In this issue

Contributing Authors

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Editorial

It's our Birthday!

We published CQ-DATV issue 1 in February 2013, so we have been in production for 5 years and are about to embark on year 6. Can we say a big thank you to everyone that has submitted copy. We could not have done it without you.

In the pipeline is a CQ-DATV master index so you can quickly find past articles in our ever expanding library, which is on course to fill our allotted web space in the next 12 months. Should we bite the bullet and jump into the next price bracket or lose some of the e-book variants? As alway, your comments are most welcome.

What have we got for you in this issue:-

- Jim Andrews, KH6HTV reports from the Hawaiian Island of Maui, where there is no fast scan ATV activity from anyone other than himself, having set up his kit and driven around the island to verify it's all working, but there is some SSTV and it's not too far away....Sorry Jim its freezing here in the UK, we might have ATV activity, but I suspect anyone of us would willingly swap QTH's with you in an instant ATV or no ATV (those of us in Oz would willingly swap with those in the UK right now - Oz Ed.).

- Mike Stevens G7GTN is using an Ardunio Pro Micro module to create a quick but functional MIDI controller for VMIX switching. This relies on the modules ATMEL 32U4 processor and the ability of this to emulate a MIDI to USB interface.

- Daniel Estévez EA4GPZ is looking at different hardware setups to receive the Amateur radio transponders on Es'hail 2, with an interest on inexpensive but effective solutions.

- Ken W6HCC and Art WA8RMC report that sales of Mini Tiouner Express, the DVBS/ DVBS2 receiver/analyser, which continue to be brisk. Charles G4GUO released an upgraded v1.25LP12 version of DATV Express software that is compatible with the latest firmware from Lime Micro Systems and Charles has also now received his first blank PCBs from China for a 250watt 2.4 GHz power amplifier design that he plans to use for an uplink on the Es'hail2. He is just waiting for the heatsinks.

- Art Towslee, WA8RMC reports on his 70 cms ATV repeater antenna installation, 630 feet above ground in a location where he is limited to half hour window due to RF exposure from the 1KW 161 MHz NOAA weather radio antenna about 15 feet away. Not a task for the faint hearted.

- Again Jim Andrews, KH6HTV, and this time with Don Nelson, N0YE reporting from the machine shop where they are building an inter-digital, band-pass filter for 70cm.

- Trevor G8CJS is looking at a surplus vision mixer panel, these often appear on eBay for less than £50 and exploring if it could be converted to work with Vmix, where the custom panels are upwards of £2000, could be a winner, but it's a long hard trek.

Conversions for ATEM already exist so fingers crossed it might just be possible. This is a multi part series unfolding as Trevor works on the panel. In the next issue Trevor has designed an Exploratory Dongle, so we can start talking to the hardware, beyond that it's work in progress.

- Dan Rapak, WA3ATV calls our attention to the FCC authorising a new standard for over the air digital broadcast television.

It's referred to as ATSC 3.0 and has many advantages over the current ATSC transmission standard and is capable of transmitting 4K video in a 6 MHz channel.

- Bryan Dygert KC8LMI describes the progress in the Jackson ATV repeater testing.

TVA 191 is out and for those of you that don't speak German, Klaus DL4KCK, has provided some translations which include:-

- 8k video from the ISS

- A look back at the AMSAT-DL symposium in Bochum 2018 which was dominated by Es,hail 2

- How to eliminate video squelch functions

As we always say, sit back and enjoy CQ-DATV 68.

Production Team

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

News and World Round-up

Time for a change?

A potential GPS timing problem may be coming up on April 6, 2019, when the "Week Number" of the GPS system resets itself due to processing bit-limitations of the system. The last time this happened was nearly 20 years ago (August 1999), when we were much less GPS-dependent.

Quick overview of the situation:
https://www.masterclock.com/company/masterclock-inc-blog/2019-gps-week-number-rollover

There's no problem with the GPS system itself when this happens, but there is a very big unknown about how ground devices will react.

The US Naval Observatory has a good briefing on this, and if you see the next-to-last slide, a Naval Observatory GPS clock failed due to a timing update in 2014 that was less fundamental than the Week Number reset:
https://www.gps.gov/governance/advisory/meetings/2017-11/powers.pdf

The military has been preparing for about 3 years now and there is some anxiety, particularly about older GPS receivers and even newer ones that may not be configured to properly handle the timing reset. See the cautionary notes near the end of the briefing.

Just when we thought we had some time to prepare for Y10K.

Jay Wilson, W0AIR
Bascombe J. Wilson, CEM
DERA Executive Director
www.disasters.org

Equipment for Generating Digital ATV - Comparison

Dave, G8GKQ reports:

In response to a some questions that arose on social media, I have compiled a quick comparison of modern systems for generating Digital ATV signals. You can find it on the BATC Wiki here:

https://wiki.batc.org.uk/DATV_transmitting_Equipment.

If you have anything to add, please edit the Wiki - that's what it's there for!

Dave, G8GKQ

HV-200 modulator

Rudi Pavlič, S58RU reports

Hi guys, finally the Rudi Hides HV-200 modulator is ready with the new LCD controller, so it will no longer be necessary to access the computer to change the main parameters including the frequency. In the spare time I also modified the Chinese decoder that I had purchased last year, now it works only at 12V, with external audio and video RCA connectors. I attach some photos.

ATV Repeater Progress In Melbourne, Australia

Peter VK3BFG reports.

Attached are a couple of photographs of the temporary test set up at the new site. We only set up VK3RTV1 so a bit less than half of the repeater is missing. Note the monitor with some of its screen missing! (Fell off the bench one day).
In the rack, from the top down, Monitor ... Humax 23 cm DVB-S RX ... Home Brew Controller VK3RTV 1 ... 70 cm DVB-T Exciter ... PA Heatsink (PA is behind it) PA Fan ... Power Supplies.

The small plastic box in front of the Humax is an IR LED. I have synthesized the Hand Remote signals which are activated by DTMF codes sent via DVB-S audio. Stations can bring up the signal report from the receiver. This is a very popular function as it aids antenna direction settings and also stations can see their performance over time and with changing conditions and equipment. (good for relative antenna performance)

I have looked at a number of Hand Remotes from different manufacturers. They all seem to be the same protocol, they just select different codes for different functions. The IR system in VK3RTV has its own microcontroller which drives the IR LED and responds to a simple Ascii Character sent from the main controller. I have used the code for Humax and also the small KOQIT receivers. It would be better to hardware connect the signal rather than driving an IR LED but it is either very difficult and/or impossible as the function now is often imbedded.

Would be happy to share the code with you if you are interested in incorporating a similar function (email *pcossins@bigpond.com*)

It is in assembler for the now old Atmel 89C2051. Other micros can be used of course, the critical component is the timing and sequencing of the IR pulses.

There is also a small PCB which houses the IR Controller and the IR LED driver. Just send Ascii characters to it. Let me know if you are interested.

The filter we used is one we purchased for $900.00 from Comm Tech in Italy. A really nice DVB-T filter.
They were good enough to especially align it down to our 70-cm allocation. We did not need a filter in the prior location, but now being in the metropolitan area things are different.

Source: ATCO newsletter, January 2019.

AMSAT-DL Symposium 2018

This year's AMSAT-DL symposium in Bochum at the end of September 2018 was dominated by the upcoming launch of Es'hail-2 with the P4-A hamradio transponders.

Although at the time of the symposium no start date had been set yet, all signs indicated that the date "Q4/2018" announced by Es'hailSat could be met. Peter Gulzow, DB2OS, let in the first part of his lecture the course of the project so far from the first contacts in Qatar 2012 to date to happen again. In the second part we went together with Achim Vollhardt, DH2VA, to review the transmitting and receiving equipment.

The range was from one DIY store PLL-LNB for under €5 together with an SDR-USB-Stick up to solutions of some

commercial providers. The offer will, according to the prophecy of both, after the successful start certainly grow significantly. Michael Lengrusser, DD5ER, subsequently reported on the status of the ground control stations built by AMSAT-DL. The components for Qatar were ready for shipment at the time of the symposium.

For the station in Bochum the day before they had been laying some cables. During the lunch break there was opportunity to get the radome with the 20-m parabolic dish more precisely to look at. At the same time Jens Schoon, DH6BB, and Achim Vollhardt, DH2VA, demonstrated a DATV transmission with the simplest means.

It was sent from a notebook with connected ADALMPLUTO SDR development kit for approx. €100. The receiving side consisted of a Minitiouner also with notebook. The software used was MiniTioune from F6DZP on the receiving side and DATV Express on the transmitting side.

The components for the ground stations could also be inspected more closely.

After lunch students of the Megina Gymnasium in Mayen gave a lecture about the MeginaSat project. For the first time, German high school students are building a Cubesat here. As a special feature, data transmission is to take place via light beam. On site Max Schild, Florian Jungermann, Max von Wolff and project manager Thomas Leister, DG2PU, reported.

Directly after the lecture it was agreed that in the next year in Bochum the current conditions are to be reported again. On the following annual general meeting of AMSAT-DL the executive committee could present the web page www.amsat-dl.org updated from scratch.

Here you can now find more detailed information about P4-A as well as a forum:

https://amsat-dl.org/eshail-2-amsat-phase-4-a

Source: Jens Schoon, DH6BB, TV-AMATEUR 191, Translation by Klaus, DL4KCK

8k video in space

ESA astronaut Alexander Gerst, KF5ONO, demonstrated microgravity, and NASA astronaut Ricky Arnold shot this on the International Space Station on 3 October 2018 with a helium 8K camera from digital camera manufacturer RED. NASA and ESA (European Space Agency) deliver the first 8K Ultra High Definition (UHD) video of astronauts living, working and researching on the ISS:

https://youtu.be/7k2uKb9vCOI
The same engineers who sent high-resolution (HD) cameras, 3D cameras and a camera to capture 4K footage to the space station have now delivered a new camera that captures images at four times the resolution previously offered.

The Helium 8K camera from RED is capable of capturing resolutions from conventional HDTV up to 8K, specifically 8192 x 4320 pixels.

In comparison, the average home TV in HD shows up to 1920 x 1080 pixels resolution, and digital cinemas typically project in resolutions from 2K to 4K.

On Friday 2 November, the ISS celebrated the 18th

anniversary of uninterrupted manned operation on board and the 20th anniversary of the launch of the first two space station elements on 20 November and 4 December 1998 respectively.
Source: TV-AMATEUR 191, Translation by Klaus, DL4KCK

Slow TV - MAUI Style

Written by Jim Andrews, KH6HTV

Ham TV activity on the island of Maui, in the Hawaiian Islands is island style, i.e. real slow.

Fast-Scan TV (i.e. real live TV) on 70cm band is non-existent, unless you count my occasional transmissions to myself over a distance of perhaps 10 yards. In the past, I have also driven around the island with a TV receiver in my Miata convertible to see how far my signal would go. The farthest point was about 14 air miles.

Over the past several years, I have given talks about ATV to our local Maui Amateur Radio Club (MARC), but to no avail.

Have not gotten any recruits. The Maui club is small with typically about 15 members in attendance at club meetings. Their main interest is in HF. The closest I came to generating interest was a couple of years ago when MARC asked me to include a live ATV demo at their display booth for a STEM expo at our local shopping center, the Queen Ka'ahumanu Center in the main, port town of Kahului.

I did have some luck selling ATV, and in particular DTV with DVB-T, in Honolulu on the island of Oahu. In January, 2017, I made a trip to Honolulu, on the invitation of Joe Speroni, AH0A, the ARRL section manager for Hawaii and the Pacific. Joe asked me to give a talk about ATV, including a live demo, to the largest ham club on Oahu, the Emergency Amateur Radio Club, and also to the State of Hawaii Emergency Management people.

They had had poor experiences with ATV (i.e. analog) in previous years and had given up on it. After my talks and demos, they decided to give DVB-T a try.

They asked me for a complete shopping list of stuff to purchase. I did sell them some rf linear power amplifiers and receivers. It took a lot of long distance hand holding via e-mail and phone calls to get them operational.

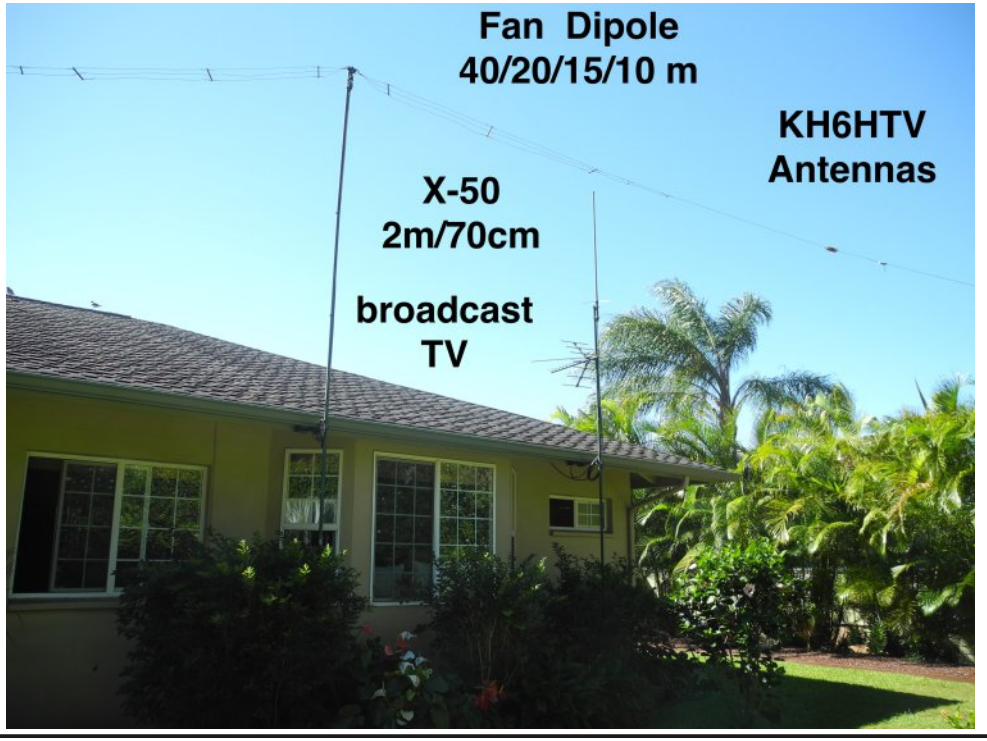
They then did put their DVB-T gear to use successfully the following summer by televising a 4th of July parade. The most recent report from Clem, KH7HO, in Honolulu said "Unfortunately, ATV on Oahu is on hold right now. Hope to get it going again next year."

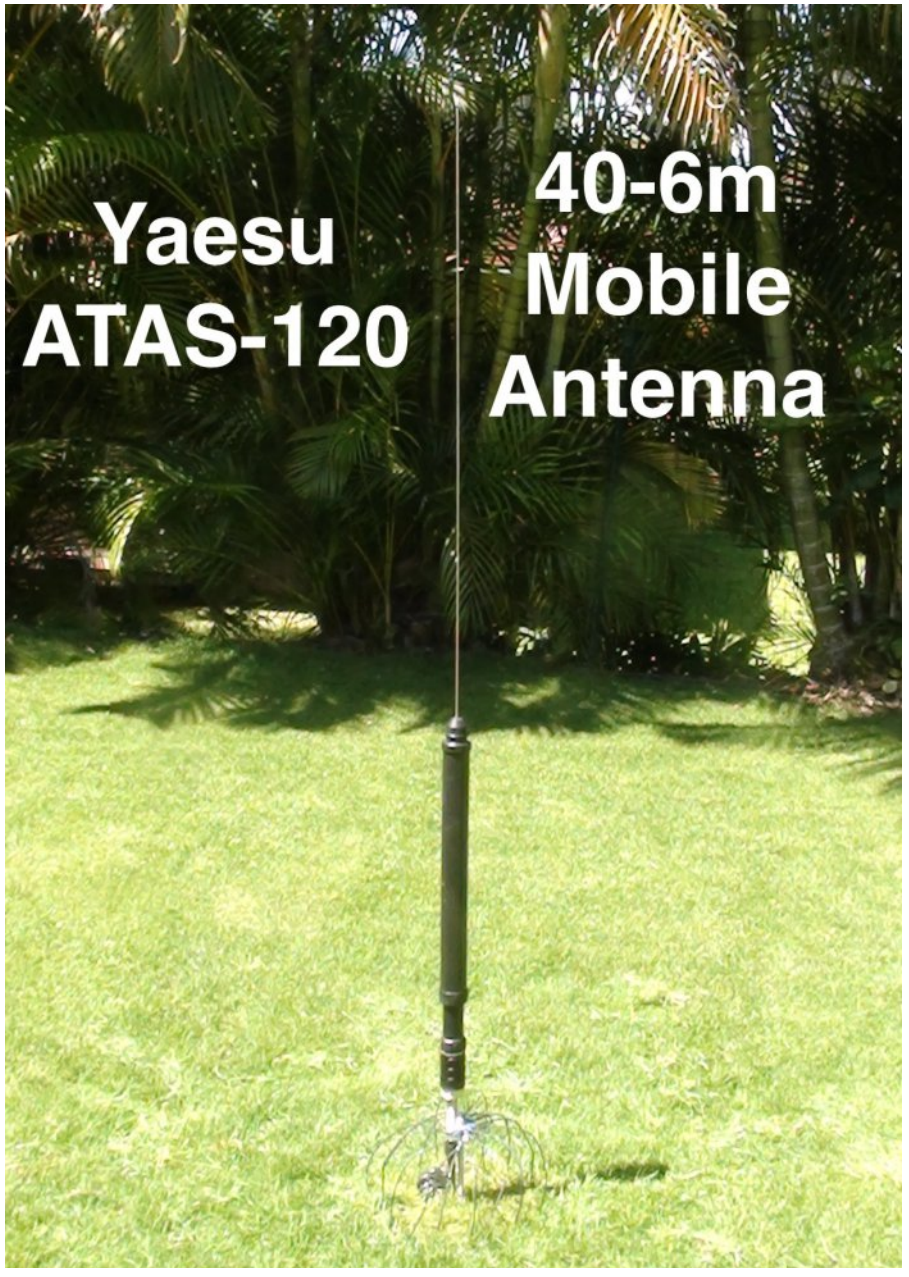
So my current ham TV activity is in the "Slow" mode, i.e. HF slow-scan, SSTV, on 20 meters (14.230 MHz). I have made a small number of SSTV contacts here. The photo left is a picture I received on 21st of November confirming a 2 way SSTV-QSO with W5BKV in Tulsa, Oklahoma.

I do receive pictures here occasionally from North America and sometimes from Japan, New Zealand and Australia.

The HF station here is less than optimal. Definitely doesn't compare with my Boulder HF station with it's Heath linear amp and 50ft. Hex beam antenna. Here I am using a 100 watt, Yaesu FT-857 feeding a 40/20/15/10 meter fan dipole up at only 23 ft. (run 40 watts on SSTV). The other antenna is a vertical. It is my old mobile antenna, a Yaesu ATAS-120 (40 thru 6m) planted in the back yard with 20 buried ground wire radials.

KH6HTV - Maui ham shack. 70cm ATV transmitter on top shelf. Middle shelf is ICOM 2m rig & 12Vdc power supply. Bottom shelf is Yaesu FT-857, 100 watt HF rig and MFJ antenna tuner. An antique Dell XP computer on the floor is dedicated to the FT-857.





KH6HTV - Maui Antennas: For 2m/70cm, a Diamond X-50. For HF an Alpha-Delta Fan Dipole for 40/20/15/10 meters. Also a Yaesu ATAS-120, 40 thru 6m screwdriver mobile antenna with 20 ground radials.

My background HF noise level here is pretty bad on 20 meters. I rarely am able to make any contacts, other than an occasional FT-8. (Don't like FT-8, too automated and can't do a real QSO.) It is a BIG DEAL when I finally make a SSTV contact, or any HF contact really.

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*.

VMIX Easy MIDI Controller

Written by Mike Stevens G7GTN

Introduction

Using an Ardunio Pro Micro module we can create a very quick but functional MIDI controller for VMIX switching software. This relies on the modules ATMEL 32U4 processor and the ability of this to emulate a MIDI to USB interface natively. This avoids having to use other Windows applications to sit in between as a software bridge. In this quick project I made use of a standard telephone matrix keypad, this is interfaced directly to digital I/O pins. This whole project is based on easily available parts so the only construction required is to make a couple of wire connections.
MIDI Notes

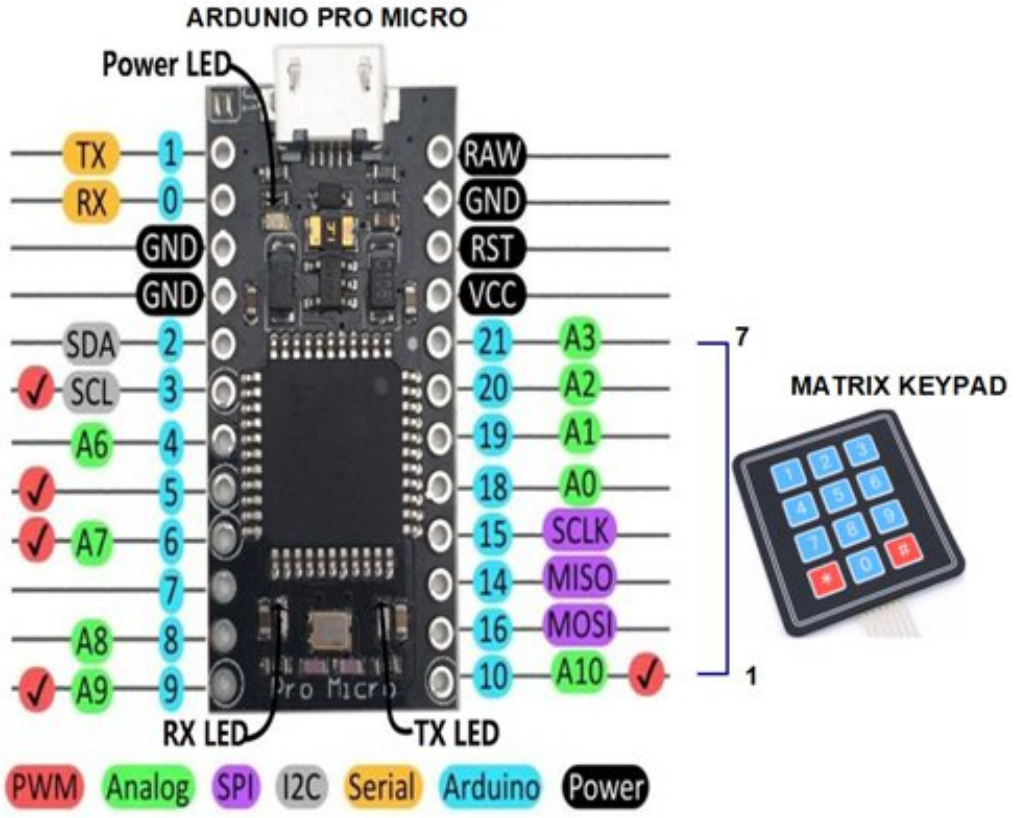
Since we can control VMIX via MIDI I have selected to send notes and allocated these as activators from within the settings section of VMIX. The note table is depicted in Figure 1 for reference.

MIDI note names

Middle C or C4 is defined as MIDI note 0x3C.
The lowest note on a standard 88-key piano is A0 (0x15) and the highest note is C8 (0x6C).

	Note											
Octave	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
-1	00	01	02	03	04	05	06	07	08	09	0A	0B
0	0C	0D	0E	0F	10	11	12	13	14	15	16	17
1	18	19	1A	1B	1C	1D	1E	1F	20	21	22	23
2	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F
3	30	31	32	33	34	35	36	37	38	39	3A	3B
4	3C	3D	3E	3F	40	41	42	43	44	45	46	47
5	48	49	4A	4B	4C	4D	4E	4F	50	51	52	53
6	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
7	60	61	62	63	64	65	66	67	68	69	6A	6B
8	6C	6D	6E	6F	70	71	72	73	74	75	76	77
9	78	79	7A	7B	7C	7D	7E	7F				

Basic Hardware



The matrix keypad attaches to the Ardunio pro Micro via a male pin header. The keypad ribbon cable has small numbers on the plastic shell (1 & 7) these face upwards. So physical pin number 1 attaches to A10 on the Ardunio

Firmware

We require the Ardunio IDE installed to compile and upload the code to the Pro Micro. Firstly we require a couple of custom libraries. The easiest way to get these installed is via Sketch include library and then manage library option. Searching for MIDIUSB & KEYPAD will find the required libraries; see Figure 2 & 3 as a guide.

←Figure 1 – Notes to be sent by the Ardunio Pro Micro

You can also find a reference where to download these if you prefer to use ZIP files. The keypad is monitored within a Loop and on detecting a button press a specific MIDI note is sent via USB – you can select any notes you wish from the table in Figure 1 you can download the required code as Easyvmix.zip

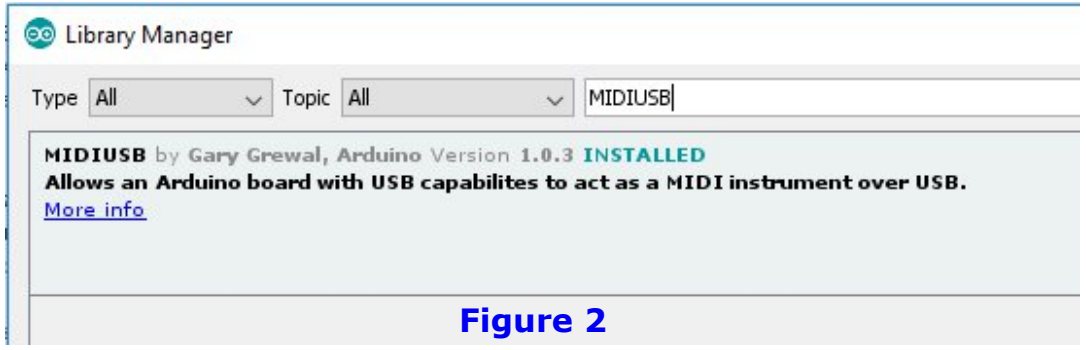


Figure 2

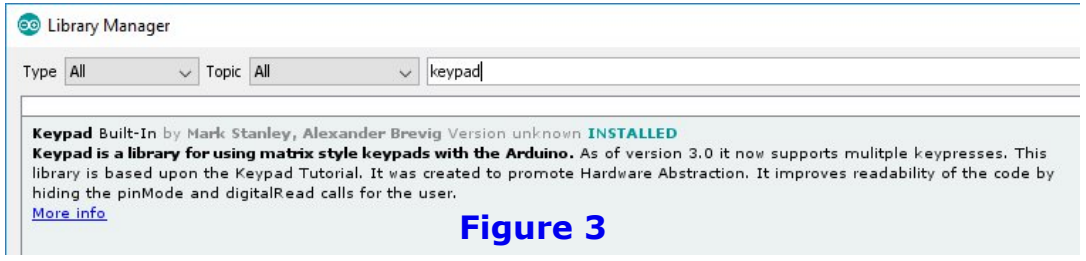


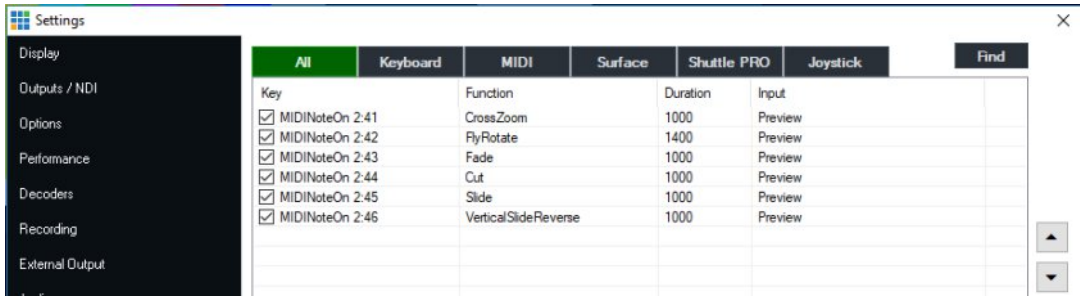
Figure 3

VMIX Software Setup

We need to attach the MIDI controller within our VMIX software and then allocate functions we wish to control. You need to go into settings and then activators to set up the functions you require. The board will present as device Ardunio Micro when connected to your USB port.

Once you enable the Device you can then go ahead and create your own custom shortcuts – if you require further guidance on this I would suggest quickly viewing a YouTube video created by the authors of the VMIX software

https://www.youtube.com/watch?v=7FbH9ThIRQo



First 6 buttons mapped to functions.

Conclusion

Using just a few parts it is possible to create a very simple switching controller. You can of course use push buttons instead connected to the available I/O, the code changes being modest. You may also wish to use a 16 way keypad to gain an extra four usable buttons (A-D); this will additionally make use of A3 on the processor. The processor utilization is approximately at 25% so you still have space to add your own enhancements. The firmware is available for download from the *CQ-DATV web site.*

Internet References

- *http://www.ti.com/lit/ds/symlink/pcf8574.pdf*
- *https://www.youtube.com/watch?v=32myesnWLuY*
- *https://www.arduino.cc/en/Main/Software*
- *https://github.com/arduino-libraries/MIDIUSB*
- *https://www.arduino.cc/en/Reference/MIDIUSB*
- *https://www.youtube.com/watch?v=7FbH9ThIRQo*

Recommendations for receiving Es'hail 2

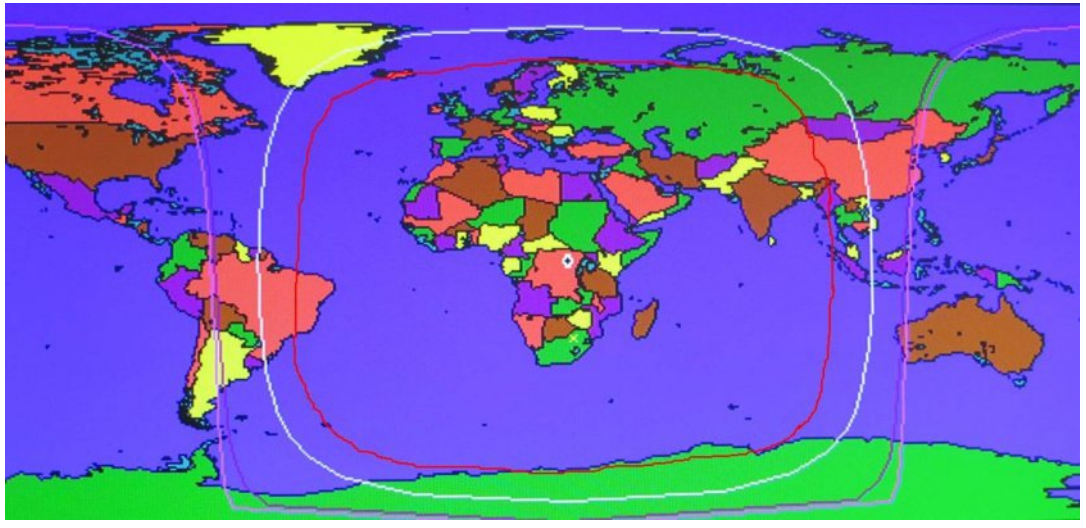
Written by *Daniel Estévez* EA4GPZ

A couple days ago, Janos Tolgyesi HG5APZ asked me by email about different hardware setups to receive the Amateur radio transponders on *Es'hail 2*, with an interest on inexpensive but effective solutions. He was quite happy with my detailed reply and convinced me to turn it into an article, so that other people can learn from it.

This article is intended for people that do not know much about Es'hail 2 but are interested in receiving it. If you've been investigating about the different setups that people are doing to receive it, then probably you'll not learn anything new here. The article addresses questions such as "do I need a modified LNB" and similar.

The coverage of the Amateur radio transponders is anywhere where the satellite can be seen above the sky, since the transponders use a global beam. A geostationary satellite sees about a third of the Earth surface. In the case of Es'hail 2 this covers longitudes from Eastern Brazil to Thailand. In the figure below you can see the coverage.

The green and red lines indicate the points on the Earth where the satellite is seen at 10 and 5 degrees of elevation respectively.



Es'hail 2 coverage map

Es'hail 2 can be received with as little as a dish and Ku-band LNB intended for satellite TV, and an RTLSDR or other cheap SDR. You also need some way of supplying voltage to the Ku-band LNB through the coax cable. This can be done with a bias-tee. There are some very cheap models around or you can easily build your own. Another possibility is to use a DVB-S receiver to supply the voltage. In this case you'll also need a splitter/combiner and DC-block (very cheap if you buy the ones intended for satellite TV). An advantage of using a DVB-S receiver is that you can control the receive polarization from the DVB-S receiver (more on this later).

Regarding the dish, you don't need anything very large. The link budget estimates seem to indicate that something around 60cm will be enough unless you are near the edge of the coverage area. My dish is a 95cm offset dish. I bought 95cm because larger sizes start to be increasingly more expensive (there is some kind of price break). If you can afford the space, I suggest you do the same thing and buy the largest dish just below the price break.

For the LNB, you should get a PLL-based model. Do not get a DRO-based one under any circumstances. The frequency stability of a PLL LNBs is much better and DRO LNBs cannot be modified to use an external reference. There is a large collection of *LNB teardowns* by *F4DAV* where you can see if your model of choice is any good.

You should know the following about LNBs. The most popular type of Ku-band LNB is the universal or "Astra-type" LNB. This is the one you should get. It can receive on vertical or horizontal polarization, and the local oscillator can be set to either 9750MHz or 10600MHz. The polarization is controlled by the DC voltage you feed through the coax cable (either 13V or 18V). The local oscillator is set to 10600MHz by feeding a 22kHz tone through the coax. If the tone is not present, the local oscillator will be 9750MHz. There is a nice table on *Wikipedia* which sums these features up.

Now, for Es'hail 2, unless you have absolutely no interest in one of the transponders, you'll need both the vertical and horizontal polarizations, since the narrowband transponder uses vertical polarization and the wideband transponder uses horizontal. Therefore, you should have a way of toggling the DC voltage you feed to the LNB. As mentioned above, a DVB-S receiver can do this for you (by means of menu options), but it is cumbersome if you want to remotely control or automate this toggle.

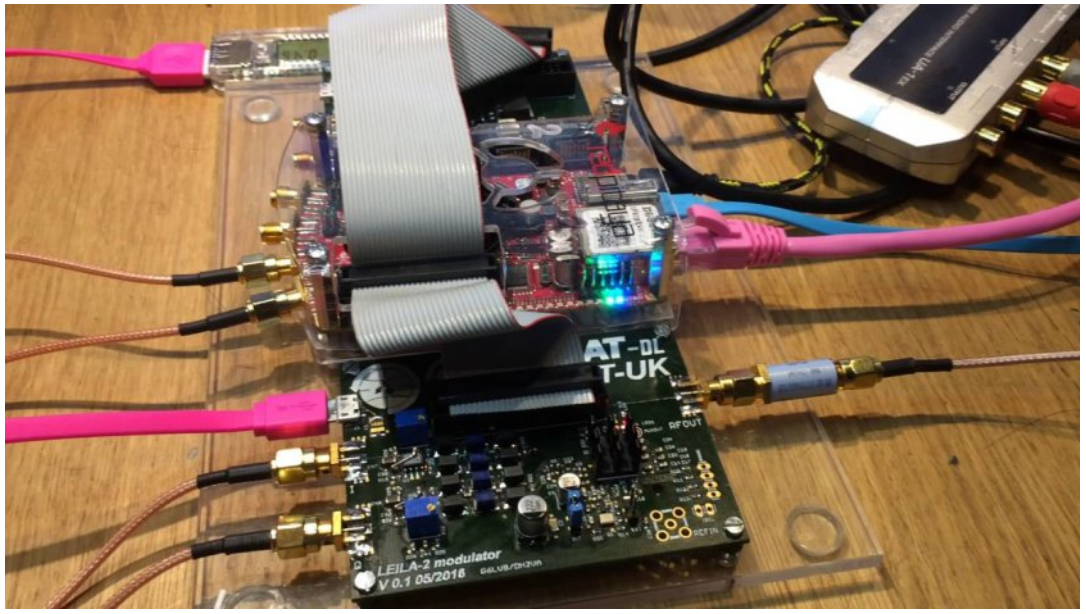
Under normal circumstances, the 9750MHz local oscillator is designed to receive 10.7 to 11.7 GHz and the 10600MHz local oscillator is designed to receive from 11.7 to 12.75 GHz. The Es'hail 2 Amateur transponders are at 10.5GHz. Most LNBs can be used to receive well below 10.7GHz with a 9750MHz local oscillator, so for Es'hail 2 you'll always use the 9750MHz local oscillator. You only need the 10600MHz local oscillator if you also want to receive other Ku-band services which are at higher frequencies or if you want to play with feeding different reference frequencies, as I'll explain below.

This is convenient, because to get the 9750MHz local oscillator you don't need to do anything special. If you need the 10600MHz local oscillator, you need some way of inserting the 22kHz tone. Probably the simplest way to do this is with a DVB-S receiver, but you may also design a small circuit to do so.

Speaking of IF frequencies, a 9750MHz local oscillator places 10.5GHz at 750MHz, so you'll need to use a receiver that can tune to that frequency. These days, most SDRs can. If you want to use a conventional Amateur radio receiver that perhaps only has the 70cm band, then you could use a frequency conversion circuit (a simple mixer) or feed a different external frequency so that the IF ends up in the 70cm band. I strongly suggest you use an SDR which can tune to 750MHz, so that the default IF is not a problem.

If you also want to use a DVB-S receiver for the DVB-S signals in the wideband transponder, then the default IF can be problematic, as most commercial DVB-S set-top-boxes do not tune this low in frequency. Again, you can do frequency conversion or feed a different reference, but there are DVB-S receivers that have a wider tuning range, such as the popular *Minitiouner*.

I suggest you use one of these to simplify the setup.



Phase-4A GeoSat S mode uplink converter developed by JH1CEP. S mode uplink converter

Also, if you are interested in DVB-S, note that there is *leandvb*, which is a software DVB-S demodulator. Thus, in certain cases you may use your PC and do without the DVB-S receiver, depending on your PC's performance, the particular signal you want to receive, etc.

The last topic about the LNB is frequency stability. The stability of a commercial satellite TV LNB is good for receiving wideband signals, such as DVB-S (after all, this is what it is sold for), but not enough for narrowband signals. Depending on your intended use, you might want to improve the stability of the LNB.

If you're only interested in the DVB-S signals and other wideband signals in the wideband transponder, then probably it is not necessary to improve the stability. If you want to receive the signals from the narrowband transponder, then you need to do something.

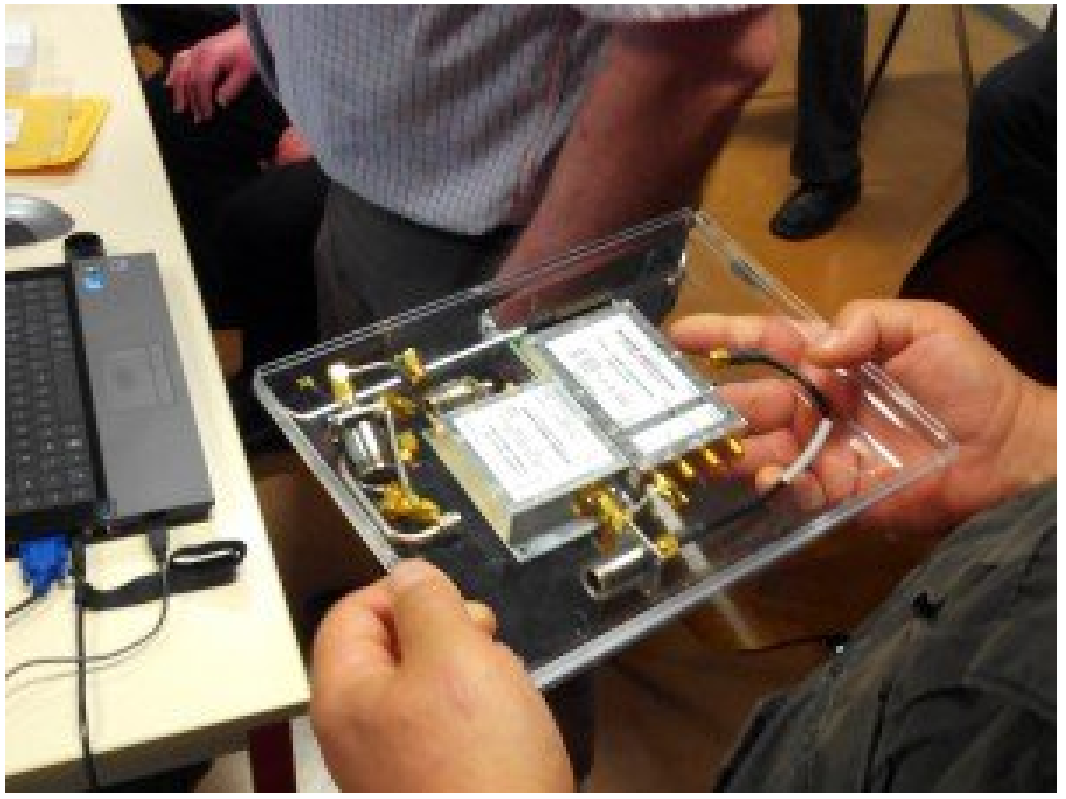
There are essentially two kind of solutions that can be done. The first involves modifying the LNB to feed it an external reference which is more stable than the integrated crystal oscillator in the LNB. The second involves using the beacons in the narrowband transponder to compensate for the LNB drift. This solution involves only software. It hasn't been developed or tested yet, since the beacons are not transmitting yet, but there are some people thinking seriously about it, and there is no reason why this approach shouldn't work well.

In any case, I think that modifying the LNB to feed an external reference is a simple and interesting project, so I recommend that you do it. Depending on your LNB model, you can find instructions online from other Amateurs about how to modify it. In any case, this involves feeding an external signal via capacitive coupling to one of the crystal pins (either removing the crystal or leaving it in place). Good starting points for reading are the documents by *G4JNT*, *F1CHF*, and *EA5DOM*.

Once you have modified your LNB, another question is where to get a stable reference of the appropriate frequency. Most LNBs use either a 27MHz or 25MHz crystal, so that is the frequency you should feed. One possibility that I've tested is to use a *OCXO/Si5351A kit* from QRPlabs. This gives you a stable reference, but I prefer to have my *reference locked* to GPS to perform very precise Doppler measurements.

In my station I am using a *DF9NP 10MHz GPSDO* together with a *DF9NP 27MHz PLL*.

Another very interesting possibility is the *Mini GPSDO* from Leo Bodnar, which can generate any frequency from 400Hz to 810MHz. It is not very expensive and it can be very useful for many other projects. This product didn't exist when I got the hardware from DF9NP, but if I was buying today, I would be very tempted to get it.



Presentation of the geostationary satellite Es Hail 2 and amateur radio AMSAT Phase 4A

Finally, as I've mentioned above, you can vary the reference frequency that you feed in to the LNB to get a different local oscillator frequency. This can be used to move the IF, for instance to 432MHz, where you can use a conventional 70cm receiver, or to the L-band, where you can use a DVB-S set-top box. Depending on your particular LNB, the lock range of the PLL will vary, so you will need to check what other people have achieved or try it out yourself.

Daniel has a web site at *https://destevez.net* for more news and information.

Images credit AMSAT-DL and AMSAT-UK

DATV-Express Project Report

Written by Ken Konechy W6HHC

Art WA8RMC reports that sales of MiniTiouner-Express, the DVB-S/DVB-S2 receiver/analyzer, continue to be brisk during December. Most sales were for distribution to EU customers. Units can be ordered by PayPal from the *DATV-Express* web site on the PURCHASE A PRODUCT link.

The MiniTioune software for Windows (currently version v0.8s) from Jean-Pierre F6DZP can be downloaded free from *http://www.vivadatv.org/viewtopic.php?f=60&t=521*

Remember that you must first REGISTER/SIGN-IN to the DATV-Express web site in order to make a purchase.

- *The price for the MiniTiouner-Express fully tested unit is US$75 + shipping.*
- *Shipping charge within USA is US$7.00*
- *Shipping charge to EU is US$24.00 (including the VAT)*
- *Shipping charge to other international countries is US$35.00*

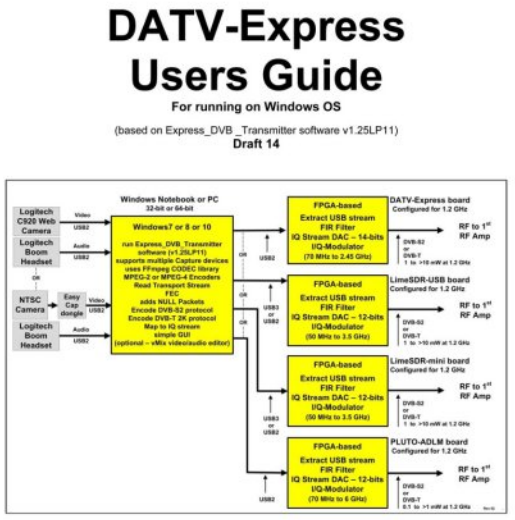
Charles G4GUO released an upgraded v1.25LP12 version of DATV-Express software that is compatible with the latest firmware from Lime MicroSystems. The Windows set-up.exe file and the NOTES file are now available at *DATV-Express* on the DOWNLOADS page. Many thanks to G4GUO for his efforts.

Ken W6HHC released an updated Express_DVB_Transmitter User Guide (Draft14) to emphasize that v1.25LP12 software for Windows has transitioned to cover four transmitter boards:

- *DATV-Express board*
- *LimeSDR-USB (larger) board*
- *LimeSDR-mini board*
- *PLUTO-ADLM board*

This User Guide available at *DATV-Express* on the DOWNLOADS page.

Ken is currently working on revising the MiniTiouner-Express User Guide to include the new power supply options available with the addition of J3 in RevB version of the MiniTiouner-Express unit.



Draft 14 of DATV-Express Software User Guide has been revised to cover the ability to be used with four different hardware exciter boards

Charles G4GUO has now received first-article blank PCBs from China for a 250-watt 2.4 GHz power amplifier design that he plans to use for uplink on the Es'hail-2 DATV satellite. He is just waiting for the heatsinks he purchased in order to begin testing the new PA. Also, he has just ordered a 1.8 meter dish antenna for his home Es'hail-2 station. He plans to use dual band feeds to provide both uplink and downlink functions.

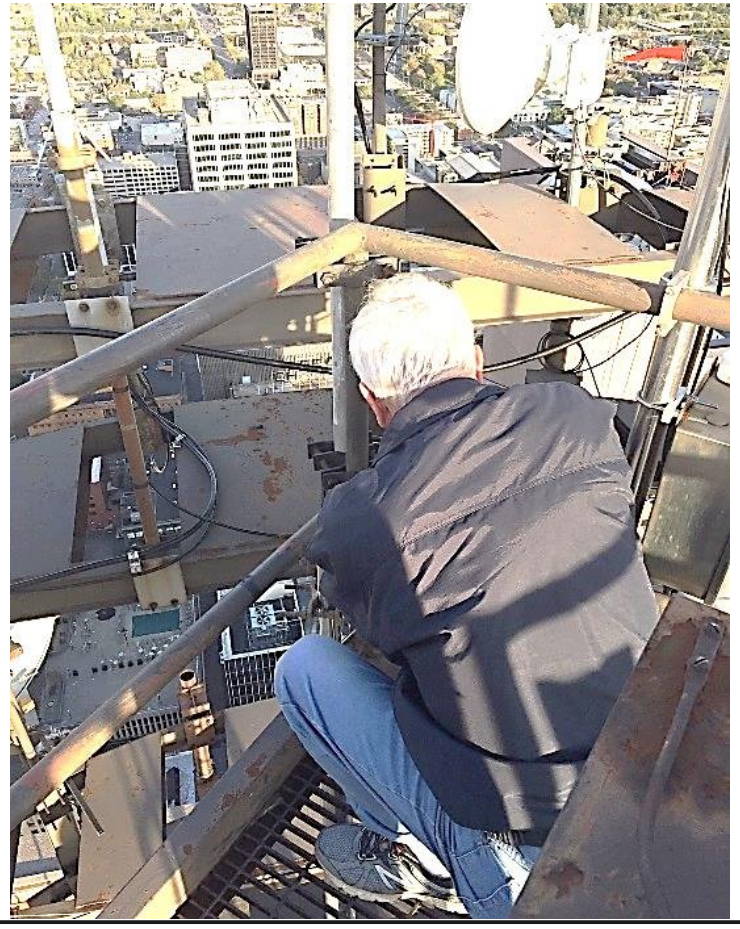
Project Speed is set to slow....de Ken W6HHC

70cm Repeater Slot Antenna Installation

Written by Art Towslee, WA8RMC

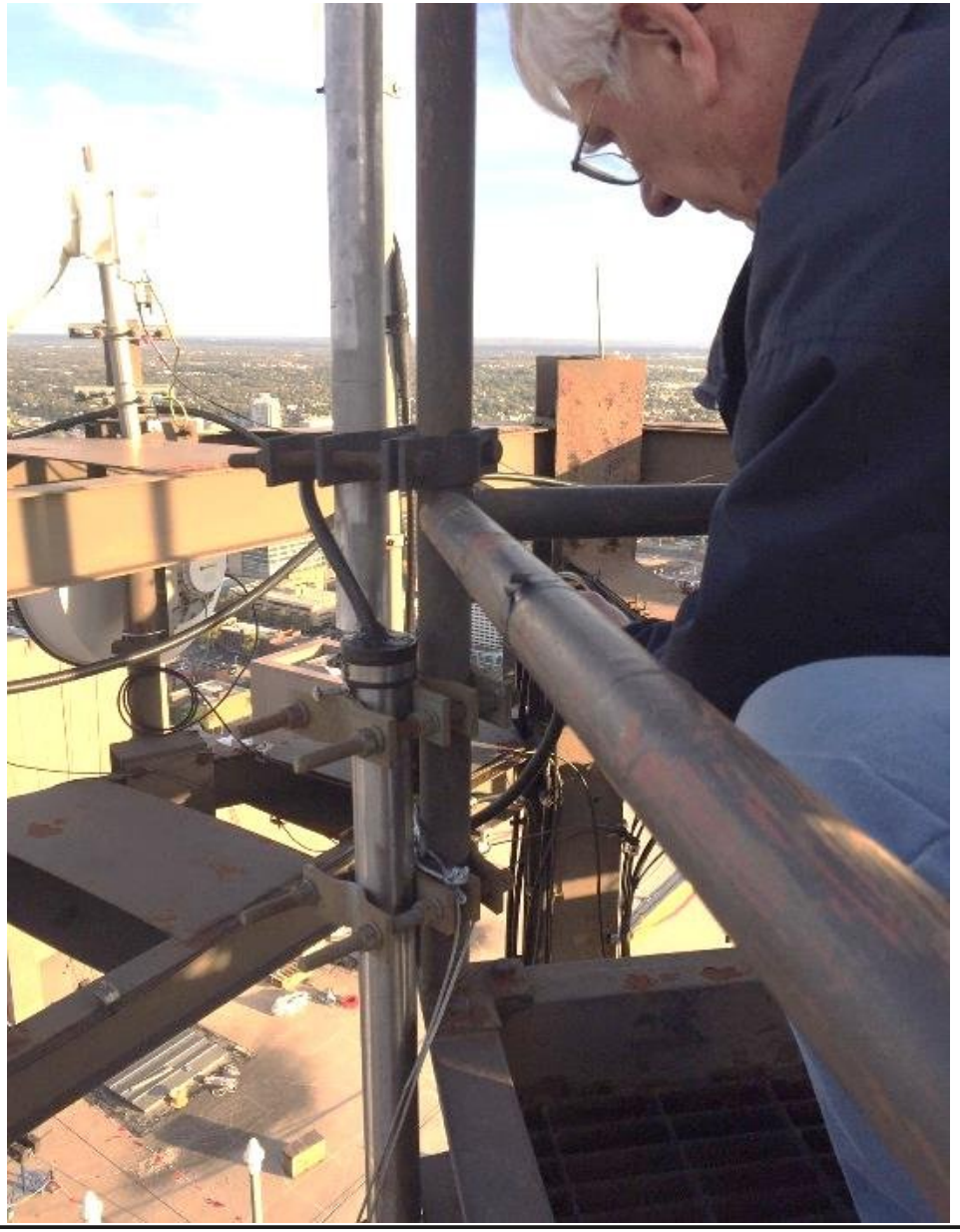
Reprinted from the ATCO newsletter, January 2019
(*http://ATVQuarterly.com*)

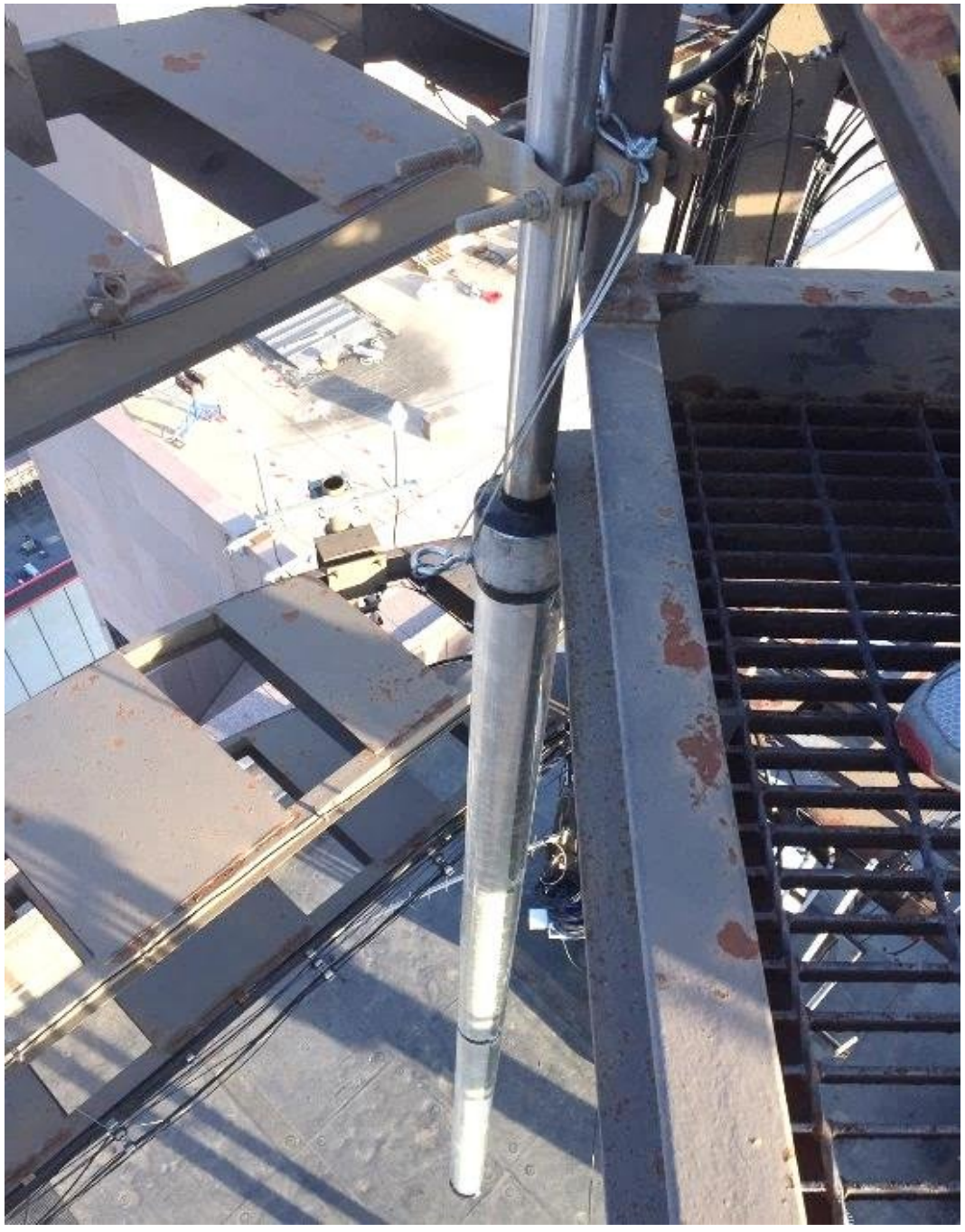
I reported on the 427 and 439 MHz antenna rework construction last Newsletter but here is my effort to install these antennas before the weather got too cold last Fall. It turned out to be the last day available with good weather. Not easy work but everything installed OK and the antennas now perform as expected. Notice that this work is not for those that don't like heights. It's 630 feet above the street below!!!



Bottom left - Here I'm tightening the clamp bolts holding the receive antenna below the access platform. The tower beacon light is behind me

Work to secure and connect the 7/8" Heliax cables to the receive and transmit antennas





Receive antenna is upside down and below the platform secured to framework. Transmit antenna is above it out of view

Whew, work complete!!! To the left of my head is the bottom of the transmit antenna. Other unknown antennas are in the background. The white tube with the yellowish cap is a partial view of our 10 GHz Tx antenna.

Now to climb down before we get too much RF exposure from the 1KW 161 MHz NOAA weather radio antenna about 15 feet away. We are limited to about 1/2 hour exposure at a time.

Everything works as expected now. **...WA8RMC**

Inter-Digital, Band-Pass Filters

Written by Jim Andrews, KH6HTV & Don Nelson, N0YE

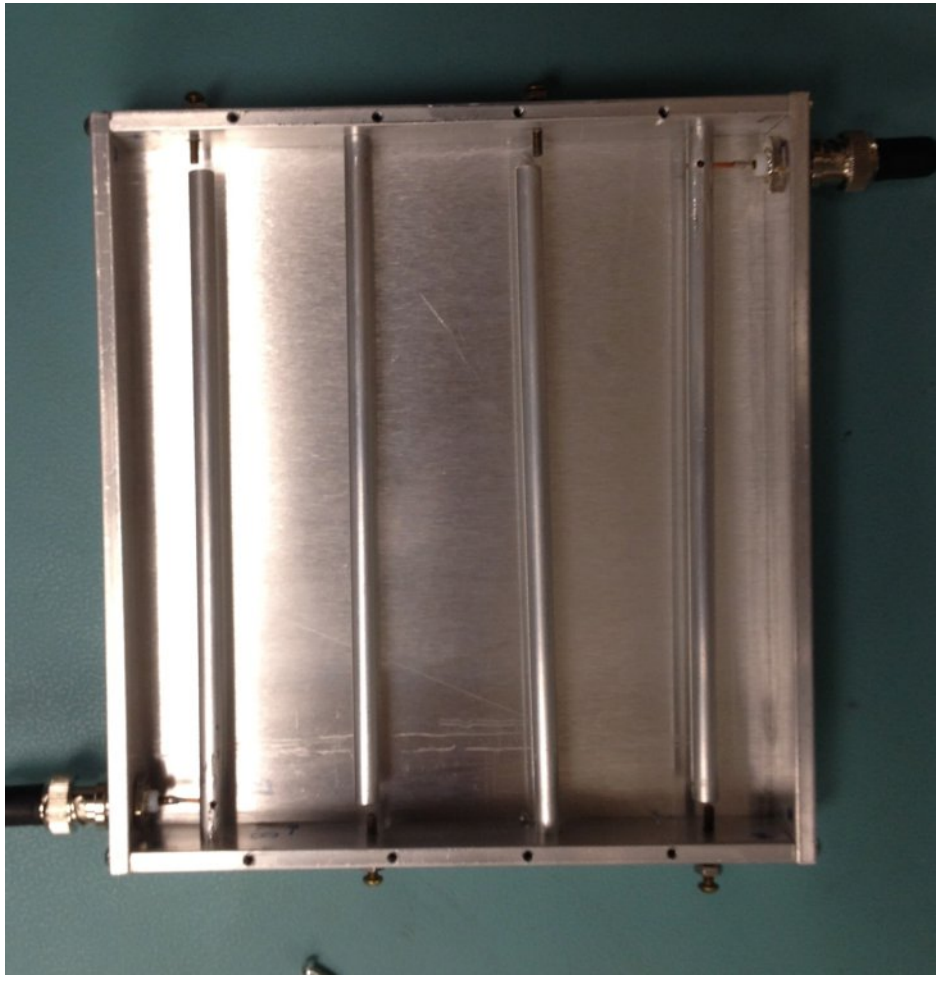


Fig. 1 Example of a four pole, inter-digital, band-pass filter

Band-Pass Filters (BPF) are critical elements required in assembling an in-band TV repeater. To achieve the conflicting requirements of low in band loss and very steep skirts with high out of band attenuation, usually means we need to resort to the machine shop to build an inter-digital band-pass filter.

On the 70cm band in the USA, 6 MHz channels are used and the typical spacing between the input and output is only 18 MHz and sometimes only 12 MHz.

The purpose for the BPF on the TV receiver input is to prevent fundamental overload of the receiver's front end by the extremely strong, near-field signal from the TV transmitter. The purpose of the BPF on the TV transmitters' output is to prevent any out of band spurious spectrum from polluting the RF environment of adjacent channels and especially the receiver's channel.

So what is meant by "Inter-Digital" ? A "digit", per the dictionary, is either a number or a finger or toe. So if we were to take both hands and interleave the fingers from the right hand and the left hand, we have created "Inter Digits". An inter-digital BPF looks exactly like this. Only instead of using fingers, we use 1/4 λ metal rods as resonators. One end of the rod is short circuited to the enclosure body while the other end is left open-circuited.

The first such filter was reported in QST, in 1968, by Reed Fisher, W2CQH [1].

See Fig. 1 above for an example of a four pole, BPF with the top cover removed. Boulder, Colorado, USA, ATV ham, Don, N0YE, has built several such BPFs, including some used in ATV repeaters. We used a free, on-line, calculator program from WA4DSY [2] to design the filter shown in Fig. 1.

This four pole filter was designed for a center frequency of 441 MHz, 6 MHz bandwidth and 0dB ripple. Fig. 2 shows it's measured pass-band, S21 frequency response. Table 1 compares the actual measured performance with the theoretical performace prdicted by WA4DSY's program.

Excellant agreement was obtained. For more details on this particular filter and others, see reference [3].

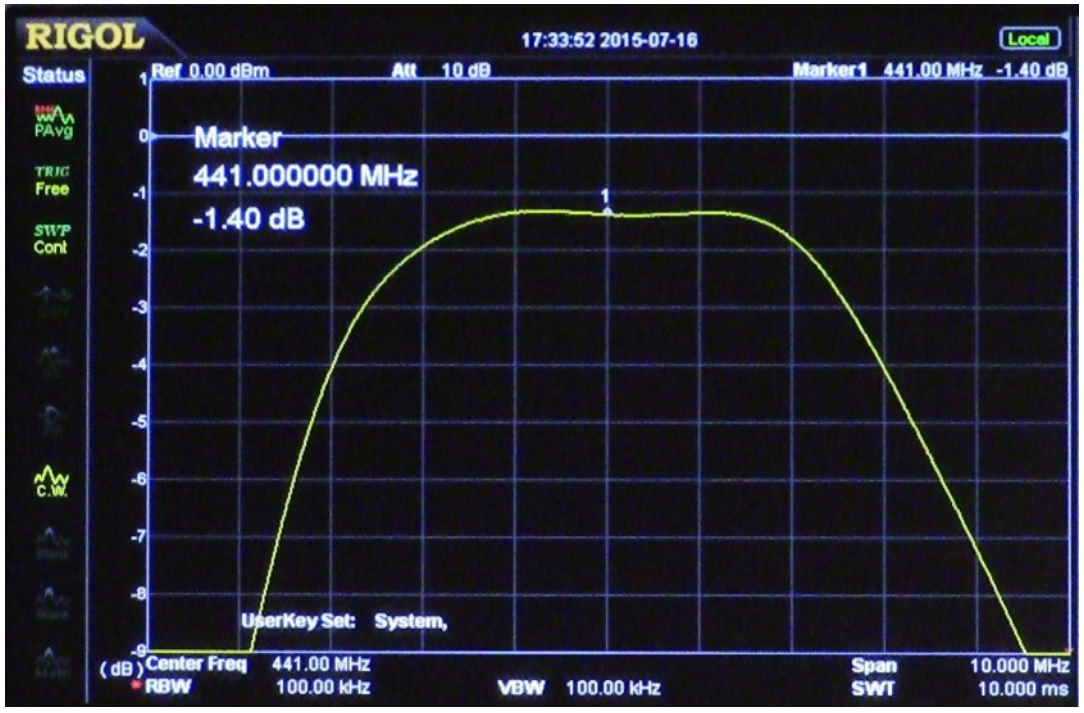


Fig. 2 Frequency Response of actual filter built by N0YE 1dB/div & 1MHz/div

Table I Comparison of S21 - Theory and Actual Measurements of BPF (443MHz, 6 MHz BW, 4 pole, 0 dB ripple)

Channel	Frequency	S21 (theory)	S21 (meas)
60	441 MHz	1.14 dB	1.4 dB
59	435 MHz	25.2 dB	23 dB
58	429 MHz	49.3 dB	48 dB
57	423 MHz	63.4 dB	61 dB
-3 dB Bandwidth =		6.0 MHz	6.2 MHz

References:

1. *"Interdigital Bandpass Filters for Amateur VHF/UHV Applications", Reed Fisher, W2CQH, QST, March 1968, pp. 32-33*

2. *Dale Heatherington, WA4DSY, on-line calculator for ID-BPF, http://www.wa4dsy.net/cgi-bin/idbpf program in C++ can also be down-loaded*

3. *"Inter-Digital Band-Pass Filters", Jim Andrews, KH6HTV Video Application Note, AN-22b, July, 2015, 8 pages*

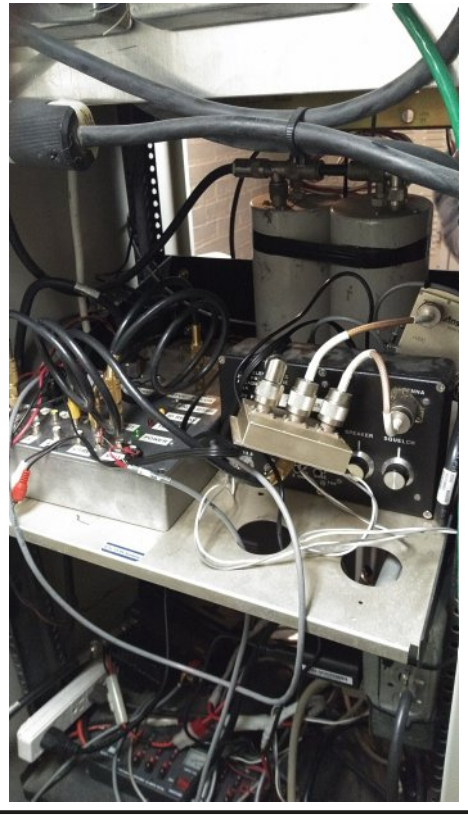
Check out the DKARS website at:- http://dkars.nl/

Jackson ATV repeater testing DVB-T receive

Written by Bryan Dygert KC8LMI

Just an update. We have added a hv-110 receiver at Jackson and we are testing DVB-T on 439.000 and 2 MHz bandwidth right now. The receiver is on an Angle Linear 2 port uhf splitter, along with an added Hi level Angle Linear pre amp, and shares the ribcage and lvsb filter with the analog atvr-4 receiver.

The hv-110 was modified per your article Jim of using the led and switching transistor. We chose port 4 on the atvc-4 plus to remove the sync det chip and bring a wire out to attach to a feed thru cap out of the controller box to a feed thru

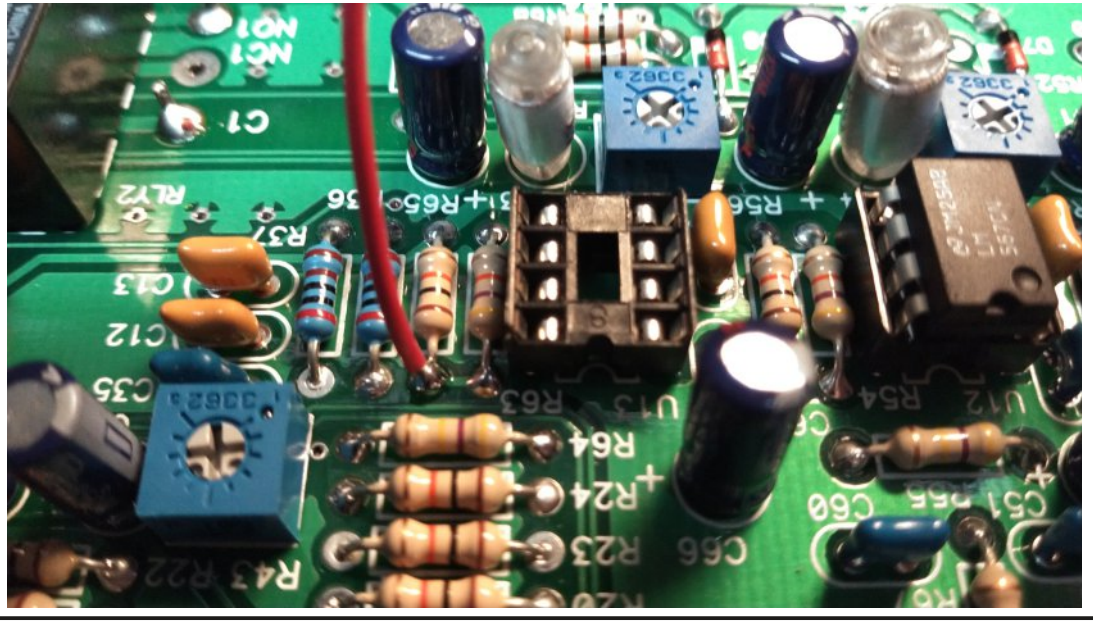


installed on the rear of the hv-110. Port 1 is still the analog atvr-4.

With this system and testing so far, I am able to get in a digital signal at 11.5 miles from the home qth using 2 k1fo 33 element hi gain beams at 110 ft and 2 mw. testing with dad's hv-320 transmitter. I am able to get in 18 miles north of the site mobile, but pulled over in a fairly clear area using my 2 stacked little wheels on the truck and a hv-320 w/pa, and d1010 running 4 watts.

In motion is pretty good but frequent freezing but nothing too bad. I enjoy driving around testing new areas. Attached are a few pics of the system.

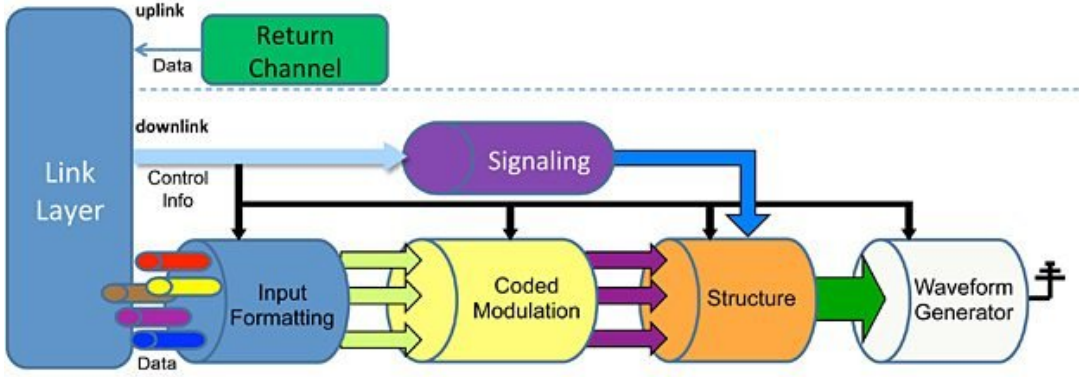
The single ribcage is on top of the small tower about 230ft above street level. The commercial 900 vertical is not in the picture but mounted to the side of the brick roof on the east side. The 900 output is still analog only right now running 230 watts sync tip. Things aren't very pretty right now but in early testing still.



The new broadcast DTV system for the USA

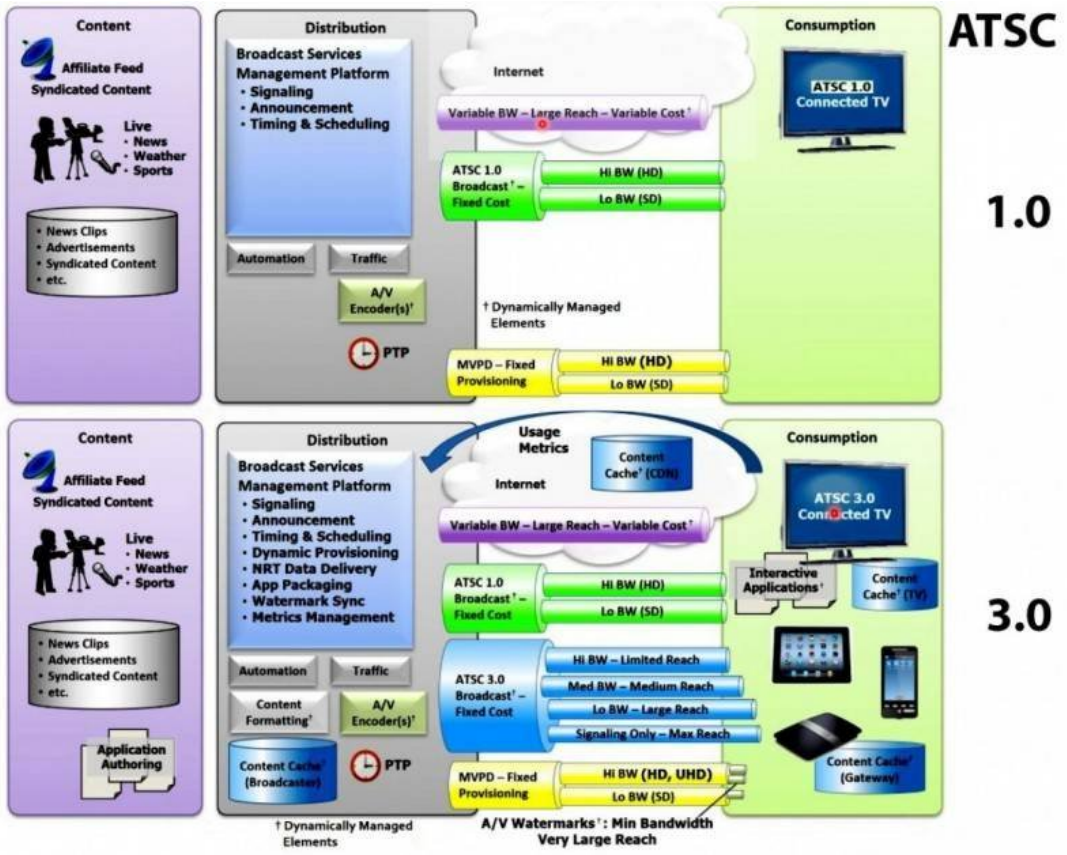
Written by Dan Rapak, WA3ATV

I'm a retired television broadcast engineer and a ham operator, WA3ATV, in Pennsylvania. We've formed a group here called "Mid-Atlantic ATV" to try to generate some DATV activity in this area. Our experimentation so far has been with Hi-Des DVB-T equipment.



I wanted to call your attention to an aspect of DTV here in the US. that most people are not aware of. A little over a year ago the FCC authorized a new standard for over-the-air digital broadcast television here in the US. It's referred to as ATSC 3.0 and has many advantages over our current ATSC transmission standard. the details are a bit much to go into in an email, but I'll touch on some of the highlights.

- Like DVB-T, it uses COFDM modulation to impress the digital information on the RF channel. As you know, this is far more robust in terms of dealing with multipath and other interference than the 8-VSB modulation system we currently have here. It is NOT backward compatible with our current system. However, manufacturers are expected to include reception for both modes in consumer sets.



- It is scalable similar to DVB-T. You can set parameters for a robust signal vs. a high quality signal. However, in ATSC 3.0 you can have both at once. That is, you can have a robust stream for mobile operation AND a high quality stream within the same RF channel at the same time.

- ATSC 3.0 is capable of transmitting 4K video in a 6 MHz channel.

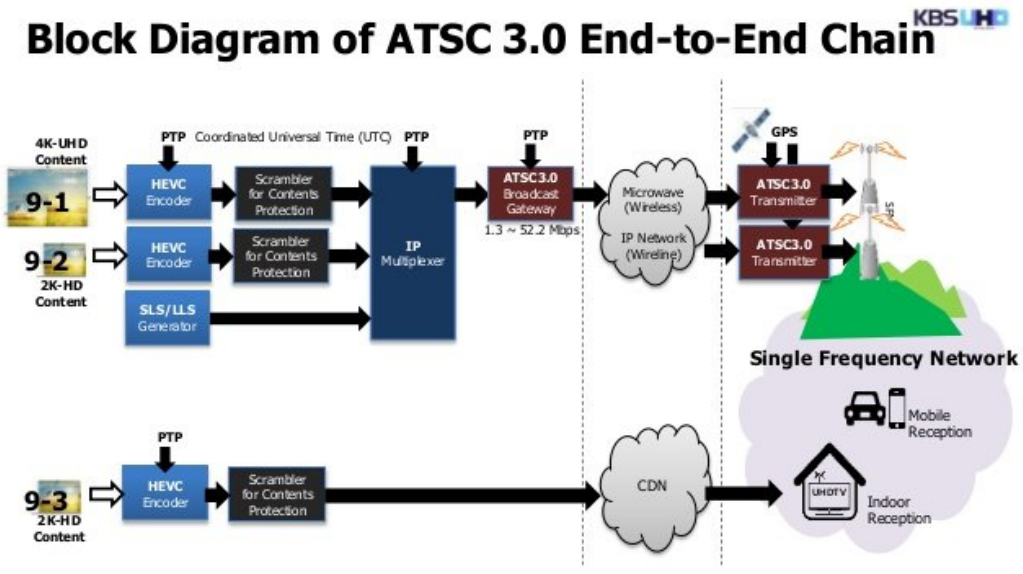
- Apart from the RF transmission method, the data protocol is I.P. based. That is, it is intended from the get-go to connect to and work with the Internet. the purpose is to allow broadcasters to engage in interactive television programming. The benefits for hams are only limited by the imagination.

- Also of interest to hams, the RF system is designed to function as a Single Frequency Network.

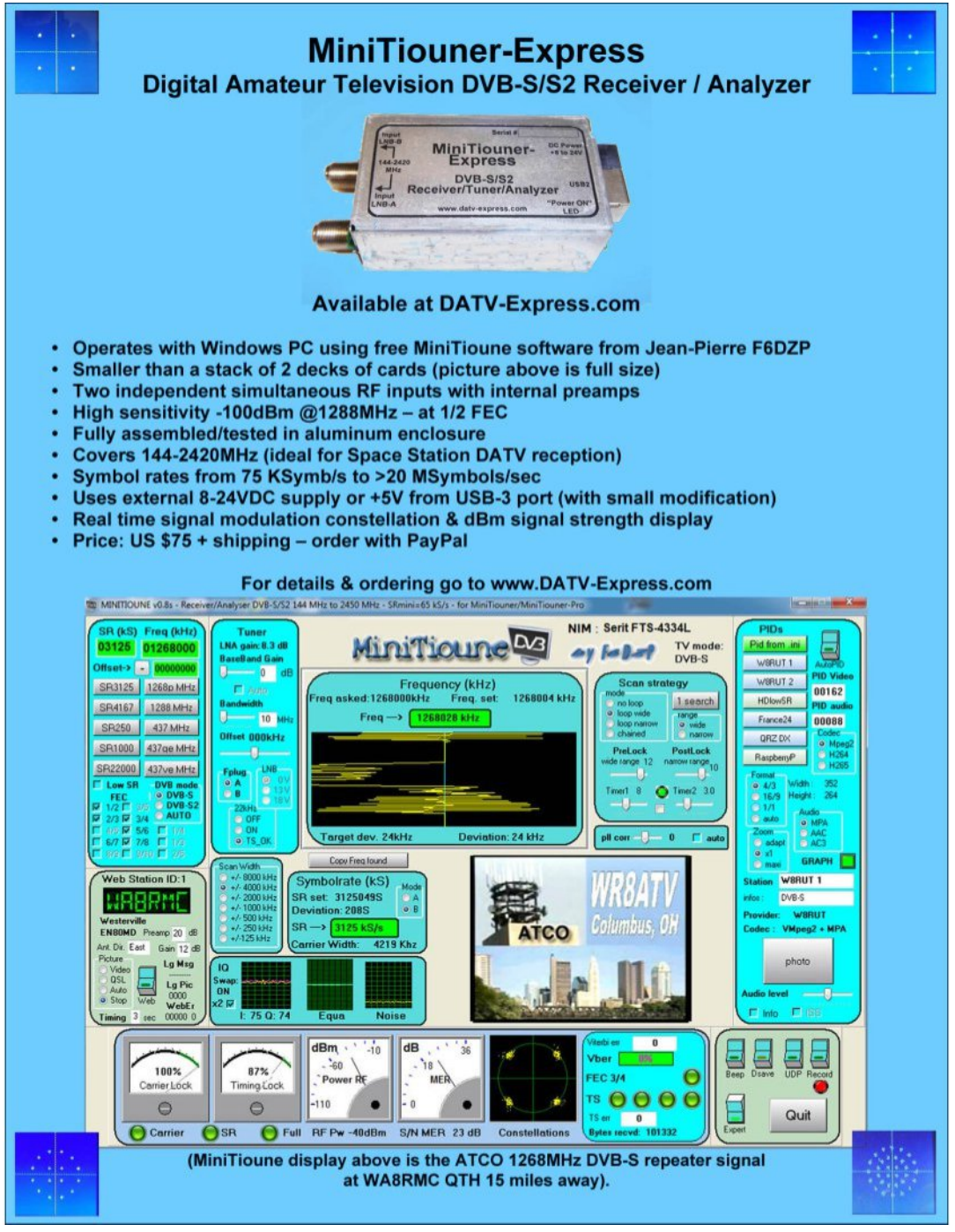
That is, you can operate multiple transmitters carrying the same information in the same area and the transmitters will augment, rather than interfere with one another. For broadcasters, this means they can operate translators on-channel and can also now have low power null-fill transmitters to fill in gaps in their coverage. For ham operators, it means that linked DATV repeaters carrying the same video could all operate on the same output channel and improve one anothers' coverage while at the same time conserving spectrum.

- The ATSC 3.0 protocol has built-in provisions for a greatly improved Emergency Alert System to allow broadcasters to disseminate information to the public during emergency situations. Hams will no doubt find many ways to use this provision in our EMCOMM work.

ATSC 3.0 has already been deployed in S. Korea and so manufacturers are now making consumer sets. They should begin showing up in stores in the US shortly, making it possible to use an off-the-shelf TV set to receive DATV signals much as we did in the analog ATV days.



ATSC 3.0 Broadcasting in Korea



How to eliminate Video squelch functions?

Written by Klaus Hirschelmann, DJ7OO

Reprinted from TV-AMATEUR 191 (*www.agaf.de*)

Who doesn't remember the noisy screens, as they were supplied by analog television receivers, as long as no input signals were received? For us TV amateurs that allowed a recognition of weak and weakest signals from incoming stations.

A slightly different situation unfortunately results in the use of almost all modern video monitors, so these at all still have an input to the processing of analog signals. Equipped with an integrated video squelch, they allow only then screen displays, if at their signal input also standard-compliant sync impulses with sufficient levels are detected.

Noise on the monitor

Now, analog ATV operation certainly no longer has the same status as before, but also experiences, e.g. in connection with the very inexpensive FTV modules available for the 5.6 GHz range, at least in some regions (G, PA0), a remarkable renaissance again.

Resourceful amateurs had also thought about how they could outsmart the squelch function of modern video monitors. At PE1RQM in the Netherlands, for example, an assembly called *"SYNCSMURF"* was created. Inserted into the video path of analog TV reception arrangements, it also generated the required sync pulses independently of any input signals and, if necessary, made them available again at their output together with any noise signals present at the input. This made noise visible again on monitors even if they were equipped with a video squelch.

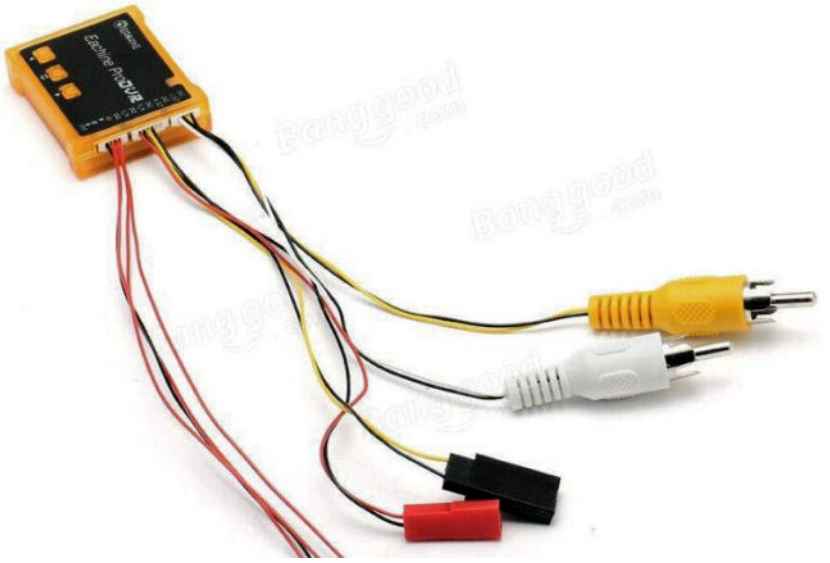
However, as there has recently been an increase of problems with the procurement of some special components for the "SYNCSMURF", its distribution unfortunately had to be discontinued in the meantime. Since there was still a need for "sync killers" in connection with the already mentioned 5.6 GHz activities, I looked around for alternative solutions.

It was more by chance that I came across the EACHINE module "DVR Pro" as offered by *BANGGOOD*. The "DVR Pro" is preferably a small unit for recording and reproducing analogue A/V signals in connection with objects such as model airplanes or drones.

The video input is usually fed the signal of a video camera flying with it. At the same time, this signal is often also used for the modulation of an on board transmitter.

A particularly interesting application for ATV use is the use of the "DVR PRO" on the receiver side. For this purpose, the video input is connected to the output of an analog TV receiver instead of a camera.

The DVR-Pro unit



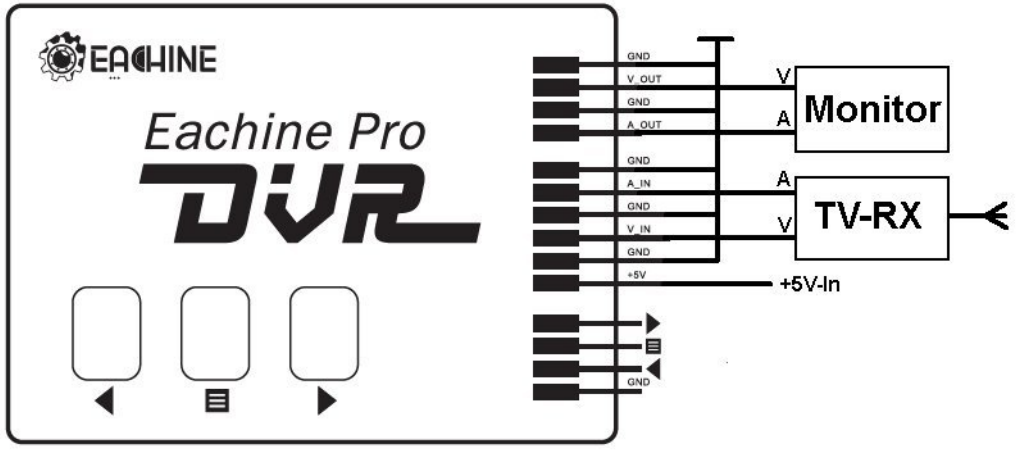
The DVR-Pro unit and cables required

The "DVR-Pro" will always provide an internally generated sync signal mixture at its monitor output, independent of input signals.

Its functionality is therefore comparable to that of frame store synchronizers. In this way, any noise signals, present on connected monitors with the squelch function activated, become visible again.

But don't forget the main function of the "DVR Pro": With a few operating steps it allows the recording and playback of A/V signals using a micro SD card.

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



The DVR-Pro layout

Grass Valley Mixer Conversions

Written by Trevor G8CJS

Let's start with a history lesson. Back in 1959, Grass Valley was born, a company that produced equipment for the television broadcast industry and in 1968 introduced their first vision mixer, or production switcher as they are better known.

They produced a whole range of production switchers from the small to the very grand, but the small one is the one that captured everyone's imagination, the GVG 100. The unit was in two halves, a crate which was rack mounted and a very attractive control surface in a desk case. The two units were linked by a small cable carrying serial commands.

The crate first appeared as a small 2U crate that could mix composite video and was followed later by a larger crate that brought component mixing to the party. The control panel was able to drive either version.

Later a separate company, Ross, designed and built an SDI mixer crate that again connected to the same control panel and used the same protocol. This was a brave move, but It allowed an update into the digital world, and enabled Ross to produce a very price competitive switcher, as the most expensive part of any mixer is the control surface and being able to re-use an existing panel was a popular move. The cut buttons ordered as replacement items were over £30 a piece! They have a very nice feel and can be customised by printing the source onto overhead projector gels, cutting and fitting it inside the button, so you can see the value of this kit.

There were updates to the panel, a 110 and a 1000. The 110 added E-memory storage for effects and also was produced as a conversion kit for the 100. This came with a replacement E-mem button to store and recall the effects, (the mixer panel in the picture has this feature). Normally this kit would have passed on into the history books as the mixer crates are a little dated now. They will only mix sources locked to the same SPG and we have all come to expect more with modern production switching solutions such as ATEM and Vmix with built in Digital effects.

The communication from the panel to the crate was RS422, a standard that was very popular with linear edit suits. The GVG mixer can be controlled via this, using P2 protocol and there is a button on the panel to pass control to an edit controller.

It's all a little long in the tooth now, but Sony P2 protocol was a standard usually carried on 9 pin D type connectors and it could be emulated on a PC that required a converter box to change RS232 to RS422.

I have a home built one somewhere and the design I published in one of the ATV magazines along with some simple software for controlling a P2 equipped VTR deck.

Unfortunately RS232 now seems to have disappeared from modern PC's, so the panels would be worth very little and start making their way to the collectors and kit fondlers, to clog up their garages as we so often see. But this is not the case due really to one person who goes by the name of Baz, who has supported these panels by providing LED replacement lamps and a full conversion kit so they can be used with the ATEM switcher.

Blackmagic ATEM Switcher

ATEM is a product from Blackmagic that enables production switching of non sync sources for just over £600 depending on the version, perhaps a little out of the amateur price range, but for somebody who is providing a streaming business it's a very affordable solution. What is not so affordable is the control surface which weighs in at a little over £2,000. So enter Baz and his GVG 100 control surface modification kit, to make these panels work with the ATEM. This is making these panels rather sort after units and at the moment they sell for anything from £50 to £100 on eBay.

Blackmagic ATEM custom control surface

Ok its confession time! I have in my very small collection of broadcast items just such a panel it's a 1000 model. I tried to pass but it was next to a friends wheely bin waiting for disposal and I took pity on it.

I have used one professionally for several years as part of a VT edit suite, so I know my way around it to operate. I have some limited documentation, and I can still remember how to read a circuit diagram although the code is locked into an MC 6801 micro and I have no words, flowcharts or disassembly listings, so there will be some reverse engineering and experimentation involved.

This might not quite elevate me to Baz's level of expertise, but I have been thinking for some time about having a poke around inside one of these units and perhaps helping any of our readers who have just such a panel squirrelled away, to understand how it functions and the commands it exchanged with the long extinct crate and see if it can be interfaced to something a little more amateur price friendly like Vmix.

I think Baz has the ATEM market well and truly sewn up and if that's the way you want to go I can only point you to his site.

Is Vmix capable of external control? I think Mike G7GTN has answered that question already in some of the past issues of CQ-DATV and there is at least one person on the internet that has built his own control panel from scratch, but as yet I have not seen a GVG 100 conversion, which means one of two things, it's not possible or this could be a CQ-DATV first, or perhaps a third option in that I need to get out more.

No promises at this point in time, but perhaps it might be time to look around for a panel should this project interest you. One GVG 100 panel changed hands in Blackpool last week for £56 on eBay and there is currently one for sale in the states, which looks in nice condition and I suspect will change hands for a Sub £100. So soldering irons at the ready let's see what we can do and if you know how to suck the code out of an MC 6801 and disassemble it please don't hold back, you can reach me via *editor@cq-datv.mobi*

Internet links

- Baz's site
http://www.lefflerpost.com.au/gvg2atem/
- Baz's Facebook site
https://www.facebook.com/groups/234458053564266/
- Interesting
https://www.youtube.com/watch?v=ww5byIxv_hI
- a home built Vmix controller
https://www.youtube.com/watch?v=lBawephM1dA
- Black Magic
https://www.blackmagicdesign.com/products/atemtelevisionstudio

To be continued... In the next issue I will put together an exploratory dongle which will enable the lamps to be mapped and programmes to select them to be developed. The dongle will enable I2C commands into the GVG panel. If you want to play along keep checking e-Bay these panels do turn up, three have changed hands since I started the article two un the UK and one in the USA.

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/*

USA - ATV Repeater Directory

The ARRL repeater directory no longer has a separate listing for ATV repeaters, but mixes them in with all of the other voice repeaters.

With over 31,000 repeaters for just the USA & Canada, it now seems an impossible task to find the ATV repeaters buried in the mix. The ARRL directory is also available on-line as a subscription service from *www.RFinder.net*. The free, on-line, Repeater Book (*www.repeaterbook.com*) does not even list ATV repeaters, only voice (analog & digital).

I thus decided to work up a new ATV repeater directory for the USA. At the same time, Art, WA8RMC, in Columbus, Ohio got the same idea. We have been working together on creating a new directory. I have just published the new directory on my web site (*www.kh6htv.com*) as my AN-47.

In 2009, there were a total of 91 separate ATV repeaters listed for the USA. So far, with our research we have come up with a current total of only 35 ATV repeaters in the USA. We have thus lost almost 2/3eds of our ATV repeaters in the last decade. Is this because most of them were analog and today's modern TVs are all digital ??

So, analyzing the remaining 35 ATV repeaters, I have come up with these statistics..

14 repeaters have 70cm outputs, while 16 have 23cm outputs, and 3 have 33cm outputs.

There are two with 5.8G outputs and only one with a 10G output.

18 repeaters are strictly analog, while the others support some digital TV, either as inputs or output. 6 repeaters have digital outputs, while 14 have digital inputs.

DVB-T is the dominant digital TV mode. There are only 2 repeaters using DVB-S.

Almost all of the repeaters (30) have inputs on 70cm, either analog and/or digital. Many repeaters also support multiple inputs on various bands/modes.

The most complex repeater is the ATCO repeater in Columbus, Ohio, WR8ATV (*www.ATCO.tv*). It has 5 different inputs and 6 outputs covering from 70cm to 3cm with modes of VUSB, FM, DVB-T & DVB-S. It is also transmitting from a very tall building in downtown Columbus, at 630 ft. above street level!

The most complex ATV network is the ATN (*www.atn-tv.org*) which links six repeaters in southern California, four repeaters in Arizona, and one in southern Nevada.

The most up to date repeater list is available here:-

https://kh6htv.files.wordpress.com/2019/01/an-47-atv-rptrs.pdf

NOTES

1. All repeaters are NTSC, VUSB-TV, 6 MHz channel, unless otherwise noted. Some rptrs are using non-standard LSB. The frequency listed is the video carrier frequency.

2. Digital TV lists the center frequency. 6 MHz channel, unless otherwise noted. dt = DVB-T, ds = DVB-S

3. For full details, go to the listed web site, or send an e-mail to the contact person

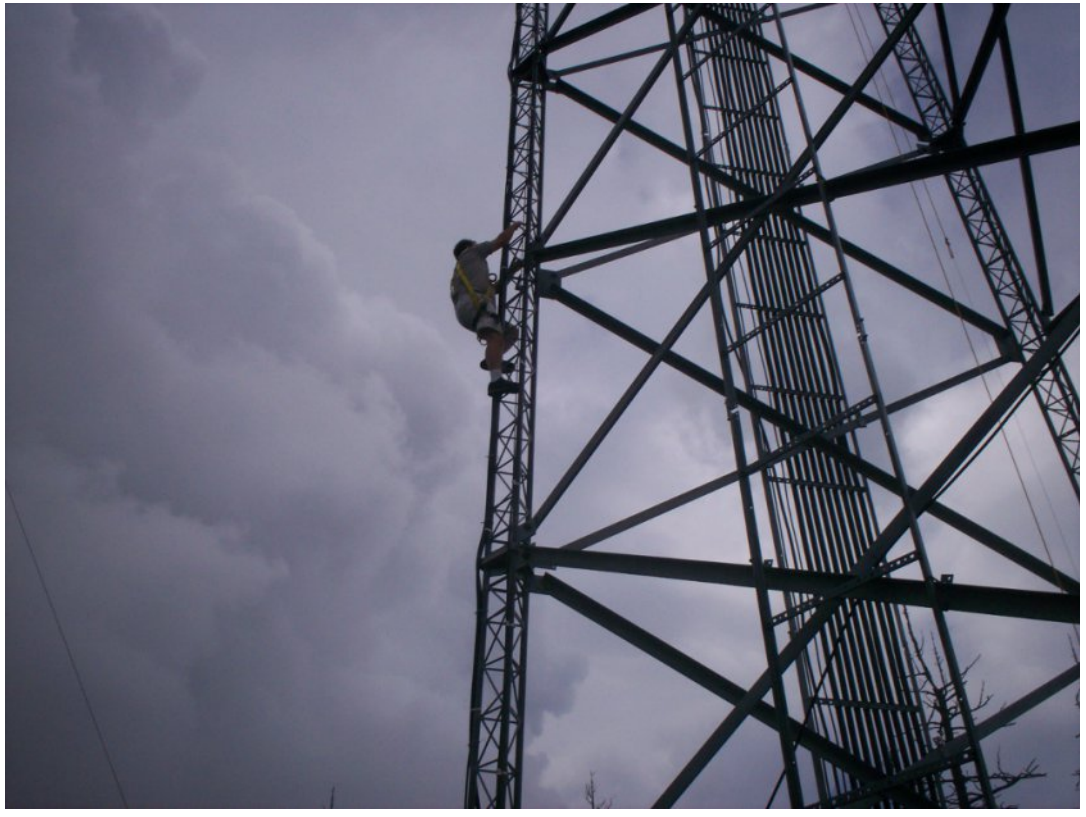
4. Some ATV groups also post repeater info on *www.qrz.com* under their call sign.

Repeater Directory compiled by Jim Andrews KH6HTV

Location	Call Sign	Output	Input(s)	Modes	Web Site & Contact for info
ARIZONA					note: AZ is linked to W6ATN in S. CA & NV
Phoenix, White Tank	W7ATN	1253.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wb9kmo@gmail.com
Mesa	W7ATN	1289.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wb9kmo@gmail.com
Tucson, Mt. Lemmon	W7ATN	1277.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wb9kmo@gmail.com
N.E. AZ & NM Green's Peak	W7ATN	1289.25	434	VUSB	www.atn-tv.org wb9kmo@gmail.com
CALIFORNIA					note: W6ATN rptrs are linked to AZ & NV
Orange Santiago Peak	W6ATN	1253.25 5910 fm	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Los Angeles, central Mt. Wilson	W6ATN	1265.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Los Angeles, north Oat Mtn.	W6ATN	919.25, 3380 fm	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Jobs Peak	W6ATN	1253.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
San Bernardino Snow Peak	W6ATN	1242 / 4 dt	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Santa Barbara	WB9KMO	1289.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wb9kmo@gmail.com linked with W6ATN
San Jose	K6BEN	427.25	910 fm, 1255 fm	VUSB, FM	www.k6ben.com :w2nyc@pacbell.net
Palomar	W6NWG	1241.25	915 fm 2441.5 fm	VUSB, FM soon be DVB-S	w6nwg@palomararc.org mountain.michelle@gmail.com
Clayton	W6CX	1273.0 FM	DVB-S	1292.5, 1273.0 915.0 DVB-S	info@mdarc.org http://www.mdarc.org/activities/repeaters/atv
COLORADO					
Boulder	KH6HTV	423 / 6 dt or 421.25	1243 / 6 dt 441 / 6 dt 439.25 1247 fm	DVB-T, VUSB, FM	www.kh6htv.com kh6htv@arrl.net
DELAWARE					
Wilmigton	KC3AM	423 / 6 dt	439.25 AM, LSB	DVB-T AM	KC3AM@verizon.net qrz.com
FLORIDA					
Cape Coral	W1RP	421.25	439.25	VUSB	paul@cardlink.com
IDAHO					
S.W. Idaho	WI7ATV	1257 fm	426.25	VUSB, FM	ka7anm@yahoo.com under construction
KENTUCKY					
Bowling Green	KY4ATV	421.25	439.25 1280 fm	VUSB FM	w4htb@twc.com www.qrz.com http://www.bluegrassars.org/
LOUISIANA					
New Orleans	WD0GIV	421.25	439.25	VUSB	wd0giv@att.net
MARYLAND					
Laurel	W3BAB	421.25	434.0, 1291 fm	VUSB, FM	ny3k2004@yahoo.com
Baltimore	W3WCQ	439.25 911.25	426.25 1253.25	VUSB	http://bratsatv.org/ brats@bratsatv.org
MICHIGAN					
Jackson	KC8LMI	923.25	439.25, AM LSB	VUSB	KC8LMI@hotmail.com
Grand Rapids	K8DMR	421.25	439.25	VUSB	ron_fredricks@att.net
MINNESOTA					
Wabasha	KD0HWX	421.25	439.25	VUSB	jonmcpete@yahoo.com
MISSOURI					
St. Louis	WD0FCH	426 / 4 dt	440 / 4 dt	DVB-T	k0pfx@arrl.net
NEBRASKA					
Omaha	WB0CMC	421.25	434	VUSB	wb0cmc@cox.net
NEVADA					
LAS VEGAS	N7ZEV	1253.25 912 fm	434.0, 434.0 / 2 dt 2441 fm	VUSB, FM DVB-T	frank.n7zev@gmail.com linked to W6ATN S. CA & AZ

NEW JERSEY					
Vernon	W2VER	5885 fm	5665 fm	FM	jaythienel@yahoo.com
OHIO					
Columbus	WR8ATV	423 / 2 dt 427.25 1258 fm 1268 ds 2397 mesh 10350 fm	439 / 2 dt 439.25 AM LSB 1288 fm 1288 ds 10450 fm	VUSB AM FM DVB-T DVB-S MESH	www.ATCO.tv gkenmorris@gmail.com towslee1@ee.net
Dayton	W8BI	421.25 428 / 2 dt 1258 fm	439.25, 439 / 2 dt 1280 fm	VUSB, FM DVB-T	www.w8bi.org dpel@aaahawk.com
Van Wert	W8FY	434	923.25	VUSB	ka8zge@w8fy.org
OREGON					
Portland	W7AMQ	1257 fm	426.25	FM, VUSB	belles73@comcast.net
Portland	WB2QHS	426	910 fm	VUSB, FM	emellnik@emavideo.com
PENNSYLVANIA					
Delaware Cty	KC3AM	421.25	439.25 AM, LSB	VUSB, AM	KC3AM@verizon.net
PUERTO RICO					
Aguas Buenas	KP4IA	426.25	439.25, 1252 fm	VUSB, FM	kp4ia@yahoo.com
WASHINGTON					
Seattle	WW7ATS	1253.25	434	VUSB	https://www.qsl.net/ww7ats/ ww7ats@gmail.com qrz.com

Mike Collis WA6SVT working on the ATV transmitter



Mike Collis WA6SVT climbing the 168 foot antenna. The base of the antenna is at 9260 feet elevation

Rural Australian Computer Terminology

A little bit of Aussie culcha.....

LOG ON Adding wood to make the barbie hotter.
LOG OFF Not adding any more wood to the barbie.
MONITOR Keeping an eye on the barbie.
DOWNLOAD Getting the firewood off the Ute.
HARD DRIVE Making the trip back home without any cold tinnies.
KEYBOARD Where you hang the Ute keys.
WINDOW What you shut when the weather's cold.
SCREEN What you shut in the mozzie season.
BYTE What mozzies do.
MEGABYTE What Townsville mozzies do.
CHIP A bar snack.
MICROCHIP What's left in the bag after you've eaten the chips.
MODEM What you did to the lawns.
LAPTOP Where the cat sleeps.
SOFTWARE Plastic knives & forks you get at Red Rooster.
HARDWARE Stainless steel knives & forks - from K-Mart.
MOUSE The small rodent that eats the grain in the shed.
MAINFRAME What holds the shed up.
WEB What spiders make.
WEBSITE Usually in the shed or under the verandah.
SEARCH ENGINE What you do when the Ute won't go.
CURSOR What you say when the Ute won't go.
YAHOO What you say when the Ute does go.
UPGRADE A steep hill.
SERVER The person at the pub who brings out the counter lunch.
MAIL SERVER The bloke at the pub who brings out the counter lunch.
USER The neighbour who keeps borrowing things.
NETWORK What you do when you need to repair the fishing net.
INTERNET Where you want the fish to go.
NETSCAPE What the fish do when they discover the hole in the net.
ONLINE Where you hang the washing.
OFFLINE Where the washing ends up when the pegs aren't strong enough.

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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.

The inner workings of this GVG panel. If we understand how it works we can then investigate how to interface it to something other than a GVG mixer . The first move is to communicate with it via an I2C bus and the hardware for this will be in CQ-DATV 69.

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