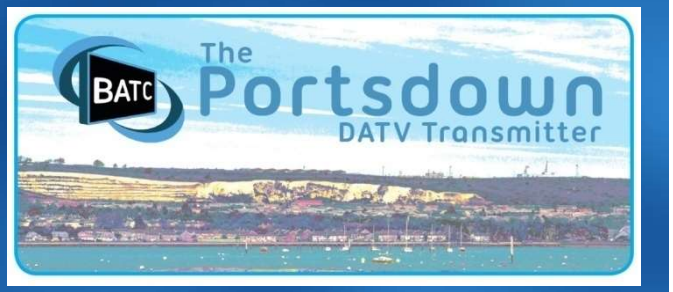

BATC
Portsdown DATV Transceiver
Ryde DATV Receiver
Dave G8GKQ

Topics

- Portsdown
- Langstone
- Ryde
- WinterHill
- Latest Developments

Portsdown



- Hardware versions
- Capability
- New features
- Receiver Improvements
- Test Equipment
- Langstone Integration

Portsdown Hardware

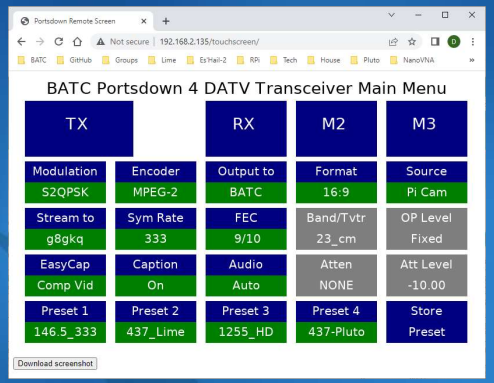
- Portsdown 2020
  - Raspberry Pi 3
  - 3.5 or 7 inch Screen
  - Filter-mod board, Lime or DATV Express
- Active support

- Portsdown 4
  - Raspberry Pi 4
  - 5 or 7 inch Screen
  - Lime, Pluto or DATV Express
- Active development

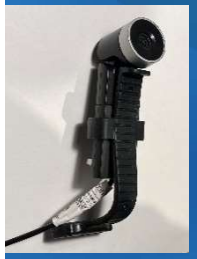
Portsdown Capability

- Transmit DVB-S/S2 and DVB-T
- Receive DVB-S/S2 and DVB-T
- Touchscreen control
- MPEG-2 or H264 TX (+ H265 on RX)
- SD or similar definitions

New Features



- Local Web Control
- WiFi Config
- WebCam Support
  - Polycom EagleEye USB, C930e and all C920
- LimeRFE Control



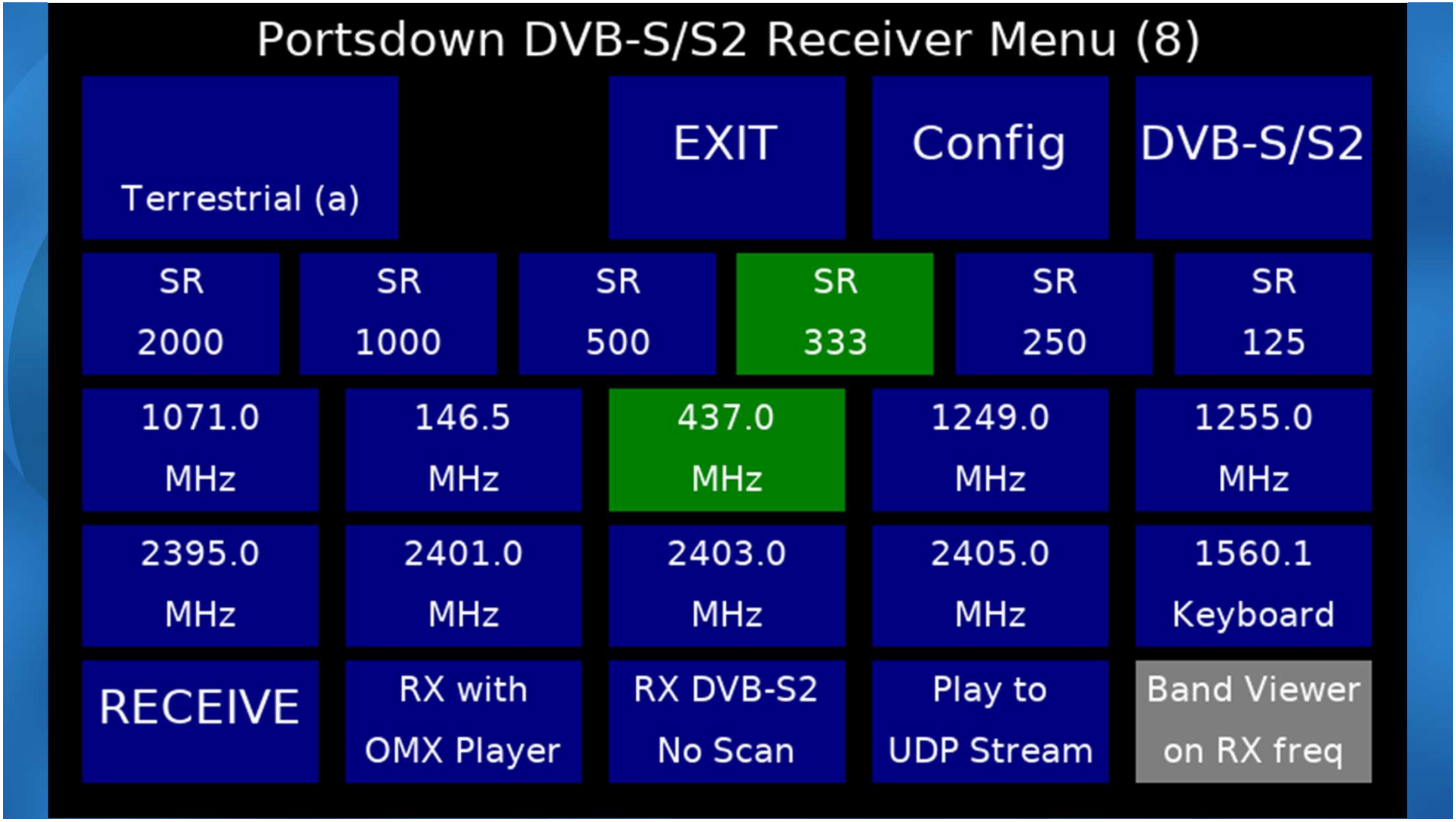
Receiver Improvements

- MiniTiouner RF power Level (> -70 dB)


DVB-S2 Lock
438.134 MHz
333 kS
FEC 2/3
QPSK
G4XAT/P
FIRM2101RC
H264 AAC
MER 9.7 (3.1 needed)
RF Input Level -50 dB
.
Touch Left to Hide Overlay
Touch Centre to Exit

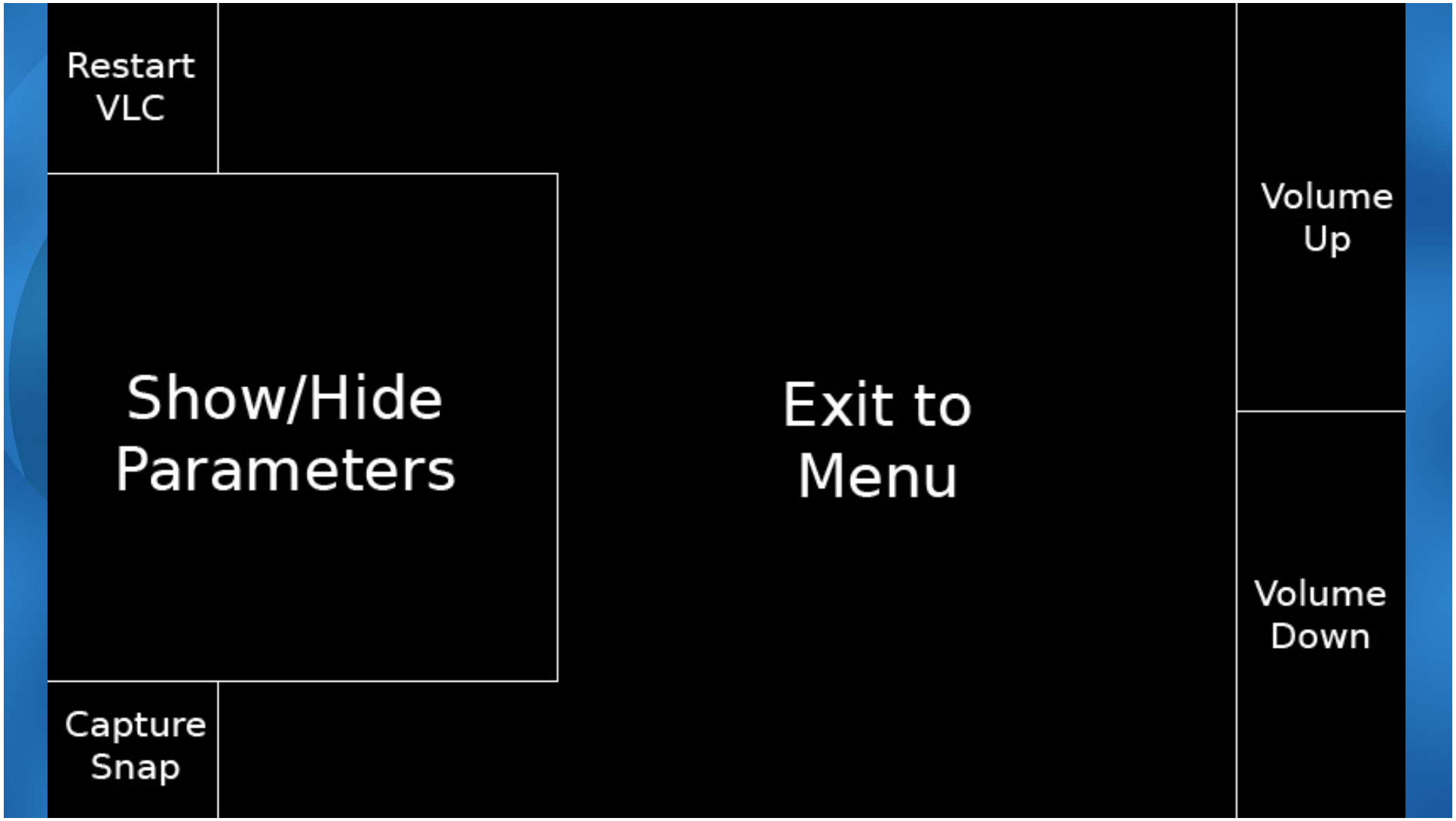
Receiver Improvements

- MiniTiouner RF power Level (> -70 dB)
- DVB-S2 no-scan mode


Portsdown DVB-S/S2 Receiver Menu (8)
Terrestrial (a)
EXIT
Config
DVB-S/S2
SR 2000
SR 1000
SR 500
SR 333
SR 250
SR 125
1071.0 MHz
146.5 MHz
437.0 MHz
1249.0 MHz
1255.0 MHz
2395.0 MHz
2401.0 MHz
2403.0 MHz
2405.0 MHz
1560.1 Keyboard
RECEIVE
RX with OMX Player
RX DVB-S2 No Scan
Play to UDP Stream
Band Viewer on RX freq

Receiver Improvements

- MiniTiouner RF power Level (> -70 dB)
- DVB-S2 no-scan mode
- Touchscreen mapping


Restart VLC
Show/Hide Parameters
Capture Snap
Exit to Menu
Volume Up
Volume Down

Test Equipment

- Signal Generator
- XY Display
- Band Viewer
- Power Meter
- Noise Figure Indication
- Frequency Sweeper

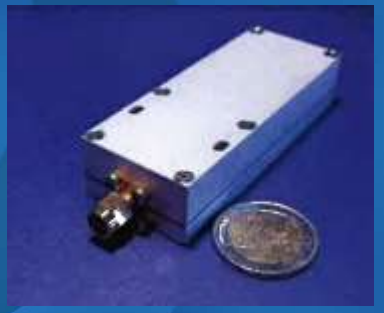
Signal Generator

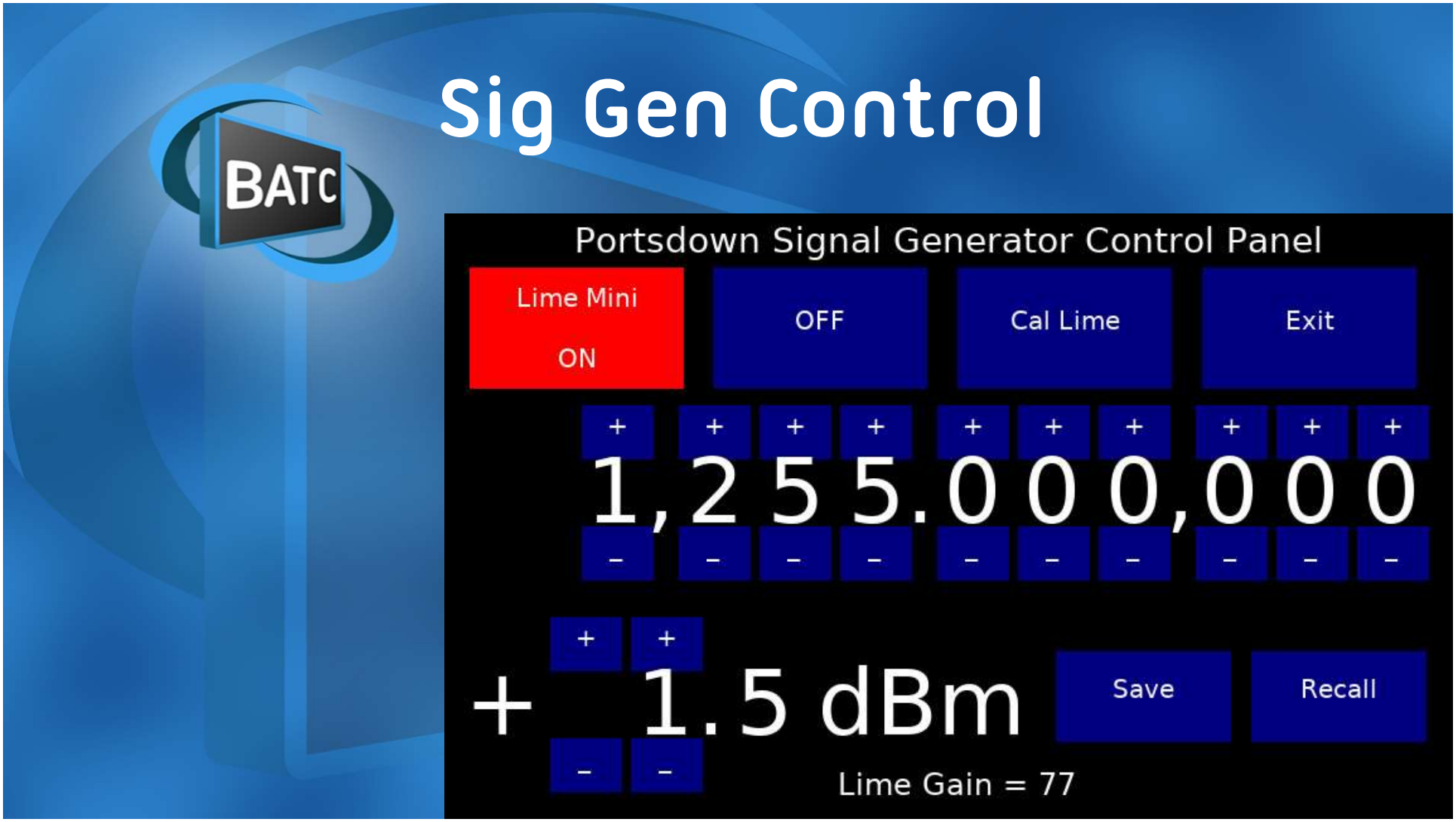
- Simple Interface to Existing Sources
- Approximate Amplitude Calibration
- Look-up tables
- Some sources not clean

Signal Generator

- Sources
  - Pluto SDR - 6 GHz
  - Pluto SDR x5 - 30 GHz
  - LimeSDR Mini - 3.5 GHz
  - ADF4351 - 4.4 GHz
  - ADF5355 - 13.6 GHz
- Elcom Source

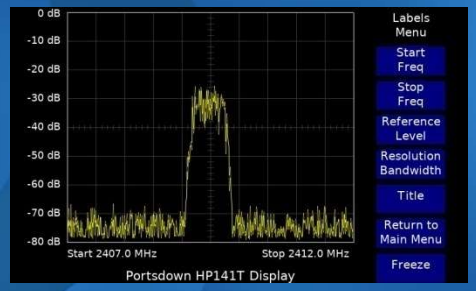
- Nort SLO



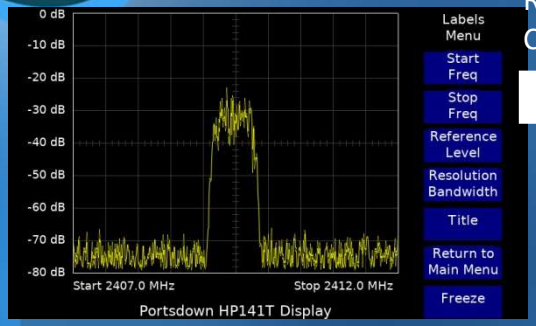

Sig Gen Control
BATC
Portsdown Signal Generator Control Panel
Lime Mini
ON
OFF
Cal Lime
Exit
1,255.000,000
+ 1.5 dBm
Save
Recall
Lime Gain = 77

XY Display

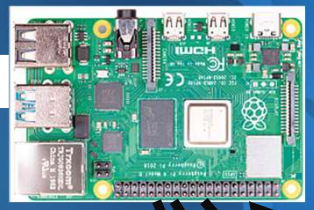
- For use with HP or Homebrew SA
- Portsdown with added 2 IC interface
- Provides
  - 500 x 400 pixel plot
  - Screen Capture and Freeze
  - Normalisation



XY Display – How?



Display Ribbon Cable



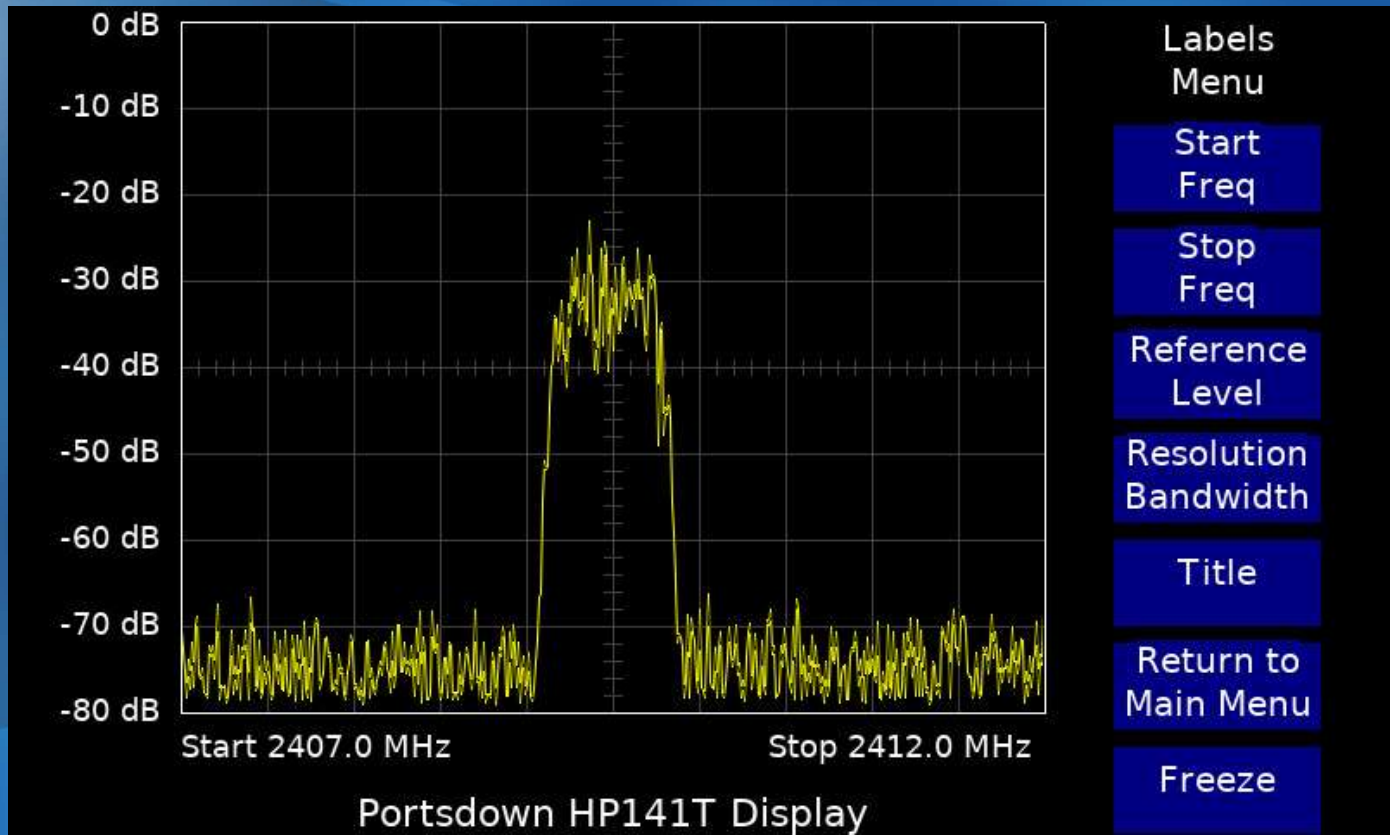
spi Data

Y input

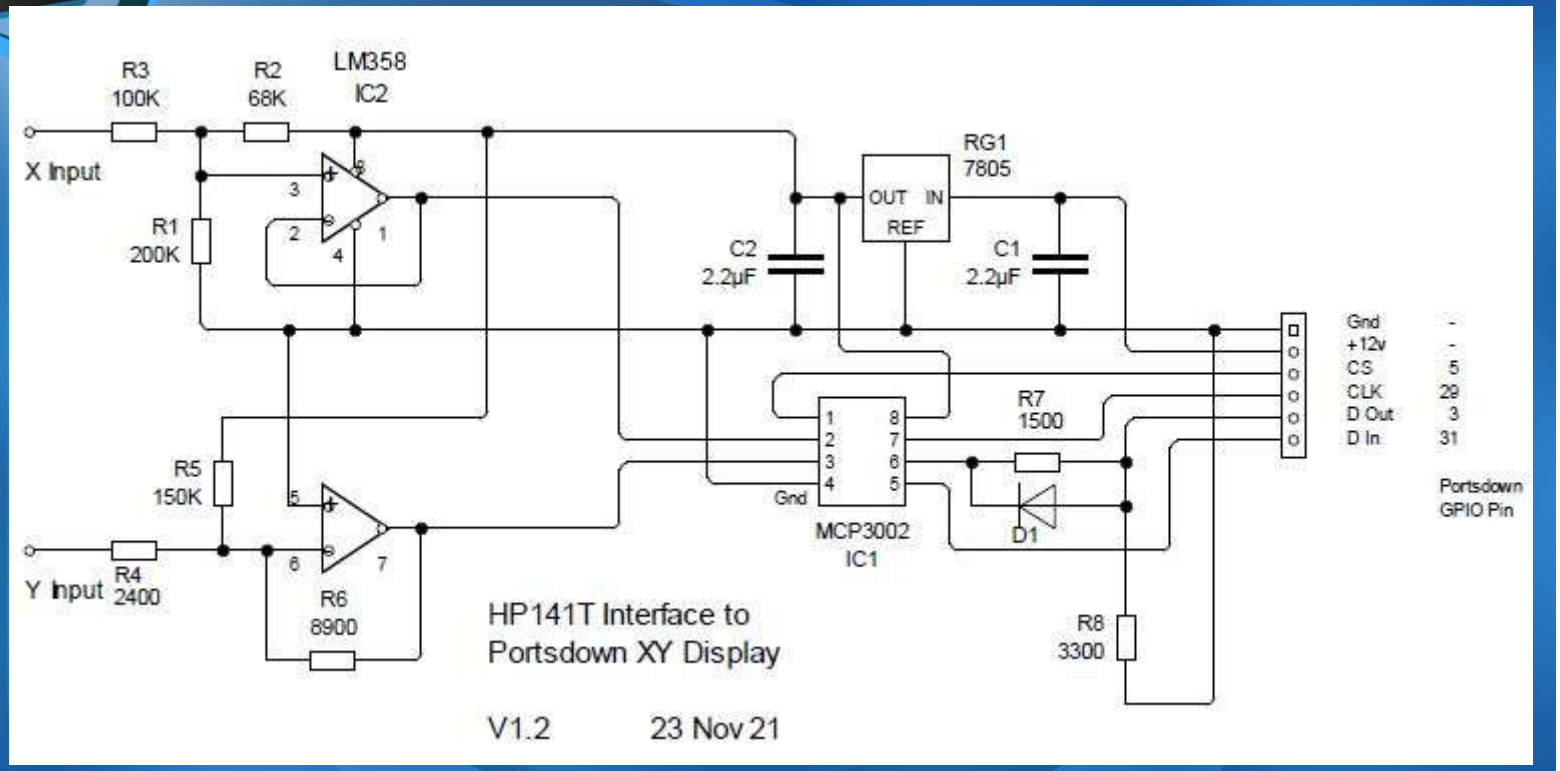
Interface

X input

Typical Plot



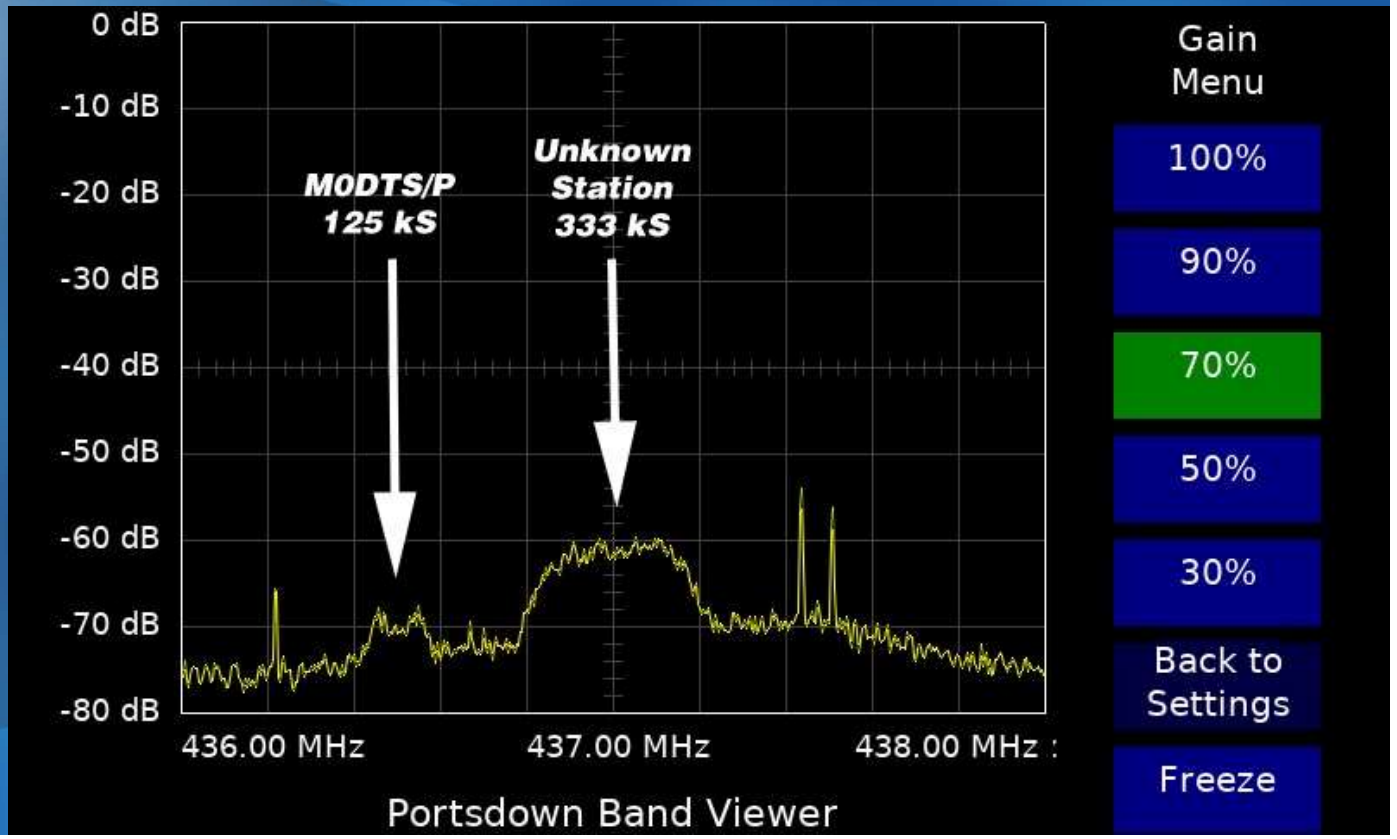
XY Interface Circuit



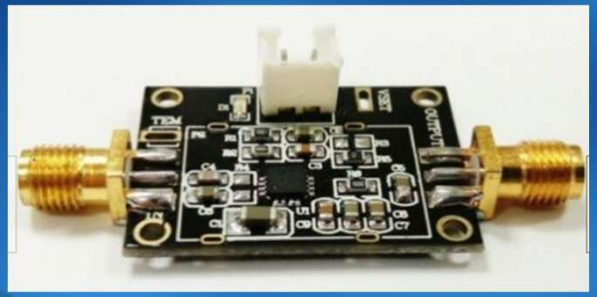
Band Viewer

- Portsdown 2020 and Portsdown 4
- LimeSDR on Portsdown 2020
- LimeSDR or Airspy R2 on Portsdown 4
- Intended as a “Panadapter”
- Accurate relative levels
- Limited Dynamic Range

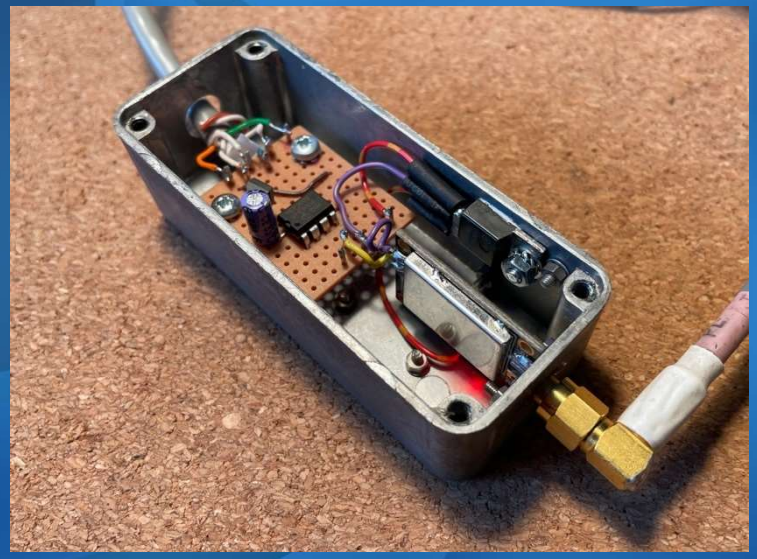
Weak Signal Work

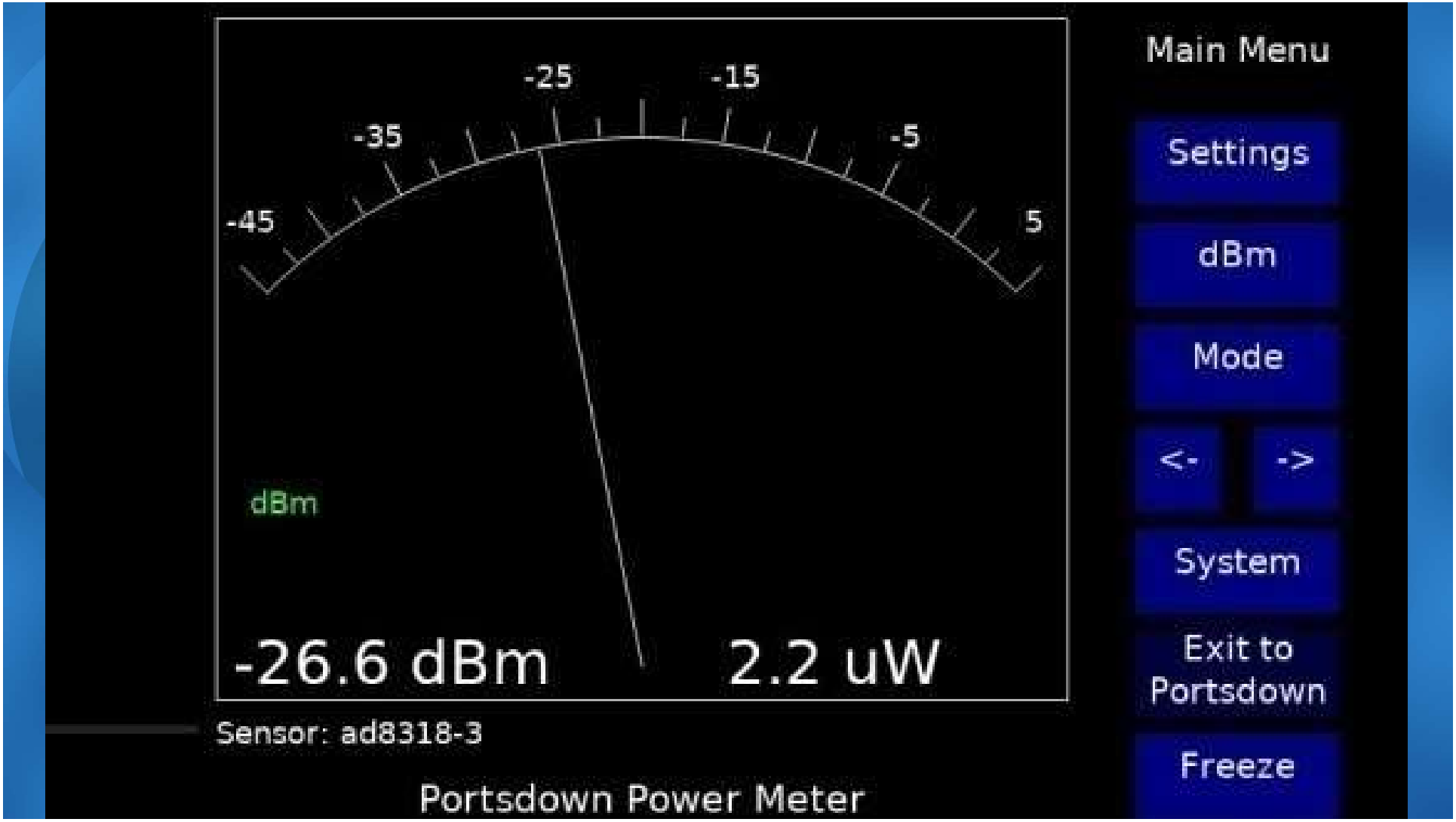


Power Meter

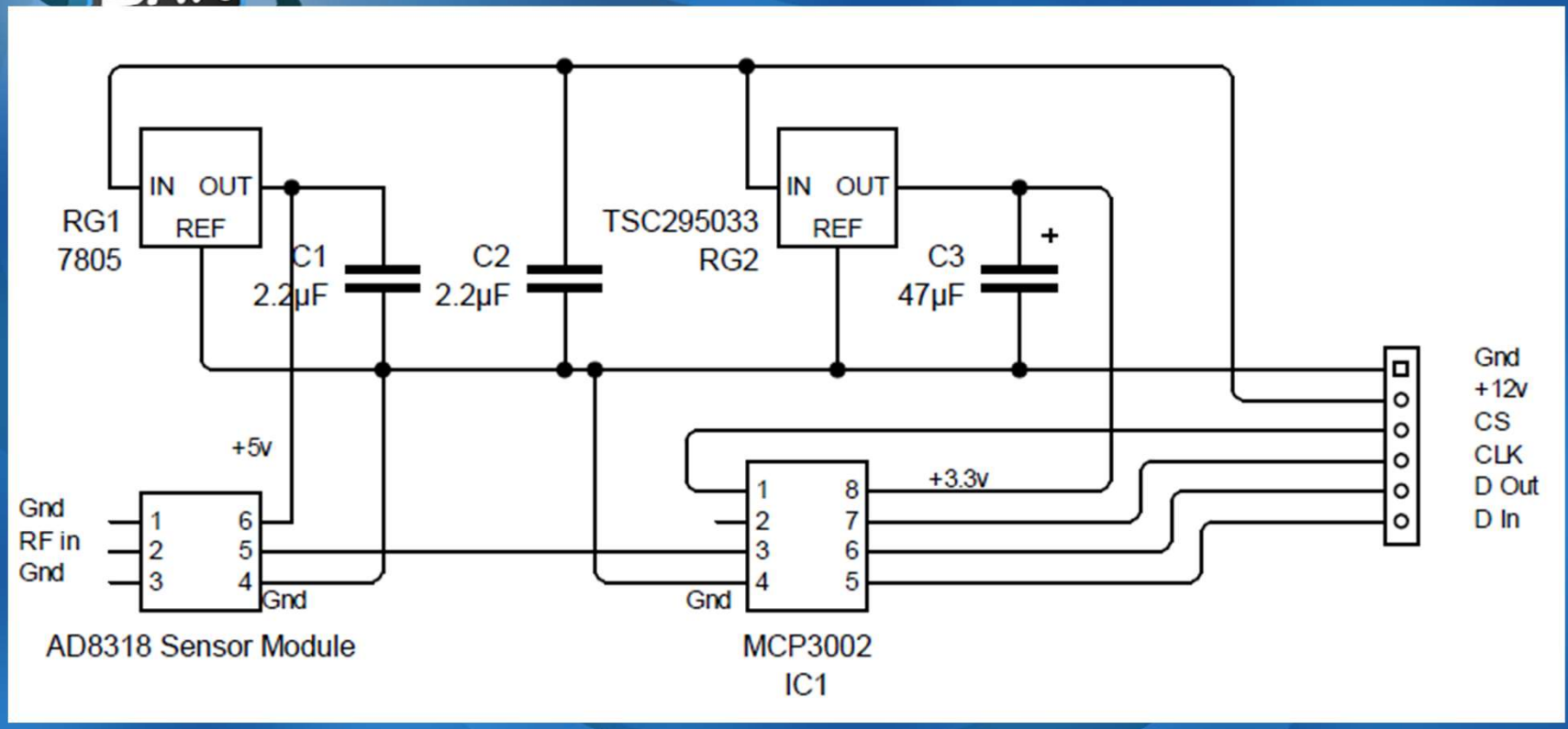


- Needs external sensor
- AD8318
- MCP3002 A-D
- More sensors in future

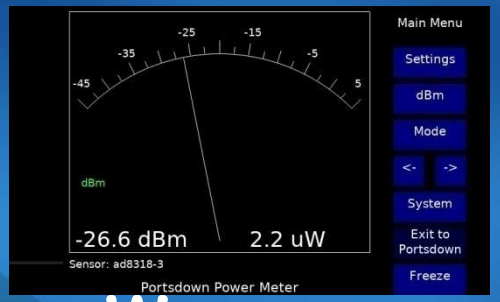



-45
-35
-25
-15
-5
5
dBm
-26.6 dBm
2.2 uW
Sensor: ad8318-3
Portsdown Power Meter
Main Menu
Settings
dBm
Mode
<-
->
System
Exit to Portsdown
Freeze

Power Meter Circuit

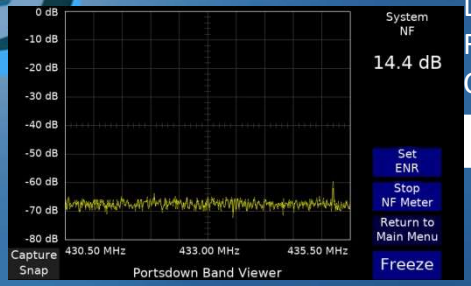


Power Meter Features

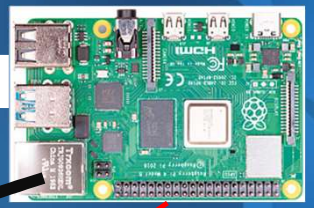


- Needle has “inertia”
- Selectable Ranges - dBm or mW
- Look-up table for linearity
- Calibration Factors can be entered
- Direct reading with attenuators
- An alignment tool – not an HP432!

NF Measurement – How?



Display Ribbon Cable



USB Cable

3v3 Switching Signal

28v

Switched PSU

Noise Source

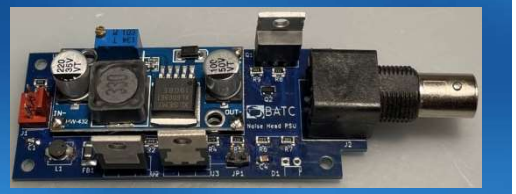
Device Under Test

LimeSDR Mini

Noise Figure Notes

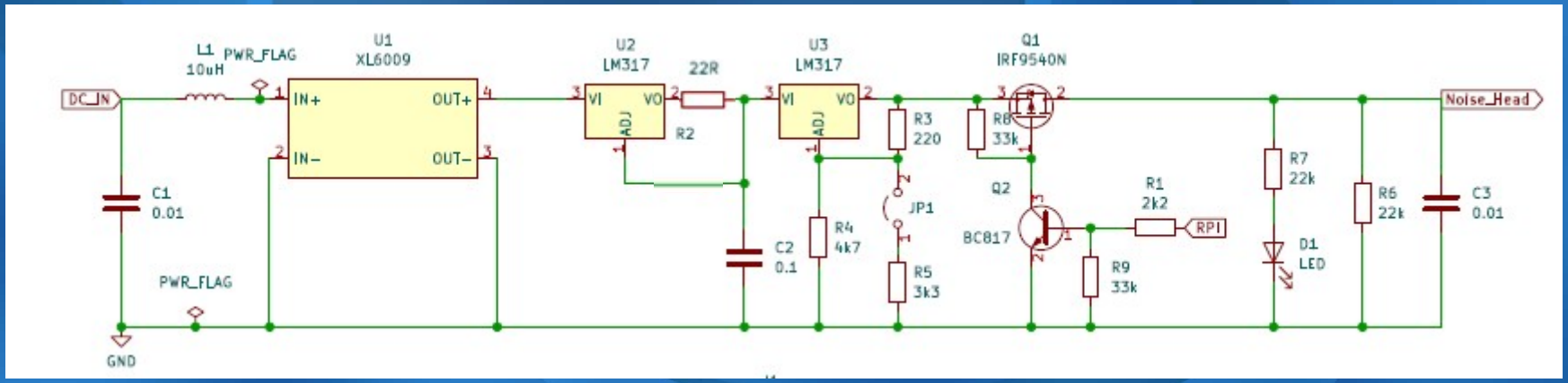
- LimeSDR must be operating in linear region
- No significant signals in bandwidth
- Bandwidth?
- Minimise digital noise locally

Noise Source Switching PSU

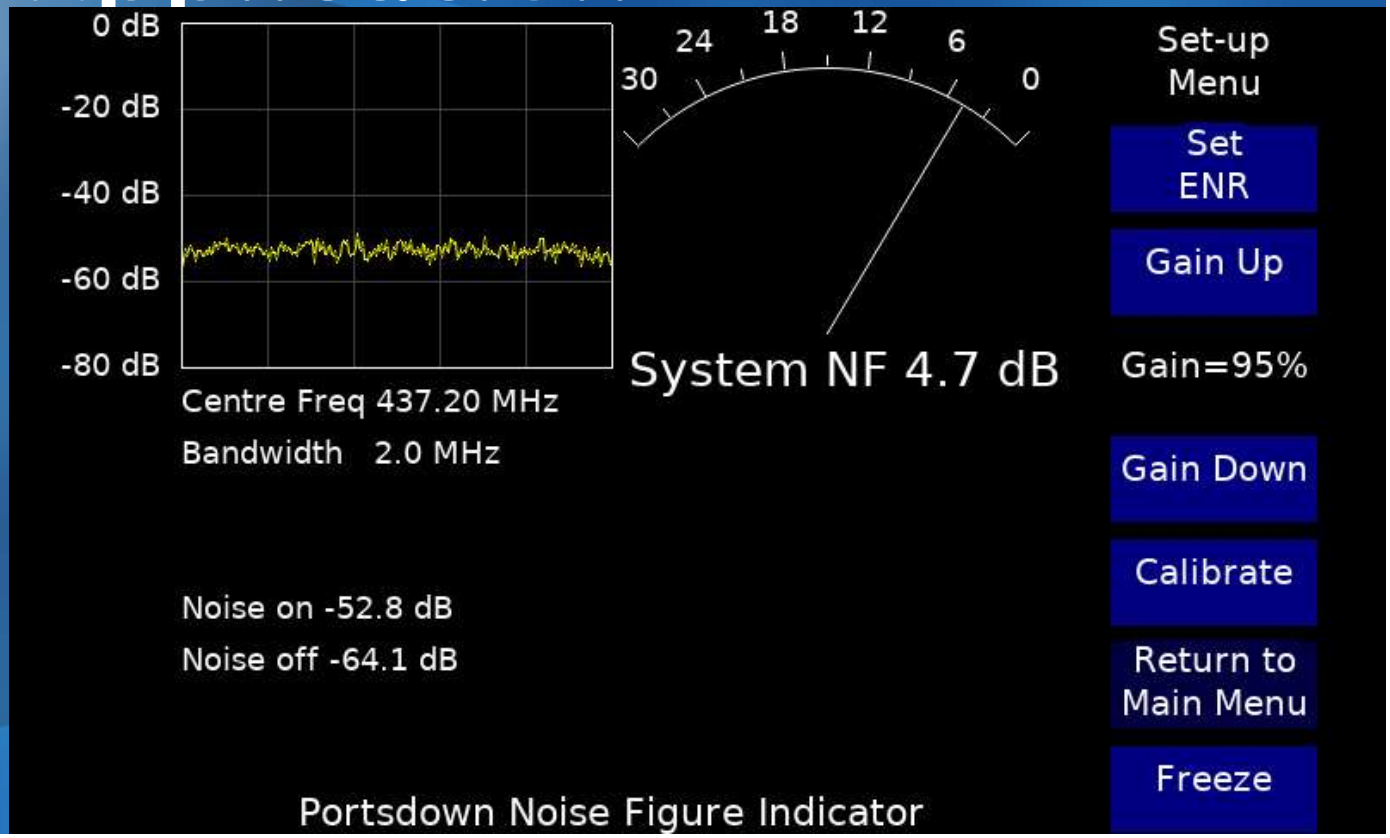


- Commercial sources need 28v
- RF Design Sources need 12v or 13.5v
- Needs to be a clean supply
- BATC design (and PCB) available

BATC Noise Source PSU



Noise Figure Application



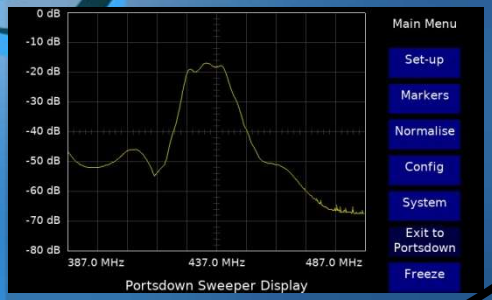
Noise Figure Notes

- Not an exact science
- Beware LimeSDR Digital Noise
- Use attenuators for error-checking
- Beware changing source VSWR between noise on and noise off

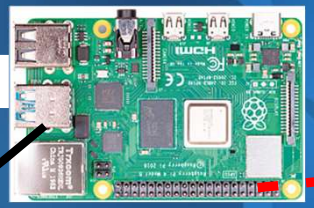
Portsdown Sweeper

- Combine the Signal Generator with the Power Meter
- Add some automation
- Frequency Response Sweeper

Sweeper – How?



Display Ribbon Cable



USB Cable

28v

LimeSDR Mini

10 dB

Attenuator

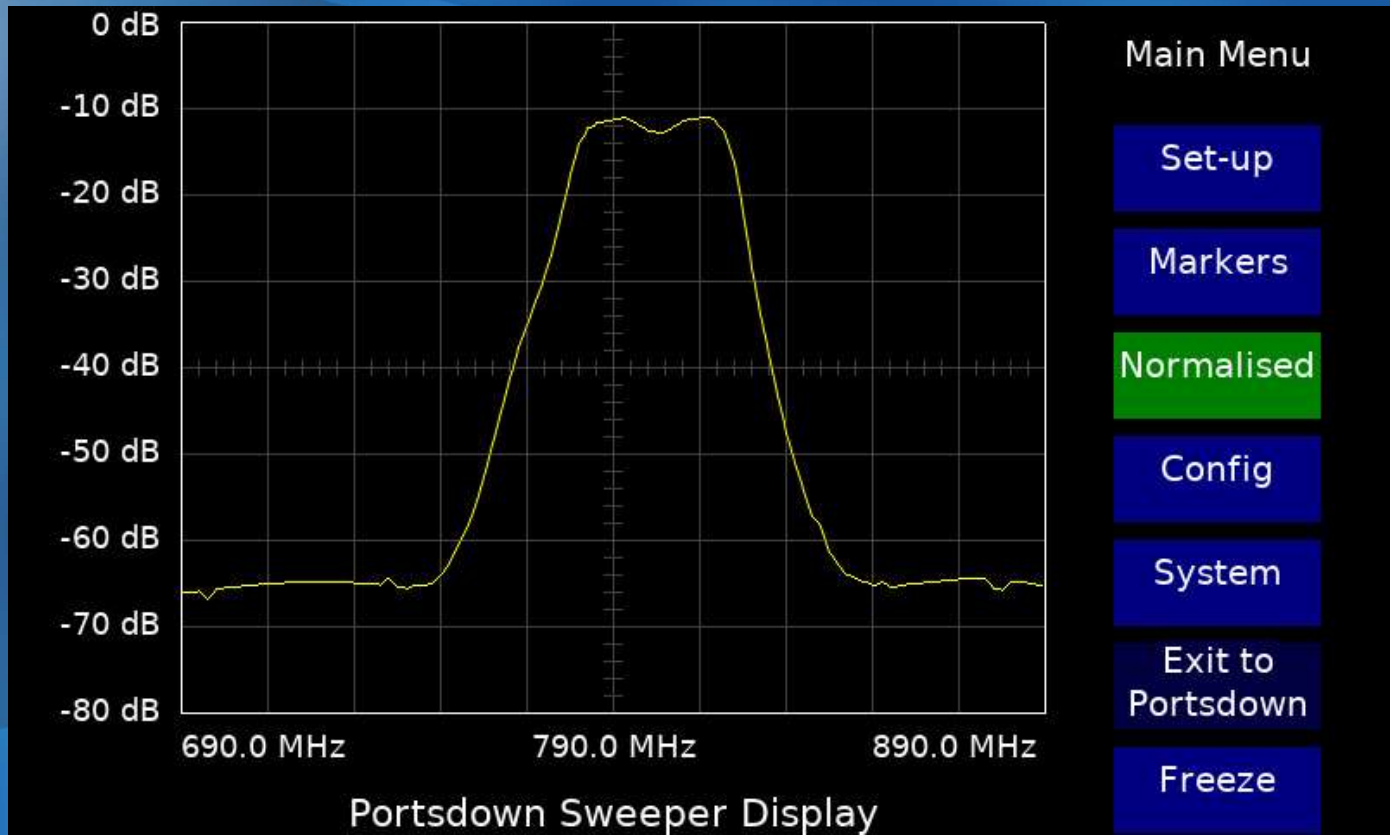
Device Under Test

10 dB

Attenuator

Power Head

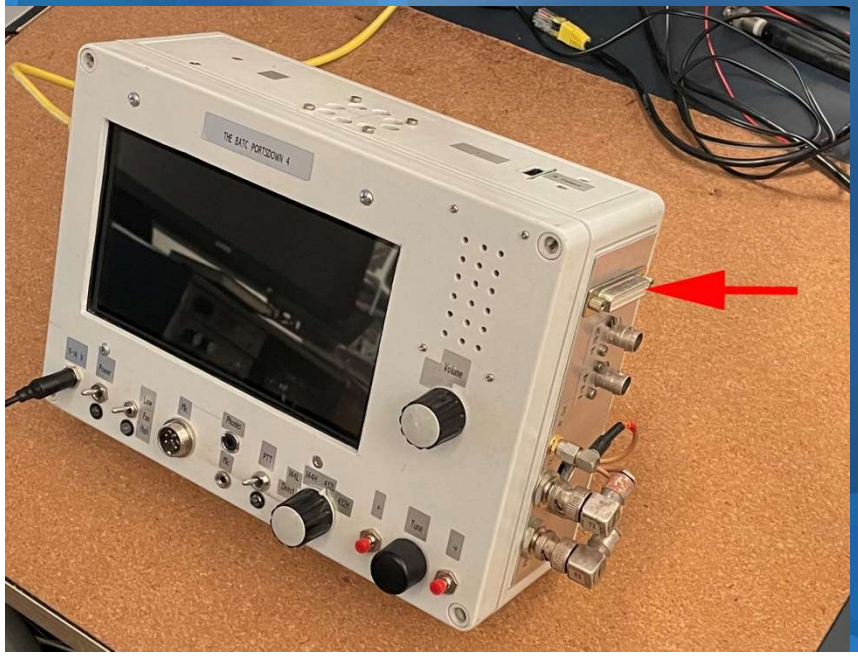
Checking a Filter

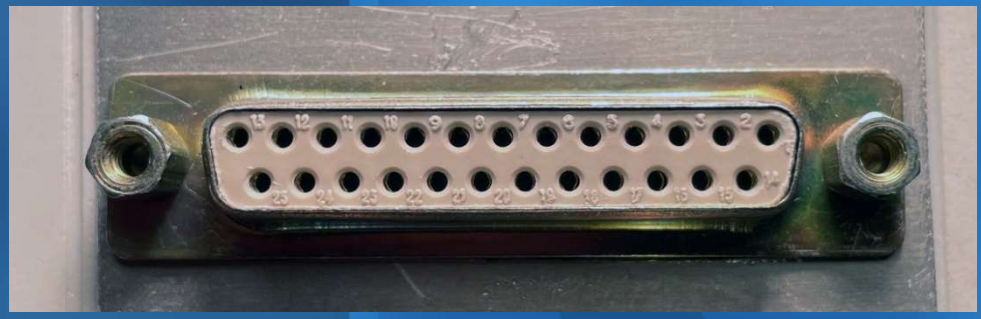


Sweeper Limitations

- Slow scan speed – Reduce samples?
- Responds to Spurii from Source
  - LimeSDR 3rd Harmonic 15 dB down?
- LimeSDR source only at present

Portsdown Interface



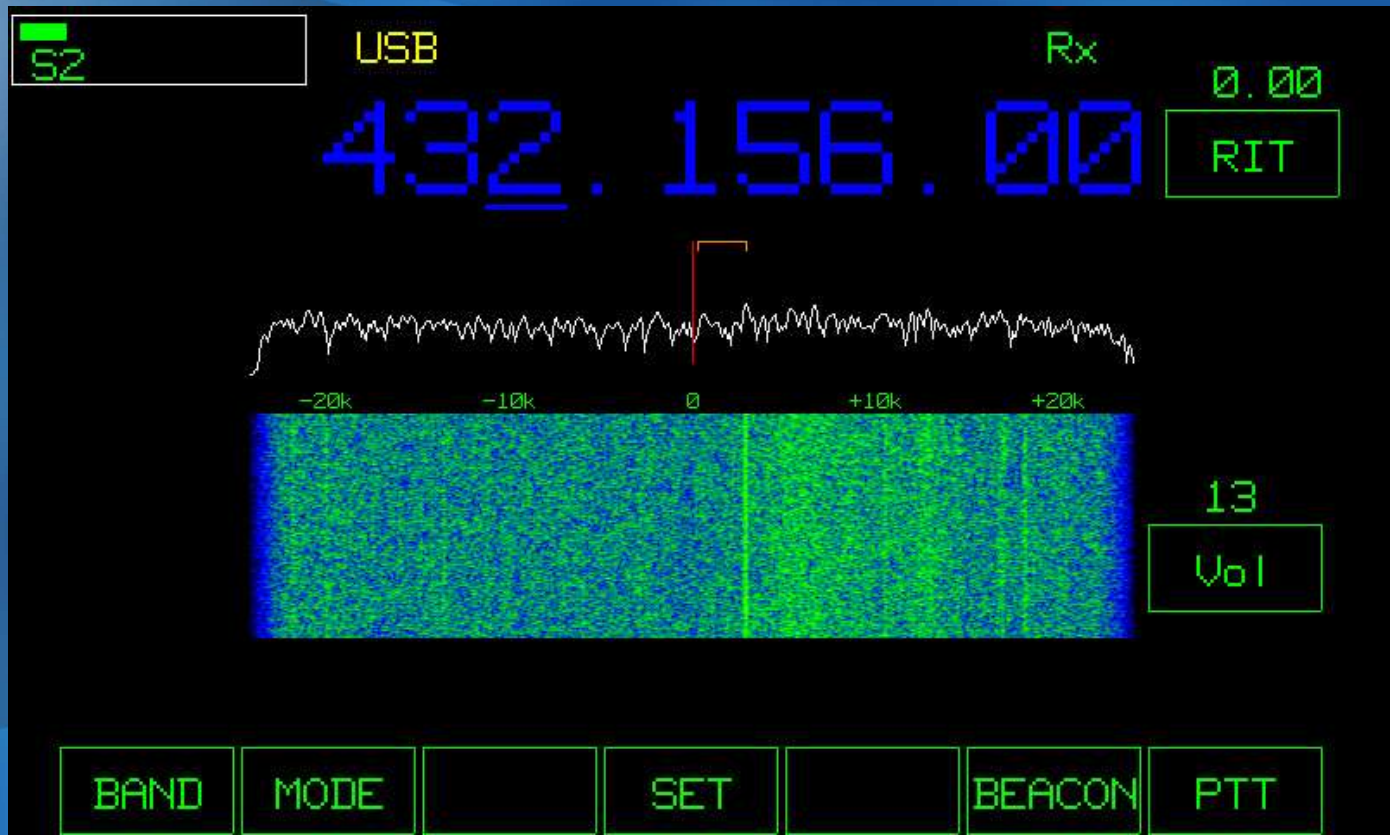


- Single interface for spi, Power and Data
- Defined in CQ-TV

Langstone

- Langstone Microwave Transceiver by G4EML – 70 MHz to 6 GHz (3.5 GHz Lime)
- RPi 4 and Touchscreen with Pluto
  - or Lime for Langstone V2
- Needs Compatible USB Sound Dongle
- Optional Mouse-based Tuning Control

Langstone Interface



Portsdown/Langstone Summary

- Raspberry Pi, Touchscreen and peripherals provide a very capable platform for RF activities
- Peripherals MUST be the exact type – its not like Windows
- Open source (with one exception – DVB-T RX)
- BATC Wiki is primary information source
- Go and play with the applications and hardware

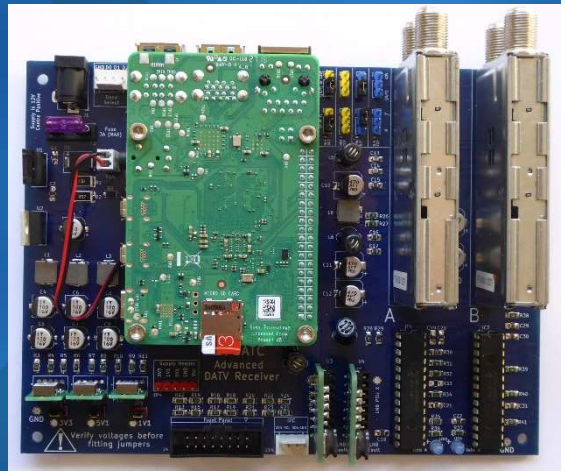
Ryde Receiver – MWORUD

- Set-top Box DATV RX with IR Remote Control
- Raspberry Pi 4 and HDMI Display
- DVB-S/S2
- Also works for DVB-T/T2 with Knucker
- Stream receiver recently added


60
% Vol
5.3
dB MER
D0.1
dB Margin
-59
dBm Power
KENWOOD
140252
DVB-S2 QPSK 5/6
F1TE
1404Lucien
256: H.264
257: AAC
332kS
10498291kHz

WinterHill

- Very capable 4-channel DATV RX
- Raspberry Pi 4 on PCB with 2 MiniTiouners
- Optimised for QO-100
- Local HDMI or network

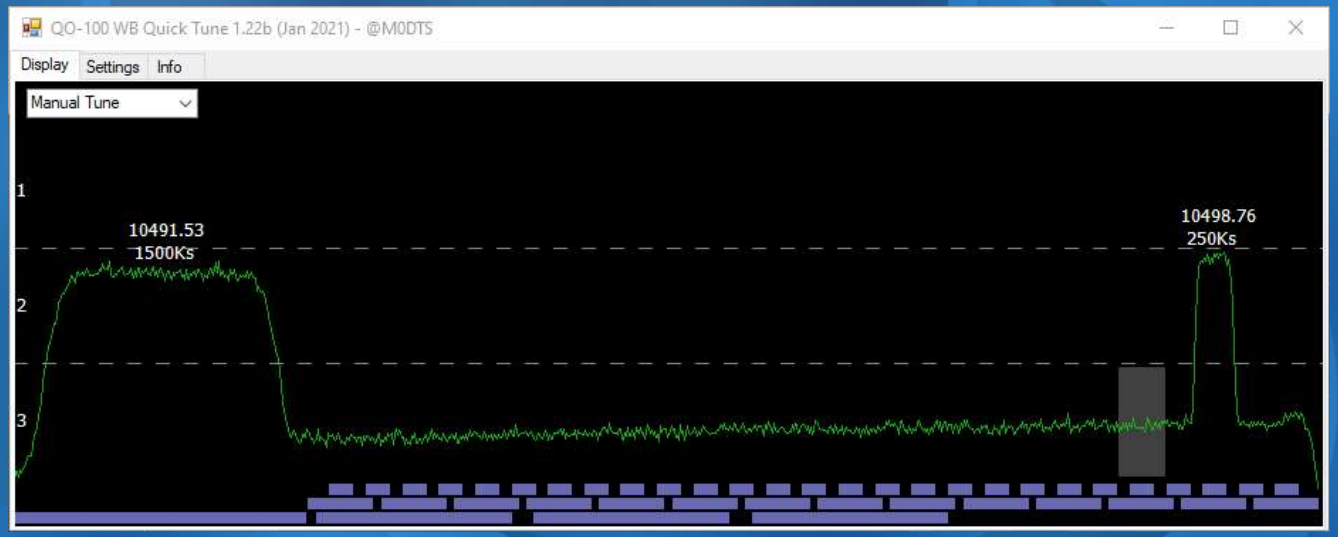


Latest Developments

- QO-100 QuickTune

Quick Tune from MODTS

- Windows tuning aid for Ryde, WH and MT

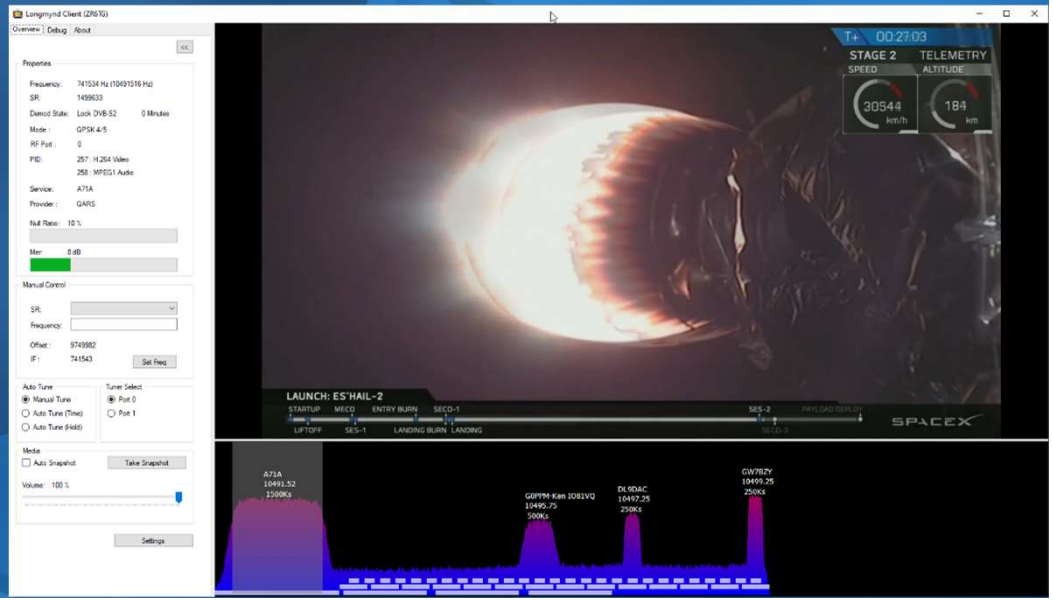


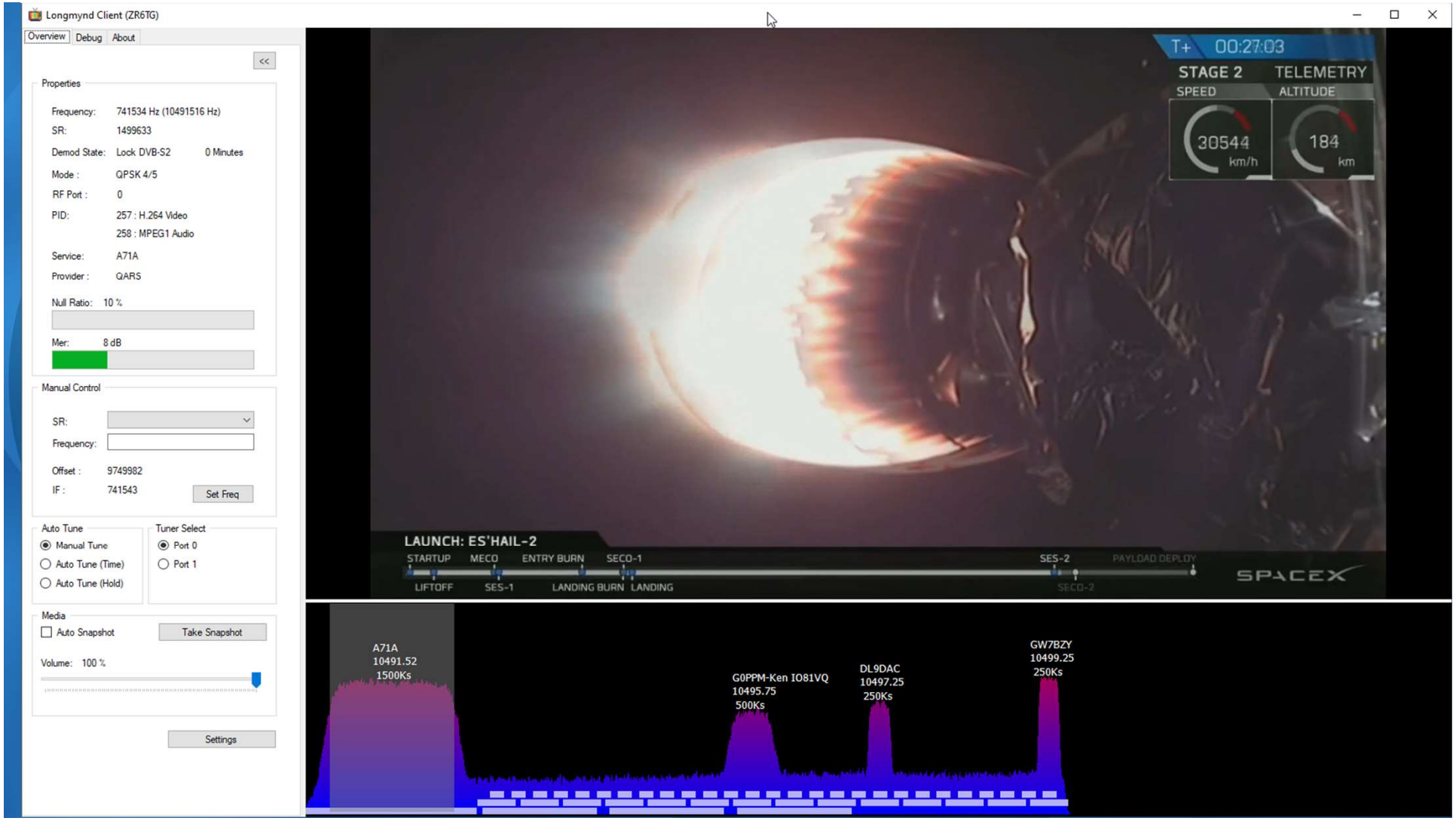
Latest Developments

- QO-100 QuickTune
- LongMynd Client
  - Windows-based network Display for custom LongMynd receiver on RPi

LongMynd Client – ZR6TG

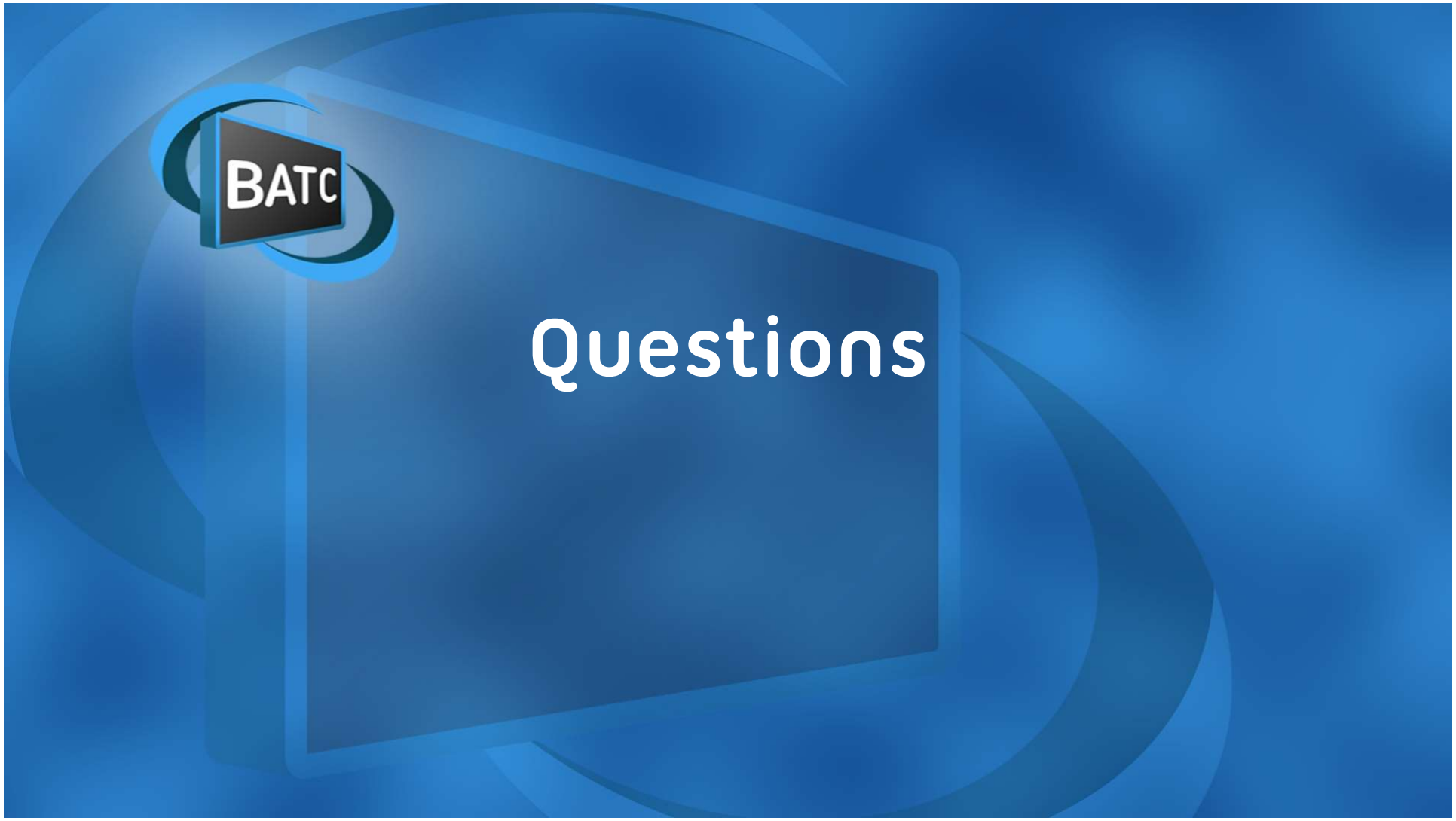
- Run custom LongMynd on an RPi 4
- Network control
- Windows desktop




Longmynd Client (ZR6TG)
Overview
Debug
About
<<
Properties
Frequency: 741534 Hz (10491516 Hz)
SR: 1499633
Demod State: Lock DVB-S2 0 Minutes
Mode : QPSK 4/5
RF Port : 0
PID: 257 : H.264 Video
258 : MPEG1 Audio
Service: A71A
Provider : QARS
Null Ratio: 10 %
Mer: 8 dB
Manual Control
SR:
Frequency:
Offset : 9749982
IF : 741543
Set Freq
Auto Tune
Manual Tune
Auto Tune (Time)
Auto Tune (Hold)
Tuner Select
Port 0
Port 1
Media
Auto Snapshot
Take Snapshot
Volume: 100 %
Settings
T+ 00:27:03
STAGE 2 TELEMETRY
SPEED
ALTITUDE
30544 km/h
184 km
LAUNCH: ES'HAIL-2
STARTUP
MECO
ENTRY BURN
SECO-1
SES-2
PAYLOAD DEPLOY
LIFTOFF
SES-1
LANDING BURN
LANDING
SECO-2
SPACEX
A71A
10491.52
1500Ks
G0PPM-Ken IO81VQ
10495.75
500Ks
DL9DAC
10497.25
250Ks
GW7BZY
10499.25
250Ks

Summary

- Lots going on
- Thanks to all the developers
- Please use their efforts
- BATC Bursaries available


BATC
Questions