A simple CW plugin for SDRuno (Version 3)

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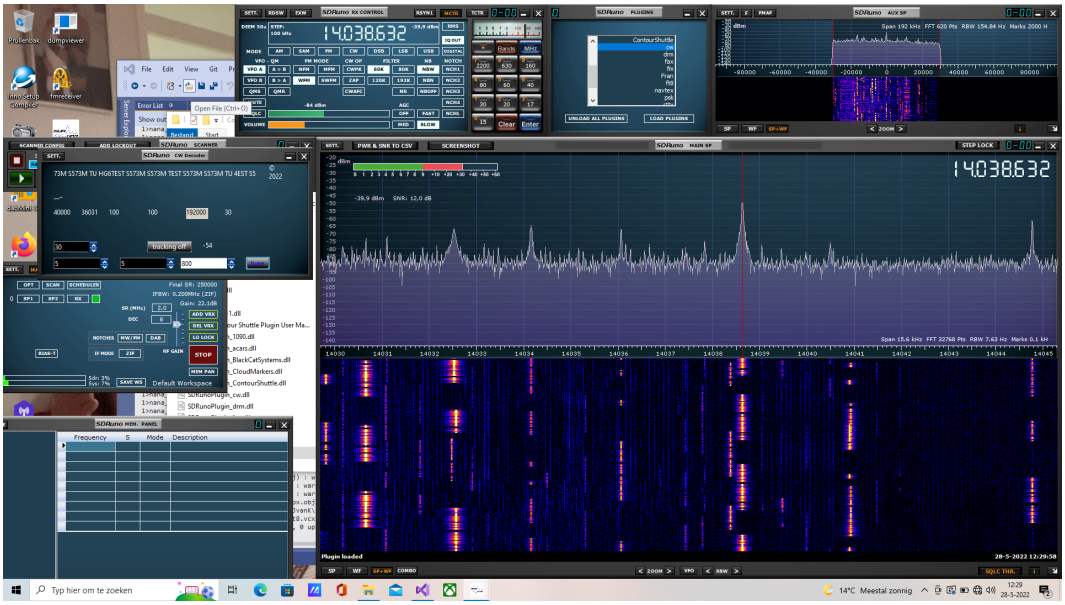


1 Introduction

The SDRuno cw plugin is a simple plugin to decode CW (Continuous Waves) signals. CW is in amateur bands still very popular, I am usually looking at the 14 MHz band, around 14025 KHz.

2 Settings

CW (basically carrier on/carrier off) is a signal with a small footprint, the width used on the band can be less than 50 Hz. The decoder therefore works with an intermediate samplerate of

2000 samples/second.

This implementation select the so-called *IQ-OUT* option of SDRuno, so decoding basically uses the unprocessed input, down-sampled to 192000. One should realize that the SDRuno spectrum display shows default a wide band - usually 2 MHz - the advantage is that one sees a lot of signals, the disadvantage is that precise tuning, based on the view on the spectrum is not easy.

The plugin generates an audiotone of 800 Hz + the tuning offset, At least for me, some sound helps with tuning.

3 Tuning

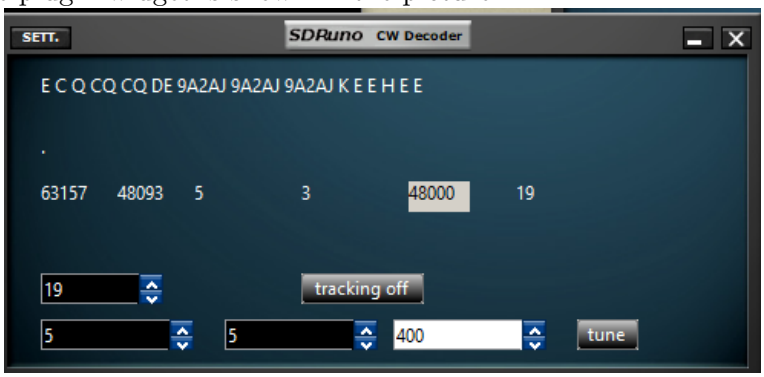
As said, CW is a signal with a small footprint, and since many of the amateur transmissions are brief messages (such as CQ CQ ...), tuning requires some training.

What is really helpful is *zooming in* on the main display as was shown on the first picture.

To aid in tuning, this version of the decoder is equipped with an *automatic tuning aid*. Touching the *tune* button instructs the software to look - for about half a second - for the strongest signal in a user specfied range and adapt the frequency to make that the center signal.

4 The plugin

The plugin widget is shown in the picture



The main issue with CW decoding is that different operators use different transmission speeds. The way the plugin works is that the *duration* of the signal above a certain noise level is measured. As known, a dot and a space within the encoding of a letter have the same length, while a dash is supposed to take 3 times as much time. Experience shows that most operators transmit with app 25 to 35 words per minute. The spinbox - in the picture set to "19" - can be used to adapt the wpm estimate.

The top line in the widget shows the received text, the second line - in the picture only containing a single dot - displays the dots and dashes of the letter currently being received. The third line contains 6 number displays, from left to right

- the number of micro seconds *assumed* as duration for a dot. The number is computed by looking at the setting for the words per minute;

- the number of micro seconds *measured* as (average) duration of the spaces between dots and dashes;
- the strength of the signal;
- the strength of the noise floor;
- the audio output rate;
- the current words per minute setting.

As said, the next row contains a selector for the assumed words per minute. It furthermore contains a button labeled *tracking off*. If a transmission is seen with a duration longer than a few seconds, a tracker can be activated that adapts the assumed WPM. However, for transmissions of 3, 4 seconds as usually seen on the 14 MHz band, it is not advisable to set the tracker on.

The number display in this row tells the computed offset.

Finally, the bottom row contains three spinboxes and a button:

- the *filter depth*. Before attempting to decode the on/off appearance of the carrier, a lowpass filter is applied to the signal. The actual degree of the (FIR) filter is twice the amount on the selector plus 1.
- the *squelch level*. To distinguish signal from noise, a squelch level can be set.
- the width of the fine tuning search. The picture shows "400", indicating that - with the current frequency as middle - a segment of 400 Hz is searched for the strongest signal if "fine tuning" is on.
- the button, when touched will reset the automatic tuning aid.