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Due to circumstances beyond our control, the YIG article that was to be in this issue, has had to be held over until the next issue.

Production Team

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Editorial

ATV has come a long way, but not just Analogue to Digital. When ATV started in the UK, portable operation had to have the site cleared by the UK authorities. Fortunately, once a site was cleared, it remained cleared for future ATV operations. So then working under the BATC umbrella, we produced a list of cleared locations for future use.

When ATV repeaters were conceived and licenses applied for, we had to spend considerable time and effort with various RSGB committees who insisted on clearing each application on an individual basis and this really slowed down applications reaching the authorities. Every problem has a solution and the UK ATV repeater applications were expedited by the efforts of Graham G3VZV who introduced a template approach which, as long as your repeater fitted the template, did not require this slow and time consuming vetting by each individually committee.

All this comes down to team work and with ATV's minority status we need to work together and never so much as with the introduction of Digital ATV where we still need work to implement an international system and dare I say internet inputs for ATV repeaters. So that would be recruits to the mode could try the hobby before they invest time and effort in equipment

I have heard this called try before you buy and even try instead of buying but the ATV repeaters have peaks and troughs in activity so it could be restricted to quiet times or the priorities set to reduce internet activity to be below on air users. The possibilities are endless.

All of this shows that ATV still needs support and team work. Here at CQ-DATV we have delivered that support by producing a monthly magazine that others said "could not be done" as there was insufficient copy and by taking full advantage of electronic only distribution, we have managed to do it at no cost.

Our content from issue one, has been a broad church, from Mike's Arduino projects, John G3RFL's constructional projects, Dave G3ZGZ's Aerial photography, and Trevor's TV production input, along with Richard VK4XRL's Digital world, Ken W6HCC's DATV express reports, and Klaus Welter, DH6MAV's input, plus many more guest items.

All this is whipped up into a magazine by our resident production team that is Ian G8IQU and Trevor G8CJS in the UK and Terry VK5TM in Australia. (Dropbox very cleverly converts Northern Hemisphere text to Southern Hemisphere and visa-versa).

The next issue marks our third year of distribution with one issue passing 12,000 downloads. 2016 will also take the total downloads of CQ-DATV publications to beyond the 150,000 mark.

The original plan was for an eBook only magazine that would be delivered directly via an app to all the subscribed readers eBooks. This has not come to fruition for one or two technical reasons, but we did add a PDF version that could be computer downloaded and also read on-line via the magazine publishing company ISSUU.

We have come a long way in the last three years. Yes next month's issue will mark year 3 of CQ-DATV and we are looking for reports and copy to make this our best ever issue.

We also reported in the last issue that Mike Stephens G7GTN, creator of our Arduino projects, was in hospital undergoing a major stomach operation. Mike was eventually discharged, but as soon as he entered the Chemo phase of this operation he had to rushed back into surgery. He is now out, so some good news, he won't be spending Christmas in hospital, but he still has a long way to go. I am sure we all wish him well and look forward to his health improving and his copy returning to our pages.

So, from all the contributors and production team here at CQ-DATV, we wish you all a prosperous and happy new year for 2016.

CQ-DATV Production team

Defence Minister is radio ham

Sweden's Minister for Defence is radio amateur, Carl Anders Peter Hultqvist SM4HCF, he was appointed on October 3rd, 2014
On Friday, December 11th, 2015 the Swedish national amateur radio society, SSA, had the honour to receive Peter Hultqvist, SM4HCF. He was in Karlsborg on official mission, but after this Peter took the time to complete a telegraphy test in a classroom at the old S2 led by Kjell SM6CTQ and Fredrik SA6CJZ, and then devoted an hour to the SSA archives.

The Defence Minister expressed surprise that the archive was so extensive. Eric SM6JSM had picked up some interesting documents such as QSL card from the Swedish military and humanitarian operations in a distant land, from the Palestine conflict in 1948, Katanga, Cyprus, Afghanistan and so on.

A small gift was presented, consisting of old issues of the QTC from the 30's. We hope that at some later time have the opportunity to present other delights. The picture (follow the link below) was taken in our archives and shows from left Eric SM6JSM, Peter SM4HCF and Kjell SM6CTQ.
Source SSA *http://tinyurl.com/SwedenSSA*

Medium Wave AM switch-off in Germany

Deutschlandfunk reports an era comes to an end when, on December 31, 2015, the last medium wave transmitters are switched off in Germany

For many lovers of analog radio technology a memorable event, because now the transition to the digital era is irrevocably accomplished. No more noise and crackle, no more whistling and no volume fluctuations.
And yet: Not a few look wistfully back on this great chapter in Radio, as we know from your reactions and letters.

Read the Deutschlandfunk story in Google English
http://tinyurl.com/Medium-Wave-Shutdown

Tim Peake ISS School Contacts

ARISS stand at the London Science Museum Tim Peake launch event

ARISS have announced details of the first of the school amateur radio contacts with UK astronaut Tim Peake KG5BVI. Tim will be using the special International Space Station (ISS) call sign GB1SS during his 6 month mission.

Students will be able to put a number of questions directly to Tim using amateur radio equipment specially installed at the school for the occasion.

The ARISS team of licensed UK Radio Amateurs is planning a

world first by also receiving live video from the ISS during the contact. Using the HamTV transmitter, which has recently been commissioned on board the ISS, Tim will be the first astronaut to use this equipment during a two way schools contact.

Tim Peake KG5BVI training on the amateur radio station equipment he will use on the ISS

As well as building a vehicle based receive system, which will be installed at the school on the day of the contact, the team visited Goonhilly Earth Station in Cornwall to commission a dish to receive the 2.4 GHz HamTV transmissions from the ISS.

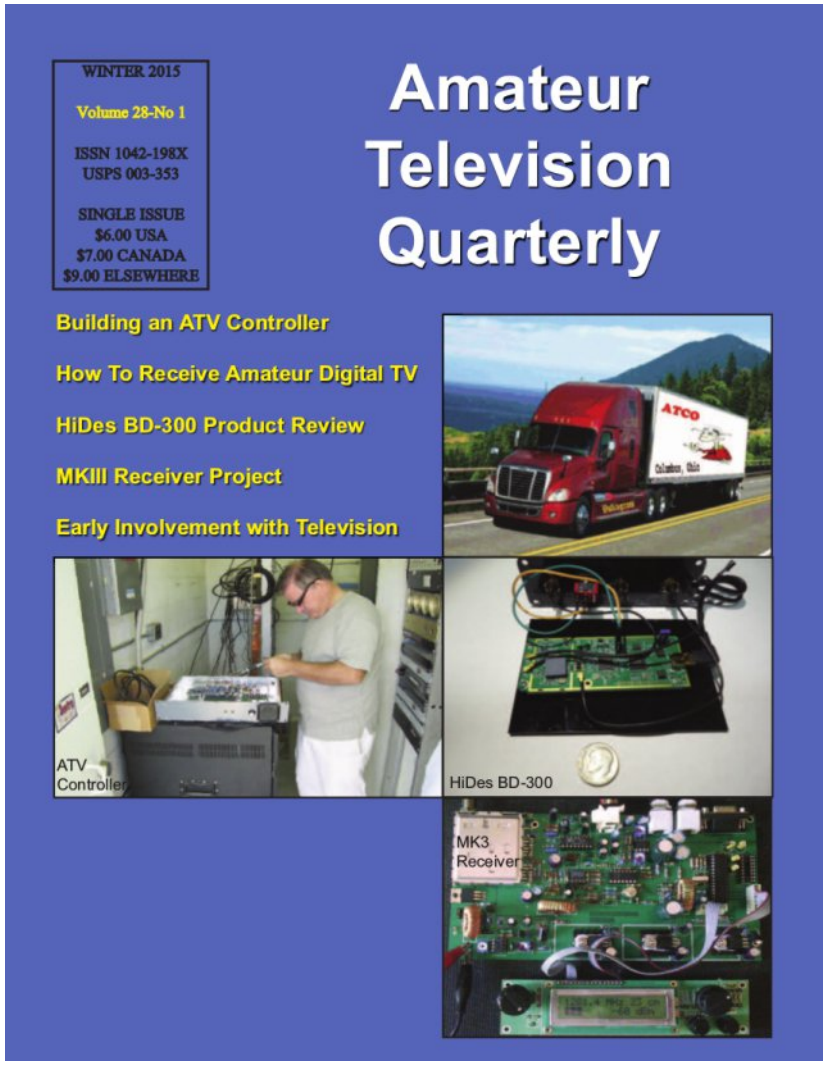
During the contact at the schools the ARISS team will be providing information displays on the ISS position and have webcams showing both the local and Goonhilly dishes as they track the ISS.

The hosting schools will be organising presentations and displays before and after the contact and the ARISS team will be providing a live web cast of all the day's events including the actual contact with Tim Peake.

The live event webcast will be hosted by the British Amateur Television Club (BATC) on their web streaming service at *https://principia.ariss.org/live/*

The ARISS programme is designed to maximise the impact of the Principia Mission outreach activities. It will directly engage students with media and communication technologies with the goal of inspiring them to pursue careers in Science, Technology, Engineering and Maths.

HamTV dish antenna at Goonhilly
Credit - Frank Heritage M0AEU



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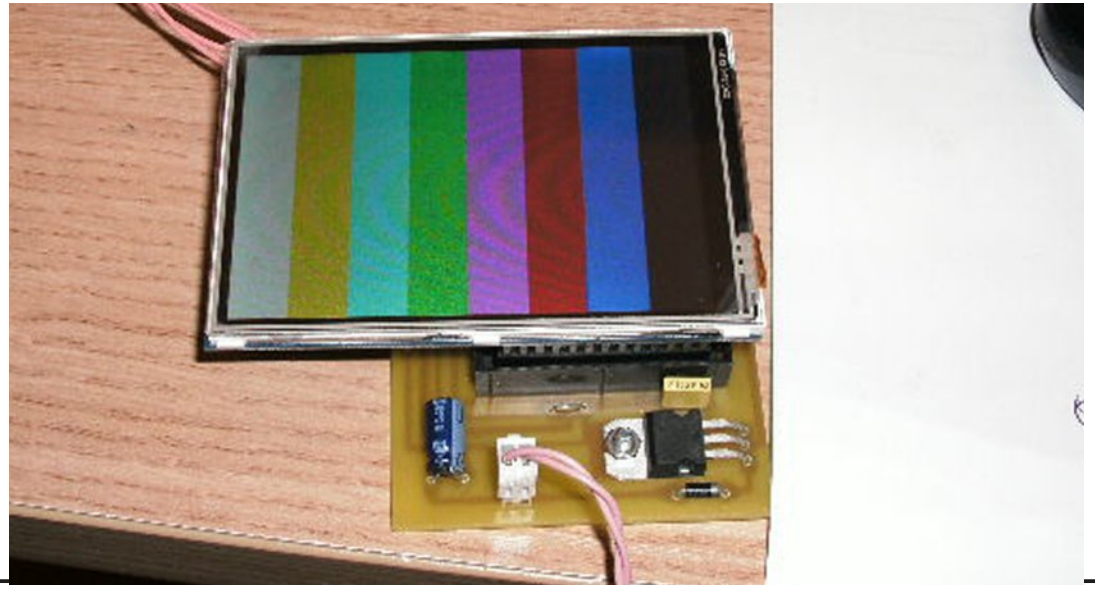
TFT Screens

By John G3RFL

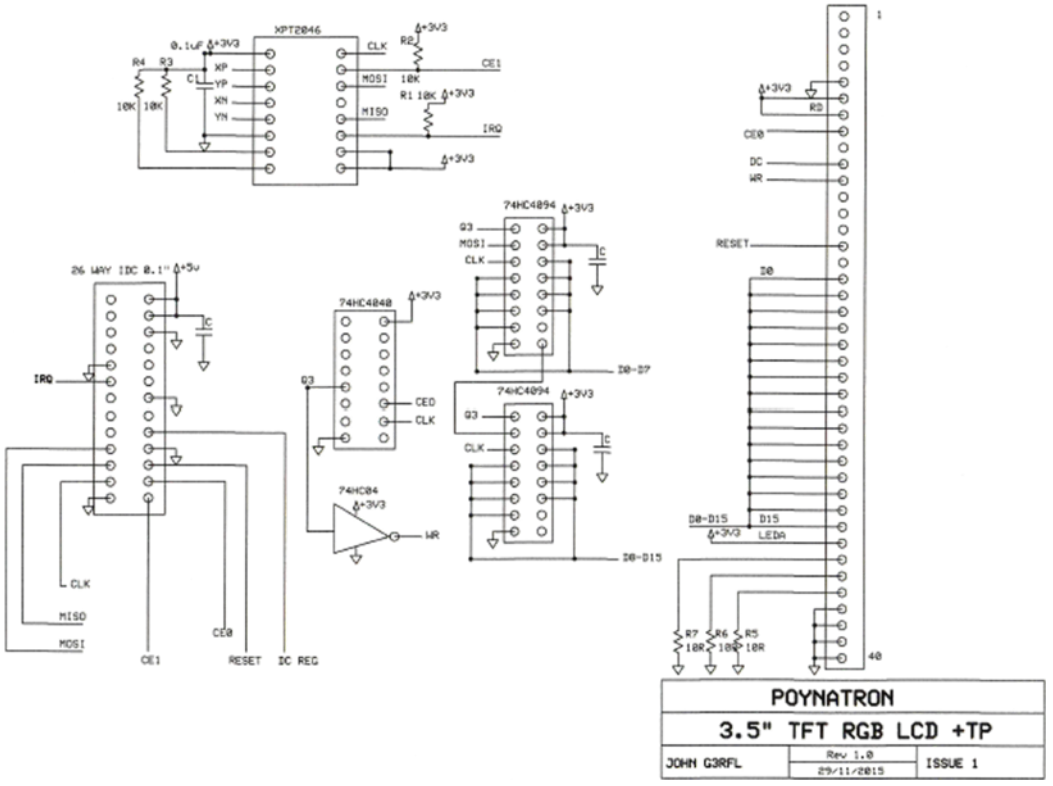
I have been designing constructional projects for CQ-DATV right from issue one and I am often asked where does the idea for great construction project come from well I have to admit to a number of sources from simple requirements such as wanting to know which way my aerial is pointing, through to the requirement for a local ATV repeater (GB3RF) which connects all the local ATVer's. I also have to admit that all too often, my inspiration comes from eBay and some of the incredible bargains such as the YIG modules I used for ATV transmitters and ATV filter.

The bargains are out there, but you have to know what they are and more so what to do with them. Recently I came across these 3.5" 320 X 480 RGB TFT display screens, which are also touch screens and are selling at £11.68. Could I resist, no and I have now bought 6.

This for me is commitment and the challenge is to drive them.



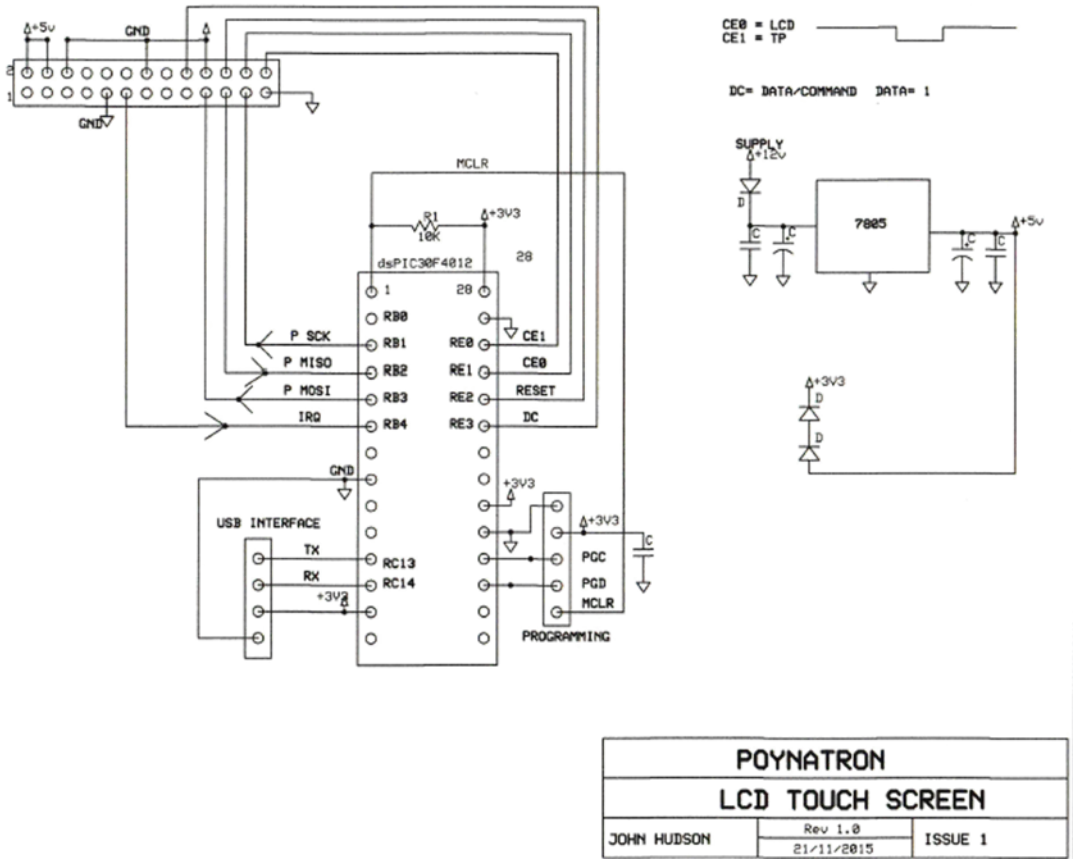
With the pressure on I did eventually manage it, but there were one or two dead ends and U turns along the way. I have to admit when they finally displayed their humble RGB colour bars, I was rather pleased with myself. The above picture shows the result.



The Circuit Diagram of the TFT Screen

This (next page) is the circuit of the RGB component generator and the final solution to driving the display part of the screen. It's the hardware part and considerable R&D went into the software side of this project.

The software maths is very complex and takes you into floating point maths and also with sine and cosine functions, so please forgive me if I don't go through it blow by blow with you.



The Circuit for putting Colour Bars on the TFT screen

There will be a *download available* and which will lead to a radar type screen with an A/D input.

Other screens appear on eBay but, at the time of CQ-DATV going to press, this is the one I purchased, well 6 off to be accurate, but I did leave some for you to invest in. eBay Item 181666140314.

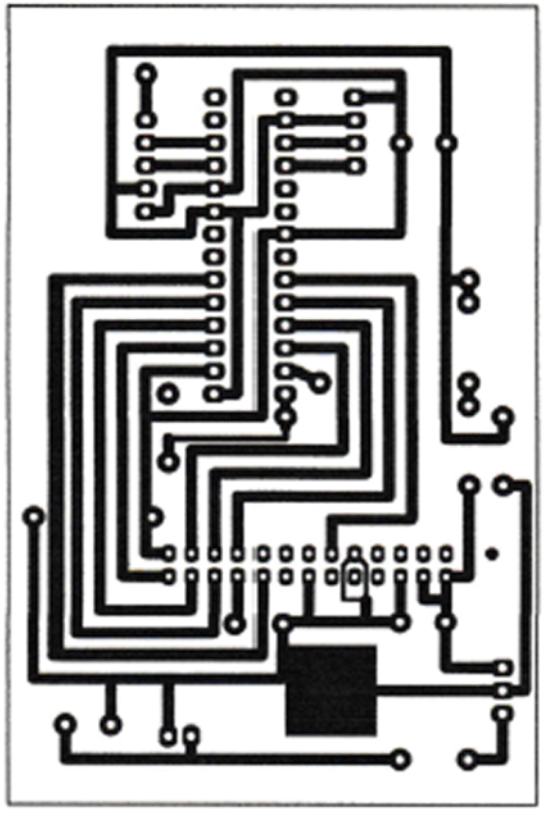
I now have control of 153600 pixels with thousands of colours. This has potential for numerous projects from scopes to spectrum analysers and at prices that should suit everyone's pocket.

The information on the display was scant and it is almost as if the display people do not want you to know how to drive it. But a little reverse engineering soon produced the circuit diagram and now I have hardware, software and the display all talking to each other, well.....wait and see.

The only problem left is the speed as it can take a little over 1 second to refresh the screen. None of which should stop the development of the next batch of CQ-DATV constructional projects. Just watch this space!

In an upcoming issue, I will describe the TFT LCD being used as an antenna rotator controller, both a 'radar' type display (polar plot) with a red dot pointing to the direction and a novel way of displaying (3 digits) its angular position using the resistor colour code.

The PCB Board for the PIC and the TFT Connector - NOT TO SCALE



Caption competition

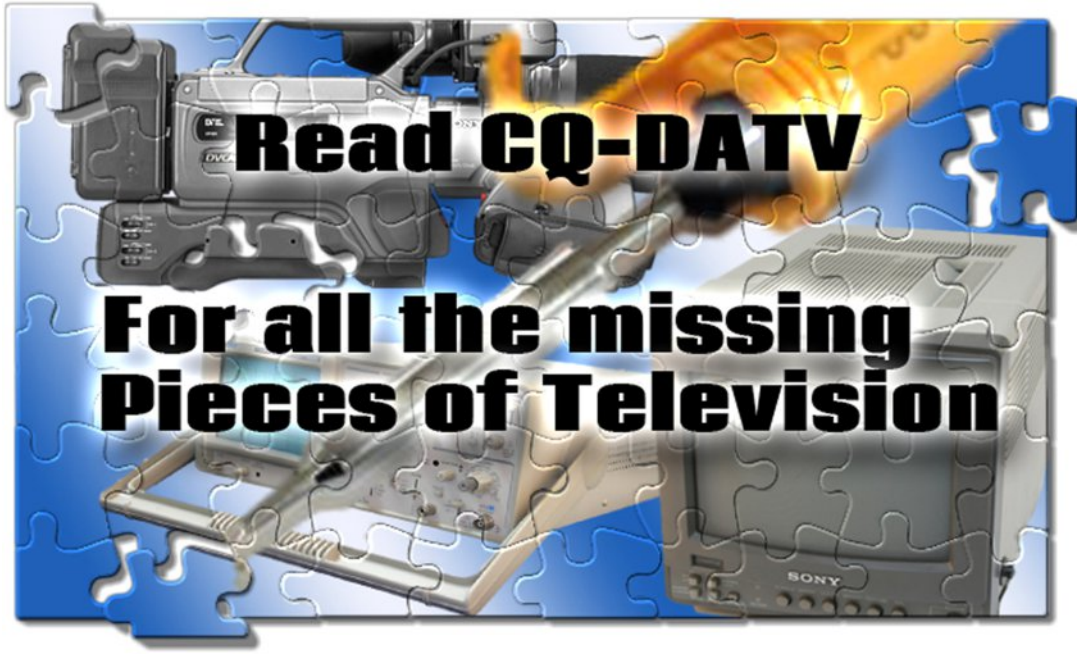
In CQ-TV 30 we published a picture of Trevor and a statue and asked you for your punch lines and also if anyone knew the real name of the statue and its whereabouts.

John Metcalf was is a civil engineer. He was known as Blind Jack and the statue is in Knaresbrough North Yorkshire.

John was blind from an early age, but this did not stop him building many of the local roads. You can Google the full story.

Trevor is the one on the right (I think)

We will save the funny punch lines for CQ-TV 32 and also keep the competition open, captions to *editor@cq-datv.mobi*



Gerrit Polder, PA3BYA.

Introduction

In this project the Raspberry Pi with the PiCam is used as a wireless camera which can transmit images over long distances, usually tens of kilometers.

Images will be transmitted by amateur radio (ham-radio) using slow scan television (SSTV) on the 2 meter band (144.5 MHz). Since the Pi can generate the HF FM signal itself, no additional electronics are needed for low power transmissions. For a little bit more power a one or two transistor amplifier will be suitable. Furthermore a low pass filter is recommended to filter out higher harmonics of the signal.

This project also contains a python script which detects movement. Using this script the Raspberry Pi can be used as a wireless security cam at distances far outside the range of normal WiFi networks. Be aware that you need a ham-radio license to use this application!

Complete portable pi-sstv transmitter

Capturing the image

First thing to do is capturing the image we want to transmit. This can easily be done with raspistill:

```
raspistill -t 1 --width 320 --height 256 -e png -o
/tmp/image.png
```

For sstv we need a small image, of 320 x 256, it is saved into the /tmp directory as png.

Converting the image to a SSTV sound file

Next we need to convert the image to a sound file which can be transmitted over the air. There are several SSTV implementations available for the Raspberry Pi.

PySSTV

First I had a look at PySSTV, a Python implementation which can be installed using pip:

```
pi@rpicamera ~/sstv $ sudo apt-get install python-
setuptools

pi@rpicamera ~/sstv $ sudo apt-get install python-imaging

pi@rpicamera ~/sstv $ sudo easy_install pip

pi@rpicamera ~/sstv $ sudo pip install setuptools --no-use-
wheel --upgrade

pi@rpicamera ~/sstv $ sudo pip install PySSTV
```

This works, but it is very slooooooooooooow, it takes many minutes to convert a single image. So I continued to search for another option.

C implementation

Next I found a plain C implementation here: *https://sites.google.com/site/ki4mcw/Home/sstv-via-uc*

Unfortunately there were some errors in the preamble tones, but those were easy to fix. I also made it a little bit more flexible so that you can set the audio sample rate from the command-line line. Source of my implementation can be found on GitHub. To compile the source code:

```
pi@rpicamera ~/sstv $ sudo apt-get install libgd2-xpm-dev
pi@rpicamera ~/sstv $ sudo apt-get install libmagic-dev
pi@rpicamera ~/sstv $ gcc -lm -lgd -lmagic -o pisstv pisstv.c
```

To run the program:

```
pi@rpicamera ~/pisstv $ ./pisstv /tmp/image.png 22050
Constants check:
rate = 22050
BITS = 16
VOLPCT = 20
scale = 6553
us/samp = 45.351474
2p/rate = 0.000285
Checking filetype for file [/tmp/image.png]
File is a PNG image.
Input file is [/tmp/image.png].
Output file is [/tmp/image.png.wav].
Writing audio data to file.
Got a total of [2589556] samples.
Done writing to audio file.
Created soundfile in 4 seconds.
```

As you can see the SSTV sound file is created in just 4 seconds. So far so good, next step, how to transmit the audio over the air.

Transmitting the sound file with PiFm

You can add a radio transmitter, like a portable radio transceiver, but its much more fun to let the Pi itself generate the high frequency signal. Thanks to Oliver Mattos and Oskar Weigl this is possible. You can find their code here: *Turning the Raspberry Pi Into an FM Transmitter - Imperial College Robotics Society Wiki*. Their code has evolved considerably. The first version was very simple, but used all cpu cycles, and the signal was hampered by glitches when other processes were active. The last version uses dma and works pretty good, without eating up all cpu cycles. Nevertheless the code is much more complex now. Oliver and Oskar did a very good job, but out of the box the software is not suitable for ham-radio and SSTV. There are mainly two problems. First the bandwidth is too high and secondly the timing which is very important for SSTV was a little bit off.

Reducing the bandwidth

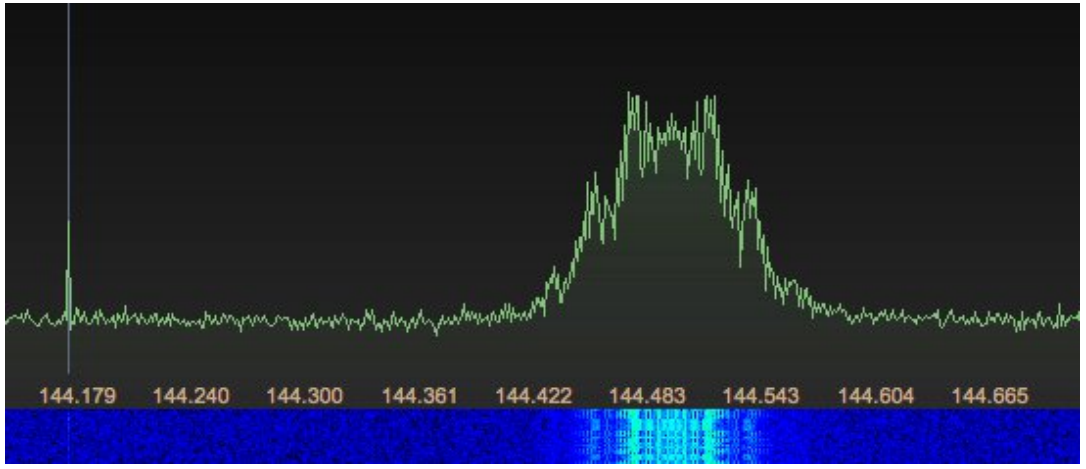
Reducing the bandwidth appeared to be very simple. As every ham knows, for frequency modulation the bandwidth can be set with the modulation index, which is equal to the volume of the audio signal which modulates the hf carrier. In the source code it is just one value it can be found in the consume function of the Outputter class. Here is the original code:

```
void consume(float* data, int num) {
for (int i=0; i<num; i++) {
float value = data[i]*8;  // modulation index (AKA volume!)
```

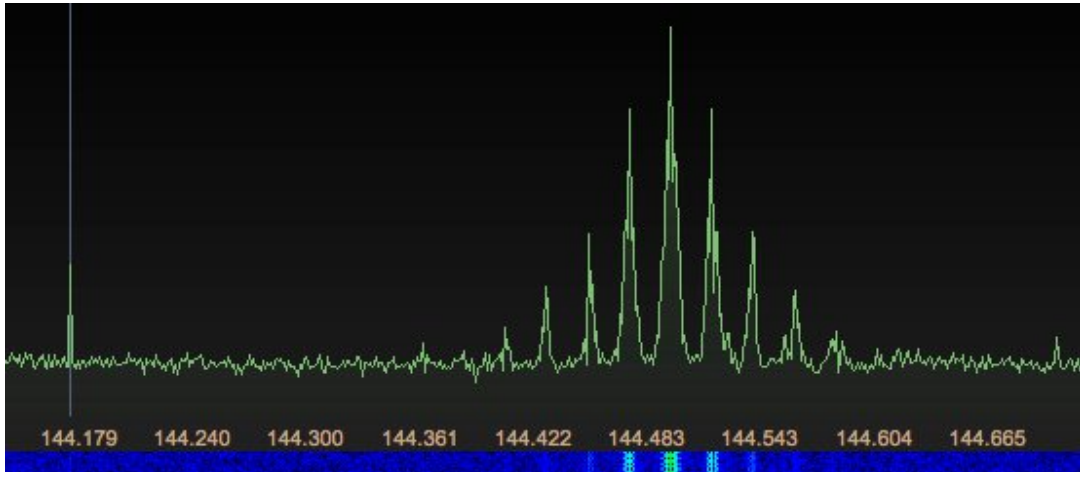
I made a command line parameter of this value, the new code looks like:

```
void consume(float* data, int num) {
for (int i=0; i<num; i++) {
float value = data[i]*modulation_index;  // (AKA volume!)
(original 8)
```

Unfortunately this does not work very well, very strong sidebands persists, so this needs some focus in future versions of the software.



This figure shows a spectral plot of the full bandwidth FM signal.

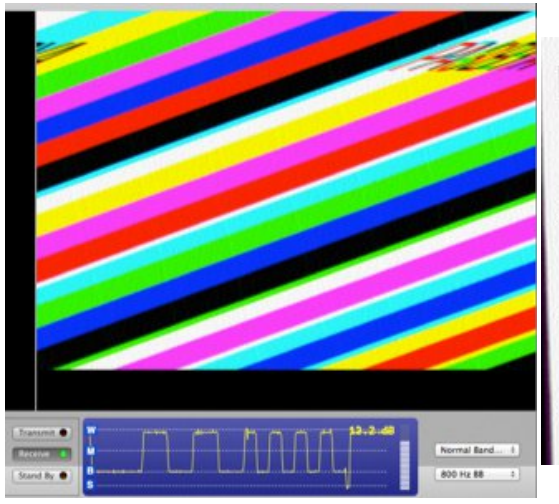


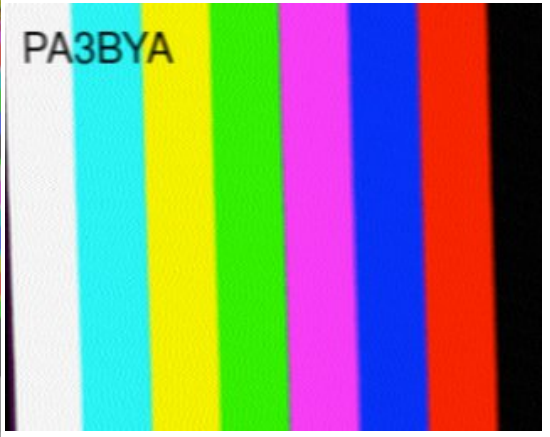
The second spectrum is the reduced bandwidth, tuning on the peak in the middle shows a nice and clean signal, but we need to get rid of the sidebands.

The last one is the reduced bandwidth signal of the first version of PiFm, nice bandwidth, but the signal is hampered by clicks due to cpu activity in other processes.

Fixing the timing

When the sample rate of audio transmitted by PiFm is slightly larger or smaller, a listener hardly notice any difference. For SSTV this is not the case, SSTV timing is very precise. A slightly off sample rate results in slanted images, as can be seen below on the left. The second image is the same sound file properly sampled.





Fixing the timing appeared to be straight forward.

```
// clocksPerSample = 22500.0 / rate * 1373.5;  // for
timing, determined by experiment

clocksPerSample = 22050.0 / rate * timing_correction;  //
for timing, determined by experiment
```

As you can see I replaced the timing constant (1373.5) in the code with the variable 'timing_correction' which can be set from the command line.

I expect a different value for each individual Rpi. In my case the value is 1414.0. I'm just curious which is the proper value for you, please comment your value on this blog post.

To compile your new version of pifm type:

```
gcc -lm -std=c99 -g -xc pifm.c -o pifm
```

For all other adaptions to the code, see the source file at GitHub.

Adding call-sign

When you start transmitting SSTV signals using your ham-radio license, you are required to transmit your call-sign in every transmission, so we need to add this information to the image. This can easily be done either from the command line using imagick, or from python using the python image library (PIL). Both are used in this project. In sstvcam.sh mogrify which is part of imagick is used. sstvcam.sh is a simple shell script to just capture and transmit an image. In sstvcatch.py I used PIL.

Catching movement

Now we are able to grab an image and send it properly over the air using PiFm. We now need to focus on triggering the image capture when something interesting happens in front of the camera. I have implemented this in python, using PIL. The code can be found in sstvcatch.py. It works quite straight forward, it just compares the pixels of the previous image with the current image. When the difference is to large, the current image is transmitted. Here is a code snippet (right):

All the code is on gtihub - *https://github.com/AgriVision/pisstv*

This project won the *Make Raspberry Pi* contest in March 2015.

At the time of writing, a video is available on YouTube for this project at *https://youtu.be/qzrPN0v-N0U*

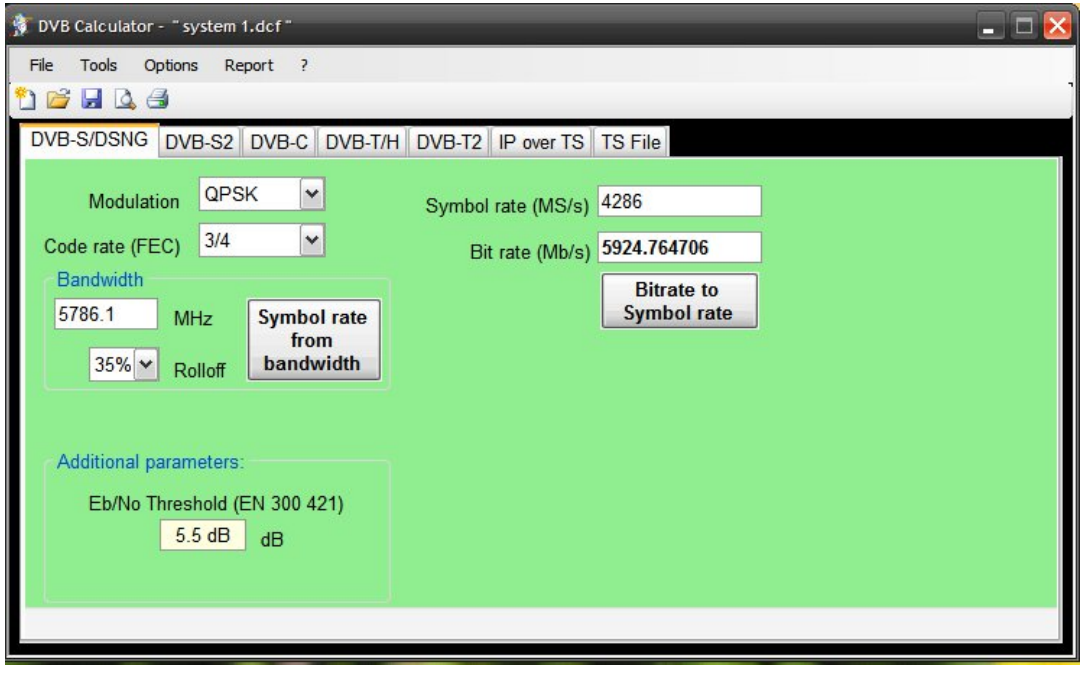
```
# loop forever
while (True):
        # grab comparison image
        imgnew, bufnew = captureImage()

        # Count changed pixe
        changedPixels = 0
        for x in xrange(0, 320):
                for y in xrange(0, 256):
                        # Just check red channel as it's dominant
for PiCam NoIR
                        pixdiff = abs(buf[x,y][0] - bufnew[x,y][0])
                        if pixdiff > threshold:
                                changedPixels += 1

        # Transmit an image if pixels changed
        if changedPixels > sensitivity:
                # Swap comparison buffers
                img = imgnew
                buf = bufnew
                transmitImage(img.copy())
```

Digital World DATV

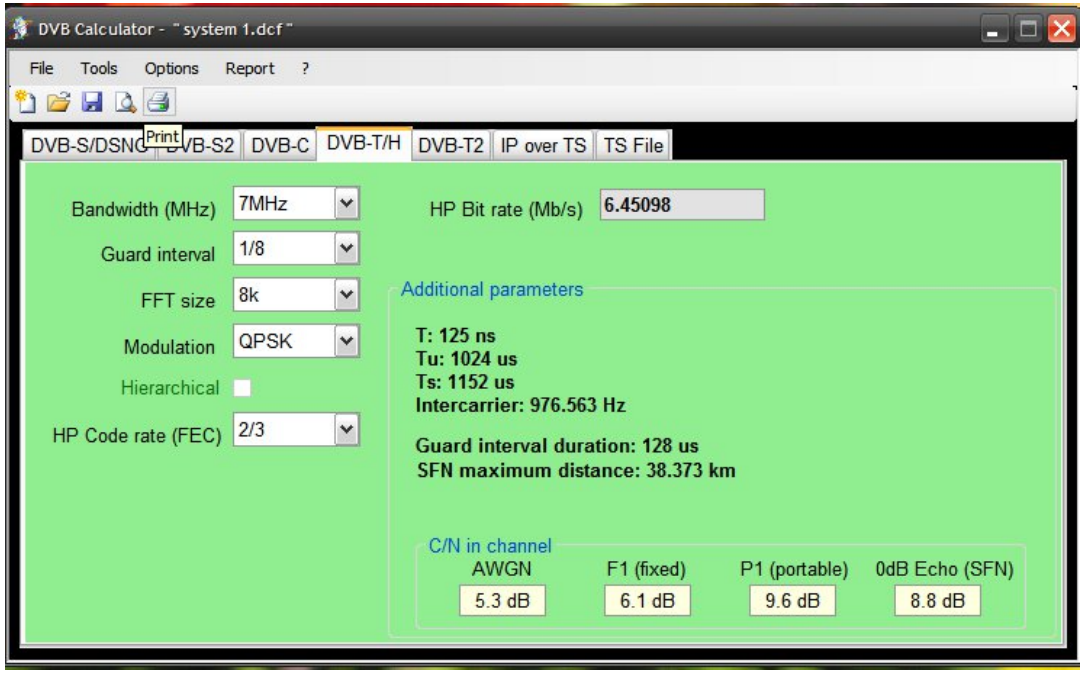
An Introduction to DATV - Part 1

By Richard Carden VK4XRL

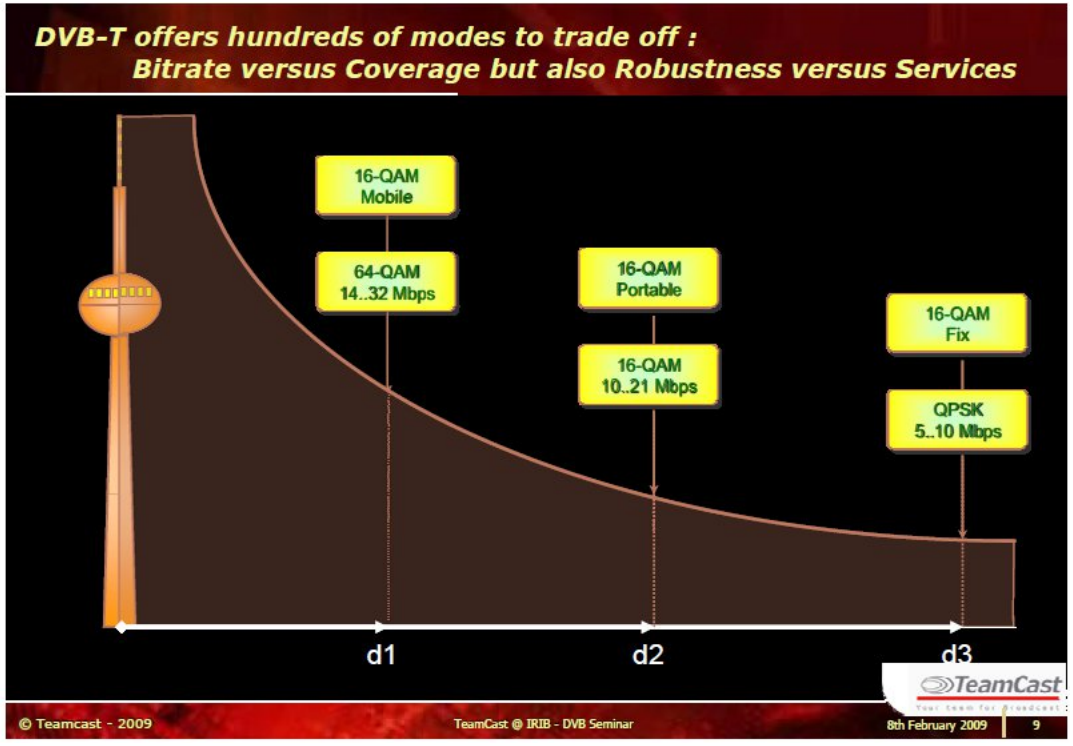
Having read the article "Show and Tell' by Ted G4MXR I thought what was a great idea. Also over the past few months we have seen many emails from people who want to get started in DATV or to build a repeater. Having this information available via CQ-DATV is a great starting point where people can learn from the experience of others and that includes myself. I will try and give as much information as I can from our experiences here in Australia. I won't be going into the technical aspects as this has been covered by others like the technical talk articles at *http://www.datv-express.com/#Item4* and those of *http://kh6htv.com/application-notes/*.



We started to transmit digital going back to 2002 and bought some boards from SR-Systems for 23/13cm. These were the first digital transmissions here in Australia and looked very good. We just opted for 1250/1283 MHz and set the other parameters for a 10 MHz bandwidth. However better utilisation can be had my dividing the 23cm band into 3 sections and using a 6 MHz bandwidth (see picture). 23cm DATV using DVB-S is only used as far as I know for input to the repeaters. We used a Humax receiver modified with a video present indicator to trigger the repeater controller.



However better receivers are now available and I have found the Strong brand to be very good. The STR 4950E *http://strong.com.au/hd-satellite-receivers/high-definition-mpeg4-dvbs-2-digital-satellite-receiver-with-record-function-via-usb* is an example that has the added advantage of a signal indicator so you only need a relay and transistor to apply an earth (in our case) to the controller, also it has another advantage in that DVB-S2 can be received for those wanting to experiment further.



We have been transmitting digital for the past 6 years using DVB-T on 446.5 MHz were we decided to at a very early stage to go for the same standard as used by the FTA systems used in this country. The only difference was we went for QPSK which gives slightly better results and helps when running higher power amplifiers.

A black chip will give you around 5 to 6 watts output (IE the 6db rule). So for my 100w power amplifier I would expect around 25 Watts output. To receive the repeater you'll need a STB or Digital Television that enables you to programme manually the required frequency.

Again we have found that the Strong brand will cover our requirements and one of my choices is the STR 5432. *http://strong.com.au/set-top-boxes/hd-mpeg4-with-record-function-to-usb*. It also covers MPEG4 which is another added advantage.

I know the problems in the UK and parts of Europe don't allow for wide bandwidths associated with DATV on 70cm so I apologise in that regard. Note that QAM 16 and QAM 64 are only needed to be used for where greater bitrates associated when multiple transport streams are required, however QPSK will allow for dual transports if and when required.

The subject of antennas for transmission will now arise and will be depended on where you situate your repeater in relation to those going to use it. We use dual yagi antennas to cover most of the Brisbane area from our repeater situated some Km north west of the CBD area. I for one personally like the phased array which has a broader bandwith. Shown is my prototype, see CQ-DATV 21.

If omi direction antennas are required then the phasing of a couple of the big wheel antennas or even the Alford slot maybe the answer.

So where do you start, firstly you need to decide what digital platform you want to use. You will need to take into account what system is being used in your area to determine if DVB-T or DVB-S should be used.

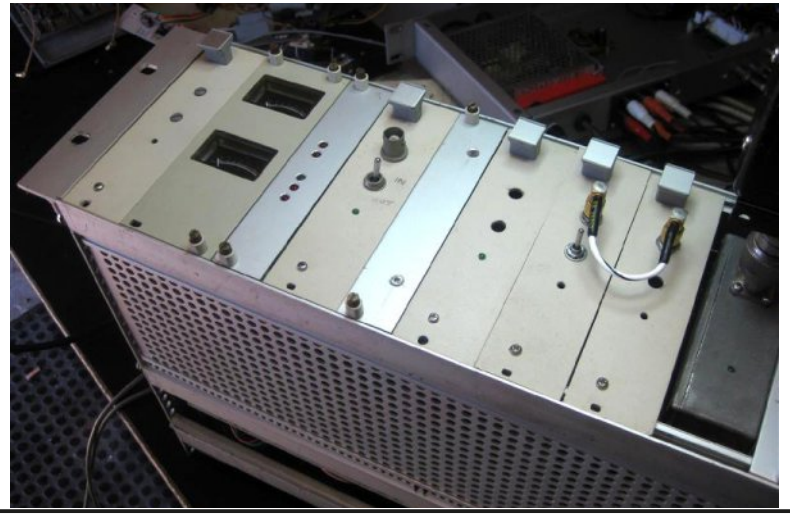
My personal preference would be if it's a new repeater system would be to go with DVB-T. The modulators are readily available for this system and they are not expensive, and there are not a lot of digital modulators for DVB-S , however commercial equipment is now coming available that could be utilised. DVB-T digital modulators that I have used are;

a. SR-System – *check with Stefan on your requirements* *http://goo.gl/3kP7wz*

b. Clearview *from Kristal* - *https://www.kristalelectronics.com/digital-products/digital-modulators.html*

c. PVI – *I have some problems with this unit in that it reboots on loss of signal and distortion on audio when feed from low impedance outputs from commercial SDA's.* *http://www.pvistore.com/hdmi-mod/*

d. HiDes - *http://www.hides.com.tw/index_eng.html*



The build of a repeater or home TX is a personal issue and will depend on individual skills. I personally like to build in module form in a rack format. I don't like to put all my eggs in one basket, however having said that there are occasions where space becomes the major consideration and a one rack repeater system excluding receivers maybe warranted. Whatever the case I would make dual units for easy replacement as it's normally a long drive to most repeater sites. Testcards and Idents can be happily provided for by WD media players these units when setup properly will reset back to your setup after power glitches.

Video and audio switchers can be, roll your own or again commercial units as found on eBay. I like the idea of providing VDA's on the inputs if you have the space to do so, especially the FM receiver input as we are using only half the normal bandwidth of 18MHz and therefore the output would be around half a volt P/P so a VDA will reset that to one volt P/P. Sometimes you may need to fit a LP video filter to the receivers output to reduce any residual indication of audio sub-carries. This will depend on the FM receiver that you use. Also one thing that should be added is a way to monitor levels both audio and video, the aim should be to make the repeater as transparent as possible.

Reference: *http://dvbcalculator.altervista.org/*

KD0PXF Armand here

I have 70 cm DVB-T up and running with Mel Whitten K0PFX and if you think similar call signs can be confusing just read on. I have followed Mel's suggestion re antenna, feed lines, Power amp [boxed up by Mel] and went with stand alone RCVR, relay bypassed mast mounted preamp, and Xmitter [encoder/modulator] both RX and TX have HDMI at the video/audio connection, this changed my "studio" plan rather than studio hardware I've kept it mostly digital with a computer for video/audio production.

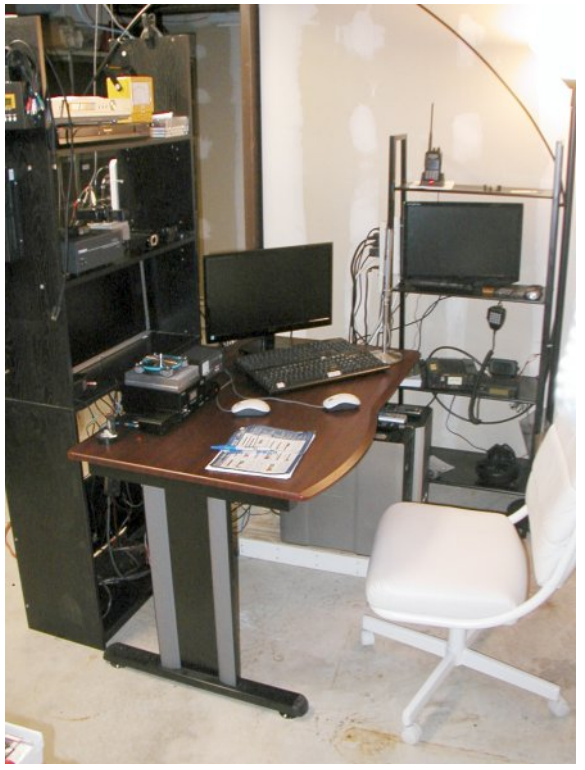
First let me say my location is not amateur friendly, [mentally picture the bottom of a well] but DVB-T 16 QAM with the max data rate at 4000, error correction at 1 of 2 does the job, despite several big hills in the way, smooth motion, no pixilation. [the antenna a 10 element yagi on a 3M [10 ft] mast , does not 'see' over the next house]

The AV end

I did not have any collection of NTSC stuff save an old Beta max and about 100 tapes from the 1970s lets go digital!

A few years old gaming box cast off in my son's need for speed will do, Laptops will usually not do well. It is a strong video card that makes this use possible picture a card needing more than one connection for additional power.

In operation, one simply pulls to the desktop the material to send [mirrored outputs] high res web cam on capture, video clips to test motion, ever changing colour bar video clip, call letters still slide shows and home movies from the 1930's to now, all previously dubbed to digital. [one roll of my late father from the mid 1930s is colour.]



Corner devoted to 70 cm D-ATV & 2M talk back

All this available material easily accessed on the storage servers [NAS4Free] all while using the computer's audio mixing and the video cards HDMI audio output the web cam audio was good but I resurrected an old stereo mic, and matching transformers. an inexpensive phono preamp with the RIAA curve parts removed feeds the stereo line in.

I've twice mucked up windows 10 and find 7 a bit more hardened also 10 does not even work correctly in every instance where the same hardware does with win 7 audio shifts to the output mis buss with VLC but not with the included windows 10 movie player it will be nice when that work in progress is done.

One can get a great picture with DVB-T - well worth the effort. **Armand**

DATV-Express Project - November update report

By Ken W6HHC

Art WA8RMC reported that sales of the latest batch of DATV-Express DATV exciter boards were going faster than expected. Below is a breakdown of world-wide sales since the beginning of production:

Country	Qty
Australia	2
BATC - distribution	13
Belgium	2
Brazil	1
Chile	1
Denmark	1
France	3
Germany	7
Japan	13
Netherlands	3
Switzerland	3
UK	22
USA (excluding California)	13
California	9
California - Mt Diablo ARC	1

BATC announced that they had run out of DATV-Express boards and would no longer sell any more through the BATC Online Shop. The DATV-Express project team wants to thank BATC for their tremendous support and their help in getting sales of the boards started "from the beginning".

The project team has made a decision to have an EU distribution centre ready by the new year.

So anyone that wants their board shipped from inside the EU should hold off ordering until we have moved the stock. When ready, EU orders will be entered like normal orders on the DATV-Express-Project website *www.DATV-Express.com* using the PURCHASE-A-BOARD link at the top of the main page…but will ship from within the EU.

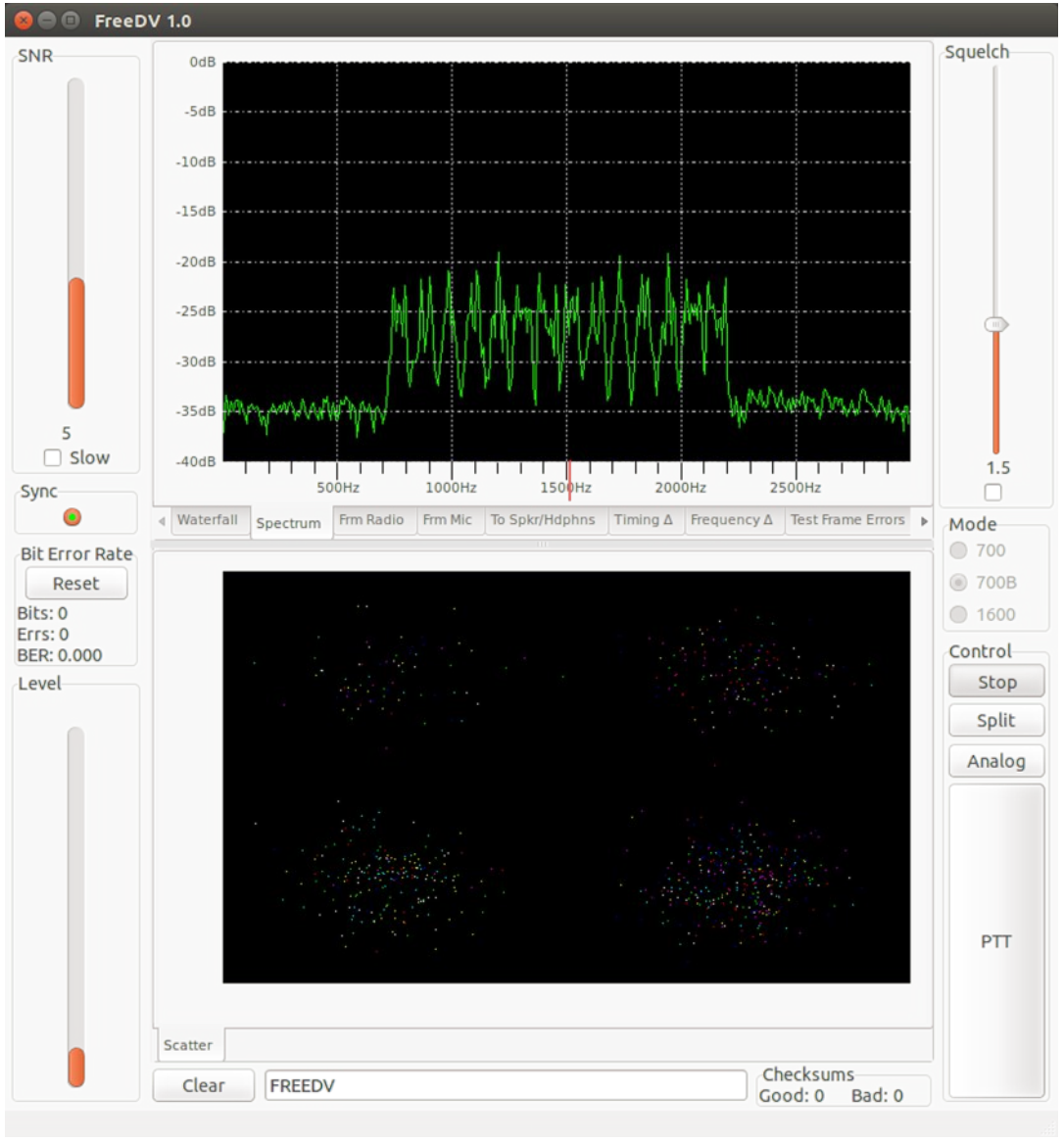
Charles G4GUO has been tweaking the DatvExpressServerApp software for Windows by tweaking the Windows Installation program and fixing a few bugs. Charles has just changed over to a new Windows-installation utility called InnoSetup. The InnoSetup package will allow the DatvExpressServerApp software to be "installed" and also "uninstalled" on a Windows machine in a more conventional manner.

Slowly but surely, Ken W6HHC (who recently has way too many conflicting interests for his spare time) is switching over to begin testing the new DatvExpressServerApp-with-InnoSetup-installer software package. The plan is to provide this new software package on the project web site as an alpha-release download.

"project is set to slow speed"....de Ken W6HHC

FreeDV

Following on from Mel's article in issue 30 about DVB-T using the HiDes modules where FreeDV was mentioned, this article goes into more detail on this system.



Introduction

FreeDV is a Digital Voice mode for HF radio. You can run FreeDV using a free GUI application for Windows, Linux and OSX that allows any SSB radio to be used for low bit rate digital voice.

Alternatively you can buy a *SM1000 FreeDV* adaptor that allows you to run FreeDV on any HF radio without a PC or sound card.

If you are a hardware or software developer, you can integrate *FreeDV* into your project using the LGPL licensed *FreeDV API*.

Speech is compressed down to 700-1600 bit/s then modulated onto a 1.25 kHz wide signal comprised of 16 QPSK carriers which is sent to the Mic input of a SSB radio. The signal is received by an SSB radio, then demodulated and decoded by FreeDV. FreeDV 700(B) rivals SSB in it's low SNR performance. At high SNRs FreeDV 1600 sounds like FM, with no annoying analog HF radio noise.

FreeDV was built by an international team of Radio Amateurs working together on coding, design, user interface and testing. FreeDV is open source software, released under the GNU Public License version 2.1. The modems and Codec 2 speech codec used in FreeDV are also open source.

The FreeDV developers have donated 1000's of hours of highly skilled engineering time. Your donation will reduce the out of pocket costs of the developers for hardware, travel, and FreeDV promotion at Ham events.

Alternatively please consider buying a *SM1000 FreeDV* adaptor that allows you to run FreeDV on any HF radio without a PC or sound card. This supports *David Rowe*, the primary developer of FreeDV and Codec 2.

Why FreeDV?

Amateur Radio is transitioning from analog to digital, much as it transitioned from AM to SSB in the 1950's and 1960's. How would you feel if one or two companies owned the patents for SSB, then forced you to use their technology, made it illegal to experiment with or even understand the technology, and insisted you stay locked to it for the next 100 years? That's exactly what was happening with digital voice. But now, hams are in control of their technology again!

FreeDV is unique as it uses 100% Open Source Software, including the speech codec. No secrets, nothing proprietary! FreeDV represents a path for 21st century Amateur Radio where Hams are free to experiment and innovate, rather than a future locked into a single manufacturers closed technology.

Here is what you need:

- *A SSB receiver or transceiver*
- *FreeDV software, download links are below.*
- *A Windows, Linux or OSX PC with one (receive only) or two sound cards.*
- *Cables to connect your PC to your SSB radio.*

OR:

- *A SM1000 [7] Digital Voice Adaptor*
- *Cables to connect the SM1000 to your SSB radio*

Connecting Your Radio

Those who don't have a special connection for digital modes can use the normal audio inputs and outputs of your radio. The same cables and hardware that you use for other digital modes that are based on PC programs will work with FreeDV, but you will need a second sound interface for the microphone and speaker connections to the FreeDV program.

A USB headset of the sort used by gamers is all you need for the second sound interface.

Configuring Your Radio

Turn off as much processing as possible. In general noise blankers, DSP band limit filtering and narrow bandpass filters are more likely to hurt than help, while compression, DSP noise or carrier elimination, and voice processing are definitely wrong for Digital modes. FreeDV's HF modem does its own DSP, and in general this is true for other digital programs as well.

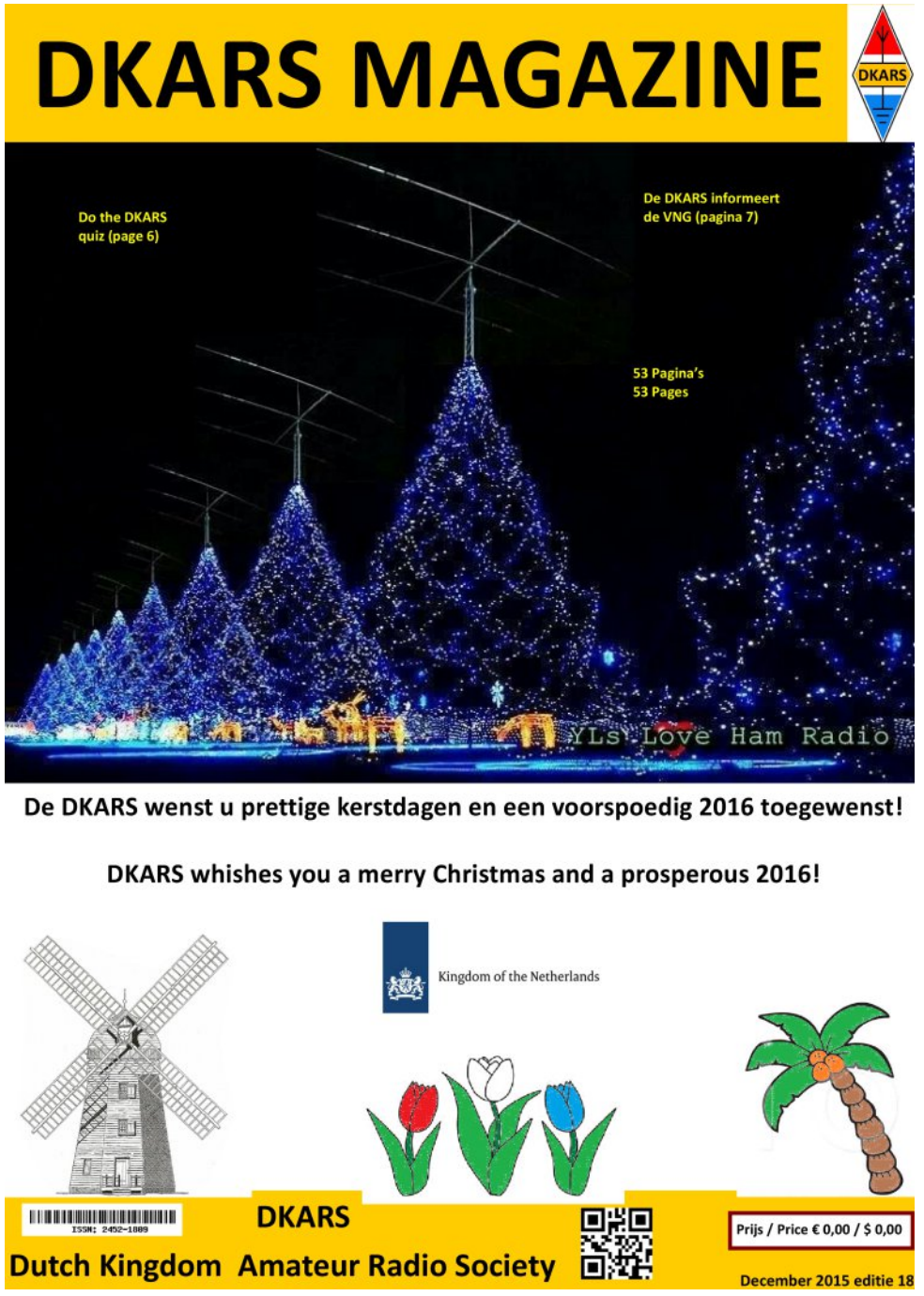
You can see the received effect of different settings in the S/N (signal to noise ratio) display of FreeDV. A higher S/N is better.

Drive your transmitter to an average power of about 20% of it's PEP power. There is a 8-12 dB peak-to-average power ratio in our HF modem. Over-driving will reduce the received S/N. More is not better for DV!

Demo Video

Watch this video of a FreeDV QSO.

TV Amateur is a German Language ATV Magazine It is published 4 times a year and if you would like to subscribe go to http://www.agaf.de/



Check out the DKARS website at:-
http://www.dkars.nl/

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Smart phone reading apps are ok providing that you have a 3G data connection.
Note: These links will fire up your devices browser and if you are using 3G/4G then you will incur data usages charges.

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Images should be in PNG format if possible and the best quality available. Do not resize or compress images, we will do all the rework necessary to publish them.

If you are sending a construction project, please include the dimensions of any pcb's and make the pcb image black and white, not greyscale.

CQ-DATV reserves the right to redraw any schematics and pcb layouts to meet our standards.

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