```
ZCZC TA31
060900 UTC SEP 24
OOSTENDERADIO MSI 455/24
APPROACH BLANKENBERGE
LIGHTBUOY HB2, 51-18.81N 003-06.22E
TEMPORARILY REMOVED


NNNN
```
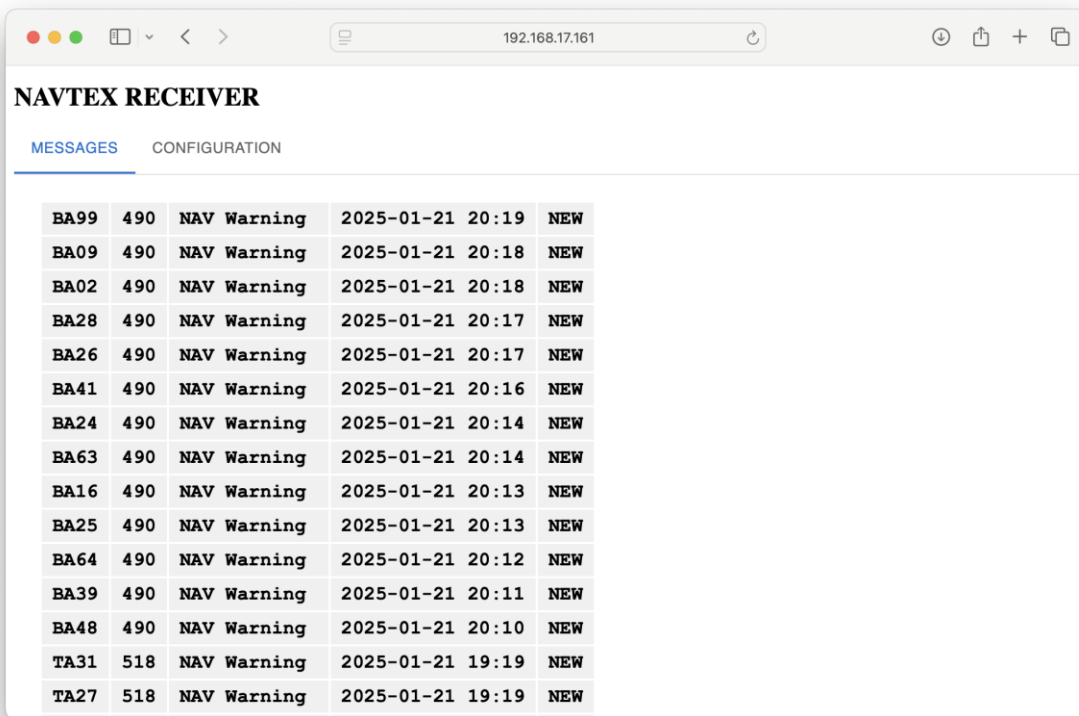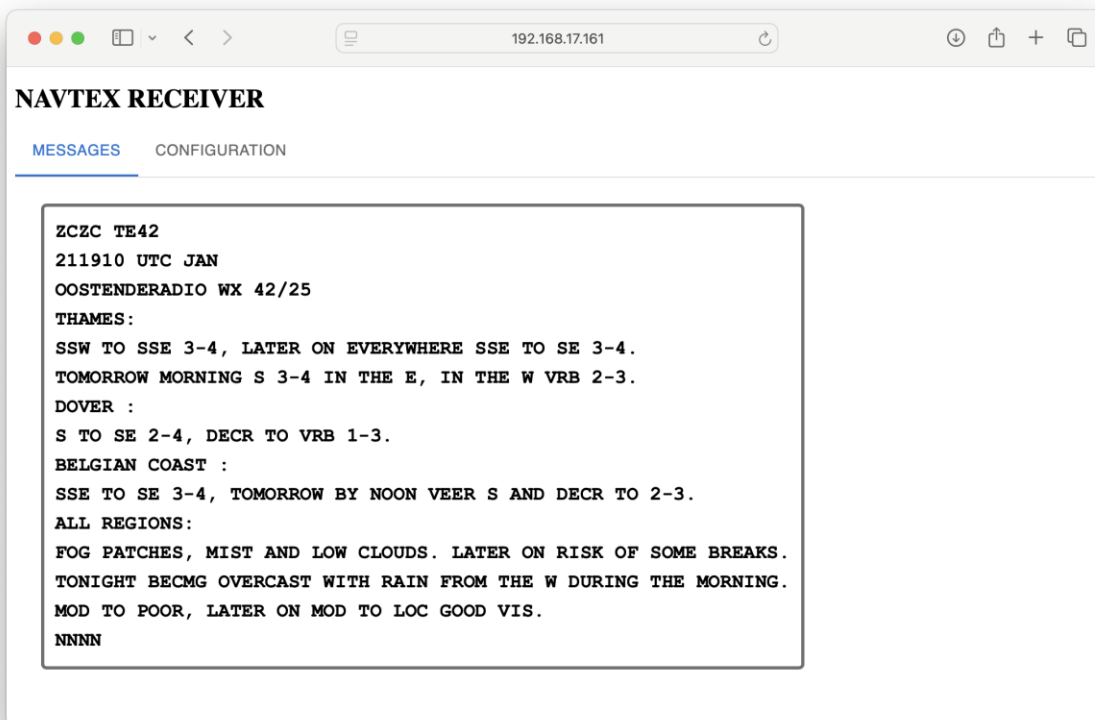
using the RSP1B.....

This document describes a Navtex receiver application for the raspberry Pi specifically developed for practical use on recreational boats.

Navtex?

Navtex is a part of the GMDSS (Global Maritime Distress and Safety System).
It is a broadcast service for delivery of "Maritime safety information" (MSI) from shore to ship. Typical Navtex messages are navigational and meteorological warnings and forecasts. Also SAR (search and rescue) operations can be announced on Navtex.

NAVTEX broadcasts are primarily made on 490 kHz and 518 kHz.
518kHz is the international NAVTEX frequency. Transmissions here should always be in English.
490kHz is the National frequency, used specifically for broadcasts in local languages.

For commercial shipping navtex (or an equivalent satellite-based system) is mandatory equipment.

Receiving Navtex for fun or for real?

Several solutions exist for people wanting to give receiving navtex a try.

A typical way to do this is by using a PC with
- a receiver software (like SDRconnect or SDRuno)
- a software like virtual audio cable to convey the received signal to a decoder software
- a demodulation/decoding software like YAND or FLDIGI

Those solutions work fine but are not really suited for practical use on a boat.
Recreational boaters will rarely go through the trouble of sitting in front of a PC at the right time and running three applications for receiving a navtex message. Let aside doing so while under way, sailing.

A practical Navtex solution should be receiving and collecting messages in the background, without having someone in front of a GUI. It should, just like commercial navtex receivers, have the ability to configure which stations and message types to receive or not.

For recreational boats a Navtex receiver is not a mandatory equipment. Commercial navtex equipment is expensive and therefore not very commonly found on e.g. sailboats. The info found on navtex can nonetheless be very relevant to sailors especially when making longer passages and e.g. when sailing at night.
Getting weather forecast updates and navigational warnings about e.g. buoys not lit can be very relevant when making an overnight passage.

Receiving Navtex on a raspberry pi using an SDRPlay receiver
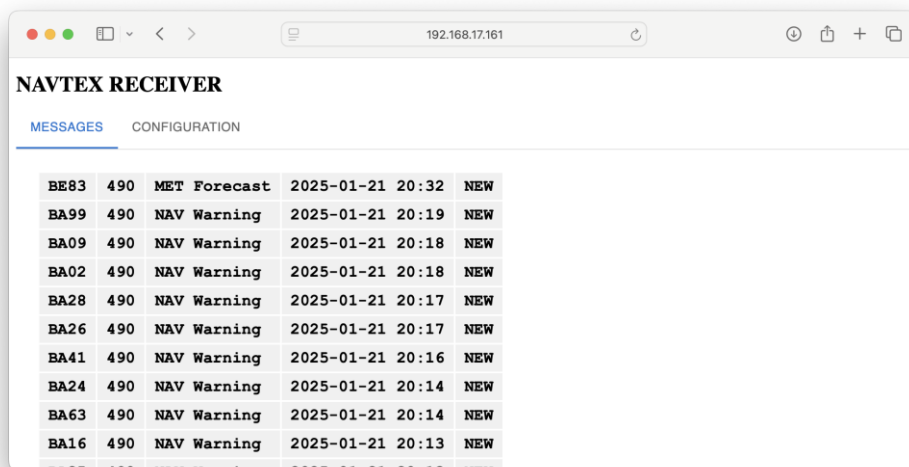
Hardware setup

Nasamarine Series 2 Navtex Antenna

SDRPLAY RSP1B

RaspberryPi 4 - 1GB
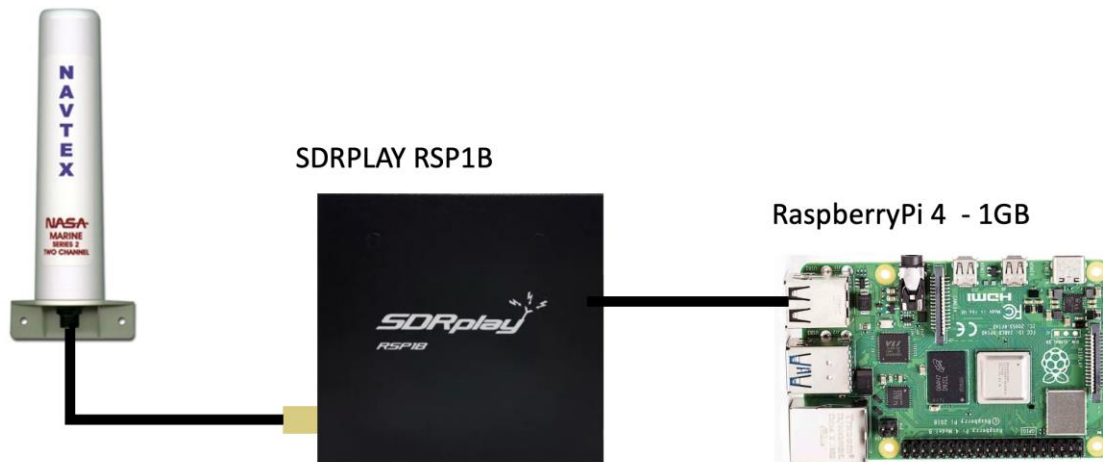
Other antennas can be used as well, see below
Software is also compatible with RSP1A, RSPdx and RSPdx-R2.

Software

The main screen shows a list of messages. The lines in the list include:
- the 4 characters identifying the message
- the frequency on which it was received (518kHz or 490kHz)
- the type of message e.g. Navigational warning
- the time of reception in UTC
- unread messages will be tagged as New.
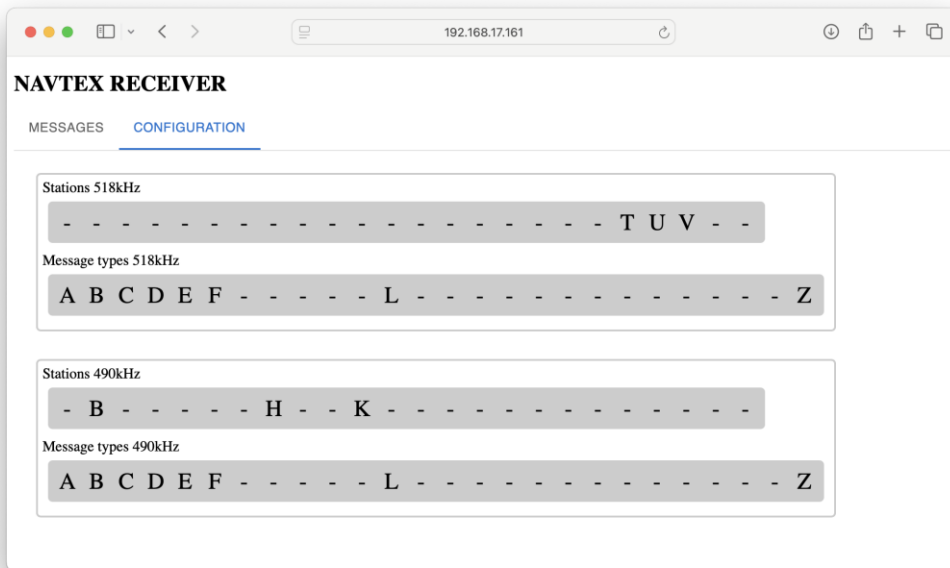
The software allows configuration of the transmitters and the message types to be received and displayed, respecitvely for 518kHz and 490kHz.

Clicking on a line in the message list will display the actual message:
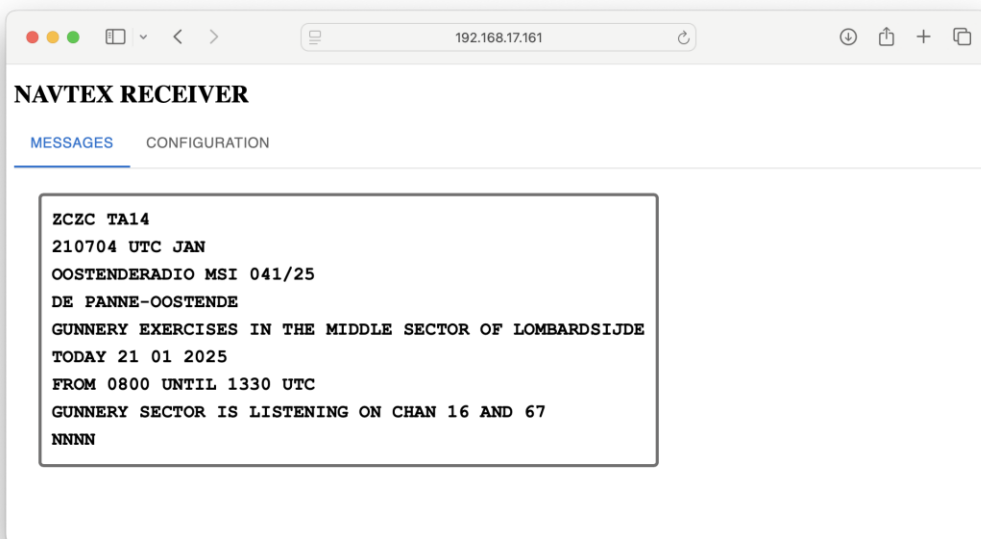
Notes:
- Messages configured to be displayed will be filtered at the time of display. The receiver will always be storing all messages it receives. It will display selected messages only. When changing the config, messages received be displayed right away, even if they were received earlier on
- In line with the "**NAVTEX MANUAL**" (IMO MSC.1/Circ.1403/Rev.2) subject indicator characters A, B, D and L cannot be deselected
- Messages are kept for 72 hours after and then automatically deleted.

Software installation process (raspberry pi)

This installation procedure was tested on openplotter v4 distribution for the Raspberry PI. As such it should also work on distributions like Debian 12 Bookworm and Ubuntu 22.04 Jammy.

1) Install the SDRPLAY API
   Go https://www.sdrplay.com/api/
   Download the linux version of the API
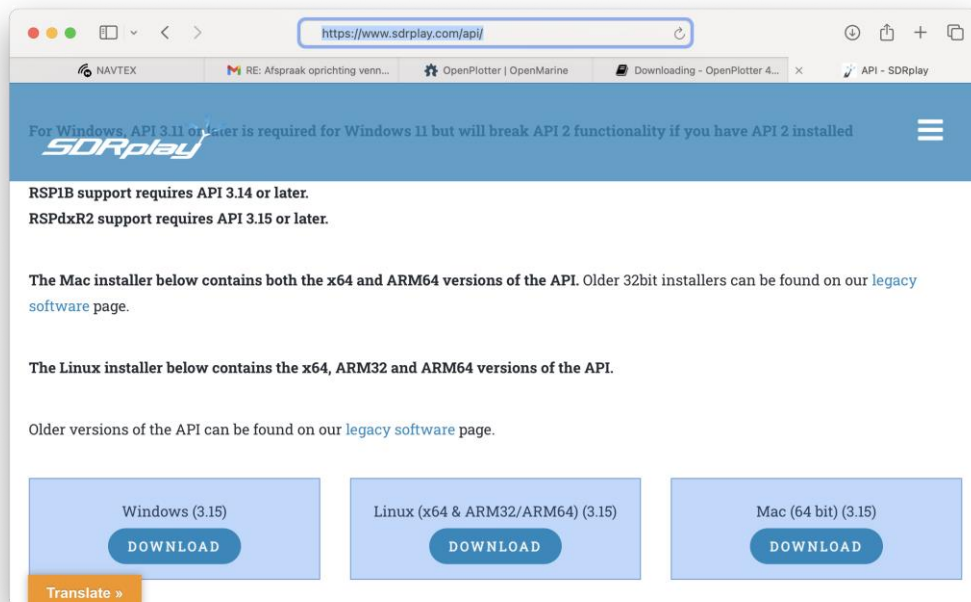
   This will download a script. Make that script executable (chmod +x). and run it.

2) Install some prerequisites

   ```
   sudo apt-get libcjson-dev libsqlite3-dev libmicrohttpd-dev sqlite3
   ```

3) download the actual software

   ```
   wget http://csme.be/dl/navtex-0.01.tar.gz
   ```

4) unpack

   ```
   tar -xvzf navtex-0.01.tar.gz
   ```

5) build & install

   ```
   cd navtex-0.01
   ./configure
   make
   sudo make install
   ```

   This installation process will install two executables on the system:
   One named "navtexwebserver" and "navtexreceiver"
   The navtexreceiver executable accepts two options:
   -b : activate the bias voltage
   -p X: select RF port X (e.g. -p B for selecting port B on the RSPdx)
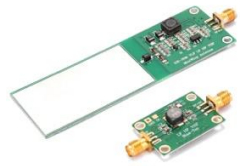
Suitable Navtex antennas for use on a boat

	Nasamarine E-field antenna Needs 5V bias voltage that can be provided by any RSP device. This type of antenna will most probably not be very happy in the vicinity of a radar or a VHF antenna.
	Nasamarine H-field antenna Needs 5V bias voltage that can be provided by any RSP device. The original connector should be replaced with an SMA type connector. This is probably the most economical option with +/- guaranteed good performance.
	Furuno NX-3H Is typically used with the Furuno NX-300 unit. Can sometimes be found on ebay. Comes with a 10m long coax cable attached having a TNC connector at the end. Needs 5V bias voltage that can be provided by any RSP device. The TNC Connector should be replaced with an SMA type connector. Excellent choice of antenna if you can get hold of one.
	Furuno NX-7H Normally works with the Furuno NX-700 unit. You do find them occasionaly on ebay. Comes with a short coax cable attached, with a PL259 connector. Be aware that this one needs a 7V-9V bias voltage, as it has been designed to allow long cable runs (up to 50m). So you need a separate biasT, the 4,7V the RSP can provide will not be enough.

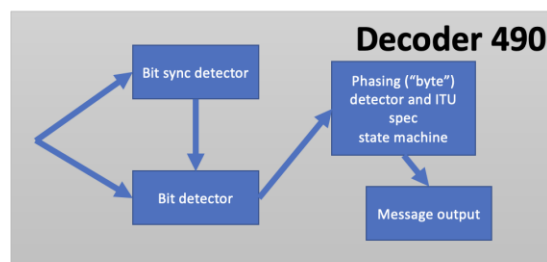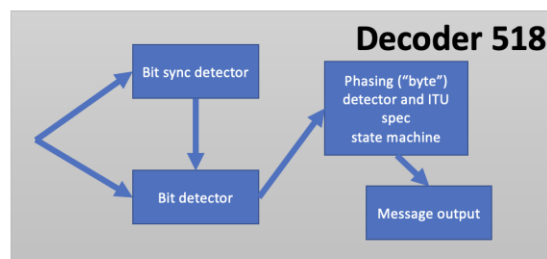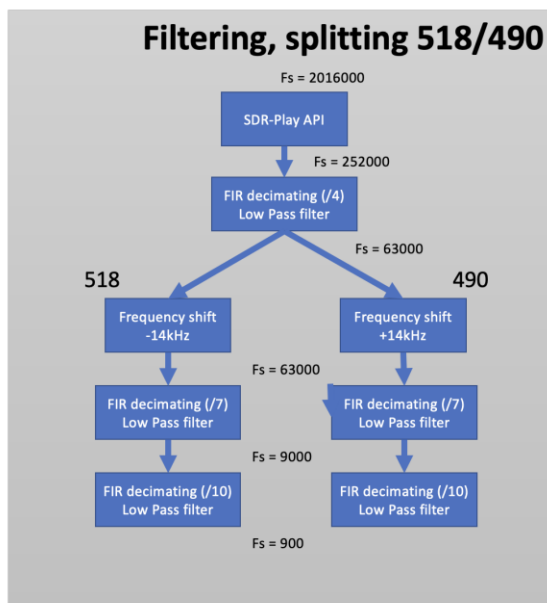|	
	Isolated backstay antenna Usually this type of long wire antenna was meant for use on HF (short wave), and is combined with an antenna tuner. In case you are not using HF anymore you could reuse the antenna for Navtex. The tuner will probably not be the ideal component to keep in the chain to receive in the 500kHz range. You may want to replace it with a 9:1 balun. You will need a good "ground" connection to make such a setup work. In principle you can reuse the one that is in place already for the tuner.
  OR 	*Mini-whip antenna* Requires a good "ground". Needs 12V bias voltage, is usually shipping with the necessary biasT. Coax leading to the receiver should be fitted with (a) common mode choke(s). Not sure how good it will perform when mouted aft in the presence of a metal wire backstay. Do not install it in a radar beam nor in the vicinity of your VHF antenna.

Software structure

There are two executable processes, communicating with each other through a 'database'.
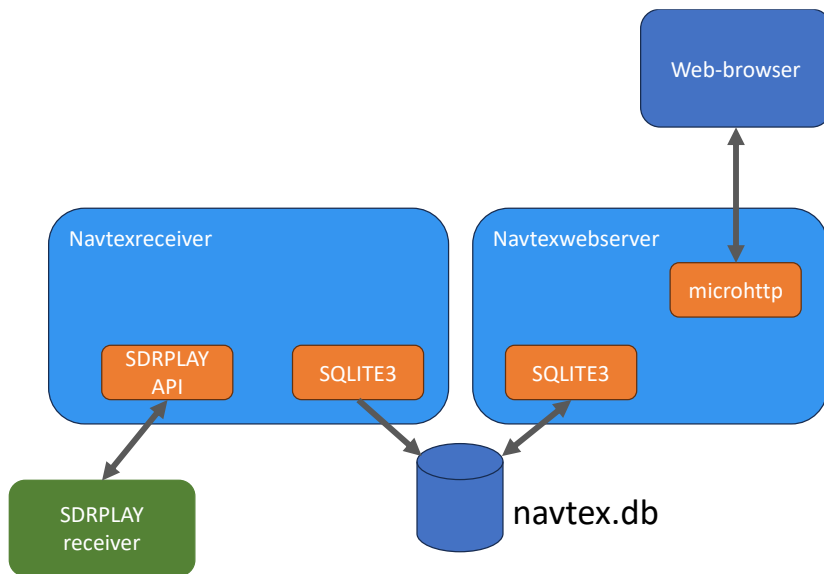
These are the functional blocks of the 'navtexreceiver' process.
The receiver is tuned to 504kHz. In software the frequency is shifted +14kHz and -14kHz to allow for 490kHz and 518kHz messages to be received in parallel.

The software can also be found on github:
https://github.com/bartelvdh/Navtex
https://github.com/bartelvdh/NavtexWebapp

YouTube channel: https://www.youtube.com/@boatcomm