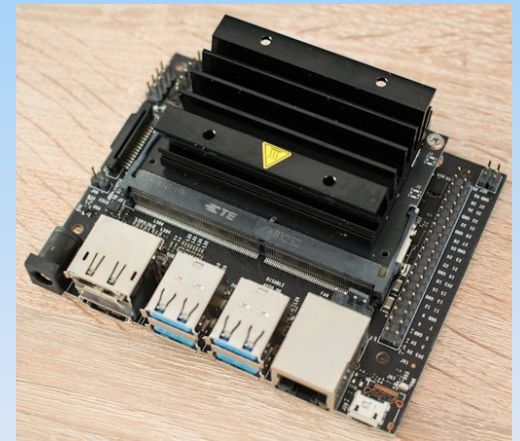




DATV Systems

Dave G8GKQ

Michel HB9DUG



Topics

-  Digital ATV Transmit Systems
-  Portsdown 2019
-  Portsdown 2019 on LimeNet Micro
-  The Future – The Jetson Nano?
-  Receive Systems
-  Questions



Commercial Solutions



SR Systems

- Current equipment limited to a minimum of 2 Mbits/s video encoding.

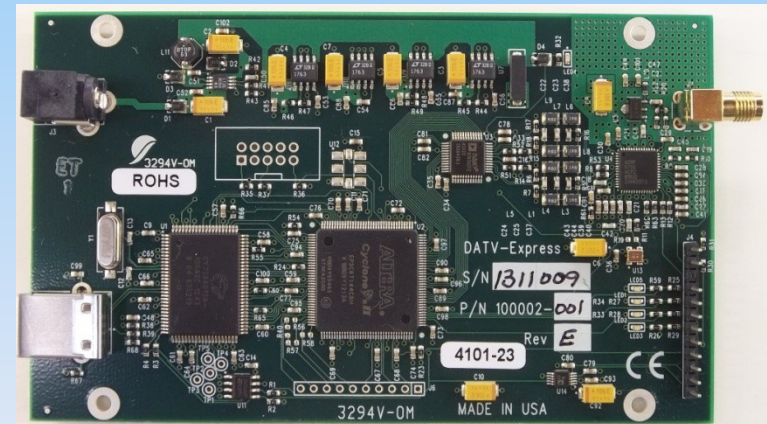


Ex-broadcast Equipment





- Normally limited to a Minimum of 1 MS

DATV Express Solutions




-  DATV Express hardware
 - With PC DATV Express Software (DVB-S/S2)
 - With Portsdown Software (DVB-S only)
-  DATV Express software (DVB-S/S2)
 - DATV Express Hardware
 - LimeSDR Mini and USB
 - Pluto



F5OEO derived Solutions

-  DigiLite (MPEG-2, DVB-S)
-  Portsdown 2018 (MPEG-2 & H264 DVB-S)
 - Hardware Filter/Modulator board
-  Portsdown 2019 (DVB-S and DVB-S2)
 - LimeSDR Mini or USB
-  Jetson Nano (H264 and H265)
 - LimeSDR
 - Hardware H265 encoding

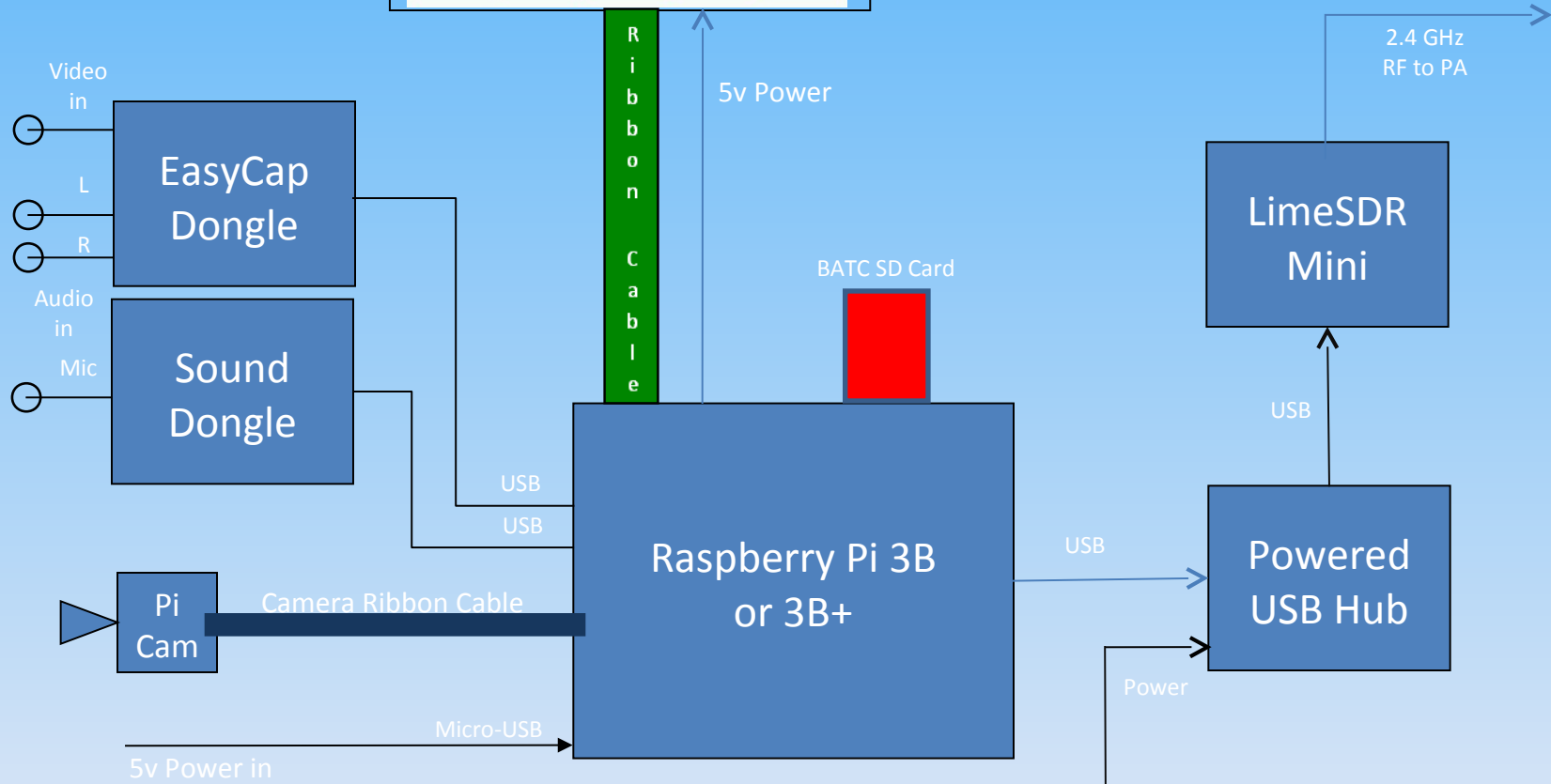
Portsdown 2019

-  Heritage – Portsdown 2018
 - Take F5OEO’s code and make a user-friendly DATV transmitter (an appliance)
-  Portsdown 2019 uses the same codebase, but expanded to drive the LimeSDR
-  Now a “no-solder” solution

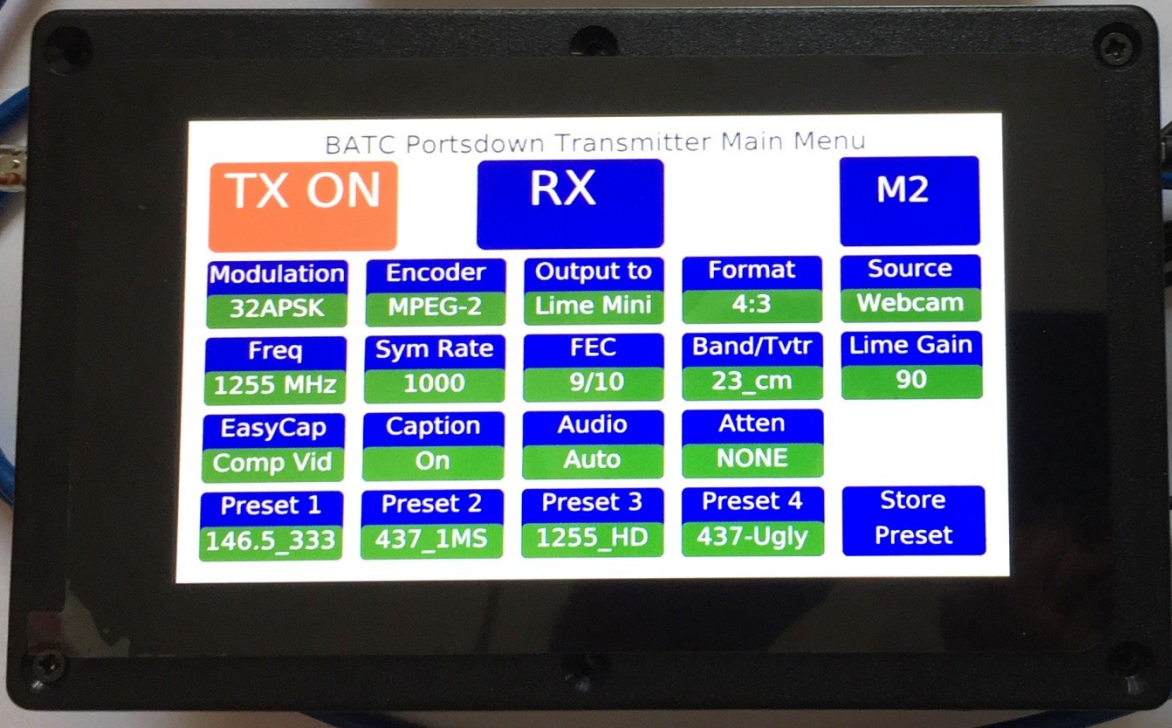
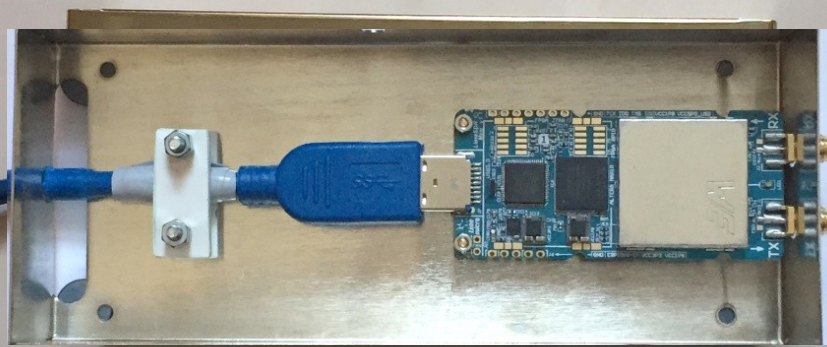
7 inch Touchscreen

BATC Portsdown Transmitter Main Menu



TX	RX	M2	M3	
Modulation DVB-S	Encoder H264	Output to Ugly	Format 4:3	Source PiScreen
Freq 437 MHz	Sym Rate 333	FEC 7/8	Band/Tvtr 70_cm	Att Level -10.00
EasyCap Comp Vid	Caption On	Audio Auto	Atten NONE	
Preset 1 146.5_333	Preset 2 437_1MS	Preset 3 1255_HD	Preset 4 437-Ugly	Store Preset



Portsdown 2019








Portsdown 2019 Limitations








-  Max Symbol Rate 1 MS
-  Current software has problems with some sources and SRs

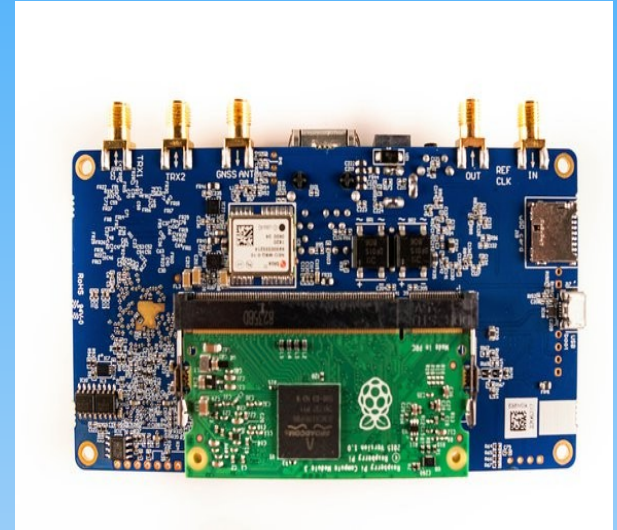
SR	FEC	Pi Cam	EasyCap	Test Card	TCAnim	C920 Webcam
1000	1/4	Green	Green	Red	Yellow	Yellow
	1/2	Green	Green	Yellow	Yellow	Yellow
	3/4	Green	Yellow	Green	Yellow	Red
	9/10	Green	Yellow	Green	Yellow	Red
500	1/4	Green	Yellow	Red	Green	Yellow
	1/2	Green	Green	Yellow	Green	Yellow
	3/4	Green	Green	Yellow	Yellow	Yellow
	9/10	Green	Yellow	Yellow	Yellow	Yellow
333	1/4	Green	Yellow	Red	Green	Green
	1/2	Green	Yellow	Yellow	Green	Green
	3/4	Green	Green	Yellow	Green	Yellow
	9/10	Green	Green	Yellow	Yellow	Yellow
250	1/4	Green	Yellow	Red	Green	Green
	1/2	Green	Yellow	Yellow	Green	Green
	3/4	Green	Green	Green	Green	Green
	9/10	Green	Green	Yellow	Green	Yellow

Portsdown 2019 Strengths

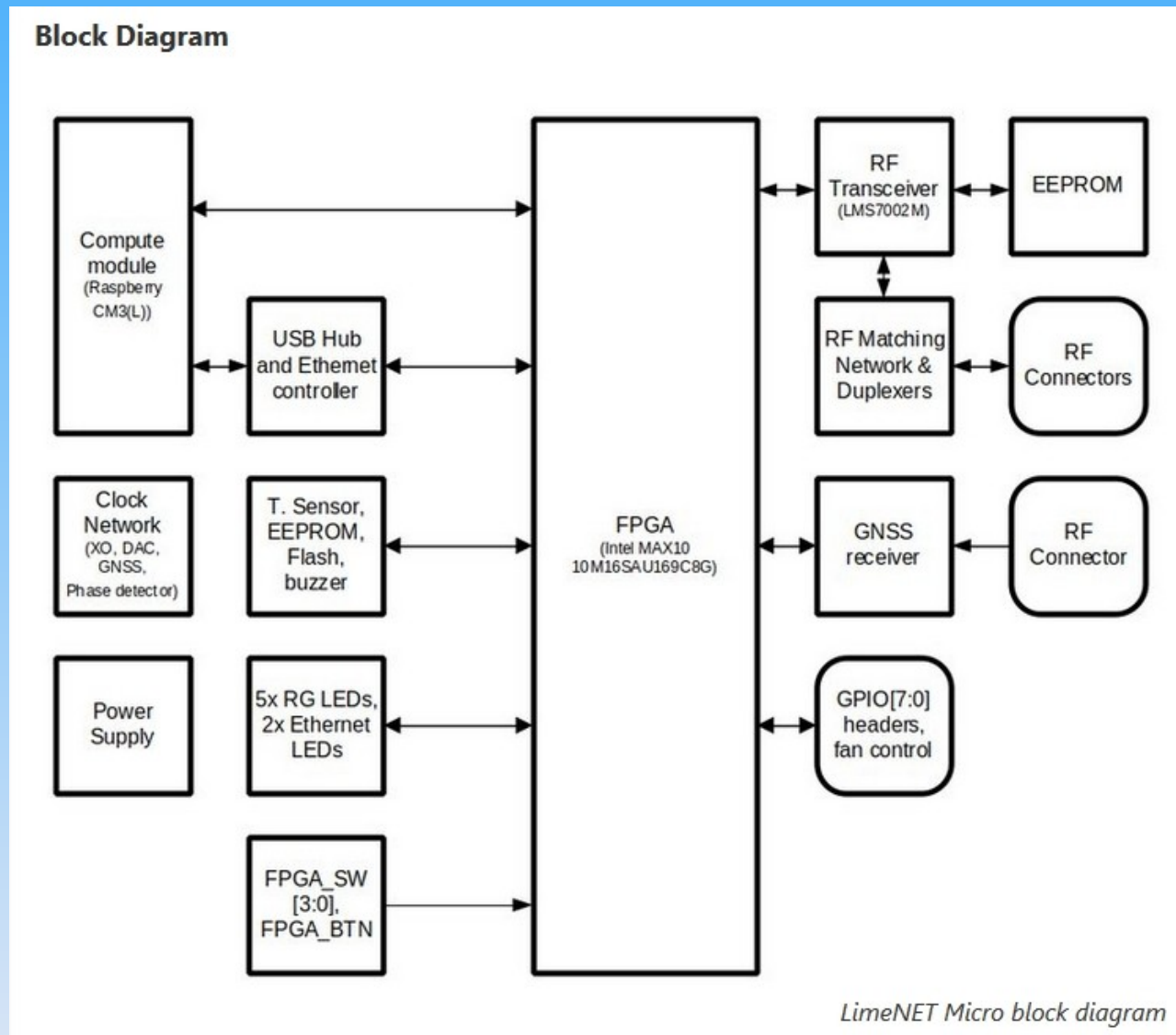
-  Ideal for QO-100 (DVB-S2 and low SRs)
-  Output directly at 2400 MHz
-  Implements delayed PA Switching for LimeSDR calibration
-  Can be driven from OBS or vMix for video effects
-  Active online community support

Portsdown on LimeNet Micro








-  All-in-One!
-  LimeSDR Mini like
-  Integrated GPS
-  RPI Compute Module CM3
-  RPI 7" Touchscreen and Camera
-  RJ45 Ethernet (POE) or 5 V DC Power
-  1st basic tests with Portsdown 2019 OK!

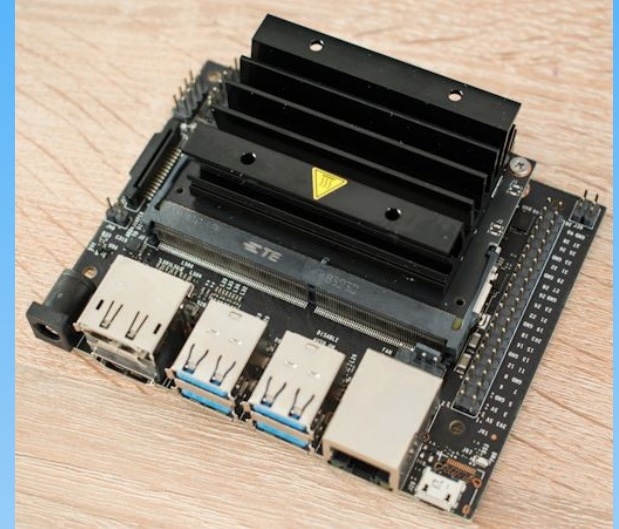


Portsdown on LimeNet Micro



The NVIDIA Jetson Nano

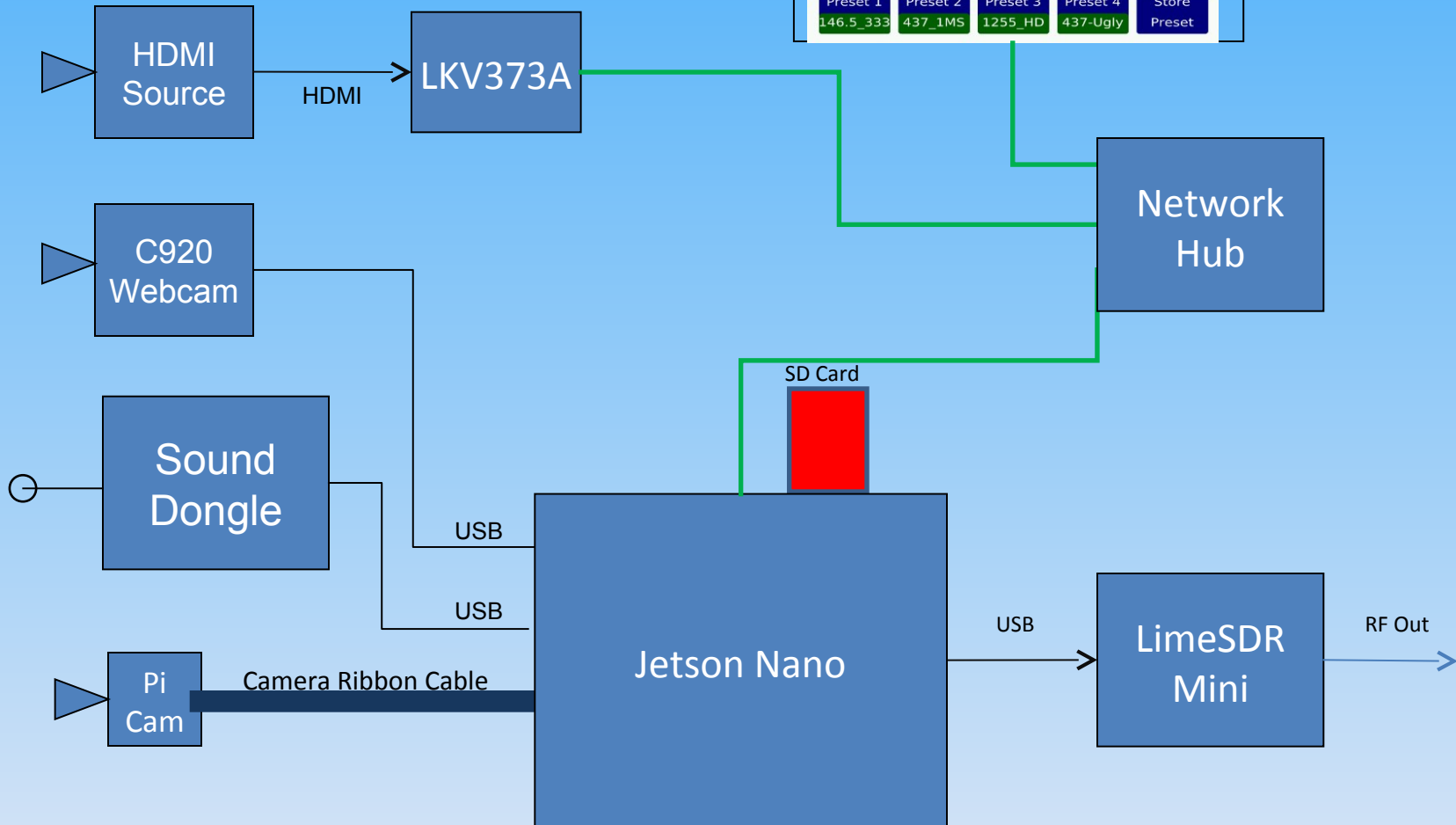
-  Similar to RPi
-  Hardware H264 and H265
-  Will take RPi Camera V2
-  No touchscreen interface
-  £101 + SD Card + PSU + Fan
-  Use LKV373A V3 (£20) for HDMI HD input
-  Configuration details on BATC Wiki



Portsdn 2019

BATC Portsdn Transmitter Main Menu

TX	RX	M2	M3	
Modulation DVB-S	Encoder H264	Output to Ugly	Format 4:3	Source PiScreen
Freq 437 MHz	Sym Rate 333	FEC 7/8	Band/Tvtr 70_cm	Att Level -10.00
EasyCap Comp Vid	Caption On	Audio Auto	Atten NONE	
Preset 1 146.5_333	Preset 2 437_1MS	Preset 3 1255_HD	Preset 4 437-Ugly	Store Preset



Portsdown Control

Jetson Configuration Menu (44)

Set Jetson
Username

Set Jetson
Password

Set Jetson
Root PW

LKV373
UDP port

Shutdown
Jetson

Reboot
Jetson

Set Jetson
IP address

LKV373
UDP IP

Exit

Portsdown Control

Output Device Menu (42)

Jetson
Lime

Portsdown

Comp Vid

Ugly

DTX1

Express

IPTS out

Lime USB

Lime Mini

BATC
Stream

Cancel

Portsdown Control

Encoding Selection Menu (12)

MPEG-2

H264

H265

IPTS in

TS File

Cancel

Portsdown Control

BATC Portsdown Transmitter Main Menu

TX ON	RX	M2	M3	
Modulation S2QPSK	Encoder H265	Output to Jtsn Lime	Format 4:3	Source Webcam
Freq 437 MHz	Sym Rate 125	FEC 9/10	Band/Tvtr 70_cm	Lime Gain 88
EasyCap Comp Vid	Caption On	Audio Auto	Atten NONE	
Preset 1 146.5_333	Preset 2 437_1MS	Preset 3 1255_HD	Preset 4 437-Ugly	Store Preset

H265 Encoding

MINITIOUNE v0.9beta8_9 - Receiver/Analyser DVB-S/S2 144 MHz to 2450 MHz - SRmini=32 kS/s - for MiniTiouner/MiniTiouner-Pro

SR (kS) Freq (kHz)

00125 00437000

Offset-> - 00000000

SR2000	Beacon
SR1000	10496250
SR500	10497250
SR333	10497750
SR250	10498250
SR125	10498750
SR66	11597MHz
SR27500	437 MHz

Oscar 100

DVB mode: DVB-S DVB-S2 Auto

FEC DVBS: All 1/2 2/3 3/4 5/6 6/7 7/8

Wide scan Low SR

Fplug: A B

LNB volt: 0 13(V) 18(H)

22kHz: OFF ON TS

Store into Memory: M1 M2 M3

MiniTiouner V2

NIM : Serit FTS-4335

Symbolrate (kS)

SR set: 125021S
Deviation: -8S
SR -> 125 kS/s

LNA gain: 00 dB

Derotator Search

Carrier Width: 169 KHz
TV mode: DVB-S2

Web Station ID: 1

MYCALL

MY CITY JJ00XX

Preamp 20 dB
Ant. Dir. East Gain 12 dB

Picture: Video QSL Auto Stop

Lg Msg 0000
Lg Pic 0000
WebEr 0 00000

Timing 3 sec

MiniTioune DV3 by F6D.ZP

Frequency (kHz)

Freq asked: 437000kHz doppler/ISS

Freq -> 437004 kHz IF 437000kHz

Copy Freq found keep it

Noise

I: 155 Q: 154

Extern. Request

Apply auto

232.0.0.11:6789

PIDs

Pid from .ini

G8GKQ Auto PID

F6DZP-Mpeg

HDlowSR

France24

QRZ DX

RaspberryP

PID Video: 00256

PID audio: 00257

Codec: Mpeg2 H264 H265

Format: 4/3 16/9 1/1 auto

Width: 384
Height: 288

Audio: MPA AAC AC3

Zoom: adapt x1 maxi

GRAPH

Program: G8GKQ

infos: DVB-S2

Provider: G8GKQ

Codec: VH265 + AAC

photo

Audio level

Info

Carrier Lock

SR Lock

RF Power

C/N MER

Carrier SR Full RF Pw C/N MER Constellations

BCH errors 0

LDPC 0%

FEC 9/10 QPSK_L35

C/N must be > 6.42 dB

TS 0

Bytes recvd: 238 kb/s

254ms

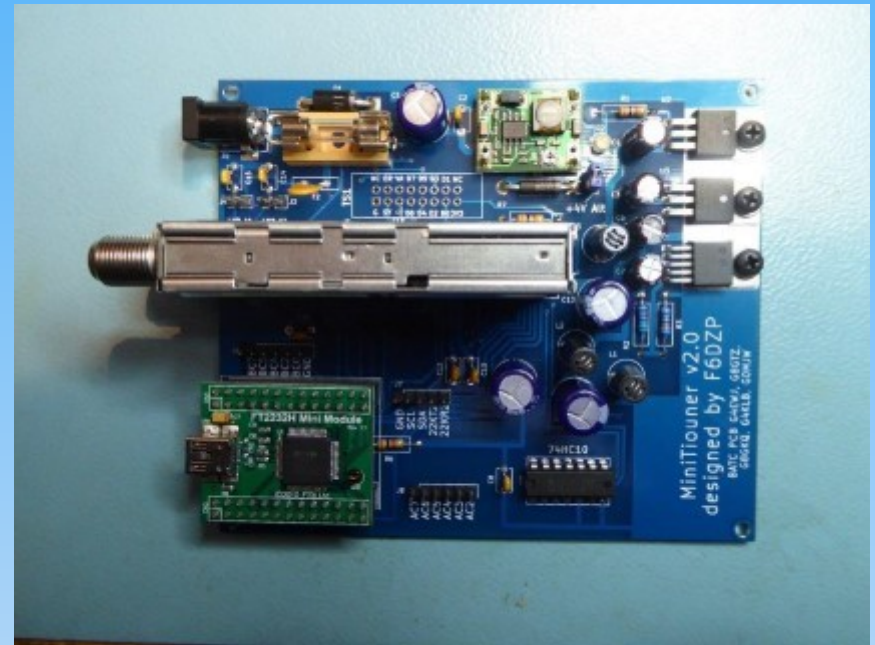
Beep Dsave UDP Record

Quit







Expert Web

Receive Systems

-  MiniTiouner
-  LeanDVB
-  DVB-S2 GUI
-  SDR Angel



DVB-S2 GUI

-  Windows software DVB-S/S2 demodulator !
-  Limited to QPSK mode and SR < 2000 ks/s
-  Support LimeSDR Mini and Airpspy products
-  Use VLC Media Player to display
-  Developed by Marcel Kröner
-  Info and link to the soft are on the
ASMAT-DL Forum under :
Software DVB-S Demodulator (SWL-marko92)

DVB-S2 GUI

DVB-S2 Demod GUI - Version 2.0.6 | CPU: Intel(R) Core(TM) i7-2600K CPU @ 3.40GHz | Features: CMOV MMX SSE SSE2 SSE...

Help

limesuite | ID: 0 | LimeSDR Mini, media=USB 3, module=FT60 1, serial=1D3AC6BD9B74D6, index=0

742.500 MHz

Open Device

Baseband Processing

Standard: DVB-S1 DVB-S2

Bandwidth: 8000000

FFT Size: 2048

BB Gain: [Slider]

Spectrum: Inverted

RF Filter: [Slider]

Timing Recovery

sym_rate: 2000 ks

Loop Gain (Kp): 1/4

Loop Damping (Ki): 1/16384

Error Term: Mueller & Müller TED

Fractional Interpol. Enable

DVB-S1 Symbol skip

Matched Filtering (Root Raised Cosine)

RRC Taps: 64

Rolloff: 0.35

Show FFT After Matched Filtering

Recording / Network

MPEG-TS (188) File

230.0.0.1 1234 TX

Carrier Recovery

Coarse Fine

Enabled

Loop Gain (Kp): 2

Loop Damping (Ki): 0.03125

Error Correction / Sync Byte

Derotate: [Slider]

FEC: DVB-S2 QPSK 2/3 (normal)

Enable LDPC Decoding

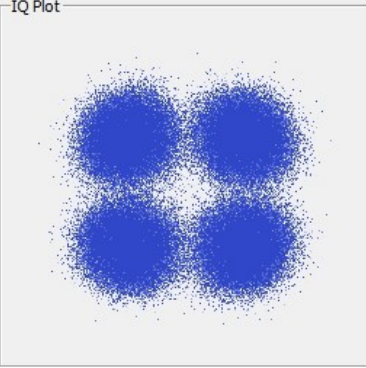
Debug

Update Plots MODCODES DCC

Worker Stats / Debug

9FFTWorker	20%
9FIRWorker	22%
14ResampleWorker	12%
11DemodWorker	78%
13ViterbiWorker	0%
10LDPCWorker	56%

IQ Plot








sync_confidence: 256

2004.35 ksym/s

Buffers: 3 / 8192

SDRAngel

-  Windows and linux software DVB-S/S2 ? demodulator
-  Based on leandvb from Pascal F4DAV
-  Limited to QPSK mode and SR < 2000 ks/s
-  Support Lime, Airspy, Pluto and RT-SDR products
-  Info and link to the soft are on :
<https://github.com/f4exb/sdrangel/releases>

SDRAngel

The image displays the SDRAngel software interface, which is used for software-defined radio (SDR) operations. The main window is titled "SDRAngel" and contains several panels:

- Sampling devices control:** Shows the selected device "PlutoSDR[0]" with its unique ID and a refresh button.
- Sampling devices:** Displays the current frequency "1,280,000 kHz" and various settings like "36000k", "3000k", "LO ppm", "S? 1", "Fc Cen", "Abal", "SR 03,000,000 S/s", "LP 01,200 kHz", "FIR 02,251 kHz", and "Man 26 26".
- Spectrum Display:** A graph showing the frequency spectrum. The x-axis represents frequency in kHz (1.2785 to 1.2815), and the y-axis represents power in dB (-10 to -110). A prominent signal is visible at 1.280 MHz.
- Channels:** A panel on the right showing the "DATV Demodulator" settings. It displays "RF Settings" with a frequency of "+0,011,904 Hz", a bandwidth of "0,779,000 Hz", and a gain of "-4.9 dB". Below this, a "VIDEO Stream" is shown, featuring a video frame of a man in a dark jacket and glasses. The video stream details include "PID: 256 - Width: 704 - Height: 576", "service_name HB9DUG", "service_provider HB9DUG", and "Codec: H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10". There are also checkboxes for "Data", "Transport", "Video", and "Decoding", along with "Video" and "Full Screen" buttons.

At the bottom of the SDRAngel window, the version and build information are displayed: "SDRAngel v4.3.1 Qt 5.11.1 x86_64 Windows 7 SP 1 (6.1) 2019-01-14 20:25:25 Europe de l'Ouest".

Questions

 Portsdown: https://wiki.batc.org.uk/Portsdown_2019

 DVB-S2 GUI:
<https://forum.amsat-dl.org/index.php?thread/101-software-dvb-s-demodulator/>

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