

QST



DIGITAL EDITION



ARRL The National Association for
Amateur Radio®

July 2024

www.arrl.org

DEVOTED ENTIRELY TO AMATEUR RADIO

The Power of Preparedness

QST Reviews

RFinder B1 Plus Dual-Band DMR/FM
Transceiver/Smartphone

N2EME RX-In RX-Out 0 – 450 MHz
100 W SDR Switch

Halibut Electronics Common-Mode
Current Test Rig



The Best of the Best

Narrow Band SDR Transceiver

FTDx10

Unrivalled RF Performance

Narrow Band SDR Technology is the Revolution

Inheriting the performance of the FTDx101, which is validated to exceed HF transceivers in laboratories around the world.

The most advanced digital narrow band SDR technology is combined with the RF Front-End engineering, such as the low noise-figure RF amplifier and the very sharp shape factor roofing filter designs that Yaesu has incorporated over the years, resulting in unsurpassed HF receiver performance.

Equipped with the latest MPVD feature, and 3DSS visual display to deliver superior Operability and Visibility.

A New Legend in HF Transceivers debuts

HF/50MHz TRANSCEIVER

FTDx10

100W



- The image is shown with an optional third party external display that may be connected using a DVI-D digital cable.
- Shown with Optional External Speaker SP-30.

YAESU
Radio for Professionals

YAESU USA
6125 Phyllis Drive, Cypress,
CA 90630 (714) 827-7600

For the latest Yaesu news, visit us on the Internet: <http://www.yaesu.com>

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

Carries the Yaesu genes for true RF performance

- SDR circuit emphasizes Receiving Performance
- Powerful RF Front-End & Low Noise Oscillator Enable Phenomenal Multi-Signal Receiving Characteristics*

• RMDR : 113dB+ • BDR : 127dB+
• 3rd IMDR : 102dB+ • TX Phase Noise : -143dBc/Hz

- Band-Pass-Filters dedicated for the amateur bands to eliminate out-of-band unwanted signals
- Built-in High-speed Automatic antenna tuner
- Effective QRM rejection by Dual-core DSP

*Multi-signal receiving characteristic: 14MHz band/2kHz separation

*TX Phase Noise: 100W, CW mode

- AECS (Acoustic Enhanced Speaker System) with SP-40 speaker to create High-fidelity audio output
- 3DSS, real-time 3-Dimensional Spectrum Stream presentation
- High Resolution 4.3-inch TFT Color Touch Panel Display
- VMI (VFO Mode Indicator) shows the current operating mode
- "PRESET" Mode functions most suitable for FT8 operation
- Equipped with the External Display terminal

FT-710 AECS

- Includes External Speaker SP-40

FT-710 Field

- Includes Carrying Belt
- To use the AECS function, External Speaker SP-40 (Optional) is required

- Display is not included. The image is shown with an optional third-party external display that may be connected using a DVI-D digital cable.



* Photo shows the FT-710 AECS

HF/50MHz 100W SDR TRANSCEIVER w/ SP-40

FT-710 Aess

Acoustic Enhanced Speaker System

HF/50MHz 100W SDR TRANSCEIVER

FT-710 Field

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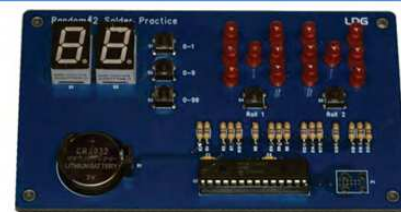
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9

Second Century

SAFECOM: A Seat at the Table and Why It Matters

30

2023 ARRL Donors

34

Power Tool Batteries for Portable or Emergency Operation

Gordon S. Novak, Jr., AF5KA

▶ 36

The WT3J GUI-Based Morse Code Controller

John Wiseman, CT9/WT3J

39

Product Review

Pascal Villeneuve, VA2PV

RFinder B1 Plus Dual-Band DMR/FM Transceiver/Smartphone;
N2EME RX-In RX-Out 0 – 450 MHz 100 W SDR Switch;
Halibut Electronics Common-Mode Current Test Rig

57

Preparedness Paid Off Before, During, and After Hurricane Ida

Brian Karcher, KG5GJT

60

The Great Washington ShakeOut

Phil Cornell, W7PLC

63

The GOES-16 Satellite and Emergency Management

Michael Tice, KE0ZXU

66

Planning a Surprise Emergency Training Session

Randy Brack, N5MRB

▶ 68

Creating Off-the-Grid Power for Emergency Use

Chuck Dennis, W5CTD

70

Simulated Emergency Test 2023 Results

82

2023 ARRL 10-Meter Contest Results

Andrew Goss, AA5JF

85

2024 ARRL January VHF Contest Results

James Duffey, KK6MC

87

The ARRL 222 MHz and Up Distance Contest

87

August 2024 ARRL Rookie Roundup — RTTY

102

A Look Back — August 1974



An icon next to an article means there's bonus content in the digital edition at www.arrl.org/qst.



Columns

Ask Dave	51
Celebrating Our Legacy	105
Classic Radio	106
Club Station	88
Contest Corral	81
Correspondence	24
Exam Info	79
Ham Media Playlist	90
Happenings	73
Hints & Hacks	53
How's DX?	92
Member Spotlight	13
Microwavelengths	55
Public Service	77
The World Above 50 MHz	94
Up Front	20
100, 50, and 25 Years Ago	108

Digital and Mobile Editions

ARRL members can access the digital edition via a link at www.arrl.org/qst, download our iOS app from the iTunes Store, and download our Android app from the Google Play Store.

Departments

Amateur Radio Band Chart	10
ARRL Section Managers	16
ARRL Special Service Clubs	89
Certificate of Code Proficiency Recipients	101
Convention and Hamfest Calendar	98
Feedback	38
Field Organization Reports	97
Guide to ARRL Member Benefits	14
Ham Ads	124
Index of Advertisers	126, 127
Officers, Division Directors, and Staff ...	15
QST Cover Plaque Award	65
Silent Keys	109
Special Event Stations	96
Strays	52, 91
Volunteer Monitor Program Report	100
W1AW Qualifying Runs	101
W1AW Schedule	28



Our Cover

Our EmComm issue is filled with material to enhance your readiness — everything from recounting of real-life responses and exercises, to projects like Gordon S. Novak, Jr.'s, AF5KA, "Power Tool Batteries for Portable or Emergency Operation" shown on this month's cover with operator Naldy Medina, KP4AMC. [Chris Zajac photo]

Write for QST

www.arrl.org/qst-author-guide
email: qst@arrrl.org



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ARRL/RAC Sections
on back of shirt

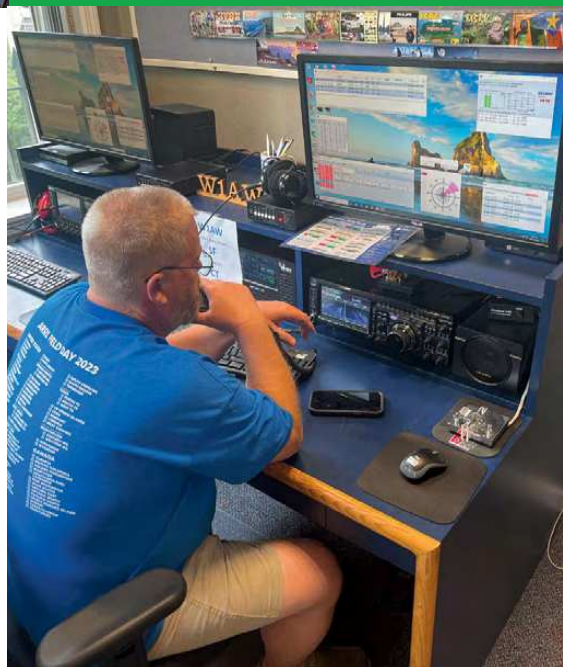
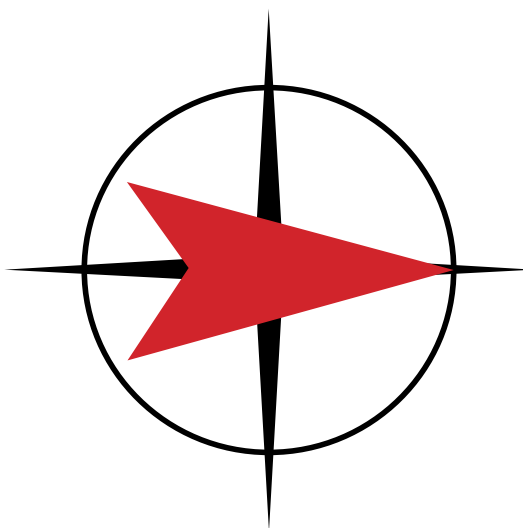


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DIAMOND ANTENNAS help you get the most out of your on-air experience.

For all your base station and repeater needs, DIAMOND has an antenna that will work for you.

You've tried the rest, now own the best!

Here is a small sample of our wide variety of antennas

Model	Bands	Length Ft.	Max Pwr. Rating	Conn.
Dualband Base Station/Repeater Antennas				
X700HNA (4 section)	2m/70cm	24	200	N
X510HD (3 Section)	2m/70cm	17.2	330/250	UHF or N
X300A (2 Section)	2m/70cm	10	200	UHF or N
X200A (2 Section)	2m/70cm	8.3	200	UHF
X50A (1 Section)	2m/70cm	5.6	200	UHF or N
X30A (1 Section)	2m/70cm	4.5	150	UHF
Monoband Base Station/Repeater Antennas				
F23H (3 Section)	144-174 MHz (W/ Cut Chart)	15	350	UHF
F22A (2 Section)	2m	10.5	200	UHF
CP22E (Aluminum)	2m	8.9	200	UHF
F718A (Coax Element)	70cm	15	250	N
Dualband Mobile Antennas				
SG7900A	2m/70cm	62.2 in.	150	UHF or NMO
SG7500A	2m/70cm	40.6 in.	150	UHF or NMO
NR770H Series	2m/70cm	38.2 in.	200	UHF or NMO
MR77 Series	2m/70cm	20 in.	70	Mag Combo
AZ504FXH	2m/70cm	15.5 in.	50	UHF
AZ504SP	2m/70cm	15.5 in.	50	UHF
NR7900A	2m/70cm	57 in.	300/250	UHF
Monoband Mobile Antennas				
NR22L	2m	96.8 in.	100	UHF
M285	2m	52.4 in.	200	UHF or NMO

X700HNA Special Features:

- Heavy duty fiberglass radomes
- Four section assembly
- Overlapping outer shells for added strength
- Stainless steel mounting hardware & radials
- Strong waterproof joint couplings
- Type-N cable connection
- Wideband performance
- Highest gain Dual-band Base Antenna!

The Standard By Which All Others Are Judged

NR770H Series

SG7900A

X30A / X50A

X700HNA



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Second Century

SAFECOM: A Seat at the Table and Why It Matters

Some 5 years ago, the ARRL Board of Directors decided that, given the importance of emergency communications to ARRL — and, indeed, its importance within FCC Part 97 — we needed to elevate our focus and our capabilities.

Two important things developed from that decision: first was the establishment of a senior position at ARRL responsible for EmComm, while the second was the establishment of a new Board-level standing committee, the Emergency Communications and Field Services Committee (EC-FSC). Taking these two steps has led to the re-establishment or development of relationships with served agencies, like FEMA, and Memorandums of Agreement (MOAs) about how we will work together. We've learned that these MOUs are not sufficient on their own to contribute to or guarantee success. It takes very strong interpersonal relationships with these agencies and the ability to function within a network of players during a time of need.

The federal government has learned the same lesson. There were significant lessons to be learned in the weeks and months following the attacks on September 11, 2001. Communications between agencies and the active sharing of information were the most significant weaknesses identified. In order to rectify that, the newly formed Department of Homeland Security established an advisory group called SAFECOM. SAFECOM is continuously working to improve emergency response providers' interjurisdictional and interdisciplinary emergency communications operability, interoperability, and security across state, local, tribal, territorial (SLTT), regional, and international borders, and with the federal government, allowing emergency responders to communicate through different communications systems to exchange information. The Cybersecurity and Infrastructure Security Agency (CISA) administers and supports the program and its stakeholder activity.

SAFECOM brings together more than 80 representatives from SLTT emergency responders, appointed and elected officials, and major intergovernmental and national public safety associations. SAFECOM's membership also coordinates with elected and appointed officials, as well as other key emergency communications stakeholders, to provide input on the challenges, needs, and best practices facing emergency communications. Over the past 20 years, SAFECOM has produced many public service communications documents, white papers, and guides that are now best practices for communication services and 911 systems, and is widely accepted as the premier authority for public safety communications resources.

Why does this matter? The first and foremost concern for ARRL's Amateur Radio Emergency Service® (ARES®) is interoperability. Long gone are the days when amateur radio

stood on its own, providing communications in response to an emergency. With advanced portable cellular and satellite capabilities, SAFECOM members in their individual capacities will get involved in emergency response, and our ability to understand and co-operate with them is critical. Having a seat at the SAFECOM table is critical. ARRL being a SAFECOM member provides the opportunity for EmComm officials to see amateur radio in a new light and bring that vision back to their respective agencies, associations, and groups. That is the power of SAFECOM: bringing good ideas and best practices to the forefront in our communities.

In the coming years, ARRL, through its participation in SAFECOM, will look to work with their member organizations to develop and evolve training programs that better prepare our involvement and preparation around the country. The interactions and involvement will build a better-trained and professional volunteer resource pool to support emergency management functions for all hazards, and serve as a technical asset for all response organizations.

As ARRL gets more involved in the SAFECOM committees, working groups, and task forces, we will have the opportunity to build relationships and create contacts, as well as learn directly from subject-matter experts within the public safety community. These relationships serve as an example for state and local hams in the relationships they should be working to build in their local communities. Our ARRL Director of Emergency Management, Josh Johnston, KE5MHV, has been named to the AUXCOM working group on the Emergency Communications Task Force. He also serves on the Education and Outreach Standing Committee.

SAFECOM matters. Having a seat at the table matters. Our ability to integrate and interoperate ARES into the SAFECOM community matters. It also underscores the reality that communicating over the radio may not be their first priority, but being able to provide those communications is. Be radio active. Look to get involved in emergency communications locally, starting with ARES. Be a connector. If you already have a strong relationship with local emergency authorities, let us know! And be prepared personally for that potential time of need.

David A. Minster, NA2AA
Chief Executive Officer

US Amateur Radio Bands

Operator license classes: **E** = Amateur Extra **A** = Advanced **G** = General **T** = Technician **N** = Novice
 CW operation is permitted throughout all amateur bands. Except as noted, all frequencies are in megahertz (MHz).

■ = RTTY, data, phone, image
 ■ = USB phone, RTTY, data and CW
 ■ = RTTY and data
 ■ = phone and image
■ = SSB phone
 = CW only

LF – Low Frequency band

2200 Meters (135 kHz) E,A,G
1 W EIRP maximum



Amateurs wishing to operate on **2200 or 630 meters** must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.

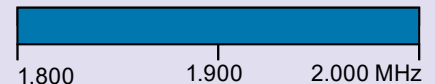
630 Meters (472 kHz) E,A,G

5 W EIRP max, except in Alaska within 496 miles of Russia where the limit is **1 W EIRP**



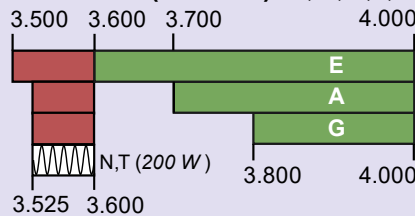
MF – Medium Frequency bands

160 Meters (1.8 MHz) E,A,G

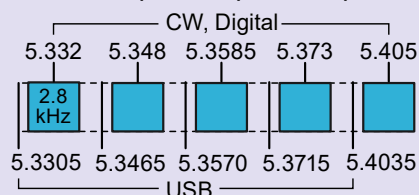


HF – High Frequency bands

80 Meters (3.5 MHz) E,A,G,T,N

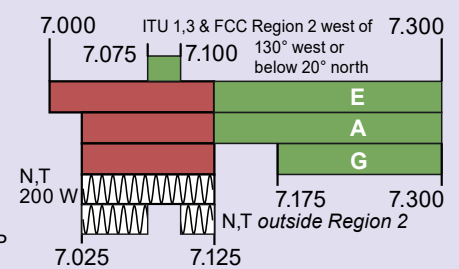


60 Meters (5.3 MHz) E, A, G (100 W)



General, Advanced, and Extra licensees may operate on a secondary basis with a maximum ERP of 100 W (relative to a half-wave dipole antenna).

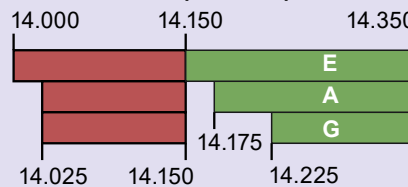
40 Meters (7 MHz) E,A,G,T,N



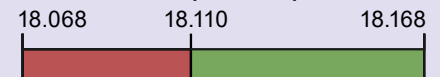
30 Meters (10.1 MHz) E,A,G



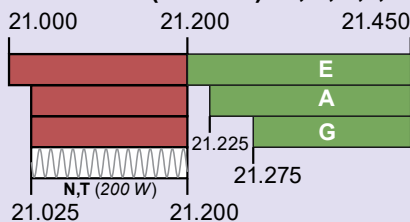
20 Meters (14 MHz) E,A,G



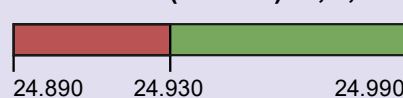
17 Meters (18 MHz) E,A,G



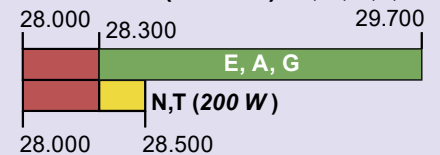
15 Meters (21 MHz) E,A,G,T,N



12 Meters (24 MHz) E,A,G

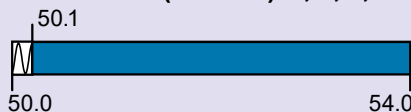


10 Meters (28 MHz) E,A,G,T,N



VHF – Very High Frequency bands

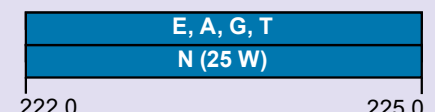
6 Meters (50 MHz) E,A,G,T



2 Meters (144 MHz) E,A,G,T

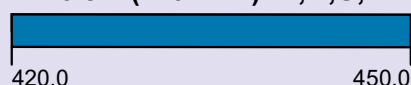


1.25 Meters (222 MHz) E,A,G,T,N



UHF – Ultra High Frequency bands

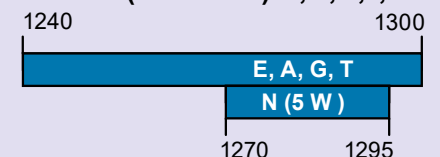
70 cm (420 MHz) E,A,G,T



33 cm (902 MHz) E,A,G,T



23 cm (1240 MHz) E,A,G,T,N



SHF&EHF – Super and Extremely High Frequency bands

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

2300-2310 MHz	3300-3450 MHz	10.0-10.5 GHz	47.0-47.2 GHz	122.25-123.0 GHz	241-250 GHz
2390-2450 MHz	5650-5925 MHz	24.0-24.25 GHz	76.0-81.0 GHz	134-141 GHz	All above 275 GHz

See www.arrl.org/band-plan-for-detailed-band-plans.

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Upgrade Your Antenna, Get The Best Mag Loop Today!



HG1 Deluxe MLA Portable & Quick Setup

- 80m to 10m *
- 45W PEP
- LMR600 Radiation Loop
- Calibrated 6:1 Manual Tuning Dial

\$535

HG3 Pro MLA Remote Control & Auto Tuning

- 80m to 10m *
- 45W PEP
- LMR600 Radiation Loop
- Integrated SWR Bridge

\$1,335

HG3 QRO-B MLA Precision Remote Control & Auto Tuning

- 80m to 10m *
- 1000W PEP
- LMR600 Radiation Loop
- Integrated SWR Bridge

\$3,025

See what our users say
on their Facebook Group
"PreciseRF HG3 QRO"

CONSIDER THESE BENEFITS IN YOUR NEXT MLA PURCHASE DECISION:

- 1 Stepper Motor Tuning**
Precision in Every Tune: Achieve repeatable and precise tuning with higher resolution. Optimized Signal Quality. Enjoy the lowest SWR for clear communication.
- 2 Microprocessor Control**
Control at Your Fingertips: Experience remote tuning for unparalleled convenience. Set the precise capacitor resonance value. Select bands quickly and seamlessly for spot-on tuning and minimal noise.
- 3 Integrated SWR Bridge**
Optimal Signal Strength: The integrated SWR bridge automatically scans for the lowest SWR, ensuring peak transmitter performance, minimal noise, and greater convenience.
- 4 Ideal for HOA Restrictions**
Setup Anywhere, Anytime: Easily deploy your mag loop in diverse locations. Freedom from elevation constraints, such as wire antennas. Great for HOA restrictions. Sets up easily in the attic.
- 5 QRO High Q Vacuum Capacitor and Loop**
High-Power with Minimal losses for the Best Performance: Vacuum capacitor and higher loop surface area deliver greater efficiency. Wide tuning range provides coverage of all popular HF bands.
- 6 Supported by Knowledgeable Hams**
Trusted Expertise: Choose a brand with a proven track record in the hands of knowledgeable hams. Dedicated Support: We are committed to providing comprehensive assistance and guidance for your mag loop setup.



SOTA-1 MLA \$435

- High-Q Capacitor
- 3:1 Reduction Dial
- 15W PEP
- LMR400 Radiation Loop
- Lightweight Nylon Bag



Bag holds everything
including the tripod

Tested and proven on Mt. Kilimanjaro

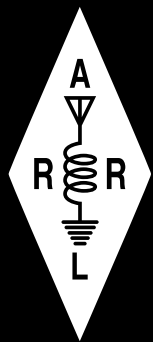
Gear up for your next adventure with the SOTA-1 MLA – your perfect companion for SOTA expeditions. Crafted from durable and lightweight materials, making it easy to carry on your hiking adventures.

Key Features:

- Lightweight Design: Ideal for easy transport on your outdoor journeys.
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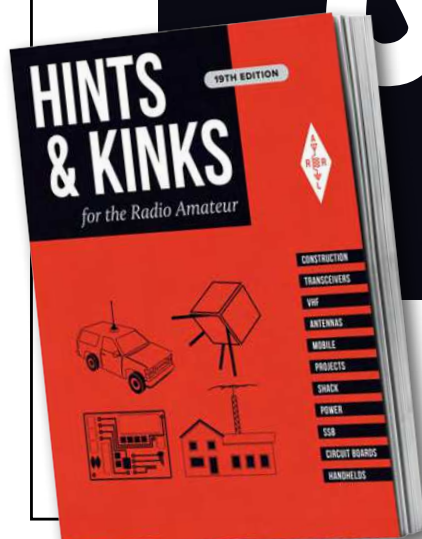
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Member Spotlight

Sloan Davis, Jr., N3UPS

Through dedication and hard work, Sloan Davis, Jr., N3UPS, participates in his two favorite hobbies almost every day of his professional career.

Getting Started

Sloan's interest in ham radio began when he was about 13. As a Boy Scout, he knew of the Morse code merit badge and that passing a Morse code test was required to get a ham radio license. However, Sloan's strengths were not in Morse code, so he sidelined his ham radio career for a while. At 17, he got his pilot's license, and his interest remained in CB radio for the time being. In 2019, he discovered Morse code was no longer a requirement and obtained his Technician-, General-, and Extra-class licenses all within 6 months before the year was over.

Sloan's journey to becoming a pilot was fueled by his passion and drive. Having been raised by parents who did not have many educational opportunities, Sloan wanted more. He attended Santa Fe Community College in Gainesville, Florida, on a track scholarship and was one of 26 students to attend the school's first-ever aviation course in 1977. As the only African American in the class, he faced some challenges, but he was the first student to pass the written exam for the private pilot's license.

After attending class each day, Sloan hitchhiked to the airport for his flying lessons and other learning opportunities. He unconventionally asked pilots if he could tag along on their flights to gain experience. Pilots were happy to teach Sloan but admitted they couldn't pay him. Sloan's response was "I don't want pay. I just want the experience."

During his sporadic air travels, and after obtaining his Commercial Multi-



Engine license, Sloan met a doctor who was looking for a private pilot. When Sloan was asked if he wanted the job, he responded, "Is the snow white?" and his aviation career began. After about 12 years and a couple of other jobs in between, he reached out to Aaron Gould, an African American pilot who worked for UPS, to seek guidance on his career in aviation. Aaron surprised Sloan by getting him a job interview with UPS, and he piloted for them (hence his call sign) for more than 33 years before retiring.

Operating Among the Clouds

Throughout his aviation career, Sloan operated airborne mobile. The Boeing 767 and 747 aircraft he flew were equipped with Rockwell Collins HF radios on 425 W with a tunable antenna on the plane's tail for 20-meter upper sideband, and hams were ecstatic to contact a pilot soaring *on the air*. "Talking to an airplane doing 700 mph at 39,000 feet, it was a thrill to give [hams] that [contact], and I faced pileups like you wouldn't believe," Sloan said.

Sloan's ham radio interest grew from there. He explained, "[At] my first HamCation, like everybody else, I'm

going around like a kid in a candy store, and I went by the [Amateur Radio Satellite Corporation] AMSAT booth, and I got interested in satellites." He has stuck with them ever since. Sloan's home setup includes two Alaskan Arrow antennas and an Icom IC-9700 transceiver that allows him to track satellites and operate almost daily. He is also an active POTA hunter, with 48 states confirmed, missing Alaska and Hawaii. He doesn't have much interest in becoming a POTA activator because he enjoys being close to home. He treasures his time with his wife, two daughters, and 5-year-old granddaughter.

Igniting Future Generations' Involvement

Sloan hopes to influence youth interest in ham radio. He frequents Florida's HamCation and the Huntsville Hamfest in Alabama as an ARRL representative to educate Boy Scout troops and other young generations. He teaches them about satellites and how to make contacts, and lets them hear what a contact sounds like. Sloan believes the best way to engage youth is through the Amateur Radio on the International Space Station (ARISS) program. When he pitches the idea, the feedback is usually great because, as Sloan said, "Everybody wants to talk to astronauts."

Recently, Sloan began taking CW classes to learn Morse code. He said it is "one of the things left unchecked." He is always up for a challenge, and now, in his retirement, he has dedicated time to learning. Sloan is also a recreational glider pilot. Rather than fly, the plane floats or glides through the air at a gradual descent. Landing safely is left to strategic planning. Sloan added, "The peacefulness and serene [feeling] of flying a glider is the [most] rewarding thing for me."

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Puerto Rico: Rene Fonseca, NP3O, Urb Santa Isidra 4 GB Calle 6, Fajardo, PR 00738-4145; 939-579-4134; np3o@arrl.org

Southern Florida: Barry M. Porter, KB1PA, 14555 Sims Rd., Apt. 259, Delray Beach, FL 33484; 561-499-8424; kb1pa@arrl.org

Virgin Islands: Fred Kleber, K9VV, P.O. Box 24275, Christiansted, VI 00824-0275 k9vv@arrl.org

West Central Florida: Michael Douglas, W4MDD, 2527 Apple Blossom Ln., Wauchula, FL 33873; 863-585-1648; w4mdd@arrl.org

Southwestern Division AZ, LAX, ORG, SB, SDG

Arizona: Rick Paquette, W7RAP, 1600 W. Sunkist Rd., Tucson, AZ 85755-9561 520-425-6877; w7rap@arrl.org

Los Angeles: Diana Feinberg, AL6DF, P.O. Box 4678, Palos Verdes Peninsula, CA 90274-9618; 310-544-2917; al6df@arrl.org

Orange: Bob Turner, W6RHK, P.O. Box 973, Perris, CA 92572 951-236-8975; w6rhk@arrl.org

San Diego: Dave Kaltenborn, N8KBC, 630 Alber St., Chula Vista, CA 91911 619-616-8758; n8kbc@arrl.org

Santa Barbara: John Kitchens, NS6X, P.O. Box 178, Somis, CA 93066 805-216-2569; ns6x@arrl.org

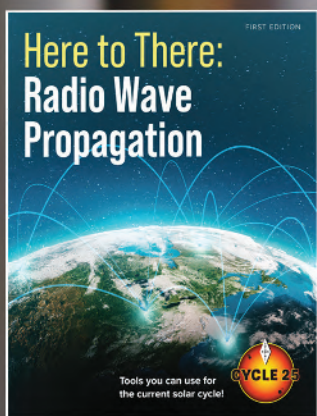
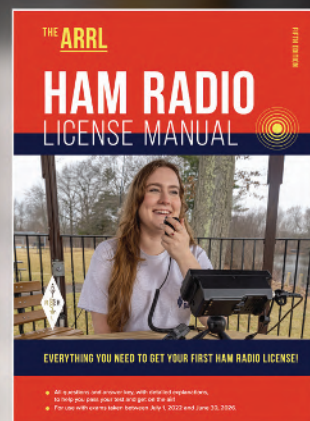
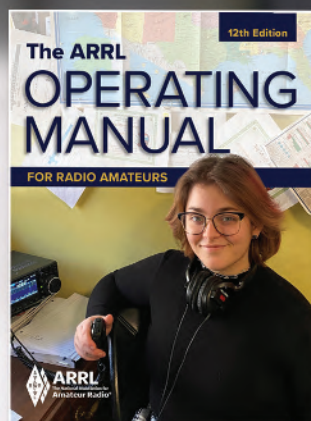
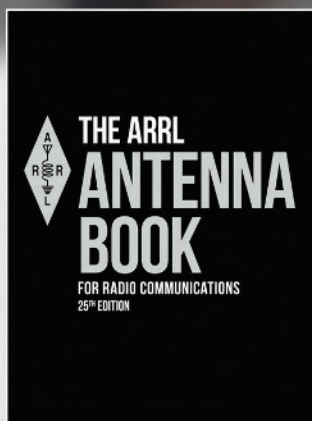
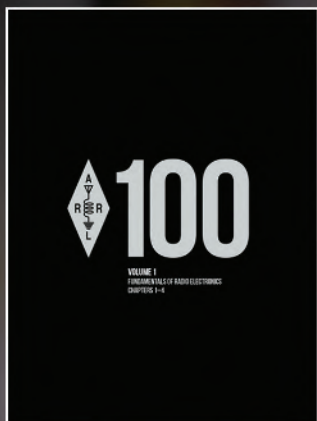
West Gulf Division NTX, OK, STX, WTX

North Texas: Steven Lott Smith, KG5VK, 125 Contest Ln., Ben Franklin, TX 75415-3830 318-470-9806; kg5vk@arrl.org

Oklahoma: Mark Kleine, N5HZR, 2651 84th Ave. SE, Norman, OK 73026 405-410-6756; n5hzh@arrl.org

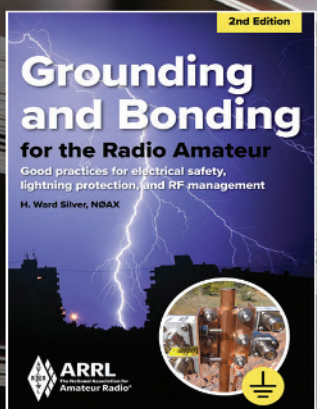
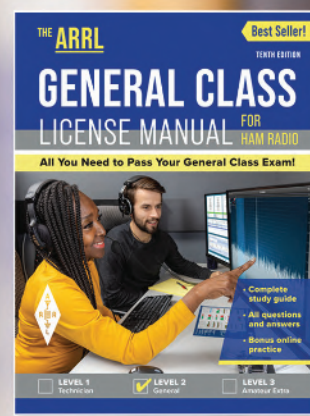
South Texas: Stuart Wolfe, KF5NIX, 408 Cedar Grove Rd., Rockdale, TX 76567 512-660-9954; kf5nix@arrl.org

West Texas: H. Dale Durham, W5WI, P.O. Box 375, Buffalo Gap, TX 79508 830-719-9000; w5wi@arrl.org

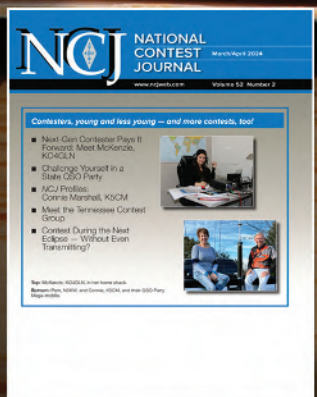
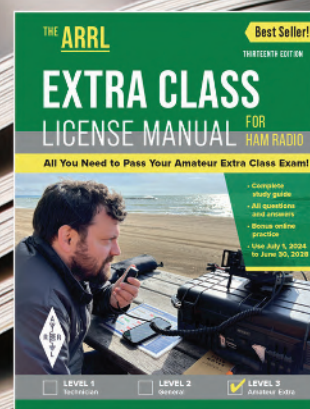


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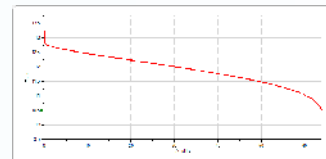
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K4 KEY FEATURES

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ATU with 10:1+ range, 3 antenna jacks

Up to 5 receive antenna sources

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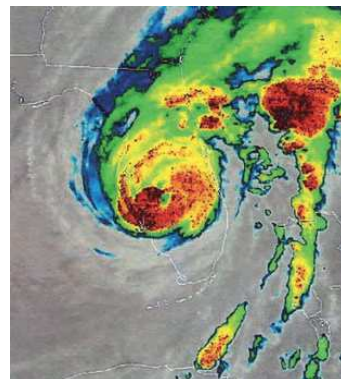
Up Front



Weather Satellite Receiving System

Jim Kocsis, WA9PYH, has been interested in weather for as long as he can remember — more specifically, weather satellites since the mid-1980s.

Shown is his homebrew 5-foot-diameter dish with a feedhorn. He uses a Raspberry Pi 3B+, a NooElec LNA, a NooElec USB SDR, and *goestools* software (free). The construction of the dish took many hours but was a labor of love. Jim says, “Getting that first image was one of the most exciting events in my radio career!” [Jim Kocsis, WA9PYH, photos]



This image of Hurricane Ian over the Gulf side of Florida in September 2022 is from Jim’s weather satellite receiving system.

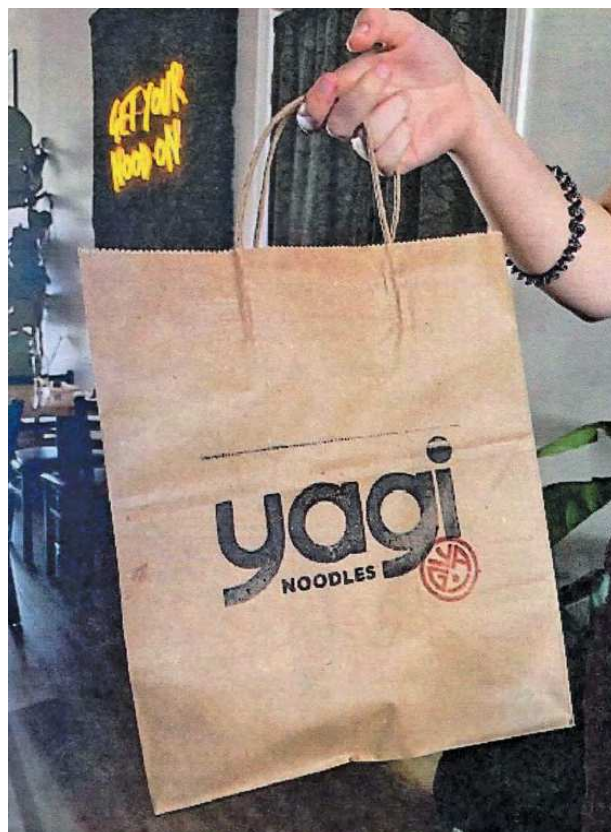
Secondhand Find with a Call Sign!

Erin Reed came across this beautiful artifact while rummaging through a local antique store near Sioux Falls, South Dakota. She was drawn to the Mayan etching, and was a bit intrigued by the call letters. She posted pictures to a Facebook “Secondhand Finds” page, where one of our staff members saw it and sent it along for Up Front. When Erin purchased this desk plaque, a label with the letter “A” had been applied over the “B.” Apparently, the call was engraved incorrectly (WBØQLS had never seen it). A quick search shows that it originally belonged to Emil Tiesen of Freeman, South Dakota. [Erin Reed, photos]



Yagi Noodles?

QST Editorial Director Becky Schoenfeld, W1BXY, couldn’t resist stopping into Yagi Noodles on a recent trip to Newport, Rhode Island. During a delicious lunch, she learned that “yagi” means “goat” in Japanese, and the owner, Basil Yu, learned a little about antennas. [Becky Schoenfeld, W1BXY, photo]



If you see something ham-related out in the world, take a photo of it and send it to “Up Front” at upfront@arrl.org

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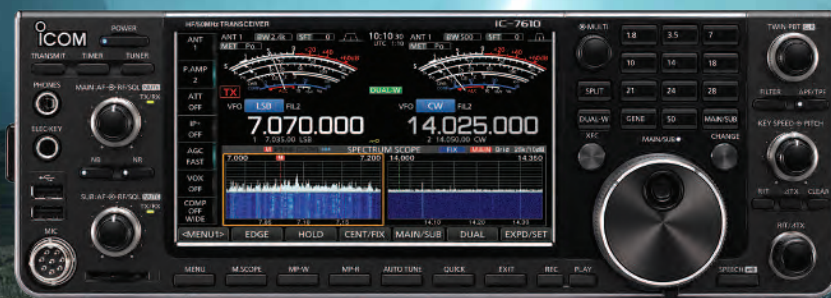
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Correspondence

Letters from Our Members

Uncovering the History Behind “Ham”

Poorly skilled wire telegraph operators were commonly called “hams” or “plugs.” Many early professional radiotelegraph operators most likely came from the wire telegraph industry and were familiar with its slang. We have many accounts of early radiotelegraph hobbyists who, before licensing and regulation, regularly disrupted commercial and military radio communication. So, they were called hams by the pros in that era. Further corroboration of this most plausible theory is provided in the book *The American Telegrapher: A Social History, 1860-1900* by Edwin Gabler.

Jim Haynes, W6JVE
Fayetteville, Arkansas
Life Member

Little Difficulties

I received my Technician license in high school in 1965. Miniaturizing technology was in its infancy at that time and has continued unabated to date. It is really wonderful how manufacturers have been able to make our radios so small. I am now a 76-year-old Extra-class licensee, I no longer have lean fingers, and my eyesight now requires more light to see by. Though it is impressive just how small we can make radio equipment, I suggest we turn the corner and get back to practical-sized buttons, knobs, and controls.

JT King, K4GOM
Mount Airy, Georgia

Encourage FT8

Recently, I read someone’s state-

ment that FT8 was not ham radio. I like to look at it a different way. FT8 gets more people on the air. Those people might be new operators who are microphone-shy and don’t know CW. It gives them a taste of HF, and hopefully, it’s enough to get them to try other modes.

When you compare FT8 to other modes or operations like POTA, RTTY, or chasing DX, it’s not that different. Many people provide the most basic QSO information and then move on to the next contact.

Any mode that gets hams on the air is very good for ham radio. So, instead of shooting down FT8, recognize that it gets more people on the air. Maybe someday, those who operate FT8 will start chasing DX, doing POTA, or enjoying another aspect of our great hobby.

Larry Krainson, W1AST
Longmeadow, Massachusetts
Life Member

My First POTA Activation

I participated in POTA for the first time on New Year’s Day with my dad, KF6MIQ. We set up a sloper antenna and started calling CQ. We were at a park right next to the freeway, so that made it hard to hear.

About 20 minutes in, our AA batteries died, and we had to replace them; then we were able to keep making contacts. Unfortunately, the day rolled over after we made about five contacts, so we didn’t make a full activation. However, we made enough contacts and park-to-parks the next day to count as an activation, which put us on the leaderboard for that park. One of the contacts

we made was with Mark Zeiset, Jr., KL4JP, in Alaska, which was incredible because our antenna was just a wire on a pole, and we were in Utah. Our radio was maybe 10 W.

After an hour or so, my dad and I got ready to sign off and call it a day. Right after we decided this, we got a pileup and stayed for another 30 minutes trying to get more contacts! I had an amazing experience, and I think everyone should learn how to activate a park or become a hunter because it is really fun to go outside, set up a radio, and contact people everywhere. You’d be surprised at the places you can reach and the people you are able to talk to.

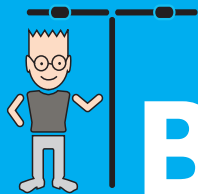
Kiara Johnson, KI7RES
Springville, Utah

An Excited Author

Thank you to the entire staff at *QST*. I am really excited about the publication of my article “Arizona Hams Hit Their Local Parks” in the April 2024 issue of *QST*. It’s the first time I have ever submitted an article, and I have been blessed with having it published. Getting our hobby out into the eyes of the public the way we do with our BE-HIP group is huge for promoting and expanding the interest in our hobby, and it is a lot of fun.

Gary Laatsch, KI7PBR
Chandler, Arizona

Send your letters to letters@arri.org. We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Letters published in “Correspondence” may also appear in other ARRL media. The publishers of *QST* assume no responsibility for statements made by correspondents.



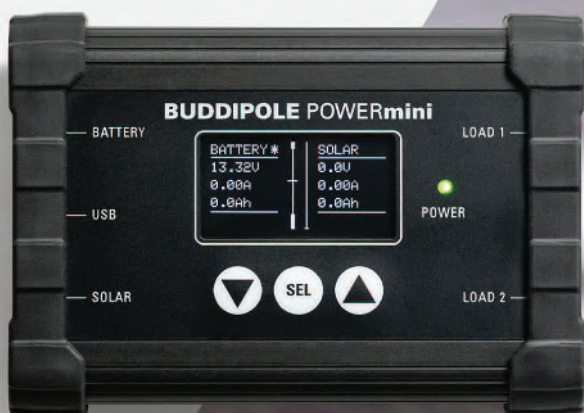
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Featuring Yuri Onipko, VE3DZ
Friday, August 23, 2024

Convention Keynote Address



Featuring Steve Goodgame, K5ATA
Saturday Morning, August 24, 2024

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ARES® Checklist



IDEAS FOR A HEALTHY ARES GROUP

- ☐ **Attend Test Sessions**
Many new hams get their license for an opportunity to participate in emergency communications.
- ☐ **Public Safety**
There are many volunteers in public safety around the country. Many of those individuals would make great ARES volunteers as well. You should always look for opportunities to assist your partners in public safety.
- ☐ **Professionalism**
Maintaining a professional look, including the ARES logo or other appropriate attire at official events, shows that you are part of a professional volunteer organization. Mannerisms and actions should also be consistent with a business environment.
- ☐ **Mentoring**
Take time to coach new or potential members. Mistakes can happen — use them as a teaching moment. Remember what it was like to be the “new person.”
- ☐ **Hamfests**
Take this opportunity to encourage your fellow hams to be active.
- ☐ **Training**
Train regularly and realistically. An active group will typically have a better volunteer response. Use a combination of classroom and practical training.
- ☐ **CERT**
If you have a Community Emergency Response Team in your area, have conversations with them. Many of these teams are looking for volunteers and ways for their members to communicate.
- ☐ **Field Day**
Use events such as ARRL Field Day or Winter Field Day as opportunities for an exercise or drill. Pick one or two areas of the event that you are going to evaluate and work on improving those areas. Treat the event as a real emergency with the opportunity to fix problems.
- ☐ **Planned Events**
Parades, bike and running races, and other types of planned events make excellent opportunities to train and are a great service to the community.
- ☐ **Nets**
On-the-air activity provides more opportunity for training and operating practice.

WANT TO GET INVOLVED IN ARES?

- Ask local hams about involvement
- Contact your Section Manager or Section Emergency Coordinator, www.arrl.org/sections
- Join local radio clubs, www.arrl.org/clubs
- Be “radio active” — Get on the air as often as possible
- Attend SKYWARN® training, www.weather.gov/SKYWARN
- Learn more about the Amateur Radio Emergency Service®, www.arrl.org/ares
- Reach out to ARRL for assistance, email ares@arrl.org



W1AW Schedule

PAC	MTN	CENT	EAST	UTC	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM	1300		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-12 ⁴⁵ PM	8 AM-1 ⁴⁵ PM	9 AM-2 ⁴⁵ PM	10 AM-3 ⁴⁵ PM	1400-1945	VISITING OPERATOR TIME				
1 PM	2 PM	3 PM	4 PM	2000	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	2100	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	2200	DIGITAL BULLETIN				
4 PM	5 PM	6 PM	7 PM	2300	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	0000	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	0100	DIGITAL BULLETIN				
6 ⁴⁵ PM	7 ⁴⁵ PM	8 ⁴⁵ PM	9 ⁴⁵ PM	0145	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	0200	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	0300	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. From the second Sunday in March to the first Sunday in November, UTC = Eastern US time + 4 hours. For the rest of the year, UTC = Eastern US time + 5 hours.

♦ Morse code transmissions: Frequencies are 1.8025, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675, 50.350, and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13, and 15 WPM.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13, and 10 WPM.

Code bulletins are sent at 18 WPM.

For more information, visit us at

www.arrrl.org/w1aw

♦ W1AW Qualifying Runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted by various West Coast stations on CW frequencies that are normally used by W1AW, in addition to 3590 kHz, at various times. Underline 1 minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any), and complete mailing address. Fees: \$10 for a certificate, \$7.50 for endorsements.

♦ Digital transmissions: Frequencies are 3.5975, 7.095, 14.095, 18.1025, 21.095, 28.095, 50.350, and 147.555 MHz.

Bulletins are sent using 45.45-baud Baudot, PSK31 in BPSK mode, and MFSK16 on a daily revolving schedule.

Keplerian elements for many amateur satellites will be sent on the regular digital frequencies on Tuesdays and Fridays at 6:30 PM Eastern time using Baudot and PSK31.

♦ Voice transmissions: Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59, 50.350, and 147.555 MHz. Voice transmissions on 7.290 MHz are in AM double sideband, full carrier.

♦ Notes: On Fridays, UTC, a DX bulletin replaces the regular bulletins. W1AW is open to visitors 10 AM to 3:45 PM Monday through Friday. FCC-licensed amateurs may operate the station during that time. Be sure to bring a reference copy of your current FCC amateur license. In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

W1AW code practice and CW/digital/phone bulletin transmission audio is also available real-time via the *EchoLink Conference Server* W1AWBDCT. The conference server runs concurrently with the regularly scheduled station transmissions. The W1AW Qualifying Run texts can also be copied via the EchoLink Conference Server.

During 2024, Headquarters and W1AW are closed on New Year's Day (January 1), Presidents Day (February 19), Memorial Day (May 27), Independence Day (July 4), Labor Day (September 2), Veterans Day (November 11), Thanksgiving and the following day (November 28 and 29), and Christmas Day (December 25).



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David A. Norris, K5UZ
George Oster, NP2N†
Art Pahr, K9XJ
Dino Papas, KLØS, and
Toby Papas, KLØSS
Benjamin Patton, N4AXE
Ernest Paul, KC2WD
Ron Pollack, K2RP
Ernest Porter, N4JOQ

John Putnam, W1DRG
Lawrence Quinn, W1LDQ
Michael Raskin, W4UM, and
Sherry Raskin, W4SLR
John P. Rautenstrauch, N2MTG
Alfred C. Rousseau, W1FJ
Stanford H. Rowe, K6VWE
Barney Scholl, K3LA
Rev. Les Shattuck, K4NK
Arnold Shatz, N6HC
Clarence Shmitka, K6AQI
Charles F. Spetnagel, W6KK
Wayne Starnes, KU4V, and
Catherine Starnes
Walton Stinson, WØCP, and
Mary Kay Stinson, KØZV
Norbert Suchanek, WE5Z
John Thomas, AE3M
John J. Thornton, W6RR, and
Jane M. Thornton, K6HDX
Hal Turley, W8HC
Bob Vallio, W6RGG
James Ward, W6AAJ
Robert Wareham, NØESQ
Johnny Welch, KE6K
Steven West, W7SMW, and
Donna Karam, KC5FTN
Dan White, W5DNT
Tom Whiteside, N5TW
Allen Zimmerman, K3WGR
12 Anonymous Donors

† = Silent Key

Power Tool Batteries for Portable or Emergency Operation



An inexpensive dc-dc converter allows lithium tool batteries to power a radio.

Gordon S. Novak, Jr., AF5KA

There are many dc-dc converters available on Amazon and eBay for \$20 to \$45, depending on specifications. The output voltages available include 12 V, 13.8 V, and others that are adjustable. These dc-dc buck or buck-boost converters are of high efficiency (in the 95% range) and are enclosed in an aluminum heatsink (see Figure 1). They seem pretty clean, but spurious RF radiation may be evident on some bands. This can be reduced by using ferrite beads on the leads and keeping them short. Also, you can try floating or grounding the aluminum case.

Connections

A good option for your connections is an 8 to 40 V input to 13.8 V 25 A output converter, which has a wide



Figure 1 — When setting up for emergency communications, it can be helpful to have battery connectors of multiple brands to maximize your backup power options. A combiner for multiple batteries with Schottky diodes can also be used. [Chris Zajac, photo]

Lead photo — Power tool batteries are easily accessible, making them a good backup power option for emergency communications. [Chris Zajac, photo]

Precautions

Many affordable dc-dc buck converters can be destroyed if you put a battery (even built-in batteries in some radios) on the output with no input voltage. Some manufacturers state that their converters are not to be used as battery chargers. A diode at the output may solve this problem, but it will drop the voltage. Also, reverse-voltage connections may damage the battery or the converter. If you can, design your connectors to make cross connections impossible or difficult.

input voltage range and can power a 100 W radio. Figure 2 shows a Milwaukee M18 battery; these batteries are nominally 18 V, but they're more than 20 V when fully charged. The simplest way to interface to these batteries is to put female spade lug connectors on the input wires of the dc-dc converter (see the sidebar, "Precautions," for more information on your battery output). One blade of an ATC fuse is plugged into the spade lug connector, and the other is directly plugged into the battery (observing proper polarity). This method is small, lightweight, and affordable, and it provides fuse protection.

For more solid connections, there are plug-in battery connectors available on eBay and Amazon for brands like Milwaukee, DeWalt, and Makita batteries, as well as others.

Power Limitations

Almost any power tool battery will power a QRP radio. An 8 Ah battery at 18 V will power a 100 W transceiver. Lithium batteries are commonly rated as 2C, which means that the maximum current drawn in amperes is

twice the ampere-hour rating of the battery. In addition, reducing the voltage from 18 to 12 V provides 50% more current, so an 8 Ah battery at 18 V can supply 24 A at 12 V.

Transmit power should be limited to about 12 times the total ampere-hour rating of the batteries at 20 V; an 8 Ah battery supports a 100 W transmit, and a 4 Ah battery supports a 50 W transmit. An easy rule of thumb is to remember that the maximum amperage to the radio is three times the ampere-hour rating of the 18 V tool battery. Many tool batteries are smaller than 8 Ah, but several smaller batteries can be combined in parallel to provide more power by putting a 15 A 45 V Schottky diode (15SQ045) in series with each battery. The Schottky diode has a low forward voltage drop (diodes prevent a backflow of current in case the batteries have different voltages). A solar panel could be included in the mix, because nominal 12 V solar panels typically have an open-circuit voltage of more than 20 V.

Advantages

- 1 The batteries are multi-use and can power tools as well as a radio.
- 2 Tool batteries are mechanically and electrically rugged because they're designed for use in construction.
- 3 If you already have (or can borrow) the batteries, all it takes to get radio backup power is using an inexpensive dc-dc converter.
- 4 Many people own power tool batteries, potentially providing a plentiful source of emergency power. Having battery connectors by multiple popular tool brands will maximize the possible types of batteries that could be used.
- 5 Tool batteries are comparable in size, weight, and cost to popular 12 V lithium batteries.
- 6 The dc-dc converter supplies constant voltage to the radio as the battery discharges.
- 7 Adding a 12 V inverter will also allow tool batteries to provide 120 V of ac power.

Visit www.cs.utexas.edu/users/novak/sources.html for information on where to purchase some of the parts mentioned in this article.



Figure 2 — Gordon S. Novak, Jr., AF5KA, uses ATC fuses to plug into his Milwaukee M18 battery for QRP Summits on the Air operations. A 20 V 8 Ah battery will power a 100 W transceiver for a few hours [Gordon S. Novak, Jr., AF5KA, photo]

Gordon S. Novak, Jr., AF5KA, has a BSEE and is a professor of computer science at the University of Texas at Austin. He earned his amateur license in 2013. In addition to operating from home, Gordon enjoys SOTA activations in Colorado. He can be reached at gordonnovak7@gmail.com.

For updates to this article, see the **QST** Feedback page at www.arrl.org/feedback.



The WT3J GUI-Based Morse Code Controller



This CW controller will help you efficiently break through pileups at a minimal cost.

The code controller system with the graphical user interface (GUI).

John Wiseman, CT9/WT3J

I have several radios; some of them have CW memories, and some do not. The CW controller system shown in the lead photo works with all of my radios without the need for wiring or configuration changes. This is accomplished with a modular software architecture that is easily modified to include future features.

Main Components Required

The system uses a Raspberry Pi 4 as the processor, along with a home-built hardware interface module that provides ground-isolated connections between the Raspberry Pi interface bus and a radio's CW key input. I use two versions of this system. One version is used with a large 4K monitor, keyboard, and mouse for my main radio in a fixed desktop configuration. I use the second version for portable operation, and it drives a small HD-resolution touchscreen with an integrated keyboard. A complete *Python 3* software application that includes a separate data file containing 20 user-definable Morse code sequences is available at www.arrl.org/qst-in-depth.

Raspberry Pi GPIO and Interface Module Connections

The Raspberry Pi communicates via the general-purpose input/output (GPIO) bus. Only three GPIO pins are used. These operate two optically isolated, solid-state relays and a transmitting status LED in the interface module. The interface module schematic is shown in Figure 1, and the parts list is given in Table 1. For any readers interested, I can provide a printed circuit board ExpressPCB layout, but a prototype board implementation works well. A seven-wire ribbon cable

Table 1 — Interface Module Parts List		
Quantity	Description	Designation
3	330 Ω 1/8 W resistor	R1, R2, R3
1	LED (any color or brightness)	D1
2	3.5-millimeter three-conductor stereo jack	J1, J2
2	Solid-state relay, Mouser Electronics 78-VOR1121A6	IC1, IC2

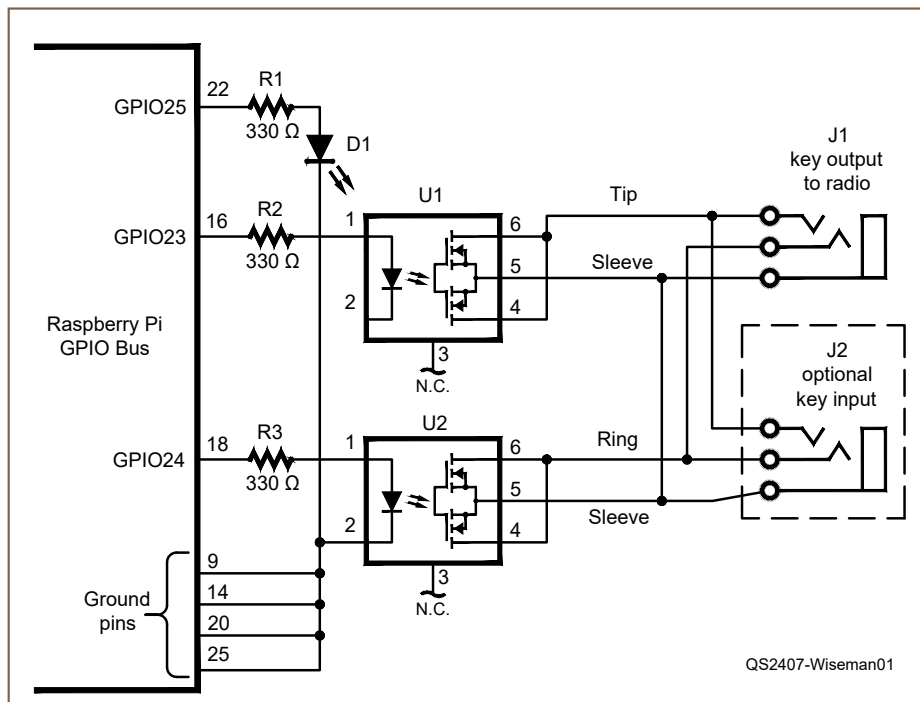


Figure 1 — The interface module schematic.

connects the Raspberry Pi to the interface module. The three signal lines with four alternating ground lines help prevent RF interference. The interface module's 3.5-millimeter jack connects to the radio's key input, and the other 3.5-millimeter key jack is used for a straight key input. The outputs of the solid-state relays and the external key are wired in parallel, and either can be used during a CW contact. When the Raspberry Pi is powered down, the optical couplers will not engage. So, the regular CW keys will remain functional. Once the interface module is connected to your Raspberry Pi (see Figure 2), you are ready to download and run the system software. The basic software design and implementation are detailed at www.arrl.org/qst-in-depth.

Sending CW

Once the system is running, it is time to send a Morse sequence to the radio. I suggest sending "QRL?" first with your key, and then again by typing "QRL?" into the first text buffer and clicking on the radio button labeled **TRANSMIT TEXT BUFFER A** in the graphical user interface (GUI) to make sure everything is operating correctly.

At this point, it's off to the airwaves. You can complete an entire contact using only a mouse or touchscreen to click the appropriate radio buttons and the alternating text boxes with input directly from your keyboard. The use of alternate inputs allows a "ping-pong" approach, where one box may be updated while the other is streaming out to the radio. Corrections can be made in advance, as each box allows for full editing before

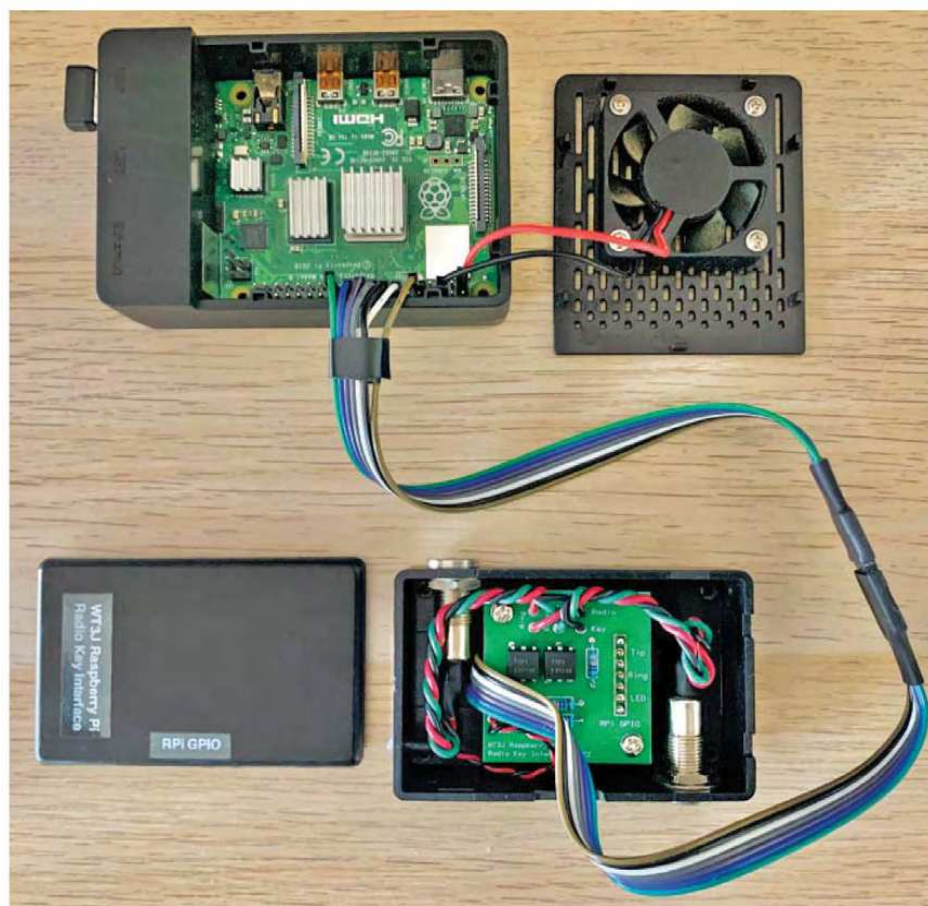


Figure 2 — Raspberry Pi and interface module connections.

it is enabled to transmit. Because a regular key is wired in parallel, you can augment your transmission at any time. More photographs pertaining to the system can be seen at www.arrl.org/qst-in-depth.

Basic Software Design and Implementation

The software, written in *Python 3*, was designed and debugged using the *Thonny Integrated Development Environment (IDE)*. The GUI was developed using Tkinter. These packages are pre-loaded into Raspbian, the Raspberry Pi operating system. As Python is an interpreted language, it runs directly when invoked. It does not require compilation and linking stages.

The *Python* software design is broken up into what are known as *functions*. Programming in this style is analogous to performing hardware design in a modular fashion. This results in a series of elements that can be individually built and tested, and then combined into a system as you go. In the end, this also allows greater flexibility for adding or improving individual portions of the design later without having to significantly modify other areas.

A detailed description of the low-level character processing can be accessed by tracing through the software using the *Thonny IDE* on the Raspberry Pi. Being of a modular, functional design style, it is relatively easy to read, trace through, understand, and modify. The source code has extensive comments embedded throughout to help with this process. The *Python* system code and the associated program data file listings are provided at www.arrl.org/qst-in-depth.

All photos provided by the author.

John Wiseman, WT3J, was first licensed in 1985. His mentor and Novice-class license administrator was Dave Benson, K1SWL, of Small Wonder Labs. John holds a BSEE from the University of Massachusetts Amherst and an MSEE from the University of New Mexico. He recently retired from a 40+ year career specializing in video technologies and applications. He enjoys designing hardware and software projects for his shack, especially those related to CW applications. He and his wife recently moved to Madeira Island, where he is using the call sign CT9/WT3J. Besides being involved in amateur radio, John is also an avid motorcyclist, and he takes Portuguese language classes. He can be reached at ct9.wt3j@gmail.com.

See QST in Depth for More!

Visit www.arrl.org/qst-in-depth for the following supplementary materials and updates:

- ✓ A *Python 3* software application with a separate data file containing 20 user-definable Morse code sequences
- ✓ The system software design and implementation
- ✓ Additional photos pertaining to the system



Click here to watch a seven-video playlist of John Wiseman, CT9/WT3J, demonstrating the WT3J GUI-based Morse code controller.

For updates to this article, see the **QST Feedback** page at www.arrl.org/feedback.



Feedback

“The RAS2 — A Remote Antenna Switch” by John Albert, WA9FVP, in the May 2024 issue, contains an error in Figure 4. The BC807 PNP transistors are incorrectly drawn as NPN devices. The emitters should be connected to +12 V. A correction has been made to the digital edition. Also, good practice would include adding 1 K resistors in the gate feed lines to each 2N7002, rather than have direct connections to the Arduino pins.

Product Review

RFinder B1 Plus Dual-Band DMR/FM Transceiver/Smartphone

Reviewed by John Leonardelli, VE3IPS
jleonardelli@arrl.net

The RFinder B1 Plus dual-band radio is an advanced and versatile feature-packed communication device that caters to the needs of advanced amateur radio enthusiasts. It is an Android smartphone with an embedded radio frequency (RF) module for 2-meter and 70-centimeter coverage that allows software integration with various ham radio applications found in the Google Play store. The B1 Plus supports digital mobile radio (DMR) digital mode and analog FM narrow and wide capability. See Table 1 for the RFinder B1 Plus specifications.

The previous version of the B1 radio was reviewed in the November 2020 issue of *QST*. The primary hardware differences between the B1 and B1 Plus models are a slightly faster CPU, updated Android OS support for newer versions beyond 8.1, and the ability to charge the radio via the USB-C port. These are small but important enhancements; the main difference is in the new software support that allows the enhanced new features developed in the past few years since the B1 was released.

In this review, I will cover the new software features of the B1 Plus for amateur radio applications only. So, I will not cover the smartphone features like the front and rear camera, Bluetooth functionality, Android OS, etc., which are all standard features on each model.

The advantage of this radio is that not only does it do everything the embedded smartphone does on the cellular and Wi-Fi networks, but it also provides that radio functionality over those networks as well. I found the ability to have this all-in-one functionality to be interesting, as there is no need for complex code plugs, so programming in repeaters and memory banks is very simple.

At first glance there is complexity to this radio, but after breaking down its components and following an update and configuration process, the ability to use the radio becomes easier. In short, there is the Android operating system itself, the RF module, and the World Wide Re-

peater Directory (WWRD), which is a core software requirement.

Build Quality and Ergonomics

The RFinder B1 Plus boasts a sturdy and durable build, making it suitable for outdoor use and harsh environments. The well-designed user interface ensures easy navigation through the various features, making it accessible for both beginners and experienced users. The bright and clear display enhances visibility, even in challenging lighting conditions. The rubberized key caps provide a good level of protection, and there are two push-to-talk (PTT) buttons, one for the RF module and the other for EchoLink and Zello modes.

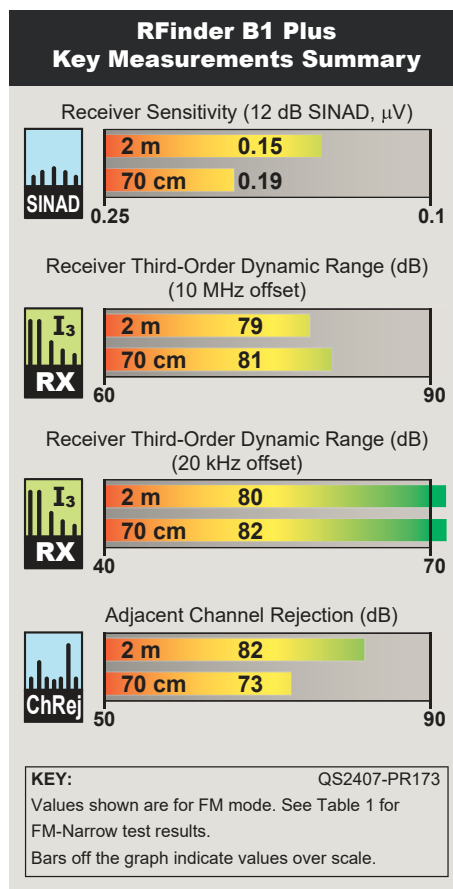
With its IP67 rating, it will operate in wet conditions and survive a dunk into the water. The battery must be installed correctly to maintain its water-sealing ability.

Equipped with a high-capacity 2500 mAh lithium-ion battery, the B1 Plus offers ample battery life for your daily use. During my testing, the radio consistently provided extended usage on a single charge, making it suitable for extended outdoor adventures or emergency situations.



Bottom Line

The RFinder B1 Plus integration of a smartphone and a radio offers more possibilities than a traditional transceiver, and despite its advanced features, the software simplifies the user experience.



Initial Setup

There is a list of requirements on the well-documented www.rfinder.wiki page, but I will cover the basics to give you insight into the process.

First, if you don't have one already, you will need to get a DMR Radio ID from <https://radioid.net>. After connecting to your Wi-Fi network, it's best to update the operating system and the application software. If you plan to use it as a cell phone, you will need to install an activated nano SIM card for the cellular network access (just make sure before you buy the B1 Plus that is supporting your local cell provider mobile frequencies — most of them should).

Then, download the RFinder application WWRD from <https://install.rfinder.net> (the ham radio version) — a subscription is required (more on this later). In the application, provision your radio with your DMR Radio ID using the Radio Setup menu, and click **INITIALIZE RADIO**. You can set up your preferred frequencies manually, and your local FM and DMR repeaters using the online programming portal or the WWRD menu for memories. Configure DMR radio over IP (DMRoIP) using the **DMRoIP SETTINGS** menu (see Figure 1). Select the BrandMeister Primary Server (USA is BM 3104), and

Table 1

RFinder B1 Plus, serial number 20220321000042

Manufacturer's Specifications

Frequency coverage: 136 – 174, 400 – 490 MHz.

Modes: FM, FMN, DMR.

Power requirements: 2500 mAh at 7.4 V dc battery.

Receiver

FM sensitivity: Not specified.

FM two-tone, third-order IMD dynamic range: Not specified.

FM two-tone, second-order IMD dynamic range: Not specified.

Adjacent-channel rejection: Not specified.

Squelch sensitivity: Not specified.

Transmitter

Power output: 4 W (high), 2 W (low).

Spurious signal and harmonic suppression: Not specified.

Size (height, width, depth): 5.8 × 2.5 × 1.9 inches (including protrusions, without belt clip).

Antenna, 6.5 inches; belt clip, add 0.5 inches to depth.

Weight: 15.2 ounces, with belt clip and antenna.

*Measurement was noise limited at the levels reported.

Note: Squelch settings have very limited range.

Measured in the ARRL Lab

As specified.

As specified.

As specified.

Receiver Dynamic Testing

For 12 dB SINAD:

FM 146 MHz, 0.15 µV; 0.14 µV;
162 MHz, 0.15 µV; 0.14 µV;
440 MHz, 0.19 µV; 0.17 µV.

20/15 kHz offset: (FM, FMN)
146 MHz, 80/82 dB; 440 MHz,
82/82 dB. 10 MHz offset: 146 MHz,
79/80 dB. 440 MHz, 81/81 dB.

146 MHz, 73 dB; 440 MHz, 90 dB.

20/15 kHz offset: (FM/FMN)
146 MHz, 82/71 dB*; 440 MHz,
73/72 dB*.

At threshold, 0.09 µV (min), 0.16 µV (max).

Transmitter Dynamic Testing

For high/low power, 146 MHz,
5.5/1.9 W; 440 MHz, 4.8/2.3 W
at 8.7 V dc (full charge).

(High/low power) 146 MHz,
69/57 dB; 440 MHz, >70/>70 dB.
Meets FCC requirements.

enter your security password from the BM Self-Care page. Return to the RFinder home screen. **SAVE**, **REBOOT**, and go make QSOs.

I also added the EchoLink, Zello, and HAMRS applications that were available from the Google Play store.

WWRD Subscription

The software is a key requirement and provides worldwide repeater listings and displays the repeaters nearby on a map, and you can add new repeaters. I found the ability to choose a repeater from the list and push it to the radio for instant access very useful. If you are traveling, this feature alone means that wherever you are, the repeaters in your area are available instantly through the subscription plan. This ability to “search and click” is very powerful, and on a road trip allowed me to access local repeaters with ease (see Figure 2).

You can also save memories into the Cloud as a backup, simplifying life after performing any software or ROM



Figure 1 — The RFinder radio application menu.

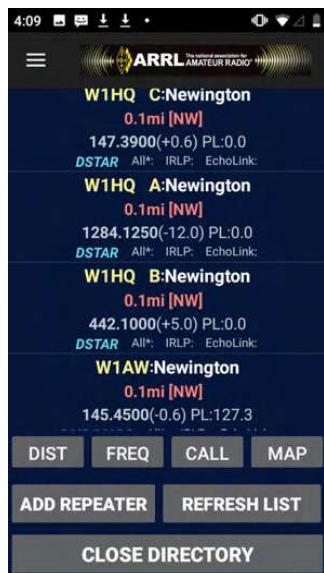


Figure 2 — The World Wide Repeater Directory (WWRD) showing nearby repeaters in the RFinder radio application.

updates. For those who like to perform memory assignment manually, Keypad Front Panel Programming is also supported. The software allows online programming capabilities as well (see Figure 3).

I found the graphical user interface for this software to be intuitive and easy to use. Storing memories and syncing them into the Cloud were seamless. I can always use the refresh list, which will pull all the updated information from its secure Cloud servers. The subscription fee (\$14.99 for 1 year) is a small price to pay for the enhanced capabilities, and covers costs associated with the RFinder Cloud servers.

RFinder B1 Plus Features

DMR is a digital radio standard that enhances voice communication with improved clarity and additional

features. The RFinder B1 Plus supports DMR, providing users with access to a broader network of digital repeaters. The dual-band capability further ensures compatibility with a worldwide range of DMR frequencies, making the radio suitable for both local and international DMR networks. The memory for contact talk groups and channels is unlimited. The admit tones and volume boost features are also available for configuration, and the ability to not have to know DMR programming simplifies the process to get on the air quickly.

DMRoIP

The RFinder B1 Plus is now fully capable of DMRoIP, which means that even without a DMR repeater, you will be able to connect to your favorite DMR network using the cell phone (data plans required) or Wi-Fi internet connection. This means that you will always have access to your favorite DMR networks without a repeater in sight with or without a hotspot (see Figure 4). Additionally, DMRoIP NetRoam (a specialized feature that allows your device to roam from network to network while using DMRoIP) provides auto-reconnects if the call is dropped on the network during a cellular tower or Wi-Fi handoff. The Brand-Meister talk groups and the TGIF Network are also supported.

Multi-RX for DMR

This allows multiple DMR talk groups to be listened to by the B1 Plus. This is similar to dual watch.



Figure 4 — Using the DMRoIP feature on the RFinder B1 Plus.

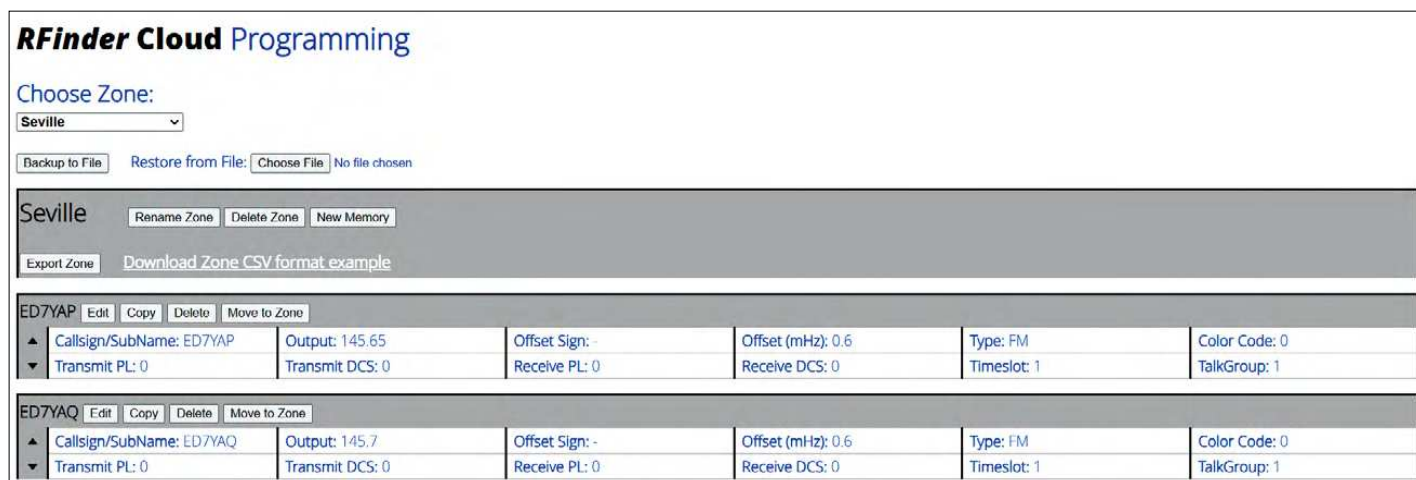


Figure 3 — The RFinder online programming tool.

Promiscuous Mode for DMR

This allows you to monitor all the activity on a particular DMR repeater, no matter what time slot a talk group is in or what color code a repeater might use.

BrandMeister DMR Support

DMR users can enjoy access to thousands of BrandMeister talk groups and have the database updated by the RFinder team. I was able to get on the BayNet talk group 31075 directly with a quick lookup, without the need for a hotspot.

DMR Last Call

The ability to use the Last Call feature is also useful to see who is on the talk groups in a list format.

RFinder Network

This network is unique and exclusive to RFinder users, allowing personal calling, a video conference room, and a map of nearby user network locations. This is an interesting feature that brings voice over IP (VoIP) and social media-style communication capability to members of this community. The Community Messaging Board is secure using a secure message PIN.

An interesting feature is RFinder on the Air. It shows me who is available on the network in real time with details and the ability to communicate with them (see Figure 5). If I click on their call sign, it does an <https://qrz.com> lookup with FCC database information. Click again for a view of the user's QRZ web page.

Automatic Packet Reporting System-Internet Service (APRS-IS)

APRS-IS is the common name given to the internet-based network that interconnects various APRS radio networks throughout the world. APRS-IS is maintained and operated by volunteer amateur radio operators to provide worldwide capabilities to the amateur radio APRS RF networks. It's a simple on/off command in the settings. You can view and track your APRS data at <https://aprs.fi/callsign-ssid>.



Figure 5 — The RFinder on the Air feature, showing who is available on the network in real time.

I saved the URL on the main screen of the radio for easy access.

SKYWARN Mode

You can submit weather reports to the local SKYWARN location. I could not find any SKYWARN repeaters in my area to try this out.

RFinder Cloud Programming

Your radio memories are also stored on the RFinder Cloud servers. You can also upload to your radio various specialty frequencies like Marine, Railroad, Survivalist, NOAA, GMRS, MURS, etc., very easily. This is a huge time-saver. I uploaded 10 special zones as they were called within 2 minutes — all saved to my radio and backed up in the Cloud.

Propagation Conditions

One of the drop-down menu items brings up the current HF propagation information. I do a lot of POTA, and having the ability to bring it up within the application is handy.

Call Sign Lookup

This menu item is standalone and interfaces with <https://qrz.com>. If a personal call is enabled for the user, I can point and click and make that personal call very easily using the RFinder Network tabs.

Zello Integration

Zello, a PTT app that operates over the internet, enables users (ham and non-ham) to connect globally. The B1 Plus seamlessly integrates with Zello, and the radio has a second PTT (POC) button for Zello.

Satellite Feature

One of the standout features of the RFinder B1 Plus is its ability to communicate via satellites. This functionality allows users to connect with satellites in orbit, expanding the radio's range beyond traditional terrestrial communication. The intuitive interface simplifies the process of selecting and tracking satellites, making it accessible even for those new to satellite communication. The dual-band capability enhances flexibility, allowing users to work with different satellite frequencies effortlessly. I was extremely pleased with how easy it was to manage this and be able to point and click into communication readiness. The menu allows visibility of a large list of satellites.

Accessing AllStar Nodes with RFinder

In the past, you could use an AllStar hotspot and access with the RFinder B1 on analog FM mode, but now it's much easier. You can install the DVSwitch Mobile 2.x app directly to your B1 Plus and access the network without the need for a hotspot.

If IAX is enabled on the AllStar node for remote access, DVSwitch Mobile will work; if the node is connected to Hamshack Hotline, there are lots of VoIP apps you could use — lots of possibilities. It all depends on the AllStar node and how it's configured. I have noticed there are more and more Android ham apps available, and they can be loaded into the B1 Plus for use.

DroidStar Support

This open-source software connects to M17, Fusion (YSF/FCS), DMR, P25, NXDN, D-STAR (REF/XRF/DCS) reflectors, and AllStar nodes (as an IAX2 client) over UDP. The application is supported on Android (as well as other operating systems), but I did not end up setting it up or testing it.

EchoLink

If you have EchoLink installed on your RFinder B1/B1 Plus radio, you can use RFinder to access an EchoLink pathway. When looking through the Repeater List, if you see a number next to EchoLink, this indicates that there is an EchoLink node registered with that repeater. To access that node, select the repeater from the Repeater List. Click on the EchoLink node number. This will launch the EchoLink application and connect you to that node.

GPS Functionality

One standout feature of the RFinder B1 Plus is its built-in GPS that integrates seamlessly with the radio, providing real-time location information. This is particularly useful for outdoor activities, emergency situations, and navigation. This is also used by the RFinder Network and APRS-IS.

Programming and Software

Programming the B1 Plus is straightforward, thanks to user-friendly WWRD software. The radio supports the importing of DMR contact lists and other configuration parameters, streamlining the setup process. Regular firmware updates from the manufacturer ensure that the radio stays up to date with the latest features and improvements. Programming the radio from the web interface is very simple. You can access the online portal from any device, with no need to download any software. Log in at <http://web.rfinder.net> and click on **GET REPEATER LIST** to see local repeaters. To manage memories of the B1 Plus, click on the **MANAGE RFINDER ANDROID RADIO MEMORIES** icon. There are some export profiles like .csv and CHIRP. I noticed that you need to click on **GET REPEATER LIST** to pull the data out of the RFinder Cloud servers whenever making location changes if you are building travel repeater lists.

On the Air

The radio's dual-band capability allows for a wide range of communication options. The B1 Plus consistently delivers clear and crisp audio, ensuring reliable communication. The power output is sufficient for most communication needs, providing reliable coverage over moderate distances. I really like the high-output speaker in noisy environments.

I found the B1 Plus ability to be supported by the RFinder WWRD application to be extremely useful. It means I have no need to do web lookup for repeaters, write them down on a sheet of paper, and then program my radio with them. I can just take advantage of the database and integration to build my memories and frequency lists. Being able to store them in the Cloud was also useful. By going online, I can use my larger PC screen to easily navigate, update, and sort or add new frequencies. Many users use their home PC to look up contacts on <https://qrz.com>, and now that functionality is in your radio. I also used the online portal (<https://web.rfinder.net>) to add channels and save memory banks. This means I can add some new channels to the radio using my iPad, and the next day add or modify any channels using my PC with a larger monitor. I can do this on the fly and out in the field as well.

As a traveler, you can easily find local repeaters on the application map, click, push to the radio, and instantly access the repeater. This is such a powerful feature because the complexity for DMR programming is more than an analog FM repeater, but the WWRD integration makes it easy. Can you imagine landing in a new city, turning the radio off Airplane mode, connecting to the cellular data network, and having local repeaters available to you with a few swipes and clicks? You also have the capability to do a manual location override. This allows you to tell the radio to bypass the real-time GPS data and set a new location. I am planning for a DXpedition to Spain. I was able to reset the location for Seville, and it shows the five local repeater details as well as a map view. If I click on **SET PARAMETERS**, it pushes the repeater details to the radio and I can PTT and start chatting without any time wasted. This is very powerful because I cannot tell you how many times I am in a new city, and locals offer up channels of interest or find a new DMR repeater that I have no information on. The last thing I want to do is go back to the hotel and spend an hour programming a radio. I can do this quickly and easily using several different programming methods.

I was also impressed with the Satellite feature (see Figure 6). I was at the car wash, somewhat bored, and I texted my wife to say I would be home in 15 minutes.

I opened the RFinder application and found the ISS in the database. The map and pass details showed a possible good elevation pass within 7 minutes on the countdown timer. As I drove home, I was able to hear some of the traffic on the ISS. The ability to have all this information available demonstrates the power of smartphone and radio integration into one unit. The application also manages the Doppler shift and changes frequency along with the pass. Of course, I found listening to the ISS enjoyable and easy. I am looking forward to adding the external antenna and making contacts through the satellites.

I am a longtime D-STAR user and hang out on a few reflectors but also use DMR and Fusion. I always found the code plugs for DMR and even Brand-Meister to be somewhat complicated due to the need for specific configuration information relating to color codes, time slots, and talk group assignments. RFinder makes it easy. I just need to find the local repeater using WWRD, push it to the radio, and make contacts. If I don't have the information, such as a new DMR repeater being deployed in Toronto, I can use the Promiscuous mode to get the information. Then I save it to memory in the zone of my choice, and I am programmed and ready to go. If I want to use a specific talk group found on BrandMeister, that is just as easy as a lookup and push to the radio.



Figure 6 — The RFinder showing the ISS satellite pass.

I had a lot of fun calling my contacts via Zello or listening in to faraway repeaters using EchoLink. I think one of the best ways to explain my experience is that by the integration with the smartphone, the ability to communicate is unprecedented. I have many times been on my radio and looking up or responding to things on my smartphone. Combining these in one device can be very interesting in improving the ability to communicate across multiple modes.

Conclusion

The RFinder B1 Plus dual-band radio is a reliable, advanced, feature-rich communication tool that caters to the diverse needs of advanced radio enthusiasts. Its durable build, intuitive user interface, GPS functionality, and excellent battery life make it an asset for those who demand versatility and performance from their communication equipment. Whether used for regular radio operations, emergency communications, or outdoor adventures,

the RFinder B1 Plus proves to be a dependable and versatile companion. Overall, it's a solid investment for those seeking a high-quality dual-band radio with advanced digital radio features.

Manufacturer: RFinder, 455 Sunrise Hwy., West Islip, NY 11795, www.rfinder.net and www.androiddmr.com.
Price: \$1150 for the 4 GB of RAM version with 64 GB of storage, and \$1250 for the 6 GB of RAM version with 128 GB of storage.

N2EME RX-In RX-Out 0 – 450 MHz 100 W SDR Switch

Reviewed by Phil Salas, AD5X
ad5x@arrl.net

The availability of inexpensive software-defined radios (SDRs) has made them popular additions to many ham stations. Not only can they add spectrum and waterfall displays to your older transceivers, but these SDRs also often cover frequencies well above normal transceiver ranges. The trick, of course, is knowing how to tie the SDR in with your existing transceiver. Enter the N2EME SDR Switch products from www.sdrswitch.com.



SDR Switch currently offers four types of switches, consisting of two versions of a 0 – 70 MHz switch, and two versions of a 0 – 450 MHz switch. One version of each frequency range switch is simply called the SDR Switch. The second version is called the RX-In RX-Out SDR Switch. The SDR Switch is designed to allow you to use an SDR receiver for receiving and your 100 W transmitter or transceiver for transmitting. This is useful for providing panadapter capability, as well as extending the frequency receiving range of your current transceiver. It is also useful for operating separate transmitter/receiver setups (like boat anchor stations). Besides providing the same capability as the SDR Switch, the RX-In RX-Out SDR Switch permits adding a low-noise amplifier (LNA) in-line with your transceiver, and/or permitting dual-receiver reception for your single-receiver transceiver by using a separate SDR. All switches are designed to operate with up to a 100 W transmitter or transceiver. This review is for the 0 – 450 MHz RX-In RX-Out SDR Switch.

Switch Description

The SDR Switch uses conventional relays for switching, as these relays provide the necessary isolation when used in the second receiver-only configuration it is designed for. The RX-In RX-Out SDR Switch reviewed here uses coaxial relays (see Figure 7) to provide high isolation and minimal insertion loss necessary for the variety of configurations for which it can be used.

All RF interfaces are BNC (see Figure 8), and all keying and power interfaces use phono jack inputs (see the lead photo). A phono plug pendant cable is supplied for the dc interface. There is no on/off switch or power indication LED. And there is no RF sensing. Switching is controlled by your transceiver's amp-key output. Both the SDR Switch and the RX-In RX-Out SDR Switch keying inputs are designed to interface with any amp-key interface that provides a contact closure to ground. In the RX-In RX-Out SDR Switch, this contact closure is passed through the unit so that you can still key an external amplifier without having to use an amplifier-keying splitter cable. No documentation comes with either product, but all the necessary information can be found at www.sdrswitch.com.

Bottom Line

The SDR Switches by N2EME make it easy to implement a preamp and/or second receiver with your existing transceiver. At the very least, a low-cost SDR receiver can add a waterfall and spectrum display to your existing older station.

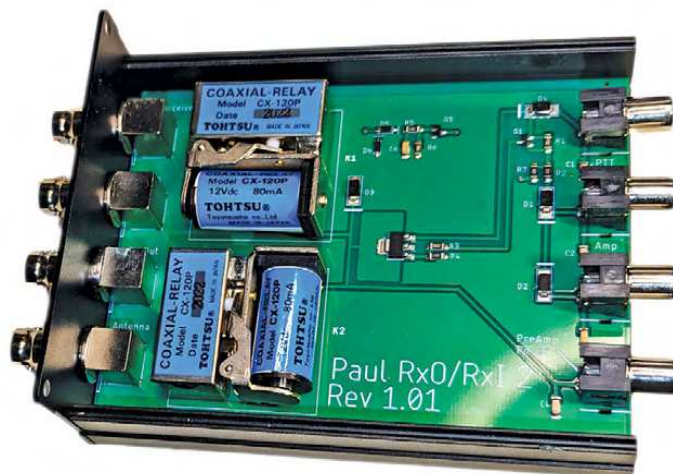


Figure 7 — The internal view of the RX-In RX-Out SDR Switch.



Figure 8 — The RF interconnect side of the RX-In RX-Out SDR Switch.

Operation and Performance Measurements

You will find the specifications on the manufacturer's website; however, Table 2 contains the specifications determined from my measurements.

I had an odd problem when initially applying power through the supplied pendant phono cable. No dc appeared on the unit. Continuity checks verified that the cable was fine and the phono jack on the unit did have continuity from the center pin to the printed circuit board. It turned out that the shield on the supplied dc power cable phono plug was a bit wider than the mating phono jack shield. And because the center pin on the cable was held firmly by the phono jack on the unit, the cable's shield did not contact the phono jack's shield, even though it looked like it was making contact. When I finally figured this out, my solution was to slightly distort the cable's phono shield with a pair of pliers. Problem solved. The manufacturer mentioned that they have changed their supplier for a better connector.

There are numerous configurations that can be used with the RX-In RX-Out SDR Switch, but there are three popular configurations. You will find a diagram for each of them on the manufacturer's RX-In RX-Out SDR

Switch setup page (see <https://sdrswitch.com/pages/setting-up-your-rxin-rxout-switch>).

The first configuration permits adding an LNA to your existing transceiver. This would probably be used to improve the sensitivity of VHF or UHF transceivers.

The second configuration permits using an SDR as the receiver and your transceiver just for transmitting. This would be popular for a separate transmitter and receiver, or for replacing your transceiver’s receiver with a modern SDR receiver. The LNA is probably not necessary for HF applications but may be important for VHF and UHF receivers.

And finally, the configuration I suspect will be the most popular is a setup with dual receivers (i.e., the ability to use both the transceiver’s receiver and an SDR simultaneously). In this case, an LNA may be more desirable, as there is receive path loss due to the splitter.

In all cases, it is important to understand the relay operation times. We certainly don’t want to damage an LNA or SDR, or hot switch your transmitter by transmitting before the relays have had time to operate.

Regarding the setup with dual receivers, when your transceiver’s amp-key line goes low, the **RXIN** and **RXOUT** ports are disconnected from the through path, and the transmitter output is connected directly to the **ANT** port. The time I measured to disconnect the **RXIN** and **RXOUT** ports from the main line after the amp-key line goes low demonstrated that they are both very similar at about 14 – 18 ms. What this means is that any transmit power occurring before about 18 ms after the amp-key line goes low could damage the receiver or LNA.

In my measurements, when the transmit relays switch the receive lines offline and enable the direct transmit connection to the antenna, it takes about 15 ms before the relays start operating — meaning that the through path is completely broken when the receive relays open and before the transmit relay is enabled. The total time measured is 22 ms. This shows that besides the risk of causing receiver damage by transmitting too early, you could also cause hot switching of the transmitter during this interval. To make sure this doesn’t happen, the transmitter’s amp-key-to-RF-out time should be set to more than 22 ms. This is an adjustable parameter in most modern rigs. However, some radios don’t have this capability. As an example, my IC-706MKIIG has a fixed amp-key-to-RF-out delay of 8 ms.

Next, I looked at standing wave ratio (SWR)/return loss and insertion loss. All measurements were made with an

Array Solutions VNAuhf. The VNAuhf was calibrated using the N/BNC adapters, which were necessary.

Figures 9 and 10 show the TX-to-ANT SWR/return loss and insertion loss, respectively. For the SWR/return loss measurement, the **ANT** port was terminated in a preci-

Table 2 — 450 MHz RX-In RX-Out SDR Switch Performance Measurements	
Specifications as tested by Phil Salas, AD5X	
Frequency Range	0 – 450 MHz
TX/ANT SWR	Typically 1.3:1 or less. See Figure 9.
TX/ANT Insertion Loss	Typically less than 0.1 dB. See Figure 10.
ANT/RX-Out Insertion Loss	Typically less than 0.1 dB. See Figure 11.
TX/RX-In Isolation	>38 dB. Much better below 400 MHz. See Figure 12.
TX/RX-Out Isolation	>40 dB. Much better below 400 MHz. See Figure 13.
Switching Time	25 ms. See text.
Operating Current at +13.8 V dc	200 ma when keyed

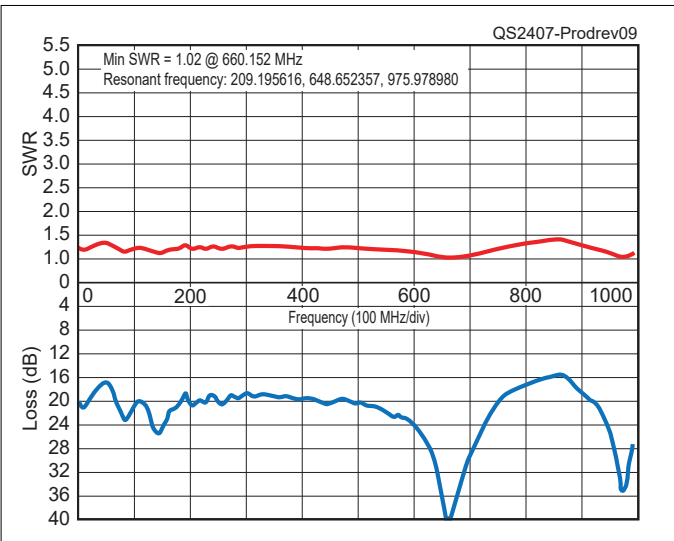


Figure 9 — The RX-In RX-Out SDR Switch TX/ANT SWR and return loss.

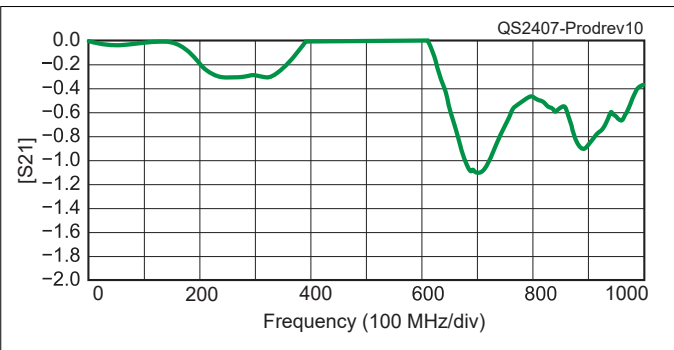


Figure 10 — The RX-In RX-Out SDR Switch TX/ANT insertion loss.

sion 50 Ω load. The insertion loss through the path was calibrated using a microwave 3 dB attenuator in series to improve the return loss of the through cable and VNAuhf input impedance.

As you can see, the return loss stays better than 24 dB through the 450 MHz band. The insertion loss is close to 0 dB through 150 MHz and in the 450 MHz band. It is about 0.3 dB in the 220 MHz band, and has a worst-case loss of about 1.1 dB at 700 MHz.

Next, I looked at insertion loss from the **ANT** port to the **RXOUT** port. Any loss here impacts the noise figure of the SDR receiver. The measurement is shown in Figure

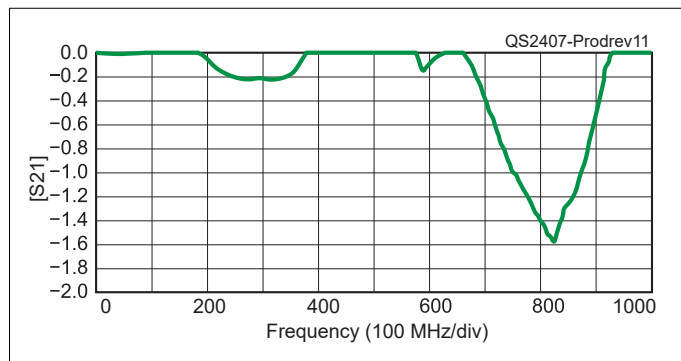


Figure 11 — The RX-In RX-Out SDR Switch ANT/RX-Out insertion loss.

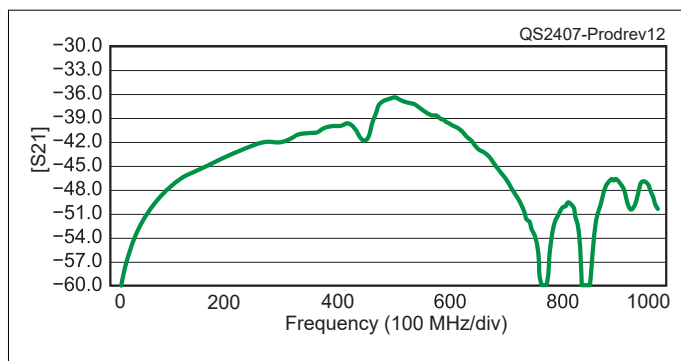


Figure 12 — The RX-In RX-Out SDR Switch TX/RX-In isolation.

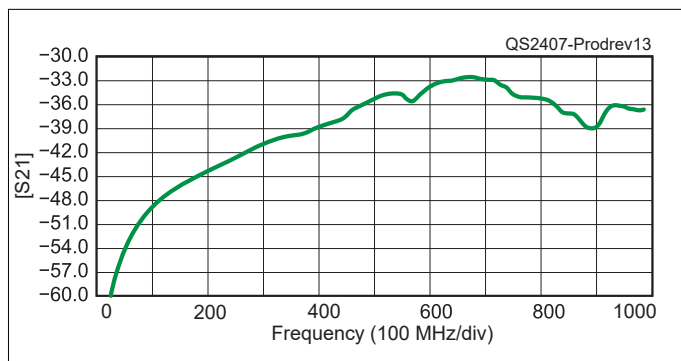


Figure 13 — The RX-In RX-Out SDR Switch TX/RX-Out isolation.

11. As you can see, losses are only a tiny fraction of a dB for all the ham bands through 450 MHz.

Finally, I looked at isolation between the **TX/RXIN** and **TX/RXOUT** ports when in the transmitting mode. As a reminder, the **RXIN** port would be the output of an LNA or the output of a splitter, depending on your configuration. And the **RXOUT** port would be the input to an LNA or SDR (**LNA** port). For a 100 W transmitter, you want any leaked RF power to be less than about 20 mW so as not to damage your SDR and/or LNA. That means that you would want at least 37 dB of isolation if you are using a 100 W transmitter. The data shown in Figures 12 and 13 show a minimum isolation of about 40 dB for the **RXIN** port, and about 38 dB for the **RXOUT** port at 450 MHz. The isolation gets much better at lower frequencies.

A Splitter for Dual-Receiver Operation

N2EME discusses using a 3 dB splitter in order to implement a dual-receiver setup. Of course, 3 dB is the theoretical loss. Real-world splitters are more like 3 – 4 dB loss. Because I wanted to try the RX-In RX-Out SDR Switch with my HF station, I started looking for a splitter solution. Of course, you can build your own, especially for HF applications (look for “Magic-T combiner splitters”). But I decided to see how well a CATV splitter might work, as these are inexpensive and very broadband. I chose an Antronix CMC2002HA splitter (\$5 at Amazon), which claims a 3.5 dB splitter loss from 5 – 1000 MHz. Yes, this is designed for 75 Ω , but I hoped it wouldn’t be too bad in a 50 Ω receiving system. I also bought a four-pack of BNC-to-F adapters from Amazon for \$8 (see Figure 14).

As it turned out, the performance was surprisingly good. The SWR was less than 1.5:1 through 200 MHz, and the SWR was less than 3:1 at 450 MHz, which should be fine for receiving purposes, especially if an LNA is used. The splitter loss was less than 3.5 dB through 200 MHz,



Figure 14 — The Antronix two-way 75 Ω splitter with BNC/F adapters.

and less than 4 dB at 450 MHz. And though the splitter has a low-frequency specification of 5 MHz, the performance was really good to well below 160 meters. Again, remember that this is all measured in a 50 Ω setup! Keep in mind that a 50 Ω splitter will perform better in terms of noise and SWR.

I used the RX-In RX-Out SDR Switch with my Elecraft K3 transceiver and Drake 2B receiver. What I found was that even though there is 60+ dB isolation from the transmit path to the receiver in the HF bands, the leakage signal is still very strong. For example, with 70 dB of isolation, a 100 W transmitter will be at -20 dBm into the receiver. An S-9 signal is -73 dBm, so when your receiver is on the same frequency as the transmitter, you will have a very strong (S9+50 dB with splitter) receive signal when you are transmitting. It would be nice if the SDR Switches had contact closures that could be used to mute the receiver audio when transmitting. You can, of course, build your own receive muting relay that can be driven by the amp-key output of your transceiver in parallel with the SDR Switch. There are also ways to

mute your receiver when you transmit using your SDR software; see your software manual.

Conclusion

The N2EME series of SDR Switches provides a simple way to add a separate receiver (SDR or otherwise) to your existing station, and it is very good up to 450 MHz with regard to SWR and insertion loss. The RF isolation exceeds the minimum requirements, so no receiver damage will occur with a 100 W transmitter. The N2EME SDR Switch is aimed at the dedicated HF DXer who is looking to work weak signals. The insertion of a switch needs to have a low insertion loss. This is also true for the VHF/UHF operators, where every dB counts.

You also need to be aware of your transmitter timing, as the relay operating times are such that receiver damage and/or transceiver hot switching can occur unless the transceiver's amp-key-to-RF-out delay can be set for 25 ms or greater.

Manufacturer: SDR Switch by N2EME, www.sdrswitch.com. Price: SDR Switch 70 MHz, \$179; SDR Switch 450 MHz, \$219; RX-In RX-Out 70 MHz, \$229; RX-In RX-Out 450 MHz, \$299.

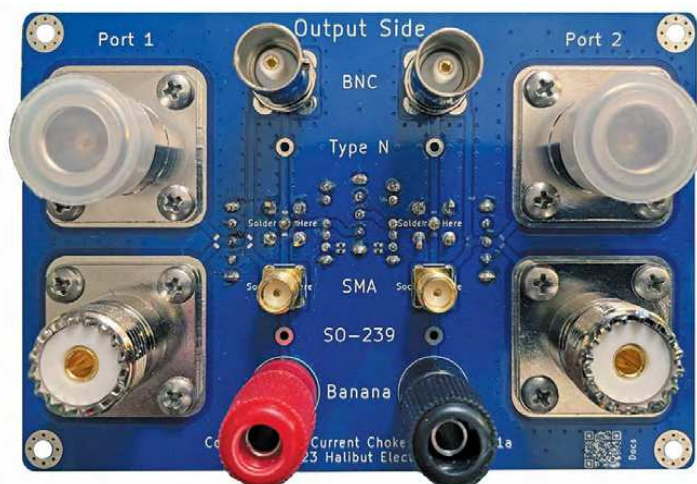
Halibut Electronics Common-Mode Current Test Rig

Reviewed by Stephen Anderson, W1EMI
sanderson@arri.org

I purchased the first version of this test rig at the 2023 Dayton Hamvention, thinking it would help me to use and learn more about my NanoVNA. I'm glad I purchased that one, and the new version of the test rig adds a key feature that makes the process of testing common-mode chokes even easier — specifically, the ability to perform calibrations quickly and easily using switches on the test rig rather than having to attach the NanoVNA calibration standards for every calibration. The test rig is a great option for anyone who wants to start building and testing their own common-mode chokes.

Description

I'm not going to get into all the theory on common- and differential-mode currents here — there's a video on the Halibut Electronics website that lays that out very well for those who are interested (see www.youtube.com/watch?v=3ReRu7Yt4Ao). But most of us who have put



Bottom Line

This new test rig from Halibut Electronics is easy to build and provides a convenient and simple way to test common-mode chokes.

up a dipole have probably also installed a 1:1 balun that gets placed at the antenna feed point — this is an example of a common-mode choke.

To put it simply, common-mode chokes are designed to impede unwanted signals on the outside of a coaxial transmission line. Measuring the effectiveness of a common-mode choke with a VNA requires routing the signal from the VNA from the center pin and inside shield of the coax to the outside shield where common-mode currents flow. The Halibut Electronics Common-Mode Current Test Rig is a handy tool that does just that (see the constructed test rig in the lead photo showing the output side, and Figure 15 showing the input side). There's a schematic of this routing in the Halibut Electronics User Guide that you can download on the manufacturer's website (see <https://halibut-electronics.github.io/CMChokeTester/User%20Guide.pdf>). In addition to providing for this signal routing, the new version (3.1a) also includes the ability to easily perform the necessary VNA calibrations using on-board switches and loads. This schematic is also available in the Halibut Electronics User Guide.

The circuit board is clearly labeled and easy to understand. On the input side of the board, there are several switches used for performing calibrations and testing, and SMA ports to connect the VNA. On the output side, there are SMA ports and BNC, PL-259, and N-type connectors and banana plugs to enable connection to just about any choke you might want to test.

Construction

Construction of the test rig is very straightforward. Required tools are pliers, a small adjustable wrench and/or a nut driver, a #1 Phillips screwdriver, and a soldering iron. Note that there are some connectors with a decent amount of thermal mass to them, so a higher-wattage

iron can be helpful, though I was able to get away with my 40 W iron. The kit comes packaged in a small bag about the size of a QSL card, and the parts all appear to be of good quality (see Figure 16 for a photo of the kit contents). The assembly instructions are comprehensive and well organized, with plenty of photos and construction tips. Be sure to follow the order of assembly in the instructions. I found it important to get the switches in first. It took me about an hour to build the latest version of this kit.

Testing Common-Mode Chokes with the Test Rig

Once I had the test rig built, I was off to try out the new calibration features and measure a few chokes. After connecting the VNA to the test rig and my computer, I opened up the VNA software, *NanoVNASaver*. Once connected to my VNA, I set up the software to measure frequencies between 0 and 30 MHz to cover the HF bands and chose the type of measurement needed, which was S21 gain (which shows the attenuation from the choke in dB), and complex impedance ($R+jX$) to see the resistance from the chokes being tested.

Once the VNA parameters were set up, I used the software's "Calibration Assistant" and the switches on the test rig to perform a two-port calibration. All of these instructions are described in detail in the user guide (though Halibut rightfully notes that not all VNAs and software are the same, so they don't cover the software). Please note that there are two versions of the user guide; version 3.0 is for the previous version, and 3.1 is for the new version.

Once calibrated, the last step in the process is to ensure that all the switches on the input side of the test rig are in the up position. Next, I built and measured several chokes, a simple 4-inch air core choke, and three ferrite core chokes, using 31, 75, and 43 material cores — all chokes for which I had some idea of what the results

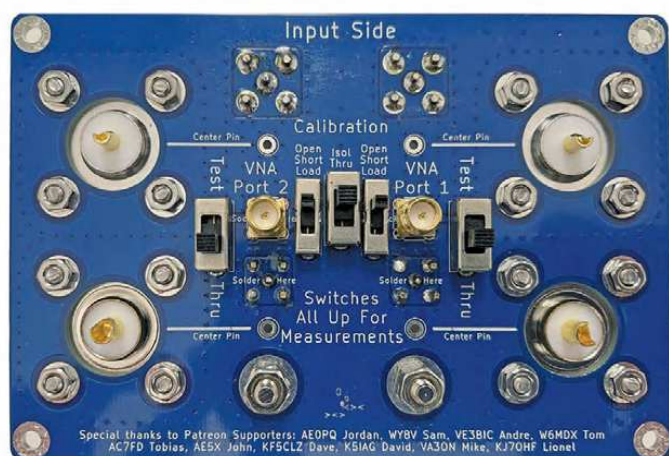


Figure 15 — The constructed Halibut Electronics test rig, showing the input side.



Figure 16 — The constructed Halibut Electronics test rig contents of the kit as shipped.

may look like. I found it to be pretty quick and easy once I had things set up. To run through the chokes, I decided to test and save all the output to compare to expected results. All of the results appeared to be in line with my expectations. Again, as this is not a review of the NanoVNA or its software, I'm going to include output from only one of the chokes. Figure 17 shows the output from the choke wound on the 31-material core. It was expected that this choke would have good attenuation over most of the HF bands between about 5 and 30 MHz (the target region), and this can easily be seen from the output produced. The S21 gain chart shows the attenuation from the choke to be 30 – 35 dB over the target region, and the resistance (from the S21 complex impedance chart) over the target region is well over 2000 Ω , a desirable value for this choke.

Figure 18 depicts the best configuration I found for placement of the choke, test rig, and VNA. I found that having the VNA, test rig, and choke under test away from the computer (and my hands and arms) while doing sweeps was best — less noise and more repeatable results.

Conclusion

This test rig, especially in its latest form with the onboard 50 Ω load and the ability to do calibrations, is certain to get more of us feeling comfortable building and testing

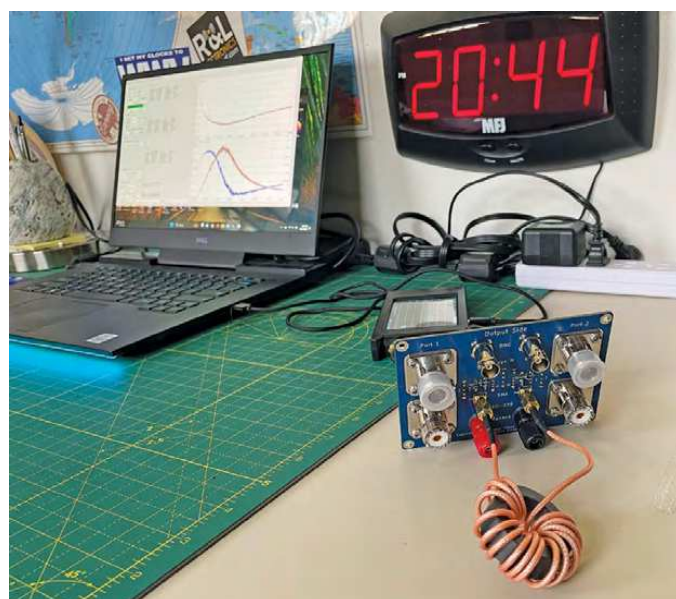


Figure 18 — The test rig, a VNA, and a choke under test (RG-316 on 43-material).

our own common-mode chokes and learning from the experience. The components are of good quality, the labeling on the board is well thought out, and it's a kit that even a novice builder could take on.

Manufacturer: Halibut Electronics, www.electronicshalibut.com. Price: \$59 (pre-assembled, add \$25.00).

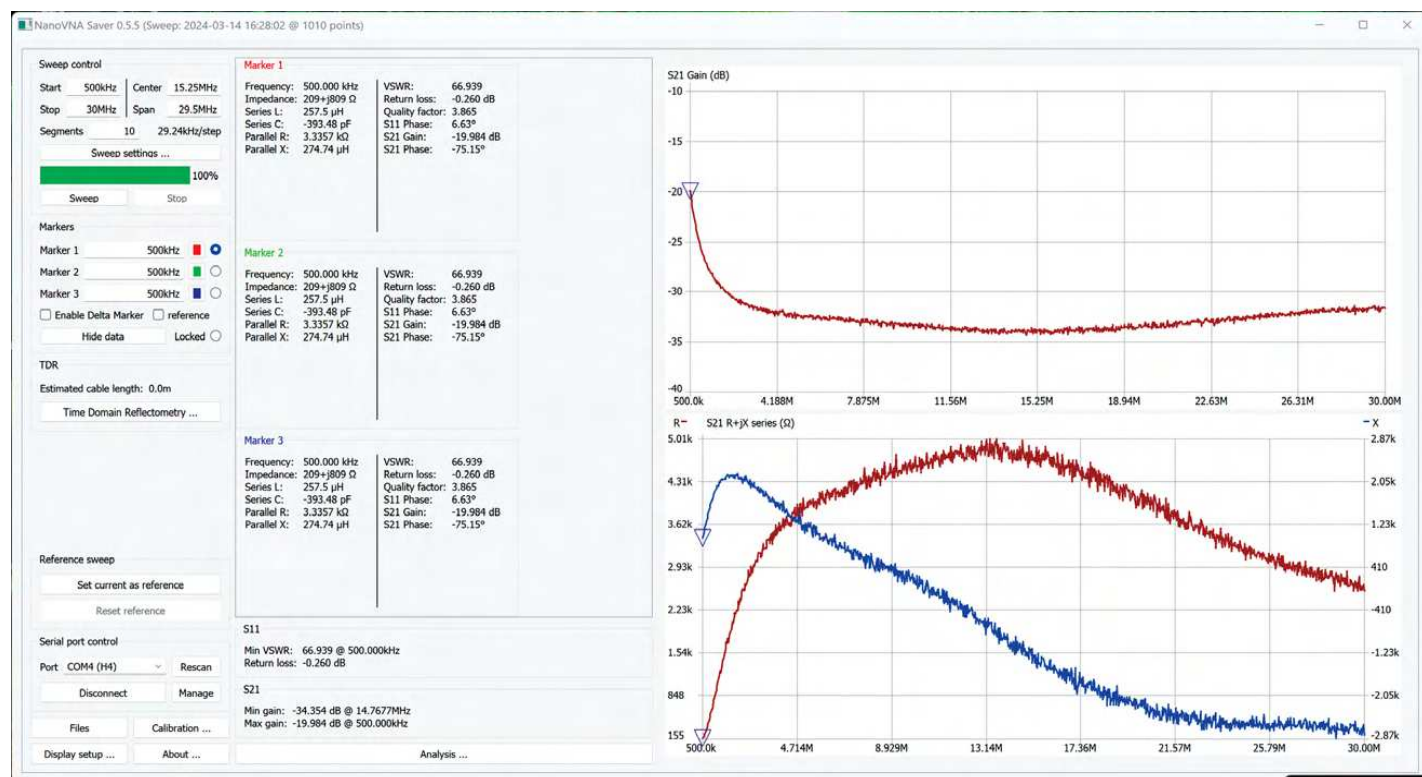


Figure 17 — NanoVNASaver output for 31-material 2.4-inch-outer-diameter choke tested (nine turns RG-58).

Ask Dave

Get more information from the “QST: Ask Dave” YouTube playlist at <https://bit.ly/3z2MBMI>.

Antennas Keep Hams Busy

Determining Matching Loss Using a NanoVNA

Q Kyle Humphrey, WØAAV, asks: I run QRP 99% of the time. I have a myriad of antennas ranging from commercial to homemade, including some ununs and coils. I have begun to wonder how to test ununs and coils with a vector network analyzer (VNA) to determine how much loss each antenna match has. I commonly run 9:1, 49:1, and Wolf River coils. How do I use a VNA to determine how much loss each antenna match has to maximize my choice of antenna?

A You can test your entire transmission line ensemble all at once with a VNA. The first thing to understand is that when your transmission line is left open and disconnected from the antenna, it will reflect all the power back to the transmitter. Second, if your transmission line is shorted at the point where it normally connects to the antenna, it will also reflect all the power. The parameter that you are looking for is called the return loss. It is usually stated in decibels and is frequency-dependent. So, use frequencies that are close to where you normally operate. The VNA will send a small signal down the line like any antenna tuner would. The parameter most people look at is the standing wave ratio (SWR), but in this case, the parameter that you are interested in is the return loss. Also, you can compute the reflection coefficient from the SWR and vice versa.

I use the popular NanoVNA. There is a marvelous piece of companion software called *NanoVNASaver* available at https://nanovna.com/?page_id=90. All you have to do is connect your NanoVNA to the computer via its USB cable and then connect the NanoVNA to your transmission line with everything connected appropriately. The *NanoVNASaver* software can operate independently from what is on the NanoVNA's screen. You can set up the screen to measure SWR as a function of frequency. You can do this across multiple bands or a single band. I find the software, which unfortunately runs only on Windows, to be invaluable.

Many parameters are collected together and displayed, as shown in Figure 1. Note the one that says “return loss.” This is typically measured in decibels and will usually be a negative number. As the coefficient gets

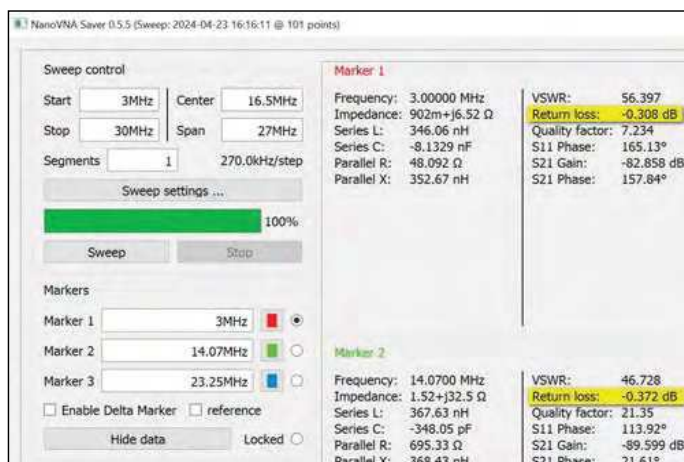


Figure 1 — This is a sample report from the *NanoVNASaver* software showing all the collected parameters with the return loss highlighted in yellow. When the end of the transmission line is disconnected and open, do a sweep with the software. This will show the return loss. Then short the end of the transmission line and do another sweep to show the return loss again. The open versus closed return losses are usually pretty close to each other. Now connect your antenna as normal and do another sweep so you can determine the SWR. If the SWR is good, the reflection coefficient will be a larger negative number because very little power is returned.

more negative, the loss is less, and when you measure this with the antenna end of the line either shorted or open, there should be no return loss because 100% of the power is reflected. This is never the case with real components — there is always a little loss. The return loss is defined as the amount of power returned versus the amount of power sent down the line. The numbers for when the antenna is shorted versus when it is open are usually pretty close to each other. This is the round-trip loss in your line. For example, if the round-trip return loss is -10 dB, you have -5 dB loss on the forward trip and -5 dB loss on the return trip.

If you connect a nicely matched antenna, there will not be much return power. So, the return loss will read something like -20 dB or so, meaning there's not much loss.

This works for anything that resembles a transmission line in any way. For instance, if you were to hook

up an unun at one end of the coil, and the other is disconnected, you should get about the same return loss as the end of the coil shorted. You can use this to get your return loss at the frequency of interest.

Sequentially connect the 1:4, 1:9, and Wolf River coils to the antenna end of the transmission line with the antenna removed (the Wolf River coils should be adjusted for a match with the desired antenna at the frequency of interest). Compare the return losses at the frequencies of interest for each matching device. The matching unit with the lowest return loss will be the unit with the lowest loss.

Finally, for longer antennas (normally used with ununs), the radiation resistance is probably high enough that the difference in loss between the different matching networks won't make any significant difference, assuming the match with the antenna connected is reasonable.

Shattered Antenna Insulators

Q Alex Croci, WB3ATF, asks: Why do I have so many ceramic insulator failures on the same side of my dipole? I've had an Alpha Delta DX-EE antenna mounted on my roof for about 10 years, as shown in Figure 2. It works wonderfully, but recently, I added an amplifier rated at 700 W PEP. I use only single sideband. The DX-EE antenna uses ceramic insulators at each end. In the past 2 months, I have had three ceramic insulators fail, all on the same side of the antenna. Figure 3 shows a wire and an insulator with a burn mark, showing how it broke. The antenna is rated at 1000 W, and I transmit nowhere near that. I've noticed that the failures occur when it's raining or has rained recently.

A Figure 3 is clear evidence of arcing. The question is, what causes the arc? Because your antenna has been in place for years, the ceramic insulators get dirty. It's interesting to note that although rainwater is a good insulator, rainwater mixed with soil or mud has collected on your insulators, so they are not acting as an insulator but rather

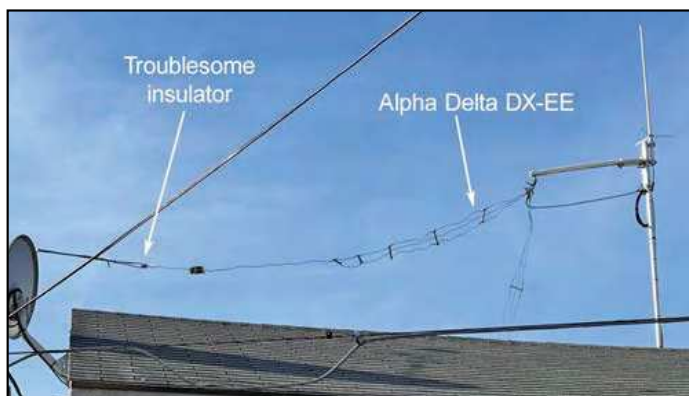


Figure 2 — Alex's, WB3ATF, Alpha Delta DX-EE multiband antenna covers 10, 15, 20, and one-half of 40 meters.



Figure 3 — One of Alex's, WB3ATF, broken ceramic insulators. An arc formed from the end of the antenna, where the voltage is the highest, to the other end, supported by a rope. The antenna wire shows signs of arcing.

as a conductor. Similarly, the soggy rope that you use to connect this to the antenna tie-down point acts as a relatively high-resistance conductor. The voltage at the very end of the antenna is high. At 100 W, it is not high enough to arc over the insulator, but it may when using 400 W.

An arc on an insulator will find the weakest point and can easily cause a break. Fortunately, those insulators are relatively inexpensive. You might want to try stringing several of these insulators in a series to hold up that end of your antenna. This divides the voltage across several insulators and can perhaps forestall the issue.

One other source of arcing voltage to consider is lightning. A nearby strike can induce high voltage across an antenna. While your station's lightning protection can keep this from impacting your equipment, it still puts quite a bit of stress on the antenna and its insulators. Lightning is a very fickle thing. I once had a dipole antenna vaporized by a lightning strike. Keep the connections to your lightning arrestors dry and well grounded. I hope this helps you get to the bottom of the problem so you can enjoy trouble-free operations.

Send your questions to askdave@arri.org. I answer some questions here, and some via videos on my YouTube channel (www.youtube.com/davecasler), or during my weekly livestream on Thursdays at 6:45 to 8:15 PM Mountain Time on my channel.

Strays

Young Ladies' Radio League Special Event

The Young Ladies' Radio League, K4LMB, is hosting a special event at Moravian Contest Group's station, OK5Z, in the Czech Republic from Sunday, August 4, to Saturday, August 10, 2024. In addition to radio activities, there will be workshops. For more information and to register, contact Eva Thiemann, HB9FPM/OK3QE, at hb9fpm@uska.ch.

Hints & Hacks

Keeping Gear in Place; An Alternative for Making Outdoor Connections Water Resistant

Securing Equipment on Inclined Surfaces

If you have radios or test equipment sitting on an inclined surface and are concerned about them sliding down and falling, here is a possible solution to prevent such an occurrence.

Install a length of shelf pilaster underneath the equipment, just in front of the rear feet. Pilaster is normally used in storage areas like closets, pantries, and cabinetry for installing shelving. It is available in assorted sizes (height, width, and length) and colors/finishes, and it is usually located in the storage and shelving areas of most big-box and hardware stores (see Figure 1). Be sure to use the appropriate size(s)

and length(s) for your equipment and secure the pilaster in place with screws (see Figure 2).

To install the pilaster, determine where and how you want the equipment to be positioned. If necessary, have someone hold the equipment in place. Measure the width of the equipment and add at least 2 inches to that length. The extra length will allow you to more easily position and initially install the pilaster, in addition to providing some leeway for you to move the equipment from side to side.

Cut the pilaster to length with a hacksaw and deburr the sharp edges. When sizing the screws to secure it in

place, be sure they are long enough to adequately penetrate the shelving material. Also, be sure to secure the pilaster with enough screws along its length, as the spacing of its pre-drilled holes may not be sufficient for your installation. Drill and chamfer/counter-sink additional through-holes in the pilaster if necessary. Using flathead screws reduces the chance of the screws contacting the bottom cover of the equipment and preventing it from solidly resting on the shelf.

If it is possible to slide the cut length of pilaster underneath the equipment, and if there is at least one screw hole showing on each side of the equipment, you may be able to secure the

► **Figure 1** — Examples of Menards pilaster material (www.menards.com). The top piece is John Sterling™ Single Track Black Standard #2114918, and it measures approximately $\frac{3}{8}$ × $\frac{5}{8}$ × 48 inches. The lower piece is John Sterling™ Gold Tone #2114853, which measures approximately $\frac{1}{8}$ × $\frac{5}{8}$ × 48 inches. [Mark Kupferschmid, AC9PR, photo]

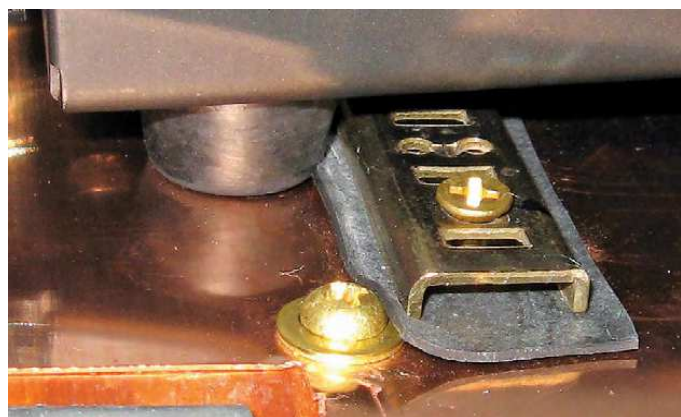


Figure 2 — A length of small pilaster can secure a piece of equipment in place on an inclined shelf. [Mark Kupferschmid, AC9PR, photo]



Figure 3 — Use a larger pilaster to keep large, heavy equipment in place on an inclined shelf. [Mark Kupferschmid, AC9PR, photo]

Figure 4 — In this image, pilaster strips are mounted in front of and behind the rear feet of an external speaker to prevent movement when plugging/unplugging the headphone jack. [Mark Kupferschmid, AC9PR, photo]



pilaster in place without moving the equipment. However, depending on the size and weight of the equipment and the angle of the shelf, it may be wise to remove the equipment and secure the pilaster with additional screws if necessary.

After the pilaster is secured in place, move the equipment until it is positioned to your satisfaction. When facing the front of the equipment, make sure the front side of the rear feet rest against the rear of the pilaster.

If the equipment is larger and heavier, and/or if the height between the top of the shelf and the bottom of the equipment is greater, use a larger-sized pilaster (see Figure 3).

To prevent lighter-weight pieces of equipment from sliding forward or backward, such as an external speaker equipped with a jack for headphones, install two lengths of pilaster strips: one in front of the rear feet, and one behind the rear feet. This will help keep the equipment in place when you plug and unplug your headphones (see Figure 4). — 73, Mark Kupferschmid, AC9PR, mkkupferschmid@gmail.com

Outdoor Feed-Line Cover

Most of us have had the unpleasant experience of discovering that the coaxial feed line between our antenna and our station has been severely damaged, or even completely severed.

One solution can be to entirely replace the feed line, but if the replacement length is considerable (and if you are using low-loss coax), the cost can be substantial. A less expensive option is to repair the cable by cutting out the damaged portion and joining the remaining ends with a couple of male connectors and a dual-female bulkhead. For example, you might join two PL-259 connectors with an SO-239 bulkhead. But how do you make this connection water resistant? Wrapping the connection with self-fusing silicone tape would work, but if you ever need to access the connection, you'll find that removing the tape can be challenging work.

I discovered that the Cord Protect water-resistant shields from Twist and Seal (www.twistandseal.com) fit most coaxial connectors perfectly (see Figure 5). I initially used these for Christmas lights and had some left over, so I tried them on a recent feed-line repair (see Figure 6). So far, all is well.

Note that these shields are water resistant, not waterproof. Don't use them to protect connections that are — or could ever be — submerged in water.

You'll find Cord Protect shields online and in home goods stores. They are inexpensive and easy to remove, and they allow for quick access to connections without the need to cut through layers of tape. — 73, W. Derek Meche, WM5TS, mechetelecom@gmail.com



Figure 5 — Cord Protect offers a water-resistant solution for outdoor wiring. [W. Derek Meche, WM5TS, photo]



Figure 6 — A Cord Protect shield is being used to protect a feed-line splice consisting of two PL-259 connectors and an SO-239 bulkhead. [W. Derek Meche, WM5TS, photo]

"Hints and Hacks" items have not been tested by QST or ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author. QST invites you to share your hints with fellow hams. Send them to hh@arrl.org. Please include your name, call sign, complete mailing address, daytime telephone number, and email address on all correspondence. Whether you are praising or criticizing an item, please send the author(s) a copy of your comments.

Microwavelengths

Testing and Troubleshooting a Microwave Transverter

In the last two “Microwavelengths” columns, I described transverters and their associated local oscillators (LOs), which are essential parts of a microwave station. Once you’ve built these pieces, you’ll have to tune them and get them working. Even if you buy a transverter, you’ll have to test it and set the power levels to work together with the intermediate frequency (IF) radio and the rest of the system.

Some hams get things working with almost no test equipment, while others acquire enough test equipment for an RF laboratory. So, what is a reasonable approach for getting radio equipment working and on the air without a large expense?

The minimum equipment required is a digital voltmeter (DVM) and a simple RF power detector like the one described in the “Microwavelengths” column in the April 2023 issue of *QST*. The next step is inexpensive handheld test equipment like the NanoVNA and tinySA Ultra spectrum analyzers (SAs). Despite their low prices, these are serious instruments that can rival professional equipment selling for much more.

Spectrum Analyzer

An SA is a receiver that graphically displays signals over a range of frequencies and shows their amplitude over a wide range, typically 80 dB or more. This allows viewing a desired signal and any harmonics, stray emissions, and noise sources. When connected to an antenna, a tinySA Ultra can show all the signals on the air, as Phil Salas, AD5X, described in Product Review in the April 2023 issue.

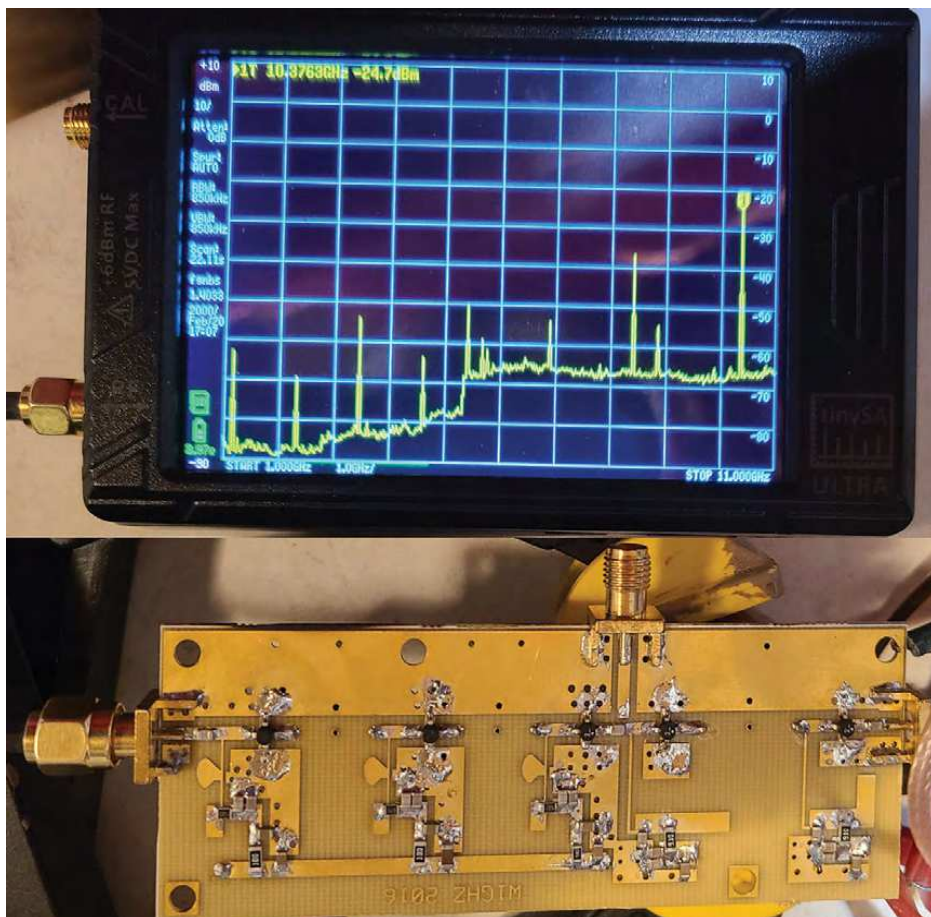


Figure 1 — A 10 GHz signal source including two frequency multiplier stages with the output spectrum displayed on the tinySA Ultra spectrum analyzer. The displayed frequencies are approximate.

The tinySA Ultra is advertised as covering 100 kHz to 6 GHz for about \$160. We would like 10 GHz. In the menu options, there is an **ULTRA** mode that extends the frequency range to 12 or even 20 GHz with reduced sensitivity, but it is still adequate for most testing, and it includes a signal generator with an output of 100 kHz to 5.4 GHz.

Figure 1 shows the tinySA Ultra displaying the output of a 10 GHz weak-signal source I call a “personal

beacon.” The printed circuit board in the picture multiplies a 1152 MHz synthesizer to 10.368 GHz, generating the harmonics shown, which are not completely filtered out. The 4-inch screen can make it difficult to see the details, but the tinySA Ultra can be connected to a PC for better resolution and controls. However, I find that the convenience of untethered handheld operation is often more useful.

Transverter Testing

Start by testing the LO and check if it

is on the right frequency. An LO chain with many multipliers can be tuned to the wrong harmonic, which will quickly be obvious with the SA. The tinySA Ultra can be used to check the LO power level. Most mixers need an LO power of +7 dBm (give or take a few decibels), and the LO can be tuned to reach this level (insufficient LO power is a common problem among microwaves). The display will also show if undesired frequencies sneak out of the multipliers.

Once the LO works, it should be connected to the mixer so that the transverter is powered to transmit with the SA connected to the output. An attenuator between the transverter and the SA will reduce the output power to a safe level (about 0 dBm maximum for the SA). I usually do an initial tuning of the transverter by peaking the LO leakage without any IF input. Then an IF signal is added so the filters can be re-tuned for maximum output at the operating frequency. After tuning to the desired frequency, the LO and image frequencies should still be visible but at much lower levels than the desired frequency. Figure 2 shows the captured display output of a transverter that I re-tuned from 3456 to 3400 MHz, the new calling frequency. The LO leakage is about 40 dB lower, and the image frequency is about 55 dB lower. Other frequencies are also down by many decibels. Any frequencies that you can't explain should be investigated, as amplifiers have been known to oscillate.

Tuning the receiving side of the transverter is pretty much the reverse operation. The SA moves to display the IF output from the mixer, and a signal is injected at the operating frequency (a lower-frequency harmonic is usually adequate). Then the transverter is tuned for the maximum signal on the SA.

A commercial transverter should not require tuning, but a similar process can be used to set the signal levels and gain. A power detector will probably suffice, but the SA ensures that everything works well.

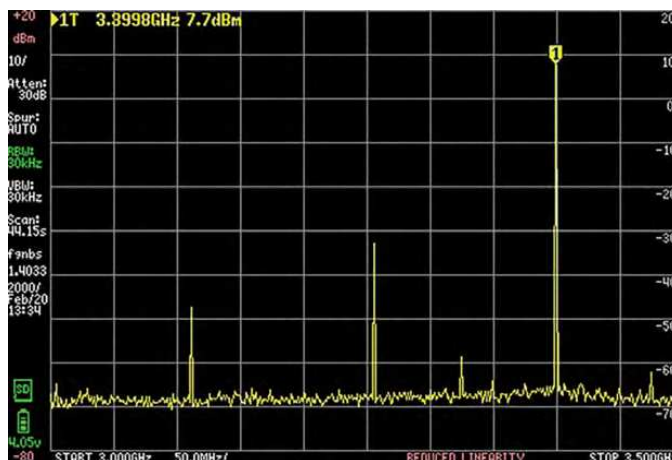


Figure 2 — The output spectrum of a transverter for 3400 MHz showing the desired output toward the right, 144 MHz above local oscillator leakage in the center, and the image signal on the other side of the LO on the left.

Troubleshooting

If everything works so far, connect an antenna and make contacts. If nothing appears on the power detector or SA, it's time to troubleshoot.

The first step is to check the dc voltages with the DVM (sometimes, I think 90% of microwave problems involve dc power). Because solid-state transverters operate at low voltages and low signal levels, it is safe to probe them. Stay away from alternating current line voltages and high-power amplifiers. Most transverters use monolithic microwave integrated circuit (MMIC) devices where the voltage on the output lead should be within 3 – 5 V, and the input lead within 1 – 3 V. Gallium arsenide field-effect transistors (GaAsFETs) typically have 3 – 8 V on the drain lead and a negative voltage on the gate. If there is a resistor in the supply line, measure the voltage on both ends of the resistor to estimate the current.

If all the voltages seem reasonable, power up the misbehaving section as described above. Make a high-impedance probe for the SA — a ¼ W resistor with very short leads on the pin of an SMA connector, as shown in Figure 3. I used 470 Ω, which is a high impedance compared to 50 Ω. It created roughly a 10:1 voltage divider for 20 dB attenuation. That's enough to protect the SA from overvoltage or excess power. By moving this probe along the signal path, you can follow the signal as it is amplified or changes

frequency and find problems. If the signal disappears at some location, that is at least the first problem.

An 8 GHz harmonic at the probe point was stronger than the desired 10.368 GHz signal, so it alerted me to re-tune for the result shown in Figure 1.

Some of the problems I found, aside from forgetting a dc supply wire, included a bad MMIC, which drew a normal current, an MMIC installed backwards, forgetting to solder one end of a chip capacitor, poor solder joints, and bad or intermittent RF cables. With thin printed circuit boards, flexing them can crack solder joints or components.

Of course, intermittent problems can drive you crazy. I have an old commercial 10 GHz transverter that occasionally fails in the field. On the bench, I can trace all the signals, and everything works fine, so I am still struggling with it.



Figure 3 — A simple RF probe useful for probing and troubleshooting RF circuits, especially printed circuit boards.

Preparedness Paid Off Before, During, and After Hurricane Ida

A firsthand account of how this Louisiana ham family stayed informed and connected during a catastrophic storm.



Damage is assessed in Hahnville, Louisiana, during the aftermath of Hurricane Ida. This was about 25 minutes away from Brian Karcher's, KG5GJT, home. [Photo courtesy of FEMA]

Brian Karcher, KG5GJT

On August 29, 2021, Hurricane Ida made landfall in Port Fourchon, Louisiana, as an “extremely dangerous” Category 4 hurricane that traveled on a path of destruction through the northeastern US and into the Atlantic Ocean on September 2. It was the second most damaging storm to hit Louisiana since Hurricane Katrina.

Geographical Demand for Emergency Preparedness

Residents of the New Orleans metropolitan area of southeast Louisiana experience a yearly threat of tropical systems and hurricanes from June to November. Because of this, I take emergency preparedness very seriously. I'm an active member of the Louisiana Ama-

teur Radio Emergency Service® (ARES®) Region 1. Checking in to our weekly ARES training net reminds me to stay prepared to keep improving upon my amateur radio capabilities.

I keep a 2-week supply of emergency food and water year-round. Between that and the normal supplies in the house, I always have enough to keep my family fed and hydrated for 4 weeks in case of an emergency. I also regularly ensure that all of my amateur radio equipment is operational and ready to go for any emergency. And when a storm is approaching, I double-check that all of my radio batteries and backup batteries are topped off.

Having been through many power outages, my station is equipped with a West Mountain Radio Epic

PWRgate backup power system, a West Mountain Radio RIGrunner 4012 dc power distribution strip, and a Duracell 75 Ah 12 V deep-cycle battery. I also plan to add a solar panel to my power system as a means to charge the battery if my home's Kohler 20 kW whole-home natural gas-powered generator fails.

The rest of my station is equipped with an IC-7300 (for HF), ID-5100A (for VHF, UHF, and D-STAR), FTM-400 (for VHF, UHF, and System Fusion), and ID-51A, FT-3DR, FT-70DR, and Radioddity GD-77 for DMR. All of my antennas are mounted at 27 feet, and include a homebrew end-fed with 72 feet of wire, an M2 Antenna Systems 6-meter HO Loop, and a Diamond X300A. My end-fed antenna wire extends from the roof of my house to the roof of my garage and turns down to a wooden post at 12 feet, where it turns again, ending at 8 feet atop my wooden fence.

I also prepare for an impending storm by monitoring various nets. During Hurricane Ida, I found the Hurricane Watch Net (HWN; <https://hwn.org>) to be a valuable resource. This net disseminates tropical and hurricane advisories during times of emergencies, collects measured or observed weather and storm damage reports from amateur radio operators in the affected area, and passes the information on to the National Hurricane Center. Additionally, they serve as backup communications for hurricane centers, emergency operations centers (EOCs), and others involved in protecting life and property during and after hurricanes. I also monitored the Voice over Internet Protocol (VoIP) Hurricane Net (<http://voipwx.net>) during the storm.

Staying Informed and Connected

My house was within Hurricane Ida's forecast cone, so as it approached the Louisiana coast, I checked into the HWN on 20 meters the day before landfall. The net was active at this time to line up reporting stations that would be in the affected area and to give EOCs and other stations a chance to verify that their stations were working. I checked in on 14.325 MHz, received a 5 × 5 signal report, and sent a 3 × 3 signal report back.

Once Hurricane Ida made landfall, conditions worsened throughout the day, causing the wooden post holding up part of my end-fed antenna to break. The damaged wood was still attached to the antenna with 550 cord, but the wind was blowing it and the wire around violently. Fearing the wire would break next, my son David, KG5DRK, and I made our way through the wind and rain to quickly detach the wire. The antenna was now partially laying in a tree, but even in this condition, it was effective throughout the storm.



Brian Karcher's, KG5GJT, updated battery backup system. [Brian Karcher, KG5GJT, photo]

While hurricane-force winds and heavy rain ravaged the area, our house was hit with flying debris and tree limbs. I saw that a tree had landed on my neighbor's roof, causing significant damage, so I decided to send a weather and damage report to the VoIP Hurricane Net. I could hear net control giving me the latest hurricane advisories and calling for stations with reports, but there was some packet loss. I made several attempts to connect SharkRF openSPOT 1 to the Yaesu System Fusion Reflector 50535 AU-VK Multi Link, but never made it into the reflector. I switched to D-STAR Reflector XLX432 and didn't hear any packet loss from net control, but I still couldn't connect. I tried using my iPhone as a hotspot for SharkRF openSPOT 3 but still wasn't able to connect. Shortly after this, my house lost all cable and internet connections, and my cell phone could only send text messages (but not reliably).

I was able to send an observed weather and damage report to the HWN on 14.325 MHz while they were on 20 meters. Net control was great, and I could quickly relay the information. I also wanted to keep friends and family updated on our status throughout the storm. Having lost internet connection, cell service, and most texting abilities, I used Winlink Global Radio Email, with which you can send and receive emails using HF, VHF, or UHF without an internet connection. I sent and received several emails via Amateur Radio Digital Open Protocol (ARDOP) Winlink sessions on 40 meters.

Support from the Local EOC

I learned from hurricane advisories that the storm hadn't taken the predicted turn to the northwest, and instead, turned northeast toward the New Orleans metropolitan area. We knew this was always a possibil-



Hurricane Ida damaged the wooden post holding Brian Karcher's, KG5GJT, end-fed antenna, so he replaced it with a fiberglass military tent pole. [Brian Karcher, KG5GJT, photo]

ity, as we were in the forecast cone. I contacted the Jefferson Parish EOC on a 2-meter repeater for more details about the position and track of the storm (the Region 1 ARES group was manning the Jefferson Parish EOC). Several of the repeaters that the EOC intended to use were knocked off the air by Hurricane Ida, but thankfully, they were able to use backup repeaters. The EOC gave me the storm's current coordinates, its direction of movement, and the distance between the eye of the storm and several cities. Later on, my wife Liz, KG5ONB, contacted the EOC again for an update on the storm's location so we could continue tracking it.

Post-Storm Assessments

After almost 24 hours of Hurricane Ida battering the New Orleans metropolitan area, the storm finally passed. The Jefferson Parish EOC asked for updates on damage reports as well as reports of gas stations, grocery stores, and other businesses that were reopening and could help with recovery. I used 2 meters to make several reports of businesses opening in the area and used 2-meter repeaters to stay connected with local hams.

I found that my HF, VHF, UHF, and digital capabilities worked well during the hurricane. Being unable to contact net control of the VoIP Hurricane Net was due to internet connection problems. Our power didn't return for about 10 days, but our home generator performed great and kept us going until power was restored.

Since Hurricane Ida, I've replaced the damaged wooden post that held my end-fed antenna with a fiberglass military tent pole and added a second HF antenna, a Comet CHA-250HD multi-band vertical antenna mounted at 31 feet, and a Davis Instruments Vantage Pro2 weather station (to make more accurate weather reports). I replaced my deep-cycle battery with three Bioenno Power 12 V 20 Ah 240 Wh lithium iron phosphate batteries. To increase my Winlink capabilities, I now have a Yaesu FT-2800M and a Digirig Mobile dedicated to VHF Winlink.

Be Prepared This Hurricane Season

Forecasters predict an extremely active 2024 Atlantic hurricane season. It's important to frequently assess your communications capabilities and look for ways to improve your disaster preparedness. Consider getting involved with the ARES group in your region, and check in to local ARES training nets. This practice made me familiar with emergency nets and passing radio traffic.

Amateur radio gave my family the ability to obtain and provide critical information and kept us connected to friends and family throughout and after Hurricane Ida — when all else failed.

Brian Karcher, KG5GJT, was licensed in 2015 and upgraded to Amateur Extra in 2017. He is active in his local club and in ARES in his ARRL Section. Brian enjoys HF, HF digital, VHF/UHF, digital modes, and satellites. His wife, son, and daughter are also hams. He can be reached at kg5gjt@cox.net.

For updates to this article, see the **QST Feedback** page at www.arri.org/feedback.



The Great Washington ShakeOut

How Washington's Thurston County Amateur Radio Emergency Service® (TCARES®) left a big impression on a state agency.

(From right to left) Norm Pritchett, AC6DF; Steve Tomlin, W7SLT; Mark Weisenfeld, K7TUM, and Eric Messelt, W8ESM, overseeing the station in Lacey, Washington. [Phil Cornell, W7PLC, photo]



Phil Cornell, W7PLC

It was a cool, foggy October morning in the Pacific Northwest when I began loading my car with equipment for the 2022 Great Washington ShakeOut, Washington state's version of the Great ShakeOut earthquake drill (www.shakeout.org/washington), held worldwide in at-risk areas. The drill had been in the planning stages for almost 6 months and was scheduled for October 20. I loaded a folding table, some folding chairs, a pop-up canopy, a 10-foot mast, a J-pole antenna, an end-fed long-wire antenna, a Yaesu FT-857D go-kit, batteries, and other items into the car for the adventure that was about to unfold. The Pacific Northwest is no stranger to earthquakes due to the nearby Ring of Fire, a series of volcanoes encircling the Pacific Ocean. The Cascadia Subduction Zone that runs from the coast of British Columbia to the northern coast of California is also capable of creating at least a 9.0-magnitude earthquake. It is not known when such a quake will happen, so it's important to be prepared.

This event was intended to be a demonstration for Emergency Manager of the Washington State Department of Transportation (WSDOT) Olympic Region Littleton "Lit" Dudley. It was meant to show how — when power, phone, and internet are compromised by a natural disaster — amateur radio can be a valuable addition to any state agency's emergency communications plan.

The Drill Begins

The Great Washington ShakeOut commenced with a simulated 7.9-magnitude earthquake 20 miles off the coast of Westport. In the scenario, power, phone, and internet were all down, and WSDOT needed to know the status of the state's roadways and bridges to issue warnings and begin restoration. Bridge damage reports, found in the Winlink **TEMPLATE MANAGER**, were to be sent from Aberdeen to Lacey via HF and VHF using the Winlink Common Message Server system.

I arrived at the WSDOT parking lot in Lacey at 9:30 AM and began unloading the equipment from the car with the help of fellow Thurston County Amateur Radio Emergency Service® (TCARES®) members. We set up the FT-857D station at around 10:00 AM and operated with the TCARES call sign, WA7OLY (see Figure 1). We used a bungee cord to lash the mast and J-pole for VHF to the chain-link fence behind us, and we ran a vertical wire antenna for HF up a 30-foot fiberglass mast that was also lashed to the fence (see Figure 2). Besides the FT-857D, the TCARES go-kit consists of an LDG Electronics AT-100 tuner and a Tigertronics Signalink USB Interface with all of the necessary cables. It has been used many times during simulated exercises.

The Aberdeen Station

Meanwhile, about 50 miles west, John O'Brien, K7JOB, and Leslie O'Brien, N7LOB, set up a VHF packet sta-

tion and an HF VARA station at the WSDOT office in Aberdeen. Doyle Wenzel, N7UJK, provided backup. Their report of the exercise was as follows:

We arrived at the Central Park WSDOT parking lot at 10:00 AM and left at 1:45 PM. Round-trip miles were 11.4. After setting up the Winlink station in our van, we established radio voice contact with Phil Cornell, W7PLC, the TCARES radio operator at the parking lot of the WSDOT Olympic Region Headquarters maintenance building in Lacey. We used the K7CPR VHF repeater on Capitol Peak throughout the event. We sent two practice Winlink messages to Phil at wa7oly@winlink.org. We also tried peer-to-peer HF connections, but the Thurston County group had too much RFI to make HF work for them. They acknowledged each message we sent.

WSDOT Assistant Superintendent Cliff Whitehill brought us a thumb drive containing a photo of a hand-written bridge damage report and two photos of the bridge on US Route 101 in Hoquiam. We were able to transcribe the report onto the Winlink WSDOT bridge damage report template, attach the two bridge photos, and send the message addressed to WA7OLY via VARA HF to a gateway in Bend, Oregon. Total transmission time was only 4.7 minutes. Whitehill received a copy and was pleased. We then resent the package as three separate Winlink emails — the report, photo 1, and photo 2 — to make it easier for the Thurston County radio operator to retrieve the smaller messages.



Figure 1 — Phil Cornell, W7PLC, setting up the station in Lacey. [Eric Messelt, W8ESM, photo]

Afterward, Whitehill and another employee (both had radio experience in the military) came out to see our antennas and station in the parking lot. We were able to give them Winlink demonstrations by sending text messages to their cell phones via Winlink (HF to Bend).

It was very successful, and the setup was quick. We had duplicate equipment available in case of malfunction. WSDOT gave us easy-to-use information. We used HF so as not to burden the VHF digipeaters when sending photos.

The Lacey Station

Back in Lacey, my much-appreciated helpers were TCARES Emergency Coordinator Steve Tomlin, W7SLT, and TCARES members Eric Messelt, W8ESM; Norm Pritchett, AC6DF, and Mark Weisenfeld, K7TUM (see the lead photo). As we began receiving reports, we experienced rainfall. Though we were under a canopy, it's important to remember that being outside in the elements is something all emergency communicators may experience. We were joined by Lit Dudley,



Figure 2 — The antennas lashed to the chain-link fence. [Phil Cornell, W7PLC, photo]

WSDOT Olympic Region Safety Officer Rick Reimer, and other WSDOT officials. We handed Rick eight reports and two photos.

The plan was to send a single Winlink bridge damage report from Aberdeen to the WA7OLY Winlink station in Olympia via ham radio, and then deliver it to Rick/WSDOT. However, the next stages didn't go exactly as anticipated. We were able to get a good signal from K7TCM-10 on 145.080 MHz VARA FM and begin downloading messages. The first time I checked messages at 10:40 AM, I was expecting only one or two, but there were seven. At this point, other Washington ARES organizations caught wind of this exercise and joined in. WA7OLY was receiving reports from Grays Harbor, Mason, and Pierce counties, among others, which are all located in the WSDOT Olympic region. WA7OLY had received a total of 18 VHF Winlink bridge damage reports: six from the Aberdeen team, seven from Mason County, and five from Pierce County. We tried a Winlink peer-to-peer HF connection on 80 meters with the Aberdeen team, but unfavorable propagation and local noise prevented any connection, and RFI locked up our computer. But after turning off the radio and rebooting the computer, everything went back to normal. We may need a better HF antenna for our next exercise.

State Agency Feedback

WSDOT's reaction to our drill was very positive. Lit Dudley stated:

Thank you for the support you provided WSDOT yesterday. It was outstanding! Your communications provided us with crew damage reports. This is critical because we rely on reporting to make information available to counties, responders, and the travelling public.

Our crews reported 20 bridge site damages in our one region (WSDOT has six regions) for the Great ShakeOut. Crews "closed" 10 state routes and "restricted" four additional bridge sites. In several cases, we received your radio Winlink data quicker than via our internet systems. That surprised me, but I think your process for handling the information made for efficient transmission. For our Grays Harbor area, we relied entirely on your transmissions of damage reports. That operation went off without a hitch!

At the site staffed by TCARES, you met and exhibited your operations for our Olympic Region Administrator, Steve Roark, PE; our Construction Engineer, MaryLou Shannon, PE, and our Maintenance Engineer, Troy Cowan, PE. They were impressed and appreciative. You and I discussed making your site more weather-resilient by finding a set-up location within our building. Steve Roark supports that move.

I understand we received reports from ARES groups in Mason, Kitsap, and Pierce, too. Please

forward our thanks to any amateur radio communicators at or behind the scenes. Let's continue to work together. I have copied Grays Harbor and Thurston County Departments of Emergency Management. My next step is to pursue an agreement that would work for both the county and Washington state Departments of Transportation.

Rick Reimer wrote the following review of the exercise:

Recently, I had the opportunity to work with and see the volunteers of TCARES in action. I work for WSDOT, and I am fairly new to emergency operations for the Olympic Region. During meetings and training, and as we developed our plan [for] a major earthquake or similar event, it became evident that communication was a fragile — but vital — component.

One day, I was attending a local fair and came across a booth of ham operators (Doug Grover, N7POV, and others). They were very engaging, and they took the time to show my granddaughters their names in Morse code. I asked them if they were involved in any emergency service work with local government. Although they were not directly [involved], they put me on the path to TCARES.

As we had our Great ShakeOut drill with our new friends from TCARES, I was impressed with their professionalism and expertise, [and] the fact that they are all volunteers dedicated to making their communities safer. They came to our facility to set up their equipment, and within minutes they were operational, delivering damage reports from around the region and the state.

WSDOT requested a repeat exercise for the Southwest Region (the Vancouver/Clark County area, including ARES Washington Regions 3 and 4) in April 2023. Since this article was submitted, TCARES has developed a strong relationship with WSDOT, and we now have a multi-band HF vertical antenna and a dual-band VHF/UHF antenna on the roof of the WSDOT building. WSDOT has set aside a room for radio operations that is only steps away from their Emergency Operations Center. We have successfully completed three exercises from this location since this article's submission, and WSDOT staff look to us to confirm information from the field. Now that we have planted the seed, we will continue to grow our activities to help our community.

Phil Cornell, W7PLC (formerly KA7FRZ), has been a ham since 1978. He is very active in the hobby and primarily focuses on ARES activities. Phil has been the TCARES Training Coordinator for the last 5 years, and he also enjoys writing, bicycling, and cooking. Phil can be reached at w7pic@arrl.net.

For updates to this article, see the **QST Feedback** page at www.arrl.org/feedback.



The GOES-16 Satellite and Emergency Management

A Boy Scout takes on a small project that could have a big impact on his community.

Michael Tice, KEØZXU

In September 2021, a search and rescue drill was held at Volga Lake in Iowa using the Federal Emergency Management Agency's (FEMA's) Incident Command System. The drill included members of the Rural Iowa Amateur Radio Club, WØOEL. The club is active in emergency management, and their main tools include their emergency management trailer and an antenna trailer. The purpose of these drills is to identify issues with the trailers and protocols, but as an active Boy Scout, I was also looking for an idea for my Eagle Scout Service Project.

Ham radio and scouting are closely intertwined for me. One of my first campouts was at a Jamboree on the Air event, and eventually, I became an Extra-class licensee. I knew that I wanted my Eagle Project to reflect my interest in ham radio and emergency management, and while at Volga Lake, I found two issues I could address for my project.

The first issue was that the emergency management trailer's only way to obtain weather information was through the internet, but it's supposed to run stand-alone without internet access or cell phone service. The second issue was that paper maps of the county were being used, which blew around in the wind, and in a real emergency (when Murphy's Law is in full effect), the emergency will always happen on the border of two maps.

Michael Tice, KEØZXU, sitting with the dish antenna after finally receiving a signal. Note the lack of a robust mounting system.



Reaching for GOES-16

The GOES-16 satellite was launched on November 19, 2016, as GOES-R. It became GOES-16 in December 2017. It's in geostationary orbit, approximately 22,236 miles in altitude over the equator at 75.2 degrees west longitude.

With the help of Iowa Section ARES Technical Specialist, Al Jones, KBØVGG, and others, I began designing and building an antenna to reach this satellite. It needed to have high gain, be highly directional, and be able to handle multiple polarizations, which severely limited the options available. My team and I went through at least half a dozen different designs for antennas, and eventually, I realized that I would spend more money on materials for new designs than if I just bought an existing one. So, I purchased a parabolic dish specifically designed for receiving the GOES-16 satellite.

The signal from the antenna is fed through a SAW filter and amplifier before going to a software-defined radio (SDR) dongle. We used a Nooelec NESDR SMARt v5 RTL-SDR for the dongle, a Nooelec GOES weather satellite mesh antenna, and a Nooelec GOES SAW-

bird+ filter/amplifier. For reasons I don't understand, I had more success using a 3-foot cable to connect the filter to the dongle rather than connect them directly, which is a fairly common observation in these applications. From there, the signal was fed to the USB port of a Raspberry Pi using a USB extension cable. Plugging the dongle directly into the Raspberry Pi worked fine, but

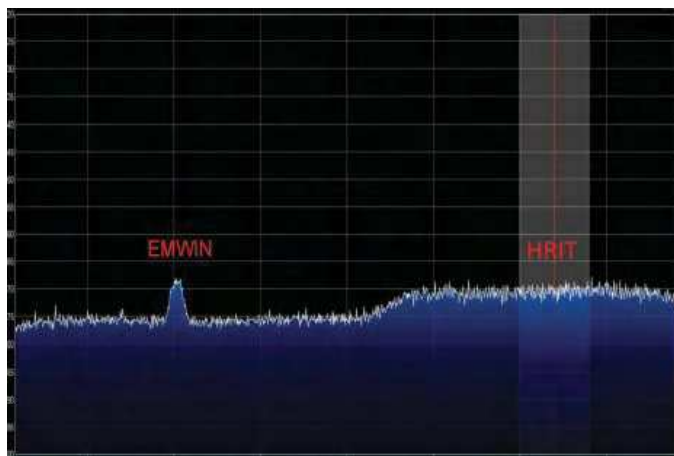
using a cable helped prevent the weight of the dongle from damaging the USB plugs. In this case, I used a Raspberry Pi 3B with a 1.2 GHz quad-core processor.

Speaking the Language

The antenna needed to be aimed within a degree or less on azimuth, elevation, and (less accurately) skew. To do this, I used two different tools: **www.dishpointer.com**, a website that provides a calculated azimuth and elevation to reach the satellite, and *SDR#*, an SDR program that also has a waterfall. So, **www.dishpointer.com** gave a rough direction, and once *SDR#* received a signal, I made slight corrections and reviewed whether the signal was better or worse. The settings needed to receive a readable signal within half of a degree on elevation and azimuth. Without a solid mount, slight wind could stop the operation, so we built a mounting system. It's a rectangular base with a plank sticking up on one of the short sides. There is a double-threaded screw through the long sides and a boom stick placed between the middle and the short side without the plank. There is also a double-threaded screw attached through the boom stick and the plank. These allow for precise corrections of azimuth and elevation, respectively, by turning the nuts on either end with a wrench.

There is more to tuning this satellite. The GOES-16 satellite transmits two signals, the Emergency Managers Weather Information Network (EMWIN) and the High Rate Information Transmission (HRIT). We were mainly receiving the EMWIN signal and trying to maximize it because it is easy to see, but it sends text data, alerts, and telemetry. The HRIT signal sends out the packets required to make the pictures, and the skew for each is 90 degrees off from one another. So, in maximizing one, I minimized the other, and with the decibel over the noise of the EMWIN signal maximized, the HRIT wasn't strong enough to receive packets. After an embarrassingly long time, I figured it out and could receive packets.

I looked for at least 5 dB over the noise floor for the HRIT, with 7 dB being pretty good. Once that was achieved, *SDR#* was closed, and we ran a command called *goesrecv* on the Raspberry Pi using a secure shell protocol client called *PuTTY*. Check out the *QST* in Depth web page (www.arrl.org/qst-in-depth) for instructions on how to use *goesrecv*, and to purchase the equipment mentioned earlier. Using the command **`goesrecv -v -i 1 -c /goesrecv.conf`**, the Raspberry Pi displayed the Viterbi error rate (which measures the error when transmitting digital information after the original signal has already been corrected for errors)



A screenshot of the two signals received from the GOES-16 satellite as they appear on *SDR#*.

and dropped packets. Then we made more minor adjustments to the antenna to bring the Viterbi error rate to 700 or less. We decoded the signal in decipherable packets by using the command **`goesproc -c /usr/share/goestools/goesproc-goesr.conf -m packet -subscribe tcp://127.0.0.1:5004`** and converted those packets into pictures. After about 15 minutes, a full set of pictures were on the Raspberry Pi, and I used FileZilla to transfer the pictures onto a laptop.

To address the paper map issue, I decided we could program a digital map of the county. My high school IT club consists of skilled programmers, so I enlisted their help to program this map.

We used topographical maps from the US Geological Survey website, which are available for free as PDF files, and Windows Maps. For the topographical maps, we mapped GPS coordinates on the corners of the maps and then used calculations to determine the positions of teams based on their coordinates. While it is not precise due to plotting longitude lines on a flat map, it is close enough that the team's actual position will be under the color-coded marker our program places on the map.

Future Directions

For the satellite download, the biggest direction for the future would be a more robust mounting system. While it does not need to be in the air, it does need to be stable. In addition, several people online have noted that it is far easier to access the EMWIN signal with a larger disk (the recommendation seems to be about 3 feet).

The GPS information for each team currently involves a manual input for the mapping program. The coding has comments to help direct future programmers to con-

nect this system with an APRS system, a digital mobile radio, or some other system to automate this process. Before I move forward on this project, I want to educate myself more to avoid costly mistakes and overruns. I've been researching APRS systems, including installation and the cost of upgrading handhelds and integrating them into the system. The ability to automate the collection of GPS coordinates would significantly lessen the workload of the individual teams and provide an incident commander with a better understanding of the incident. Better inputs may lead to a better output of saving lives.

While it did take a bit of practice, we've been able to set up the antenna system and aim it fairly quickly, and it works! The map program also works mostly flawlessly. We routinely use these at drills just like the one this entire project started with. I hope that I have provided enough details so that others may duplicate and improve on what I've done, as well as inspire people to consider ways their passion for ham radio might be applied to community service. Except for the Raspberry Pi (the price of which can fluctuate heavily), the

system costs about \$230, most of that being the antenna. I'm proud to have built a system that helps keep my community safer. Thank you to everyone who helped.

See QST in Depth for More!

Visit www.arrl.org/qst-in-depth for the following supplementary materials and updates:

- ✓ Instructions for using *goesrecv*
- ✓ Links to purchase equipment

All photos by the author.

Michael Tice, KE0ZXU, is a member of Boy Scout Troop 47 in Independence, Iowa. He is a junior in high school and recent Eagle Scout. Michael holds an Extra-class license and spends most of his free time looking into electrical engineering programs for college. He can be reached at michael.tice@yahoo.com.

For updates to this article, see the **QST Feedback** page at www.arrl.org/feedback.

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April 2024
QST Cover Plaque Award Winner

*McKenzie Denton,
KO4GLN*

In her article, "Get On the Air April 8 for the Solar Eclipse QSO Party," McKenzie shares an opportunity for amateur radio operators to contribute to ionospheric research while having fun in the next Solar Eclipse QSO Party, sponsored by Ham Radio Science Citizen Investigation (HamSci).

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Get On the Air April 8 for the Solar Eclipse QSO Party

Contribute to ionospheric research while having fun on HF.

McKenzie Denton, KO4GLN

An extraordinary celestial event is set to occur over North America on Monday, April 8, 2024, where the sun and moon will align in a total solar eclipse! This date marks the next Solar Eclipse QSO Party (SEQP) for hams interested in HF operating or contributing to studies of the ionosphere (or both). Sponsored by Ham Radio Science Citizen Investigation (HamSci, <https://hamsci.org>), the SEQP invites amateur radio operators to participate in an ionospheric research initiative, transforming routine radio exchanges into valuable scientific data. Operators of all experience levels, with stations small and large, are invited to make contacts on a variety of modes and bands during the SEQP. The contact data will help researchers unravel the mysteries of our planet's upper atmosphere and its interactions with the sun.

An Opportunity to Contribute to Radio Science

The 2024 SEQP is an event that no serious amateur radio enthusiast should miss because it's the last total solar eclipse visible from the contiguous United States until 2044. This event is a unique blend of scientific pursuits and radiosport. Amateur radio operators will have a chance to experience the changes to radio wave propagation when the moon's shadow temporarily reduces the amount of solar radiation reaching the ionosphere during the eclipse. This initiative is not just about radio contacts; it's also about building a vast repository of data relative to the time of the eclipse passing overhead, such as who contacted whom and when, where they were located, and on which bands their contacts occurred. Networks, such as the Reverse Beacon Network, PSKReporter, and WSPRnet, along with individual logs, will yield invaluable insights into the ionosphere's behavior to researchers. This event could be a transformative moment for amateur radio enthusiasts and scientific discoveries.



Paul Christy, N0GN, operated during the 2017 SEQP using solar power from the Rockford Lake State Recreation Area in Beatrice, Nebraska. (Denise Christy, KE0MYM, photo)

Amateur radio operators will submit logs that contain details such as frequency, mode, contact times, and signal reports to the HamSci team after the SEQP. This information will be combined into a comprehensive database for preliminary analysis, which ensures completeness and consistency and identifies any anomalies. Then physicists, engineers, and other scientists collaborate to analyze this data pool rigorously. The focus is to observe the ionosphere's reaction to the solar eclipse by identifying shifts in signal propagation. Integrating the data with other sources, such as the Reverse Beacon Network, PSKReporter, WSPRnet, and other (non-amateur) data sources, can achieve a more detailed understanding of the ionosphere. The findings will be shared at conferences, published in scientific journals, and made available to the public, thus advancing global knowledge about the ionosphere and its impact on radio communications.

HamSci's Recognition of Hams' Contributions to Science

As the solar eclipse nears, it's essential to acknowledge the valuable contributions of amateur radio op-

Planning a Surprise Emergency Training Session

Randy Brack, N5MRB

On November 12, 2022, the Garland, Texas, Radio Amateur Civil Emergency Service (RACES) and Amateur Radio Emergency Service® (ARES®) units conducted a surprise exercise to test our emergency preparedness. Garland has a combined RACES and ARES team. The unit can be activated by the city, or it can self-activate in case of an emergency. The group conducts regular training sessions, but this exercise was something special.

Planning the Surprise

Unit Training Officer Kevin Canady, KG5JPL, and unit Radio Officer John Galvin, N5TIM, planned the exercise in secret with Adam Traylor, KG5HUQ, of the City of Garland Office of Emergency Management (OEM). N5TIM and KG5JPL acted as the command team.

The scenario was based on a severe winter weather event like the one that much of Texas suffered in February 2021, when much of the city — including public utilities — was shut down for days. People were without electricity, gas, landlines, and internet. Cell service suffered, and temperatures fell below freezing.

The plan for the exercise:

- A major snow event shuts down power to Garland. Public utilities are non-functional.
- Garland opens warming centers for the public at six recreation centers.
- Communication to and from the shelters is provided by amateur radio operators.
- Garland RACES/ARES is activated, and operators are assigned to the various shelters.
- The command post is located at the Garland Communications Center (GCC). (In a real-life emergency, the command post would be stationed at the OEM.)
- Radio operators run scripts to send information to the command post, including unscripted traffic, to test the command post operator(s).

The GCC is operated and maintained by the Garland Amateur Radio Club (GARC). There is a close affiliation between Garland RACES/ARES and GARC, with

Members of a Texas EmComm unit had their emergency preparedness tested when they unexpectedly received notifications of a severe weather exercise.



many amateur radio operators being members of both. RACES/ARES uses GARC facilities and equipment.

The scenario required close coordination between the OEM and the parks department to ensure that city employees wouldn't be surprised when amateur radio operators showed up with their equipment on the morning of the event.

The command team chose a weekend day for the exercise to maximize participation.

Notifying Unit Members

On the morning of the exercise, N5TIM and KG5JPL manned the command post and sent notifications to unit members at 8:00 AM. This was the first time they were notified of the event. They all have smartphones, so the preferred notification method was Slack (<https://slack.com>). The command team also sent an email notification and made announcements on the GARC



Kevin Canady, KG5JPL, at the exercise command post.

VHF and UHF repeaters. Each notice was repeated multiple times.

The notice called for RACES/ARES members to report to the GCC by 9:30 AM and to be prepared for immediate deployment. They were required to set up and operate a mobile station.

Thanks to Slack's remote capabilities, several members were able to report from out of town that they wouldn't be able to participate.

Exercise Details

When I arrived at the GCC at 8:57 AM, I was the first team member there. Per the local process, I was appointed as staging manager until the designated staging manager arrived. As other operators filtered in, I briefed them and assigned them to recreation centers and shelters. I also took an assignment at a shelter. By 9:45 AM, seven members had reported to the GCC and had been assigned to five shelters at Garland recreation centers.

Garland OEM allowed us use of five of their six recreation centers. Operators set up outside the centers on a park bench or in the parking lot. The temperature that day was in the low forties. It was sunny, but the biting wind made working outside unpleasant.

Net control at the command post opened the exercise net at 9:45 AM. Each of the five shelters had one operator communicating via VHF voice simplex, and two of the shelters had a VHF Winlink operator. Unfortunately, one of the Winlink operators had trouble setting up because of a configuration error and was unable to establish communication until well into the exercise.

When each operator checked in at the GCC, they were given a script to use when calling the command post for resources, such as first aid kits, blankets, water, etc. The command post responded with an estimated arrival time, and the operator called back at that time to tell the command post that the item(s) had arrived. Operators kept logs of their traffic. Shelter operators were also encouraged to send unscripted traffic to the command post to test the operators there.

The command post team shared duties. KG5JPL handled VHF traffic, and N5TIM operated Winlink. KG5JPL oscillated between periods of no activity and having to write down information at a furious pace. He had trouble keeping up with the incoming traffic and sometimes missed information, requiring repeats.

The drill was scheduled to progress until 12:00 PM, but because the participants were enjoying themselves so



Randy Brack's, N5MRB, mobile radio setup on a park bench during the surprise exercise.

much, they requested that the exercise be extended. The net closed at 12:30 PM, and participants went home.

Operators submitted their after-action reports to the command post team and KG5HUQ at the OEM. The city thought it was a good operation, and the Garland RACES/ARES unit proved that it could mobilize quickly and perform an activity in a timely manner.

A Successful Learning Experience

One important lesson learned during the exercise was that voice is satisfactory when transmitting a small amount of data, but the sender has to speak slowly and clearly, or retransmissions will be required while the operator tries to copy the message. Winlink is clearly superior for large amounts of data. Not only is it faster, but it's also more accurate — you don't have to try to read somebody's handwriting.

When asked if the exercise was a success, KG5JPL said, "Yes. We showed we were willing, able, and capable of responding without warning to an event [and can] set up critical communication anywhere in the city within a short amount of time."

Other exercises — scheduled and unscheduled — are planned for the future.

All photos provided by the author.

Randy Brack, N5MRB, became active in amateur radio in 2012 when he retired from a career in system engineering. He is a licensed Amateur Extra who was introduced to emergency communications as a member of the Dallas, Texas CERT. He is a member of Garland RACES/ARES and GARC. Randy can be reached at n5mrb@arrl.net.

For updates to this article, see the **QST Feedback** page at www.arrl.org/feedback.



Creating Off-the-Grid Power for Emergency Use

One ham's journey to utilizing solar power.

Chuck Dennis, W5CTD

This story begins in February 2021 when Texas was hit by a massive winter blast that will likely go down in history for its severity, duration, and impact on residents. The temperatures started to dive well below freezing almost a week before the power outages struck. The cold arrived with ice, snow, high winds, and all-around bad weather. During this time, snow fell for days and did not melt.

Fortunately, about 2 weeks before it hit, word came out about what was in store. We took that opportunity to get supplies like bottled water, food, and medications. At the time, I had three 12 V batteries: 18, 15, and 5 A. I also had two handhelds that used batteries. I was able to charge all of these in the days before the power outages.

I started getting text messages from the Electric Reliability Council of Texas that warned of a severe incident with the Texas electrical grid for the day before the power shutdowns. The first power outage occurred around midnight on Sunday, February 14, 2021. That shutdown lasted until Monday morning, and the power came back on for around half an hour, then went off again. This started the 3-day period of no power. The power flashed on intermittently but was off for most of the time. In the few short times we did have power, I was able to recharge some of my batteries and, in some cases, do some cooking. Entire areas of town were shut down. Nearly all businesses, including restaurants, gas stations, and grocery stores, were closed.

Taking Precautions for the Future

After witnessing this event, my wife and I found it necessary to have some way to get power, even if only to charge batteries and run radio equipment. I started pricing solar panels and solar charging systems and found a 12 V 100 W solar panel at a good price. I purchased the solar panel, connecting cables, a PWM



The 12 V 100 W solar panel.

solar charge controller, and a mounting kit for the solar panel.

After I unboxed the equipment, I realized I needed more than the limited instructions included with the solar panel and the solar charge controller. I searched the internet to learn more about how to wire and use them. There are a number of valuable resources for how to connect, use, and maintain solar power systems for any installation. There are also many YouTube videos on how to wire and use solar power systems, including the solar charge controllers, that can help a lot.

Some sources say you can use a solar panel without a charge controller for a short period of time, though I



The charge controller reflecting the solar panel charges the battery and runs the radio equipment. In this photo, the solar charge controller shows the battery has been charged to 12.8 V.

would strongly advise against it. Using a solar panel in that way can cause damage to the panels, charge controller, battery, or electronic equipment. For a maximum power point tracker (MPPT) charge controller system, you should always connect the positive (red) and negative (black) wires to your battery first. Then connect the solar panel leads to the solar panel.

A quick word on safety: During this process, if there is any light in the area of the solar panel, there may be a risk of shock. If you are touching, moving, or working with the solar panel, you should always wear rubber-coated gloves to avoid shock. Double-check all the connections to ensure polarity and proper component placement. You do not want to connect the solar panel to the leads for the battery because you could easily damage something expensive. Also, do not ever connect a positive lead to a negative lead.

Tests and Adjustments

When I first connected the system, the charging worked great. Provided I had no clouds and full sun, I charged all the batteries I had in one afternoon. I also charged any USB devices like cell phones, tablets, and iPads. Once I was ready to try running my equipment on it, I connected the radio equipment as a parallel connection to the battery because that's how it was done on one of the solar panel instructions. The radio worked fine, except there was a bad popcorn sound any time I tried transmitting on VHF with the solar panel

connected. Several members of my local club recommended I make some RF chokes for the circuit. I interjected several ferrite beads into the power connection wiring, and as an additional step, I wound a number of coils with four to five turns of wire. I did this for each lead into and out of the charge controller and several times on the wire leading to the solar panel. After this, there was no more popcorn noise when I transmitted on VHF FM while running the battery with the solar panel.

The solar panel is on a mounting bracket on the concrete floor of our back porch, and although the location is not ideal, it does get good sun for about 7 hours. Maintenance for the solar panel is relatively easy. Ensure that it is properly connected to the system. Occasionally, the top surface needs to be cleaned with a clean cloth, to help the panel work more efficiently. Keep in mind if there are clouds, the performance of the solar panel drastically diminishes, to the point where it may be difficult to charge or run anything on it.



Click here to see what you need to power your radio with the sun.

All photos by the author.

Chuck Dennis, W5CTD, became interested in ham radio at around 6 years old and obtained his Novice- and General-class licenses in 1970. In 1994, he upgraded to the Advanced and then Extra-class licenses. Chuck earned a BBA in accounting from Baylor University in 1980, an associate degree in electronic technology from ITT Technical Institute in 2000, and a master's degree in computer information systems from the University of Phoenix in 2003. He is now retired and lives in Plano, Texas. Chuck can be reached at charles.t.dennis@outlook.com.

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Simulated Emergency Test 2023 Results

Lessons learned in this annual nationwide practice for emergency situations.

ARRL Field Organization Supervisor Steve Ewald, WV1X

The 2023 ARRL Simulated Emergency Test (SET) encouraged all amateur radio operators to put their operating skills, training, plans of action, and equipment to the test under simulated emergency conditions and scenarios.

SET participants demonstrated their desire to improve their readiness to provide communication assistance whenever or wherever needed. They utilized cues and guidance from leaders of the Amateur Radio Emergency Service® (ARES®), the Radio Amateur Civil Emergency Service (RACES), the National Traffic System (NTS), SKY-WARN®, and many other allied Amateur Radio Service organizations and groups.

Limerick Nuclear Generating Station Drill

Public Information Coordinator Robert Alan Griffiths, NE3I

On September 26, 2023, the Limerick Generating Station (LGS) and the Montgomery County Department of Public Safety (Montco DPS) in Pennsylvania conducted their biannual drill under the evaluation of the Federal Emergency Management Agency (FEMA) and the Pennsylvania Emergency Management Agency (PEMA). Radio amateurs from Montgomery County ARES RACES (MCAR) were intensely engaged in the LGS drill. Preparations began in July, and meetings continued through August and September.

Operator availabilities and assignments were determined, and hands-on go-kit and *fldigi* practices were conducted. During the LGS drill, 31 MCAR operators were deployed to 21 different locations, including the Montco Emergency Operations Center (EOC), 19 different

municipal EOCs within the 10-mile emergency protection zone (EPZ), and a hospital outside the EPZ. MCAR currently serves in a backup and confirmation communications role for LGS drills. Amateur radio communications between the Montco EOC and the municipal EOCs were conducted via the MCAR 2-meter repeater, AA3E, on 146.835/235 MHz and the Pottstown Amateur Radio Club's 2-meter repeater, K3ZMC, on 147.210/810 MHz.

Deployed MCAR operators utilized homebrew and MCAR internal go-kits at the municipal EOCs. Montco DPS briefing information was summarized in emails to the MCAR Resource Net's control operator, who then cut and pasted the information into an Incident Command System ICS-213 *fldigi* form and sent the text messages to the municipal EOCs using the MK63-2KL mode.

PEMA Auxiliary Communications Service (ACS) Officer Travis Best, W3TMB, initiated a statewide ACS activation for the LGS drill. Utilizing the PEMA headquarters amateur radio station, KB3NIA, in Harrisburg, Pennsylvania, a net was established on 7.253 MHz. A pileup of stations from across Pennsylvania and the mid-Atlantic region immediately ensued. HF single sideband (SSB) communications were confirmed promptly between MCAR, AA3E, and PEMA's headquarters station, KB3NIA, on 7.253 MHz. Despite the onset of darkness, MCAR and the PEMA headquarters station also worked on 3.993.5 MHz. In addition to the HF SSB, VHF FM voice, and digital communications, MCAR operators within the RACES room also received a live video feed of the LGS site via MCAR's developing mesh network.

FEMA and PEMA evaluators visited the RACES room and expressed amazement at the level of activity, capability,



Chuck Farrell, W3AFV, confirms message receipt by municipal EOCs during the Montgomery County ARES RACES SET. [Robert Alan Griffiths, NE3I, photo]

and dedication of MCAR's all-volunteer group. Additionally, they expressed their recognition that When All Else Fails®, radio amateurs will fill the need for emergency communications.

Empowering Healthcare Resilience with ARES

Emergency Coordinator George B. Lampere, AB9CQ

In an increasingly interconnected world where cybersecurity threats loom, healthcare institutions face unprecedented challenges in safeguarding their critical systems and services. In this ever-evolving landscape of risks and vulnerabilities, Wisconsin ARES has emerged as a formidable force, proving that communication is not just a key to resilience but a lifeline in times of crisis.

On October 7, 2023, the nationwide SET put ARES to the test in Wisconsin. It was a response to a simulated cybersecurity alert that targeted hospitals. Cyberattacks left hospitals grappling with system-wide outages on August 27, 2023, for more than 2 weeks. Wis-

consin ARES stepped up to the plate, and the results were remarkable.

During the exercise, ARES operators were activated across many hospitals in Wisconsin to establish communication networks that proved to be the backbone of the state's emergency response efforts. One notable example was Waushara County ARES, which set up operations at ThedaCare Medical Center. Their mission was to test communication channels using voice and data, including email over the radio, and to coordinate the needs of hospitals throughout the state.

The exercise was part of the Hospital Incident Command System (HICS), a comprehensive framework designed to enhance the preparedness, response, and recovery capabilities of healthcare organizations. HICS operates in alignment with the ICS and the National Incident Command System to ensure a coordinated and effective response.

The success of the SET was not just a testament to the effectiveness of HICS but also a celebration of ARES's invaluable contributions. According to East Central District Emergency Coordinator Stan Piekarczyk, K9STN, it marked the largest participation in the East Central District in a decade, underscoring the critical role of amateur radio operators in bolstering the healthcare system's preparedness.

West Texas Uses Eclipse in SET

Section Emergency Coordinator J. David Overton, W5JDO

On October 14, 2023, at 0730 CDT, a text message was sent to participants using cell phone messaging to announce the activation and provide brief initial information. Participants were directed to listen for a net at the top of 4 hours during the day on the HF rally frequency assigned in the West Texas Section ICS-205.

The net was activated at 0800, 1100, 1400, and 1800 CDT on 7.240 MHz. The directions during the net were to connect to one of the five Winlink peer-to-peer (P2P) stations across the Sec-

tion and download the message for instructions. The instructions asked for answers to three questions:

- 1) Has the annular solar eclipse caused noticeable changes to RF propagation at your location?
- 2) Is there a noticeable increase in vehicle traffic on the main highways? If so, please identify the highway.
- 3) What is the average price of unleaded, premium, and diesel fuel in your area? Use prices from three local fuel stations.

Participants were requested to send their observations in a P2P message to a common address via Telnet Winlink or the internet.

The 1100 CDT net was held on battery power from the Cactus Patch parking lot at the Midland Army Air Field Museum located on the grounds of the Midland International Air & Space Port in Midland, Texas. The site normally has a low background-noise floor. However, during the eclipse, it was very quiet (near zero). Propagation from across Texas was extremely good, with strong, clean audio. Some stations that are heard only in the noise participated in this net, too.

The 1800 CDT net became a hotwash discussion about the experiences of the participants who checked in. The area that had some visibility of the eclipse was much wider than expected. Almost all of the exercise participants were able to see some of it. The Midland Army Air Field Museum was on the center line of the eclipse and provided an excellent location for observations. All stations experienced enhanced radio signals and propagation.

Takeaways from this exercise included observing 40 meters as currently the most useful way to communicate across the large area and diverse topography of the West Texas Section. The 40-meter band worked well for voice and digital communications. The voice net was efficient for providing initial activation information and directions. Digital communication using Winlink P2P and email (Radio Mes-

2023 SET Top Ten

Section	Points
ARES Activity	
Alabama	3,616
Ohio	2,470
Michigan	2,104
Connecticut	1,923
Eastern New York	1,223
Santa Clara Valley	1,215
Wisconsin	1,142
Southern New Jersey	1,136
Eastern Pennsylvania	1,071
Colorado	906
Section/Local Nets	
Wisconsin	3,830
Alabama	1,730
Ohio	1,212
Michigan	665
Georgia	217
New Mexico	151
NYC-Long Island	129
Eastern New York	125
Northern Florida	123
Louisiana	113

sage Server and Telnet) quickly and accurately exchanged detailed data.

Our activation exercises allow the ARES members of West Texas to practice and modify the methods of notifying and activating members who are preparing and training to use their radio skills to help families and the community of our Section.

Boone County ARES SET

Emergency Coordinator Bill McFarland, N0AXZ

The Boone County (Missouri) ARES SET on November 4, 2023, was successful. It was good to have American Red Cross volunteers and other agency personnel interacting with Boone County ARES members at shelter sites. The University Hospital communications trailer and Boone County Hospital command center were exercised. We also placed a station at the Humane Society for pet sheltering functions. We had 18 portable Winlink stations and 13 APRS-equipped vehicles deployed for the SET. All ICS-213 messages were passed to and from the EOC, where the net control station was set up. This exercise was an excellent learning experience.

ARES Activity

Area	Reporter	Points	Section Points	Area	Reporter	Points	Section Points	Area	Reporter	Points	Section Points	Area	Reporter	Points	Section Points
Atlantic Division				Mississippi				Kansas				South Carolina			
Eastern Pennsylvania				District 8				Leavenworth Co.				Charleston Co.			
Montgomery Co.	W3AFV	1,071		Warren,	KF7DLW	161		Missouri							
Maryland/DC				Claiborne Co.	W5VMS	137		Boone Co.	N0AXZ	329		Rocky Mountain Division			
Carroll Co.	WX3F	45		Okibbeha Co.	AG5ND	131		St. Charles Co.	N0PNP	177		Colorado			
Southern New Jersey				Tennessee				St. Louis	KC0QMU	153					
Section-wide				Rutherford Co.	KN4CCQ	63		New England Division				Jefferson, Clear Creek,			
with NNJ	WB2ALJ	883		Great Lakes Division				Connecticut				Gilpin Co.	N0MKV	246	
Ocean Co.	WX2NJ	176		Michigan				Section-wide #1	K1XFC	697		Douglas,			
Camden Co.	WB9ULP	77						Section-wide #2	K1XFC	687		Elbert Co.	K8ZTT	194	
Western Pennsylvania				Monroe Co.	KE8BYC	836		Region 5	W1QH	189		Adams-Arapahoe			
Beaver Co.	N3EJL	245		Saginaw Co.	KC8YVF	411		Newtown	KB1LYP	169		Co. #1	KD0UFO	172	
Erie Co.	WX3E	210		Wayne Co.	KD8ZSK	180		Winchester	KA1WPM	69		Pueblo, Huerfano	WB0YKO	148	
Centre Co.	K3CWP	168		Upper Peninsula	N8NAV	160		Brookfield	W1QK	59		Co.			
Washington Co.	N3WS	150		Ogemaw Co.	W8COP	158		New Milford	KC1EEQ	53		Region 3,			
Westmoreland Co.	KA3UTD	131		Midland Co.	K8GTG	150		Maine				District 3	N0FON	76	
Western New York				Tuscola Co.	WJ8V	140		Cumberland Co.	KB1HNZ	236		Park Co.	AA0BF	70	
Ontario Co.	KC2DKP	177		Gratiot Co.	NO8V	69		Washington Co.	N1EP	173		New Mexico			
Monroe Co.	N2JAC	145		Ohio				New Hampshire				Bernalillo Co.	KC5RUO	131	
Erie Co.	N2JRS	125						Capital Area #1	K1CFI	140		Southeastern Division			
Central Division				Licking Co.	N8CJ	546		Capital Area #2	K1CFI	21		Alabama			
Indiana				Mahoning	WB8YHD	322		Capital Area #3	K1CFI	19		Jefferson Co.	WX4HAM	980	
District 1	AC9EB	189		Cuyahoga Co.	K8CVM	243		Northwestern Division				Madison Co.	KK5H	738	
Marion	W9SOX	131		District 9	AA8BN	225		Eastern Washington				Shelby Co.	KN4DLV	657	
Wisconsin				Montgomery Co.	KA5RUC	199		District 7	KG7NCS	187		Lauderdale Co.	KE4QID	556	
Eau Claire Co.	K9NY	335		Coshocton Co.	AA8BN	165		Yakima	KA7LJQ	132		Walker Co.	K4TGE	389	
Dunn Co.	KB9MMT	166		Guernsey Co.	WD8SDH	160		Western Washington				Colbert, Franklin			
East Central	AC9F	155		Miami Co.	WB8PMG	156		Pacific Co.	N7CVW	488		Co. #1	KE4QID	265	
Washington Co. #1	WT9Q	151		Jefferson Co. #1	W8PAB	148		Grays Harbor Co.	N7UJK	178		Co. #2	KE4QID	31	
Portage Co.	KC9YLK	126		Jefferson Co. #2	W8PAB	138		Clark Co.	AE7GQ	125		Georgia			
Sheboygan Co.	K9XB	110		Hocking Co.	KB8OTU	101		Pacific Division				Cherokee Co. #1	W1JKU	210	
Manitowoc Co.	W9AH	96		Ashtabula Co.	W8DEC	67		Nevada				Whitfield Co.	K4HYJ	131	
Wauashara Co.	AB9CQ	92		Hudson Division				Lyon Co.	KE7JIV	185		Floyd Co.	N4RMG	128	
Outagamie	KD7VBG	85		Eastern New York				Santa Clara Valley				Cherokee Co. #2	W1JKU	100	
Door Co.	K9HAH	64		Orange	KC2VTJ	486		Santa Clara Co. #1	K6OTT	301		Gilmer Co.	KO4FLA	61	
Fondulac Co.	KX9B	44		Warren,				San Benito Co.	W6TST	203		Camden Co.	K1JHH	55	
Washington Co. #2	WT9Q	18		Washington Co.	N1NDN	235		San Mateo Co.	K16FAO	201		NW District 1	WB4LCW	43	
Dakota Division				Saratoga Co.	W2EMS	166		Santa Clara Co. #2	K6OTT	191		Southern Florida			
Minnesota				Rensselaer Co.	WO2H	138		Santa Clara Co. #3	K6OTT	186		Brevard Co.	K4JTT	82	
Metro District	W3QLC	162		Columbia	WA2KLP	100		City of Cupertino	KN6PE	133		West Gulf Division			
Carlton Co.	KC0AFE	119		Schenectady Co.	KB2WZT	98		Roanoke Division				North Texas			
Delta Division				Northern New Jersey				Virginia				District 1	WC9J	709	
Arkansas				Clinton Co.	KD2RJP	209		Chesterfield Co.	KN4LQN	116		South Texas			
Cross Co.	W5ARS	151		Monmouth Co.	KA2IRQ	116		Fauquier Co. #1	KD6AKC	116		Walker Co.	KB5DTS	117	
Louisiana				New York City-Long Island				Fauquier Co. #2	KD6AKC	108		West Texas			
St. Tammany				Suffolk Co.	W2HCB	254		Fauquier Co. #3	KD6AKC	101		Section-wide	W5JDO	565	
Parish	KG5CEN	205		Town of Babylon	W2HCB	232		Fauquier Co. #4	KD6AKC	33					
				Midwest Division											
				Iowa											
				Dallas Co.	K0WOI	153									
				Dubuque,											
				Jackson Co.	W9UPK	96									

Section/Local Nets

Area/Net Name	Net Mgr	Points	Section Points	Area/Net Name	Net Mgr	Points	Section Points	Area/Net Name	Net Mgr	Points	Section Points	Area/Net Name	Net Mgr	Points	Section Points
Atlantic Division				Delta Division				Hudson Division				Rocky Mountain Division			
Eastern Pennsylvania				Arkansas				Eastern New York				Colorado			
Limerick	N3FKR	100		Cross Co.	W5ARS	82		W2WCR	KA5VVI	107		Montrose ARC	K10KY	62	
Maryland-DC				Louisiana				Rensselaer Co.	W02H	18		New Mexico			
Cecil Co. #1	KC3NZY	30		Ascension	K5ROP	84		New York City-Long Island				BCARES	KC5RUO	151	
Cecil Co. #2	KC3NZY	28		Pearl River Co.	KG5CEN	29		Suffolk Co.	W2HCB	93		Southeastern Division			
Western New York				Great Lakes Division				Town of Babylon	W2HCB	36		Alabama			
Ontario Co.	WB2VMR	77		Kentucky				Midwest Division				Jefferson Co.	WX4HAM	725	
Western Pennsylvania				JCSA	WX4SAR	59		Kansas				Madison Co.	KM4CJ	288	
WACOM	K3SEM	55		Michigan				Kansas Sideband	K0RCJ	86		Central AL Simplex	W4IGK	235	
Central Division				Monroe Co.	KE8BYC	263		Missouri				Walker Co.	K4GTE	195	
Wisconsin				Saginaw Valley	KC8YVF	231		St. Louis Metro	KC0QMU	53		Lauderdale Co.	KE4QID	132	
Dunn Co.	KC9FXE	3,361		Midland Co.	K8GTG	95		Pacific Division				KE4QID	KE4QID	124	
Badger Emergency	NX9K	235		Ogemaw Co.	W8COP	76		Santa Clara Valley				W9RES	W9AH	31	
Eau Claire Co.	K9NY	168		Ohio				SC4ARES	K16FAO	100		Georgia			
Wild Rose Hospital	AB9CQ	29		Licking Co.	N8CJ	439		Northern Florida				Cherokee Co.	WA4EOC	160	
ARES/RACES	ND0L	20		OSSBN	KC8WH	330		Central Florida				Gilmer Co.	KO4FLA	57	
Door Co.	K9HAH	17		Mahoning Co.	WB8YHD	202		SKYWARN	KO4HXV	123					
				District 9	AA8BN	119									
				N8CUY	KB8VXE	74									
				Coshocton Co.	AA8BN	45									
				Franklin Co.	KE8SVT	3									

Happenings

MFJ Enterprises Ceases On-Site Production

MFJ Enterprises, Inc., founder Martin F. Jue, K5FLU, announced that as of May 17, 2024, the company ceased on-site production at their Starkville, Mississippi, facility. Ameritron, Hy-Gain, Cushcraft, Mirage, and Vecronics products have been affected by the shutdown.

In a letter posted to social media, Jue said he was looking forward to retiring:

Times have changed since I started this business 52 years ago. Our product line grew and grew and prospered. COVID-19 changed everything [for] businesses, including ours. It was the hardest hit that we have ever had, and we never fully recovered.

I turned 80 this year. I had never really considered retirement, but life is so short, and my time with my family is so precious.

Jue founded MFJ Enterprises in 1972, after he built a CW filter kit that sold for less than \$10. Since 1990, the company has acquired several other legacy brands within the amateur radio market. Jue shared that the company will remain open to sell existing inventory because they have “a lot of stock on hand.” They will also continue to offer repair services for the foreseeable future.

Jue expressed gratitude to the many longtime employees of MFJ, some of whom have been with the company for 40 years. He also thanked MFJ dealers and radio amateurs for their patronage over the decades. He sent a special message to ARRL members and loyal QST readers:

I give my deepest heartfelt thank-you to my fellow hams all over the world, and especially to ARRL members and QST readers. In my youth, I was given a second-hand set of 1958 [issues of] QST. I read them over and over, until I practically memorized every word. This gave seed to MFJ.

MFJ became a worldwide ham radio leader only because of you. As I turned 80, I cannot thank you all enough for 52 wonderful ham radio years.



MFJ

*Thank you, 73s...
Martin F. Jue, K5FLU*

ARRL Learning Center Features Two New Emergency Communication Training Courses

ARRL has released two new courses to train emergency communications (EmComm) operators for volunteering within the Amateur Radio Emergency Service® (ARES®). Both courses are within the ARRL Learning Center.

The Basic EmComm course is designed to get a new volunteer started. It provides basic knowledge and tools for any EmComm volunteer, and it contains three modules and 11 topics, including required prerequisites. It's expected to take approximately 10 – 20 hours to complete.

The Intermediate EmComm course builds on the lessons learned in the first course. It equips volunteer radio amateurs with the tools needed to

thrive in the fast-paced environment of public service communications and to understand the legal rights and responsibilities of working with a served agency. It also teaches them about how ham radio fits into the broader incident command structure.

The new courses replace the previous EC-001 and EC-016 programs. However, certificates of completion earned for the previous courses are still valid. “Training is not a one-and-done thing. Throughout my fire-fighting and emergency management career, we were constantly taking new courses to reinforce existing knowledge and introduce new concepts,” said ARRL Director of Emergency

Management Josh Johnston, KE5MHV. “Engaged volunteers should want to stay up to date on advances in the science of [EmComm]. I'd even encourage veteran operators to take the new courses.”

In 2023, the Federal Emergency Management Agency (FEMA) revised the National Incident Management System Information and Communications Technology Functional Guidance to specifically include amateur radio. ARRL and FEMA entered a new Memorandum of Understanding in May 2023 that outlined the importance of trained radio amateurs within the response ecosystem.



"Amateur radio is as important as ever in emergency management," said Johnston. "The new courses will keep hams trained to serve effectively."

The ARRL Learning Center (<https://learn.arrl.org>) is a member benefit and features many ways to get the most out of your amateur radio license. The Basic and Intermediate EmComm courses are available to anyone with

an ARRL account (www.arrl.org). Users must log in to the ARRL Learning Center with this account. Site functionality relies on cookies being enabled.

Amateur Radio Provided Communications Support for 2024 Boston Marathon

On April 15, 2024, ham radio operators provided communications for the 128th running of the Boston Marathon. More than 280 radio amateurs participated in the event. The marathon is one of the largest events for which hams provide communications support.

It drew volunteers from many different places. District Emergency Coordinator for the ARRL Eastern Massachusetts Section Rob Macedo, KD1CY, wrote:

Operators are volunteering across Start, Course, Finish, Transportation, and various operations centers, including the Massachusetts Emergency Management Agency, State Emergency Operations Center Unified Command Center, and the Boston Athletic Association (BAA) Race Operations Center in Boston. They are performing communications duties that include logistics support as a primary function, and backup support for medical and other public safety requests for the race as needed.

Amateur radio operator volunteers support the BAA, the American Red Cross, and other agencies surrounding the event, according to Macedo.



Amateur radio operators serving in the Unified Command Center for the 128th running of the Boston Marathon. [Nancy Austin, KC1NEK, photo]

ARRL Volunteers Obtain Ham Exemption to Pennsylvania Hands-Free Law

Member-volunteers of ARRL in Pennsylvania have successfully protected the legal right to use amateur radio while operating mobile within the state. A hands-free distracted driving bill had worked its way through the legislature over the past several years, and Director of the ARRL Atlantic Division Bob Famiglio, K3RF, successfully advocated for an exemption license for licensed radio amateurs. "The bill survived until just before the latest vote, which stripped out our exemption but left in exemptions for commercial drivers, including truck drivers, bus drivers, and public transportation [drivers]," he wrote in a mes-

sage to ARRL members in Pennsylvania.

In April, the exemption was stripped from the bill, sending Pennsylvania hams into a state of worry. ARRL members in the state rallied, contacting their state legislators to explain the benefit that licensed operators provide to the state. The bill was also going to remove the ability for first responders, such as volunteer firefighters, to use radios in their personally owned vehicles. "Hundreds of emails went out to legislators and such and back to me. We also helped our volunteer emergency responders, who were in the same boat as us, with radio use

from their personal cars. Many members are emergency responders as well, and they picked up on this, too," said Famiglio.

The Pennsylvania House of Representatives subsequently voted in favor of accepting the bill with the exemption. The Senate passed it last summer. As of press time, the bill is now on its way to Pennsylvania Governor Josh Shapiro's desk, where he is expected to sign it. Mobile use of amateur radio will continue in Pennsylvania, thanks to ARRL advocacy and government relations carried out by member-volunteers.

CQ Magazine Publisher Dick Ross, K2MGA, Silent Key

Longtime amateur radio publisher Dick Ross, K2MGA, has become a Silent Key. He passed away on April 27, 2024.

In 1960, Ross started working for Cowan Publishing Company, and quickly became Associate Editor for *CQ*. In 1964, he was promoted to editor of *CQ*, when Cowan Publishing moved its offices to Long Island, New York. As Ross became more involved with the business side of the magazine, he was elevated to Vice President/General Manager of the company in 1976. In this role, he was responsible for all fiscal matters and publishing operations for five publications.

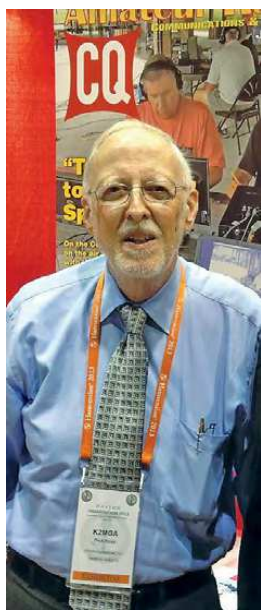
His colleagues respected him greatly. *CQ* Editorial Director Rich Moseson, W2VU, said:

Dick was a friend as well as my boss, and we saw eye-to-eye on most things regarding amateur radio. Dick was a leader in the ham radio industry for decades and an innovator in ham radio publishing. He also built the *CQ* brand into worldwide leadership in many aspects of the radio hobby, particularly contesting and DXing.

Ross had been Publisher of *CQ* magazine since 1979. As President of CQ Communications, Inc., he was also publisher of multiple magazine titles, including *Popular Communications*, *CQ VHF*, *CQ Contest*, *World-Radio*, *Communications Quarterly*, *CB Radio Magazine*, *Electronic Servicing & Technology*, *Modern Electronics*, *MicroComputer Journal*, and *Music and Computer Educator*. In addition, Ross oversaw the production and publication of *CQ* Communications books and calendars, the *CQ* Video Library, and more.

Ross was given the Dayton Hamvention® 2010 Special Achievement Award for his work on *CQ* (www.arrl.org/news/dayton-hamvention-announces-2010-award-winners).

"I will greatly miss his ideas, his insights, and his friendship. His passing is a great loss for our hobby," added Moseson. Ross is survived by his wife Cathy, daughters Kate and Jennifer and their husbands, and five grandchildren. As of press time, a memorial service will be scheduled at a future date.



CQ Publisher Dick Ross, K2MGA (SK). [Rich Moseson, W2VU, photo]

Section Manager Nomination Notice

To all ARRL members in Eastern Massachusetts, Missouri, Nebraska, NYC-Long Island, Northern New York, South Carolina, Southern New Jersey, West Central Florida, and Western Pennsylvania. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 16 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the Sections concerned. It is advisable to have a few more than five signatures on each petition. A sample nomination form is available on the ARRL website at www.arrl.org/section-terms-nomination-information. Nominating petitions may be made by facsimile or electronic transmission of images, provided that upon request by the Field Services Manager, the original documents are received by the manager within 7 days of the request. It is acceptable to submit signatures that have been sent via email or mail under the following guidelines: The petition copies must be made from the original form supplied by ARRL or downloaded from the ARRL website. The form must be exactly the same on both sides (i.e., autobiographical information should appear exactly the same on all copies). All forms/copies must be submitted together.

Candidates may use any of the available electronic signature platforms such as DocuSign, Dropbox Sign, and Signed PDF. Candidates who use an electronic signature platform to be nominated, as described above, do not have to send the original paper copies of the nominating documents. The packet that is sent to ARRL Headquarters must be complete. Multiple files or emails for a single petition will not be accepted.

We suggest the following format:

(Place and Date)

Field Services Manager, ARRL
225 Main St.
Newington, CT 06111

We, the undersigned full members of the _____ ARRL Section of the _____ Division, hereby nominate _____ as candidate for Section Manager of this Section for the next 2-year term of office.

(Signature _____ Call Sign _____ City _____ ZIP _____)

Any candidate for the office of Section Manager must be a resident of the Section, an amateur radio licensee of Technician class or higher, and a full member of ARRL for a continuous term of at least 2 years immediately preceding receipt of a nominating petition. Petitions must be received at Headquarters by 4:00 PM Eastern Time on September 6, 2024. If more than one member is nominated in a single Section, ballots will be mailed from Headquarters no later than October 1, 2024, to full members of record as of September 6, 2024, which is the closing date for nominations. Returns will be counted November 19, 2024. Section Managers elected as a result of the above procedure will take office January 1, 2025.

If only one valid petition is received from a Section, that nominee shall be declared elected without opposition for a 2-year term beginning January 1, 2025. If no petitions are received from a Section by the specified closing date, such Section will be resolicited in the January issue of *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. A Section Manager vacancy occurring between elections is filled through appointment by the Field Services Manager. — Mike Walters, W8ZY, Field Services Manager

Call for Nominations for ARRL Director and Vice Director

Attention: Full ARRL members in the Central, Hudson, New England, Northwestern, and Roanoke Divisions. You have the opportunity to choose a Director and Vice Director to represent you for a 3-year term beginning January 1, 2025.

ARRL is governed by its Board of Directors. A voting Director is chosen by ballot by the full (licensed) ARRL members in each of its 15 Divisions. Vice Directors who serve in the absence of the Director at a Board meeting and succeed to the position of Director should a vacancy occur are chosen at the same time. Elections are held in five Divisions per year. It takes only 10 full members in a Division to nominate a candidate for either office.

Qualifications

The eligibility of nominees for the positions of ARRL Director and Vice Director will be reviewed by the Ethics & Elections Committee, composed of three Directors not subject to election this year: Mickey Baker, N4MB; Jeff Ryan, KØRM, and Scott Yonally, N8SY. A nominee must be at least 21 years old and must have been licensed and a full member of ARRL for a continuous term of at least 4 years immediately preceding nomination. Each nominee must provide information concerning their employment, ownership, investment interests, and other financial arrangements to ensure compliance with the Conflict of Interest Policy (see Article 12 of the ARRL *Articles of Association and Bylaws* 18 – 24), available at www.arrl.org/general-information. The qualifications for Director and Vice Director are identical. All the powers of the Director are transferred to the Vice Director in the event of the Director's resignation, recall, removal outside the Division, inability to serve, or death.

Nomination Procedure

Step 1: Obtain official nominating petition forms. Starting July 1, any full member residing in a Division where there is an election may request an official nominating petition package in writing, either by letter or via email, to

execadmin@arrl.org. The request must reach the ARRL Secretary *no later than noon EDT on Friday, August 9, 2024*. If you are seriously considering running or nominating someone to run, please don't wait until the last minute to request the forms; the deadline for submitting a completed petition form is just 1 week later.

Step 2: Complete the questionnaire and obtain signatures. Only the official form may be used. The candidate must complete page one, providing the information required to determine eligibility, certifying its accuracy, and agreeing to assume the office if elected. To be valid, a nominating petition must name the candidate and must bear the signatures of 10 full members of the Division.

Step 3: Submit the petition form. The completed form must reach the Secretary *no later than noon EDT on Friday, August 16, 2024*. The submission may be made by electronic transmission of images (i.e., a PDF or JPEG attachment to an email) or facsimile provided that upon request, the original documents are received by the Secretary within 7 days of the request. A person who is nominated for both Director and Vice Director may choose to decline the nomination for Director; otherwise, the nomination for Director will stand and that for Vice Director will be void.

On Monday, August 19, 2024, the Secretary will notify each candidate of the name and call sign of each other candidate for the same office. Candidates will then have until Friday, August 30, 2024, to submit a 300-word statement and a photograph if they desire those to be made available to voters in accordance with instructions that will be supplied.

Balloting

If there is only one eligible candidate for an office, he or she will be declared elected by the Ethics & Elections Committee. If there is more than one eligible candidate for an office, the full members in that Division who are in good standing as of September 10,

2024, will have the opportunity to cast ballots. Official voting documents will be mailed to members who are eligible to vote no later than October 1, 2024. Votes must be electronically cast, or completed paper ballots must be received at the designated PO Box in the envelope provided, by noon Eastern Time on Friday, November 15, 2024. The candidate receiving the most votes will be declared the winner that day.

Absentee Ballots

A full member who is residing temporarily outside his or her home Division, including overseas, may arrange to vote in the home Division by notifying the Secretary before September 6, 2024, giving their current mailing address as reflected in the ARRL membership records (i.e., QST mailing address) and the reason that another Division is considered home. Members with overseas military addresses should take special note of this provision; in the absence of information received to the contrary, ballots will be sent to them based on their postal addresses.

The Incumbents

The incumbent Directors and Vice Directors, respectively, in the five Divisions in which elections will be held this year are:

Central: Carl Luetzelschwab, K9LA, Director, and Brent Walls, N9BA, Vice Director

Hudson: Nomar Vizcarrondo, NP4H, Director, and Ed Wilson, N2XDD, Vice Director

New England: Fred Kemmerer, AB1OC, Director, and Phil Temples, K9HI, Vice Director

Northwestern: Mark J. Tharp, KB7HDX, Director, and Michael Sterba, KG7HQ, Vice Director

Roanoke: Jim Boehner, N2ZZ, Director, and Bill Morine, N2COP, Vice Director

For the Board of Directors:
David A. Minster, NA2AA, Secretary/
Chief Executive Officer

Public Service

AUXCOMM Requirements, ICS Structural Changes, and More

The state of Florida now requires all deployable volunteers to complete their auxiliary communications (AUXCOMM) course and Auxiliary Communicator (AUXC) Position Task Book (PTB), according to Statewide Interoperability Coordinator (SWIC) for the Florida Department of Emergency Management (FDEM) Roger Lord. This past February, 20 students attended the AUXCOMM training course, taught by a panel of three instructors at a public safety facility in Orlando; all of them passed the rigorous and demanding program. This past year, six candidates had their AUXC PTB signed off on. Volunteer radio amateurs who serve the FDEM state emergency operations center (EOC) must have this training.

The AUXC state recognition process starts with individuals who have completed the 20-hour AUXCOMM course. Sign-off of the AUXC PTB can be initiated by a representative of a local served agency, such as a Communications Unit Leader (COML), a Logistics Chief, an EOC Emergency Manager, a state-approved Exercise Evaluator, or the SWIC. The incident manager serves as an individual evaluator who observes and signs off on specific tasks during an exercise or real-life incident. The SWIC approves any exercises of which PTB tasks are being evaluated for sign-off in advance.

Once an applicant completes their PTB, the application packet is sent to Florida statewide AUXCOMM Coordinator David Byrum, KA4EBX. Byrum submits the PTB for review and final approval by the Florida Department of Emergency Management and the SWIC.

AUXC regional coordinators know of events and exercise opportunities for completing the tasks required for recognition, and they are also good resources for mentoring and answering questions. The state of Florida recognizes the US Department of Homeland Security (DHS) PTB. Other organization position task books — such as the Amateur Radio Emergency Service® (ARES®) PTB — are not recognized as AUXCOMM training.

The most current version of the AUXC PTB is available at <https://floridaemergency.net/wp-content/uploads/2022/09/AUXC-PTB-508-Jan22-FINAL-APPROVED15954.pdf>. The state of Florida currently has four AUXCOMM instructors. Byrum reported that another AUXCOMM course will be offered later this year in the southern part of the state.



Rick Palm's, K1CE, SERT TRAC account web page. [Rick Palm, K1CE, image]

Communications Systems

Under the Florida requirements, the state EOC is the primary served entity. Primary communications systems include SARnet (a 70-centimeter FM repeater network that links Florida counties statewide), the ShakeAlert® earthquake early warning system, and Winlink Global Radio Email. Two AUXCOMM deployments occurred in 2023: one was during Hurricane Idalia, and another was for a spate of tornadoes when the radio room at the state EOC in Tallahassee needed assistance.

Justin Watters from the DHS's Cybersecurity and Infrastructure Security Agency (CISA) reported that the agency has been working to update the COML and AUXCOMM courses and that Florida currently has the strongest AUXCOMM program in the country. If Florida AUXCOMM operators are deployed to other states, they're required to have passed the course and have their AUXCOMM task books signed off on by the Florida SWIC.

Lord explained that the FDEM's State Emergency Response Team (SERT) Training Resources and Activity Center (TRAC) program was primarily created as a calendar and registration tool, but that many additional needs were identified and added, such as tracking attendance for and the completion of courses; the issuance, uploading, and archiving of course completion certificates; the use of career path tools, and other features. For example, radio

amateurs wishing to deploy must register their primary, required Federal Emergency Management Agency (FEMA) independent study (IS) courses (the now-ubiquitous IS-100, -200, -700, and -800 courses) that are available online at the SERT TRAC repository.

AUXC PTBs now take about a year to complete (there should be a record of participation in multiple events and incidents, with multiple checkoffs by different evaluators). "Completed and signed task books give the volunteer credibility," said Lord. Incident Command System (ICS) Incident Personnel Performance Rating (ICS 225) forms also may be required. He said that applicants should be sponsored by an agency and sign-offs should be completed by agency officials. Now, even professional emergency management communicators are taking the AUXCOMM course.

ICS Updates

In the ICS structure, the Communications Unit is now under the Information and Communications Technology (ICT) Branch of the Logistics Section. This change consolidates ICT services within one branch of the Logistics Section, while designating the delivery of services as interoperable communications, IT, or cybersecurity services. There are potentially three units within the ICT Branch: The Communications Unit oversees the delivery of interoperable communications, including the management of radio and telephone equipment. The IT Service Unit delivers data services, including managing the Unified Help Desk and securing data network systems. And the Cybersecurity Unit identifies cybersecurity risks and vulnerabilities and assesses threats to the ICT infrastructure and the incident management organization.

In other updates, the 2024 *Florida Field Operations Guide (FOG)* has been published and should be available online soon. The national-level *Auxiliary Field Operations Guide (AUXFOG)* and *National Interoperability Field Operations*



Rick Palm, K1CE (left), and ARRL Director of Emergency Management Josh Johnston, KE5MHV (right), received certificates of appreciation for the Amateur Radio Hurricane Communications Workshop at the 2024 National Hurricane Conference. [Josh Johnston, KE5MHV, photo]

Guide (NIFOG) are other valuable resources and are available online at www.cisa.gov/safe-com/field-operations-guides.

ARRL Represented at National Hurricane Conference

ARRL Director of Emergency Management Josh Johnston, KE5MHV, gave a presentation during the amateur radio workshop at the National Hurricane Conference this past March, ahead of what has been predicted to be a busy hurricane season. He spoke about ARRL's role on the board of SAFECOM, a program managed by CISA that sets the standards of interoperability procedures. Being part of the group solidifies the Amateur Radio Service as a robust resource before and during times of crisis.

Johnston shared that in 2023, ARES volunteers contributed at least \$21.8 million in volunteer hours to their local communities. "Is amateur radio still relevant? Absolutely! Are we still involved in the places that are doing things the right way? Amateur radio absolutely is," he said.

Johnston highlighted the relationship between ARRL and FEMA, as well as ARRL's position as a net control station within the SHARED RESOURCES (SHARES) High Frequency Radio program managed by CISA.

ARRL EmComm Training Courses Refresh

Johnston reported that ARRL is discontinuing its emergency communications training courses EC-001 and EC-016, stating, "We launched the new basic EmComm course in mid-April, as well as a new intermediate EmComm course. An advanced course will be released by the end of June." He also shared that ARRL will be releasing an ARES leadership course in the near future. The updated courses will be enhanced by the release of an ARES PTB update as well. "Upgrading and refreshing our course offerings is important to keep the training relevant and in tune with current EmComm topics and tasks," Johnston said.

Exam Info

ARRL VEC Celebrates 4 Decades of Service to the Amateur Radio Community

A look back at 40 years of vital volunteerism, and a look ahead to important changes in our program.

ARRL VEC Program's History

July 21, 2024, will mark the 40th anniversary of the inception of the ARRL Volunteer Examiner Coordinator (VEC). Our program has a long-standing tradition of serving the amateur radio community and the Federal Communications Commission (FCC) with integrity and expertise. The ARRL VEC program is nationally and globally known as a great contributor to the amateur radio community and a symbol of excellence.

On July 21, 1984, ARRL and the FCC signed the VEC Memorandum of Agreement at the ARRL National Convention in New York City. The agreement officially authorized ARRL to accredit Volunteer Examiners (VEs) and coordinate exam sessions. The first ARRL VEC exam session was held soon thereafter, on September 2, 1984, at the ARRL Pacific Division Convention in California.

To give you an idea of what the ARRL VEC and our VEs have accomplished, here are some statistics: In the first 40 years, we have accredited more than 81,000 licensees as VEs. These VEs have conducted more than 183,000 test sessions. At these sessions, approximately 1.1 million individuals have taken 1.4 million examinations.



ARRL VEC Program's Future

The role and importance of the VEC system have not diminished over the years; most hams today never had the experience of sitting for an exam in front of an FCC official at an FCC field office. The VEC exam sessions provided are far more convenient and plentiful than any FCC-commissioned examinations. VE teams can administer exams online at any time or in person at any location according to local needs.

Today, our VEC program is more than just amateur radio examinations. We also serve the FCC and support the amateur radio community in many functions. We are special event call sign coordinators, club call sign administrators, question pool writers, and a knowledgeable information source for a wide range of licensing matters.

2024 will be the last year that the ARRL VEC will create, print, and ship new examination booklets (for the ever-changing question pools). This will move us one step closer to our complete digital transformation. VE teams using paper tests will need to transition to the online exam platform in 2025. Shifting teams to this system will reduce VEC printing, storage, shredding, and shipping (both to and from the team).

We hope our VEs are willing to take on this endeavor with us as we continue to move toward electronic testing, as it is vital to the amateur radio community. We will be here every step of the way to ensure a smooth transition as we remain committed to offering quality programs and services, providing a superior experience for our customers and potential customers, and demonstrating our capabilities and value to the public.

These strategies will help our program remain strong and active in the amateur radio community. Our commitment to delivering a fast, easy, and affordable solution allows teams to speed up FCC license grants for customers. Hopefully, this will give us the traction to grow the amateur radio community more than ever.

Stronger results will be attained by meeting our VE teams' and examinees' expectations, being less dependent on the US Postal Service and paper filings, and achieving higher customer satisfaction due to the shorter wait times for license issuance.

The COVID-19 pandemic served as a catalyst to accelerate changes that were already under way. We know that we must keep an eye on our future and new technology, and we must be poised to thrive in the electronic testing world.

We recognize the need to create a better digital experience for our

customers and members, and we are committed to providing an honest, reliable examination system. Overall, we are proud to serve the community. We've accomplished so much in the past 40 years, and continuing to move forward will protect amateur radio for future generations.

Proud to Serve the Amateur Radio Community — A Message from AB1FM

I began working for ARRL in 1985, shortly after the VEC launch. It still amazes me, after all these years, how important the VEC program is to amateur radio and how well it works. The VE system has made a truly positive difference in our community's growth and future.

I would like to thank our VEs for playing an important role in the success of the ARRL VEC program and amateur radio, as I believe our contributions are rewarding and that our impact is significant.

I have proudly served the community for the past 39 years and enjoy working with our volunteers. You have truly shown me what volunteering is all about. ARRL VEs generously devote their time, energy, and skills, and are invaluable to our community. I thank them for all of their efforts.

It's fun to reminisce about the past — to see how far we've come and how much we've accomplished. However, it's essential to think about and plan for our future.

I look forward to continuing to serve you wherever your examining takes you, and I hope we can continue working together for the good of amateur radio. — *73, Maria Somma, AB1FM*

ARRL VEC Manager
(19 years of service)

VEC employee
(39 years of service)

NCVEC Vice Chairman
(9 years of service)

NCVEC Question Pool Committee member
(7 years of service)

New Amateur Extra Question Pool Takes Effect July 1

On July 1, 2024, a new Element 4 Amateur Extra-class question pool will take effect for examinations. VECs and VEs will have new test designs available that must be used at exam sessions, effective on that date.

The newly revised pool, released in December 2023 by the Question Pool Committee of the National Conference of Volunteer Examiner Coordinators (NCVEC), must be used starting July 1. There are 10 graphics required for this pool. To view all three question pools, visit the NCVEC website at www.ncvec.org.

Write for QST

The membership journal of ARRL is always open to manuscript submissions from ham radio operators.

QST looks for material that appeals to a broad cross-section of readers within the diverse amateur radio community. Feature articles published in *QST* fall into one of two broad categories: *technical* and *general interest*.

Technical articles outline a construction project or a technical concept. General interest articles are “everything else” that’s not technical: recaps of DXpeditions, grid expeditions, or public service activities, or personal accounts of trying a new mode or style of operating — anything relating to operating or the ham radio avocation.

Whether your manuscript has a technical or general focus, a strong “how-to” component will make it stand

out. Readers should come away from the article with specific ideas for recreating your experience.

General interest submissions should be in the range of 1,200 – 1,800 words, with 3 – 5 high-resolution images. Technical article submissions may be longer and include more images, as the subject matter requires (for example, if there are step-by-step instructions for a build project). Please submit images as separate attachments (rather than embedded in your manuscript), and include caption information for all images at the end of your manuscript. Send all manuscripts, with images, to qst@arrl.org.

For even more information on what *QST* is looking for, and further details on how to submit manuscripts, see our Author Guide at www.arrl.org/qst-author-guide.

Contest Corral

July 2024

Check for updates and a downloadable PDF version online at www.arrrl.org/contest-calendar.

Refer to the contest websites for full rules, scoring information, operating periods or time limits, and log submission information.

Start - Finish		Date-Time	Date-Time	Bands	Contest Name	Mode	Exchange	Sponsor's Website
Date-Time	Date-Time							
1	0000	1	2359	1.8-28, 50,144	RAC Canada Day Contest	CW Ph	RS(T), VE prov/terr or serial	www.rac.ca
1	1900	1	2030	3.5	RSGB 80m Club Championship, CW	CW	RST, serial	www.rsgbcc.org
2	0000	2	0200	3.5-28	ARS Spartan Sprint	CW	RST, SPC, pwr	arsqrp.blogspot.com
2	0100	2	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM-YL-youth YL-youth)	wwsac.com/rules.html
2	0800	2	0859	3.5	ZL Sprint	CW Ph	RS(T), outside temp (C)	www.nzart.org.nz
3	1700	3	2100	144	VHF-UHF FT8 Activity Contest	FT8	4-char grid	www.ft8activity.eu
4	0000	5	0300	7	Walk for the Bacon QRP Contest	CW	RST, SPC, name, mbr or pwr; 13 WPM max	qrpcontest.com/pigwalk40
4	1800	4	2200	28	NRAU 10m Activity Contest	CW Ph Dig	RS(T), 6-char grid	nrau.net
4	2000	4	2200	1.8-28,50	SKCC Sprint Europe	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
5	0145	5	0215	3.5-28	Weekly RTTY Test	Dig	Name, SPC	radiosport.world/wrt.html
6	0000	6	2359	1.8-28	Venezuelan Independence Day Contest	CW Ph Dig	RS(T), serial	radioclubvenezolano.org
6	0800	7	1100	3.5	NZART Memorial Contest	CW Ph	RS(T), serial	www.nzart.org.nz
6	1200	7	1200	50,144, 432	TA VHF/UHF Contest	CW Ph	RS(T), serial, 6-char grid	trac.org.tr
6	1400	7	1400	1.8-28	Marconi Memorial HF Contest	CW	RST, serial	www.arifano.it
6	1500	7	1500	3.5-14	Original QRP Contest	CW Ph	RST, serial, pwr	www.qrpcc.de
6	2000	7	2000	7	PODXS 070 Club 40m Firecracker Sprint	Dig	RST, SPC	www.podxs070.com
9	0100	9	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM-YL-youth YL-youth)	wwsac.com/rules.html
9	1800	9	1929	3.5,7	DARC RTTY Sprint	Dig	RST, (DOK/"NM") or serial	www.darc.de
10	1700	10	2100	432	VHF-UHF FT8 Activity Contest	FT8	4-char grid	www.ft8activity.eu
10	1900	10	2030	3.5	RSGB 80m Club Championship, SSB	Ph	RS, serial	www.rsgbcc.org
12	0145	12	0215	3.5-28	Weekly RTTY Test	Dig	Name, SPC	radiosport.world/wrt.html
13	1200	14	1200	1.8-28	IARU HF World Championship	CW Ph	RS(T), IARU HQ soc or ITU zone	www.arrrl.org/iaru-hf-world-championship
13	1200	14	2359	1.8-28,50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
14	2000	14	2300	1.8-28	QRP ARCI Summer Homebrew Sprint	CW	RST, SPC, mbr or pwr	qrparci.org
15	0000	15	0200	1.8-28	4 States QRP Group Second Sunday Sprint	CW Ph	RS(T), SPC, mbr or pwr	www.4sqrp.com
15	1900	15	2030	3.5-28	RSGB FT4 Contest	FT4	Signal report	www.rsgbcc.org
16	0100	16	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM-YL-youth YL-youth)	wwsac.com/rules.html
17	1700	17	2100	1.2G	VHF-UHF FT8 Activity Contest	FT8	4-char grid	www.ft8activity.eu
18	0000	19	0300	14	Walk for the Bacon QRP Contest	CW	RST, SPC, name, mbr or pwr; 13 WPM max	qrpcontest.com/pigwalk20
18	0030	18	0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, (NAQCC No./pwr)	naqcc.info/sprint_rules.html
18	1900	18	2000	3.5-14	NTC QSO Party	CW	RST, SPC, mbr or pwr	pi4ntc.nl/ntcqp
19	0145	19	0215	3.5-28	Weekly RTTY Test	Dig	Name, SPC	radiosport.world/wrt.html
20	0000	21	2359	1.8-28	LABRE DX Contest	CW Ph	RS(T), 2-ltr state or 2-ltr continent	www.labre.org.br
20	0000	28	2359	1.8-28	Maidenhead Mayhem Contest	CW Ph Dig	4-char grid	w9et.com/rules.html
20	0700	20	1459	7,14,21,28	Russian Radio Team Championship	CW Ph	RS(T), mbr code or ITU zone	srr.ru
20	0800	20	1400	1.8-7	Trans-Tasman Low-Bands Challenge	CW Ph Dig	RS(T), serial	www.wia.org.au
20	1000	20	2159	3.5-28	YOTA Contest	CW Ph	RS(T), age	www.ham-yota.com/contest
20	1200	20	1359	1.8-28,50	Feld Hell Sprint	Dig	Mbr, SPC, 4-char grid	sites.google.com/site/feldhellclub
20	1400	21	1400	70	IARU Region 1 70 MHz Contest	CW Ph	RS(T), serial, 6-char grid	www.iaru-r1.org
20	1800	21	0559	3.5-28	North American QSO Party, RTTY	Dig	Name, SPC	www.ncjweb.com
20	1800	21	2100	50,144	CQ Worldwide VHF Contest	CW Ph Dig	4-char grid	www.cqww-vhf.com
21	0900	21	1600	3.5-14	RSGB International Low Power Contest	CW	RST, serial, pwr	www.rsgbcc.org
21	2300	22	0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or pwr	qrpcontest.com/pigrun
23	0100	23	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM-YL-youth YL-youth)	wwsac.com/rules.html
24	0000	24	0200	1.8-28,50	SKCC Sprint	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
25	1900	25	2030	3.5	RSGB 80m Club Championship, Data	Dig	RST, serial	www.rsgbcc.org
27	0000	28	2359	1.8-28, 50,144	MARAC US Counties QSO Party	CW Ph	RS(T), state and county or "DX"	www.marac.org/contests.htm
27	1200	28	1200	50	ARAM 50 MHz Contest	CW Ph	RS(T), serial, 6-char grid	www.aram.pt
27	1200	28	1200	3.5-28	RSGB IOTA Contest	CW Ph	RS(T), serial, IOTA no.	www.rsgbcc.org
27	1500	28	0300	3.5-28	Alabama QSO Party	CW Ph	RS(T), AL county or SPC	alabamacontestgroup.org/aqp
28	1700	28	2100	7,14,21,28	ARS Flight of the Bumblebees	CW	RST, SPC, pwr, or Bumblebee number	arsqrp.blogspot.com
30	0100	30	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM-YL-youth YL-youth)	wwsac.com/rules.html

There are a number of weekly contests not included in the table above. For more info, visit: www.qrpfoxhunt.org, www.ncccsprint.com, and www.cwops.org. All dates and times refer to UTC and may be different from calendar dates in North America. Contests are not conducted on the 60-, 30-, 17-, or 12-meter bands. Mbr = Membership number. Serial = Sequential number of the contact. SPC = State, Province, DXCC Entity. XE = Mexican state. Listings in blue indicate contests sponsored by ARRL or NCJ. The latest time to make a valid contest QSO is the minute listed in the "Finish Time" column. Data for Contest Corral is maintained on the WA7BNM Contest Calendar at www.contestcalendar.com and is extracted for publication in QST 2 months prior to the month of the contest. ARRL gratefully acknowledges the support of Bruce Horn, WA7BNM, in providing this service.

2023 ARRL 10-Meter Contest Results

The results of the December 9 – 10, 2023, event.



Full Results Online

You can read the full results of the contest online at <http://contests.arrl.org>. You'll find detailed analysis and more play-by-play, along with the full line scores. Improve your results by studying your log-checking report, too.

Seth Charles, AC5M, operated outdoors during the 2023 ARRL 10-Meter Contest. He used a homebrewed vertical full-wave loop antenna hung from the trees in his backyard. Seth completed 55 contacts, placing third in the Single Operator, Mixed Mode, QRP category for the West Gulf Division. [Seth Charles, AC5M, photo]

Continental Winners

Africa

Single Operator, Mixed Mode, High Power	CT3KN	1,775,680
Single Operator, Mixed Mode, Low Power	EA8BQM	263,160
Single Operator, Phone Only, High Power	ED8X	
	(LU9ESD, op)	1,228,128
Single Operator, Phone Only, Low Power	CT3HF	60,676
Single Operator, CW Only, High Power	SZ4VJ	612,744
Single Operator, CW Only, QRP	EA8RM	362,504
Single Operator Unlimited, Mixed Mode, High Power	EA8DIG	327,990
Single Operator Unlimited, Phone Only, High Power	V55Y (V51WH, op)	519,294
Single Operator Unlimited, Phone Only, Low Power	EA8AM	259,000
Single Operator Unlimited, CW Only, High Power	V51YJ	190,404
Single Operator Unlimited, CW Only, Low Power	ZS6WN	352,272
Multioperator, Single Transmitter, Low Power	TO0GL	444,470

Asia

Single Operator, Mixed Mode, High Power	JS1OYN	518,008
Single Operator, Mixed Mode, Low Power	JA1BJI	339,012
Single Operator, Mixed Mode, QRP	JH7UJU	67,080
Single Operator, Phone Only, High Power	TA3DE	105,786
Single Operator, Phone Only, Low Power	UA9CUA	27,600
Single Operator, Phone Only, QRP	JA2MWV	5,760
Single Operator, CW Only, High Power	BD7MM (RA1A, op)	984,960
Single Operator, CW Only, Low Power	VR2T (VR2QZ, op)	503,424
Single Operator, CW Only, QRP	JQ1NGT	56,000
Single Operator Unlimited, Mixed Mode, High Power	JH4UTP	578,688
Single Operator Unlimited, Mixed Mode, Low Power	UC9A	446,420
Single Operator Unlimited, Mixed Mode, QRP	JK1TCV	37,560
Single Operator Unlimited, Phone Only, High Power	VR2XAN	582,428
Single Operator Unlimited, Phone Only, Low Power	JL3VUL/3	94,134
Single Operator Unlimited, CW Only, High Power	JE1LFX	431,880
Single Operator Unlimited, CW Only, Low Power	5B4AMX	284,960
Single Operator Unlimited, CW Only, QRP	JA6GCE	124,968
Multioperator, Single Transmitter, High Power	JA3YBK	1,053,728
Multioperator, Single Transmitter, Low Power	AT2G	85,974

Europe

Single Operator, Mixed Mode, High Power	LZ4TX	685,026
Single Operator, Mixed Mode, Low Power	EA1FBU	285,456
Single Operator, Mixed Mode, QRP	UA6AK	110,044
Single Operator, Phone Only, High Power	CR6K (CT1CJJ, op)	506,626
Single Operator, Phone Only, Low Power	EI4KU	185,954
Single Operator, Phone Only, QRP	PA00T (PA2TMS, op)	35,376
Single Operator, CW Only, High Power	F5OGL	529,568
Single Operator, CW Only, Low Power	M1S1 (GI0RQK, op)	352,800
Single Operator, CW Only, QRP	LZ2RS	60,720
Single Operator Unlimited, Mixed Mode, High Power	EA7X	1,485,600
Single Operator Unlimited, Mixed Mode, Low Power	ED1R (EA4AOC, op)	633,862
Single Operator Unlimited, Mixed Mode, QRP	EA3O	122,540
Single Operator Unlimited, Phone Only, High Power	TM0T (F4HQZ, op)	524,370
Single Operator Unlimited, Phone Only, Low Power	UZ7M (UT9MZ, op)	78,416
Single Operator Unlimited, Phone Only, QRP	I4MFA	14,560
Single Operator Unlimited, CW Only, High Power	IK2PFL	859,336
Single Operator Unlimited, CW Only, Low Power	ON6NL	276,992
Single Operator Unlimited, CW Only, QRP	UA7G	69,148
Multioperator, Single Transmitter, High Power	E7DX	1,691,976
Multioperator, Single Transmitter, Low Power	TM6M	1,315,880

North America

Single Operator, Mixed Mode, Low Power	NP4TT (N4GN, op)	754,208
Single Operator, Mixed Mode, QRP	CO6EC	26,980
Single Operator, Phone Only, High Power	NP3X (EB7DX, op)	230,508
Single Operator, Phone Only, Low Power	T12VAI	215,712
Single Operator, Phone Only, QRP	CM2JR	6,664
Single Operator, CW Only, High Power	ZF9CW	1,490,632
Single Operator, CW Only, Low Power	T12OY	407,680
Single Operator Unlimited, Mixed Mode, High Power	NP2X	1,538,988
Single Operator Unlimited, Mixed Mode, Low Power	T11T	347,490
Single Operator Unlimited, Phone Only, High Power	T11T (T12CC, op)	958,070
Single Operator Unlimited, Phone Only, Low Power	T11Z (T12MOT, op)	54,708
Single Operator Unlimited, Phone Only, QRP	CO2QU	105,342
Single Operator Unlimited, CW Only, Low Power	KP3W	102,648
Multioperator, Single Transmitter, High Power	T48K	1,763,776
Multioperator, Single Transmitter, Low Power	VP2VMM	2,626,564

Oceania

Single Operator, Mixed Mode, High Power	ZL3CW	671,840
Single Operator, Mixed Mode, Low Power	YC3GEM	114,168
Single Operator, Mixed Mode, QRP	ZL1BQD	12,052
Single Operator, Phone Only, High Power	VJ2J	185,130
Single Operator, Phone Only, Low Power	DW7EVQ	40,432
Single Operator, Phone Only, QRP	YB0SSF	4,444
Single Operator, CW Only, High Power	ZL1IF	480,476
Single Operator, CW Only, Low Power	VK2IG	122,208
Single Operator, CW Only, QRP	4F3OM	47,128
Single Operator Unlimited, Mixed Mode, High Power	VL2A (VK2IM, op)	2,035,200
Single Operator Unlimited, Mixed Mode, Low Power	YB9ELS	57,120
Single Operator Unlimited, Phone Only, High Power	VL4R	212,344
Single Operator Unlimited, Phone Only, Low Power	DV1DLX	36,040
Single Operator Unlimited, Phone Only, QRP	YC1CMZ	54
Single Operator Unlimited, CW Only, High Power	VK4DX	164,636
Single Operator Unlimited, CW Only, Low Power	VK6NU	47,520
Single Operator Unlimited, CW Only, QRP	VK4NOW	1,568
Multioperator, Single Transmitter, High Power	VK4KW	590,992

South America

Single Operator, Mixed Mode, High Power	LT3E (LU5WW, op)	2,516,568
Single Operator, Mixed Mode, Low Power	PY2NY	842,832
Single Operator, Mixed Mode, QRP	PY2PLL	106,026
Single Operator, Phone Only, High Power	PX2A (PY2LED, op)	1,039,920
Single Operator, Phone Only, Low Power	HK3EA	291,622
Single Operator, Phone Only, QRP	PY2BN	31,008
Single Operator, CW Only, High Power	PW2E (PY2ZEA, op)	1,240,524
Single Operator, CW Only, Low Power	LU1ICX	190,836
Single Operator, CW Only, QRP	PP5IP	22,176
Single Operator Unlimited, Mixed Mode, High Power	CE2LR	1,490,090
Single Operator Unlimited, Mixed Mode, Low Power	PY2EX	974,510
Single Operator Unlimited, Mixed Mode, QRP	PY2MLO	47,124
Single Operator Unlimited, Phone Only, High Power	AZ1D (LU4DJB, op)	523,882
Single Operator Unlimited, Phone Only, Low Power	ZZ5K (PP5RT, op)	283,392
Single Operator Unlimited, CW Only, High Power	LU3MG	1,162,880
Single Operator Unlimited, CW Only, Low Power	LW5HR	610,032
Single Operator Unlimited, CW Only, QRP	LT7D	161,408
Multioperator, Single Transmitter, High Power	FY5KE	4,420,416
Multioperator, Single Transmitter, Low Power	LW1F	1,305,984

Top Ten

United States

Single Operator, Mixed Mode, High Power

N5DX	2,363,200
K7RAT (N6TR, op)	1,753,092
K7RL	1,715,280
K6XX	1,671,096
K5ZD	1,321,440
N4OX	1,148,070
AB3CX	1,051,560
NR7T	995,880
KTOK	978,000
N0AT	926,060

Single Operator, Mixed Mode, Low Power

N8II	1,029,600
KU2M	877,282
WA7NB	864,878
N1UR	849,444
K2PS	680,316
AC0W	478,848
NU6S	466,966
N5JJ	465,740
K8MR	341,802
W0IZ	330,336

Single Operator, Mixed Mode, QRP

ND0C	224,298
WA3LXD	121,250
N6AN	78,840
N4ELM	75,834
K2GMY	58,968
WA6FGV	57,392
WB2AMU	53,890
KE6K	34,776
WU2M	28,730
KO4DN	27,676

Single Operator, Phone Only, High Power

K5TR (WM5R, op)	711,180
WJ0W (KH6XX, op)	481,200
K1FMS	395,568
N1PGA	332,540
N7MGW	299,728
W1SJ	286,984
AF1T	253,920
AD5XD	216,918
W0SD (KT0W, op)	214,800
K0SIX	208,692

Single Operator, Phone Only, Low Power

WZ8T	162,488
N5YIZ	114,408
W0SJE	104,780
KK7AC	78,608
KH6W0ZB	78,474
N0XT	70,824
AB1F	67,940
W6SAN	45,730
NC8R	45,258
WA2GOT	44,370

Single Operator, Phone Only, QRP

AB2IW	25,480
W6QU (W8QZA, op)	19,200
WW0WB	19,096
K9JK	16,800
NT7S	9,374
WN1C	8,736
N7SVI	4,690
NF2L	4,488
KG5IQU	3,648
KS4GW	1,664

Single Operator, CW Only, High Power

K1TO	1,294,800
K5PI	1,136,240
NR7CW	1,012,380
N4OGW	942,576
K2SSS	833,784
W6PH	728,768
N4XD	713,880

WD0T	675,024
N2PP	637,732
NA8V	605,280

Single Operator, CW Only, Low Power

K7SV	641,840
K1TR	533,736
N4AO (WC4E, op)	518,364
WJ9B	484,832
K1VUT	482,080
KH6CJJ	478,400
KL7AC	375,560
WB4TDH	356,224
W1OK	332,328
KH6AQ	331,256

Single Operator, CW Only, QRP

W1FJ	178,164
W6JTI	163,400
K7FR	104,488
N7RCS	99,384
K2NV	96,432
K2YAZ	90,816
NQ2W	57,960
W7USA	52,800
N5EE	48,620
N2JNR	48,312

Single Operator, Unlimited, Mixed Mode, High Power

N8OO	2,020,416
W6YX (N7MH, op)	1,786,428
K3MM	1,775,900
K6LL	1,775,130
K4AB	1,650,250
N6WM	1,498,538
W6GH	1,471,628
KL7SB	1,450,764
WBMJ	1,324,400
W04O	1,265,298

Single Operator, Unlimited, Mixed Mode, Low Power

K1BX	1,287,936
KB3WD	1,253,276
K9OM	758,160
K1HTV	672,798
W9XT	568,544
KB1EFS	511,680
N7IR	389,244
K0KX	326,160
K7BG	320,016
K6GHA	296,884

Single Operator, Unlimited, Mixed Mode, QRP

KA4RRU	171,556
WQ6X	117,626
WC7S	76,704
W3EK	13,356
K2YG	8,554
K8ZT	1,254

Single Operator, Unlimited, Phone Only, High Power

K3EST	691,824
WT1A	556,200
W5PR	488,244
KA1ZD	427,968
N2NT (K17WX, op)	386,958
WA2BOT	374,836
WV4P	303,840
AA7VR	280,720
W7BJN	223,236
W5LO	219,964

Single Operator, Unlimited, Phone Only, Low Power

K2DRH	362,880
NN4TT	126,240
N7MZW	110,084
N9TGR	101,840
WA2QAU	60,060
KF0IDT	57,188
KA0WWT	57,186
KB7HDX	56,560
W6MX	48,692
AC9TO	43,200

Single Operator, Unlimited, Phone Only, QRP

N8MWK	8,900
WA3FRP	2

Single Operator, Unlimited, CW Only, High Power

W1KM	1,597,200
AA3B	1,386,320
K1KI	1,264,228
N9NC	1,198,484
N5RZ	1,110,700
K2XR	1,085,400
K1MM	1,063,888
K9CT	957,744
K4EA	858,452
N6SS	847,384

Single Operator, Unlimited, CW Only, Low Power

KG9X	709,836
K6WSC	456,008
N2YO	454,812
K0XF	418,192
KR2AA	391,668
WA1FCN	339,948
W2UP	334,152
W7CXX (WA7LNNW, op)	333,632
KI1G	269,072
N4IJ	258,332

Single Operator, Unlimited, CW Only, QRP

NZ3D	184,688
K3TW	110,520
N6RO	81,600
K6JS	71,120
KO1H	55,476
AI1TT	50,400
AC2YD	23,296
N5YT	22,800
N6MA	20,240
KK0U	19,780

Multioperator, Single Transmitter, High Power

K1LZ	3,812,688
NX5M	2,189,296
N4RV	2,155,852
N4SS	1,955,668
K9RS	1,860,480
KY7M	1,674,098
K6EZ	1,635,660
NX6T	1,539,468
K3AJ	1,204,416
W7RN	1,116,612

Multioperator, Single Transmitter, Low Power

WW4LL	624,732
NC1CC	614,482
KT4XA	491,104
W3ZGD	456,624
W7TV	431,000
WA1F	427,912
W9KM	381,100
K6EI	328,934
W1FM	312,044
K7NXL	309,342

Canada

Single Operator, Mixed Mode, High Power

VY2TT (K6LA, op)	2,319,912
VE3AT	1,789,488
VE6UM	697,824
VE4VT	298,132
VO1CH	177,600
VA7XU	35,532
VE3PCP	25,960
VE3TAZ	21,546
VE3SST	20,020

Single Operator, Mixed Mode, Low Power

VE3DZ	1,183,888
VO2LAB	201,390
VA6RCN	126,896
VE3FH	87,870
VY2LI	59,760

VE3KOT	58,176
VE3OIL	56,966
VE1JS	46,632
VE2OWL	13,566
VA7ZM	8,832

Single Operator, Mixed Mode, QRP

VE9QR	14,720
VA2NW	400

Single Operator, Phone Only, High Power

VA5DX	319,774
VE2HTC	87,768
VE3YZ	67,704
VE3LRL	51,568
VA6MA	31,722
VE3YV	10,800
VE6CA	5,580
VE3MT	4,488
VA3MW	1,776
VE2PIJ (VE2GT, op)	60

Single Operator, Phone Only, Low Power

VE3RVZ	66,000
VE2HIT	52,722
VE9CZ	36,120
VE2IAA	32,890
VE9SRC	23,460
VE7GDE	22,236
VE3KMQ	20,252
VA4HZ	19,796
VE7CUP	16,240
VE7EMI	13,104

Single Operator, Phone Only, QRP

VA2IW	6,510
VA3RTG	5,928

Single Operator, CW Only, High Power

VE6WP (VE6BBP, op)	653,556
VE9AA	479,644
VA3AR	404,976
VE7WO	319,228
VA7MM	150,416
VA7ST	150,144
VE3KP	148,896
VA7OM	147,108
VA7MG	121,660
VE1GN	78,000

Single Operator, CW Only, Low Power

VE5UF	256,432
VE5GC	166,584
VA3FF	160,380
VE9KK	143,856
VE7JKZ	116,960
VE7CA	76,664
VA3FN	74,888
VE3MA	70,148
VE4DL	69,192
VE3TM	68,000

Single Operator, CW Only, QRP

VE3KJQ	4,876
VE3RSA	3,280

Single Operator, Unlimited, Mixed Mode, Low Power

VE5MX	2,022,592
VA3DF	796,172
VA7DX	778,140
VE3EJ	695,024
VE4GV	676,800
VE3YT	558,010
VA1MM	488,904
VE5ZX	387,368
VE3RZ	315,462
VA2EBI	302,250

VE3KTB	30,756
VA3OOL	15,660
VE3ETE	11,844
VA2VT	10,332

Single Operator, Unlimited, Phone Only, High Power

VO1KVT	211,582
VE6FI (VE6AQ, op)	187,200
VA7TU	141,930
VE3PTA	31,652
VE3LDE	468

Single Operator, Unlimited, Phone Only, Low Power

VE5KS	127,840
VA3IDD	38,240
VE7DX	20,460
VE3RGO	20,212
VE3IDT	18,176
VY2AN	12,880
VA3UG	7,790
VA2SCJ	7,740
VA3PMH	6,630
VE7CMI	884

Single Operator, Unlimited, Phone Only, QRP

VE3BFU	2,914
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Single Operator, Unlimited, CW Only, High Power

VE7ZO	763,504
VE6WQ	666,216
VE3JM	392,616
VE3EY	285,456
VE6KC	147,220
VA3TNM	146,916
VE7XF	124,956
VA3CW	120,668
VA3FH	96,096
VE3MM	61,500

Single Operator, Unlimited, CW Only, Low Power

VA2WA	548,192
VE5SF	417,900
VE1ANU	167,056
VE9VIC	117,720
VA4ADM	117,600
VE2FK	101,388
VE3UZ	98,600
VE3AQ	85,424
VE3MGY	40,880
VE7KAJ	38,016

Single Operator, Unlimited, CW Only, QRP

VE3VN	213,864
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Multioperator, Single Transmitter, High Power

VA7DZ	310,896
VY2OM	201,390
VE6AO	195,210
VA7IHF	99,960

Multioperator, Single Transmitter, Low Power

VE2CWQ	16,936
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Mexico

Single Operator, Mixed Mode, High Power

XE2X	1,564,400
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Single Operator, Mixed Mode, Low Power

XE2AU	9,576
XE2T	5,184

Single Operator, Phone Only, High Power

XE2CS	98,472
XE1CKJ	13,230
XE2V	1,100

Single Operator, Phone Only, Low Power

XE1YL	176,456
XE1CQ	160,132
XE3N	119,952
XE2Q	48,000
XE2MBE	37,856
XE1JMF	17,064
XE1GLA	10,412
XE2YWB	5,694
XE2N	5,550
XE2EM	5,548

Single Operator, Phone Only, QRP

XE1SY	4
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Single Operator, CW Only, High Power

XE1CT	169,008
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Single Operator, CW Only, Low Power

Top Ten (continued)

Single Operator, Mixed Mode, Low Power (continued)

UP7L (UN6LN, op) 195,468
4K6FO 189,168

Single Operator, Mixed Mode, QRP

UA6AK 110,044
PY2PLL 106,026
JH7UJU 67,080
UY5LW 66,066
ES2MC 58,604
GW9T (GW4OKT, op) 28,512
CO6EC 26,980
UT5EOX 24,640
F8AKC 18,850
RW3AI 13,370

Single Operator, Phone Only, High Power

ED8X (LU9ESD, op) 1,228,128
PX2A (PY2LED, op) 1,039,920
CR6K (CT1CJJ, op) 506,626
TM5X (F5MZN, op) 303,000
CX3AT 285,956
M6T (G0AEV, op) 268,224
GM5X (GM4YXI, op) 262,300
NP3X (EB7DX, op) 230,508
LU1FM 218,064
HC2PY 193,256

Single Operator, Phone Only, Low Power

HK3EA 291,622
PY2UD 268,644
TI2VAI 215,712
PJ7PL (N2HX, op) 207,854
EI4KU 185,954
YV5RAB 168,800
PY2CX 158,574
AZ6H (LU3HIP, op) 148,470
PY2QT 131,016
CX2BAH 124,712

Single Operator, Phone Only, QRP

PA00T (PA2TMS, op) 35,376
PY2BN 31,008
CT2GSN 24,920
HF7A 13,462
PY6GOE 12,950
DL3AN (UT1AN, op) 12,876
MI7DGO 11,438
CM2JR 6,664
PY3EW 5,928
JA2MWV 5,760

Single Operator, CW Only, High Power

ZF9CW 1,490,632
PW2E (PY2ZEA, op) 1,240,524
BD7MM (RA1A, op) 984,960
KP2M (KT3Y, op) 818,100
5Z4VJ 612,744
F5OGL 529,568
LN8W (LB1GB, op) 527,144
PZ5NH 512,064
ZL1IF 480,476
VK2GR 468,280

Single Operator, CW Only, Low Power

VR2T (VR2ZQZ, op) 503,424
TI2OY 407,680
MI5I (GI0RQK, op) 352,800
TI5VA3RA (VE3IKV, op) 310,464

EI0W (EI9ES, op)

J35X 288,704
JJ1LBJ 255,600
LU1ICX 197,540
9A2AJ 190,836
OT4A 150,976
144,504

Single Operator, CW Only, QRP

EA8RM 362,504
ZS2M 64,740
LZ2RS 60,720
JQ1NGT 56,000
4F3OM 47,128
US5VX 45,216
M7R (G0TPH, op) 41,340
JK1CNL 30,600
OK2HBY 30,192
JR1NKN 27,864

Single Operator, Unlimited, Mixed Mode, High Power

VL2A (VK2IM, op) 2,035,200
NP2X 1,538,988
CE2LR 1,490,090
EA7X 1,485,600
F5NBX 1,012,960
PY2KJ 988,530
TM2D 982,008
PV2K (PY2KNK, op) 971,370
RK4FD 870,660
SN2M (SP2XF, op) 742,434

Single Operator, Unlimited, Mixed Mode, Low Power

PY2EX 974,510
ED1R (EA4AOC, op) 633,862
PY2RSA 621,216
MM2N (MM0GPZ, op) 588,224
XQ3WD 463,740
PT1K (PP1KV, op) 453,164
UC9A 446,420
JH1EAQ 413,842
9Z4Y 373,240
TI1I 347,490

Single Operator, Unlimited, Mixed Mode, QRP

EA3O 122,540
PY2MLO 47,124
JK1TCV 37,560
BH4TQX 26,394
YV6BXN 14,700
UZ2I (UT2II, op) 13,502
BI3BX 12,450
PE2K 11,424
YO8WW 10,480
ZV2F (PY2SFA, op) 8,364

Single Operator, Unlimited, Phone Only, High Power

TI1T (TI2CC, op) 958,070
TI1K (TI5CDA, op) 867,186
VR2XAN 582,428
CO2XN 533,390
TM0T (F4HQZ, op) 524,370
AZ1D (LU4DJB, op) 523,882
V55Y (V51WH, op) 519,294
9A1P 504,900
DL2ARD 483,632
EB5A 467,266

Single Operator, Unlimited, Phone Only, Low Power

ZZ5K (PP5RT, op) 283,392
EA8AM 259,000
ZV1T (PP1WW, op) 254,540

ZW2N (PY2MNL, op)

213,504
PY2HT 170,236
CX2RA 118,876
PP5KC 99,440
PY1KV 96,280
PU1JSV 94,800
JL3VUL/3 94,134

Single Operator, Unlimited, Phone Only, QRP

CO2QU 105,342
KP4PUA 22,784
I4MFA 14,560
ES6RW 13,104
HB9GSR 1,156
MW8R (GW4SHF, op) 1,026
G1WVK 816
OK6RP 84
YC1CMZ 54
YF3CYT 30

Single Operator, Unlimited, CW Only, High Power

LU3MG 1,162,880
IK2PFL 859,336
OK3C (OK2ZC, op) 837,864
YT3X 752,752
HA5JI 712,816
HA1AG 708,660
DR1D (DK3DM, op) 701,520
9A5D (9A7Z, op) 615,492
9A5M 569,088
YT0Z (YU1ZZ, op) 560,728

Single Operator, Unlimited, CW Only, Low Power

LW5HR 610,032
ZS6WN 352,272
ZW8T (PS8HF, op) 347,208
5B4AMX 284,960
ON6NL 276,992
SP1D 270,336
EF6B 263,340
CX2AQ 256,176
4U1A (OE1ZZZ, op) 233,240
CT1DRB 221,392

Single Operator, Unlimited, CW Only, QRP

LT7D 161,408
JA6GCE 124,968
JA6VZB 73,800
UA7G 69,148
SP7M 66,120
G4ZFE 53,192
JK7DWD 51,700
HA3HX 42,244
JE1CKA 39,128
SD6F (SM6JWR, op) 35,700

Multioperator, Single Transmitter, High Power

FY5KE 4,420,416
CW5W 3,198,000
PX2W 2,945,080
PJ2T 2,896,548
P40L 2,699,760
T48K 1,763,776
E7DX 1,691,976
9A5Y 1,654,800
PR1T 1,640,460
ZP0X 1,350,216

Multioperator, Single Transmitter, Low Power

VP2VMM 2,626,564
V3A 1,738,528
WP2Z 1,475,814
TM6M 1,315,880
LW1F 1,305,984
TO5M 1,089,024
TO0GL 444,470
H13LT 398,300
PR3K 221,424
ZW2WSP 142,464

Affiliated Club Competition

Club	Score	Entries
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Unlimited

Northern California Contest Club	27,019,032	90
Yankee Clipper Contest Club	26,915,324	88
Potomac Valley Radio Club	26,277,376	129
Florida Contest Group	17,499,046	60
Frankford Radio Club	15,217,038	68
Soc. of Midwest Contesters	13,999,380	86
Minnesota Wireless Assn.	12,153,094	88
Contest Club Ontario	9,258,820	52

Medium

Arizona Outlaws Contest Club	11,248,654	33
Southern California Contest Club	6,266,216	38
Central Texas DX and Contest Club	4,946,200	14
Western Washington DX Club	4,644,900	21
Alabama Contest Group	4,452,050	11
Mad River Radio Club	4,385,844	14
Tennessee Contest Group	4,108,006	27
Willamette Valley DX Club	3,792,836	16
Kansas City Contest Club	3,544,114	10
Kentucky Contest Group	3,478,308	14
Saskatchewan Contest Club	2,993,272	6
South East Contest Club	2,788,748	22
Arkansas DX Assn.	2,595,088	6
Grand Mesa Contesters of Colorado	2,214,314	25
Orca DX and Contest Club	2,115,778	12
Hudson Valley Contesters and DXers	1,986,302	19
Swamp Fox Contest Group	1,959,228	18
DFW Contest Group	1,597,954	21
Big Sky Contesters	1,536,804	6
Great Places Contest Club	1,326,352	6
Bay Area DXers	1,303,636	8
Deep Dixie Contest Club	1,296,312	3
Heartland DX Assn.	1,288,328	4
Texas DX Soc.	1,268,426	12
Niagara Frontier Radiosport	1,161,482	9
Radiosport Manitoba	1,064,586	5
Oklahoma DX Assn.	945,478	4
Carolina DX Assn.	937,060	13
Northeast Maryland Amateur Radio Contest Soc.	831,996	8
Maritime Contest Club	822,068	4
North Coast Contesters	716,636	8
Spokane DX Assn.	515,510	10
Idaho Mountain ARS	493,238	5
South Jersey Radio Assn.	399,682	5
Rochester (NY) DX Assn.	396,160	6
Order of Boiled Owls of New York	286,508	4
Oklahoma City Autopatch Assn.	149,932	3
Valley ARA	124,026	4
Mother Lode DX/Contest Club	121,508	3
Silver Comet ARS	118,618	6
Pacific Northwest VHF Soc.	115,860	3
Fairlawn ARC	69,730	4
Lake Area Amateur Radio Klub	54,370	3
New Providence ARC	32,266	3
American Red Cross Emergency Communications Service	31,730	4
Portage County Amateur Radio Service	29,796	4
Sierra Nevada ARS	28,976	3
Driftless Zone Contesters	15,512	4
Big South Fork ARC	13,554	6
Motor City Radio Club	2,780	3

Local

The Villages ARC	1,177,360	6
Iowa DX and Contest Club	1,173,296	3
CTRI Contest Group	638,960	7
Central Virginia Contest Club	346,588	4
Hampden County Radio Assn.	340,456	5
Metro DX Club	110,806	5
Hughes ARC	82,754	4
Cape Fear ARS	66,240	4
Sterling Park ARC	60,206	5
OH-KY-IN ARS	58,564	3
Seneca Radio Club	36,486	4
Athens County ARA	35,118	3
Hazel Park ARC	25,768	4
Alexandria Radio Club	16,838	3

The next ARRL
10-Meter Contest will be held
December 14 – 15, 2024.

2024 ARRL January VHF Contest Results

Full Results Online

You can read the full results of the contest online at <http://contests.arri.org>. You'll find detailed analysis and more play-by-play, along with the full line scores. Improve your results by studying your log-checking report, too.

This year's ARRL January VHF Contest was held January 20 – 22, 2024.

Division Winners

Classic Rover

Atlantic	KF2MR/R	79,443
Central	K9TMS/R	8,540
Central	N9REP/R	8,540
Dakota	N0SPN/R	2,040
Midwest	AF4JF/R	160
Roanoke	K2EZ/R	28,938
Rocky Mountain	KK6MC/R	14,701
Southwestern	N7GP/R	94,160
West Gulf	KJ5DTR/R	273
West Gulf	KJ5DTS/R	273
Canada	VE3OIL/R	60,480

Limited Rover

Atlantic	AA2SD/R	4,296
Central	KG9OV/R	17,520
Dakota	K0LTC/R	2,013
Delta	KE5EXX/R	546
Great Lakes	W8ISS/R	546
Hudson	WB2SIH/R	260
New England	WS1O/R	135
Northwestern	KA7RRA/R	1,290
Pacific	N9VM/R	120
Roanoke	KM4OZH/R	11,070
Rocky Mountain	W0WLA/R	572
Southeastern	K4NO/R	4,324
Southwestern	N6GP/R	9,918
West Gulf	KA5D/R	44,080
Canada	VA3ELE/R	33,142

Unlimited Rover

Dakota	KC0P/R	6,020
New England	KG6CIH/R	53,755
Southeastern	NV4B/R	17,886
Southwestern	K6WCI/R	41,318

Single Operator, High Power

Atlantic	N2JMH	299,736
Central	K9MU	14,661
Dakota	K0AWU	12,246
Delta	W5VY	5,355
Great Lakes	KE8FD	40,754
Hudson	N2GHR	17,952
Midwest	KB0ZOM	1,170
New England	K1TEO	264,434
Northwestern	N7EPD	23,650
Pacific	W6DQ	9,514
Roanoke	W3IP	47,676
Rocky Mountain	W9RM	38,896
Southeastern	WA4GPM	11,232
Southwestern	N1AV	68,036
West Gulf	W5LO	19,152
Canada	VA3IKE	13,376

Single Operator, Low Power

Atlantic	N2WK	129,600
Central	K9KLD	38,190
Dakota	W0UC	2,880
Delta	AJ6T	5,940
Great Lakes	KE8JCD	7,686
Hudson	WB2SIH	2,822
Midwest	N0LL	15,655
New England	N8RA	6,300
Northwestern	WZ8T	13,413
Pacific	K6USY	8,288
Roanoke	WA4LDU	8,052
Rocky Mountain	NJ7A	17,248
Southeastern	W4MAA	9,975
Southwestern	N7IR	37,278
West Gulf	N5EKO	14,616
Canada	VE3SMA	8,232

Single Operator, Analog Only, High Power

Atlantic	W2FU	18,765
Dakota	W0GHZ	4,455
Delta	K4YRK	140
Great Lakes	K8TQK	4,560
Hudson	W2KV	19,886
New England	WZ1V	51,204

Pacific	K6MI	10,200
Southeastern	W4AMP	231
Southwestern	N6KN	2,842
West Gulf	K5LLL	10,044
Canada	VE3ZV	30,855

Single Operator, Analog Only, Low Power

Atlantic	K3TUF	11,080
Central	KY0Q	15
Dakota	KA0PQW	1,265
Hudson	WB2JAY	8,073
Midwest	KK0U	152
New England	AF1T	97,745
Northwestern	W7IMC	11,200
Pacific	KE7UQL	420
Roanoke	NJ4Q	2
Rocky Mountain	KB0KAI	1,078
Southeastern	W4RAA	2,600
Southwestern	N7RK	3,857
West Gulf	WB5ZDP	858
Canada	VE3DS	45,590

Single Operator, Portable

Atlantic	N2MAK	1,200
Dakota	N0SUW	217
Midwest	N0JK	2,244
Southeastern	AB4DX	640
Southwestern	WQ6D	308
Canada	VA2VT	1,647

Single Operator, Portable, Analog Only

Atlantic	N3YMS	4,756
Central	WN1C	90
Dakota	KE0DLQ	84
Hudson	N2YTF	923
New England	NT1D	182
Northwestern	KJ7BJS	920
Pacific	KN6PRZ	638
Southwestern	W7JET	2,574
Canada	VA3TO	96

Single Operator, Three-Band

Atlantic	W3FAY	9,690
Central	K09A	26,394
Dakota	K7BG	9,963
Delta	KM4RT	1,485
Great Lakes	KE8AKW	22,692
Hudson	NA2NY	6,144
Midwest	WA0ARM	456
New England	W1FKF	9,342
Northwestern	K5DTC	8,085
Pacific	K6VVP	3,440
Roanoke	K3FR	3,968
Rocky Mountain	KC7QY	5,952
Southeastern	W2UA	3,705
Southwestern	W8JH	10,164
West Gulf	W5TRL	57,440
Canada	VE7DAY	5,073

Single Operator, Analog Only, Three-Band

Atlantic	N1XKT	198
Dakota	N7QJP	35
Hudson	KC2JRQ	88
New England	W1SRH	754
Northwestern	N7QOZ	2,662
Pacific	K2GMY	3,270
Roanoke	KV4ZY	112
Rocky Mountain	NR7T	1,960
Southwestern	KN7Y	1,786
Canada	VE3ZY (VE3FFK, op)	36

Single Operator, FM Only

Atlantic	KA1CNF	36
Delta	K4NRT	15
Great Lakes	KA8TOA	44
Hudson	KE2CCG	6
New England	KB1YNT	469
Northwestern	N7OOS	100
Pacific	KO6BGT	80
Roanoke	N4NTO	56

Southeastern	K3TW	4
Southwestern	N6ZE	684
West Gulf	AD5HC	1
Canada	VE3RWJ	2,472

Limited Multioperator

Atlantic	W2MMD	52,000
Hudson	N2NT	120,000
New England	W1FM	3,567
Southeastern	W4EE	2,769
Southwestern	W01S	4,500
West Gulf	K5QE	204,792
Canada	VE3MIS	26,695

Unlimited Multioperator

Atlantic	N3NGE	120,648
Central	WD9EXD	51,988
Delta	AG4V	11,919
Great Lakes	N8GA	81,718
New England	KE1LI	35,155
Southeastern	W4NH	48,824
Southwestern	KN6UWK	12,805
West Gulf	KC5MVZ	8,142
Canada	VE6AO	1,056

Affiliated Club Competition

Club	Score	Entries
Unlimited		
Mt. Airy VHF Radio Club	1,227,321	56

Medium		
Rochester VHF Group	1,221,190	33
North East Weak Signal Group	241,545	12
Arizona VHF Soc.	181,947	7
Potomac Valley Radio Club	164,598	40
Soc. of Midwest Contesters	163,783	24
Pacific Northwest VHF Soc.	130,726	30
Roadrunners Microwave Group	98,303	4
Ontario VHF Assn.	82,524	10
Fourlanders Contest Team	76,426	6
Grand Mesa Contesters of Colorado	76,158	7
Arizona Outlaws Contest Club	75,918	14
Contest Club Ontario	71,093	9
Kentucky Contest Group	57,364	3
Northern Lights Radio Soc.	55,575	17
Frankford Radio Club	37,144	4
Texas DX Soc.	33,418	6
Southern California Contest Club	30,491	11
DFW Contest Group	28,140	6
Northern California Contest Club	25,880	9
Yankee Clipper Contest Club	23,388	9
New Mexico VHF Soc.	21,225	3
Minnesota Wireless Assn.	10,706	5
Tennessee Contest Group	8,431	6
Carolina DX Assn.	7,405	5
Alabama Contest Group	5,830	3
Convair/220 ARC	5,405	3
Florida Contest Group	5,388	6
South Jersey Radio Assn.	4,644	5
Wayne County ARC	4,527	3
Michigan VHF-UHF Soc.	3,825	4
Mad River Radio Club	2,491	3
Western Canada Weak Signal Assn.	1,687	4
W6TRW ARC	715	3
Silver Comet ARS	393	3

Local		
Eastern Connecticut ARA	43,771	5
Chippewa Valley VHF Contesters	26,816	4
Stoned Monkey VHF ARC	19,608	3
CTRI Contest Group	6,578	3
Bristol (TN) ARC	5,283	5
BRX ARC	1,880	5

Regional Leaders

LM = Limited Multioperator; R = Classic Rover; RL = Limited Rover; RU = Unlimited Rover; SO-ALG-3B = Single Operator, Analog Only, Three-Band; SO-ALG-HP = Single Operator, Analog Only, High Power; SO-ALG-LP = Single Operator, Analog Only, Low Power; SO3B = Single Operator, Three-Band; SOFM = Single Operator, FM Only; SOHP = Single Operator, High Power; SOLP = Single Operator, Low Power; SOP = Single Operator, Portable; SOP-ALG = Single Operator, Portable, Analog Only, and UM = Unlimited Multioperator

West Coast Region

(Pacific, Northwestern, and Southwestern Divisions; Alberta, British Columbia, and NT Sections)

N7GP/R	94,160	R
KD6EFQ/R	4,914	R
N6GP/R	9,918	RL
KA7RRA/R	1,290	RL
K6LMN/R	425	RL
N9VM/R	120	RL
N7MKO/R	100	RL
K6WCI/R	41,318	RU
N6TEB/R	35,490	RU
N5BF/R	448	RU
N1AV	68,036	SOHP
N7EPD	23,650	SOHP
W7FI	13,275	SOHP
KD7UO	11,340	SOHP
NA6MG	10,218	SOHP
N7IR	37,278	SOLP
WZ8T	13,413	SOLP
K6USY	8,288	SOLP
K10E	6,063	SOLP
N7VGO	4,508	SOLP
K6MI	10,200	SO-ALG-HP
N6KN	2,842	SO-ALG-HP
KM6SRR	2,670	SO-ALG-HP
N6RO	1,088	SO-ALG-HP
W7ON	180	SO-ALG-HP
W7IMC	11,200	SO-ALG-LP
N7RK	3,857	SO-ALG-LP
N7VD	3,225	SO-ALG-LP
K6MUG	1,533	SO-ALG-LP
K7BHM	507	SO-ALG-LP
WQ6D	308	SOP
KD7WPJ	208	SOP
W7JET	2,574	SOP-ALG
KJ7BJS	920	SOP-ALG
KN6PRZ	638	SOP-ALG
KO6BCW	39	SOP-ALG
A17QG	38	SOP-ALG
W8JH	10,164	SO3B
K5DTC	8,085	SO3B
VE7DAY	5,073	SO3B
K6TDI	3,450	SO3B
K6VVP	3,440	SO3B
K2GMY	3,270	SO-ALG-3B
N7QOZ	2,662	SO-ALG-3B
KN7Y	1,786	SO-ALG-3B
K7CX	1,349	SO-ALG-3B
WB7FJG	928	SO-ALG-3B
N6ZE	684	SOFM
N6MX	450	SOFM
K1CT	413	SOFM
AF6GM	378	SOFM
N1TEN	280	SOFM
WO1S	4,500	LM
KN6UWK	12,805	UM
VE6AO	1,056	UM

Midwest Region

(Dakota, Midwest, Rocky Mountain, and West Gulf Divisions; Manitoba, and Saskatchewan Sections)

KK6MC/R	14,701	R
N0SPN/R	2,040	R
KJ5DTR/R	273	R
KJ5DTS/R	273	R
KJ5DHA/R	221	R
KA5D/R	44,080	RL
W5TN/R	37,130	RL
K0LTC/R	2,013	RL
W5OC/R	1,320	RL
W0WLA/R	572	RL
KC0P/R	6,020	RU
W9RM	38,896	SOHP
W5LO	19,152	SOHP
K5ND	16,926	SOHP
WT0DX	14,028	SOHP
K0AWU	12,246	SOHP
NJ7A	17,248	SOLP
N0LL	15,655	SOLP
N5EKO	14,616	SOLP
WB5TUF	12,180	SOLP
KC0VDY	10,472	SOLP
K5LLL	10,044	SO-ALG-HP
W0GHZ	4,455	SO-ALG-HP
WA5LFD	884	SO-ALG-HP
KA0PQW	1,265	SO-ALG-LP
KB0KQI	1,078	SO-ALG-LP
WB5ZDP	858	SO-ALG-LP
W0ZF	429	SO-ALG-LP
KA0CRO	396	SO-ALG-LP
N0JK	2,244	SOP
N0SUW	217	SOP
KE0DLQ	84	SOP-ALG
W5TRL	57,440	SO3B
K7BG	9,963	SO3B
KB0HNN	6,912	SO3B
KC7QY	5,952	SO3B
WB0NRV	5,656	SO3B
NR7T	1,960	SO-ALG-3B
K0XF	290	SO-ALG-3B
N7QJP	35	SO-ALG-3B
AD5HC	1	SOFM
K5QE	204,792	LM
W5AC	646	LM
KC5MVZ	8,142	UM

Central Region

(Central and Great Lakes Divisions; Ontario East, Ontario North, Ontario South, and Golden Horseshoe Sections)

VE3OIL/R	60,480	R
K9TMS/R	8,540	R
N9REP/R	8,540	R
VA3ELE/R	33,142	RL
KG9OV/R	17,520	RL
K9AJW/R	2,528	RL
W8ISS/R	546	RL
VE3RKS/R	54	RL
KE8FD	40,754	SOHP
K9MU	14,661	SOHP
VA3IKE	13,376	SOHP
AB8M	13,321	SOHP
WA8MCD	12,320	SOHP
K9KLD	38,190	SOLP
WE9R	14,812	SOLP
VE3SMA	8,232	SOLP
KE8JCD	7,686	SOLP
KB9RUG	6,528	SOLP
VE3ZV	30,855	SO-ALG-HP
VE3KG	11,868	SO-ALG-HP
K8TQK	4,560	SO-ALG-HP
VE3DS	45,590	SO-ALG-LP
VE3KH	15,088	SO-ALG-LP
VE3MIX	1,207	SO-ALG-LP
VE3WJ	1,005	SO-ALG-LP
VA3NFL	38	SO-ALG-LP
VA3TO	96	SOP-ALG
WN1C	90	SOP-ALG
VE3FU	15	SOP-ALG
KO9A	26,394	SO3B
KE8AKW	22,692	SO3B
W9XT	9,150	SO3B
NT9E	3,400	SO3B
VA3ECO	2,419	SO3B
VE3ZY (VE3FFK, op)	36	SO-ALG-3B
VE3RWJ	2,472	SOFM
KA8TOA	44	SOFM
VE3HZR	24	SOFM
VE3MIS	26,695	LM
N8GA	81,718	UM
WD9EXD	51,988	UM
KE8RV	22,695	UM

Southeast Region

(Delta, Roanoke, and Southeastern Divisions)

K2EZ/R	28,938	R
KM4OZH/R	11,070	RL
W4JST/R	6,528	RL
KE4WMF/R	5,772	RL
K4NO/R	4,324	RL
KE5EXX/R	546	RL
NV4B/R	17,886	RU
W3IP	47,676	SOHP
K1HTV	25,160	SOHP
KK4MA	13,090	SOHP
WA4GPM	11,232	SOHP
K3SK	8,642	SOHP
W4MAA	9,975	SOLP
WA4LDU	8,052	SOLP
W4ERP	6,771	SOLP
AJ6T	5,940	SOLP
K4SO	4,048	SOLP
W4AMP	231	SO-ALG-HP
K4YRK	140	SO-ALG-HP
K4BAI	1	SO-ALG-HP
W4RAA	2,600	SO-ALG-LP
AF4PX	14	SO-ALG-LP
NJ4Q	2	SO-ALG-LP
AB4DX	640	SOP
W2BL	14	SOP
K3FR	3,968	SO3B
W2UA	3,705	SO3B
KD4ADC	3,160	SO3B
KK4ZUJ	1,978	SO3B
KM4RT	1,485	SO3B
KV4ZY	112	SO-ALG-3B
N3AC	10	SO-ALG-3B
N4NTO	56	SOFM
KO4OFO	40	SOFM
K4NRT	15	SOFM
K3TW	4	SOFM
K4CAB	2	SOFM
W4EE	2,769	LM
W4NH	48,824	UM
N4BRF	12,948	UM
AG4V	11,919	UM

Northeast Region

(New England, Hudson, and Atlantic Divisions; Nova Scotia, New Brunswick, Newfoundland/Labrador, and Quebec Sections)

KF2MR/R	79,443	R
K2UA/R	59,846	R
KE2BUY/R	54,978	R
K2ET/R	16,860	R
W2EV/R	13,547	R
AA2SD/R	4,296	RL

KB1POP/R	552	RL
WB2SIH/R	260	RL
WS1O/R	135	RL
KG6CIH/R	53,755	RU
N2JMH	299,736	SOHP
K1TEO	264,434	SOHP
K2TER	76,544	SOHP
K1RZ	61,008	SOHP
WA3DRC	54,802	SOHP
N2WK	129,600	SOLP
NR2C	108,281	SOLP
WA3NUF	67,419	SOLP
N3RG	47,526	SOLP
N2OA	43,632	SOLP
W2V1	51,204	SO-ALG-HP
W2KV	19,886	SO-ALG-HP
W2FU	18,765	SO-ALG-HP
W3BFC	1,364	SO-ALG-HP
K1ZE	1,320	SO-ALG-HP
AF1T	97,745	SO-ALG-LP
W1MKY	20,335	SO-ALG-LP
K3TUF	11,080	SO-ALG-LP
WB2JAY	8,073	SO-ALG-LP
AC1J	6,144	SO-ALG-LP
VA2VT	1,647	SOP
N2MAK	1,200	SOP
N3YMS	4,756	SOP-ALG
N2YTF	923	SOP-ALG
WB2AMU	232	SOP-ALG
W2NTN	231	SOP-ALG
NT1D	182	SOP-ALG
W3FAY	9,690	SO3B
W1FKF	9,342	SO3B
K1DC (@K1TTT)	8,748	SO3B
W1QK	6,160	SO3B
K1HC	6,149	SO3B
W1SRH	754	SO-ALG-3B
KB1HXO	624	SO-ALG-3B
N1ZN	396	SO-ALG-3B
N1JD	364	SO-ALG-3B
N1XKT	198	SO-ALG-3B
KB1YNT	469	SOFM
KA1CNF	36	SOFM
KE2CCG	6	SOFM
AG2Y	2	SOFM
N2NT	120,000	LM
W2MMD	52,000	LM
WA3EKL	14,656	LM
W0RSJ	9,898	LM
W1FM	3,567	LM
N3NGE	120,648	UM
KD2LGX	73,899	UM
KE1LI	35,155	UM
KV1J	21,432	UM
W1XM	15,652	UM

The 2025 ARRL January VHF Contest will be held January 18 – 20, 2025.

Top Ten

Classic Rover

N7GP/R	94,160
KF2MR/R	79,443
VE3OIL/R	60,480
K2UA/R	59,846
KE2BUY/R	54,978
K2EZ/R	28,938
K2ET/R	16,860
KK6MC/R	14,701
W2EV/R	13,547
K9TMS/R	8,540
N9REP/R	8,540

Limited Rover

KA5D/R	44,080
W5TN/R	37,130
VA3ELE/R	33,142
KG9OV/R	17,520
KM4OZH/R	11,070
N6GP/R	9,918
W4JST/R	6,528
KE4WMF/R	5,772
K4NO/R	4,324
AA2SD/R	4,296

Unlimited Rover

KG6CIH/R	53,755
K6WCI/R	41,318
N6TEB/R	35,490

Single Operator, Analog Only, High Power

NV4B/R	17,886
KC0P/R	6,020
N5BF/R	448
N2JMH	299,736
K1TEO	264,434
K2TER	76,544
N1AV	68,036
K1RZ	61,008
WA3DRC	54,802
N2YB	52,150
W3IP	47,676
WB2RVX	46,020
W3SZ	41,160

Single Operator, Low Power

N2WK	129,600
NR2C	108,281
WA3NUF	67,419
N3RG	47,526
N2OA	43,632
KA2ENE	42,150
K9KLD	38,190
N7IR	37,278
WA3GFZ	25,172
NF3R	23,025

Single Operator, Analog Only, High Power

WZ1V	51,204
VE3ZV	30,855
W2KV	19,886
W2FU	18,765
VE3KG	11,868
K6MI	10,200
K5LLL	10,044
K8TQK	4,560
W0GHZ	4,455
N6KN	2,842

Single Operator, Analog Only, Low Power

AF1T	97,745
VE3DS	45,590
W1MKY	20,335
VE3KH	15,088
W7IMC	11,200
K3TUF	11,080
WB2JAY	8,073
AC1J	6,144
WB2VVV	5,810
N7RK	3,857

Single Operator, Portable

XE2YWB	2,604
N0JK	2,244
VA2VT	1,647
N2MAK	1,200
AB4DX	640
WQ6D	308
N0SUW	217
KD7WPJ	208
W2BL	14

Single Operator, Portable, Analog Only

N3YMS	4,756
W7JET	2,574
N2YTF	923
KJ7BJS	920
KN6PRZ	638
WB2AMU	232
W2NTN	231
NT1D	182
VA3TO	96
WN1C	90

Single Operator, Three-Band

W5TRL	57,440
KO9A	26,394

KE8AKW	22,692
W8JH	10,164
K7BG	9,963
CO2QU	9,715
W3FAY	9,690
W1FKF	9,342
W9XT	9,150
K1DC (@K1TTT)	8,748

Single Operator, Analog Only, Three-Band

K2GMY	3,270
N7QOZ	2,662
NR7T	1,960
KN7Y	1,786
K7CX	1,349
WB7FJG	928
W1SRH	754
KB1HXO	624
AJ6LG	492
N1ZN	396

Single Operator, FM Only

VE3RWJ	2,472
N6ZE	684
KB1YNT	469
N6MX	450

K1CT	413
AF6GM	378
N1TEN	280
N7OOS	100
KN6FKQ	99
KO6BGT	80

Limited Multioperator

The ARRL 222 MHz and Up Distance Contest

1800 UTC Saturday, August 3 – 1759 UTC Sunday, August 4, 2024

The objective in this distance-scored event is to make as many contacts as possible on 222 MHz up to 241 GHz using terrestrial means (no EME contacts) over as great a distance in kilometers as possible. Participants will exchange six-digit grid locators, and distances will be based on the center-to-center distance between the two stations' six-digit locators. Visit <http://k7fry.com/grid> for a grid mapping and distance tool, courtesy of Steve Fry, K7FRY.

The three station categories are: Single Operator, Fixed; Multioperator, Fixed, and Rover. Rover stations may be worked from each four-character grid square in which they operate. If more than one contact on a given band is made between stations in specific grid squares, then the contact with the longest path will be counted. All stations exchange six-digit grid locators on as many bands as possible, but Rover stations can re-contact stations when they move to a new four-digit grid square. Attempts to increase the contact distances are encouraged, and all contacts should be logged (even duplicates, to ensure that a valid contact isn't lost).

There are no power categories. Competition is by region. There is also a Club Competition and Team Competition. Be sure to register your team at <https://contests.arrl.org/teamreg.php?eid=1> before the contest begins.

Each band has a unique band factor value. Total score is the sum of all QSO points.

Only electronic, Cabrillo-formatted logs will be accepted (significant distance scoring calculations must be made to each QSO). Upload logs to <https://contest-log-submission.arrl.org>. The deadline for submission of entries is 1759 UTC August 18, 2024.



One of the antenna configurations Scott Dantis, AA2SD, used during the 2023 ARRL 222 MHz and Up Distance Contest. As this was his first entry in the Rover category in a contest, he used different antenna systems to determine which configuration had the best results. [Scott Dantis, AA2SD, photo]

For specific scoring details
and event rules, see
www.arrl.org/222-mhz-and-up-distance-contest.

August 2024 ARRL Rookie Roundup — RTTY

1800 UTC – 2359 UTC, Sunday, August 18, 2024

Rookies make as many contacts as possible during this 6-hour event. Rookies work everyone, and non-Rookies work only Rookies. The exchange is your name, call sign, a two-digit year, and state (US or Mexican), Canadian province, or "DX."

You can enter as a Rookie if:

- You were first licensed this year or in the previous 3 calendar years (send the last two digits of the year you were first licensed in the exchange);
- You were licensed before 2021 and made your first-ever contact during 2024, 2023, 2022, or 2021; or
- You haven't made any contacts using the contest mode (RTTY)

before (send the current year in your exchange).

Rookies can enter as a Single Operator or invite Rookie friends over and operate as Multioperator. Up to five Single Operator Rookies can also enter from their individual stations and submit their total score as a team.

Non-Rookies can join the fun by calling "CQ Rookies," to encourage the Rookie operators to call them.

All scores must be reported within 72 hours after the event. No late entries will be accepted. You can share your photos and stories via the ARRL Contest Soapbox at <https://contests.arrl.org/rrtty/soaps>.



Complete rules, logging sheets, and links
for submitting your score can be found at
www.arrl.org/rookie-roundup.

Club Station

Planning a Memorable Club Anniversary Celebration

Many clubs take pride in reaching milestone anniversaries and often choose to spend the entire year celebrating. In this month's column, Plano Amateur Radio Klub (PARK), K5PRK, Vice President Anthony Burokas, KB3DVS, shares how the Plano, Texas, club successfully planned its year-long 50th anniversary celebration in 2023.

Despite being a small club, PARK was proud to honor 50 years of amateur radio and wanted to celebrate in a big way. But putting on a year-long celebration takes a lot of planning. Using Google Docs, I created one main document that was updated on a weekly basis throughout the year. It was also shared with Board members, so they could review it at any time. We honored our 50th year with a contest, a formal Golden Jubilee Dinner, and a special QSL card, and by selling memorabilia with an anniversary logo.

Gathering Anniversary Swag

At the beginning of the year, Dick Thiot, N5FCB, and his son Skyler volunteered to modify the club's logo to commemorate 50 years. We put the logo on our website (<https://k5prk.net>), on a special anniversary QSL card, in email signatures, and on various pieces of memorabilia.

I commissioned a company to make gold lapel pins with the anniversary logo to be used as giveaways at the Golden Jubilee Dinner. There are dozens of companies available to do this.

PARK President Tim Johnson, K5TCJ, created badges with the 50th anniversary logo, and I used CafePress, an online retailer of customized items, to order shirts, mouse pads, mugs, and other items for members to purchase. The nice thing about an online retailer is that everything is printed and shipped on demand.

Planning Celebratory Events

Our formal dinner and anniversary contest took a bit of planning. I worked with Dave Koch, W8OV, a club member who's well-versed in logging solutions, to help figure out how to set up a contest that allowed members to activate PARK's call sign "50" and log contacts in a central database that was accessible throughout the year. HamAward (<https://hamaward.cloud>) allowed us to create a special contest that each participant could log into

PARK President Tim Johnson, K5TCJ (right), presented PARK Founder Dick Sander, K5QY (left), with a Certificate of Appreciation at the club's 50th anniversary Golden Jubilee Dinner. Dick has since become a Silent Key. The club is grateful to have had the chance to honor him during their semicentennial celebration.



and record their contacts. Even though every participant was remote, they each could see the current tally and the logbook, along with who else was on the air at the same time. PARK PR Chair Francis "Dan" Daniels, W5KKQ, helped a local print shop design a return QSL card.

Whoever had the highest number of total contacts as K5PRK/50 at the end of the year won the top prize, but we also had awards for the most contacts made on a particular mode and the most VHF contacts made, among others. I solicited various companies and organizations for prizes, which were awarded at the club's year-end holiday party.

Hosting the Golden Jubilee Dinner was also an important part of the celebration. We began looking for the reception hall more than 6 months in advance. Johnnie Young, KG5CQQ, did an amazing amount of research in regard to contacting each of our past presidents, founders, and charter members. Because each past president was invited to bring a guest, this number was critical in determining the size of the facility we needed.

We anticipated at least 100 people would attend, so we decided on a city-owned facility with a minimal reservation fee that included AV, chairs, and tables. We had to cater the food, but we could use the facility's kitchen to keep items warm or cold as needed. Mike Tharp, KG5TJF, oversaw the food, including ordering, serving, and cleaning up. During the dinner, Mike and Sam Parson, W9VPU, made sure that no one went home hungry.

Each past president received a certificate (created by Johnnie and Tim), along with an anniversary pin. Additionally, the club lacked portraits of past presidents and founders, so I set up my camera and lights in the lobby to take their portraits as they arrived (with assistance from Johnnie and Larry Randall, WA5BEN).

I also set up video cameras around the room to record the event. Afterward, I edited the content into a single presentation that's available for members to view on PARK's website. I was also able to stream the dinner on our Facebook page for members who couldn't attend. Bob Nine, KD5QDQ, volunteered his services and his gear to mix audio for the night. He also ran the slide presentations.

Getting the Public Involved

Tim and Johnnie put together a press release and sent it to local newspapers, websites, and TV stations. I also reached out to the City of Plano to see about getting a proclamation for the club, and the process was fairly easy.

Johnnie used the club's Groups.io email list and HamClubOnline (www.hamclubonline.com), a radio club member management system, to notify club members of the celebratory activities and to direct them to the regularly updated 50th anniversary section of the club website, which included links for purchasing memorabilia, contest rules, and historical information on the club's founding, as well as several polls and the ability to purchase tickets for the Golden Jubilee Dinner.

City of Plano Deputy Mayor Pro Tem Maria Tu presented the PARK declaration at the dinner. Section Manager of the ARRL North Texas Section Steven Lott Smith, KG5VK, delivered presentations and prize giveaways at the Golden Jubilee Dinner. We also thanked Icom America, Yaesu, Kenwood, MFJ Enterprises, DX Engineering, the Plano Balloon Festival, Homebrew Coffee Shop & Eatery, Scott Boutwell of HamStop (a local maker who donated some military sectional push-up poles to give away at the dinner; www.etsy.com/shop/HamStop), Bioenno Power, and Dakota Lithium for their sponsorships and donations.

Financial Commitment

Out of everything we did to celebrate our 50th anniversary, the Golden Jubilee Dinner was by far the most

Pieces of memorabilia, like this commemorative pin, were created with PARK's 50th anniversary logo.



PARK's special 50th anniversary QSL card.

expensive — this type of event can cost thousands of dollars. Our treasurer presented a budget to the general membership that was approved to pay for the dinner and all related expenses. Thankfully, PARK members donated their time, services, use of equipment, and more, dramatically cutting the total cost. We received some monetary donations, and ticket sales offset the cost as well. We only charged an additional \$5 per person to help defray costs, as we wanted to consider our older, fixed-income members. PARK held its annual auction prior to the dinner, which also helped with the cost.

Each aspect of our 50th anniversary was planned to give back to our club members so they were celebrated as well — a club can't exist without members.

All photos by K5PRK.

Write for "Club Station"

QST's "Club Station" column is a designated space for clubs to share specific and practical ideas about what has contributed to their success, in the hope that the information will help other clubs grow and thrive. Visit www.arrl.org/qst-club-station-guidelines-and-profile-form for more information, including author guidelines and a Club Profile Form (this form is required in order for "Club Station" submissions to be considered complete).

ARRL Special Service Clubs

ARRL offers the Special Service Club (SSC) program for clubs that demonstrate that they're working to improve the amateur radio community by completing special projects, holding license classes, and working with local groups on events, among other activities. Visit www.arrl.org/ssc-application for more information about this program. Below is a list of new and renewing SSCs as of April 16, 2024.

Renewing SSCs

Hampden County Radio
Association, W1NY
Barnstable ARC, W1MA
Sun City ARC, K5WPH

Agawam, MA
South Dennis, MA
El Paso, TX



Ham Media Playlist

The Tech Prepper — Practical Preparedness

While everyone discovers amateur radio in a different way, one thing remains consistent — hams remember how they first learned of the hobby. Gaston Gonzalez, KT7RUN, is no different. Amateur radio tends to morph over time — some modes and features last for the long term, and some essentially disappear as technology advances. The feature that was once a boon for repeaters but is virtually nonexistent today — the auto-patch — caught Gaston's eye in 1996 and piqued his interest in ham radio.

Practical Prepping

In 2015, Gaston was stranded at work for 8 hours without water, food, money, or a way to contact his wife due to a power grid outage. That event served as a catalyst for Gaston to begin researching ways to be more self-sufficient and looking into what he calls “practical prepping.” After 2 years of learning and preparing, Gaston discovered a gap in his plan — communications. As a way to fill that gap, he purchased the Gordon West Technician book (<https://home.arrl.org/action/Store/Product-Details/productId/2015951493>) and was on his way to earning his license.

Engaging new hams is critical to keeping them interested in amateur radio. Gaston almost fell victim to what often happens to new licensees — leaving amateur radio because no one engaged with him. He tried repeaters and calling on simplex, to no avail. It appeared to him that there was simply no one to talk to, so he put the radio away.

When the COVID-19 pandemic changed the way people went about their lives, Gaston moved to a rural property. He pulled out his neglected handheld and put his call out on the W7ARA Metrolink repeater system. To his surprise, Mike, WB4ZKA, answered. Mike encouraged Gaston to support local endurance events and become active in the Maricopa County Emergency Communication Group. Gaston was hooked, and Mike, along with Seth, KJ4TFK, and Mike, KC8OWL, became his mentors, encouraging him and helping him grow in the hobby.

Eventually, Gaston filmed a practical preparedness tip every day for 30 days. After that month, his YouTube channel evolved into a sort of diary documenting his growth in amateur radio. Today (4 years later), his channel still serves as an opportunity for Gaston to share his experiences.

Teaching the *What, Why, and How* of Preparedness

Everything Gaston showcases on his channel deals with preparedness in one form or another. He explains what he is doing and why he is doing it, and teaches his viewers in the process. One such video, titled “Targeted Comms – Anti Field Day 2023” (<https://tinyurl.com/kt7run-contacts>), was recorded during ARRL Field Day and shows Gaston working remotely from Ruin Ridge in the Tonto National Forest. Gaston intentionally scheduled this exercise to demonstrate that if the bands are completely congested for any reason (for example, due to a contest or other activity), there are options to maintain communications using frequencies that are less often used. Gaston put together a communications plan to operate on the World Administrative Radio Conference (WARC) bands. A benefit of Gaston's channel is that he believes in sharing his successes as well as his failures.

Gaston goes into great detail about his setup, even letting viewers know what kind of knot he uses to se-



Gaston, KT7RUN, steps viewers through his process and preparations for targeted communications.



Gaston, KT7RUN, demonstrates targeted communications using digital modes during Winter Field Day 2024.



Gaston, KT7RUN, explains to viewers how to calculate the appropriately sized battery. His power distribution system for his shack is visible in the background.

cure lines and explaining why he chooses to guy his mast at different heights. While many YouTubers tend to focus on the broader picture, Gaston takes the time to get into the nitty-gritty.

The fact that amateur radio operating fits so well with other interests and hobbies is what makes it so appealing to many people. In his video titled “HF Comms, Hunting, Camping and Food – Winter Field Day 2024” (<https://tinyurl.com/kt7run-wfd>), Gaston mixes many of his loves with Winter Field Day.

In true Tech Prepper style, Gaston spends considerable time detailing his setup and changes he has made to his equipment. His channel has a significant following of people who stay up to date on his journey through amateur radio and preparedness, so this sort of explanation shows just how in tune he is with his subscribers.

Power for Portable Operations

As a part of any portable communications setup, how it is powered is critical. In Gaston’s video “How to size a battery for Amateur Radio” (<https://tinyurl.com/kt7run-battery>), he shares his preference for battery type for portable operations. One interesting tidbit from this video is the fact that Gaston powers all of his radios from a battery. He has never owned a power supply for amateur radio purposes.

Gaston then explains how to find the power requirements for the radio or gear you intend to use, and calculate the size of battery using that information. Per his style, Gaston takes the time to show viewers how to find the limitations of the battery itself, reminding hams to match the equipment needs to the power capabilities.

As you make communications plans and practical preparations, “The Tech Prepper” is a resource that

you can learn from. Gaston explains material in a way that makes sense and helps viewers understand not only how to do something, but why it is important. You can find The Tech Prepper at www.youtube.com/@TheTechPrepper.

Strays

QST Congratulates...

Carlos Roig Toledo, WP4AOH, for receiving the 2023 Instructor of the Year Award. The plaque was presented by Puerto Rico Section Manager René Fonseca, NP3O, and Puerto Rico Assistant Section Manager Leyda Rios, WP4RBK, during the 2024 ARRL Puerto Rico State Convention. Carlos is the Technical Coordinator for the Puerto Rico Section and is known as a great resource for new amateurs to learn about amateur radio.



Carlos Roig Toledo, WP4AOH (center), accepts the Instructor of the Year Award from Puerto Rico Section Manager René Fonseca, NP3O (left), and Puerto Rico Assistant Section Manager Leyda Rios, WP4RBK (right). [Luis Collazo, WP4RAQ, photo]

How's DX?

Clipperton Island — TX5S 2024 DXpedition Recap

In this month's column, guest author Gene Spinelli, K5GS, reflects on the TX5S team's DXpedition to Clipperton Island. For more information about Clipperton, refer to the January 2024 "How's DX?" column. More photos of the operation can be viewed at www.arrl.org/qst-in-depth.

In July 2022, the TX5S team began preparations by contacting Frank Lo Preste, owner of the *Shogun*, a sport-fishing boat. Frank and the *Shogun* had been to Clipperton before for scientific, sportfishing, and DXpedition projects.

Clipperton was administered from French Polynesia by the Office of the High Commissioner. We asked Philippe Gloaguen, FO4BM, to be our on-site Tahitian representative and to help me with the French translation of our proposal(s).

By law, a project on Clipperton must include scientific content. Philippe reached out to Anthony Tchékémian, a lecturer at the University of French Polynesia who published a book about Clipperton Island, to have him join the TX5S team as a visiting scientist. Joining Anthony was Patrick Leleu, a professor from the University of Orléans, and Jean-Francois Beaulieu, a representative of Association la Passion-Clipperton in Paris, whose goal is to protect Clipperton's environment.

We received the landing permit in March 2023. Jacky Calvo, ZL3CW/F2CW, was selected as the team leader, and I, K5GS; Steve Dyer, W1SRD, and Dave Lloyd, K3EL, became the co-leaders. After this, we began staffing the rest of the team. To keep team member fees reasonable, we needed a larger team than usual. In total, we had 16 experienced DX and/or contest operators. Besides me, Jacky, Steve, and Dave, we had: Glenn Petri, KE4KY; Rob Fanfant, N7QT; Walt Wilson, N6XG; Heye Harms, DJ9RR; Francesco Valsecchi, IK0FVC; Dave Jorgensen, WD5COV; Ricardo Rodrigues, PY2PT; Andreas Junge, N6NU; Arliss Thompson, W7XU; Chris Tate, N6WM; Nodir Tursun-Zade, EY8MM, and Paul Ewing, N6PSE.

Because the last major DXpedition to Clipperton was TX5K in 2013, we knew there would be significant interest from the DX community. Neither 60 meters nor FT8 operation had ever been used on the island before.

On January 9, our equipment was loaded aboard the



The seven-element over seven-element array that the TX5S team used for 6-meter Earth-moon-Earth (EME). Note the counterbalances. [Andreas Junge, N6NU, photo]

Shogun. We departed San Diego on January 11 for the planned 6-day transit. The boat had a Starlink terminal, so email and Wi-Fi calling were available. The journey to Clipperton took about 1.5 days longer than planned due to weather issues.

Landing and Campsite

Clipperton is surrounded by a reef that lies just below the waterline 25 – 50 meters from the beach. Both the High Commissioner and the *Shogun's* owner said there would be challenges getting over the reef. We used three custom-made aluminum skiffs for the landings. It was possible to go ashore only during high tide and daylight hours. The *Shogun's* crew brought over meals, drinking water, and generator fuel.

The campsite consisted of nine sleeping tents, a kitchen/dining building, an HF operating building, a dedicated Earth-moon-Earth (EME)/6-meter/satellite operating tent, and the headquarters tent. There were no serious injuries — only some sunburn and several conditions treated by the team doctor, Arliss.

Radios and Antennas

Each operating position had either an Elecraft K3S or K4D transceiver. Amplifiers included either an Elecraft KPA500, a KPA1500, or a FlexRadio PGXL. There were no equipment failures.

Our HF antennas included monoband vertical dipole arrays and vertical antennas for 40, 60, 80, and 160 meters. We were close enough to the sea and the island's lagoon to benefit from the saltwater amplifier effect. The 160-meter antenna was the "Top Band Express," built by Dave Jorgensen, WD5COV. While it was always windy, we had very few antenna problems. The pilot team was communicating with us via Starlink. This was our second DXpedition for which we used a Groups.io account, allowing the DX community to provide input to the pilots.

All five operating positions were in action during periods of good propagation. As high-band propagation waned during the night, single sideband was usually the first to drop, and then we would shift to FT8. We used the same operating schedule from our Ducie Island (VP6D) and South Orkney Islands (VP8PJ) DXpeditions. For each 4-hour shift, operators were scheduled on the five stations. Every few days, each of the three radio teams would move their start time by 4 hours.

EME/6-Meter/Satellite Activity

The first moonrise operation yielded a handful of 6-meter EME Q65 contacts. On the following day, after working a few EME contacts, the *WSJT-X* screen started to show many strong signals coming in directly via tropospheric scatter. We worked as many stations as we could during the opening. The final EME count was 17 contacts and three countries. However, over the next few days, we added 197 6-meter tropospheric scatter contacts and 13 countries to the log, including NA, SA, AF, ZL, and VK.

Additional activity was on 23 centimeters/1296 MHz. Due to the constant wind, the 2.4-meter dish was converted from fabric to wire mesh. On this band, we made 55 contacts in 17 countries.

TX5S Statistics

We made a total of 113,736 contacts and the distribution was: NA 48.1%, EU 29.4%, AS 17.8%, SA 2.2%, AF 0.46%, and OC 1.96%, with 23,806 unique call signs and 171 DXCC entities.

The number of not-in-log/busted call sign inquiries was low, at only 268 inquiries. The operators paid close attention to logging accuracy. While averages don't always tell the full story, we averaged an amazing 14,217 contacts a day. Two days resulted in more than 18,000 contacts each.

During the voyage to Clipperton, we operated as N6WM/MM. We did not operate maritime mobile on the return voyage. Our two Starlink terminals were online 24/7 while we were on the island, enabling communication with friends and family. We used Club Log's livestream feature and made daily log uploads to M0URX's Bespoke Online QSL Request System application.

The Science Team

The primary interest of our team scientists was to study the island's rat population. Using infrared cameras and data-recording instruments, they tracked rat movements at night. Another aspect of their study was an assessment of future uses for Clipperton Island. These three gentlemen blended well with the radio team, and for the most part, they did their work away from the radio operations.

Departure

On January 27, we removed some equipment and operators from the island. The remaining operators made contacts until shutdown on January 28. The morning's high tide allowed this additional operating time, but there was monsoon-like rainfall during the final takedown. The 8-day trip back to San Diego was very rough, and we were greeted by rain once we arrived.

Sponsors and Wrap-Up

We received the following support from manufacturers and amateur radio equipment distributors: Elecraft loaned two K4D transceivers and two KPA1500 amplifiers; DX Engineering donated coax, connectors, tools, antenna parts, aluminum tubing, and countless other accessories; Arlan Communications loaned eight RadioSport headsets; Bart Bzymek, SQ1K, designed and provided the TX5S clothing; The DX Store subsidized the cost of several shipping cases; M0URX United Radio QSL Management Bureau and ON5UR QSL Printing subsidized the cost of QSL card production, and The Daily DX was a financial sponsor. The generosity and ongoing support of these firms are greatly appreciated.

Our major financial sponsors were as follows: the Northern California DX Foundation, the German DX Foundation, the International DX Association, the European DX Foundation, the UK DX Foundation, and the Clipperton DX Club, as well as many other clubs, foundations, and individuals.

The highlights of this project were giving many DXers all-time new ones and/or band fills, logging the first FT8 and 60-meter contacts from Clipperton, and working with a fantastic team of operators and a wonderful support team. We must also recognize the *Shogun* crew, who were as much a part of the project's success as the radio team. Until the next time, thank you for your interest in TX5S Clipperton Island 2024.

See QST in Depth for More!

Visit www.arrl.org/qst-in-depth for the following supplementary materials and updates:

- ✓ More photos of the TX5S Clipperton Island DXpedition

The World Above 50 MHz

Satellite Activity Can Expand Your VHF/UHF Horizons



I was intrigued by the TX5S Clipperton Island DXpedition team's use of the IO-117 GreenCube satellite on 435 MHz; they made more than 500 contacts on it. Satellite operation (active satellites and not passive satellites, like the moon) is another facet of VHF/UHF/microwave activity. It is an interesting and challenging pursuit with awards like VHF/UHF Century Club, Worked All States (WAS), and even DXCC. Many VHF enthusiasts considerably invest in their station equipment, and satellite operation can expand its use.

Amateur satellite activity started with the launch of OSCAR 1 in 1961. OSCAR 3 — like a ground-based repeater in orbit — was the first satellite to carry a transponder, allowing stations to use it to make contacts. Early satellites were in low Earth orbit (LEO), as are most of the current ones. LEO satellites orbit Earth at altitudes of less than 2,000 kilometers, which limits the potential range of contacts. Starting in 1983, several amateur satellites were launched into highly elliptical Molniya-type orbits pioneered by the Soviet Union. These satellites included OSCARs 10, 13, and 40. They had higher power, more diverse communication transponders, and a larger footprint than LEO satellites, and they could “see” nearly an entire hemisphere of Earth at apogee. From HC8N in the Galápagos Islands, I used OSCAR 13 along with 40 W and a small W5UN Quagi antenna to work Europe stations on 435 MHz single sideband (SSB) for hours. These higher-orbit satellites are now off the air. QO-100 is in high Earth orbit, but it has a fixed footprint available to only part of Earth. The rest of the currently active amateur satellites are in LEO.

In 2022, IO-117 was launched in medium Earth orbit with a 70-centimeter digipeater on 435.310 MHz. It is the highest-orbiting amateur satellite currently on the air that is available from anywhere on Earth. The longest contact reported through IO-117 was between DK9JC and VK6PY at a distance of 13,056 kilometers! If you have a computer, a 70-centimeter station, and a directional antenna with 12 dBi or more gain, you have most of what you'll need to operate via IO-117. Several software programs are required, including a modem and a GreenCube terminal program for IO-117 packet operation. The packet messages are short, much like FT8. An example of a received IO-117 message is: 04.12.22 17:29 XE2YWH ALL CQ DL92.

One important point is that the packet contacts must take place in real time to count for awards. IO-117 has a “store and forward” function that can allow delayed contacts. Set the RX delay to 0 to avoid this. There are some online resources for those interested in operating via IO-117. Ryan Zink, KI7QEK, discussed using a Yaesu FT-847 and a handheld antenna to do so at www.ki7qek.com/blog/ft-847-greencube. Fred Kemmerer, AB1OC, has a detailed explanation of setting up to operate IO-117 at www.stationproject.blog/2023/07/04/greencube-io-117-setup.

AH6FX's Well-Timed Activity from Hawaii

Danny, AH6FX, was active from Hawaii during the late March geomagnetic storms. He once again operated with a four-element SteppIR from grid BK29, about 4 miles from the top of Kilauea Volcano on the Big Island. Danny said:

Six-meter conditions were much different from my last visit exactly 1 year before, when I worked 39 new DXCC entities. Specifically, we had a significant geomagnetic storm this year on March 24. Despite a quiet band days before, I completed FT8 contacts with nine South America stations (in Brazil, Argentina, and Uruguay) between 0303 and 0407 UTC on [March 23].

On March 24, from 1900 to 1940 UTC, Danny logged only four stations from Hawaii, Brazil, and Chile. Note the South America opening that was also experienced the day before. The coronal mass ejection impact happened on the same day, triggering the severe G4-class geomagnetic storm.

Danny continued:

A major 6-meter opening occurred on March 25 between about 2000 and 2230 UTC into the US mainland, Mexico, Paraguay, Guatemala, Ecuador, the Galápagos, and Chile, resulting in 52 FT8 contacts. Earlier in the day, five other contacts were made at around 0100 – 0130 UTC with surprisingly strong signals, as a southerly path opened to Chile and Brazil. Oddly enough, signal paths shifted primarily to the Asia-Pacific region on March 26 between 0230 and 0445 UTC as 61 stations were worked, including two each from Ecuador and Brazil. New Caledonia was heard, but not worked.

AH6FX's 6-meter scorecard (number of 6-meter contacts for each country, represented by call sign prefix) is as follows: BY (3), BX (3), CE (7), CX (2), TG (1), HC (3), HD8 (1), HK (1), JA (48), W (26), KH6 (2), LU (1), PY (15), VK (1), VR (2), XE (12), and ZP (3).

March F2 Openings Had Heavy QRM on 50.313 MHz

Many North America stations commented on the difficulty of working DX stations on 50.313 MHz during the March F2 openings. The DX stations were very loud, but they could not copy many North America stations. F-layer openings often have much larger footprints compared to sporadic E. Frank Donovan, W3LPL, noted that multi-hop sporadic-E footprints are small — usually only 100 × 200 kilometers or less — which limits callers. Stations in the Caribbean, Central America, and South America had coast-to-coast PSK flags on 6 meters, as well as flags from the Gulf of Mexico to Canada. The huge pileups from strong F2 North America stations chasing a few DX stations created noise floor compression in the narrow 2.5 kHz – 50.313 MHz FT8 channel, which pushed weaker stations into the noise. Is there a solution? The 50.323 MHz frequency has been used by Europe and Asia stations during the summer E_s seasons. The CB0ZA Robinson Crusoe Island DXpedition team used 50.310 MHz, and VP8LP was on 50.318 MHz FT4. Next time 50.313 MHz is overwhelmed, consider using 50.323 MHz or other frequencies.

On the Bands

50 MHz. On April 4, the YJ0VK Vanuatu DXpedition team worked stations in Central and North America, starting with XE1YY at 2248 UTC, and then TG9AJR, W5RY, AJ4F, and K3FM. Glenn Johnson, W0GJ (EN43), worked YJ0VK at 1815 UTC on April 5, on an otherwise “dead band.” John Green, A2NEW (KG25), worked W6UC (DM05) using a quarter-wave mobile whip on his car on April 8. On April 14, Martin, PJ4MM (FK52), had VK8AW (PH57) in at +10 dB via long path. Four days later, Abdallah, 9K2GS (LL39), worked 9V1XX at 1450 UTC (this information is courtesy of Steve, NN4X). There was sporadic E along the eastern seaboard in the afternoon on April 19, from the Gulf Coast states to Ontario and the W1 and W2 regions. I, N0JK (EM28), NO0T/P (DN70), WQ0P (EM19), and W0LGQ (EN21) received PY2XB (GG66) early in the morning on April 20, at 1340 UTC. XE1MEX (EK08) worked VK9DX (RG30) “for a new one” at 0050 UTC on April 21. Jay, K0GU (DN70), said, “I hear most of Colorado working VK9DX.” Robert, W5AJ, operated for a few hours from rare grid DL79 on April 21 and made 10 contacts via MSK144. His best DX was N0PB (EM39). Later that same day, ZL3OZ (RE55) worked Trey Garlough, N5KO (CM97), at 2300 UTC on 50.125 MHz SSB.



Paul Andrews, W2HRO (left), and Jay Baack, N1AV (right), operating as N1V from Oahu, Hawaii, in March 2024. Paul's 10 GHz dish setup with an SL-1 rotor can be seen in the background. [Jay Baack, N1AV, photo]

144 MHz. On April 4, Steve Sacco, NN4X (EL98), worked AA4ZZ (EM96) with strong signals on FT8 via tropospheric propagation. Eden, ZF1EJ (EK99), worked stations in Florida as far north as WB4OMG (EL98), also via tropospheric propagation on April 13. NN4X and K4CVL worked ZF1EJ the same way on April 14. Aurora appeared on April 19 with a G3-class geomagnetic storm. VE3DS (FN03) spotted NZ3M (FN10) and WA2AEY (FN23) on CW. W5EME (EM32) worked VE3JO (EN93) on MSK144 on April 21, during the Lyrid meteor shower.

1296 MHz and 10 GHz. On March 5 – 10, N1V (N1AV and W2HRO) operated from Hauula (BL11) on the northeastern shore of Oahu, Hawaii. They were on 902, 1296, and 2304 MHz, as well as 10 GHz. They said, “This location was optimal, as it had nothing but ocean between us and the moon.” N1V gave DL8FBD his state #50 for WAS on 1296 MHz. They worked FG8OJ for the first Guadeloupe – Hawaii contact on 1296 MHz, and they also made the first 10 GHz Earth-moon-Earth (EME) contacts from Hawaii. The stations they worked on 10 GHz (using a 1-meter dish) included W7CJO, DL3WDG, OK1KIR, PA3DZL, PA0BAT, W5LUA, F5VKQ, OK1DFC, and OZ1LPR. N1AV and W2HRO are planning another trip to Hawaii in 2026.

Here and There

VK0DS is now active from Antarctica on 1296 MHz EME with a 2.4-meter dish and 70 W linear polarization. This is a one-person operation by Dave, VK2DJS, and he will continue to be active there for a year (this information is courtesy of the “432 MHz and Above EME Newsletter”).

Special Event Stations

Working special event stations is an enjoyable way to help commemorate history. Many provide a special QSL card or certificate!

May 4 – July 21, 0000Z – 0000Z, TM24JB, Fort Blackmore, France. F1SXC. **Homage to Josephine Baker, the Voice of the Paris Olympic Games 2024**. 7.124 14.154 18.124 28.424. QSL. David, F1SXC/Radio-club de Saint-Quentin-Yvelines, F6KPK, 1 bis avenue des Frênes, Montigny-Bretonneux 78180, France. www.qrz.com/db/tm24jb

June 1 – June 28, 0000Z – 2359Z, GB80DDAY, Berkshire, England. Newbury and District Amateur Radio Society. **GB80 D-Day — World War II D-Day 80th Anniversary**. All bands; all modes. QSL. See website for QSL information. Operating from the control tower each Saturday, and Thursday, June 6; remote at other times. www.nadars.org.uk

June 29 – July 6, 1700Z – 2200Z, N4V, Sewanee, TN. National Speleological Society (K7NSS). **83rd Annual National Speleological Society Convention**. 7.050 7.195 14.050 14.285. QSL. Sam Rowe, KG9NG, 2749 Commercial Ave., Madison, WI 53704. n4v@nssces.org

July 1 – July 5, 0100Z – 0400Z, K2BSA/8, Metamora, MI. Garden City Amateur Radio Club/Boy Scouts of America/ Michigan Crossroads Council. **Trail to Eagle**. 3.840 7.270 14.330. QSL. GCARC, P.O. Box 482, Garden City, MI 48136-0482. We will monitor frequencies depending on operator availability. <https://scoutingevent.com/272-TTE2024>

July 6, 1400Z – 2000Z, K4RC, Williamsburg, VA. Williamsburg Area Amateur Radio Club. **Colonial Williamsburg Special Event**. 7.265 14.265. Certificate & QSL. QSL Manager, WAARC, P.O. Box 1470, Williamsburg, VA 23187. The Historic Triangle Certificate is available for contacting the Jamestown, Williamsburg, and Yorktown Special Event Stations. www.k4rc.net/events/special-event-stations

July 12, 1800Z – 2100Z, N3TAL, Lanham, MD. American Legion Post 275 Amateur Radio Team. **Bladensburg World War I Peace Cross**. 7.275. QSL. American Legion Post 275 Amateur Radio Team, 8201 Martin Luther King Jr. Hwy., Lanham, MD 20706. n3tal275@gmail.com or www.qrz.com/db/n3tal

July 13, 1600Z – 2300Z, N6IW, San Diego, CA. USS Midway Museum Ship. **Commemorating US Independence Day**. 7.250 14.320; 14.070 PSK31; D-STAR on PAPA System repeaters. QSL. USS Midway Museum Ship COMEDTRA, 910 N. Harbor Dr., San Diego, CA 92101. www.qrz.com/db/n6iw

July 14, 1700Z – 2100Z, W2E, Esperance, NY. Schoharie County Amateur Radio Association. **Esperance Presbyterian Church Bicentennial**. 7.055 14.240. QSL. Schoharie County Amateur Radio Association, P.O. Box 394, Warnerville, NY 12187. wa2zwm.scara@gmail.com or www.schoharieamateurradio.org

July 14 – July 22, 1300Z – 2100Z, W1S, Calais, ME. St. Croix Valley Amateur Radio Club. **Celebrating St. Croix Island Landing 1604**. 7.200 14.270 21.300 28.600. QSL. Roger Holst — W1S, 70 Cooper Rd., Baileyville, ME 04694. QSLs will be available via LoTW. www.stcroixvalleyamateurclub.com

July 19 – July 21, 1300Z – 2200Z, W3A, Hunt Valley, MD. Amateur Radio Club of the National Electronics Museum. **W3A Commemoration of Live TV from the Moon that Allowed the World to See Mankind's First Steps on the Lunar Surface**. 7.069 7.269 14.069 14.269. Certificate & QSL. ARCNE, 338 Clubhouse Rd., Hunt Valley, MD 21031. Operation on 80 meters, 3.869 and 3.569; digital modes possible during event. www.wv-2.us

July 20, 1300Z – 2100Z, K3S, Baltimore, MD. Nuclear Ship Savannah Amateur Radio Club. **Nuclear Ship Savannah Launch Anniversary**. 7.1 14.1 21.1 28.1. QSL. K3LU, 980 Patuxent Rd., Odenton, MD 21113. Check spotting networks. www.qrz.com/db/k3s

July 20, 1300Z – 2100Z, W4DOC, Kennesaw, GA. Atlanta Radio Club. **Railroad Rendezvous**. 7.250 14.200. QSL. Atlanta Radio Club/Railroad, 227 Sandy Springs Pl., Ste. D-306, Atlanta, GA 30328. www.atlantaradioclub.org/railroadrendezvous

July 22 – July 27, 0000Z – 2359Z, W4H, Albion, NY. Orleans County Amateur Radio Club. **Orleans County 4-H Fair**. 7.180 14.074. QSL. Orleans County Amateur Radio Club, 14064 W. County House Rd., Albion, NY 14411. www.ocarc.us

July 22 – July 28, 1300Z – 2030Z, W9ZL, Appleton, WI. Fox Cities Amateur Radio Club. **EAA AirVenture 2024**. 7.250 14.270 50.150. Certificate. W9ZL Special Event Station, P.O. Box 2346, Appleton, WI 54912. www.fcrc.club

July 22 – July 29, 1400Z – 0200Z, K4TLH, Tallahassee, FL. Tallahassee Amateur Radio Society. **Tallahassee, Florida Bicentennial**. 7.260 14.260 28.380; all frequencies, all modes; repeater contacts are not valid. Certificate. Email only to wa6poz@arri.net; include log information, date, time (UTC), frequency, and signal report. www.k4tlh.org

July 26 – Aug. 9, 0000Z – 2359Z, TM2024JOP, Lillers, France. Union des RadioClubs. **Jeux Olympiques de Paris 2024**. 7.000 14.000; all bands will be activated. Certificate & QSL. Union des RadioClubs, 3 rue Saint Luge, Lillers 62190, France. <https://log-et-qsl.associationsradioamateurs.org/wp>

July 27, 1200Z – 2200Z, NJ2KC, Hammonton, NJ. New Jersey Knights of Columbus Amateur Radio Club. **50th Anniversary of Discovery House**. 14.250 28.450; other HF frequencies possible. Certificate & QSL. Thomas M. Perrotti, N2JIE, 785 Vineland Ave., Bridgeton, NJ 08302. www.nj2kc.org or <https://dmi-nj.org>

July 27, 1500Z – 2000Z, WSBXR, Davenport, IA. Davenport Radio Amateur Club. **50th Annual Bix 7 Road Race**. 14.326. QSL. Davenport Radio Amateur Club, W0BXR, P.O. Box 1523, Davenport, IA 52809. www.drac.club

July 27 – July 31, 0000Z – 2359Z, W4R, Dallas, GA. Silver Comet Amateur Society. **World Ranger Day**. FT8: 7.074 14.074; SSB: 7.240 14.240. Certificate & QSL.

David Walk, K4BBH, 46 Ashwood Ct., Rockmart, GA 30153.
www.qrz.com/db/w4r or www.silvercometars.com

July 28 – July 29, 1400Z – 0100Z, WW5HF, Marion, TX. The HiFivers Amateur Radio Club. **Buffalo Soldiers — Commemorating the Official Formation Date of July 28, 1866.** 14.074 14.295 28.074 28.500. QSL. HiFivers Amateur Radio Club, 15480 Bexar Bowling Rd., Marion, TX 78124.
www.qrz.com/db/ww5hf

July 29 – Aug. 2, 1900Z – 2300Z daily, K2BSA/8, Boulder, CO. Boy Scouts of America. **2024 National Order of the Arrow Conference.** 7.200 14.290 18.140. QSL. Frederick Donkin, 6092 Contadora Dr., Salt Lake City, UT 84128. *Operating from CU Boulder. QSL via LoTW.* ka7mmm@arrrl.net

July 31 – Aug. 3, 1300Z – 1200Z, W8W, Bryan, OH. Williams County Ohio Amateur Radio Association. **127 Yard Sale/ New Hope Community Church Mission to Uganda.** 146.820 PL 107.2; 3.900 7.230 14.250. QSL. Williams County Amateur Radio Association, 3440 County Road 9, Bryan, OH 43506. wmscoarc@gmail.com

Certificates and QSL cards: To obtain a certificate from any of the special event stations offering them, send your QSO information along with a 9 × 12-inch self-addressed, stamped envelope (3 units of postage) to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, use the ARRL Special Events Listing Form at www.arrrl.org/special-events-application, or email information to events@arrrl.org.

Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; a special event listing for **October QST** would have to be received by **August 1**. In addition to being listed in *QST*, your event will be listed on the ARRL Web Special Event page. **Note:** All received events are acknowledged. If you do not receive an acknowledgment within a few days, please contact us. ARRL reserves the right to exclude events of a commercial or political nature.

You can view all received Special Events at www.arrrl.org/special-event-stations.

Field Organization Reports | April 2024

Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories.

Details on the program can be found at: www.arrrl.org/public-service-honor-roll.

865 AD8CM	186 W1RVY	148 KO4KUS NI2W	KA9QWC W2AH	102 N3KRX	K3RC WB3FTQ K8RDN AA3N W4KX K2MTG K5OB AB9ZA K8ED N2GS W2QMI N1CVO	WA3QPX KB0DTI	76 KN4AAG W5XX KA0DBK	73 KA1G K6RAU K2PHD	71 K1STM
415 N9VC	185 AG9G AC8NP KC8YVF ND8W	145 KC9FXE KD2LPM N3GE	119 KC3MAL	100 KZ8Q WB4RJW K5OB NX9K KB8GUN WB8SIQ N8MRS KA5AZK N4CNX W4EDN K3YAK KA2HZP KB1NMO N1LAH KC1KVY	89 W4NHO	78 KE8CYC K4DH KC1TLF	74 KF5IOU W3ZR	72 KF0BPN KD2TBS N0ET	70 N3RB
390 WM5N	175 AC0KQ	143 WM2C	115 KD0HHN K7OED K9ANP KB8PGW WX2DX KC1OIP	114 W8IM	87 N2TSO				
370 WA3EZN	174 WB8YYS KB3YRU	140 WA3QLW K9LGU WO2H KK3F	112 N5RH	98 WB2VUF	85 K4FHR W2OOD WB8R				
280 N2LC	170 KV8Z W4DNA KC8T	135 W3YVQ KD8ZCM	110 KM4WHO AD4DO KO4OL WB8TQZ KB2QO NW3X N1IQI	97 AA3SB	83 WB8RGE KB3MXK				
277 W9EEU	169 W1LEM	130 W4CMH WB9WKO W2PAX KE4RS K8MDA N2JBA WK4WC KW1U N1UMJ WZ0C	109 WV5Q	96 KA9IKK	82 K6JT				
276 W7EES	168 KT4WX	125 KE5YTA	108 KC1HHO	91 KE8HKA	80 KG4AOP AE2EY W7FSC KR4ST KA8BJA K3EAM				
244 KE8DON	165 W9GRG	122 N2DW	106 WW3S	90 KB9GO KC9UC WB4RGE W8GSR K8KRA KB8HJJ N8OD	79 W7MIN N0JAR				
235 KD8UUB	161 KT5EM	120 WC4FSU KB4OLY WA4VGZ KC8WH K3JL	105 WD8USA						
225 W0PZD K8AMH	160 N8SY								
223 KB5PGY	157 W5WMC								
215 KT2D	155 N1ILZ								
205 KF5OMH	150 KR4PI N0DMP K1XFC W1TCD								
200 KE8ANW									
190 KT5SR W8MAL									

The following stations qualified for PSHR in previous months, but were not acknowledged in this column yet. (Mar.) W9EEU 212, K1XFC 174, WV5Q 123, NA7G, KA9QWC, KY2D 120, N7IE 118, WA1URS 110, W1KX 100, KB1NMO 93, NT1N 91, N7UWX, AB9ZA 90, KB0DTI 78, K1STM 77, W5XX 73, W9BGJ 70.

Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CO, CT, DE, EMA, ENY, EPA, GA, IN, KS, KY, LA, MDC, MI, MO, MS, NC, ND, NE, NFL, NLI, NM, NNJ, NNY, NTX, OR, RI, SFL, SJV, SNJ, STX, TN, WCF, WI, WMA, WPA.

Section Emergency Coordinator Reports

The following Section Emergency Coordinators reported: AL, CT, DE, ENY, EPA, GA, KY, MI, MO, MS, NLI, NV, PAC, RI, SCV, SNJ, STX, TN, VA, WCF, WMA, WPA, WTX, WY.

Brass Pounders League

The BPL is open to all amateurs in the US, Canada, and US possessions who report to their SMs a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

NX9K 2,036, W2AH 1,227, WB9WKO 921, WA3QLW 825, N9CK 801, KW1U 624, KK3F 520.

The following stations qualified for BPL in March 2024, but were not acknowledged in this column yet. KY2D 2,005, NS7K 1,282.

Convention and Hamfest Calendar

A = AUCTION
D = DEALERS / VENDORS
F = FLEA MARKET
H = HANDICAP ACCESS
Q = FIELD CHECKING OF QSL CARDS
R = REFRESHMENTS
S = SEMINARS / PRESENTATIONS
T = TAILGATING
V = VE SESSIONS

Abbreviations

Spr = Sponsor
TI = Talk-in frequency
Adm = Admission

Alabama (Cullman) — July 13 **D F H Q R T V**

7 AM – 1 PM. *Spr*: Cullman ARC. Cullman Co. Fairgrounds, 1501 Sportsman Lake Rd. NW. *TI*: 145.310 (100 Hz). *Adm*: \$5. www.cullmanarc.com/hamfest

Arizona (Flagstaff) — July 20 **D F H Q R S T V**

7 AM – 3 PM. *Spr*: Northern Arizona DX Association, Amateur Radio Council of Arizona. Sinagua Middle School, 3950 E. Butler Ave. *TI*: 146.98 (162.2 Hz) *Adm*: \$5. www.flagstaffhamfest.org

Colorado (Grand Junction) — Aug. 10 **F H Q R S T V**

9 AM – 3 PM. *Spr*: Western Colorado ARC. First Christian Church, 1326 N. 1st St. *TI*: 146.94 (107.2 Hz). *Adm*: \$15. www.w0rrz.org

Colorado (Monument) — July 27 **D F H R S V**

8 AM – 1 PM. *Spr*: Pikes Peak Radio Amateur Association. Lewis-Palmer High School, 1300 Higby Rd. *TI*: 147.345 (107.2 Hz). *Adm*: \$5. www.ppraa.org/megafest

Florida (Milton) — July 26 – 27 **D H Q R V**

Fri. 3 PM – 8 PM, Sat. 8 AM – 1 PM. *Spr*: Milton ARC. Santa Rosa Co. Auditorium, 4530 Spikes Way. *TI*: 146.700 (100 Hz). *Adm*: \$6 Advance, \$7 door. www.miltonarc.org

ARRL IDAHO STATE CONVENTION

August 3, Post Falls, Idaho

D F H R S T V

8 AM – 3 PM. *Spr*: Kootenai ARS. Outdoor venue, 2130 N. Meyer Rd. *TI*: 146.52. *Adm*: \$5. www.k7id.org

Illinois (Carlinville) — Aug. 3 **D F H Q R S T V**

7 AM – noon. *Spr*: Macoupin Co., Montgomery Co., Okaw Valley, Sangamon Valley ARCS. Macoupin Co. Fairgrounds, 21368 State Rte. 4. *TI*: 444.250 (103.5 Hz). *Adm*: \$10. www.wcilhamfest.com

Illinois (Peotone) — Aug. 4 **D F H R S T**

6 AM – 1 PM. *Spr*: Hamfesters Radio Club. Will Co. Fairgrounds, 710 S. West St. *TI*: 146.52. *Adm*: \$8 Advance, \$10 door. www.hamfesters.org

Indiana (Auburn) — July 20 **D F H R T**

9 AM – 2 PM. *Spr*: Northeastern Indiana ARA. Auburn Cord Duesenberg Museum, 1600 Wayne St. *TI*: 147.015 (141.3 Hz). *Adm*: Free. www.w9ou.org

Indiana (Avon) — Aug. 10 **T**

8 AM – 1 PM. *Spr*: Ham Emergency Radio Operations. Avon United Methodist Church, 6850 E. US Hwy. 36. *TI*: 145.13 (88.5 Hz). *Adm*: \$5. Email: kc9sqd425@gmail.com

ARRL CENTRAL DIVISION CONVENTION

August 3, Elkhart, Indiana

D F H Q R V

9 AM – 2 PM. *Spr*: Northern Indiana K9DEW Repeater Network. Northern Indiana Event Center, 21565 Executive Pkwy. *TI*: 147.330 (131.8 Hz). *Adm*: \$8. www.elkharteasthamfest.com

Indiana (Portland) — July 27 **D F H R V**

8 AM – 2 PM. *Spr*: Jay Co., Whitewater Valley, Randolph Co. ARCS. Jay Co. Fairgrounds, 806 E. Votaw St. *TI*: 443.475 (100.0 Hz), 145.210 (97.4 Hz). *Adm*: Free. www.sites.google.com/view/ecindianahamfest/home

CENTRAL STATES VHF SOCIETY CONFERENCE

July 25 – 26, Cedar Rapids, Iowa

D F H R S

Thurs. 2 PM – 10 PM, Fri. & Sat. 8 AM – 10 PM. *Spr*: Cedar Rapids Microwave Society. Radisson Hotel Cedar Rapids, 1200 Collins Rd. NE. *TI*: 146.745 (192.8 Hz). *Adm*: See website. www.csvhfs.org

Iowa (Central City) — Aug. 3 **D F H R S T V**

8 AM – 5 PM. *Spr*: Cedar Valley ARC. Linn Co. Fairgrounds, 201 Central City Rd. *TI*: 146.735 (192.8 Hz). *Adm*: \$10. www.w0gq.org/hamfest

Iowa (Davenport) — Aug. 10 **D F H R T**

8 AM – 5 PM. *Spr*: Davenport Radio Amateur Club. Iowa Army National Guard, 5300 W. Kimberly Rd. *TI*: 146.88 (77 Hz). *Adm*: \$8 Advance, \$10 door. www.drac.club

Kansas (Hutchinson) — Aug. 10 **D F V**

8 AM – 1 PM. *Spr*: Reno Co. Kansas ARA. HCC Fire Science Building, 3211 E. 4th Ave. *TI*: 147.120 (103.5 Hz). *Adm*: \$5. www.rckara.org

Kentucky (Whitesburg) — Aug. 10 **F H R V**

8 AM – 1 PM. *Spr*: Letcher Co. ARC. The Mountain Shrine Club, 95 Maryland Dr. *TI*: 444.6625 (103.5 Hz). *Adm*: \$5. www.lcarcky.com

Michigan (Rapid River) — Aug. 3 **D H R**

9 AM – 2 PM. *Spr*: Delta Co. ARS. American Legion Post 301, 10584 Main St. *TI*: 147.15 (109 Hz). *Adm*: \$5. Email: waho@chartermi.net

Minnesota (Brewster) — Aug. 10 **F H R S**

9 AM – 1 PM. *Spr*: Northern Plains Regional Radio Council. Brewster American Legion Post 464, 3rd Ave. *TI*: 146.67 (141.3 Hz). *Adm*: \$5. www.facebook.com/groups/613395962166982

Missouri (Warrensburg) — July 20 **D F H R S T V**

8 AM – noon. *Spr*: Warrensburg Area ARC. Johnson Co. Fairgrounds, 386 NW. 145th Rd. *TI*: 146.88 (107.2 Hz). *Adm*: Free. www.waarci.org

Missouri (Washington) — July 21 **D F H R T V**

7 AM – noon. *Spr*: Zerobeaters ARC. Washington KC Hall, 1121 Columbus Ln. *TI*: 147.240. *Adm*: \$7. www.zerobeaters.org

Montana (Essex) — July 19 – 21 **D F H Q R S T V**

8 AM – 10 PM. *Spr*: Great Falls Area ARC. Glacier Meadow RV Park, 15735 US 2. *TI*: 146.52. *Adm*: \$26 Advance, \$30 door. www.gwhamfest.org

Nebraska (North Bend) — July 13 **D F H Q R V**

8 AM – 12:30 PM. *Spr*: Pioneer ARC. North Bend City Auditorium, 741 N. Main St. *TI*: 443.90, 146.67 (100 Hz). *Adm*: \$5. www.k0sw.org

New Jersey (Augusta) — July 14 DFHQRTV

8 AM – 3 PM. *Spr:* Sussex Co. ARC. Sussex Co. Fairgrounds, 37 Plains Rd. *Tl:* 147.30 (151.4 Hz). *Adm:* \$8. www.scarcnj.org

2024 EME CONFERENCE

August 9 – 11, Ewing, New Jersey

DFHRST

All day Fri. – Sun. *Spr:* Delaware Valley Radio Association, Mt. Airy VHF Radio Club, IEEE Princeton Section, The College of New Jersey ARC. The College of New Jersey, 2000 Pennington Rd. *Adm:* \$125. www.eme2024trenton.org

New Jersey (Wall Township) — July 27 DFHRT

8 AM – noon. *Spr:* New Jersey Antique Radio Club. InfoAge Science and History Museums, 2201 Marconi Rd. *Adm:* \$5. www.njarc.org

New York (Alexander) — July 20 DFHRTV

6 AM. *Spr:* Lancaster ARC. Alexander Firemen Grounds, 10708 Alexander Rd. (Rte. 98). *Tl:* 147.285 (141.3 Hz). *Adm:* \$10. www.w2so.org

New York (Camillus) — July 13 FHRTV

7:30 AM – 12:30 PM. *Spr:* Radio Amateurs of Greater Syracuse. Camillus Elks Lodge #2367, 6117 Newport Rd. *Tl:* 146.91 (103.5 Hz). *Adm:* \$5. www.ragsclub.org

New York (Speculator) — Aug. 10 FHRTV

8 AM – noon. *Spr:* Southern NNY Section Clubs. Sacandaga Park & River Walk, 2834 NY-30. *Tl:* 147.165. *Adm:* Free. www.adkhamfest.org

New York (Trumansburg) — Aug. 3 DFHRT

7 AM – noon. *Spr:* Tompkins Co. ARA. Trumansburg Fairgrounds, 2150 Trumansburg Road/NYS Rte. 96. *Tl:* 146.970, 146.370 (103.5 Hz). *Adm:* \$5. www.tcara-ny.org

North Carolina (Cary) — July 20 FHRTV

8 AM – 1 PM. *Spr:* Cary ARC. Ritter Park, 301 W. Lochmere Dr. *Tl:* 148.88 (82.5 Hz). *Adm:* \$5. www.caryarc.org

North Carolina (Fayetteville) — Aug. 10 FHRTV

8 AM – noon. *Spr:* Cape Fear ARS. Cumberland Co. Shrine Club, 7040 Ramsey St. *Tl:* 146.910 (100 Hz). *Adm:* Free. www.cfarsnc.org

North Carolina (Salisbury) — July 13 DFTV

7 AM – 1 PM. *Spr:* Rowan Co. ARS. Salisbury Civic Center, 315 Martin Luther King Jr. Ave. S. *Adm:* \$5. Email: rmowery42@charter.net

North Carolina (Waynesville) — July 20 DFHRSTV

8 AM. *Spr:* Western Carolina ARS. Smoky Mountain Event Center, 758 Crabtree Rd. *Tl:* 147.39 (94.8 Hz). *Adm:* \$7 Advance, \$10 door. www.wcars-club.org

ARRL NORTH DAKOTA SECTION CONVENTION

July 13, Minot, North Dakota

FHRSTV

7 AM – 2 PM. *Spr:* Souris Valley ARC. Minot City Auditorium, 420 3rd Ave. SW. *Tl:* 146.97 (77 Hz). *Adm:* \$15. www.k0ajw.com

Ohio (Grove City) — Aug. 3 DFHR

8 AM – 1 PM. *Spr:* Aladdin Shrine Audio Unit. Aladdin Shrine Center, 1801 Gateway Cir. *Tl:* 146.76 (123.0 Hz). *Adm:* \$5. www.columbushamfest.com

Ohio (Owensville) — Aug. 10 DFHRTV

8 AM – 2 PM. *Spr:* Milford ARC. Clermont Co. Fairgrounds, 1000 Locust St. *Tl:* 147.345 (123.0 Hz). *Adm:* \$10. www.cincinnatihamfest.org

Ohio (Pierpont) — July 20 DFHRV

8 AM. *Spr:* Amigos Radio Club Ashtabula. Pioneer Picnic Campground, 1809 Middle Rd. *Tl:* 146.895 (141.3 Hz). *Adm:* Free. www.sites.google.com/view/arca-home

Ohio (Van Wert) — July 21 DFHT

8 AM – noon. *Spr:* Van Wert ARC. Van Wert Co. Fairground, 1055 S. Washington St. *Tl:* 146.850. *Adm:* \$10. www.w8fy.org

Oklahoma (Oklahoma City) — July 26 – 27 DFHQRSV

Fri. 3 PM – 6:30 PM, Sat. 8 AM – 3 PM. *Spr:* Central Oklahoma Radio Amateurs. Oklahoma City Community College, 7777 S. May Ave. *Tl:* 146.76 (141.3 Hz). *Adm:* \$10 Advance, \$12 door. www.hamholiday.com

Oregon (North Bend) — July 20 DFHRV

10 AM – 2 PM. *Spr:* Coos Co. Radio Club. North Bend High School, 2323 Pacific St. *Tl:* 146.610 (110.9 Hz), 147.280 (146.2 Hz). *Adm:* \$5; under 18 years old, free. www.coosradioclub.net

Pennsylvania (Chambersburg) — July 27 DFHRTV

8 AM – 2 PM. *Spr:* Cumberland Valley ARC. Cumberland Valley Antique Engine and Machinery Association show grounds, 1501 Criders Church Rd. *Tl:* 147.12 (100 Hz). *Adm:* \$5. www.w3ach.com

Pennsylvania (Erie) — July 13 FHRTV

8 AM – noon. *Spr:* Wattsburg Wireless Association. Greene Township Municipal Building, 9333 Tate Rd. *Tl:* 147.315 (186.2 Hz). *Adm:* Free. www.wattsburgwireless.org

Pennsylvania (Sinking Spring) — Aug. 3 DFRTV

8 AM – noon. *Spr:* Reading Radio Club. Heritage Park, 992 Clematis St. *Tl:* 146.91 (131.8 Hz). *Adm:* \$5; examinees and unlicensed family, free. www.qsl.net/w3bn

Pennsylvania (Uniontown) — Aug. 10 DFHRSTV

8 AM – 2 PM. *Spr:* Uniontown ARC. 433 Old Pittsburgh Rd. *Tl:* 147.18 (131.8 Hz). *Adm:* Free. www.w3pie.org

South Carolina (Florence) — Aug. 10 DFT

8 AM – noon. *Spr:* Florence ARC. West Florence Fire Station Annex, 3379 Pine Needles Rd. *Tl:* 146.85 (123.0 Hz). *Adm:* Free. Email: kb4rrc@yahoo.com

ARRL SOUTH DAKOTA STATE CONVENTION

July 20, Sioux Falls, South Dakota

DFHRST

8 AM – noon. *Spr:* Sioux Empire ARC. Westminster Presbyterian Church, 3801 E. 26th St. *Tl:* 146.895 (146.2 Hz). *Adm:* Free. www.w0zwy.org

Tennessee (Athens) — July 20 DFHRTV

7 AM – 2 PM. *Spr:* McMinn Co. ARC. McMinn Co. Expo Center, 2405 Decatur Pike. *Tl:* 146.82 (141.3 Hz). *Adm:* \$5. www.mcminnarc.com

Tennessee (Lebanon) — July 20 DFHQRSTV

8 AM. *Spr:* Wilson Co. ARC. James E. Ward Agricultural Center (Made in TN Building), 945 E. Baddour Pkwy. *Tl:* 147.105 (156.7 Hz). *Adm:* \$5. www.midtnhamquest.com

Texas (Schertz) — July 19 – 20 DFHQRSTV

Fri. 1 PM – 8 PM, Sat. 8 AM – 2 PM. *Spr:* San Antonio Radio Club. Schertz Civic Center, 1400 Schertz Pkwy. *Tl:* 147.00 (103.5 Hz). *Adm:* \$13 Advance, \$15 door. www.w5sc.org

Texas (Texas City) — July 13 DFHQRSV

8 AM – 2 PM. *Spr:* Tidelands ARS. Charles T. Doyle Convention Center, 2010 5th Ave. N. *Tl:* 147.14 (167.9 Hz). *Adm:* \$10. www.tidelands.org

ARRL ROCKY MOUNTAIN DIVISION CONVENTION

July 12 – 13, St. George, Utah

D F H Q R S V

8 AM – 3 PM. *Spr:* Dixie ARC. Dixie Convention Center, 1835 S. Convention Center Dr. *Tl:* TBD. *Adm:* TBD. www.hamconzion.com

YOUNG LADIES RADIO LEAGUE CONVENTION

July 11 – 14, St. George, Utah

R S

All day. *Spr:* HamCon: Zion. Dixie Convention Center, 1835 S. Convention Center Dr. *Adm:* \$35. www.ylrl.net

ARRL VIRGINIA STATE CONVENTION

August 4, Berryville, Virginia

D F H Q R S T V

6 AM. *Spr:* Shenandoah Valley ARC. Clarke Co. Fairgrounds, 890 W. Main St. *Tl:* 146.82 (146.2 Hz). *Adm:* \$10. www.berryvillehamfest.com

Virginia (Portsmouth) — Aug. 10 D H T

9 AM – 3 PM. *Spr:* Tidewater Radio Conventions. Ambassador Club of Portsmouth, 364 Peninsula Ave. *Tl:* 146.850 (100.0 Hz). *Adm:* \$10. www.virginiabeachhamfest.com

Virginia (Vinton) — Aug. 3 D F H R T V

8 AM – 1 PM. *Spr:* Roanoke Valley ARC. William Byrd Middle School, 2910 E. Washington Ave. *Tl:* 146.985 (107.2 Hz). *Adm:* \$5. www.roanokehamfest.info

Washington (Centralia) — July 20 F R T V

8 AM – 1 PM. *Spr:* Chehalis Valley ARS. Lewis Co. Fairgrounds, 1909 S. Gold St. *Tl:* 147.06 (110.9 Hz), 145.52. *Adm:* \$5. www.cvars.org

PACIFIC NORTHWEST DX CONVENTION

August 9 – 11, Everett, Washington

Q S

See website for times. *Spr:* Western Washington DX Club. Delta Hotel, 3105 Pine St. *Adm:* See website. www.pacificnwdxconvention.com

West Virginia (Huntington) — Aug. 10 D F H R S T V

8 AM – 2 PM. *Spr:* Tri-State ARA. New Baptist Church, 610 28th St. *Tl:* 146.760. *Adm:* \$6. www.qsl.net/w8va

Wisconsin (Chippewa Falls) — Aug. 10 F R V

9 AM – noon. *Spr:* Chippewa Valley ARC. Northern Wisconsin State Fairgrounds, 225 Edward St. Exhibit Hall A. *Tl:* 147.375 (110.9 Hz). *Adm:* \$10. www.w9cva.org/hamfest

Wisconsin (Racine) — Aug. 10 F H R

9 AM – noon. *Spr:* Racine Megacycle Club. The Greater Racine Kennel Club, 6320 6 Mile Rd. *Tl:* 147.27 (127.3 Hz). *Adm:* Free. www.w9udu.org

To All Event Sponsors

Before making a final decision on a date for your event, you are encouraged to check the Hamfest and Convention Database (www.arrl.org/hamfests-and-conventions-calendar) for events that may already be scheduled in your area on that date. You are also encouraged to register your event with HQ as far in advance as your planning permits. See www.arrl.org/hamfest-convention-application for an online registration form. Dates may be recorded up to 2 years in advance.

Events that are sanctioned by ARRL receive special benefits, including an announcement in these listings and online. Sanctioned conventions are also listed in *The ARRL Letter*. In addition, events receive donated ARRL prize certificates and handouts. Once the form has been submitted, your ARRL Director will decide whether to approve the date and provide ARRL sanction.

The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **August 1** to be listed in the **October** issue. Information in this column is accurate as of our deadline; contact the sponsor or check the sponsor's website for possible late changes, driving directions, and other event details. Please note that postal regulations prohibit mention in QST of games of chance, such as raffles or bingo.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to special discounted rates on QST display advertising and ARRL web banner advertising. Call ARRL's toll-free number at 1-800-243-7768, or email ads@arrl.org.

Volunteer Monitor Program Report

The Volunteer Monitor (VM) Program is a joint initiative between ARRL and the FCC to enhance compliance in the Amateur Radio Service. This is the April 2024 activity report of the VM Program.

◆ Two operators in West Virginia and two operators in North Carolina received notices concerning wideband operation of 6 to 7 kHz wide on 75 and 40 meters, contrary to FCC rules. Operators in Florida, Ohio, Kentucky, Virginia, and Georgia received notices for wideband operation of 6 to 8 kHz wide on 40 meters. Commission Rule 97.307(a) provides that “no amateur shall occupy more bandwidth than necessary for the information rate and emission type being transmitted, in accordance with good amateur practice.”

◆ An electric cooperative power company in Arkansas received an advisory notice due to unlicensed operation on 145.500 MHz by its fiber optics contractor working in Sharp, Izard, and Fulton counties.

◆ Technician-class operators in Maryland and California received advisory notices for operating FT8 on 20 and 40 meters. Technicians have no 20-meter operating privileges and may operate only CW on 40 meters.

◆ An operator in Massachusetts received an advisory notice for failure to identify during 75-meter transmissions of more than 30 minutes. Section 97.119(a) requires amateur stations to transmit the assigned call sign at the end of each communication and at least every 10 minutes during a communication.

◆ During April there was one referral from the VM Program to the FCC, at the request of the FCC, regarding repeater interference findings. A VM Program presentation was given to the Mt. Airy VHF Radio Club in Warminster, Pennsylvania.

◆ The totals for March 2024 monitoring were 1,166 hours on HF frequencies, and 1,046 hours on VHF frequencies and above, for a total of 2,212 hours. — *Thanks to Volunteer Monitor Program Administrator Riley Hollingsworth, K4ZDH*



Certificate of Code Proficiency Recipients



This month, ARRL recognizes merit and progress in Morse code proficiency on the part of the following individuals, who have achieved proficiency at the following rates, in words per minute.

December 2023

Matthew K. Jamison, KI5PGL	10
Andrew C. Kirk, WB2C	10
Richard F. Phillips, AE0QH	10
Erica W. Zavaleta, W7WXR	10
Russell L. Bast, Jr., AD2BO	20
James W. Carter, K7IOL	20
Alfred F. Hanzl, K2AL	20

January 2024

Charles W. Campbell, K0CWC	15
Douglas B. Diegert, N2KGT	15
George Wayne Moore, W8SUN	20

February 2024

Charlene K. Lewis, K8XCO	10
Douglas B. Powers, KD5DBP	10
Timothy J. Sinnott, KE2UM	10
Margot L. Wasz, KM6JWY	10
Lawrence Schall, KB2MN	20
Albert J. Whetter, W9WJ	20

March 2024

Mark A. Jessing, N4OJE	10
Stephen M. Riley, WA9CWE	10
Kenneth F. Robinson, K8SCA	10

Steven L. Myers, AI7OL	20
Bernard A. Poskus, KF0QS	20

April 2024

Joseph P. Kononchik, KS1I	10
Bill Durham, KG5ZCI	15
Joseph P. Kononchik, KS1I	15
Glenn R. Barr, Jr., WB0KFC	20
Daryl I. Hammond, W0BZ	20

Congratulations to all of the recipients.

July 2024 W1AW Qualifying Runs

W1AW, the Hiram Percy Maxim Memorial Station at ARRL Headquarters in Newington, Connecticut, transmits Morse code Qualifying Runs to assist ham radio operators in increasing and perfecting their proficiency in Morse code. Amateur radio operators can earn a Certificate of Code Proficiency or endorsements by listening to W1AW Qualifying Runs.

July Qualifying Runs will be transmitted by W1AW in Newington, Connecticut, at the times shown on 1.8025, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675, 50.350, and 147.555 MHz. The West Coast Qualifying Runs will be transmitted by K9JM on Wednesday, July 24, at 9 PM PDT (0400 UTC on July 25) on 3590 kHz. Unless indicated otherwise, sending speeds are from 10 to 40 WPM.

Amateur radio operators who participate in Qualifying Runs may submit proof of 1 minute of the highest speed they have copied in the hope of qualifying for the Certificate of Code Proficiency, or an endorsement to their existing certificate.

Legibly copy at least 1 minute of text by hand, and mail the sheet to: W1AW Qualifying Runs, 225 Main St., Newington, CT USA 06111.

Include \$10 (check or money order) if this is a submission for your initial Code Proficiency certificate; \$7.50 if you are applying for an endorsement (available for speeds up to 40 WPM). Your test will be checked against the actual transmissions to determine if you have qualified.

Members of the North Fulton (Georgia) Amateur Radio League (<https://nfarl.org>) are offering to subsidize the total cost of a Code Proficiency certificate or endorsement submission for any individual age 21 years and younger, and who

reside in either the US or Canada. Participants who wish to make use of this offer should indicate on their Qualifying Run submissions they are age 21 or younger, and certify as such via their signature. Eligible participants are not required to send any fee with their Code Proficiency submissions.

For more information about Qualifying Runs, please visit www.arrl.org/qualifying-run-schedule.

For information about how to qualify for the Certificate of Code Proficiency, please visit www.arrl.org/code-proficiency-certificate.



W1AW Qualifying Runs — July 2024

(All times are in Eastern Daylight Time.)

Monday	Tuesday	Wednesday	Thursday	Friday
	7/9 9 AM – 1300Z 10 – 35 WPM	7/10 4 PM – 2000Z 10 – 35 WPM	7/11 10 PM – 0200Z (7/12 – UTC) 10 – 40 WPM	
	7/16 4 PM – 2000Z 10 – 35 WPM	7/17 7 PM – 2300Z 10 – 40 WPM	7/18 9 AM – 1300Z 35 – 10 WPM	7/19 10 PM – 0200Z (7/20 – UTC) 10 – 35 WPM
	7/23 10 PM – 0200Z (7/24 – UTC) 35 – 10 WPM		7/25 9 AM – 1300Z 10 – 35 WPM	7/26 4 PM – 2000Z 10 – 40 WPM
7/29 10 PM – 0200Z (7/30 – UTC) 10 – 40 WPM	7/30 9 AM – 1300Z 35 – 10 WPM	7/31 4 PM – 2000Z 35 – 10 WPM		

A Look Back



REMOTE CONTROL for the **Morse Code** Time Identifier

BY BILL FISHER,* W2OC

THE CW CLOCK described by W8BEB in his excellent article in November 1972 *QST*¹ was built and installed at the repeater site of WR2ACI (formerly K2AVP), Valhalla, N. Y. Besides the twice-yearly adjustment necessitated by daylight savings time, power failures and other power interruptions which occurred also made it necessary to reset the clock from time to time. The circuit described here was subsequently added to the original design to permit setting of the clock by remote control, and thus eliminate the need for traveling to the transmitter site whenever such adjustment is required.

The additional circuitry, consisting of only 3 ICs (designated U31, U32, and U33 in Fig. 1), was placed on a piece of perforated board measuring approximately 6 × 2 inches (150 × 50 mm) and mounted piggy-back style over the original circuitry.

The Circuit

At WR2ACI, repeater control is exercised by Touch Tone telephone. Closure of a single pair of relay contacts, actuated by a Touch Tone button, is used to perform the clock control function. Momentary closure of these contacts grounds pins 3 and 4 of U31, a one-shot multivibrator, and produces a 300-ms pulse if, and only if, pin 5 is high, as it is during a clock readout. (The 300-ms pulse duration was chosen to avoid any problem related to contact bounce of the Touch Tone relay.) This pulse from U31 (pin 6) is fed to pin 1 of U32, a 4 bit binary counter. Each such pulse successively steps U32 through 1 of 4 counts. These steps (or counts) appear in binary form at pins 8 and 9 of U32 and are fed to pins 2 and 14, respectively, of U33, a dual 4-line-to-line multiplexer. The FAST ADVANCE and SLOW ADVANCE switches originally used are removed, and switching of the various divider frequencies to pin 1 of U26, formerly provided by the switches, is now accomplished by U33.

When pins 2 and 14 of U33 are both at a logic low, the clock is considered to be in the NORMAL

mode and the digital signal on pin 6 of U33 is effectively reproduced on pin 7 of U33. From Fig. 1 (and with reference to W8BEB's original schematic), it can be seen that in this case pin 11 of U4 is effectively connected to pin 1 of U26, placing the clock in the normal time-keeping mode. The next momentary closure will produce a logic low at pin 2 and a high at pin 14 of U33, which will then effectively transfer the digital signal on pin 5 of U33 to pin 7 of U33. This places the clock in the FAST ADVANCE mode by effectively connecting pin 14 of U2 to pin 1 of U26. The next momentary closure produces a high at pin 2 and a low at pin 14 of U33, which effectively connects pin 4 of U33 to pin 7 of U33, thus providing the SLOW ADVANCE mode. The next momentary closure returns pin 7 of U33 to pin 11 of U4, as in the NORMAL mode previously, but also effectively connects pin 9 of U33 to pin 13 of U33. This places a logic high on pin 9 which, as shown in Fig. 1, is connected to pins 3 and 4 of U9. (Note: Pins 3 and 4 of U9 were originally grounded and should be removed from ground before being connected to pin 9 of U33.)

Placing a logic 1 on pins 3 and 4 of U9 inhibits U9 from producing any output and thus effectively stops the clock. This STOP mode is used for precisely setting the time of clock readout change. During the three previous modes (i.e., NORMAL, FAST ADVANCE, and SLOW ADVANCE) pin 9 of U33 was effectively connected successively to pins 10, 11 and 12, all of which are grounded. Thus, pin 9 of U33 and pins 3 and 4 of U9 are at ground potential during these modes, which enables operation of U9. U28B, U30B, C and D, which are existing ICs in W8BEB's original circuit, are connected as shown in Fig. 1. In order to use U28B as a NAND gate as shown, its original use as an inverter is replaced by U30D. This modification of U28B provides for the disabling of the "carrier keying" function during the STOP mode so as to prevent holding the transmitter on continuously when the clock is "stopped." This new connection of U28B also requires that the 10-kΩ resistor in the base of Q1 be disconnected from the 1-kΩ resistor (as shown in the original schematic diagram) and connected to pin 8 of U30C as shown in Fig. 1. The connection from pin 6 of U30 to pin 5 of U23 (previously not used) also disables the clock readout when in the STOP mode.

* 2 Barnard Rd., Armonk, NY 10504.

¹ Pienkowski, "A Morse-Code Time Identifier," *QST*, November, 1972, p. 34. Also *FM and Repeaters for the Radio Amateur*, ARRL, p. 139.

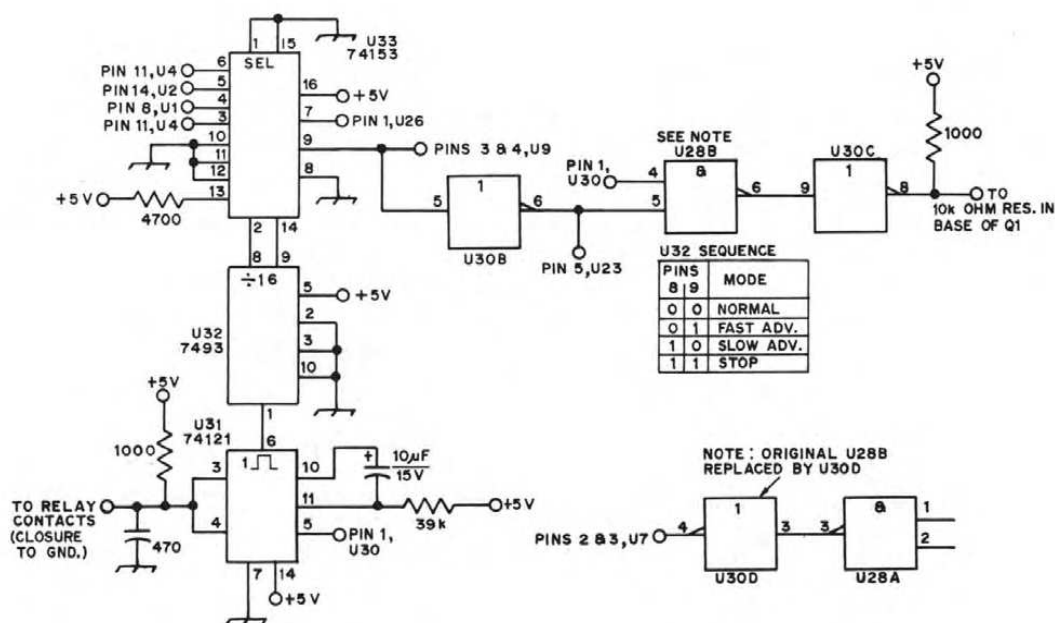


Fig. 1 — Schematic diagram of the remote-control circuit for setting the time identifier. Changes required in the original circuit (see footnote 1) are also shown here. Resistances are in ohms, k = 1000. Unless shown otherwise, capacitance is in picofarads (pF). All ICs are DIP (dual in-line

package); pin numbers not shown are not connected.

U31 — Monostable multivibrator (one shot), type 74121.

U32 — 4-bit binary counter, type 7493.

U33 — Dual 4-line-to-1-line data selector/multiplexer, type 74153.

Setting the Clock

Just as with the original method of setting the clock with the FAST ADVANCE and SLOW ADVANCE switches, the remote-control method also takes a little practice to master. It must be remembered that the remote-control function is only active *during* a clock readout. Therefore, a clock readout must first be initiated (by whatever means you have set up for your particular repeater) before the remote control can be exercised. One exception to the above is that once the clock has been placed in the STOP mode, the next control pulse, sent at any time, will take the clock out of the STOP mode (and put it into NORMAL) *without* the need of first initiating a clock readout. This is because pin 5 of U31 remains high during the STOP mode. When in either the NORMAL, FAST ADVANCE, or SLOW ADVANCE modes, however, the clock readout must be initiated before a change of mode can be accomplished.

Although remote control at WR2ACI is via Touch Tone on a telephone line, it could also be done directly through the repeater via tone control, but perhaps with less security than the telephone provides. In fact, any method which provides for applying a momentary ground to pins 3 and 4 of U31 can be employed.

As mentioned earlier, the STOP mode permits setting the time of readout change precisely. At WR2ACI, the clock is set to change exactly at the

30-second mark of each minute, 30 seconds *ahead* of the actual time. By doing this, the error of any clock readout is limited to a *maximum* of 30 seconds.[†] Inasmuch as the clock is interrogated at random intervals, however, the *average* error is only 15 seconds, which, for most purposes, is quite satisfactory.

It will be noted that a steady tone will result when placing the clock into the STOP mode, if the clock happens to stop at a "key-down" point in the readout. This will normally be of no concern when using the STOP mode to set or adjust the clock, inasmuch as it would usually be left in the STOP mode for only a short period of time. However, if you wish to use the STOP mode to disable the clock for an extended period, it may be necessary to make several attempts before succeeding in stopping the clock during a "key-up" interval. Inasmuch as the blinking SECONDS lamp will not be visible when setting the clock by remote control, it will also be necessary to use a stop watch (or a watch with a second hand) to enable accurate adjustment of the readout.

I would be interested in hearing from other amateurs who have built or are building the cw clock, and I will be glad to answer any questions about adding the remote-control feature. **QST**

[†][EDITOR'S NOTE: Clock readout is sent as four digits in Morse code, as hours and minutes. During normal operation the readout is updated at 60-second intervals.]

Celebrating Our Legacy

You Don't Need to Be an Expert to Be Welcomed to the Club

When I was 13, I saw my neighbor's ham station for the first time. It was a room full of black boxes with dials and switches and a homemade wooden cubical quad. He informed me that he could use ham radio to communicate with other hams far away. "Allow me to demonstrate," he said, adjusting the switches, dials, and knobs, and he spoke into a microphone. A voice came back from someone 500 miles away in Kansas.

That made me want to be a ham, too. My neighbor said I needed to get a license to talk on the air. However, no license was needed to eavesdrop. So, I saved my paper route money and bought my own Hallicrafters black box with switches and dials. I dropped an antenna wire out of the upstairs window and made believe I was a ham.

After a year or two, things began to change. My Hallicrafters didn't work with the new thing called "side-band," and I couldn't get a license because I had no aptitude for electronics. Plus, the Morse code requirement flummoxed me.

Forty years later, my ham radio interest reignited. I still didn't understand how Morse code or radios worked, but Morse code was no longer a requirement to become a ham. After studying intently every night for 3 months, I took the Technician test and barely passed. Soon, I had a little radio and an antenna on the roof and could talk to nearby counties, but that wasn't the same as talking to Kansas.

Another 10 years later, I studied hard every night for 3 months once again. I cranked up my courage to take the General test and just barely passed again.

I went to a meeting at the local DX club attended by a roomful of experienced hams. I thought they were all physicists or electrical engineers because they used words I didn't understand. I smiled and nodded as if I understood. I couldn't imagine how I got into a get-together like this.

At the conclusion of the meeting, each person said a few words about their most recent impressive contacts to faraway places. I frantically looked around for the nearest exit. Inevitably, it was my turn to say something. I finally blurted, "I'm the only General-class operator in this room, and I just got my DXCC!" To my surprise, they applauded me! Turns out, you don't have to be a physicist or an electrical engineer to be a part of the group.

Clark Secrest, NØVCY
Laguna Niguel, California

A Childhood in Ham Radio

I first became interested in ham radio when I was about 12. I experimented with building a crystal radio by holding one terminal of a crystal earphone to a cold-water pipe in our house (as a ground), another to a 1N34A germanium diode, and the diode back to the pipe. I could hear radio broadcasts without having to rely on complicated wiring diagrams or any source of power. It was an exciting discovery for me at that time and left a lasting impression.

When I was 13, my father bought me a Grundig Majestic imported German radio that had the frequencies listed for all the cities you might be able to hear. It was exciting for a child who knew little to nothing about radio to be able to turn a dial and hear voices from around the world.

In ninth grade, I discovered that one of my classmates had a ham radio station. He taught me the logistics of getting a Novice license. I purchased a used Hammarlund HQ-129X receiver and homebrewed a Novice transmitter from a *Radio TV Experimenter* magazine.

Once I got my license, I was good to go. The most amazing thing was listening to the receiver with headphones and hearing a station calling me in Morse code. Every hour I was not in school or doing homework, I was in our basement, on the air, talking to people from all over the world using Morse code. In a few months, my speed went from 5 WPM to more than 13 WPM, and I passed my General license exam and became WB2ABM. Amateur radio and experience with electronics led to electrical engineering and my career as an ophthalmologist.

Arnold Rabin, WB2ABM
Mill Valley, California

Send reminiscences of your early days in radio to celebrate@arrl.org. Submissions selected for publication will be edited for space and clarity. Material published in "Celebrating Our Legacy" may also appear in other ARRL media. The publishers of QST assume no responsibility for statements made in this column.

Classic Radio

Radio Amateur Callbook — the Original Call Sign Database

With computers and instant worldwide communication, it's quick and easy to look up a ham's address to see where they're transmitting from, or for a QSL card address, by accessing the US FCC database, private worldwide amateur radio databases, or even a ham's personal website. But before the internet was invented, there was only one place to search for a ham's information — the *Radio Amateur Callbook Magazine*.

Beginning in 1920, the callbook magazine published the call signs and addresses of every ham in the world. This resource was like the internet, except it was made of paper and you had to wait months (instead of seconds) for updated versions.

Unique Cover Design

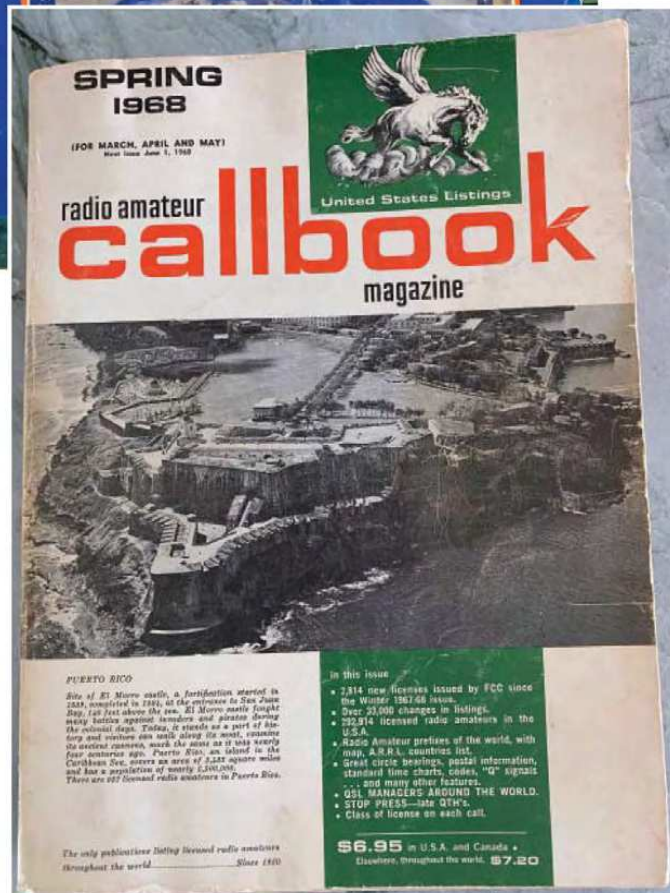
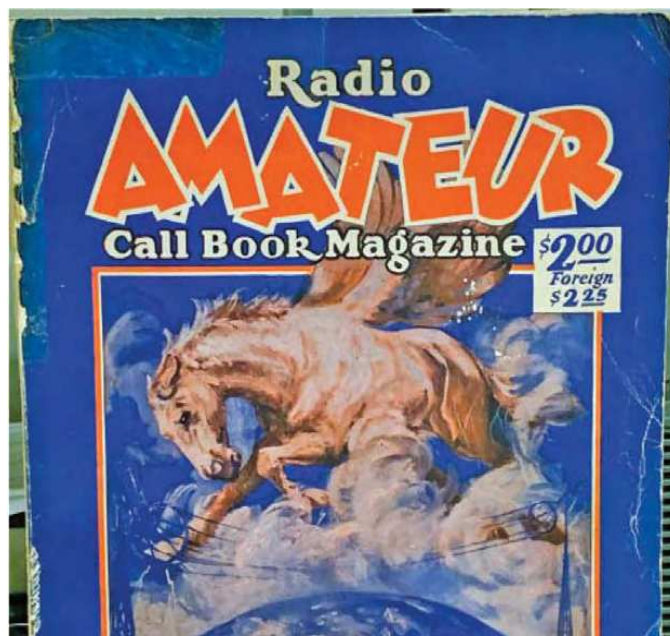
In the publication's early years, all of the US and international hams were listed in a single callbook (see Figure 1). As the number of hams grew worldwide, the book was eventually divided into a US version (see Figure 2) and an international version (see Figure 3). Both versions were large and packed with information.

Each softcover book was about 9 × 12 inches in size, around 1 inch thick, and weighed more than 2 pounds. (The 1992 edition was nearly 2 inches thick and weighed more than 3½ pounds!) It contained 624 pages of call signs, addresses, and advertisements. Call signs were printed in a tiny font size on the thinnest paper I've ever seen (see Figure 4); it was so thin that if it was held up to the light you could see the text on both sides of the paper.

The publication's logo was Pegasus. The 1968 edition stated, "I am Pegasus...according to legend, winged and with blazing hoofs, mane flying, crossed the heavens with such speed, I caused the crash of lightning

▲ **Figure 1** — The 1950 edition had a blue front cover that showed Pegasus electrifying the ether.

▼ **Figure 2** — The cover of the spring 1968 edition of the US listings showed a modern Pegasus.



and the roar of thunder.” The artwork featured on the covers over the years has been magnificent. Pegasus was portrayed as electrifying a ham antenna while surrounded by clouds, ether, and small lightning bolts. The spring 1963 cover was so dramatic and gorgeous that I once had it in a frame hanging on my shack wall.

The *Radio Amateur Callbook Magazine* also sold Pegasus jewelry that you could have your call sign engraved on. You could purchase a pin, tie tack, tie bar, charm bracelet, or key ring with the Pegasus logo on it. I’ve never seen one of these in person, so if you have one, I’d like to see it.

Content Between the Covers

The book was published quarterly on the first of March (spring), June (summer), September (fall), and December (winter). If you earned your license in January, your call sign might appear in the spring edition, but if it didn’t make it in, then you (and the rest of the world) would have to wait until the summer issue. Often there was a section published at the end of each issue for the call signs and station addresses of those whose information came in too late for inclusion in the main directory.

The US versions were organized by ARRL Section, W1 through W0, and included sections for Alaska, Hawaii, Puerto Rico, and various territories of the US, such as Johnston Atoll and Guam. Call signs were listed alphabetically, so you could simply scan the rows and columns of tiny print for a specific one; good eyesight was needed!

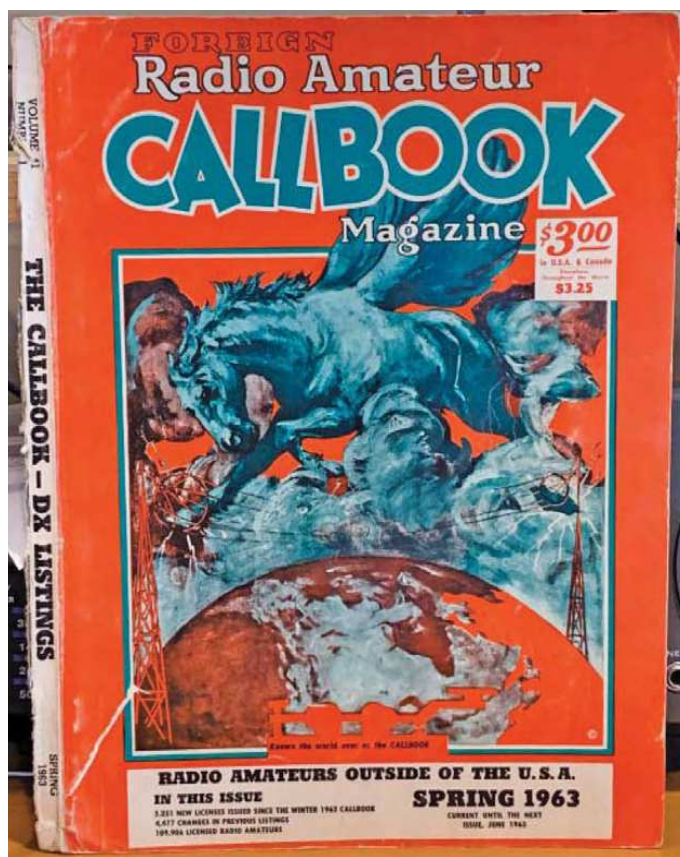
The callbook cost \$6.95 in 1968, which is equal to \$62.38 in 2024 (www.usinflationcalculator.com). It was one of three books that amateurs of this time often made sure they owned. The other two were ARRL’s *The Radio Amateur’s Handbook* and *The Radio Amateur’s License Manual*.

The callbook also provided useful information such as how to calculate great circle bearings, and had listings of DX QSL managers, time zones, maps, Q signals, DX prefixes, and a lot more.

Modern-Day Callbook

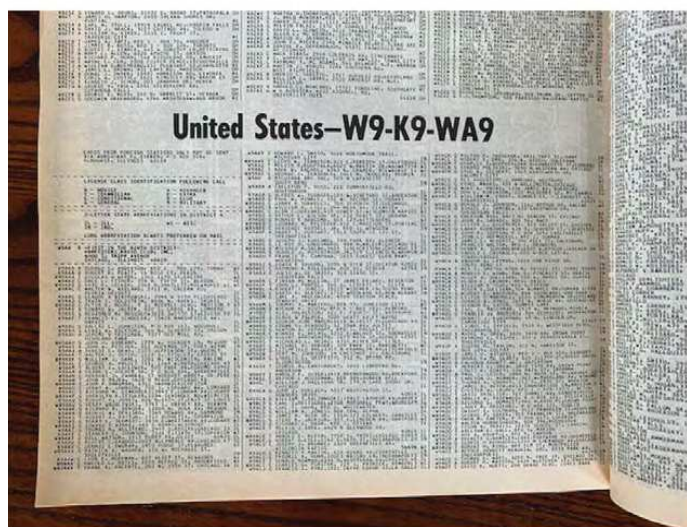
I have a few callbooks from my early Novice days, and they are still fun to browse through. I especially enjoy the nostalgia of looking up my own call sign, where I was living at the time, and call signs of friends from back then.

While the paper version of the callbook is no longer published, the *Radio Amateur Callbook Magazine* is still being produced, but now it’s available on compact discs and flash drives. Even though modern-day inter-



▲Figure 3 — The 1963 edition of the international *Radio Amateur Callbook Magazine*.

▼Figure 4 — Call signs and addresses were listed in a tiny font on very thin paper.



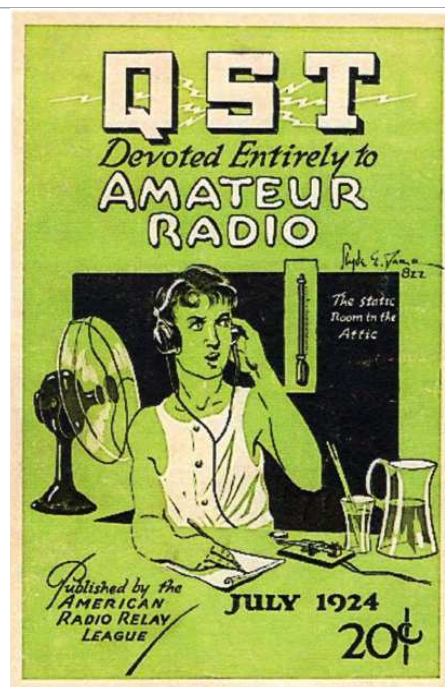
net databases are convenient, quick, and informative, I still have a fondness for the old paper callbooks and the wonderful ham radio memories they contain.

All photos by the author.

100, 50, and 25 Years Ago

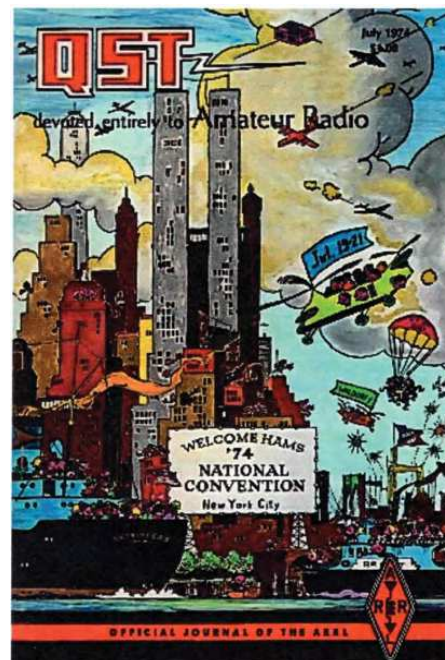
July 1924

- The cover shows an overheated ham sitting in front of a fan, fighting summer QRN, in "The Static Room in the Attic."
- "Editorials" reports on several items including an update on the amendments to "The White Bill" and a request from the governments of Canada, France, Italy, and the United States for A.R.R.L. to participate in more "Short Wave Tests."
- Argentine CB8 captures the world's DX record by working New Zealand 2AC. The details are in "A South American Does It!" by H.F. Mason, 1ID.
- A transmitter that never shifts its wave even a hundredth of a meter is described in "Oscillating Crystals" by H.S. Shaw.
- A.L. Budlong, 1ASN, explains the beginnings of the A.R.R.L. Railroad Emergency Service Committee, and the results of a test along the Pennsylvania Railroad System in "P R R."
- How to get rid of the thing that causes 99% of all amateur interference is explained in "Stopping The Key Thump" by James H. Turnbull, 2XQ.
- The benefits of a universally adopted auxiliary language are discussed in "The Language of International Radio" by Henry W. Hentzel.



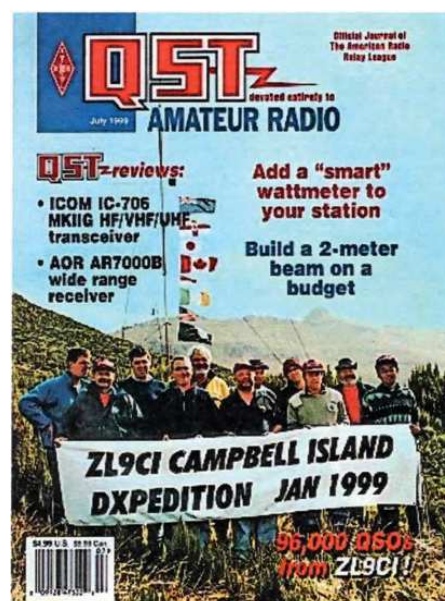
July 1974

- The cover, by Gil, W1CJD, shows hams arriving at the National Convention by many modes of transportation. Highlights of the program appear in the "ARRL National Convention" by "Dee" Logan, WB2FBF.
- League officers, directors, and key HQ staffers were special guests of the FCC for a day-long briefing in Washington. "It Seems to Us...FCC-ARRL Liaison" discusses some of the positive outcomes. A detailed report appears in this month's "Happenings" column.
- An artificial video generator capable of providing two lines of up to 6 characters each, enabling an amateur to generate his call sign and "TV," "ATV," "CQ ATV," or similar, at low cost, is presented in "A Character Generator for ATV" by Thomas M. Ellison, Jr., WA4JNA.
- Looking for an easier way to crank up his tower (without purchasing a motor-driven winch), Irving Smith, WB2BCY, came up with this simple, inexpensive solution with "A Poor Man's Electronic Tower Hoist."
- In "Oh, I Work the 8000-Angstrom Band," high-school student Thomas D. East, WB8LOX, explains his current experimental project — to develop a frequency modulation communications system in which a 3-W gallium arsenide laser diode, operating in pulsed mode at room temperature, could be used.
- A short history of the Amateur Radio Emergency Corps is given in "Amateur Radio Public Service: How It All Started — The AREC" by George Hart, W1NJM.



July 1999

- The cover highlights members of the 1999 ZL9CI Campbell Island DXpedition. Their adventures are told in "The ZL9CI DXpedition to Campbell Island" by Lee Jennings, ZL2AL.
- Do you have plans to travel this summer? David Sumner, K1ZZ, shares why you should take Amateur Radio with you in "It Seems to Us...You Can Take It With You."
- A handy station accessory that saves desk space and centralizes all your RF power and SWR metering is "The DWM-4: A Microprocessor Controlled Multi-channel Wattmeter for HF, VHF and UHF" by Dwayne L. Kincaid, WD8OYG.
- "The Poor Man's Paddle" by Denny Payton, N9JXY, is quick, nifty, inexpensive, and easy to build.
- When airplanes go down, radio direction finding (RDF) is often used to locate crash sites by tracking the signals emitted by ELTs — emergency locator transmitters. Pete Ostapchuk, N9SFX, suggests "Hunting ELTs: A Role for Amateurs" in "Public Service."
- Steps to take when you find that your call isn't in the logs of a DXpedition are discussed in "How's DX?: Not In the Log!" by Wayne Mills, N7NG.



Silent Keys

It is with deep regret that we record the passing of these radio amateurs:

K1BGZ
♦W1BMY
♦N1DGQ
N1DOO
♦KB1HEM
♦KT1L
♦N1PHN
N1PVT
KC1QMM
KC1RLZ
♦W1SL
♦KD1XQ
♦K2BQ
♦K2DRK
W2DRW
♦WB2FXB
♦WA2IAM
♦AB2IO
♦K2JAO
W2RGB
♦♦♦K2SZ
W2XOY
W2ZMZ
♦N3CBK
♦N3DMO
♦K3QQA
K3QV
WB4ADA
K4BAK
♦K4CMS
K4DOY
♦♦W4DRY
♦W4FKM
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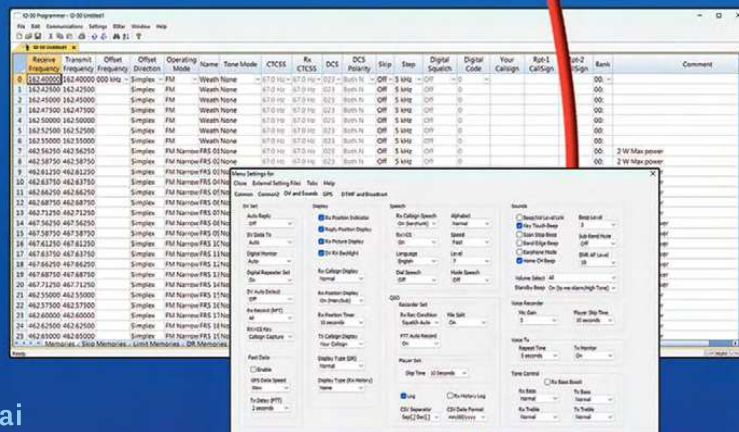


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- Easy to use controls

5W amplified DSP noise canceling In-Line module - 8 filter levels 8 to 40dB - Use in-line with a loudspeaker - Audio bypass feature - 3.5mm mono inputs and outputs - Headphone socket - Audio input overload feature

Compact In-Line



- Portable DSP noise canceling unit
- Simple controls
- Use in-line with headphones or powered speakers
- Line/speaker level inputs
- Use with AA batteries or 12V DC supply

NEDSP1962-KBD
5W amplified DSP noise canceling extension speaker retrofit pcb module
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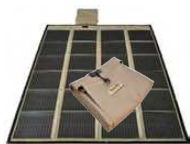
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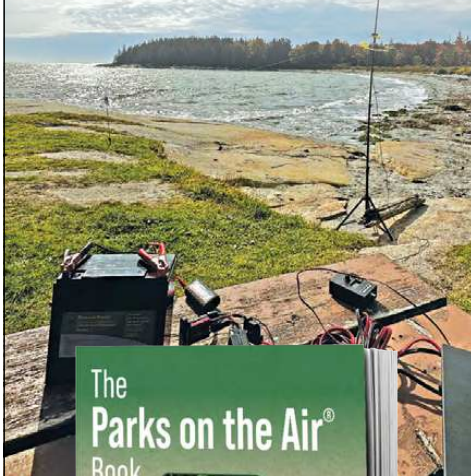
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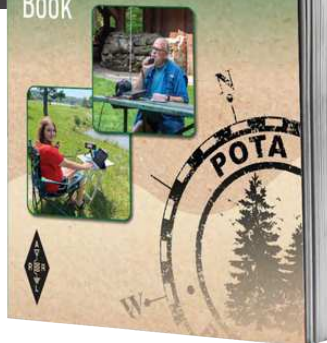
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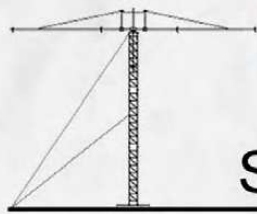
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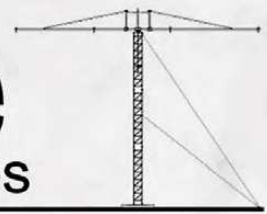
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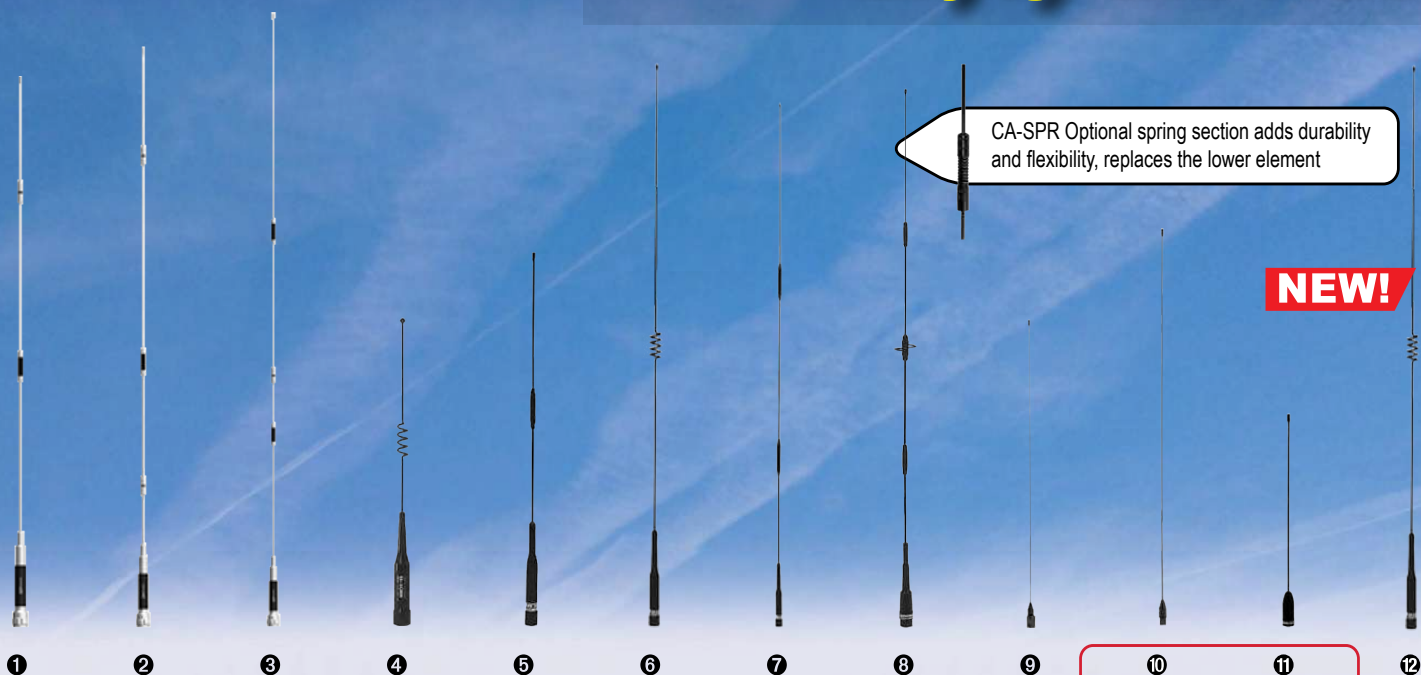
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bhi Ltd – www.bhi-ltd.com	114
Bioenno Power – www.bioennopower.com	116
BridgeCom Systems – www.BridgeComSystems.com	117
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California Peripherals & Components, Inc. – www.Californiapc.com	116
Cedar Valley Amateur Radio Club - www.w0gq.org	126
ChattRadio – www.chattradio.com	126
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Diamond Antenna – www.diamondantenna.net	8
DMMCheckPlus – www.dmmcheckplus.com	116
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FTM-100/400	90'	TM-D700	100'	ID-4100A	65'
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* Also TYT TH-9800

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ICOM America – www.icomamerica.com	22, 23
Intuitive Circuits, LLC – www.icircuits.com	123
K6IOK – www.k6iok.com	119
Kenwood Communications – www.kenwoodusa.com	29, Cover 4
LDG – 410-586-2177	2
Main Trading Company – www.mtcradio.com	112
Mosley Electronics – www.mosley-electronics.com	117
Pacific Antenna – www.qrpkits.com	119
Palomar Engineers – www.Palomar-Engineers.com	119
Penta Laboratories – www.pentalabs.com	121
PreciseRF – http://preciserf.com	11
PreppComm – www.preppcomm.com	119
RF Parts Company – www.rfparts.com	127
RT Systems – www.rtsystems.com	113
San Antonio Radio Club Radio Fiesta 2024 – www.sarc-radio-fiesta-2024	116
Schulman Auction – www.schulmanauktion.com	117
Starlink® RV Pole Kits – www.hitched4fun.com	121
SwapMyRigs – www.swapmyrigs.com	126
Tac-Comm – www.tac-comm.com	123
Ten-Ten International Net, Inc. – www.ten-ten.org	121
Tigertronics – www.tigertronics.com	121
Timewave Technology, Inc. – www.timewave.com	118
W5SWL Electronics – www.w5swl.com	121, 123
West Mountain Radio – www.westmountainradio.com	18
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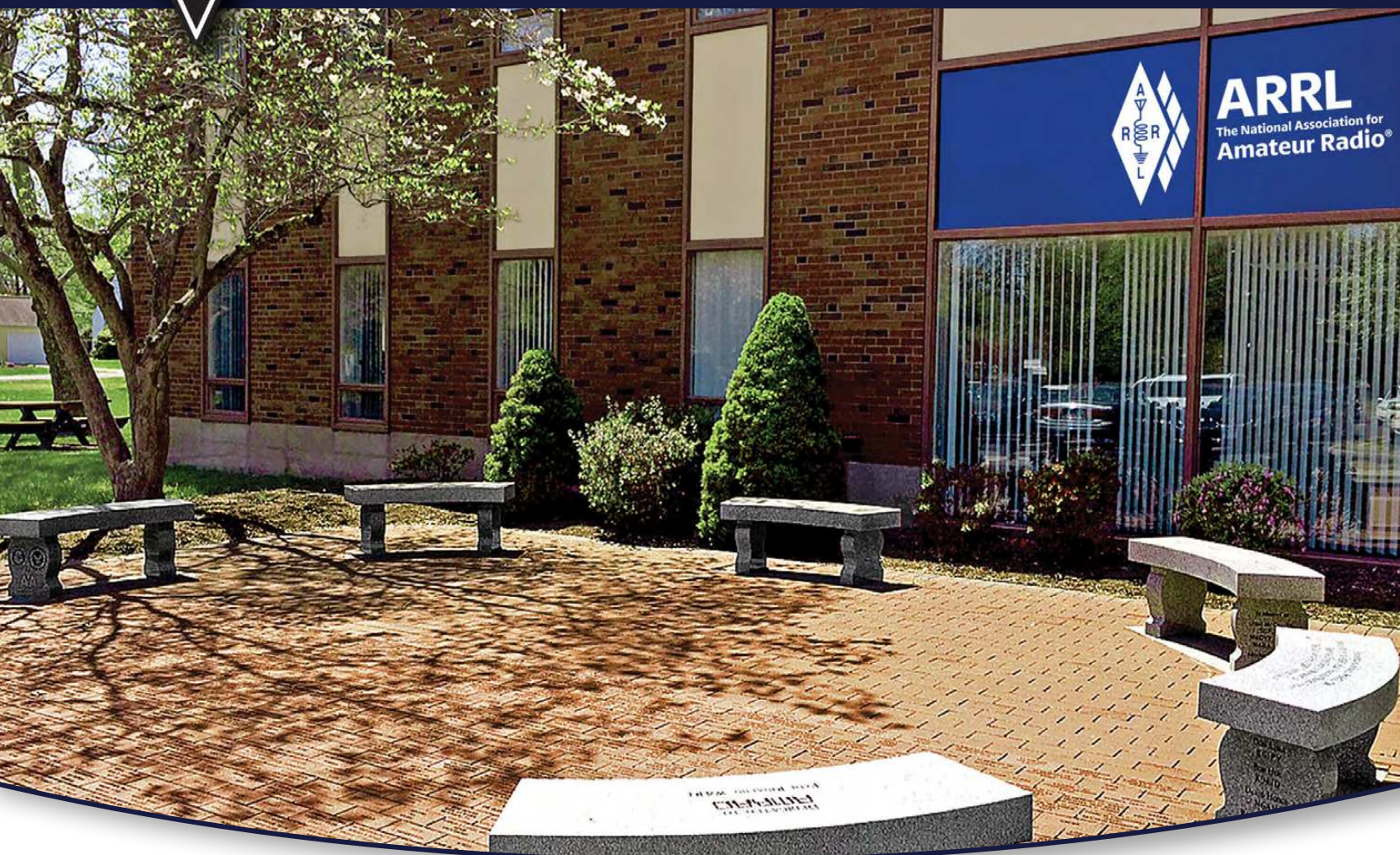
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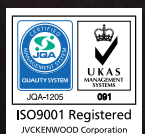
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