Boulder Amateur Television Club
TV Repeater's REPEATER

April, 2021
2ed Edition

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

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ISDB-T 5.7GHz 10.2GHz FHD-DATV映像 20210403 弥彦山ー茶屋ヶ原間 (ISDB-T 5.7GHz 10.2GHz FHD-DATV video)

5 & 10GHz, Hi-Def, DATV, DX in Japan

Watch it on You-Tube *https://www.youtube.com/watch?v=3j9p07gCfKc*

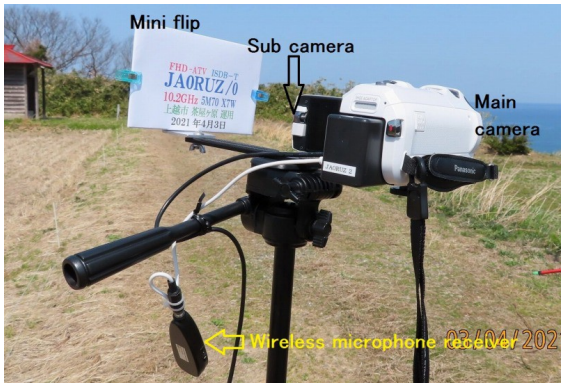
Hi Jim --- Thank you for always sending us your newsletter. Even in the "ISDB-T full high-definition ATV" held in Japan. The board units introduced this time have been imported and made for 5 years. Yesterday, (April 3ed), we had a full high-definition video communication at 5.745GHz and 10.225GHz between the Yahikoyama Skyline

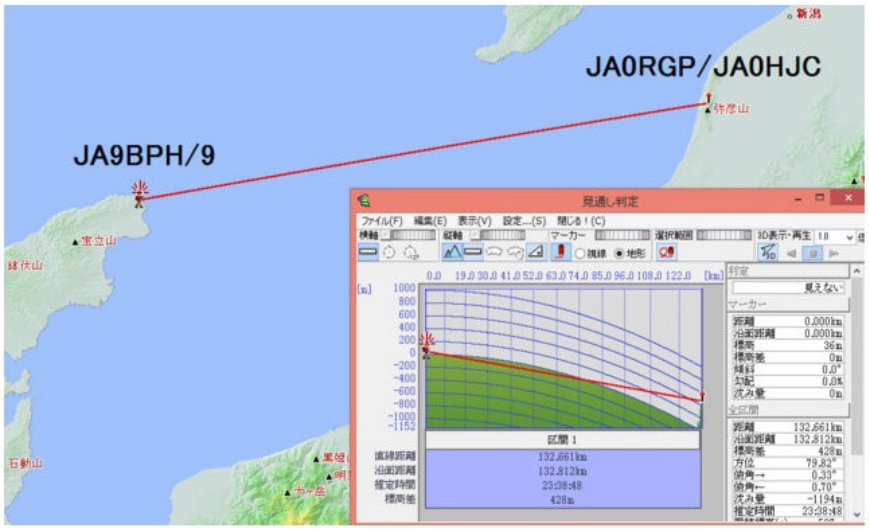
and Joetsu City, where the snow melted and became passable. The distance between the two sites for JA0RUZ, Fumio and JA0RGP, Kazuya, was 87 km. JA9BPH, Tamotsu, and JA0RGP worked 132km on 10.2 GHz FM. JA0HJC, Masaki, also participated.

Fumio further reports -- "The units such as amplifiers and mixers introduced in the newsletter are often used in the ISDB-T transmitter / receiver I made." With this full high-definition ATV in the 5.7GHz & 10.2GHz band, the distance of 85km has been used many times. Last year he was successful at 5.7GHz 10.2GHz with a mutual distance of 167km.

73 de JA0RUZ, Fumio

Editor's Note: *ISDB-T is the Japanese version of DVB-T.*





August, 2020 - DATV, 5 & 10 GHz operations from Nozawa Onsen ski resort - 167km
https://blog.goo.ne.jp/ja0ruz/e/c2c80c833cb952a76002b9448c37ad5a

"Smalband" ATV (SATV)

Rick Peterson, WA6NUT, Buena Vista, Colorado

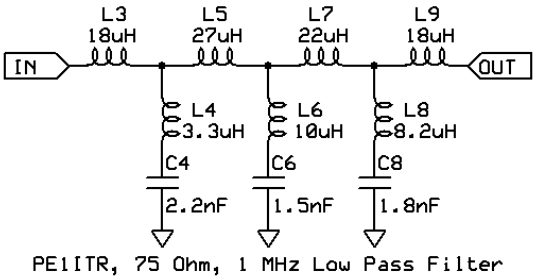
Introduction This article describes "Smalband" ATV (SATV), an ATV mode popular in the Netherlands. In Dutch, "Smalband" means "narrow-band" ("Schmalband" in German). Although this technique has been applied to PAL and SECAM analog ATV in Europe, it can also be used with NTSC analog ATV.

What is SATV? SATV was first suggested by Heinz-Guenter Venhaus, DC6MR, in a 1972 article in TV-Amateur, the publication of AGAF, the German ATV club. DC6MR proposed using a 1 MHz low pass filter between the video source and ATV transmitter, reducing the bandwidth of the ATV signal from about 10 MHz to 2 MHz. The narrow band signal lacks color and the FM sound subcarrier, but a voice signal can be added by FM modulation of the video carrier. [1]

Interestingly, the Aptron Labs AX-10B ATV transmitter allows the operator to select either the usual 4.5 MHz FM sound subcarrier or FM voice modulation of the video carrier. Alternatively, voice communication can accompany the SATV image signal by means of a 2-meter FM link.

Why SATV? SATV has been popular in Europe, especially in the 70 cm band, since that band is only 10 MHz wide. A single 10 MHz wide double sideband AM analog ATV signal would occupy the entire band! So SATV allows the band to be shared with other users. In the U.S., the 70 cm band is wider, but really not wide enough for ATV signals with 10 MHz bandwidth, especially in populated areas. So the considerate ATV'er will transmit with bandwidths of 2 MHz or less, using SATV or digital TV (or at least transmit analog TV with suppression of the lower sideband).

Implementing SATV Implementations of SATV are found in the BATC publication CQ-TV in articles by G8CHK, G8MNY and PA3CRX [2, 3 , 4] and on PE1ITR's web-site. [5]



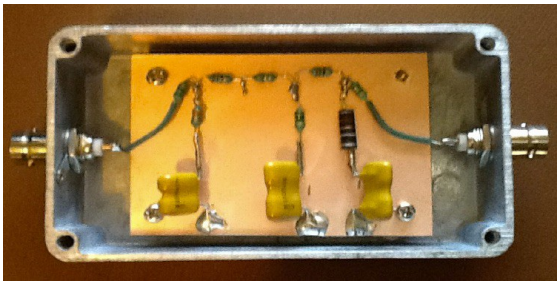


Fig. 1 The assembled 1 MHz lowpass video filter (housed in a Hammond 1590B enclosure)

The author constructed the 1 MHz low pass video filter described by PA3CRX and PE1ITR. Fig. 1 shows the schematic diagram for the filter. The author's filter is identical to their filter, except that the 27 µH inductor (L5) is replaced by separate 4.7 µH (L5A) and 22 µH (L5B) inductors in series (the separate inductors have higher resonant frequencies than available 27 µH inductors). Fig. 1 shows the author's filter.

Parts List for SATV Filter

All components available from Newark Electronics

Ref. Desig.	Value	Newark #	Ref. Desig.	Value	Newark #
L3, L9	18 µH	63K2928	C4	2200 pF	81K0666
L4	3.3 µH	63K2936	C6	1500 pF	81K0849
L5A*	4.7 µH	63K2943	C8	1800 pF	81K0858
L5B,* L7	22 µH	63K2932	note -- C4, C6 & C8 are silver micas		
L6	10 µH	42AH0135			
L8	8.2 µH	86K8305			

* note -- L5A and L5B are connected in series to form L5 = 27 µH

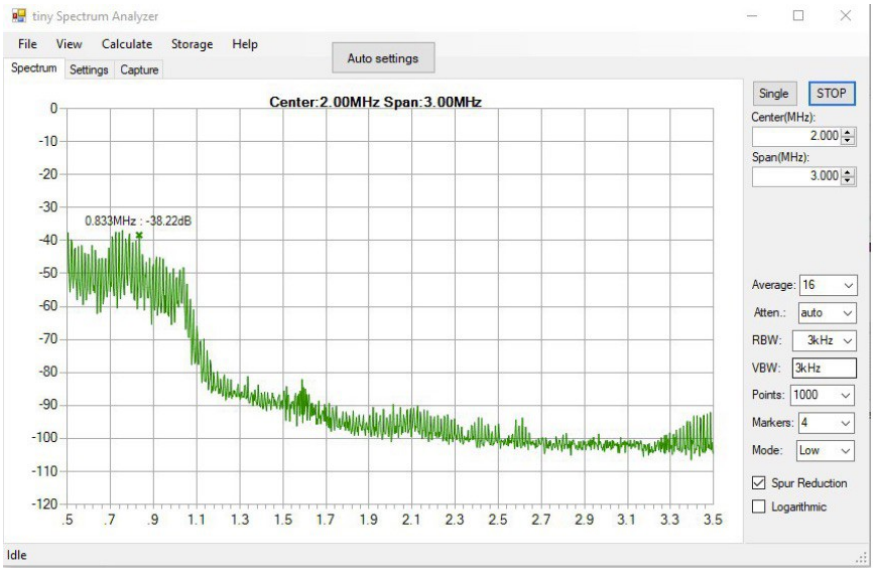


Figure 2: The spectrum at the output of the 1 MHz low pass video filter, with its input fed from an NTSC video camera (measured with a tinySA® spectrum analyzer)

A video camera NTSC signal was applied to the filter, with its output monitored with a tinySA® spectrum analyzer. The spectrum, shown in Figure 2, provides an approximate indication of the filter's performance:

- 3 dB cutoff = 1 MHz (approx) & Stop band attenuation = - 50 dB (approx)

This is the same as measured by PA3CRX and PE1ITR.

Fig. 3 The received ATV image, without the low pass video filter (on the left) and with the 1 MHz low pass (on the right). Note the distortion in the QTH ID and lack of color in the received SATV image.

Figure 3 shows the received 439.25 MHz TV image before and after adding the low pass filter. The transmitter is an Aptron Labs AX-10B. The receiver is a Sony Bravia receiver tuned to cable channel 60 and connected to an antenna. It shows how the filter removes color and reduces resolution.

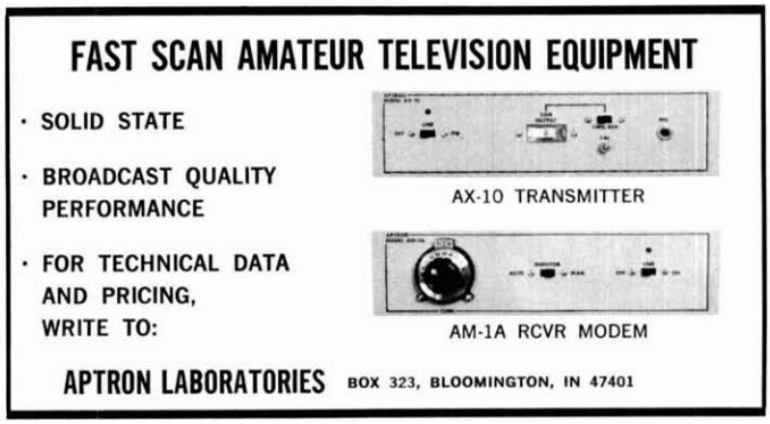
The voice signal from the Aptron transmitter, produced by FM modulation of the video carrier, was monitored on the author's B-Tech UV-25X2 VHF/UHF transceiver tuned to 439.240 MHz. The -10 kHz offset is probably due to the varactor circuit used for FM modulation of the Aptron's crystal oscillator. Audio quality was good.

The SATV signal is compatible with any analog TV receiver. However, improved signal-to-noise reception is possible using receivers with lower bandwidth. Dongle-type SDR receivers offer lower bandwidth suitable for receiving SATV. In his CQ-TV article, PA3CRX describes using an RTL-SDR dongle receiver with SDRSharp software to receive SATV. He used the PAL/SECAM/NTSC TV plugin, part of the "Community Plug-in Package" released in 2019.

References:

1. VHF Managers Handbook, 2016, IARU Region 1. A description of SATV is found on p.119. https://thf.r-e-f.org/docs/Handbook_7.51.pdf
2. King, R., G8CHK "Video Filter for 70 Cm," CQ-TV, No. 153, February 1991, p. 20 https://batc.org.uk/wp-content/uploads/cq-tv153-1.pdf
3. Stockley, J., G8MNY "Narrow Video TX Filter," CQ-TV, No. 166, May 1994, pp. 79-80 https://batc.org.uk/wp-content/uploads/cq-tv166.pdf

4. van den Berg, C., PA3CRX "Reduced bandwidth analogue ATV, the easy (lazy?) way," CQ-TV, No. 269, Autumn 2020, pp. 38-41 https://batc.org.uk/cq-tv/cq-tv-download/ (available only to BATC members)
5. Hardenberg, R., PE1ITR. web page. Use Goggle Translate for a version in English. http://pe1itr.com/432mhz/satv-met-70cm-zender.htm



Advertisement for Aptron ATV gear - Ham Radio magazine, August 1976

ATV from the 70s

My Aptron Labs equipment was given to me recently by Dwight, WB9TLH, who lives in Bloomington, Indiana. He gave me an AX-10B ATV transmitter, its matching PS-16 power supply, and an XR-70 FSTV receiving converter. Dwight is a fellow HF digital voice (FreeDV) enthusiast, and knew I was interested in ATV. He had long been out of ATV.

The AX-10B is an interesting ATV transmitter. Not only does it allow voice transmission by FM'ing the video carrier (or with the usual 4.5 MHz FM sound subcarrier), it employs a high-level video modulator, so that the final amplifier can be operated Class-C (much in the manner of AM HF transmitters in the past). No worries about linearity (except in the video modulator). The literature provided with the transmitter does not mention low pass filtering of the video input (a la SATV), but that would be the obvious application for FM'ing the video carrier (FM'ing the video carrier was part of the SATV standard given in the VHF Managers Handbook published by IARU Region 1). Perhaps Aptron intended to market the transmitter in Europe, where SATV was popular.

Aptron Labs was located in Bloomington, Indiana. The company was owned by Biagio Presti, who was also chief engineer at Sarkes Tarzian a manufacturer of commercial TV equipment. His title was "General Manager of the Broadcast Equipment Division." Presti was not a licensed amateur, but he wrote and published the *Television Handbook for the amateur*, a 96 page book (I have a copy). It provides a detailed description of analog TV, and gives information on the AX-10B transmitter and an ATV receiving converter (not the XR-70). The book comes up from time to time on Amazon, sold by its used bookstore affiliates.

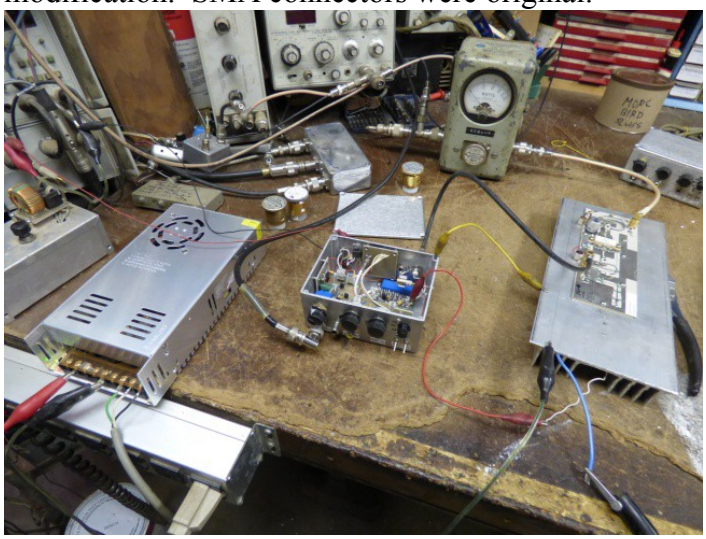
Rick, WA6NUT, Buena Vista, CO

HARRIS, 300 Watt, ATV Amplifiers

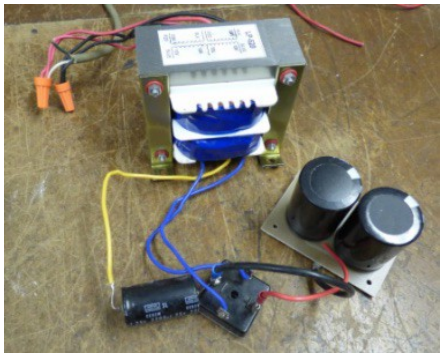
John, WB0CMC, from Omaha, Nebraska writes --- "Here is more info on the Harris amps. I even had a request from NSW Australia. I still have a few left."

I have been doing some more research on what some of the latitudes are with these amps. It turns out that the will work from about 26 VDC to 34VDC with little difference in performance. I found a switcher on Amazon (Chinese) 24 V @ 15 Amps. It does have an adjustment pot and it will go up to 29.5 VDC. It was only $33 including shipping. It will work on either 120 or 240 VAC. There's a switch on it. With one of the 300 watt amps doing CW @ 29VDC, 15 watts input @ 434 MHz, It did do 300 watts and drew 16.5 Amps. A bit over the rating of the switcher but it held long enough for me to get the measurements. With color bars, still 29VDC, 300 watt sync but now only 10 Amps draw. With sync only, no bar video current was about 12.5 Amps. It should draw even less if it is used for a digital signal. I also tried a 24 volt transformer rated @ 10 A running into a FW bridge (I had a 35 A handy) and 60,000 mFd filter (35V). No load voltage was 35VDC and under load 27 since it wasn't regulated. It has a CT secondary which, when filtered, provides 14 VDC. Transformer was from MP Jones, #27846 TR for 43.95 + sh. Caps from Digikey, FW bridge from my junk box.

I do have 4 of the 150 watt amp strips which were the drivers for the 300 watt array. They do work fine with the above transformer pictured or the switcher. With the 7 watt TX you do get 150 Watt sync power. With NTSC color bars current is only about 5.4 Amps. Note the 3 trimmer caps. That's all that's necessary to match these from 420 MHz and up. I have not tried these on 902-928 MHz but they should work with some modification. SMA connectors were original.

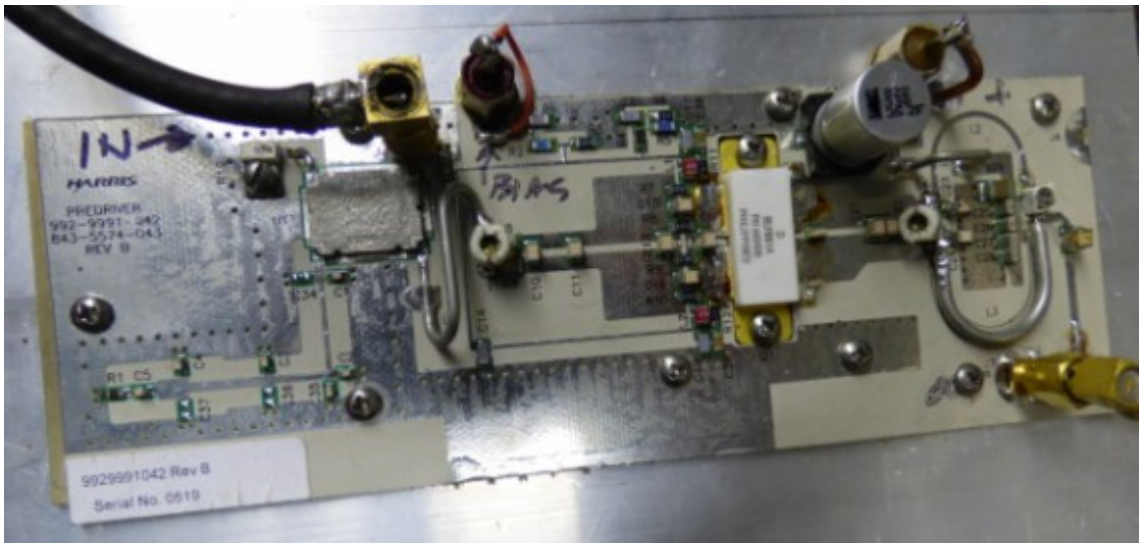


L-R, switcher, 7 watt ATV TX, 150 watt amp

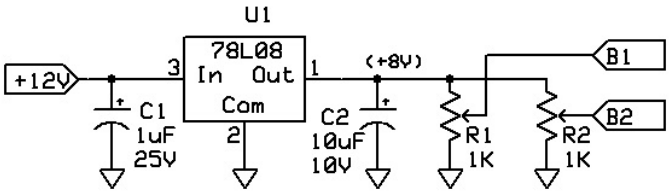


Transformer, bridge and (BHAC)*

*BHAC= Big Hairy A.... Capacitor.



Biasing the 300 Watt Amps: I've had requests for bias info, so this follows. You can use a 78L08 (TO92) or 7808 (TO220) as follows for the 300 watt boards.



Input to the 78L08 can be 12-14 volts from the transmitter to set below 5 V initially. Then it can come from a keyed voltage of at least 10 V in the transmitter since without bias the amp will not conduct.

Three terminal regulators do need some capacitance in and out with short leads next to the device since they occasionally like to oscillate. The two pots should be multi-turn since the FETs start to conduct at about 5 Volts and saturate at nearly 6 Volts. Single turn could get a bit tricky. Start adjusting each without the HV on or disconnected. Set both a little below 5 V. With the HV on, set one for 1 amp drain current, then the other for another amp, 2 Amps total. This should put them in the linear region.

73 de John, WB0CMC

ANOTHER ATV REPEATER FOUND

I wrote recently about finding more ATV repeaters listed in the RepeaterBook (www.repeaterbook.com). I made an attempt to contact the trustees of them to confirm their existance. Many of the listings turned out to be false and those repeaters no longer existed. However, I just got confirmation from South Carolina of another active ATV repeater. It is the **N4VDE** repeater in Greenville, SC.

Rick, N4VDE writes --- "The ATV repeater is on the air with a input at 434Mhz and output @ 421.25Mhz. It is analog, NTSC, VUSB-TV. I do have plans to add Digital mode,

DVB-T as I have purchased a receiver and transmitter from Hi-Des. The ATV repeater is in the same building as Pickens County Emergency Comm group. Their web site is: www.wx4pg.org " Rick promises to send us some photos and more info about their ATV repeater for a future newsletter.

SLOW TV -- NORSK STYLE:

Don, N0YE, Boulder, CO writes --- The Norwegians have created a different kind of TV called slow TV. This TED talk gives a fun description of what their slow TV is all about. Enjoy the video.
https://www.ted.com/talks/thomas_hellum_the_world_s_most_boring_television_and_why_it_s_hilariously_addictive?language=en#t-2708

Editor's comment: *The Norwegians have nothing on us. Watch our Boulder ATV, W0BTV repeater for similar video excursions. We have shown videos of car rides up and down Pike's Peak, our own Boulder Canyon, etc.*

Hi-Des Firmware Issues

Readers need to be aware of some potential firmware pitfalls with Hi-Des gear. Besides supporting the ham TV market, Hi-Des also sells gear to the drone TV market. Flying a drone, or other R/C aircraft, and using the on-board TV camera for the pilot's vision can be tricky. They call it FPV for First Person View. With digital TV's inherent latency (i.e. delay), it really becomes a safety issue. Any latency greatly increases the pilot's reaction time which could lead to a fatal mistake. So, Hi-Des has developed some special, low-latency, firmware for some of their products.

I ran into this issue when I recently purchased for an amplifier customer of mine, a Hi-Des HV-320E modulator and HV-110 receiver. When I trained the receiver to receive the modulator's DVB-T signal, I then later discovered that it failed to work properly when receiving other DVB-T transmissions, such as from our W0BTV repeater. What happened ? --- Well after corresponding with Hi-Des' support person, Calvin Yang, I

found out why. It was a firmware incompatibility. The HV-110 was shipped to me with their special low latency firmware installed.

For our amateur, digital TV, we need to be careful that all of our equipment conforms to the ITU broadcast standard for DVB-T. That way we will support transmissions from any source and be able to receive our transmissions on any standard equipment, regardless of manufacturer.

In communicating with Calvin, he has informed me of Hi-Des' shipping policy. ---- When users buy the HV-320 and the HV-110 together, they most likely need the low latency for wireless surveillance, thus we ship with low latency F/W. We ship with standard F/W if users buy the receiver only. ----

Calvin did however assure me that in the future, when I purchase an HV-110 & HV-320 package he would ship it with the standard firmware installed, if I would also send him a "heads-up" e-mail at the same time as when I place my E-Bay order. Thus, other hams, when buying from Hi-Des, should also send Calvin an e-mail and request standard, not low latency, firmware. His address is: calvin@hides.com.tw

So, returning to my immediate issue of the non-functioning receiver. Fortunately, Hi-Des supplied a CD with the shipment which included on it copies of both versions of the firmware. I thus was able to install the proper, standard, firmware and the receiver then worked properly with all other standard DVB-T transmissions.

Jim, KH6HTV, Boulder, CO

W0BTV Details:

Inputs: 439.25MHz, analog NTSC, VUSB-TV; 441MHz/6MHz BW, DVB-T & 1243MHz/6MHz BW, DVB-T
Outputs: 423MHz/6MHz BW, DVB-T, or optional 421.25MHz, analog VUSB-TV. 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 400. 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.**

Featured Product of the Month
33cm & 70cm Amplifier

We have just built a model 33-1A Amplifier for K0TA of Chadron, Nebraska. The 33-1 is unique among the KH6HTV line of rf linear power amplifiers. It is useful on two bands. While it is designed for the 900 MHz (33cm) band, it also can be used on the 430MHz (70cm) band.

For digital TV (DVB-T) service it puts out +35dBm (3 Watts) on 900 MHz. The output power is lower on 70cm band, but it still puts out a useable +27dBm (1/2 Watt).

For FM/CW the output powers are 18 W (33cm) and 3.5 W (70cm). For analog, NTSC, VUSB-TV service the PEP power is 6 W (33cm) and 2 W (70cm). For more details, down-load the .pdf spec. sheet from --- *www.kh6htv.com*