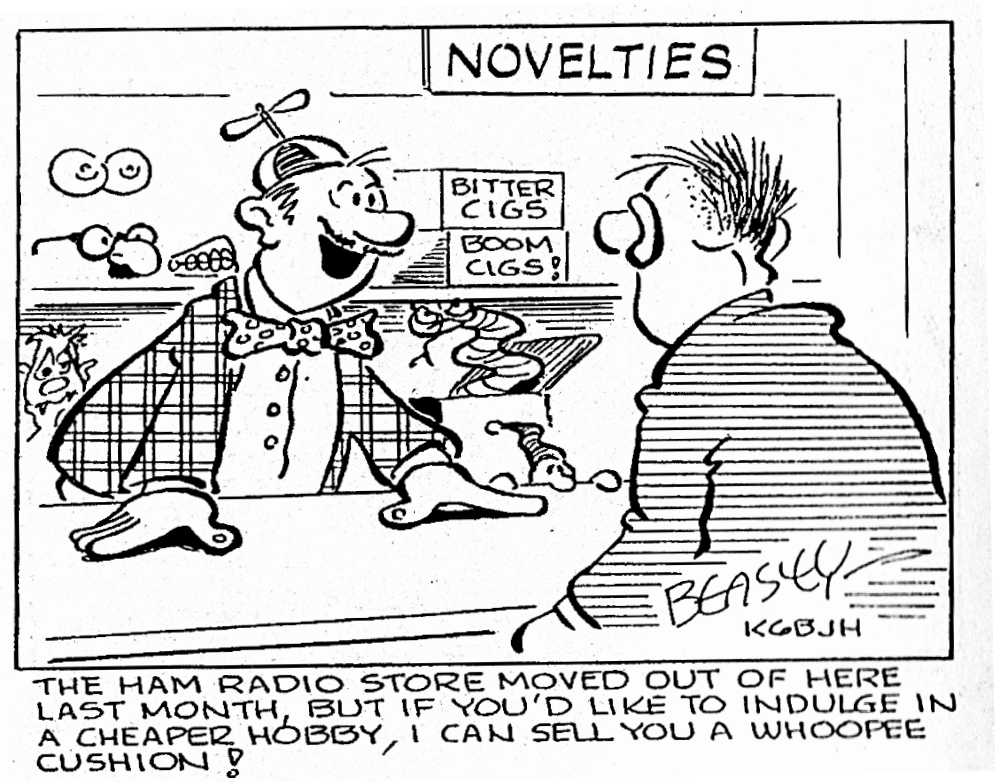
ATCO NEWSLETTER

VOLUME 41 NUMBER 2 **April 2024**

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, October)

ATCO SPOTLIGHT TOPIC



ACTIVITIES ... from my Workbench

Hi, ATVers! Like this weather? Boy, I hope it stays this way, 70 degrees, sunny and low humidity. I say this as I gaze at the grass outside that definitely needs cutting…….. "See Ya."

……I'm Back. Grass is cut!!! Now, where is that beer???

There is not a lot to report this time around. The ATCO repeater is running but on occasion, it seems to freeze the video and produce a blank screen until I reset AC power to the DVB-T modulator. We use a HiDes HV-100E modulator which has early software that needs to be pulled out to service. It's kind of a pain to get to it so I'm reserving work there until I'm there for another reason. It's easy enough to toggle power off then on to reset everything from home.

Also, I've noticed some de-sense showing up on the 439.25 analog input. That's always tricky to work with so a challenge probably is in store for me. Yet to change is the 147.48 input filters mentioned last time. I changed the input filters last fall but didn't have time to activate it then so new filters are in place but not active. The new arrangement should improve the input sensitivity by at least 3-4 dB so we'll see.

Hopefully, I'll have more news to report next time. Don't forget to stop by to chat at Hamvention. We'll be in booth 2003 and 2004 on the left as you enter the west tent area. The ATCO and ATN banners will be hung up on the wall and the VersaTune receiver will be on display. If you're at Hamvention on Friday and get hungry for Chinese food, visit us at the China Garden Buffet restaurant. They have some great and reasonable food. Details are below.

Hamvention May 17. ATV Friday Night dinner.
The ATV Friday Night Dinner will be at the China Garden Buffet restaurant starting at 6:30PM on 112 Woodman Drive in Dayton, Ohio 45431 (Airway Shopping Center) on May 17. Buffet Dinner $15.99 (937-781-9999). We have dinner then presentations about various ATV topics and door prizes concluding about 9 PM.

Hamvention May 18. I'm the ATV Forum moderator and will cover DATV information. Stop by if you attend Hamvention. Forum will be on Saturday at 10:30 AM in room 4.

The presenters so far will be:
Art Towslee WA8RMC Introduction
Gordon West WB6NOA Warm up. Some humor with a couple of one liners.
Art Towslee WA8RMC DATV basics. DVB-S, DVB-T Comparison & analog ATV operation.
Mike Collis WA6SVT ATN California summary

…WA8RMC

VersaTune DATV RECEIVER UPDATE

I've been talking about my new DATV receiver design for years now, but not too loudly, because I was uncertain about its future as a saleable product. We have been plagued with many unwelcome setbacks but now I see the light at the end of the tunnel. (No train this time!)

We started designing a self-contained scanning combined DVB-S / DVB-T receiver in mid-2019. Then Bob, N8NT, decided he wanted to move his home closer to his son and daughter so off to Vermont they went. His company said it was OK to work from home which made the far away transition much easier. Since the software could be done at home with ZOOM available, that didn't seem like an issue. However, along with a new home came new home renovations. On top of that the COVID-19 fiasco put a halt to software work for about 2 years. Also, Bob had software difficulties using the Raspberry Pi as the program engine. He struggled with some serious bugs that just wouldn't go away. We asked for help but for practical purposes, got very little. Some people offered assistance but we found they were not fluent using Java or Python associated with the Raspberry Pi. He also didn't have sufficient software debug programs to help. It's no wonder he frequently got frustrated and nearly gave up.

Fast forward almost 3 years…he got a new software debug package which showed him all along he was directed to the wrong section of code containing very serious bugs. Upon solving those bugs, the code started working but also for efficiency, it needs to be partially re-written. Therefore, serious re-writes took place.

Along the way, we found that the existing code in the tuner demodulator IC didn't perform well at low symbol / bandwidth rates. To my surprise the IC manufacturer agreed to help us by re-writing some of their code in the front-end tuner we are using to improve the RF signal lock function. I've signed a "non-disclosure" statement to protect them from me giving away code to the competition, so now we're off and running again.

The VersaTune-Express receiver is now operational. It scans properly and the "slide show" function works. However, there are, at my last counting, about 20 minor bugs still in the product so it's too early to release for sale. Those remaining bugs are almost a relief because they're fun to solve for they're much more satisfying. However, they still take time so it looks like we will be into at least the third quarter this year before we're ready.

The hardware is complete but I'm using a prototype PCB with jumpers. We haven't revised the PCB yet pending stable software. We're nearing the time where I'll order a new PCB. Then I must start writing the user manual.

We are now at the point where we can demonstrate the operation so I'll have a working model at Hamvention this year. We will be in booth 1003 and 1004 (look for the ATCO and ATN banner) to show it working and I'll talk about it at my ATV Forum on Saturday in room 4 at 10:25 AM. I will also demonstrate it at the ATV Friday night dinner. (See the announcement in the DARA Hamvention web site bulletin).

Basic Specifications:
DVB-S/S2 and DVB-T/T2 scanning standalone receiver with internal Raspberry Pi engine.
8 active scan channels but > 100 channel memory.
Slide show of up to 7 selected JPEG, MOV, PDF or web files running whenever there is no active signal present.
One fixed ID of your choice displayed at power up.
Frequency: 250-2150 MHz (DVB-S), 44-1002 MHz (DVB-T) Separate inputs. (Opt. downconverter for 2.4 GHz)
Setup is by remote PC on web or WiFi enabled smartphone.
HDMI or CVBS video/ audio output and solid state 120 vac/dc "signal Lock" output for repeater control.
…WA8RMC

NASA LUNAR LANDER UPDATE

On Jan. 8, Astrobotic's Peregrine lunar lander launched aboard the first flight of United Launch Alliance's Vulcan rocket en route to the Moon. Shortly after launch, the team uncovered a propulsion issue. Although the lander will not achieve a soft landing on the Moon, we have switched on all the NASA science instruments that can be turned on and are currently collecting data in space

Carrying NASA science and technology, Astrobotic's Peregrine lunar lander continues on a trajectory back toward Earth and is expected to re-enter Earth's atmosphere on Thursday about 4 p.m. EST.

To ensure a controlled, safe re-entry, Astrobotic in coordination with NASA and other government agencies, changed the spacecraft's projected re-entry location to a remote area of the South Pacific. No ground hazards are anticipated.

Astrobotic evaluated several options with NASA consultation to end the mission safely and determined that the best approach for minimizing risk and ensuring responsible disposal of the spacecraft would be Peregrine's re-entry into Earth's atmosphere, likely causing the spacecraft to burn up.

After Astrobotic confirmed Astrobotic's Peregrine Mission One would not be a soft-landing on the Moon, NASA science teams adjusted their procedures to collect data in space near the Moon. All NASA payloads designed to power on have received power and collected data, including: Linear Energy Transfer Spectrometer (LETS), Near-Infrared Volatile Spectrometer System (NIRVSS), Neutron Spectrometer System (NSS), and the Peregrine Ion-Trap Mass Spectrometer (PITMS). Since the LRA (Laser Retroreflector Array) instrument is a passive experiment designed for the lunar surface, it cannot conduct any operations in transit.

Although interpreting the results will require some time, preliminary data suggests that the instruments have collected measurements of the radiation environment and chemical compounds in the lander vicinity, a positive sign that the instruments survived the harsh conditions of space and are functioning as expected.

The NSS and LETS experiments gathered measurements of the radiation environment in interplanetary space around the Earth and the Moon. The two instruments collected different components of the radiation spectrum, providing complementary insights into galactic cosmic ray activity and space weather from solar activity.

The PITMS operations were successful, and the team was able to acquire multiple mass spectra both before and after opening the instrument's protective dust cover. The data confirm PITMS was in good health and that the instrument could provide useful measurements of lunar volatile compounds on future missions. The PITMS is a partnership between NASA; The Open University; RAL Space; and ESA (European Space Agency).

NIRVSS also successfully powered on and collected images, spectra, and additional data around the lander. A variety of chemical compounds were detected in the NIRVSS spectra which the team currently attributes to lander outgassing and leaked fuel. The team also refined their process for capturing spectra, or intensity of light being emitted, and images while at low data rates. Some of this work validated data processing methods, tools, and operational procedures, all of which will improve NASA's ability to map the lunar surface in the future.

NASA will join Astrobotic during their media telecon at 1 p.m. EST on Friday, Jan. 19, to provide an end of mission update. Audio of the call will stream live on NASA's website.

Author Nilufar RamjiPosted on January 18, 2024 3:52 pmCategories Artemis, NASATags Artemis, CLPS, Commercial Lunar Payload Services With NASA Science Aboard,

SENATORS INTRODUCE BILL TO ELIMINATE AMATEUR RADIO PRIVATE LAND USE RESTRICTIONS (ARRL Letter February 15, 2024)

January 30, 2024: US Senators Roger Wicker (MS) and Richard Blumenthal (CT) introduced S.3690, the Senate companion bill to H.R.4006, introduced last June. Both bills reflect the Congressional campaign efforts by ARRL to eliminate homeowner association land use restrictions that prohibit, restrict, or impair the ability of an Amateur Radio Operator to install and operate amateur station antennas on residential properties they own.

Amateur Radio Operators repeatedly are relied upon to provide essential communications when disaster strikes, but their ability to do so is being impaired by the exponential growth of residential private land use restrictions that hinder their ability to establish stations in their homes to train and provide emergency communications when called upon.

In announcing the introduction of S.3690, Senator Wicker said: "Because communication during natural disasters is often hindered, we should be making every attempt to give folks more options. Reliable access can make the difference between life and death in an emergency. Our legislation removes roadblocks for amateur radio operators looking to help their friends, families, and neighbors."

In a similar announcement, Senator Blumenthal stated: "Our measure will help clarify the rules so ham radio enthusiasts can successfully continue their communications.

In the face of emergency or crisis, they help provide vital, life-saving information that allow listeners to properly and safely respond, but prohibitive home association rules and confusing approval processes for installing antennas have been an unnecessary impediment**.** The Amateur Radio Emergency Preparedness Act resolves these bottlenecks and ensures that radio operators can function successfully."

ARRL President Rick Roderick, K5UR, and Director John Robert Stratton, N5AUS, Chair of the ARRL's Government Affairs Committee, both extended on behalf of ARRL, its Members, and the Amateur Radio community their thanks and appreciation for the leadership of Senator Wicker and Senator Blumenthal in their continuing efforts to support and protect the rights of all Amateur Radio Operators.

US Senators Richard Blumenthal (CT) [left] and Roger Wicker (MS) [right]

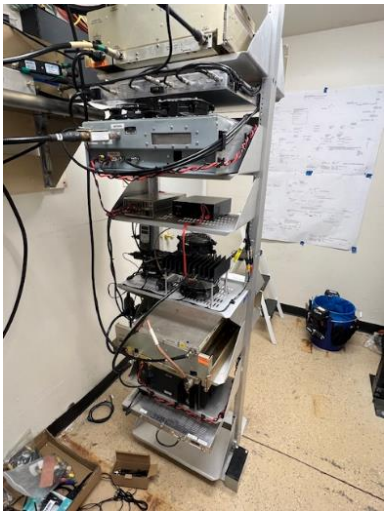
A BILL

To amend the Communications Act of 1934 to prohibit the application of certain private land use restrictions to amateur station antennas, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

STATUS OF DARA ATV REPEATER RE-INSTALL

K8FIX, Bruce Kobe has been concentrating his effort on all of the Lace-work on the many 12 VDC Buss Connections on the receiver/audio/video rear rack, and he has done a superlative job. Hats off to Bruce! I will provide some photos next week. I still can't estimate when the re-rack will be completed but work continues to progress and we are hoping to have it complete by the end of the month. I did a checkout of the receiver audio / video distribution and I also checked the newly installed transmitters and amplifiers, and all are operating fine. Below photo shows the finished transmitter / amplifier rack placed at the front of the small room.



Interestingly enough, after re-installing the DVR in the new open receiver rack, I found a problem with one of the three DTMF decoders that I had built into the DVR several years back for the DARA ATV repeater. This particular decoder controls screen selection on the DVR that conditions and distributes four separate ATV receiver screens into the voter. It's odd how things can break simply sitting in a box waiting for a re-install! I will be swapping out the DVR / DTMF decoder with a spare that I had on the shelf in "standby", and that will give me the opportunity to troubleshoot the decoder function and R&R the unit which will then become our "new spare". We also had a small video gain adjustment box that ended up missing in action. Not sure where it went, but it could have easily gotten lost in the shuffle. I am in the process of fabricating another one as I wait in earnest for a 100-ohm potentiometer from Amazon to arrive on my doorstep.

DARA March 2024 repeater progress…

Bruce K8FIX and I finished the installation over the weekend. All the systems are working superbly well, with no de-sense. Concerns here locally on whether it was a good idea to go with an open rack design, vice the previous cabinet installation that had served the DARA ATV community well for years, ended up being unfounded. Interestingly enough, the old cabinet RF-tight doors were never closed due to in-the-way cabling and air circulation issues, but still worked well with no de-sense. With the new open racks now installed, all of the swapped equipment is exactly the same, minus some new cabling and the separation distances between the two racks. Several new installation features may have indirectly contributed to the open racks' success. The new racks have good physical separation between the receivers and transmitter/amplifier racks. Also, some of the inter-rack RF cabling was switched out as part of this re-rack effort, with the replacement cables being corrugated hardline. As you know, de-sense that could occur within the repeater room likely may have been further reduced since received power decreases in proportion to the square of the distance. This separation went from approximately 2 feet, to about 7 feet, possibly representing an additional 6 to 10 dB isolation between the two racks candidate RF leakage points. Also, 12 ft runs of audio, video and control lines were placed inside a deep U-channel aluminum beam that served also has stiffening up the two new unsupported racks. The beauty of the open rack design makes it so much easier to work on the equipment! Bruce's expertise in "making things neat" and his skills at cable lacing in the avionics industry paid off. We were able to finish this work ahead of schedule for the Hamvention!

AMAZING 70CM BAND OPENING ON SATURDAY

We had a really excellent band opening on 70cm ATV Saturday March 16. We exchanged both analog (P-5) and digital video (closed circuit quality) at 90 miles+, **using only 2 watts**. W8URI, AH2AR, W8KHP, WB8YIF and N8KKY participated in this unusual Saturday morning band opening. That's all for now... See you during Net Time!
…Dave AH2AR

NARROW BANDWIDTH DVB-T EXPERIMENTATION

I received this e-mail from Rick WA6NUT and definitely want to pass this along.…Dave AH2AR

Hi Dave! On the ATV net last week, you mentioned that some ATV'ers in your area were interested in DX operation at lower bandwidths. Reduced bandwidth operation for DX is common in Europe, especially at 70 cm and lower frequencies. I've provided links to PDF documents showing how I've implemented DVB-T at 500K and 125K bandwidths. There are many ways to do this -- this is only one -- not necessarily the best way. I've found that, with my setup, operation at 125K requires less tweaking (no retuning) than at 500K. All my operation has been on 70 cm, using Pluto (TX) and RTL-SDR V3 (RX) SDR hardware. Here's some links:

"Digital Amateur Television on a Budget: A Software Approach": This PDF is from a PowerPoint presentation, with local references. Includes block diagrams of my setup.
https://www.qsl.net/wa6nut/WA6NUT%20DATV%20Presentation.pdf

"Operating Instructions DVB-T ATV Setup": Shows TX and RX setup at WA6NUT. I'm currently using a different RX setup, using software from F4FDW (see next PDF below).
https://www.qsl.net/wa6nut/DVB-T%20Operating%20InstructionsB.pdf

"Operating Instructions F4FDW DVB-T Receiver v.4.2 (Python)": F4FDW's receiver software uses a combination of GNU Radio and Python.
https://www.qsl.net/wa6nut/F4FDW%20Python%20RX.pdf

I provided links instead of providing them as attachments because I can update the online documents as I discover new information.…Rick. Thanks Rick! That's all for now... See you during Net Time!
…Cheers Dave AH2AR

ATV ANTENNAS

(*from Boulder Amateur Television ClubTV Repeater's REPEATER February, 2024)*

Jim, KH6HTV, we have finally finished testing 70 cm & 23 cm antennas for possible use in ATV service. Here is our list of recommended antennas.

RECOMMENDED ANTENNAS for ATV Service:

Yagi Antennas: M-Squared, model 440-6SS (70 cm, 10 dBi)
Directive Systems, model DSE2414LYRMK (23 cm, 15 dBi)
Antennas-Amplfiers, model 70cm23cm11WB (70cm, 8dBi & 23cm, 11dBi)
Base Station: Diamond, model X50NA (70 cm, 6 dBi)
Diamond, model X6000A (qualified endorsement, 23 cm only, 7 dBi do not use on 70 cm,)
HT Antenna: Diamond, model SRH999 (70 cm, +1.5 dBi & 23 cm, +3.5 dBi)
Bingfu, model BFN00606 (70 cm, +1.5 dBi)
Mobile Antenna: Diamond, model NR2000N (70 cm, 5 dBi & 23 cm, 7.5 dBi)
We have written documentation of our testing. It is on-line at our web site: ***www.kh6htv.com***

HAMTV IS BACK! (Digital ATV IN SPACE STATION)

HAMTV is the name of the Digital Amateur Television (DATV) transmitter on board the Columbus module of the International Space Station (ISS). It transmits Digital video and audio in MPEG-2 format using the DVB-S protocol in the 13 cm band. (2395 MHz)

The original HamTV unit was installed on the ISS in 2013, commissioned in April 2014 and was used for a number of ARISS school contacts in 2016 - 2018.

The unit failed in 2019, and was brought back to earth for repair. It was recently returned to the ISS on the SpaceX SpX-30 flight on March 21st 2024 and it is hoped that it will be recommissioned by a visiting astronaut within a few weeks of its arrival.

HAMTV specifications

Ham Video RF Transmission

- 2395 MHz (main operating frequency)

The HAMTV transmitter produces 10 watts RF. This is then fed through a series of interconnecting cables and a bandpass filter before passing through the ISS Columbus module external wall. Estimated power at the antenna is approx. 2 watts.

DVB-S modulation

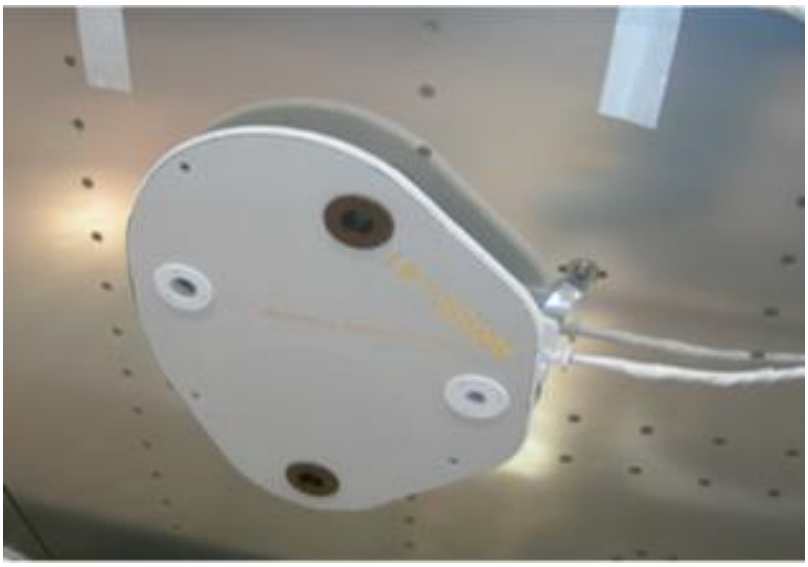
- Symbol rates: 2.0 Ms/s
- FEC : ½
- Rolloff: 35%

TS format

- MPEG-2 Video, approx. 1 Mbits/s, PID 256
- MP2 Audio, approx 360kb/s, PID 257
- Null padding, PID 8191
- NTSC
- SIF resolution: 352×240 or D1:720×480, 29.97fps
- Note: non-square pixels are used, the 4:3 picture is stretched to 16:9 for correct visual aspect ratio.

MPEG-TS Recordings of previous transmissions can be found at live.ariss.org/media/HAMTV Recordings/

ISS HAMTV antenna



The HamTV transmission runs relatively low power on 2395MHz to a simple patch antenna on the ISS.

This patch antenna is located on the earth facing side of the ISS but there are many other items that project below the antenna and may cause reflections. These include the solar panels, thermal radiator panels, sometimes, two or more visiting vehicles and robotic arms. Depending upon your location in respect to the ISS, these projections may result in strong reflected signals as well as the one from the patch antenna itself. They may cause disturbances to the signal level you receive.

The ISS also “flies” slightly nose down to protect the cupola windows from space debris and so the RF performance, particularly when it is rising from the west, is slightly unpredictable.

The transmissions are right hand circular polarized (RHCP)

What is HAMTV used for?

The primary use is for ARISS school contacts, when the astronaut will use a camera to show live video of himself and the inside of the ISS to the school during the VHF radio contact.

It is hoped in the future that test patterns, including JPEG images, will be transmitted when the cameras are not in use. Note this will NOT happen when HAMTV is recommissioned in Spring / Summer 2024.

When will HAMTV be "on the air"?

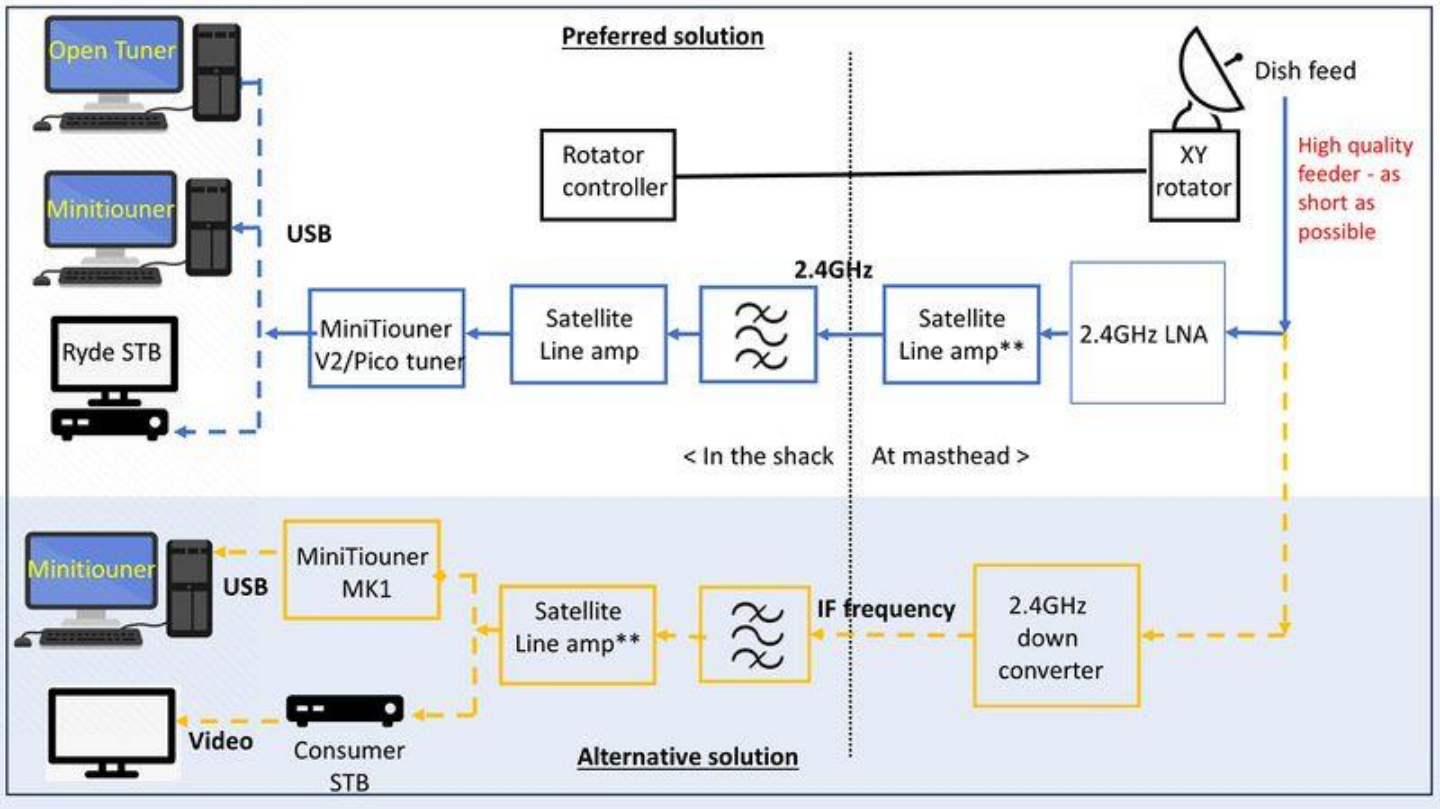
Once re-commissioned, HAMTV will be tested before school contacts are undertaken, however it is unlikely that the transmitter will be left on air 24/7.

During the first flight on the ISS between 2014 and 2018 it was used primarily for ARISS schools contacts but transmitter was left on at other times but no video was transmitted. This did allow ground stations to test their receive equipment and it is hoped an ID test signal generator will eventually be included, perhaps in 2025.

HamTV will be added to the AMSAT status page https://www.amsat.org/status/ - always check there before doing any receive tests.

How to receive HAMTV?

There are a number of challenges to receive HAMTV from the ISS and a typical ground station is made up of the elements shown in the diagram.



* The LNA / Downconverter should be placed as close as possible to the dish feed and high quality microwave cable must be used.
* The upper blue-boxes option is the preferred solution for new builders.
* In the blue-boxes option the line amplifier and filters are at 2.4Ghz and GOOD (not cheap) quality satellite co-ax must be used to avoid the RF level being too low at the receiver.
* The satellite line amplifiers are required to ensure there is enough signal at the receiver input - these may be placed at masthead or in the shack
* The filters are essential, not nice to have!
* The Minitiouner V2 / Pico tuner USB receiver can be connected to **EITHER** a PC running OpenTuner or Minitiouner software or a Pi4 based Ryde set top box receiver.

NEW ELEMENT DISCOVERED!

Physicists at the University of Colorado recently announced the discovery of the heaviest element yet known to science. This new element has been tentatively named "Administratium". Administratium has 1 neutron, 12 assistant neutrons, 75 deputy neutrons, and 111 assistant deputy neutrons, giving it an atomic mass of 312. Each Administratium atom is held together by sub-atomic particles called morons, which are surrounded by vast quantities of lepton-like particles called peons. Since Administratium has no electrons, it is inert. However, it can be detected as it impedes every reaction with which it comes into contact. A minute amount of Administratium caused one reaction to take over 4 days when it would normally take less than a second. Administratium has a normal half-life of 3 years; it does not decay but instead undergoes a reorganization, in which a portion of the assistant neutrons and deputy neutrons and assistant deputy neutrons exchange places. In fact, Administratium's mass will actually increase over time, since each reorganization causes some morons to become neutrons forming isodopes. This characteristic of moron-promotion leads some scientists to speculate that Administratium is formed whenever morons reach a certain quantity in concentration. This hypothetical quantity is referred to as "Critical Morass."

DATV AMPLIFIER OVER-DRIVE

(from Boulder Amateur Television Club TV Repeater's REPEATER March, 2024 issue #156)
Good info to keep in mind. However, don't lose sight of keeping the spectrum as clean as possible. Sometimes you don't have much control over the signal to noise ratio (s/n) because of the lack of measurement equipment. Therefore, do this simple test: with wattmeter in line, increase RF drive signal gradually. Notice output power change. Stop increasing when the output changes little or not at all when drive is increased. That's the point where the final amplifier becomes non-linear and s/n decreases ***Keep it there!*** *....WA8RMC*

Recently one of the Boulder ATV hams posed the question --- ***"Why when I over-drive my amplifier don't I see a degradation in the S/N at the repeater?"***
We have always preached the DTV rule that we don't want to drive our rf power amplifiers any harder than that level which creates the out of channel inter-mod spectrum growth with a shoulder break-point at -30 dB below the in-band rf power level. (Note: This measurement is made by first measuring the rf power at the center frequency. Then measuring the rf power on the shoulders at a point 200 kHz beyond the TV channel band-edges.)
So, this called for still yet another experiment. I set up a bench test using a Hi-Des HV-320E modulator driving a model UWB-103 broad-band amplifier (250 kHz-3 GHz, 20 dB gain, +22 dBm (sat) to various levels of saturation creating the spectrums shown above in the photo. By over-driving this amp, the out of channel, inter-mod spectrum grew very rapidly. The worst-case shoulders I was able to create was with a -16 dB break-point. This gave me the ability to test a DTV receiver with various levels of shoulder break-points. I then attenuated this signal by 60 dB to avoid overloading the front end of the DTV receiver. I used a Hi-Des HV-110 because of its capability to measure and display both the received signal strength in dBm and also the received signal to noise ratio in dB. There are three types of constellations available with DVB-T, namely QPSK, 16QAM, and 64QAM. The respective max. S/Ns for these are: 23 dB, 26 dB and 32 dB. I set the modulator's digital parameters to HDMI in, H.264 encoding, 1080P resolution, 5.5 Mbps, 5/6 FEC and 1/16 Guard. At this setting, the min. required S/N was 8 dB (QPSK), 14 dB (64QAM) or 21 dB (64QAM). I then tested all 3 constellations. Here are the conclusions from my over-drive tests:
QPSK --- The s/n stayed at max. 23 dB until the shoulder break-points dropped below -21dB. The receiver continued to decode successfully with s/n = 12 dB at -16 dB shoulders.
16QAM --- The s/n stayed at max. 26 dB until the shoulder break-points dropped below -25 dB. The receiver stopped working at -17 dB shoulders.
64QAM --- The s/n stayed at max. 32 dB until the shoulder break-points dropped below -30 dB. The receiver stopped working at -23 dB shoulders.
QPSK works better than QAM in much the same fashion as FM outperforms AM. QPSK being purely phase shift keying is independent of amplitude variations, is much more like FM. QAM adds amplitude modulation on top of phase shift keying and thus starts to suffer the well-known AM limitation. So why should we stop at -30 dB shoulders? As hams we always want to put out the absolute most RF power possible. At -30 dB shoulders, we have an acceptable compromise between putting out a strong, in channel signal and keeping to a minimum our pollution of the spectrum in the adjacent TV channels. Plus, as we saw above, if we were using 64QAM, we would start to degrade the quality of the DTV signal if the shoulders got any worse than -30 dB.
… Jim Andrews, KH6HTV, Boulder, Colorado

DUPLEXERS & TRIPLEXERS for ATV ANTENNAS

(From Boulder Amateur Television Club TV Repeater's REPEATER April, 2024)

These duplexers (band splitters if you will) are valuable in repeater service to feed multiple band signals to a single multiband antenna through a common feedline or multi band receivers from a multi band antenna through a common feedline. The ATCO repeater uses a 2-port duplexer to connect a 436 MHz transmitter and 147.48MHz receiver to a single 2M/70cm dual band antenna with a single 7/8 Heliax feedline...WA8RMC

We often find it useful to be able to use a single coax cable to handle multiple antennas, or multiple bands with a multiband antenna. For this purpose, both Diamond and Comet offer excellent filters Diamond MX-72A Diamond MX-3000N called a Duplexer (1 in / 2 out) and a Triplexer (1 in / 3 out). These contain either two or three filters with a common input port. A Low Pass Filter (LPF) which passes DC up to a higher cut-off frequency. A High Pass Filter (HPF) which blocks DC and low frequencies, but passes un-attenuated the high frequencies. For the triplexer, there is also a Band-Pass Filter (BPF) which has both low and high frequency cutoffs and only passes a narrow band of frequencies.

I am showing here in this newsletter actual measurements on the performance of the Diamond filters. The Diamond MX-72A is intended for service as a 2 m / 70 cm Duplexer. It sells for $55 at HRO. The Diamond MX-3000N is intended for service as a 2 m / 70 cm / 23 cm Triplexer. It sells for $90 at HRO. I did swept frequency tests on them. The dynamic range of the swept frequency test was not sufficient to show some of the really high insertion losses in these filters, so single frequency CW tests were also performed and tabulated below. …KH6HTV

Diamond MX72A 2m/70cm Duplexer -- Insertion Loss

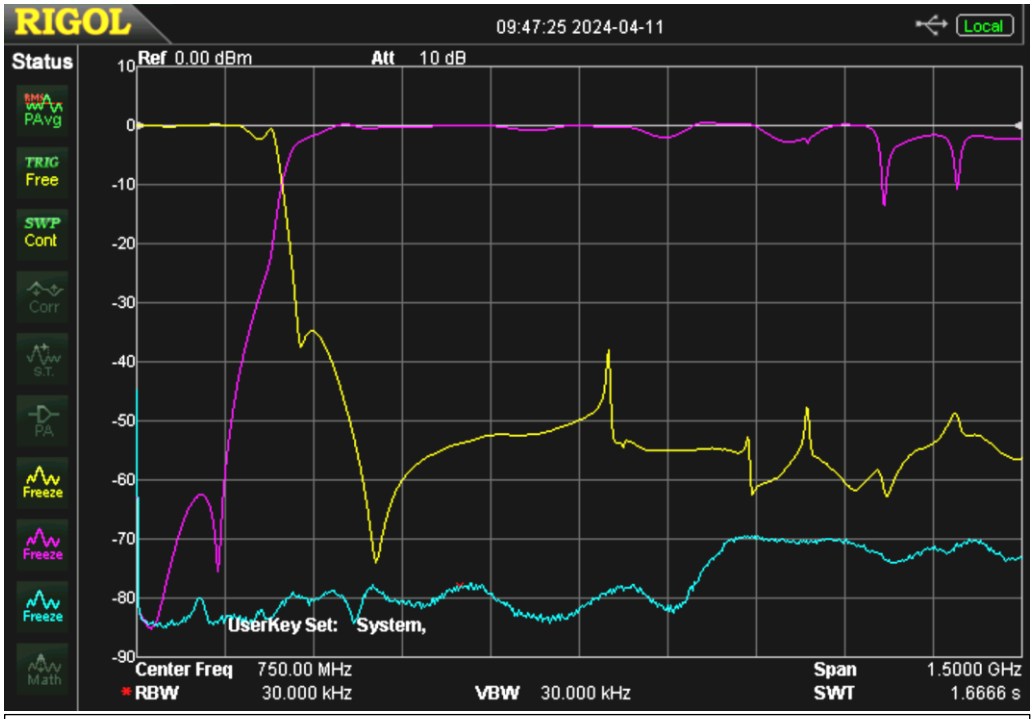
port 1 = input, port 2 = LPF, port 3 = HPF

S parameter	146 MHz	435 MHz	915 MHz	1270 MHz
S21	**-0.08dB**	-63dB	-50dB	-63dB
S31	-65dB	**-0.27dB**	**-1.67dB**	-11.6dB
S32	-67dB	-62dB	-59dB	-58dB

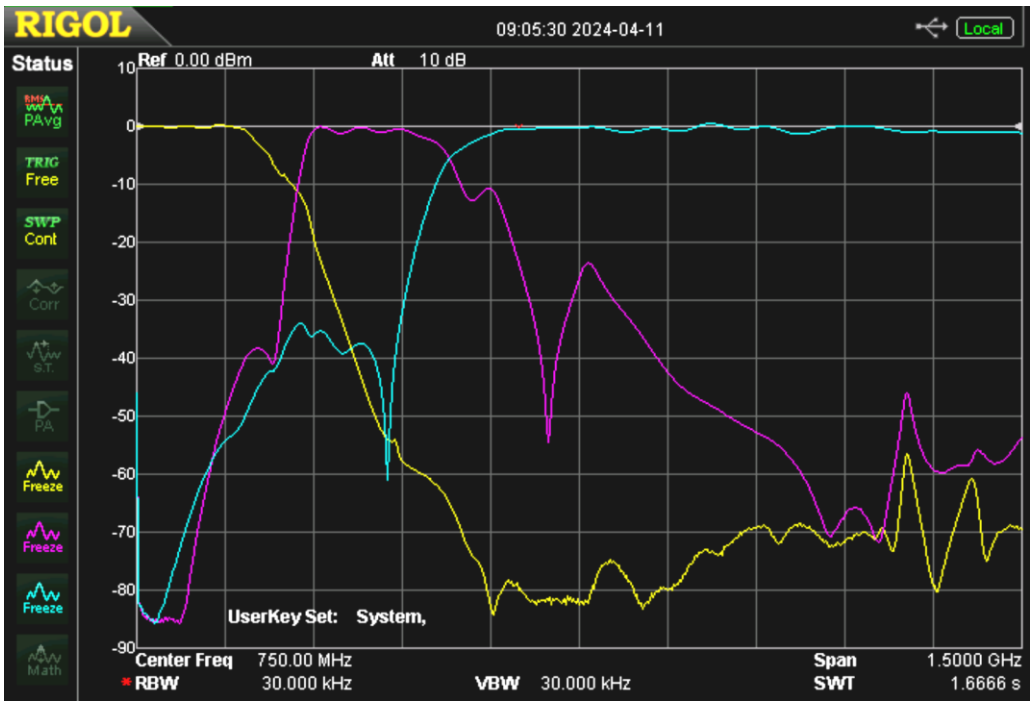
Diamond MX3000N 2m/70cm/23cm Triplexer -- Insertion Loss

port 1 = input, port 2 = LPF, port 3 = BPF, port 4 = HPF

S parameter	146 MHz	435 MHz	915 MHz	1270 MHz
S21	**-0.21dB**	-55dB	-91dB	-78dB
S31	-52dB	**-0.46dB**	-43dB	-63dB
S41	-56dB	-44dB	-.65dB	-.63dB
S32	-52dB	-54dB	-71dB	-66dB
S42	-55dB	-82dB	-93dB	-76dB
S43	-99dB	-46dB	-42dB	-65dB



Diamond MX72A 2m/70cm Duplexer *(note: cyan trace is system lower limit)*
yellow trace is 2 m LPF output.
magenta trace is 70 cm HPF output.



Diamond MX3000N 2m/70cm/23cm Triplexer
Swept Frequency Test from 0 to 1.5 GHz. 10 dB/div & 150 MHz/div.
yellow trace is 2 m LPF output, magenta trace is 70 cm BPF output
cyan trace is 23 cm HPF output.

DEEP SPACE COMMUNICATION

From IEEE Spectrum. By Willie D. Jones 18 Apr 2024 https://apple.news/AncypUMgvRPC9Tp_GsWFnBw
50 Years Later, This Apollo-Era Antenna Still Talks to Voyager 2

Guys, we need something like this for our DATV work! Talk about a popularity contest! That would do it! My antenna has about a 5-degree beamwidth. I've got some work to do to compete with one with 0.0039 degrees!. …WA8RMC

DSS-43 is the only antenna that can communicate with the probe

The Deep Space Station 43 radio antenna, located at the Canberra Deep Space Communication Complex in Australia, keeps open the line of communication between humans and probes during NASA missions.
Carole Lloyd/Alamy
ieee history nasa space antenna ieee milestone ieee history center

For more than 50 years, Deep Space Station 43 has been an invaluable tool for space probes as they explore our solar system and push into the beyond. The DSS-43 radio antenna, located at the Canberra Deep Space Communication Complex, near Canberra, Australia, keeps open the line of communication between humans and probes during NASA missions.

Today more than 40 percent of all data retrieved by celestial explorers, including Voyagers, New Horizons, and the Mars Curiosity rover, comes through DSS-43.

"As Australia's largest antenna, DSS-43 has provided two-way communication with dozens of robotic spacecraft," IEEE President-Elect Kathleen Kramer said during a ceremony where the antenna was recognized as an IEEE Milestone. It has supported missions, Kramer noted, "from the Apollo program and NASA's Mars exploration rovers such as Spirit and Opportunity to the Voyagers' grand tour of the solar system.

"In fact," she said, "it is the only antenna remaining on Earth capable of communicating with Voyager 2."

Why NASA needed DSS-43

Maintaining two-way contact with spacecraft hurtling billions of kilometers away across the solar system is no mean feat. Researchers at NASA's Jet Propulsion Laboratory, in Pasadena, Calif., knew that communication with distant space probes would require a dish antenna with unprecedented accuracy. In 1964 they built DSS-42—DSS-43's predecessor—to support NASA's Mariner 4 spacecraftas it performed the first-ever successful flyby of Mars in July 1965. The antenna had a 26-meter-diameter dish. Along with two other antennas at JPL and in Spain, DSS-42 obtained the first close-up images of Mars. DSS-42 was retired in 2000.

NASA engineers predicted that to carry out missions beyond Mars, the space agency needed more sensitive antennas. So in 1969 they began work on DSS-43, which has a 64-meter-diameter dish.

DSS-43 was brought online in December 1972—just in time to receive video and audio transmissions sent by Apollo 17 from the surface of the moon. It had greater reach and sensitivity than DSS-42 even after 42's dish was upgraded in the early 1980s.

The gap between the two antennas' capabilities widened in 1987, when DSS-43 was equipped with a 70-meter dish in anticipation of Voyager 2's 1989 encounter with the planet Neptune.

DSS-43 has been indispensable in maintaining contact with the deep-space probe ever since.

The dish's size isn't its only remarkable feature. The dish's manufacturer took great pains to ensure that its surface had no bumps or rough spots. The smoother the dish surface, the better it is at focusing incident waves onto the signal detector so there's a higher signal-to-noise ratio.

DSS-43 boasts a pointing accuracy of 0.005 degrees (18 arc seconds)—which is important for ensuring that it is pointed directly at the receiver on a distant spacecraft. Voyager 2 broadcasts using a 23-watt radio. But by the time the signals traverse the multibillion-kilometer distance from the heliopause to Earth, their power has faded to a level 20 billion times weaker than what is needed to run a digital watch. Capturing every bit of the incident signals is crucial to gathering useful information from the transmissions.

The antenna has a transmitter capable of 400 kilowatts, with a beam width of 0.0038 degrees. Without the 1987 upgrade, signals sent from DSS-43 to a spacecraft venturing outside the solar system likely never would reach their target.

NASA's Deep Space Network

The Canberra Deep Space Complex, where DSS-43 resides, is one of three such tracking stations operated by JPL. The other two are DSS-11 at the Goldstone Deep Space Communications Complex near Barstow, Calif., and DSS-63 at the Madrid Deep Space Communications Complex in Robledo de Chavela, Spain. Together, the facilities make up the Deep Space Network, which is the most sensitive scientific telecommunications system on the planet, according to NASA. At any given time, the network is tracking dozens of spacecraft carrying out scientific missions. The three facilities are spaced about 120 degrees longitude apart. The strategic placement ensures that as the Earth rotates, at least one of the antennas has a line of sight to an object being tracked, at least for those close to the plane of the solar system.

But DSS-43 is the only member of the trio that can maintain contact with Voyager 2. Ever since its flyby of Neptune's moon Triton in 1989, Voyager 2 has been on a trajectory below the plane of the planets, so that it no longer has a line of sight with any radio antennas in the Earth's Northern Hemisphere.

To ensure that DSS-43 can still place the longest of long-distance calls, the antenna underwent a round of updates in 2020. A new X-band cone was installed. DSS-43 transmits radio signals in the X (8 to 12 gigahertz) and S (2 to 4 GHz) bands; it can receive signals in the X, S, L (1 to 2 GHz), and K (12 to 40 GHz) bands. The dish's pointing accuracy also was tested and recertified.

Once the updates were completed, test commands were sent to Voyager 2. After about 37 hours, DSS-43 received a response from the space probe confirming it had received the call, and it executed the test commands with no issues.

DSS-43 is still relaying signals between Earth and Voyager 2, which passed the heliopause in 2018 and is now some 20 billion km from Earth.

[From left] IEEE Region 10 director Lance Fung, Kevin Furguson, IEEE President-Elect Kathleen Kramer, and Ambarish Natu, past chair of the IEEE Australian Capital Territory Section at the IEEE Milestone dedication ceremony held at the Canberra Deep Space Communication Complex in Australia. Furguson is the director of the complex.Ambarish Natu

Other important missions

DSS-43 has played a vital role in missions closer to Earth as well, including NASA's Mars Science Laboratory mission. When the space agency sent Curiosity, a golf cart–size rover, to explore the Gale crater and Mount Sharp on Mars in 2011, DSS-43 tracked Curiosity as it made its nail-biting seven-minute descent into Mars's atmosphere. It took roughly 20 minutes for radio signals to traverse the 320-million km distance between Mars and Earth, and then DSS-43 delivered the good news: The rover had landed safely and was operational.

"NASA plans to send future generations of astronauts from the Moon to Mars, and DSS-43 will play an important role as part of NASA's Deep Space Network," says Ambarish Natu, an IEEE senior member who is a past chair of the IEEE Australian Capital Territory (ACT) Section.

DSS-43 was honored with an IEEE Milestone in March during a ceremony held at the Canberra Deep Space Communication Complex.

"This is the second IEEE Milestone recognition given in Australia, and the first for ACT," Lance Fung, IEEE Region 10 director, said during the ceremony. A plaque recognizing the technology is now displayed at the complex. It reads:

First operational in 1972 and later upgraded in 1987, Deep Space Station 43 (DSS-43) is a steerable parabolic antenna that supported the Apollo 17 lunar mission, Viking Mars landers, Pioneer and Mariner planetary probes, and Voyager's encounters with Jupiter, Saturn, Uranus, and Neptune. Planning for many robotic and human missions to explore the solar system and beyond has included DSS-43 for critical communications and tracking in NASA's Deep Space Network.

Administered by the IEEE History Center and supported by donors, the Milestone program recognizes outstanding technical developments around the world. The IEEE Australian Capital Territory Section sponsored the nomination.

USA ATV REPEATER DIRECTORY April 2024

NOTES:

1. All repeaters are NTSC, VUSB-TV, 6 MHz channel, unless otherwise noted. Some repeaters use non-standard lower sideband inputs VLSB to reduce interference with FM repeaters in upper portion of band. The frequency listed is the video carrier frequency.
2. Digital TV lists center frequency. 6 MHz channel, unless otherwise noted. dt = DVB-T, ds = DVB-S, da = ATSC
3. For full details, go to the listed web site, or send an e-mail to the contact person
4. Some ATV groups also post repeater info on www.qrz.com under their call sign

Location	Call Sign	Output(s)	Input(s)	Modes	Web Site & Contact for info
ARIZONA					note: AZ is linked to W6ATN in S. CA & NV www.atn-tv.org
Phoenix, White Tank	W7ATN	1253.25	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	wb9kmo@gmail.com kwjacob@icsaero.com
Mesa	W7ATN	421.25 1289.25 dt	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	wb9kmo@gmail.com kwjacob@icsaero.com
Tucson, Mt. Lemmon	W7ATN	1277.25	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	wb9kmo@gmail.com kwjacob@icsaero.com
CALIFORNIA					W6ATN rptrs linked to AZ & NV
Orange Santiago Peak	W6ATN	1253.25 5910 fm	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Los Angeles, central Mt. Wilson	W6ATN	1265.25	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Los Angeles, north Oat Mtn.	W6ATN	919.25 3380 fm	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Jobs Peak	W6ATN	1253.25	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
San Bernardino Snow Peak	W6ATN	1242 / 4 dt	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Santa Barbara	WB9KMO	1289.25	434.0 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wb9kmo@gmail.com linked with W6ATN
San Diego	KD6ILO	423 dt 1243 dt 1268 ds	441 dt 1286 ds 5885 fm	DVB-T, DVB-S, FM	kd6ilo@yahoo.com also AREDN mesh
San Jose	W6SVA	427.25	910 fm, 1255 fm	VUSB, FM	www.k6ben.com :w2nyc@pacbell.net
Clayton	W6CX	1244.5 ds	1292.5 1273 915 ds 1273 fm	DVB-S, FM	www.mdarc.org info@mdarc.org
Palomar	W6NWG	1241.25	915 fm 2441.5 fm	VUSB, FM DVB-S	w6nwg@palomararc.org mountain.michelle@gmail.com
COLORADO					
Boulder	W0BTV	423 / 6 dt or 421.25 5905 FM	1243 / 6 dt 441 / 6 dt 439.25	DVB-T, VUSB, FM	www.kh6htv.com kh6htv@arrl.net
Pueblo	W0PHC	423 / 6 dt	441 / 6 dt	DVB-T	billn@billnicoll.com www.puebloradio.org
DELAWARE					
Wilmigton	KC3AM	423 / 6 dt	439.25 LSB	DVB-T AM	KC3AM@verizon.net qrz.com
FLORIDA					
Cape Coral	W1RP	421.25	439.25	VUSB	paul@cardlink.com
Cocoa Beach	K4ATV	427.2	439.25	VUSB	www.lisats.org
Panama City	KV4ATV	434.0	919.25	?	kv4atv@gmail.com
S.W. Idaho	WI7ATV	1257 fm	426.25	VUSB, FM	ka7anm@yahoo.com under construction
IOWA					
Davenport	W0BXR	421.25	439.25	VUSB	http://www.arcsupport.com/drac/

Location	Call	Output	Input(s)	Modes	Web Site &

	Sign				Contact for info
KANSAS					
Wichita	KA0TV	421.25	439.25	VUSB	k0wws@arrl.net
KENTUCKY					
Bowling Green	KY4TV	421.25 423.0 /2	439.25 1280 fm	VUSB FM DVB-T	w4htb@ieee.org www.qrz.com www.atn-tv.org
LOUISIANA					
New Orleans	WD0GIV	421.25	439.25	VUSB	wd0giv@att.net
MARYLAND					
Laurel	W3BAB	421.25	434.0	VUSB	www.qsl.net/w3bab
Towson	W3BAB	1291 fm	434	VUSB, FM	www.qsl.net/w3bab
Baltimore	W3WCQ	439.25 911.25	426.25 1253.25	VUSB	http://bratsatv.org/ brats@bratsatv.org
MICHIGAN					
Jackson	KC8LMI	923.25	439.25, LSB	VUSB	KC8LMI@hotmail.com
Grand Rapids	K8DMR	421.25	439.25	VUSB	ron_fredricks@att.net
Flushing	KC8KCG	1253.25	439.25 LSB	AM	kf8ui@mscginc.org
Flint	KC8KGZ	1253.25	439.25	VUSB	www.mscginc.org kf8ui@mscginc.org
MINNESOTA					
Wabasha	KD0HWX	421.25	439.25	VUSB	jonmcpete@yahoo.com
MISSOURI					
St. Louis	W0ATN	426 / 4 dt	440 / 4 dt	DVB-T	k0pfx@arrl.net
NEBRASKA					
Omaha	WB0CMC	421.25	434.0	VUSB	wb0cmc@cox.net
NEVADA					
Las Vegas	N7ZEV	1253.25 912 fm	434.0 434.0 / 2 dt 2441 fm	VUSB FM DVB-T	frank.n7zev@gmail.com linked to W6ATN S. CA & AZ
NEW JERSEY					
Vernon	W2VER	5885 fm	5665 fm	FM	jaythienel@yahoo.com
OHIO					
Columbus	WR8ATV	423 / 2 dt 427.25 1258 fm 1268 ds 2397 mesh 10350 fm	439 / 2 dt 439.25 1288 fm 1288 ds 10450 fm	VUSB AM FM DVB-T DVB-S MESH	www.ATCO.tv gkenmorris@gmail.com towslee1@ee.net
Dayton	W8BI	421.25 428 / 2 dt 1258 fm	439.25 439 / 2 dt 1280 fm 1280 dt	VUSB FM DVB-T	www.w8bi.org dpel@aaahawk.com
Van Wert	W8FY	434.0	923.25	VUSB	ka8zge@w8fy.org
OREGON					
Portland	W7AMQ	1257 fm	426.25	FM VUSB	belles73@comcast.net
Portland	WB2QHS	426.0	910 fm	VUSB FM	emellnik@emavideo.com
PENNSYLVANIA					
Delaware County	KC3AM	421.25	439.25 LSB	VLSB AM	KC3AM@verizon.net
PUERTO RICO					
Aguas Buenas	KP4IA	426.25	439.25 1252 fm	VUSB FM	kp4ia@yahoo.com
WASHINGTON					
Seattle	WW7ATS	1253.25	434.0	VUSB	https://www.qsl.net/ww7ats/ ww7ats@gmail.com qrz.com

Revision Notes:
Aug. 2019 --(1) corrected data for Kentucky (2) changed call sign for Boulder, CO Sept. 2019 - -added Pueblo, CO
Oct. 2019 --added San Diego, CA Feb. 2020 -- changed K6BEN to W6SVA, CA --added KC8KGZ, MI Mar. 2020 -- added Davenport, IA May 2020 -- corrected typos Jan. 2021 -- updated Boulder, CO repeater info June 2021 -- found 20 more ATV repeaters listed on www.repeaterbook.com -- attempted to contact all of their trustees to confirm them. Most are obsolete listings and are no longer on the air. Added only two -- Cocoa Beach, FL, Wichita, KS,
April 2023 – re-configured most listings, added 1280 for W8BI

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.

04/27/2024 - Tusco Amateur Radio Club
Location: Dover, OH
Type: ARRL Hamfest
Sponsor: Tusco Amateur Radio Club W8ZX
Website: http://www.w8zx.net/hamfes

04/28/2024 - Athens Hamfest
Location: Athens, OH
Type: ARRL Hamfest
Sponsor: Athens County Amateur Radio Association
Website: https://www.ac-ara.org/

05/05/2024 Lucas County ARES Trunk/Swap Meet
Location: Toledo, OH
Type: ARRL Hamfest
Sponsor: Lucas County ARES
Website: http://lucasares.org

05/11/2024 - 05/16/2024
RV Radio Network
Location: Millersburg, OH
Type: ARRL Convention
Sponsor: RV Radio Network

5/16/2024 - 05/19/2024
Four Days In May
Location: Fairborn, OH
Type: ARRL Convention
Sponsor: QRP Amateur Radio Club International
Website: http://qrparci.org/fdim

05/17/2024 - 05/19/2024
Dayton Hamvention, ARRL National Convention
Location: Xenia, OH
Type: ARRL Convention
Sponsor: Dayton Amateur Radio Association
Website: https://hamvention.org
Learn More

06/01/2024 - FCARC Summer Hamfest
Location: Wauseon, OH
Type: ARRL Hamfest
Sponsor: Fulton County Amateur Radio Club
Website: https://k8bxq.org/hamfest

07/06/2024 - Mansfield Mid Summer Trunkfest
Location: Mansfield, OH
Type: ARRL Hamfest
Sponsor: Intercity Amateur Radio Club
Website: http://W8WE.ORG

07/20/2024 - Ashtabula County Hamfest 2024
Location: Pierpont, OH
Type: ARRL Hamfest
Sponsor: Amigos Radio Club Ashtabula
Website: https://sites.google.com/view/arca-home/

07/21/2024 - Van Wert Hamfest
Location: Van Wert, OH
Type: ARRL Hamfest
Sponsor: Van Wert Amateur Radio Club
Website: http://w8fy.org

08/03/2024 - 2024 Columbus Hamfest
Location: Grove City, OH
Type: ARRL Hamfest
Sponsor: Aladdin Shrine Audio Unit
Website: http://www.columbushamfest.com

WEDNESDAY NITE ZOOM NET

Every Tuesday night @ 8:00 PM WA8RMC **used to** host a net for ATV topic discussion. However, in order to consolidate the two nets, ATCO on Tue. and the DARA on Wed. we'd like to have only one net on Wednesday, same time at 8 PM. We'll rotate the net control host duty so you won't be bored with just me. All are invited as we get check-ins from all around the USA and sometimes from international participants. We normally have 12-20 check-ins.

To join ZOOM for the first time, simply type **https://zoom.us/join** then download, install the .exe program and run it. ZOOM will start. Click on **join**, enter the **9670918666 meeting ID** then the **191593 password.** Use video or just audio if you don't have a camera.

ATCO TREASURER REPORT - de N8NT

OPENING BALANCE (01/15/24)…….$ 5270.58
(2) HV-110 receivers – one for RPTR spare (1) for Hamvention donation……..…...$ (226.10)
Web site domain fee……$ (60.00)
CLOSING BALANCE (04/20/24) ……... $ 4984.48

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris W8RUT
Treasurer: Bob Tournoux N8NT

Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Secretary: Mark Cring N8COO
Newsletter editor: Art Towslee WA8RMC

Corporate trustees: Same as officers

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 MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. It is now a free publication.

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.

Your support of ATCO is welcomed and encouraged.

ATCO REPEATER TECHNICAL DATA SUMMARY

Location:	Downtown Columbus, Ohio
Coordinates:	39 degrees 57 minutes 47 seconds (latitude) 82 degrees 59 minutes 58 seconds (longitude)
Elevation:	630 feet above the average street level of 760 feet ASL (1390 feet above sea level)
TV Transmitters:	423.00 MHz DVB-T, 10W FEC=7/8, Guard=1/32, Const=QPSK, FFT=2K, BW=2 MHz, PMT=4095, PCR=256, Vid=256, Aud=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 SR=3.125MS, FEC=3/4, PMT=32, Video=162, Teletext=304, PCR=133, Audio=88, Service =5004) **Two video channels on this output:** Channel 1 is fed from all receivers. Channel 2 is fed from 439.25 analog receiver.
	2397 MHz Mesh Net transceiver 600 mw output (channel 1 minus 2). ID is WR8ATV-2
	10.350 GHz: 1W continuous analog FM
Link transmitter:	446.350 MHz: 5W NBFM 5 kHz audio. This output used for control signals & to repeat 147.48 MHz and 449.975 MHz input.
Identification:	423, 427, 1258, 1268 MHz, 10.350 GHz transmitters video ID every 10 min. with active video and information bulletin board every 30 min.
	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 - Single slot rib cage horizontally polarized 3 dBd 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 minus 2 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 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. (Input here = output on all TV transmitters)
	439.250 MHz - A5 NTSC video with FM subcarrier audio, Upper sideband. (Input here = output on all TV transmitters & also direct output to 1268 MHz DVB-S output channel 2.)
	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 SR=4.167MS, fec=7/8. PIDs: PMT=133, PCR=33, Vid=33, Aud=49 (In here=out on all Trans.)
	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)
	439.00/439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west (Shared with 439 digital & 439.25 analog 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 MESH is 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)**
	001	Select 2398 MHz receiver then 00# for auto scan to continue
Manual mode analog) Functions:	00* then 1 for Ch. 1	Select 439.25 analog /439 digital receiver (if video present on digital, it is selected. Otherwise,
	00* then 2 for Ch. 2	Select 1288 digital receiver
	00* then 3 for Ch. 3	Select 1288 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 analog/439 digital rcvr. scan enable (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 April 2024

Call	Name	Address	City	St	Zip
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703
AH2AR	Dave Pelaez	1348 Leaf Tree Lane	Vandalia	OH	45377
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
N8COO	C Mark Cring	8774 Jersey Mill Rd	Alexandria	OH	43001
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026
KB8EMD	Larry Baker	4330 Chippewa Trail	Jamestown	OH	45335-1210
WB4IR	Bob Holden	7725 Tressa Circle	Powell	TN	37849
WA8HFK,KC8HIP	Frank & Pat Amore	P.O. Box 2252	Helendale	CA	92342-2252
W8KHP	Allen Vinegar	2043 Treetop Lane	Hebron	Ky	41048
WA8KKN	Chuck Wood	5322 Spruce Lane	Westerville	OH	43082-9005
WB9KMO	Rod Fritz	8334 E. Culver Street	Mesa	AZ	85207
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	135 Barrett Hill Road	Center Rutland	Vt	05736
W8NX, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015
WU8O	Tom Walter	15704 St Rt 161 W	Plain City	OH	43064
KB8OFF	Jess Nicely	1888 Woods Drive	Beavercreek	OH	45432
W6ORG,WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201-2636
WA8RMC	Art Towslee	438 Maplebrooke Dr W	Westerville	OH	43082
W8RUT,N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021
KB8RVI	Dave Jenkins	100 Miller Ave Apt. 108	Ashville	OH	43103
WA8RR	Richard Robbins	10483 Cambridge Place	Powell	OH	43065
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904
W8RXX, KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101
WA8UZP	James Reed	818 Northwest Blvd	Columbus	OH	43212
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	4080 Dill Road	Centerburg	OH	43011-9771
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064
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
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371

ATCO Newsletter
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