

All-In-One

Un transceiver DATV

utilisant le logiciel SDRangel

NÎMES 2024

HB9DUG Michel

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SDRangel quesaco ?

TX & RX Software Defined Radio

Logiciel libre développé par Edouard Griffiths F4EXB



SDRangel

Utilise des **sample source plugins** pour collecter des échantillons I/Q à partir d'un hardware SDR. Ensuite, dans la bande passante retournée, éventuellement décimée, un ou plusieurs **channel Rx plugins** peuvent être utilisés pour démoduler, décoder ou analyser une partie de ce spectre.

Utilise des **sample sink plugins** pour envoyer des échantillons I/Q à un hardware SDR. Un ou plusieurs **channel Tx plugins** peuvent être utilisés pour produire des échantillons modulés qui sont mélangés dans une bande passante de transmission avec une éventuelle interpolation avant d'être envoyés au hardware SDR.

L'interface utilisateur est organisée en espaces de travail à l'intérieur desquels vous placez les différents composants : appareil, spectre principal, canaux, fonctionnalités.

Sample source plugin: PlutoSDR



Channel Rx plugin: DATV Demodulator

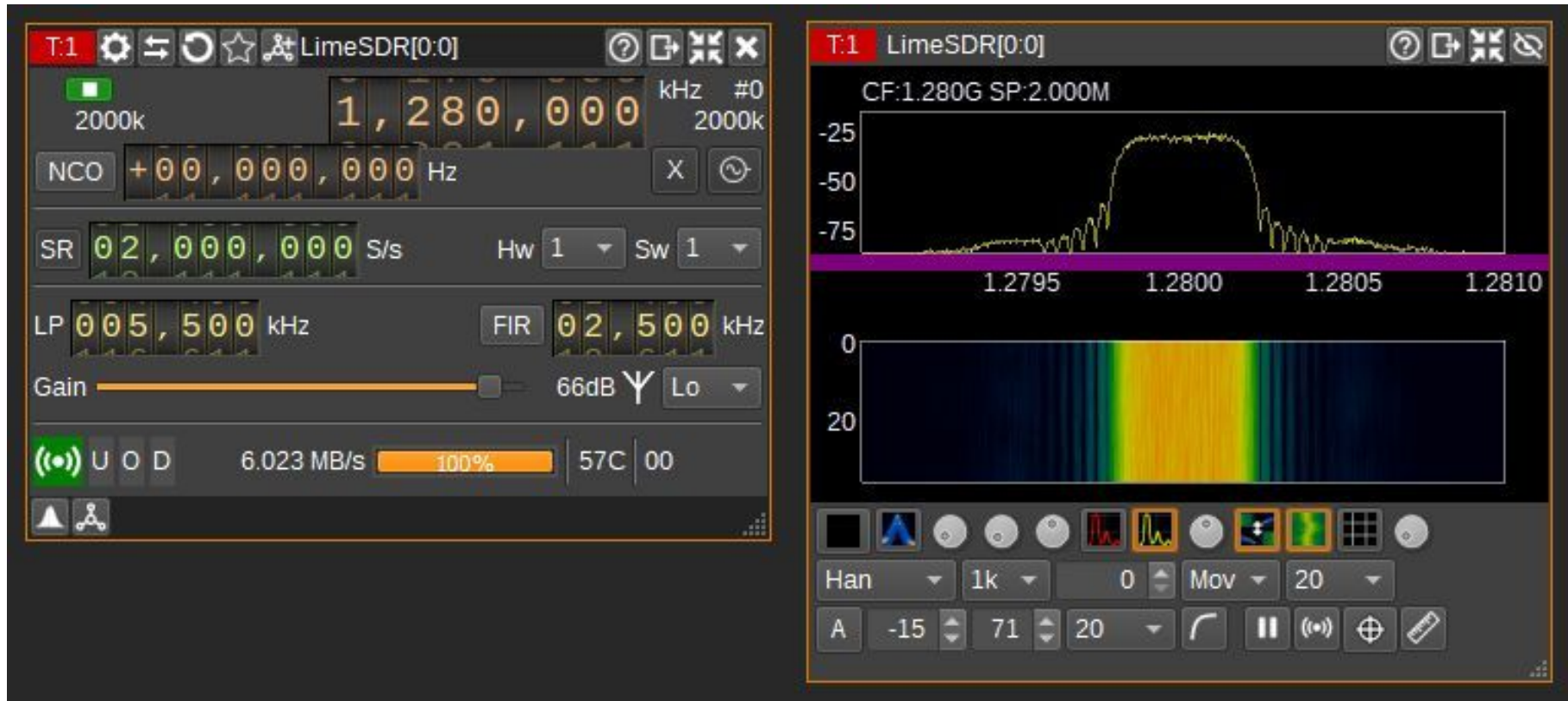
The screenshot shows the DATV Demodulator interface with the following settings:

- RF Settings:** Frequency offset Δf is +00,000,000 Hz, Bandwidth (BW) is 00,600,000 Hz, and gain is -14.6 dB.
- DATV Settings:** DVB-S2, MCOD QPSK 2/3, QPSK, Symbols/s: 333000, 2/3, Notch filter: 0.
- Advanced Settings:** FAST LOCK, HARD METRIC, SOFT LDPC, ALLOW DRIFT, VITERBI (checked), MAX BFL: 0.
- FIR RRC:** R.off: 35, Exc: 10.
- Performance:** Data: 4.2 MB, Speed: 754.9 Kb/s, Buffer: 1%.
- Video:** Video is checked and active.
- Metrics:** MER is 21.5, CNR is 18.3.
- UDP:** Addr: 127.0.0.1, Port: 8882.
- Bottom Bar:** 1 280 000 000.

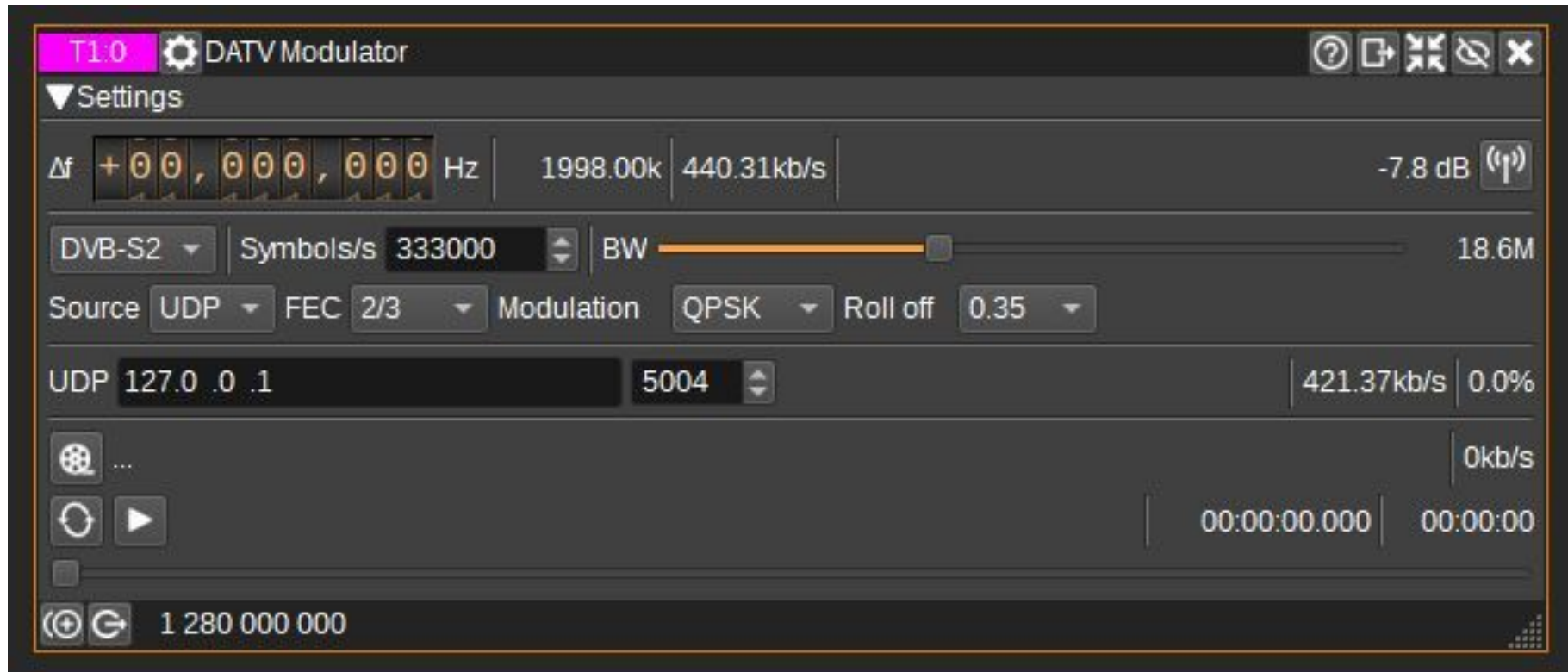
The screenshot shows the DATV Demodulator interface displaying a video stream of a test signal:

- RF Settings:** Frequency offset Δf is +00,000,000 Hz, Bandwidth (BW) is 00,600,000 Hz, and gain is -15.0 dB.
- Video Stream:** The video shows a test signal with a color bar, a clock, and the text "HB9DUG Test Signal".
- Metadata:** PID: 256 - Width: 960 - Height: 540, service_name: HB9DUG, service_provider: 0201, Codec: HEVC (High Efficiency Video Coding).
- Stream Control:** Data, Transport, Video, and Decoding are all checked.
- Bottom Bar:** 1 280 000 000.

Sample sink plugin: LimeSDR



Channel Tx plugin: DATV Modulator



User interface – Rx PlutoSDR / TX LimeSDR

The screenshot displays the SDRangel software interface, which is used for software-defined radio operations. The interface is divided into several panels:

- PlutoSDR [0] (R:0):** This panel shows the receiver settings for the PlutoSDR. The center frequency is set to 1,280,000 kHz. The LO (Local Oscillator) is set to 30000k ppm. The sample rate (SR) is 02,500,000 S/s, and the low-pass filter (LP) is 01,500 kHz. The gain is set to -51.00 dB. The interface includes a spectrum plot and a waterfall plot.
- LimeSDR [0] (T:1):** This panel shows the transmitter settings for the LimeSDR. The center frequency is 1,280,000 kHz. The NCO (Numerically Controlled Oscillator) is set to +00,000,000 Hz. The sample rate (SR) is 02,000,000 S/s, and the low-pass filter (LP) is 005,500 kHz. The gain is set to 66dB. The interface includes a spectrum plot and a waterfall plot.
- DATV Demodulator (R0:0):** This panel shows the settings for the DATV (Digital Audio Television) demodulator. The RF settings include a frequency offset of +00,000,000 Hz, a bandwidth (BW) of 00,600,000 Hz, and a gain of 0.3 dB. The DATV settings include DVB-S2, MCOD QPSK 2/3, QPSK modulation, 333000 Symbols/s, and a notch filter of 0. The interface includes a video display and a buffer status indicator.
- DATV Modulator (T1:0):** This panel shows the settings for the DATV modulator. The RF settings include a frequency offset of +00,000,000 Hz, a bandwidth (BW) of 1998.00k Hz, and a gain of -7.9 dB. The DATV settings include DVB-S2, 333000 Symbols/s, QPSK modulation, and a roll-off of 0.35. The interface includes a video display and a buffer status indicator.

The bottom of the interface shows the system information: SDRangel 7.3.1 Qt 5.15.2 OpenGL 4.6 x86_64 Windows 10 Version 2009 2022-06-17 12:33:48 Europe de l'Ouest (heure d'été).

User interface – Rx LimeSDR / Tx LimeSDR

The screenshot displays the SDRangel software interface, which is used for software-defined radio operations. The interface is divided into several main sections:

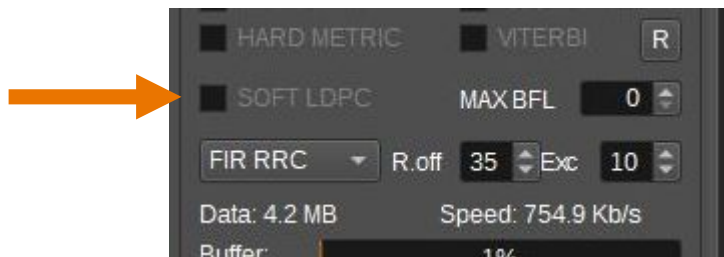
- Top Left (Rx LimeSDR [0:0]):** This panel shows the receiver's configuration. It includes a frequency display set to 1,280,000 kHz, a sample rate of 2,000,000 S/s, and a bandwidth of 2000 kHz. It also features a spectrum plot and a waterfall plot.
- Top Right (Tx LimeSDR [0:0]):** This panel shows the transmitter's configuration. It includes a frequency display set to 1,280,000 kHz, a sample rate of 2,000,000 S/s, and a bandwidth of 2000 kHz. It also features a spectrum plot and a waterfall plot.
- Bottom Left (DATV Demodulator):** This panel shows the settings for the DATV demodulator. It includes a frequency display set to +00,000,000 Hz, a bandwidth of 00,600,000 Hz, and a gain of -7.1 dB. It also features a constellation plot and a video output section.
- Bottom Right (DATV Modulator):** This panel shows the settings for the DATV modulator. It includes a frequency display set to +00,000,000 Hz, a bandwidth of 1998.00k Hz, and a gain of -7.7 dB. It also features a modulation settings section and a video output section.

The interface also includes a menu bar (File, View, Workspaces, Preferences, Help) and a toolbar with various icons for file operations and playback. The status bar at the bottom indicates the version (SDRangel 7.3.1) and the date/time (2022-06-17 12:39:58 Europe de l'Ouest (heure d'été)).

SDRangel – DATV Demodulator

DVB-S2 spécifique - Soft LDPC décodeur

Il peut être utilisé pour décoder des signaux inférieurs à ~10 db MER, qui est la limite du décodage LDPC (Low Density Parity Check)..



Détails ici:

<https://github.com/f4exb/sdrangel/blob/master/plugins/channelrx/demoddatv/readme.md>

SDRangel Features – Lime RFE USB Controller



F:0 Lime RFE

▼Settings

Dev Open Close

to GUI Apply

Rx channel

Wideband 1-1000MHz

Rx port TXRX (J3) Att 0 dB Notch

Tx channel Same as Rx

Wideband 1-1000MHz

Tx port TXRX (J3)

▼Power

Pwr Corr 0.0

Fwd 00.0 | Ref 00.0 | RL 00.0 dB | VSWR 1.000

Abs power 0.0 dBm 0.001 W Avg

▼Control

Mode None RxTx Sync

RX TX Toggle Rx R:0 Tx T:1

SDRangel support

SDRangel peut être téléchargé ici :

<https://github.com/f4exb/sdrangel/releases>

pour:

- Windows 10/11
- MAC os
- Linux (ubuntu 22.04)
- from source

Un manuel en ligne est disponible pour chaque module en sélectionnant l'icône point d'interrogation dans le coin supérieur droit du module de la fenêtre..



Un forum est disponible:

<https://groups.io/g/sdrangel/>

References

The screenshot shows the homepage of swissATV.ch. The header includes the logo 'swissATV.ch' with the tagline 'groupe technique ATV de l'IAPC'. Navigation tabs are provided for Home, News, Activités, Hardware, Académie, and Labs. A search bar and a font size control are also present. Below the header, a secondary navigation bar offers filters for All, News, Labs, Tests, Hardware, Software, and Académie, along with sorting options: Default, Title, Date, and Random.

The main content area features a grid of four article cards:

- A-Tech 2014 Automne**: 2014-10-22 09:50:46. Includes a photo of a workshop.
- DATV-Express DVB-T 1 MHz**: 2014-10-13 11:10:14. Includes a photo of a green PCB.
- H264 DigiThin**: 2014-10-01 17:23:43. Includes a photo of a yellow PCB.
- DVB-T2, le standard pour...**: 2014-08-15 12:30:06. Includes a photo of an i-TAB DTV tablet.

Below the grid is a 'Hardware' section with five featured items, each with a 'Read More' button:

- SR-Systems
- MK808 DigiThin
- BATC DTX1
- AGAF
- Hides USB DVB-T

Good hack !