

Boulder Amateur Television Club TV Repeater's REPEATER

January, 2020

2ed edition

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



Future Newsletters: If you have contributions for future newsletters, please send them to me. We love to also include news from other ATV groups.

Jim Andrews, KH6HTV, email = kh6htv@arrl.net

EDITOR's APOLOGY: The last newsletter (#30) had some issues. For some people, they were unable to download it because it's size was too large. Some others virus filters found some nasties in it. Guess this is part of my editorial learning curve with electronic documents. The file size issue was due to my being careless and simply reusing .jpg photos without checking their file size. Simply resizing the photos in the last issue, I was able to drop the .pdf file size from 18Mb down to 1.5Mb. For the virus issue, that one is certainly a bigger worry as to what caused it. I worked with Cary, KX0R, on the issue and we found that eliminating the hyperlinks took care of the issue. A clean version of newsletter #30 is now posted on my web site. In the future, I will discontinue grabbing images directly from the internet and second, I will discontinue putting any hyper-links in the text. Hopefully, this will lead to "safer sex" on the keyboard.

Heads Up ! -- W0BTV - ATV Repeater Modifications Soon --- Our ATV repeater will soon be off the air temporarily. It will be removed from the repeater site for modifications in my ham shack (KH6HTV).

1. The most important will be replacing the 23cm Band-Pass Filter. We have been bothered by RFI from the powerful 23cm radar at DIA. From it's high elevation on the mesa south-west of Boulder, the ATV repeater has a direct, line-of-sight, view out to DIA and it's radar. Dan, WB0AIA, has designed a new, improved BPF for us. The new filter will have a much narrower pass-band and additional rejection of the offending FAA radar at DIA. Dan is our local, resident filter expert. For a more complete write-up about Dan, see the Dec. 2018 (#6) issue of this newsletter - pages 11-14. Check out his web site at: <https://www.dgsboulder.com/> Mark, N0IO, in Grand Junction, Colorado, is fabricating the custom filter for us.

2. The 23cm FM-TV receiver will be removed from the ATV repeater. This is a compromise to allow us to reduce the band-width of the new 23cm BPF and steepen the

skirts to help in rejection of the radar signal. Plus, noone was using the FM-TV mode with essentially everyone transisitonng to DVB-T.

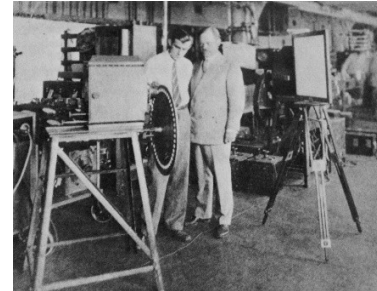
3. We will also be adding a new transmitter to the repeater. This one will be in the microwave, 5 cm band. It will be an analog transmitter, transmitting NTSC (480i) video using FM modulation with a 6.5 MHz sound sub-carrier. Current plans are for the transmitter to be on 5.905 GHz with 2 Watts (+33dBm) of power.

It is anticipated that the ATV repeater will be out of service for about two weeks. In the meantime, I (KH6HTV) will set up a temporary ATV repeater at my own QTH for the weekly ATV nets. More details on these enhancements will follow in future newsletters.

Early Development of Television

Roger Salaman, K0IHX

The invention of television evolved by invention of its components from the latter 1800's to the Federal Communications final official standards for the industry in 1941. In 1926, Dr. E. F. W. Alexanderson of General Electric Company of Schenectady, New York experimented with revolving mirrors to project a television image of motion pictures on a screen. The next year, Dr. Alexanderson used a scanning disc which revolved at 20 revolutions per second. The first regularly scheduled television service in the United States began on July 2, 1928, fifteen months before television in the United Kingdom. The Federal Radio Commission authorized C.F. Jenkins to broadcast from experimental station W3XK in Wheaton Maryland, a suburb of Washington, D.C. For at least the first eighteen months, 48-line silhouette images from motion picture film were broadcast, although beginning in the summer of 1929 he occasionally broadcast in halftones. WRGB claims to be the world's oldest TV station, tracing its roots to an experimental station founded on January 13, 1928, broadcasting from the General Electric factory in Schenectady, New York under the call letters W2XB. It was popularly known as "WGY Television" after its sister radio station. Later in 1928, General Electric started a second facility, this one in New York City, which had the call letters W2XBA and which today is known as WNBC. The two stations were experimental in nature and had no regular programming, as receivers were operated by engineers within the company. The image of a Felix the Cat doll rotating on a turntable was broadcast for 2 hours every day for several years as new technology was being tested by the engineers.



The FCC adopted [NTSC](#) television engineering standards on May 2, 1941, calling for 525 lines of vertical resolution, 30 frames per second with interlaced scanning, 60 fields per second, and sound carried by FM. Sets sold since 1939 that were built for slightly lower resolution could still be adjusted to receive the new standard. The FCC saw television ready for commercial licensing, and the first such licenses were issued to NBC-

and CBS-owned stations in New York on July 1, 1941, followed by Philco's station WPTZ in Philadelphia.

The effect of World War II in 1942 significantly affected the progression of television with induction into military service, and the need for greater production of war equipment. About 7,000–8,000 television sets were made in the U.S. before the War Production Board halted manufacture in April 1942, production resuming in August 1945. Television usage in the western world skyrocketed after WWII with the lifting of the manufacturing freeze, war-related technological advances, the decrease in television prices caused by mass production, increased leisure time, and additional disposable income. While only 0.5% of U.S. households had a television in 1946, 55.7% had one in 1954, and 90% by 1962.

After the U.S. entry into World War II, the FCC reduced the required minimum air time for commercial television stations from 15 hours per week to 4 hours. Most TV stations suspended broadcasting; of the ten original television stations only six continued through the war. On the few that remained, programs included entertainment such as boxing and plays, events at Madison Square Garden, and illustrated war news as well as training for air raid wardens and first aid providers. In 1942, there were 5,000 sets in operation, but production of new TVs, radios, and other broadcasting equipment for civilian purposes was suspended from April 1942 to August 1945.

Following the rapid rise of interest in television after the war, the Federal Communications Commission was flooded with applications for television station licenses. With more applications than available television channels, the FCC ordered a freeze on processing station applications in 1948 that remained in effect until April 14, 1952.

Roger & Roy Salaman - Early TV Pioneers in Connecticut

In 1946, New York television stations were on the air only three days a week. In that year, Roger and his brother Roy Jr. interest expanded from photography to television. To earn enough money to buy a television kit, they took pictures of houses around the neighborhood and sold 8 by 10-inch framed prints to the home owner for one dollar. They also sold pictures of the holes at New Haven Country Club, where their family were members. In addition, Roy Jr. and Roger worked with Lefebvre's drug store in Wauwatosa, developing and printing film for customers.



From 1946 to 1950, Roy Jr. and Roger built, sold and installed television sets, and became the New England distributor for Transvision Television Kits. Transvision was formed in 1945 and remained until at least 1963. So that they could sell television sets

around New Haven, Roger designed, built, and installed guyed rooftop antennas to receive the distant television signals from New York. Roy and Roger also repaired older, 1930's model, television sets, and converted them to receive the channel 3 when the FCC eliminated channel 1 because of interference with other radio services.



12" KIT (Table Model)

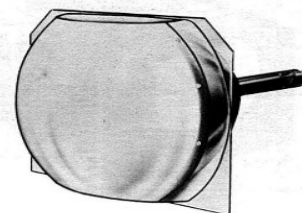
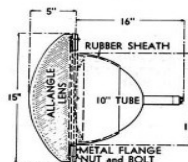


Model 10BL Television Kit
with lens built into cabinet

TELEVISION KITS		
7" Std (5 channels)*	\$169.00	
10" Conversion Kit (converts any electro. 7" set to 10")	69.00	
10" Standard, Electrostatic	225.00	
10" with FM, Electromagnetic	266.95	
7BL Kit	NET 189.00	
10BL Kit	LIST 359.00	
12BL Kit	LIST 389.00	
12" Std (with FM)**	296.95	
12" Deluxe***	359.50	
15" Std (with FM)**	372.95	
15" Deluxe***	429.00	
* Television sight and sound only		
** Television plus FM Radio, 88-108 MC		
*** With Inductuner — 13 TV channels plus FM radio; continuous tuning 50-216 MC		
TELEVISION CABINETS & TABLES		
7" Table Model—Std or Del.	32.50	
10" Table Model—Std or Del.	35.00	
12" Table Model—Std or Del.	44.95	
12" Console—Std or Del.	95.00	
7BL Cabinet	44.95	
10BL Cabinet	99.50	
12BL Cabinet (same as 10BL)	99.50	
15" Table Model—Std or Del.	59.00	
15" Console—Std or Del.	105.00	
Table for TV sets (wal.)	19.95	
(This table fits any 7"-10"-12"-15" sets.)		
TELEVISION PICTURE TUBES		
7EP4—Electrostatic 7" picture tube—ea.		23.25
10HP4—Electrostatic 10" picture tube—ea.		65.00
10BP4—Magnetic Deflection 10" picture tube — ea.		49.50
12JP4—Magnetic Deflection 12" picture tube — ea.		69.75
15AP4—Magnetic Deflection 15" picture tube — ea.		129.50
PICTURE ENLARGING LENSES		
10" Lens (52 sq. in. pict.)		19.95
12" Lens (75 sq. in. pict.)		25.95
15" Lens (125 sq. in. pict.)		36.95
All lenses are provided with mounting brackets.		
Special lens frame to support 15" lens for mounting away from cabinet		
		8.95
7" AND 10" KIT BASIC PARTS		
Part No.	Description	List
	Coil Kit with Peaking Coils	\$15.35
16	Peaking Coil, 250 mh	.37
17	Peaking Coil, 125 mh	.37
19	Peaking Coil, 35 mh	.37
22	Filter choke, 30 ma	
	20 henries	1.95
23	Filter choke, 175 ma, 10 henries	4.05

TRANSVISION TELEVISION KITS

The 10-inch tube was the largest that could be manufactured at that time. Therefore, Transvision developed an oil filed lens that could be placed in front of the tube to enlarge the picture.



Roger's father, Roy Sr., was a cabinet maker by heart. Among other things, he built a TV and Hi-Fi cabinet to house the electronics that Roy Jr. and Roger built, and a headboard with bookcase and



shelves for the master bedroom. Their family dentist and friend, Dr. Fred Harold also enjoyed building. He built a TV and Hi-Fi cabinet for the TV set Roy Jr. and Roger built for him. This cabinet was unique because he housed the TV tube in a hair dryer so that it could be turned in any direction. Dr. Harold was President of the American Dental Association.

By 1947, when there were 40 million radios in the U.S., there were about 44,000 television sets (with probably 30,000 in the New York area). Regular network TV broadcasts began on [NBC](#) on a three-station network linking New York with the Capital District and Philadelphia in 1944; on the DuMont TV Network in 1946, and on CBS and ABS in 1948. Roger's mother, Bernie, wrote to the New Haven Register, asking them to publish the television schedule, and they responded that there was not enough demand for television. On June 25, 1948, our parents invited a full living room of friends over to watch the Joe Louis, Jersey Joe Walcott boxing match on two 10 inch black and white television sets that Roy Jr. and Roger built.

Roy Jr. and Roger Worked for New Haven Connecticut WNHC-TV

The New Haven Connecticut TV Station, WNHC-TV went on the air June 15, 1948 as channel 6, 6 days after WBZ-TV in Boston, thus just missing being the first operational



television station in New England. WNHC was the first TV service for Hartford, Springfield, the Hamptons and Eastern Long Island. In 1946, Roger had built multiple element antenna and mounted them on home roofs so long-distance reception of television signals from New York city was possible. WNHC-TV moved to Channel 8 on January 1, 1954. The call letters then became WTNH in 1971. WNHC, with transmitter located on Gaylord Mountain, 8 miles from New Haven, was the first station to bring network TV to Connecticut. WNHC was the first DuMont affiliate. In the 1946, DuMont began operation as America's fourth television network, with headquarters and television station, WABD in New York City. Hindered by a lack of primary stations and a small budget, and by being forced to utilize UHF affiliates in an era when UHF was not competitive, DuMont never achieved the success of the other networks, and folded its television network in 1956.

On its first day of operation, June 15, 1948, WNHC and ran shows like Bishop Fulton Sheen's Life is Worth Living. The 1948 Democratic and Republican national conventions, at which Harry Truman and Thomas Dewey were nominated respectfully, were also broadcast live. At this early stage of television, newscaster, Ben Grawer, provided a real-time view of the transmitter and antenna on the Empire State Building. Television was very informal, and the newscasters did not wear coats.

In 1948, Roger and his brother, Roy Jr. visited the WNHC-TV transmitter after reading in the New Haven Register about the Elm City Broadcasting Company building of the television station for New Haven. Roy and Roger talked to the chief engineer, Mr. deLaurentis, who said Roy, who was 18 years old, could work as a TV cameraman in the studio, and Roger, who was 16 years old, and a Freshman at New Haven High School, was given the job to run the relay station on Oxford Hill, Connecticut. Since Roger didn't have a First-Class Radio Telephone License, Mr. deLaurentis said he should obtain a Third-Class Radio Telephone License and tell anyone that he was supervised by a First-Class Licensee, Mr. deLorentis.

Roger Operated the Television Relay Station. At the relay station, besides switching to the correct network signal on the hour or half-hour, Roger needed to maintain a quality signal for transmission to the TV transmitter on Gaylord Mountain. For pickup of the off-the-air signals, Roger had to switch the television signal to the correct channel and tune the RF section of the receiver for the best quality signal according the video signal on an oscilloscope. Therefore, during the 30 second station break, he fine-tuned the RF signal for best quality, and adjusted the synchronization signal to meet the FCC standard. More times than not, he finished making these adjustments while WNHC-TV was on the air carrying the appropriate television signal for public viewing.

The Oxford Hill Relay station was half-way between New York, where the programs originated, and the WNHC-TV transmitter in New Haven, Connecticut. The relay station had a Microwave transmitter at the bottom of a wooden pole, with a parabola pointed straight up to a reflector which allowed the microwave signal to be beamed to the microwave parabola receiving antenna on a tower at the Gaylord Mountain transmitter station.

The New York signals from WABD, CBS, and NBC were received on a yagi antenna mounted at the top of the wooden pole. Later Roger built and installed a sloping-V antenna to improve the TV reception. The signal was fed inside the relay station to a fixed frequency crystal receiver tuned to receive the WABD signal on Channel 5. The signal from the antenna was also fed to an RCA 630 television set to receive the signals from CBS and NBC on Channels 2 and 4.

Roger's job was to assure the relay station operated correctly to receive the WABD, WCBS and WNBC signals, convert the correct signal, according to the schedule of which station was to be carried by WNHC-TV at that particular time, to microwave, and beam it to the WNHC-TV transmitter on Gaylord Mountain. The WNHC-TV transmitter personnel and Roger established communications by normal telephone calls. There were other externalities associated with this job. Hurricanes Edna, Carol and Hazel pounded New England in the 1950's and knocked the relay station as well as the New Haven television station WNHC-TV off the air. To get the Oxford Hill relay station on the air as soon as possible, Roger drove around debris-littered roads, and activated an emergency power generator at the relay station. Roger put the relay station on the air, providing the New Haven area with information concerning the hurricane

Besides its early affiliation with WABD, WNHC-TV was also affiliated with NBC in 1949, CBS by 1949 and ABC by 1950. Because of the concurrent affiliations, WNHC was able to cherry pick the best TV programs and present them to



Connecticut viewers. Roger selected the appropriate program when operating the WNHC-TV, New-York to New Haven television relay station in Oxford Connecticut, half way between New York and New Haven. WNHC-TV moved to Channel 8 on January 1, 1954. The call letters became WTNH in 1971.

REFERENCES:

1. History of Television: https://en.wikipedia.org/wiki/History_of_television
2. Transvision Television Kits: <http://www.earlytelevision.org/transvision.html>
3. "Early Involvement with Television", Roger Salaman, K0IHX, Amateur Television Quarterly, Winter, 2015, pp. 24-25

Roger, K0IHX, and Naomi, KD0PDZ, have been active in Boulder ATV since 2008. Roger has an interesting background. During the 1950s & 60s he did fundamental ionospheric radio research at NBS' Central Radio Propagation Lab here in Boulder. In the 70s & 80s he worked in the White House Office of Telecommunications Policy.

For more about Roger & Naomi, see the Sept. 2018, issue #3, ATV newsletter, pp. 3-4.

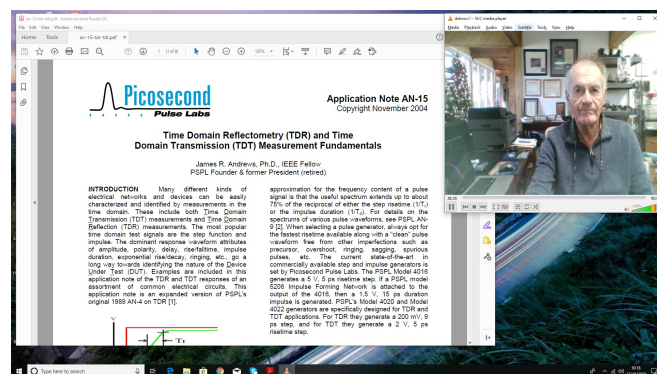


off the air photo taken via the TV repeater

Ham Shack ATV Video Techniques Suggestion

Jim, KH6HTV

Several times recently on our ATV net, hams have wanted to show items from their computer monitor screen, but also include audio commentary. They have often had to resort to using our 2 meter, 146.76MHz, inter-com link for their audio. I have a suggestion of what I have found to work around this problem. I use the built-in camera and microphone on my computer. First, I connect my computer's HDMI monitor output directly to my Hi-Des DVB-T modulator. I setup the computer so the



I use the built-in camera and microphone on my computer. First, I connect my computer's HDMI monitor output directly to my Hi-Des DVB-T modulator. I setup the computer so the

external monitor (i.e. the Hi-Des modulator) mirrors the computer monitor screen. I next turn on the computer program **VLC**. **VLC** is a very powerful media player program, plus it is FREE. (<https://www.videolan.org/vlc/index.html>) If you don't have it on your computer, you should definitely install it. It is available for Windows, Mac, Linux, Android, etc. Open up **VLC** and on the task bar, click on "Media". Select "Open Capture Device". Then for Video device name, select "Integrated Webcam" and Audio device name, select "Microphone". Then click "Play". You should now see displayed on your monitor your own image sitting in front of your computer. The next thing to do is to determine where you are going to route your audio. On a Windows computer, go to the loud speaker symbol in the lower right corner of your screen and click on it. This is where you select the destination for your audio and also set the output audio level. Select the "Hides-AVS". Now, go ahead and bring up whatever program material on your computer you wanted to show and talk about. See the above photo for an example.

W0BTV HISTORY W0BTV is the new club callsign for the Boulder Amateur TV Club. When researching available calls this past summer, we were surprised to find such a suitable call available. BTV = Boulder TeleVision. We figured that it must have recently become available again due to a silent key. On Christmas eve, I worked an old timer, Joe, W7ISJ, in Tuscon, AZ, on 80m AM phone. He said he remembered working in years past on AM phone, W0BTV. This kindled my interest, so I googled "W0BTV" and did get some "hits". I found that the earlier call 9BTV was held in 1922 by Alex Quirk in Livia, Kentucky. In 1923, it was held by Russell Anderson, in St. Paul, Minnesota. Russell's transmitter put out 5 watts into an inverted L at 48 ft. Even more details about Russell are found at <http://w0is.com/history/9BTV.html> , including a copy of his application to the Dept. of Commerce, Bureau of Navigation, Radio Service with a complete description of his amateur station, including a sketch of his antenna. There are also copies of some of his QSL cards on this site. The call 9BTV eventually was changed by the govt. to W9BTV, and then after WWII with the reorganization of call districts, became W0BTV. From the 1954 Call Book, our new call was then held by Claude Sweger right here in Colorado. He was listed as living in Yuma. The 1960 call book showed Claude to then be in McCook, Nebraska. W0IS says that Claude later relocated to Corpus Christi, Texas. With further research, I found that Claude graduated from the Lone Star high school in Yuma, Colorado in 1924. There were 12 in his class. Thus we are least keeping the call sign, W0BTV, at home again here in Colorado.



Claude - W0BTV



W8URI's DVB-T, 2 MHz BW - 439 MHz



NTSC, 439.25 MHz

70cm BAND OPENING -- On Saturday, Dec. 28th, at 7:30pm there was a 70cm band opening in Ohio for simplex ATV on a 90 mile path between Bill, W8URI in Mt. Giliad & Dave, AH2AR, in Vandalia, Ohio. Dave says "This actually happens frequently on A5 and a little less frequently on D2 since it requires at least a P3 A5 signal before we can work D2.

ATV in DARA Clubhouse

W8GUC finished the integration of the K0PFX ATV interface for the Dayton Amateur Radio Association today. Mel Whitten built the interface controller for the club last year. Instead of setting up the new W8BI ATV station in the DARA van, we decided to set the ATV station inside the clubhouse. It has not found a permanent location at the club



house yet, but that should happen in the next week. We are using a unique crossed dipole antenna inside the clubhouse and it works great. The photos below are actually showing the live transmission from the K0PFX interface, going thru the ATV repeater, and being received in my ham shack in Vandalia. W8GUC used the open frame bitcoin mining fixture that I acquired last year to house most of the gear needed for this project. It is the correct size (19 inches) to hold the three video monitors and to include the HiDes transmitter, receiver and power supply.

Cheers -- Dave, AH2AR

AB1OC in QST

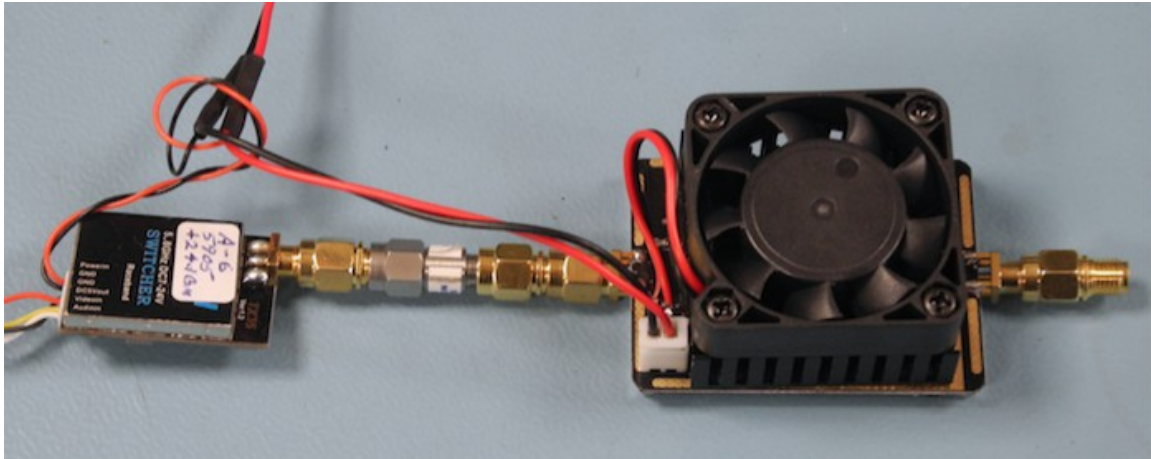
ATV ham, Fred, AB1OC, in New Hampshire had a very nice article in the January issue of **QST**. It was entitled "Nashua Area Radio Society Outreach to New Hams". It is found on pages 66-69. Fred is the president of the NARS which was selected as the 2019 Club of the Year at the Dayton Hamvention. Nice job Fred !

FEEDBACK

In response to the previous newsletter (#30), Mike, WA6SVT writes --- "Great Newsletter Jim, Thank you! -- BTW, some comments on the gadgets you talked about from China. --- The **5 watt amp** that lasts a few days. Th heat sink is

undersized even with the fan. Less drive and running at 2 watts will usually not burn out. --- **LO sources** for SSB, CW or DVB-T for 10 GHz. One of the members of San Bernardino Microwave Society has a modern LO that is stable, uses one supply voltage and small size. Has a clean spectrum too. You can program the frequency. I think they can be made for 5 GHz band too."

73, Mike, WA6SVT



5 GHz, FM-TV transmitter for W0BTV-ATV repeater.
1/4W, synthesized exciter (left - \$8), 6dB, SMA attenuator (center)
(most expensive item !) & 2 W amplifier (right - \$25)

Editors' Comments -- I have taken Mike's suggestion and backed off the rf drive power to another of the 5 GHz amplifiers and set it to run at 2 Watts (+33dBm) output in the ham shack at room temperature. I burned it in for several days in the shack with no failure. I then exposed it to temperature extremes. I put it in a box outside the ham shack in the cold, Colorado winter weather. I ran a cable back into the ham shack and monitored the rf output power. I let it run outdoors for about a week continuously. After a week, I then brought it back into the ham shack and ran more tests heating the amplifier up with Janet's hot air, hair dryer. No failures ! What I did observe was variations in rf output power vs. temperature. 2 Watts at room temperature. 2.75 Watts at 25 deg. F and 1.3 Watts at 120 deg. F. ---- Jim, KH6HTV

TO: BARC General Staff
FROM: Office of the BARC Field Marshal
SUBJ: A Call for Microphone-Wielding Arms:

Winter Field Day Operations, Jan. 25-26

BARC is entering a station in ARRL Winter Field Day, Jan. 25-26. The station will be set up in Dave Patton's KG0EW van. It formerly was used for mass media live remotes, so came equipped with the prodigious mast seen in the photo, and other amenities suited for our purpose. The plan is



to park it on Roger, K0IHX and Naomi, KD0PDZ Salaman's multi-acre QTH on Davidson Mesa, using a 20 m Hex Beam and a 40/80 dipole for lower frequencies. The van won't be as roomy as the operating tents we use for Summer Field Day, so we are looking solely for two person teams to operate the one station in four hour shifts. The VAN WILL BE HEATED throughout the operation, so you don't have to be a veteran of the 10th Mountain Division in order to participate.

PLEASE CONTACT ME (Mike - michael.stutzer@colorado.edu) if you are interested, so we can accommodate your availability. We will then schedule your operating period, as well as an occasion with Dave for you to familiarize yourselves with van/station operations. Exact directions to the Winter Field Day QTH will be sent in a later email.

Editor's Note: We will probably also be setting up a TV camera and TV transmitter in Dave's van to transmit the winter field day action to the BATVC ATV repeater. Thus other members can also participate remotely. The repeater's output will also be streamed live over the BATC server <https://batc.org.uk/live/>