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March 2026

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QST Reviews

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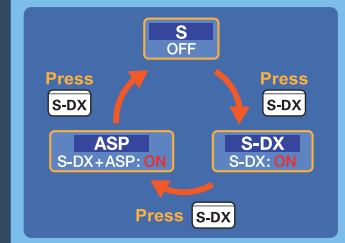
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Analog FM Super-DX Super-DX+ASP



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Our Cover

By popular demand, Dave Ahlgren, K1BUK, shows how to scale his May 2019 6-meter “Moxy” antenna (a Moxon-Yagi hybrid) for 2 and 10 meters, and presents a refresh of the 6-meter design with higher gain. [Justin Francis, photo]

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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

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Huntsville Hamfest tickets at hamfest.org.

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Find more 2026 events on the ARRL Hamfests and Conventions Calendar

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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

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Second Century

Rolling Out the Welcome Mat

A persistent concern we hear from new hams is that they attended a local radio club meeting and felt like an outsider. No one spoke to them. No one made an effort to let them introduce themselves. North Florida Section Manager Scott Roberts, KK4ECR, recently sent me a well-composed report of issues and ideas from town hall meetings he conducted. And there it was again: clubs that are perceived as closed communities (“talking to ourselves”), and newcomers, especially women and youth, feeling unwelcome. How will we solve this issue?

First of all, every club should look at how its meetings are conducted. Starting each meeting with a 1-hour business meeting is probably not the best way to inspire a new member. Consider how meetings could be more focused on the amateur radio activities the club is undertaking and sharing knowledge through live or virtual speakers — or recorded sessions from ARRL or YouTube that could be coordinated and hosted by one club member with discussion afterwards.

Second, what opportunities does the club offer for new visitors to make themselves known and get involved with the club? Of course, starting off with an open mic for visitors is an obvious first step, but what if that is supplemented by a recruitment or new member coordinator for the club? Ensure that not only does the visitor have the opportunity to get involved, but that there's a specific club member assigned to help the individual get licensed, get on the air, get involved with club activities like ARRL Field Day, and even get a station built or antenna in the air!

With this being the ARRL Year of the Club, now is a great time for your club to take a focused, intentional look at how you welcome new and inexperienced hams. Throughout the year, I encourage you to look for inspiring and informational content we have included in *QST*, *On the Air*, our newsletters, podcasts, and videos to help you bolster your club's activities for the benefit of your members.

ARRL is also urging clubs to be more accessible to their local communities and more inviting to new visitors by hosting a Ham Radio Open House! With April 18 being World Amateur Radio Day, ARRL created the Open House as a way for clubs to invite their local communities — and potentially new hams — to see what modern amateur radio is all about!

Pick any date in April to host your club's Ham Radio Open House, and start planning ways to attract those with curiosity or interest in amateur radio into your club station. The notion of hams sitting in Grandpa's base-

ment listening to tube radios is quickly dispelled when visitors see a modern transceiver and computer being used to work the world! Consider including a POTA activation or satellite operating demonstration.

Another tactic used successfully by clubs is for your Volunteer Examiners to conduct an exam session in the hour before a club meeting starts. You will attract those new hams and hams upgrading to take their tests and then hang around for recognition from the club with a round of applause! What a great welcoming moment for the new ham — and an inspiring moment to join your club and become a part of your community.

A large percentage of newcomers to amateur radio join because they want to get involved in emergency communications. What does your club do in terms of engaging and training members for emergency communications? Do you have a functioning Amateur Radio Emergency Service® group in your area? Is your club more involved with public service events than those related to emergencies? Hand-holding and guidance are required here because expectations of newcomers are high. It is highly effective for your club to have one person who is the single point of contact for these EmComm-inspired volunteers. Guiding them through the process is important to not losing them.

Your club may have its own successful methods for attracting and involving new hams and engaging visitors. I encourage your club to be radio active! Make sure there are great activities for newcomers. Be a connector! Get newcomers and visitors connected to club members who can help them. And if you're going to Dayton Hamvention, come and see me with your success stories!

A handwritten signature in black ink, appearing to read 'David A. Minster', with the call sign 'NA2AA' written in a smaller font to the right of the signature.

David A. Minster, NA2AA
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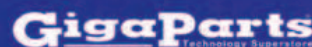


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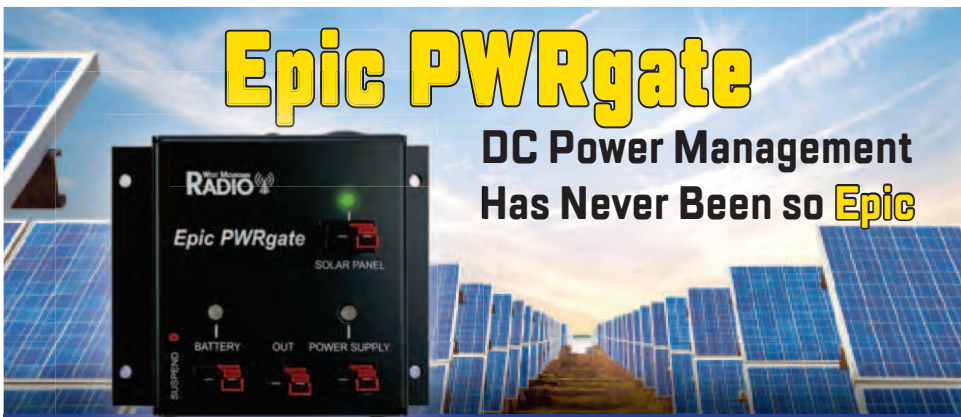
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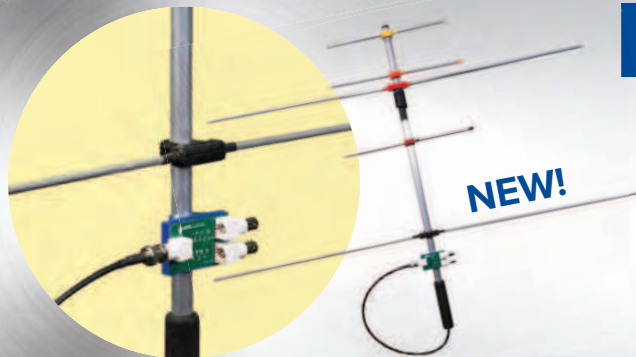


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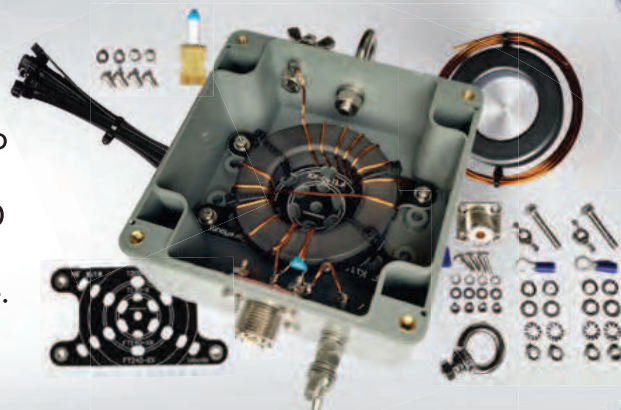
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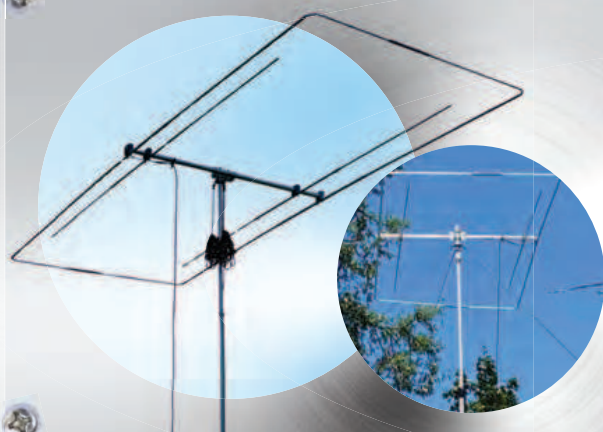
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Club Spotlight



W5RRR

Johnson Space Center Amateur Radio Club

Founded: 1967	ARRL Affiliation Date: May 30, 1989
Voting Licensed Amateur Members: 73	Meetings: Monthly
Members: 75	Website: www.w5rrr.org
Section: South Texas	Focus: Space comms., STEM outreach

A Club and a Mission

For more than 5 decades, the Johnson Space Center Amateur Radio Club (JSCARC) has been using amateur radio to bring both hams and non-hams closer to the stars — and to each other. The operators employed at NASA’s JSC meet under the call sign W5RRR to serve the space agency, the amateur community, and the public.

Pathways to Success

It was this same club that collaborated with NASA astronaut Owen Garriott, W5LFL (SK), to take a ham radio into space during the STS-9 mission. This first-time event led to their assistance with the Shuttle Amateur Radio Experiment. JSCARC knew they needed to continue their science, technology, engineering, and mathematics (STEM) outreach at schools (when they’re not helping the astronauts get licensed), so they’re now affiliated with Amateur Radio on the International Space Station (ARISS). To them, it’s a worthy effort that gets the ball rolling for future STEM majors and future hams. “Members have set

up ARISS contacts with elementary schools by installing antennas on school roofs, training students on how to speak into a microphone, and operating transceivers while students asked questions to in-flight astronauts,” said JSCARC member George Fletcher, AD5CQ.

JSCARC reaches the high school, undergrad, and grad crowd, too, via NASA’s Pathways Internship Program. They sponsor a group of JSC interns each semester to get them licensed and on the air. Club members continually develop hands-on activities to keep these young scientists eager for more, including soldering exercises, radio and antenna builds, foxhunts, and Morse code practice.

These projects are documented on their club website, like their most recent initiative: launching and tracking pico balloons. The excitement is mutual. “As a recently retired NASA guy, I get some personal reward out of teaching JSC interns about launching balloons carrying ham radio,” said JSCARC Trustee John Maca, AB5SS. The activity

directly applies to the electronics, avionics, and hardware/software know-how they’ll need at the center for human spaceflight. On the flip side, it gives them a glimpse into digital modes, satellite tracking, weak-signal communications, and propagation. One of their balloons, KI5CWE-1, stayed aloft for an impressive 122+ days. “It’s kind of like investing in [their] future success here,” he added.

Looking Up and Ahead

Investing in the future is indeed a JSCARC priority. Like any amateur radio club, they feel the strain that comes with growing membership despite wins in youth outreach, so they lean on each other to nurture their strengths while also seeking outside opportunities. Although they recently earned a STEM-based grant and JSC sponsorship to improve their station, much equipment was bought and installed by fellow members. Station maintenance is also handled by their own. “Our club members’ resourcefulness is an asset [that] can overcome almost any obstacle,” said JSCARC Secretary David Lee, W5OC.

The club is tackling several projects for 2026. Amid plans to erect a new 60-foot self-standing tower for expanded HF/VHF/UHF/microwave capabilities, they’re continuing to work with Houston’s Lone Star Flight Museum for further outreach. Outlines for a radio merit badge program, an informational ham radio booth at the annual Girls in Aviation Day gathering, and an “Aviation Museums On the Air” event are being devised. For more information and even more JSCARC efforts not covered here, visit www.w5rrr.org.

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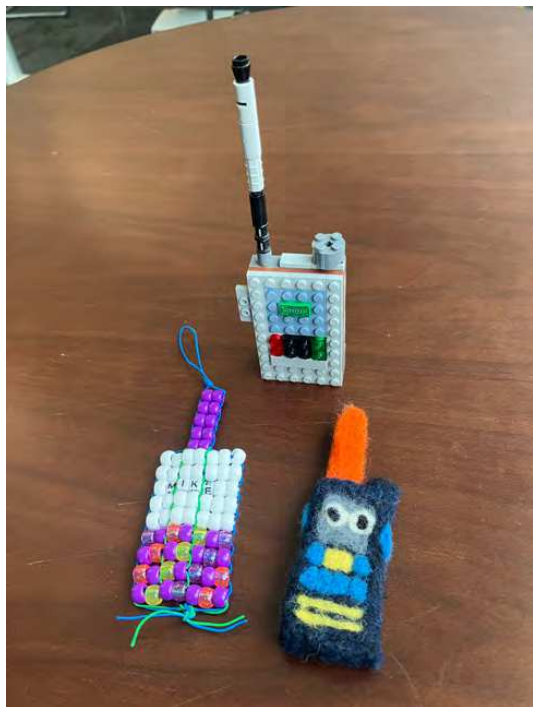


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Up Front



[Mike Nutt, K3LOE, photo]

“Hamcrafted” Birthday Gifts

Mike Nutt, K3LOE, recently had his first birthday as a new ham. To celebrate, his wife and two children made some “hamcrafted” miniature handheld transceivers. His 11-year-old son made a handheld with a high-gain antenna out of LEGO®; his wife made him a handheld with felt eyes; and his 7-year-old daughter made a handheld out of pony beads, which required careful planning on graph paper. Mike explained that his vanity call sign is an initialism of his family’s names: “Kisses 3: Lyra, Otis, Ellie.”

A QRO Bus

While out having breakfast with his family in Mexico, Erik Thoresen, K1OGF, noticed several buses in the area labeled “QRO BUS.” This was not the first time he had seen these buses over the years, and he finally decided to snap a picture of one as it drove by. These buses serve the city of Santiago de Querétaro (QRO), Mexico.



[André G. Lareau, Sr., WA9ZJW, photo]

A Father-Son SOTA Adventure

André G. Lareau, Sr., WA9ZJW (left), and his son André, Jr., K7ZJW (right), went out on Summits on the Air excursions to two prominent landmarks in the North Phoenix area: Shaw Butte (W7A/MN-138) and North Mountain (W7A/AW-060). The father-son duo braved the 100-degree Arizona desert heat to operate FT8 with a Chelegance MC-750 antenna and an Icom IC-705 QRP radio, managing contacts as far west as California and as far east as Pennsylvania. This was the first time that André, Sr., had operated portable since the 1970s, and he was amazed that long-distance contacts that used to require a trailer of equipment and a gas-powered generator could now be made with equipment they could fit in their backpacks.



[Erik Thoresen, K1OGF, photo]

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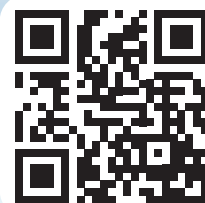
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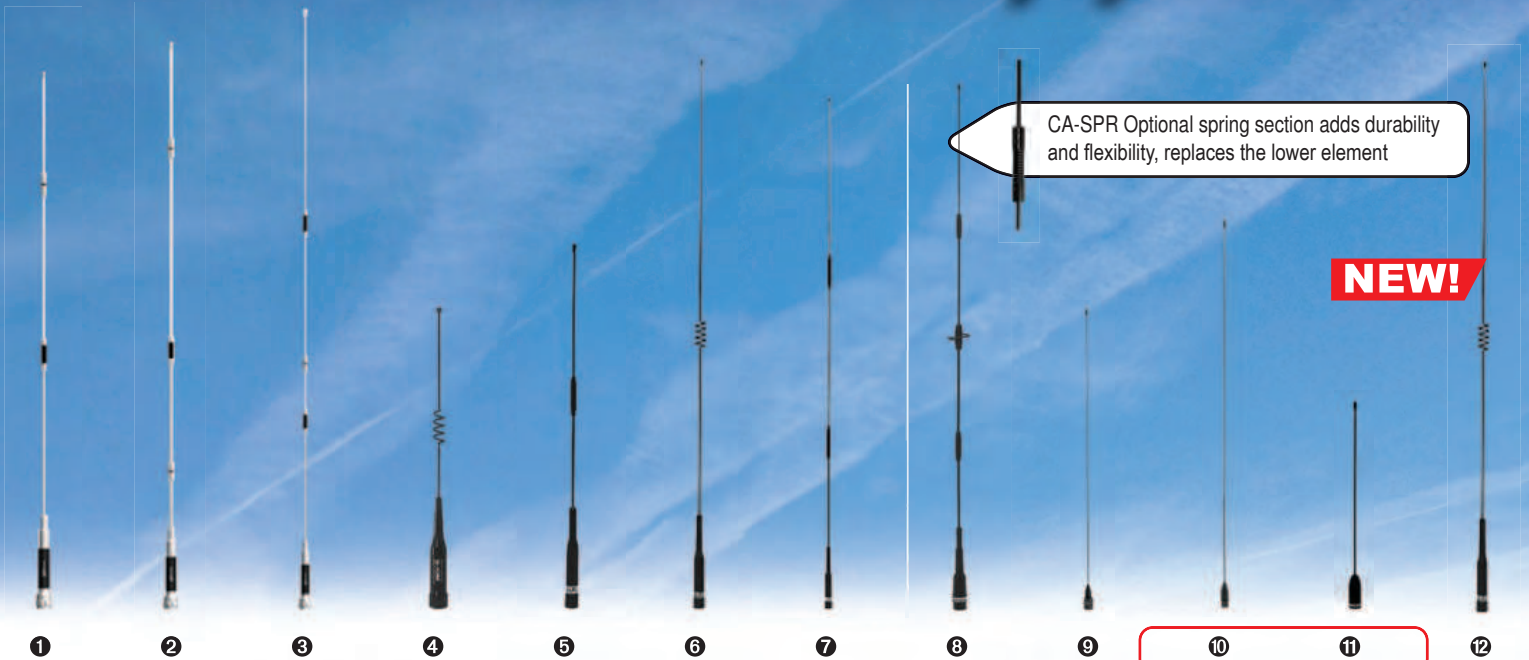
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2M: 5/8 wave center load • 440MHz: 5/8 wave x 2 center load • VSWR: 1.5:1 or less • Length: 51" • Conn: PL-259 • Max Pwr: 150W

3 COMET CSB-790 A 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

4 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

5 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

6 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

7 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

8 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

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

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10 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

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

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Letters from Our Members

Have Caution When Operating Band Edges

Recently, I was hunting parks for Parks on the Air®, and a Canadian station had activated a rare park in Saskatchewan, operating USB on 21.200 MHz. I was surprised at the number of US hams who answered with SSB. The lower limit of phone privileges for US Amateur Extra-class hams is 21.200 MHz, but our exam studies teach us that each transmission has a bandwidth. Thus, when you transmit at the band edge, some portion of your signal goes beyond that limit and is out of the band. Because of this, we should avoid transmitting on band-edge frequencies.

I certainly can't fault the Canadian operator, as he has no responsibility to know our rules. However, the US stations certainly should have known better. I'm also not looking to insult the operators who went out of band — in more than 40 years as a ham, I've made my share of mistakes. Fortunately, I've had gentle and knowledgeable mentors who corrected me.

ARRL offers colorful Frequency Band Charts that are suitable for framing (www.arrl.org/graphical-frequency-allocations). It's helpful to hang one at your operating position to make sure you stay in band.

DP Dunn, AB2NM
Webster, New York

Gratitude for VEC Staff

I would like to express my deep appreciation to ARRL and the Volunteer Examiner Coordinator staff for all the services they provide to the amateur radio community.

After spending 2 days trying to navigate the FCC website and their COMmission REGistration System (CORES) to renew my amateur radio license, I gave up in frustration. I sent an email to ARRL explaining the difficulties I was experiencing and requested any guidance ARRL could provide. The very next business day I received a response stating that ARRL would be happy to assist me and was given NCVEC Form 605 (www.arrl.org/ncvec-form-605), a very simple form designed for this purpose (the FCC would be well served to adopt it). Within a few days, my license renewal was completed.

After 75 years, my amateur radio license likely would have expired without the kind and efficient assistance of the ARRL staff. My gratitude is beyond measure!

Carleton "Barney" Waldrop, W7IHN
Clarkston, Washington

The ARES and Public Service Connection

I agree that public service events are a key component of the Amateur Radio Emergency Service® (ARES®), and for some reasons not mentioned in David Minster's, NA2AA, October 2025 "Second

Century" column. Public service events do not dilute the program. In fact, providing communications in an emergency is public service.

Public service events are a key component to practicing and testing the skills needed in an emergency. They also present us to the public as being competent in what we do. It's not just our people who get tested — our equipment needs testing, too. Any equipment that hasn't been used recently is not emergency ready.

Participating in public service events also requires us to set up our equipment in unfamiliar locations. When I operate during an event, I make notes on what I needed to get my station running in that situation.

NA2AA also mentioned a lot of ham and non-ham technology that we need to be ready to use. Sometimes during public service events we get exposure to some of this technology. We also get a chance to learn what resources are out there in the locations we might be sent to.

This is what we need to think about when future-proofing not just ARES, but our hobby, too.

Ray T. Stevens, KB9LGS
Bedford, Indiana

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

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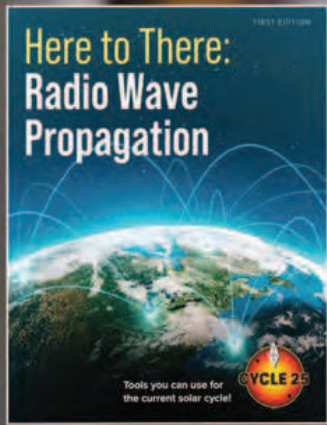
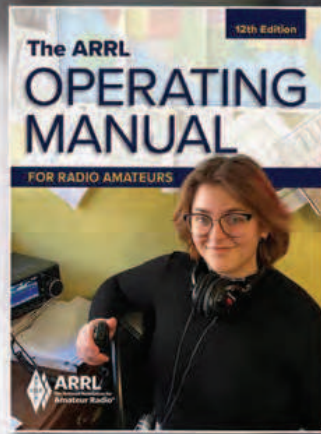
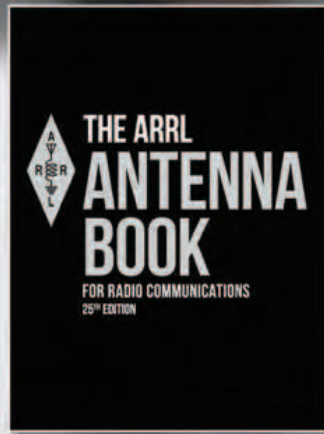
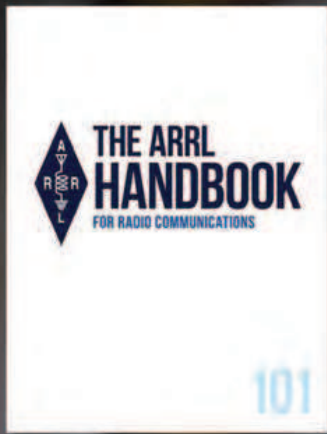
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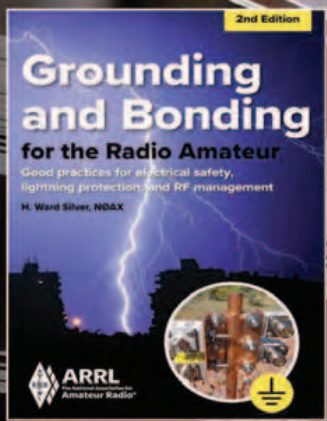
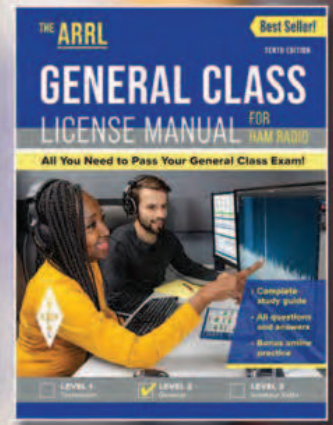
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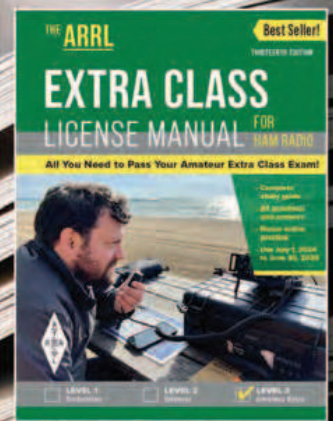
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W1AW Schedule

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, in addition to 3590 kHz, at various times. Underline 1 minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any), and complete mailing address. Fees: \$10 for a certificate, \$7.50 for endorsements.

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

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

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

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

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

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

During 2025, 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).



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Revisiting the Quagi Directional Antenna

An inexpensive 70-centimeter Yagi for satellite or terrestrial operation.

Richard “Rick” Lawn, W2JAZ

While thumbing through the 21st edition of *The ARRL Antenna Book*, I came across a design that I remembered reading about in the early 1970s. Maybe it was the name “Quagi” that first caught my eye, but after looking at more articles about this antenna that emerged 30 years ago or more, I decided it might be worth revisiting for my satellite operations, as I am always looking for inexpensive ways to operate the “birds.”

The Quagi gets its name from the characteristics it shares with quad and Yagi antennas. Further online research led me to an excellent article by Wayne Overbeck, N6NB (SK), who was one of the founding designers of the Quagi in 1972. Subsequent articles by Overbeck appeared in the April 1977 issue of *QST* (“The VHF Quagi”), the February 1978 issue (“The Long-Boom Quagi”), and the August 1981 issue (“Reproducible Quagi Antennas for 1296 MHz”). Surprisingly, it seems this antenna hasn’t caught the eye of commercial manufacturers, aside from a hybrid crossed-polarity design by WiMo.

What made the Quagi more appealing to me was the fact that the driven element is a quad loop — as is the reflector — making it simple to feed directly with 50 Ω

coax. Easy-to-find materials also make it a great homebrew project.

I had already built a quadri-filar helix antenna (QHA) for 2-meter satellite operation that might pair well with a 70-centimeter Quagi, so I decided to build an eight-element version following specifications in the 24th edition of

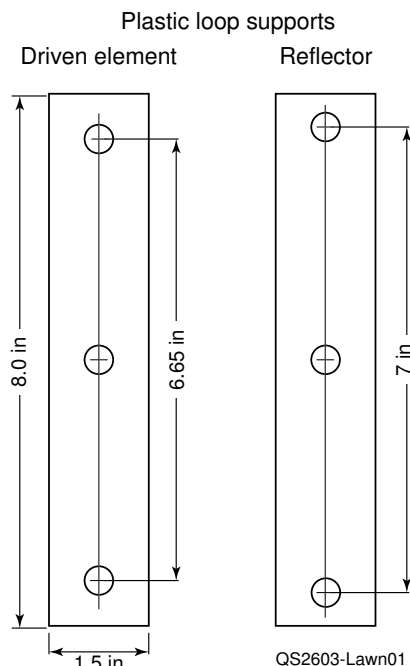
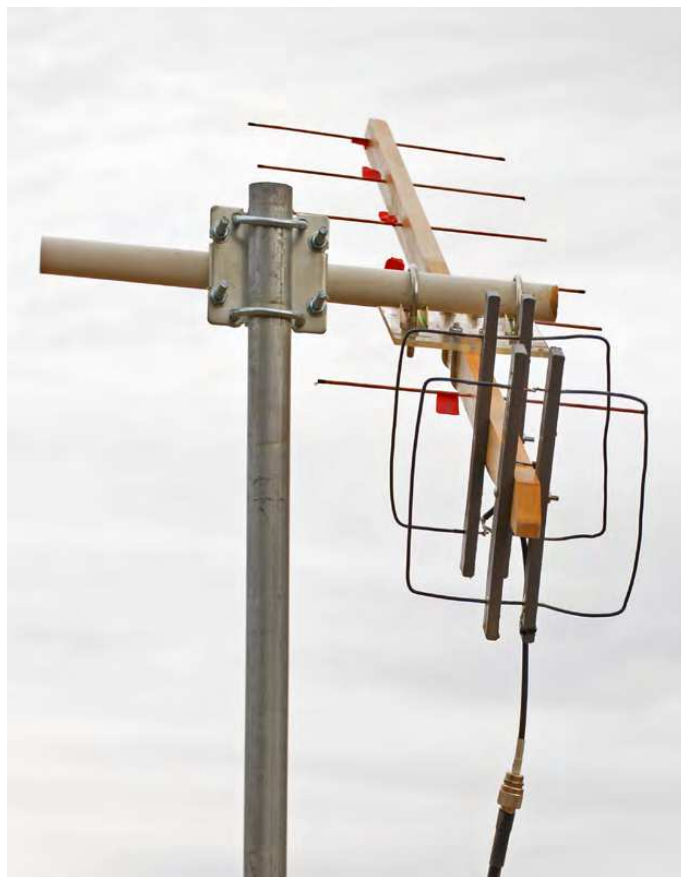


Figure 1 — Diagram of the loop supports.



The author's fully assembled Quagi. [Bill Saidel photo]

The ARRL Antenna Book. I designed it for resonance centered around the satellite portion of the band at 435 MHz. Square quad elements would provide the driven element and reflector, and six horizontal elements would provide the Yagi-like directors.

Materials, Preparation, and Tools

I fashioned the boom from a 1 × 2-inch piece of 4-foot, 10-inch-long hardwood and coated it several times with clear polyurethane to seal it from weather effects. I slightly tapered the ends with a jigsaw. I also used #12 AWG solid insulated house wire to make the square director and reflector. Wire with white insulation will clearly show Sharpie® markings, though black insulation is more UV resistant. To support these quad loops, I used four plastic strips (two for each loop) cut from a dollar store cutting board; these strips should be 8 inches long and 1 – 1.5 inches wide.

Table 1 — Element Dimensions

Element	Length	Spacing Distance
Reflector	28 inches (7 inches each side)	N/A
Driven element	26 ⁵ / ₁₆ inches (6.65 or 6 ²¹ / ₃₂ inches each side)	6.8 inches (6 ⁵¹ / ₆₄ inches from reflector)
Director 1	11 ¹ / ₁₆ inches (11.375 inches)	5.34 inches (5 ³ / ₃₂ inches from driven element)
Director 2	11 ¹ / ₁₆ inches (11.3125 inches)	10.7 inches (10 ⁴⁵ / ₆₄ inches from director 1)
Director 3	11 ¹ / ₄ inches (11.25 inches)	5.6875 inches (5 ¹¹ / ₁₆ inches from director 2)
Director 4	11 ³ / ₁₆ inches (11.1875 inches)	8.46 inches (8 ²⁹ / ₆₄ inches from director 3)
Director 5	11 ¹ / ₈ inches (11.125 inches)	8.46 inches (8 ²⁹ / ₆₄ inches from director 4)
Director 6	11 ¹ / ₁₆ inches (11.0625 inches)	8.46 inches (8 ²⁹ / ₆₄ inches from director 5)

I used inexpensive 1/8-inch welding rods from Harbor Freight for the director elements. You will have to buy a package of a dozen or so, but you will need only two 36-inch-long pieces for this design. Consider donating the excess to your local ham club for a club antenna kit project.

For the short coaxial pigtail feed line with an N connector, eBay is an excellent source for materials. There, you can find short pieces of coax with an N connector already attached, which is helpful if you prefer not to make your own. N connectors are generally recommended for use at UHF and above because they have negligible signal loss at higher frequencies.

You will also need two stainless-steel bolts, nuts, and washers to attach the two pairs of plastic spreaders to the 2-inch side of the 1 x 2-inch boom. Length is not critical, and you can judge it by what you have in your toolbox or by measuring the diameter of the plastic spreader supports and the thickness of the boom.

The tools you'll need to assemble this include an accurate ruler or measuring device that shows 32nd and 64th increments, a high-wattage soldering iron or gun, a hacksaw or some other means of cutting the welding

rods, a Sharpie marker, a straight edge, heat shrink-wrap or electrical tape, masking tape to label directors after cutting them, epoxy for locking elements in place, and an electric hand drill or drill press with bits.

Preparing the Components

Table 1 includes the exact measurements I used to construct the Quagi for 435 MHz. It shouldn't take long to mark and cut the various components.

Plastic Quad Loop Supports

To prepare the loop supports, drill a center mounting hole in each of the four plastic loop supports (see Figure 1). Next, drill 1/8-inch holes spaced equal distances from the center hole, and measure the total distance of the driven element and the reflector sides. In this case, it should be 7 inches for the reflector and 6²¹/₃₂ inches (6.656 inches) for the driven element. This should leave approximately an inch or so at the end of each support.

Boom Holes for Directors

Measure 2 inches in from each end of the boom, and then mark the center point of the wide side of the boom, which should be at 3/4 of an inch, and draw a center line using a straight edge. This will ensure that the holes for the directors and quad loop supports are aligned. Mark drill points along this line according to Table 1 to mount the directors, the driven element, and the reflector



Figure 2 — A view of the quad loops. [Richard Lawn, W2JAZ, photo]



Figure 3 — The Quagi with a cross-boom mount. [Richard Lawn, W2JAZ, photo]

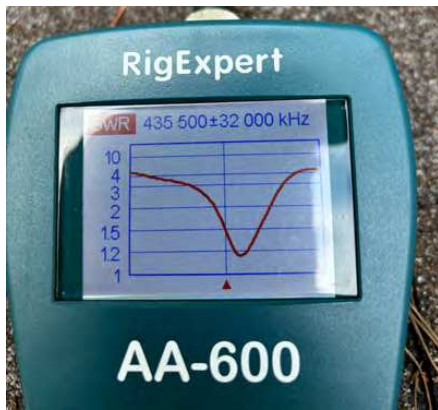


Figure 4 — The SWR at 435 MHz. [Richard Lawn, W2JAZ, photo]

supports, and drill the holes. If possible, use a drill press to ensure the holes are straight — 1/8-inch holes will make a perfect, snug fit for the directors.

Element Preparations

Using a Dremel-like tool or a hacksaw, cut the six directors from 1/8-inch welding rod per the dimensions in Table 1. Mark a piece of tape with Sharpie to label each element.

Use #12 AWG insulated solid copper wire to form the loops. They are easier to form if you mark the bends with Sharpie before inserting the wire into the plastic supports. Once the loops are formed and inserted through the supports, use epoxy or silicone to fix the wire loops to the supports. The reflector is a closed loop, so you must solder the two open ends at the bottom of the loop once the loop is passed through both spreaders. Leave the driven element loop open to attach the short coaxial feed-line jumper (see Figure 2).

Final Assembly

Before attaching the elements to the boom, it helps to find the center or balance point on each director. I made a little jig from a piece of balsa wood and carved a small notch in the end. Then, I clamped it in a vice to make it vertically level and balanced each director on it to find the center. You can probably use a Popsicle® stick or a chopstick to help find a balancing point, or you can just measure each side to ensure the elements are centered. Mark the center of each director with Sharpie, and then add marks at 3/8 of an inch on either side of the center. These marks will make the job of centering each director on the boom easier. Before the driven elements are in place, find the boom's balance point, and drill holes for a mast-mounting C clamp.



Figure 5 — The SWR with shorter quad loops. Making the loops longer will lower the resonant frequency. [Richard Lawn, W2JAZ, photo]

Mount the elements to the boom, and use a little epoxy or silicone to fix the elements to the boom. I learned the hard way that the ends of these elements are sharp even after filing, so I used small pieces of heat-shrink tubing on the ends. You can also use electrical tape for this purpose. The Quagi can be mounted for a vertical mast or horizontal satellite-style boom (see Figure 3). The completed antenna can be seen in the lead photo.

Using stainless-steel bolts, nuts, and washers, attach the driven element and reflector to the boom. Once the driven element is attached, solder a short coaxial jumper terminated in a female N connector to the open ends of the wire quad loop. You can use epoxy or wire ties to keep the ends of the wire loop from pulling through the holes in the plastic spreader supports. Once these two elements and the coaxial jumper are in place, I suggest using wire ties to anchor the jumper to the boom so that the N connector exits the antenna via the back of the boom (see Figure 2).

Testing and Performance

Initial testing can be done at near-ground level using a 6-foot fiberglass stepladder or a small tripod. My standing wave ratio (SWR) readings that I took with a RigExpert AA-600 were impressive. Not only was the SWR at resonance more than acceptable, but the curve suggested the antenna was fairly broad banded, showing 2:1 or less for a large portion of the band (see Figure 4). If you find that the resonant point is too low, just shorten the loops slightly — remember, it doesn't take much to shift the frequency at 70 centimeters! If the antenna resonance is too high, re-make the loops with slightly longer dimensions (see Figure 5). For such minor adjustments, you shouldn't need to adjust the director element lengths.

The real test was to replace my M2 Antenna Systems circularly polarized 70-centimeter antenna with the

newly minted Quagi and see how it performed for satellite contacts. Of course, the SWR changed slightly when I mounted it to my roof, but the changes were not significant enough to negatively impact performance. I used it on the FM and linear satellites for a week or so with good reports. I did not notice a significant signal degradation compared to the M2 antenna — at least not enough to make contacts difficult. The circular polarization provided by the M2 antenna would no doubt be better at handling very weak signals or signals subject to satellite spinning. The gain on this eight-element design, as measured at the 1972 West Coast VHF Conference, was 12 – 13 dBd over a reference dipole! By comparison, the M2 456CP34 with a 125-inch boom is listed at 16 dBi gain, and their smaller 436CP16 with a 65-inch boom in their low-earth-orbit pack posts a gain of 13.3 dBic. Therefore, the Quagi is not too shabby for an easily constructed antenna that should cost about \$25 or less to build.

Future Experimentation

I have not yet tried staggering the director elements so that three are mounted horizontally and three vertically, nor have I used *EZNEC* or similar software to model this variation in design. If someone builds the Quagi with this design variation, I would love to know how it performs. My next experiment will be to combine this with the homebrew 2-meter QHA and see how my satellite station performs.

Richard “Rick” Lawn, W2JAZ, has authored reviews and articles for *QST* and *CQ* magazines and currently serves as President of the South Jersey Radio Association. He holds undergraduate and graduate degrees from the Eastman School of Music and has performed with Chuck Mangione, Lionel Hampton, and a host of other noted performers and ensembles. Rick can be reached at rjlawn@gmail.com.

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December 2025
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Fred Lass
K2TR

In his article, “The Tomato Stake Antenna: An Optimized 6-Meter Array,” Fred outlines the design, testing, construction, and performance of his tomato stake 6-meter array, which earned him the top spot in the 6 meters and up category of the 2024 *QST* Antenna Design Competition.

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The Tomato Stake Antenna: An Optimized 6-Meter Array

This design won first place in the 6 meters and up category of the 2024 *QST* Antenna Design Competition.

Fred Lass, K2TR

FT8 has significantly changed the dynamics of operating on 6 meters. While I miss the excitement of SSB on the Magic Band, there is no denying the signal-to-noise (S/N) advantages of FT8. This antenna design was part of a plan to allow two stations on a mountaintop to operate SSB and FT8 without interfering with each other. Although many excellent 6-meter antennas exist, most prioritize gain over front-to-back (F/B) ratio. My attempts to enhance F/B ratio through stagger stacking proved ineffective. Instead, I turned to the data published in Dr. James Lawson’s, W2PV, *Yagi Antenna Design*. The graphs included in Figure 2.9 of that book suggest specific boom lengths and element dimensions to attain an F/B ratio of as much as 40 dB (see Figure 1). While the gain of an antenna using those measurements is lower, the S/N advantages of FT8 easily make up for that slight difference.

This article outlines the design, testing, and field performance of a 6-meter array optimized for a high F/B ratio. After making, testing, and using this antenna with tomato stakes, I recently found that it may not be possible to source them due to import issues and the supplier changing the type offered. To be sure that prospective builders can still use the design, I ordered fiberglass tubes from Max-Gain Systems, a reliable US source. The differences in the dimensions and material of the tubes meant that I had to re-calculate the effects of the fiberglass on the lengths of the elements. Details of the version with the Max-Gain tubes can be found at www.arrl.org/qst-in-depth, along with photos of



The deployed tomato stake 6-meter array.

that version and a brief history of why I created this antenna.

Dimensions, Materials, and F/B Considerations

Two sets of dimensions for this antenna are provided in Figure 2. The parts list is provided in Table 1. An *EZNEC* model of a high-F/B-ratio antenna design agreed with Lawson’s predictions. While the bandwidth of this high-F/B improvement is narrow, field testing has proven that it includes the common 6-meter SSB and FT8 frequencies simultaneously.

I began verifying this design using a square aluminum tube boom and solid aluminum elements. The F/B ratio measured as predicted, but the antenna was heavy and expensive to implement in quantity. My solution to these problems was to use #14 AWG THHN electrical wire inserted into a fiberglass tube for the elements. I searched Amazon for appropriate hollow fiberglass and found a package of 30 tomato stakes for \$56.99. This was sufficient to build a total of five three-element antennas. The fiberglass has a .340-inch outer diameter (OD), and it is light, stiff, and coated to withstand weathering and reduce fiberglass abrasion.

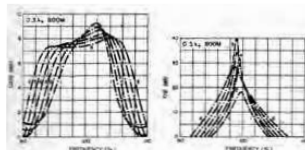


Figure 1 — Part of Figure 2.9 in the first edition of *Yagi Antenna Design* by Dr. James Lawson, W2PV.

Optimized Moxy Antennas for the 2-, 6-, and 10-Meter Bands

The original 6-meter design has been scaled for 2 and 10 meters.

Dave Ahlgren, K1BUK

In the May 2019 issue of *QST*, my article, “The Moxy Antenna,” described four-element Moxon-Yagi (or Moxy) antennas for the 6-meter band. These antennas combined the low SWR of the Moxon with the high gain and front-to-back (F/B) ratio of the Yagi. I’m still using a four-element Moxy on a painter’s pole 15 feet above ground and have made contacts with 48 states and 41 countries with it.

After my 2019 article was published, many amateurs emailed me to ask if the antenna could be scaled down to 2 meters and if it could be built in a three-element configuration. Such questions inspired a fresh look at the antenna, leading me to the new designs presented in this article: three- to six-element antennas for the 2- and 6-meter bands, and three- to five-element antennas for the 10-meter band. These new designs exhibit low SWR, higher gain, and excellent F/B ratios.

This article outlines the design process, presents tables that summarize the dimensions of optimized antennas for the three bands, discusses construction approaches, and evaluates on-air results.

A New Design

The results presented here relied on optimization algorithms built into the *4NEC2* software (www.qsl.net/4nec2). These algorithms accept an initial antenna

design and vary its dimensions to improve performance, as measured by simulated forward gain, F/B ratio, and SWR. The algorithms require the user to assign a numerical weight to each measure, and the user specifies which antenna dimensions are adjusted.

The 2-meter Moxy dimensional layout. See Table 1 for details.

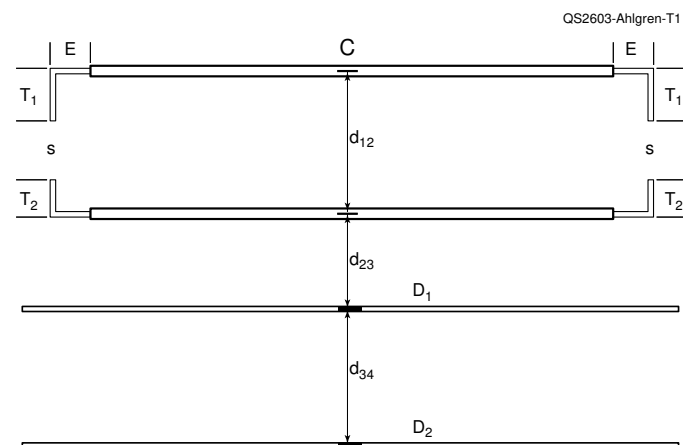


Table 1 — Optimized Dimensions (in Millimeters) for Three- to Six-Element 2-Meter Moxy Designs

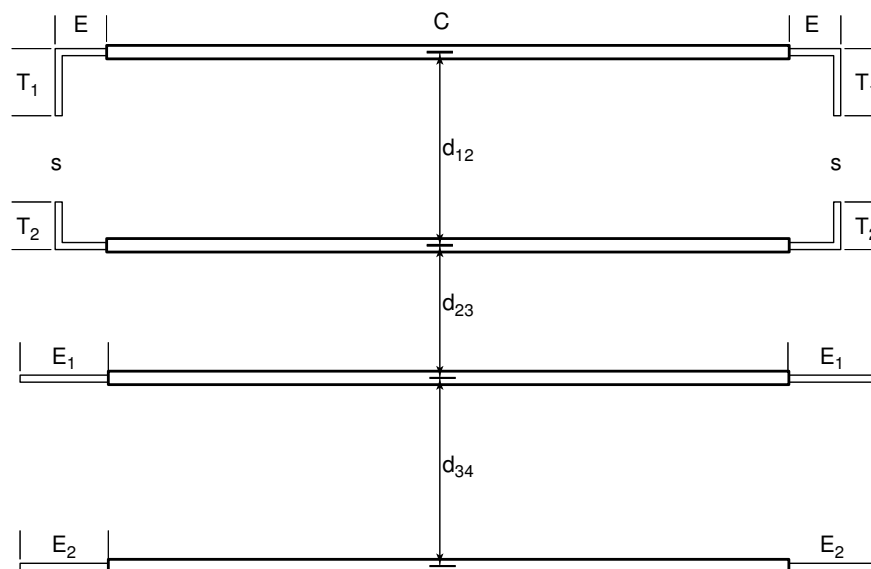
$f = 144.5$ MHz, $H = 20$ feet. Diameters: C = $\frac{1}{2}$ inch, others $\frac{3}{8}$ inch. Physical boom is 3 inches (75 millimeters) longer than distance D from reflector to front director.

Design	3 Element	4 Element	5 Element	6 Element
Gain (dBi)	12.7	14.5	15.7	16.7
SWR	1.0	1.0	1.0	1.0
F/B (dB)	30.0	30.0	47.0	40.0
Rad eff (%)	69.6	73.2	75.4	76.6
C	457.2	278.0	278.0	457.0
E	203.2	280.0	280.0	203.0
T ₁	112.4	114.0	114.0	110.0
S	98.7	61.2	73.4	73.6
T ₂	76.2	85.1	86.4	99.9
D ₁	824.9	893.0	898.0	925.9
D ₂		844.0	892.0	880.1
D ₃			809.0	875.0
D ₄				842.8
d ₁₂	287.3	260.3	273.8	283.5
d ₂₃	340.5	280.0	279.4	255.3
d ₃₄		466.0	466.0	466.0
d ₄₅			579.0	451.0
d ₅₆				490.0
D	628	1,006	1,598	1,946
Phys. boom	704	1,082	1,674	2,022
Phys. boom (ft)	2.31	3.55	5.49	6.63



Figure 1 — Dave Ahlgren’s, K1BUK, 6- and 2-meter Moxy antennas on a 16-foot painter’s pole.

The 6-meter Moxy dimensional layout. See Table 2 for details.



QS2603-Ahlgren-T2

Table 2 — Optimized Dimensions (in Inches) for Three- to Six-Element 6-Meter Moxy Designs

$f = 50.313$ MHz, $H = 20$ feet. Diameters: $C = \frac{1}{2}$ inch, others $\frac{3}{8}$ inch. Physical boom is 3 inches longer than distance D from reflector to front director.

Design	3 Element	4 Element	4 Element	5 Element	5 Element	6 Element
Gain (dBi)	12	13.3	14	14.4	15.1	15.4
SWR	1.02	1	1.01	1.01	1	1.02
F/B (dB)	25	30	31	40	37	60
Rad eff (%)	68.9	72	72.9	73.4	74.8	75.3
C	72	72	72	72	72	72
E	11.000	11.350	11.350	11.375	11.375	11.375
T ₁	13.119	11.825	12.189	13.630	12.081	12.000
S	8.900	7.241	7.676	7.647	7.439	4.923
T ₂	9.879	9.915	12.356	11.194	10.327	10.447
E ₁	13.141	16.761	19.330	18.000	17.794	18.368
E ₂		14.075	16.429	16.000	16.000	16.339
E ₃				13.861	13.011	14.000
E ₄						12.095
d ₁₂	31.898	28.981	32.222	32.471	29.848	27.370
d ₂₃	37.102	19.016	24.000	30.293	30.548	29.639
d ₃₄		45.002	48.778	38.368	61.972	44.879
d ₄₅				39.868	75.498	41.278
d ₅₆						64.703
D	69	93	105	141	198	208
Phys. boom	72	96	108	144	201	211
Phys. boom (ft)	6	8	9	12	16.7	17.6

In this project, I obtained the initial designs. For the 2- and 10-meter bands by scaling the 6-meter antenna. Then, I used *4NEC2* to compute optimal dimensions of the Moxon section, the directors, and the element spacings. I specified a convenient boom length for some designs. For others, an optimal boom length was calculated by *4NEC2*. Tubing diameters were consistent with construction standards presented in chapter 25 of the 25th edition of *The ARRL Antenna Book*.

In this project, I used two of *4NEC2*'s optimization algorithms, named Evolve and Optimize. Each antenna design required two weighted optimization steps. Step

one used *4NEC2*'s Evolve algorithm to compute the best director lengths and spacings. This step also emphasized maximizing forward gain and F/B ratio with less weight assigned to SWR. Step two used the Evolve algorithm to optimize the Moxon dimensions and first director position. In this step, SWR was heavily weighted, while the gain and F/B ratio were less so. For some designs, a third step fine-tuned the design-frequency SWR using the Optimize method.

Tables 1, 2, and 3 summarize the results of the optimization runs and include predictions of gain, F/B ratio, and SWR performance at the design frequency.

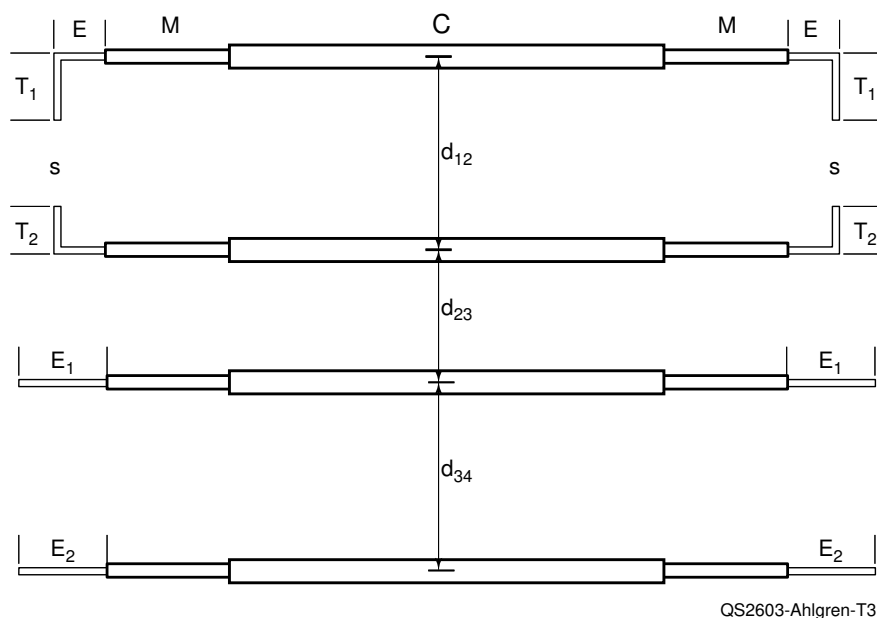
Making Moxy Antennas

My May 2019 article presented a detailed construction plan for a 6-meter Moxy that used a fiberglass boom and available hardware. Feedback from amateurs who made a Moxy indicated that they had adopted their own construction methods. Bill Blazina, W3XS, from Oregon said, “I used cedar for the boom and element mounts — works great with a coax balun. Seems as good as the five-element commercial Yagi that it replaced.” And Dave Lancey, NØUB, from Missouri said, “I used a metal boom and plexiglass to insulate the boom-to-element mounting. The SWR came right

in at the start. I moved up from a 6-meter Moxon, and the Moxy is heads and shoulders over it. I am up to 47 states and 150 grid squares.”

This feedback suggests two construction approaches: to use a boom of insulation material, or to insulate the antenna elements from a metal boom — both work! To prove this point, I made a five-element 2-meter Moxy with a square PVC boom, and a three-element 6-meter Moxy with an aluminum boom (see Figure 1). Predicted radiation patterns for these antennas are presented in Figure 2.

The 10-meter Moxy dimensional layout. See Table 3 for details.



QS2603-Ahlgren-T3

Table 3 — Optimized Dimensions (in Inches) for Three- to Five-Element 10-Meter Antennas

f = 28.074 MHz, H = 40 feet. Diameters: C = 5/8 inch, M = 1/2 inch, others 3/8 inch. Physical boom is 3 inches longer than distance D from reflector to front director.

Design	3 Element	3 Element	4 Element	4 Element	5 Element	5 Element
Gain (dBi)	12	12.2	12.8	13.8	14.3	14.7
SWR	1.01	1.01	1.01	1.02	1.01	1.02
F/B (dB)	23	34	32	32	40	33
Rad eff (%)	69.2	69.6	71.5	73.9	74.7	75.4
C	72	72	72	72	72	72
M	32	32	32	32	32	32
E	23.890	22.570	19.858	17.863	16.900	16.900
T ₁	18.000	21.080	20.474	20.826	23.596	22.760
S	12.980	28.000	15.204	13.064	13.717	14.040
T ₂	11.730	15.580	16.136	17.228	20.059	17.383
E ₁	24.690	27.150	24.008	29.291	28.153	26.102
E ₂			22.243	26.377	27.957	26.056
E ₃					22.256	21.115
d ₁₂	42.710	64.660	51.814	51.118	57.372	54.183
d ₂₃	50.290	52.340	26.827	31.131	37.606	42.650
d ₃₄			62.358	82.751	53.168	104.400
d ₄₅					88.855	125.767
D	93	117	141	165	237	327
Phys. boom	96	120	144	168	240	330
Phys. boom (ft)	8.0	10.0	12.0	14.0	20.0	27.5

The five-element 2-meter antenna uses a 1-inch square PVC boom. Elements are inserted into the boom through holes drilled carefully with a drill press. The two halves of the driven element are separated by 5 millimeters and linked by a fiberglass rod secured using high-strength epoxy. The 6-meter antenna uses a 1-inch square aluminum boom. Element insulators were cut from high-density polyethylene and mounted to the boom by square U bolts. Both antennas use a choke balun placed close to the feed point. The balun consists of a short length of RG-8X coaxial cable and five type-43 ferrite cable cores (Fair-Rite type 2643540002).

Details of making the Moxon section are presented in my May 2019 article, and *The ARRL Antenna Book* includes relevant guidelines for builders. Two important points to note are to allow an overlap of at least 4 inches between telescoped tubing sections, and to avoid galling by applying copper-based anti-seize grease at tubing intersections. See *QST in Depth* (www.arrl.org/qst-in-depth) for further construction details and *NEC* files for all designs.

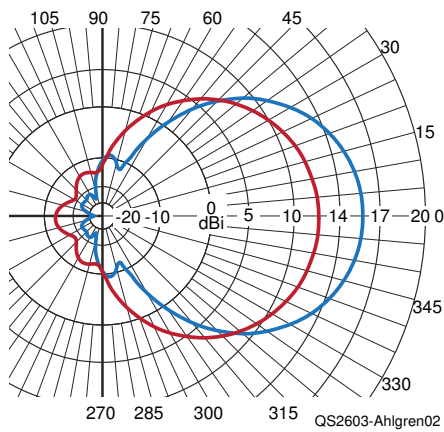


Figure 2 — Horizontal radiation patterns in dB for three-element 6-meter Moxy (red) and five-element 2-meter Moxy (blue), both 20 feet above average ground. Main takeoff angles: 6 meters, 14 degrees; 2 meters, 5 degrees.

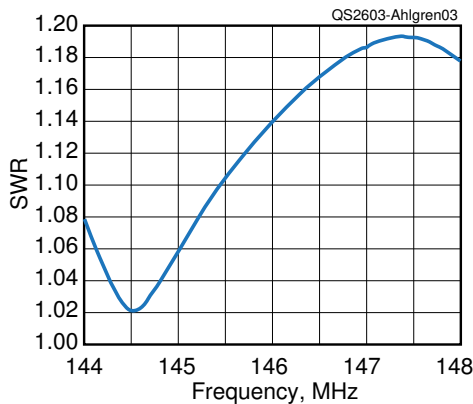


Figure 3 — Measured SWR vs. frequency of a five-element 2-meter Moxy.

Performance

The 2- and 6-meter designs were mounted on a 16-foot painter’s pole. Figure 3 presents the SWR curve for the five-element 2-meter antenna measured using a NanoVNA-F device (<https://depelec.com/nanovna-f>). After a slight (less than 1 centimeter) adjustment to the driven element, made by equally sliding the “trombone” ends of the Moxon, an SWR of 1.02 was measured at the design frequency of 144.5 MHz.

Figure 4 shows the SWR indication at 50.313 MHz for the three-element 6-meter antenna — the on-air perfor-



Figure 4 — A KPA500 SWR readout of a three-element 6-meter Moxy at 50.313 MHz.

mance was excellent. I made many FT8 contacts from grid square FN31 during sporadic-E openings in the summer of 2025, and I had several contacts with South American stations during transequatorial openings. Operating portable using FT8 from grid square FN53 with 100 W and an antenna 20 feet above ground, I logged DX stations from Europe, South America, and the Caribbean.

I look forward to receiving feedback from those who make a Moxy antenna!

See QST in Depth for More!

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

- ✓ NEC files for 10, 6, and 2 meters
- ✓ Additional photos
- ✓ Construction notes

All photos provided by the author.

Dave Ahlgren’s, K1BUK, adventures in ham radio began in 1957, with his Novice call sign KN1BUK. He operated as W8IXX in Michigan in the early 1970s, and returned to the hobby in 2015, after retiring from teaching courses in digital and analog electronics, computer-aided design (CAD), and robotics at Trinity College. He now holds an Amateur Extra-class license and operates on 160 to 6 meters via CW, SSB, and FT8/FT4. He has earned DXCC and nine-band WAS. Dave’s current projects include CADs of antennas, tuners, and baluns using *4NEC2* and *EMCoS Studio* CAD. He earned a BS from Trinity College, an MSEE from Tulane University, and a PhD in EE from the University of Michigan. Dave can be reached at djahlgren@cox.net.

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A Portable HF Glove Antenna

A lightweight cobweb for the 10-, 15-, 17-, and 20-meter bands.

Jim Grebey, N4KCT

My article “A 2-Meter Glove Antenna for Portable Operation,” in the January 2023 issue of *QST*, uses the term “glove” to describe a portable antenna with a fabric enclosure instead of rigid structural components. I presented it to several radio clubs, and each time, I received suggestions to make an HF version.

After reading about the cobweb antenna built by Steve Webb, G3TPW (www.kerryamateurradiogroup.com/resources/Cobwebb%20Design.pdf), I decided to re-imagine that design as a portable HF glove. A traditional cobweb has structural and mounting hardware that is too heavy for portable use. My solution (see the lead photo) supports 10, 15, 17, and 20 meters and integrates full half-wave folded dipoles for each band. An inexpensive 10 × 10-foot tarp/shade canopy forms the antenna’s structural component. Fabric tubes sewn into the canopy hold the elements in place, making it lightweight compared to a typical cobweb. It is both omnidirectional and horizontally polarized, and it doesn’t need a counterpoise. It also uses a common-mode choke; you can use either a toroid choke (preferred) or a coaxial choke (six turns of coax, 4 inches in diameter). While it’s great for low power, it will handle full legal-limit power limited only by the choke you choose. The toroid choke shown at www.arrl.org/qst-in-depth limits the power to about 200 W. The parts list is provided in Table 1. As with any portable antenna, use ARRL’s RF Exposure Calculator (<https://arrl.org/rf-exposure-calculator>) before use.

The Fabric Glove

Begin with the fabric component (see Figure 1). I used two shade canopies — one for the base of the glove, and the other for cutting into 3-inch-wide strips to form the tubes through which the wires run.

Open the base canopy on a hard surface. Using a dry-erase marker and referring to Figure 2, draw the layout of the entire glove on the canopy. Start with two dashed lines between opposite corners to identify the center. If your canopy does not have a grommet in the middle, add one to help support the antenna later. The top of the junction box should be 28 inches from the center of the canopy.

Next, make the tubes that will hold the dipole wires onto the antenna (see Figure 3). You will insert the



The deployed HF glove antenna.

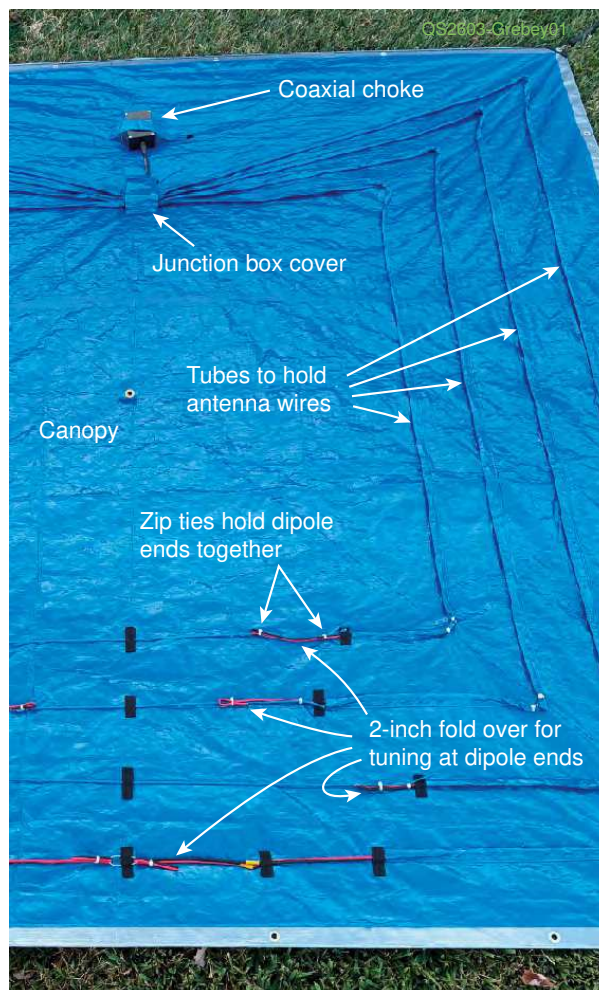


Figure 1 — General placement of the glove antenna’s components.

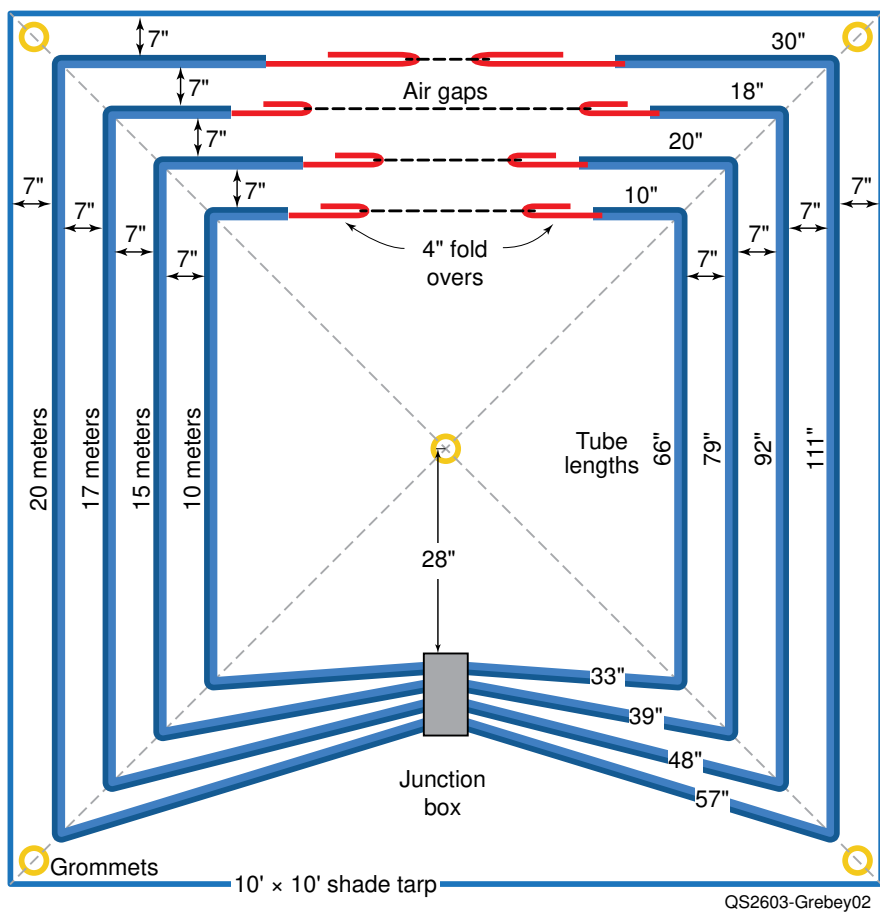


Figure 2 — The HF glove's layout.

antenna wires later — do not put them in the tubes while sewing. It's not possible to push the dipole wires around a bend, so there needs to be one tube for each straight wire run (leave them open at each end).

Fold the 3-inch strips in half, and add a seam using nylon thread to each one about half an inch in from the open end. This leaves a half-inch flap, allowing you to sew each 1-inch-diameter tube to the base layer. Use the lines you drew earlier on the canopy as sewing lines. Sew the tubes to the canopy, leaving 1½ inches

Table 1 — Parts List		
Qty	Description	Source
2	Waterproof 10-foot × 10-foot × 7.5-mil tarp with grommet	TARPAL
1	Spool of nylon thread	N/A
Misc.	Velcro	N/A
1	Toroid	N/A
Misc.	Zip ties	N/A
1	70-foot #12 AWG ultra-flex black-and-red speaker wire	DS18 SW-12GA-100RB
1	Waterproof 4.5 × 3.5 × 2.2-inch outdoor/junction box	Zulkit IP65
2	Block brass wire screw terminal strip	RLECS
1	10-foot RG-8X 50 Ω coax with connectors	exg00fit
Misc.	SO-239 through-wall female connector, brass grommet	N/A

at each end unsewn; this allows an opening for the antenna wire to turn at each intersection point. Note that no tube is ever sewn across another.

Cut a 6 × 9-inch piece of fabric to cover the junction box, and sew a half-inch border around all four sides. The fabric will be long enough to cover the top and bottom (coaxial end) of the junction box. The end at the top of the junction box should be sewn to the canopy, and the coaxial end should have Velcro®. Add Velcro as needed to hold the fabric in place. Leave the remaining sides open.

The Dipoles

It's best to begin with the 20-meter dipole and then add the other three, working from the outside of the glove toward the center as you progress (see Figure 4). This antenna uses folded dipoles with a common feed point. I used two-conductor #12 AWG copper speaker wire with black-and-red insulation to simplify construction.

Cut each of the dipoles to their respective "A" length. Fold the wire in half to identify the center, and at the center point, cut *only* the red wire. Separate the red wire from the black wire about 1½ inches in the center of the dipole.

A folded dipole impedance is 300 Ω and is usually matched by using a 300 Ω open-wire feed line or a 4:1 balun as a matching transformer. For portability, I followed the G3TPW approach and used the gamma

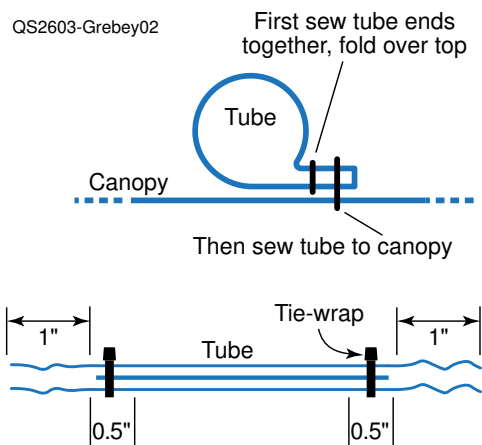


Figure 3 — The fabric tube dimensions.

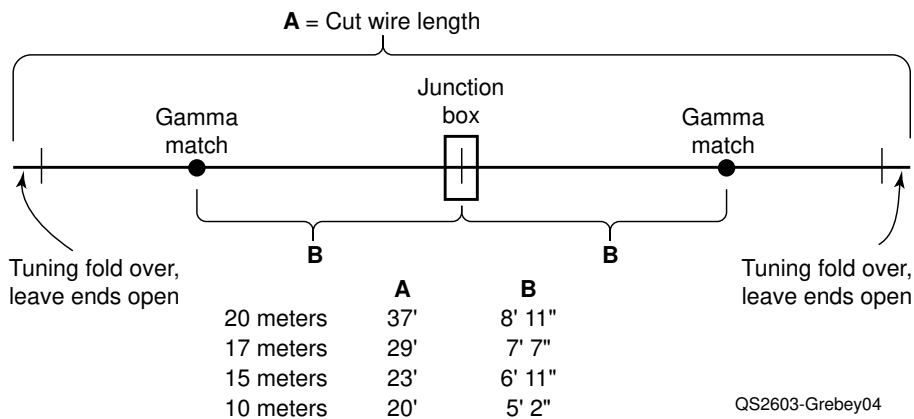


Figure 4 — The dipole dimensions.

tee match for each dipole. This created a 50 Ω match between the dipoles and the common coaxial feed line.

To make the gamma tee match, measure the distance from the center of the dipole to its point “B” per Figure 4, strip the insulation from both wires (without cutting the conductor), twist the wires so the red and black make contact, and solder them together (see Figure 5).

Run the dipole wires through the tubes for the respective frequencies. Use a stiff #14 AWG wire to pull them through if necessary. On both sides, fold over 4 inches at the ends of the wires of each dipole (do not connect the ends of the wires together). Connect the air gaps between the dipole ends, using zip ties to hold them in place. After assembly, tune each dipole separately by adjusting the amount of wire that is folded over at the ends.



Figure 5 — A photo of the gamma tee match.

The Junction Box

To make the junction box (see Figure 6), I used a 4.5 × 3.5 × 2.2-inch plastic utility box and mounted two electrical utility ground bars side by side within it. Drill four holes on each side of the box for the dipole wires and one at the end for an SO-239 female connector. Connect the terminal bar on one side to the SO-239 center connector and the other to the shield. Do not connect the two strips together. Start with the 20-meter dipole and put it closest

QS2603-Grebey04

to the SO-239 connector. Using the junction box holes closest to the coax, push the red wires through and connect them to the terminal. Run the black wires outside and behind the junction box. A photo of it is provided at www.arrl.org/qst-in-depth.

Tune the glove like any dipole; it's best done at the anticipated operating height, which I demonstrate in a photo provided at www.arrl.org/qst-in-depth. I leave the wires long and trim them an inch at a time while monitoring them on a NanoVNA. The standing wave ratios ran from 1.4:1 on 20 meters to 1.1:1 on 10 meters (see Figure 7).

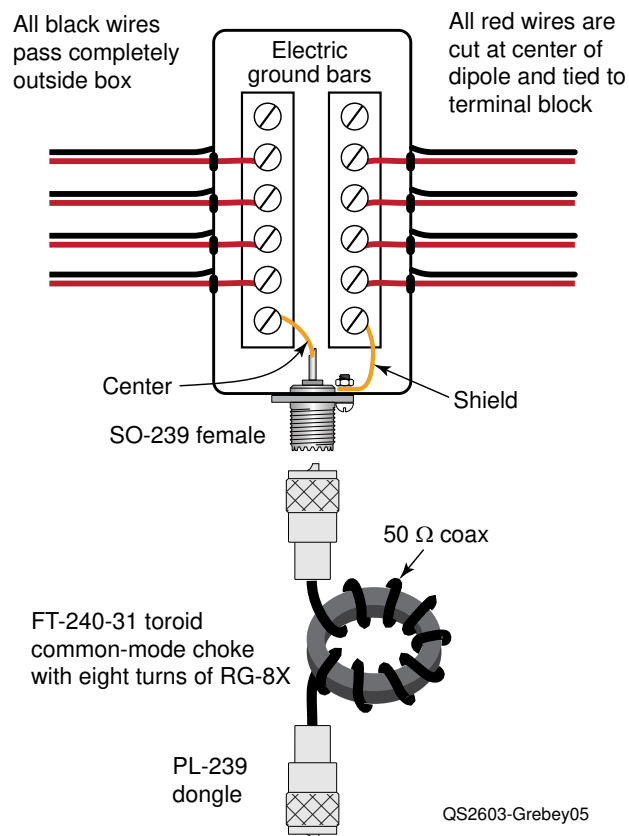


Figure 6 — The junction box.

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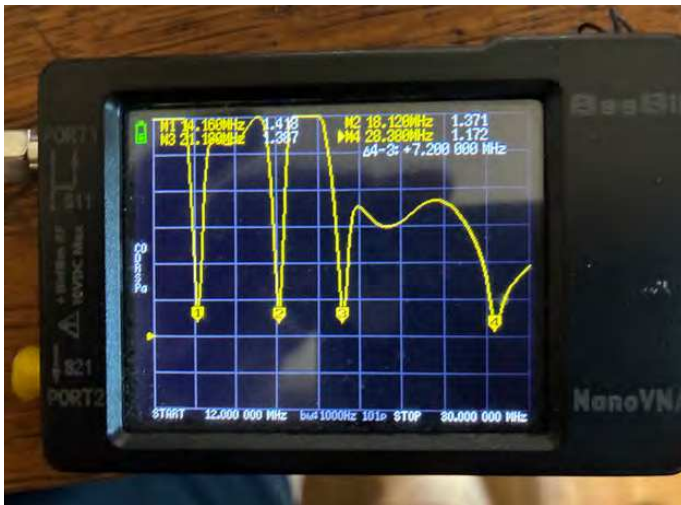


Figure 7 — The glove's standing wave ratio curves.

In the Field

In the field, I use 2-inch x 2-inch x 8-foot wood posts to support each corner of the canopy. The components should hang underneath. Connect the choke close to the junction box when in use. Depending on how you set it up, it may droop from the junction box and choke. You can add a tube for a support dowel to prevent sagging, but I've found no performance problems as a result.

See QST in Depth for More!

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

- ✓ A photo of the toroid choke on the deployed glove
- ✓ A photo of the junction box
- ✓ A photo of the author tuning the deployed glove

All photos provided by the author.

Jim Grebey, N4KCT, authored *Red Tide: Life on the Martian Frontier* and *The Search for Little Green Men*. He became active in amateur radio in 1964 as WN2YTF. A year later, he upgraded to General class and became WB2YTF before upgrading to Advanced class in 1967. After retiring in 2021, he re-licensed to General class and upgraded to Amateur Extra the following year. Jim can be reached at jim@grebey.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

Field Organization Reports — December 2025

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.

325 N9VC	180 W9FE	145 AC0KQ N3GE	121 N3STP	107 K1CJV AD3J	99 KC1HHO	88 KT4WX KM2I AA3N	77 W5XX	75 KM4BRQ KA9ROY WB3FTQ	74 AF9SC KD2TDG	72 NT1N K8RDN W2ZXN	71 KB0DTI
320 W7EES	168 KC8T	140 KN4QJ WK4WC KA5AZK	120 WA4VGZ WC4FSU WB9WKO	105 K5OB K5ANP	98 K1STM	87 WW3S WB2VUF	76 W3ZR N2RTF	73 KF7GC KG5VSR		70 WG3K KC1TLF	
266 W9EEU	165 WA3QLW W4CMH N4CNX	138 KE8DON	115 WO2H K9LGU KB3YRU	104 N4NOA AE5MI	94 KO4KUS	86 NK4AA					
227 W7PAT	160 NW3X K3JL W8ROY	135 AG9G KE5YTA W3YVQ	112 KM4WXX W0AHA KT5EM	100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC	83 W2QS					
216 W9RY	155 W4DNA	131 KC9FXE	110 KM4WHO N9CK	100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC	81 KB4OLY KJ5DJC W4TTO					
210 ND8W	153 KT2D	130 K7OED W2PAX W5RFY	110 KM4WHO N9CK KO4OL WV5Q WB8TQZ	100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC	80 WA5EWN N2TSO KR4ST KC3SJ					
200 KD2NMG	150 K9SX KR4PI KV2J	130 K7OED W2PAX W5RFY KY2D KD0HHN KW1U N1UMJ W9BGJ	110 KM4WHO N9CK KO4OL WV5Q WB8TQZ KB8PGW N1IQI W1RVY K2VTT	100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC	79 W4PXE KG4AOP					
195 KV2J	148 WM2C	125 N1ILZ	108 KA9IKK	100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC	78 N0ET					
185 WM5N	147 W5WMC			100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC						
181 WA9SWW				100 WB9EDL AD4DO KZ8Q WB8RJW	90 W8IM K9BJA KB9GO KC9UC						

The following stations qualified for PSHR in these previous months, but have not been recognized in this column yet: (Nov. 2025) NA7G 120, K2MTG, K3YAK, KA2HZP, KB2QO, W2AH 100, N7UWX 98, WB2VUV 92, K2PHD 90, KC2THY 80. (Oct. 2025) KA0DBK 74.

Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CO, CT, DE, EMA, ENY, EPA, GA, IA, IL, IN, KS, KY, MDC, ME, MI, MO, MS, NC, ND, NE, NFL, NLI, NM, NNY, NTX, OR, RI, SFL, SJV, SNJ, STX, TN, WCF, WI, WMA, WNY, WPA, WY.

Section Emergency Coordinator Reports

The following Sections submitted ARES Activity Reports for November: AR, CT, EMA, ENY, EPA, GA, IA, IL, IN, MN, NC, NFL, NH, NNJ, NNY, NTX, NV, OH, STX, SV, TN, VA, VI, VT, WCF, WI, WMA, 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 2,283, NX9K 1,240, WA3QLW 789, WB9WKO 772, KB9GO 635, KW1U 633, KE5YTA 550, K8ED 544, W2PAX 512.

Product Review

Chelegance KC4 Four-Band Vertical Antenna

Reviewed by John Leonardelli, VE3IPS
jleonardelli@arrl.net

Over the years, the forest behind my home has crept closer and closer to my property line, making it nearly impossible to keep a Yagi clear of the trees in my backyard. The 16-foot turning radius was the problem. Constant tree branch trimming, tower and tree climbing, and maintaining antennas and rotators have taken their toll. At this stage of my life, I'm leaning toward simplicity, without giving up efficiency or the ability to work DX. This led me to look for a multiband vertical that could be mounted at a reasonable height, was easy to manage, didn't require ¼-wave radials, and still offered solid performance. I had a relatively clear area where the antenna would be tree limb-free for some years to come.

My search brought me to the Chelegance KC4 four-band vertical antenna. I own several Chelegance portable antennas, so I already trusted the brand. The KC4 immediately grabbed my attention with its unique and small-footprint design. Compact and covering my four key bands, it looked like a solid fit for both base and fixed portable use. After field-testing this four-band vertical, I can say with confidence that it's a reliable, almost plug-and-play solution for anyone who wants 40-, 20-, 15-, and 10-meter coverage without the usual fuss.

In practice and per the specifications, I found the higher bands showed impressively wide bandwidths under 2:1 SWR, while 40 meters (as predicted) was narrower at about 120 kHz. My radio's antenna tuner easily handled frequency changes if I ventured above the Extra-class portion of the band.

One thing to note — the antenna is influenced by ground coupling, so it performs best elevated and up in the clear. The lower radial footprint spans 106 inches. This is not a “stick-it-in-the-ground” antenna — it's happiest above 10 feet or mounted on a garage-roof tripod. Thanks to its light weight, it can also ride on a sturdy lighting tripod, which makes it viable for fixed or portable use. No guying is required, but grip bags will be needed.



Bottom Line

The Chelegance KC4 is a rugged, four-band vertical that balances bandwidth and DX performance, making it ideal as a primary antenna for base, contest, or portable HF operation.

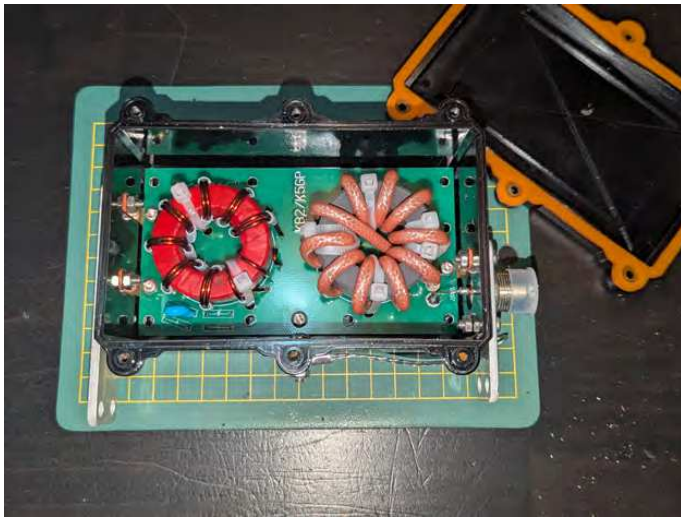


Figure 1 — The inside of the waterproof broadband RF transformer of the Chelegance KC4. The toroids are mounted on a printed circuit board.

Antenna Design and Build Quality

At its core, the KC4 is essentially a half-wave trapped vertical with traps for 10, 15, and 20 meters. Capacity hats for 20 and 40 meters shorten the overall length while keeping efficiency high. A broadband RF transformer with a built-in 1:1 common-mode choke takes care of matching the antenna and keeping stray RF away from your radio.

Chelegance continues to impress with attention to detail. The KC4 uses high-quality aluminum tubing that's well machined, with no sharp edges. The powder-coated finish resists UV and rain for longevity. Hardware

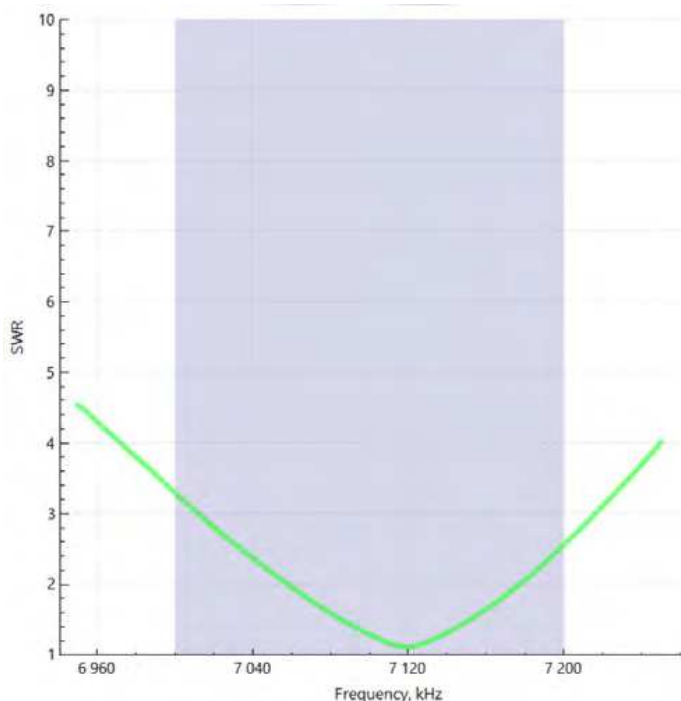


Figure 2 — The Chelegance KC4 40-meter SWR sweep.

is stainless steel, which is exactly what you want for a long-term outdoor antenna.

The base assembly is rugged enough to inspire confidence against windstorms. Tubing fits snugly, traps are weather-protected, and the transformer box is in a waterproof enclosure with a weep hole. Inside, the toroids are mounted on a printed circuit board (see Figure 1). This is exactly the solution I was looking for: a low-maintenance, DX-capable antenna built to survive Canadian winters and winds up to 80 mph.

Assembly

At first glance, the manual is a little unusual — not because it lacks photos (it has plenty), but because there are no measurement charts. Instead of “cut here for CW” or “trim here for SSB,” Chelegance simply labels each element: connect #1 to #2, then #3, and so on. Install the transformer box, screw in the radials and capacity hats, and you're in business.

Setup is straightforward and requires nothing more than a few wrenches, and Chelegance even includes a set of metric wrenches.

For my test build, I started with a sawhorse and a step-ladder and built the antenna horizontally. These new antenna-building tools are necessary, as the antenna is somewhat flexible for its length, so we need to rest it against something to avoid bending. The ladder is also needed for adding the radials later at your test height.

I assumed 120 inches for the 10-meter element. I left the traps alone and then used 80 inches for the 40-meter element. The capacity hats were added (two at the top for 40 meters, two just below for 20 meters), keeping an eye on not bending any of the capacity hats or radial elements. I did bend a few of the lower ones but was able to jig them back into shape.

Once I tightened everything, I attached it to a lighting tripod held horizontally, and then with the tripod now angled on the ground, I walked the antenna upright starting from the traps position. Do this slowly and carefully, as the antenna will bend due to it being top-heavy with the traps. I then sandbagged the tripod legs to ensure it didn't topple over. I used the stepladder to attach the six radials, then pushed the mast up to the 8-foot mark.

I then swept the bands with my antenna analyzer, made adjustments to the 10- and 40-meter sections, and repeated the process until the resonance points landed where I wanted them, for an antenna low to the ground. The 20- and 15-meter bands needed no change due to their wideband coverage. On 10 meters, I added



Figure 3 — The Chelegance KC4 multiband SWR sweep.

another 12 inches. On 40 meters, I ended up shortening it by 10 inches. As calculated, the resonance point moved up about 70 KHz at a deployed height of 16 feet.

I used a heavy-duty vertical hinge bracket mounted to my chain-link fence post, with a commercial telescopic pop-up mast. I can drop the antenna to a lower height and then, using the hinge, walk the antenna to rest on the sawhorse and stepladder. Then I can just as easily walk it back up. This is ideal, as I can do regular maintenance checks without climbing any towers. I do temporarily remove three of the lower radials.

The KC4 is purpose-built for its bands. Don't expect miracles on 17 or 12 meters, even with a tuner. However, I got a surprise on 6 meters. The final tuned lengths were:

- 10 meters: 132 inches (elements 1 – 3)
- 15 meters: 9½ inches (element 5)
- 20 meters: 16⅞ inches (element 7)
- 40 meters: 71 inches (elements 9 – 10)

Use Cases

General Base Station Operation

For hams with limited space, the KC4 is an excellent

base station antenna. It covers four popular bands without an external tuner and can be mounted on a TV mast, garage wall, or fence post. For ragchews on 40 meters or DX chasing on 20 meters, it does the job well. This antenna will offer up many 10- and 15-meter contacts across both oceans, as it opens up during the day as we enter the fall/winter DX season. I found it to perform better than a ¼-wave vertical on 10 meters.

Portable Operations (POTA, Field Day, and EmComm)

Although I selected the KC4 for permanent home use, it can just as easily be deployed in the field for an extended stay at an RV park or campsite. With the elements pre-assembled into three to four sections, it can be transported and set up on a large wide-legged lighting stand or trailer hitch mount. It's rugged enough for overlanders and far more durable than delicate telescopic whips. Just remember, it's 24+ feet tall, so deploy with safety in mind. I found it performed well at the 10-foot mark. Its small footprint makes it ideal in tight operating areas like a parking spot, treeless terrain, or even a single-tent campsite.

Performance and SWR

The KC4 is rated at 1000 W PEP (SSB 400 W, CW 200 W, and digital 100 W). I tested the KC4 at 20, 50, 100, and 200 W. Here's what I found:

- 40 meters: < 120 KHz bandwidth (antenna tuner needed for full band)
- 20 meters: < 250 KHz bandwidth
- 15 meters: < 800 KHz bandwidth
- 10 meters: < 3 MHz bandwidth
- 6 meters: < 1 MHz with 1.5 at 52.525 MHz 6-meter national calling channel

See Figure 2 for the 40-meter band sweep. I tuned for the 40-meter frequency to cover some of the SSB portion, but it will be just fine for the lower 100 kHz — no tuner required.

Overall, the resonance points are within the specified bands (see Figure 3), as advertised and tested.

On the Air

The on-air results matched what you'd expect from a well-designed vertical: solid signals, low take-off angles, and bandwidth better than I anticipated.

On the higher bands, the antenna at the 16-foot height (see the lead photo) provided comparable signals to my Hy-Gain AV-12AVQ. I found 10-meter signals to be consistently better on the KC4 by 1 – 2 S-units. The 20- and 15-meter bands were comparable with, and at

times had an advantage over, the AV-12AVQ depending on how far the DX stations were. On 40 meters, it's a bit of a compromise antenna with its narrower bandwidth and shorter length. The capacity hats help with efficiency, but it will cover the whole CW and digital mode segments without a tuner. Compared to my 40-meter 33-foot vertical (with radials), the KC4 was just as good, but there were various cases where the longer antenna had weak-signal CW copy that the KC4 did not.

The KC4 was also better than the ground-mounted Chelegance MC-750 portable vertical by 1 – 3 S-units and was less noisy. This could be an ideal solution for the RVer needing a small-footprint, low-impact solution for their extended park stay. This improvement can make the difference in being able to hear and work a DX station.

I also had a chance to compare the KC4 to a popular no-radial multiband vertical for a couple of days. The KC4 consistently outperformed it by several S-units, proving the Chelegance design using traps and capacity hats is a better solution than an untuned design using a totally different RF transformer design, and at a lower price point.

My QTH can offer ice storms, snow squalls, and a mix of wet and dry snow. We have experienced several snowstorms with more than 5 inches of snow and several days of freezing rain and the 60-kilometer winds that come with it. After 2+ months of winter weather since my installation, I am pleased with the durability so far.

Conclusion

The Chelegance KC4 is a rugged, practical multiband vertical that delivers what it promises. It's thoughtfully built and easy to assemble and tune, and it offers real performance across the four key ham bands. Wide bandwidth makes operating across 10 meters a pleasure. The 6-meter band coverage is a nice surprise. Whether for base, contest, or even portable operation, it's a well-proven design that will fill your logbook with DX contacts. The KC4 is also a cost-effective solution for those looking to add a second or third antenna to their antenna farm.

Manufacturer: Chelegance, www.chelegance.com.
Price: \$269.

Elecraft AX3 Whip Antenna with AXE1 40-Meter Extender

Reviewed by Phil Salas, AD5X
ad5x@arrl.net

I travel quite a bit, and I like to take a portable radio and accessories with me. One of the biggest issues is deciding on what antenna to take. So, I was pleased to be asked to review the Elecraft AX3 whip antenna system.

The AX3 covers 30 – 10 meters and is spec'd to handle up to 30 W. With the optional AXE1 extension, 40 meters is also supported, making the AX3 an interesting option for minimalist HF portable setups and POTA/SOTA activities. The AX3 consists of a tripod mount with built-in matching for 30 – 10 meters, a 45-inch collapsible stainless-steel whip (6 inches when collapsed), a 13-foot radial wire, a 3-foot BNC/BNC cable for tabletop operation, and a carrying case.

Bottom Line

The Elecraft AX3 30 – 10-meter whip antenna system (plus 40 meters with the AXE1 extender) is a very lightweight and portable antenna system for SOTA and POTA use.





Figure 4 — The Elecraft AXE1 40-meter extender coil.



Figure 5 — The Elecraft AX3 band change socket and jumper block.

A gold-plated pin jumper block plugs into the tripod mount and selects 10 MHz (30 meters), 14 MHz (20 meters), 18 MHz (17 meters), and 21 – 30 MHz (15, 12, and 10 meters). For 40-meter operation, the AXE1 extender coil, shown in Figure 4, screws between the tripod base and the whip. The AXE1 adds 6 inches to the length and is used with the 20-meter band selection position.



Figure 6 — The Elecraft AX3 jumper block selects 20 meters.

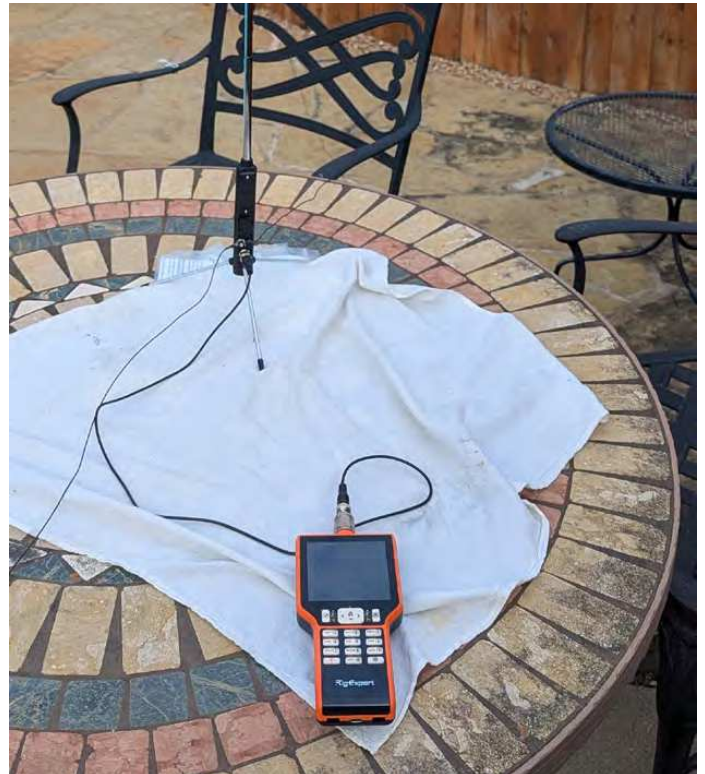


Figure 7 — The reviewer's SWR test setup for the Elecraft AX3.

The AXE1 comes with one 33-foot radial. In all cases, the AX3 does not provide a perfect 50 Ω load. While it is reasonably close in resonance to the desired bands, an antenna tuner is needed. If your transceiver doesn't have a built-in auto-tuner, you will need to use an external antenna tuner with the AX3. The internal auto-tuners in the Elecraft KH1, KX2, and KX3 transceivers work well with the AX3 and AX3/AXE1 system.

The band-changing jumper block is interesting. Figure 5 shows the socket and plug. Note that the pins and sockets are all gold-plated. The thumb nut and mini banana jack above the BNC connector are ground interfaces. Figure 6 shows the jumper block inserted into the AX3 base, with 20 meters selected.

My first test involved measuring the SWR on the different bands. My setup with the 40-meter extender is shown in Figure 7. I used both the 13- and 33-foot radials supplied.

Figures 8 through 12 show the measured SWR on the covered bands. The 30-meter SWR curve (Figure 9) includes the AXE1 40-meter extender. Note that only 17 meters can be used without an antenna tuner (at least with my setup).

So, how well does it work? My QRP setup (shown in the lead photo) consisted of the Elecraft KH1 with the AX3. While I could hear some weak signals on 40 and 30 meters, I was unable to make any contacts with the

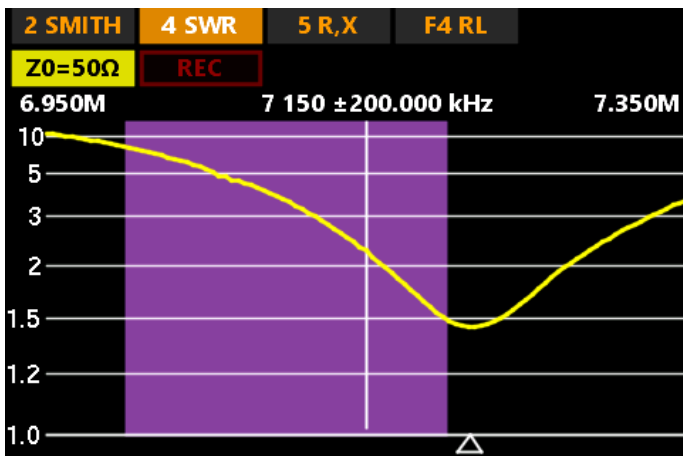


Figure 8 — The Elecraft AX3 40-meter SWR sweep with the AXE1 40-meter extender coil.

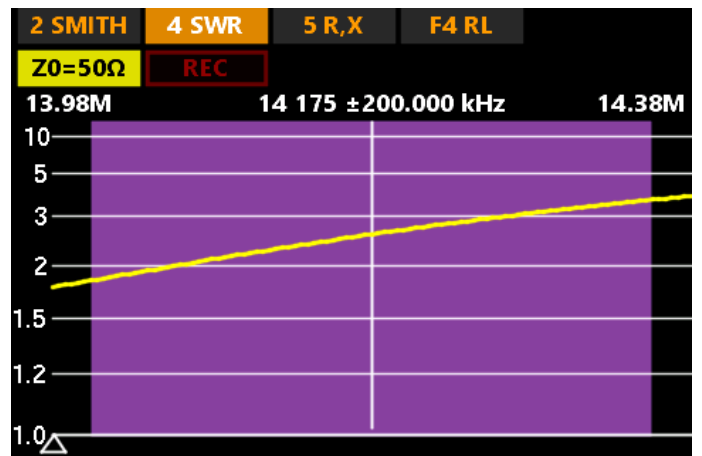


Figure 10 — The Elecraft AX3 20-meter SWR sweep.

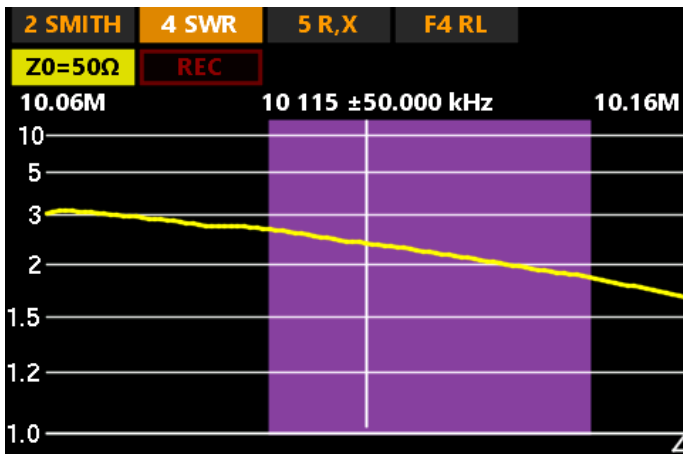


Figure 9 — The Elecraft AX3 30-meter SWR sweep with the AXE1 40-meter extender coil.

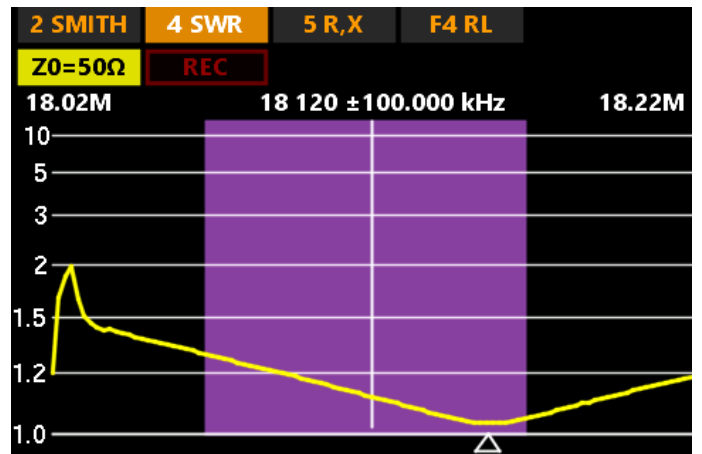


Figure 11 — The Elecraft AX3 17-meter SWR sweep.

KH1. I did better on the higher bands. I made a few marginal contacts on 20 meters. Contacts on 17 – 10 meters were better, with 10 meters being the best. I was operating from the flatlands of Dallas County, and I'm sure one could do better in a SOTA environment. Keep in mind that this is a severely shortened antenna. It is even less than $\frac{1}{8} \lambda$ on 10 meters. And with just the 13- and 33-foot radials, I suspect that the ground losses and loading inductor losses overwhelm the radiation resistance of the antenna, especially on the lower bands. To quote from the Elecraft AX3 brochure: "For times when conditions are poor, we recommend also carrying a lightweight wire antenna made from two 25-foot lengths of #26 wire... Toss one wire into a tree and lay the other on the ground, or toss into a second tree. Elecraft ATUs will usually match this on 40 through 10 meters."

Final Thoughts

For quick QSOs during SOTA or POTA activations or when space is limited, the AX3 system will work — but don't expect pileup-breaking performance. It is a



Figure 12 — The Elecraft AX3 15-, 12-, and 10-meter SWR sweep.

portable solution for ultralight operations, emergency communications, or casual field use.

Manufacturer: Elecraft Inc., 125 Westridge Dr., Watsonville, CA 95076, www.elecraft.com. Price: AX3 30 – 10-meter antenna, \$250; AXE1 40-meter extender, \$55.

Halibut Electronics G1LRO Universal Radio Controller

Reviewed by John Leonardelli, VE3IPS
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The Universal Radio Controller (URC) is a versatile multi-port device that provides an interface between a handheld radio transceiver and a computer. Mark, G1LRO, initially designed the URC to connect to his Quansheng UV-K5 radio (similar to the Baofeng UV-5R). Over time, it has expanded beyond a simple sound card programming interface to become a full-featured connectivity hub for handheld radios. See the block diagram in Figure 13.

It offers several key functions:

- **USB-C interface:** provides both power and a sound card interface for receive and transmit audio
- **PTT functions:** uses the CM108 standard serial port or serial programming interface (DTR and CTS) for push-to-talk (PTT) control
- **Audio and microphone interface:** accommodates TRRS connections, discrete jacks for audio, microphone, PTT, and Open Headset Interface Standard (OHIS)
- **Computer-aided transceiver (CAT) control:** enables real-time management of band, frequency, PTT, and other transceiver functions
- **Serial connection for handhelds:** allows serial port programming via *CHIRP* or manufacturer's software
- **Monitor button:** lets users hear audio present on the signal path, which is useful when the radio speaker is muted
- **Front-panel LED:** provides power and transmit status

Since its initial release in 2023, the URC has evolved into an experimental platform, with the latest version (V2.2) supporting "personality boards" for:

- APRS
- CW keyer functions
- Future open-source add-ons such as an AllStar node interface and a VHF or UHF transceiver

Bottom Line

The Halibut Electronics G1LRO Universal Radio Controller is an experimental platform for easy integration with various handheld radios and software applications.



USB-C and Sound Card Capabilities

USB-C has become the standard for interfacing with host computers, providing power and connectivity for receive/transmit audio. A sound card using the AIOC processor opens up numerous applications, including APRS, FT8, and slow scan TV, with the URC acting as a bridge between your handheld radio and digital communication software.

PTT Options

Users can connect a handheld PTT or foot switch, transforming the URC into a practical base-station dock. A reliable relay-based system ensures smooth operation.

The CM108 (USB sound card chip) standard is available for popular software packages like *Dire Wolf* APRS (*Dire Wolf* is a free, software-based sound card modem for APRS).

OHIS Interface for Headsets

Developed by Mark, N6MTS, the OHIS allows users to connect high-quality headsets and microphones to their handheld radio, offering base-station functionality. Features include a switchable attenuator for radios with strong audio output, and two parallel pass-through RJ-45 jacks for in-line connection between the radio (see Figure 14).

I plan to use this at the next emergency test exercise with a Baofeng UV-82 and a computer headset, allowing a more ergonomic approach to managing radio traffic for several hours.

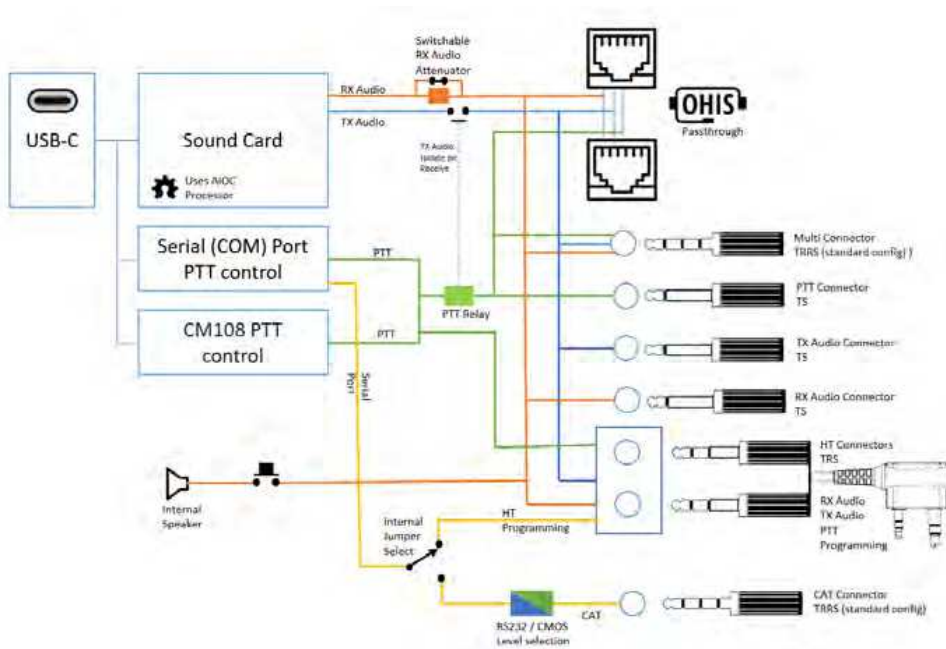


Figure 13 — The G1LRO block diagram. [Courtesy of <https://G1LRO.uk>]

CAT Control and Serial Programming

The URC supports CAT control, enabling software-based radio management. Through collaboration with open-source developer Serge Vakulenko, the URC allows manipulation of VFO A/B using *Baoclone* software (an open-source programming utility for Baofeng radios). The CAT interface also provides a 3.3 V power line.

For programming handheld radios, the URC's front-panel switch activates the serial programmer, supporting *CHIRP* and other programming software.

When connected, the URC enumerates as a standard Windows COM port (visible in the Device Manager), while the sound card is identified as an AIOC audio device. The sound card supports bit rates from 8 – 48 kHz and has mono-microphone and speaker channels.

It uses the Kenwood standard dual connector (speaker and microphone), and I successfully programmed multiple Baofeng and Quansheng radios in testing. You use TRS cables between the URC programming interface and the radio. A USB programming cable is not needed, as it's built into the URC.

Inside, the URC reveals a clean and thoughtful design, with jumper blocks for increased functionality and customization — including CAT signal settings, serial port configurations, and RS-232 voltage adjustments. My testing required no changes, but these options provide flexibility for advanced users.

Personality Boards

The standout feature of the URC is the modem interface allowing personality boards to be connected. A 12-pin internal modem expansion port serves as the main interface for personality boards, allowing users to add new features. I did not test this functionality for this review but look forward to further experimentation as these boards are released.

APRS/Packet VP-Digi Board Kit

The *VP-Digi* board provides KISS TNC modem and APRS digipeater functions using an STM32F103C8 module with *VP-Digi* software.

The kit includes a new front panel and requires basic soldering and assembly skills. Setup is straightforward with configuration via *PuTTY* terminal software. Support for 1200 baud Bell 202 standard (VHF APRS) and three other baud rates for HF is provided.

K1EL WinKeyer Kit

The WinKeyer V3.1 personality board provides a standalone Morse keyer using the K1EL microchip (not included). It integrates seamlessly with popular logging programs and uses the serial port connection. A new front panel adds paddle connections, a speed control knob, and a command button for stored messages. An



Figure 14 — The rear panel of the Halibut Electronics G1LRO Universal Radio Controller unit.

upcoming add-on button board is in development for additional message storage and playback. Soldering and hand tools are required for this simple project.

AllStar Node Interface

While not a kit, detailed instructions are available for integrating the URC with a Raspberry Pi 3B. This offers advanced experimenters a way to create an AllStar node without hardware modification. This option is recommended for advanced users comfortable with firmware updates and GitHub-based installations.

VHF/UHF Transceiver Personality Board

In collaboration with Mark, N6MTS, a prototype transceiver board for the URC is in development, offering 2 W of output on VHF or UHF with selectable low-pass filtering. This could potentially integrate APRS functionality without requiring a separate handheld radio in a single box. This would be ideal for emergency communications and ARES. Currently in the prototype phase, this board would eliminate the need for a separate handheld radio by integrating all functions directly into the URC.

Open-Source Expansion

G1LRO has released development resources on GitHub, encouraging third-party innovation.

I'd love to see a QRP transceiver personality board that leverages the URC's PTT keying and CAT interface for portable CW contesting, or even a board with built-in FT8 support. With access to the audio path, the URC could be used to provide for a DTMF relay remote-control project.

Conclusion

Initial testing included programming a Baofeng UV-5R and UV-82 and a Quansheng UV-K5 handheld radio, experimenting with PTT and OHIS, and using the URC as a docking station with a headset and PTT functionality.

The URC is a powerful and flexible interface with popular handheld transceivers while providing a platform for experimentation and expansion. Its personality board ecosystem adds impressive value, and I look forward to further exploring its potential for digital modes, APRS digipeating, and creative open-source projects.

Manufacturer: Halibut Electronics, www.electronics.halibut.com. Price: \$79.

Riioddity HF-009 Portable HF Antenna

Reviewed by Richard Lawn, W2JAZ
w2jaz@arrl.net

The Riioddity HF-009 is a multiband HF portable antenna that covers 5 – 50 MHz and is rated at 100 W CW and 150 W PEP SSB. It is packaged in a convenient zippered carrying bag with a shoulder strap and contains the five parts of the antenna and a few accessories (see the lead photo). The primary components screw together and include the base section with a pre-mounted spike and SO-239 connector (see Figure 15), two extension rods, an enclosed adjustable loading coil section that incorporates a slider with a clearly marked scale (see Figure 16), a telescoping whip, and three ground radials 16.6 feet (5 meters) long with banana plugs to easily attach to the base section. Riioddity thought of everything and includes a 16.1-



Bottom Line

This Riioddity HF-009 antenna is well made and offers portability and ease of setup, making this antenna stand out in a rather crowded field.

foot coaxial cable with PL-259 connectors and a BNC-(M)-to-SO-239 adapter, as many field or QRP radios feature BNC antenna connections. Each piece of this kit is held in place inside the case by convenient Velcro® straps or a separate pocket inside the case lid. All aluminum parts are treated with a black anti-corrosion coating. This kit is so well organized that it literally takes only minutes to deploy, which makes it an excellent choice for POTA operations where too much baggage presents unwanted challenges. The entire package measures 19.1 × 7.7 × 3.7 inches (48.5 × 19.5 × 9.5 centimeters) and weighs only 4.4 pounds (2 kilograms), including the case, and half that weight for just the antenna. Fully assembled with the whip fully extended, the visible height of the antenna is 12.1 feet (3.7 meters). The Radioddity website offers a fine resource supporting this antenna, including a downloadable manual.

The Manual

The HF-009 antenna is packaged with a comprehensive manual in English and German with helpful suggestions. For example, the manual suggests that once a good resonance point for a particular band is found with the sliding red cursor, a piece of tape should be placed at that point on the scale for quick reference in the future. One could also write down the number of hash marks on the scale for resonance on each band and keep the record in the case. It is probably wise that they do not specify precisely where the antenna tunes

for each band, as conditions are often vastly different in terms of where and how the antenna is deployed.

The comprehensive manual includes color photos to assist in assembly based on band usage, as well as screenshots of analyzer or VNA SWR measurements on each band of operation. The manufacturer promises 1.5:1 SWR or better on all bands when properly tuned.

Testing the SWR

Matt, N2IDW, and I assembled the antenna on my lawn in the Poconos area of northeast Pennsylvania. We used an Icom IC-705 for testing. Initial testing showed that by elevating the radials and antenna base about a foot off the ground (see Figure 17), the SWR improved noticeably on some bands, and the resonance point was much sharper with the RigExpert analyzer showing a much more pronounced dip. The antenna almost lived up entirely to Radioddity's claim regarding SWR on all bands (see Table 1).

Performance in the Field

Measuring SWR is, of course, only a small part of the equation. The real proof is on-the-air experiences. We activated the antenna with the IC-705 on October 17 – 18, 2025, when conditions were not optimal. There was noticeable QSB and QRN to contend with, and bear in mind that we were using only 15 W. Because the antenna is designed for portable operation, this transceiver seemed like a perfect match for our tests. Despite poor conditions, we added W9KIV, VE8CF,

Table 1 — Radioddity HF-009 Portable HF Antenna (not tested in the ARRL Lab)

Band	Frequency Range	SWR Findings
40 meters	7.000 – 7.200 MHz	< 2:1
30 meters	10.100 – 10.150 MHz	See note 1
20 meters	Entire band	1.5:1 or less
17 meters	Entire band	Flat SWR — coil adjusted all the way up
15 meters	Entire band	1.5:1 or less (see note 2)
12 meters	Entire band	1.5:1 or less (see note 2)
10 meters	Entire band	1.5:1 or less (see note 2)
6 meters	50 – 52 MHz	1.5:1 or less (see note 3)

Note 1: We found 30 meters next to impossible to precisely tune. Resonant points fell either too high or too low. The slider on the tunable coil does not permit lateral movement on the coil, as some competitive products offer, making the sweet spot more easily found. A tuner will make the entire 30 meters easy to tune.

Note 2: We found that for bands from 15, 12, and 10 meters up, shortening the radials to approximately 8 feet (half the original length) significantly improved the SWR. This was accomplished by simply rolling up each radial.

Note 3: The whip was completely collapsed to its shortest length, and the shortened 8-inch radials raised off the ground proved to provide the lowest SWR. With radials and mounting spike at ground level, the SWR was 1:5.1, so only a minor difference compared to the slightly elevated installation.



Figure 16 — The Radioddity HF-009 adjustable loading coil.

KN4AL, F6FJI, and HA8A to our 20-meter log. All contacts were on SSB except the QSOs with HA8A and F6FJI. Signal reports varied from 53 to 59. There is no doubt that CW or digital operations would be even more successful given the power level used. Operations were quite satisfying, especially considering the poor conditions. Because conditions were poor, we did not try the other bands, as there were even fewer signals.



Figure 17 — The Radioddity HF-009 slightly elevated installation using a Home Depot metal stake and an available mobile bracket.

In Summary

The Radioddity HF-009 antenna is a real performer, very well suited for portable operations, well made, easily deployed, versatile, and well priced.

Manufacturer: Radioddity, www.radioddity.com.
Price: \$199.

SI4732 Mini Radio Receiver

Reviewed by Paul Danzer, N111
n111@arrl.net

The first thing you might notice about this receiver is its size, at approximately $2.9 \times 1.5 \times 1.25$ inches. After finding the slightly hidden power button, you'll see that the 1.9-inch color display is capable of showing about nine or 10 lines of text. However, to read this text you may need some sort of magnifying device!

There are two main components in the mini radio: The ESP32-S3 acts as the main controller for the user inter-

Bottom Line

The SI4732 mini radio receiver is very inexpensive for the frequency range it covers, but it may not be a good choice for a serious shortwave listener.



face, connectivity, and extra features, while the SI4732 DSP handles the actual radio signal processing.

The specified capabilities are very impressive, covering the LF through HF bands (153 kHz through 26.1 MHz with some holes) and 64 through 108 MHz minus the aircraft band. Equally impressive are the specified operating modes: FM/AM/LSB/USB, all in about a 2-ounce package.

The unit has a built-in 800 mAh rechargeable battery that can be charged by the included USB-A-to-USB-C wire, but you will have to provide the charging block. According to the manufacturer, the battery can provide listening for more than 10 hours (not tested). The antenna port is an SMA female, and included with the unit is an SMA-male telescopic antenna. The unit enclosure is 3D printed and available in different colors.

On the Air

While these specifications may tempt you to use this unit as a demonstration of propagation and reception, there are several problems. First, sensitivity is variable and low. Control is by a typical menu/submenu design, which is not consistent and often not uniformly responsive.

If the intended use is to listen to AM/FM broadcast radio stations, its performance is acceptable, but for shortwave listening, don't expect too much out of this small radio.

While improvements may be under way with new software releases, the ARRL Lab indicated that, rather than being for beginners, the upgrading procedures

Lab Notes

The SI4732 presented a bit of a challenge to test in the ARRL Lab. The AGC circuit was quite aggressive and had an extremely low non-adjustable threshold interfering with our ability to run our standard suite of sensitivity and dynamic range testing. While the AGC can be switched off in the menu system, nothing changed in the audio behavior based on the setting, and this prevented us from performing any meaningful testing. On the bench and on the air, the radio generally exhibited low sensitivity and high levels of noise.

The unit arrived with an older version of the firmware, so we updated it here. The update process was not difficult but requires the use of software programs (provided free of charge by the manufacturer) that are essentially software development utilities and might be confusing to use for non-technical amateurs. Tuning, volume level, mode and band selection, and operational configuration are all accomplished via a single rotary control, which was easy to understand but frustrating at times.

The receiver has both a tiny built-in speaker and a headphone jack. The speaker was moderately loud, but according to the manual the headphone jack is not designed to drive a pair of headphones, but instead intended to be connected to a powered speaker or amplifier. This was confirmed on the bench — connecting a 300 Ω headphone load reduced the output to an unusably low level.

Tuning resolution was limited to 1 kHz, making the receiver of limited use for monitoring CW transmissions. AM, FM, and SSB transmissions are more likely to be on integer kHz frequencies, and we monitored several using W1HQ's antenna farm. The receiver's VFO accuracy was variable, and this often resulted in poor voice quality for the SSB QSOs that we heard, but AM and FM reception should generally be okay.

— Rick Ciervo, W1CIE, ARRL Senior Laboratory Engineer

require a certain amount of experience and skill (see the Lab Notes).

Conclusion

There are several versions of this radio available at www.amazon.com; they are inexpensive, but don't expect them to perform on HF like an SDR receiver commonly used by hams. This may also not be suitable for a beginner looking for a low-cost introduction to ham radio, as it will not necessarily offer a great listening experience.

Manufacturer: Mini Radio, available from www.amazon.com. Price: \$32.

Ask Dave

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

Tech Antennas, Studying, and CWR

Antenna for Tech on 10 and 6

Q Jim “Bimmster” Benoit, KJ5NAX, just received his Technician license. He asks: I would like to get on 10-meter SSB while studying for my General license. I am limited on space in an HOA situation. Can I erect an attic fan dipole cut for the 20-, 15-, and 10-meter bands? Can I use the existing 75 Ω TV coaxial cable run to that location? Would a balun be required?

A First: Congratulations on your new license, and welcome to amateur radio! Be sure to search out a local club and become active. You’ll find that you often tend to talk to the same people over the local repeater, which can lead to great friendships!

Yes, you can use RG-6 75 Ω TV coax if you wish. Even for an attic antenna, you should run the cable down to a ground rod and lightning arrestor outside your station and from there back to your radio room. Amazon has a wealth of cable adapters, so you can pick those that will convert the common RG-6 F-connector to SO-239 or BNC, as you need. I’ve done experiments with RG-6, which is readily available from most hardware stores for much less money than traditional ham radio cables such as RG-58 or RG-8X. These experiments revealed that 75 Ω RG-6 can be substituted for 50 Ω cable to save money (see my video #1300 at <https://youtube.com/watch?v=DKpzzr-toHV0>).

Regarding the antenna itself, I would start with a simple dipole for 10 meters. You can add the 20- and 15-meter elements later when you upgrade. You may want to add a 6-meter dipole to the fan arrangement. Both single sideband (SSB) and data modes such as FT8 are available to you on 10 and

6 meters. If you go the extra mile, you can learn CW (Morse code) and use it on 80, 40, 15, and 10 meters, as well as on 6 and above. Eventually, when you get your General license, you will want to add a 40-meter antenna to the mix — as the sunspot cycle continues to decline, you’ll find that 40 meters is pretty good at night.

Whether you add a 1:1 balun at the feed point is up to you — you may find one essential to keep radio frequency interference (RFI) under control (see Figure 1). A good ground system will also help with RFI.

Also note that ARRL sells a handy Dual-Band Momobeam 6/10-Meter Antenna (<https://home.arrl.org/action/Store/Product-Details/productId/2018039112>). It has a turning radius of 6.6 feet, which may be a bit big for many attics.

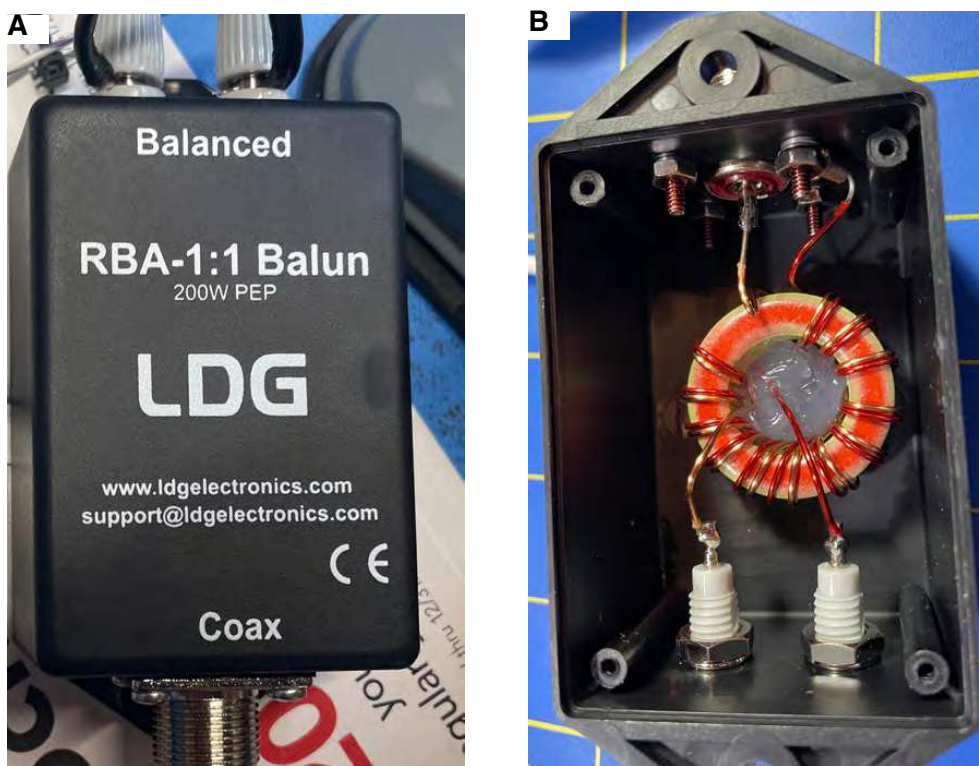


Figure 1 — You may find a 1:1 balun essential to keep RFI under control in your shack. (A) shows an LDG RBA-1:1 balun, readily available for about \$30; (B) shows the interior of the balun. [Dave Casler, KEØOG, photo]

Effective Ways to Study for Upgrade Testing

Q Rob Barry, KD8YWF, asks: I have my General-class license. What is the best way to study for the Amateur Extra?

A Different people have different learning styles. I've seen folks who can just study the test questions and answers and pass the exam. I don't recommend this because this approach may get you the license upgrade, but you don't learn much in the process. The next option is to study a question-oriented study guide based on the test questions, which will offer the answers along with an explanation of "why" each answer is correct. Again, you'll learn a little, but only if the subject relates directly to a test question.

My preferred teaching approach is to use the ARRL license manuals along with the many videos I've made that introduce each section. The ARRL license manuals for Technician, General, and Amateur Extra license grades are available at the ARRL Store. The General and Amateur Extra video series are on the ARRL Learning Center, available at <https://learn.arrl.org>. You need to be an ARRL member to create an account. There are 39 videos in the Amateur Extra playlist. Every time I visit a hamfest, many hams thank me for these videos, so they seem to work. For a sense of what these videos look like, the Technician-level videos are available on the ARRL HQ YouTube channel at https://youtube.com/playlist?list=PLuaplzKwhZN_30dcgsDbGU3J7C8BAYJcG.

These videos are updated every 4 years to match the updated question sets and license manuals. To use them, get the most recent license manual, watch the corresponding video before each section, then go ahead and read the section. Lastly, check the exam questions that correspond to that section, and make sure you understand all the answers and why they are correct before moving to the next. Online practice tests are available from ARRL (<https://arrl.org/exam-practice>), and several other online resources offer practice tests, including Ham Radio Prep (<https://hamradioprep.com/free-ham-radio-practice-tests>) and Ham Study (<https://hamstudy.org>). Once you're answering about 85% – 90% of questions correctly, you're probably ready to take the test.

I recommend that hams get a couple of years of HF experience with their General before moving up to Amateur Extra to get the most satisfaction out of the upgrade. I also highly recommend that you do not purchase any ham radio equipment until you pass the

test for the license class you need to use that equipment.

CW vs CWR Receiver Modes

Q Marvin Lowman, KG5MCN, asks: What does CWR do on an HF transceiver?

A Switching CW to CW-Reverse (CWR) changes the sideband the receiver uses to receive and demodulate Morse code. An ordinary AM receiver cannot receive CW because it appears to the radio as an unmodulated carrier. So, the CW receiver has a separate beat frequency oscillator (BFO) that injects a signal either above or below the received CW signal. Using SSB techniques, you hear a tone in the receiver that has the same frequency as the difference between the received signal and the BFO frequency. Older receivers often have a front-panel control to adjust the BFO, but all modern receivers do this under the hood.

If the BFO injected signal is above the received CW frequency, we are using lower sideband (LSB). As you tune the radio's receiver (and hence the BFO) up in frequency, you are creating a larger difference in frequency, and the tone's pitch increases. If there is an interfering signal somewhat higher in frequency to the desired signal, the interfering signal will be heard as a lower-frequency tone. Similarly, if the BFO is injected below the received signal, you are using upper sideband (USB).

Under certain interference circumstances (which I personally have never faced), it is convenient to use the opposite sideband. Nearly all modern receivers allow you to do this by selecting CWR.

Which sideband is normally used is different from radio to radio. For example, my Yaesu FTDX3000 radio normally uses USB, whereas my Icom IC-7300 normally uses LSB. You should use the sideband you're most comfortable with. Changing from one sideband to the other is done by choosing CWR, often found in a menu setting.

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.

Hints & Hacks

An EV-Powered Station; Hold Your CW Key in Place; Another Way to Bring the Heat

A Reliable POTA Power Source

I hadn't participated in Parks on the Air® (POTA®) since ARRL's National Parks on the Air event in 2016, so I decided it was time to get out and do my own activations. I figured that my shiny new electric vehicle (EV) would provide a great power source (see Figure 1). The Hyundai IONIQ 5 EV has a feature called *Vehicle-to-Load* (V2L), which provides 120 V ac from the main traction battery; that should be just like operating from home in terms of power capacity. It turns out that this vehicle allows for quick setup and nearly infinite power for my go-box with a Yaesu FTDX10, making POTA operations quick and easy.

My first question when I brought the car home was, "Can I operate ham radio in the presence of all those inverters?" The vehicle has an 800 V dc battery and is driven by ac motors. It also charges a 12 V dc battery and supplies 120 V ac, so there is potentially a lot of switching noise. I made some 2-meter and 70-centimeter FM contacts with a mag-mount antenna and power from the 12 V vehicle accessory outlet, and there was no noticeable noise or whine on receive or



Figure 2 — The V2L display during the author's 100 W FT8 transmissions. Note that the display is 0.1 kW (100 W), and it fluctuated between 0.1 and 0.3 kW during transmit. [Rob Suggs, NN4NT, photo]

on my transmitted signal while driving. I then tried my FTDX10 connected to the 12 V accessory port with a variety of hamsticks on a mag mount on the roof. I detected noise on 10 meters, but there wasn't much on 40 – 12 meters, and there was certainly no impulse noise like you get from spark plugs during the ignition of an internal combustion engine. When sitting still with the car powered on (no traction motor action), the spectrum was perfectly quiet.

With testing done, it was time to head to the field and activate some parks. I kept it simple by operating FT8 at 100 W using the FTDX10, a Samlex power supply, a 15-meter hamstick on a mag mount on the roof, and a Dell laptop running *WSJT-X* and Glenn Davis', *N3FJP, Amateur Contact Log*. In less than 1 hour, I set up the station, made 22 contacts from Crow Creek Nature Refuge (POTA reference US-9880), tore down the setup, and went back on the road.

I can't speak for other EVs, but the Hyundai Electric Global Modular Platform, which is also used in Genesis and Kia EVs, seems quiet enough for mobile operations on VHF, UHF, and most HF bands. It also has protection to keep you from discharging the battery to the point where you can't get home. There



Figure 1 — The author's POTA setup at Chickamauga and Chattanooga National Military Park (US-0716), which includes a Yaesu FTDX10 and a Samlex power supply connected to his Hyundai IONIQ 5's V2L port. The USB cable runs to the back seat, where his laptop is set up. [Rob Suggs, NN4NT, photo]

is a programmable lower state-of-charge threshold at which the V2L shuts off. I watched the V2L load indicator during my POTA operation (see Figure 2) and saw a range of 0.1 – 0.3 kW (the resolution of the display is 0.1 kW) during transmit and no load indication during receive.

Assuming a conservative 0.3 kW (300 W) load, the full battery capacity of 77 kWh would provide more than 250 hours (10.7 days) of key down. So, I can't imagine normal POTA operations using a significant fraction of the battery capacity. You should be able to get home from your POTA activations just fine if you've planned your charging stops as usual. — 73, Rob Suggs, NN4NT, nn4nt@outlook.com

Stop Chasing Your CW Key Around

While pounding brass, my CW key would slide on my smooth operating bench surface, and I was constantly chasing after it.

I found a solution in the kitchen, in the form of a “grabby” cabinet shelf liner. The product is a flat and flexible rubberized material that is commonly used to line the bottoms of kitchen cabinets. It comes in various degrees of grip, from a no-grip smooth surface to a high-grip non-slip surface that can hold a CW key in place.

Using scissors, cut the liner to the size of the key's base, and then set it on the table and place the key on it. You can easily pick up and move the key and liner to another comfortable position.

Liners are also available with adhesive on one side, should you want to affix it to the underside of a flat key



Figure 3 — A Johnson Speed-X hand key (left) and a Brown Bros iambic key (right), both held in place via shelf liner. [Scott Freeberg, WA9WFA, photo]

base. It works well for holding down hand keys, iambic paddles, and even semi-automatic bugs that stand on rubber feet (see Figure 3). — 73, Scott Freeberg, WA9WFA, wa9wfa@arrl.net

An Embossing Heat Tool for Solder Paste and Shrink-Wrap

Useful tools sometimes come from unexpected places. In the instructions for the Four State QRP Group's 4S Dummy Load kit with surface-mount technology parts, David Cripe, NMØS, suggests using an embossing heat tool to flow the solder paste. I purchased one from a local craft store and tried it (see Figure 4) — it worked quite well for that task.

I discovered that the embossing heat tool works just as well as my larger heat gun for applying shrink-wrap tubing, which is useful for many ham radio projects. In fact, I found that the embossing heat tool was easier to use for that purpose, as the heat gun tended to be overkill. — 73, Jody Nelis, K3JZD, k3jzd@nelis.net



Figure 4 — An embossing heat tool, which can be useful for projects involving solder paste or heat-shrink tubing. [Jody Nelis, K3JZD, photo]

The 2024 Floods of Bangladesh: A Story of Hope and Ham Radio

With rapidly rising waters in Feni knocking out most modes of communication and isolating those caught in the disaster, local operators got on the air to help.

Abdullah Al Fahad, S21AF

On August 20, 2024, the usual hum of life in Feni District, Bangladesh, was swallowed by a sudden deluge caused by heavy rainfall and runoff from the hills of Tripura, plunging the entire area into chaos. By nightfall, embankments in the Parshuram and Fulgazi *upazilas* (units in the administrative system of Bangladesh) broke, triggering severe flooding. The central and northern areas of Feni suffered the most.

On average, a major flood hits Feni every 8 to 10 years, while smaller floods occur almost annually. Although the people of Feni are familiar with floods, the 2024 flood was different, because the water flow was extremely rapid, and within just half an hour, many villages were already underwater — electricity, mobile networks, and food supply systems were disrupted almost instantly, isolating everyone caught in the disaster.

A Call for Help

Amid the turmoil, a call came over the radio from Dr. Asif Ud Doula, S21NWR, who became trapped by the encroaching waters. He shared that all his other forms of communication were cut off, and he needed help getting the word out about the floods. But the other amateur radio operators (who spontaneously responded during the flood) and I couldn't reach him immediately because the roads were gone and water kept rising; all we had at this time were our radios. So, while most of us were hundreds of kilometers (more than 130 miles)

away from Dr. Asif in Dhaka, he kept us updated from Feni.

A few of us who had received our amateur radio license began discussing the situation in a WhatsApp group. Under my coordination, along with Sabbir Hossain, S21ACP; Mob Jihad, S21MOB; Muhammed "Rifat" Muniruzzaman Dhali, S21AIG; Abu Noman Md. Shiful Islam "Sunny," S21TE, and S21NWR, we devised a plan to focus on helping Feni because it had suffered the most. We talked about who could go, what equipment we had, and what steps we needed to take.

Despite challenges — the limited number of radio devices allowed by the Bangladesh Telecommunication Regulatory Commission and the high cost of importing equipment — we pushed forward using our own funds and resources. We used portable antennas, handheld radios, *base radios* (two-way radios designed for a stationary location), and omni antennas for base stations. To ensure long-distance communication between Dhaka and Feni, we set up a Yagi antenna. We arranged our own transport to reach Feni (which included carrying our radio gear 12 kilometers, or about 7.5 miles, through the district while it was entirely underwater), and, as electricity and local markets were mostly unavailable, we also had to carry emergency food and water. This wasn't a matter of just helping S21NWR — this was about helping everyone caught in the flood.

Setting Up Emergency Communications

We finally reached Feni on the evening of August 22, approximately 48 hours after the flooding began. We established our first base station on the rooftop of Tara Nibash, a 15-story building, and set up a control room at the Feni Deputy Commissioner's office. At 9 PM that night, our first team — S21ACP, S21MOB, and S21AIG — arrived to help. Fahim, a trained volunteer who passed the Bangladesh Amateur Radio Service exam but was waiting to receive his call sign, took charge of coordinating with the Deputy Commissioner's office to make sure everything ran smoothly. By the next day, more operators had joined us, including S21TE; Mutammim Mahmud Asif, S21NN, and Dr. Deepta



Team members coordinating rescue efforts from Kakrail Scout Headquarters.



Establishing a base station on the rooftop of Tara Nibash.

Majumder, S21HK, who brought along a team of medical students from the Platform Doctors Foundation (a voluntary group of Bangladeshi doctors and medical and dental students who work together to improve the health sector of Bangladesh). Together, we successfully extended our network farther, setting up more stations at the Mohipal Army Camp and a temporary army medical camp.

Two base areas were established: one at Kakrail Scout Headquarters (the national headquarters of Bangladesh Scouts) in Dhaka and another at my home in Demra Thana. I couldn't be at the Scout headquarters all the time, so having a station at home meant I could stay involved around the clock. However, it was only one-way communication, which meant the team in Feni could hear me, but I couldn't hear them. Thankfully, they managed to pick up my transmissions on the rooftop of Tara Nibash. To send updates back to me, S21ACP would walk up to the rooftop of Tara Nibash every evening (because that spot had some mobile signals) and inform me of the day's operations, rescues, and outcomes of my messages. I kept sending updates and information about people in need, and every bit of information I relayed helped the army and Deputy Commissioner's office direct their resources more effectively.

In the Field

As the flood raged on, our network became the life-line for the entire region. The army's communications systems had been damaged by the flood, so they relied

on us to keep in touch with their teams in the field. Every rescue boat deployed to the most distant and dangerous locations had one of our operators on board maintaining a constant line of communication with the Feni control room. We had to conserve power, so after establishing contact every 30 minutes, we'd switch off our devices to save battery life — but we never lost connection.

For the first 4 days, our team worked nonstop to coordinate rescue efforts and relay crucial information. This helped facilitate more than 375 rescue missions throughout some of the most remote and difficult-to-reach areas. Our amateur radio network was the only link between the different rescue units and the control room within a 70-kilometer (43.5-mile) radius. This effort was led by a community of people — Scout members, Red Crescent (www.ifrc.org) volunteers, doctors, engineers, and university students from all over the country. Many of us were connected through informal communities on social media.

By August 27, nearly 1 week after the flooding began, the water finally began to recede and rescue operations became more effective.

Looking Ahead

After learning from this experience, the Bangladesh DX Club (<https://bdxc.org>) decided to form a team dedicated to emergency communications. While it's still in the works, the plan is to define emergency frequencies, prepare trained field operators, and build readiness for any future disaster.

All photos provided by the author.

Abdullah Al Fahad, S21AF, has been a licensed ham since 2016. He is the secretary of the Bangladesh DX Club and co-founder and managing director of Onirban Electronics & Engineering, which builds radio communication equipment under the brand TORUN. It's the first of its kind in Bangladesh and specializes in walkie-talkies, mobile radios, and HF radios for commercial and amateur use. Abdullah enjoys operating HF with his Icom IC-706MKII, an sBitx, and a variety of homebrew antennas. Passionate about FT8, he also enjoys SSB and is active on DMR Talkgroups 91 and 470. Abdullah can be reached at fahadmieaji@gmail.com.

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Amateur Radio Keeps Montana Tour on Track

A 6-day cycling event gives hams a chance to fill multiple roles, both on and off the air.

Jim Halfpenny, PhD, K9YNP

In 2024, Montana Tour (<https://montanatour.org>) finished its 11th year of traversing Montana to advertise the state's beauty and remoteness while bringing income to small communities. Each tour includes 6 days of cycling, covering an average of 350 miles on mostly gravel roads, with up to 350 cyclists and 200 support personnel camping along the way. Fire camp personnel provide tents, food, water, toilet facilities, and showers, while traveling mechanics provide bike repair.

For each event, up to 35 hams come from Montana, Idaho, and Wyoming, with most coming from two ARES® groups: Yellowstone ARES (Billings, Montana) and Park County ARES (Gardiner, Montana).

The challenges for riders and hams are many, as routes change every day. Routes range from long stretches traversing sweeping elevation changes (from 3,000 to nearly 11,000 feet), to scorching hot days

where vehicle exhaust pipes could start a grass fire, to sudden hailstorms and even freezing blizzards. Much of the route may not allow for phones, internet, or iGate.

That's where ARES training is critical. Hams understand that there will never be 100% radio coverage; during planning, we focus on what we can control while emphasizing individual adaptability to cover unexpected situations.

Montana Tour is an excellent training opportunity for ARES personnel, encompassing 6 days of dealing with rough terrain, grizzly bears, rattlesnakes, foul weather, and other hazardous situations, all while maintaining location and radio communications to support hundreds of cyclists and the emergencies they encounter.

This is no drill; it's a live event, equivalent to a deployment, and it requires dealing with real life-and-death



Montana Tour cyclists start their race. [Jim Halfpenny, K9YNP, photo]



A blizzard along the tour route buries 55 bikes while hams evacuate hypothermic cyclists. [Ron Glass, WN7Y, photo]

situations, including broken bones, exhaustion, and fatal heart attacks.

Tools of the Trail

During the 6-day tour, trained ARES hams travel the same routes the cyclists use and bivouac in their vehicles or tents for 5 nights. Even though hams are present to provide communications, they pitch in for many other tasks, including supplying snacks, carrying extra water and sunscreen, and having bike racks mounted on their vehicles. It is physically and mentally exhausting, with little downtime.

Events this big involve many considerations, including logistical planning in advance and on the day, managing personal supplies and gear, location issues, and myriad medical and communication concerns. Routes are scouted beforehand, if possible, to check repeaters, radio coverage, and, most importantly, dead zones for phones and radios. Training sessions are conducted to teach hams how to use special equipment and apps for the ride.

Each ham is responsible not only for personal health, medicines, extra food, clothing, and camping gear, but also for their radio equipment, including at least one mobile (two are preferred), one handheld, and one phone. The radios and phones must be capable of transmitting an automatic packet reporting system (APRS) signal. Phones must be programmed with GPS, APRS, and the Ride with GPS (RWG) app. Local clubs also loan radio gear, especially to new ARES members who lack equipment.

Experience has shown Yaesu radios — especially the Yaesu FTM-400DR — are easy to learn, provide both



Dan Poole, KJ7MT, photographs his daily assignment at the command center before heading out to his duty station. [Jim Halfpenny, K9YNP, photo]

APRS and crossband functionality (though not at the same time), and offer reliable service.

To facilitate radio and APRS communications, vehicles are outfitted with portable crossband or UHF repeaters and digipeaters. When possible, a small trailer equipped with a computer programmed with APRSIS32 and APRS.fi is used as a mobile command center. It is critical to have access to APRSIS32 to receive radio-transmitted APRS location information. APRS.fi does not pick up radio signals; instead, it gets its information over the internet, which is usually not available on the tour routes. In a few areas, a telephone hotspot may provide access to APRS.fi.

The RWG app is instrumental to each ride — cyclists are encouraged to have it running on their phones during rides, and hams must have it on their phones. With the route map programmed, the app displays latitude, longitude, elevation, and route miles, a critical part of navigation on the myriad backcountry roads, which are sometimes unmarked and unnamed. RWG standardizes mileage locations, sounds a warning when going off route, and provides a path back to the official race route. These features reduce the number of lost cyclists and hams.

Logistical needs include ambulances and Support and Gear (SAG) vans to help riders along the route. Because routes cross many counties, some areas supply ambulance service, but additional ambulances must be hired. Hams provide location information and radio communications for ambulances and SAG vans.

Ambulances and SAG vehicles carry waterproof boxes containing Byonics MicroTrak RTG 10 W APRS trans-



Reve Carbarry, KX4LZ, greets radio-curious mountain goat visitors. [Jim Halfpenny, K9YNP, photo]

mitters and Bioenno lithium iron phosphate batteries — a magnet attaches the box and a magnetic mount antenna to each vehicle. Gas generators are used to charge radios and APRS batteries each night.

The state authorizes our ARES groups to communicate with agencies or ambulances using mutual aid frequencies, and hams use General Mobile Radio Service (GMRS) radios to communicate with licensed sponsors who carry GMRS radios. Near towns, where considerable human interference occurs on GMRS channels, we use spread spectrum radios on the eXRS radio service in the 915 MHz band.

A Typical Tour Day

A day's operation is complex and starts with a briefing the night before to discuss previous actions, the Incident Radio Communications Plan (ICS Form 205, available at <https://training.fema.gov/emiweb/is/icsresource/icsforms>), and route maps, and to assign next-day tasks. Hams must be up and on the road while it is still dark, before riders even have breakfast. The route changes each day, and communication propagation is unknown to the hams, especially in the high mountains and deep valleys. The crossband, UHF repeater, and digipeater teams must leave ahead of riders and locate repeaters at high locations to relay communications and APRS location data.

Each day, hams may have to fill multiple positions, such as command center assistant, rest stop coordinator, repeater operator, SAG rider, black-top rover, sweep, and ambulance chaser. Hams are also posted at confusing turns, dangerous sections of roads, and cattle guards, where accidents happen.

An ambulance chaser is necessary because ambulances often have their radios wired through their ignition switch, and cutting the motor turns the radio off. Additionally, ambulance mutual aid radios have limited

range, while ham radios communicating through mobile repeaters can get messages through. Ambulances cannot be on the whole route at once, so one ham carries an automated external defibrillator (AED), and each ham must be briefed as to who has the AED and other first aid equipment that day. Many hams have first aid training and carry their own equipment.

Crossband repeaters may have to leapfrog when crossing mountain passes. Repeater teams communicate using simplex on frequencies outside those used to communicate with command — vehicle-to-vehicle simplex communications are an integral part of communication planning when navigating twisting valleys and deep hollows.

At night, hams transmit HF health and welfare communications out of camp. When possible, home-based net control stations help with communications.

This sequence recurs across all 6 days of the tour. Then, at the end of each tour, we hold a final hotwash discussion, write after-action reports, and develop improvement plans to guide the next year's events.

Montana Tour is both an outstanding training exercise for ARES hams and a good experience with real emergencies. And it benefits amateur radio as a whole — after seeing hams in action, several of the tour staff have become hams themselves.

Thank you to some of the incredible crew who have made the last 11 years possible: Dennis Tulp, AE7DU, served all 11 years, and there have been notable service records from Ken Clark, AF7QP (SK); Vern Drommond, KG7VGX; Ron Glass, WN7Y; Randy Kraai, KR7RAN; Stephanie Kraai, KR7STF; Paul Stiles, KF7SOJ; Bruce Walker, KE7SJJ, and Richard Wilson, KF7ITU. And special thanks to Montana Tour director Jennifer Drinkwalter. Years of working relationships have built friendships that will never be forgotten!

Jim Halfpenny, PhD, K9YNP, became a Novice in 1965. In 1969, Jim operated a Collins radio in Antarctica and taught radio in Vietnam as a Navy adviser. He is a scientist, author, and educator who has worked the wild outdoors on seven continents. He is a former fellow of the Institute of Arctic and Alpine Research, serves as Emergency Coordinator for Park County, Montana, and is president of A Naturalist's World. Jim can be reached at <https://tracknature.com>.

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USB Provides Easy Connectivity with Amateur Devices

Free yourself from interface boxes and tangles of cable with this decades-old solution.

Al Rovner, K7AR

From the late 1980s to the early 1990s, connecting devices to a PC resulted in a cabling mess. There was no commonality among cables or devices. There were Centronics parallel port cables for printing, RS232 breakout boxes and cables for modems, and DIN cables for keyboards and mice. A typical PC user had a drawer full of cables. In the late 1990s, all this changed with the arrival of the Universal Serial Bus (USB).

Starting with Windows 95B and Windows 98, USB connectors became the standard for many devices, including Mac and Linux PCs, resulting in a simpler way to connect peripheral devices with increased speed and performance. Today, many amateur devices include USB connectors, which allow easy interfacing with your computer.

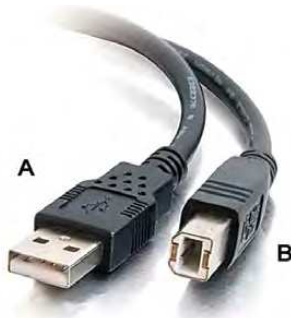


Figure 1 — A USB cable. “A” plugs into your PC, and “B” plugs into your device.

USB Basics

The original USB A-to-B cable is shown in Figure 1. The “A” connector plugs into the computer, while the “B” connector is generally on the rear panel of the device you wish to connect. There are four

wires inside of this cable — two for power and two for data. The ground and +5 V wires run straight through while a twisted pair of wires is used to carry data as a differential voltage. The computer USB port typically provides up to 500 mA of current capability. A device that uses more than 500 mA will provide its own power supply. The USB cable is widely used today, and most amateur devices use this cable. Figure 2 shows USB-B ports for a transceiver, amplifier, and rotator control box. Many other amateur devices provide this capability.

USB Hubs and Devices

A typical PC includes two or more USB hubs to expand a single USB port to multiple ports. There is one for front-panel USB connections, one for rear-panel connections, and usually additional USB headers on the PC motherboard. The hub is a smart device that communicates with the operating system. When a device is connected to a hub, the device starts drawing a current that “wakes up” the hub. Let’s say I connect an Icom IC-7610 to my PC. A “conversation” takes place that we can imagine goes something like this:

USB Hub Two: Hey, Windows! Someone just connected a device to USB hub two, port three. Go check it out.

Windows: I’m on it.

Windows: Hey, device on hub two, port three, who is your manufacturer?



Figure 2 — The back of an Elecraft KPA1500, an Icom IC-7610, and a Green Heron RT-21 showing the USB-B port.



Figure 3 — The PC’s Device Manager drop-down menu showing the added devices.

Device: Icom.

Windows: What is your model number?

Device: IC-7610.

What happens next depends on whether the drivers for this device have been installed previously. In this example, Windows will check its list of installed, available drivers for the IC-7610. If a driver is found, Windows will load and activate the driver and include any devices supported by the driver in its Device Manager control panel. Supported devices can be utilized once they appear in the Device Manager control panel.

If no driver is found, Windows will check its online list of available drivers for this device. If no driver is found online, an error message will display, stating the user must manually install drivers for this device. If a driver is found, it will be installed, as discussed earlier.

Continuing with our IC-7610 example, if your computer has never connected to an Icom device using USB, it will need the Icom-specific drivers for the radio to operate properly. Microsoft does not have these on the Windows list of available drivers, so they will not self-install. They are, however, available to download from Icom directly. You’ll need to take the additional steps of visiting the Icom website (<https://www.icomamerica.com>), clicking “Support” on the menu bar, and selecting “Firmware Download.” Select “Search by Model Name” and enter your Icom model number — in this case, IC-7610. A list of available downloads will be presented, including the USB driver. Select the newest

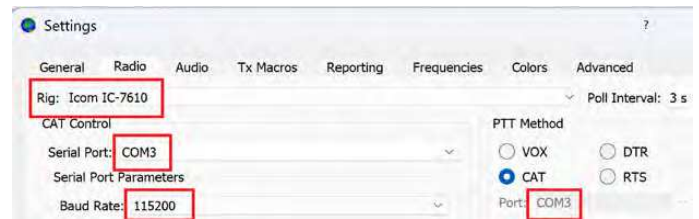


Figure 4 — A sample of what WSJT-X should look like when connecting it to the IC-7610.

one (if there is more than one choice), read and agree to the Icom terms and conditions, and press the download button.

The download will appear as a .zip file in your “Downloads” folder. In Windows Explorer, click the file once to highlight it and then press the “Extract All” icon in the top menu bar. It will extract the file into the Downloads directory and create a new folder called “Driver.” In that directory, you will find two additional folders that have drivers dependent on your Windows operating system. Click the one you have, and you will see the driver, along with an .exe program to install it. Double-click the correct .exe for your operating system — 32-bit or 64-bit — and it will install the driver.

If you’re using a radio by a different manufacturer, you may need to take steps similar to the Icom example to find the specific drivers required.

Verifying Connected Device Status

Now that the IC-7610 is plugged into the PC and an appropriate driver has been installed, Figure 3 shows what new devices are available, highlighted here in red. The IC-7610 uses two Silicon Labs CP210x USB to UART Bridge interface chips. In my case, Windows has assigned these devices to COM3 and COM4. Also, a new sound interface called USB Audio CODEC is provided. Many amateur manufacturers provide similar functionalities and add a sound interface and one or more COM ports similar to the IC-7610 (they may even



Figure 5 — A sample of what WSJT-X should look like when setting up the audio devices.

use the same chips). Having this functionality 20 years ago would have required external interface boxes, audio cables, etc. Now this is all accomplished using one simple USB cable. The two COM ports and the sound interface shown in Figure 3 can be used in any number of amateur software packages. Let's look at *WSJT-X* and *N1MM* as examples.

WSJT-X

Figure 4 shows the **RADIO** tab in the *WSJT-X* Settings page. We can see that the Rig is set to Icom IC-7610, and it's connected to COM3 with a baud rate of 115200. This assumes the IC-7610 already has its COM port set to 115200 baud. We use the computer-aided transceiver (CAT) method to assert the push-to-talk (PTT) line, and the COM3 Serial Port. This setup allows *WSJT-X* to read the frequency from the IC-7610, change the IC-7610 to other bands, and assert the PTT line when *WSJT-X* is ready to transmit.

Figure 5 shows the **AUDIO** tab in the *WSJT-X* Settings page. Here, we can see how the USB Audio CODEC is used. The USB Audio CODEC has two sections, one for Receive Audio and one for pTransmit Audio. While this setup is easy, there are a couple more tasks. The Receive and Transmit Audio levels must be set. To set up the Receive level, consult the *WSJT-X* documentation. To set up the Transmit level, if your rig has an upper sideband-data mode (also referred to as USB-data), use it.

Using the USB-data mode disconnects any front-panel mic audio. Also make sure your mic compressor is turned off. Adjust the Pwr Slider in *WSJT-X*, so your automatic level control meter shows little or no movement when transmitting.

Just a quick note: As you saw, the IC-7610 provides two serial ports (COM3 and COM4). The IC-7610's second serial port is used to run FSK RTTY. COM3 is used as previously described, and COM4 uses MMTTY to run RTTY, mainly in contests. You have frequency control for logging and FSK RTTY capability all through the same USB cable, which makes a very flexible and easy setup!

N1MM

N1MM is set up in a similar manner by using its **HARDWARE CONFIGURE** screen. Figure 6 shows a typical



Figure 6 — A sample of what *N1MM* should look like when connecting it to the IC-7610.

setup selecting the COM3 port installed by the driver, the IC-7610 rig, and CW mode. This setup allows *N1MM* to read the frequency from the rig for logging, changing bands, and to perform CW keying. Again, all this is done without needing external keying interfaces or RS232 breakout boxes.

Powering Down

When you power off your device, the USB hub recognizes that a current is no longer drawn from the previously used port. The hub notifies Windows that the device has been physically disconnected or powered off. Then Windows removes the supported devices from its Device Manager control panel and unloads the supporting driver.

As a traveling DXpeditioner, the less I carry, the better it is for weight management, quick setup, and teardown times. USB connectivity has been a boon to amateur radio for 25 years.

All photos provided by the author.

Al Rovner, K7AR, has been a licensed ham radio operator for 53 years, and is an active DXer and contester. He is a retired engineer with a BS in electrical engineering from Drexel University and an MS in computer science from Oregon Health & Science University. Al can be reached at k7ar@comcast.net.

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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.



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.

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

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 FT8WW suddenly appeared. For several weeks starting in late December 2022, every DXer in the world had been trying to contact Thierry Mazel, FT8WW, 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

taught me other ways to get my operating on par with the bigger stations. Here are my take-aways that other hams may find useful:

Bands

Get on as many bands as possible. I was limited to 10 meters when I started, but there were many countries I hadn't worked, so this restriction wasn't a concern — until the D68C DXpedition to the Comoros. The D68C team was active for 3 weeks in 2001, and I couldn't get through on that band. I heard them clearly on 15 meters with manageable pileups, but I didn't have the right antenna. I had to wait until the D66D DXpedition in 2016 for another chance to work the Comoros. By then, I had antennas for more than one band.


Modes

Get on as many modes as possible. I started my DX journey on SSB because it was easier to use at the height of the sunspot cycle. I later learned that CW opened more possibilities, as there are a few countries that I've been able to work only on that mode. Similarly, I have worked Palestine only twice in more than 20 years — both on RTTY.

While all modes are important, FT8 is a game changer for smaller stations, especially those with compromise antennas. There are almost always FT8 (and its little brother, FT4) signals on most bands, but it's not so with SSB and CW. When tuning on 17 meters, my favorite band, I can usually find FT8 signals when it's open. If I go up to the phone section or down to the CW section, there is often nothing. I can operate on 30 meters with my 20-meter attic dipoles, but not well. But on FT8, I worked the 4W6RU DXpedition to Timor-Leste on 30 meters. That contact might have been nearly impossible to make on SSB or CW.

Propagation

Understand propagation. I learned that from my location in South Carolina, 20 meters opens in the mornings and evenings to the Pacific and Indian Oceans. I wanted to contact the 2014 FT5ZM DXpedition to Amsterdam Island, and I knew when my best chances would be. I heard them a couple of times on 20 meters at night, but the pileups were more than I could handle. Early one morning, I tuned to 14.185 MHz, which was their 20-meter SSB frequency. I heard nothing and started looking around. I soon found FT5ZM calling on 14.180 MHz without any answers. I jumped in and easily made the contact.

Vanuatu  **October 2023, 10/26 to 11/04**

CQ 32 ITU 56
Grid RH42DF
<https://www.dxobsessed.org/>

er NC7M

MHz	Mode	Report
		59 599
		59 599
		59 599
		59 599

YJ0TT confirms QSOs with W4KVS
02/11/2023 22:08 on 12m 2xFT8 SNR -01dB
31/10/2023 23:42 on 15m 2xFT8 SNR -09dB

DXObsessed, where does it come from? It starts with your first contact, the initial spark. As time passes, the hunger for the next DX contact increases as you listen intensely. The chase turns into the hunt, and you begin to engage with others, and gravitate toward those sharing your passion; that's how Marc (NC7M) and I (NG7E) started. We're taking small steps for now, as our first step together started with St. Lucia, and our second step is Vanuatu (October 2023), embarking together with 4 others that share the same Obsession for DX (Scott N7JI, Alex K6VHF, Phil W6UC, and Leon NJ6P). Share the adventure with us and encourage us with your support!!

LX5UO print

The back of the QSL card confirming the author's contact with the YJ0TT team on Vanuatu. This contact, made in October 2023, was the last one he needed to meet his 300-entity goal.

Pileup Practice

Learn how to break a pileup. Practice is critical for any sport, and DXing is no different. Fortunately, there are plenty of pileups available to hone your skills. Special events, like Route 66 On the Air, can generate pileups on all modes and are sometimes harder to work than DX stations.

The delayed call method works well on both SSB and CW. This involves carefully timing your call for the best odds of being heard. If you have a big station with good antennas and an amplifier, you can call as soon as the DX operator says "QRZ." However, smaller stations must be a bit more resourceful and wait for the initial pileup to taper before calling. There are countless notes in my log indicating delayed calls that have yielded contacts. Listen to the pileup and count how many seconds it takes for the DX station to answer. For instance, a 5-second delay might work sometimes, while other times, you might have to wait 10 seconds. This technique has been around for decades, and it was even mentioned in a 1947 publication, *The Technique of Working DX*. When working split on CW, a scope can be useful for identifying the DX operator's pattern. I've had success calling on the frequency of the last caller after their contact has been completed.

Research

Do your homework. There are many resources allowing operators to keep track of what is happening in the DX world. A variety of regularly updated DX newsletters keep subscribers up to date on activations, operating practices, band frequencies, and QSL procedures. Some of my favorites are *The Daily DX*, the *ARRL DX Bulletin*, and *425 DX News*.

Future-Proofing ARES



Adding Adaptability to Our ARES Tool Kits

Scott Yonally, N8SY

Adaptability is a unique skill that many Amateur Radio Emergency Service® (ARES®) groups have learned to stay relevant over the years. We can still be communicators, but we must be willing to grow and evolve by learning new skills, too.

Leveraging Potential

Today's Community Emergency Response Team (CERT) programs equip ham volunteers with essential training that enables them to contribute various aspects of disaster response in addition to communications. This includes foundational skills in first aid, CPR, fire safety and prevention, and search-and-rescue operations. As the nature of emergencies continues to grow more complex, an effective disaster response increasingly relies on a multidisciplinary approach. This trend has heightened the demand for CERT volunteers who possess a broader range of specialized skills. This has become a very versatile tool for not only the emergency management agency, but many other served agencies as well, especially when you're able to perform many different roles when disaster strikes.

In contrast, ARES communicators traditionally focus on radio communications only. While this still remains a critical function, it often means that we miss out on other valuable opportunities to make an impact when an emergency happens, limiting ourselves by not fully leveraging our potential. ARES needs to tap into the same level of adaptability that CERT has done to survive.

For example, many ARES volunteers can't perform CPR or use a fire extinguisher or have ever been involved in a circle search for a missing person. With additional training, ARES volunteers will still be able to carry their radios, but they could also "carry":

- Medical kits for basic first aid and triage
- The knowledge of fire safety protocols
- Search-and-rescue gear to help locate missing persons
- Disaster logistics training to coordinate supplies and volunteers

- Community outreach skills to educate neighbors before disaster strikes
- Damage assessment skills

If ARES is to be of real use in the field, we'll need to be responders, problem solvers, and bridges between agencies and communities, in addition to being communicators.

A Recent Example

When a tornado touched down this summer, a local ARES/CERT group was activated. Their radios were busy as they relayed messages between several shelters and the incident command center. When a shelter worker got hurt and needed medical attention, two ARES members used their CERT/first aid training to help stabilize the worker until paramedics could arrive and take over. Another team helped clear debris to open a road for police and fire vehicles. The sheriff later stated, "They weren't just voices on the airwaves — they were hands, hearts, and minds on the ground."

In Conclusion

Our ARES groups need to step out of a communications-only mindset and adapt to the growing need for learning additional skills so we can provide more help, not only for our served agencies but also for our communities, in a clear direction that will lead us into the next decade. Yes, we are communicators, but we can also be first aiders, educators, and neighbors who have learned to adapt to whatever the situation demands. Our radios remain our primary objective, but our relevance comes from our willingness to evolve and grow.

Investing in the Future of Amateur Radio

How the ARRL Club Grant Program is powering innovation — and revitalizing clubs.

The strength of amateur radio can be measured by the strength of local clubs. In 2024, the ARRL Club Grant Program — administered by the ARRL Foundation with generous support from Amateur Radio Digital Communications — made a significant investment to empower clubs across the country with funding for projects that educate, innovate, and serve their communities.

Designed to support amateur radio's long-term growth and sustainability, the Club Grant Program goes beyond financial support. Its purpose is to fund transformative projects — initiatives that expand public awareness, strengthen emergency communications, and engage new generations through hands-on STEM learning.

Unprecedented Interest, National Reach

Following a major outreach campaign tied to the 2024 Dayton Hamvention, the response from clubs was overwhelming. The Foundation received 182 applications, with 110 qualified proposals representing every ARRL Division and 40 states. Collectively, clubs requested more than \$1.59 million, underscoring both the need for funding and the creativity of amateur radio volunteers nationwide.

After a rigorous review process, 37 grants totaling \$500,502 were awarded to clubs pursuing projects ranging from youth education and satellite communications to repeater modernization and emergency preparedness.

Local Projects, Lasting Impact

Funded projects reflect the breadth of amateur radio's public value. Clubs are launching youth engagement programs, building portable and off-grid emergency stations, expanding digital and satellite operations, and bringing amateur radio into schools, museums, and community events. These initiatives strengthen both local resilience and the future of the Amateur Radio Service.

Looking Ahead

Grant recipients submitted progress and final reports through 2025, allowing the ARRL Foundation to track



The Camp Quest NorthWest Amateur Radio Club targeted youth ages 8 – 17 in the Pacific Northwest during a year-long, multi-event engagement program with a variety of amateur radio activities. [Photo courtesy of Camp Quest NorthWest Amateur Radio Club]

outcomes and share successes. As these projects continue to unfold, the impact of the ARRL Club Grant Program is a clear strategic investment in local clubs that strengthens amateur radio everywhere.

Grant-Funded Club Revitalization

MARCONI: Motivating Amateur Radio Clubs to Open New Initiatives

MARCONI is a club revitalization program led by Dr. Ed Snyder, W1YSM, of the Meriden Amateur Radio Club, W1NRG, helping amateur radio clubs rebuild momentum, strengthen leadership, and reconnect with their communities.

Supported by the ARRL Club Grant Program, MARCONI provides mentoring, ready-to-use activities, and structural guidance to address common challenges such as declining membership and leadership fatigue. To date, the program has helped clubs merge or reorganize, launched turnkey initiatives, and reactivated three struggling clubs.

Designed to scale, MARCONI offers a repeatable model for long-term club engagement, extending the impact of grant funding well beyond a single community. To learn more about MARCONI, please go to www.arrl.org/marconi-program.

Happenings

Obsolete Part 97 Rules Deleted

In October 2025, the FCC adopted a Report and Order to delete almost 400 obsolete rules pertaining to its wireless services. As previously reported by ARRL (www.arrl.org/news/fcc-announces-intent-to-delete-minor-part-97-provisions), among the deletions were four rules in Part 97 that governed the Amateur Radio Service.

ARRL reports that the notice of the Report and Order has now been published in the *Federal Register*. The following Part 97 provisions will be deleted as of February 10, 2026:

§ 97.27. This provision is duplicative of a statutory provision related to the FCC's right to modify station licenses.

§ 97.29. This provision specified an obsolete procedure to replace paper licenses. ARRL proposed deleting this section in comments filed earlier in 2025.

§ 97.315 (b)(2). This obsolete provision grandfathered HF amplifiers purchased before April 28, 1978, by an amateur radio operator for use at that operator's station. It also grandfathered those manufactured before April 28, 1978, for which a marketing waiver was issued.

§ 97.521(b) and Appendix 2. This rule and appendix relate to obsolete Volunteer Examiner Coordinator regions.



Up to \$25,000 at Stake in ARRL Student Coding Competition

As of January 1, 2026, ARRL has been sponsoring a Student Coding Competition. The project is designed to engage young hams in shaping the future of amateur radio through software development. Open to licensed ARRL members aged 21 and younger, the competition invites students to design a mobile app that supports ARRL and the amateur radio community. Cash awards totaling up to \$25,000 will be presented to one or more winning entries.

The complete rules and application specifications are available at www.arrl.org/files/file/Youth/ARRL%20Student%20Coding%20Competition%20-%20Specifications%201%20Jan%202026.pdf. Project submissions are due by March 31, 2026. Entries will be judged on how well they meet the specifications, user interface design and usability, code quality and stability, and inclusion of extra features.



Adult ARRL members are encouraged to help spread the word and support the next generation of amateur radio innovators. ARRL membership is free for full-time students aged 21 and younger, removing a key barrier to participation. For more information, visit www.arrl.org/student-coding-competition.

ARRL Awards Colvin Grant to Bouvet DXpedition

ARRL has awarded a \$5,000 Colvin Award grant (www.arrl.org/colvin-award-grants) to the Delta-Xray Group, organizers of the upcoming 3YØK DXpedition to Bouvet Island, scheduled for February 2026. The Colvin Award is funded by an endowment established by the legendary DX couple Lloyd Colvin, W6KG (SK), and Iris Colvin, W6QL (SK). The award is intended to support amateur radio projects that promote international goodwill in the field of DX.

As of press time, they plan to leave for Bouvet from Cape Town, South Africa, on February 1. Weather permitting, 3YØK plans to use helicopter airlifts to transport personnel and equipment between the vessel and the island. The group expects to spend 3 weeks on and around Bouvet, and they will attempt



to make as many worldwide contacts as they can. They'll use up to eight stations on CW, SSB, FT8, RTTY, and the QO-100 geostationary satellite.

The 3YØK DXpedition is perhaps the most expensive ham radio expedition ever mounted, with a budget of \$1.7 million, most of which (\$1.2 million) is for what the team refers to as a "reliable commercial Arctic/Antarctic vessel," noting that "safe and reliable ship transportation continues to be a challenge for such remote island expeditions, and the cost continues to rise." Team leaders added, "The foremost priority of the 3YØK expedition is the safety of the operating team, support personnel, and the vessel and helicopter crews."

Two of the team members are young hams: 21-year-old ARRL Education and Learning Support Specialist Max

Freedman, N4ML, and 26-year-old Alex Schengber, DL2ALY, an aviation engineer currently working at a German research station in Antarctica.

Other major financial support for the DXpedition has come from the Northern California DX Foundation, the International DX Association, and the German DX Foundation. In a joint statement, the 3YØK team said:

We extend our sincere thanks to all equipment sponsors and financial supporters, and particularly the ARRL Colvin Award grant. Without this collective support, activating Bouvet Island and delivering an [all-time new one] from [Club Log's #10 DXCC] most-wanted entity would not be possible.

For more information, visit www.3y0k.com.

New ARRL Section Managers Took Office in January

ARRL announces four new Section Managers (SMs) who took office on January 1, 2026.

Bret Stemen, KD8SCL, has been appointed as the Ohio SM to finish the term that will end on September 30, 2026. Stemen, of Pataskala, has recently served as the Section Emergency Coordinator. He is taking the reins from Tom Sly, WB8LCD, who has decided to step down following his tenure as Ohio SM since 2021.

Mike Corey, KI1U, has been appointed to be the ARRL Rhode Island SM, completing the term that will end on June 30, 2027. Corey, of Coventry, has been serving as the Assistant SM and Public Information Coordinator. Rhode Island SM Nancy Austin, KC1NEK, is stepping down early, following her service in the position since 2023.

Ralph Katz, AA8RK, will become the Michigan SM, with a term ending on June 30, 2028. Katz, of Ann

Arbor, was the only nominee for the position during the most recent election cycle. He succeeds Larry Camp, WB8R, who has served as the Michigan SM since 2023, and from 2012 through 2017.

Keith Elliott, W6KME, of Newbury Park, California, will be the Santa Barbara SM through June 30, 2028. He was the sole nominee during the most recent election cycle. Elliott takes on the role of SM after John Kitchens, NS6X, completes his term of office as SM. Kitchens served as SM since 2018, and he was elected to the ARRL Board of Directors last month to become the Vice Director of the Southwestern Division starting January 1.

The ARRL Field Organization is divided into 71 Sections and comprises more than 60,000 volunteers among ARRL's membership.

Richard "Dean" Straw, N6BV, Silent Key

Richard "Dean" Straw, N6BV, died on July 9, 2025. Amateur radio was one of his passions.

Dean retired from ARRL in 2008 following 15 years of service as the Senior Assistant Technical Editor.

In 2006, the World Radiosport Team Championship (WRTC) was held in Florianópolis, Brazil, a coastal city that straddles both Santa Catarina Island and the Brazilian mainland. Not far inland, snow-capped mountains climb into the clouds, and miles of glittering, sandy beaches ring the city. The climate is subtropical and supports a dizzying diversity of plant and animal life from swaying palms to visiting American tourists. Among those visiting tourists, in this case for WRTC as

part of the PT5J team, was Dean. Accompanying him was his beloved wife, Rayma.

Dean was born on another island, thousands of miles from Florianópolis, on Honolulu in 1946. He lived there until he came to the mainland to study electrical engineering at Yale University. After graduating, he worked in radio design in Massachusetts at the National Radio Company, as well as in North Carolina, San Francisco, and on Cape Cod. "He had a great ability to pull calls out of the noise," his counterpart in PT5J in WRTC, Mark Obermann, AG9A, recalled. "Must have had some extra processing gain inside his noggin." While Dean and Obermann wouldn't win the contest that year, they posted an impressive score of 1,333,789. After the

contest, while vacationing in Brazil, Obermann relayed an anecdote that involved another of Dean's hobbies, competitive running. Dean and Rayma were in Rio de Janeiro, when "a kid stole Dean's 35-millimeter camera." Being a long-distance runner, Dean chased after him for several miles before it occurred to him that catching the kid might be dangerous, and that possibly "getting killed was not worth getting the camera back." Indeed, Dean would live many years beyond that trip to Brazil, passing away from complications of an extended battle with Parkinson's disease. Rayma Mui, his wife of 38 years, survives him, as do his sons Geoff and Rick.

Not only is Dean remembered among hams for his contesting prowess, but for his tenure in the Publications Department at ARRL Headquarters. He edited five editions of *The ARRL Antenna Book* (the most of any named editor), four volumes of *The ARRL Antenna Compendium* (4 – 7), and several editions of *The ARRL Handbook*. Former *QST* Editor and ARRL author Steve Ford, WB8IMY, recalled his time with Dean. He "became my 'antenna mentor' when I joined the Headquarters staff. Until I met Dean, I didn't even know that ladder line existed." He continued, "He helped me incorporate it into my home station and then collaborated with me in writing a popular *QST* article about my experience." The article was titled "The Lure of the Ladder Line" and appeared in the December 1993 issue.

Reflecting on Dean's contributions to *The ARRL Antenna Book*, that volume's most recent editor, H. Ward Silver, NØAX, said Dean's "were very big shoes to fill. Dean started with a small book of antenna fundamentals and basic designs, then brought it into the modern era with much more detail and a wider scope that was groundbreaking."

Beyond his expansion and updating of *The ARRL Antenna Book*, Dean wrote modeling software that is still distributed with *The ARRL Antenna Book*, including *Yagi for Windows*, for which he "generated a whole family of HF and VHF designs," according to Silver. He also wrote *Transmission Lines for Windows*,



Richard "Dean" Straw, N6BV (SK).

which "integrated several calculator-style tools into one comprehensive package." And, arguably, his software masterpiece was *High Frequency Terrain Analysis*, which "combined terrain data and antenna patterns so that hams could finally get a reasonably good idea of where their signal energy was actually going." Silver added, "His painstakingly prepared set of Angle of Arrival files that modeled propagation to and from many areas allowed top stations to optimize their antenna systems to a high degree," and, "combined with the wide availability of software tools like *EZNEC*, the effect on amateur radio antenna system design was Promethean."

Dean's legacy lives on through his many contributions to ham radio at ARRL Headquarters and beyond, and in the countless lives he touched with his generosity, intelligence, and love. Dean shared this message when he retired from ARRL: "The Lord has been good to me — how many people can truly say that their vocation has been their beloved avocation too? My wife has consistently maintained over the years: 'You're having entirely too much fun in this job!'" — *ARRL Acquisitions Editor Mark Derks, KC1RVQ*

Read the full version and more remembrances at www.arrl.org/news/richard-dean-straw-n6bv-arrrl-antenna-expert-silent-key.

The 2025 IARU HF World Championship Results

More than 5,000 entries were received for the 40th anniversary of this worldwide event, held July 12 – 13, 2025.

This year, the 40th annual IARU HF World Championship played its role in the centennial celebration with 5,077 logs submitted from 52 ITU zones, 52 national society headquarters stations, Administrative Council members, and representatives from the three ITU regions.

With the inaugural IARU HF World Championship held in July 1986, this contest has come a long way in terms of popularity and is arguably enjoying its golden age today. In that first contest, 1,397 logs were submitted and just 16 IARU headquarters stations participated (though history shows those teams got on the air with relatively short notice).

Propagation

The 2025 contest did not have the best conditions. After enjoying better conditions last year, which benefited from a solar flux in the mid-230s, participants this year had hoped those elevated conditions might linger just a little longer. Instead, they were left lamenting what appears to be a solar cycle peak in the rearview mirror, with many describing in their www.3830scores.com posts conditions that were among the poorest they had experienced in years. While 1986 was in a deeper part of the sunspot cycle than we are in today, this sounds familiar.

In 2025, impressions of 15-meter conditions varied depending on geographic location. Stations located south of the major population areas of Europe and North America reported 15 and 20 meters were their most productive bands. However, others who relied more on east-west paths, typically susceptible to higher absorption in the summer months, saw a significant reduction in propagation on 15 meters and shorter band openings in the evening on 20 meters.

With excellent 20-meter conditions across common paths of darkness in last year's IARU HF event, many contesters opted to sacrifice low band numbers and, perhaps, avoid the aural discomfort of summertime atmospheric noise in favor of quieter and more enjoyable conditions. This year, while propagation on 20

meters between some parts of the world occurred during the hours of darkness, there was a clear activity shift to 40 meters in the local evening hours.

It Was Still Fun

While we can chalk up this contest as a bit forgettable given the conditions, it's still important to remember how much has changed in 40 years. The top Single Operator scores in W/VE and World in 1986 by Steve, N2IC, and Jorge, LU8DQ (operating as AZ8DQ), respectively, didn't come close to a million points. Neither broke 1,500 contacts.

Today, the IARU HF World Championship remains as popular as ever. More than 4,000 log entries have been submitted every year since 2012 — and this year is the third consecutive year we've received more than 5,000 entries.

Join the fun in the 41st IARU HF World Championship starting at 1200Z on July 11, 2026. With the excitement surrounding World Radiosport Team Championship 2026, we expect another banner year. Disturbed conditions will not stop us!

2025 IARU Special Station Scores

Scoring of IARU station logs provided by World Wide Radio Operators Foundation (WWROF). # = Multiple stations in a single HQ operation, using call signs with different numbers in the prefix.

IARU Headquarters Stations		IARU Administrative Council Stations	
Call	Score	Call	Score
TM0HQ	19,194,670	SM6EAN	1,053,711
ED0HQ	18,987,246	W5ZN	578,250
DA0HQ	18,748,935	VE6SH/7	57,660
9A0HQ	18,576,960	IARU R1	
II#HQ	18,270,259	IV3KKW	1,990,326
SN0HQ	17,160,000	DJ3HW	419,950
S50HQ	16,510,280	HB9JOE	196,808
GR2HQ	14,849,380	IARU R2	
YT0HQ	14,804,092	VE3YV	3,432
LZ0HQ	13,847,532	IARU R3	
OE0HQ	10,967,686	JA1CJP	135,783
SK9HQ	10,145,520	VR2XMC	15
OH1HQ	9,245,097		
YR0HQ	9,211,752		
OP0HQ	8,496,852		
HG0HQ	8,360,422		
E7HQ	7,661,017		
OZ1HQ	7,064,194		
HB9HQ	6,557,019		
R#HQ	3,744,312		
A60HQ	3,520,188		
B#HQ	3,104,880		
8N#HQ	3,062,718		
LT4RCA	2,939,520		
EI0HQ	2,792,088		
Z30HQ	2,174,144		
W1AW/KP4	2,050,242		
ER7HQ	1,917,092		
DX0HQ	1,573,746		
ZL6HQ	1,520,544		
Z60HQ	1,340,739		
ES9A	1,101,870		
PJ2HQ	880,384		
3V8HQ	879,874		
UN1HQ	851,599		
OA4O	805,335		
V55HQ	713,980		
E2HQ	660,240		
VA3RAC	556,640		
CE3AA	510,080		
NU1AW	466,137		
HB0HQ	367,131		
HZ0HQ	286,172		
EX9HQ	228,174		
CS5HQ	212,410		
HC2GRC	187,680		
HL0HQ	164,280		
OY1CT	79,900		
CX1AA	60,804		
VR2HK	40,424		
VK3WIA	1,156		
ZS9HQ	42		

Regional Leaders

Boxes list call sign, score, and class: MSHP = Multioperator, Single Transmitter, High Power; M2LP = Multioperator, Two Transmitter, Low Power; SO-CW-HP = Single Operator, CW Only, High Power; SO-CW-LP = Single Operator, CW Only, Low Power; SO-CW-QRP = Single Operator, CW Only, QRP; SO-MIX-HP = Single Operator, Mixed Mode, High Power; SO-MIX-LP = Single Operator, Mixed Mode, Low Power; SO-MIX-QRP = Single Operator, Mixed Mode, QRP; SO-PH-HP = Single Operator, Phone Only, High Power; SO-PH-LP = Single Operator, Phone Only, Low Power; SO-PH-QRP = Single Operator, Phone Only, QRP; SOU-CW-HP = Single Operator Unlimited, CW Only, High Power; SOU-CW-LP = Single Operator Unlimited, CW Only, Low Power; SOU-CW-QRP = Single Operator Unlimited, CW Only, QRP; SOU-MIX-HP = Single Operator Unlimited, Mixed Mode, High Power; SOU-MIX-LP = Single Operator Unlimited, Mixed Mode, Low Power; SOU-MIX-QRP = Single Operator Unlimited, Mixed Mode, QRP; SOU-PH-HP = Single Operator Unlimited, Phone Only, High Power; SOU-PH-LP = Single Operator Unlimited, Phone Only, Low Power, and SOU-PH-QRP = Single Operator Unlimited, Phone Only, QRP.

West Coast Region

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

N9RV	1,489,012	SO-MIX-HP	N6OKU	4,123	SO-PH-LP	N6HI	1,335	SO-CW-QRP	KD6HOF	1,062	SOU-PH-LP
KM7W (KL9A, op)	1,305,447	SO-MIX-HP	NX7W (N7FLT, op)	2,486	SO-PH-LP	KA3DRR (@N6WT)	441,490	SOU-MIX-HP	KW6SA	210	SOU-PH-LP
K6XX	1,003,944	SO-MIX-HP	W6QU (W8QZA, op)	9,720	SO-PH-QRP	K7NT	190,799	SOU-MIX-HP	VE7ZO	903,621	SOU-CW-HP
K7JQ	30,360	SO-MIX-HP	K6NA	775,443	SO-CW-HP	VE7BC	167,688	SOU-MIX-HP	N7AT (K8IA, op)	711,540	SOU-CW-HP
NN6DX (W1PR, op)	26,164	SO-MIX-HP	VE7UF (VE7JH, op)	666,666	SO-CW-HP	K6RIM	45,600	SOU-MIX-HP	K6KM		
WA7BNM	41,448	SO-MIX-LP	NT6Q (N5ZO, op @WA6TQT)	471,410	SO-CW-HP	NT6X	45,501	SOU-MIX-HP	(@W6SRR)	523,854	SOU-CW-HP
W6DN	12,051	SO-MIX-LP	KC7V	255,460	SO-CW-HP	WU8T	24,990	SOU-MIX-LP	KA6BIM	507,416	SOU-CW-HP
VE7CV	10,188	SO-MIX-LP	AJ6V	218,376	SO-CW-HP	WN6W	19,110	SOU-MIX-LP	WA0WWW	107,888	SOU-CW-LP
N9BD	9,660	SO-MIX-LP	N7VM	420,679	SO-CW-LP	N6SPP	5,544	SOU-MIX-LP	NN6U		
W6JBR	5,539	SO-MIX-LP	WJ9B	213,930	SO-CW-LP	N7ESU	3,280	SOU-MIX-LP	(@K6MTU)	11,790	SOU-CW-LP
W6AFA	199,186	SO-PH-HP	N6MU	63,217	SO-CW-LP	AG6JA	1,340	SOU-MIX-LP	KI6OY	10,950	SOU-CW-LP
KE8FT	89,928	SO-PH-HP	KS7T	48,507	SO-CW-LP	N7GCO	14,904	SOU-MIX-QRP	KZ2V	10,286	SOU-CW-LP
NC6R	603	SO-PH-HP	N7IR	39,780	SO-CW-LP	NT7GC	10,452	SOU-PH-HP	K7NEW	8,289	SOU-CW-LP
N7XCZ	378	SO-PH-HP	W6YX (N7MH, op)	123,851	SO-CW-QRP	AC7GL	10,452	SOU-PH-HP	WD6T	1,109,934	MSHP
W6AGZ	165	SO-PH-HP	K7HBN	21,197	SO-CW-QRP	K6DW	3,861	SOU-PH-HP	N7DX	945,659	MSHP
K6GHA	13,833	SO-PH-LP				KM6TFY	3,250	SOU-PH-HP	KT7E	344,596	MSHP
K7HKR	8,715	SO-PH-LP				VE6CLG	616	SOU-PH-HP	VA7DZ	296,728	MSHP
KB9LHT	5,920	SO-PH-LP				W6MX	15,840	SOU-PH-LP	W7TVC	104,040	MSHP
									K7BTW	64,965	M2LP

Midwest Region

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

K5WA	1,003,844	SO-MIX-HP	K0SCO	3,973	SO-PH-LP	KA8HDE	21,199	SOU-MIX-LP	NS0R	489,955	SOU-CW-HP
WR5O	312,825	SO-MIX-HP	WX0B (AD5Q, op)	1,192,779	SO-CW-HP	KF0QFD	4,515	SOU-MIX-LP	N0AV	435,024	SOU-CW-HP
N2IC	304,212	SO-MIX-HP	W0UA	973,440	SO-CW-HP	K2HT	2,250	SOU-MIX-LP	AA0FO	209,088	SOU-CW-HP
K0EA	61,270	SO-MIX-LP	K5PI	636,728	SO-CW-HP	AE0MO	139,480	SOU-PH-HP	N5RZ	829,326	SOU-CW-LP
WA5LFD	43,364	SO-MIX-LP	N4VI	137,724	SO-CW-HP	K0YR	60,860	SOU-PH-HP	K0AD	221,667	SOU-CW-LP
KC5DCT	8,436	SO-MIX-LP	K0FX	105,570	SO-CW-HP	N5KWD	32,376	SOU-PH-HP	K0XF	166,060	SOU-CW-LP
K0BF	7,474	SO-MIX-LP	AD5A	693,660	SO-CW-LP	W5ABA	8,148	SOU-PH-HP	K0RC	134,264	SOU-CW-LP
AF5CC	5,724	SO-MIX-LP	AI6O	109,736	SO-CW-LP	WA0O	2,668	SOU-PH-HP	K4IU	122,850	SOU-CW-LP
VE4SG	58,344	SO-PH-HP	W0IZ	68,676	SO-CW-LP	N7MZW	18,240	SOU-PH-LP	KJ5T	20,458	SOU-CW-QRP
K9MWM	16,452	SO-PH-HP	KN0V	64,233	SO-CW-LP	AB5NX	18,090	SOU-PH-LP	K5TR	1,649,174	MSHP
AIGM	3,996	SO-PH-HP	N5CHA	52,469	SO-CW-LP	NT5F	13,950	SOU-PH-LP	W0ECC	515,431	MSHP
KG5EIU	72	SO-PH-HP	W0DCX	1,638	SO-CW-QRP	KF9MT	6,752	SOU-PH-LP	N0AX	476,117	MSHP
K5DHY	8,908	SO-PH-LP	KE0UI	179,102	SOU-MIX-HP	K0TJT	1,919	SOU-PH-LP	NA5C	237,160	MSHP
WR0H	8,785	SO-PH-LP	N0RC	110,141	SOU-MIX-LP	W10WA (W0AAE, op)	1,010,240	SOU-CW-HP			
KF5VDX	5,626	SO-PH-LP	K0KX	70,210	SOU-MIX-LP	W0ZB	693,750	SOU-CW-HP			
N0MMA	4,368	SO-PH-LP									

Central Region

(Central and Great Lakes Divisions; Greater Toronto Area, Ontario East, Ontario North, and Ontario South Sections)

KW9A	9,240	SO-MIX-HP	NA8V	1,031,600	SO-CW-HP	N4QS	132,330	SOU-MIX-HP	WM9C	692,988	SOU-CW-HP
VE3UZ	8,556	SO-MIX-HP	K8GL	370,440	SO-CW-HP	NE9U	181,366	SOU-MIX-LP	VE3NNT	549,332	SOU-CW-HP
N8PE	148,082	SO-MIX-LP	VA3AR	145,425	SO-CW-HP	KJ6XC	24,795	SOU-MIX-LP	VE3NE	499,731	SOU-CW-HP
K5ZD	109,592	SO-MIX-LP	WI9WI	94,608	SO-CW-HP	WB9HFK	24,206	SOU-MIX-LP	KE4KY	312,567	SOU-CW-HP
N8VV	24,180	SO-MIX-LP	VE3TM	693,625	SO-CW-LP	K9KE	17,331	SOU-MIX-LP	KC9EE	200,367	SOU-CW-LP
W9QL	10,044	SO-MIX-LP	VA3SP	310,853	SO-CW-LP	W8TOM	12,052	SOU-MIX-LP	AB9YC	177,388	SOU-CW-LP
N4HAI	2,106	SO-MIX-LP	W1NN	184,140	SO-CW-LP	K8ZT	6,020	SOU-MIX-QRP	VE3YT	170,610	SOU-CW-LP
VA3ZNQ	31,257	SO-PH-HP	KV8Q	131,882	SO-CW-LP	VE3BFU	441	SOU-MIX-QRP	VE3MA	166,005	SOU-CW-LP
KE8NBC	7,938	SO-PH-HP	VE3FH	125,271	SO-CW-LP	W9NZ	70,104	SOU-PH-HP	VE3MV	147,900	SOU-CW-LP
KD9EOT	2,943	SO-PH-HP	K4YJ	26,182	SO-CW-QRP	W8GX	18,336	SOU-PH-HP	KD8JDC	1,674	SOU-CW-QRP
KD9YAX	1,456	SO-PH-HP	VE3EDE	900	SO-CW-QRP	VA3UG	3,840	SOU-PH-HP	K8AZ	1,190,952	MSHP
W8LYO	21,186	SO-PH-LP	VE3GMZ	517	SO-CW-QRP	KF8AVC	2,502	SOU-PH-HP	NV9L	664,656	MSHP
N8YDM	18,391	SO-PH-LP	K8RXB	180	SO-CW-QRP	VA3IDD	63,848	SOU-PH-LP	N9NB	1,071,840	M2LP
VE3RVZ	10,800	SO-PH-LP	WB9MII	114	SO-CW-QRP	NQ9N	31,533	SOU-PH-LP	ND8DX	329,420	M2LP
VE3GJP	8,658	SO-PH-LP	K9OM	564,927	SOU-MIX-HP	W8TB	28,251	SOU-PH-LP	K8LG	122,166	M2LP
KD9ZUN	8,246	SO-PH-LP	W8MJ	301,884	SOU-MIX-HP	KD9YOO	19,027	SOU-PH-LP	VE3RHQ	27,295	M2LP
VE3JM	1,890,114	SO-CW-HP	VE3TW	234,250	SOU-MIX-HP	VE3RGO	14,224	SOU-PH-LP			
			W9XT	230,466	SOU-MIX-HP	K9CT	1,331,003	SOU-CW-HP			

Regional Leaders (continued)

Southeast Region

(Delta, Roanoke, and Southeastern Divisions)

AA4NC			N4KS	201,663	SO-CW-HP	W4LT	151,110	SOU-MIX-HP	WO4O	881,920	SOU-CW-HP
(N4YDU, op)	1,448,258	SO-MIX-HP	K4BAI	188,976	SO-CW-HP	NF4A	149,766	SOU-MIX-HP	AD4EB	642,630	SOU-CW-HP
K4ZW	1,337,504	SO-MIX-HP	K9UQN	95,456	SO-CW-HP	WN4AFP	192,874	SOU-MIX-LP	KM5G	486,750	SOU-CW-HP
K4PV	316,404	SO-MIX-HP	WQ5L	82,644	SO-CW-HP	W6FB	118,655	SOU-MIX-LP	KO4VW	417,474	SOU-CW-HP
W2CSI	1,053	SO-MIX-HP	KQ4R	71,905	SO-CW-HP	WA4IPU	56,376	SOU-MIX-LP	NK4O	326,890	SOU-CW-HP
W4IX	475,115	SO-MIX-LP	WB4TDH	181,944	SO-CW-LP	W4EE	47,396	SOU-MIX-LP	N4AO		
N8II	245,826	SO-MIX-LP	K3JT	116,932	SO-CW-LP	K4OV	14,364	SOU-MIX-LP	(WC4E, op)	590,640	SOU-CW-LP
KX4UI	67,067	SO-MIX-LP	K4EJ	63,114	SO-CW-LP	K3TW	97,600	SOU-MIX-QRP	N2YO	457,104	SOU-CW-LP
NX9B	42,984	SO-MIX-LP	W4YE	55,941	SO-CW-LP	NJ4P			K2KW	260,429	SOU-CW-LP
WS4C	37,467	SO-MIX-LP	N3CKI	54,144	SO-CW-LP	(N0GJW, op)	493,392	SOU-PH-HP	WA2LMC	217,175	SOU-CW-LP
N4MM	23,698	SO-PH-HP	N5ER	79,135	SO-CW-QRP	NA4DA	172,788	SOU-PH-HP	N9TF	119,795	SOU-CW-LP
KQ4ZIO	23,427	SO-PH-HP	NU4B	26,752	SO-CW-QRP	W4EEY	67,462	SOU-PH-HP	NB1U	3,922	SOU-CW-QRP
WV4E	6,050	SO-PH-HP	N3CZ	18,612	SO-CW-QRP	K4PZZ	49,810	SOU-PH-HP	AD4ES	744,462	MSHP
K4MOD	2,576	SO-PH-HP	N4NM	18,592	SO-CW-QRP	N5GI	39,390	SOU-PH-HP	N1RM	582,660	MSHP
W9TCV	53,664	SO-PH-LP	K6RM	1,122	SO-CW-QRP	AC5O	37,417	SOU-PH-LP	W4NF	228,600	MSHP
KF8N	50,692	SO-PH-LP	K4AB	790,224	SOU-MIX-HP	W4GB	28,770	SOU-PH-LP	W4MLB	134,415	MSHP
NL7WA	44,672	SO-PH-LP	K3IE	254,100	SOU-MIX-HP	N4MCC	16,472	SOU-PH-LP	W4USF	528	MSHP
KC2QVD	23,280	SO-PH-LP	KI5GTR	191,900	SOU-MIX-HP	KM4IAJ	14,706	SOU-PH-LP	NN3W	977,882	M2LP
N1GNF	19,530	SO-PH-LP				N2ESP	13,688	SOU-PH-LP	AC4BB	10,556	M2LP

Northeast Region

(New England, Hudson, and Atlantic Divisions; Maritime and Quebec Sections)

N6MJ	2,665,752	SO-MIX-HP	K1IMI			WJ1U	494,460	SOU-MIX-LP	N2PP	752,500	SOU-CW-HP
K1DG	176,525	SO-MIX-HP	(N4CW, op)	443,632	SO-CW-HP	WA2JQK	100,005	SOU-MIX-LP	NJ3K	303,676	SOU-CW-LP
N1NQD	80,348	SO-MIX-LP	W2RQ	438,480	SO-CW-HP	NI1Q	74,208	SOU-MIX-LP	W3KB	203,580	SOU-CW-LP
KD2TT	64,152	SO-MIX-LP	KU2M	287,375	SO-CW-HP	NV3K	62,605	SOU-MIX-LP	K2ZR	138,672	SOU-CW-LP
KA2FIR	64,070	SO-MIX-LP	K1VUT	429,156	SO-CW-LP	KD2KEH	7,462	SOU-MIX-LP	AC5XK	93,100	SOU-CW-LP
KN2M	39,648	SO-MIX-LP	W1QK	107,622	SO-CW-LP	KE2AY	410,495	SOU-PH-HP	KE2D	87,568	SOU-CW-LP
K3HW	36,828	SO-MIX-LP	K1TR	103,748	SO-CW-LP	VE9CF	348,192	SOU-PH-HP	W1FJ	112,548	SOU-CW-QRP
N1UR	510,138	SO-PH-HP	K3UA	83,520	SO-CW-LP	VE2NTT	298,606	SOU-PH-HP	K9RS	1,305,500	MSHP
KG1E	70,122	SO-PH-HP	N2EY	54,900	SO-CW-LP	VE2CSM	151,226	SOU-PH-HP	K3AJ	730,584	MSHP
KC2MBV	14,522	SO-PH-HP	K8CN	65,968	SO-CW-QRP	W3FR	72,924	SOU-PH-HP	W2A	716,289	MSHP
KB2DX	13,462	SO-PH-HP	NQ2W	2,860	SO-CW-QRP	N3AAA	117,100	SOU-PH-LP	KD1MC	713,368	MSHP
W1JIM	11,077	SO-PH-HP	K1TW	2,280	SO-CW-QRP	KC1QEM	26,048	SOU-PH-LP	K3CCR	316,043	MSHP
VE9CZ	139,686	SO-PH-LP	K4UW	1,024	SO-CW-QRP	WB2ITX	12,342	SOU-PH-LP	VY2TT	1,993,050	M2LP
VE2IAA	41,090	SO-PH-LP	ND3T (LZ5DB, op @K1LZ)	3,403,552	SOU-MIX-HP	VY2GF	11,712	SOU-PH-LP	WG3J	311,234	M2LP
W2JV	40,376	SO-PH-LP	K3MM	921,400	SOU-MIX-HP	KE2CRB	4,232	SOU-PH-LP	W3ZGD	227,404	M2LP
KS2G	19,352	SO-PH-LP	W1GD	908,725	SOU-MIX-HP	K3WW	2,097,048	SOU-CW-HP	W1FM	186,333	M2LP
KE2DPK	17,238	SO-PH-LP	W3PU			W8FJ	844,038	SOU-CW-HP	WA2QAU	137,648	M2LP
W1KM	1,513,377	SO-CW-HP	(K08SCA, op)	873,942	SOU-MIX-HP	N3AD	791,538	SOU-CW-HP			
W3RJ	511,700	SO-CW-HP	AB2E	424,205	SOU-MIX-HP	W1UE	753,468	SOU-CW-HP			



K8LG operators in the 2025 IARU HF World Championship. [Kelley Alkema, photo]

The April 2026 ARRL Rookie Roundup — Phone

1800 UTC – 2359 UTC, Sunday, April 19

The Rookie Roundup event is meant to encourage newly licensed operators to get on the HF bands and experience competitive amateur radio. This is a great way for clubs to get their newer members on the air, and the perfect opportunity to mentor new licensees.

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

You can enter as a Rookie if:

- ◆ You made, or will make, your first-ever contact this year or during the previous 3 calendar years (send the last two digits of the year of your first contact in your exchange).
- ◆ You haven't made any contest contacts using the contest mode (Phone) before (send the last two digits of the current year in your exchange).

If you are a non-Rookie, send the last two digits of the year of your first license.

Rookies can enter as a Single Operator, or invite Rookie friends over and operate as Multioperator. Up to five Single Operator Rookies can also enter from



Rookie Roundup Station KQ4NVU put in a Multioperator effort (from W4MLB) in the April 2025 SSB event, earning this certificate. Group efforts often provide a wonderful opportunity for camaraderie and mentorship. In this 2026 Year of the Club, your club might consider (or offer) a similar mentoring opportunity for such newcomers.

their individual stations and submit their total score as a team.

As a non-Rookie, you can join the fun by calling “CQ Rookies,” encouraging Rookie operators to call you.

All scores must be reported within 72 hours after the event. No late entries will be accepted.

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

Write for QST

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

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

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

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

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

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

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

Contest Corral

March 2026

Check for updates and a downloadable PDF version online at www.arrrl.org/contest-calendar. Check <https://contests.arrrl.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		Bands	Contest Name	Mode	Exchange	Sponsor's Website
	Date-Time	Date-Time					
1	1200	1 2200	3.5	NSARA Contest	CW Ph Dig	RS(T), Nova Scotia county or serial	nsara.ca
1	1500	2 0100	3.5-28,50,144	North Carolina QSO Party	CW Ph Dig	NC county or SPC	ncqsoparty.org
3	0100	3 0300	3.5-28	ARS Spartan Sprint	CW	RST, SPC, pwr	ars-qrp.com
3	1900	3 2100	3.5	AGCW YL-CW Party	CW	RST, serial, "YL" (if YL), name	www.agcw.de
4	2000	4 2100	3.5	UKEICC 80m Contest	Ph	6-char grid	www.ukeicc.com
5	0000	6 0300	7	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, name, mbr or pwr	qrpcontest.com/pigwalk40
5	1800	5 2200	28	NRAU 10m Activity Contest	CW Ph Dig	RS(T), 6-char grid	nrau.net
5	2000	5 2200	1.8-28,50	SKCC Sprint Europe	CW	RST, SPC, name, mbr or none	www.skccgroup.com
7	0000	8 2359	1.8-28	ARRL International DX Contest, SSB	Ph	RS, SP or pwr	www.arrrl.org/arrl-dx
7	0000	15 2359	3.5,7,21,28,144	Novice Rig Roundup	CW	Name, QTH, optional rig or mbr	www.novicerigroundup.org
7	0600	7 0800	7,14	Wake-Up! QRP Sprint	CW	RST, serial, suffix of previous QSO or "QRP" for 1st QSO	qrp.ru/contest
7	0700	7 1059	7,14,21,28	Russion YL/OM Contest	CW Ph	RS(T), "88" or "73"	www.contest.ru
8	0700	8 1700	3.5-28	FIRAC HF Contest	CW	RS(T), serial, "F" (if mbr)	www.firac.de
8	1300	11 0700	1.8-28,50,144	Classic Exchange, CW	CW	Name, RST, SPC, rcvr/xmtr manuf/model	www.classicexchange.org
9	0000	9 0200	1.8-28	4 States QRP Group Second Sunday Sprint	CW Ph	RS(T), SPC, mbr or pwr	www.4sqrp.com
10	1800	10 1859	3.5	DARC CW-Training Contest	CW	RST, mbr or serial	www.darc.de
14	0000	14 2359	3.5-28	YB DX RTTY Contest	Dig	RST, serial	rtty.ybdxcontest.com
14	0800	15 1000	50,144,432	SARL VHF/UHF FM Contest	Ph	RS(T), 6-char grid	mysarl.org.za
14	0800	15 1000	1.8-28	SARL Field Day Contest	CW Ph Dig	RS(T), # of transmitters, category, SA province or "DX"	mysarl.org.za
14	1000	15 1000	3.5-28	Commonwealth (BERU) Contest	CW	RST, serial	www.rsgbcc.org
14	1200	15 1100	3.5-28	DIG QSO Party, SSB	Ph	RS, mbr or none	dig-contest.de
14	1200	15 1200	3.5-28	EA PSK63 Contest	Dig	RSQ, EA province code or serial	concursos.ure.es
14	1200	15 1200	28	South America 10m Contest	CW Ph	RS(T), CQ zone	sa10m.com.ar/wp/rules
14	1200	15 2359	1.8-28,50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or none	www.skccgroup.com
14	1400	14 2000	3.5-28	AGCW QRP Contest	CW	RST, serial, pwr, mbr or "NM"	www.agcw.de
14	1500	15 1500	1.8	Stew Perry Topband Challenge	CW	4-char grid square	www.kkn.net/stew
14	1500	15 2200	3.5-28,50	Oklahoma QSO Party	CW Ph Dig	RS(T), OK county or SPC	k5cm.com/okqp.htm
14	1600	16 0200	1.8-28	Idaho QSO Party	CW Ph Dig	ID county or SPC	www.idahoqsoparty.org
14	1800	15 0559	3.5,7	TESLA Memorial HF CW Contest	CW	RST, serial, 4-char grid	www.radiosport.yu1srs.org.rs
15	0000	15 0359	3.5-14	North American Sprint, RTTY	Dig	Other's call, your call, serial, name, SPC	ncjweb.com/Sprint-Rules.pdf
15	1000	15 2159	3.5-28	YOTA Contest	CW Ph	RS(T), age	yotacontest.mrasz.org
15	1800	16 0100	No WARC	Wisconsin QSO Party	CW Ph Dig	WI county or SPC	www.warac.org
15	2300	16 0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or pwr	qrpcontest.com/pigrun
16	1800	16 2059	3.5,7	Bucharest Digital Contest	Dig	RST, serial	yo3test201x.blogspot.com
16	2000	16 2200	3.5-28	RSGB FT4 Contest	Dig	Signal report	www.rsgbcc.org
18	2000	18 2100	3.5	IRTS 80m Counties Contest	CW Ph	RS(T), serial, EI/GI county (if EI/GI)	www.irts.ie
19	0000	20 0300	14	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, name, mbr or pwr	qrpcontest.com/pigwalk20
19	0030	19 0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or pwr	naqcc.info/sprint_rules.html
21	0000	21 2359	1.8-28,50	PODXS 070 Club St. Patrick's Day Contest	Dig	SPC	www.podxs070.com
21	0200	23 0159	3.5-28	BARTG HF RTTY Contest	Dig	RST, serial, 4-dig UTC	www.bartg.org.uk
21	0500	21 0859	3.5-28	Popov Memorial Contest	CW Ph	RS(T), experience	www.contest.ru
21	1200	22 1200	1.8-28	Russian DX Contest	CW Ph	RS(T), oblast or serial	www.rdxcc.org
21	1400	21 1800	144,432	AGCW VHF/UHF Contest	CW	RST, serial, pwr, 6-char grid	www.agcw.de
21	1400	22 2359	No WARC	Virginia QSO Party	CW Ph Dig	Serial, VA county or SPC	www.qsl.net/sterling
21	2000	21 2159	1.8-28	Feld Hell Sprint	Dig	See rules	sites.google.com/site/feldhellclub
25	0000	25 0200	1.8-28,50	SKCC Sprint	CW	RST, SPC, name, mbr or none	www.skccgroup.com
25	2000	25 2100	3.5	UKEICC 80m Contest	CW	6-char grid square	www.ukeicc.com
27	1900	28 0300	3.5-28	Sasquatch Stomp	CW	RST, SPC, mbr or ZIP code, name	www.pnwqrp.org
28	0000	29 2359	1.8-28	CQ WW WPX Contest, SSB	Ph	RS, serial	www.cqwp.com
28	1200	29 1200	1.8-28	Africa All Mode International DX Contest	CW Ph Dig	RS(T), serial	mysarl.org.za

There are a number of weekly contests not included in the table above. For more info, visit: www.qrpfoxhunt.org, www.nccsprint.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.*

Public Service

ARES®: Growth, Evolution, Enhancement

In a forward-facing editorial featured in the October 2025 issue of *QST*, ARRL CEO David Minster, NA2AA, called for wider use of emerging telecommunications technologies by ARES® groups, including non-amateur modes and tools. This month, we'll discuss a few of these assets, as well as how to maintain reliable communication networks.

The amateur community in Melrose, Florida, a rural suburb of Gainesville, is using alternative primary and backup communications systems to supplement their existing emergency infrastructure. In addition to robust amateur FM, D-STAR, DMR, AllStarLink, Winlink, and other systems, they have incorporated General Mobile Radio Service (GMRS)/Family Radio Service (FRS) radio and Meshtastic networks — the latter is a method of sending texts without a cell phone or internet, with automatic re-routing around blockages. FRS is ideal for neighborhoods and their Community Emergency Response Teams (CERTs), with GMRS for relay of CERT emergency traffic and situation reports to the emergency operations center (EOC).

Reid Tillery, K9RFT, said: "Right now, we have a dozen people around town involved in our emergency communications system, with more coming through Meshtastic — no licenses needed." The system enables the use of inexpensive radios as a long-range, off-grid communication platform in areas without existing or reliable communications infrastructure.

Tillery noted that he has a Starlink Mini, a satellite system for off-grid internet access that can be packed into a Pelican-type case, carried into the field, and set up in less than 5 minutes for high-speed internet access. The Starlink Mini can run off 12 V batteries via a USB-C connection. Starlink Mini can also run on ac current delivered by a powerpack or a pure sine wave inverter connected to a 12 V battery. "In a disaster, grab a random battery from a vehicle and we're in business," Tillery said.

My hometown program is Columbia County ARES in northern Florida, led by Emergency Coordinator Brad Swartz, N5CBP, who is overseeing the mesh network build throughout the 800-square-mile county. Columbia County has had its share of major incidents, including Hurricane Idalia, which destroyed both of my cars in August 2023.

Swartz is managing the installation of mesh nodes atop 80-foot towers throughout the county. In addition to mesh and other technologies, local ARES members are adding the new Starlink Mini satellite system to their portfolios.

"When and if disaster strikes, we want to be able to communicate; good comms can save lives," said Swartz.

Critical Communications, Cloud, and Internet Services

Reliable emergency communications are a vital component of public safety operations, and planning for communication outages is crucial. Guest writer Erik Westgard, NY9D, the Minnesota Section Assistant Section Emergency Coordinator for Events,



Rick Palm, K1CE, manning the evacuation shelter in Fort White, Florida, during a drill with Columbia County ARES. Extreme weather events in Columbia County have prompted local ARES volunteers to incorporate mesh networks and Starlink Mini satellite systems into their disaster communications plans. [Rick Palm, K1CE, photo]

offers insights on the significance of multiplexing and keeping amateur radio volunteers engaged in the overall emergency communications infrastructure.

Outages in critical communications, cloud platforms, and internet services are increasingly in the news. These networks underpin modern life and public safety operations, and their reliability matters.

Historically, the public switched telephone network (PSTN) in the United States was built on engineering standards developed at Bell Laboratories. One breakthrough that enabled scalable national phone coverage was the ability to multiplex telephone calls or data channels on a single high-capacity circuit. Without multiplexing, each active call would have required its own dedicated copper wire pair from end to end — an inefficient model. To solve this, Bell Labs developed the digital signal (DS) hierarchy:

- DS-0: 64 kbps (one voice call or data channel)
- DS-1/T1: 1.544 Mbps (24 voice channels or data circuits)
- DS-3: 44.736 Mbps (672 channels)

The T1 system became famous for very high reliability. This, combined with their ability to carry up to 24 calls, led to the deployment of thousands of T1 lines nationwide.

Over the past few decades, most carrier backbone voice and data traffic has migrated from copper to fiber. Fiber is more reliable than the copper T1 (close to 100% uptime), not vulnerable to lightning or corrosion, and capable of carrying traffic at far higher speeds.

Despite this physical improvement, overall carrier network and cloud service performance is less than perfect once you factor in routing, power systems, software failures, and large-scale outages. This gap widens dramatically in disaster-impacted areas, where commercial power is lost; fiber is cut; carrier huts, nodes, and buildings are damaged; and tower sites fail.

The most effective strategy for managing communication outages is formal redundancy planning, expressed in FEMA's PACE model:

- Primary (i.e., fiber or wired broadband)
- Alternate (i.e., cellular, ideally from a different carrier than the primary)
- Contingency (i.e., satellite communications)
- Emergency (i.e., runners or amateur radio)

Network reliability math is straightforward: Adding independent parallel systems increases total system availability.

For years, public cloud services have offered diverse data center locations where data, servers, and services could be distributed and protected from natural or man-made disasters. Recent outages have pointed out routing, management, and provisioning systems that are not themselves diverse, and one failure can take out the entire system. You must prepare and plan for any type and number of outages.

If amateur radio only provides the “E” in PACE — Part 97 emergency backup communication — it can be a lonely assignment. The expected maximum outage time for a well-designed, redundant communications or computer system is only a few hours a year. As Jim Kvochick, K8JK, puts it: “Standing by to be a runner at the EOC is the best way to gain 5 pounds — coffee, a bag of donuts, and a crossword puzzle book.”

The better model is integration — amateur radio technology experts should be part of the overall communications architecture, not sitting on the sideline waiting for a catastrophe. Being woven into the plan increases value, training, and readiness, and keeps volunteers engaged.

Less Is More: Operating at 10 W

Section 97.313(a) of the FCC rules dictates: “An amateur station must use the minimum transmitter power necessary to carry out the desired communications.” This is arguably the most-often broken rule among amateur radio operators — most of us (myself included) just run the ubiquitous 100 W rig without a second thought.

I changed that behavior once I purchased the Icom IC-705 QRP (10 W maximum) radio. I found that I get enjoyment out of operating with 5 – 10 W, along with the satisfaction of knowing that I was truly obeying the rules.

In a potentially remote disaster area, it is imperative that the incident command post's resources are used efficiently. That includes minimizing energy consumption. Even with county FM repeaters and simplex, my 5 – 10 W gets me in. And, of course, the weak-signal PSK modes are great for 10 W radios. Concentrate on good antennas versus power. Consider donating your high-power gear to your county EOC's amateur station. — *Rick Palm, K1CE*

Club Station

GCARC's Collaborative Build: The Digital Wattmeter/Dummy Load from QST

The Gloucester County Amateur Radio Club (GCARC), W2MMD, in Harrison Township, New Jersey, has a long-standing tradition of offering members hands-on learning through group projects. One of our key assets is our clubhouse, which is a dedicated facility housing HF, VHF, and satellite stations, and it has a spacious common area for meetings and construction activities. Equipped with tables and chairs, this space is ideal for collaborative work, and over the years, our Tech Saturday sessions have produced projects like tape-measure Yagi antennas with step attenuators for transmitter hunting, Ed Fong collinear antennas, and other practical devices for ham shacks.

In May 2025, GCARC members held a Tech Saturday session where they built the digital wattmeter/dummy-load device featured in Bob Fontana's, AK3Y, article "A Wideband Dummy Load with a High-Accuracy Wattmeter" from the February 2025 issue of *QST*. This device integrates a 50 Ω dummy load with an Arduino-based wattmeter to measure RF power, making it a

useful tool for testing transmitters while offering an educational opportunity to explore microcontroller integration with RF circuitry.

Preparing the Project

The project was led by Chris Prioli, AD2CS, a seasoned GCARC member with extensive experience in electronics and device construction. Chris ensured the build was accessible and educational by thoroughly preparing every aspect of the project. He began by contacting AK3Y to gain deeper insights into the design, aiming to optimize it for a group setting. Chris made two key modifications: repositioning the heatsink to the top of the assembly for better thermal dissipation — a critical adjustment for handling RF power — and adding a dedicated heatsink to the voltage regulator in the external power supply to improve reliability during extended use. He also socketed the connectors between the boards and the LCD display to improve reliability and construction ease.

To facilitate assembly, Chris designed and ordered two custom circuit boards: one for the wattmeter circuitry and another for the Arduino interface. He sourced all necessary components, including resistors, capacitors, the Arduino microcontroller, and LCD displays for power readouts and organized them into separate plastic bags for each board, ensuring easy identification. He also pre-made cables with connectors to plug into sockets on the circuit boards, eliminating the need to solder multiple wires to connect the boards. This innovation saved time, reduced errors, and made the project approachable for members with varying soldering skills.

Building the Devices

Our clubhouse can accommodate 12 to 15 participants, so we scheduled two Tech Saturday sessions on May 10 and May 17, 2025. Interest was high, and both sessions were full, reflecting members' enthusiasm for this practical build. On the first day, 14 club members gathered in the meeting area, ready to assemble their devices. Chris guided the group through each step — populating the circuit boards, mounting the heatsinks, and connecting the Arduino



GCARC members are eagerly working on the digital wattmeter/dummy-load project. [Jon Pearce, WB2MNF, photo]

— ensuring everyone stayed on track during the 3-hour session.

A few minor challenges arose, which was to be expected in a group build. Several members accidentally cracked their LCD displays while mounting them to the enclosure, highlighting the delicate nature of the components. Fortunately, Chris had brought spares, allowing everyone to continue. By the end of the session, most participants left with fully functioning wattmeter/dummy-load units; many tested their devices with handheld radios before heading home.

The second session saw similar success, with 10 more members completing their builds, resulting in a total of 24 new units in the hands of GCARC members.

Technical Insights and Learning Opportunities

A notable feature of this project is its use of an Arduino microcontroller to measure voltage across the 50 Ω resistor, calculating RF power for display on the LCD. This design allows for customization, as the Arduino's firmware can be modified to suit different operating conditions. For example, digital mobile radio (DMR) signals, which operate in 30-millisecond timeslots, may register only half the actual output power due to the wattmeter's default sampling interval. Adjusting the firmware to change the sampling rate can provide more accurate readings for digital modes like DMR, a topic that sparked discussion among participants. This adaptability underscores the project's educational value, offering members a chance to experiment with microcontroller programming and RF measurement techniques, potentially through future club collaborations.

Looking Ahead

The success of these builds has prompted us to consider future sessions, possibly in collaboration with other local ham groups. We've been monitoring how members use their wattmeters and have found the device to be useful in normal ham activities. It's broadband enough to use for HF and VHF radios, and the power-handling capacity makes it practical for use with handheld transceivers and mobile and HF radios. It's easily powered by USB-C, and I keep a USB cable connected to it because there's almost always a USB-C power source somewhere near where I'm working. We have one of the units at our clubhouse for general member use, and I see it frequently being used by members on project workdays.

For clubs considering a similar project, it's important to note that thoroughly planning your build, anticipating minor setbacks like component mishaps, and leveraging your club's space and community will help to create an educational and collaborative experience. The digital wattmeter/dummy-load project equipped our members with a valuable tool while reinforcing the joy of working together on a practical ham radio project.

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 December 20, 2025.

Renewing SSCs

Crawford ARS, W3MIE	Meadville, PA
Northville ARA, Inc., NA1RA	New Milford, CT
Maine Ham Radio Society, KB1CEJ	Milbridge, ME
Albemarle ARC, Inc., WA4TFZ	Charlottesville, VA
Mount Vernon ARC, K8EEN	Mount Vernon, OH
Toledo Mobile Radio Assn., W8HHF	Toledo, OH
Valley Radio Club of Oregon, W7PXL	Eugene, OR
Gloucester County ARC, Inc., W2MMD	Harrison Township, NJ
Jupiter Tequesta Repeater Group, Inc., W4JUP	Jupiter, FL
Alliance ARC, W8LKY	Maximo, OH
PART of Westford MA, WB1GOF	Acton, MA
Santa Fe Trail ARC, KS0KS	Olathe, KS
Long Island Mobile ARC, W2VL	Levittown, NY
Radio Assn. of Western NY, W2PE	Depew, NY
Cuyahoga ARS, K8ZFR	Independence, OH
Fort Herkimer ARA, W2FHA	Dolgeville, NY
Rocky Mountain Ham Radio, N0SZ	Evergreen, CO
Radio Amateurs of the Gorge, W7RAG	Hood River, OR
Hampden County Radio Assn., Inc., W1NY	Agawam, MA
Woodbridge Wireless, Inc., W4AD	Woodbridge, VA
Mike and Key ARC, K7LED	Renton, WA
Southwest Idaho ARC, K7SWI	Nampa, ID
Voice Of Idaho ARC, W7VOI	Boise, ID
Olympia ARS, NT7H	Olympia, WA
Southbay ARS, K6QM	Chula Vista, CA

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.

How's DX?

SDDXC; Sable Island and Other March Activations; A Note on Direct QSLing

The following section on the San Diego DX Club (SDDXC) is provided by SDDXC President Rob Reichman, WA3IHV.



Born in the aftermath of World War II, SDDXC traces its origins to 1946, when returning hams who were eager to reconnect with the world founded what would become one of the nation's most respected DX organizations. The club's formal charter followed in 1949, and by the 1950s, SDDXC managed the W6 QSL Bureau and established a membership ladder list that continues to this day. The club became an ARRL-affiliated organization on September 28, 1959.

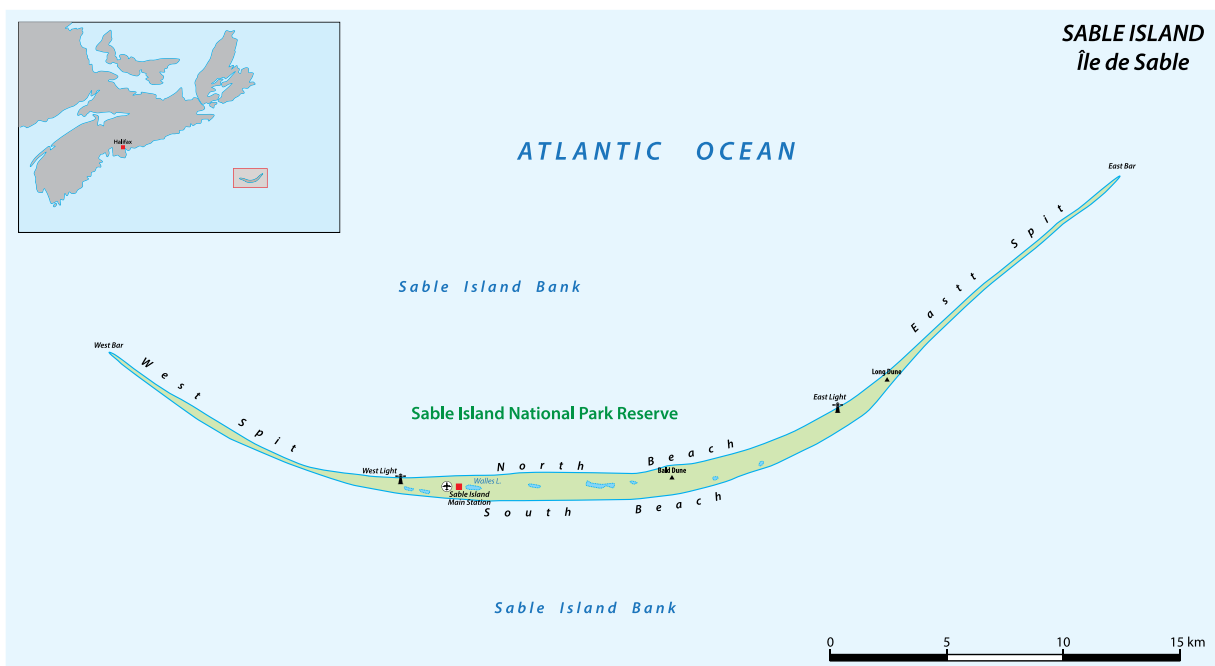
Today, SDDXC stands at the intersection of tradition and innovation. We are a multi-generational community where old-timers — many at the very top of the DX Century Club (DXCC) Honor Roll — share a lifetime of experience with newer DXers eager to make their mark. Together, we blend the heritage of CW and SSB DXing with the excitement and efficiency of modern digital modes, representing the leading edge of amateur radio technology.

Our monthly meetings feature presentations from world-class DXers and technical experts, while our members consistently excel in major contests and DXpeditions. Beyond the chase for rare entities, SDDXC remains a place to share stories, mentor newcomers, and celebrate excellence through our annual awards: Hall of Fame, DXer of the Year, Top Gun, Big Gun, and Rookie of the Year. We also keep the spirit alive through our Summer Bash and Holiday Party, uniting hams across Southern California who share the thrill of DX.

Whether you're chasing your first DXCC country or adding to your Honor Roll standing, SDDXC bridges generations, preserves the art of DXing, and propels the DX community confidently into the digital age. For more details, check out our website at www.sddxc.org.

CYØS — Sable Island

Sable Island, known as the “graveyard of the Atlantic,” is a 42-kilometer-long crescent-shaped sandbar in the North Atlantic, southeast of Halifax, Nova Scotia. It became the Sable Island National Park Reserve in



A simplified map of Sable Island, which is located about 300 kilometers southeast of Halifax, Nova Scotia.

December 2013. The island is home to more than 500 wild horses and tens of thousands of grey seals. Parks Canada maintains a small staff there, and meteorological data collection is now automated.

Sable is one of two separate Canadian DXCC entities, the other being St. Paul Island. In January 1976, ARRL added Sable (VX9) and St. Paul (VYØ) to the DXCC list, effective November 15, 1945. Sable was added per the old Point 1 “separate administration” rule, while St. Paul was added as a result of the old Point 3 “separation by foreign land” rule.

The first operation from Sable was probably VE1RB in 1947. In the 1960s, there was VE1ABV (1960) and VE1ASE/1 (1966). During the 1970s, there were at least five operations, including VX9A (1975), VE4CF/VE1 (1979), VE1AI/1 (1979), VE1AIH/1 (1979), and VE1AST/1 (1979). In the 1980s, there was again VE1AI/1 (1980), followed by CYØSAB (1985). The 1990s saw activity from CYØNSM (1992), CYØTP (1995), CYØXX (1996), CYØAA (1996), again CYØSAB (1997), and CYØDX (1997). By the turn of the new century, activations started slowing down with just CYØMM (2002), CYØAA (2005), and CYØX (2008). Since 2010, there have been only five operations: NØTG/CYØ (2011), CYØP (2013), CYØC (2014), CYØS (2023), and AC1JS/CYØ (2024).

Despite all of the aforementioned activity from CYØ, Sable Island ranks number 59 worldwide on Club Log’s DXCC Most Wanted List. By continent/region, it ranks 34 in Asia, 36 in Oceania, 51 in Africa, 64 in South America, 70 in Europe, and 113 in North America. When breaking it down by modes, it’s number 48 on digital, 49 on CW, and 86 on SSB.

March 2026 CYØS DXpedition

In May 2025, CYØS DXpedition leader Murray, WA4DAN, announced that Parks Canada had invited his team to return to Sable Island on March 19 – 31, 2026. Joining Murray will be DXpedition veterans Jay, K4ZLE; Mike, K9NW; Ralph, KØIR; Pat, N2IEN; Scott, NE9U; Glenn, WØGJ, and Lee, WW2DX. They will be active on CW, SSB, and digital modes on 1.8 – 50 MHz. Complete details can be found on their website at www.cy0s.com.

S2 – Bangladesh

There are more than 500 amateur radio operators in the semi-rare Bangladesh, but only a few handfuls

of operators are active on HF because of a lack of equipment. S2 ranks number 91 on Club Log’s DXCC Most Wanted List. Members of the Next Generation DX Club e.V. have announced that their next DXpedition will take place from a Bangladeshi island in the Khulna/Barisal region group (Islands on the Air; IOTA reference AS-140) for 2 weeks at the end of March. This was the same team that put on 8R7X from Guyana in 2024 and V73WW from the Marshall Islands in 2025. As of press time, the list of operators is not available, and they have not announced their call sign. They plan to be on 160 – 6 meters and the QO-100 satellite on CW, SSB, and digital modes. The group plans to have five complete stations, with a sixth station as a backup. For more details, check out their website at www.next-generation-dx.com and your favorite DX outlet.

XX9 – Macao

The DX Friends group is planning a DXpedition to Macao on March 19 – 31, 2026. The team of operators will consist of EA1CJ, EA1SA, EA5BCQ, EA5KA, EA5KM, EA7KE, EA7R, EA7X, F2JD, F8ATS, F8GGV, JH4RHF, IK5RUN, and IN3ZNR. Additional details about the event will be shared closer to the date at www.dxfriends.com/xx9.

Direct QSLing

Fred, G4BWP, is the QSL manager for the M6T contest station, and he has been receiving direct QSL cards from mostly newer US operators who are not including return postage or a self-addressed envelope. He responds directly and includes a note explaining the need for return postage, as mailing from the UK is costly. Fred sees this as an educational issue and suggests that a note in *QST* could help inform new hams, though he acknowledges not all may be members.

Wrap-Up

That is all for this month, with special thanks to DK6SP, G4BWP, WA3IHV, and *The Daily DX* for helping to make this month’s column possible. If you have any DX or IOTA news, photos, or club newsletters, please send them to bernie@dailydx.com. Until next month, see you in the pileups! — *Bernie, W3UR*

The World Above 50 MHz VHF Online Chat Rooms — Ensuring Valid Contacts

When operating VHF — especially with meteor-scatter contacts — it’s essential to have a method to coordinate contacts, keep track of the sequence and direction of transmissions, and confirm when a contact has been successfully completed.

But there’s an important point to keep in mind: Too much online communication can invalidate a contact. Let’s examine the range of available VHF chat rooms and how to ensure your on-the-air contacts remain valid.

VHF Online Chat Rooms and Information Sources

The original online contact scheduling chat room might be *Ping Jockey Central* (<https://pingjockey.net/cgi-bin/pingtalk>; see Figure 1). It is designed to facilitate meteor-scatter contacts, which make use of meteor burst communications in which radio signals are reflected off the ionized trails that meteors leave behind as they burn up in Earth’s atmosphere. *Ping Jockey* is accessible online via a web browser, and there is also a downloadable PC software version called *PJClient*, which pulls data from the website and displays it on your computer. You can download *PJClient* at <https://n5tm.com/pjclient>.

Another good page to monitor is the ON4KST amateur radio chat at <http://on4kst.com/chat/start.php>. This

online resource offers chat rooms by band and IARU region to help you zero in on the stations that you’re more likely to hear and work. Here, again, there are downloadable software options for displaying the information: *KSTChat* (<http://kstchat.pp.ua>; see Figure 2) and *wkKST* (<https://gm3sek.com/2020/01/31/wtkst-download>).

The Slack app is becoming increasingly popular as a chat option. Several workrooms for VHF operators are available on the app. The main one is VHF-Chat, which includes channels ranging from regions like the “four-landers,” to special operations such as “rover-raregrid,” to “eme,” and even “all-topics.” To use this chat room, download the app at <https://slack.com> and request an invitation to the workroom from an existing member.

Another way to access real-time VHF information, such as 6-meter openings, is to join special interest groups on <https://groups.io>. For instance, there is a dedicated group for the Fred Fish Memorial Award that maintains a leaderboard and a calendar of rare grid rover operations.

The Required Exchange for a Valid QSO

Before we dig deeper into how best to ensure a valid contact, we need to define the key requirements for a contact. Looking back through this column’s archives, we find two definitive answers.

In the March 1957 issue of *QST* — back when this column was called “The World Above 50 Mc.,” with “Mc” standing for “megacycles” — columnist Edward P. Tilton, W1HDQ, wrote: “The minimum exchange for two-way work to be considered a contact has been fairly well standardized on a two-stage procedure: positive identification of calls at both ends, and the complete exchange of signal reports.”

He goes on to say, for meteor-scatter contacts: “If he gets the signal report, he then sends you one. If you get it, you send ‘R.’ If he gets the single letter, he also sends ‘R,’ and the QSO is over, as far as the claim for a contact is concerned.”

Nearly 50 years later, in the March 2006 issue of *QST*, the subject is taken up again, this time by columnist

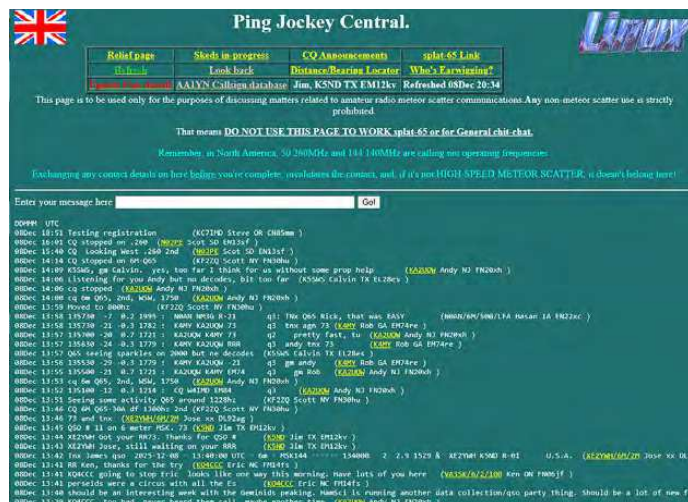


Figure 1 — *Ping Jockey Central* is an online chat room dedicated to the discussion of amateur radio meteor-scatter communications, including facilitating contacts.

Eugene Zimmerman, W3ZZ. He cites the column by W1Hdq and adds:

To this day we still follow the same general outline but with a few changes. Exchange of “signal reports” has come to mean exchange of at least one specific piece of information beyond the other station’s call sign. This can be an actual signal report...a grid locator or whatever. In addition, once the contact sequence has begun, there can be no communication between the participants by some other means like the telephone, the Internet or some other amateur frequency, HF or VHF+.

From nearly 70 years ago to today, the definition of a valid contact has mostly remained the same across communication modes: exchange calls, reports, or grids, and provide an RRR confirmation. Additionally, “73” is not required but can be helpful, or at least considered a courtesy, to the other operator.

Online Chat — What’s Allowed, and What’s Not

In that same March 2006 column, W3ZZ writes:

All of our awards and standings depend on how vigorously we maintain our standards. As a group VHF operators have always had high standards in the past. Thus I have been dismayed at the reports I have received and in fact the postings I have seen on the Internet reflectors that are used to make schedules for both meteor scatter and EME contacts where stations are talking to one another on the Internet while a contact is being made on VHF. Worse yet, other well-meaning stations with perhaps bigger antennas or better conditions will tell the participants what they have heard.... So the participants are getting information about the contact even if all they are doing is watching the Reflector and not sending anything themselves.

It is completely reasonable to set up schedules and exchange information before the contact takes place, he continues. “Once the contact begins, however, exchanging any details about the contact while it is ongoing is unacceptable,” he adds. “Information about the contact from third parties is likewise forbidden.”

I personally like the warning posted on the *Ping Jockey* web page: “Exchanging any contact details on here before you’re complete invalidates the contact.” This directive applies to both sides of the contact and to observers who add information as it happens. That means reporting contact progress via chat, phone, text, or similar methods is not allowed. Specifically, it



Figure 2 — KSTChat is another option for scheduling meteor-scatter contacts. This software pulls information from the ON4KST amateur radio chat room.

bans phrases like “I got your signal report” and similar messages. Of course, if you’re working the station for the 10th time and trying out a new antenna, it’s less critical. But if you’re participating in a contest or aiming for a new grid, it matters.

Ensuring Valid Contacts

We have some incredible technology at our fingertips. That includes our ham shack computers, amazing rigs, and modulation modes from *WSJT-X* that dig deep for weak signals. But we still face the same problems that challenged operators in 1957 and earlier. They are human issues.

We are eager to earn awards, gain rare grids, and help one another do the same, so we’ll use any tool at our disposal to make that happen.

But there does need to be some genuine reflection on how we coach each other and how we behave when placed in situations that could violate the principles outlined above. We should further note that our awards and contest results are based on the integrity of every operator.

Good luck with your contacts, awards, and contests. I hope this history lesson and compilation of information aid you in that journey in some small way.

Thanks to NØJK

With this issue, Jon Jones, NØJK, is stepping down from his role as the “World Above 50 MHz” columnist. He took over from Gene Zimmerman, W3ZZ, in August 2011. Since then, he has documented the ups and downs of two solar cycles in the VHF, UHF, SHF, and higher bands. Thank you, Jon!

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 ALABAMA SECTION CONVENTION

March 6 – 7, Birmingham, Alabama

DFHQIRSTV

Fri. 4 PM – 7 PM, Sat. 8:30 AM – 4 PM. *Spr*: Birmingham ARC. Trussville Civic Center, 5381 Trussville Clay Rd. *TI*: 146.88 (88.5 Hz). *Adm*: \$10. www.birminghamfest.org

Arkansas (Dardanelle) – Mar. 7 DFHRSV

8 AM – 3 PM. *Spr*: Arkansas River Valley Amateur Radio Foundation. Dardanelle Community Center, 2059-2099 AR-22. *TI*: 146.82 (131.8 Hz). *Adm*: \$10. www.arvhamfest.com

Arkansas (Paris) – Apr. 4 FHRV

8 AM – 2 PM. *Spr*: Mt. Magazine ARC. Union Bank Community Center, 11 E. Main St. *TI*: 147.09 (151.4 Hz). *Adm*: \$5. Email: techno1953@gmail.com

Connecticut (Southington) – Mar. 22 DFHV

8 AM – 2 PM. *Spr*: Southington ARA. Southington High School, 720 Pleasant St. *TI*: 147.345 (151.4 Hz) and 444.20 (151.4 Hz). *Adm*: \$8. www.w1ecv.org

Florida (Bradenton) – Mar. 15 DFHRTV

8 AM – 2 PM. *Spr*: Manatee ARC. Bible Baptist Church, 2113 57th St. E. *TI*: 147.195 (103.5 Hz). *Adm*: \$5. www.manatee-arc.org

Florida (Fort Walton Beach) – Mar. 20 – 21 DFHRSV

Fri. 3 PM – 5 PM, Sat. 8 AM. *Spr*: Playground ARC. Destin - Fort Walton Fairgrounds, 1958 Lewis Turner Blvd. *TI*: 146.79 (100 Hz). *Adm*: \$10; Scouts in uniform, free; over 90 years old, free. www.w4zbb.org/parc-hamfest-march-2026

Florida (Stuart) – Mar. 21 DFHQIRSTV

7 AM – 3 PM. *Spr*: Martin Co. ARA. Martin Co. Fairgrounds, 2616 SE. Dixie Hwy. (A1A). *TI*: 147.06 (107.2 Hz). *Adm*: Free. www.mcaraweb.com

Florida (Zephyrhills) – Mar. 21 FHRTV

7 AM – noon. *Spr*: Zephyrhills Area ARC. St. Elizabeth's Episcopal Church, 5855 16th St. *TI*: 146.91 (146.2 Hz). *Adm*: \$5. www.zaarc.org

Illinois (Dixon) – Mar. 15 DFHRSV

7:30 AM – noon. *Spr*: Sterling Rock Falls ARS. Sauk Valley Community College Dillon Mall, 173 IL-2. *TI*: 146.85 (114.8 Hz). *Adm*: \$8 Advance, \$10 door. www.w9mep.org

Illinois (Godfrey) – Mar. 14 DHSV

7 AM – noon. *Spr*: Lewis and Clark Radio Club. Lewis and Clark Community College, 5800 Godfrey Rd. *TI*: 145.23 (79.7 Hz). *Adm*: \$4 each or three for \$10 advance, \$5 door. www.k9ham.org

Indiana (Brazil) – Mar. 28 DFHRSV

9 AM – 1 PM. *Spr*: Wabash Valley ARA. Clay Co. 4-H Fairgrounds, 6550 N. IN-59. *TI*: 146.685 (151.4 Hz). *Adm*: \$10. www.w9uuu.org

Iowa (McClelland) – Mar. 7 DFH

8 AM – noon. *Spr*: Southwest Iowa ARC. McClelland Town Hall, 117 Main St. *TI*: 442.225 (136.5 Hz). *Adm*: \$5. www.swiradio.org

Kentucky (Cave City) – Mar. 7 DFHRTV

7:30 AM – 3 PM. *Spr*: Mammoth Cave ARC. Cave Area Conference Center, 502 Mammoth Cave St. *TI*: 146.94 (114.8 Hz). *Adm*: \$5. www.ky4x.org

Louisiana (Rayne) – Mar. 20 – 21 DFHRSSTV

Fri. 3 PM – 8 PM, Sat. 8 AM – 2 PM. *Spr*: Acadiana DX Association. Rayne Civic Center, 210 Frog Festival Dr. *TI*: 145.41 (103.5 Hz). *Adm*: \$10; children under 12, free with paid adult. www.acadianadx.org

Maryland (Frederick) – Mar. 21 DFHT

8 AM – noon. *Spr*: Frederick ARC. Amvets Post #2 "The Farm," 9602 Baltimore Rd. *TI*: 146.73 (141.3 Hz). *Adm*: \$7. www.frederickarc.org/fredfest26

Michigan (Lowell) – Mar. 21 DFHRSV

9 AM – noon. *Spr*: Lowell ARC. Lowell High School, 11700 Vergennes St. *TI*: 147.37, 147.97 (100.0 Hz). *Adm*: \$8; K – 12 students, free. www.larc.club

Minnesota (Buffalo) – Mar. 28 DFHQRSV

8 AM – noon. *Spr*: Maple Grove Radio Club. Buffalo Civic Center, 1306 County Rd. 134. *TI*: 147.00 (114.8 Hz). *Adm*: \$10. www.k0ltc.org

New Hampshire (Henniker) – Mar. 15 DFHRSV

9 AM – 2 PM. *Spr*: Contoocook Valley Radio Club. Henniker Community School, 51 Western Ave. *TI*: 146.895 (100 Hz). *Adm*: \$5. www.k1bke.org

New Jersey (Clinton [Annandale]) – Mar. 15 DFHRSV

8 AM. *Spr*: Cherryville Repeater Association II. North Hunterdon High School, 1445 NJ-31. *TI*: 147.375 (151.4 Hz). *Adm*: \$8. www.w2cra.org

New Jersey (Parsippany-Troy Hills) – Mar. 15 DFHRSV

8 AM – noon. *Spr*: New Jersey Antique Radio Club. Parsippany PAL, 33 Baldwin Rd. *Adm*: \$8. www.njarc.org

New York (Troy) – Mar. 15 FHRSSV

9 AM – 2 PM. *Spr*: RPI ARC. Rensselaer Student Union, 1761 15th St. *TI*: 146.82. *Adm*: \$6. www.w2sz.org

ARRL ROANOKE DIVISION CONVENTION

April 4, Raleigh, North Carolina

DFHQRSV

8 AM – 3 PM. *Spr*: Raleigh ARS. North Carolina State Fairgrounds Jim Graham Bldg., 4285 Trinity Rd. *TI*: 146.64. *Adm*: TBD. www.rarsfest.org

ARRL NORTH DAKOTA STATE CONVENTION

March 28, Bismarck, North Dakota

DFHRSV

8 AM – 1 PM. *Spr*: Central Dakota ARC. Bismarck Public School Career Academy, 1221 College Dr. *TI*: 146.85. *Adm*: Freewill donation. www.w0zrt.com

Ohio (Elyria) — Mar. 8 D H R

9 AM – noon. *Spr:* Northern Ohio ARS. Lorain Co. Community College College Center Commons, 1005 Abbe Rd. N. *Tl:* 146.70 (110.9 Hz). *Adm:* \$10.

www.noars.net/hamfests/winter-hamfest

Ohio (Perrysburg) — Mar. 15 D F H R S V

8 AM – 2 PM. *Spr:* Toledo Mobile Radio Association. Owens Community College, 7315 Championship Dr. *Tl:* 147.87 (103.5 Hz). *Adm:* \$10. www.w8hhf.org

Oklahoma (Altus) — Mar. 28 D F H R S V

8 AM – 2 PM. *Spr:* Altus Emergency Operations Center, Altus Area ARA, Prairie Dog ARC. Altus Community Center, 401 Falcon Rd. *Tl:* 442.05 (100.0 Hz). *Adm:* \$5; children under 11, free. Email: bcrnfnp@sbcglobal.net

ARRL OKLAHOMA SECTION CONVENTION

April 10 – 11, Claremore, Oklahoma

D F H Q S V

Fri. 4 PM – 9 PM, Sat. 8 AM – 3 PM. *Spr:* Green Country Hamfest, Inc. Claremore Expo Center, 400 Veterans Pkwy. *Tl:* 147.09 (88.5 Hz). *Adm:* \$8 Advance, \$10 door.

www.greencountryhamfest.org

Tennessee (Tullahoma) — Mar. 13 – 14 D F H R S T V

Fri. 5 PM – 8 AM, Sat. 8 AM – 2 PM. *Spr:* Middle Tennessee ARS. First Methodist Church, 208 W. Lauderdale St. *Tl:* 146.82 (114.8 Hz). *Adm:* \$10; children 15 and younger, free.

www.qsl.net/mtars

ARRL WEST TEXAS SECTION CONVENTION

March 15, Midland, Texas

D F H Q R S V

8 AM – 2 PM. *Spr:* Midland ARC. MLK Community Center, 2300 Butternut Ln. *Tl:* 147.30 (88.5 Hz). *Adm:* \$25 Advance for pre-registration and door prizes; free at door. www.w5qgg.org

ARRL VIRGINIA STATE CONVENTION

March 15, Vienna, Virginia

D F H Q R S T V

8 AM – 6 PM. *Spr:* Vienna Wireless Society. Oakton High School, 2900 Sutton Rd. *Tl:* 146.52, 146.685 (110.9 Hz), 448.375. *Adm:* \$12 Advance, \$15 door.

www.viennawireless.net/wp/winterfest

To All Event Sponsors

Before making a final decision on a date for your event, you are encouraged to check the Hamfest and Convention Database (www.arrl.org/hamfests-and-conventions-calendar) for events that may already be scheduled in your area on that date. You are also encouraged to register your event with HQ as far in advance as your planning permits. See www.arrl.org/hamfest-convention-application for an online registration form. Dates may be recorded up to 2 years in advance.

Events that are sanctioned by ARRL receive special benefits, including an announcement in these listings and online. Sanctioned conventions are also listed in *The ARRL Letter*. In addition, events receive donated ARRL prize certificates. Once the form has been submitted, your ARRL Director will decide whether to approve the date and provide ARRL sanction.

The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **April 1** to be listed in the **June** issue. Information in this column is accurate as of our deadline; contact the sponsor or check the sponsor's website for possible late changes, driving directions, and other event details. Please note that postal regulations prohibit mention in *QST* of games of chance, such as raffles or bingo.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to special discounted rates on *QST* display advertising and ARRL web banner advertising. Call ARRL's toll-free number at 1-800-243-7768, or email ads@arrrl.org.

Strays

SP7VC Activates Grid Squares

Przemek Golembowski, SP7VC, from Lodz, Poland, decided during the 2020 travel restrictions to begin activating Maidenhead grid squares that he could get to by road. His present score is 160 squares. He has been on the air from these squares on bands above 30 MHz.



Przemek Golembowski, SP7VC, in the wilderness of northwestern Finland (KP14). [Henryk Kotowski, SMØJHF, photo]

Special Event Stations

Working special event stations is an enjoyable way to help commemorate history. Many provide a special QSL card or certificate!

Mar. 3 – Mar. 14, 0001Z – 2359Z, N1KL, Wheelwright, MA. Geratol Net. **50 Plus Years of Service**. 3.668. QSL. Kevin Lynch, P.O. Box 124, Wheelwright, MA 01094. www.geratol.net

Mar. 7, 1400Z – 2100Z, W4OT, Vero Beach, FL. Vero Beach Amateur Radio Club. **Pelican Island National Wildlife Refuge**. 14.035 14.250 21.290 28.350. QSL. Vero Beach Amateur Radio Club c/o: IRC EOC, 4225 43rd Ave., Vero Beach, FL 32967. www.w4ot.com

Mar. 14 – Mar. 15, 1800Z – 0100Z, N2RE, Mount Laurel, NJ. David Sarnoff Radio Club. **Pi Day**. 7.031 7.227 14.031 14.314. QSL. Donald G. Corrington, 7 Pinewald Ln., Burlington, NJ 08016-3421. <https://n2re.org>

Mar. 21, 1300Z – 1900Z, N4SRC, Kissimmee, FL. Solivita Radio Club. **Solivita Car Show**. 14.074 18.124 24.980. QSL. Solivita Radio Club, 117 Auburn Dr., Kissimmee, FL 34759. *SSB on 18.124, 24.980; FT8 on all frequencies (10 through 40 meters)*. www.solivitaradioclub.weebly.com

Mar. 21, 1330Z – 2100Z, K3S, Port of Baltimore, MD. Nuclear Ship *Savannah* Amateur Radio Club. **First LORAN Experiments**. 7, 14, 18, 21, 28. QSL. Ulis Fleming, 980 Patuxent Rd., Odenton, MD 21113. www.qrz.com/db/k3s

Mar. 21 – Mar. 22, 1400Z – 2359Z, K4NVA, Sterling, VA. Sterling Park Amateur Radio Club. **Virginia QSO Party**. 1845 3860 7260 14270. QSL. Sterling Park QSL Bureau — Attn: VAQP, P.O. Box 29, Sterling, VA 20167. *The theme is “Virginia is for Lovers®” with special 1x1 call sign bonus stations that spell “Lovers:” K4L, K4O, K4V, K4E, K4R, and K4S. Also, in support of the ARRL Year of the Club, designated Virginia affiliated club call signs will also be bonus stations. See the VAQP website for complete rules and regulations.* www.qsl.net/sterling

Mar. 21 – Mar. 23, 0000Z – 0400Z, NJ2KC, Bridgeton, NJ. New Jersey Knights of Columbus Amateur Radio Club. **Free Throw Championship for Youths**. 7.2250 14.2500 21.4125 28.4500. QSL. Thomas M. Perrotti, 785 Vineland Ave., Bridgeton, NJ 08302-4822. www.nj2kc.org

Certificates and QSL cards: To obtain a certificate from any of the special event stations offering them, send your QSO information along with a 9 × 12-inch self-addressed, stamped envelope (3 units of postage) to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, use the ARRL Special Events Listing Form at www.arrl.org/special-events-application, or email information to events@arrl.org.

Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; a special event listing for **June QST** would have to be received by **April 1**. In addition to being listed in *QST*, your event will be listed on the ARRL Web Special Event page. Note: All received events are acknowledged. If you do not receive an acknowledgment within a few days, please contact us. ARRL reserves the right to exclude events of a commercial or political nature.

You can view all received Special Events at www.arrl.org/special-event-stations.

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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	1,135	30-Aug-22	John Kiernan, KE2UN	328	01-Jul-91	*Robert Vosper, KZ1B	1,195	09-Jul-10
Donald Rees, K3PCT	777	28-Apr-23	Thomas Carrubba, KA2D	311	01-Sep-93	Thomas McCurdy, AJ7TM	662	26-Jun-18
Howard Gillott, KC3VJQ	671	24-Jan-24	Robert Casino, N2WZ	304	03-Jun-08	Zacharey Gunyan, KE7WYG	529	06-May-24
Arthur Clemons, N8BLK	515	01-Mar-01	Carlos Prior, KE2TT	287	01-Jun-90	Robert Hamilton, N0RN	446	19-May-87
James Mullen, KK1W	381	01-Mar-91	Midwest			Jeffrey Weinberg, W0QO	360	01-Apr-93
James McCloskey, NS3K	367	14-Nov-94	*Chris Hunt, N0YH	1,098	05-Aug-20	David Avery, N0HEQ	302	13-Jan-88
Kevin Marchetti, K3VNN	354	23-Oct-17	*Ralph Waldren, N0OTS	1,008	03-Jan-20	Gary Zabriskie, N7ARE	278	20-Nov-84
George Brechmann, N3HBT	333	01-Apr-91	David Bartholomew, AB0TO	829	22-Mar-02	David Sharpe, KI0HG	259	02-Feb-98
Jobst Vandrey, AC0LP	324	23-Jun-08	Kevin Naumann, N0WDG	718	17-Nov-02	Martin Soffran, NM5MS	240	21-Mar-94
Cully Phillips, N3HTZ	245	01-Sep-91	Harry Steger, W0HMS	702	26-Aug-08	David Bratcher, AK0MR	222	23-Sep-08
Central			Roland Kramer, W0RL	572	21-Jun-01	Southeastern		
Dennis Keyfauber, K3DCK	703	29-Dec-22	Nick Catrow, N0DAD	541	31-May-17	****Gary Pike, KA4KBX	11,560	28-Jun-90
Edward Wagner, AB9FN	445	01-Jul-02	Edwin Berkel, AE0EB	297	06-Jan-15	***Justin Pike, KJ4AXF	9,597	12-Nov-12
Allan Bukowski, N9ZD	375	01-Jun-92	Charles Wilmes, KW0K	265	28-Apr-09	***Collin Pike, WE4RR	9,562	26-Apr-11
Eldon Boehm, NK9U	358	21-Nov-86	John Mountain, KJ0MTN	259	28-Sep-09	***Anna Pike, KD4PCU	7,734	18-Aug-09
Donald Hlinsky, N9IZU	351	01-Mar-91	New England			***Patrick Pike, KJ4AXD	5,814	13-Oct-15
Brian Eder, WB9UGX	323	01-Jan-92	**Paul Lux, K1PL	2,710	25-Jan-85	**Ryan Krenzischek, W4NTR	2,106	04-Jan-13
Timothy Pechtold, AA9BV	290	01-Nov-92	*Bob Phinney, K5TEC	1,739	20-Jan-14	*John Reynolds, W4TXA	1,938	08-Jun-16
Frederick Baguhn, W9GOC	286	16-May-02	*Robert Latlippe, NC1RL	1,102	10-Mar-22	*Tonja Jesko, WV2P	1,684	23-Aug-23
James Rinehart, K9RU	283	01-Aug-91	William Poulin, WZ1L	740	01-Sep-91	*Robert Fauci, N1UVO	1,247	28-Mar-18
David Pritchard, W9QL	276	12-Apr-01	Mark Carey, N1SK	686	05-Nov-24	*Stanley Whitfield, K4SHW	1,188	26-Sep-19
Dakota			Gregory Paul, KC1MND	548	03-Jun-20	*Randy Richardson, W4RSR	1,044	29-Oct-20
Jeffrey Goodnuff, W0KF	367	17-Jun-03	Phillip Temples, K9HI	520	12-May-89	Southwestern		
Shep Shepardon, N0NMZ	339	12-Mar-01	Michael Harwood, WO1X	443	11-Apr-24	*Bill Martin, AI0D	1,075	01-Nov-84
John Schwarz, AE0AL	338	26-Oct-94	Bruce Anderson, W1LUS	421	11-Feb-88	David Morrill, N7TWT	528	20-Jul-00
Joel Dunham, NC1D	287	26-Jul-23	Robert Beaudet, W1YRC	413	01-Aug-90	Heather Parker, KM6Z	411	14-Feb-20
Douglas Nelson, AA0AW	266	01-May-90	Northwestern			William Peters, K1WMP	402	26-Jun-23
Daniel Royer, KE0OR	263	01-Jul-91	*Stephen Hutchings, WM7X	1,072	13-Apr-15	Peter Morrison, K6VVR	401	03-Apr-07
James Rice, N0OA	249	04-Dec-00	*David Braucht, KK7OJK	1,025	01-May-24	Richard Buck, KC7OCT	385	21-May-97
Robert Tracy, N0TC	212	30-Jul-86	Peter DeKeles, KJ7IEA	915	22-Dec-22	Donald Kramer, WA6UVW	355	08-May-98
Karl Eriksen, WA2DEE	183	08-Jan-90	Mark Hunn, KI7SI	708	20-Sep-18	Bruce Ziemienski, WA6BZ	321	25-Mar-02
Edward Van Cleave, W0VC	169	01-Jun-92	Nathan Zane, KH6IHB	513	01-Apr-93	Robert Smith, WB6ODR	316	10-Mar-99
Delta			Keith Regli, K7KAR	512	28-Jul-22	Charles Ketchum, N7OMI	307	12-Sep-24
*Elmer McKenzie, K5MCK	1,386	23-Dec-22	Erin Henrickson, ND7B	479	06-Jan-23	West Gulf		
*Terry Partigianoni, W5TMP	1,179	27-Nov-07	Scott Robinson, AG7T	468	01-Aug-91	**Franz Laugermann, K3FL	3,047	01-Dec-91
*Darrell Wiggins, W4AI	1,155	02-Jun-23	Richard Morgan, KD7GIE	448	11-Aug-00	*Tanner Jones, W9TWJ	1,384	31-Jul-07
Loma Westmoreland, KU5J	838	31-Jan-21	Nancy Wolters, AA7VE	443	29-Jun-16	*Jonathan Diner, N5JLD	1,024	16-May-11
Monvel Tandy Maskew, K9FQ	768	18-Jul-18	Pacific			Daniel Quigley, N7HQ	793	24-Apr-20
Rodney Webb, W4WRE	481	21-Mar-17	*Brian Torr, N6IY	1,149	06-Sep-00	John Paterson, KC5LAA	644	16-Mar-09
David Andrews, N1ESK	473	21-Aug-15	Neal Kernes, K3VG	666	07-May-24	Juan Castro, WK5I	575	15-Feb-24
Bryan McCammon, K15HAV	467	03-Sep-20	Morris Jones, AD6ZH	612	27-Nov-01	Gerald Crenshaw, WD4BIS	558	27-Feb-98
Bryce Zitterich, KJ1J	464	07-May-24	Dieter Stussy, KD6LVV	481	27-Jan-94	Gerald Grant, WB5R	548	04-Jan-85
William Crowden, W4ETA	386	10-Jun-20	Joe Pasqua, KR4ML	422	27-Mar-25	Adolph Chris Koehler, K5VCR	542	29-Sep-95
Great Lakes			Larry Loomer, KI6LNB	419	03-Dec-08	David Fanelli, KB5PGY	524	01-Oct-91
*Charles Tyrrell, KE8PCB	1,771	03-Sep-20	Robert Perlman, W6BP	400	26-Aug-08	International		
*Bruce Osmon, KE8LT	1,648	16-Nov-18	Bill Nichols, NN7K	380	01-Sep-93	**Robert Girdo, AK2RG	2,259	27-Sep-17
*David Potter, KE8OHG	1,497	03-Jun-20	Gordon Fuller, WB6OVH	363	06-Sep-84	Gregory Croad, NN3Z	545	03-Jan-20
Earl Paazig, W8BR	822	16-Apr-02	Jim Brunk, N6BHX	353	13-Jul-95	Wayde Nie, AD2GX	464	13-Feb-24
Roger Weith, KE8QGV	421	28-Feb-22	Roanoke			Vince D'Eon, AI7LK	267	13-Jan-21
William Bogle, KE8FZY	297	08-Jul-20	Justin Freeman, KQ4DX	604	13-Feb-25	Wesley Printz, W3SE	137	24-Feb-89
Charles Hall, W8HF	286	01-Jun-92	Billy Stallings, NZ3C	466	09-Jan-25	Kazuo Suzuki, N1KS	118	20-Apr-01
Lance Harvala, AB8Y	256	06-Nov-19	Richard Brannen, KA3JCA	389	25-Jan-89	Yuri Kuwana, N1ENV	116	24-May-10
Archie Mack, AF4EB	253	19-Aug-97	Judy Friel, AC4RG	327	01-Feb-91	Jay Oka, KH2J	113	01-Aug-91
Stanley Arnett, AC8W	239	06-Sep-84	William Smith, KQ1S	326	20-Jun-12	Masatoshi Shimizu, AH6KY	111	07-Jul-09
Hudson			Terry Sanner, WV8V	272	06-Sep-84	Masanori Kawakami, AI9C	98	04-Dec-97
Jeremy Griffel, K2GRI	626	03-Dec-20	David Snyder, W4SAR	264	01-May-93			
Alan Crosswell, N2YGK	539	26-Oct-94	Larry Withrow, AF4HX	239	17-Dec-98			
Fritz Boigris, KB2O	498	26-Oct-84	Leonard Crawford, KZ4WR	236	22-Aug-25			
Sid Markowitz, K2GG	476	27-Sep-94	David Poe, W8IW	233	13-Mar-07			
Michael Abbey, KC2NJ	433	06-Jul-23						
Walter Lesnowich, W2EE	332	06-Mar-08						

*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 Nelson Rotz, KC3PAP, from Fayetteville, PA (Atlantic Division), Darrell Wiggins, W4AI, from Mount Juliet, TN (Delta Division), Chris Hunt, N0YH, from Neosho, MO (Midwest Division), Ralph Waldren, N0OTS, from Girard, KS (Midwest Division), Robert Latlippe, NC1RL, from Auburn, ME (New England Division), Stephen Hutchings, WM7X, from Clarkston, WA (Northwestern Division), David Braucht, KK7OJK, from Otis Orchards, WA (Northwestern Division), Randy Richardson, W4RSR, from Deland, FL (Southeastern Division), and Jonathan Diner, N5JLD, from Fort Worth, TX (West Gulf Division), who are the latest VEs to reach 1,000 session participation!



Certificate of Code Proficiency Recipients

Sponsored by



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.

July 2025

Thomas Duong, KR4DOT	10
William H. Rupert, KI5JWV	10
Mark A. Jessing, N4OJE	15
Daniel L. Schaible, KD8UZS	15

August 2025

James M. Joyce, VE3LTN	10
Gary D. Mentro, Sr., N3OS	10
Todd E. Foster, W2TEF	15
Margaret L. Bowen, KY4WH	20
Richard McCleaf, K3EYJ	20
Denis O'Brien, N2JJF	40

September 2025

Richard F. Bobrowicz, K2RFB	10
J. Andrew Hall, N5ASE	10
Simpson A. Huston, N8UZF	15
Thomas F. Corcoran, VE3NY	20
Scott R. Rosenfeld, N7JI	25
David R. Koberstein, N9DK	30

October 2025

Douglas M. Dukes, W5DMD	10
Thomas F. Corcoran, VE3NY	25

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, K4OHW	10
Michael G. McCarty, KB9HV	10
William G. Homsany, KG6COH	20
Craig H. Moody, K1CHM	20
Michael A. Krahenbuhl, KØARA	30

Congratulations to all of the recipients.

March 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.

March 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, March 25, at 9 PM PDT (0400 UTC on March 26) on 3581.5, 7047.5, and 14047.5 kHz. Unless indicated otherwise, sending speeds are from 10 to 40 WPM.

Amateur radio operators who participate in Qualifying Runs may submit proof of 1 minute of the highest speed they have copied in the hope of qualifying for the Certificate of Code Proficiency, or an endorsement to their existing certificate.

Legibly copy at least 1 minute of text by hand, and mail the sheet to: W1AW Qualifying Runs, 225 Main St., Newington, CT USA 06111.

Include \$10 (check or money order) if this is a submission for your initial Code Proficiency certificate; \$7.50 if you are applying for an endorsement (available for speeds up to 40 WPM). Your text will be checked against the actual transmissions to determine if you have qualified.

Members of the North Fulton (Georgia) Amateur Radio League (<https://nfarrl.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 – March 2026

(All times are in Eastern Daylight Time. Blue indicates Eastern Standard Time.)

Monday	Tuesday	Wednesday	Thursday	Friday
		3/4 4 PM – 2100Z 10 – 35 WPM	3/5 10 PM – 0300Z (3/6 – UTC) 10 – 40 WPM	3/6 9 AM – 1400Z 10 – 35 WPM
	3/10 10 PM – 0200Z (3/11 – UTC) 10 – 35 WPM	3/11 7 PM – 2300Z 10 – 40 WPM	3/12 9 AM – 1300Z 35 – 10 WPM	
		3/18 9 AM – 1300Z 10 – 35 WPM	3/19 10 PM – 0200Z (3/20 – UTC) 35 – 10 WPM	3/20 4 PM – 2000Z 10 – 40 WPM
3/23 10 PM – 0200Z (3/24 – UTC) 10 – 40 WPM	3/24 7 PM – 2300Z 10 – 35 WPM		3/26 4 PM – 2000Z 35 – 10 WPM	

US Amateur Radio Bands

US AMATEUR POWER LIMITS — FCC 97.813 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <http://utc.fcc.gov>. You need only register once for each band.

2,200 Meters (135 kHz)



630 Meters (472 kHz)

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



160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1,900 to 2,000 MHz



80 Meters (3.5 MHz)



60 Meters (5.3 MHz)



General, Advanced, and Extra licensees may operate on a secondary basis with an operating bandwidth of 2.8 kHz, maximum ERP of 100 W (re-able to a half-wave dipole antenna) on individual channels. As February 13, 2025 the WRC-15 band 5351.5 to 5366.5 kHz is available with a max. ERP of 0.15 W.

10 Meters (28 MHz)



6 Meters (50 MHz)



2 Meters (144 MHz)



1.25 Meters (222 MHz)



* Geographical and power restrictions may apply to all bands above 420 MHz. For information about your area, see FCC 97.303 Frequency sharing requirements.

70 cm (420 MHz)*



33 cm (902 MHz)*



23 cm (1240 MHz)*



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

2300-2310 MHz	10.7-10.8 GHz ‡	122.25-123.0 GHz
2380-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3450 MHz	47.0-47.3 GHz	241-250 GHz
5650-5925 MHz	76.0-61.0 GHz	All above 375 GHz

‡ No spurious emissions.

KEY

Note: CW operation is permitted throughout all amateur bands.

MICV is authorized above 58.1 MHz, except for 144.0-144.1 and 219-220 MHz. Test transmissions are authorized above 51 MHz, except for 219-220 MHz.



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

See www.arrl.org Band plan for detailed band plans.

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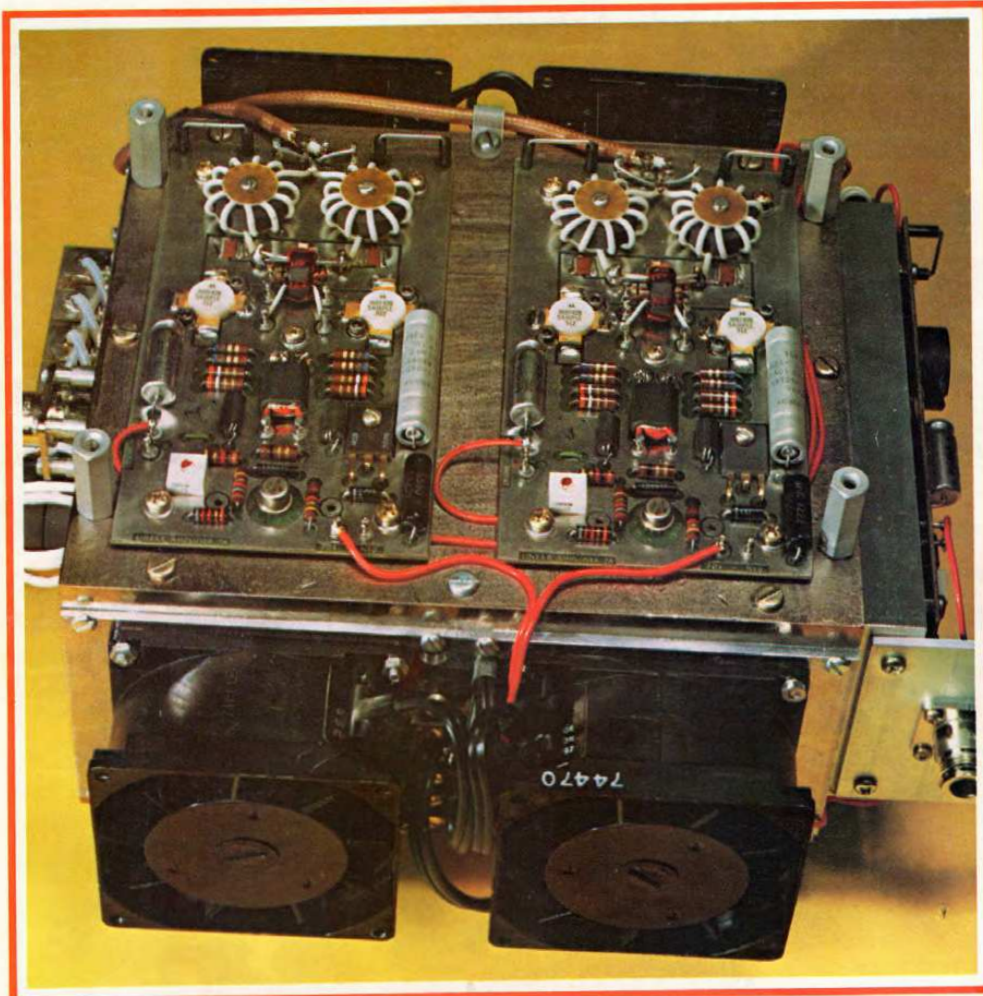


A Look Back



devoted entirely to Amateur Radio

April 1976 \$1.00



Amateurs act fast in Guatemala emergency.



Page 37

An ITV Cure for 6 Meters

Let a coaxial notch filter keep the television signals out of your 6-meter receiver. Make them stay where they belong, on the "boob tube."

By Dick Jansson,* WA1QLI

Interfering television (ITV) has plagued many a vhf'er. It's a toss-up as to where the problem is worse — on 220 MHz or on 6 meters. The author found the interference unbearable, but the prospect of not being able to operate on his favorite band was even more so. Therefore, he did something about it. Read on and take heart.

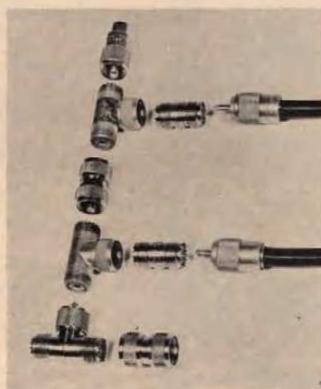
Very shortly after my entrance into 2-meter mobile fm operations, I was introduced to the "intermod alley" that WICT described.¹ It took but very few inquiries to find George and an answer to the problem. The results have given faultless operation since the construction of my own version of his filter.

My being an avid 6-meter ssb and a-m operator has highlighted another set of intermodulation problems in this area of Eastern Massachusetts. Only a few miles south of "intermod alley" is an area called "TV alley" wherein reside the major TV towers for the area. All three towers are between 1-1/2 and 3 miles from this QTH and emit TV channels 2, 4, 5, 7, 38, 44, and 56. Also radiating from these towers are a half-dozen fm broadcast signals and other commercial services. In a nearby dump there is even a powerful a-m broadcast station.

The rf "rocket" incident to the front end of a vhf receiver is almost unbelievable. With an unprotected receiver we have witnessed massive intermodulation, vestigial (in-band) channel-2 video side-

*6 Pine St., Wellesley Hills, MA 02181

¹Downs, "A Cure for Intermod Alley," QST for March, 1976.

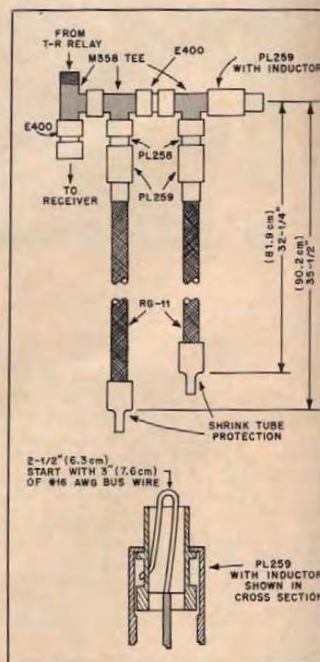


Putting it all together is made easier if you have a good assortment of fittings, as shown here.

bands every 15.75 kHz, in-band image of channel-2 audio subcarrier at 50.75 MHz, heterodyne products of the a-m station with channel 2 at 50.16 MHz, and, in general, a fantastic amount of man-made QRM. A majority of this energy can be prevented from reaching the receiver through the use of a high-Q band-pass filter. A search, followed by the judicious purchase of some old QSTs, found such a filter as the cover feature of the October, 1964, issue of QST. A 42-inch high coaxial-tank filter made from six standard large fruit-juice cans, was described. With little inducement, my family's fruit-juice diet was

modified from the frozen types to the canned varieties, thus making available

Fig. 1 — Cable lengths and component designations for the trap assembly.



the basic stock for the filter.

Performance of the coaxial filter in the receiver antenna line was just short of miraculous even though the in-band component of the channel-2 vestigial sideband was still present every 15.75 kHz. Some of these blips were noted to be peak tunable with the coaxial filter along with the 6-meter signals while some others were noted to be stronger as the filter was tuned to higher frequencies. The conclusion here was that some of the energy was getting past the filter. It even caused a strong amateur station to be heterodyned and heard every 15.75 kHz up and down the band for some distance.

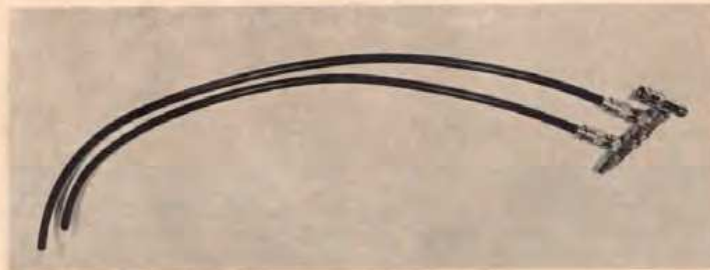
Onto the scene came the WICT filter with its 2-meter fm success. The instant idea was to construct a trap to be used in conjunction with the coaxial-tank filter. It was decided to provide a tuned notch for the channel-2 picture carrier at 55.25 MHz, while providing a pass-band for (at least) the lowest 1-1/2 MHz of the 6-meter band. As an additional experiment, a second tuned notch was inserted for the audio subcarrier at 59.75 MHz. In retrospect this second filter is probably not needed, but if one is to carry the idea further, it might be interesting to add a third tuned notch for the color subcarrier at 58.83 MHz.

According to WICT's concepts, a pair of notch traps with a corrective bandpass inductance were assembled of uhf coaxial tees, double male couplers, double female adapters, cable connectors, and RG-11 coaxial cable, as shown in Fig. 1 and the photographs. Be sure to start with the cable sections longer than shown so that variations in velocity constant can be compensated for. Tuning the traps and the inductor is not difficult; it just takes time and a methodical approach as noted by WICT. After tuning, the ends of the RG-11 traps were protected with some heat-shrinkable tubing. Making the corrective inductor was somewhat easier than for the 2-meter version, as this one is a hairpin loop of No. 16 AWG copper wire. The characteristics of the finished filter are shown in Fig. 2, illustrating that the 1-dB points are just at the edges of the 50- to 51.5-MHz region and the notches are near to the desired frequencies.

When installed in series with the coaxial tank filter in the receiver antenna line, the new filter eliminated the out-of-band rf components previously seen and reduced the in-band blips. This performance allows the reception of weak signals despite the channel 2 operation nearby.

The merits of this channel-2 filter in an area that has weak TV signals (to prevent 6-meter TVI) are not known, as it has not been tried. In transmitter service the power losses of approximate-

ly 0.5 dB (insertion loss) can cause some noticeable heating of the filter when used at output power levels of 200 watts. The loss is about 11% or 22 watts. This trap definitely should not be used in high-power service as it will get smoked, but if used for 10- to 30-watt transmissions, it would cause no heating problems. For my purpose, in ITV service in a receiver antenna line, there is no measurable heating and the insertion loss is of no consequence. **QST**



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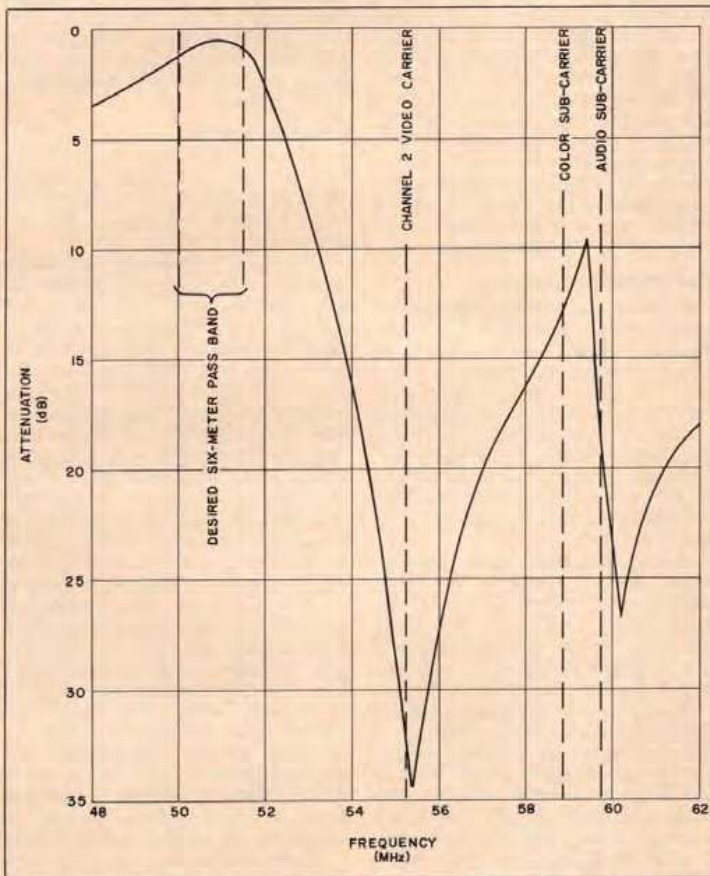


Fig. 2 — Attenuation characteristics of the filter used by the author. Trimming procedure follows that given by WICT in March, 1976, *QST*.

Celebrating Our Legacy

The Joys of Tinkering

When I was about 8 years old, I asked my dad how radios worked. He drew some strange-looking lines on a piece of paper and somehow explained it in simple terms. A couple weeks later he got a cat whisker, and we found a small piece of plywood in the garage to attach the parts with wires — it worked, and I helped make this amazing device!

My dad's barber was a ham, and he arranged for a visit to his shack; it was a magical place, and I knew immediately I wanted to become a ham. After I earned my Novice license, I acquired a Hallicrafters S-41 receiver and a Globe 75 W CW transmitter, but I needed an antenna. One day I got off the school bus and noticed two 30-foot wooden line poles on the side of the house; my dad knew somebody in the utility business, and they planted these two poles while I was at school! We fabricated a dipole antenna for 80 and 40 meters, and I couldn't wait to hook it up and get on the air.

Over the years, there have been lots of projects, various rigs, countless antenna experiments, and hours of fun. I recently purchased a digital FM handheld that I'm learning to use. There are so many new things to experiment with and learn about!

Jim Sibley, WA7NSJ
Post Falls, Idaho

60 Years of Upgrades

I got my first transmitter — a used Heathkit DX-20 — in 1965 at age 12. My first antenna was a 40-meter

inverted V, and my first receiver was a used Heathkit HR-10. After upgrading to General, I purchased a used Heathkit DX-40 and upgraded my receiver to a Hammarlund HQ-129X.

Not long after, I bought a Heathkit DX-100 at a hamfest. I spent the better part of the summer fixing it, as about a third of the tubes were dead. Later that year, I sold that and my HQ-129X and used the money to buy a new Heathkit HW-32A — I really enjoyed assembling it. I also purchased the HP-23 ac supply. I upgraded my antenna in 1968 with a Hy-Gain 203BA three-element 20-meter Yagi and built a 30-foot self-supporting tower from scratch with my dad.

The next summer I turned 16, and I got my first job. By the end of the summer, I had enough money to order the HW-100! I had gotten a NASA soldering manual from a ham friend and used some of the techniques in my HW-100 build. I had that radio for a very long time.

Amateur radio had a great impact on my life!

Stephen Werner, AG4W
Huntsville, Alabama

An Unwavering Dedication to Contesting

I was introduced to contesting in 1959, and spent 65 years furthering the art of radiosport.

At age 18, I connected with K5LZO, who was determined to operate from Easter Island, but we didn't have

transportation. Instead, we spent a month in Tahiti and were the first Americans allowed to operate there as FP8CB/FO8.

When I turned 19, I moved to Houston, Texas, and spent 14 years at Mission Control supporting Apollo missions as a quality control engineer. I also began the K5LZO Sweepstakes dynasty at this time, developing an interlock system (that has since been banned) so contesters could operate as CW multioperators in ARRL's November Sweepstakes.

I became editor of *NCJ*, built my first multioperator station, and co-founded Houston Ham Conventions. I was part of the group that founded the North American QSO Party and North American sprints. I also co-founded the 7QP and have been a judge at the World Radiosport Team Championship.

In 1987, I moved to Virginia City, Nevada, where Grady Ferguson, W5FU (SK), and I built a superstation at my residence. The Comstock Memorial Station, W7RN, was founded in 2007 and had eight towers and 54 antennas.

Tom Taormina, K5RC (SK)
Reno, Nevada
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

A Brief History of Pioneer-Standard Electronics' Amateur Radio Department Store

In the 1960s, Pioneer-Standard Electronics in Ohio had a retail operation with three stores inside one building: An audio department sold home hi-fi equipment, a parts department sold tubes and component parts, and a ham radio and commercial sound department sold ham radio, CB radio, and sound equipment for commercial purposes.

While in high school, I got a job at Pioneer-Standard Electronics selling and servicing amateur radio and hi-fi equipment.

Ham Radio Equipment Inventory

The amateur radio department at Pioneer-Standard sold several very good equipment lines, such as Collins Radio, R. L. Drake, National Radio Company, E. F. Johnson, Hallicrafters, Swan Electronics, Hy-Gain, Mosley Electronics, and New-Tronics.

The Collins S-line and KWM-2 were considered to be high-end amateur radio equipment at the time. Drake's 4-line products and TR-4 transceiver were primary products in 1968. Hallicrafters sold an extensive line of shortwave receivers, and two new product families were introduced while I worked for Pioneer-Standard. They were Ten-Tec, who initially sold simple, low-power transceivers called the Power Mites, and the Signal/One CX-7 all-in-one transceiver.

The store also sold a Hallicrafters SR-2000 Hurricane 2000 W peak-envelope-power transceiver and P-2000

power supply that was set up as a working station on display — it was a very high-power and interesting transceiver. We also had a National VX-501 remote variable frequency oscillator (VFO) for their NCX-5 transceiver. This was a most interesting piece, which had a second VFO that allowed the receive and transmit frequencies to be set to two different frequencies when operating an NCX-5. This remote VFO, like the NCX-5 itself, had a mechanical digital-frequency readout.

On the used equipment shelf, inventory included two E. F. Johnson Viking Invader 2000s with power supplies. These were about the largest amateur radio transmitters made since the 1950s-era Collins Radio KW-1 1 kW AM transmitter.

Overall, Drake was the best-selling brand at Pioneer-Standard; Collins Radio's sales were held back by the brand's premium price tags. I convinced the store's upper management to begin selling the Galaxy product line and Hammarlund receivers. (I much preferred the Galaxy V transceiver family to the Swan Electronics products at that time.) R. L. Drake saw an uptick in business when they began to market their line of 2-meter FM transceivers, the TR-22 battery- or mobile-powered low-power transceiver, and the premium



Collins Radio's KWM-2 was a high-end amateur radio transceiver at the time. [Photo courtesy of www.rigpix.com]



Drake was the best-selling brand at Pioneer-Standard. They saw an uptick in business when they began to market their TR-22, among other products. [Photo courtesy of www.universal-radio.com]

Marker-Luxury ML-2 transceiver for mobile or fixed station use. We also sold the very popular Regency HR-2 fully solid-state 2-meter FM transceiver.

Pioneer-Standard Sells Their Retail Stores

Pioneer-Standard decided to close the three retail electronics businesses they had at this store to concentrate on industrial business, a market they are still quite successful with. Herb Farr, Jr., the son of one of the founders of Pioneer-Standard Electronics, bought the three retail stores and stayed at that location, which was a building the Farr family owned. Herb Farr, Jr., and a few of his associates formed Farr Electronics and started with the three retail stores bought from Pioneer-Standard Electronics in early 1971. All of the people working in the retail stores were transferred to Farr Electronics, and Pioneer-Standard moved out to a new facility.

Herb Farr tried to set up his own industrial electronics business, but it never really took off. He retained all the amateur radio lines, including Collins Radio and R. L. Drake, as well as all the hi-fi audio lines, like McIntosh, H. H. Scott, and Fisher Electronics. The three retail stores struggled for about 3 years before insufficient revenue and excessive costs caught up with his new company and forced them to close. Sadly, Farr never rented out the empty space in the five-story building they were in; I assume the costs of the large building, in terms of heating and property taxes, were a heavy drain on the new company.

Problems That Plagued Farr Electronics

Herb Farr likely had a lot of dead weight working in his new company; there seemed to be way too much high-level but non-productive staff at the top. The three retail businesses under Pioneer-Standard did make a profit — not a huge one, but enough to make the retail busi-

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<input type="checkbox"/> Please send Remote VFO \$69.95	ZIP _____ Dept. QST
<input type="checkbox"/> Please send WRL 1966 HAM/CB CATALOG	

129

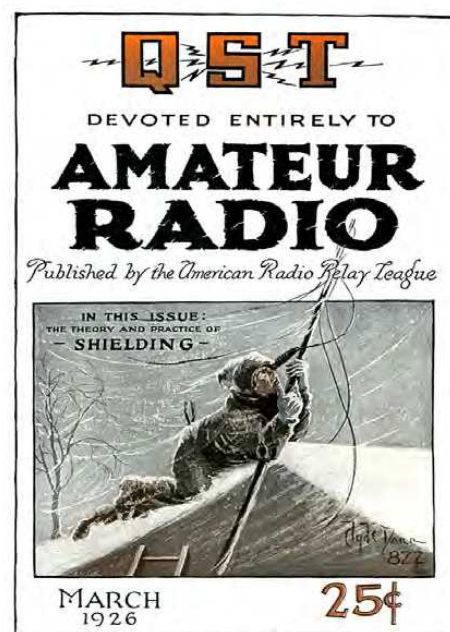
George Mistic, KE8RN, convinced Pioneer-Standard to begin selling the Galaxy product line. This advertisement for the Galaxy V originally appeared in the February 1966 issue of QST.

nesses pay their own way. With much less inventory to draw from and high fixed costs, the parts department became the biggest loser; the hi-fi audio department and the amateur radio departments paid their own way for a while, but reality caught up with the operation, and Farr Electronics was soon liquidated.

100, 50, and 25 Years Ago

March 1926

- The cover, by Clyde Darr, 8ZZ, depicts a ham on the roof in a snowstorm adjusting an antenna.
- In “Editorials: Roll Over,” Kenneth Bryant Warner, 1BHW, laments that amateurs are not sticking to their bands, and warns that if they can’t, “there will be trouble ahead.”
- D. R. Clemons examines “The Shielding Problem,” explaining how shielding operates and how its performance is changed by spacing, coil shapes, wave-length, shield material, and the connections of the set.
- F. H. Schnell, 1MO, describes how ARRL is helping to provide amateur radio communication for the Detroit Arctic Expedition and the North American Newspaper Alliance in “Amateur Radio to the North Pole Again.”
- J. K. Clapp walks readers through different ways to set up “Multiplex Short Wave Reception,” as well as its utility in wavemeter work, reducing traffic, and taking more efficient radio survey information.
- In “6XBR, 108 Meters,” Hal Shaw introduces readers to the portable broadcast station for Warner Brothers West Coast Studio, 6XBR.
- “Amateur Radio Stations” highlights 6HM in Carmel, California, run by Clair Foster, c9CK, and Harry Lyman, 6CNC.



March 1976

- The cover shows a photo by WB2DZL of the tower at W2AEE at Columbia University.
- In “It Seems to Us...” ARRL General Manager Richard L. Baldwin, W1RU, outlines ARRL’s new Task Force for the Development of Amateur Radio, focusing on development of training courses through which new hams can get their license.
- In “RFI Primer,” Tony Dorbuck, W1YNC, presents the results of laboratory studies intended to answer common questions on the topic.
- In the third part of their series on “Learning to Work with Integrated Circuits,” Jerry Hall, K1PLP, and Charles Watts, WA6GVC/1, talk about truth tables, “the Ouija board of digital-circuit designers.”
- In “New Tricks for Old Club Program Nights,” WA1STO gives some tips on how to make club nights such as Old Timer’s Night, Homebrew Night, and Novice Night more successful.
- “Norwegian Hams Aid the Disabled” outlines efforts by the Norsk Radio Relae Liga to help train, equip, and license those with disabilities who are interested in amateur radio in Norway.



March 2001

- The cover features some vintage 1940s equipment, including a Hallicrafters HT-6, an S43 receiver, old QSLs, and two issues of QST from the 1940s.
- In “It Seems to Us...” ARRL Executive Vice President David Sumner, K1ZZ, explains the necessity of an increase in membership dues to \$39 per year.
- Mike O’Brien, K0MYW, interviews former Hallicrafters engineer Bob Samuelson about his work designing several of the company’s first transmitters, in “Hallicrafters’ Chevy, Buick and Cadillac.”
- George Blahun, Jr., KS1U, discusses his hobby of disassembling and rebuilding vintage equipment, using an EICO 723 transmitter as an example, in “Classic Kits — Unbuilt or Rebuilt.”
- “A Simple TRF Receiver for Tracking RFI” by Rick Littlefield, K1BQT, walks readers through the construction of a tuned-radio-frequency (TRF) receiver operating at about 136 MHz to help locate interference.
- In “The Great Paper Chase,” Billy B. Johnson, WB5RYB, highlights his collection of old catalogs, ads, company memos, and other paper for the Hammarlund company.
- In the second part of his series on “How to Maximize Your Receiver’s Effective Selectivity,” Larry Scheff, W4QEJ, discusses how passband tuning, as employed in the Kenwood TS-440S, can reduce or eliminate received noise and interference.



Silent Keys

It is with deep regret that we record the passing of these radio amateurs:

- ♦W1CEK **Reuter**, Gary M., Kittery, ME
- AB1DV **Thome**, George D., Lyndeborough, NH
- K1EDY **Carulli**, John M., Orange, CT
- K1FGA **Angelo**, Francis G., East Bridgewater, MA
- WB1FST **Dole**, Philip G., Reading, MA
- K1GF **Fox**, Geoff, La Quinta, CA
- ♦•W1HIL **Eckhouse**, Richard H., Scituate, MA
- ♦•W1LJJ **Bourassa**, Andrew G., Ashland, NH
- KC1RLS **Shields**, Robert L., Bedford, NH
- N1RNA **Aarons**, Richard N., Ridgefield, CT
- ♦•N1TIW **Thoren**, William T., South Portland, ME
- KC1TWR **Rodgers**, Timothy W., Carrboro, NC
- ♦•WA2BUC **Volk**, Richard F., Albany, NY
- ♦KB2CBQ **Smith**, Walter R., Schenectady, NY
- ♦K2ENU **Burke**, Morton H., Tinton Falls, NJ
- ♦W2FJA **Gauch**, Hugh G., Ithaca, NY
- ♦W2FNF **Turley**, Robert R., Williamsville, NY
- NG2G **Challender**, Mark, Bellingham, WA
- ♦W2HK **Lebund**, Robert A., Shawnee, OK
- ♦•NM2L **Potter**, Gregory R., Sugar Hill, GA
- ♦•W2LWB **Chiuchiolo**, John, Milford, CT
- ♦•WB2NLD **Fitzgerald**, James M., Perth, NY
- KB2RMC **Thomas**, Timothy M., Conesus, NY
- K2ULW **La Falce**, Raymond R., Waynesboro, VA
- KB2VLO **Crofoot**, Deanna M., Little Falls, NY
- K2YV **Warren**, John D., Ballston Lake, NY
- KC2ZB **Curley**, Harry, Vineland, NJ
- ♦K3EKT **Schott**, Eric, Mount Vernon, OH
- ♦NX3G **O'Grady**, Thomas L., Punta Gorda, FL
- ♦•W3GAT **Reilly**, Thomas A., Shreveport, LA
- ♦KA3HZF **Vasbinder**, John E., Titusville, PA
- ♦KB3IED **Conte**, Thomas M., Wellsboro, PA
- ♦WB3IUG **Peters**, Fred L., Youngsville, PA
- KA3JJV **Leff**, Mark I., Munhall, PA
- AK3M **Miller**, Mark S., Bethlehem, PA
- ♦•WA3MVV **Newell**, Harold G., Ligonier, PA
- ♦N3OBJ **Davis**, Paul A., Greensburg, PA
- KB3OJS **Cook**, Robert D., Greenville, PA
- ♦KB3ORT **Doble**, James W., Harding, PA
- K3RJA **Sivowitch**, Elliott, Washington, DC
- W3VTF **Diller**, Reginald H., Waynesboro, PA
- ♦•WA3VZK **Brewer**, Jack T., Conowingo, MD
- KM4AKN **Smeathers**, Raymond K., Owensboro, KY
- WA4BFS **Brock**, Harold G., Spartanburg, SC
- WA4BKX **May**, John A., West Liberty, KY
- KN4BOM **Owens**, John D., Bainbridge, GA
- ♦W4BUE **Siff**, Richard L., Portsmouth, VA
- ♦N4BXB **Switzer**, Herbert B., Shelby, NC
- K4CHS **McKenzie**, Wayland N., Columbia, MO
- K4CHT **Wright**, John S., Morristown, TN
- ♦•N4CPV **Blosser**, George E., Moneta, VA
- AD4D **McCracken**, Dorothy "Dot" M., Clyde, NC
- KN4DLD **Muth**, Robert L., Cumming, GA
- ♦•WB4DXZ **Whichard**, Willis K., Goldsboro, NC
- W4EGM **Mooneyhan**, E. Gordon, Surfside Beach, SC
- ♦KN4ELL **McCormick**, Robert J., Decatur, AL
- KN4FJE **Gruenewald**, John M., Anniston, AL
- ♦WA4GRT **Friederich**, Paul J., Largo, FL
- ♦WF4H **Greenberg**, Dwight A., Hughes Springs, TX
- KI4IBF **White**, Peregrine, Nags Head, NC
- KI4JB **Martin**, David H., Bushnell, FL
- KG4JMN **Adams**, Samuel, Lynchburg, VA
- WB4KJV **Parker**, Clingman "Butch" H., Charlotte, NC
- ♦K4KXO **Ferguson**, Kenneth B., Lexington, SC
- K4KZS **Perkins**, Patrick E., Hayden, AL
- ♦•K4MUJ **Bible**, Ralph S., Limestone, TN
- ♦•WA4MTY **McCracken**, Lewis R., Clyde, NC
- W4OCM **Medley**, Otto C., Bryan, OH
- AD4OK **Mobley**, Roy L., Somerset, KY
- KI4RBY **Armstrong**, James H., Melbourne, FL
- ♦KD4RO **Sanders**, Eugene D., Atlanta, GA
- N4RXJ **Slusher**, Jeffery A., Asheville, NC
- N4SSI **Mullis**, Neil, Rentz, GA
- ♦W4SXH **Atkins**, Benjamin L., Charlottesville, VA
- KC4UCN **Lawrence**, Addison R., Galion, OH
- KJ4UEO **Oglesby**, Rodney, Powderly, KY
- WA4ULS **Yon**, Terry R., Gilbert, SC
- KF4VNT **Taylor**, Theresa, Fayetteville, NC
- KD4VRY **Fleishman**, Steve H., Naples, FL
- ♦WB4YYY **Langley**, James W., Raleigh, NC
- ♦•KE4ZHY **McLain**, Carl C., Wichita, KS
- K5AUW **Rodriguez**, Robert A., San Antonio, TX
- KG5AZX **Osborne**, Bradley D., Henryetta, OK
- ♦KG5BV **Hillis**, Dwight W., Beebe, AR
- WD5DHF **Brennan**, Robert H., Arlington, TX
- ♦WA5EOD **Johnson**, Richard A., Wister, OK
- KI5IYX **Charles**, James B., Kempner, TX
- W5JMD **Durham**, Johnny M., Shallowater, TX
- ♦K5JNE **Easley**, Jimmy N., Abbeville, MS
- ♦KN5K **Craig**, James W., Texas City, TX
- ♦KB5LTQ **Stansbery**, E. C., Dennard, AR
- KC5MGW **Scarborough**, Bob S., Taylor, TX
- KI5MS **Christiansen**, Roger, Anna, TX
- AA5NN **Brandt**, Linda D., Albuquerque, NM
- KF5TEX **Turnage**, Jeffery D., Sumrall, MS
- ♦KF5THA **Card**, Robert C., Chickasha, OK
- ♦•KD5UDA **Hovey**, Glen R., Santa Clara, UT
- ♦♦KQ5W **Walker**, George E., Spring, TX
- KI5WZA **St. Pierre**, Keith B., Rio Rancho, NM
- W15Z **Markle**, Kenneth F., Baton Rouge, LA
- KM6CVB **Waters**, Gary M., Fresno, CA
- KE6CVT **Meyer**, Dean O., Jonesboro, TX
- ♦KH6FDG **Boyer**, Carl W., Honolulu, HI
- W6NY **Armstrong**, Thurston G., Spencer, MA
- KY6V **Smith**, Gordon L., Stockton, CA
- ♦KD6VAD **Whittemore**, Eric H., Moreno Valley, CA
- ♦•KB7AD **Crocker**, Dewey L., Tacoma, WA
- ♦WA7B **Carpenter**, Max D., Soldotna, AK
- K7DV **Jolley**, David M., Idaho Falls, ID
- ♦KL7FHF **Girard**, Jon M., Eagle River, AK
- ♦•KL7GKY **Bone**, Jack R., Canyonville, OR
- ♦W7HJ **Huntemann**, Harley J., Suffolk, VA
- KI7JOE **Boggs**, Joseph L., Red Wing, MN
- KB7KWO **Goodsell**, Daisy J., Chico, CA
- ♦WB7NDM **Burnett**, Forrest H., Alpine, UT
- NI7P **Miller**, Brian M., Post Falls, ID
- K7WSD **Drummond**, William S., Forest Grove, OR
- WD8ATN **Laxton**, Gary R., Charlotte, NC
- N8BY **Christian**, Richard R., Bedford, OH
- ♦KD8DTC **Schmuckal**, Ralph P., Ypsilanti, MI
- ♦KE8FD **Flynn**, Gary L., Mount Vernon, OH
- N8GIJ **Beyer**, Donald K., Mount Vernon, OH
- WB8IAM **Molnar**, John T., Youngstown, OH
- ♦KD8IQY **Luedeke**, Donald J., New Bremen, OH
- N8ISJ **Di Cesare**, Dominick, Melvindale, MI
- KD8KNN **Jenkins**, Thomas H., Fairview, MI
- ♦KC8KS **Tackett**, Curtis D., Franklin Furnace, OH
- ♦KA8MCL **Boboltz**, Lee M., Cincinnati, OH
- ♦WD8NHK **Hibbard**, Carl S., Dayton, OH
- ♦•WA8NOI **Lutman**, William G., Munroe Falls, OH
- WD8OLR **Leubitz**, Martin R., University Heights, OH
- ♦WB8SUG **Ten Eyck**, Carl D., Upper Sandusky, OH
- ♦KC8TFY **Young**, Claude, Miamisburg, OH
- K8TLC **Blakeman**, Ronald J., Portland, MI
- WB8TLZ **Bushong**, David C., Vassar, MI
- KD8UVU **Barr**, Gregory L., Greenfield, OH
- NK8V **Beck**, Robert E., Fenton, MI
- NO8V **Gibson**, John H., Alma, MI
- ♦W8WJP **Bixler**, Larry R., Salem, OH
- N8XDF **Walinski**, Susan, Toledo, OH
- N8ZDL **McFarland**, Robert E., Hillsboro, OH
- WB9AKM **Derderian**, Haig S., Racine, WI
- K9BBL **Eastway**, Dorothy A., Mayville, WI
- W9BDN **Conrad**, Stephen G., Morton, IL
- ♦W9CUC **Manor**, Robert M., Upland, IN
- N9DUQC **Stratton**, Enid, Scottsdale, AZ
- ♦K9DUR **Andrews**, Raymond N., West Terre Haute, IN
- ♦KC9FPU **Coulter**, Richard L., Robinson, IL
- ♦•KB9FTG **Dawley**, Richard L., Waukesha, WI
- ♦W9JBS **Kelly**, Russell E., Russiaville, IN
- ♦•KB9JZ **Schmidt**, Arlen G., Marion, IN
- ♦•KA9KKC **Benson**, Wallace F., Montgomery, IL
- ♦K9LDV **Schmidt**, Merle W., Marion, IN
- WA9LOU **Baer**, Theodore J., Springfield, IL
- ♦KC9MXR **Hurst**, Ronald R., Lovington, IL
- ♦WA9NOH **Alexander**, James E., Jacksonville, FL
- ♦W9NRS **Machinton**, Stephen, Fox Point, WI
- N9PPX **Wineinger**, Chris W., Mukwonago, WI
- ♦WA9RD **Hutchins**, Dennis D., Bethalto, IL
- ♦KB9RHZ **Gilmore**, Jon C., Germantown, WI
- ♦ND9T **Kearney**, Timothy R., Fort Wayne, IN
- W9UGT **Aspinwall**, William H., Lodi, WI
- ♦W9ZEK **Sloan**, Willard H., Lake Zurich, IL
- K0AA **Johnston**, Phil, Colorado Springs, CO
- ♦KA0BBQ **Wilson**, Barry A., Thornton, CO
- ♦N0CV **Fellows**, Bruce W., Ellsworth, WI
- ♦WM0D **Smith**, Michael J., Davenport, IA
- ♦AE0DR **Denno**, Gordon J., St. Charles, MO
- ♦W0EW **Muellhaupt**, Elmer W., St. Louis, MO
- N0FTV **Miller**, Thomas, Fairfield, IA
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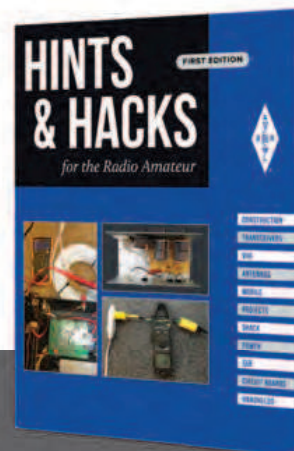
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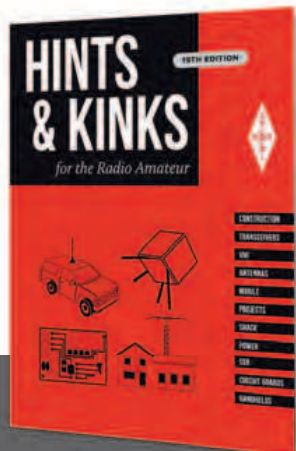
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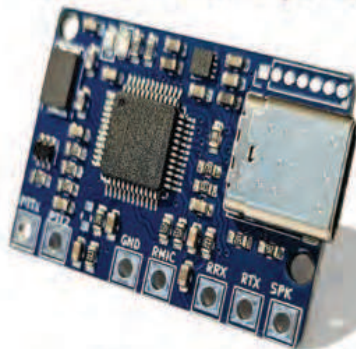
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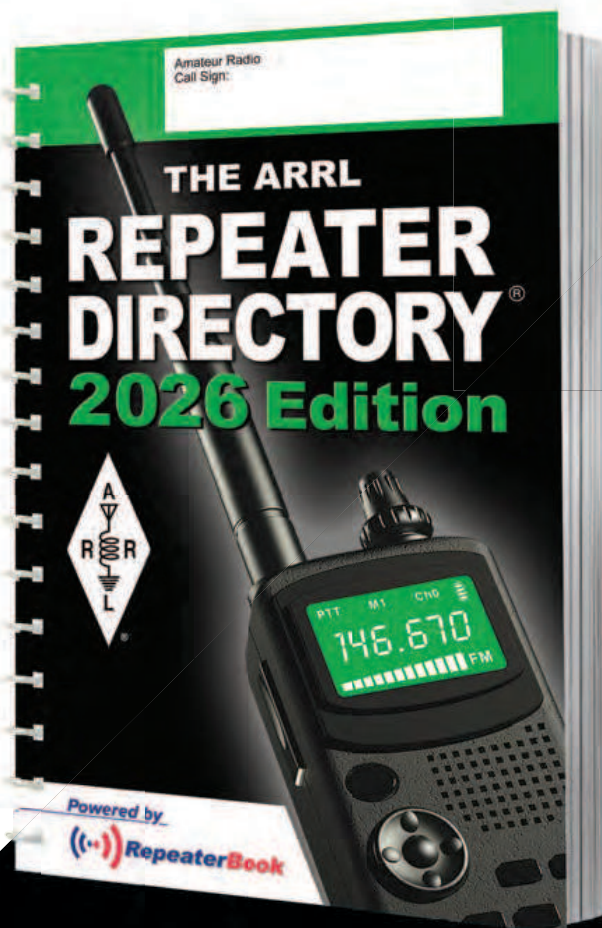
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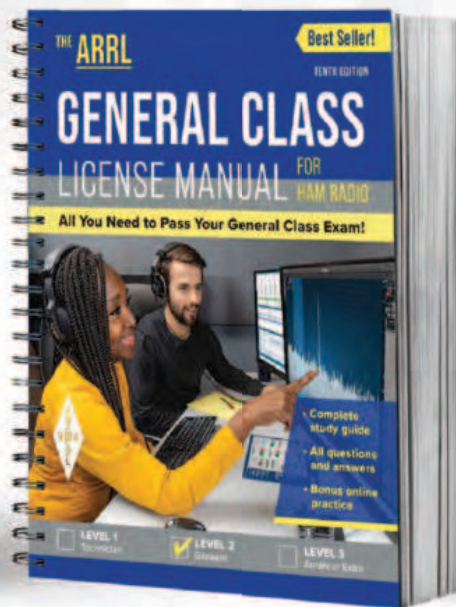
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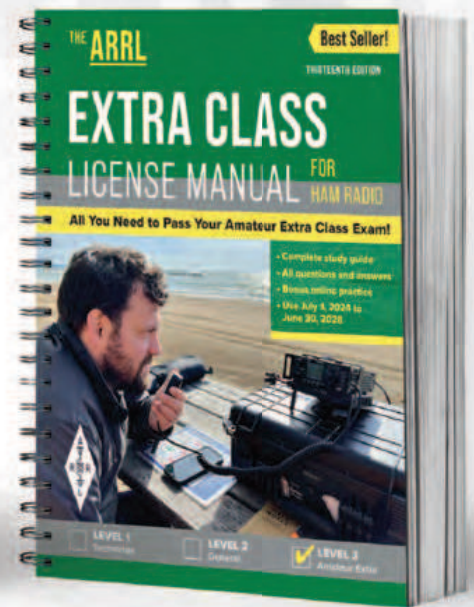
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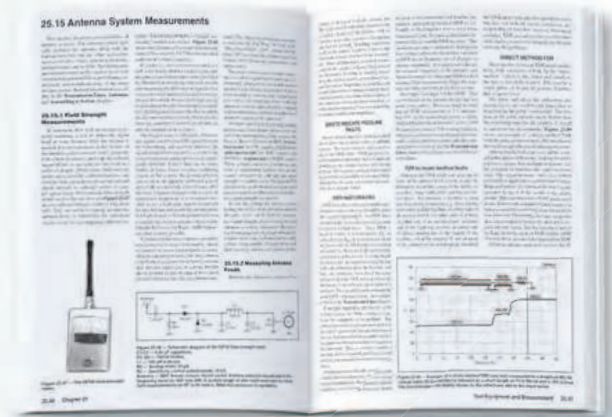


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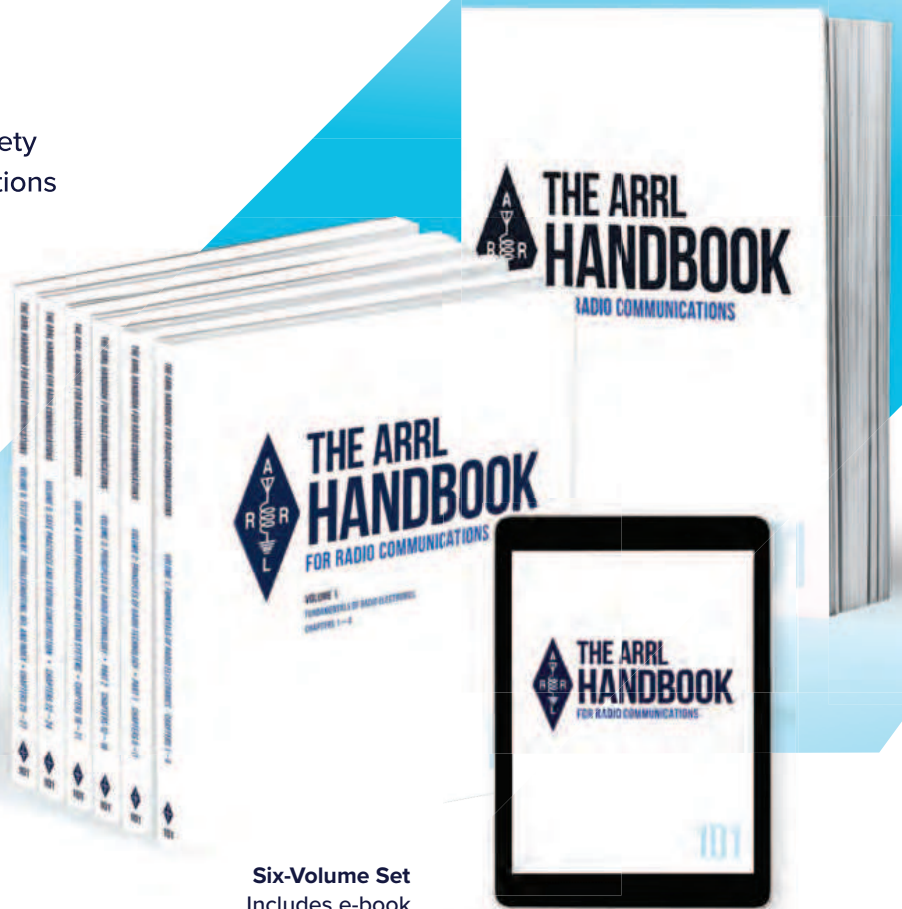
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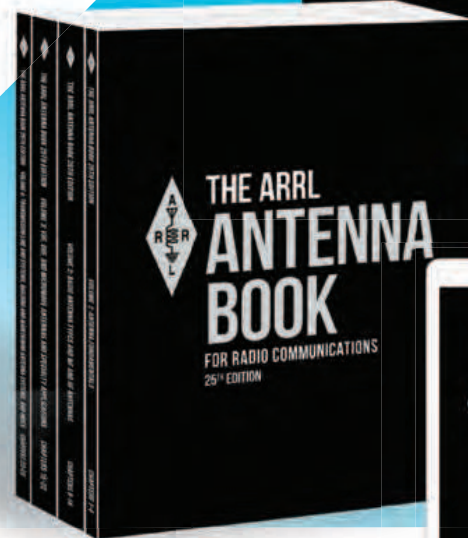
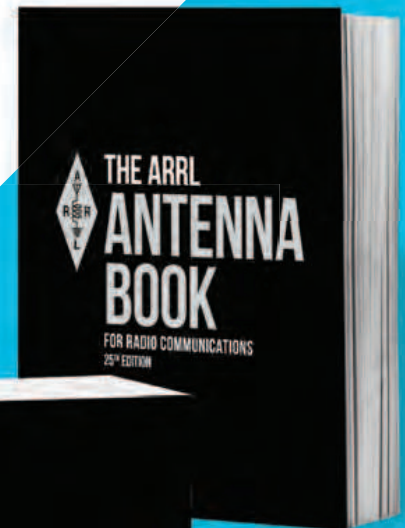
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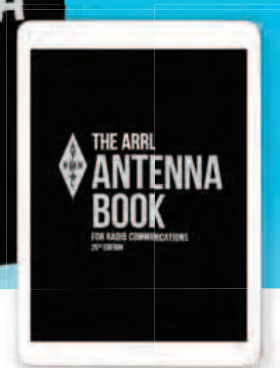
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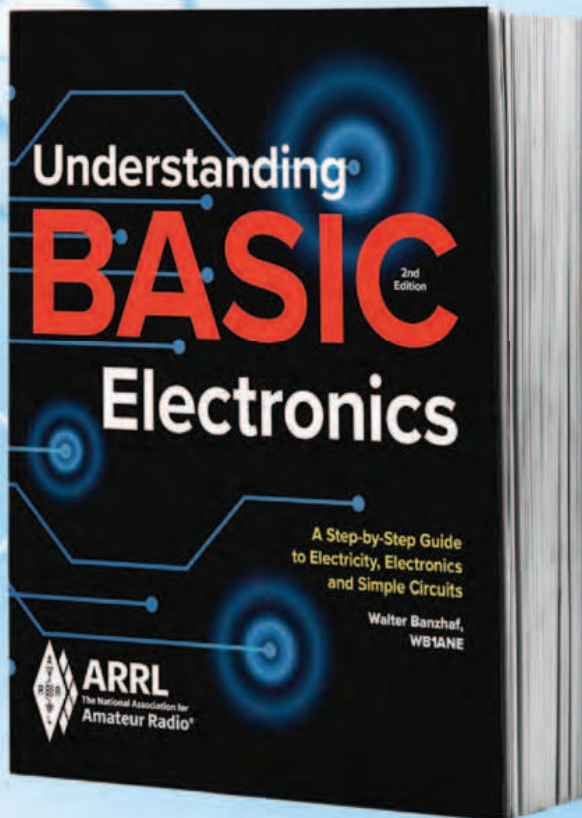
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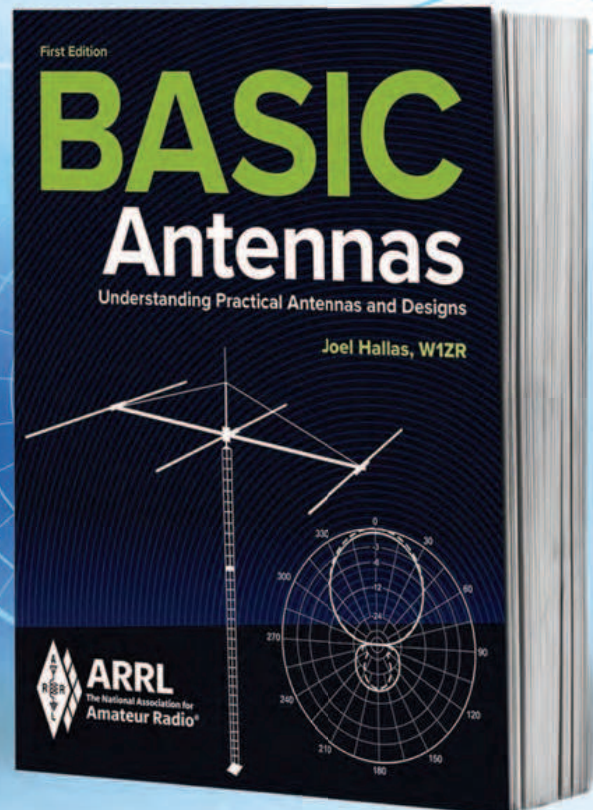
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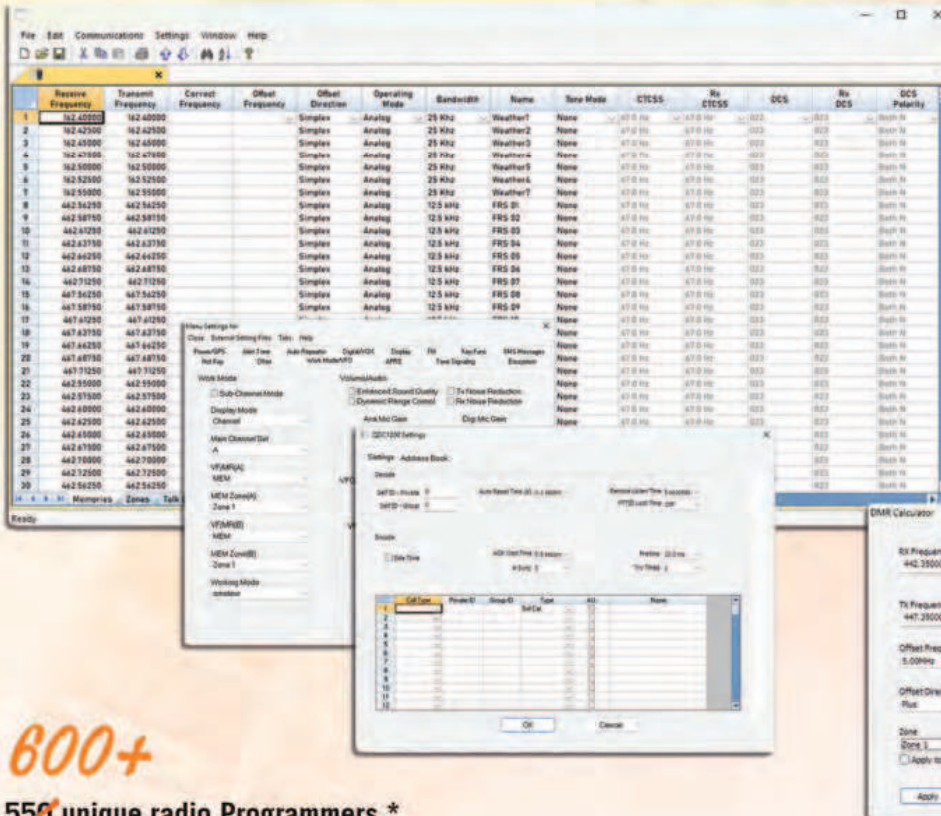
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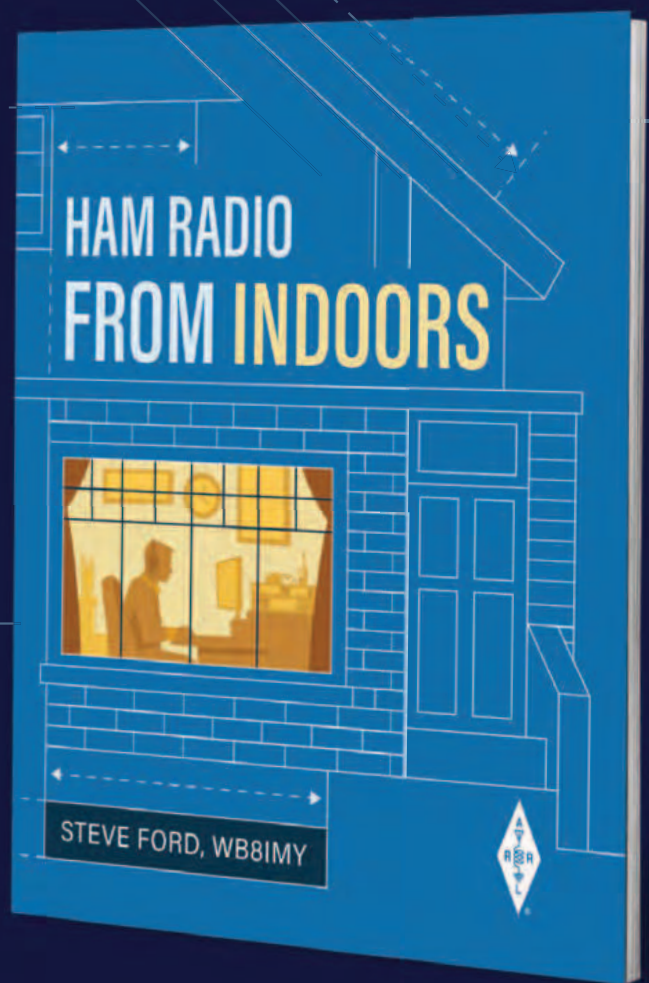
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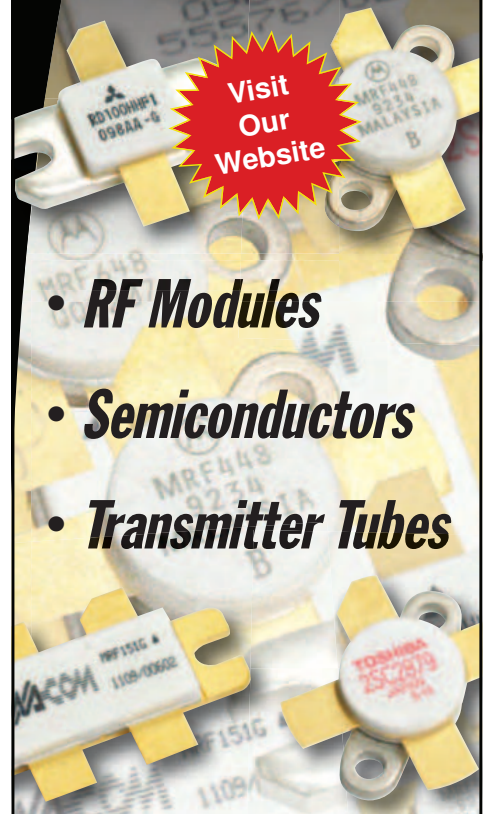
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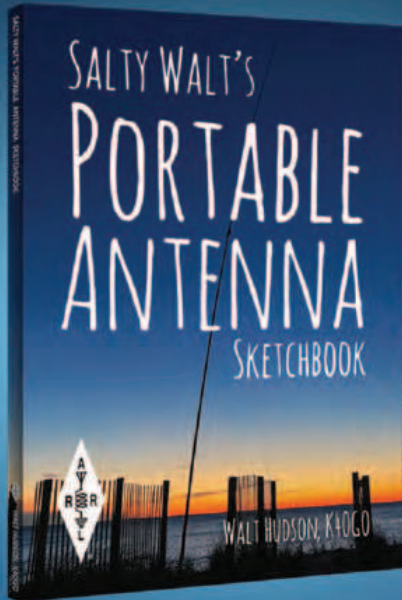
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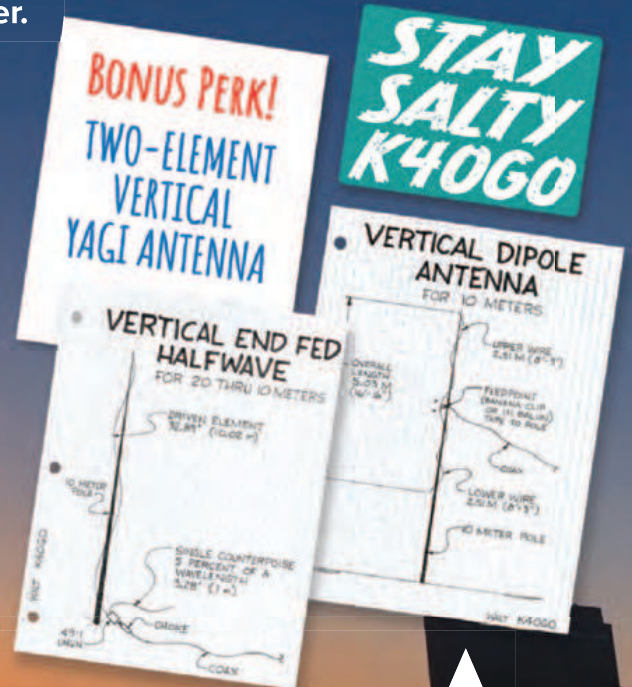


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Join Salty Walt, K4OGO, of the Coastal Waves & Wires YouTube channel, where all the action happens — right on the beach! Ham radio adventure awaits with these portable antenna designs. In addition to his sketches, Walt offers portable construction and operating tips, and just enough about counterpoise wires and ground to get you making contacts in no time.

Walt pairs each antenna with a dining spot you can try. He guides you to the best chowders, fish tacos, crab legs, and more, all while building antennas, making contacts, and soaking up some coastal rays.



Salty Walt's Portable Antenna Sketchbook

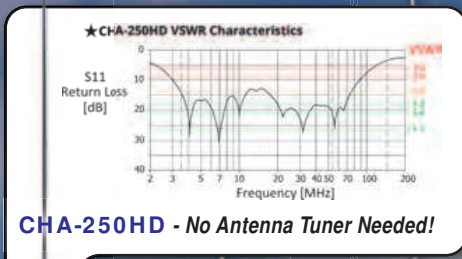
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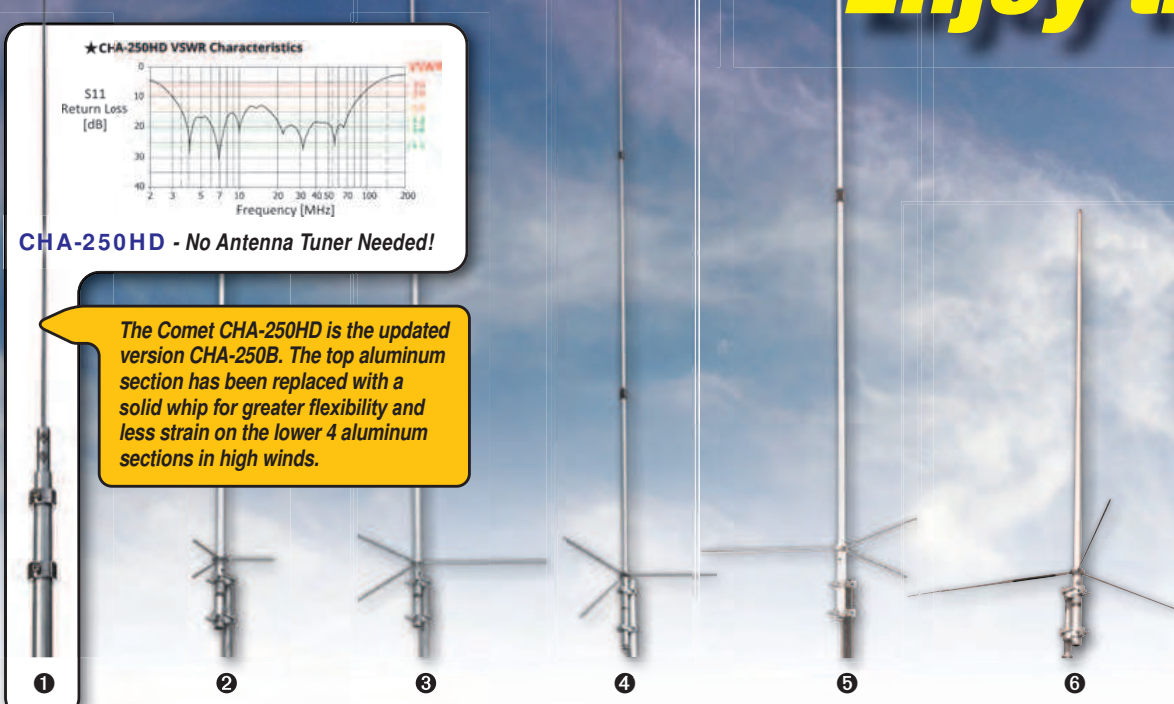


**Life is a JOURNEY.
Enjoy the ride!**



CHA-250HD - No Antenna Tuner Needed!

The Comet CHA-250HD is the updated version CHA-250B. The top aluminum section has been replaced with a solid whip for greater flexibility and less strain on the lower 4 aluminum sections in high winds.



Base Antennas

1 COMET CHA-250HD BROADBAND 80M THROUGH 6M VERTICAL ANTENNA

A newly designed broadband vertical with NO GROUND RADIALS. EXTREMELY easy to assemble, requires no tuning or adjustments and VSWR is under 1.5:1 from 3.5-57MHz! • TX: 3.5MHz – 57MHz • RX: 2.0– 90MHz • VSWR is 1.5:1 or less, continuous • Max Power: 250W SSB/125W FM • Impedance: 50 Ohm • Length: 23' 5" • Weight: 7 lbs. 1 oz. • Conn: SO-239 • Mast Req'd: 1" – 2" dia. • Max wind speed: 67MPH

2 COMET GP-3 DUAL-BAND 146/446MHZ BASE REPEATER ANTENNA

Wavelength: 146MHz 6/8 wave • 446MHz 5/8 wave x 3 • Gain-146 MHz: 4.5dBi / 446 MHz: 7.2dBi • Max Pwr: 200W • Length: 5'11" • Weight: 2lbs. 9ozs. • Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

3 COMET GP-6 DUAL-BAND 146/446MHZ BASE REPEATER ANTENNA

Wavelength: 146MHz 5/8 wave x 2 • 446MHz 5/8 wave x 5 • Gain-146 MHz: 6.5dBi / 446 MHz: 9dBi • Max Pwr: 200W • Length: 10'2" • Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

4 COMET GP-9 / GP-9N DUAL-BAND 146/446MHZ BASE REPEATER ANTENNA

Wavelength: 146MHz 5/8 wave x 3 • 446MHz 5/8 wave x 8 • Gain-146 MHz: 8.5dBi / 446 MHz: 11.9dBi • Max Pwr: 200W • Length: 16' 9" • Weight: 5lbs. 11ozs. • Conn: GP-9 Gold-plated SO-239 • GP-9N Gold-plated N-type female • Construction: Fiberglass, 3 Sections

5 COMET CX-333 TRI-BAND 146/220/446MHZ BASE REPEATER ANTENNA

Wavelength: 146MHz 5/8 wave x 2 • 220MHz 5/8 wave x 3 • 446MHz 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz. • Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

6 COMET GP-15 TRI-BAND 52/146/446MHZ BASE REPEATER ANTENNA

Wavelength: 52MHz 5/8 wave • 146MHz 5/8 wave x 2 • 446MHz 5/8 wave x 4 • Max Pwr: 150W • Length: 7'11" • Weight: 3lbs. 1oz. • Conn: Gold-plated SO-239 • 2MHz band-width after tuning (6M) • Construction: Single-piece fiberglass

7 COMET CTC-50M WINDOW GAP JUMPER

Avoid drilling holes or leaving windows open/unlocked. Flat coax easily forms to window frame. Low loss SO-239 on each end, 15 inch length.

• Max Pwr: HF 100W PEP / VHF 60W FM / UHF 40W FM / 900-1300 MHz 10W FM



CAA-500MarkII 1.8-500MHz Antenna analyzer

The CAA-500MarkII combines the simplicity and accuracy of an analog instrument, PLUS...a full color LCD graphic display • Resistive (R) and Reactive (X) components of impedance graphed and displayed numerically • SWR readings in both graphic and numerical results.

Operates on 8-16VDC external power, 6 AA Alkaline or NiMH rechargeable cells • Trickle charger built in (only when using NiMH batteries) • Typical battery life: 9 hours of continuous operation • Battery level indicator • Selectable auto power-off time limit preserves battery capacity • SO-239 connector for 1.8-300MHz range • N-female connector for 300-500MHz range

The perfect combination of analog and graphic information, designed in particular for antenna diagnostics and adjustments while on the roof, tower or in the field!

CAA-5SC

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Shoulder strap included.



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KENWOOD

3rd IMDR **110 dB***

RMDR **122 dB***

BDR **150 dB***

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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 - NCOB - 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

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ADS#16221