

Boulder Amateur Television Club TV Repeater's REPEATER

May, 2024
3ed edition, issue #163

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com



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

ATV at Dayton Hamvention

Feed-Back from Attendees:

....."The guys at the Hamvention booth yesterday were extremely helpful in getting me started. I arrived with an interest and they gave me an overview of the equipment and what's going on these days with ATV. Their knowledge and the show setup was really great."..... de Bill, N3TCR, Mount Airy, Maryland



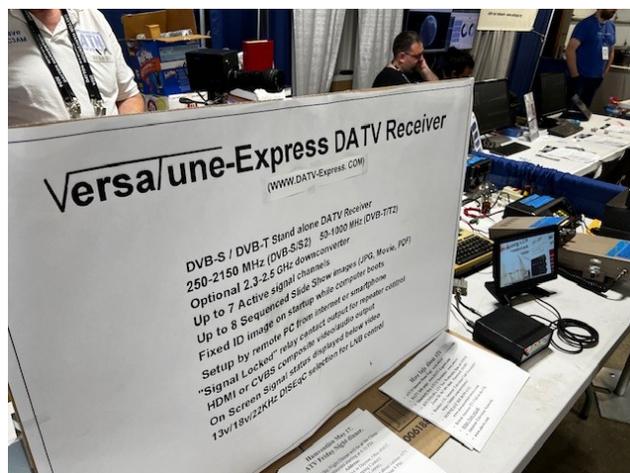
Left to Right: KK4LW, K8FIX, WA8RMC, WA6SVT, KC3AM

Tnx for this report and photos from Dave Pelaez, AH2AR, DARA, Dayton, Ohio

Dayton Hamvention -- 2024 is now history! This year's Hamvention likely broke a new record for attendance. The figure has not come in yet, but every indication points to a record crowd. The ATV hobby was well represented at the two booth spaces (1003 & 1004) with WA8RMC Art, KC3AM Dave, WA6SVT Mike, KK4LW Rick, K8FIX Bruce, and AH2AR Dave providing top-cover. A large number of hams visited the booth and the exhibitors were very busy answering a whole slew of questions. The exhibit had a number of ATV related displays, along with Art's display of the NEW **VersaTune-Express** receiver project that is currently in the works. Just like last year, we set up a live 23cm/70cm DVB-T cross-link as a demonstration. For once, the latency that was occurring from the round trip of the cross-linked ATV signal to the Dayton ATV repeater and back to the fairgrounds ended up being quite a novelty. Folks passing in front of the camera at the booths were treated to seeing themselves on the TV monitor with the video delay. Their wave at the camera was followed by a delayed wave back... the kids loved it! On Friday, the ATV Dinner at China Garden in Fairborn went really well. The lucky winner of the door prize was Earl King, WB9EZL who left with the door prize, an HV110 DVB-T receiver.



WA6SVT and KC3AM kept busy at the exhibit... No rest for the weary!



WA8RMC displayed the NEW VersaTune-Express receiver that he designed



23cm & 70cm antennas to/from W8BI-ATV repeater



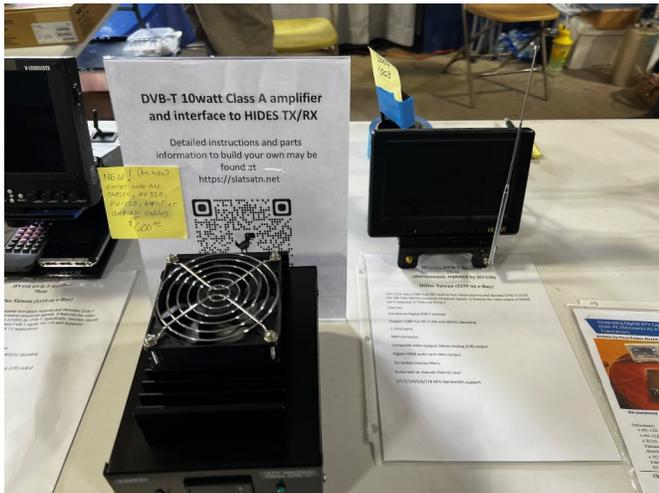
The W8BI ATV Repeater was showcased at the exhibit. The repeater cross-linked Hamvention crowds walking by the booths.

1280 MHz, DVB-T, 2 MHz bandwidth. ATV signal was transmitted at Hamvention in Xenia to the DARA, Huber Heights, W8BI-ATV Repeater site, and then linked back on 428 MHz, DVB-T, 2 MHz bandwidth (50 mile round trip link)



The 23cm transmitter cross-linking to the W8BI repeater was accomplished through use of an HV310 transmitter, a Jim Andrews, KH6HTV, 23-11A amplifier that was being used as a driver to drive an XRF-286, W6PQL amplifier

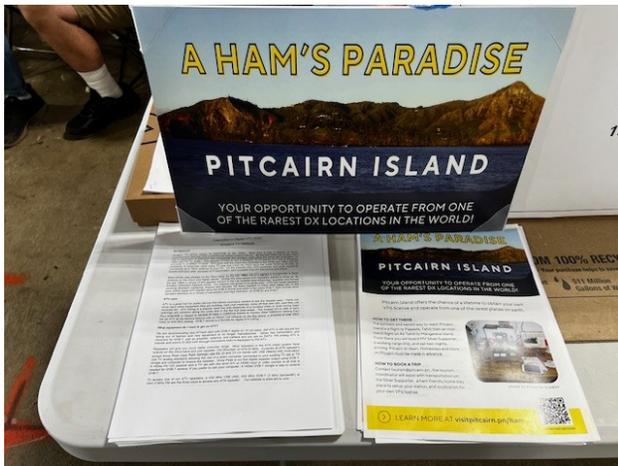
Bruce brought in his PC-Electronics Host transceiver that was modified to host a DVB-T transmitter/receiver for display



Other display hardware included a K0PFX digital interface with HV320 and HV120. It sold!



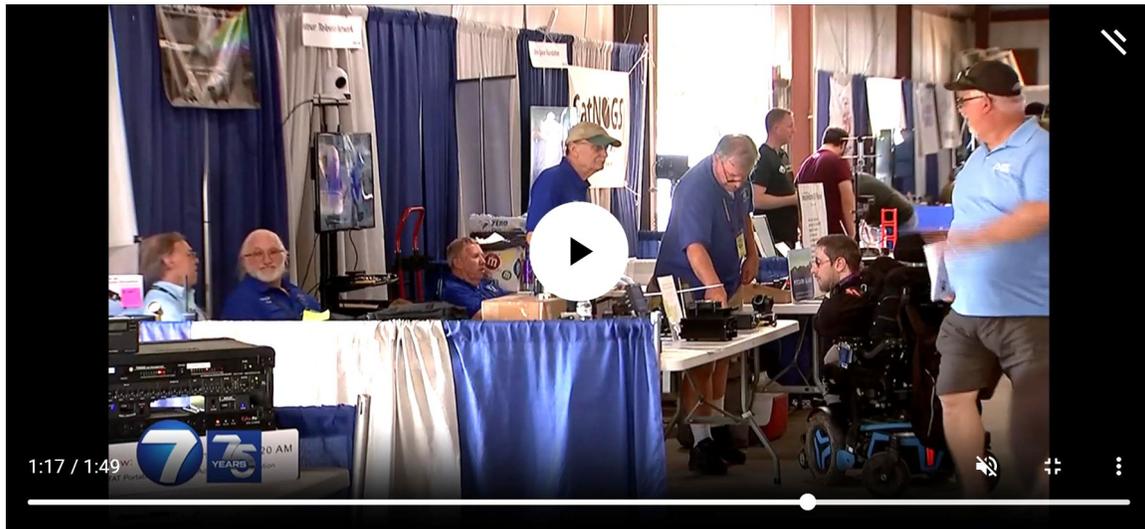
We wanted to see how well an analog signal would do at Hamvention in Xenia, so Bill, W8CWM, transmitted an analog, NTSC, A5 though the repeater for a quick signal check.



As a side hustle, WA6SVT was able to answer a thousand-and-one questions about his upcoming adventures to Pitcairn Island.



The Hamvention would not be complete without a visit to China Garden for the ATV Dinner on Friday night.



Dayton TV Channel 7 Newscast

While I was at the Hamvention, my daughter grabbed this frame from her home (commercial) TV when it was aired on Dayton channel 7 local news. It's only appropriate that channel 7 News ended up allowing a cameo appearance of K8FIX, KK4LW, KC3AM, AH2AR, and WA6SVT. Looks like Art, WA8RMC missed his five seconds of fame due to the timing with one of his flea market runs!

73 de Dave, AH2AR, DARA, Dayton, Ohio

More 5.8 GHz, FM-TV Transmitters

Jim, KH6HTV



After the disappointing results reported in the previous issue, #162, I decided to try some other 5.8 GHz, FPV, FM-TV transmitters advertised on Amazon. They included units rated to 1 and 2 Watts. The following table shows the results of my measurements. Still some disappointments !

In the previous issue, we discussed the new, much smaller TS-982 transmitter purchased by Doshia, KB0NAS & George, NORUX. It was rated to put out 600 mW (+27.8dBm), but we found that it's output was -3dB low, coming in around 300 mW instead. Not wanting Doshia & George to have to go out in the field for the next BATVC's ATV DX-pedition with a whimpy transmitter, we decided to check out some of the other new transmitters now being advertised on Amazon. In addition to 600 mW units, we also found a couple of even higher powered units rated to 1 and 2 watts RF. So we ordered them. It turned out they were all made by the same Chinese, AKK company. The results were disappointing for both the 1 and 2 watt models. The 1 watt model max. rf power was -5dB below spec. coming in at about 1/3 watt. The 2 watt model max. rf power was -3.4dB below spec. coming in at about 900 mW. The 600 mW model (FX3) was closer to spec. giving out 500 mW. Pretty disappointing results. Doesn't say much for the Chinese quality control (or lack thereof). Also don't believe their advertising.

I felt quite comfortable with the rf power measurement. I made it using an HP-432A power meter with an HP-478A thermistor power head. In front of the power meter I used a Weinschel 30dB, 50 watt, DC-8.5GHz precision attenuator. The three new transmitter modules also came with programmable, adjustable rf power levels. I checked the lower power level changes using a TinySA-Ultra spectrum analyzer. The TinySA max. readings agreed fairly closely with the HP power meter reading.

Comparison Table for various 5.8 GHz, FM-TV Transmitter Modules

Model #	TS-832	TS-982	AKK, FX3	AKK-X2 Ultimate	AKK-VTX Long Range
Pout (spec.)	600 mW	600 mW	600 mW	1 Watt	2 Watts
Pout (meas)	590 mW	235 mW	500 mW	320 mW	910 mW
Id (12Vdc) spec.	220 mA	300 mA	320 mA	no spec	no spec
Id (12Vdc) meas.	290 mA	280 mA	250 mA	200 mA	500 mA
Adjustable RF Power	No	Yes, 2 levels	Yes, 4 levels	Yes, 4 levels	Yes, 4 levels
rf pwr adj.- spec.	NA	no spec.	0, -1.8, -4.8, - 14dB	0, -2.2, -7, - 16dB	0, -3, -6, -9dB
rf pwr adj. - meas.	NA	0, - 18dB	0, 0, -2.6, - 13dB	0, -1, -4, -11dB	0, -4, -7, -10dB
FM-TV Deviation (meas)	2.56 MHz	2.70 MHz	2.30 MHz	2.25 MHz	2.39 MHz
SSC	Yes	Yes	NO	Yes	Yes
SSC Freq.	6.5 MHz	6.5 MHz	NA	6.5 MHz	6.5 MHz
SSC level	-25 dBc	-25 dBc	NA	-25 dBc	-25 dBc
On board Mic	Yes	Yes	NO	Yes	Yes
option to rewire for ext. audio	YES	No	No	No	No
Max. Board Temperature (meas.)	134° F	142° F	186° F	155° F	178° F
RF Channels	40	48	48	48	48
RF connector	RP-SMA	RP-SMA	MCX/SMA	MCX/SMA	MCX/SMA
Dimensions	2.1"x1.25"	1.2"x0.8"	1"x1"	1.25"x0.85"	1.4"x1.4"
Price (5/2024) (Amazon)	\$50	\$48	\$20	\$25	\$35

Deviation: I measured the deviation on all of the transmitters. I used the Bessel function null method. I drove the 75 Ω video input line with a standard 1.0 V_{rms} sine wave of adjustable frequency. I increased the frequency until the video carrier was nulled to zero. I made the assumption that pre-emphasis was not being used on any of these transmitters. The deviation, D, was thus given by the equation $D = \chi \times m$, where m = modulation frequency. The 1st Bessel null occurs at $\chi = 2.405$. For each transmitter, the 1st null occurred around 1 MHz, thus giving about 2.4-2.5 MHz deviation.

Live Video Test: The last test to report was to transmit a real video signal and monitor it on an RS-832 receiver and also to watch it's spectrum on the TinySA-Ultra. The received video signal was of excellent quality for all of the transmitters. The spectrum photo on the left was typical for all of the transmitters, except for the FX3. The FX3's spectrum (right photo) is seen to be much cleaner and narrower as a result of it not having a sound sub-carrier (SSC). It is seen to have a -20dB occupied band-width of the order of 8-9 MHz as a result. It is about 10 MHz on the spectrum null measurement photo.

Conclusion: I still feel the best choice among these five different transmitters is still the older, model TS-832. For our ham radio applications, the tiny size is not important. The fact that you can not transmit your camcorder's audio with the tiny ones makes all the difference in making this choice. Also, the TS832 runs cooler which should translate to higher reliability in the long term. Plus, they actually put out a true 600 mW of rf power, per spec. The others were far from meeting the rf power specs. The current prices for the TS832 around \$50 are considerably higher than the \$15 they were originally sold for, but still well worth the additional cost to be able to have the external line level input audio feature.

Another FM-TV Resource: For a whole lot more good info on the 5.8 GHz, FM-TV gear check out the BATC's web site: https://wiki.batc.org.uk/5.6_GHz

73 de Jim Andrews, KH6HTV, Boulder, Colorado

IC-905 FM-TV Feed-Back:

IC-905 Feed-Back from ATN:

Hi Jim --- The IC-905 is set up for NTSC, 525 line, pre-emphasis TX and RX de-emphasis. Deviation is set up for standard 4 MHz deviation used for terrestrial FM video links. I have not found an option to select between the PAL 625 line and NTSC 525 line emphasis. This should be a firmware upgrade. Most of the IC-905's I have seen have both an RX and TX video level but at best deviation with 1 volt P-P input is just above 4 MHz deviation.

There are so many variants in world wide FM ATV due to the use of FPV, video senders and satellite TV receivers. The variants may have non standard deviation and either no emphasis or non standard ones used. Years ago ATN repeaters FM inputs and outputs were standardized with the NTSC, 525 line emphasis and 4 MHz deviation. This standardization has allowed simplex and repeater users within

any of our ATN chapters to be compatible with each other's systems. If I recall, the European TV analog FM microwave links were also 4 MHz deviation with 625 line emphasis.

The above usually resulted in about 14 to 16 MHz occupied bandwidth for a single audio sub-carrier depending on sub-carrier frequency used and up to 22 MHz occupied bandwidth if four sub-carriers were used.

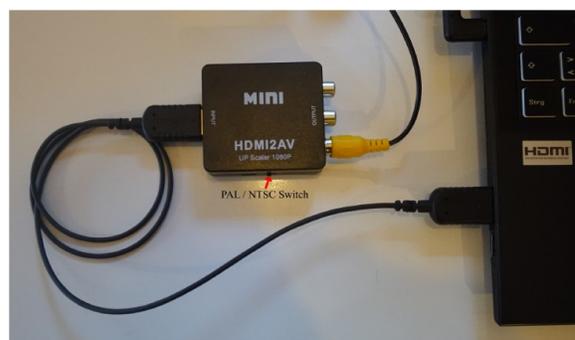
73, Mike WA6SVT / VP6MC, Amateur Television Network, Crestline, California & Pitcairn Island

IC-905 Feed-Back from Deutschland:

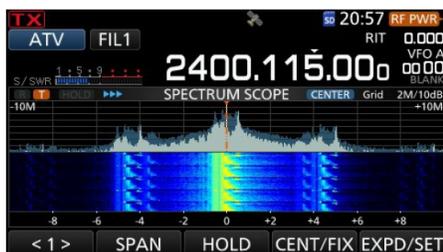
Here I would like to share some information about my IC-905. I've been waiting for the IC-905 for a long time. Now I have two devices and one 10 GHz converter. With the devices I am QRV on QO-100. You can find a few images on my QRZ com page (DG2YK).



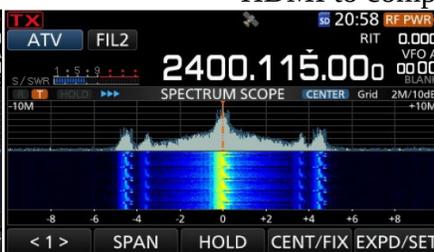
IC-905 Transmitter



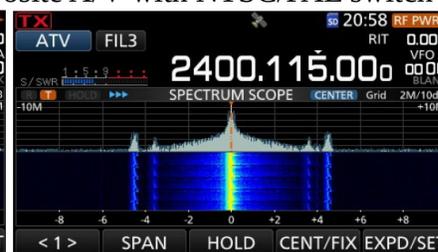
HDMI to composite A/V with NTSC/PAL switch



Filter #1



Filter #2



Filter #3



Received PAL image



Received NTSC image

Now I also want to do ATV and have done some tests. I think the image quality is good. Even with filter 3 (5 MHz) the quality is very good. However, filter 3 has a bandwidth of around 9 MHz. Filters 1 and 2 are not much wider, see the screenshots. The firmware is 1.15. With PAL the RX only shows a black and white image. NTSC also produces a coloured image. I tested it with two different video

sources, so the reason is the IC-905. As video sources I used a Flir thermal camera with a native AV output and an HDMI to AV converter, see the last image. Any camera with an HDMI output and my PC can be connected to the converter. Now I will do some tests in the field with a colleague.

Best regards --- Wilhelm Sicking, DG2YK, Gescher, Germany

WOBTV Details: **Inputs:** 23 cm Primary (CCARC co-ordinated) + 70 cm secondary all digital using European Broadcast TV standard, DVB-T 23cm, 1243 MHz/6 MHz BW (primary), plus 70cm (secondary) on 441 MHz with 2 receivers of 6 & 2 MHz BW
Outputs: 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz/6 MHz BW, DVB-T Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).
Operational details in AN-51c Technical details in AN-53c. Available at:
<https://kh6htv.com/application-notes/>

WOBTV 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. 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/> 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 is a free newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 700+. 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



If we can fix it -- we can sell it in the BATVC Newsletter !



ITEMS FOR SALE OR GIVE AWAY:



Mel, K0PFX, has lots of Hi-Des, DVB-T, used gear for sale. For details, check out the SLATS web site.

Hi-Des Items Mel has for sale include: USB receiver (\$100), HL-100R&T Control Modules (\$25 ea.), UT-120 dual diversity receiver (\$50), HV-110 receiver (\$75), USB Tx/Rx dongles UT100A (\$75) & UT100B (\$100). Plus Mel also has four complete DVB-T ATV stations for sale.

Other Items Currently Listed on SLATS web site include: 38ft. Pneumatic Mast (FREE !), HDMI 8 port switch, Icom HM-133V microphone, Motorola SU42 Spirit HTs, Icom IC-451 70cm transceiver, Digital voice adapter (FreeDV) for SSB rigs, 8" dial caliper, Scroll Saw, Hot air SMD tool, Solder bath pot, SMD de-soldering tool, Nvidia GeForce 8800 GTS video card, Talking VHF/UHF Wattmeter, misc. ham antennas, Green Screen, Brady BMP-21 label machine, Yaesu FT-847 HF/VHF/UHF transceiver, Icom IC-7000 with LDG-7000 auto tuner, Bird 43 element, Davis RF rotor cable, HF Force 12 Yagi antenna, VHF/UHF Sweep Generator (FREE), Marconi 6970 RF Power Meter, Hallicrapfters Remote Antenna Tuner, 23cm Transverter, Millen Antenna Bridge, -- plus more items added each month.