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BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

The Amateur Television Network

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1/2 Way There -- then Dr. Murphy Visits Once Again !

Jim, KH6HTV

Don, N0YE, and my efforts to log **"Worked All Bands - DVB-T"** were stymied once again. On the 29th of Sept. we headed out in the field once again to try to make a two way DVB-T contact on the last remaining microwave band we have not yet worked. The 9 cm, 3.4 GHz band. We both had micro-

QRP rigs, with low rf output powers, so we knew we couldn't work any heroic distances. This time we headed to the large vacant fields of the future Univ. of Colorado campus on the south side of Boulder, CO. We parked our cars about 0.2 km apart. We had clear visual line of sight of each other across flat, open ground. It was a beautiful fall day. The future campus site has great views of the Flatiron mountains as seen in the above photo.

My QRP, 9 cm rig was described in the previous issue #194 of this ATV Journal. The DVB-T transmitter power was +8 dBm. The patch antenna had +15 dBi gain. The rf final amplifier was mounted directly on the antenna, thus no added coax feedline loss. The receiver was a simple frequency synthesized LO and an active mixer. It 's sensitivity for a signal with 1/2 FEC was -89dBm.

Don, was using an old 9 cm rig he had built from surplus microwave components quite a few years ago for SSB work. He had modified it slightly to also use it for DVB-T. The LO was a surplus brick from California Microwave. His antenna was a surplus traffic light which had a great 1 ft. diameter silvered, parabolic reflector. Don has built microwave feeds for this parabolic dish for several bands. He estimates the gain at 3.4 GHz to be about +14dBi. His 9 cm receiver was a simple, brick LO driving a double balanced diode mixer. I suspect it's sensitivity was comparable to mine? He used a Hi-Des HV-320 modulator and HV-110 receiver for the DVB-T IF components.

So, I got on the air first and transmitted on 3.370 GHz. I was monitoring and saw my own signal. Plus, Don immediately reported getting a strong signal from me. He took photos to document it. The received signal strength is shown in the photo at -55 dBm with a perfect 23 dB s/n. Assuming -10 dB conversion loss in his mixer, it would have been about -45 dBm.

Next Don tried to transmit back to me. Ops, he kept blowing fuses. No RF output. I never saw any pictures from Don. Bummer ! So, we had to give it up as a half successful attempt.

73 de Jim, KH6HTV, Boulder, Colorado

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BARC Swap-Fest

ATVer Allen, K0ARK's mobile antenna trailer & BCARES exhibit

The Boulder Amateur Radio Club (BARC) held it's annual swap-fest on Sunday, October 5th. It was held in the Boulder County Fairgrounds exhibit hall in Longmont.

Our own YL-ATVer, Debbie, WB2DVS, was once again the chair-lady in charge of organizing the event.

Debbie reports the event was again a success. There were a total of 93 exhibitor tables and 338 paid attendees. Lots of ham radio "treasures" exchanged hands at the event. Our ATV group had a display table there with a live video ATV demo.

VE ham license exams were given at the swapfest with 7 new techs and 3 general upgrades. Door prizes were given out during the morning. The grand prize was a Radioddity HT.

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LARCAN UHF-TV AMPLIFIER EVALUATION

The Front Range ATV hams hit the Jack-Pot at the recent BARC Swap-Fest. A generous ham from Grand Junction, CO offered to give us several used Larcan UHF-TV amplifiers and band-pass channel filters. He delivered them to us at the swap-fest. The amplifiers were originally designed as 20 Watt, NTSC, analog TV amplifiers. They more recently had been in service as translators for ATSC.

I have evaluated the amplifier I got and compared it to my own product, my model 70-9B amplifier. The following table shows the results.

Larcan UHF-TV Amplifier Evaluation

Jim Andrews, KH6HTV

Parameter	Larcan Model MXD10U s/n 201674-10	KH6HTV Video Model 70-9B s/n 160	Notes
S21 - Gain	37 dB	53 dB	CW meas. at 429 MHz
S21 Band-Width (-3dB)	527 MHz	53 MHz	swept freq test at -23dBm in to 1 GHz
S21 (-3dB) lower	352 MHz	385 MHz	
S21 (-3dB) upper	877 MHz	438 MHz	
Pout (-1dB compression)	46.3 dBm 43 Watts	45.1 dBm 32 Watts	CW (429 MHz)
Pout (max)	46.5 dBm 45 Watts	48.1 dBm 65 Watts	CW (429 MHz)
Harmonic Suppression	-16 dB (2x) -43 dB (3x)	-68 dB (2x) -56 dB (3x)	CW, 10 W out at 429 MHz
DTV Power Output	42.8 dBm 19 Watts	40.6 dBm 11.5 Watts	-30 dB spectrum shoulder break points
DTV Power Output	41.8 dBm 15.1 W	39.6 dBm 9.1 W	-33 dB spectrum shoulder break points
DTV Power Output	40.8 dBm 12 W	37.7 dBm 5.9 W	-36 dB spectrum shoulder break points
DTV Power Output	39.7 dBm 9.3 W	35.6 dBm 3.6	-39 dB spectrum shoulder break points
Power Supply Required	115 VAC	+12 VDC	
Dimensions	19"x5"x21"	5.5"x4.5"x5"	
Weight	34 lbs	2 lbs.	
Cooling Fan Noise	LOUD !	Quiet	
Ext. PTT capability	maybe ?	Yes	
VSWR Protection	Yes	No	
Front Panel Meter	Yes	No	
Adjustable RF Power	No	Yes	
FCC ID	Yes	No	
Price	?, expensive new	$450	

CONCLUSION: For the Larcan UHF-TV amplifier, I suggest for a very good quality DVB-T spectrum with minimum shoulders at -39 to -40dB break points, the RF average power be kept to +40 dBm = 10 Watts. Set the AGC to OFF. It would make a great amplifier for a DATV repeater. Due to it's size, weight and very loud fan noise, it is probably not suitable for use in the ordinary ham shack.

73 de Jim Andrews, KH6HTV, Boulder, Colorado

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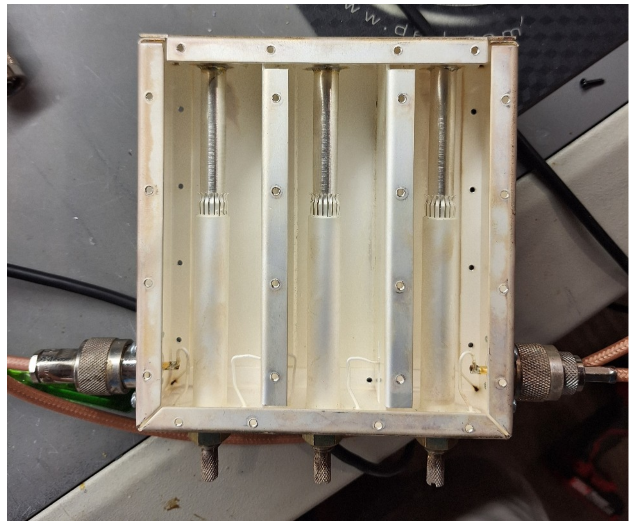
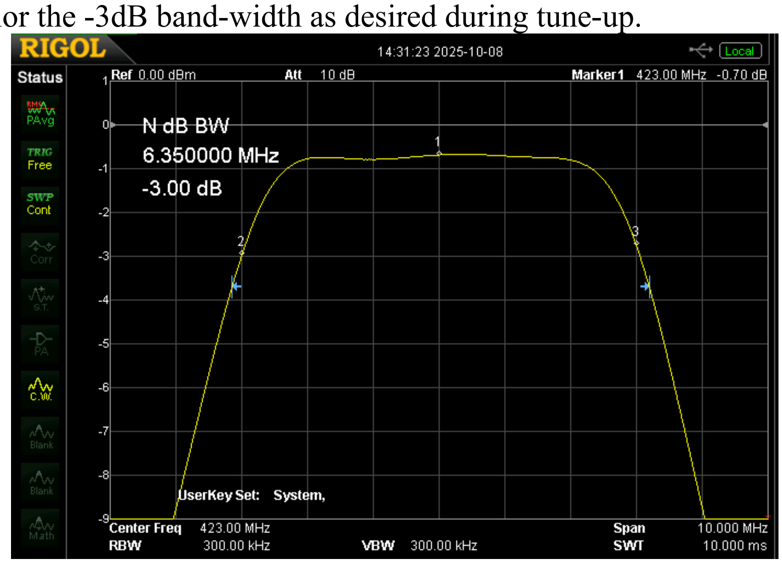
UHF-TV Band-Pass Filters



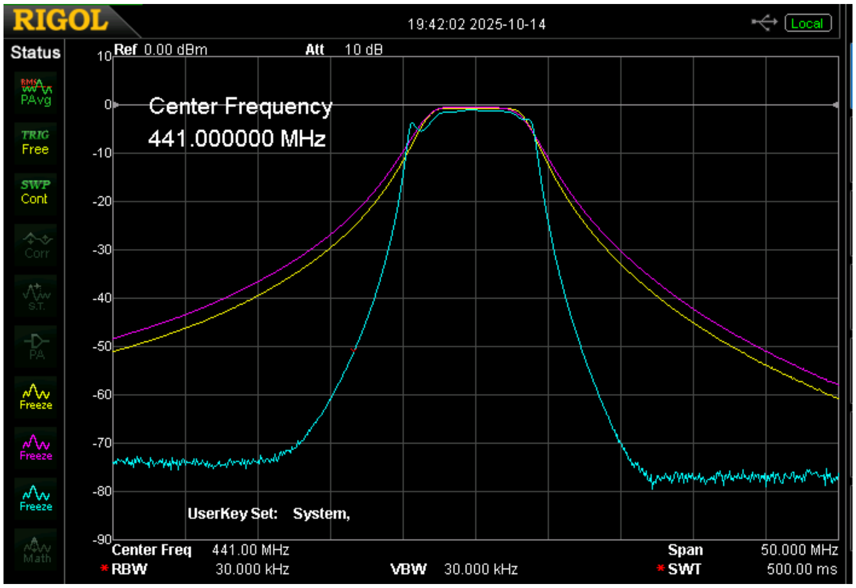
Included with the Larcan UHF-TV amplifiers gift from the Western Slope ham was an assortment of commercial grade UHF-TV, channel band-pass filters. They had also been taken out of translator service recently along with the amplifiers. No labels on them IDing them as to manufacturer nor model number. Simply a TV channel number indicating which UHF channel they were tuned to.

Fortunately for our ham ATV service, these filters do in fact tune down to the bottom end of our 70cm ham band. The photo to the right shows one of them opened up to show the excellent internal construction, complete with silver plating. It also shows the filters are a three pole design with three 1/4 wave resonator rods on adjustable lead screws with a long travel length. Large end caps are mounted on the tips of the rods. Wire coupling loops are used for the input / output and inter-stage. Slightly altering the shape of the inter-stage coupling loops allows us to tailor the -3dB band-width as desired during tune-up.



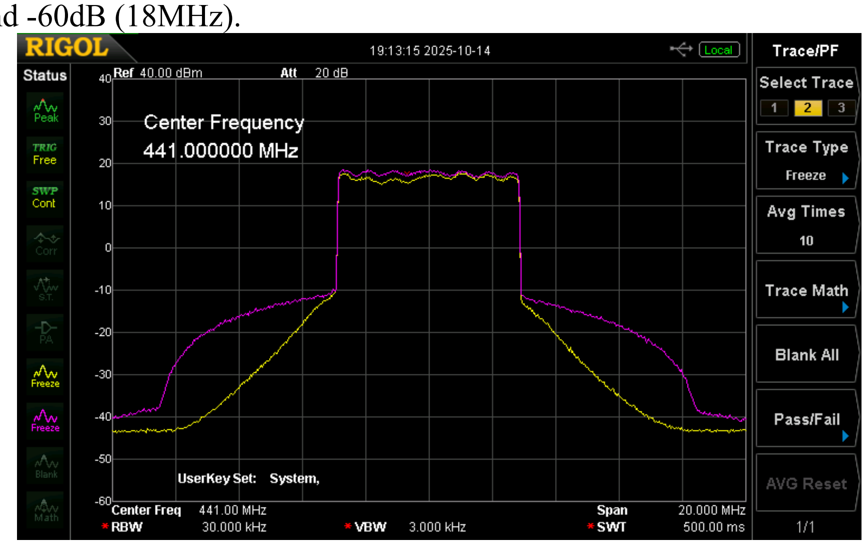
UHF-TV BPF-3P tuned to cable channel 57 -- plot shows S21 passband vs. frequency. center frequency set to 423 MHz. 10MHz span 1dB/div & 1MHz/div. -0.7dB insertion loss, 6.35MHz BW

The above photo shows the excellent, flat pass-band response of a filter tuned to Ch 57 (423MHz).



fo = 441MHz, 50MHz span, 10dB/div & 5MHz/div

This photo of S21 vs. frequency shows the stop-band performance of these filter. In this case, two filters were both tuned to Ch 60 (441MHz). Each filter had about -0.7dB insertion loss and 7.2 MHz, -3dB band-width. Their individual responses are shown in yellow and magenta. The blue trace shows the composite response with the filters connected in cascade. The pass-band insertion loss was -1.2dB with 7.2 MHz band-width. For a single filter, the other band-widths were: -10dB (10MHz), -20dB (14MHz) & -40dB (30MHz). For the two in cascade, they were: -10dB (9MHz), -20dB (10MHz), -40dB (13MHz) and -60dB (18MHz).



fo = 423MHz, 20MHz span, 10dB/div & 2MHz/div

This photo shows the typical use for these filters to clean up the out of channel, undesired spectrum created by amplifier non-linearities. The magenta trace is the DVB-T spectrum coming from a KH6HTV model 70-9B, 10 Watt, 70cm amplifier. The drive level was set to put the spectrum shoulder break-point at -30dB. The rf output was 10W, +40dBm average. Then a UHF-TV BPF-3P tuned to Ch 57 was attached to the amplifier's output. The resultant cleaner spectrum is shown by the yellow trace.

73 de Jim Andrews, KH6HTV, Boulder, Colorado

FEEDBACK -- AIRCRAFT SCATTER:

Thank you to Filippo, IZ5TEP, for this report in English. We here in Colorado have bounced signals off aircraft for some time. We have done so using SSB or CW at 10 GHz. We use DVB-T here and not DVB-S2. So it will be interesting to see if we can successfully bounce and receive DVB-T signals off of aircraft and at which frequencies. At 10 GHz the Doppler shift was about 15 KHz off jet aircraft. Will the Doppler shift at lower frequencies impede the DVB-T signal?

73 de Don, N0YE, Boulder, Colorado

Filippo's Reply: Hi, congratulations on your experiments. Yes, on SSB, the bounce off airplane fuselages is much easier.

On DVB-T, it's very difficult. The receiver is very selective; if the frequency is off by a few kHz, it won't work. I have a Batch knuker receiver, which records at 333 kHz on DVB-T. I can try it, it won't hurt, it's all fun.

Regards, IZ5TEP

Editor's Comment: *I have had a different experience with DVB-T frequency offset. I refer readers to my 2019 app. note, AN-50, "Is DVB-T Sideband Sensitive ?". While doing the sideband experiments, I also tested a DVB-T receiver for center frequency offset error and also phase noise. I ran my tests with 5.5 Mbps, 6 MHz BW signals. I found I could skew the center frequency up to ± 1/2 MHz without the receiver losing lock. But I also found that a very small amount of FMing or phase noise would destroy lock and the receiver would refuse to decode a DVB-T signal.*

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Upcoming SSTV events --- ARISS ANNOUNCES SSTV EVENT

The ARISS team is working towards two, short, SSTV activations for October 2025. Both of these are expected to start on a Friday and end on the following Monday. Both will be interrupted for a short (~60 minute?) period to accommodate a school contact.

The first is our traditional celebration of the launch of the first artificial Earth satellite in 1957. SSTV activation is tentatively scheduled for sometime on Friday October 3 and to end on Monday October 6th. SSTV would be paused for a short time (~60 minutes?) on Saturday October 4th for a special student voice contact.

The second SSTV campaign is tentatively scheduled to start on Friday October 17, pause (for ~60 minutes?) for a special student contact on Saturday the 18th, and resume until completion on Monday October 20. This interval roughly coincides with the International Scouting Jamboree on the Air (JOTA) and the SSTV image theme is expected to deal with Scouting.

ARISS expects to offer separate electronic award diplomas for participants who receive at least one image from a campaign and submit it to the SSTV gallery.

Tnx to Dave, AH2AR, DARA, Dayton, Ohio

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Late Breaking Good News !
Our 70 cm Repeater
Receiver is free from RFI

To: BATVC ATV Hams ---- I have potentially some really good news to share with you about our ATV Repeater at NCAR. 70cm Receiver is Free from RFI ! It is no longer blind. Let's really hope this situation lasts a long time.

This afternoon (Tues, 10/14), I set up to run a controlled experiment putting a known signal level into the repeater on it's 70cm input of 441 MHz.

For all afternoon, I have been putting a very weak -86dBm signal into the 70cm receiver and not getting any RFI, with either total blocking , nor any freeze frames. I am running aggressive digital parameters with 720P, 3.5Mbps, 1/2 FEC. The repeater's on screen display is showing a consistant S/N of 6dB. The S meter reading is -72dBm. The 70cm correction factor is -14dB. Thus the real rf signal into the receiver is -86dBm

P.S. I also ran a ***Radio Mobile*** rf propagation experiment. I am putting out a signal from my home qth with the 10 Watt transmitter to a 6 element yagi antenna. Knowing all the various system parameters of both my home qth station and also the NCAR repeater, ***Radio Mobile*** computer program predicted the received signal strength at the repeater's receiver would be -53dBm. Per the repeater's S meter, when running 10 Watts (40dBm) I was hitting it with -50dBm. Only a 3dB difference.

For the repeater sensitivity test, I have a step attenuator in line to drop the rf drive power to the final amplifier. I thus have a 35 dB margin for hitting the repeater on 70cm band.

Let's keep our fingers crossed and hope the RFI never, ever returns ! ! !

73 de Jim Andrews, KH6HTV, W0BTV trustee, Boulder, Colorado

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/

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