ATCO NEWSLETTER

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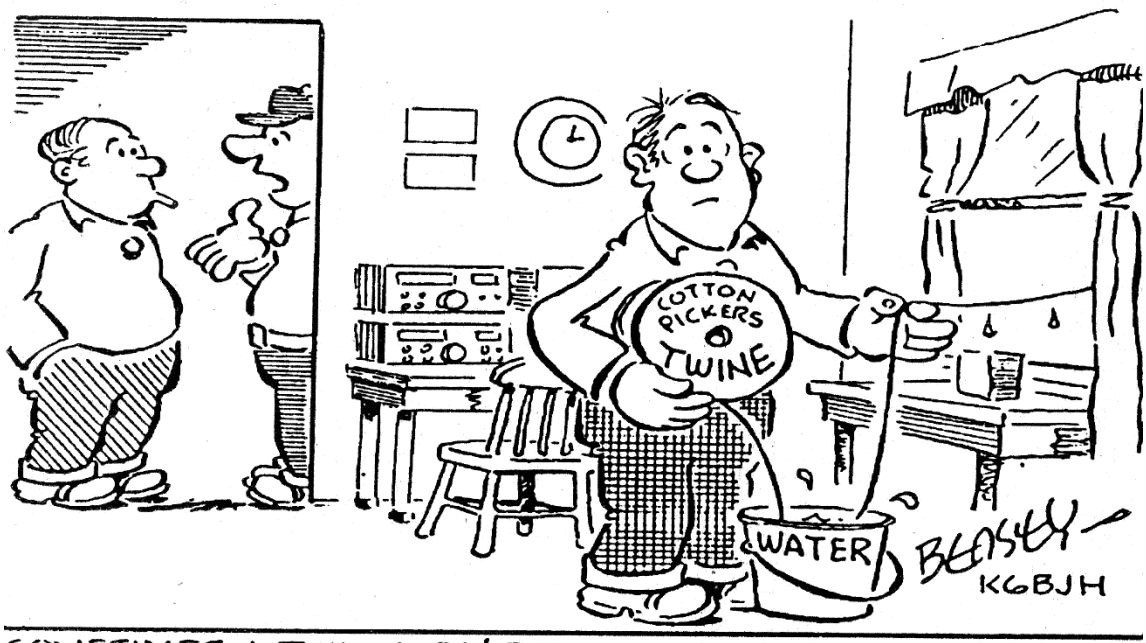
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" published quarterly (January, April, July, October)

ATCO SPOTLIGHT TOPIC



SOMETIMES I THINK OL' RON JUST USES A PIECE OF WET STRING FOR AN ANTENNA

ACTIVITIES ... from my Workbench

Hello again ATVers! I hope you had a joyous and safe holiday season! I assume there were ATV presents under the tree for you. Now, it's the first of a new year with associated new opportunities. There is little to report about the ATCO repeater. It is alive and well. The bulletin board function is operable but not enabled at this time. That's mainly due to my "laziness" in not getting material organized and installed on disk. I'll put that on my list for later this year.

I DO have a new antenna and filter combination installed for the 147.48 MHz FM input at the ATCO repeater. It is ready to go on-line but I have not enabled it yet by connecting the coax to the receiver. The existing antenna and feedline is still in operation. I want to check the existing system sensitivity with the existing components first to establish a baseline. Then I'll switch it over to see if it yields an improvement. The new antenna is a single band 2-meter Diamond F23A unit with 7.8dB gain. The existing antenna is a dual band Diamond X50A antenna with 4.5dB gain. The existing 147.48 MHz dual cavity filter has ~2dB loss through it and associated band splitter filter adds another 1dB loss. The new replacement 11" diameter cavity filter has a loss of only 1dB so the new combination should produce about 5.3dB more gain. That's significant so receive sensitivity will improve.

IMPORTANT CLUB CHANGE NOTE:
Due to declining ATCO membership but sufficient ATCO treasury funds, I decided to suspend **membership dues** effective January 1, 2024 until further notice. All present members, old members and guests presently receiving the ATCO quarterly Newsletters will continue to automatically receive them for free sent out in January, April, July and October. They will be considered to be members. I have disabled the website PayPal section so if anyone attempts to pay ATCO dues, it will not be accepted. I'm going to continue sending out ATCO Newsletters via Email to all. If anyone presently receiving them that does **not** want one, reply to this Email asking to be removed from my list. Likewise, if there is anyone not presently getting a Newsletter and **would like one**, send me an Email asking to be added to my "membership" list. **Let's hope getting a free Newsletter 4 times a year will inspire ATVers to become more active**.

If there becomes a time when we run low on operational funds, we may re-instate a dues requirement or ask for donations. Until then, enjoy the free Newsletter. Send me any information you feel may be Newsletter worthy so I can edit and include it. (Please, I will not send hard copy mailings anymore). Experiences you had or items you built are great to read about! If you can point me to an existing article that I can re-publish, or know of a good joke that would be great too. I'll do the work to secure permission if required for re-publication. Non-ATV articles are OK too if they have interest to the average Ham.

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 ~11AM. Building to be announced. More info in next Newsletter.

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.

Now, back to work on this Newsletter. Have a happy and safe New Year!!!
…WA8RMC

FCC 60 METER BAND POWER REDUCTIONS

From ARRL bulletin see www.arrl.org/60-meter-band. For more detail

The FCC has issued Notice of Proposed Rulemaking's (NPRM) Docket Number 23-120 which would reduce power on 60 meters from 100 watts ERP (Effective Radiated Power) to the equivalent of 9.5 watts ERP. The NPRM would replace the current five channels (currently each with a 100-watt power limit) with a 15 KHz continuous spectrum from 5351.5 to 5366.5 KHz, but limiting power to the equivalent of 9.5 watts ERP. ARRL is proposed 15 KHz of continuous spectrum, all at a power level of 100 watts ERP.

It's important to note that in 2022 our neighbor, Canada, enacted RRL's position by keeping the five current channels AND adding the expanded 15 KHz of continuous spectrum, all at 100 watts. ARRL is advocating for the FCC to adopt the identical allocations and power limits which Canada put in place over a year ago.

When the FCC authorized 60-meter access for Amateur Radio operators in July 2003, the Commission cited the positive propagation attributes for emergency communications. Over the past twenty years during hurricanes, Caribbean Amateur Radio stations used 60 meters to relay critical weather and situational reports to U.S. operators. Clearly, 9.5 watts ERP would be woefully inadequate to maintain communications for these purposes.

In the May 2023 ARRL survey, members overwhelmingly pointed to Spectrum Defense as the #1 priority of the League. The Great Lakes Division takes this priority seriously. For the maximum impact, the FCC needs to hear from ARRL members in Kentucky, Michigan and Ohio to underscore the importance of 60 meters in our densely populated region on the eastern seaboard situated between active hurricane zones and our nation's capital of Washington, DC. Having a consistent band plan with Canada will also ensure harmonious communications throughout most of North America.

ARRL RESPONSE TO AMATEUR ACCESS ON 3.5 GHZ BAND

The following is a chronology of ARRL efforts related to the FCC's proposal and decision that orders the "sunsetting" of the 3.3 – 3.5-GHz amateur radio secondary spectrum allocation. It is in descending chronological order, with the first actions at the bottom of the page and the latest presented first. It is comprised of items as reported by ARRL as well as ARRL comments and interactions filed with the FCC in response to the proposal.

Current status: Secondary operations are permitted to continue indefinitely in the remainder of the band, 3.3 – 3.45 GHz, pending future FCC proceedings.

While Amateur Radio access to the 3.3-3.5 GHz band is no longer codified in Part 97, per Footnote 103 (US103) to the U.S. Table of Frequency Allocations (47 C.F.R. 2.106), Amateur Radio Secondary operations are permitted to continue indefinitely in the 3.3 - 3.45 GHz band pending future FCC proceedings.

The footnote reads: "In the band 3300-3550 MHz, non-Federal stations in the radiolocation service that were licensed (or licensed pursuant to applications accepted for filing) before February 22, 2019 may continue to operate on a secondary basis until 180 days after the issuance of the first flexible-use licenses in the 3.45 GHz Service. No new assignments shall be made. **In the band 3300-3500 MHz, stations in the amateur service may continue to operate on a secondary basis until new flexible-use licenses are issued for operation in the band in which they operate. Amateur operations between 3450 MHz and 3500 MHz must cease within 90 days of the public notice announcing the close of the auction for the 3.45 GHz Service. Stations in the amateur service may continue to operate in the band 3300-3450 MHz on a secondary basis while the band's future uses are finalized, but stations in the amateur service may be required to cease operations in the band 3300-3450 MHz at any time if the amateur service causes harmful interference to flexible-use operations."**

2M, 70CM and 23CM BAND PLAN SUMMARY

The ARRL has suggested we follow the band plans shown in part here. This is only a reference to be used for future frequency planning. For full details see ARRL web page at https://www.arrl.org/band-plan.

2 Meters (144-148 MHz)

144.00-144.05	EME (CW)
144.05-144.10	General CW and weak signals
144.10-144.20	EME and weak-signal SSB
144.200	National calling frequency
144.200-144.275	General SSB operation
144.275-144.300	Propagation beacons
144.30-144.50	New OSCAR subband
144.50-144.60	Linear translator inputs
144.60-144.90	FM repeater inputs
144.90-145.10	Weak signal and FM simplex 145.01,03,05,07,09 used for packet
145.10-145.20	Linear translator outputs
145.20-145.50	FM repeater outputs
145.50-145.80	Misc. and experimental modes
145.80-146.00	OSCAR subband
146.01-146.37	Repeater inputs
146.40-146.58	Simplex – Sometimes
146.52	National Simplex Calling Frequency
146.61-146.97	Repeater outputs
147.00-147.39	Repeater outputs
147.42-147.57	Simplex
147.60-147.99	Repeater inputs

70 Centimeters (420-450 MHz)

420.00-426.00	ATV repeater or simplex with 421.25 MHz video carrier control links and experimental
426.00-432.00	ATV simplex with 427.250 MHz video carrier frequency
432.00-432.07	EME (Earth-Moon-Earth)
432.07-432.10	Weak-signal CW
432.10	70-cm calling frequency
432.10-432.30	Mixed-mode & weak-signal work
432.30-432.40	Propagation beacons
432.40-433.00	Mixed-mode & weak-signal work
433.00-435.00	Auxiliary/repeater links
435.00-438.00	Satellite only (internationally)
438.00-444.00	ATV repeater input. 439.250 MHz video carrier frequency & repeater links
442.00-445.00	Repeater inputs and outputs (local option)
445.00-447.00	Shared by auxiliary & control links repeaters and simplex (local option)
446.00	National simplex frequency
447.00-450.00	Repeater inputs & outputs (local option)

23 Centimeters (1240-1300 MHz)

Frequency Range	**Suggested Emission Types**	**Functional Use**
1240.00-1246.000	ATV	ATV Channel #1
1246.000-1248.000	FM, digital	Point-to-point links paired with 1258.000-1260.000
1248.000-1252.000	Digital	
1252.000-1258.000	ATV	ATV Channel #2
1258.000-1260.000	FM, digital	Point-to-point links paired with 1246.000-1248.000
1240.000-1260.000	FM ATV	Regional option
1260.000-1270.000	Various	Satellite uplinks, Experimental Simplex ATV
1270.000-1276.000	FM, digital	Repeater inputs 25 kHz channel Spacing paired with 1282.000-1288.000
1270.000-1274.000	FM, digital	Repeater inputs 25 kHz channel spacing, paired with 1290.000-1294.000
1276.000-1282.000	ATV	ATV Channel #3
1282.000-1288.000	FM, digital	Repeater outputs, 25 kHz channel spacing, paired with 1270.000-1276.000
1288.000-1294.000	Various	Broadband Experimental Simplex ATV
1290.000-1294.000	FM, digital	Repeater outputs, 25 kHz channel spacing, paired with 1270.000-1274.000
1294.000-1295.000	FM	FM simplex
	FM	National FM simplex calling frequency 1294.500
1295.000-1297.000		Narrow Band Segment
1295.000-1295.800	Various	Narrow Band Image, Experimental
1295.800-1296.080	CW, SSB, digital	EME
1296.080-1296.200	CW, SSB	Weak Signal
	CW, SSB	CW, SSB calling frequency 1296.100
1296.200-1296.400	CW, digital	Beacons
1296.400-1297.000	Various	General Narrow Band
1297.000-1300.000	Digital	

EARLY TELEVISON

*Here is a great early television summary by Roger Salaman, K0IHX progress originally in the Boulder, Co. Television Club newsletter November 2023. Thanks to Jim, KH6HTV. …*WA8RMC

The first regularly scheduled television service in the United States began on July 2, 1928, fifteen months before the United Kingdom. The Federal Radio Commission authorized C. F. Jenkins to broadcast from experimental station W3XK in Wheaton Maryland, a suburb of Washington, D.C. For at least the first eighteen months, 48-line silhouette images from motion picture film were broadcast, although beginning in the summer of 1929 he occasionally broadcast in halftones.

WRGB claims to be the world's oldest television station, tracing its roots to an experimental station founded on January 13, 1928, broadcasting from the General Electric factory in Schenectady, NY, under the call letters W2XB. It was popularly known as "WGY Television" after its sister radio station.

Later in 1928, General Electric started a second facility, this one in New York City, which had the call letters W2XBS and which today is known as WNBC. The two stations were experimental in nature and had no regular programming, as receivers were operated by engineers within the company. The image of a Felix the Cat doll rotating on a turntable was broadcast for 2 hours every day for several years as new technology was being tested by the engineers.

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

The FCC adopted NTSC television engineering standards on May 2, 1941, calling for 525 lines of vertical resolution, 30 frames per second with interlaced scanning, 60 fields per second, and sound carried by frequency modulation. Sets sold since 1939 that were built for slightly lower resolution could still be adjusted to receive the new standard. The FCC saw television ready for commercial licensing, and the first such licenses were issued to NBC and CBS owned stations in New York on July 1, 1941, followed by Philco's station WPTZ in Philadelphia.

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

By 1947, when there were 40 million radios in the U.S., there were about 44,000 television sets (with probably 30,000 in the New York area). Regular network television broadcasts began on NBC on a three-station network linking New York with the Capital District and Philadelphia in 1944 on the DuMont Television Network in 1946 and on CBS and ABC in 1948.

The New Haven Connecticut TV Station, WNHC-TV went on the air June 15, 1948, as channel 6, six days after WBZ-TV in Boston, thus just missing being the first operational television station in New England. WNHC was the first TV service for Hartford, Springfield, the Hamptons, and Eastern Long Island. In 1946, Roger had built multiple element antennas and mounted them on home roofs so long- distance reception of television signals from New York city was possible. WNHC-TV moved to channel 8 on January 1, 1954. The call letters then became WTNH in 1971.

WNHC, with transmitter located on Gaylord Mountain, 8 miles from New Haven, was the first station to bring network TV to Connecticut. WNHC was the first DuMont affiliate. In the 1946, DuMont began operation as America's fourth television network with headquarters and television station WABD in New York City. Hindered by a lack of primary stations, a small budget and being forced to utilize UHF affiliates in an era when UHF was not competitive, DuMont never achieved the success of the other networks, and folded its television network in 1956.

WNHC-TV Transmitter. 1948

WNHC-TV Test Pattern

On its first day of operation, June 15, 1948, WNHC ran shows like Bishop Fulton Sheen's Life is Worth Living. The 1948 Democratic and Republican national conventions, at which Harry Truman and Thomas Dewey were nominated respectfully, were also broadcast live. At this early stage of television, newscaster Ben Grauer provided a real-time view of the transmitter and antenna on the Empire State Building. Television was very informal, and the newscasters did not wear coats. Bob Smith and Claribel in the Howdy Doddy show, 1948 As television programing developed, WNHC-TV ran top NBC shows such as Milton Berle, Bob Hope, Dragnet, Perry Como, Groucho Marx, the Today show, Mr. Wizard, and the daily News Caravan with John Cameron Swayze, the original evening network newscast. It ran top CBS shows such as Ed Sullivan. Arthur Godfrey, Lucille Ball, Phil Silvers, Jack Benny, Burns and Allen and Red Skeleton. It ran top ABC shows such as Ozzie and Harriet, American Bandstand with Dick Clark, Walter Winchell, Lawrence Welk, Leave it to Beaver, the Brady Bunch, Dick Cavett and Nightline with Ted Koppel. In its earliest decades, ABC was oriented to the youth market.

On June 25, 1948, our parents invited a full living room of friends over to watch the Joe Louis, Jersey Joe Walcott boxing match on two 10 inch black and white television sets that Roy Jr. and Roger built. The 10-inch tube was the largest that could be manufactured at that time. Therefore, Transvision developed an oil filed lens that could be placed in front of the tube to enlarge the picture. Joe Louis defeated Jersey Joe Walcott in an 11 round bout thus retaining the world heavyweight boxing championship.

In 1948, with television just starting after World War II, Roger and his brother, Roy Jr. visited the WNHC-TV transmitter after reading in the New Haven Register about the Elm City Broadcasting Company building of the television station for New Haven. Roy and Roger talked to the chief engineer, Mr. deLaurentis, who said Roy who was 18 years old, could work as a TV cameraman in the studio and Roger who was 16 years old and a Freshman at New Haven High School, was given the job to run the relay station on Oxford Hill, Connecticut. Since Roger didn't have a First-Class Radio Telephone License, Mr. deLaurentis said he should obtain a Third-Class Radio Telephone License and tell anyone that he was supervised by a First-Class Licensee, Mr. deLorentis. Therefore, while in high school in 1948, Roger ran and maintained the television relay station in Oxford, Connecticut. This station received New York television signals (on an RCA 630 conventional television receiver), processed the signals and relayed them by microwave to the new, New Haven, Connecticut television station WNHC- TV.

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

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

The New York signals from WABD, CBS, and NBC were received on a yagi antenna mounted at the top of the wooden pole. Later Roger built and installed a sloping-V antenna to improve the TV reception. The signal was fed inside the relay station to a fixed frequency crystal receiver tuned to receive the WABD signal on Channel 5. The signal from the antenna was also fed to an RCA 630 television set to receive the signals from CBS and NBC on Channels 2 and 4. Roger's job was to assure the relay station operated correctly to receive the WABD, WCBS and WNBC signals, convert the correct signal, according to the schedule of which station was to be carried by WNHC-TV at that particular time, to microwave, and beam it to the WNHC-TV transmitter on Gaylord Mountain. The WNHC-TV transmitter personnel and Roger established communications by normal telephone calls.

New England Hurricanes There were other externalities associated with this job. Hurricanes Edna, Carol and Hazel pounded New England in the 1950's, and knocked the relay station as well as the New Haven television station WNHC-TV off the air. To get the Oxford Hill relay station on the air as soon as possible, Roger drove around debris-littered roads, and activated an emergency power generator at the relay station. Roger put the relay station on the air, providing the New Haven area with information concerning the hurricane. 73 de Roger, K0IHX, Boulder, Colorado as you can tell from the above history of TV, Roger is one of TV's pioneers. He and his wife, Naomi, KD0PDZ, were very active Boulder ATVers. The photo on the right was taken off the air from their DVB-T signal in 2018. They participated in every weekly ATV net up to Dec 2021. Unfortunately, their lovely, hand-built home on the top of Davidson Mesa was destroyed in the disastrous Marshall Fire, which also burned down 1000+ other houses, including those of other hams. Roger is now 91 years young. At the present time, they are living in the Sunrise assisted living center in Broomfield. Their Davidson mesa house is being rebuilt and is nearly finished. They hope to be able to move in by the first of December. Their son, Glen, has done a great job working with the general contractor and overseeing the rebuilding.

BANDWIDTH LIMITS REPLACE SYMBOL RATES

From ARRL Headquarters Newington CT December 11, 2023

The Federal Communications Commission (FCC) published new rules adopted last month that replace the symbol rate restrictions on the HF bands with a bandwidth limit of 2.8 kHz. The new rules go into effect January 8, 2024. See https://www.federalregister.gov/documents/2023/12/07/2023-26770/amateur-radio-service-rules-to-permit-greater-flexibility-in-data-communications for further details.

The bands and band segments affected by the rules change are those authorized for data transmission between 160 and 10 meters, exclusive of 60 meters (where no change was made). In adopting a bandwidth limit in place of the baud rate limit the FCC agreed with ARRL that some limitation is necessary because "without a baud rate or bandwidth limit, data stations using a large amount of spectrum for a single emission could do so to the detriment of simultaneous use by other stations using narrowband emission modes."

ARRL has advocated for this change for a long time. The move opens amateur data communications to faster and more modern modes and restores the incentive for amateurs to experiment with and develop faster and more efficient data methods. Previously, ARRL obtained waivers to the symbol rate rules on a case-by-case

basis to facilitate communications during situations like hurricane responses. These delays will now be removed, permitting drills to be conducted with the faster modes and more timely responses when needed. The FCC also requested comment on removing similar symbol rate restrictions in the rules governing 135.7 - 137.8 kHz (2200-meter band), 472 - 479 kHz (630-meter band), and the very high-frequency (VHF) and ultra-high frequency (UHF) bands.

The VHF bands with baud rates are the 6-meter band, 2-meter band, and the 1.25-meter band. The single UHF band with a baud rate is the 70-centimeter band (420 - 450 MHz). The Further Notice of Proposed Rule Making (FNPRM) proposes to maintain the existing bandwidth limits in the Commission's rules for these VHF and UHF bands but seeks comment on whether they should be kept, and if so, whether the bandwidths should be changed. The Commission also sought comment on whether bandwidth limits should be adopted for application to the 2200 and 630-meter bands, and if so, what an appropriate bandwidth limit would be.

Public comments on these additional issues are sought in the FNPRM. The comment period is open until January 8, 2024. Replies to comments are due no later than January 22, 2024. If changes are later adopted, rules will go into effect in the same manner for the other bands -- after notice and publication in the Federal Register.

The ARRL follows up with additional comments:
From ARRL Headquarters Newington CT January 12, 2024
The ARRL responded to the Federal Communications Commission's (FCC) request for comments on removing the symbol (baud) rate restrictions that apply to data communications on the LF bands and the VHF and UHF bands below 450 MHz. The FCC also requested comments on the bandwidth limits applicable to those bands.

The FCC's action follows their 2023 decision to remove the symbol (baud) rate limits on the 160- to 10-meter amateur bands. Those limits were replaced with a 2.8 kHz bandwidth limit, a move ARRL had long advocated for. The FCC's Further Notice of Proposed Rulemaking sought comments on updating the other amateur bands on which its symbol (baud) rate limits continue to throttle faster data rates. The subject bands are the LF bands (2200 and 630 meters) and the VHF and UHF bands below 450 MHz. In its comments, ARRL strongly agreed with the FCC's proposal to remove the symbol (baud) rate limits on the remaining bands.

ARRL's comments also noted that CW operation is protected in the lower 100 kHz of the 6- and 2-meter bands and will continue to be so protected, but otherwise, all modes are permitted in the remainder of the subject VHF and UHF bands with only the data modes subject to bandwidth restrictions below 450 MHz that vary by band. The bandwidth restrictions uniquely applicable to data modes have resulted in the other modes being permitted to use many times the bandwidth of data modes in an intermixed fashion determined by those using the bands. For the data modes, however, the limits have limited experimentation with techniques already in use in other countries on amateur VHF and UHF bands.

ARRL concluded that the FCC should also remove the bandwidth limits that apply uniquely to the data modes on the subject bands, and instead, amateurs rely on voluntary band plans and local agreements, as they already do with regard to the mix of the other modes ranging from Morse code (CW) signals of 50 Hz or so (depending upon speed) to amateur television that employs signals of 6 or more MHz. ARRL also noted that the limited propagation range on the subject bands enables local cooperation that is not possible on the HF bands where propagation is such that signals can cover the globe. The bands addressed in this rulemaking are:

* 135.7 - 137.8 kHz (2200-meter) and 472 - 479 kHz (630-meter) bands.
* 50.1 - 54 MHz (6-meter) and 144.1 - 148 MHz (2-meter) bands.
* 219 - 220 MHz (1.25-meter digital) bands.
* 222 - 225 MHz (1.25-meter) and 420 - 450 MHz (70-centimeter) bands.

The public period for reply comments remains open until January 22, 2024. An ARRL guide to filing comments is available at, https://www.arrl.org/arrl-guide-to-filing-comments-with-fcc .

NASA RECEIVES SIGNAL FROM 10 MILLION MILES AWAY.

From "the Independent Newsletter" https://www.independent.co.uk/tech/nasa-laser-beam-space-message-b2452741.html on 11/24/23

Success could transform how spacecraft communicate.

Nasa has received a signal from probe after historic flyby four billion miles away Nasa has received a signal from a spacecraft 10 million miles away. The message, delivered using a distant laser, could "transform" communications with spacecraft, the space agency has said.

It represents a successful test of Nasa's Deep Space Optical Communications or DSOC experiment. It is also the first time that data has been successfully relayed through a laser from further away than the Moon – and marks a rapid increase, at more than 40 times the distance from the lunar surface.

At the moment, almost all communications with craft in deep space is achieved through radio signals, sent and received from vast antennas on Earth. They have proven reliable but their bandwidth is limited, meaning that it is slow or impossible to send large files such as high-definition photos and videos.

Nasa's work on DSOC is an attempt to use optical communications through lasers instead. The technology could improve data rates by as much as 100 times, the space agency says.

The first attempt to test the technology beyond the Moon left the Earth on Nasa's Psyche mission, which left Earth last month on a mission to study a distant asteroid. The spacecraft is carrying a laser transceiver than can both send and receive laser signals in near-infrared.

Last week, that equipment locked onto a Nasa laser beacon in California. Nasa says that "first light" breakthrough is one part of a host of experiments that they hope will prove the laser technology can work.

"Achieving first light is one of many critical DSOC milestones in the coming months, paving the way toward higher-data-rate communications capable of sending scientific information, high-definition imagery, and streaming video in support of humanity's next giant leap: sending humans to Mars," said Trudy Kortes, director of technology demonstrations for the Space Technology Mission Directorate at Nasa Headquarters in Washington.

Nasa likens the precision pointing of the laser signal to trying to point a light at a coin from a mile away. What's more, the laser and its target are constantly moving: in the 20 minutes it will take for the light to travel to Earth from Psyche's furthest distance, both the planet and the spacecraft will have moved significantly.

The team will now work to refine the systems that ensure the spacecraft is pointing its lasers in the right direction. When that happens, Nasa will try an experiment to demonstrate that the spacecraft is able to maintain high-bandwidth data transfer at different distances from Earth.

It will do so by breaking the data into bits that can be encoded in the photons of light sent by the spacecraft. That light then arrives at the telescope on Earth and can be reassembled into images or other important data that will be sent by spacecraft and perhaps humans in the future.

DVB-T DIGITAL PARAMETERS -- HOW DO THEY IMPACT SYSTEM PERFORMANCE?

Jim, KH6HTV, did such a wonderful job of defining and explaining basic DVB-T parameters in his Newsletter, I thought it ideal to repeat here. Since most of us in the USA use DVB-T for our DATV operation, we definitely need to understand it better. Granted, DVB-T performs best in mountainous areas like Jim encounters but it also has a place in flat terrain localities like central Ohio where I live. There are pros and cons for DVB-T versus DVB-S but I'll leave that subject for another article. If, for no other reason, let's use this overall most common format in the USA regardless of terrain. So, DVB-T it is!!!...WA8RMC

(I will cover this subject in the Fast Scan ATV Forum at the Dayton Hamvention coming up this May 16 in Xenia, Ohio)

From Boulder Amateur Television Club TV Repeater's REPEATER Newsletter November 2023.

This is a report on some experiments performed to determine the impact of choosing various DVB-T digital parameters upon the sensitivity of a DVB-T receiver. The tests were performed in a perfect lab environment with a coaxial cable connection between the transmitter and receiver. They obviously did not cover all of the nasty issues encountered out in the real world with radiated signals. Issues such as multi-path, mobile flutter, RFI, etc. rear their ugly heads out there. Some of the digital parameters are intended to deal with those but don't necessarily impact receiver sensitivity. To test them, would require additional field testing. The digital parameters considered are those which can be selected on the Hi-Des HV-320 modulator using the windows PC program called AV-Sender. They include:

Media Configuration:

Video Encoding Type: MPEG2 or H.264
Video Encoding Resolution: 15 choices from Auto, 360x480 up to 1920x1080
Max Bit Rate: any value may be entered up to the calculated theoretical upper limit
Video Encoding GOP (Group of Pictures) Length: any integer value. typical is 30 or 60
Video Encoding Frame Rate: we use 30 fps for the USA
Audio Encoding Type: MPEG2, AAC, or AC3, most common is MPEG2
Audio Encoding Rate: 96, 128, 192, or 384 Kbps

Transmission Configuration:

Center Frequency: 100 MHz to 2.6 GHz, in 1 kHz increments
Band-Width: 1.5, 2, 2.5, 3, 4, 5, 6, 7 or 8 MHz
Modulation Method (Constellation): QPSK, 16QAM, or 64QAM
Number of Sub-Carriers (FFT): 2K, 4K, or 8K
FEC - Forward Error Correction (Code Rate): 7/8, 5/6, 3/4, 2/3, or 1/2
Sync (Guard Interval): 1/32, 1/16, 1/8, or 1/4
Modulation Data Rate: *Based upon the choices made in the above Trans. Config. parameters, the computer calculates a theoretical max. possible data rate. This is taken into consideration when selecting the video encoding data rate in the Media Config. Hi-Des recommends that it be set no higher than 80% of the theoretical max. This is to allow for the audio data plus other overhead data to also be transmitted. For very low band-widths, an even lower % should be used.*

"Standard" Parameters: These are the values typically used by the Boulder ATV hams, plus they are used in the Boulder, W0BTV repeater transmitter. Media Configuration: HDMI, H.264, 1920x1080, 5.5 Mbps, 60 GOP, Audio = MPEG2, 96 Kbps Trans Configuration: 6 MHz BW, QPSK, 8K sub-carriers, 5/6 FEC, 1/16 sync

Receiver Parameter Requirements: Fortunately, the DVB-T receivers are "smart". They work automatically with any combination of the above parameters except bandwidth. They will even switch seamlessly if the transmission parameters are changed abruptly mid-steam. The transmitter sends out a meta-data header informing the receivers what it will be using.

Receiver Sensitivity Test Procedure: The transmitter was a Hi-Des model HV-320E modulator. A live HDMI video source was a DVD player playing a live action video with constant motion and audio. The receiver was a Hi-Des model HV-110. Some tests also placed a low noise, pre-amplifier in front of the receiver. The pre-amp was a KH6HTV model 70-LNA. The transmitter and receiver were connected via a long coaxial cable permitting adequate separation between the two units to minimize any residual rf leakage coupling. The internal attenuator in the HV-320 was adjusted to provide exactly 0 dBm rf average power at the far end of the coax cable. Additional attenuation was inserted in front of the receiver with fixed 20dB & 30dB SMA attenuators plus a rotary step attenuator (0 – 69 dB in 1 & 10 dB steps). The step attenuator was adjusted to determine the weakest possible signal which still gave perfect P5 / Q5 video and audio. The signal level and resultant signal / noise ratio were then recorded. An additional 1 dB of attenuation caused either freeze framing or complete loss of signal (the cliff point). This state was also indicated by the Signal LED on the front panel of the HV-110. It flickered red/green. The LED was solid green when receiving a P5 picture.

TEST RESULTS -- RECEIVER SENSITIVITY for VARIOUS DIGITAL PARAMETERS

QPSK vs. 16QAM vs. 64QAM:
All were measured with "standard" parameters. Only items changed were modulation method and video data rate. The "max" values are the calculated theoretical max. possible encoding data rates. Hi-Des recommends we never exceed 80% of the maximum. The measured receive sensitivities and resultant signal to noise ratios were:
QPSK (5.5 Mbps 7.32 max) = -94dBm / 8dB s/n (max s/n = 23 dB)
16QAM (11.5 Mbps, 14.64 max) = -88dBm / 14dB s/n (max s/n = 26 dB)
64QAM (16 Mbps, 21.96 max) = -80dBm / 22dB s/n (max s/n = 32 dB)
16QAM is 6 dB worse and 64QAM is 14 dB worse compared to QPSK

QPSK - vary the Code Rate (i.e. FEC): measured with standard parameters. Only items changed were FEC and video data rate. The measured receiver sensitivities were:
7/8 (6.0 Mbps, 7.68 max) = -93 dBm / 9 dB s/n
5/6 (5.5 Mbps, 7.32 max) = -94 dBm / 8 dB s/n
3/4 (5.0 Mbps, 6.59 max) = -95 dBm / 7 dB s/n
2/3(4.5 Mbps, 5.85 max) = -96 dBm / 6 dB s/n
½ (3.5 Mbps, 4.39 max) = -98 dBm / 5 dB s/n
Conclusion: Each step increase in FEC adds about 1 dB improvement in sensitivity and required s/n but at the expense of considerable reduction in encoding data rate.

QPSK - 6 MHz BW vs. 2 MHz BW: measured with standard parameters. Only items changed were bandwidth and video data rate. The measured receiver sensitivities were:
6 MHz BW (5.5 Mbps, 7.32 max) = -94 dB / 8 dB s/n
2 MHz BW (1.5 Mbps, 2.39 max) = -98 dB / 8 dB s/n
conclusion: Going from 6 to 2 MHz bandwidth buys 4 dB improvement in sensitivity, but at a considerably lower data rate.

MPEG-2 vs. H.264 Video Encoding: No change noted.
Sub-Carriers - 8K vs. 2K: No change noted
Guard Interval (i.e. Sync): Only items changed were guard interval and video data rate. No change noted.
Video Encoding Resolution: No change noted.
Parameters for Best Sensitivity:
6 MHz BW = -98 dBm Trans. Config = QPSK, 8K FFT, 1/2 Code (FEC), 1/16 Guard
Media Config = H.264, 1080P, 2.5 Mbps
2 MHz BW = -102 dBm Trans. Config = QPSK, 8K FFT, 2/3 Code (FEC), 1/16 Guard
Media Config = H.264, 640x480, 1.2 Mbps
Add a Low-Noise PreAmp: measured with standard parameters.

6 MHz BW: HV-110 = -94 dBm 70-LNA + HV-110 = -98 dBm
2 MHz BW: HV-110 = -99 dBm 70-LNA + HV-110 = -102 dBm
Ultimate Performace: Best sensitivity parameters + plus low noise preamp
6 MHz BW = -102 dBm / 5 dB s/n
2 MHz BW = -105 dBm / 6 dB s/n

LNA Conclusion: adding a low noise (NF < 1 dB) preamplifier improves HV-110 receiver sensitivity by about 3-4 dB.

ATN-California, recommended 2 MHz Parameters with 16QAM
Trans. Config = 2 MHz BW, 16QAM, 8K FFT, 3/4 Code (FEC) & 1/16 Guard
Media Config = MPEG2, 1280x720, 2.6 Mbps, & 30 GOP
HV-110 = -93 dBm / 14 dB s/n 70-LNA --> HV-110 = -97 dBm / 13 dB s/n
ADDITIONAL READING: If you want to find out a lot more about the various digital parameters, or anything else about DVB-T, DVB-S, DVB-C, etc., I suggest the book I consider the "Bible" for DTV.
"Digital Video and Audio Broadcasting Technology --- A Practical Engineering Guide" by Walter Fischer (TV engineer at Rhode & Schwartz, Munich, Germany). Springer, 3ed edition, 2010

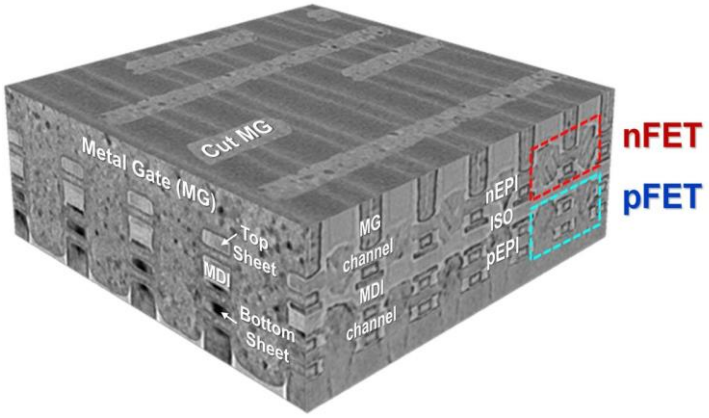
COMPLIMENTARY FIELD EFFECT TRANSISTORS

So, you thought all information in this Newsletter is "LOW TECH"! Think again! Hold onto your hat folks, for the semiconductor explosion is alive and well. It's not that hard to comprehend so bear with us and you'll discover a little bit about the next generation integrated circuits. If you don't try to dig into it too deep, you'll be OK. This is what the new Intel factory being built here near Columbus is going to produce….WA8RMC

From the IEEE Spectrum December 2023). Control click below to see the complete articles.
cfetfinfetiedminterconnectsnanosheetsnanowires

(Moore's Law: **"**The principle that the speed and capability of computers can be expected to double every two years as a result of increases in the number of transistors a microchip can contain. Even if Moore's Law fails in the future, new methods of computing may again set the industry on breakneck development speeds")

Intel, Samsung, and TSMC Demonstrate 3D-Stacked Transistors. Those Big Three companies can now all make CFETs (complimentary field effect transistors) —The next stop on the Moore's Law roadmap.
By Samuel K. Moore (No relationship to Moore's Law)



At the IEEE International Electron Devices Meeting this week, TSMC revealed their take on the CFET—a stack of logic needed for CMOS chips.

A vision for future processors with nearly double the density of transistors is beginning to take shape, now that all three advanced chipmakers have demonstrated CFETS, or complementary field-effect transistors. CFETs are a single structure that stacks both the types of transistors needed for CMOS logic. At the IEEE International Electron Devices Meeting this week in San Francisco, Intel, Samsung, and TSMC showed what progress they've made toward the next evolution in transistors.

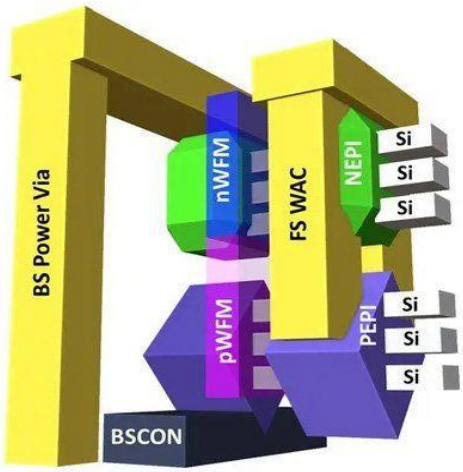
Chip companies are transitioning from the FinFET device structure in use since 2011 to nanosheet, or gate-all-around, transistors. The names reflect the basic structure of the transistor. In the FinFET, the gate controls the flow of current through a vertical silicon fin. In the nanosheet device, that fin is cut into a set of ribbons, each of which is surrounded by the gate. The CFET essentially takes a taller stack of ribbons and uses half for one device and half for the other. This device, as Intel engineers explained in the December 2022 issue of *IEEE Spectrum*, builds the two types of transistor—nFETs and pFETs—on top of each other in a single, integrated process.

Experts estimate CFETs to roll out commercially seven to ten years from now, but there is still a lot of work before they are ready.

Intel's inverter

Intel was earliest of the three to demonstrate the CFET, unveiling an early version at IEDM back in 2020. This time around, Intel is reporting several improvements surrounding the simplest circuit that the CFET makes, an inverter. A CMOS inverter sends the same input voltage to the gates of both devices in the stack and produces an output that is the logical inverse of the input.

“The inverter is done on a single fin,” Marko Radosavljevic, principal engineer at Intel’s components research group, told reporters ahead of the conference. “At maximum scaling, it would be 50 percent” of the size of an ordinary CMOS inverter, he said.



Intel’s inverter circuits depend on a new way of connecting the top and bottom transistors [yellow] and on contacting one of them from beneath the silicon [grey]Intel

The hitch is that squeezing in all the interconnects needed to make that two-transistor stack into an inverter circuit eats away at the area advantage. To keep things tight, Intel tried to remove some of the congestion involved in connecting to the stacked device. In today’s transistors, all the connections come from above the device itself. But later this year, Intel is deploying a technology called backside power delivery that allows interconnects to exist both above and below the surface of the silicon. Using that technology to contact the bottom transistor from below instead of from above significantly simplified the circuit. The resulting inverter had a density quality called contacted poly pitch (CPP, essentially the minimum distance from one transistor gate to the next) of 60 nanometers. Today’s 5 nm node chips have a CPP of about 50 nm.

Additionally, Intel improved the CFET stack’s electrical characteristics by increasing the number of nanosheets per device from two to three, decreasing the separation between the two devices from 50 nm to 30 nm, and using an improved geometry for connecting parts of the device.

Samsung’s secret sauce

Samsung went even smaller than Intel, showing results for 48-nm and 45-nm contacted poly pitch (CPP), compared to Intel’s 60 nm, though these were for individual devices, not complete inverters. Although there was some performance degradation in the smaller of Samsung’s two prototype CFETs, it wasn’t much, and the company’s researchers believe manufacturing process optimization will take care of it.

Crucial to Samsung’s success was the ability to electrically isolate the sources and drains of the stacked pFET and nFET devices. Without adequate isolation, the device, which Samsung calls a 3D stacked FET (3DSFET), will leak current. A key step to achieving that isolation was swapping an etching step involving wet chemicals with a new kind of dry etch. That led to an 80 percent boost in the yield of good devices.
Like Intel, Samsung contacted the bottom of the device from beneath the silicon to save space. However, the Korean chipmaker differed from the American one by using a single nanosheet in each of the paired devices, instead of Intel’s three. According to its researchers, increasing the number of nanosheets will enhance the CFET’s performance.

TSMC takes its shot

Like Samsung, TSMC too managed to get to an industrially-relevant pitch of 48 nm. Its device’s distinctions included a new way to form a dielectric layer between the top and bottom devices to keep them isolated. Nanosheets are generally formed from alternating layers of silicon and silicon germanium. At the appropriate step in the process, a silicon-germanium specific etching method removes that material, releasing the silicon nanowires. For the layer destined to isolate the two devices from each other, TSMC used silicon germanium with an unusually high fraction of germanium, knowing that it would etch away faster than the other SiGe layers. That way the isolation layer could be built several steps before releasing the silicon nanowires.

OK, did you follow that? Me neither. Not important. Just remember you were exposed to it so you can tell others you know “all about that”!
…WA8RMC

WRC-23 REACHES ACCEPTABLE CONCLUSION ON 23 CM ISSUE

From ARRL News bulletin 12/11/2023 https://www.arrl.org/news
From what I understand, the entire 1240-1300 MHz band is open for our use on a ***non-interfering basis.*** *We are secondary so if we interfere with any of the primary users, we have to either change frequency or shut down. That includes staying away from any of the GPS services. In the Columbus, Ohio area we must continue to stay away from 1245-1255 MHz because GLONAS GPS service is presently using it. There used to be a government radar on 1280 MHz but it's gone now so until a primary user shows up, we can use it…WA8RMC*

The International Telecommunication Union (ITU) World Radiocommunication Conference 2023 (WRC-23) continues through December 15, 2023, in Dubai, United Arab Emirates (UAE).

IARU's primary effort focused on Agenda Item 9.1 topic b to address amateur use of the 23-centimeter band and co-frequency use by several radionavigation satellite service (RNSS) systems in the 1240-1300 MHz band.

IARU's work that began 4 years ago with a preparatory study in the ITU Radiocommunication Sector (ITU-R) to address this agenda item has finally come to a close. Our concerted engagement in the ITU-R working parties, study groups, and WRC preparatory meetings ensured that the amateur services were properly represented during the development of two published ITU-R reports: M.2513 and M.2532. An ITU-R Recommendation, M.2164, followed these, which formed the basis for the discussions at WRC-23.

During the WRC-23 deliberations, strong positions were expressed by all parties involved. The result is a well-supported compromise for a footnote in the Radio Regulations regarding amateur and amateur satellite service operation in the 1240 -1300 MHz range. The footnote reminds administrations and amateurs of the need to protect the primary RNSS from interference, and it provides guidance for administrations to allow both services to continue to operate in this portion of the spectrum.

The Conference Plenary compromise was formally adopted on December 8 and is not subject to further consideration during the final week of WRC-23. The IARU team continues its work on other WRC issues, including developing agendas for future conferences.

IARU President Tim Ellam, VE6SH, noted, "This is a very good result for the amateur services. The decision reached at WRC-23 on this agenda item makes no change to the table of allocations nor incorporates by reference M.2164 into the Radio Regulations. The addition of a footnote that provides guidance to administrations in the event of interference to the RNSS is a good regulatory outcome for amateurs and the primary users of this band."

The WRC also agreed to suppress Resolution 774, which closes the issue and satisfies the agenda item.

WRC-23 began on November 20. The IARU team includes: ARRL Technical Relations Specialist Jon Siverling, WB3ERA; Paul Cloverdale, VE3ICV, for Radio Amateurs of Canada; Barry Lewis, G4SJH (IARU AI 9.1b Lead), Flavio Archangelo, PY2ZX, for Liga de Amadores Brasileiros de Rádio Emissão / IARU Region 2; Bernd Mischlewski, DF2ZC, for Deutscher Amateur Radio Club; IARU President Tim Ellam, VE6SH; Murray Niman, G6JYB, for the Radio Society of Great Britain; IARU Vice President Ole Garpestad, LA2RR; IARU Secretary Joel Harrison, W5ZN; Wahyudi Hasbi, YB1PR, for Organisasi Amatir Radio Indonesia; Peter Pokorny, VK2EMR, for the Wireless Institute of Australia; Dale Hughes, VK1DSH, for the Wireless Institute of Australia (SWG4B7 Chair), Roland Turner, 9V1RT, for Singapore Amateur Radio Transmitting Society (IARU), and Ken Yamamoto, JA1CJP, for the Japan Amateur Radio League.

…WA8RMC

ESA EXPLORES POSSIBLE MICROWAVE ATV SATELLITE PAYLOAD

BREAKING NEWS BULLETIN: 21 Dec. 2023 European Space Agency is exploring a possible microwave amateur payload on a satellite for North America, including DTV!
from: Amateur Radio Newsline Report 2407 for Friday December 15th, 2023

Is there room aboard a satellite for a geostationary microwave amateur payload to cover part of North America? Jeremy Boot G4NJH looks at that question.

JEREMY: The European Space Agency has an approved proposal to investigate sharing a commercial geostationary satellite contract to piggy-back a microwave amateur payload on it to cover Europe and part of North America. The investigatory project was presented by ESA's Frank Zeppenfeldt, PDØAP, to the AMSAT-UK Colloquium in Milton Keynes on the 14th of October. Frank described a payload that would have both an amateur radio and educational role, with two uplink transponders on 5.6 GHz and two downlink transponders on 10 GHz the payload would be capable of handling narrow-band modes such as CW and SSB and narrow-band digital modes but would also have the capacity for wide-band modes such as amateur TV. To see Frank's presentation, follow the link to a YouTube video that appears in the text version of this week's newscast at arnewsline.org https://www.youtube.com/watch?v=_FTvlEyDa1Y The proposal from AMSAT-UK and the British Amateur Television Club has input and support from the newly incorporated AMSAT-CA's Technical Working Group as well as from AMSAT-USA. According to a November 30th position paper from AMSAT-CA's president Stefan Wagener, VE4SW, and technical director Levente Buzas, VA7QF, a number of amateur radio satellite associations are helping Frank promote the project to commercial satellite operators in 2024 during the World Satellite Business Week. Stefan told Newsline that Frank hopes to use the QO-100 geostationary amateur payload on Qatar's Es'hail 2 satellite as an example so another commercial partners can be identified to carry a similar payload in a position over the Atlantic to cover Europe and Canada. The study is being undertaken with the help of €250,000 in ESA funds.

USA ATV REPEATER DIRECTORY April 2023

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	1289.25	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
N.E. AZ & NM Green's Peak	W7ATN	1289.25	434.0	VUSB	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 Sign	Output	Input(s)	Modes	Web Site & 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.

01/14/2024
Sunday Creek Amateur Radio Federation Hamfest
Location: Shade, OH
Type: ARRL Hamfest
Sponsor: club members

03/10/2024 - WINTERHAMFEST
Location: Elyria, OH
Type: ARRL Hamfest
Sponsor: Northern Ohio Amateur Radio Society
Website: http://winterhamfest@noars.net

03/17/2024
Toledo Mobile Radio Assoc Hamfest&Computer Fair
Location: Perrysburg, OH
Type: ARRL Hamfest
Sponsor: Toledo Mobile Radio Association
Website: http://www:w8hhf.org

04/13/2024
Cuyahoga Falls Amateur Radio Club 68th Hamfest
Location: Cuyahoga Falls, OH
Type: ARRL Hamfest
Sponsor: Cuyahoga Falls Amateur Radio Club, Inc.
Website: http://www.w8vpv.org/hamfest

04/13/2024
Mid-Ohio Valley Amateur Radio Club
Location: Bidwell, OH
Type: ARRL Hamfest
Sponsor: Mid-Ohio Valley Amateur Radio Club

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

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

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 (10/24/23)..……$ 5253.60
Repeater preamp purchase……$ (93.00)
Money transfer from another account because of deposit error……$ 109.98
CLOSING BALANCE (01/15/24) ……... $ 5270.58

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris W8RUT
Treasurer: Bob Tournoux N8NT
Secretary: Mark Cring N8COO
Corporate trustees: Same as officers
Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Statutory agent: Stan Diggs AA8XA
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 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)	00* then 1 for Ch. 1	Select 439.25 analog /439 digital receiver (if video present on digital, it is selected. Otherwise,
Functions:	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 January 2024

Call	Name	Address	City	St	Zip	
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	
N8COO	C Mark Cring	8774 Jersey Mill Rd	Alexandria	OH	43001	614-836-2521
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785	301-772-7382
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641	
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-405-1710
KB8EMD	Larry Baker	4330 Chippewa Trail	Jamestown	OH	45335-1210	
WB4IR	Bob Holden	7725 Tressa Circle	Powell	TN	37849	865-314 - 4285
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	
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	614-563-7443
W8NX, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856
WU8O	Tom Walter	15704 St Rt 161 W	Plain City	OH	43064	614-309-7134
KB8OFF	Jess Nicely	1888 Woods Drive	Beavercreek	OH	45432	
W6ORG,WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-446-2750
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201-2636	
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	Dave Jenkins	100 Miller Ave Apt. 108	Ashville	OH	43103	740 954-9221
WA8RR	Richard Robbins	10483 Cambridge Place	Powell	OH	43065	
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
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325	
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
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	614-879-9946
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	

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