

Amateur Television Journal

2ed Edition, October, 2026

issue # 220

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

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Why DVB-T2 rather than DVB-S2?

Justin D. Cockett, G8YTZ

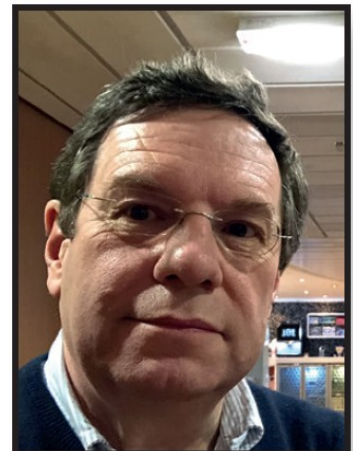
Most of us transmit DVB-S2 because that is what the hardware does, but DVB-S2 was designed for a satellite path: One clean route, no reflections, and plenty of bandwidth. Terrestrial ATV is the opposite; a simple receive antenna, a path full of hills, buildings and reflections that move as traffic passes.

DVB-T2 was designed for exactly that. It carries the signal on hundreds of slow carriers rather than one fast one, so echoes fall inside a guard interval and add to the wanted signal instead of smearing it. Its time

interleaving spreads each block of data across a whole frame; up to 250 ms at our symbol rates, so a burst of flutter costs a few bits from many blocks rather than destroying a few outright, and the LDPC coding repairs every one of them.

DVB-S2 treats those reflections as damage; DVB-T2 treats them as signal. If narrowband ATV is going to grow, it will grow among people starting out with modest budgets and antennas and this is the mode that suits them. In practice that means you can wave the transmitting antenna about and not lose a frame, and that a station can be worked from a car park or even on the move without the picture falling apart every time a lorry goes by. It also locks in about two seconds, against the rather longer hunt a DVB-T receiver makes at low symbol rates.

(Editor's note: This was a portion snipped out of a much longer article by Justin, entitled "A £ 40 DVB-T2 Receiver for Narrowband DATV" in the latest issue of CQ-TV, #293, Autumn, 2026, published by the BATC.)



G8YTZ

Misc. from New England: Skip, K1NKR, writes ---- "Hi Jim -- Things are still dormant in New England, ATV wise. My DATV station is still capable of going back on the air on a moment's notice, but I know of no one within 70 cm propagation distance who's available to be 'the guy on the other end.'" My second station is still in parts down in the workshop.

Anyway, I want to call to your attention the "Hands On" column in IEEE Spectrum this month. It describes building a mechanical TV. Much like the old scanners, but in a different (drum versus disk) format. Not DATV, but of interest to us old time aficionados.

And coincidentally, I was on Orkney Island, U.K. recently. It turns out they have a nice little wireless museum right in town (Kirkwall, <http://gb2owm.org.uk/>). One of the offerings in the museum shop is a 16-page booklet entitled: "Seeing by Wireless--Early Experiments in 30 Line Television in Orkney and the people behind them." It's not only historically interesting but it gives design, circuit diagram, and mechanical construction information. The history part pretty much bounces around and describes Jack (GM3CCK) and Jimmy (G6ZC) Twat's early radio experiences. Then it goes into the introduction of TV as we know it in Orkney in the mid-1950s. Then it backtracks to 1931 when Jack and Jimmy made their own mechanical scanning TV to see if they could resolve the radio (presumably HF) signals from the Baird Company's laboratory in London and later from the BBC. They succeeded. No indication that the two ever transmitted.

73, Skip, K1NKR, Marlborough, MA

(editor's note: check out Skip's www.qrz.com page. He is begging for ATV contacts in New England)

CCARC - Frequency Coordination: In Colorado, frequency coordination of amateur radio repeaters is handled by the Colorado Council of Amateur Radio Clubs (CCARC). Their web site is: www.ccarc.net To access their list of coordinated repeaters in Colorado, click on -- "existing coordination support"

At present, there are only two ATV repeaters listed there for Colorado. They are our own Boulder open repeater, W0BTV, and our member, Steve, WA0TQG's personal, closed repeater which he uses to link into W0BTV from his Sugar Loaf mountain home QTH. His repeater is actually located in the city of Boulder at another ham's qth which has line-of-sight views to both WA0TQG and W0BTV.

CID	Call	Output	Input	Location	Status	Type	Mode	Access	Last Update
210	W0BTV	423.0000	1243.0000	Boulder	Coordinated - On Air	Open	DVB-T		2026-08-31

CID	Call	Output	Input	Location	Status	Type	Mode	Access	Last Update
880	WA0TQG	1255.0000	423.0000		Coordinated - On Air	Open	ATV		2025-09-12
881	WA0TQG	423.0000	1255.0000		Coordinated - On Air	Open	DVB-T		2025-09-12

Our Boulder ATV repeater has been coordinated with the CCARC since the early 90s. At present, this is what our two listings looks like on their web site. The only other supplemental info listed for W0BTV is the name of our club, web site, emergency power, and ARES/RACES support.



Lab1113 ATSM-3 v1, 23cm / 70cm 5-10W Mobile DATV SDR-Ettus B210 Transmitter ©2026



Lab1113 ATST-3 v2a, 70cm 3-10W Base Unit DATV SDR-Ettus B210 Encoder / Modulator ©2026



Lab1113 ATSR-3 v1, 70cm ATSC 3 Base Receiver Unit ©2026

KD6ILO -- ATSC 3.0 Up-Date: Mario, KD6ILO, reports that he is making progress with his recent project to develop ATSC 3.0 ATV transmitters and receivers for the ham bands. He recently posted photos of his current developments. The photo on the left is 23 cm / 70 cm, 5-10 Watt mobile unit. The middle photo is a 70 cm 3-10W base station transmitter. The right photo is a 70 cm base station receiver.

ATV NEWS from Belgium: We receive a nice ATV newsletter from Frans Van de Velde, ON4VVV, in Belgium. Here is some of the recent news from Frans.



70 cm RF Power Amplifier:

My new PA for 70cm is now fully finished and has already been thoroughly tested. There is well over 400 W (or 56 dBm) coming out at the bottom of the coax cable, so with the cable loss that is 200W D-ATV at the antenna, and at that power, you just sit with your shoulders hunched -30dB. As you can see, the PA consists of 2 pallets, each containing 2 coupled LD-MOS type BLF878s. Each of these BLF878s is rated for 300W CW. Giulio Scaroni from Italy, the



supplier, had advised me to also cool the 2 combiners of the 4 LD-MOSs with a small fan. There are a total of 6 fans in the PA: 2 directly under the cooling fins, 2 at the rear, and 2 above the LD-MOSs, while the warm air can escape everywhere through the perforated casing.

3 cm Progress: In the meantime, I have positioned the transmitting antenna for 3cm perfectly vertically with great precision so that the signal now radiates straight towards the horizon. My RX antenna dish, with a diameter of 95 cm, is elevatable and can be lowered by 1 to 2 degrees. The result has been tested with ON0MCL as well as with ON0HVL's beacon and found to be satisfactory. The opening angle is quite sharp (1 degree at 1 dB) and aiming can take a bit of time, but with some patience and practice, we should be able to achieve good results with this.

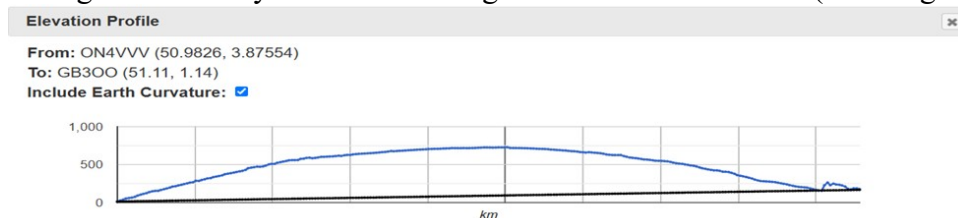
I can produce a transmit power of 5 to 6 Watts D-ATV directly without loss in my 1m (mesh) parabolic antenna (37dBm power + 38dB antenna gain = 75dBm) or **36.6 megaWatts ERP**.

SPORADIC-E PROPAGATION at 6 meters: The period during which there are very regular Es openings runs mainly from May to the end of August, and very rarely outside this period. You can see the 6 m Es conditions from and to where connections are possible thanks to the brilliant work of Rob PE1ITR: <https://pe1itr.com/dxalert/dxspots-latest-datv50.htm>

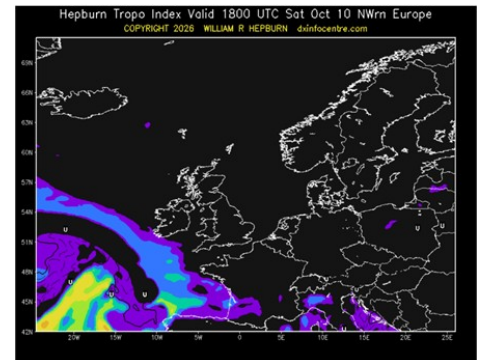
Our 51.7MHz receiver, specially set up for Sporadic-E on ON0TVO, can continue to be used for experiments in preparation for a new season and as a regular input on ON0TVO. The settings are an SR of 250 kps, and for the rest, everything is automatic for all FEC values and from QPSK to 32 APSK.

The NEW ATV Repeater, GB300, a Tropo: This new ATV repeater has been in service in Folkestone, UK, since the month of August, 192 km away from me. The output is at 1304 MHz with an SR of 2000 ks/s and the input at 437 MHz with an SR of 333 ks/s. You can also view the image with the traditional delay at any time via the BATC “streamer” or via VLC. More info at <https://gb300.co.uk> During standby, this repeater continuously transmits extremely useful content: e.g. a Morse code course and information about how DVB-S works. I was the first station located outside the UK to receive the image from GB300, and have since had the pleasure of receiving it back several times during positive conditions on 23cm.

TROPOSCATTER: The fact that my signal was repeatedly and immediately detected by stations 300 km away in the north of the Netherlands during various contests gave me the idea to conduct a series of propagation tests via this new GB300 repeater. I didn't have to bother anyone for this, as GB300 keeps a logbook itself whenever you come in more than ten seconds over the input on 70 cm. The distance of 192 km means there is absolutely no Line of Sight (LOS), because due to the curvature of the earth, there is actually a bulge of approximately 750 m high in between. Only the high coastal strip of the UK also gets in the way a bit more during the last few kilometers. (see image below)



All signals originating from me must therefore reach the RX antennas either through “ducting”—for example due to temperature inversions—or via “troposcatter”. The question that occurred to me was, “what if there is absolutely no ducting propagation, can one always make a connection via troposcattering?” and is there always sufficient strength over such a distance, because being spotted repeatedly in the North of the Netherlands during a contest could also have been a coincidence. Despite the extremely beautiful and perfect installation of that repeater, the reception there is actually



anything but super-sensitive, due to a high SR of 333 ks/s and an omnidirectional antenna, but the situation was still usable for my experiment. Up until today, whenever I was at home, and at most once per evening, I have transmitted a signal a total of 30 times and determined that only on a single occasion was it insufficiently strong to form an image. A score of 96.9%, therefore, even though that included several days without the slightest conditions. That one time I did get a notification that a signal was detected, but no picture. Admittedly, I am using 200W of power at the antenna, and in the worst case, I had to keep the transmitter on the air for 5 to 10 minutes to bypass the QSB.

I monitor UHF conditions via 2 sites, both with excellent tropospheric forecasts:
https://www.dxinfocentre.com/tropo_nwe.html

73 de Frans, ON4VVV

The Ultimate Ham ATV - QTH

Check out these photos of **F1GWR**, Christian's ham shack / ATV studio. Makes us envious of all his collection of video & test equipment.





*Readers of ATV Journal --
How about sharing with
the rest of us photos of
your ATV ham shack.*



E-Bay Restricts Listings of Radio Equipment, but Exempts Ham-Band-Only Gear

Online marketplace eBay has imposed new restrictions on listings of radio transmitting equipment in response to new FCC rules that took effect this week, but responded to ARRL that its new policy will not apply to gear that operates exclusively on amateur radio frequencies. The FCC's rules are intended to use its equipment authorization program to protect against "national security threats to the communications supply chain" and cover a wide variety of products.

reprinted from ARRL weekly newsletter, dated 10/15/26

Mods to the Hi-Des HV-320, DVB-T Modulator:

While the Hi-Des, HV-320, is a great piece of ATV ham gear, there are a few minor irritants in it's design. I have heard the common complaint from most owners that the fan noise is too loud. Another common objection is the HV-320 includes a IR sensor and responds to remote control commands intended for the Hi-Des HV-110 receiver instead. With it's front panel up/down push-buttons for channel selection, it really has no need for remote control.



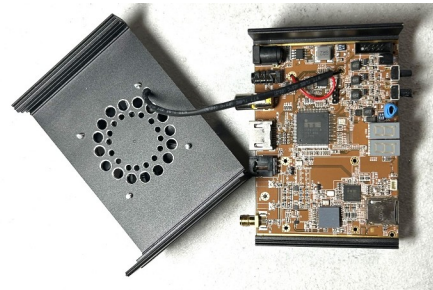
KH6HTV modified HV-320

Last year I built a couple of 70 cm DVB-T repeaters for the Boulder, Colorado ARES group, BCARES. One of the repeaters has now been in service for a year running 24/7. The mini-fan in it's HV-320 has started making lots of noise indicating that it's bearings were about to seize up. So guess it was time to repair it. Rather than simply replace the very tiny, 20x20mm, fan Hi-Des mounted on the front panel, I decided to simply replace it with a larger fan and run it at a low, quiet speed. A

standard, 12Vdc, 50mm x 50mm fan is the ideal size to mount on the top of the enclosure. The photos above and below show the result. I drilled a lot of small holes in the top of the enclosure for air flow from the bigger fan. The larger fan moves a whole lot more air than the original fan. I throttled it back to run at a lower speed and to also be much quieter. The fan was a 12Vdc fan. I added a series resistor to drop the fan voltage down to 7.5 Vdc.

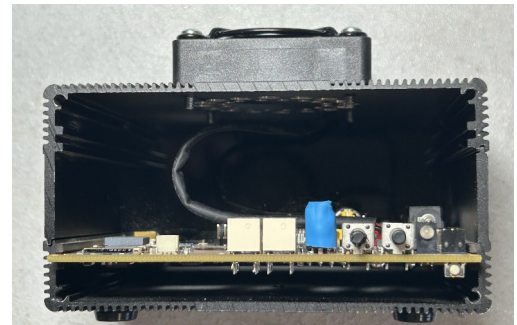


20x20mm & 50x50mm fans



inside view of new fan holes

To eliminate the HV-320 responding to IR remote control commands was a very simple fix. The HV-320 has an IR sensor mounted on the pc board immediately behind the front panel. Without removing the sensor, I simply covered it up with two layers of heat shrink tubing. See the photo at the right. The sensor is covered with blue tubing.



Front view of interior with front panel removed

73 de Jim Andrews, KH6HTV, Boulder, Colorado

New Product Review: Cheap Chinese Camcorder

When new ATVer, Joe, K2EVK, joined the Boulder ATV group, he proceeded to procure the necessary bits-n-pieces to get on the air. One item he needed was a TV camera with an HDMI output for his DVB-T transmitter. Joe found at Amazon a new camcorder for an unbelievably low price of only

---- \$ 40 ! ----

So, he bought it. *He soon found out that it was not suitable for ATV service.*



Chinese 4K Camcorder

The camcorder Joe bought was the Model HDV 900PRO made by GD Digital Ltd. in Shenzhen, China. The camcorder came with quite a few accessories, including: a detachable microphone, two 3.7V, 1

Amp-hr, lithium ion batteries, a type C USB charging cable, a 64GB memory card, HDMI cable, a carrying case, and a remote control.

The mfr's key claimed specs. included: 4K, 12MP cmos sensor, dual lens for wide (120°) and narrow (60°) with 21X zoom, web-cam capability, etc.

When Joe first fired up the camcorder he found that it indeed did produce crisp, vivid video images. So why wasn't the camcorder suitable for Joe's ATV use in his ham shack ? Well the number # 1 reason was **NO AUDIO !** when used simply as a studio camera.

The camcorder does not include a built-in microphone. You absolutely must use the provided detachable microphone. The mic input socket is located on the rear next to the mini HDMI output. When you plug in the mic, it is then physically impossible to also plug in the mini HDMI cable ! In the play-back mode, with the mic disconnected, the camcorder does output audio along with video on the HDMI.

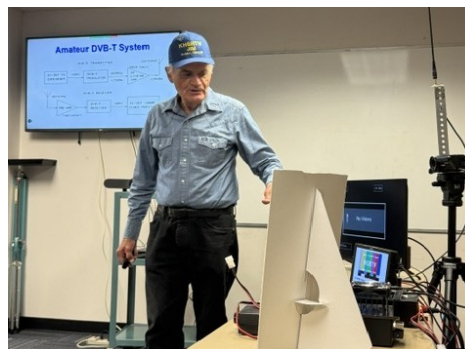
All settings of the camcorder are, as typical, via a multi-depth menu using the touch screen. Videos can be shot at many different resolutions ranging from 720P/30fps up to 6K/12fps. I set it to work at 1020P. They are recorded in .MP4 Still photos can be taken at 5MP to 64MP. The dual-lens switches from 120° wide angle to the 60° lens when the digital zoom reaches 3X. Unlike most camcorders, the digital zoom is not continuous. Instead it works in discrete steps of 0.5 for wide-angle lens and the steps of 1 up to 21 for the narrow angle lens. It apparently does not set the exposure by examining the displayed image. I found if I used the zoom and looked out my ham shack window at a bright outdoor scene but I was still in a darker room, the camera didn't set the exposure for the bright scene, but set it instead for the dark room and thus the zoomed image was over exposed and washed out.

There were a few draw-backs to this camcorder. But considering the price, one could overlook them and still use it for it's normal intended purpose. That being to take home / vacation videos -- on the cheap. Just don't plan on using it as your in studio TV camera for ATV.

reviewed by Jim, KH6HTV, Boulder, Colorado



Joe, K2EVK



Jim, KH6HTV

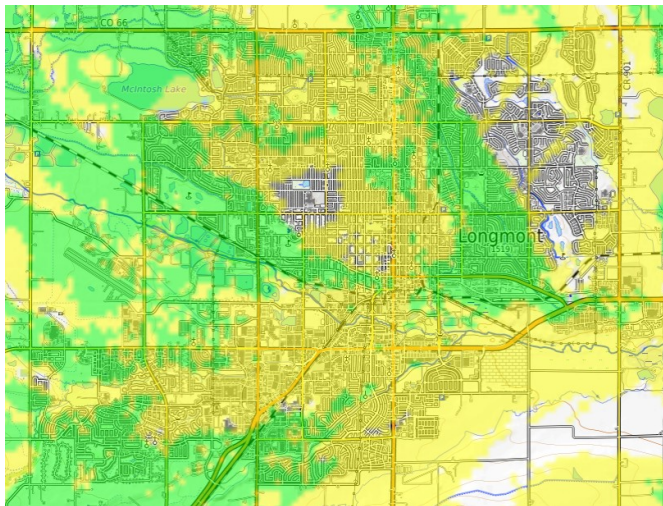
ATV Evangelists on the Road Again

At the recent BARC ham radio swap-fest, BATVC had a DATV display table. One visitor to the table was John, AF0XS, the V.P. of the Longmont, Colorado ham club, LARC. John invited BATVC to give a talk about ATV at the next LARC meeting. So, on Wed., Oct. 21st, Joe, K2EVK, and Jim, KH6HTV, gave a talk to the LARC members. Joe lead off with a power-point presentation dealing with how the Boulder County ARES group, BCARES, uses ATV to support our local Sheriff, Police and Fire depts. Jim, then followed with a discussion on the principles of digital TV and how hams can implement it. They also had a table top display of the necessary gear for getting on the air with DTV.

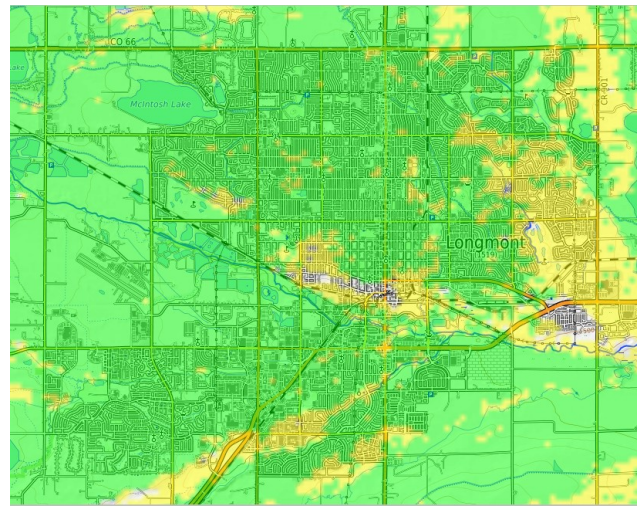
Jim concluded his presentation by holding a "Carrot on a Stick" out to LARC members. He explained that BCARES had received a \$30K grant from Boulder County to enhance it's communications networks, including adding additional DATV repeaters.



BCARES last year purchased two, new, 70 cm, DVB-T repeaters with some of this money. But BCARES has still yet to find sites to permanently house them. Jim, KH6HTV, then said that he has been strongly advocating to BCARES that one of the new repeaters be located in Lyons at a site which presently already hosts a 2 meter FM voice/data repeater. This would be an ideal site to provide great TV coverage for the city of Longmont and the north-east portion of Boulder County. The Lyons repeater would be 8 miles west of Longmont, whereas the Boulder repeater would be 15 miles to the south-west. Here below are two computer coverage maps of Longmont showing the present coverage from the existing Boulder TV repeater and the proposed Lyons TV repeater. Jim then encouraged LARC, if they were interested in having ATV for their city, to put pressure on BCARES management to install one of the new ATV repeaters at the Lyons site.



Boulder, W0BTV, repeater



Proposed Lyons, W0BCR, repeater

70cm DATV repeater coverage maps for the City of Longmont

calculated for mobile unit coverage with 3 watt transmitter and 5 dBi antenna

Yellow shaded areas - weak signal (-90 to -80dBm). Green shaded areas - strong signal (> -80dBm)

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 900+, 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.

Newsletter Archive: All past issues of the newsletter are archived on the web site: <https://kh6htv.com/newsletter/> A free DVD with all past issues is available upon sending an e-mail request to the editor.

Boulder CO - 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/> 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).

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radio & TV gear
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