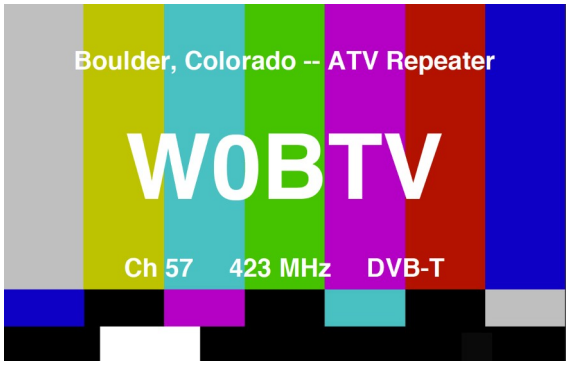
Amateur Television Journal



March, 2025
issue #183

BATVC web site: www.kh6htv.com

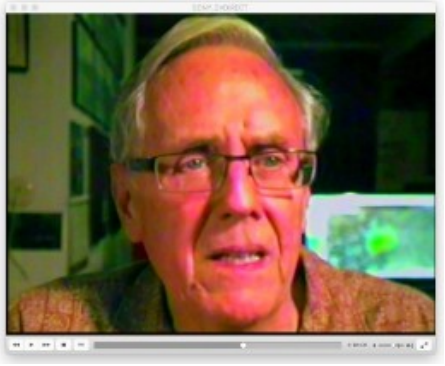
ATN web site: www.atn-tv.com

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

AD0I -- *Silent Key / Video Camera*

Joe Woods
AD0I

1942 - 2025



off the air, ATV image

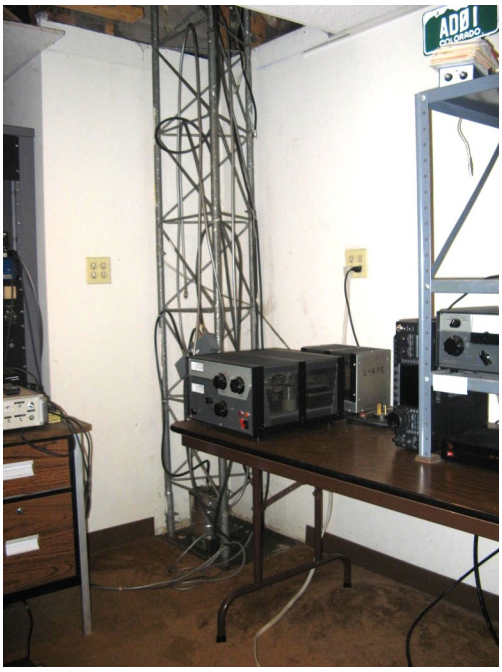
We are grieved to announce the passing of a local Boulder **ATV** *legend. Arleen has just informed us of the death of our good friend, Joe Woods,* **AD0I.**

Here is what Joe had to say about himself on ***www.qrz.com***
(*editor's note -- I am adding a bit to Joe's narrative*)

I have been a ham for a little over 40 years. I started in electronics with a crystal radio in junior high, and moved on to TV repair in the summers. (*Joe grew up in Oklahoma and went to the Univ. of Oklahoma. He was then drafted into the Army and was assigned to NASA during the Vietnam war.*)

I am an electrical engineer and my first engineering job was at the Space Electronics Systems Division at the NASA Manned Spacecraft Center, now the Johnson Spacecraft Center near Houston. I worked in the Television Systems Section designing TV cameras and a bandwidth compression system. After NASA reached the moon, I moved on to Colorado where I started a company that made TV equipment for broadcast and cable. (*that company was called Video Aids of Colorado*)

When I got my ham license we lived in a subdivision with covenants against antennas. After putting up with a vertical in the kitchen and dipoles in the attic for a couple of years, we had a house built with a tower supported by a 30 foot high chimney. (*the house was actually built around the tower which started in the basement - see Joe's photo.*) In my younger days I could climb the tower from the basement floor to a trap door at the top of the chimney, and then on up. (*to his BIG HF yagi and 70cm ATV yagi*)



I am mostly active on HF and fast scan 70 cm TV.

KH6HTV comments: *Joe was active in ham ATV starting in the mid-70s along with several other hams in the Rocky Mtn. VHF Society. Joe helped build our very first ATV repeater which we put on Lee Hill in the late 70s. All B&W in those days. No one could afford a color camera. Joe was also very active in the early days of BCARES, especially with ATV.*

More recently when we moved on to digital ATV, our first iteration of our NCAR digital repeater still included the capability to be dual-mode with both analog (NTSC) and digital (DVB-T) receive and transmit capabilities. As the BATVC members transitioned over to digital, Joe was the lone hold-out for analog. He said I helped develop the narrow band-width, analog TV system for the moon landings, I am going to stick with analog, if just for old time memories. Eventually, Joe's disabilities made it impossible for him to visit his basement ham shack any more and he had to sign off from being an active ATV participant. Now his TV screen has faded to just analog snow. Good Bye Joe - We will all miss you.
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Cable TV - QAM Modulation for ATV --- Feed-Back:

Joel Wilhite, KD6W, writes this Feed-Back Letter
(editor's note: *We would like to encourage others to also send us your opinions on the subject which we can reprint for our readers.*)

Dear Jim --- Thanks again for the newsletter. I always enjoy reading about all the things other people are doing and I am duly impressed with the DVB group out of San Diego in this latest issue.

With regard to your commentary about my talk and work we have been performing at Quartzfest and other locations, your comment in red bold letters left me thinking, I'm not sure you understand what it is we are trying to accomplish. In the case of Quartzfest and other hamfests, the signal propagation at those venues is fairly short distance to be able to reach the intended viewers. Your statement JUMPED to the conclusion to not use QAM since in your use case you needed to support emergency service and for use in a large metropolitan market with numerous interferes and multipath and so on. Where was our data points? ((hint - you didn't ask) At a hamfest or similar activity, we are not going 10's or 100's of miles but rather, 4 miles or less. Small communities are easily served by leveraging the freely available QAM tuner built into every TV which just so happens to be installed in most RV's at zero cost. You must admit It's hard to compete with free, unless your user base has a money is no object attitude and you decide to start handing out free HiDes decoders to everybody. Good luck with that.

What bothered me was you told everybody to throw away one technology and go buy this other product from a single vendor. Sure, it works, until it doesn't. Hi-Des is a single source, UAV link manufacturer who also happens to sell their products into the hotel/motel market worldwide. They were happy to help you because you (and other hams) who leverage their products only serve their purpose. What will your user base do if HiDes goes belly up and can no longer support their product anymore? Once your unit bricks or fails, I seriously doubt you will be able to fix it and so you will be forced to go buy another one until you can't anymore. Forcing hams to buy into a single source product and not leverage readily available or cheap technology is IMHO, short sighted. I never advocate any one solution is perfect, nor do I tell everybody go drop HiDes and invest in other technology. In my talk I promoted QAM as one way to get started, it is very easy to set up and in most cases very low cost and robust enough. Once you discover those limitations with a deployment, you then appreciate what other technology can potentially do to improve a solution.

What also bothers me is your newsletter opinion pushes HiDes like it is the only solution out there, almost like you have a stake in their business. That's your business, but your opinion in the newsletter was like a bucket of cold water, as if to say to me personally I don't know what I'm talking about. Your newsletter goes on to explain your use case and why you came to your conclusion, but you completely dismissed my use case so in my opinion, your opinion misses my point. Faced with all the facts, your readers should be able to judge for themselves how to deploy ATV and for what it's worth, QAM from a Drake modulator works has worked successfully year after year at Quartzfest and you didn't mention this point in the newsletter. I always include a disclaimer with my statements online and in front of audiences when talking about ATV, quoting the proverbial car dealers, "your millage may vary", and further to say "Try it. You might like it."

All of this is to say I am, like many people, a "toolbox" kind of guy. Maybe you weren't aware, I worked as a Sr. System Engineer developing system designs in Satellite (DISH Network, Bell ExpressVu) and in broadcast television (with many of the 3 letter networks you know) for 27 years and maintain a seat at the ATSC committee to this day. I rolled out all of the model ATSC 3.0 TV stations, NAB's system in Ohio, PEARLs system in Phoenix and Capitol Broadcasting system in Durham NC and provided 3 different live demo systems at NAB for the NAB. You could say I was an ATSC 3.0 fan boy. QAM is only one tool, ATSC 1 or 3 are two others, Hi-Des is another, AM (NTSC) is another, and IC-905 FM TV is another and so on. They all come with a cost which varies from zero to thousands of dollars (IC-905 is $$$$) to implement with varying degrees of success. I'm not in a habit of throwing the baby out with the bath water, and in my humble opinion, neither should other hams. Hams are "playing" in a world of technology surrounded by standards which just so happen to support our niche hobby in many different ways. Standards are like a gift that keeps on giving, the more the better, They provide us more tools to use for all the different applications which allows us more freedom in which type of system we wish to employ. I agree, HiDes builds a standards based product which when set in a specific way allows it to work into a store bought TV, but their software allows users to use it in non-standard ways (i.e. 2MHz is not part of the DVB-T/T2 specification). Like Ron Economos W6RZ's efforts, his is perfect example of this exact same point and provided yet another tool in the toolbox. He provided proof there is another way to do the same thing ATSC 1.0 does using 3.0 modulation (MPEG 2 TS but over ATSC 3.0) and I like the way Ron thinks. But his solution limits his deployment to the very particular receiver he had in his lab, but hey, it works. So this is cool stuff!

Of course you are entitled to your own opinion but you are not entitled to your own facts and by omitting data from other use cases, you are not providing the whole story. I get it though, it's your newsletter.
The next time you choose publish something of mine without a chance for me to discuss or rebut your opinion, I ask you kindly to not to quote me out of context without my permission.

Sincerely, Joel Wilhite - KD6W, Tucson, Arizona

KH6HTV Reply & Comments - re Cable QAM:

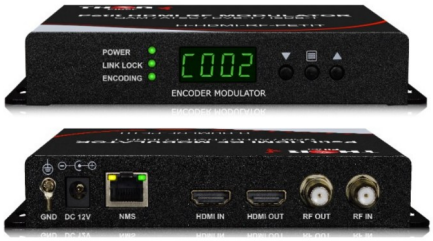
1. First my apologies to Joel for quoting you without asking permission. Sorry bout that !

2. Yes, I agree, you can radiate a USA cable QAM (technical term is ITU-T J.83-Annex B) signal over the air. I have done it myself in the past. But typically it can only be radiated reliably over relatively short distances measured in fractions of a mile. As an example around a swap-fest gathering. But I claim that most ATV hams are interested in sending their signals much greater distances, measured in miles, not yards (kilometers vs. meters).

3. You worry about Hi-Des being a Sole Source supplier for our DATV. If they disappear, we are out of luck. The answer here is both Yes and No. Yes, if you are looking for DVB-T equipment which will work on narrow bandwidths (< 6 MHz). The commercial broadcast industry uses either 6, 7 or 8 MHz BW, depending upon which country you are in. So NO, for 6/7/8 MHz BW equipment. This is not an issue for us here in Boulder, Colorado, as we made the decision at the very beginning to

stick with the USA broadcast TV standard of 6 MHz wide TV channels. Doing so opened up a whole lot of other sources for our equipment.

Hi-Des is definitely not the only supplier for standard bandwidths. A quick Google search on the internet will come up with lots of other vendors. Two come to mind right away, both with reasonable priced modulators ($470).



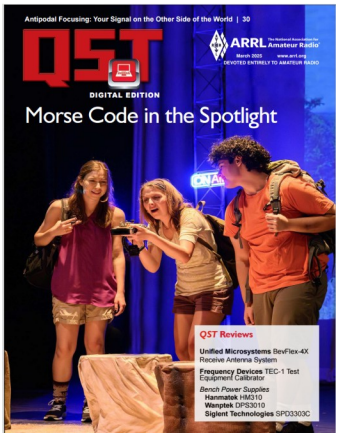
THOR

PVI

While they only do 6/7/8MHz, they are not just DVB-T like Hi-Des, but actually support in one box several modulation methods of USA cable QAM, USA broadcast ATSC (1.0), DVB-T, etc. Interested ? look at ProVideoInstruments (PVI) (***www.shop.provideoinstruments.com***) for their "Mini-Mod" modulator. Also check out THOR Broadcast (***www.thorbroadcast.com***) for their "Petit" modulator. I do know that the ATV group in San Diego, California has adapted the Thor unit as their modulator of choice. See Mario, KD6ILO's comments about it in our newsletter issue #88. So, if your ATV ham group would like to experiment with several different modulation methods, I suggest you consider the Thor or PVI equipment. (*disclaimer: I have never personally owned, nor tested, either of these, so can not vouch for their specs. etc. -- kh6htv*)

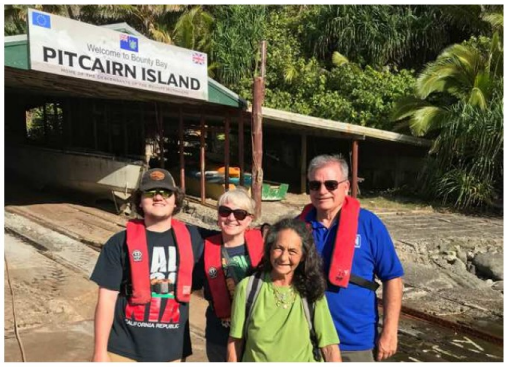
Another issue which pushed our group here in Boulder, Colorado towards adopting the Hi-Des modulators was that of frequency coverage. Most all DVB-T modulators from various companies typically only cover the normal broadcast / cable TV range of VHF/UHF channels up to around 900 MHz. Hi-Des offers DVB-T modulators which go up to the 2.4 GHz range directly. Because our primary input to our W0BTV-ATV repeater is on the 23cm band, it made a lot of sense to stick with Hi-Des. Yes, we could use other brands, but that then made things more complex requiring an additional up-converter piece of equipment to reach 23cms. Likewise for receivers, Hi-Des has offered receivers with coverage to 23cm.

4. NO ! I am not associated with Hi-Des in Taiwan in any manner. I am not an authorized distributor of their products. In the past, I had made offers on my web site and in this newsletter of a package deal for a complete, turn-key, DATV ham station. I offered to purchase, then program, then resell (**at cost ! - no mark-up**) a Hi-Des DVB-T modulator -- IF the customer would also buy one of my 70 or 23cm rf linear power amplifiers. I had a very few hams take me up on the offer. It was a money loser so I have since discontinued making that offer. It didn't generate sufficient sales of my amplifiers.



Our own ATVer in QST !

Mike Collis, WA6SVT, is the head guru for the Amateur Television Network (ATN) in southern California. The latest March issue of QST has a very nice article in it from Mike. It is entitled "Vacation on Pitcairn Island" and is found on pages 58-59.



Mike Collis, WA6SVT/VP6MC (right), with his wife, Laura, KJ6GFI (center), and their son (left) arriving on Pitcairn Island with their homestay host, Brenda Christian (front).

70 cm Band is Noisy

Jim Andrews, KH6HTV

Readers have heard us complain in the past about the poor performance of the 70cm receiver on our Boulder, Colorado, W0BTV, DVB-T repeater. The basic receiver is sensitive when bench tested with a 50 Ohm dummy load as the antenna. But when installed at the repeater site and connected to an outside antenna, to be perfectly honest -- "It Sucks Big Time !" OK, you say "How bad is it?"

The repeater's Hi-Des HV-110 and HV-120 receivers include an accurate built-in RF power S meter with readout in dBm along with a readout of the incoming DVB-T signal's S/N ratio. We have the receiver programmed to continuously provide an On-Screen-Display (OSD) on it's outgoing video these values in addition to the received frequency and the call sign of the incoming video. From bench tests we also know the appropriate correction factors to apply to the S meter readings to account for the other hardware in the receiver chain, including the input ATV channel filter, pre-amplifier, etc. The values I am reporting here are the actual rf signal levels as seen at the input port to the repeater itself. They do not include any antenna gain, nor antenna feed-line loss.

Tests on the W0BTV, 70cm receiver showed:
(1) The rf background noise level on channel 60 (438-444 MHz) with no input DATV signal is typically about -95dBm when other RFI sources also happened to be quiet.
(2) Next when a weak DATV signal is put on the air and it's rf level is slowly increased in 1dB steps, we see the repeater can be keyed up at about -84dBm with an indicated S/N of 8 to 9dB. But, at this level, we see a tremendous amount of "Freeze-Framing" thus providing unusable video.
(3) Now continuing to increase the input signal level in 1dB steps, we then searched to find the point at which we were able to overcome the RFI and finally achieve perfect P5 video with absolutely no freeze-framing. We had to increase the level by a whopping 28 dB to **-56dBm** before this was accomplished.

We ran the same tests on the W0BTV, 23 cm receiver. Much better results. Much quieter band !

(1) Background noise level measured -104dBm (9dB better than 70cm band)
(2) Repeater key up level was -96dBm with S/N of 6 dB and lots of freeze framing.
(3) Perfect P5 video with no freeze framing was **-93dBm** with S/N of 9 dB

note: The DVB-T test signal used our "normal" digital parameters of: 1080P, H.264 encoding, 5.5Mbps, 6 MHz BW, QPSK, 5/6 code rate and 1/16 guard.

BCARES: Our local ARES group, BCARES has a large amount of DATV gear in their equipment cache which is kept at the EOC / 911 center. It includes four, 70cm portable pac-sets along with a 70cm portable repeater. This past summer, they received a large $30K grant from Boulder County to be used to enhance their communications capabilities. This was to include improving their ATV coverage of the county. Our W0BTV repeater is a key element in providing such ATV coverage. But with it's very poor 70cm receiver performance, it is presently of very limited value. BCARES has been searching for one or more other quieter sites. The present thought is to install a remote receiver base at these sites. The receiver would be watching (hey it is video !) on a 70cm ATV channel and if a signal appears, it would then relay it via 23cm link (1243 MHz) to the primary W0BTV repeater at NCAR. There it would be re-broadcast over a wide area from it's high location on 70cm band (Ch 57, 423 MHz).

Field Tests: We recently took a proto-type 70cm to 23cm portable cross-band DVB-T repeater out in the field to make field tests of potential sites. The same basic tests were run as listed above. Key data was the rf signal level into the repeater to have perfect P5 video with no freeze framing. For the first week-end of testing, we tested nine potential sites. While none were as bad as the W0BTV/NCAR site, some were far worse than others. At each site, we ran the tests on all three available 70cm, 6 MHz ATV channels of Ch 58 (429), Ch 59 (435) and Ch 60 (441 MHz). The best P5 results obtained on one of more channels ranged from -86dBm to -73dBm, a 13 dB spread. Still far worse than the -93dBm for 23cm band. But all definitely much better than the -56dB at W0BTV.

We also had a TinySA spectrum analyzer connected into the portable repeater to monitor the incoming spectrum to be able to ID the types of RFI we were encountering. It varied depending upon the TV channel. We noted a lot of continious activity at the SSB/CW frequency of 432 MHz which was the exact band edge between Chs 58 & 59. On Ch 60, there was one particularly strong FM signal a lot of the time at about 439.4 MHz. On Ch 59, there was a lot of very intermittant, on/off spikes from a whole lot of unlicensed transmitters. We found these to be particularly strong in tightly congested residential areas. Thus rendering Ch 59 useless in these areas. Much less of an issue at rural sites tested.

To Be Continued: 73 de Jim Andrews, KH6HTV, Boulder, Colorado
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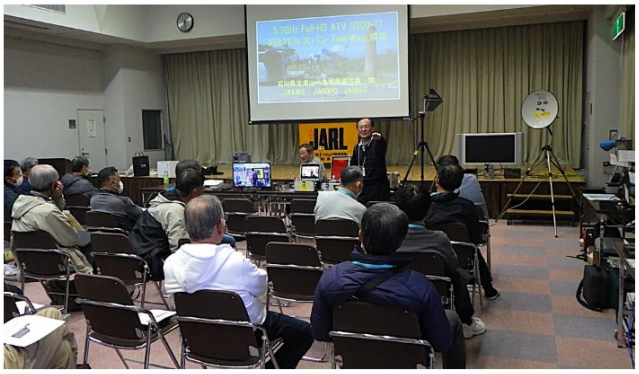
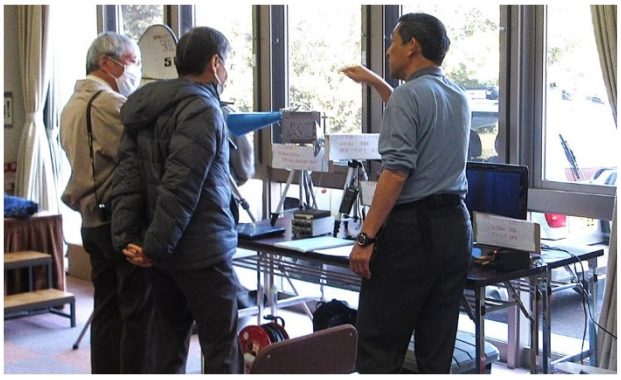
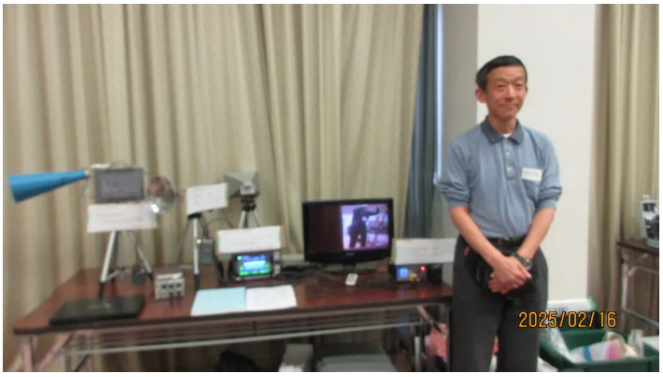
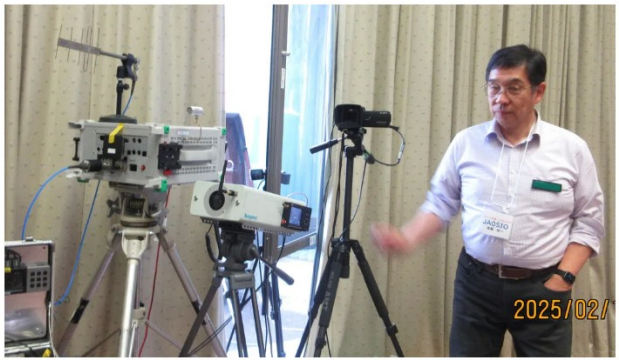
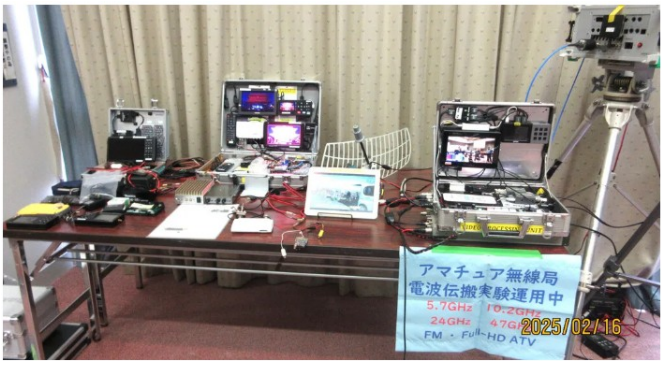
Talks & Demos at JARL meeting on Full High Definition - Amateur TV











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ATV Has Way Too Many Choices - or Does It?

We recently received yet still another letter from Rudi, S58RU, in Slovenia, complaining once again about there being way too many options (analog vs. digital, multiple modulation standards, too many possible frequency bands, etc. etc.) available for ATV today for anyone to seriously participate in ATV contests, or work other hams. Here below is your Editor's comments in response. We invite comments from our readers as well.

KH6HTV Comments: Aloha Rudi --- I know you are disgusted with the current state of affairs for ATV, what with analog and digital all having multiple modulation methods to chose from. Even analog however was not just FM-TV as you state. We also had the various versions of Vestigal Upper SideBand (i.e. AM with part of the lower sideband suppressed). We had NTSC, PAL, SECAM, and variations. Plus even with FM-TV there was a real lack of standarization. As an example look at the sink being raised right now by some hams on ICOM's choices made for their FM-TV, IC-905, microwave transceiver.

ATV Contests: Really, how many ATV hams were into participating in ATV contests ? I suspect not many, even in your "Good Old Days". Obviously you were a contest participant judging from your present complaints. From my and the hams here in Boulder, Colorado, at least our perspective on ATV was that it was and is purely a local affair owing to the nature of RF propagation and TV signals in general. Due to the wide band-widths required for live, fast-scan TV, we were, and still are, limited to the UHF and microwave bands where our typical RF propagation paths for our low powered signals were strictly limited to "line-of-sight" RF paths. So long distance, over the horizon, ATV contacts were non-existant, or at least extremely rare.

ATV Clubs: If we wanted ATV contacts, our best option was to form a nucleus of like-minded, local hams also interested in ATV. I can vouch from my non-existant, ATV experience living on the island of Maui, in Hawaii --- that nucleus needs to be as an absolutely bare minimum, of two interested hams with a good line-of-sight, RF path between their stations. It was no fun being an ATV loner on Maui only watching my own signals. Once you have at least one other interested ham, then pick your ATV parameters, be they analog or digital, modulation method, frequency band, antenna polarization, etc. --- then stick with them. As long as everyone gets together with the same standards, local ATV will be a success. If everyone goes their own way, then all will lose interest quickly and ATV will die locally. Also important is to have a dedicated ATV net once a week, so everyone is assured of finding an ATV signal on the air at least for 1 hour per week. If the number of folks involved and the resources are available, then creating your own local ATV repeater goes a real long way towards tying all the local hams together into a cohesive, functioning group.

Analog vs. Digital: Also in your so-called good old analog days, with Vestigal Upper-Sideband (i.e. AM-TV), to get a perfect P5, 480i video picture required extremely strong signal levels of -60dBm or better at the receiver. FM-TV while better, still required -80dBm at the receiver. That usually meant either an extremely high powered, or close, near-by, transmitter to achieve. Now with many of the various digital TV modulation schemes, we can get perfect P5, 1080p video images with considerably weaker signals in the range of -90 to -100dBM at the receiver input.

73 de Jim KH6HTV, editor of ATV Journal, Boulder, Colorado, USA

WHERE CAN I FIND OLD ARTICLES IN OUR ATV JOURNAL ?

A new addition to our A**TV Journal** (newsletter) archives is an **Index of Articles.** It lists the various topics and which issue numbers to search further for the items of interest. Go to:

https://kh6htv.com/newsletter/

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BCARES & ARRL: The latest (2/19) issue of the ARRL's ARES email newsletter contained an article entitled "*Pioneering Amateur Television ARES Group Holds Annual Meeting*". It was a reprint from our last ATV newsletter, issue #182. The article was written by Pete, WB2DVS.

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V.E. Exams at HRO: Ham Radio Outlet (8400 E. Iliff Ave., Denver) now offers ham radio license exams on the second Saturday of each month. Contact Jeff at HRO, in advance of the desired test date. Send an e-mail to him at jjweinb@gmail.com. Include your name and license exam needed. Jeff will send registration information and session requirements by return e-mail.
(tnx to BARC's Bark Feb. 2025 newsletter for this info)

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Next Issue of ATV Journal ? It is unknown when or if your next issue of the ATV Journal will appear. I will be having serious surgery next Monday with a predicted long recovery time. 73 de your editor, Jim, KH6HTV

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W0BTV Details: **Inputs:** 23 cm Primary (CCARC co-ordinated) + 70 cm & 3 cm secondary all digital using European Broadcast TV standard, DVB-T with standard 6 MHz wide TV channels. Frequencies listed are the center frequency of the TV channel.
23 cm = 1243 MHz (primary), 70 cm = 441 MHz & 3 cm = 10.380 GHz
Outputs: 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz with 6 MHz BW, DVB-T
Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).
Operational details in AN-51d Technical details in AN-53d. 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 (22:00 UTC). The net typically runs for 1 to 1 1/2 hours. ATV nets are streamed live using the British Amateur TV Club's server, via: ***https://batc.org.uk/live/*** Select ***ab0my or n0ye***. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz *(-600 kHz, 100 Hz PL tone required to access*).

Newsletter Details: This newsletter was started in 2018 and originally published under the title "*Boulder Amateur Television Club - TV Repeater's REPEATER*" Starting with issue #166, July, 2024, we have changed the title to "*Amateur Television Journal.*" This reflects the fact that it has grown from being simply a local club's newsletter to become the "de-facto" ATV newsletter for the USA and overseas hams. This is a free ATV newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 800+, both in the USA and overseas. 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

Colorado Ham Radio Swap-Fest:

Set the date, Saturday, April 5th, aside on your calendar for the annual Longmont Amateur Radio Club's LARCFest - 2025.
Location is the Boulder County Fairgrounds, 9505 Nelson Rd. in Longmont.
Hours are 9am to 1pm, Admission is $7, with kids 16 and under free.

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SLATS - Buy, Sell, Trade - Giveaway web site

(*www.slatsatn.net* **)**

Check it out -- new items are added every month.
New items added -- Watters Protax 375 Antenna Switch, Mosley TA-33 Traps, CD-43 Antenna Rotor, Rowetel.com model SM-1000 HF Digital Voice Adapter