



In this issue

Editorial.....	2
DATV News.....	3
DATV-Express Project - August update report....	6
ATV Mast Project.....	8
Great Cow Basic Compiler Quick Overview.....	19
A 70cm DATV DVB-T 7 MHz band-pass filter using a cheap Chinese duplexer.....	20
Simple to build 8 Channel Video Switcher Project.....	22
Known DX Records for DATV.....	25
Information.....	26
Coming up.....	27

Production Team

Ian Pawson G8IQU Trevor Brown G8CJS
Terry Mowles VK5TM

Contributing Authors

Mick Ampt VK3CH
Ken Konechy W6HHC
Mike Stevens G7GTN
Dr Andrew (Drew) Wollin VK4ZXI

Welcome to CQ-DATV 40.

When in January 2014 we put CQ-DATV on a monthly publication schedule, we embarked on something that had never been attempted before for ATV and we did it because we passionately believed in ATV and set out to provide what was in our view necessary support to ensure its survival. The publication team would like to thank everybody who has got on board and produced the vital copy that is needed to keep this magazine afloat. Its thanks to your support that this free magazine is not only surviving, but flourishing.

The production team work hard to meet every monthly deadline and keep something running that costs nothing to its readers and delivers no expenses to those who work on writing, developing and delivering a monthly publication. Our thanks go to everyone that has contributed to this platform.

In this changing world, it would seem that ATV enthusiasts prefer to communicate electronically and that attendance at ATV events is in decline. The BATC set up a conference in Friedrichshafen and more recently their convention at CAT 16 and the attendance, was disappointing. This is sad, in a world where the footfall at either of these events could have once been in three figures, but this seems to be the way our hobby is moving. Cat 16 also reported the rising cost of printing and posting a paper magazine, seems not to be self financing proposition. Let's hope that CQ-DATV is not an experiment, but the way forward and that more of the traditional ATV magazines that are experiencing rising costs and declining demand take the brave decision to go electronic and buck the trends so they don't go the way VHF communications went in the UK. We cannot afford to lose publications in this way. Fortunately the Amateur radio publication world seems able to reinvent itself and the Dutch Kingdom Amateur Radio Society is a classic example with it free electronic publication <http://www.dkars.nl/index.php?page=magazine>.

Unfortunately the technology was not around when we lost the excellent Dutch ATV publication called 'Repeater' <http://www.cchmedia.nl/pdf/5-1.pdf>. ATV needs all the support we can jointly muster to get it from its analogue roots into the digital world, where it can exploit the technology and grow and expand.

Now we have the [publication] platform and are using it, so where to next? Well next month Grant ZL1WTT will put the first of what we hope is going to be a series of articles with a common theme on ATV repeater linking to try and come up with an approach and standard that we can all move towards.

Digital ATV has many advantages and is delivering reduced Bandwidth ATV that is increasing our communication power. There is a whole world out there that needs a common approach formulating, so that we can benefit from the power of Digital ATV, but there are also myths to destroy such as lossless transcoding when you convert from one compression format to another, such as Mpeg2 to h264, this can be compared to analogue video and copying from one VHS tape to the next and well we all know what happens. Digital is opening new doors for ATV, but at the same time there are many practices we need to embrace from how hard to push PA stages and which digital format is going to be the one that will deliver a universal digital ATV format. Our thanks to Grant in advance for taking the lead in grasping this digital nettle.

Please keep the copy coming and lets use this platform to support ATV not just in the UK but around the world.

CQ-DATV Production team.

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.

Get ready for simple USB-C to HDMI cables

HDMI Alt Mode lets devices connect directly without dongles or adapters.

HDMI Over USB-C

Connect a Native HDMI Source Directly to an HDMI Display.

No Adapter. No Converter.



More devices are starting to ship with USB-C connectors built-in, and today groups behind HDMI and USB announced another way to take advantage of it. That method is HDMI Alt Mode, which means cable manufacturers can build a connector that plugs directly from the port on your phone, laptop or other device into the HDMI port on a TV or monitor. With this spec, there's no additional dongle or adapter needed in the middle.

It's all pretty simple, with just a USB Type-C cable on one end, HDMI on the other, but there are a couple of drawbacks. It supports the older HDMI 1.4b spec instead of the newer HDMI 2.0b. What that means for you is that while 4K video, 3D, HDMI-CEC and Audio Return Channel are all supported, it won't be quite enough to send the newest Ultra HD 4K video with HDR. That's probably not an issue if you're just trying to play a video or two from your phone, but it's good to know.

Three TV anniversaries in 2016

Television has a long tradition in Germany, many important developments were made there and german companies pioneered TV technology. There are three TV anniversaries this year:

1. 1926 - 90 years ago the official "Telegraphentechnische Reichsamt" made first (mechanical) TV experiments in Germany.
2. 1931 - 85 years ago Manfred von Ardenne demonstrated at the 8. 'Großen Deutschen Funkausstellung' (radio exhibition) in Berlin full electronic TV as a world premiere (100 lines, with "Loewe").
3. 1996 - 20 years ago digital television started normal operation based on DVB standards (Digital Video Broadcasting).

On 28. July 1996 first commercial broadcasts in DVB-S started with "DF1", a pay TV group named "Kirch" (Munich) was a trailblazer of DTV and went "on air" with live sports and special movie programmes. The groundwork began on 10 September 1993 with signing the "Memorandum of Understanding" by TV stations, appliance industry, telecom network operators and administrations for the foundation of the european DVB project. These technical standards were used for first regular transmissions in 1995 and are now operational for satellite, cable and terrestrial TV broadcasts world-wide.

Digitalisation made way for "High Definition" TV too with up to five times more pixels. The Olympic winter games 2010 were starting point of HDTV transmissions by public-law stations in Germany. Some commercial HDTV stations already were on air (via Astra satellite) since 2009. Today that is standard even on terrestrial TV being updated to DVB-T2 HD (1080p50).

But technical evolution never stops, "Ultra HD" now gives even more resolution with extended colour space and "High Dynamic Range" (HDR), an impressive contrast on suitable displays. www.gfu.de

Digital Audio Broadcast amazes with pictures (Klaus, DH6MAV)

Dr. Willi Steul, director of the german-wide radio station "DLF", predicted a "Visual Radio". Is this meant as Online-Streaming? Well, there are some links found in Google, i.e.

<http://www.swr3.de/info/liveblog/SWR3-Visual-Radio/-/id=2569182/did=2928172/18jemog/>

In HD resolution some infos are "visualized live" by webcams in the radio studio. No problem for listeners with fast online access, but costly for German mobile phone users! More and more young radio listeners are lost to Online-Streaming suppliers like Netflix, Google, Amazon and YouTube. Picture transmissions could attract them again - an anonymous alternative to online usage is "DAB+". This needs more than 2-line text displays like in most DAB radio receivers!

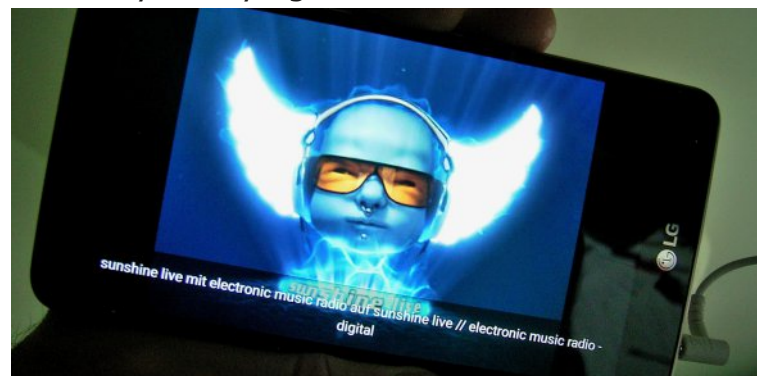
There is one world-wide supplier of mobile phones with internal DAB+ reception: LG from South Korea has developed a smart-phone "Stylus2", against all expectations of german mobile radio providers. Recently my first view showed an incredible lot of communication techniques in this tiny mobile (15,5 x 8,0 x 0,8 cm, display 5,7 inches with 1280 x 720 pixels): besides standard mobile frequencies DAB, FM, NFC, WiFi (WLAN), Bluetooth, GPS and LTE4.

The Stylus2 colour display is brilliant, even with direct sunlight on it all illustrations are visible. The internal attitude sensor enables to view pictures horizontal or vertical. A scrolling station listing can be inserted, much easier to handle than with 2-line text displays.

At home in Bavaria I found 58 DAB stations, and in Friedrichshafen at HAMRADIO 2016 it summed up to 75 with Swiss programmes in german, french and italian language. Another aspect is usability: I did not need any operating manual! WLAN access, app download, bluetooth loudspeaker attachment, FM and DAB scanning is easy, all done by touch-screen operations. But - for broadcast reception you have to plunge the earphone cable, as this is used as receiving antenna!

In Germany the DAB synchronized network installation will get finished in 2020, so not all DAB+ programme providers are supporting picture data transmissions today. In addition they have to finance the old simulcast FM broadcast net - on its own DAB+ is about 30 percent cheaper than FM. In the future it is planned to connect the visual radio viewers to studio and external offers, similar to HbbTV in Digital TV. So the slogan "HbbRadio" has been used for some time already. Passive DAB+ reception is anonymous like FM reception, but with HbbRadio like other apps you get known online - be aware. Audio programs broadcasted by DAB+ is fourty times cheaper than a mobile online distribution (in Germany).

While writing this text I am hearing a brass band - in our village this is sometimes done as a birthday surprise. I am going to the window to open it, but there I detect the audio source - the Stylus2 lying on the window sill...

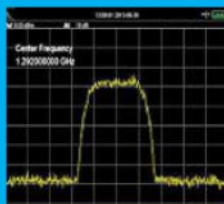


Translations: Klaus, DL4KCK www.agaf.de



Digital Amateur TeleVision Exciter/Transmitter

Now available from



DATV-Express



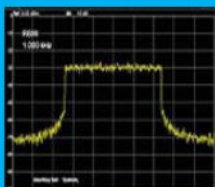
- A more affordable DATV exciter can now be ordered
- Fully assembled and tested PCBA
- DVB-S protocol for DATV (using QPSK modulation)
- Can operate all ham bands from 70 MHz-to-2450 MHz
- RF output level up to 10 dBm (min) all bands (DVB-S)
- Software Defined Radio (SDR) architecture allows many variations of IQ modulations
- "Software-Defined" allows new features to be added over the next few years, without changing the hardware board
- Symbol Rates from 100K to 8000K Symb/sec allows RB-DATV
- Requires PC running Windows or Ubuntu Linux (see User Guide)
- Price is US\$300 + shipping – order using PayPal



For more details and ordering

www.DATV-Express.com

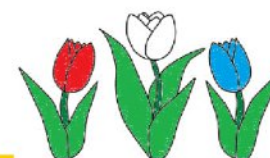
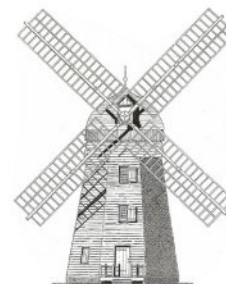
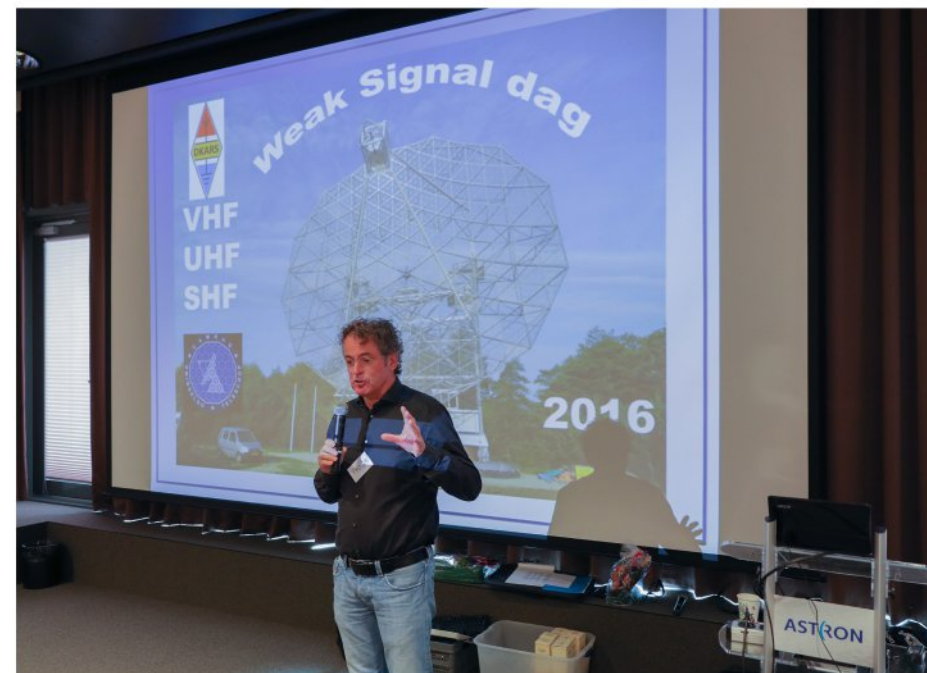
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DKARS MAGAZINE



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Verslag DKARS Weak Signal Dag



DKARS

Dutch Kingdom Amateur Radio Society



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

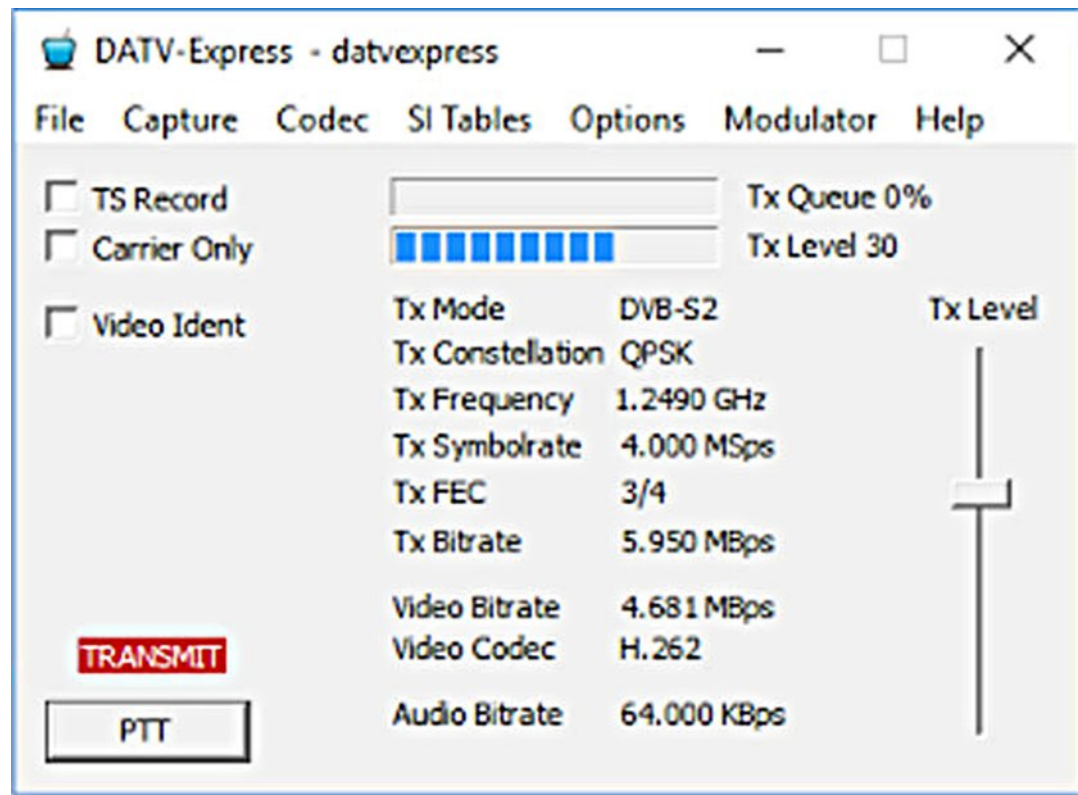
DATV-Express Project - August update report

By Ken W6HHC

Charles G4GUO has declared that the DATV-Express project team can now “production release” v1.11 of the Express_DVB-S_Transmitter software for English language Windows operating system. There have been plenty of beta-testers of v1.11 software world-wide. The only known bug at this time is that the v1.11 does not handle correctly the French language Windows operating system. Charles understands what has to be done to correct the French language issue in Windows...but does not run any French Windows in his lab to test any corrections he will make. If anyone can help test out French-language-Windows-correction versions with Charles...please let him know.

G4GUO has also been moving forward towards adding DVB-S2 protocol to the Windows software for the DATV-Express board. To this goal he has ported his Linux DVB-S2 implementation over to Windows. The actual implementation is a C++ class and runs almost entirely on the host. This means DVB-S2 uses more CPU resources than the DVB-S implementation does. As Charles explains, the DVB-S2 protocol is just too large to fit inside the FPGA coding (as the DVB-S coding does) so it has to run on the Windows PC.

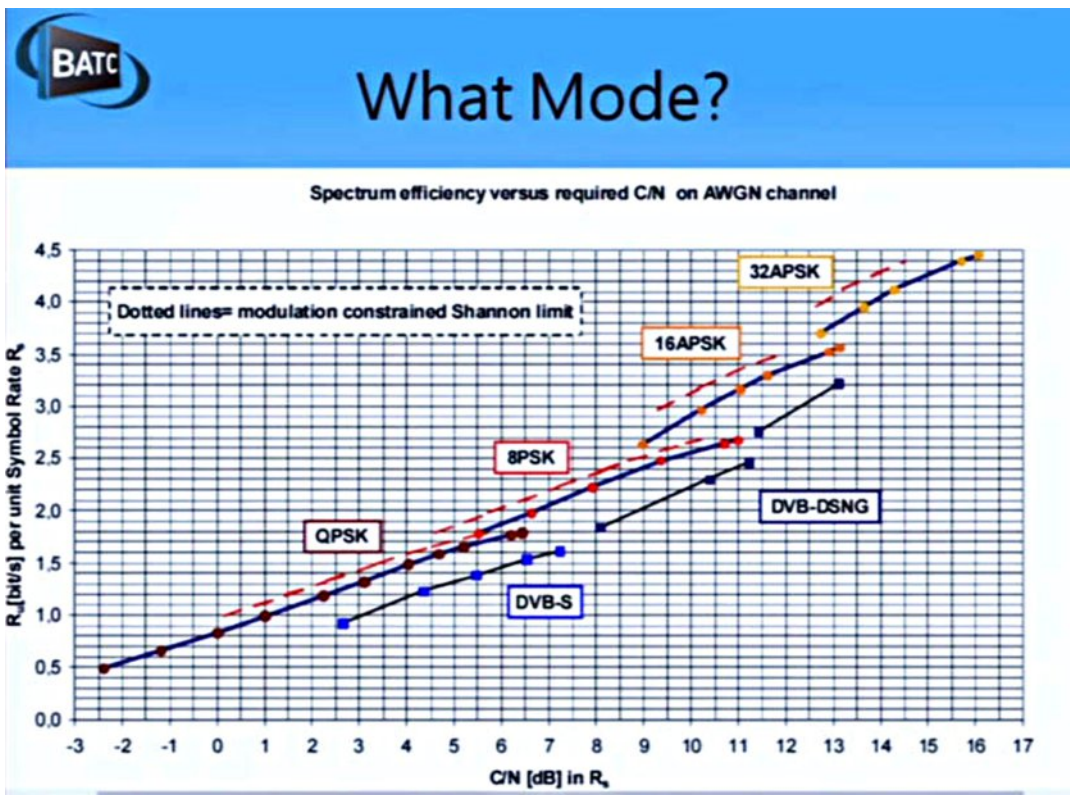
The incentive to port the DATV-Express linux coding for DVB-S2 over to Windows is that the recent AMSAT-UK conference announced that the DVB-S2 would take a starring role in the new Es'hailSat-2 geostationary satellite to be launched in 2017-Quarter-3. Dave G8GKQ explained with the graph below that DVB-S2 protocol is more robust and can provide better signal-to-noise (called CN - aka carrier-to-noise) ratio reception in weak signal environments.



Prototype of Users Interface for running DVB-S2 protocol on Windows.

The biggest DVB-S2 problem for hams today is that commercial receivers for DVB-S2 protocol do NOT receive Symbol-Rates below 1 MSymb/sec. The good news is that hams are looking at solving this RX low-Symbol-Rate limitation.

Ken W6HHC had some time to play with the free vMix Basic software companion-product for the Express_DVB-S_Transmitter on Windows. The nice new feature is that vMix can be set to use a JPEG file as a video source for a “test pattern” or a beacon-like photo. See the screen-capture below using Ken’s favorite “test pattern JPEG” in the upper-right corner. (No more Imprex hardware box is needed any more for my “test pattern generation” from JPEGs!!).

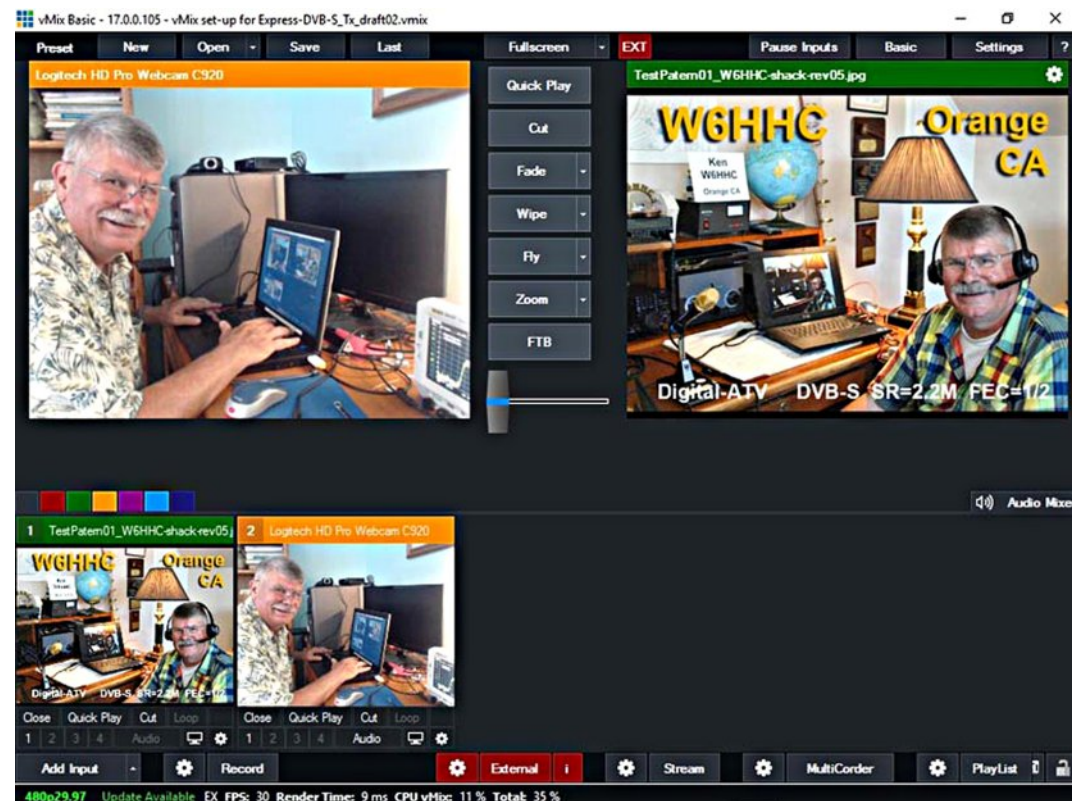


This graph shows that DVB-S2 protocol is more robust compared to DVB-S protocol by at least 5 dB (courtesy of Dave G8GKQ)

The final vMix feature Ken confirmed is he can configure vMix to perform a slide-show function from a group of JPEG files.

Ken also finished the "production release" version of the Users Guide for Windows (draft09). This latest draft (based on the v1.11 software) clarified some of the details for GOP used in video compression encoders, thanks to the notes and suggestions provided by Noel G8GTZ.

The latest Users Guide for Windows PDF can be downloaded from the project web site at <http://WWW.DATV-Express.com> using the DOWNLOADS page.



An example of running vMix Basic video software with one camera and one "Test Pattern" JPEG

Finally, Charles G4GUO has been asked to create a video to go with his CAT16 talk at the end of September and that is going to be time consuming no doubt.

"Project speed set to slow" ...de Ken W6HHC



ATV Mast Project

By Mick Ampt VK3CH

After operating amateur radio at my place over the years, antenna experimentation has graced the house roof. The antenna farm has flourished and grown; as has suburban commercial development.

A letter stating that our area was rezoned and a notice that two lots of three story apartment blocks were to be built over the road from our place was sent by the local council. Over the following months, the building works and noise commenced but somehow they had become five story units.

This new height obstruction just happened to be right on the edge to the path from my antennas to the Melbourne Amateur Television Repeater, one day I was no longer able to trigger VK3RTV, even on high power.

Therefore, my options were, give up on ATV, destroy the new apartments, move house, or try to increase my antenna height. Destroying the apartments would mean hassles under terrorism laws, moving was too much work, so height was the best answer.

At its peak, my roof had 18 separate vertical antennas or beams for amateur radio, covering MF, HF, VHF, UHF & SHF and a discone for the scanner.

Using Google Earth, paths between my house, the new apartment and the VK3RTV site was mapped and the new height required above my existing roof top line calculated being eight meters, an increase of seven meters to where the ATV beams were currently.

Getting approval for an eight meter mast above the roof, for amateur radio purposes from the XYL would seem a big ask,



Roofline View Before Work Commenced – February 2016

until the new apartment messed up our domestic TV reception. I told her that some antenna consolidation would occur with many antennas disappearing off the roof and her TV reception would return. After that, permission was granted! However, to be certain, the mast was erected while she was away overseas, so on her return it was all a “done deal”.

Along with a new mast, now was a good opportunity to “prune” some non-essential items and cut down on any metal guy rope interference, plus any other close antenna interaction.

In all eight antennas, a mix of verticals, beams and a discone removed, most of these were from the early EchoLink and IRLP days when my station was a repeater node for a while.

Then the coax line tracing inside the roof back to the shack done, six RG213 coax, two thin RG58 coax, some DC leads, Ethernet cables and two phone quad cables all traced and removed. Some I cannot even remember what they were.

The new mast installed in the roof attic, attached to wood supports for the roof, at the edge of the three roof slopes for extra strength. Passing through the roof the mast tilts over lowered by a self-braking winch, with guy ropes to maintain it vertical in the wind.

The guy ropes pass through pulley guides and come back to the base of the mast. Locking bolts ensures it remains vertical.

When it is lowered the ropes are untied, passing through guides and are pulled back through when the mast is wound back up.

No need to place you in harm's way at the edge of the roof, a one-man job, but only ever done in calm weather, no winds allowed.

Some of the verticals are to be moved closer to the top of the roof on an external flat platform attached to the roof.

This will remove many off the common roof area between the two houses. My next-door neighbour is OK with me using the common space, but future neighbours may not, so it was a good idea to take care of any future drama now and the rooftop will look much neater and draw less attention.



View from the base of the new mast, with one of the apartments under construction, the green arrow indicates the exact RF path location of the VK3ATV repeater site to access, right on the edge of the fourth story level.



The new mast seen without anything on it on left and just a TV antenna attached on the right as a wind load test before adding the rest.



Six black guy ropes can be seen attached just under the log periodic TV yagi beam.



The view from across the front of my house, looking across the road at the new building, the black arrow indicates the path to VK3RTV and the commercial Melbourne TV station towers at Mount Dandenong that is required to clear to access them.

Note the EHT power lines on the wooden pole right in front of the building; if the building were located only 6 to 10 meters to the North, no need to do anything there would have been no signal obstruction.

On the left, in front of the streetlight, another apartment block of same design and size is going up, but that is away from being an RF problem.

Because the uplink to VK3RTV is on 23cm, reflections off the windows and absorption and reflection from all the metalwork in the building will cause interference, the requirement to "aim" the 23cm beam right through and just over the fourth level is tight.

The mast itself is an 80mm square pipe for strength, with 2 meters internal to the house attic space attached to wooden roof supports.



Before the work and antenna and radio consolidation, here is the roof and shack, with eight radios and a scanner, back in May 2004...

Another 3.8 meters (base mast) appears above the roofline where the top hinged from the rest of the mast.

The top tilt mast is 4.3 meters in length. Into this is 6 meters length of round pipe, a meter that is inside the square tilt mast.

The top of my roof apex is 8 meters above the ground. An additional 9.7 meters of total mast height to the top extends from there.

This gives a total top mast height of 17.7 meters from the ground, or house floor level, or 58 feet in the old measurements.

Google Earth puts my house ground level as 36 meters above sea level, not surprising when you have a creek at the end of the street.

This puts the top of the mast where the 23cm 45-element ATV TX loop Yagi beam is located as being 53.7 meters above sea level.

Prior to the mast installation, the ATV beams were 9 meters lower.

If you are from "old school" a height gain of 9 meters or 29.5 feet, the new extra 9.7 meters of mast above the roof is 31.8 feet.

EMR Considerations

ACMA (Australian Communications and Media Authority) has rules regarding Electromagnetic Radiation (EMR) exposure to humans and animals in public places.

Any antenna that has an EIRP (Effective Isotropic Radiated Power) exceeding 3200 watts requires ACMA Level 2 Compliance.

Effective Isotropic Radiated Power (EIRP) is the output power when a signal is concentrated into a smaller area by the Antenna.

At 23cm and above this is surprisingly easy to achieve EIRP radiation of such large emissions.

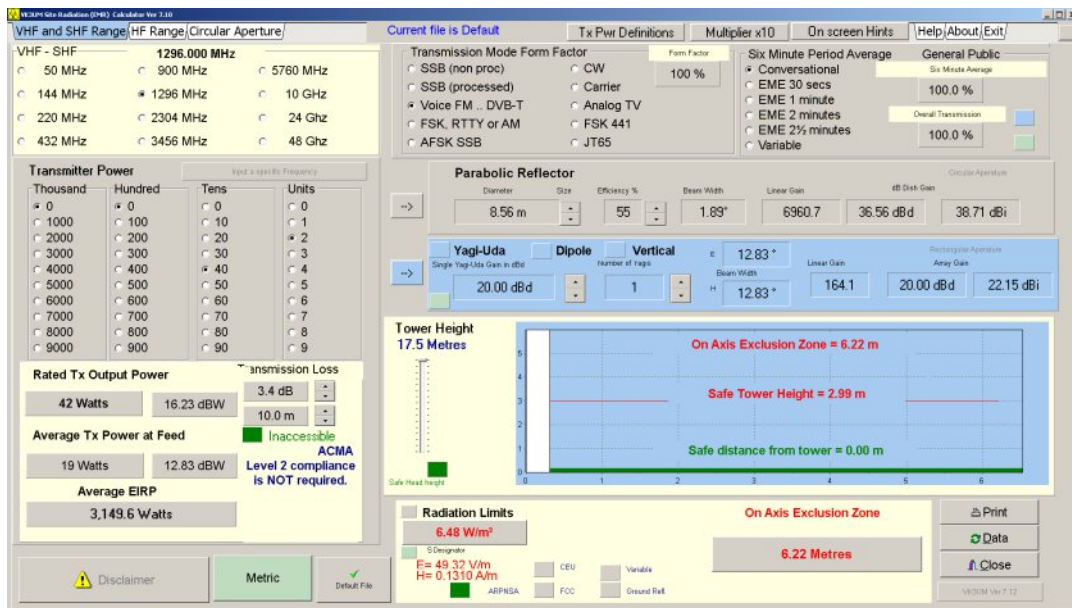
There is an EMR calculator available on the WIA website written by VK3UM, current software version 7.12

Plugging in the values at ATV frequencies on 23cm with 25 meters of LMR-400 coaxial cable transmission loss is 3.45dB, as the cable has a quoted loss of 13.8dB per 100 meters at 1000GHz. With an additional 255MHz, the losses will be just slightly higher.

I have assumed the connectors have no loss, so my estimates are leaning on the safe side for losses.

Using the EMR calculator, the most RF power leaving the ATV Transmitter in the shack can be 42 watts, before the 45-element 23cm ATV beam, giving Level 1 compliance, radiating under 3200 watts (EIRP).

With 17 meters height, the safe distances from the public are in compliance. The mode of ATV has a 100% transmission form factor.



A screenshot of the EMR calculator with 42 watts ATV TX output into the 45-element beam, with the 3.4dB coax loss

The on axis exclusion zone from the end of the beam is 6.22 meters, which is still just within the property boundary of the two houses.

The safe tower height is 2.99 meters, so if a person was standing on my roof as I was transmitting on ATV, the mast height of 9.7 meters above the roof still gives adequate safe distance from the beam.

In normal use, the ATV transmitter will only output a few watts from home to trigger VK3RTV, so the actual EIRP output is 599.9 watts, with an exclusion zone of 2.71 meters from the front of the beam, at 8 watts output on the transmitter in the shack.

On 1246 MHz the peak output is only 4 watts, on 1255 MHz it increases to 9.5 watts – all way within safe EMR limits.

On a clear non-moist day, 2 watts will suffice to get into VK3RTV, which is all I need most times, in rain 3 watts is enough usually.

At work, all that is required is 25 milliwatt, but work is on higher ground.

Receive Dramas

Previously a dedicated beam cut for 446.500 MHz was enough to receive VK3RTV from home. Not only was 70cm tough to get a good signal, obtaining reliable signals from Mount Dandenong was still a hassle even with height.

It was good unless it was raining, then you had pixilation or total dropouts.

I decided to use the city TV translator site at 600 Bourke Street Melbourne CBD that runs 270 watts, vertically polarized.

According to their coverage map, I was located in an excellent reception area, they were correct. The house TV mast relocated to point to the city buildings at the western end of the CBD where the TV translator tower was.

This was one less antenna going on the new mast. The existing TV preamp was years old so a new one purchased with dual outputs, saves using another splitter/combiner.

Instead of having two different coax joined a splitter/combiner joins the two antennas, TV & ATV together then into the preamp.

Coax from the ATV RX beam replaced with high quality RG8 TV coax as well. After these improvements, perfect ATV reception obtained on both TV's in the lounge and in the radio shack.



**TV antenna beaming vertically to 600 Bourke Street
Another house height extended up in this direction. Work
started on this two months ago**

Changes to VK3RTV

VK3RTV has an analogue input that used to be on 1250 MHz but has been moved to 1283 MHz. The sensitivity is about the same as previously on 1250 MHz. If the analogue input signal is weak it will require a bit more video drive, proper set up of the video signal is important.

Stereo audio is operational but default is monaural. Stereo selected by Touch Tone Code.

1283 MHz Analogue will experience interference from the D Star Repeater, which is no more than 200 metres away and is right on the edge of ATV Channel 2, it is not very active, however.



**Green outer windows now added - more height to get
over! another meter height 'lost' with the new mast, what
a saga... the march of progress is choking my hobby**

VK3RTV1 1283 Analogue FM or 1255 MHz DVB-S.
First in keys it up.

VK3RTV2 1246 MHz DVB-S.
If inactive, video from VK3RTV1 seen on VK3RTV2.

BATC streaming is serviceable. Streaming live at www.vk3rtv.com but note most of the information in the site is way out of date.

Touch Tone Codes are shown in the table on the next page.



Mast lowered over next doors roof, 70cm ATV RX beam sighted to VK3RTV

Code	Action
; TT0.TT0 = \$AA	Spare
; TT0.TT1 = \$1A	Colour Bar and Tone Burst
; TT0.TT2 = \$2A	Colour Bar
; TT0.TT3 = \$3A	Select Analogue Stereo
; TT1.TT0 = \$A1	Beacon Mode
; TT1.TT1 = \$11	Digital Signal Report CH1
; TT1.TT2 = \$21	SMPTE Colour Bar
; TT1.TT3 = \$31	Analogue Signal Report
; TT2.TT0 = \$A2	VK3RTV Camera
; TT2.TT1 = \$12	Green Screen
; TT2.TT2 = \$22	Digital Signal Report CH2
; TT2.TT3 = \$32	Red Screen
; TT3.TT0 = \$A3	Blue Screen
; TT3.TT1 = \$13	Digital Receiver Exit CH1
; TT3.TT2 = \$23	Digital Receiver Exit CH2
; TT3.TT3 = \$33	Spare
; TT4	User Reset

With receiving VK3RTV completed, it was time to install the 23cm loop yagi on the top of the mast; this adds 2.5kg of weight.

Each individual ring element was unscrewed and reattached with a dab of JB Weld glue so that they remain aligned with years of wind and birds landing on them. This 45-element beam is the largest ATV TX beam I have with a boom length of 3.658 mm.



Checking the yagi ring elements for accuracy

It has a 3dB beam width of 18 degrees, with front to back ratio of 20dB. It can handle 400 watts.

Well it was going to be used – BUT it was too long to reach to mount!

Now I had to use a lesser 33-element beam. This was the same beam I previously had on the roof, less weight however.

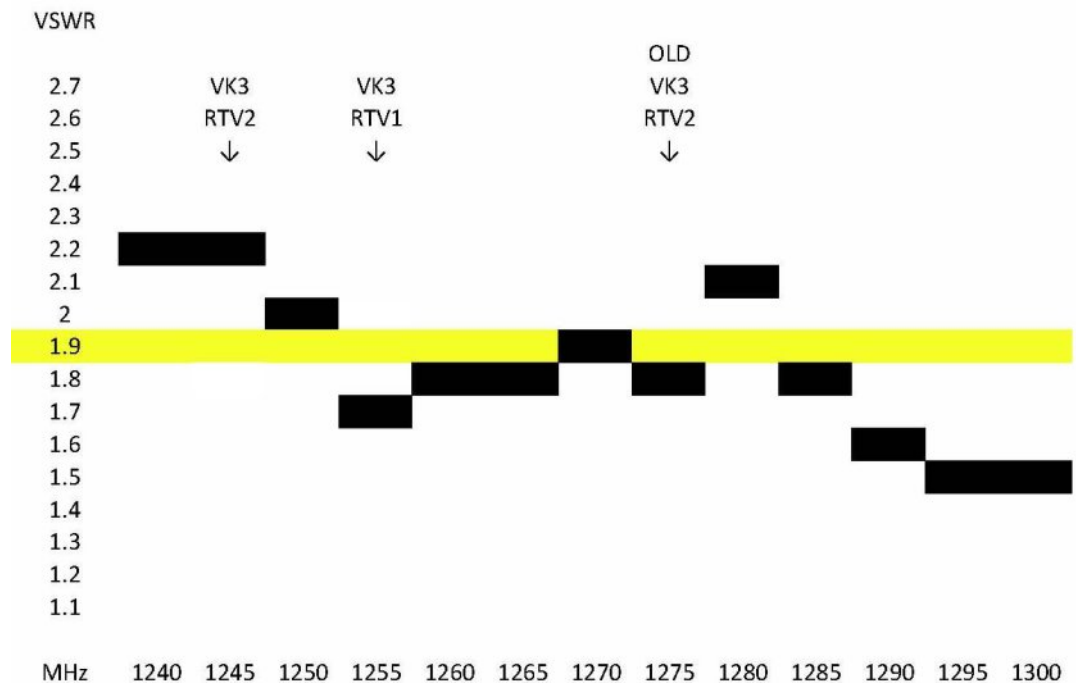
This mounted to the mast top, by just reaching over next door's roof, with a safety harness, to the nuts to tighten it on.

Then the mast was then raised slightly so the beam could be turned and sighted to VK3RTV.

This done by aligning it with the receive ATV beam below.

Now that the 33-element beam is used, my EMR considerations are even lower.

Finally, the day had arrived, time to test and see if it worked, VK3RTV1 reached perfect on just 1.3 watts, 700 milliwatt was enough to trigger and hold the repeater, but with occasional dropouts. 4 watts enough in very strong rain, leaving plenty in reserve.



The VSWR chart plotted using the IC-9100 to test on 23cm, where the ATV repeater spots were was not the best VSWR. Later the rings will be manipulated to improve the lower end of the band. A VSWR of 1:2.0 equates to a mismatch loss of 0.55 dB



The ATV TX with power output on Level 4 out of a range of 1 to 15, 2.2 amps so not near the 5 amps limit, less stress on PA.



The ATV 23cm beam placed on the mast



View from the other side of the street from new building



VSWR of 1:1.7 on VK3RTV1 at 1255.000MHz. Forward power from shack of 1.3 watts with 0.75 watts reflected back

The coax run ended up being just 20 metres instead of 25 meters, so with LMR400 coax the calculations are:

Transmitter Power on 1255.000MHz – 1.3 Watts – VSWR 1:1.7

Matched Loss – 3.048dB

VSWR Loss – 0.23dB

Total Loss – 3.278dB

Power Output to Antenna – 0.564 Watts

FUTURE SIGHTING

The apartments are having an open day for inspection, even though all units sold, but another is going up down the road.

That opportunity to photograph the view to my beams, also to the VK3RTV repeater site not missed.

Maybe I should have just snuck a mini ATV repeater up on their rooftop!

Any privacy in my back yard is gone now; time to plant some tall trees...

INVERTED 'V' 40 METERS

With ATV sorted, time to install an "outrigger" pole and install an inverted V off the mast.

A pulley is on the end, so the inverted V antenna raised and lowered on its own for tuning and maintenance.

I decided to copy the antenna to work and selected 40 meters as the band of choice, other bands to be tunned by an ATU.

To keep losses and weight down, 450Ω ladder line used.

At the time of putting this issue out, this new inverted V is still a work in progress...

After that is up, I will take down the long wire that ran to the creek.

I will miss the wire however, great from 160 meters to 6 meters.

TURNING BAD INTO GOOD

Before apartments built, we had ATV, TV reception and life was easy... after a lot of planning, work and expenditure, now:-

- Improved ATV transmit and reception, with lower power required to trigger and hold the VK3RTV repeater
- Improved domestic TV reception
- Removed many redundant antennas (eight in all) making the roofline less obtrusive to other residents
- Removed all the metal guy wire RF interaction
- Removed all redundant coax and wiring from roof, ceiling space and radio shack
- Traced and documented every coaxial, DC and video cable on the roof, know where they go and know its function
- Renewed all ATV antennae, connections, waterproofing – maintenance right for many years to come
- Removed most antennae from the shared roof space from next door, the 160 meter vertical the last remaining there
- Treated rust areas on the roof to halt any permanent damage and cleaned out all rubbish, nuts, bolts, wire off cuts
- Removed unused masts, pipes, brackets, took away any loose spare bits that could be blown away by wind from the roof

Now its time to have something interesting to put up to ATV, I might start with a celebratory BBQ...

You can watch that on the ATV Streaming page if you are outside of Melbourne, at <http://nevarc.org.au/atvfeeds.html>

CQ-DATV

dotMOBI



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ESA-Astronaut Tim Peake, KG5BVI, im Columbus-Modul der ISS

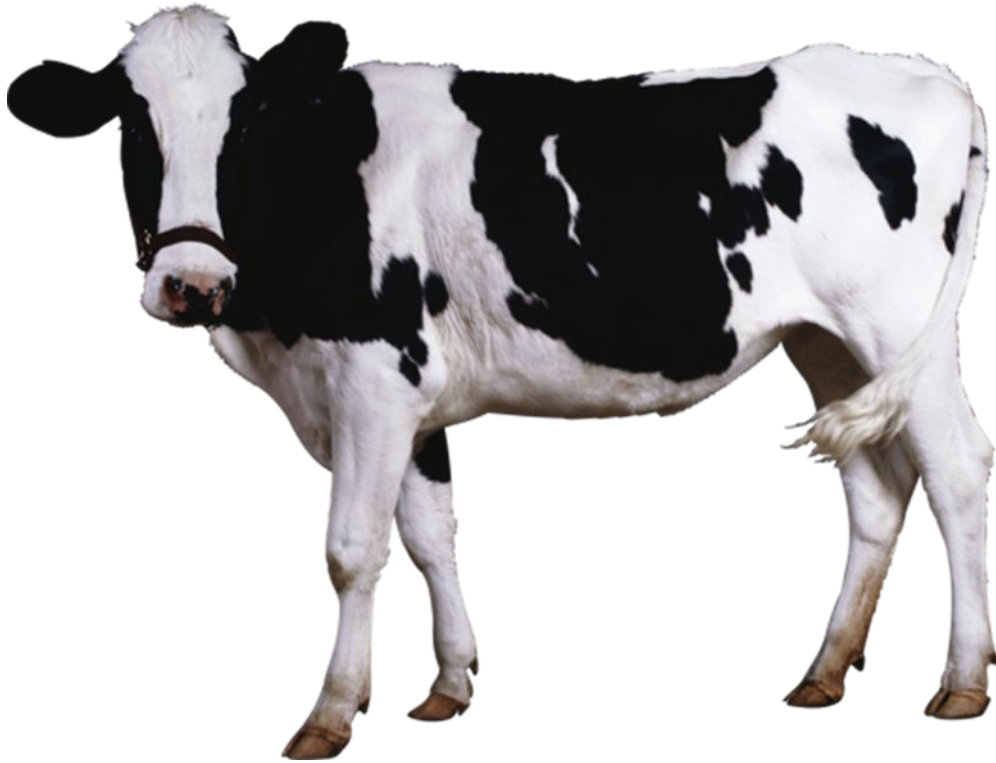
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TV Amateur is a German Language ATV Magazine It is published 4 times a year and if you would like to subscribe go to <http://www.agaf.de/>

Great Cow Basic Compiler Quick Overview

Mike G7GTN



I was recently looking for a Microcontroller software compiler solution that had a robust set of commands and additional libraries but with a free cost. I found an excellent solution in the form of Great Cow Basic.

If we can ignore the somewhat strange choice of name for a moment we get some really excellent software that can target both the PIC and AVR Microcontroller range of processors that we are already quite familiar with in our project designs. On the PIC side we can go up to the 18F range, at present not sure on any expansion plans the author & developers might have for higher end devices such as 24F, 32F or dsPIC.

I suspect very radical & significant changes would need to be in place within the compiler code to see this actually any time soon.

You can download this totally free package from <http://gcbasic.sourceforge.net/>

Installation was as simple as unpacking the ZIP file in to a directory of your choice.

Of course many will see this as a kind of cop-out when we should be programming at the assembler level. This is basic (no pun intended) and allows quick proof of concept things to be very easily put together.

To me the biggest benefit is the ability for others to take some source I have written and re purpose and then compile freely without having to reach into your wallet and purchase sometimes very expensive software or struggle with some unfamiliar language that makes you have to go through a learning process to make even minor changes you wish the original author had actually thought of.

I fully recommend that others also download this software and see what you can then go and create. A very friendly support forum is also run where help and advice is freely available to get you over any programming issues on your own particular project.

I have a simple TV Testcard control project with the magazine editor to show a practical usage example of this software in a practical context. I will certainly be making more use of this for additional projects in the future and believe is worth you exploring for yourself.

Remember you can target over 900 devices from the PIC & Atmel range using the exact same compiler – so sure to be something for everyone.

A 70cm DATV DVB-T 7 MHz band-pass filter using a cheap Chinese duplexer

By Dr Andrew (Drew) Wollin - VK4ZXI

Introduction

DATV transmitters for DVB-T are notorious for “spread” outside the channel, to the point that keeping it 30 dB or more below the signal becomes a limit for power output, typically 10 W out of a 70 W module amplifier.

Even with -30 dB spread, it is desirable to have a band-pass filter before further amplification or transmission. Usually an interdigital filter is used, but they are either expensive to buy or a bit difficult to build.

VK4JVC suggested using a cavity filter duplexer instead. I tried a four cavity notch duplexer, but the pass-band losses were too high, more than 20 dB. I had bought a cheap, ~A\$100, Chinese Jiesai duplexer, but had put it aside as the response looked bad. After try other duplexers (notch and pass-reject types), I tried the Chinese one again, this time successfully.

The result is that the Chinese filter seems to provide a good pass-band for the 7 MHz DVB-T DATV signal with acceptable pass-band losses and steep skirts. The next test is to try it with my 10 W amplifier from Darko in Austria.

The filter

The duplexer is a typical mobile device available on eBay for about A\$100 delivered, taking a week or so to Australia. The store insisted I supply some tuning data, even though I was immediately going to change it. I specified 440.5 and 446.5 MHz to keep them happy.



It came with notches at those frequencies, but had not been well tuned.

The filter has three square cavities for each of RX and TX. The only adjustment is a screw at the top that capacitively alters the cavity's resonate frequency. There are no other adjustments. Each cavity has an cable in and out, but they seem to be notch filters rather than pass-band.

I am not sure what the power handling capacity is, 25 W, from memory. That would make it an adequate final TX filter for most DATV applications.

Tuning

The Australian 70 cm DATV band is 7 MHz wide centered on 446.5 MHz, with edges at 443 and 450 MHz.

I use the whole 7 MHz as it makes reception on conventional TVs easier and I want high quality 1080p.

Using a HP 8591A spectrum analyser and tracking generator, re-tuning is quite easy. Three cavities at a time first (RX-ANT, TX-ANT), then checking all six with the input and output through the RX and TX connectors, ignoring the antenna connector.

I have tuned the cavities to about -3 dB at the channel edges. The loss through all six cavities is about 2 dB which indicates quite reasonable construction. The side slopes are quite steep.

I am not sure this tune will be adequate to suppress the channel spread, but I will re-tune to find an acceptable

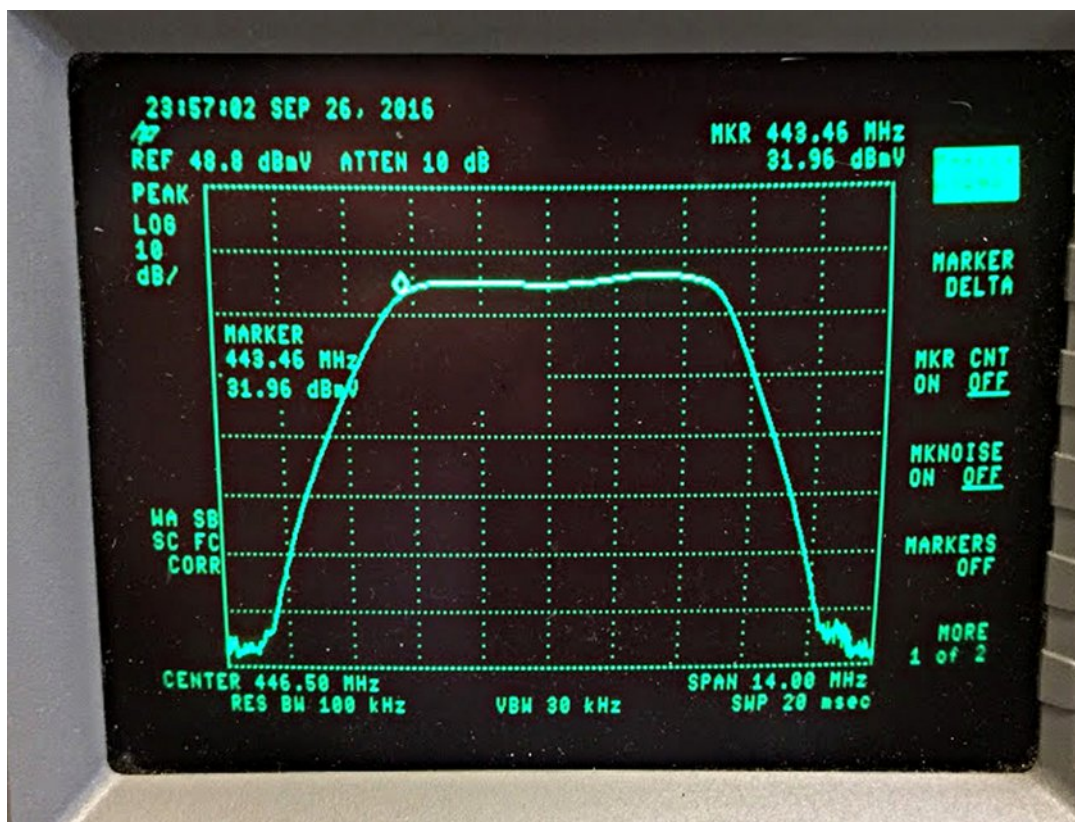
compromise. I may need to narrow the width, but without affecting the TX signal.

Conclusion

A cheap Chinese duplexer has been re-tuned to produce what appears to be an acceptable TX band-pass filter for a 7 MHz wide channel on 70 cm.

Despite their reputation, the Chinese duplexer seems of reasonable quality and has typical characteristics for this type of device. The original tuning was indifferent, so should always be checked.

Next month the Drew will describe his testing procedures.





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- ▶ Web site – where you can find our online shop stocking hard to get components, software downloads for published projects and much more.
- ▶ A members forum at www.batc.org.uk/forum/ for help, information and the interchange of ideas.
- ▶ A video streaming facility at www.batc.tv which enables repeaters and individual members to be seen worldwide.
- ▶ An annual Convention held in the UK where you can meet other members, visit demonstrations and listen to lectures.
- ▶ Meet other club members at the BATC stand at local rallies across the country.

www.batc.org.uk



Simple to build 8 Channel Video Switcher Project

Mike G7GTN

I required a quick but simple to build Eight Channel Video switcher and came up with this very simple design.

I used one of my in stock Maxim MAX455 devices as the video multiplexer element.

You can quite easily swap this for a different device and modify the appropriate section of the source code to drive your own chosen video switching part if so desired.

Hardware Features

- *Ardunio NANO Controlled*
- *LCD (16X2) with 2 line large numeric digit display for selected video channel*
- *Sony IR Remote Control to select your required video channel*
- *Optional CW channel indication tone – can be quickly turned off with one code change*
- *14 Ardunio I/O Pins left spare for your own modifications and subsequent additions*

Circuit Description

The heart of the design is a small Ardunio board called the NANO which contains an ATMEGA328P these are very commonly available from eBay for just a few pounds. The LCD is based on the standard HD44780 Chipset and controlled via the I2C bus using a small additional backpack module.

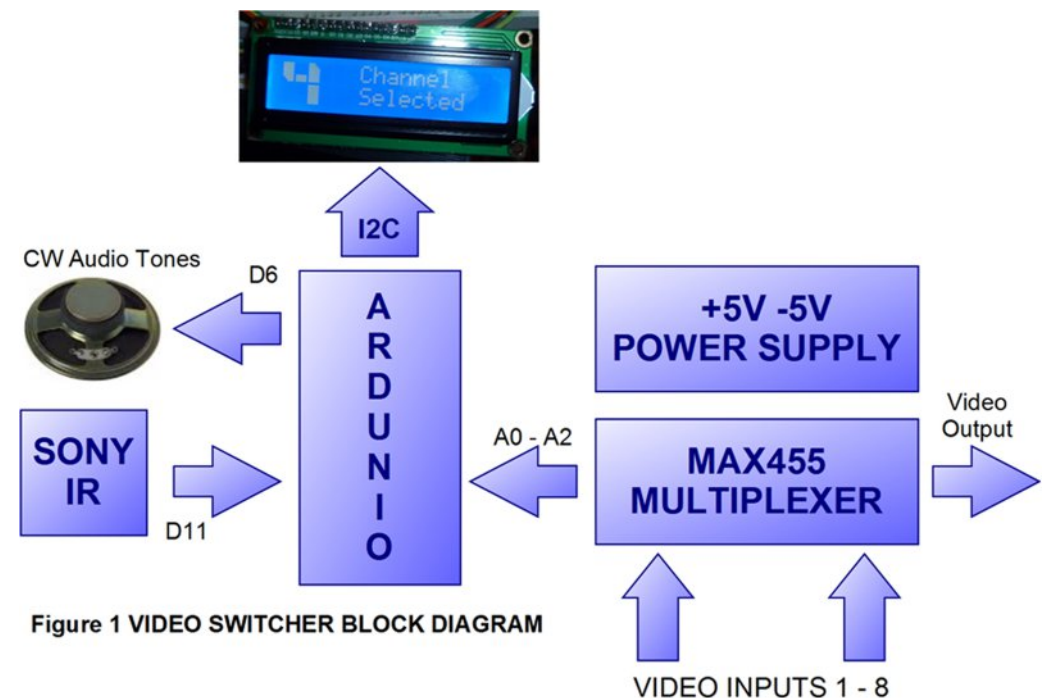


Figure 1 VIDEO SWITCHER BLOCK DIAGRAM

This was to save as many pins as possible for any future additions. The user channel switching is handled by an IR sensor (type TSOP2838) using the Sony SIRCS Protocol.

The MAX455 device is a slight pain in that it requires a split power supply arrangement of +5V & also -5V. This can easily be realised using an ICL7660 or equivalent voltage converter IC feed from the clean and stable 7805CV +5V supply rail.

The MAX455 video switching section is shown in Figure 2 the Ardunio Nano loads the required binary sequence on A0-A2 to switch channels. An optional LED can be connected to I/O D7 to show the code is running.

Construction

My prototype was realised using an Ardunio NANO Module with the video matrix and associated +5V power supply both on small independent sections of through pad prototype boards.

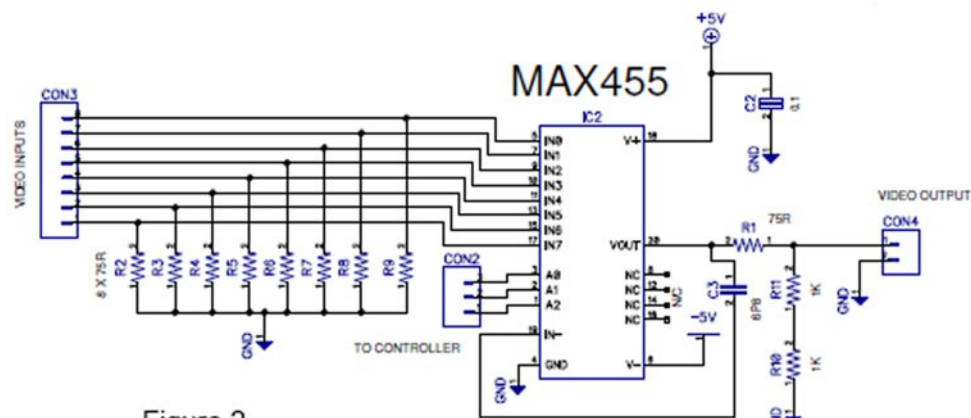
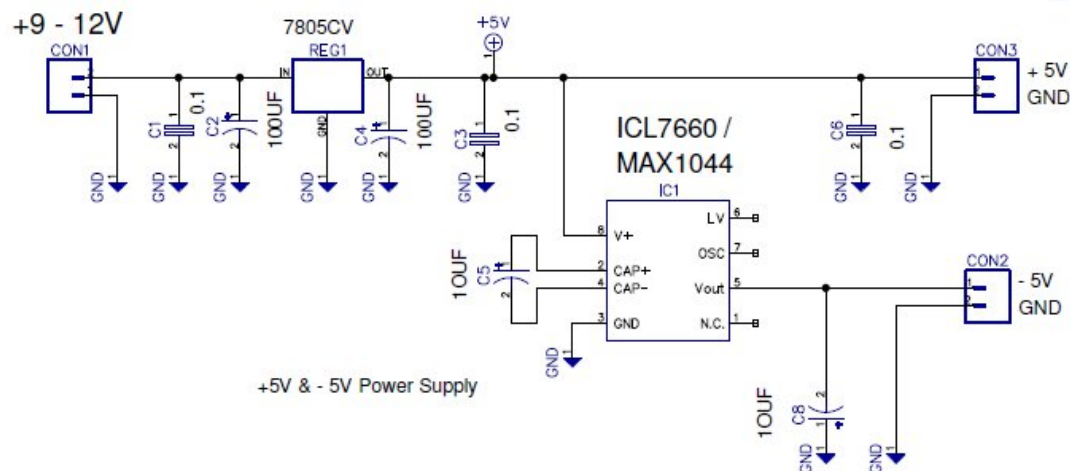
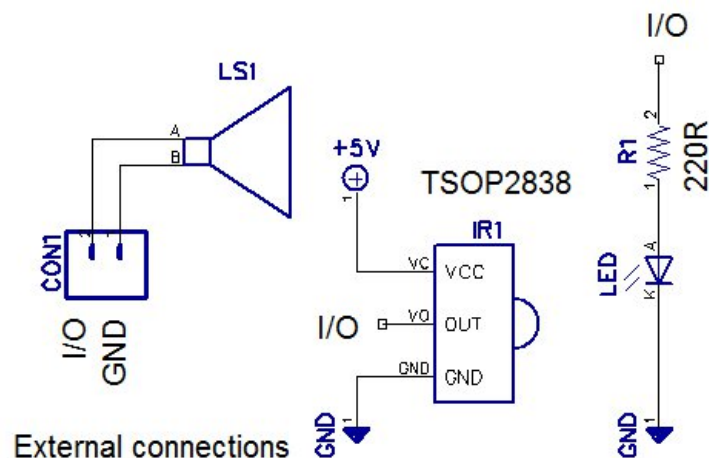


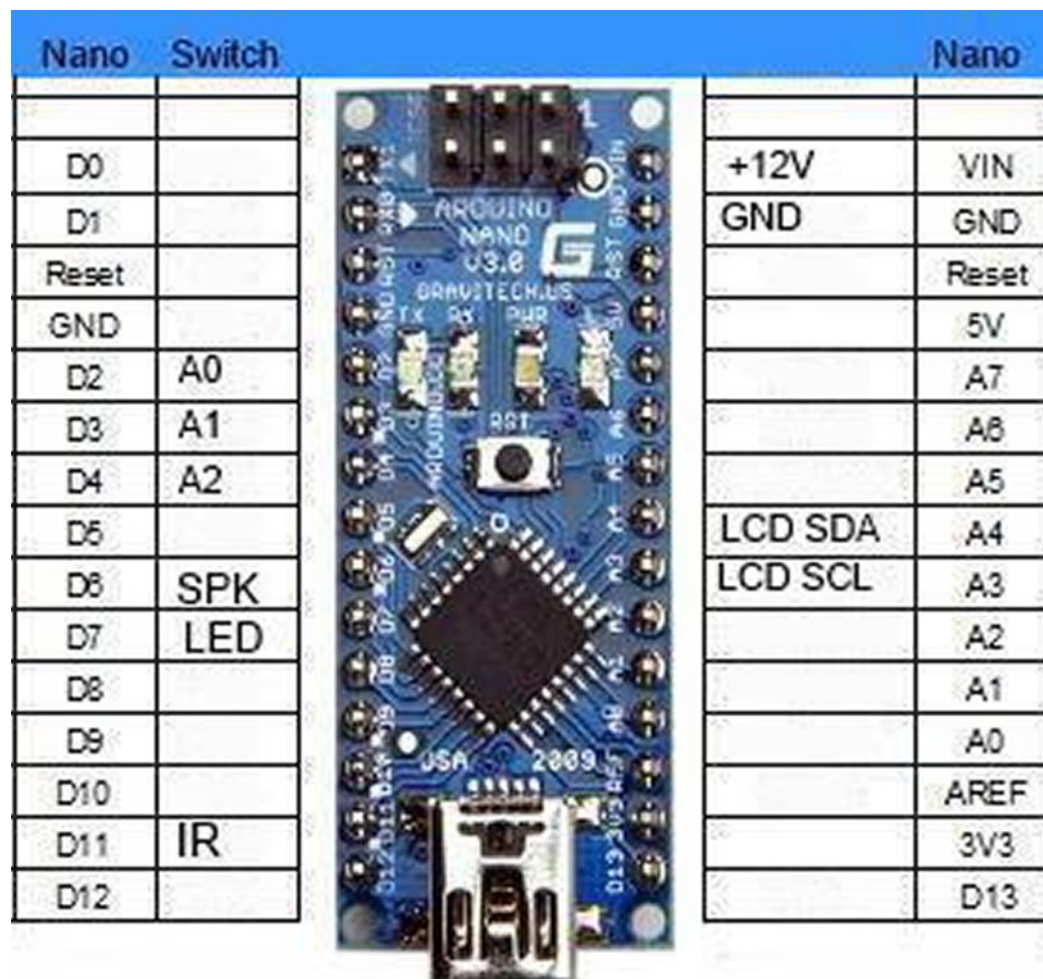
Figure 2



+5V & -5V Power Supply



External connections



I used a surplus metal cabinet to house all the electronics including a small enclosed mains switch mode power supply module. A series of eight BNC sockets were used for the video input connections, with both front and back BNC output connections.

The Sony IR Sensor was purchased as a small eBay module with the sensor face being visible through a hole drilled in the front panel and when correctly aligned a small dab of hot glue was then used to fix this securely in position.

Compiler Library setup

To be able to compile or make changes and modify the source code as supplied you need to install the supplied files from the switch455.zip in to your working Arduino Libraries sub folder.

Just unzip these and copy the directories as is directly to this location. If you had the Arduino IDE already open, then just close this and reload the switcher source code.

The code file that you need to load is SwitcherLCD.ino You can now upload this in the normal way to the Arduino NANO module.

Operation

The device was controlled using a generic remote control handset. This has to be set to Sony Protocol, and code page 0140 worked on my prototype and final unit without fault.

Keys one to eight will select between the different channels. Channel up and down will either turn the LCD backlight on or off. These LCD backlight settings are written to Eeprom and again restored on the next power cycle.

A CW audio indication of the channel selected is sent via a small 8Ω speaker (quickly configurable within code to remove) or even better do not connect a speaker if you do not want to be delving in software.

Equally the LCD can be dispensed with and channel number can be notified in CW alone.



**Above: Prototype & code development
Below: The Arduino NANO module used**



Known DX Records for DATV

by Ken W6HHC

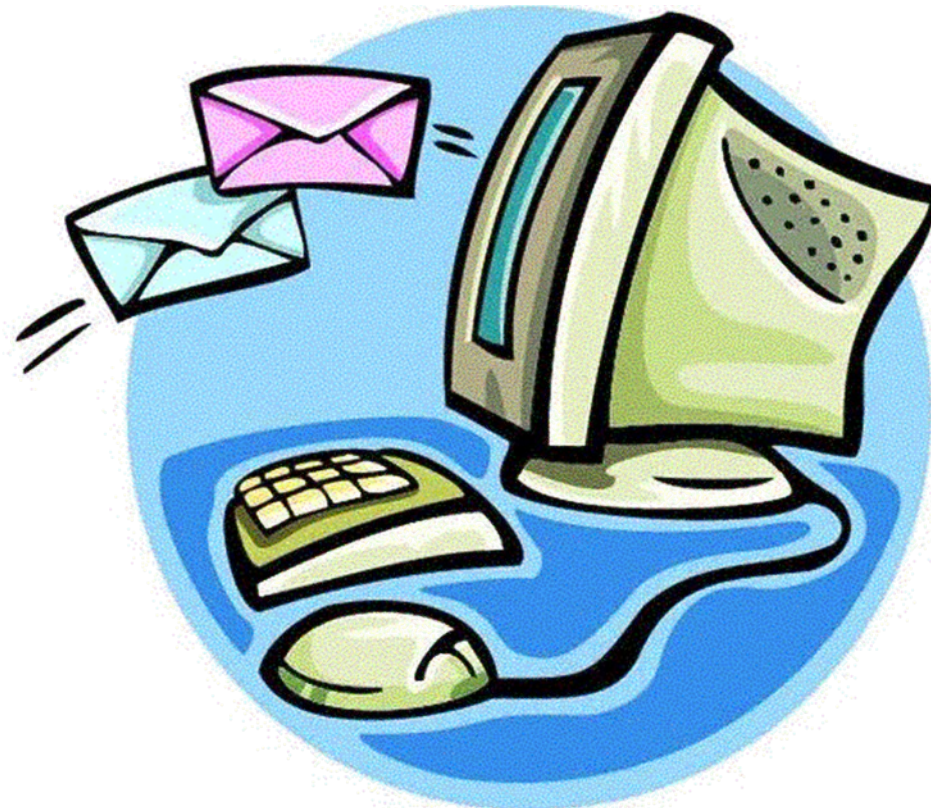
The list of Known DX Records for Digital-ATV, was recently revised on 2016-09-17 to add:

- 2 Meter RB-DATV QSO of G8GTZ and G8GKQ on 2016-09-03 182km

Known Digital-ATV DX Records updated 2016-09-17 by Ken W6HHC		
24 GHz		
124 KM	JA6DME & JA6EES	2011-11-12
Locations Mont Ten-Zan and Mont Ge-Zan		
10 GHz		
450 KM	HB9JBC & F4CXQ	2005-06-21
Locations JN40CT (Sardinia) and JN12OH (Spain)		
93 KM	G8GKQ & G8GTZ	2016-07-05
H.264 video - DVB-S protocol at 333 KSymb/s FEC=7/8. G8GKQ used RPI and DigiThin at 250 mW. G8GTZ used PIPO and DATV-Express at 3W. Locations IO80VP (Povington Hill near Lulworth) and IO91GI (Walbury Hill)		
32 KM	G8GKQ & G8GTZ	2016-06-23
H.264 video - DVB-S protocol at 333 KSymb/s FEC=7/8. G8GKQ used RPI and DigiThin at 200 mW. G8GTZ used PIPO and DATV-Express at 5W. Locations IO91JA (Lane End) and IO91JH (Hannington)		
5.7 GHz		
341 KM	JL1BLF & JH1GED	2011-08-06
Locations Mont Chokai-san and Mont Kashimayari-gatake)		
2.4 GHz		
~ 1000 KM	OR4ISS to I0KPT (one-way)	2014-03-08
~ 1000 KM	OR4ISS to IK1SLD (one-way)	2014-03-08
Initial DVB-S protocol live video transmissions from HamTV in orbit aboard ISS SR = 1.34 MSymb/sec and 2.0 MSymb/s using SR-Systems exciter & MPEG2 Locations Orbit to Matera, Italy and also Orbit to Casale Monferrato, Italy		
252 KM	JA6SPI & JA5MFY	2009-11-03
Locations ??		
1.2 GHz		
440 KM	G4KLB to G1LPS	2010-10-11
Locations IO90BR and IO94EQ (tropospheric ducting - one-way DATV)		
419 KM	G4KLB & M0DTS	2010-10-11
Locations Bourne-mouth, England and Yarm, England (tropospheric ducting)		
379 KM	VK3RTV(RPTR) & VK7EM	2011-02-23
Locations Mount Dandenong, Victoria and Penguin, Tasmania (operators VK3BFG, VK3DQ, VK3WWW and VK3TRX)		
252 KM	JA5GYU & JA6JNR	2009-11-03
(1 Watt)		
70 CM		
696 KM	F1FY to G8GTZ	2013-09-24
(DVB-S 2MS/sec FEC=1/2 - one way reception)		
696 KM	G8GTZ to F1FY	2013-09-25
(DVB-S 2MS/sec FEC=1/2 - one way reception reported by FM) Locations IO91KH (near Basingstoke) and JN16VB (near Roanne, France)		
70 CM - continued		
600 KM	DBØTAN (repeater) to F9ZG	2014-11-28
DVB-S - one-way DATV - Tropospheric ducting (signal 25 dB S/N over ca) Locations Wasserkuppe (Hesse state, Germany) to IN99KC (Normandy, France)		
528 KM	G3PYB & F5AGO	2013-09-24
(DVB-S 2MS/sec) Locations near W YORKSHIRE and JN06DP (near Poitiers, France)		
501 KM	W4HTB & WB8LGA	2014-07-26
(DVB-T QPSK FEC=1/2 2 MHz Bandwidth) - Tropospheric ducting Locations Bowling Green, KY and Marengo, OH		
235 KM	G8GTZ & F9ZG	2016-06-12
H.264 video - DVB-S protocol at 125 KSymb/s using DATV-Express w/ 19-ele yagi Locations JO00HU (Fairlight near Hastings) and IN99KC (near Cherbourg)		
121 KM	KH6HTV to KØRZ	2011-11-21
(video resolution HDTV 1080i - protocol ITU-T/J.83B QAM-64 - one-way DATV) Locations Cheyenne, Wyoming and Boulder, Colorado		
144 MHz		
237 KM	F3YX to F9ZG	2011-11-09
DVB-S protocol at 1000 KSymb/s using modified SR-Sys MiniMOD (one-way) on 145.0 MHz experimental license 5-Minute max Locations JN18AP (near Limours, France) to IN99KC (near Cherbourg, France)		
182 KM	G8GTZ & G8GKQ	2016-09-03
H.264 video - DVB-S protocol at 333 KSymb/s using DATV-Express w/ 9-ele yagi at G8GTZ. G8GKQ used RPI w/ camera and DigiThin with 5-ele yagi Both produced 25W ERP. - on 146.5 MHz - UK temporary band allocation Locations IO82QL (Clee Hill) and IO80UU (Bulbarrow Hill)		
169 KM	G8VPG & G8GTZ	2016-09-03
H.264 video - protocol DVB-S at 333 KS/s - G8VPG using DATV-Express w/ 9-ele G8GTZ also used DATV-Express w/ 9-ele yagi on 146.5 MHz - UK temporary band allocation Locations IO80WX (Win Green) and IO82QL (Clee Hill)		
169 KM	G8GTZ & G7NSY	2016-09-03
H.264 video - DVB-S protocol at 333 KSymb/s using DATV-Express w/ 9-ele yagi at G8GTZ. G7NSY used DATV-Express w/ 9-ele yagi on 146.5 MHz - UK temporary band allocation Locations IO82QL (Clee Hill) and IO80WX (Win Green)		
50 KM	M0DTS & G1LPS	2015-02-21
H.264 video - protocol DVB-S at 333 KSymb/s using experimental DATV-Express on 146.5 MHz - UK temporary band allocation Locations North York Moors, England and Spennymoor (County Durham), Eng		
50 MHz		
64 KM	G8ADM to G8LES	2015-02-10
DVB-S protocol at 1.133 MSymb/Sec with FEC=3/4 (one-way) on 51.2 MHz using 200W avg Pwr Out and BW approx 1.5 MHz Locations North of Harrow (IO91TO) to North of Alton in Hampshire		

See more details at www.von-info.ch/hb9afo/records/recordse.htm

- 2 Meter RB-DATV QSO of G8VPG and G8GTZ on 2016-09-03 169km
- 2 Meter RB-DATV QSO of G8GTZ and G7NSY on 2016-09-03 169km
- 70 CM one-way DATV from DBØTAN (repeater) to F9ZG on 2014-11-28 600km



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

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

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