Boulder Amateur Television Club
TV Repeater's REPEATER

October, 2021
issue #89

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

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CQ-DATV 100 - Final - October 2021

After 100 issues, Ian G8IQU, Trevor, G8CJS, & Terry, V5TM are calling it quits with their fine, free, on-line only magazine dedicated to amateur television.

I have full sympathy for the "burnout" factor. In the past I was the editor of club newsletters for a couple of ham clubs. When readers fail to provide material, it becomes increasing harder to put out a quality publication month after month.

Our TV Repeater's Repeater newsletter has become somewhat of the national USA ATV newsletter. With the demise of CQ-DATV, we hope to be able to fill their void and cover ATV news world-wide. To do that we solict news, articles and photos from you our readers.

ATV on ARRL Podcast:

After the recent article on ATV & microwaves in the October issue of QST, we were contacted by Steve Ford, WB8IMY, former QST editor. Steve invited us to be featured on an upcoming ARRL Eclectic Tech podcast. Every two weeks the Eclectic Tech podcast brings you news, interviews, and commentary about technology and science -- all with an amateur radio twist. Steve's interviews typically last 15 to 20 minutes. The ATV podcast is scheduled to air on

October 21st. To find out more about these podcasts and listen to earlier archived ones, go to: http://www.arrl.org/eclectic

NextGen ATSC 3.0 & Ham ATV:

As a broadcasting and consumer electronics consultant, I've been actively involved in the development and rollout of digital television since its inception. I'm now helping broadcasters to transition to the NextGen TV system that incorporates the revised ATSC 3.0 standard. Like DVB-T, this system uses COFDM modulation, but goes further, supporting reception at C/N ratios less than 0 dB! ATSC 3.0 can outperform DVB-T, given the selection of modulation constellation and code rate. See, for example, ITU-R BT.1877-3 https://www.itu.int/rec/R-REC-BT.1877-3-202012-I and RF Wireless World Tutorial: DVB T2 vs ATSC 3.0 https://www.rfwireless-world.com/Tutorials/difference-between-DVB-T2-and-ATSC-3.html ATSC 3.0 C/N ranges from -6.2 dB to +32 dB, while DVB C/N ranges from 1 dB to 22 dB. That's an available 7.2 dB advantage.

I would be very interested to get an amateur ATSC 3.0 station up and running. Yes, there will be costs involved for both 3.0 modulators and receivers. Receivers are already affordable. A 43", 4K, ATSC 3.0 UHDTV is available for $599, which is less than half the price of the very-popular ICOM-7300, street price $1,299. An ATSC 3.0 Gateway/STB is available for $99. I just bought a 50" ATSC 3.0 TV at a very reasonable price.

At this time, encoding equipment is expensive, but so were ATSC 1.0 and DVB equipment at their inception. I am active in the ATSC committees and have many colleagues - some of whom are hams - and there are probably industrial partners that could be tapped to loan equipment for a proof-of-concept. Cost reduction could then be an ongoin g project.

73 Aldo, W2AGC, Long Valley, NJ

MPEG-2 vs. H.264 Issues:

In a recent conversation with Mike, WA6SVT, of ATN - California, he mentioned some difficulties they were encountering trying to receive DVB-T signals of both MPEG-2 and H.264 encoding. So, I have done some bench tests to check out the compatibility, or lack thereof, of some modulators and receivers for changes in various digital parameters. The conclusions are of importance for folks considering setting up a DVB-T repeater in their area and wanting compatibility among users. They may dictate what equipment you and your fellow hams purchase, or avoid.

I set up an experiment using both a Hi-Des model HV-100EH and an HV-320E DVB-T modulator. Using the AV-Sender pc program, I was able to modify many of their media configuraton and transmission configuration parameters. I used them to test two totally different types of DVB-T receivers. One was a H-Des model HV-120A. The other was a consumer grade, set-top box made by GT-Media. Their model V7 Plus. Note, the consumer grade receivers will only receive 6, 7 or 8 MHz bandwidths, while the Hi-Des receivers are also capable of receiving narrower bandwidths.

Video Encoding: The Hi-Des models HV-100 & 102 modulators allow the user to select either MPEG-2 or H.264 encoding. The Hi-Des models HV-310 & 320 only do H.264 encoding. The Thor model H-HDMI-RF-PETIT, used by the San Diego ATV group was discussed in the previous newsletter, issue #88. It is specified that it only uses MPEG-2 encoding.

For my experiments, using the HV-100 modulator to switch between MPEG-2 and H.264 encoding, I found that the Hi-Des receiver would only receive the encoding which it had originally been trained (scanned) to receive. In other words, if it was trained to receive H.264 originally, switching the input signal's encoding to MPEG, the receiver would lock up, and vice versa. I next tried the same test with the GT Media receiver. I got the opposite results. Even though it had orignally been trained (scanned) for H.264, switching to MPEG encoding, it still worked and received equally well either encoding.

PIDs: PID, or Program Identifiers can act like using sub-audible or PL tones for opening the squelch on your 2 meter FM receiver. The standard PIDs are: 640 for PMT, 641 for Video and 642 for Audio. I tried altering the PID values. I found they had no impact at all on the GT Media receiver. For the Hi-Des receiver, changing the video PID stopped completely reception. Changing the audio PID muted the audio, but the video continued working.

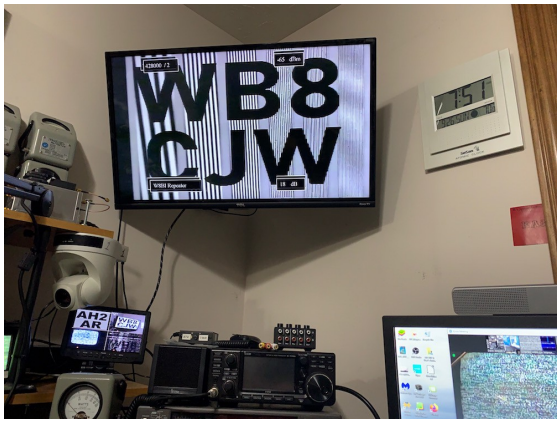
Other Parameters: I then proceeded to try making changes in many other parameters. In every case both receivers were able to automatically track the changes and continue receiving both the audio and video. The parameters I altered were: constellation (QPSK, 16QAM & 64QAM), FFT, code rate (FEC), guard interval, video resolution, video encoding rate, GOP length, and audio encoding,

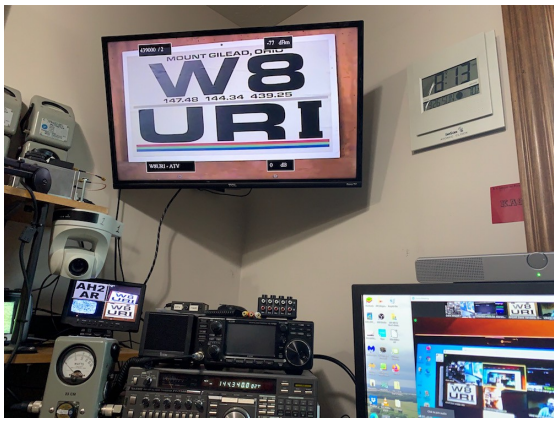
Jim, KH6HTV, Boulder, CO

MORE 70cm Band Openings:

Photos of another excellent Band Opening on Sunday morning, 26 September 2021. The photos below are some of the ATVers within the Midwest region that were successfully being repeated through the W8BI Dayton, Ohio ATV repeater this past Sunday. W8KHP (an A5 ATV transmission) in Hebron Kentucky and WB8CJW (a digital ATV transmission) in Powell Ohio are located approximately 60 miles from the repeater. W8URI (a digital ATV transmission), is located in Mt Giliad, approximately 80 miles from the W8BI ATV repeater. I was able to work into the ATCO repeater during this same session. Lastly, W8CWM continues to make ATV station improvements, as he is now DVB-T receive capable.

Dave, AH2AR, Dayton, Ohio





QST Feedback:

Jim --- Nice article in QST. It's good to see content from Colorado hams!
73, Jeff, K0RM, ARRL Rocky Mtn. Division Director

Great article on DATV! ---- One technical point in the QST article: the concept "RMS power" (or "average RMS power") has no useful meaning in physics or engineering, notwithstanding its continued erroneous use by audio and other equipment manufacturers. The only valid measures of transmitter output power are average, peak, and PEP. For a full explanation of why this is true, please see my article: https://agcsystems.tv/rms-power-fallacy/
73 Aldo, W2AGC, Long Valley, NJ

RMS POWER - a Misnomer:

My apologies for using the term RMS power when discussing digital TV signals when I should have instead used the term Average power. Several hams have caught this error and called it to my attention. RMS should only be applied to voltage or current when considering the heating effect of such voltage or current. The resultant "AVERAGE" power is then determined by: $P(avg) = V(rms)^2 / R$ -- or -- $P^*(avg) = I(rms)^2 * R$

My rationale for using RMS was trying to call attention to the fact that the digital signal in the time domain looks like random noise with peaks and valleys and no distinct features. I suspect that I was initially mislead by two things. First was the DTV bible, the book "Digital Video and Audio Broadcasting Technology", by Rhode & Schwarz TV engineer, W. Fisher. In his chapter on measuring DVB-T signals using a spectrum analyzer, he says to use the RMS detector. Then the labeling on my Rigol spectrum analyzer says it has a selection of various detectors including Peak, Voltage Average, and RMS Average. The RMS average reads out in dBm. So I was using the term RMS average power, but should have instead simply used average power.

Aside from my using the wrong term, the measurement of the power in a digital TV signal is no simple matter because of it's noise like nature. Depending upon the test instrument used, it is prone to many different types of errors. Perhaps the best article on the subject I have found is an on-line paper, "RF Power to the People: Measuring DTV Signals" by Charles W. Rhodes, August 16, 2005
https://www.tvtechnology.com/opinions/rf-power-to-the-people-measuring-dtv-signals

Jim, KH6HTV, Boulder, CO

E-Bay 10 GHz Down-Converter: Bob, WB0NRV, has called our attention to a low cost, 10 GHz receiving down-converter available on E-Bay.com A fella in the Ukranine is now offering a line of products for hams including VHF/UHF transverters and this 10 GHz down-converter. The item on the left is a modified 10 GHz LNB with 0.1dB NF. The modification he does is to replace the 25MHz reference crystal with a high stability TCXO. He sells the LNB for $32 + $10 shipping. The item on the left is the companion IF to be used with the LNB. For a 10.368 GHz input to the LNB, two IFs result of 618 MHz and 145 MHz. The price for this is $45 + $10 shipping. He also sells the same box, but for the QO-100 amateur satellite with IF outputs of 739 & 144 MHz for same price. Note: QO-100 is a stationary satellite parked over Europe and Asia. It's footprint does not cover the Americas.

British Amateur Television Club

U.K. Amateur TV Convention: Following the very successful CAT21 Part 1, when 50 ATVers met at the Coventry Air Museum, CAT21 Part 2 online event will be held on Saturday 16 October.

CAT21 Part 2 will be a day of online talks using the very successful format that we used in 2020 which had an audience of nearly 500 ATVers from around the world.

The convention will be available as a Zoom webinar for BATC members enabling live Q+A. The whole day will also be streamed live on the BATC streamer at https://batc.org.uk/live/cat21 - this does not require registration and all the sessions will be available on the BATC Youtube channel after the event.https://www.youtube.com/c/BATCOnline

The convention program is as follows: (note: times listed are U.K. times)
9:30 - Welcome - G8GKQ
9:45 - Portsdown update - G8GKQ
10:45 - Coffee
11:00 - Ryde update - Tim MW0RUD
12:00 - QO100 desktop development - Micheal EA7KIR
12:45 - Lunch - Interactive Q+A session
13:30 - EMF for microwaves and QO100 - Ian GM3SEK - organised jointly with the UK MIcrowave group offering theory and practical advice
15:00 - Coffee
15:15 - DATV Rx system gain distribution - G8GTZ
16:00 - Close

The EMF talk is particularly relevant as UK stations must have Electromagnetic Field (EMF) assessments in place for operation above 110MHz from 18th November 2021.

The RSGB has been developing a tool that incorporates the Ofcom EMF Calculator but extends the models to include single and multiple Yagis plus various sizes of dish antennas, and takes account of the directivity of the antenna. Ian GM3SEK, a key member of the team that developed the spreadsheet tool, will be talking about its application to Microwaves and QO100 narrow and band and DATV operation.

For more details and the latest updates about CAT21 please see the members forum on the BATC website.

W0BTV Details: **Inputs:** 439.25MHz, analog NTSC, VUSB-TV; 441MHz/6MHz BW, DVB-T & 1243MHz/6MHz BW, DVB-T
Outputs: Channel 57 --- 423MHz/6MHz BW, DVB-T, or optional 421.25MHz, analog VUSB-TV. Also, secondary transmitter, 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 450. 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

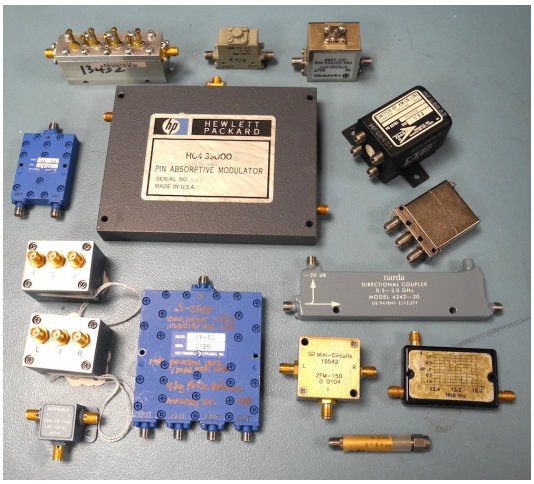
Free advertising space is offered here to ATV hams, ham clubs or ARES groups. List here amateur radio & TV gear **For Sale - or - Want to Buy.**

FREE MICROWAVE GEAR: Have you thought about getting into microwave amateur radio ? Would you like some microwave gear to get you started ? If so, then we have an offer you can't afford to ignore. A local Boulder microwave ham has donated a whole lot of microwave goodies to be distributed FREE to any hams interested in microwaves. The equipment includes lots of SMA microwave components, plus waveguide components in the following sizes: WR-62, WR-75, WR-90, WR-112, WR-137, WR-159, WR-187, & WR-229. WR-229 is for 3.3 - 4.9GHz, while WR-62 is for 12.4 - 18GHz. Also included is some wired equipment, such as Frequency-West brick local oscillators, amplifiers, down-converters, etc. Complete inventory lists have been prepared to itemize all of the multitude of equipment available.

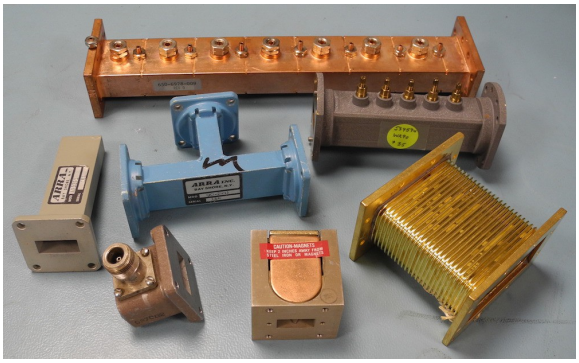
Note: This equipment was previously offered in our September ATV newsletter, issue #86, only to local Boulder area hams. Some of it has now been given away locally. We are now opening up this offer to all USA hams. You will be required to reimburse us for our shipping costs. We will ship via USPS priority mail in flat rate, fixed price

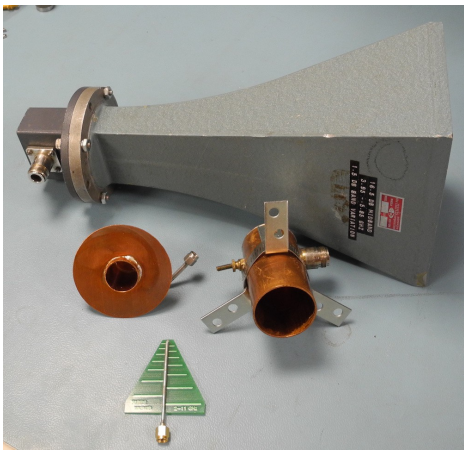
cartons. We are also requesting that a donation be made to the Boulder Amateur Radio Club's scholarship fund. 10% of the street value of the items received is suggested.

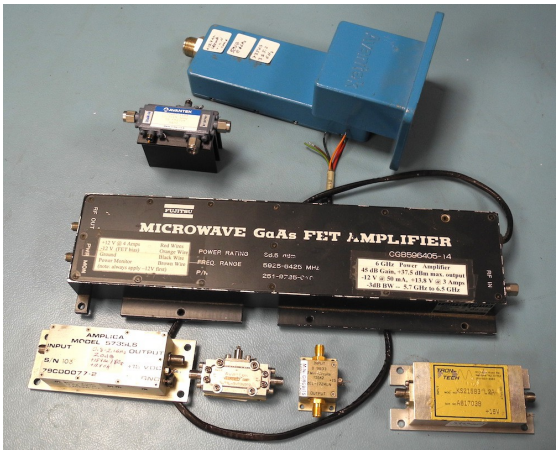
If interested, contact Jim at kh6htv@arrl.net. Jim will then e-mail you copies of the current inventory lists. First come - First served. So don't delay.



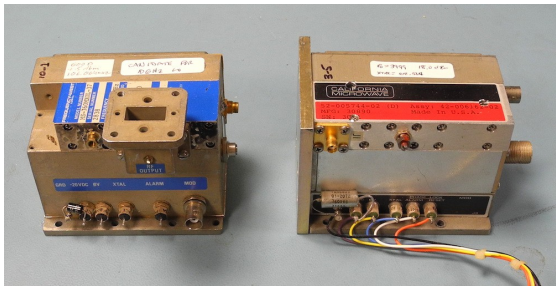
SMA microwave parts: all types


Waveguide Components: 3 to 47 GHz


Microwave Antennas



Amplifiers: 1 to 18GHz


Microwave Local Oscillators: 1 - 18 GHz

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SLATS

ST. LOUIS AMATEUR TELEVISION SOCIETY

Buy - Sell - Trade - Giveaway

(web site: http://www.slatsatn.net/?page_id=713)
Check it out. New items listed every week

WWW.SLATSATN.NET

Items like: IC-451A, Rohn House Bracket, Remote Antenna Tuner, Antenna Bridge, Hi Freq Probe, ATV ID-Maker, 23cm Trnsvrtr, TS-700, and MORE!