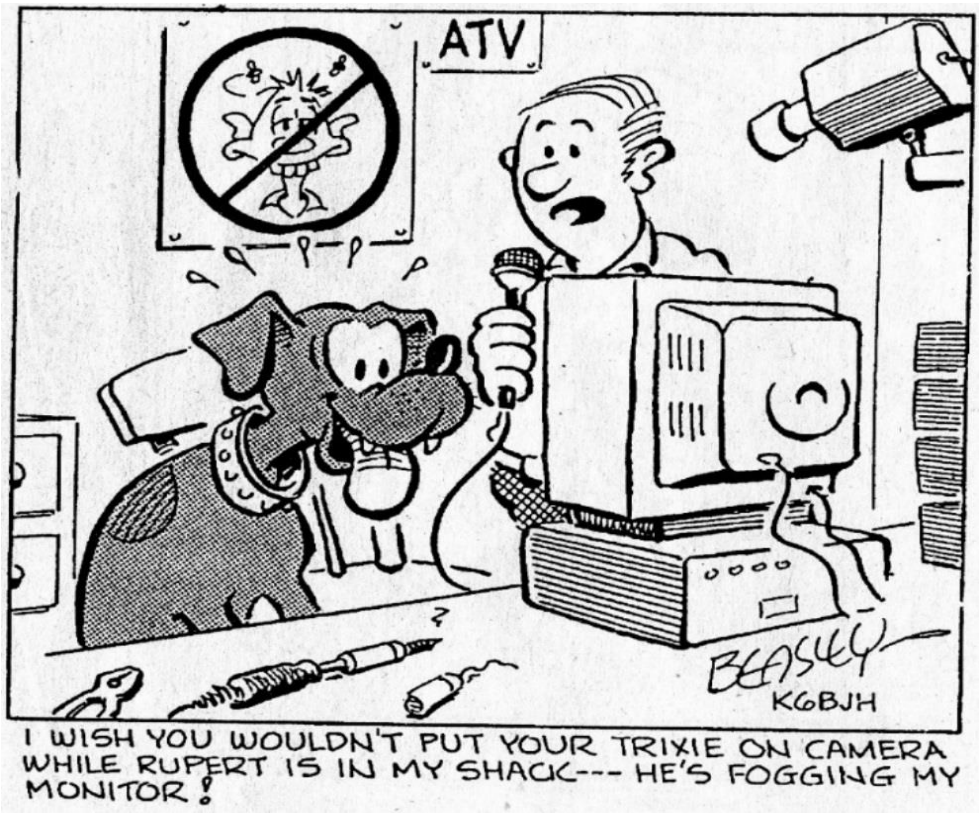
ATCO NEWSLETTER

VOLUME 36 NUMBER 1 **January 2019**

The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" published quarterly (January, April, July, and October)

ATCO SPOTLIGHT TOPIC

Thanks to Beasley, K6BJH (SK) for allowing us to share his cartoons. For the complete book on "The Best of Beasley" go to the ATVQ Magazine web site (http://atvquarterly.com/) available for purchase.



ACTIVITIES ... from my Workbench

Well, here I am again guys! Nothing new here except for the falling snow right now. Last week while the weather was in the 60's, I was asking where's the snow? Now…here it is. **I'VE REALLY GOT TO WATCH WHAT I WISH FOR! S**ince the snow is already on the ground, I might as well wish for a week of below zero weather. Don't complain! The low temperature kills a lot of the bugs that pester us in the summer. So, a short stretch of zero weather is really a **good** thing. That's it for the biology lesson.

The repeater 70 cm antennas are working OK now so I hope that's put to bed, so to speak. Other issues there I consider to be minor so all is well.

Ken reports the 10 GHz signal isn't heard at his place so that needs to be investigated. The problem is we don't know if it's at his end or at the repeater. Since I don't have any 10 GHz antenna in place now I can't report it either way. I removed it to make way for my MESH antenna. I guess I need to put together a portable receiver and take it with me on my next trip there. Note to self: add that to my existing list.

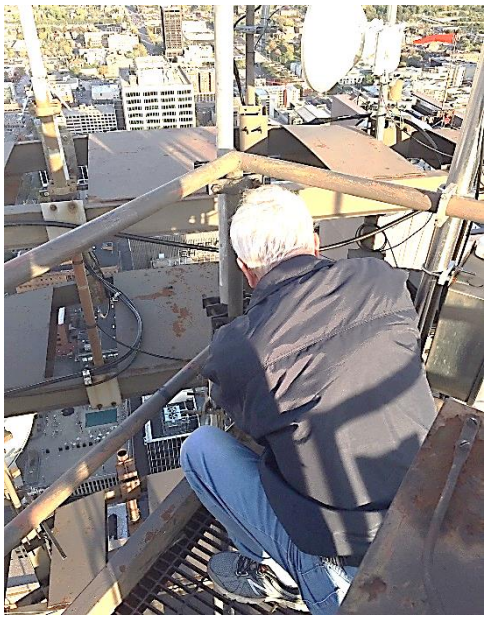
Sometime this winter I need to see what I can do to add a roof camera at the repeater in the Spring. I told the severe weather guys I'd look into adding it. They told me it is REALLY needed. They said that a few years ago but when I added it, nobody used it. Maybe it was just too complex to use or they didn't know it was there. In any case, I plan to add a high definition camera and control it with the MESH system. That will require adding computer control there. I hope it will be reliable for trips there every week are not on my list of preferred things to do. We'll see. I like the idea of using MESH for the camera control for that adds a practical function for MESH and leads the way to using a MESH link for repeater bulletin board control. That should make it easier for Dale who transmits new information from his QTH on 1288 MHz now.

Next on my list to think about is how we can revive the ATV activity around here. I've been thinking about it for a few years now and have not come up with an answer. Has ATV come to a point of diminishing activity and not far from declaring it DEAD? I hope not. We are not alone as ATV activity nationwide is on a downhill slope. I'm sure the smart phone social environment and just general computerized control of our actions makes it difficult to do creative thinking but if we let that happen, we become slaves of the automation environment to the point where we won't be able to think on our own. I grew up at a time where I got excited having two tin cans on a string for communication but today, the smart phone is dominating our lives to the point where individual creativity is rare. That's too bad. I digress, but think about it, our shift to digital communication has put the brakes on the ATV effort. It has become too difficult to create your own communications equipment and too expensive to go out and buy it. It doesn't have to be that way. It's easy to just sit back and let others do the work which is what many of us are now doing. We're basically all in "receive" mode so we sit back and let someone else do the thinking. We need to talk it up among others to get them interested in ATV. Let's get active again! Create some articles for me to publish describing how you are operating your station or ask what you'd like to see someone else do. I'm sure someone will pick up the ball and run with it. Let's see more innovative ways you use your camera. Can you use the Vmix free software program to create a superimposed background? I've not seen any of you do that. Let's see who will be the first!

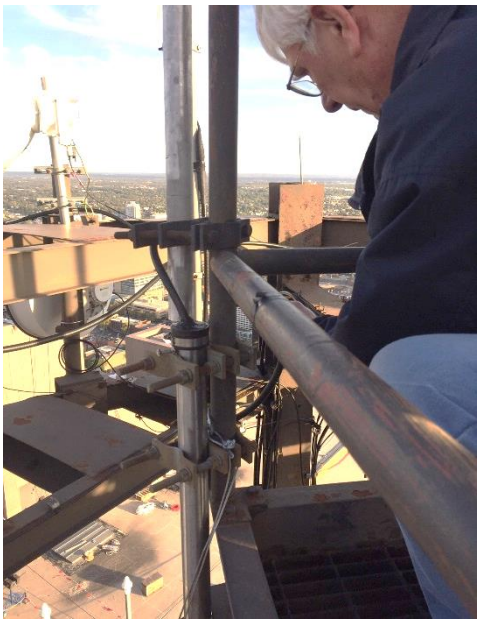
At the very least, join us on 147.48 on Tuesday night to discuss. Please don't sit back and let me do all of the talking for I'm getting to hate that. I know there are a number of you out there that tune in to listen but don't check in. **DON'T DO THAT!** That's the "receive mode syndrome" I was just talking about. Get active and say something even if it's only to say hi and good-by!
…WA8RMC

70CM REPEATER SLOT ANTENNA INSTALLATION!

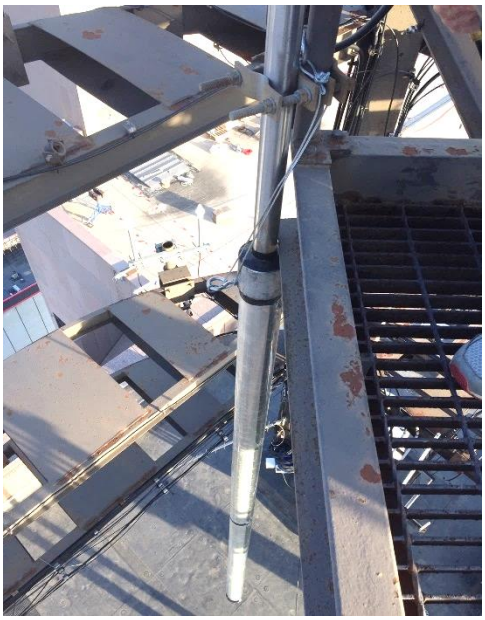
I reported on the 427 and 439 MHz antenna rework construction last Newsletter but here is my effort to install these antennas before the weather got too cold last Fall. It turned out to be the last day available with good weather. Not easy work but everything installed OK and the antennas now perform as expected. Notice that this work is not for those that don't like heights. It's 630 feet above the street below!!!



Here I'm tightening the clamp bolts holding the receive antenna below the access platform. The tower beacon light is behind me.



Work to secure and connect the 7/8" Heliax cables to the receive and transmit antennas.



Receive antenna is upside down and below the platform secured to framework. Transmit antenna is above it out of view.

Whew, work complete!!! To the left of my head is the bottom of the transmit antenna. Other unknown antennas are in the background. The white tube with the yellowish cap is a partial view of our 10 GHz Tx antenna.

Now to climb down before we get too much RF exposure from the 1KW 161 MHz NOAA weather radio antenna about 15 feet away. We are limited to about ½ hour exposure at a time. Everything works as expected now.
…WA8RMC

HAMVENTION 2019 IS COMING!

From ARRL Newsletter 11/1/18

NEWINGTON, CONNECTICUT – ARRL, the national association for Amateur Radio®, has announced that Hamvention® will host the 2019 ARRL National Convention in Xenia, Ohio, May 17-19, 2019. Hamvention is the largest annual Amateur Radio gathering in the US. Hamvention and the ARRL National Convention will share a joint theme, "Mentoring the Next Generation" of Amateur Radio operators.

As host of the 2019 ARRL National Convention, Hamvention will feature dozens of forums covering a variety of topics in Amateur Radio, such as technology, public service, on-air operating, training, and learning. A track of presentations will be organized to build on the convention theme, encouraging more individuals and radio clubs to serve mentoring roles, leading new and inexperienced radio amateurs to become more active, involved & engaged.

A special event Amateur Radio station, call sign W8BI, will be set up and operating from the fairgrounds—inviting attendees to join in for some on-air fun.

The National Convention will also feature ARRL EXPO—a large assembly of ARRL-sponsored exhibits, activities, and representatives for ARRL programs and services. Several ARRL-sponsored presentations and forums will be given. Information will be posted to www.arrl.org/expo as it becomes available.

2019 will be the third Hamvention to be held at the Greene County Fairgrounds and Expo Center in Xenia, Ohio since the event relocated from Dayton. At 28,417 visitors, Hamvention recorded its third-largest attendance ever in 2018. It attracts many international attendees.

Since 1952, Hamvention has been sponsored by the Dayton Amateur Radio Association® (DARA), an ARRL-affiliated radio club, and is supported by volunteers from radio clubs throughout the country. In past years, Hamvention has received regular sanctioning as the ARRL Great Lakes Division Convention. Hamvention® hosted the ARRL National Convention most recently in 2005 and 2009.

Hamvention features multiple buildings of indoor vendor exhibits, an outdoor flea market, and many food trucks and concession stands. There is free parking onsite and at nearby remote parking lots served by free shuttles.

The Hamvention website www.hamvention.org will include details for convention tickets and information about forums, exhibits (including information for vendors and flea market), travel, and preferred hotels with special rates. Convention tickets are $22 in advance; or $27 at the gate. Each ticket includes convention admission for all three days. Electric scooter rental information can be found at the Hamvention website. Onsite RV camping is managed by the Greene County Fairgrounds.

Ham radio operators are encouraged to bring family and friends, and extend their convention trip by visiting nearby popular attractions. The National Museum of the US Air Force, the oldest and largest military aviation museum in the world, is located at Wright-Patterson Air Force Base in Dayton, Ohio. The Dayton region also boasts many parks, museums, shopping, entertainment, and dining options.

All major airlines serve the minutes-away Dayton International Airport (DAY), and some travelers use the airports in Columbus and Cincinnati, Ohio, driving the final 60 to 90 minutes to Dayton/Xenia. Plan your trip to Hamvention at www.greenecountyohio.org and www.daytoncvb.com.

Interested parties will find complete details for the 2019 ARRL National Convention at www.arrl.org/expo (coming soon).

For information about ARRL and Amateur Radio, visit www.arrl.org and www.arrl.org/what-is-ham-radio.

INTEGRATE DIGITAL ATV INTO OLDER PC ATV TRANSCEIVERS

Definitions:
HV-110: DVB-T HiDes Receiver
HV-310E: DVB-T HiDes Transmitter
TC70-10*: PC Electronics discontinued 10 watt 70cm A5 transceiver. Contains a **TXA5-70B** exciter and **TVC-2G f** downconverter and an RF module Toshiba **S-AU4**
TC70-20s*: PC Electronics discontinued 20 Watt 70cm A5 transceiver. Contains a **TXA5-70S** 1996 exciter and **TVC-2G S1** downconverter and RF module **M57716**
PA5: PCB on the TC70 that contains the RF Module
DMTR-10: Relay and monitor board inside TC-70 transceiver
Tohtsu Coaxial Relay CX-120a : Available from Henry Radio, E-bay, required for switching A5/D2 exciters

*Note: PC Electronics Internal PCBs and RF Module versions may vary, depending upon date of manufacture.

Re-purposed A5 transceiver transmitting DVB-T ATV

THE IDEA
With the advent of stand-alone HiDes DVB-T ATV receivers and transmitters such as the HV-110 and HV-310E, adding digital ATV (D2) receive and transmit capabilities at the operating position is now possible, but integrating this new equipment into the ham shack can get somewhat involved. T/R switching and amplifier integration require additional equipment and planning since the T/R feature and proper cabling and RF power levels must be accounted for to provide a workable and practical transmit and receive station. Recognizing this potential dilemma, Mel Whitten, K0PFX had showcased his solution for integrating HV-110s and HV-310s into a very functional solution and has gone so far as providing plans and parts lists to anyone one who was interested in taking on such a project. Other amateurs, such as myself, have resorted to kluging together, in “Rube Goldberg” fashion, switches, cabling and relays that are functional but may not be easily relocated or changed without having to resort to complicated disassembly and reassembly work. Since I live in the Midwest, ATV activities still include analog (A5) ATV on 70cm as this mode is still extensively used for ATV DX contacts in this region of the country. Consequently, A5 and D2 activities in the Midwest are interspersed and this further complicates the ATV station layout. Chaotic placement of cabling for power supplies, amplifiers and video sources result in a tangle of wiring.

While assisting a local long-time A5 ham (KE8QR) to suggest options for how he could integrate his newly acquired HV-110 and HV-310, I pursued an alternate solution to help eliminate the conundrum of wiring, relays, switches and working RF power levels encountered when jumping into the digital mode from A5. As all of the ATVers in the local area have PC Electronics TC-70's, I thought that it may be possible to integrate this older ATV transceiver as a “host” to help eliminate redundant cabling and amplifiers when operating A5 or D2. In keeping all of the functionality of the PC Electronics TC-70 intact, provision of a “Mode” switch and a relay could allow amateurs to simply throw a SPDT switch to change ATV modes on the fly. This sounded like an elegant solution worth pursuing.

Pictured are two TC70 Versions, TC70-10 and TC70-20s

REQUIRED FEATURES

Any modification of the host PC Electronics TC-70 must be simple and practical. The goal of this project had to include these features:

- Not counting the TC70 and HV-110/HV-310E, keep the parts count to a minimum (9 parts total) Includes the following: 2 bulkhead SMA connectors, 1 SPDT switch, 1 1N4001 Diode, 1 Tohtsu CX-120a coaxial relay, 1 chassis-mount DC power barrel connector, 3 miniature RF cabling runs with SMA connectors.

- All TC-70 A5 functionality must be left intact. Additions or modifications must not degrade or disrupt the normal workings of the TC-70 transceiver. The HV-110 and HV-310 can also be removed easily with no host transceiver A5 functionality lost.

- No modifications must be made to either the HV-110 or HV-310 DVB-T receiver/transmitter.

- There must be a minimal number of umbilical connections between the host transceiver and DVBT gear. Consequently, only three connections between the host and HV-110/HV-310 is needed. Bulkhead SMA connectors and a bulkhead DC power connector for the HV-310 will allow for quick removal of the umbilical HV-110/HV-310 from the host ATV transceiver.

- A single mode-selector-switch will control A5 and D2 modes.

- To transmit in either mode, the original "Transmit" switch on the TC-70 will key the A5/D2 transmitter.

- The HV-110 receiver and the host transceiver downconverter will operate simultaneously with no effect on downconverter sensitivity.

- The HV-110 receiver will be coupled to the downconverter in a manner that uses the GaAs MESFET preamplifier within the downconverter to provide additional receive gain for the HV-110.

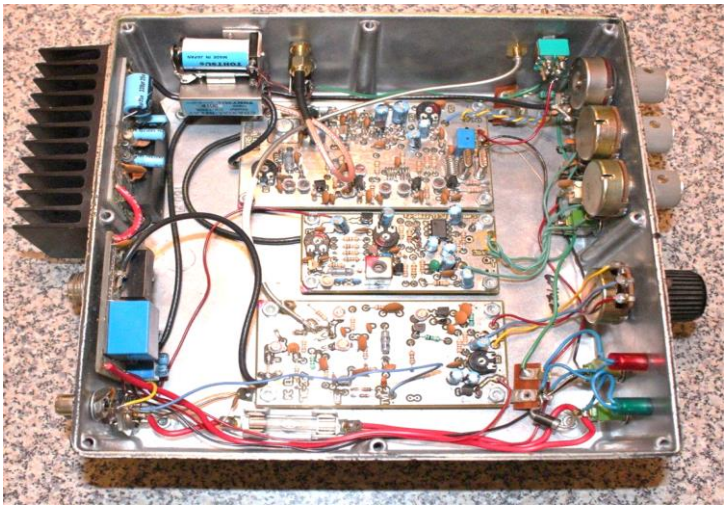
- When not being used for hosting D2, a single coaxial relay (internally placed within the transceiver) will default to A5 transceive functionality so as not to require user intervention.

- Receive and transmit on A5 and D2 must go through the transceiver's N-connector antenna connection.

CONCEPT OF OPERATION

Think of it this way: all this modification does is electrically switch in-and-out the TXA5 (A5 exciter) and HV-310 transmitter in the host TC-70. This function is controlled by the Mode switch, allowing the output of either the TXA5 or HV-310 to be switched into the PA5 (RF Module PCB) As for the HV-110 receiver, it is simply coupled via a pickup loop to L3 on the downconverter PCB.

Before starting, it's essential to understand the layout of the TC70. There will be some small internal differences between the TC70 versions, but the layout is essentially the same in all TC70 models.



Installed relay is shown in the upper left corner of the cabinet.

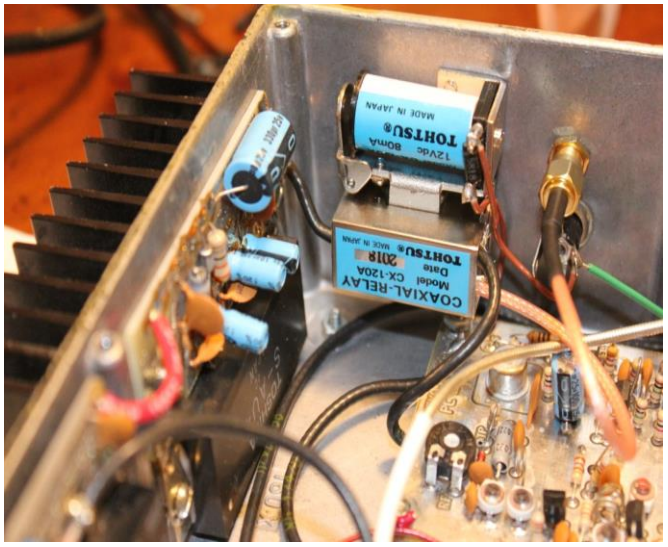
TC-70 LAYOUT

The photos provided here allow for a better understanding where the relay and Mode Switch can be placed, along with the RF cabling to the HV-310/HV-110 that are bulk headed through the TC-70 cabinet. I opted to place the relay closest to the PA5 board so the existing PA5-to-TXA5 line can be used without having to replace the line. Note that the Mode Switch is located near the front side of the cabinet, since the front cabinet of the TC-70 essentially has no room for additional switch mounting.

Location of the mode switch, bulkhead SMA connectors, and power connector for the HV-310

ADDING THE RELAY:

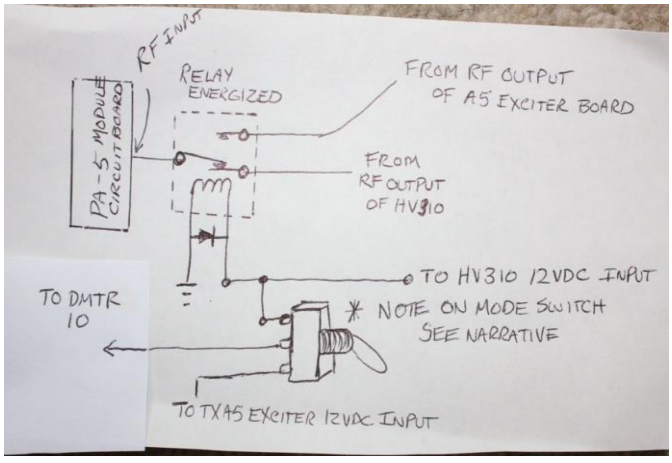
Two machine screws require drilling two holes in the side of the cabinet as pictured. Relay mounting is straightforward, with the Tohtsu CX-120 Coaxial relay's "single" coaxial output facing the TC70's PA5 board (See closeup photo of the mounted coaxial relay). This side of the relay is soldered to the PA5 RF input line. If measured correctly, the RG-174 going from the TXA5 exciter to the PA5 board can be cut so the only soldering that is needed is soldering the cut lines to either side of the relay as pictured. Take extra care to ensure soldering of the center conductor of the cut RG-174 is low enough on the gold-plated contact of the coaxial relay, so when the relay is re-assembled there are no solder high spots that could come in contact with the miniature screw-down clamps. The coaxial relay is designed so the shielding side of the RF line does not require soldering. This "clamp-arrangement" allows for secure positioning of the RF line once the clamp screws are secured. Note that the other end of the cut RF line coming from the exciter board is soldered to the relay post nearest the top of the transceiver chassis pictured. When the relay is not energized, the TXA5 output will pass through the relay to the PA5 board.



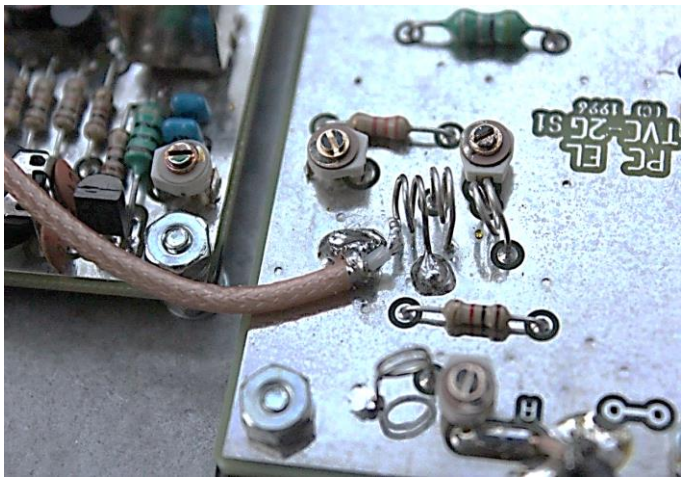
Closeup of the Tohtsu relay

The second pole of the relay passes to the bulkhead SMA connector as pictured. This is the RF connection for the HV-310. One side of the relay coil goes to ground, and the other side of the relay goes to one throw leg of the SPDT switch. This + VDC line also goes to the center conductor on the chassis-mounted barrel connector. Don't forget to put a 1N4001 clamping diode across the relay coil, with the anode side facing ground.

ADDING THE MODE SELECTOR SWITCH Positioning the Mode Switch on the right front side of the TC70 cabinet provides for easy access. As already covered, the relay coil and its + line connects to the top throw post of the SPDT. For the other throw post of the Mode Switch, cut the + line of theTXA5 and place the end of this cut line going to the TXA5 on the bottom throw post of the SPDT switch. The other end of the cut line that was going to the TXA5 and is now cut, should be placed on the center throw of the SPDT switch. With these connections made, when the mode switch is flipped to the "up" position, this will put the Mode Switch into "A5" and the down position will place the mode into D2.



ADDING THE HV-110 RECEIVE LOOP



Pickup coil next to the down-converter mixer input coil.

Placing a #22 AWG 1 to 2 turn loop approximately 1/8 inch away from L3**, the mixer input coil of the TC-70's downconverter**, (with the cold side grounded) provides an excellent means for coupling the needed extra receive antenna port for the HV-110. Some miniature hardline or RG-174 can be used to bring the coupled signal out as shown. This approach was suggested to me four years ago **by Tom O'Hara** W6ORG. Tom stressed that the preamp stage has plenty of gain and that the system noise figure is practically unaffected. This provides a measured additional 5 dB gain for the HV-110 receiver, since putting the pickup loop in after the GaAsFET preamp on the TVC-2G downconverter provides additional receive sensitivity for the HV-110. If you need a **data sheet with the schematic and layout of** your **P. C. Electronics downconverter**, since there have been a number of these produced, Tom (**ATVinfo@**hamtv.com) indicates that he will provide a copy**,** but you will need to provide him **with** the downconverter PCB version that you have. See the photo of how this addition is accomplished.

THE SMOKE TEST

Once the parts have been installed, functioning could not be simpler. Flip the mode switch up and it puts the unit in A5 mode. In the down position, it is now ready for D2. To transmit, simply throw the transmit switch on the TC70's front panel and you are in business.

Additional information about this modification:

- The HV-110 receiver is powered up continuously through its standard DC power connection. It does not need to be turned off during transmit cycling since there is plenty of isolation during D2 and A5 transmissions. This isolation is achieved since the TC70 powers the downconverter down when the transmit switch is energized. Isolation is so effective that its not possible to watch your D2 video on the HV-110 during HV-310 DVB-T transmissions.

- Video input-output connections must be configured in the normal way for A5 and D2 transmissions for the TC70 and HV-110 and HV-310.

- Under normal conditions, the HV-310 provides 15 dBm RF power output on its highest power setting. At this power level, the S-AU4 RF module in the TC70-10 provides 1 watt RF output measured on a Bird APM-16 with minimal spectral regrowth since the S-AU4 RF module remains in its linear range at this DVB-T power level. For TC70-20s operation that uses a M57716 RF amplifier module, it's necessary to reduce the HV-310's RF power to 11 dBm in order to minimize spectral regrowth. By adjusting the HV-310's RF power to 11dBm, driving the host transceiver with 11dBm provides 3W output into the APM-16. *

- When the transceiver is in D-2 mode and the TC70's transmit switch is thrown, this will power up the HV-310E, and as normal, the HV-310E will take about 7 seconds before the HV-310E will start transmitting. This delay is a normal part of the HV-310E's function.

All A5 functionality of the TC70 remains intact. An additional modification can include an LED light indicating the transceiver is in D2 mode (see photo). After five host transceiver modifications, the form, fit and function of this approach has proven to be sound. Also note that variations between TC70 transceivers are likely due to differences in RF module performance/age and changing manufacturer specifications. but I was able to achieve successful results with five different TC70s. This modification could likely be accomplished with Wyman

Research transceivers or use of other HiDes standalone DVB-T transmitter/receivers.

KE8QR on-the-air with the host TC70/DVB-T system

Host Transceiver with connected HV-110/HV-310 3Watts output (APM-16) into a dummy load

*NOTE: The APM-16 measures average RF power for digital waveforms but in this case, does not provide the appropriate accuracy for actual/accurate RF power measurements of the DVB-T signal's complex waveform. To that end, a spectrum analyzer is a way to determine whether the DB-T signal is driving the amplifier into its non-linear region (creating spectral regrowth) and wattmeters such as the Bird APM-16 can be used to determine relative power level changes in concert with employment of a spectrum analyzer.

A logical add-on after host-transceiver conversion is the addition of a “D2 Transmit” front panel light!

…Dave Pelaez 11/11/18

CHECK OUT THIS CRAZY LOOKING DVB-T IMAGE!!!!

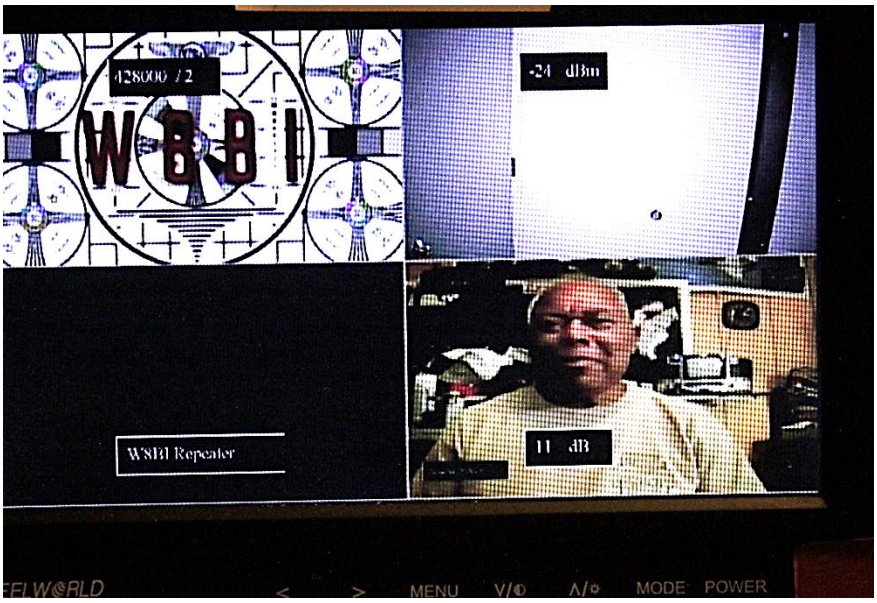
I went to the W8BI repeater site this morning to continue troubleshooting an analog 1280 receiver co-interference issue. While I was there, I looked at the monitors and noticed that Reuben W8GUC was the last person to transmit a DVB-T signal, as captured by the in-place DVB-T receiver at the site. A close look at the video indicated that the last frame received on the site's DVB-T receiver had some type of glitch that occurred as he was shutting his DVB-T transmitter down. On occasion, the interleaving of other frames may occur as the receiver decoder abruptly stops decoding the live video. Amazingly, this last video frame of Reuben's looked like something out of a Grade B Halloween Horror movie.

This is a no-kidding, unaltered image that the DVB-T receiver "altered" as he shut off his transmitter. That has got to be one of the best Halloween masks I have ever seen. In actuality, it’s an artifact of the receiver-decoder

interruption as he shut the transmitter off!
…Dave Pelaez

DARA DATV

Here's KA8HBT James Green on the air with a DVB-T video signal from his QTH. His DVB-T video is pictured here in the W8BI "quad screen mode" as seen on the W8BI ATV repeater.



Congratulations James!

…Dave Pelaez. AH2AR 11/12/18

BAND OPENING

Band opening on Sunday 12/9/18.
After the Sunday morning ATV net was finished, Dale WB8CJW and I stayed on frequency and I was able to work through the WR8ATV ATV repeater. The opening lasted continuously/unbroken for about an hour. I was able to get in via both modes (A5 and DVB-T) with no problem and was also working Dale via ATCO direct. Dale was also seeing the DARA repeater and was bringing it up so there was an excellent East-West pipeline this morning. Things started to improve greatly around 8:30AM after most folks had signed off.

Cheers,

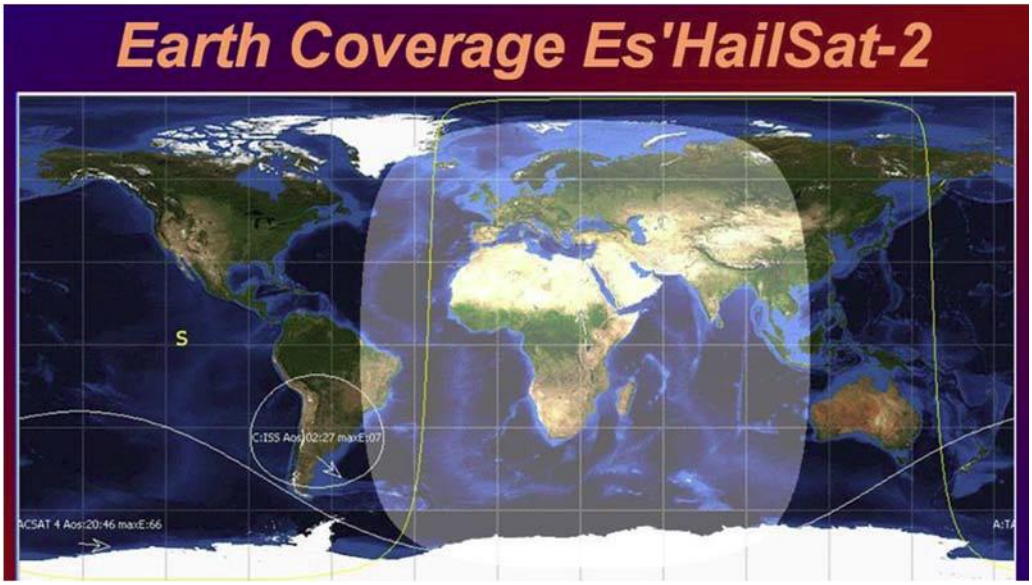
…Dave P AH2AR

GEOSTATIONARY ES'HAIL-2 SATELLITE WITH HAM RADIO DIGITAL-ATV LAUNCHED NOVEMBER 15, 2018

Reprinted by permission from the RF Newsletter at http://www.w6ze.org/Newsletter/RF-Index.html

The Es'Hail-2 satellite on board a SpaceX Falcon 9 launch vehicle was launched from Cape Canaveral on 2018-11-15. From a concept proposed by the Qatar Amateur Radio Society, the Es'Hail (the Qatar Satellite Company) developed the geostationary Es'Hail-2 communications spacecraft that also provides two transponders (AMSAT Phase 4-A) for use by radio amateurs.

Es'Hail-2 will provide a 250 KHz linear transponder intended for conventional analog operations (CW, SSB, FM) in addition to another transponder which will have an 8 MHz bandwidth. The latter transponder is intended for experimental digital modulation schemes and DVB amateur television. Think of the wideband transponder as an 8 MHz-wide "bent-pipe". The technical design support of the two ham transponders is under the leadership of AMSAT-DL. The geostationary position will give coverage of Europe, Africa, Asia out to Thailand, and a piece of Brazil.



Map of signal coverage for the two Ham Radio transponders (courtesy of AMSAT-DL)

Narrowband (250 KHz) Linear transponder
2400.050 2400.300 MHz Uplink
10489.550 10489.800 MHz Downlink

Wideband (8.0 MHz) Digital transponder
2401.500 2409.500 MHz Uplink
10491.000 10499.000 MHz Downlink

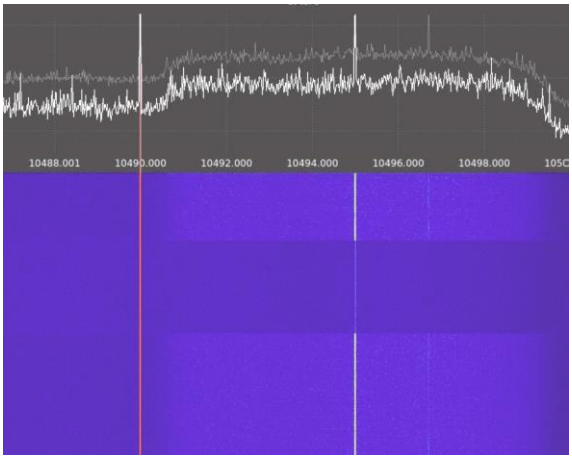
There is a YouTube video of the AMSAT-UK conference presentation on the ham radio DATV transponder given in July 2016 by Dave G8GKQ of the British Amateur Television Club (BATC).

https://www.youtube.com/watch?v=hnALEzG8rEQ&index=10&list=PLTDI7lbh1cWoBqnxVSkIHFzZmCHcC2ZG2

Also, a recent issue of the BATC magazine, CQTV (Issue No. 261 – Autumn), contains great articles about the Es'hail 2 communications satellite, including the proposed bandplan, and a useful 10 GHz LNB to consider for receiving the downlink ("across the pond", of course)

While this satellite coverage does not reach United States or any part of North America, Peter Guelzow DB2OS (President of AMSAT-DL) has explained that this ground breaking project is expected to provide an exciting new phase of activity for radio amateurs for the 21st century.
Noel G8GTZ of the BATC posted that the satellite has been positioned into a test orbital slot, and that the **In-Orbit Testing** (IOT) procedures will take a few months to complete. During IOT, the ham radio payload will not be turned on.

Once IOT is complete…there will be an announcement by AMSAT-DL when the transponders are available for use. However, John GI7UGV reported on the BATC Forum (Forum.BATC.ORG.UK) that an interesting (but temporary) 8 MHz-wide signal on 10 GHz had been spotted on 2018-12-12.



An interesting horizontal polarized 8 MHz-wide signal captured by GI7UGV in the correct location of Es'Hail-2 satellite. The signal-gap in the middle was caused by switching the antenna to vertical polarization. (courtesy of John GI7UGV and BATC Forum)
…Ken Konechy W6HHC

WA6SVT VISITED OTHER ATV CLUBS LAST SUMMER

Early summer Mike WA6SVT, Laura KJ6GFI and our son Ryan took a two-week vacation across the country to visit family in Ohio and stopped on the way out and on the way back visiting with ATV groups along the way. We left Crestline Saturday morning and arrived at our first stop in Albuquerque New Mexico to meet with Darlene Campbell KD7HPN and Jean-Luc K1ATN both are founding members of the ATN-NM chapter for dinner and talked about the good old days. We then drove another three hours to Tucumcari and spent the night. Sunday, day two of our trip took us from the eastern edge of New Mexico through the Texas panhandle, Oklahoma, Missouri, Illinois, Indiana and we arrived early Monday morning in East Liberty Ohio at Laura's sister Becky Peterson and her family. Lance (Becky's husband) is KD8TED. During our visit with the Petersons, Lance and I drove to Westerville to meet up with ATCO's net control operator Art Towslee WA8RMC. Art gave Lance some ATV gear to help get him on ATV. Mike also brought out some ATV gear. We visited on the air at Art's QTH with some of the local ATVers.

Art Towslee WA8RMC

One of the highlights of our trip was digging an 8-foot hole and pouring a tower foundation for Lance's used tower that was donated by Linda Smith, wife of the late Spencer Smith N6IWY a long time ATN-CA member. Mike had taken down the tower in Simi Valley and shipped it to Lance. Several days later we installed the tower and VHF and ATV antennas. We could hear Art and all the Columbus ATVers 40 miles away. We also rebuilt Spencers old HF beam but time was not on our side to install it before we started our journey home.

Lance Installing his HF beam this November

We left Friday and met up with Mel Whitten K0PFX at his and his wife's QTH. Then over to a BBQ Restaurant to meet the rest of the St. Louis ATV group! After lunch, we visited the ATV repeater site.

St. Louis ATV Group, Mel on lower right side

Laura and I greatly appreciate the hospitality of Mel and the St. Louis ATV group! We then drove to Laurence Kansas and spent the night. The next Morning (Saturday) we drove through Kansas and into Colorado and stopped at Jim Andrews KH6HTV and his wife Janet's QTH for a late afternoon BBQ they prepared for us and a couple of friends. As it turned out they invited all of the Boulder ATV group! We all had so much fun we forgot to take any pictures. We appreciate the hospitality shown us by the Andrews and the Boulder ATV group!

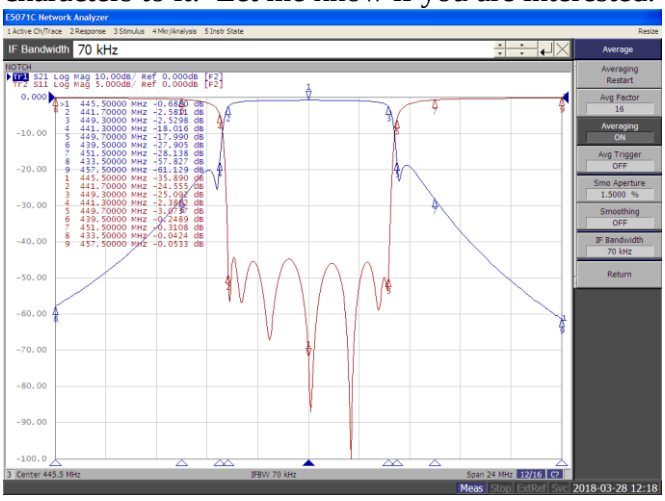
One of the newer members Don Apte KK6MX and his wife Barbara invited us over to their house in Broomfield rather than a motel for the evening. Don used to live in California and is still a member of the Northern California chapter of ATN. I have known Don for years and it was great to see his new QTH. After breakfast, we headed over to a dinosaur park in Morrison for our son Ryan. We then drove back to our home in Crestline and arrived just before dawn on Monday morning.

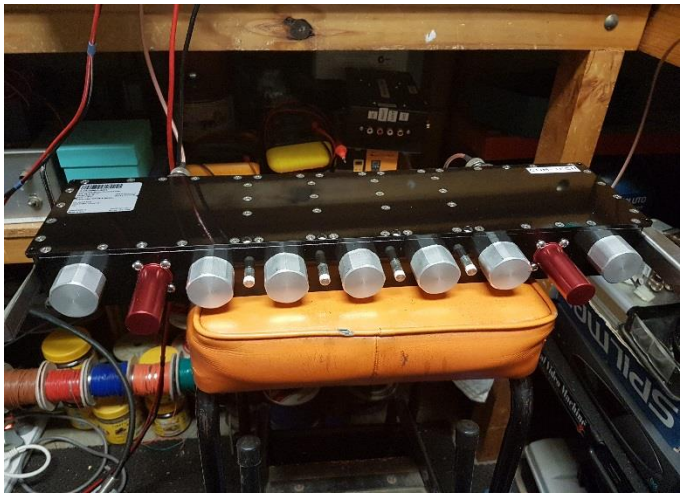
ATV REPEATER PROGRESS IN MELBOURNE, AUSTRALIA

Attached are a couple of photographs of the temporary test set up at the new site. We only set up VK3RTV1 so a bit less than half of the repeater is missing. Note the monitor with some of its screen missing! (Fell off the bench one day). From the top down, Monitor -- Humax 23 cm DVB-S RX ---- Home Brew Controller VK3RTV 1 ..... 70 cm DVB-T Exciter .... PA Heatsink (PA is behind it) PA Fan ... Power Supplies.

The small plastic box in front of the Humax is an IR LED. I have synthesized the Hand Remote signals which are activated by DTMF codes sent via DVB-S audio. Stations can bring up the signal report from the receiver. This is a very popular function as it aids antenna direction settings and also stations can see their performance over time and with changing conditions and equipment. (good for relative antenna performance)

I have looked at a number of Hand Remotes from different manufacturers. They all seem to be the same protocol, they just select different codes for different functions. The IR system in VK3RTV has its own microcontroller which drives the IR LED and responds to a simple Ascii Character sent from the main controller. I have used the code for Humax and also the small KOQIT receivers. It would be better to hardware connect the signal rather than driving an IR LED but it is either very difficult and/or impossible as the function now is often imbedded. Would be happy to share the code with you if you are interested in incorporating a similar function. There is also a small PCB which houses the IR Controller and the IR LED driver. Just send Ascii characters to it. Let me know if you are interested.





The filter we used is one we purchased for $900.00 from Comm Tech in Italy. A really nice DVB-T filter. They were good enough to especially align it down to our 70-cm allocation. We did not need a filter in the prior location, but now being in the metropolitan area things are different.

… VK3BFG Peter

BOULDER, COLORADO ATV REPEATER INFORMATION

REPEATER STATUS: On 20th of December, Don, N0YE, made a trip to the repeater site and installed his new Ch. 60, band-pass filter (filter details later in this newsletter). It was first tested operationally on that afternoon's ATV net. It seemed to help with 70cm reception. We only saw some RFI crawling thru Joe's, AD0I, analog TV signal. All of the 70cm DVB-T transmissions came through fine. We still have severe RFI on 70cm, analog TV from the BARC 2m repeater. But that is to be expected. That repeater is co-located with the TV repeater and shares the same tower. More work will be needed to reduce its effect.

Discussions about the 146.70 RFI at a recent Friday morning ham breakfast suggested using instead the 146.76 repeater on Gunbarrel Hill. Historically, we have been associated with BARC and used their 2 meter repeater for our net voice intercom. However, this was started many years ago when our TV repeater was located in Chautauqua Park. No 146.70 RFI was experienced then because the repeaters were separated by about 2 miles. Now the antenna separation is measured in feet instead of miles. Debbie, WB2DVT, offered to ask the owner of the 146.76 repeater for permission to let the ATV group hold their weekly net on that repeater. Stay tuned for further details.

Details about the repeater are available on our web site: www.kh6htv.com AN-43 gives all the technical details. If you have any questions about the current operations or status of the repeater, contact the asst. trustee, Don, N0YE.

Future Newsletters: If you have contributions for future newsletters, please send them to me. Jim Andrews, KH6HTV, email = kh6htv@arrl.net

TV RFI: Since the TV repeater was moved to its new location at a higher elevation, it has been more susceptible to RFI to its 70cm receiver. Let's put some numbers on what rf levels are required for RFI. Back in 2014, I did some bench, lab measurements on co-channel and adjacent channel RFI to both analog (i.e. NTSC VUSB-TV) and digital (DVB-T) TV transmissions. The work was fully documented in my app. note, AN-19, which is available at www.kh6htv.com I will summarize the results relevant to our having RFI from FM voice signals here.

TV Rptrs Rptr-7.doc (kh6htv 12/25/2018) p. 2 of 8

1. For VUSB-TV: Moderate RFI occurred at -25dBc (i.e. 25dB below the level of the video carrier) for CW/FM signals inside the 6 MHz channel. Outside the channel bandwidth the receiver rejected well interfering CW/FM signals. An interfering signal ± 6MHz from the video carrier needed to be greater than + 45dBc. 2. For DVB-T: For interfering CW/FM signals within the DVB-T pass-band that are >20dB stronger than the desired signal, the receiver will stop decoding the picture. Worst case is for an interfering CW/FM signal that is >17dB stronger on the center frequency carrier. For interfering CW/FM signals that are at least 4 MHz away from the DVB-T center frequency, they must be >45dB stronger than the desired signal to cause the receiver to stop decoding. From these results, we see for in-band RFI, digital DVB-T is 45dB more tolerant of RFI compared to analog VUSB-TV. For adjacent channel RFI, both systems are about equal at +45dB. You might also find it of interest as to what interference two DVB-T transmitters will cause to each other. The test was run with typical amateur DVB-T transmitters in which the spectrum regrowth, out of channel, breakpoints were at -30dB. 1. Signal strengths exceeding 30dB difference on adjacent channels will block reception on the weaker signal.

2. Signal strengths exceeding 50dB difference on channels separated by at least one empty, guard channel will block reception on the weaker signal.

3. Co-Channel RFI - No picture was received whenever the signal strengths from both transmitters were within ± 6dB of each other. Whichever transmitter's signal strength was +8dB stronger than the other one would capture the DVB-T receiver and give a perfect P5 picture.
… Jim Andrews, KH6HTV, editor - kh6htv@arrl.net

HAM ITEM BIDDING RESULTS

Many thanks to all of those who participated in the Ham bidding process last Fall. It was a complete success. With that over, our club treasury now is in much better shape. In fact, we haven't had a Pizza Party lately and is well overdue. I'll arrange a date and let everyone know.
…WA8RMC

ITEM	Description	Bid	high bidder
1.	**STANDARD RADIO 2M FM RADIO.**	1	Ferd Ward
2.	**ALINCO DR-1200 2M FM MOBILE RADIO.**	20	Troy Bonte AC8XP
3.	**TYT TH-UV8000SE TRI BAND HAND HELD**	50	Bob Rector W8RWR
4.	**HY-GAIN CD-45-II ROTOR/CONTROL BOX.**	165	Larry Baker KB8EMD
5.	**ASTRON Model RS-35A POWER SUPPLY.**		See item 23
6.	**MFJ Model MFJ-815B SWR/WATTMETER.**		See item 23
7.	**KENWOOD SM-230 STATION MONITOR.**		See item 23
8.	**KENWOOD TS-870 HF TRANCEIVER.**		See item 23
9.	**RAYTRACK Model DX2000L LINEAR Tx.**		See item 23
10.	**KENWOOD Model SP-31 SPEAKER.**		See item 23
11.	**BENCHER RJ-2 STRAIGHT KEY.**	35	Larry Howell AC8YE
12.	**BENCHER ST-2 PADDLE KEYER.**	51	Chuck Wood WA8KKN
13.	**VIBROPLEX VIBROKEYER DELUXE.**	40	Mark Cring N8COO
14.	**DRAKE Model TV-1000 LO PASS FILTER.**	20	Charles Beener WB8LGA
15.	**MFJ Model MFJ-486 MEMORY KEYER.**		See item 23
16.	**MICRONTA FIELD STR./SWR METER.**	10	Brad Buck KE8HXE
17.	**KENWOOD TH-75A HANDI-TALKIE**	50	Bob Rector W8RWR
18.	**MFJ 4 PORT MANUAL COAX SWITCH.**	15	Charles Beener WB8LGA
19.	**DUMMY LOAD. "CANTENNA TYPE".**	10	Joe Coffman WB8YTZ
20.	**DIAMOND X200A VERTICAL ANTENNA.**	45	Larry Howell AC8YE
21.	**HUSTLER 4-BTV VERTICAL ANTENNA.**	75	Larry Baker KB8EMD
22.	**CUSHCRAFT A3S 3 EL. BEAM ANTENNA.**	20	Tom Taft KA8ZNY
23.	**Total of items 5,6,7,8,9,10,15.**	1400	Dave Tkach N8YZ
24.	**Argonaut MODEL 509 QRP Transceiver.**	50	Ferd Word, Mike Cotts
25.	**LDG RBA-4:1 and LDG RBA-1:1 Baluns.**	20	Charles Beener WB8LGA
26.	**LDG Z100 autotuner. (Sells for $150 on Ebay**	75	Troy Bonte AC8XP

FALL EVENT SUMMARY

The Fall Event was very enjoyable as usual. The special treat was the announcement of the Biding items. The attendance was a little lower than expected for only 22 people attended. The good news was that we saw some people we haven't seen for a while. Food was good as we had lasagna this time. It's been a few years since I did that. I might be tempted to have it again in the Spring since there was none left! Door prizes were plentiful as usual.

SATURDAY BREAKFAST

OK! What's keeping everyone else away from the breakfast outings??? As you can see there were only 5 of us…OK Jay, I'm told you were sick and most certainly we don't want someone spreading bugs so you're excused.

For the rest of us, it's only once per month guys. You should be able to spare time for an outing that often. This one was at Abners. I believe on February 2, it's at Marshalls in Grandview. Mark your calendar!
…WA8RMC

LOCAL HAMFEST SCHEDULE

This section is reserved for upcoming Hamfests. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here; notify me so it can be corrected. This list will be amended, as further information becomes available. To see additional details for each Hamfest, Control Click on the blue title and the magic of the Internet will give you the details complete with a map! To search the ARRL Hamfest database for more details, CTL click ARRLWeb: Hamfest and Convention Calendar …WA8RMC.

01/20/2019 | S.C.A.R.F. Hamfest

Location: Nelsonville , OH
Type: ARRL Hamfest
Sponsor: Sunday Creek Amateur Radio Federation
Website: http://www.qrz.com/db/kc8aa

01/27/2019 | Tusco ARC Hamfest

Location: Strasburg, OH
Type: ARRL Hamfest
Sponsor: Tusco Amateur Radio Club
Website: http://www.tuscoarc.org

02/17/2019 | InterCity ARC Hamfest

Location: Mansfield, OH
Type: ARRL Hamfest
Sponsor: InterCity Amateur Radio Club
Website: http://www.iarc.club

03/03/2019 | WINTER HAMFEST

Location: Elyria, OH
Type: ARRL Hamfest
Sponsor: Northern Ohio Amateur Radio Society
Website: http://www.noars.net/hamfests/noarsfest

03/17/2019 | Hamfest & Comp. Fair

Location: Perrysburg, OH
Type: ARRL Hamfest
Sponsor: Toledo Mobile Radio Association
Website: http://www.tmrahamradio.org

04/13/2019 | 65th Annual Cuyahoga Falls Amateur Radio Club Hamfest

Location: Cuyahoga Falls , OH
Type: ARRL Hamfest
Sponsor: The Cuyahoga Falls Amateur Radio Club, Inc.
Website: http://cfarc.org

04/28/2019 | Athens Hamfest

Location: Athens, OH
Type: ARRL Hamfest
Sponsor: Athens County Amateur Radio Association
Website: http://www.ac-ara.org/

05/17/2019 | 2019 ARRL National Convention at Dayton Hamvention®

Location: Xenia, OH
Type: ARRL Convention
Sponsor: Dayton Amateur Radio Association
Website: http://hamvention.org

TUESDAY NITE NET ON 147.48 MHz SIMPLEX

Every Tuesday night @ 8:00PM WA8RMC hosts a net for the purpose of ATV topic discussion. There is no need to belong to the club to participate, only a genuine interest in ATV. All are invited. For those who check in, the general rules are as follows: Out-of-town and video check-ins have priority. A list of available check-ins is taken first then a roundtable discussion is hosted by WA8RMC. After all participants have been heard, WA8RMC will give status and news if any followed by late check-in requests or comments. We usually chat for about ½ hour so please join us locally or via internet at https://batc.org.uk/live/wr8atv/. Click on WR8ATV.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (10/21/18)	$ 1689.54
RECEIPTS(dues)	$ 120.00
Ham Biding income	$ 2202.00
Fall Event food	$ (207.88)
PayPal fees	$ (3.69)
CLOSING BALANCE (01/14/19)	$ 3799.97

ATCO REPEATER TECHNICAL DATA SUMMARY

Location: Downtown Columbus, Ohio
Coordinates: 82 degrees 59 minutes 53 seconds (longitude) 39 degrees 57 minutes 45 seconds (latitude)
Elevation: 630 feet above the average street level (1460 feet above sea level)

TV Transmitters: 423.00 MHz DVB-T, 10 W contin, FEC=7/8, Guard=1/32, Const=QPSK, FFT=2K, BW=2MHz, PMT=4095, PCR=256, Video=256, audio=257
427.25 MHz Analog VSB AM, 50 watts average 100 watts sync tip (cable channel 58)
1258 MHz 40 watts FM analog
1268 MHz DVB-S QPSK 20W continuous. SR=3.125MS, FEC=3/4, PMT=32, Video=162, Teletext=304, PCR=133, Audio=88, Service =5004)
2397 MHz Mesh Net transceiver 600mw output (channel 1 minus2). ID is WR8ATV-2
10.350 GHz: 1 watt continuous analog FM
Link transmitter: 446.350 MHz: 5 watts NBFM 5 kHz audio. This input is used for control signals.

Identification: 423, 427, 1258, 1268 MHz, 10.350 GHz transmitters video ID every 10 min. with active video and information bulletin board every 30 minutes.
423 MHz digital, 1268 MHz digital & 10.350 GHz analog - Continuous transmission of ATCO & WR8ATV with no input signal present.

Transmit antennas: 423.00 MHz - 8 element Lindsay horizontally polarized 6dBd gain "omni"
427.25 MHz - Dual slot horizontally polarized 7 dBd gain "omni" major lobe east/west, 5dBd gain north/south
1258 MHz - Diamond vertically polarized 12 dBd gain omni
1268 MHz - Diamond vertically polarized 12 dBd gain omni
2397 MHz - Ubiquiti dual polarity omni 13dBi gain slot for channel 1 minus2 MESH Rx/Tx operation
2397 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (Used for experimental Mesh operation)
10.350 GHz - Commercial 40 slot waveguide slot horizontally polarized 16 dBd gain omni

Receivers: 147.480 MHz - F1 audio input with touch tone control. (Input here = output on 446.350)
439.000 MHz - DVB-T QPSK, 2MHz BW. Receiver will auto configure for FEC's and PID's. (Input here = output on all TV transmitters)
439.250 MHz - A5 NTSC video with FM subcarrier audio, **lower sideband**. (Input here = output on all TV transmitters)
449.975 MHz - F1 audio input aux touch tone control. 131.8 Hz PL tone. (Input here = output on 446.350).
1288.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
1288.00 MHz - DVB-S QPSK digital SR=4.167Msps, FEC=7/8. PIDs: PMT=133, PCR=33, Video=33, Audio=49 (Input here feeds all TV transmitters and also goes directly to 1268 MHz DVB-S digital output channel 2.)
2398.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters) (inactive at this time because of MESH on 2397)
10.450 GHz - F5 video analog NTSC. (Input here = output on all TV transmitters)

Receive antennas: 147.480 MHz - Vert. polar. Diamond 6dBd dual band (Shared with 446.350 MHz link output transmitter)
438.00/439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west (Shared with 438 & 439 receivers)
1288.00 MHz - Diamond vertically polarized 12 dBd gain omni (shared with analog and DVB-S receivers)
2398.00 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (inactive at this time because of MESH on 2397)
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Auto mode Input control:

Touch Tone	Result (if third digit is * function turns ON, if it is # function turns OFF)
00*	turn transmitters **on** (enter manual mode-keeps transmitters on till 00# sequence is pressed)
00#	turn transmitters **off** (exit manual mode and return to auto scan mode)
264	Select Channel 4 Doppler radar. (Stays on for 5 minutes) Select # to shut down before timeout.
004	Select 10.450 GHz receiver. **(Always exit by selecting 001)**
003	Select room camera **(Always exit by selecting 001)**
002	Select roof camera. Select room cam first then 002 for roof cam. (**Always exit by selecting 001**)
001	Select 2398 MHz receiver then 00# for auto scan to continue

Manual mode Functions:

00* then 1 for Ch. 1	Select 439.25 analog /438 digital receiver (if video present on digital, it is selected. Otherwise analog)
00* then 2 for Ch. 2	Select 1280 digital receiver
00* then 3 for Ch. 3	Select 1280 analog receiver
00* then 4 for Ch. 4	Select 2398 receiver
00* then 5 for Ch. 5	Select video ID (17 identification screens)

01* or 01#	Channel 1 439.25 MHz scan enable (hit 01* to scan this channel & 01# to disable it)
02* or 02#	Channel 2 1288 MHz digital receiver scan enable
03* or 03#	Channel 3 1288 MHz analog receiver scan enable
04* or 04#	Channel 4 2398 MHz scan enable
A1* or A1#	Manual mode select for 439.25 receiver audio
A2* or A2#	Manual mode select for 1288 digital receiver audio
A3* or A3#	Manual mode select for 1288 analog receiver audio
A4* or A4#	Manual mode select for 2398 receiver audio
C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
C1* or C1#	No function at this time
C2* or C2#	No function at this time

ATCO MEMBERS AS OF January 2019

Call	Name	Address	City	St	Zip	Phone
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221	614-457-9511
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703	
AH2AR	Dave Pelaez	1348 Leaf Tree Lane	Vandalia	OH	45377	937-264-9812
W8ARE	Terry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964	
K9BIF	Charlie Short	415 West Pike Street	Goshen	IN	46527-0554	
VK3BFG	Peter Cossins	14 Coleman Road	Melbourne	Au	03152	
N9BNN	Michael Glass	6836 N. Caldwell Rd	Lebanon	IN	46052	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551
N8COO	C Mark Cring	2844 Sussex Place Dr.	Grove City	OH	43123	614-836-2521
N8CXI	Garry Cotter	2367 Northglen Drive	Columbus	OH	43224	
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785	301-772-7382
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641	
W8DMR	Bill Parker	2738 Florbunda Dr	Columbus	OH	43209	
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198
N8DUK	Ron Reynolds	2173 Noe Bixby Rd	Columbus	OH	43232-4131	
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-405-1710
KB8EMD	Larry Baker	4330 Chippewa Trail	Jamestown	OH	45335-1210	
N8FRT	Tom Flanagan	6156 Jolliff St.	Galloway	OH	43119	
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147	
WA8HFK,KC8HIP	Frank & Pat Amore	P.O. Box 2252	Helendale	CA	92342-2252	760-503-8106
W8KHP	Allen Vinegar	2043 Treetop Lane	Hebron	Ky	41048	
WA8KKN	Chuck Wood	5322 Spruce Lane	Westerville	OH	43082-9005	614-523-3494
WB9KMO	Rod Fritz	8334 E. Culver Street	Mesa	AZ	85207	
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	OH	45331	937-548-2492
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334	
W8MA	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081	
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660	
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127
W8NX, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856
KB8OFF	Jess Nicely	1888 Woods Drive	Beavercreek	OH	45432	
N0OBG	Jim Conley	33 Meadowbrook C C Est	Ballwin	MO	63011	
W6ORG,WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022	
AE6QU	Ron Phillips	2227Via Puerta unit N	Laguna Woods	CA	92637	
WA8RMC	Art Towslee	438 Maplebrooke Dr W	Westerville	OH	43082	614-891-9273
W8RUT,N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021	
KB8RVI	David Jenkins	1941 Red Forest Lane	Galloway	OH	43119	614-853-0679
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904	614-276-1689
W8RXX, KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021	614-579-0522
WA6RZW	Ed Mersich	34401 Columbine Trl West	Elizabeth	CO	80107	
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325	
KD8TIZ	Bob Holden	7725 Tressa Circle	Powell	TN	37849	
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123	937-981-1392
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101	
WA8UZP	James Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328
KB9VGD	Gary Oaks	472 Storle Ave	Burlington	WI	53105-1028	
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123	
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011	
AC8XP,KE8GTT,KE8HPA	Troy,Seamus Bonte	5210 Smothers Road	Westerville	OH	43081	
AC8YE	Larry Howell	1163 Cloverknoll Ct	Columbus	OH	43235-4008	
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064	
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224	
KD8YYP	Anna Reed	818 Northwest Blvd	Columbus	OH	43212	
WB8YTZ	Joe Coffman	233 S. Hamilton Rd	Gahanna	OH	43230-3347	
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771
W8ZCF	Farrell Winder	6686 Hitching Post Ln.	Cincinnati	OH	45230	513-218-3876
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371	

ATCO MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. The annual dues are $10 per person. Additional members within an immediate family and at the same address are included at no extra cost.

ATCO publishes this Newsletter quarterly in January, April, July, and October. It is sent to each member without additional cost. All Newsletters are sent via Email unless the member does not have an internet connection. Dues payments are as of the date paid and will expire on the same month/year on the due date year.

Your support of ATCO is welcomed and encouraged.

Membership expiration notices will be sent out via Email starting 30 days prior to expiration date.
NOTE: Dues records on your individual portion of the ATCO website are listed as the date money is received and shows due one year from that date.

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES ○ NO ○
HOME PHONE _____
NAME_____
INTERNET Email ADDRESS_____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
COMMENTS_____
_____
_____
ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK ○ MONEY ORDER ○

Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026. Or, if you prefer, pay dues via the Internet with your credit card. Go to www.atco.tv and fill out the "pay ATCO dues" section. Alternately, you can use the ATCO web site www.atco.tv/PayDues.aspx directly. Credit card payment is made through "PayPal" but you DO NOT need to join PayPal to send your dues. Simply DO NOT fill out the password details and there will be no "PayPal" involvement.

ATCO CLUB OFFICERS

President:	Art Towslee WA8RMC	Repeater trustees:	Art Towslee WA8RMC
V. President:	Ken Morris W8RUT		Ken Morris W8RUT
Treasurer:	Bob Tournoux N8NT		Dale Elshoff WB8CJW
Secretary:	Mark Cring N8COO	Statutory agent:	Stan Diggs AA8XA
Corporate trustees:	Same as officers	Newsletter editor:	Art Towslee WA8RMC

NEW MEMBER(S)

Let's welcome the new members to our group! If any of you know anyone who might be interested, let one of us know so we can flood them with information. New members are our group's lifeblood so it's important we aggressively recruit new faces.
No new members this time.

ATCO Newsletter
c/o Art Towslee -WA8RMC
438 Maplebrooke Dr. West
Westerville, Ohio 43082

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK THE
MEMBERS PAGE OF ATCO WEBSITE FOR THE EXPIRATION DATE.
SEND N8NT A CHECK OR USE PAYPAL IF MEMBERSHIP IS EXPIRED.