In this issue

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

Production Team

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

Contributing Authors

Michael Ampt VK3CH
Jim Andrews KH6HTV
Trevor Brown G8CJS
John Hudson G3RFL
Mike Stevens G7GTN

Editorial

Ian Pawson, our editor in chief has had rather serious fall and broken his hip, at the time of writing he is due to be released from hospital after surgery and will convalescing at a friend's house away from his steps and computers. I am sure we all wish him a safe and speedy recovery.

For the magazine, that puts us into uncharted territory. Ian creates the master version of CQ-DATV which then becomes the e-Book version and from that Terry lays out the PDF version. Ian then publishes and Trevor does any required publicity.

At the moment Terry is putting together a PDF version in the hope that Ian can find a way to remotely publish, so apologies if the e-book version is delayed, but we are a small team all working in a virtual office that encompasses the whole world but in reality is our own personal homes and communicating via email.

CQ-DATV 76 has some bumper copy, so if you are reading this we have published.

Let me start by reviewing our Facebook page which often gets neglected, but this time has some interesting input from Fumio Sekizaki JAORUZ who is working full high-definition D-ATV on 5745MHz, Fumio has his own Face Book group at *https://www.facebook.com/groups/2375023609443269/*

Sorry about the language problems but, thanks to modern software we can all press the translate button in Google Chrome or make use of other translation tools that are available.

In a time when ATV seems to be obsessed with reducing the bandwidth of its transmissions regardless of picture quality Fumio is a refreshing change and his work can be viewed on his Youtube channel here *https://www.youtube.com/channel/UCPgvJDvKvNBHLcZBc4PIt4g*

Our Facebook page is always worth a visit and is where you will find any breaking news between issues *https://www.facebook.com/groups/285807174898375/*

Jim Andrews, KH6HTV is looking at our ATV picture quality reporting system called the P or Picture report and explains why we don't give S reports.

Trevor G8CJS has written up part 9 of his GVG 100 control panel interface and is digging further into producing I/O and reviewing the various options.

Trevor has also been looking at what appears to be the star of the show, from IBC at least in the sub £300 bracket (it's a small bracket for IBC) but features the new ATEM mini which provides a very elegant solution to mixing live non sync video sources. It's not a perfect solution, but may be a door that we could open further, given the base project price.

Michael Ampt VK3CH has recently moved to a new house and has started experiments with portable 24GHz ATV transmitter and has some surprising results for this often-overlooked ATV band.

John Hudson G3RFL has been looking back at one of Trevor's early designs, a simple fade to black and has added one or two refinements, that have updated this design considerably since it first appeared.

Micro Corner and Mike G7GTN has been working hard at harnessing a free PCB drawing package. The second part of the project is a general-purpose board that will host several planned future CQ-DATV projects.

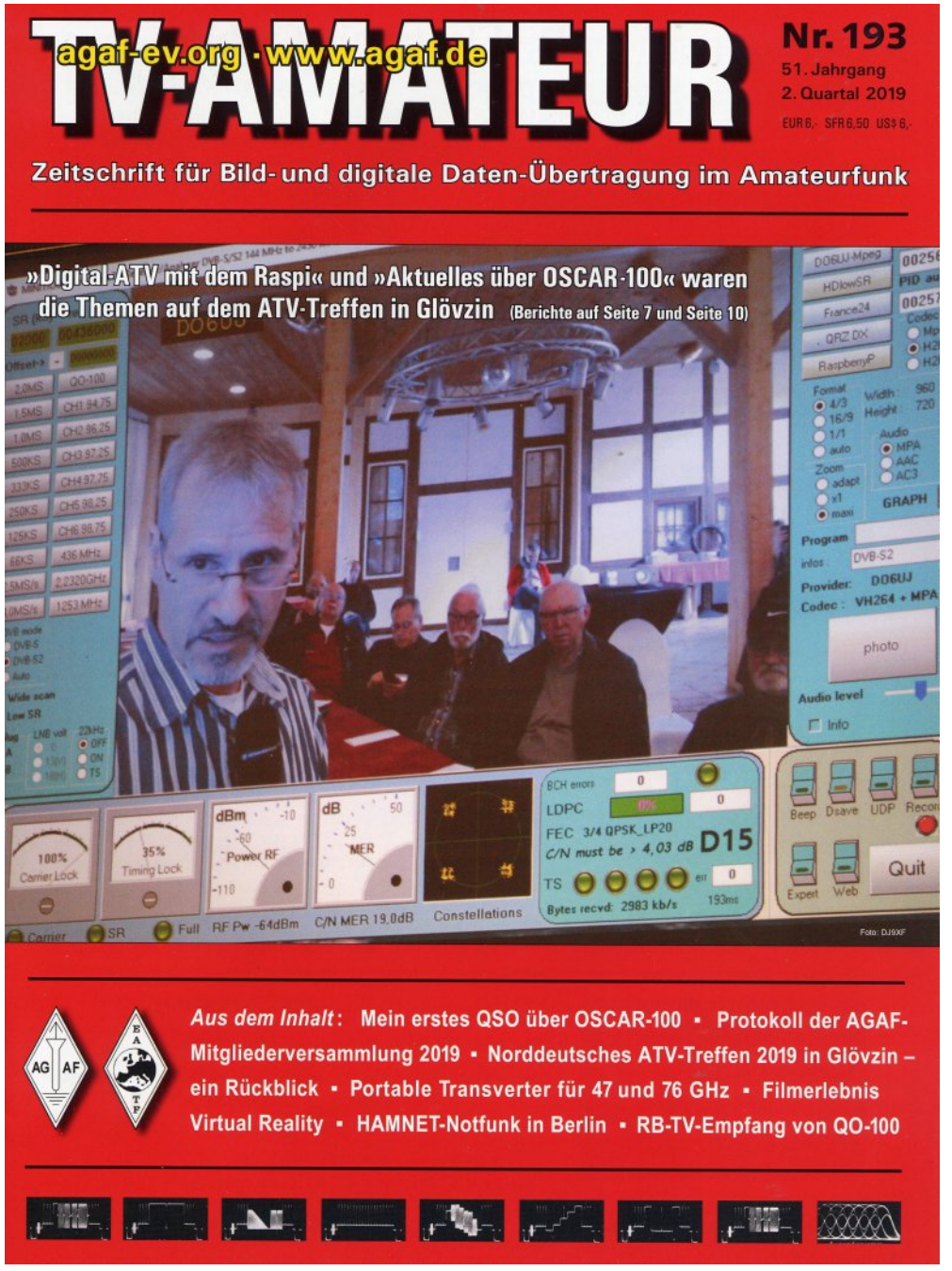
So along with all the latest news and world roundup, which includes the latest news from Clive G3GJA on the GB3EY ATV repeater rebuild, please sit back and enjoy CQ DATV 76

CQ-DATV Production Team

CQ-DATV

ALL BACK ISSUES AVAILABLE

Please note: articles in this magazine are provided with absolutely no warranty whatsoever; neither the contributors nor CQ-DATV accept any responsibility or liability for loss or damage resulting from readers choosing to apply this content to theirs or others computers and equipment.



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/*

10 GHz DVB-T Transmission at 6.0 km

A Video DVB-T transmission was done today over a 6.0 km distance from the N0YE QTH to the garage next to Macys in Boulder Colorado. The distance was 6.0 km. The received video was P5 quality. The video content, a slide show with motion, was received without interruption. According to the receiver the received signal was strong as shown on one of the attached pictures. The path is line of sight. The position of the receiver dish was critical. Moving the dish off the peak signal by only a few degrees lost the signal.

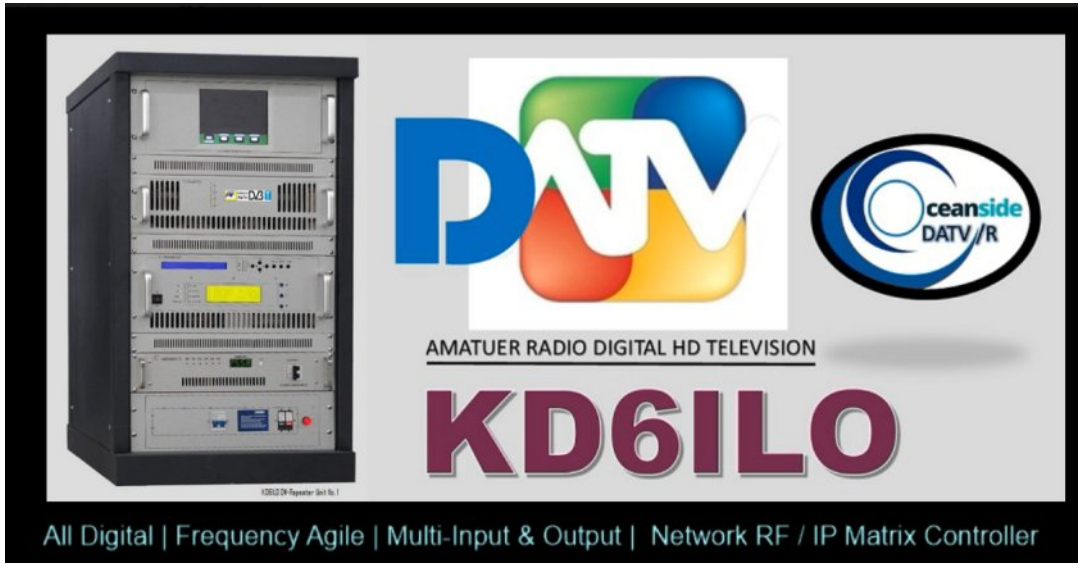
The 10 Ghz equipment is re-purposed subsystems and systems that have been used in the ARRL 10 GHz and Up contests over the years.

The transmitter is a 10 GHz transverter with a 1 foot dish attached via wave guide. The input to the transverter was a 441 MHz DVB-T video signal out of the HV100 modulator. The HV100 output was 1 dBm. The output of the transverter was 15 dBm at 10.359 GHz. The LO in the transverter is high side operating at 10.800 GHz. The transverter was not modified and used only as a transmitter. The receiver capability was not used in this exercise. Modifications to the transmitter may be done later for more power when needed. The gain of the dish may be about 27 dB.

The receiver is a 10 GHz down converter with an LO feeding a balanced mixer capable of rejecting the upper sideband and passing only the lower side band. The LO is high side operating at 10.800 GHz. The front end of the receiver has a preamp with a NF of 1.8 dB and gain of about 15 dB. The receiver dish was an 18 inch off-center fed dish. The gain of the dish may be about 32 dB.

Don, N0YE

KD6ILO TV Programming



M. Badua, Jr KD6ILO comments

Hi gentlemen,
I hope all of you are doing well and like myself sharing our TV mode of operation with our fellow ham's?

I was ask to share a program with a group of new ATV operator's. Stefan, DL7MAJ, of AMSAT-DL shared a brief short program on, Es'Hail AMSAT QO-100, equipment and station set-up. I have currently three(3) Rf transmit output channels being used for different types of programs concerning Amateur Radio TV all with different programs.

Users using their (HiDes) receivers only have to change the channels to watch what they want (example; CH1- BATC Tech Talk, CH-2 HAM TV world Events of Activities and CH3 AR Newsline & local user TV conference}. I don't stream often but when a group of Ham's (non -ATV) users what to see what is going on on DATV, I tell them to access my YouTube or my BATC Stream for an example of activities here in the U.S. and the world.
KD6ILO Youtube Channel

GB3EY progress

Sun Sep 15, 2019

Following two full weekends of engineering at the Cave Wold repeater site, GB3EY is back on air with the antenna now at 14m AGL. This is the height of the Alford Slot when the Versatower is lowered. It will stay at this height whilst we complete work on the new feeders for the other antennas on the tower (2 x 2m folded dipoles for GB3HS, 70cm colinear for GB7HU, 2m/70cm colinear for RAYNET use and 2m/70cm dual band yagi for DATV receive).

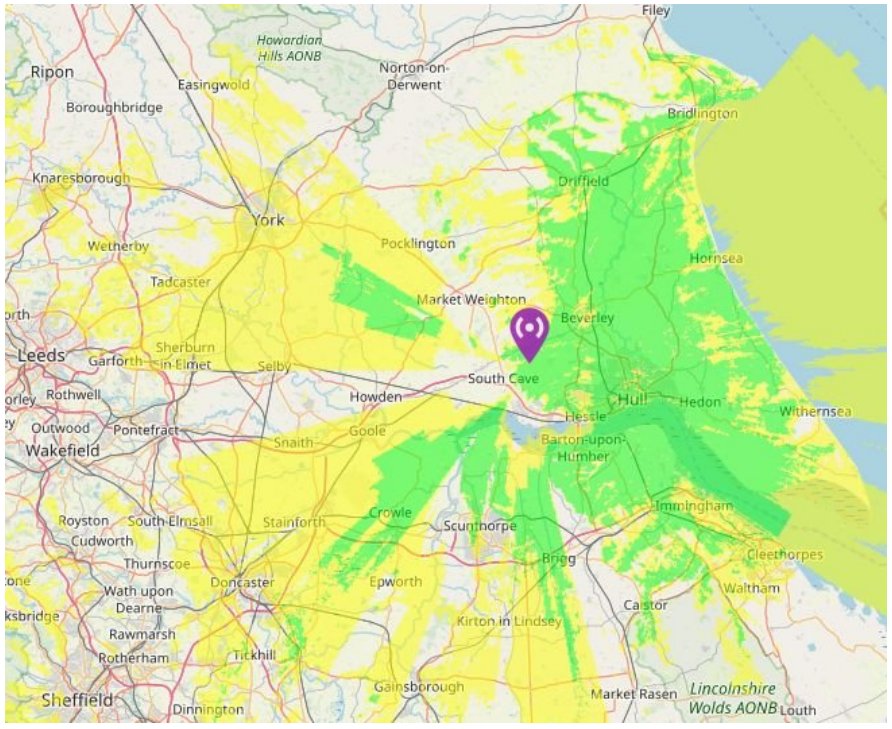
The height is now sufficient to clear some of the high ground to the west so I look forward to hearing reports from Eggborough and Barnsley!

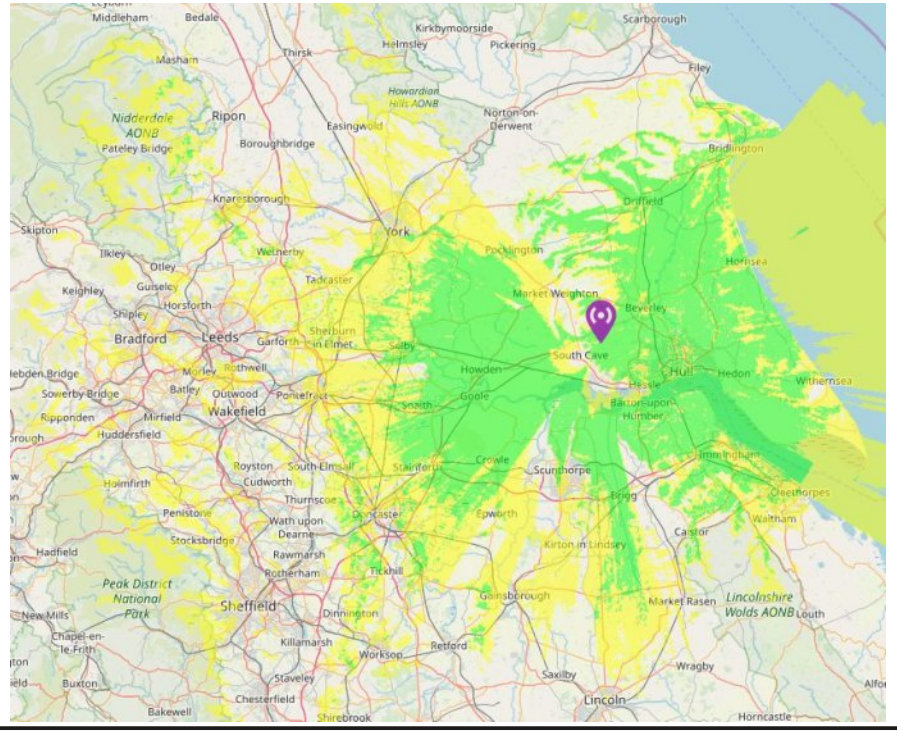
The antenna height will be at least 25m when the tower is fully extended but for now the beacon coverage should be as below. Note that the coverage map assumes a height of 10m for the receive antenna with an isptropic gain of 18dB and a masthead preamp.

Clive G3GJA

Source: *https://forum.batc.org.uk/viewtopic.php?t=6294*

See coverage maps next page...





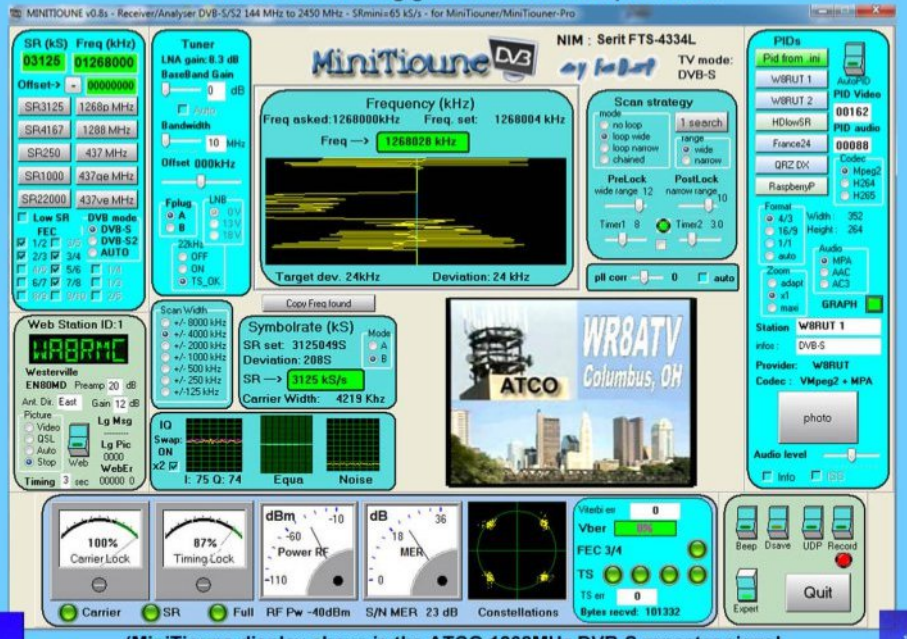
MiniTiouner-Express

Digital Amateur Television DVB-S/S2 Receiver / Analyzer

Available at DATV-Express.com

- Operates with Windows PC using free MiniTioune software from Jean-Pierre F6DZP
- Smaller than a stack of 2 decks of cards (picture above is full size)
- Two independent simultaneous RF inputs with internal preamps
- High sensitivity -100dBm @1288MHz – at 1/2 FEC
- Fully assembled/tested in aluminum enclosure
- Covers 144-2420MHz (ideal for Space Station DATV reception)
- Symbol rates from 75 KSymb/s to >20 MSymbols/sec
- Uses external 8-24VDC supply or +5V from USB-3 port (with small modification)
- Real time signal modulation constellation & dBm signal strength display
- Price: US $75 + shipping – order with PayPal

For details & ordering go to www.DATV-Express.com

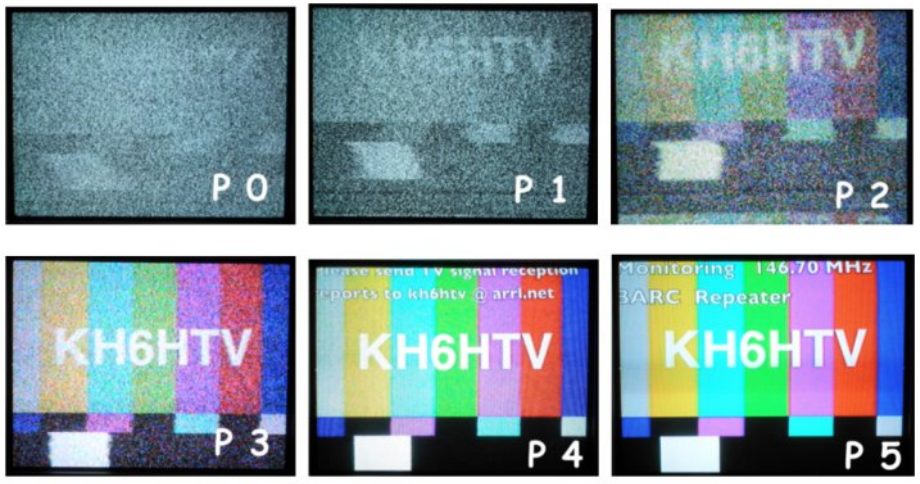


(MiniTioune display above is the ATCO 1268MHz DVB-S repeater signal at WA8RMC QTH 15 miles away).

P5 - TV Signal Quality Reporting

Written by Jim Andrews, KH6HTV *www.kh6htv.com*

In ham radio, we hams are always reporting to the other ham a set of numbers conveying information about the signal strength and quality. For cw, we use the R-S-T code, where R stands for Readability, S stands for signal strength and T stands for Tone quality. For voice communications, we typically only report R and S. The Readability definitions are: R1 = unreadable, R2 = barely readable, R3 = readable with considerable difficulty, R4 = readable with practically no difficulty and R5 = perfectly readable. For the S number, we report the actual numerical value indicated on the S or Signal Strength meter. The range for S readings is from 0 to 9 where each S unit corresponds to a 6 dB increase in signal strength with S9 being defined as 50 µV. An S0 signal is thus down at the typical SSB receiver noise level of 0.1 µV. (note: not every rig's noise level nor S meter calibration adheres closely to this definition) For very strong signals, we report the dB over S9. An example would be a report of "5 by 9 plus 20 dB". Unfortunately, far too many hams give every report as "5 by 9", which then becomes meaningless to the recipient.



In amateur TV (i.e. ATV), we use a similar reporting system called the P or Picture report. We don't typically give S reports because our TV receivers normally do not include an S meter readout. Our P reports are similar to the R reports for cw and voice. Most hams use a P rating from 1 to 5. I personally have added two more of P0 and P4.5. Our definition for ham TV P reports is:

- *P0 Extremely weak signal. At the threshold of the receiver noise. Can only detect the presence of possible sync. No useable image.*
- *P1 Very weak signal. Can detect presence of video buried in the noise. Mostly snow. Receiver often times has difficulty sync locking. Only very large block letters are barely readable, such as in a camera view of only the call sign on a stationary, automobile license plate. OK for DX reporting only.*
- *P2 Weak signal. Lot of snow present in image. Usually Black and White only with no audio. Can detect presence of people in the image and movement. Not a useable picture for routine, pleasurable viewing. Note: some excellant receivers might show color with a P2 signal. Then instead of white "snow", you will experience a shower of colorful confetti !*
- *P3 Moderate signal. Still has snow present in image. Color lock. Audio is present, but noisy. Acceptable picture for people living in very rural areas watching analog broadcast TV.*
- *P4 Strong signal. Very good color and audio. No snow or confetti. Some defects noted in picture quality. Almost full quieting on the FM audio.*
- *P4.5 Strong signal. Only a very few, minor picture defects. A border line P5.*
- *P5 Very strong signal. Perfect, noise-free, picture and audio.*

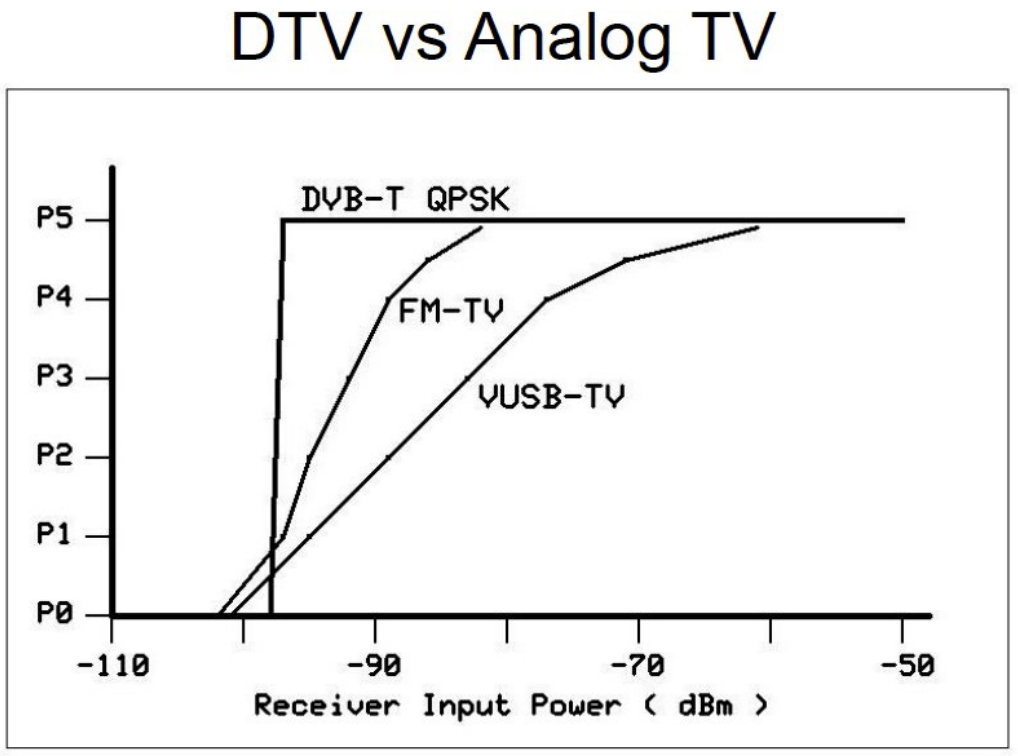
It should be noted that most newer production TV receivers on the market now all include a built-in video squelch. The squelch threshold is typically not adjustable, nor is one able to disable the squelch. Thus, newer TV receivers oftentimes will not display weak, signals below a P3 or maybe a P2 level.

I have made many controlled TV picture measurements using a calibrated step attenuator (1 dB steps) and a spectrum analyzer in my ham shack and have come to the following conclusions.

For VUSB (or AM) TV transmissions, to obtain a P5 picture requires an RF signal to noise ratio of S/N > 40 dB. For each P unit from P0 to P4, there is an increase in signal strength of 6 dB, i.e. the same definition as used for S units. For FM-TV, the FM quieting effect kicks in earlier and results in a considerably lower required S/N for good to excellant pictures.

For comparison, modern digital TV receivers will either give you a perfect, P5, picture - or no picture at all. The have the "Cliff Effect". All or nothing, i.e. you fell over the cliff. The cliff edge is very sharp. If you see any picture defects, such as pixelization, losing another 1dB or less of signal strength, the picture is totally lost. The following table and graph vividly show these results.

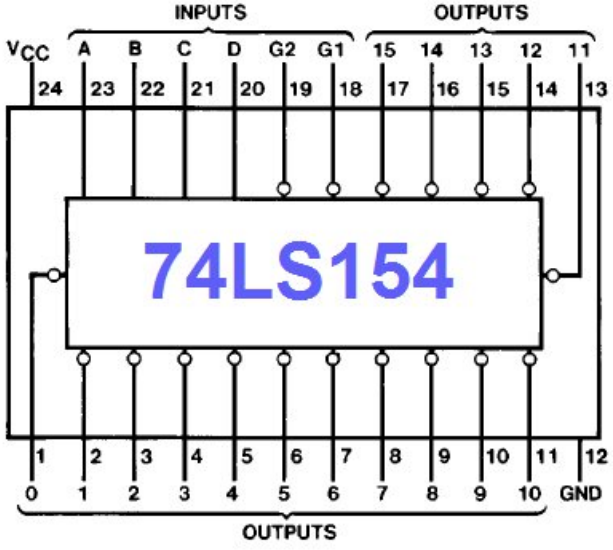
"P" Units	VUSB-TV RF S/N	FM-TV RF S/N
P0	0 dB	0 dB
P1	6 dB	5 dB
P2	12 dB	7 dB
P3	18 dB	10 dB
P4	24 dB	13 dB
P4.5	30 dB	16 dB
P5	40 dB	20 dB



Grass Valley Mixer Conversions - Part 9

Written By Trevor Brown G8CJS

In CQ-DATV 75 I added some I/O to the software which delivered 4 of the push buttons as command lines and 3 sets of BCD coded outputs, from the Key, PGM and PST, banks, these were demonstrated by a video on the CQ-DATV Facebook page driving some LEDs. If you want to translate them into single line commands E.G. one wire for each selected source, you need to add a 74LS154 to each of the banks.



The advantage of a BCD coded signal is that it uses less I/O lines, EG 4 wires can carry 16 outputs, but only 10 were used as that's the number of push buttons on each of the banks. The disadvantage of BCD coding the signal is only one command can be implemented at once, but for the Key, PST and PGM banks its ideal as only one push button can be selected at any one time, something the software takes care of.

INPUTS					OUTPUTS										
G1	G2	D	C	B	A	4	5	6	7	8	9	11	12	13	14	
L	L	L	H	L	H	L	H	H	H	H	H	H	H	H	H	PGM 9
L	L	L	H	H	L	H	L	H	H	H	H	H	H	H	H	PGM 8
L	L	L	H	H	H	H	H	L	H	H	H	H	H	H	H	PGM 7
L	L	H	L	L	L	H	H	H	L	H	H	H	H	H	H	PGM 6
L	L	H	L	L	H	H	H	H	H	L	H	H	H	H	H	PGM 5
L	L	H	L	H	L	H	H	H	H	H	L	H	H	H	H	PGM 4
L	L	H	L	H	H	H	H	H	H	H	H	L	H	H	H	PGM 3
L	L	H	H	L	L	H	H	H	H	H	H	H	L	H	H	PGM 2
L	L	H	H	L	H	H	H	H	H	H	H	H	H	L	H	PGM 1
L	L	H	H	H	L	H	H	H	H	H	H	H	H	H	L	PGM 0

Truth Table showing the 74LS154 logic for the PGM Bank. The low on the D C B A inputs correspond to illuminated LED's on the CQ-DATV Facebook video page. The same applies for Key and PST Banks.

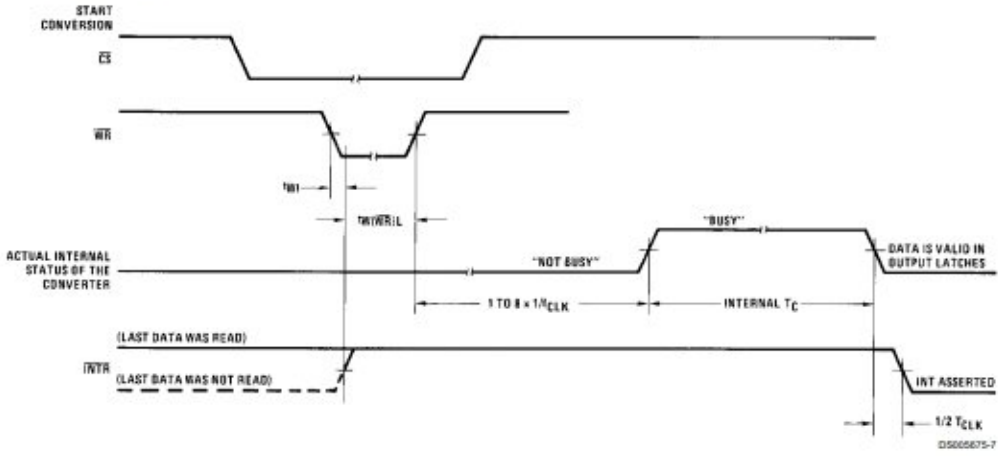
The 4 bit code from the PCF 8574's that I used to drive the LED's needs to go to the 4 input connections D C B A. G1 and G2 need grounding and you now have the full code. Because I arranged the software to deliver active lows (easy way to light the LED's) the outputs are 14 to 4 for buttons 0 to 9 producing 10 command lines corresponding to the 10 push buttons (numbered 0 to 9 GVG logic). The active low outputs are ideal for driving tally LED's and video cross points.

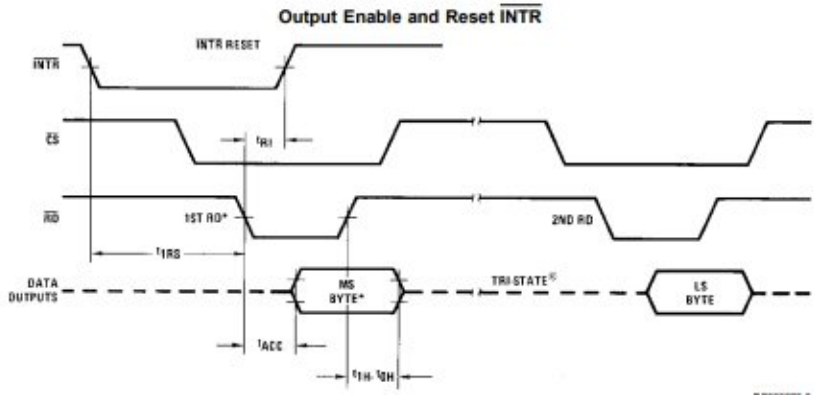
The problem is now I have now used all the port chips on Mikes G7GTN's PCB, I could expand by adding more PCF 8574 chips, the software is not creaking and the I2c bus will certainly support more (I just need to rebuild or supplement the hardware interface) or beg for a replacement PCB with more ports and other bells whistles, that I could never have envisaged when I started the project nine issues ago.

In this issue I promised to look at the analogue pots, T bar and Joysticks and all the other pots, I have exhausted the I/O, OK let's not panic and start by looking at how the GVG panel processes these signals.

There are 16 pots and they deliver an analogue signal that swings between 0 and +5 volts. These are connected to a 4067 analogue switch which can select one at once by and route it to an A to D converter (ADC1001). The switch uses a 4 bit input word to select the pot using the address bus within the panel. The A to D converter converts this to a digital word and presents it on J2 of the panel, but it's ADC1001 delivery is a little more complex

Timing Diagrams





It delivers a 10 bit word as two 8 bit words, and in the GVG panel CS is grounded so how did GVG manage this is a mystery. The 10 bit word delivered as two bytes looks like this

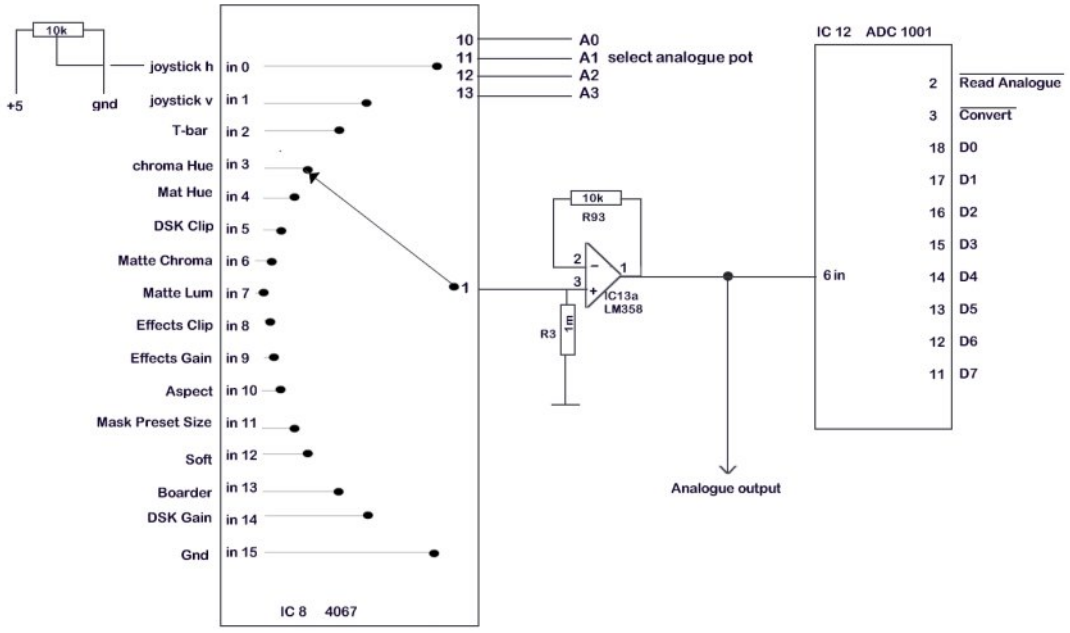
BYTE SEQUENCING FOR THE 20-PIN ADC1001

Byte Order	8-Bit Data Bus Connection							
	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1st	MSB Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2
2nd	Bit 1	LSB Bit 0	0	0	0	0	0	0

So assuming we have more I/O to deliver this word (which we don't at present) it's going to get complex, so how about we keep it analogue and intersect the signal on the GVG PCB at the output of the 4067 (IC 8) or input to the ADC 1001 (IC 12) a little nonstandard but not beyond the wit of man.

We can switch the 4067 from the pushbuttons on the panel, but we do walk into another problem, we need to know which signal this analogue bus is delivering, EG what push button has been pressed. External hardware can only deal with this analogue signal if it knows if it is T-Bar, Joystick or Colour background. The other disadvantage is analogue is difficult to store, EG a colour background would need RGB or Y U and V all to be available simultaneously. To this end I have brought out an analogue bus to experiment with.

The problem is that the address bus does not latch in the 4067, so we can direct the switch to the required output and freeze the software, to maintain the correct analogue selection, even indicate on the LCD panel what signal the analogue bus is carrying. That will freeze the panel and to move on from there the software will need to poll around to check for an indication from the panel, or a command to flag that the analogue port is no longer required and that the panel needs unfreezing so all the other functions can be restored. The problem is that this polling required manipulation of the address bus and disturbs the analogue signal being delivered by IC8. Not a problem with the output of the ADC as this can be latched.



The analogue path in the GVG Panel. The components are indicated on the silk screen (I have only shown one of the pots for simplicity).

Ok my homework for the next instalment, watch this space while I develop some more inspiration.

I hope this project is of interest. I know that to follow my work you need to find a panel and the supply of these seems to have dried up or perhaps I have encouraged people with panels that might have otherwise have passed one along to hoard it, a frequent problem with ex broadcast equipment collectors.

The one thing that seems to retain its value in ex broadcast equipment is control panels, probably because they are not full of leaking capacitors that need replacing.

This whole project has been a journey of discovery and is being presented as warts an all, in real time and not as a completed article.

I admit to backtracking, most of which was changing the programming language from ESP BASIC to Annex Wi-Fi BASIC, but that really was an necessary improvement.

I hope also by explaining problems before any implemented solutions that I can canvas help or ideas along the way. This has happened with daily input from Mike G7GTN and includes the PCB which really stopped regular trouble shooting session of an oversubscribed prototyping board, but also help on the Annex BASIC forum without which I would have not got this far.

The panel I have used was a rescue from another collectors out pile, which may or may not have been a good idea at the time, considering the grief that the project has delivered along the way.

Any thoughts, ideas or, dare I say solutions, you can always reach me at *editor@cq-datv.mobi* which is an editorial team shared mail box for any input to CQ-DATV magazine.

24GHz Television DX Tests

Written by Michael Ampt VK3CH

Reprinted from NEVARC NEWS Vol 06 Issue 09 by kind permission

After moving house another project was to finally get around to playing with my microwave television transmitters. Both 10GHz and 24GHz dishes are available. I had only tested out the 24GHz dish on ATV over a few hundred meters years ago. 24GHz is a challenge, apparently, due to atmospheric water vapour to get long distances.

As transmission frequency increases, atmospheric path losses become greater, particularly at frequencies above 10 GHz. When I have asked other hams what sort of distances expected the answers vary, no surprise I suppose.

So the only way is to experiment.

Television being wideband is most likely going to get less distance than narrow band voice and all the other modes such as SSB or digital modes. I decided to start small and work my way up.

FIRST TEST OVER 2km – Doncaster East to Doncaster Shoppingtown

A friends place has a nice view of Doncaster Shoppingtown so I set up my dish transmitter unit and a camera on mains power, pointing out their second storey lounge window, to the roof top carpark about 2.1km away.

Arriving at Doncaster Shoppingtown I chose the roof top carpark facing the direction of their house, but I could not see it, just a sea of houses and trees so aiming my RX dish was a general guess. Hoping that security were not going to close me down, I set the dish up on its stand, but the carpark had a big wall to stop cars going over the edge, so I had to hold the dish in my hands and aim all while looking down at my small 12 volt TV on the ground.

After a minute a picture quickly appeared then gone, I had to sweep very slowly, but once again the picture appeared in colour and prefect resolution. The 24GHz dish system is analogue PAL mode.

As my hands were busy holding the dish, no photos of that achievement were taken. Google Earth put the distance path at 2.14km

View to Doncaster Shoppingtown from the house at Doncaster East

Doncaster Shoppingtown Carpark, the house I am aiming for is 2km away, in there somewhere, time for microwave dish DF practice

Elevation path from the test house to Doncaster Shoppingtown carpark

At a distance of 2.14km the amount of sweep to keep a picture was about 3 degrees either side of the exact path, so at longer distances the sighting was going to be really spot on. At least with a wideband TV signal of 7MHz no real need for GPS frequency locking is necessary, one less piece of 'kit' and expense.

As the drive over 2km does not take long, I left the 24GHz TX side on and unattended. This won't be possible over a longer distance.

It was time to attempt a longer distance and I thought a place with mains power would be nice. After talking to Peter Cossins, VK3BFG, he suggested he could go to the Sky High Mount Dandenong. This is a restaurant and observation deck that overlooks greater Melbourne, 34.3km from Melbourne CBD.

View from Sky High Mount Dandenong observation deck, 620 meters above sea level The city buildings of Melbourne CBD 34km in the distance

Google Earth elevation profile from Sky High Mount Dandenong observation deck to Doncaster Lutheran Church

My QTH is on the lower part of the road so another place with a clear view of Mt Dandenong was required. It was time to go to church, the Doncaster Lutheran Church has a view to Mt Dandenong with the commercial TV towers visible. Google Earth puts elevation as 93 meters above sea level and a distance of 19.2km

SECOND TEST OVER 19km – Doncaster to Mt Dandenong

After some plots and exchange of emails an idea of sighting compass bearings was calculated using Google Earth. On the morning of Tuesday 28th May I setup at the church and Peter drove to Sky High Mount Dandenong and setup his end.

I had previously delivered my 24GHz TX dish to him, so all he required was power, camera and a mast and stand. Peter suggested that we make it a two way contact via Amateur Television, so I took my portable 23cm DVS-S Amateur Television Transmitter. Having a second unit saves ripping the shack apart and all the cable hassles. I also took my 23cm VSWR meter to make sure my 23cm loop antenna was tuned OK.

The weather looked dark and cold but no rain, which may have killed off any 24GHz signal. In about an hour I was all setup, having mains power was a convenient bonus and also a bit of shelter from the wind.

View from rear of 24GHz dich and 23cm beam looking to Mount Dandenong, 3 TV towers in the highlighted black rectangle Sky High Mount Dandenong observation deck just to the left of the left most TV tower by about 1km

About half hour later I was in contact with Peter, who could already see my 23cm DVB-S signal back to him. I was running 6 watts into the loop yagi beam, later dropping power down to 60 milliwatt and he still had me perfect ATV copy. This 60 milliwatt going via about 10 meters of coax into the beam – not bad, but line of sight all helps.

As Peter and Rob VK3MQ could see my TV set as my camera was focused on it, they were able to sight their 24GHz TX dish by watching my 23cm signal back to them. After a picture was obtained back from Sky High Mount Dandenong, I adjusted my RX dish just a fraction to get a completely clear picture.

On occasion the picture went a bit grainy, most likely due to the imminent rain on its way. But the weather held long enough for a bit of an ATV full-duplex QSO. Peter said, I used a pre-amp first, but your signal was so strong it was not needed. If we both have 23 cm transmit and receive we can use this to align the SHF dishes. Being able to see your receive monitor made it easy to align the 24G dish. Going further afield we will need the pre-amps.

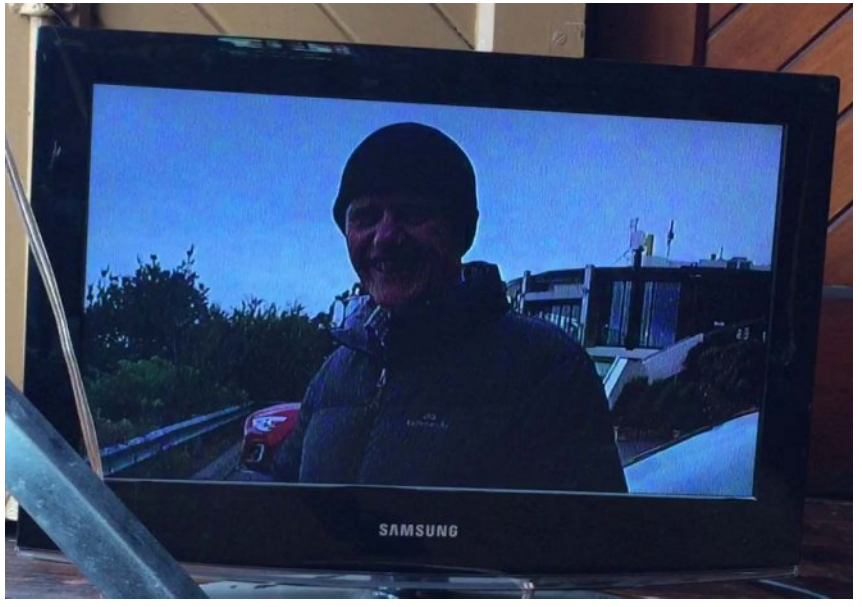
Encouraged by this success, Peter suggested that we try a path from Sky High Mount Dandenong to Mount Buninyong near Ballarat. This will attempted at a later date. I also have the 10GHz dishes that need some DX tests, but the RX requires an analogue satellite receiver that needs 240 volts, so an inverter, which I have, will be needed for portable work. My 24GHz TX unit has 300mW power and the dish has 36dB gain, using an Effective Isotropic Radiated Power (EIRP) Calculator online, the 24GHz dish has an EIRP of about 1000 watts.

Left: Camera focused on the TV
Right: The beam just fits against the wall

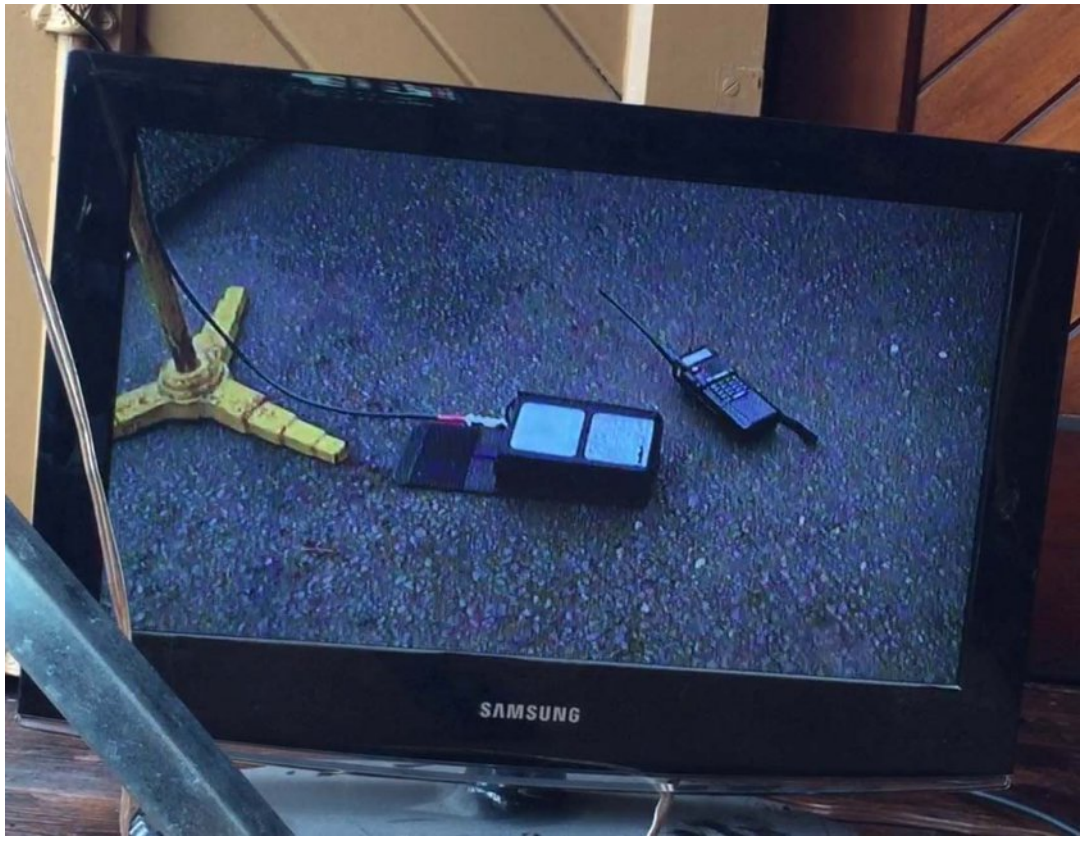
DVB-S TX setup

Sky High 6 element RX yagi

Despite the beam near the rear of the wall, a low VSWR About 9 watts of power, which was later reduced to just 60 milliwatt, with still perfect picture copy



Rob VK3MQ all smiles at the successful 24GHz test



Peter's portable satellite receiver with display receiving the 23cm signal from Doncaster

This is a Digital LCD Satellite Signal Finder Meter 3.5" SATlink WS-6906 DVB-S FTA SAT AU, cost about $83 on EBay It runs off a rechargeable lithium battery, perfect for portable operation Also a handheld 2 meter rig for voice liaison during setup

The Sat Link WS-6906 - some of the specs from their website

- *View the actual channel on the screen of the meter*
- *Quickly and accurately align the satellite dish*
- *Transponders, Frequency, Symbol Rate, Polarity, and other settings can be modified by the user*

The view from Sky High Mount Dandenong observation deck from Peter's camera

The rear of the 24GHz TX dish received from Mt Dandenong

• *Each time the meter boots up it automatically calibrates for optimum performance*

• *View All the Actual FTA Satellite Channels on the Meters Screen*

• *Auto Re-Calibration Due To the Unique Calibration System Built in to the Meter*

- Automatically Calculates Dish Angles and Settings Based On Your Longitude and Latitude

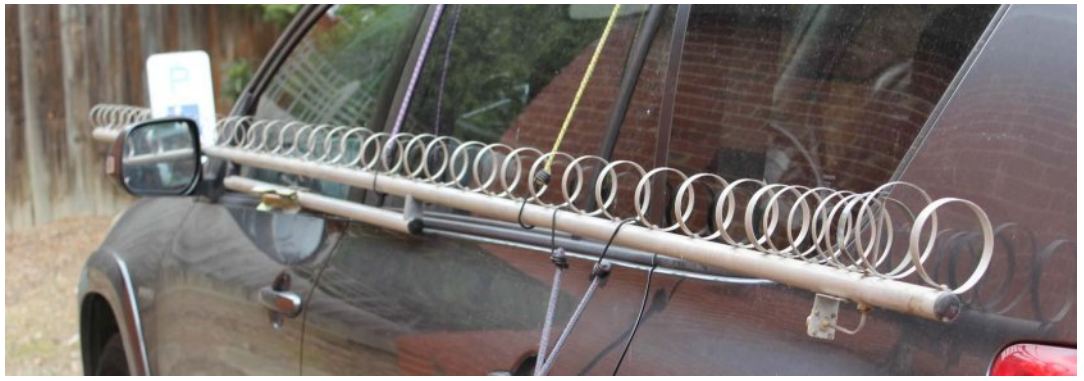
• *View All FTA Satellite Channels On Screen With Sound.*

A week later I ordered my own Sat Link WS-6906 unit, just $83 and was very impressed, so small but very handy.

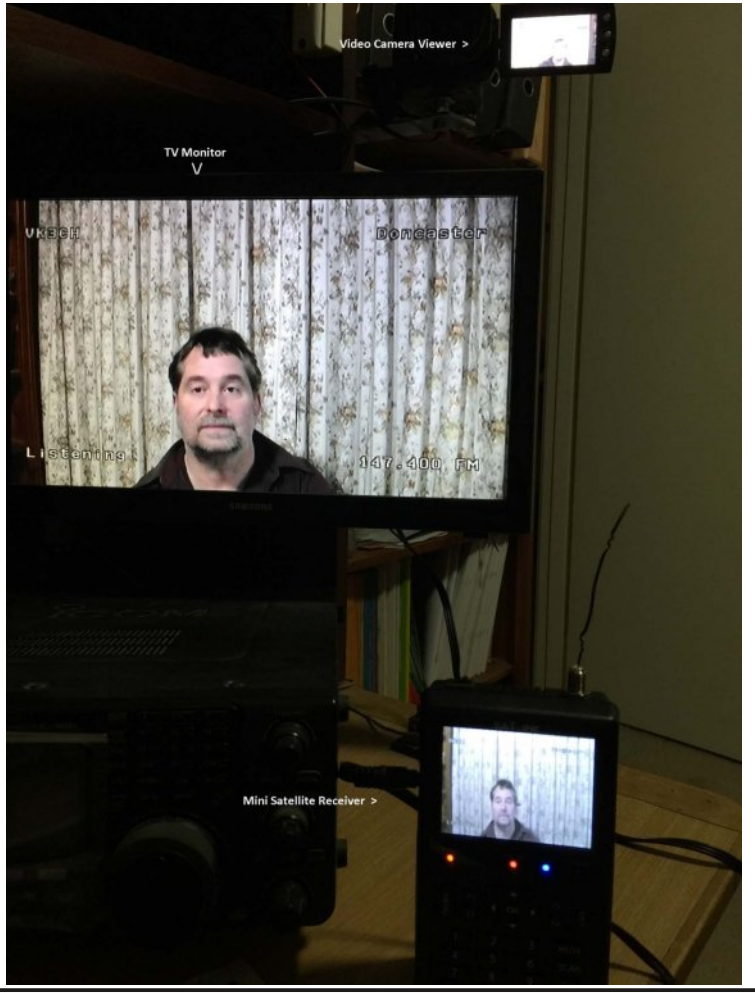
What I really like is the AV output, which you can see here (right) is ported to my TV from the Sat Link WS-6906. So now I have a 23cm TV RX of the 23cm DVB-S transmitters of all Melbourne hams, all that's required is an antenna pointing in the right direction of their location.

Note the bit of wire for an antenna on top of the Sat Link WS-6906

A further longer distance test (Ballarat to Melbourne) will be attempted in November.

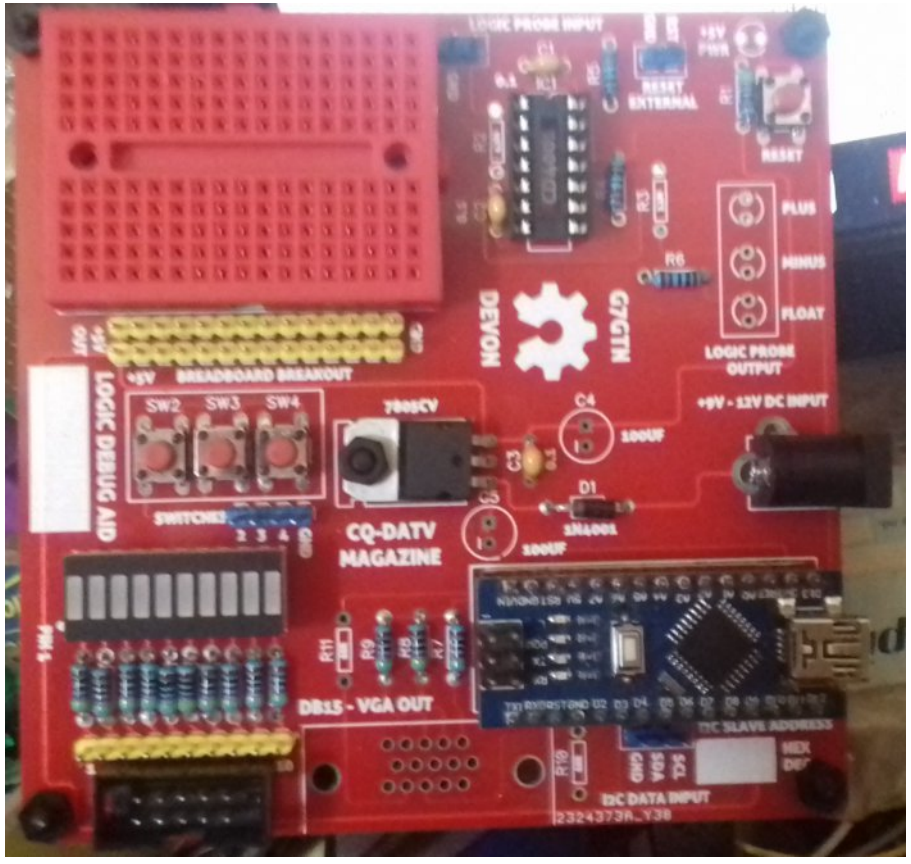


The 23cm loop yagi clipped to the car, as it's too long to fit inside during transit



Micro Corner - Easy Debugging Board Pt2

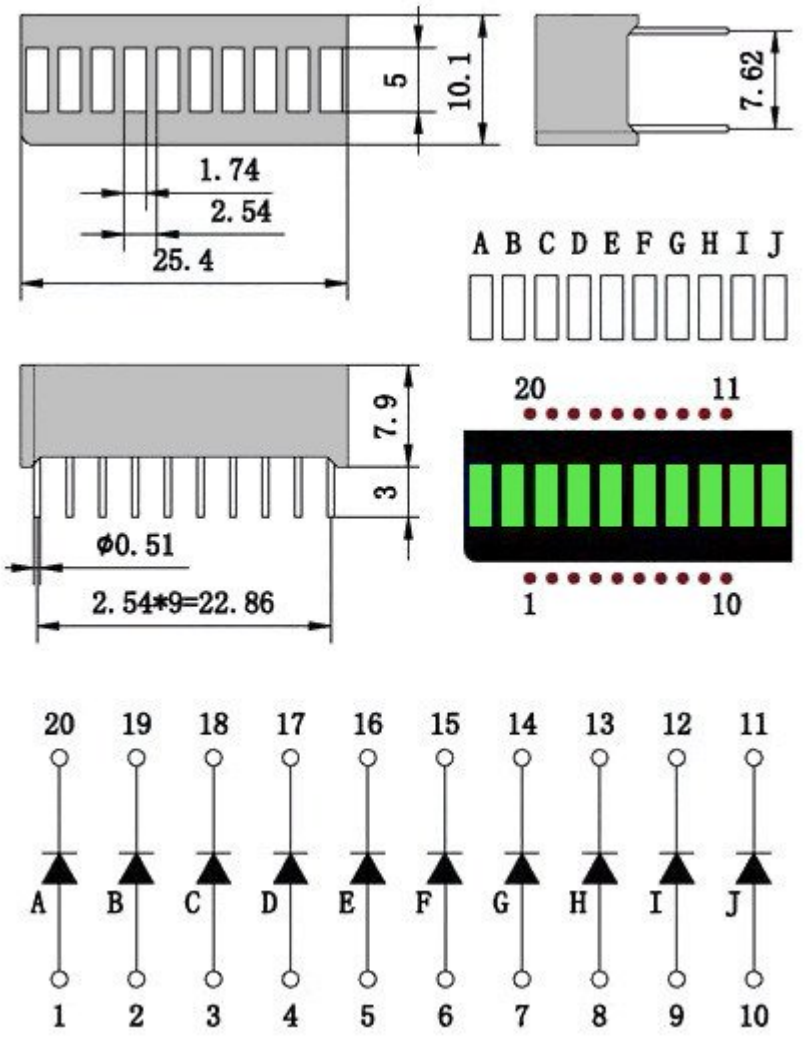
Written by Mike Stevens G7GTN



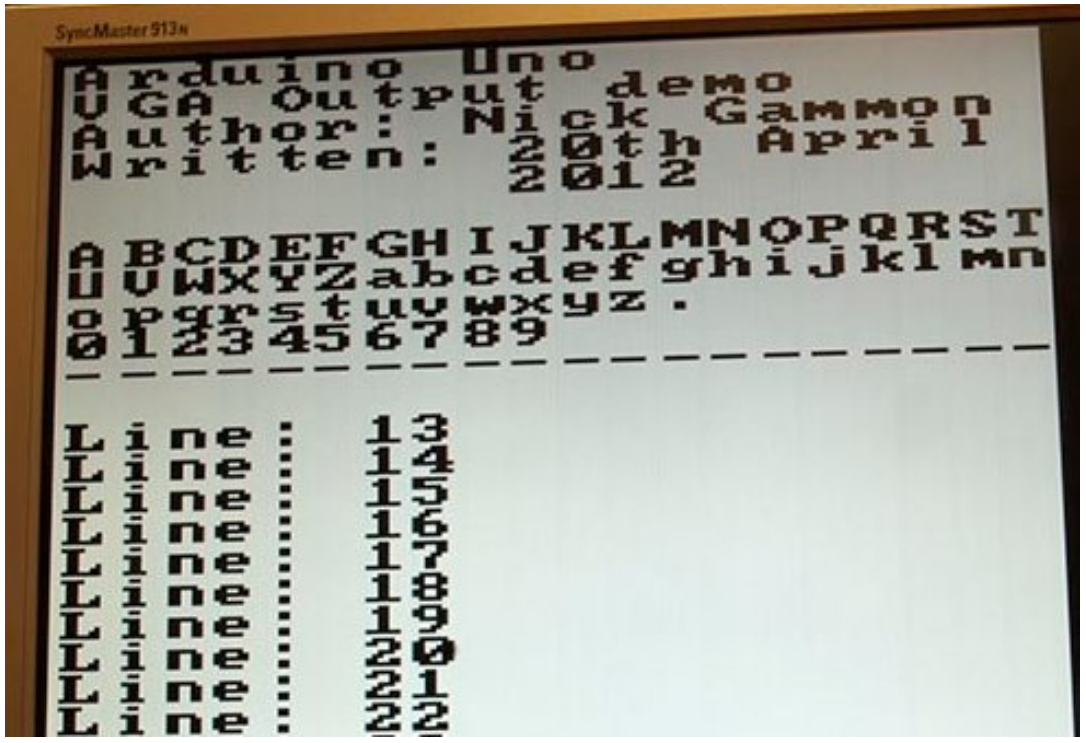
Last time we looked at the very basic circuits to create a simple little development board which might help when developing our projects. Sample code to test elements is provided to demonstrate the switches; LED Bargraph and VGA monitor output processor.

Construction

The board is very simple to build, on my prototype I used two 15 way female sockets for the Ardunio Nano module to allow re-use in other projects if required. One thing to check before fitting the LED Bargraph is the correct orientation of the part.



You will notice on close inspection a small chamfer on one corner this indicates pin 1, or another common trick is to use a CR2302 3V3 coin cell battery to check correct polarity. No heatsink is required on the +5V 7805CV regulator and mine was simply bolted to the board. The power supply is also provided on output pin headers to allow you to power external circuits if needed. I used male pin headers for all off board connections – if you prefer you can fit female headers next to the breadboard section instead depending on what jumper cable type you use the most often.

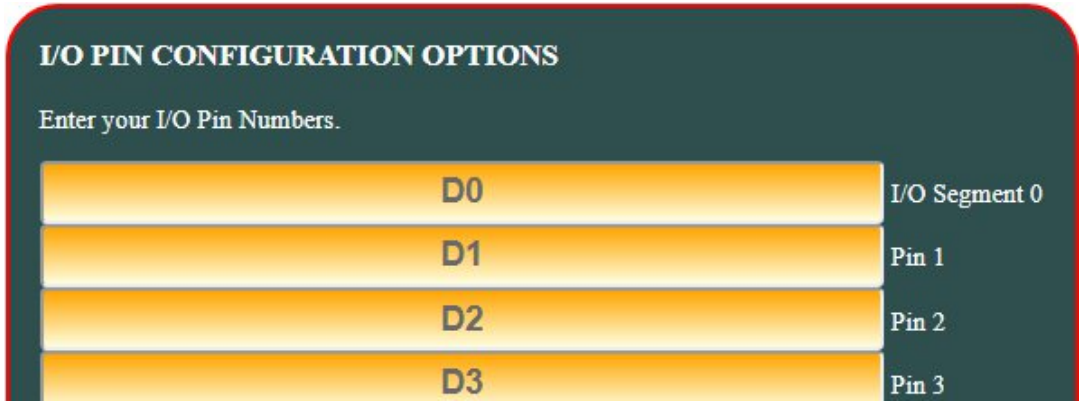


VGA I2C Slave Firmware

The Nano processor module requires the I2C VGA code loading, the quickest method is to compile this source in the Ardunio IDE and upload this to the processor. You may wish to change the default I2C Bus Address from 42 Decimal; this can be found on line 60 of the code. This requires the installation of an additional library called TimerHelpers.h which is included in the download samplecode.zip file.

Sample Source Code

Source code is supplied for Ardunio C++ and also Annex Basic. Most of my tests were done using a standard Ardunio UNO board for ease of connection. The Annex Basic samples can only be run from an ESP8266 module with the Firmware loaded. Please see CQ-DATV 72 for further details on the simple setup required for this versatile platform.



Sample Web Interface and custom I/O Pin Configuration Screen Running on ESP8266 Annex WiFi RDS Basic

LED Bargraph Segment Driving

The KYX-B10G common cathode bar segment displays are connected to the I/O ports of your chosen processor platform, they each have 470Ω current limiting resistors and making one High will turn that individual segment on.

I have provided a simple web interface that you can use to test these, you may also change the I/O Ports that you wish to connect the segments to.

If you change these press return on the textbox and then press the Save button to write these to a settings text file called leds.ini – You can also use the Load button to populate the boxes if you have edited this file manually and uploaded it using the Windows utility application instead of the browser interface.

Logic Probe Element

The CD4001 probe circuit can also be basically tested (High and Low Levels) by connecting your probe to an I/O Pin. In the case of Annex Basic I/O D0 is selected. The pin is simply set to toggle between the two logic states with a 550 millisecond delay between, this repeats continuously in a loop. The Ardunio C++ code is configured for I/O Pin D2 but the process is the exact same. The logic probe was made out of an old pen with a steel panel pin for the actual probe element, held together with some hot glue. The connection is via two extended dupont ribbon cables and a crocodile clip to attach the ground connection of the logic circuit being tested.

Links

The C++ code is written using the standard Ardunio IDE available from *https://www.arduino.cc/en/Main/Software*

The Annex RDS Basic is downloadable from *https://sites.google.com/site/annexwifi/home*

You can download all the board design files (created in Diptrace free edition) which includes pre-generated GERBER files from *https://github.com/G7GTN*. You can also obtain the required source code files from this location.

This has made a very simple board for various quick testing, all be it with just a very small breadboard area to hold a few parts at a time.

ATEM Mini

By Trevor G8CJS

September means IBC, the television equipment exhibition for broadcasters held every year in Amsterdam. The problem with broadcast equipment is the broadcast price tags.

There are various exceptions and one example is the launch of the ATEM mini from Black Magic which is a hardware solution to production switching of non-synchronous vision sources. It is smaller and less expensive than its big brother the ATEM which has been around for some considerable time and has a price tag that is above an amateur application and is usually only seen in more commercial applications where it can pay for its keep.

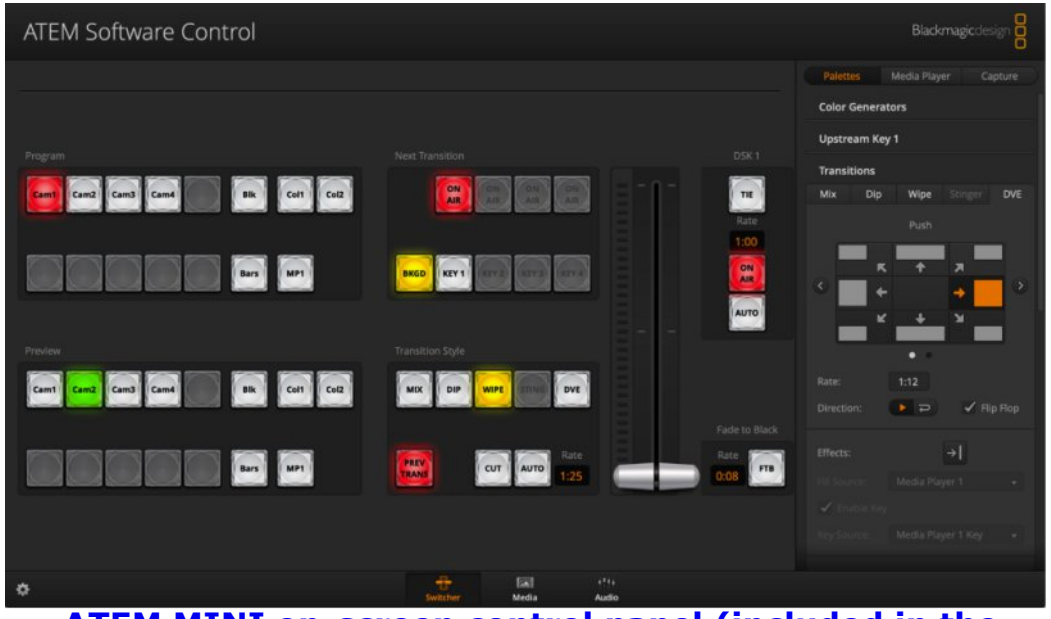
Instead amateurs usually fall back on Vmix which is a software solution, that has various price levels dependent upon the facilities you require, but the bottom level or demo is free and the other levels can be sampled by downloading a full working version that is time limited (well it is free).

This year that has changed, Black Magic has delivered the ATEM mini with a price tag of £255, Ok it still hurts, but it does look incredible value when you see what it is capable of.

Rear view showing connections 4 HDMI inputs 1 HDMI out 2 mics a webcam output and control panel

ATEM Hardware and built in control panel

The Unit is built inside a very small and attractive control panel, that accommodates 4 HDMI inputs and enables some remarkable control over those sources.



ATEM MINI on-screen control panel (included in the £255 price)

If you want to connect it to your PC, then you have access to a much larger software panel.

Rather a nice option and would look good on anyone's desk, but all the functions are available on the smaller more portable panel.

HDMI always makes you think of TV standards, leaving the comfort of red and yellow phono plugs behind, but with the advantage of entering the world of HDTV and dare I say it 4k. Well although there is no 4K there are a whole lot of ticks in the standards boxes.

INPUT STANDARDS / SWITCHER STANDARDS	720p HD	720p59.64	720p60	1080p23.98	1080p24	1080p25	1080p29.97	1080p30	1080p50	1080p59.94	1080p60	1080i50	1080i59.94	1080i60
1080p23.98	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p29.97	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p59.94	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080p60	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Standards that the ATEM Mini can control and deliver

There is also a soft panel for audio control which really is the icing on the cake for small outside broadcast such as AMSAT lectures that we all used to enjoy streamed live or even the EME conference that went down so well.

Two independent mics and audio down the HDMI would seem to cover just about all the requirements for a small lecture.

There is also an external larger control panel that, unfortunately is not included in the £255 price tag, but I am sure it would rock everyone's boat, (note to self, add a GVG panel adaptation to my already overloaded to do list).

The software audio control panel (not quite sure how you move the faders, but I am sure there is a way to mouse them into action)

The panel does not look too dissimilar to the GVG project does it. All in all, a rather elegant solution to production control over non sync sources and something that could best be described as an Outside Broadcast truck in your pocket. What's missing? Well P/V monitors, so you can see the output of the various cameras, it's difficult to see how anyone could do a serious live mix down without them. There seems no mention of tally lights, without which no self-respecting camera operator can work, but most small camcorders have some sort of on air or record tally, can these can be controlled via the HDMI and does the ATEM mini support them, I do not know.

Audio level indication might also be useful, I must admit to being locked into an age of PPM meters which don't really correlate to the more commonly encountered bar graphs, or LED displays, but something would be good even a VU meter, no forget I said that.

The hardware control panel, looks brilliant, but I suspect well outside the pocket of most of us

HDMI cabling does have length limitations, but for a small conference or lecture I think that's a limitation we can work with, if the budget runs to the remote panel well then the cable lengths only limit the distance apart that the camera's can be positioned. The remote panel connection via an RJ45 connector will not suffer the same limitations.

I will leave you with the link to the Black Magic demo where you can read everything first-hand and see the demonstration video which says it all. If you do spend, sorry invest your hard-earned income in one be sure to let our readers know what you think about it.

https://www.blackmagicdesign.com/uk/products/atemmini

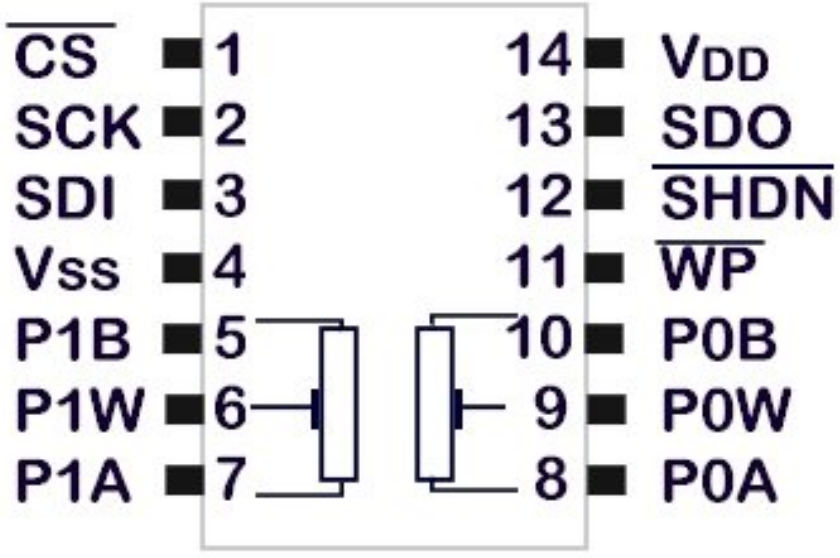
This is your free ATV magazine.
Please consider contributing an article!

Dual Fade to Black

By John Hudson G3RFL

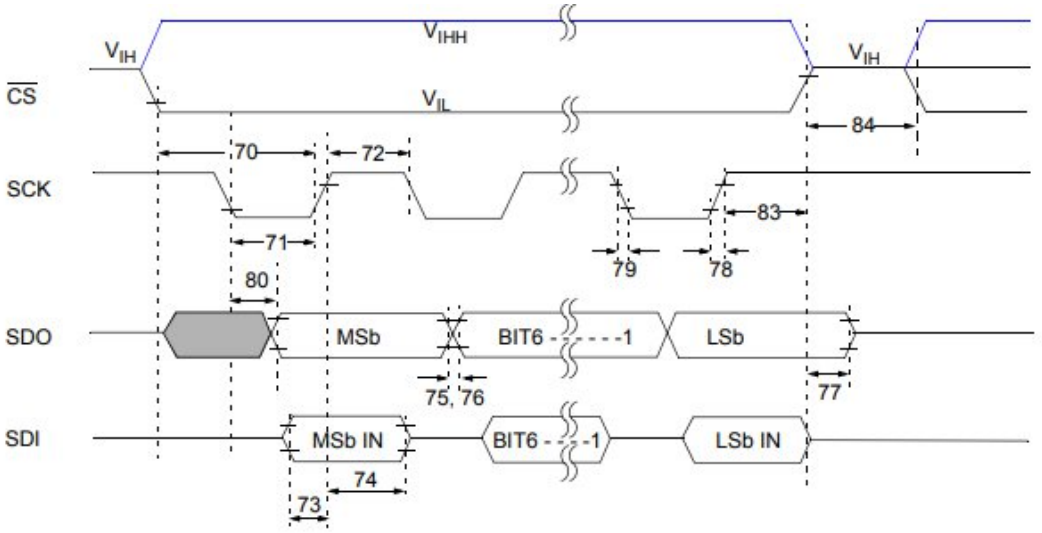
In CQ-DATV 73 we published under the heading "One from the vault" a simple fade to black circuit which I think originated from one of Trevor's designs. The circuit worked on the principle of switching in and out a video fader which was only present during active picture and out of circuit during nonactive picture so that the sync and burst was not subject to fading. Trevor's design was simple, but the fader element relied on a manually operated potentiometer.

I wanted one that could be driven by software, so I rebuilt the original using the MCP4521 chip.



MCP4521

This clever little chip has not only one, but two potentiometers that can be software controlled using 3 control pins that I hoped I could control with some PIC software, at least worth a try.



Timing Data for the MCP 4521

I have to confess to some late night oil and one or two restarts, but I did get the control I wanted and that really broke the back of this project. I used the original LM1881 sync separator from the CQ-DATV 73 design and started to layout a PCB. Then I had a bright idea why not add some more bells and whistles.

Use both potentiometers and make it into a dual channel unit. My inspiration did not stop there, I added an LCD screen, with touch controls. Once you have a micro on board well its just a matter of adding code and some of the required routines were already in my library from previous projects.

I used the same TEA 5114 that was in the original design, they are still available and make an excellent video switch.

Once I had some working hardware, I could have a go at fine tuning the software. The fade duration is pre-set at 1 second and looks about right. I have added some RS232 control that I may or not may not use to control a future On Screen Display, the jury is still out on this.

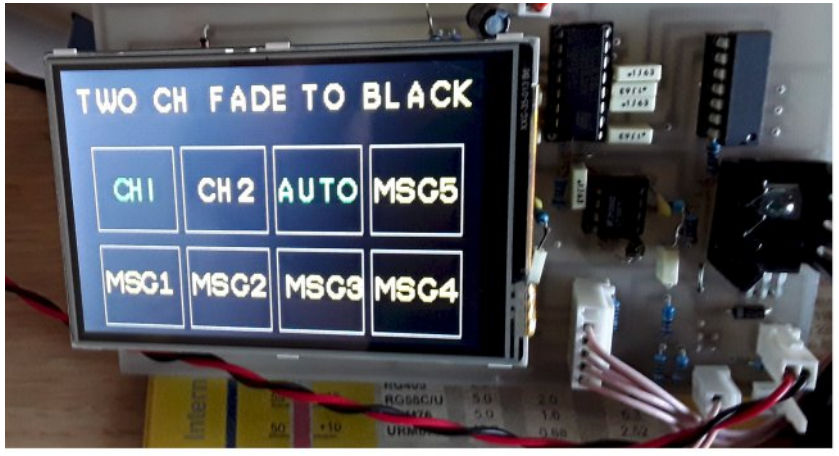
The unit draws 300mA and I might add a heatsink to the 7805 to cover any additional circuitry for a future revision.

The touch screen has a possible 8 buttons and I am only using 3 so I might revisit the software and add some functions, but as of this moment:-

Press CH 1 and right away up pops channel one video, press CH 2 and it cuts immediately to channel 2 video. Press the auto and the countdown pot for the displayed channel will fade the channel to black, then after small 1 sec delay starts increasing the other channel pot until the channel is displayed at full video level. The whole auto process takes around 4 seconds.

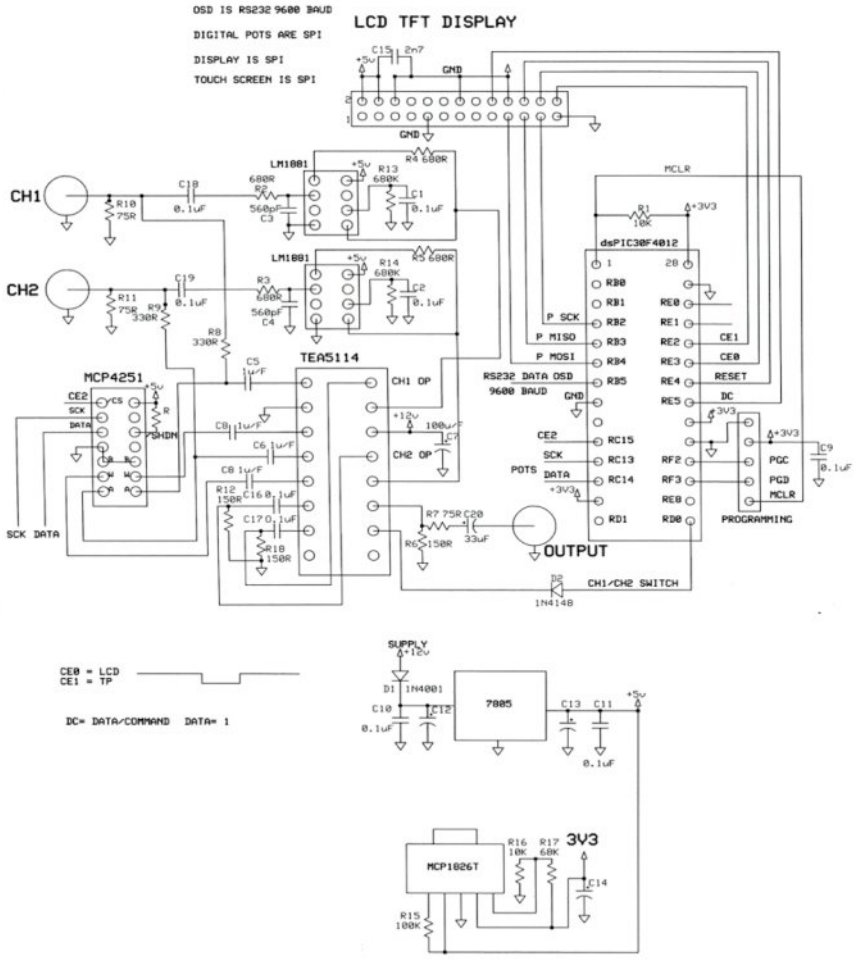
This provides the ability to cut between sources on the CH 1 and CH 2 buttons and the ability to fade the selected channel to black and fade up the other video channel. The MSG buttons are yet not implemented, but that's not to say that I won't be revisiting this project and adding functions in the future

Construction was on a single sided home etched PCB. There was what can only be described as continual development which involved some post etched surgery to the PCB to get the best out of the hardware.



To this end I won't publish the copper work or layout. The circuit diagram shows the final project. I will leave you to put together your own PCB, but this is what my project looks like and I am very pleased with result. This is now nothing like the CQ-DATV original, but I retained the LMM1881 sync separators and the same TEA 5114 switch, but time marches on and our expectations grow so we now have a 2019 version.

The current software for the dsPIC30F4012 is on the CQ-DATV download site.



The full circuit diagram of the FADE to Black unit

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*.