# A simple weatherfax plugin for SDRuno

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## 1 Introduction

The SDRuno weatherfax plugin is a simple plugin to decode weatherfax signals.

On shortwave (between 3 and 16 Mhz) there are from time to time transmissions of weatherfax charts. Here, in webstern Europe, 3588 KHz and 4601 KHz are frequencies wheere (almost) continuously weather charts are transmitted.

The most common format for transmitting weather charts is *Wefax576*. In this format, the so-called IOC (index of cooperation) is 576, leading to a width if the chart of app 1800 pixels. TRransmission is with 2 lines a minute, and a chart has 1200 lines (so, with some header information preceding the chart, transmission takes more than 10 minutes).

Modulation of the signal is phase shifting, with a signal deviation of 400 Hz. A transmission starts with a signal of precise 300 Hz, followed by a number of phase lines with which the receiver can synchronize with the transmission. Such a phase line consists of a signal encoding app 2.5 % of the linelength with pure white, 95 % of the linelength with pure black, and = again - 2.5 % of white.

## 2 SDRuno setting

### 2.1 Setting the samplerate

Weatherfax signals are transmitted on well defined settings and SDRplay devices have - different from e.g. dab sticks - a ppm error that is absolutely neglible on these shortwave frequencies.

Decoding uses a sample frequency of 12 KHz, similar to e.g. the navtex and the rtty plugin. The SDRuno software can provide a samplerate of 62.5 KHz, remaining filtering and decimation is done in the weatherfax plugin itself. The SDRuno setting is then a sampplerate of 2 MHz, and a decimation factor 32.

The plugin generates an audiotone of 800 Hz + the tuning offset, in my experience is sound very helpful in precise tuning.

The sound is output with a rate of 48000, setting "AM" in the RX control window will set this rate.

## 3 setting the frequency

As said, the weatherfax frequencies are predefined, so just select a frequency from one of the lists of frequencies. In

`https://www.weather.gov/media/marine/rfax.pdf`

frequencies are given for transmissions worldwide.

Note that - differing from some other implementations, tuning is precisely on the mentiuoned frequency, not 1900 Hz less!

## 4 The plugin

The plugin widget is shown in the picture

The widget for this plugin is large, the weather chart is displayed on it. The size of the widget is such that a wefax576 chart is shown on precisely one quarter of its size (app 900 pixels wide, 600 lines).

The top lines of the widget are reserved for the controls.

The top line contains

- a selector for the kind of charts, default Wefax576;
- the modulation mode, default FM;
- the phase, default is the higher frequency of the signal the indicator for white, and the lower for black. Selecting "invers" reverses this interpreation; ]item the deviation. While in Europe the deviation of the modulation is 400 Hz, literature states that the US uses 450 Hz.
- a blank field (for later use);
- the state of the decoder.
  - APTSTART is - as the name suggests - the start state. The software will read incoming signals until a few seconds a signal of 300 Hz is received;
  - PHASING is the state when the software is trying to synchronize. If - during a longer time - no reliable synchronization is made, the asumtpion is that the detection of the 300 Hz was erroneous, and the APTSTART state is entered;
  - ON SYNC is the state when there is a reliable synchronization, and in this state the data lines are processed. The lines in the picture will be displayed on the widget.

  - FAX_DONE is - as the name suggests - the stated entered when processing the picture finishes. If *saving* was set, the picture will be stored in a file and the APTSTART state will be entered again, if
    em saving was not set, the software will wait in the final state until a *reset* is given.

The second line contains 5 elements

- the *save* button. When set, the software will continuously run the sequence to decode a picture and store the result in a file. If set the text on the button reads *saving*, otherwise *Save*.
- the reset button, which does what can be expected from a reset button;
- a label on which - while in the APTSTART state - the frequency of the incoming decoded signal is displayed.
- a label on which - when in sync - displays the line number of the line currently being decoded is displayed;
- a "cheat" button. As said, processing a whole chart in mode wefax576 takes well over 10 minutes. The cheat button cheats the system by forcing it into state "ON SYNC".