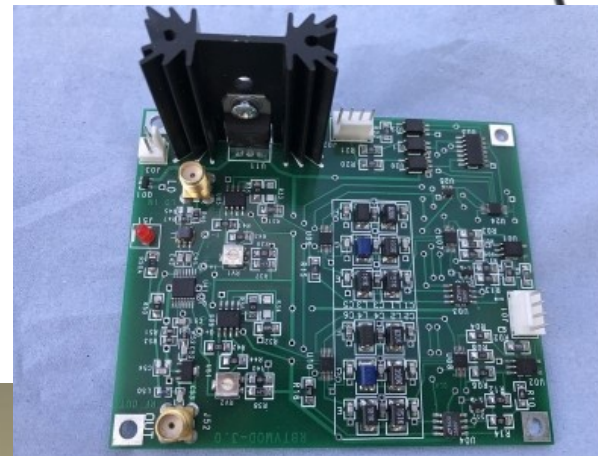
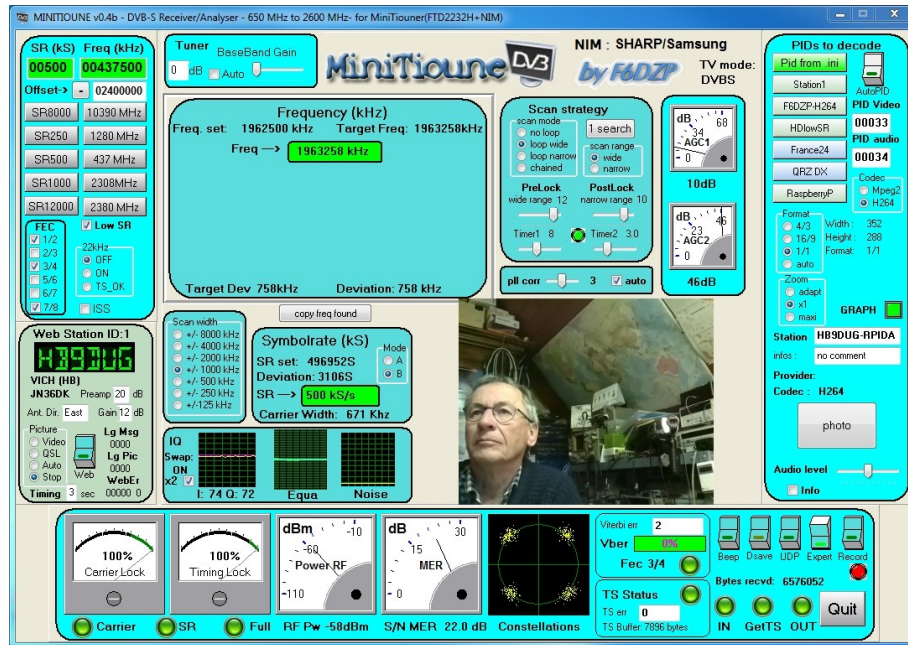


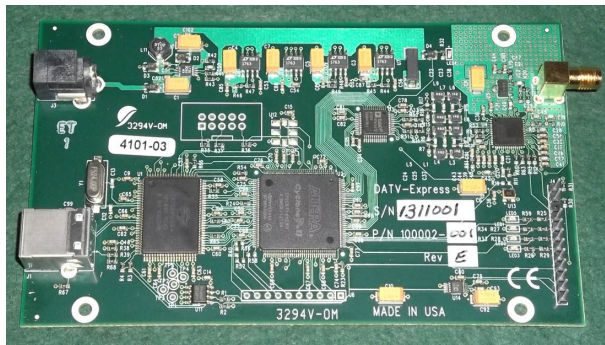
DATV – What is the best solution today ?



A-Tech 2017

HB9DUG Michel

14 octobre 2017



IAPC - ATV Technical Goup

It depends ...

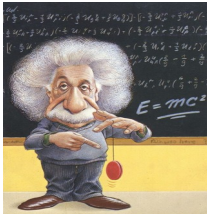
On your goal



I want to try DATV at the lowest price



I want a turnkey solution

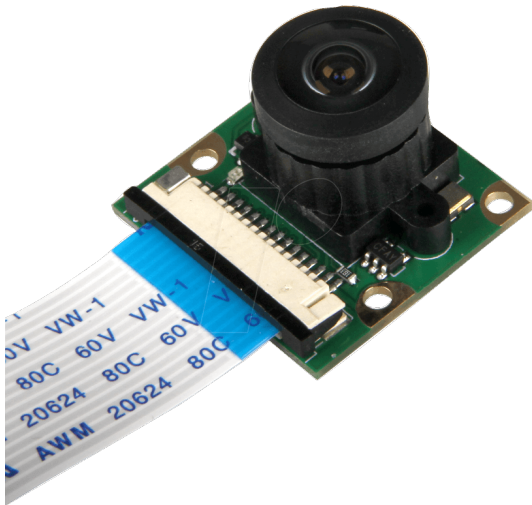


I want to be at the front end of the technology

Raspberry PI 3 solution



- A 900MHz quad-core ARM Cortex-A7 CPU
- 1GB RAM
- 4 USB ports
- 40 GPIO pins
- Full HDMI port
- Ethernet port
- Combined 3.5mm audio jack and composite video
- Camera interface (CSI)
- Display interface (DSI)
- Micro SD card slot
- VideoCore IV 3D graphics core
- **H.264 hardware codeur-décodeur**
- Camera 5 Mpixels, 1080p

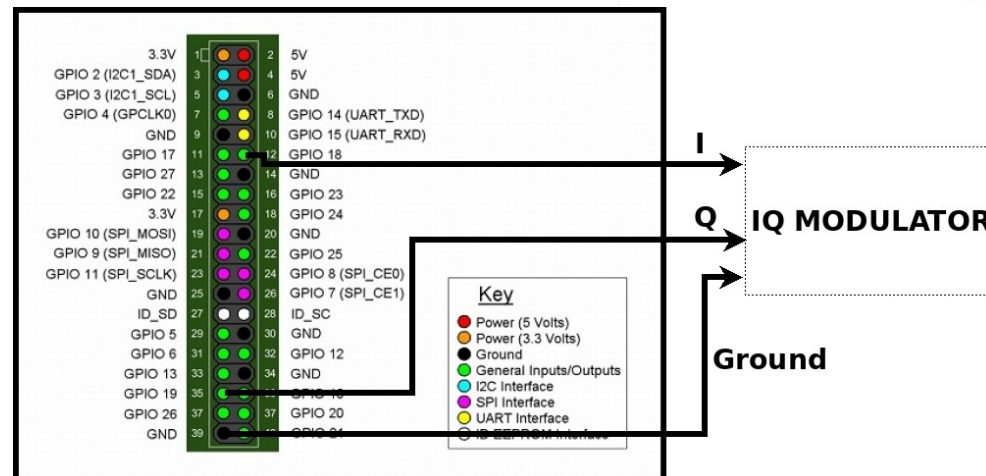
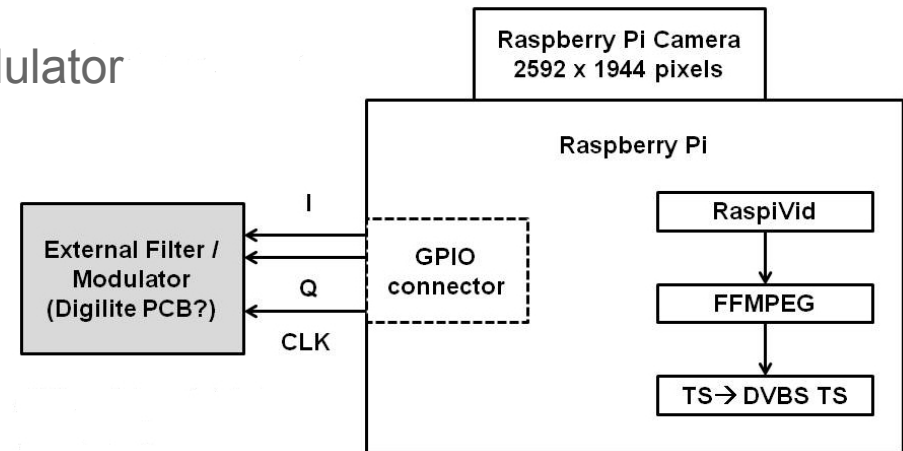


RpiDATV



The software developed by par Evariste F5OEO

- « turnkey solution »
a system image is available. Load it on a SD card, install it on the Rpi 3, switch on and RpiDATV is ready.
- Output mode:
 - IQ bit stream to feed an external QPSK modulator
 - A direct HF QPSK modulator
 - Portsdown
 - DATV-Express
 - TX DTX1



RpiDATV Ugly mode



Called Ugly because the RF modulation is done with square signals which implies a lot of harmonics.

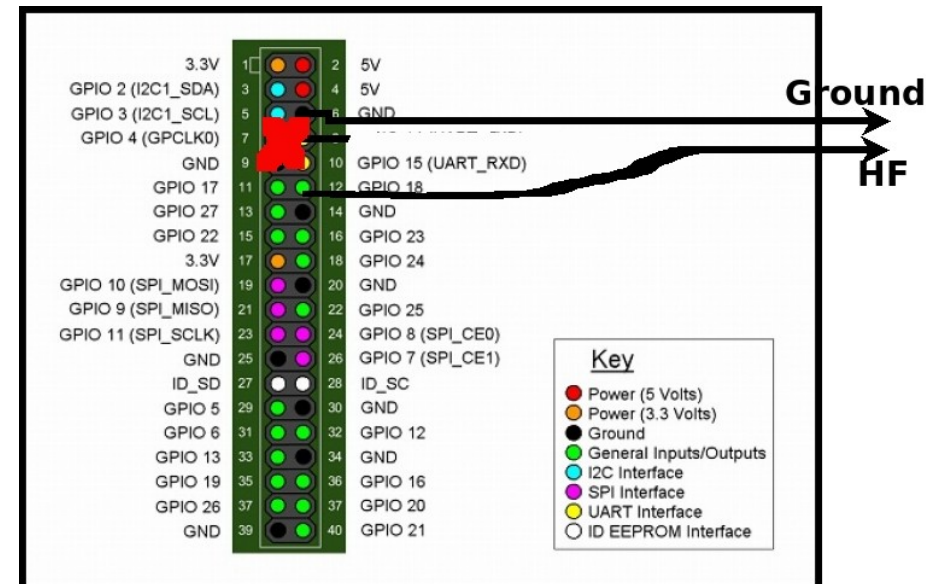
- DVB-S QPSK modulation
- Symbol rate 250 - 1500 Ks/s

Use the PLL programmable clock up to 250 MHz. We can therefore generate a QPSK signal up to 62.5MHz.

As the signal is square, we can receive also all even harmonics.

Harmonic 7 of 62.5 MHz is 437.5 MHz

Harmonic 17 of 62.5 MHz is 1.0625 GHz

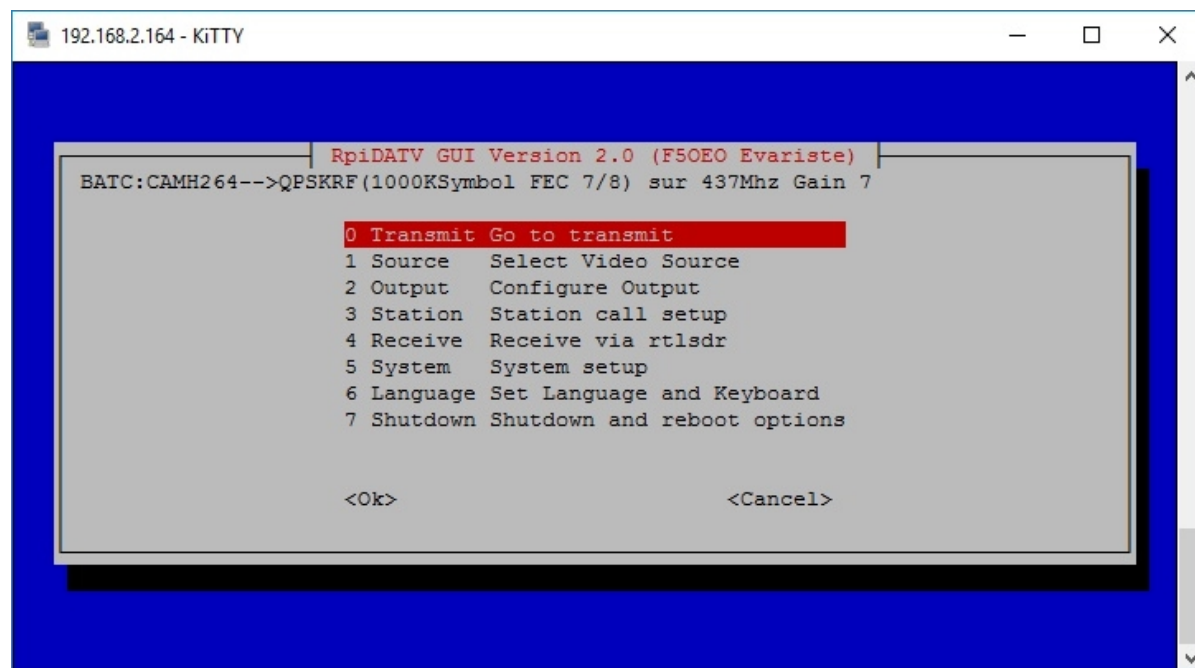
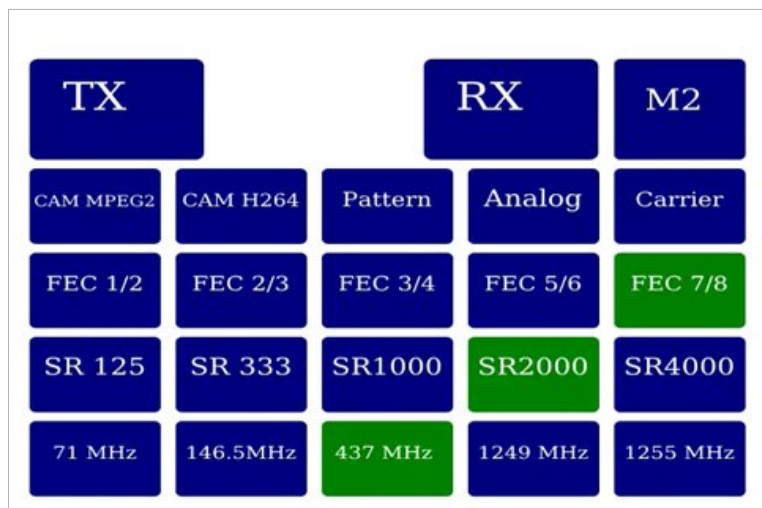


RpiDATV configuring & controlling the system



RpiDATV can control the transmitter (F1DJO, Portsdown, DATV-Express) in one of two modes:

- Through the console using a second computer (PuTTY, smarTTY)
- By the use of the Pi touchscreen (with preprogrammed parameters)

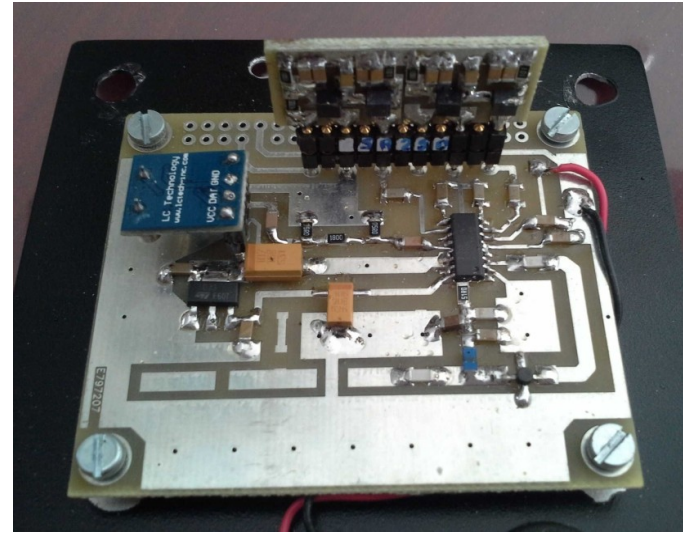
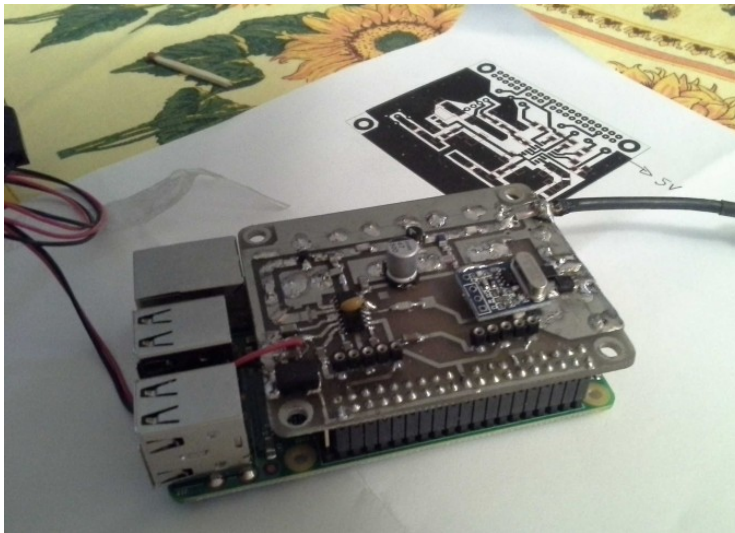


F1DJO modulator



A basic modulator very simple to realize, "plug and play" with RPI DATV and a Raspberry PI 3.

- DVB-S QPSK modulation
- 437 MHz
- Symbol rate 125 - 1500 Ks/s

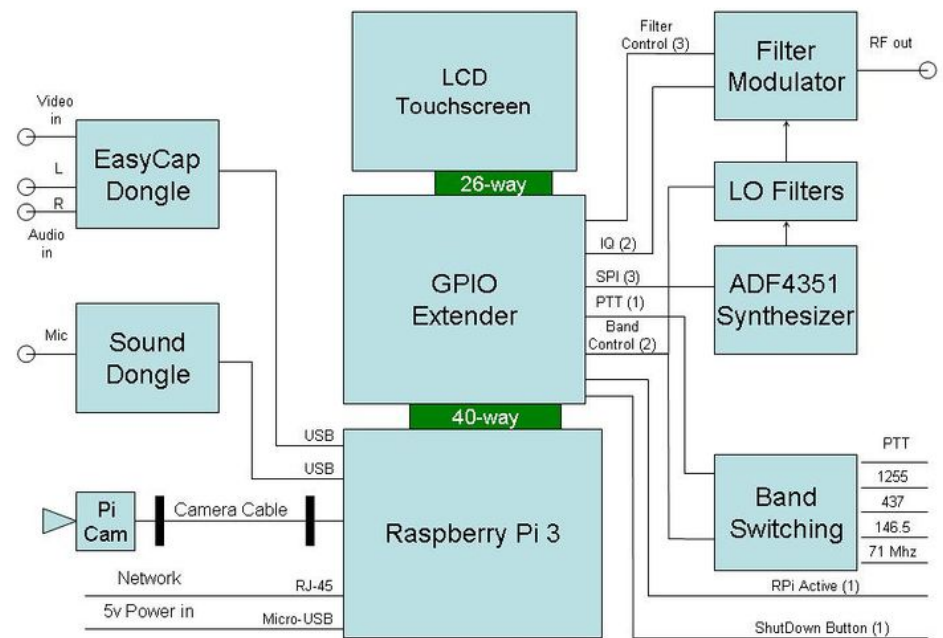


Portsdown Transmitter



Based on a hardware prototype from Jean-Pierre F6DZP, on RPIDATV from Evariste F5OEO realized by BATC members

- DVB-S modulation, covers 70 – 2'400 MHz, SR 125 Ks/s – 4 Ms/s
- MPEG-2 and MPEG-4 video encoding



The Portsdown ATV Transmitter

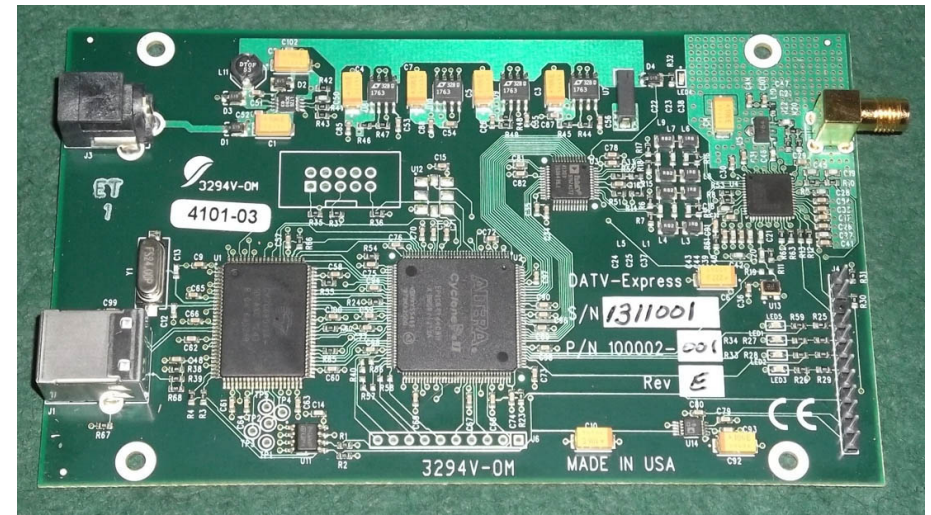
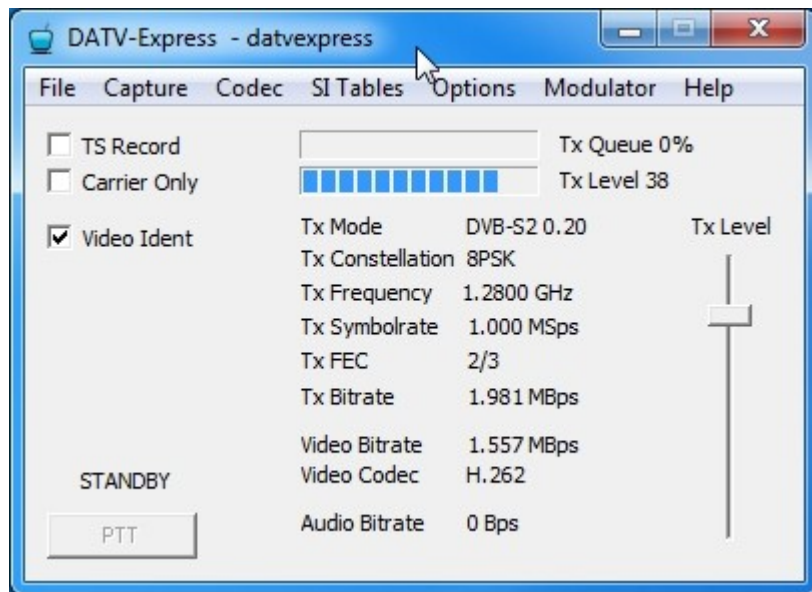
08GKQ 4 Feb 17

DATV-Express



Express DVB-S Transmitter software is developed par Charles G4GUO

- Run on Windows and support also reduce bandwidth transmission
- DVB-S/S2 (T) modulations



TX between 100 MHz and 2.45 GHz
Linux software version support also DVB-T

DATV-Express



vMix – Video mixing software



DATV-Express

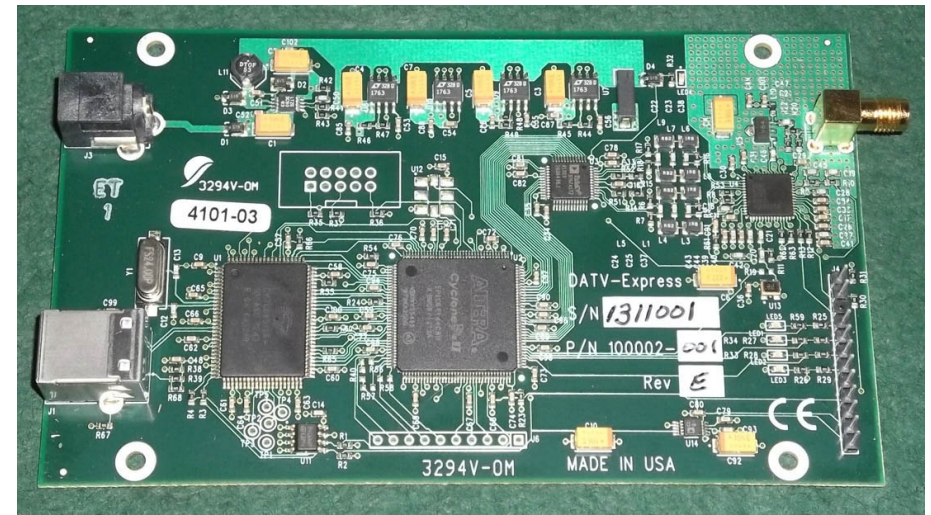


With RpiDATV developed by Evariste F5OEO and extended by BATC

- Run on Raspberry PI 3 and support also reduce bandwidth transmission
- DVB-S modulation only !

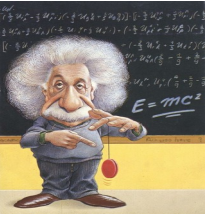


TX			RX		M2
CAM MPEG2	CAM H264	Pattern	Analog	Carrier	
FEC 1/2	FEC 2/3	FEC 3/4	FEC 5/6	FEC 7/8	
SR 125	SR 333	SR1000	SR2000	SR4000	
71 MHz	146.5MHz	437 MHz	1249 MHz	1255 MHz	

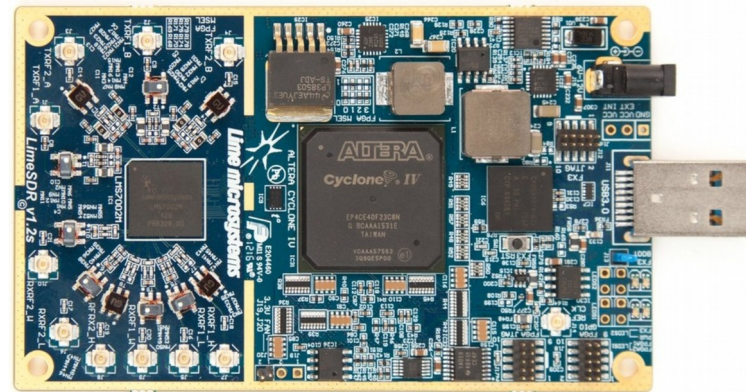


TX between 100 MHz and 2.45 GHz

SDR Hardware for DATV



Ettus B20x (70 MHz - 6 GHz)
1 RX et 1 TX channel, 2 RX et 2 TX channels



LimeSDR 100 kHz – 3.8 GHz, 2 RX et 2 TX channels



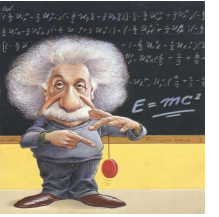
ADALM – Pluto 325 MHz - 3.8 GHz, (70 MHz - 6 GHz)
1 RX et 1 TX channel



LimeSDR Mini 100 kHz – 3.8 GHz, 1 RX et 1 TX channel

Other hardware: Blade RF, Hack RF, Red Pitaya

Software



Express DVB Transmitter

- LimeSDR
- ADALM-Pluto

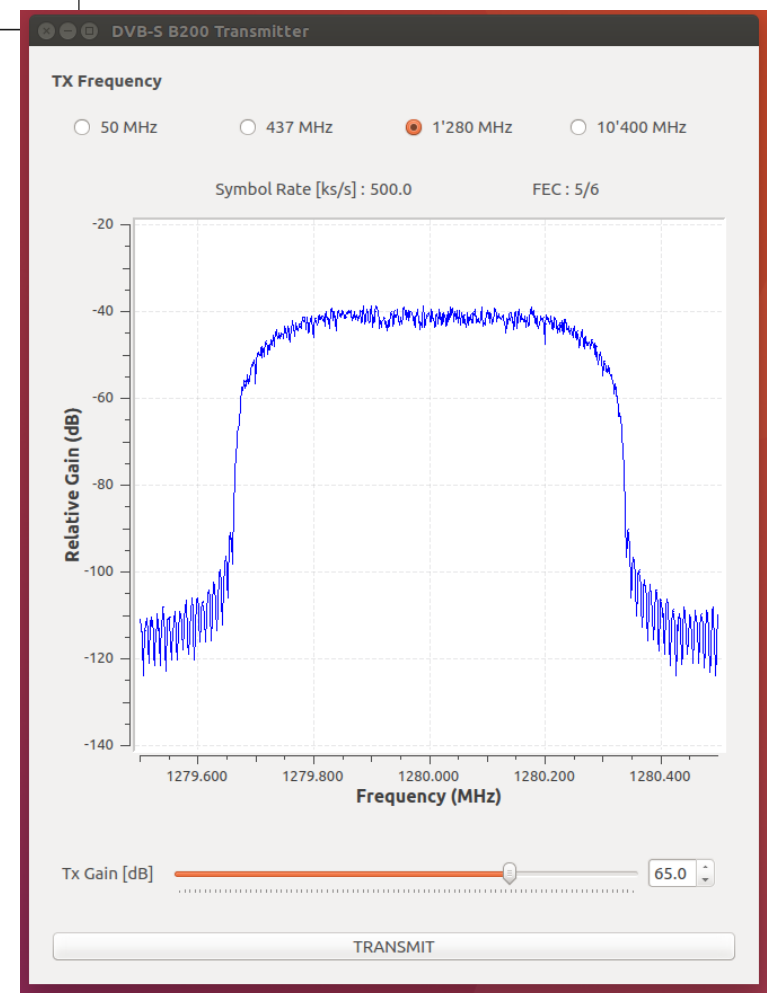
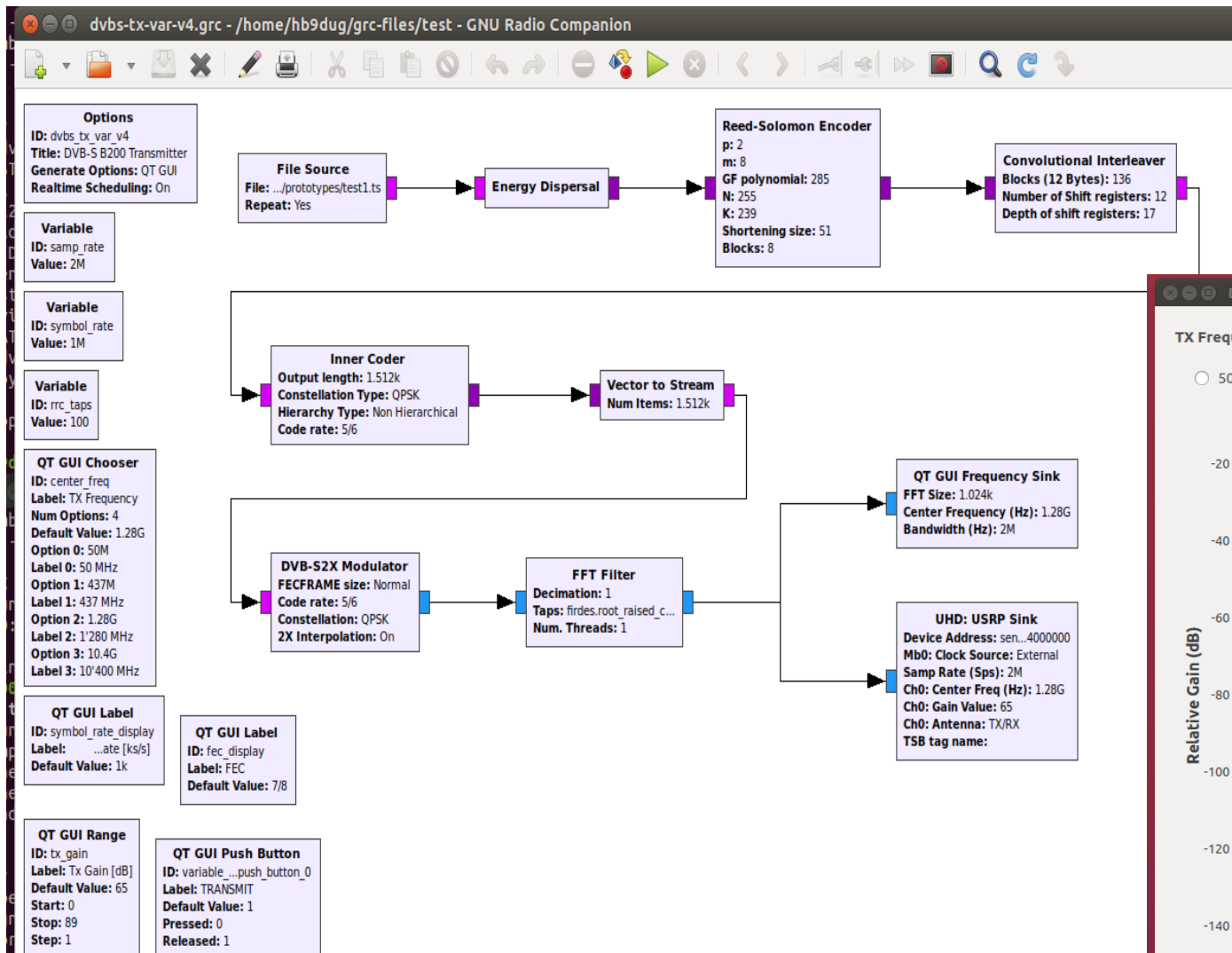
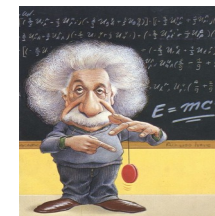
GNURadio

- LimeSDR
- ADALM-Pluto
- DATV Express (linux)
- RTL-SDR (receiver)

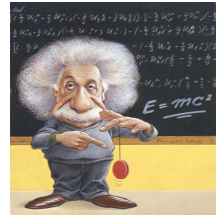
Pothos

- LimeSDR
- ADALM-Pluto
- RTL-SDR (receiver)

GNURadio environment

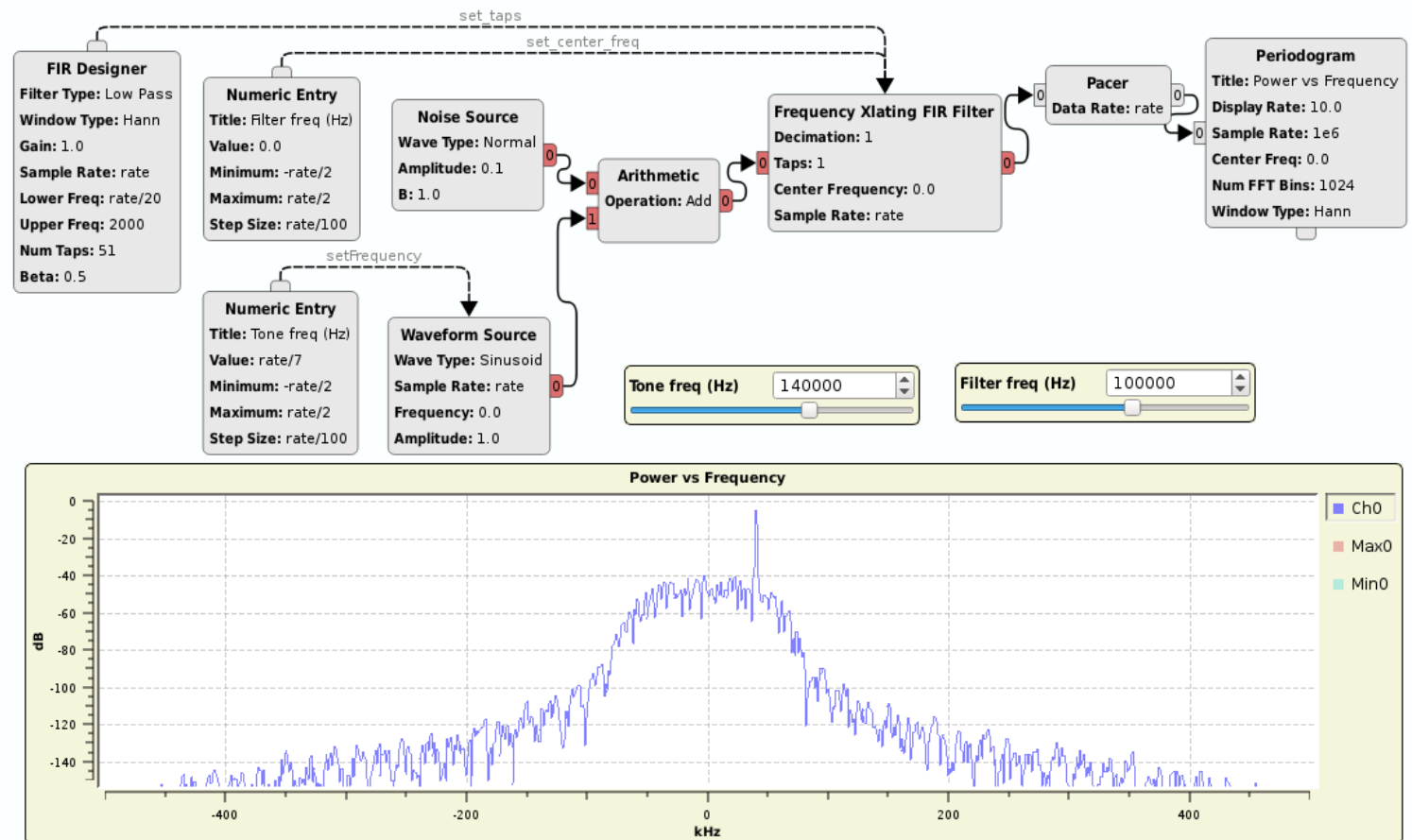


Pothos environment



Pothos is developed par Josh Blum

- Run on Windows, linux and OSX
- ATSC, DVB-T, DVB-T2, DVB-C and DVB-S2 modulation

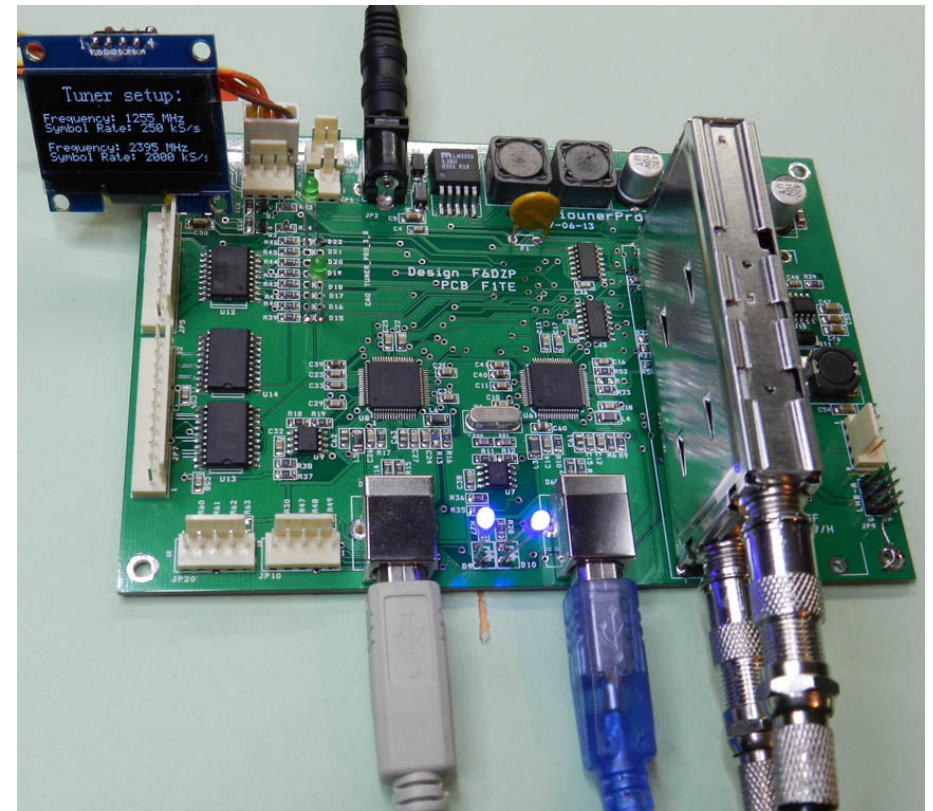


Pothos

MiniTiouner and MiniTiounerPro

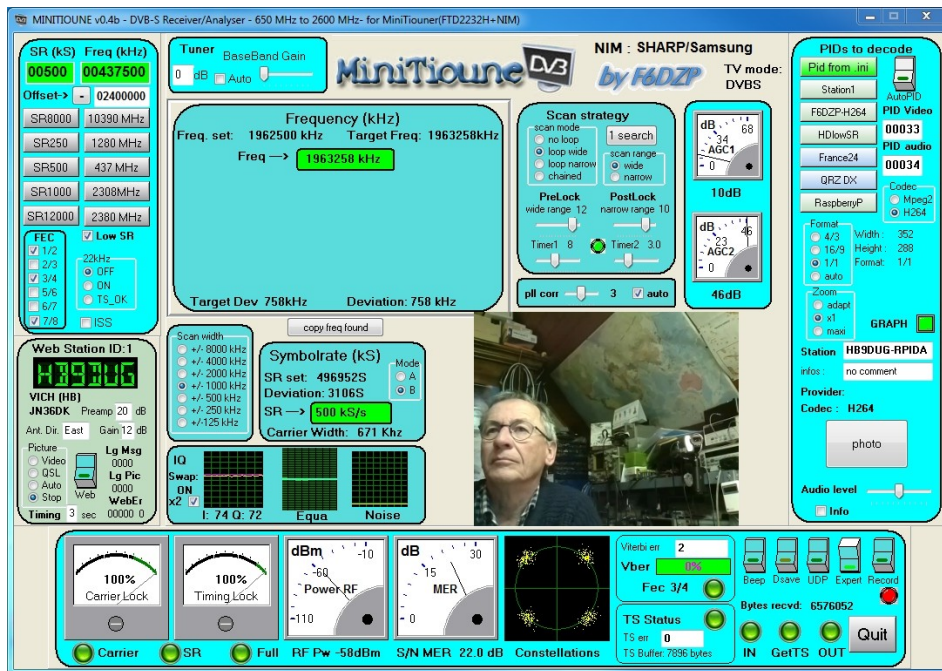
Concept by Jean Pierre F6DZP

- The goal : a USB DVB-S/S2 tuner running with MiniTouine software on a laptop supporting low SR mode



MiniTioune

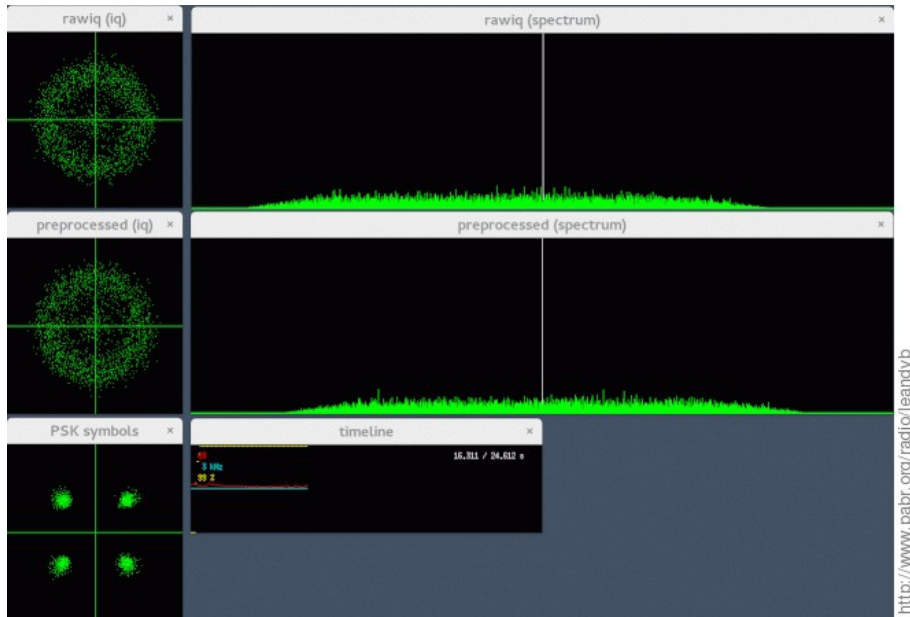
Software developed by Jean Pierre F6DZP



- Soft for reception and measures
- H.262, H.264 or H.265
- SR 115 - 27500
- Rx 950 – 2450 MHz (tuner dependent)
- Up to Full HD 1080

with MiniTioner/MiniTionerPro (USB)

Leandvb, DVB-S software demodulator



Software developed by Pascal F4DAV

- DVB-S software demodulator
- H.262, H.264 or H.265 (VLC)
- SR 125 – 2000 Ks/s
- Rx frequency (tuner dependent)

with rtl-sdr dongle

References

swissATV.ch
groupe technique ATV de l'IAPC

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et Express DVB Transmitter


Charles G4GUO a intégré ADALM-PLUTO, le SDR d'Analog

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Adalm Pluto

ADALM-PLUTO

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et All-in-One


Du nom d'Adalm-Pluto, ce module d'apprentissage actif des communications SDR

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Adalm Pluto


LimeSDR et DATV Express Transmitter

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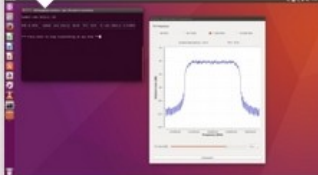
Forum DATV - Hamradio 2017

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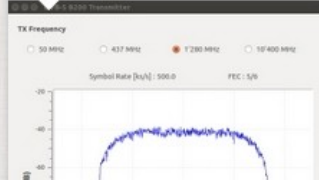
All-in-One DVB-S2

2017-08-19 15:49:17



All-in-One

2017-07-16 11:37:15



Good hack !