

■ Amateur TV – Getting Started

David Crump, G8GKQ



Dave, G8GKQ

- Active with ATV since 1975
- BATC Committee since 2006
- Not an electronics professional
- Now retired for 11 years
- Lead for the Portsdown Project

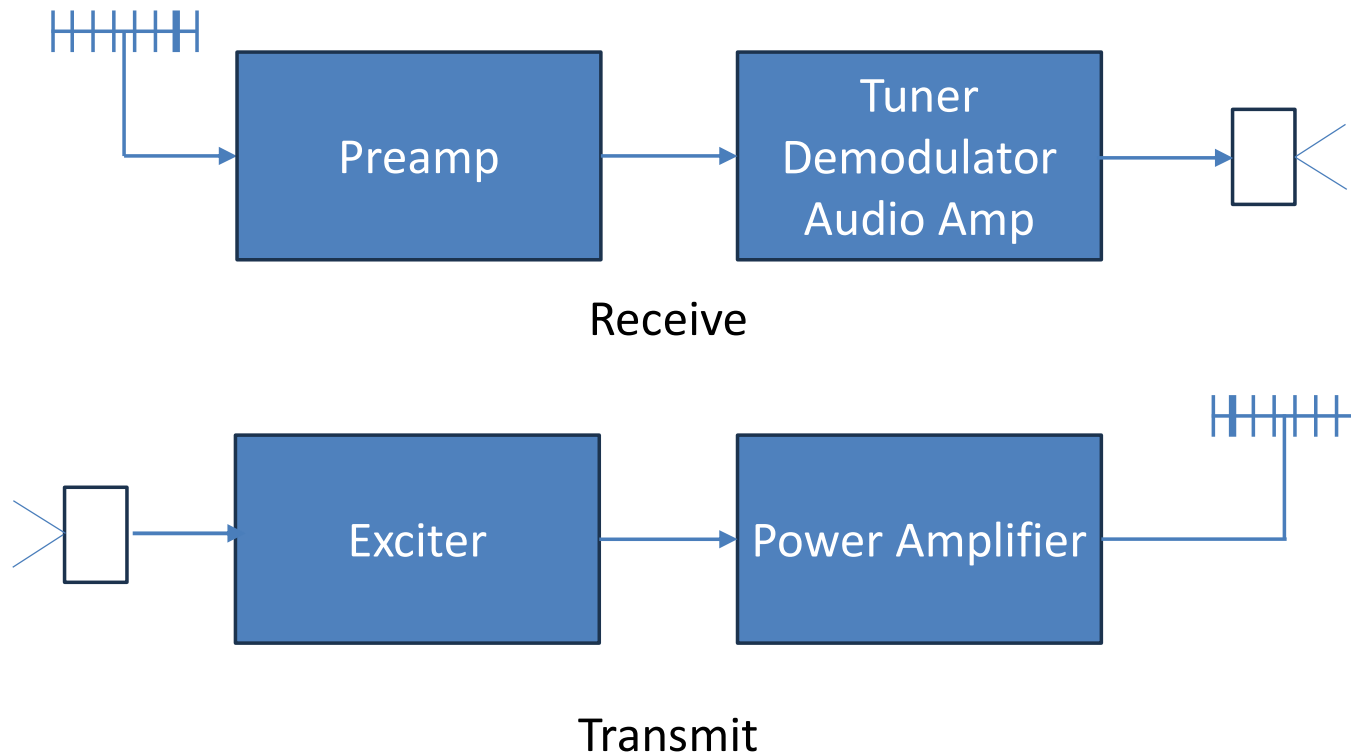


Overview

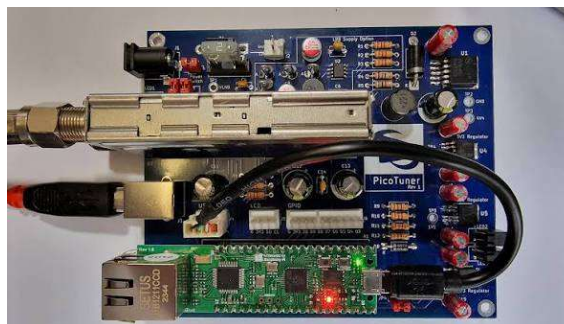
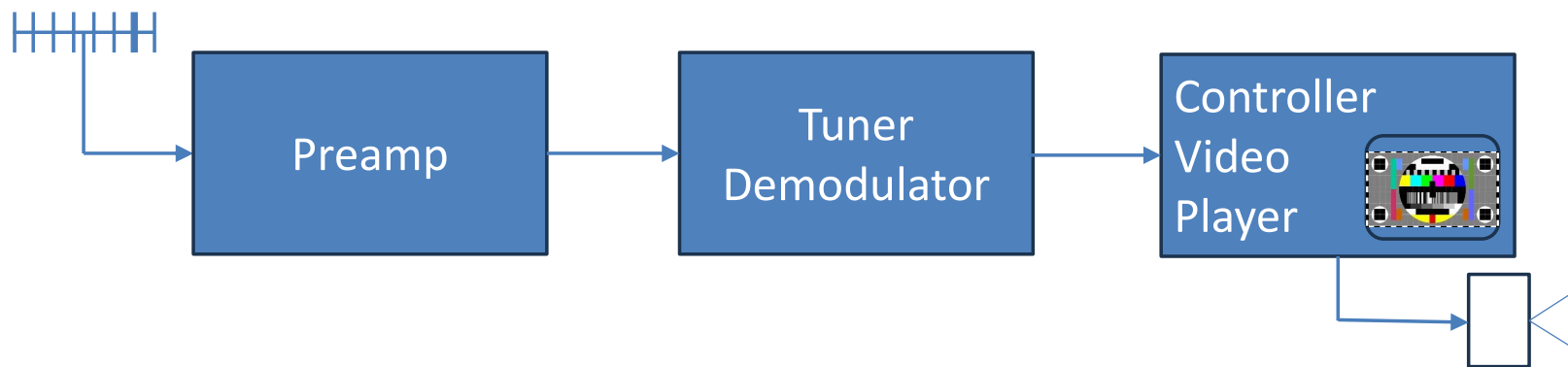
- Beginner's ATV Station
 - Receive
 - Transmit
- Beginner's QO-100 DATV Station
- Questions



Typical 70cm FM/SSB Station

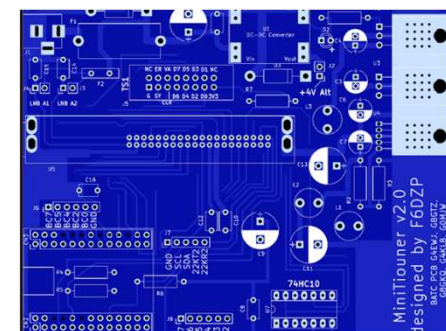


Simple 70cm DATV Receiver



The Tuner

- PicoTuner is a satellite TV tuner with an added USB interface
- Tunes 144 - 2450 MHz
- Needs a high-gain preamp
- Self-build, through-hole construction
- Cost: ~£100



Controller and Video Player

- Controller sets the tuner frequency (LongMynd software)
- Video player shows the received TV signal (VLC, ffplay, mPlayer)
- Packaged into Portsdown or Ryde Raspberry Pi (pre-built SD Cards)
- ~£120 (Portsdown), ~£60 (Ryde)



Simple DATV Transmitter



The Camera

- Raspberry Pi Camera 2 ~£20
- Or a C920 WebCam ~£100
- Or a Video Capture device



Encoder and SDR Driver

- Raspberry Pi 4
- Use the same Portsdown device as you built for receive
- Raspberry Pi 4 has a hardware video encoder
- It will control and drive a Muntjac, Pluto or LimeSDR



■ Software Defined Radio

- Muntjac from BATC £50
 - 70cm and 13cm only
- Or use a Pluto or LimeSDR
 - 70 MHz to 3.5 GHz



■ Power Amplifier

- Needs to be really linear
- An existing PA run at 20% of capacity
- Power requirements are modest



Complete Station

- Pi Camera
- Raspberry Pi and screen
 - Portsdown 4
- PicoTuner
- Existing Preamp, PA and Aerial



System Options

- Portsdown 4 is the simplest tx/rx
- Ryde receiver uses an external HDMI screen
- OpenTuner receives using a PC
- SDR Television receives and transmits using a high-end PC and a Pluto SDR



■ Operating

- Talkback is generally on 144.75 MHz FM
- ATV Repeaters have a text chat on the BATC Streamer



Operating

**BRITISH AMATEUR
TELEVISION CLUB**

HOMEJOIN BATCMEMBERSCQ-TVSHOPSTREAMERON-LINECONTESTS & MAPSEVENTSCLUB INFO

GB3NQ



Stream is Active - Click to play!

Current Viewers: 2

looks like someone is streaming in with black screen

6:05 **Kevin_MOBFB**
Yes that's the way I see it Alan

10:33/2026

10:41 **Kevin_MOBFB**
Could all GB3NQ streamer users please check their equipment as we have a constant blank stream being sent, Thank you

10:42 **Kevin_MOBFB**
It did go off overnight but back on now

10:53 **Kevin_MOBFB**
GB3NQs streamer input has been disabled untill problem resolved, sorry for any inconvenience.

1:57 **Kevin_MOBFB**
All resolved now, streamer input will be back on ASAP

2:55 **Alan G3XPY**
streamer input back in service

Dave_G8GKQ

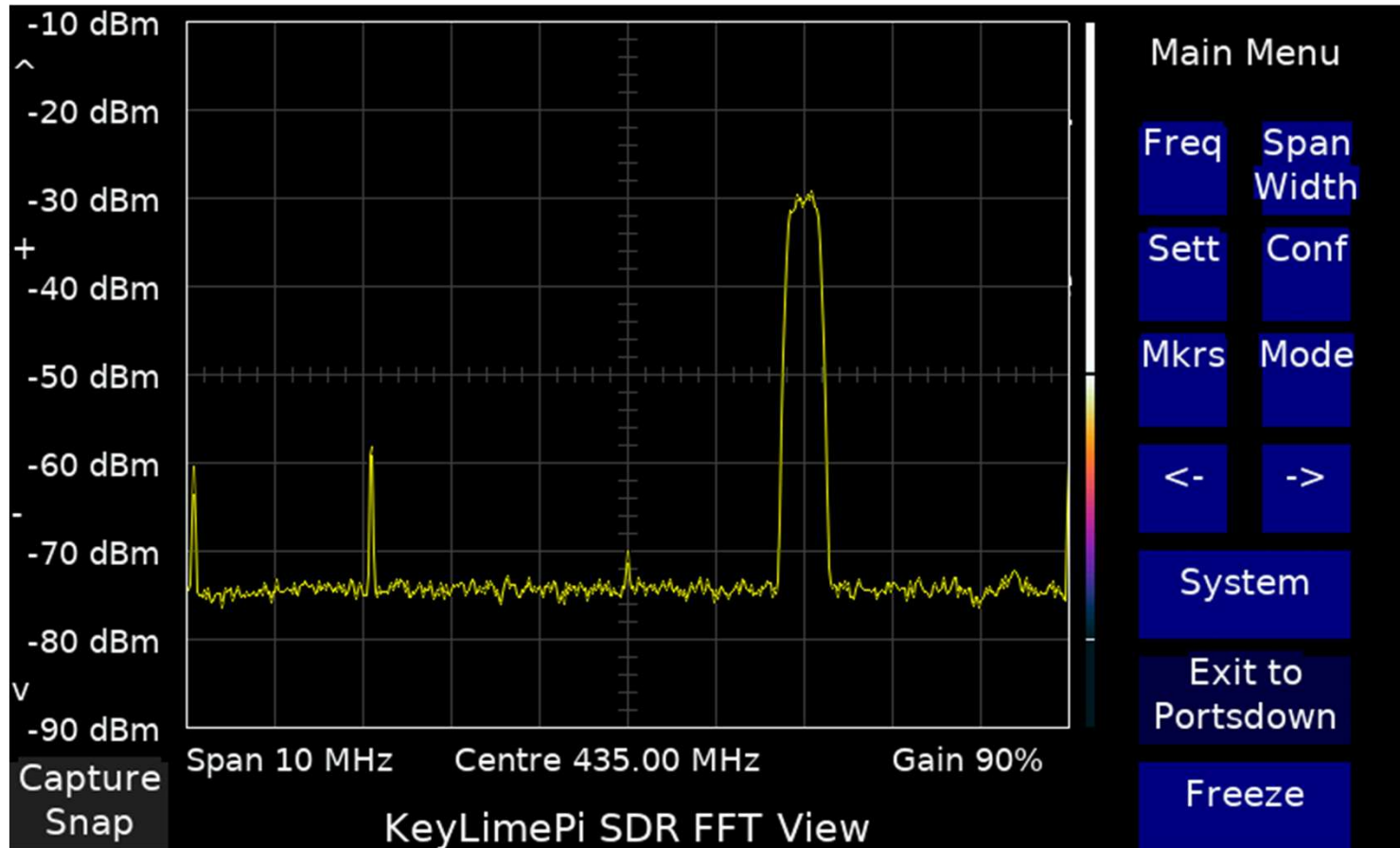
Type a message here and press enter.

GB3NQ 1080 HD Digital TV Repeater
Run by the Mid Cornwall Beacon and Repeater Group
GB3NO is located near St Austell in Cornwall IO700J

■ Operating

- Talkback is generally on 144.75 MHz FM
- ATV Repeaters have a text chat on the BATC Streamer
- Simplex ATV signals use 500 kHz of bandwidth

Operating

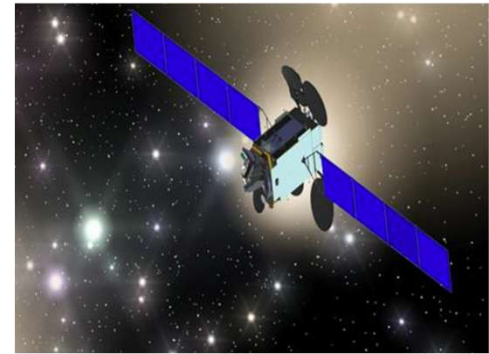


■ Operating

- Talkback is generally on 144.75 MHz FM
- ATV Repeaters have a text chat on the BATC Streamer
- Simplex ATV signals use 500 kHz of bandwidth
- Start on 437 MHz SR 333 FEC 2/3

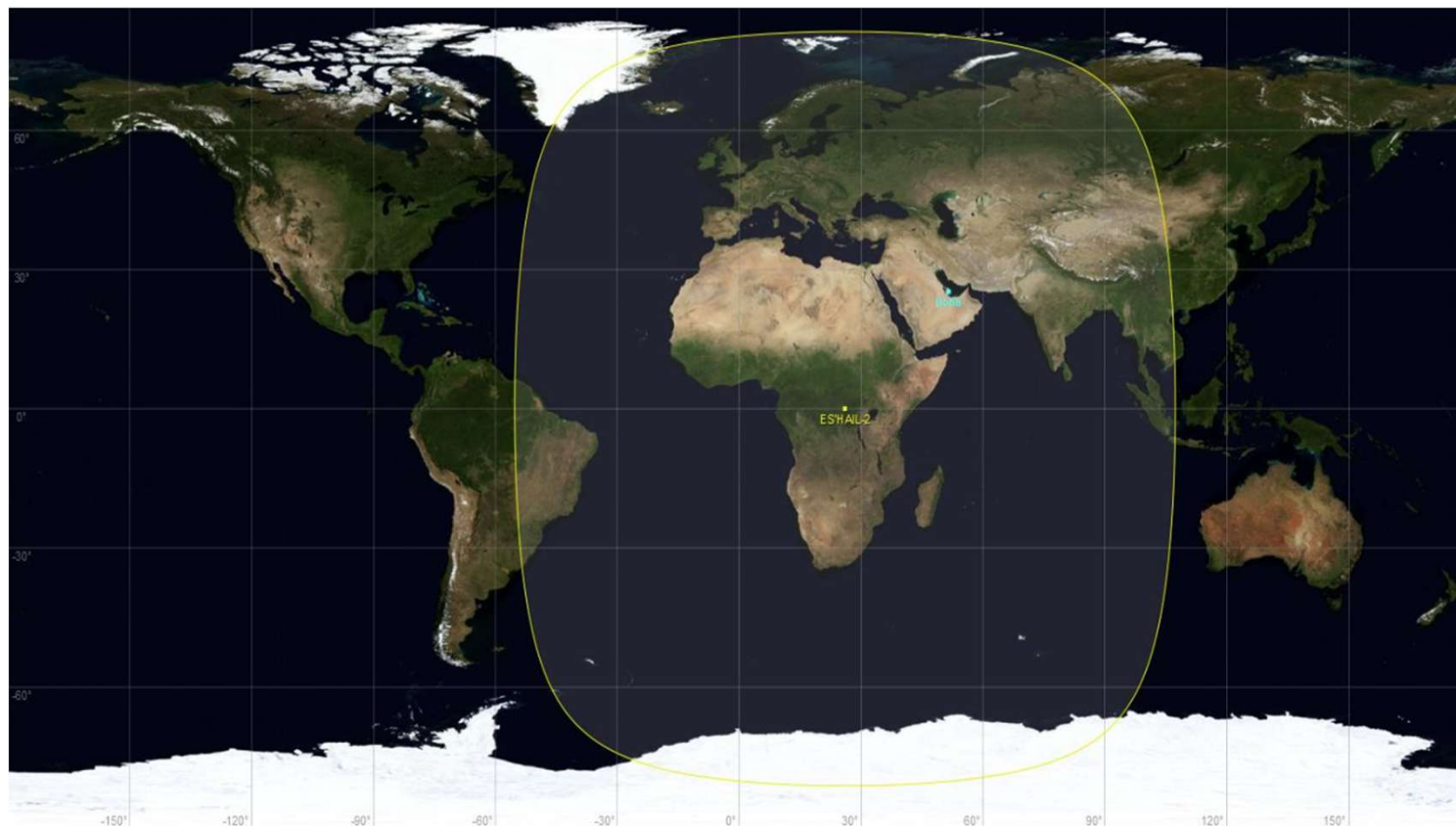
■ QO-100 DATV Basics

- Es'hail-2 at 26 degrees east
- 500 kHz transponder for SSB/CW
- 9 MHz wide transponder for DATV
- Downlink on 10.4905 – 10.4995 GHz
- Uplink 2.391 – 2.4 GHz
- Whole-earth beam



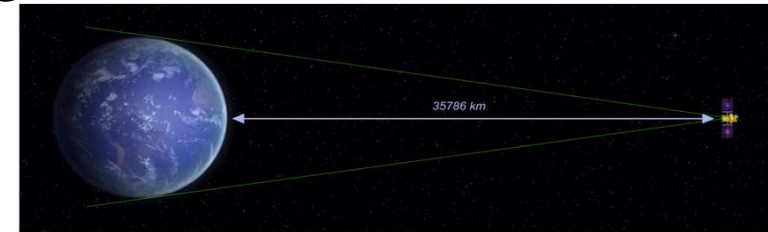
-3dB Beamwidth = 17.4° $\rightarrow$ ~20dB Antenna Gain





QO-100 DATV

- Receive is easy
 - But not as easy as SSB/CW
 - Same transmitted power over 18 times the bandwidth
- Transmit is more of a challenge
 - Need to compete with hot earth



■ QO-100 Receive

- Min 90 cm dish (pref 1.2m)
- Direction is close to Sky Satellite
- Use a standard “Universal” LNB
 - IF 740 – 750 MHz
- Must be perfectly aligned with a good feed
- Signal Margin is typically < 5 dB



QO-100 Receive-only

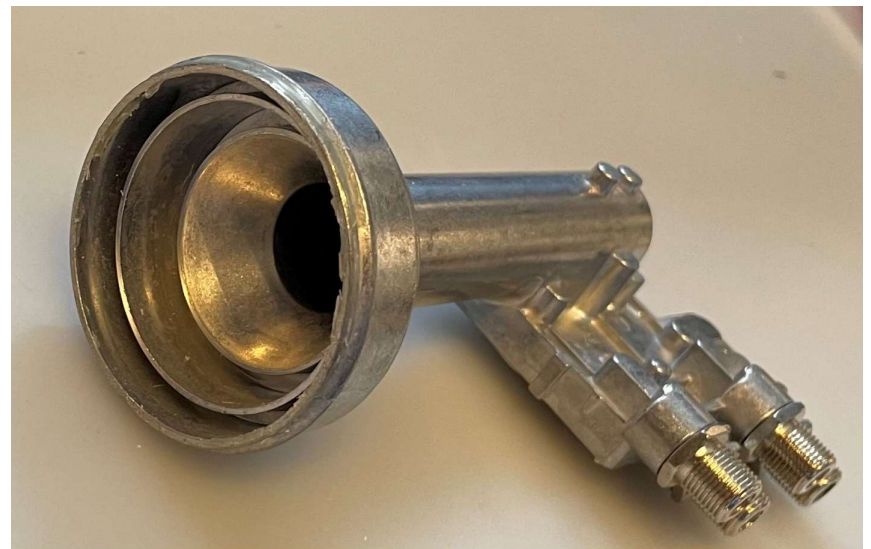
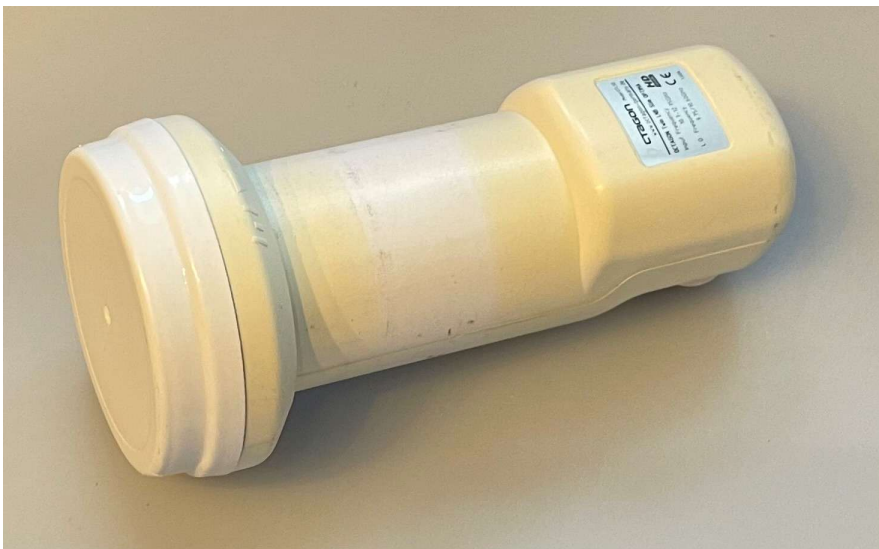


LNB Mount



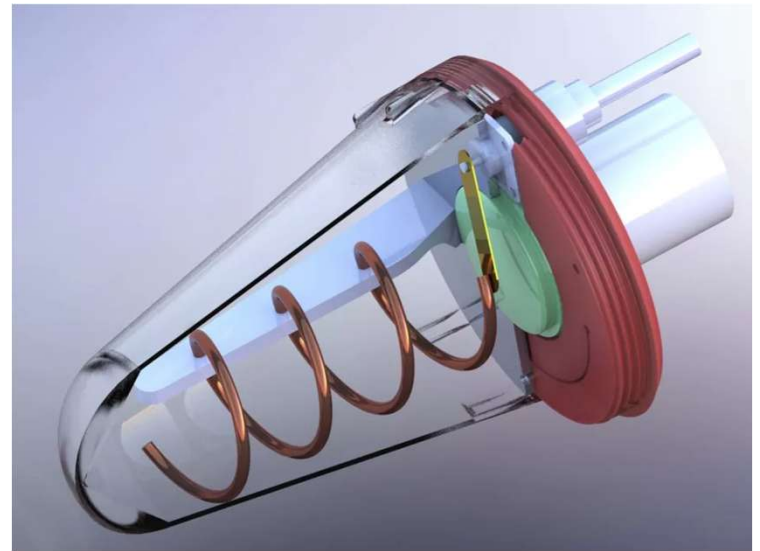
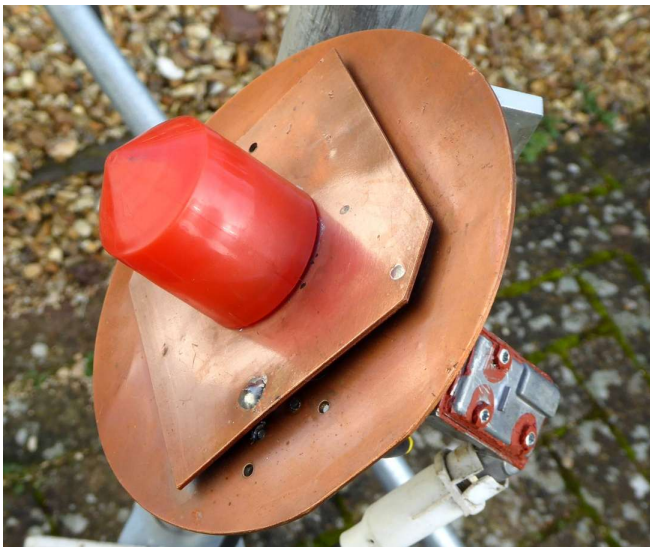
■ QO-100 Dish Feeds

- Receive-only
- Simple horn



■ QO-100 Dish Feeds

- Dual Band
- POTY or Ice Cream Cone

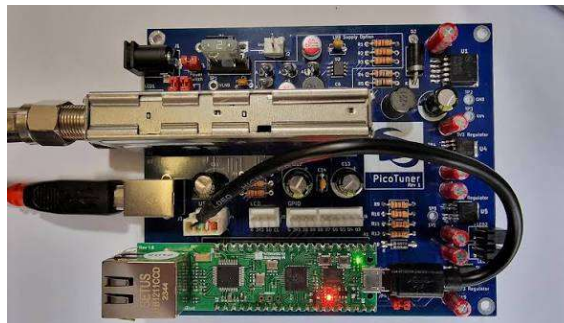
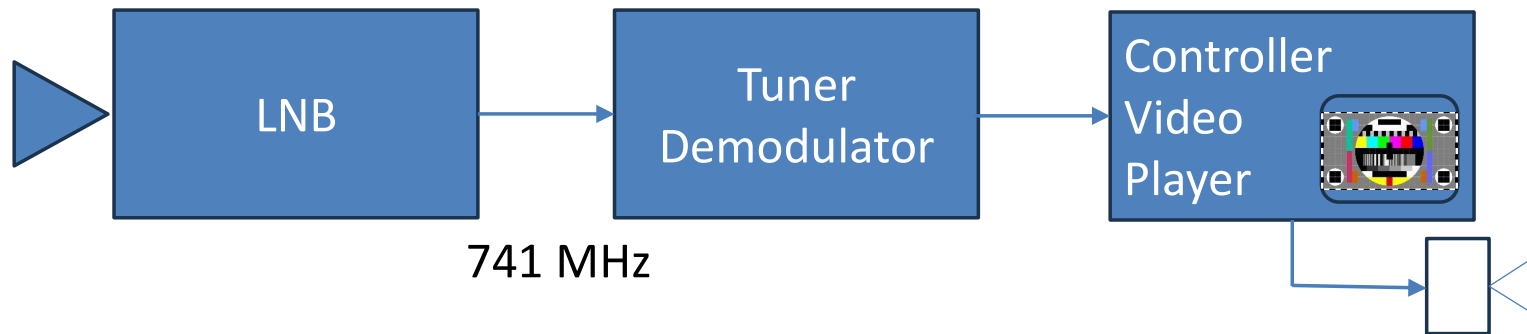


■ QO-100 Dish Feeds

- Lenses for Dual Band Feeds
- Two-part Rocket Lens is essential

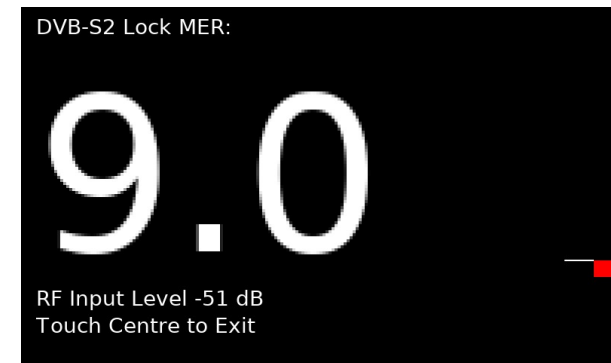
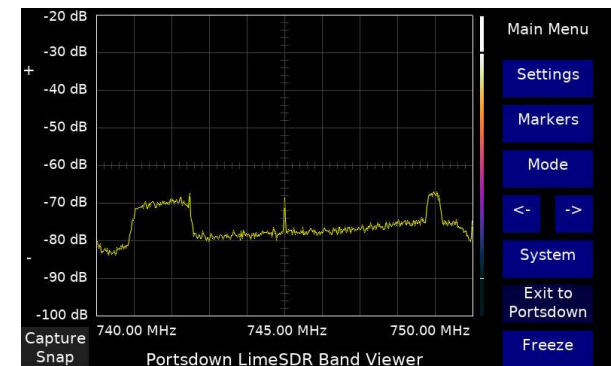


QO-100 Receive



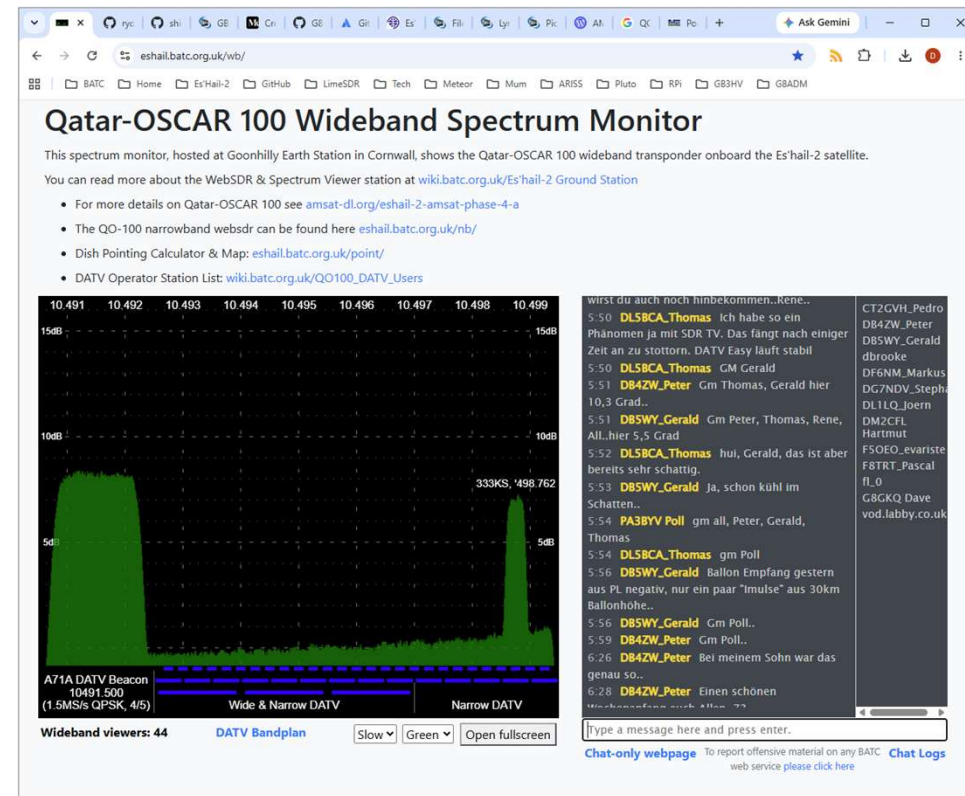
QO-100 Receive – Getting Started

- Align Your dish on the NB Beacon
- Change Polarisation
- Look for the DATV Beacon on 741.5 MHz
- Use an SDR?
- Then use Portsdown to peak (on smart phone?)



QO-100 Receive – Operating

- Use the online spectrum monitor



■ QO-100 Transmit

- Requires 30 W with a 1.2m dish
 - 53 W for a 90 cm dish
- Requires a very linear PA
 - Close to the dish
- Right Hand Circular Polarisation



Simple QO-100 DATV Transmitter



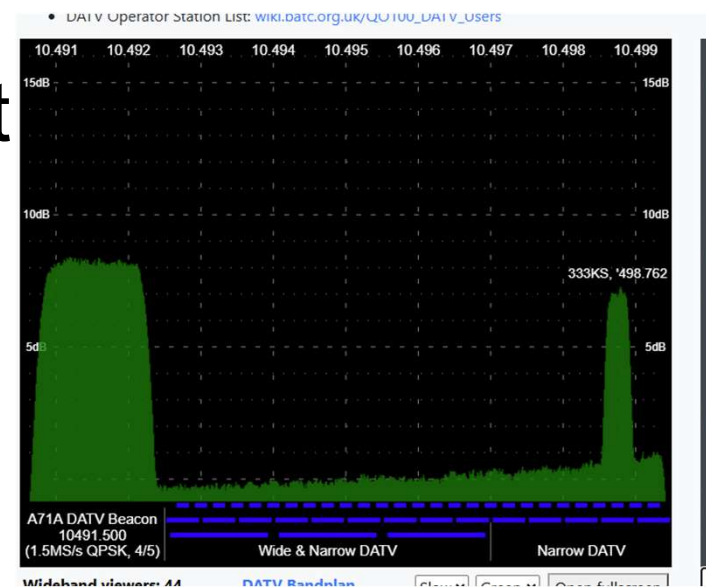
QO-100 PAs

- No commercial option at 50 W
- Mobile Phone Base Stations
 - UMTS from Poland
 - Modified by Jim G7NTG
 - eBay

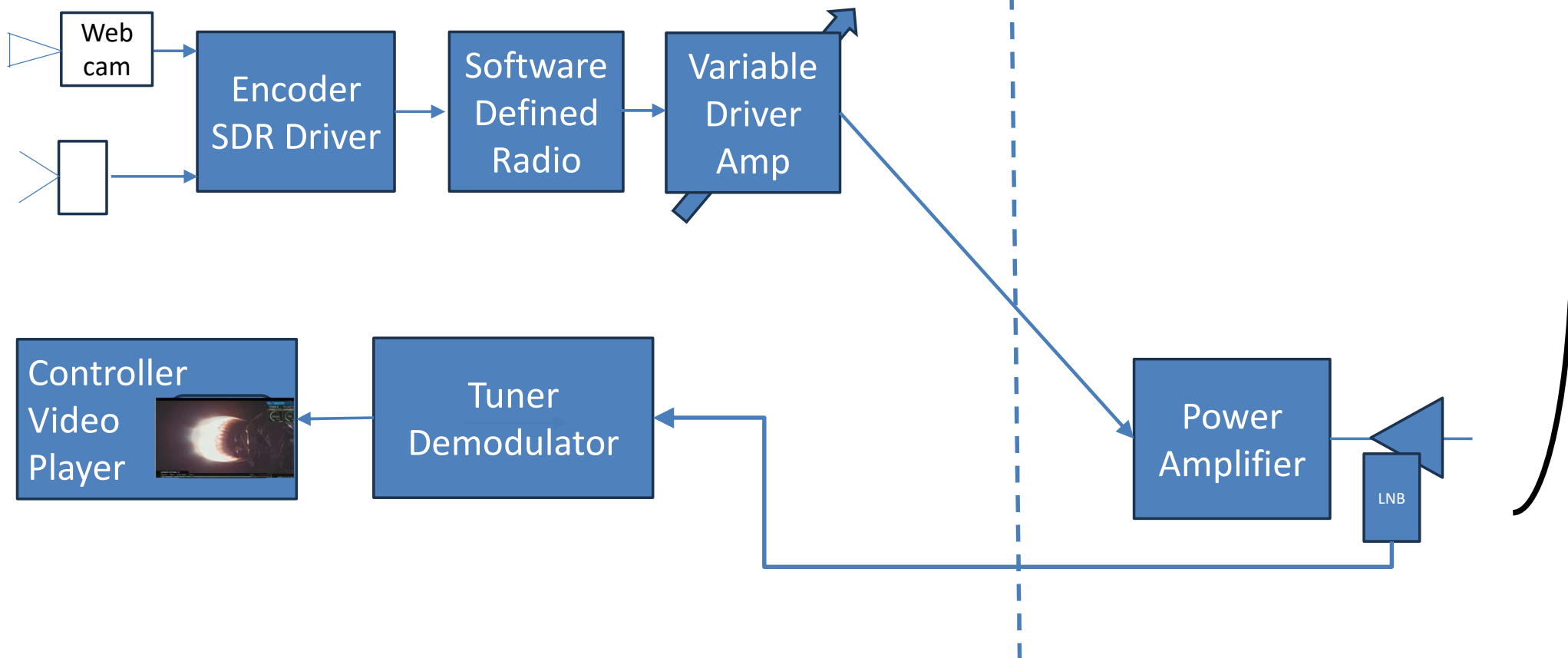


■ QO-100 Power Control

- All sharing the power of the Satellite
- Use the wideband monitor to set your power 1 dB less than the beacon
- Follow the bandplan

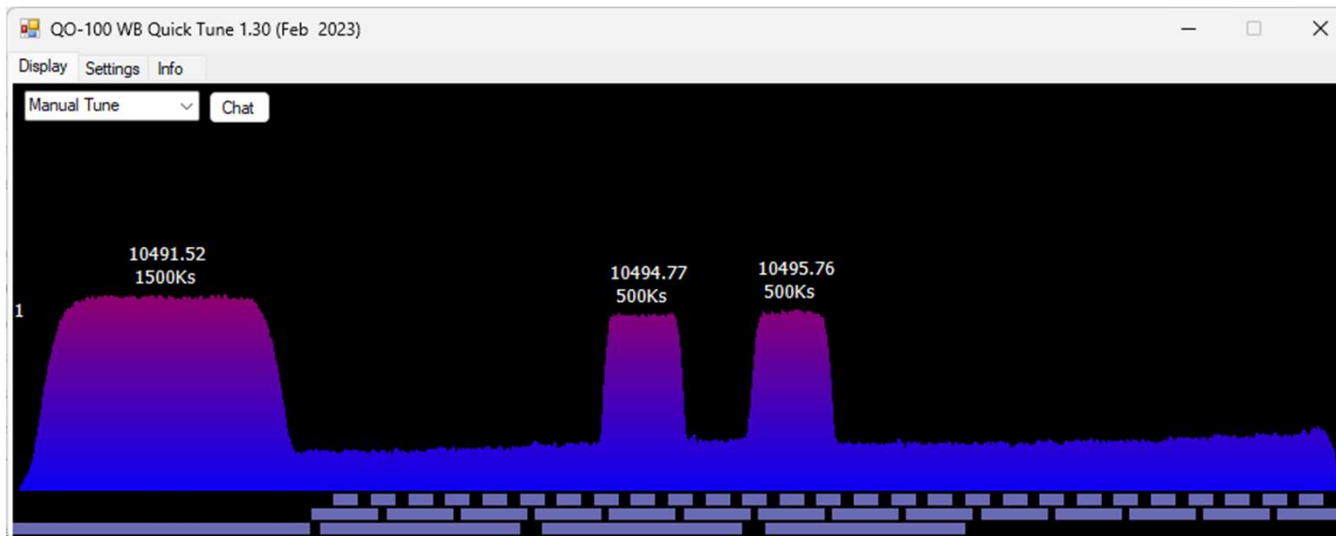


Typical QO-100 Set-up



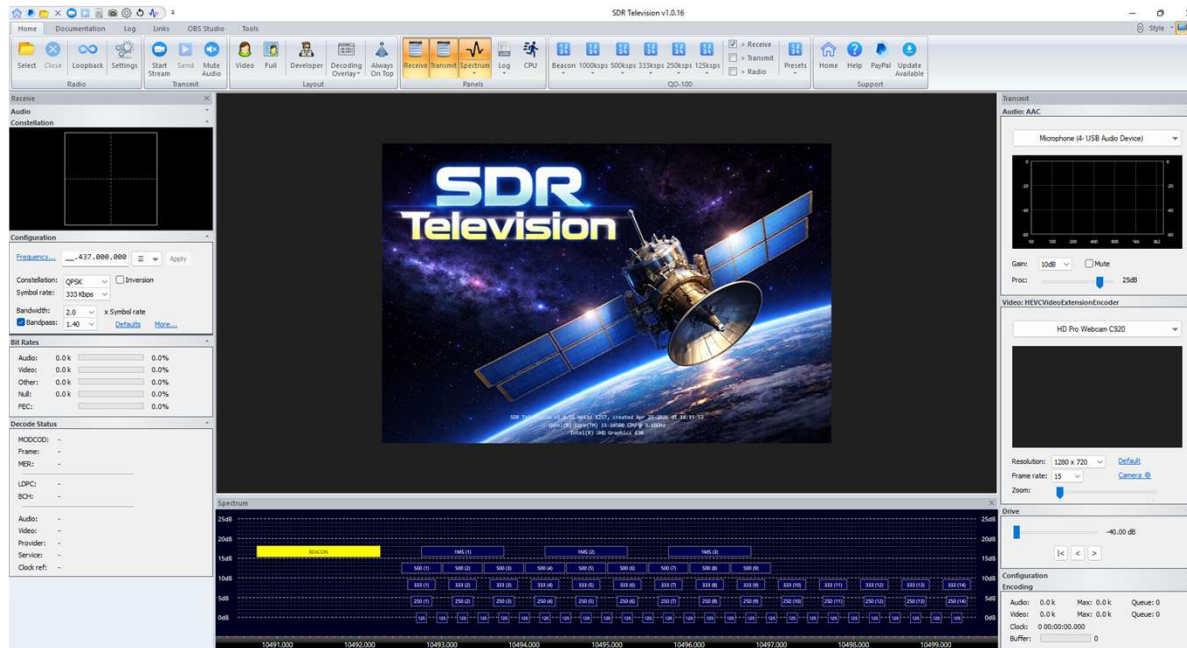
QO-100 Advances

- Use a Ryde Receiver With MODTS's Quick Tune



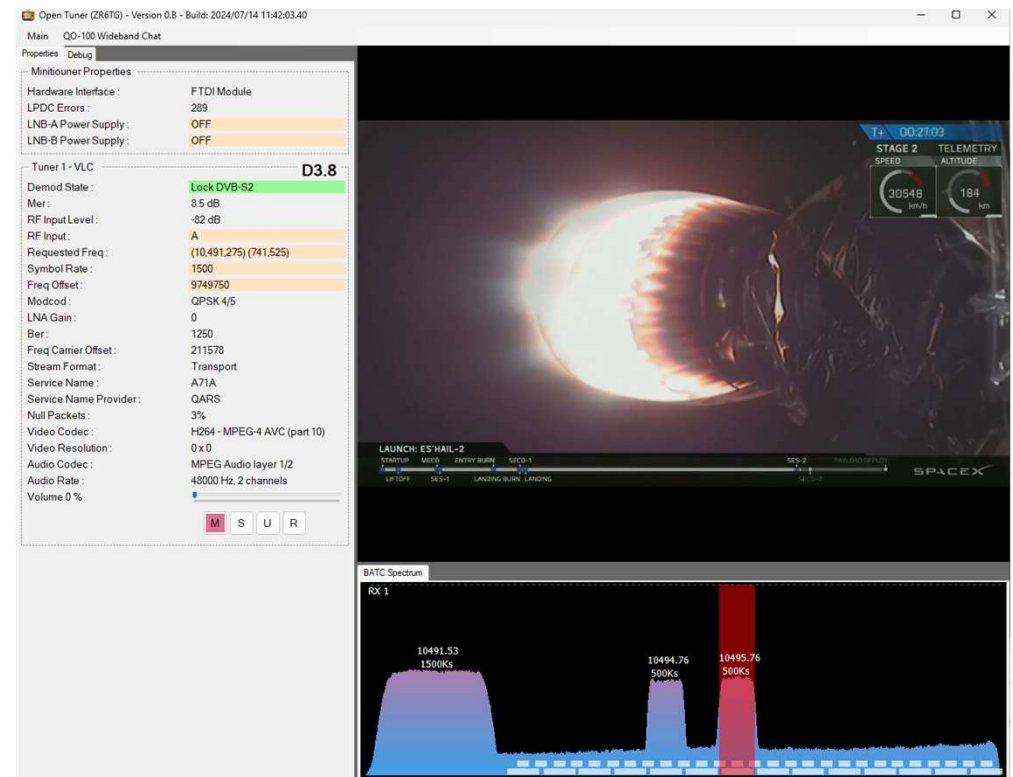
QO-100 Options

- SDR Television on a PC with a Pluto



QO-100 Options

- OpenTuner RX on a PC with a PicoTuner



Conclusion

- Start simple with local receive
- Transmit across the shack
- Use repeaters
- Receive QO-100
- Transmit to QO-100
- Portable ATV



■ Questions

Find out more...

<https://batc.org.uk/>

<https://wiki.batc.org.uk/>

 BATCOnline

 @BATCOnline

www.rsgb.org

