

QST



DIGITAL EDITION



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Field Day 2025

NOVEMBER 9
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3 ALPHA
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QST Reviews

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Antenna

Banggood SDR TX/RX Switch

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FTM-510DR (SPU-1 is required for ASP Operation)

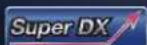
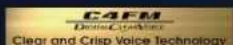
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Search & Go / Touch & Go Operations

Improved PMG Operation

ASP for Better Coverage

The BIGHEAD



* BU-5 is required for Bluetooth Operation

■ Super-DX+ASP expands the communication range

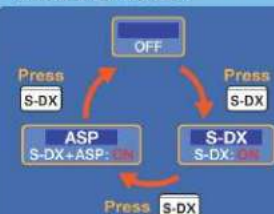
The Super-DX with the ASP ensures reliable audio quality for weak signals and expands the communication range. ASP AUTO mode is also selectable. In this mode, the ASP is automatically activated when the transceiver detects weak signals in FM analog mode and AM mode.

Analog FM Super-DX Super-DX+ASP



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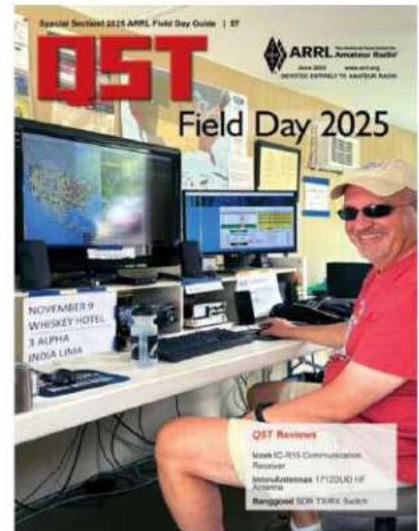
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Write for QST

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



Our Cover

The excitement is mounting for ARRL Field Day 2025! The most popular ham radio operating event is back again on June 28 – 29, 2025, and this issue is full of advice and resources to help you have the best Field Day ever, whether you're operating on your own, or with a club or group like The 415 Amateur Radio Club, N9WH, in Crystal Lake, Illinois. [Photo courtesy of The 415 Amateur Radio Club]



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QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, Inc., 225 Main St., Newington, CT 06111-1400, USA. Canada Post: Publications Mail Agreement #90-0901437. Canada returns to be sent to The Mail Group, 1501 Morse Ave., Elk Grove Village, IL 60007.

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

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

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F718A (Coax Element)	70cm	15	250	N
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SG7500A	2m/70cm	40.6 in.	150	UHF or NMO
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MR77 Series	2m/70cm	20 in.	70	Mag Combo
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Second Century

The Case for Remote

Some 15 years ago, ARRL staff member and author Steve Ford, WB8IMY, wrote perhaps the first comprehensive book about remote operations of an amateur radio station via the internet. In Remote Operating for Amateur Radio, Steve talked about how these times, they are a changin', and indeed the past decade and a half has seen huge advances in the ability to operate your station remotely. It would be easy to suggest this is being driven by the restrictions placed on hams who are living in deed-restricted communities, but that tells only part of the story.

Today, hams are driven by myriad reasons to access remote stations, including escaping high-noise environments, having small properties that don't allow for larger antenna or tower construction, or having the ability to operate a station from anywhere including a coffee shop or hospital bed. Those are the obvious drivers, but innovation is being pushed even further by remote operating from locations where the simple logistics of getting there are nearly impossible or cost prohibitive. Look at the expeditions that George Wallner, AA7JV, has made possible (such as Jarvis Island, N5J, in 2024) due to his efforts to implement a Remote in a Box (RIB) station. The radios and antennas are placed on the beach of an island, for example, and the team operates the stations from George's boat. But that's not all, adding another layer of access using StarLink has provided top operators from around the world the opportunity to remote into his boat and operate the RIBs remotely. Amazing!

For us everyday hams, the software space has advanced significantly. Applications that allowed you to have basic control over your PC have advanced to products like *AnyDesk*. This free software client provides superior ability to operate a computer remotely, and adds functionality including local and remote file management. Which leads to the first philosophical difference in remote station design and access: where do you put the rest of the software? Some stations will put logging and digital mode software on their local computer to use the remote station, while others advocate for putting all of the software on the remote PC.

As a part of the experimentation and education for staff at HQ, I have undertaken three remote stations using various designs. The first is located at PJ4G on the island of Bonaire. The availability of high-speed, reliable internet has supported the model of all software local to the operator. The second station was inspired by remote operations guru Gerry Hull, W1VE. His model has all the software at the remote site, and tools like *AnyDesk*, *Win4Yaesu*, and *Mumble* (for voice and CW). With this model, the radio and PC are located at

the home QTH of Noah Gottfried, K2NG (who owns the PJ4G station). This second station will be used exclusively on 6 meters this summer to study propagation. The third station, to follow later this year, will be a remote satellite station at W1HQ. This model will use proprietary Icom software to have full access to the IC-9700 and will have a Node-RED dashboard to control the rotators and preamps.

A few columns ago I had suggested that taking on a remote project, especially if you're only looking for FT8 and have a modern transceiver, is a remarkably easy project. With all of the other tools you can use with *WSJT*, it actually becomes a form of gaming while you chase your favorite awards. One of those tools is *JTAlert*, which some of us at HQ use. We call it "hunting for yellow boxes" as we look for new countries or states. With a remote station where you may have more room and no restrictions on antennas, you can open yourself to far more opportunities to experiment with antenna design, radiation patterns, and performance. This too adds to the gaming aspect of understanding how to best use your station to hear the other station and work it. This is one of the driving reasons that testers are looking to remote! Build a big station and have your team access it from anywhere, using every antenna for that winning edge.

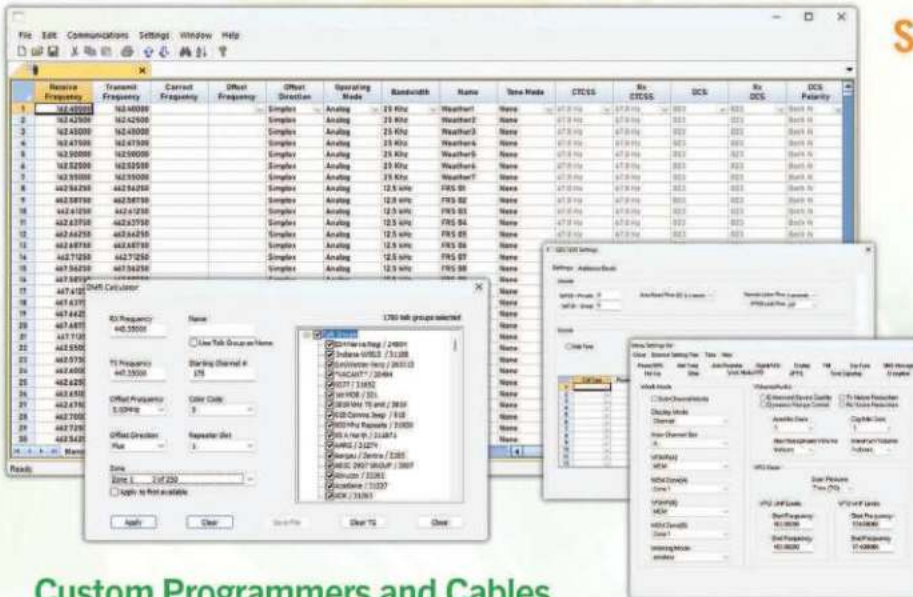
You'll see that coming in July we'll have a special single-month edition of ARRL's *National Contest Journal (NCJ)* on remote. We also have a book on remote that is in the early stages of production, set for 2026 publication. Get remote radio active! It's easy and makes for a great club project. Be a connector! Get with others, like Gerry, who are successfully running remote. And let me know how your remote projects evolve. The internet is creating the next frontier for amateur radio and we're proud to be a part of it!

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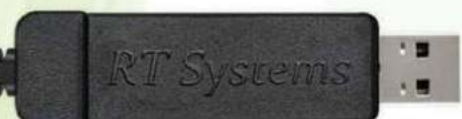
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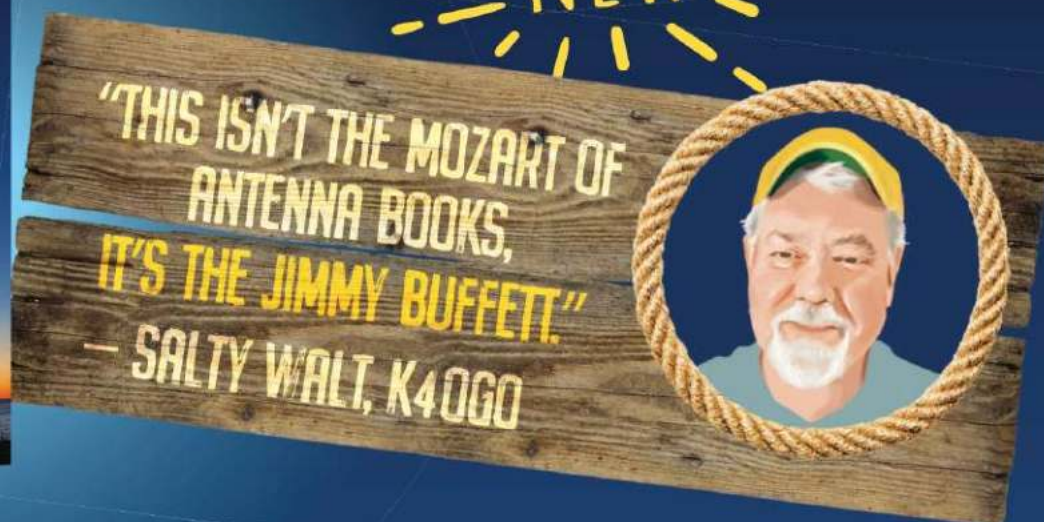
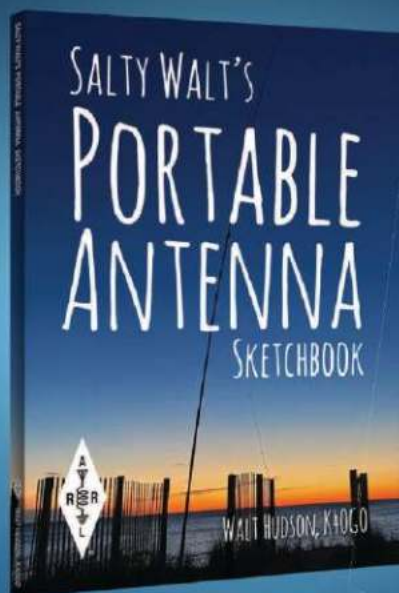
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Member Spotlight

Tom Schuessler, N5HYP

Tom Schuessler, N5HYP, was born in December 1956 in Sheboygan, Wisconsin. When he was a Cub Scout in the early 1960s, he witnessed a CB radio demonstration. According to Tom, this sparked an interest in communications technology that has continued to the present.

In high school, Tom was fortunate to take 3 full years of electronics shop, but he still wasn't quite ready for amateur radio. "I had a high school friend who was a ham back then, but for some reason, I never studied for the license," Tom explained. "Also, living in a very blue-collar home, with neither the space nor the money to acquire the necessary equipment, becoming a ham seemed an impossible stretch anyway."

Tom went to the University of Wisconsin-Platteville, which — at the time — offered a radio and television major with a broadcast engineering emphasis. His amateur radio interest was still present, and some 6 years after graduating, and with the encouragement of one of his college friends, Tom Weeden, WJ9H, Tom finally acquired his license. "I took the plunge in 1985 and haven't regretted it since," he said.

An Enthusiastic Communicator

Tom said, "I like to talk, and I like communicating with people. I've always loved ragchewing. I enjoy the random conversations that lead to some common passion or interest we may have in common. One of those casual chats on a local

repeater even ended up getting me a job!"

In the early 2000s, with computer sound card modes growing in popularity, Tom started doing some of his ragchewing digitally. He began with PSK31 and has since expanded to other digital modes.

"PSK31 was enjoyable, but it could be frustrating if conditions were bad, there was lots of interference, or [if] signals were weak," Tom said. "Recently though, I have been trying keyboard-to-keyboard communication through the *VarAC* program created by Irad Deutsch, 4Z1AC, which is supported by the VARA HF/FM modem authored by Jose Alberto Nieto Ros, EA5HVK. The combination of the rich tools in *VarAC* and the [automatic repeat request] features of the modem provides perfect copy down to inaudibility."

The Space Nerd

"Like many kids from the 1960s, I was a space nerd," Tom said. "I loved learning about satellites and the latest missions. In the early 2000s, I had seen demonstrations of FM satellite contacts at hamfests, but [I] never thought I could do it on a meager budget like mine. In 2009, Keith Pugh, W5IU (SK), a great ambassador for [the Radio Amateur Satellite Corporation (AMSAT)] and mentor for [Amateur Radio on the International Space Station] school contacts, challenged me to give satellites a try."

Tom began with the FM repeater satellites in 2010, using an Icom IC-W32A transceiver and an Arrow



Antennas dual-band 2-meter/70-centimeter Yagi. He joined AMSAT soon after and has been hooked on space communications ever since.

Today, Tom is an "AMSAT Ambassador," giving numerous presentations at local clubs and hamfests, remote clubs via Zoom, and the QSO Today Virtual Ham Expo. He also hosts two local AMSAT-related 2-meter nets in the Dallas/Fort Worth area.

Tom considers the highlight of his amateur radio satellite activities to be a random contact with Woody Hoburg, KB3HTZ, who was operating as NA1SS aboard the International Space Station in summer 2023.

From the late 2000s through 2019, Tom led multiple Jamboree on the Air activations and Radio and Electronics merit badge activities in cooperation with the National Scouting Museum. Tom is a member of two local clubs: the Irving Amateur Radio Club and the Dallas Amateur Radio Club.

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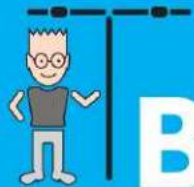
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Up Front

Unique QSL

Paul Lux, K1PL, received this unique wooden QSL card from his friend Mike Barcikowski, W1PL. It was routed out on an 8 x 20-inch piece of wood. The talented crafter is Pawel Ku, VA1HOT. [Paul Lux, K1PL, photos]



Ham House

Colin Wheatley, W9UPK, and Bob Crippes, WB0WSE, operated from the historic Mathias Ham House in Dubuque, Iowa, during the Great River Amateur Radio Club's, W0DBQ, Fourth of July event. Mathias Ham was prominent in Dubuque's commercial and financial circles and helped establish many firsts, such as funding for the first public school and building the first local brickyard, though it doesn't appear that he was a ham. Colin and Bob made many radio contacts across the US and enjoyed a cooling ice cream social — a great end to a hot, muggy day.



[Colin Wheatley, W9UPK, photo]



[Mitch Stern, W1SJ, photo]

Celebrate

The Radio Amateurs of Northern Vermont's, W1NVT, hard work paid off. At their holiday party, the club celebrated their coming in at the top of the 2024 ARRL Field Day 2A category by serving a luscious chocolate cake for dessert.

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



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Letters from Our Members

Confessions of an FT8 Convert

My first impression of operating FT8 was that you turn on your computer, go to bed, and wake up to learn what contacts your computer made. I believed that digital operating was the beginning of the end for amateur radio. However, with the hope of working the Bouvet Island DXpedition, 3YØJ, amidst the anticipated pileups, I gave FT8 a try.

FT8 is not as automated as I had imagined. We have Dr. Joe Taylor, K1JT, to thank for creating the *WSJT-X* digital software. This free, multi-platform software transforms free-for-all pileups into an organized, wait-your-turn sequence of 15-second handshakes by dividing every 60 seconds into four 15-second quarters to allow weak signals to be heard.

I was wrong for thinking that you could turn on your computer, step away, and let *WSJT-X* do the work. On the contrary, the software will time out in 6 minutes if it's sedentary. Also, if you rely solely on stations listed in *WSJT-X*, you'll miss others that may have been identified elsewhere by DX clusters, *NetTime*, *GridTracker*, *JT Alert*, and other software tools. If that rare DX sends you only one of the four standard replies, it counts as a completed contact only if they log it, but you have to be alert to notice.

Now, I favor separating FT8 and digital contacts from mixed awards out of respect for the hard DXing methods many of us grew up with. If

you are a digital denier like I was, go ahead and give FT8 a try. Even with a modest learning curve, FT8 was much less painful than listening to the 3YØJ pileups.

Chip Lohman, NN4U
Woodbridge, Virginia

Applauding the ARRL DXCC Staff's Hard Work

I sent in an application via Logbook of The World (LoTW) to issue my 20-meter DXCC certificate just before chaos ensued with ARRL's cyber system last year.

When LoTW went down, I figured I would never see my contacts or certificate. I was pleased to see the confirmation move from the "LoTW QSLs in Progress" to my "DXCC Credits Awarded" column. A few weeks later, an asterisk appeared after 20 meters, indicating the award was issued. I was disheartened again when I read that more than 3,000 applications were in the queue, and LoTW had not yet been linked to DXCC accounts. However, recently, I received my award and sticker!

I want to thank the DXCC staff for their diligent work under trying circumstances. Staff like you make me proud to be an ARRL Life Member.

Lad Nagurney, WA3EEC
Amherst, Massachusetts
Life Member

Article Revives Interest in Pitcairn

I enjoyed Mike Collis', WA6SVT/VP6MC, "Vacation on Pitcairn

Island" article in the March 2025 issue. I have always been fascinated with the island!

I remember talking with Tom Christian, VP6TC (SK), on 10 meters in the late 1980s and early 1990s. It was fascinating to hear him describe life on the island. Mike's article has inspired me to visit and maybe relocate there. It sounds like a nice place to spend my remaining years. Thanks for a great article!

Dale Clark, WAØCFQ
Wichita, Kansas

Artistically Recruiting the Next Generation of Hams

"When ARRL Field Day Becomes Theater" by Kevin Potter, KD9YYO, in the March 2025 issue, is an inspiring article. It showcases a remarkable collaboration between the fine arts and amateur radio.

Most efforts to recruit next-generation amateur radio operators are through STEM, computers, and technical schools. While these areas of study are a natural fit for amateur radio, Kevin's article shows that non-technical young people can connect to amateur radio, too, and that our oldest communication mode — Morse code — is of interest.

Jon Jones, NØJK
Lawrence, Kansas
Life Member

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

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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.arrl.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.

♦ Voicetransmissions: 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 17), Memorial Day (May 26), Independence Day (July 4), Labor Day (September 1), Veterans Day (November 11), Thanksgiving and the following day (November 27 and 28), and Christmas and the following day (December 25 and 26).



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Evaluate Portable QRP AC Power Supplies Before Use

Ripple, noise, and radio damage can be easily avoided with an oscilloscope test.



Figure 1 — The 12 V 5 A power supply.

Phil Salas, AD5X

There are numerous small switching power supplies available at companies like Amazon, AliExpress, etc. Because I'm constantly looking for a compact power supply for my low-power radios when I'm traveling, I thought I'd take a closer look at a few options. My requirements are 12 – 14 V dc at 4 A.

Selecting Switchers

I initially picked two power supplies to experiment with (both available from Amazon). One is a 12 V 5 A power supply (see Figure 1), and the second is a very popular

Samsung-compatible PSCV840101A 14 V dc 6 A monitor power supply (see Figure 2). Both of these power supplies are compact, making them perfect for portable operation when ac power is available.

Of course, I wanted to ensure that the power supplies were



Figure 2 — The 14 V 6 A power supply.

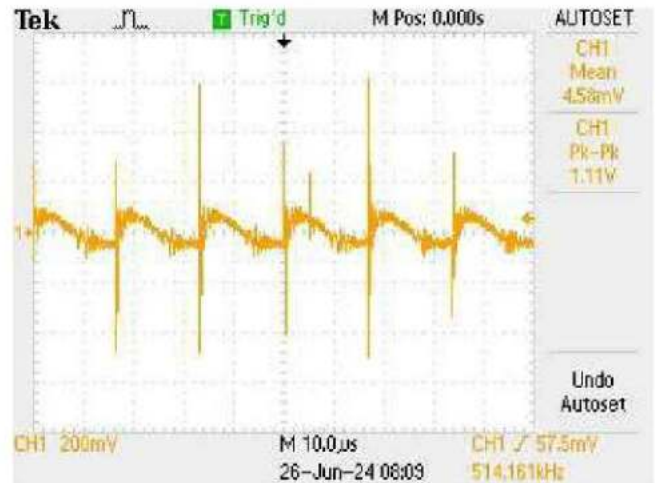


Figure 3 — The 12 V 5 A power supply's ac-coupled output.

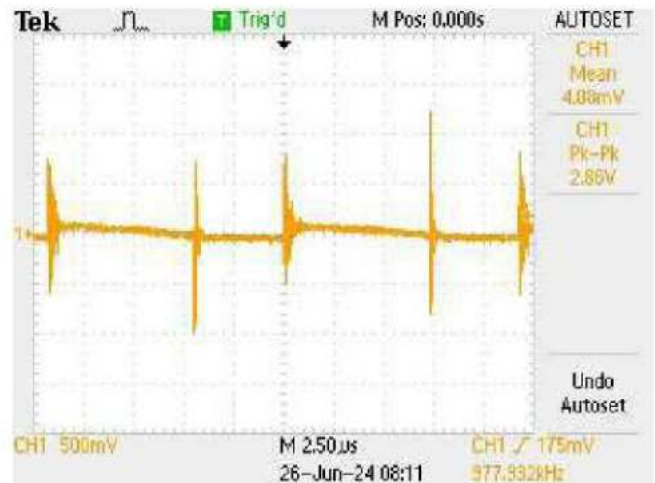


Figure 4 — The 14 V 6 A power supply's ac-coupled output.

reasonably free from ripple, noise, and RF interference. The first thing I did was load the power supplies with 4 A and look at the ripple on my Tektronix TDS2022B oscilloscope. Figures 3 and 4 show the ac-coupled outputs of the 12 V 5 A and the 14 V 6 A switchers, respectively. As you can see, the 12 V switcher has a roughly 500 kHz switching frequency with 1.1 V peak-to-peak (p-p) voltage spikes, and the 14 V 6 A switcher has a switching frequency of about 1 MHz and 2.9 V p-p voltage spikes. With these levels of p-p voltage

spikes, I wouldn't connect either power supply to any of my radios.

Adding Filters

Next, I looked at some inexpensive dc filters. From Amazon, I purchased a 4 A filter (see Figure 5) and a 10 A filter (see Figure 6). I connected them in series

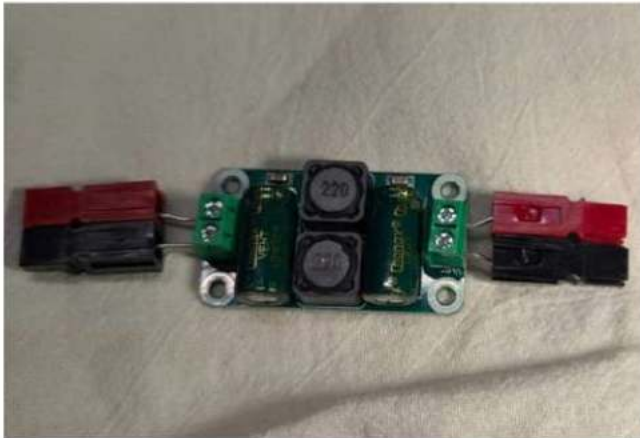


Figure 5 — The 4 A dc filter.

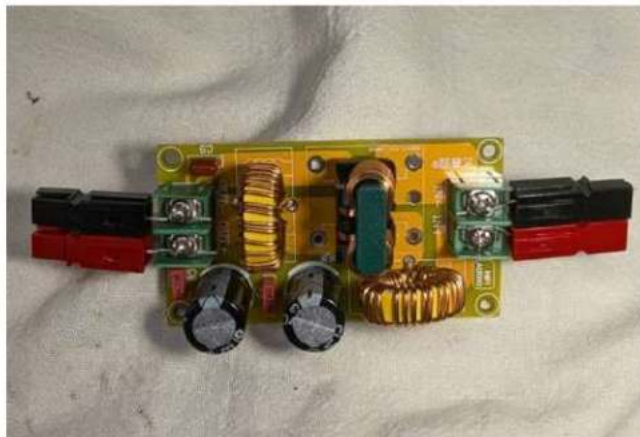


Figure 6 — The 10 A dc filter.

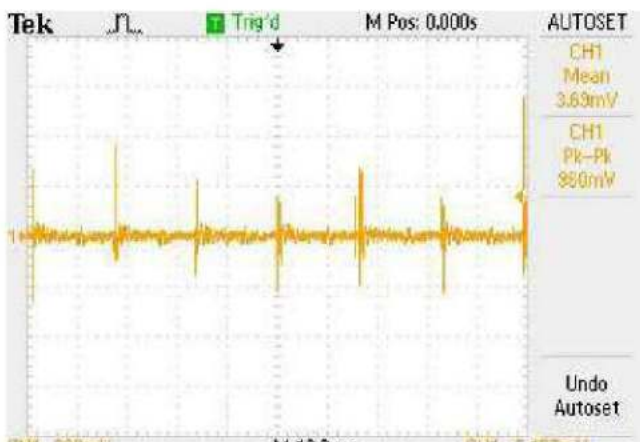


Figure 7 — The 4 A filter on the 12 V 5 A power supply.

with both power supplies. Figures 7 and 8 show the results of the 4 A and 10 A filters, respectively, on the 12 V 5 A power supply output. With the 4 A filter, the spikes are still close to 1 V p-p. The 10 A filter is a little better, as it reduced the spikes to 650 mV p-p.

Figures 9 and 10 show the results of the 4 A and 10 A filters, also respectively, on the 14 V 6 A power supply. The 4 A filter drops the spikes to 140 mV p-p, and the 10 A filter drops the spikes to about 400 mV p-p.

The 14 V 6 A power supply with the 4 A dc filter was the best combination for me. Under a 4 A load, there is a voltage drop of about 0.5 V. I connected this to my BG2FX FX-4CR and did not hear any switching noise. The FX-4CR puts out its full 20 W RF power. This result was okay, but I was frustrated by having to use a power supply with a separate filter, as I'm trying to minimize equipment when I operate portable with my FX-4CR. So, I thought I'd try one more power supply.

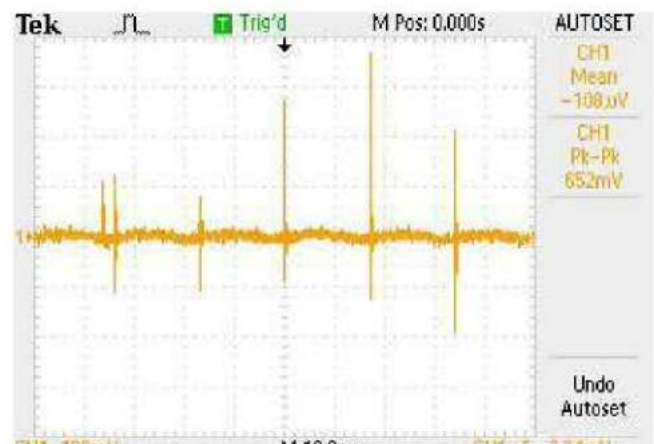


Figure 8 — The 10 A filter on the 12 V 5 A power supply.

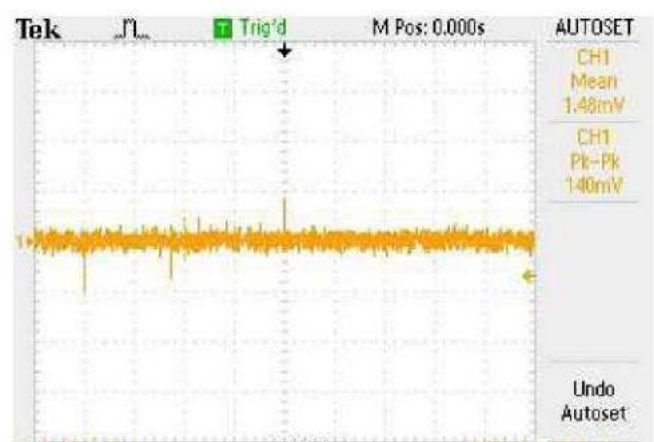


Figure 9 — The 4 A filter on the 14 V 6 A power supply.

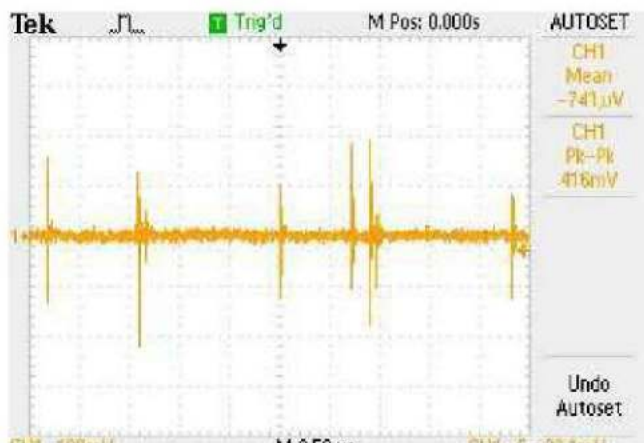


Figure 10 — The 10 A filter on the 14 V 6 A power supply.

Finding the Perfect Fit

The Facmogu AL-1250 power supply in Figure 11 looked interesting; it plugs directly into the wall, it is rated at 5 A at 12 V, it has a small in-line choke, and it even has a 5.5 × 2.5-millimeter power plug that exactly mates with my FX-4CR power jack. As of press time,



Figure 11 — The Facmogu AL-1250.



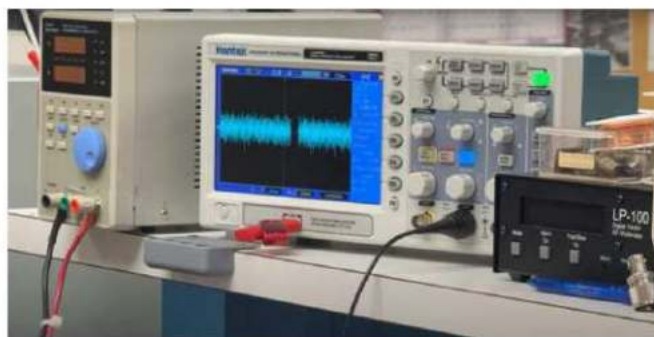
Figure 12 — The AL-1250 pictured with the BG2FX FX-4CR.

it costs only \$11 at Amazon. When I looked at the 4 A loaded output on my oscilloscope, I saw absolutely no noise or spikes (there are no oscilloscope photos, as there is nothing to show)! Under the 4 A load, the 12 V output dropped to only 11.83 V, which permits full 20 W operation of my FX-4CR. This is an astonishingly clean power supply. Figure 12 shows the AL-1250 alongside my FX-4CR.

Few — if any — of these power supplies have FCC certification labels on them, but consider the Xiegu XPA125B amplifier that I covered in the February 2023 QST Product Review had FCC certification, yet it exceeded the maximum gain allowed. Its 6-meter harmonic output also exceeded FCC limits, and it worked just fine for CB.

The Importance of Testing

There are many low-cost switching power supplies available. If you don't have an oscilloscope, borrow one to evaluate your power supply before you use it. It could be well worth the effort to ensure minimal power supply noise and interference, and even to protect against possible damage to your radio.



Access the digital edition of *QST* (www.arrl.org/qst) to watch ARRL Lab Digital RF Engineer John McAuliffe, W1DRF, replicate the power supply measurements discussed in this article.

All photos provided by the author.

Phil Salas, AD5X, an ARRL Life Member, has been licensed continuously since 1964. His interest in ham radio led him to pursue BSEE and MSEE degrees from Virginia Tech and Southern Methodist University, respectively, followed by a 35-year career in RF, microwave, and lightwave design. He held positions ranging from design engineer to Vice President of Engineering. Now fully retired, Phil enjoys tinkering with ham radio projects. You can contact Phil at ad5x@arrrl.net.

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

VOTE

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

XRAI-1 External Receive Antenna Interface

Use this device to add a receive antenna to a rig with only one RF port, and to automatically switch between receive and transmit.

Ray Kauffman, AJ4YN

Receive-only antennas, like the Beverage, the Loop on Ground, and the magnetic loop, can offer significant improvements to signal-to-noise ratio (SNR), especially on 40 meters and below. This can let you work stations that get buried in the noise when you use only a transmit antenna. In other words, you can optimize receive SNR while optimizing transmitter efficiency. More information on the advantages of receive-only antennas can be found on the ARRL website at www.arrl.org/mf-hf-receiving-wire-antennas.

Many entry-level transceivers do not have a separate connection for a receive-only antenna. Manually switching from the transmit antenna to the receive antenna is impractical. It can also be destructive if you forget to switch to the transmit antenna before keying the rig. Most receive-only antennas, which often include a low-noise preamplifier, would be instantly destroyed with 100 W. As a solution, I offer the XRAI-1: an interface that automatically switches the transceiver from a receive (RX) antenna to a transmit (TX) antenna when the transmitter is keyed (see the lead photo).

How It Works

The key line of the transceiver is used to operate a relay that switches between the RX and TX antennas. The XRAI-1 defaults to the TX antenna if the key line is not connected, or if 12 V power is not present. However, if a relay fails or the key line is disconnected while transmitting, RF power could be applied to the RX antenna. To minimize any damage to the receive-only antenna, the RX antenna connector (J3) is fused with a 1.5 V 100 mA miniature “grain-of-wheat” bulb. RF power higher than 2 W instantly burns out the bulb, opening the circuit to the RX antenna.

Refer to Figure 1. Relay modules RY1 and RY2 can be set by a jumper to activate when the input is either high or low. RY1 is connected as a latching relay and activates when the microphone is keyed. RY2, the antenna relay, connects the transceiver to the RX antenna when the key line goes high. The relay rating is 10 A at 230 V ac, which is more than adequate for a 100 W transceiver, as $100\text{ W into }50\ \Omega\text{ is }71\text{ V RMS at }1.4\text{ A}$.



The XRAI-1 RX antenna interface.

Latching Relay RY1

The common (COM) terminal of RY1 is connected to the 12 V supply line, and the normally closed (NC) contact supplies 12 V to R3. This raises the voltage at the IN terminal, which keeps RY1 off. When the microphone is keyed, the key line goes low and grounds the cathode of D2, thereby pulling IN low, activating RY1, and opening the connection between the COM and NC terminals. The IN terminal will now be pulled low by the current through R2 and R3, and the relay will remain activated until the 12 V power is switched off. C1 de-bounces the NC contacts and prevents an accidental latch-up of RY1 if a mechanical shock momentarily opens the NC contact. Once the microphone is keyed, RY1 will latch, which connects the NO contact to the 12 V supply. The NO contact is also connected to RY2's dc+ input, and it supplies operating power to the antenna relay.

Antenna Relay RY2

The transceiver is connected to COM, the receive-only antenna is connected to NO, and the transmit antenna is connected to NC. When 12 V power is available from RY1, antenna relay RY2 remains closed while the key line is open, thus connecting the transceiver to the receive-only antenna. Keying the transceiver releases

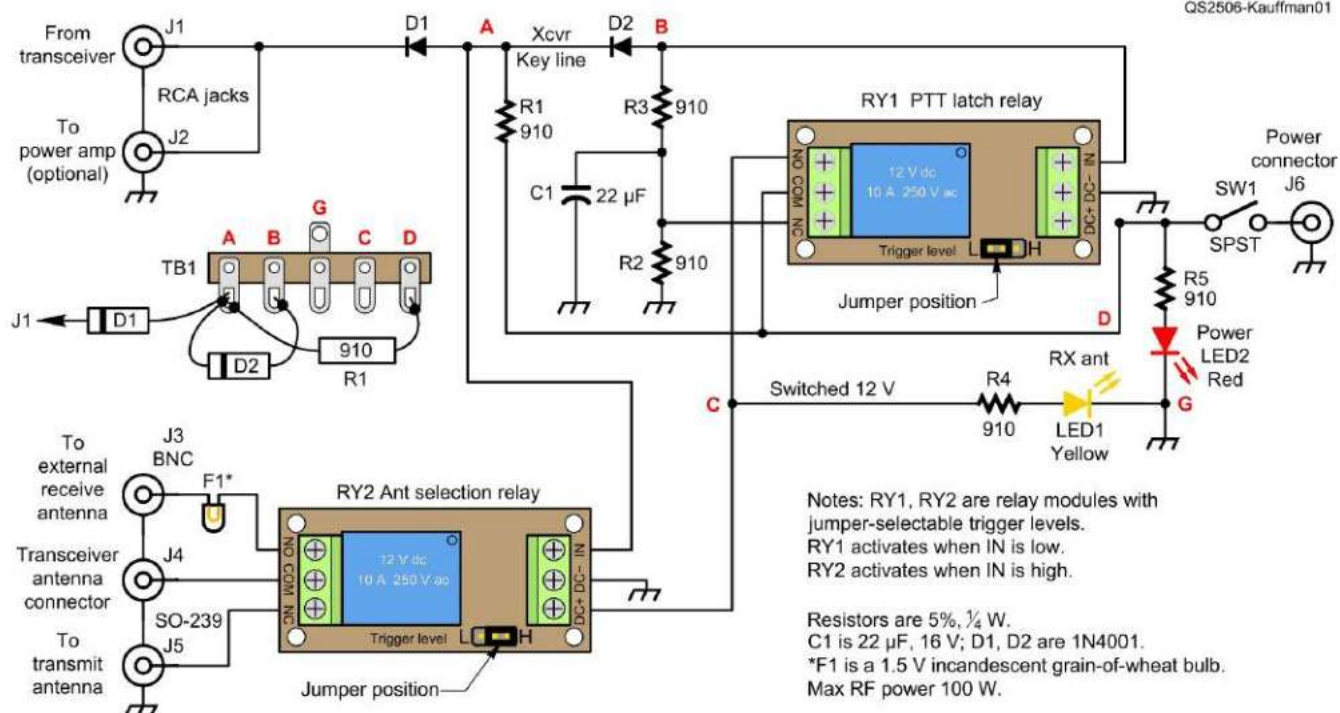


Figure 1 — The schematic of the XRAI-1. Note the jumper positions on the two relays.

RY2, which connects the TX antenna to the transceiver. If there is no 12 V dc power to the XRAI-1, RY2 remains open, and the TX antenna will be connected to the transceiver for transmit and receive. If the key line is not connected, RY1 will not energize and apply power to RY2, so the rig will remain connected to the TX antenna.

Building the XRAI-1

The required parts are given in Table 1. I found all of these parts on Amazon. While most are

not specific, relays RY1 and RY2 should be the Anmbest 12 V relay modules (www.amazon.com/ANMBEST-Module-Optocoupler-Trigger-Arduino/dp/B08PNHHC65?th=1), as they perform well.

In Figure 2, the XRAI-1 is constructed in a 4.7 × 3.1 × 2.1-inch metal box for shielding and good RF connector grounding. The placements of antenna relay RY2 and the SO-239 connectors are important for low standing wave ratio (SWR). The leads from J4 and J5 are #14 AWG and as short as possible (see Figure 3). The RX antenna fuse F1 is connected from RY2's NO terminal to the center pin of J3, the BNC connector. A small square of double-sided tape serves to anchor the bulb to the wall of the enclosure. As constructed, the SWR measured less than 1.1:1 from 1 to 30 MHz.

Relay module RY1 has resistors R2 and R3, capacitor C1, and a jumper soldered to points on the bottom of the circuit board to simplify the wiring. Refer to Figure 4 for placement of the parts and jumper. RY1 is fastened to the bottom of the enclosure with four #4-40 screws and spacers.

The LEDs are force fit into 3/16-inch holes, and a drop of super glue on the inside of the box anchors them in place. R4 and R5 are not required if 12 V LEDs are used, as 12 V LEDs have built-in resistors and can

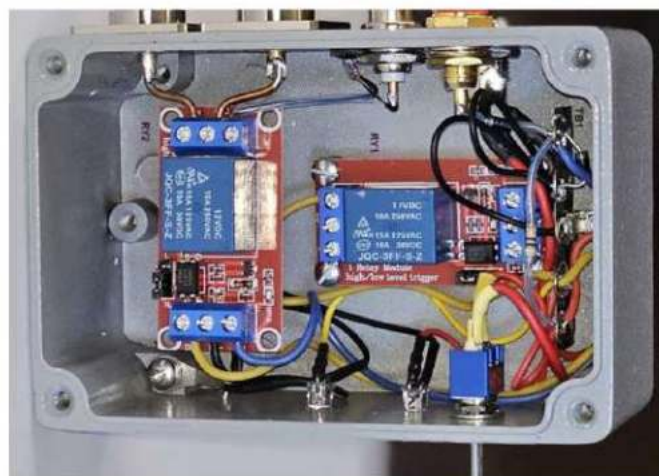


Figure 2 — An interior view of the XRAI-1.

Table 1 — Parts List for the XRAI-1

Quantity	Part/Label	Description
1	Enclosure	4.7 x 3.1 x 2.1-inch LeMotech aluminum electrical box
1	C1	22 μ F 16 V electrolytic capacitor with radial leads
2	RY1, RY2	Anmbest 12 V relay modules with optocoupler high/low-level trigger
1 – 2	J4, J5 (optional)	Mookeerf SO-239 connector flange panel chassis mounts
1	J3	BNC chassis panel-mount socket, female jack solder-type connector
1	J6	Ikelyonewy 5.5 x 2.1-millimeter dc power jack
2	J1, J2	Ikelyonewy RCA panel-mount plugs, female jacks
2	LED1, LED2	Edgelec 56-piece total (7 colors, 8 pieces) 12 V LEDs
1	F1	GPW02W 50-piece clear 3-millimeter 1.5 V 100 mA miniature grain-of-wheat bulbs
2	D1, D2	Bojack 1N4007 1 A 1000 V DO-41 rectifier diodes
5	R1 – R5	Chanxon 100-piece $\frac{1}{4}$ W 910 Ω metal film fixed resistors
1	TB1	FretMax (five-lug, third lug common) horizontal terminal strip
1	SW1	Miniature SPST switch with 6-millimeter bushing

be directly connected to the 12 V dc input and the switched 12 V points.

Operating the XRAI-1

Connect the XRAI-1 to the station's 12 V dc power supply. Connect the transceiver's key-line output to the XRAI-1 key-line input with a shielded RCA-to-RCA cable (the transceiver amp-key output may require a different connector). Connect the transceiver's antenna connector to J4 on the XRAI-1. Connect the TX antenna to J5. Connect the RX antenna to J3.

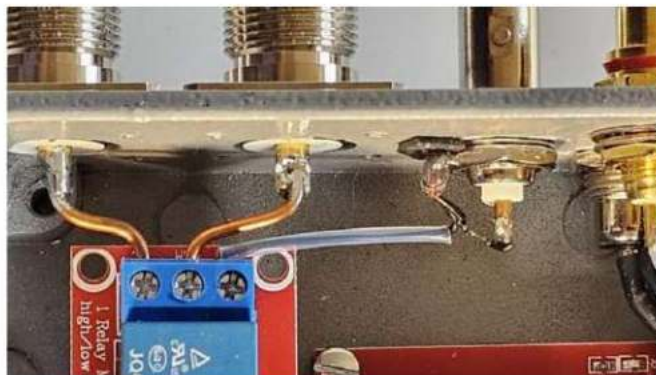


Figure 3 — A view of the short lead lengths and RX fuse F1 placement.

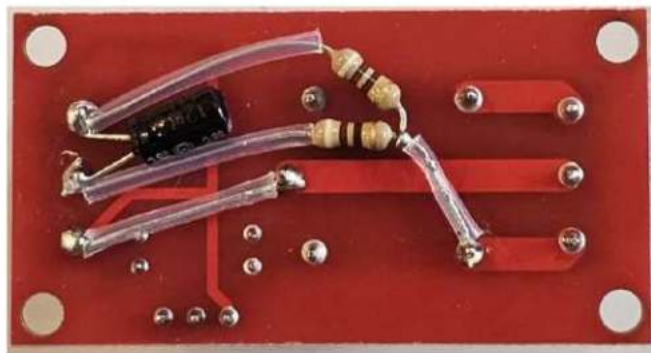


Figure 4 — Components added to the bottom of the RY1 module.

Turn the XRAI-1 switch to the **TX ANT ONLY** position and power the transceiver. No LEDs will be illuminated, and the TX antenna will be used for both TX and RX. If you turn the XRAI-1 on, the **AUTO MODE** LED will turn on, but the transceiver will still be receiving from the TX antenna. Key the microphone button briefly, and the **EXT RX ENABLED** LED will illuminate, indicating that the transceiver is connected to the RX antenna. When the microphone is keyed, RY2 switches the transceiver back to the TX antenna. Releasing the microphone button switches back to the RX antenna. To revert to the TX antenna for both transmit and receive, turn the switch to the **TX ANT ONLY** position. This turns the power off so RY2 is de-energized, keeping the transceiver connected to the TX antenna while receiving or transmitting.

It is important to note that relays RY1 and RY2 have 10-millisecond activate and 5-millisecond release times. While this is generally not a problem when using push-to-talk with voice communications, it's possible to momentarily hot-switch your transceiver's output and apply RF power to the receive antenna if using voice-operated transmit or CW. To keep this from happening, set your amp-enable-to-TX-out delay to greater than 10 milliseconds. This option is available on most modern transceivers.

I would like to thank Edward Cobb, K4YFR, and Robert Glenn, K4FHI, for encouraging me to write this article.

All photos provided by the author.

Ray Kauffman, AJ4YN, was first licensed in 2010 after spending many years as an avid shortwave listener. He has several patents and holds an FCC First Class Radiotelephone Operator License with Radar Endorsement. You can contact Ray at rayk2@cox.net.

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Product Review

Icom IC-R15 Communication Receiver

Reviewed by Steve Ford, WB8IMY
ford_steven@sbcglobal.net

The Icom IC-R15 is a handheld receiver for reception of AM, FM, and wide FM signals between 76 and 500 MHz. It offers a sophisticated dual-receiver design intended to appeal to enthusiasts who need versatile frequency coverage and user-friendly features.

Description

Measuring 2.3 × 4.6 × 1.3 inches (not including protrusions) and weighing about 9 ounces, the IC-R15 is not compact, per se, though it would likely fit within spacious pockets. If you'd rather carry the radio on your belt, Icom includes a robust clip that attaches to the back.

The colorful 1¾-inch (diagonal) TFT LCD screen provides a clear, easy-to-read display, even in bright daylight. In low-light conditions, the IC-R15's backlit buttons make operating much easier.

Immediately beneath the display you will find a multi-selection switch with a center button (think of the center button as an **ENTER** key). This is surrounded by six function buttons and a front-panel power on/off button.

Check the left side of the IC-R15 and you'll discover a slot for a microSD memory card (not included). On the opposite side of the case, there is a USB-C port, which serves as an interface for computer programming, but it also functions as a battery-charging jack. The IC-R15 ships with its own USB-C cable, but for charging you must provide your own power source. This could be a traditional 5 V USB wall-wart charger, a computer USB port, or whatever 5 V dc source you have on hand. Icom also offers a drop-in charger, known as the BC-223, as an option (compatible with the previous IC-R30 receiver).

According to the user manual, the rechargeable BP-287 3280 mAh lithium-ion battery pack (also compatible with the previous IC-R30 receiver) provides up to 13 hours of continuous use. This may be conservative. Even after about 8 hours of continuous monitoring, I noticed that the battery display still indicated an 80% charge remaining.

On the same side as the USB port, the IC-R15 also offers a 3.5-millimeter headphone jack. A female SMA

antenna jack graces the top of the radio (a flexible helical antenna is included), along with two concentric knobs. The top knob controls frequency selection and scrolls through menu options, while the bottom knob functions as a volume control.

According to Icom, the IC-R15 features superior IPX7 waterproofing and pro-grade construction.

Frequency Display and Scanning

The IC-R15 is highly intuitive to operate, so much so that I was able to use it straight from the box without consulting the manual. You'd think a radio with two separate receivers would be complicated from the start, but the Icom engineers went out of their way to make the IC-R15 as easy to enjoy as possible.

The frequencies of the dual receivers are displayed in two separate bands labeled A and B. The factory default mode is to display the bands in split screen at start-up, one atop the other, but you can also configure the IC-R15 to display just one band at a time. Volume and squelch levels can be set independently for each band.



Bottom Line

The Icom IC-R15 is the perfect VHF/UHF analog receiver for newcomers, as an introduction to ham radio, but also for more advanced listeners.

Table 1 — Icom IC-R15 Communication Receiver S/N 15001274, Firmware 1.02

Manufacturer's Specifications

Frequency coverage: 108 – 500 MHz,
88 – 108 MHz commercial FM broadcast.
Power requirements: 5.0 V dc ($\pm 5\%$) from
USB (charging only), 3.6 V dc using the
supplied battery pack.
Receiving: 360 mA.
Standby: 150 mA.
Power saving: 80 mA.
Modes of operation: A and B bands —
FM/FM-N/AM/AM-N; WX (Weather, 10
channels), FM radio (WFM, commercial
broadcast frequencies only).

Receiver

AM sensitivity: 10 dB S/N, 1 kHz, 30%
modulation:
108 – 142 MHz: ≤ 0 dB μ .
222 – 249.995 MHz: ≤ 0 dB μ .
250 – 400 MHz: ≤ 5 dB μ .

FM sensitivity: 12 dB SINAD, 1 kHz, 3.5 kHz
deviation:
108 – 249.995 MHz: ≤ -8 dB μ .
250 – 299.995 MHz: ≤ -3 dB μ .
300 – 500 MHz: ≤ -5 dB μ .

FM adjacent channel rejection:
AM/FM: ≥ 50 dB.
WFM: ≥ 35 dB.

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

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

S-meter sensitivity:
Not specified.

Squelch sensitivity:
Not specified.

Audio output: ≥ 0.12 W (8 Ω , 10% THD).

Size (height, width, depth, including protrusions): 5.25 $\times$ 2.25 $\times$ 1.25 inches.
Weight: 0.55 pound with antenna and battery.

Measured in the ARRL Lab

As specified.

Battery pack max voltage (100% charge): 3.98 V dc.
Maximum volume, no signal, lights on/off, one receive channel:
370/300 mA.
Maximum volume, no signal, lights on, two receive channels: 465 mA.
Standby, one receive channel, power save on/off: 72/138 mA.

As specified.

Receiver Dynamic Testing

10 dB (S+N)/N, 1 kHz tone, 30% modulation:

	Band A		Band B		
	AM	AM-N	AM	AM-N	
120 MHz	-113/0.51		-113/0.49		dBm/ μ V
240 MHz	-114/0.46	-115/0.40	-114/0.47	-115/0.39	dBm/ μ V
280 MHz	-113/0.52	-112/0.55	-113/0.49	-114/0.45	dBm/ μ V
350 MHz	-112/0.55	-113/0.52	-113/0.52	-114/0.45	dBm/ μ V

12 dB SINAD, 1 kHz, 3 kHz deviation:

	Band A		Band B		
	FM	FM-N	FM	FM-N	
100 MHz ¹	-118/0.28				dBm/ μ V
162.4 MHz	-124/0.15		-124/0.15		dBm/ μ V
146.02 MHz	-124/0.14	-124/0.14	-125/0.13	-125/0.13	dBm/ μ V
223.50 MHz	-125/0.13	-125/0.13	-125/0.13	-125/0.13	dBm/ μ V
440.02 MHz	-121/0.19	-122/0.17	-122/0.18	-122/0.17	dBm/ μ V

20 kHz spacing:

	Band A		Band B		
	FM	FM-N	FM	FM-N	
146.02 MHz	67 ²	70 ²	69 ²	68 ²	dB
223.50 MHz	69 ²	70 ²	69 ²	69 ²	dB
440.02 MHz	66 ²	67 ²	64 ²	64 ²	dB

At 20 kHz/10 MHz spacing:

	Band A		Band B		
	FM	FM-N	FM	FM-N	
146.02 MHz	58/66	56/65	58/66	58/66	dB
223.50 MHz	58/63	58/63	58/63	58/63	dB
440.02 MHz	67/69 ²	67/69 ²	65/70 ²	67/70 ²	dB

	Band A		Band B		
	FM	FM-N	FM	FM-N	
146 MHz	82		79		dB
446 MHz	85		84		dB

For full-scale bar graph reading: 146 MHz, 1.57 μ V; 223 MHz,
1.92 μ V; 440 MHz, 2.43 μ V.

	Min Threshold Setting		Max Threshold Setting		
	FM	FM-N	FM	FM-N	
146 MHz	-116/0.34		-106/1.16		dBm/ μ V
223 MHz	-114/0.44		-104/1.49		dBm/ μ V
440 MHz	-114/0.44		-103/1.66		dBm/ μ V

As specified.

¹ Broadcast FM (wide FM).

² The unit was noise limited at the value(s) shown.

When it comes to scanning, the dual-receiver design really comes into its own. You can set up two scans to run simultaneously on separate bands, which is a remarkable thing to see. Once again, the radio is so easy to operate that a single press of the **SCAN** button instantly displays your options in plain English. You can scan the band of your choice, using the parameters of your choice, all without consulting the user manual.

The receiver scans at blinding speeds, sweeping through 150 frequencies per second in VFO mode. The IC-R15 includes a range of scanning options, including Full Scan, Program Scan, Memory Scan, and Tone Scan.

Scanning is particularly smooth thanks to the IC-R15's voice squelch control (VSC) feature. With VSC enabled, the radio will automatically skip any signal that lacks a human voice. The VSC worked remarkably well, and I found it to be a godsend when running memory-write scans in particular. It isn't foolproof, but it does a fine job of avoiding most noise bursts, random beeps, and so on.

The IC-R15 treats FM broadcast reception as a separate mode. You access it by pressing the **MENU** button and then using the multi-selection control to highlight and select **FM RADIO** in the display. Even with headphones, reception is monaural only.

Memories

Memories are critical for any modern scanning receiver, and the IC-R15 is generous with 2,000 separate slots. You can store signals in memory groups that the IC-R15 refers to as "categories." This is a huge help in keeping all of your memories organized for easy access. You can even choose among a collection of icons (such as an airplane symbol for an aeronautical frequency) to add to memory labels in the display.

It is interesting to note that the IC-R15 comes preprogrammed with "marine VHF" and "airband" memory categories. The marine VHF memories are populated with all of the standard marine channels, but the airband category is subdivided into frequency memories for several airports: Narita and Kansai (Japan), Dulles (Washington, DC), Frankfurt (Germany), and Heathrow (United Kingdom). The frequencies include tower, ground, approach, departure, and more.

While the IC-R15's memories can be programmed from the front-panel buttons, it is much easier to do with software. There is an Icom programming software called *CS-R15*; it's not free, and at the time this review was written, the software was not available from any retailer in the US, but according to Icom it should be

available by the time the review is published. But RT Systems (www.rtsystemsinc.com) also offers a software package for the IC-R15 that includes a dedicated cable. The RT Systems cable is necessary because the software won't communicate with the IC-R15 without it; the Icom-supplied cable is not compatible.

Speaking of programming, the IC-R15 allows you to access the microSD memory card with your computer and edit its data directly. For this function you can use the supplied USB cable. You simply install the card of your choice, select the card-reading mode, and plug in the cable. Your computer then treats the card like a separate hard drive.

There is also a function that permits CI-V control of the radio via the USB cable, though at the time this review was written I couldn't locate CI-V control software specifically written for the IC-R15.

Listening In

Using the helical antenna indoors — inside an aluminum-sided house, no less — I found plenty of signals to enjoy. Granted, many public service systems have switched to digital, but several in my area still use analog FM. There was a healthy population of amateur FM repeaters, too. The popularity of digital systems notwithstanding, analog FM still dominates the ham community.

The IC-R15's speaker is small, but the audio sounded clean regardless. Audio fidelity was much better in headphones, as you'd expect. I tried a pair of wired headphones, but I also had the pleasure of using the IC-R15's Bluetooth functionality to pair the radio with my wireless earbuds.

The IC-R15 was sensitive enough that I was able to use it — and its helical antenna — to eavesdrop on signals from the International Space Station without difficulty. I even had an opportunity to decode slow scan TV transmissions from the station simply by feeding the IC-R15 audio to my computer.

Of course, attaching a better antenna makes a world of difference. After connecting my external outdoor antenna, I was deluged with signals and there were times when I had to resort to the IC-R15's attenuator function due to sheer overload. This is understandable, as a handheld receiver will have the proper sensitivity to perform with a small antenna, and signals may overload when connected to a higher-gain external antenna. Tying the handheld to an external antenna defeats the purpose of portability, but it is an interesting exercise just the same.

If you have a memory card installed, the IC-R15 will allow you to record anything you hear. Recording is toggled on and off from a front-panel button, and the audio is saved to the card as a .wav file. You can play these files through the radio or offload them to your computer.

Conclusion

The Icom IC-R15 is a feature-rich receiver that caters well to hobbyists and serious users alike. I even put it to use as a test receiver on my workbench.

Yes, there are other more expansive receivers on the market that include digital reception, but with so many

agencies switching to encrypted systems, the return on investment may be questionable.

It is also true that for an additional expenditure you can find handheld receivers that toss HF reception into the feature mix. However, unless you anchor the radio to a superior antenna, the results are often disappointing.

Overall, the Icom IC-R15 offers excellent value if you are in the market for an intelligently designed scanning receiver that offers excellent performance while keeping user-friendliness among its top priorities.

Manufacturer: Icom America, 12421 Willows Rd. NE, Kirkland, WA 98034, www.icomamerica.com. Price: \$559.95.

InnovAntennas 1712DUO HF Antenna

Reviewed by Ward Silver, NØAX
n0ax@arrl.net

The LFA Design

When reviewing “WARC band” beams, one option caught my eye — the two-element 1712DUO LFA beam from InnovAntennas, shown in the lead photo. The LFA driven-element design was created by InnovAntennas owner Justin Johnson, GØKSC, for Yagis in the VHF/UHF bands. He describes the basic LFA Yagi in the 25th edition of *The ARRL Antenna Book* as follows:

The LFA (Loop-Fed Array) replaces the tips of the driven element with an extended folded-dipole type feed laid flat on the boom. Thus, both sides of the driven loop are in line with the parasitic elements, rather than extending above or below the boom. Unlike a traditional folded dipole driven element, the feed point of the LFA design is in line with the boom and all elements...The LFA design leads to a symmetrical pattern in both the E and H planes.

The LFA is an evolution of Yagi design that provides more consistent performance across a band and reduces side lobes that pick up off-axis noise, both from horizontal directions and from ground-level sources. While this is a more significant problem at VHF/UHF, the benefits of reducing receive noise and interference are also useful on the higher HF amateur bands. You can find out more about LFA designs in

Bottom Line

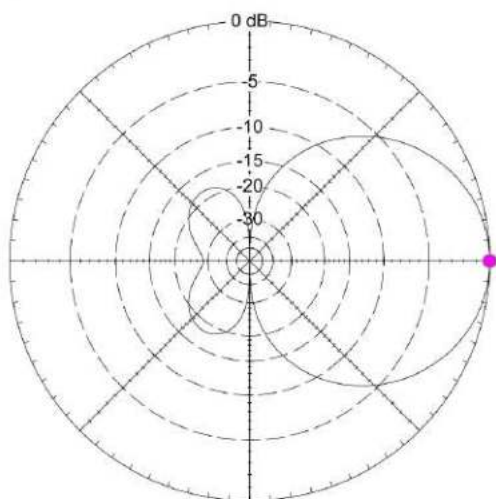
The InnovAntennas 1712DUO antenna complements a traditional tribander and is more effective on 17 and 12 meters. It's also well designed and constructed such that it should provide years of solid service.



[Image courtesy of DX Engineering]

The ARRL Antenna Book and from GØKSC's LFA design description at www.g0ksc.co.uk/g0ksc-articles/intro-lfa.html.

Folded-dipole driven-element designs have been common on VHF/UHF for many years, but not so much on HF. One benefit of the LFA design is a direct-feed 50 Ω impedance that does not require matching, such as by a gamma match or transformer. The feed point must be insulated from the boom, but because

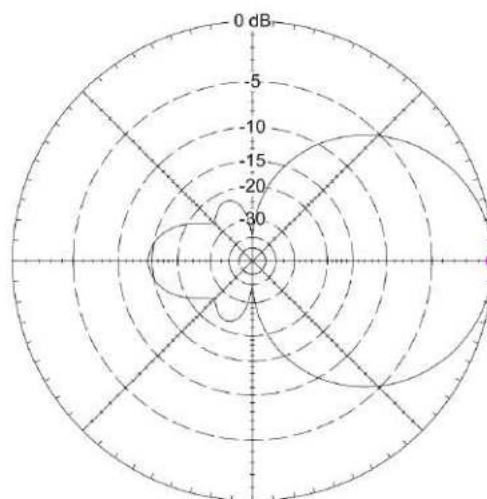


2/2 el 17m/12m DUO

18.1 MHz

Azimuth Plot	0.0 deg.	Cursor Az	0.0 deg.
Elevation Angle	0.0 deg.	Gain	6.96 dBi
Outer Ring	6.96 dBi		0.0 dBmax
Slice Max Gain	6.96 dBi @ Az Angle = 0.0 deg.		
Front/Back	28.2 dB		
Beamwidth	68.0 deg.; -3dB @ 326.0, 34.0 deg.		
Sidelobe Gain	-11.07 dBi @ Az Angle = 125.0 deg.		
Front/Sidelobe	18.03 dB		

Figure 1 — The 1712DUO 17-meter pattern. The two-element beam has a fairly wide beamwidth but the front-to-back and front-to-side ratios are quite good. [Image courtesy of InnovAntennas]



2/2 el 17m/12m DUO

24.92 MHz

Azimuth Plot	0.0 deg.	Cursor Az	0.0 deg.
Elevation Angle	0.0 deg.	Gain	7.97 dBi
Outer Ring	7.97 dBi		0.0 dBmax
Slice Max Gain	7.97 dBi @ Az Angle = 0.0 deg.		
Front/Back	14.37 dB		
Beamwidth	68.8 deg.; -3dB @ 325.6, 34.4 deg.		
Sidelobe Gain	-6.4 dBi @ Az Angle = 180.0 deg.		
Front/Sidelobe	14.37 dB		

Figure 2 — The 1712DUO 12-meter pattern. The two-element beam has a fairly wide beamwidth but the front-to-back and front-to-side ratios are quite good. [Image courtesy of InnovAntennas]

the element is electrically balanced, the center of the loop's opposite side is an RF-neutral point and can be connected to the antenna boom for mechanical stability. A feed-line choke should be used to prevent interaction with the coax shield.

Overview and Specifications

The 1712DUO is a two-element Yagi with an LFA driven element and single-conductor director on each band. Only the 17-meter driven element is connected to the feed line. The adjacent 12-meter driven element is excited by open-sleeve coupling. To ensure consistent coupling, a pair of plastic spacers hold the driven elements in alignment.

InnovAntennas products are distributed in the US by DX Engineering. The 1712DUO manual may be downloaded from the DX Engineering web page at www.dxengineering.com/parts/iva-18480-0004.

Element spacing is optimized for gain and front-to-back ratio across the relatively narrow 17- and 12-meter bands (200 kHz wide, 0.6% and 0.4% wide, respectively). See the manu-

facturer's specifications in Table 2. Free-space azimuth patterns for 17 and 12 meters are shown in Figures 1 and 2. In comparison, the two-element, 6-foot boom monoband designs in *The ARRL Antenna Book* have about 1 dB less gain and much lower front-to-back ratios. Table 2 also gives the main mechanical specifications.

It is important to manage expectations — regardless of driven-element design, the 1712DUO is still a two-

Table 2 — InnovAntennas 1712DUO HF Antenna

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

Band	Gain	Front-to-Back Ratio
17 meters	6.9 dBi	28.6 dB
12 meters	7.2 dBi	14.4 dB

SWR bandwidth:	200 kHz both bands
Power rating:	5000 W
Feed-point impedance:	50 Ω
Antenna feed-line connection:	Terminal studs

Wind surface area:	7.6 square feet (0.7 square meter)
Weight:	30 pounds (14 kilograms)
Boom length:	5.12 feet (1.56 meters)
Max. half-element length:	14 feet (4.26 meters)
Turning radius:	14.4 feet (4.39 meters)



Figure 3 — The elements are mounted on an aluminum plate using a STAUFF-style tubing clamp and stainless-steel hardware.

element Yagi. Its excellent front-to-side and front-to-back ratios reduce off-azimuth interference and noise, making the antenna sound a little louder than the usual two-element Yagis.

Mechanically, this is a very compact antenna with a boom length of just over 5 feet. The elements are much longer with the 17-meter driven element extending 14 feet on each side of the boom, creating a turning radius of 14.4 feet. The extra tubing required to construct the LFA elements makes the wind surface area of 7.6 square feet (0.7 square meter) somewhat higher than a single-tube driven-element Yagi design. This antenna can be handled by a HAM-IV-class rotator on the top of a mast, or inside a lattice tower combined with a small tribander, such as the A3S at 4.4 square feet. In temporary installations, it can be easily turned by hand.

The 1712DUO is a fairly narrowband design, and interaction with other antennas will typically result in a large shift in minimum SWR frequency or higher-than-expected SWR. If other antennas will be near the 1712DUO, check their elements or structural components, such as the boom, for resonance or a low impedance on 17 or 12 meters. For example, a 40-2CD “Shorty Forty” beam has a pronounced 17-meter resonance (and is quite useful on that band) that would affect the 1712DUO. To avoid interaction, consider orienting the 1712DUO so its elements are perpendicular to nearby conductors.

Construction

The antenna has a square boom that is different from the round tubing of most small Yagis. The element mounting plates have one bolt through the boom —

this sets element spacing. Four bolts then capture the boom with a threaded plate on the other side.

Each element is attached to its mounting plate with a STAUFF clamp, as seen in Figure 3. Stainless-steel bolts and nylon-insert nuts are used throughout. STAUFF clamps have become quite popular and give a more secure attachment than the usual U-bolts. Both insulating and all-metal clamps are used. The square boom and extra-sturdy clamps and plates result in an assembled weight of 30 pounds.

The boom-to-mast assembly uses the usual U-bolts and saddles to accommodate 1.5- to 2-inch-diameter masts. Because the boom is square, it will not rotate in the boom-to-mast clamp as with round tubing. Note that the antenna is not weight-balanced along the boom, which should be taken into account as the antenna is lifted into position and secured. Once mounted, this should not be a problem, as the antenna weighs only 30 pounds.

Individual element sections are relatively short, with none longer than 4.3 feet (1.3 meters) before assembly. Sections are held together with stainless-steel hose clamps. The slotted end of each element was prop-



Figure 4 — The antenna parts as received from the manufacturer.



Figure 5 — The 1712DUO elements and boom assembled prior to adding the boom-to-mast plate and plastic element stabilization strips.

erly deburred so there was no binding on insertion. Personally, I prefer bolts or rivets for assembling telescoping element sections because the hose clamps are intended for use on compressible plastic or rubber tubing, not for metal-to-metal joints. (Also, see the note on thermal cycling later.) Hose clamps also tend to snag on ropes and guys if not wrapped with electrical tape. Nevertheless, they are sufficient for this design.

The LFA loops are formed with a U-shaped piece of tubing that slides into the outer element. The antenna is tuned by sliding both U-shaped sections in and out in equal amounts, so the element remains symmetric with respect to the boom. The dimensions given were accurate, and no adjustment was required after assembly. SWR was initially tested with the boom vertical and the driven element about 10 feet off the ground. (This is a good technique to check HF Yagi assembly before lifting the antenna into final position.)

Due to the antenna's high-Q design, its resonant frequency and SWR dip minimum are quite sensitive to the final installation environment, so adjustment may be required when it is installed in its final location.

Assembly Notes

The antenna is shipped with the elements in several bundles and hardware in sealed bags (shown in Figure 4). A detailed bill of materials is provided, and I recommend a part-by-part check to ensure you have everything before starting the assembly. The cover drawing suggests a 3 kW bead balun should be used, but one is not supplied with the antenna and will have to be obtained separately.

Note that the antenna pieces and hardware are all metric. Most of the hardware is available in the US, but the tubing is not, except from specialty suppliers. The antenna I received had two tubing sections of an incorrect diameter. My provider shipped replacements promptly. No spare nuts or bolts are provided, but they are standard metric sizes available in the US. You might want to get a few spares locally in case you lose or misplace anything. To build the antenna, you will need a 10-millimeter and 7-millimeter metric socket or nut driver, a metric hex key set ($\frac{3}{16}$ - and $\frac{5}{32}$ -inch hex keys will also work), and a tape measure with a metric scale.

The manual provided is rather sparse, with assembly instructions limited to a sequence of drawings, similar to certain Scandinavian furniture makers. The drawings are very clear and quite detailed but assume a bit of skill and experience in putting together antennas. There is no discussion of how the antenna works (see the InnovAntennas website), troubleshooting, or a suggested order of assembly beyond figure numbering.

Before beginning, study the manual drawings carefully, especially the plan view titled "Antenna Construction" on page 2, to be sure you understand each major subassembly. Separate the hose clamps by size and the tubing by diameter and length so you use only the right parts for each element. Perform a loose assembly to check for parts and lengths before final assembly of each element. Don't tighten the bolts and nuts on the element mounting plates until you double-check element lengths and orientation of the feed-point hardware. Use a small tri square to be sure the element mounting plates and elements are perpendicular to the boom before tightening. Figure 5 shows the antenna with all elements mounted on the boom.

As with all aluminum and stainless-steel assemblies, you should use protective lubricants to protect the hardware and connections. Figure 3 shows my two favorites: small amounts of Jet-Lube Anti-Seize on threaded stainless-steel fasteners and a thin, even coating of SS-30 Anti-Seize on aluminum tubing joints.

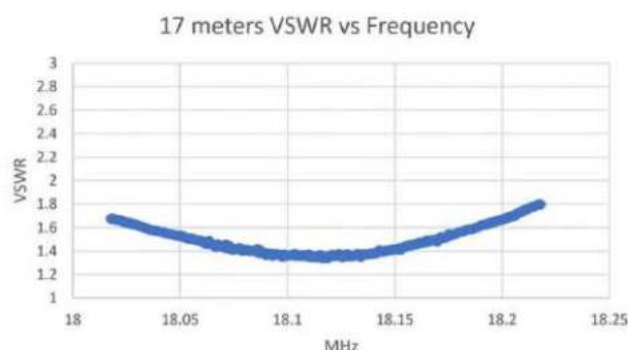


Figure 6 — Measured SWR for 17 meters with the antenna installed 25 feet above ground on a telescoping aluminum mast.

An antioxidant compound such as Noalox or Penetrox can be substituted for SS-30. Have some shop rags handy to keep your hands and tools clean!

Pay particular attention to the feed-point orientation before final driven-element assembly and tightening all clamps. If you plan on using a full 1.5 kW, rotating the feed point so the attachment screws are parallel to the boom avoids creating a space that can capture debris or insect nests, which can arc. If you use a feed-line choke balun, consider how you will mount it and the coaxial feed line before tightening the driven-element clamps. The lead photo shows the balun oriented toward, and the coaxial feed line wrapping around, the end of the boom. You can also orient the coax and balun toward the boom-to-mast clamp.

A final note — mechanical fasteners usually loosen with thermal cycling, no matter how tight they seem after initial assembly. If possible, let the antenna sit outside through at least one day-night cycle and then do a final tightening of each clamp and bolt. You may be surprised at how much additional tightening is possible, particularly of the hose clamps!

The 1712DUO On the Air

After assembly, I operated with the antenna mounted on a temporary mast at a height of about 25 feet above ground. This is about 0.5 wavelength on 17 meters and 0.8 wavelength on 12 meters. This is typical for portable operation on a telescoping mast or on a roof-mounted tripod for a permanent station. SWR measurements are shown in Figures 6 and 7.

The antenna can be partially disassembled and carried on a vehicle roof rack for portable operation. I would also recommend this antenna as a nice complement to a triband Yagi, mounted above it by at least 6 feet and

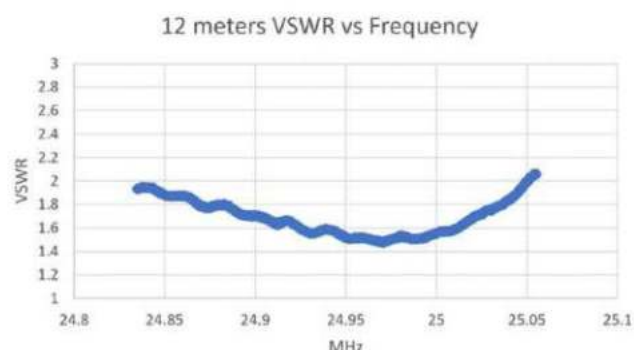


Figure 7 — Measured SWR for 12 meters with the antenna installed 25 feet above ground on a telescoping aluminum mast.

ensuring that the tribander has no resonances on 17 or 12 meters.

Even at the low height, the performance of this two-element beam is a distinct upgrade over a wire $\frac{1}{2}$ -wave or trap dipole and would be a dramatic improvement over a $\frac{1}{4}$ -wave ground plane or loaded whip. Mounted higher above ground, this antenna could hold its own against conventional three-element designs. Remember that it is a two-element Yagi and maintain appropriate expectations!

I was able to compare the 1712DUO on the mast to a nearby XR5-T multiband two-element Yagi at about 60 feet up. From Reverse Beacon Network reports from transmission comparisons and FT8 reception signal-to-noise ratio values, the 1712DUO was within 1 S-unit of the higher antenna on lower-angle paths. There were some short-skip, high-angle reports where the 1712DUO was more than an S-unit better than the higher antenna — a valuable reminder that the lower elevation angles are not always best, particularly for domestic propagation around North America. To the side and rear, the two antennas were about the same on comparable paths.

Summary

Adding the 1712DUO to complement a traditional tribander or wire antennas is a good strategy to be more effective on 17 and 12 meters. Similarly, it would be a good choice for a special event or expedition needing a dedicated 17- and 12-meter beam. The antenna is well designed and constructed such that it should provide years of solid service.

Manufacturer: InnovAntennas Limited, 20 Sanders Rd., Canvey Island, Essex SS8 9NY, UK, www.innovantennas.com. Distributed in the US by DX Engineering. Price: \$829.99.

Banggood SDR TX/RX Switch

Reviewed by Phil Salas, AD5X
ad5x@arrrl.net

Adding an external SDR receiver to an existing transceiver is becoming popular due to the low cost of these receivers and the additional features they can add. These features include spectrum and waterfall displays, which older transceivers don't have. And these SDRs often cover additional frequency ranges not covered by many transceivers. You can easily and inexpensively connect an SDR to your existing transceiver with the Banggood SDR TX/RX Switch.

Switch Description

The SDR TX/RX switch selects either your transceiver or SDR receiver based on RF sensing from your transceiver. It can also use a push-to-talk (PTT) input from your transceiver. An internal jumper (see Figure 8) determines whether the transceiver and SDR receiver paths are both active during receive, or just the SDR receiver. Normal operation uses the transceiver for transmitting, and the SDR receiver for receiving. When the jumper is removed, both receivers are active. In this case, the RF input is split and sent to both the transceiver and the SDR. Audio from both the transceiver and SDR receiver can be connected to the SDR TX/RX switch. The audio output from the SDR TX/RX switch can then be fed to an external speaker. When connected in this manner, the receiver's audio is muted when transmitting. This is an important feature, in that unmuted receiver audio, when transmitting, can be extremely irritating even with high isolation between the transmit and receive paths.

The lead photo shows the front of the switch, and Figure 9 shows the rear panel; the transceiver and antenna interfaces are UHF connectors. The SDR RF interface is an SMA connector. If used, the PTT input is a 3.5-millimeter mono connector. The transceiver and SDR audio inputs and the audio output are all 3.5-millimeter mono connectors. The 13.8 V dc input uses a 2.1 × 5.5-millimeter jack. An SMA/SMA cable, a 3.5-millimeter pendant cable, and a 2.1 × 5.5-millimeter pendant cable are supplied with the SDR TX/RX switch. There is no on/off switch, though a green power LED lights when the unit is powered. PTT

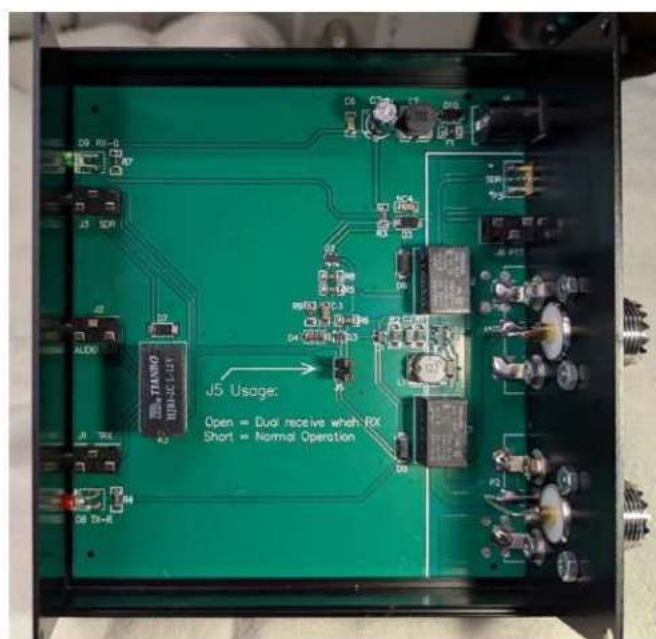


Figure 8 — Internal view of the SDR TX/RX switch.



Figure 9 — Rear of the SDR TX/RX switch.

Bottom Line

The Banggood SDR TX/RX Switch provides an inexpensive and simple means of adding a separate receiver (SDR or otherwise) to your existing station.

Table 3 — Banggood SDR TX/RX Switch

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

Impedance:	50 Ω
Frequency range:	dc – 160 MHz
Maximum transmit power:	100 W
RF sensing threshold:	<10 mW (test frequency is 1.8 MHz – 30 MHz)
Enable/release timing:	<20 ms enable, <190 ms release
Insertion loss:	<0.3 dB @ 144 MHz (typically 0.2 dB)
Receive isolation:	>38 dB @ 144 MHz (typically 40 dB)
Power supply:	13.8 V dc 200 mA
Dimensions:	4.9 × 4.3 × 2 inches (126 × 119 × 52 millimeters)
Weight:	15 ounces (430 grams)
Gas discharge protection	

switching is designed to interface with any amp-key interface that provides a contact closure to ground. When the TX/RX switch is in the transmit mode, either due to RF sensing or the PTT input, a red transmit LED is illuminated. This same red LED is constantly illuminated when both receive paths are active during receive (when the internal jumper is removed). Relays are used for both RF and audio switching. If PTT switching is used with both the SDR TX/RX switch and an external amplifier, you will have to use an amplifier keying splitter cable. Finally, no documentation comes with the SDR TX/RX switch, but the manual can be found on the Banggood website (see <https://usa.banggood.com/SDR-Transceiver-and-Receiver-Switch-Antenna-Share-TR-Switch-Box-with-Gas-Discharge-Protection-160MHz-p-1734290.html>). The published specifications are shown in Table 3.

Performance Measurements

I began my tests by looking at SWR/return loss and insertion loss. All measurements were made with an Array Solutions VNAuhf. The VNAuhf was calibrated using N/UHF and N/SMA adapters. The insertion loss through path was calibrated using a microwave 3 dB attenuator in series to improve the return loss of the through cable and VNAuhf input impedance.

Figure 10 shows the TX-to-antenna SWR/return loss, and Figure 11 shows the TX-to-antenna insertion loss.

As you can see, the input is capacitive below about 120 MHz and inductive above this frequency. There is appar-

ently a resonance in the through path — possibly between the relay contacts and the relay coils. The SWR is about 1.5:1 on 10 meters, and about 2:1 on 6 meters. And insertion loss is about 0.5 dB on 10 meters and 1.0 dB on 6 meters. This is certainly not consistent with the published insertion loss specifications. Based on these measurements, I would not recommend transmitting above 10 meters when using this switch.

I next looked at insertion loss from the antenna port to the SDR port (normal operation), and insertion loss to both the radio port and the SDR port when both receive paths are active. Any loss here impacts the noise figure of the SDR receiver. The measurements are shown in Figures 11, 12, and 13.

As you can see in Figure 12, for normal operation (SDR path only on receive), the loss on 6 meters is only about 0.3 dB, and about 0.6 dB on 2 meters. Figures 13 and 14 show the insertion loss for the SDR and transceiver receive paths, respectively, when both receive paths are active. About 4 dB of insertion loss is added to both receiver paths due to splitting the RF signal.

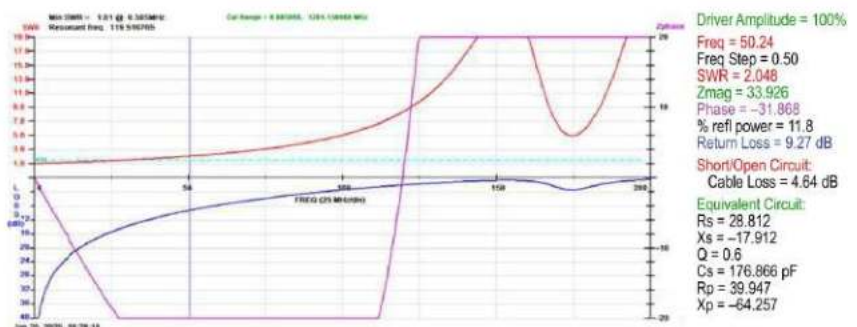


Figure 10 — TX/ANT SWR/return loss.

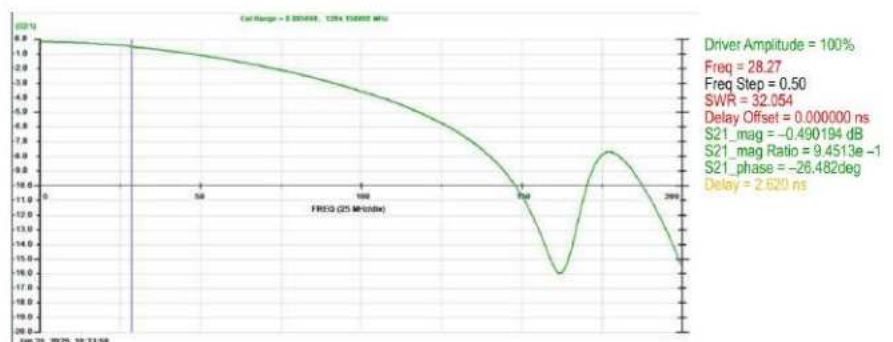


Figure 11 — TX/ANT insertion loss.

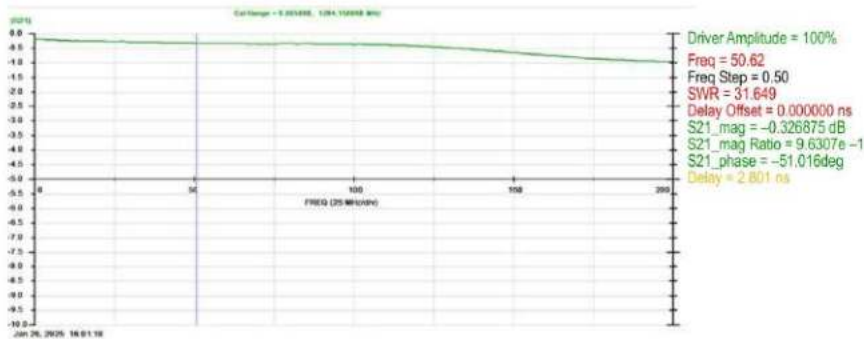


Figure 12 — ANT/SDR insertion loss.

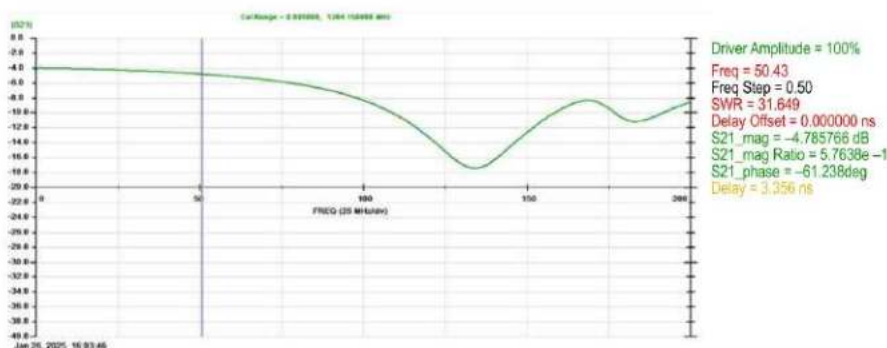


Figure 13 — Antenna/SDR dual receive.

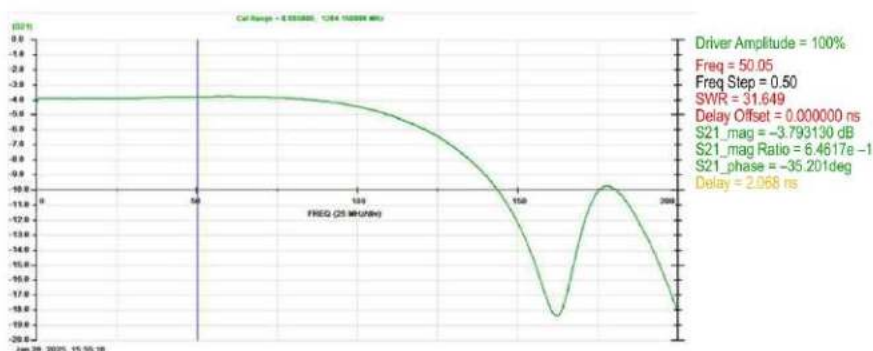


Figure 14 — Antenna/radio dual receive.

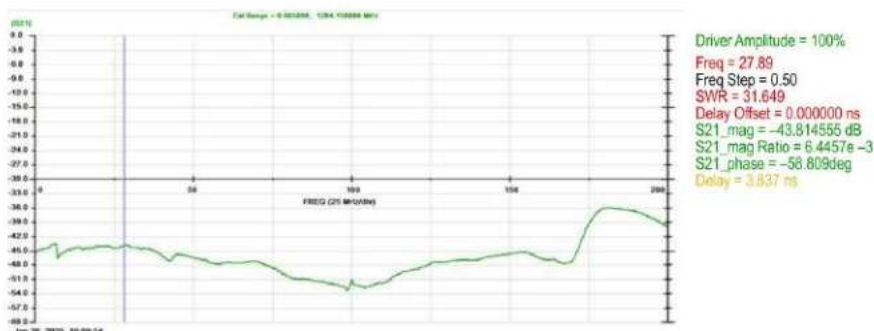


Figure 15 — TX/RX SDR isolation.

Finally, I looked at isolation between the TX/RX SDR port when in the transmitting mode. For a 100 W transmitter, you want any leaked RF power to be less than about 10 mW so as not to damage your SDR. That means that you would want at least 40 dB of isolation if you are using a 100 W transmitter. The data shown in Figure 15 shows a minimum isolation of almost 44 dB.

Before using the switch, it is important to understand the relay operation times. We certainly don't want to damage an SDR, or hot-switch the transmitter by transmitting before the relays have had time to operate. We will first look at the RF sense timing.

Figure 16 shows the transmit relay enable timing when the TX/RX switch senses RF. The upper trace is the transceiver RF output, and the lower trace is the TX/RX switch antenna RF output. RF sensing is much better than specified, at about 2.5 ms sense to switch. However, during the 2.5 ms, the transmitter is being hot-switched. I was only transmitting a few watts, but you can see the impact on the transmitter output during the relay switching. Perhaps a 2.5 ms hot-switch is not a problem for some transceivers. However, it makes me uncomfortable. As the RF sensing prevents the relays from disengaging until RF goes away, there was no hot-switching when the relays were disabled.

Next, I looked at the transmitter output when using the PTT input from the transceiver to enable the TX/RX switch. You can see in Figure 17 that there is no hot-switching. And the reason can be seen in Figure 18. The lower trace shows the PTT input, and the upper trace is the transmitter output. As you can see, PTT occurs almost 15 ms before the RF output occurs.

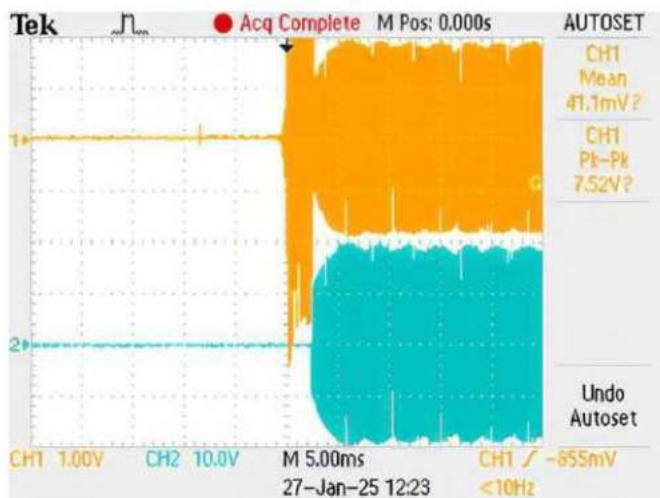


Figure 16 — Upper trace is the transmitter output. Lower trace is the TX/RX switch RF output during RF sensing.

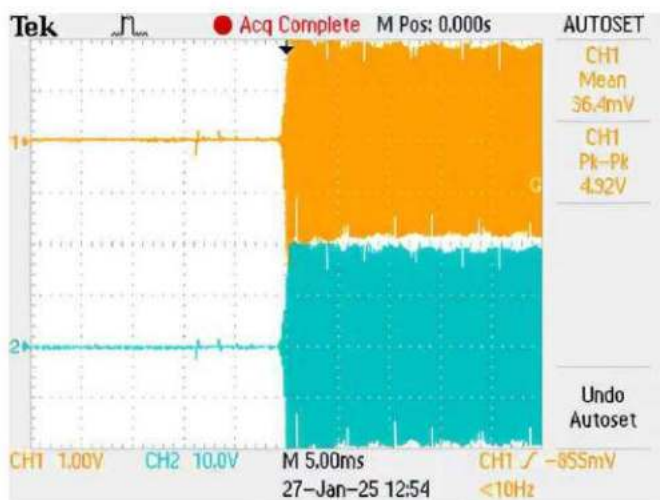


Figure 17 — Transmitter output and TX/RX switch output with PTT switching.

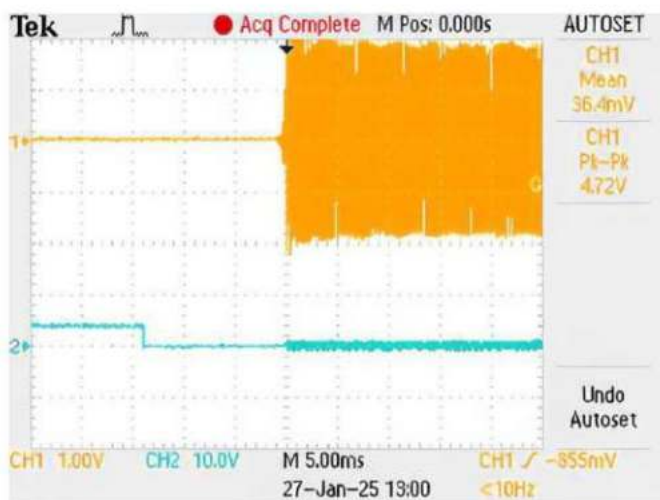


Figure 18 — PTT input to the TX/RX switch occurs ~15 ms before RF is enabled, thus preventing hot-switching.

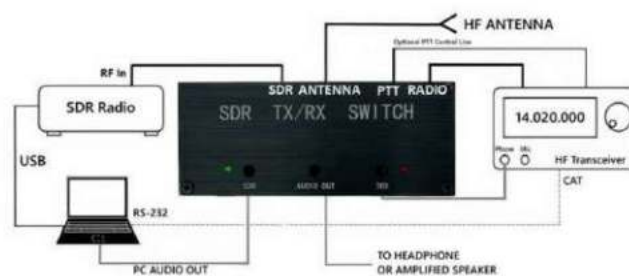


Figure 19 — A typical setup using a computer-controlled SDR with the SDR TX/RX switch.

Using the SDR TX/RX Switch

Figure 19 shows a typical setup. Alternately, the SDR can be a standalone receiver that is individually tuned rather than under control of a computer.

I operated the SDR TX/RX switch with my Yaesu FT-710 transceiver and Xiegu X5105 as a second receiver. If you're using a transceiver as a second receiver, make sure not to transmit, as you can't transmit into the SDR SMA port and this will cause damage. Connecting the audio outputs of both radios to the SDR TX/RX switch was a necessity. Even though there is >40 dB of isolation, the leaked signal into the receiver is still very strong. For example, with 40 dB of isolation in the TX/RX switch, a 100 W transmitter will be at +10 dBm into the SDR. An S-9 signal is -73 dBm, so when your receiver is on the same frequency as the transmitter, you will have a very strong (S9+43 dB) receive signal when you are transmitting. While this level will not harm your SDR, the audio output while transmitting is very loud and irritating. This is why it is important to use the audio muting capability of the TX/RX switch.

Also, because of the fast sensing, I found a lot of relay chatter when using RF sensing with both CW and SSB. The relays are not noisy, but you can hear them if you are not using headphones. Using PTT solves this problem, as the TX delay on CW and PTT on SSB keep the SDR TX/RX switch in the TX mode during transmissions.

Conclusion

The Banggood SDR TX/RX Switch provides an inexpensive and simple means of adding a separate receiver (SDR or otherwise) to your existing station. And while the SDR may be used up to 160 MHz, you should limit your transmissions to 1.8 – 30 MHz and use the PTT input to prevent hot-switching.

Manufacturer: Banggood, www.banggood.com.
Price: \$31.99.

Ask Dave

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

Quiet Bands and a Wet Antenna

Quiet HF Band Solution

Q Ben Roberts, K1ALR, asks: Why is there hardly anyone on HF? I have an Albrecht AE-2990 and a rubber duck antenna.

A Your Albrecht radio can send and receive SSB signals on 10 and 12 meters, and 11 meters with a slight modification. Your immediate problem is the antenna. The small, flexible antenna is inadequate for receiving ham radio SSB stations on 10 and 12 meters unless the other station is only a short distance away. According to pictures of your radio I found on the internet, the antenna connector is a BNC. This allows you to connect to a half-wave dipole mounted outside easily. You can create a fan dipole to accommodate 10 and 12 meters. Do not forget to ground the outer shield of the BNC.

On 10 and 12 meters, AM, SSB, and CW are generally horizontally polarized, hence the recommendation for the dipole. CB work is usually vertically polarized. Also, the FM antenna is generally vertically polarized for 10 meters, which is the only HF ham band authorized for FM.

Let's broaden our look at HF band activity. Many factors affect how busy the bands are. First and foremost, the most popular mode is FT8, usually found about 74 kHz above the band edge, though this can vary. There is almost always some FT8 activity on every band. At night, you'll look for this on 80 and 40 meters. During the day, 80-meter propagation is poor, but you'll find FT8 activity on 40, 30, 20, 17, 15, 12, and 10 meters and sometimes 6 meters. So, a good way to see if the band is open is to tune for FT8 activity. Sometimes, FT8 is the only activity because it gets through so well, even when other modes do not. If your receiver has a band scope or spectrum display with a waterfall, you can spot active stations easily.

Another way to discern band activity is with WSPR. I have a small ZachTek WSPR transmitter I feed to an end-fed half-wave antenna that covers 80 through 10 meters. So, the ZachTek can be set up to transmit first on 80, then 40, then 30 meters, and so on. Then I go to www.wsprnet.org/drupal/wsprnet/map to see where I am being heard and on what band, as shown in Figure 1.

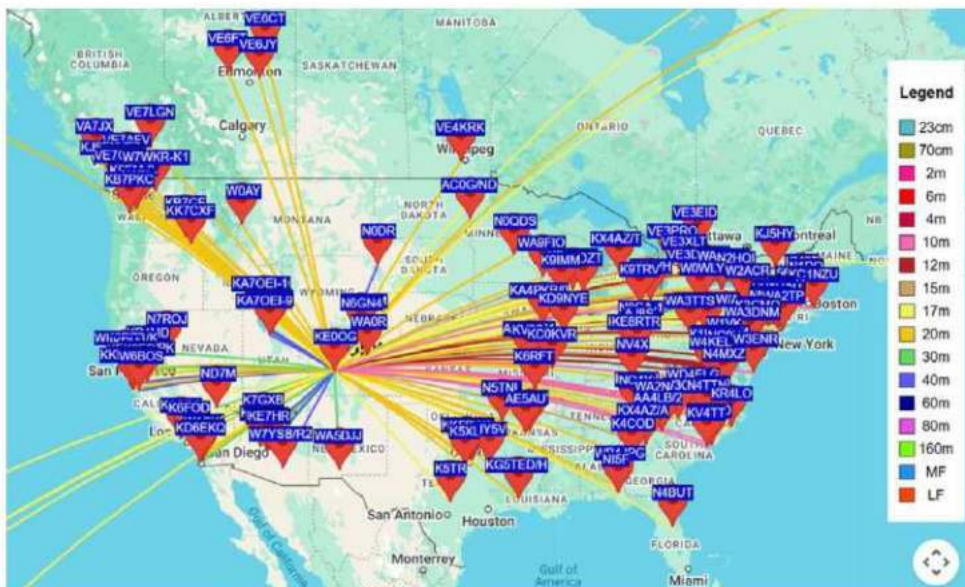


Figure 1 — This map shows which stations heard Dave, KEØOG. His ZachTek WSPR transmitter puts out only 200 mW but can be heard around the world.

Eighty meters is often open after sunset until sunrise. The band is heavily occupied by long-standing nets, so 80 meters is not a good band for calling CQ. Forty meters is often open in the daytime and can have good DX propagation in the early evening. Forty meters and up are great bands for calling CQ. Twenty meters is a workhorse band for long-haul domestic and DX contacts during the day. During the high points in the 11-year solar cycle (like right now), this can be a great band for DX. Bands above 20 meters are often open

only in the daytime. When they're open, these bands can provide great DX.

I think you will find the greatest success with your CQs if you call in the General-class portion of the band because these band segments attract the General and Extra-class licensees and are thus more populated. As you operate on HF, you'll build intuition about where to find hams to talk to. Don't be afraid to call CQ. One day, I didn't find any stations on 12 meters. I remembered a tip I read in *QST* and tried calling CQ. Three strong stations answered! All of them were waiting for someone else to call CQ. Even if the band seems empty, try calling CQ.

You can also look at ionospheric forecasts at <https://voacap.com/dx>. Active geomagnetic storms can completely block HF or greatly enhance it. So, if you cruise all the bands and hear nothing, this could be the cause.

Rain Affects Cobweb Antenna

Q David Webber, GØPBS, asks: I built a homebrew cobweb antenna, as shown in Figure 2, that works brilliantly on 20 to 10 meters. When it rains, and water droplets cling to the wires, the resonant frequency drops considerably. Normally, the standing wave ratio on each band is very low, but the bandwidth is narrow, so tuning usually ends up below the amateur bands when it rains. In most cases, it is too low for auto-tune to work. The antenna wire has a plastic coating, and the gaps opposite the balun are plastic cable ties. What are your thoughts?

A The plastic coating on the wires required you to shorten the elements from the bare wire lengths. The plastic is an insulator and acts as a dielectric. If you put plastic around the wire, it electrically lengthens the element. That's why the wires must be cut slightly shorter. Water also has a dielectric constant, so adding water to the insulated wires changes the dielectric constant, meaning the wires will behave as if they were longer. This will lower the wire's resonant frequency. Enough water might push the resonant frequency below the band.

I live in the semi-arid part of southwestern Colorado, where we get most of our moisture as snow or during thunderstorms. I don't operate during thunderstorms and thus have very little experience working with wet antennas. So, I can say water droplets on the antenna will change the resonant frequency, though I can't say how much.

The classic way to electrically shorten an antenna is to add capacitance at the feed point. You'd have to



Figure 2 — David Webber's, GØPBS, cobweb antenna. A cobweb antenna is a fan dipole that is wrapped on itself. It is a compromise antenna. One compromise is that for any given band, it doesn't cover the entire band and must be tuned to cover the part of the band that is desired. Another compromise is that the gain is 2 or 3 dB less than an equivalent dipole. Because the antenna is built upon the idea of a dipole, it is a balanced antenna, and radials are not required. [David Webber, GØPBS, photo]

experiment with the capacitance value, but I doubt it would be more than a few picofarads. You can do the same thing from inside your station if you are using an antenna tuner. When an antenna is wet, sometimes it is necessary to touch up the tuner settings. If you can use a vector network analyzer, such as the NanoVNA, you can quantify the electrical characteristics of your cobweb antenna under wet and dry conditions. This may help you determine the capacitance you need to add. Perhaps you could set up a coax switch to include or exclude this capacitance.

Send your questions to askdave@arrrl.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.

Take Field Day on Vacation

Utilize this ham's arrangements to have a successful ARRL Field Day during any getaway.

Jim DeLoach, WUØI

My wife and I like to explore our beautiful continent, travel across America frequently, and have implemented five Field Days from the road. For years we desired to drive the Alaska-Canada Highway into Alaska and then take the Alaska Marine Highway ferry back. In late June 2017, we finally went for it and operated the most amazing and challenging Field Day of all from Haines, Alaska. Our experience illustrates how you can implement a successful Field Day from wherever you happen to be vacationing during the fourth full weekend in June.

Preparations

We weren't familiar with the region, so I investigated state and national parks in the area. I quickly realized some rules prohibited securing ropes to trees and discovered other restrictions that made these parks unsuitable for our purposes. Vacation rentals turned out to be a much better option.

After searching a few vacation rental websites, I found a local rental agent in the area and described our unique needs. I explained that I was looking for a clear view to the southeast, preferably on the coast in a rural setting, with space for wire antennas and tall trees to hold them up. She was eager to help and found us a beautiful spot south of Haines.

The site had a lot of tall trees and occasional clearings, so wire antennas seemed like the way to go. I used

Google Earth to determine where an antenna might fit, but I packed several designs because I couldn't be sure.

Simple antennas are best for Field Day, but Haines presents some unique challenges, as it is at the top of Chilkoot Inlet, surrounded by massive mountains in all directions except the southeast. Fortunately, much of western North America lines up perfectly with this narrow opening, but I knew working the Midwest or East would be unlikely. Thus, I needed as much horizontal gain as possible directed down the narrow inlet, with a vertical takeoff angle broad enough to work from Vancouver, Canada, to San Diego, California.

I searched for ideas in *The ARRL Antenna Book for Radio Communications* and *ARRL's Wire Antenna Classics*, then used the 4NEC2 software to model several promising designs. I looked for multiband antennas that might fit within the forest clearings while maintaining a broad vertical takeoff angle at different heights. I selected the seven most promising designs, including my rhombic loop twofer (available in the June 2017 issue of *QST*). I constructed the antennas using 18-gauge multi-stranded wire and chose ladder line because it packs tighter than coax and has lower losses.

We would arrive in Haines just before Field Day, so I tried to get as many things done ahead of time as possible.

I prepared the training and promotional materials, received permission from the rental property owner for visitors to access the site, and applied for a special 1 × 1 call sign. I authored a press release for the local newspaper using the ARRL template, and they were eager to cover the event.

I made sure all of the necessary software was loaded on our laptops and purchased a license for the *N3FJP* logging app. I tested Winlink, which I planned to use for message handling and Section Manager emails. I found the W1AW and K6KPH bulletin schedules and used the VOACAP propagation website to predict what frequencies and times would most likely work.



Jim DeLoach's, WUØI, Subaru Impreza packed with gear on the Alaska-Canada Highway. [Jim DeLoach, WUØI, photo]



Jim DeLoach, WUØI, deploying the rhombic loop twofer antenna. [Maggie DeLoach, KK6DZS, photo]

Packing Up

I assembled and tested the station end to end and listed every item. Then I made sure to have spares and a backup plan. The entire station had to fit within an already pretty full Subaru Impreza, so space was limited. I protected the transceiver and key accessories in a well-padded Pelican case. I placed the wire antennas and other parts in plastic bags to keep things organized. These items, along with the ladder line, power cables, an AirBoss antenna launcher from Olah Technologies, safety equipment, and tools, were packed in a larger shipping trunk. I placed two deep-cycle

batteries, which I charged using solar panels, behind the driver and passenger seats. With our Impreza stuffed to the gills, we were ready to hit the road.

Haines Field Day

Two weeks and 4,000 miles after leaving home, we made it to Haines. I immediately saw that there was only one clearing suitable for antennas. I set up the rhombic loop twofer antenna because it could get us out on four bands with solid gain.

Friday morning, we deployed the antenna. We set up the station in the rental cabin, and everything was going great until the Field Day laptop died. Fortunately, I had my work laptop as a backup. By late Friday, we were on the air and ready.

On Saturday morning, we worked SSB on the low bands and sent Winlink messages. Visitors showed up right away, and we spent much of the day promoting amateur radio and getting to know the friendly residents of Haines. I ran a training program on amateur radio satellites and easily made an FM satellite contact. By late afternoon the crowds had thinned, and it was time to really make some contacts.



Jim DeLoach, WUØI, making an FM satellite contact. [Maggie DeLoach, KK6DZS, photo]

We switched the antenna to rhombic mode but struggled to get through on 20-meter SSB to the lower 48 states. Alaska is far from most North American hams, link margins are lower, and beams are rarely pointed north. Digital was dominated by PSK31, which was ridden with interference and almost unusable. However, CW worked well.

Contacts started flowing once I got the courage to dust off my rusty key. The noise floor was delightfully low, and I was able to make CW contacts on 20 and 40 meters throughout the contest. It took 30 to 50 W to get through reliably.

As expected, we worked western stations from British Columbia, Canada, to San Diego, and as far east as North and South Dakota and West Texas. I could barely hear the W1AW bulletin, but the K6KPH bulletin from California boomed in on 20 meters.

In the end, we scored 1,608 points, with 92 contacts, coming in second in Alaska. Alaskan stations rarely have big contact totals, so bonus points were key.

All in all, it was a successful and fun effort. There is no way this Alaska expedition could have succeeded without the preparations we made before we left. Tackling Field Day while vacationing is challenging but also very rewarding. It can take you to surprising places and connect you with people you would otherwise never know.

More information about Jim DeLoach's, WUØI, Alaskan Field Day can be found at www.deloach.net/Alaska.htm. His next Field Day will be from Hawaii with Denning Powell, WH6GDC; Jon Griffiths, W6PI, and Andreas Wachter, K6AKW. Listen for K6H in June 2025. Jim can be reached at jim@deloach.net.

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

VOTE

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

Maximize Your ARRL Field Day Performance

Expert advice from the W3AO team will help you get the most out of your station, regardless of the bands, modes, and antennas you may be using.

Frank Donovan, W3LPL, and Rol Anders, K3RA

If you are a Field Day enthusiast, perhaps you have worked W3AO (see Figure 1). Our group has entered Field Day for more than 20 years in categories with many transmitters on the air simultaneously, often exceeding 10,000 contacts. Groups often ask us for recommendations on how to improve their scores, given that we have transmitters on virtually all modes and bands whenever and wherever there is a chance that contacts can be made.

Bands and Modes

The most common question we are asked is: “What bands and modes should we concentrate on?” Because we are on all bands and modes simultaneously, W3AO has extensive data that will help you make decisions. The 20- and 40-meter bands are by far the most productive Field Day bands due to propagation. Forty meters is open around the clock, and 20 meters is open much longer than every band other than 40. Year after year, our highest contact totals have been on 20- and 40-meter SSB. But the Field Day scoring system always produces our highest point totals on 40- and 20-meter CW. If you have one or more operators with CW skills, those two CW bands should be their highest priority. As you can see in Table 1, our 40- and 20-meter CW, SSB, FT8, and Get on the Air (GOTA) stations have exceeded our point totals

on every other band. If you do not have one or more experienced CW operators, excursions to FT8 on 40 and 20 meters could be among your most productive operating periods.

CW, SSB, FT8, and GOTA Stations

To capitalize on the enormous potential of 40 and 20 meters, it is obvious that you should spend as much time on both bands as possible. That means having the ability to operate at least two modes on these bands simultaneously. One hundred watts of RF and basic antennas provide the opportunity to simultaneously operate multiple transmitters on the same band with little to no mutual interference. W3AO operates as many as four stations simultaneously on both 40 and 20 meters — SSB, CW, FT8, and sometimes GOTA.

If you’re considering the use of four simultaneous transmitters on the same band, the question remains: “How do you do that?” All W3AO antennas on the same band are horizontally polarized, are installed end to end with at least one-half wavelength of separation between them, and are oriented broadside to the highest concentrations of population. When operating an SSB GOTA station in the same band and at the same time as the main SSB station, their frequencies are separated as much as possible.

Cross-Polarization Does Not Adequately Reduce Inter-Station Interference

Years ago, we tried the “cross-polarization solution” by installing a quarter-wavelength vertical antenna as far



Figure 1 — The W3AO Field Day team in action. [Audrey Suhr photo]

Table 1 – W3AO Bands and Points Breakdown in 2024								
Band (Meters)	Contacts				Points			
	CW	FT8	SSB	GOTA	CW	FT8	SSB	GOTA
80	466	204	387	57	932	408	387	57
40	1211	292	1709	160	2422	584	1709	160
20	1213	533	1423	216	2426	1066	1423	216
15	634	334	925	259	1268	668	925	259
10	8		235	3	16		235	3
6		83				166		
2		23				46		
Totals	3532	1469	4679	695	7064	2938	4679	695

as possible from the horizontally polarized antenna on the same band. We were never able to eliminate the interference between stations, even with substantial antenna spacing. Besides, verticals have drawbacks that make them undesirable for Field Day.

Simple Antennas

Because 40 and 20 meters are by far the most productive Field Day bands, they are also the most crowded, especially on SSB and FT8. As a result, it's critically important that you install simple but highly effective 40- and 20-meter antennas.

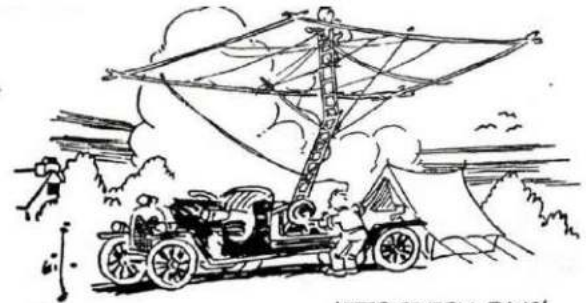
It is tempting to consider a quarter-wave vertical antenna given the ease of erection and omnidirectional radiation pattern. However, unless your Field Day site is on the oceanfront or in a salt marsh, horizontally polarized antennas at modest heights will consistently outperform vertically polarized and sloping antennas by as much as 8 dB at the same location. Furthermore, to the extent you can make a vertical antenna work, vertically polarized antennas have inadequate higher-angle radiation needed for the many Field Day contacts taking place within less than 1,000 miles. Vertically polarized antennas and low antennas such as NVIS horizontal dipoles, low horizontal loops, and magnetic loops are proven poor performers on these highly productive but crowded bands, and they will quickly discourage all but your most hard-boiled operators.

Beam Antennas

You may have heard stories of clubs that decided to build their "dream antenna" for Field Day — perhaps erecting a huge multi-element Yagi for 20 meters. Is it worth the extra effort? Definitely not.

Increased gain in one direction always results in unwanted loss in another, and you want a strong signal into all the large population centers without need for a rotator. A horizontally polarized Yagi with a maximum of three elements (a 3 dB beamwidth of nearly 70 degrees) is preferred. Eliminating a rotator means one less thing to break, as well as simplified setup and operating.

Near the center of the US, a 20-meter horizontal dipole broadside east/west at a 30- to 50-foot height will work quite well, perhaps supplementing with a small rotatable two- or three-element horizontal Yagi. Near the east and west coasts, a fixed two- or three-element 20-meter beam at a 30- to 50-foot height will cover almost all of the major population centers without the need for a rotator.



AFTER SEVERAL DAYS' WORK WE WERE READY TO TRY "THE MONSTER"

This cartoon from a 1949 issue of QST is as valid today as it was 76 years ago. "Monster" high-gain antennas are not the way to ensure high contact rates on Field Day.

Be sure you know where to accurately aim your antennas. Print a map of your Field Day site along with a Great Circle map centered on your location, such as those available at <https://ns6t.net/azimuth/azimuth.html>. Figure 2 shows a Great Circle map centered on W3AO. All of our HF antennas are fixed due west, which maximizes our coverage of high-population areas.

At W3AO, we've found that horizontally polarized, center-fed half-wavelength dipoles are effective on 40 meters, and small two- or three-element Yagis at 30- to 50-foot heights are effective on 20, 15, and 10 meters. In the past, we went to considerable effort to erect two-element 40-meter beams, but our half-wavelength horizontal dipoles have proven to be just as productive.

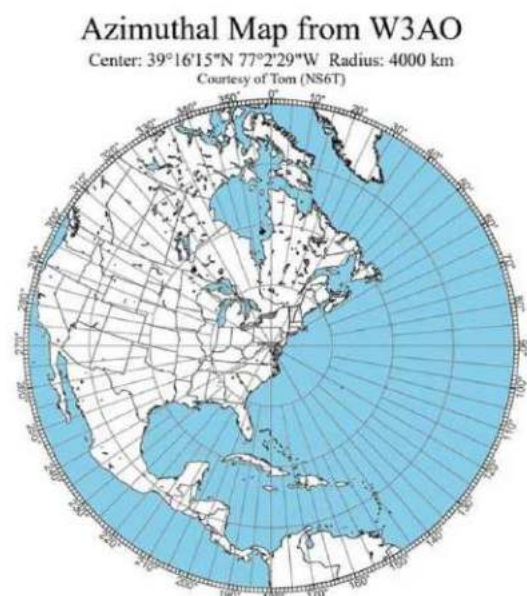


Figure 2 — A Great Circle map centered on W3AO.

Antenna Height Matters

All W3AO antennas are installed at 50 feet or less. To maximize coverage from your antennas, you do not want high antennas optimized for low-angle radiation at the expense of needed higher-angle radiation, nor should you use low antennas with inadequate low-angle radiation. A 40-meter half-wavelength dipole at 40 feet has the desirable radiation pattern shown in Figure 3. It provides excellent 78-degree broadside beamwidth and adequate higher-angle radiation at all azimuths. This is ideal for 40 meters during the day, and it provides sufficient low-angle radiation for making contacts late at night.

Band-Pass Filters

Inexpensive 100 W transmit/receive band-pass filters for each station provide valuable protection against crossband front-end overload, but band-pass filters won't help with in-band interference between stations. That can be controlled by simple end-to-end antenna placement.

Most harmonics between bands can be placed out of band by judicious choice of operating frequencies. For example, harmonics from a 40-meter SSB transceiver operating in the General portion of the band — say, at 7220 kHz — will appear at 14,440 kHz, well outside the 20-meter band. Even a 40-meter CW signal at 7060 kHz will have a second harmonic at 14,120 kHz, which is a relatively unused portion of the band during Field Day.

Other HF Bands

The 160-meter band will produce very few points and will complicate your antenna arrangements. After 40 and 20 meters, 15, 80, and 10 meters — in that order — are the most productive Field Day bands. When 20 meters slows during the day, especially on Sunday, 15 or even 10 meters might be more productive for several hours. Likewise, when 20 slows during Saturday nighttime hours, 80 meters might be quite productive.

While 40-meter dipoles might work well enough on 15 meters, a small two- or three-element Yagi at least 30 feet high will be far superior. Definitely install an 80-meter half-wavelength horizontal dipole at least 30 feet high if you can, but this is not essential for a successful Field Day.

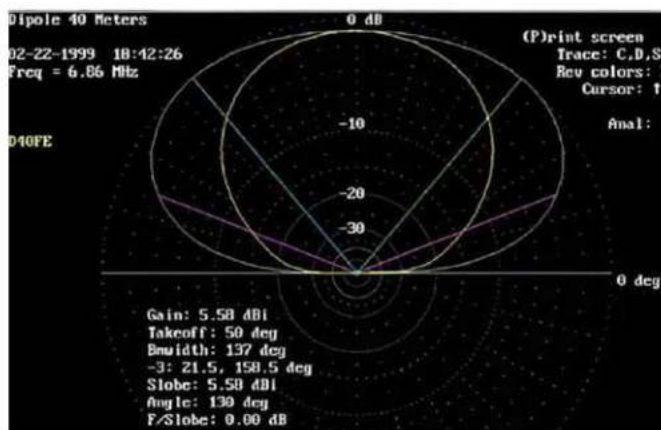


Figure 3 — The radiation pattern of a 40-meter horizontal dipole at 42 feet.

6-Meter FT8

A VHF station is a freebie from a transmitter count standpoint in nearly all Field Day entry categories, providing a valuable addition to your score. The vast majority of all Field Day VHF activity is on 6-meter FT8. A modest 6-meter beam (ideally with a small rotator or manually rotatable) at a 30- to 50-foot height is ideal.

Have Fun and Be Safe!

Finally, remember the Field Day “prime directive” (right after “Safety First”) is to have fun. Simple but effective antennas — especially for 40 and 20 meters — will increase your team’s fun factor. Here’s wishing you a safe and fun Field Day 2025!

Frank Donovan, W3LPL, began his ham radio adventures at age 12 during the Providence Radio Association, W1OP/1, Field Day in 1959. His multioperator teams have made more than 1 million DX contacts in CQWW and ARRL DX contests. Frank contributed to the updated propagation section of the 100th edition of *The ARRL Handbook*. He retired 14 years ago as a chief engineer at General Dynamics Corporation. Frank can be reached at donovanf@erols.com.

Rol Anders, K3RA, was first licensed in 1958. Now retired as Chief Scientist for Space at Northrop Grumman Space Systems in Maryland, he is active in contests from home, W3LPL, and V26B, and he is an avid DXer. He is long-time chair of the National Conference of Volunteer Examiner Coordinators Question Pool Committee. Rol teaches free online licensing classes to hundreds of students each year, and he has been an organizer and 20-meter CW operator of the W3AO Field Day team since 1999.

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



Jacek Pawlowski's, SP3L, "Multi-V Rotary Broadband Antenna for the 14–30 MHz Range" won First Place in the 80 Through 10 Meters category. Watch for Jacek's project in an upcoming issue of QST.

Announcing the Winners of the 2024 QST Antenna Design Competition

Out of the dozens of entries we received, these rose to the top.

The 2024 QST Antenna Design Competition sought entries in three categories: "160 Meters, LF or VLF," "80 Through 10 Meters," and "6 Meters and Up."

After weeks of evaluating the more than 300 pages of material supplied in the entries, as well as generating their own models, the judges have made their decisions.

First Place entries will be awarded \$500, Second Place entries will receive \$250, and Third Place will receive \$100. All entries listed here will be published.

QST extends sincere thanks to all the entrants, as well as our gratitude to the ARRL Lab staff and the QST Technical Editors for serving as the judges.

160 Meters, LF or VLF

First Place: Bob Glorioso, W1IS, and Bob Rose, KC1DSQ, "An All-Band 160-Meter OCF Antenna"

Honorable Mention: Jim Spaulding, WØUO, "Ground-Independent Beverage on the Ground"

80 Through 10 Meters

First Place: Jacek Pawlowski, SP3L, "Multi-V Rotary Broadband Antenna for the 14–30 MHz Range"

Second Place: Greg Mihran, KJ6ER, "PERformer (Portable, Elevated, Resonant) Antenna"

Third Place: Yasuhiro Kawai, JH1KOJ, "Exponential Spiral Antenna"

Honorable Mention: David Cutter, G3UNA, "80-Meter Portable Yagi-Uda Three-Element Array for Field Day, SOTA, or IOTA"

Honorable Mention: Hajime Nakajima, JR1OAO, "Desktop MLA"

6 Meters and Up

First Place: Fred Lass, K2TR, "The Tomato Stake Antenna: An Optimized 6-Meter Array"

Second Place: Charlie Dieterich, N2CTW, "Rigel-6 Antenna"

Honorable Mention: John Post, K7SKI, "Adjust-a-J Antenna"



Certificate of Code Proficiency Recipients



This month, ARRL recognizes merit and progress in Morse code proficiency on the part of the following individuals, who have achieved proficiency at the following rates, in words per minute.

November 2024

Edward K. Metzler, KN9V 10
Paul B. Walp, WB6PIO 10

December 2024

Brian A. Bayani, KT3X 10
Gary L. Carlson, KF5NV 10
Barry G. Fluxe, W4LSV 10
Barry G. Fluxe, W4LSV 15
Franz Willy Odenthal, DK5EQ 15
Kurt Hohler, HB9FMJ 20
Jonathan Leung, VA7JC 20
Lance Martin, VK6DU 20
Gary W. Stephan, AE4GS 20
Kurt Hohler, HB9FMJ 25

January 2025

Ronald M. Bell, KG5CWH 10
Luke A. Sandell, KN4FVR 10
Freddie O. Cruz, AA2QL 15
Forrest Phillips, AE0QH 15
Ron Kinney, KC0ZPS 30

February 2025

James J. Werth, KD1AO 15
Barry G. Fluxe, W4LSV 20
Dominick F. Golino, NR2Z 20
Roger L. Burkhart, N3GE 25

March 2025

Richard L. Eilers, Jr., K4RLE 10
Horacio S. Falciglia, KA8TVY 10
Sherrick A. Slattery, KA6NZB 15
Brian A. Bayani, KT3X 20

April 2025

Scott A. Fronius, N1HQZ 10
Steven M. Johnson, WB4WBO 10
Clifford R. Cantrell, N5GWU 15

Congratulations to all of the recipients.

June 2025 W1AW Qualifying Runs

W1AW, the Hiram Percy Maxim Memorial Station at ARRL Headquarters in Newington, Connecticut, transmits Morse code Qualifying Runs to assist ham radio operators in increasing and perfecting their proficiency in Morse code. Amateur radio operators can earn a Certificate of Code Proficiency or endorsements by listening to W1AW Qualifying Runs.

June Qualifying Runs will be transmitted by W1AW in Newington, Connecticut, at the times shown on 1.8025, 3.5815, 7.0475, 14.0475, 18.0775, 21.0675, 28.0675, 50.350, and 147.555 MHz. The West Coast Qualifying Runs will be transmitted by K6KPH on Saturday, June 21, at 2 PM PDT (2100 UTC) on 3581.5, 7047.5, 14047.5, 18077.5, and 21067.5 kHz. Unless indicated otherwise, sending speeds are from 10 to 35 WPM.

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

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

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

Members of the North Fulton (Georgia) Amateur Radio League (<https://nfarl.org>) are offering to

subsidize the total cost of a Code Proficiency certificate or endorsement submission for any individual age 21 years and younger, and who reside in either the US or Canada. Participants who wish to make use of this offer should indicate on their Qualifying Run submissions they are age 21 or younger, and certify as such via their signature. Eligible participants are not required to send any fee with their Code Proficiency submissions.

For more information about Qualifying Runs, please visit www.arrl.org/qualifying-run-schedule

For information about how to qualify for the Certificate of Code Proficiency, please visit www.arrl.org/code-proficiency-certificate.



W1AW Qualifying Run Schedule – June 2025 (All times are in Eastern Daylight Time.)

Monday	Tuesday	Wednesday	Thursday	Friday
6/2 4 PM – 2000Z 10 – 35 WPM		6/4 7 PM – 2300Z 35 – 10 WPM		6/6 10 PM – 0200Z (6/7 – UTC) 10 – 40 WPM
	6/10 10 PM – 0200Z (6/11 – UTC) 10 – 40 WPM	6/11 4 PM – 2000Z 10 – 35 WPM	6/12 9 AM – 1300Z 35 – 10 WPM	
6/16 10 PM – 0200Z (6/17 – UTC) 35 – 10 WPM		6/18 9 AM – 1300Z 10 – 35 WPM	6/19 7 PM – 2300Z 10 – 35 WPM	
	6/24 9 AM – 1300Z 35 – 10 WPM	6/25 10 PM – 0200Z (6/26 – UTC) 10 – 40 WPM	6/26 4 PM – 2000Z 35 – 10 WPM	

2025 ARRL FIELD DAY GUIDE



QST Field Day Section, June 2025
Sponsored by LDG Electronics
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Frequently Asked Questions

Here are some of the most common questions that we receive about ARRL Field Day. If you have a question that's not covered here, visit the Field Day FAQ pages in the "Rules, Entry Forms and Information Packets" section at www.arrl.org/field-day#rules or email fdinfo@arrl.org.

Q What is our Field Day class?

A Field Day entries (such as 21A, 3B, etc.) are classified according to the maximum number of simultaneously transmitted signals, followed by a designator indicating the nature of their individual or group participation. The transmitter number is not the number of physical transmitters onsite, but the maximum number of transmitters on the air at any point during the event. See the Field Day rules for more information on each class.

Q What is the Field Day exchange?

A Stations located in the United States, Canada, and US possessions exchange their Field Day operating class and ARRL/RAC Section. For example, a three-transmitter Class A station in Connecticut would send "3A CT" on CW and digital, or "3 Alpha, Connecticut" on phone. Stations located outside of the US and Canada send their operating class and "DX."

Q How do I determine my ARRL Section?

A A complete list of ARRL Sections is available at <https://contests.arrl.org/contestmultipliers.php?a=wve>. While some Sections are an entire US state or Canadian province, there are several states (Florida and California, for example) that have multiple Sections within them. See www.arrl.org/section-boundaries to determine which Section you are located in.

Q Our club would like to run a 40-meter CW station and a 40-meter SSB station at the same time. Is that permitted under the Field Day rules?

A Yes, that is permitted. You're allowed to have three signals on the air on the same band at the same time — one CW, one phone, and one digital.

Q I will be participating with my club Saturday during the day. Can I get on the air from home and make some Field Day contacts using my own call sign afterwards?

A Yes, the only limitation is that you cannot make contacts for points with any group or station from which you participate during Field Day. For example, you can't call the club's 2-meter Field Day station while driving to the site for QSO point credit.

Q What bands are we allowed to use on Field Day?

A Field Day operation is permitted on the 160-, 80-, 40-, 20-, 15-, and 10-meter HF bands, as well as all bands 50 MHz and above. Use of the 2200-, 630-, 60-, 30-, 17-, and 12-meter bands is prohibited.

Q Our group is planning to operate at our usual Field Day site, but some members will be operating from their home stations or from other locations. If we submit an entry using the club call sign, can members who operated using their own call signs contribute to the club's aggregate score?

A Yes. If your club is hosting a group Field Day effort, it will submit an entry as usual, using the club call sign. Club members operating at other locations will submit separate entries with their own call signs and will enter the club name on the entry form for club aggregate scoring.

Q The trustee of our club call sign is an Extra. Does this mean our station can operate on any frequency?

A No. A club call sign carries no operating privileges. A station may only operate according to the privileges of the control operator at the control point for that station. For example, if a control operator is a General, that transmitter may only be operated using General-class privileges.

Q We have a small group of area hams. I have a large, deep property, and we will be setting up in my backyard. What class will we be?

A Class A and Class B stations are designated as portable stations, with the difference being the number of participants. Class B stations are limited to 1 or 2 participants, which includes anyone assisting in setup/breakdown, as well as operating. If you're not using your normal station, or using any facilities installed for permanent station use, then you'd qualify as Class B. If you're operating from your permanent station location, then you'd be a Class D or E home station.

Q How do I know if my Field Day entry has been accepted?

A The web app will display a confirmation number and email a confirmation of your Field Day entry to the email address entered via the app. If accepted, the entry will appear on the "Field Day Entries Received" page at <https://field-day.arrl.org/fdentriescvtd.php>. If you have difficulty submitting an entry, contact fieldday@arrl.org.

FIELD DAY Media Coverage

BY ARRL PUBLIC RELATIONS AND OUTREACH MANAGER SIERRA HARROP, W5DX

ARRL Field Day is a tremendous opportunity to get your local amateur radio club, and ham radio, on your local news outlets. In Public Relations, we call it *earned media*. Your activation presents a strong story that earns placement. In return, we measure *ad value equivalence* (or *AVE*) — the amount of money ARRL and all the clubs would have had to pay to place ads for the same amount of coverage that you, the local amateur radio public information volunteer, earned. The AVE for 2024 ARRL Field Day was nearly \$20 million, reaching 1.58 billion viewers, readers, and listeners. This very real, measurable impact is only possible thanks to each amateur radio club participating in ARRL Field Day, developing and reaching out to local media contacts.

On the ARRL Field Day website (www.arrl.org/FieldDay), you'll find a PR kit. It contains information and tools developed to make the task of publicizing your activation less daunting. There are step-by-step guides for each element of the process, and a sample press release that will allow you to fill in your club's details and contact information and have something ready to send.

Here are some tips found in the PR kit that can position your club to get maximum reach, exposure, and AVE for 2025 ARRL Field Day:

- 1 Use the press release template contained in the kit, adding your club's logo and details.
- 2 Email the news release/media advisory to editors at your local paper, radio, and television stations. Follow up with a telephone call within a few days to see that it was received, and offer any additional information. Remember to check if the person is on deadline or if he or she has time to talk.
- 3 Field Day may be a training exercise that the media will enjoy, but make sure to talk about all aspects of what amateur radio is: public service, a hands-on way to learn science, and a great time.
- 4 Avoid amateur radio jargon in any press materials and in conversations or interviews with media representatives.

- 5 Designate someone at your Field Day site who will be able to greet media, talk about amateur radio, and explain what is happening at the event. Be sure the person you pick is someone who can answer questions in a clear, concise, and professional manner.
- 6 Leverage the power of social media. If your club doesn't have a page or account, start one now. Find a club member to be your social media content developer. "Friend" or "follow" as many local media representatives as you can. Provide regular content to your social media pages, so your club doesn't appear to be stagnant. Distribute your press release via your social media accounts, and invite local journalists via social media to visit your Field Day site.
- 7 Take a lot of good action photos of your Field Day event.
- 8 Post colorful, easy-to-read flyers in prominent places: libraries, supermarkets, schools, etc.
- 9 Invite your mayor or other local official to your Field Day site. Get photos!
- 10 Write a letter to the editor of your local paper, and invite readers to visit your Field Day site and learn more about amateur radio.
- 11 Print and share handouts for non-hams to learn more at your Field Day site (www.arrl.org/brochures-and-exhibit-materials).

ARRL FIELD DAY MEDIA OUTREACH TIMELINE

1 month – 3 weeks before:

Book guest appearances on broadcast news and talk shows.
Hint: Bring video clips from years past for TV, and audio for radio.

2 weeks before:

Send release and photos to weekly newspapers.

Week of event:

Do guest appearances on radio and TV.

Week of event:

Send press releases to TV news assignment editors and reporters.

3 – 4 days before: Send releases to daily newspapers.

2 – 3 days before: Send reminders to all daily media.

FIELD DAY Logging Software

BY ARRL CONTEST PROGRAM MANAGER PAUL BOURQUE, N1SFE

With the popularity of computer logging programs that support ARRL Field Day, logging your contacts during Field Day is easier than ever. Many modern radios can interface directly to a computer that offers automatic logging of the band and frequency that the contacts are made on.

When selecting a logging program to use, choose one that is specifically designed as a contest logging program. General-purpose logging programs may not prompt you to log the required information that is being exchanged during the event. The software needs to be capable of exporting the results in the correct format for submission of your entry. Visit <http://arrl.org/field-day#rules> for a list of logging software that supports Field Day.

While Field Day is not an adjudicated contest, we do require that an effort is made to ensure that duplicate contacts (or “dupes”) on the same band and mode are not included in the QSO totals that are submitted in your entry. Contest logging software actively alerts you if a duplicate contact is being logged. [See Figure 1.]

Some logging software offers built-in networking capability, which is useful to larger groups that have several stations scattered around a single Field Day site. Many groups use the mapping feature of N3FJP’s ARRL Field Day Contest Log to display the cumulative ARRL and RAC Sections contacted on a large monitor as a demonstration to visitors to their Field Day site. It’s an effective way to welcome newcomers to the hobby, or those who’ve never operated Field Day before. [See Figure 2.]

When Field Day is over, you’ll need to export the data needed to submit your Field Day entry using the web app at <https://field-day.arrl.org/fdentry.php>. The required file needs to be either a dupe sheet (a list of contacts sorted by band and mode) or a Cabrillo-formatted log, which you’ll attach to the entry form when submitting. Note that ARRL does not accept ADIF files.

You’ll also need to generate the summary file, which is needed to enter the data in the band/mode QSO breakdown on the entry form. [See Figures 3 and 4.] After completing the entry form, you’ll receive a confirmation page and confirmation email. If you need to change anything, there’s a link provided in the confirmation email that allows you to edit the entry.

Figure 1 — N1MM Logger+ log entry screen displaying warnings of a duplicate contact. Figure 2 — The N3FJP map display.

Figure 3 — N3FJP Summary Report. Figure 4 — ARRL Field Day entry form band/mode QSO breakdown.

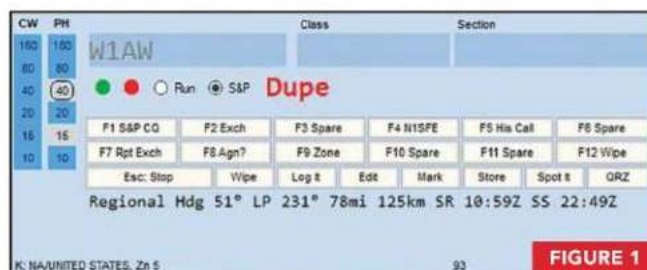


FIGURE 1



FIGURE 2

N1SFE's Contest Summary Report for ARRL-FD
Created by N3FJP's ARRL Field Day Contest Log
Version 6.6.7 www.n3fjp.com

Total Contacts = 95
Total Points = 96

Operating Period: 2023/06/24 20:40 - 2023/06/25 17:58

Total op time (breaks > 30 min deducted): 3:45:54
Total op time (breaks > 60 min deducted): 3:45:54

Avg Qs/Hr (breaks > 30 min deducted): 25.2

Total Contacts by Band and Mode:

Band	CW	Phone	Dig	Total	§
40	1	54	0	55	58
20	0	28	0	28	29
15	0	12	0	12	13
Total	1	94	0	95	100

FIGURE 3

Attention: Entrants must upload a QSO dupe sheet or Cabrillo log and complete the band/mode QSO breakdown below.

Upload band/mode calls list (Dupe Sheet or Cabrillo file): No file chosen

Band/Mode QSO Breakdown: Do not list GOTA QSOs in this section.

Band	Mode	QSOs	Per(W)	QSOs	Per(W)	QSOs	Per(W)
160m							
80m							
40m	1	100				54	100
20m						28	100
15m						12	100
10m							
6m							
2m							
222							
432							
Other							
Satellite							

FIGURE 4

Portable Vertical Wire Antennas

BY WALT HUDSON, K4OGO ("SALTY WALT")

As someone who operates portable quite often by the sea, I build a lot of portable vertical wire antennas. They're easy to build and deploy, which makes them great for Field Day.

You need only a few items to get going. In simplest terms, this is just some wire, a wire cutter or wire tool, a tape measure, a pole or non-metallic mast, a pole mount, electrical tape, coax, and either a balun, unun, or banana coax clip for the feed point [see Figure 1]. Let's take a look at each of these items.

Wire is the essential part of the antenna for both the upper vertical driven element and the ground plane or counterpoise below it. I've found that the absolute best option is 16-gauge speaker wire that I can get at Walmart for \$17 [see Figure 2]. It comes in a 100-foot (30.5-meter) roll, which gives me 200 feet of wire after pulling apart the double strands. This is more than enough, including counterpoise wires, to build several vertical antennas, and with this gauge thickness it can more than handle 100+ W as well as QRP and anything in between, which is generally anyone's portable operating power output. If you need a lighter option, there are several other wire options that will work just as well. I've also purchased and used inexpensive light wire from Amazon, especially for low-power operating.

Find a good wire tool for cutting and stripping wire. This is also essential when trimming and tuning the antenna if you are building a resonant vertical. I'll admit it, I've stripped the end of wires with my teeth. That is a practice that many of us have done over the years, but having a good wire tool makes building wire antennas so much easier than breaking out the pocketknife and trying to strip the end of a wire or taking the dental risk route.

I have found that when it comes to tape measures, having one that is both imperial as well as metric makes things so much easier. Often the antennas we build are converted from metric to imperial, and we typically have both numbers when we go to cut the wire.

The most important part of a vertical wire antenna is the pole or mast that the wire is attached to. This is the biggest investment in building these antennas, and it doesn't have to be expensive. A simple telescoping fishing pole will work fine. A 17-foot fiberglass "crappie" or "squid" pole can be purchased inexpensively online and will give you the opportunity to build a quarter-wave vertical for any HF band from 20 to 10 meters

[see Figure 3]. I've also experimented with several larger poles and have found that the largest one that really makes sense for a portable vertical antenna is a 10-meter pole. There are several different makers, but I really like my DX Commander 10-Meter Expedition Pole [see Figure 4], as it collapses small. It also gives me the option of building larger verticals — from a half-wave vertical for the 20-meter band to other multi-band



Figure 1 — Some of the basic tools needed to build a portable vertical wire antenna. **Figure 2** — 16-gauge speaker wire available at Walmart for \$17. **Figure 3** — An example of a quarter-wave antenna. **Figure 4** — A DX Commander 10-Meter Expedition Pole. **Figure 5** — An example of a half-wave antenna.

verticals, including the popular Rybakov antenna. With poles this length, it is easy to mount them vertically by just driving a piece of PVC pipe into the ground and dropping the pole in or over the pipe to stand tall and not require guy wires.

The heart of the antenna is the feed point. For a simple resonant quarter-wave vertical, a coax clip with wire attachments, or "banana clip," works well. I prefer to build multi-band verticals that give me many more options. This requires an unun at the feed point — a 4:1 or 9:1 unun is a good start for building multi-band verticals. You can also build half-wave verticals with a 49:1 unun. I have worked some amazing low-power DX on 20 meters with a vertical half-wave [see Figure 5]. For building multi-band verticals, I highly recommend using a transceiver with a built-in tuner, or purchasing an antenna tuner for operating portable. Remember, every antenna is resonant somewhere, and every multi-band antenna is a compromise. Overcome the compromise with an antenna tuner.

There are so many great verticals to build. Check out my YouTube channel, "Coastal Waves & Wires," and you can see almost any vertical wire antenna build possible, along with seeing it in action. You can also get exact measurements and construction details for these antennas in my book, *Salty Walt's Portable Antenna Sketchbook*, available from ARRL.



FIGURE 5

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FIELD DAY Towers – Doing It Right

BY DON DASO, K4ZA, AND WARD SILVER, NØAX

Many Field Day operations use short towers or masts to support Yagis or wire antennas. For either support, it's easy to compromise safety when you're in a hurry to get on the air. Here's how to set up safely.

If you're thinking in "temporary" terms, compromises and other challenges inevitably creep in. Questions or considerations that would be addressed for a permanent installation can easily be overlooked or not thoroughly considered in the field due to the immediate challenge of getting an antenna up.

Take note of any power or utility lines nearby, let alone overhead. Be mindful of the area surrounding the tower and the potential footprint of the entire setup. Do not set up a station or any other facility within that footprint!

Towers

Can 40 feet (four sections) of Rohn 25 be "walked up" safely? Will it stay up all weekend if guyed? There are circumstances to consider in every case, and failing to assess and respond to them during planning creates the potential for injury and damage during execution.

Figure 1 illustrates the problem of walking up a tower consisting of four 40-pound sections of Rohn 25 topped with a 40-pound beam/mast/rotator. The total weight is 200 pounds balanced 25 feet from the base. Assuming your crew can lift the load to 7 feet, a horizontal pulling force of 658 pounds is required to lift the tower at its balance point and 685 pounds is compressing the tower. The same 658 pounds of force is pushing horizontally against whatever is holding the base to the ground. If the base is not secured well, there will be serious problems. Account for this multiplication of force when walking up a ladder or other light-duty support as well. It must be adequately rated for the load during raising, as well as holding the dead weight afterward.

If the crew walks toward the base to raise the tower and reduce the pulling force, that will place the balance point behind them, causing the tower to pivot around the crew lift point and raise the base off the ground. Many a tower lifting operation has gone awry at that moment.

The secret to tilting any tower into position is having a hinged base plate that is securely held in place. Secure the base plate by driving stakes through it or by having something heavy holding it in place, like a vehicle. Don't rely on a shallow hole as a seat for the base, and don't have someone stand on the base to hold it down. If the base begins to slip, a lot of aluminum will be dangerously out of control.

Over the years, hams with metalworking experience have fashioned some clever solutions to this problem. **Figures 2**

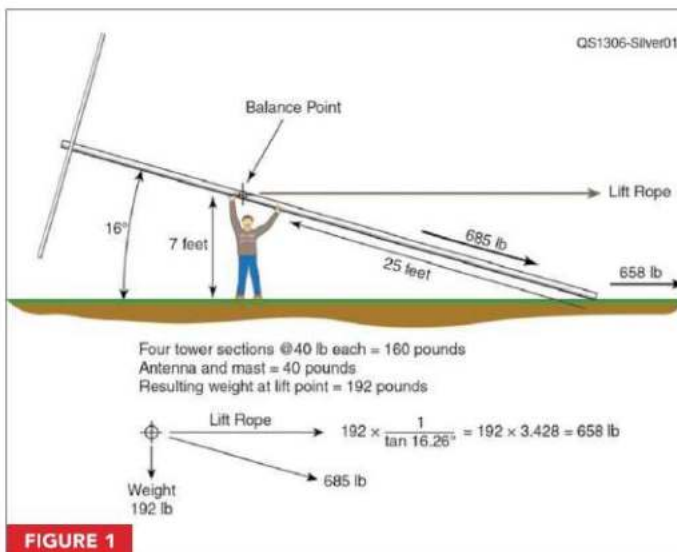


FIGURE 1



FIGURE 2

Figure 1 — Substantial force is needed to lift a tower off the ground using nearly horizontal pull rope. The same force is pushing the base of the tower horizontally, requiring the base to be securely held in place. **Figure 2** — The 2014 World Radiosport Team Championship stations used this simple and effective "falling derrick" method to erect 40-foot towers for more than 50 portable stations! [Mark Pride, K1RX, photo]

and 3 show the design worked up for the more than fifty 2014 World Radiosport Team Championship stations. The "falling derrick" erection system is an elegant, simple solution to this problem. By lifting from a point high above the base of the tower, you avoid the high forces that are encountered from



RADIO CONNECTS

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www.arrl.org/shop/FieldDay

Get Field Day rules and resources at www.arrl.org/FieldDay



lifting at a small angle. The same method works to lower towers safely, too. Rick Karlquist, N6RK, has photos showing how to construct and use the falling derrick at www.n6rk.com/falling_derrick_gme/falling_derrick_gme.html.

Masts

For wire antennas and very light beams, multi-section aluminum masts such as the AB-155/U and MS-44 surplus packages are widely available, and telescopic TV antenna push-up masts work too. Heights of 20 through 50 feet are available. (Telescoping fiberglass masts are not strong enough to hold anything except wires and very light antennas.) Homemade masts constructed from 10-foot or longer sections of pipe or tubing can be walked up (carefully). All masts present challenges; don't overload them.

A mast's flexibility makes side guys especially important because they keep it from bending sideways under load [see Figure 4]. Masts require care during installation to be sure they are kept straight — a curve can quickly cause a collapse. Surplus "rocket launcher" AB-577 masts (www.ontariosurplus.com/ab577.htm) can support a triband HF Yagi if erected properly.

Steel push-up masts are heavy, especially when raising the final sections carrying the full weight of the extended mast. Push-up masts can be walked up, but only with the lightest of antennas attached (the top section is likely to bend if loaded and out of vertical alignment).

Guying

Use a four-way arrangement with the guys separated by 90 degrees instead of the 120 degrees typical of permanent installations. When lifting a tower or mast, use a four-way system with one set of guys aligned with or performing the lift while the two side guy sets steady the tower and stiffen a mast.

This system allows side guys (perpendicular to the lift) to be strung to their final length while still on the ground. This stabilizes the tower (or mast) to prevent tipping away from the plane of the lift. When the lift is finished, there will be three sets of guys in place, and by quickly attaching the front guys, the tower will be stabilized. Secure and adjust the guys for vertical plumb and you're done.

A tower can be guyed with ropes, provided the load it carries is limited, no serious winds come up, and no one climbs the tower. Choose at least $\frac{3}{8}$ -inch-diameter material without a lot of stretch, such as Kevlar or Dacron — not nylon or manila.

Guy Anchors

Make certain the guy anchors are strong enough. Use heavy pipes driven deep into the soil, or screw-in earth anchors. For any temporary tower setup, the earth anchors will be the weakest link in the chain. Do not use brush or saplings. Only mature trees are safe enough to use as guy anchors



FIGURE 3

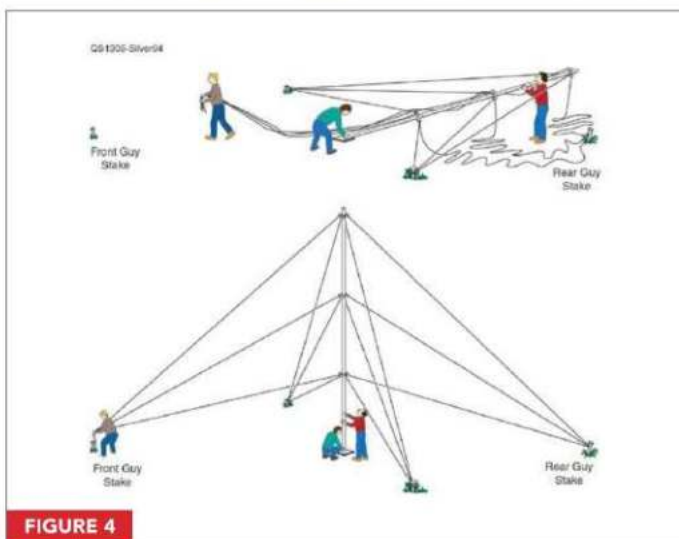


FIGURE 4

Figure 3 — A close-up of the hinged base and derrick attachment method for the 2014 World Radiosport Team Championship station towers. [Jason Corriveau, W1UJ, photo] **Figure 4** — A multi-section mast can be walked up using side guys.

and even then, only attach guys near the base of the trunk. Don't use vehicles as guy anchors.

Managing the Process

Have someone in charge with not only enough experience to make the proper decisions, but the ability to manage the construction itself. This person will not be able to do everything, so meet beforehand to discuss and assign various jobs.

Finally, don't let yourself or others be talked into doing something that isn't safe. When something starts looking "iffy," stop. Return to the last safe configuration, if possible. Take time to determine what went wrong and correct the situation before resuming.

BONUS POINTS ADD UP!

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

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



FIELD DAY 2025

ARRL/RAC Section Checklist

UNITED STATES

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

CALIFORNIA

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

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

FLORIDA

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

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

MASSACHUSETTS

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

- ☐ MICHIGAN · MI
- ☐ MINNESOTA · MN
- ☐ MISSISSIPPI · MS
- ☐ MISSOURI · MO
- ☐ MONTANA · MT
- ☐ NEBRASKA · NE

- ☐ NEVADA · NV
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NEW JERSEY

- ☐ NORTHERN NJ · NNJ
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- ☐ NEW MEXICO · NM

NEW YORK

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

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

PENNSYLVANIA

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

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

TEXAS

- ☐ NORTH TX · NTX
- ☐ SOUTH TX · STX
- ☐ WEST TX · WTX

- ☐ US VIRGIN ISLANDS · VI
- ☐ UTAH · UT
- ☐ VERMONT · VT
- ☐ VIRGINIA · VA

WASHINGTON

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

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

CANADA

- ☐ ALBERTA · AB
- ☐ BRITISH COLUMBIA · BC
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Happenings

FCC Initiated Broad Inquiry on Rules to Delete or Amend



In a Public Notice titled “In Re: Delete, Delete, Delete,” issued on March 12, 2025, the FCC solicited public input on any FCC rules (in any service) that the public believes should be deleted or modified “for the purpose of alleviating unnecessary regulatory burdens.” This was the latest in a series of similar proceedings going back to 1996, when the Communications Act was amended to require the FCC to periodically review its rules.

ARRL, through its Executive Committee and FCC Counsel, conducted a review of the provisions in Part 97 and other related rules that apply to radio amateurs. ARRL also solicited feedback from its members. Rules identified as outmoded, obsolete, or that for other

reasons should be repealed or modified, were included in ARRL's filing that was to be submitted no later than the FCC deadline of April 11, 2025. The deadline for filing reply comments was April 28, 2025.

As of press time, it is expected that the FCC will incorporate suggestions that it decides worthy of its consideration in a future Notice of Proposed Rulemaking that could be issued later this year. There will then be an opportunity for public comment on the specific rules that the FCC proposes for deletion or modification.

A PDF of the FCC Public Notice is available at <https://docs.fcc.gov/public/attachments/DA-25-219A1.pdf>.

ARRL Iowa Section Wins Ham Exemption to Hands-Free Law

Volunteers in the ARRL Iowa Section have cause to celebrate. Their state-level advocacy work on behalf of amateur radio has resulted in an exemption to the state's hands-free driving law that covers hams.

Iowa Senate File 22 (SF22), a bill addressing distracted driving, had been in development since 2020. Former ARRL Iowa Section Manager Lelia Garner, WA0UIG, and Iowa Section State Government Liaison Alan Erickson, WB0OAV, played a crucial role in fostering and maintaining key legislative relationships. Over the course of 5 years, they navigated the legislative process to ensure the continued exemption for amateur radio operators.

The COVID-19 pandemic and political opposition to the measure ground the bill to a halt. However, ARRL Iowa Section volunteers continued to engage in the process and ensure that amateur radio was represented as the legislature finally took the bill back up. The final language of the bill included, “The provisions of this subsection do not apply to...A person using a two-way

radio transmitter or receiver who is licensed with the federal communications commission in amateur radio service.”

Being proactive about sharing the good work amateur radio operators do was key. “We presented a carefully crafted exemption proposal, backed by evidence of our contributions as a radio service,” said Garner.

The bill passed the Iowa Senate with a vote of 47 – 1 on March 18, 2025, and the Iowa House passed it on March 26, 2025, with a vote of 54 – 11. On April 2, 2025, it was signed by Governor Kim Reynolds, and it goes into effect July 1, 2025.

The process encouraged Erickson. He said:

Every legislator I spoke with appreciated the public service that licensed amateur radio provides. They also acknowledged the responsibility demonstrated by amateur radio operators. I was impressed by their willingness to exempt amateur radio from their texting bill, and [I] was also humbled that we have a duty to preserve this awesome reputation.

Ham Radio, Students, and Scientists at the 2025 HamSCI Workshop

Some 175 scientists, students, professors, and amateur radio operators from around the world gathered in person and virtually on March 14 and 15, 2025, to share research, educate each other, and network at the annual Ham Radio Science Citizen Investiga-

tion (HamSCI) Workshop. HamSCI aims to promote collaboration between science, amateur radio, and education. The 2025 workshop was hosted by the New Jersey Institute of Technology in Newark. The program featured 30 talks and two dozen poster presentations.

Many focused on the HamSCI community's research activities during the 2023 annular and 2024 total solar eclipses, as well as its ongoing programs to involve amateur radio operators in collecting data for research on space weather and its impact on the ionosphere.

See a short video of the workshop's poster session on ARRL's YouTube channel at <https://youtu.be/VGoP7hYjGhQ?si=tca-x4dQZf11C4Kj>.

"I believe the workshop went very well," said HamSCI Lead Dr. Nathaniel Frissell, W2NAF, a professor at the University of Scranton. "There were many stimulating presentations and discussions, and the workshop did an excellent job bringing together amateurs, students, and scientists from near and far."

Among the presenters was Space Science Institute researcher Dr. Kristina Collins, KD8OXT, the 2025 recipient of the Dayton Hamvention® Technical



Attendees of the 2025 HamSCI Workshop, which was filled with 2 days of oral sessions, poster presentations, and networking. [Bob Inderbitzen, NQ1R, photo]

Achievement Award. Collins demonstrated how interactive data visualization software can be used as a platform for HamSCI work, including visualization of data amassed from the Personal Space Weather Station (PSWS) project. Owen Ruzanski, KD3ALD, an undergraduate at the University of Scranton, co-authored "Development of a Contesting and DXing Dashboard for the HamSCI Personal Space Weather Station." Citizen scientist Mindy Hull, MD, KM1NDY, researched and authored the "Effect of near total solar eclipse on radio propagation of HF, Weak-Signal Propagation Reporter (WSPR) transmissions."

ARRL was well represented at the conference, with a team led by Director of Marketing and Innovation Bob Inderbitzen, NQ1R — who was also the keynote speaker at the Friday-night banquet — and Hudson Division Director Ed Wilson, N2XDD. Inderbitzen focused his remarks on amateur radio's unique status as a technological sandbox for exploring and developing new communication technologies. He also highlighted ARRL's commitment to growing the Amateur Radio Service through programs like the ARRL Teachers Institute on Wireless Technology, which prepares schoolteachers and college professors to develop student interest and skills in radio communications and technology.

"Last year, the ARRL Board of Directors established a road map for a bold, new strategic direction," said Inderbitzen in his address. "For 110 years, you might sum up the organization's purpose as promoting and protecting amateur radio. But last year, ARRL's mission was expanded...to develop the next generation of radio amateurs. And to be even more deliberate, a new advocacy was established: to inspire youth." Inderbitzen also led a meeting of the ARRL Collegiate Amateur Radio Program at the end of the workshop.

Caribe Wave 2025 Tsunami Exercise in Puerto Rico

Amateur radio operators in Puerto Rico participated in the Caribe Wave 2025 Tsunami Exercise on March 20, 2025.

The event is an annual tsunami exercise designed to validate and advance tsunami preparedness efforts in the Caribbean and adjacent regions. The National Oceanic and Atmospheric Administration (NOAA) and the United Nations Educational, Scientific and Cultural Organization International Tsunami Information Center served as exercise coordinators.

In Puerto Rico, the exercise was coordinated by the Puerto Rico Seismic Network (PRSN) in conjunc-

tion with NOAA and the Puerto Rico Emergency Management Bureau (PREMB). Prior to the event, a meeting was held between PRSN representatives, ARRL Puerto Rico Section Emergency Coordinator Emmanuel Cruz, NP4D, and regional emergency coordinators. They delineated a plan to disseminate all messages directly by PRSN personnel to the local amateur radio packet bulletin board systems and then retransmit them via voice on all radio services, including General Mobile Radio Service, Family Radio Service, Multi-Use Radio Service, CB, and amateur radio.



PREMB Zone 5 Director A. Trabal (left) and ARRL Puerto Rico Section Manager Carmen Greene, KP4QVQ (right), in Mayagüez, studying a coastal map of Puerto Rico while monitoring the tsunami bulletin alerts to pass on amateur radio nodes.

The scenario chosen for Caribe Wave 2025 was a tsunami generated by a magnitude-8.5 earthquake located approximately 168 miles off the coast of Portugal, with the expected tsunami wave arriving 8 hours later. The exercise started at 11:00 AM EST, with an alert on radio and TV stations made by the Emergency Alert System. Some cell phone companies also sent the tsunami alert, and all systems stated clearly that it was a test.

As PRSN began to receive the tsunami alert bulletins sent through the KP4NTS and KP4DOG packet nodes, the information was sent to island-wide coordinated amateur radio frequencies for emergency events on VHF, 40 meters, and 5403.5 MHz. ARRL Puerto Rico Section Manager Carmen Greene, KP4QVQ, was stationed at the Zone 5 PREMB office in Mayagüez to observe how the bulletins were sent through various amateur radio outlets. The exercise for the amateur radio part concluded at 1:00 PM.

Siren systems were tested, evacuation drills were practiced on coastal cities, and some amateur radio groups formed special nets to gather information on how they received the advisory alert. For more information on the Caribe Wave exercises, visit www.tsunamizone.org.

Colorado High School Students Visit the Plishner Radio Astronomy and Space Sciences Center

In late January 2025, 17 students and staff members from Las Animas High School in Colorado visited the Deep Space Exploration Society (DSES) radio telescope located at the Plishner Radio Astronomy and Space Sciences Center near Haswell, Colorado. They also got an introduction to amateur radio.

"This first field trip visit of high school students reflected the dreams of Michael Lowe, former DSES Board president, who sought to create a center for radio astronomy and space science education in southeast Colorado," said DSES President Myron Babcock, KL7YY. Since 2009, society members have devoted hundreds of hours to rebuilding the Plishner site. In 2024, a grant from Amateur Radio Digital Communications provided funds to complete a new building suitable for hosting groups.

DSES Board member Ray Uberecken, AAØL, and DSES member Roger Oakey, W3MIX, showed students how the big dish was controlled to track and focus on deep-space objects as Earth revolves.

DSES Vice President Bill Miller, KCØFHN, gave an overview of the organization's history and the years of effort required to revive the 60-foot-diameter radio telescope. He introduced radio astronomy and some of the studies DSES members have conducted since restoring the telescope, including detecting pulsars and masers, observing solar and planetary radio emissions, and mapping the hydrogen line to show which galaxies are moving toward or away from Earth.

Students braved intense winds and cold to venture to the underground bunker location of the DSES amateur radio station, KØPRT. Board member Paul Sobon, NOØT, demonstrated how long-distance contacts are made using HF transceivers. Under his supervision, several students learned to call CQ. Unfortunately, because band conditions were poor, no student got a response. Later, Sobon was able to contact a radio amateur in the Canary Islands, and students observed two-way HF radio communication between stations more than 5,000 miles apart.



Ununs for Austria

Österreichischer Versuchssenderverband, the Austrian International Amateur Radio Union (IARU) member-society, reported that a regional association in Vienna held a successful hands-on workshop earlier this year. It was designed to assist amateurs who wanted to get on HF with random-wire antennas. The workshop participants focused on assembling a low-power unbalanced-to-unbalanced (unun) transformer designed by Arnold Huebsch, OE1IAH.

Under Huebsch's guidance, the participants wound their transformers and installed them inside 2 x 2 x 2-inch enclosures with three banana plug connectors for the antenna wire. The unun provides impedance ratios of 1:9, 1:49, and 1:64, according to which plug is used, and it includes a BNC connector for the coaxial cable line to the transceiver. Rated for 30 W continuous duty, it's designed primarily for use during Parks on the Air®, Summits on the Air, and other portable operations.

The workshop attracted more than 20 participants. Martin Wytek, OE1MVA, brought load resistors and measured the finished ununs with his MFJ vector network analyzer. Complete design and construction details are available at Huebsch's website (in both German and English) at https://oe1iah.at/Hardware/Antennen/UNUN_1_zu_9_49_64.shtml.



Lukasz Wojcik, OE1WLR (left), and Andreas Ballenstorfer, OE3BAJ (right), building their unun kits. [Arnold Huebsch, OE1IAH, photo]



The multi-impedance unun designed by Arnold Huebsch, OE1IAH. [Arnold Huebsch, OE1IAH, photo]

PR2L Women's Day DXpedition

Liga de Amadores Brasileiros de Rádio Emissão reported that an all-female DXpedition team traveled to Ilha Comprida, a barrier island along the coast of the State of São Paulo, Brazil, to celebrate International Women's Day. The team was active throughout March 8 and 9, using the call sign PR2L on HF, 6 meters, and the QO-100 satellite.



**EXPEDICÃO DAS
Young Ladies
2025**

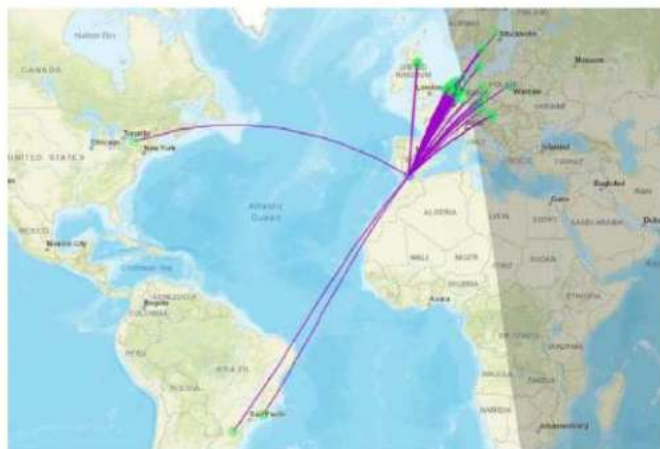
PR2L

DIB: SP-03
IOTA: SA-024
POTA: BR-0829
WWFF: PYFF-0380

Ilha Comprida - SP
de 08/03 - 07h00 PT
a 09/03 - 13h00 PT

Gibraltar Returns to WSPR

The Gibraltar Amateur Radio Society weak signal propagation reporter (WSPR) beacon, ZB2TEN, has returned to the air after a few repairs. From its position



A map showing the ZB2TEN WSPR beacon in action from Gibraltar. [Steve Ford, WB8IMY, image]

atop the iconic Rock of Gibraltar, the transmitter generates 100 mW into a 10-meter wire antenna. The WSPR transmitter is powered by a battery and a 50 W solar panel.

SARTS QSL Bureau Closed

The Singapore Amateur Radio Transmitting Society (SARTS) announced that it has closed its 9V QSL bureau, effective February 14, 2025, and it is no longer accepting cards. Singapore Post is terminating all PO Box services nationwide, so the SARTS mailing address is also no longer valid.

Field Day in the Netherlands

ARRL isn't the only organization conducting Field Day this year. Dutch IARU member-society Vereniging voor Experimenteel Radio Onderzoek in Nederland sponsors their own field day, and they do it twice! The dates and times are as follows:

- Saturday, June 7, 1500 UTC to Sunday, June 8, 1459 UTC.
- Saturday, September 6, 1300 UTC to Sunday, September 7, 1259 UTC.

Contacts from amateurs anywhere in the world are welcome. For more information, visit www.veron.nl/vereniging/commissies-en-werkgroepen/traffic-bureau/hf-contesten/velddag-contesten.

Amateur Radio at British Science Week 2025

The Radio Society of Great Britain (RSGB) was a partner in British Science Week 2025 on March 7 – 16. The RSGB Outreach Team worked with the RSGB Communications Team to submit two activities for this year's theme, "Change and Adapt." One activity was



chosen for the Community Pack that was available to all participants.

The activity was created by John Hislop, G7OHO, and tested by RSGB School Youth Champion Chris Aitken, MMØWIC, and other members of the RSGB Outreach Team. The activity plan used amateur radio to find out if people in different countries were seeing changes in their weather patterns.

Maximum Mobile in India

The Amateur Radio Society of India recently highlighted the impressive mobile/portable station of Hari Sriramaiah, VU2UCR. His station is outfitted with a Yaesu FT-891 transceiver, a portable two-element HF Yagi, a screwdriver-style HF mobile antenna, a Yaesu FTM-200DR transceiver for VHF and UHF (connected to a $\frac{5}{8}$ -wavelength whip antenna), and a portable QO-100 satellite transceiver with a parabolic dish antenna.



Hari Sriramaiah, VU2UCR, and his multiband mobile station. [Hari Sriramaiah, VU2UCR, photo]

Public Service

2025 Tsunami Exercise: A Wave of Success

Several ARES® and other groups led by the Los Angeles ARES organization ARES LAXNORTHEAST collaborated on planning and executing the 2025 Tsunami Exercise, a simulated emergency response scenario designed to test and enhance the capabilities of amateur radio operators in disaster situations. The exercise was conducted March 22 – 30, with all licensed amateurs invited to participate.

The scenario was an earthquake, subsequent tsunami, and flood warnings. Participants conducted a series of tasks, including logging, submitting US Geological Survey (USGS) “Did You Feel It?” (DYFI) assessments, conducting Winlink check-ins and check-outs, sending welfare messages, and sharing situational awareness with Incident Command System (ICS)-formatted messages. Their ability to provide critical information and support in a high-stress environment was tested.

The USGS received 304 mapped DYFI reports. For the tsunami portion, there were 345 unique call sign participants; 1,771 received messages; 232 mapped Winlink DYFI reports (251 received); 319 mapped Winlink check-ins (333 total received); 295 mapped Winlink check-outs (304 received); 232 mapped ICS-213 General Messages (280 received); 280

mapped Welfare Messages (318 received); and 238 ICS-214 Activity Logs received. There were also 40 voice check-ins to the exercise’s HF voice net.

Lessons Learned: What Went Well

- The exercise exceeded the expected target of 50 check-ins by 600% (+253).
- The majority of operators adhered to instructions.
- Operators took 1 to 2 hours to research answers, compose messages, correct errors, and send traffic (based on ICS-214), aligning perfectly with expectations.
- Some operators extended their participation across multiple operational periods.
- Numerous excellent situational resources were shared in the ICS-213.
- The lessons learned and shared in the Winlink check-out comments were insightful and highly valuable for guiding future training.
- Strong international participation included operators from the US, Puerto Rico, US Virgin Islands, Canada, Panama, New Zealand, Austria, and Germany.

Overall, operators participating in this exercise went above and beyond. They shared resources and insights and they followed instructions.



2025 TSUNAMI dashboard showing check-ins.

Winlink and Forms

Many participants learned about new Winlink forms, practiced using them, and identified areas needing improvement (e.g., saving forms, filling them out correctly, understanding the process). Several comments highlighted the need for more practice with Winlink in general.

Preparation and Readiness

A significant number of comments emphasized the

Personal Exercise Experience at Station K1CE

While I was able to send my check-in, ICS-213, welfare, check-out, and ICS-214, my DYFI report went only to the USGS, and should have been cc'd to TSUNAMI. My ICS-213 did not map because the FormData.txt was missing.

My biggest mistake, however, was not being able to transmit my messages via a Radio Mail Server due to sound card issues that I could not resolve in time. Unfortunately, I relied on the internet to send in my reports. So, the biggest takeaway for me was: practice with Winlink operation regularly so my reports will go through efficiently over the air. — *Rick Palm, K1CE*

importance of preparedness, including equipment readiness, having resources readily available, and pre-planning. Several participants realized they needed to improve their station setups or gather more emergency information. Key points were: being prepared before an emergency is vital; equipment should be tested and secured; having a go-bag and essential supplies is recommended; and emergency contact information and resources should be readily accessible.

Communication and Coordination

Participants noted challenges with communication, such as HF propagation issues, busy channels, and coordinating with others. Some learned about the need for clear instructions and avoiding the spread of unconfirmed information. Key points were: HF communication can be unreliable, especially in high-traffic situations; net control discipline and clear communication are essential; backup communication methods should be considered; and coordination among team members can be challenging.



2025 TSUNAMI map showing sources of DYFI reports.

Personal Lessons and Reflections

Many participants shared personal takeaways, such as needing more practice, improving organizational skills, managing stress, and prioritizing personal safety. Some reflected on the value of exercises for learning and improvement. Key points were: exercises provide valuable learning opportunities; personal limitations and areas for improvement were identified; stress management is important in emergency situations; and teamwork and collaboration are vital.

Technical and Equipment Issues

Several comments mentioned technical problems with equipment, such as PTT issues, battery failures, and computer glitches. Some participants experimented with different modes (VARA HF/FM) and power setups. Key points were: equipment reliability is crucial; battery power and backup systems are essential; technical issues can arise and need to be addressed; and different modes and configurations have varying effectiveness.

Major Takeaways

The volunteer radio operators participating in the 2025 Tsunami Exercise did an outstanding job! Exercise coordinator Oliver Dully, K6OLI, said, "The 2025 Tsunami Exercise was a tremendous success, showcasing the dedication and skill of our amateur radio operators," and added, "This simulated emergency response scenario tested our abilities to provide critical communications during a disaster, focusing on Winlink proficiency and standardized procedures."

Here are the three key takeaways from the event, according to Dully:

- 1. Proficiency in Standardized Procedures:** Participants effectively utilized standardized forms like ICS-214, ICS-213, and Winlink templates, ensuring clear and coordinated communication. This highlights the importance of regular practice with these tools.
- 2. Enhanced Winlink Skills:** The exercise provided invaluable practice in sending various messages, including check-ins, DYFI reports, and welfare messages, via Winlink. This hands-on experience significantly improved our operators' Winlink proficiency.
- 3. Collaboration and Coordination:** The 2025 Tsunami Exercise was a collaborative effort involving multiple ARES groups and other organizations. This demonstrated the strength of our community and our ability to work together effectively in a simulated emergency.

2024 ARRL November Sweepstakes — Phone

Last year's ARRL November Sweepstakes phone weekend was held November 16 – 18, 2024.

Band conditions for the 2024 ARRL November Sweepstakes — Phone Contest were better than last year but not superb. Ten meters was jumping for the first 2 hours and carried 14% of the total QSO load, which is higher than in the past but perhaps not quite up to expectations. This year, 1,457 logs were submitted, down from 1,514 in 2023. After checking the logs, 356,085 valid contacts were reported.

Twenty meters was the dominant band in the contest, with 32% of all reported contacts made on that band. Forty and 15 meters had a respectable share of contacts, with 25% and 20% of all the contacts, respectively.

The most popular category in the contest was Single Operator, Low Power, with 42% of the 1,457 entries received in that category. All of the Single Operator categories combined totaled 94% of the entries received. The Limited Antennas Overlay, which was introduced in 2023, continued to be popular this year, with 483 participants selecting the overlay in their entries.

Nineteen logs indicated the Youth Overlay, a modest increase from last year. Levi Jefferies, K6JO (operating as ND7K), returned to the top of the overlay and placed seventh overall in Single Operator, High Power. A promising newcomer, Max Freedman, N4ML, showed up in Single Operator Unlimited, High Power with the second-highest youth score overall at 158,000 points.

Full Results Online

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



Mason Match, KC3WNY, operated as part of the W6YX Stanford Amateur Radio Club team during the 2024 ARRL November Sweepstakes — Phone Contest. The team placed fifth overall in the School Club category, reporting 569 contacts in 84 Sections. [David Jaffe, WD6T, photo]

Logs Received by Category

Category	Logs	% of Total
Single Operator, High Power	198	13.59%
Single Operator, Low Power	610	41.87%
Single Operator, QRP	47	3.23%
Single Operator Unlimited, High Power	300	20.59%
Single Operator Unlimited, Low Power	195	13.38%
Single Operator Unlimited, QRP	11	0.75%
Multioperator, High Power	48	3.29%
Multioperator, Low Power	36	2.47%
School Club Station	10	0.69%
Checklog	2	0.14%
Total	1,457	

Contacts by Band

Band	Contacts	% of Total
160 meters	0	0%
80 meters	32,092	9%
40 meters	90,037	25%
20 meters	112,482	32%
15 meters	69,491	20%
10 meters	50,113	14%

Top Ten

Single Operator, High Power		Single Operator Unlimited, QRP	
N2IC	292,400	WE9R	50,630
W7WA	275,910	AI1TT	29,748
VY2TT (K6LA, op)	267,580	(W1WBB, op)	
WH7Z (W0CN, op @ KH6YY)	266,784	W3EK	23,520
VA7RR	264,768	WQ6X	21,760
N4OX	258,910	N4IJ	14,910
ND7K (K6JO, op @ N6WIN)	256,200	K7RAT (N6TR, op)	14,616
WC6H	248,640	K6XX	13,216
W2RQ	223,040	K2AL	8,352
K4ZW	217,940	K2GMY	7,476
		KN4PHS	2,788

Single Operator, Low Power		Multioperator, Single Transmitter, High Power	
K2PO	180,096	K4OV	251,770
N4OO	175,560	KR0P	246,500
AC0W	174,250	N6WM	241,920
WQ5L	170,520	N2NT	241,570
VE4VT	170,170	W1XX	211,650
N8II	148,070	N0MA	192,610
N7XU (K4XU, op)	146,496	KT4Q	191,590
VE5SF	141,950	ND8DX	187,680
WR3R	118,776	N3OC	182,750
KY4KP	113,390	WD9CIR	182,410

Single Operator, QRP		Multioperator, Single Transmitter, Low Power	
K5TR	152,192	WX4W	158,100
W0EWD	72,912	KT4XA	147,000
ND0C	70,632	K9KE	143,140
W1QK	65,600	NX6T	134,568
K6GHA	45,000	K2APD	120,020
K1EP	44,320	K9DA	112,710
AG9A	40,508	K0AJW	102,256
KA8SMA	34,456	WA1F	101,490
W4WKU	33,456	K8DP	99,110
K2PI	28,140	NP3Y	95,540

Single Operator Unlimited, High Power		School Club	
K0EU	291,890	K0HC	247,350
W1SJ	241,060	W0EEE	134,904
W7RN (WX5S, op)	235,450	K0ESU	97,170
K1KD	219,980	W1YK	96,348
KH7X (KH6ND, op)	219,300	W6YX	95,592
NJ4P (K9TI, op)	212,330	K9IU	46,970
NS0R	209,270	W0YC	23,064
ND4Y	198,730	W8EDU	8,188
KD4D	198,220	W4USF	1,000
K6LL	193,120	W3UD	2

Single Operator Unlimited, Low Power	
N7MZW	134,626
NT5V	117,936
KT0R (K0OB, op)	108,864
K0UK	108,564
VE3RGO	107,016
WZ8T	105,000
KI2D	98,600
W9AV	83,996
K9PW	83,328
N0UR	82,004

Division Winners

Single Operator, High Power		
Atlantic	K3TC	109,062
Central	K9BGL	160,944
Dakota	K0SIX	122,344
Delta	KI5GTR	141,280
Great Lakes	KW8N	119,354
Hudson	W2RQ	223,040
Midwest	N7WY	62,560
New England	K1VUT	178,584
Northwestern	W7WA	275,910
Pacific	WH7Z (W0CN, op @ KH6YY)	266,784
Roanoke	K4ZW	217,940
Rocky Mountain	N2IC	292,400
Southeastern	N4OX	258,910
Southwestern	ND7K (K6JO, op @ N6WIN)	256,200
West Gulf	AD5XD	198,730
Canada	VY2TT (K6LA, op)	267,580

Single Operator, Low Power		
Atlantic	WR3R	118,776
Central	N9MSG	79,056
Dakota	AC0W	174,250
Delta	WQ5L	170,520
Great Lakes	N8PE	90,780
Hudson	KS2G	83,640
Midwest	WN0G	101,844
New England	WJ1U	91,392
Northwestern	K2PO	180,096
Pacific	N6YEU	72,090
Roanoke	N8II	148,070
Rocky Mountain	K0XF	91,896
Southeastern	N4OO	175,560
Southwestern	W1DGL	68,222
West Gulf	W5ACQ	90,720
Canada	VE4VT	170,170

Single Operator, QRP		
Atlantic	N3WS	3,996
Central	AG9A	40,508
Dakota	ND0C	70,632
Delta	N5EE	15,498
Great Lakes	KA8SMA	34,456
Hudson	K2YG	11,242
Midwest	W0EWD	72,912
New England	W1QK	65,600
Northwestern	K7FR	27,450
Pacific	K6GHA	45,000
Roanoke	K2PI	28,140
Rocky Mountain	K7DLX	640
Southeastern	N4NM	24,288
Southwestern	N6AN	2,820
West Gulf	K5TR	152,192
Canada	VA3HY	32

Single Operator Unlimited, High Power		
Atlantic	KD4D	198,220
Central	WT9U	167,960
Dakota	K1KD	219,980
Delta	NJ4P (K9TI, op)	212,330
Great Lakes	ND4Y	198,730
Hudson	KD2RD	150,280
Midwest	NS0R	209,270
New England	W1SJ	241,060
Northwestern	KA6BIM	161,448
Pacific	W7RN (WX5S, op)	235,450
Roanoke	K3DNE	192,950
Rocky Mountain	K0EU	291,890
Southeastern	K3TW	98,430
Southwestern	KH7X (KH6ND, op)	219,300
West Gulf	WB0TEV	189,720
Canada	VY1CO	105,244

Single Operator Unlimited, Low Power		
Atlantic	W3RA (W3WC, op)	41,334
Central	W9AV	83,996
Dakota	KT0R (K0OB, op)	108,864
Delta	AB5SE	74,534
Great Lakes	N8FYL	68,392
Hudson	KI2D	98,600
Midwest	W9LG	53,088
New England	KC1SQ	63,672
Northwestern	WZ8T	105,000
Pacific	K6PUD	40,014
Roanoke	N2YO	81,260
Rocky Mountain	N7MZW	134,626
Southeastern	W4LT	66,834
Southwestern	W4IDX	42,818
West Gulf	NT5V	117,936
Canada	VE3RGO	107,016

Single Operator Unlimited, QRP		
Atlantic	W3EK	23,520
Central	WE9R	50,630
Hudson	K2AL	8,352
New England	AI1TT (W1WBB, op)	29,748
Northwestern	K7RAT (N6TR, op)	14,616
Pacific	K6XX	13,216
Roanoke	N4IJ	14,910
Southeastern	KN4PHS	2,788
Southwestern	WQ6X	21,760

Multioperator, Single Transmitter, High Power		
Atlantic	N3OC	182,750
Central	WD9CIR	182,410
Dakota	W0AA	104,550
Delta	W5NX	175,100
Great Lakes	ND8DX	187,680
Hudson	N2NT	241,570
Midwest	KR0P	246,500
New England	W1XX	211,650
Northwestern	K7RI	181,440
Pacific	N6WM	241,920
Roanoke	K4OV	251,770
Rocky Mountain	K2KR	147,168
Southeastern	W4MLB	108,360
Southwestern	KI7PPV	142,236
West Gulf	KS5Z	154,700
Canada	VA3NW	102,850

Multioperator, Single Transmitter, Low Power		
Atlantic	K2APD	120,020
Central	K9KE	143,140
Dakota	K0AJW	102,256
Great Lakes	WX4W	158,100
Hudson	K1RQ	28,644
New England	AF1R	57,290
Northwestern	KC7HF	65,760
Pacific	N6ACL	93,408
Roanoke	W4TG	53,700
Rocky Mountain	KK5OV	39,050
Southeastern	KT4XA	147,000
Southwestern	NX6T	134,568
West Gulf	W5AFV	40,922

School Club		
Atlantic	W3UD	2
Central	K9IU	46,970
Dakota	W0YC	23,064
Great Lakes	W8EDU	8,188
Midwest	K0HC	247,350
New England	W1YK	96,348
Pacific	W6YX	95,592
Southeastern	W4USF	1,000

Plaque Sponsors

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



**PRINCIPAL
AWARDS
SPONSOR**

Winner	Division	Category	Sponsor	Winner	Division	Category	Sponsor
N2IC	Overall	Single Operator, High Power	Icom America	N7WY	Midwest	Single Operator, High Power	Icom America
K2PO	Overall	Single Operator, Low Power	Icom America	WN0G	Midwest	Single Operator, Low Power	Icom America
K5TR	Overall	Single Operator, QRP	Icom America	W0EWD	Midwest	Single Operator, QRP	Icom America
K0EU	Overall	Single Operator Unlimited, High Power	Icom America	NS0R	Midwest	Single Operator Unlimited, High Power	Icom America
N7MZW	Overall	Single Operator Unlimited, Low Power	Icom America	W9LG	Midwest	Single Operator Unlimited, Low Power	Icom America
WE9R	Overall	Single Operator Unlimited, QRP	Icom America	KR0P	Midwest	Multipoperator, Single Transmitter, High Power	Icom America
K4OV	Overall	Multipoperator, Single Transmitter, High Power	Icom America	K0HC	Midwest	School Club	Icom America
WX4W	Overall	Multipoperator, Single Transmitter, Low Power	Icom America	K1VUT	New England	Single Operator, High Power	Icom America
K0HC	Overall	School Club	Robert Tuttle, N8YXR, and Jennie Tuttle, KC0RBV	WJ1U	New England	Single Operator, Low Power	Icom America
			Icom America	W10K	New England	Single Operator, QRP	Icom America
				W1SJ	New England	Single Operator Unlimited, High Power	Icom America
				KC1SQ	New England	Single Operator Unlimited, Low Power	Icom America
				AH1TT	New England	Single Operator Unlimited, QRP	Icom America
K3TC	Atlantic	Single Operator, High Power	Icom America	(W1WBB, op)			
WR3R	Atlantic	Single Operator, Low Power	Potomac Valley Radio Club	W1XX	New England	Multipoperator, Single Transmitter, High Power	Icom America
N3WS	Atlantic	Single Operator, QRP	Icom America	AF1R	New England	Multipoperator, Single Transmitter, Low Power	Icom America
KD4D	Atlantic	Single Operator Unlimited, High Power	Icom America	W1YK	New England	School Club	Icom America
W3RA	Atlantic	Single Operator Unlimited, Low Power	Icom America	W7WA	Northwestern	Single Operator, High Power	Icom America
(W3WC, op)				K2PO	Northwestern	Single Operator, Low Power	Icom America
W3EK	Atlantic	Single Operator Unlimited, QRP	Icom America	K7FR	Northwestern	Single Operator, QRP	Icom America
N3OC	Atlantic	Multipoperator, Single Transmitter, High Power	Icom America	KA6BIM	Northwestern	Single Operator Unlimited, High Power	Icom America
K2APD	Atlantic	Multipoperator, Single Transmitter, Low Power	Icom America	WZ8T	Northwestern	Single Operator Unlimited, Low Power	Icom America
W3UD	Atlantic	School Club	Icom America	K7RAT (N6TR, op)	Northwestern	Single Operator Unlimited, QRP	Icom America
K9BGL	Central	Single Operator, High Power	Society of Midwest Contesters	K7RI	Northwestern	Multipoperator, Single Transmitter, High Power	Icom America
N9MSG	Central	Single Operator, Low Power	Society of Midwest Contesters	KC7HF	Northwestern	Multipoperator, Single Transmitter, Low Power	Icom America
AG9A	Central	Single Operator, QRP	Icom America	WH7Z (W0CN, op @KH6YY)	Pacific	Single Operator, High Power	Icom America
W79U	Central	Single Operator Unlimited, High Power	Society of Midwest Contesters	N6YEU	Pacific	Single Operator, Low Power	Icom America
W9AV	Central	Single Operator Unlimited, Low Power	Society of Midwest Contesters	K6GHA	Pacific	Single Operator, QRP	Icom America
WE9R	Central	Single Operator Unlimited, QRP	Icom America	W7RN (WX5S, op)	Pacific	Single Operator Unlimited, High Power	Icom America
WD9CIR	Central	Multipoperator, Single Transmitter, High Power	Icom America	K6PUD	Pacific	Single Operator Unlimited, Low Power	Icom America
K9KE	Central	Multipoperator, Single Transmitter, Low Power	Icom America	K6XX	Pacific	Single Operator Unlimited, QRP	Icom America
K9IU	Central	School Club	Icom America	N6WM	Pacific	Multipoperator, Single Transmitter, High Power	Icom America
K0SIX	Dakota	Single Operator, High Power	Icom America	N6ACL	Pacific	Multipoperator, Single Transmitter, Low Power	Icom America
				W6YX	Pacific	School Club	Icom America
				K4ZW	Roanoke	Single Operator, High Power	Icom America
				N8II	Roanoke	Single Operator, Low Power	Icom America
				K2PI	Roanoke	Single Operator, QRP	Icom America
				K3DNE	Roanoke	Single Operator Unlimited, High Power	Icom America
				N2YO	Roanoke	Single Operator Unlimited, Low Power	Icom America
				N4IJ	Roanoke	Single Operator Unlimited, QRP	Icom America
				K4OV	Roanoke	Multipoperator, Single Transmitter, High Power	Icom America
				W4TG	Roanoke	Multipoperator, Single Transmitter, Low Power	Icom America
				N2IC	Rocky Mountain	Single Operator, High Power	Icom America
				K0XF	Rocky Mountain	Single Operator, Low Power	Icom America
				K7DLX	Rocky Mountain	Single Operator, QRP	Icom America
				K0EU	Rocky Mountain	Single Operator Unlimited, High Power	Icom America
				N7MZW	Rocky Mountain	Single Operator Unlimited, Low Power	Icom America
				K2KR	Rocky Mountain	Multipoperator, Single Transmitter, High Power	Icom America
				KK5OV	Rocky Mountain	Multipoperator, Single Transmitter, Low Power	Icom America
				N4OX	Southeastern	Single Operator, High Power	Icom America
				N4OO	Southeastern	Single Operator, Low Power	Icom America
				N4NM	Southeastern	Single Operator, QRP	Icom America
				K3TW	Southeastern	Single Operator Unlimited, High Power	Icom America
				W4LT	Southeastern	Single Operator Unlimited, Low Power	Icom America
				KN4PHS	Southeastern	Single Operator Unlimited, QRP	Icom America
				W4MLB	Southeastern	Multipoperator, Single Transmitter, High Power	Icom America
				K74XA	Southeastern	Multipoperator, Single Transmitter, Low Power	Icom America
				W4USF	Southeastern	School Club	Icom America
				ND7K (K6JO, op @N6WIN)	Southwestern	Single Operator, High Power	Icom America
				W1DGL	Southwestern	Single Operator, Low Power	Icom America
				N6AN	Southwestern	Single Operator, QRP	Icom America
				KH7X	Southwestern	Single Operator Unlimited, High Power	Icom America
				(KH6ND, op)			
				W4IDX	Southwestern	Single Operator Unlimited, Low Power	Icom America
				W06X	Southwestern	Single Operator Unlimited, QRP	Icom America
				K17PPV	Southwestern	Multipoperator, Single Transmitter, High Power	Icom America
				NX6T	Southwestern	Multipoperator, Single Transmitter, Low Power	Icom America
				AD5XD	West Gulf	Single Operator, High Power	Icom America
				W5ACQ	West Gulf	Single Operator, Low Power	Icom America
				K5TR	West Gulf	Single Operator, QRP	Icom America
				WB0TEV	West Gulf	Single Operator Unlimited, High Power	Icom America
				NT5V	West Gulf	Single Operator Unlimited, Low Power	Icom America
				KS5Z	West Gulf	Multipoperator, Single Transmitter, High Power	Icom America
				W5AFV	West Gulf	Multipoperator, Single Transmitter, Low Power	Icom America
				VY2TT (K6LA, op)	Canada	Single Operator, High Power	Icom America
				VE4VT	Canada	Single Operator, Low Power	Icom America
				VA3HY	Canada	Single Operator, QRP	Icom America
				VY1CO	Canada	Single Operator Unlimited, High Power	Icom America
				VE3RGO	Canada	Single Operator Unlimited, Low Power	Icom America
				VA3NW	Canada	Multipoperator, Single Transmitter, High Power	Icom America
W2RQ	Hudson	Single Operator, High Power	Icom America				
KS2G	Hudson	Single Operator, Low Power	Icom America				
K2YG	Hudson	Single Operator, QRP	Icom America				
KD2RD	Hudson	Single Operator Unlimited, High Power	Icom America				
K12D	Hudson	Single Operator Unlimited, Low Power	Icom America				
K2AL	Hudson	Single Operator Unlimited, QRP	Icom America				
N2NT	Hudson	Multipoperator, Single Transmitter, High Power	Icom America				
K1RQ	Hudson	Multipoperator, Single Transmitter, Low Power	Icom America				

Top Ten Limited Antenna Overlay

Call	Section	Score	Contacts	Multipliers	Call	Section	Score	Contacts	Multipliers	Call	Section	Score	Contacts	Multipliers
Single Operator, High Power					Single Operator, QRP					Single Operator Unlimited, Low Power				
K5TA	NM	131,544	783	84	AG9A	IL	40,508	247	82	N7MZW	WY	134,626	811	83
NX9T	NC	80,008	548	73	K7FR	WWA	27,450	183	75	VE3RGO	GH	107,016	637	84
VA1MM	NS	74,632	491	76	K9ARF	WI	24,450	163	75	K9PW	IL	83,328	496	84
N7AGP	MT	72,160	451	80	WN1C	WI	22,692	183	62	W9QL	IL	79,390	467	85
W9YZR	WI	71,064	423	84	KJ4M	AL	7,656	87	44	NQ9N	WI	77,010	453	85
W8FN	NC	69,768	459	76	W8MZ	NE	7,650	75	51	N8FYL	MI	68,392	412	83
K4BAI	GA	64,676	437	74	AF9J	WI	6,636	79	42	W4LT	WCF	66,834	423	79
K0CN	MN	64,152	396	81	N0SPN	MN	5,760	72	40	VE1RPX	NS	60,830	395	77
VA7XU	BC	57,456	378	76	AC2N	NFL	4,636	61	38	K4SBZ	NFL	60,424	364	83
NN3W	VA	55,380	355	78	N7JI	OR	4,320	72	30	W4KAZ	NC	59,400	396	75
Single Operator, Low Power					Single Operator Unlimited, High Power					Single Operator Unlimited, QRP				
N4OO	GA	175,560	1,045	84	WW2Y	NNY	185,810	1,093	85	AI1TT	RI	29,748	201	74
WR3R	MDC	118,776	707	84	AG3I	WPA	122,910	723	85	(W1WBB, op)				
KK0SD	SD	105,000	625	84	K4QQG	SC	110,700	675	82	W3EK	DE	23,520	168	70
WJ1U	NH	91,392	544	84	N5TJ	STX	109,310	643	85	N4IJ	NC	14,910	105	71
N8PE	OH	90,780	534	85	KE0L	TN	100,968	601	84	K2GMY	EB	7,476	89	42
KD9QS	MDC	79,704	492	81	W3UL	EPA	82,668	498	83	KN4PHS	AL	2,788	41	34
N9MSG	IL	79,056	488	81	N9EP	IL	81,838	493	83	N1SOH	EMA	1,600	32	25
N1GNF	NC	67,704	434	78	N1EK	MDC	74,460	438	85					
N1SFE	CT	61,254	369	83	AC5M	OK	72,376	436	83					
AC4HI	IN	61,088	368	83	AC6ZM	TN	68,880	410	84					

Top Ten Youth Overlay

Call	Section	Score	Contacts	Multipliers
Single Operator, High Power				
ND7K (K6JO, op @N6WIN)	AZ	256,200	1,525	84
Single Operator, Low Power				
KF8CEB	OH	30,600	204	75
KC1UYC	VT	10,504	101	52
KD9VZP	IN	8,800	88	50
KF0QFD	KS	6,216	74	42
KM4TQD	GA	2,706	41	33
KK7UXY	OR	1,800	36	25
KI5WES	LA	1,768	34	26
KF0QFC	KS	216	12	9
KO6GLN	EB	50	5	5
KE2DCD	DE	2	1	1
Single Operator Unlimited, High Power				
N4ML (@AA4NU)	TN	158,440	932	85
KK7QHF	ID	29,100	194	75
Single Operator Unlimited, Low Power				
W8OSS	OH	19,712	128	77
W5IOH	STX	10,692	99	54
W9ZVE	IL	880	22	20
KK7PKA	AZ	8	2	2
School Club				
W4USF	WCF	1,000	25	20
W3UD	DE	2	1	1

Affiliated Club Competition

Club	Score	Entries	Club	Score	Entries
Unlimited					
Potomac Valley Radio Club	13,025,572	217	South Jersey Radio Assn.	229,824	8
Society of Midwest Contesters	7,396,352	116	Rochester (NY) DX Assn.	211,106	8
Minnesota Wireless Assn.	5,522,122	111	599 DX Assn.	200,712	5
Yankee Clipper Contest Club	5,520,668	90	Heartland DX Assn.	195,128	5
Frankford Radio Club	4,994,578	92	Motor City Radio Club	181,390	11
Florida Contest Group	3,027,430	51	Northeast Maryland Amateur Radio Contest Soc.	178,882	9
Medium					
Mother Lode DX/Contest Club	3,043,160	36	Delara Contest Team	168,006	3
Contest Club Ontario	2,806,944	46	Carolina DX Assn.	165,408	8
Arizona Outlaws Contest Club	2,493,398	28	Candlewood ARA	150,732	3
South East Contest Club	2,083,744	29	Dupage ARC	146,336	5
Northern California Contest Club	1,824,380	49	Portage County Amateur Radio Service	113,888	6
Grand Mesa Contesters of Colorado	1,776,748	24	Texas DX Soc.	98,816	3
Western Washington DX Club	1,660,764	25	Allegheny Valley Radio Assn.	82,096	3
Southern California Contest Club	1,555,224	26	New Providence ARC	70,342	6
Mad River Radio Club	1,516,676	26	Sierra Foothills ARC	58,392	4
DFW Contest Group	1,515,228	22	Granite State ARA	33,980	4
Kansas City Contest Club	1,416,546	18	Sierra Nevada ARS	17,270	4
Willamette Valley DX Club	1,331,764	21	Local		
Central Texas DX and Contest Club	1,283,228	16	Pizza Lovers 259	1,543,780	10
Big Sky Contesters	1,259,108	16	Bella Vista Radio Club	669,044	8
Tennessee Contest Group	1,153,284	16	Radio Amateurs of Northern Vermont	641,120	6
Kentucky Contest Group	1,123,884	33	Iowa DX and Contest Club	453,588	4
Deep Dixie Contest Club	1,083,286	22	Central Oregon DX Club	323,254	4
Orca DX and Contest Club	980,606	14	CTRI Contest Group	289,958	5
Hudson Valley Contesters and DXers	969,334	11	Bristol (TN) ARC	239,934	6
Alabama Contest Group	959,746	26	OH-KY-IN ARS	132,222	4
Niagara Frontier Radiosport	689,176	14	The Villages ARC	129,110	5
Swamp Fox Contest Group	686,530	13	Medina County ARC	112,700	3
Saskatchewan Contest Club	624,182	10	Central Virginia Contest Club	85,158	3
Great Places Contest Club	586,540	6	Providence Radio Assn.	77,934	3
Bay Area DXers	487,166	8	Redwood Empire DX Assn.	76,696	3
Maritime Contest Club	477,640	14	Alexandria Radio Club	73,152	4
North Coast Contesters	475,284	11	Bellbrook ARC	58,308	4
Radiosport Manitoba	431,808	5	Central Michigan ARC	54,162	3
Order of Boiled Owls of New York	302,014	4	Coos County Radio Club	49,746	3
Spokane DX Assn.	245,868	4	North Fulton ARL	48,714	3
			Bolingbrook ARS	40,984	3
			Stoned Monkey VHF ARC	38,298	3
			High Desert Amateur Radio Group	23,284	3
			Metro DX Club	13,724	3

The 2025 ARRL
November Sweepstakes
phone weekend will be held
November 15 – 17, 2025.

2024 ARRL 160-Meter Contest Results

Last year's contest was held December 6 – 8, 2024.



Julio Henriquez, HI3A, participated in the 2024 ARRL 160-Meter Contest from his contest station in the Dominican Republic. He placed second overall in the Single Operator, Low Power, DX category. [Julio Henriquez, HI3A, photo]

The 2025 ARRL 160-Meter Contest will be held December 5 – 7, 2025.

Affiliated Club Competition

Club	Score	Entries
Unlimited		
Potomac Valley Radio Club	5,882,455	99
Frankford Radio Club	4,289,372	57
Society of Midwest Contesters	3,872,775	60
Yankee Clipper Contest Club	3,749,425	61
Minnesota Wireless Assn.	2,620,402	56
Medium		
Contest Club Ontario	1,920,633	29
Mad River Radio Club	1,266,102	13
Tennessee Contest Group	1,193,447	19
Kansas City Contest Club	990,359	10
Arizona Outlaws Contest Club	791,378	18
Grand Mesa Contesters of Colorado	689,385	11
Florida Contest Group	660,469	16
Central Texas DX and Contest Club	659,215	11
Niagara Frontier Radiosport	626,623	10
Northern California Contest Club	568,165	19
South East Contest Club	557,527	12
Hudson Valley Contesters and DXers	548,714	16
North Coast Contesters	467,433	8
DFW Contest Group	416,815	13
Kentucky Contest Group	378,922	9
Big Sky Contesters	280,857	5
Rochester (NY) DX Assn.	277,448	8
Willamette Valley DX Club	258,373	7
Arkansas DX Assn.	241,759	5
Oklahoma DX Assn.	213,717	3
Swamp Fox Contest Group	210,345	7
Southern California Contest Club	204,682	11
Alabama Contest Group	166,223	4
Orca DX and Contest Club	145,162	7
Heartland DX Assn.	112,661	3
Western Washington DX Club	93,214	4
Texas DX Soc.	55,084	3
Spokane DX Assn.	32,163	4
Portage County Amateur Radio Service	26,004	3
Local		
Medina County ARC	251,165	3
Central Virginia Contest Club	231,881	3
Bristol (TN) ARC	59,791	4
Metro DX Club	9,870	3

Full Results Online

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

Top Ten — US and Canada

Single Operator, High Power		Single Operator Unlimited, Low Power	
K3ZM	354,392	VE3MGY	181,790
N2MF	317,625	K3PA	163,736
NA8V	311,880	N3HEE	136,677
WF2W	286,065	K8BL	124,500
K1LT	270,256	K0RC	117,754
N4XD	264,730	KX9RT	116,960
N0TT	249,610	NJ3K	112,509
AB3CX	241,722	N0HJZ	106,038
WS9M	208,299	ND4Y	101,052
K0IDX	205,485	WT9Q	89,325
Single Operator, Low Power		Single Operator Unlimited, QRP	
KG9X	163,392	WA4PGM	106,650
W0UO	133,588	KA4RRU	83,980
WD8DSB	129,232	WE9R	49,088
AC0W	121,346	AA2A (N2KW, op)	39,707
N8LJ	97,600	AA5JF	27,030
K8FH	92,550	W0GJ	20,374
N4UA	90,428	N5UE	2,232
N5IF	89,292	K0LW	2,047
K8NVR	88,243	AD4TJ	750
K7SV	82,836	WQ6X	175
Single Operator, QRP		Multioperator, Single Transmitter, High Power	
K1ZM	89,181	K1LZ	399,454
K9AY	65,700	W2GD	356,040
W3TS	46,004	W1FV	328,704
N3CZ	45,201	W4NF	247,365
N5OE	41,958	K9RS	245,556
N2AWE	24,584	N4RV	235,866
KE0TT	19,453	K3AJ	233,298
K2YAZ	18,318	K5CM	202,036
K0KT	15,904	N4QS	193,600
KF7MD	15,631	N4HB	174,342
Single Operator Unlimited, High Power		Multioperator, Single Transmitter, Low Power	
VE3EJ	363,474	N0NI	220,313
K1KI	342,290	KT4XA	145,327
K9CT	309,639	W4TG	62,208
AA1K	304,917	W0CPH	60,214
N1LN	288,218	KA9VVQ	55,062
K3CT	277,306	AC8Y	14,910
W0AIH (K0TG, op)	268,356	NJ1F	8,251
W8MJ	231,012	K0LTC	1,188
KP4AA	227,528		
W1SJ	223,104		

Continental Winners

Africa	
Single Operator Unlimited, High Power	CR3DX (OM3RM, op) 35,496
Asia	
Single Operator, High Power	JA8NFV 672
Single Operator, Low Power	JE1SPY 300
Single Operator, QRP	JH1APZ 12
Single Operator Unlimited, High Power	JF1AMX 3,450
Single Operator Unlimited, Low Power	JH1BBT 162
Multioperator, Single Transmitter, High Power	JA1ZGP 12
Europe	
Single Operator, High Power	G6XX (G4FAL, op) 22,776
Single Operator, Low Power	SP1D 2,200
Single Operator Unlimited, High Power	DR5X 18,424
Single Operator Unlimited, Low Power	LY7M 5,082
Single Operator Unlimited, QRP	SP7AS 40
Multioperator, Single Transmitter, High Power	OZ5W 3,776
North America	
Single Operator, High Power	ZF9CW 169,984
Single Operator, Low Power	XE2S 11,616
Single Operator Unlimited, High Power	FM5BH 52,114
Single Operator Unlimited, Low Power	HP1EUA 32
Oceania	
Single Operator, High Power	VK2GR 416
South America	
Single Operator Unlimited, High Power	PJ2T (K8ND, op) 111,456

Division Winners

Single Operator, High Power		Single Operator Unlimited, Low Power	
Atlantic	N2MF 317,625	Great Lakes	W8MJ 231,012
Central	W9RE 199,038	Hudson	KC2GOW 166,644
Dakota	K0IDX 205,485	Midwest	NS0R 141,955
Delta	N4ZZ 73,097	New England	K1KI 342,290
Great Lakes	NA8V 311,880	Northwestern	K7QA 90,112
Hudson	W2XL 149,815	Pacific	K9YC 59,254
Midwest	N0TT 249,610	Roanoke	N1LN 288,218
New England	K1ZZ 123,284	Rocky Mountain	KV0Q 219,132
Northwestern	K7RAT (N6TR, op) 174,832	Southeastern	KP4AA 227,528
Pacific	AA6AA (@W6UC) 56,772	Southwestern	KY7M 115,338
Roanoke	K3ZM 354,392	West Gulf	N5TJ 118,180
Rocky Mountain	WD5COV 134,514	Canada	VE3EJ 363,474
Southeastern	W1RCR 109,824	Single Operator Unlimited, Low Power	
Southwestern	W8KA 164,238	Atlantic	NJ3K 112,509
West Gulf	K5RX 202,650	Central	KX9RT 116,960
Canada	VA3AR 156,124	Dakota	K0RC 117,754
Single Operator, Low Power		Delta	N9TF 77,532
Atlantic	N2EM 54,747	Great Lakes	K8BL 124,500
Central	KG9X 163,392	Hudson	W2VQ 28,944
Dakota	AC0W 121,346	Midwest	K3PA 163,736
Delta	K1GU 72,864	New England	K1EP 88,232
Great Lakes	N8LJ 97,600	Northwestern	N7UVH 15,480
Hudson	N2CJ 50,203	Pacific	K6ST 192
Midwest	N0NB 28,130	Roanoke	N3HEE 136,677
New England	W1QK 59,605	Rocky Mountain	K0UK 16,224
Northwestern	W7TMT 58,292	Southeastern	K3TW 18,528
Pacific	K6RAD 18,200	West Gulf	K5LJ 29,181
Roanoke	N4UA 90,428	Canada	VE3MGY 181,790
Rocky Mountain	K7TD 23,562	Single Operator Unlimited, QRP	
Southeastern	WB4AAA 66,130	Central	WE9R 49,088
Southwestern	N7IR 42,600	Delta	N5UE 2,232
West Gulf	W0UO 133,588	Midwest	W0GJ 20,374
Canada	VE4DX 66,080	New England	AA2A (N2KW, op) 39,707
Single Operator, QRP		Roanoke	WA4PGM 106,650
Atlantic	W3TS 46,004	Southeastern	AA5JF 27,030
Central	K9AY 65,700	Southwestern	WQ6X 175
Dakota	KE0TT 19,453	Multioperator, Single Transmitter, High Power	
Great Lakes	K2YAZ 18,318	Atlantic	W2GD 356,040
Hudson	WU2M 11,058	Great Lakes	N4QS 193,600
Midwest	K0KT 15,904	Hudson	N2NC 120,650
New England	K1ZM 89,181	Midwest	K0LIR 110,245
Northwestern	KK7A 2	New England	K1LZ 399,454
Roanoke	N3CZ 45,201	Pacific	N6RO 161,856
Rocky Mountain	KF7MD 15,631	Roanoke	W4NF 247,365
Southeastern	K4PQC 6,623	Southeastern	AD4ES 123,876
Southwestern	W6MZ 4,884	West Gulf	K5CM 202,036
West Gulf	N5OE 41,958	Multioperator, Single Transmitter, Low Power	
Canada	VE3DQX 3,024	Central	KA9VVQ 55,062
Single Operator Unlimited, High Power		Dakota	K0LTC 1,188
Atlantic	AA1K 304,917	Hudson	NJ1F 8,251
Central	K9CT 309,639	Midwest	N0NI 220,313
Dakota	K0TI 152,750	Roanoke	W4TG 62,208
Delta	AD4EB 180,129	Rocky Mountain	W0CPH 60,214
		Southeastern	KT4XA 145,327

Top Ten — DX

Single Operator, High Power		Single Operator Unlimited, Low Power	
ZF9CW	169,984	LY7M	5,082
VP5M (K4QPL, op)	64,972	LZ2ZG	644
G6XX (G4FAL, op)	22,776	OL1A	510
S59ZZ	8,880	JH1BBT	162
XE2T	5,412	EW1M	40
TF3SG	4,958	G4BRK	32
F6FYA	3,456	HP1EUA	32
OH1XX	2,640	OZ1AAR	24
G4BUO	2,016	SO7NA	18
US6EX	1,880	SD6F (SM6JWR, op)	12
Single Operator, Low Power		Single Operator Unlimited, QRP	
XE2S	11,616	SP7AS	40
H13A	7,520	Multioperator, Single Transmitter, High Power	
CO2AN	3,770	OZ5W	3,776
SP1D	2,200	OH0Z	330
ON7EH	1,950	JA1ZGP	12
Single Operator, High Power		Single Operator Unlimited, Low Power	
SP3HLM	1,008	LY7M	5,082
JE1SPY	300	LZ2ZG	644
JA7KPI	280	OL1A	510
JJ1VRO	112	JH1BBT	162
JE1TSD	98	EW1M	40
Single Operator, QRP		G4BRK	32
JH1APZ	12	HP1EUA	32
JH7UJU	8	OZ1AAR	24
Single Operator Unlimited, High Power		SO7NA	18
PJ2T (K8ND, op)	111,456	SD6F (SM6JWR, op)	12
FY5KE (F6FVY, op)	68,256	Single Operator Unlimited, QRP	
FM5BH	52,114	SP7AS	40
CR3DX (OM3RM, op)	35,496	Multioperator, Single Transmitter, High Power	
T17W (N3KS, op)	27,202	OZ5W	3,776
DR5X	18,424	OH0Z	330
G4AFF	8,610	JA1ZGP	12
OM2ADM	8,066		
G4IRN	7,920		
DL2SAX	7,600		

The 2025 IARU HF World Championship

1200 UTC Saturday, July 12 – 1159 UTC Sunday, July 13

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

- The exchange is a signal report and your ITU zone.
- Single-Operator entrants choose from High, Low, or QRP Power, and Mixed Mode, CW Only, or Phone Only.
- Stations from IARU member-societies around the world will be active. Get on the air to find out how many headquarters stations you can work.
- Seven-day log submission deadline: Upload electronic log submissions to our web app at <https://contest-log-submission.arrrl.org> no later than 1159 UTC July 20. Mail paper logs (postmarked by July 20) to IARU HF Championships c/o ARRL Contests, 225 Main St., Newington, CT 06111 USA.



Jim Smith, KK0U, operated at Elayer Contest Club, W0ECC, as part of the 2024 NU1AW/0 IARU headquarters operations. [Ward Silver, N0AX, photo]

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

Volunteer Monitor Program Report

The Volunteer Monitor (VM) Program is a joint initiative between ARRL and the FCC to enhance compliance in the Amateur Radio Service. This is the March 2025 activity report of the VM Program.

- ◆ A commendation was issued to an operator in Texas for exceptional courtesy and guidance to new operators regarding procedures on the HiFivers 3.908 MHz Friendship Net.
- ◆ A commendation was issued to an operator in Florida for exceptional efforts to maintain the Florida SARnet linked repeater system on 446.00 MHz, and for instructing newcomers in net procedures.
- ◆ Technician-class operators in Texas, Colorado, and Florida were reminded of the limitations of their licenses regarding FT8 operation on 20 meters. Under FCC rules, Technicians are not allowed 20-meter operation.

◆ An advisory was issued to a Technician-class operator in Alabama concerning FT8 operation on 15 meters. Technician-class operators in Florida, Texas, and California received advisories regarding FT8 operation on 40 meters. Technicians have no FT8 authority on either 15 or 40 meters.

◆ An operator in New Jersey was issued an advisory concerning proper identification on 75 meters. Section 97.119(a) requires amateur stations to transmit the assigned call sign at the end of each communication and at least every 10 minutes during a communication.

◆ A virtual VM Program was presented to the Gateway Amateur Radio Club in Georgia.

The totals for February 2025 monitoring were 1,883 hours on HF frequencies, and 2,260 hours on VHF frequencies and above, for a total of 4,143 hours.

— Thanks to Volunteer Monitor Program Administrator Riley Hollingsworth, K4ZDH

Contest Corral

June 2025

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

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					
2 0000	2 0100	1.8-28	K1USN Slow Speed Test	CW	Max 20 WPM; name, SPC	www.k1usn.com
2 1300	2 1400	1.8-28	ICWC Medium Speed Test	CW	Name, serial	internationalcwcouncil.org
2 1900	2 2030	3.5	RSGB 80m Club Championship, Data	Dig	RST, serial	www.rsgbcc.org
3 0000	3 0200	3.5-28	ARS Spartan Sprint	CW	RST, SPC, pwr	ars-qrp.com
4 1700	4 2100	144	VHF-UHF FT8 Activity Contest	Dig	4-char grid	www.ft8activity.eu
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 1900	5 2100	1.8-28,50	SKCC Sprint Europe	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
6 1900	6 1959	3.5,7	HA3NS Sprint Memorial Contest	CW	RST, mbr or "NM"	radioamator.honlapepites.hu
7 0000	8 2359	28	10-10 Int'l Open Season PSK Contest	Dig	Name, SPC, mbr	www.ten-ten.org
7 0000	7 2359	1.8-28	VK Shires Contest	CW Ph	RS(T), VK shire, or CQ zone	www.wia.org.au
7 0200	7 1459	1.8-28	Tisza Cup CW Contest	CW	RST, CQ zone	www.tiszacup.eu
7 0600	7 0800	7,14	Wake-Up! QRP Sprint	CW	RST, serial, suffix of previous QSO ("QRP" for 1st QSO)	qrp.ru
7 1200	8 0200	3.5-28	Atlantic Canada QSO Party	CW Ph	RS(T), province and county or SPC	acqp.ca
7 1300	8 0100	1.8-28,50,144	Kentucky QSO Party	CW Ph Dig	RS(T), KY county or SPC	www.kyqsoparty.org
7 1300	8 1300	50	UKSMG Summer Contest	CW Ph Dig	RST, serial, 6-char grid, mbr (optional)	uksmg.org
7 1500	8 1459	1.8-28	IARU Region 1 Field Day, CW	CW	RST, serial	www.darc.de
7 1500	8 1500	1.8-28	RSGB National Field Day	CW	RST, serial	www.rsgbcc.org
7 1800	8 2359	1.8-28,50	ARRL Int'l Digital Contest	Dig (no RTTY)	4-char grid	www.arri.org/arri-digital-contest
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
11 0030	11 0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or power	naqcc.info
11 1700	11 2100	432	VHF-UHF FT8 Activity Contest	Dig	4-char grid	www.ft8activity.eu
11 1900	11 2030	3.5	RSGB 80m Club Championship, CW	CW	RST, serial	www.rsgbcc.org
14 0000	14 2359	3.5-28	YB ORARI DX Contest	Ph	RS, "ORARI" or "DX"	www.oraricontest.id
14 1100	14 1300	14,21	Asia-Pacific Sprint, SSB	Ph	RS, serial	jsfc.org/apsprint/aprule.txt
14 1200	15 1200	3.5-28	Portugal Day Contest	CW Ph	RS(T), CT district or serial	portugaldaycontest.rep.pt
14 1200	15 2359	1.8-28,50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
14 1400	14 1800	144,432	AGCW VHF/UHF Contest	CW	RST, serial, pwr, 6-char grid	www.agcw.de
14 1400	15 1400	50	REF DDFM 6m Contest	CW Ph	RS(T), serial, 4-char grid	concours.r-e-f.org
14 1500	15 1500	3.5-28	GACW WWSA CW DX Contest	CW	RST, CQ zone	www.gacw.ar
14 1800	16 0259	50 and up	ARRL June VHF Contest	CW Ph Dig	4-char grid	www.arri.org/june-vhf
15 2300	16 0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or pwr	qrpcontest.com/pigrun
16 1200	16 1300	7	SARL Youth QSO Party	Ph	RS, age	mysarl.org.za
16 1900	16 2100	3.5-28	RSGB FT4 Contest	FT4	Signal report	www.rsgbcc.org
18 0030	18 0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or power	naqcc.info
18 1700	18 2100	1.2G	VHF-UHF FT8 Activity Contest	Dig	4-char grid	www.ft8activity.eu
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 1900	19 2000	3.5-14	NTC QSO Party	CW	Max 25 WPM; RST, mbr or "NM"	pi4ntc.nl/ntcqp
21 0000	22 2359	1.8-28	All Asian DX Contest, CW	CW	RST, 2-digit age	www.jarl.org
21 0000	22 2359	50	SMIRK Contest	CW Ph Dig	4-char grid, mbr (optional)	smirk.info/contest.html
21 1200	22 2359	All, no WARC	SKCC QSO Party	CW	RST, SPC, name, 4-char grid	www.skccgroup.com
21 1400	22 1400	50	IARU Region 1 50 MHz Contest	CW Ph	RS(T), serial, 6-char grid	www.iaru-r1.org
21 1400	22 1400	50	LZ International 6-Meter Contest	CW Ph	RS(T), serial, 6-char grid	www.radioclub-troyan.bg
21 1500	22 1500	1.8	Stew Perry Topband Challenge	CW	4-char grid	www.kkn.net/stew
21 1600	22 0400	3.5-28	West Virginia QSO Party	CW Ph Dig	RS(T), WV county or SPC	www.qsl.net/wvqp
21 1800	21 2359	3.5-14,18,21,24,28,2 repeaters	ARRL Kids Day	Ph	Name, age, QTH, favorite color	www.arri.org/kids-day
22 0000	22 2359	1.8-28,50	Feld Hell Sprint	Dig	See rules	sites.google.com/site/feldhellclub
22 0800	22 1400	50	WAB 50 MHz Phone	Ph	RS, serial, WAB square or country	wab.intermp.net/Contest Rules.php
25 0000	25 0200	1.8-28,50	SKCC Sprint	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
26 1900	26 2030	3.5	RSGB 80m Club Championship, SSB	Ph	RS, serial	www.rsgbcc.org
28 0600	28 1700	3.5-28	UFT QRP Contest	CW	RST, QRP/QRO, mbr or "NM"	www.uft.net
28 1200	29 1200	1.8-28	His Maj. King of Spain Contest, SSB	Ph	RST, EA province or serial	concursos.ure.es
28 1800	29 2059	All, except 60,30,17,12	ARRL Field Day	CW Ph Dig	Number of transmitters, operating class, ARRL/RAC Section or "DX"	www.arri.org/field-day
30 1300	30 1400	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	www.qrp-labs.com/party.html
30 1900	30 2000	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	www.qrp-labs.com/party.html

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

Club Station

Riding the Rails for a Special Event

It is common for amateur radio clubs to host special event stations for various reasons. They are excellent activities for members, and they are often large publicity draws for the general public. This month, Ron Evans, K5XK, and Don Banta, K5DB, describe how the Bella Vista Radio Club (BVRC) of northwest Arkansas took a unique approach, setting up a mobile special event operation on a train!

Operating amateur radio mobile isn't unusual. Two-wheel, four-wheel, maritime, and aeronautical mobile aren't unheard of. But what about riding the rails, aka "train mobile"? Reviving an exciting amateur radio rail adventure after a 10-year absence, the Bella Vista Radio Club took to the tracks, reactivating our HF train mobile station on April 20, 2024, using special event call sign N5T.

Riding the Rails

We operated aboard an excursion train of the Arkansas & Missouri Railroad on a day-long 135-mile round trip through the scenic Ozark Mountains, from Springdale southward to Van Buren in the Arkansas River Valley and then returning to Springdale. As the train rolled through the Boston Mountains of the Ozarks, it passed through a tunnel and crossed three trestles, one of which was 125 feet above the valley floor.

Our club has had a good rapport with the railroad for many years. We haven't consistently operated on board from year to year, but whenever we have wanted to operate, the Arkansas & Missouri Railroad has always accommodated us.

Our station on the rails consisted of a Yaesu FT-991A transceiver with hamstick-style antennas for 20 and 40 meters. The passenger car had its own generator, so we availed ourselves of that, but we did have a LiFePO4 battery backup if needed.

The antennas required to operate train mobile were a challenge, as we needed the flexibility to change bands and to lower the antennas prior to passing through the 150-foot tunnel. Fortunately, one of our members with an outstanding machine shop fabricated an antenna mount that worked perfectly.

The event saw excellent attendance, filling passenger car 107 to capacity. With an Amateur Extra-class licensee as control operator, everyone had an opportunity to participate. This provided several of our new Technician-class license holders with not only the opportunity to experience the thrill of operating HF, but also the excitement of activating an HF train mobile station, which is relatively rare on the bands.

The sun was less than cooperative that day, sending a coronal mass ejection that dampened propagation. We also had to contend with an extraordinary RF/electrical noise field between our railcar and the engine. These limitations led to us making a nominal number of contacts, but the event was still hailed as a success, with everyone operating who wished to do so. Of course, we all enjoyed the majestic scenic views and great club fellowship. We intend on making the train mobile operation an annual event.



The N5T special event QSL card.



Ryan Wolfe, KE0CZQ, operates N5T on SSB while his son Zac, KE0CZP, handles logging.



Bella Vista Radio Club members packed into car 107 for the journey.

About Our Club

Bella Vista Radio Club began in 1993 as a small coffee klatch in Bella Vista, Arkansas, just south of the Arkansas/Missouri state line in the northwest corner of the state. Since that time, it has grown into the largest amateur radio club in Arkansas, with more than 315 members in five Arkansas counties, as well as northeast Oklahoma and southwest Missouri. Our primary mission is to promote and educate northwest Arkansas and surrounding areas about all aspects of amateur radio. We offer Technician and General license classes (an Amateur Extra class is in the works), assistance with acquiring equipment, and an equipment loan program to help our newcomer members get a jump start in the hobby. We have two Volunteer Examiner teams that conduct monthly testing sessions at two locations, in addition to special test sessions when needed.

We have a monthly newcomer workshop, a weekly newcomer repeater net, and a cast of mentors ready to help with anything these new amateurs need to begin their ham radio experience. We have also helped many of our newcomers with antenna and station installa-



Kathy Bromley, WQ5T, bangs out a CW contact

tions at their homes, along with assisting in installing and using software.

We host an annual in-person CW Academy class each year and help students with practice QSOs on the air to prepare them to begin making real CW contacts. We also host an annual BVRC CW Roundup where veteran and new amateurs alike operate for a 1.5- to 2-hour period, exchanging signal reports and other rudimentary elements of making contacts.

Bella Vista Radio Club offers an informative website (www.bellavistaradioclub.org), a robust monthly newsletter, and an active social media presence. We are an ARRL Affiliated Club, and we celebrated our 30th anniversary in 2023.

All photos provided by the authors.

ARRL Special Service Clubs



ARRL offers the Special Service Club (SSC) program for clubs that demonstrate that they're working to improve the amateur radio community by completing special projects, holding license classes, and working with local groups on events, among other activities. Visit www.arrl.org/ssc-application for more information about this program. Below is a list of new and renewing SSCs as of March 26, 2025.

Renewing SSCs

Radio Association of Western New York, W2PE	Depew, NY
Clark County ARC, W7AIA	Vancouver, WA
Portage County Amateur Radio Service, K8BF	Ravenna, OH
North Florida ARC, NF4RC	Newberry, FL
Sedalia-Pettis Amateur Radio Klub, WA0SDO	Sedalia, MO

New SSCs

Bear Bait Radio Club, W2JST	Clay, NY
Milwaukee Radio Amateurs' Club, W9RH	Milwaukee, WI

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.

Ham Media Playlist

Jeff Geerling, Geerling Engineering, and Level 2 Jeff

We all have stories of what inspired our interest in amateur radio. Some of us started out on CB, some discovered radio because of adjacent hobbies, and others learned about it through friends and family. Jeff Geerling, KF0MYB, discovered radio through his father, who was a broadcast radio engineer. Thus, Jeff grew up around 30 – 50 kW FM and AM transmitter sites.

Jeff was fascinated by the engineering culture his dad's group of friends fostered. Growing up, he would often pretend to be a radio broadcaster. He started getting into the two-way radio scene with Family Radio Service radios. Jeff later discovered that radio offered a lot of fun through not only receiving, but also via playing with small transmitters and tinkering with software-defined radio (SDR) and Raspberry Pi computers. It didn't take long for Jeff to decide to get his amateur radio license and expand his ability to experiment with RF.

Jeff didn't have a traditional mentor, even though he was friends with many hams. While preparing for his licensing exam, he spoke with Teak Phillips, W0TLP, and some of his dad's radio engineer friends who were also hams, such as Ken Meacham, K0KYZ. As he grew in his experience, he ended up having great conversations with Kyle Krieg, AA0Z, as well. To Jeff, part of the allure of the amateur radio community is the wide range of niche interests that exist. Many of his friends have interests in POTA, emergency communications, packet radio, nets, and SDR. Each individual makes meaningful contributions to the group and, thus, keeps Jeff plugged in.

Jeff Geerling

Jeff's first YouTube channel, which he dubs his "main channel," is named after him, Jeff Geerling (www.youtube.com/@JeffGeerling). He started this channel when he was in college in 2006. Initially, Jeff uploaded short videos of interesting projects he was working on. When the

pandemic hit, he decided to livestream a series on IT automation software, and his channel expanded tenfold. In 2023, with his channel doing well, Jeff went full-time on YouTube. The Jeff Geerling channel currently has 906,000 subscribers.

Geerling Engineering

Parallel to his main channel, Jeff began posting videos with his dad. While on a family vacation in 2022, they discussed that his dad had many stories to tell from his radio days. They had already posted a couple of videos on Jeff's main channel, so they knew people were interested in the content. Shortly after that vacation, they created the YouTube channel Geerling Engineering (www.youtube.com/@GeerlingEngineering), which serves as an outlet for more radio-centric videos.

Geerling Engineering currently has 106,000 subscribers, but expect to see both that number and the number of videos grow shortly, as Jeff's dad is retiring soon and will be available to post more videos. In one video that many hams will find of interest, titled "The EASY way to build an electronics workbench" (<https://tinyurl.com/geerling-bench>), Jeff's dad offers his years of experience to step viewers through the planning of where to create space for various components. Jeff and his dad make sure to point out



Jeff and his dad share their planning process to build an electronics workbench.

considerations one should make when planning shelf dimensions, location, and more.

While many of Jeff's videos are procedural, some have entertainment value while also delivering a message. For example, in the video titled "If I touch this tower, I die" (<https://tinyurl.com/geerling-tower>), Jeff and his dad show the tower of the AM radio station KMOX. They explain that for the AM station, the entire tower is the antenna. This serves as both a technical as well as a safety lesson. Jeff and his dad do an outstanding job of explaining all of the various components of the antenna system. When looking at the building, viewers get to see the grounding system and the tuner components. Interestingly, while they are inside the building, they (and the viewers) can hear the KMOX transmission, even though there is not a radio inside the room. Jeff and his father also demonstrate how dangerous antennas, towers, and RF can be.

In the video titled "How dangerous is AM radio?" (www.tinyurl.com/geerling-corn-dog), Jeff, his father, and a friend answer questions to explain what happens when touching various food items to the antenna tower. It should be noted, Jeff says very clearly, that this is for educational purposes only and viewers should not attempt this. Mixing facts with a bit of humor, the trio do a great job explaining the science behind what happens during each experiment.

Level 2 Jeff

Jeff's third channel, Level 2 Jeff (www.youtube.com/@Level2Jeff), was created directly in response to the YouTube algorithm. Jeff uses this channel to post



Jeff demonstrates why it is important to keep clear of AM towers by touching this one with a corn dog.

videos that don't necessarily fit into the content of his other two channels. The topics vary quite a bit but still have the same great quality of the other two channels.

One video that stood out to me, titled "This device makes Meshtastic the BEST off-grid tech" (<https://tinyurl.com/geerling-mesh>), delves into Meshtastic and focuses on some of the experimentation that is possible with Meshtastic. Many high school students that I work with love Meshtastic because it's an inexpensive way to facilitate communication and experimentation.

Proud Moment

When asked about a video he was especially proud of, Jeff mentioned "How Raspberry Pis are made (Factory Tour)" (www.tinyurl.com/geerling-Pi). Raspberry Pi computers are amazing feats of technology, offering users the ability to run a lot of amateur radio software (as well as other software) on a machine that fits in the palm of your hand. The opportunity to see these computers made through Jeff's video is amazing. Viewers see how the boards are produced, some of the challenges that exist in such a fast-paced environment, and the automation of much of the process via robots. Jeff grew up watching the TV show *How It's Made*, and this video is a nod to his time spent watching. Also, this video took months to produce, while most of his videos take just days.

If you're looking for a HamTuber with a wonderful combination of videos ranging from radio to electronics, Jeff Geerling's channels are likely to be a great fit for you.



Jeff's dad gives viewers a tour of the KMOX radio station.

How's DX?

Revisiting Wake Island and DX News from the Board

Since November 2024, Allen, KH7AL/KH9, has been on the air from Wake Island in his spare time, as detailed in the February 2025 "How's DX?" column. He was on multiple bands this past January, including 12 meters, 17 meters, and 10-meter SSB. He built a 12-meter dipole from spare parts, and it functioned exceptionally well with a standing wave ratio of 1.25:1. By February, Allen made his first attempts at Morse code on 30 meters. His steady CW skills were at just more than 15 WPM and garnered praise from multiple DXers. For the foreseeable future, Allen plans to focus on CW and SSB without immediate plans for FT8. He anticipates operating on the 60-, 80-, and 160-meter bands upon receiving a loop antenna from a ham in Australia.

In March 2025, Allen took a short break from Wake Island to return to his Montana home for about 4 weeks. During his absence, Richard, KR4CDI/KH9, a newly licensed Technician-class operator under Allen's mentorship, made his first contact on 10 meters. As of press time, Richard is studying for his General-class license and will stay on Wake Island until at least June 2025. Allen expects to be back on Wake around mid-April 2025, probably for another 3 – 4 months. Upon returning home, Allen found a pile of QSL cards awaiting him, indicating the enthusiastic response to his activities on Wake. Wake Island is currently number 28 on Club Log's DX Century Club (DXCC) Most Wanted List.

January 2025 ARRL Board Meeting

Following the January 2025 ARRL Board meeting, ARRL is pleased to announce the DXCC Trident Award. This award, which will be like the Triple Play Worked All States Award, aims to encourage more operating and inspire digital mode users to develop their CW and SSB skills.

Additionally, the ARRL Administration and Finance Committee agreed that an additional year will be granted to those Incoming QSL Bureaus who still require financial support from all ARRL members to operate. Further details will be provided by ARRL in due course. Do you have envelopes on file at your



Newly licensed operator Richard Cook, KR4CDI, operating from Wake Island. He will be there until at least June 2025. Go easy on him as he operates from the rare DXCC entity. [Allen Le Vie, KH7AL, photo]

Incoming QSL Bureau? For more information, visit www.arrrl.org/incoming-qsl-service.

DX News from Around the World

JD1/M — Minami Torishima

Take, JG8NQJ, typically works for 2 – 3 months at a time on Minami Torishima, with breaks in between. He has been following this routine for several decades, operating in his free time when on the island. His most recent departure from Minami Torishima was on March 7. His next 2-month assignment at JD1/M commenced on April 17, and he primarily operates on CW, with occasional FT8 activity. Minami Torishima currently ranks number 32 on Club Log's DXCC Most Wanted List. Sin, JA8CJY, serves as Take's QSL manager and has received the JG8NQJ/JD1 log, which includes entries from up to 2114Z on March 1, 2025. Sin also posts updates regarding Take's activities at www.qrz.com/db/JA8CJY.

T8 — Palau

As of press time, Japanese operators JF1GHX, JR1FKR, and JK1SZX are scheduled to be active at the Palau Radio Club station from May 22 to June 1. They will be operating under the call signs T88HF (JF1GHX)

and T88SG (JK1SZX). JR1FKR is currently awaiting his Palau call sign. Another group from Japan is heading to the Palau Radio Club station for a June 6 – 11 activation. JR1FKR will be operating as T88TJ, while JH1MLO will be active as T88HR.

E6 — Niue and YJ — Vanuatu

Bob, ZL1RS, is organizing a 6-meter DXpedition to Niue in late May, as of press time, followed by a trip to Vanuatu. He will be on the air as E6RS from Niue on May 27 – June 2. He will primarily be on 6-meter FT8, with a focus on ionospheric propagation. Bob will be active on 50.313 MHz and 50.303 MHz Fox and Hound. Additionally, he will attempt Earth-moon-Earth (EME) on the Magic Band. If 6 meters is not open, he will direct his focus to 10 meters. You can find more information about Bob's Niue activity at www.qsl.net/zl1rs/e6_eme.html.

When Bob travels to Vanuatu, he will conduct similar activities as YJØRS on June 11 – 28. He will use an Icom IC-705 and an LDMOS kW amplifier with a seven-element Yagi. On 10 meters and from both islands, he will use the IC-705 with a 300 W amplifier and delta loop antenna. Further details about his 6-meter EME activity from Vanuatu are available at www.qsl.net/zl1rs/yj0_eme.html.

FJ — St. Barthélemy

Otis, NP4G, is operating as FJ/NP4G on May 27 – June 2 at the St. Barthélemy Nature Reserve, a new Parks on the Air® park (BL-0001). QSL via Logbook of The World® (LoTW®).

IOTA AS-169 — Arnala Island

After their highly successful AU2V Islands on the Air (IOTA) DXpedition to Sacrifice Rock (IOTA AS-161; see the May 2025 “How's DX?” column), Sarath, VU2RS, will be leading his team to Arnala Island (IOTA AS-169). They will be active as AU2M from May 29 to June 1. The license has been secured, and they plan to have three stations with a variety of antennas for HF and 6-meter CW, SSB, and digital modes. If conditions warrant, they will focus on the Magic Band. You can find more details on their website at <https://vu2rs.com/au2m>, or you can email Sarath directly at sara@vu2rs.com.

OY — The Faroe Islands

Operators from the 7163 Net Group led by Jim, WB2REM, are planning a DXpedition to the Faroe Islands on June 1 – 10. He will be joined by co-leader Mike, W9MK; John, K4LT; Bill, W2WCM; Carol, K5TFL (aka G6TFL); Bruce, K3BAB, and Krish, W4VKU (aka VU2VKU). They will be operating as OY6FRA, OY6A,

OY/W9MK, and OY/K4LT on FT8, FT4, SSB, CW, and 1.8 – 50 MHz. The team will participate in the ARRL International Digital Contest using the call sign OY6A. Jim will be handling the QSL duties, which can be done via OQRS, Club Log, QRZ, and LoTW. For more details, visit their website at www.faroeis.com.

FS — St. Martin

John, K9EL, will be operating as FS/K9EL in St. Martin on June 4 – 18. This will be a holiday-style operation with efforts to be active during 6-meter openings. He will be on 7 – 50 MHz, and he'll upload contacts to LoTW daily. John will also attempt to use Club Log's livestream feature. QSLs can be done directly or via the bureau, but Club Log OQRS is preferred.

FO — French Polynesia

DXpeditioner Nobby, GØVJG, will be active from Bora Bora (IOTA OC-067) on June 10 – 26 as FO/GØVJG. He will be on SSB, CW, and FT8. QSL via MØOXO.

Z6 — Kosovo

Members of the Italian DXpedition Team are planning to operate as Z68TT and Z68ZZ on June 26 – July 10. They plan to be active on all modes on 3.5 – 50 MHz. I2PJA, I2YSB, I1FQH, and I1HJT will be on the team. They will upload contacts after the DXpedition. QSL directly via I2YSB. There are more details about this one at www.i2ysb.com/joomla5/?tw_p=tw (click on the Z68TT/Z68ZZ picture).

Errata

In the February 2025 “How's DX?” column, the Next Generation DX team's call sign while at the Marshall Islands was V73WW, not V7X. In the March 2025 column, we covered the Belgian DXpedition to the Andaman and Nicobar Islands. At the last minute, the team was notified that their call sign would be changed from VU4X to VU4AX. In the April 2025 column, we provided a thorough DX history of the Galápagos Islands. But Alex, LU8YD, reminded me of the 2017 HC8LUT DXpedition. After the April 2025 column went to press, Adrian, GØKOM, canceled his trip to the UK Sovereign Bases on Cyprus. The good news is that Dave, G4WXJ, planned to operate there as ZC4RH in late April and early May. Adrian now anticipates operating as ZC4MK in July and October 2025. Keep an eye on your favorite DX outlet for updates.

Wrap-Up

That's it for this month, with special thanks to GØKOM, G4WXJ, JA8CJY, K9EL, KH7AL/KH9, LU8YD, ON5UR, VU2RS, WB2REM, and *The Daily DX* for providing input for this month's column. Until next month, see you in the pileups! — *Bernie, W3UR*

The World Above 50 MHz

March 6-Meter Action

March propagation started slowly for North America as February F2 openings became a memory. Some were discouraged by reports that Solar Cycle 25 had peaked; that changed on March 12, as the spring equinox approached. VP8LP appeared suddenly with strong signals to North America. At 1707 UTC, I copied VP8LP at +7 dB on FT8, with audible tones on a whip antenna. I saw KCØY, NT7C, NØLL, and "How's DX?" columnist Bernie, W3UR, complete contacts with VP8LP. Danny, KB8W (EL99), worked VP8LP on March 14 with 20 W and an indoor wire antenna. In the afternoon on March 15, the southwest states enjoyed a strong opening to the South Pacific, detecting signals from E51WL, VK9DX, ZL7DX, H44MS, ZL1RS, and others. Stations in Arizona and California began working Japan after that. JE1BMJ, JG1TSG, JA7QVI, JN1JFC, and JR3REX were noted.

This opening may have been "side scatter," as Trey, N5KO (CM97), was beaming at 225 degrees, and K5XI (DM52) and JE1BMJ were both beaming toward the South Pacific (see Figure 1, which also applies to the K4PI-to-Japan activity that will be discussed later in this column). A strong opening to Argentina appeared on St. Patrick's Day. LU1WFU was up to +10 dB for more than 45 minutes in Kansas, and he called CQ without a reply. On March 18, Nick, VK9DX, reported "a massive opening to China." Later that day, CE8EIO, LU1WFU, and VP8LP were in to North America with strong signals at around 1745 UTC. CE8EIO was on 50.110 MHz SSB for a short while in Kansas. At 1750 UTC, VP8LP went to FT4 on 50.318 MHz and made many contacts.

On March 19, South American stations, including LU1WFU (FE64) and LU7XZ (FD66), had strong signals to the Midwest; I contacted them while I was fixed mobile with 10 W. Randy, NØLD (EM15), worked ZL7DX at 1855 UTC. Bob, KØNR (EL29), activated Galveston Island State Park in Texas for POTA® and worked several LU-region stations, E51BQ, ZL1RS, and TG9AJR with 100 W and an end-fed wire. Bob said it was "a good lesson in what is possible with a basic antenna on 50 MHz." Ken Reecy, AC4TO (EM70), worked E51BQ, VK9DX, ZL1AKW, and ZL1RS on FT8, and he worked VK4CZ and FK4QX/P (RG29) on SSB.

An unusual long-path opening from Arizona and Texas to Japan took place in the morning on March 21. Greg McIntire, AA5C (EM13), noted:

We had a long-path 6-meter opening to Japan this morning [at] around 1500 UTC. I was aimed 135 degrees, waiting for the South American [transequatorial propagation (TEP)] we have had a lot of lately. [I] worked a dozen JAs before it closed. It lasted only about 25 minutes, but it was crazy while it was open. My antenna is at 90 feet, and locals with lower antennas weren't copying them.

Ed, K5YT (EM22), "had a pileup" of Japanese stations calling him. Li, BA4SI (PM01), copied WQ5S (EM13) but did not complete a contact. At that time, it was midnight in China.

Openings at the End of March

Strong sporadic E and F2 occurred across the southern states on March 23. I logged CA6SNT (FF30) via F2, and 2 minutes later, I logged XE2NK (DL95) via E_s. The rare sporadic E set up links to the South Pacific for many, including Gene, N9TF (EM66), who worked E51BQ and copied 3D2AG. That evening, I copied VK9DX (RG30). KCØY (EM17), AAØMZ (EM29), and NØEG (EM28) worked VK9DX at around 0150 UTC

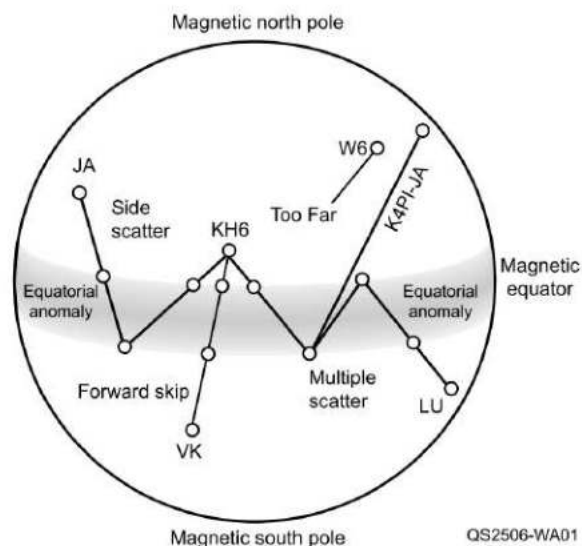


Figure 1 — A TEP map created by Jim Kennedy, K6MIO, and originally featured in "50 MHz Long-Path Propagation" in the *Proceedings of the 37th Conference of the Central States VHF Society*, redrawn for clarity. For this column, the circle to the right of W6 was added to represent K4PI's location, and the line connecting to the circle represents his signal traveling via an E_s hop to Mexico.

on March 24. Mike, WØMU (DM79), worked VK9DX at 0346 UTC. The next morning, Ken, AC4TO (EM70), noted strong E_s toward HH2AA, and he worked EA8 and CT1EEB. Ken said:

I noticed that K2BLA and N4RWG were calling and then working D68Z on the opposite sequence from me. Of course, I stopped my transmitting, turned up to D68 heading, and listened on the D68Z sequence. [I] quickly worked her for a new [DXCC entity]. She faded immediately after the contact. As far as I know, K2BLA, N4RWG, and myself, all located in Florida, were the only US [stations] to get in her log. It was completely unexpected. A crazy 24 hours on 6 meters, with VK5s popping in at 2215 UTC...within 5 hours, I had worked D68Z — 9,000 miles to my east — and then several VK5s, 10,000 miles to my west...a good day on 6 indeed!

On March 25, KCØY worked ZL1RS and noted signals from Mexico. Mike, K4PI (EM73), and N4HU had an opening to Japan that went southwest that evening; it started with Mexico at 240 degrees azimuth. Mike said:

When I finished (with XE) and let up, my screen was lit up with JA callers. I [thought] I must have gotten onto the wrong band! Some of them sent me text messages saying they were beaming ZL [at] the same time as me. It ended at about 0115 UTC. [I] worked 17 [stations].

Perhaps this was the result of an E_s link from K4PI to Mexico, and then TEP to the South Pacific and side scatter to Japan (see Figure 1). In the figure, the circle to the right of W6 was added to represent K4PI's location. The line drawn from the circle to the leftmost point of "Multiple Scatter" was added to represent an E_s hop to Mexico, connecting to the TEP zone labeled "Equatorial Anomaly." K4PI's signal may have then bounced back and forth inside the equatorial anomaly until it popped out and headed toward Japan. This occurrence was similar to the aforementioned west-coast JA openings. Carl Luetzelschwab, K9LA, observed:

K4PI working JA on 6 meters when pointed to the southwest is likely the same mechanism as the similar [southwest] path to JA on 10 meters from the Midwest. I've worked this 10-meter path a number of times. Of course, it will be more prevalent on 10 meters due to the [maximum usable frequency] issue, but it should happen on 6 meters under the right conditions and at a much lower probability.

In the evening on March 26, Ecuador and Argentina were in to Kansas for hours, along with HR1R (EK64) and XE2YWH (DL92) via E_s. The last opening for the month was on March 27 for some operators in South Africa. It began with strong F2 from North America to the Caribbean and South America. Jack, NA3F

(FN10), worked seven HC stations starting at 1528 UTC. AC4TO worked ZS1LS/6 at 1544 UTC, followed by ZS4TX at 1548 UTC. WQØP (EM19) worked PJ7AA at 1614 UTC. With my whip, I copied J79WTA and stations from call sign regions HC and HK working John Lock, KFØM (EM17), at 1619 UTC. A minute later, John worked ZS4TX and picked up a signal from PZ5TW. John Geiger, AF5CC, copied ZS6NK at 1635 UTC. Fred, NO5Z (DM62), worked ZS4TX, J88BTI, PJ7AA, J79WTA (on FT8), and FY5KE (on CW). The opening continued for 4 more hours. At 1958 UTC, I logged HK6RF with 10 W on FT8.

These openings were mostly on days with high geomagnetic activity. This was due in part to the Russell-McPherron effect at the equinox. Sporadic E played a major role in setting up links to TEP and side-scatter paths. E_s is rare in March, and it's unclear why there was so much this year.

On the Bands

50 MHz. On March 1, long-distance transpolar long-path propagation took place from South America to Japan. LU7MC noted that JG1TSG was "+22 dB" on FT8 at 0014 UTC. LU5FF (FF99) copied JA6YBR/B with a 59 signal. On March 9, 9Z4Y (FK90) worked YB1AR and YB1UUN (both OI33) via long path. At 0119 UTC on March 20, K2HJB (FN21) logged HC3RJ (FI06). On March 23, WA2GFN (FN20) worked WA3GWK (EM60) on SSB via E_s. At 1900 UTC, Wayne, NØPOH (DM79), worked VP8NO on FT8 with 100 W and an M2 Antenna Systems 6M5X Yagi. Antoine, 3D2AG, worked 7Q2MM at 2020 UTC and 5H8HZ at 2112 UTC. Rémi, FK8CP, logged 5H8HZ at 2109 UTC and D2UY at 2116 UTC. The next day, Trey, N5KO, worked 28 VK stations. Paul, WBØBBC, worked PY2GG on March 25 with 15 W and an end-fed wire antenna.

144 MHz. Jim, K5ND (EM12), noted strong tropospheric propagation across the Gulf of Mexico and to Florida on March 12. KO4MA, NN4X, W4AS, WB2FKO, and others were active.

Here and There

Rich, K1HTV, noted that the Ham Radio Science Citizen Investigation is planning "meteor-scatter QSO parties" for the 2025 Perseid (peaking August 11 – 12) and Geminid (peaking December 12 – 13) meteor showers. "This is a [combination of a] special event and a contest to generate contact data during meteor-scatter events, using 10 meters and 6 meters with MSK144," he said. Bruce, KN4GDX, is one of the coordinators. For more information, visit www.hamsci.org/article/save-dates-hamsci-meteor-scatter-qso-party.

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

Iowa (Prescott) — June 14 DFHRV
8 AM – noon. Spr: Southwest Iowa ARA. Williamson Legion Hall, 1120 Sycamore Ave. TI: 146.79 (136.5 Hz). Adm: \$5.
www.facebook.com/groups/327085807349791

Maine (Hermon) — May 31 FHRVT
8 AM – 1 PM. Spr: Pine State ARC. Hermon High School, 2415 US-2. TI: 146.940 (136.5 Hz). Adm: \$5. <https://n1me.org>

Maryland (Upperco) — June 15 DFHQV
8 AM – noon. Spr: Baltimore ARC. Arcadia Carnival Fairgrounds, 16020 Carnival Ave. TI: 146.67 (107.2 Hz). Adm: \$5.
www.w3ft.com/hamfest

Michigan (Midland) — June 14 DFHRV
8 AM – noon. Spr: Midland ARC. Salvation Army Building, 330 Waldo Ave. TI: 147.00 (103.5 Hz). Adm: \$5. www.w8kea.org

Michigan (Monroe) — June 15 DFHQRT
8 AM – noon. Spr: Monroe Co. Radio Communications Association. Monroe Co. Fairgrounds, 3775 S. Custer Rd. TI: 146.72 (100 Hz). Adm: \$7. www.mcrca.org

Minnesota (Plymouth) — June 21 FRT
7 AM. Spr: Twin City FM Club. West Medicine Lake Community Club, 1705 Forestview Ln. TI: 146.76 (114.8 Hz). Adm: \$5.
www.tcfmc.org

New Jersey (Fair Lawn) — June 14 DFHQRT
6 AM – 1 PM. Spr: Fair Lawn ARC. Fair Lawn Memorial Pool, Morlot Ave. & Essex Pl. TI: 145.470 (167.9 Hz). Adm: \$5. Email: fairlawnarc@yahoo.com

New Jersey (Piscataway) — June 21 DFHQRV
8 AM – 1 PM. Spr: Raritan Valley Radio Club. Piscataway High School, 100 Behmer Rd. TI: 146.625 (141.3 Hz). Adm: \$7.
www.w2qw.org

New York (Bethpage) — June 8 DFHQRS
7 AM. Spr: Long Island Mobile ARC. 999 Stewart Ave. TI: 146.86 (136.5 Hz). Adm: \$8. www.limarc.org

New York (Cortland) — June 14 DRT
7 AM – noon. Spr: Skyline ARC. Cortland Co. Fairgrounds, 4301 Fairgrounds Dr. TI: 147.180 (71.9 Hz). Adm: \$6.
www.skylinehamradioclub.org

New York (Greece) — June 21 DFHQRTV
7 AM – 2 PM. Spr: Rochester ARA. Barnard Fireman's Field, 410 Maiden Ln. TI: 146.61 (110.9 Hz). Adm: \$10.
www.rochesterham.org/hamfest.htm

New York (Rensselaer) — June 7 DRT
8 AM – 1 PM. Spr: East Greenbush ARA. East Greenbush Volunteer Fire Dept., 68 Phillips Rd. TI: 444.70 (94.8 Hz). Adm: \$9. Email: w2rbj@outlook.com.

Oregon (Grants Pass) — June 7 DFHT
9 AM – 3 PM. Spr: Southern Oregon ARC. Fruitdale Grange, 1440 Parkdale Dr. TI: 146.52. Adm: Free. www.soarc.org

Pennsylvania (Harrisburg) — July 5 DFHQRTV
6 AM – 2 PM. Spr: Harrisburg Radio Amateurs Club. Harrisburg Postal Employees' Picnic Grounds, 1500 Roberts Valley Rd. TI: 147.075 (123 Hz). Adm: \$10. www.w3uu.org

Pennsylvania (Lime Ridge) — June 21 DFHRTV
7 AM – 1 PM. Spr: Columbia-Montour ARC. Lime Ridge Community Center, 6405 4th St. TI: 147.225 (85.4 Hz). Adm: \$5.
www.qsl.net/cm-arc/hamfest.htm

Pennsylvania (Plains) — July 6 DFHRTV
8 AM – 1 PM. Spr: Murgas ARC. Polish American Veterans Club, 2 S. Oak St. TI: 146.610 (82.5 Hz). Adm: \$10.
www.murgasarc.org

ARRL TENNESSEE STATE CONVENTION

June 21, Knoxville, Tennessee

DHQRTV
8 AM – 4 PM. Spr: Radio Amateur Club of Knoxville. Wallace Memorial Baptist Church, 701 Merchant Dr. TI: 145.21 (100 Hz). Adm: \$8 Advance, \$10 door. www.w4bbb.org

Washington (Spokane Valley) — June 14 DFHRT
7 AM. Spr: Inland Empire VHF Radio Amateurs. Plante's Ferry Park, 12320 E. Upriver Dr. TI: 146.88. Adm: Free. Email: jeffbanke@gmail.com

Wisconsin (Oak Creek) — July 5 DFHR
6 AM – 3 PM. Spr: South Milwaukee ARC. American Legion Post 434, 9327 S. Shepard Ave. TI: 146.910 (127.3 Hz). Adm: \$5. www.wi9sm.org

Wisconsin (Onalaska) — June 21 DFHRTV
8 AM – 1 PM. Spr: Riverland ARC. American Legion Onalaska, 731 Sand Lake Rd. TI: 146.97. Adm: \$5. www.rarc.qth.com

Wisconsin (Oshkosh) — June 21 FT
7 AM – noon. Spr: Fox Cities ARC. Sunnyview Exposition Center Parking Lot #2, 500 E. County Rd Y. TI: 146.76 (100 Hz). Adm: \$5. www.fcarc.club

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 **July 1** to be listed in the **September** issue. Information in this column is accurate as of our deadline; contact the sponsor or check the sponsor's website for possible late changes, driving directions, and other event details. Please note that postal regulations prohibit mention in *QST* of games of chance, such as raffles or bingo.

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

Special Event Stations

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

May 9 – May 11, 0000Z – 2359Z, GU8ØLIB, Castel, Guernsey. Guernsey Amateur Radio Society. **Liberation by British Forces of the Channel Islands 9 May 1945**. 7.180 14.180 21.180 28.350. QSL. Keith Le Boutillier, Tiverton, Bailiff's Cross, St. Andrew's, Guernsey GY6 8RT, British Isles. www.qrz.com/db/gu80lib

May 10, 1500Z – 2000Z, W2NYW, Yorktown Heights, NY. Peekskill/Cortlandt Amateur Radio Association. **PCARA's Silver Anniversary**. 7.245 14.245 21.245 28.445. Certificate & QSL. PCARA, P.O. Box 146, Crompond, NY 10517. *Operating from Franklin D. Roosevelt State Park; Parks on the Air Number US-2056*. www.pcara.org

May 15 – May 17, 2200Z – 1800Z, N6H, Sacramento, CA. Glenn Amateur Radio Society and Lutheran Emergency Disaster Response. **73rd Convention CNH District-LCMS**. 7.178 14.240 144.950 440.750; 40 m, 20 m, 2 m, and 70 cm. QSL. Philip W. Zabell, 881 Brennan Pl., Willows, CA 95988.

May 15 – May 18, 1400Z – 2100Z, W9K, DeKalb, IL. Kishwaukee Amateur Radio Club. **Kishwaukee ARC 75th Anniversary**. 7.225 7.276 14.049 14.225. Certificate. Robert Yurs, P.O. Box 371, DeKalb, IL 60115; bob@w9icu.us. *Certificates will be emailed upon request and verification of contact*. www.karc-club.org

May 16 – May 19, 1100Z – 2359Z, K9NBH, Salem, WI. Great Lakes Radio Club. **Armed Forces Day**. 7.250 14.250 21.250; SSB, FT8, FT4, PSK31. Certificate. Great Lakes Radio Club, General Delivery, Salem, WI 53168. www.qrz.com/db/k9nbh

May 17 – May 18, 1330Z – 2100Z daily, K3S, Baltimore, MD. Nuclear Ship *Savannah* Amateur Radio Club. **National Maritime Day**. 7, 14, 18, 21, 28. QSL. Ullis Fleming, 980 Patuxent Rd., Odenton, MD 21113. *Check spotting networks*. www.qrz.com/db/k3s

May 28 – May 31, 1000Z – 2000Z, WØR, Sedalia, MO. Sedalia-Pettis Amateur Radio Klub (SPARK). **Scott Joplin International Ragtime Festival**. 14.250 28.4. QSL. Bret Kuhns, 1880 Quisenberry Rd., Sedalia, MO 65301. www.wa0sdo.org

May 30 – June 6, 0100Z – 2301Z, W7R, Portland, OR. Portland Amateur Radio Club. **Portland Rose Festival**. 14.290. QSL. Ken Milnes, 32355 NW Beach Rd., Hillsboro, OR 97124. www.w7lt.org

June 1 – June 14, 1300Z – 2200Z, W2W, Hunt Valley, MD. Amateur Radio Club of the National Electronics Museum (ARCNE). **W2W D-Day Commemoration**. 7.044 7.244

14.044 14.244; 80 m (3.544, 3.844), additional bands and digital modes possible. Certificate & QSL. ARCNE, 338 Clubhouse Rd., Hunt Valley, MD 21031. *Primary operation, June 1 – June 6; additional operation possible, June 7 – 14, as operator availability permits*. www.w2w-2.us

June 2 – June 16, 0000Z – 2359Z, TM44LIB, Stuart, France. CORASUN (Collective of Sundgau Radio Amateurs). **Commemorating the Crash of B-24 Liberator #41-29157**. 14.040 14.074 14.130 18.100. QSL. Alain Mehr, F4JZF, 24 Rue de la Barrière, Mulhouse 68200, France. www.qrz.com/db/tm44lib

June 5 – June 8, 0000Z – 2359Z, NJ2KC, Bridgeton, NJ. New Jersey Knights of Columbus Amateur Radio Club. **25th Annual Feast of Saint Anthony Festival**. 7.185 14.250 21.350 28.450. Certificate & QSL. Thomas M. Perrotti, N2JIE, 785 Vineland Ave., Bridgeton, NJ 08302-4822. www.nj2kc.org

June 6, 1100Z – 1900Z, W2B, Bedford, VA. New River Valley Amateur Radio Club. **D-Day**. 14.275. QSL. Danny Wylam, 710 McDaniel Dr., Christiansburg, VA 24073. *Operating from the National D-Day Memorial*. dannywylam@gmail.com or www.n4nrv.org

June 6 – June 7, 1700Z – 0000Z, W4H, Georgiana, AL. Jim Bell Wireless Association. **Hank Williams Celebration**. SSB: 7.180 14.250 21.400 28.400; FT8: 7.074 14.074 21.074 28.074. Certificate & QSL. Jerry McCullough, 274 West Pettibone Rd., Georgiana, AL 36033. *Operating from Watson Park; area amateurs may operate during this time with their own call signs*. www.k4tns.com

June 7 – June 8, 0000Z – 2300Z, W4AVM, Tampa, FL. American Victory Museum Ship. **Museum Ships Weekend**. 7.268 14.320. QSL. American Victory Ship & Museum/W4AVM, c/o Richard Burbes, KE9VS, 5224 Franklin Woodland Dr., Plant City, FL 33565. www.w4avm.org

June 7 – June 8, 0001Z – 2359Z, NJ2BB, Camden, NJ. Battleship *New Jersey* Amateur Radio Station. **Museum Ships Weekend Event**. 7.044 7.272 14.044 14.262. Certificate. Margaret Burgess, KB2BRR, 150 Schooner Ave., Barnegat, NJ 08005. www.nj2bb.org

June 7 – June 8, 0000Z – 2359Z, N1S, Groton, CT. Submarine Force Library & Museum. **Museum Ships Weekend Station**. 3.850 7.225 14.275 21.350. QSL. N1S Generations ARC, 110 Vinegar Hill Rd., Gales Ferry, CT 06335. *Nautilus information*: www.usnnautilus.org. www.qrz.com/db/k3lbd or www.qrz.com/db/n1s

June 7 – June 8, 1330Z – 2100Z daily, K3SAV, Port of Baltimore, MD. Nuclear Ship *Savannah* Amateur Radio Club. **Museum Ships Weekend**. 7, 14, 18, 21, 28. QSL. Ullis Fleming, 980 Patuxent Rd., Odenton, MD 21113. *Check spotting networks*. www.qrz.com/db/k3sav

June 7 – June 8, 1400Z – 1830Z, K8E, Toledo, OH. Toledo Mobile Radio Association. **National Museum of the Great Lakes Museum Ships Weekend**. 7.039 7.260 14.239 14.260. QSL. James M. Schoonmaker, P.O. Box 9673, Toledo, OH 43697. www.w8hhf.org or www.qrz.com/db/k8e

June 7 – June 8, 1400Z – 2000Z, NB9QV, Manitowoc, WI. USS *Cobia* Amateur Radio Club. **NB9QV USS Cobia Museum Ships Weekend**. 7.240 14.240. Certificate. Send contact information to kc9yl@arrrl.net to receive PDF certificate. www.qrz.com/db/NB9QV

June 7 – June 8, 1600Z – 2300Z, NI6IW, San Diego, CA. USS *Midway* Museum Ship. **Museum Ships Weekend**. 7.250 14.320; 14.070 PSK31; D-STAR on PAPA System Repeaters. QSL. USS *Midway* Museum Ship COMEDTRA, 910 N. Harbor Dr., San Diego, CA 92101. www.qrz.com/db/ni6iw

June 7 – June 8, 0359Z – 2359Z, KJ4DD, Jacksonville, FL. Orleck Amateur Radio Society. **Ships on the Air**. 7.225 14.250. Certificate. John Reynolds, 5547 Lofty Pines Cir. S., Jacksonville, FL 32210. johnr1000@aol.com

June 14 – June 29, 0000Z – 2359Z, W5M, Greenville, TX. Sabine Valley Amateur Radio Association. **Audie Murphy's 100th Birthday**. 7.270 14.270 21.300 28.350. Certificate & QSL. Sabine Valley ARA, P.O. Box 843, Greenville, TX 75403. www.k5gvl.com/audie-murphy

June 21 – June 22, 2300Z – 2000Z, K0CBP, Golden Valley, MN. The American Legion Amateur Radio Club (TALARC) Post 523. **Remembering Private Chester Bird**. 7.260 14.260 21.360 28.360. e-Certificate. See website for details. www.chesterbird.org/amateur-radio-club or www.qrz.com/db/k0cbp

June 22 – Jul 7, 2200Z – 0700Z, VE2JAZZ, Saint-Jérôme, QC, Canada. **Festival Jazz Montreal**. 14.030. QSL. Jean Charron, 17 Rue Élisabeth, Saint-Jérôme, QC J7Z 2S9, Canada. www.qrz.com/db/ve2jazz

June 28 – June 29, 1800Z – 1800Z, W2GSB, Lindenhurst, NY. Great South Bay Amateur Radio Club. **Field Day**. 7.245 14.246 21.250 28.340. Certificate. W2GSB, P.O. Box 1356, West Babylon, NY 11704. www.gsbarc.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 x 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@arrrl.org.

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

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

This Month in **QEX**

QEX magazine is a forum for the free exchange of ideas among communications experimenters. All ARRL members can access the digital edition of *QEX* as a member benefit (www.arrrl.org/magazines). Print subscriptions are available and sold separately; see www.arrrl.org/qex.

Coming up in the May/June 2025 issue of *QEX*:

■ Dhiru Kholia, VU3CER/WQ6W, and Bradshaw Lupton, Jr., K1TE/WB2TEV, describe an open-source, cost-effective, rugged, variable-power 5 W WSPR beacon transmitter design for 160 through 6 meters.

■ Heinz Schmiedel, DJ5FN, discusses how to calibrate ENR noise sources at home with modest ham equipment.

■ Robert J. Zavrel, W7SX, develops an accurate definition and resulting equations to make accurate derivation possible to calculate antenna radiation resistance.

■ In his essay series, Eric Nichols, KL7AJ, discusses how the affordable VNA has given many hams a new look at the radio universe.

Would you like to write for *QEX*? We pay \$50 per published page for full articles and *QEX* Technical Notes. Get more information and an Author Guide at www.arrrl.org/qex-author-guide.

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	499	30-Aug-22	John Kiernan, KE2UN	325	01-Jul-91	Robert Vosper, KZ1B	749	09-Jul-10
Donald Rees, K3PCT	432	28-Apr-23	Walter Lesnowich, W2EE	319	06-Mar-08	Robert Hamilton, N0RN	435	19-May-87
James McCloskey, NS3K	359	14-Nov-94	Thomas Carrubba, KA2D	305	01-Sep-93	Jeffrey Weinberg, W0QO	348	01-Apr-93
George Brechmann, N3HBT	325	01-Apr-91	Robert Casino, N2GDY	297	03-Jun-08	David Avery, N0HEQ	302	13-Jan-88
Jobst Vandrey, AC0LP	324	23-Jun-08	Carlos Prior, KE2TT	279	01-Jun-90	Gary Zabriskie, N7ARE	263	20-Nov-84
Edward Genoino, WA2NDA	298	10-Jul-85	Midwest			David Sharpe, K10HG	259	02-Feb-98
Howard Gillott, KC3VJQ	244	24-Jan-24	David Bartholomew, AB0TO	815	22-Mar-02	Martin Soffran, NM5MS	240	21-Mar-94
Cully Phillips, N3HTZ	236	01-Sep-91	Chris Hunt, N0YH	759	05-Aug-20	Peter Brisbane, NM5PB	233	20-Jan-14
Arthur Clemons, N8BLK	228	01-Mar-01	Kevin Naumann, N0WDG	714	17-Nov-02	David Bratcher, AK0MR	211	23-Sep-08
Michael Harla, N2MHO	226	12-Apr-06	Harry Steger, W0HMS	680	26-Aug-08	Denis Campbell, AA0YX	185	02-Feb-96
Central			Ralph Waldren, N0OTS	664	03-Jan-20	Southeastern		
Ed Wagner, AB9FN	431	01-Jul-02	Roland Kramer, W0RL	566	21-Jun-01	***Gary Pike, KA4KBX	10,350	28-Jun-90
Dennis Keyfaufau, K3DCK	391	29-Dec-22	Nick Catrow, N0DAD	385	31-May-17	***Justin Pike, KJ4AXF	8,428	12-Nov-12
Allan Bukowski, N9ZD	368	01-Jun-92	Kenneth Simila, KC0VMY	318	18-Feb-07	***Collin Pike, WE4RR	8,396	26-Apr-11
Eldon Boehm, NK9U	352	21-Nov-86	Edwin Berkel, AE0EB	275	06-Jan-15	***Anna Pike, KD4PCU	6,850	18-Aug-09
Donald Hlinsky, N9IZU	345	01-Mar-91	John Mountain, KJ0MTN	256	28-Sep-09	***Patrick Pike, KJ4AXD	5,416	13-Oct-15
Brian Eder, WB9UGX	317	01-Jan-92	New England			**Ryan Krenzischek, W4NTR	2,096	04-Jan-13
Timothy Pechtold, AA9BV	284	01-Nov-92	**Paul Lux, K1PL	2,659	25-Jan-85	*John Reynolds, W4TXA	1,494	08-Jun-16
James Rinehart, K9RU	278	01-Aug-91	*Bob Phinney, K5TEC	1,708	20-Jan-14	*Tonja Jesko, WV2P	1,173	23-Aug-23
Frederick Baguhn, W9GOC	277	16-May-02	William Poulin, WZ1L	610	01-Sep-91	Stanley Whitfield, K4SHW	889	26-Sep-19
David Pritchard, W9QL	268	12-Apr-01	Robert Latippe, NC1RL	569	10-Mar-22	Robert Fauci, N1UVO	854	28-Mar-18
Dakota			Gregory Paul, KC1MND	548	03-Jun-20	Southwestern		
Jeffrey Goodnuff, W0KF	359	17-Jun-03	Phillip Temples, K9HI	520	12-May-89	*Bill Martin, AI0D	1,075	01-Nov-84
John Schwarz, AE0AL	336	26-Oct-94	Robert Beaudet, W1YRC	413	01-Aug-90	David Morrill, N7TWT	521	20-Jul-00
Shep Shepardsen, N0NMZ	331	12-Mar-01	Bruce Anderson, W1LUS	412	11-Feb-88	William Peters, K1WMP	385	26-Jun-23
Joel Dunham, NC1D	287	26-Jul-23	Barbara Irby, KC1KGS	385	05-Aug-19	Richard Buck, KC7OCT	369	21-May-97
Douglas Nelson, AA0AW	258	01-May-90	Brandin Hess, NL7CW	376	24-Sep-15	Pete Morrison, K6VVR	367	03-Apr-07
Daniel Royer, KE0OR	258	01-Jul-91	Northwestern			Donald Kramer, WA6UVW	351	08-May-98
James Rice, N0OA	241	04-Dec-00	Stephen Hutchings, WM7X	509	13-Apr-15	Bruce Ziemienski, WA6BZ	321	25-Mar-02
Robert Tracy, N0TC	205	30-Jul-86	Peter DeKesels, KJ7IEA	497	22-Dec-22	Heather Parker, KM6Z	311	14-Feb-20
Karl Erikson, WA2DEE	180	08-Jan-90	David Braucht, KK7OJK	496	01-May-24	Ali Hassan, AA6WC	288	01-Jun-90
Edward Van Cleave, W0VC	169	01-Jun-92	Mark Hunn, K17SI	462	20-Sep-18	Frank Westphal, K6FW	286	06-Sep-84
Rodney Klug, KE0A	166	12-Aug-85	Scott Robinson, AG7T	459	01-Aug-91	West Gulf		
Delta			Erin Henrickson, ND7B	450	06-Jan-23	**Franz Laugermann, K3FL	2,481	01-Dec-91
Elmer McKenzie, K5MCK	895	23-Dec-22	Richard Morgan, KD7GIE	448	11-Aug-00	*Tanner Jones, W9TWJ	1,360	31-Jul-07
Loma Westmoreland, KU5J	829	31-Jan-21	Nathan Zane, KH6HB	433	01-Apr-93	Daniel Quigley, N7HQ	793	24-Apr-20
Terry Partigiani, W5TMP	785	27-Nov-07	John Clarke, AC7WW	394	20-Jan-03	John Paterson, KC5LAA	620	16-Mar-09
Monvel Tandy Maskew, K9FQ	768	18-Jul-18	Loren Hole, KK7M	381	06-Sep-84	Jonathan Diner, N5JLD	582	16-May-11
Darrell Wiggins, W4AI	575	02-Jun-23	Pacific			Gerald Grant, WB5R	543	04-Jan-85
Bryan McCammon, K15HAV	460	03-Sep-20	*Brian Torr, N6IY	1,063	06-Sep-00	Adolph Chris Koehler, K5VCR	535	29-Sep-95
Rodney Webb, W4WRE	439	21-Mar-17	Morris Jones, AD6ZH	599	27-Nov-01	David Fanelli, KB5PGY	514	01-Oct-91
Joshua Johnson, KC5JMJ	357	03-Jun-20	Dieter Stussy, KD6LVW	475	27-Jan-94	Gerald Crenshaw, WD4BIS	508	27-Feb-98
John Waters, KC5FYA	333	14-Sep-21	Larry Loomer, K16LNB	404	03-Dec-08	Wilbert Cannonier, KK5JJ	475	03-Nov-95
William Crowden, W4ETA	321	10-Jun-20	Robert Perlman, W6BP	388	26-Aug-08	International		
Great Lakes			Bill Nichols, NN7K	378	01-Sep-93	*Robert Girdo, AK2RG	1,816	27-Sep-17
*Charles Tyrrell, KE8PCB	1,558	03-Sep-20	Gordon Fuller, WB6OVH	363	06-Sep-84	Gregory Croad, NN3Z	348	03-Jan-20
*Bruce Osmon, KE8LT	1,558	16-Nov-18	Jim Brunk, N6BHX	332	13-Jul-95	Wayde Nie, AD2GX	301	13-Feb-24
*David Potter, KE8OHG	1,490	03-Jun-20	Dennis Simon, KB7UTV	318	10-Dec-13	Vince D'Eon, AI7LK	205	13-Jan-21
Earl Paazig, W8BR	802	16-Apr-02	Neal Kernes, N3ALK	311	07-May-24	Wesley Printz, W3SE	137	24-Feb-89
William Bogle, KE8FZY	292	08-Jul-20	Jane Garwood, KB7YUZ	311	20-Jan-14	Kazuo Suzuki, N1KS	114	20-Apr-01
Charles Hall, W8HF	286	01-Jun-92	Roanoke			Jay Oka, KH2J	110	01-Aug-91
Lance Harvala, AB8Y	256	06-Nov-19	Judy Friel, AC4RG	327	01-Feb-91	Masatoshi Shimizu, AH6KY	109	07-Jul-09
Stanley Arnett, AC8W	239	06-Sep-84	Richard Brannen, KA3JCA	325	25-Jan-89	Yuri Kuwana, N1ENV	109	24-May-10
Chris Anderson, K8VJ	234	09-Feb-90	Terry Sanner, WV8V	266	06-Sep-84	Masanori Kawakami, AI9C	95	04-Dec-97
William Anderson, WA9Y	227	23-Mar-23	David Snyder, W4SAR	260	01-May-93	*Denotes participation in over 1,000 sessions.		
Walter Callahan, W8ALT	223	15-Aug-23	Larry Withrow, AF4HX	239	17-Dec-98	**Denotes participation in over 2,000 sessions.		
Dale Pritchett, KC8HJL	223	26-Mar-98	William Smith, KQ1S	230	20-Jun-12	***Denotes participation in over 3,000 sessions.		
Hudson			David Poe, W8IW	227	13-Mar-07			
Alan Crosswell, N2YGK	530	26-Oct-94	Edwin Williams, KN4KL	222	01-Jan-92			
Fritz Boigris, KB2O	498	26-Oct-84	Henry Wyatt, K4YCR	220	28-Jan-98			
Sid Markowitz, K2GG	466	27-Sep-94	John Kanode, N4MM	215	07-Jun-85			
Jeremy Griffel, K2GRI	402	03-Dec-20						
Michael Abbey, KC2NJ	350	06-Jul-23						

Congratulations to Gary Pike, KA4KBX, from Roanoke, Alabama (Southeastern Division), who is the first VE in our program's history to reach participation in 10,000 sessions!

Field Organization Reports — March 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.

760 AD8CM	215 KF5MOH	152 W9EEU	133 KD0HHN	120 WA4VGZ W4CMH WB9WKO WC4FSU	105 K1YBO N3GE	97 W4TTO	85 WW3S W6ETC	82 K6RAU	80 KR4ST K9SX KG4AOP W2ITT	79 K1STM	75 KB4OLY WB3FTQ
435 N9VC	212 KC8YVF	150 KR4PI N2LC	130 W9GRG KY2D	104 K3JL W2AH N1ILZ	103 N2TSO	95 WB9EDL KB8PGW	84 KF7GC	81 N0JAR N9NKO W2ARP K1XFC	77 K3YAK K2PHD	72 W5XX	
401 KD2LPM	198 KO4KUS	148 W0PZD	115 W3YVQ WK4WC K8MDA N2JBA W2OOD KW1U N1UMJ WZ0C	101 N2DW N12W KC1HHO	93 WA3EZN	83 KE8CYC KM6OU	76 W5RFY	70 NK2Y			
392 KE8ANW	196 KD2NMG	145 KT2D KD8ZCM	114 KM4WX	100 NX9K AD4DO K28Q WB4RJW W1KX K2MTG K3YAK KA2HZP WD8SDH KD8UUB KF5IOU WB8TQZ WV5Q N1IQI W1RVY	90 KB9GO KC9UC WA3QPX W2QMI AA3N KN4AAG W4KX K8KRA W8GSR K3RC N8OD WB9ZA N0ET N1CVO						
382 KE2BYC	195 N4CNX ND8W	141 AC0KQ K5ANP	128 KT4WX	111 W2ZXXN	89 K1CJV N5RH WX2DX						
375 AC8NP	190 K7OED	140 W8MAL WB8YYS WO2H WM2C KE8HKA K2VTT	127 W5WMC	110 KM4WHO WD8SDH KD8UUB KF5IOU WB8TQZ WV5Q N1IQI W1RVY	88 WJ3P						
320 W9EES	183 W9RY	135 WA3QLW K5OB AG5G K9LGU KC9FXE W9FE KA9IKK KT5SR	126 N8SY	107 AE5MI							
290 WM5N	177 WD8USA	123 KC8T	125 W2PAX KY2MMM KO4OL	106 N7YD AD3J							
286 W7PAT	160 KV2J										
255 KE8DON	155 W4DNA W9BGI										
230 KN4QJ	154 KA9IKK KT5SR										
216 KB5PGY											

The following stations qualified for PSHR in February, but have not yet been recognized in this column yet: NA7G 120, N7IE 118, WD0B 110, N7YD 106, N7UWX 90, KO4OL 80, KA0DBK 74, WB8RGE

Section Traffic Manager Reports

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

Section Emergency Coordinator Reports

The following sections submitted ARES Activity Reports: AR, CT, EPA, GA, IN, ME, MN, MO, NFL, NLI, NNY, OH, SCV, SNJ, STX, WMA, WPA, WTX, WWA, 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 4 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

The following stations qualified for PSRR in February, but have not been recognized in this column yet: NA7G 120, N7IE 118, WD0BFO 110, N7YD 106, N7UWX 90, KO4OL 80, KA0DBK 74, WB8RGE 72.

Section Traffic Manager Reports

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

Section Emergency Coordinator Reports

The following sections submitted ARES Activity Reports: AR, CT, ENY, EPA, GA, IN, ME, MN, MO, NFL, NLI, NNY, OH, SCV, SNJ, STX, VA, WMA, WPA, WTX, WWA, 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.

W2AH 1,909, KY2D 1,688, NX9K 1,249, WB9WKO 1,064, KB9GO 896, WA3QLW 710, KW1U 539.

Congratulations

March 2025
QST Cover Plaque Award Winner

Kevin Potter
KD9YYO

In his article, "When ARRL Field Day Becomes Theater," Kevin details the collaboration between the 415 Amateur Radio Club and the Raue Center for the Arts for the production of *Static: Noise of a New Musical* — one of the first musicals to utilize Morse code as a method of storytelling.

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

www.arrl.org/cover-plaque-poll

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

When ARRL Field Day Becomes Theater

A surprise collaboration blends technology and the performing arts.



Sam Haidman, KD9GPY (second from left), and the Static cast and crew at the 415 Amateur Radio Club Field Day operation.

Kevin Potter, KD9YYO

The 415 Amateur Radio Club of Crystal Lake, Illinois, had its first ARRL Field Day in 2018. Although our inaugural attempt had a total of just eight participants, the event has grown rapidly since. As a result, Field Day planning has become a year-round exercise with club members Gary Dembaki, W0GD, and Sam Haidman, KC9GPY, leading the effort.

A Twist for 2024

As the planning process for Field Day 2024 was getting under way, Sam was surprised to receive a phone call from Meredith Schoeller, Director of Marketing and Institutional Advancement at the Raue Center for the Arts, a local nonprofit organization. She was doing research about amateur radio for a new musical that was scheduled to open in July. Meredith was also interested in a collaboration between the Raue Center, the new musical production, and the 415 Amateur Radio Club.

Strange as Meredith's collaboration offer seemed at first, her motivation soon became clear. You see, the name of the show is *Static: Noise of a New Musical*, and it is one of the first musicals to utilize Morse code.



Karl Lundgren, KD9PFX (seated), shows Static author Tess Rowan how to send CW.

Celebrating Our Legacy

CW Saved My First Contact

My ham radio journey began with Hank Bennett's *The Complete Shortwave Listener's Handbook*. I ordered Heathkit's Morse Code Practice Oscillator Kit and short-wave receiver. The receiver had a beat frequency oscillator, so I could listen to ham SSB transmissions. However, I was interested in talking only to DX stations.

I questioned why I needed to learn Morse code to get licensed, but the fire in my belly was stronger. After getting my General-class license, I made arrangements with my friend Lee, WB2UIY, to be my first HF contact.

On the established date and time, we made contact via SSB on 15 meters. After a few minutes, an ocean of static swept over the band, and Lee's voice disappeared! Then I started hearing dits and dahs. I recognized my call sign — Lee was coming through the static loud and clear! I grabbed my key, and we were able to finish our contact.

Steve Baron, KU9J
Hendersonville, North Carolina

The Vehicle for My Journey

In 1955, I had surgery that required me to eliminate physical activities for at least 10 years.

Desperate to keep my spirits up, my parents purchased a one-tube radio experimenter kit, and I soon discovered amateur radio. I learned about ARRL, and eventually became a General-class ham.

My high school had a low-power FM radio broadcasting station. My amateur radio background placed me on the technical staff, and I was permitted to perform on the air. Our teacher-advisor told me about an after-school part-time job opening at



Kent Voigt, K8JWG (SK), at his 1957 ham station. [Kent Voigt, K8JWG (SK), photo]

a nearby commercial radio station. I was hired, and after a few months I was appointed permanent DJ for the 6:30 to 10:00 PM slot.

I eventually earned degrees in communication and education and became a high school teacher and later the school's technology coordinator. Two years later, I became the school district's technology director, and several years after that, I took a job as the assistant superintendent for technology at one of Michigan's Regional Educational Service Agencies.

The surgery was a blessing. Radio has been the vehicle for my life journey, and I am grateful for the many ways it helped shape my life.

Kent Voigt, K8JWG (SK)
Troy, Michigan
Life Member

Imagining an Amateur Radio Time Capsule

Sometimes I wish I had a ham radio time capsule! My first experience with amateur radio was as a Novice operator from 1971 to 1972. Everything came to a halt once I joined the Air Force. I didn't pursue amateur radio again until 2018. By 2020, I earned my Technician, General, and Extra-class licenses. Now I look back and wonder what I would have included in my ham

radio time capsule. If I were to open the vault today, here are some things I'd like to find.

The several stacks of QSL cards I used to have. I had scores of them from around the world and am glad we still have them today, but it is sad to see the dwindling number of them.

A Knight-Kit T-50 transmitter and a Heathkit HR-10B receiver. I used to take these on family vacations and string wire around our motel room.

My helical 15-meter vertical antenna. I wound $\frac{1}{4}$ wavelength of insulated bell wire on a broom handle, attached the bottom to a music stand's legs, and added a short whip antenna to the top. I fed it with coax and ground the outer conductor to a water pipe. I made 21 MHz CW contacts with it in my bedroom.

My old logbook. I would give anything to have it back so I could see all of my contacts.

My secondhand brass straight key. It was adjusted just right for my fist.

My used 43rd edition of *The Radio Amateur's Handbook* from 1966.

Every contact was a thrill during my first ham radio period. If I could somehow package that exhilaration, that would complete my ham radio chamber.

Scott van Tonningen, K3VAN
Hummelstown, Pennsylvania

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

One-of-a-Kind Rigs

To describe something as one of a kind means that it is unique and unlike anything else. When applied to amateur radio equipment, this distinction is not particularly common. A transceiver with a unique design or a unique set of features can fit this definition, and some rigs indeed start as unique products, but their functionality and even their design may be copied over time.

For this column, let's be strict with our definition and highlight a few rigs that were made only once and never duplicated by a second company, or even as an upgraded product by the same company. Some of these rigs have become collector's items and command considerable prices to this day.

The Gonset G-76 AM/CW Transceiver

The Gonset G-76 AM/CW transceiver for 80 through 6 meters was the only tabletop or mobile transmitter-receiver (usually called a transceiver even though it does not automatically transmit on the receive frequency) that included AM operation on bands below 10 meters. The G-76 had an internal VFO that did not cover 6 meters; if you wanted to operate on 6 meters, you had to use crystals. No one else made a product quite like the G-76. In 1955, Hallicrafters packaged an HT-30 transmitter, an HT-31 amplifier, and an SX-100 receiver within a single enclo-

sure and called it the "SR-500 console," but this was not an integrated unit like the Gonset G-76.

The Gonset Communicator IV Transceiver for 220 MHz

Gonset made the only single-box 220 MHz receiver-transmitter built for home use or mobile operation. The Gonset model 3351 Communicator IV for 220 – 225 MHz was a stand-alone product. During my research I could not locate another company that made a



The Gonset Communicator IV 220 MHz transceiver. [RigReference photo]

rig like the Communicator IV for 220 MHz. The 220 MHz Communicator IV looked exactly like the 6- and 2-meter versions of the Communicator IV. The Gonset 3357 VHF VFO covered 6 and 2 meters plus 220 MHz, matching the Communicator IV style.



The Gonset G-76 AM/CW transceiver. [RigPix photo]

The Centimeg 432 MHz Transmitter

Few have probably heard of Centimeg Electronics, but this California company built a 10 W AM and CW transmitter for 432 MHz. The transmitter was produced for a brief time in the early '60s and never saw the light of day again; the company is long gone. The transmitter is such a rare item that even photographs are lacking.

The Swan/Siltronix 1011 10-Meter SSB Transceiver

The first of these models were built by Swan. They were initially popular among amateurs, but the company soon began catching flak about the fact that the 1011 was easily modifiable to transmit on CB with its 260 W PEP output. Some 1011s were even marketed to the CB community with this in mind.

The Siltronix company was a spin-off of Swan, and they continued to build the 1011 in various models. The most popular Siltronix model was the 1011D.



The Swan/Siltronix 1011 10-meter SSB transceiver. [Radio Wrench photo]

The Regency HR-6 6-Meter FM Transceiver

Regency, well-known as the first manufacturer of a transistor AM radio in 1954, and much later the very popular HR-2 2-meter FM transceiver, developed a 6-meter FM rig that few remember today. The HR-6 was crystal controlled and produced 25 W input power. As far as I know, it was the only inexpensive 6-meter FM-only transceiver of its kind.



The Regency HR-6 6-meter FM transceiver. [RigPix photo]

The E. F. Johnson Thunderbolt 6N2 Linear Amplifier

Starting in 1959, E. F. Johnson of Waseca, Minnesota, built a power amplifier for the 6- and 2-meter bands. The Thunderbolt 6N2 ran 1200 W PEP input on SSB, 1000 W input on CW, and 700 W on AM using a pair of 4X150A/7034 tubes operating in push-pull. Other high-power amplifiers for 2 meters were made, but none that covered both 6 and 2 meters and included a convenient band switch.



The mighty E. F. Johnson 6N2 linear amplifier. [AARauctions photo]

Strays

New Software Package for the International Naval Contest

The annual International Naval Contest, organized by Navy amateur radio clubs, has moved entirely to the computer age. To significantly relieve the workload of the competition organizers, a new software package called *OH1MIE Veikko* was developed. The package contains the *Naval Logger* and *OH1NAVY* software, and can be used to electronically send the contest logs for review immediately after the contest has ended.

Naval Logger allows the log to be sent electronically directly to the organizers' database after the end of the competition. *OH1NAVY* extracts an average of

5 – 8% of the connections for manual inspection, so incorrectly copied calls and messages are revealed by cross-checking.

Previously, most of the logs were delivered as email attachments in a variety of formats, on paper in the mail, and even as images. This caused a considerable workload for the organizing clubs. In some cases, it could take up to 6 months for the results to be published. *OH1MIE Veikko* made calculating the results significantly faster and more accurate. To download the software, visit www.oh1mie.fi/naival.html.

— Veikko Nieminen, OH1MIE

100, 50, and 25 Years Ago

June 1925

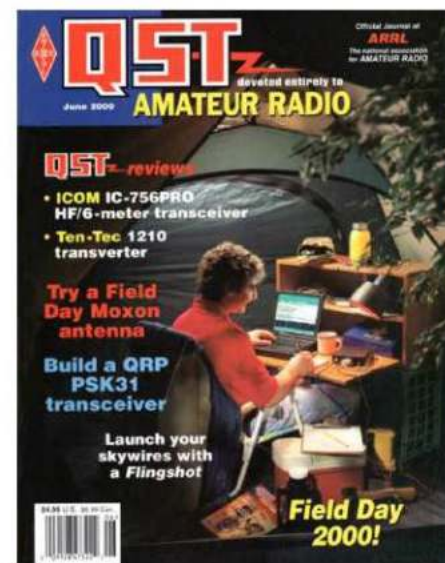
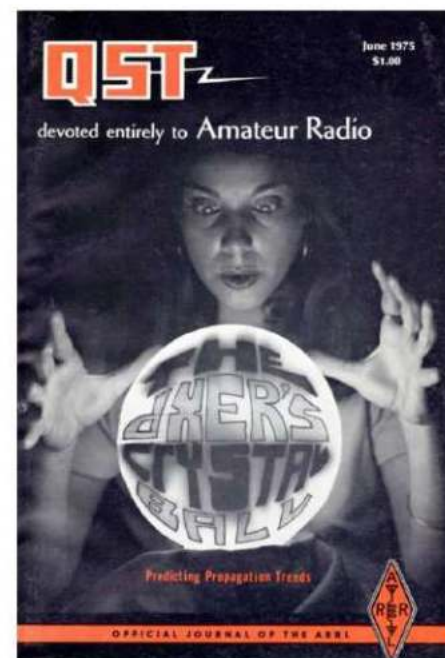
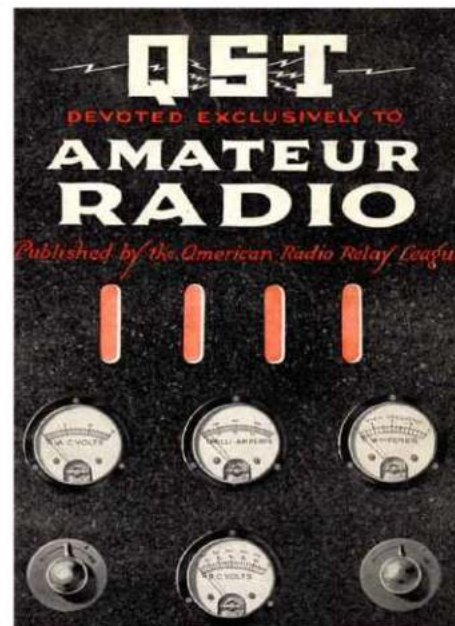
- The cover shows a neatly laid-out front panel of a ham transmitter.
- A.R.R.L. began as a United States association, and has expanded to include Canada, Newfoundland, and Cuba. In "Editorials: Shall We Change?" K. B. Warner, 1BHW, invites comments on the topic of a name change.
- K. B. Warner, 1BHW, reports on the Paris Congress meeting of April 17, 1925, and its outcome in "International Amateur Radio Union Formed!"
- Simplifying receivers and their controls and front panels is discussed in "Giving the Coil and the Condenser a Rest" by R. S. Kruse, 1OA.
- The Rag Chewers' Club has been organized to promote friendly conversation between amateurs and get away from momentary contacts. F. C. Beekley, 1KP, shares in "RCC."
- Radio will play a prominent role in Commander Donald B. MacMillan's expedition to explore unknown areas near the North Pole. Details are in "The Navy-MacMillan Expedition" by R. H. G. Mathews, 9ZN.
- F. Austin Lidbury, 8BAG, presents an investigation of some hurry-up methods of getting rough wavemeter calibrations, and shows just how far they can be trusted in "Checking up Wavemeter Methods."

June 1975

- The cover features a crystal ball for DXers. No, it won't tell you when it's going to get better, but the story "The DXer's Crystal Ball" by Edward P. Tilton, W1HDQ, shares tips on making the best of the sunspot minimum.
- David Sumner, K1ZND, shares on the one weekend every year that we find all kinds of hams working together in "It Seems to Us...Field Day — An Amateur Radio Potpourri."
- A transverter design that derives optimum performance from the combined advantages of MOSFET devices and tubes is shown in "A Hybrid Ten-to-Two Transverter" by J. F. Sterner, W2GQK.
- A simple transceiver that is within the building capabilities of most beginners is described in "Beginner and Novice: The Mavti-40, Part 1" by D. K. Siemer, K0JYD.
- Homer T. Fort, WN5IKK, has some advice for new Novices as he shares his story in "New Novice-itis."
- What do hams talk about? "A Content Analysis: Amateur Radio Conversations," by Ralph R. Behnke, W0DWP, and Larry W. Carlile, WB0IVC, outlines some casual listening generalizations.

June 2000

- The cover shows QST Product Review Editor Joe Bottiglieri, AA1GW, operating 20-meter PSK31. Details for building this PSK31 transceiver are in "A Panoramic Transceiving System for PSK31" by Howard "Skip" Teller, KH6TY, and Dave Benson, NN1G.
- David Sumner, K1ZZ, offers suggestions on how to make your license more than just a trophy in "It Seems to Us...New License—Now What?"
- Good gain and a high front-to-back ratio are a couple of reasons to consider this antenna for Field Day use. L. B. Cebik, W4RNL, explains in "Having a Field Day with the Moxon Rectangle."
- Alan Dove, N3IMU, shares what it's like to host competitive swimmers in a marathon-like race through the shipping lanes that surround a densely populated island in "New York City ARES Takes to the Water."
- A fast, easy, and attention-getting way to put up an antenna is described in "Launch Your Field Day Antenna with a Flingshot" by Gary Gordon, K6KV.
- A report on the IARU's 75th anniversary is given in "Amateur Radio World: Sorbonne Hosts IARU 75th Anniversary" — a memorable day, marked by reverence for the past and anticipation of the future.



Silent Keys

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

K1AMB WB1AQM W1CCC KC1DAN	Foshey , Fred, Wrentham, MA Best , Robert E., Brooklyn, CT Carmel , Clifford F., Pittsfield, MA Lake-Gagliardi , Rene A., Royalston, MA Roco , Theodore A., Amherst, MA Hanley , Robert J., Saint Cloud, FL Lowe , Douglas R., Sr., Murfreesboro, TN Plamondon , David Q., Douglas, MA Plummer , Stephen O., Harrington, ME Walker , Timothy, Westport, CT Richard , John D., Rutland, MA Colten , Richard L., Boothbay Harbor, ME Sola , Steven C., Meriden, CT Kirchner , Lawrence H., Pittsfield, MA Pfeiffer , Kevin S., North Haven, CT Barefoot , Aaron J., Livermore, ME Lewis , Randall A., Augusta, ME Chirone , Paul A., Hudson, NH Scipione , Paul A., Canandaigua, NY Wilkinson , David J., Schenectady, NY Erickson , Edward F., South Amboy, NJ Heitzman , Eugene T., Hurley, NY Bright , David W., Worton, MD Morgan , Merrill A., Jr., Elmira, NY Dobrow , Peter V., Staten Island, NY Hinds , John B., Nashua, NH Surowy , Stephen P., Holley, NY Buus , Robert G., Holmdel, NJ Wozniak , 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Larry, Charlotte, NC Crofoot , David J., Morrow, GA	•KY4MB •AB4O K4PMZ •N4RGN KG4RJU K4SIR K4SIT N4SYB K4TDM •AA4TS •KE4UGG W4VC •K4DXM N4YI KE4YS KA5DOQ •NS5G •KD5IV •N5KT •AD5LJ KB5LRC KE5LXE W5MJF KG5PNY •KK5PX •N5RL •K5RWB •KA5STV KU5T KE5TAZ •KW5Y •KG5ZES •KH6AD K6GRR WW6H •K6HTM KH6ICQ KE6TKN •K6XJ K7AS •N7JTG KD7KBL K7LTV •K7MO KB7OUU •WA7OYC KE7OYO KK7PBM •N7TDI KC7ULX •K7WQE N7YTT KA8ARF •N8AT •WD8BPT •WB8CBA •WA8CMF KA8FOP •W8FWF •N8GTI W8IXF •N8MUB KA8NJO W8UPL •N8VUA •N8WFL	Brock , Marvin M., Helton, KY Swisher , John B., Unicoi, TN Becht , Paul A., Apopka, FL Brazil , Robert J., Madison, AL Adams , Brian S., Northport, AL Presswood , James R., Benton, TN Long , Scott A., Bridgewater, VA Holmes , Richard, Opp, AL Madigan , Thomas, North Augusta, SC Goodson , Jerry L., Winston-Salem, NC Metcalf , Michael D., Greenville, NC Carter , Vance L., Waycross, GA Hogan , William F., Coral Gables, FL Wilkes , Cecil W., Sr., Hayden, AL Perkins , Don, Bremen, KY Hollis , James B., Sr., 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Note: Silent Key reports must confirm the death by one of the following means: a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address, and call sign. Allow several months for the listing to appear in this column.

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FTDX101D | HF + 6M Transceiver

- Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled -70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream

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FTM-510DRASP C4FM/FM 144/430MHz Dual Band Xcvr

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FT-70DR C4FM/FM 144/430MHz Xcvr

- System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging



FT-5DR C4FM/FM 144/430 MHz Dual Band

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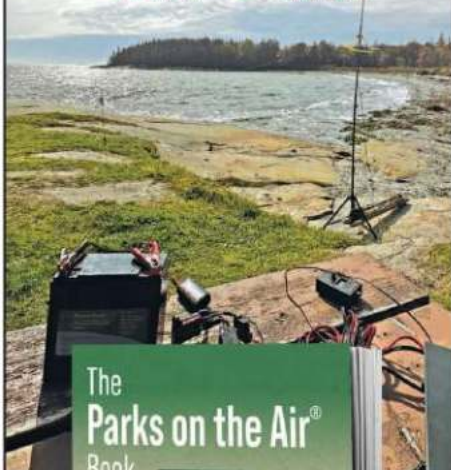
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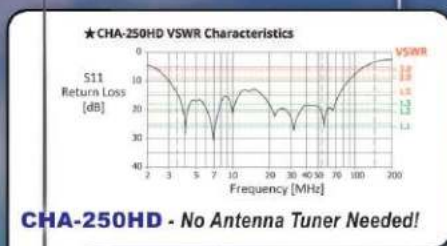
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3 C★MET GP-6 DUAL-BAND 146/446MHZ BASE REPEATER ANTENNA

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

4 C★MET GP-9 / GP-9N DUAL-BAND 146/446MHZ BASE REPEATER ANTENNA

BEST SELLER! • Wavelength: 146MHz 5/8 wave x 3 • 446MHz 5/8 wave x 8 • 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 C★MET CX-333 TRI-BAND 146/220/446MHZ BASE REPEATER ANTENNA

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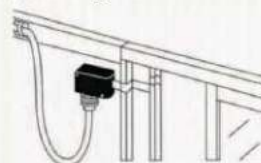
6 C★MET GP-15 TRI-BAND 52/146/446MHZ BASE REPEATER ANTENNA

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

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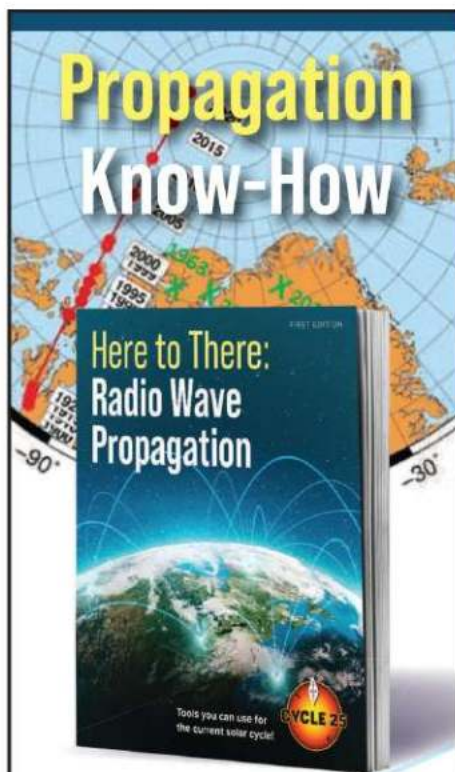
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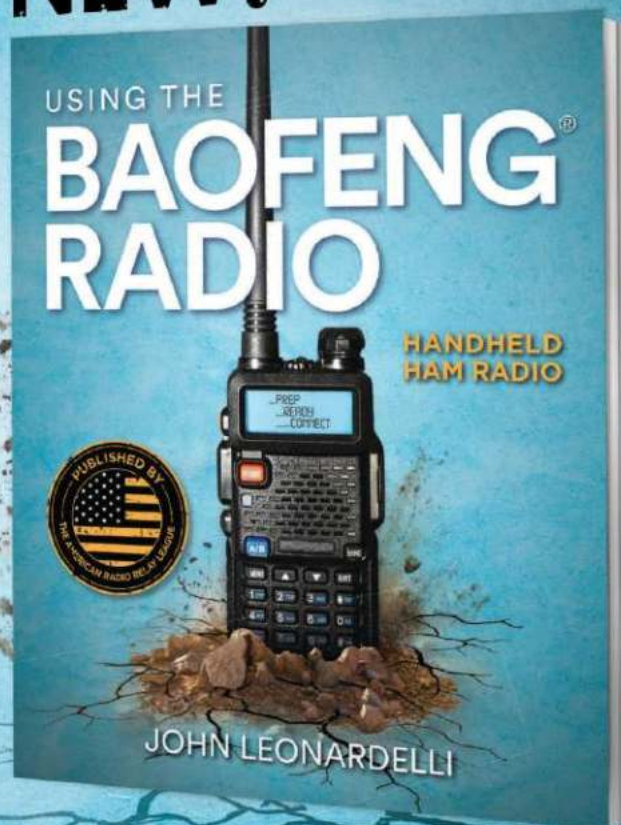
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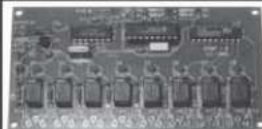
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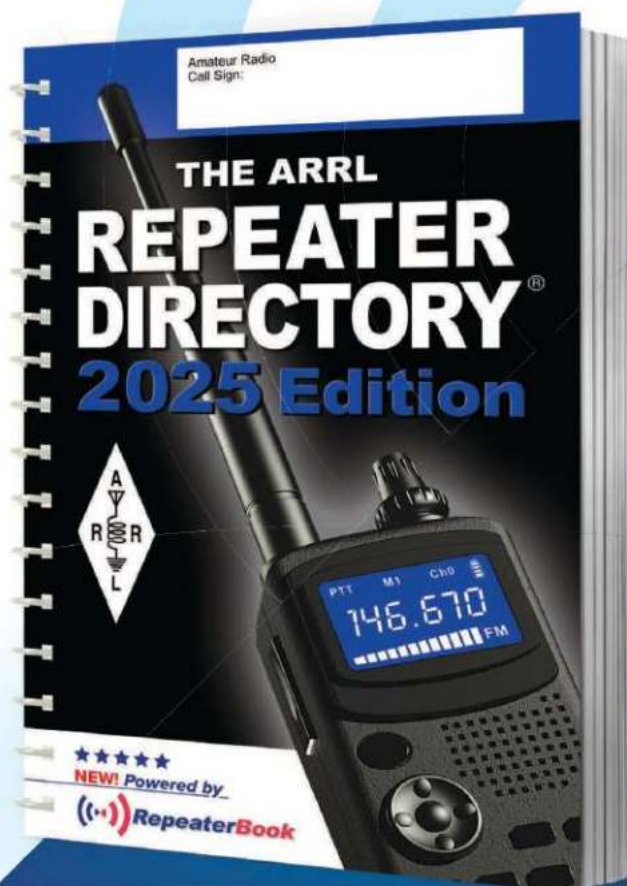
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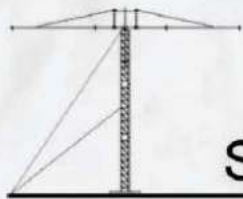


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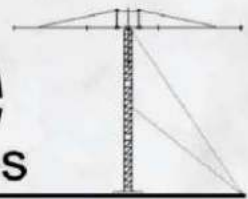


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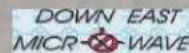


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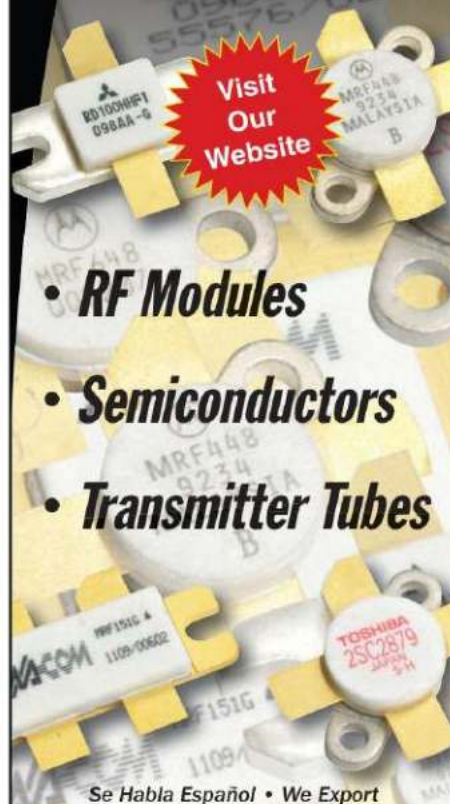
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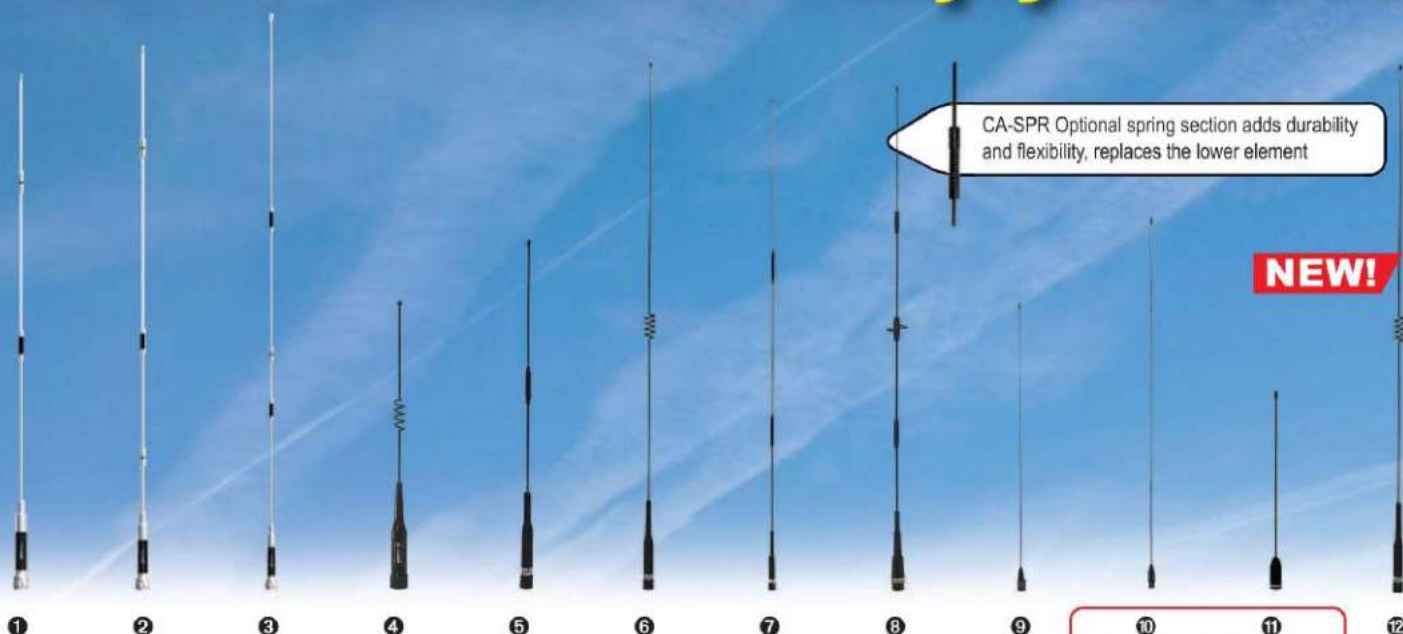
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