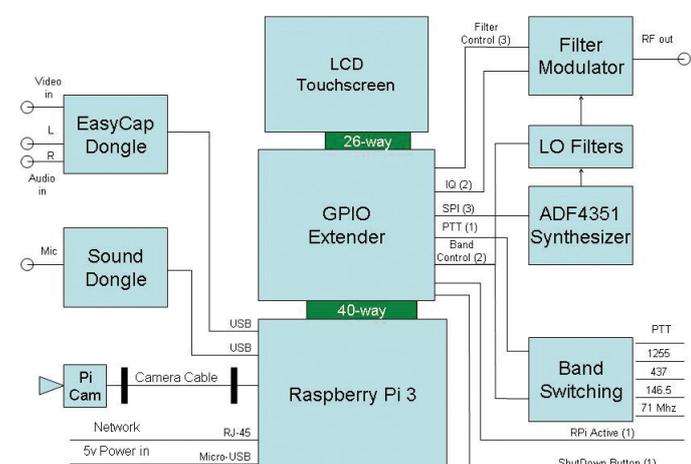


The Portsdown Digital Amateur Television Project



The Portsdown DATV project provides an easy way to “get on air” with Digital ATV at relatively low cost. The Portsdown system enables amateur radio operators with little or no knowledge of Digital ATV to construct the hardware elements, load and configure the software and use the system to send live Digital ATV signals across town on their existing aerials. It includes the new Reduced Bandwidth modes and the ability to transmit to local repeaters using the more traditional 2 and 4 Msymbol DATV modes.



- ▶ **Frequency coverage** of 71 MHz, 146 MHz, 437 MHz and 23cms bands
- ▶ **Wide symbol rate** range to include the Reduced Bandwidth (RB-TV) modes and “normal” DATV modes
- ▶ **Cost-effective** stand-alone (not PC based) Digital TV Transmit solution
- ▶ **Analogue video input** to allow use of camcorders and mixing desks
- ▶ Use of **commonly available components** and modules
- ▶ **Modular construction** enabling a step-by-step system build and easy trouble-shooting
- ▶ **Fully documented** and supported including easy software installation and upgrades

At the heart of the Portsdown transmitter is a Raspberry Pi 3 (Rpi) computer running a BATC customised version of the F5OEO rpidatv software. The RPi 3 was chosen because it is relatively cost, has an on-board MPEG-4 (H264) encoder and versatile hardware interface (GPIO) capabilities. The system is controlled using a simple touch screen interface; no keyboard, mouse or monitor are

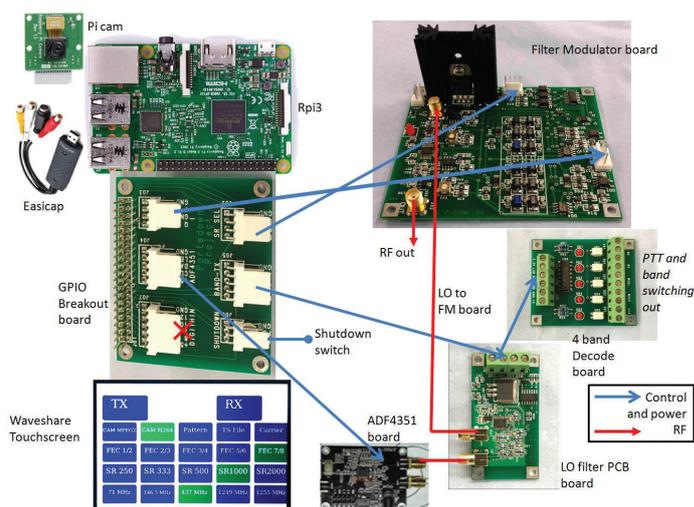
required. If the touch screen is not available, the system can be controlled using an external PC connected over a wired or wi-fi network.

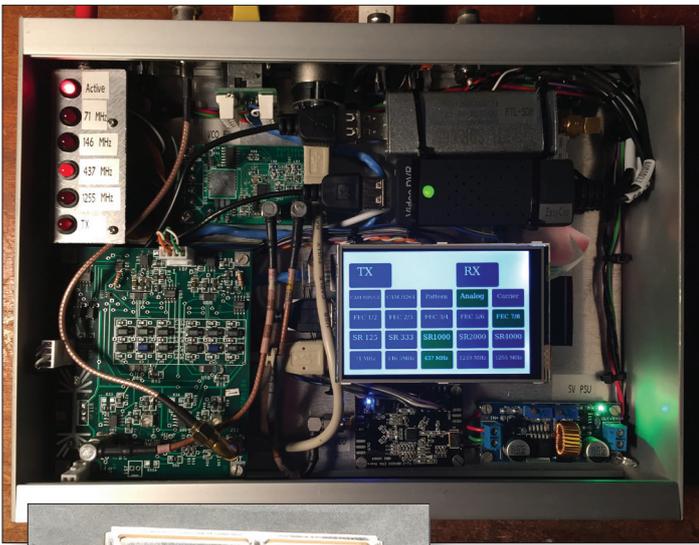
The Portsdown Filter Modulator board is available as a ready built unit or a blank PCB from the BATC shop and PCBs for PTT band control and LO filtering are also available. The Portsdown RPi software is capable of controlling an external ADF4351 oscillator module to give full output on all bands from 71MHz to 1.3 GHz and a reduced power output at 2.3GHz.

Just like any other DATV transmitter, the Portsdown has a relatively low output power (10 milliwatts maximum) and will need bandpass filters and drivers / amplifiers on the output - there's lot of designs around for sale or easy home construction and more details can be found on the BATC wiki.

Receiving Digital Amateur TV is surprising easy, particularly on the 23cms band, and the Portsdown transmitter, which uses the DVB-S standard, can be received on any Free to Air satellite set top box. To receive the Reduced Bandwidth transmissions you will need the special MiniTouner USB receiver developed by F6DZP – the hardware is simple to build and most components are available for the BATC shop and the software is downloaded from F6DZP's site.

The Portsdown project aims to condense many recent RB-TV and DATV initiatives into one, easy-to-build and get-on-air project. It brings DATV and RB-TV within the grasp of the average ATV operator who still values some basic hands-on construction and is looking for a project which will deliver the capability to operate on all the communally used DATV and RB-TV modes at a reasonable cost.





Portsdown ATV transmitter specification

Frequency coverage: 71 – 1325 MHz
(operation outside this range may be possible)

DATV Modes: DVB-S QPSK 1/2, 2/3, 3/4, 5/6 and 7/8 FEC

Symbol rate: 125 Ks to 5 Msymbols

Typical MER (with LO filters): 26 dB measured with Tutioune Version 5

Frequency MHz	SR	Output Level dBm
71	333	9.6
146.5	333	10.1
437	333	9.2
437	1000	9.0
1255	333	5.0
1255	1000	5.0
2400	333	-7.0
2400	1000	-7.0

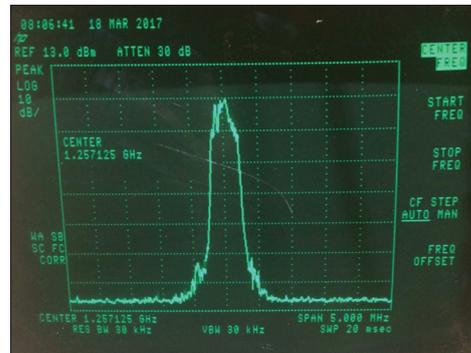


Top: The complete, boxed Portsdown Transmitter

Left: MiniTioner

Below: The 4 band decoder board

Bottom: LO Filter Board



Video encoding: MPEG-2 and H264

Video input:

- ▶ Raspberry Pi camera
- ▶ Analogue input via EasyCAP USB device
- ▶ Internal test sequence generator
- ▶ Input from Vmix software using IPTS

Audio input: Via USB audio capture device

Control: LCD touchscreen or console menu via SSH

Auxiliary boards include:

- ▶ GPIO breakout board
- ▶ 4 band decode and PA control
- ▶ Local oscillator filter board



For more details go to the BATC wiki pages at https://wiki.batc.tv/The_Portsdown_Transmitter

You can get support and discuss the project with the ATV community at the BATC forum <http://www.batc.org.uk/forum/viewforum.php?f=103>