

Devoted Entirely to Amateur Radio

QST



June 2026

DIGITAL EDITION



ARRL
The National Association for
Amateur Radio®

SUPPORTING PARTNER

AMERICA



Field Day 2026



QST Reviews

**Yaesu FTM-150RASP VHF/UHF
FM Transceiver**

**Aediko 25 A DC Voltage Reducer/
Converter as a Battery Booster**

**Intellitron AM-2306KD 45-Foot
Heavy-Duty Telescopic Fiberglass
Mast**

FTX-1 Field

6W HF/VHF/UHF
All Mode Field Transceiver



The True Field Performer

Stand-Alone 6 WATTS - 9 HOURS Operation*

*No Additional Battery or Power Supply Needed
TX: 6 seconds (6W), RX: 6 seconds, Standby: 48 seconds



FTX-1optima

6W/100W HF/VHF/UHF
All Mode Field/Base Transceiver

WRTC
2026

YAESU - Prime Sponsor

YAESU
Radio for Professionals

YAESU USA

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

<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.

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.



**WRTC
2026**

YAESU – Prime Sponsor

YAESU
Radio for Professionals

YAESU USA

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

<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.

from 5 watts to 1,000 watts

LDG Station Accessories

LDG

Desktop Autotuners



AT-1000ProII

QRO Autotuner to 1000W • Dual Antenna Ports •
1000W SSB/600 FT8



AT-600ProII

600 Watts for Mid-Size Amps •
1.8 to 54 MHz Continuous • 600W SSB/400 FT8



AT-200ProII

Tunes 10:1 SWR • Two-Year Warranty •
250W SSB/150 FT8



AT-100ProII

Switched-L Network • Dual Baragraph for Watts/SWR •
125W SSB/75 FT8

Portable and Desktop Autotuners



Z-11ProII

LED SWR Indicator • 10:1 SWR Range •
125W SSB/75 FT8



Z-100A

Generic Tuner for HF Radios • Includes Icom Interface Cable •
125W SSB / 75 FT8



Z-817

FT-817/818 Compatible • Operates on 4-AAAs •
20W SSB/15 FT8

Baluns and Ununs for Everyday Use



RU-1:1 Unun



RU-4:1 Unun



RU-9:1 Unun



RBA-1:1 Balun



RBA-4:1 Balun

\$30 each!



Remote Autotuner

RT/RC-100

- Remote Tuner with Latching Relays
- DC Power and Control over the Coax
- 125W SSB, 75 FT8
- Includes Bias-Tee Controller

ONE BOX.
500 WATTS.
ZERO COMPROMISE.

NEW DAY.
FOR THE
UNEXPLORED

/ 500 WATTS.

/ ULTRA-HIGH-EFFICIENCY

/ COOL RUNNING

/ 18LBS



**AURORA IS THE FIRST OF ITS KIND.
NO AMPS. NO EXTRAS. JUST PLUG IN AND DOMINATE.**

FlexRadio's new compact, high-efficiency HF radio with everything built in. Integrated antenna tuner, built-in power supply, over 80% efficiency. A complete HF station in a single 18lb. package. Simplify your shack. Activate parks. Go remote. Aurora delivers powerful, quiet performance anywhere you go. Welcome to the all-in-one revolution.

Available Models:

AU-510 / AU-510M / AU-520 / AU-520M

FlexRadio.com/Aurora

AURORA 
A NEW DAY FOR THE UNEXPLORED

David A. Minster, NA2AA
Publisher

Becky R. Schoenfeld, W1BXY
Editorial Director

Dana Kasowitz, KC1SEB
Managing Editor

Sam Shaner, KE1SAM
Editor

John McKenna, K3NNA
Matt Smith
Assistant Editors

Conrad Trautmann, N2YCH
Technical Editor

Dave Casler, KE0OG
Leanna Figlewski, KC1RMP
Steve Goodgame, K5ATA
Bernie McClenny, W3UR
Ken Neubeck, WB2AMU
Rick Palm, K1CE
Pascal Villeneuve, VA2PV
Paul Wade, W1GHZ
Jim Wilson, K5ND
Contributing Editors

Terese Newman, KC1YPP
Assistant Production Supervisor

Matt Ali
Layout & Production Specialist

Margie Bourgoin, W1MRG
Production Coordinator

David Pingree, N1NAS
Senior Technical Illustrator

Bart Jahnke, W9JJ
Radiosport & Regulatory
Information Manager

Steve Ewald, WV1X
Field Organization Supervisor

Steve Bossert, K2GOG
Advertising Sales Manager

Bob Inderbitzen, NQ1R
Senior Director of
Marketing & Innovation

9

Second Century Right to Repair



30

A Resolution of Utility Company RFI

David Otto, AA9H

33

A Simple Transceiver Protector and SWR Tuning Indicator

Phil Salas, AD5X

35

Understanding Blocking Dynamic Range in HF Receivers

George Spatta, W1GKS

38

Product Review

Pascal Villeneuve, VA2PV

Yaesu FTM-150RASP VHF/UHF FM Transceiver;
Aediko 25 A DC Voltage Reducer/Converter as
a Battery Booster; Intellitron AM-2306KD 45-
Foot Heavy-Duty Telescopic Fiberglass Mast



52

Effective Communication — The Crux of Field Day

Buddy Sohl, KC4WQ

54

Organizing a Large Field Day Effort

Jeff Reinhardt, AA6JR

56

Future-Proofing ARES: Collaboration and Innovation Bring Success with Served Agencies

Scott Yonally, N8SY



57

2026 ARRL Field Day Guide

74

2025 ARRL November Sweepstakes — Phone

Scott Davis, K5TA

78

2025 ARRL 160-Meter Contest Results

80

The 2026 IARU HF World Championship

93

A Look Back — July 1976



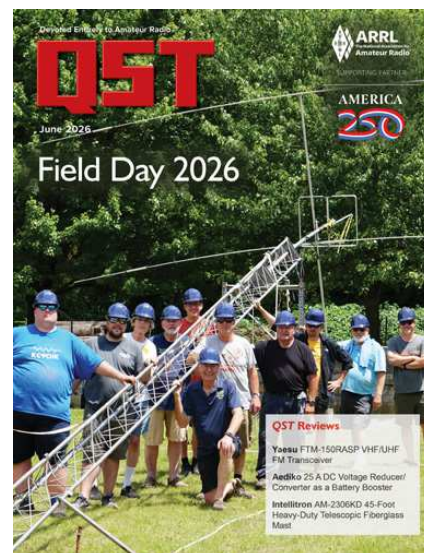
An icon next to an article means there's bonus content
in the digital edition at www.arrl.org/qst.

Columns

Ask Dave	50
Celebrating Our Legacy	97
Classic Radio	98
Club Spotlight	13
Club Station	82
Contest Corral	81
Correspondence	24
Happenings	69
How's DX?	84
Public Service	72
The World Above 50 MHz	86
Up Front	20
100, 50, and 25 Years Ago	100

Departments

ARRL Section Managers	16
ARRL Special Service Clubs	83
ARRL VEC Volunteer Examiner Honor Roll	88
Certificate of Code Proficiency Recipients	91
Convention and Hamfest Calendar	89
Field Organization Reports	92
Guide to ARRL Member Benefits	14
Ham Ads	124
Index of Advertisers	126, 127
New Products	83
Officers, Division Directors, and Staff	15
QST Cover Plaque Award	37
Silent Keys	101
Special Event Stations	90
Strays	49
This Month in QEX	92
Volunteer Monitor Program Report	80
W1AW Qualifying Runs	91
W1AW Schedule	28



Our Cover

Teamwork — as embodied here by members of The 415 Amateur Radio Club of Crystal Lake, Illinois — and task assignments can help make ARRL Field Day more successful and fun for everyone involved. This year's Field Day issue includes tried-and-true advice for organizing a large operation, maximizing your group's outreach, fitting digital modes into your setup, and much more. [Laura McCallister, photo]

Digital and Mobile Editions

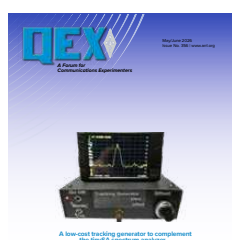
ARRL members can access the digital edition via a link at www.arrl.org/qst, download our iOS app from the iTunes Store, and download our Android app from the Google Play Store.

Write for QST

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



NCJ, National Contest Journal, is ARRL's bimonthly magazine by and for the ham radio contesting community, presenting information and advice from top contesters, operator profiles, and scores for the North American QSO Party and North American Sprint. www.arrl.org/ncj



QEX, A Forum for Communications Experimenters, is ARRL's bimonthly forum for research, theory, and projects on the cutting edge of RF communications. www.arrl.org/qex



On the Air is ARRL's bimonthly magazine for beginner to intermediate ham radio licensees, presenting jargon-free, easy-to-understand explainers, practical information, and projects. www.arrl.org/ota

QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, Inc., 225 Main St., Newington, CT 06111-1400, USA. Volume 110, Number 6. Periodicals postage paid at Hartford, CT, USA and at additional mailing offices.

POSTMASTER: Send address changes to: QST, 225 Main St., Newington, CT 06111-1400, USA. Canada Post: Publications Mail Agreement #90-0901437. Canada returns to be sent to The Mail Group, 1501 Morse Ave., Elk Grove Village, IL 60007.

ARRL Membership and QST cannot be separated. All ARRL members have digital, online access to QST. Print subscriptions are available and sold separately. For ARRL members in the US, a subscription to QST via mail is

\$25 per year. For libraries and institutions, a subscription to QST is available for \$84 per year; single copies \$7.

ARRL Membership is available to individuals at \$59 per year. A reduced rate is available for licensed radio amateurs under 26 years old, for \$30 per year. Membership is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for \$12 per year. A complete list of dues rates is available at www.arrl.org/join. Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

Copyright © 2026 by the American Radio Relay League, Inc. Title registered at the US Patent Office. International copyright secured. All rights

reserved. Quedan reservados todos los derechos. Printed in the USA.

QST®, DXCC®, VUCC®, DX Century Club®, ARES®, Amateur Radio Emergency Service®, Logbook of The World®, LoTW®, and ARRL The National Association for Amateur Radio® are registered trademarks of the American Radio Relay League, Inc.

ARRL and QST in no way warrant the products described or reviewed herein.

QST is available to blind and physically handicapped individuals from the Library of Congress, National Library Service for the Blind and Physically Handicapped. Call 1-800-424-8567 or go to www.loc.gov/nls.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421.

To ensure prompt delivery, we ask that you periodically check the address information on your mailing label. If you find any inaccuracies, please contact Member Services at circulation@arrl.org or 860-594-0200.

Reprints and permissions: permission@arrl.org

Online Privacy Policy: www.arrl.org/online-privacy-policy
Telephone: 860-594-0200



DAYTON HAMVENTION® Radio Adventure



Greene County Fairgrounds & Expo Center

Get Your Tickets Online NOW!
\$30 in Advance of the Show

May 15 - 17, 2026

- Exhibits & Flea Market
- Forums & Activities
- Networking & More!

hamvention.org

Join ARRL at Dayton Hamvention®

Developing the next generation of radio amateurs!

- Spotlight on Radio Clubs and Youth
- Special Exhibits and Guests
- Presentations and Forums
- Get 2026 ARRL Field Day Gear!

2026 ARRL Youth Rally at Hamvention® Saturday, May 16

Hands-on ham radio activities, discovery, sharing,
and fun! Advance online registration required
(ages 11–21; includes t-shirt, lanyard, and badge).

Register for the Youth Rally at www.arrl.org/expo

*Hamvention will provide admission tickets at no cost for these
ARRL pre-registered Youth Rally attendees.*



See what **ARRL** has in store for you at
Hamvention at www.arrl.org/expo.



Download the ARRL Events app to find booths, exhibits,
forums, maps, hourly prize drawings, and more!

AMATEUR RADIO
FD★26
A NATIONAL RESOURCE



The New K-Line

ENGINEERED FOR PERFORMANCE. DESIGNED FOR THE OPERATOR.



K4 Direct-Sampling SDR

- Crystal-clear, low-fatigue RX audio
- 160-6M all-mode operation with a rugged 100W PA
- Ultra-low RX/TX phase noise and TX CW bandwidth
- Color panadapter with touch and mouse tuning
- Built-in remote operation (server and client)
- Precision DSP filtering down to 50 Hz

K4/0 Remote Panel

Full K4 Operating Experience.
Compact by Design.



KPA1500 Amplifier

The K4 interfaces seamlessly
with the KPA1500 and KPA500
Amplifiers

**HANDS-ON HAM RADIO.
BY DESIGN.**



ELECRAFT

elecraft.com - 831-763-4211

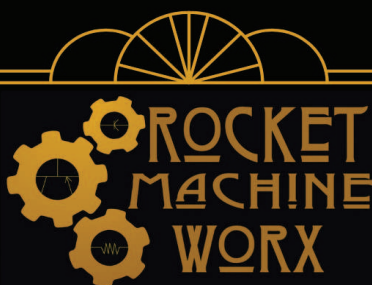
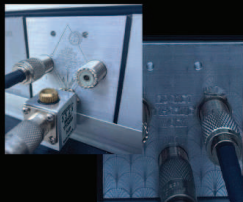
MIDPATCH



MINIPATCH



MICROPATCH



NEW!!!



TRAVELPATCH



CABLERING



WINDOW WING KIT



COME SEE US AT HAMVENTION®
BUILDING ACROSS FROM THE FLEA MARKET
BOOTH 4210

Mosley

... "a better Antenna!"

AIRCRAFT GRADE ALUMINUM
ELEMENTS & BOOMS and
STAINLESS STEEL HARDWARE

STRONG!

Snow, ice or rain
are no match for
Mosley Quality!

...built to last!

FOR OVER 80 YEARS,

Mosley antennas are

* **pre-tuned,**

* **pre-drilled,**

* **and color-coded**

**for ease of assembly
which means...**

* **NO MEASURING!**

REQUEST A CATALOG

Call 800-325-4016

In Business Since 1946!

Mosley... "a better Antenna!"

www.mosleyelectronics.com



Second Century

Right to Repair

One of the YouTube content creators I follow outside of the amateur radio arena is a car fanatic named Mat Armstrong. He is known for buying cars — typically supercars — that have been totaled in accidents and restoring them to perfect condition. He has recently run afoul of two particular brands: Ferrari and Bugatti. Despite laws to the contrary, they are refusing to sell him the parts necessary to repair the vehicles.

In the United States, 2025 saw bills introduced across 22 states pursuing a legal Right to Repair. These bills have now been introduced in all 50 states. One of the categories important to us as hams is that the bills address electronics as one of the categories supported. Certain cell phone and computer manufacturers have obstructed consumers from repairing the units they own, now going to the extent of embedding brand-identifying logic in replacement parts so that third-party components won't work.

Why is this important to the ham radio market?

Because we *expect* to be provided the technical information to diagnose and repair the equipment that we buy. We also expect to be able to purchase components directly from manufacturers and will routinely go out to the market at large, including sites like eBay, to find components that will fix or even enhance the equipment that we own and use. Certain advanced amateur equipment has become so sophisticated that it's unreasonable to think amateurs can even repair it!

I had a 6-meter preamp that took a little hit of RF, which damaged some of the internal components. I reached out to the manufacturer to see if it could be repaired. I was told that the preamp was garbage at that point, and I should throw it away and buy a replacement. That was not what I wanted to hear, looking at this otherwise brand-new box sitting in my hand! Fortunately, our local club "has a guy" — an experienced electrical technician who repairs amateur radio equipment for members. He was able, with a microscope and a tiny soldering iron tip, to remove the surface-mounted device. He bought a bag of them on eBay for less than a dollar (!), replaced the damaged component, and brought the preamp right back to life. A very inexpensive repair versus an expensive replacement.

How would you react to opening a radio and finding out that you melted a custom FPGA (Field-Programmable Gate Array) chip and the manufacturer would not sell you one to fix your radio? How would you react if your end-fed half-wave antenna started acting strange, with SWR swinging all over the place, only to open the unit and find that the manufacturer had potted the inside so that you could not identify, let alone repair, the blown capacitor connected to the toroid?

Amateur radio operators have been accustomed to, to the extent they want to, having access to technical manuals, schematics, parts lists, and replacement parts in support of the equipment that they own. As this trend by manufacturers in many industries has made right to repair a hill to die on, we are most fortunate to work with and be served by a community of manufacturers who understand our culture along with our needs and desires to remain close to the technology. And for those manufacturers who decide to go the other way? I suspect hams will vote with their wallets!

Keep radio active! Take on a project to build or repair a radio, just for fun. Be a connector! If you know of someone struggling to solve a problem with damaged equipment, see if you know someone in your club or the community who can help. And now is the time of year with the great hamfest schedule to get out and buy those things that allow us to enjoy our right to repair.

David A. Minster, NA2AA
Chief Executive Officer

DIAMOND ANTENNA

diamondantenna.net

When it comes to quality and performance, DIAMOND ANTENNA is the worldwide leader in VHF/UHF base and mobile antennas.

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!

NR770H Series

SG7900A

X30A / X50A

X700HNA



RF PARTS™
COMPANY

Diamond Antenna is a division of RF Parts Company

The Standard By Which All Others Are Judged

As the days get longer, Elecraft has you covered - from the trail to the shack.



KH1 Hand-Held 5-Band CW Transceiver

Pocket-sized power. Operates from anywhere!

KX-Line: KX3/KX2

Elecraft® Full-Featured Ultra-Portables with 100W Matching Amp



KX2 Ultralight Grab-and-Go Station
Perfect for SOTA & Field Operations



KX3 Compact 160-6 Meter,
All-Mode Transceiver

ELECRAFT K-LINE

BUILT FOR OPERATORS WHO KNOW THE DIFFERENCE

K4 Direct-Sampling SDR and KPA1500 Legal-Limit Amp



K4/O Remote Panel

Full K4 Operating Experience
1/3rd of the Desk Space



ELECRAFT
elecraft.com - 831-763-4211



HF Excellence, Evolved — Even More Excitement

IC-7300MK2

HF / 50 / (70) MHz Transceiver



For the love of ham radio.



www.icomamerica.com/amateur
insidesales@icomamerica.com

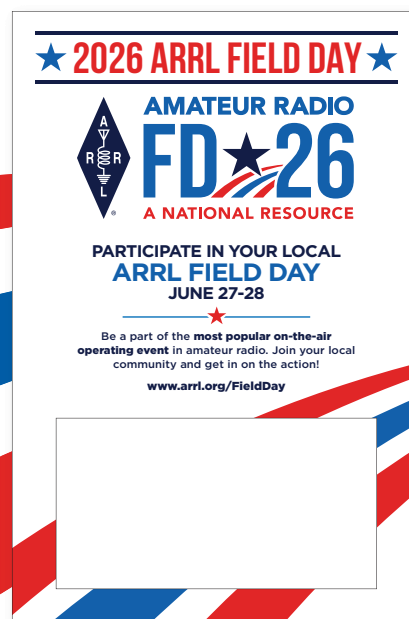


GET YOUR CLUB READY FOR 2026 ARRL FIELD DAY!

ARRL Field Day is June 27–28. Make sure your club is fully prepared for amateur radio's largest on-the-air event and the nationwide **America250** celebration. Official **2026 Field Day merchandise**—t-shirts, hats, mugs, pins, patches, stickers, banners, and recruitment posters—helps your club promote amateur radio, recognize members, and celebrate together.

Clubs: Collect orders from members and place one group order to save on shipping.

Order now so your club is ready for Field Day!



Order online at www.arrl.org/shop | Call toll-free US 1-888-277-5289

Club Spotlight

ICOM® Official Sponsor of ARRL Year of the Club



K7LED



Mike & Key Amateur Radio Club

Founded: 1963	ARRL Affiliation Date: Nov. 18, 1972
Voting Licensed Amateur Members: 315	Meetings: Monthly
Members: 319	Website: www.mikeandkey.org
Section: Western Washington	Focus: Field Day, swap meet, testing

When it was first founded in 1963, the Mike & Key Amateur Radio Club (M&K) consisted of a small handful of ham radio enthusiasts seeking a place to get together and talk about radio. Now, M&K is among the most active amateur radio clubs in the Pacific Northwest. With activities spanning every corner of amateur radio — public service, contesting, DXing, license testing, experimentation, foxhunts, Parks on the Air®, and beyond — this ARRL Special Service Club works hard to offer opportunities for radio enthusiasts to explore their interests.

Hosting Hams

M&K is best known for hosting two large amateur radio events each year — ARRL Field Day and the M&K Electronics Show & Swap Meet.

M&K's annual Field Day gathering — held at Fort Flagler State Park since 1975 — is a massive undertaking that kicks off several days before Field Day begins, according to Club President Robert Christian, KJ7CBO.

Each year, club participants “take their RVs, their tents, and their vans to the park for what we call ‘radio camp,’ which generally runs from Monday to Monday,” Robert explained. The days leading up to Field Day are spent preparing shelters, assembling eight mobile radio stations, and accumulating enough equipment, food, and coffee for hams, their families, and other visitors. The event doubles as an amateur radio open house; M&K Field Day is open to the public, with opportunities for non-hams to get on the air with the help of licensed operators.

The club's hard work and preparation pays off when the Field Day results are tallied — K7LED routinely racks up impressive scores, earning the top spot in the 6A category for the past 4 years.

The club's annual Electronics Show & Swap Meet, meanwhile, is one of the largest amateur radio events in the Pacific Northwest. Held on the Washington State Fairgrounds every year since 1982, this 1-day hamfest attracts more than 1,500 visitors from the Pacific Northwest and

beyond to sell and trade radio equipment and electronics. The proceeds go toward funding club activities and maintaining their repeater systems, and running the event takes up to 300 volunteers.

Serving Hams Old and New

In between hosting these large-scale ham radio events, M&K makes time to serve hams and non-hams alike. The club hosts license exam sessions, including virtual, video-supervised sessions, on the third Saturday of every month. The club also promotes training courses and educational programs at all licensing levels to help hams expand and hone their skills, and members can access their free lending library of educational texts, media, and journals covering topics related to amateur radio, communications systems, and electrical theory.

M&K also hosts several nets to get hams on the air, including a weekly informal net, NVIS net, EmComm net, and Member and Visitor Check-In net. Robert highlighted the club's weekly Tech net, where newer hams can get technical tips from more experienced operators. “It's fun to stump the Elmers — and it has been done!” he said.

Finding a Home

M&K stresses that it “cannot be everything to everybody,” but it sure is a lot of things to a lot of hams. The club is constantly seeking fresh ideas and new technologies to expand the breadth of amateur radio opportunities available to their membership — including their most recent project, their first high-altitude balloon launch.

“Finding a home is key for many of us,” Robert said.

Guide to Member Benefits



ARRL Online | www.arrl.org/myarrl

Create an online ARRL Member account, and get access to members-only benefits. Register at www.arrl.org/myARRL. Already registered? Log in at the top of the ARRL website.

ARRL Magazines | www.arrl.org/magazines



Members can access the digital editions of four ARRL magazines from a web browser and the free ARRL Magazines app available from Apple's App Store, Google Play, and Amazon Kindle. Members need a valid ARRL account to access the digital magazines, Periodicals Archive and Search, and Product Review Archive. Print subscriptions are available and sold separately.

QST – ARRL's monthly membership journal

On the Air – for new and beginner-to-intermediate-level radio amateurs

QEX – A Forum for Communications Experimenters

NCJ – the National Contest Journal

E-Newsletters | www.arrl.org/opt-in-out

Subscribe to the weekly ARRL Letter, the monthly ARRL Current, and a variety of other e-newsletters and announcements for members. Keep up with ARRL News, publications, podcasts, and calendars.

Email Forwarding Service

Email sent to your arrl.net address will be forwarded to any email account you specify.

ARRL Learning Center | learn.arrl.org

This online learning environment is designed to help members get the most out of amateur radio. Courses, tutorials, and resources cover getting on the air, emergency communications, and electronics and technology.

Technical Information Service | www.arrl.org/tis

Call or email our expert ARRL Lab specialists for answers to all of your technical and operating questions.

Join or Renew

www.arrl.org/join

Donate

www.arrl.org/donate

Benefits

www.arrl.org/benefits

Shop

www.arrl.org/shop

Advocacy | www.arrl.org/regulatory-advocacy

ARRL supports legislation and regulatory measures that preserve and protect meaningful access to the radio spectrum. Our **ARRL Regulatory Information Branch** answers member questions concerning FCC rules and operating practices.

Logbook of The World – LoTW

www.arrl.org/lotw

Record your contacts and qualify for awards using ARRL's premier logging service.

Group Benefits* | www.arrl.org/benefits

ARRL Ham Radio Equipment Insurance Plan *US only

Find...

...a License Exam Session | www.arrl.org/exam

...a Licensing Class | www.arrl.org/class

...a Radio Club (ARRL-affiliated) | www.arrl.org/clubs

...a Hamfest or Convention | www.arrl.org/hamfests

Interested in Becoming a Ham?

www.arrl.org/newham

newham@arrl.org | Tel. 1-800-326-3942 (US)

Connect with ARRL

ARRL The National Association for Amateur Radio®

225 Main Street, Newington, CT 06111-1400 USA

1-860-594-0200, or 1-888-277-5289 (toll-free US only)

Mon. – Thurs. 8 AM to 7 PM EST, and Fri. 8 AM to 5 PM EST, except holidays

Email: hq@arrl.org

Contact ARRL: www.arrl.org/contact-arrl



Website: www.arrl.org

Facebook: [@ARRL.org](https://www.facebook.com/ARRL.org)

X: [@arrl](https://twitter.com/arrl), [@w1aw](https://twitter.com/w1aw), [@arrl_ares](https://twitter.com/arrl_ares)

Threads: [@arrlhq](https://www.threads.net/@arrlhq)

Instagram and Instagram TV: [@arrlhq](https://www.instagram.com/arrlhq)

YouTube: [ARRLHQ](https://www.youtube.com/ARRLHQ)

LinkedIn: www.linkedin.com/company/american-radio-relay-league

The American Radio Relay League, Inc.

ARRL The National Association for Amateur Radio® in the United States: supports the awareness and growth of Amateur Radio worldwide; advocates for meaningful access to radio spectrum; strives for every member to get involved, get active, and get on the air; encourages radio experimentation and, through its members, advances radio technology and education; and organizes and trains volunteers to serve their communities by providing public service and emergency communications (*ARRL's Vision Statement, adopted in January 2016*).

ARRL is an incorporated, noncommercial association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting members are elected every 3 years by the general membership. The officers are elected or appointed by the Directors.

ARRL is noncommercial, and no one with a pervasive and continuing conflict of interest is eligible for membership on its Board.

"Of, by, and for the radio amateur," ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

A *bona fide* interest in Amateur Radio is the only essential qualification of membership; an amateur radio license is not a prerequisite, although full voting membership is granted only to licensed amateurs in the US.

Membership inquiries and general correspondence should be addressed to the administrative headquarters: ARRL, 225 Main St., Newington, Connecticut 06111-1400 USA.

Officers, Division Directors, and Staff

As an ARRL member, you elect the Director and Vice Director who represent your Division on ARRL policy matters. If you have a question or comment about ARRL policies, contact your representatives listed below.

Officers

Founding President 1914-1936
Hiram Percy Maxim, W1AW

President
Rick Roderick, K5UR*
P.O. Box 444, Vilonia, AR 72173
501-988-2527; k5ur@arrrl.org

First Vice President
Kristen McIntyre, K6WX*
900 Golden Wheel Park Dr., #85
San Jose, CA 95112
510-703-4942; k6wx@arrrl.org

Second Vice President
Rick Niswander, K7GM
P.O. Box 2701
Greenville, NC 27836
k7gm@arrrl.org

International Affairs Vice President
Rod Stafford, W6ROD
5155 Shadow Est.
San Jose, CA 95135
408-238-4671; w6rod@arrrl.org

Chief Executive Officer and Secretary
David A. Minster, NA2AA*
225 Main St.
Newington, CT 06111
860-594-0404; dminster@arrrl.org

Treasurer
John Sager, WJ7S

Chief Financial Officer
Diane Middleton, W2DLM

Staff

VEC Manager
Maria Somma, AB1FM

Radiosport & Regulatory Information Manager
Bart Jahnke, W9JJ

Laboratory Manager
George Spatta, W1GKS

Emergency Communications & Field Services Director
Josh Johnston, KE5MHV

Senior Director of Marketing & Innovation
Bob Inderbitzen, NQ1R

Marketing Operations Manager
Jason Leonard, KJ7FEZ

Retail Sales & Marketing Manager
Jackie Ferreira, KB1PWB

Advertising Sales Manager
Steve Bossert, K2GOG

Director of Publications & Editorial
Becky R. Schoenfeld, W1BXY

Director of Education & Learning
Steve Goodgame, K5ATA

Director of IT
Justin Biamonte

Director of Development
Kevin Beal, K8EAL

Development Operations Manager
Christina Lessard, KC1TDM

Controller
Thomas Bell, KC1MHQ

Atlantic Division

www.atldiv.org
Marty Newingham, AG3I
6003 Autumn View Ct., Greensburg, PA 15601
724-875-5385; ag3i@arrrl.org

Vice Director: Vacant

Central Division

www.central.arrrl.org
Joshua Long, W9HT
8725 Edwardsberg Pl., New Haven, IN 46774
260-749-9851; w9ht@arrrl.org

Vice Director: Vacant

Dakota Division

www.arrrldakota.org
Bill Lippert, AC0W*
2013 6th Ave. SE, Austin, MN 55912
507-993-9181; ac0w@arrrl.org

Vice Director: **Christian Stallkamp, KI0D**
P.O. Box 271, Selby, SD 57472
605-848-3929; ki0d@arrrl.org

Delta Division

www.arrrldelta.org
David A. Norris, K5UZ
1200 Becky Ln., Redfield, AR 72132
870-613-1606; k5uz@arrrl.org

Vice Director: **John Mark Robertson, K5JMR**
201 Madewood Ct., Bossier City, LA 71111
318-572-7917; k5jmr@arrrl.org

Great Lakes Division

www.arrrl-greatlakes.org
Scott Yonally, N8SY*
258 Valley Hi Dr., Lexington, OH 44904
419-512-4445; n8sy@arrrl.org

Vice Director: **Roy Hook, W8REH**
6611 Steitz Rd., Powell, OH 43065
w8reh@arrrl.org

Hudson Division

www.hudson.arrrl.org
Ed Wilson, N2XDD*
P.O. Box 483, Shirley, NY 11967
631-484-8826; n2xdd@arrrl.org

Vice Director: **David Galletly, KM2O**
540 Wemple Rd., Glenmont, NY 12077
518-421-8324; km2o@arrrl.org

Midwest Division

www.arrrlmidwest.org
Art Zygielbaum, K0AIZ*
6601 Pinecrest Dr., Lincoln, NE 68516
402-421-0840; k0aiz@arrrl.org

Vice Director: **Dave Propper, K2DP**
747 Old Bonhomme Rd., University City, MO
63132, 314-225-5167; k2dp@arrrl.org

How to Contact ARRL Staff

To send an email to any ARRL Headquarters staff member, put his or her call sign (or first initial and last name) in front of @arrrl.org. For example, to send to Hiram Maxim, First President of ARRL, use w1aw@arrrl.org or hmaxim@arrrl.org.

*Executive Committee Member

New England Division

<https://nediv.arrrl.org>
Tom Frenaye, K1KI
P.O. Box J, West Suffield, CT 06093
860-597-4539; k1ki@arrrl.org

Vice Director: **Phillip E. Temples, K9HI**
125 Coolidge Ave. #803
Watertown, MA 02472-2875
617-331-0183; k9hi@arrrl.org

Northwestern Division

www.arrrlnwdiv.org
Mark J. Tharp, KB7HDX
P.O. Box 2222, Yakima, WA 98907
509-952-5764; kb7hdx@arrrl.org

Vice Director: **Michael A. Sterba, KG7HQ**
212 Laurel Dr., Sedro Woolley, WA 98284
360-708-2757; kg7hq@arrrl.org

Pacific Division

www.pacific.arrrl.org
John Litz, NZ6Q
1434 Douglas Rd., Stockton, CA 95207
209-687-0774; nz6q@arrrl.org

Vice Director: **Dr. Carol Milazzo, KP4MD**
P.O. Box 665, Citrus Heights, CA 95611
916-259-3221; kp4md@arrrl.org

Roanoke Division

www.arrrl-roanoke.com
Dr. James Boehner, N2ZZ*
525 Barnwell Ave. NW, Aiken, SC 29801-3939
803-343-9040; n2zz@arrrl.org

Vice Director: **Bill Morine, N2COP**
101 Windlass Dr., Wilmington, NC 28409
910-452-1770; n2cop@arrrl.org

Rocky Mountain Division

www.rockymountaindivision.org
Jeff Ryan, K0RM
9975 Wadsworth Pkwy. K2-275
Westminster, CO 80021
303-432-2886; k0rm@arrrl.org

Vice Director: **Mel Parkes, NM7P**
2166 E. 2100 N, Layton, UT 84040
801-673-6116; nm7p@arrrl.org

Southeastern Division

www.facebook.com/ARRLSoutheasternDivision
Mickey Baker, N4MB
14764 Black Bear Rd., West Palm Beach, FL
33418, 561-320-2775; n4mb@arrrl.org

Vice Director: **Dr. Andrew Milluzzi, KK4LWR**
440-829-1187; kk4lwr@arrrl.org

Southwestern Division

www.kkn.net/n6aa
Richard J. Norton, N6AA
21290 West Hillside Dr., Topanga, CA 90290
310-455-1138; n6aa@arrrl.org

Vice Director: **John Kitchens, NS6X**
P.O. Box 178, Somis, CA 93066
805-216-2569; ns6x@arrrl.org

West Gulf Division

www.westgulfddivision.org
John Robert Stratton, N5AUS
P.O. Box 2232, Austin, TX 78768-2232
512-445-6262; n5aus@n5aus.com

Vice Director: **Lee H. Cooper, W5LHC**
2507 Autrey Dr., Leander, TX 78641
512-658-3910; w5lhc@arrrl.org

ARRL Section Managers

The 15 Divisions of ARRL are arranged into 71 administrative Sections, each headed by an elected Section Manager (SM). Your SM is the person to contact when you have news about your activities, or those of your radio club. If you need assistance with a local problem, your SM is your first point of contact. He or she can put you in touch with various ARRL volunteers who can help (such as Technical Specialists). Your SM is also the person to see if you'd like to become a Section volunteer. Whatever your license class, your SM has an appointment available. Visit your Section page at www.arrl.org/sections.

Atlantic Division DE, EPA, MDC, NNY, SNJ, WNY, WPA

Delaware: Steven Keller, KC3DSO, 803 Meadow Brook Ln., Milford, DE 19963-3000
240-515-0620; kc3dso@arrl.org

Eastern Pennsylvania: Vacant

Maryland-DC: Chris Van Winkle, AB3WG, 24 Tattersaul Ct., Reisterstown, MD 21136-2431; 240-755-4257; ab3wg@arrl.org

Northern New York: Rocco Conte, WU2M, 152 W. Bush Rd., Gloversville, NY 12078-6405; 518-848-9028; wu2m@arrl.org

Southern New Jersey: Ron Fish, KX1W, 29 S. Canary Way, Galloway, NJ 08205-6208; 845-988-6705; kx1w@arrl.org

Western New York: Scott Bauer, W2LC, 1964 Connors Rd., Baldwinsville, NY 13027-9743; 315-430-6368; w2lc@arrl.org

Western Pennsylvania: Joe Shupienis, W3BC, P.O. Box 73, Falls Creek, PA 15840-0322; 814-771-3804; w3bc@arrl.org

Central Division IL, IN, WI

Illinois: Thomas Beebe, W9RY, 3540 Market Rd., Marion, IL 62959-8940
618-534-6282; w9ry@arrl.org

Indiana: Bob Burns, AK9R, P.O. Box 808, Brownsburg, IN 46112
317-520-1188; ak9r@arrl.org

Wisconsin: Jason Spetz, KC9FXE, E5910 490th Ave., Menomonie, WI 54751-5644
715-231-7722; kc9fxe@arrl.org

Dakota Division MN, ND, SD

Minnesota: Bill Mitchell, AE0EE, 7412 Colfax Ave. S., Richfield, MN 55423
510-529-5658; ae0ee@arrl.org

North Dakota: Ralph Fettig, N0RDF, 6650 County Rd. 12 W., Minot, ND 58701-3003
701-822-3467; n0rdf@arrl.org

South Dakota: Nicholas Hauser, KT0W, 813 E. 19th St., Yankton, SD 57078-2426
605-291-5537; kt0w@arrl.org

Delta Division AR, LA, MS, TN

Arkansas: James D. Ferguson, Jr., N5LKE, 1500 Lauren Dr., Searcy, AR 72143-8477
501-593-5695; n5lke@arrl.org

Louisiana: Houston Polson, N5YS, 43459 Denali Dr., Hammond, LA 70403
318-209-8843; n5ys@arrl.org

Mississippi: Malcolm Keown, W5XX, 64 Lake Circle Dr., Vicksburg, MS 39180
601-636-0827; w5xx@arrl.org

Tennessee: David Thomas, KM4NYI, 205 Linford Rd., Knoxville, TN 37920
865-654-5489; km4nyi@arrl.org

Great Lakes Division KY, MI, OH

Kentucky: Bob Selbrede, K6ZZ, 402 N. 4th Ave., La Grange, KY 40031-1512
760-284-2126; k6zz@arrl.org

Michigan: Ralph Katz, AA8RK, 605 Skydale Dr., Ann Arbor, MI 48105-1138
734-657-5059; aa8rk@arrl.org

Ohio: Bret Stemen, KD8SCL, 328 Pataskala Ridge Dr. SW, Pataskala, OH 43062-7434
614-778-3754; kd8scl@arrl.org

Hudson Division ENY, NLI, NJ

Eastern New York: John K. Fritze, Jr., K2QY, 4 Normanskill Blvd., Delmar, NY 12054-1335; 401-261-4996; k2qy@arrl.org

NYC-Long Island: Jim Mezey, W2KFV, 38 Appletree Ln., Carle Place, NY 11514-1336
516-315-8608; w2kfv@arrl.org

Northern New Jersey: Nomar Vizzarondo, NP4H, P.O. Box 245, Tenafly, NJ 07670-0245
917-443-2664; np4h@arrl.org

Midwest Division IA, KS, MO, NE

Iowa: Barry Buelow, W0IY, 4109 Cedar Heights Dr., Center Point, IA 52213-9206
319-651-4985; w0iy@arrl.org

Kansas: Ronald D. Cowan, KB0DTI, P.O. Box 36, La Cygne, KS 66040
913-757-4456; kb0dti@arrl.org

Missouri: Cecil Higgins, AC0HA, 27995 County Rd. 220, Hermitage, MO 65668-8493
417-493-8208; ac0ha@arrl.org

Nebraska: Matthew N. Anderson, KA0BOJ, 14300 NW 98th St., Raymond, NE 68428-4254; 402-480-5515; ka0boj@arrl.org

New England Division CT, EMA, ME, NH, RI, VT, WMA

Connecticut: Douglas Sharafanowich, WA1SFH, 168 Housatonic Dr., Milford, CT 06460-4936; 203-494-3887; wa1sfh@arrl.org

Eastern Massachusetts: Jon McCombie, N1ILZ, 75 Northwest St., Eastham, MA 02642
508-246-4982; n1ilz@arrl.org

Maine: Philip Duggan, N1EP, 195 Kansas Rd., Milbridge, ME 04658-3120
207-598-5397; n1ep@arrl.org

New Hampshire: Dennis Markell, N1IMW, 47 Old Farm Rd., Bedford, NH 03110-5733
860-462-9522; n1imw@arrl.org

Rhode Island: Mike Corey, K1IU, 31 Colvintown Rd., Coventry, RI 02816-8509
860-518-4124; k1iu@arrl.org

Vermont: Paul N. Gayet, AA1SU, 11 Cherry St., Essex Junction, VT 05452
802-878-2215; aa1su@arrl.org

Western Massachusetts: Raymond Lajoie, AA1SE, 245 Leominster Rd., Lunenburg, MA 01462-2031; 978-549-5507; aa1se@arrl.org

Northwestern Division AK, EWA, ID, MT, OR, WWA

Alaska: David Stevens, KL7EB, 8521 Golden St., Apt. 4, Anchorage, AK 99502
907-242-6483; kl7eb@arrl.org

Eastern Washington: Jo Whitney, KA7LJQ, P.O. Box 2222, Yakima, WA 98907
509-952-5765; ka7ljq@arrl.org

Idaho: Don Lynn, ND7L, 41 N. Hastings Dr., Nampa, ID 83687-7504

208-899-5801; nd7l@arrl.org

Montana: Kevin Kerr, W1KKG, P.O. Box 69, Plains, MT 59859-0069

406-242-0109; w1kgk@arrl.org

Oregon: Scott Rosenfeld, N7JL, 3662 Vine Maple St., Eugene, OR 97405-4473
541-684-9970; n7ji@arrl.org

Western Washington: Bob Purdom, AD7LJ, P.O. Box 65171, University Place, WA 98464-1171; 253-691-2388; ad7lj@arrl.org

Pacific Division EB, NV, PAC, SCV, SF, SJV, SV

East Bay: Mike Patterson, N6JGA, P.O. Box 30627, Walnut Creek, CA 94598
925-200-8300; n6jga@arrl.org

Nevada: Craig McVeay, N0CSM, 3820 Twilight Ave., Pahrump, NV 89048
305-712-0254; n0csm@arrl.org

Pacific: Heather Flewelling, AH7RF, 1717 Mott-Smith Dr., Apt. 2610, Honolulu, HI 96822-2873; 808-234-9303; ah7rf@arrl.org

Sacramento Valley: Jay Ballinger, N6SAC, 8448 Misty Oak Way, Antelope, CA 95843-5830; 916-622-2746; n6sac@arrl.org

San Francisco: Dr. Antonis Papatsaras, AA6PP, 48 Bayo Vista Ave., Larkspur, CA 94939-1006; 415-861-5053; aa6pp@arrl.org

San Joaquin Valley: Steven Hendricks, KK6JTB, P.O. Box 630, Inyokern, CA 93527-0630; 760-977-2590; kk6jtb@arrl.org

Santa Clara Valley: James Armstrong, NV6W, 2048 Paseo Del Sol, San Jose, CA 95124-2048; 408-679-1680; nv6w@arrl.org

Roanoke Division NC, SC, VA, WV

North Carolina: Marvin K. Hoffman, WA4NC, P.O. Box 2208, Boone, NC 28607
828-964-6626; wa4nc@arrl.org

South Carolina: Matthew Crook, W1MRC, 220 Star Hill Ln., Lexington, SC 29072-6948; 803-386-1069; w1mrc@arrl.org

Virginia: Mike Aimone, WA8AHZ, 4835 Powell Rd., Fairfax, VA 22032
703-870-1730; wa8ahz@arrl.org

West Virginia: Dan Ringer, K8WV, 18 W. Front St., Morgantown, WV 26501-4507
304-292-1999; k8wv@arrl.org

Rocky Mountain Division CO, NM, UT, WY

Colorado: Amanda Alden, K1DDN, 230 Glenmoor Rd., Canon City, CO 81212-7705
719-735-8444; k1ddn@arrl.org

New Mexico: Bill Mader, K8TE, 4701 Sombereite Rd. SE, Rio Rancho, NM 87124
505-250-8570; k8te@arrl.org

Utah: Brett Pruitt, K7BDP, 239 S. Valley View Dr., Hurricane, UT 84737-4413
435-922-1114; k7bdp@arrl.org

Wyoming: Garth Crowe, Sr., WY7GC, 2342 Sagewood Ave., Casper, WY 82601-5018
307-689-1340; w7gc@arrl.org

Southeastern Division AL, GA, NFL, PR, SFL, VI, WCF

Alabama: Dennis Littleton, K4DL, 2230 Bishop Rdg., West Blocton, AL 35184-4246
205-718-4410; k4dl@arrl.org

Georgia: Hank Blackwood, K4HYJ, 406 Dawnville Rd. NE, Dalton, GA 30721
706-529-5647; k4hyj@arrl.org

Northern Florida: Scott Roberts, KK4ECR, 2361 Oak Hammock Ln., Orange Park, FL 32065; 904-759-7812; kk4ecr@arrl.org

Puerto Rico: Carmen N. Greene Rodriguez, KP4QVQ, Parc. San Romualdo 52 Calle H, Hormigueros, PR 00660-9735; 787-246-5634; kp4qvq@arrl.org

Southern Florida: Barry M. Porter, KB1PA, 10605 S. Jog Rd., Apt. 215, Boynton Beach, FL 33437; 561-499-8424; kb1pa@arrl.org

Virgin Islands: Wess Tester, K2AHU, 6002 Diamond Ruby #3-233, Christiansted, VI 00820-5226; 340-513-9107; k2ahu@arrl.org

West Central Florida: Darrell Davis, KT4WX, 6350 Mills Rd., Fort Meade, FL 33841-9584; 863-245-9923; kt4wx@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; ai6df@arrl.org

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

San Diego: Bruce Kripton, AG6X, 5755 Castleton Dr., San Diego, CA 92117-4058
619-813-5505; ag6x@arrl.org

Santa Barbara: Keith Elliott, W6KME, 691 Randy Rd., Newbury Park, CA 91320
805-208-5655; w6kme@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: David Overton, W5JDO, 2812 W. Shandon Ave., Midland, TX 79705-6101
432-553-5597; w5jdo@arrl.org



Introducing ATEM Mini

The compact television studio that lets you create presentation videos and live streams!

Blackmagic Design is a leader in video for the television industry, and now you can create your own streaming videos with ATEM Mini. Simply connect HDMI cameras, computers or even microphones. Then push the buttons on the panel to switch video sources just like a professional broadcaster! You can even add titles, picture in picture overlays and mix audio! Then live stream to Zoom, Teams or YouTube!

Create Training and Educational Videos

ATEM Mini includes everything you need. All the buttons are positioned on the front panel so it's very easy to learn. There are 4 HDMI video inputs for connecting cameras and computers, plus a USB output that looks like a webcam so you can connect to Zoom or Skype. ATEM Software Control for Mac and PC is also included, which allows access to more advanced "broadcast" features!

Use Professional Video Effects

ATEM Mini is really a professional broadcast switcher used by television stations. This means it has professional effects such as a DVE for picture in picture effects commonly used for commentating over a computer slide show. There are titles for presenter names, wipe effects for transitioning between sources and a green screen keyer for replacing backgrounds with graphics.

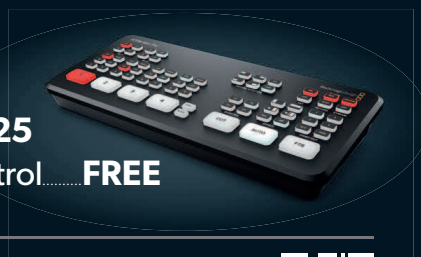
Live Stream Training and Conferences

All models have built in hardware streaming engine for live streaming via its ethernet connection. This means you can live stream to YouTube, Facebook and Teams in much better quality and with perfectly smooth motion. You can even connect a hard disk or flash storage to the USB connection and record your stream for upload later!

Monitor all Video Inputs!

With so many cameras, computers and effects, things can get busy fast! The ATEM Mini features a "multi-view" that lets you see all cameras, titles and program, plus streaming and recording status all on a single TV or monitor. There are even tally indicators to show when a camera is on air! Only ATEM Mini is a true professional television studio in a small compact design!

ATEM Mini Pro \$325
ATEM Software Control FREE



The Lowdown

The Compact 630-Meter Antenna for Amateur Radio



- "HOA-friendly." A convenient way to operate on 630 meters in a confined area.
- Simple and quick to set up, take down, transport and store. Lightweight: 18 lbs. Assembled length 21.5'. Height 24'. Groundplane: 10-25' radius.
- Center-loaded and base-fed with a capacitive top hat for optimum efficiency.
- Accessories: insulator mounts, matching transformers, junction enclosures and preassembled groundplanes.

Visit theRADIOsource.com to learn more.

Contact Info@theRADIOsource.com | 616.772.2300

Use Code ARRL630X for 10% off your order!

Made and Serviced in America

SEE YOU AT HAMVENTION!

Celebrating 30 Years of Four Days in May (FDIM)

FDIM Events HQ
DoubleTree Hotel
Fairborn, Ohio
May 14-17, 2026

FDIM Main Events
Thu – Symposium & Vendors
Fri – Buildathon, Club Night, & Transmitter Efficiency Challenge
Sat – Awards Banquet & Door Prizes



For more information, including the FDIM schedule of events - QRPARCI.org

Visit QRP ARCI at Hamvention - Booth 5107

Join, renew, and connect with operators like you.

DITSTORM™ CYPHER™

Ultra-Compact Expert Decoding

DitStorm" Cypher packs machine learning-powered Morse decoding into a sub-6-cubic-inch portable unit, enabling expert-level performance from any transceiver with pocket-sized convenience.

Versatile Connectivity & Distributed Processing

Hosts an internal web server for browser-based control on any device and uses distributed processing between its dual-core processor and host device for real-time decoding, auto-correction, and adaptive operation.

Unexpected Capability

Instant decode: Great for DX Chasing, POTA, contesting. 5 to 80 WPM. Full Auto Log: all call signs, times and text. Adapts instantly to speed, hand changes. Rich text, including upper/lower case, bold, colors, blink and emoji's. AudioScope, waterfall, visual BPF. Tone Translator to 600 Hz.

With OTA Software Update

THE FUTURE OF CW IS HERE!

MORSE NEXUS . COM



MORSE NEXUS
Formerly  **PreppComm**
Amateur Radio



Schulman Auction

ESTD 2006



The world's premier ham radio auctioneer, with over 150 years of combined staff experience in amateur radio and more than 50 years in the auction industry.

Schulman Auction is your one-stop solution for selling amateur-radio equipment worldwide. "By hams, for hams."

WHY CONSIGN WITH US?

- Our proven online auction platform effectively markets your gear and consistently achieves strong market results.
- Every item is thoroughly tested before listing, giving buyers confidence—and driving higher bids.
- We specialize in estates and major collections, including Wills and Trusts, and offer nationwide pickup and transportation to our facility.

For more information, contact us today.

David Schulman, WDØERU

816-455-5520 | 913-568-3767

david@schulmanauction.com | www.schulmanauction.com

Up Front



[Dee Hester, II, K7UD, photo]

It's Rocket Science!

On May 1 – 3, 2025, students from Texas and Colorado schools gathered near Stonewall, Texas, to launch 54 student-built rockets as part of the SystemsGo program, a high school aerospace engineering curriculum. The Hill Country Amateur Radio Club of Kerrville and the Fredericksburg Repeater Operators Group, Texas, operated station N5G during the event to offer amateur radio demonstrations to the students and visiting public. In between rocket launches, hams demonstrated more than 1,000 contacts on CW, voice, and FT8, and James Froemke, KØMHC, showed off satellite contacts.



[Chris Waldrup, KD4PBJ, photo]

Field Day Is Coming!

Chris Waldrup, KD4PBJ, was heading to GigaParts, an electronics superstore in Huntsville, Alabama, when he spotted this banner above a new storefront that reminded him that ARRL Field Day was right around the corner. The sign was heralding the grand opening of Field Day, a restaurant and entertainment venue in Huntsville offering food, cocktails, and games.



[Bill McGuire, N7MSI, photo]

Hats Calling CQ

After a successful Parks on the Air® activation at Montana's Blackfoot-Clearwater Wildlife Management Area (US-12654), Bill McGuire, N7MSI, and his wife stopped at the Copper Queen Saloon in Helmville. As they sat down for drinks, Bill's wife pointed to some hats for sale above the bar and asked, "Isn't that what you say on the radio?"

If you see something ham-related out in the world, take a photo of it and send it to upfront@arri.org.



Elk Antennas

Log-Periodic Antennas for the Radio Amateur



2M/440L5 Dual-Band Antenna

Great for working satellites from horizon to horizon, DXing, Direction Finding, Contesting, EmComm, Public Service Events, and making contact with difficult to reach repeaters and simplex.



70 cm Band UHF Antenna 440L8

Equally great for GMRS and Amateur Radio.

1.25 Meter Band VHF Antenna 220L6

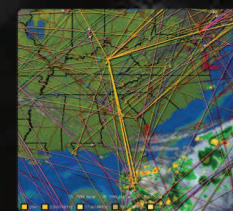
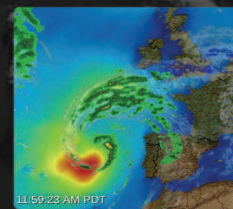
Get started in effective 220 MHz communications.



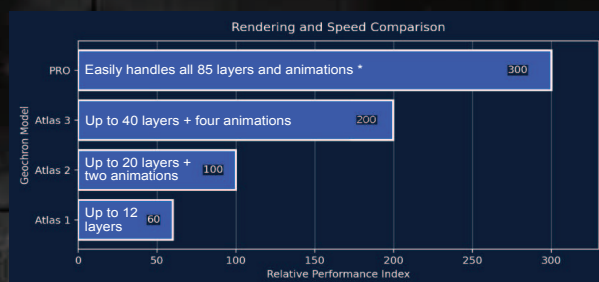
307-250-0040

www.ElkAntennas.com

GEOCHRON®



The Geochron Atlas 3 is a dedicated hardware system connected to your 4K TV that brings propagation, solar conditions, weather, and global context together into a single display for total situational awareness.



Loved by 5,000+ awesome customers including:



Explore Atlas 3 at:
geochron.com/4k

PicoFox r3

Open Source Fox Transmitter

More Than a Fox — Made to Tinker

PicoFox ships as a capable 2-meter fox transmitter, but what it becomes is up to you.

- **Adjustable Power** — Up to 65mW or down to 0.1mW in ¼ dB steps. As a fox that makes for adjustable difficulty but how will you use it?
- **Upgradable & Expandable by Design** — 20 pin header supplies power, GPIO, ADC, I2C, and more. Ask me why there's two solder jumpers on the back...
- **Easy to Program, Easy to Debug** — USB-C programming, on-board reset and boot select buttons, and an SWD header just in case.

Open Hardware for Hams

- RP2040 MCU
- 16Mb Flash
- 20 Pin GPIO Header
- 144-148MHz Transmitter
- Software Controlled Modulation
- Upgrade Footprint on Back



Order at
www.picofox.radio/qst



NEW & IMPROVED!



Designed & Assembled by Hams in the USA!

Built for VHF Contesting and Field Day Ops. Heard It. Worked It. Logged It.

Photo by Josh D KN4UXF



IC-705
(HF / 6M / 2M / 70CM)



IC-7300
HF / 6M



IC-7300MK2
HF / 50 MHz Transceiver



IC-9700
2M / 70CM / 23CM



IC-905
2M / 70CM / 23CM / 13CM / 5CM

*Optional
CX-10G
10GHz Transverter



IC-PW2
HF / 6M 1 kW Amplifier



IC-7760
HF / 50MHz

For the love of **ham radio.**



www.icomamerica.com/amateur
insidesales@icomamerica.com



Correspondence

Letters from Our Members

References Needed

As a ham who likes to use a variety of modes, from SSB through digital, I continually find a need for information about a call sign before I make a contact. The biggest problem is that so much of the information about an individual call sign is not readily available. There are more than 300 country prefixes, 32 CQ zones, 80-plus ITU zones, and 324 grid squares. Add 1,200 Islands on the Air references and you now have more than 2,000 descriptors or locators for the millions of hams worldwide. Many ham software applications give you one or more of these descriptor locators for a call sign, most of which are alpha-numeric. You then have to look up the actual information for the code. No single reference seems to have more than one or two of these code references.

John Parker, KL2LR
Kodiak, Alaska

Spread the Joy of QST

While many of us are now going digital, I still like paper. I look forward to the arrival of my print edition of *QST* every month. When the new issue arrives, I used to put the previous issue on a shelf to collect dust; however, I now take them with me to my veterans clinic. I find an issue lasts about a week before someone has taken it home. I suggest that if you are not a veteran, you can drop that copy at a local doctor's office. Let's spread the joy

of reading *QST* and hopefully bring more people into our hobby.

Charlie Rankin, WA2HMM
Ridge, New York

CW Contest Benefits

I enjoyed Mike Lunebach's, WG9P, letter, "CW Contest Interference," in the April 2026 issue of *QST*. Any contest I've ever been in has been half-hearted at best. A 25 kHz window would be nice. However, there is another way to look at all the interference. Imagine a major calamity deals a death blow to cell phones, and solar storms weaken HF, SSB, and the internet. In emergency communications, I'd want someone who has practiced copying low-power DX CW stations handling the traffic.

Chet Peugh, NK9Y
Chadwick, Illinois
Life Member

ARRL Structure

Thank you for the "Second Century" editorial, "What Is ARRL?" in the April 2026 issue of *QST* — it was needed sorely for our members to better understand how nonprofits, specifically ARRL, work.

I would opine that most members do not understand nonprofit makeup and corporate governance based on the opinions I see flying around the internet. I frankly didn't understand that Section Managers do not feed directly to the ARRL Board of Directors — but rather to the Director of Emergency Communications and

Field Services. This explains to me some of the situations that Section Managers have versus the "overall good" of ARRL.

In short, thank you for the information — I better understand our makeup. Hopefully, many more members do now as well and can better direct their issues to the proper parties.

David Clark, N4YHC
Union, Kentucky
Life Member

WSJT-X SuperCW Mode

I read Frans Thomas Eyt's, KA1FTE, "WSJT-X SuperCW Mode" in the April 2026 issue of *QST* with great interest. It described SuperCW mode, which allows up to 150 WPM decoding, and the imitation of different fists to keep from offending CW purists. It seemed like such a strange departure from FT8 and the other modes in the software — K1JT would surely be offended!

And then I read in the last sentence, "Available to download on April 1, 2026." You got me good.

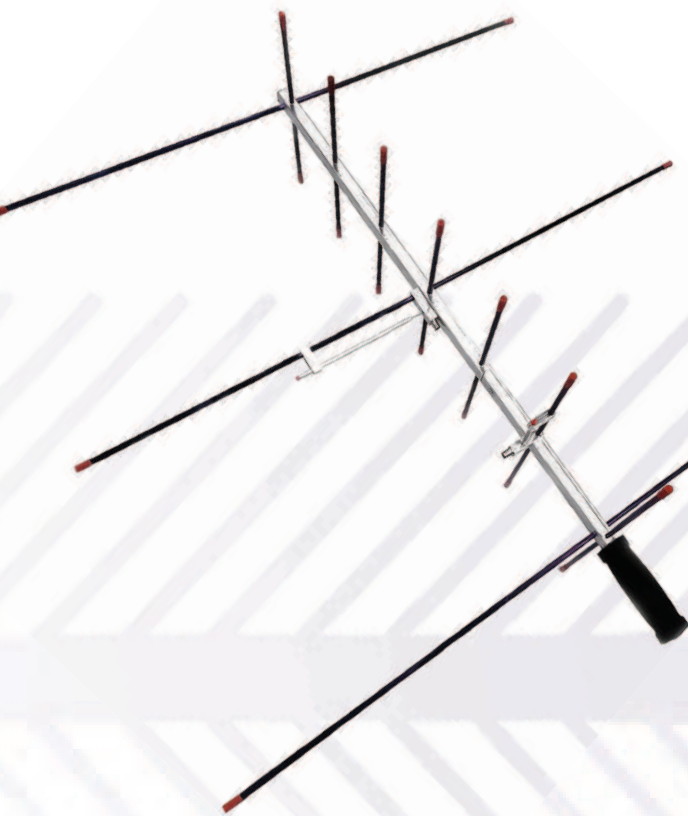
Harris Butler, NN0Y
Castle Rock, Colorado

Send your letters to letters@arrrl.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.

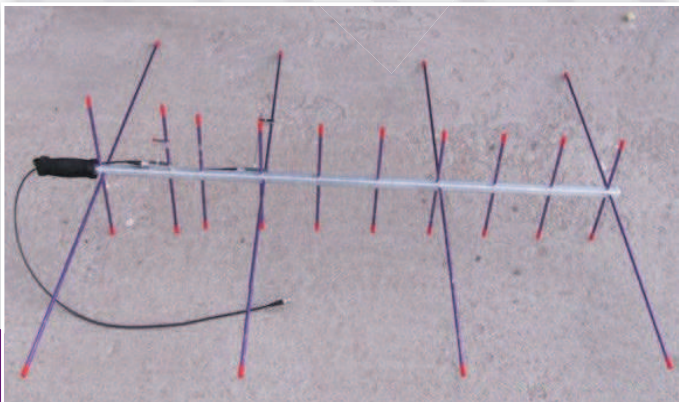
← Arrow Antenna

Simply the Best! - Made in the USA

**Arrow Antenna manufactures
VHF & UHF antennas for 6m,
2m, 220 and 440, GMRS, MURS,
Aircraft and Business bands:**



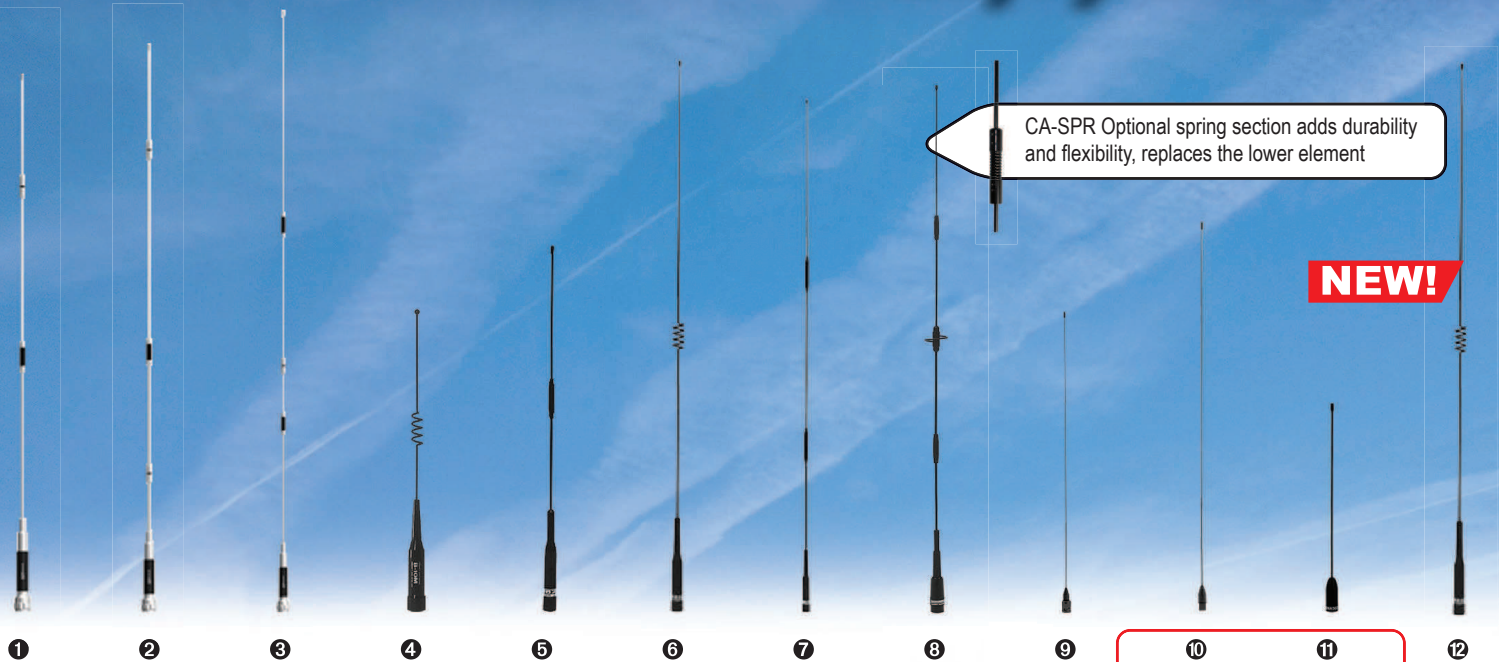
- Satellite Antennas – Hand-held dual band 2m/440. Comes with or without the diplexer and with or without a split boom for backpacking. We also offer a separate roll-up bag for it.
- Open Stud J-poles – 2m/440, 220, Search & Rescue, FRS, GMRS.
- Hand-held Yagis – Dual band, 2m/440, Custom, 6m dipole.
- 1/4 Wave Ground Plane – Dual & single band, 2m/440, Aircraft, Custom.
- Solid Element Yagis – 2m, 22, 440, Custom.
- Fox Hunt Loops and Offset Attenuators for Fox Hunting.
- Corner Reflectors – 2m, 220, 440, 2m/440, Business, Custom.



→ www.ArrowAntennas.com



Life is a JOURNEY.
Enjoy the ride!



Mobile Antennas

**SMA-Female Connector
Versions Available**

❶ **COMET CSB-750A DUAL-BAND 2M/440MHz w/FOLD-OVER**

2M: 1/2 wave • 440MHz: 5/8 wave x 2 • VSWR: 1.5:1 or less • Length: 42" • Conn: PL-259 • Max. Pwr: 150W

❷ **COMET CSB-770A DUAL-BAND 2M/440MHz w/FOLD-OVER**

2M: 5/8 wave center load • 440MHz: 5/8 wave x 2 center load • VSWR: 1.5:1 or less • Length: 51" • Conn: PL-259 • Max Pwr: 150W

❸ **COMET CSB-790A DUAL-BAND 2M/440MHz w/FOLD-OVER**

2M: 7/8 wave center load • 440MHz: 5/8 wave x 3 center load • VSWR: 1.5:1 or less • Length: 62" • Conn: PL-259 • Max Pwr: 150W

❹ **COMET B-10/B-10NMO DUAL-BAND 2M/440MHz**

2M: 1/4 wave • 440MHz: 1/2 wave • Length: 12" • Conn: B-10 PL-259, B-10NMO - NMO style • Max Pwr: 50W

❺ **COMET SBB-2/SBB-2NMO DUAL-BAND 2M/440MHz**

2M: 1/4 wave • 440MHz: 5/8 wave center load • VSWR: 1.5:1 or less • Length: 18" • Conn: SBB-2 PL-259, SBB-2NMO - MNO style • Max Pwr: 60W

❻ **COMET SBB-5/SBB-5NMO DUAL-BAND 2M/440MHz w/FOLD-OVER**

2M: 1/2 wave • 440MHz: 5/8 wave x 2 • Length: 39" • Conn: SBB-5 PL-259, SBB-5NMO - NMO style • Max Pwr: 120W

❼ **COMET SBB-7/SBB-7NMO DUAL-BAND 2M/440MHz w/FOLD-OVER**

2M: 6/8 wave • 440MHz: 5/8 wave x 3 • Length: 58" • Conn: SBB-7 PL-259, SBB-7NMO - NMO style • Max Pwr: 70W

❽ **COMET CA-2X4SR/CA-2X4SRNMO WIDE-BAND 140-160MHz 435-465MHz w/FOLD-OVER**

2M: 5/8 wave • 440MHz: 5/8 wave x 3 • Length: 40" • Conn: CA-2x4S PL-259, CA-2x4SRNMO NMO style • Max Power: 150W

❾ **COMET BNC-24 DUAL BAND 2M/440MHz HT ANTENNA**

RX range: 100-1200MHz • Length: 17" • SuperFlex featherweight whip • Conn: BNC

❿ **COMET SMA-24, SMA-24J DUAL BAND 2M/440MHz HT ANTENNA**

RX range: 100-1200MHz • Length: 17" • SuperFlex featherweight whip • Conn: SMA-24: SMA-male / SMA-24J: SMA-female

⓫ **COMET SMA-503, SMA-503J DUAL BAND 2M/440MHz HT ANTENNA**

RX range: 100-1200MHz • Length: 8.75" • Conn SMA-503: SMA-male, SMA-503J: SMA-female

⓬ **COMET NEW! FC5/FC5NMO DUAL-BAND GMRS & MURS w/FOLD-OVER**

MURS: 1/2 wave • GMRS: 5/8 wave x 2 • Length: 37" • Conn: FC5 PL-259 style, FC5NMO - NMO style • Max Pwr: 120W

Comet offers several
"No-holes to drill"
lip mounts, in a
variety of sizes
and connectors

CP-5M
pictured



Call or visit your local dealer today!

www.cometantenna.com | 800-962-2611



Custom Embroidery for Your Ham Radio Club—Done Right.

Bring your club logo to life with premium embroidery.

- Polo shirts, hats, jackets & more
- Fast turnaround
- Exceptional stitch quality
- Industry leading equipment and reliability



To get a free stitch-out sample visit:

www.OrangeBlossomEmbroidery.com/hams

Or email Taylor@OrangeBlossomEmbroidery.com



**ORANGE BLOSSOM
EMBROIDERY**



HAM-OWNED & OPERATED - KI4GHK



*The Northeast's largest gathering of radio amateurs, featuring in-person experts
presenting on timely topics, trends and technologies*

HamX - The Northeast HamXposition

August 13-16, 2026

ARRL New England Division Convention



Thursday Night Magic Act



Jack Miller
Professional Magician

Friday Night DXCC/ Contest Banquet



Max Freedman, N4ML

sponsored by:
DX
ENGINEERING

Saturday Morning Keynote



Everton Henriques, KD2ZZT

Saturday Grand Banquet Speaker



Katie Campbell, KE8LQR

Over \$12,000 in prizes * Large Outdoor Flea Market * W1XPO GOTA Station

**ARRL • Flex Radio • New Holland Radio Shack • Elecraft • Halibut Electronics • Reliance Antennas • W1QSL Bureau
• Smitty's Switches & Stuff • Unitrend • Scanner Master • plus many more!**

TOPICS: Youth Forum • POTA • Stealthy HF • Arduino Workshop • Antique Radio Repair • Intro to DSTAR • YL Meet and Greet
• ARRL Section Meetings • Club Forum • Andy's Linux • Hunting RFI • Mini Contest University • New England QRP Club • and more!

August 13-16, 2026 * Boston-Marlborough MA * hamx.org/qst626

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, 18.0775, 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 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 MFSK16.

♦ 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 2026, Headquarters and W1AW are closed on New Year's Day (January 1), Presidents Day (February 16), Memorial Day (May 25), Independence Day (July 3), Labor Day (September 7), Veterans Day (November 11), Thanksgiving and the following day (November 26 and 27), and Christmas (December 25).



KENWOOD

3rd IMDR 110 dB*

RMDR 122 dB*

BDR 150 dB*

Performance Exceeding Expectations.

The most happy and sublime encounters happen in the worst circumstances and under the harshest conditions.

There are enthusiasts who know this all too well because of their love of HF radio.

Results born of certainty and not circumstance. Delivered through impeccable performance. This is our offering to you.



"The Kenwood TS-890S has the highest RMDR of any radio I have ever measured."

- Rob Sherwood - NC0B - December 2018

HF/50MHz TRANSCEIVER TS-890S

Top-class receiving performance

3 kinds of dynamic range make for top-class performance.

- ▶ Third order intermodulation Dynamic Range (3rd IMDR) 110dB*
- ▶ Reciprocal Mixing Dynamic Range (RMDR) 122dB*
- ▶ Blocking Dynamic Range (BDR) 150dB*

*Values are measured examples. (2kHz spacing: 14.1 MHz, CW, BW 500 Hz, Pre Amp OFF)

- ▶ Full Down Conversion RX
- ▶ High Carrier to Noise Ratio 1st LO
- ▶ H-mode mixer

4 kinds of built-in roofing filters

500Hz / 2.7kHz / 6kHz / 15kHz (270Hz Option)

7 inch Color TFT Display

- ▶ Roofing frequency sampling band scope
- ▶ Band scope auto-scroll mode
- ▶ Multi-information display including filter scope

Clean and tough 100W output

Built-in high-speed automatic antenna tuner

32-bit floating-point DSP for RX / TX and Bandscope

*: 2 kHz spacing measurement standard - Receiver frequency 14.2 MHz, MODE CW, BW 500 Hz, PRE AMP OFF

Customer Support: (310) 639-4200



www.kenwood.com/usa



ADS#16221

A Resolution of Utility Company RFI

How a group of hams tracked down and eliminated mysterious shack interference.

David Otto, AA9H

My friend Jim Wolf, KR9U, and I noticed significant RFI on 20 meters at his home shack. It appeared suddenly and without any significant changes to his gear or shack configuration. The RF appeared as spikes, or *birdies*, on his FLEX-6600 spectrum display. They were spaced about 512 Hz apart and rose 40 – 50 dBm above the noise floor (see Figure 1). The birdies extended across the entire 14 MHz amateur band and up into the 15 and 16 MHz frequency range, and they sounded like high-pitched tones. We could work around them when operating CW and using 300 – 500 Hz band-pass filtering. But when listening to a sideband window of 2.8 – 3.0 KHz, it became a real problem as five to six birdies were incorporated into the band pass. Another curiosity was that every 3 minutes, they disappeared entirely for about 3 – 5 seconds before reappearing.

Searching for the Source

First, we had to rule out Jim's shack and residence as the source of interference. We pulled his house's main breaker and set the radio up to run on a generator. The RFI remained. Next, Jim noticed that when rotating his 50-foot tower Yagi to the southwest, the RF spikes peaked. The only thing new in that direction was a long-term care facility about 800 feet away — or so we thought.

We called upon longtime QST contributor and friend Carl Luetzel-schwab, K9LA, to assist with our RFI sleuthing. He brought a tinySA Ultra spectrum analyzer and connected it to a small telescopic antenna. We drove around the long-term care facility and the surrounding neighborhoods to the southwest with no significant readings on the analyzer. Once back at Jim's shack, we took a walk to the southwest of the property while carrying the spectrum analyzer and a handheld tuned to 14.025 MHz and set to AM mode. Unfortunately, we didn't have a directional antenna with us. As we approached the drop-line utility pole for the local



Cable company technician analyzing the suspected source of the RFI. [Carl Luetzelschwab, K9LA, photo]

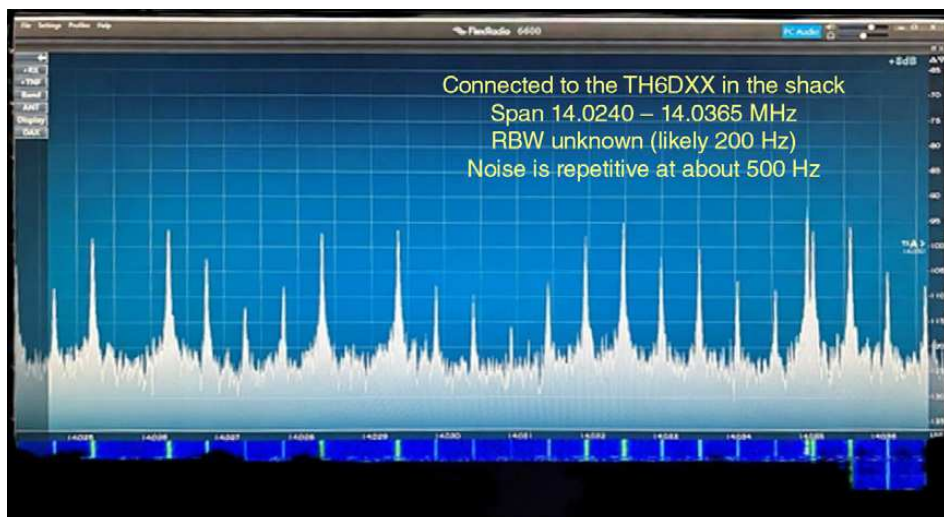


Figure 1 — FLEX-6600 spectrum capture on 14 MHz. The RF spikes are visible about 512 Hz apart. [Jim Wolf, KR9U, photo]

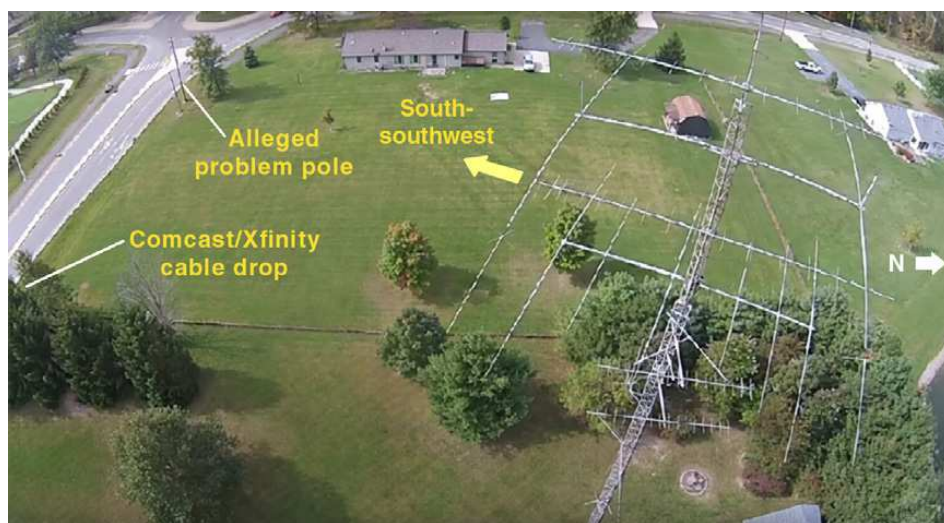


Figure 2 — Overhead labeled view of the premises around Jim's shack. [Jim Wolf, KR9U, photo]

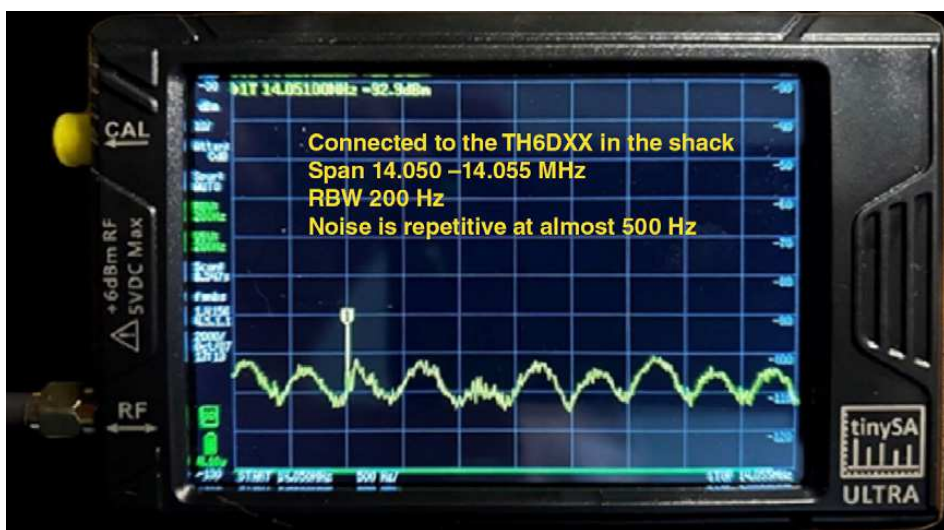


Figure 3 — TinySA Ultra reading near the cable utility box. [Carl Luetzelschwab, K9LA, photo]

cable company (Comcast/Xfinity), the handheld started to buzz, but the analyzer wasn't showing much.

I noticed what appeared to be a Comcast/Xfinity utility pole with a large box assembly farther west (see the lead photo and Figure 2). When we walked closer to the pole, the analyzer registered a very strong spike signal every 512 Hz on 14 MHz (see Figure 3). The analyzer spikes appear wider than the FLEX-6600 display because the resolution bandwidth goes down to only 200 Hz. Also, the handheld buzzed loudly near the base of the pole and quickly dissipated as we walked away.

Contacting Helpful Sources

There was a circuit breaker pull box at the base of the suspect pole. I wanted to pull the breaker to see if that would resolve the RFI, but tampering with utility company gear is illegal. Carl had an idea; he was

going to forward a description of the RFI problem to former ARRL Lab RFI Engineer Steve Anderson, W1EMI, who is familiar with RFI experienced by amateurs and has contacts at the FCC for complaint escalation. It is always preferable for hams to contact ARRL in such situations rather than going directly to the FCC consumer complaints portal. Steve reached out to Ron Hranac, NØIVN, who explained that the box was most likely a cable company line power supply with an enclosed two- to three-battery backup and a transponder to communicate with the parent company server.

Jim called Comcast/Xfinity, and a complaint ticket was generated. Weeks went by without a response. Luckily, Jim made additional calls and eventually got hold of a fellow operator. Jim explained that the company's electrical gear was causing direct and documented interference with an FCC-licensed radio station.

Confirming Our Suspicion

A technician arrived within a couple of days. He powered down the box, rebooted it, and checked the bonding and ground connections. The problem was resolved for a week before returning with the original RFI pattern. Fortunately, Jim had an email address

from the original technician service call; we made arrangements for the next service visit. This time, we met the technician in the field and showed him the real-time RFI interference pattern via the SmartSDR iPhone app (developed by DL8MRE). He pulled the main breaker and manually shut down the inverter. The RF finally went away! The spectrum display on the app allowed the technician to confirm that the Comcast/Xfinity pole box was the culprit. He looked through his service records and found the date when the box was replaced, which correlated to our RFI problem.

The Answer Inside the Box

The box contained an Alpha Technologies XM3.1-HP cable broadband uninterruptible power supply (UPS; see Figure 4). This is a microprocessor-controlled inverter for a 63 – 89 V ac power supply combined

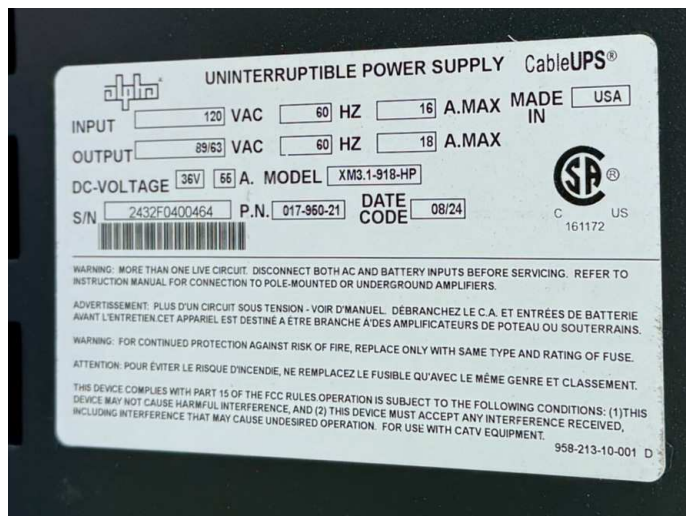


Figure 4 — Alpha Technologies XM3.1-HP cable broadband UPS. [David Otto, AA9H, photo]

with a 36 V 55 A dc output for battery charging. The inverter supplies power to the cable amplifiers in a power outage, and the dc power charges the batteries. A transponder communicates with the parent company every 3 minutes, corresponding with the RFI occurring every 3 minutes. The inverter was the suspected circuit for our problem, but we had no way to prove it. Interestingly, the culprit unit was meant to replace the older, less-efficient model XM3-HP.

Our technician was resourceful. He knew there were still some of the original XM3-HP UPSs in storage. Sure enough, he returned later that day and replaced the XM3.1-HP with the older model, manually turned on the system and inverter, and found no RFI.

Why did the problem temporarily correct without the UPS replacement? Probably because the UPS was rebooted, but there was no demand for backup power at that time, and the inverter remained off. When a spring thunderstorm rolled through and interrupted the power supply, the inverter circuit came back on.

What I Learned

RFI at amateur radio stations will continue to be a problem. As this story demonstrates, commercial utilities are a potential source. Here's what I learned from this experience:

- To mitigate or eliminate RFI at an amateur shack, the exact source of the RFI must be located.



Access <https://www.youtube.com/watch?v=6PBoxX9iMJ8> to watch the author expand on the steps taken to troubleshoot the RFI.

- Use all of the people and resources you can muster to work on the problem. Most fellow hams are willing to help. The ARRL Lab is also a good resource.
- Be courteous when engaging a third party.
- Take notes during the process, and document dates and the names of the people you've spoken to.
- Offer useful and practical suggestions to the responsible party rather than blame.
- Be willing to escalate the problem to a higher authority, and don't give up.
- Thank those who helped to resolve the problem.

David Otto, AA9H, is a Fort Wayne, Indiana, resident who enjoys CW contesting and chasing DX. He holds an Amateur Extra-class license and has been licensed since 1982. He thanks Jim Wolf, KR9U; Carl Luetzelschwab, K9LA; Steve Anderson, W1EMI; Ron Hranac, NØIVN, and the Comcast/Xfinity technician for their help, and for providing materials for this article. You can contact David at drobertotto@gmail.com.

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

VOTE

If you enjoyed this article, cast your vote at www.arrl.org/cover-plaque-poll

A Simple Transceiver Protector and SWR Tuning Indicator

Protecting your QRP radios without antenna tuning units.

Phil Salas, AD5X

The resistive SWR bridge has been around for a long time. It is a simple and effective means of indicating resonance, while also protecting the transceiver. The worst-case SWR with an open circuit is 2:1, and the worst-case SWR with a short is 1.5:1. The transmitter will never see a bad match no matter how the antenna is tuned.

This bridge has been popular for QRP operators. It typically consists of 2 W carbon or metal film resistors and a diode detector that drives a small milliamp meter or a light-emitting diode (LED) when the bridge is unbalanced. When the LED is lit, it gives an indication of the mismatch. When the output is matched for resonance, no current flows to the indicator and the LED will be off.

Because an LED is a diode, I wondered how well it would work as an RF detector and SWR indicator. It turns out that it does work well in this dual role (at least up to 6 meters). This eliminates the detector diode and a capacitor. Further, you no longer have the additional 0.4 – 0.7 V detector diode voltage drop, which adds to the LED forward voltage drop. As a result, eliminating the detector diode generates a more sensitive indication. While this works well, the problem has always been that the LED is just not bright enough to easily see outdoors, but this has all changed.

Schematic and Parts List

The schematic of my SWR bridge is shown in Figure 1, and the parts list is provided in Table 1. Caddock 50 Ω 15 W thick film resistors are used in the bridge. This lets me use the full 20 W output of my FX-4CR during tuning, if I wish. Caddock resistors are inexpensive and have great resistive (and non-reactive) properties well into the VHF range. The LED is rated at 27,000 millicandela (mcd) at 20 mA. It is extremely bright and works very well in outdoor environments. I used a BNC connector for the input, as that matches my transceiver's output connector and coaxial cable connectors. The UHF output connector connects directly to the base of my vertical antenna with a double-male UHF connector (see Figure 2); however, you can choose whatever RF connectors suit your needs.



Table 1 — Parts List

Qty	Description	Mouser Part Numbers
3	50 Ω 15 W resistor	684-MP915-50
2	8.2 pF 1 kV capacitor	75-561R10TCCV82
1	DPDT toggle switch	612-100DP1T1B1M1QE
1	Mini box (2.25 x 1.5 x 1.38")	563-CU-3000A
1	0.05 μ F 500 V capacitor	80-C330C473K2R
1	680 Ω ¼ W resistor	71-RL07S-G-680
1	27 K mcd red LED	630-HLMP-EG08-Z2000
1	SO-239 bulkhead connector	601-25-7350
1	BNC bulkhead connector	571-1-1337447-0
Misc.	#2 and #4 screws/nuts/lock washers	

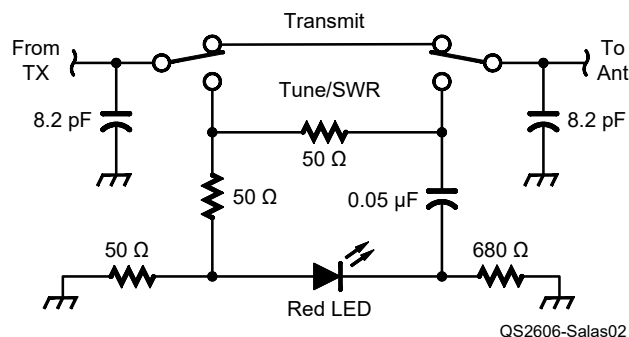


Figure 1 — SWR bridge schematic.

Figure 3 shows a drawing of the physical wiring, and Figure 4 shows the internal view of the unit.

While the Caddock resistors provide excellent performance well above 6 meters, the point-to-point wiring and the switch add inductance to the circuit.

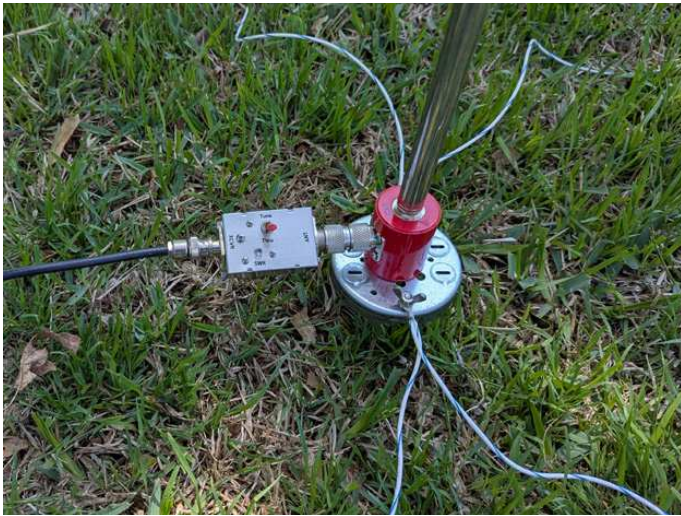


Figure 2 — The tuning protector connected at the antenna base.

QS2606-Salas04

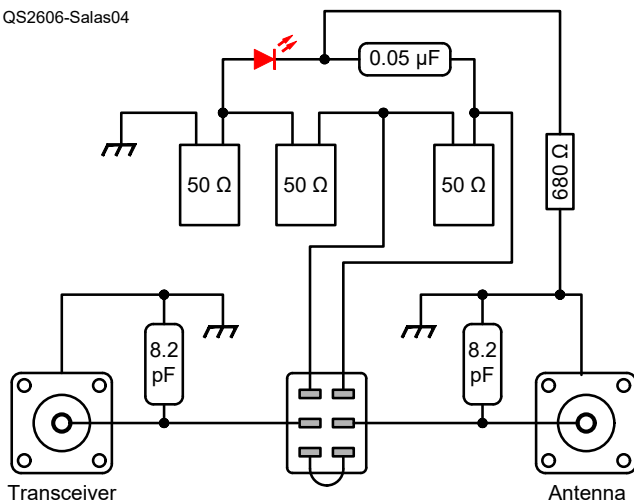


Figure 3 — A diagram of the physical wiring.

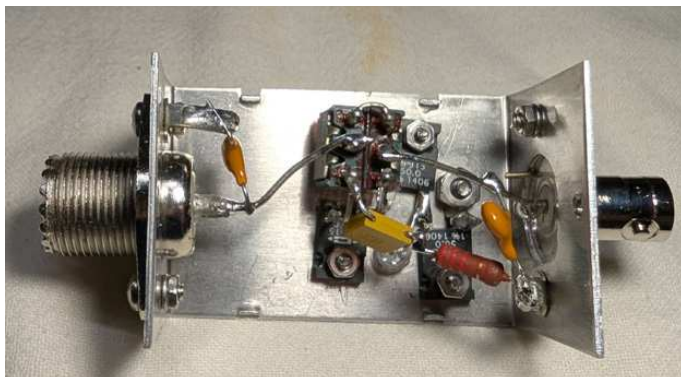


Figure 4 — An internal view.

SWR Measurements

Figure 5 shows the SWR when the bridge was first built. Notice the SWR reading (as shown by an orange line). The positive Z-phase indicates inductance. This is due to the wiring, and while a 1.3:1 SWR on 6 meters isn't bad, the added 8.2 pF input and output capacitors made the SWR almost perfect, as shown in Figure 6.

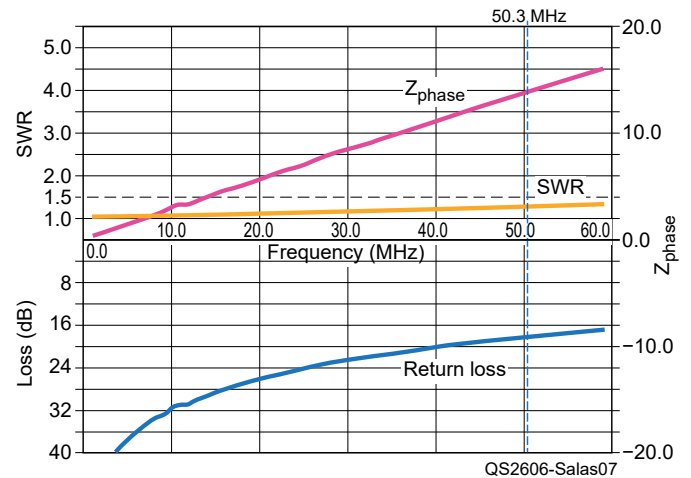


Figure 5 — Initial SWR/return-loss measurement.

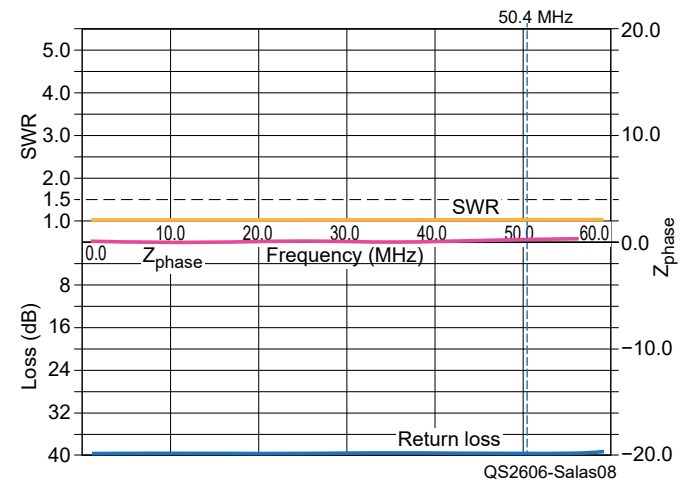


Figure 6 — SWR/return loss after adding the 8.2 pF capacitors.

In the Field

I get a very good LED indication from 1.8 – 54 MHz at a 2:1 SWR with just 1 – 2 W of RF power. For higher SWR and/or higher power, the indication gets much brighter. I find it very easy to set up my antenna in the field using this unit, and I never worry about stressing my transceiver finals.

All photos provided by the author.

Phil Salas, AD5X, an ARRL Life Member, has been licensed since 1964. His interest in ham radio led him to pursue BSEE and MSEE degrees from Virginia Tech and Southern Methodist University, respectively, followed by a 35-year career in RF and microwave and lightwave design. Now fully retired, Phil enjoys tinkering with ham radio projects. He can be reached at ad5x@arri.net.

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



Understanding Blocking Dynamic Range in HF Receivers

The second of a three-part series explaining receiver dynamic range measurements performed by the ARRL Lab.

George Spatta, W1GKS
ARRL Laboratory Manager

If you've ever noticed your receiver becoming less sensitive when a very strong station appears nearby, you've likely experienced the effects of blocking. Last month, we discussed reciprocal mixing dynamic range (RMDR). In this article, we'll explore what blocking dynamic range (BDR) is, how it affects reception across the HF bands, and how both traditional analog and modern software-defined receivers (SDRs) manage it.

Receiver Dynamic Range

A receiver's dynamic range (DR) is the difference between the strongest signal it can tolerate without undesirable audio artifacts (e.g., a rise in noise, spurious signals, distortion, audible "pumping," etc.) and its sensitivity, or the smallest signal it can detect (minimum discernable signal; MDS). Receiver DR tests are performed with multiple simultaneous test signals. They indicate how well a radio will perform under real-world operating conditions, such as crowded bands, contests, ARRL Field Day, or any situation where strong signals are close to your desired frequency.

Blocking Dynamic Range

When you tune to a signal, your receiver filters and amplifies it for demodulation. However, if a strong signal appears nearby, the receiver's front-end amplifier(s) or mixer(s) may start to saturate or compress. When this happens, the receiver's gain drops — not only for the strong signal, but for all signals within its passband.

This phenomenon is called *blocking gain compression*, and the amount of separation between a receiver's MDS and a strong interfering signal that causes 1 dB of gain reduction defines the BDR. Simply put, BDR is a measure of how well your receiver can handle a nearby strong station without losing sensitivity to the weaker signal you are trying to copy.

The amount of blocking depends on:

- The signal strength difference between stronger and weaker signals.

- The frequency separation (spacing) between the two signals.
 - The filtering and pre-selection before the first mixer.
- A well-designed receiver minimizes blocking by using high-linearity amplifiers, low-noise mixers, and good band-pass filtering.

Traditional Receivers vs SDRs

In superheterodyne receivers, the first mixer and RF amplifier are often the limiting factors for BDR. Well-designed mixers with stable local oscillators (LOs) help improve performance. Some transceivers have used up-conversion designs with crystal roofing filters and other circuit topologies to isolate strong signals before they reach the intermediate frequency chain.

In modern SDRs, BDR is a different animal. This is because SDRs use analog-to-digital converters (ADCs) with sometimes minimal or no analog components in the signal path — depending on the band — before the conversion to a digital bitstream. The ARRL Lab has observed that many SDRs do not exhibit any blocking at all up to the point at which the ADC clips or overloads. In such cases, we report the ADC clipping level instead of BDR. On the higher bands, such as 10 and 6 meters, preamplifiers will often be implemented in the receiver, and as analog circuit elements, they can exhibit blocking while engaged.

How BDR Is Tested in Receivers

The ARRL Lab measures BDR by injecting two signals into the receiver under test:

- A desired signal set to 10 dB below the receiver's automatic gain control (AGC) threshold or knee
- A blocking signal at increasing power levels and spaced 2, 5, and 20 kHz away from the desired signal

The blocking signal's strength is increased until the demodulated desired signal is reduced by 1 dB. This is observed simultaneously on a calibrated audio meter and an audio spectrum analyzer. The difference between the blocking signal level and the receiver's MDS is the BDR. For example, if the blocking signal

causes a 1 dB gain reduction at a level of -30 dBm while the measured MDS is -130 dBm, then $BDR = (-30) - (-130) = 100$ dB.

How BDR and RMDR Are Related

In receivers that have a poor RMDR, the audio noise floor will become louder due to the injected blocking signal. If the noise increases by 3 dB before we observe a 1 dB reduction in the desired signal, then the blocking measurement is reported as *noise limited*. This means that at specific spacing, RM noise is the limiting factor at lower desired signal levels. Because the receiver's noise was measured with the RMDR test, the Lab is still often able to obtain a BDR with an alternative test method that ignores the noise, which is useful information for hams listening to signals far above the band noise. Typically, RMDR is a more important benchmark when listening to weak signals near the noise floor.

The HP-339A audio meter used in the ARRL Lab has a very wide bandwidth, and it monitors the 500 Hz (typical) CW bandwidth during the BDR measurement. If noise increases steadily with the blocking signal due to a receiver's RMDR, 1 dB of gain compression will never be observed. Instead, the noise will continue to increase with the blocking signal. By using a 1 Hz resolution bandwidth on an audio spectrum analyzer, the noise is effectively pushed down so low that it won't mask the point at which blocking can be observed.

RMDR and BDR Distinction

It is important to remember that RMDR and BDR are independent of one another and highlight different problems a receiver may exhibit on the air. When a receiver has mediocre-to-moderate reciprocal mixing performance while having a significantly better BDR, it will still maintain its gain in the presence of a strong nearby signal — up to a point — despite the rise in the noise. During operations where extremely large signals are encountered, such as ARRL Field Day and contests (whether single or multi-operator), the RM noise can increase enough to obscure signals far above the noise floor. So, even though RMDR and BDR are separate, a poor RMDR can limit the receiver.

We will cover a similar concept when discussing third-order intermodulation distortion in a future article. Even if reciprocal mixing noise increases, knowing the signal level where gain compression begins is still important for operators, as it describes where problems will start to happen while they try to copy larger signals. The limiting factor in how a receiver behaves depends on which problem happens first.

If both DRs are on the poor side, the noise *and* blocking effects (pumping) will affect your ability to copy signals. The better the measured DR numbers are, no matter how close they are to one another, the less your desired signal will be impacted. Blocking will still typically be the limiting factor for good copy even with large amounts of noise present.

How AGC Fits into the Equation

When measuring BDR, the desired test signal must be below the AGC threshold to ensure the receiver's gain remains fixed during the test. The primary purpose for AGC is to keep the audio level constant despite changes in the received signal, and because the BDR test is performed by measuring the demodulated audio output, AGC action anywhere in the receiver can mask the blocking response.

AGC functions as an automatic volume knob, and this is undesirable in a laboratory test. While working a weak signal below the AGC threshold, a strong nearby signal will reduce the gain of all signals in the pass-band. If the station being worked is much stronger and above the AGC threshold, the blocking signal will likely cause some pumping in the received audio depending on the AGC speed setting (recovery time) and operating mode. Experiment with any available AGC parameters on your radio to minimize these negative effects. Faster AGC settings typically work better with CW signals, while slower settings are more appropriate for SSB.

BDR in Practical Terms

An excellent-performing receiver can have a BDR exceeding 125 dB, allowing it to maintain its sensitivity even with a 100 W signal 20 kHz away. Mid-range radios might exhibit a BDR between 110 and 125 dB, which will be sufficient for most operators. Underperforming receivers with limited filtering may show a $BDR \leq 100$ dB, which can result in audible gain compression when a nearby strong signal appears.

The difference between 100 and 120 dB may not sound large, but in practical terms, it can mean the ability to copy an S1 signal while an S9 +10 station operates nearby. When considering a direct-sampling SDR, pay attention to the reported ADC overload level to evaluate its strong-signal performance. Values of -10 dBm or higher are better. Many — but not all — manufacturers provide an overload indicator that displays instantaneous clipping. These indicators becoming active for short periods of time will not always translate to audible artifacts. ADC overload is not a dynamic range like BDR and is expressed in terms of absolute power (dBm).

Combatting Blocking

Many amateurs don't realize they can combat blocking. First, turn on an attenuator. It may seem backward to attenuate signals you are having a hard time copying, but there's a reason this works. Remember that a strong off-channel signal will drive your receiver into gain compression even if your desired signal doesn't. An attenuator will bring both the blocking and desired signals down several dB, but doing so will result in your receiver no longer being gain compressed. Because the front end is now operating in its linear region, your desired signal becomes copyable. The small reduction in sensitivity won't hinder you from copying signals that may also be dominated by noise. However, the RM noise will be louder when the attenuator is engaged.

You may already be using an attenuator on the low bands at night, realizing the benefits. When band noise

is 20 dB or more than your receiver's MDS, an attenuator can actually increase its signal-to-noise ratio by preventing any blocking.

Summing Up

Blocking dynamic range is one of the most telling measurements of real-world receiver performance. It doesn't manifest as obvious distortion or create spurious signals, but it sneaks in quietly, reducing gain and sensitivity when the band is busy or when there is a "big gun" station operating close to your channel.

Understanding blocking dynamic range will help you get the most out of your station. As with most aspects of radio, clean design and smart operating techniques can help you maximize your ability to operate efficiently no matter how crowded the bands get.

Congratulations

March 2026
QST Cover Plaque Award Winner

Kim Stenson
W4KVS

In his article, "300 Countries on Attic Antennas," Kim draws on 23 years of experience operating with attic antennas to offer practical advice for fellow DXers working with limited antenna options.

QST Cover Plaque Awards are given to the author or authors of the most popular article in each issue. You choose the winners by casting your vote online at

www.arrl.org/cover-plaque-poll

Log in now and choose your favorite article in this issue!

300 Countries on Attic Antennas

Twenty-three years and 300 prefixes into DXing, this ham has words of wisdom for DXers with station limitations.

Kim Stenson, W4KVS

My DX odyssey started more than 20 years ago, when I first earned my license in 2000. I acquired two 20-meter dipoles, a 6-meter beam, and a 6-meter loop, and I would run only 100 W when transmitting. Hampered by HOA regulations, I put the antennas into my attic, about 25 feet off the ground. I wrote about it in "Adventures with Indoor Antennas" in the March 2004 issue of QST. I had worked 257 countries at the time, so quickly increasing that number to 300 seemed reasonable. Little did I know that it would take me a long time to reach that target.

Of course, some DX entities are much harder to contact than others. The closer I got to reaching my goal, the clearer it became that having a DX-specific technique was the best way to get those elusive stragglers in my log. I also wanted to keep using my attic setup and low power level. Though some of my contacts were lucky, in most cases, I needed alternate ways to hear their signals and get my own signals heard.

The Final Stretch

It took me until 2013 to break 290, but I was steadily creeping closer to 300, even with the last solar cycle's dismal performance. I finally reached 297 in 2022 by adding Monaco, which I have rarely heard on the air for the entirety of my DX journey. I was outside on a summer afternoon and decided to check the DX spots. I saw Paul Granger, 3A/F6EXV, on 17-meter FT8. I had heard Paul before, but it was always light copy. I figured that I wouldn't be able to hear him, but I went into my shack anyway. His signal was there within an instant of turning on my Icom IC-756 Pro III. In a few minutes, he was in my log.

The well-run Czech DXpedition to St. Brandon was next on my list, and I was able to work 3B7M on several bands on SSB, CW, and FT8. Late into the



The author's attic antennas. His three-element, 6-meter beam is in the middle. If you look closely, you can see his two 20-meter dipoles and 6-meter loop.

night at my South Carolina location, I completed one of the contacts on 20-meter FT8. I decided to stay on 20 meters and see if anything else would show up, when FT8WV suddenly appeared. For several weeks starting in late December 2022, every DXer in the world had been trying to contact Thierry Mazel, FT8WV, on Crozet Island. I didn't expect to add Crozet to my log, given my setup. However, I made only a couple of calls before confirming the island as number 299 on my list.

I was excited to hear about the YJ0TT DXpedition to Vanuatu in fall 2023. I had never heard YJ on the air, but I hoped to work it at least once. Based on experience, I determined that my best shot would be late afternoon or early evening, and I was right — I confirmed Vanuatu on 15-meter FT8, making it entity number 300.

DXing Advice

I learned a lot about DX operating over the course of this 300-country quest. Working with limited power and equipment added another layer of difficulty, but that

Product Review

Yaesu FTM-150RASP VHF/UHF FM Transceiver

Reviewed by Ken Campbell, AD2T
ad2t@protonmail.com

I have to admit that I was skeptical of the marketing hype on this radio's Audio Signal Processor (ASP) feature when I read up on it. It seems that many new amateur radios or technologies lead in with much hype and limp out with a whimper. Yet within the first 10 minutes of power, the FTM-150RASP solidly proved how good this feature actually is. I didn't even have the radio fully set up for my testing and heard a lot of static on a GARA repeater in the Adirondacks. I couldn't make out anything; everything was in, or below, the noise floor. I pushed the **ASP** button and everything became crystal clear — from no contact to fully readable copy in less than a second.

Description

The FTM-150RASP is a dual-band duplex VHF/UHF FM mobile transceiver with true dual-channel receive. That means you can either monitor/receive two independent channels simultaneously or still receive uninterrupted on one channel while you transmit on another. Three power settings are available; the high maximum is 55 W on VHF and 50 W on UHF, medium is 25 W, and low is 5 W.

Additionally, it receives frequencies for National Oceanic and Atmospheric Administration (NOAA) weather radio with an optional weather alert feature, and both air band and maritime mobile receive capabilities are built in. Crisp and clean audio receive and transmit round out the package.

The radio is a solid build, with great form factor and lots of human interface features that make it simple and easy to use. The control head is detachable, with an optional swivel mount for ease of use when driving. All control buttons are on top of the detachable control head and are angled and backlit, making it easy to find by touch or sight, day or night. The knobs and their layout make for rapid tactile recognition, plus they are mechanical and have a subtle haptic *click* when you turn them, meaning you can keep your eyes on the road while driving and still make adjustments to your radio by feel.



The screen is large, sharp, high contrast, and switchable between blue on white or black on amber whenever you want, making operating safer (preserving night vision) and more comfortable. The display always shows the channel name and frequency simultaneously (which eliminates guesswork for linked repeaters with the same call sign).

When the radio's in scan mode, the frequency always blinks. Blinking for scan may seem trite, but if you're stuck on a channel that suddenly goes full ragchew or full of noise, you can instantly tell if you're in scan (blinking) or manual (solid) mode and know how to increment the channel. For testing I had one side scanning and the other side locked on a repeater of interest. If a ragchew commenced, I knew what to do.

The DTMF microphone has additional programmable buttons to allow the most common functions to be controlled from there. Also, there are two mic ports and one speaker port — one mic port on the body and one on the control head, but on the FTM-150R series only one speaker port is functional (EXT SP A) and located on the rear panel.

There is a 3 W speaker integrated into the body of the radio and a 3 W speaker in the control head, for a total of 6 W of audio output. Both built-in speakers can be set up independently in the menu system — no more struggling to hear the radio, and no more short

Bottom Line

The Yaesu FTM-150RASP with the Advanced Signal Processor feature can get rid of scratchy and/or muddy signals instantly, and it makes mobile contacts much more enjoyable.



Figure 1 — The Yaesu FTM-150RASP rear panel.

across the entire screen. From there, short-press the **BAND/SCOPE** button to cycle through VHF only, UHF only, and ALL channels. From there you can dial up or down to isolate any particular channel you want. Furthermore, as you select a single channel, the main screen still shows all channels, and the smaller single channel bars display shows a more detailed display on that one specific channel.

My opinion of this feature has improved now that I've used it. I see some real usefulness to it in many ways. If you are just programming in your regular repeaters, you probably won't use it much, as you already know what works and what doesn't. However, once I went outside normal operating procedures for my testing, it opened up a whole new way to use this feature and radio.

If you're exploring a new recreational area for outdoor adventures, POTA, SOTA, satellites, radio direction finding (RDF), etc., this feature helps to find new radio connections in unknown locations.

Real-time data is gold. Websites list the repeater details for you, but I can't access 75% of the repeaters listed within 25 miles of me due to the presence of mountains. Doing line-of-sight mapping on all of these helps but takes a huge chunk of time. Also, it still doesn't tell you if the repeater is live or not. The scope feature allowed me to set up, scan, and find viable active repeaters more than 75 miles away within hours. That put me weeks ahead on this project and got me thinking about other projects. For example, if I programmed in a bunch of satellites, I could passively monitor all of them while working on other things at my desk. I could find out which ones are active and have good coverage in my area. Likewise, if the radio is mobile mounted, I could sit on a mountaintop and scan for active simplex frequencies for SOTA or POTA. If doing mobile RDF, the manual squelch and scope options allow a second person navigating to get real-time data and relay this to the driver.



Figure 2 — The Yaesu FTM-150RASP band scope.

Optional FVS-2 Voice Guide Unit

This optional add-on unit is dual use. It can be set to verbally announce what channel you're on, and it can record your QSO. It was very easy to install; it took me less than 7 minutes to install and have it up and running (see Figure 3 for the FVS-2 module before the installation, and Figure 4 for the FVS-2 module installed in the FTM-150RASP).

I found the voice announcer to be a useful safety feature. When I was driving emergency vehicles, I learned to use my radio by feel so as not to have to take my eyes off the road. However, amateur radios are more complex, and there are too many options to do this completely by feel. This feature announces what channel you're on whenever you change bands, and you can enable a button on the microphone that will tell you which side (A/B), memory slot channel (001-1103), and frequency (146.520) you're on. This allows you to control the radio manually and confirm audibly, all while keeping your eyes on the road.

Used as a base station, this feature is also useful for a visually impaired radio operator. This is not the intended use, but with a radio programmed for easy access, it could open up new worlds for this population.

The other function of this add-on is recording of QSOs. Recording is limited to only the last 5 minutes, but that can be handy. If you're traveling and ask for directions, and the other station gets back to you while you're navigating a tricky maneuver or intersection, you still have the recording to listen to the missed information when it's safe to do so. Likewise in the chaotic frenzy of a satellite pileup, you can call away; if you get through, you'll have enough details recorded to log your QSO.

Cross-Band Repeater Function

Simply hold the **F** and **PMG** buttons down while powering on, and you will be in **X-BAND** mode. It says that on the flash screen during power up. Once turned on, it stays in that state until you repeat the process to turn it off.



Figure 3 — The optional FVS-2 Voice Guide Unit before installation in the FTM-150RASP.

On the Air with ASP

ASP is Yaesu's Audio Signal Processor feature, which is included with the FTM-150RASP (the reviewed unit). It requires an add-on SPU-1 module to the basic FTM-150R (or E) radio, but in North America it is typically sold pre-installed under the "RASP" nomenclature.

Once installed, you have three levels of audio control at the push of a button: **STANDARD**, **SUPER-DX**, and **ASP**. In manual mode, short-press once for each level, or long-press for auto ASP mode, and the radio will choose for you based on signals.

To try this out, I set up my testing conditions using a good radio and a compromised antenna, and then found several repeaters that were just out of range and waited for a poor signal. Once I had a signal, I manually cycled through all three levels to compare things. I had to broaden my range twice! Even tests on the International Space Station repeater pulled in several signals out of static.

I did have a few signals that I couldn't get a good copy on, but even my worst case went from pure static to an obvious human at S1 to S2. This was true for both repeaters' traffic and simplex on VHF. Granted, S1 to S2 is not enough for passing traffic, but if a station was using a handheld on a mountain with an emergency call, the ASP function could make a difference in this situation to at least be able to understand a basic



Figure 4 — The optional FVS-2 Voice Guide Unit after installation in the FTM-150RASP.

yes-or-no response to questions. In an emergency, any communication is better than no communication, and this radio pulls signals out of the mud incredibly well. It even cleaned up several European and South American countries coming in on 10 meters to a local cross-band repeater. I had six signals of total static, and it pulled out an S5 to S9 copy for each.

Admittedly, not all calls were salvageable, but more than 80% of the cases where readability needed improvement were improved. Some that were readable (> S4) had no improvement, and one was actually made worse. But that was one out of many, and by pressing the button again, I was back to full copy on that station. I love those odds!

Lastly, one or two did have a minor pitch distortion when the ASP was on, but it did not have a negative effect on the QSO. A rare pitch change versus a missed QSO is worth it. The save rate greatly outnumbers the handful of any minor blips. And keep in mind those blips meant no contacts without ASP.

Conclusion

This is an easy-to-use, sturdy, and fun radio for base, mobile, or field use. The ASP feature makes things enjoyable, as you can hear more voice and less static.

Manufacturer: Yaesu USA, 6125 Phyllis Dr., Cypress, CA 90630, www.yaesu.com. *Price:* FTM-150RASP, \$379.95; FVS-2 Voice Guide Unit, \$39.99.

Aediko 25 A DC Voltage Reducer/Converter as a Battery Booster

Reviewed by Phil Salas, AD5X
ad5x@arrl.net

Battery boosters alleviate transceiver low-dc-input voltage problems due to the nominal 12 – 12.5 V when a lead-acid battery is removed from a charger, such as in a mobile installation when the car's engine is turned off. And the lead-acid discharge voltage can be as low as 10.5 V dc before you should stop using it. QST has previously reviewed battery boosters from W4RRY (October 2005), TG Electronics N8XJK and MFJ-4416 (November 2008), and WF5Y (August 2013). However, it appears that only a re-designed N8XJK booster is currently available.

In the July 2024 issue of QST, Gordon S. Novak, Jr., AF5KA, described the use of buck-boost converters to power amateur radio equipment from a variety of power tool battery voltages, mostly from batteries that have higher voltages than the normal 13.8 V dc. One item that he discussed was an 8 – 40-V-dc-input-to-13.8-V-dc-25-A-output buck-boost converter. This unit is available from Amazon at a price of only \$42. Could this be all you need for reliable mobile/portable battery operation from a 12 V lead-acid battery? At that price, I had to find out.

Battery Buck-Boost Converter Description

This converter (shown in the lead photo) is made by Aediko, which makes several products, including lower-current versions of this converter. All Aediko products are available from Amazon. This particular converter includes over-load, over-current, over-temperature, short-circuit, and over-voltage protection. The unit is enclosed in a waterproof silicon-sealed aluminum case. No additional heatsinking, air vents, or fans are included. The full specifications are given in Table 2.

The converter is factory set for +13.8 V dc output. There is no output adjustment available. The converter is always on when input dc voltage is applied, and there are no LEDs or other indicators to show when it is on.

Bottom Line

The Aediko 25 A DC Voltage Reducer/Converter is a low-cost buck-boost option that works, but it requires added filtering to be truly radio-friendly.

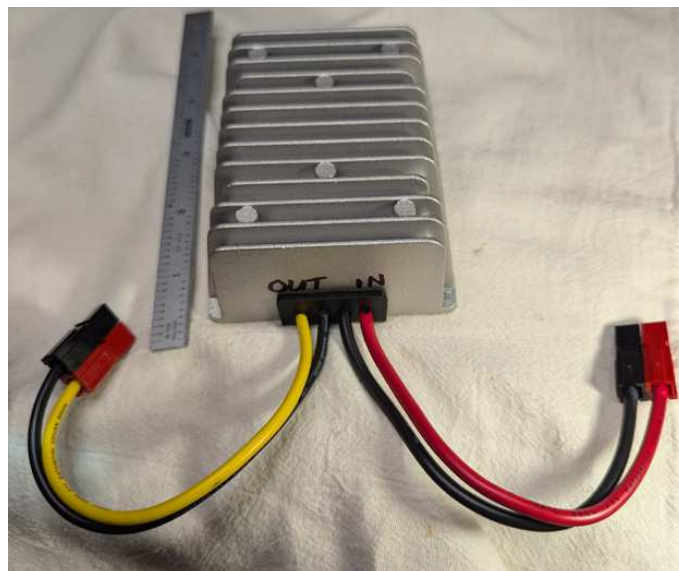


Table 2 — Aediko 25 A DC Voltage Reducer/Converter

Manufacturer's Specifications (not tested in the ARRL Lab)

Input voltage range:	8 – 40 V dc
Output voltage:	13.8 V dc at up to 25 A*
Output rated power:	300 W
Efficiency:	97% (half load); 95% (full load)
Ripple:	200 mV peak
Line regulation:	± 0.2%
Load regulation:	± 0.2%
Voltage accuracy:	± 1.5%
Operating temperature range:	–40 to +84°C
Dimensions:	3.93 × 3.14 × 1.49 inches
Weight:	1.12 pounds

*At the 300 W rated power, the maximum current would be 21.7 A.

Table 3 — Battery Booster Efficiency Tests

Not tested in the ARRL Lab

V _{in}	I _{in}	V _{out}	I _{out}	Efficiency
12.6 V	3.77 A	13.8 V	3.16 A	92%
12.6 V	12.6 A	13.8 V	9.6 A	83%
12.6 V	25.5 A	13.8 V	19.11 A	82%
11 V	14.1 A	13.8 V	9.7 A	86%
11 V	29.6 A	13.8 V	19 A	81%
10.5 V	14.3 A	13.8 V	9.7 A	89%
10.5 V	31.3 A	13.8 V	19 A	80%
9 V	17.2 A	13.8 V	9.7 A	86%
9 V	38 A	13.5 V	19 A	77%

Buck-Boost Converter Testing

I began by connecting 30 A Powerpole® connectors to both the input and output, as I use Powerpole connectors for all my dc interconnect requirements. For the following tests I used my dc load box described on page 61 of the October 2006 issue of QST. When I applied power to the converter, the output voltage immediately jumped to the +13.8 V dc factory-set value with no overshoot. I did find that the converter would not start with a 3 A or higher load. So, you need

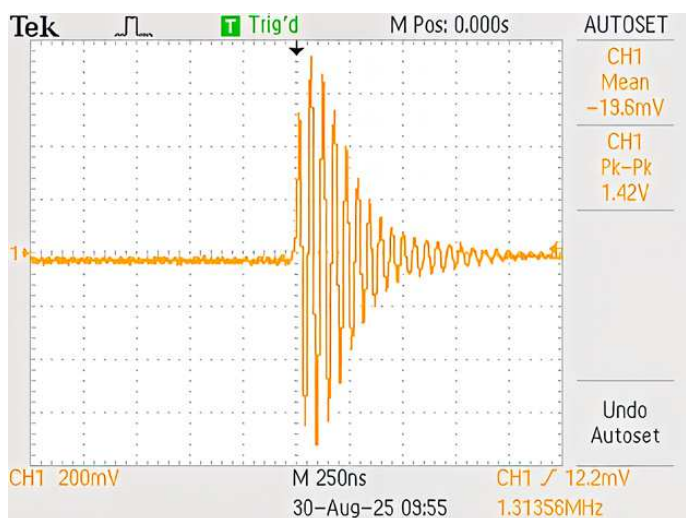


Figure 5 — The ac coupled output at 13.8 V dc 12 A output load.

to make sure any radios connected to the output are turned off when the converter is first powered on. The description states that the converter will operate with an input voltage as low as 8 V dc. I found that the unit stopped working right at 8 V dc.

Efficiency Testing

For efficiency measurements, I chose nine input conditions. The nominal lead-acid battery voltage is 12.6 V dc, while a fully charged mobile lead-acid battery is about 14.2 V dc. The voltage quickly drops to about the nominal 12.6 V dc when the battery is not being charged. The 11 V dc input is the fully charged level of a three-cell LiFePO₄ lithium-ion battery. Four-cell lithium-ion batteries are probably not used in portable operations, as their fully charged voltage is 16.8 V dc, which exceeds the upper voltage limit on many transceivers. The discharge voltage level of a lead-acid

battery is 10.5 V dc. Close to the nominal voltage of a three-cell lithium-ion battery is 10 V dc. And finally, 9 V dc is just above the maximum discharge voltage of a three-cell lithium-ion battery.

SSB transmissions have a duty cycle of 15% to 25%, increasing to 30% to 40% with normal compression, and up to 50% with heavy compression. CW operation has a duty cycle of 40% to 50%. I chose to make efficiency measurements at close to the 20 A requirement for full-output digital modes, and at the 10 A requirement for a 50% duty cycle. As a sanity check, I measured the current of my IC-706MKIIG for various conditions. Key down was 17 A at 100 W output. Key up, or SSB with no speaking, was 4 A. Receive current was 1.4 A. I made one low-current measurement at about 3 A, which is between the receive current draw and the key-up/idle SSB current. Table 3 shows the efficiency testing results.

The efficiency specification is “97% (half load); 95% (full load).” The output voltage stays consistently at +13.8 V dc under the different loads. However, the efficiency is about 10% to 20% lower than specified. This is very similar to the efficiencies of the previously reviewed battery boosters mentioned earlier. Perhaps the higher efficiency specification refers to when the input voltage is higher than the output voltage. This would make sense, as the input current would be lower and thus possibly result in less I^2R (current² × resistance) losses in the input circuitry.

Assuming a 100 W transceiver, at high-output current levels (~20 A) the efficiency is close to 80%. However, at the average-output current level (~10 A) for SSB and CW operation, the efficiency is close to 85%. And it exceeds 90% at low-output current levels

(~3 A). Because you normally spend more time receiving than transmitting, your overall operating efficiency will probably exceed 90%.

Finally, based on my experience with inexpensive switching power supplies (see my article “Evaluate Portable QRP AC Power Supplies Before Use” in the June 2025 issue of *QST*), I thought I’d better look at output ripple and noise. I loaded the converter output at 12 A. The input to the converter was set at 10.5 V dc. Figure 5 shows the peak-to-peak (p-p) ripple at this load. As you can see, the

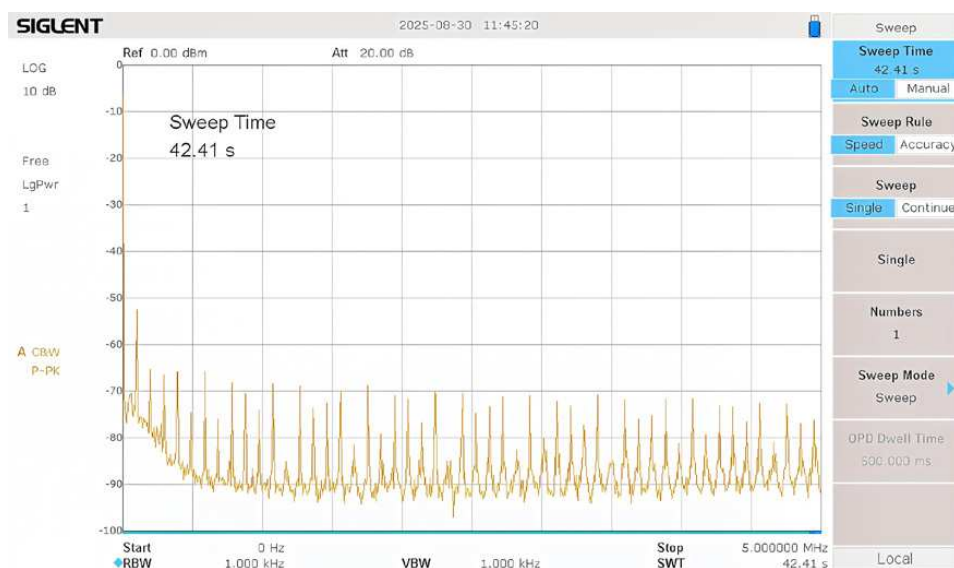


Figure 6 — The ac coupled spectrum of the buck-boost converter.

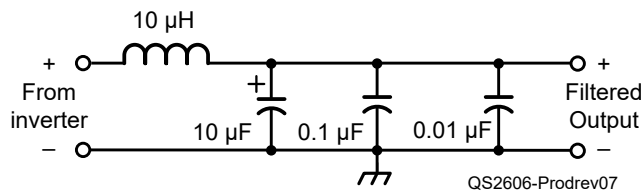


Figure 7 — Simple low-pass filter schematic.

output has 1.4 V p-p spikes. This certainly didn't meet the 0.2 V peak (0.4 V p-p) specification.

The HF spectrum from 0 – 5 MHz is shown in Figure 6. The spectrum analyzer was ac coupled to the converter output. There is 20 dB of input attenuation at the spectrum analyzer input. The spikes are at about –50 dBm (after the 20 dB attenuation), except for the ~100 kHz fundamental switching frequency, which is about 10 dB hotter.

I then listened to the noise on a transceiver powered from a separate, clean voltage source. I connected a clip lead to the transceiver's antenna port and draped the other end of the clip lead across the dc output cable of the converter. No antenna was connected to the receiver. I could hear harmonics of the 100 kHz switching frequency across the lower HF bands. However, when I powered the radio directly from the converter, the harmonics were not discernable. And I could hear no noise floor degradation.

So, what did this all mean to me? The 1.4 V p-p spikes on the +13.8 V dc line were a concern, as it made me uncomfortable to put that much ripple on my transceiver's dc input. Also, it would result in a maximum voltage of about 15.2 V dc, which is just above the +15 V maximum specified for my IC-706MKIIG. And, depending on the length of the power cable from the inverter, I was concerned that there would be enough

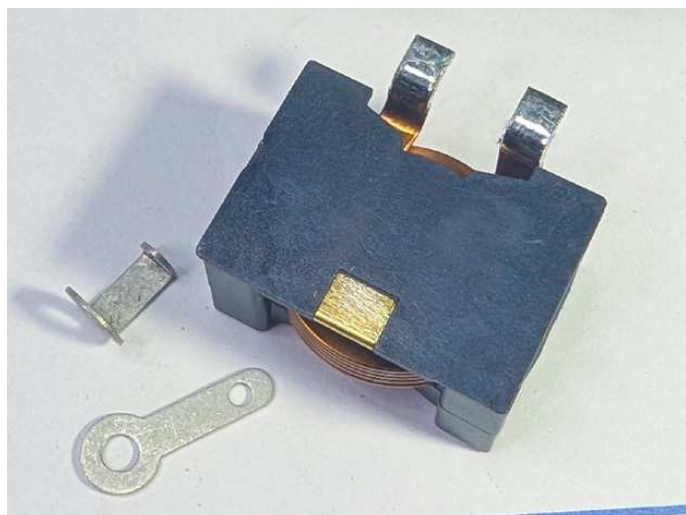


Figure 8 — Inductor and solder lug.

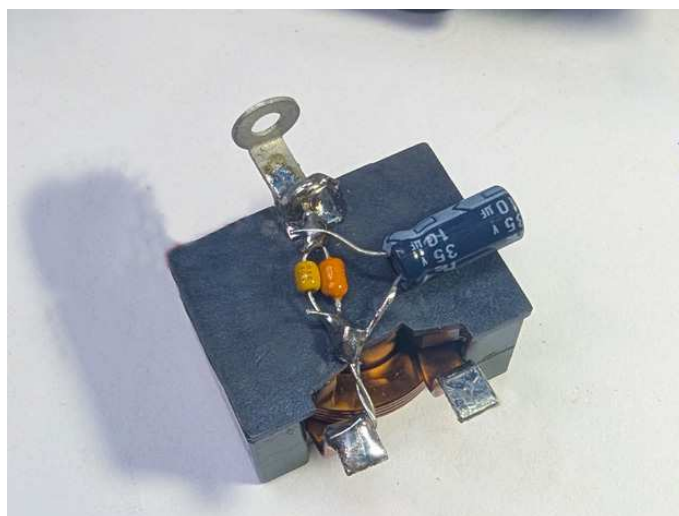


Figure 9 — The inductor-modified solder lug and capacitors attached.

radiation of the switching frequency harmonics to possibly cause interference to others, especially in a portable/Field Day environment. So, I thought that an output filter would make sense.

As the converter's switching frequency appeared to be around 100 kHz (see Figure 6), I designed a very simple low-pass filter with a cutoff frequency of about 50 kHz. This is just a series L with an inductance of 10 μH, and a shunt C with a value of 10 μF. I also paralleled the shunt C with 0.1 μF and 0.01 μF capacitors for good high-frequency attenuation. For the inductor, I used a Coilcraft 10 μH inductor (SER2918H-103KL) that is specified to handle 28 A with a maximum loss of just 2.9 mΩ. Figure 7 shows the schematic of this filter.

The inductor is designed for surface-mount assemblies. Besides the input and output lugs, there is a third unconnected contact that is just meant for providing additional support when the inductor is mounted on a

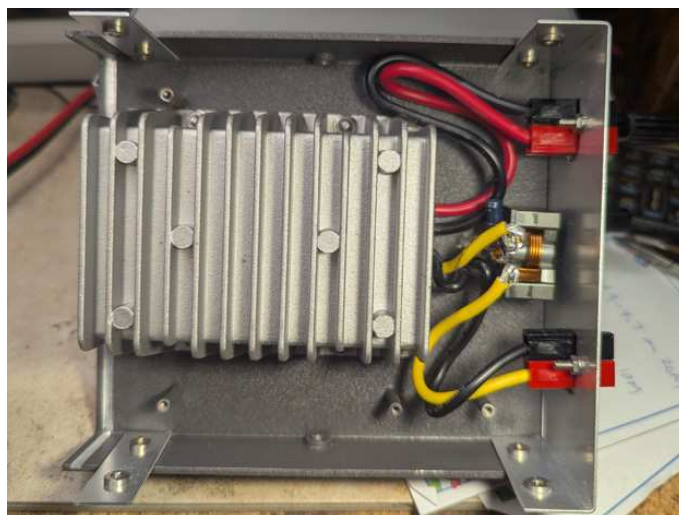


Figure 10 — All parts mounted in the DIY enclosure.



Figure 11 — The dc Powerpole interfaces.

printed circuit board. In order to mount the inductor, I soldered a physically modified solder lug to the unattached terminal on the inductor. Figure 8 shows the inductor and modified solder lug, and Figure 9 shows the inductor with the solder lug and filter capacitors soldered in place. I mounted everything in a 5 × 6 × 2-inch metal box that was originally a DB9 switch box. Figure 10 shows the components mounted inside of the box, and Figure 11 shows the dc interfaces. I considered mounting high-current input and output switches, but I decided against it as I could just plug and unplug the dc connectors as necessary. I desired simplicity and a low-voltage drop.

How well did this work? Figure 12 shows the oscilloscope output with the filter. Note that the ripple is now just 192 mV p-p. Figure 13 shows the 0 – 5 MHz spectrum. The spurs are gone, and I could no longer hear any harmonics of the switching frequency on any HF ham bands.

Finally, I measured the voltage drop through the filter. At a 20 A load, I measured a 0.2 V dc drop. This included the Powerpole interfaces.

One Last Test

There was concern that if the converter's output was connected to a battery or a high-value capacitor, the converter could be damaged if the input was removed. To check this out, I disconnected the input to the converter and connected a variable-voltage dc power supply to the output of the converter. I gradually increased the voltage to +13.8 V dc while monitoring the current. There was no current drawn during this test.

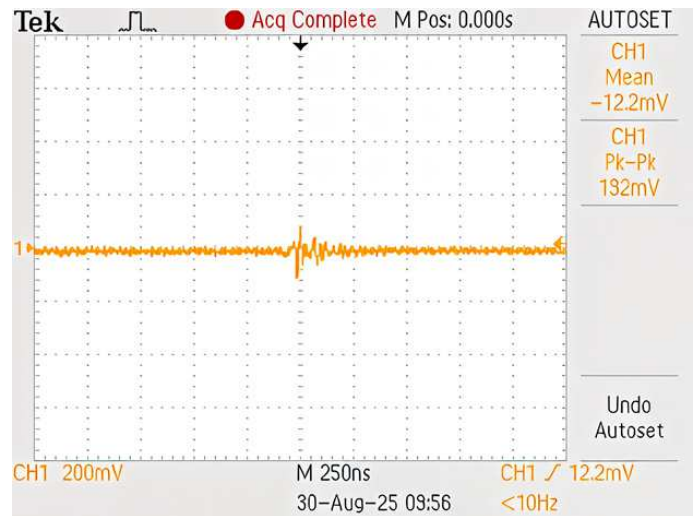


Figure 12 — Filtered dc output ripple.

I then connected my high-current +13.8 V dc power supply directly to the converter's output. Again, there was no problem. I then reconnected the converter normally, feeding my high-current load, and everything worked properly.

Final Thoughts

Battery boosters are effective in compensating for low-voltage power sources in mobile or portable environments. This buck-boost converter handles an input voltage as low as 8 V dc while maintaining +13.8 V dc output.

Manufacturer: Aediko, available at www.amazon.com.
Price: \$42.

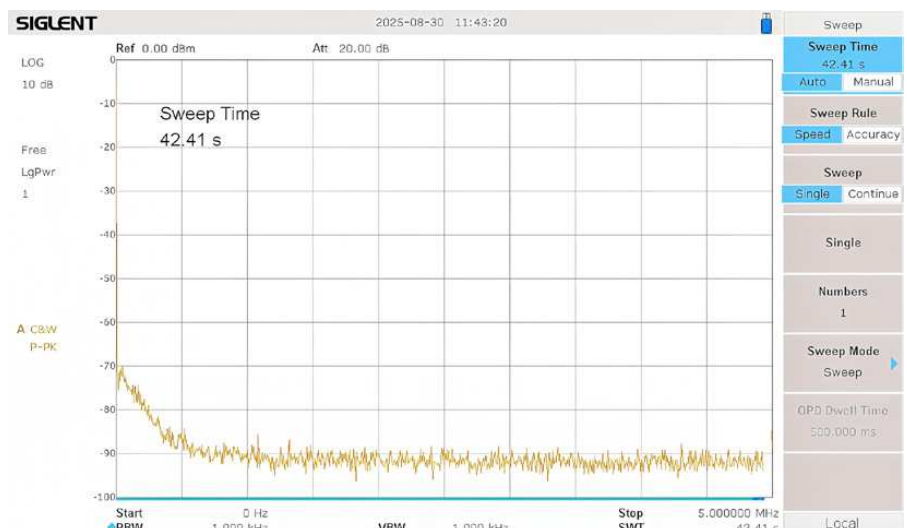


Figure 13 — Filtered dc output spectrum.

Intellitron AM-2306KD 45-Foot Heavy-Duty Telescopic Fiberglass Mast

Reviewed by John Leonardelli, VE3IPS
jleonardelli@arrl.net

I enjoy making contacts above 30 MHz — whether I'm on simplex FM or running SSB during the ARRL VHF Contest from high-point locations. I normally haul out lightweight three- to five-element Yagis on a DIY 16-foot aluminum mast or a 16-foot painter's pole, though the latter does flex under load. I tried carbon fiber and thin-walled fiberglass masts, too; they're great for wire antennas, but once you clamp on anything heavier, they tend to crack or splinter. I even stuffed dowels inside to stiffen them, but they're not designed for my use cases. I want to be able to support single or multiple lightweight Yagis at heights from 25 to 45 feet. Initial testing with my NATO 40-foot aluminum mast showed me that I can get improved results, but its deployment made it difficult for a single person to deploy. This is an example of trying to force a product to perform a task it's not designed to handle safely. Thus, choose the best product for your needs that will not break or fail when you need it most.

That's why I was curious about the new Intellitron line carried by GigaParts. These value-priced products include heavy-duty fiberglass masts that are built tough, with a 2.5-inch base and 0.125-inch walls that can manage heavier loads. I thought the AM-2306KD 45-foot model would be ideal, as it would give me an additional 15 to 20 feet over my other masts. For portable operations, that extra height can be a real game changer. I also can easily adapt the mast for shorter heights. Telescopic masts are easier to push up by oneself, whereas fixed masts need to be walked up by several assistants.

The mast does need guying at four or five height levels for safe operation, and it's dependent on the top load and mast length.

If you are an HF operator, then this mast will help you erect dipoles and other heavy wire antennas up in the clear. I used this with an Army Loop project I have been working on, as well as experimenting with end-fed half-wave (EFHW) and end-fed random wire (EFRW) in a vertical format. I feel confident that a 10-meter Moxon can be supported up high and clear.

Description

When it comes to antenna masts, thick-walled heavy-duty fiberglass really shines in a few key areas. First, it



handles clamping stress like a champ without warping or cracking. RF-wise, fiberglass is completely transparent to your antenna's fields, so it won't mess with tuning or absorb signals like carbon fiber can. For long-term use, fiberglass masts keep working season after season, unlike carbon fiber material, which can de-laminate and degrade with prolonged exposure to the sun and cold.

Heads up — safety first. When setting up any antenna mast, always scan your surroundings. Power lines and infrastructure don't forgive mistakes. Even though fiberglass isn't conductive like aluminum, the gear you're hoisting might be. One lapse in awareness can lead to a life-threatening situation.

Bottom Line

The Intellitron AM-2306KD 45-foot heavy-duty telescopic fiberglass mast offers a value-priced mast that is ideal for deploying small Yagis, heavy wire loops and dipoles, and wire-based vertical antennas.

Table 4 — Intellitron AM-2306KD 45-Foot Heavy-Duty Telescopic Fiberglass Mast

Manufacturer's Specifications

Material:	Heavy-duty thick-walled fiberglass	
Number of sections:	8	
Extended height:	45 feet	
Collapsed length:	86 inches	
Base diameter:	2.5 inches	
Wall thickness:	0.125 inch	
Quick-Clamps:	7 included	
Weight:	26 pounds	
Warranty:	2 years	
Section diameters:	Section 1: ¾ inch	Section 5: 1¼ inches
	Section 2: 1 inch	Section 6: 2 inches
	Section 3: 1¼ inches	Section 7: 2¼ inches
	Section 4: 1½ inches	Section 8: 2½ inches

The heavy-duty fiberglass tubing provides long-lasting durability, with smooth, edge-free sections that slide together easily. Quick-release clamps allow for one-handed operation — even while wearing gloves. The semi-matte gray finish blends well into outdoor environments, offering low visibility, while the surface remains smooth enough to shed dirt and water yet grippy enough for secure tightening. See Table 4 for the manufacturer's specifications.

This mast feels rock solid. You will notice very quickly how heavy it is. There is no wobble or twist, even at mid-extension. With a 2.5-inch base diameter and thick 0.125-inch walls, it supports everything from small Yagis and loops to full-size dipoles. The red safety markings, placed 4 inches from the tube ends, act as a smart stop line so you don't over-extend. Weather resistance is excellent, too, standing up to wind, rain, and whatever the weekend throws at it. A squall blew through during a backyard deployment, and it presented no concerns with using three guy sets and 25-foot height supporting a 10-meter hamstick dipole.

Deployment and Operation

If you're planning to deploy the Intellitron AM-2306KD at full height, it's best to have a second operator on hand and have all your guy lines prepped in advance. The Quick-Clamp assembly makes setup smooth and quick — perfect for a POTA day trip or getting a communications hub online in an emergency. Just extend the sections to the red safety markings, and lock the clamps into place. Clamping tension can be fine-tuned easily with the included Allen key. I used duct tape to secure the Allen key to the mast (in case I need it in the field) and have a second one in my tool kit.

Guy rings are sold separately. I installed various guy rings at different heights to facilitate the ease of guying. I have them at various heights starting with one after section 8, section 7, section 5, and section 3. You need to install the guy rings before installing the Quick-Clamps.

For guy lines, I used an orange reflective paracord 550, but I suggest marine grade if you're setting up something more permanent. I used 10-inch tent stakes, but for full height with heavier loads, I am using screw-in ground anchors.

If there is no more than a light wind, this is how I deploy it myself (four to five sections for mast heights up to 35 feet), ensuring safety for myself and others after doing a safety walk-around check: I guy the mast alone by preparing the guy wires in advance. I start with the first section, keeping it vertical. I now have my base mast just over 7 feet high that is guyed securely. Next, using a stepladder, I reach up and push each section up and then adjust the guy wires accordingly with a bit of slack. Then, I take it down again, section by section. I put the antenna on top (and connect the coaxial cable) and push the mast up again section by section, and tighten the guy lines at the guy ring height as I go upward. As my antenna goes upward, I increase my awareness to monitor the mast for flexing under load, as well as ensure the prepared guy lines are in place. Once the antenna is up, I can go around the mast and adjust each guy line tension, ensuring every line is snug.

One advantage of having the 45-foot mast is that it can be easily converted into a shorter mast, allowing easier one-man deployment. If we only use four to five of the sections to achieve a 25- to 35-foot height and nest the extra sections inside (you could remove them temporarily to decrease weight if needed), this still allows a 1½-inch diameter for your antenna mounting bracket. It is almost like two masts in one.

This is the first ham radio purchase that required me to go out and buy a kitchen stepladder for my go-kit to help me deploy the antenna. The ladder becomes a chair, an operating desk, or even an antenna tripod out in the field.

Field Use Cases

VHF/UHF Operations

This mast is ideal for deploying vertical antennas like a Slim Jim, a J-pole, or dual-band vertical antennas up to 45 feet, giving you a serious edge in extended range on 2 meters and 70 centimeters.

For VHF/UHF contesting, this mast is perfect for quickly pushing up a five-element 2-meter Yagi when chasing grids on a weekend sprint. It's rugged enough to hold steady in the wind. I feel comfortable that I can attach a 2-meter, 1.25-meter, and 70-centimeter Yagi or a dual-band Yagi and the 220 MHz Yagi all at different heights without overloading it, with a J-pole on top. You can rotate the antenna but it's by the armstrong method.

The fiberglass construction is a big win here — being non-conductive, it's essentially invisible to RF, which helps preserve the performance of your antenna. This is ideal for my log-periodic antenna in a vertical configuration.

Parks on the Air® (POTA®)

For POTA activations, this 45-foot telescopic mast makes it easy to get above the tree canopy, which is a game changer for signal propagation — especially on low-angle bands (10 to 20 meters). It's a one-person setup at half height, and that portability is golden when you're setting up solo in the field. The system is stable and strong enough for heavyweight wire antennas like 40- to 160-meter dipoles or even 132-foot inverted-V end-feds, making it a go-to for improved performance. I have a 132-foot doublet with 450 Ω ladder line as an all-bander antenna that is too heavy for my lightweight mast but ideal for the Intellitron mast. For those looking for gain and directionality and great DX, a 10-meter Moxon antenna will be ideal.

Emergency Communications

In a communications emergency, this mast is built to handle repeated setup and teardown without complaint. The heavy-duty clamps lock in tight and hold up to the kind of abuse you see in field conditions. With its high load capacity, you can stack multiple antennas without worrying about failure. Fiberglass is naturally corrosion-resistant, making this a reliable choice for coastal, humid, or storm-prone environments.

A dual-band fiberglass antenna on top and a low-band dipole mounted lower could cover your needs nicely. You could also add a weather station module or even mesh equipment on it to make for a single mast communications hub.

Wire Antennas

This mast is right at home supporting full-size dipoles for the low bands, giving you options for 80 and 160 meters with the right layout. A center support is important for these long antennas, and if suitable end points can't be used, then a dipole and an inverted-V configuration can be deployed. I've used it to elevate a large Army Loop and even deployed a corner-fed delta loop for 40 meters with great results. If you're into receiving antennas, this mast will also handle large aperture loops using stronger #14 wire for the end-fed wire elevated, pennant, small receiving directional loop, and large flag loops — perfect for digging out those weak signals on the low bands during grayline or DX conditions. My 20-meter dipole up at the 41-foot mark showed improved performance versus my usual 16-foot height due to being in the ideal sweet spot.

Hamstick and Telescopic Whip Dipoles

I found it rewarding to get a 20-meter dipole using two hamsticks up higher. The availability of 17-foot and 25-foot telescopic whips allows full-length dipoles to be created with the proper center insulator. The results of my testing indicate that additional height is improving signals and with less electrical noise all around. This is ideal for single-band contest or POTA operators, but swapping out hamsticks for other bands isn't that difficult.

Contesters

This could prove to be an ideal solution for temporary antenna setup for the major weekend contests. The difference in top-10 scores, as seen in *NCJ*, is a result of the number of contacts and multipliers. I am always amazed when running low power how well the big contest stations hear me, and it's because of their antennas placed up high, improving their reception and transmissions. I suggest an off-center-fed dipole (132 feet) or even a 160-meter antenna for the low bands, and maybe above that place a 20-meter dipole. Active contesters will try different antennas to ensure every signal is hitting the skip zone, and this use case can help with increasing your scores.

Feedback for Improvements

The bottom cap is just soft plastic and won't last long. I wish there was a better bottom cap to protect the mast bottom from damage when deploying or manually rotating the mast.

The included instructions are on two pages of 4 × 5-inch card stock in small type. Due to the length, weight, and ability to cause damage, proper guying instructions are very important. I had to search a competitor's site for

proper instructions. The guying omission on the instruction card will result in tragedy or mast failure if you don't guy the mast. In fact, if you deploy to full height, the use of screw-in ground anchors is highly recommended. The instruction card offers excellent deployment tips.

The suggested guy ring sets for this mast are sized at 1.25, 1.0, and .75 inches and are only useful for the upper sections, but it is critical to have guy rings that start at 2¼ inches. I strongly suggest that Intellitron offer a ring set that includes three more rings for the lower sections.

I am concerned about the toothed antenna clamp leaving marks or possibly damaging the fiberglass tubing, and a plastic protection tube that slides on would be ideal. They would be needed in different diameters, of course. Right now, I am using electrical tape.

Conclusion

This mast is a solid addition to my antenna kit. It is heavy-duty and tall at 45 feet, with useful stopping points at 33 and 25 feet for heavier antenna deployments. It definitely takes longer to set up compared to my lighter masts, but when you're hoisting up serious hardware, this is the right tool for the job. It's a beast, weighing more than 20 pounds heavier than my go-to lightweight masts, and with a collapsed length of 7 feet, it's not something you'd want to backpack into the bush. That said, Intellitron offers these masts in a variety of lengths and material types, which might satisfy different field operation needs than mine.

For serious multi-use field ops where strength, reliability, and additional height are important, the Intellitron AM-2306KD mast delivers. It's tall, tough, and built to last.

Manufacturer: Intellitron, www.intellitron.com. Price: \$249.95. Sold via GigaParts, www.gigaparts.com.

Strays

Online NEC Modeling for Portable Antenna Design

Many amateur operators building simple wire antennas for portable use rely on published formulas, antenna handbooks, or online length calculators. While these approaches often produce workable antennas, they provide little insight into how the antenna will actually perform — particularly in terms of radiation pattern, takeoff angle, or feed-point impedance.

The website www.portable-antennas.com provides a browser-based antenna modeling environment that allows radio amateurs to explore these characteristics interactively. The system uses the *Numerical Electrodynamics Code (NEC)* modeling engine to perform the underlying calculations, and presents numerical and graphical results through a dedicated interface. Because the tool runs entirely in the user's web browser, no software installation is required.

Instead of a general-purpose modeling program, the site provides dedicated design pages for antenna types commonly used in portable operating. These designs can also be used effectively at a home station. Currently supported designs include linked dipoles, off-center-fed dipoles, end-fed half-wave antennas, verticals, delta loops, half-square antennas, Moxons, and a few other more specialized configurations.

Users enter basic parameters such as operating frequency, antenna height, wire diameter and insulation, and other configuration values specific to the antenna type. The software then calculates the required element dimensions and generates performance predictions. The user can then choose a range of graphical results to be displayed, all based on NEC modeling. These include azimuth and elevation radiation patterns, interactive 3D radiation plots, polarization patterns, VSWR curves, antenna current distribution diagrams, and Smith charts. By adjusting antenna parameters and regenerating the plots, users can quickly see how these changes affect antenna behavior.

In addition to the antenna design tools, the site includes several supporting resources useful to radio amateurs, including data tables and charts for several coaxial cables commonly used in portable operations, charts related to feed-line losses and VSWR behavior, and a number of small calculators and reference tables related to antenna construction and feed-line matching.

The goal of the project is to make antenna modeling more accessible to radio amateurs who want to better understand the performance of their antennas without needing to install complex modeling software. — Rob Banfield, DM1CM

Ask Dave

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

Portable Ops, RG-59, and Antenna Reciprocity

Grounding While Portable

Q Curt Sardeson, KB9JQU, asks: I’ve been thinking of operating portable, such as Parks on the Air®. I don’t really see anyone talking about grounding the radio or coaxial cable while working portable — perhaps the antenna type has something to do with it, or perhaps it just isn’t practical to drive a ground rod while portable. What do you recommend?

A There are two issues with using ground rods during portable operations. First, if you are near park facilities, driving anything into the ground can damage underground infrastructure, such as water pipes or underground electrical cables. Many parks even forbid putting tent stakes in the ground. Second, a fully driven 8-foot ground rod is nearly impossible to remove without equipment that can lift several hundred — or perhaps even a couple thousand — pounds, like a tow truck. What’s more, leaving a ground rod in place can create hazards for others; even if you drive it a couple extra feet into the ground, erosion from flooding or further excavation can expose others to tripping hazards or damage construction equipment.

Simple portable operations often consist of a battery, the radio, the coax, and the antenna, skipping grounding entirely. If you are using a balanced antenna, such as a dipole, a system with no reference to ground can act like an entirely balanced system. Such a station can be “hot” with RF, causing the radio to misbehave, but this can be alleviated by running at low power or adding a few radial wires from the antenna feedpoint.

Using RG-59 to Feed a 10-Meter Antenna

Q Brandon Godsell, KQ4ZUT, who recently upgraded to a General license, asks: I have 500 feet of RG-59 coaxial cable with a characteristic impedance of 75 Ω . Can I use this to feed a 10-meter antenna?

A Yes, you can, but there are caveats. First, RG-59 coaxial cable is rather lossy at 10 meters, but no more so than the popular RG-8X cable. Second, the

difference in impedance between your 50 Ω radio and the 75 Ω cable will create a reflection, so your standing wave ratio will be no better than 1.6:1. This impedance mismatch, however, is well within the corrective capabilities of the antenna tuners built into modern radios.

The losses in this cable can cause you to lose about half of your transmit and receive power. If you are particularly interested in 10 meters, you may want to spring for lower-loss RG-213 or LMR-400 coaxial cable. I recommend buying these cables with the connectors already attached.

Many amateur radio antennas cover the HF bands from 40 through 10 meters, and sometimes they even cover 6 meters and parts of 80 meters. One common antenna option, the end-fed half-wave (EFHW), is readily available from several sources, including ARRL’s EFHW Antenna Kit for 10, 15, 20, and 40 meters, which is available from the ARRL Store for less than \$100 (<https://home.arrl.org/action/Store/Product-Details/productId/133267>).

Effect of a Felony on Obtaining a License

Q Brandon Godsell, KQ4ZUT, also asks: I have a friend who has a felony conviction on his record. He has completed his jail time and turned his life around. Will this prevent him from getting an amateur radio license?

A Whether or not your friend can get his license will depend on the nature of the felony. The FCC includes a question about felony convictions on Form 605, which he would need to fill out as part of his license application. Answering “yes” requires that the applicant submit a statement explaining their conviction directly to the FCC — not to the VE team or ARRL — for adjudication. ARRL explains in detail at www.arrl.org/fcc-qualification-question.

In a reply to a 2011 petition asking that felons be barred from amateur radio (see <https://docs.fcc.gov/public/attachments/DA-11-1315A1.txt>), the FCC explained:

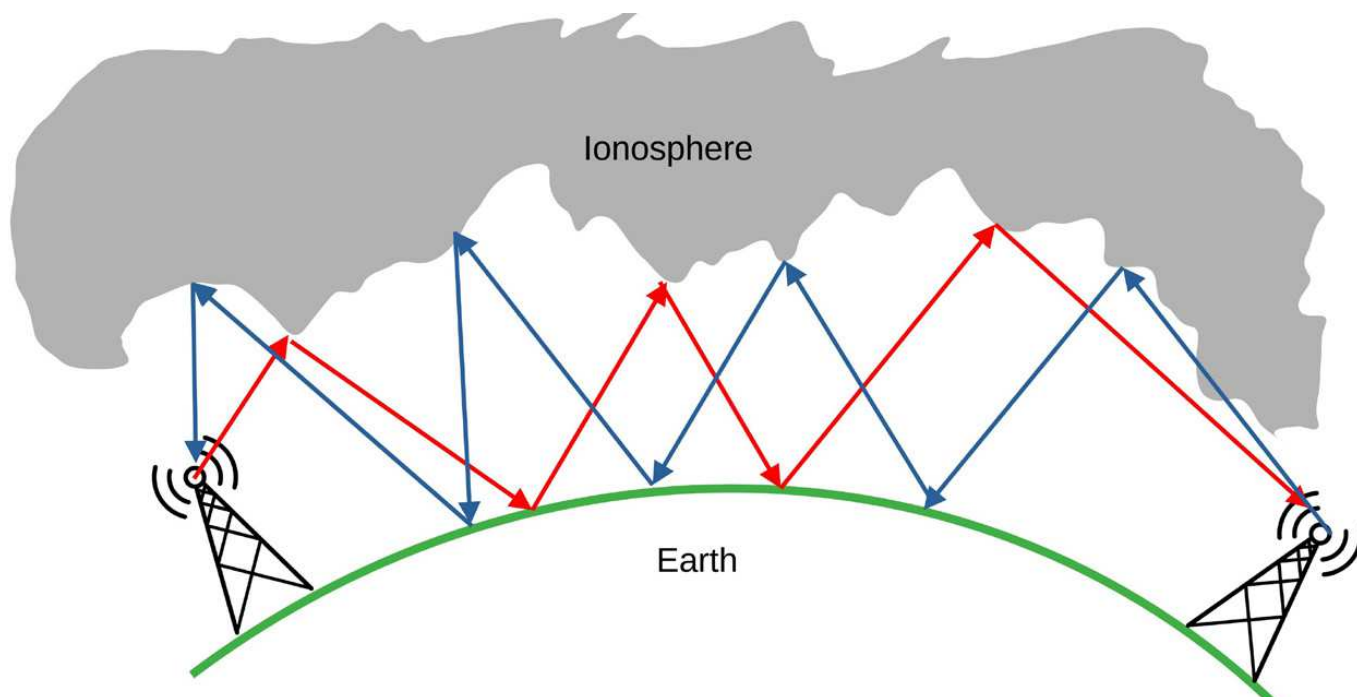


Figure 1 — Under real-world conditions, the relationship between receiving and transmitting may not be perfectly reciprocal. The path of the transmitted signal, shown from left to right (red), is usually different from the path of the received signal, from right to left (blue).

Before it will revoke a license or deny an application based on the felony conviction...the Commission takes into consideration factors that may mitigate a licensee's felonious misconduct. For example, the Commission reviews the willfulness of the misconduct, the frequency of the misconduct, how recently the misconduct occurred, the seriousness of the misconduct, efforts made to remedy the wrong, overall record of compliance with FCC rules and policies, and rehabilitation. Thus, a felony conviction may disqualify a person from holding an amateur radio license but does not necessarily disqualify the person.

Your friend's letter to the FCC should address each of the items quoted above. Note that, unless your friend accompanies his statement with a specific request for privacy, his response will be available to the public via the FCC's Universal Licensing System.

Antenna Reciprocity

Q Bil Paul, KD6JUI, asks: In your "Ask Dave" column in the November 2025 issue of *QST*, you said that most antennas are reciprocal — both transmit and receive characteristics are the same. Which antennas don't display reciprocity?

A Non-reciprocal antennas are an area of active research in advanced communications, but as far as ham radio is concerned, every antenna currently available is reciprocal. According to the 25th edition of *The ARRL Antenna Book*, section 1.5.5, "Reciprocity in

Receiving and Transmitting," antennas are reciprocal in that they have the same directivity pattern, same gain, and same impedance.

However, in practice, this reciprocal relationship may not be exact, because the transmitted and received signals follow different paths through the ionosphere, as illustrated in Figure 1. Also, signals refracted by the ionosphere are usually elliptically polarized, regardless of the polarization of the transmitting antenna. A linearly polarized antenna — for example, a ground-mounted vertical or a horizontal dipole — can usually copy at least some of the signal. That said, it is possible that if you transmit with a vertical, the best receive polarization may well be horizontal, or vice versa. It can go so far that while the other station may receive you well, you may not hear their signal at all!

You can take advantage of something called *polarization diversity* by feeding a vertical antenna into one receiver and a horizontal antenna into another. When the incoming signal fades on one antenna, it may well be strong on the other.

Send your questions to askdave@arrl.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.

Effective Communication — The Crux of Field Day

The Bullitt Amateur Radio Society's tips on pooling club members' skills and experiences to operate efficiently on ARRL Field Day.

Buddy Sohl, KC4WQ

The Bullitt Amateur Radio Society, KY4KY, has had very successful ARRL Field Day efforts, primarily because we prepare, and we build on past successes and failures. Operating events held throughout the year are the bread and butter of our success. For each event, we set a personal or group goal. We look at whether there was anything lacking last year (phone station antennas, number of operators at the CW station, equipment needs, etc.) and how we can fix it for this year.

Transferable Member Skills

During the year, many of our members participate in different operating events, all involving skill sets that prove useful during Field Day.

Several members are Parks on the Air® (POTA®) enthusiasts who have developed the skill to handle multiple callers (pileups) and have learned to keep their exchange to just the facts. Another skill set the POTA ops have gained is how to use compromise antennas efficiently and effectively.

Our club has supported the Lewis and Clark Trail on the Air special event since its inception. This is another operation that requires handling the occasional mini-pileup and getting contacts in the log efficiently and correctly. All those call signs in your log are looking for this special event award. If we get it right, everyone is happy.

Several of our members are contesters. Their success is measured by contacts and multipliers, so accuracy is paramount.

A few of our members love chasing DX. They've developed the ability to figure out a pileup and find the optimal time to insert their call to get through.

These skills become shared assets as members work together toward common goals. And they all have one commonality — effective communication.

Effective Field Day Communication

Exchanging information quickly, efficiently, and correctly is the crux of Field Day. As a young air traffic controller, my instructor asked me why I talked so much. I came from a law enforcement background, and upon considering his point I realized that there was a lot of unnecessary verbiage in my communications. Those extra words add nothing and actually degrade your effort by introducing points of potential confusion, errors, delays, and unnecessary repeats. When you're providing emergency or public service communications, eliminating errors and minimizing airtime are two high-profile considerations.

When we train for Field Day, there is an emphasis on minimizing verbiage and getting the message through quickly, efficiently, and error-free. Our members familiarize themselves with the rules of the event and the type of exchange, and practice writing out the exchange and verbalizing it out loud several times before they ever key a transmitter. There's a focus on minimizing words, regardless of mode. CW and digital are fairly easy to corral, as so much of our exchange is accomplished with the aid of computers and logging software. Phone communication is where the largest issues arise. We're talkers by nature, and an occasional extra hello or thank you doesn't detract too



Tina Sohl, KJ4QFK, at the mic.

much from the score, but it's the beginning of a slippery slope.

This increases the amount of time to complete a contact and decreases the number of contacts the station is able to accommodate. Just a bit of simple math — if it takes 20 seconds to complete a two-way exchange using minimal verbiage, you can optimally make 180 contacts per hour. However, by introducing an extra 10 seconds of talking, you've reduced your efficiency to no more than 120 contacts per hour optimally (a 33% reduction). Over the 24-hour Field Day contest window, you've effectively removed the opportunity for 1,440 additional contacts. Another simplification is minimizing the number of exchanges. When you are CQing, answer the caller with their call sign only and the exchange. Don't waste time by verifying call signs or saying, "[call sign] go ahead." All of these introduce opportunities for errors and reduce efficiency. If you got the call sign wrong, they will let you know.

Keep It Simple

If your exchange is "2 Foxtrot Kentucky," then that is what should be conveyed. Don't add verbiage such as "please copy" or "2 Florida Bluegrass State KY" or repeat the exchange two or three times or out of sequence. Keep it simple and straightforward, and use standard phonetics. Use a speed of voice or CW that is effective for your audience — remember, Field Day has a lot of new and inexperienced operators.

Slow things down a bit. Speak clearly and succinctly. Send what you need to type or write in the log, in the order you would write it. Learn to use the microphone or key quickly, and know what you're going to say before you push the push-to-talk button. Certainly, there are those times when fills or repeats will be required. Those become more obvious as you gain



Glenn Petri, KE4KY, at the CW station.

experience. But looking at the basics, transmit your information one time. If the receiving station doesn't get it, they will ask for a fill or repeat.

Listen effectively. In a contest, there will be a sequence to the exchange. Incorporate intelligent listening. You know what should be coming. Anticipate what you should be hearing, and verify it in your mind. Decode it and log it, then move on.

The Rewards of Efficiency

The bonus of efficient communication is more contacts in the log and more points. If you have a small pileup and spend too many words on each contact, some of those stations in the queue may well move on to other frequencies. While they may end up in your log later, they also may just be a lost opportunity. Maximize your opportunities for contacts by minimizing your words.

When you send just the needed information, nothing is misconstrued, errors are reduced or eliminated, and you are one giant step closer to producing that golden log and being an effective and efficient communicator. Everyone wins when the correct information gets through quickly and efficiently.

All photos provided by the author.

Buddy Sohl, KC4WQ, was licensed in 1979 as KA4JMX and upgraded to Amateur Extra in 1980. Primarily a CW operator and casual tester, he has operated from 25 different states over the years and most recently has been bitten by the POTA bug. He is a trustee for the Bullitt Amateur Radio Society, KY4KY, and coordinated the first Big Project school in Kentucky. A Life Member of ARRL and CWops, he is a retired air traffic controller. He can be reached at buddysohl@gmail.com.



Dustin Rhodes, KM4UNY, hamming it up with the antennas.

For updates to this article, see the [QST Feedback](http://www.arrl.org/feedback) page at www.arrl.org/feedback.



Organizing a Large Field Day Effort

This California-based club with more than 200 members plans their next ARRL Field Day event immediately after their last one ends.

Jeff Reinhardt, AA6JR

What does it take to assemble one of the world's largest ARRL Field Day efforts? It's much more than finding a few friends to camp with over the weekend. And that's not a swipe at anyone; those operations are indeed the backbone of Field Day. But in 2023 and 2024, the Conejo Valley Amateur Radio Club (CVARC; www.cvarc.org) of Thousand Oaks, California, handled a truly massive group of people and equipment. With some 200 members, the club's interest in Field Day runs high. CVARC places emphasis on getting newly licensed operators on the air alongside veterans who can make them feel at ease, and Field Day is a great environment for that — hence the countless resources we put into the event.



CVARC members erecting emergency operations tents on the eve of ARRL Field Day.

A Team for Pre-Event Tasks

For the last 2 years (and for 2025), the CVARC Field Day effort has been chaired by Keith Elliott, W6KME, who said, "Planning for the next Field Day begins literally the week after the last one has ended." Elliott has taken up the challenge of reinvigorating Field Day following the COVID-19 pandemic. He built a successful operation that has been steadily growing, with much credit given to his predecessor, Martin Hickey, AJ6CL. Elliott is assisted by a host of others who meet throughout each year to tackle tasks like site procurement, gathering insurance documents, acquiring shelter tents, and arranging for trash disposal and recycling. They are also in charge of securing

equipment, such as tables, chairs, radios, antennas, cabling, band-pass filters, logging computers, generators, solar panels, water, ventilation fans, portable restrooms, and more.

Besides the operational items, the team must arrange for food, assigned areas for parking and camping, and displays, as well as sign-in logs for visitors, safety officers, and technical problem solvers. In 2024, more than 40 members connected with outside contacts and each other for the setup effort.

Public Outreach Essentials

Along with CVARC President Daphne Vandervalk, KN6TXX, Public Information Officer April Taylor, KN6QQW, invites and greets local elected officials, VIPs, and of course, the public via traditional correspondence and social media. Last year, their work resulted in more than six pages' worth of visitors logged on the sign-in sheets and guided tours for several local, state, and federal elected officials.

Drawing on Local Resources

The CVARC Field Day site is divided into quadrants that identify areas for the operational tents, the antenna array, a parking and camping zone, and a picnic area; you can see examples of the planning documents at www.arrl.org/qst-in-depth. Setup begins the day before Field Day begins, and a crew erects tents (see



Interactive public displays are part of the CVARC Field Day effort. Here, a visitor is learning about Morse code.



It helps to have an operator and a logger teaming up at a single station. In this photo, Ben Kuo, AI6YR, shares operating tips with Joe Tischler, KN6JGX.

the lead photo) that are designated for emergency operations by Ventura County. "It's important that people know how to assemble and use these items. Field Day gives us the opportunity to train volunteers in their deployment and to exercise the equipment to make sure it works properly," said Amateur Radio Emergency Service® District Emergency Coordinator and Ventura County Radio Officer Rob Hanson, W6RH. CVARC member Zak Cohen, N6PK, also coordinates and uses an emergency communications trailer provided by the City of Thousand Oaks.

When It's Time to Transmit

We arrange for 21 simultaneous stations, which requires a lot of equipment and operators who are familiar with SSB, FM voice, CW, and digital modes. We have been applying experiences from previous years to increase efficiency. For example, we've learned to employ *N3FJP* logging software at each operating position. A sign above each station tells visitors what band and mode each position is operating. The most popular operating positions use both a radio operator and a dedicated person for computer logging. Headphones help reduce noise and confusion when the bands are busiest. Sign-up rosters for bands and modes are distributed at club meetings prior to Field Day, but walk-ins are also able to operate. We've addressed cross-band interference by refining antenna placement, grounding, and band-pass filtering.

An Enjoyable Experience

While CVARC works hard to organize such a large event, our top priority is providing a social, casual, enjoyable, and quality experience for club members and visitors from the public. Just as important is the experience operators gain under simulated emergency conditions. So, although we had an impressive number of operating positions last year, we logged just over 2,000 contacts. It's a substantial total, but many other Field Day operations recorded more contacts and points. Keith Elliott, W6KME, reiterated that CVARC is a general-interest club that focuses on creating more casual learning experiences rather than high-energy, contest-style operations.

When Elliott was asked how he might train a future chair for the annual Field Day endeavor, he quipped, "Follow me around for the next 2 years!"

One of Many

While this story focuses on CVARC's effort, it must be mentioned that several other clubs in the ARRL Santa Barbara Section mount their own significant and well-executed Field Day events. Each year, they are honored by their respective county boards of supervisors with proclamations that recognize their contributions, including June being declared "Amateur Radio Month" in each jurisdiction.

See QST in Depth for More!

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

- ✓ Examples of CVARC's Field Day planning documents

All photos provided by the author.

Jeff Reinhardt, AA6JR, has been licensed since 1991. He's an ARRL Life Member and serves as the Public Information Coordinator for the ARRL Santa Barbara Section. Jeff has also served as Chair of the ARRL Public Relations Committee and has had several articles published in *QST* and other amateur radio publications. Jeff is retired from a career in broadcasting, advertising, marketing, and government relations. He is currently enjoying ham radio and world travel, and you can reach him at aa6jr@arrl.net.

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

VOTE

If you enjoyed this article, cast your vote at www.arrl.org/cover-plaque-poll

Future-Proofing ARES



Collaboration and Innovation Bring Success with Served Agencies

Scott Yonally, N8SY
Director, Great Lakes Division

In the past 6 months, much attention has been given to developing new methods, adopting advanced equipment, and forming initial connections with served agencies to keep the Amateur Radio Emergency Service® (ARES®) relevant. These steps are essential for building long-term collaboration, as ongoing commitment is what turns initial contact into lasting, trusted alliances for effective emergency response.

The Event Support Group (ESG) of Cuyahoga County, Ohio, which operates under the auspices of ARES (often called ARES/ESG), has demonstrated exceptional skill in adopting advanced technologies and nurturing strong working relationships with their 57 surrounding communities, by maintaining open communication and embracing new tools.

ESG has established outstanding relationships with many critical agencies and organizations across Cuyahoga County and northeast Ohio, such as the National Weather Service Cleveland, Cuyahoga County Office of Emergency Management, City of Cleveland Office of Emergency Management, Northeast Ohio Healthcare Coalition, and Chagrin Valley Dispatch.

What Works for ARES/ESG

ARES/ESG is a great model of how an amateur radio support organization becomes indispensable instead of optional, because they don't help with only one project; they maintain a strategy built on relationships, capability, reliability, and visibility.

ESG's access to dispatch facilities and emergency operations centers didn't happen because of equipment; it happened because of trusted partnerships built over years of working together with their served agencies. Your ARES group can learn a lot by regularly attending county Emergency Management Agency meetings and by becoming a member of your Local Emergency Planning Committee.

Offering communications support for small local events is a good first step. Meet dispatch leadership and public safety chiefs early on, and provide after-action

reports following every deployment. One of the most important, and probably most difficult, things to do is to show up consistently. Build a reliable and trusted team of volunteers; trust builds access, and access builds integration.

Supporting a variety of community events, such as charity runs, cycling events, parades, and festivals, is an effective way to establish a presence and build relationships with local agencies. By providing backup communications planning and actively participating in annual disaster drills, your group can demonstrate its preparedness and reliability. Even forming a partnership with a single hospital can significantly influence how agencies perceive the value of amateur radio support.

Resources, such as portable repeaters, deployable internet, cross-band interoperability, hospital connectivity, and Winlink capability, are essential for meeting the needs of served agencies. True capability comes from solving real operational challenges, and ESG's approach is to think like infrastructure, not just as volunteers.

The understanding that successful emergency communications teams present themselves as a communications capability that happens to be volunteer supported, and not as volunteers who happen to have radios, is a big mindset shift. That distinction changes everything.



With a strategy built on relationships, capability, reliability, and visibility, ARES/ESG is a great model of how an amateur radio support organization becomes indispensable instead of optional.

2026 ARRL Field Day Guide

AMATEUR RADIO
FD★26
A NATIONAL RESOURCE

AMERICA
250TM

QST Field Day Section, June 2026

- Maximizing Field Day Outreach
- Incorporating Digital Modes Into Your Setup
- NVIS Antenna, Safety Tips, and More!

Sponsored by Elecraft
www.elecraft.com



BE FIELD DAY READY TAKE PERFORMANCE WITH YOU

ELECRAFT KH1

HAND-HELD, 5-BAND TRANSCEIVER

- 40-15 m bands; 6.7-22 MHz SWL
- CW mode; 5 watts, all bands
- ATU includes whip & high-Q inductor for 20/17/15 m*
- 2.5 AH Li-Ion battery & internal charger*
- CW decode & 32K TX log
- Scan/mini-pan feature
- Real-Time Clock
- Full remote control
- Speaker
- RIT, XIT, & VFO lock



KX-LINE: KX2/KX3

KX2 ULTRALIGHT GRAB-AND-GO STATION PERFECT FOR SOTA & FIELD OPERATIONS



- 5.8" x 2.8" x 1.5" (weight: 13 oz.)
- 80-10 meters (9 bands)
- SSB / CW / Data / AM / FM
- Up to 12 W TX
- Internal 2.6 Ah Li-ion battery*
- Built-in mic for HT-style operation
- Wide-range internal ATU*

KX3 COMPACT 160-6 METER, ALL-MODE TRANSCEIVER



- Best-in-class performance
- 7.4" x 3.5" x 1.7" (weight: 1.5 lbs)
- Matching PX3 panadapter*
- 160-6 meters plus 2 or 4 m*
- SSB, CW, AM, FM, Data
- Up to 15 W TX
- Wide-range internal ATU*

AX-LINE ANTENNAS

WHEREVER YOU OPERATE

AX1 MULTI-BAND WHIP ANTENNA Performance that fits in your pack.

- Ultra-compact HF antenna system for true field portability
- 20 m (~14 MHz) and 17/15 m (~19 MHz)
(Resonant frequencies may vary +/- 300 kHz or more)

AXE1 ANTENNA EXTENDER Expand your reach.

- Precision loading coil extending AX1/AX3 operation to 40m and 30m
- Compact screw-on design maintaining system efficiency with minimal added weight

AX2 MINIATURE 20-METER WHIP ANTENNA Go farther. Stay portable.

- Covers 20m
- User-Modifiable for single-band operations from 17-6m

AX3 30-10 METER WHIP ANTENNA Instant adventure, wherever you go.

- Self-supporting vertical for maximum field performance
- Compact 6" collapsed design, extending to 45"
- Trail-ready light at 5.0 oz

Maximizing Field Day Outreach

Bob Inderbitzen, NQ1R, Senior Director of Marketing and Innovation

ARRL Field Day has always been more than an operating event — it's amateur radio's most visible public showcase. In 2026, that visibility carries added significance, as ARRL joined the nationwide celebration of America's 250th anniversary through its partnership with America250 (www.arrl.org/america250). With the theme "Amateur Radio: A National Resource," this year's Field Day presents an exceptional opportunity for radio clubs to elevate their public relations efforts and connect more deliberately with their communities.

Successful outreach can fill seats in your club's next ham radio licensing class. It can also lead to meaningful connections with town and city leaders, emergency management officials, and local educators. Field Day is your opportunity to demonstrate — not just describe — what amateur radio can do.

PR that Gets Noticed

Effective outreach begins well before the first antenna is raised. Clubs should treat Field Day as a coordinated public relations campaign. Building a media contact list with information for local newspapers and radio, television, and community outlets is essential. A clear press release answering the who, what, when, where, and why should be distributed several weeks in advance, followed by personal outreach; a simple follow-up call or email can make the difference between coverage and silence.

Crafting a message that resonates beyond the amateur community

is equally as important (see the sidebar "America250 Messaging" for a quote from the ARRL President to include in your messaging). Avoid jargon and emphasize service, education, and community impact; Field Day tells a compelling story by demonstrating how amateur radio provides resilient communication during emergencies and When All Else Fails® — an increasingly relevant message in today's connected world.

The America250 connection adds another powerful narrative: Amateur radio continues to drive innovation, public service, and education, with ARRL youth initiatives inspiring students through hands-on STEM learning and opening pathways to higher education and careers in wireless communications and related technical fields.

On-site engagement is just as critical. Designating a knowledgeable spokesperson ensures visitors and media receive clear information. Having a simple information table with brochures and easy-to-understand explanations can turn a casual visit into a meaningful introduction.

Visual storytelling also plays a major role. Photos and videos shared on social media extend your reach beyond your Field Day site. Capture action, such as operators making contacts, visitors getting on the air, and youth exploring STEM concepts. These moments not only document the event but support future outreach.

Inviting community leaders and elected officials can further amplify impact and build lasting relation-

ships. After Field Day, follow up with media, share coverage, and invite visitors to your next meeting or licensing class. Public outreach efforts may also qualify your club for valuable Field Day bonus points.

The 2026 ARRL Field Day is more than an annual tradition — it is a chance to tell amateur radio's story to a broader audience and demonstrate its value as a national resource.

America250 Messaging



Include this quote in your club's Field Day media advisory:

"Amateur radio has been part of the American story since the earliest days of wireless communication," said ARRL President Rick Roderick, K5UR. "For more than a century, the Amateur Radio Service has advanced the nation's communications capabilities by fostering technical innovation, developing a pool of trained and skilled operators, strengthening emergency and public service communications, and promoting international goodwill. These enduring contributions reflect why amateur radio continues to serve the public interest as a uniquely resilient and volunteer-driven national resource."

Incorporating Digital Modes Into Your Field Day Setup

John McAuliffe, W1DRF, ARRL Lab Digital RF Engineer

In recent years, digital modes have become ubiquitous on all the amateur radio bands. From digital voice, to weak signal, to high-speed packet, there's no shortage of digital communication protocols for amateur usage. During ARRL Field Day, which is meant in part to be an emergency communications exercise, weak-signal modes are effective at exchanging information in challenging band conditions between multiple operators simultaneously, which makes them robust for creating reliable communications links in almost all scenarios.

When operating on HF, you need three things: a transceiver, a PC, and some method of passing audio to the transceiver. Most transceivers have a voice-operated exchange (VOX) mode that, when the audio input and output are properly interfaced and adjusted to a PC, will key the radio when you need to transmit. I don't recommend connecting the audio output from your radio directly to your PC and vice versa, because it's very easy to overdrive the input and output ports of both devices. Instead, use an audio interface designed to connect a computer to an HF transceiver, such as those made by Signalink and Digirig. Depending on the transceiver, these devices may also be able to support keying the transceiver via the CAT control.

Your PC's device driver is what helps it recognize what these devices are. On modern Windows systems, the PC can often find and download the correct driver itself, but don't be surprised if you receive an **ERROR: UNRECOGNIZED DEVICE** message

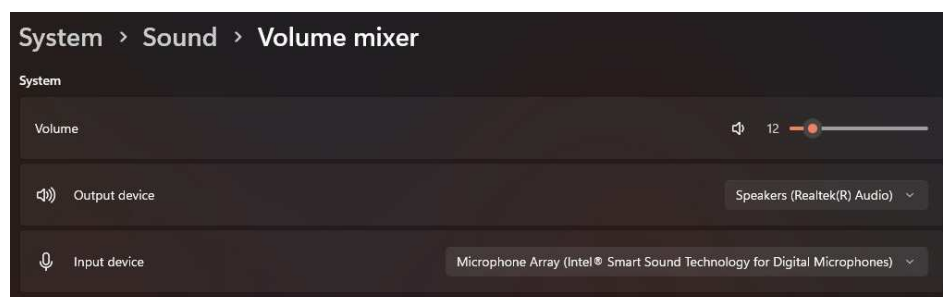


Figure 1 — How to find the default audio device on Windows 11 PCs.

when you connect an external audio interface to your PC. If this happens, you'll have to navigate to the manufacturer's website to find their instructions for downloading and installing the correct driver. Many radios built in the last 15 years have an internal sound interface accessible via USB, which negates the need for an external interface for the transceiver. For these specific radios, you'll want to make sure you've downloaded and installed the correct driver from the manufacturer's website.

By default, your PC should see the audio input and output of your radio's interface device as a Windows speaker and microphone. The "speaker" is the audio you want to be transmitted, while the "microphone" is the audio your radio is receiving at your tuned frequency. You'll want to rename these devices in your settings to avoid confusing them with other audio devices connected to your PC and make sure they're not the default audio devices for your applications. In Windows devices, the default audio device is found under **SETTINGS > SYSTEM > SOUND > VOLUME MIXER** (see Figure 1), while sound devices can be renamed under **SETTINGS >**

SYSTEM > SOUND > PROPERTIES (see Figure 2).

Examples

Using *WSJT-X* as an example (because most amateur radio digital software is fairly similar), under **FILE > SETTINGS > AUDIO**, set the input device for the software to your microphone, or line (as shown in Figure 3), and the output to speakers in the audio settings.

If your transceiver is set to VOX mode in SSB, and you set *WSJT-X* to push-to-talk (PTT) via VOX under **FILE > SETTINGS > RADIO**, you have the minimum settings to operate most digital modes using your PC and radio. You'll have to manually set the frequency (and I do not recommend running this type of setup with an amplifier), but if all you have is a radio and a smartphone or PC, this will get you on the air.

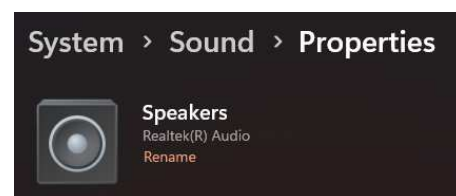


Figure 2 — How to rename sound devices on Windows 11 PCs.

If your radio is more modern, it likely has a built-in computer-aided transceiver (CAT) control interface, which is the recommended way for keying a radio to transmit, and it often gives your PC access to the radio's variable frequency oscillator (VFO), negating the need for manual tuning. When connecting your transceiver on a Windows device, check your device manager under **PORTS COM/LPT** to see which serial port is used for this feature. Then, in your software of choice, find the CAT control setting, and set the serial port to the one used by your transceiver. Most software programs contain a *hamlib* (ham radio control library), which contains the default baud rate and other settings for controlling the VFO, mode, and PTT settings (see Figure 4). If your radio is on the list, simply select it to automatically populate the settings for your radio, and use the **TEST CAT** and **TEST PTT** buttons to verify that everything is working. If something fails, consult your device's manual, and try searching online forums to see if there are unusual hang-ups for your particular radio. You'll also want to turn off the noise reduction and noise blanker settings when operating digital modes, as they can often mistake signals for noise.

Further Applications

After you find the settings that work for one software, you can easily migrate them to other digital software, and you'll be fully set up to operate most of the digital modes in amateur radio during ARRL Field Day. Some specific modes, such as PACTOR 4, require the use of an external modem, but



Figure 3 — Setting the input and output device on WSJT-X.

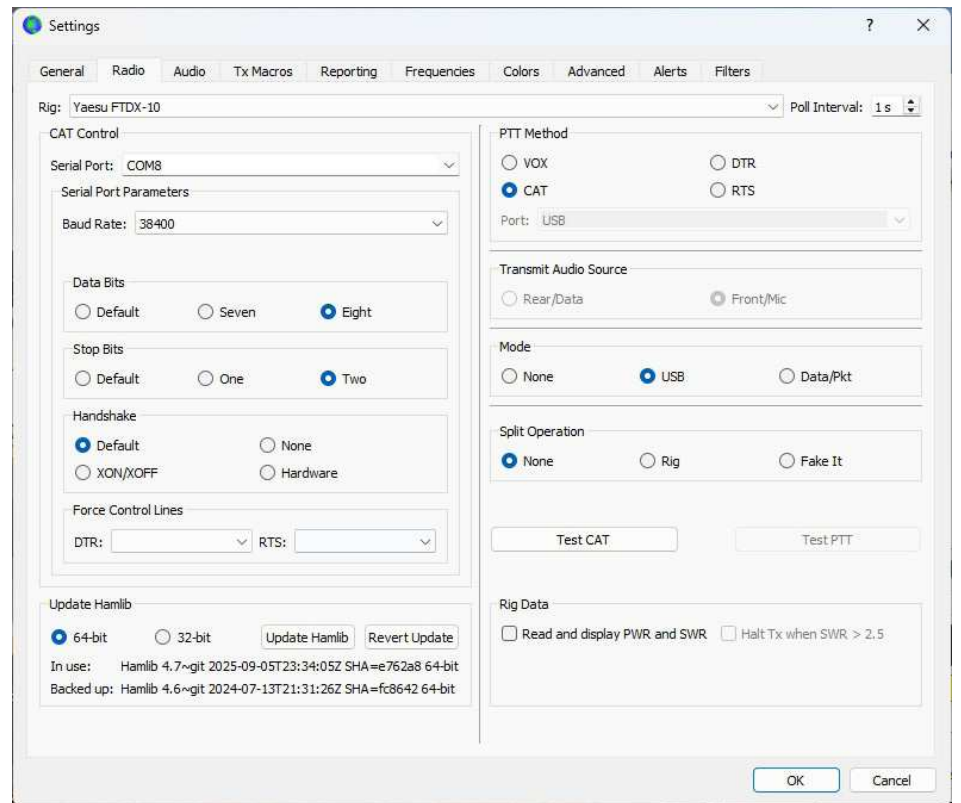


Figure 4 — WSJT-X's radio control settings.

these modes are the exception, not the rule; almost any data mode can be operated using a PC and a software application, and USB connectivity has made virtually any PC compatible in some way with any radio.

In addition to the JT modes, install *VarAC* so that you can get started with Winlink; it's a great way to

get extra points during ARRL Field Day for sending and receiving messages from your Section Manager. Also, get set up with *fldigi* and *JS8Call* for keyboard-to-keyboard live communications. Most importantly, have fun! I look forward to seeing you on the air June 27 – 28 for ARRL Field Day.

All images provided by the author.

Operating Portable with an NVIS Antenna

Walt Hudson, K4OGO

I'm a serious DXer, and the thought of operating HF portable with a near vertical incidence skywave (NVIS) antenna was never my idea of fun — until I did it. Now, I think every portable operator should give it a try. I learned so much about HF propagation and portable HF operations by building what I call the “Easy NVIS” antenna.

Typically, NVIS propagation is used for emergency, mountainous, or tactical operations, but I also found it perfect for events like ARRL Field Day and state QSO parties. I researched and built my Easy NVIS antenna for the Virginia QSO Party, with hopes of contacting as many stations around me as possible, especially in my home state of Virginia, while I was portable in Virginia Beach.

Research

First, I did some research on what NVIS communications were all about. I discovered that in the world of antenna building, it was no different than what I do for DXing. You simply manipulate the takeoff angle of the antenna to get the desired skip distance, while avoiding certain dead zones. NVIS antennas are designed for short- to medium-range HF communication (0 – 500 miles) by directing RF steeply upward, which, in return, avoids local skipping and sends your signal directly back down in proximity to your location. To do this, a takeoff angle between 90 and 60 degrees is the desired characteristic of a good NVIS antenna.

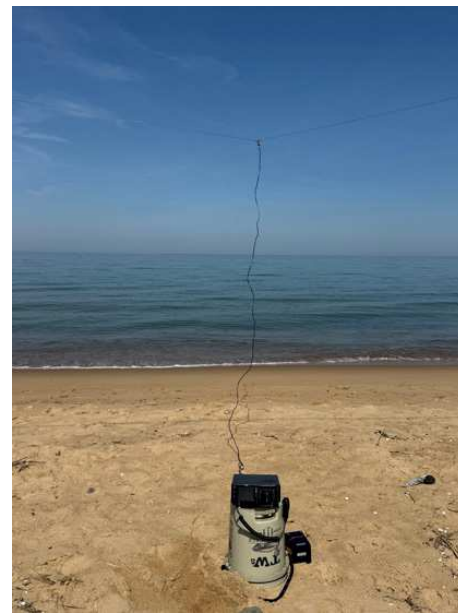
Research pointed me toward operating on the 40-meter band, as my plan was to operate in the middle

of the day, into the late afternoon. Typically, for NVIS operations, the 40-meter band is the spot to be during daylight hours, while the 60- and 80-meter bands are good at night.

I needed to build a 40-meter dipole positioned low to the ground. Most of what I read stated that a dipole positioned below a quarter wavelength above the ground acted as a good NVIS antenna. I also found that many designs used some type of reflector below the horizontal dipole to give it a boost, somewhat like a two-element beam antenna pointing straight up into the sky. Some of these designs had as many as five wires laid out directly under the dipole to get the reflector effect.

Antenna Design

With all this in mind, I started modeling an antenna that I thought would work. I found that putting a dipole at a distance between $\frac{1}{10}$ of a wavelength and $\frac{1}{4}$ of a wavelength gave me very good gain at 90 degrees, with a reflector directly under it. This reflector was 5 percent longer than the dipole. I also discovered that even with the dipole not perfectly square to the ground, I still got the gain effect from the reflector. I knew this would be critical, as I would be portable with the dipole strung between two poles on the beach, and it would have some sag in the middle at the feed point. Modeling still showed considerable gain using a drooping dipole with a reflector below it, if the dipole itself stayed between the $\frac{1}{10}$ - and $\frac{1}{4}$ -wavelength height. I modeled the ground below it close to salt-



Walt Hudson's, K4OGO, dipole and radio setup.

water on the beach, and I suddenly had a massive amount of added gain — I knew this was going to be a fun build.

Next, I needed to figure out how to make this antenna as light as possible to make it easier to suspend between two poles and carry over the sand dunes and onto the beach. That's when I contacted my friend Tim Ortiz, N9SAB, who builds and sells ultra-light Nano dipoles. Tim said, “I'll cut and send you the reflector, along with my lightweight dipole for 40 [meters].” I was set!

Results

As fate would have it, on the day I set up for the Virginia QSO Party, band conditions were horrible; we were in the middle of a strong G2 to G3 solar storm. This was when I learned my greatest propagation lesson using my NVIS antenna:



Walt Hudson's, K4OGO, NVIS antenna strung between two poles on the beach.

NVIS antennas remain effective during solar disturbances. Solar activity often decreases critical frequency, requiring the use of the lower bands. On this particular day, the lower band was 40 meters. Severe solar activity can create high absorption, reducing range. However, because NVIS uses low horizontal antennas to fire signals almost straight up, they're less affected by typical low-angle fading. Low-angle signals are more susceptible than a signal with a near vertical angle to the ionospheric absorption that occurs during solar activity, as this angle helps the signal pierce through the

absorption and reach the F layer of the ionosphere to be refracted back down. It was my lucky day.

I strung the lightweight dipole between two 7-meter fiberglass DX Commander telescopic poles parallel to the ocean on the beach, just a couple meters from the edge of the water, using monofilament fishing line to support it from pole to pole. Directly under it, I centered the reflector wire and staked it down at the ends with plastic tent stakes. Tim stated that the dipole was rated for 50 W, so I turned down the power of my Yaesu FT-991 to 50 W and started calling

CQ. At this moment, I realized I'd been missing an incredible part of HF communications for years. I was absolutely blown away by the number of times I was told how strong my signal was by stations that were 250 to 500 miles away. I made 57 contacts in 90 minutes in the middle of heightened solar activity. All these contacts were generally inside of a 600-mile radius, with many being right in my home state. This made an NVIS believer out of me, and I'm convinced it's the way to activate portable on a day when conditions are not so good.

Take it from a hardcore DXer — using an NVIS antenna and experiencing this phenomenon is amazing. If you're a frequent portable operator, you have to try this during ARRL Field Day. Put up an Easy NVIS antenna by just getting a dipole $\frac{1}{10}$ to $\frac{1}{4}$ wavelength off the ground, put a reflector under it that is 5 percent longer than the dipole, and watch the magic happen!

All photos provided by the author.



"Salty" Walt Hudson, K4OGO, operating on the beach using his NVIS antenna.

Design Field Day Your Way

Wayne Burdick, N6KR

Planning and designing your own Field Day experience is half — or more — of the fun, with gear, techniques, and crewmates evolving over time. Whether you're crafting a massive operation or dipping your toes into the Field Day pool for the first time, each year there's a new radio, antenna, or software to test; a new campsite with its idiosyncratic antenna trees, and new ways things can go wrong.

Making Plans

With most radio outings, it's common practice for everyone to bring their favorite gear and hope for the best. But putting multiple stations on the HF bands requires more planning. There's nothing as frustrating as having your receiver's noise floor come up nine S-units when someone else transmits; this is most likely to happen if stations are covering the same band at the same time in two different modes.

Regardless of whether your station setup is large or small, you need to secure permission to operate at your chosen location. One year, we "double-booked" a meadow with an astronomy club (we coexisted on the condition that we use only red-colored lamps, to minimize light pollution, and between shifts we saw the rings of Saturn).

Large Station Setups

Other than selecting clean radios, there are two things you can do to avoid mutual interference in the case of a large-station Field Day setup. First, keep antennas spaced as far apart as possible. Event rules require that all gear, including antennas, be confined to a circle with a 1,000-foot (approximately

300-meter) diameter. Second, you can orient horizontally polarized antennas, such as dipoles and Yagis, so they're perpendicular to each other.



Wayne Burdick, N6KR, using a KH1 while operating solo during 2024 ARRL Field Day. He operated on 20- and 15-meter CW, using an "invisible" #26 AWG trailing ground wire. [Griffin Svec-Burdick, photo]

All the Necessary Bits

When it comes to gear, don't leave out coaxial and dc-power jumper cables, long and short; BNC, SO-239, and other adapters (male and female); various tools; alligator clips; wire; cable ties, and duct tape. Above all, bring all specialized items pertaining to your radios, namely microphones, keyer paddles, batteries, and power cords. I've made CW contacts using ad hoc bits of wire and hardware due to a forgotten key.

Make Assignments

With larger setups, you should assign operators to specific stations and tasks. A large campaign will need an antenna guru (it's a bonus if they have a crank-up tower on a trailer), an expert CW operator or two, and someone with serious barbecue skills. You'll also need to have activities for kids and teens. They won't all get on the air, so this prevents them from making mischief while you're running stations after dinner.

Small Station Operations

Some of my favorite Field Days have featured a single radio on a picnic table, solo or with a friend. This type of Class-B outing can be every bit as rewarding as a multi-transmitter effort, while requiring less time to prepare. There's no limit to how small you can go. You might sit on a beach chair overlooking the ocean the entire time, operate from a parked car, or backpack through the wilderness with your microphone in hand and solar panel strapped to your pack.

Last year, my Field Day consisted of operating an Elecraft KH1 handheld transceiver while walking — for 2 hours. I used the logbook tray attachment and communed with nature.

Remember to Have Fun

Whether you operate on all bands or one band, stay on the air for 24 hours or 1 hour, aim to earn the highest score in your Section, or simply dabble on the radio, it's still Field Day in all its inimitable glory.

Field Day Safety

Here are a few tips to get you thinking about ARRL Field Day safety.

Lightning Safety

- ▶ When you hear thunder, immediately move to safe shelter: a substantial building with electricity or plumbing, or an enclosed metal-topped vehicle with the windows up.
- ▶ Stay in a safe shelter for at least 30 minutes after you hear the last sound of thunder.
- ▶ Stay away from objects that conduct electricity.
- ▶ Power down and disconnect your radios and generators.

Antenna Safety

- ▶ Be aware of and avoid electrical power lines.
- ▶ Don't climb towers that use temporary guy ropes.
- ▶ Don't climb ladders being used for antenna supports.
- ▶ Erect antennas far enough away from operating positions so there is no possibility of the antenna and structure falling on operators and observers.
- ▶ Regularly inspect guy ropes and stakes.
- ▶ Ensure anchor stakes have sufficient load capacity.
- ▶ Ensure that your Field Day station complies with FCC RF exposure requirements (see www.arrl.org/rf-exposure).
- ▶ Never climb an unguyed tower.

Generator and Electrical Safety

- ▶ Never add fuel to or move a running generator.
- ▶ Store fuel in approved containers away from generators and ignition sources, in well-ventilated areas away from direct sunlight.
- ▶ Centrally locate the generator to keep all branches to stations equal.
- ▶ Use an earth ground at the generator and at each station.
- ▶ If practicable, electrically bond all stations together.

Physical Safety

- ▶ Avoid tripping hazards. Use fluorescent safety tape to mark guy ropes, stakes, and cables.
- ▶ Secure hazardous areas with caution tape to keep people away.
- ▶ Escort visitors around your Field Day site.

Medical Safety

- ▶ Avoid overexposure to sun.
- ▶ Stay hydrated — drink plenty of water.
- ▶ Know the signs of heat exhaustion and heat stroke.
- ▶ Keep a first aid kit on hand.
- ▶ Have an automated external defibrillator (AED) on hand.

KH1: TAKE HF ANYWHERE

Light, Fast, Field-Ready!

Whether you're climbing summits or setting up for Field Day, the KH1 is built to go wherever you go.



Internal ATU

Tunes both the built-in multi-band whip and BNC-connected random wires.

CW-Friendly Interface

Optimized for handheld operation, no bench required.

Field Logging Made Easy

Track every contact with convenience.



831-763-4211



Elecraft.com

★ OFFICIAL 2026 FIELD DAY MERCH ★

Wear Your T-Shirt Again on the Fourth of July!



Field Day T-Shirt – Retail \$30
Unisex sizes Small-5XL

The AMERICA250® word mark and logo are trademarks of the U.S. Semiquincentennial Commission and are used under license.



Field Day Mug – Retail \$20



Field Day Baseball Hat – Retail \$25



Field Day Bucket Hat – Retail \$20



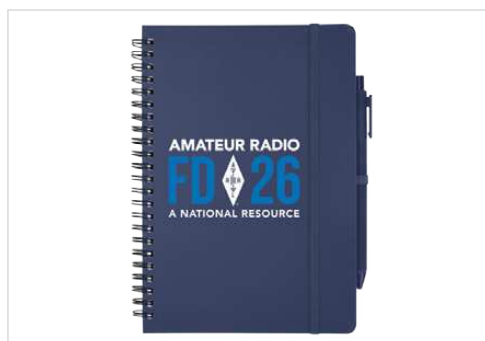
Field Day Pin – Retail \$6



Field Day Patch – Retail \$5



Field Day Sticker – Retail \$2



Field Day Notebook – Retail \$10



Field Day Drawstring Bag – Retail \$10



Field Day Cooler Chair – Retail \$25

Order online at www.arrl.org/shop | Phone **860-594-0200**

BONUS POINTS ADD UP!



Use this Bonus Points Calculator to keep track of your Field Day Bonus Points (see Rule 7.3 for details). Some bonus points require submission of proof and will be verified before being added to your score. Maximum bonus points are listed unless otherwise noted.



POINTS	ACTIVITY	AVAILABLE CLASSES
	100% Emergency Power. 100 bonus points per transmitter; max. 20 transmitters, max. 2,000 points. Bonus stations (such as the GOTA station and satellite station) do not count toward determining the number of transmitters for the class and do not qualify for transmitter bonus points.	A, B, C, E, and F
	Media Publicity. 100 bonus points. Bonus points may be earned for obtaining publicity from the local media. A copy of the media publicity received (newspaper article, news website post, etc.) must be submitted to claim the points.	All
	Set Up in Public Place. 100 bonus points.	A, B, and F
	Public Information Table. 100 bonus points. Bonus points may be earned for making information about amateur radio available to the public at your Field Day site.	A, B, and F
	W1AW Field Day Bulletin. 100 bonus points. Copy, via amateur radio, the special Field Day bulletin transmitted by W1AW or K6KPH. An accurate copy of the message must be included with your Field Day entry to claim the bonus.	All
	Message Handling NTS/ICS-213. 0 to 100 points max., calculated by taking the Number of Messages (max. 10 messages): ____ × 10 bonus points for each formal message originated, relayed, or received and delivered during the Field Day period. Copies of each message must be included with the Field Day entry. The message under Rule 7.3.5 does not count. All messages claimed for bonus points must leave or enter the Field Day operation via amateur radio RF.	All
	Message to ARRL Section Manager or Section Emergency Coordinator. 100 bonus points. See Rule 7.3.5 for message format. This message is separate from the messages handled in Rule 7.3.6 and may not be claimed for bonus points under that rule. A copy of the message must be included with the Field Day entry.	All
	A Satellite QSO. 100 bonus points. Satellite QSOs also count for regular QSO credit. List these contacts separately on the summary sheet as a separate "band." The QSO must be between two Earth stations through a satellite. Stations are limited to one (1) completed QSO on any single-channel FM satellite.	A, B, and F
	Alternate Power QSOs. 100 bonus points. Complete at least five QSOs without using power from commercial mains or a petroleum-driven generator. A separate list of alternate power QSOs must be submitted with your entry.	A, B, E, and F
	Site Visit by Invited Elected Official. 100 bonus points.	All
	Site Visit by Invited Served Agency Official. 100 bonus points. Visits from ARRL officials (SM, SEC, DEC, EC, etc.) do not qualify for this bonus.	All
	Educational Activity. 100 bonus points.	A, D, E, and F
	Youth Participation. ☐ For Class A, C, D, E, or F groups: 20 bonus points per participant age 18 or younger who completes at least one QSO; max. 100 points. ☐ For a one-person Class B station: 20 bonus points if the operator is age 18 or younger; max. 20 points. ☐ For a two-person Class B station: 20 bonus points for each operator age 18 or younger; max. 40 points	All (see specific points per class)
	GOTA. See Rule 7.3.13 for the bonus point breakdown.	A and F
	Use the Field Day Entry Web App. 50 bonus points. Submit your entry using the web app at https://field-day.arrl.org/fdentry.php .	All
	Safety Officer. 100 bonus points. Include a statement with the supporting documentation for your entry, verifying that a designated Safety Officer completed the ARRL Field Day Safety Check List.	A
	Social Media. 100 bonus points. Promote your Field Day activation to the general public via social media (Facebook, X, Instagram, etc.). Individual participants do not qualify for this bonus. Club websites do not qualify as social media. Available to all classes who welcome visitors to their operation.	All
	Field Day Site Responsibilities. 50 bonus points. Include a statement with the supporting documentation for your entry, verifying that a designated individual completed the Field Day Site Responsibilities Check List.	B, C, D, E, and F
	TOTAL BONUS POINTS CLAIMED	

ARRL FIELD DAY 2026

ARRL/RAC Section Checklist

UNITED STATES

- ☐ ALABAMA · AL
- ☐ ALASKA · AK
- ☐ ARIZONA · AZ
- ☐ ARKANSAS · AR

CALIFORNIA

- ☐ EAST BAY · EB
- ☐ LOS ANGELES · LAX
- ☐ ORANGE · ORG
- ☐ SACRAMENTO VALLEY · SV
- ☐ SAN DIEGO · SDG
- ☐ SAN FRANCISCO · SF
- ☐ SAN JOAQUIN VALLEY · SJV
- ☐ SANTA BARBARA · SB
- ☐ SANTA CLARA VALLEY · SCV

- ☐ COLORADO · CO
- ☐ CONNECTICUT · CT
- ☐ DELAWARE · DE

FLORIDA

- ☐ NORTHERN FL · NFL
- ☐ SOUTHERN FL · SFL
- ☐ WEST CENTRAL FL · WCF

- ☐ GEORGIA · GA
- ☐ HAWAII/PACIFIC · PAC
- ☐ IDAHO · ID
- ☐ ILLINOIS · IL
- ☐ INDIANA · IN
- ☐ IOWA · IA
- ☐ KANSAS · KS
- ☐ KENTUCKY · KY
- ☐ LOUISIANA · LA
- ☐ MAINE · ME
- ☐ MARYLAND/DC · MDC

MASSACHUSETTS

- ☐ EASTERN MA · EMA
- ☐ WESTERN MA · WMA

- ☐ MICHIGAN · MI
- ☐ MINNESOTA · MN
- ☐ MISSISSIPPI · MS
- ☐ MISSOURI · MO
- ☐ MONTANA · MT
- ☐ NEBRASKA · NE
- ☐ NEVADA · NV
- ☐ NEW HAMPSHIRE · NH

NEW JERSEY

- ☐ NORTHERN NJ · NNJ
- ☐ SOUTHERN NJ · SNJ

- ☐ NEW MEXICO · NM

NEW YORK

- ☐ EASTERN NY · ENY
- ☐ NORTHERN NY · NNY
- ☐ WESTERN NY · WNY
- ☐ NYC/LONG ISLAND · NLI

- ☐ NORTH CAROLINA · NC
- ☐ NORTH DAKOTA · ND
- ☐ OHIO · OH
- ☐ OKLAHOMA · OK
- ☐ OREGON · OR

PENNSYLVANIA

- ☐ EASTERN PA · EPA
- ☐ WESTERN PA · WPA

- ☐ PUERTO RICO · PR
- ☐ RHODE ISLAND · RI
- ☐ SOUTH CAROLINA · SC
- ☐ SOUTH DAKOTA · SD
- ☐ TENNESSEE · TN

TEXAS

- ☐ NORTH TX · NTX
- ☐ SOUTH TX · STX
- ☐ WEST TX · WTX
- ☐ US VIRGIN ISLANDS · VI
- ☐ UTAH · UT
- ☐ VERMONT · VT
- ☐ VIRGINIA · VA

WASHINGTON

- ☐ EASTERN WA · EWA
- ☐ WESTERN WA · WWA

- ☐ WEST VIRGINIA · WV
- ☐ WISCONSIN · WI
- ☐ WYOMING · WY

CANADA

- ☐ ALBERTA · AB
- ☐ BRITISH COLUMBIA · BC
- ☐ GOLDEN HORSESHOE · GH
- ☐ MANITOBA · MB
- ☐ NEW BRUNSWICK · NB
- ☐ NEWFOUNDLAND/LABRADOR · NL
- ☐ NOVA SCOTIA · NS
- ☐ ONTARIO EAST · ONE
- ☐ ONTARIO NORTH · ONN
- ☐ ONTARIO SOUTH · ONS
- ☐ PRINCE EDWARD ISLAND · PE
- ☐ QUEBEC · QC
- ☐ SASKATCHEWAN · SK
- ☐ TERRITORIES · TER



AMATEUR RADIO
FD★26
A NATIONAL RESOURCE

Happenings

ARRL Hosts Successful 2026 HamSCI Workshop

The worlds of amateur radio and ionospheric science came together once again at the 9th annual Ham Radio Science Citizen Investigation (HamSCI) Workshop on March 14 and 15, 2026. HamSCI 2026 was hosted by ARRL and held at Central Connecticut State University, just minutes from ARRL Headquarters in Newington.

HamSCI encourages radio amateurs to collect data that scientists use in their research on ionospheric phenomena. This year's workshop featured 17 oral presentations, three tutorials, five demonstrations, and 31 posters, and it drew researchers from Virginia Tech, Saint Francis University, Dartmouth College, Boston College, and others.

ARRL CEO David Minster, NA2AA, welcomed participants at the conference opening, followed by lead HamSCI community organizer Dr. Nathaniel Frissell, W2NAF, who set the stage for the weekend's activities. The keynote speaker at Saturday evening's banquet was NASA astrophysicist and citizen science officer Dr. Marc Kuchner. The workshop also included a field trip to ARRL Headquarters, and attendees were invited to participate in late-night operating from the iconic W1AW station.

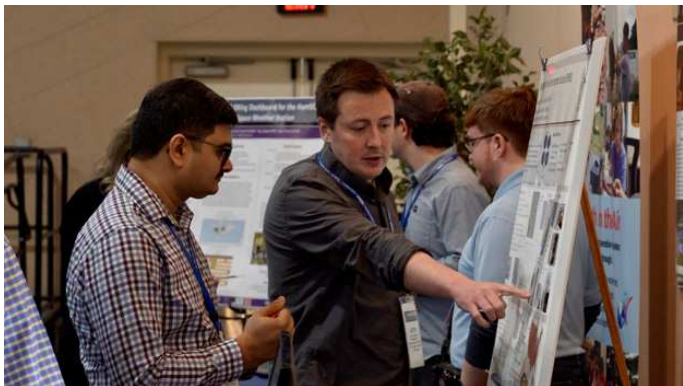
One overriding theme of the conference was that you don't need to be a scientist to contribute valuable data. HamSCI's basic Personal Space Weather Station (PSWS) can observe space weather effects both as a single-point measurement and as part of a larger distributed network. The group has made data collection fun, with activities like the Solar Eclipse QSO Party and the Meteor Scatter QSO Party. One presentation demonstrated how ham observations and measurements captured ionospheric effects during two recent solar eclipses.

At Sunday morning's poster session, University of Scranton student Owen Ruzanski, KD3ALD, described a project to develop a dashboard for HF contesting, DXing, and general operations using data from PSWS and other remote sources. The project is intended to enhance the real-time propagation assessments sought by amateur radio operators.

For many participants, the chance to operate from W1AW was a highlight of the weekend. ARRL Senior Director of Marketing and Innovation Bob Inderbitzen, NQ1R, described the atmosphere at the station as "energetic." All six guest operating positions were occupied until closing time at 11:30 PM on Saturday. Participants were treated to a first-ever 630-meter contact



HamSCI 2026 attendees.



A poster session was held Sunday morning during HamSCI 2026.

from W1AW, a contact with the J51A DXpedition to Guinea-Bissau, and a contact between W1AW and a

remote station in Bonaire (operated by Inderbitzen as PJ4/NQ1R), with both control operators in the same room. The roughly 35 visiting operators had a chance to use equipment from multiple manufacturers, notably Icom, Yaesu, Kenwood, and FlexRadio. Ryusuke Takata, JI1VHV, who had traveled from Japan to attend the workshop, made 46 contacts in 20 minutes. Each visitor left with a personalized certificate, and several considered it a once-in-a-lifetime experience.

ARRL extends its thanks to many partners that supported HamSCI 2026, including The University of Scranton, the New Jersey Institute of Technology, the National Science Foundation, NASA, Amateur Radio Digital Communications, and others.

2026 Dayton Hamvention® Award Winners Announced

Technical Achievement Award: Robert B. “Bob” Famiglio, K3RF

Robert B. “Bob” Famiglio, K3RF, has spent almost 60 years in amateur radio, blending technical expertise, legal knowledge, and leadership in emergency communications. Licensed at age 13, Famiglio later earned a BSE in electrical engineering and a doctorate in law. For more than 40 years, he has served as volunteer counsel, advising hams on PRB-1 matters, zoning and antenna ordinances, RFI enforcement, and club governance. His technical understanding of station engineering and interference resolution has informed effective legal strategies and regulatory comments.

Famiglio served in many ARRL leadership roles, including Eastern Pennsylvania Section Manager, Atlantic Division Vice Director, and Atlantic Division Director. He also served several terms as Vice President and General Counsel of the Radio Club of America and functioned as corporate counsel for the Board.

He served as Amateur Radio Emergency Service® District Emergency Coordinator for Greater Philadelphia, supporting regional response agencies by applying technical expertise, message handling skills, and interoperability between amateur and public safety systems. His formal training as a professional firefighter enhances his ability to align ham radio technology with the operational needs of served agencies.

A longtime mentor, Famiglio supports on-air training nets and club programs stressing technical competence, regulatory literacy, and readiness for public service. He believes that amateur radio’s core value lies in the skills, service, and technical capability of operators — not merely spectrum access — and he

has worked to translate complex technical issues like spectrum coexistence, interference mitigation, and regulatory compliance into clear actionable recommendations for policymakers. His blend of engineering, legal acumen, and emergency response experience has encouraged continuous training, lowered barriers to participation, and inspired new generations of ham radio operators.

Amateur of the Year Award: Dr. Jose “Otis” Vicens, NP4G

Dr. Jose “Otis” Vicens, NP4G, was born and raised in Humacao, Puerto Rico. He was first licensed at the age of 16 and is the only amateur radio operator in his family.

Vicens studied biology at Purdue University, where he became active with the Purdue University Amateur Radio Club, W9YB. He graduated from the University of Puerto Rico School of Dental Medicine and completed a specialty program in pediatric dentistry at Brookdale University Hospital and Medical Center in Brooklyn, New York. In 2008, Vicens returned to his hometown to begin practicing orthodontics.

One of his early memories of service through amateur radio was in 1998, when Vicens helped provide communications support in Puerto Rico following Hurricane Georges. During the 2017 Puerto Rico hurricane disasters, he helped coordinate amateur radio emergency communications across eastern Puerto Rico.

Vicens recalled attending the DX Forum at Dayton Hamvention, where presentations on major DXpeditions inspired him to someday be a part of future adventures. He has now participated in many DXpeditions from all over the world, including the 3Y0J DXpedition to Bouvet Island (3Y), and he was recently Team

Leader for the KP5/NP3VI DXpedition to Desecheo Island.

Vicens was also President of the Puerto Rico Amateur Radio League and the International DX Association.

**Special Achievement Award:
Martha Fell, N3QBE, and Joe Fell, W3GMS**

Martha and Joe Fell's journey began in 1966, when Joe earned his Novice-class license at the age of 14. Shortly thereafter, he met Harry I. Davis, W3FDY (SK), who mentored him for 4 years. Davis taught him to think critically, design circuits, and execute projects with precision. His guidance was life-changing, and Joe pledged to honor his request to give back to others just as Davis had done for him.

To fulfill this promise, Joe chose to retire at 56, following a 34-year corporate career and the launch of his own company. The success of this mission is thanks to his wife, Martha, whose dedication to overseeing administration and logistics has greatly benefited their students.

Their program's reach has grown significantly over the decades. In 1976, Joe designed and built a repeater for his mentor's radio site, which remains operational 50 years later and serves approximately 85 operators. Their weekly technical net has become a primary resource for both new and seasoned amateurs, including many professional electrical engineers.

Today, Martha and Joe mentor students of all ages and interests. Their first student is currently pursuing a PhD

in electrical engineering at the Massachusetts Institute of Technology, and their youngest student started at just 8 years old.

Club of the Year Award: Long Island CW Club

The Long Island CW Club (LICW) is an online Morse code training community built to help hams become confident and proficient CW operators. The club emphasizes high standards alongside a welcoming culture, focusing on teaching practical operational skills while fostering mutual respect and a spirit of learning for fun.

LICW offers structured classes from beginner through advanced levels, as well as a wide range of topical forums and practice resources that help students move from "copying characters" to true conversational flow.

Instructors are volunteers who remember what it felt like to be new and who coach students through plateaus with clear, effective teaching methods, encouragement, and accountability. LICW includes strong participation and leadership across generations. It's a diverse group; more than 400 women serve as instructors and club leaders, and LICW provides programs that support youth and hams with disabilities. It is a community where people show up for each other, celebrate progress, and share the joy of CW on the air.

Read the complete 2026 Hamvention Awards announcement at www.hamvention.org/event-details/awards.

Spring 2026 Section Manager Nomination Results

The nomination period for the spring 2026 Section Manager election cycle concluded on Friday, March 6. There will be no balloted elections because only one nominee per Section was received at ARRL Headquarters.

Wisconsin will have a new Section Manager starting on July 1, 2026. Myron Oestreich, KB9STB, was declared elected as the sole nominee. He is currently the Wisconsin Section Public Information Coordinator. Oestreich will take the reins from Jason Spetz, KC9FXE, of Menomonie, who has been Section Manager since 2022.

The following incumbent ARRL Section Managers did not face opposition and were declared elected for their

upcoming new terms beginning July 1, 2026: Thomas Beebe, W9RY, for Illinois; Bob Burns, AK9R, for Indiana; Scott Roberts, KK4ECR, for Northern Florida; Scott Rosenfeld, N7JI, for Oregon, and Paul Gayet, AA1SU, for Vermont.

Nominations will be re-solicited for Section Manager positions in Maine and Santa Clara Valley in the January 2027 issue of *QST* because no nominating petitions were received by the deadline on March 6.

Phil Duggan, N1EP, decided not to run for another term as Maine Section Manager — a position he has held since December 2021. In Santa Clara Valley, James Armstrong, NV6W, decided not to run for a new term after serving since August 2020.

Public Service

EmComm: Serving Country and Community

The Amateur's Code, a set of guidelines for amateur radio operators, was written in 1928 by then-ARRL General Counsel Paul Segal, W9EEA, who served ARRL as its general counsel from 1928 to 1961. In an editorial published in the May 1990 issue of *QST*, then-ARRL Executive Vice President David Sumner, K1ZZ, noted that Segal's Amateur's Code "compacted much wisdom in few words.... It was a guide to how one should behave while pursuing an avocation that was as wonderful then as it is today."

The code, as it is currently presented by ARRL (see www.arrl.org/amateur-code), asks that ham radio operators uphold the following standards:

- Considerate: The radio amateur never knowingly operates in such a way as to lessen the pleasure of others.
- Loyal: The radio amateur offers loyalty, encouragement, and support to other amateurs, local clubs, and the IARU Radio Society in their country, through which amateur radio in their country is represented nationally and internationally.
- Progressive: The radio amateur keeps their station up to date. It is well built and efficient. Their operating practice is above reproach.
- Friendly: The radio amateur operates slowly and patiently when requested; offers friendly advice and counsel to beginners; and extends kind assistance, cooperation, and consideration for the interests of others. These are the marks of the amateur spirit.
- Balanced: Radio is a hobby, never interfering with duties owed to family, job, school, or community.
- Patriotic: The radio amateur's station and skills are always ready for service to country and community.

Presenting an EmComm Practitioner's Code of Conduct

The key principles of the Amateur's Code can be easily adapted for use in the modern era of amateur EmComm service, particularly the last element of the code — keeping skills and equipment ready for service to country and community.

The following is my take on what an "EmComm Practitioner's Code of Conduct" might look like:

- Respectful: It is a privilege, not a right, to serve the emergency management agency (EMA) and emergency operations center (EOC) or other entities, such as the American Red Cross, Salvation Army, and other volunteer organizations active in disaster.
- Considerate: Never tell the Emergency Manager or any EOC staff what to do; instead, politely and respectfully answer their questions. You are there strictly to serve them; they are not there to serve you. Cheerfully, respectfully, and efficiently help them with any tasks assigned, even if it's to take water bottles and food supplies off a pallet on a loading dock.
- Professional: Be seen, not heard. Dress smartly and appropriately. Wear an ARES® polo shirt and khaki pants. Look professional in appearance.
- Helpful: Extend a hand to those fellow radio amateur responders who need help operating a piece of gear, filling out an ICS form, or putting up an antenna, and patiently answer questions from less experienced operators. Follow the directions of the ARES emergency coordinator in charge, and provide them with efficient reports of your activity — tasks completed, work to be done, etc.
- Effective: Regularly evaluate and upgrade your oper-



With a long history of supporting the Boston Marathon communications team, Eliot Mayer, W1MJ, epitomizes the tenets of the proposed EmComm Practitioner's Code of Conduct. [Rick Palm, K1CE, photo]

ating skills and technical acumen to maintain your ability, and upgrade and maintain your radio equipment. Attend and learn from every after-action discussion, and update your skills and equipment accordingly.

Hurricane Watch Net Seeks Net Control Operators

If you're looking for an opportunity to use your operating skills to serve country and community, the venerable Hurricane Watch Net is looking for net control stations and operators as we head into the 2026 tropical cyclone season. While bilingual ability is not required, operators fluent in English and Spanish or French/Creole are especially encouraged to apply.

Net control duty can involve long hours, with operators committing to days and nights of duty to receive real-time weather reports and forward them directly to the National Hurricane Center in Miami. Ground-truth reports are called into the net by radio amateurs in the storm-affected areas.

As discussed in the "Public Service" column in the May 2026 issue of *QST*, the Hurricane Watch Net generally activates whenever a tropical system reaches hurricane strength and is within approximately 300 miles of a populated landmass, or when requested by forecasters at the National Hurricane Center. The net operates on 14.325 MHz by day and 7.268 MHz by night, disseminating the latest advisories and receiving real-time weather observations and initial damage reports. The net then passes these reports to the National Hurricane Center's amateur station, WX4NHC, and, when indicated, the Canadian Hurricane Center.

The net also provides backup communications for the National Hurricane Center, National Weather Service Forecast Offices, EOCs, EMAs, involved non-governmental organizations, and other critical partners involved in protecting life and property. It provides situational awareness to agencies and assists the Salvation Army Team Emergency Radio Network (SATERN) with health and welfare traffic when requested. For more information about the SATERN program, visit <https://salvationarmyusa.org/satern-program>.

Bobby Graves, KB5HAV, is the Hurricane Watch Net manager. For more information on net control operator positions, visit <https://hwn.org>.

Working with County Emergency Management

I live in Columbia County, Florida, a rural, sparsely populated ranching and farming community in the northern part of the state. The county has a vibrant ARES organization boasting a membership of 25 dedicated hams, capably managed by Emergency Coordinator Brad Swartz, N5CBP.

Our ARES group has a solid working relationship with Columbia County's emergency manager and staff, as well as the county's Red Cross, which typically manages local storm shelters during the frequent hurricanes that impact the region. There is a fixed amateur station in the county EOC, maintained by our ARES group's technicians.

I serve as a net control station for the ARES net. We are fortunate to have a regular roster of net check-ins; many participants have technical expertise in various aspects of emergency communications and radio equipment. This expertise, coupled with other assets held by the group — including non-amateur networking, such as mesh systems — nurtures the positive relationship between the hams and the emergency management professionals they serve.

Relationships with county emergency staff and served agencies cannot begin and end at emergency activations. In between activations, our ARES group keeps up regular communications and meetings with Columbia County emergency management and Red Cross staff, maintains and upgrades the EOC station, and strives to reinforce these professional relationships to ensure optimal emergency communications when the need arises.

Remember — maintaining these partnerships is a constant work in progress. — *Rick Palm, K1CE*

Personal Experience with the Hurricane Watch Net

As my wife and I huddled with our two dogs in abject terror while Hurricane Idalia devastated our home in the Big Bend area of Florida one night in 2023, I called into the Hurricane Watch Net with my report of conditions on the ground. I found that it was comforting to give my report to the net control station — my wife and I were both grateful to have that human connection and to know we were not alone. — *Rick Palm, K1CE*

2025 ARRL November Sweepstakes — Phone

Last year’s ARRL November Sweepstakes phone weekend was held November 15 – 17, 2025.

For the past several years, the opening segment of this report has concentrated on the deteriorating level of participation in the ARRL November Sweepstakes, but this year’s log submission numbers (1,449) were virtually identical to last year’s (1,457) — that’s better than another big drop. There actually does seem to be, anecdotally, some new energy circulating in the contesting community. The popularity of Parks on the Air® continues to expose a new audience to radiosport-like activity. There are also quite a few new online publications, blogs, videos, etc. dedicated to various aspects of contesting. The Youth category, now available in most major contests, and the general emphasis on attracting young operators have been noticeable as well.

Most of the 338,757 contacts made in the contest were on the 20-meter band (31%), but 40 and 15 meters also had a fair amount of the share of contacts, at 26% and 23%, respectively.

The most popular category in the contest was Single Operator, Low Power, which had 578 entries (40%). In its third year, the Limited Antennas Overlay had 448 participants, a drop from the 483 entries in 2024.

The Youth Overlay also saw a slight drop from the previous year, going from 19 participants in 2024 to 15 in 2025. Levi Jefferies, K6JO (operating as KM7W), earned the top spot in not only the Youth Overlay, but the Single Operator, High Power category as well.

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.



As a new ham, Joseph Raviele's, W1TKT, first contest was the 2025 ARRL November Sweepstakes phone weekend, where he operated out of his backyard. [Joseph Raviele, W1TKT, photo]

Contacts by Band		
Band	Contacts	% of Total
160 meters	9	<1%
80 meters	24,913	7%
40 meters	89,902	27%
20 meters	104,982	31%
15 meters	79,103	23%
10 meters	39,848	12%
Total	338,757	

Logs Received by Category		
Category	Logs	% of Total
Single Operator, High Power	199	14%
Single Operator, Low Power	578	40%
Single Operator, QRP	51	4%
Single Operator Unlimited, High Power	308	21%
Single Operator Unlimited, Low Power	211	15%
Single Operator Unlimited, QRP	11	1%
Multioperator, High Power	43	3%
Multioperator, Low Power	42	3%
School Club Station	6	<1%
Total	1,449	

Top Ten

Single Operator, High Power		Single Operator Unlimited, Low Power	
KM7W (K6JO, op)	298,690	W4LT	154,190
K5TR	287,130	K5TD	123,984
VY2TT (K6LA, op)	269,640	AB5SE	122,230
KP4AA	258,720	N8CWU	117,640
WH7Z (W0CN, op @KH6YY)	255,474	N4ZZ	114,070
WC6H	249,312	K9PW	113,710
WJ0W	245,140	NQ9N	111,552
W0SD (KT0W, op)	242,930	K15MM	104,550
K4ZW	240,072	VA6RCN	102,920
W2RQ	238,340	N0HJZ	102,816
Single Operator, Low Power		Single Operator Unlimited, QRP	
W7CXX (WA7LNU, op)	186,830	K6XX	68,226
AC0W	167,328	N0YY	65,280
N8II	154,870	WE9R	42,164
VE4VT	154,360	K6JS	37,050
N4OO	151,704	N0SV	19,176
NF6P	129,724	KJ4M	12,480
KY4KP	124,100	W3EK	9,222
WQ5L	108,730	K6YLH	5,850
K0CN	103,418	VE3GMZ	3,248
WN0G	100,968	VE3BFU	1,944
Single Operator, QRP		Multioperator, Single Transmitter, High Power	
K1EP	48,900	N6WM	234,600
K2PI	42,930	N0MA	224,910
KA8SMA	41,984	NU5A	213,180
K6GHA	38,064	KR0P	203,490
WD0T	32,620	N7DX	203,320
VA2IW	26,650	ND8DX	171,700
WN1C	25,160	K9RS	160,650
N4CW	23,364	K1KP	160,310
K7FR	23,048	N1RM	155,040
K9ARF	21,700	K2KR	147,560
Single Operator Unlimited, High Power		Multioperator, Single Transmitter, Low Power	
K0EU	284,580	NX6T	152,150
K9CT	255,850	K9KE	121,632
NR4L	222,190	K9DA	120,120
W1SJ	219,980	KT4XA	98,280
K3DNE	216,750	W4TG	94,454
KD4D	208,760	K2APD	90,138
K1KD	208,420	W3ZGD	86,352
WB0TEV	206,720	N8YXR	78,370
KH7X	200,928	W1FM	74,534
K3MM	199,410	N0EO	72,420
		School Club	
		K0HC	259,080
		W9YB	115,920
		W0EEE	104,210
		W1YK	55,062
		W4AQL	41,870
		W8EDU	24,888

Division Winners

Single Operator, High Power			Single Operator Unlimited, Low Power		
Atlantic	N2ZN	100,098	Atlantic	N3AAA	101,830
Central	K9BGL	114,696	Central	K9PW	113,710
Dakota	WJ0W	245,140	Dakota	N0HJZ	102,816
Delta	K15GTR	157,920	Delta	K5TD	123,984
Great Lakes	KM4RO	86,520	Great Lakes	N8CWU	117,640
Hudson	W2RQ	238,340	Hudson	K12D	85,212
Midwest	NJ8M	183,060	Midwest	AF0F	59,976
New England	K6RO (N4ML, op)	178,248	New England	KC1OT	59,368
Northwestern	KM7W (K6JO, op)	298,690	Northwestern	KC7H	18,592
Pacific	WH7Z (W0CN, op @KH6YY)	255,474	Pacific	K6OK	45,296
Roanoke	K4ZW	240,072	Roanoke	K4MI	51,840
Rocky Mountain	K5TA	155,890	Rocky Mountain	AB6GS	78,556
Southeastern	KP4AA	258,720	Southeastern	W4LT	154,190
Southwestern	N6AA	117,936	Southwestern	W7JET	720
West Gulf	K5TR	287,130	West Gulf	K15MM	104,550
Canada	VY2TT	269,640	Canada	VA6RCN	102,920
Single Operator, Low Power			Single Operator Unlimited, QRP		
Atlantic	KD9QS	71,148	Atlantic	W3EK	9,222
Central	N9MSG	61,304	Central	WE9R	42,164
Dakota	AC0W	167,328	New England	N1SOH	240
Delta	WQ5L	108,730	Pacific	K6XX	68,226
Great Lakes	N4ROA (W6LX, op)	87,550	Roanoke	N0YY	65,280
Hudson	KD2TT	81,810	Southeastern	KJ4M	12,480
Midwest	WN0G	100,968	West Gulf	N0SV	19,176
New England	KK1L	60,882	Canada	VE3GMZ	3,248
Northwestern	AE7AP	78,352	Multioperator, Single Transmitter, High Power		
Pacific	N6YEU	75,152	Atlantic	K9RS	160,650
Roanoke	N8II	154,870	Central	W9YK	98,438
Rocky Mountain	W7CXX (WA7LNU, op)	186,830	Dakota	NR0T	105,570
Southeastern	N4OO	151,704	Delta	W5NX	138,936
Southwestern	N6OKU	46,230	Great Lakes	ND8DX	171,700
West Gulf	NY5B	59,096	Midwest	N0MA	224,910
Canada	VE4VT	154,360	New England	K1KP	160,310
Single Operator, QRP			Northwestern	N7DX	203,320
Atlantic	W7LG	16,758	Pacific	N6WM	234,600
Central	WN1C	25,160	Roanoke	N1RM	155,040
Dakota	WD0T	32,620	Rocky Mountain	K2KR	147,560
Delta	N3AWS	3,700	Southeastern	W4MLB	116,790
Great Lakes	KA8SMA	41,984	Southwestern	K17PPV	54,362
Hudson	K2YG	12,948	West Gulf	NU5A	213,180
Midwest	K0ESE	7,520	Canada	VE3UZ	85,680
New England	K1EP	48,900	Multioperator, Single Transmitter, Low Power		
Northwestern	K7FR	23,048	Atlantic	K2APD	90,138
Pacific	K6GHA	38,064	Central	K9KE	121,632
Roanoke	K2PI	42,930	Dakota	N0EO	72,420
Rocky Mountain	K7DLX	3,604	Delta	N5OGW	242
Southeastern	AC2N	7,200	Great Lakes	N8YXR	78,370
Southwestern	W6R (WQ6X, op)	6,708	Hudson	W2GSB	24,072
West Gulf	K5AYO	9,996	Midwest	N0RC	24,992
Canada	VA2IW	26,650	New England	W1FM	74,534
Single Operator Unlimited, High Power			Northwestern	N7JI	68,320
Atlantic	KD4D	208,760	Pacific	N6ACL	62,328
Central	K9CT	255,850	Roanoke	W4TG	94,454
Dakota	K1KD	208,420	Rocky Mountain	KD9ERP	46,816
Delta	NR4L	222,190	Southeastern	KT4XA	98,280
Great Lakes	KW8N	184,968	Southwestern	NX6T	152,150
Hudson	W2A (KD2RD, op)	138,720	West Gulf	N5VBP	31,688
Midwest	NS0R	187,850	School Club		
New England	W1SJ	219,980	Central	W9YB	115,920
Northwestern	KB7HDX	103,656	Great Lakes	W8EDU	24,888
Pacific	W1SRD	172,890	Midwest	K0HC	259,080
Roanoke	K3DNE	216,750	New England	W1YK	55,062
Rocky Mountain	K0EU	284,580	Southeastern	W4AQL	41,870
Southeastern	N6AR	171,020			
Southwestern	KH7X	200,928			
West Gulf	WB0TEV	206,720			
Canada	VE5MX	178,500			

Plaque Sponsors

ARRL is pleased to award a Sweepstakes Plaque to the Overall and Division Leaders in each category, thanks to Icom America, clubs, and individuals who sponsor these awards. For more information on plaque sponsorship or to order a duplicate plaque, contact the ARRL Contest Program at 860-594-0232 or contests@arrl.org. Plaques cost \$95, which includes all shipping charges.



**PRINCIPAL
AWARDS
SPONSOR**

Winner	Division	Category	Sponsor	Winner	Division	Category	Sponsor
KM7W (K6JO, op)	Overall	Single Operator, High Power — Youth Overlay	ARRL Education and Learning Department	N0MA	Midwest	Multioperator, Single Transmitter, High Power	Icom America
KE0WPA	Overall	Single Operator, Low Power — Youth Overlay	ARRL Education and Learning Department	N0RC	Midwest	Multioperator, Single Transmitter, Low Power	Icom America
KM7W (K6JO, op)	Overall	Single Operator, High Power	Icom America	K6RO	New England	Single Operator, High Power	Icom America
W7CXX (WA7LNU, op)	Overall	Single Operator, Low Power	Icom America	KK1L	New England	Single Operator, Low Power	Icom America
K1EP (@N2DE)	Overall	Single Operator, QRP	Icom America	K1EP	New England	Single Operator, QRP	Icom America
K0EU	Overall	Single Operator Unlimited, High Power	Icom America	W1SJ	New England	Single Operator Unlimited, High Power	Icom America
W4LT	Overall	Single Operator Unlimited, Low Power	Icom America	KC1OT	New England	Single Operator Unlimited, Low Power	Icom America
K6XX	Overall	Single Operator Unlimited, QRP	Icom America	N1SOH	New England	Single Operator Unlimited, QRP	Icom America
N6WM (@N6RO)	Overall	Multioperator, Single Transmitter, High Power	Icom America	K1KP	New England	Multioperator, Single Transmitter, High Power	Icom America
NX6T (@WA6TQT)	Overall	Multioperator, Single Transmitter, Low Power	Icom America	W1FM	New England	Multioperator, Single Transmitter, Low Power	Icom America
N2ZN	Atlantic	Single Operator, High Power	Icom America	KM7W (K6JO, op)	Northwestern	Single Operator, High Power	Icom America
KD9QS	Atlantic	Single Operator, Low Power	Potomac Valley Radio Club	AE7AP	Northwestern	Single Operator, Low Power	Icom America
W7LG	Atlantic	Single Operator, QRP	Icom America	K7FR	Northwestern	Single Operator, QRP	Icom America
KD4D (@W3LPL)	Atlantic	Single Operator Unlimited, High Power	Icom America	KB7HDX	Northwestern	Single Operator Unlimited, High Power	Icom America
N3AAA	Atlantic	Single Operator Unlimited, Low Power	Icom America	KC7H	Northwestern	Single Operator Unlimited, Low Power	Icom America
W3EK	Atlantic	Single Operator Unlimited, QRP	Icom America	N7DX	Northwestern	Multioperator, Single Transmitter, High Power	Icom America
K9RS	Atlantic	Multioperator, Single Transmitter, High Power	Icom America	N7JI	Northwestern	Multioperator, Single Transmitter, Low Power	Icom America
K2APD	Atlantic	Multioperator, Single Transmitter, Low Power	Icom America	WH7Z (W0CN, op @KH6YY)	Pacific	Single Operator, High Power	Icom America
K9BGL	Central	Single Operator, High Power	Society of Midwest Contesters	N6YEU	Pacific	Single Operator, Low Power	Icom America
N9MSG	Central	Single Operator, Low Power	Society of Midwest Contesters	K6GHA	Pacific	Single Operator, QRP	Icom America
WN1C	Central	Single Operator, QRP	Icom America	W1SRD	Pacific	Single Operator Unlimited, High Power	Icom America
K9CT	Central	Single Operator Unlimited, High Power	Society of Midwest Contesters	K6OK	Pacific	Single Operator Unlimited, Low Power	Icom America
K9PW	Central	Single Operator Unlimited, Low Power	Society of Midwest Contesters	K6XX	Pacific	Single Operator Unlimited, QRP	Icom America
WE9R	Central	Single Operator Unlimited, QRP	Icom America	N6WM (@N6RO)	Pacific	Multioperator, Single Transmitter, High Power	Icom America
W9YK	Central	Multioperator, Single Transmitter, High Power	Icom America	N6ACL	Pacific	Multioperator, Single Transmitter, Low Power	Icom America
K9KE	Central	Multioperator, Single Transmitter, Low Power	Icom America	K4ZW	Roanoke	Single Operator, High Power	Icom America
WJ0W	Dakota	Single Operator, High Power	Minnesota Wireless Assn. — In memory of Tod Olson, K0TO	N8II	Roanoke	Single Operator, Low Power	Icom America
AC0W	Dakota	Single Operator, Low Power	Minnesota Wireless Assn.	K2PI	Roanoke	Single Operator, QRP	Icom America
WD0T	Dakota	Single Operator, QRP	Icom America	K3DNE	Roanoke	Single Operator Unlimited, High Power	Icom America
K1KD	Dakota	Single Operator Unlimited, High Power	Minnesota Wireless Assn. — In memory of Jim Dokmo, K0FVF	K4MI	Roanoke	Single Operator Unlimited, Low Power	Icom America
N0HJZ	Dakota	Single Operator Unlimited, Low Power	Minnesota Wireless Assn.	N0YY	Roanoke	Single Operator Unlimited, QRP	Icom America
NR0T	Dakota	Multioperator, Single Transmitter, High Power	Icom America	N1RM	Roanoke	Multioperator, Single Transmitter, High Power	Icom America
N0EO	Dakota	Multioperator, Single Transmitter, Low Power	Icom America	W4TG	Roanoke	Multioperator, Single Transmitter, Low Power	Icom America
K15GTR	Delta	Single Operator, High Power	Icom America	K5TA	Rocky Mountain	Single Operator, High Power	Icom America
WQ5L	Delta	Single Operator, Low Power	Icom America	W7CXX (WA7LNU, op)	Rocky Mountain	Single Operator, Low Power	Icom America
N3AWS	Delta	Single Operator, QRP	Icom America	K7DLX	Rocky Mountain	Single Operator, QRP	Icom America
NR4L	Delta	Single Operator Unlimited, High Power	Icom America	K0EU	Rocky Mountain	Single Operator Unlimited, High Power	Icom America
K5TD	Delta	Single Operator Unlimited, Low Power	Icom America	AB6GS	Rocky Mountain	Single Operator Unlimited, Low Power	Icom America
W5NX	Delta	Multioperator, Single Transmitter, High Power	Icom America	K2KR	Rocky Mountain	Multioperator, Single Transmitter, High Power	Icom America
N5OGW	Delta	Multioperator, Single Transmitter, Low Power	Icom America	KD9ERP	Rocky Mountain	Multioperator, Single Transmitter, Low Power	Icom America
KM4RO	Great Lakes	Single Operator, High Power	Icom America	KP4AA	Southeastern	Single Operator, High Power	Icom America
N4ROA (W6LX, op)	Great Lakes	Single Operator, Low Power	Icom America	N4OO	Southeastern	Single Operator, Low Power	Icom America
KA8SMA	Great Lakes	Single Operator, QRP	Icom America	AC2N	Southeastern	Single Operator, QRP	Icom America
KW8N	Great Lakes	Single Operator Unlimited, High Power	Icom America	N6AR	Southeastern	Single Operator Unlimited, High Power	Icom America
N8CWU	Great Lakes	Single Operator Unlimited, Low Power	Icom America	W4LT	Southeastern	Single Operator Unlimited, Low Power	Icom America
ND8DX	Great Lakes	Multioperator, Single Transmitter, High Power	Icom America	KJ4M	Southeastern	Single Operator Unlimited, QRP	Icom America
N8YXR	Great Lakes	Multioperator, Single Transmitter, Low Power	Icom America	W4MLB	Southeastern	Multioperator, Single Transmitter, High Power	Icom America
W2RQ	Hudson	Single Operator, High Power	Icom America	KT4XA	Southeastern	Multioperator, Single Transmitter, Low Power	Icom America
KD2TT	Hudson	Single Operator, Low Power	Icom America	N6AA	Southwestern	Single Operator, High Power	Icom America
K2YG	Hudson	Single Operator, QRP	Icom America	N6OKU	Southwestern	Single Operator, Low Power	Icom America
W2A (KD2RD, op)	Hudson	Single Operator Unlimited, High Power	Icom America	W6R (WQ6X, op)	Southwestern	Single Operator, QRP	Icom America
K12D	Hudson	Single Operator Unlimited, Low Power	Icom America	KH7X	Southwestern	Single Operator Unlimited, High Power	Icom America
W2GSB	Hudson	Multioperator, Single Transmitter, Low Power	Icom America	W7JET	Southwestern	Single Operator Unlimited, Low Power	Icom America
NJ8M	Midwest	Single Operator, High Power	Icom America	KI7PPV	Southwestern	Multioperator, Single Transmitter, High Power	Icom America
WN0G	Midwest	Single Operator, Low Power	Icom America	NX6T	Southwestern	Multioperator, Single Transmitter, Low Power	Icom America
K0ESE	Midwest	Single Operator, QRP	Icom America	K5TR	West Gulf	Single Operator, High Power	Icom America
NS0R	Midwest	Single Operator Unlimited, High Power	Icom America	NY5B	West Gulf	Single Operator, Low Power	Icom America
AF0F	Midwest	Single Operator Unlimited, Low Power	Icom America	K5AYO	West Gulf	Single Operator, QRP	Icom America
				WB0TEV	West Gulf	Single Operator Unlimited, High Power	Icom America
				K15MM	West Gulf	Single Operator Unlimited, Low Power	Icom America
				N05V	West Gulf	Single Operator Unlimited, QRP	Icom America
				NU5A	West Gulf	Multioperator, Single Transmitter, High Power	Icom America
				N5VBP	West Gulf	Multioperator, Single Transmitter, Low Power	Icom America
				VY2TT	Canada	Single Operator, High Power	Icom America
				VE4VT	Canada	Single Operator, Low Power	Icom America
				VA2IW	Canada	Single Operator, QRP	Icom America
				VE5MX	Canada	Single Operator Unlimited, High Power	Icom America
				VA6RCN	Canada	Single Operator Unlimited, Low Power	Icom America
				VE3GMZ	Canada	Single Operator Unlimited, QRP	Icom America
				VE3UZ	Canada	Multioperator, Single Transmitter, High Power	Icom America

Top Ten Limited Antenna Overlay

Call	Section	Score	Contacts	Multipliers	Call	Section	Score	Contacts	Multipliers	Call	Section	Score	Contacts	Multipliers
Single Operator, High Power					Single Operator, QRP					Single Operator Unlimited, Low Power				
K5TA	NM	155,890	917		85	VA2IW	QC	26,650	205	65	K9PW	IL	113,710	685
K5NZ	STX	101,752	644		79	WN1C	WI	25,160	185	68	WR3R	MDC	100,632	599
N5TJ	STX	94,692	607		78	N4CW	NC	23,364	177	66	K8BL	OH	91,040	569
KC3C	EPA	89,836	607		74	K7FR	WWA	23,048	172	67	W9QL	IL	89,972	542
K4BAI	GA	80,960	506		80	N8OCJ	OH	19,154	157	61	N8FYL	MI	87,360	546
VE3GJP	GH	64,740	390		83	W7LG	WPA	16,758	133	63	VE3RGO	GH	62,250	375
W9YZR	WI	64,160	401		80	N9NE	WI	14,994	119	63	AF0F	KS	59,976	357
W4SDX	TN	62,880	393		80	N3WS	WPA	12,272	118	52	KC1OT	CT	59,368	362
VE3BR	GH	54,984	348		79	N3RF	WPA	11,088	99	56	W4TM	GA	56,780	334
K8AO	MI	44,104	298		74	K5AYO	STX	9,996	102	49	VE3MGY	ONS	53,200	350
Single Operator, Low Power					Single Operator Unlimited, High Power									
N4OO	GA	151,704	903		84	AG3I	WPA	107,420	655	82				
NF6P	WCF	129,724	791		82	W0UC	MN	99,792	594	84				
N4ROA	KY	87,550	515		85	WB0SND	MO	86,240	539	80				
(W6LX, op)						N9EP	IL	82,492	503	82				
KD9QS	MDC	71,148	462		77	W8TB	OH	79,128	471	84				
K5QQ	MO	63,200	400		79	W1CTN	NC	78,684	474	83				
K8BB	MI	62,580	447		70	N1PB	NH	77,408	472	82				
N9MSG	IL	61,304	388		79	N5UM	OK	63,910	385	83				
AG9A	IL	54,756	338		81	K1ZZI	SC	55,112	332	83				
K8MR	WCF	51,060	345		74	VA1MM	NS	53,818	379	71				
K5HIP	WMA	47,586	309		77									

Top Ten Youth Overlay

Call	Section	Score	Contacts	Multipliers
Single Operator, High Power				
KM7W (K6JO, op)	MT	298,690	1,757	85
K6RO (N4ML, op)	ME	178,248	1,061	84
KF0UXP	CO	264	12	11
KF0RHQ	CO	112	7	8
KM6FEP	ID	32	2	8
Single Operator, Low Power				
KE0WPA	MN	40,040	286	70
KO6JGB	SDG	19,584	192	51
VA3MYZ	ONE	10,672	116	46
W3BRL	WPA	4,810	65	37
KC1WZQ	EMA	1,640	41	20
Single Operator, QRP				
K0CMR	MN	2	1	1
Single Operator Unlimited, Low Power				
WV4AM	TN	65,790	387	85
NU1D	ME	38,690	265	73
KE2EGF	WNY	21,360	178	60
Multioperator, Single Transmitter, Low Power				
W0YC	MN	22,578	159	71

Affiliated Club Competition

Club	Score	Entries	Club	Score	Entries
Unlimited			Maritime Contest Club	384,878	10
Potomac Valley Radio Club	12,039,880	212	North Texas Contest Club	274,564	3
Society of Midwest Contesters	7,410,088	132	Eastern Iowa DX Assn.	247,132	3
Yankee Clipper Contest Club	5,520,212	86	Rochester (NY) DX Assn.	245,986	8
Minnesota Wireless Assn.	5,366,072	108	Northeast Maryland Amateur Radio Contest Soc.	212,956	10
Frankford Radio Club	5,291,098	96	Carolina DX Assn.	187,200	10
Florida Contest Group	2,914,882	64	South Jersey Radio Assn.	160,944	7
Contest Club Ontario	2,603,862	54	Delara Contest Team	141,754	3
Medium			Lake Area Radio Klub (SD)	124,778	7
Mother Lode DX/Contest Club	3,528,838	49	Motor City Radio Club	99,468	6
Arizona Outlaws Contest Club	2,759,042	33	Arkansas DX Assn.	89,548	3
Southern California Contest Club	2,650,882	38	Allegheny Valley Radio Assn.	86,442	3
South East Contest Club	2,035,362	32	Granite State ARA	75,066	7
Kansas City Contest Club	1,952,062	24	Orange County ARC	62,932	3
Grand Mesa Contesters of Colorado	1,800,242	25	Western Kansas ARC	60,748	3
Tennessee Contest Group	1,608,432	34	Idaho Mountain ARS	58,452	3
Mad River Radio Club	1,594,056	25	Heartland DX Assn.	57,920	3
DFW Contest Group	1,552,798	25	New Providence ARC	51,254	4
Central Texas DX and Contest Club	1,331,432	18	Portage County Amateur Radio Service	48,526	5
Big Sky Contesters	1,189,972	14	L'Anse Creuse ARC	44,742	3
Northern California Contest Club	1,134,986	41	Candlewood ARA	11,172	5
Willamette Valley DX Club	1,080,648	20	Anoka County Radio Club	268	3
North Coast Contesters	1,031,020	16	Local		
Western Washington DX Club	1,016,522	15	Pizza Lovers 259	1,027,606	8
Deep Dixie Contest Club	987,382	10	Radio Amateurs of Northern Vermont	618,332	5
Swamp Fox Contest Group	964,576	23	CTRI Contest Group	229,090	9
Niagara Frontier Radiosport	923,442	27	OH-KY-IN ARS	182,768	4
Alabama Contest Group	792,246	12	Central Oregon DX Club	173,210	4
Orca DX and Contest Club	787,622	11	Jefferson ARC	162,518	3
Great Places Contest Club	739,748	8	Providence Radio Assn.	159,816	4
Hudson Valley Contesters and DXers	680,554	20	The Villages ARC	110,630	3
Kentucky Contest Group	657,756	16	Seneca Radio Club	75,616	4
Order of Boiled Owls of New York	645,950	10	Not Quite Workable Contest Club	70,134	3
Radiosport Manitoba	518,982	7	Central Virginia Contest Club	53,128	4
Bay Area DXers	443,728	7	Meriden ARC	49,812	4
Texas DX Society	412,738	4	Vienna Wireless Society	35,330	5
Saskatchewan Contest Club	398,986	7	Stoned Monkey VHF ARC	34,798	3
			Silver Springs Radio Club	17,754	3

The 2026 ARRL November Sweepstakes phone weekend will be held November 21 – 23, 2026.

2025 ARRL 160-Meter Contest Results

Last year's contest was held December 5 – 7, 2025.



Sakaaki Ashikawa, JE1SPY, competed in the 2025 ARRL 160-Meter Contest from Japan using a micro-vertical antenna and Elecraft K2 transceiver and was surprised to contact many US stations. [Sakaaki Ashikawa, JE1SPY, photo]

Division Winners

Single Operator, High Power

Atlantic	AA1K	220,608
Central	K9AY	120,933
Dakota	W0SD	195,923
Delta	K5KU	134,652
Great Lakes	K1LT	212,553
Hudson	W2XL	75,660
Midwest	N0TT	174,522
New England	W1XX	62,992
Northwestern	N7AGP	17,556
Pacific	N6XI	40,920
Roanoke	W4CB	126,844
Rocky Mountain	N2IC	82,404
Southeastern	KP4AA	188,895
Southwestern	W8KA	143,176
West Gulf	K5RX	141,462
Canada	VY2WW	142,755

Single Operator, Low Power

Atlantic	N2EM	55,205
Central	KG9X	128,142
Dakota	WD0T	45,968
Delta	N5EE	44,608
Great Lakes	K8DX	97,455
Hudson	N2RI	32,544
Midwest	NZ0T	41,477
New England	K1EP	87,850
Northwestern	KS7T	13,984
Pacific	N9BD	10,215
Roanoke	N8II	66,795
Rocky Mountain	W0BZ	10,416
Southeastern	NS4T	97,230
Southwestern	WA7NB	64,980
West Gulf	W0UO	115,200
Canada	VA3FF	29,664

Single Operator, QRP

Atlantic	W3TS	52,360
Central	AF9J	64
Dakota	ND0C	1,140
Great Lakes	K4TO	46,177
Hudson	KR2AA	1,122
Midwest	K0KT	20,160
New England	K1ZM	71,148
Northwestern	N7JI	980
Roanoke	N4XD	60,207
Rocky Mountain	NO2D	1,330
Southeastern	K4PQC	9,990
Southwestern	W6GL	4,032
West Gulf	KD5ZCQ	570
Canada	VA2IW	5,974

Single Operator Unlimited, High Power

Atlantic	K3CT	211,470
Central	W0AIH	179,520
Dakota	K0IR	180,405
Delta	AD4EB	106,436
Great Lakes	W8MJ	174,666
Hudson	W2NTN	89,907
Midwest	N0AV	127,893
New England	K1KI	238,356
Northwestern	N7XU	30,429
Pacific	K6EI	55,500
Roanoke	K2KW	213,939
Rocky Mountain	K7NJ	174,420
Southeastern	NO9E	142,205
Southwestern	W4EF	22,692
West Gulf	N5RZ	127,270
Canada	VE3EJ	244,504

Single Operator Unlimited, Low Power

Atlantic	NJ3K	89,460
Central	WE9R	72,534
Dakota	N0HJZ	109,593
Delta	N9TF	44,072
Great Lakes	WB8JUI	64,576
Hudson	W2VQ	37,098
Midwest	KK0U	58,499
New England	N9NC	52,953
Northwestern	KN7K	3,792
Pacific	WE6Z	4,092
Roanoke	W4IX	164,120
Rocky Mountain	AF0E	16,432
Southeastern	WA1S	43,230
West Gulf	W0VX	24,534
Canada	VE3MGY	144,402

Single Operator Unlimited, QRP

Great Lakes	K2YAZ	15,576
Midwest	W0GJ	25,080
Pacific	K6GHA	1,280
Southwestern	WQ6X	1,300
Canada	VA3IK	2

Multioperator, Single Transmitter, High Power

Atlantic	W2GD	279,776
Central	WS9V	64,232
Great Lakes	N4QS	180,720
Hudson	W2CG	88,760
Midwest	K0LIR	88,340
New England	K1LZ	308,880
Northwestern	N7IP	46,230
Pacific	N6RO	97,110
Roanoke	W4NF	193,705
Southeastern	WJ9B	256,695
Southwestern	NA7TB	192,090
West Gulf	K5TR	179,025

Multioperator, Single Transmitter, Low Power

Midwest	N0NI	152,650
New England	NJ1Q	44,118
Northwestern	K7RAT	21,006
Roanoke	KA4RRU	141,804
Southeastern	KT4XA	125,892
Southwestern	NX6T	46,505
Canada	VE9ML	23,276

Full Results Online

You can read the full results of the contest online at <https://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.

Top Ten — US and Canada

Single Operator, High Power		Single Operator Unlimited, Low Power	
AA1K	220,608	W4IX	164,120
K1LT	212,553	VE3MGY	144,402
N2MF	196,930	N3HEE	127,428
W0SD	195,923	N0HJZ	109,593
KP4AA	188,895	NJ3K	89,460
N0TT	174,522	N3AC	84,825
NA8V	152,546	K0RC	73,200
K0TT	152,100	WE9R	72,534
W8KA	143,176	K2QO	67,136
VY2WW	142,755	WB8JUI	64,576
Single Operator, Low Power		Single Operator Unlimited, QRP	
KG9X	128,142	W0GJ	25,080
W0UO	115,200	K2YAZ	15,576
WD8DSB	100,959	WQ6X	1,300
K8DX	97,455	K6GHA	1,280
NS4T	97,230	K6MI	84
ND8D	88,506	K6ICS	40
K1EP	87,850	VA3IK	2
N8LJ	81,807	Multioperator, Single Transmitter, High Power	
AA4LR	70,283	K1LZ	308,880
N8II	66,795	W2GD	279,776
Single Operator, QRP		WJ9B	256,695
K1ZM	71,148	W4NF	193,705
N4XD	60,207	NA7TB	192,090
W3TS	52,360	N4QS	180,720
K4TO	46,177	K5TR	179,025
N3CZ	30,030	K3AJ	158,613
N3ZV	26,400	K9RS	156,420
N2AWE	24,205	NN4N	135,020
WB8DC	20,160	Multioperator, Single Transmitter, Low Power	
K0KT	20,160	N0NI	152,650
K2PI	20,025	KA4RRU	141,804
Single Operator Unlimited, High Power		KT4XA	125,892
VE3EJ	244,504	W4TG	66,734
K1KI	238,356	NX6T	46,505
VA2WA	218,872	NJ1Q	44,118
K2KW	213,939	VE9ML	23,276
K3CT	211,470	K7RAT	21,006
N1LN	204,725	W4FOC	15,275
AB3CX	189,981	N1SOH	14,028
KB1EFS	189,316		
K0IR	180,405		
W0AIH	179,520		

Continental Winners

Africa			
Single Operator Unlimited, High Power	ZS1C	84	
Asia			
Single Operator, High Power	JE1BMJ	1,188	
Single Operator, Low Power	JE1SPY	650	
Single Operator Unlimited, High Power	JF1AMX	3,276	
Single Operator Unlimited, Low Power	JH1BBT	140	
Multioperator, Single Transmitter, High Power	JA3YBK	2,756	
Europe			
Single Operator, High Power	G6XX	2,200	
Single Operator, Low Power	OP3T	352	
Single Operator Unlimited, High Power	LY4A	3,192	
Single Operator Unlimited, Low Power	OK6Y	216	
Multioperator, Single Transmitter, Low Power	HG0R	1,050	
North America			
Single Operator, High Power	TO9W	19,968	
Single Operator, Low Power	HI3R	10,890	
Single Operator Unlimited, High Power	TI7W	11,210	
Single Operator Unlimited, Low Power	XE2X	80,256	
Oceania			
Single Operator, High Power	9M6NA	70	
South America			
Single Operator, High Power	PY9MP	60	
Single Operator, Low Power	9Z4BM	1,008	
Single Operator Unlimited, High Power	PJ2T	97,736	
Single Operator Unlimited, Low Power	XQ2OP	8	



The 2025 ARRL 160-Meter Contest was the first time Ken Countess, KN2D, operated on 160 meters. [Ken Countess, KN2D, photo]

Top Ten — DX

Single Operator, High Power		Single Operator Unlimited, High Power	
TO9W	19,968	PJ2T	97,736
ZF9CW	14,664	TI7W	11,210
FM5BH	5,740	V26OC	9,744
G6XX	2,200	JF1AMX	3,276
JE1BMJ	1,188	LY4A	3,192
JA8NFV	300	S59A	2,850
DM3XRF	96	9A3JH	2,352
JH7XMO	90	OK1CF	2,340
9M6NA	70	DR5X	2,288
PY9MP	60	DQ2A	1,872
Single Operator, Low Power		Single Operator Unlimited, Low Power	
HI3R	10,890	XE2X	80,256
HI3A	8,000	OK6Y	216
XE2S	7,760	XE2T	216
4U1UN	3,132	JH1BBT	140
9Z4BM	1,008	LZ2ZG	126
JE1SPY	650	OL5Y	126
OP3T	352	OL1A	84
JA7KPI	168	JK0ABQ	56
JK1TCV	48	JG1LFR	56
JH0MUC	30	JR0ELG	48
Multioperator, Single Transmitter, High Power		JA3YBK	2,756
Multioperator, Single Transmitter, Low Power		HG0R	1,050

Affiliated Club Competition

Club	Score	Entries
Unlimited		
Potomac Valley Radio Club	4,206,936	86
Society of Midwest Contesters	2,922,287	57
Frankford Radio Club	2,693,667	51
Medium		
Yankee Clipper Contest Club	1,612,015	49
Minnesota Wireless Assn.	1,527,542	48
Contest Club Ontario	1,293,735	18
Florida Contest Group	1,006,314	21
Mad River Radio Club	953,064	14
South East Contest Club	763,047	13
Kansas City Contest Club	753,288	10
Arizona Outlaws Contest Club	684,380	10
Central Texas DX and Contest Club	576,750	8
Tennessee Contest Group	571,514	16
Niagara Frontier Radiosport	525,789	10
Hudson Valley Contesters and DXers	429,270	16
Swamp Fox Contest Group	408,077	13
Northern California Contest Club	338,827	21
Kentucky Contest Group	299,740	7
DFW Contest Group	261,395	9
North Coast Contesters	224,077	6
Grand Mesa Contesters of Colorado	222,779	5
Heartland DX Association	195,809	4
Southern California Contest Club	100,969	8
Local		
Alabama Contest Group	227,610	4
Rochester (NY) DX Assn.	199,811	8
Central Virginia Contest Club	179,489	4
Medina County Amateur Radio Club	170,788	4
CTRI Contest Group	141,608	5
Carolina DX Association	65,663	3
Willamette Valley DX Club	34,507	6
Texas DX Society	22,054	3
Western Washington DX Club	18,698	5
Orca DX and Contest Club	2,360	3

The 2026 ARRL
160-Meter Contest
will be held
December 4 – 6, 2026.

The 2026 IARU HF World Championship

1200 UTC Saturday, July 11 – 1159 UTC Sunday, July 12

The objective of this contest is to support amateur self-training in radiocommunications, including improving operating skills, conducting technical investigations, and communicating with other amateurs around the world (especially IARU member-society headquarters stations) using the 160-, 80-, 40-, 20-, 15-, and 10-meter bands.

- The exchange is a signal report and your ITU zone.
- Single-Operator entrants choose from High, Low, or QRP Power, and Mixed Mode, CW Only, or Phone Only.
- Stations from IARU member-societies around the world will be active. Get on the air to find out how many headquarters stations you can work.
- Seven-day log submission deadline: Upload electronic log submissions to our web app at <https://contest-log-submission.arrrl.org> no later than 1159 UTC July 19. Mail paper logs (postmarked by July 19) to IARU HF Championships c/o ARRL Contests, 225 Main St., Newington, CT 06111 USA.



La Sierra Contest Group, WP3Z, ran their second IARU HF World Championship in 2025 from Jose Diaz Morales's, KP3J, station in Puerto Rico. [Jose Diaz Morales, KP3J, photo]

Up-to-date rules, paper log forms, and ITU zone maps can be found at www.arrrl.org/iaru-hf-world-championship

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 March 2026 activity report of the VM Program.

- ◆ Technician operators in Michigan, Oregon, Utah, and Connecticut were issued Advisory Notices for 40-meter FT8 operation, a band on which Technicians have no FT8 privileges but are allowed CW operation.
- ◆ Technician operators in Illinois, California, and Colorado were issued Advisory Notices for 20-meter FT8 operation, a band on which Technicians have no privileges.
- ◆ An Advisory Notice was issued to an operator in Indiana concerning his operation on an expired license.
- ◆ An operator in Colorado was issued a commendation for outstanding operation in the America250 special event. His operation was efficient and cour-

teous, and complied exactly with the FCC's identification requirements for special events.

- ◆ The new automated FT4/FT8 monitoring system has begun generating incident reports. The new system appears to be very effective and fair in continuously monitoring data frequencies to ensure that operators have the proper license for the band on which they are using FT4 and FT8.
- ◆ There was a virtual presentation about the VM Program to an amateur radio club in Minnesota, and one FCC meeting concerning continuing enforcement issues on 40-meter SSB.

The totals for February 2026 monitoring were 1,964 hours on HF frequencies, and 2,560 hours on VHF frequencies and above, for a total of 4,524 hours.

— Thanks to Volunteer Monitor Program Administrator Riley Hollingsworth, K4ZDH

Contest Corral

June 2026

Check for updates and a downloadable PDF version online at www.arrl.org/contest-calendar. Check <https://contests.arrl.org> for recent results. Refer to the contest websites for full rules, scoring information, operating periods or time limits, and log submission information.

Start - Finish		Date-Time		Bands	Contest Name	Mode	Exchange	Sponsor's Website
2	0000	2	0200	3.5-28	ARS Spartan Sprint	CW	RST, SPC, pwr	ars-qrp.com
4	0000	4	0500	144	VHF-UHF FT8 Activity Contest-NA	Dig	4-char grid	ft8activity-na.net
4	0000	5	0300	7	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, name, mbr or pwr	qrpcontest.com/pigwalk40
4	1700	4	2100	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	1900	5	1959	3.5,7	HA3NS Sprint Memorial Contest	CW	RST, mbr or "NM"	radioamator.honlapepites.hu
6	0000	6	1459	1.8-28	Tisza Cup CW Contest	CW Ph	RST, CQ zone	www.tiszacup.eu
6	0000	6	2359	1.8-28	VK Shires Contest	CW Ph	RS(T), VK shire or CQ zone	www.wia.org.au
6	0000	8	2359	1.8-28,50	PODXS 070 Club 3-Day Weekend Contest	Dig	Mbr or "0000"	www.podxs070.com
6	0600	6	0800	7,14	Wake-Up! QRP Sprint	CW	RST, serial, suffix of previous QSO ("QRP" for 1st QSO)	qrp.ru
6	1300	7	0100	1.8-28,50,144	Kentucky QSO Party	CW Ph Dig	RS(T), KY county or SPC	www.kyqsoparty.org
6	1300	7	1300	50	UKSMG Summer Contest	CW Ph Dig	RST, serial, 6-char grid, mbr (optional)	uksmg.org
6	1500	7	1459	1.8-28	IARU Region 1 Field Day, CW	CW	RST, serial	www.darc.de
6	1500	7	1500	1.8-28	RSGB National Field Day	CW	RST, serial	www.rsgbcc.org
6	1800	7	2359	1.8-28,50	ARRL Int'l Digital Contest	Dig (no RTTY)	4-char grid	www.arrl.org/arri-digital-contest
7	1400	8	0100	3.5-28	Atlantic Canada QSO Party	CW Ph	RS(T), province and county or SPC	acqp.ca
10	0030	10	0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or pwr	naqcc.info
10	2100	10	2359	1.8-28	PVRC Reunion	CW Ph Dig	Name, SPC, 1st year and call sign when joined (if member)	pvrc.org
11	0000	11	0500	432	VHF-UHF FT8 Activity Contest-NA	Dig	4-char grid	ft8activity-na.net
11	2200	12	0100	1.8-28	PVRC Reunion	CW Ph Dig	Name, SPC, 1st year and call sign when joined (if member)	pvrc.org
12	2300	13	0200	1.8-28	PVRC Reunion	CW Ph Dig	Name, SPC, 1st year and call sign when joined (if member)	pvrc.org
13	0000	13	2359	3.5-28	YB ORARI DX Contest	Ph	RS, "ORARI" or "DX"	www.oraricontest.id
13	1100	13	1300	14,21	Asia-Pacific Sprint, SSB	Ph	RS, serial	jsfc.org/apsprint/aprule.txt
13	1200	14	1200	3.5-28	Portugal Day Contest	CW Ph	RS(T), CT district or serial	portugaldaycontest.rep.pt
13	1200	14	2359	1.8-28,50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
13	1400	13	1800	144,432	AGCW VHF/UHF Contest	CW	RST, serial, pwr, 6-char grid	www.agcw.de
13	1400	14	1400	50	REF DDFM 6m Contest	CW Ph	RS(T), serial, 4-char grid	concours.r-e-f.org
13	1500	14	1500	3.5-28	GACW WWSA CW DX Contest	CW	RST, CQ zone	www.gacw.ar
13	1800	15	0259	50 and up	ARRL June VHF Contest	CW Ph Dig	4-char grid	www.arrl.org/june-vhf
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	2100	3.5-28	RSGB FT4 Contest	Dig	Signal report	www.rsgbcc.org
17	0030	17	0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or pwr	naqcc.info
18	0000	18	0500	1296	VHF-UHF FT8 Activity Contest-NA	Dig	4-char grid	ft8activity-na.net
18	0000	19	0300	14	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, name, mbr or pwr	qrpcontest.com/pigwalk20
18	1900	18	2000	3.5-14	NTC QSO Party	CW	Max 25 WPM; RST, mbr or "NM"	pi4ntc.nl/ntcqp
20	0000	20	2359	3.5-28	Pajajaran Bogor DX Contest	Ph	RS, serial	www.pbdc-contest.id
20	0000	21	2359	1.8-28	All Asian DX Contest, CW	CW	RST, 2-digit age	www.jarl.org
20	0000	21	2359	50	SMIRK Contest	CW Ph Dig	4-char grid, mbr (optional)	smirk.info/contest.html
20	1200	21	2359	All, no WARC	SKCC QSO Party	CW	RST, SPC, name, 4-char grid	www.skccgroup.com
20	1400	21	1400	50	IARU Region 1 50 MHz Contest	CW Ph	RS(T), serial, 6-char grid	www.iaru-r1.org
20	1400	21	1400	50	LZ International 6-Meter Contest	CW Ph	RS(T), serial, 6-char grid	www.radioclub-troyan.bg
20	1500	21	1500	1.8	Stew Perry Topband Challenge	CW	4-char grid	www.kkn.net/stew
20	1600	21	0400	3.5-28	West Virginia QSO Party	CW Ph Dig	RS(T), WV county or SPC	www.qsl.net/wvqp
20	1800	20	2359	3.5-14,18,21,24,28, 2 repeaters	ARRL Kids Day	Ph	Name, age, QTH, favorite color	www.arrl.org/kids-day
21	0800	21	1400	50	WAB 50 MHz Phone	Ph	RS, serial, WAB square or country	wab.interimp.net/Contest%20Rules.php
21	2300	22	0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or pwr	qrpcontest.com/pigrun
24	0000	24	0200	1.8-28,50	SKCC Sprint	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
27	0600	27	1700	3.5-28	UFT QRP Contest	CW	RST, QRP/QRO, mbr or "NM"	www.uft.net
27	1200	28	1200	1.8-28	His Maj. King of Spain Contest, SSB	Ph	RST, EA province or serial	concursos.ure.es
27	1800	28	2100	All, except 60, 30, 17, 12	ARRL Field Day	CW Ph Dig	Number of transmitters, operating class, ARRL/RAC Section or "DX"	www.arrl.org/field-day

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.

Club Station

Three Clubs Find Camaraderie Through an International Tradition

In 2016, I spent 3 months in Germany for work, and during my free time, I often operated with my ham radio friends there. One of the highlights of that trip was being invited to a German Field Day, held on Swabian Jura (also known as the Swabian Alps) in southern Germany. Each year, Donau-Bussen P43, DFØDO (the local branch of the German Amateur Radio Club, or DARC), gathers on top of this beautiful mountain to enjoy good company and delicious food and drink. Kids take part in a foxhunt, and the adults relax and enjoy the day with friends.

Having traveled overseas for more than 45 years, which has included meeting hams and sharing experiences around the world, I thought it would be wonderful to bring a bit of that tradition home to share with my ham friends in the US.

I met with three radio clubs in the northwest corner of Connecticut — CQ Radio Club, K1BCI; Southern Berkshire Amateur Radio Club, W1BAA, and Wireless Operators of Winsted, WB1DJU — and pitched the idea of hosting our own version of Donau-Bussen P43's Field Day. To my delight, all three clubs enthusiastically agreed, and we decided to host the inaugural event on August 3, 2025.

We called the event Operation Sparks Rendezvous, and it entailed a group picnic and Parks on the Air® (POTA) activation at Dennis Hill State Park (POTA US-1661), which sits atop a 1,627-foot summit in Norfolk, Connecticut. Our goal was simple: bring

hams together to strengthen friendships, recruit new members, and share our hobby with the many visitors who stop at this popular mountaintop park.

Creating a Local Tradition

We knew that combining good food with a great location would draw folks out for a terrific day of radio recreation. To add some fun, we set up a friendly inter-club contest, awarding points to the station that made the most POTA contacts and for participation in the foxhunt and family activities, such as cornhole and croquet.

We began holding monthly Zoom meetings 6 months in advance to plan the event, with each club taking responsibility for rallying their members and organizing logistics for the big day. Using www.qrz.com, we compiled a list of hams in our region and reached out to about 300 operators through phone calls and emails. We invited all the hams in our Division, and we were surprised to see hams showing up from more than 30 miles away. Getting an accurate head count proved challenging, but we were determined to make as many contacts as possible. It was a long, drawn-out task, but we divided the work among the clubs and reported our progress at each meeting.

We also advertised the event on local nets, reached out to a nearby radio station, and extended invitations to non-hams and local Scouting America troops to join in the fun.

The central activity of the day was the POTA competition. With three stations operating in proximity, careful planning was essential. To prevent band interference, we scheduled time slots for each band, so every club enjoyed equal operating opportunities. Using HAMRS logging software (<https://hamrs.app>), contacts were accurately recorded and uploaded to the POTA website for US-1661. Each club set up its own POTA station, with power supplied by generators and gear provided by club members.

We set up a log sheet, allowing each club 1-hour segments to operate on 10 to 40 meters. It was unfor-



A group photo of the three-club POTA activation from Dennis Hill State Park.



Southern Berkshire Amateur Radio Club members Andy Tedds, KB1UIF (left), and Dattatreya Haynes, KA6PAT (right), setting up their POTA station.

tunate that HF band conditions were so bad that the noise level was high.

For food, we decided on a potluck. Each participant shared what they planned to bring, and I kept and circulated the master list so everyone could see what was covered. From burgers and hot dogs to classic side dishes and a tempting array of desserts, no one went home hungry. Sharing a meal added to the sense of camaraderie and made the day even more memorable.

At the Finish Line

After the contacts were logged and the games wrapped up, the Wireless Operators of Winsted,

WB1DJU, emerged as the overall winners of the Operation Sparks Rendezvous inter-club contest. Their efforts earned them the inaugural Operation Sparks Rendezvous trophy — a gleaming D-104 microphone — for top scores across all events.

Organizing three clubs together was no small feat, but everyone pitched in with equipment and a wonderful variety of food. We hope to make this an annual tradition every August, celebrating friendship, radio, and the shared spirit of the hobby.

All photos provided by the author.

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 March 25, 2026.



Renewing SSCs

ARC of Columbia County, K4KNS
Bella Vista Radio Club, N5BVA

Evans, GA
Springdale, AR

New SSCs

Sci Tech ARS, W1STR

Natick, MA

Sign Up for ARRL Club News

Read the monthly *ARRL Club News* e-newsletter to find out more about what clubs are doing to advance amateur radio in their communities and within the hobby. To opt in to monthly email delivery of *ARRL Club News*, log in to www.arrl.org and select "E-Newsletters and Notifications" on your account web page.

New Products

Digitenna

Digirig has released its new Digitenna, a palm-sized Parks on the Air®/Summits on the Air® end-fed half-wave antenna on a spool — deploy and take down in seconds without fighting kinks and knots. It's rated for up to 30 W on high-duty modes and up to 50 W for voice/SSB. It comes in two sizes, optimized for maximum portability or versatility. As an open-source design, the STL files and build instructions are available at www.printables.com/model/1440130-digitenna. For more information or to purchase one for \$99.95 or \$119.95, depending on size, visit <https://digirig.net/product/digitenna>.



How's DX?

February 2026 3YØK DXpedition to Bouvet

In this month's column, guest author Ken Opskar, LA7GIA, shares details about his much-anticipated return to Bouvet Island with the 3YØK team.

In February 2026, an international team of 14 operators set course for Bouvet Island, currently ranked number 10 on Club Log's DX Century Club (DXCC) Most Wanted List. This volcanic island is a Norwegian dependency in the Southern Ocean. It remains one of the most isolated places on Earth. As a designated nature reserve, landing requires a permit issued by Norwegian authorities, and setting up camp there is only possible via helicopter.

Bouvet has attracted numerous DXpeditions in recent years, and every team that managed to reach the island has faced severe weather conditions. Four members of the 3YØK team also participated in the 2023 3YØJ DXpedition to Bouvet, and with that experience, we began planning our return.

Readying the Campsite

On February 28, a small reconnaissance team of three loaded their gear into an AS350 helicopter on a vessel located on the island's northeast side. Our mission was to scout the landing area and determine the best location for the camp. After 3 years of planning the immense challenge of getting the team and equipment safely ashore, the moment felt surreal. As we flew over the island, several thoughts ran through my mind. We had prepared the team to stay focused and determined in order to face the difficulties ahead of us. Our plan-

ning evolved through several phases as we refined how to establish a camp and how to move people and equipment safely on and off the island within the narrow weather windows.

As we approached Cape Fie, it was clear how dramatically the island had changed since our last visit. Due to global warming, the glacier receded significantly, and wildlife took over the area. Thousands of seals now occupied Cape Fie — some reaching all the way up to the former camp location and beyond! Landing by dinghy under these conditions would have been extremely dangerous.

Using the helicopter, we were relieved to find a quiet and suitable camp area on a hill near what had previously been designated the upper landing area. This location offered excellent take-off angles in most directions, including the best path to North America from that side of the island. Many North American DXers had hoped we would set up on the northwest side, but the Norwegian Polar Institute (NPI) avoids that area due to frequent landslides. As we passed the northwest side later, we saw the NPI weather station almost collapsing in the water, as its foundations were destroyed by a recent landslide.

Once the recon team landed, we began receiving helicopter sling loads of essential items. We held daily meetings with the vessel and helicopter crew during the voyage. Our discussions covered landing procedures, risk factors, and necessary preparations. We also spent considerable time with the pilots to understand their flight parameters, weather assessments, and risk evaluations. By the time we arrived, the crew was fully integrated with us as one unified team with a shared mission to activate Bouvet.

Operating Amid the Elements

It took 5 days from our initial landing to complete the camp setup, which included seven stations, five Yagis, and verticals for 160 – 40 meters. Additionally, we had five large tents — three sleeping tents, a social tent, and a radio tent — plus another group of smaller emergency tents. During those first days, we focused on building infrastructure and facilities and erecting



The 3YØK camp area with a view toward Europe. [Ken Opskar, LA7GIA, photo]



3YØK team members having trouble standing up against 50-knot wind gusts. The 80-meter vertical is pictured in the background. [Ken Opskar, LA7GIA, photo]

simpler antennas to get on the air as we battled the windy conditions. The wind on Bouvet is relentless. Typically around 30 knots and rarely below 20 knots, it often reaches 40 – 50 knots with 60-knot gusts. Every time one of us stepped outside a tent, we could expect to be hit in the face with a gust so strong it became difficult to stand upright.

We worked hard as a team, both when building the camp and when working the intense pileups. Our selection of monoband Yagis from WiMo (three to five elements on 20, 15, and 10 meters) was a major strength. With Acom amplifiers running at around 1 kW, we produced strong signals across much of the world. We had three models available: the 500S, the 1400S, and the 2020S. The Spiderbeam fiberglass poles performed impressively, bending heavily in the wind but returning to normal whenever conditions eased. We used an 18-meter top-loaded vertical for top band and full-size verticals for 80 and 40 meters. We were able to place Yagis on small moraine hills left behind by the retreating glacier, effectively increasing antenna height while keeping mast height lower for

safety and mechanical reasons. Some antennas were positioned near the edge to optimize take-off angles toward Asia and Europe. Our main radios were Icom IC-7610s that performed flawlessly — user-friendly, reliable, and with excellent built-in panadapters for monitoring pileups. The combination of monoband Yagis, big amplifiers, and quality radios made a difference in our ability to produce strong signals. The propagation was mostly good, though we experienced a solar storm the last few days of the operation. We also ran in-band operation, mostly on 40, 20, 17, 15, and 12 meters, which allowed us to increase the number of contacts. We had some expected station interference in such a high-power setup, but we managed this well with a combination of adapting the frequencies, using filters, and fine-tuning the antenna location and separation.

Gratitude for All Involved

As we approached the end of the DXpedition, we carefully planned the extraction of personnel and equipment from the island. Within two weather windows during the last weekend, all were off of the island and safely back on the vessel. This was due to great teamwork by everyone involved. The operation was a success; we achieved our goals, made more than 102,000 contacts, and experienced no injuries. It was a happy team that returned to the welcome ceremony hosted by the South African Radio League in Cape Town the following weekend.

The 3YØK budget was approximately \$1.7 million, making it the most expensive DXpedition ever undertaken. Without the collaboration of a small private group, this would not have been possible. We fully acknowledge and appreciate their contribution. Alongside them, our support team, medical personnel, and experienced polar guides were essential to the success of this mission. We are already planning our next adventure with the private group: Peter I Island, ranked number seven on Club Log's DXCC Most Wanted List.

We extend our deepest thanks to all donors, clubs, individuals, and supporters who believed in us and made the 3YØK DXpedition to Bouvet Island possible. On behalf of the entire 3YØK team — thank you! With this, we can say that all of our efforts during the last 3 years have come to an end, and we are happy to say, “Mission accomplished.”

The World Above 50 MHz

Take Advantage of Sporadic E in June

June is the statistical peak for 6-meter sporadic-E propagation in North America. In this month’s column, we will discuss two aspects of sporadic E: how it was observed by hams on this band more than 70 years ago, and how it can impact ARRL Field Day and the June VHF Contest. See Tables 1 and 2 for a more comprehensive June 2026 VHF propagation outlook.

Early VHF Sporadic-E Observations

Sporadic-E propagation was first observed by hams on 5-meter (56 MHz) AM in the 1930s. More intensive sporadic-E activity occurred during the summer of 1938, as documented in QST articles like “Interpreting 1938’s 56-Megacycle DX” by J. A. Pierce, W1JFO, in the September 1938 issue. During World War II, all regular amateur radio operations were curtailed by the US government. When amateur radio activity was allowed to resume in 1946 following the end of World War II, the original frequency allocation of 5 meters was changed to 6 meters (50 – 64 MHz) in the US due to potential TV interference concerns. It would be a while before hams were able to build radios or modify existing commercial equipment for the new set of frequencies.

By the early 1950s, hams would experience the same summertime propagation conditions on 6 meters that they originally observed on 5 meters — called *abnormal E* at the time. I found my dad Ray’s, W2ZUN, old mobile logs from when he was active on the original 6-meter AM frequency of 50.4 MHz, which served as the local civil defense net for Long Island’s Suffolk County.

His log indicates numerous local stations checking into the net, but one log entry from June 1, 1950, showed

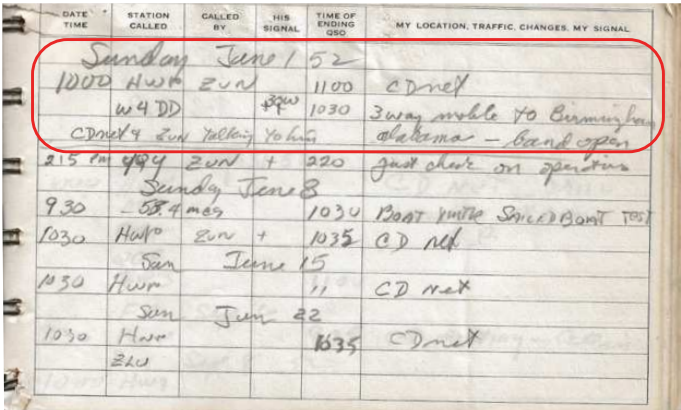


Figure 1 — Ray’s, W2ZUN, mobile logbook from 1952 shows a three-way contact circled in red. The contact was completed between him, a nearby station, and a station in Birmingham, Alabama — evidence of sporadic-E skip between Long Island and Alabama.

a three-way contact between him, another Long Island station (W2HWP), and station W4DD located in Birmingham, Alabama (see Figure 1). This was undoubtedly an early example of 6-meter sporadic-E skip between Long Island and Alabama, which added some excitement for the local net that day.

June 6-meter sporadic E is now seen as a consistent phenomenon with minimal variation throughout the solar cycle, and it remains a source of fascination for hams.

June ARRL Events for VHF Operators

ARRL June VHF Contest

This event is held each second full weekend in June (this year, it will be June 13 – 15). Fixed stations participate in addition to rovers and low-power portable operators. For the latter group, it is like a mini-Field Day event; rovers go to different grid squares, and low-power portable stations pick out suitable VHF locations, such as hilltops or mountains (see Figure 2). Higher elevations are desirable because they make it easier to conduct line-of-sight contacts on the VHF bands. I encourage anyone who participates in the June event to try portable or rover operations.

While digital modes have become more dominant during the ARRL VHF Contests, there are several different categories for stations to participate in, including those for conventional analog modes or combined analog/digital modes. FT8 is favored in some

Table 1 — June 2026 VHF 6-Meter Propagation (North America)

Propagation Mode	Rate of Occurrence
Sporadic E	Active — expected during roughly 60 percent of days in June
Aurora	A remote possibility if sunspots are active

Table 2 — June 2026 VHF 2-Meter Propagation (North America)

Propagation Mode	Rate of Occurrence
Tropospheric	Occasional for certain US locations (east, Central Valley, Gulf area, and West Coast)
Sporadic E	Rare opening possible



Figure 2 — The author's low-power 2- and 6-meter setup for the 2025 ARRL June VHF Contest. For this event, he operated on a hilltop and used three-element beams mounted on umbrella stands, and he set the masts at 10 feet high.

parts of the country, but SSB can also allow you to work many stations in a short period of time during an opening. My best effort as a low-power portable station running 10 W into a three-element beam took place 20 years ago in June 2006. I operated both SSB and CW from a hilltop on Long Island and contacted more than 85 stations (mostly via sporadic-E propagation) during the first 3 hours of the event. I was even able to break an SSB pileup into Montana with Lance, W7GJ, by using CW to contact him!

Sometimes, sporadic E isn't the only propagation mode present in sporadic-E season. During the 2005 June VHF Contest, a rare strong aurora impacted 6 and 2 meters. I worked several Canadian stations on 6 meters using 10 W and a three-element Yagi pointed north toward the aurora. Oddly enough, no sporadic E occurred for me that day, but it was the only time in my



Figure 3 — The Peconic Amateur Radio Club's Field Day VHF, UHF, and satellite antenna farm at Horton Point Lighthouse in Eastern Long Island (circa 1995).

30 years of VHF operating that I worked 6-meter aurora in June.

ARRL Field Day

This event is held on the fourth full weekend of June (for 2026, it will be June 27 and 28). VHF stations do not count toward the transmitter class designation for a participating Field Day group. Thus, any points earned by the VHF station count toward the group's overall score without changing its transmitter class. It takes minimal effort to put up a VHF station for this event, and 2- and 6-meter antennas are typically small enough to not interfere with the group's overall footprint.

In recent years, I have focused primarily on 6 meters for Field Day. Setup for this band is relatively simple. A single-band radio, like the Yaesu FT-690, hooked up to a 6-meter amplifier, like the Mirage A-1015-G, is an effective combination. However, many current transceivers have 6-meter capability at a 100 W output, which is generally sufficient. Because of the small size of the 6-meter wavelength, you can choose from several antenna possibilities, but I recommend a directional two-element or three-element Yagi for maximum effect. You can mount the antennas using a simple base mount, and they should be elevated 15 feet or higher (see Figure 3). During the 1998 Field Day, I worked more than 270 stations with the Peconic Amateur Radio Club Field Day group — 240 via SSB and the rest via CW. Sporadic-E propagation on 6 meters resulted in 75 percent of those contacts.

Other bands, such as 2 meters and 440 MHz, can also be reasonably simple to set up for with a multi-element beam due to the wavelength size. But you will generally be confined to line-of-sight contacts in most Field Day locations, with some occasional tropospheric propagation enhancements.

In recent years, I have been observing fewer 6-meter stations in Field Day groups in the Northeast, as well as a reduction in SSB and CW usage. I recommend that all clubs participating in Field Day try adding a VHF station, especially for 6 meters.

It is important to recognize that there are many other activities that can keep VHF operators busy in June, such as Parks on the Air® and activating rare grids. Although these can be enjoyed any time of the year, consider taking advantage of sporadic-E season to maximize contacts.

All photos provided by the author.

ARRL VEC Volunteer Examiner Honor Roll

The ARRL VEC Honor Roll recognizes the top 10 Volunteer Examiners in each ARRL Division according to the total number of ARRL exam sessions in which they have participated since their accreditations. Considering each session requires an average time commitment of 2 to 4 hours or more, the thousands of hours these VEs have invested represent extraordinary dedication! Whether you are one of our VE Teams that tests once a week, once a month, or once a year, we want to express our warmest appreciation to all volunteers for your generous contribution to the ARRL VEC program.

If you are an ARRL VE, you can view your session stats online at www.arrl.org/ve-session-counts.
If you are not a VE, become one today! See www.arrl.org/become-an-arrl-ve.



Volunteer Examiner	Sessions	Accreditation Date	Volunteer Examiner	Sessions	Accreditation Date	Volunteer Examiner	Sessions	Accreditation Date
Atlantic			Hudson (continued)			Rocky Mountain		
*Nelson Rotz, KC3PAP	1,376	30-Aug-22	Walter Lesnowich, W2EE	337	06-Mar-08	Thomas McCurdy, AJ7TM	763	26-Jun-18
Donald Rees, K3PCT	905	28-Apr-23	John Kiernan, KE2UN	328	01-Jul-91	Zachary Gunyan, KE7WYG	718	06-May-24
Howard Gillott, KC3VJQ	837	24-Jan-24	Thomas Carrubba, KA2D	311	01-Sep-93	Robert Hamilton, N0RN	451	19-May-87
Arthur Clemons, N8BLK	630	01-Mar-01	Seth Greenfield, N2SPG	310	16-Mar-22	Andrew Maddox, AE0WZ	391	18-Mar-24
Kevin Marchetti, K3VNN	466	23-Oct-17	Robert Casino, N2WZ	309	03-Jun-08	Jeffrey Weinberg, W0QO	365	01-Apr-93
James McCloskey, NS3K	370	14-Nov-94	Midwest			David Avery, N0HEQ	302	13-Jan-88
George Brechmann, N3HBT	334	01-Apr-91	*Chris Hunt, N0YH	1,203	05-Aug-20	Gary Zabriskie, N7ARE	283	20-Nov-84
Jobst Vandrey, AC0LP	324	23-Jun-08	*Ralph Waldren, N0OTS	1,125	03-Jan-20	David Sharpe, K10HG	259	02-Feb-98
Cully Phillips, N3HTZ	247	01-Sep-91	David Bartholomew, AB0TO	834	22-Mar-02	Martin Soffran, NM5MS	240	21-Mar-94
Dennis King, W2KDC	231	02-May-24	Kevin Naumann, N0WDG	718	17-Nov-02	David Bratcher, AK0MR	222	23-Sep-08
Central			Harry Steger, W0HMS	707	26-Aug-08	Southeastern		
Dennis Keyfauber, K3DCK	748	29-Dec-22	Nick Catrow, N0DAD	603	31-May-17	****Gary Pike, KA4KBX	11,965	28-Jun-90
Edward Wagner, AB9FN	448	01-Jul-02	Roland Kramer, W0RL	575	21-Jun-01	***Justin Pike, KJ4AXF	9,980	12-Nov-12
Allan Bukowski, N9ZD	381	01-Jun-92	Edwin Berkel, AE0EB	303	06-Jan-15	***Collin Pike, WE4RR	9,950	26-Apr-11
Eldon Boehm, NK9U	360	21-Nov-86	Richard Allen, N0CFL	280	23-Jun-08	***Anna Pike, KD4PCU	7,979	18-Aug-09
Donald Hlinsky, N9IZU	354	01-Mar-91	Charles Wilmes, KW0K	269	28-Apr-09	***Patrick Pike, KJ4AXD	5,944	13-Oct-15
Brian Eder, WB9UGX	326	01-Jan-92	New England			**John Reynolds, W4TXA	2,132	08-Jun-16
Timothy Pechtold, AA9BV	291	01-Nov-92	*Paul Lux, K1PL	2,711	25-Jan-85	**Ryan Krenzischek, W4NTR	2,110	04-Jan-13
Frederick Baguhn, W9GOC	289	16-May-02	*Bob Phinney, K5TEC	1,750	20-Jan-14	*Tonja Jesko, WV2P	1,955	23-Aug-23
James Rinehart, K9RU	287	01-Aug-91	*Robert Latippe, NC1RL	1,352	10-Mar-22	*Robert Fauci, N1UVO	1,386	28-Mar-18
Daniel Alexander, KE9AKS	282	04-Oct-24	*Mark Carey, N1SK	1,080	05-Nov-24	*Stanley Whitfield, K4SHW	1,272	26-Sep-19
Dakota			William Poulin, WZ1L	780	01-Sep-91	*Randy Richardson, W4RSR	1,180	29-Oct-20
Jeffrey Goodnuff, W0KF	369	17-Jun-03	Michael Harwood, W01X	652	11-Apr-24	Thomas Kocourek, N4FWD	783	09-Feb-04
Shep Shepardson, N0NMZ	345	12-Mar-01	Salvatore DiMare, KC1VYL	587	12-Feb-25	Southwestern		
John Schwarz, AE0AL	338	26-Oct-94	Gregory Paul, KC1MND	548	03-Jun-20	*Bill Martin, A10D	1,075	01-Nov-84
Joel Dunham, NC1D	287	26-Jul-23	Phillip Temples, K9HI	520	12-May-89	David Morrill, N7TWT	532	20-Jul-00
Douglas Nelson, AA0AW	270	01-May-90	Bruce Anderson, W1LUS	424	11-Feb-88	Heather Parker, KM6Z	449	14-Feb-20
Daniel Royer, KE0OR	264	01-Jul-91	Northwestern			Peter Morrison, K6VVR	409	03-Apr-07
James Rice, N0OA	251	04-Dec-00	*Stephen Hutchings, WM7X	1,329	13-Apr-15	Richard Buck, KC7OCT	388	21-May-97
Robert Tracy, N0TC	212	30-Jul-86	*David Braucht, KK7QJK	1,196	01-May-24	Donald Kramer, WA6UVW	355	08-May-98
Karl Eriksen, WA2DEE	185	08-Jan-90	*Peter DeKeles, KJ7IEA	1,042	22-Dec-22	Robert Smith, WB6ODR	333	10-Mar-99
Michael Wills, WX0MIK	171	24-Apr-20	Mark Hunn, K17SI	735	20-Sep-18	Bruce Zieminski, WA6BZ	321	25-Mar-02
Delta			Nancy Wolters, AA7VE	647	29-Jun-16	Charles Ketchum, N7OMI	312	12-Sep-24
*Elmer McKenzie, K5MCK	1,567	23-Dec-22	Keith Regli, K7KAR	599	28-Jul-22	Frank Westphal, K6FW	297	06-Sep-84
*Darrell Wiggins, W4AI	1,435	02-Jun-23	Nathan Zane, KH6IHB	549	01-Apr-93	West Gulf		
*Terry Partigiani, W5TMP	1,322	27-Nov-07	Erin Henrickson, ND7B	483	06-Jan-23	**Franz Laugermann, K3FL	3,319	01-Dec-91
Loma Westmoreland, KU5J	841	31-Jan-21	Scott Robinson, AG7T	473	01-Aug-91	*Tanner Jones, W9TWJ	1,395	31-Jul-07
Monvel Tandy Maskew, K9FQ	769	18-Jul-18	Richard Morgan, KD7GIE	448	11-Aug-00	*Jonathan Diner, N5JLD	1,153	16-May-11
Bryce Zitterich, KJ1J	594	07-May-24	Pacific			Daniel Quigley, N7HQ	793	24-Apr-20
David Andrews, N1ESK	571	21-Aug-15	*Brian Torr, N6IY	1,178	06-Sep-00	Juan Castro, WK5I	727	15-Feb-24
Rodney Webb, W4WRE	497	21-Mar-17	Neal Kernes, K3VG	759	07-May-24	John Paterson, KC5LAA	655	16-Mar-09
Bryan McCammon, K15HAV	470	03-Sep-20	Morris Jones, AD6ZH	618	27-Nov-01	Gerald Crenshaw, WD4BIS	573	27-Feb-98
Boris Alvarez Sancho, N9BI	439	13-Mar-25	Joseph Pasqua, KG6G	601	27-Mar-25	Gerald Grant, WB5R	548	04-Jan-85
Great Lakes			Dieter Stussy, KD6LVW	482	27-Jan-94	Adolph Chris Koehler, K5VCR	543	29-Sep-95
*Charles Tyrrell, KE8PCB	1,983	03-Sep-20	Larry Loomer, K16LNB	422	03-Dec-08	David Fanelli, KB5PGY	527	01-Oct-91
*Bruce Osmon, KE8LT	1,749	16-Nov-18	Robert Perlman, W6BP	405	26-Aug-08	International		
*David Potter, KE8OHG	1,502	03-Jun-20	Bill Nichols, NN7K	380	01-Sep-93	**Robert Girdo, AK2RG	2,414	27-Sep-17
Earl Paazig, W8BR	830	16-Apr-02	Gordon Fuller, WB6OVH	363	06-Sep-84	Gregory Croad, NN3Z	626	03-Jan-20
Roger Weith, KE8QGV	540	28-Feb-22	Jim Brunk, N6BHX	361	13-Jul-95	Wayde Nie, AD2GX	529	13-Feb-24
William Bogle, KE8FZY	297	08-Jul-20	Roanoke			Vince D'Eon, A17LK	281	13-Jan-21
Charles Hall, W8HF	286	01-Jun-92	Justin Freeman, KQ4DX	921	13-Feb-25	Wesley Printz, W3SE	137	24-Feb-89
Duane Vanderpool, K3LWD	274	14-Sep-21	Billy Stallings, NZ3C	800	09-Jan-25	Kazuo Suzuki, N1KS	118	20-Apr-01
Lance Harvala, AB8Y	256	06-Nov-19	Jerry Picard, KR4BXO	473	26-Jun-25	Yuri Kuwana, N1ENV	118	24-May-10
Archie Mack, AF4EB	253	19-Aug-97	Leonard Crawford, KZ4WR	453	22-Aug-25	Jay Oka, KH2J	115	01-Aug-91
Hudson			Richard Brannen, KA3JCA	390	25-Jan-89	Masatoshi Shimizu, AH6KY	112	07-Jul-09
Jeremy Griffel, K2GRI	672	03-Dec-20	William Smith, KQ1S	361	20-Jun-12	Masanori Kawakami, A19C	100	04-Dec-97
Alan Crosswell, N2YKG	541	26-Oct-94	Judy Friel, AC4RG	327	01-Feb-91			
Fritz Boigris, KB2O	498	26-Oct-84	Terry Sanner, WV8V	276	06-Sep-84			
Michael Abbey, KC2NJ	494	06-Jul-23	David Snyder, W4SAR	266	01-May-93			
Joseph Leland, N1JML	494	13-Mar-25	Larry Withrow, AF4HX	239	17-Dec-98			
Sid Markowitz, K2GG	476	27-Sep-94						

*Denotes participation in over 1,000 sessions.
**Denotes participation in over 2,000 sessions.
***Denotes participation in over 5,000 sessions.
****Denotes participation in over 10,000 sessions.

Congratulations to Mark Carey, N1SK, from Grantham, NH (New England Division), and Peter DeKeles, KJ7IEA, from Kennewick, WA (Northwestern Division), who are the latest VEs to reach 1,000 session participation!

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

ARRL ARIZONA SECTION CONVENTION

June 19 – 20, Flagstaff, Arizona

DFHQRTV

Fri. 10 AM – 4 PM, Sat. 8 AM – 4 PM. *Spr*: Amateur Radio Council of Arizona. Coconino High School, 2801 N. Isabel St. *TI*: 146.98 (162.2 Hz). *Adm*: \$5. www.flagstaffhamfest.org

Colorado (Delta) — June 6 T

8 AM – 11 AM. *Spr*: Montrose ARC. Lion's Club Pavillion, 501 N. Palmer St. *TI*: 146.91 (107.2 Hz). *Adm*: Free. www.montrosehamradio.org

Louisiana (Monroe) — June 6 DFHIRSTV

8 AM – noon. *Spr*: Louisiana Delta Radio Club. Barak Shrine Temple, 6620 Frontage Rd. *TI*: 147.135 (127.3 Hz). *Adm*: \$5. www.kc5dr.org

Maryland (Upperco) — June 21 DFHST

8 AM – noon. *Spr*: Baltimore ARC. Arcadia Carnival Fairgrounds, 16020 Carnival Ave. *TI*: 146.67 (107.2 Hz). *Adm*: \$8. www.w3ft.com/hamfest-drone-rc-plane-robotics-demo

Michigan (Midland) — June 20 DFHRTV

8 AM – noon. *Spr*: Midland ARC. Salvation Army Building, 330 Waldo Ave. *TI*: 147.00 (103.5 Hz). *Adm*: \$5. www.w8kea.org

Michigan (Monroe) — June 21 DFHQRT

7:30 AM – 1 PM. *Spr*: Monroe Co. Radio Communications Association. Monroe Co. Fairgrounds, 3775 S. Custer Rd. *TI*: 146.72 (100 Hz). *Adm*: \$7. www.mcrca.org

Michigan (Newberry) — June 5 – 6 DFHRTV

Fri. 6 PM, Sat. 9 AM. *Spr*: Luce Amateur Radio Services. Luce Co. Fairgrounds, 11555 N. Co. Rd. 399. *TI*: 146.61 (114.8 Hz). *Adm*: \$5. www.w8nby.org

Missouri (St. Louis) — June 14 DFHRTV

7 AM – noon. *Spr*: Egyptian Radio Club. VFW Post 4223, 215 Military Rd. *TI*: 146.76 (141.3 Hz). *Adm*: \$8 Advance, \$10 door. www.w9aiu.org

New Jersey (Fair Lawn) — June 6 DFHQRT

6 AM. *Spr*: Fair Lawn ARC. Fair Lawn Memorial Pool, 1st St. and Berdan Ave. *TI*: 145.47 (167.9 Hz), 442.70 (97.4 Hz). *Adm*: \$5. www.fairlawnarc.org

New Jersey (Piscataway) — June 20 DFHQRTV

6 AM. *Spr*: Raritan Valley Radio Club. Piscataway High School, 100 Behmer Rd. *TI*: 146.625 (141.3 Hz). *Adm*: \$7. www.w2qw.org

New York (Cortland) — June 6 FHRTV

7 AM – noon. *Spr*: Skyline ARC. Cortland Co. Fairgrounds, 4301 Fairgrounds Dr. *TI*: 147.18 (71.9 Hz). *Adm*: \$6. www.skylinehamradioclub.org

New York (Lockport) — June 6 DFHTV

8 AM. *Spr*: Lockport ARA. Cambria Volunteer Fire Hall, 4631 Cambria Wilson Rd. Rte. 425. *TI*: 146.82 (107.2 Hz). *Adm*: \$8. Email: n2dzd@arri.net

ARRL WESTERN PENNSYLVANIA SECTION CONVENTION

June 14, Butler, Pennsylvania

DFHQRTV

8 AM – 2 PM. *Spr*: Breezeshooters ARC. Butler Farm Show Grounds, 625 Evans City Rd. *TI*: 147.30 (131.8 Hz). *Adm*: \$8 Advance, \$10 door. www.breezeshooters.org

Pennsylvania (Lime Ridge) — June 13 DFHRTV

7 AM – 1 PM. *Spr*: Columbia-Montour ARC. Lime Ridge Community Center, 6405 4th St. *TI*: 147.225 (85.4 Hz). *Adm*: \$5. www.qsl.net/cm-arc/hamfest.htm

ARRL TENNESSEE STATE CONVENTION

June 13, Knoxville, Tennessee

DFHQRTV

8 AM. *Spr*: Radio Amateur Club of Knoxville. Wallace Memorial Baptist Church, 701 Merchant Dr. *TI*: 145.21 (100 Hz). *Adm*: \$8 Advance, \$10 door. www.w4bbb.org

Texas (Lewisville) — June 12 – 13 DFHRTV

Fri. noon – 5 PM, Sat. 9 AM – 5 PM. *Spr*: Denton Co. ARA. Vista Mall, 2401 S. Stemmons Fwy. (I-35 E). *TI*: 146.92 (110.9 Hz). *Adm*: \$10. www.dfwhamexpo.com

Virginia (Manassas) — June 20 DHQRTV

8 AM – 12:30 PM. *Spr*: Ole Virginia Hams. Colgan Sr. High School, 13833 Dumfries Rd. *TI*: 146.97 (100 Hz). *Adm*: \$10. www.w4ovh.net/welcome-to-manassas-hamfest

Washington (Dryden) — June 12 – 13 DFHRTV

Fri. noon – 5 PM, Sat. 6 AM – 6:30 PM. *Spr*: Apple City ARC. Dryden Gun Club, Saunders Rd. *TI*: 146.68 (156.7 Hz). *Adm*: \$8. www.applecityarc.com

Wisconsin (Oshkosh) — June 20 T

7 AM – noon. *Spr*: Fox Cities ARC. Sunnyview Exposition Center parking lot, 500 E. County Rd. Y. *TI*: 146.76 (100 Hz). *Adm*: \$5. www.fcarc.club

To All Event Sponsors

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 **July 1** to be listed in the **September** 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.

Special Event Stations

Working special event stations is an enjoyable way to help commemorate history. Many provide a special QSL card or certificate!

May 30 – May 31, 1000Z – 1700Z, N8S, Mount Clemens, MI. Utica Shelby Emergency Communications Association. **Selfridge Air National Guard Base 2026 Open House and Airshow.** 7.240 14.240 21.240 28.340. Certificate & QSL. N8S, P.O. Box 46331, Mount Clemens, MI.

June 1 – June 14, 1300Z – 2200Z, K3NEM, Middle River, MD. Amateur Radio Club of the National Electronics Museum. **W2W D-Day Commemoration.** 7.044 7.244 14.044 14.244. Certificate & QSL. ARCNEM, c/o Fred Heath, 202 Baltimore-Annapolis Blvd., Severna Park, MD 21146-1368. *Primary operation will be June 1 – 6 with additional operation possible during June 7 – 14 as operator availability permits. Operation on 80 meters (3.544, 3.844), additional bands, and digital modes possible during event. Frequencies ± according to QRM.* <https://ww-2.us>

June 6, 1400Z – 1900Z, W6J, Christiansburg, VA. New River Valley Amateur Radio Club. **D-Day.** 14.262. QSL. Danny Wylam, 710 McDaniel Dr. Southeast, Christiansburg, VA 24073-3848. *Operating from the National D-Day Memorial.* dannywylam@gmail.com

June 6 – June 7, 0000Z – 2359Z, N1S, Groton, CT. Generations Amateur Radio Club. **Historic Ship USS Nautilus SSN-571 Museum Ships Weekend.** 3.950 7.250 14.270 21.075. QSL. N1S Generations ARC, 110 Vinegar Hill Rd., Gales Ferry, CT 06335. *Nautilus information:* www.ussnautilus.org. www.qrz.com/db/n1s or www.qrz.com/db/k3lbd

June 6 – June 7, 0001Z – 2359Z, W4BSF, Oneida, TN. Big South Fork Amateur Radio Club. **USS Tennessee Museum Ships Weekend.** 3.900 7.200 14.750 28.400. QSL. Buddy McCartt, 275 Hunter Hill Rd., Oneida, TN 37841-3578. <https://bsfarc.org>

June 6 – June 7, 1400Z – 2020Z, NB9QV, Manitowoc, WI. USS Cobia Amateur Radio Club. **NB9QV USS Cobia Museum Ships Weekend.** 7.240 14.240. e-Certificate. *Send contact information to kc9yl@arrl.net to receive PDF certificate.* www.qrz.com/db/nb9qv

June 6 – June 7, 1400Z – 2200Z, K3SAV, Baltimore, MD. Nuclear Ship Savannah Amateur Radio Club. **Museum Ships Weekend.** 7000. QSL. Ullis Fleming, 980 Patuxent Rd., Odenton, MD 21113. *Check spotting networks for frequencies on all bands.* www.qrz.com/db/k3sav

June 6 – June 21, 0000Z – 2359Z, W7AIA, various cities and states. Clark County Amateur Radio Club. **Lewis and Clark Trail on the Air.** 14.240. Certificate & QSL. Clark County Amateur Radio Club, P.O. Box 1424, Vancouver, WA 98661. *SSB, FM, CW, and FT8 on 10, 15, 20, 40, and 80 meters across 16 states. See website for information on receiving certificates, time slots, and operating frequencies.* www.lctota.org or info@lctota.org

June 10 – July 15, 0000Z – 2359Z, K5A, Springdale, AR. Bella Vista Radio Club. **190th Anniversary of Arkansas Statehood.** 7.040 7.260 14.040 14.260. QSL. Don Banta, 3407 Diana St., Springdale, AR 72764. www.qrz.com/db/k5a or <https://bellavistaradioclub.org>

June 11 – July 19, 0000Z – 2359Z, W5C, Dallas, TX. Lake Whitney Amateur Radio Society. **2026 World Soccer Tournament.** 14.074. Certificate & individual host city QSL. Ron Franklin, 120 PR 22223, Whitney, TX 76692. *W5C will join 16 special event stations located in host cities in Mexico, Canada, and the US. Days and times will vary. Check out www.wc2026ses.org for each city's schedule.* info@wc2026ses.org

June 12 – July 19, 0000Z – 2300Z, WM3PEN, Philadelphia, PA. Holmesburg Amateur Radio Club. **2026 World Soccer Tournament.** 7.276 14.276. QSL. Bob Josuweit, 3341 Sheffield Ave., Philadelphia, PA 19136. *WM3PEN will join 16 special event stations located in host cities in Mexico, Canada, and the US. Days and times will vary. Check out www.wc2026ses.org for each city's schedule. QSL card available for SASE and donation to offset printing costs.* www.qrz.com/db/wm3pen or info@wc2026ses.org

June 20, 1400Z – 2100Z, W2ECR, Orchard Park, NY. East Coast Reflector. **East Coast Reflector Meet and Greet.** 7.217 14.317. Certificate. Steven Fook, 351 Regal Dr., Abingdon, MD 21009. www.eastcoastreflector.com

June 21, 1200Z – 2200Z, W3G, Trexlertown, PA. East Penn Amateur Radio Club/Education Alliance for Amateur Radio. **World Giraffe Day.** 7.266. QSL. Walter J. Skavinsky, 1574 Layfield Rd., Pennsburg, PA 18073-1702. *Operating from the giraffe exhibit at Lehigh Valley Zoo.* kb3sbc@arrl.net or walter.skavinsky@radiostemalliance.org

June 24 – Jan. 1, 0000Z – 0000Z, N6R, Thousand Oaks, CA. Ventura County Amateur Radio Station. **Field Day 2026.** 14.255. QSL. Peter Heins, 1559 Norwich Ave., Thousand Oaks, CA 91360. *Celebrating the lives of President Ronald Reagan and Nancy Reagan.* www.vcars.org

June 25 – July 8, 0000Z – 2359Z, KM0DRC, Doniphan, MO. Doniphan Amateur Radio Club. **America250.** 28.500. QSL. Kent Wilfong, 209 Locust St., Doniphan, MO 63935. doniphanarc@outlook.com

June 27 – June 28, 1800Z – 1800Z, W2GSB, Babylon, NY. Great South Bay Amateur Radio Club. **Field Day.** 7.275 14.245 21.325 28.500. QSL. GSBARC Field Day, 200 E. Sunrise Hwy., Lindenhurst, NY 11757. www.gsbarc.org



Certificate of Code Proficiency Recipients

Sponsored by



www.i2rtf.com

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.

November 2025

Thomas D. Tarman, AF5TT	10
Maiyun Zhang, AK6DS	10
J. Andrew Hall, N5ASE	15
Buren Earl Wells, Jr., KZ4W	15
Ronald G. Call, KE7CR	20
Louis K. Yadevia, WA3EBS	25
Michael R. Lunebach, WG9P	35

December 2025

James E. Ligman, K4OHV	10
Michael G. McCarty, KB9HV	10
William G. Homsany, KG6COH	20

Craig H. Moody, K1CHM	20
Michael A. Krahenbuhl, K0ARA	30
Thomas P. Dean, K7TPD	35
Michael A. Krahenbuhl, K0ARA	35

January 2026

John M. Fenton, KB0KSA	10
Karl L. Skogen, AA0BQ	10
James B. Wilkinson, KQ4RXX	10
Stephen Bonville, KN6NMV	15
Stephen M. Riley, WA9CWE	15
Thomas F. Corcoran, VE3NY	30

February 2026

Rick Nungester, WA6NDR	10
Mark W. Fink, KB5WS	15
James E. Ligman, K4OHV	15
Arthur J. Mueller, WA3BKD	15
Karl L. Skogen, AA0BQ	15
Ron Kinney, KC0ZPS	35
Michael A. Krahenbuhl, K0ARA	40

March 2026

Tyge E. Legier, WA6CJE	20
------------------------	----

Congratulations to all of the recipients.

June 2026 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.

June Qualifying Runs will be transmitted by W1AW in Newington, Connecticut, at the times shown on 1.8025, 3.5815, 7.0475, 14.0475, 18.0775, 21.0675, 28.0675, 50.350, and 147.555 MHz. The West Coast Qualifying Runs will be transmitted by K6XX on Wednesday, June 24, at 9 PM PDT (0400 UTC on June 25) on 3581.5, 7047.5, and 14047.5 kHz. Unless indicated otherwise, sending speeds are from 10 to 35 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 text 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 Run Schedule – June 2026 (All times are in Eastern Daylight Time.)

Monday	Tuesday	Wednesday	Thursday	Friday
6/1 4 PM – 2000Z 10 – 35 WPM		6/3 7 PM – 2300Z 35 – 10 WPM		6/5 10 PM – 0200Z (6/6 – UTC) 10 – 40 WPM
	6/9 10 PM – 0200Z (6/10 – UTC) 10 – 40 WPM	6/10 4 PM – 2000Z 10 – 35 WPM	6/11 9 AM – 1300Z 35 – 10 WPM	
6/15 10 PM – 0200Z (6/16 – UTC) 35 – 10 WPM		6/17 9 AM – 1300Z 10 – 35 WPM	6/18 7 PM – 2300Z 10 – 35 WPM	
	6/23 9 AM – 1300Z 35 – 10 WPM	6/24 10 PM – 0200Z (6/25 – UTC) 10 – 40 WPM		

Field Organization Reports — March 2026

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.arrl.org/public-service-honor-roll.

705 AD8CM	229 W0PZD	168 WK4WC	135 KE5YTA KB3YRU KE4RS	119 KC9FXE W0AHA	100 NX9K W2OOD AD4DO KZ8Q	93 W4DNA WB2VUF	82 K8RDN W2ZXN W1LEM	80 KG5AOP KO4KUS KA9ROY WW3S KA8BJA W2QS K2PHD KN1OBI	79 W4PXE W2LC	76 KN4POJ	72 W3ZR
612 KE8ANW	215 W7PAT	163 W4EDN	134 K1CJV	117 K8MDA N3GE KC8T	100 WB9EDL W1KX WX2DX KB8GUN N8MRS WB8SIQ AA3SB N9TU	91 WB8RGE	81 WB4ZDU	78 K9WIC KD2TDG WG3K KC4PGN	74 WA4EWN WB3FTQ KD2KUB	71 KC2THY KE8HKA	70 KF7GC AF9SC KC3SJ
400 N9VC	210 KT2D KD2NMG	158 K9BJA	131 W3YVQ	116 ND2W K3JL	115 K2MTG K3YAK KA2HZP KB2QO W2AH W1TCD KC1KVY	90 KC9UC K5OB KR4ST WA3QPX N5RH WD8JMD K3RC N8OD K8KRA W2ITT WB2JNQ W3STN AB9ZA K8ED N3RPB KB2YAA KD2IWN N1CVO W1VEG KC1TLF		77 W5XX			
355 W8ROY	209 W9RY KE8DON	155 W5RFY W2PAX KF5OMH WD8USA KB8PGW	130 AG9G K9LJU KD0HHN KY2D W9BGJ KW1U N1UMJ	115 K5ANP	99 N3STP	86 WD8SDH N1LAH					
329 KD2LPM	200 ND8W	152 KD2QAR	129 AE5MI KC8PBU	110 N9CK WB9WKO W5WMC KV2J KM2I KM4WHO WV5Q KN4WX N1IQI W1RVY	98 WJ3P N7UWX	84 KJ4JWC					
308 W7EES	195 NW3X	150 W4CMH N8YS	125 KD0PYG KA9IKK KA5AZK	109 KO4OL	95 W9ARG KL7RF	83 K1XFC K1STM					
305 WM5N	190 N2LC	148 KR4PI	122 NK4AA	108 W8MAL	94 N4NOA W8IM AD3J						
266 KE8BYC	189 KD8UUB	149 KC8YVF	121 N0JAR	107 KT4WX	101 KC1HHO						
254 K9SX	185 KN4JQ WB8YYS	145 W9GRG	120 WA4VGZ WC4FSU N1WZ N1ILZ NA7G								
240 WA9SWW	180 WA3QLW	140 AC0KQ									
234 KB5PGY	173 W9EEU	136 W02H WM2C									
232 W3OJO	170 KT5SR K2VTT										
230 AC8NP											

The following stations qualified for PSHR during these previous months have not been recognized yet: (Feb. 2026) KD2LPM 270, W7PAT 200. (Dec. 2026) KD2LPM 263, W7PAT 194, KA0DBK 71. (Dec. 2025) W7PAT 227.

Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CO, CT, DE, FL, HI, IL, IN, KY, LA, MI, MN, MO, MS, NC, NF, NH, NJ, NY, OH, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WY.

Section Emergency Coordinator Reports

The following Sections submitted ARES Activity Reports for February: CT, DE, ENY, EPA, GA, IA, ID, IL, IN, KY, LA, MI, MN, MO, MT, NC, NH, NJ, NY, OH, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, 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 be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly total points follow.

KY2D 1,569, NX9K 1,050, WA3QLW 723, KE5YTA 620, WB9WKO 601, W4WJ 550.

The following stations qualified for PSHR during these previous months, but have not been recognized yet: (Feb. 2026) KD2LPM 270, W7PAT 200. (Jan. 2026) KD2LPM 263, W7PAT 194, KA0DBK 71. (Dec. 2025) W7PAT 227.

Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CO, CT, DE, EMA, ENY, EPA, GA, IA, IL, IN, KY, MDC, ME, MI, MO, MS, NC, NFL, NLI, NM, NNJ, NNY, NTX, OH, RI, SJV, SNJ, STX, TN, UT, WCF, WMA, WNY, WPA, WWA, WY.

Section Emergency Coordinator Reports

The following Sections submitted ARES Activity Reports for February: CO, CT, DE, ENY, EPA, GA, IA, ID, IL, IN, KY, LA, MI, MN, MO, MT, NC, NFL, NH, NLI, NM, NNJ, NNY, NV, OH, OR, PR, RI, SB, SC, SJV, STX, TN, VA, VI, VT, WCF, WI, WMA, WNY, 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.
KY2D 1,569, NX9K 1,050, WA3QLW 723, KE5YTA 620, WB9WKO 601, KW1U 559.

This Month in **QEX**

QEX magazine is a forum for the free exchange of ideas among communications experimenters. All ARRL members can access the digital edition of **QEX** as a member benefit (www.arrl.org/magazines). Print subscriptions are available and sold separately; see www.arrl.org/qex.

Coming up in the May/June 2026 issue of **QEX**:

- Valentino Barbi, I4BBO, shows how to unlock the full measurement potential of the tinySA Ultra with a simple, low-cost tracking generator. The article details a practical design that overcomes dynamic range and coupling limitations, bringing real-time filter alignment and RF analysis within easy reach.
- Tony Brock-Fisher, K1KP, explores a transformative transmitter architecture that replaces traditional linear amplification with high-efficiency switching techniques. The design shows how polar modulation can dramatically reduce heat, size, and power consumption — pointing toward the future of truly digital amateur transmitters.

■ Christoph van Wüllen, DL1YCF, takes a deep dive into CW keying and spectral purity, showing why common pulse shapes fall short of the ARRL Clean Signal Initiative. He introduces an optimized ramp that significantly reduces key clicks while meeting and exceeding modern spectral limits.

■ Gerald Artner, OE1GAQ, explores how artificial intelligence can move from the shack computer into the RF signal chain. His work demonstrates a working AI-driven voice station highlighting both the promise and the real-world challenges of putting chatbots on the air.

■ Stefan Dambeck, DC7DS, presents a new FPGA-based SDR concept that challenges the cost-performance balance of multi-slice receivers, delivering Red Pitaya-class capability at a fraction of the price. The discussion explores Pavel Demin's open-source PDSDR and its potential to redefine high-performance, multi-band receive systems.

Would you like to write for **QEX**? We pay \$50 per published page for full articles and **QEX** Technical Notes. Get more information and an Author Guide at www.arrl.org/qex-author-guide.

A Look Back

QST

devoted entirely to Amateur Radio

July 1976 \$1.00



Come along, too! The
ARRL National Convention,
Denver, July 16-18.

Page 13

Affiliated Clubs — a New Look

Affiliated clubs have been one of the great strengths of the ARRL organization from its very beginnings. Now the partnership is about to enter an exciting new era.

By Charles J. Harris,* WB2CHO

The ARRL Club and Training Program is managed by Charles J. Harris, WB2CHO, assisted by Rosalie Cain, WA1STO.

A relative newcomer to Hq., Chod is a graduate of Princeton University where he was president of Princeton ARS, W2PU, for three years. For the past five years, he has been a teacher of science for high school and college credit at the Taft School in Watertown, CT. As advisor to the school's radio club, Chod garnered first-hand experience on the needs of training materials. Licensed since 1966, Chod's amateur radio interests include traffic, DX, and contesting, with a special preference for the latter. The newest facet of operating to pique his interest is Oscar. Chod is a native of Rochester, NY.

With a BS in Education from Indiana University and a stint of public-school teaching behind her, instructional techniques are a familiar medium to Rosalie. A Headquarters staffer since August of 1973, she is presently completing a master's degree in reading at Central Connecticut State College. She brings to her present position experience as DXCC assistant, public service assistant, and head of the training-aid/affiliated club branch of the CD. A licensed operator since 1970, Rosalie lists Field Day, CD parties and operating special station KJ1ITU, K11ITU and PJ9JT, among her favorite amateur activities. But showing her femininity, she says she relaxes to DX cw ragchewing.

*Club and Training Manager, ARRL

Amateur radio clubs have been around since the second person became interested in amateur radio and got together with the first ham. From the earliest days, the local radio club has been and continues to be the backbone of organized amateur radio. The League came along later — and in fact grew out of the efforts of Hiram Percy Maxim and other members of the Hartford Radio Club. Club meeting notices and reports filled the pages of the first issues of *QST*.

It was not long before someone had the idea of establishing some sort of formal relationship between the fledgling League and local radio clubs. That is still one of the best ideas anyone has had in more than a half-century of League affairs. The concept of club affiliation was actually born in August of 1919. A major purpose behind the concept was to further the systematic passing of traffic to augment the limited range of the amateur radio equipment of the day. That, of course, is where the

The amateur radio museum in the lobby of the Hq. building, before it was disassembled and stored to make room for the growing Club and Training Department.



July 1976 43



The temporary Club and Training office at Hq., only one week after the museum was removed.

word "Relay" came from in American Radio Relay League.

Over the years, as the nature and scope of amateur radio have changed, the Affiliated Club program too has changed and grown and evolved. It is a relationship which has enormously benefited the League, the clubs and, indeed, amateur radio itself.

Now amateur radio is entering a whole new era and facing new challenges on several fronts — notably the upcoming World Administrative Radio Conference (WARC) in 1979. To help meet those challenges and to serve better the needs of today's and tomorrow's radio amateur, some new dimensions are being added to the Affiliated Club program to create a whole new level of partnership and teamwork.

What does *that* mean? Okay, here it is in essence:

A brand new department, the first in 40 years, designated as the Club and Training Department, has been created at Headquarters. It now has a full-time staff of six and is growing.

As the cornerstone of the ambitious and unprecedented new development program previously announced in *QST*, a brand new, comprehensive Novice course has been prepared and will be tested this summer. Based on the ex-

perience of the most successful instructors and club courses around the country, it includes (a) a student package replacing the long-time Gateway, with a new one-volume manual, a code-practice cassette and a call-area map, (b) a complete instructor's package with everything needed to conduct a successful course, and (c) a complete promotional package to attract prospective students to the course and to provide support at the community level.

A field program is in the process of development to provide direct support and assistance at the community level from Headquarters.

The staff is currently working with the J. C. Penney Company, the Heath Company and others to provide retail distribution locally for the training materials, the availability of products for prospective Novices and cooperative promotional support with the local club.

The entire program is built around the local amateur radio club and a closer working relationship with the League. It is in every sense a "grass roots" program because that's where amateur radio is and lives.

"Tune in the World — with Ham Radio"

Anyone long familiar with League publications will hardly recognize the new Novice package to be marketed soon. The basic element, bearing the title above, is a thoroughly modern handbook which covers in a bright, lively fashion everything a beginner needs to know to prepare for the Novice license exam and to set up and operate his or her own amateur station. The chapter headings are indicative of the style of the new manual: Meet Ham Radio, The FCC Speaks, The Fundamentals of Electronics, The Morse Code Hurdle, Getting It All Together, Over the Airwaves — Painlessly. Copious picture treatment, diagrams and other illustrative material enliven the text at every stage.

The second element included in the package is a complete code practice cassette, introduced by Jean Sheperd, K2ORS, noted author, actor and star of radio and television (and himself an enthusiastic cw operator). Step by step, it takes the beginner in easy-to-follow stages through the process of learning the code in a way that makes it fun.

To complete the package, a large, wall-size, full-color call-area map of the United States is included. The course will have wide distribution through many new as well as traditional channels.

Instructors' Package

Over the years many amateur radio clubs have conducted code and theory

Eligibility Benefits of Club Affiliation

1. Receive regular and special mailings concerning club related activities.
2. Special library donation offer of League publications.
3. Partial retention of ARRL membership dues for club treasury.
4. Competition for club awards in ARRL contests.
5. First choice on all training aids and films.
6. Receive visits from local and Hq. ARRL personnel for club meetings.
7. Use of ARRL name in correspondence and publicity.
8. Special membership promotional mailing lists.

(Write ARRL hq. for details on any of these programs.)

classes, the major source, in fact, of new amateurs. Other groups no doubt would do so too if more and better instructional materials and guides were available. Accordingly, what we have attempted to do is to compile the best experience, knowledge and judgment from the most successful instructors into one new, complete course. The new instructors' manual includes everything an amateur needs to prepare for, plan and conduct an effective licensing class. It covers organization, lesson plans, subject matter, classroom techniques, administrative details, and even how to attract students to the course. With it, we will also supply slides and tapes to assist in the presentation.

One of the problems in amateur licensing has been the high "drop-out" rate among Novices. Consistently, about 50 percent have failed to go on to a higher class of license. The League is in the process of conducting a special survey among ex-Novices to determine accurately the reasons. One indication we had from pilot-testing this survey is that some Novices feel they are helped to get their tickets and then, in effect, left to their own devices. Getting on the air and making those first contacts turns out to present a formidable barrier for some. We will incorporate recommendations and how-to suggestions (based on the results of the survey) in the instructors' package to carry new licensees beyond that first step.

Promotion and Publicity

Preliminary and exploratory discussions have been held with the J. C. Penney Company, the Heath Company and others to develop ways in which retailers can provide both a source of supply for manuals and instructional materials, as well as Novice and pre-Novice gear and promotional support to the local club in its recruiting efforts by means of cooperative advertising, display and local publicity. We expect to

The new Novice instruction package: Book, code cassette and wall map!



develop materials to be available to any retailer and club wishing to participate in a cooperative effort.

Some concern has been expressed by industry sources that this whole League program may push the sale of ARRL materials at the expense of other manufacturers' and publishers' products. Actually the standard course approach in no way limits the use of any particular instructional materials. Any publisher can, in fact, take advantage of the opportunity to supply appropriate training and instructional aids. So far as we are concerned, this is all to the good. The more effort there is behind the program from the more sources, the more new amateurs there will be. We very much hope the program will indeed be a stimulus to the development of all sorts of new and better instructional material and equipment.

Amateur Radio on the Move

Why now? Why is ARRL undertaking a big new expansion and recruiting program at this particular point in time? Simply because the time is unmistakably right. Our nation is in the midst of an unprecedented surge of public interest in two-way radio communications, in personal radio use. A part of it, of course, is the CB phenomenon — and nobody is quite sure how much of that is cause and how much effect. After several years of static numbers, amateur radio itself is experiencing a substantial growth spurt. League membership is up to new highs. (The *QST* print order for June is expected to be 145,000 copies vs. 128,000 a year ago.) Moreover, with WARC coming up in 1979, a visible demonstration of amateur radio's vitality is surely desirable to reinforce the amateur position at the Conference. All this adds up in the judgment of the Board to a clear go signal.

Where it is all going to happen is in every city, town and hamlet across the country. That's where amateur radio is and it is certainly where the new amateurs are. And, as always, it is the affiliated clubs, the backbone of amateur radio, that have the opportunity to do the job. Headquarters can help with the tools; the actual courses to produce new amateurs, as well as the follow-through to sustain the interest of these new amateurs and help them upgrade, will be conducted by the hundreds of present and new affiliated clubs that elect to participate in the program. Full details on all the elements of the new program and descriptions and samples of all the materials to be available will be forthcoming shortly.

For the long haul, this new development program can perhaps be described as Phase I in the League's plan to improve, expand and strengthen its ser-



Club and Training's first home: Behind the file cabinets in a corner of the Communications Department office. Diane Fleury handles affiliation matters.

vices to all affiliated clubs in the years ahead. Affiliation has worked well for both clubs and the League over the years, but there have been frustrations; the affiliation idea is still in many ways an undeveloped resource. That is going to change.

Phase II and Beyond

The new program was first presented as an idea at the January ARRL Board meeting. The creation of a new department and the entire preparation of the new program materials have all taken place since that time. Recruiting and building a staff, launching preparation of the new materials and maintaining existing club services have kept us thoroughly occupied. Yet some additional targets have been identified for the C & T Department.

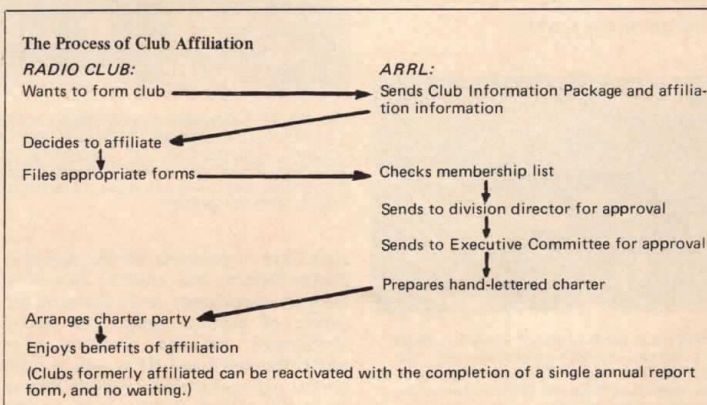
Following the Novice course, we expect to develop similar materials for other license classes as well, to assist affiliated clubs in carrying on continuing programs.

We will review all that is available and should be available in the training-aids library with a view toward upgrading and expanding films, slides, tapes

and visuals for club training, educational, informational and entertainment uses. We feel there is room for much improvement in training aids.

Changes have already been made in the "Radio Club News," the bulletin that goes to all affiliated clubs on a quarterly basis. We will continue efforts to make it a better exchange of good ideas from clubs, together with suggestions and guidelines for program chairmen, membership chairmen, licensing instructors and club news bulletin editors. More than 200 club bulletins are received each month at Headquarters. Each is carefully read and circulated among interested staffers. If we are not on your club's mailing list, we would very much appreciate being added.

None of what is being done in all this planning and preparation is cast in concrete. Comments, suggestions and constructive criticism will be warmly welcomed and much appreciated. Your ideas on how we can together help amateur radio to grow and to retain the vitality and special qualities we all value are what will give the program life. Let us have them. QST



Celebrating Our Legacy

Grandpa's Ham Radio Story

In 1922, my friend Steve Hobbs' grandfather, Ernest Hobbs, eagerly listened on frequencies below 200 meters to amateur radio enthusiasts as they entertained their neighbors and distant listeners with music, news of local interest, sermons, weather forecasts, crop estimates, and even stock market quotations. He especially enjoyed a local ham group in Cleveland, Ohio — the Cleveland Radio Association — operating under the ham license of Warren Cox, 8ACS, that had been broadcasting weekly concerts heard all over the northern US. However, on February 4, 1922, there was a temporary suspension of radio broadcasting by amateurs because of interference caused to commercial radio services.

In January 1923, Ernest, newly licensed as 8CUP, in Groton, New York, learned that he would not be able to broadcast music or news via ham radio; his separate operator and station licenses carried strict warnings against broadcasting. He was told that this might be only a temporary suspension by the US Commerce Department.

Ernest became very active in the ham radio hobby, and in 1934, he began to write for *Radio* magazine's monthly feature "From Ones to Nines: Doings of the Amateur in All U.S. Districts." His contribution was titled "New England Notes from W2DBP."

By 1941, Ernest (and many hams in the US and around the world)

enjoyed ham radio, until Congress shut down all amateur radio operations for the duration of World War II. When amateur radio activity resumed, many hams found military radio gear available for pennies on the dollar at local war surplus stores. Ernest purchased lightly used military gear, including aircraft ARC-5 radios, which he converted to ham radio frequencies.

My friend Steve was only 6 years old when his grandpa became a Silent Key, so he wasn't able to take advantage of having a family mentor. As a fireman/paramedic, Steve experienced a lot of radio communications, but he never became a ham radio operator. Now in retirement, and after finding a treasure trove of Ernest's old ham radio memories, he just might begin studying so that W2DBP may be heard on the airwaves again.

Dennis Lazar, W4DNN
Port Charlotte, Florida

Ham Radio Was Worth the Wait

My dad was a radioman in the US Coast Guard during World War II. I suppose knowing this was a factor in my becoming interested in amateur radio as a kid. I remember my dad used to tell a story of when he was an operator in Virginia, and a ship not too far off the Atlantic coast was in distress and couldn't be heard by the shore station. However, because of the skip on the band at that point in time, a West Coast station heard the distress call and relayed the information to my dad's post by landline. I was amazed at how the nearby



Bob Lankston's, WA7TZP, Novice station when his call sign was WN9FYF in 1971. [Bob Lankston, WA7TZP, photo]

station couldn't hear the radio call, but a station 3,000 miles away could hear it clearly!

During my grade-school days, my dad discouraged my interest in ham radio because of the technical content of the avocation. He suggested that I postpone my interest until high school, when I would know more about science and mathematics.

To ease my frustration, my grandfather loaned me a crystal radio that he built around 1920. In 1971, when I was in graduate school, I studied geophysics, and with the help of a Novice license course offered by the campus radio club, I earned my license with the call sign WN9FYF.

Bob Lankston, WA7TZP
Graham, Washington
Life Member

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

An In-Depth Look at the Heathkit SB-Line

In the November 1958 issue of *QST*, Collins Radio ran a full-page advertisement introducing the 75S-1 receiver and announced the Collins S-line amateur radio station, launching the era of smaller and lighter amateur radio equipment. Engineers at Heathkit felt they could make amateur radio equipment that looked like Collins, and they largely duplicated their function so hams felt like they were buying Collins-level performance radios for much less money. Heathkit's SB-line was the result of their quest to clone the Collins S-line in kit form.

The Heathkit LMO

Heathkit's SB-300 and SB-400 used the same variable frequency oscillator (VFO), called a linear master oscillator (LMO). The LMO was supplied in the kits fully assembled, with a warning not to open or tamper with it. The SB-303 and SB-313 solid-state receivers, the SB-102 five-band transceiver, and the SB-104 solid-state transceiver all used solid-state versions of the LMO. Heathkit made lower-cost versions of the SB-100 five-band transceiver covering 80/75, 40, 20, 15, and 10 meters in four segments. The lower-cost version of the SB-100 did not have the expensive Collins-like cabinet and the costly pre-assembled LMO; they were replaced by a solid-state customer-built VFO — the radio was known as the HW-100.

The SB-200

After the SB-300 and SB-400, the next item in the SB-line was the SB-200, which used a pair of 572B and T160L triode tubes — a knockoff of Collins Radio's 30L-1 linear amplifier. The SB-200 cost only \$200

in kit form and ran 1200 W peak envelope power on SSB and 1000 W on CW. The SB-200 linear amplifier became the SB-201 in 1978, but the selling price rose significantly to \$449.94. The SB-200 and SB-201 came with a tuned cathode input, which made them compatible with solid-state transceivers and transmitters, and a built-in SWR meter to check antenna operation. The SB-200 and SB-201 used a cabinet that was the same size as the SB-300 and SB-400, but didn't have the opening lid for safety reasons.

The 6-Meter SB-110 SSB/CW Transceiver

Heathkit next turned to transceivers, with something that Collins did not have: a 6-meter SSB/CW transceiver that didn't have any provisions for AM operation; 6 meters was still largely an AM band in 1965, when the SB-110 6-meter radio became available. The Collins 62S-1 transverter for 6- and 2-meter SSB and CW operation was introduced in 1963. Six-meter SSB didn't really begin to grow until 1966, when the low-cost, high-power Swan Electronics 250 SSB/CW radio with AM capabilities became available.

The SB-100 Low-Band Transceiver

In 1965, Heathkit introduced the 80/75-, 40-, 20-, 15-, and 10-meter SB-100 SSB/CW transceiver. The kit price of the transceiver was only \$360; it required a microphone or key, an antenna, a speaker, and a power supply to operate. Heathkit had already released kits for a fixed-station power supply (the HP-23) and a mobile power supply (the HP-13) to go with their single-band transceivers; the power supplies could be used with the SB-110 and SB-100 SSB/CW transceivers.

SB-Line Upgrades

In 1966, Heathkit started two initiatives with their already-successful SB-line, upgrading the major items and adding a series of accessory products to go with the line's transmitters, receivers, and transceivers. They first upgraded the SB-300 to the SB-301, which had a number of improvements, some of which included adding a RTTY position to the mode switch to allow the 850 Hz RTTY shift to be received with the SSB filter and the 170 Hz shift to be received using the optional 400 Hz wide CW filter, adding WWV reception



In 1967, the SB-100 transceiver was upgraded to the SB-101. [Photo courtesy of www.rigpix.com]



The solid-state SB-303 receiver. [Photo courtesy of www.rigpix.com]

by adding a 15.0 – 15.5 MHz band to the band switch, and allowing the 6- and 2-meter converters to be selected from a switch on the front panel, concentric with the RF gain control in the lower right corner.

Heathkit also updated the SB-400 to the SB-401. Of those updates, the most significant was the addition of a front-panel switch to select between transceiving with the receiver controlling the operating frequency or operating with the receiver and the transmitter each controlling their own frequency. The SB-400 required a change of internal cables to switch frequency-control modes, a much more cumbersome method of operation that was unique to Heathkit.

In 1967, Heathkit upgraded their SB-100 transceiver to the SB-101; it gained the ability to accommodate a 400 Hz wide CW crystal lattice filter (in addition to the SSB filter) and the ability to be modified to support the rare SB-640 remote VFO that allowed the receiver and transmitter functions to be set to different frequencies.

In 1968, Heathkit created a wildly popular lower-cost kit version of the SB-100 with the HW-100 for only \$250. The HW-100 reduced the cost of the SB-100/SB-101 by replacing the expensive cabinet with a simpler design that could be made in Heathkit's in-house metal shop, and the costly LMO with a much simpler solid-state VFO built by the purchaser. The HW-100 also replaced two rotary switches and knobs with two three-position slide switches for the LSB/USB/CW function selector. Heathkit claimed the HW-100 was the fastest-selling amateur radio transceiver, and no doubt it was.

There was a great deal of activity for the SB-line in 1970. The solid-state SB-303 receiver was similar in concept to the SB-301 in that it covered the same bands and WWV, accommodated an optional CW

and AM filter in addition to the supplied SSB filter, and could switch two optional converters for 6 and 2 meters. The SB-303 added an RF attenuator control with a range of 40 dB.

The popular SB-101 became the SB-102. It used the same solid-state LMO as the SB-303 receiver, and it had the ability to operate with the SB-500 2-meter SSB/CW transverter by plugging into the rear of the radio and connecting a few other cables.

Heathkit also updated the HW-100 to the HW-101. It gained a switch to select between an SSB and CW bandwidth receive filter. The HW-101 went up almost \$150, selling at \$399.95. It stayed in the Heathkit product line until 1983, making it one of the last vacuum-tube radios for sale, outliving even the solid-state replacement for the SB-102 by many months. The HW-101 used a 6HS6 tube in the receiver's RF amplifier, with a few circuit changes to improve receiver sensitivity, as was done with the SB-102.

The SB-104

The solid-state SB-104 became available in 1974, just before the SB-102 was discontinued in 1975. It was released with a complete family of accessories, including the SB-604 speaker that also housed the power supply for \$33.95, the HP-1144 ac power supply for \$99.95, the SB-614 monitor oscilloscope for \$199.95, the SB-634 station console for \$199.95, the SB-644 remote VFO for \$134.95, and the SB-230 conduction-cooled linear amplifier with an Eimac 8873 triode tube for \$469.95.

The SB-104 80/75- to 10-meter 100 W input SSB/CW transceiver soldiered on until 1982, with a significant update to the SB-104A in 1977. Heathkit corrected many issues with the SB-104/SB-104A, as they cost the company a great deal of money and customer satisfaction. The HW-104 lower-cost version of the SB-104 came out in 1975, and it eliminated the digital readout to the nearest 100 Hz, replacing it with a mechanical dial. The HW-104 cost \$569.95 — a substantial increase from the HW-100 at \$250 just 7 years earlier.

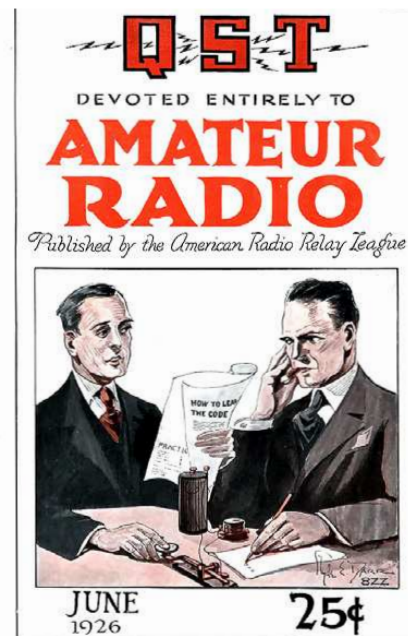
Heathkit's Last 80/75- to 10-Meter Transceiver

The end of Heathkit's 80/75- to 10-meter transceivers came with the SS-9000 in 1982. The low-cost version of the SS-9000 was the HW-5400 eight-band kit transceiver that added the World Administrative Radio Conference bands and sold for \$499.95. Heathkit reportedly lost more than \$3,000,000 on this project and hasn't done any major-scale projects since.

100, 50, and 25 Years Ago

June 1926

- The cover, by Clyde Darr, 8ZZ, depicts two hams practicing Morse code.
- In the editorial, Kenneth B. Warner, 1BHW, writes about "The Problem of Regulation," after a court ruling from the government against Zenith regarding wavelength usage.
- Technical editor Robert S. Kruse, 10A, interviews Dr. E. F. W. Alexanderson about "Polarized Transmission."
- In "Of, By and For the Beginner," J. T. McCormick, 9BHR, recounts his struggles getting his first contact.
- "High Adventure in the Northland" by Kenneth B. Warner, 1BHW, discusses how shortwave amateurs are the sole method of communication for three Arctic expeditions.
- C. T. Burke describes the importance of transformers, tubes, and reproducers in "Amplifier Ins and Outs."
- John M. Wells, 1CAK, 1ZD, 1XAX, and E. D. Tillyer explain the construction and adjustment of "A Multi-Stage Crystal-Controlled Transmitter," in which a thick crystal is used to control a low-power tube.
- "A. R. R. L. Standard Frequency Station 1XM" by Killian V. R. Lansingh highlights the setup at the experimental station of the Massachusetts Institute of Technology Radio Society.



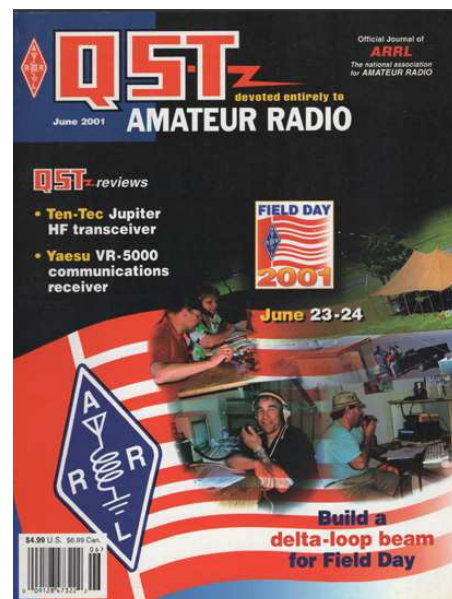
June 1976

- The cover shows the Summer Olympics in Montreal, where CZ20 will operate around the clock during the games.
- In "It Seems to Us...Onward and Upward," Richard L. Baldwin, W1RU, asks amateurs to make more use of the UHF-and-above spectrum.
- James R. Fisk, W1DTY, offers some "Helical-Resonator Design Techniques" for solving spurious responses at VHF and UHF.
- In "Your Radio Signal — Short May It Wave," Margaret Koerner, WBØBEM, provides a basic overview of radio waves.
- In the sixth part of their series on "Learning to Work with Integrated Circuits," Jerry Hall, K1PLP, and Charles Watts, WA6GVC/1, discuss the differences between digital and linear integrated circuits.
- In part one of "His Eminence—the Receiver," Doug DeMaw, W1CER, describes his design for a station receiver for use in areas of high signal density.
- Wes Hayward, W7ZOI, builds on W1CER's work with designs for a family of high-performance HF-band converters for the receiver in "CER-verters."
- In "Odyssey," Linda S. Cleveland, WB4CTR, narrates her journey to earning her Technician license.



June 2001

- The cover features Canada's VA3RAC crew, who had stations on the air from 160 meters to 3 centimeters during ARRL Field Day 2000.
- In "It Seems To Us...Article S25: More Than Morse," David Sumner, K1ZZ, discusses aspects of the review of Article S25 set for the 2003 World Radio-communication Conference.
- Paulo N. Jorge, CT1EFL, writes about "The Spot Grabber," a tool for monitoring DX-cluster activity without a computer.
- Wes Hayward, W7ZOI, and Bob Larkin, W7PUA, provide some basic homebrewed instruments for "Simple RF-Power Measurement."
- "Gain without Pain—A Beam Antenna for Field Day" by Bob Clarke, N1RC, describes a variety of delta-loop-based beams made with low-cost PVC pipe, electrical wire, and coax.
- Neville Cheadle, G3NUG, highlights the D68C DXpedition to the Federal Islamic Republic of the Comoros in 2001, which broke many world records and established a new record of 168,722 contacts, in "The D68C Story."
- In "The Arkansas Catfish Dipole," David G. Byrd, KD7VA, describes a low-cost portable 20-meter antenna.
- Colin Robertson, ZS2CR, profiles Iris Hayes in "ZS2AA: South Africa's Grand Old Lady of the Airwaves."



Silent Keys

It is with deep regret that we record the passing of these radio amateurs:

N1BXB
 ▼KA1CJP
 ◆N1CL
 ▼N1DNN
 ◆KC1DOD
 ▼K1DOW
 ▼K1EDP
 K1HKF
 KB1IAN
 ◆N1LGH
 K1NMM
 AC1UO
 ▼K1WMP
 ▼N1ZD
 WA1ZFD
 W2CDS

 ▼WA2CWF
 WB2EYE

 WA2FAX
 ▼N2HR
 N2HYG
 WA2IIE
 ▼K2JIT
 ▼AE2R
 W2VDH
 N2GY
 KA2YEO
 ▼N2YQW
 ▼W2YWC
 ▼◆W3ASK
 ▼W3DVT
 AA3F
 ▼N3GWV
 ◆NE3H
 ▼WV3M
 WA3MPX
 KB3NXT
 N3RCN
 KB3RFB
 ▼WA3TD
 ◆AA3TK
 ▼N3UDQ
 WA3WGJ
 W3WLW
 W3WVG
 W3WYO
 ◆W4AVY
 ▼K4BEB

 K4BXX
 W4CZF
 ▼K4DKM
 ▼KC4EMS
 WA4FV
 KW4GB
 N4HCZ
 N4HHP
 WJ4ID
 W4IIC
 ▼K4JA
 KF4KCA
 ▼KQ4KIC
 N4KYW

 W4LOV
 ◆▼◆N4LZ

 ▼W4MOR

Staire, Arnold W., Torrington, CT
Bonnette, Lawrence, Webster, MA
Long, Christopher D., Maple Valley, WA
Segel, William D., Montpelier, VT
Pineault, Matthew D., Norwood, MA
Tower, Harvey R., Arcadia, FL
Slosberg, Richard M., Hanover, NH
Dorsky, Jerome I., Falmouth, ME
Pottier, John J., Beverly, MA
Stone, Barbara K., Northford, CT
McCue, Brian E., Pittsford, MA
Simmons, Chuck N., Marlborough, MA
Peters, William "Bill" M., Hesperia, CA
Payne, Duncan "Dee" P., Norwalk, CT
Levine, Edward A., Orr's Island, ME
Sullivan, Cecil A., Egg Harbor Township, NJ
Neri, Brian N., Boston, NY
Thompson, William B., Atlantic City, NJ
Price, Brian D., Lanoka Harbor, NJ
Scoblick, Francis J., Johnson City, NY
Danielczyk, Paul E., Toms River, NJ
Hurney, Paul J., Fair Lawn, NJ
Kester, Robert W., Fairport, NY
Bergman, Frederick A., Altamont, NY
Eisenstadt, Howard M., Summit, NJ
Dayton, Richard S., Southampton, NJ
Competillo, Michael, Groton, NY
Meaux, Hollins M., Albany, NY
Moskowitz, Harvey S., Caldwell, NJ
Jacobs, George, Silver Spring, MD
Hain, Wilbur "Bud" A., Middleburg, PA
Mayo, Ralph E., Allentown, PA
Garvin, William, Sykesville, MD
Shuey, Joseph B., Camp Hill, PA
Breish, Joseph J., Coopersburg, PA
Goodspeed, Gary C., Erie, PA
Konas, Joseph J., Ashland, PA
Doss, Michael W., Elkton, MD
Murray, Laura V., River Ranch, FL
Shearer, Jeffrey R., Latrobe, PA
Kavic, Thomas A., Sewickley, PA
Koebe, Roger A., North East, PA
Shelton, Howard D., Oak Grove, LA
Litteral, Mark R., Clinton, PA
Come, Richard B., Waterford, PA
LePage, Charles M., Sykesville, MD
Crane, Robert "Gary," Springfield, AL
Willingham, Thomas A., Punta Gorda, FL
Davis, Jeffery D., New Castle, IN
Marley, Thomas C., Cincinnati, OH
Lane, James R., Franklin, NC
Hanbury, John P., Havana, FL
Gentry, William D., Woodstock, VA
Blankenship, Gary C., Cope, SC
Griggs, Robert M., Lakeland, FL
Terrill, Robin E., Hyden, KY
Henderson, Teresa D., Clinton, TN
Condie, Charles A., Oneida, TN
Hellenberg, Paul J., Dry Ridge, KY
Coffman, Ronald E., Hohenwald, TN
Newton, Samuel R., Valley, AL
Goodman, Howard A., Poughkeepsie, NY
Hensley, James M., Cocoa, FL
Schietecatte, Maurice L., Summerfield, FL
Jacobsen, Jimmie D., Lake City, FL

KE4NGM
 KE4NLT
 K4NRA
 ◆K4JNU
 ◆K4OCI
 ▼N4OGJ
 KI4PJI
 ▼KW4PRO
 ◆WB4QBE
 ▼W4QNW
 ▼NC4RS
 ▼K4SBZ
 KB4SFN
 WB4SUO
 ▼KB4TH
 ▼WB4UVW
 ▼WJ4W
 AF4XZ
 ▼KB4ZAA
 ▼WB4ZAR
 KO4ZSK
 WA4ZUM
 ▼W5AKE
 ◆WA5ANF
 ▼W5BJV
 ▼KC5DS

 ▼KC5EIU
 ▼NJ5G
 K5MGO
 ▼W5QJE
 ▼KD5RSY
 KI5TE
 KB5TPV
 KD5YVQ
 AC5Z
 W6EGZ
 ◆W6LXA

 ▼K6MXI
 ◆KH6NO
 ▼AA6PB
 KB6PR
 K6RF
 AC6SF

 ▼AG6SI
 ▼N6TB
 KB6TR
 WB7BVM
 K7DYY
 KL7E
 AI7H
 WA7HMM
 ▼KE7IZH
 ▼KD7JFC
 ▼WA7MRJ
 K7NXX
 ▼N7TYO
 ◆K7VK
 WA8AVO
 WD8BAN
 KE8BDO
 ▼N8CW
 ◆WA8GEO
 ▼K8GVK
 W8HXY
 N8HOQ
 N8HZL

Orander, Betty "Meme" J., Raleigh, NC
Atkinson, Don H., Grant, FL
Ritchie, Ray D., Timberville, VA
Gentle, Bruce G., Vernon, AL
McElroy, Benjamin R., Fairfax, VA
Shaw, James H., Richmond, VA
Furr, Richard C., Blacksburg, VA
Wise, Jan F., Horseshoe Bend, AR
Tabor, Roy J., Youngsville, NC
Tames, Sherwin F., Bluffton, SC
Selmont, Ralph M., Raleigh, NC
Zawrotny, Stanley B., Tallahassee, FL
Parker, Joe T., Lebanon, TN
Breeding, Fred A., Cookeville, TN
Bishop, William Y., Huntsville, AL
Griffin, Charles H., Clarkston, GA
Jones, Lemuel, Gainesville, FL
Collette, John M., Trion, GA
Kraft, Donald, Springfield, VA
Carpenter, John L., Franklinton, NC
Bass, Garrett L., Adamsville, TN
Mullins, Jerry F., Pamplico, SC
Allen, John W., Manvel, TX
Gannon, Daniel P., Houston, TX
Richmond, Paul N., Metairie, LA
Schaeffer, Philip A., Pass Christian, MS
Roundtree, Robert, Lawton, OK
Greenlee, Patrick W., Asher, OK
Payne, Harold D., Taylor, AR
France, Karl E., Akron, OH
Waldo, Harley M., Shelby, MI
Brown, Bruce A., Lawton, OK
Shepan, Dennis R., Van Horn, TX
Polinski, Robert J., Kingwood, TX
Quarterman, Clayton E., Brandon, MS
Elovitz, Michael, Carlsbad, CA
Purgill, Leonard R., Thousand Oaks, CA
Ferrera, Allen B., Santa Rosa, CA
Hew, Wilmer K. F., Henderson, NV
Jensen, Paul E. T., Pleasanton, CA
Knox, Wesley L., Yucaipa, CA
Hunter, Howell "Hal," Oakdale, CA
McCune-Gardner, Bev J., Casa Grande, AZ
Gaschk, Raymond W., Medford, OR
Aitken, Donald G., Irvine, CA
Sturmey, Terence A., Oroville, CA
Hamblin, Duane E., Roosevelt, UT
Franklin, Bruce D., Bremerton, WA
LaVarnway, John P., Wasilla, AK
Stuckey, Edward L., Post Falls, ID
Anarde, Darrell G., Renton, WA
Foulke, Alfred J., Hereford, AZ
McMahon, Thomas T., Lindon, UT
Huffman, Robyn D., Chipley, FL
Johnson, Lloyd, Tucson, AZ
Culver, David R., Sisters, OR
Applegate, Vick J., Missoula, MT
Williams, Rolly L., Middletown, OH
Zastrow, Douglas, Gahanna, OH
Paolacci, George L., Traverse City, MI
Davis, Robert M., Cincinnati, OH
Savage, William S., Seven Hills, OH
Metzger, Dave P., Williamston, MI
Reith, David J., Kent, OH
Robins, Russell H., Chesterfield, MO
Weinmann, William J., Chesterfield, MI

▼K18I
 ◆N8JH
 ◆K8KK
 KD8KK
 ◆N8LFK
 KC8NQJ
 ▼WB8NUS
 ▼KD8OEJ
 WB8PHH
 ▼KD8PRX
 WO8R
 KA8RCQ
 KE8TEN
 WB8UPA
 ▼KR8V

 ▼W8WRS
 ◆W9ANY
 W9APM

 KD9BMG

 ▼KD9CLG
 ▼KA9CPB
 K9ESK
 K9FRY
 WB9GAT
 W9LB
 ▼N9LCE
 KD9LTN
 ▼W9NHE

 KB9NTH
 ▼K9OGZ

 ▼KC9SX
 ◆WD9USA
 KD9VEX
 WB9BQV
 KB9CH
 W9DDM
 KF9DOR
 WD9HWL
 ▼W9IDI

 KE9ILD
 K9IZI
 KD9JIY
 KI9LQ
 ▼W9MQY
 W9NGK
 KT9NY
 ▼AB9SE

 KB9SEK
 ◆KC9URL
 ▼K9URU
 ▼KC9YQU
 VA3HN

 ◆ARRL Life Member
 ◆Current Diamond Club
 ◆Maxim Society
 ▼Veteran
 • Former call sign
 For information on how to list a Silent Key in QST, please visit www.arrl.org/silent-key-submission-guidelines.

Higley, David L., St. Albans, WV
Simons, James D., Hersey, MI
Kunde, Keith A., Independence, OH
Smole, Victor J., Rocky River, OH
Farquharson, Leland F., Zanesville, OH
Moore, Rosemary, Hartland, MI
Tillison, Donald L., Lansing, MI
Clark, Marshall E., Hilliard, OH
Safran, Frank, Cortland, OH
Hill, John, Rockbridge, OH
Hartge, Michael L., Shelby, OH
Anthony, Albert M., Paw Paw, MI
Robins, Andrew C., Kalamazoo, MI
Saepic, Russell C., Brunswick, OH
Rutledge, Gary R., Clinton Township, MI
Harmer, John D., Columbus, OH
Camfield, Eugene J., Grand Haven, MI
Pawlik, James R., Arlington Heights, IL
Rogers, James "Jimmy" M., Sullivan, IN
Kudrie, Albert C., Appleton, WI
Knapp, Clayton R., Wichita Falls, TX
Kronenwetter, Charles, New Berlin, WI
Fry, Laurence O., Janesville, WI
Pence, Howard W., Montpelier, IN
Benham, Larry G., Oakland City, IN
Wood, Lawrence E., Wilmette, IL
Bergren, Michael R., Coal Valley, IL
Willett, Theodore "Teddy" R., Milwaukee, WI
Etchison, Kevin K., Alexandria, IN
Wesolowski, Ferdinand A., Waukesha, WI
Crusie, Bernard "Butch" E., Elkhart, IN
Mhoon, Hankey, Skokie, IL
Marky, Gregory N., Chesterton, IN
Ashby, David A., Gilbert, IA
Mayer, Wayne G., New Brighton, MN
Miller, Don D., Lincoln, NE
Ray, Steven L., Lebanon, MO
Bolduan, Ronald R., Aberdeen, SD
Falkenbury, Quentin J., Clay Center, KS
Cook, Ronald L., Colorado Springs, CO
Arbuckle, John W., Ankeny, IA
Amelung, Robert L., St. Louis, MO
Freeman, Eugene P., Paducah, KY
Porter, Joe D., Pittsburg, KS
Luetkemeyer, John R., California, MO
Estep, Preston W., St. Louis, MO
Sherman, Byron "Wes" W., Columbia, MO
Uitts, Kent D., Iola, KS
Goebel, Alvin R., Plymouth, MN
Lovison, Robert D., Manzanola, CO
Hansen, Mike D., Hayward, MN
Hamblin, Thomas M., Scarborough, Ontario, Canada

HAM RADIO OUTLET®

WWW.HAMRADIO.COM

HRO is Your Field Day Headquarters!



IC-9700 | All Mode Tri-Band Transceiver

- VHF/UHF/1.2GHz • Direct Sampling Now Enters the VHF/UHF Arena • 4.3" Touch Screen Color TFT LCD • Real-Time, High-Speed Spectrum Scope & Waterfall Display • Smooth Satellite Operation



IC-PW2 | HF-50 MHz 1kW Linear Amplifier

- 1kW Output Full Duty Single Operator Two Radios (S02R) • Built-in Automatic Antenna Tuner • Detachable Controller with Touch Screen Display • 2x6 Automatic Antenna Selector - 2 Radio Inputs & 6 Antenna Connections



Two versions available!

IC-V3500 | 144MHz FM Mobile

- 65W of Power for Long Range Communications • 4.5 Watts Loud & Clear Audio • Modern White Display & Simple Operation • Weather Channel Receive & Alert Function



IC-7760 | HF150MHz All Mode Transceiver

- New Design-Remote Control Head & Separate RF Deck • Dual Independent Receivers, Spectrum Scope & Waterfall • 200 Watts Output 100% Duty Cycle • Flexible Remote Operation Capabilities



IC-705 | HF/50/144/430 MHz All Mode Transceiver

- RF Direct Sampling • Real-Time Spectrum Scope and Waterfall Display • Large Color Touch Screen • Supports QRP/QRPP • Bluetooth® and Wireless LAN Built-in



ID-50A | VHF/UHF D-STAR Portable

- High Visible LCD with Backlight Function • Find Nearby Repeaters with the Built-In GPS • Easy D-STAR Settings for Beginners • Voice Recorder Function • Share Pictures in DV Mode

IC-7300 version available!



IC-7300MK2 | HF/50MHz All Mode Transceiver

- HDMI™ Port for External Display • RX-ANT Connectors for Band Pass Filters, Preamps & Receiving Antennas • Built-In CW Decoder • APF (Audio Peak Filter) for CW Signals



IC-7100 | All Mode Transceiver

- HF/50/144/430/440 MHz Multi-band, Multi-mode, IF DSP • D-STAR DV Mode (Digital Voice + Data) • Intuitive Touch Screen Interface • Built-in RTTY Functions

IC-V86 | VHF 7W HT

- 7W Output Power Plus New Antenna Provides 1.5 Times More Coverage • More Audio, 1500 mW Audio Output • IP54 & MIL-STD 810G-Rugged Design Against Dust & Water • 19 Hours of Long Lasting Battery Life • 200 Memory Channels, 1 Call Channel & 6 Scan Edges



Two versions available!



IC-7610 | HF/50 MHz All Mode Transceiver

- Large 7-inch color display with high resolution real-time spectrum scope and waterfall • Independent direct sampling receivers capable of receiving two bands/two modes simultaneously



IC-2730B version available!

IC-2730A | VHF/UHF Dual Band Transceiver

- VHF/VHF, UHF/UHF simultaneous receive • 50 watts of output on VHF and UHF • Optional VS-3 Bluetooth® headset • Easy-to-See large white backlight LCD • Controller attachment to the main Unit



IC-T10 | Rugged 144/430 MHz Dual Band

- Disaster Ready - Excellent Fit for Your Emergency Bag • Loud Audio - New Speaker Design • Long Battery Life - Up to 11 Hours • FM Broadcast & Weather Channels



IC-R8600 | Wideband SDR Receiver

- 10 kHz to 3 GHz Super Wideband Coverage • Real-time Spectrum Scope w/Waterfall Function • Remote Control Function through IP Network or USB Cable • Decodes Digital Incl P25, NXDN™, D-STAR • SD Card Slot for Receiver Recorder



ID-5100 AD VHF/UHF Dual Band Digital Transceiver

- Analog FM/D-Star DV Mode • SD Card Slot for Voice & Data Storage • 50W Output on VHF/UHF Bands • Integrated GPS Receiver • AM Airband Dualwatch

ID-52A Plus version available!

ID-52A | VHF/UHF D-STAR Portable

- Bluetooth® Communication • Simultaneous Reception in V/V, U/U, V/U and DV/DV • Enriched D-STAR® Features Including the Terminal Mode/Access Point Mode • UHF (225~374.995MHz) Air Band Reception



5 Ways to Shop!

- RETAIL LOCATIONS - Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE - Toll-free phone hours 9:30AM - 5:30PM
- ONLINE - WWW.HAMRADIO.COM
- FAX - All store locations
- MAIL - All store locations

ICOM®

FOLLOW HRO ON SOCIAL MEDIA



twitter.com/HamRadioOutlet
facebook.com/HROHamRadioOutlet
instagram.com/HamRadioOutlet
youtube.com/HamRadioOutlet

HAM RADIO OUTLET®

WWW.HAMRADIO.COM

Family owned and operated since 1971



FTDX101MP | 200W HF/50MHz Transceiver

- Hybrid SDR Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Scope Display 3DSS • ABI (Active Band Indicator) & MPVD (Multi-Purpose VFO Outer Dial) • PC Remote Control Software to Expand the Operating Range • Includes External Power With Matching Front Speaker



FTDX10 | HF/50MHz 100 W SDR Transceiver

- Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Shape Factor • 5" Full-Color Touch Panel w/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SCU-LAN10)



FT-991A | HF/VHF/UHF All Mode Transceiver

- Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 Inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO



FTDX101D | HF + 6M Transceiver

- Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled -70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream

FT-710 Field version also available!



FT-710 Aess | HF/50MHz 100W SDR Transceiver

- Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner



FT-891 | HF+50 MHz All Mode Mobile Transceiver

- Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control



Two versions available!

FT-3185RASP | Heavy-Duty 85W 2M FM Transceiver

- Massive Heatsink Ensures Reliable 85W RF Power • Super-DX Function Increases Receiver Sensitivity & Weak Signal Reception • 221 Memory Channels • Large 6-Character Alpha-Numeric Display



Two versions available!

FTM-150RASP | 2M/430MHz FM True Dual Band Xcvr

- Dual Receivers Allowing (V+V, U+U, V+U, U+V) Operation • 55W VHF & 50W UHF • Heavy Duty Heat Sink w/Funnel Air Convection Conductor • Front & Main Body Speaker for 6W High Quality Audio



Two versions available!

FTM-510DRASP C4FM/FM 144/430MHz Dual Band Xcvr

- New Super-DX & ASP (Audio Digital Signal Processor Unit) • True Dual Bank Receive (V+V/U+U/V+U/U+V) • C4FM/C4FM Digital D-D Dual Receive • 2.4" High-Res Full-Color Touch-Panel Display • Wireless Operation Capability with Optional Bluetooth® Headset



FTX-1 Optima | HF/50/144/430MHz All Mode SDR Xcvr

- Detachable Field head For QRP SOTA/POTA Adventures • Attach Field Head to SPA-1 For 100 Watts (Base Operations) • SPA-1 Includes Internal HF Antenna Tuner • SSB, CW, AM, FM and C4FM Digital



FTX-1 Field | HF/50/144/430MHz All Mode SDR Xcvr

- Compact QRP SOTA/POTA Xcvr (8.4"W, 3.5"H, 2.2"D) • 6W (5W for QRP) • Includes 6400mAh High Capacity Li-ion Battery • SSB, CW, AM, FM and C4FM Digital • 10W of Power w/External Power Supply • Upgradable to 100W with Purchase of SPA-1



FT-70DR C4FM/FM 144/430MHz Xcvr

- System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging

FT-5DR

C4FM/FM 144/430 MHz Dual Band

- High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth® Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot



VX-6R | VHF/UHF Tri-Band Hand-Held

- Big-Radio Features in a Compact Package • Wide-band Receiver Coverage for Catching All the Action! • 900-Channel, 24-Banks Memory System • Outdoor-Ready Features including Waterproof Rating • Smart Search Automatic 31-Channel Scanning/Loading System



5 Ways to Shop!

• RETAIL LOCATIONS – Store hours 10:00AM - 5:30PM - Closed Sunday

• PHONE – Toll-free phone hours 9:30AM - 5:30PM

• ONLINE – WWW.HAMRADIO.COM

• FAX – All store locations

• MAIL – All store locations

YAESU
The radio

ANAHEIM, CA
(800) 854-6046

PORTLAND, OR
(800) 765-4267

PHOENIX, AZ
(800) 559-7388

MILWAUKEE, WI
(800) 558-0411

WOODBIDGE, VA
(800) 444-4799

WINTER SPRINGS, FL
(800) 327-1917

SACRAMENTO, CA
(877) 892-1745

DENVER, CO
(800) 444-9476

PLANO, TX
(877) 455-8750

NEW CASTLE, DE
(800) 644-4476

SALEM, NH
(800) 444-0047

ATLANTA, GA
(800) 444-7927

Earn points, get rewards. It's free to join!



**MORE POWER IN
EVERY PURCHASE!**

SCAN FOR DETAILS.



RACK UP QSO POINTS

Earn 1 QSO Point for every \$1 US dollar spent on thousands of eligible items when you order online or by phone.

Retail Store purchases and order pick-ups may result in even greater rewards.

GET REWARDS

For every 250 QSO Points, get \$5 in DX Bucks™ in your account!

JOIN TODAY

It's **FREE** to join! Visit DXEngineering.com/rewards to enroll.

Retail Store customers are automatically enrolled in the program.

Must be at least 18 years old and a legal resident of the United States, a Territory of the United States (including APO/FPO addresses), Canada, Mexico, or Australia. Other restrictions apply.

DXENGINEERING.COM • 800-777-0703



<http://amrad.io>



Think to time.

3-Year Membership Offer!

Receive this limited-edition Gil cartoon coffee mug when you renew your ARRL membership for 3 years – the second in the series.

Use code **GILQST**



Gil Gildersleeve, W1CJD

www.arrl.org/membership

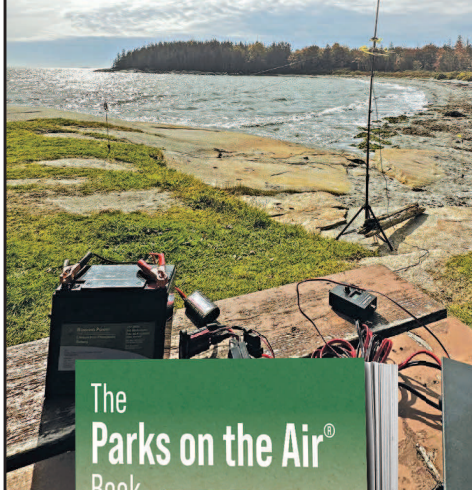
This offer applies to a 3-year standard membership.

Not valid for student, life, or international memberships.

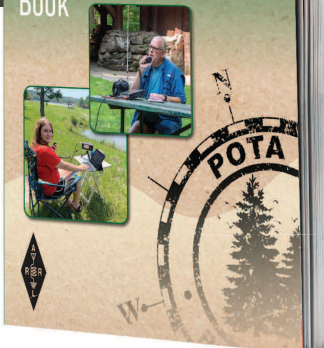


ARRL
The National Association for
Amateur Radio®

Get Started in POTA!



The Parks on the Air® Book



Think outside the shack!
You never know what exciting
adventure awaits. Fresh air,
beautiful scenery, wildlife, and
new friends are waiting for you.

Topics Include:

- Multi-park roves
- QRP operation
- Satellite operation
- Surefire wire antennas
- Activating urban parks
- CW and POTA

Parks on the Air® Book

Item No. 1748 | Retail \$22.95

Member Price \$19.95

www.arrl.org/shop

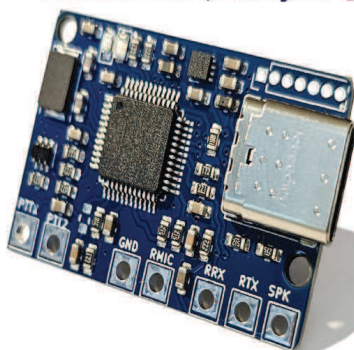


ARRL

The National Association for
Amateur Radio®

Expensive USB TNCs are dead.

APRS, FT8, JS8CALL, VARA, CW, PSK, Olivia, RTTY, Winlink, VARAC,
M17, MT63, Robust Packet, WEFAX, and even plain old analog FM.
With the AIOB, even your 40 year old FT-757 can work digital modes.



AIOB

All-In-One-Board

only from bigtimeradio.us



Dual Band 2M/440 and other models

EmComm,
Satellite work,
long distance
simplex and
repeater use.

Elk Antennas
Log-Periodic Antennas
for the Radio Amateur
jim@siemons.com
www.ElkAntennas.com



Still Struggling With Your 20-Year-Old Repeater Controller?



**More Power, More Features
Less Money**

**State-of-the-Art Repeater
Controllers and Accessories**

Arcom

Aurora, OR 97002 (503) 678-6182
www.arcomcontrollers.com

ARRL Field Day is June 27-28



AMATEUR RADIO

FD★26

A NATIONAL RESOURCE

www.arrl.org/FieldDay

NEW RELEASE

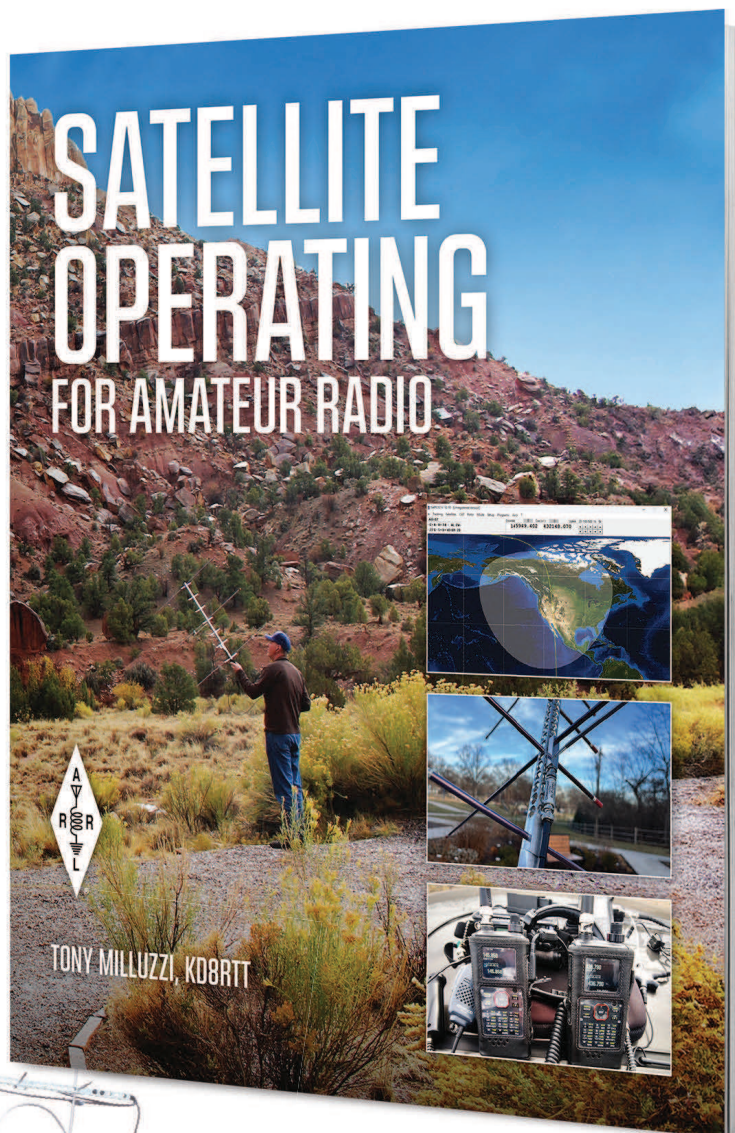
SATELLITE OPERATING FOR AMATEUR RADIO

WORK THE BIRDS!

Satellite Operating for Amateur Radio makes satellite operation **exciting, approachable, and fun**. Whether you've wanted to work the "birds" but found tracking them intimidating—or weren't sure you had the right equipment—this book shows just how **easy and rewarding** satellite contacts can be.

Includes:

- Listening to Your First Amateur Satellite Pass
- Making Your First Satellite Contact
- Linear Transponder Satellite Operations
- Digital Satellite Operations
- Antennas for Satellite Operating
- Software and Mobile Applications
- The Amateur Radio Satellite Community



Tony Milluzzi, KD8RTT

Satellite Operating for Amateur Radio

ARRL Item No. 2363 | Member Price \$22.95/ea. | Retail \$25.95/ea.

Order online at www.arrl.org/shop | Phone 860-594-0200

REACH NEW HEIGHTS!



**ARRL DUAL-BAND 2 M/70 CM
HANDHELD YAGI ANTENNA**

Take your amateur radio experience to the next level. This compact, handheld directional antenna lets you track satellites, hunt hidden transmitters, and receive signals from weather satellites. Quick to assemble and easy to carry, it delivers excellent performance wherever your adventures take you.

- No-tools assembly—ready in minutes
- Dual radio capable with included diplexer (10 W max, >50 dB isolation)
- Comes with carrying bag and step-by-step instructions

**ARRL Item No. 0090
Retail \$99.95**

Order online at
www.arrl.org/shop



ARRL

The National Association for
Amateur Radio®



HAMMOND®



**MANUFACTURING FOR
RADIO SINCE 1917**

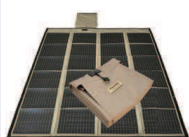
- Racks & Cabinets, Shelves, Panels, Drawers
- Small Cases & Project Boxes
- Transformers



Technical Data, Drawings,
List of Stocking Distributors:

hammondmfg.com

Foldable Solar Panels



PowerFilm.
Made in the USA SOLAR

5 to 220 Watts

sales@californiipc.com
(877) 487-1213

CaliforniaPC.com

TUBES

• 100% Tested
• 1-year Warranty
• Matched Groups

800-421-4219 (ext 119)
www.PentaLabs.com

Air Boss Antenna Launcher

www.olahtechnologies.com

See Video

For when you want your antenna on top

\$99.99

Free shipping to lower 48
olahtechnologies@gmail.com

**Fun and affordable kits from
Pacific Antenna**



Tracer Injector



Tenna Dipper II



Micro Attenuator



Mini SWR Indicator

See our selection of quality
Kits starting at \$5
www.qrpkits.com



The Only Separation Kit You'll Ever Need
\$89.95 Complete with 15' VGA Cable

Radios & Tested Separation	
Yaesu	Kenwood
FT-891 100'	TM-D710A/G 75'
FT-857 75'	TM-V71 75'
FTM-300, 6000 15'	TS-480 100'
FTM-100/400 90'	TM-D700 100'
FTM-500 15'	TS-2000 100'
FT-7-8xxx* 100'	

* Also TYT TH-9800

† Tested with 15' VGA cable only

ICOM

IC-880H 15'†

IC-2720/30H 100'

IC-2820H 25'

ID-4100A 65'

ID-5100 100'

IC-7100 100'

IC-7100 USB port can be extended up to 50'

NEW! UNIVERSAL KIT WITH 15' VGA CABLE \$89.99 COMPLETE

www.SwapMyRigs.com



CHATTANOOGA, TENNESSEE

1.833.456.4673

**We Are Your One Stop
Radio Shop**

C. CRANE CC SKYWAVE SSB 2

Portable Radio With AM, FM, SW, SSB, Weather + Alert & VHF Aviation

- Superior radio reception and clear audio for its small size. Portable SW antenna, and "voice tuned" earbuds included.
- Engineered for DX performance, excellent sensitivity & signal clarity. Fine tune SSB with 10 Hz resolution for better audio and reception.
- High-sensitivity DSP design, 400 memory presets, direct-entry keypad, LCD display, adjustable squelch for VHF, and external 3.5mm antenna jack. In-circuit charging for NiMH batteries.



4.75" W x 3" H x 1.1" D

Use Code **ARRL25** for 10% Off Your Order!*

Call To Order or Request A Free Catalog
1-800-522-8863 or online at ccrane.com/arrl

U.S. Based Customer Service & Tech Support

*Some exclusions apply. Offer ends 5/31/26



PicoFox r3

Open Source Fox Transmitter

Ready to Hunt In Minutes

Ships fully assembled; add your callsign and go.

- **Power for Hunts Big & Small** Transmits up to 65mW.
- **Adjustable Difficulty** Reduce power as low as 0.1mW.
- **Easy Setup, No Software** Configuration is just a text file.
- **Battery Lasts All Day** 1200mAh LiPo transmits 5+ hrs at 100% output.
- **Made to Tinker** Fully open source hardware & software.

Technicals

- RP2040 MCU
- 16Mb Flash
- 144-148MHz Transmitter
- 20 Pin GPIO Header



Order at
www.picofox.radio/qst



NEW & IMPROVED!



Designed & Assembled by Hams in the USA!



Offering the Gold Standard in AMATEUR RADIO PRODUCTS

Desktop Tuners
Zero Power Tuners
Remotes
Baluns/ Ununs
Meters
Cables
Analog Audio Filters

LDGelectronics.com
Contact Us: 410-586-2177



**CUSTOM
VINTAGE
QSL CARDS**
Hand Designed in the USA

Modern or vintage, make your QSL cards frameworthy and unique at **BIGTIMERADIO.US**

Structural Analysis
of Towers
TIA-222 latest Rev.

Foundation and
Anchorage Design

Building Code
Compliance

Analytical Engineering Inc.

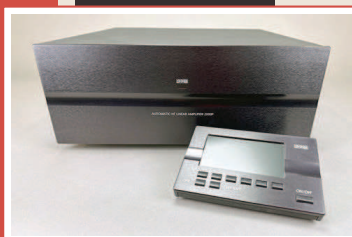
W. A. Shaheen PhD, PE
Licensed in Numerous States

413.467.3141

billshaheen@analytical-engineering.com



**Schulman
Auction** ESTD 2006



Schulman Auction is your one-stop solution for buying and selling amateur radio equipment.

Through targeted marketing of our carefully curated auctions, we consistently achieve market value (or more) for sellers - and reliable equipment packed and shipped professionally, for buyers.

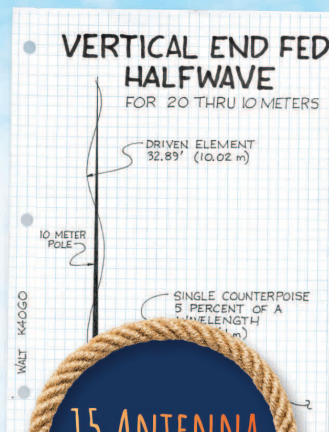
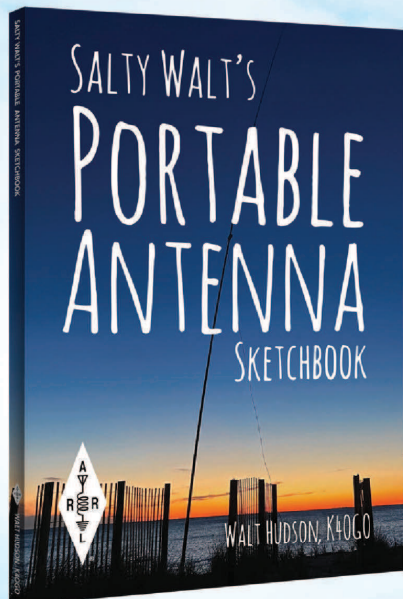
"By hams, for hams" - and we can help you, too!

For more information, call or email us today.

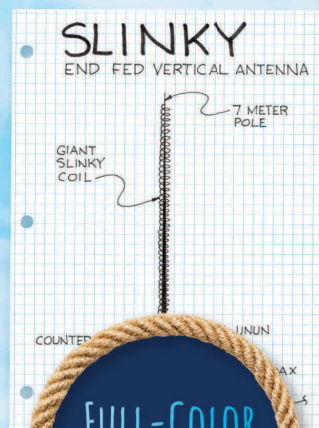
David Schulman, WDØERU
816-455-5520 or 913-568-3767
david@schulmanauction.com

HAM RADIO BEST-SELLER

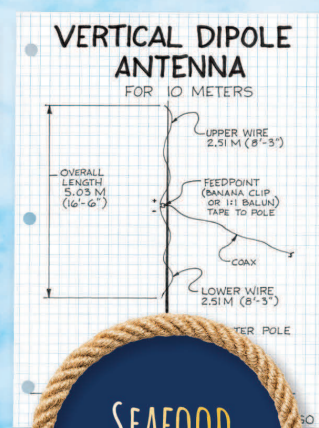
SALTY WALT'S PORTABLE ANTENNA SKETCHBOOK



15 ANTENNA
DESIGNS



FULL-COLOR
FORMAT



SEAFOOD
PAIRINGS

PORTABLE ANTENNAS, BEAUTIFULLY RENDERED!

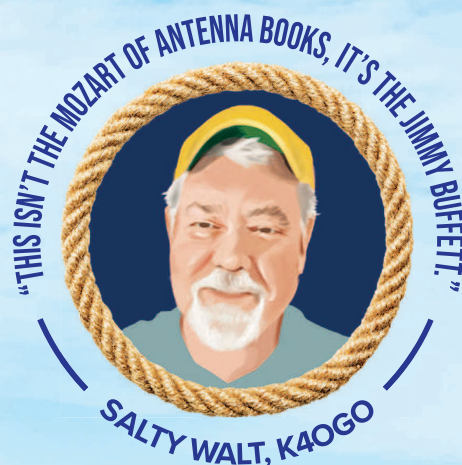
Join **Salty Walt, K4OGO**, of *Coastal Waves & Wires*, for a beachside ham radio adventure!

From **quarter- and half-wave verticals** to the **Coastal 20** and an **end-fed Slinky®** vertical, Walt presents **15 portable antenna designs** complete with:

- Hand-drawn sketches showing wire lengths and feed options
- Practical advice on counterpoise, grounding, and portable operation
- Tips to get you on the air fast and having fun.

BONUS! Download a Two-Element Vertical Yagi antenna design

Walt pairs each antenna with **local coastal dining spots**, from chowders to fish tacos, so you can **build antennas, make contacts, and soak up the coastal sun.**



ARRL Item No. 2226

Member Price \$22.95 | Retail \$25.95

Order online at www.arrl.org/shop | Phone 860-594-0200



Build an Antenna Kit



...and Get on the Air!

Get ready to drill, fasten, and solder with this popular **End-Fed Half-Wave Antenna Kit**. This antenna kit is popular with portable operators, and works on 10, 15, 20, and 40 meters.

Why an EFHW?

The antenna performs nearly as well as a dipole but requires suspending only one end up in a tree or similar placement. It's so easy to build and deploy!

EFHW Antenna Kit

Item No. 0612 | Retail \$79.95

www.arrrl.org/shop



ARRL

The National Association for
Amateur Radio®

Tigertronics *Signalink™* USB

The *Signalink USB* has you covered with 15+ years of proven performance and reliability, radio cables for almost any radio, and compatibility with virtually any sound card digital or voice mode. Whether you're new to digital operation, or an experienced operator, the *Signalink USB*'s built-in sound card, front panel controls, and simplified installation will get the job done right the first time. The *Signalink USB* is fully assembled (**made in the USA!**) and comes complete with printed manual and all cables. Don't miss the peak of the Solar Cycle 25! Visit our website today and see what the *Signalink USB* can do for you!



(800) 822-9722
(541) 474-6700

154 Hillview Drive Grants Pass, Oregon 97527

Operate FT8, JS8CALL, VARA HF, VARA FM, Packet, WinLink, PSK31, RTTY, SSTV, CW, EchoLink + more!

Sale Price
\$119.95



Easy Digital!

Complete with all cables
+ FREE SHIPPING!

www.tigertronics.com

We stock the rugged 1KW transistor and parts for the 2M and 88-108MHz amplifier designs. We also stock the NXP MRF101 LDMOS transistors.

RF TRANSFORMERS

2—54MHz

COAX WIRE



RF400



RF600



RF800



RF1000



RF2000

FLEXIBLE

TC-12 - 10.7 ohm
TC-18 - 17.1 ohm
TC-20 - 18.6 ohm
TC-22 - 21.7 ohm
TC-24 - 26.8 ohm
SM250-50 50 ohm

SEMI-RIGID

UT-141C-25 25 ohm
260-4118-0000 25 ohm

CCI Communication Concepts, Inc.

508 Millstone Drive, Beavercreek, OH 45434-5840

Email: cci.dayton@pobox.com

www.communication-concepts.com

Phone (937) 426-8600

Established in 1979



Type "U"
2 to 300MHz

PROMOTING THE USE OF TEN METERS SINCE 1962

Ten-Ten International Net, Inc.

Awards - QSO Parties - Special Events - Paperchasing

NETS DAILY (except Sunday) on 28.380 and 28.800 at 1800z



CHECK US OUT ON THE WEB

www.ten-ten.org / www.10-10.org

1349 Vernon Ter San Mateo CA 94402-3331



Premium Telescopic
Antenna Masts
& Mounts

www.hitched4fun.com



ARRL Teachers Institute on Wireless Technology

Sponsored by The ARRL Education & Technology Program



Learn more at

www.arrrl.org/teachers-institute-on-wireless-technology

CREATE YOUR LEGACY

Give tax-free from your IRA

A **qualified charitable distribution (QCD)** direct from your IRA allows you to donate to ARRL tax-free instead of paying tax on your **required minimum distribution**.

Giving from your IRA could have **more tax advantages** for than a direct donation.



Donors
age 70 1/2
or older



Non-taxable for individuals
up to \$108,000 or
up to \$216,000 for
married couples



Fulfill some or all of your
Required Minimum
Distribution (RMD)



Reduce taxable
income



Lowered tax bracket &
lowered Medicare
premiums possible

Learn how to invest in the future of Amateur Radio with a donation to ARRL through a qualified charitable distribution. **Schedule a personal conversation** with ARRL Development to discuss the possibilities today.



ARRL
The National Association for
Amateur Radio®

Email: development@arrl.org | Call 1-860-594-0200 | www.arrl.org/ira-distributions

ARRL is an IRS-designated 501(c)(3) nonprofit organization holding federal tax identification #06-6000004 and recommends individuals interested in an IRA distribution consult their IRA administrator, tax accountant or financial advisor with account or specific questions to determine if such a gift is appropriate for you.



Dust & Water-proof
compatible

ALINCO®

Quality. Style. Performance!



REMtronix



Whatever your favorite operating frequency and mode, Alinco has a radio that's perfect for making the most of your budget. With a wide selection of easy-to-operate, multi-band handheld and mobile radios, Alinco delivers maximum value for your ham radio enjoyment!



30-470MHz
MULTIMODE RECEIVER
DJ-X100T



144MHz FM MOBILE/BASE
TRANSCIVER
DR-B185TMKII

NEW



30A SWITCHING POWER SUPPLY
DM-530T



144/222/440MHz DMR MOBILE/BASE
TRANSCIVER
DR-MD520T



144/440MHz DMR
HANDHELD TRANSCIVER
DJ-MD5XLT

REMtronix, Inc.

586 Commerce Ct. Manteca, CA 95336

Ph: (209) 800-1945 Website: <http://www.remtronix.com>

Email: alinco@remtronix.com Service: alincosupport@remtronix.com

REMTRONIX

Products intended for properly licensed operators. Required products are FCC part 15B certified. Specification subject to change without notice or obligation.

HEIL

HAM RADIO

**"The most comfortable
headset I've ever used."**

Mark, WZ4I

**"The microphone gave our radios the
typical Heil crisp audio in controlling the
pileups."**

Don, N1DG

DXpedition co-leader KH1/KH7Z

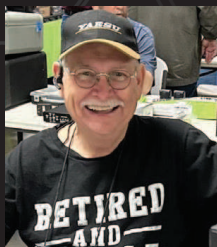
**"In the heat of battle, the phase switch
was switched to 'out' to get a clean
copy. Nice feature!"**

David, W5XU, VP8RXU



HEILHAMRADIO.COM

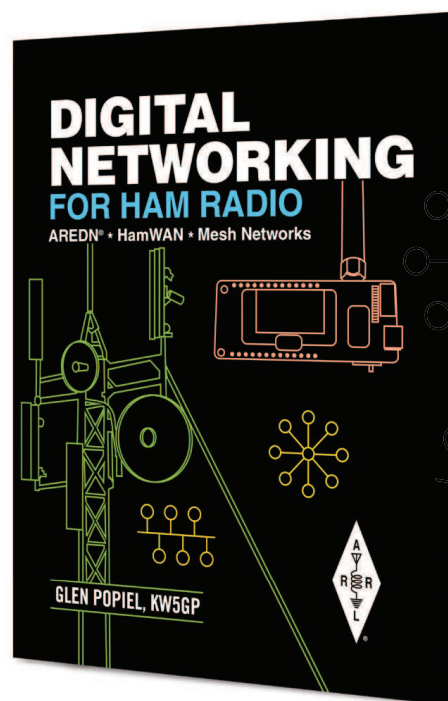
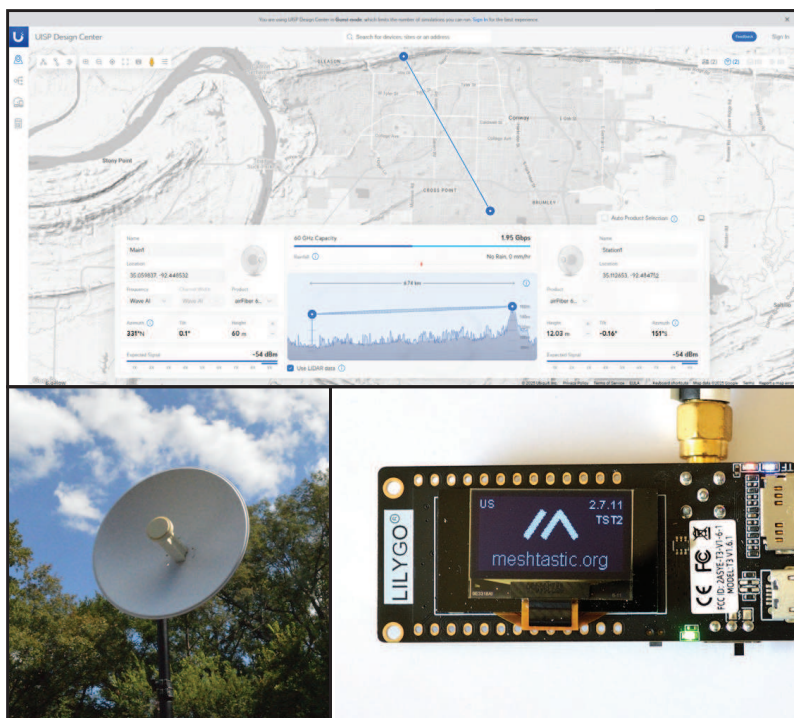
BUILD MODERN, RELIABLE NETWORKS WITH CONFIDENCE!



Digital Networking for Ham Radio by Glen Popiel, KW5GP



Networking has become an essential part of the modern amateur radio station, and ***Digital Networking for Ham Radio*** shows you how to put it to work. This practical guide covers network topology, hardware selection, system configuration, and core TCP/IP concepts, with hands-on instruction for deploying **AREDN®**, **HamWAN**, and mesh networks such as **Meshtastic®**. Learn how to design Part 97-compliant systems, connect responsibly to the internet, and build reliable local or neighborhood networks for everyday use or backup communications.



Includes:

- Introduction to Radio Data Networks
- Digital Data Networking Technologies
- Radio Data Networking Equipment
- TCP/IP for Radio Data Networking
- Radio Data Networking Applications
- Filtering, Security, Authorization, and Authentication
- Backup and Redundancy
- Deploying Amateur Radio Data Networks
- The Future of Amateur Radio Data Networking

Order Your Copy Today!

ARRL Item No. 2349 | Member Price \$29.95 | Retail \$34.95

Order online at www.arrl.org/shop | Phone 860-594-0200



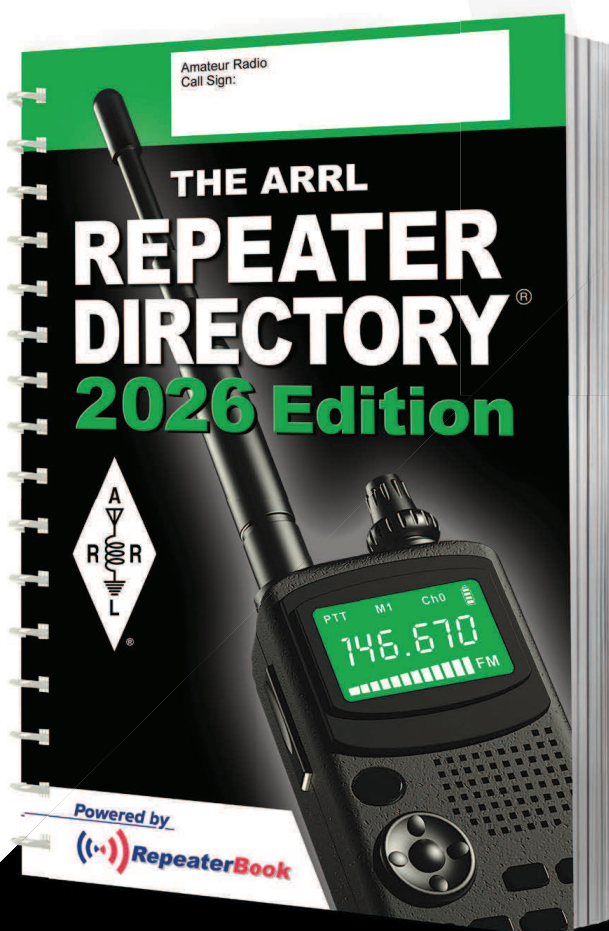
THE ARRL REPEATER DIRECTORY® 2026 Edition



Powered by  **RepeaterBook**

The ARRL Repeater Directory is powered by RepeaterBook, amateur radio's comprehensive, worldwide, FREE repeater database – RepeaterBook.com.

The **NEW** 2026 edition is the best way to find repeaters in your area, when you're traveling, or when you're on the move! Now includes a **City Quick Find Index**, making it even easier to locate repeaters.



- Listings for US and Canada, organized by state/province, county, and city/town.
- A location indicator for many repeaters in cities/towns.
- Additional information on ARES® and SKYWARN® affiliation, emergency power, and more.
- Digital repeaters including System Fusion, D-STAR®, DMR, NXDN, M17, Tetra, and P25 systems.
- HF, VHF, UHF, and microwave band plans.
- Indicator for Narrow FM (12.5kHz) versus Wide FM (25 kHz) repeaters.

ARRL Item No. 2332 | Member Price \$19.95 | Retail \$22.95
Order online at www.arrl.org/shop | Phone 860-594-0200

ARRL
FIELD DAY 2026
JUNE
27-28



MORE THAN
30,000
Hams Participate
in Field Day



AMATEUR RADIO
FD★26
A NATIONAL RESOURCE



1.2
MILLION
CONTACTS MADE
IN 2025



FIND A
FIELD DAY
SITE
[www.arrl.org/](http://www.arrl.org/field-day-locator)
[field-day-locator](http://www.arrl.org/field-day-locator)

Get Ready for a Field Day to Remember
Celebrate in Red, White, and Blue!

bhi

Noise Problems Solved

Got Noise Problems? Get A bhi DSP Noise Cancelling Product!

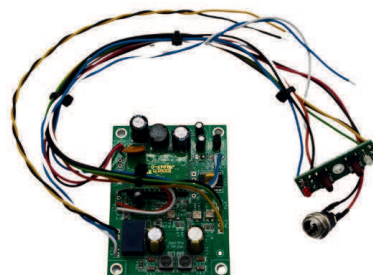
Don't put up with noise & interference any longer

"I can hear better - weak stations come in much clearer. I have diminished hearing, and the unit makes listening much easier. I am very impressed." - Mark Habberfield KB9OPW



NES10-2 MK4

- 5W amplified DSP noise cancelling speaker
- 8 to 40dB noise cancelling
- Audio bypass feature
- Use mobile or base station



NEDSP1962-KBD

- 5W Amplified DSP noise cancelling PCB module
- Easy to install pre-wired retrofit module
- Includes full fitting kit & instructions



In-Line Module

- Advanced DSP noise cancelling technology
- Compact, powerful 5W amplified in-line module
- 8 filter levels, 8 to 40dB
- Use in-line with a loudspeaker



DESKTOP MKII

- 10W Amplified DSP noise cancelling base station speaker
- 8 DSP noise cancelling filter levels
- Suitable for all radios
- Dims: 200(H) x 150(D) x 160(W)mm

Don't forget to check out our range of retrofit DSP install modules and our unique bhi accessories

bhi



DX
ENGINEERING

R&L
ELECTRONICS
www.randl.com

HAM
RADIO
OUTLET

GigaParts
Technology Superstore

HUNTSVILLE HAMFEST AND 2026 ARRL NATIONAL CONVENTION



August 21 - 23, 2026

Von Braun Center ★ Huntsville, Alabama

One of the nation's favorite hamfests — supercharged as host of the ARRL National Convention! Thousands of ARRL members, top manufacturers and resellers, clubs, and experts under one roof.

Don't miss:

Friday, Aug. 21 — **ARRL National Convention Program:** all-day training tracks and luncheon. Register early at www.arrl.org/expo.

Sat - Sun, Aug. 22 - 23 — **Huntsville Hamfest:** massive exhibit hall and indoor flea market; ARRL exhibits and program representatives; experts, forums, license exams, and prize drawings.

Huntsville Hamfest tickets at hamfest.org.

Download the ARRL Events App

– Find exhibitors, booths, forums, maps, prizes, and more.

Stay Informed. Stay Connected.

Find more 2026 events on the ARRL Hamfests and Conventions Calendar
www.arrl.org/hamfests

EXPERT AMPLIFIERS

Visit our new website. Huge discounts on used gear!

NOW SHIPPING

UPGRADE YOUR STATION TODAY
THOUSANDS SOLD WORLDWIDE



EXPERT 1.5 K-FA TAURUS



ICOM IC-7300 MK II



SPE EXPERT 2K-FA



KENWOOD TS-890



SPE EXPERT 1.3 K-FA



YAESU FTDx10



Our amplifiers work great with Kenwood Icom and Yaesu

Fully automatic • Built in ATU • Built in coax switch • Built in watt meter • 1.3k and 1.5k models are portable • Small and lightweight • Takes up minimal space on the desk

We Take Trade-Ins!

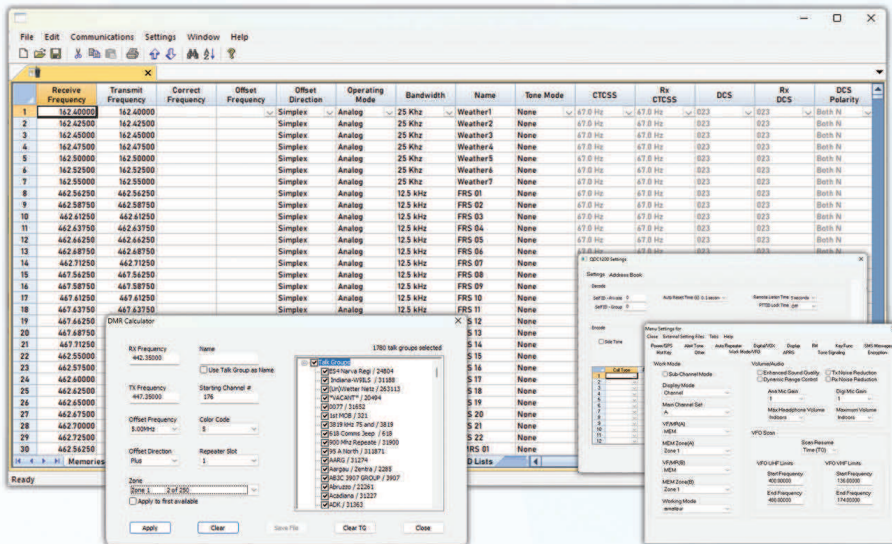


1875 17th NE St.,
Suite 100
Paris, TX 75460
www.expertamps.com
sales@expertamps.com
Telephone: (903) 737-0773



Knowing Your Radio Matters!

Every Feature, Fully Yours! With RT Systems Programmer



**Program, organize, and explore
your radio's full capabilities**

- DMR
- D-STAR
- Fusion
- Names
- Tones
- Banks
- HF Filters
- PM Settings
- Programmable Key Options

"Your software knows my radios better than me!"

Satisfied Customer

600⁺
500 Unique
Radio Programmers*
Find yours at
www.rtsystemsinc.com

Custom Programmers and Cables
Designed Specifically for Your Radio

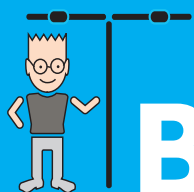
- ✓ No Subscription
- ✓ USA-Based Support
- ✓ Made by Hams, for Hams

Learning never exhausts the mind.

Leonardo da Vinci

**Get your RT Systems Radio Programmer
immediately after purchase by electronic download**





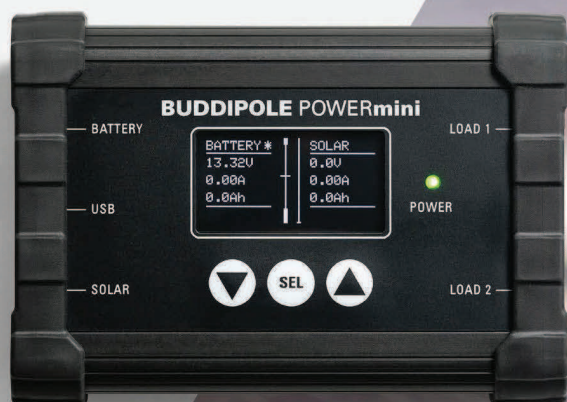
BUDDIPOLE

Secure online ordering:
www.buddipole.com

See our videos:
www.youtube.com/buddipole

BUDDIHEX

- **Ultra Lightweight:** Just 9.5 lbs fully loaded
- **6 Bands:** 6, 10, 12, 15, 17 and 20 meters
- **Quick setup** – less than 20 minutes
- **Power Handling** from 600W (BNC) to 1500W (SO239)
- Use with a Telescopic Push-up Mast
- Perfect for Field Day, Camping, POTA, or in your backyard



POWERMINI 2

- Compact Portable DC Power Management System with built-in Solar Charge Controller
- Power Management includes Current and Voltage readout
- High Contrast OLED display
- User-definable Low Voltage Alarm + Cutoff
- Solar Controller for use with Panels up to 6 amps
- Maximum Current Handling Capacity – 40 amps

BUDDISTICKPRO

- New Versahub Feedpoint with Quick-Attach Shockcord Tripod Legs
- Multi-band Design works 9 bands (40m – 2m) with one adjustable coil
- Lightweight at less than 3 lbs
- Compact and perfect for POTA, SOTA, and portable operating
- Rated from QRP to 250 Watts PEP



OUR PRODUCTS
ARE PROUDLY
MADE IN USA

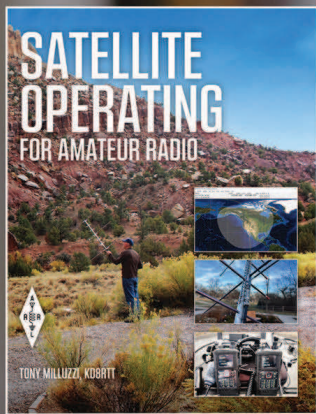
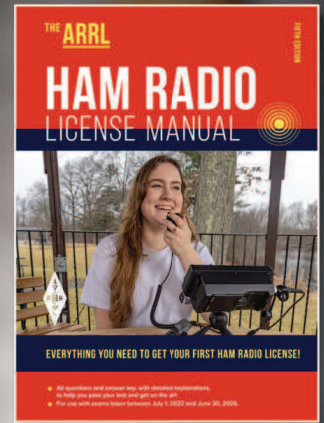
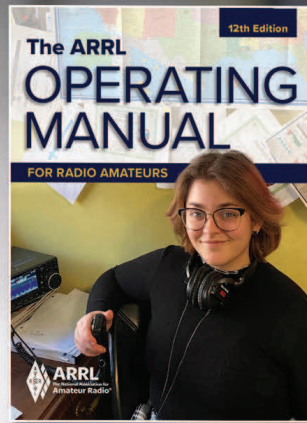
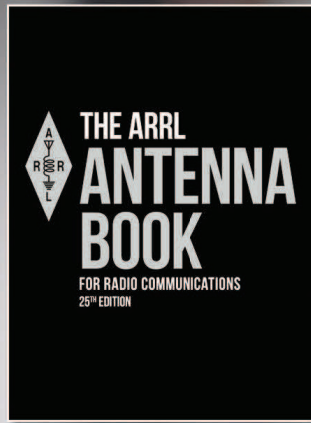
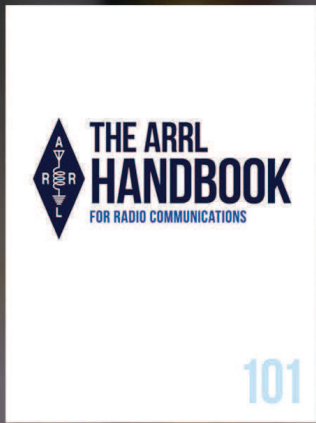


NEW ADDRESS:

2011 W 3000 S, Suite C
Heber City, UT 84032

CONTACT US:

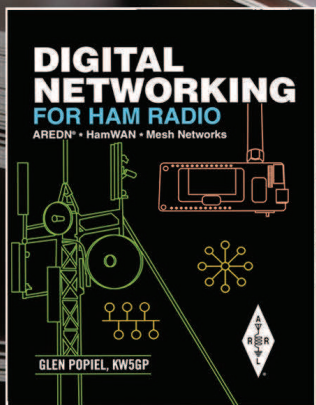
info@buddipole.com
(435) 244 2211



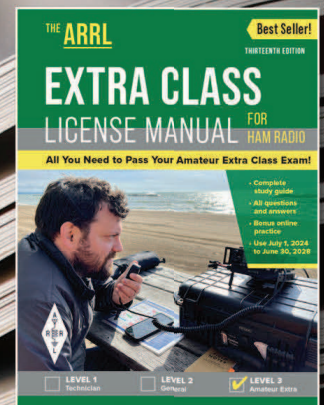
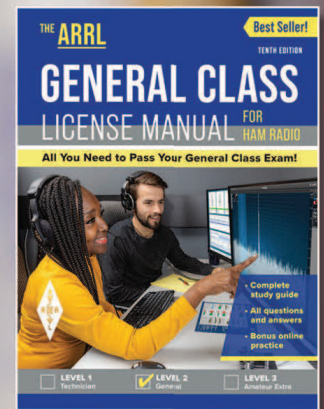
Stay in the Know

ARRL Publications and Journals

www.arrl.org/shop



ARRL The National Association for Amateur Radio®





ANTENNAS TO GET YOU ACTIVE!



ARRL DUAL-BAND 2 M/70 CM HANDHELD YAGI ANTENNA

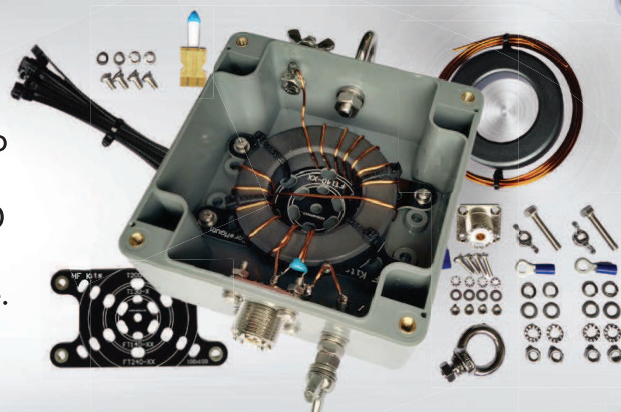
Use this handheld directional antenna to make satellite contacts (with included diplexer), hunt for hidden transmitters, and even capture signals from weather satellites. It can be assembled and disassembled in minutes and has excellent gain for its size.

ARRL Item No. 0090 | Retail \$99.95

ARRL END-FED HALF-WAVE ANTENNA KIT

Get ready to drill, fasten, and solder with an easy-to-build antenna kit. It's popular with new hams and portable operators, and works on 10, 15, 20, and 40 meters. Requires suspending only one end up in a tree or similar placement. You can take it anywhere.

ARRL Item No. 0612 | Retail \$79.95



ARRL DUAL-BAND MOMOBEAM 6/10 ANTENNA

Lightweight yet robust, this dual-band antenna is an easy-to-use antenna with a small footprint and a big reach. The beam features a 10-meter Moxon (28 MHz) and 6-meter Yagi (50 MHz). Put it on the air and operate 10 and 6 meters with a single feed line.

ARRL Item No. 0084 | Retail \$329.95
Includes ground shipping in the US.

Order online at www.arrl.org/shop | Phone 860-594-0200

Ham Ads

Please contact the Advertising Department at 860-594-0203 or hamads@arrrl.org for further information or to submit your ad.

www.arrrl.org/ham-ad-listing

Before considering a ham ad please read.

1. Advertising must pertain to products and services which are related to Amateur Radio.

2. The Ham-Ad rate for commercial firms offering products or services for sale is \$2.25 per word. Individuals selling or buying personal equipment: ARRL member 1.00 per word. Non-ARRL member \$1.50 per word. **Bolding** is available for \$2.50 a word. Prices subject to change without notice. You may pay by check payable to the ARRL and sent to: Ham-Ads, ARRL, 225 Main St., Newington, CT 06111. Or, you may pay by credit card sending the information by fax to 860-594-4285 or via e-mail to hamads@arrrl.org. Credit card information needed is: the type of credit card, the exact name that appears on the credit card, the credit card number, the expiration date and the credit card billing address.

3. **Closing date for Ham-Ads is the 10th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date.** If the 10th falls on a weekend or holiday, the Ham-Ad deadline is the previous working day. Please contact the Advertising Department at 860-594-0255 or hamads@arrrl.org for further information or to submit your ad.

4. No Ham-Ad may use more than 200 words. No advertiser may use more than three ads in one issue. Mention of lotteries, prize drawings, games of chance etc is not permitted in QST advertising.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

The American Radio Relay League does not discriminate in its advertising on the basis of race, color, religion, age, sex, sexual orientation, marital status or national origin. ARRL reserves the right to decline or discontinue advertising for any other reason.

AN IMPORTANT NOTICE TO ALL HAMAD POSTERS AND RESPONDERS, FROM THE ARRL ADVERTISING DEPARTMENT Greetings from ARRL HQ! Please note that we have received reports from many ARRL members who have placed classified ads in these listings, and have received responses from individuals proposing "creative" payment schemes. These particular instances involved offers of overpayments for goods by bank check, followed by instructions to deduct the cost of your item from the overpayment, and to transfer the overage back or to another individual. This is a well-known scam. Unfortunately, we have no control over this and other scams of this type. Once your email address is posted, you are vulnerable to those individuals seeking to provide you with questionable information.

Club/Hamfests/Nets

CW INSTRUCTION via video conference classes on ZOOM.
VISIT longislandcwclub.org

Property/Vacation/Rentals

A CARIBBEAN SAINT KITTS "V4" DX RENTAL. See V47JA on QRZ.com and email: W5JON@sbcglobal.net for Ham Discount information. John W5JON/V47JA

A DX Apartment available in VP9 with rigs and antennas. Email: ed@vp9ge.com for details.

Beautiful outdoor Idaho! Spacious low populated areas. Abundant recreation opportunities. Moderate four season climate. Thinking of buying and selling? Contact Ron Bishop, W7IM, Keller Williams Realty Boise. 208-870-6075.
Ron@BoiseBargains.com

COLORADO CHALET with ham gear for weekly rental, www.lostcreekcabin.com.
WØLSD, Buena Vista, CO.

Hams Looking to purchase or sell real estate in Connecticut? Please contact Licensed Ham and Realtor, Claude Cousins, Sr. N1QAE, Berkshire Hathaway Home Services, claudecous@gmail.com, 860-989-2113

Antique/Vintage/Classic

6 Meter legacy by K6EDX K6MIO. www.bobcoopertv.tv

ANTIQUE WIRELESS ASSOCIATION - the largest international organization for historic radio enthusiasts. Publishes the quarterly AWA Journal and annual AWA Review on all aspects of collecting and history of communications. AWA produces the famous annual AWA Convention and sponsors the world renowned Antique Wireless Museum. Only \$35/year USA, \$40/year elsewhere. Antique Wireless Association, PO Box 421, Bloomfield, NY 14469. Website:

<http://www.antiquewireless.org>

Six Decades of Amateur Radio
www.kk4ww.com

Vintage Radio, Ham Radio and Military Radio Repair. www.mcveyelectronics.com
845-561-8383

WANTED PRE-1980 MICROCOMPUTERS for historical Museum kk4ww

QSLCards/Call Sign Novelties

Airmail postage, envelopes. K3FN
airmailpostage.com

Get Top Quality Full Color UV Coated QSL Cards direct from the printer. Chester QSL Cards by Chester Press. Call 800-748-7089 for samples, email QSLinfo@chesterpressinc.com or visit the chesterpressinc.com/QSL website.

General

RF CONNECTORS & GADGETS
Parts - Products - More
www.W5SWL.com

#1 World-wide Callsign Database, Ham-Call with 2,700,000 callsigns on DVD, USB, or Download. 800-282-5628
<http://hamcall.net>

GAIN the EDGE with NARTE Certification – NARTE gives you the competitive edge with individual certification in Electromagnetic Compatibility, Electromagnetic Discharge Control and Telecommunications. Industry-recognized certification required or desired by more than 400 corporations nationwide. Call 1-800-89-NARTE or visit www.inarte.org. NARTE offers the premier EMC/EMI, ESD, Telecommunications and Wireless certification to professional technicians and engineers.

Get the F.C.C. "Commercial" Radio-telephone License! The highest-class Telecommunications Certification! Fast, Inexpensive, guaranteed home-study. Command Productions. Please visit www.LicenseTraining.com (800) 932-4268

HAM KITS for sale at www.HecKits.com
L/C Meter, SWR Bridge, ESR Meter, 2-Tone Gen, FET DIP Meter.

ISOTRON ANTENNAS FOR 160 - 6 METERS! Efficient, rugged and resonant. Please visit WWW.ISOTRONANTENNAS.COM. wd0eja@isotronantennas.com
719/687-0650.

KB6NU'S "NO NONSENSE" LICENSE STUDY GUIDES have helped 1000's get their first license and upgrade to General or Extra. They can help you, too. KB6NU.
COM/STUDY-GUIDES/

MicroLog-By-WA0H .. Easy to use logging program .. Free download ..
www.wa0h.com

RF SUPERSTORE

Connectors, Adapters, Antennas, Coaxial Cable and more!

High Quality, Low Cost, Ham Friendly
WWW.RFSUPERSTORE.COM

Radio Shack HTX-100 Repair. Free Estimates. KA1HVR -- www.HTX-100.com

Rohn Tower, telescoping poles, tripods and antenna parts delivered to your door.
www.antennapartsoutlet.com

Tactical Portable Accessories for Yaesu 710, DX-10, 817/818, 857D, 891, 991A. Icom 7300, 9700, 8600, 706/703, 718. VHF/UHF radios. W0MSN
www.portablezero.com

WIND TUNNEL TALES Looking for a great career? See what it can be like. Great gift for your child. Amazon and bookstores. W3BZR

Xcellent **Amateur** and **Monitor Logging** from **DXtreme!** Click www.dxtreme.com

FREE 3 Collins S-Line w/Power Supplies. Pick up or pay for shipping. K0IVI, Dave.

Internet Radio
Station

W2PH Radio

Classic Rock & Oldies For Hams

<https://W2PHRadio.com>

Programming 24/7 with
Classic Rock and Oldies
along with Ham Radio
Programs



w2phradio.com

Live DJ's that are also Hams. Shows like
This Week IN Amateur Radio, The ARRL
Weekly News and ARES Nets During
Storm Activations.



ARRL® QST Award Winner Antenna Design Competition

KJ6ER PERformer

7-Band
Antenna
System

- P.O.T.A.
- E-Comms
- H.O.A.




Featuring
Antenna
Systems &
Accessories

**PERformer
Challenger
Dominator**



**Radial
Sets**

**Pole
Pods**

**16-inch
Spikes**

**Guys
Kits**




**Shop our
Etsy® Store:
J-Systems**

Authorized Manufacturer
of KJ6ER Antennas 

Based in Chicago, IL U.S.A.

Advertising Department

Steve Bossert, K2GOG, Advertising Sales Manager
Toll Free: 1-800-243-7768
Office: 1-860-594-0203 – ADVERTISING
E-mail: ads@arrl.org
Web: www.arrl.org/ads



QST Index of Advertisers

Air Boss Antenna Launcher – www.olahtechnologies.com.....	107
AI6YM – www.ai6ym.radio.....	22, 108
Alinco – www.remtronix.com	113
AMRAD.IO – www.amrad.io	104, 117
Analytical Engineering Inc. – www.analyticalengineering.com.....	109
Arcom Communications – www.arcomcontrollers.com	105
Arrow Antenna – www.arrowantenna.com.....	25
ARRL – www.arrl.org	6, 12, 25, 104, 105, 106, 107, 111, 112, 114, 115, 116, 122, 123, 128
Begali Keys – www.i2rtf.com	127
bhi Ltd – www.bhi-ltd.com	117
Big Time Radio – www.bigtimeradio.us.....	105, 109
Blackmagic Design – www.blackmagicdesign.com	17
Buddipole – www.buddipole.com	121
California Peripherals & Components, Inc. – www.Californiipc.com	107
C. Crane – www.ccrane.com.....	108, Cover 3
ChattRadio – www.chattradio.com.....	107
Communication Concepts – www.communication-concepts.com.....	111
Diamond Antenna – www.diamondantenna.net.....	10
DX Engineering – www.dxengineering.com	104
Elecraft – www.elecraft.com	7, 11, 58, 65
Elk Antennas – www.ElkAntennas.com.....	21, 105
Expert Amplifiers – www.expertamps.com	19
Flex Radio – www.flexradio.com	3
Geochron – www.geochron.com	22
Ham Ads – www.arrl.org/ham-ad-listing	124



U-BOAT RADIO

www.uboatradio.com

- ✓ FULL-VIEW AND INCREDIBLE CLOSE-UP PHOTOGRAPHS OF GERMAN WWII SUBMARINE RADIOS
- ✓ CAPTIONS THAT EXPLAIN EVERY PHOTOGRAPH
- ✓ UPDATED WITH NEW RADIOS FREQUENTLY

Member Services Contact Information:

Toll Free: 1-888-277-5289 – MEMBER SERVICES

Fax: 1-860-594-0303

E-mail: circulation@arrl.org

Web: www.arrl.org

Ham Radio Outlet – www.hamradio.com	102, 103
Hammond Mfg. Co. – www.hammondmfg.com	107
HamXposition 2026 – www.hamexposition.org	27
Heil Ham Radio – www.heilsound.com	113
Huntsville Hamfest – www.hamfest.org	118
Icom America – www.icomamerica.com/amateur	12, 23, 102
J-Systems “POTA PERformer” – www.etsy.com/shop/JSystems	126
Kenwood Communications – www.kenwoodusa.com	29, Cover 4
LDG Electronics – 410-586-2177.....	2, 109
Main Trading Company – www.mtradio.com	119
Morse Nexus – www.morsenexus.com/	19
Mosely Electronics – www.mosley-electronics.com/	108
Orange Blossom Embroidery – www.orangeblossomembroidery.com	27
Pacific Antenna – www.qrpkits.com	107
Penta Laboratories – www.pentalabs.com	107
QRP Amateur Radio Club International – www.qrparci.org	18
RF Parts Company – www.rfparts.com	127
Rocket Machine Worx – www.rocketmachineworx.shop	8
RT Systems – www.rtsystems.com	120
Schulman Auction – www.schulmanauktion.com	19,
Starlink® RV Pole Kits – www.hitched4fun.com	111
SwapMyRigs – www.swapmyrigs.com	107
Ten-Ten International Net, Inc. – www.ten-ten.org	111
The Radio Source – www.theradiosource.com/	18
Tigertronics – www.tigertronics.com	111
Unified Microsystems – www.unifiedmicro.com	127
U-Boat Radio – www.uboatradio.com	126
W2PH Radio – www.w2phradio.com/	125
West Mountain Radio – https://www.westmountainradio.com/	7
Yaesu USA – www.yaesu.com	1, Cover 2, 103

We Are Near The Sunspot Peak And The High HF Bands Are Hot! That is why you *must* upgrade your low band antennas now!

Low-band QSOs are tougher now, but DXpeditions to rare locations favor sunspot peaks to maximize their QSO totals. You might not get a chance to work those rare DXCC entities when the low bands improve. Get an edge with a BevFlex-4X. The BevFlex-4X is a switchable, bi-directional, low noise RX antenna that can be built to fit your yard as a Beverage, BOG, or loop. Select four directions with a BevFlex-4X/Q. See the March 2025 QST Review! Unified Microsystems also produces antenna switching, CW Keyer, and other products.

www.unifiedmicro.com

UM Unified Microsystems

Begali Keys
Where Art &
Engineering meet



Made in Italy by Begali Keys ©

www.i2rtf.com

begali@i2rtf.com / bbegali@gmail.com
Phone: 0039 (0)30 32 2203



From **MILLIWATTS**
To **KILOWATTS** SM

In Stock Now!

Semiconductors for Manufacturing and Servicing Communications Equipment

Visit
Our
Website

- **RF Modules**
- **Semiconductors**
- **Transmitter Tubes**

Se Habla Español • We Export

Phone: **760-744-0700**
Toll-Free: **800-737-2787**
(Orders only) **800-RF PARTS**
Website: **www.rfparts.com**
Fax: **760-744-1943**
888-744-1943
Email: **rpf@rfparts.com**



RF PARTS
C O M P A N Y



THE ARRL DIAMOND CLUB IS THE ANNUAL GIVING PROGRAM.

A donation to Diamond Club provides vital unrestricted revenue for ARRL's many programs and services.

**NOW WITH EASY MONTHLY
GIVING LEVELS!**

Why donate monthly?



Easy

Automated monthly gifts using your credit card mean that you can set it and forget it.



Affordable

Your giving is easy to budget with monthly payments and has a great impact.



Sustainable

Your monthly support means we can count on your gift for daily operational needs all year long.

Examples of some of the benefits include: a Diamond Club pin, certificate, and window decal, a discount on ARRL publications, complimentary *QST* magazine in print, unlimited free use of DXCC, QSL Services, awards, and more.

**YOUR SUPPORT IS AN INVESTMENT
IN THE FUTURE OF AMATEUR RADIO.**

DIAMOND CLUB GIVING LEVELS

	Annual Gift	Monthly (starting at)
Introductory	\$100+	\$10
Brass	\$250+	\$21
Silver	\$500+	\$42
Gold	\$1,000+	\$85
Platinum	\$2,500+	\$210
Director	\$5,000+	\$420

Give to Diamond Club in any amount, or learn about the special recognition you receive when you donate at various giving levels by visiting:

www.arrl.org/the-arrl-diamond-club

GIVE TODAY

ONLINE www.arrl.org/DiamondClub

BY PHONE 888-277-5289 or 860-594-0200

BY MAIL ARRL Development Office, 225 Main St, Newington, CT 06111-1400

thank you

ARRL is an IRS-designated 501(c)(3) organization holding federal tax identification #06-6000004.

C.CRANE

40 Years of Providing High Quality Radios



Keeping you connected with reliable reception

From emergencies to everyday listening -
radios you can rely on

Superior sound quality - crisp, easy-to-hear audio



172 Main St. Fortuna, CA 95540

Use Code **ARRL26 for 10% Off Your Order!***

**Call to Order or Request A Free Catalog
1-800-522-8863 or online at ccrane.com/arrl**



KENWOOD

Versatile and Flexible Radio Returns with
Soaring Functions That'll Thrill Amateur
Radio Enthusiasts.



TRIBANDER

TH-D75A

144 / 220 / 430 MHz TRIBANDER

Key Features

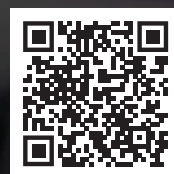
- **APRS® Protocol¹ compliant**

To exchange GPS location data and messages in real-time.

- **D-STAR² with Simultaneous Reception on DV mode**

Compatible for transferring voice and digital data over D-STAR networks.

- Reflector Terminal mode to access D-STAR Reflectors
- USB Type-C for Data Transfer and Charging
- Built-in Digipeater (a digital repeater) station to transmit received data
- Built-in GPS unit
- Easy-to-read Transflective Color TFT Display
- Call Sign Readout



Experience the TH-D75A up close and personal by simply scanning this code with your smartphone's camera.

- Tough & Robust - meets IP54/55 Standards
- Wide-band and multi-mode reception
- Built-in IF Filter for comfortable reception (SSB/CW)
- DSP-based Voice Processing and Reputable KENWOOD Custom Tuned Sound Quality
- Bluetooth®, microSD/SDHC Memory Card Slot for flexible link with a PC

*1: APRS is a registered trademark of TAPR and is used with permission.

*2: D-STAR is a digital radio protocol developed by JARL (Japan Amateur Radio League).

All other company names, brand names and product names are registered trademarks or trade names of their respective holders.

Specifications, design, and availability of accessories may vary due to advancements in technology. Actual product colors may differ from photograph due to photography or printing conditions. Brand or product names may be trademarks and/or registered trademarks of the respective holders.

The content of this document is based on information available at the time of its publication and may be different from the latest information.

This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.