Amateur Television Journal

May, 2026
2ed edition, issue # 209
BATVC web site: www.kh6htv.com
ATN web site: www.atn-tv.com

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

G0MJW on QO-100 - YouTube

Mike, G0MJW, visits Boulder ATV Hams

Boulder, Colorado ATV hams enjoyed a recent visitor from the U.K. Mike Willis, G0MJW, was in Boulder for a scientific conference at NOAA. While here he contacted us and expessed an interest in meeting the local ATV hams. Several of us had breakfast with him at Doug's Diner. Then we went home to continue the eye-ball QSOs over our W0BTV TV repeater as a means of demonstrating it's performance to Mike. The above photos were taken with Mike in KH6HTV's ham shack. Mike used Jim's computer to log onto You Tube to then give folks a tour of his ham shack, via the QO-100 geo-stationary satellite. To see this, log onto YouTube and search for " QO100 BATC "

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Great Advice on How to Aim High Gain Dish Antennas

(i.e. use a spectrum analyzer along with your receiver)

We got this email from **Chris, K0CJG**, after our recent April Boulder 10 GHz outings.
(*I have edited it somewhat for this article*)

Most of the time Steve,WA0TQG, was transmitting from Sugar Loaf, I redirected the IF signal (630 MHz) from my LNB to my spectrum analyzer instead of the DVB-T receiver so I could tweak my antenna focus and feed and get a feel for the beam-width and pointing issues. (Steve's signal at Legion Hill on the SA suggested his signals to my satellite LNB directly-coupled to my 23" dia dish antenna were within a few dBm of the bench-measured 1 dB compression of the LNB. i.e. very strong !). Turns out my dish focus and feed slot settings were OK. -10dB full beam width (estimated) ~5-6 deg with 2 prominent side lobes +- ~8 deg (due, no doubt, to the funky splash plate and waveguide to slot feed arrangement). On future expeditions I plan to bring my spectrum analyzer to view received signals (adding a splitter so I can view and monitor/record at the same time) as a pointing aid. Makes pointing really easy because the visual feedback is instantaneous, frequency and modulation specific, and doesn't require a delay time for receiver lock while hunting for the signal. Also provides a good RSSI for signal reports.

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BCARES New TV Repeater Test Results:

Recently our Boulder W0BTV was temporarily out of service for repairs. So for our weekly ATV net, we instead opted to try making simplex contacts and also try out the new BCARES 70cm DVB-T repeater. It has input on Ch 59 (435MHz) and output on Ch 57 (423MHz). It's current, temporary location is at KH6HTV's QTH in Spanish Hills south-east of Boulder on the prairie at an elevation of 5465 ft. Most of the participants in the ATV net were able to both see and access the BCARES repeater. Here are the results of the test. (*note: a s/n of 23 dB is perfect. max. possible*)

Ham	Pin	S/N	Distance	Elevation
AB0MY	-65 dBm	23 dB	11 km	5502'
N0YE	-85 dBm	5 dB	6.1 km	5679'
WB2DVS/DVT	-87 dBm	9 dB	6 km	5249'
WA0TQG	-68 dBm	16 dB	19.2 km	7720'
WA2YUN	-77 dBm	19 dB	7.3 km	5659'
K0HEH	-80 dBm	13 dB	7.1 km	5312'

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MARKET SIZE for ATV ?

Jim, KH6HTV

How big is the market for Amateur TV gear ? In the good old days of analog ATV using NTSC, AM-TV transmitters, it was definitely big enough for **Tom O'Hara, W6ORG**, to make a full time business out of it with his company **P.C. Electronics**. Tom was the major ATV supplier for many years. Tom retired from the business in 2014. Tom has told me that over the years he sold 1000s of his TV transmitters. His web site is still up and running. ***www.hamtv.com***

I retired from my own company, **Picosecond Pulse Labs**, way back in 2001 when I turned it over to my kids to run. (*We later sold PSPL to Tektronix, but they closed it down and it no longer exists.*) In 2010, after a disastrous forest fire in Boulder County where BCARES was deployed for over a week providing live video images of the fire to the EOC, there suddenly was a demand for my 70 cm, VUSB-TV transmitters. That year I sold 11 of them to Boulder hams. I was looking for something to occupy my time in retirement and keep my brain busy. So when there was suddenly a demand for my TV transmitters, I decided to start my own part-time, hobby business which I called **KH6HTV Video**. ***www.kh6htv.com*** From my experience, I can guarantee you the ATV market is not big enough to support a full time real business ! Great however as a retirement hobby.

For this newsletter, I decided to total up the numbers of the major ATV products that I have sold since 2010 to give folks some feel for the market.

70cm RF Linear Power Amplifiers:	(70 W FM/10 W DTV) amps - 70 sold	
	(25W FM / 3W DTV) amps - 31 sold	
23cm RF Linear Power Amplifiers:	(30W FM / 4.5W DTV) amps - 25 sold	
	(15W FM / 2W DTV) amps - 10 sold	
Low Noise Pre-Amplifiers:	70 cm - 41 sold	23cm - 21 sold
23cm Down-Converter:	13 sold	
70cm VUSB-TV Transmitters:	19 sold (*note: discontinued after transition to digital in 2014*)	
70cm DVB-T Repeaters:	3 sold	
70cm DVB-T Receivers:	45 sold	
70cm Band-Pass Filters:	34 sold	
70cm Duplexers:	10 sold	
Bias Tees:	16 sold	

I had also developed and offered for sale several other products which were a bust in the market place. They included a high quality, 23cm FM-TV transmitter and receiver. I was quite proud of it's design and performance, but unfortunately, by the time I offered it on the market place everyone was moving over to digital TV instead of FM-TV. Plus, it was too expensive for most hams budgets.

73 de Jim Andrews, KH6HTV, Boulder, Colorado

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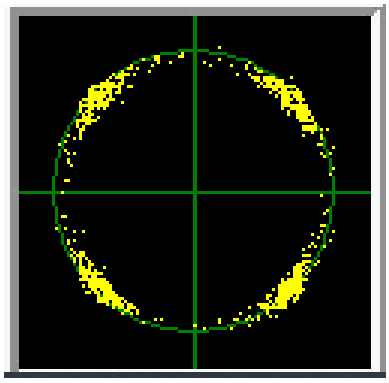
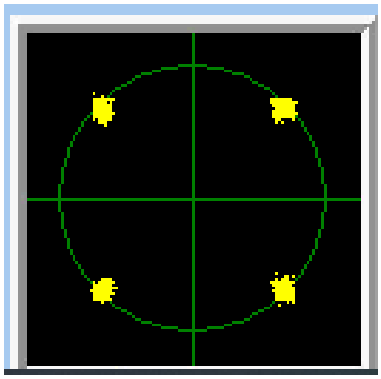
Bull's Eye LNB vs. Generic LNBs

We get an exchange ATV newsletter from Belgium, from French, ON4VVV. In his May issue, he writes about developing equipment for DVB-S on the 3 cm (10 GHz) band. In it, he makes a comparison of phase noise in various LNBs (Low Noise Block Converters). He writes:

"At lower frequencies below 1 GHz, you can still use a spectrum analyzer to examine the phase noise of the LO, but it is very difficult to measure due to the limited dynamic range of your measuring instrument. So, I used the reception constellation with a MiniTiouner to judge the quality of the sideband and phase noise of the local oscillators being tested. The measurement results were illuminating:



standard generic LNB



Bulls Eye LNB

The conclusion is therefore that a standard LNB certainly cannot be used for receiving narrower SR values below 1000 ks/s, and my further tests were performed only with a “Bulls Eye” LNB."

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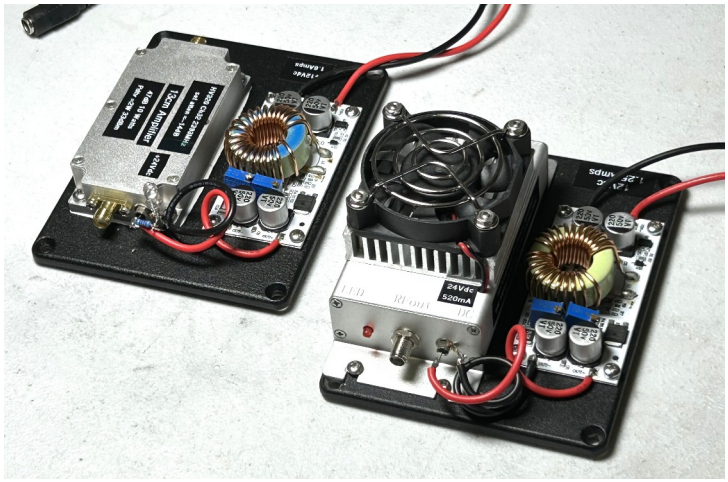
QRP Amplifiers for DATV

Jim, KH6HTV



Looking for a low cost entry point to getting on digital ATV ? There are now some great little amplifiers coming out of China and available on E-Bay and Amazon that just might be your solution.

The "gotcha" for many hams that were a turn-off from these amps is the fact that they are designed to run off of +24 Vdc, not +12Vdc. That is really not a big obstacle. It just means you need to add a second module to the amplifier as shown in the above photo. The pc board with a big toroid on it is a 12 to 24 V boost switching voltage regulator. It provides the necessary 24 V from a 12 V supply. I

got mine from Amazon for less than $10. It is rated for 250 Watts and max. current of 6 Amps. I tried some boosters rated for less, but they didn't like the inrush current of the amplifiers.

These amplifier modules are available from lots of unknown Chinese suppliers. No brand name, nor model number, but that is typical of most items coming from China these days. The price for the amps is typically in the neighborhood of about $75 including shipping. Thus your total cost for one of these amplifiers including the 12/24V booster will be less than $100.

I have found these amplifiers for the following ham bands --- 70cm, 33cm, 23cm & 13cm. Here is how they performed for me.

70cm: This is the amplifier shown in the photo with the attached small heat sink and cooling fan. It was specified to work from 25 MHz to 1.2GHz and put out 4 Watts. I measured it's 3 dB BW and found it to be 4 MHz to 1.1 GHz with 42 dB of gain. It didn't put out 4 Watts over that whole range however. It worked best in the 450 MHz range (i.e. 70 cm band). I got 5 Watts, max. saturated power out of it. For DVB-T service, I got about 1 Watt (+30 dBm) of average power. At 1 W (DTV), it pulled 1.25 Amps at +12Vdc.

33, 23 & 13cm: All of the other bands used the other amp module shown in the above photo. But when purchasing you need to specify which frequency band you want as they are tuned differently for each band. All of these amp modules do require being mounted on some heat sink surface. The metal plate shown in the photo is sufficient only for lower power DTV service. If the amps are to be driven to max. RF output power, then a larger heat sink is necessary.

33cm: This amp module was specified to put out a max. of 15 Watts. Mine did in fact put a max. saturated power of 15 Watts. It's gain was 47 dB. For DTV service, I got 3 Watts average (+35dBm). At 3W (DTV) it pulled 0.9 Amps at +12Vdc.

23cm: This amp module was specified to put out a max. of 15 Watts. Mine did in fact put a max. saturated power of 15 Watts. It's gain was 50 dB. For DTV service, I got 2 Watts average (+33dBm). At 2 W (DTV) it pulled 0.9 Amps at +12Vdc.

13cm: This amp module was specified to put out a max. of 10 Watts. Mine did in fact put a max. saturated power of 10 Watts. It's gain was 47 dB. For DTV service, I got 2 Watts average (+33dBm). At 2 W (DTV) it pulled 1.6 Amps at +12Vdc.

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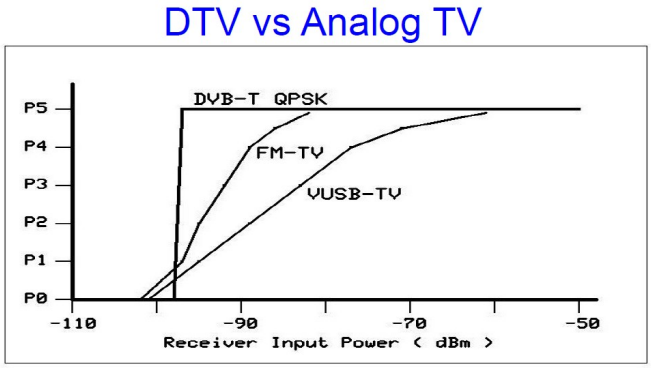
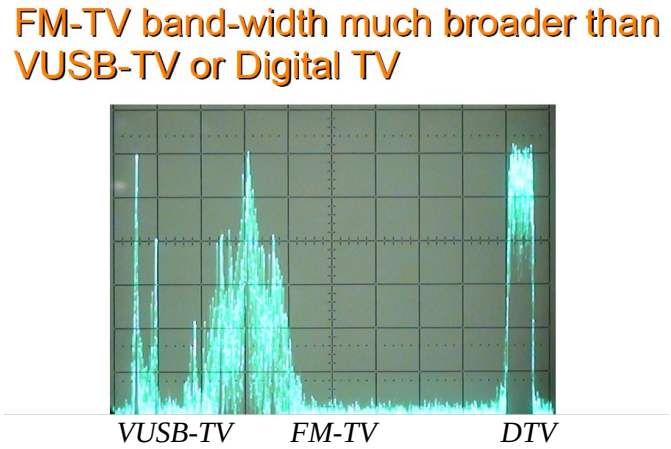
A Trip Down Nostalgia Lane

Jim, KH6HTV

The May meeting of the Boulder Amateur Radio Club (BARC) was our annual "Home-Brew - DIY" night. I decided to take my 23cm FM-TV gear for the "Show-N-Tell"





FM-TV now is in the catagory of Antique radio history along with AM-TV. Commercial broadcast, NTSC, television stations used a form of AM-TV called vestigal side-band. It had all the disadvantages of AM, which we hams are well aware of. FM-TV was also used. It had the advantages over AM that we are all aware of. But it's draw-back, was it required a lot more band-width. Thus FM-TV was only used by the broadcasters for ENG, and microwave links. We hams only used it on the 23cm band and higher microwave bands. It consumed too much band-width for use on our 70cm band.

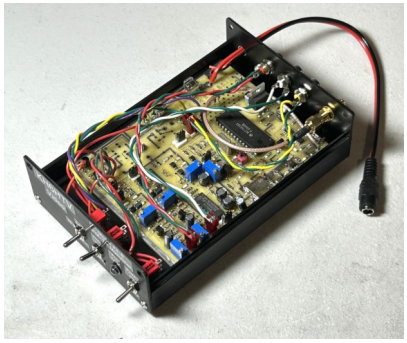
models 23-8, 23-7 & 23-5

Turn the clock back about 15 years. At that point, I thought I saw a market opportunity for some quality FM-TV gear for the ATV market. What little FM-TV gear being offered then to hams at low cost was pure "junk" with very poor performance.

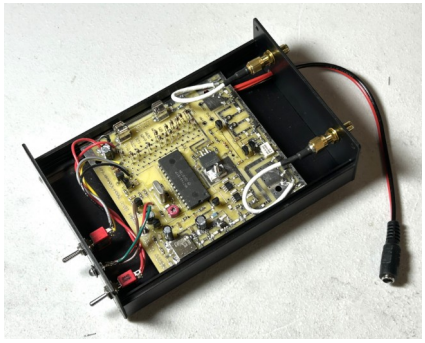
I spent about a year working on developing a complete transmitter and receiver package for 23cm FM-TV. I was quite proud of the result. Passing video test signals through the complete system showed no degradation in video quality. Because there was considerable variations in the technical standards used for FM-TV, as opposed to the strict NTSC, VUSB-TV standards --- I designed the equipment to be easily customizable to meet the various standards used by different ham TV repeater groups. The above photo shows the results. On the left is the model 23-8 23cm FM-TV Modulator. (3 channel synthesized, +17dBm output). In the middle is the model 23-7 23cm Down-Converter (3 channel synthesized). On the right is the model 23-5 70 MHz IF Amplifier and FM-TV De-Modulator. Orginally, I also offered a complete transmitter, model 23-1, which consisted of the modulator pc board, plus a built-in 3 Watt rf power amplifier.

Well my products were a "Bust" in the ATV market place for a couple of reasons.
1. Too expensive for tight fisted hams. I had to design them around some obsolete, expensive, ICs. Plus lots of labor involved to build them. Even charging $400 for each unit, I wasn't going to make a profit.
2. The Digital Revolution: Just about the time, I introduced them, Hi-Des appears with their low cost solution to digital TV with DVB-T. Most hams wanting to get into DTV, thus abandoned analog in favor of the newest kid on the block --- Digital TV !

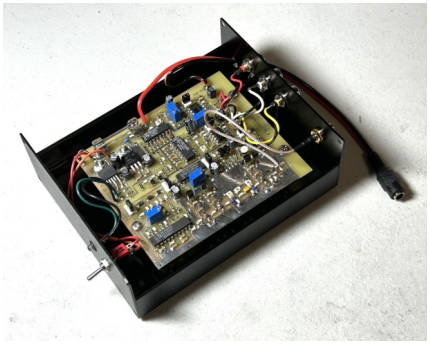
The result was essentially no sales of either the modulator or de-modulator. I have however sold about a dozen of the 23cm Down-Converter over the years. It is being used for DTV, equally well as for the older AM or FM TV from the 23cm band.



23-8



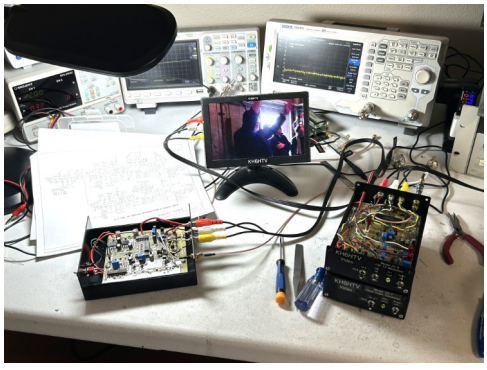
23-7



23-5

FIRE ! 2021 a 100mph wind drove a prarire fire in Boulder Colorado destroying 1000+ homes, including my QTH. I lost everything, including the prototypes for my FM-TV gear. So recently, I decided, strictly for "old times sake" to rebuild what I lost. Hence the photo above is my new FM-TV gear. Won't be making many TV QSOs with it, but good items to set up on the mantle as antiques.

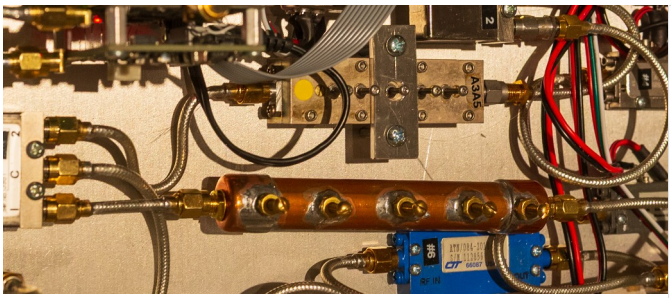
73 de Jim, KH6HTV, Boulder, Colorado

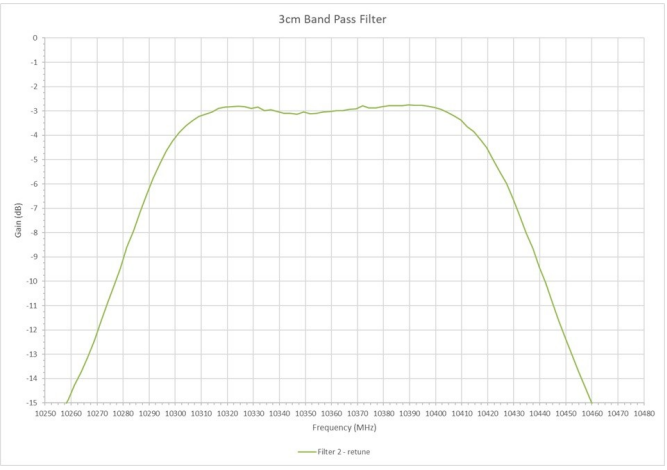


It All Works !

Another Boulder ATVer, Steve, WA0TQG, also had a nice "Show-N-Tell" for the BARC meeting. Steve showed his home-brew, 10 GHz Band-Pass Filter made out of copper plumbing. He built it this past winter as a needed component in his new 10 GHz transceiver project. He also explained what he had to do to jury rig a test configuration to be able to tune the filter using his 6 GHz HP, VNA. He had to put together a test set consisting of an LO, a couple of mixers, etc. to up/down to/from 10 GHz for the VNA.

Steve entitled his talk ***"Evanescent Mode Circular WG Filters"***. He got the design data from a paper by K5TRA. Steve said "There are several other papers on the theory and other build configurations but they did not have the tables of build dimension for this configuration of the filter." Steve ended up building the filter twice before he got the desired performance. The one he showed at the meeting was the reject. The final filter is presently buried in his 10 GHz rig. The VNA insertion loss plot shows a very nice pass-band response. The center frequency was 10.360 GHz, with an insertion loss of 3dB and a -3dB band-width of 136 MHz.





QST: All Amateur Radio & TV Stations Organizations and Members.

Query: ***What are your organization's future endeavors with image communications with Amateur Radio Television moving forward?***

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* I am inquiring about the future endeavors and technological advancements regarding image communication within the Amateur Radio Television (ARTV) community. Specifically, interested in learning more about the direction the field is taking and what developments as we can expect to see moving forward.

* Share your insights of what your organizations may have on this topic.
new applications, modes of transmission etc, making this an interesting area for young amateur radio operators.

As most already know, we here in San Diego have transitioned to FSO mode of modulation (PPM) + (DWDM) optical transport (with up to 80-90 channels). San Diego-DTBS/ITG Labs, and I are a part of the coalition network, a strategic alliance of organizations, institutions, and individuals working together to achieve a shared goal. Optical Ground stations from Peru, Australia, Spain, Japan and here in the U.S just to name a few. FSO (laser) is the preferred mode for passing data, voice and HD video because of the hi-bandwidth availability. But we prefer to use FSO/RF hybrid combination as it is more resilient. Television transmissions are part of that integration. We are now in LEO with our CubeSat constellation.

We have 26 STEM students who are Amateur licensed in our group and they ask me the question, if any other organizations had young hams operating using ARTV image communications? [My answer: I'm not aware and couldn't give them a correct response but I would look into it. Our group have has seen, experience and confronted the limitations coordination issues with RF to include component supply issues of out of date, stock and manufacturing etc.

warmest regards & 73, Mario Badua, KD6ILO, Oceanside, California
email = fsocomnet@gmail.com web streaming = https://batc.org.uk/live/kd6ilor

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Editor's Comments: We invite our readers to reply to Mario's inquiry. Upon receipt of his email inquiry, I immediately replied to him. Here below is my reply.

Tuesday, 19 May, Boulder, Colorado
To: Mario KD6ILO, San Diego
From: Jim Andrews, KH6HTV, trustee for W0BTV DATV repeater in Boulder, CO
Aloha Mario ---
Your below email requested feed-back on the fundamental question of where is ATV going ? And you are advocating your free space optical approach is the way to go.

Your new area of research for your San Diego group is admirable. However, as I see it your free space optical transmissions are really only useful for point-to-point communications. Yes, they offer fantastic huge potential band-widths.

A distinct, totally separate advantage of most of our ATV activity is our use of one way, broadcast, standard RF transmission. By using omni directional antennas or wide beam-width antennas, we can "spray" our signals like from a garden hose sprinkler nozzle over a wide area to many viewers/listeners in widely dispersed geographic areas. The viewers/listeners only need a receiver. They are not required to also have transmit capability. Plus using broadcast standards, our transmissions are one-way. They do not require hand-shaking, to establish a transmission. We can thus serve an infinite number of potential viewers. Point-to-Point is limited usually to one on one communication.

A similar RF system called Mesh Network is also limited to point-to-point communications and requires a transmitter/receiver at both ends and hand-shaking being required before communications are established.

Both systems have their distinct values and are mutually exclusive. They simply address different needs.

73 de Jim Andrews, KH6HTV, Boulder, Colorado

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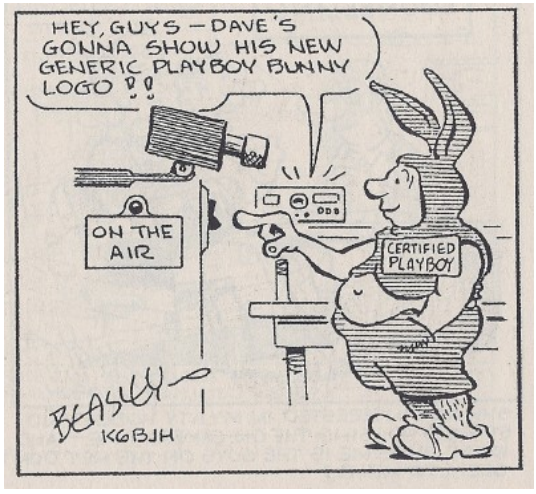
TYPO in issue #208: Darko writes -- typo error for Calvin's email address at Hi-Des. It should be ***calvin@hides.com.tw***



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