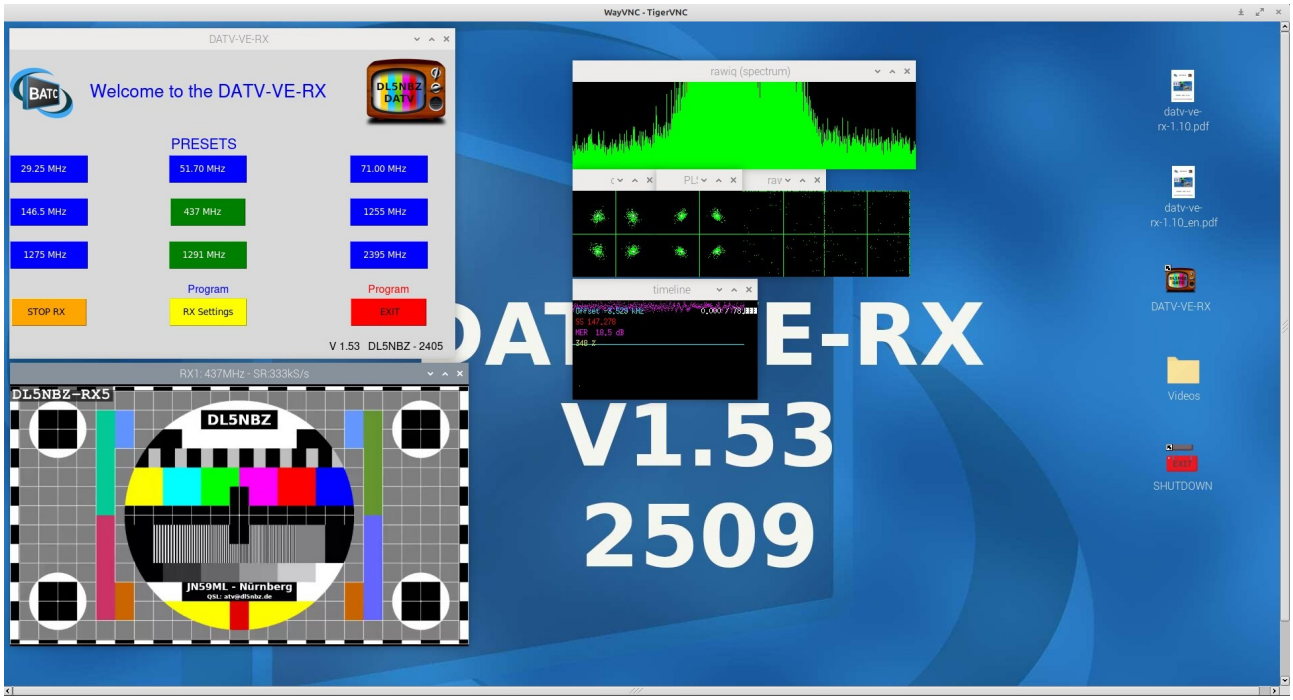
DATV-VE-RX



DL5NBZ – 2405 – V1.53

September 2025

Table of contents

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Preface

Any good solution is simple

When I first received pictures on 23cm with the DATV-VE-RX in the version 0.90 in May 2024, I was not aware of what I started. After I presented the project at the HamRadio 2024 to AGAF I was asked to introduce it unprepared in the international DATV forum. When I remember today, I see a mourning of people around me looking unbelievably on the individual components on the table, where a DATV signal from my portable DATV station was to be seen in a small display. In the edition 11/24 of the CQ/DL appeared as a title story the description of version 1.03, Within a short time I received many positive feedback and reviews. Some of these references have led me to make a “fine tuning” at some points of the project. The result was that an update came about every 6 months. Now there is version 1.53 that brings some innovations. Without the qualified comments and hints of my testers and users, this would not have been possible. Thank you for that!
I have learned, that the receiver plays in the first league, although it is significantly cheaper. But whether this is still possible with updates every 6 months in the future is doubtful. The air gets thinner.

In version 1.53, I started to solve the problem of selection, which is now switchable in two stages. Step 0 is as before, step 1 approaches the actual bandwidth of a signal. However, this stage 1 should understood as a field test.

I also tried to arrange the user interface and make it clearer.

Here is another important note: The basic idea was to make the project with the Raspberry PI 5 to be future-proof in performance. It has now been found that the Raspberry PI 4 is better suited for portable use. The Raspi4 does not need a power supply like the Raspi5 (power Delivery) and can therefore be operated with any Power Bank. The described software runs on both models without any changes.

1. Concept

In Germany, the lowest usable frequency band for DATV 435 MHz (70 cm), another frequency band is 1275 MHz (23 cm). Higher frequencies require special antennas and, in my opinion, were not in focus for the project. Discrete receivers for 70 cm and 23 cm require special printed circuit boards and SMD components which require a certain skill in soldering. That's why I decided this way.

Since I already had experience with the RTL-SDR sticks and had several more in my toybox, it was obvious to make first attempts. The processing of signals from dem RTL-SDR should be done in a Raspberry PI. The image reproduction can also in a TV or monitor with HDMI input. A display on the Raspi via the DSI interface is also possible.

The following components are required:

- the **RTL-SDR stick** – **preferably the original Version 3** (RTL-SDR.COM) or a compatible stick (the famous blue DVB-T-Stick). The limited version 4 is now with new drivers supported. The original has a metal housing and protects better against the computer radiates.

- a **Raspberryi5** (min. 4 GB) – as the concept should last for several years, I have chosen the current model with the current operating system “Debian Bookworm’ (Debian 12) decided. The Raspi4 is more suitable for portable applications because it is operated from a normal power bank kan. The Raspi5 needs power delivery, which is not supported by all power banks, and the power consumption is higher.

- a **Display** – min. 1024x600 pixels, also as touch screens, alternatively a distanceeor monitor with HDMI input, but then with mouse and keyboard. Displays less than 7” are no longer supported. I recommend displays 10.1“ and bigger.

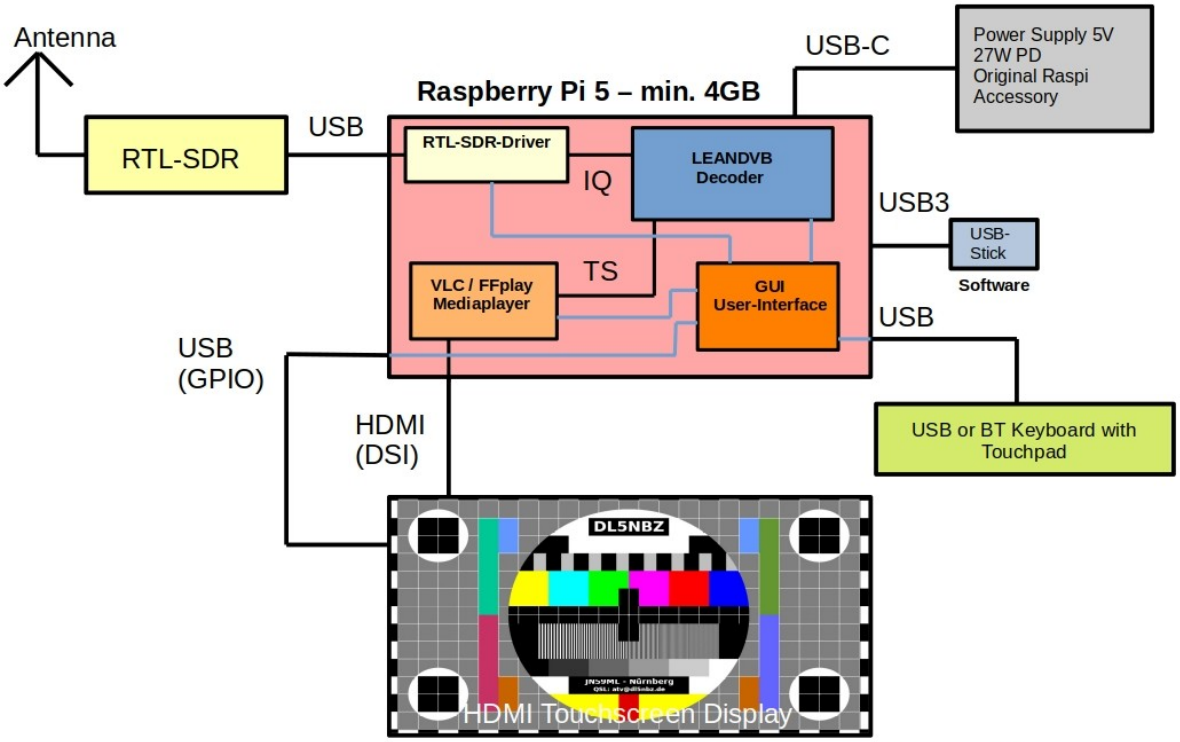
- A suitable **Power supply** for the Raspi5 (**Attention:** 5V/27W with power delivery)

- Sufficient **Cooling** the Raspi5, the standard fan with heat sink is fine.

- the necessary software, based on **Raspian Bookworm** (Base Debian 12) with the receiving software with user interface. Is available as an complete image.

Construction and assemblies

The DATV-VE-RX is plugged together from finished assemblies. Commercial cables are used for the connection of the individual assemblies. The operation is via the touch screen. When using a TV or monitor on the HDMI plugs a USB keyboard with touchpad or mouse is necessary. The assembly and the The connection of the individual modules shows the following scheme.



DATV-VE-RX – Modules and Connections
DL5NBZ - 2405

Note: the software (operating system, receiving software and user interface) is located on a USB stick (preferably) USB3 on one of the USB3 ports). From the Raspi4 on a boot is also possible from USB if no MicroSD card is inserted. The method with the USB stick is much more robust. MicroSD cards are much more sensitive and tend in rough treatment for failures. If you need the fourth USB port, the use of the MicroSD card or an SSD with adapter cards remains.
The Raspi5 can also be booted from an NVME-SSD that can be connected to PCIe. For this, the boot order must be changed in the EEPROM of the Raspi5.

Function description

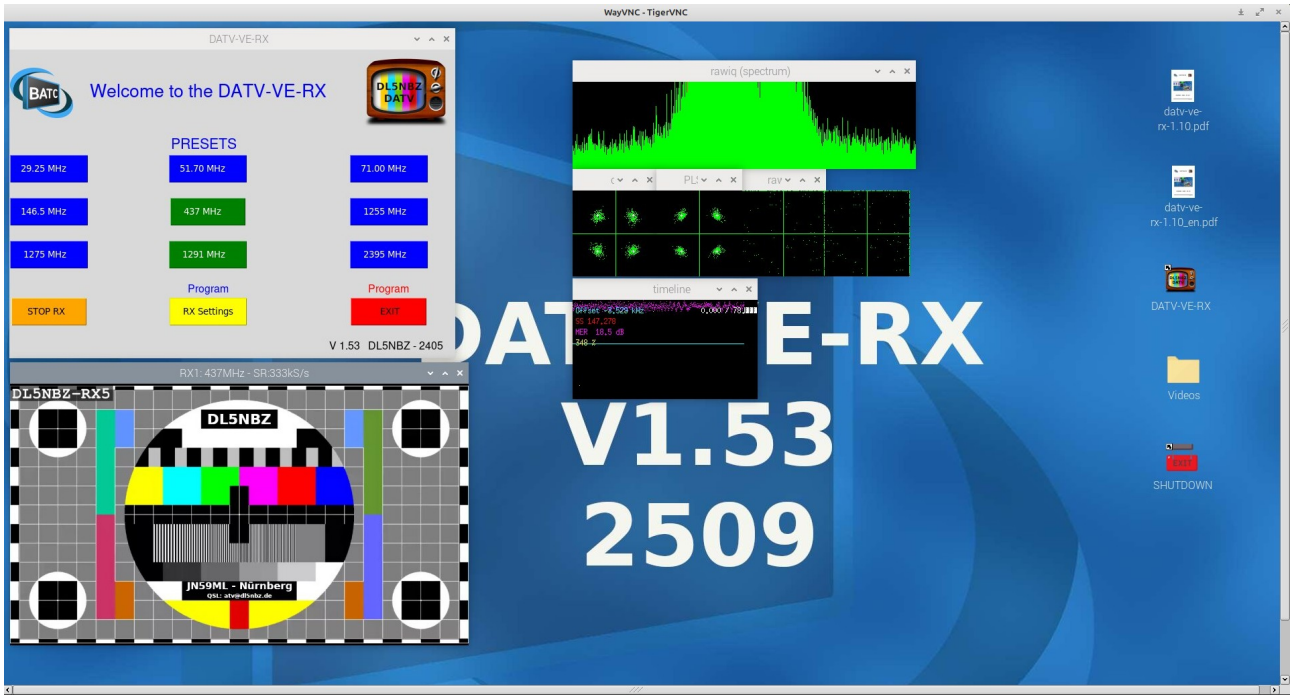
The software consists of the following parts:

- The Linux operating system based on **Debian Bookworm**
- The graphic **User interface (GUI)** written in **Python3**
- The programme **RTL_SDR** as driver and receiver for the RTL-SDR stick
- The programme **leandvb** as decoder of the DVB-S/DVB-S2 transport stream
- The programme **vlc or ffplay** for converting the transport stream into an MPG-2, MPG-4, AAC stream and its display and Audio playback.

After booting the operating system (Linux Debian Bookworm) into the desktop the a Graphic User Interface (GUI) written in Python3 (datv-ve-rx.py) will appear.

9 preset frequencies are initially available (presets).
After pushing one of the Preset-Buttons in the GUI the selected frequency is transferred to rtl_sdr and leandvb and the receiver is started.
rtl_sdr gets the sampling rate, the gain and the reception frequency and is started, then an IQ signal is available.
leandvb gets the symbol rate, the FEC, the operating mode (DVB-S/DVB-S2) and some other parameters with which the output is controlled. By default after the start of **leandvb** five windows (two spectrum displays, two consolesellation displays and a display of the received data) opens. With small display some of them are covered, the important ones are always on top.
If a valid signal is received, **ffplay (or vlc)** is started and the image displayed in another window. The sound is available on the HDMI signal. If the HDMI monitor has no audio, you have to either an audio HAT or a USB audio card connected to reproduce the sound. It is also possible to connect a BT headset or a BT speaker to the Raspi and thus to reproduce the sound.
Frequently used frequencies can be marked by green buttons.

The yellow button “RX-Settings” opens a further window in which any frequencies and other parameters can be entered. If all parameters are entered, you can start the recipient by pressing the green “Start” button.



Technical data

Receiver (RTL-SDR stick V3)
Frequency range: 24 MHz to 1766 MHz
Maximum receiver bandwidth: 3,2 MHz max. / 2.56 MHz stable
Types of modulation: QPSK, 8PSK, 16APSK, 32APSK – recognize yourselfd
Symbol rates: 18 kS/s – 2000 kS/s
Standards: DVB-S, DVB-S2

The possible frequency range depends on the tuner of the stick. Der RTL-SDR stick V3 is best suited for this recipient, there he Built into a metal housing is and via a TXCOt.

Tuners	Frequentrange
Elonics E4000	52 - 2200 MHz with a gap of 1100 MHz to 1250 MHzOther)
Rafael Micro R820T	24 - 1766 MHz
Rafael Micro R828D	24 - 1766 MHz
Fitipower FC0013	22 - 1100 MHz (FC0013B/C, FC0013G have an extra L-band Entrance, which is not connected with most sticks)
Fitipower FC0012	22 - 948.6 MHz
FCI FC2580	146 - 308 MHz and 438 - 924 MHz (with a gap in between)

Information about the software

The DATV-VE-RX consists of several software packages. Only if all these individual packages are installed, the receiver works as he should. The individual packages require dependencies in the operating system (Raspian OS based on Bookworm), which must be installed. In total, the receiver is a complex software system that needs to be properly installed, to work.

The Raspi5 has an ARM processor that has another command set as the usual INTEL or AMD processors. Therefore, some parts of the software must be compiled on the Raspi5 to run on this processor. Some dependencies are also required for this.

For this reason, I decided not to publish an installation script, but only a complete image of the system. I hope that this will facilitate the commissioning of the receiver. The time I can save on support, I can spent in the future development.

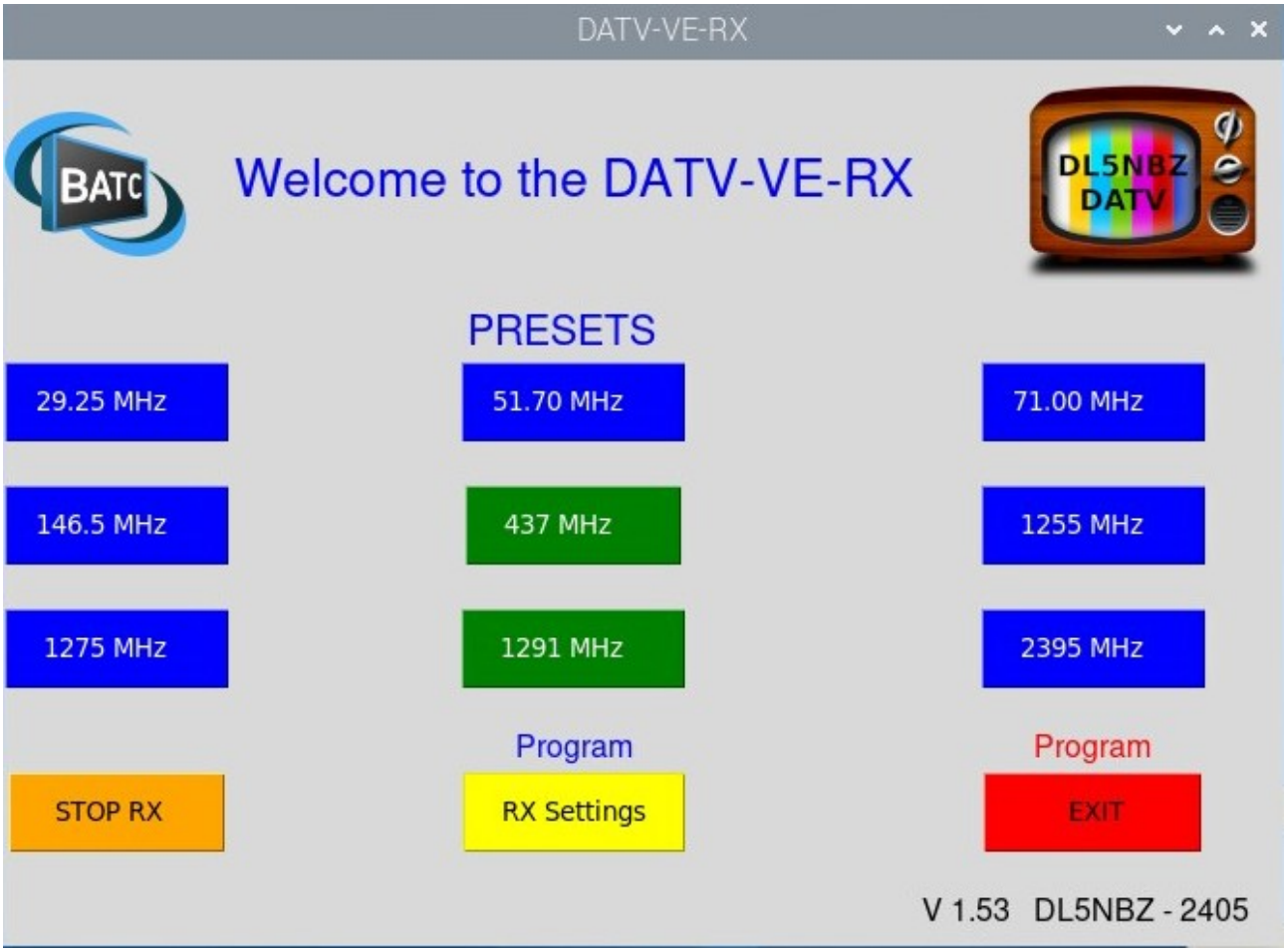
In principle, it is also possible to install the receiver on a laptop. Prerequisite is also here a system based on Debian 12 Bookworm (i.e. Ubuntu, Linux Mint, etc). It is not planed that I create an installation script at some point. This project currently has a very low priority. A Windows version will definitely not exist.

System components and licenses

1. RASPIAN OS Bookworm
   Raspberry PI Foundation, freie and open source software licenses, Mainly GPL
Two. RTL_SDR
   osmocom.org, open source software
3. ffmpeg (ffplay)
   ffmpeg.org, GNU Lesser General Public Licence (LGPL) version 2.1
4.
   pabr.org, F5OEO, K4KDR, W6RZ, G4GUO, AMSAT-DL, BATC, GNU General Public License version 3
Five. Python3
   Python Software Foundation, GPL

2. Description of the software

1. datv-ve-rx.py

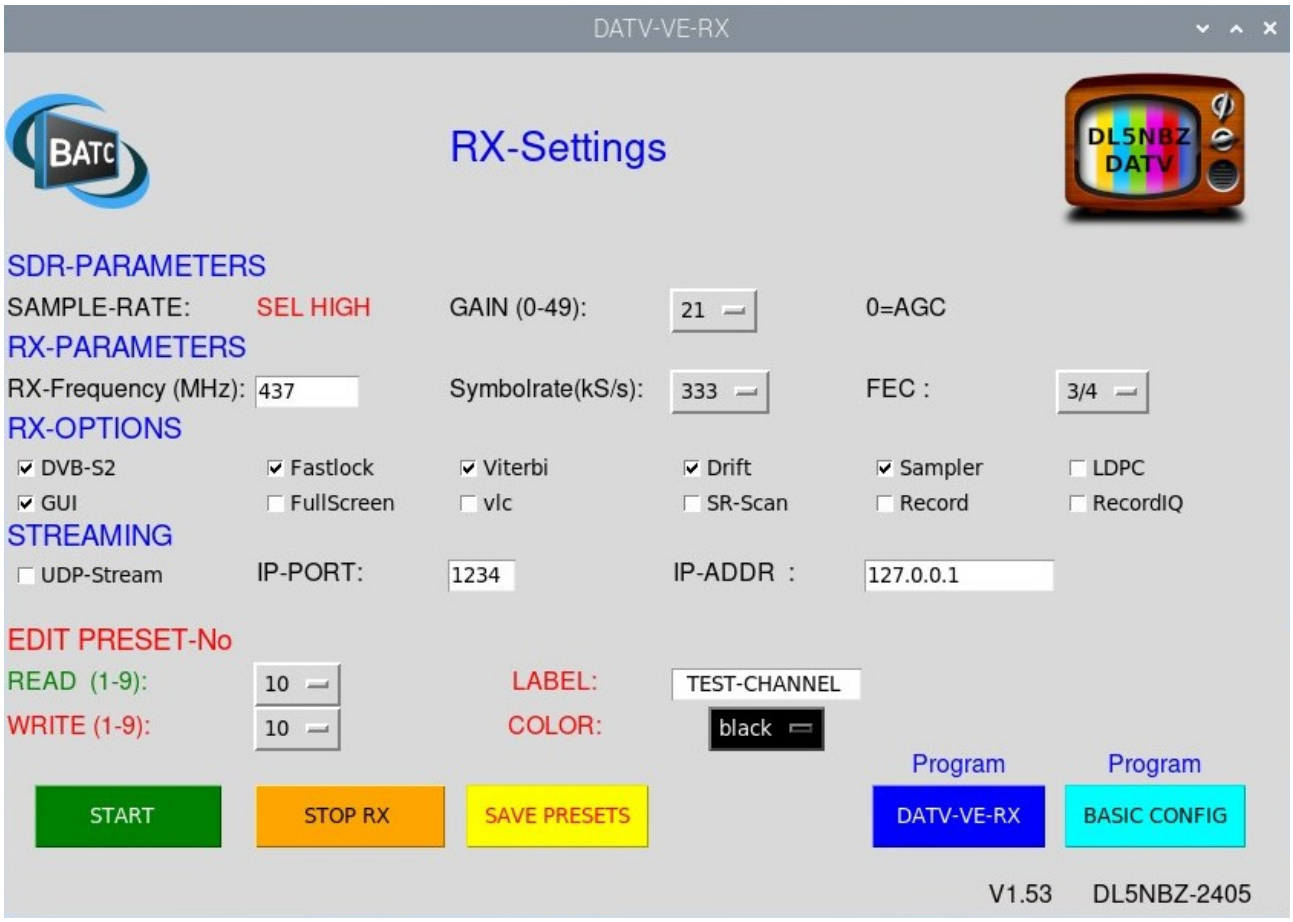


datv-ve-rx.py is the central user interface. It will be started automatically after the start of the RasPi5. The following mask is then shown (see above): Nine preset frequencies are available here. The parameters of these frequencies are stored in the file **presets.csv**. If this file is not present, it will be created with default valuess. Close the program via the button **EXIT**. Frequently used frequencies can be marked with a green button background. By click on one of the nine frequency buttons, the receiver is started with the stored parameters for this frequency.
With a click on **STOP RX** the receiver can be disabled again.

By click on the button **RX Settings** you get into a program in which you can enter and start a selected frequency. You can also change and edit PRESETS here.

With the button **EXIT** all presets in the file **presets.csv** are saved and the program finished. The programme **datv-ve-rx.py** has reached the planned range of functions.

2. settings.py



The picture shows the version 1.53 the programme **setting.py**. The version allows to enter a frequency and all necessary parameters manually.
The input mask is divided in four areas:

SDR parameters

Here the gain of the receiving part is set.
Sample rate: in version 1.53 the sample rate no longer has to be set. It is determined from the symbol rate. The sample rate determines the bandwidth and selectivity of the receiver. If the SAMPLE-RATE shows **SEL STANDARD** everything is shown as in previous versions, with **SEL HIGH** the bandwidth is adjusted to the symbol rate. In the **basig_conf.py** the two stages can be switched.
GAIN: The basic setting for GAIN is 0. With this setting the automatic gain control (AGC) is active. If the basic noise (Noise Floor) is too strong, you can reduce the gain to smaller values (1-49) in 2dB steps. The noise should thus become lower in the receiving channel. The two spectrum displays after the start of the receiver give information about it.

RX parameters

Here, the **reception frequency** entered in MHz. When entering “odd” frequencies, the decimal point shall be used (e.g. 51.7). The **Symbol rate** is entered in kS/s (kilosymbols/second). Here the Standard values (125 kS/s, 250 kS/s, 333 kS/s, 500 kS/s, 1000 kS/s, etc.) are offered.
The **Error correction (FEC)** is entered. Depending on the system (DVB-S / DVB-S2), valid values are offered in a table. With DVB-S2, the receiver recognizes the correct value independently.
The current error correction does not meet the standard for DVB-S/DVB-S2. The built-in LDPC filter is a large step away from the target. I could not compile an external LDPC filter on the ARM processor.
Note: LDPC stands for **Low Density Parity check**.

RX-OPTION

There are still some **CheckBoxes** but in the version 1.53 not all are activated yet. The following checkboxes are enabled:

DVB-S2: By default the receiver works in the DVB-S standard. For DVB-S2 reception, this box must be ticked. At DVB-S reception enter a correct FEC. The following FECs are allowed: 1⁄2, 2/3, 3⁄4 (offered by the list). At DVB-S2, the receiver itself finds the right FEC, possible settings are ignored. With DVB-S, a FASTLOCK is not possible and cannot be ticked.

FASTLOCK: A calculation-intensive algorithmyth which allows faster synchronization to the received signal.

VITERBI: a dynamic demodulation method for optimal performance on different platforms (intensive)

DRIFT: equals frequency offset. Helpful in receiving the ISS to compensate for the Doppler shift. From V1.02 unlocked.

LDPC: See the Error Correction section. Here the external LDPC filter can be activated later. In V1.53 still without function.

GUI: After starting the receiver two spectrum displays and two Constellation displays and a window with the timeline of the received signal are displayed. These displays are helpful for adjusting the antenna and adjusting the reception gain. If this box is ticked, the receiver starts these ads. For fixed and tested routes, unnecessary and can be omitted.

Sampler: Gets active the Calculation Bandpass filter on the input frequency.

FullScreen: If this box is ticked, the received image will display screen-filling.

VLC: By default the receiver displays signals with the media player **FFPLAY**. With **FFPLAY** Signals are displayed within 15 seconds after the receiver is locked in. **FFPLAY** but has fewer possibilities than VLC. By ticking this box the

receiver uses VLC and not FFPLAY. When using the VLC, the data of the Service Description Table (SDT) can be displayed under Tools/Codec information when receiving.

SR-Scan: This activates the scanner for the symbol rates. At the start of the receiver, all common symbol rates (125kS/s – 1000kS/s) tested until the matching SR is found. **Attention:** If SR-Scan has been selected again, a symbol rate must be selected from the list again, otherwise the receiver starts without SR selected.

RECORD: This box is ticked, the received transport stream is recorded. It will be stored a file **Record-YYY-MM-DD-HH-MM-SS.ts** in the directory **/home/pi/desktop/videos/** written. The directory can be reached from the desktop and via FTP.

RECORDIQ: This box is ticked, the received IQ data stream is recorded, to evaluate it later with appropriate software. It will be a file **Record-YYY-MM-DD-H-MM-SS.iq** in the directory **/home/pi/desktop/videos/** written. The directory can be reached from the desktop. **ATTENTION: When recording the IQ signal, very large files are created. Therefore, use this function carefully.**

STREAMING

From version V1.10 on, the receiver can stream the received transport stream via UDP to another computer. On the other computer, the image can then be displayes e.g. with the VLC (Media/Networkstream open udp://@:1234).

UDP stream: The streaming is activated by ticking.

IP-PORT: The port for streaming is set here. The default value is 1234

IP-ADDR: Here, the IP address of the computer is entered in the network on which the transport stream is to be viewed. The default value is the address of the receiver (127.0.0.1). During the streaming, no image is displayed on the receiver itself.

EDIT PRESET-No

During the start of the program, the input mask of the program shows only the data of the “Preset 10”, which the program **datv-ve-rx.py** is not accessible. This program space 10 is intended for testing, setting and processing of the parameters. Specified parameters can be tested. Click on the button **START** and the receiver starts with the parameters entered. With **STOP RX** you stop the reception. Then you are **SETTINGS** back into the input mask of the receiving parameters. The previously made inputs were stored on the program location 10 and can be seen again as default values in the input mask.
Would you like to store these parameters to a Button (program location) **LABEL** a name for the PRESET Button with **COLOR** the background color of the button is selected. Now you open the selection list under **WRITE (1-9)** and select the

program location (button) on which the parameters are stored. Once you have checked all settings again, click on **SAVE PRESETS**. This means that the program space is newly occupied and datv-ve-rx.py is restarted with the new data.
You can also edit and change programme places. To do this, you get the program space to be edited to the program location 10, by selectingout of the list **READ (1-9)** the desired program space and click. The input mask is rebuilt and the parameters of the selected program location can be processed in the mask. The storage of the data works as described above.

Buttons: When pressing on this button, the entered data is processed to a start command for the receiver. This Start-Command is sent to Postion 10 **presets.csv** written and the recipient started.

button STOP RX: When pressing, all data in the **presets.csv** secured, all tasks finished.

Button DATV-VE-RX: When pressing, you return to the DATV-VE-RX program.

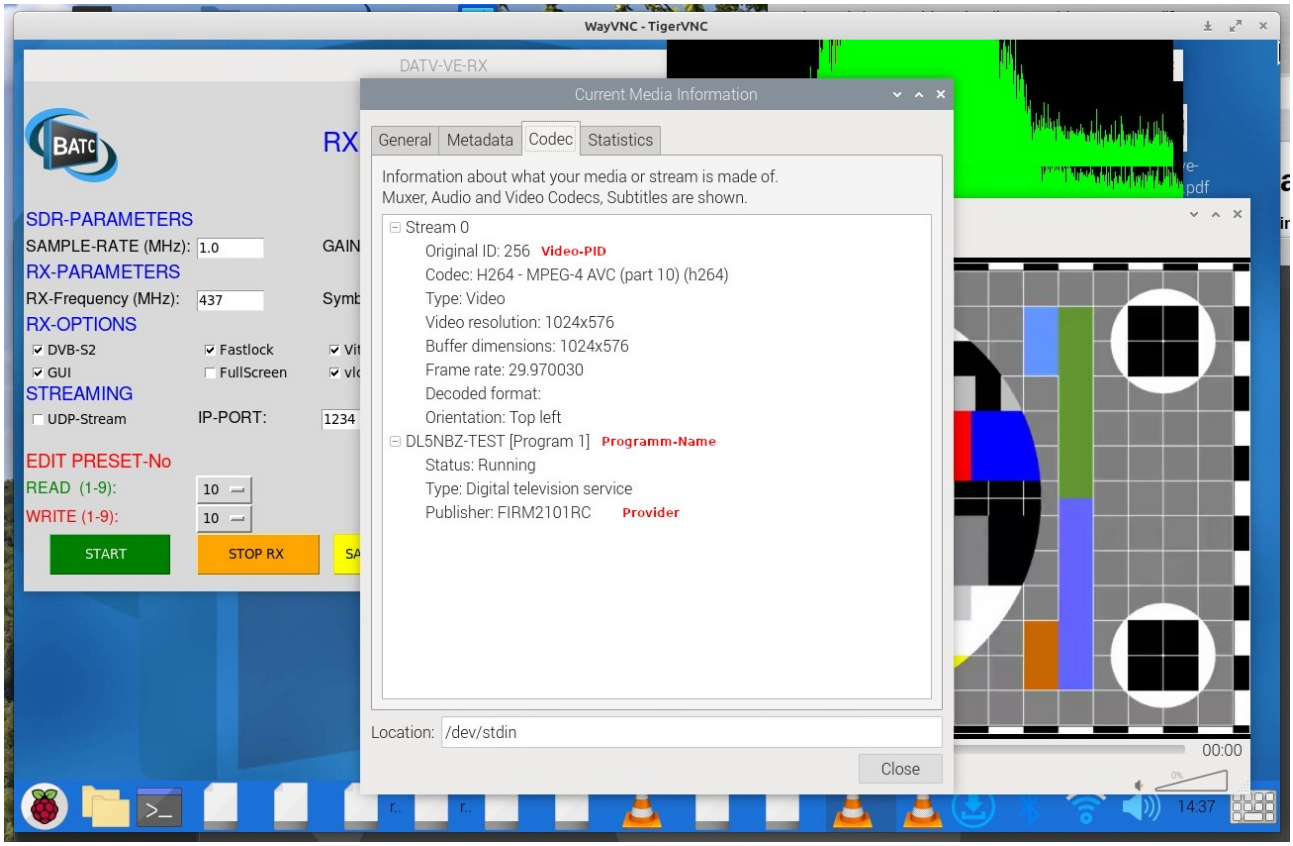
Button BASIC_CONF: When you press the program BASIC_CONF

Figure 1: Various RTL-SDR sticks

Displaying the data Of which: Service Description Table (SDT)

For a DVB format dispatch if the transmitter is correctly configured, the call sign and other information about the codecs used are also transmitted in digital form, it is possible to use the call sign, if the call sign is missing in the image content, from which **Service Description Table (SDT)** to determine.

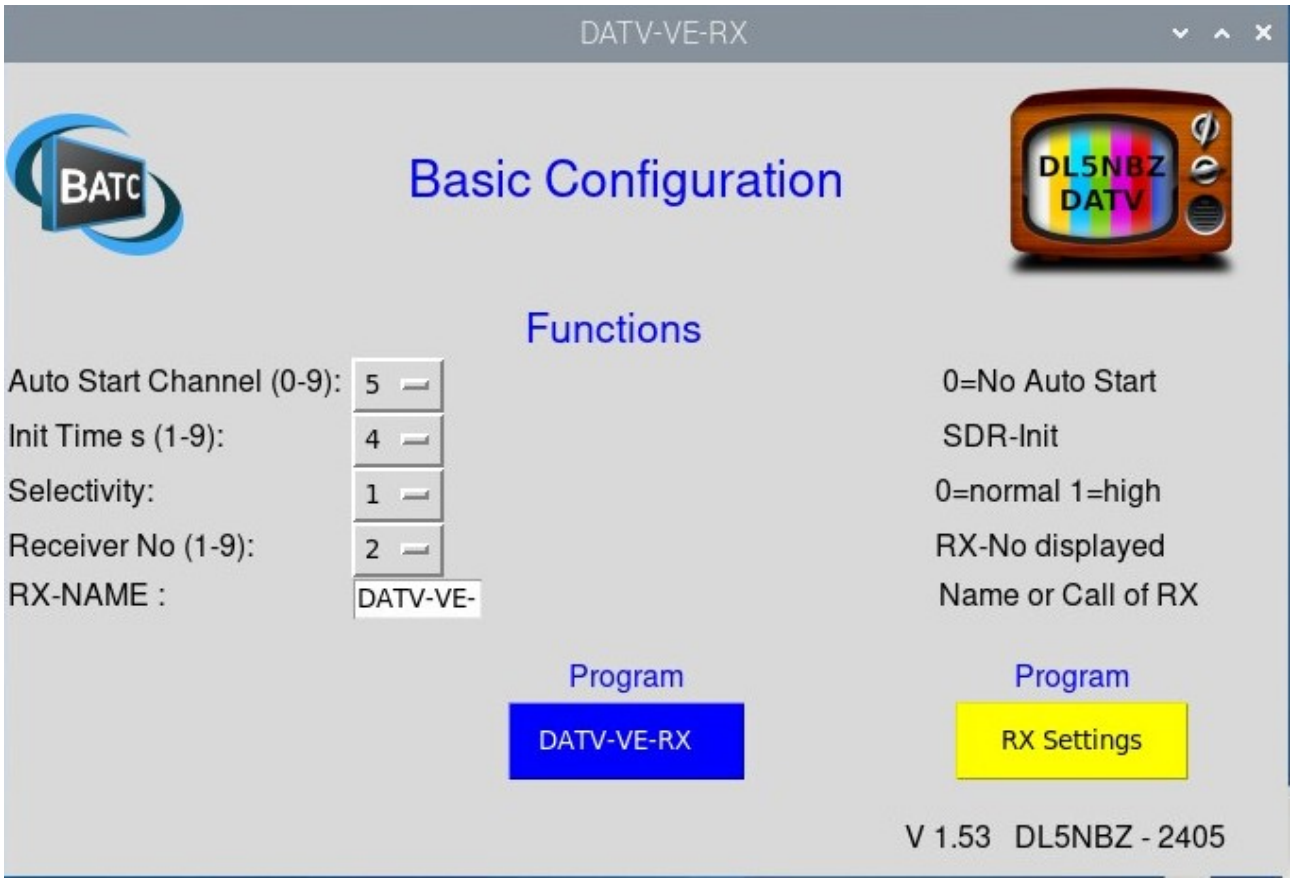
To save me the effort of extracting from the transport stream, I use the function of **VLC**. The **VLC** to use as a media player for reception, **SETTINGS** „**VLC**“ has to be ticked. At reception, the broadcast will be displayes with the VLC. To display the SDT data during the ongoing reception, click “Tools” in the VLC window and then click “Codec information”. The following window opens:



In the “Codec” tab you will find interesting data.

New in version V1.53

3. basic_conf.py



Auto Start Channel (0-9):

Here, one of the nine preset channels can be selected as an auto start channel. The assignment follows a telephone keyboard. 0 = no autostart takes place.

1	**2**	**3**
4	**5**	**6**
7	**8**	**9**

Init Time s (1-9):

Here, the time duration of the initialization of the RTL-SDR sticks can be set in seconds. The value depends on the hardware and must be found by testing. A good start value is 4. For the period of initialization, the triggering program displays a red bar on the top.

Selectivity:

Here, the receiver can be switched between standard selectivity (0) and high selectivity (1). For the use of high selectivity, initialization is necessary.

Receiver No (1-9):

Here a receiver number can be set when displaying with ffplay. This is advantageous if several receivers are operated in parallel.

RX-NAME:

In addition to the recipient number, a name entered here can be displayed before the recipient number. If this field is empty, only the recipient number will be displayed.

The data are coded for data exchange with the other program parts in the first line of the **presets.csv**.

Button DATV-VE-RX:

By pressing the program part DATV-VE-RX is started.

RX-SETTINGS button:

By pressing the program part RX-SETTING is started.

Note: Changes in **basic_conf.py** are in **settings.py** available and can be used there immediately. Only after storage in a new Preset channel are they in **datv-ve-rx.py** effective.

4. presets.csv

In the file **resets** all parameters required for reception are stored. The file is in **CSV-Forma**t creates and consists of 11 rows with 3 columns. The Tabulator is used as a column separator.
The first line contains Data for the individual program parts. The first column contains the **LABEL names**, so the labels of the buttons.
The second column contains the **Background color** of the buttons.
In the third column you find **operating system command,** to start the recipient, the decoder and the media player. Numerous parameters are passed here. The syntax is extensive and complex. Without a precise knowledge of these parts of the program, you should leave your fingers away of changes.
The programme **settings.py** makes this much more reliable.
If you want the file **presets.csv** have lost, is the safest way to delete the file. At the next start of the program, it will be back with default values new ,

The presets.csv version 1.53 file is no longer compatible with previous versions and is no longer suitable for manual processing.

5. Virtual keyboard

Since the version V1.10 a virtual keyboard (on-screen keyboard) is active.
A complete operation of the receiver via the touch screen is now possible.

In the actual receiver user interface has always been able to start and finish the presets via the touch screen. The virtual keyboard is only required in the settings.py program. Here you can click into the white input fields by touch. Then you open the virtual keyboard by touching the keyboard icon right in the taskbar. After you have done the inputs, click on the Enter button and can then turn off the virtual keyboard again by clicking on the keyboard icon.

For good usability, I recommend touch displays with at least 10.1” size.

6. VNC server

On the DATV-VE-RX the VNC server is activated by default. If the DATV-VE-RX is connected to the home network, you can connect to the DATV-VE-RX with a VNC viewer from any PC via the VNC viewer. The following data is required:

IP address the DATV-VE-RX, to find in your own router or the Raspi
User name: **pi**
Password: **raspberry**

After connection to the local PC, the use opensrsurface of the DATV-VE-RX on the PC and you can use the receiver completely via the network.

7. FTP-Server

From version V1.53, a FTP server is running in the background of the receiver. You can download or upload files from the receiver via the FTP server. This brings recorded transport streams or snapshots to your own PC. As a FTP client you can use Filezilla

IP address the DATV-VE-RX, to find in your own router or the Raspi at the top right in a gray field.
User name: **pi**
Password: **raspberry**
Port: **21**

After connecting, you are automatically in the directory **/home/pi/desktop/videos**, in which the receiver stores recorded transport streams and snapshots. You cannot switch to other directories for security reasons.

8. Installation of the software on the Raspi 5 or Raspi4

1. The complete image **datv-rx-153.zip** (approx. 7GB) is downloadable and write to a microSD card or a (USB3) stick with an image writer. The medium should be 32 GB large. I recommend the program **Etcher** (etcher.io). Etcher is available for Windows, MacOS and Linux. For writing the image with Etcher, the Zip file does not have to be unpacked. After writing the image to the medium, two partitions are present on the medium: **bootfs** (FAT32) and **rootfs** (EXT4). On Windows systems the partition **rootfs** not shown, Windows cannot work with the EXT4 file system.

2. Connecting the medium to the Raspi, and at least screen and RTL-SDR-Stick.

3. Turn on Raspi. The Raspi bootes up to the operating system and goes down immediately. Shortly after that, he automatically restarts. In this process, the software expands the partition **rootfs** to the full remaining size of the medium. The receiver software is then automatically started. **During this process do not turn off the Raspi or from the power supply !!!**

4. It is recommended to use the Raspi with the local Network to connect either via LAN or WLAN.

5. If you are asked to enter a username and password, the default settings of RaspianOS apply:
User name: **pi** Password: **raspberry**

Development progress

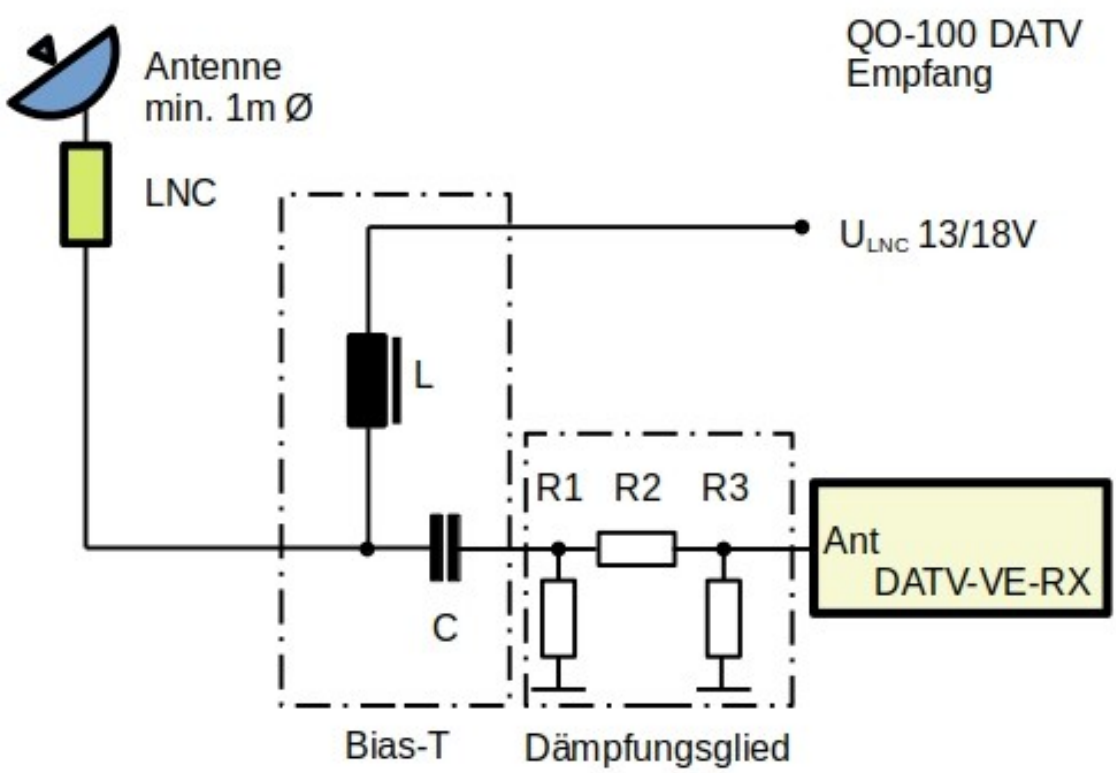
V 0.4	March 24	functioning RX, but no display in the terminal
V 0.5	April 24	first functioning RX version in the terminal on the Desktop
V 0.7	April 24	first cruel GUI on desktop
V 0.81	May 24	first halfway usable GUI for presets
V 0.85	May 24	reliable call of rtl_sdr, leandvb and mplayer from the Python3 GUI
V 0.90	May 24	Presets in a file (presets.csv). Planned Functional scope **datv-ve-rx.py** achieved. Experiments with **ffplay** are promising. With **ffplay** will make the video much faster as with the **mplayer**. With **settings.py** can now any frequency with input and started any parameters to be. The data will be presented as a tenth preset in **presets.csv** pirated. A review entered data is not done.
V1.01	May 24	Programme part **datv-ve-rx.py V1.01** with the Fulln planned range of functions. Checks presence of File **presets.csv** ab; if the file does not exist is, it is created with standard values. Programme part **settings.py** with the Fulln planned Range of functions. Some **Options** (drift, record ldpc) are not yet unlocked. The program package is therefore operational.
V1.02	June 24	Spectrum and IQ display for small screens adapted. Function **drift** is now unlocked.
V1.03	July 24	For small screens, the program can now a parameter. For a 5’ Start the program with **./datv-ve-rx.py 5**. With other values starts Program with the default values for 7” or größhe. The **record**-Function is for transport streams unlocked. The transport stream files Directory **/home/pi/desktop/videos/** stored. The directory is directly accessible from the desktop. Ein tonnes **recordiq**-Function has been added to the Reception of the IQ data for a later to record processing. With the new **READ**-Function in Setting-Program can now be Load programme places for editing.
V1.10	Junk 25	Virtual keyboard introduced. The decoded signal can be sent via UDP stream to other

		Computers are streamed. The MPLAYER was removed and VLC as second media Player used. With the VLC you can also Take screenshots. VLC also shows the image faster on. A symbol rate scan can be used. For unknown symbol rate will be the usual symbol rate are scanned for DATV.
V1.53	Sep 25	Possibility to switch between two bandwidths. The bandwidths are stored in tables and can are not changed manually. The user interface was made more clear. A new Program section has been added to global to change settings in the program. A FTP server was activated on the receiver to load files from receiver to PC or from PC on the receiver. It was a car start introduced after the start of the receiver one of the nine channels from DATV-VE-RX starts. The RTL SDR driver has been updated. The RTL-SDR-V4 now works completely with the receiver

QO-100 reception

The receiver lives from a good signal/noise ratio. Therefore, the amplification of the receiver (Gain) should be set in such a way that as low a basic noise as possible can be seen in the spectrum and the useful signal clearly in the spectrum. heeint. The LNC has a very high through gain and overloads the receiver particularly with short cable lengths between LNC and receiver. The power supply of the LNC is fed through a Bias-T.

Here is a schematic representation:



If the LNC has too large gain and the receiver cannot be regulated far enough with the gain control, an additional attunator must be inserted between Bias-T and the receiver. The attunation value depends on the amplification of the LNC. A dish of at least 1 m diameter is required for the QO-100 reception. For the reception of the beacon a symbol rate of 1500 kS/s is necessary and can now be selected directly. The receiver should be on the transponder with **SEL HIGH** to be operated.

Appendix

Supported RTL-SDR Hardware

In addition to the above mentioned original RTL-SDR sticks are following sticks known to work with the RTL-SDR software:

VID	PID	tuna	device name
0x0bda	0x2832	all of them	Generic RTL2832U (e.g. hama nano)
0x0bda	0x2838	E4000	ezcap USB 2.0 DVB-T/DAB/FM dongle
0x0ccd	0x00a9	FC0012	Terratec Cinergy T Stick Black (rev 1)
0x0ccd	0x00b3	FC0013	Terratec NOXON DAB/DAB+ USB dongle (rev 1)
0x0ccd	0x00d3	E4000	Terratec Cinergy T Stick RC (Rev.3)
0x0ccd	0x00e0	E4000	Terratec NOXON DAB/DAB+ USB dongle (rev 2)
0x185b	0x0620	E4000	Compro Videomate U620F
0x185b	0x0650	E4000	Compro Videomate U650F
0x1f4d	0xb803	FC0012	GTek T803
0x1f4d	0xc803	FC0012	Lifeview LV5TDeluxe
0x1b80	0xd3a4	FC0013	Twintech UT-40
0x1d19	0x1101	FC2580	Dexatek DK DVB-T Dongle (Logilink VG0002A)
0x1d19	0x1102	?	Dexatek DK DVB-T Dongle (MSI DigiVox mini II V3.0)
0x1d19	0x1103	FC2580	Dexatek Technology Ltd. DK 5217 DVB-T Dongle
0x0458	0x707f	?	Genius TVGo DVB-T03 USB dongle (Ver. B)
0x1b80	0xd393	FC0012	GIGABYTE GT-U7300
0x1b80	0xd394	?	DIKOM USB-DVBT HD
0x1b80	0xd395	FC0012	Peak 102569AGPK
0x1b80	0xd39d	FC0012	SVEON STV20 DVB-T USB & FM