Boulder Amateur Television Club
TV Repeater's REPEATER

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issue #91

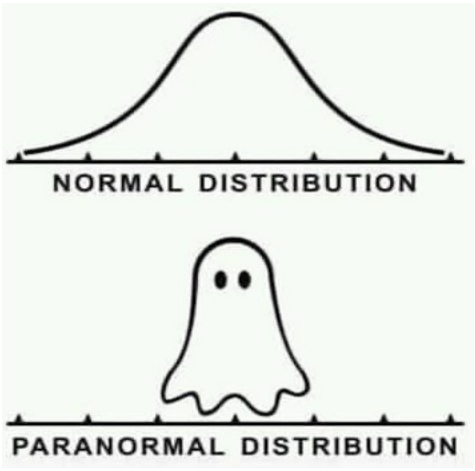
BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

Jim Andrews, KH6HTV, editor - kh6htv@arrl.net www.kh6htv.com

HALLOWEEN GREETINGS

from



Larry, K0PYX **Ruby, KH6DOG**

ARRL Podcast on ATV: Steve Ford, WB8UMY, former QST editor, hosts a bi-weekly podcast called "Eclectic Tech" (http://www.arrl.org/eclectic) Steve's podcast usually deals with new, novel aspects of technology. Check out the podcast #45 which aired on October 21st. The topic was "Talking about the state of amateur radio television with Jim Andrews, KH6HTV".

Hi-Des MPEG-2 / H.264 Issue Feed-Back:

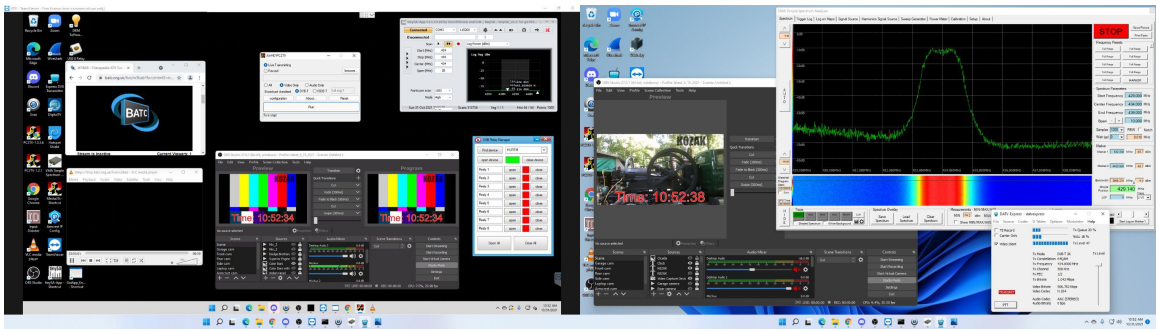
Aloha Jim -- I sent an email to Calvin about the MPEG 2/H.264 RX issues and he said they worked on the firmware and have a new one (on their website) dated 10-28-2021 that allows the receiver to switch by itself between the two encoded modes. Calvin and the gang at HiDes are super with customer service.

73, Mike, WA6SVT, Crestline, California

DAYTON ATV NEWS: This photo shows Dayton Amateur Radio Assoc. (DARA), DVB-T ATV station after replacement of the monitors. Since the DARA ATV repeater is located within the equipment barn directly adjoining the clubhouse, a "gimmick receive antenna" is all that is needed to receive the output of the ATV repeater. A separate antenna is used for the transmitter (not pictured). Consequently, "full duplex" is possible while transmitting 70cm DVB-T. Having a complete transceiver on site also helps greatly when troubleshooting any issues with the DVB-T ATV repeater.

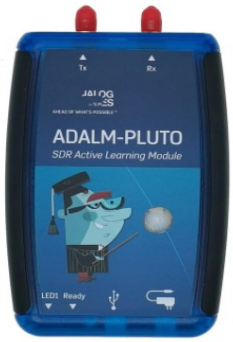
Dave, AH2AR, Dayton, Ohio

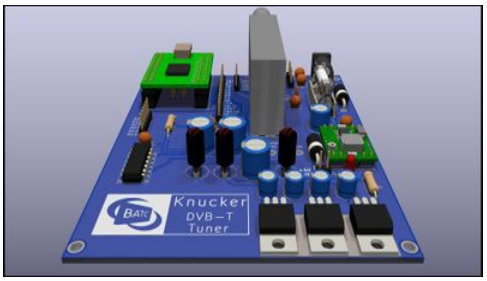
BALTIMORE ATV NEWS: Hi Jim -- I thought I'd give you an update on what has been happening in Baltimore with DBV-T. Not much progress has been made over the summer for various reasons, but we do have the Hi-Des HV 110 receiver at the repeater site now, Unfortunately, due to the high RF environment at that location, it was showing a noise floor of around –75Dbm, so was pretty much unusable. We were only able to get signals into it a couple of miles away. We recently tuned up one of the 6 MHz bandpass filters we got from you and that made a huge difference in the noise floor. It dropped it down –95 dBm. However, the only people that are currently set up to transmit DVB-T in the local area are myself & Fred, and we are both on the fringes of the repeater. We can see a slight rise in the noise floor of the receiver when Fred transmits, but not enough to actually do anything. I have an Advanced Receiver Research pre-amp that we are going to put behind the bandpass filter to see if it might help.



Unfortunately, I am directly behind a ridge which is between me and the repeater, so there is little hope for me to get a signal there from my location. So I have just finished setting up a remote base and installed it at a friends house closer to the repeater for testing.
(update today 1 Nov) Fred met with the repeater guys at the site this morning (11/1) and I sent them a signal from my remote base and discovered that the receiver was receiving a solid signal from me without even adding the pre-amp to the antenna. It turns out that there was an issue with the Hi-Des's connection to the repeater controller and they are working on that now. So hopefully we will have the digital input working on the repeater shortly.

You might be interested in that remote base setup. The above picture (left screen) shows me logged into the control PC at his location using Team viewer. This transmitter consists of a HiDes UT100 set to 434Mhz at 2 MHz bandwidth. This feeds a 10 watt RF amplifier. I am using OBS studio to feed my videos, ID, and cameras from the computer to the UT 100. I am controlling the UT100 with the Hi-Des supplied PC2TV program. I also have a USB relay board hooked up that I can remotely key the RF amplifier with, as well as a TinySA that allows me to monitor the actual RF waveform of the transmitter. Hopefully, I will be able to begin testing this setup soon.





In the above picture, the right side monitor shows a whole different setup which is at my house. That screen shows me transmitting a reduced bandwidth DVB-T signal with an Adalm Pluto. I am controlling that with the DATV Express software from BATC. The picture shows it transmitting on 434 MHz @ 500 kHz bandwidth. The waveform shows its transmit pattern. I am receiving this signal with a Knucker receiver I built from BATC as well. I am currently able to generate stable signals with QPSK, 16QAM, & 64QAM

and decode them solidly with the Knucker at both 1MHz & 500 kHz bandwidths. and it will transmit for hours in my house without any issues. I have thus far not gotten the Pluto to transmit a clean signal at 2 MHz bandwidth or 333 kHz bandwidth. There are some mods they are doing with the Pluto that I have not performed yet, so that could help in that regard. I have also not put this signal into a RF amplifier yet or transmitted it over the the air as no one else in the area is currently equipped with hardware to receive these bandwidths.

Hope that is of some interest to you. By the way, I am looking for a decent Band-Pass filter with a 2 MHz bandwidth and capable of handling around 50 watts. I am looking at a Chinese LBQ-450 that should fit those parameters, but have not ordered one due to the excessive shipping times from China right now.

LBQ-450 Band-Pass Filter

Seeya, John, K0ZAK, Reisterstwn, Maryland

Editor's Notes: The problem with desensing of the Hi-Des receiver due to strong urban RFI and it's cure with a 6 MHz band-pass filter is identical to what we recently encountered in Denver. We discussed it in the Sept. issue # 88.

The **Adalm Pluto** is a powerful SDR (software defined radio) from Analog Devices based upon their AD9363 transceiver chip. It offers rf coverage from 325 MHz to 3.8GHz. It is available from many sources, including Mouser and Digi-Key. Prices start at about $209.

The **Knucker** is a USB based receiver for DVB-T developed by the BATC. (https://wiki.batc.org.uk/Knucker) It is intended strictly for narrow-band 150kHz to 2 MHz wide OFDM with a frequency range of 44 to 1002 MHz.

The Chinese **LBQ-450** band-pass filter which John has found on the inter-net looks to be quite interesting. It could potentially be a good solution to many of our 70cm receiver de-sensing issues. From it's photo, it appears to be a machined three cavity resonator filter. The specs. found on-line are: tunable frequency range of 400 to 520 MHz, Pass Band tunable from 0.6 to 8 MHz, insertion loss < 1.5dB, max. power rating of 50 watts. I have found it on-line with type N, BNC and SMA connectors available. The on-line prices seem to range from $65 to $122. Robin, LA2YUA, has written a very complete technical review of it. http://longview.be/lbq-450-3-cavity-uhf-bandpass-filter.html

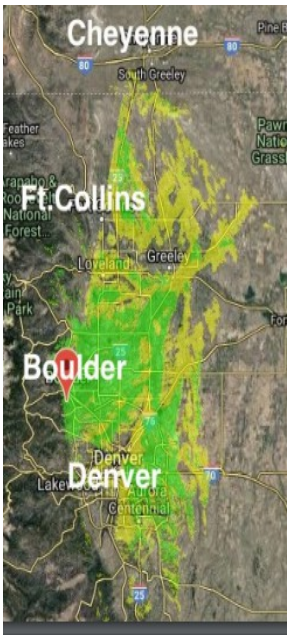
A 2 meter (136 - 180 MHz) version is also available. Do a google search under LBQ-150.

MARKETING ATV: We here in Boulder are actively trying to promote ATV. We set up display tables at area swapfests. We also give talks on ATV to neighboring ham clubs. Most recently, in October we gave a talk about DATV to the Longmont, Colorado ham club. Because LARC is in our coverage area of our DATV repeater, we are also encouraging their members to at least try to watch our ATV nets, either via the internet or hopefully off the air. The following is an article we submitted to the *LARC Splatter* newsletter as a follow-up.

Contribution for LARC Splatter newsletter

How to Watch Boulder County ATV

Jim Andrews, KH6HTV



This is a follow-on to my Zoom presentation for your LARC October meeting. My talk was on "High-Definition, Digital Amateur Television".

Boulder County has a DATV repeater, W0BTV. It covers most of the eastern half of Boulder County and beyond out onto the eastern prairie. Due to it's location (same as the BARC 146.70 repeater) it does not penetrate into the mountainous western part of the county. The repeater does give good coverage over most of your city of Longmont, plus points further to the north and east. We presently have one active ATVer up in Johnstown, Bob, WB0NRV, 29 air miles from the repeater.

The repeater has an active group of ATVers. They hold a weekly ATV net on Thursday afternoons. The net starts at 3pm and runs for 1 to 1 1/2 hours. The repeater's transmitter

Some of the W0BTV active ATVers -- actual off the air photos

is typically turned on 1/2 to 1 hour prior to the net with either a test pattern or with a DVD playing a vacation travelogue. During the net each participant gets a chance to turn on his TV transmitter and chat on the air with the other net participants. Each TV transmission lasts for typically about 10 minutes. Many different topics are discussed on the various nets. Some are ham radio technical, some are slide shows of walks around town or travels, etc. We also have some viewers without TV transmitters

who join in and add their comments. We use the BCARES 2 meter FM voice repeater on 146.76MHz for net control and our intercom. If you only listen to 76 you might wonder why the conversation is one sided ? It is because the other person is on TV and talking on the TV channel. Thus a full duplex conversation is actually in progress.

So how can you join in and watch the ATV net ? You can watch it on your computer being streamed over the internet. But being hams we really like to do things using antennas over the air. Here is what it takes to do either.

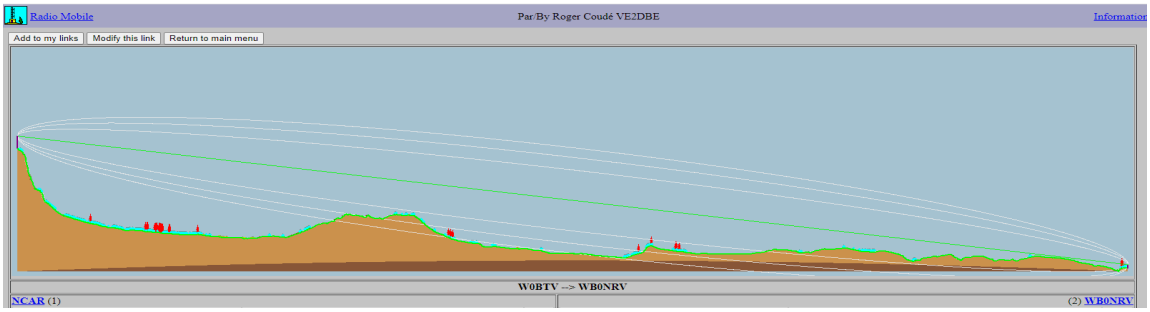
Internet: Boulder's W0BTV ATV is streamed live over the internet. We use the services of the British Amateur Television Club (BATC) for streaming. The URL link to the BATC server in the U.K. is: https://batc.org.uk/live/ This takes you to the BATC page for streaming. There are over 60 ATV repeaters around the world listed on this page, plus many more individual ATV hams. Those that have active streams are listed as On-Line. Not all of those on-line will have actual live hams chatting, but might be in a stand-by mode playing a test pattern. The Boulder ATV repeater is accessed by clicking on either "N0YE" or "KH6HTV-TVR".

We only stream to the BATC when our weekly net is in progress, or there is a special event in progress, such as a BCARES operation. An example was the Cal-Wood forest fire a year ago when we had live video coverage 24/7 for several days. We use both stereo audio channels. We put the ATV repeater's audio on the the left channel and the 146.76 audio on the right channel. Please


FOREST FIRE IN BOULDER COUNTY !

note that the stream from the BATC has about a 20 second delay from the live video. Thus it can be confusing if you are also listening to 146.76 live.

Over the Air: If you want to actually watch the ATV repeater over the air, we are willing to help you get setup. It will be a multi-step process.



RF path profile from W0BTV ATV repeater in Boulder to WB0NRV in Johnstown

Step 1 -- I will first determine if a viable RF path exists from the repeater to your QTH. I use the free, on-line, computer program called ***Radio Mobile*** to perform an rf path prediction. We have found ***Radio Mobile*** to be very accurate. If it says no path exists, we will drop it there. The above plot shows an example of one path which works to Bob, 47km to the north-east.

Step 2 -- If ***Radio Mobile*** says there is a workable path, then we are willing to loan you on a short term basis a digital TV set-top box receiver. It is similar to the set-top box provided by the cable TV company. Our repeater's output is on the 70cm band on channel 57 at 423 MHz. You can not receive this signal directly on your home TV receiver. The set-top box must be used. We are using vertical polarization. If you already have a vertically polarized, 70cm antenna at your QTH, then great. You will simply connect it to the set-top box. The HDMI output from the set-top box goes to your home TV receiver, the same as if you were plugging in a DVD player, etc. If this is not convenient, we could also loan you a small, portable TV monitor. If you don't have a suitable antenna, we do also have available for loan a Diamond X-50, 2m/70cm base station antenna, antenna tripod mount, mast and a length of coax cable.

Step 3 -- Once you have this setup at your QTH, you then give us a phone call and ask us to turn on the ATV repeater with a test signal. If you still have trouble receiving the signal, we are also willing to do a doctor's house call for de-bugging.

Step 4 -- After you have achieved reception at your QTH, the next step is for you to purchase your own digital TV set-top box. Unfortunately, these come "dumb" and will not automatically work to receive the repeater's signal. To get around this problem, we offer to purchase a suitable receiver for you, program it to receive all of the amateur 70cm and

$42 DVB-T RECEIVER for 70cm & 33cm ATV ! ! !

33cm ATV channels and then re-sell it to you at cost. The cost is typically about $50 although we sometimes have been able to find receivers for as low as $15.

Interested in our offer ? --- Then contact me at kh6htv@arrl.net
73 de Jim, KH6HTV, Boulder, Colorado

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MEASUREMENTS with the NANO-VNA: Many of us now own that great little box, the Nano-VNA. You might be amazed at what all you can do with it. Arie, PA3A, has written a great series on just this topic. They appear in the great on-line, free, ham radio magazine, *"The Communicator"* from the Surrey, BC, Canada club SARC. The latest Nov-Dec issue has his *"Part 7: Measuring the Q of a coil"* This issue and all previous issues are available on the SARC web site: https://ve7sar.blogspot.com/

W0BTV Details: **Inputs:** 439.25MHz, analog NTSC, VUSB-TV; 441MHz/6MHz BW, DVB-T & 1243MHz/6MHz BW, DVB-T
Outputs: Channel 57 --- 423MHz/6MHz BW, DVB-T, or optional 421.25MHz, analog VUSB-TV. Also, secondary transmitter, FM-TV output on 5.905 GHz (24/7).
Operational details in AN-51a Technical details in AN-53a. Available at: *https://kh6htv.com/application-notes/*

W0BTV ATV Net: We hold a social ATV net on Thursday afternoon at 3 pm local Mountain time. The net typically runs for 1 to 1 1/2 hours. A DVD ham travelogue is usually played for about one hour before and 1/2 hour after the formal net. ATV nets are streamed live using the British Amateur TV Club's server, via: *https://batc.org.uk/live/kh6htvtvr* or *n0ye*. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz (-600kHz, 100 Hz PL tone required to access).

Newsletter Details: This is a free newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 450. News and articles from other ATV groups are welcomed. Permission is granted to re-distribute it and also to re-print articles, as long as you acknowledge the source. All past issues are archived at: *https://kh6htv.com/newsletter/*

ATV HAM ADS

Free advertising space is offered here to ATV hams, ham clubs or ARES groups. List here amateur radio & TV gear **For Sale - or - Want to Buy.**

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RF LINEAR POWER AMPLIFIERS

KH6HTV Video produces a line of RF Linear Power Amplifiers specifically intended for use in Amateur Television service, either analog or digital. TV transmissions, unlike SSB or FM voice, typically last for many minutes or even hours in duration. Thus TV amplifiers must be rated for 100% duty cycles. Our amplifiers are designed for 100% duty cycles and incorporate large heat sinks and cooling fans. We offer a selection of amplifiers with different output powers for the amateur radio 70cm, 33cm and 23cm bands. The amplifiers all share a common design and features. A key feature is an RF Power control on the front panel to adjust the RF output power (and current draw) down by -5dB (medium power) and -10dB (low power). They also include a PTT circuit for easy incorporation in a TV repeater. All of the amplifiers have a built-in driver amplifier and the overall gain is typically >50dB. They have sufficient gain to be driven directly by cable TV analog modulators or Hi-Des DVB-T modulators (www.hides.com.tw). All amplifiers are designed to operate on 12 Vdc. Go to our web site: www.kh6htv.com for detailed specification sheets, price list and over 60 application notes on amateur TV.

Model	Band	Digital TV (rms avg)	Analog TV or SSB (peak)	Saturated (FM-CW)	Gain	Current @13.8Vdc
70-9B	70 cm	10 W	25 W pep	60 W	53 dB	10 A
70-12C	70 cm	6 W	15 W pep	40 W	53 dB	4.8 A
70-7B	70 cm	3 W	10 W pep	20 W	50 dB	3 A
33-3B	33 cm	6 W	20 W pep	50 W	50 dB	10 A
33-1A	33 cm	3 W	6 W pep	20 W	42 dB	2 A
23-11A	23 cm	4.5 W	15 W pep	30 W	50 dB	7 A