In this issue

The team

- Ian Pawson - G8IQU
- Trevor Brown - G8CJS
- Richard Carden - VK4XRL
- Alexandru Csete - OZ9AEC
- John Hudson - G3RFL
- Dave Kenward G8AJN
- Ken Konechy - W6HHC
- Klaus Kramer - DL4KCK
- Terry Mowles - VK5TM
- Mike Stevens - G7GTN
- Darren Storer - G7LWT

Norfolk Amateur Radio Club streams and evening with ARRL CEO David K1ZZ

NARC's first ever live television streaming of an event was on Wednesday June 25th. Over 40 people viewed online from all around the world with live feedback and questions.Most comments were positive, although we know sound could have been better and this is something we will look more closely at if we do it again.

To those who have already suggested we do it regularly I think this is unlikely as to be honest it took a huge amount of work and time to rig (we started at 5pm) and, more importantly, I hope you agree that an important part of the club is being there....

But it was an interesting project and showed off what can be done with Amateur Television and maybe next time it will be over RF too which will give much better quality and really live up to the ATV name.

The photograph shows life as seen from the directing and control side of the desk with Kevin and Mark.

Sincere thanks to my partners in the video production team where much (literally!) midnight oil has been burnt the past few days working and testing for this event, Mark G0LGJ and Kevin M0UJD.
We are also very grateful to NARC member Robert G4TUK of Abacus Television who filmed the event and this will be made available in due course.

Ken W6HHC reports

Above is OCARC group photo in Southern California for ARRL 2014 Field Day. The Boy Scouts are easy to spot in their red shirts.
Using the club call sign of W6ZE, seven simultaneous transmitters plus satellite plus digital plus GOTA ("Get On The Air" for newcomers) were operated. Preliminary "raw/draft" numbers show over 5,300 QSOs for the club effort!

Ken W6HHC is kneeling on far right in green shirt.

Big commotion around DB0BC

On Thursday, June 5 2014, at 1800 hours (6 pm) three policemen and two telecom authority agents entered my flat and "pulled the plug" at the DATV repeater DB0BC operated there for testing - by merely shutting off the automatic circuit breaker.

What had happened before?

The new ATV repeater DB0BC in Berlin had received a licence on a 70 cm output on 434,500 MHz in DVB-T with 2 MHz bandwidth and started operations end of May 2014. The TX worked 24/7 with information boards and test cards in order to enable interested amateurs to test their receiving gear.

Between May 31 and June 5 some hundred car owners alerted the police station of Berlin Charlottenburg, that they were not able to open or shut their car using the wireless key switch. This happened up to several hundred meters away from DB0BC. Shutting down the repeater the police only wanted to prevent car theft and burglary - this is done often by criminals using small SRD hand-held radios in order to prevent locking of cars in large car parks...

Telephone conversations with the BNetzA telecom authorities added up to the fact, that I did not breach any regulations, and I agreed to keep the repeater offline until further clarification. Talks with the responsible BNetzA authority person ended up with: The repeater sys-op DF4EI will apply for amendment to change the output frequency to 436,0 MHz and take up test transmissions on that frequency in order to enquire if amateur satellite traffic is affected.

Now this frequency change does not solve the problem because: the 433 MHz remote control receivers built into cars are simple gear without any input selectivity. Near field transmissions in the center of the 70 cm band will cause blocking and malfunction of that remote control locking system. Talking with the responsible police officer I proved that german radio amateurs are primary users of that band by handing over an info paper from BNetzA. Policemen in Berlin Charlottenburg will get copies and are instructed to hand over a copy to any car owner complaining about wireless key problems. Furthermore the car owner shall get a hint to use alternative locking measures (mechanical key?).

Police officials have assured to provide data about numbers, time frame and possibly manufacturer of affected cars that we can use arguing with legal authorities. So after all we are glad to be able to use our 70 cm band for ATV experiments furthermore, and the new frequency 436 MHz seems to be more capable for undisturbed ATV operations than the ISM/SRD polluted 434.5 MHz.

Jörg, DF3EI, translation Klaus, DL4KCK

www.agaf.de

Viewer's reception poll with DATV repeater DB0KO

DATV repeater DB0KO near Cologne (Germany) has been transmitting 720p HD on 23 cm in DVB-S2 and on 3 cm in DVB-T since January 10th. During recall traffic on 144 MHz after the weekly DARC ATV bulletin transmission on May 11 the visitors were asked, which TV reception mode they were using. The result is showing that around 50 percent used DVB-S2 HD receivers on 23 cm and 28 percent used DVB-T receivers on the 3 cm output. 11 percent used older DVB-S receivers and another 11 percent watched the DB0KO internet video stream or the HAMNET video stream. Visitors with older DVB-S receivers are asked to upgrade to cheap

DVB-S2 HD receivers, see a listing of usable set-top boxes at www.db0ko.de. In the future DB0KO will have only HD outputs!

Uli, DD1KU, translation Klaus, DL4KCK
www.agaf.de

Wirral Grammar School for Girls launch 434 MHz balloon

Pupils at Wirral Grammar School for Girls have launched a High Altitude Balloon with 434 MHz telemetry and Slow Scan Digital Video (SSDV) transmitters

The launch was on Wednesday July 16 from Middletown Hill near Welshpool. The balloon was a 1200g Hwoyee with Helium and the transmitter details are:

- *Callsign: WG3*
- *Frequency: 434.300 MHz*
- *Mode: RTTY 50,7n2 470 Hz shift*
- *Callsign: WG3TV*
- *Frequency: 434.350 MHz*
- *Mode: RTTY 300,8n2 610 Hz shift SSDV + telemetry*

The balloon carried a Raspberry Pi A with RFM22B based daughterboard. The radio coverage area was expected to extend up to a radius of 700 km which would have made it receivable throughout the British Isles.

Video of the launch can be seen at:
http://www.wirralgirls.co.uk/space-balloon/

TV Amateur is a German language magazine. It is published 4 times a year. If you would like to subscribe, go to http://www.agaf.de/

Editorial

CQ-DATV 14, well at least we survived any bad luck from issue 13 and have now produced issue 14 and a lot has happened.

Running a free Magazine has its disadvantages in that there is no income to lavish on foreign trips, but we have two members of the production team that financed their own way to Freidrichshafen and have reported back in this issue on the ATV activity that was taking place there, our thanks to Darren and Klaus.

- *Alexandre Csete OZ9AEC has been looking onto using the Raspberry Pi with DATV, The Pi is set up with a RaspiCam and connected a UT100c module to produce a DVB-T signal.*

- *Richard Carden VK4XRL has produced an update to the article in CQ-DATV 12 on the Australian DATV repeater VK5RDC.*

- *John Hudson G3RFL has produced some clever solutions to remotely turning his pump up mast.*

- *Mike Stevens G7GTN is still progressing his on screen display module and has added Blue Tooth control*

- *Trevor G8CJS is looking back 45 years, to Apollo 11 and the camera that brought us the first live pictures from the moon.*

We have one more issue before CAT 14 which if you do not have it in your diary is September 6 and 7 in Basingstoke see http://www.batc.org.uk/forum/viewforum.php?f=89&sid=5ae7bd632cc817f531e27d5b8ccba149.

CQ-DATV will be making a presentation at the business meeting, which is yet to be announced, but should be on the 7th just after lunch. Although there is a charge for admission to this event that does not and cannot apply to members wishing to attend the BGM, business meeting only. This is where the committee report back on the last two years of the club, elect new committee members and this year there is a proposed new constitution.

If you have nothing else on the 7th of September and you are a BATC member please come along and support CQ-DATV and it's proposals...more in CQ-DATV 15

ISS DATV Update

Dear all,

The Ham Video transmitter on board Columbus will be activated Tuesday July 22 at 9:55 UTC in Blank Transmission mode, without camera connected.
The transmitter will run permanently till August 6, 2014 in configuration 4:

- 2.395GHz
- 2.0 MSym/sec.

Ground stations are invited to provide reception reports, using this facility:
http://www.spaceflightsoftware.com/ARISS_FSTV/submit.php

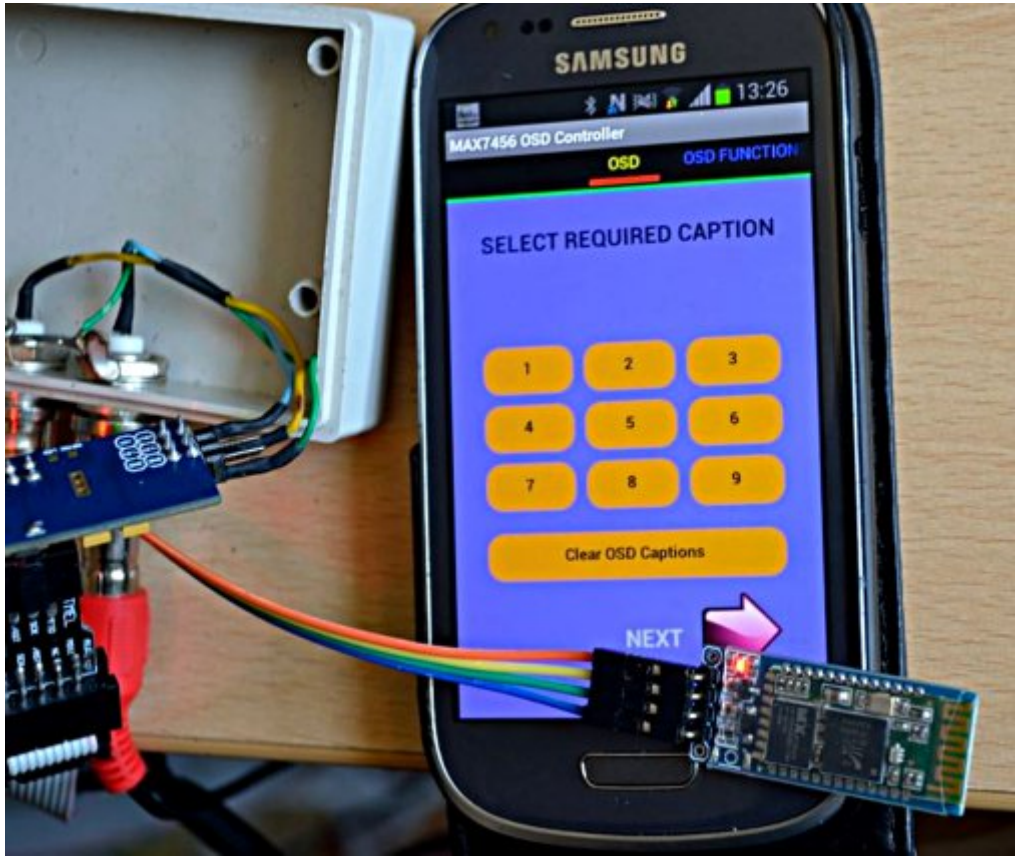
Thank you and Good Luck!
73,
Gaston Bertels - ON4WF
ARISS-Europe chairman

MAX7456 OSD Bluetooth Control Project

Mike G7GTN

Since we have a serial connection to the OSD modules we can very easily combine a Bluetooth module to make control possible from an Android application. I have used the HC-06 type slave Bluetooth module which is easily available from the well-known online internet shop.

Connection is a +5V power supply with the TX Pin of the HC-06 going to the OSD RX pin and the RX pin on the HC-06 going to the OSD TX Pin. So the TTL Serial pins are simply crossed over to provide the required communication between both modules. No level conversion is required since this is included on the carrier PCB already. That is the full extent of the required hardware setup. Simple enough to make a diagram not required.

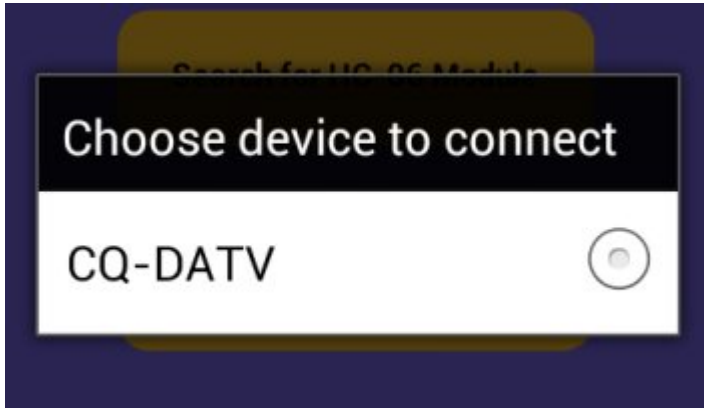


For this project we have two simple software issues to deal with, the first being some new code to download on to the physical OSD module. This should now be feeling slightly familiar as we again use the FTDI Breakout adaptor to load the code from the "OSDBT.ZIP" file which is available from the usual CQ-DATV download location.

Next we need a simple Android application (Java compiled APK) to control the switching of our TV captions. This requires that you allow the Installation from an unknown source

option on your Phone or Tablet. The only hardware requirement is that the device obviously requires Bluetooth connectivity to be enabled. You may require a visit to the settings section of your device to do so.

With the application now correctly installed on your Android device you will see a new ICON that when tapped will launch the OSD controller. If you slide across from the first screen you will see the Bluetooth connection screen. When you select Search for devices your HC-06 module should be quickly found and allow you to connect.



On the first connection with the module you will be required to enter a Pass Code, which will be 1234 Once this has been done you are presented with the first of two control screens. Pressing one of the screen soft buttons will allow you to switch the captions that you have set-up on the module using the supplied Ardunio source code. These will need to be changed by you starting from Line#74 for your own unique captions and then uploaded to the OSD module.

The next screen has a few more options.

The Eeprom clear button will over write the Eeprom (totalling 512 bytes) with all zero's to remove all remnants of the previous flying hobby usage. The Brightness level that you select will not be correctly saved until you have done this for the first time. Brightness simply changes the white level of the displayed caption and is selected by touching the down arrow to show a spinner box with all available user percentage values. Once you have made a selection press the

set button to save this to Eeprom. On the next power cycle this value will be restored and hence all your captions will use this setting.

Conclusion

Whilst this whole project has been geared to the use of a smartphone or tablet for the control surface we can just as easily create a cross platform desktop application when used with a Bluetooth dongle for connection gives some similar control elements, but obviously now using a Mouse as our selection device. If this is an area you are interested in seeing developed further please let the magazine Editor Ian know and will happily create some articles along these lines.

Amateur Television Quarterly

Amateur Television Quarterly (ATVQ) is a one-of-a-kind publication for hams who are interested in sending and receiving their own television signals. Amateur Television (ATV) is a lot of fun!

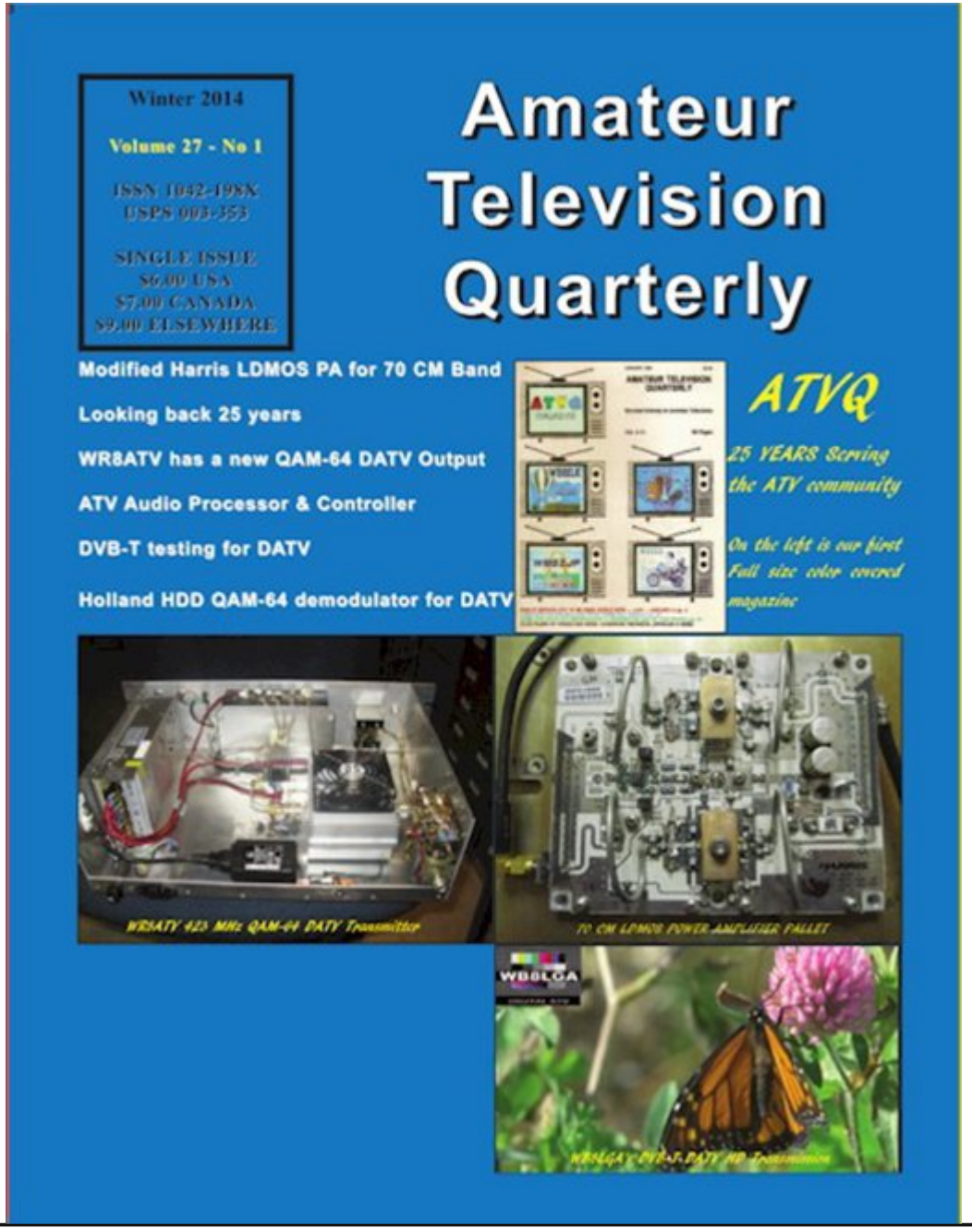
Have you heard about using ATV while hang gliding, hot air ballooning, or for public service events?
How about ATV in the payload of a helium balloon at a hundred thousand feet, sending video showing the earth's curvature?

If not, then you need to subscribe to ATVQ and find out what you've been missing.

For a little history behind ATVQ and the Amateur Television publications that preceeded it, we have provided a link to an article by Henry Ruh (KB9FO) that appeared in the April 1991, Vol. 4 #2 issue of Amateur Television Quarterly.

1962-2008 A PHOTO HISTORY OF ATV MAGAZINES

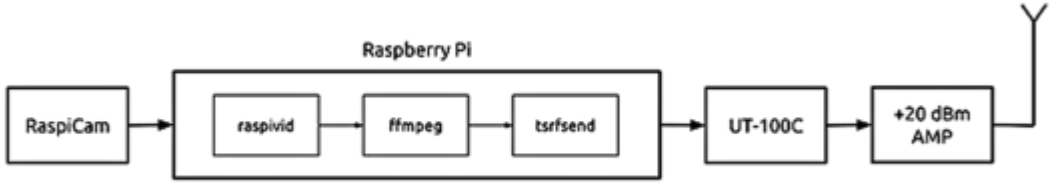
2009 ... A new chapter for Amateur Television Quarterly (ATVQ)



Turn your Raspberry Pi into a live HDTV transmitter

By Alexandru Csete, OZ9AEC
http://www.oz9aec.net/

In a previous article I wrote about using the UT-100C DVB-T modulator on linux and I promised to follow up how to use the modulator with live video sources. In this article I am going to describe how to setup the modulator on a Raspberry Pi equipped with a RaspiCam camera module, effectively turning the Pi into a live HDTV transmitter.



The setup can be made small enough to be carried by a medium size drone and the range can be increased using power amplifiers. If you do that be sure to comply with the radio regulations applicable in your country. In particular, transmitting with significant power in the UHF TV bands will most likely get you into trouble. Your best bet is to get a ham radio license and use the 23 cm band.

The setup I am using performs the following tasks:

- *Capture H.264-encoded video from the camera using the raspivid application.*
- *Convert the H.264 bitstream to constant bitrate and DVB compliant MPEG-TS stream using ffmpeg 2.2.2.*
- *Send the MPEG-TS stream to the UT-100C modulator using tsrfsend application.*

In my own setup I also use a 20 dBm power booster to increase the range.

The idea for this setup, in particular for using the latest ffmpeg for MPEG-TS generation, comes from Evariste F5OEO who published it on the Viva DATV forum. In fact, he has made a complete Raspbian image available for download for those who want a quick and easy way to get started. While his image works well, it will limit you to the software available at the time when he built the image.

Raspberry Pi HDTV transmitter

To get an idea of the video quality you can expect from this setup check out these test recordings I have published on Youtube. Be sure to check out the recording of the HEAT 2X rocket being fueled with liquid oxygen at -180°C. They were all recorded over the air using the Rocketcam 1 prototype setup and an RTL2832-based DVB-T dongle with modified drivers to work in the 1.3 GHz band.

In the following sections I will describe each component of my setup.

Step 1: Raspberry Pi and camera

The first thing to do is to ensure that you have your Raspberry Pi up and running with an up to date Raspbian image and the RaspiCam. You can use this tutorial on the Raspberry Pi website. You should definitely get acquiantened with the raspivid application that is used to capture H.264 encoded video with the camera module. It is a great tool and you will also find it useful for other tasks.

I suggest you create a working directory, for example ~/dvb/, where you can put the scripts and binaries used for the DVB-T setup.

Step 2: The UT-100C driver

You can download my binary driver built for kernel linux-rpi-3.12.19+: usb-it950x.ko.

I have also published instructions, how to build the driver on the target (Raspberry Pi). You may have to do this if my driver is not compatible with your device.

In either case put the usb-it950x.ko file in the working directory, e.g. ~/dvb/. You can test the driver by plugging in the UT-100C dongle and loading the module:

```
$ cd ~/dvb
$ sudo insmod ./usb-it950x.ko
```

To remove the module:

```
$ sudo rmmod ./usb-it950x.ko
```

Step 3: Get ffmpeg 2.2 or later

At the time of writing ffmpeg seems to be the only open source application capable of muxing H.264 video into DVB compatible, constant bitrate MPEG-TS. The downside of the ffmpeg muxer is that it adds a 5 second latency to the transmission. We'll have to work on this.

My binary built with libc-2.13 is available here: ffmpeg. However, here you really have the opportunity to learn something by cross compiling your own ffmpeg. Just follow the instructions from the ffmpeg wiki which is what I did with the following choices / changes:

- *I didn't build any addon libraries as I only want to use ffmpeg for TS muxing.*
- *During menuconfig of the crosstoll-ng under C library select eglibc 2.13 or whatever version comes with your Raspberry Pi.*

You can find which version of libc you got on you pi by running the following command in the Raspberry Pi console:

```
$ ll /lib/arm-linux-gnueabihf/libc-*
-rwxr-xr-x 1 root root 1200240 Mar 20 23:00 /lib/arm-linux-gnueabihf/libc-2.13.so*
```

As you can see I had version libc 2.13 installed at the time of writing this article.

Put the ffmpeg binary(ies) in the same working directory you created earlier and check that it works:

Continued next page....

```
$ cd ~/dvb
$ ./ffmpeg -v
ffmpeg version 2.2.2
built on May 29 2014 23:17:41 with gcc 4.8.2 (crosstool-NG
1.19.0) 20130603 (prerelease)
configuration: --enable-cross-compile --cross-
prefix=/home/alc/embedded/rpi/ffmpeg/ctng/
arm-unknown-linux-gnueabi/bin/arm-unknown-linux-
gnueabi- --arch=armel --target-os=linux
--prefix=/home/alc/embedded/rpi/ffmpeg/deploy
libavutil      52. 66.100 / 52. 66.100
libavcodec     55. 52.102 / 55. 52.102
libavformat    55. 33.100 / 55. 33.100
libavdevice    55. 10.100 / 55. 10.100
libavfilter     4.  2.100 /  4.  2.100
libswscale      2.  5.102 /  2.  5.102
libswresample   0. 18.100 /  0. 18.100
```

Step 4: tsrfsend

Finally, we need an application that can talk to the UT-100 modulator, configure it and send the MPEG-TS steam to it. You can write your own application based on the API docs that come with the driver package or use the tsrfsend application included in the UT-100C Opencaster Bundle.

There is no license included with the tsrfsend application so I can only assume full copyright; however, I hope I will not get into trouble for sharing my armhf binary with you: tsrfsend.

If you have the sources you can simply build it on the Raspberry Pi, or try the cross compiler you created for ffmpeg. In either case you should apply the patch that I have articleed on the Avalpa forum.

Put the tsrfsend binary into the same working directory where you put the driver and the ffmpeg application.

A few hints how to test the tsrfsend application are available in my previous article.

Step 5: Connecting the pieces

We need a way to (1) send H.264 video from raspivid to ffmpeg and (2) send the MPEG-TS from ffmpeg to tsrfsend. Since all these applications can operate on files the easiest way to connect them is using named pipes (aka FIFOs).

We can create two named pipes in the working directory:

```
pi@raspberrypi ~ $ cd ~/dvb
pi@raspberrypi ~/dvb $ mkfifo videoes
pi@raspberrypi ~/dvb $ mkfifo videots
pi@raspberrypi ~/dvb $ ll
total 0
prw-r--r-- 1 pi pi 0 Jun  4 22:37 videoes|
prw-r--r-- 1 pi pi 0 Jun  4 22:37 videots|
pi@raspberrypi ~/dvb $
```

The names videoes and videots refer to video elementary stream and transport stream respectively. Having the pipes in place we can now launch the raspivid, ffmpeg and tsrfsend applications sequentially using the pipes for input and output.

In the following example I use a 6 MHz channel, QPSK modulation with rate 1/2 FEC, 1/4 guard interval and 8k FFT. With these parameters the channel capacity is 3.732 Mbps which is what we set the ffmpeg muxrate to. THe video rate must be lower than that and leave sufficient margin for bitrate fluctuations. Therefore, I have set raspivid to capture 1280x720 pixel frames at 30 frames per second and 3.3 Mbps video bitrate.

The following lines should be copy & paste-able into a terminal or a script:

```
raspivid -n -w 960 -h 720 -b 3300000 -t 0 -fps 30 -g 90 -pf
high -ih -o videoes &
./ffmpeg -loglevel error \
 -framerate 30 -i videoes -minrate 3.1M -maxrate 3.5M
-vcodec copy \
 -f mpegts -mpegts_original_network_id 1
-mpegts_transport_stream_id 1 \
 -mpegts_service_id 1 -mpegts_pmt_start_pid 1000
-mpegts_start_pid 1001 \
 -metadata service_provider="YOUR CALL" \
 -metadata service_name="COOL TV CHANNEL" \
 -muxrate 3732k -y videots &
sudo ./tsrfsend videots 0 1280000 6000 4 1/2 1/4 8 0 0
```

Note that I am using "sudo tsrfsend" because I did not configure any udev rule for the modulator that would allow using it as regular user. If you want to run the application as regular user, create a udev rule as I showed it in my previous article.

In the example I am using 1.28 GHz carrier frequency which is in the DATV segment of the 23 cm amateur radio band. If you don't have a DVB-T receiver that works at that frequency you can change it to some UHF frequency and use your regular digital television to receive it provided that it can do DVB-T and you are only transmitting in your lab with very low power. Check the regulations in your country to know for sure what you may and what you may not do.

I have modified the RTL2832, R820T and E4000 drivers to allow tuning to L-band frequencies by these tuners.

We can also use ffmpeg to read from a file instead of the camera. In that case we use "... -re -i videoes ..." to transmit in real time, otherwise ffmpeg will read and send the file as far as it can read it from the SD card. I haven't tested this option much as I am only interested in live transmissions for now.

I hope this guide was helpful and I am looking forward to see who will make the first handheld HDTV transmitter using a Raspberry Pi and a UT-100C modulator and in particular who will make it work from a flying drone.

A Little Light Humour

I have been in many places, but I've never been in Cahoots. Apparently, you can't go alone.
You have to be in Cahoots with someone.

I've also never been in Cognito. I hear no one recognizes you there.

I have been in tolerable, but they couldn't put up with me there. ((:-)-((:-)-

I have, however, been in Sane. They don't have an airport; you have to be driven there. I have made several trips there, thanks to my friends, family and work.

I would like to go to Conclusions, but you have to jump, and I'm not too much on physical activity anymore.

I have also been in Doubt. That is a sad place to go, and I try not to visit there too often.

I've been in Flexible, but only when it was very important to stand firm.

Sometimes I'm in Capable, and I go there more often as I'm getting older.

One of my favorite places to be is in Suspense! It really gets the adrenalin flowing and pumps up the old heart! At my age I need all the stimuli I can get!

I may have been in Continent, but I don't remember what country I was in. It's an age thing.

Author Anon A Moose

By Richard Carden - VK4XRL

Having read the article from David Carwana in CQ-DATV 12 and after speaking to Trevor, we thought it would be a great idea to update certain aspects relating to the digital repeater as it was the latest here in Australia and it's been over 11years since we here in Brisbane went digital.

I then contacted David via email and raised a few points regarding this installation. I am grateful to say he was more than happy to provide further information so I am appreciative of the comments and feedback provided.

Receivers.

The 23cm digital receiver is a commercial unit being a Humax Satellite receiver while the analogue unit is a brand new Pacific Satellite receiver PSR500.

All of the equipment on the repeater site is switched off when not in use, the only exception to this is the 12v supply, DTMF controller and Raspberry Pi. This is because he has to pay for all power used.

DVB-T Modulator.

This is a Clearview SD1010 again a commercial unit available from Kristal Electronics in Townsville (Australia) for a very good price. http://www.kristalelectronics.com/
It has one only composite input with a maximum power output of around -16dbm. David has interfaced this to the W6PQL 70cm power amplifier via a Mini Kits PAG-103 amplifier then into a DGOVE PA70-M-7W providing around 2 to 3 of drive. This in turn feeds via a coaxial divider to two CA-16 antennas modified for 70 MHz.

Clearview SD1010 Encoder / Modulator

The 23cm receive antenna has been taken care of by using a homemade vertical collinear of about 8.5db gain. This feeds a LNA-23-BP-F preamplifier and splitter into the two satellite receivers.

Switching for the repeater is being taken care of via DTMF codes at this stage. A signal has also been received in Whyalla which is about 56Km from the repeater site. For those transmitting 23cm DATV, the SR-System boards are being used while the FM transmitters are from Mini Kits in SA. http://www.minikits.com.au/

After some discussions with David it was realized that the settings being used for 23cm DATV produced a very wide bandwidth. David has now changed these so symbol rate is

The modified CA-16 antennas

The rack containing VK5RDC

Since being in contact with David I purchased one of the DVB-T modulators and for the price about a third of the SR-System boards it works very well, maybe a dual system will be available later? Other units are available that have dual HDMI inputs and are fitted into a one unit rack layout.

Thank you David for your input.

4286 and FEC ¾ with a bandwidth of around 6 MHz. An interesting point that I raised with David was the FM transmission standards. The WIA bandplans call for two FM frequencies, one at 1250 MHz and the other at 1283 MHz with a bandwidth of +/-9 MHz. With these settings you only get around 0.5v to 0.7 P/P video output from a normal satellite receiver therefore you will need an external video amplifier if the receiver has no video level control to increase the gain to 1v p/p.

As David has said the control is via DTMF on two meters with 5.8 GHz link backup via a Raspberry Pi.

HAM RADIO
International Exhibition for Radio Amateurs
mit HAMtronic - Elektronik, Internet, Computer
June 27 - 29, 2014
Messe Friedrichshafen

Darren Storer G7LWT reports:-

Darko (OE7DBH) is very worried about the loss of 23 cm due to the introduction of "safey of life" aviation navigation services from the Galileo satellites. Darko is recommending that amateurs move their DATV to 70 cm using a narrow bandwidth form of DVB-T, with an H.264 codec for greater data rates and improved resolution.

Darko DATV amps

The Winter Hill TV Club (M0WTV) purchased one of Darko's amplifiers to provide a significant boost to the output of the club's DTX1 DATV TX, here is a picture of the module:

With greater than 50 dB gain, designed for the ultra linearity requirements of COFDM DVB-T, this intermediate amplifier module will easily cope with the QPSK DVB-S output from the DTX1 DATV TX.

The AGAF stand was very busy until the AGM was held in the late afternoon. Prof. Dr. Uwe Kraus, (DJ8DW) once again demonstrated his famous DATV link from a local mountain, down to the Hamradio 2014 Messe Halle where the AGAF stand displayed the output. Uwe was very pleased with his latest narrow band GMSK/QPSK (2 MHz) RX/upconverter for 70 cm DATV. The new RX has very low power requirements and can be powered via the coax from a standard DVB satellite RX.

Right
70 cm DATV Dongle HDTV H264 in only 2 MHz

Below:
Calvin from www.hides.com.tw helps with software advice

Left:
AGAF Klaus DL4KCK

Below:
Portable DATV DB0QI

AGAF DATV Inc Latest Narrow Band GMSK RX 70 cm

NEW STYLE AERIAL ROTATOR WITH ELECTRONIC SERVO CONTROL

By John Hudson G3RFL

This is how I got around the problem of turning remotely my pump up mast and getting an accurate direction reading. I use 23cm and 3cm at the moment for ATV.

I first looked at the ELECTRONIC compass devices on the market and I wrote about this in a previous CQ-DATV.

Then I needed to turn the mast which was too heavy for a motorised unit and these rot after 2 years anyway, so I thought of using a Linear actuator which are fairy cheap on Ebay now.

These tend to be 24V and would run too slow on 12V so I jacked up the supply with an external 12V battery that gets trickle charged when not rotating. This is added to the input 13.65V and the speed can be controlled via the PIC PWM output so that when it gets near to the PRESET set-point it can slow down.

I put 32 PRESETS in but that could be made less or more.To date I have only used about 10 so far. The Presets are just incremented through with one of the buttons.

On the controller, we have Manual clockwise and anti-clockwise buttons, a Station (PRE-SET) select button and an AUTO button.

The display shows you where your mast is pointing with a sensor stuck on a small tube, weatherproofed and mounted on the side of the mast about 8 feet off the ground and 6" away from the mast.

The Top line of the display has PRESET info and we also have left and right symbols telling you the direction the mast is going.

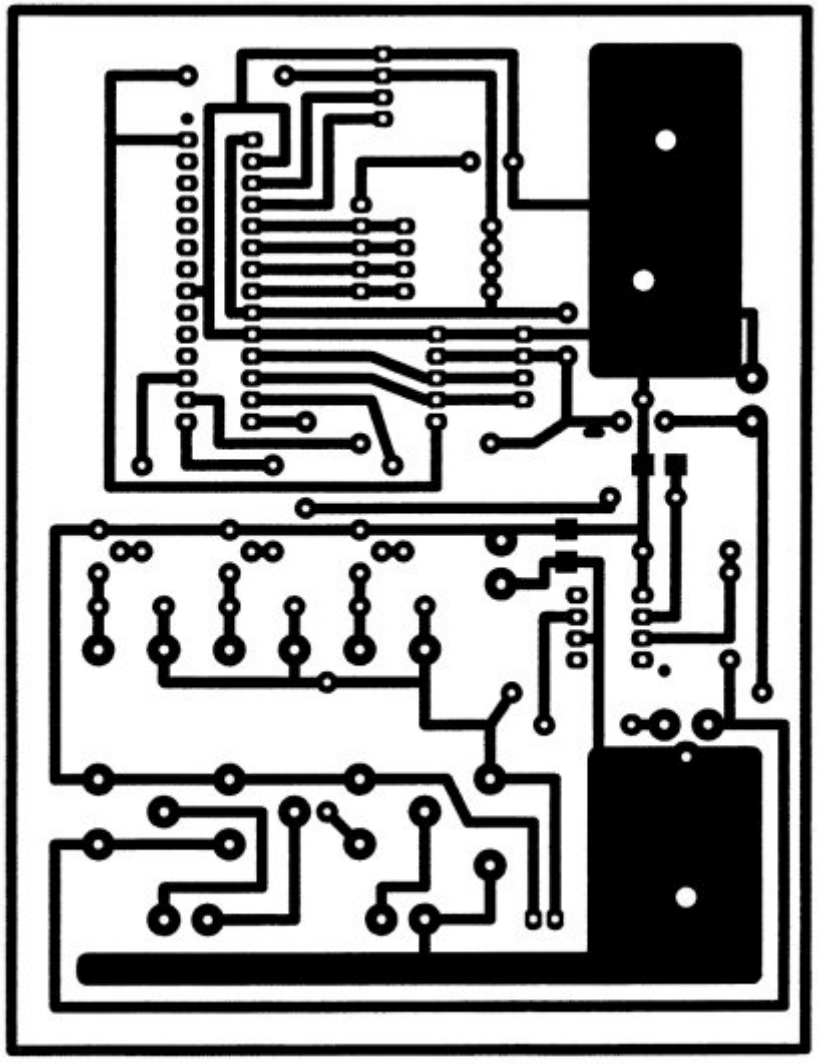
Both the SENSOR and the DISPLAY are I2C and the display works in 4 bit mode at 9600 baud. The Display is a nice BLUE one from Ebay.

The actuator had a lever coupling to the mast and the actuator is mounted about 8" off the wall. Pressing AUTO activates the actuator till the directions agree in a servo type loop.

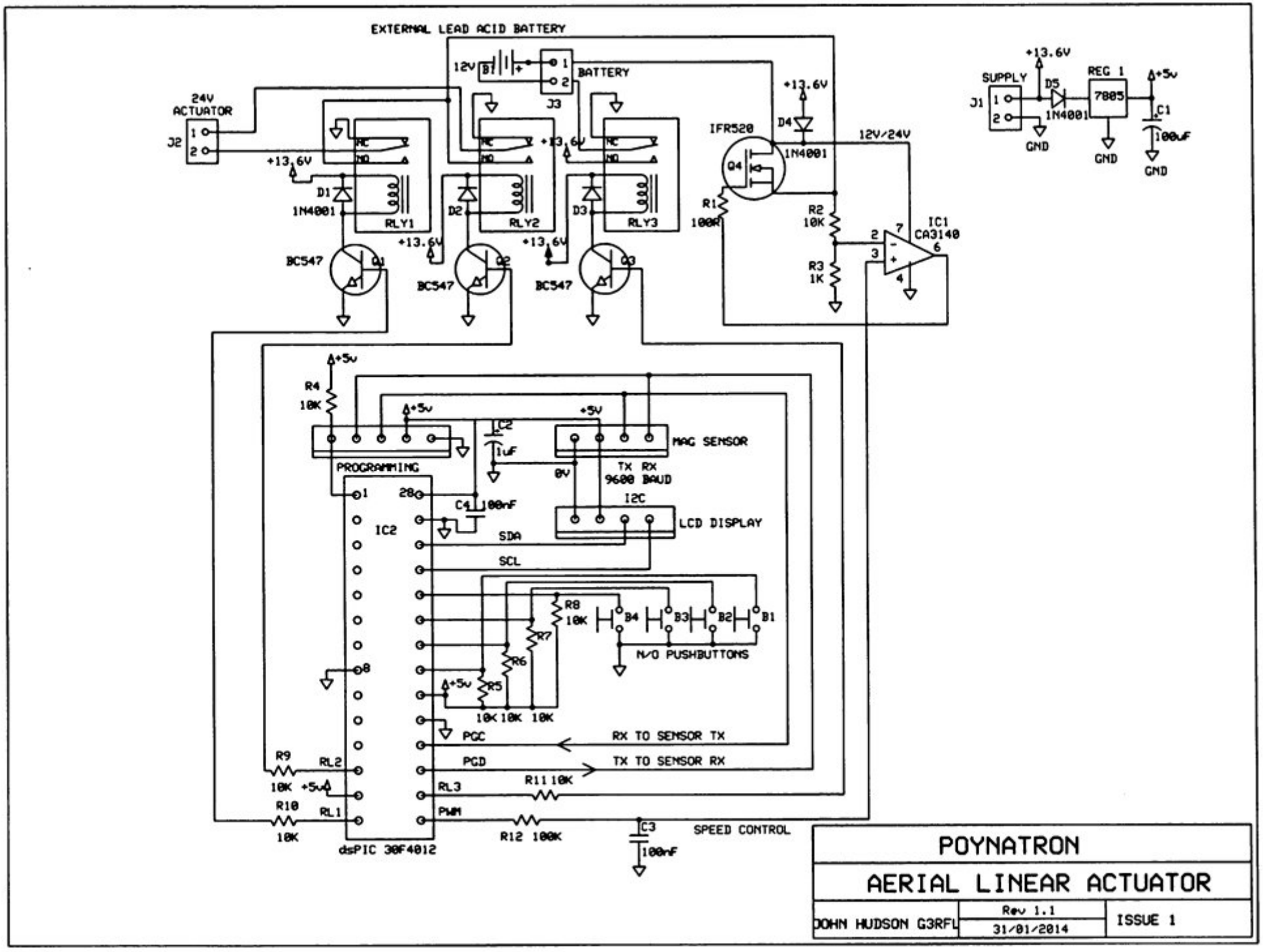
I used 12V Relays to switch the direction and the external battery. A FET was used to set the volts from 12V to 24V under Software control. The current when running was about 1 AMP.

At the moment I get about 110 DEG travel with this actuators min / max length.

Internal view of the controller



Rotator Controller PCB (NOT TO SCALE)



Rotator Controller schematic

Stan Lebar and the Apollo 11 TV camera

by Trevor Brown G8CJS

It is now 45 Years since the 1969 July Apollo 11 launch put Americans Neil Armstrong and Buzz Aldrin, on the moon. They took with them a very special TV camera developed by Stan Lebar and his team at Westinghouse.

The camera Stan's team developed and built ran at 10 fps using 320 lines. Rather a non standard TV signal, but at the time nobody knew if live pictures from the moon would be possible, so the transmission path was via the telemetry channel and was shared with voice and biomedical data. The bandwidth available for a television signal was only 500 KHz, Stan's team had to engineer from scratch the camera which had also to withstand Lunar temperatures of -184 C to 101 C so this was rather a special camera The tube was supplied by

military and no pictures of the tube were permitted.
The Apollo 11 mission was tracked at three locations Goldstone, Honeysuckle Creek, and Parkes, the telemetry was recorded onto 1" tape by M22 recorders. NASA hired RCA to build a standards converter to process the images in to a 525 line TV signal. The tracking stations converted the signals and transmitted them by microwave links, Intelsat communications satellites, and AT&T analog land lines to Mission Control in Houston. By the time the images appeared on television, they were substantially degraded. Stan was delighted to see his camera working, but was always disappointed with the quality; he knew it was capable of much better results. The problem was not the camera but the standards converter and transmission path. "No one was unhappy," he said. "We were all in seventh heaven". America had pulled off the impossible. The Nation had landed a man on the moon and showed the world, via live television, that it could be done.

The live pictures were viewed at tracking centres on monitors that worked on the 10 fps 320 line standard and reports confirm that these pictures were considerably better quality than what the rest of the world saw.

The original high quality was preserved via the M22 telemetry recordings. The engineers boxed the one-inch telemetry tapes wound onto 14-inch canister reels-which served no other purpose than to provide backup if the live relay failed- and shipped them to the Goddard Space Flight Center. From there, the tapes were sent to the Washington National Records Center in Suitland, Md.

In 1997 a phone call from a British author, to Sarkissian, who had been part of the Parkes team, raised the issue of the location of the M22 tapes, Only one had ever surfaced in Australia which was a copy of one of the tapes sent to Goddard. Everyone assumed that NASA had the originals stored away safely. This did however start a search in the

states by Stan Lebar, Bill Wood and Richard Nafzger, for the original M22 recordings with a view to unlocking the true quality of the Apollo 11 camera and showing the world some improved quality recordings of this historic mission. This has been a long and exhausting search and in what one of the American papers headlined as "One Giant Blunder for Mankind" it would seem the Apollo 11 telemetry recordings no longer exist and are presumed wiped.

In 2004 a machine was located and the Australian tape was replayed. It contained chatter and simulation data only, no pictures.

What the search did reveal was that NASA had hired the Applied Physics Laboratory (APL) near Baltimore to modify two Ampex VR-660C 2" helical VTR's to record the 320 line pictures. This machine only recorded the pictures received at Parkes.

Sarkissian found a letter and a photo showing two Ampex VR-660C recorders and a man who may have operated them. The letter, written by the former Parkes director, suggested the operator worked for APL. They uncovered the identity of the man who had indeed modified the two Ampex VR-660C's.

Now also in his 80s, the former APL employee confirmed he had modified the recorders and recorded the original moonwalk pictures, he packed the tapes and personally delivered them to APL.

Nafzger found five two-inch videotapes only, but when a machine was located these tapes too turned out to be blank.

So it may seem the rest of us will never get to see the true quality pictures produced by the Apollo 11 mission. Stan Lebars camera did prove that pictures were possible from the moon and although it was sent as a back up on the Apollo 12 and 13 missions it was never used again, Stan had proved what could be done and a higher definition colour camera was used on the following missions so presumably a greater bandwidth had been allocated.

In addition to Apollo 11's lunar camera, Lebar also managed the Apollo color TV, Skylab series and Apollo-Soyuz Test Project camera programs. On behalf of his Westinghouse team, Stan Lebar accepted the Emmy Award in 1970 from the Academy of Television Arts and Sciences, for "Outstanding Achievement in Coverage of a Special Event." He retired in 1986 after a 33 year career with Westinghouse.

https://www.youtube.com/watch?v=OVcQ4CvGelI&feature

http://www.nasa.gov/pdf/398311main_Apollo_11_Report.pdf

Philips TV history

Reprinted from TV-AMATEUR 173

The traditional Dutch radio and TV manufacturer Philips has disposed its remaining shares in "TP Vision" (which manufactured Philips TV sets for Asia and Europe) to the Taiwanese partner "TPV" some months ago. Thus ends the long dying of an outstanding TV development tradition, from TV studio equipment to TV sets. There were early video camera tubes from Philips and later a huge TV cathode-ray tubes factory in Aachen (Germany), that even delivered 16:9 colour CRTs to competitors like Grundig, Loewe and Panasonic.

In 1936 the first Philips TV showed up at "Radio Olympia" in London, and their first colour TV set was built 1964. Starting the PAL colour TV broadcasting era all over Europe. In 1967, handy size Philips colour TV studio cameras were equipped with their own tiny "Plumbicon" camera tubes. But there were other big brands to set the pace: PAL was developed by Walter Bruch at "Telefunken" (Germany), the famous "Trinitron" colour CRT was built by Sony (Japan), and the first european TV set with Stereo audio was a "Loewe" (Germany).

One big asset regarding TV picture quality was developed by Philips engineers in the eighties - the 100 Hz storage display electronics stopped the annoying flickering of european 50 fps CRTs with interlaced video. Further developments like "Digital Scan" were only useful with still pictures, but around 1995 the "Natural Motion" video processing with movement prediction pointed to the right direction. Only in 2000 with "Digital Natural Motion" there was enough processing power to display flicker-free smooth video.

Another trick was developed by Sony: DRC (Digital Reality Creation) tried to show more detail than the analog video chain was able to deliver, so Philips had to give an answer with "Pixel Plus" processing. The climax of CRT development was the first 16:9 TV set with HDMI input (Philips 32PW9551) in 2006, but only 800 lines of resolution. In 1997, the first european flat screen TV set came from Philips for 15000 Euro, giving 42 inches diameter and mere 852x480 pixels resolution from a Fujitsu screen. A much better Plasma TV was the 32PF9964 for only 6000 Euro in 2001.

The unique highlight of newer Philips TV history is "Ambilight", short for "ambient lighting" - an integrated coloured back side lighting system for television sets from 2004 - and sold until now. Regarding HDTV: the european "HD-MAC" system with analog 1250p50 resolution was developed in the eighties by Philips and Thomson (France), but it came too early and got too costly. It needed flat screens and digital technology to bring high definition TV into the homes.
www.heise.de

Philips was suffering like Loewe (Germany) from competitor´s pressure by LG and Samsung (Korea). They dominate the worldwide TV set market, so Philips CEO Frans van Houten pulled the plug at the end of 2011 and sold the majority of TV production shares to TPV. Now the Dutch company is concentrating on medical technology systems and small consumer lifestyle products.
www.futurezone.at

Comment by Prof. em. Dr.-Ing. habil. Uwe E. Kraus, DJ8DW (AGAF president):

Most details given by heise.de are not correct - I myself developed the 100 Hz storage display electronics (in my capacity of the head of the Digital Signal Processing group within Predevelopment of TV receivers at Philips, Eindhoven), constructed with my group the very first model based on the chassis K12 and demonstrated it 1981 at the FKTG convention in Ulm (Germany). This very first model had a picture memory built with 512 16k DRAMs controlled by TTL logic components.
There were 50 Hz and 100 Hz CRT displays (K12 chassis) side by side in the conference room, both fed by a Laservision player. Some judder was present with my AABB system, but for the viewer was familiar with this effect from broadcasting cinema movies by television. Philips and Grundig (Germany) brought such 100 Hz TV sets into the european market in 1983 already, ITT, Sony and Thomson came later. The following movement prediction technology minimized the judder effect, but it was very expensive, so most manufacturers did not use it. I also designed the very first Philips all digital Picture in Picture system thus introducing the use of a picture memory in a consumer electronics TV receiver. This PiP system was shown at the Berlin Fair in 1977.

Philips never had TV development labs in Bruegge (Belgium), only for production enhancement in order to simplify mass production. The "Iconoscope" was developed by Zworykin at RCA´s David Sarnoff Research Lab in Princeton, NJ (USA). Philips invented the "Plumbicon" camera tubes enabling a small TV studio camera body and excellent colour quality. The camera division was in Breda (Netherlands), but they sold the Plumbicon to competitors too. For some time Philips was the leading colour picture tube producer worldwide, the biggest factories were in Aachen (Germany) and Barcelona (Spain).

The Dutch company also developed an own colour TV system with luminance and two colour carriers on different frequencies within the video frequency range, but they never mastered interference effects caused by non-linear components. Instead they later supported Walter Bruch on his promotion tour for the PAL system. So my late colleague Wolfgang Steinkopf, ON7ST, travelled with the Bruch team to Spain and South America and calibrated the colour TV sets, above all the black setting. He once said "Black is the prettiest colour on TV", but also the white setting is important. There is the D65 standard, but on the tour he chose "Bruch white" - a colour temperature more convenient to Mr. Bruch.

The "HD-MAC" standard was developed by the european consumer electronics industries in a common effort under the leadership of Philips (European project "Eureka 95").

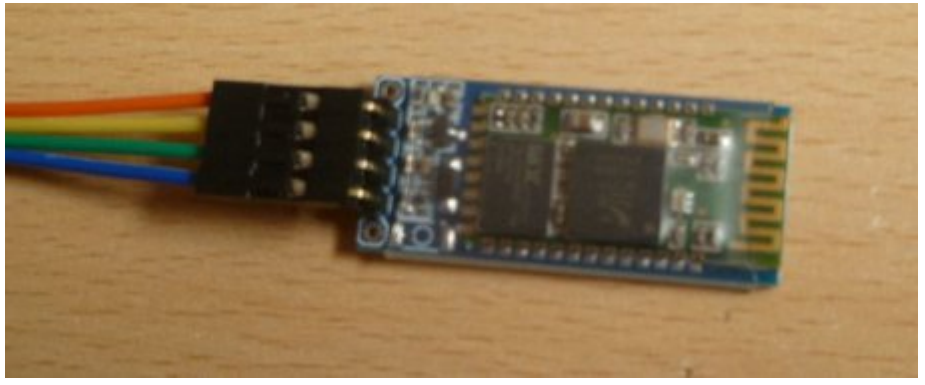
Translation Klaus, DL4KCK
www.agaf.de

Bluetooth - Serial TTL Module Review

Mike G7GTN

Whilst thinking about some more computer orientated control mechanisms for television projects Bluetooth seemed like a good option for me to further investigate. As we know this system operates in the ISM Part of the band on 2.4GHz but instead of using the more familiar Frequency Modulation technique these use Gaussian frequency-shift keying (or GFSK for short)

If you look on eBay you will find two commonly available types of Bluetooth modules the first being the HC-05 which can act as both Master & also in Slave mode. The next is the HC-06 which will operate only in Slave Mode. Both are sized 15mm X 35mm when mounted on the small carrier PCB which provides voltage conversion down to 3.3V required to operate the on board Bluetooth chipset from a nominal user supplied external +5V supply. Both modules will provide serial connectivity to a maximum of 1382400 baud. To me that sounds like would really be pushing some good luck to get reliable and constant connections!? I stuck with using 9600 baud for this review.



I selected the type HC-06 as I had no requirement at this time to operate in Master Mode; my intended application is mainly from an Android Tablet or Smartphone for control

mechanisms. So the information presented here is geared towards this particular module. The HC-05 by its very nature has more commands available for user configuration purposes. When first powered up the small on board indicator LED will be flashing constantly until the module is actually paired with a Bluetooth connection.

Making Configuration Changes - Required Hardware

To make any changes to the configuration we require an FTDI USB - Serial TTL breakout board based on an FT232RL chip. The connections are TX - RX & RX - TX and of course the supply rails to power the Bluetooth module. So in effect all pins are connected with the TX & RX pins crossed over to provide terminal and later project communication.

Configuration Software - Terminal software

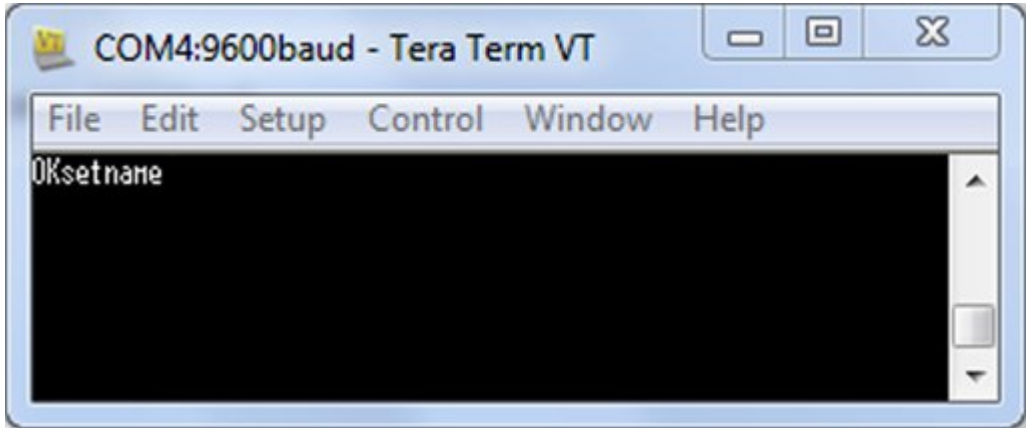
Next we need some terminal application software, use whatever you feel most comfortable with as all has the same effect. I generally make use of Tera Term http://ttssh2.sourceforge.jp/index.html.en as this is installed on all my project systems.

Command structure - The use of AT Commands

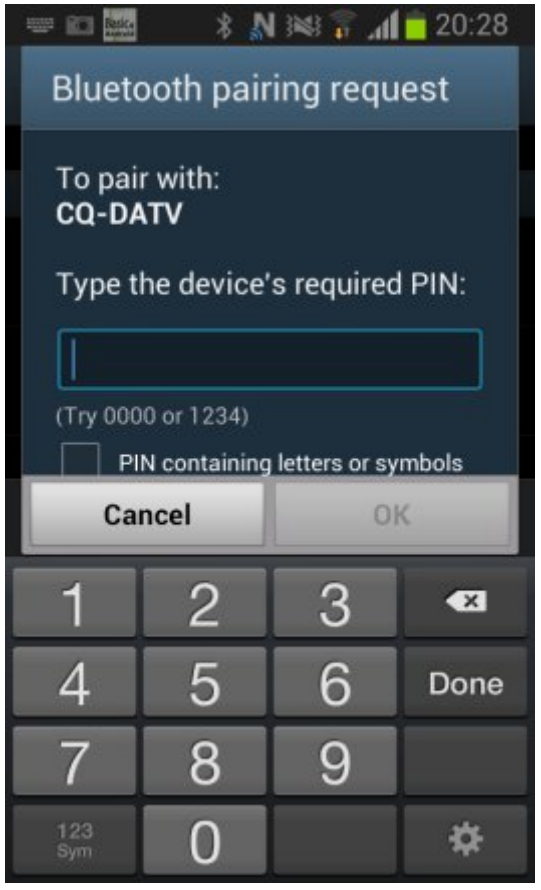
You may already be somewhat familiar with AT commands from the early days of the computer modem, well these modules also are configured using a limited subset of these commands. We issue a command via our serial terminal using the form AT+<Command> and get a response back from the module. But we have a problem already! We only have up to one second to enter the required command. Apart from typing very quickly the easy option is to have an ASCII text file open of the commands and then just copy & paste these in to our terminal software's window. I have prepared such a File which is called ATCOMMANDS.TXT for you to download from the usual CQ-DATV file location to accompany this article.

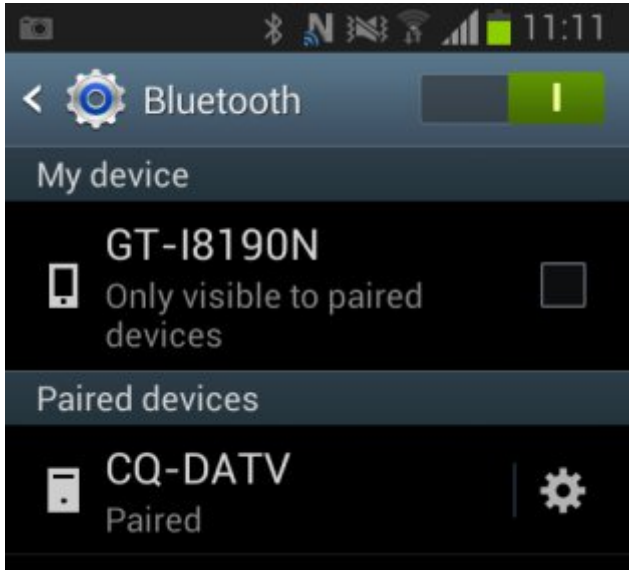
So as in the image shown we want to set the baud rate to 9600 we entered AT+BAUD4 the response we received back was a confirmation OK9600 that this change has been made and as part of the persistent settings also been stored. The communication speed will be 9600 until we change this again. The modules are generally supplied pre-configured to this starting baud rate.

Another quick example to change the modules name (which is broadcast and hence discoverable) enter the following in your terminal AT+NAMECQ-DATV which will set the name to CQ-DATV and of course the module will reply with a response OKsetname in our terminals window. Notice that on this HC-06 type module no additional Carriage Return or linefeed combination is required to be entered by us.



When you go to connect to the module for the first time, you will be required to enter a Pin or Pass code to pair the devices. If you have not used the AT+PIN command to change this value our default will be 1234.





The full range of recognised AT Commands for the HC-06 (Slave) type modules are as shown in TABLE 1 below.

TABLE 1	HC-06 BLUETOOTH AT COMMANDS
AT	No function
AT+VERSION	Firmware Version & Number
AT+NAMECQ-DATV	Change Devices Name
AT+PIN1234	Change Device Pin Pairing Code
AT+BAUD1	1200 Baud
AT+BAUD2	2400 Baud
AT+BAUD3	4800 Baud
AT+BAUD4	9600 Baud = Module Default Setting
AT+BAUD5	19200 Baud
AT+BAUD6	38400 Baud
AT+BAUD7	57600 Baud
AT+BAUD8	115200 Baud
AT+BAUD9	230400 Baud
AT+BAUDA	460800 Baud
AT+BAUDB	921600 Baud
AT+BAUDC	1382400 Baud

Conclusion

If you have a requirement to control any of your home designed equipment and wish to use any form of short range RF control then Bluetooth is certainly a very good option to look at further. It gets more interesting when you can create Android applications with sliding panels for your touch control surfaces. Obviously we can also create Desktop applications just as easily and control our projects via a Bluetooth Dongle. For the cost around £4 UK it provides an interesting diversion, even if just from doing house work.

Now to Bluetooth and control the vacuum cleaner remotely from my very comfortable chair.

HAMRADIO report 2014
- from Klaus DL4KCK

Europe's biggest amateur radio fair, HAMRADIO, together with the new "Maker World" fair side by side at the Friedrichshafen exhibition halls, drew around 17100 visitors to Lake Constance. 200 exhibitors from 34 nations showed antennas, radios and technical attachments, and the amateur radio TV specialists were represented by ATV Munic and AGAF in the central hall A1 like last year (and before). For the first time the supporting program in the Convention Center listed a big presentation of several european ATV repeaters in different languages.

AGAF Stand with 3D Laptop

Pierre-André Probst, HB9AZN, as host opened the series of lectures virtuosic in english, french and german in front of around 30 visitors, and Michel Burnand, HB9DUG, described in english the developments at ATV repeater HB9TV in the Alps since 1993, from FM-ATV to DVB-S and a full duplex DATV link to HB9F (Schilthorn) as a gate to Germany and Austria. All lectures were given with laptop and beamer assistance.

Roland Moser, HB9MHS, presented in german, technical details at HB9F on 3000 meters ASL, a central platform for the european ATV traffic. Ernst Weber, DJ7DA, showed how DB0QI in Munic is linked to many neighbour repeaters and described the development of modern technology units by DL1MFK (I2C bus and software) and DH1MMT (home-made hardware), also demonstrated at the ATV Munic stand A1-551. As principle the user control of nearly all repeater functions by DTMF, Packet Radio and D-Star data ruled. The ATV Munic club founded in 1990, has around 30 members and produces a weekly "ATV magazine" video with news from DARC and from Bavaria, transmitted over DB0QI and on the web: http://www.db0qi.de/

AGAF Stand with DJ8DW DATV RX live

Lately the licence for two central output frequencies on 23 cm (DATV and FM-ATV) was withdrawn by the german authorities, because the Galileo control center (new european

GNSS) near Munic reported potential interference (Galileo centre frequency 1279 MHz +- 15 MHz). As a consequence they approved a 436 MHz output in DVB-T with 2 MHz bandwidth for DB0QI. In between Darko Banko, OE7DBH, who presented together with Calvin from "HiDes" (Taiwan) the new DVB-T products for TV-Amateurs and his own 70cm PAs in fleamarket hall A3, distributed a flyer showing the OEVSV paper being presented to the IARU region 1 conference in September. It wants to block DATV operation on 70 cms in order to safeguard the amateur satellite portion of the band. In red ink he commented the cited text: "You want lose 70cm ATV band? No problem, Austrian amateur radio organisation helps you."

AGAF Stand DJ3DY GMSK DATV TRX

After a coffee break Yvan Capo, F1UNA, gave an extensive lecture in french about ATV repeater F1ZEP on Mont Ventoux in southern France. It has many inputs and outputs controlled by the users with DTMF, one is a DATV-RX on 437 MHz with hor. polarization. Near Lake Constance is the QTH of ATV repeater OE9XKV above Dornbirn. Arno Krainer, OE9AKI, showed in german its development assisted by schematics and pictures, i.e. of a rotating video camera and several home-made waveguide slot antennas on the roof of the cable car upper station. Latest additions were ATV links to OE9XTV and to DB0UTZ in Germany beyond Lake Constance.

The final talk was given by BATC chairman Noel Matthews, G8GTZ, describing in english the special situation of british ATV repeaters. Around 100 active users can work up to 32 ATV repeaters, many of them with a 437 MHz DATV input (backed by a bandplan entry). Another priviledge is the british ATV repeater output band 1300-1325 MHz (maybe a solution for the Galileo problem all over Europe?). Not only during ATV contests there are many contacts to France and the Netherlands, shown by lines and data online on the BATC webpage http://www.dxspot.tv/

ATV Munich Stand

Beginning from 2015 there is a danger to lose 2310-2340 and 2390-2450 MHz in Great Britain, and on 3 cm maybe only 10350-10500 MHz will be usable for amateur radio. Noel

G8GTZ is convinced that it is still too early to adopt a DATV only input policy, but BATC is actively promoting DATV by selling 100 "DigiLite" DIY units and 50 DTX1 systems by now. 900 members worldwide are giving a stable base for lobbying, also on the 70 cm band problems on IARU level, see www.batc.org.uk/Getting_Started/Hamradio2014.pdf

DARA mobile webcam

Another BATC highlight is the internet portal for amateur television at www.batc.tv/

Most UK ATV repeaters are streamed live with 16 international repeaters from Australia, USA, Ireland and Argentina.

Visiting the AGAF stand A1-246 in Friedrichshafen, Noel G8GTZ announced to register a BATC stand at HAMRADIO 2015, maybe right besides the AGAF stand.

On Friday we had no DATV live pictures from Austria to show there, because the long directional 23 cm antenna on the roof of hall A1 was pointing to the wrong place in Austria. So Willi, DC5QC, and Rudolf, DJ3DY, used their mostly home-made DATV TRX equipment to demonstrate DATV contacts on-site with a show effect: waving to the small camera was received delayed on the RX monitor. Our friends from DARA (Dayton Hamvention organizers) at the stand opposite to ours moved their live webcam vehicle through hall A1 again. Many AGAF members asked about the health situation of our chairman Heinz, DC6MR (again not present like last year), and wished him all the best. Update: he got his second eye surgery on Thursday after the HAMRADIO event, and we have good news: he is able to see much better than before now, without doubling effect.

ATV Munich Stand

On Saturday our president Uwe, DJ8DW, at first corrected the directional DATV RX antenna with help of the DARC ATV managers Iwo, DG0CBP, und Bernhard, DM2DXG. Then we got the usual excellent live video from Uwe´s hotel room in Austria showing the Isle of Lindau at the AGAF stand. DARA people were stunned about 3D video snapshots from Hamvention 2012 picked up at YouTube and demonstrated on

his 3D laptop with 3D shutter glasses by DL4KCK. The fresh AGAF DVD-ROM Nr.3 with all TV-AMATEUR issues from 1 to 171, some goodies and many old and new ATV videos found reception, and some foreign AGAF members payed their annual subscription in cash.

Uwe, DJ8DW, had many discussions on ATV matters around the fair ground, i.e. at an informal RTA meeting (german round-table construction for different ham radio interest groups including DARC). The new DARC VHF/UHF/SHF manager Jann Traschewski, DG8NGN, gave a talk to around 20 listeners on his new crew members and some IARU region 1 conference papers regarding ATV. He pointed out to treat every mode on 70 cm equally and announced to defeat the OEVSV paper. At a recent meeting in Brussels with EU officials and Galileo agents Jann and Ulli, DK4VW (DARC frequency management), were able to demonstrate the danger for ATV on 23 cm. A viable solution would be a new DATV band from 1300 to 1325 MHz all over Europe...

Klaus, DL4KCK
www.agaf.de

Balloon launch preparations

The DARA Stand

HiDes Taiwan Darko OE7DBH Stand

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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.

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