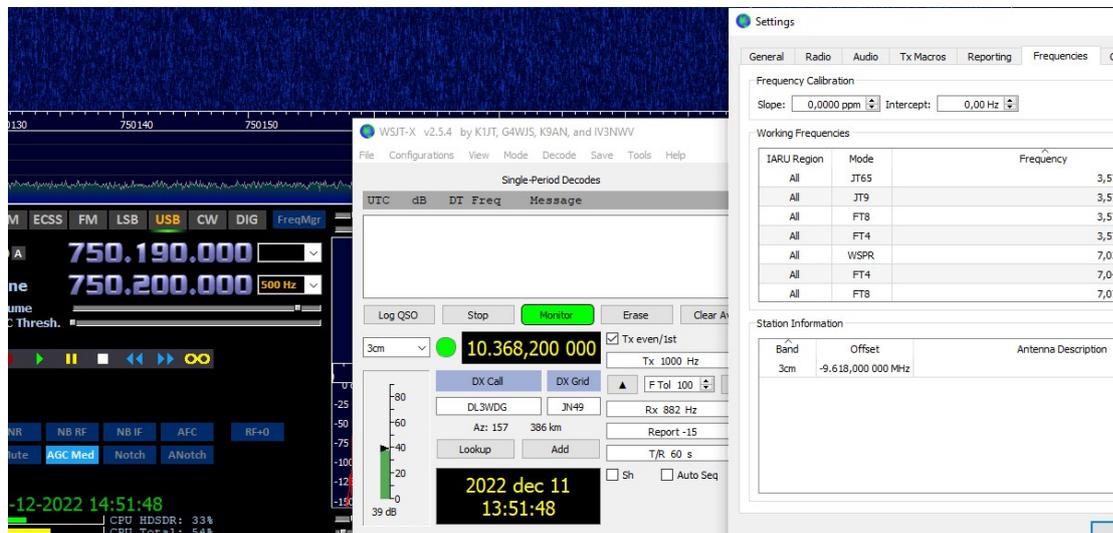
Last but not least, go to the **Frequencies** section to set reception on 10Ghz using a converter type. In the station information section add a new band: 3cm, then you are able to inform on the LO frequency. Here I used $-9.618.000\text{MHz}$ for an input frequency of 750MHz .



Now once all set and connected you may run your system.

Start up HSDR first and then WSJT-x, and select 3cm in WSJT-x

When all works ok, you can select a frequency in the HSDR screen or use the TUNE function. This change will also change the frequency in the WSJT-x main screen, as per example below.

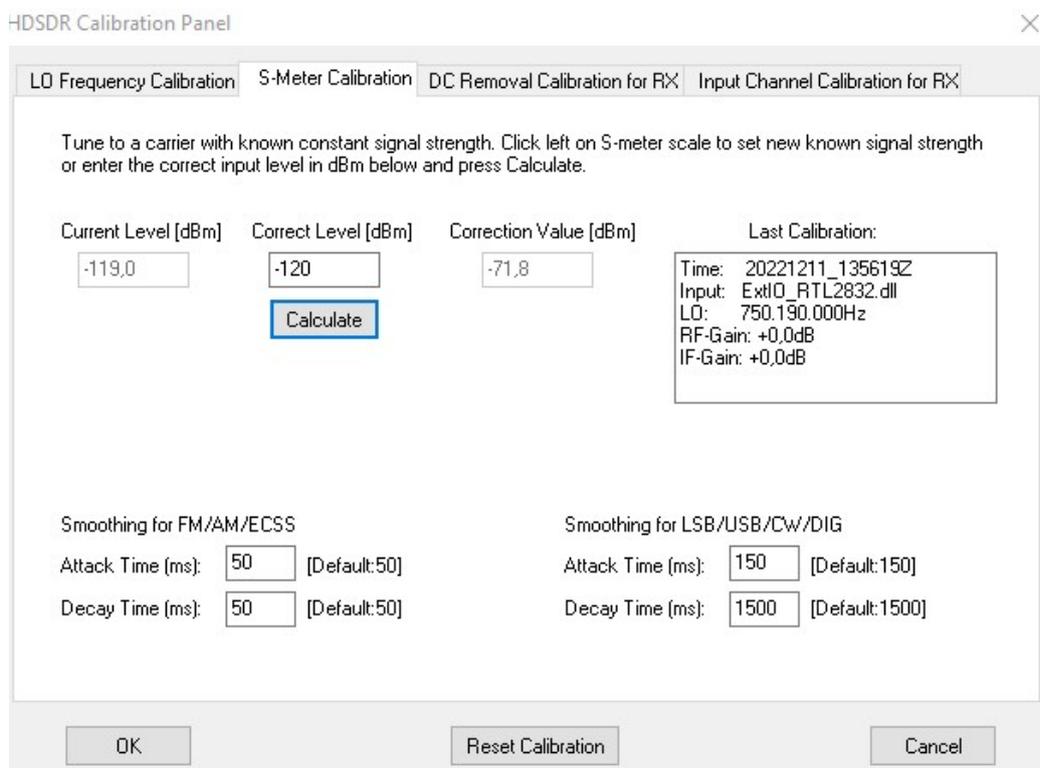


S-meter calibration

Connecting a RTL dongle and LNB most likely will push the noise into the S9 range.

Go to options menu calibration settings menu for **S-meter calibration**.

Using S-meter calibration you will be able to reduce the metering as per example below:



It took some time to get this setup defined but finally I am happy with the result.

I hope it will help others to start receiving EME signals on 10GHz, although this set-up is as wide as the frequency range of the RTL dongle.

So you may use it in different configurations as well.

GL, Jan, PA0PLY