In this issue

Production Team

Ian Pawson G8IQU
Trevor Brown G8CJS
Terry Mowles VK5TM
Jim Andrews KH6HTV

Contributing Authors

Jim Andrews KH6HTV
Trevor Brown G8CJS
Peter Cossins VK3BFG
John Hudson G3RFL
Rainer Mueller DM2CMB
Clive Reynolds G3GJA
Mike Stevens G7GTN

Editorial

I am sure it cannot have escaped anyone's attention that its 50 years since Neil Armstrong and Buzz Aldrin landed on the moon! Perhaps those of us that are old enough can remember where they were when we heard the immoral words "the Eagle has landed". It was watched by an estimated TV audience of over 600 million viewers. What you may not know is the TV pictures from the moon were 320 line, 10 frames per second, relayed back to earth via a 500KHz bandwidth link.

I will not spoil it for you, Trevor has the full story in this issue.

Clive Reynolds G3GJA, BATC Contests Manager has the results for the IARU International ATV Contest held over the 8th and 9th June 2019 and also in this magazine the results for BATC contest for 2m & 4m ATV held concurrently.

Congratulations to Martin for taking first place in the 4m section and Noel G8GTZ who just secured first place with a dual site entry of five contacts from Colin G4KLB with just 2 points less in the 2m section.

Trevor is still working on his GVG mixer panel and its I2C interface. Trevor now has a whole host of push buttons working and is still singing the praises of Annex Basic and the ESP8266 module which it is driving. Next issue he promises connection to the outside world! Keep watching and looking for a panel. Unfortunately no more seem to have surfaced on eBay, but we all live hope. You can see the buttons working on the CQ-DATV facebook page
https://www.facebook.com/groups/285807174898375/

Peter Cossins VK3BFG and John Hudson G3RFL have revisited the article in CQ-DATV 54 for a using an AD 8318 module as a power meter. Yes it was ahead of its time with a bandwidth of 1MHz to 8GHz and has a logarithmic detector providing a DC output voltage ranging from about 0.6V to 2.18V. Not wishing to spoil the project, its enough to say it was worth a second visit.

Jim KH6HTV has been working portable on Pikes Peak which is the highest mountain in the southern part of the front range of the Rocky mountains. It is 14,115 ft. high and towers over the city of Colorado Springs at 6,000 ft. That does sound like an ideal spot to go portable with ATV. Jim has also been working on improving the Boulder TV repeater, together with Don, N0YE.

They have added a quad HDMI switcher box that has RS 232 control. Don has written some Arduino code to control the RS232 interface.

While on the subject of computer code, Micro Corner is back! Mike G7GTN has put a compendium of projects together from a debug board, a logic probe and an I2C VGA generator all in this issue. Welcome back Micro corner.

We also have a report by Rainer Mueller, DM2CMB from East Germany which featured a QO-100 3 cm RX demo with a converted LNB. Es´hail-2/QO-100 was also the focus of the lecture programme, but not to be out done Hubertus Rathke, DC1OP, showed everyone how to generate the DATV signal with the Raspberry Pi.

Again we have one from the vault, which was first published in CQ-DATV issue 6 and has Trevor looking about the new 4k television standard and what we could expect in the future. How quickly the future becomes the present and 4k is no longer something on the horizon, but something we can all see demonstrated in any high street store. Has the world moved so far in just 68 issues of CQ-DATV.

Where will we be in another 68 issues time….

As we always say, sit back and enjoy CQ-DATV 74.

From the CQ-DATV production team

Sotherby's Quad tapes

A set of original videotape recordings of the Apollo 11 Moon landing that were bought for $217.77 at a government surplus auction by a former NASA intern in the 1970s have sold at auction for $1.82M.

The un--restored, un-enhanced and un-remastered tapes are described as "the earliest, sharpest, and most accurate surviving video images of man's first steps on the moon," by auction house Sotheby's.

The tapes, which have a run time of 2 hours and 24 minutes, had a pre-sale estimate of $1 million to $2 million. The artifacts were auctioned in New York on Saturday, the 50th anniversary of the Apollo 11 Moon landing.
Viewed only three times since they were bought directly from NASA at the auction in 1976, the tapes are the only surviving first-generation recordings of Neil Armstrong's first steps on the Moon, according to the auction house.

One of the original videotapes of the Apollo 11 Moon landing. (Sotheby's)

DATV-Express Project - MiniTiouner-Express Update

All MiniTiouner-Express RX assemblies are depleted at the UK distribution location. More stock should arrive in UK July 26th.

The MiniTiouner-Express PayPal function is DISABLED until these units are in the hands of Charles G4GUO.

The DATV-Express Project website for ordering both DATV-Express TX units and MiniTiouner-Express RX units is located at: *www.DATV-Express.com*

1. Make sure that you have registered on the website.
2. Log-in before you try to go to the PURCHASE page
3. Click on the PURCHASE A PRODUCT link on the home page

A TYPO crept into the first website update to announce the PayPal price for MiniTiouner-Express RX being purchased for shipments to EU customers who order.

The website PURCHASE A PRODUCT page should say:
MiniTiouner-Express Orders to EU: MiniTiouners are bulk shipped from USA to the UK. We then charge reduced shipping and prepay the VAT for the EU community. We notice, however, due to the untracked shipping, delivery time could be greater, usually 1 to 2 weeks for orders outside the UK. The price for the MiniTiouner-Express assembly for EU and UK customers is US$75 + $24 shipping including VAT. Limit 1 board per order for European Union.

MiniTiouner Orders outside EU:
The price for the MiniTiouner-Express assembly is US$75 + shipping.
- Shipping in the USA is $7.00
- Shipping to all other international customers is US$35.00

The project team will fix the website typo on EU shipping costs.
73...de KenW6HHC

DATV reception of low symbol rates (RB-TV) from QO-100

Helmut Schroeder, DG3KHS (DB0KO-Sysop), at AGAF online forum

Hello DATV enthusiasts, the digital TV receiver "SF8008 Single" from Octagon and also various Dreamboxes with the Si2166D tuner and the current firmware are able to receive low symbol rates down to 250 KS/s.

The Octagon can receive DVB-S and -S2 and decodes H.264 and H.265 video signals, but the frequency setting is not easy - smallest steps are 1 MHz, e.g. 10496 MHz.

It can happen that if there are several 333 KS/s signals, it locks on the stronger one. You can use a special transmitter list to show every 333 KS/s signal without knowing the PIDs.

I own the RX for about 1 month now and am thrilled - it is of course not comparable to the MiniTiouner.

I once created a station list for the QO-100, which you can import with the Openwebif of the RX under "Bouquet Editor".

G7JTT (bottom center) and DG3KHS 2m reflector parabol (bottom right) via QO-100 on the DB0KO ATV repeater output (near Cologne) received there by two "Digital Video Recorders" which filter automatically for 333 resp. 500 KS/s signals

Peter Guelzow, DB2OS, at the QO-100 ground station of the AMSAT-DL Bochum observatory (Germany)

Awards for innovations

At the RSGB Annual General Meeting in Birmingham on Saturday, April 27, 2019, two awards were presented for work related to the amateur radio transponders on the geostationary satellite Es'hail-2 / QO-100.

The prestigious "Louis Varney Cup" for progress in space radio was awarded to Peter Gülzow, DB2OS, for his leadership of the team responsible for the now operational Qatar-OSCAR-100 mission.

The Fraser Shepherd Award for radio microwave applications was presented to Dave Crump G8GKQ, Phil Crump M0DNY, Noel Matthews G8GTZ and Graham Shirville G3VZV for providing access to the QO-100 for the entire amateur radio community by developing and installing a narrowband transponder WebSDR and a broadband transponder spectrum monitor (at Goonhilly earth station, Cornwall).

Source: *https://amsat-uk.org*

QO-100 ground station in Bochum

Thilo Elsner, DJ5YM, head of the observatory in Bochum and member of the board of AMSAT-DL, is pleased: "The operation of the ground station for this special satellite project is a challenge for us and makes us proud. Above all, however, this development confirms that Bochum was the right choice for the location of "esero Deutschland".

It is the ESA Space Education Office, which was founded last year with the participation of the Ruhr University, the Bochum Observatory and other partners. Within the framework of "esero", we are looking forward to establishing contact with the world via "our" satellite QO-100 in the coming years from South America through Europe and the Arabian Peninsula to Asia - i.e. from the North Pole to Antarctica - and to using it for radio experiments, international understanding as well as education and training of schools and universities. The possibility of transmitting not only speech but also pictures and videos is particularly attractive. For example, the (almost) worldwide transmission of astronomical observation data from a telescope is planned".

Thanks are due to all those who made the project possible in principle, but also to the members of AMSAT-DL who prepared and accompanied the commissioning of the technology at the ground stations in Doha (Qatar) and Bochum.

Source: *https://www.darc.de*

Translations by Klaus, DL4KCK *www.agaf.de*

Contest Results

Supplied by Clive Reynolds G3GJA, BATC Contests Manager

Results for the IARU International ATV Contest held over the 8th& 9th June 2019

These are for the IARU section only and the separate BATC contest for 2m & 4m, held concurrently, are elsewhere in this issue.

Nr	Call	Points
1	G8GTZ/P	9423
2	M0DTS/P	7730
3	G8GKQ/P	6676
4	G1LPS	5184
5	G4FRE/P	2720
6	M1EGI	2392
7	G7KPM	892
8	G4FVP/P	755
9	G4LDR	728
10	G4BVK	728
11	G3GJA	664
12	G3KKD	552
13	M0YDH/P	420
14	G4KLB	204

70cm

Nr	Call	QTH	QSOs	Kilometres	Aver.km	Points	BestDX	Locator	Distance
1	G8GTZ/P	IO91GI/81FD	6	556	92.67	944	M0YDH/P	IO82QJ	141
2	G8GKQ/P	IO80UV/WP	5	415	83.00	540	G8GTZ/P	IO81FD	92
3	G3KKD	JO02CF	4	310	77.50	493	G8GKQ/P	IO91IN	127
4	G4BVK	IO81RK88	3	206	68.67	412	G8GTZ/P	IO81FD	79
5	G4KLB	IO80UU24VN	4	257	64.25	329	G8LES	IO91LC	93
6	M0YDH/P	IO82QJ85	1	140	140.00	280	G8GTZ/P	IO91GI	140
7	M0DTS/P	IO94DF/MJ	3	139	46.33	278	G1LPS	IO94EQ	54
8	G1LPS	IO94EQ	3	125	41.67	250	M0DTS/P	IO94MJ86	55

23cm

Nr	Call	QTH	QSOs	Kilometres	Aver. km	Points	BestDX	Locator	Distance
1	M0DTS/P	IO94DF/MJ	7	553	79.00	2052	G7KPM	IO93UM	122
2	G8GTZ/P	IO81FD/91GI	5	387	77.40	1294	G4KLB/P	IO80UU	93
3	M1EGI	IO93FL61/GL49	3	323	107.67	1292	G1LPS	IO94EQ82	135
4	G8GKQ/P	IO80UV/WP	5	299	59.80	1196	G8GTZ/P	IO81FD	92
5	G1LPS	IO94EQ	4	261	65.25	1044	M1EGI/P	IO93FL61	136
6	G7KPM	IO93UM	3	223	74.33	892	M0DTS/P	IO94DF	122
7	G3GJA	IO93TR09	3	206	68.67	664	M0DTS/P	IO94DF	100
8	G4BVK	IO81RK88	1	79	79.00	316	G8GTZ/P	IO81FD	79
9	G4LDR	IO91EC	1	52	52.00	208	G8GKQ/P	IO80UV	52
10	G4KLB	IO80UU24VN	2	97	48.50	204	G8GTZ/P	IO81FD	92

13cm

Nr	Call	QTH	QSOs	Kilometers	Aver. Km	Points	BestDX	Locator	Distance
1	G8GKQ/P	IO80UV/WP	3	235	78.33	2350	G8GTZ/P	IO81FD	92
2	G8GTZ/P	IO81FD/91GI	2	183	91.50	1830	G8GKQ/P	IO80UV	92
3	G1LPS	IO94EQ	2	106	53.00	785	M0DTS/P	IO94MJ86	55
4	M0DTS/P	IO94DF/MJ	2	105	52.50	780	G1LPS	IO94EQ	54
5	G4LDR	IO91EC	1	52	52.00	520	G8GKQ/P	IO80UV	52

9cm

Nr	Call	QTH	QSOs	Kilometers	Aver. Km	Points	BestDX	Locator	Distance
1	G1LPS	IO94EQ	3	125	41.67	1155	M0DTS/P	IO94MJ86	55
2	M0DTS/P	IO94DF/MJ	2	105	52.50	1050	G1LPS	IO94EQ	54
3	G8GKQ/P	IO80UV/WP	2	183	91.50	915	G8GTZ/P	IO81FD	92
3	G8GTZ/P	IO81FD/GI	2	183	91.50	915	G8GKQ/P	IO80UV	92

6cm

Nr	Call	QTH	QSOs	Kilometers	Aver km	Points	BestDX	Locator	Distance
1	M0DTS/P	IO94DF/MJ	4	257	64.25	2570	M1EGI/P	IO93FL	109
2	G8GTZ/P	IO81FD	2	228	114.00	1820	G4FRE/P	IO81XW	136
3	G4FRE/P	IO81XW81	1	136	136.00	1360	G8GTZ/P	IO81FD	136
4	G1LPS	IO94EQ	3	117	39.00	1170	M0DTS/P	IO94MJ86	55
5	M1EGI	IO93FL61	1	110	110.00	1100	M0DTS/P	IO94MJ	110
6	G4FVP/P	IO94FO	2	54	27.00	540	M0DTS/P	IO94DF	43
7	G8GKQ/P	IO80UV	1	92	92.00	460	G8GTZ/P	IO81FD	92
8	M0YDH/P	IO82QJ85	2	14	7.00	140	M0HMO/P	IO82PI	9

3cm

Nr	Call	QTH	QSOs	Kilometers	Aver. Km	Points	BestDX	Locator	Distance
1	G8GTZ/P	IO81FD	2	126	63.00	1260	G8GKQ/P	IO80UV	92
2	G8GKQ/P	IO80UV	2	151	75.50	1215	G8GTZ/P	IO81FD	92
3	G1LPS	IO94EQ	2	105	52.50	785	M0DTS/P	IO94MJ86	55
3	M0DTS/P	IO94DF/MJ	2	105	52.50	785	G1LPS	IO94EQ	55

1.2cm

Nr	Call	QTH	QSOs	Kilometers	Aver. Km	Points	BestDX	Locator	Distance
1	G4FRE/P	IO81XW81	1	136	136.00	1360	G8GTZ/P	IO81FD	136
1	G8GTZ/P	IO81FD	1	136	136.00	1360	G4FRE/P	IO81XW	136
2	G4FVP/P	IO94FO	1	43	43.00	215	M0DTS/P	IO94DF	43
2	M0DTS/P	IO94DF	1	43	43.00	215	G4FVP/P	IO94FO	43

Grass Valley Mixer Conversions - Part 7

Written By Trevor Brown G8CJS

Pleased to report that since I switched from ESP BASIC to Annex BASIC, I have had no problems with the ESP 8266 module talking to my PC. It connects first time every time and has allowed me to get on with developing the code.

I now have all three banks PST, PGM and KEY responding. When you press the buttons the lights come on and latch. I know this sounds like a small step, but it was an even bigger problem than I first thought.

My original plan of soft latches stored as programme variables and updated with key presses and then their contents moved to the GVG hardware latches worked. The detector for deciding if a lamp is illuminated and then and only then to subtract the correct value that will turn it off, was a problem and I am indebted to someone known as "BUGS" who came up with a solution via the Annex forum.

Code for Storing a KEY Press in the soft latch and clearing the other key presses from that bank or group

```
if (q AND 64)   <>  0 then  let q = q-64   'if key 0 lit turn off
if (q AND 16)   <>  0 then  let q = q-16   'if key 1 lit turn off
if (q AND 4)    <>  0 then  let q = q -4   'if key 2 lit turn off
if (q AND 1)    <>  0 then  let q = q -1    'if key 3 lit turn off
if (o AND 2)    <>  0 then  let o = o -2   'if key 4 lit turn off
if (o AND 1)    <>  0 then  let o = o -1   'if key 5 lit turn off
if (o AND 8)    <>  0 then  let o = o -8   'if key 6 lit turn off
if (o AND 4)    <>  0 then  let o = o -4   'if key 7 lit turn off
if (t AND 8)    <>  0 then  let t = t- 8   'if key 8 lit turn off
if (t AND 32)   <>  0 then  let t = t- 32  'if key 9 lit turn off
if B=1 and  e=254 then  let q = q+64     'if key 0 pressed
turn on
if B=1 and  e=253 then  let q = q+16     'if key 1  pressed
turn on
if B=1 and  e=251 then  let q = q+4      'if key 2  pressed
turn on
if B=1 and  e=247 then  let q = q+1      'if key 3 pressed turn
on

gosub strobeq
gosub strobeo
gosub strobet
return
```

When working with any of the three banks you need to clear all the lights in that bank before you add the new selection. The data for each key button is not stored in the same latch, so this clear code routine needs to be in every one of the soft latch update routines that has KEY info. It could have been a subroutine and I may yet adopt that approach, but for the moment I am just trying to make it work and I have already had the Annex warning "too many nested subroutines" so I have repeated its code.

Each soft latch needs partitioning into separate sub routines for the bits with KEY info, the bits with PGM and again the bits with PST information. That is the only way to ensure that only KEY, PGM or PST latches only get cleared by that subroutine! It took a while for that penny to drop, but I now have my head around it.

At the end of each soft latch routine is a gosub routine called strobe and the latch letter, this calls another long-winded subroutine that updates the hard latch in the GVG panel via the I2C bus. It does produce a latch strobe, but it also moves the data. I have repeated the code for every latch, just changed the soft latch address containing the data and the address of the hard latch.

It might be possible to come up with a more compact algorithm that updates all the latches once a key has been pressed, but again, this routine works. Once the programme is running I can try refining the code if we are staying with BASIC.

Code for Strobe Routine

```
strobeq:  ' move the soft latch q into hard latch 03
i2c.begin PRT1          ' switch all maps off
i2c.write tristate
i2c.end
i2c.begin PRT4         ' load Q contents onto data bus
i2c.write Q
i2c.end
i2c.begin PRT3         ' Address hard latch
i2c.write 03
i2c.end
i2c.begin PRT1           ' Control port
i2c.write lamps          ' load hard latch with Q
i2c.end
i2c.begin PRT1           ' switch lamp map off
i2c.write tristate
i2c.end
return
```

For the GVG buttons that control the Yellow and Orange buttons, I have written directly to the GVG latch without going through the process of first writing to a soft latch and then updating from the soft latch or variable as it is called in programming. This produces code that is simple to follow and is only stored in the GVG hardware where it cannot be read.

This removes the need to clear the latch before you add a key press as all the information is stored in a single latch so that when we add a new key press it automatically removes the existing data. This restricts us to only one button being latched in any group of buttons.

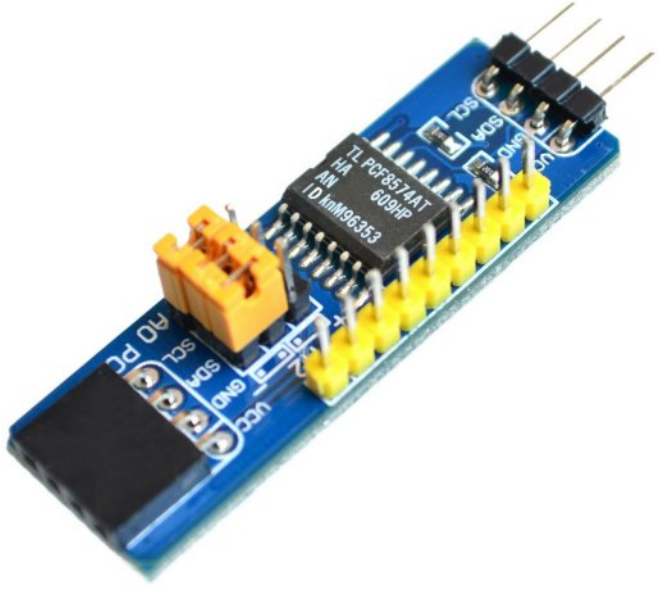
This may or may not be a problem as we add external hardware to the mixer and set the functions of the buttons, which may or may not be the function etched on the key. It would be wonderful to find a source of blank key-tops and to get them custom etched with more fitting functions E.G. turn 24cms TX on or video insert 1, but it's early days yet and having mastered the soft latch storage that enables more than one button to be illuminated in any group or bank, if required then we can change the software.

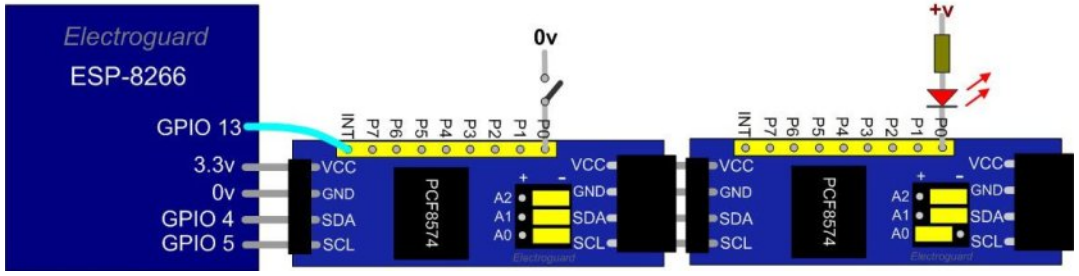
Code for writing to a GVG latch direct

```
'-----yellow buttons no memory cannot read latches--own
strobe within the routine------
tran:
if B=5 and e = 223 then let z = 2     'Transition wipe
if B=5 and e = 191 then let z = 8     ' Transition mix
if B=6 and e = 191 then let z = 1     ' Fade to Black
'if B=6 and e =254  then let Z =16      ' KEY1
'if B=6 and e =253 then  let z =32      ' KEY
'if B=6 and e =251 then  let z= 64     ' BKGD

   i2c.begin PRT1   'strobe routine to move data to GVG latch

   i2c.write tristate            'no command
   i2c.end
      i2c.begin PRT4          ' Data bus
      i2c.write z            ' Y address
      i2c.end
   i2c.begin PRT3          ' Address bus
   i2c.write 5            ' X address
   i2c.end
      i2c.begin PRT1            ' Control port
      i2c.write lamps             ' Scan lamps
      i2c.end
   i2c.begin PRT1            ' Control port
   i2c.write tristate             ' Scan buttons
   i2c.end
return
```

I have taken on board Ian's description of "Beginners Awfully Slow Idiot Code" and as I originally stated in the first edition of this series of articles, I am just using BASIC to explore the panel, but now we have Annex BASIC it's a big improvement on the BASIC of the 70's. It does not need to be fast as we are only responding to button presses and at the moment, for all the code I have written, it is not creaking! Push a button and the response is instant as for idiot code I think I belong to the KISS generation if it works. People can understand it and more importantly, customise it to their own requirements, then we are on to a winner.

The code is on the CQ-DATV site so you can download it and read it in notepad, or import it into Annex and develop it further. I have added lots of comments in order that you can follow it, refine it and customise it. The only problem you have is finding a panel and putting the interface hardware together. On this front, Mike G7GTN designed my PCB interface, but there are alternative modules around that will plug PC8574 mounted PCB's together for I2C operation, just ask Google.





Lots of general purpose PCF 8574 I2C modules around.
In the next issue I will be adding some I/O routines to this project so we can press the various the buttons and do something rather than just admiring the way the lamps light!

The complete BASIC software can be downloaded from *https://cq-datv.mobi/downloads.php*.

To save you looking back at previous issues, here is the key map

X Address →

Y Address ↑

PORT 4 single row word (decimal)	PORT 3 ADDRESS 0 latch LS0 soft copy n	PORT 3 ADDRESS 1 latch LS1 soft copy o	PORT 3 ADDRESS 2 latch LS2 soft copy p	PORT 3 ADDRESS 3 latch LS3 soft copy q	PORT 3 ADDRESS 4 latch LS4 soft copy r	PORT 3 ADDRESS 5 latch LS5 soft copy s	PORT 3 ADDRESS 6 latch LS6 soft copy t	PORT 3 ADDRESS 7 latch LS7 soft copy u
1	PGM 8	KEY 5	EFF KEY INV	KEY 3	PST 3	FTB	KEY	
2	PST 4	KEY 4	EFF KEY MASK	ASPECT ON	PGM 0	DSK INV	BKGD	DSK MAT
4	PGM 9	KEY 7	EFF EXT	KEY 2	PST 2	DSK MASK	AUTO TRANS	OUTLINE
8	PST5	KEY 6	EFF KEY BUS FILL	Nb key lamp power	PGM 1	DSK MIX	KEY 8	DSK EXT VIDEO
16	PST9	PGM 7	EFF MATT FILL	KEY 1	PST 1	DSK PVW	WIPE	SHADOW
32	PST6	PGM 4	PST PTN	NB PGM lamp power	PGM 2	?	KEY 9	DSK EXT SOURCE
64	PST 8	PGM 6	CHROMA KEY	KEY 0	PST 0	UPPER LIMIT	MIX	BORDERLINE
128	PST 7	PGM 5	EFF KEY	NB PST lamp power	PGM 3	LOWER LIMIT		DSK BUS SOURCE

The lamp map for the mixer

RSSI Field Strength Meter Re-Visited

Written by Peter Cossins VK3BFG and John Hudson G3RFL

An article in CQ-DATV 54 by John Hudson G3RFL caught my attention as I was looking for such a device to assist with antenna and other measurements I like to make occasionally. John described a Field Strength Meter using an AD 8318 Module.

As a first step I purchased an AD8318 module for about $18AU from ebay. This module has a bandwidth of 1MHz to 8GHz and is a logarithmic detector with a DC output voltage ranging from about 0.6V to 2.18V. The IC is designed as a controller for RF amplifiers with a dynamic range of 50dB.

Using my Rigol DFS815 Signal Generator as a calibrated RF source I conducted a series of measurements at 1255MHz logging DC output voltage Vs RF input power. I measured DC output values with inputs from from 0dBm to -80 dBm.

I found the response to be linear from -5dBm to about -60dBm but with a slightly different slope to the theoretical ideal and 'y intercept' not through the origin as it should be. (See Figure 1).

Later, looking at the Datasheet for the IC I find that the slope can be between 21.5 and 25.5 mV/dB

I produced a motherboard for a 3.5 inch TFT Display using G3RFL's design as a guide. The PCB is singled sided with top straps and can be made using backyard techniques as I did.

I then downloaded G3RFL's software file and using MPLAB software and a PICKIT 3 programmer burnt the dsPIC30F4012 which is the micro-controller used for the RSSI Meter.

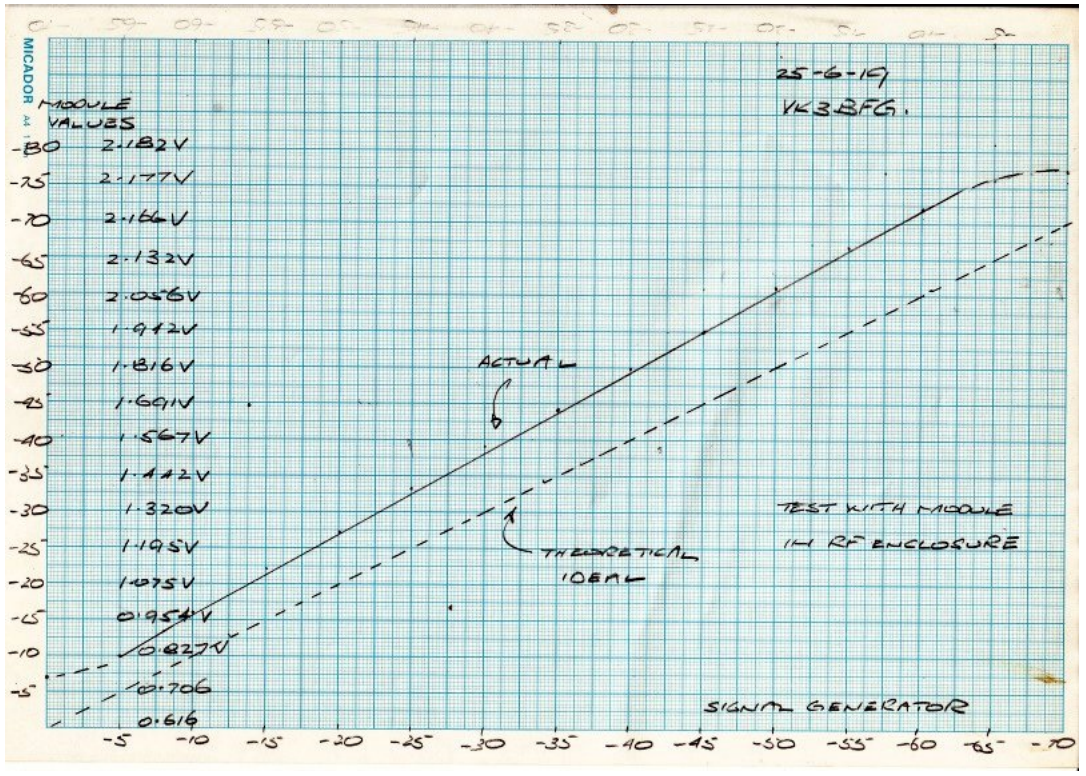
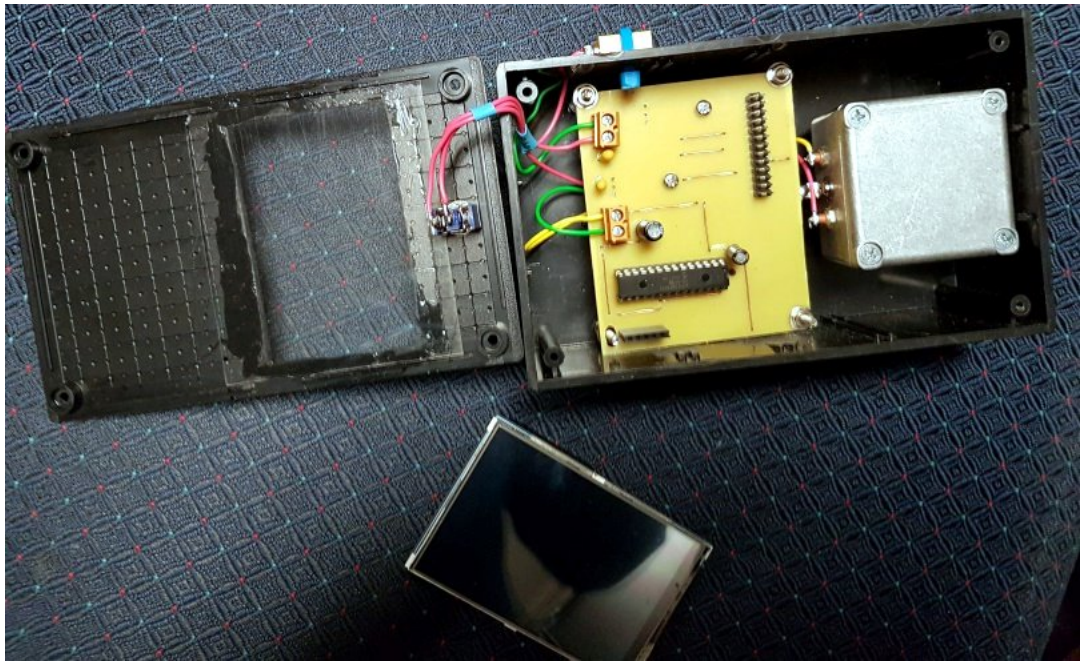


Figure 1

While the unit worked, the software did not produce an accurate enough result. Looking at the Datasheet specification in hindsight this was not be surprising . Through the Editor of CQ-DATV I was able to make email contact with John and I sent him my results. John was good enough to try a number of modifications to the software to see if a better result could be made.

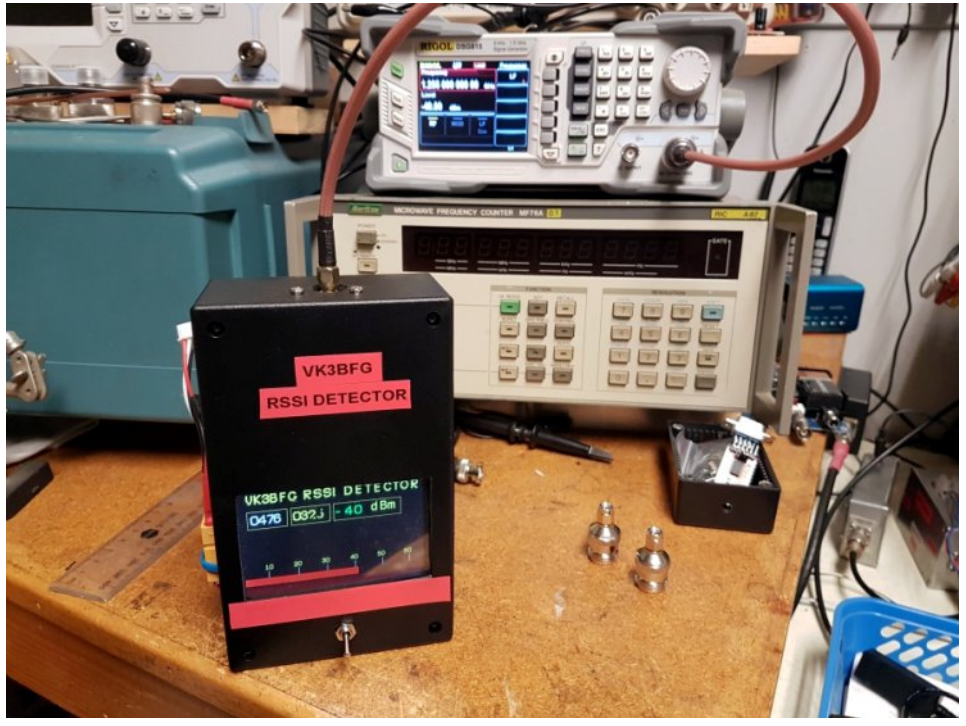
After a number of attempts John settled on using a look table approach. For this to occur I made measurements from 0dBm to -65dBm in 1 dB steps at a frequency of 1225MHz and sent the results to John.

John's efforts over a number of versions finally resulted in an error of +/- 0.5dB at 1225MHz and +/- 1dB at UHF and SHF to 1.5GHz.



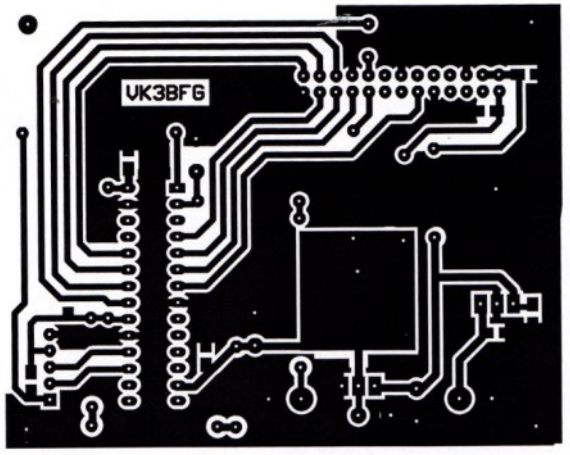
I found a small diecast box that will fit the AD8318 module well and provide an RF proof enclosure. Our local electronics stores of Jaycar and Altronics also sell a set of plastic boxes of various sizes. These are called 'Jiffy Boxes' . One on offer was 90 by 150 by 500 mm that would just fit the TFT display and also house the diecast box with the module inside.

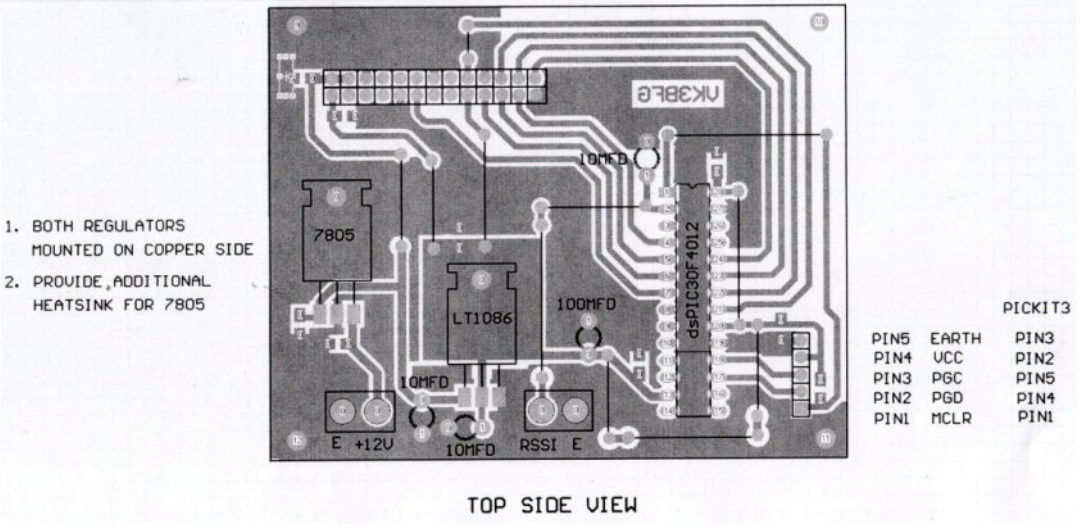
As the whole assembly draws about 300mA, I decided to heatsink the 5V regulator with additional metal sheet cut and bent to fit. I also drilled ventilation holes in the back of the Jiffy Box. I have an external connection to a small 800 mahr LIPO which sits on the back.



At VHF and lower, the error was +/-2dB. Although these errors are high, relative measurements can still be made.

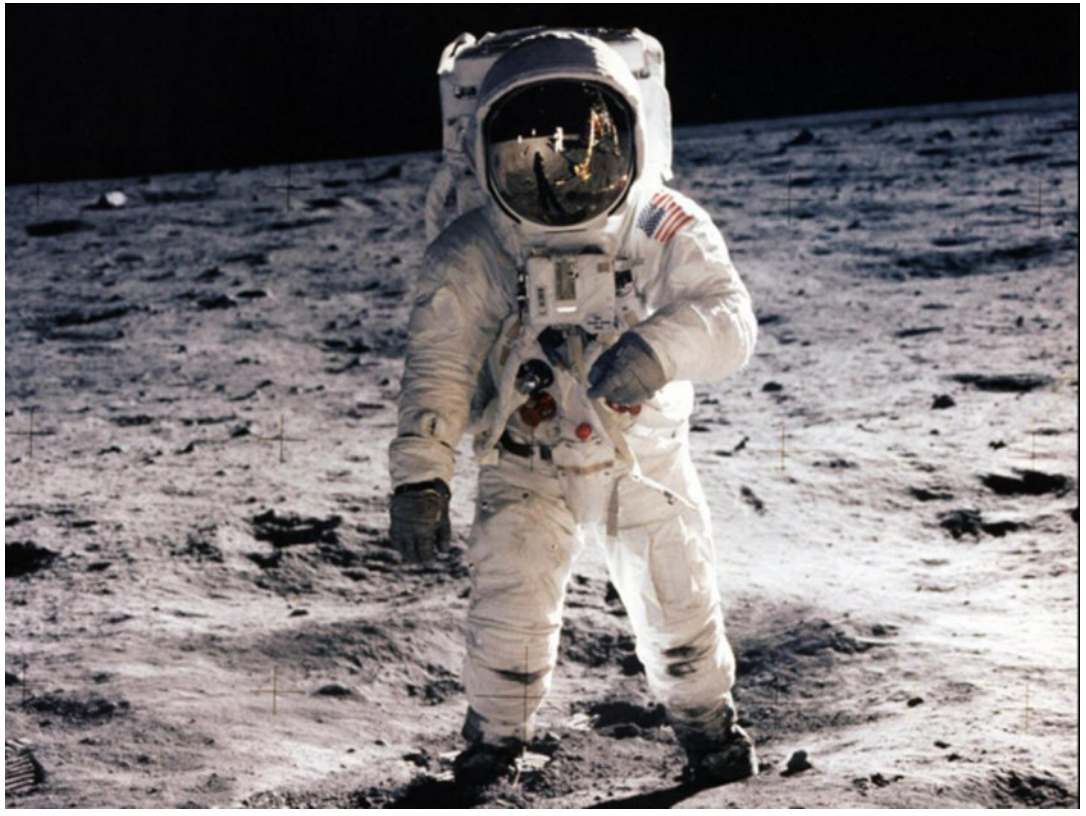
NOT TO SCALE





Apollo 11 - 50 years ago

Written by Trevor Brown (Photo attributes: NASA)



We have just passed the 50th anniversary of Apollo 11, the mission to put a man on the moon.

For those of you old enough to remember One giant step for mankind or the immortal words of "the Eagle has landed" yes it really was 50 years ago and if that makes you feel old you are not alone.

I know there are those who believe it all took place on a Hollywood set, but for those of us in the UK the talkback was monitored at Jodrell Bank where the world's third largest radio telescope monitored live the landing and they assure us all the dish was definitely pointing at the moon.

How does this link into a Television magazine? Well, they took with them a rather special TV camera to relay pictures back to earth.

This was developed by a team of engineers at Westinghouse lead by Stan Lebar, it was this camera that allowed us to see the Moon landings of the Apollo 11 mission in 1969. Stan sadly passed away in December 2009 he was 84.

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 500kHz.

Remember this was analogue TV, none of that digital nonsense. Stan's team had to engineer from scratch the camera which had to withstand Lunar temperatures of -184 C to 101 C.

This was rather a special camera, the tube was supplied by the 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 into a 525-line TV signal. The tracking stations converted the signals and transmitted them by microwave links, Intelsat communications satellites, and AT&T analogue land lines to Mission Control in Houston. By the time the images appeared on television, they were substantially degraded.

Stan Lebar, the project manager for Westinghouse's Apollo television cameras, shows the field-sequential color camera on the left and the monochrome lunar surface camera on the right.

By Unknown - National Aeronautics and Space Administration, Public Domain, https://commons.wikimedia.org/w/index.php?curid=29075691

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 RCA standards converters 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.

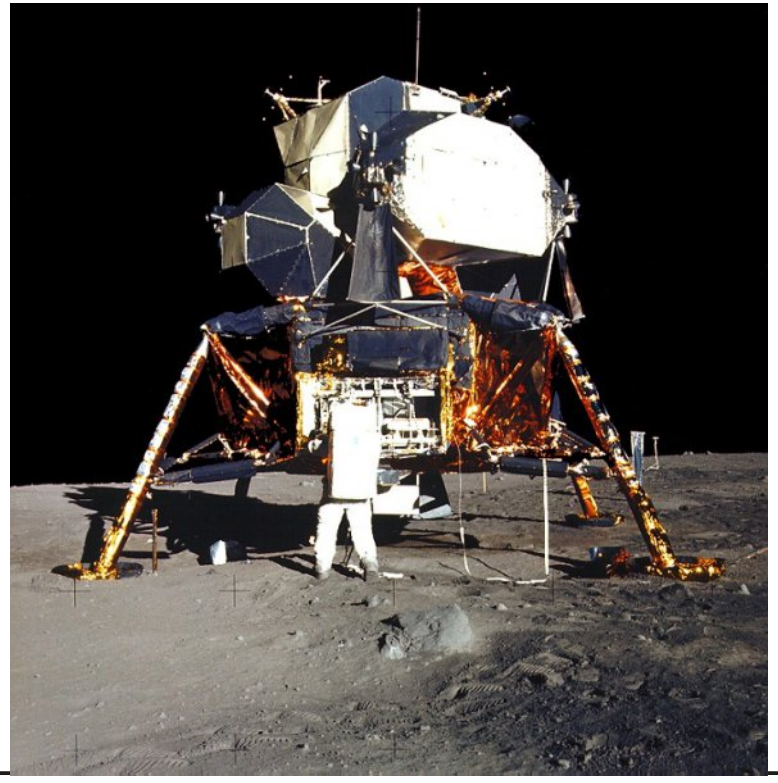
The original high quality was preserved via the M22 telemetry recordings. The engineers boxed the one-inch telemetry tapes wound onto 14-inch canister reels which served no other purpose than to provide backup if the live relay failed and shipped them to the Goddard Space Flight Centre. From there, the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

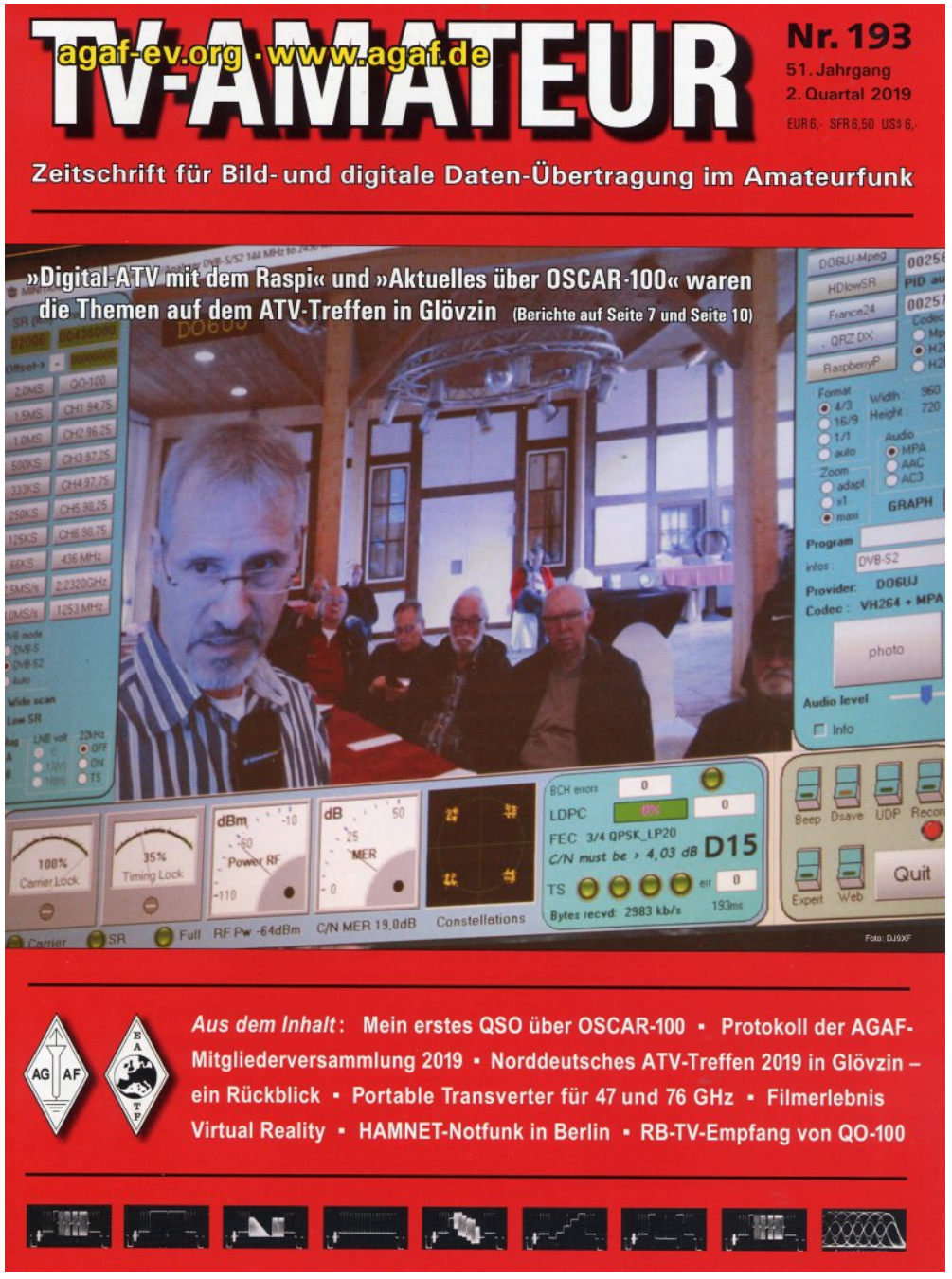
In 1997 a phone call from a British author, to Sarkissian who had been part of the Parkes team raised the issue of the location of the M22 tapes. Only one had ever surfaced in Australia which was a copy of one of the tapes sent to Goddard. Everyone assumed that NASA had the originals stored away safely. 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 recording no longer exist and were presumed wiped.

In 2004 a machine was located and the Australian tape was replayed and 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 also turned out to be blank.

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 backup 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.





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://agaf-ev.org/*

Boulder TV Repeater Rebuild Update

Written by Jim Andrews, KH6HTV

In a previous edition of CQ-DATV, I reported on the discovery of a new HDMI Quad Viewer / Switch which also included an RS-232 interface. With this discovery, Don & I realized that we could probably solve a lot of the major input/mode switching issues we have with the old ATV/DTV repeater. That repeater was needlessly complex due to needing to have elaborate work around for the old HDMI switch.

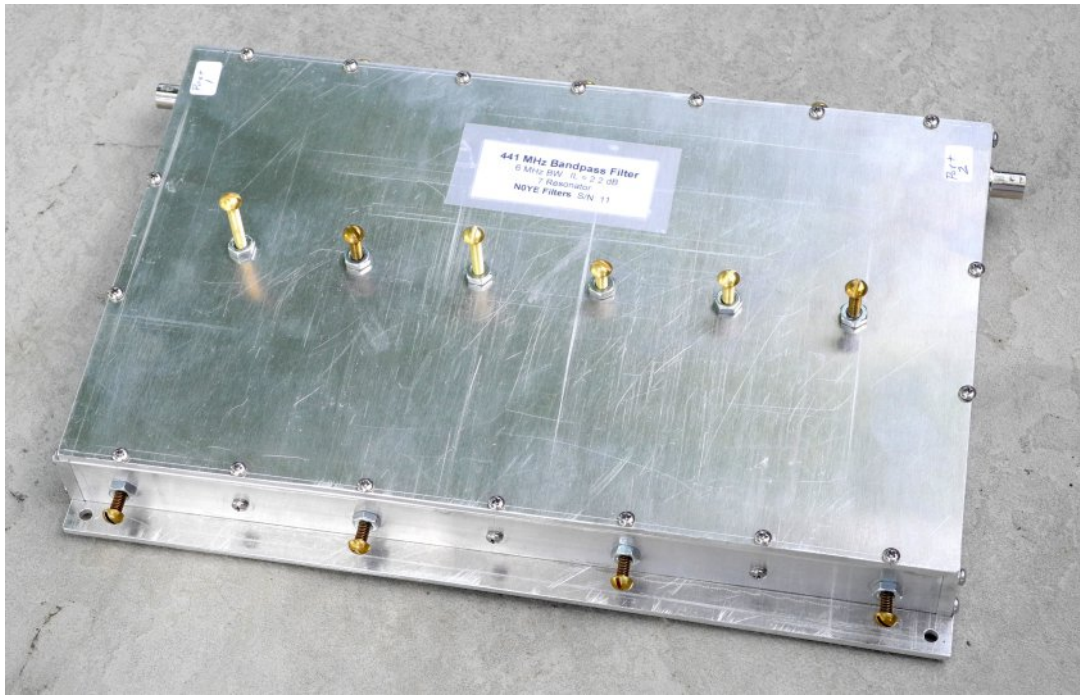
In the meantime, Don, N0YE, has mastered how to write Arduino code to control, via RS-232, the new HDMI Quad box. Thus, Don has now removed the old TV repeater from the repeater site on Table Mesa and it is now in "bits & pieces" scattered all over the floor and workbench in my ham shack.

It is now being completely rebuilt to incorporate the new HDMI Quad Box. In the meantime, Don installed at the repeater site, a temporary, portable ATV repeater. It was built several years ago by Jack, K0HEH, and Don. It is an in-band, 70cm only ATV repeater. Ch 60 input & Ch 57 output.

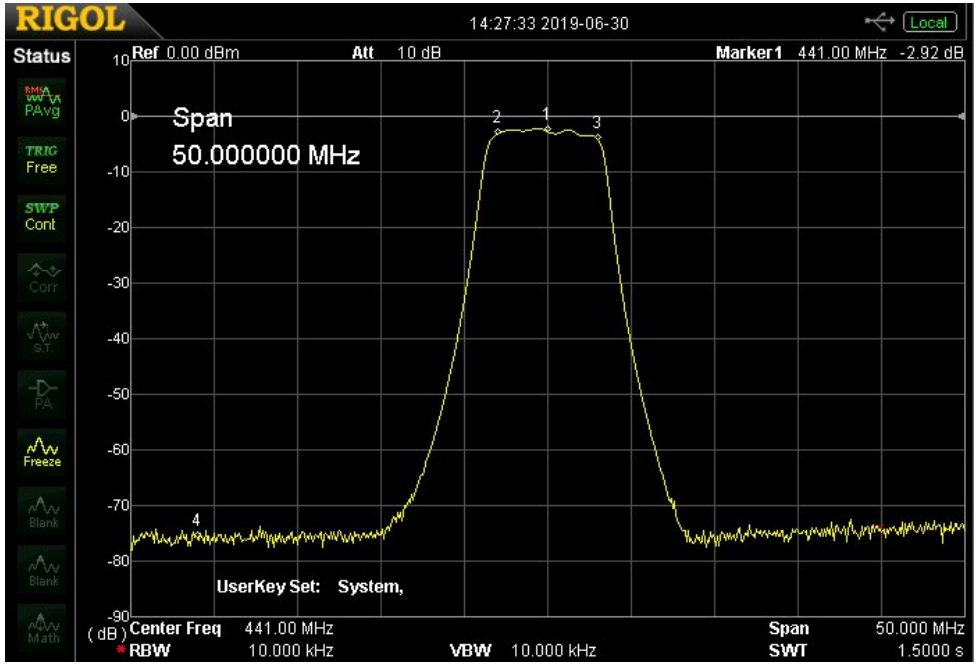
It only functions in DVB-T mode. The transmitter output is about 1 watt. There are no control functions on it. It simply keys up when receiving a valid DVB-T signal and turns off rapidly when the signal disappears. There is no way to tone it down.

So far, I have rebuilt the repeater's receiver panel and the transmitter panel. Photos of the rebuilt receiver and transmitter are on the following pages.

I removed the old Spectrum International, inter-digital, bandpass filters (Ch 57 & Ch 60).



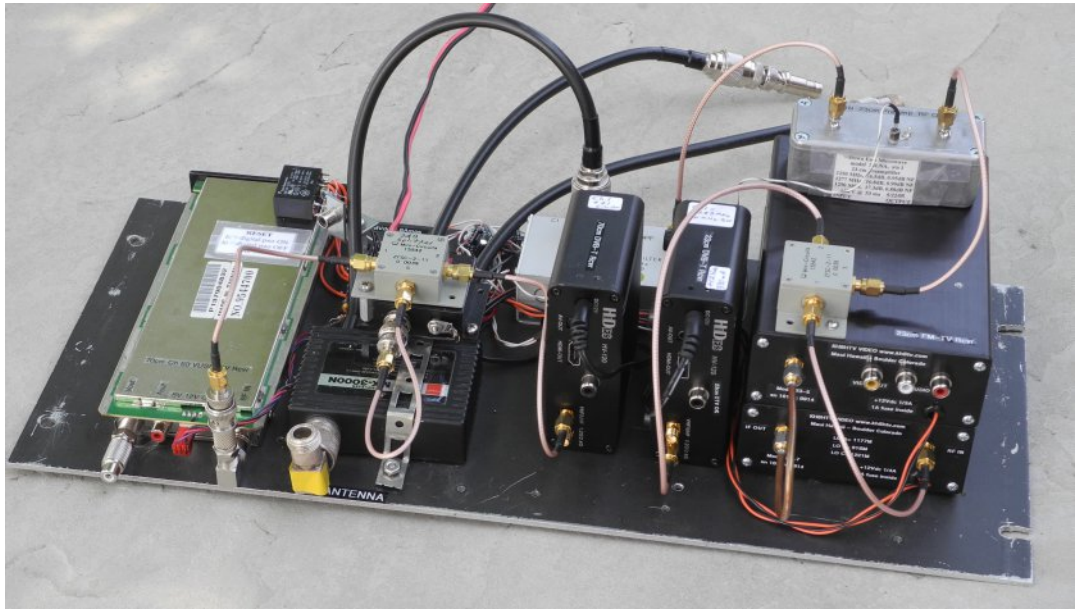
Don's NEW, 7 pole, 441MHz, BPF



10dB/div & 5MHz/div -76dB noise floor

I replaced the 70cm, Ch 60 receive filter with a new, home brew, 7 pole, BPF built by Don. It has much steeper skirts on it. Particularly important for filtering out the severe 70cm RFI we have been encountering from strong ham FM repeaters in the 446-450 range and commercial FM signals in the 450-460MHz range.

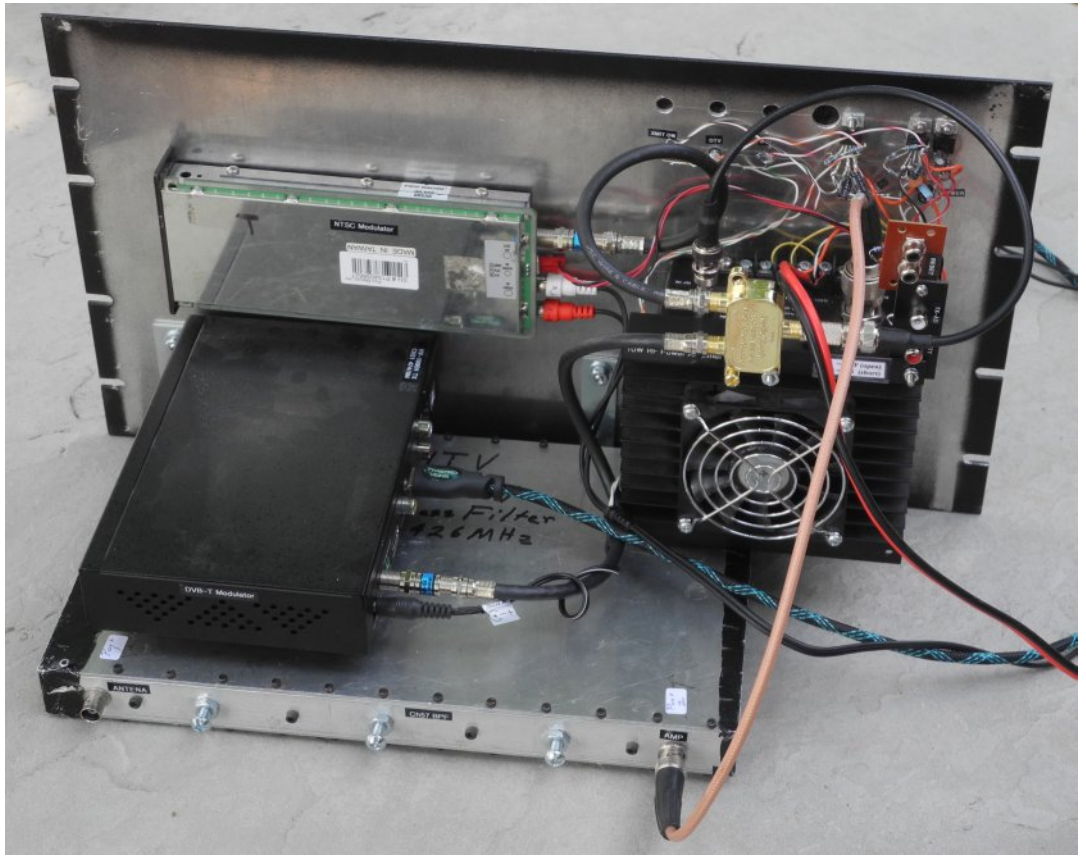
Don's new filter has 40dB rejection at 446MHz and up to 130dB rejection at 460MHz. The new filter is considerably larger than the old SI-BPF. There was not room for it on the existing 19" rack panel. It will be mounted on a separate 19" shelf.



ATV/DTV Receiver

The receiver is dual band and dual mode. It has one common antenna input which goes to a Diamond triplexer which splits the receive signals into 2m (control), 70cm (TV) & 23cm (TV). There is a BPF following for each band.

For 70cm & 23cm, there next is a low noise pre-amp which is followed by a 3dB power splitter. The outputs from the power splitters feed Hi-Des 70cm & 23cm DVB-T receivers and also analog TV receivers. For 70cm, we use a commercial Pico-Macom CATV, NTSC receiver. For 23cm, we use a KH6HTV Video FM-TV receiver.



ATV/DTV Transmitter

The transmitter is 70cm only on channel 57 (420-426MHz). However, it is dual mode. It can transmit either analog or digital TV. The analog TV signal is created by a Pico-Macom CATV modulator. It creates perfect VUSB-TV with nothing outside of the 6 MHz TV channel. The digital, DVB-T signal is created by a Hi-Des, DVB-T modulator. Likewise it is a very pure signal with essentially nothing outside of the TV channel Both modulators feed a 75Ω, 3dB splitter used in the reverse direction as a combiner.

The selection of either analog or digital is done simply by applying DC power to only the desired modulator. 75Ω pads are on the output of each modulator to provide Z back matching when a modulator is turned off. The output of the 3dB combiner then goes to a KH6HTV Video model 70-9B, RF Linear Power Amplifier.

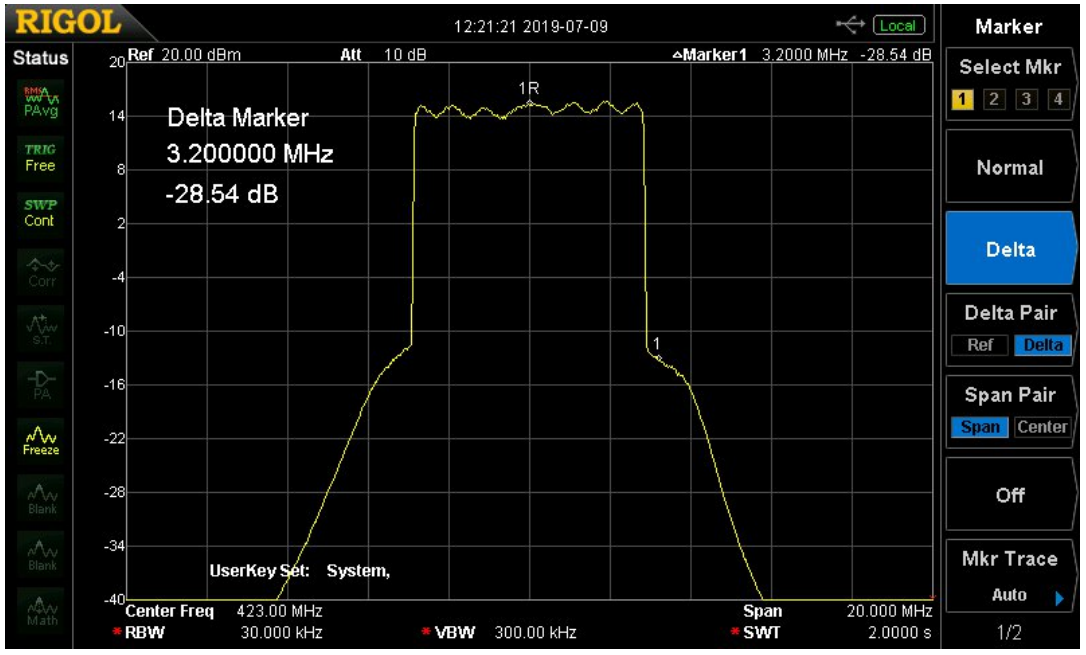
In analog TV mode, the amplifier puts out 22 Watts (PEP). In digital TV mode, the amplifier puts out 10 Watts (rms). The output of the amplifier is then routed to a Ch 57, 6 MHz, bandpass filter which has about 2 dB of insertion loss.

Since the early 90s, the TV repeater has used a pair of inter digital, bandpass filters made by Spectrum International. Like the receiver, I also removed the SI, Ch 57 filter from the transmitter this time. I have replaced it with actually a much older, but better filter.

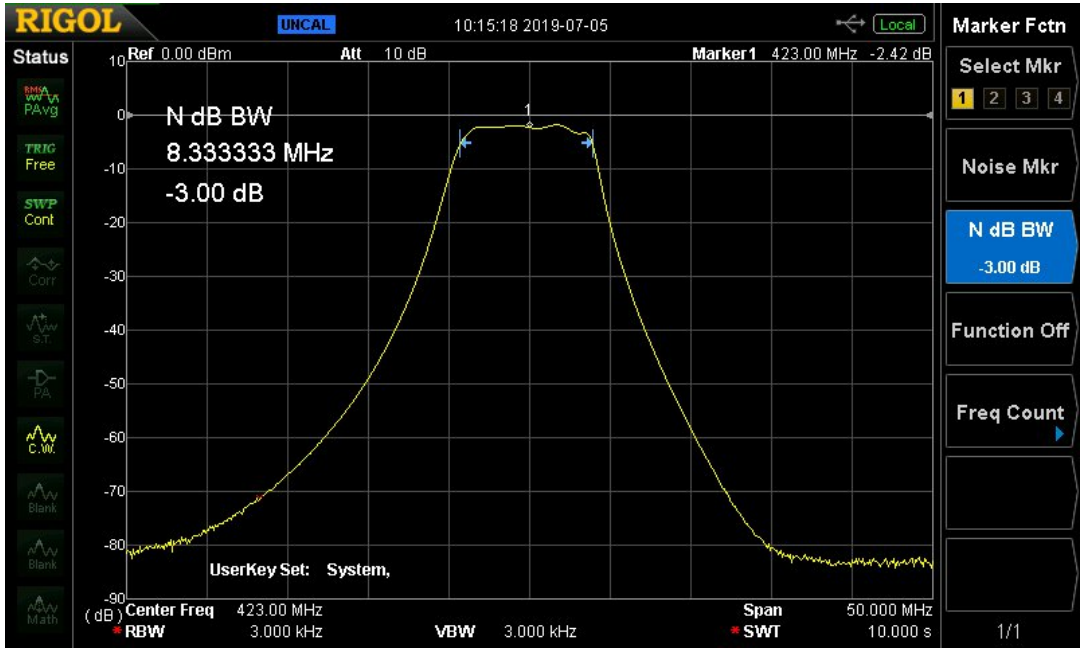
The filter I installed was made by John Shafer, W0KWR, (now SK) in the late 70s. John built it for the very first Boulder ATV repeater. It was a 7 pole design.

I have just retuned it on my Wiltron 5447A Network Analyzer (10MHz - 20GHz). Tuning a filter is easier on the Wiltron compared to the Rigol spectrum analyzer because I can view simultaneously both S21 (insertion loss) and S11 (return loss). This 7 pole, Ch 57 filter does not have as steep skirts compared to Don's new Ch 60 filter. However, it still gives 31dB (429), 75dB (435) and 117dB (441) rejection for the upper adjacent TV channels.

The two Spectrum International, TV Channel Bandpass Filters which I pulled from the repeater, I intend to resell. I will be listing them on my web site for sale at $200 each.



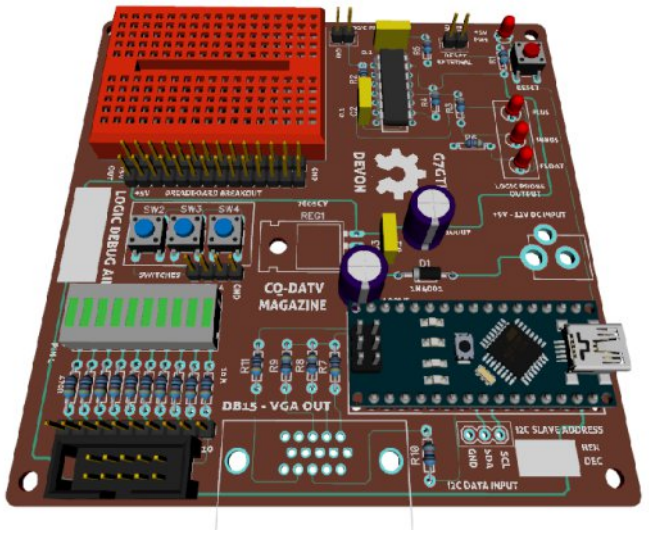
DVB-T spectrum 6dB/div & 2MHz/div



W0KWR, 7 pole, 423MHz, BPF 10dB/div & 5MHz/div

Micro Corner - Easy Debugging Board - 1

Written by Mike Stevens G7GTN



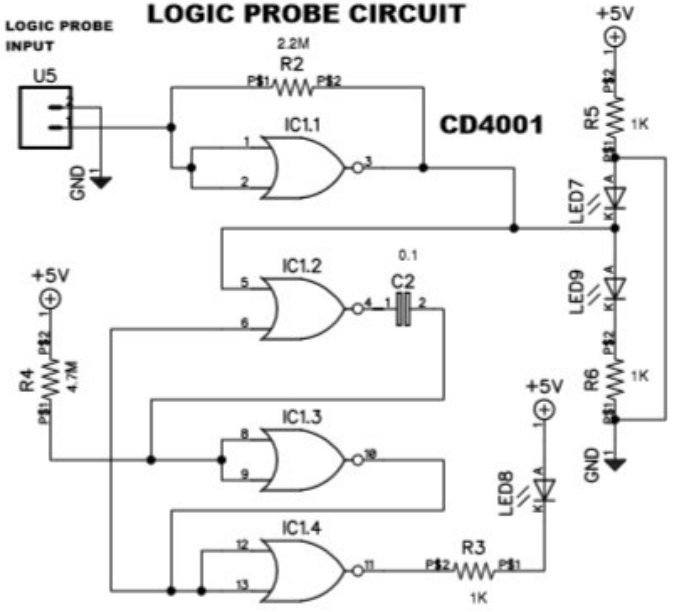
This project came about when myself and Trevor G8CJS were discussing setting up some LEDs on a breadboard for testing some logic conditions that were being tested & debugged. So I came up with this design to incorporate a few useful elements on to a (100X100) mm sized custom PCB where use can be made of small header cables to connect elements you might require when prototyping or testing your own custom designs.

Board Elements

- *10 position LED Bargraph segment display with current limiting resistors.*
- *3 X User tactile push button switches (no pull-up resistors fitted)*
- *Custom Ardunio Nano software based I2C VGA display generator*
- *Basic CMOS CD4001 Logic Probe*
- *Mini Breadboard with 170 tie points*
- *7805CV +5V Basic Power Supply*
- *Diptrace Design and Gerber Files will be freely available for Download*

Logic Probe

The circuit is based on a CMOS CD4001 (or equivalent part number) four 2 input NOR gate. This is a commonly available circuit available from the internet from locations such as *http://www.tonyvanroon.com/oldwebsite/circ/probe2.htm*. With this circuit we can detect a HIGH, LOW or a FLOATING condition on devices via a simple probe mounted in an old pen casing.

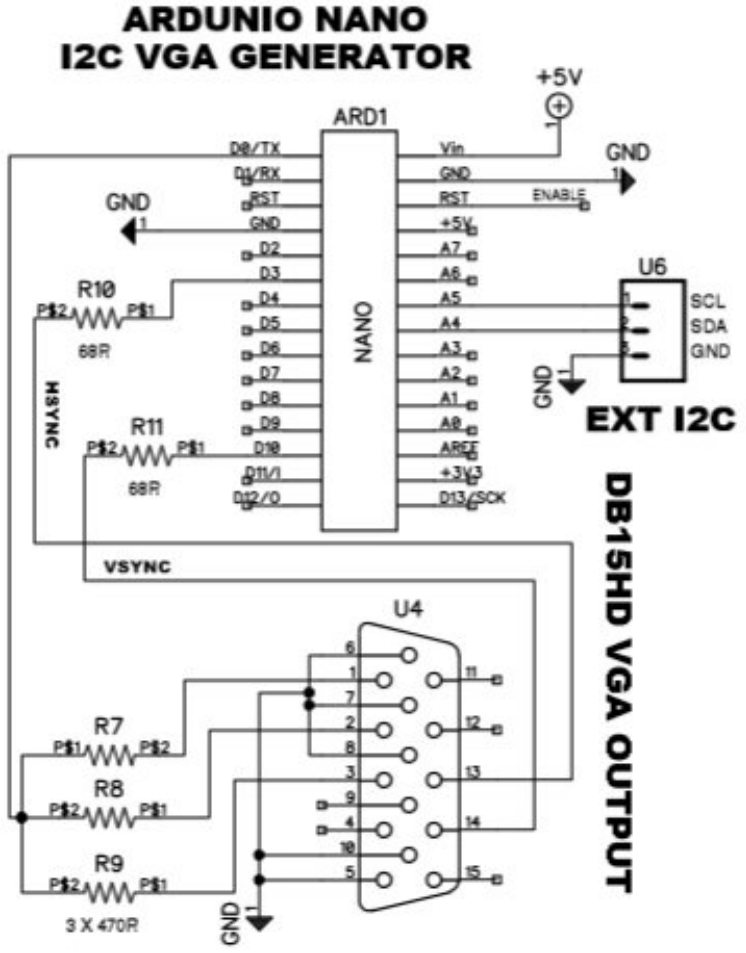


Ardunio Nano I2C VGA Generator

The VGA generator was a project created by Nick Gammon and fully documented on his own website, you can find this from the following link *https://www.gammon.com.au/forum/?id=11608*. That should keep you entertained for a few hours digesting all the technical details on software video generation. The board I created makes use of an Ardunio Nano module. The data to be displayed is sent via I2C which is configured as a slave device with a user selectable address if required.

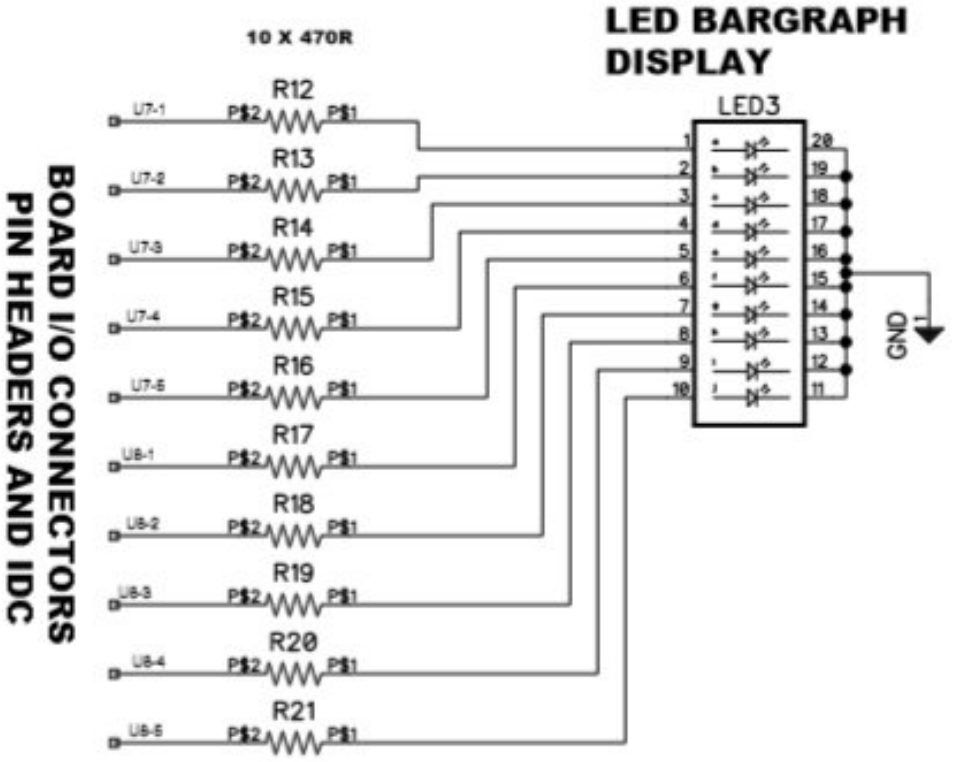
The RED, GREEN, BLUE signals are fed via 470Ω resistors. The Horizontal and Vertical Sync drive signals are via 68Ω resistors. No additional pull-up resistors are required on the I2C bus as would normally be expected for driving. Once the module is programmed we have no further reliance on the USB cable as this circuit is powered from the +5V supply on the PCB.

In part 2 we will look at setting up a required library for our Ardunio IDE and a small change to the font definition file to allow this to be compiled. I will also create a single binary file for people who may not want to delve in to setting up this element and are happy with the pre-set slave address.



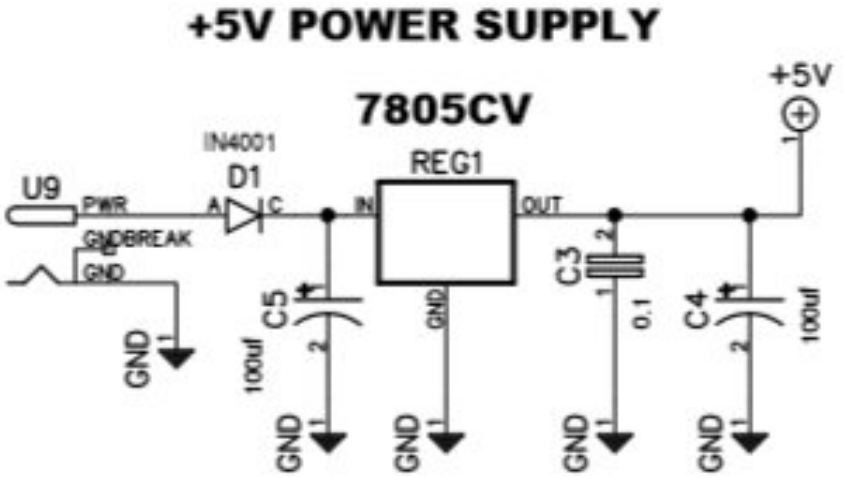
LED Bargraph

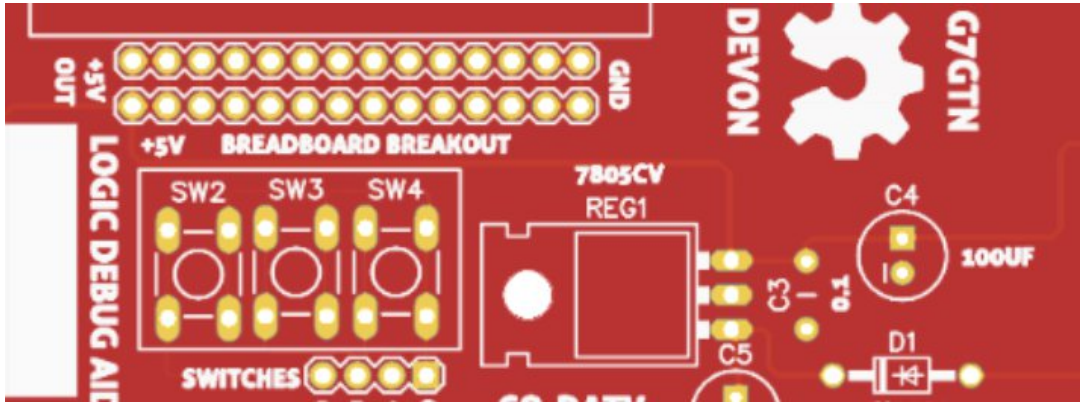
The 10 way LED Bargraph is feed from either a 10 way Male pin header or via an IDC connector to allow the use of pre-made ribbon cables. Each individual pin goes through a 470Ω resistor to provide current limiting. You can adjust this resistor value for the brightness level you require. The LED Bargraph displays selected are in a standard 20 pin DIL package with a designated part number of HF-810BS.

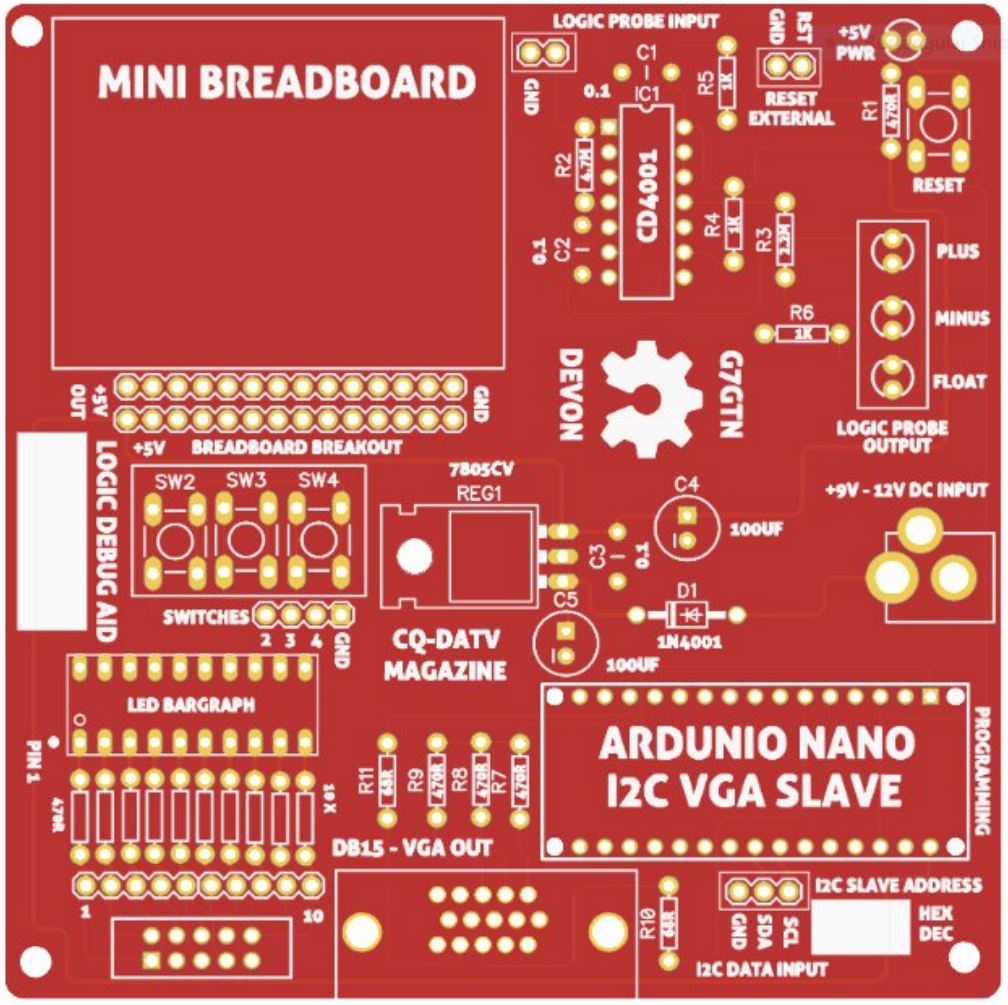


Power Supply

The power supply section is based on a T0220 packaged 7805CV regulator with filter capacitors and a reverse polarity silicon diode. The +5V and also Ground output can be taken from the pin headers next to the mini breadboard to power other elements.







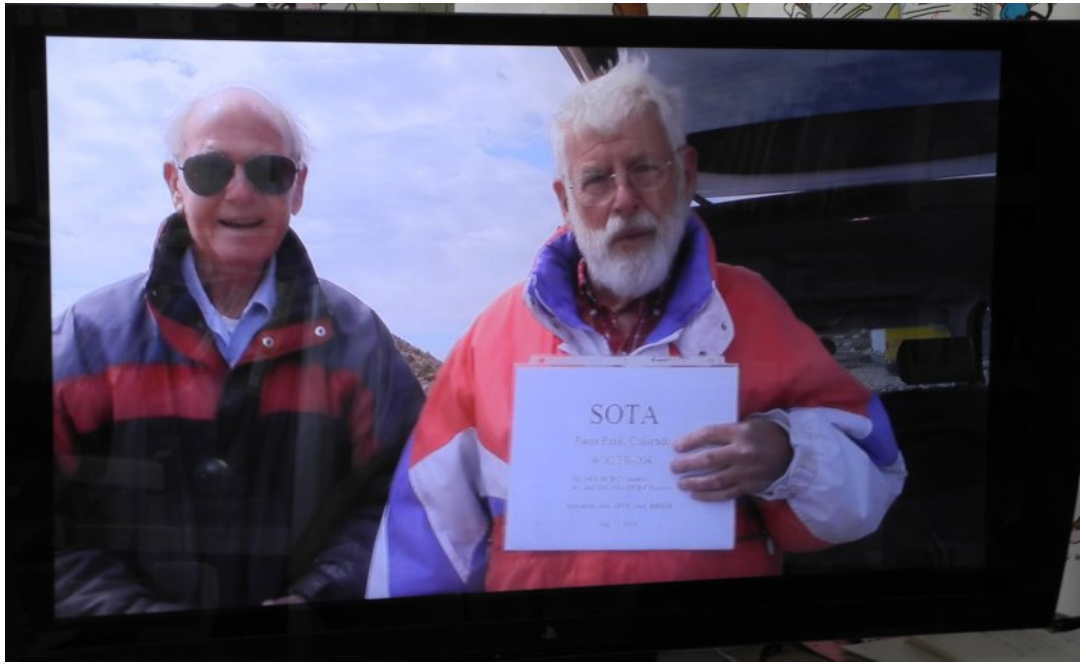
Conclusion

In this first part we have covered the very basic circuits involved, so in part 2 we will have boards and get a pair constructed. Once this is done we can go through the possibly much more interesting aspects such as the VGA generator circuit and how to drive this via software on your own processor. Once the board has been fully proven all the design files created in Diptrace will be freely downloadable alongside any custom software samples. Hopefully this might prove to be a useful board to put away in a drawer.

This is your free ATV magazine.
Please consider contributing an article!

Pike's Peak, SOTA, DVB-T, DX-pedition is Successful

Written by Jim Andrews, KH6HTV

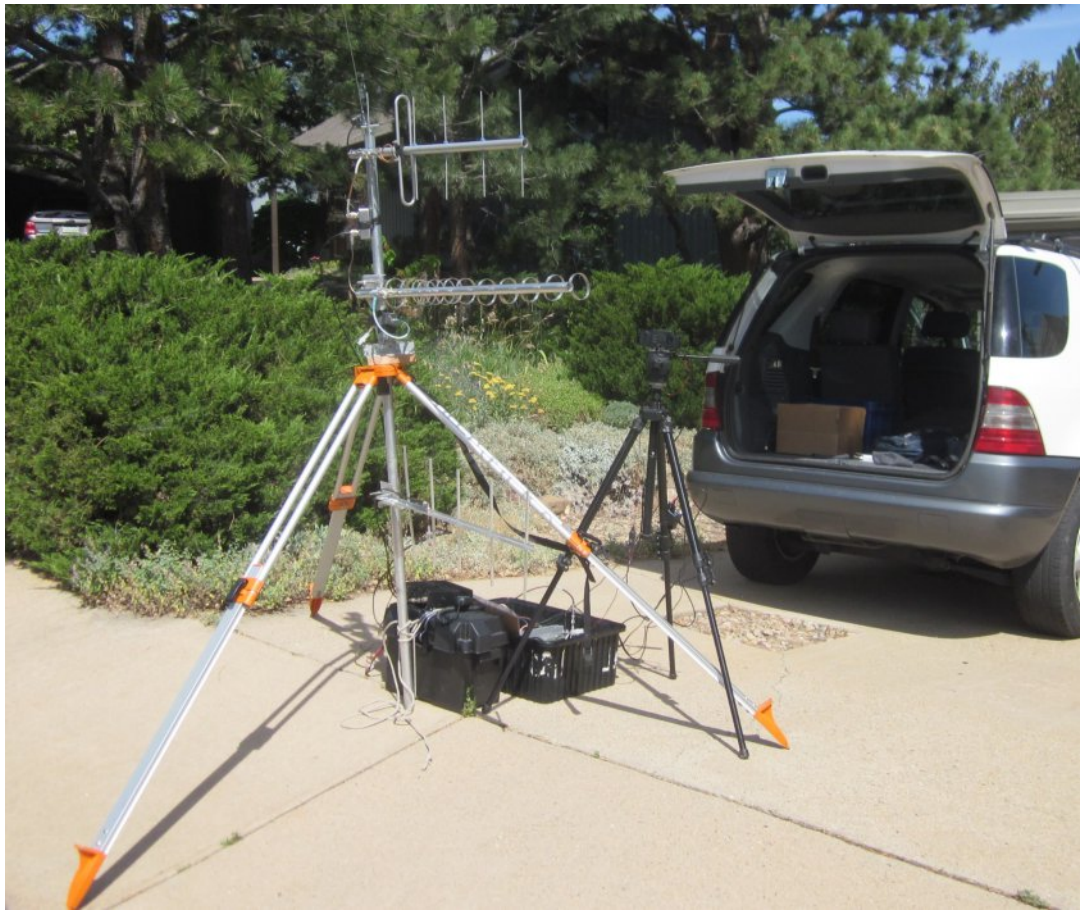


Jack, K0HEH, & Don, N0YE, on top of Pike's Peak –TV picture received 79 miles away by Roger, K0IHX. Lew, K0ANS, got the same at 91 miles!

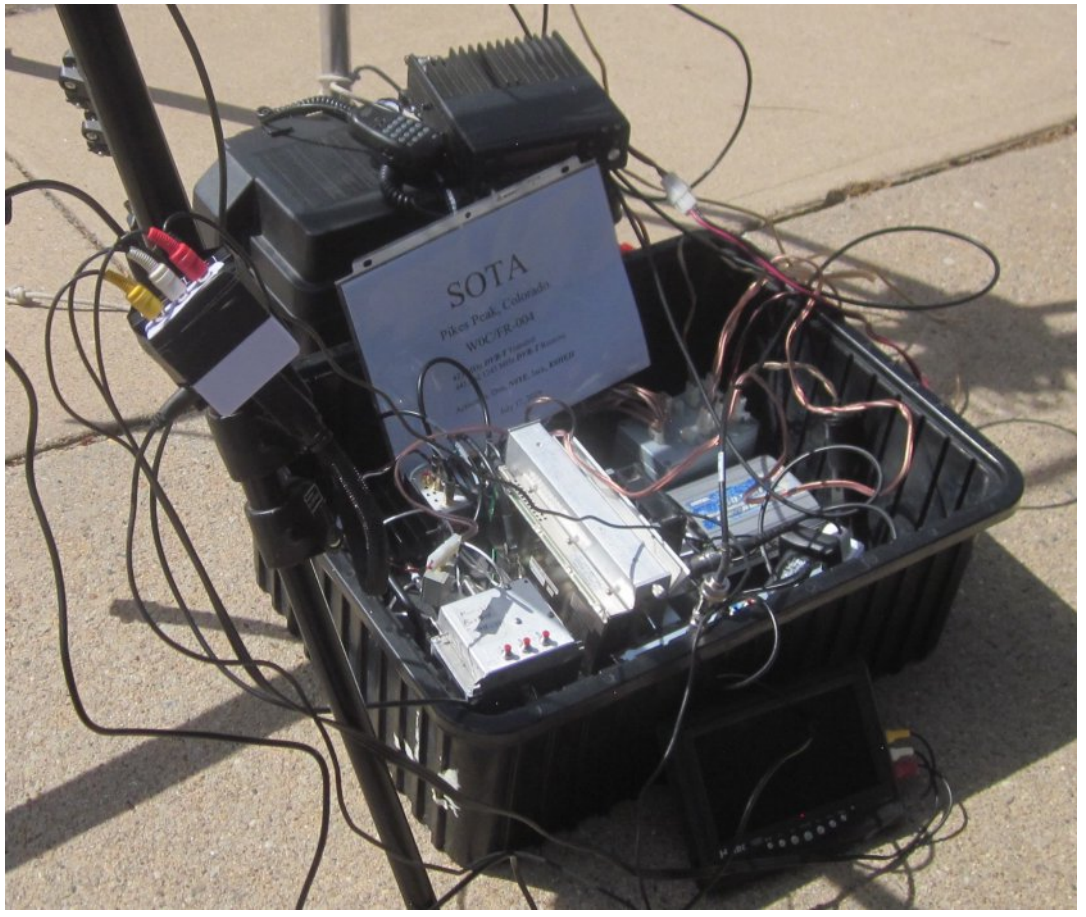
Don, N0YE, recently announced on the Boulder ATV Net that he was planning to do a SOTA (Summits On The Air), *https://www.sota.org.uk/* ATV operation from Pike's Peak. Pike's Peak is the highest mountain in the southern part of the front range of the Rocky mountains. It is 14,115 ft. high and towers over the city of Colorado Springs at 6,000 ft. It can be seen visually from extremely long distances from many locations in the eastern, prairie part of the state of Colorado. There is a road going all the way to the summit which is very popular with tourists in the summer. Closed in the winter.

View from the summit of Pike's Peak looking north towards Boulder, 80+ miles in the distance Photo of live DTV transmission taken from TV receiver at K0IHX / KD0PDZ's QTH on Davidson Mesa, Boulder

Don and Jack, K0HEH, drove to the summit of Pike's Peak on Wednesday morning, July 17th. They adhered to the SOTA rules and did not use their car for either physical or electrical support for their TV operation. It was however their "mule" to hump all their ATV gear up the very tall mountain ! Their equipment was all set up outside the car and they used a separate, large storage battery provided by Colin, WA2YUN. They set up one, rugged, tripod antenna mast with three yagi antennas. For 70cm, they had two, 6 element yagis (1 transmit & 1 receive). For 23cm, they had a 15 element, loop yagi for receive only. They transmitted, live, high-definition, pictures using digital, DVBT modulation. Their output power on 70cm was 5 watts, rms.



The SOTA-DTV setup. Don forgot to take a photo while on the mountain. So he took this photo the next day in his home driveway



Close-up of all the ATV gear plus battery

They transmitted on Ch 57 (423MHz / 6MHz BW) and received on Ch 60 (441MHz / 6MHz BW). They received incoming DVB-T on 441MHz (70cm) and also 1243 MHz (23cm). They did voice coordination with the various other ATV stations participating using 2m FM on simplex 144.33MHz.

Don had prearranged with several of the active Boulder ATV hams to be rovers and go to good rf locations and set up their own portable, DVB-T stations.

The following hams participated:

Pete, WB2DVS, & Debbie, WB2DVT, were the closest at 47 miles and were setup in Highlands Ranch, CO. with a 70cm rig running 3 W to a 6 element yagi antenna. From the photo, it looks like they were "sitting down on the job! "

Bill, AB0MY, was next at 74 miles at the Broomfield jail. He was on 70cm with 1 watt to a 6 element yagi.
Doshia, KB0NAS, & George, N0RUX, were also 74 miles from Pike's Peak at the high spot on 120th Ave. west of Indiana, Arvada, CO.

They had a 70cm rig running 3 watts to a 10 element M2 yagi antenna at 8 ft.

Roger, K0IHX, Naomi, KD0PDZ, & Jim, KH6HTV were 79 miles from Pike's Peak operating from Roger & Naomi's QTH on Davidson Mesa with their assortment of 2m, 70cm & 23cm antennas. They transmitted on both 70cm & 23cm with 3 watts. It only took 300mW on 70cm to get to Pike's Peak. For 70cm receive they used a Diamond X50 omni. For 70cm transmit they used a 10 element yagi. For 23cm transmit they used a Diamond X6000, omni.

Ed, K0JOY, was in the most unlikely location to get signals. He was at his own QTH on a ridgeline in the foothills north-west of Boulder, near Olde Stage Road & Left Hand Creek. He was 89 miles north of Pike's Peak. Ed received on 70cm and transmitted on 23cm (3W).

His 70cm antenna was an 8-bay Dipole array with flat reflector. His 23cm antenna was a home-brew, 6 element yagi.

Lew, K0ANS, was the farthest away at 91.4 miles and operating from his home QTH in Longmont, CO. Lew was 70cm receive only. His antenna was a home-brew, 8 element yagi.

The SOTA, DTV DX-pedition was a TOTAL Success ! Everyone participating was able to receive the 70cm, DTV signals from Pike's Peak, plus Don & Jack were able to receive DTV signals on 70cm and 23cm from everyone that transmitted. All pictures were reported to be very solid P5 with no breakups nor freeze framing.

In addition to doing simplex ATV with the above hams, at the end of the session, Don & Jack then swapped 70cm frequencies to see if they could also hit the Boulder ATV repeater, W0BTV, on Table Mesa. (Ch 60 in & Ch 57 out). They were successful. Note: contacts via repeaters do not count for SOTA scores.

The following is Don, N0YE's, after action report:-

THANK YOU all for the successful activation of Pike's Peak using DVB-T TV. Jack and I were able to work everyone wanting to participate on 70cm and 23cm. All signals were P5. You all were ready and made our task of getting all of the exchanges done efficiently. Several of you demonstrated different signal strength thresholds for working/not working by lowering your power levels below our receiver's thresholds. This reinforced that we were not doing a "slam dunk" undertaking. Our antenna pointing on 70cm was not critical. We were far enough away from everyone and the antenna beam width wide enough so that your diversity of location was not an issue on 70cm.

We did not have to adjust the 70cm antenna to work everyone. The antenna pointing on 23cm was important, understandably, because the 23cm antenna was higher gain and the signal strengths may have been less. Plus the strong winds keep us busy keeping it pointed properly.
Being at 14,000 feet diminishes ones proficiency, clarity of action, etc. I demonstrated that again to myself yesterday. Fortunately I had done much of the setup ahead of time. For example, the antenna system including preamps and cabling was done at home minimizing the setup details and time. When we moved to 23cm, we were not getting any video. Well when the output of the 23cm receiver is not connected, it does not work!

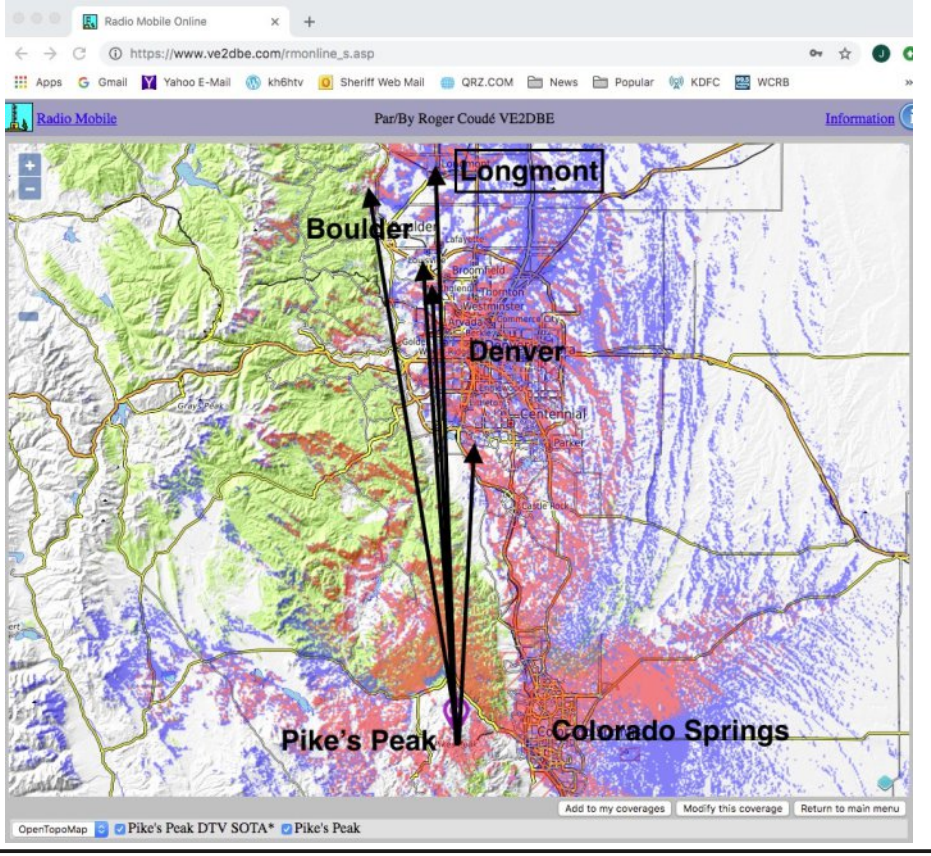
We needed a special pass to get the top. Everyone else was stopped at a parking lot part way up the mountain. In fact there were two parking lots at two different elevations depending on activity. Yes it is summer and there were lots of people. The drive up and down was slow because of the volume of cars. On the top we were able to choose our parking location for good operation to the north. Had we wanted to work pointing in other directions, the construction equipment and materials would have been in the way. It is clear that the construction up there is going to be a multi year activity.

The weather was about as good as it gets up there. Yes it was 42 degrees when we arrived, and the wind was a reasonable 10-15 MPH maybe. Where we were given the summit pass, the attendant said the winds were mild and no ROCKS were being made airborne yet ! A "ranger" commented, up there, that the afternoon winds would be much worse. It was a relief to be able to setup and do a legitimate SOTA instead of having to work out of the car. 73 de Don, N0YE

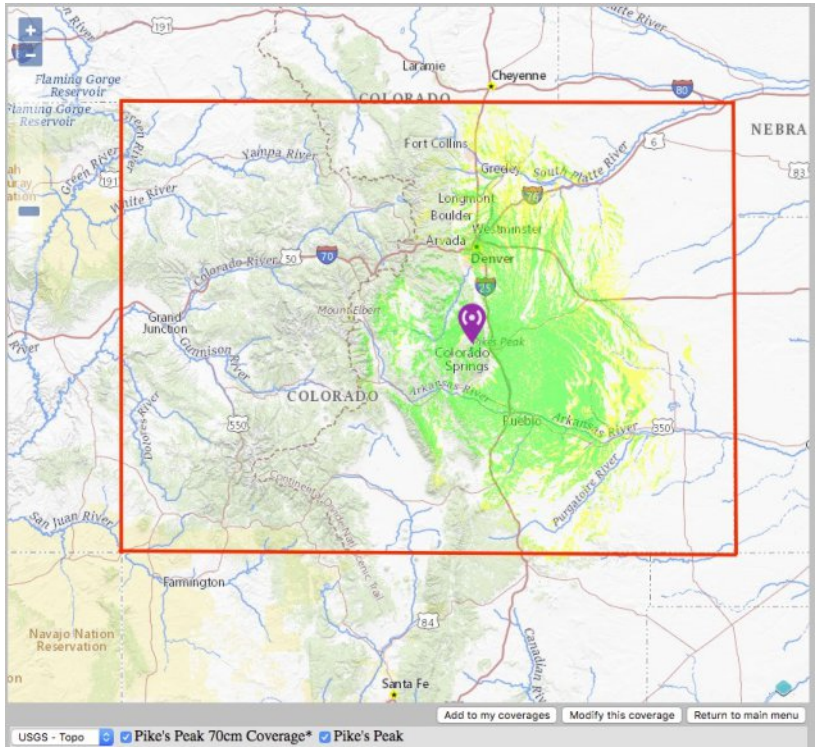
The map on the following page shows a lot of details about the DTV, DXpedition. The arrows show the paths to the various receive sites.

The color shading is the predicted rf signal strength using the on-line, rf propagation program, Radio Mobile. Red = strong signals. Blue = weak signals.

So, these great results, beg the question, what could we do if the hams in Colorado Springs were to install a 70cm, DVB-T, television repeater on the top of Pike's Peak? The next map shows the coverage area that would result from a 5 watt, 70cm, DVB-T transmitter with a 7dBi, omni directional antenna at the summit. It would be great ! The strong signal (>-80dBm) area would include Pueblo on the south, to Colorado Springs, to Denver, up to Longmont on the north. The weak signal area would extend all the way from the New Mexico border on the south to the Wyoming border on the north. It would also extend out east on the prairie as far as Limon.



Radio Mobile RF propagation predicted coverage area for the N0YE/K0HEH Pike's Peak DTV operation. Using a 70cm, 5 W transmitter with a 6 element yagi pointing north towards Boulder. The receiving stations were assumed to have 6 element yagis at 10ft. The blue shaded areas are for weak signals (-90 to -80dBm). The red shaded areas are for strong signals (> -80dBm). The green areas show the locations of national forests. This is a topo enhanced map. The flat, rolling prairie of eastern Colorado is on the right side of the map. The Rocky mountains of Colorado are on the left side of the map. The rf signals from Pike's Peak were shooting due north right along the front range of the Rockies.



Predicted rf coverage area map for a 70cm, 5 W, DVB-T transmitter on the top of Pike's Peak using a 7dBi omni antenna. Assumed receiving stations are using an 11dBi yagi at 30ft. Red lines are the borders of the state of Colorado, 380 miles x 280 miles. note: max. radius for the calculation was the largest possible at 300km (186 miles).

UK only VHF Contest - June 2019

Here are the results of the UK only VHF Contest held simultaneously with the IARU (70cm and up) ATV Contest held in June 2019.

For the first time there is a single contact entry for 4m from G4FKK. Congratulations to Martin for taking first place and I look forward to getting more 4m entries in the low bands contest coming up soon.

On 2m, Noel G8GTZ just secured first place with a dual site entry of five contacts from Colin G4KLB with just 2 points less.

It's good to see several contacts that exceeded 100km on this band with the best DX being 192km between GI7UGV and G3ZGZ.

Congratulations to Martin and Noel.

Clive G3GJA

4m

Nr	Call	QTH	QSOs	Kilometers	Aver. km	Points	BestDX	Locator	Distance
1	G4FKK	IO91WI	1	12	12.00	24	G4XAT	JO01AI	12

2m

Nr	Call	QTH	QSOs	Kilometers	Aver. Km	Points	BestDX	Locator	Distance
1	G8GTZ/P	IO81FD/91GI	5	387	77.40	556	G4KLB/P	IO80UU	93
2	G4KLB	IO80UU24VN	3	277	92.33	554	G4BVK	IO81RX	126
3	G8GKQ/P	IO80WP	5	279	55.80	430	G8GTZ/P	IO81FD	92
4	G4BVK	IO81RK88	2	147	73.50	294	G8GTZ/P	IO81FD	79
5	GI7UGV	IO74DN38SN	2	202	101.00	212	G3ZGZ	IO83LU	192
6	M0YDH/P	IO82QJ85	1	126	126.00	126	G0MJW	IO91IO42	126
7	GI3VAF	IO74EP56CB	1	10	10.00	20	GI7UGV/P	IO74DN38SN	10

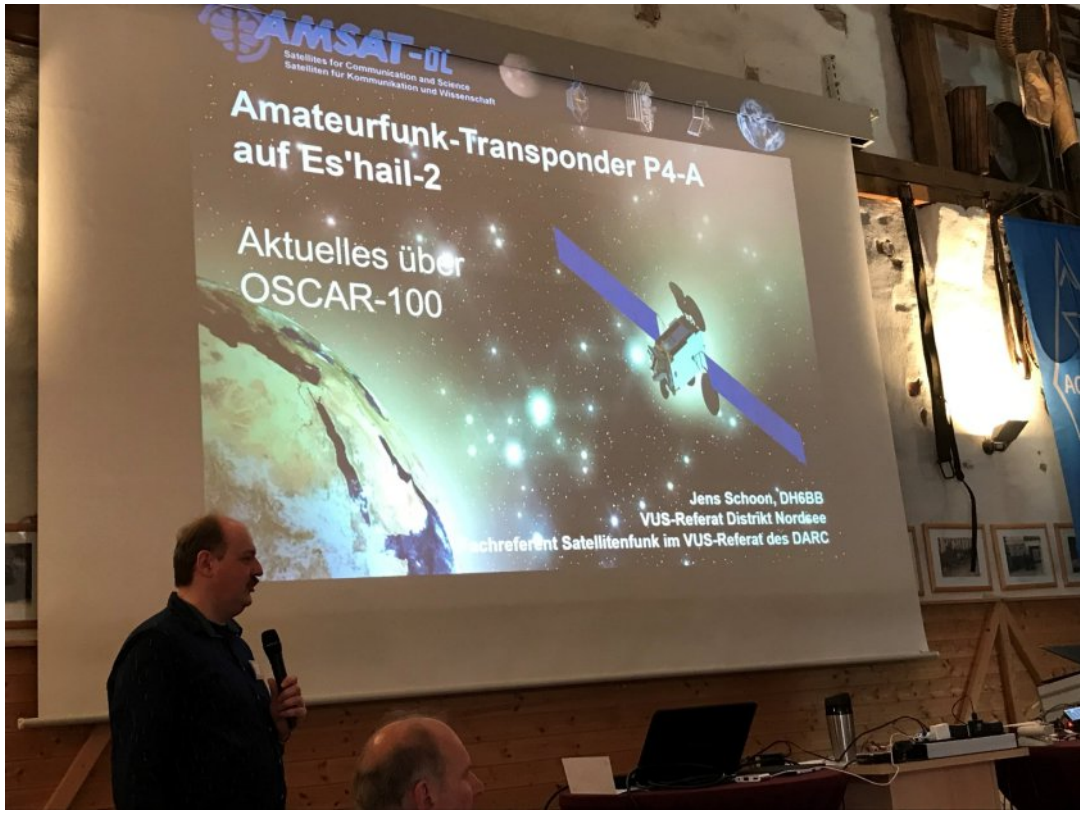
The CQ-DATV editors gratefully acknowledge all those authors that have contributed articles for this free magazine.

North German ATV Meeting 2019 - A Review

Written by Rainer Mueller, DM2CMB
Reprinted from TV-AMATEUR 163 by kind permission

From the first meeting of 24 ATV amateurs in 1999 in Polz (Brandenburg, Eastern Germany), a well-attended ATV meeting has developed over the past 20 years, which took place this year for the 12th time in Glövzin (Brandenburg). "Dahses Erbhof" once again offered us excellent conditions and very good catering. Several OM had brought their technology with them and set up the antennas outside.

For the reception of the satellite QO-100 in the 3 cm band a commercial satellite dish with a converted LNB can be used.

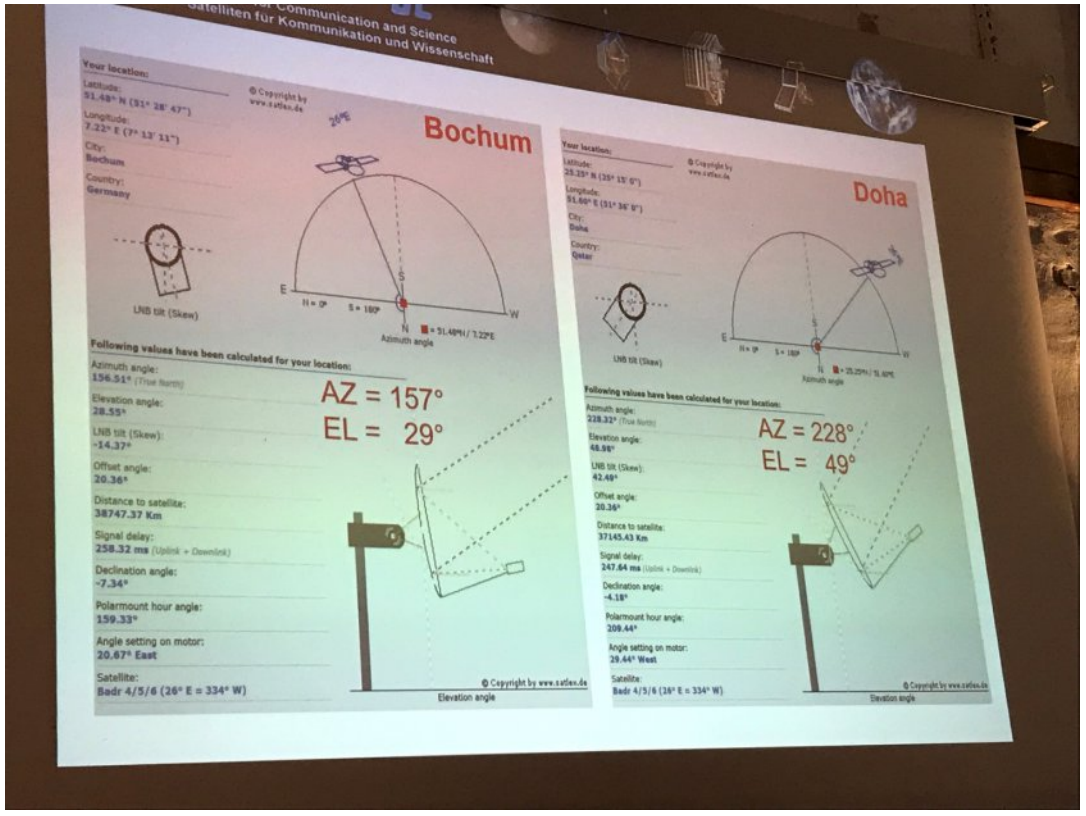


A clockwise circularly polarized directional antenna for the 13 cm band is required for transmission.

Also in this year interesting lectures were again on the agenda. One focus was the new, geostationary amateur radio satellite Es´hail-2/QO-100.

Jens Schoon, DH6BB (now also 2nd chair of AGAF), first reported on the origin and development of the AMSAT-DL project Es´hail-2/QO-100, the first geostationary satellite for amateur radio.

The satellite transmits horizontally in the 3 cm band. Due to the earth's curvature, the LNB must therefore be rotated slightly. In Bochum, for example, the "LNB tilt" is -14.37 degrees.



It was also important to note that we are only guests on the TV satellite with our amateur radio transponders and have to behave accordingly. Switching off the transponders in case of misuse or overriding due to too high transmission power would be very quick, the re-commissioning might be difficult.

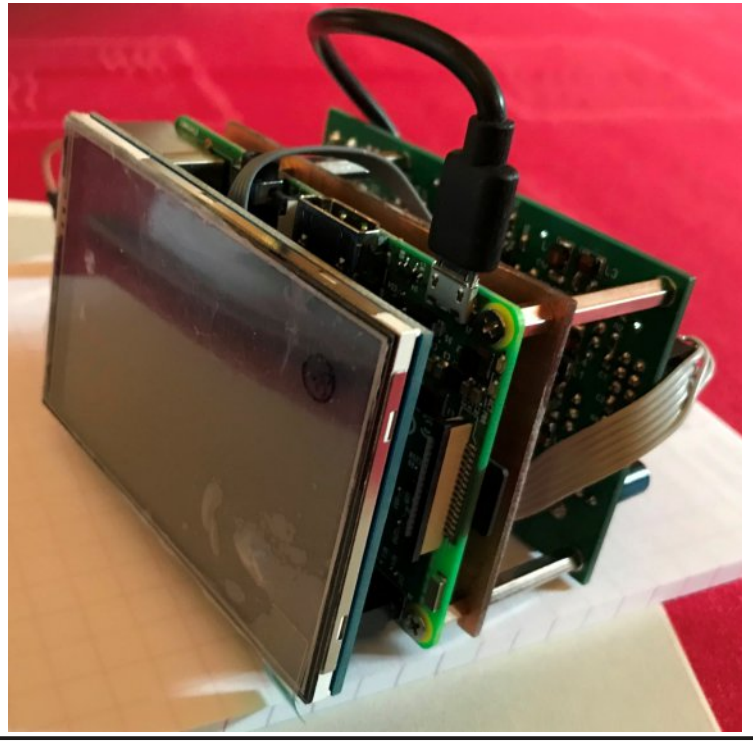
Raspberry Pi

Hubertus Rathke, DC1OP, showed us in his lecture different possibilities to generate the DATV signal with the Raspberry Pi. Using a block diagram, he explained the individual function blocks of the "Portsdown" software [2] for generating a DATV transmission signal and showed further examples of possible TX modules for generating the DATV signal.

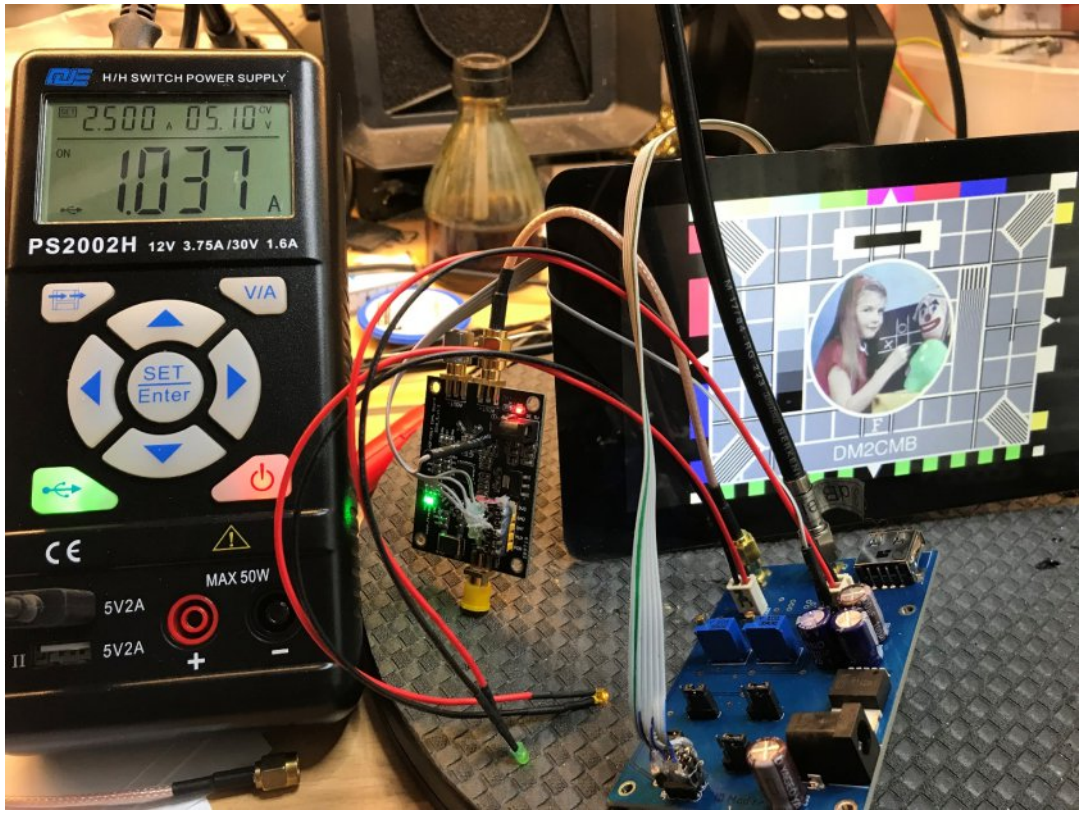
In TV-AMATEUR 99 (1995) Uwe, DJ8DW, reported about his first DATV experiments. The processing of the I/Q baseband was done with a PC at that time. With the Raspberry Pi 3 Model B+, we now have an inexpensive, powerful small computer at our disposal. British radio amateurs have taken up the principle again [2].

With the Raspberry Pi, the video and audio signals are processed and a baseband is generated from it, so that the I/Q signals are provided via the GPIO connections. The finished SHF transmission signal can be taken from a filter board with modulator connected there. In addition, you need an oscillator module, available on the Internet for approx 16 € and a small touch screen monitor for operation - ready is the DATV transmitter.

In FUNKAMATEUR (FA) issue 1/2019 DC1OP described such a modulator module, the "Mini IQmod" [1] and presented it in detail in his lecture.



Finished DATV transmitter board with Mini-IQmod, Raspberry Pi and 3.5" monitor from DC1OP



Test setup of a DATV transmitter with the Raspberry Pi, the Mini-IQmod board from [1]

After this release I built and tested two "Mini-IQmod" boards. The boards were relatively easy to assemble and adjust, both played right away. However, I used a 7" display for the operation, at the age of 74 you prefer it a bit bigger (picture 5). The measured transmission power was about 3 mW. As receiver I use a commercially available Sat-TV-Rx.

The disadvantage of this simple solution is that only the two filters for limiting the I/Q signals are available. An even simpler solution is to use the "LimeSDR Mini" module, a ready-made SDR transceiver connected to the Raspberry Pi via USB. The LimeSDR Mini offers much more possibilities with its digital filters, but also costs "a few" Euro more.

SDR Transceiver ADALM-PLUTO

"ADALM-PLUTO" (above) is also a finished board with an SDR transceiver that can be used for DATV communications.

In the following lecture Dieter Meier, DL2VT, Udo Jestadt, DO6UJ, and Hubertus Rathke, DC1OP, showed us in a practical demonstration the operation of three computer-aided DATV transmitters (Raspberry Pi, PC) on three different hardware platforms. It was impressive that even with a symbol rate of 500 kS/s a very good picture was transmitted from the connected video camera.

Literature:

[1] Rathke, H., DClOP: Mini IQmod self build modulator for digital ATV with Raspberry Pi. FUNKAMATEUR 68 (2019 Issue 1), P.60-63

[2] *https://wiki.batc.org.uk/Portsdown_2019*

[3] *https://limemicro.com/products/boards/limesdr-mini/*

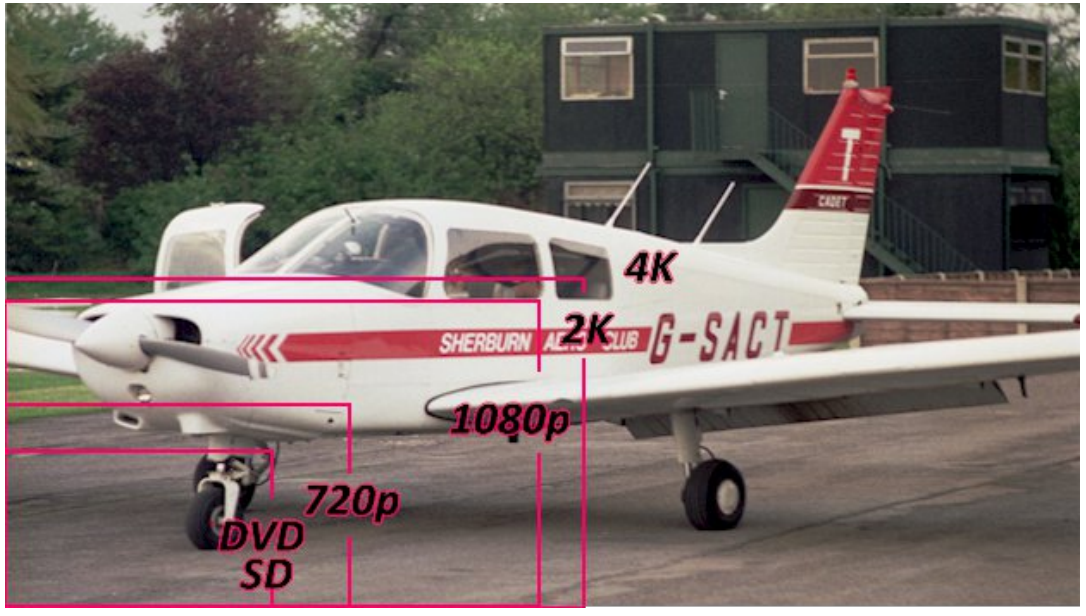
Translation by Klaus, DL4KCK *www.agaf.de*

First published in issue 6

4k DATV?

Written by Trevor Brown

Ok so a new Television standard has been launched called 4K, let's start by clearing up any confusion; the 4k refers to the horizontal resolution in pixels. 1080p and 720p refers to the lines or vertical resolution (I know you knew that already). I hope the diagram below puts it into perspective; I have plotted pixels as picture size when in reality the screen size is the same and the resolution improves. I hope what comes across is that a 4k picture is twice the resolution of 1080p which at best is 1,920 pixels across.



Ok well out of amateur price ranges I hear you say, well actually maybe not, there are camcorders and screens available and yes the screens are not cheap but you can always argue the screen comes out of the family viewing budget (no I have not tried the argument yet, just rehearsing it here). How about a camera for the shack that's a different budget in our house, part of the ongoing"if anything happens to me please don't let my ATV kit go for what you think I paid for it" argument. The shack budget is subject to slightly different accounting practises, the universal laws of mathematics are different, as in what does 2+2 equal, when answered by an accountant its "what would you like it to equal".

As the sole reader of CQ-DATV in our household I thought I could share with you some cost calculations based on a less euphemistic accounting

The GoPro black edition 3+ camcorder currently retails at £360 and it will record in 4K, Ok it's not cheap as chips but its not silly broadcast money. The funny thing is its not broadcast money, but it is broadcast, have you seen the broadcaster using them, well the answer is yes look for the reality cops shows and helicopter hero programmes and they are pinned to most of the characters jackets, then wait for a shot to come up from that camera angle and when it does compare it to the, broadcast shot before, not bad.

The BBC won't let them be used for the entire programme, and the pictures may need extra work by the colourist, but the pictures are being broadcast to our screens. The Go Pro does not have an iris and uses fixed focus at a small f stop to get the depth of field required to eliminate focus requirements, so it needs good light as this technique does not exactly flood the small sensor with light.

So the camera is not quite off the table, but the screen will require work, you will have to argue what the family budget is for a new 4k screen in the living room. The content argument may raise its head, so let's have a few stock answers to hand.

4k movies exist in some cinemas, will you be able to rent one, well let's do the sums on these, 90 minutes of movie will require 3 terabytes of storage or 200 blue-ray discs, (I suspect the video compression people are burning the midnight oil on this one), and I am not sure Hollywood producers would be too keen on these files reaching Joe public, even if the storage issues were solved
YouTube has a 4k section but will require a 15mb/s Internet connection for live viewing and it does not have the pull of Downton Manor

If your other half is an avid games player (yes unlikely I know) the PS4 and Xbox 1 that have just been launched do not support 4K, so don't start singing the virtue of video games

So the screen is going to be a difficult argument, so let's revisit the Go Pro as the must have camcorder to film the holiday pictures or the grand children growing up (I am working on it) the screen is a still the problem with the rather high price tag which is, well guess it's in the title 4k it's not just pixels it GBP's for the screen, but there are rumours they will half in price next year. So I thought buy the camera now and record the grandchildren in 4K at Christmas and hope for a screen in the New Year, what do you think ?

This heavy price tag is for the budget entry screens; if you live on a different planet, with different laws of mathematics then Sony have a nice 84" flat screen under development the XBR-84X900 TV. 3840 x 2160-pixel resolution with integrated speakers which will sell for $24,999 US. I think it might be cheaper to buy the aeroplane at the start of the article rather than just film it and watch it back on a dream 84" flat panel
I said at the beginning 4k DATV, will that be DATV Express 2 then ken, needs an HDMI 2 input none of this 1.4 rubbish, but don't rush not fully equipped this end yet.
We are going to need some more bandwidth, but fortunately there is a spectrum neutral auction coming up so we may need to pass the hat around BATC.

Note to Mike Cox we need a 4k test pattern generator with an HDMI 2 output.

Note to Chris Smith the streamer needs work
http://www.youtube.com/watch?v=rdQ0i3v_KVY&list=PL5BF9E09ECEC8F88F&index=5

External links

If you have an eBook reader that does not have WiFi then you will not be able to use the hyper-links in this publication. If you have an eBook reader that has WiFi then you will be able to providing you are in a WiFi zone.

But if you have a Kindle 3G then yes, but only to Amazon, and there is not a lot of ATV material on their site.
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.

Legal Niceties (the small print)

E&OE. Whilst every care is taken in the production of this publication, dotMOBI accepts no legal responsibility for the advice, data and opinions expressed. dotMOBI neither endorses nor is it responsible for the content of advertisements or the activities of those advertisers. No guarantee of accuracy is implied or given for the material herein. dotMOBI expressly disclaims all liability to any person in respect of anything and in respect of the consequences of anything done or omitted to be done wholly or partly in reliance upon the whole or any part of this publication.
As the regulations for the operation of radio frequency equipment vary in different countries, readers are advised to check that building or operating any piece of equipment described in dotMOBI will not contravene the rules that apply in their own country.
All copyrights and trademarks mentioned in this publication are acknowledged and no infringement of the intellectual copyright of others is intended.

Copyright

Notice to Contributors

Authors are alone responsible for the content of their articles, including factual and legal accuracy, and opinions expressed by them may not reflect the editorial stance of the publication. Material submitted to dotMOBI should not infringe the copyright of other writers or bodies.
Contributions are accepted for publication on this basis alone.
dotMOBI publications - *https://cq-datv.mobi*

Author Guidelines

CQ-DATV welcomes contributions from our readers. It does not necessarily have to be on ATV, as long as it is of interest to our readers.

Although a formatted article showing the layout can be sent, we prefer an unformatted text file of the script, along with annotations of where important images should be placed. All images should be identified as Fig 1 etc and sent seperately.

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.

Coming up in CQ-DATV

Is this the latest issue of CQ-DATV? *Click here* to go to our web site to check to see if there is a later edition available.

CQ-DATV is published on the last day of the month. The cut-off day for submissions/corrections/alterations is 5 days before the day of publication.

Please note that this mailing list is only used to advise interested people about the availability of new issues of CQ-DATV magazine. The list is not, and never will be, shared with any other organisations.

Want to be notified when issues of CQ-DATV are published? Join our *mailing list*.