Signals

The Amateur Radio Journal of the ARRL Eastern Pennsylvania Section

Volume 1, Number 2 **March 2024**

Senate Introduces Bill to End Private Land Use Restrictions on Amateur Radio Antennas

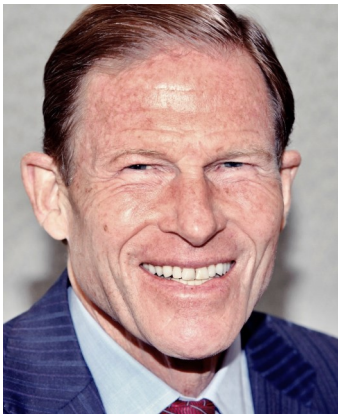
ARRL News

On January 30, 2024, U.S. Senators Roger Wicker, of Mississippi and Richard Blumenthal, of Connecticut, introduced S.3690, the Senate companion bill to H.R. 4006, introduced last June. Both bills reflect the Congressional campaign efforts by the 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. Text of bill S.3690 can be found at this link: **Senate Bill S.3690.**

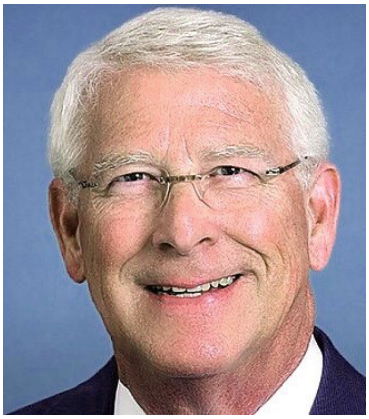
Amateur radio operators are repeatedly relied upon to provide essential communications when disaster strikes, but their ability to do so is being impaired by the exponential growth of residential private land use restrictions that hinder their ability to establish stations in their homes with which to 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 Preparedness Act* resolves these bottlenecks and ensures that radio operators can function successfully."



Sen. Richard Blumenthal (CT)



Sen. Roger Wicker (MS)

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.

Link to companion House Bill H.R. 4006

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Q T X

Bob Wilson, W3BIG
EPA Section Manager

QTX is a Q-code meaning "I will keep my station open for further communication with you."

What a Great *Hobby ?*

I was recently speaking with my good friend and ARRL Atlantic Division Director, Bob Famiglio, K3RF. We were frustrated that a handful of individuals were creating conflicts between clubs, the ensuing squabbles taking the enjoyment out of amateur radio. I stated it's supposed to be fun. It's a hobby.

Bob sighed, replying, "Well, no, it's technically *not* a hobby. Remember, it's the *Amateur Radio Service*." As an experienced attorney and volunteer counsel for the ARRL, Bob has been called upon many times in court, defending the right of hams to erect antennas, explaining why amateur radio is not some whimsical hobby, but rather a radio service comprised of volunteers dedicated to providing emergency radio services when needed by municipalities, states and the federal government.

Too many hams give this fact lip service, but it's the most important reason amateur radio exists and is granted incredible operating privileges in the crowded radio frequency spectrum. Do you really believe the federal government would have been so generous with bandwidth had it not expected something really valuable in return?

The Radio Act of 1912 was the first legislation in the United States requiring all radio stations, including amateur radio, to be licensed. Not long after, following a world war and many widespread disasters, the *Amateur Radio Service* was created to meet important radio communications needs the federal government anticipated.

Codified in **CFR 47, Part 97: Telecommunications**, The *Amateur Radio Service* was created, as stated in Part §97.1, having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

Though we enjoy amateur radio immensely, it's important to keep the concept of *service* foremost when thinking about amateur radio. It's so much more than a hobby. With climate change whipping up more frequent and devastatingly more powerful storms, amateur radio has never been needed more to assist with critical communications during disasters.

Through the Amateur Radio Emergency Service, ARES®, amateur emergency communicators, organized in teams at the county level, are trained and equipped to provide the radio services governments request during disasters and communications outages. Most county emergency management agencies deem the services so valuable they dedicate facilities inside their 911 centers for ARES® teams.

Even though the value of amateur emergency communicators is obvious, ARES® teams continue to operate shorthanded, finding it increasingly difficult to recruit volunteers. In most counties in the EPA, our amateur emcomm teams are stretched way too thin to provide viable communications during incidents lasting more than 24 hours.

Please consider serving with an ARES® team in your county. Your experience with and affinity for amateur radio will be put to good use. Reach out to your county ARES® Emergency Coordinator to volunteer. And, remember why it's called the *Amateur Radio Service.*

Signals

Signals is published bimonthly by the Eastern Pennsylvania Section of the ARRL with the express purpose of communicating information of interest to the Amateur Radio community in the EPA.

Editor: Robert G. Wilson, W3BIG, SM, SEC

Public Information Coord: Robert A. Griffiths, NE3I

Articles, announcements and pictures may be submitted for consideration by emailing the Editor or Public Information Coordinator. All materials are subject to editing for content, accuracy and brevity.

About the EPA

ARRL Eastern Pennsylvania (EPA) Section Statistics

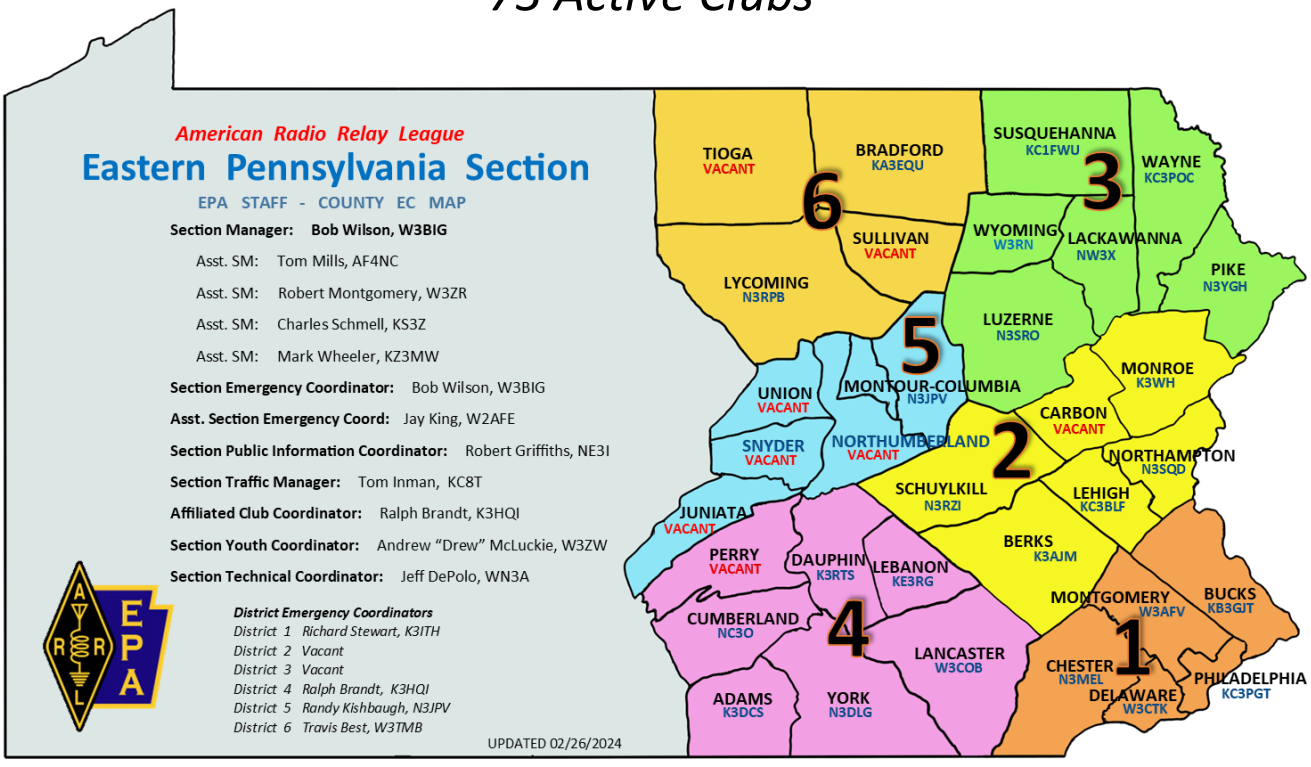
34 Counties

22,000 Square Miles

13,000 plus Licensed Amateur Radio Operators

3,500 plus ARRL members

73 Active Clubs



EPA Districts, County Emergency Coordinators, Leadership Positions

EPA Website Link

Club Corner

Clubs Are the Backbone of Amateur Radio

Bob Wilson, W3BIG

It should come as no surprise that the best aspects of amateur radio originate in our clubs. They attract new hams, train and assist the inexperienced and provide the social fabric that holds our diverse community of individuals together.

In the EPA we have over 70 active amateur radio clubs. Some are more successful than others and the good ones, though unique, share some common characteristics. Here are some of the best aspects of the most successful clubs:

Good Clubs are welcoming. They greet and do their utmost to make all members and newcomers feel the warmth and value of the organization. Their members never ignore a new face but instead make them feel they are joining a special team that values them.

Good clubs are diverse. Members have varied ages, genders, ethnicities and interests. Our most successful clubs are microcosms of our society and they appreciate the diversity of all members—their wisdom, experience, youth and enthusiasm. The best clubs make great use of the diverse skills and experiences. They recognize that everyone has something unique to bring to the table.

Good clubs have broad appeal. Though there are successful *niche clubs,* those that specialize in one aspect of amateur radio, the ones having broad appeal tend to attract and keep the most members. Within successful clubs with broad appeal, there are teams or committees designated to unique areas of interest or expertise. These committees could be dedicated to digital, CW, DXing, contesting, Field Day, POTA, etc.

Good clubs understand the importance of socialization. Though the technology of radio is the main attraction to our clubs, it's the social aspect that brings people together and forms the basis of the organization. Good clubs never underestimate the importance of socialization. The personalities and uniqueness of individual members make our experiences interesting. Good clubs know that the social aspects of our clubs are even more important than technical pursuits in attracting and holding members.

Good clubs are committed to attracting new members. Without new blood, all organizations will literally die out. Attrition will ultimately cause all clubs to contract and then collapse. The best clubs have a dedicated team to attract new members through operating activities, training and social events. Really good clubs hold public events to showcase amateur radio in pursuit of new members.

Good clubs know the importance of training. Amateur radio is a technical enterprise. The act of assembling and operating an amateur radio station in compliance with FCC regulations, and in a manner that is safe, efficient and effective, requires a moderate amount of technical expertise. Though not as challenging as in the days when hams built all their own equipment, amateur radio, in all of its various modes and protocols, still depends on knowledgeable and skilled operators. Good clubs provide forums and sessions to promote education and training. Helping newcomers learn the skills is a basic club tenet.

Good clubs promote a cohesive organization. The really successful clubs are able to provide effective leadership to recognize the importance of everyone and the unique contributions they can offer. They are able to hold in check the often inflated egos of some individuals that may cause dissention and divisiveness that damage or destroy teamwork. Good clubs are able to avoid splinter groups that break away when cliques form and challenge the unity of the organization.

List of Amateur Radio Clubs in the EPA Section

Club Corner

2024 EPA Section Hamfest Calendar

The following hamfests are ARRL affiliated events. Dates of those in *italics are TBA.*

April 27 York Hamfest sponsored by the York Hamfest Foundation. The hamfest is held at Elicker's Grove Park at 511 Roth Church Road, Spring Grove, PA 17362. **Website link**

May 5 Warminster ARC Hamfest sponsored by the Warminster Amateur Radio Club. The hamfest held at Bucks County Community College—Lower Campus at 1304 Veterans Highway (Route 413), Bristol, PA 19007. **Website link**

TBA Bloomsburg Hamfest *sponsored by Columbia-Montour Amateur Radio Club. The hamfest is held at the Lime Ridge Community Center at 6405 4th Street, Lime Ridge, PA.* ***Website link***

July 6 Harrisburg Firecracker Hamfest sponsored by the Harrisburg Radio Amateurs Club. The hamfest held at Postal Employees Picnic Grounds at 1500 Roberts Valley Road in Harrisburg, PA 17112. **Website link**

July 7 Murgas Amateur Radio Club Hamfest Sponsored by Murgas Amateur Radio Club. The hamfest is held at the Polish American Veterans Club at 1 South Oak Street in Plains, PA. **Website link**

August 3 Reading Radio Club Hamfest *Sponsored by the Reading Radio Club. The hamfest is held at Heritage Park, 992 Clematis Street in Sinking Spring, PA 19608.* ***Website link***

August 11 Mid-Atlantic Amateur Radio Club Hamfest Sponsored by the Mid-Atlantic Amateur Radio Club. The hamfest is held at Kimberton Fire Company Fairgrounds at 762 Pike Springs Road in Phoenixville, PA 19460. **Website link**

TBA Eastern Pennsylvania Amateur Radio Association Hamfest *Sponsored by the Eastern Pennsylvania Amateur Radio Association. The hamfest is held at Moose Lodge 1336 at 705 Stokes Mill Road in East Stroudsburg, PA.* ***Website link***

TBA Red Rose Repeater Association Hamfest *Sponsored by the Red Rose Repeater Association. The hamfest is held in New Holland, PA.* ***Website link***

October 20 RF Hill Amateur Radio Club Hamfest Sponsored by the RF Hill Amateur Radio Club. The hamfest is held at the Bucks County Community College—Upper Campus at 313 Blooming Glen Road in Perkasie, PA. **Website link**

Telnet Is My Friend

Jay King, W2AFE, EPA ASEC

I'm a regular Winlink user. I check Winlink daily. Normally I use a VHF packet connection to get on a local RMS. I also participate in several Winlink nets, host one of my own and have developed and executed Winlink activities for SETs (Simulated Emergency Tests).

I've heard on multiple occasions that "telnet is not radio." The inference being that using Telnet with Winlink is not proper.

First, an explanation of what is Telnet with Winlink. Telnet, developed in 1969, is a protocol that provides a command line interface for communication with a remote device or server, sometimes employed for remote management but also for initial device setup like network hardware. Telnet stands for *Teletype Network,* but it can also be used as a verb; to telnet is to establish a connection using the Telnet protocol.

But, Telnet in the Winlink context, is simply using the internet rather than a radio connection. As such, Telnet is not radio, but Telnet has many legitimate uses with Winlink.

I first encountered Winlink Telnet when I was being introduced to Winlink. Using Telnet enabled me to learn about the Winlink platform and participate in Winlink nets without engineering a connection to a sound card and mastering one of the many protocols. The Winlink system is complex. While it looks like email for ham radio, it has its own quirks that need to be mastered. Telnet is a great entry path for any Winlink novice so they can quickly participate in messaging and build their Winlink operating skills.

Telnet also has an important role in live EMCOMM events. If you are serving in an EMCOMM role in an active event and you have a Telnet connection, you should use it. In a live event your first priority is to move messages for your served agency. Telnet is the fastest and most reliable way to do that. And, by using Telnet, you are freeing up bandwidth for those who actually need it.

When writing exercise plans for SETs and other activities, I often say about Winlink, "RF preferred, Telnet okay." This promotes engagement. I don't want to turn away anyone who wants to participate. You see a similar approach in many of the Winlink nets. The most common check-in is to provide your identification and Winlink connection details. So, RF participants are recognized and Telnet users get to participate.

In summary, Winlink with Telnet has many legitimate uses, even though "it's not radio." It is a valuable training tool, has a role in actual emergency communications and encourages wider participation in the amateur community.

Jay King, W2AFE, serves as the Assistant Section Emergency Coordinator for the EPA and has served with Philadelphia ARES® and the American Red Cross for many years. He has been instrumental is designing and implementing emergency exercise plans for the EPA.

Useful Winlink sites

Main Winlink site

Winlink Downloads

Celebrate New Red Cross Emcomm Stations in Pennsylvania

Jay King, W2AFE, EPA ASEC

Pennsylvania Red Cross invites all Pennsylvania amateur radio operators to join in celebrating the opening of the Red Cross Emcomm Stations (RCES). These stations are located in Red Cross facilities in each of the 10 Pennsylvania Red Cross Disaster Response Areas (DRA). The Red Cross Emcomm Stations are located in existing Red Cross facilities. Most are "compact" stations.

Please join the Red Cross on the air on March 16. The RCES will be activated from 1:00 to 4:00 PM local time. All Pennsylvania hams are invited to participate. Listen for the RCES lead to announce the exercise. Check in with your call sign, name, county and state if you are an ARES® or Red Cross volunteer. ARES® Emergency Coordinators are invited to visit the stations during the exercise. Contact the station lead (detailed in the chart below) to make arrangements. The stations are compact so visitors will be limited to one or two.

Station Call	Location	Station Lead	Primary Repeater	
KC3TFM	Erie	David Morneau KB3RIP 814-746-2938	W3GV	146.610 - pl 186.2
KC3WMS	Pittsburgh	Dave Herzog KC3KAG 412-580-4852	W3EXW	147.090 + pl 88.5
KC3WQJ	Greensburg	Dave Herzog KC3KAG 412-580-4852	W3LWW	147.180 + pl 131.8
KC3WQI	Johnstown	Carl Keller KC3KFW 610-301-3881	K3SMT	147.195 + pl 123.0
KC3WQG	State College	Brett Saylor W3SWL 814-321-5536	W3YA	146.850 - pl 146.2
KC3WQL	Stroudsburg	Len Lavenda KC3OND 570-369-6118	WB3FKQ	146.610 - pl 82.5
KC3WQK	Allentown	Sean Campbell KC3LMZ 484-347-6478	W3OI	146.940 - pl 71.9
KC3WQM	Harrisburg	Richard Johnson N3EPY 717-226-3793	W3ND	145.110 - pl 131.8
KC3WQH	Lewisburg	Tim Gelvin KC3TEG 570-495-0982	KC3FIT	146.655 - pl 107.2
WA3ARC	Philadelphia	Cliff Hotchkiss KC3PGT 828-230-8067	W3QV	147.030 + pl 91.5

American Red Cross Building in Harrisburg, Pennsylvania

Typical Red Cross Emcomm Station (RCES)

EPA Traffic Handling

What is the National Traffic System?

The National Traffic System (NTS) is a structure organized under the ARRL that allows for rapid movement of message traffic from origin to destination, training amateur radio operators to handle written traffic and participate in directed nets. These two objectives, which sometimes conflict with each other, are the underlying foundations of the NTS. The NTS operates daily, even continuously with advanced digital links. The National Traffic System is an organized effort to handle traffic in accordance with a plan which is easily understood, and employs modern methods of network traffic handling in general acceptance today.

January 2024 (EPA) NTS Report

Tom Inman, KC8T

EPA Section Traffic Manager

NET NAME	QNI	QTC	SESSIONS	NET MGR
EPA EPTN	263	38	31	WA2BBS
PTN	133	31	31	N3GE
RF JILL SEPPTN	96	6	9	KB3DEN
LACKAWANNA ARES	45	4	5	NW3X

STATION	ORIG.	SENT	RCV'D	DEL'VRD	QTC TOT	PSHR TOT	COUNTY
K3EAM	10	10	11	11	42	267	LUZERNE
KC8T	13	15	7	1	36	146	LYCOMING
N3GE	3	11	49	23	86	115	LANCASTER
NW3X	1	50	58	2	111	110	LACKAWANNA
WA2BBS	0	8	14	1	30	90	LUZERNE
W3ZR	1	1	1	1	4	74	SULLIVAN
N3RPB	0	0	0	0	0	48	LYCOMING
WJ3G	0	0	2	2	4		LEBANON
KC3QVF	11	8	1	5	25		PHILADELPHIA
WA3FIR	1	4	9	9	23		MONTGOMERY

If you're interested in becoming a traffic handler. email EPA Traffic Manager.

TRAFFIC NET NAME	FREQUENCY	TIME	OCCURENCE
Eastern PA Emergency Phone & Traffic Net	3918 kHz	5:00 PM EST	Daily
Western PA Emergency Phone & Traffic Net	3918 kHz	5:30 PM EST	Daily
Pennsylvania Traffic Net (CW)	3585 kHz	7:00 PM EST	Daily
Luzerne County ARES® Traffic & Training Net	146.61(-) MHz, tone 82.5 Hz	8:00 PM EST	Monday
Lackawanna County ARES® Traffic & Training Net	146.715(-) MHz, tone 136.5 Hz	8:00 PM EST	1st & 2nd Wednesday
	146.94(-) MHz, tone 127.3 Hz	8:00 PM EST	4th Wednesday
N3CFK UHF Link Repeater System	442.55 (+) MHZ, tone 100 Hz	8:00 PM EST	5th Wednesday
N3FCK UHF Link Repeater System	443.60(+) MHz, tone 100 Hz	8:00 PM EST	5th Wednesday
N3FCK UHF Link Repeater System	444.50 (+) MHz, tone 100 Hz	8:00 PM EST	5th Wednesday
N3FCK UHF Link Repeater System	441.15(+) MHz, tone 100 Hz	8:00 PM EST	5th Wednesday
RF Hill ARC Southeastern PA Practice & Traffic Net	145.130(-) MHz, tone 131.8 Hz	8:00 PM EST	Sundays, Wednesdays

Youth Activities

Temple University Amateur Radio Club: K3TU

Dennis Silage, PhD, K3DS

The Temple University Amateur Radio Club (TUARC) dates back to the 1950s with the original callsign K3KJI. But as often happens on a college campus when faculty are not involved, students come and go and interest waxes and wanes. TUARC was revived in the 1970s as WA3TVT but somewhat faded again until 1984 when I became a faculty member and license trustee there. By integrating TUARC as a working undergraduate laboratory in *wireless technology* I was able to obtain recognition and support for all the towers, antennas and equipment that provide its current operation not only for students but for alumni, staff and faculty.

TUARC is now K3TU and has three 30 foot towers and mountings for HF, VHF/UHF, satellite, APRS and 1.25m and 70cm linked repeater antennas on the 10th floor roof and the station on the 7th floor of the College of Engineering Building in Philadelphia. The descriptions of the antennas, transceivers and repeaters can be found at **www.temple.edu/k3tu.** But rather than recount these details, let me relate the important role that collegiate stations can play in promoting amateur radio.

Undergraduate Electrical and Computer Engineering (ECE) students take a capstone project course in which they apply their knowledge as a team to solve a design problem. In times past many of these ECE students (it was called Electrical Engineering then) were amateur radio operators and their capstone projects were in RF electronics, microwaves, antennas and the misty beginnings of digital data and satellite communication. TUARC has promoted a variety of such capstone projects over the years. These ECE students have not only acquired their amateur radio licenses then, have gone on to technical careers and are active in the hobby.

K3TU Club Station located in College of Engineering Building.

A very early example of such a capstone project at Temple University included a frequency hopping spread spectrum modulation system in the 70cm band (1986). The students were able to successfully demonstrate the digital data transmission of keyboard characters in the presence of a swept interfering carrier frequency. Another early capstone project (1990) was a high-speed (for the era at 2Mb/sec), 10 GHz carrier frequency, frequency shift keyed, digital data communication system. Recognizing that this was over three decades ago, the system was demonstrated by a high-speed data transmission across the university campus. More recent capstone projects were the development of a wide area rover vehicle using 2m for telemetry and 70cm for ATV bands rather than limited range WiFi, digital voice vocoders, digital signal processing filters and satellite modems and mesh network hardware in the 2.4 GHz band (amateur radio, not WiFi) and protocol software.

The ARRL has recognized that collegiate stations can promote the hobby not only for ECE students but for all students with its Collegiate Amateur Radio Program (CARP, **www.arrl.org/collegiate-amateur-radio).** CARP has encouraged students and educators to pursue the technical and fellowship aspects of amateur radio. Going beyond this, TUARC has further promoted amateur radio to alumni, staff and faculty, many of whom are not really capable of having a complete station due to housing restrictions. Both licensed and newly licensed TUARC members have kept K3TU active. Look for K3TU on all the bands and modes!

TUARC Wide Area Rover Vehicle
Uses 2m for telemetry and
70cm for ATV signals.

ARRL MEMBERSHIP

ARRL is the national association for amateur radio in the U.S. We provide opportunities to discover radio, develop skills, and serve your local community.

Anyone who is active in amateur radio or who wishes to get more involved to pursue interests, public service, or personal enjoyment will benefit from ARRL Membership.

Benefits

To get you involved and keep you up to date with all that amateur radio has to offer!

INFORMATION

As a member, you will gain access to all four digital magazines, several special interest e-newsletters, & personalized answers to your technical and operating questions.

LEARNING

From licensing exam prep, to live training forums; to online training courses for new hams, emergency communicators, and more.

PROGRAMS & SERVICES

License renewal, member recognition programs, contesting opportunities, advocacy efforts, and an active local club system.

Join or renew today at www.arrl.org/join

Join ARRL link

WHAT DO YOU WANT TO DO WITH AMATEUR RADIO?

Discover New Interests

Whether you're interested in new technologies, project building, radiosport, emergency preparedness, or public service, ARRL has resources to help you learn, get active, and get on the air.

Your membership provides digital access to all four ARRL publications, with offerings for beginners as well as advanced hams. They include *QST*, the membership journal of ARRL; *On the Air*, an introduction to the world of amateur radio; *QEX*, covering topics related to radio communications experimentation; and *National Contest Journal (NCJ)*, covering radio contesting.

Build & Share Your Knowledge

With online learning courses, members-only web content, and leadership opportunities, you can grow your skills and interest in amateur radio through the many ARRL programs available to members.

Shape the Future

Your membership dollars help to preserve and protect access to frequencies allocated to the Amateur Radio Service.

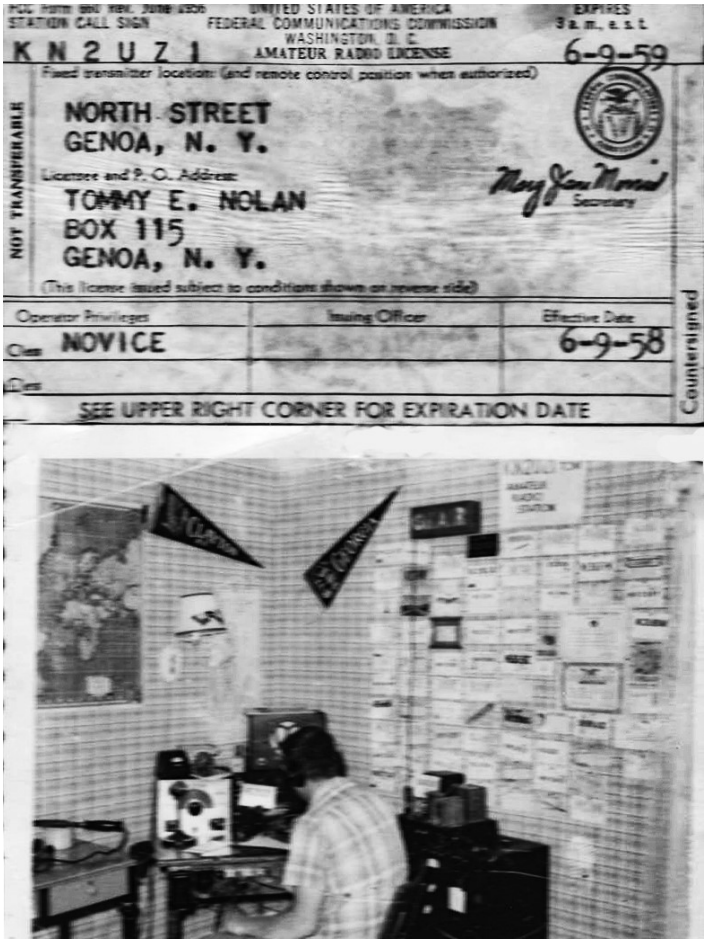
Autobiography - Thomas Nolan, DVM, W3EX

Thomas Nolan, W3EX

I was born and raised in a small town in the Finger Lakes region of upstate New York in May of 1943. My home town is Genoa, apparently named after Genoa, Italy. Genoa had a grocery store, hardware store, two nursing homes, a funeral home, a post office, a TV repair shop, a hotel and a feed mill. I attended a small central school from first through twelfth grade; there was no kindergarten. I was one of 18 in our graduating class. I was not a stellar student but did have an interest in science and electronics from the age of 12. Other interests at that age were small townish including helping my grandfather and uncle on their dairy farm, helping my parents run their small greenhouse business, and going fishing and swimming with my buddies. Genoa remains as a farming community to this day and is devoid of any thriving businesses.

MY electronics interest was nurtured by the local radio / TV repair shop owner named Dud Hand. Dud allowed me to hang out in his shop where he taught me how to test tubes and work on radios. Dud was careful to keep me away from the high voltage TV repairs. It was about that time that I learned about the fascinating hobby of amateur radio. I became acquainted with Sid Talman, K2UGP, who worked at Cornell University as a technician. Sig became my *Elmer* and invited me to his home on occasion. I learned about receivers, transmitters, antennas—especially with six meters which was open essentially 24/7 in those days. There were about six other hams in the area that I began to know and who helped further my early knowledge of the hobby. I eventually earned my novice license on June 9, 1958 and was given the call sign of KN2UZI. My parents scraped up enough money to purchase a BC-348 receiver and I built a transmitter with the help of K2UGP and was on the air. My first CW contact was with KN8HYD in Miamisburg, Ohio. I soon earned my general class license and dropped the N from my call.

I graduated from high school in 1961 during the cold war and at the very beginning of the Vietnam conflict. At that point in time I was not college material neither on scholastic or motivational levels. I had aspirations of becoming an electronics engineer but that was not to materialize. In fact, I was diverted from that interest one day when my beagle dog, Jake, was injured by an automobile and needed to visit the local veterinarian. This visit led to a long term relationship with Dr. Art Underwood who became my mentor in the field of veterinary medicine. He was a large and small animal practitioner. There was still the issue of not being college material, so I signed up for the U.S. Navy and was sent to Great Lakes, Illinois for my boot camp training. After boot vamp, and based upon my qualifications as a ham radio operator, I attended Electronics Class A School in Memphis, Tennessee and became an Aviation Electronics Technician. I ultimately shipped out to Hawaii and the Pacific flying as a radio operator on P2V and P3A patrol aircraft. I attained the rate of ATN2 and was discharged from the U.S. Navy in August of 1965. During my Navy days I had the opportunity to work many great amateur stations in places such as Memphis, San Diego, Barber's Point in Hawaii and

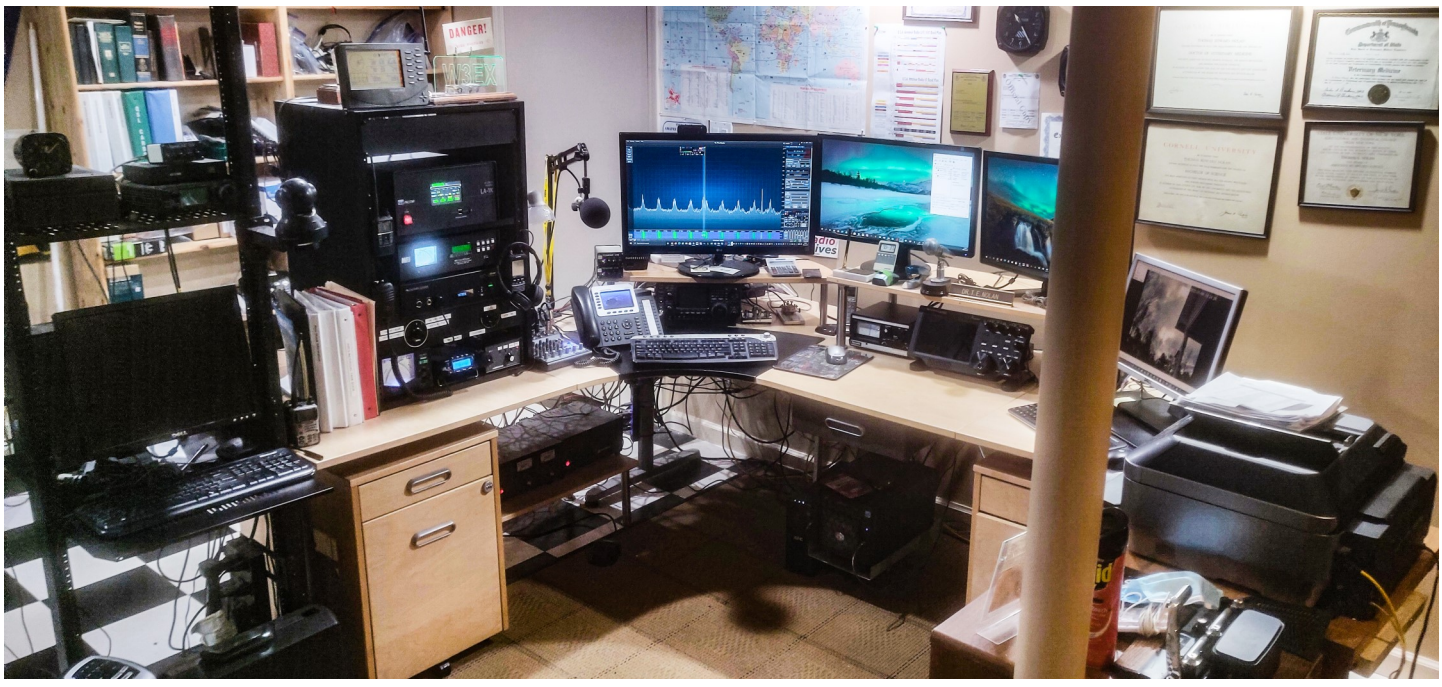


W3EX original license and radio shack in Genoa, New York, 1958.

Iwakuni, Japan. Many of these stations were Collins S-lines acquired for Navy-Mars operations. While flying as a radio operator, I also recall running phone patches from 30,000 feet over the Pacific back to my parents as well as to loved ones for other members of my crew. We carried dual Collins ARC-94 transceivers that were usually in service on tactical frequencies but worked great on the ham bands. The antenna was a long wire that was spooled out from the back of the aircraft on a lead weight. My job as radio operator was to monitor two CW stations, one on each ear during tactical operations and to transmit encoded messages to our home base. Although CW is no longer of much interest to me, I did manage to get awarded a *Speed Key Certificate* from the Admiral of the Fleet. This required proficiency with a bug sending at 30 words per minute. I never attained proficiency in receiving that fast. During my time in the Navy, I was trained in both vacuum tubes and transistors; integrated circuits had not yet been invented. I operated CW followed by Single Side Band and then finally Radio Teletype from the aircraft with big technology changes over a four year period.

My experience in the Navy was a great motivator for me and made me realize that I might have a shot at becoming a veterinarian. During leaves from the Navy I would spend time at Dr. Underwood's practice and was strongly encouraged by him to enter college and pursue the profession. I recall Dr. Underwood having a 3 channel citizen's band radio in his farm call truck. That radio was not all that effective in communicating with the home base; the very early days of CB. So, knowing that I would likely not qualify for admittance to Cornell University, I applied for the veterinary technician course at Delhi College in the Catskill Mountains of New York state. On the day, which was a Thursday, following my arrival home from the Navy, I was surprised to get a phone call from Delhi telling me that I could start school on the following Monday morning. So, I packed up the Ford Falcon that my Aunt Lizzy had given to me and headed off to start college.

During my two years at Delhi, I worked at three jobs to earn money for school. My jobs included manager of the apartment house where I lived, repairing radios and TVs at a local shop and working as the technician for the local cable TV company doing cable installs and troubleshooting the cable system in the town. While at Delhi I became acquainted with Dr. Orin Flint who was the local physician and college doctor. Dr. Flint was also a ham and we hit it off from the start. He also provided me with a Drake 2B and a Central Electronics 200v on a long term loan which e he ultimately gifted to me after moving to Northern Virginia years later. What a great station for the



Tom Nolan, W3EX Radio Shack in Harleysville, Montgomery County.

time. In later years I traded it for a Collins S-line, which I wish I had never done. The most significant thing that occurred during my Delhi days was marriage to my wife of now 58 years, Carolyn. Another significant accomplishment was being accepted into the College of Agriculture at Cornell University after having earned my Associate of Applied Science degree at Delhi.

So, Carolyn and I, along with our three Siamese cats headed off to Ithaca, New York to work on my Bachelor's degree at Cornell University. We had purchased a 12 x 60 foot mobile home and took up residence in the Schwan trailer park for the next six years. Somewhere along the line, I picked up a Swan 350 transceiver that became my rig for the next six years. I have no recollection of antennas that I used. I do recall picking up a sailing craft on 20 meters that was in trouble in the Caribbean Sea and reporting it via telephone to the Coast Guard. Our focus for the next two years was getting me through college and submitting an application for the College of Veterinary Medicine. I will never forget the day a letter arrived in the mail with the news that I had been accepted into veterinary school.

During my junior year I had landed a summer internship at the Kindness Animal Hospital in Sunnyvale, California. We traveled to California and back in my beat-up old Pontiac. We lived in an Apartment in Mountain View for the summer. I set up the Swan 350 and had an all-band vertical set up on the railing of the apartment's deck. During one of my first transmissions there was a knock on the door. The landlord was there to inform me I was scrambling every television in the apartment complex and that I was to stop transmitting immediately. I asked if I could check out the cable TV system to see if there was anything could be done to improve the situation. Upon investigating, I found that the TV system utilized a 300 Ohm twin lead infrastructure with numerous splitters. That was the end of the line for my ham operations at the apartment. I moved the Swan 350 to the practice and made a few contacts there while not seeing patients. One 10 meter AM phone contact that I made while there was with Jim Lauridson, W6OGE at the time. Jim was a recent graduate from medical school and was doing a residency at Stanford University. That simple 10 meter contact was the beginning of a friendship that has lasted to this day.

After graduation from veterinary college in June of 1973, I accepted a job in a small animal practice in Alexandria, Virginia. Dr. Flint and his wife visited us during that time and it was then that he brought the Drake 2B and Central Electronics 200v. That set me up with a great station. I had changed my call to K4JYP and was very active on the 31/91 repeater in the area operated by the Northern Virginia FM Association, with which I became a member. I had purchased a synthesized two-meter transceiver and had put together a keypad from an old phone into a home-built unit to run autopatches. Autopatches were the thing at the time and I remember calling my wife on the way home from work every day. During my time in Virginia I decided to visit the FCC office in Washington, D.C. to take the amateur extra exam. I was successful in demonstrating my abilities at 20 wpm, answering technical questions and even drawing schematics for things like a Colpitts oscillator. Somehow I managed to pass the exam and earned my extra class license.

After three years of veterinary practice in Virginia I landed a job as a laboratory animal veterinarian at Merck Research Laboratories in West Point, PA. Our family had now grown to four with the arrival of Kristin and Dan. I was pretty bust with my job at Merck and not much ham radio happened until we moved from Patriot Drive in Lansdale to Main Street in Harleysville in 1978. I purchased a tower from a guy in Perkasie for $50 and erected it at the Main Street QTH along with a TH6DXX that I had purchased from a friend for $50. It was about that time that I traded the 2B and 200v for a Collins S-line. It was also at that time that I acquired the call W3EX. We lived at the main Street QTH for 20 years and then moved to our present QTH on Store Road, also in Harleysville, The Store Road station consists of a Flexradio 6500, Icom 7600, Yaesu FT857D and various handheld radios. I also host a MARS station for K3ZKO who operates his IC-706 remotely from his apartment.

My interest in ham radio mesh networking started in about 2019 when I became acquainted with Jim Fisher, AJ3DI (SK). Jim was the impetus for development of the mesh network in Montgomery County. Along with 6 other local hams, we formed the Jim Fisher Memorial Digital Association in Jim's honor in October of 2023. I have greatly enjoyed my ham radio hobby over the years and continue to operate both fixed and mobile stations. I can say, without reservation, that ham radio has been one of the best things I have tackled in my life.

From the Public Information Coordinator

Signals Needs Your Articles, Photos to Publish

Robert Alan Griffiths, NE3I, EPA PIC

Many thanks to all those EPA radio amateurs who submitted articles and photos for the January issue of *Signals*. We received numerous complimentary comments. Let's keep it going! Be sure to drop us a few lines and action photos if you, your club or organization conduct or has upcoming activities or events. As you can see from January's issue, a few lines and illustrative photos can provide really interesting reading for fellow EPA radio amateurs.

I also promised to work on developing a *Speakers Bureau* to facilitate presentations to EPA clubs and friends. Below, you will find our initial list of your colleagues who have volunteered to provide interesting programs for your meetings. The list details some of the program subjects. You can click on the presenter's name and callsign to send them an email. We plan to post the Speaker Bureaus list on the EPA website and hope more presenters will step up and join its ranks.

EPA Speakers Bureau Participants

Alex Van Patten, W3AVP: *Amateur Satellites for the Absolute Beginner, Contesting for the Absolute Beginner, Using DX Clusters and Spotting Pages, Digital Modes: A Brief Overview, QSLing: The Final Courtesy of a QSO, SSTV: More Than Just Bikini Pics, Usually.*

Bob Famiglio, K3RF: *Antenna Law Issues, Liability, Future Challenges for Amateur Radio.*

Barry Feierman, K3EUI: *Nano VNA, Part 1 (The Basics of a VNA—What They Do, Part 2 (Under the Hood: Impedance, Smith Charts, SWR, Return Loss), Antennas-How Do They Radiate (Resistance, Reactance and Impedance), Why Don't Transmission Lines Radiate?, Antenna Tuners, Sound Card Basics, Winlink Emcomm Traffic Demo on 40m SSB, NBEMS (FLDIGI)-Why It Works So Well as an Emcomm App, FLMSG Custom Forms and FLAMP Formats for Emcomm, VAR AC—New Kid On The Block Using VARA HF And FM Modems, Ionosonders: What They Show About RF Propagation, SDRplay—The Specifics Of How An SDR Receiver Works, SDRuno and SDR Console Software, Generating A CW– Signal using A Soundcard, The RF Spectra of Various Sound Card Modes Using AM, SSB and FM Transmitters, Capacitors and Coils _ What They Are and How They Work, Stealthy Antennas.*

Bob Josuweit, WA3PZO: *Contact speaker for details.*

Ron Cohen, K3ZKO: *Apollo 10 Splashdown In The Pacific Ocean, Grounding, Cell Phone Apps For Amateur Radio.*

Dennis Silage, K3DS: *Software Defined Radio, What's All This Digital Voice Stuff?, RF Safety Qualifications for Amateur Radio Stations, Antenna Modeling For Amateur Radio Using NEC.*

Riley Hollingsworth, K4ZDH: *Contact speaker for details.*

Dr. Tom Nolan, W3EX: *Establishing A Radio Frequency Internet On Amateur Radio.*

Helpful Guidelines for Submitting Material For Publication in *Signals* Newsletter

1. Articles should be related to amateur radio. They do not have to be of a technical nature. Human interest stories, articles about operations, public service or other events are always a good choice.
2. When writing stories for publication, keep your articles brief and on topic. Try to avoid jargon unless it helps to explain concepts or details.
3. Avoid flowery or excessive verbiage. Plain language is always preferable.
4. Include full names and call signs of individuals named in articles. Double check the spelling of names and places.
5. When taking pictures for articles, action photos are much more interesting than static line-ups of people. Compose your photos to include faces of people *doing something*.
6. When photographing people outside, employ your camera's fill-flash. This will fill in the harsh shadows from bright sunlight and show more detail. Even your cellphone camera has a fill-flash function. On that subject, your cellphone camera will take great photos. You do not need an expensive DSLR.
7. When submitting photos, include full information for captioning. Names, call signs, locations and other details are important. Identify individuals listing them from left to right.

The Digital Den

Hybrid Digital Net: Don't Drop That Mic!

Jeremy Allen, N1ZZZ

"N1ZZZ will transmit at the drop of the carrier." This is a phrase often used in the weekly Luzerne County ARES® (LCARES) digital net on the 145.45 repeater near Wilkes Barre. One of the distinct advantages of running a digital net on VHF is the ability to run a *hybrid net*; that is, using both voice and digital protocols on the same channel.

LCARES runs this digital net every Tuesday at 9:00 pm. The dual purpose of the net is to pass traffic and to train ARES® operators on the use of various digital resources. The use of voice allows for rapid check-ins as well as training moments and troubleshooting using voice, while also passing traffic rapidly using digital protocols. This net also mimics the hybrid voice / digital net we use when operating on behalf of our served agency, Luzerne County EMA, during the annual Talen Energy nuclear power plant drills.

The net primarily works with the FLDigi suite of programs and the net routinely passes custom and stock forms via FLMsg. The net manager, Chis Keller, WA2EXI, does not stop there. The last week of each month is dedicated to SSTV where operators pass images over the repeater, another product that LCARES provides to the local EMA. Periodically, a Winlink® training session is also conducted. The Winlink® net is run slightly differently, with the repeater as a resource and training platform, while traffic is shifted either to a simplex frequency, in the case of P2P messages, or to a local VARA node or even to an HF RMS.

While the hybrid net is the customary method, the net manager also has pure digital sessions. These nets run like typical HF NBEMS nets, except over a VHF repeater. This allows operators to practice and learn the protocols and equipment settings, while removing complexities of HF propagation for a more targeted training experience.

Employing a VHF repeater also allows for the use of the high-speed digital protocols available in FLDigi to make passing traffic forms a quick process, often in well under a minute.

The use of a VHF repeater does require some setting changes to work effectively. Typically, an audio tone is inserted prior to transmission to open the repeater prior to any protocol being sent. Additionally, if the operators are using TXID, a delay must be inserted so that the repeater doesn't drop out during the TXID sequence. It is also best to make sure any digital operations are cleared by the repeater owner as the tones may upset some users and elicit complaints. These obstacles are easily overcome with a bit of training and planning.

I would encourage other ARES® groups to experiment with VHF repeater digital operations. They are an efficient and effective way to move a variety of traffic for your served agency, utilizing reliable circuits with minimal net overhead.

ARES® Needs Your Support

Assisting with emergency communications is one of the primary reasons new amateur radio operators list as a reason for getting a license. Sadly, this desire to serve rarely brings recruits to the emcomm community. In the EPA, almost every ARES® unit is short-handed. If you have a desire to use your license and expertise to assist your community, please reach out to your county ARES® Emergency Coordinator to volunteer. You can put your expertise and love of radio to good use. There is no more rewarding experience than serving!

Outdoors and on the Air

AC9L's Radio Adventures on the Edge of a Cliff

Thomas Ask, AC9L/3

From the damp basement of my cloistered house, I was hearing reports from the Arctic. The non-BFO equipped radio made alien whooshing Morse Code sounds while the green cat's eye winked. Coupling this bizarre sound and exotic content with teenage imagination brought a spark to my heart. I wanted be climbing mountains, cutting through jungles and riding on the roof of buses, not studying chemistry in high school.

Ham radio was presented to me by my electronics teacher and I jumped into the hobby with alacrity. The age of 15 was a quiet time, before I started working every waking moment with dreams at my doorstep. Ham radio let my dreams go beyond my little world—but you had to earn it. Train trips to the Federal Building in Chicago, sketching out Colpitts oscillators and other circuits in preparation for my FCC tests and building my Heathkit HW-101 transceiver taught me electronics, self discipline and "developed character" as Calvin's father was always trying to encourage (probably true for the theologian too, but I am, of course, referring to Calvin and Hobbes.

As a newly licensed ham, I entered my high school's shack, the room smelling of hot phenolic, ozone and dummy load oil. I tapped out my first CQ and dah-laden K9HWI call sign and was thrilled when I heard a reply. Technology working in such an intimate way over such an expanse of earth was amazing. I learned about moonbounce, aurora, meteor showers and OSCAR satellites. I could touch space in a way every Apollo era kid dreamed of. At my college's ham radio club, W9YH, there were 150 foot towers to be climbed and shiny cooper and aluminum to be bent and soldered. Adventure and science mixed, along with friends of the of the same flock. I would take long walks in college, often with a portable Drake TR-22 two-meter transceiver hanging off my shoulder. This radio gave me everything a lonely heart could want; nature, a clear mind and radio friends to talk to all the while. This was a time when *wireless* was an old-fashioned term (who would guess of its reemergence?) and my unprotected final had to be replaced whenever my cut coat hangar soldered into a PLH-239 connector misbehaved.

Technology kept developing and soon the magic of a 300 baud acoustical modem with cut tennis balls for the telephone receiver was replaced by packet radio and the internet. But, that old two-meter radio was all I had at times. I was a work-study student without a telephone much of the time and changed apartments every semester. It was the radio with which I would join a weekly net when my days were too quiet. I would use it for my Skywarn work when everyone wanted to announce a tornado spotting and we had to fight hard not to wistfully see things to be a micro celebrity for a few minutes.

One day, when I was young and would write lists on how to improve my work efficiency and "great inventions", I removed my ham gear from my kitchen table and tucked it under the table. I replaced the gear with a white sheet and a nicely arrayed spread of stuffed clams and mixed vegetables. At this converted hamshack I proposed marriage to my girlfriend. She said yes and the ham radio equipment hidden below the dangling "tablecloth" didn't realize how this change would affect it -radio that is.

AC9L/3's transceiver gives a whole new meaning to rock-bound.

Outdoors and on the Air

A wife and kids drew me away from ham radio for a long time. I moved into the phase of life where you divided things up into that which you can change and that which you can't. A time when you still dream but sense the closure of many doors. This summer I came across my old Drake TR-22 transceiver waiting for me in my garage and in a romantic and nostalgic fit, I dreamed of taking it to one of the most special places I know of in my area—a beautiful cliff in the McIntyre Wild Area 15 miles north of me. I have enjoyed climbing the cliffs in this area over the years I have taken my kids there for adventure and quiet times. When I am on those cliffs, I feel like I am in a different world, fat from everything, much like I did as a college student taking long, long walks off campus or at the top of the W9YH's radio towers.

On a surprisingly cool summer afternoon, my daughter and I set up my old Drake on the tallest cliff in the area. The cliff scratched its way 60 feet through dense foliage above a cool stream that made gentle oscillations through this vertical world. The radio and battery pack were hung from cracks and the snaked up the crumbly gray rocks. We tried to operate on 146.52 MHz but my old Drake radio didn't have it in her and refused to work. When I tested it at home, I knew it wasn't promising but I wished (really hard) that it would operate one last time. MY wishing didn't work. All my day dreams over these months just withered away. But we did really enjoy the climb and finally dropped down into the cool stream delow, soaking our hot feet as the clear water washed over smooth rocks. I have climbed this cliff with my son but this was the first time with my daughter. It was still a nice time, just not what I envisioned. It was a ham radio experience that melded my past and present, satiated a humble dream and made a great pursuit. The only thing missing was a radio contact. For all but the romantic it was a failure. But shouldn't all free summer afternoons be in pursuit of whimsy?

Rock Radio: I wasn't done with cliffs. I wiped off those lovely Drake infused memories and moved into a new chapter of ham radio. Data. I wanted to explore things and learned more about interesting environments. Motivated by Mark Spencer's PICAXE based marine buoy, whose design and construction is gratefully acknowledged, I moved to a new chapter of ham radio. With some gentle tweaks to his design and extended thermistor cables, I went on to investigate the microclimates of the cliffs I love. As with the cliff expedition, I routed a quarter-wave vertical to the top of the cliff. The radio, microcontroller and battery were wedged into a sheltered rock shelf. From this equipment, I ran cables into a couple of interesting cracks and measured rock face temperature and air temperature. I used a pen cap as a radiant shield for the air temperature and foam taped the thermistor to the cleaned rock surface.

I explored the changing temperatures deep in cracks where all sorts of creepy things live. The system worked great and I enjoyed watching data stream in from the comfort of my office chair. This APRS routed sensor data gave me a presence of the cliff in a way only a ham radio operator could understand. This data let me learn how different rocks, with their differing thermal conductivities and shapes, affect interior temperatures.

Kite Radio: I have flown kites all my life and one of my earlier memories is my mom asking if it was too windy to fly my paper and stick kite. "No, it will be fine," I replied and sure enough the wind broke the wispy kite string and there went my 19 cent kite. Now, kites are made like tanks and can handle almost anything. My kids also have the misfortune to have a father who thinks he knows everything and is more inclined to declarative sentences— "Don't fly your kite" than my mom's more gentle inquiry.

I also remember when we learned from our parents rather than *YouTube*. I recall wanting to make a didgeridoo, an Australian musical pipe, a couple years ago. It seemed easy and I went to my workshop to give it a try.

AC9L's kite transceiver payload equipped to send APRS data.

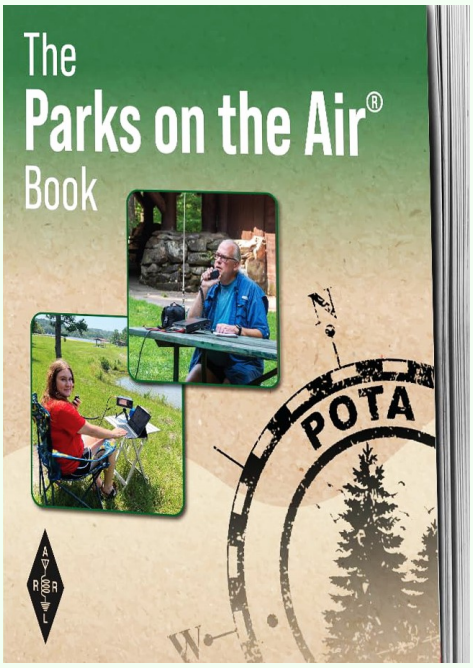
Outdoors and on the Air

I first booted up my computer and searched for didgeridoo making. I ended up watching other people making didgeridoos to the point I no longer felt like making one myself. Therefore, for the kite project I purposely didn't look for anything but developed my foam enclosure and parachute recovery in my own mind. All of this has probably been invented before but I enjoyed the process of discovery. I made a trip arm with a flap that would pull out the parachute if the instrument package made a rapid descent. I used masking tape for a limited load fastener—explosive bolts for poor folks. I then threw it out of my treehouse a few times to see that it worked.

Unfortunately, we had the longest streak of windless days that I can remember. My kite system cluttered up our bedroom (my son's projects had taken over everything else). I kept telling my wife, "I will get the stuff out of the bedroom once we have a windy day." She was patient with my electronics, winglets, foam and other stuff cluttering up a cozy corner of the room. Now I see why the Wright brothers invented the airplane. Waiting on nature can be inconvenient!

Finally, a day arrived with enough wind to send my APRS equipped data acquisition beyond the water and cliffs and aloft on my power lift kite for a cheap foray into very near space. I loved "seeing" these environments through APRS routed data. This period of exploration showed that even a middle-aged guy owns textbooks referring to the ether and Heaviside layer can stick with radio experimentation. Amateur radio connects many of us with our youth, but radio can just as assuredly allow us to enjoy wonderful future pursuits.

Thomas Ask, AC9L/3
lives in Cogan Station
In Lycoming County.



ARRL Parks on the Air Book

The Parks on the Air® Book explores the process of activating a park unit and hunting those activations. Through the experiences of 14 operators, it offers advice and motivation for taking your radio out to the park and becoming active in the growing POTA community.

Full-color format brimming with photos!

ARRL Member price: $19.95 **To Order**

Signals Wants Your POTA Photos and Stories

Portable outdoor operation is a fascinating aspect of amateur radio. Your fellow hams enjoy reading about the adventures and challenges of radio in the great outdoors. If you've had recent POTA activations you'd like to share, please send us your pictures and operating description for publication. You don't need to write a huge article. Even one good photo with a paragraph is great. Send your materials here.

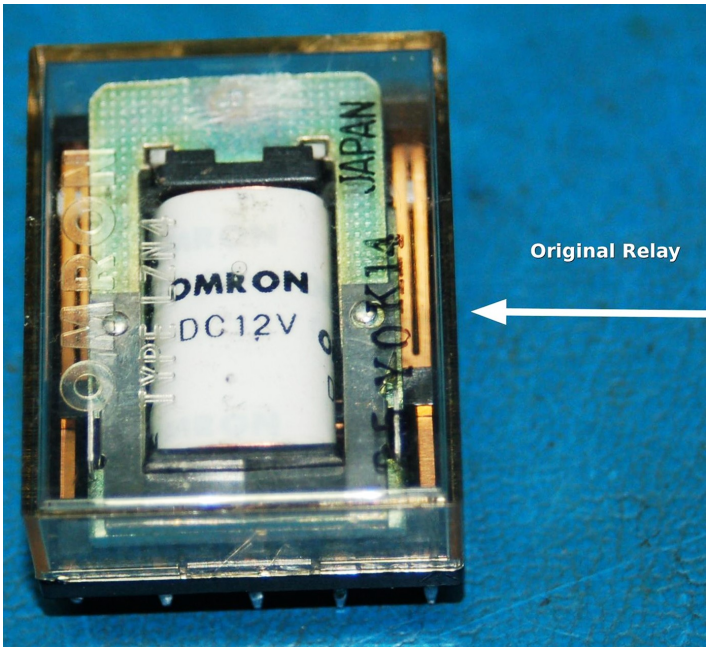
Kenwood TS-830S Low Level Receive Repair

Dave Carroll, N2VUZ

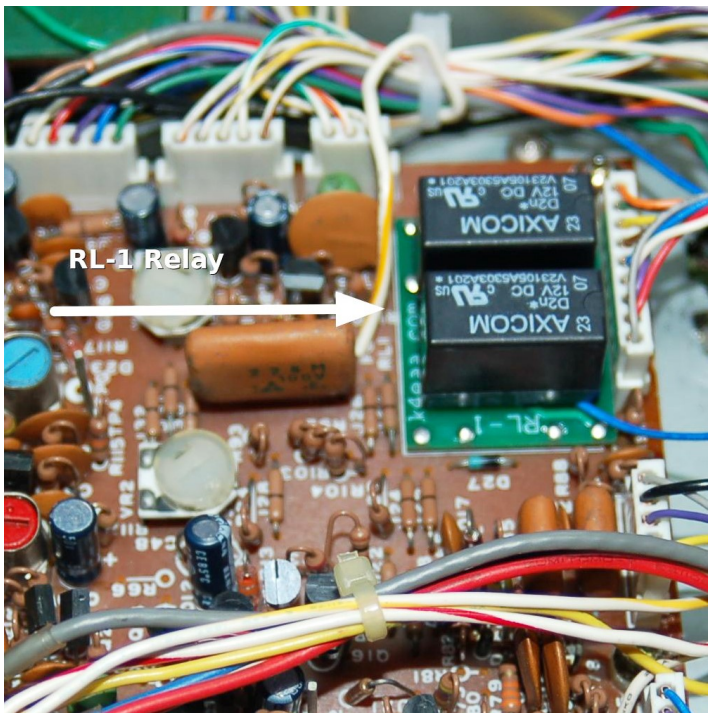
I have 4 Kenwood transceivers, 3 of which are hybrids. The TS-830S is a 1980s era transceiver and they occasionally require maintenance or repair, especially if they have not been used for a while. Most of the issues are with internal connectors, deck switches, switches, potentiometers and adjustments. However, sometimes part failures occur. In this case, the original RL-1 relay partially failed on receive. This is a common issue with this Kenwood hybrid transceiver.

In this one case for my TS-830S, it had several common issues which were previously fixed and now the receive level was intermittently low occasionally after transmit. Transmit was fine.

If I tapped on the RL-1 relay, the received signal would sometimes clear up. See photo below of original relay. RL-1 switches the final bias, RIT, XIT and exciter gain. Removing the cover on the relay and cleaning the contacts did not fix the issue. In receive, the contacts would only make solid contact occasionally. This Omron brand relay , of course, is no longer made and the Kenwood part is no longer available. A web site for hard to find Kenwood parts had a replacement relay that was plug and play. The site is https://www.k4eaa.com.



Original TS-830S RL-1 relay with intermittent issue on receive.



TS-830S AF board after replacement of defective RL-1 relay.

I bought the replacement board and it came quickly. It consists of 2 Axicon relays on a PC board. The relays are plugged into sockets for easy replacement. The board the relay is mounted on is the AF board on the bottom of the TS-830S. The AF board must be removed to replace the relay, which is relatively easy. It is just a matter of unplugging connectors and removing the mounting screws for the board. The original relay needs to be un-soldered and the new relay board re-soldered into the same holes. You can't get it backwards as the pins only permit mounting it one way.

While I had the cover off I also checked the PC board with the 6146B tube sockets. They often have broken solder joints on the tube socket pins, and mine did. They were re-soldered and cleaned. Preliminary tests on the bench showed both transmit and receive worked as expected. Receive sensitivity was exactly where it should be using my HP generator. On air tests were next. I found someone calling CQ on 40 meters and answered him. Received a good report from the other station and receive level was where it should be.

If you have a project or repair you have documented, please write it up, photograph it and send it in for possible publication in Signals.

Jim Fisher Memorial Digital Network Association Presents to RF Hill Amateur Radio Club

Robert Griffiths, NE3I, EPA PIC

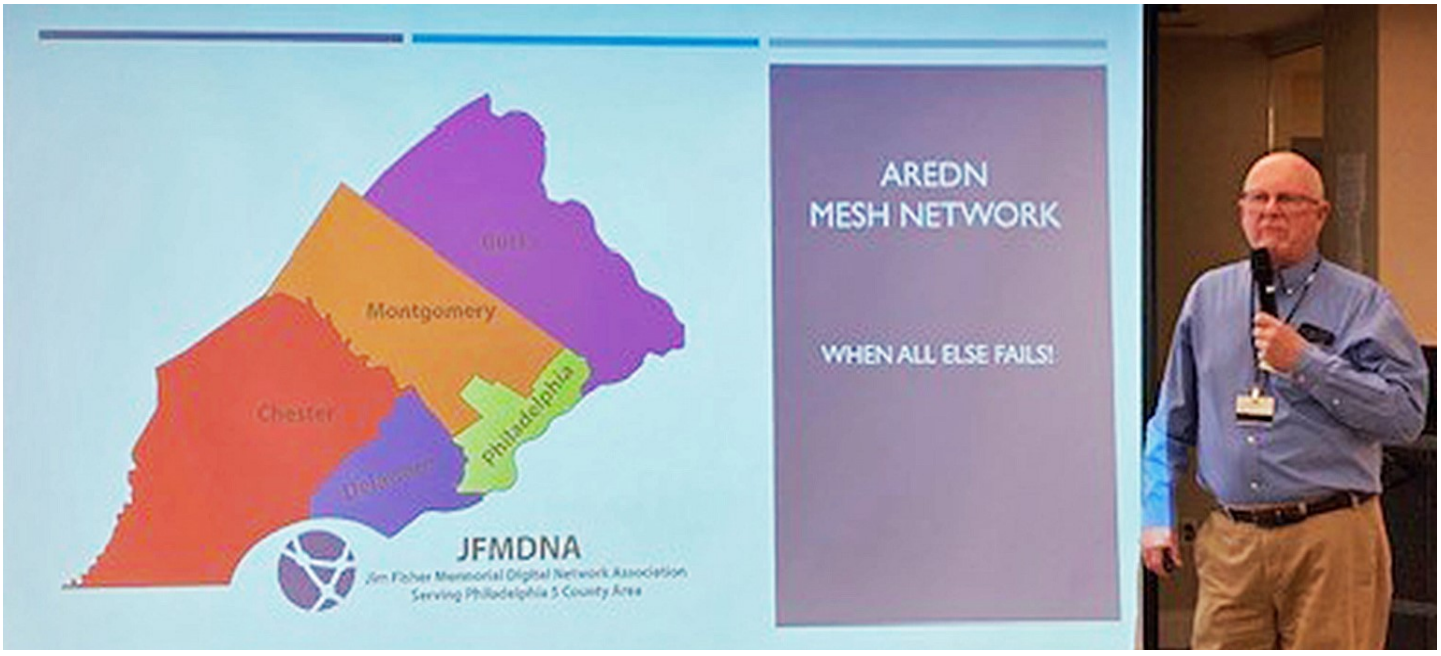
Several representatives from the recently formed Jim Fisher Memorial Digital Network Association (JFMDNA) presented an update explaining the system and developments with the JFMD Network to the RF Hill Amateur Radio Club at its January Meeting.

EPA clubs AND ARES® groups are encouraged to contact the JFMDNA if interested in learning about this endeavor to create a *radio frequency internet* using converted commercial Wi-Fi devices to amateur radio frequencies. For more information about the network or scheduling a presentation of this program to your club or group, use the following email links below or call (724) 568-6374.

Jim Fisher Memorial Digital Network Association

Tom Nolan, W3EX

Ben Bowers, KE3KQ, describes his recent efforts to establish a network RF communication link in the field using a battery-powered portable two-node system.



Dr. Tom Nolan, W3EX, makes presentation on the JFMDNA effort to establish an RF internet on Amateur Radio to the RF Hill ARC.

Demonstrating Ham Radio with a Slinky Antenna

Craig Huey, KC3TRT

My wife, a local high school science teacher, asked me to visit one of her science classes to discuss radio. Their February unit was on waves, and they had just discussed the basics of wave theory. Incidentally, I had discovered the week prior, that the students had just learned some of that theory using a *Slinky* toy. Earlier this year, I had watched some footage of an operator using a Slinky as an antenna. My wife thought that would be a fantastic tool to introduce the students to radio. I had my doubts. The high school building sits on a slight hill but there is a water tower at the corner of the property with numerous mobile phone antennas. I was hoping they would not cause much interference on what I thought would be a ridiculously compromised antenna.

In preparation for the lab, I acquired some speaker wire and an LDG 9:1 unun. The day of the lab was upon us, and I showed up to school with my *Parks on the Air* gear. I enjoy operating QRP at parks using my FT-818 on a Bienno battery providing 5 Watts output. There is usually an LDG tuner in series with the end-fed Half-wave antenna for those activations. The students and the metal Slinky appeared, so we jumped right in. We only had one class period to assemble and operate the Slinky antenna. I divided the class into 3 groups. Group 1 was the counterpoise team. They calculated and measured speaker wire to produce 6 ground radials. The radials were then connected to the ground lug on the unun. Group 2 was the equipment assembly team. Those students connected the FT-818, tuner and battery. Group 3 was the arborist team. After several attempts, they were successful in throwing a weighted arborist line into a nearby tree. Three of the students hoisted the Slinky vertically into the air after the lower end of the Slinky was connected by a 6-inch jumper to the antenna lug of the unun.

High school students prepare a Slinky antenna for operation.

The Slinky antenna was terminated with an LDG 9:1 unun.

Fingers crossed, we powered up and tuned around the bands. It really worked. The 10 meter band was open and we listened to some DX from Germany (DL5PIA) and Spain. We took the opportunity to talk a little about wave theory and radio propagation. I went to the 20 meter band and started hunting for POTA stations. N4ATJ came back to us with a clean signal from North Carolina. By this time, the students were asking great questions. Of course, time ran out, the bell rang and they were off to their next class. My children, who attend the school, told me their peers talked about how “cool” that lab was. The following weekend, one of the students’ parents approached me and said their child told them about the radio experiment, asking, “Was that really Germany?”

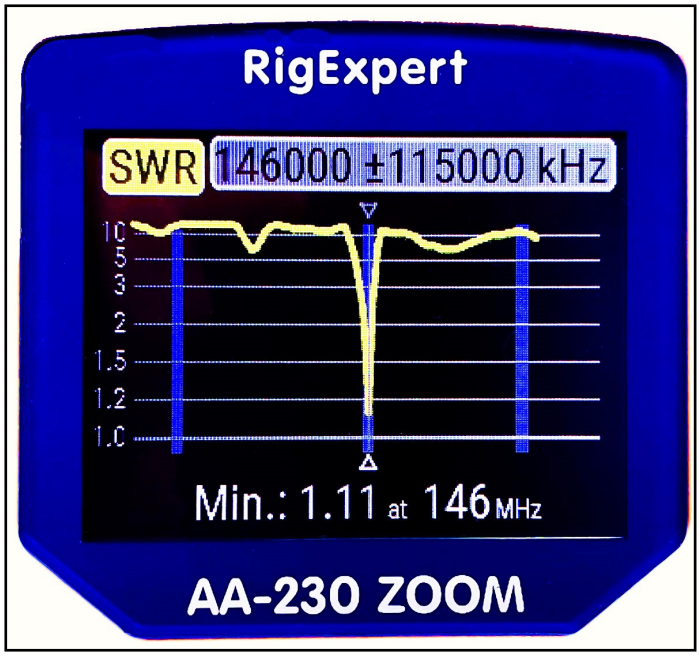
RigExpert AA-230 Zoom Antenna Analyzer

Bob Wilson, W3BIG

Whether you're building an antenna, tuning or tweaking one or checking performance, an antenna analyzer is a handy tool. These days there are plenty of good choices, but RigExpert manufacturers some of the best, There are many models to cover a wide spectrum of frequencies. They are rugged, easy to use and packed with useful features.

The **AA-230 Zoom** is a good choice that covers .1 to 230 MHz, making it a valuable tool from HF through the VHF 2 meter and 1.25 meter bands. Price is less than $350. If you need an analyzer that covers the 70 cm band, there are models available such as the AA-650 Zoom and the Stick 500.

The AA-230 Zoom is convenient to use in the field, on a tower or in the shack. It is powered by 4 AAA batteries and is equipped with an N-type connector on the top of the unit. The screen is a sharp 290 x 220 color TFT display. A USB type B port is located on the bottom for connection to a PC. The PC connection is necessary for using the *AntScope* software to measure, analyze and print plots. I use this feature for checking the characteristics of my fixed station antenna systems including the cabling. The display modes include: SWR at single or multiple frequencies, SWR, return loss, R, X, Z, L, C at a single frequency, SWR chart from 20 to 500 points, Smith chart 20 to 500 points, return loss chart 20 to 500 points, TDR (Time Domain Reflectometer) chart and cable tools including stub tuner, length and velocity factor, cable loss and characteristic impedance measurement.



AA-230 Zoom SWR Chart Display

RigExpert AA- 230 Zoom Hand-held Antenna Analyzer

I recently used the AA-230 Zoom to test a 4-element 2 meter cubical quad I built. The AA-230 Zoom SWR chart for that antenna is pictured at left.

Odds & Ends

Michael Drawbaugh-KD3MAD Earns QRZ DX100

On 1 FEB 24, KD3MAD, Michael A. Drawbaugh, successfully received confirmation for contact with his 100th country. As a result, he applied for and received his DX 100 award from QRZ. The honor went to 7Q7EMH - Radio Station of Embangweni Mission Hospital - Malawi – Africa. It was an FT8 contact on 17M. Michael is continuing his quest for endorsements over above Mixed for both Digital and Phone. He currently stands at 75+ on each mode.

KD3MAD has also been busy getting back into POTA. On 2 FEB 24, Groundhog Day, he fittingly completed his Repeat Offender award for 20 activations at K-8908. Coincidentally, that was also the same activation in which he obtained his Kilo award for Reference No. K-8908.

W3RN Appointed EC for Wyoming County

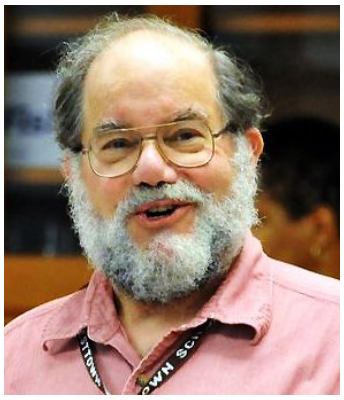
On February 26, Ronald Nelson, W3RN, of Laceyville was appointed to serve as the ARES® Emergency Coordinator for Wyoming County. Ron is a former firefighter and medic from upstate New York who has also served as a fire instructor in New York and 911 dispatcher in San Diego, CA. He has also worked as an emergency preparedness and CERT coordinator in schools. Ron also currently serves as the VP for the Endless Mountains Amateur Radio Club (EMARC).

POTA Extravaganza at Evansburg State Park

Pottstown Area ARC will host a POTA event in Evansburg State Park on April 28 at Pavilion A from 9:00 AM to 4:00 PM. Bring your enthusiasm and radios. Whether you're a seasoned operator or just getting started, there's something for everyone. There will be POTA "pros" on hand to answer questions and share their experience. Social media tags: #PAARCinthe PARK, #POTA, #AmateurRadio, #EvansburgStatePark, #RadioAdventure, #HamRadio. **PAARC website for information**.

Thank you Barry Feierman K3EUI for All You Do

We want to send out a big thank you to a tireless individual who embodies everything it means to be an amateur radio operator, a teacher and a wonderful personnel asset within the Eastern Pennsylvania Section. Barry Feierman, K3EUI of West Chester in Chester County, has trained and assisted countless hams get connected on many different digital modes. His dedication to introducing the amateur community in our area to communicating effectively via a myriad of digital protocols has led in a very tangible way to the advancement of emergency communications in so many ARES units. His work with NBEMS nets and RF tests with low-power systems has been instrumental increasing the effectiveness of amateur radio emcomm operations within the section.



Barry was first licensed in 1958 as a 13 year-old. He upgraded to the Extra license when he was still a teen. His first rig was a *Gonset II Communicator* running 10 Watts on 2-meter AM with just 3 crystals. He easily worked CW on HF with a speed of 25 wpm.

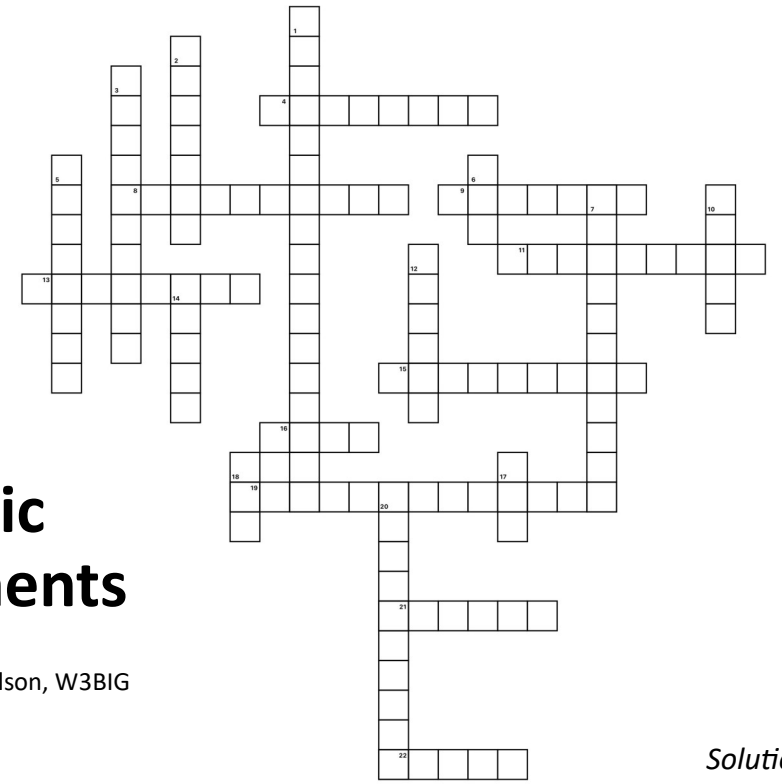
Barry taught high school physics and astronomy at the Westtown School in West Chester for 41 years. Just image the incredible number of young minds he introduced to those fascinating fields.

If you hear Barry on the air, please take a minute to say hello and thank him for all he has contributed. We in the EPA are especially fortunate to count him as one of our own.

The Editor

Send us your blurbs and amateur radio accomplishments for publication. Your fellow hams enjoy reading about your achievements. Send to Signals Editor.

Ham Radio Crossword



Electronic Components

Crossword by Bob Wilson, W3BIG

Solution on page 26

Down

1. An assembly of components in which hundreds or millions of transistors, resistors and capacitors are interconnected on a thin substrate (2-words) (17)

2. A _____ mount component has leads designed to be soldered on the side of a circuit board on which the component is mounted (7)

3. Semiconductor device designed to sense light and convert it to current (10)

5. Also called a coil or choke, it stores energy in a magnetic field (8)

6. A semiconductor device with 3 terminals where current flow through the device is controlled by an electric field (acronym) (3)

7. A device that converts voltage levels while keeping frequency constant (11)

10. Semiconductor device with 2 terminals that typically permits current flow in one direction only (5)

12. Acronym for a metal-oxide field-effect transistor (6)

14. A narrow flat copper conductor, equivalent to a wire, on a circuit board (5)

17. Semiconductor device which glows when voltage is applied (3)

18. Bipolar transistor that comprises 2 semiconductor junctions that share a p-doped region (3)

20. An early semiconductor device with 3 leads that is capable of amplification and rectification (10)

Across

4. Component measured in Ohms (8)

8. Device designed to produce a periodic alternating output at a specified frequency (10)

9. A _____ core is placed around a cable to suppress high frenquency noise (7)

11. Stores an electrical charge and measured in Farads (9)

13. A type of fast-switching diode (8)

15. A voltage _____ is a device placed between a power source and load to provide a constage voltage to the load (9)

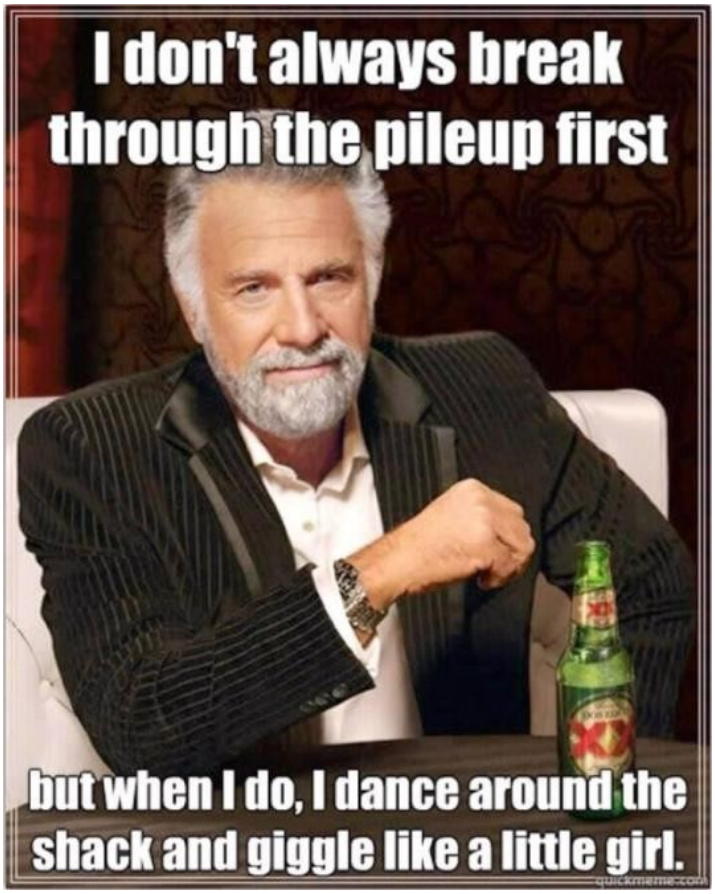
16. A device designed to stop current flow when it exceeds a certain limit (4)

19. Variable resistor adjusted either manually or digitally (13)

21. A device for making and breakingthe connection in a circuit (6)

22. An electrically operated switch that opens and closes a circuit bt receiving an electrical signal from an outside source (5)

Ham Humor

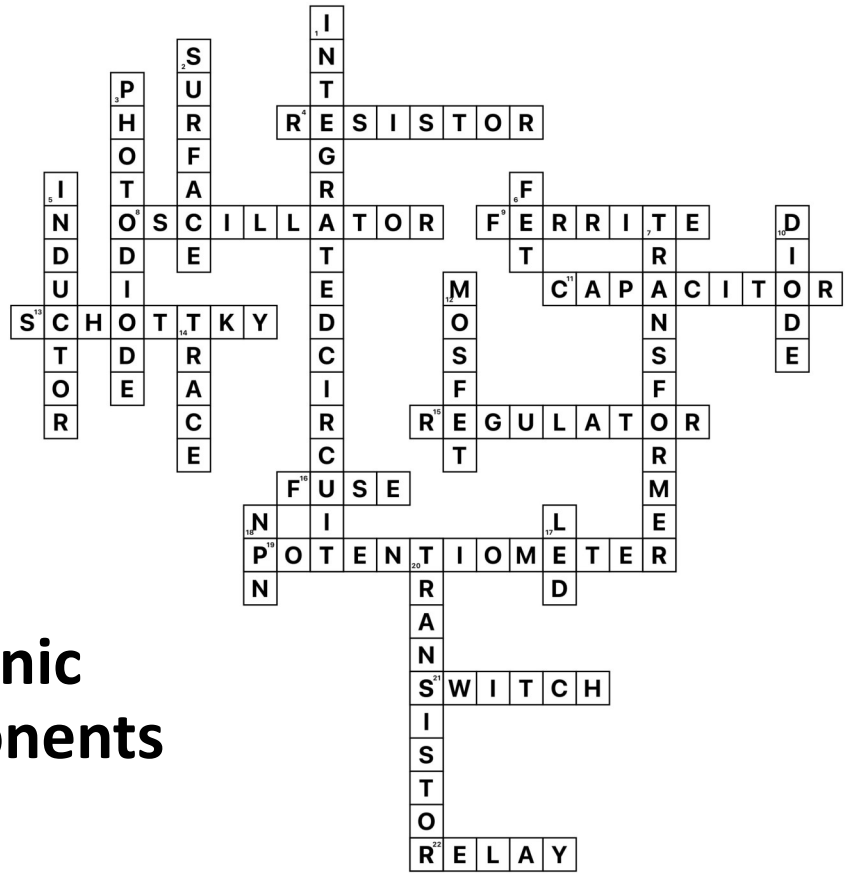


If you have ham humor to contribute, send your cartoons, jokes and puns here:

Signals Editor

"Ohms, Watts and audio frequency he understands. Drains and faucets are beyond him."

Crossword Solution



Electronic Components

Signals Wants Your Crossword Ideas

If you have an idea for an amateur radio-related crossword puzzle, we can format the word grid and clues. All we need is a title, the words for the grid and corresponding clues.

Example from the above puzzle, 3 Down:

Grid word: *PHOTODIODE*
Clue: *A semiconductor device designed to sense light and convert it to current*

Once you have your puzzle ready, submit it to Signals Editor and we will do the rest. Make sure you include your full name and FCC call sign so we can give you credit.

US Amateur Radio Bands

US AMATEUR POWER LIMITS

FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Effective Date for 2,200 and 630 Meters to be announced

ARRL The national association for AMATEUR RADIO®

On March 28, 2017, the Federal Communications Commission adopted rules that will allow Amateur Radio access to 472-479 kHz (630 meters) and to 135.7-137.8 kHz (2,200 meters). However, amateurs cannot use these frequencies until 30 days after the Report and Order is published in the Federal Register and the final procedures for registering stations with the Utilities Telecoms Council (UTC) have been approved and announced. At the time this chart was created, the Report and Order had not been published and the UTC online registration site is not yet available. Follow ARRL news for further information. New charts will be published at www.arrl.org/graphical-frequency-allocations when the bands are fully available for use.

2,200 Meters (135 kHz)

E,A,G

135.7 kHz — 1 W EIRP maximum — 137.8 kHz

630 Meters (472 kHz)

E,A,G

472 kHz — 479 kHz

5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP.

160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1.900 to 2.000 MHz

E,A,G

1.800 — 1.900 — 2.000 MHz

80 Meters (3.5 MHz)

3.500 3.600 3.700 4.000 MHz

E
A
G
N,T (*200 W*)

3.525 3.600 3.800

60 Meters (5.3 MHz)

CW, Dig: 5332 5348 5358.5 5373 5405 kHz — 2.8 kHz — E,A,G (*100 W*)

USB: 5330.5 5346.5 5357.0 5371.5 5403.5 kHz

General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.

40 Meters (7 MHz)

7.000 7.075 7.100 7.300 MHz

ITU 1,3 and FCC region 2 west of 130° west or below 20° north

E
A
G
N,T (*200 W*)

7.175
N,T *outside region 2*

7.025 7.125

See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.

30 Meters (10.1 MHz)

Avoid interference to fixed services outside the US.

200 Watts PEP E,A,G

10.100 10.150 MHz

20 Meters (14 MHz)

14.000 14.150 14.350 MHz

E
A
G

14.175

14.025 14.150 14.225

17 Meters (18 MHz)

E,A,G

18.068 18.110 18.168 MHz

15 Meters (21 MHz)

21.000 21.200 21.450 MHz

E
A
G
N,T (*200 W*)

21.225
21.275

21.025 21.200

12 Meters (24 MHz)

E,A,G

24.890 24.930 24.990 MHz

10 Meters (28 MHz)

28.000 28.300 29.700 MHz

E,A,G
N,T (*200 W*)

28.000 28.500

6 Meters (50 MHz)

50.1

E,A,G,T

50.0 54.0 MHz

2 Meters (144 MHz)

144.1

E,A,G,T

144.0 148.0 MHz

1.25 Meters (222 MHz)

E,A,G,T
N (*25 W*)

219.0 220.0 222.0 225.0 MHz

*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.

70 cm (420 MHz)*

E,A,G,T

420.0 450.0 MHz

33 cm (902 MHz)*

E,A,G,T

902.0 928.0 MHz

23 cm (1240 MHz)*

1240 1300 MHz

E,A,G,T
N (*5 W*)

1270 1295

All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz ‡	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

‡ No pulse emissions

KEY

Note:

CW operation is permitted throughout all amateur bands.

MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.

Test transmissions are authorized above 51 MHz, except for 219-220 MHz

= RTTY and data
= phone and image
= CW *only*
= SSB phone
= USB phone, CW, RTTY, and data
= Fixed digital message forwarding systems *only*

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See *ARRLWeb at www.arrl.org* for detailed band plans.

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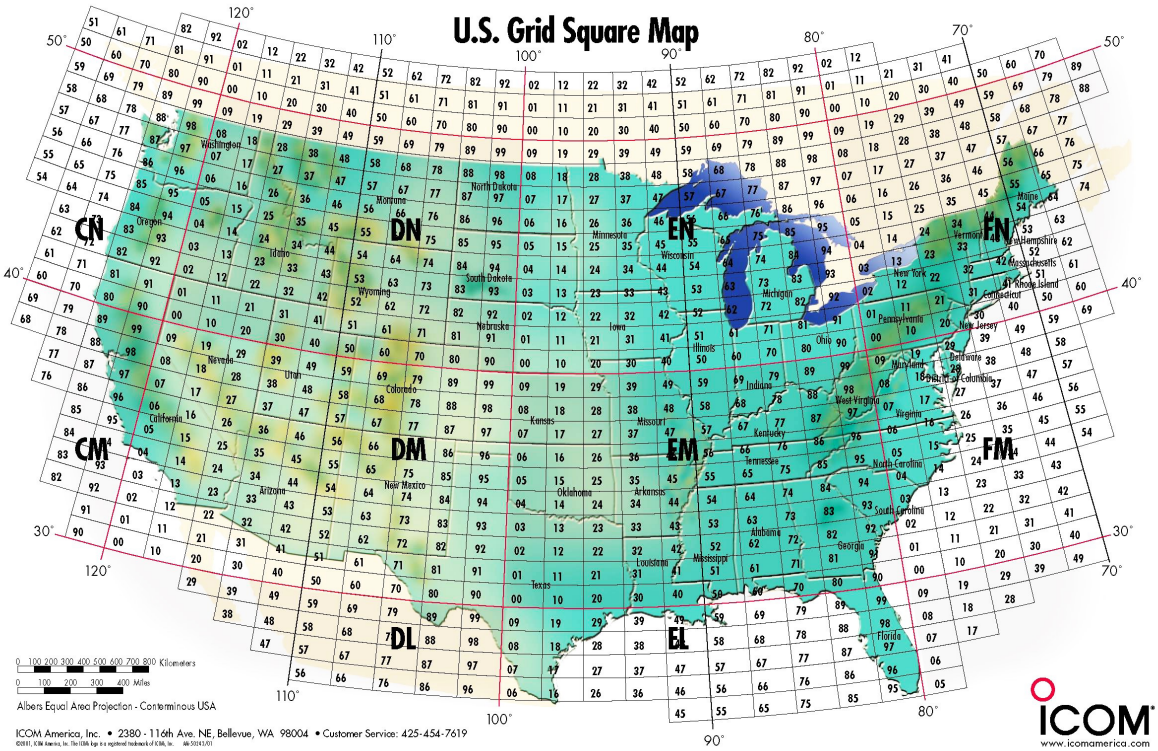
U.S. Grid Square Map



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