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QST Reviews

**Icom IC-905 VHF/UHF/
SHF Multi-Mode Transceiver
System**

**AF6SA Portable Wi-Fi
Rotator Controller (PWRRC)**

HAMRS Logging Software

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*TX Phase Noise: 100W, CW mode

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- "PRESET" Mode functions most suitable for FT8 operation
- Equipped with the External Display terminal

FT-710 AECS

- Includes External Speaker SP-40

FT-710 Field

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

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



* Photo shows the FT-710 AECS

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

FT-710 Aess

Acoustic Enhanced Speaker System

HF/50MHz 100W SDR TRANSCEIVER

FT-710 Field

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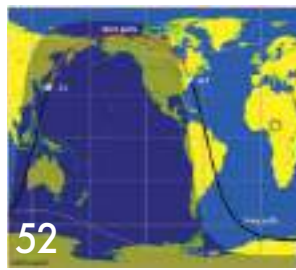
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Our Cover

The holiday cheer on this month's cover is courtesy of Ted Holland, WB3AVD, who says, "I've spent the last dozen years doing little more than building strange, exotic telegraph keys." In that time, Ted has designed and built more than 100 unusual keys, most of which he has used on the air. The snowman and Santa pictured here are vertical semiautomatic keys, also known as "bugs." Warm wishes for a healthy, safe, and happy holiday season, from all of us at QST and ARRL! [Chris Zajac, photo]



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

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Second Century



Another Auld Lang Syne

2024 was a tough year for ARRL and, more broadly, amateur radio as a whole. ARRL has dealt with backlash from a restructuring of its dues, as well as a ransomware attack in May that showed us that, despite investments in security hardware and software, it is nearly impossible to prevent an attack. All of this pales in contrast to the many people — the many friends — who we lost this year to the ranks of Silent Keys. These were big names, some with notoriety outside of amateur radio. We are left with our memories of these people, as well as the legacy that their contributions and friendships will mean to us for the rest of our lives.

Within what we call the “board family” at ARRL are those volunteers who served our membership with their time, money, and passion. Someone I knew for years in the Hudson Division, and who I contested with on Antigua back in 2001 right after September 11, was former Vice Director Bill Hudzik, W2UDT. He was a kind and soft-spoken gentleman who was a leader in the hobby and within ARRL. We likewise lost former Midwest Division Director Cliff Ahrens, K0CA, who was a well-known judge and respected DXer. Southeastern Division Vice Director Jeff Beals, WA4AW, who seemed to have served or helped in every aspect of ARRL’s field organization with an emphasis on emergency communications, was recognized at his passing as a leader and organizer. And then there’s Carter Craigie, N3AO, husband of former ARRL President Kay Craigie, N3KN. Carter was always a gentleman and a generous financial supporter of ARRL. These board family members will be sadly missed.

Many hams ultimately chased careers stemming from their hobby or integrated their love of radio into their vocations. We recently lost Mike Valentine, W8MM, who had the distinction of being ARRL’s largest individual donor. Mike loved ham radio and his experience at the University of Cincinnati, which he molded into establishing not one but two very successful radar detector companies. He celebrated these experiences, and his time as a young engineer at R. L. Drake, with a bench in front of Headquarters where he included many of his friends — and put himself last.

We lost Bob Heil, K9EID, who innovated so many products into the sound industry, creating the industry standard headset in amateur radio that spanned decades. Just prior to his passing we had a long phone conversation about his love of AM and his desire to see hams continue to use that mode with their latest-model gear.

As amateur radio has seen one publication after another flounder and fail, one that hung in there was CQ magazine. Owner Dick Ross, K2MGA, passed away and with him the passion he had for publishing content for hams, operating perhaps the most important contests worldwide, and offering wonderful awards causing hams everywhere to chase prefixes and zones. Back in the mid-1980s, it was CQ that gave this young software developer a discount on advertising to help launch a PC morse code terminal for the IBM PC. Thank you, Dick.

How many of us worked new countries toward our DXCC awards because of the initiative and hard work of a passionate DXpeditioner we lost this year, Bob Allphin, K4UEE? Bob was not one to take on the easy places to operate — he had to activate many top 10 most wanted countries. Bob was a gentleman, a mentor, and extremely generous to ARRL.

There are others like Marty Engstrom, N1ARY, well known and loved by New Englanders as “Marty on the Mountain” with his weather reports from Mount Washington. And Dick Rutan, KB6LQS, world-famous aviator and pioneer. And the list goes on. Who in your close circle was lost in 2024?

As we ring in the new year and think about the renewal that it brings, let’s take a moment, “for auld lang syne,” to raise a toast to these friends of ours who we will dearly miss. Let’s celebrate them by being radio active. Let’s commit ourselves to being connectors and being kind to each other, in their honor. I wish you a happy and healthy holiday season, and a wonderful 2025. See you on the air.

David A. Minster, NA2AA
Chief Executive Officer

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2	145.70000	145.10000	600 kHz	UP	FM	Windshield Noise	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	5 kHz			
3	145.71250	145.11250	600 kHz	UP	FM	Windshield Noise	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	5 kHz			
4	146.01000	146.01000		Simplex	FM	None	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	5 kHz			
5	146.08000	147.40000	600 kHz	UP	FM	None	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	5 kHz			
6																
7	440.00000	440.00000		Simplex	FM	None	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	25 kHz			
8	430.10000	430.10000		Simplex	FM	Orangeville Noise	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	25 kHz			
9	444.80000	443.95000	500 kHz	UP	FM	Orangeville Noise	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	25 kHz			
10	445.80000	443.95000	500 kHz	UP	FM	Orangeville Noise	None	88.5 Hz	88.5 Hz	0023	8 kHz	ON	25 kHz			
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See review in October 2024 QST page 38

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See review in October 2024 QST page 43

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- 2 MLA can perform as well or even better than a dipole antenna.
- 3 Integrated digital SWR bridge allows auto-tuning (HG3 Series only).
- 4 Designed and built by preciseRF - selected by MIT Haystack Observatory to design and build custom magnetic loop antennas for the 2024 solar eclipse radio propagation study.



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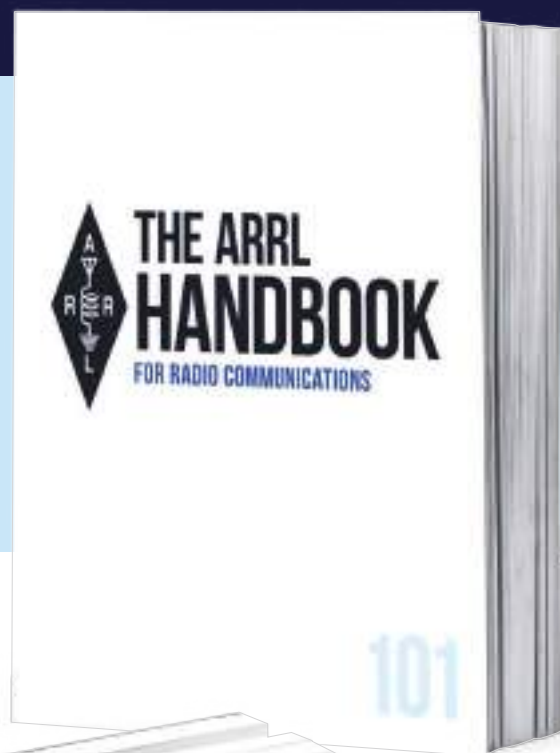
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Member Spotlight

Meg Blubaugh, K5MEG

Meg earned her license in 2015, and in just a few years, she moved up the ranks to being an Amateur Extra-class licensee. She started her journey going on Parks on the Air® (POTA) activations — often as a duo with her husband, David Blubaugh, ND1J — and operating FT8. Now, Meg's favorite mode is CW, and she's earned the 26th spot on a list of 31 hams who've achieved the Straight Key Century Club (SKCC) Marathon Award since its inception in 2014.

Family Operations

Having a spouse who comes from a family of hams, it's no surprise Meg became one herself. At first, she was only going to become a ham to keep her father-in-law's call sign, W0SGR, in the family after he became a Silent Key. After that, Meg became more interested in ham radio. David's youngest son, Nicholas, ended up earning his Technician license and being assigned his grandfather's call sign.

Before she earned her license, Meg joined David on his POTA activations. "I did the logging while he was on the air. Once I got my General license, I really got interested in participating and being on the air, too," she shared. Her most notable POTA operation was being the first activator of Doerun Pitcherplant Bog Wildlife Management Area in Georgia (US-7882).

A Marathon of Dits and Dahs

POTA activations allowed Meg to get acquainted with operating. From there, she was ready to attempt learning CW. Meg was practicing



on her own, but while at a Franklin NC Amateur Radio Club meeting a friend recommended the Long Island CW Club (LICW). Meg took some of their beginner classes but was hesitant to get on the air. Between LICW, SKCC, and having David as her mentor, she made her first contact after about 6 months of practice. "CW is like learning another language," Meg said. "It's incredible to think that I can communicate with someone in another country using just dits and dahs!"

Meg had heard of the SKCC Marathon Award, but never had any thoughts about working toward it. "In my mind, it was for very experienced folks," she said. To earn this award, you must make 100 contacts, each lasting 60 minutes or more with a unique SKCC operator, and the contact must be made using a straight key, bug, or cootie key — it was designed to be a demanding achievement for operators.

One day, Bob Paiva, AK9A, asked Meg if she would be interested in having a marathon contact with him.

the award, Meg experienced highs, such as meeting interesting operators, making new friends, and becoming part of a support group for those working toward the award, as well as lows, like working around poor band conditions and struggling to find operators willing to have a marathon contact. "Recognize that it's a marathon, not a sprint," Meg said. "It will take a while to do, but there's no time limit."

After nearly 12 months, Meg completed her 100th marathon contact and received SKCC Marathon Award #26. And to top it all off, she got permission from the SKCC Marathon Award manager to allow her 100th contact to be with David while he was in North Carolina and she was in Georgia. Out of 31 award recipients, Meg is the third woman to receive the award — Ai Nguyen, AI8AI, was the first, earning #15, and Teri Beard, KO4WFP, was the second, earning #23.

"I had never done more than a 20-minute ragchew," she said. "It was pretty exciting when I finished the marathon!" A few days later, Meg had a second marathon contact and was hooked. Throughout her journey toward earning

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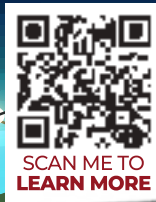
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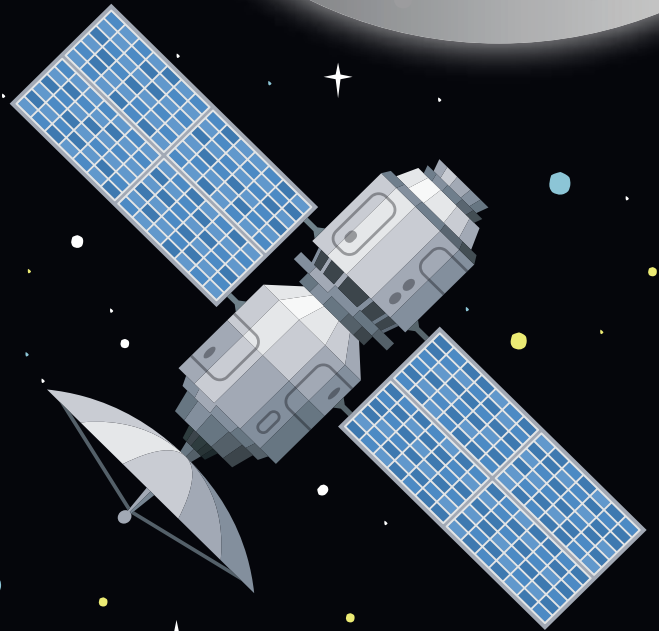
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Up Front

Ham Towers

Chris Quale, LA8OM, snapped this picture during a taxi ride in Kampala, Uganda. Founded by Dr. Hamis Kiggundu, Ham Towers is part of Ham Shopping Mall, that advertises itself as an accommodation and leisure center with offices, shops, supermarket, food court, and furnished suites. There was, however, no mention of a ham station. [Chris Quale, LA8OM, photo]



Introduction to Field Day

George Allison, K1IG, and his wife Annette, KB1LSH, give Field Day hats to several of their non-ham friends to help introduce them to the hobby. One of them, Jenny, reciprocated this year with a handmade birthday card designed by her artist friend, Veronica. George says, "I may use this as my new stationery!" [George Allison, K1IG, photo]

Ham in a Hurry

Bob Harris, WB2ZUB, saw this sign while driving through Hamilton Township in New Jersey, and figured it must be for when you need to talk to a radio amateur in a hurry. In truth, HAMStat provides Hamilton Township residents with a centralized location for complaints, service, and information requests. Maybe you can request to speak to a ham. [Bob Harris, WB2ZUB, photo]



Field Day Insurance?

This town takes Field Day in a big way! Robert Pantazes, W2ARP, shared this photo taken just south of Myrtle Beach, South Carolina. [Robert Pantazes, W2ARP, photo]



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* Photo shows the FTDX101MP

*1 3DSS: 3-Dimensional Spectrum Stream

*2 ABI: Active Band Indicator

*3 MPVD: Multi-Purpose VFO Outer Dial

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Correspondence

Letters from Our Members

FT8 Logging Caution if Using WSJT-X

If you are using the *WSJT-X* log to upload to any database, be aware that the log reports the frequency chosen on your *WSJT-X* front page and not the transmitter frequency.

Like me, you may tend to chase contacts across many bands. Make sure your software reflects the same band/frequency as your radio if you're making a contact. Remember to check your log window before accepting or updating the *WSJT-X* log to reflect your contact frequency.

I just had to go through seven logs uploaded to Logbook of The World to correct my previous band errors.

Tim Crawford, KE7TAC
Arch Cape, Oregon

Putting New Hams First

I would like to concentrate on getting more newcomers into the ham community because I believe there is nothing more important. It will require dedicated focus, energy, and dollars.

I suggest starting with focus groups of K – 12 and college-level educators to get their input on how ham radio could excite their students. Meet with passionate hams and international ham clubs to discover or create best practices. Then come up with a master plan, and hire an experienced, national public relations firm to get ARRL's message across to potential new hams. I firmly believe that with focus, energy, and passion we can double and triple the number of licensees, but it requires making it a priority and serious, unrelenting action and follow-through.

Ham radio is such a wonderful and fulfilling hobby with so many avenues that could appeal to a variety of interests. From emergency communications and talking with astronauts on the International Space Station, to collecting DX entities, there's some-

thing for everyone. Ham radio can be very useful, even essential, in emergencies.

Let's all do what we can to put ham radio back on the map and make it come to life for the next generation. Make this your number-one priority because it's worth it.

John Self, K6VFR
Santa Fe, New Mexico

A Unique Contact

I have been a ham for more than 60 years, and recently I had a CW contact like none before. It immediately took me back to my earliest Novice days when I was at a very slow speed.

The operator on the other end of the contact was struggling with his key and was unfamiliar with common CW abbreviations, operating prosigns, and protocols. He eventually apologized and said he hadn't learned the whole Morse code yet. I was surprised that he tried a CW contact before he had even learned all the letters of the Morse code alphabet.

Now that Morse code is no longer a license requirement, I suspect we will be dealing with these kinds of self-trained aspiring CW operators on the bands more often. Let's do all we can to encourage and help them along!

Bill Schrempp, K7RY
Newberg, Oregon
Life Member

Maidenhead Grid Squares to the Rescue

I was operating mobile SSB on a 10-meter opening, and it was quite crowded. I faintly heard a four-lander conversing with someone I couldn't hear on my end. As the four-lander turned back to the other station, I heard KI7 (I'm leaving out the suffix on purpose) calling "Priority traffic." The four-lander picked him up on his next transmission, and KI7 relayed

he was in west central Utah, stuck in the sand, and running out of water. The four-lander was struggling to hear him. KI7 was trying to get him to call the county sheriff. KI7 was solid copy in the mobile/9, so I called him. I called the sheriff myself, just in case the four-lander lost him.

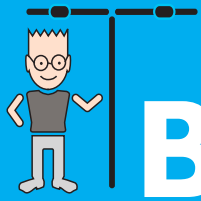
I connected to a dispatcher and relayed the problem. He said there was another report of this stuck truck on another line, probably from the four-lander. The dispatcher asked for the location, and I relayed, "Just off Fossil Mountain, in a deep canyon." The dispatcher asked if he was north or east of the mountain peak. KI7 said he was north of it. The dispatcher asked for his GPS location, but KI7 didn't know because there was no cell phone service.

KI7 reported DM38gv. I relayed it to the dispatcher, who asked what that meant because he had never heard of it before. I told him the information is available on the internet, under "Maidenhead grid squares." He said he would look into it, and took my name and phone number. He called back and said, "Man, that sure is easy to understand. I read about it for 2 minutes, and it made perfect sense." The dispatcher plugged the heading into a map, and it zoomed into the correct canyon. KI7 was relieved to hear that help was on the way!

It took a deputy 2.5 hours to drive to the canyon, and KI7 was safe, thanks to Maidenhead grid squares and an open 10-meter band!

Chet Peugh, NK9Y
Chadwick, Illinois
Life Member

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



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- Easy to use controls

- 5W amplified DSP noise canceling In-Line module - 8 filter levels 8 to 40dB - Use in-line with a loudspeaker
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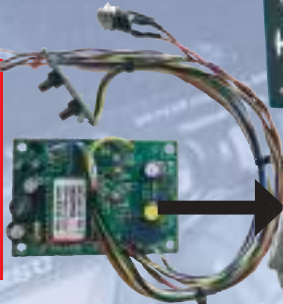
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W1AW Schedule

PAC	MTN	CENT	EAST	UTC	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM	1400		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	1500-2045	VISITING OPERATOR TIME				
1 PM	2 PM	3 PM	4 PM	2100	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	2200	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	2300	DIGITAL BULLETIN				
4 PM	5 PM	6 PM	7 PM	0000	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	0100	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	0200	DIGITAL BULLETIN				
6 ⁴⁵ PM	7 ⁴⁵ PM	8 ⁴⁵ PM	9 ⁴⁵ PM	0245	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	0300	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	0400	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.

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

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

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

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



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About the Artificial Ground

Its invention, operation, and usefulness.

José Luis Giordano, CA4GIO

The device known as an *artificial ground* is useful to some radio amateurs, while others have never needed it. Furthermore, the circuit and the inventor's name change depending on the reference consulted. The purpose of this article is to clarify what it is and how it works, and to share some facts about its history.

What Is and Isn't an Artificial Ground

The *ground* of an amateur radio station is the reference point of potential between RF circuits, which can be a rod buried outside the shack. On the other hand, *grounding* is the physical connection of the station devices to the ground point, while *bondings* are joints between the chassis of the devices that minimize potential differences between them. The device called an *artificial ground* does not replace grounding or bonding. It does not allow us to do without the radials or the counterpoise of a $\frac{1}{4}$ -wavelength vertical antenna or an end-fed wire. Instead, it is an electrical circuit that eliminates RF present in the grounds, chassis, and shields due to a problem in the station's grounding.

The Circuit

The schematic of the circuit of the first commercial artificial ground, the MFJ-931, is shown in Figure 1. This device was manufactured by MFJ, and the diagram was drawn by Doug DeMaw, W1FB (SK), who took a unit apart to write the April 1988 QST Product Review. "MFJ" are the initials of American electrical engineer and businessman Martin F. Jue, K5FLU, inventor of the artificial ground and President of MFJ (until April 2024, when Mr. Jue announced his retirement). As a radio amateur since the age of 16, Mr. Jue founded MFJ in 1972, and was the owner of Hy-Gain, Cushcraft, and Ameritron, among others. He invented the MFJ-207 antenna analyzer about 30

years ago, and he has a series of patents on amateur radio systems.

How It Works

The artificial ground provides a path to eliminate existing RF in parts of the station that should be at ground potential. The simplest way to do this is to use the magic of transmission lines, placing a short section of line open at the end. When the length of this line is equal to exactly $\frac{1}{4}$ wavelength at the operating frequency, it is seen as a short circuit (minimum impedance), and the line can drain RF current at this specific frequency. However, to work with different bands, the most practical solution is to use a tunable LC-series resonant circuit. By adjusting the variable inductance (L) and capacitance (C), the resonant frequency of the circuit is adjusted to obtain minimum impedance at the operating frequency.

In Figure 1, you can see that between the transmitter chassis and the station ground, the artificial ground is formed by only a tapped coil connected in series with a variable capacitor. The other components correspond to the ammeter that allows the operator to see that the amplitude of the RF current is maximum (indicating resonance).

When It Is Useful or Necessary

If there are no problems with tingling, noise, or interfer-

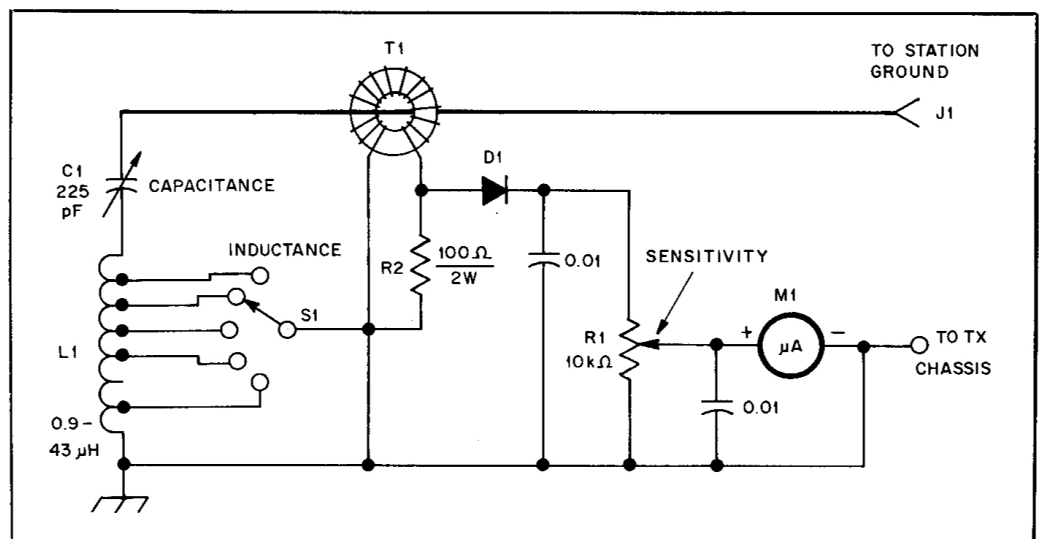


Figure 1 — The MFJ-931 circuit, as depicted in the April 1988 QST Product Review by Doug DeMaw, W1FB (SK).

ence at a station, an artificial ground is unnecessary. In contrast, the most common situation in which an artificial ground may be necessary is when the shack is far from the station's ground rod. In the same MFJ-931 review mentioned earlier, DeMaw explained that many years ago, when his station was on the second floor, he had RF problems due to the excessive length of his ground line. He solved it by using the LC circuit of an antenna tuner to cancel out the reactance of the line. This situation was precisely what led Mr. Jue to invent the artificial ground. The problem is recurring. In the "The Doctor is IN" column in the March 2004 issue of *QST*, there was a query about grounding a station on the second floor. Regarding artificial ground, the answer said:

As a practical matter, accomplishing a good RF ground is difficult at best, especially on the second floor. The good news, however, is that most installations do not necessarily require one. If you have a well balanced antenna/feed line system, you're probably okay. If you use a wire antenna and you do have a relatively poor RF counterpoise or ground system, you might look into an "artificial ground."...This can successfully resonate a random length ground wire and make the station "see" an effective counterpoise. These can work well, although every situation is unique, and it would have to be evaluated for your particular RF environment.

Other Designs

Despite the market appearance of the MFJ-931 and the 1988 publication in the US (at a time without the internet), 2 years later, the artificial ground was independently invented and published again under the name "Earth Tuner." British electrical engineer Dr. Colyn Baillie-Searle, GD4EIP, felt tingling in his metal microphone while operating his station on the second floor.

Realizing that there was RF in his ground potential, he placed a $\frac{1}{4}$ -wavelength wire and let it hang out of the window, which fixed the problem. He did the same on other bands; seeing that it was working, he later thought to use a tuned circuit. He built one, tested it, and sent an article with his findings to the

English magazine *Practical Wireless*. Upon receiving the draft, the then-editor did not believe this device could work. Consequently, Dr Baillie-Searle had to build another unit and send it to the editor. The article was finally published in the October 1990 issue. It should be noted that the publication was made with the schematic that had been redrawn from the manuscript (see Figure 2). In this process, the artist forgot a resistor that was in parallel with the secondary winding of the transformer that makes up the ammeter. The detail is not relevant (because the resistor is related only to the sensitivity of the ammeter), but it allows us to see some traces of history, as this incomplete circuit is the one seen in many internet sources. The GD4EIP circuit is very similar to the MFJ circuit, which is expected because it is the simplest and most practical solution.

Shortly afterward, the invention of the artificial ground reappeared in several Radio Society of Great Britain (RSGB) publications, but it was attributed to a radio amateur from Sweden, SM6AQR. This can be seen in Figure 15.4 in the *Radio Communication Handbook*, and in Figure 3.7 of *Backyard Antennas* written by Peter Dodd, G3LDO (SK), and published by RSGB in 2000 (see Figure 3). The style of the diagram is different, suggesting another author. In any case, the circuit is functionally equivalent to the previous ones. The story gets confusing after this point because, for example, in the 2017 reprint of *Successful Wire Antennas* (edited by Ian Poole, G3YWX, and Steve Telenius-Lowe, 9M6DXX, and published by RSGB in 2012, 2014, 2017, and 2021), the exact same figure legend

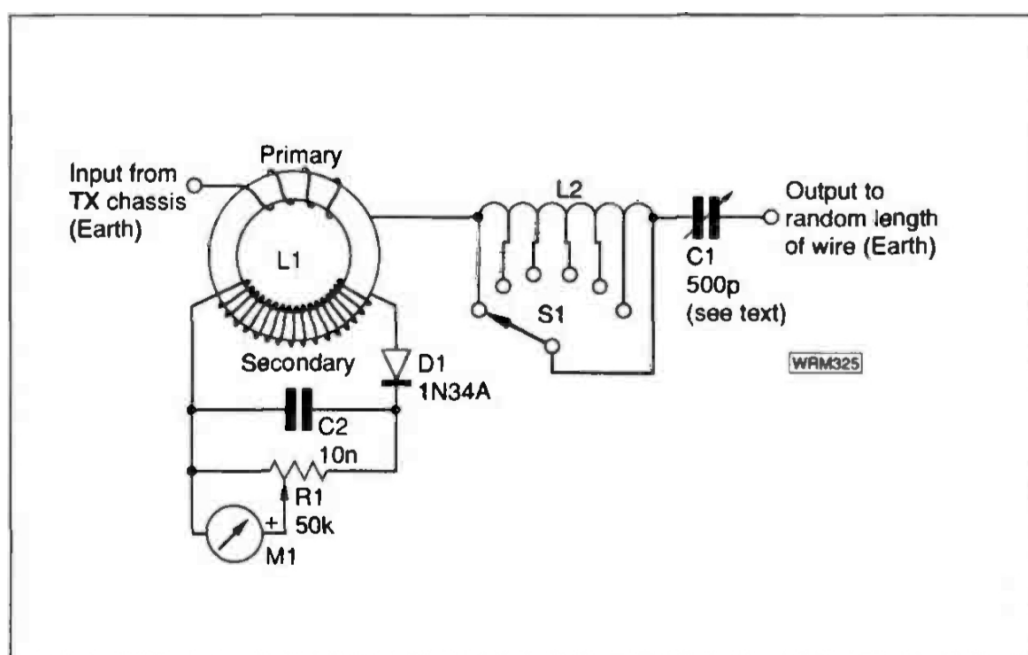


Figure 2 — The "Earth Tuner" Figure 2 schematic, as depicted in Dr. Colyn Baillie-Searle's, GD4EIP, article in the October 1990 issue of *Practical Wireless*.

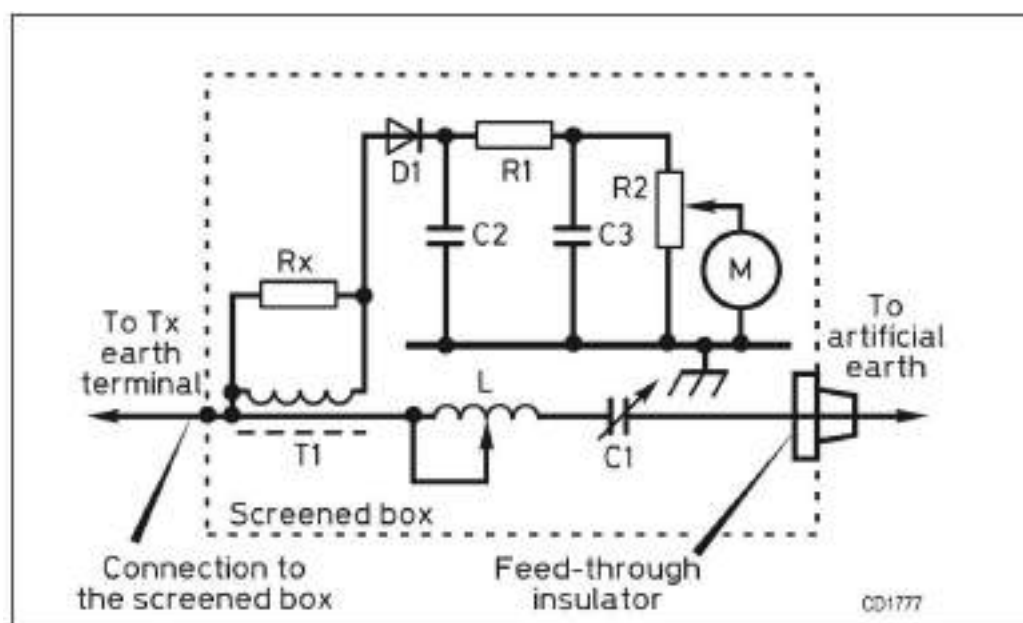


Figure 3 — The artificial ground schematic, as depicted in Figure 3.7 of *Backyard Antennas* by Peter Dodd, G3LDO (SK).

appears as the *Backyard Antennas* figure. It has details of the SM6AQR circuit components, including attribution to SM6AQR, but it shows the schematic circuit of GD4EIP. Evidently, the figure was taken from one source and the figure legend was taken from another.

To clarify the authorship of the invention, I wanted to find the name of SM6AQR. After a lot of searching, I found in the SM-Callbook of the Swedish Society of Radio Amateurs that the call sign holder's name was Olle Lindqvist. I confirmed this in a photo found in the February 1951 issue of the Swedish magazine *QTC*. Unfortunately, because the authors who attribute the invention to SM6AQR have not properly placed the reference, we may never know whether the device was also invented and published by Mr. Lindqvist. Perhaps a history buff will one day find an old article published in a magazine like *QTC* that will clarify this.

Non-Commercial Prototypes

At the web page www.remeeus.eu/english/hamradio/artificial_ground.htm by Hans Remeus, PA0Q, you can see a device built with the GD4EIP circuit. This nice work was carried out without Remeus knowing the 1988 publication on MFJ-931. Another interesting work is "Building a Ground Tuner (Artificial Earth)" by John Howard Green, ZS1JHG, in the January 2020 issue of *ANTENTOP*. Although in that article the device is built with the GD4EIP circuit, the MFJ circuit is shown at the end despite there being no mention of the 1988 *QST* Product Review. For those interested in building an artificial ground, one

inductor option (suggested by GD4EIP) is Barker & Williamson air coils. They are wound with solid tinned copper wire embedded in plastic ribs, making tapping very easy. They have a high Q value and are mechanically stable. Another experimental work to highlight is the January 9, 2016 YouTube video "Artificial Ground for RF Earthing radios" by HamNoob. It explains when artificial ground can be useful. You can also see the interior of the MFJ-931, the prototype of PA0Q, and the circuit diagram of GD4EIP

(which the YouTuber erroneously attributed to "Dr. ARRL"). The video is interesting because it shows how a circuit tuned to the ground line decreases noise without affecting the signal. To do this, the operator uses the inductance and a variable capacitor from a commercial manual antenna tuner (from Nevada Radio). This experience shows directly that artificial ground really works; it's exactly what Doug DeMaw said he did long before his 1988 review.

Acknowledgments

I would like to thank Martin F. Jue, K5FLU; Dr. Colyn Baillie-Searle, GD4EIP, and Hans Remeus, PA0Q, for their collaboration and for the information kindly sent by each of them. Their help made possible the reconstruction of the still-incomplete history of the artificial ground.

José Luis Giordano, CA4GIO, is a physicist who has worked at the Balseiro Institute and Bariloche Atomic Centre in Argentina, the University of Zaragoza in Spain, and the University of Talca in Chile. His area of work was applied magnetism and superconductivity. Now retired from academic life, José lives in Chile, and he obtained his amateur radio license in 2021. He is a member of ARRL, Radio Club Argentino, and Unión de Radioaficionados Españoles. He also is the author of four books, several papers on physics, and articles in *QST* and other ham radio magazines. José is especially interested in DX, HF, and broadband transformers. He can be reached at jlgiordano@hotmail.com.

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



Homebrewing Software with Python

N8ME shows how software projects are within the capabilities of most hams, not just professionals.

Mark Erbaugh, N8ME

This article introduces Python, a powerful and easy-to-understand programming language. It's a free open-source language that can be used for simple scripting as well as creating complex websites. There are many open-source development tools and online learning resources available.

The Project

I've constructed and programmed (using Python) a 10-minute ID timer (see the lead photo). When powered on, the timer displays a countdown from 10:00 minutes. When the time reaches 0:00, the display changes to ID. Any time during the countdown or ID display, a button can be pressed to reset the countdown to 10:00. The timer is powered by three AA batteries.

Required Hardware

The necessary hardware, purchased from Amazon, costs less than \$30 (see www.arrl.org/qst-in-depth for a list of links).

The Raspberry Pi Pico (see Figure 1) is a small development board based on the RP2040 microcontroller from the Raspberry Pi Foundation (I've verified that the listed code runs fine on the Pico 2). There are four versions: the original Pico, the Pico H with pre-soldered header pins, the Pico W with Wi-Fi and Bluetooth, and the Pico WH with Wi-Fi, Bluetooth, and pre-soldered header pins. This project doesn't require Wi-Fi but does require header pins, which can be soldered to the versions that don't have them. Unlike the Raspberry Pi series of single-board computers, this is not a full computer and does not have an operating system. Development is accomplished through a micro-USB connection to a computer.

The Waveshare Pico LCD 1.14 backpack (see Figure 2) is a 1.14-inch, full-color, 240 × 135-pixel backlit display with two buttons and a joystick. It's designed with header sockets that connect directly to the Pico header pin. The LCD controller is an ST7789.

Hardware Assembly

Development is accomplished by plugging the Pico into the sockets on the Pico LCD and connecting it to the computer with a USB cable. Be sure to observe the



The completed countdown timer.

silkscreened USB marker on the Pico LCD and align it with the USB connector on the Pico.

For stand-alone operation, you'll need a three-cell AA battery holder with a lid, a power switch, a micro-USB cable with a pigtail, and M.2 mounting hardware (four screws, four nuts, and four spacers). The weight of the case with batteries makes a stable stand. I drilled holes in the battery case lid, as shown in Figure 3. The holes in each corner are for mounting the Pico, and the interior hole provides access to the **BOOTSEL** button. I used a desktop CNC machine to drill five 2.1-millimeter holes, then I used a hand drill to enlarge the **BOOTSEL** hole. Next, I soldered the micro-USB pigtail to the power leads of the battery case.

Using the M.2 hardware, I mounted the Pico upside down to the battery case lid, with the header pins away from the lid (see Figure 4).

Required Software

MicroPython is a version of Python designed to run on microcontrollers. The Raspberry Pi Foundation maintains versions for the Pico, Pico H, Pico W, and Pico WH, and they are supplied as UF2 files. *MicroPython* is compatible with the full versions of Python. I'll be referring to *MicroPython* as "Python" unless I need to make a distinction about functionality between the two.



Figure 1 — Raspberry Pi Pico.

When a Pico is connected to a computer via USB, it creates a serial connection. While a simple serial terminal program can be used for development, an integrated development environment (IDE), like *Thonny* (<https://thonny.org>), makes things much easier. *Thonny* is included in software that's installed in the full version of Raspberry Pi OS and can be installed from the recommended software application for the regular version and from most Linux software repositories (its website has installers for Windows, Mac, and Linux). *Thonny* can also be used to develop regular Python software that runs on computers other than the Pico.

Install MicroPython on the Pico

If the Pico has already been programmed with something other than *MicroPython*, the flash must be erased. To do so, download the file “flash_nuke.uf2” from Raspberry Pi to your computer. Then, while pressing **BOOTSEL** (the white button near the USB connector), connect the Pico to the computer with the USB cable. The Pico should mount a file system on the computer like a USB flash drive. Copy “flash_nuke.uf2” to the Pico's file system. Once the file has copied, the file system will unmount. The computer may complain that a drive was improperly removed, but this is not a real problem. Because the Pico's flash is now empty, it will remount the file system. Continue as you would with a new Pico.

Now you can download the appropriate *MicroPython* UF2 file to your computer. Connect the Pico to the



Figure 2 — The Waveshare Pico LCD 1.14 backpack.

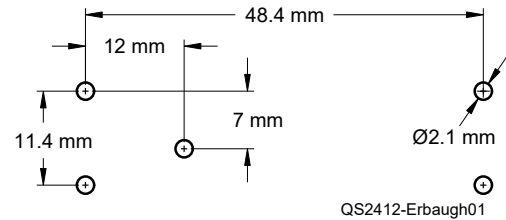


Figure 3 — Battery holder drilling template.

computer. There is no need to press **BOOTSEL**, as a Pico with unprogrammed flash will mount its file system whether **BOOTSEL** is held or not. Copy the “micropython.uf2” file to the Pico's file system. The drive will unmount automatically.

Launch Thonny

On initial installation, *Thonny* launches in simple mode with limited features and no menu bar. This project needs features that aren't available in simple mode, so you'll need to click **SWITCH TO REGULAR MODE**, then close and restart the software to enable the new mode.

By default, *Thonny* uses a local (on the computer) version of Python. Click on **LOCAL PYTHON 3 * THONNY'S PYTHON** at the bottom right of the window for a list of available Python environments; choose *MicroPython*. For my installation, *Thonny* showed two entries for *MicroPython* — one for Raspberry Pi Pico and one for RP2040 (which is the processor on the Pico). They are the same, so either one can be selected. *Thonny* will connect to the Pico, and the bottom shell window should display the following banner:

```
MicroPython v1.22.2 on 2024-02-22; Raspberry Pi
Pico with RP2040
Type "help()" for more information.
>>>
```

The “>>>” prompt indicates that you can type in a Python statement. The shell window is an interface to the Python read-evaluate-print loop (REPL). This allows you to interactively execute Python statements. Statements and results in the REPL are available only until the REPL is restarted, such as by clicking **STOP** in the toolbar or cycling the power to the Pico. To be permanent, statements must be entered into a file that is saved to the flash on the Pico. The upper window is a text editor for editing these files.

Thonny includes a file manager to allow for files to be copied between the computer and the Pico. Select **FILES** under the **VIEW** menu to use the file manager. In the top **FILES** pane, use the breadcrumb list and the

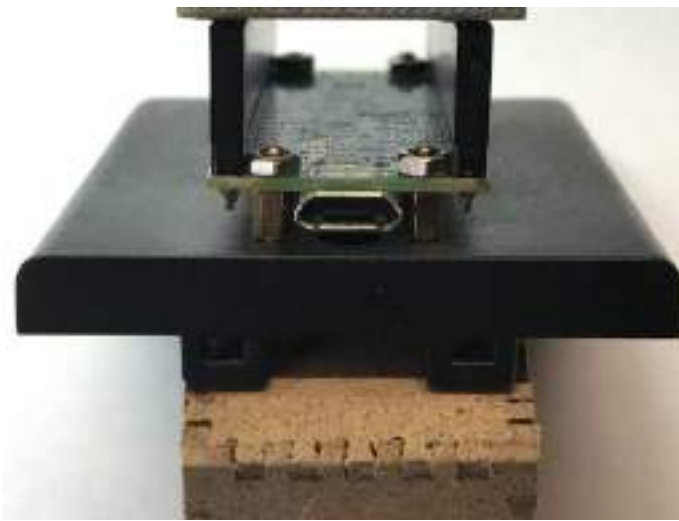


Figure 4 — Pico mounting on battery pack.

graphical interface to navigate to where the files for this project are located. Select “LCD.py,” “LM48.py,” “Heartbeat.py,” and “main.py” by clicking and shift clicking. Next, select the hamburger (three-bar) menu at the top and choose **UPLOAD TO /**. This will copy the files from the computer to the root of the Pico. Once the upload completes, the files show up in the lower pane.

In the lower **FILES** pane, double click “main.py” to load it into the editor window. Click **RUN**. The display should start counting down from 10:00 in yellow. When it reaches 0:00, the display shows ID in red. Press the top right button on the Pico LCD to reset the counter to 10:00.

The complete program listing of the ID timer is shown in Figure 5; it is 15 lines of code. A detailed explanation of the program and a very brief introduction to Python are included on the *QST* in Depth web page (www.arrl.org/qst-in-depth).



Figure 5 — The complete ID timer program.

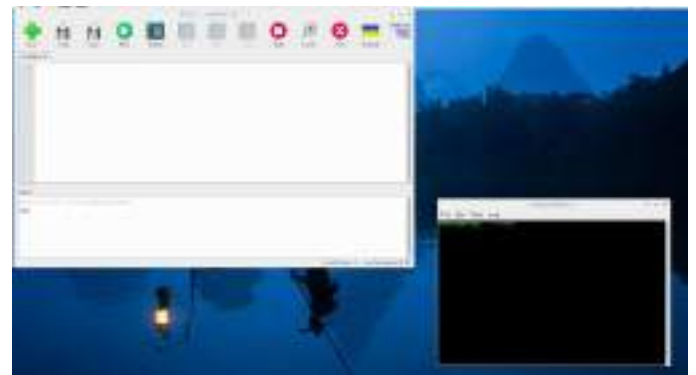
Final Touches

Disconnect the USB cable to the computer and plug in the USB cable from the battery case. The case’s **ON/OFF** switch will turn the Pico on and off. *MicroPython* executes a program named “main.py,” which runs automatically every time the Pico is turned on.

Conclusion

This program uses only a small fraction of the RAM and flash storage on the Pico, so there is plenty of room for expansion.

I hope I’ve been able to give you some insight into Python programming of Pico processors. With a little bit of practice, you’ll find that making a Pico do what you want is easier than constructing hardware projects.



In the digital edition of *QST* (www.arrl.org/qst), John McAuliffe, W1DRF, uses these procedures on a Raspberry Pi to program an STM32 microcontroller using *MicroPython* to do a simple LED Blink.

See *QST* in Depth for More!

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

- ✓ Links to required software and hardware
- ✓ A detailed explanation of the program
- ✓ A brief introduction to Python

Mark Erbaugh, N8ME, retired as Deputy Director from the Madison County (Ohio) Board of Elections and still works at the polls on election days. He has been a ham for more than 40 years and is a member and former Trustee of the Dayton Amateur Radio Association. Mark volunteers yearly at Hamvention and was in charge of Hamvention license exams for 5 years. He was the Region 8 Coordinator for Laurel VEC and Vice Chair of the National Conference of Volunteer Examiner Coordinators (NCVEC). Mark can be reached at mark.election@gmail.com.

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Product Review

Icom IC-905 VHF/UHF/SHF Multi-Mode Transceiver System

Reviewed by Dave Hallidy, K2DH
k2dh@arrl.net

The Icom IC-905 is an all-mode transceiver system covering 2 meters, 70, 23, 13, and 6 centimeters, and with the optional CX-10G transverter module, 3 centimeters. This is, as far as I know, the first commercial product of its kind covering well into the upper microwave amateur bands in two boxes (three with the 10 GHz module).

Based on software-defined radio technology and using down conversion on the bands above 70 centimeters, it is capable of operating all modes on all bands: SSB, CW, AM, FM, D-STAR digital voice and digital data, and amateur TV (ATV, FM only).



Figure 1 — The bottom unit is the RF for 2 meters and 70, 23, 13, and 6 centimeters. The upper unit is the 3-centimeter transverter. The antenna shown is the optional AH-109PB parabolic antenna for 10 GHz (Note: the tripod and mast are not included).

The RF sections are designed to be operated remotely from the shack, putting them as close as possible to the antennas to minimize feed-line losses. The only cable between the remotely placed RF equipment (see Figure 1) and the controller is the control cable, which carries dc power and control signals to and from the in-shack controller. As anyone who has experimented with the microwave amateur bands will tell you, cable losses can seriously reduce the performance of an otherwise great set of RF equipment. Icom has very effectively minimized the amount of coax required to connect the RF equipment to the antenna by fully weatherproofing the outdoor equipment. When I recently set up the equipment for a trip to the field, I needed no more than 3 feet of coax for any band. Some hams might want to use the IC-905 in a fixed station application, and Icom has accounted for this. They supply a 20-foot-long control cable, but both 65 feet (20 meters) and 164 feet (50 meters) are available options. I used the 20-foot length for my testing. Note that Icom

Bottom Line

The IC-905 offers a great way to become operational on the popular microwave bands. The equipment is high performance and weatherproof, allowing great microwave DX opportunities without the need for expensive, low-loss transmission lines.



Figure 2 — The right side of the IC-905 main unit.

does not specify a maximum length for the control cable in the specifications for the IC-905, so it is unknown whether the user could make their own longer cable for runs longer than the 50-meter maximum sold by Icom.

As can be seen in the lead photo, Icom has styled the IC-905 after the immensely popular IC-705 HF/VHF/UHF QRP transceiver. The controller looks very much the same as the IC-705, with the same 4.3-inch touch-screen display and knobs and buttons in the same positions as on the IC-705. Most of the button and knob functions are the same as well, so becoming familiar with the operation of the radio was easy. Unlike the IC-705, the IC-905 does not use Wi-Fi; it has an RJ45 LAN connection instead to connect to the internet for remote operation.

Description

The form factor of the IC-905 main unit is the same as the IC-705, but there are way more possible connections.

On the right side of the IC-905 main unit, you have an SD card slot, an RJ45 Ethernet LAN port, a USB (type C), and the RF unit RJ45 connector for the remote RF module (see Figure 2).



Figure 3 — The left side of the IC-905 main unit.



Figure 4 — The bottom view of the IC-905 main unit.

On the left side of the IC-905 main unit, you have six 3.5-millimeter ($\frac{1}{8}$ -inch) female stereo-type connectors: the audio-video input (**AV-IN**), the audio-video output (**AV-OUT**), a transmit jack (**SEND**), a CW key jack (**ELEC-KEY**), and the external speaker (**EXT-SP**). The last 3.5-millimeter female connector is for the speaker connection to the supplied speaker/mic (**MIC-SP**). There's also a 2.5-millimeter female connector (four conductors) for its microphone (**MIC**). You will also find a ground terminal and the dc power connector (see Figure 3).

Under the main unit you have a few screw holes; the $\frac{1}{4}$ "-20 located in the middle can be used for mounting the radio to a common camera mount like a tripod. You also have four holes in a rectangular pattern spaced at 1.181×1.496 inches (30×38 millimeters); this is for mounting solutions using the automated mounting positioning system (AMPS) standard (see Figure 4).

There is no connector on the main-unit rear panel; you will find only the heatsink (see Figure 5). There are reports that it can get pretty hot, but in my testing (which included long key-down periods in FM at full power) that was not the case.

For the description of the included RF module and the optional 10 GHz transverter, see Figures 6 and 7.



Figure 5 — The IC-905 main-unit rear-panel heatsink.

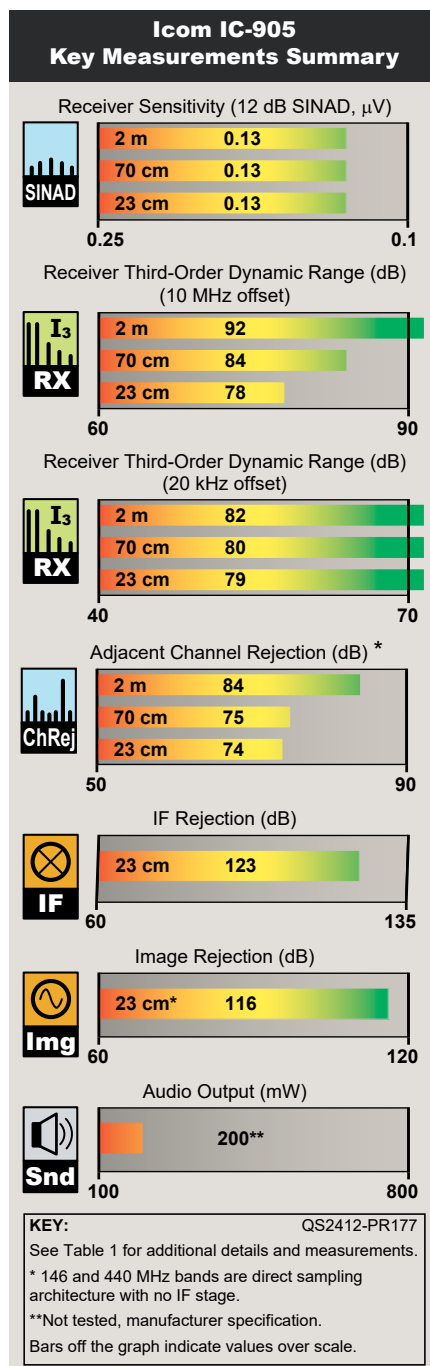


Figure 6 — Connections to the included RF module. Left to right: N-female for 2 meters, 70 centimeters, and 23 centimeters; SMA female for 13 centimeters, and SMA female for 6 centimeters. Also shown is the GPS antenna.

Table 1

Icom IC-905, serial number 12001065, Firmware V1.03

Manufacturer's Specifications

Frequency coverage: Receive/transmit
144 – 148, 430 – 450, 1240 – 1300,
2300 – 2309.999999, 2390.000001 –
2450, 5650 – 5925 MHz.

Power requirements: 13.8 V $\pm$ 15%.
Receive, 2 A standby, < 3 A max.
audio. Transmit, < 5.5 A at
max. RF output.

Modes of operation: SSB, CW, AM, FM,
DV, DD, ATV.

Receiver

SSB/CW sensitivity, 10 dB (S+N)/N,
SOFT filter, 144/430/1200/2400 MHz
bands: < -19 dB μV (0.11 μV), 5600 MHz
band: < -16 dB μV (0.15 μV). Preamplifier on
for 144/430/1200 MHz bands.

AM sensitivity: 10 dB (S+N)/N,
144/430/1200/2400 MHz bands:
< 0 dB μV (1.0 μV), 5600 MHz
band: < +3 dB μV (1.4 μV). Preamplifier on
for 144/430/1200 MHz bands.

FM sensitivity: 12 dB SINAD, 15 kHz BW,
144/430/1200/2400 MHz bands;
< -15 dB μV (0.17 μV), 5600 MHz
band; < -12 dB μV (0.25 μV). Preamplifier on
for 144/430/1200 MHz bands.

Measured in the ARRL Lab

As specified.

At 13.8 V dc: Receive, max. brightness,
max. volume, no signal, 2.13 A (2.427 GHz).
Transmit, 3.8 A (440 MHz) at max. RF
output; no change in RF output at min.
specified supply voltage.

As specified.

Receiver Dynamic Testing

Noise floor (MDS), SOFT filter:

146.02 MHz -132 dBm (0.05 μV)*
440.02 MHz -133 dBm (0.05 μV)*
1260 MHz -142 dBm (0.02 μV)*
2400 MHz -144 dBm (0.01 μV)
5750 MHz -143 dBm (0.02 μV)

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

modulation, 6 kHz BW:
146.02 MHz -115 dBm (0.41 μV)*
440.02 MHz -115 dBm (0.41 μV)*
1260 MHz -115 dBm (0.41 μV)*
2400 MHz -115 dBm (0.41 μV)
5750 MHz -111 dBm (0.63 μV)

For 12 dB SINAD, 3 kHz deviation,
1k kHz BW:

146.02 MHz -125 dBm (0.13 μV)*
440.02 MHz -124 dBm (0.13 μV)*
1260 MHz -124 dBm (0.13 μV)*
2400 MHz -123 dBm (0.16 μV)
5750 MHz -120 dBm (0.23 μV)

Overview

The package performs well on all bands. The basic system consists of two boxes: the controller (main unit) and the RF unit. In this configuration, the radio operates on the full US authorizations of the 2-meter (144 – 148 MHz), 70-centimeter (430 – 450 MHz), 23-centimeter (1.240 – 1.300 GHz), 13-centimeter (2.300 – 2.309999999 and 2.390000001 – 2.450 GHz), and 6-centimeter (5.650 – 5.925 GHz) bands. RF output is 10 W on 2 meters, 70 centimeters, and 23 centimeters, and 2 W on 13 and 6 centimeters (see Table 1 for the full specifications).

The addition of the CX-10G 10 GHz module allows operations over the full 3-centimeter (10.000 – 10.500 GHz) band at a power output of 0.5 W. Note that most hams are running between 3 and 10 W on 10 GHz, so 500 mW is a significant step down from that. Also note that Icom has made no provisions for adding a power amplifier or preamplifier to the IC-905 for any of its bands.

FM adjacent channel rejection: Not specified.	146.02 MHz, 84 dB†; 440.02 MHz, 75 dB†; 1260 MHz, 74 dB†.
FM two-tone third-order IMD dynamic range: Not specified.	20 kHz offset, 146 MHz, 82 dB; 440 MHz, 80 dB; 1260 MHz, 79 dB; 10 MHz offset, 146 MHz, 92 dB; 440 MHz, 84 dB; 1260 MHz, 78 dB. 146 MHz, 109 dB, 440 MHz, 104 dB.
FM two-tone second-order IMD dynamic range: Not specified.	
IF rejection: Not specified.	IF rejection‡: 1260 MHz, 123 dB; 2400 MHz, 129 dB; 5600 MHz, 140 dB.
Image rejection FM: 144/430 MHz > 60 dB, 1200/2400/5600 MHz > 50 dB.	Image rejection‡: 1260 MHz, > 116 dB; 2400 MHz, 122 dB; 5600 MHz, 121 dB.
S-meter sensitivity: Not specified.	S-9 signal (−93 dBm): 146 MHz, −97 dBm (3.23 μV); 440 MHz, −98 dBm (2.85 μV); 1260 MHz, −98 dBm (2.85 μV); 2400 MHz, −97 dBm (3.23 μV); 5600 MHz, −97 dBm (3.23 μV).
Squelch sensitivity: Not specified.	At threshold/maximum level, FM: 146 MHz, 0.09/4.5 μV; 440 MHz, 0.09/3.7 μV; 1260 MHz, 0.10/4.0 μV.
Audio output: > 0.2 W into 8 Ω at 10% THD.	As specified. THD 0.45% at 1 V _{RMS} .

Transmitter

Power output: 144/440/1200 MHz, 10 W (all modes except AM), 2.5 W AM; 2400/5600, 2 W (all modes except AM), 0.5 W AM
 Spurious-signal and harmonic suppression: 144/440 MHz; > 60 dB, 1200 MHz, > 53 dB, 2400/5600 MHz; > 46 dB.

Size (height, width, depth, excluding protrusions): 3.3× 7.9 × 3.2 inches (control head); 3.4× 6.8 × 8.3 inches (RF unit).

Weight: 2.1 pounds (control head); 7.1 pounds (RF unit).

All tests performed with unit GPS locked.

*Testing performed with preamp on.

†Measurement was noise limited at the value indicated.

‡146 and 440 MHz bands are direct sampling architecture with no IF stage.

Transmitter Dynamic Testing

As specified.

144/440 MHz; > 70 dB. All others as specified.
 Complies with FCC emission standards.

The system operates on 13.8 V dc. As mentioned earlier, the multi-conductor control cable carries all power and signaling between the controller and the RF equipment. The review unit includes the optional 10 GHz module, and it connects to the lower-band RF unit with another short multi-conductor control cable (supplied), a short BNC-to-BNC coaxial cable (supplied) to feed the 10 MHz reference to the optional 10 GHz module, and a short IF coaxial cable with SMA male connectors on each end (not supplied). Each piece of RF equipment has the appropriate RF connectors for the antenna connections. The 2-meter, 70-centimeter, and 23-centimeter bands are all connected through a common Type-N female connector, while the 13- and 6-centimeter bands are connected to the antennas via

separate SMA female connectors (see Figure 6). The 3-centimeter optional module also uses an SMA female connector for its antenna connection (see Figure 7). The setup of the equipment is simple. Icom supplies solid stainless-steel mounting brackets and hardware for each antenna and for the 10 GHz transverter module. Once the brackets for the RF modules have been mounted, the RF modules' mounting screws slip into notches in the brackets and are tightened, securing the pieces. The control cables connect only one way, so there is no chance to make a mistake, and the RF cable connectors are clearly marked.

The radio does not have a “bandswitch” per se. In keeping with the similarity to IC-705 and IC-9700 functionality, to change bands you use the touchscreen and touch the “MHz” portion of the displayed frequency. This brings up a menu of the six available bands (the band stacking register), and you just touch the desired band and the radio goes either to the default (if no previously used frequency has been entered for that band) or to the



Figure 7 — Connections to the optional CX-10G 3-centimeter (10 GHz) module: power and control (far left); 10 GHz (SMA female) antenna (left center), and REF IN 10 MHz reference from the lower-frequency unit (BNC), 13-centimeter IF, and 13-centimeter antenna (both SMA female; right).



Figure 8 — Band stacking register (“bandswitch”). You can also manually enter a frequency in the radio’s operating range using the **F-INP** button.

last used frequency on that band (see Figure 8).

The touchscreen display is the same as the one used in the IC-7300, IC-9700, and IC-705. It includes a waterfall spectrum display (a very useful feature on the microwave bands where the frequency error of stations you’re trying to work can be significant). The waterfall spectrum display allows you to select the amount of the band you want to view, and you can see when there’s a station off your frequency. You can also select an audio scope function to view your own TX audio, as well as a full-function meter to monitor the radio’s operation.

The review unit was first supplied with three optional antennas from Icom. They are the AH-24, AH-56, and AH-100 for 2.3, 5.6, and 10 GHz, respectively. They are compact, omnidirectional antennas with low gain. Icom claims their gain to be 4 dBi, 5 dBi, and 5 dBi, respectively. I attempted to make contacts using them on each of the three upper microwave bands, unsuccessfully.



Figure 9 — The three omnidirectional antennas offered by Icom for 2.4, 5.6, and 10 GHz (Note: these are low-gain antennas and are vertically polarized).

Table 2 — Icom IC-905 VHF/UHF/SHF Multi-Mode Transceiver System

Current Drain for Each Band, in Receive and Full Power Transmit (not tested in the ARRL Lab)

Band (MHz)	RX (A)	TX (A)
144	1.9	3.8
432	1.9	4.3
1296	2.0	4.7
2304	2.3	2.9
5760	2.4	3.1
10368	2.6	3.5

These antennas are omnidirectional and vertically polarized, and in the US pretty much all weak-signal microwave ham work is done using horizontal polarization. For temporary or portable installation, it is possible to rotate the antennas 90 degrees to accomplish the vertical to horizontal polarization, but this may compromise the waterproof integrity of the antenna. Operators running short point-to-point links (ATV, perhaps?) might be able to use these compact antennas, but they aren’t suitable for DX work. Note: If you decide these antennas are for you, I suggest you mark each with its band of operations; the only frequency marking on them is on the bottom, and if you use the supplied mounting brackets, you cannot tell them apart — they look identical! I also received the Icom AH-109PB parabolic antenna for 10 GHz and used it with much better results. Figure 9 shows the three omnidirectional antennas available from Icom. Figure 10 shows the parabolic antenna. Icom does not offer high-gain, horizontally polarized antennas for the bands below 10 GHz. To have a useful signal on the other bands, I used a short loop Yagi on 1296 MHz and a 24-inch homebrew parabolic dish on 2.3 and 5.7 GHz. On 2 meters and 70 centimeters, I used an old dual-band Yagi with four or five elements on each band.

On the Air

I enjoyed operating the IC-905. I have many years of experience building and operating my microwave ham station at home. I operate on all the ham bands from 1.8 MHz to 122 GHz. I have built most of my microwave equipment. But to me, this was a nice change, not having to concern myself with packaging and weather-proofing the outdoor equipment, wondering if it would survive. The gear is well made and should last a long time outdoors without significant maintenance. It has built-in GPS, so all bands are locked to that reference and spot-on in frequency. It was fun to change bands. At my home station, I have to throw switches to select

the band, make sure the correct IF radio is switched on, and ensure I have a CW key plugged into the correct IF radio. The IC-905 does it all in one control unit — very convenient! Just touch the band screen and it's ready to go. I ran my tests using battery power, and Table 2 shows the measured current drain for each band, running full RF output power for each.

A newcomer to VHF/UHF and microwave operation will find this radio to have a couple of advantages over other low-powered VHF/UHF units such as the Icom IC-705. While the specifications for both are similar on the 2-meter and 70-centimeter bands in terms of output power and sensitivity, one advantage the IC-905 has is that it is designed to be operated outside as close as possible to the antennas, thereby minimizing the losses associated with long feed lines. Plus, the IC-905 runs a full 10 W output on the 23-centimeter band, a ham band that the IC-705 and other QRP HF/VHF/UHF radios don't cover.

From my portable test site in FN02xu (western New York between Rochester and Buffalo), I was able to easily work a number of stations at various distances on both SSB and CW on all the bands. But the highlight on 10 GHz was a contact on CW with N8IUP when he was in EN81rj in Ohio; this is a distance of 403 kilometers between us! Figure 11 shows my operation from FN02xu in western New York.

For my testing, I manually moved the cable from the Type-N connector on the controller to the appropriate antenna for 2 meters and 70 or 23 centimeters. I recommend use of either a multi-position coaxial switch or a high-quality triplexer to make band changing simpler.

With the short coax connecting the radio to my 2-meter and 70-centimeter antenna, I found the performance to be excellent. I got (and gave out) great signal reports



Figure 10 — The AH-109PB parabolic dish antenna available from Icom. This antenna would be a good choice for 10 GHz DX work.



Figure 11 — The system set up for six-band operations in FN02, showing the short RF cables needed between the antennas and radio. The dual-band Yagi, short loop Yagi, and dish in the center of the tripod are not supplied by Icom. The setup of the equipment was simple and took no more than a few minutes to be fully operational.

from everyone I worked, and they also commented on the excellent audio quality.

Conclusion

The amateur radio market is pretty small. That said, the amateur radio microwave market is tiny! It's surprising to me that a major manufacturer of equipment for hams would spend the time and money to develop equipment that will appeal to a very small group of people. But Icom did, and this product is a fine example of the great equipment Icom produces. It can do just about anything a ham experimenting with the microwave bands would want to do, including weak-signal work, FM/repeaters, amateur TV, and digital voice/data on the most popular microwave ham bands. Comparing it to the "classic" approach to the microwaves (building and testing transmit and receive converters, preamps, power amplifiers, etc.), the IC-905 stacks up very well in terms of price and performance. I think this is another winner for Icom and the amateur radio community!

Manufacturer: Icom America, 12421 Willows Rd. NE, Kirkland, WA 98034, www.icomamerica.com. Price: main unit, \$2,995.95; CX-10G 10 GHz transverter, \$999.95; AH-24 2.4 GHz collinear antenna, \$349.95; AH-56 5.6 GHz collinear antenna, \$349.95; AH-100 10 GHz collinear antenna, \$349.95; AH-109PB parabolic 10 GHz antenna, \$999.95.

AF6SA Portable Wi-Fi Rotator Controller (PWRC)

Reviewed by John Leonardelli, VE3IPS
ve3ips@gmail.com

Amateur radio operators who operate in the field or portable may eventually need to rotate a VHF/UHF Yagi antenna, a Buddipole, a tri-band dipole, or any small HF Yagi. Rovers in the ARRL Sprint contests also need to be able to rotate their Yagi antennas — usually with an antenna array mounted on their vehicle. Radio clubs that participate in ARRL Field Day also require an antenna rotator solution to improve their signal strength and maximize scores. Most hams who operate from home use large antennas requiring larger rotators, but if you use a low-noise loop or a Yagi like the Arrow or Elk antenna for satellite use, these can also benefit from the use of a rotator. I looked at various TV rotators (Channel Master, RCA, RadioShack, and Digiwave brands), but I realized I would need to use a power inverter to supply the required 120 V ac in the field, as well as connect the control box with a three-wire rotator cable.

I wanted to be able to use my solar-powered 12 V dc power system, rotate various antennas, and be able to know where the antennas are pointed. I found a solution that solves my needs and more: the Portable Wi-Fi Rotator Controller (PWRC) manufactured by Stefan Nicov, AF6SA.

Description

The PWRC is a pre-built kit with an optional electronic compass module. It is powered by 12 V dc allowing battery-powered portable operation. The PWRC interface board mounts inside the rotator housing. It uses the electronic compass module (it is Wi-Fi enabled) that also allows the direction information to appear on a web-based application. The web-based applications do not require any software downloads, and they use your internet browser to access the device. The web interface is also used to provide setup menus and rotator direction controls. It will, once calibrated, show the antenna direction (see Figure 12).

Bottom Line

The PWRC is a great choice for operators needing a 12 V dc-powered antenna rotation solution. The ability to use the web-based application on any smartphone will simplify operations and ultimately improve contest scores and DX contacts.



The only connection to the PWRC is the 12 V dc cable; the three-wire rotator cable is not needed, as the start/stop buttons are all done on the web interface. The power source must supply 2.5 A, which is drawn only during rotation.

The TV rotators are usually able to rotate the smaller lightweight HF Yagis and can easily manage VHF/UHF Yagi antennas. These lightweight TV rotators could manage wind loads of 1.5 square feet if mast mounted, and 3 square feet if mounted in the tower on a rotator plate.

The PWRC uses the Wi-Fi (802.11n) network interface and can be set up as its own access point or can connect to an existing network. The web interface is useful, as it provides direction information and allows point-and-click control of the antenna heading or uses a grid locator for azimuth and distance information.

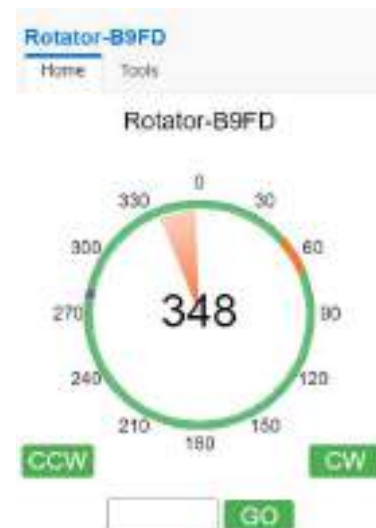


Figure 12 — The PWRC web-based application main menu.

The PWRC configuration menu offers the ability to change the variable motor drive speed (30 to 80 Hz) and acceleration and deceleration velocity profiles. For those using automation applications, the PWRC also supports a Telnet interface that allows compatibility with *PstRotator*, or you can use the UDP packet listener to integrate with *N1MM Logger* or *DXLab Suite*. The software built into the rotator module is powerful and has a wealth of features not available on the basic TV rotator control box. Contesters will find the integration to be very desirable.

The PWRC provides what I wanted: 12 V dc operation; fast deployment; antenna rotation with direction information; the ability to connect to the PWRC with a laptop, smartphone, or tablet using the internet browser, and a Wi-Fi connection that makes this device even better than I initially realized.

PWRC Interface Board Installation

The kit came packed nicely with mounting hardware, the interface board, and the electronic compass module. The interface board will mount inside the TV rotator housing and requires the drilling of three holes. A drilling template is provided in the comprehensive user manual available for download from the web store (see <http://af6sa.com/projects/Kits.html>).

Once the holes are drilled into the rotator housing base plate, the board can be mounted accordingly. The board is connected to the rotator motor, and a 12 V dc cable is connected to a power source at the radio location. The optional electronic compass module in its sealed metal box comes with a mounting strap and is mounted to the antenna mast and then connected to the PWRC board. Installation took about 30 minutes. I used the Channel Master 9521 host rotator. My use cases are for portable operations with a 20-foot mast and 30 feet to the radio equipment. I used the suggested #14-gauge wire for the power cable for a 50-foot length (see Figure 13).

Web Interface Configuration

After the hardware installation, it's time to connect to the controller using the web application. Using Wi-Fi, the PWRC can be set up and operated in two modes: Access Point (AP) and Station (STA). Access Point provides access to the Wi-Fi network with a Dynamic Host Configuration Protocol (DHCP) for up to five devices. This means that five users can rotate the antenna. This mode is ideal for connecting your laptop/tablet/smartphone while portable. Once credentials are entered, the blue LED blinks once per second.



Figure 13 — The PWRC wiring.

The Station mode allows you to connect to an existing 2.4 GHz Wi-Fi network using a dynamic IP address (via DHCP) or with an assigned fixed IP address. Your credentials will include the service set identifier (SSID) of the network you are connecting to. The blue LED blinks twice per second. I suggest you set up everything indoors and have the rotator plate hanging down so you can see the blue LED.

When starting for the first time, the PWRC is in Access Point mode, which is the mode I want to use. Connect your device (smartphone, tablet, or PC) to the controller Wi-Fi network that will appear with the name “Rotator-xxxx,” open a web browser, and enter the following link: **192.168.4/setup**. I was able to connect to the SSID named “Rotator-B9FD” using the supplied password. A new page is presented with the new DHCP-assigned IP address.

Now using the web browser, connect to the new assigned IP address. In the main configuration page, you can rename your host whatever you like — “VE3IPS-Rotator,” for example — and add a new web admin name and password. You can leave it blank for access by anyone. Next, you can change the network SSID and password from the default settings. I did not use the static IP settings, so I left this blank.

The **TOOLS** tab allows you to make any changes to the system. The **ROTATOR** section allows you to change the braking, speed, acceleration/deceleration, and even your Maidenhead grid coordinates. Calibration is also done on this screen. For logger integration, you can change the UDP control port to what is required in your scenario (see Figures 14 and 15).

I ended up doing a calibration routine with my initial antenna set up in my backyard. You can calibrate the PWRC with or without a compass. It's very simple, as the rotator will operate counterclockwise to a hard stop, then rotate clockwise to calibrate the compass. It is recommended to do this every time you move the rotator to a new location. This is a quick process.

Web Interface Operating

The application is accessed by using the **HOME** tab in the application or pointing your browser to **http://192.168.4.1/setup**. The **MENU** tab will not be available, and it is protected by your web admin password. I left it blank so other users can access the rotator.

With a 360-degree circle showing degradations and the current antenna heading, I can enter the Maidenhead grid and it will rotate to that direction. You can also click/

tap and hold the arrow until it points in the direction you want, then release to stop (see Figure 12).

All details are stored in the internal flash memory, and you can modify the web interface to meet your needs. AF6SA has done a great job with the application, and I saw no need to customize anything. I tried this with my Google Pixel smartphone and HP Stream Netbook. The *N1MM Logger* and *PstRotator* integration are just as easy to configure.

Use Case 1

My first deployment



Figure 14 — The PWRC application **TOOLS** menu.

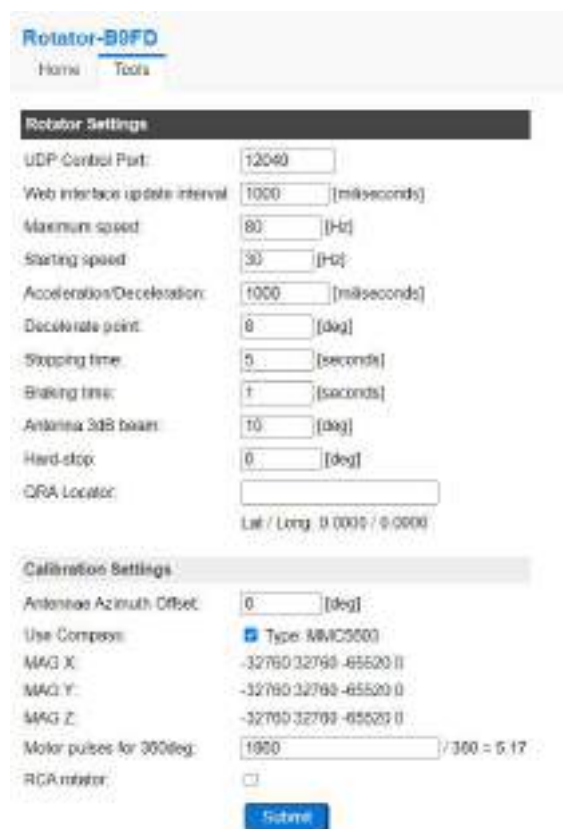


Figure 15 — The PWRC application **ROTATOR SETTINGS** menu.

was to use my DX Engineering RF-PRO-1B or the MFJ-1888 low-noise amplifier loops that I purchased at Hamvention last year. I had initially mounted the loop on a rugged video tripod and deployed it in my backyard, as needed, while I figured out where I would install it for its final location. These low-noise loops are awesome for low-band listening, and with two of them there is an opportunity for loop phasing. I was planning to have one at home and to use the other for portable operations. I brought one to ARRL Field Day last year to be used with the DX Engineering RTR-2 but found that I was a bit annoyed to have to leave my operating position to rotate the loop manually many times to peak signals.

The PWRC allows me to rotate the loop antenna easily, and everything is powered from a 12 V dc source, allowing easy connections to my RIGrunner distribution block back to my battery system. I have also found the loops to be fantastic for listening below the ham bands for medium-wave DXing or non-directional beacon hunting, and the ability to rotate the antenna is a must (see Figure 16).

Use Case 2

I am active in experimenting with signals above 30 MHz, and find the ARRL contests and sprints a great way to make contacts and try different antennas. My home location isn't great for this type of activity, so I take my



Figure 16 — The PWRC setup with a low-noise loop.

setup out to a local park that has a nice elevated area. I use a rugged video tripod for deploying 6-meter to 23-centimeter (1.2 GHz) small Yagis. For roving I use a 20-foot aluminum mast mounted on my car hitch mount. All of these are rotated using the “armstrong” method. I usually will call CQ, manually rotate the antenna, call CQ, and rotate the antenna again. Depending on the weather, I may jump in and out of my car too many times to count, searching for elusive grid squares.

The PWRC solves this problem nicely with the ability to power the rotator with a 12 V dc source and rotate it remotely from inside my car.

Use Case 3

For HF operations, several antennas that I deploy would benefit from rotation. I use the Buddipole system as a dipole or as a 10-meter two-element Yagi. A tri-band dipole (actually the driven element of a Hy-Gain tri-band) is also used, and I use that with ICE band-pass filters and a triplexer for 10-, 15-, and 20-meter operations. These filters allow three bands to be used simultaneously with an operator on each band for Field Day or POTA operation. I have a Hy-Gain TH-3JR that has a wind load of 3.4 square feet, which is too much load for the TV rotator, but if I remove the director, then it's doable. I look forward to trying that for Field Day. If the wind is too high for a three-band dipole, using the driven element of a Yagi will be ideal.

Use Case 4

For satellites, rotation is needed to be continuously aligned with the satellite as it passes overhead. Rotators that offer azimuth and elevation adjustments are the foundation of a satellite station. However, good results have been achieved with having just the azimuth rotated and leaving the elevation at a fixed angle. This makes it easier to work the satellites, as I can concentrate on adjusting the Doppler shift on the radio and logging contacts and periodically nudging the rotator direction using the web application on my smartphone. It's a trade-off, but there is an opportunity to adjust the elevation manually. The Arrow and Elk brands offer satellite antennas that are an ideal fit for the PWRC system.

Use Case 5

Computers have brought automation into our radio shacks. The integration with the popular *PstRotator* is a useful feature. *PstRotator* is a versatile software application designed for controlling antenna rotators. Whether you're a ham radio operator, satellite enthusiast, or DX chaser, *PstRotator* offers a range of features to enhance your antenna tracking experience. The PWRC also supports *N1MM Logger* for rotator integration. I look forward to experimenting further with these integrations and software applications.

Conclusion

I am now able to operate the rotator from a 12 V dc solar/battery system and rotate my VHF/UHF antenna stack or a small HF antenna. I can connect my laptop/tablet/smartphone directly to the rotator web interface using the Wi-Fi network for rotation control. My contest scores and DX contacts will now improve with the ability to use directional gain antennas or turn low-noise loops away from interference to improve readability. The simplicity of a pre-built kit, no soldering, and a great software application make portable rotation very easy to use.

Manufacturer: AF6SA, www.af6sa.com. **Price:** PWRC controller without the compass, \$119; PWRC controller with the compass (reviewed unit), \$199.

HAMRS Logging Software

Reviewed by Harold Kramer, WJ1B
wj1b@arrl.net

HAMRS is a fast, easy-to-use logging program specifically built for portable operations such as POTA, SOTA, or ARRL Field Day. *HAMRS* is similar to other logging programs but is optimized to run on small screens and multiple platforms, and it provides specific log fields and functions for portable operating activities. It was created by Jarrett Green, KBØICT, who has deliberately kept it straightforward and easy to use.

HAMRS runs on macOS, iOS, Windows, Ubuntu Linux, and Raspbian. It runs fine on my iPhone, iPad, HP Windows 10 shack computer, and Dell Windows 11 laptop. I had my friend Martin Ewing, AA6E, install the program on his Android phone, and it also ran fine on that operating system.

While the macOS, Windows PC, Ubuntu, and Raspbian versions are free for download from the manufacturer's website (www.hamrs.app), the *HAMRS* mobile version needs to be purchased and downloaded from the Apple App Store (for an iOS device, it's the same app for iPhone and iPad) or from the Google Play Store for Android users. The price is reasonable — a cup of coffee at my local coffee shop costs more!

Installation and Setup

In this review, I will discuss running *HAMRS* on my iPad, which is the device that I use for logging during POTA activations.

After downloading *HAMRS*, you create a profile including your call sign and name. You then go to the **SETTINGS** menu and select your choice of QRZ, HamDB, or HamQTH as your call sign lookup provider. I chose QRZ because I am a member. While *HAMRS* operates fine without internet connectivity, it does require the internet to look up call signs in real time. My iPad does not have a SIM card with an internet data plan, so during POTA activations, I use my iPhone as a Wi-Fi hotspot for the iPad to provide internet access for call sign lookups. Once an internet connec-

Bottom Line

The *HAMRS* logging software is easy to use, light, and fast. It's free to download for macOS, Windows PC, and Linux. The iOS and Android versions offer a great solution for portable operations at a very low cost.



tion is established, whenever a call sign is entered in the **THEIR CALLSIGN** field, that station's information appears in a blue box in the upper right-hand corner for about 10 seconds. If the call sign is not in the QRZ database, a red box appears with the message **CALL NOT FOUND**. This feature has minimized the number of mistakes that I make entering call signs during my POTA activations. Another useful feature is that a green box appears in the same screen location when you are spotted on the POTA app.

Setting up a new logbook is easy. Tap the **NEW LOGBOOK** button, and a pop-up box will appear where the name of the log, such as "20M POTA US-1776," is entered. The user is then offered a choice of five custom templates: Generic, Parks on the Air, Summits on the Air, Field Day, or Winter Field Day. Each template has specific fields for particular operating events (see Figure 17). For example, the POTA log template has fields where you enter **MY PARK** and **THEIR PARK**, and similarly the Summits on the Air template has fields for **MY SUMMIT** and **THEIR SUMMIT**.

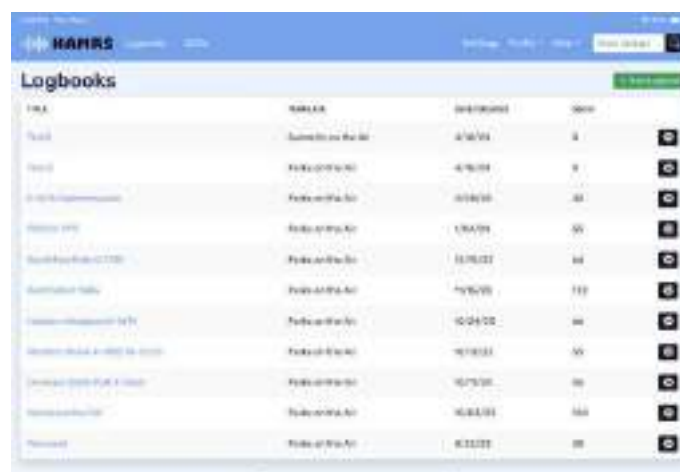


Figure 17 — The iPad *HAMRS* application logbook screen.

Operation

HAMRS has an intelligently laid-out, well-organized user interface. On the iPad version, the left side of the screen is organized by contact information including the call sign signal report, date, time, and location. The right side is organized by your station's operating information including band, mode, park, grid, etc. This information is displayed vertically rather than horizontally on the iPhone version (see Figure 18). Another nice touch is that when characters are entered in a field, they are all upper case. There is no need to switch between upper- and lower-case letters.

Before you begin logging contacts, you need to set the date and UTC time. These are set automatically on iOS devices. You then enter your station's band, mode, power, park number, grid, and country. These fields remain the same from QSO to QSO unless you change them. Once everything is set up, to log a contact, you enter the contact's call sign and hit **SAVE**, and the data goes into the log automatically. This makes contact entry very fast.

On the iPad or iPhone, completed QSOs are displayed on the first tab in a table below the operating fields. The Windows version can also display QSOs in either table format or boxes similar to the POTA web app. In table format, fields can be sorted in ascending or descending order. A specific call sign can also be queried from the database.

Two additional tabs are adjacent to the log table in the POTA template. The second tab displays a QSO map of all the QSOs in the log either with or without their call signs, and the map can be zoomed in and out. However, there is no

way to download the map. When *HAMRS* is connected to the web, the third tab displays POTA spots in real time. These can be filtered similarly to the filters on the POTA web app. An individual spot on the display can

be entered into the log by pushing the **COPY** button on the displayed spot.

When a log is closed, you can edit, duplicate, export, or delete a log. I use the **EXPORT.ADI** function to upload the iPad .adi file into my Dropbox account while I am at the park. When I return to my home station, I use a Windows ADIF utility program (ADIF Master) to create an upload file for the POTA app. I use the same .adi file to import the log to my home station's logging program.

HAMRS lacks some of the features of more advanced logging programs, but many of these are purposely excluded to keep the program easy to use, light, and fast. There is no facility to import QSOs from another log. Queries beyond call signs are limited, and there is no direct upload provision to other platforms. There is no rig control yet, but that may be available in the future according to the *HAMRS* support group.

Support

HAMRS is supported by question-and-answer support on the app, the *HAMRS* website, and Discord. There is limited individual user support by the developer. I created a login and signed up to receive email information from the *HAMRS* support group. Like other web-based support groups, this service posts lots of useful information about the program.

Besides paying the mobile device app fee, you can also support *HAMRS* by donating to "Help KB0ICT keep working on *HAMRS*!" on the *HAMRS* website. Three optional monthly membership support choices provide additional benefits such as "early access to Beta and Preview Builds on all devices."

Conclusion

I use *HAMRS* for portable operations, and I have been pleased with its operation. It's hard to beat for its modest price.

Like most software-based logging software, *HAMRS* revises its software with new features and improvements. So, be sure to check their website for the latest updates. Also, there is now a completely new web version available at <https://logger.hamrs.app> — this is serving as a test for the rewrite that will soon make its way to desktop and mobile.

Manufacturer: Cabin Interactive, LLC, www.hamrs.app. Price: iOS version (Apple App Store), \$4.99; Android version (Google Play Store), \$4.99; the macOS, Windows PC, Ubuntu (Linux), and Raspbian versions are free to download.



Figure 18 — The *HAMRS* application showing the iPhone CONTACT ENTRY screen.

Ask Dave

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

Antenna Interferencest

Radials and Grounding

Q Lawrence “Skip” Barley, W9GWV, asks: I would like to make a mount for a portable vertical antenna with radials. I understand that after I set up the vertical part, I can lay the radials atop the ground, but I should not make a connection between the radials and the ground. I am considering using a mirror mount bolted to a metal stake to mount the antenna, which would also ground the radials. Am I correct in thinking that I should not ground the radials? I wasn’t thinking of using a lightning arrestor; at the first sign of lightning, I’m going home! How will grounding the radials affect the antenna?

A I recommend radials be made with insulated wire. Strip the insulation where they come together in the middle and connect them to the coax shield. Or you can use a radial connection plate like I do (see Figure 1). This is fine for portable use. If the center touches the ground, it’s not a problem and won’t affect much. For a home station, it may help the antenna perform a bit better if you drive a ground rod where the radials come together. If you do, be sure to bond it with your home station ground rod. It’s great to ground your radials at the base of the antenna.

Like a dipole, a vertical antenna with radials is a complete antenna. It does not require contact with the

ground to work. Grounding can help eliminate some noise, but merely touching the ground is not enough of a connection. For portable operation, put up your vertical element, spread the radials where no one will trip over them, and enjoy operating!

Most park authorities don’t want you pounding anything into the ground while operating portable because you may damage infrastructure. I suggest you get a tripod or something that’s flat or heavily weighted.

Solar Panel Interference

Q Clarence Teem, N6CIT, asks: I am in the process of purchasing an HF setup for my shack. I also have solar panels on my house. I understand that solar panels can cause RFI. What would you recommend to mitigate the RFI?

A Congratulations on the new HF station! Some solar panels indeed have built-in inverters. The output of each solar panel is at line voltage, meaning around 120 V, 60 Hz ac. These can be strung together to create a large amount of alternating current, which is fed straight into the grid for systems that do not have batteries. If your system has batteries, it is more likely that the solar panels are strung in a series to create a several hundred-volt input for a separate inverter that manages the batteries.

Often, if there is surplus power, the excess power is fed into the grid. It is the first type of solar panel that causes the problem. Those very inexpensive little inverters on each panel are fundamentally switched power supplies. Often, this switching will cause RF noise.

The interconnections between the panels create an antenna. You will notice that on your radio’s waterfall diagram, there is some broadband noise in vertical lines separated by approximately the switching rate of the inverter. This can be very frustrating to a ham who wants to gather the sun’s power but, in doing so, blocks their ability to use ham radio.

To make this problem go away, you will have to put ferrite beads on the output cables of all the panels on your roof. This can be nearly impossible once the



Figure 1 — A stainless steel radial plate at the base of my vertical antenna. Each connector is crimped and soldered. Each radial terminates at the radial plate. The coax outer conductor is attached to the radial plate. A ground rod is connected, too. Note that you should use an anti-seize compound when installing the stainless steel nuts and bolts so the bolts will not shear off when they are removed.

panels are put in place. You can try some large ferrite beads at the aggregate output of the system to quiet the noise. Put up your antennas as far away from your roof as you can. Be sure to follow all of the grounding guidelines in the 2nd edition of *Grounding and Bonding for the Radio Amateur* (available from the ARRL store). This will help keep RF interference from your solar panels out of the wiring that leads to your receiver. As a last resort, turn off the solar panels while using your station if possible.

I have a large 250 W, 24 V solar panel that runs my station. Its output is fed into a charge controller (see Figure 2) that will accept the higher panel voltage and convert it to the proper input to my 100 Ah lithium-ion battery that serves as my station's power supply. The charge controller makes only S1 noise. I once had an inverter that provided a small amount of alternating current line voltage to power a few lamps in my house. One day, I experimented by removing the inverter. The noise on my radio dropped significantly.

Potential Losses Using an End-Fed Antenna

Q Quentin Blight, M7EQB, asks: I recently made a 49:1 unun for an end-fed half-wave wire antenna for 40 meters. I use it on 20, 15, and 10 meters, too. I also extended the antenna length to cover 80 meters.



Figure 2 — My solar controller can manage a 24 V panel, providing a constant 14.6 V to the battery while the sun shines. It comes with solar panel connectors, but I changed mine to Anderson Powerpoles for maximum flexibility.

It works quite well, but I wonder about the receive loss through the unun compared to a fan dipole that doesn't use an unun. Would receiving be better with an antenna that doesn't require an unun versus my current setup?

A You get a slight loss through the transformer on both transmit and receive. The amount of loss is minimal, only a fraction of a dB. If you extend your wire to use 80 meters, it will cover only a small section of 80 meters. But it will also do a relatively good job of covering 30, 17, and 12 meters. However, it will likely not work well on 60 meters.

The only way you can tune an end-fed half-wave dipole is to change the length of the wire. This, of course, changes the response on every band at the same time. Generally, you will need to tune for the lowest part of 80 meters, giving you 80-meter FT8. Then the other bands will fall into place, but not perfectly. Usually, you can use your radio's built-in tuner to bring the standing wave ratio down nicely. You can use a trick to move the 80-meter sweet spot up to 75 meters. This involves inserting a high-voltage 20 or 30 pF capacitor at the connection between the 40-meter wire and your 80-meter extension. This will affect the tuning on the other bands a little bit, but it will give you 40 and 75 meters. You give up FT8 on 80 meters.

The ARRL store sells a kit to make a 40- through 10-meter end-fed half-wave dipole. The balun is not limited to 40 meters. You can extend it to 80 meters just by adding more wire. I've done that, tested it, and it works fine. I replaced the inverter with a more RF-quiet inverter.

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

Strays

QST Congratulates...

Eric Knight, KB1EHE, on the publication of his book *Terror at 12.5 Degrees*. The action-adventure thriller features several protagonists who are amateur radio operators. You can purchase the book from Amazon.

Technical Correspondence

Adding Internet Remote Control to an Antenna Rotator; EFHW and NVIS



Figure 1 — The hexbeam antenna and RCA VH226E rotator. [Tommy Walls, KC4ZZE, photo]

A Remote Antenna Rotator

I needed to rotate a hexbeam antenna (see Figure 1) from my operating position located 200 miles away. The rotator at the antenna was an RCA VH226E, and its controller was in a nearby building. A wireless network was available, but the controller did not offer wireless connectivity.

I remembered that the controller featured a handheld infrared remote. So, I used the remote to train an inexpensive infrared Wi-Fi hub, thereby programming the hub to send compatible pulses of light from its own

infrared emitter. With the hub linked to the local wireless network and positioned atop the controller (see Figure 2), I assumed I could use it as a link between the rotator controller, the internet, and me.

To make this work from my operating position, I needed a way to “talk” to the hub. The solution was provided by the *Tuya* app — an appliance-control app available for Apple and Android mobile devices.

I installed the *Tuya* app on my Android smartphone and configured it to send commands to the distant hub. *Tuya* worked perfectly, allowing me to rotate the hexbeam by forwarding commands from my smartphone to the Wi-Fi hub, which sent commands to the controller via infrared. To make sure the controller and rotator were responding appropriately, I also installed two internet-linked video cameras at the remote site so that I could watch them both.

Later, I found a way to turn the VH226E controller on and off. With the controller ac line plugged into a Kasa Smart internet-controlled ac outlet, I am now able to bring the controller online or turn it off with my smartphone. — Tommy Walls, KC4ZZE, wtw1326@gmail.com



Figure 2 — The Wi-Fi infrared hub shown atop the RCA VH226E controller. [Tommy Walls, KC4ZZE, photo]

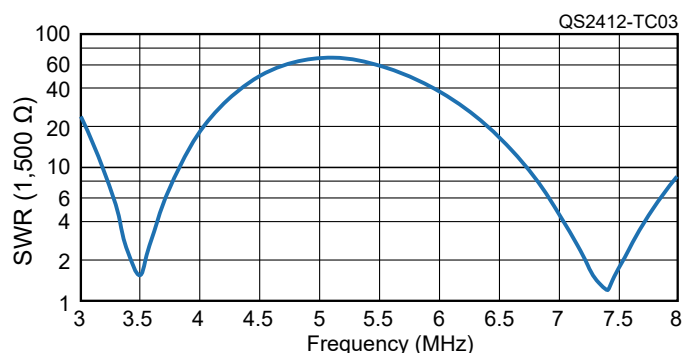


Figure 3 — The NEC SWR plot of an EFHW antenna fed with a high-ratio unun, redrawn for clarity. The wire is 130 feet long.

EFHW Antennas and NVIS on 40 Meters

The end-fed half-wave (EFHW) antenna has become quite popular in recent years, perhaps because it can provide multiband operation without a tuner, and it is easy to erect. Typically, the antenna will give a decent standing wave ratio for both 80 and 40 meters, as well as other bands (see Figure 3). Impedance matching takes place in the high-ratio autotransformer (unun) that is installed at the feed point.

However, those who want to contact relatively close stations using near vertical incidence skywave (NVIS) on the 40- and 80-meter bands should note that while 80 and 40 meters are both matched with the EFHW, only the 80-meter band has an optimal NVIS pattern.

NEC plots show the poor NVIS performance of an 80-meter EFHW on 40 meters (see Figures 4, 5, and 6). On 40 meters, the EFHW has a null at high angles, meaning it will not work well for close-in NVIS work.

This illustrates that amateurs should design antennas for pattern and matching as needed, rather than designing an antenna that is easy to match without regard for pattern.

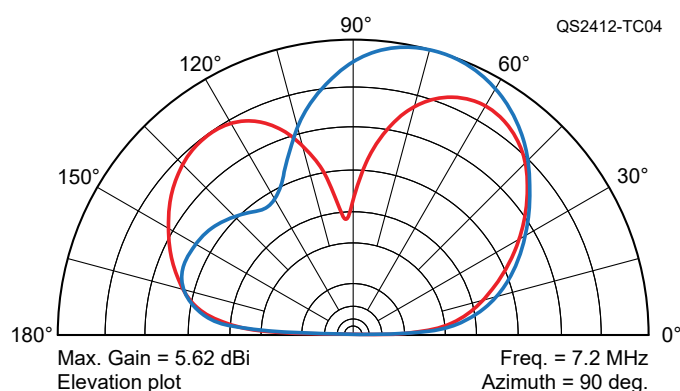


Figure 4 — Vertical radiation plots for an EFHW antenna. The blue plot represents 80 meters, and the red plot represents 40 meters.

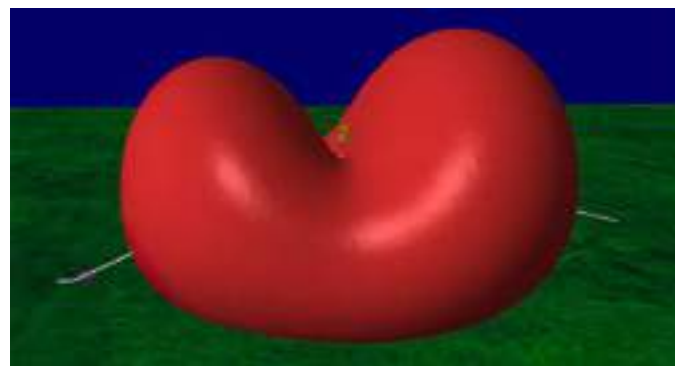


Figure 5 — The 3D pattern of an 80-meter EFHW operating on 40 meters, as generated in 4nec2.

The EFHW becomes a full wavelength at twice its design frequency. It can be seen as two half waves end to end. With an end feed, these two half waves are *out of phase*. With a center feed, they are *in phase*. When the two half-wave dipoles are fed out of phase, they cancel the signal broadside to the wire. They have decent lobes at 50 – 60 degrees to the wire, but those angles are not useful for NVIS, where the energy must go nearly vertical or 75 – 90 degrees from the wire and ground. As you can see, the horizontal EFHW at its second resonance is very poor for NVIS.

Other designs are much better for 80- and 40-meter NVIS work. Crossed dipoles for the two bands can be fed with 50 Ω coax. A 70 – 100-foot-long doublet center fed with ladder line though a balanced tuner can cover both bands with good patterns. Other center-fed antennas, such as a fan dipole, also work well. — *John Stanley, K4ERO, k4ero@arrrl.net*

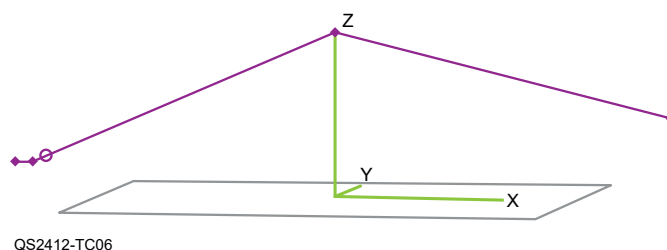


Figure 6 — The EFHW antenna modeled with the following dimensions: 33 feet high in the center, 15 feet high at the far end, and about 6 feet high at the feed end. There is a small counterpoise at the feed end, and the wire is ½ wavelength long at 3.8 MHz.

Technical Correspondence items have not been tested by QST or ARRL unless otherwise stated. Although we can't guarantee that a given idea will work for your situation, we make every effort to screen out harmful information.

Materials for this column may be sent to tc@arrrl.org. Please include your name, call sign, complete mailing address, daytime telephone number, and email address on all correspondence. Whether you are praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of QST assume no responsibility for statements made herein by correspondents.

Worldwide Fun with 100 W and a Dipole



Make contacts domestically and around the world on 10, 12, and 15 meters with a modest station.

Carl Luetzelschwab, K9LA

We're around the solar maximum for Solar Cycle 25, which offers consistent day-to-day propagation on 10, 12, and 15 meters in the fall and winter months (except when we have a disturbance to propagation).

Frank Donovan's, W3LPL, October 2024 *QST* article "What to Expect from the Solar Cycle 25 Surge" provided detailed summaries of expected propagation on 160 through 6 meters during this solar maximum period. This article will discuss short path versus long path and use of the *Voice of America Coverage Analysis Program (VOACAP)* to predict propagation. See the sidebar "A Deep Dive into 10 Meters" for more information on the band and the upcoming ARRL 10-Meter Contest.

Short Path and Long Path

The shortest distance between any two locations on Earth is a great-circle path. There are two great-circle paths between any two locations — short path (less than 20,000 kilometers) and long path (20,000 to 40,000 kilometers). Which path is available depends

A Deep Dive into 10 Meters

Every class of US license has allocations on 10 meters, and the ARRL 10-Meter Contest is right around the corner on December 14 and 15. It's a 48-hour contest, but you can operate as much as you want — the main goal is to have fun. For the full list of rules, visit <https://contests.arrl.org/ContestRules/10M-Rules.pdf>.

Signals can be very strong on 10 meters. This is due to minimal ionospheric absorption and longer hops on the band, as well as bigger antenna arrays because 10-meter antennas are physically the smallest of our HF antennas. Additionally, these antennas can be very effective at relatively low heights. A simple dipole at 20 feet will do wonders at 100 W on SSB, CW, and FT8 (FT8 isn't allowed in the ARRL 10-Meter Contest).

on the maximum usable frequency (MUF) for the path (if there's enough ionization to refract the signal back to Earth) and the loss for the path (if the loss is low enough to hear or decode the signal). The long-path heading to a distant location is 180 degrees opposite to the short-path heading.

Because we're around the solar maximum, there's a common long path on 10 meters (and on 12, 15, and 17 meters to a lesser extent) that can occur in the spring, summer, and fall months. It occurs right after sunrise at one end of the long path. Figure 1 (from the propagation prediction program *W6ELProp* at www.qsl.net/w6elprop) depicts this long-path opening from the US East Coast to the Far East and Southeast Asia on an April morning at 1100 UTC (about 40 minutes after sunrise). Note that the heading out of the East Coast is to the southeast.

The short path is not available, as much of the path has been in darkness for a long time with low MUFs in the F2 region. The long path is open because most of the F2 region is in daylight with high MUFs.

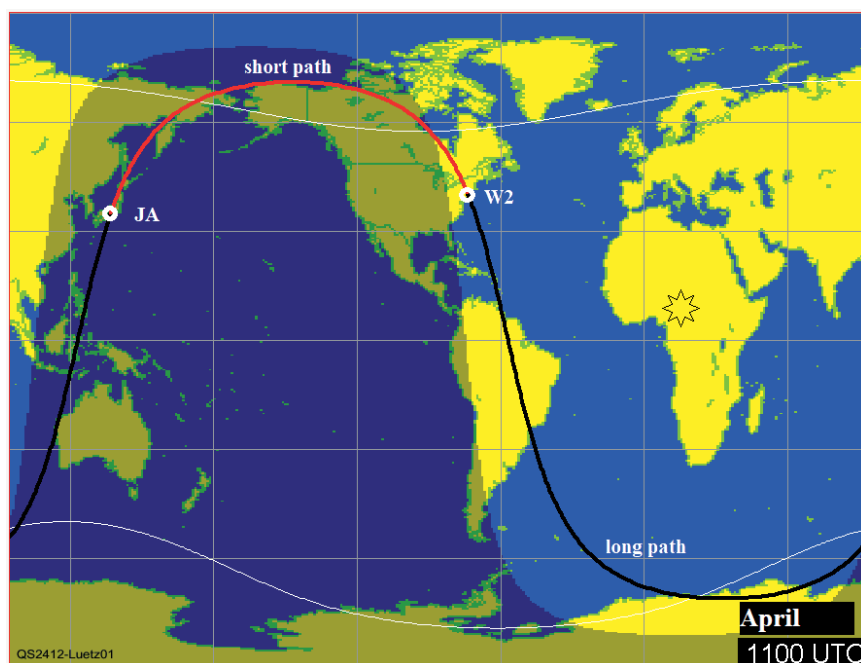


Figure 1 — East Coast 10-meter long path on an April morning.

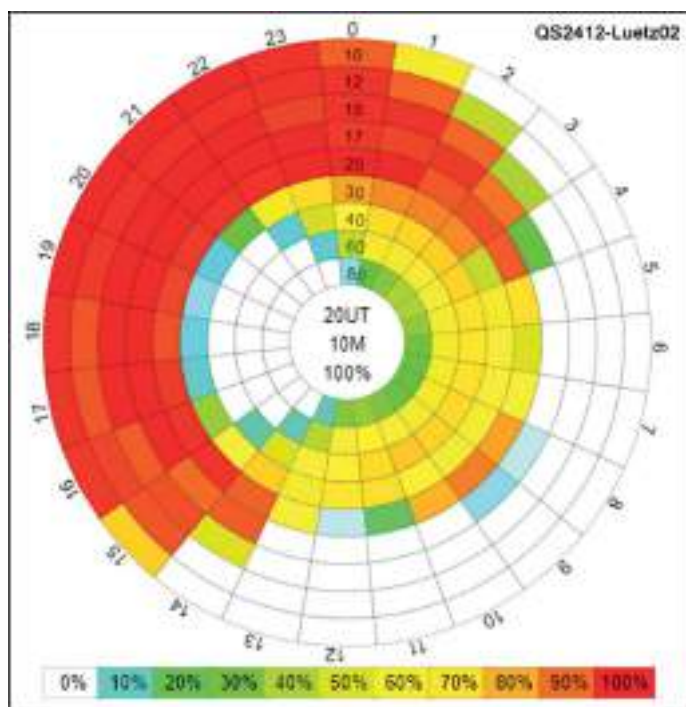


Figure 2 — December 2024 prop wheel for K9LA's location to Los Angeles.

A similar long path on 10 meters occurs in the late evening from the US West Coast to Europe and the Middle East. For this long path, the heading out of the US West Coast is to the southwest. For more details on these long paths and general comments on long path, visit https://k9la.us/A_Refresher_on_10m_Long_Path.pdf.

Using VOACAP

VOACAP is a well-respected propagation prediction program that will tell you the best time and band to contact a desired station. VOACAP Online for Ham Radio (www.voacap.com/hf) by Jari Perkiömäki, OH6BG; James Watson, HZ1JW, and Juho Juopperi, OH8GLV, will take your inputs and give you probabilities for times and bands to make a successful contact. I strongly recommend reading the “User’s Manual” found at the bottom right of the home page for information on the parameters that you must input for a prediction.

After inputting your parameters, you’ll see a Mercator-projection map depicting your desired path with a selection for either a prop chart (propagation chart) or a prop wheel (propagation wheel). I believe the prop wheel is the best way to see what band and time are best. Figure 2 shows the prop wheel for a path from my location in northeastern Indiana to Los Angeles, California, on a December day in 2024. I selected my mode, output power, and antennas. The smoothed sunspot number, which is what VOACAP uses to correlate with the state of the ionosphere, is automatically

predicted for up to 9 months from the current month; anything later must be manually inputted. Please note the smoothed sunspot number section on page 11 of the website’s manual.

The probabilities for a successful contact are color-coded for each of our HF bands (VOACAP only makes predictions from 2 to 30 MHz; there are no predictions for 160 or 6 meters) and for each hour of the day.

As you can see, I have many great possibilities throughout the day to complete my contact. This is typical around solar maximum for a relatively short-distance path (3,004 kilometers). For longer-distance paths (and long path), the possibilities will generally be less. We should have great propagation for contacting Los Angeles (and the entire West Coast) during the ARRL 10-Meter Contest.

Final Comments

Based on the needed smoothed sunspot number of 100 for 10-meter propagation, we should expect to have 10-meter propagation until 2027 and expect 12 and 15 meters to be available through 2027 (and maybe into 2028), as these two bands require a smaller smoothed sunspot number.

When using 10-, 12-, and 15-meter directional antennas, you generally should point them to “follow the sun.” In the morning, point them Northeast through Southeast for Europe, the Middle East, and northern Africa. In the late morning and early afternoon, point them Southeast through Southwest for southern Africa, the Caribbean, and South America. In the evening, point them Southwest through Northwest for the Pacific, VK/ZL, the Far East, and Southeast Asia.

Take advantage of where we are in Cycle 25. As W3LPL mentioned in his article, solar minimum between cycles 25 and 26 will be around 2030. These three higher HF bands will be very spotty unless there is sporadic-E propagation during the summer months.

Carl Luetzelschwab, K9LA, started his radio career as a shortwave listener in the late 1950s. He received his Novice-class license in 1961 and selected K9LA as his call sign in 1977. He enjoys propagation, DXing, contesting, playing with antennas, and fixing and using vintage equipment. Carl’s a graduate of Purdue University (where he earned his master’s degree in electrical engineering) and worked for Motorola and for Magnavox (now Raytheon) as an RF design engineer. He retired in October 2013. Carl can be reached at k9la@arrrl.net.

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



Happenings

Ham Radio Serves Southeast US Hurricane Recovery Efforts

ARRL tracked how amateur radio proved critical in areas hit hard by Hurricane Helene, especially in North and South Carolina, portions of Tennessee, and beyond. In the hardest-hit Asheville, North Carolina area, homes and entire towns have been swept away by floodwaters and mudslides. More than 200 people have been killed, and many more are still missing as of press time.

Widespread devastation damaged the power grid and roads, and many residents were without cell phone service and other utilities. For several days, radio communications were the only means of passing information. Ham radio played a significant role in this situation.

In North Carolina, all official emergency radio communications are done through North Carolina auxiliary communications (AUXCOMM). North Carolina Division of Emergency Management Senior External Affairs Specialist Brian Haines said hams were deployed. "Amateur radio operators are working side by side with first-responder communications personnel all over western North Carolina. Needless to say, we are interested in highlighting all they are doing, but at this point, they are heavily involved in response efforts, which is where we need to focus," he said.

Winlink, which provides email over amateur radio, has been used significantly in the recovery. ARRL Director of Emergency Management Josh Johnston, KE5MHV, said the recent FCC removal of

symbol rate restrictions has allowed a streamlined response using modern technology. "Winlink is an example of how modern tools work well within the Amateur Radio Service. Not having to petition the FCC for a waiver of the old rules allowed Winlink to be used immediately during this emergency," he said. ARRL had advocated for the change, which was implemented in 2023 (www.arrrl.org/news/bandwidth-limits-replace-symbol-rates-on-the-hf-bands-other-bands-open-for-comment).

Significant stories of the response from individual hams emerged, particularly from those who created pop-up nets to pass health and welfare traffic. Using mountaintop repeaters that have robust power backups, HF frequencies, and

Winlink, ham radio operators put their time, talents, and personal gear to good use.

The local news media in affected areas connected with several radio amateurs to highlight their work. CBS 17 in Raleigh reported on Van Lee, KM4TC, who helped families trying to get information about their loved ones (www.youtube.com/watch?v=Yk2FLaetmY8). In Charlotte, Queen City News told the story of Dan Gitro, K2DMG, who provided information to hams about current conditions and passed messages along to loved ones (www.youtube.com/watch?v=3jXb9zwnO70).

Countless other hams stepped up by passing traffic and providing information. ARRL seeks to tell those



A roadway in North Carolina destroyed by Hurricane Helene. [US Customs and Border Protection Special Response Team photo]

stories of selfless service as the operators find time.

Amateur radio had been serving communities even before the storm hit. The Hurricane Watch Net, the voice over IP (VoIP) Hurricane Net, and WX4NHC, the amateur radio station at the National Hurricane Center, were all active as the storm churned toward Florida. In the 25 hours that the net was active, hams passed along more than 100 surface reports that were used by forecasters to make more informed decisions about the storm.

Hurricane Helene made landfall near Perry, Florida, on the evening of September 26, as a Category 4 storm. With winds of 140 miles per hour, it was the strongest hurricane on record to slam into Florida's Big Bend.

In Florida, Amateur Radio Emergency Service® (ARES®) volunteers were embedded with county officials and at the State Emergency Operations Center.

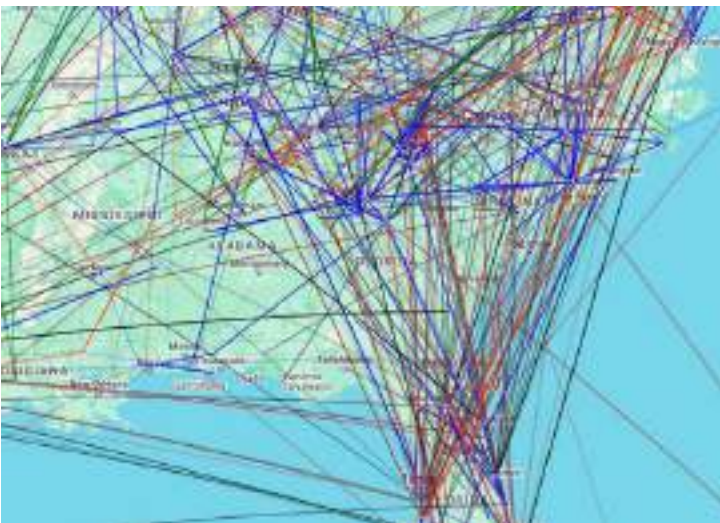
The worst impacts were felt as the storm moved north, and officials have classified the rainfall near Asheville as a 1,000-year event. The impact started to emerge over the

weekend of September 28 – 29.

ARRL leadership was in touch with field organization volunteers in the impacted area throughout the weekend. On September 30, a call was held to see what resources were needed. A clear challenge of logistics emerged, as entire road networks were unpassable. General aviation pilots had been working, as they do during major disasters, to use donated aircraft to ferry in relief supplies. Ham radio operators worked with Operation Airdrop and other volunteer groups to help provide communications support. Dozens of private helicopters flew in supplies, as did military assets.

In Tennessee, hams rallied to return repeaters impacted by the storm to service. Section Manager of the ARRL Tennessee Section David Thomas, KM4NYI, reported that a request for help on the Tennessee ARES net resulted in batteries being donated and delivered. They were used to return the W4KEV repeater system to service, including the 145.410 machine located on Viking Mountain in Greene County, which covers much of the area in North Carolina and Tennessee that was decimated.

While commercial communications networks and utilities are becoming increasingly resilient, Hurricane Helene has demonstrated that amateur radio is a critical partner When All Else Fails®.



A visualization of Winlink traffic following Hurricane Helene. The amount of activity was unusually high due to the emergency.

An Incredible Amateur Radio Rescue Story

On the evening of September 21, 2024, Greg Owen, WX7Z, heard an amateur radio emergency call on the national simplex calling frequency, 146.52 MHz. Ed Clark, K7ELC, was calling to get medical help for a 51-year-old man who had rolled his four-wheeler.

Mac Mackintosh, W7ENZ, found the injured man near his property, where there isn't any cell phone service. Mackintosh had given his handheld to Clark to make the call for help while he gave aid to the injured man. The injuries were serious, including head trauma, a broken collarbone, and broken ribs.

Owen called 911 to request help. An ambulance, a Life Flight Network helicopter, and law enforcement were dispatched to the location, which was 35 minutes outside Orofino, Idaho. Meanwhile, Owen continued using amateur radio to relay updates to the dispatcher. The injured man was transported to the hospital via helicopter and was reported to be recovering.

ARRL Idaho Section Emergency Coordinator Don Gardner, W7PJ, said hams in Idaho support a system known as the Wilderness Protocol, which encourages the use of the national simplex calling frequency, 146.52 MHz.

"As amateur radio operators, we train to be available to help when help is needed. The more that ham radio operators listen to the radio, the more chance there is that someone will be listening to take your emergency call. This is something that has been used many times throughout this county and here in Idaho," he said.

Public Service

Deployment Improvement Planning

I've endured three hurricanes this season at my home across from the Ichetucknee River in rural north central Florida. I watched as the water levels rose by the hour for each one, with my feeling of dread rising along with the river levels; it's a very uncomfortable feeling. It first arises when a hurricane is being tracked and increases when you start to see and feel the effects of the oncoming storm's early bands, especially as you see 80-foot-tall trees bend at seemingly impossible angles.

My Deployment Experience

During Hurricane Debby in August, my assignment was to report to a risk shelter near my home to provide radiocommunications to the Emergency Operations Center (EOC) in the county seat. I relieved Darren DeMarino, KO4DLN, who had served that function throughout the previous 2 days. (In our county, shelters are divided by function: a risk shelter accepts evacuees prior to a storm's arrival, a host shelter accepts evacuees after a storm, and a special-needs shelter accepts evacuees who have medical conditions — nurses are on hand to tend to their needs.)

The shelter was staffed by American Red Cross personnel and county employees who provided administration. DeMarino was set up with a 2-meter FM radio

and a feed line to an outdoor three-element Yagi on a tripod with masts, which worked effectively. He operated from inside the large metal building using a folding table positioned away from shelter staff and residents, so as not to disturb them as they slept or fulfilled their duties.

There was little traffic and few reports to pass to the EOC operator (our county Emergency Coordinator, or EC), so DeMarino and I were discharged. In response to a request from our EC, I completed a Field Situation Report (a standardized Winlink template) and transmitted it via VARA HF Winlink before driving home.

After the storm passed and I was safely home, the river across the road began to steadily rise. We watched as members of the National Guard arrived to assess the situation and effect their protocols. At the same time, the Florida Fish and Wildlife Conservation Commission arrived to read the area's water-level gauges for indications of water rise and fall, and for prediction purposes.

The National Weather Service issued amazingly detailed flood warnings on a street-by-street basis for river communities, counties, bridged highways, and roads in our small community.

Improvement Planning

There were only two out of perhaps a dozen well-trained county Amateur Radio Emergency Service® (ARES®) members who were able to deploy to shelters for this disaster. A much larger ARES organization in a much more populated county was able to field only four ARES operators to shelters. We are not first responders, or even primary communications personnel. We deploy only if our families are safe and secure and if it is personally safe to travel to serve our function: provide supplementary communications, when available. And, most importantly, we do not leave our home and family members behind in potential peril.

It's critical to understand that a major disaster is an evolving situation. It may seem safe to travel to a shelter assignment at one point, but water levels could rise, damaged infrastructure could collapse, and so on, leaving no avenues for the deployed radio amateur to return home for potentially hours or days.



Rick Palm's, K1CE, wife, Sandy Tan, listened to a National Weather Service advisory near a flooded Ichetucknee River in Fort White, Florida, after Hurricane Debby passed in early August. [Rick Palm, K1CE, photo]

Best Practices

Deploy in Place

One of the best ideas to come out of the professional and government emergency management sectors is the Community Emergency Response Team (CERT) program that educates neighbors in disaster preparedness and appropriate responses to the unique set of hazards where they live. The CERT concept originated with the Los Angeles City Fire Department in 1985. The Whittier Narrows earthquake in 1987 underscored the area-wide threat of a major disaster in California and confirmed the need for training neighbors to meet their immediate needs. It's a program that is now recognized and supported in all 50 states.

Each CERT is customized for the risks that exist in each neighborhood. They all contribute to an ecosystem of local preparedness and response. There are more than 2,700 local CERT programs nationwide, and more than 600,000 people have trained since CERT became a national program.

A neighborhood CERT trains neighbor-volunteers in basic disaster-response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Many include radiocommunica-



County deputies and American Red Cross staff unloaded supplies for the Fort White shelter during and after Hurricane Debby. [Photo courtesy of Darren DeMarino, KO4DLN]

tions using Family Radio Service, GMRS, and amateur radio services. Operators can fan out through their neighborhood in the immediate aftermath of an incident to assess damage, developing risk, situational awareness, and injuries and medical problems — all without leaving their families and immediate neighborhood.

Bring Your Family

ARES members assigned to a shelter to provide radiocommunications between the shelter and an EOC or American Red Cross office should consider bringing their families to the shelter with them. These kinds of decisions are never easy: leaving a home for parts unknown and under duress from a wildfire, hurricane, earthquake aftermath, or any other unstable situation leads to stress of the highest order. But it can be mitigated by keeping the family unit together.

In Conclusion

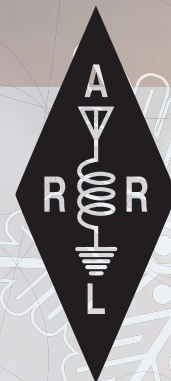
To adapt for our purpose, a famous quote from nineteenth-century mountaineer Edward Whymper: "Deploy if you will, but remember that courage and strength are nought without prudence, and that a momentary negligence may destroy the happiness of a lifetime. Do nothing in haste; look well to each step; and from the beginning think what may be the end."



The amateur radio station setup that Darren DeMarino, KO4DLN, used at the American Red Cross/county shelter in Fort White, Florida, during Hurricane Debby. [Photo courtesy of Darren DeMarino, KO4DLN]



Happy Holidays



and Peace on Earth from the ARRL
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Maria Somma, AB1FM
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George Spatta, W1GKS
Bill Spring
John Stanley, K4ERO
Jill Stelmack
Cathy Stepina
Sharon Taratula
Lisa Tardette, KB1MOI
Edwin Torres
Marvin Turner, W0MET
Pascal Villeneuve, VA2PV
Deborah Voigt
Amber von Hone
Paul Wade, W1GHZ
Michael Walters, W8ZY
Maty Weinberg, KB1EIB
Joshua Weissman

Contest Corral

December 2024

Check for updates and a downloadable PDF version online at www.arrl.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						
3	0100	3	0300	3.5-28	ARS Spartan Sprint	CW	RST, SPC, pwr	ars-qrp.com
3	0100	3	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM, YL, Youth YL, or Youth)	wwsac.com
4	0230	4	0300	1.8-14,21	Phone Weekly Test	Ph	Name, SPC	www.perluma.com/Phone_Fray_Contest_Rules.pdf
4	1700	4	2100	144	VHF-UHF FT8 Activity Contest	Dig	4-char grid square	www.ft8activity.eu
5	0000	5	0300	1.8	QRP ARCI Topband Sprint	CW	RST, SPC, mbr or pwr	qrparci.org
5	0000	6	0300	7	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, mbr or pwr	qrptest.com
5	1800	5	2200	28	NRAU 10m Activity Contest	CW Ph Dig	RS(T), 6-char grid square	nrau.net
5	2000	5	2200	1.8-28,50	SKCC Sprint Europe	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
6	2200	8	1600	1.8	ARRL 160-Meter Contest	CW	W/VE: RST, ARRL/RAC section; DX: RST	www.arrl.org/160-meter
7	0000	8	2359	3.5-28	Kalbar Contest	Ph	RS, serial	kalbarcontest.com
7	0600	7	0800	7,14	Wake-Up! QRP Sprint	CW	RST, serial, suffix of previous QSO	qrp.ru/contest/wakeup
7	1200	8	1159	3.5-28	PRO CW Contest	CW	RST, serial, "M" if mbr	proradicontestclub.com
7	1400	8	1359	3.5-14,21	INORC Contest	CW	RST, club, mbr or serial	www.inorc.it
7	1800	8	2359	3.5-28	FT Roundup	Dig	RST, SPC or serial	www.rttycontesting.com
8	2000	8	2300	1.8-28	QRP ARCI Holiday Spirits Sprint	CW	RST, SPC, mbr/pwr	qrparci.org
9	0100	9	0300	1.8-28	4 States QRP Group Second Sunday Sprint	CW Ph	RS(T), SPC, mbr or pwr	www.4sqrp.com
10	0100	10	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM, YL, Youth YL, or Youth)	wwsac.com
11	0130	11	0330	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or pwr	naqcc.info
11	0230	11	0300	1.8-14,21	Phone Weekly Test	Ph	Name, SPC	www.perluma.com/Phone_Fray_Contest_Rules.pdf
11	1700	11	2100	432	VHF-UHF FT8 Activity Contest	Dig	4-char grid square	www.ft8activity.eu
14	0000	15	2359	28	ARRL 10-Meter Contest	CW Ph	RST, state/province or serial	www.arrl.org/10-meter
14	0000	16	2359	1.8-7	PODXS 070 Club Triple Play Low Band Sprint	Dig	RST, SPC	www.podxs070.com
14	0600	15	1800	1.8-28	TRC Digi Contest	Dig	RST, serial, "TRC" if mbr	trcdx.org
14	1200	15	2359	1.8-28,50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
14	1300	15	1300	3.5,7	ARI 40/80 Contest	CW Ph Dig	RS(T), 2-letter province code	www.ari.it
14	1600	15	1559	3.5-28	International Naval Contest	CW Ph	RS(T), club and mbr or serial	www.marac-radio.nl
15	2300	16	0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or pwr	qrptest.com/pigrun
17	0100	17	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM, YL, Youth YL, or Youth)	wwsac.com/rules.html
18	0130	18	0330	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or pwr	naqcc.info
18	0230	18	0300	1.8-14,21	Phone Weekly Test	Ph	Name, SPC	www.perluma.com/Phone_Fray_Contest_Rules.pdf
18	1700	18	2100	1.2G	VHF-UHF FT8 Activity Contest	Dig	4-char grid square	www.ft8activity.eu
19	0000	20	0300	14	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, mbr or pwr	qrptest.com
19	1900	19	2000	3.5-14	NTC QSO Party	CW	Max 25 WPM; RST, mbr or "NM"	pi4ntc.nl/ntcqp
20	1600	20	1700	3.5,7	AGB-Party Contest	CW Ph Dig	RST, serial, mbr (if mbr)	www.ev5agb.com
21	0000	21	2359	1.8-28,50	Feld Hell Sprint	Dig	RST, mbr, SPC, grid	sites.google.com/site/feldhellclub
21	0000	21	2359	3.5-28	OK DX RTTY Contest	Dig	RST, CQ zone	okrty.crk.cz
21	1400	22	1400	1.8-28	Croatian DX Contest	CW Ph	RS(T), 9A county or ITU zone	www.hamradio.hr
22	1800	22	2359	3.5-28	ARRL Rookie Roundup, CW	CW	Name, 2-digit year first licensed, SPC	www.arrl.org/rookie-roundup
24	0100	24	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM, YL, Youth YL, or Youth)	wwsac.com
25	0000	25	0200	1.8-28,50	SKCC Sprint	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
25	0230	25	0300	1.8-14,21	Phone Weekly Test	Ph	Name, SPC	www.perluma.com/Phone_Fray_Contest_Rules.pdf
26	0830	26	1059	3.5,7	DARC Christmas Contest	CW Ph	RS(T), DOK or "NM," serial	www.darc.de
28	0000	28	2359	1.8-28, 50,144	RAC Winter Contest	CW Ph	RS(T), province/territory, or serial	www.rac.ca
28	1500	29	1500	1.8	Stew Perry Topband Challenge	CW	4-char grid square	www.kkn.net/stew
28	1500	29	1500	3.5-14	Original QRP Contest	CW Ph	RST, serial, pwr category	www.qrpcc.de
30	1000	30	2159	3.5-28	YOTA Contest	CW Ph	RS(T), age (avg age for multi-ops)	www.ham-yota.com
30	1300	30	1400	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	www.qrp-labs.com
30	1900	30	2000	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	www.qrp-labs.com
31	0100	31	0159	1.8-28,50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM, YL, Youth YL, or Youth)	wwsac.com
31	0300	31	0400	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	www.qrp-labs.com
31	0900	31	2359	3.5,7,28	Bogor Old and New Contest	Ph	RS, age	contest.orari-bogor.org

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

2024 ARRL Field Day Results

More than 31,000 participants took to the airwaves during amateur radio's most popular on-air event.

Paul Bourque, N1SFE, ARRL Contest Program Manager

All 85 ARRL and Radio Amateurs of Canada (RAC) Sections participated in Field Day, and we received 64 entries from 27 countries outside the US and Canada, which is a record high for DX participation in this event.

While the number of participants increased this year, the total number of entries decreased by 126 from 2023, which is a 3% change. Traditional Class A and B field stations represented 42.2% of all entries, while Class D and E home stations represented 52.4% of the total entries. Class C (mobile) stations remained relatively unchanged from last year. Class F (Emergency Operations Center, or EOC) slightly increased from 2023.

The total number of reported QSOs increased by 4% to almost 1.3 million, likely attributed to increased propagation as we near the peak of Solar Cycle 25. The number of phone and CW contacts increased from last year, with more than 522,000 phone contacts and more than 490,000 CW contacts. More than 283,000 digital QSOs were reported this year, which is a slight decrease from last year.

This year, ARRL announced that a new Field Day Responsibilities bonus of 50 points would be available for Class B, C, D, E, and F stations. Similar to the Safety Officer bonus available for Class A stations, this bonus encouraged participants to welcome guests to their Field Day locations and ensure that safety



Bob Lear, W4ZST, and Paul Nemeth, W4DUI, explain FT8 to Elizabeth and Tiffany Adams at the Gateway Amateur Radio Club, K4GAR, Field Day in Cleveland, Georgia. [Jerry Peel, KA4BDW, photo]

Entries by Class Summary

Class	Entries	% of Total
A	1,254	29%
B	568	13.2%
C	52	1.2%
D	1,612	37.3%
E	650	15%
F	183	4.2%
Total	4,319	

precautions were taken. Three hundred fifty-four participants claimed the Field Day Responsibilities bonus as part of their entries.

Activity by Class

Class A — Club or non-club groups of three or more people who set up temporary/portable Field Day sites away from their usual station locations: 1,254 entries (29%).

Class B — Club or non-club groups

2024 Field Day Overall Statistics

		% Change
Number of Participants	31,628	1%
Total Entries	4,319	-3%
Checklogs	123	8%
CW QSOs	490,813	3%
Phone QSOs	522,378	8%
Digital QSOs	283,525	-2%
Total QSOs	1,296,716	4%

with one or two people who set up temporary/portable Field Day sites away from their usual station locations: 568 entries (13.2%).

Class C — Mobile or rover operators from vehicles, bicycles, and boats: 52 entries (1.2%).

Class D/Class E — Stations operating from home, with either commercial power (Class D) or emergency power (Class E): 2,262 entries (52.4%).

Transmitter Count by Class

Class	Class Definition
A	Three-person or more club/non-club portable using emergency power
AB	Per above, with battery or alternate non-generator power source
AC	Per above, but with commercial power
B1	One-person club/non-club portable using emergency power
B1B	One person per above, with battery or alternate non-generator power source
B1C	One person per above, but with commercial power
B2	Two-person club/non-club portable using emergency power
B2B	Two persons per above, with battery or alternate non-generator power source
B2C	Two persons per above, but with commercial power
C	Mobile stations
D	Home stations using commercial power
E	Home stations using emergency power
F	EOC stations

Count by Class Summary

Class	Entries	Class	Entries	Class	Entries	Class	Entries
A	1,061	B1B	205	B2C	8	E	634
AB	42	B1C	34	C	50	F	180
AC	127	B2	66	D	1,484	Checklog	183
B1	220	B2B	25				

Transmitter Count by Class

1A	117	4AC	25	2D	36
2A	286	5AC	7	3D	14
3A	323	6AC	3	4D	4
4A	183	7AC	1	5D	3
5A	76	1B1	218	6D	1
6A	43	2B1	2	7D	1
7A	16	1B1B	202	1E	572
8A	9	2B1B	3	2E	30
9A	3	1B1C	32	3E	22
10A	1	2B1C	2	4E	3
11A	1	1B2	41	5E	6
13A	2	2B2	24	9E	1
21A	1	3B2	1	1F	29
1AB	18	1B2B	16	2F	72
2AB	7	2B2B	8	3F	40
3AB	5	4B2B	1	4F	26
4AB	5	1B2C	4	5F	6
5AB	6	2B2C	4	6F	2
12AB	1	1C	47	7F	4
1AC	13	2C	2	12F	1
2AC	38	3C	1	Checklog	183
3AC	40	1D	1425	Total	4,319

Class F — Stations operating from or as EOCs: 183 entries (4.2%).

Checklogs — 123 entries were listed as checklogs if they were missing the required list of calls sorted by band and mode (also known as a dupe sheet), showing that no duplicates were counted twice in their total QSO counts. Stations that exceeded the maximum allowable power output for their entry class are classified as checklogs.

How Do You Field Day?

Field Day is whatever you make it. For some participants, it's a contest; for others, it's a social gathering and club activity. Other groups use Field Day to showcase what amateur radio is all about to the public. Some groups use Field Day as an opportunity to introduce youths to amateur radio.

The Coventry Emergency Management Agency, KC1CUE, held a radio merit badge class that had more than 20 participants from local scout troops in attendance. Other groups used the event as an educational experience. The Cherokee Amateur Radio Society, WX4CAR, in Georgia, conducted a soldering and building workshop at their Field Day, where participants



Fred Kepner, K3FRK, and Wil Robertson, AI4QT, operated as 3 Guys with Radios ARC, KM3GW, from the Ditto Landing Marina Campground in Huntsville, Alabama. Abundant shade and battery-powered fans helped them battle the high temperatures. [Wil Robertson, AI4QT, photo]



Deanna Soika, KQ4BCP; Zeph Soika, KQ4BIM, and Noelle Soika participated in a 2-meter tape measure antenna building activity with their father Len Soika, KQ4BBR, at Albemarle Amateur Radio Club, W4DO, Field Day held in Earlysville, Virginia. [Bill Morine, N2COP, photo]

Entries by ARRL RAC Section/Prefix/DX

Section	Entries	Section	Entries	Section	Entries	Section	Entries
AB	19	LA	39	NTX	143	SK	7
AK	11	LAX	78	NV	29	SNJ	30
AL	69	MB	6	OH	202	STX	108
AR	41	MDC	83	OK	35	SV	53
AZ	107	ME	27	ONE	31	TER	3
BC	36	MI	130	ONN	3	TN	97
CO	104	MN	77	ONS	40	UT	47
CT	55	MO	91	OR	64	VA	146
DE	16	MS	26	ORG	52	VI	3
EB	31	MT	31	PAC	17	VT	19
EMA	63	NB	6	PE	4	WCF	43
ENY	47	NC	132	PR	9	WI	87
EPA	122	ND	14	QC	33	WMA	22
EWA	24	NE	23	RI	16	WNY	80
GA	97	NFL	81	SB	35	WPA	82
GH	41	NH	42	SC	64	WTX	22
IA	43	NL	3	SCV	54	WV	34
ID	41	NLI	32	SD	13	WWA	91
IL	133	NM	42	SDG	32	WY	15
IN	99	NNJ	47	SF	11	US/VE Total	4,255
KS	43	NNY	10	SFL	31		
KY	55	NS	6	SJV	25		

Entries by DX Countries

Country	Entries	Country	Entries
Argentina	3	Japan	15
Australia	3	Mexico	3
Belarus	1	Netherlands	2
Bermuda	1	Panama	1
Brazil	4	Romania	2
Costa Rica	1	Russia	2
Cuba	2	Slovak Republic	1
Dominican Republic	2	Slovenia	1
England	3	Spain	1
France	2	Sweden	3
Germany	3	Switzerland	2
Hungary	1	Ukraine	1
Indonesia	2	Venezuela	1
Italy	1	DX Total	64

Number of Participants by Class

A	24,486	E	1,254
B	668	F	2,897
C	60	Total	31,628
D	2,263		

built a Powerpole distribution strip. The Orange County Amateur Radio Club, W2HO, held a foxhunting presentation, followed by a hands-on foxhunt later that evening.

Individual participants also have their unique approaches to Field Day. Peter Kobak, K0BAK, combined his Field Day operation with Parks on the Air activations as a Class C entrant in five different parks. Dale Covington, K4GSX, says Field Day is “an opportunity to make and try a

new antenna design.” Greg Ratcliff, NZ8R, used the event to improve his CW skills at the Delaware Amateur Radio Association’s Field Day.

Looking Ahead

For many individuals and groups, planning for next year’s Field Day begins soon after the last antenna is lowered, and the last radio is packed away. What are your plans for Field Day 2025? Share your strategies and ideas with the amateur radio community on the ARRL Field Day

Facebook page at www.facebook.com/groups/arrlfd. Field Day 2025 will occur on June 28 – 29.



Members of the Las Cruces Fire Department in New Mexico were greeted by Margaret Bernstein, KF5KHJ, of the Mesilla Valley Radio Club, N5BL. [Dottie Remenar, KB5OAD, photo]



Wally Frank, WA3RWP, coaches Virginia House Delegate Amanda Batten at the Get on the Air station of the Williamsburg Area Amateur Radio Club, K4RC, Field Day. Delegate Batten completed a contact with The National Press Club, W3AO. [Dan Ewart, WG4F, photo]

Scores

Score listings are grouped according to the number of transmitters in simultaneous operation and their entry class. The listings show club or group name, call sign(s) used, total number of QSOs, number indicating power output used (5 is less than 5 W, 2 is from 6 W to 100 W, 1 is between 101 W and 500 W), number of participants, and total score including bonus points, and ARRL Section. Entries are listed from highest to lowest claimed score in each class: Class A stations are clubs or groups portable with three or more participants; Class B stations are portables with one or two participants (when there are two operators, the second operator's call sign is listed in parentheses, if it is known); Class C stations are mobiles; Class D stations are home stations using commercial power; Class E stations are home stations using emergency power, and Class F stations are EOC stations. Due to the high volume of entries, this listing contains only Class A, B, and C stations (these stations are often portable or mobile, representing operations done outside of home locations, and are most representative of the "field" in this communications exercise). Class D, E, and F stations and aggregate scores will be posted in the digital edition of *QST* and on the ARRL Field Day Page at <http://field-day.arrl.org>.



Three or More Person Club/ Non-Club Portable

1A

Blazing Paddles Field Day Team					
AB9YC	1,494	2	8	7,414	IL
Not Case ARC					
W3USA	1,484	2	3	7,086	OH
Bedlington Terrier ARC of Tucson					
WA7NB	1,523	2	3	5,964	AZ
Tampa ARC					
K4NQ	1,192	2	25	5,418	WCF
Lafayette DX Assn.					
W9LDX	1,160	2	13	5,118	IN
Tie Siding WY ARRL FD					
W7C	1,050	2	3	4,934	WY
Dr. Loomis Memorial Junior Mechanics League					
W3KDR	1,283	2	7	4,666	MDC
Souris Valley ARC					
K0AJW	1,208	2	19	4,644	ND
Benton ARS					
K5NE	1,321	2	15	4,200	AR
Dummy Loads					
K4QXX	914	2	30	4,152	WCF
Federation of AR Ops					
K9ZA	848	2	3	3,862	IL
Soc. of Midwest Contesters					
KU9Z	901	2	3	3,652	IL
Assoc. Radio Amateurs of So. New England					
W1AQ	1,211	2	15	3,506	RI
Redwood Empire DX Assn.					
W6KB	974	2	5	3,474	SF
Clinton Co. Contesters					
W9PC	745	2	3	3,442	IN
Motor City RC					
W8MRM	896	2	16	3,342	MI
Page Valley ARC					
K4PMH	745	2	15	3,300	VA
Jupiter Tequesta Repeater Grp.					
W4J	855	2	50	3,064	SFL
South Georgian Bay ARC					
VE3SGB	660	2	11	2,894	ONS
Lake Agassiz RC					
N0LAC (+WX0ND)					
	398	2	12	2,864	ND
New England Radio Discussion Soc.					
K1VW	472	2	15	2,794	ME
St. Croix ARC					
NP2VI	807	2	5	2,708	VI
Kauai ARC					
KH6E	887	2	30	2,624	PAC
SCAN/Red Ant Annihilators					
KR6AL	943	2	3	2,474	LAX
Northeast WI ARC					
K9TIT	432	2	7	2,150	WI

NHRC ARS					
W1CUM	877	2	6	2,094	VT
North Shore ARC (BC)					
VE7NSR	672	2	16	2,044	BC
Escondido ARS					
N6WB	482	2	35	2,002	SDG
6 Meter Club of Crystal Lake					
K9VI	459	2	4	1,986	WI
WD6BNY Team					
W9WLX	430	2	3	1,946	WI
Greenwood ARS					
W4GWD	275	2	18	1,926	SC
3730 Grp.					
VE3ORF	412	2	10	1,884	ONE
Rocky Mountain Ham Radio					
NM5HR	454	2	6	1,844	NM
Thibodaux ARC					
W5YL	693	2	20	1,836	LA
Southwest MS ARC					
W5WQ	268	2	8	1,818	MS
Fulton Co. (KY) ARC					
K4CAY (+KG4ZDN)					
	71	2	21	1,786	KY
Midway ARC					
W0KY	296	2	11	1,642	NE
Central WA ARC					
W7TT	279	2	15	1,626	EWA
Wood Co. ARS					
WC5TX	210	2	18	1,610	NTX
Central Dakota ARC					
W0ZRT	490	2	25	1,606	ND
Edgefield Co. ARC					
WR4EC	219	2	10	1,578	SC
Juneau ARC					
KL7JRC	254	2	35	1,578	AK
Shingle Mill Hill Contesters					
KS3F	507	2	4	1,562	VA
Vermilion Range ARC					
K0VRC	150	2	8	1,404	MN
Jasper RC					
K4G	102	2	4	1,354	GA
Upshur Area ARC					
K5UAR	264	2	18	1,330	NTX
Eastern Panhandle ARC					
N3MBH	186	2	3	1,254	WV
Skyline RC					
K7BSK	404	2	8	1,252	UT
Sandy ARC					
W7S	50	2	18	1,232	UT
Rochester DX and Contest Club					
W0BM	210	2	4	1,164	MN
Camp Kilowatt Contest Club					
N3EB	435	2	3	1,120	WPA
Wahkiakum Co. ARC					
N7WAH	416	2	3	1,024	WWA
West MI Repeater Assn.					
W8GJX (+N8RKD)					
	47	2	6	980	MI

Southeast MN ARC					
W0VGW	127	2	14	904	MN
Yukon ARA					
VY1DX	168	2	12	898	TER
Melfort Repeater Grp.					
VE5YD	311	2	3	872	SK
Renfrew Co. ARC					
VA3NRR	148	2	10	826	ONE
Eva ARC					
KQ4BLF	87	2	3	752	AL
Parma RC					
W8PRC	50	2	4	752	OH
Maury River Rain Dogs ARC					
WD8MQN	87	2	13	744	VA
Midwest ARS					
W9MAR	101	2	3	734	IN
Bonner Co. ARC					
KA7EYX	167	2	4	730	ID
Kennedy Family Field Day Grp.					
W0MRM	225	2	5	700	MO
Samuel F. Morse ARC					
W6SFM	83	2	8	682	SV
Dallas Co. ARS					
K0DCI	84	2	3	674	IA
Conejo Wireless Soc.					
K6SB	92	2	4	668	SV
Sierra Intermountain Em. Radio Assn.					
NV7CV	47	2	12	648	NV
Los Alamos ARC					
W5PDO	97	2	10	644	NM
Warren Co. EmComm Grp.					
AA4WC	37	2	5	624	VA
Triple A ARA					
WW3AAA	83	2	9	616	WPA
VE1AWR	178	2	3	606	NS
N7AWP	66	2	3	582	EWA
Enterprise ARS					
WD4ROJ	138	2	9	578	AL
Emergency ARC of HI					
KH6CE	37	2	53	550	PAC
Wasco ARS					
WC7EC	23	2	4	546	OR
Pella ARC					
K0PEA	91	2	16	532	IA
Kennedy Space Center ARC					
N1KSC	135	2	4	520	SFL
Fullerton RC					
W6ULI	38	2	7	502	LAX
Sci-Tech ARS					
W1STR	25	2	35	500	EMA
Metro North Railroad ARA					
W2MNR	19	2	10	488	CT
Groupe de Communication d'Urgence					
VA2GCU	19	2	13	488	QC
VE2KRT	143	2	4	456	QC
Bald Eagle Repeater Assn.					
KB3HLL	1	2	3	452	EPA
Ocean State ARC					
K1OS	68	2	4	446	RI
Gallatin Ham RC					
W7ED	146	2	12	442	MT
KE4GOI	90	2	3	430	IN
Space Coast ARS					
KQ4QOF	23	2	4	430	SFL
Motorola ARC					
K7TV	78	2	3	408	AZ
Amateur Radio of Churchill Co.					
K7F	22	2	8	394	NV
Community ARC					
K2SRV	19	2	5	388	WNY
W6RE	118	2	6	386	SCV
Rappahannock Raiders					
K4RET	103	2	3	362	VA
Aurora EMA ARC					
WX9AEM	6	2	5	362	IL
Atchison Co. ARS					
K5OAT	52	2	4	354	KS
Arizona ARC					
W7IO	34	2	3	350	AZ
Lake Chelan ARC					
K7SMX	94	2	6	338	EWA
Inland Empire VHF Radio Amateurs					
NZ2S	93	2	3	336	EWA
Michigan State Univ. ARC					
W8EO	70	2	3	330	MI
Toledo Mobile Radio Assn.					
W8HHF	37	2	6	324	OH
Grande Prairie Hams					
VA6VA	65	2	4	314	AB
WT8H	157	1	3	307	VA
Tri-Co. ARC (NC)					
NC4AR	14	2	5	306	NC
Graham-Conner					
KC8LIM	54	2	7	298	MI
Wall Lake Hams					
W9YAK	41	2	3	292	IN
Mercury Net					
AC7R	11	2	12	272	AZ
Mohawk ARC					
K6IPO	54	2	3	266	WMA
AR Caravan Club					
KX5VN	2	2	3	254	NM
AR Caravan Club					
K0WBG	1	2	3	252	NM
Boston Mountain RC					
K5JTB	50	2	6	250	AR
KC0WEI	46	2	3	242	MO
Federacion de Radio Aficionados de P.R.					
KP4FRA	69	2	3	188	PR
KQ2N	16	2	3	182	WNY
Emerald Coast ARA					
K4KBD	14	2	3	178	NFL
Jim's Farm Grp.					
W0BJ	12	2	3	174	MO
AA3TL	51	2	4	170	EPA
KA5CRL	30	2	3	128	MI
Nittany ARC					
KC3BHI	13	2	4	76	WPA

1A — Battery

Ridge Runners RC					
W6BX	850	5	3	8,950	SCV
South Texas Rovers					
KA5D	662	5	4	7,130	STX
Oak Mountain QRP Daredevils					
KJ4M	541	5	4	6,175	AL
Signal Hill ARC					
WS6X	401	5	4	4,460	WV
Scharks Ham Fam					
WV0H	399	5	8	4,305	NM
Hunt Co. Packet Club					
N5T	371	5	5	4,260	NTX
Chew's Ridge Gang					
K6MI	349	5	4	3,970	SCV
Club Radio Amateur Sorel-Tracy					
VE2CBS	227	5	7	2,415	QC
Saguaro Nights ARC					
NS7F	128	5	9	2,075	AZ
Narwhal ARS					
NR7WL	105	5	13	1,700	WWA
Central MO Radio Assn.					
AA0B	143	5	3	1,680	MO
Soc. of Midwest Contesters					
K9QW	74	5	3	1,190	IL
DJT Grp. ARC					
N4T/45	50	5	3	850	NFL
SPARGE					
K3ALE	72	5	6	760	WPA
York Road Ham					
WB7OND	50	5	3	745	NC
Calumet Co. ARS Grp.					
KD9WAX	1	5	3	260	WI
KA3UFV	6	5	3	180	CO
Team Oonitos at Camp Motzi					
KL3PD	2	5	3	160	AZ

1A — Commercial

Pathfinders ARC					
VA4PAR	1,043	2	5	2,336	MB
Knob Hill Krew					
K5ANR	551	2	4	2,104	NTX
High Forest ARC					
K4HRC	207	2	15	1,344	TN



ARRL Affiliated Club Coordinator of the East Bay Section Matthew Vurek, N4DLA, operated at the Lamorinda Amateur Radio Interest Group, K6ORI, Field Day. The club held their Field Day in conjunction with a Safety Fair at the Lafayette Reservoir of the East Bay Municipal Utility District in Lafayette, California. [Mary Solon, KD6MKS, photo]

3 Yahoos					
AB9PN	634	1	3	1,173	WI
Morningside Mischief Makers					
K0OV	185	2	3	778	ORG
Groupe Radio VE2RMP					
VE2CUR	166	2	8	610	QC
Hot Spring Co. AR Em. Net					
W5BXJ	100	2	15	570	AR
Sevier ARC					
AC7SC	21	2	13	492	UT
W4D	174	2	3	398	AL
K1USN RC					
K1TH	85	2	3	390	EMA
Mora Open Repeater Assn.					
KD0CI	167	2	5	384	MN
Watauga ARC					
K2SD	53	2	3	360	NC
Newark ARA					
N8ARA	26	2	5	202	OH

2A					
Radio Amateurs of Northern VT					
W1NVT (+W1PU)					
	4,976	2	20	20,662	VT
Newport Co. RC					
W1SYE (+NE1RI)					
	3,692	2	39	14,976	RI
Cape Fear ARS					
K4MN (+N1GNF)					
	3,085	2	45	14,482	NC
Muskogee ARC					
K5CM (+KK5I)					
	3,395	2	9	13,319	OK
Albuquerque DX Assn.					
W5UR (+N2GG)					
	2,931	2	25	12,147	NM
Tom's Garage ARC					
N6MI (+N7DA)					
	2,769	2	8	11,221	SJV
Hellgate ARC					
W7PX	2,930	2	11	9,412	MT
Falmouth ARA					
K1RK (+K1AIR)					
	2,181	2	30	8,613	EMA
Mississippi Valley ARA					
W9MVA (+W9FCC)					
	2,449	2	17	8,447	WI
Wyandotte Co. RACES/CERT					
W0KCK (+W0LB)					
	2,374	2	28	8,319	KS
Reelfoot ARC					
K4RFT (+N4MJ)					
	1,180	2	12	8,118	TN
Canton ARC					
W8AL (+K8ISS)					
	1,319	2	32	8,116	OH

Pine Belt ARC					
K5PN	2,308	2	16	8,040	MS
Greer ARC					
K4SV (+NY4G)					
	2,089	2	35	7,969	SC
McHenry Co. Wireless Assn.					
K9RN (+W9TD)					
	1,578	2	20	7,593	IL
Blackstone Valley ARC					
W1DDD (+NA1Q)					
	1,557	2	26	7,471	RI
Potomac Valley RC					
W4YY	1,723	2	8	7,342	VA
North Carolina Misfits					
KT4Q/VE9 (+K4LOJ/VE9)					
	1,325	2	4	7,338	NB
Chaffee Lake ARA					
W0CLA	1,764	2	15	6,754	CO
Big Bend ARC					
K5FD (+KJ5DKG)					
	1,184	2	20	6,537	WTX
Fidelity ARC					
W1MB (+K1NQG)					
	1,958	2	18	6,311	RI
Palo Alto ARA					
W6ARA (+K6OTA)					
	1,739	1	79	6,238	SCV
Muscle Shoals ARC					
W4JNB (+A14QC)					
	891	2	47	6,079	AL
Baldwin Co. ARC					
N4MZ (+WB4EMA)					
	1,164	2	27	5,902	AL
Kansas City DX Club					
W0CW	1,578	2	6	5,868	MO
Metro DX Club					
W9TY (+NE9A)					
	1,319	2	14	5,635	IL
Big Sky Contesters					
KM7W	1,671	2	8	5,624	MT
Crawford ARS					
W3MIE (+N3QQH)					
	1,208	2	30	5,318	WPA
Ottawa ARC					
VE3RC (+VE3SHQ)					
	962	2	30	5,180	ONE
Club Radio Amateur de Quebec					
VE2CQ (+VE2CDX)					
	864	2	36	5,125	QC
Cross Roads Ham RC					
W5LCR (+K15YDV)					
	995	2	44	5,121	STX
Mecklenburg ARS					
W4BFB (+NC4DP)					
	1,360	2	35	5,024	NC
W/K ARC of Greater Milwaukee					
W9I	1,273	2	13	5,018	WI
NM SOTA Guys					
W5YA	1,189	2	4	4,980	NM
Proske's Posse					
N2NC	1,418	2	4	4,952	WV
Schaumburg ARC					
N9RJV (+KD9FMN)					
	1,043	2	77	4,916	IL
MID-MO ARC					
N0SS	1,095	2	30	4,898	MO
Nashoba Valley ARC					
N1NC (+W1MJ)					
	1,042	2	23	4,832	EMA
CARE/Rogue Valley ARC					
K7D (+W6PO)					
	994	2	23	4,810	OR
Stamford ARA					
W1EE	1,291	2	21	4,682	CT
Hancock ARC					
W9ATG (+N9TT)					
	841	2	32	4,428	IN
Union Co. ARC					
W8UCO (+N8IG)					
	990	2	26	4,384	OH
Mics & Beers					
WW7A (+AF7SC)					
	635	2	6	4,353	EWA
444 DX Grp.					
K2IN	1,162	2	5	4,304	NNJ
Montrose ARC					
K0IIT (+AA0EL)					
	1,266	2	48	4,292	CO
Spartanburg ARC					
K4II	988	2	20	4,246	SC
Marshall's Minions					
K5N (+K5QE)					
	858	2	4	4,208	STX
National Electronics Museum ARC					
K3NEM	972	2	7	4,200	MDC
Pasadena RC					
W6KA	1,188	2	30	4,198	LAX

Irvine Disaster EmComm					
N6IPD (+KN6BMO)					
	898	2	21	4,193	ORG
Story Co. ARC					
W0YL (+AE0S)					
	795	2	43	4,039	IA
White River Radio Comm. Grp.					
KF5TL (+AG5CC)					
	711	2	26	3,967	AR
Waldo Co. ARA					
N1TN	1,074	2	13	3,952	ME
South East Metro ARC					
W0CGM (+NA0L)					
	803	2	12	3,938	MN
Devanooa					
W3DEV (+AB3I)					
	1,107	2	5	3,932	TN
PSRG/WSARC/Seattle ACS					
W7AW (+W7ACS)					
	685	2	125	3,836	WWA
West VA AR					
WV8AR	938	2	20	3,752	WV
Case ARC					
W8EDU	626	2	40	3,716	OH
New Providence ARC					
N2XJ	785	2	41	3,676	NNJ
Bonner Co. ARC					
K7B (+K7JEP)					
	580	2	29	3,668	ID
Westcoast ARA					
VE7VCC	850	2	34	3,622	BC
Montreal ARC/West Island ARC					
VE2ARC (+VE2CWI)					
	645	2	35	3,581	QC
Desert Cabin					
ND7T	789	2	3	3,456	EWA
Explorer Post 599					
WA2DFI (+W7BSA)					
	616	2	13	3,443	AZ
Mizpah Shrine Radio Unit					
W9FEZ	768	2	5	3,436	IN
Heritage Hunt Hams					
W4HH	722	2	16	3,346	VA
Candlewood ARA					
W1QI	921	2	18	3,346	CT
AE4WS Family and Friends					
AE4WS	568	2	8	3,286	NC
Calgary ARA					
VE6NQ (+VE6DXM)					
	676	2	14	3,270	AB
ARC EmComm Svc.					
WB2QBP (+K2ARC)					
	886	2	16	3,265	NLI
Loudoun ARG					
K4LRG (+N4RAF)					
	794	2	30	3,239	VA
Mohawk ARC					
N1WW	598	2	25	3,200	WMA
Reno Co. (KS) ARA					
W0WR (+KF0JNO)					
	555	2	10	3,194	KS
MIT Radio Soc.					
W1MX	852	2	13	3,158	EMA
Zephyrhills Area ARC					
W1PB	701	2	11	3,154	WCF
Middle Peninsula ARC					
W4HZL (+KM4VTT)					
	615	2	35	3,146	VA
Iowa Wireless AR Network					
N0IWN	629	2	8	3,102	IA
Peekskill Cortlandt ARA					
W2NYW	783	2	19	3,090	ENY
Charleston ARS					
W44USN (+WD4PBR)					
	525	2	30	3,081	SC
Tamiami ARC					
W4AC (+KN4BAR)					
	1,242	1	38	3,070	WCF
Union Co. ARC					
K4N	578	2	14	3,068	NC
Massillon ARC					
W8NP (+KC8VWH)					
	593	2	52	3,048	OH
American Legion ARC Post 33					
W9TAL (+KB9EZZ)					
	418	2	24	3,047	IL
Palomar Mtn. WFD					
WW6CC	1,109	2	11	3,014	SDG
SC4 ARC					
W6SCF	480	2	18	2,992	SCV
Socorro ARA					
W5AQA (+A15NR)					
	365	2	23	2,960	NM
Whitley Co. ARC					
WC9AR (+KC9ANF)					
	399	2	11	2,958	IN
Blossomland ARA					
W8MAI (+W8KIT)					
	390	2	38	2,907	MI

Montezuma Valley RC					
AI8Z	576	2	4	2,854	CO
Orange Park ARC					
K4BT	367	2	33	2,834	NFL
Moosehorn ARC					
AL7LE	506	2	5	2,804	AK
Williamson Co. ARES					
W5E (+WC5EOC)					
	383	2	30	2,757	STX
Paso Robles ARC					
W6R (+W6LKF)					
	391	2	28	2,737	SB
Henry Co. ARC					
W9OB (+K9UOK)					
	583	2	12	2,726	IN
Lake Region ARC					
K0QIK	440	2	16	2,688	MN
N0SFF	850	2	9	2,674	IA
Foothills ARS					
K6YA (+K9STV)					
	550	2	15	2,600	SCV
Scranton-Pocono AR Klub					
K3CSG (+W3W)					
	251	2	9	2,582	EPA
Palos Verdes ARC					
K6PV	646	2	16	2,550	LAX
Half Moon Bay ARC					
WR6HMB (+KN6QDR)					
	349	2	24	2,520	SCV
Greater Beloit ARC					
K9BY	525	2	7	2,508	WI
El Dorado Co. ARC					
AG6AU	498	2	12	2,490	SV
Wood Co. ARES/RACES					
W9WCA (+KB9STB)					
	354	2	12	2,488	WI
Parker Radio Assn.					
K0PRA (+AC5S)					
	567	2	47	2,424	CO
North East Tarrant ARC					
N5EOC	413	2	26	2,418	NTX
Beaufort Radio Amateur Grp.					
W4BFT (+KB1CTC)					
	376	2	32	2,393	SC
Delta Co. ARS					
K8PL (+K2PM)					
	344	2	17	2,358	MI
Central Alberta ARC					
VE6QE (+VE6HQ)					
	462	2	18	2,290	AB
Fox Cities ARC					
W9ZL (+N9AOT)					
	467	2	24	2,260	WI
Olive Branch ARC					
W5OBM (+K15TKL)					
	340	2	11	2,252	MS
First State ARC					
K3F	454	2	12	2,234	DE
Iowa City ARC					
W0JV	682	2	15	2,224	IA
North Central MO ARC					
KF0PLP (+W0PGH)					
	219	2	11	2,212	MO
Charlottetown ARC					
VY2CRS (+VY2CFB)					
	376	1	21	2,205	PE
Thermal Belt ARC					
K4K (+KF4JVI)					
	171	2	28	2,185	NC
Halifax ARC					
VE1FO	292	2	13	2,164	NS
Devils Tower ARC					
WY7DT (+WY7JB)					
	574	2	22	2,158	WY
WCARES Contest Grp.					
N4FR (+WC4EOC)					
	668	2	62	2,156	TN
Oak Ridge ARC					
K4PJ	275	2	23	2,154	TN
Chicago Suburban Radio Assn.					
W9SW	402	2	22	2,138	IL
Central Coast ARG					
W6WJ	532	2	10	2,120	SB
Radio Amateur Soc. of Norfolk					
W4NPS (+K04ENO)					
	257	2	17	2,120	VA
New Jersey Antique RC					
W2RTM	704	2	10	2,106	NNJ
Kalamazoo ARC					
W8VY	371	2	17	2,104	MI
Arrowhead RAC					
W0GKP	479	2	10	2,058	MN
Tri Co. ARC (WI)					
W9MQB (+AE9MZ)					
	347	2	12	2,042	WI
Mich-A-Con ARC					
KC8VC (+KE8RKF)					
	364	2	12	2,025	MI

Ascension ARC K5ARC (+W5OTO) 352 2 25 2,004 LA	Stanly Co. ARC K4OGB (+N4JAT) 190 2 10 1,478 NC	Woodford Co. ARC KY4WC 31 2 11 1,112 KY	Westside ARC WA6RC 24 2 5 706 LAX
West Palm Beach ARG W4HAW (+WS4FSC) 218 2 27 1,999 SFL	West Chester ARA WC8VOA 334 2 11 1,472 OH	Adams-Arapahoe Co. ARES WA0RES 18 2 19 1,106 CO	Parkland ARC VA5PAR 197 2 3 644 SK
Highline ARC NC7G (+W47ST) 218 2 26 1,989 WWA	Muncie Area ARC N9RI 154 2 16 1,470 IN	Convail/220 ARC W6UUS (+K6PFG) 112 2 44 1,091 SDG	Univ. of Southern California ARC W6YV 73 2 3 638 LAX
Orville ARC KD8SQ 551 2 4 1,988 OH	Sunnyvale ARES K6ANY 176 2 54 1,470 SCV	North Franklin ARS N2NNY 211 2 3 1,072 NNY	Aerospace Employees Assn. ARC W6AGO 31 2 5 632 LAX
Pasadena RC W6VIO 608 2 4 1,986 LAX	Traveling AR Team AC7YT 1,206 1 4 1,456 IA	North East IA Radio Amateur Assn. W0MG 263 2 13 1,070 IA	South Bay ARC W6SBA 30 2 11 632 LAX
Ashe Co. ARC K4J (+W4FD) 234 2 15 1,980 NC	Barron Co. ARA KD9EJA 235 2 10 1,440 WI	Audrain EmComm AA0RC 64 2 12 1,068 MO	Copper Country Radio Amateur Assn. W8CDZ 47 2 35 606 MI
Saskatoon and District ARA VE5AA 403 2 20 1,962 SK	Club Radioamateur de la Vallee du Richelieu VE2CVR 229 2 15 1,436 QC	Elmore Co. ARC K7ECI 129 2 3 1,066 ID	North GA Tri-State ARC AE1MS 22 2 20 594 GA
Ogden ARC W7SU (+KZ7O) 289 2 42 1,962 UT	Cedar Creek ARC K5CCL 260 2 14 1,430 NTX	Genesee Radio Amateurs W2RCX 297 2 7 1,058 WNY	North GA Tri-State ARC W4NGT 20 2 20 590 GA
Addison Co. ARA N1FS 328 2 6 1,912 VT	Ft. Madison ARC WF0RT 125 2 13 1,420 IA	Cowichan Valley ARS VE7CVA 240 2 12 1,058 BC	Pine State ARC N1ME 165 2 12 580 ME
Stillwater ARA W0JH 570 2 34 1,908 MN	First Baptist Church Huntsville ARC K4FBC 211 2 5 1,394 AL	Montgomery ARC W4AP (+K1AZE) 144 2 18 1,053 AL	Pioneer Radio Operators Soc. K2PRO 161 2 6 572 WNY
NXP ARC W7MRF 390 2 5 1,888 AZ	Pen Bay ARC W1PBR 109 2 10 1,382 ME	Mayerthorpe Flying Tigers VE6FT 474 1 4 1,052 AB	Lee Co. EOC KX4LEE 8 2 10 568 NC
Lancaster Co. ARES WE4LC 514 2 8 1,882 VA	West Alabama ARC KC4UG 132 2 20 1,374 AL	Heart O' Texas ARC W5ZDN (+K5ZDN) 42 2 16 1,038 NTX	Eastern AZ ARS K7EAR 86 2 9 558 AZ
Androscoggin ARC W1NPP 299 2 18 1,878 ME	North Country ARA K8TTE 305 2 4 1,368 MI	Manotick ARG VE3AIR 86 2 4 1,022 ONE	Northern IL Quad Co. ARG K9T 44 2 6 552 IL
Radio Amateurs of Skagit Co. W7TAO (+N7GDE) 382 2 15 1,874 WWA	Mt. Tom Amateur Repeater Assn. W1TOM (+K1KEZ) 55 2 17 1,365 WMA	Goose River ARC W0FLT 98 2 5 1,014 ND	ARC of El Cajon WA6BGS 133 2 8 532 SDG
Culver City ARES K6CCR (+AJ7C) 300 2 24 1,870 LAX	Hayward RC K6EAG 145 2 12 1,356 EB	Laurel ARC W3LRC 242 2 10 1,014 MDC	Old Times Ham RC KM4OT 98 2 5 514 NC
Oakland Radio Comm. Assn. WW6OR 659 2 17 1,868 EB	Boaz-Albertville ARC KN4UPN (+KD4BJW) 214 2 28 1,340 AL	Harrisburg Radio Amateurs Club W3UU 57 2 11 1,010 EPA	Crescenta Valley RC AD6IZ 61 2 15 492 LAX
Shelby ARC W4NYR (+N4K) 158 2 22 1,849 NC	Plattsmouth ARC KB0SMX 161 2 18 1,338 NE	SPARC KH6Z 163 2 25 1,006 PAC	Hays/Caldwell ARC KE5LOT 32 2 10 478 STX
Scottsdale ARC W7UF (+N7ELL) 294 2 32 1,818 AZ	Butler Co. ARA W8WRK (+WA6EZV) 174 2 15 1,326 OH	Young Co. ARC W5Y 130 2 10 998 NTX	Irvine ARC WA5CKF 91 2 10 452 NTX
Eastern Shore ARC K4BW 278 2 13 1,814 VA	HacDC ARC W3J 304 2 15 1,322 MDC	Univ. of Michigan ARC W8UM 85 2 21 980 MI	American Legion Post 82 ARC N0TAL 43 2 4 436 CO
Owensboro ARC K4HY 307 2 14 1,814 KY	Pioneer Valley RA W1HDN 287 2 16 1,316 CT	San Jose ARES/RACES AF6ZF (+AJ6DU) 135 2 13 970 SCV	Lincoln Co. ARC K7LBY 36 2 8 424 MT
Jamestown ARC W0FX 364 2 8 1,802 ND	Poway ARS N6PWY 185 2 25 1,316 SDG	Niagara RC W2QYV 302 2 3 954 WNY	Bellevue ARC W0WYV 18 2 3 408 NE
Independent Radio Crew K3ODX 343 2 3 1,776 EPA	Farrell-Gray K0W 47 2 4 1,296 CO	Juniata Valley ARC K3DNA 164 2 17 950 WPA	Calaveras ARS N6FRG 79 2 6 408 SJV
Turkey Heaven Mtn. Repeater Assn. N4THM 255 2 16 1,772 AL	Sooland ARA K0TFT 264 2 14 1,284 IA	White Rock Lake ARC WA5WRL 53 2 5 946 NTX	Live Free or Die W1BPM 26 2 4 402 NH
Broken Arrow ARC W5DRZ (+KJ5DVM) 248 2 35 1,751 OK	Hiawatha Valley ARC AA0RW 286 2 21 1,284 MN	Club Radio Amateur Laval-Laurentides VE2CRL 119 2 5 936 QC	Lowndes Co. ARC KC5ULN 42 2 12 366 MS
Columbia (MD) ARA K3CUJ 311 2 44 1,746 MDC	YARS/MVRC/SAC ARC/Yolo Co. ARES/BARC W6YAR 75 2 16 1,282 SV	Delaware Lehigh ARC W3OK (+AB3BD) 241 2 50 932 EPA	
The Villages ARC K4VRC 908 1 40 1,740 NFL	North Eastern DX Club KP4DXC 208 2 5 1,266 PR	Great River ARC W0DBQ 211 2 18 912 IA	
Wiregrass ARC W4DHN 371 2 15 1,732 AL	Smithsonian ARG NN3SI 260 2 5 1,260 MDC	Hampden Co. Radio Assn. W1NY 138 2 17 906 WMA	
M&M ARC W8PIF 411 2 29 1,718 MI	Southington ARA W1ECV 268 2 10 1,258 CT	River City AR Comms. Soc. N6PGQ 165 2 4 880 SV	
Etowah Valley ARC W4EVC (+KQ4MFE) 296 2 14 1,689 GA	Kenton ARC W8KTN 192 2 10 1,234 OH	Sarasota Em. RC W4IE 34 2 16 862 WCF	
Matagorda Co. ARC W5WTM 257 2 22 1,678 STX	Winona ARC W0NE 236 2 6 1,224 MN	Carolinas Airstream Club WB4CAC 75 2 3 860 NC	
OK Rovers N0LD 420 2 5 1,658 OK	Sam Houston AR Klub A15M 245 2 5 1,222 STX	Montana Prairie ARC KJ7ZWR 89 2 17 834 MT	
Small Town ARS W5STR 449 2 15 1,650 AR	Powhatan Area RC N4POW 210 2 19 1,214 VA	Metuchen RC K2YNT 273 2 9 824 NNJ	
Phillips Co. ARC W0ZXN 289 2 6 1,622 KS	Club Radioamateur de Drummondville VE2CRD 119 2 12 1,206 QC	Arkansas Radio Em. Srvc. N5AT 137 2 57 824 AR	
Antelope Valley ARC K6OX (+K6A) 153 2 17 1,620 LAX	Alcorn Co. ARC W5AWP 209 2 11 1,192 MS	Newaygo Co. Amateurs NA8M 124 2 6 818 MI	
Central VT ARC W1BD (+K1LNR) 431 2 15 1,597 VT	Brightleaf ARC W4AMC 214 2 15 1,192 NC	TLSC Ham Radio Grp. KC3TL 31 2 15 812 WPA	
Sunnyvale ARES K6SNY 236 2 54 1,590 SCV	York Co. (ME) ARC W1YAC 367 2 5 1,184 ME	Peconic ARC W2AMC 71 2 15 792 NLI	
Indianapolis RC W9JP (+W9ISF) 176 2 38 1,586 IN	Greenwood ARC VE1ARC (+VE1WN) 156 2 22 1,176 NS	Barrow ARC WR4BC 80 2 6 770 GA	
Tarboro RC KO4YJA 106 2 13 1,510 NC	Team Billy Goat KE5AKL 262 2 4 1,172 NM	Williams Co. ARA KT8EOC 9 2 3 768 OH	
Bankhead ARC N4IDX 260 2 10 1,504 AL	Cabarrus ARS K4WC 185 2 21 1,172 NC	Mesabi Wireless ARC NT0B 55 2 10 760 MN	
West Point Fire CERT W6WPT (+K16UTW) 236 2 6 1,499 SJV	Nashville ARC K4CPO 176 2 12 1,154 TN	Cascades ARS WB8JXN 124 2 12 758 MI	
Washington Area ARC W0ARC 224 2 22 1,490 IA	The Albemarle ARS K4WO (+NC4EC) 195 2 15 1,143 NC	Islip ARG K2IRG (+W2TOI) 52 2 8 754 NLI	
Remote Base Contest Club WX8S 261 2 3 1,484 OH	Abbotsford ARES Soc. VE7ECC 296 2 12 1,142 BC	Meriden ARC W1WRG 147 2 14 744 CT	
	Club Radio Amateur VE2CWQ VE2CWQ 211 2 13 1,138 QC	Skyline Tower ARC W7DTV 204 2 4 730 OR	
	Eaton Co. ARC K8CHR 139 2 5 1,128 MI	Victoria ARC W5DSC 136 2 4 722 STX	
	Playground ARC W4ZBB 132 2 3 1,114 NFL	VE6CJ 259 2 3 720 AB	
		Atlantic Region Repeater Legion W2XTV 179 2 3 708 NNJ	

2A — Battery

Colorado QRP Club W0CQC (+KC0VFO) 1,063 5 22 11,440 CO	510 Radio Grp. N1A 945 5 6 10,300 WMA	QRP Pals K9A 966 5 5 10,110 WI	Wilson's Wonders WA7NCL 654 5 5 7,470 EWA
		Ottawa Valley Mobile RC VE3JW (+VE3RAM) 327 5 15 4,140 ONE	
		Lanark North Leeds ARES VE3LCA 164 5 9 2,145 ONE	
		Boone and Hamilton Co. ARES K0KWO 104 5 9 1,545 IA	

2A — Commercial

Charlotte ARS WX4E (+W3IGM) 2,248 2 45 11,704 WCF	Order of Boiled Owls of NY and Radio Central ARC W2RC 2,368 2 21 8,652 NLI	Monte del Estado FD Crew NP3X (+KP3Z) 2,103 2 7 7,930 PR	Smithchart ARS K400 (+KU4S) 1,148 2 10 4,866 NC
		Not Quite Workable Contest Club K8NQW 1,001 2 8 4,554 OH	Sumter ARA W4GL 762 2 25 3,923 SC
		Union Metropolitaine des Sans-filistes de Montreal VE2UMS 726 2 25 3,382 QC	Bearcat DX Club W8BXG (+K8BUB) 1,089 2 11 2,972 OH
		Southwest Dallas Co. ARC W5WB (+W5AUJ) 491 2 26 2,595 NTX	Mountain State Transmitters K8VNU (+AD8DA) 248 2 8 1,957 WV

Douglas Co. ARC W0UK (+N0TFU) 541 2 22 1,792 KS	Stanwood-Camano ARC W7PIG (+KJ7FGG) 1,934 2 25 9,008 WWA	Holland ARC K8DAA 1,512 2 54 5,796 MI	Yellowstone RC K7EFA 682 2 10 3,718 MT
Hambuds AF5M 303 2 15 1,670 STX	Central WV Wireless Assn. K8DF (+WV8HC) 2,169 2 18 8,992 WV	Cumberland Plateau ARC W8EYU (+WA4WSZ) 1,124 2 28 5,720 TN	Schuykill Amateur Repeater Assn. W3SC 956 2 11 3,690 EPA
Lake Whitney ARS NZ5T 334 2 20 1,548 NTX	Lynchburg ARC K4CQ (+W3CQ) 2,191 2 57 8,945 VA	Dallas ARC W5FC 1,134 2 50 5,664 NTX	Nassau ARC K2VN 682 2 41 3,546 NLI
Kansas/Nebraska ARC N0GJ 239 2 34 1,464 KS	North Shore Radio Assn. NS1RA 2,178 2 27 8,864 EMA	San Mateo RC W6UQ (+AJ6VY) 1,183 2 70 5,615 SCV	Mammoth Cave ARC KY4X 718 2 10 3,542 KY
Green Valley ARC N7GV 345 2 26 1,422 AZ	Johnson Co. Radio Amateurs Club W0ERH (+W0AR) 2,531 2 72 8,863 KS	Kanawha ARC W8GK (+KB2HSV) 1,513 2 47 5,609 WV	North Augusta Belvedere RC K4NAB (+K44AMJ) 941 2 25 3,539 SC
Cascade RC W7EK 299 2 12 1,404 WWA	Signal Hill ARC K4NN (+KK4PH) 2,181 2 8 8,660 WV	Barnstable ARC W1MA 1,410 2 30 5,486 EMA	Athens RC W4H (+W4U) 878 2 32 3,528 GA
Iroquois Co. ARC AD9L (+W9GRS) 134 2 17 1,374 IL	Columbus ARC W4CVY (+W4FIZ) 2,191 2 45 8,615 GA	Larkfield ARC W2LRC (+WA2PNU) 1,075 2 53 5,350 NLI	Lehigh Valley ARC W3OI 584 2 25 3,496 EPA
National Trail ARC K9UXZ 865 1 12 1,315 IL	Delaware ARA K8ES (+W8JK) 1,700 2 35 8,387 OH	Susquehanna Valley ARC W3VPJ (+KA3IRJ) 1,214 2 46 5,306 EPA	Maui ARC KH6RS 2,020 1 11 3,493 PAC
Lisbon Area ARA K8GQB (+K8BXT) 402 2 13 1,254 OH	Piglet Radio N9BCN (+KD9YPY) 2,174 2 19 8,183 IN	CARESS-NWARC VE7SCC 1,213 2 50 5,170 BC	Denver RC W0TX 774 2 35 3,422 CO
Statesboro ARS KF4DG (+K04JKO) 302 2 22 1,254 GA	Utah Valley ARC K7UVA (+K7GSL) 1,870 2 43 7,901 UT	Albamarle ARC W4DO (+WA4TFZ) 1,100 2 39 5,017 VA	Livingston Co. AR Klub W8LRK (+K8JBA) 739 2 30 3,418 MI
Scioto Valley ARC W8BAP 274 2 4 1,146 OH	Vienna Wireless Soc. K4XY (+K4HTA) 1,691 2 80 7,736 VA	Brunswick Shores ARC N4GM (+K6RM) 841 2 35 4,847 NC	Southern KY AR Transmitting Soc. KY4AR (+WB2UBW) 566 2 40 3,400 KY
Indian River ARC AJ4IR (+W4NLX) 345 1 6 1,095 SFL	Tallahassee ARS K4TLH (+K24EA) 1,746 2 51 7,653 NFL	Panoramaland ARC K7JAR (+KL7LL) 761 2 32 4,672 EWA	Spokane DX Assn. K7SDX 706 2 13 3,362 ID
River Hills ARC W0RHX 102 2 14 954 MO	Sun Parlour ARC VE3SPR 2,125 2 20 7,618 ONS	Ski Country ARC K0RV 1,283 2 31 4,656 CO	West Carroll W6WU 793 2 3 3,362 MDC
Carbon ARC W3HA 272 2 20 918 EPA	St. Louis ARC K0LIR 1,888 2 17 7,482 MO	Garden State ARA W2GSA (+KE2BRG) 918 2 40 4,598 NNJ	Ak Sar Ben ARC K0USA 770 2 20 3,356 NE
Richmond Amateur Telecom. Soc. W4RAT 276 2 40 802 VA	Boulder ARC W0DK (+WE7A) 1,948 2 32 7,397 CO	Idaho Mountain ARS KX7ID (+KB7ZPU) 860 2 10 4,488 ID	Ole Virginia Hams W4OVH 499 2 15 3,336 VA
Moose Jaw ARC VE5MA 191 2 14 778 SK	Annapolis Valley ARC and Kings Co. ARC VE1LD (+VA1AVR) 1,397 2 35 7,363 NS	Summit Co. ARS W8ORC (+W6VM) 1,444 2 8 4,481 OH	South West Idaho ARC K7SWI (+KK4ADO) 648 2 47 3,333 ID
Prescott-Russell ARC VE3PRD 234 2 7 652 ONE	Oh-Ky-In ARS K8SCH (+N8YC) 1,640 2 30 7,303 OH	Grand Strand ARC W4GS (+N4BAK) 958 2 43 4,473 SC	Blue Springs ARC K0M (+N0NNP) 665 2 11 3,321 MO
Southern IN Tri-Co. Club KC9OLF 241 2 4 632 IN	Valley and Massanutten ARA W4XD (+K4MRA) 1,429 2 42 7,283 VA	McKinney ARC W5MRC 1,325 2 67 4,446 NTX	Mining ARC/St. Paul RC W0MR (+K0AGF) 550 2 61 3,230 MN
Pony Express Re-Ride Radio Relay Station N7E 57 2 3 624 NV	Okaw Valley ARC K9O (+AD9OV) 1,641 2 70 7,232 IL	Michiana ARC W9AB (+N9YOU) 1,098 2 15 4,471 IN	Middle TN ARC W4UOT (+KE4LPL) 519 2 14 3,161 TN
Osage Co. ARC N0OC 161 2 10 598 KS	Port City ARC K1R (+W1WQM) 1,846 2 25 7,094 NH	Moreno Valley ARA AB6MV (+K06CGU) 878 2 18 4,414 ORG	Fond du Lac ARC W9EBV (+N9RPJ) 476 2 19 3,125 WI
Clallam Co. ARC W7FEL 92 2 10 574 WWA	Cedar Valley ARC/Collins ARC W0CXX (+W0GQ) 1,975 2 50 7,049 IA	Springhill Repeater Assn. W4C (+WT4CC) 823 2 20 4,354 TN	Barrie ARC VE3GCB (+VE3WEX) 754 2 18 3,107 ONS
Mackenzie Regional RC VE6MRF 116 1 8 473 AB	Dial RC of Middletown K8PI (+W8BLV) 1,499 2 27 6,997 OH	Central MI ARC W8MAA (+KD8ONC) 896 2 50 4,352 MI	The Noise Blankers Radio Grp. WR5P 769 2 4 3,074 AR
Eden Prairie RC K0EPR 89 2 9 432 MN	Virginia Beach ARC W4UG (+K4IX) 1,700 2 41 6,852 VA	ARTS of Louisville W4CN (+KY4DX) 992 2 13 4,320 KY	Delta and Neshoba ARC Memphis W4BS (+W4NRC) 508 2 52 3,060 TN
Eastern NM ARC KA5B 164 2 15 402 NM	Williamsburg Area ARC K4RC (+AI4WU) 1,354 2 134 6,842 VA	Tippecanoe ARA W9REG 902 2 27 4,186 IN	Austin ARC W5KA (+K5LBJ) 446 2 45 3,060 STX
Southeast LA ARC WM5T 23 2 10 396 LA	Tennessee Valley DX Assn. N4LT 1,543 2 26 6,798 TN	Sudbury ARC VE3AC (+VE3GSU) 700 2 12 4,175 ONN	Decatur ARC W4ATS (+K4HNNH) 604 2 50 3,041 AL
Leflore Co. Comm. Support Team N5CST 27 2 4 250 OK	The 415 ARC N9WH (+W9JM) 1,299 2 30 6,797 IL	Morris RC/Hanover Township W2YD 888 2 21 4,158 NNJ	Murray State Univ ARC K4MSU (+W4GZ) 501 2 46 3,038 KY
Brandon ARC VE4QD 30 2 5 160 MB	Macoupin Co. ARC K9M (+K9MCE) 1,804 2 28 6,664 IL	South Orange ARA K6SOA (+K6WO) 804 2 85 4,143 ORG	Central MA ARA W1BIM (+WK1H) 703 2 19 3,032 WMA
3A	Ellsworth Amateur Wireless Assn. W1TU (+KB1NEB) 1,312 2 15 6,645 ME	Jefferson Co. (TX) ARC W5SSV 843 2 38 4,112 STX	Joplin ARC W0IN (+KB0STN) 797 2 20 2,944 MO
North Fulton ARL K4JJ (+NF4GA) 3,905 2 96 16,234 GA	Nixa ARC W0A (+K0NXA) 1,978 2 20 6,122 MO	Utah ARC W7SP 1,573 2 21 4,060 UT	Hamfesters RC W9AA (+KC9CDL) 434 2 33 2,913 IL
Rochester (NY) DX Assn. W2RDX (+W2AN) 3,342 2 30 15,562 WNY	Central OR DX Club N7LE 1,528 2 14 6,114 OR	Blue Ridge ARC W4YK (+NA4X) 770 2 44 4,005 NC	Helena ARC W5HAR (+KD5BS) 500 2 32 2,890 AR
Prairie Dog ARC W0QJY (+W0EJ) 3,268 2 34 13,230 SD	Monroe Co. ARES W2XRX (+WB2EOC) 1,111 2 40 6,102 WNY	Riverside Co. ARA W6TJ (+K06DEZ) 707 2 14 3,994 ORG	Lenoir ARC N4LNR 627 2 32 2,878 NC
North Shore RC (IL) K9SS (+NS9RC) 2,784 2 107 12,189 IL	Monkey Lover's Radio Consortium K6MMM (+N6OTA) 1,418 2 90 6,095 SCV	Hughes ARC W6HA (+N6VZF) 799 2 31 3,979 LAX	Pilot Knob ARC W0EBB (+KS0LV) 552 2 19 2,873 KS
Randallstown ARC N3IC (+K3MZ) 2,749 2 21 12,028 MDC	Nashua Area Radio Soc. N1FD (+W1SMN) 1,412 2 20 5,852 NH	Tri Co. ARC (GA) W4T4C 1,291 2 30 3,968 GA	Virgin Valley ARC KE7END (+KE7EIF) 362 2 14 2,865 NV
Fulton Co. (IL) ARC K9ILS 2,580 2 17 10,568 IL	Gold Coast ARA N4FL 1,218 2 66 5,850 SFL	Oklahoma City Autopatch Assn. W5MEL (+W5TJS) 697 2 19 3,945 OK	Motorola ARC W7MOT (+K7BLT) 385 2 15 2,864 AZ
Providence Radio Assn. W1OP (+W1C) 2,718 2 48 10,520 RI		Delaware Repeater Assn. K3WJV 906 2 12 3,854 DE	HPT/SPARK/PARC/NNACT W4MT 471 2 58 2,856 VA
Forx ARC N0GF (+ND0GF) 2,475 2 24 9,629 ND		High Appalachian Mountain ARS KE4MH (+KQ4NAV) 540 2 4 3,782 NC	Pikes Peak Radio Amateur Assn. AF0S (+K0NTS) 437 2 20 2,835 CO
United Radio Amateur Club K6AA 2,592 2 12 9,414 LAX			Wichita ARS N5WF 583 2 12 2,830 NTX
ARES of Douglas and Elbert Co. N0KV (+N0IVN) 2,324 2 28 9,400 CO			Gulf Coast ARC WA4GDN 536 2 10 2,824 WCF
Wireless Soc. of Southern ME W1M (+KC1JMH) 2,149 2 19 9,326 ME			
Mountaineer ARA W8SP (+AE8K) 1,804 2 19 9,234 WV			

River City ARC N6NA 625 2 8 2,762 SV 721st Mechanized Contest Battalion WC2FD 691 2 20 2,720 NNJ Estero RC W6JU (+W6SLO) 465 2 14 2,703 SB	Snohomish Co. Hams Club WA7LAW 456 2 43 2,098 WWA Clark Co. (IN) ARC W9WWI (+W9JBQ) 587 2 9 2,082 IN Eastern Ozarks ARC K0EOR (+K0FOHOG) 255 2 4 2,075 MO Kishwaukee ARC W9XF 390 2 6 2,070 IL 3 Rivers ARC W7W 707 2 19 2,064 ID Scarborough ARC VE3WE (+VE3TNC) 483 2 30 2,062 GH Lambton Co. RC VE3SAR (+VA3OIL) 180 2 10 2,027 ONS	Middlesex ARS W1EDH 299 2 10 1,644 CT Western IL ARC W9AWE 279 2 10 1,638 IL Ruckerville Amateur Transmitting Soc. N4CVG 271 2 19 1,636 KY Green Bay Mike & Key Club K9EAM 309 2 37 1,622 WI Garrett Co. ARES K3LNZ 204 2 3 1,594 MDC Tri-Lakes ARC W0TRI 114 2 20 1,564 MO Snoring Beagle Ranchers W6RRI 303 2 3 1,562 MI Palouse Hills ARC KD7PH (+KK7VO) 142 2 16 1,557 ID Wexauke ARC K8CAD 302 2 18 1,528 MI Frederick ARC K3ERM (+KC3MBE) 212 2 15 1,525 MDC Orange Co. (IN) ARC KB9OHY 257 2 9 1,516 IN Westmoreland ARC NN4VA (+KM4KAF) 285 2 10 1,516 VA Genesee Co. RC W8ACW (+KC8KGZ) 192 2 26 1,456 MI Adrian ARC W8TQE 210 2 14 1,456 MI Southwest IA ARC K0SWI 232 2 7 1,454 IA Skamania Co. ARES W7SKA 108 2 10 1,448 WWA Ozark Mountain ARC N0OMR (+KF0POL) 129 2 34 1,447 MO Pueblo West ARC NA0PW 278 2 12 1,422 CO South Alabama RC W4CM 208 2 18 1,420 AL Northwest OH ARC W8EQ (+KE8NRP) 120 2 26 1,400 OH Twin City FM Club W0EF 177 2 8 1,384 MN Twin Cities Repeater Club W0BU 197 2 6 1,362 MN Morrow Co. ARS. W8NL 445 2 6 1,354 OH Sweetwater ARC WY7U 129 2 20 1,342 WY Tideland ARS K5BS 253 2 15 1,326 STX Campbell River ARS VA7CRC 310 2 12 1,324 BC Mt. Magazine ARC W5MAG 280 2 7 1,310 AR Radio Operators Assn. of Dallas W7ORE 302 2 10 1,310 OR Elgin ARS VE3RSE 177 2 15 1,304 ONS Brandon ARS K4TN (+KC4MMR) 40 2 29 1,300 WCF Southwest Community Radio System N7GMR 146 2 3 1,300 AZ Ridge ARC W4RRRC 234 2 30 1,278 SC San Clemente Island RC KN6UWK 150 2 3 1,272 LAX Suburban UHF Amateur Repeater Soc. K9SA 241 2 15 1,260 IL Macon Area Ham Radio Soc. K4MHR 364 2 7 1,258 TN N6M 401 2 3 1,256 SJV Cherryland ARC W8TCM 232 2 24 1,256 MI Radio Club of Redmond N7KE 177 2 19 1,254 WWA Amigos RC Ashtabula KC8OH (+KC8LAR) 317 2 18 1,240 OH San Bruno ARC K6PVJ (+KN6KOO) 19 2 12 1,238 SCV Southern PA ARC K3IR 230 2 10 1,226 EPA Anoka Co. RC W0YFZ 199 2 15 1,220 MN Chautauqua Co. Amateur FM Assn. K2HE 220 2 19 1,214 WNY Kingsport/Bays Mountain ARC W4TRC 175 2 11 1,210 TN Troy ARA NY2U 22 2 9 1,206 ENY	San Benito Co. ARA N6SBC 91 2 7 1,192 SCV Princeton Ham RC W4KBL 160 2 32 1,192 KY Thunder Bay ARC K8PA 234 2 16 1,182 MI Southern Amateur Radio Union KT4CW 32 2 5 1,178 NFL Hassayampa AR Klub W7HRK 195 2 5 1,174 AZ Land of Lakes ARC K9HD 84 2 9 1,168 IN Lodi ARC N6SJV 186 2 15 1,168 SJV Plano AR Klub K5PRK 88 2 12 1,164 NTX Wood Co. ARC K8TIH 184 2 8 1,162 OH David M. Fiedler Memorial ARC K4WAR 249 2 7 1,158 GA Northeast MO ARC W0CBL 193 2 8 1,144 MO Skyline ARC K2IWR 184 2 7 1,122 WNY Albany ARC W4MM 110 2 6 1,102 GA Spirit Mountain ARC KS7MC 149 2 3 1,086 AZ Village 7 ARC KC0RVS 213 2 18 1,076 CO Southern AR Experimenters Club W5AXC 250 2 3 1,074 MS Ft. Venango Mike and Key Club W3ZIC 173 2 12 1,040 WPA Hi-Line ARC W7HAV 94 2 9 1,038 MT Merrymeeting ARA KS1R 74 2 16 1,032 ME Great Bay Radio Assn. W1FZ 71 2 10 1,030 NH Univ. of Arizona ARC K7UAZ 146 2 16 1,022 AZ Club Radio Amateur de l'Outaouais VE2CRO 209 2 8 1,012 QC Northwest IL RC W9F 116 2 7 1,002 IL Kititas Co. ARC N7KGS 24 2 4 998 EWA South Side ARC N0ET 248 2 13 996 MO Bloomfield ARC W1CWA 101 2 14 990 CT Mine Creek ARC KK0Y 82 2 13 986 KS Bastrop Co. ARC K5OQ 206 2 8 984 STX Casper ARC W7VJ 125 2 7 982 WY Detroit Lakes ARC W0EMZ (+KF0IBC) 33 2 10 969 MN Wisconsin Valley Radio Assn. W9NA 136 2 10 966 WI Bill Gremillion Memorial RC K4SEX 72 2 13 924 GA Lebanon Valley Soc. of Radio Amateurs K3LV 113 2 10 920 EPA Burlington Co. RC K2TD 17 2 15 904 SNJ Georgian Bay ARC VE3OSR 102 2 12 892 ONS Central OR AR EmComm Team K7HWY 109 2 4 888 OR Ohio Valley ARC KT9K 156 2 15 880 IN Englewood ARS N4EAR 113 2 21 820 WCF Rip Van Winkle ARS WD2K 130 2 10 810 ENY Framingham ARA W1FY 79 2 6 788 EMA Bishop ARC N6OV 63 2 6 776 ORG Cape Ann ARA NQ1W 5 2 10 760 EMA Aero ARC W3PGA 200 2 12 756 MDC Hell's Gate ARC WA7HGR 42 2 7 754 ID Le Club de Radio Amateur de VE2CVA VE2CVA 1 2 10 752 QC LA CQ Club AB6CQ 59 2 9 750 LAX Metropolitan ARC K8NOW 125 2 5 726 MI Brookings Radio Research Club W0BXO 105 2 7 720 SD Anritsu ARC K6AAR 134 2 3 718 SCV
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The Albuquerque Bois NM2AT 56 2 3 692 NM	Patoka Valley ARC KD9LLH 522 2 22 2,146 IN	Albany ARA K2CT (+K2ALB) 1,409 2 31 6,531 ENY	Mt. Vernon (OH) ARC K8EEN 774 2 23 3,204 OH
American Legion Post 283 K16IRL 17 2 5 684 LAX	Rockingham Co. ARC N4IV 457 2 8 1,852 NC	Shelby Co. ARC K4W 1,314 2 15 6,386 AL	Reading RC W3BN 752 2 70 3,164 EPA
Keystone VHF Club W3HZU 164 2 3 678 EPA	Madison Co. ARC KE8RV 264 2 25 1,766 OH	Fauquier ARA W4VA (+N4HKZ) 1,297 2 32 6,327 VA	Windmill ARG W3LTR (+N3AGG) 655 2 16 3,148 EPA
Highland ARA K8HO 81 2 17 672 OH	East Pasco ARS K4EX 272 2 43 1,730 WCF	Boston ARC W1BOS 1,496 2 25 6,234 EMA	South Lyon Area ARC N8SL 736 2 31 2,998 MI
American Legion Post 104 ARC AL4US 54 2 19 666 TN	Country Pond ARG W1CPG 396 2 11 1,670 NH	W7YED 1,438 2 8 5,674 WWA	Basin ARC W7BAR (+KG7VYS) 759 2 30 2,891 UT
NE TN District 7 SKYWARN WX4TN (+K4SDT) 45 2 3 640 TN	Portsouth RC N8QA 479 2 19 1,604 OH	Yonkers ARC W2YRC (+KF2FK) 1,229 2 58 5,400 ENY	Santa Barbara ARC K6TZ (+N6SBA) 504 2 12 2,839 SB
AI7PM 151 2 4 620 WY	Hidden Valleys ARC KC9KQ (+KC9MCC) 287 2 18 1,392 WI	Hazel Park ARC W8HP (+W8JXU) 1,137 2 19 5,384 MI	Mt. Diablo ARC W6CX 493 2 42 2,814 EB
Fulton Co. (IN) ARC K9RCR 30 2 5 620 IN	Kennehoochee ARC W4BTI 420 2 12 1,368 GA	Ft. Smith Area ARC W5ANR 1,212 2 10 5,280 AR	Appalachia ARC W4CNC 877 2 15 2,804 NC
Cape Ann ARA W1GLO 31 2 5 612 EMA	Splitrock ARA WS2R 140 2 15 1,348 NNJ	Radio Club of Tacoma W7DK 1,554 2 66 4,982 WWA	South Bay ARA KU6S 1,353 1 18 2,781 EB
Mayfield Graves Co. ARS W4TZX 77 2 6 604 KY	Hocking Valley ARC K8LGN 125 2 19 1,090 OH	Radio Amateurs of Greater Syracuse W2AE (+KC2HO) 786 2 38 4,956 WNY	Four Lakes ARC W9JZ 645 2 20 2,748 WI
West Desert ARC W7EO 11 2 4 590 UT	Cross Co. ARC WA5CC 169 2 6 972 AR	Barstow ARC WA6TST (+K6B) 1,242 2 11 4,943 ORG	Hernando Co. ARA K4BKV 617 2 6 2,740 NFL
Northern CO ARC W0UPS 81 2 5 586 CO	Fannin Co. RC K5FRC 221 2 23 904 NTX	Oregon Tualatin Valley ARC W7OTV 1,454 2 67 4,908 OR	Lapeer Co. ARA W8LAP (+KD8YUK) 473 2 32 2,713 MI
South Texas ARC N5CRP 19 2 4 526 STX	West River RC WR1VT 159 2 12 738 VT	N4N Field Day Grp. N4N (+WB4SQ) 1,021 2 13 4,707 GA	Bowie Wireless Assn. K3BWA 744 2 12 2,710 MDC
High Desert ARC KF5QYG 43 2 15 522 OR	Big Bend ARC KC9LMF 22 2 9 724 IL	Superstition ARC K7K (+WB7TJD) 1,264 2 32 4,676 AZ	Tompkins Co. ARA AF2A 554 2 13 2,694 WNY
Team Ferret AC1BZ 31 2 4 512 NH	Eau Claire ARC W9EAU 153 2 13 702 WI	Lakeland ARC K4LKL 1,068 2 38 4,630 WCF	St. Louis and Suburban RC W0SRC 494 2 50 2,676 MO
Defiance Co. ARC K8VON 42 2 3 476 OH	Wellesley ARS W1TKZ (+W1HEB) 141 2 25 696 EMA	Edmond ARS K5EOK 855 2 80 4,586 OK	Warminster ARC K3DN (+K3KH) 560 2 30 2,669 EPA
Sequoia ARG N6KRV 9 2 5 468 SJV	W4IBM ARC W4IBM 186 2 7 676 GA	Glynn ARA K4E 1,045 2 5 4,556 GA	Coffeyville ARC WR0MG 430 2 32 2,662 KS
Lake Cumberland ARA N4LCA 106 2 21 386 KY	Nanticoke ARC W3TBG 164 2 4 596 DE	Northeast ARC N1ERC 1,210 2 22 4,556 EMA	Culpeper ARA W4CUL (+KO4NMJ) 316 2 28 2,647 VA
St. Mary's ARC VE3SDF 35 2 5 220 ONS	Henderson ARC W7HEN 133 2 65 538 NV	Columbia-Montour ARC WE3U (+W3ZR) 671 2 14 4,548 EPA	Daytona Beach ARA K4BV (+N4HSA) 284 2 30 2,645 NFL
Radio Amateurs of Corry W3YXE 6 2 3 62 WPA	The Beekers W6BCE 66 2 3 500 ORG	Ocean Monmouth ARC N2MO 868 2 20 4,456 NNJ	Granite State ARA N1QC (+N1JUR) 514 2 20 2,614 NH
3A — Battery			
NE TX QRP Contest Fed. KA5CJJ 730 5 3 7,650 NTX	Twin Rivers ARC W9TRA 72 2 3 498 IL	Westchester EmComm Assn. N2SF (+W2ECA) 1,016 2 25 4,415 ENY	Bledsoe Co. ARC N4BCT (+KC4AC) 363 2 8 2,560 TN
Sedan ARC W0NPN (+K3UQ) 580 5 3 6,700 WV	Aiken RC KE2HG 99 2 6 420 SC	Lewisville ARA W5LVC 731 2 8 4,260 NTX	Medina Co. AR Corp. KD5DX 599 2 48 2,498 STX
South Plainfield ARC NJ2SP (+K2DFSJ) 432 5 15 5,135 NNJ	Langley ARA VE7LGY 77 2 8 380 BC	Riverland ARC W9UP (+AB9NE) 674 2 17 4,059 WI	Maury ARC W4GGM (+KO4HUV) 479 2 23 2,443 TN
NJ2SP (+K2DFSJ) 432 5 15 5,135 NNJ	Bartlesville ARC W5NS 88 2 12 360 OK	York Region ARC VE3YRA (+VE3YRK) 696 2 56 3,980 GH	Royal Gorge ARC KB0TUC (+NC0A) 354 2 12 2,438 CO
Southern VT ARC K1SV 264 5 8 2,725 VT	Suncoast ARC VE7SYR 41 2 6 354 BC	Grande Ronde Radio Amateurs Assn. W7GRA 865 2 22 3,946 OR	Quinte RC/Prince Edward RC VE3RL 574 2 20 2,432 ONE
Western Hemisphere Amateur Contest Club VA3WHC 155 5 3 2,075 GH	Sachse ARA W5SRA 38 2 10 266 NTX	Williamson Co. ARC N5TT 871 2 29 3,874 STX	Eastern Fulmont ARC W2F 352 2 8 2,428 NNY
3A — Commercial			
Bella Vista RC W5NX (+N5BVA) 2,523 2 103 9,720 AR	Sierra Foothills ARC W6EK (+NN6H) 3,355 2 178 14,221 SV	Washington Amateur Comm. WA3COM (+NY9H) 756 2 31 3,844 WPA	Sangamon Valley RC W9DUA 537 2 10 2,428 IL
Sawnee ARA N4NE (+WX4EOC) 1,974 2 82 8,001 GA	Midessa Field Day Grp. KD5C (+W5QGG) 3,412 2 20 13,490 WTX	Grand Rapids ARA W8DC 1,090 2 36 3,786 MI	Southern PA Comm. Grp. K3AE 477 2 25 2,370 EPA
Mobile ARC W4IAX (+K4DSR) 1,298 2 22 5,150 AL	Portage Co. ARS K8BF (+AC8NT) 3,553 2 66 12,230 OH	Stebenville-Weirton ARC W8CWO (+KE8NKKV) 801 2 23 3,743 OH	Central MO Radio Assn. K0SI (+KE0SIY) 285 2 30 2,364 MO
Sterling Park ARC K4NVA (+N4K) 908 2 17 4,199 VA	Rocky Mountain Ham Radio N0SZ (+W0KVA) 2,861 2 51 11,601 CO	Southeastern CT ARS W1QV 737 2 25 3,736 CT	Newton ARC N0NK (+W0BZN) 496 2 9 2,340 KS
Voice of Idaho RC W7VOI (+WH6FIG) 868 2 3 3,831 ID	Arrow Comm. Assn. W8A (+W8RP) 2,185 2 48 9,901 MI	Los Angeles City ACS N6ACS 911 2 14 3,636 LAX	North Richland Hills ARC W5R (+K5R) 335 2 13 2,338 NTX
Drake ARC K8UU 914 2 11 3,740 OH	Livonia ARC/Ford ARL K8UNS 2,765 2 66 9,674 MI	Solivita RC N4SRC 794 2 8 3,578 WCF	Peterborough ARC VE3RB 613 2 23 2,248 ONE
SMARTS RC WB0RMK (+K0LLT) 648 2 12 3,399 MN	Ozaukee RC W9CQO (+AE9MY) 2,250 2 40 8,517 WI	Island Co. ARC W7AVM 665 2 46 3,574 WWA	Alford Memorial RC W4BOC 323 2 8 2,234 GA
Stubblefield Repeater Club KF4UTJ (+KE4YRI) 628 2 15 3,380 KY	Clark Co. (WA) ARC W7AIA (+N7HR) 2,100 2 130 8,433 WWA	Two Rivers ARC of McKeesport W3OC (+KC3YKT) 870 2 16 3,552 WPA	Downey ARC W6TOI 417 2 11 2,208 LAX
Orlando ARC K1AA (+W1SE) 697 2 35 3,218 NFL	Sun Country ARS N4EK 1,928 2 23 8,106 NFL	RF Hill ARC W3AI 1,007 2 16 3,434 EPA	McMinn Co. ARC K4RST 367 2 16 2,092 TN
Keowee Toxaway ARC K4WD (+K4MDI) 770 2 30 2,749 SC	Alachua EOC RC NF4AC 1,643 2 15 7,890 NFL	Elko ARC W7V (+KM7SC) 706 2 30 3,400 NV	Lakes Region Repeater Assn. W1BST (+WX1NE) 305 2 14 2,086 NH
Metrocrest ARS KB5A (+NN5R) 496 2 36 2,683 NTX	West Fork ARC W5T (+W5FKN) 2,627 2 20 7,268 NTX	Chesapeake Bay Radio Assn. WD3E (+WA3SFJ) 547 2 41 3,398 MDC	Southern OH Friends of AR W8PU 445 2 12 2,074 OH
Cumberland ARC K3IEC (+AF3I) 421 2 23 2,446 EPA	Platinum Coast ARS W4MLB (+K5LD) 1,595 2 33 7,123 SFL	Columbia ARS NF4CQ 626 2 10 3,344 NFL	Jackson Co. ARES K4A 549 2 19 2,056 AL
Radio Assn. of Western NY W2PE 596 2 16 2,224 WNY	Kent Co. ARC N3Y (+W3DOV) 1,814 2 18 7,004 DE	Coos Co. RC K7CCH 739 2 31 3,342 OR	ARC of Parker Co. W5PC 599 2 16 2,052 NTX
Macon Co. ARC N0PR 518 2 5 2,170 MO		St. Clair ARC K9GXU 791 2 11 3,318 IL	Niagara Peninsula ARC VE3VM (+VE3GGR) 358 2 15 2,001 GH
		Fair Lawn ARC W2NPT (+KD2KLN) 559 2 26 3,254 NNJ	Boerne ARC AB5UE 235 2 7 1,976 STX

Milwaukee School of Engineering ARC					
W9HHX (+W9POG)	398	2	19	1,959	IL
Dupage ARC					
K9K	194	2	40	1,948	IL
Coastal ARS					
W4LHS	362	2	25	1,940	GA
Garland ARC					
K5QHD	360	2	30	1,934	NTX
Mesilla Valley RC					
N5BL	235	2	21	1,932	NM
Sask Alta RC					
VE6DDAY	903	1	22	1,899	AB
Tri-States ARC					
W4GTA (+W4LMS)					
359	2	4		1,888	GA
Beaver Valley ARA					
W3SGJ	388	2	16	1,840	WPA
Ft. Wayne RC					
W9TE	381	2	31	1,834	IN
Golden Spike ARC					
K7UB	426	2	32	1,822	UT
Tennessee Valley Contest Club					
KI4TV	380	2	4	1,818	TN
ARC of Augusta					
W4DV (+K04FFB)					
128	2	18		1,812	GA
KTQA Irregular RC					
N9MII	395	2	7	1,804	WWA
ARC of Columbia Co.					
K4KNS	218	2	43	1,788	GA
Rome RC					
W2OFQ	177	2	5	1,734	WNY
Allegan Co. ARC					
AC8RC (+W8RMN)					
273	2	19		1,726	MI
Centralia ARES					
K7CEM	338	2	25	1,716	WWA
Indian Peaks RC					
W0NED	309	2	6	1,714	CO
Wichita ARC					
W0W	344	2	27	1,690	KS
Florence ARC					
W4ULH	230	2	26	1,686	SC
Northern Lakes ARC					
K0GPZ	261	2	8	1,680	MN
Jones Co. ARC					
W0CWP	232	2	10	1,636	IA
Rainbow Canyon ARC					
N7U	287	2	11	1,632	UT
Lamorinda Area Radio Interest Grp.					
K6ORI	61	2	13	1,582	EB
North Shore ARC (ON)					
VE3NSR	178	2	12	1,568	GH
Mid Island Radio Assn.					
VE7MIR	179	2	25	1,526	BC
Elk Co. ARA					
N3NIA	286	2	10	1,522	WPA
Chippewa Valley ARC					
W9CVA	156	2	12	1,522	WI
Tamaqua Wireless Assn.					
W3TWA (+W3CMA)					
381	2	14		1,512	EPA
Walton Co. Repeater Grp.					
WC4RG	162	2	10	1,508	GA
Calvert ARA					
K3CAL	181	2	17	1,506	MDC
Sun City Hilton Head ARC					
KE4HAM	148	2	16	1,494	SC
Clay Co. AUXCOMM					
N9CCA	209	2	8	1,456	IN
Skywide ARC					
VE3SKY	134	2	5	1,456	ONS
San Fernando Valley ARC					
W6SD	141	2	25	1,442	LAX
Birmingham ARC					
W4CUE (+KN4CXE)					
254	2	30		1,414	AL
Heartland Hams ARC					
N0WKF	406	2	4	1,412	IA
Kay Co. ARC					
N5PC	207	2	15	1,404	OK
Clinton Co. ARA					
W8GO (+K8SP)					
145	2	11		1,404	OH
Longmont ARC					
W0ENO (+K0ITP)					
128	2	40		1,392	CO
Kent ARS					
K3ARS	171	2	4	1,380	MDC
Iola ARC					
W10LA	156	2	7	1,360	KS
Glenn ARS					
KJ6HCG	203	2	20	1,348	SV
San Francisco RC					
W6PW (+KN6PNF)					
69	2	17		1,345	SF
King George AR Operators					
K4GVA	46	2	18	1,324	VA



McKenzie Denton, KO4GLN, explains how foxhunting works to Jake Cyr, KQ4MOH, and Matt Jackson at the Williamsburg Area Amateur Radio Club, K4RC, Field Day in Virginia. [Dan Ewart, WG4F, photo]

Lockport ARA					
W2RUI	255	2	11	1,308	WNY
Insurance City Repeater Club					
W1DHT	207	2	14	1,300	CT
Wilson ARC					
WC4AR	168	2	4	1,286	TN
Western CO ARC					
W0RRZ	256	2	22	1,282	CO
Hancock AUXCOMM Team					
WV8HAT	208	2	10	1,276	WV
Cherokee Capital ARS					
K4WOC	164	2	16	1,206	GA
Northern New England Field AR Ops					
NE1FO	196	2	5	1,180	NH
Indiana Co. Em. Mgmt. Agency RC					
WB3CGY	57	2	8	1,150	WPA
McMinnville ARC					
W7RXJ (+W7YAM)					
159	2	25		1,144	OR
Fulton Co. (OH) ARC					
K8BXQ	180	2	8	1,134	OH
Monroe Co. ARS					
N4MCH	201	2	20	1,086	GA
Mid-State ARC					
W9MID	151	2	18	1,072	IN
Red Rose Repeater Assn.					
W3RRR (+W3MWC)					
106	2	11		1,063	EPA
Comm. Support Team for					
Puget Sound Fire					
K7CST	87	2	5	1,034	WWA
Milton ARC					
W4VIY	146	2	9	1,014	NFL
State Line RC					
N3SLC (+W5QS)					
123	2	13		996	MDC
Assn. Radio Amateurs of Long Beach					
W6RO	1	2	42	972	LAX
Big Signal ARC					
KE8PUB	91	2	6	964	MI
Skywide ARC					
VE3SKI	36	2	14	922	GH
Yellow Thunder ARC					
WB9FDZ	184	2	10	918	WI
Simpson Co. ARS					
KN4UTV	180	2	5	910	KY
Wireless Soc. of Lorain Co.					
K8WSL	75	2	4	900	OH
Southborough Rod & Gun ARC					
W1SRG	157	2	5	892	WMA
Sunset Empire ARC					
W7BU	8	2	9	886	OR
Las Moras ARC					
AA5KC	74	2	5	876	STX
Santa Clarita ARC					
W6JW	139	2	10	828	LAX
Ogemaw Arenac ARS					
K8OAR (+W8COP)					
66	2	4		823	MI
Maple Ridge ARC					
VE7CMR	126	2	4	802	BC
Cy-Fair CERT					
W5CFC	26	2	6	802	STX
Healing Springs Mtn. VHF Soc.					
W4PAR	81	2	10	776	NC
K28U (+KB8JOE)					
84	2	4		753	OH
Dade ARES					
K4SOD	103	2	4	742	GA
Cumberland Valley ARC					
W3ACH	53	2	5	734	WPA
Stillwater ARC					
K5SRC	33	2	6	716	OK
Radio Operators of Camden Co.					
K2AUD	57	2	5	664	SNJ
STARS ARC					
W9SRC	57	2	12	664	IL
Chehalis Valley ARS					
KJ7ZTH	34	2	12	586	WWA
STARS ARC					
KD9GHO	10	2	4	472	IL
Black Hills ARC					
W0BLK	99	2	10	408	SD
Villa Rica RC					
WR4VR	96	2	20	242	GA
4A — Battery					
St. Louis QRP Soc.					
N0A	733	5	14	8,320	MO
PART of Westford					
K1IG (+KB1OIQ)					
681	5	57		7,805	EMA
Portland ARC					
W7LT (+K7MAX)					
644	5	40		7,375	OR
Eddie and Joe Tech Club					
W7P (+N9JYV)					
447	5	5		5,650	AZ
Korean Ham Club					
KF6JBN	51	5	15	1,255	LAX
4A — Commercial					
Kingston Area Amateurs					
VA3DO	1,566	2	4	5,272	ONE
Koorner Ridge Contesters					
K1CCN	1,423	2	6	4,298	WI
Central IL RC					
W9EX (+KD9ZLC)					
812	2	29		3,931	IL
Silver Springs RC					
K4GSO	853	2	36	3,408	NFL
West Georgia ARS					
W4F (+WX4BK)					
719	2	40		3,102	GA
Seaway Valley ARC					
VE3MMH	1,008	2	16	2,745	ONE
Onslow ARC					
NC4OC (+WD4FVO)					
721	2	32		2,652	NC
Golden Empire ARS					
W6RHC (+WN6P)					
450	2	40		2,635	SV
Education Alliance for AR					
K3Q (+W3FRB)					
571	2	8		2,546	EPA
High Point ARC					
W4UA	513	2	31	2,476	NC
Jersey Shore ARS					
NJ2AR (+K2HVE)					
436	2	20		2,455	SNJ
Rockwall ARC					
K5RKW	576	2	17	2,430	NTX
Runestone ARC					
W0ALX	340	2	16	2,138	MN
Jacksonville ARS					
K9JX	805	1	11	1,898	IL
Ft. Armstrong Wireless Assn.					
K3QY	425	2	10	1,682	WPA
Richfield RC					
W0RRR	198	2	28	1,454	MN
Pioneer ARC					
K0SW	476	2	15	1,448	NE
Lakeshore ARA					
W9LRC	310	2	6	1,292	WI
West Valley ARC					
W7Z	222	2	23	1,218	AZ
Tipton ARS					
W4TIP (+K24CR)					
102	2	12		863	TN
Kankakee Area Radio Soc.					
W9AZ (+K9FO)					
164	2	4		791	IL
Jay Co. ARC					
W9JCA	150	2	17	772	IN
St. Augustine ARS					
N4AUG	180	2	15	558	NFL
VE6FAR Cycle 25					
K7EUR	79	2	4	408	MT
Elkhorn Valley ARC					
W0OFK	56	2	15	210	NE
5A					
Black River Radio Ops					
NW8S (+N8ESG)					
2,780	2	8		11,300	OH
Sussex Co. ARC					
W2LV	2,949	2	23	11,254	NNJ
Cuyahoga Falls ARC					
W8VPV (+AE8MM)					
2,487	2	44		8,766	OH

985 Repeater Grp. W3R (+K3DTS) 1,131 2 20 7,106 EPA	Ottawa Co. ARES N8O (+W8MAL) 139 2 6 2,015 OH	All Things ARA W8ATR 454 2 50 1,880 OH	Treasure Valley Radio Assn. K7OJI (+KE7KE) 158 2 6 1,756 OR
Tyler ARC K5TYR 2,111 2 60 6,794 NTX	Snoqualmie Valley ARC/ Issaquah ARC/ICC/ICST W7BI 298 2 28 2,006 WWA	EWEphoria RC K1EWE 168 2 6 1,060 NFL	Bear Bait RC W2JST 125 2 19 1,732 NNY
MGRAC/CGARC W4R (+KN4DH) 2,076 2 35 6,718 GA	Lincoln Co. ARA W4BV 337 2 5 2,004 TN	North Okaloosa ARC W4AAZ (+W4Z) 97 2 6 1,060 NFL	Clairemount Repeater Assn. N6CRA 104 2 10 1,730 ORG
Lake Monroe ARS N4EH (+N4BT) 1,604 2 45 6,520 NFL	Humboldt ARC W6ZZK 281 2 15 1,970 SF	Yadkin Valley ARC NC4TT 253 2 5 1,014 NC	Susquehanna Co. ARC N3SRC 223 2 16 1,700 EPA
Cherokee ARS K4R (+WX4CAR) 1,461 2 46 6,419 GA	Comox Valley ARC VE7CVW 312 2 6 1,962 BC	Watertown ARC W9TTN 307 2 5 808 WI	Limestone ARES N4SEV 224 2 31 1,664 AL
Cowtown ARC K5COW 1,104 2 43 5,872 NTX	Federal Way ARC WA7FW (+WA7DR) 127 2 20 1,921 WWA	Castle Rock Repeater Grp. KE0NVB 53 2 5 462 CO	St. Croix Valley ARC WW1IE 160 2 20 1,642 ME
LEFROG/MAARS W9FRG 1,405 2 9 5,324 WI	California City ARC KE6RN 328 2 10 1,870 SJV	6A Mike & Key ARC K7LED (+AE7G) 5,619 2 60 20,900 WWA	Twin State RC W1FN 230 2 12 1,568 NH
Baytown Area ARC K5BAY (+AA5RX) 1,245 2 10 5,260 STX	London ARC VE3LON 308 2 40 1,866 ONS	Orange Co. (CA) ARC W6ZE (+W6NGO) 5,717 2 30 19,409 ORG	Marple Newtown ARC/Mobile Sixers RC K3MN (+W3AWA) 126 2 15 1,402 EPA
NC TRI-CLUB N4C (+W4HS) 1,319 2 48 5,086 NC	Sabin Field Day W0HNV 298 2 9 1,812 MN	South Jersey Radio Assn. K2AA (+W2EA) 4,809 2 69 18,198 SNJ	Salt Spring Island ARS VE7RAS 235 2 20 1,320 BC
Chesapeake ARS W4CAR (+K4AMG) 1,013 2 50 4,996 VA	Black River ARC K8BRC (+K18Z) 317 2 23 1,780 MI	Lake ARA K4FC (+N4FLA) 3,566 2 38 12,978 NFL	6A — Commercial Central LA ARC K5M (+N5AEX) 1,614 2 21 7,100 LA
Medina Co. ARC W8HN 1,012 2 33 4,846 OH	Lewis and Clark RC K9HAM 71 2 27 1,732 IL	Central KY ARS AJ4A 3,253 2 30 12,482 KY	Intercity ARC W8WE 428 2 20 2,002 OH
Smoky Mountain ARC W4OLB (+W4V) 1,172 2 68 4,740 TN	Queen Anne's ARC K3QAC 158 2 5 1,724 MDC	Franklin Co. (NC) ARC AA4RV (+K04HUL) 2,827 2 38 10,957 NC	South Wake ARC N4SWC 114 2 6 678 NC
Valley RC of Oregon W7PXL 790 2 125 4,022 OR	Warrensburg Area ARC W0AU 452 2 7 1,700 MO	Cuyahoga ARS W8BM 2,021 2 35 9,108 OH	7A Ventura Co. ARS/Simi Settlers ARC N6R 1,877 2 49 6,044 SB
Andrew Johnson ARC W4WC (+N7HPE) 945 2 45 3,989 TN	Utica Shelby EmComm Assn. K8UO 301 2 17 1,650 MI	Mississauga ARC VE3MIS 1,871 2 27 7,594 GH	Panhandle ARC W5WX (+K15KGC) 1,149 2 36 4,664 WTX
Antietam Radio Assn. W3CWC 736 2 20 3,948 MDC	West Virginia Univ. ARC/Monongalia Wireless Assn./Monongalia Co. ARC W8CUL (+K8YUI) 350 2 20 1,634 WV	Broughton Memorial Field Day Grp. W2IR (+K2AE) 1,547 2 75 6,783 ENY	Piedmont ARC K4PAR (+K4P) 579 2 20 4,591 GA
Seneca RC W8ID 641 2 40 3,746 OH	Western Carolina ARS W4MOE 291 2 16 1,506 NC	Lake Area Radio Klub W0WTN 1,613 2 36 6,700 SD	Penn Wireless Assn. W3SK (+WE3F) 752 2 34 4,533 EPA
Somerset Co. ARC K3SMT (+KX3L) 649 2 23 3,692 WPA	Maryland Mobileers ARC W3CU 295 1 39 1,470 MDC	Warren ARA W8VTD 1,422 2 30 6,374 OH	Haywood Co. ARC KW4P 773 2 100 4,508 NC
Salem ARC W7SAA (+K7KVN) 861 2 25 3,634 OR	San Luis Valley ARA K0SLV 89 2 7 1,464 CO	Kitchener-Waterloo ARC VE3IC (+VE3HEC) 1,922 2 15 6,273 ONS	Silvercreek ARA W8WKY 1,125 2 30 4,442 OH
Calhoun Co. ARG W4CEM 800 2 7 3,536 SC	Burlington ARC VE3CJ 203 2 5 1,456 GH	Owatonna Steele Co. ARC K0HNY 1,272 2 21 5,978 MN	Western Reserve ARC W8WRC (+WF8U) 799 2 18 4,071 OH
Wabash Valley ARA W9UUU 732 2 20 3,532 IN	Mt. Vernon (VA) ARC K4US (+KU8V) 55 2 17 1,448 VA	Long Island Mobile ARC W2VL (+W2LI) 1,228 2 60 5,656 NLI	Delta ARS VE7SUN 481 2 35 3,390 BC
Lancaster ARC W2SO 577 2 11 3,346 WNY	Keuka Lake ARA N2AAR 166 2 7 1,422 WNY	Lake Co. ARA N8BC 895 2 16 4,468 OH	Tulsa ARC W5IAS (+K5AEB) 333 2 52 2,812 OK
Lincoln Hills ARG W6LHR (+KN6DRN) 526 2 5 3,329 SV	QSY Soc. K2QS (+N2SKP) 72 2 23 1,401 ENY	Saginaw Valley ARA K8DAC 772 2 15 4,430 MI	Sierra Nevada ARS W7TA (+KB7QOD) 337 2 48 2,780 NV
Mountain ARC W3YMW (+KB3CS) 739 2 10 3,324 MDC	Anderson Island ARC WA7AI (+KK7RJO) 43 2 7 1,386 WWA	Hoodview ARC W7Q 883 2 40 4,150 OR	Vaca Valley RC W6VVR (+KJ6DLF) 213 2 20 2,335 SV
Alexandria RC W4HFH 517 2 21 3,234 VA	Zero-Beaters ARC WA0FYA 191 2 6 1,332 MO	Ft. Myers ARC W4LX 691 2 11 3,806 SFL	Bay Area ARC K8BAY 357 2 24 2,198 MI
Cherryville Repeater Assn. II WW2CRA 635 2 12 3,186 NNJ	Toledo Radio Amateur Club K8ALB 208 2 5 1,298 OH	North Ottawa ARC W8CSO 564 2 14 2,944 MI	Muskegon Area AR Council W8ZHO 221 2 34 2,108 MI
HP Boise ARC AB7HP 616 2 12 3,110 ID	The 220 Mhz Guys WM9W 198 2 10 1,268 IL	MARC/DECT W3M 384 2 140 2,896 MDC	Bridgerland ARC W7IVM 208 2 45 1,690 ID
Overlook Mountain ARC N2LL (+K2KMM) 748 2 25 2,914 ENY	Denver Radio League KE0NCQ 77 2 5 1,210 CO	Five Flags ARA W4UC (+KB4HAH) 367 2 39 2,869 NFL	Tonto ARA N7TAR 1 2 38 1,202 AZ
Thousand Islands RC K2I 500 2 22 2,858 NNY	Jefferson Co. (MO) ARC KB0TLL 110 2 9 1,120 MO	Hamilton ARC VE3DC 471 2 45 2,614 GH	Sandusky Radio Experimental League W8LBZ 193 2 5 1,196 OH
Eastern MI ARC K8EPV 539 2 21 2,698 MI	Southwest Columbus Ham RC WB8MMR 82 2 24 1,014 OH	Phil-Mont Mobile RC W3EM (+W3AA) 593 2 20 2,604 EPA	7A — Commercial L'Anse Creuse ARC N8LC 982 2 30 4,132 MI
Red River Valley ARC W5W 384 2 30 2,678 NTX	Johnston ARS K4SWR 190 2 10 976 NC	Vero Beach ARC W4OT 253 2 38 2,484 SFL	8A Woodbridge Wireless W4IY (+W4AD) 2,554 2 42 11,085 VA
Vilas Co. ARC W9VRC 771 2 5 2,580 WI	Drumlins ARC/Skenoh Island ARC WA2AAZ 122 2 6 966 WNY	Ft. Herkimer ARA W2FHA (+KD2TDB) 166 2 19 2,467 WNY	Fox River Radio League W9NE (+W9CEQ) 2,528 2 80 10,503 IL
Klamath Basin ARA W7VW (+N2RSN) 305 2 25 2,570 OR	Cheshire Co. DX ARC AD1T 147 2 15 944 NH	Oak Hill ARC N5OAK 642 2 10 2,400 STX	Mahoning Valley ARA W8QLY 2,896 2 32 9,968 OH
Orange Co. (IN) ARC W2HO 343 2 34 2,450 ENY	Montgomery ARS NC4MC 70 2 5 710 NC	Shy-Wy ARC WY7HR 329 2 30 2,356 WY	Rappahannock Valley ARC K4TS (+KJ4MHD) 2,463 2 24 9,378 VA
NOARS/LCARA K8G (+K8KRG) 207 2 8 2,354 OH	5A — Battery W6TRW ARC W6TRW (+WA2KDL) 905 5 34 9,665 LAX	Iredell Co. ARS W4SNC 312 2 15 2,352 NC	Black Swamp ARC K8BSR 2,024 2 16 6,924 OH
Nanaimo ARA VE7NA 471 2 25 2,238 BC	Wayne Co. ARC W3ARO 453 5 14 5,710 EPA	East River ARC W8MOP (+W8ZBR) 172 2 31 2,248 WV	Gwinnett ARS W4GR 1,461 2 45 5,916 GA
David Sarnoff ARC N2RE 169 2 31 2,168 NNJ	Upper Canada QRP Club VE3UCC 338 5 5 3,675 ONE	Mississippi Coast ARA W5SGL 412 2 30 2,148 MS	San Antonio RC AA5RO 307 2 41 2,682 STX
Butler Co. AR Public Srv. Grp. K3PSG 333 2 30 2,148 WPA	North Coast ARC N8NC 224 5 9 3,040 OH	Goshen ARC K9TSM 249 2 10 2,088 IN	
ARC of Butts Co. WX4BCA 252 2 12 2,132 GA	Snake River ARC K7SI 169 5 9 2,410 ID	North Bay ARA K6LI 293 2 25 2,076 EB	
Whitman ARC NI1X 301 2 30 2,112 EMA	Ulster & Northern Dutchess Readiness Grp. N2RDY 159 5 12 2,055 ENY	Peak Radio Assn. W7PRA 541 2 10 2,072 OR	
Catalina RC and Radio Soc. of Tucson K7RST (+WN7BSA) 268 2 42 2,095 AZ	5A — Commercial Pottstown Area ARC W3U (+K3ZMC) 769 2 20 2,841 EPA	Grundy Co. ARS W9G (+KB9SZK) 184 2 10 1,802 IL	

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The McKinney Amateur Radio Club, W5MRC, had a healthy turnout for the 2024 Field Day. They participated in the 3A category from the North Texas Section. [Michael Flusche, W5MEF, photo]

2B — One Operator Commercial

WB5N	710	2	1	1,906	NTX
W5JCC	284	2	1	1,186	LA

2B — Two Operators

KP4 Expedition Grp.					
KP4EG (+WP4TZ)					
2,382	2	2	7,128	PR	
Terrible Twos					
N2A (WK2G, WK2W)					
1,660	2	2	6,134	SNJ	
The Whiskey Delta Contest Grp.					
K0WD (+KB0LF)					
668	2	2	3,096	NE	
N2RC (+KE2X)					
715	2	2	3,078	ENY	
KB1AWM (+KA8JCC)					
531	2	2	2,414	SC	
KX1Q (AA1F, KM1NDY)					
362	2	2	1,952	ENY	
Southern Sands ARC					
KC4GYM (N5CWH, KO4UWM)					
425	2	2	1,744	SC	
Mountain Toppers					
KX4BY					
395	2	2	1,476	AL	
Tamiami ARC					
W9N (K9GCC, KO4YAX)					
245	2	2	1,422	WI	
Pioneer Valley Radio Assn.					
KC5ZAP					
336	2	2	1,384	CT	
W0WH (+KG9OC)					
239	2	2	1,306	NE	
KX0A (+W0NCO)					
243	2	2	1,262	CO	
AC8QX					
368	2	2	1,086	MI	
K3WM (+AB3IK)					
192	2	2	1,026	WPA	
Friends Having Fun					
W8RU (+KC8VGG)					
100	2	2	684	MI	
AK1X (+W1ASP)					
152	2	2	554	VT	
WD9N (+W9DRN)					
97	2	2	544	IL	

VA2VX (+VA2KB)					
131	2	2	512	QC	
KJ7ZDH (+KI7YDK)					
110	2	2	470	AZ	
Muhlenberg ARS					
KR4QD					
58	2	2	416	KY	
KI7YDK (+KJ7ZDH)					
45	2	2	362	AZ	
K7DTS (+K7JPX)					
22	2	2	304	ID	
Baton Rouge ARC					
AB5TH					
38	2	2	126	LA	
K5AIA (+W5WMU)					
17	2	2	84	LA	

2B — Two Operators Battery

Panama City ARC					
N4KGL (+NZ2I)					
350	5	2	3,950	GA	
WA2ZOT (+K1PTF)					
330	5	2	3,350	WNY	
KB2DSQ (+KB2DSR)					
281	5	2	3,150	WNY	
NP2Q (+KP2T)					
259	5	2	2,715	VI	
Zuni Loop MEF					
N6GA (WO6JO, KN6EZE)					
177	5	2	2,375	LAX	
K4AKC (+KD4ADC)					
168	5	2	2,030	AL	
KN4SGS (+KC3MWD)					
2	5	2	460	MDC	
W1ASP (+AK1X)					
15	5	2	370	VT	

2B — Two Operators Commercial

Aeronautical Center ARC					
W5PAA (KF5GTX, N5PTV)					
177	2	2	704	OK	
KK4DDF					
172	2	2	694	VA	
3 Guys with Radios ARC					
KM3GWR (AI4QT, K3FRK)					
35	2	2	440	AL	

KF0KDI (+KF0QGN)					
49	2	2	246	NE	

3B — Two Operators

CQ Octogenarians					
W9AV (+W6RI)					
1,859	2	2	7,852	WI	

4B — Two Operators Battery

Huntsville ARC					
KT4XA (K4CNY, NV4B)					
853	5	2	9,380	AL	

Mobile Stations

1C

W7TMT	496	2	1	2,134	WWA
W6QX	501	2	1	1,766	SDG
Bryan ARC					
W1JCW	221	5	1	1,255	STX
AI4UH	259	2	1	1,168	EPA
N2YY	503	2	1	1,156	NLI
W7CGA	157	2	1	878	KS
W9YOY	207	2	1	628	IL
K2IW	161	2	1	596	ENY
WB0POH	102	2	1	558	VA
VE3SSR	275	1	1	553	GH
K9JK	36	5	1	510	IL
Northern Lakes ARC					
WW0TT	35	5	1	475	MN
Richardson Wireless Klub					
N4CD	103	2	1	462	NTX
WC0O	99	2	1	458	LAX
W0IS	55	2	1	456	MN
Arrowhead RAC					
N0EO	76	2	1	454	MN
KB9ENS	89	2	3	432	LAX
ND8D	73	2	1	424	OH
KK4LWR	41	2	2	332	NFL
Pottstown Area ARC					
K0BAK	50	2	1	326	EPA
N7CZ	43	2	1	322	IN

Pine State ARC					
AA1CX	69	2	1	288	ME
N1JI	29	2	1	264	NH
Southern CA Contest Club					
W6KC	40	2	1	260	NV
KF7AZY/VE7	1	5	1	255	BC
N0EVH	23	2	1	240	MO
K6VHY	8	5	2	240	LAX
KB8U	18	5	1	230	MI
N9DU	34	2	1	220	WI
Jefferson Co. (WA) ARC					
AH6EZ	50	2	1	212	EWA
N1ZZZ	77	2	1	204	NC
KA3KSP	24	2	1	198	WPA
K6LMN	9	5	1	195	LAX
W7JZE	22	2	1	194	AZ
Chippewa Valley VHF Contesters					
N9TTX	54	2	1	180	WI
VE3PPH	14	2	1	178	ONS
Chicago FM Club					
W0XXT	9	2	1	168	KS
K8JSM	103	1	1	153	OH
WH6FAM/W3	33	2	1	116	MDC
Cape Ann ARA					
W1FSR	15	2	1	110	EMA
KF0KPA	12	2	1	74	MO
ND9G	10	2	1	70	IN
KC5AJS	8	2	1	66	STX
NH7IT	3	5	1	65	PAC
AD7KI	7	2	1	64	CO
AE9XT	3	2	1	62	WI
Albamarle ARC					
KG4EIF	1	2	1	52	VA

2C

Flamingo Net					
WA4TEJ	2	2	3	254	SFL
LA Fire Dept. ACS					
WB6YSI	8	2	1	66	LAX

3C

Grassroots ARC					
VO1EGH	47	2	3	662	NL



Class D, E, and F home stations and club aggregate scores will be posted in the digital edition of QST and on the ARRL Field Day Page at <http://field-day.arrl.org>.

2024 ARRL June VHF Contest Results

This year's ARRL June VHF Contest was held June 8 – 10, 2024.

This year, a total of 1,169 logs were submitted. This is down 28% from the 1,615 logs submitted in 2023. This sharp decrease differs from the generally favorable increase we have seen for the previous 10 years, save for the massive COVID-19 stay-at-home spike in 2020.

Logs Received by Year

2017	1,265
2018	1,267
2019	1,305
2020	2,148
2021	1,589
2022	1,709
2023	1,615
2024	1,169

The most popular entry category for the contest was Single Operator, Low Power, with a total of 417 entries. Three hundred fifteen of them were in the all-mode subcategory, and 102 were analog only. Single Operator, High Power followed with 283 entries. Fifty of them were in the analog-only subcategory.

Logs Received by Category

Classic Rover	27
Limited Rover	46
Unlimited Rover	8
Single Operator, High Power	233
Single Operator, Low Power	315
Single Operator, Analog Only, High Power	50
Single Operator, Analog Only, Low Power	102
Single Operator, Portable	14
Single Operator, Analog Only, Portable	15
Single Operator, Three Band	212
Single Operator, Analog Only, Three-Band	62
Single Operator, FM Only	26
Limited Multioperator	28
Unlimited Multioperator	22
Checklog	9



Chris Knox, K11P, operated from Hogback Mountain in southern Vermont during the 2024 ARRL June VHF Contest. His rover vehicle is a repurposed television news production van, which he outfitted as his mobile shack. [Christopher Knox, K11P, photo]

Even without any long-lasting E-skip events during the contest, except for some enhanced propagation on 6 meters on the morning of June 9, 76,558 contacts were reported on 6 meters, comprising 68.9% of the total contacts made. Of the other active bands during the contest, 2 meters was the most popular, with 19,976 contacts reported.

The effect of the digital modes in the contest can also be seen, especially on 6 and 2 meters. On both bands, more than 50% of all reported contacts were made using a digital mode, with FT4/8 being the most popular of those modes. On the bands above 2 meters, the majority of the contacts were reported using CW, SSB, or FM analog modes.

Contacts by Band

Band	CW/SSB/FM	Digital	Total
50 MHz	18,172	58,386	76,558
144 MHz	8,402	11,574	19,976
222 MHz	3,226	775	4,001
432 MHz	5,126	1,789	6,915
902 MHz	852	13	865
1.2 GHz	1,322	98	1,420
2.3 GHz	481	20	501
3.4 GHz	257	2	259
5.7 GHz	214	6	220
10 GHz	309	8	317
24 GHz	29	0	29
47 GHz	6	0	6
75 GHz	2	0	2
Light	1	0	1
Total	38,399	72,671	111,070
% of Total	34.57%	65.43%	

Sponsored Plaque Winners

Thanks to the generous support of numerous clubs and individuals, we are pleased to list the winners of the Sponsored ARRL June VHF Contest plaques below. For more information on plaque sponsorship or to order a duplicate plaque, contact the ARRL Contest Program at 860-594-0232 or contests@arrrl.org. Plaques cost \$95, which includes all shipping charges.

Plaque Category	Plaque Sponsor	Winner
Overall Single Operator, High Power	Charles Dietz, W5PR	K1TEO
Overall Single Operator, Analog Only, High Power	Andrea Slack, K2EZ	W2FU
Overall Single Operator, Low Power	Jeffrey Klein, K1TEO	N2WK
Overall Single Operator, Analog Only, Low Power	Andrea Slack, K2EZ	AF1T
Overall Single Operator, Low Power, Rookie	W3ZZ First Log Award – Memorial by Tim, K3LR, and Dave, W9PA	N4AKV
Overall Single Operator, QRP Portable	Rochester VHF Group	KE6GLA
Overall Single Operator, Analog Only, QRP Portable	Andrea Slack, K2EZ	KJ7BJS
Overall Single Operator, Three-Band	Northern Lights Radio Society	WN3A
Overall Single Operator, Analog Only, Three-Band	Andrea Slack, K2EZ	N5BO
Overall Single Operator, FM Only	Andrea Slack, K2EZ	K6ARK
Overall Rover	Andrea Slack, K2EZ	VE3OIL/R
Overall Limited Rover	Andrea Slack, K2EZ	NV4B/R
Overall Unlimited Rover	Andrea Slack, K2EZ	KG6CIH/R
Atlantic Division Rover	Rochester VHF Group	KF2MR/R
Central Division Single Operator, High Power	Society of Midwest Contesters	K9CT
Dakota Division Single Operator, Low Power	Northern Lights Radio Society	K0QB
Dakota Division Rover	Matt Holden, K0BBC	KC0P/R
Hudson Division Single Operator, High Power	Ed Kucharski, K3DNE, in memory of Jud Snyder, K2CBA	N2GHR
Pacific Division Single Operator, Analog Only, High Power	Tim Coad, NU6S	N6RO
Pacific Division Single Operator, Analog Only, Low Power	Tim Coad, NU6S	K2GMY
West Gulf Division Single Operator, Low Power	Northern Lights Radio Society	AE5FM
Canada Single Operator, Low Power	Neil Macklem, VE3SST	VE3SMA
Canada Single Operator, Analog Only, Low Power	Neil Macklem, VE3SST	VE3DS
Canada Single Operator, Three-Band	Neil Macklem, VE3SST	VE3PJ
Canada Limited Multioperator	Neil Macklem, VE3SST	VE3MIS
Canada Rover	Neil Macklem, VE3SST	VE3OIL/R
Canada Limited Rover	Rochester VHF Group	VA7FC/R

Full Results Online

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

Classic Rover	Single Operator, High Power	Single Operator, Analog Only, High Power	Single Operator, Portable	Single Operator, Three-Band	Single Operator, FM Only
VE3OIL/R 116,850	K1TEO 448,896	W2FU 97,790	KE6GLA 5,358	WN3A 96,300	K6ARK 5,270
N7GP/R 53,724	N2JMH 253,976	WZ1V 84,512	N0JK 4,150	W5TRL 63,048	VE3RWJ 1,010
KF2MR/R 26,520	N4OGW 112,710	K1TR 37,386	N2MAK 2,574	K2PS 40,740	AF6GM 936
K2ET/R 21,667	K1RZ 102,416	VE3ZV 30,888	KF7NP 1,702	NS4T 35,581	K1CT 810
VE3WJ/R 20,736	K9CT 97,632	W2KV 27,342	WQ6D 1,320	WQ5L 29,016	K4POT 686
KE2BUY/R 16,960	W3IP 93,990	WB4VXE 13,416	KN2K 999	WB5TUF 24,274	KO6BT 480
K9TMS/R 13,804	K9KLD 80,510	N6KN 10,045	N0SUW 850	W3FAY 23,324	W6IA 423
N9REP/R 13,272	K1KG 74,168	N2KW 9,891	K7FR 675	W2UA 23,142	KN6FKQ 306
N6UTC/R 10,960	AA5AM 72,839	KA3FQS 9,180	KN6OKY 455	KD2CDV 19,383	KB1YNT 216
AA9IL/R 6,156	K3DNE 70,253	K4ZW 7,320	K9XB 378	WA3LXD 18,690	KN6VRM 186
Limited Rover	Single Operator, Low Power	Single Operator, Analog Only, Low Power	Single Operator, Portable	Single Operator, Analog Only, Three-Band	Limited Multioperator
NV4B/R 96,875	N2WK 127,654	AF1T 108,040	KJ7BJS 3,840	N5BO 6,360	K9NS 314,035
KA5D/R 81,468	NR2C 110,143	VE3DS 29,480	WB2AMU 2,263	K6MI 5,192	AA4ZZ 294,975
W5TN/R 62,457	K2DRH 97,451	VE3KH 25,974	AA6XA 1,258	WB6HYH 2,834	N2NT 232,250
KG9OV/R 57,706	WA3NUF 86,496	WA3EOQ 20,874	WN1C 864	N7QOZ 2,603	K5QE 217,775
W5OC/R 21,526	KA2ENE 74,880	WB2JAY 16,575	WA2CLP 817	W1SRH 2,190	KE8FD 118,104
W4JST/R 19,093	WB1GQR 71,002	KD2HZI 16,055	N3AWS 651	KQ2N 1,976	VE3MIS 114,848
N6GP/R 17,550	(W1SJ, op) 54,872	KA0PQW 13,875	NE3I 405	N1JD 1,080	AD4ES 103,008
KC9NJZ/R 15,930	AG6X 41,128	WB2VVV 9,821	AB8CI 360	KN7Y 1,037	W2LV 74,176
N5ZY/R 15,566	N2OA 39,208	AC1J 7,400	NU2H 341	K7CX 1,008	W9VW 65,156
KM4OZH/R 11,556	N2SCJ 38,640	K0SM 6,732	KQ2RP 300	WB7FJG 1,008	W4AD 44,157
Unlimited Rover					Unlimited Multioperator
KG6CIH/R 42,825					W2SZ 432,236
K0DAS/R 13,950					W3CCX 248,820
K4CNY/R 3,339					KD2LGX 117,400
WB2VVQ/R 2,883					W9XA 107,334
KO0Z/R 2,610					W4NH 97,850
VE3SST/R 1,472					N3NGE 97,370
VE3KGC/R 1,078					N8GA 83,328
					WQ0P 76,677
					WD9EXD 67,584
					VE3WCC 60,047

Affiliated Club Competition

Club	Score	Entries
Unlimited		
Potomac Valley Radio Club	495,284	59
Medium		
Mt. Airy VHF Radio Club	1,651,258	42
Rochester VHF Group	1,285,484	38
Society of Midwest Contesters	642,533	44
North East Weak Signal Group	388,667	16
Florida Contest Group	334,847	24
Carolina DX Assn.	297,911	3
DFW Contest Group	288,632	11
Roadrunners Microwave Group	226,420	6
Contest Club Ontario	224,534	15
Fourlanders Contest Team	191,865	5
Northern Lights Radio Soc.	185,759	21
Yankee Clipper Contest Club	128,463	22
Kentucky Contest Group	112,596	8
Alabama Contest Group	110,874	3
Southern California Contest Club	109,042	21
Frankford Radio Club	96,802	11
Swamp Fox Contest Group	92,914	6
Pacific Northwest VHF Soc.	85,337	40
North Texas Microwave Soc.	79,994	3
South East Contest Club	78,721	6
Texas DX Soc.	73,764	7
Northern California Contest Club	71,880	20
Arizona VHF Soc.	64,444	5
Ontario VHF Assn.	60,009	4
Grand Mesa Contesters of Colorado	50,126	10
Michigan VHF-UHF Soc.	48,436	4
Badger Contesters	48,261	8
North Coast Contesters	40,608	5
Arkansas DX Assn.	35,775	3
Arizona Outlaws Contest Club	31,924	16
Central Texas DX and Contest Club	31,265	5
Mad River Radio Club	28,877	5
Minnesota Wireless Assn.	25,825	8
Great Places Contest Club	19,476	3
Oklahoma City Autopatch Assn.	17,301	3
Wayne County ARC	16,468	3
Niagara Frontier Radiosport	16,384	6
Tennessee Contest Group	16,268	10
Western Canada Weak Signal Assn.	11,226	7
South Jersey Radio Assn.	7,040	4
New Mexico VHF Soc.	6,881	6
Hudson Valley Contesters and DXers	6,186	3
Willamette Valley DX Club	3,945	4
Convair/220 ARC	3,281	5
Orca DX and Contest Club	3,169	5
Big Sky Contesters	331	3
Local		
Eastern Connecticut ARA	65,086	3
Chippewa Valley VHF Contesters	57,917	5
Stoned Monkey VHF ARC	55,186	6
The Villages ARC	40,938	3
Hilltop Transmitting Assn.	21,337	3
Bristol (TN) ARC	13,608	5
CTRI Contest Group	13,268	4
Lake Area Amateur Radio Klub	7,294	3

The 2025 ARRL June VHF Contest will be held June 14 – 16, 2025.

Division Winners

Classic Rover			Single Operator, Portable		
Atlantic	KF2MR/R	26,520	Atlantic	N2MAK	2,574
Central	K9TMS/R	13,804	Central	K9XB	378
Dakota	N0HZO/R	4,988	Dakota	N0SUW	850
Dakota	KC0P/R	4,988	Midwest	N0JK	4,150
Great Lakes	N8AJM/R	522	Northwestern	K7FR	675
Midwest	AF4JF/R	3,103	Pacific	KE6GLA	5,358
New England	WS1O/R	630	Roanoke	KN2K	999
Northwestern	AC7SG/R	5,868	Southwestern	KF7NP	1,702
Pacific	KE6QR/R	5,376	Canada	VA2VT	342
Southeastern	AB4DX/R	5,488	Single Operator, Analog Only, Portable		
Southwestern	N7GP/R	53,724	Atlantic	NE3I	405
West Gulf	N5TJ/R	6	Central	WN1C	864
Canada	VE3OIL/R	116,850	Delta	N3AWS	651
Limited Rover			Hudson	WB2AMU	2,263
Atlantic	WG3K/R	4,760	Northwestern	KJ7BJS	3,840
Central	KG9OV/R	57,706	Pacific	AA6XA	1,258
Great Lakes	KF8QL/R	8,840	Roanoke	AB8CI	360
Midwest	AL1VE/R	11,550	Canada	VE3EG	48
New England	N1SFE/R	1,430	Single Operator, Three-Band		
Northwestern	KA7RRA/R	1,577	Atlantic	WN3A	96,300
Pacific	NN6U/R	2,996	Central	W9AV	14,151
Roanoke	W4JST/R	19,093	Dakota	N0UR	17,836
Rocky Mountain	AA5PR/R	3,690	Delta	WQ5L	29,016
Southeastern	NV4B/R	96,875	Great Lakes	KA8CNI	10,500
Southwestern	N6GP/R	17,550	Hudson	NA2NY	10,530
West Gulf	KA5D/R	81,468	Midwest	KS0AA	4,940
Canada	VA7FC/R	2,060	New England	K1HC	10,206
Unlimited Rover			Northwestern	K5DTC	4,611
Midwest	K0DAS/R	13,950	Pacific	K6TQ	627
New England	KG6CIH/R	42,825	Roanoke	K3FR	8,618
Southeastern	K4CNY/R	3,339	Rocky Mountain	K0NR	13,524
Canada	VE3SST/R	1,472	Southeastern	K2PS	40,740
Single Operator, High Power			Southwestern	K7KMR	3,116
Atlantic	N2JMH	253,976	West Gulf	W5TRL	63,048
Central	K9CT	97,632	Canada	VE3PJ	5,586
Dakota	K0AWU	25,573	Single Operator, Analog Only, Three-Band		
Delta	N4OGW	112,710	Atlantic	KQ2N	1,976
Great Lakes	K8MM	44,436	Central	N9GH	805
Hudson	N2GHR	45,484	Great Lakes	K8LG	176
Midwest	W0ZA	8,875	Hudson	W12M	24
New England	K1TEO	448,896	Midwest	N0UI	108
Northwestern	W7EW	12,810	New England	W1SRH	2,190
Pacific	K6KLY	17,388	Northwestern	N7QOZ	2,603
Roanoke	W3IP	93,990	Pacific	K6MI	5,192
Rocky Mountain	KB0NAV	15,010	Roanoke	KV4ZY	984
Southeastern	K1TO	63,240	Rocky Mountain	KC0LFQ	25
Southwestern	W7QJT	4,928	Southeastern	N5BO	6,360
West Gulf	AA5AM	72,839	Southwestern	WB6HYH	2,834
Canada	VE3CKO	32,249	West Gulf	N5LUL	126
Single Operator, Low Power			Canada	VE3MLM	320
Atlantic	N2WK	127,654	Single Operator, FM Only		
Central	K2DRH	97,451	Atlantic	K3GM	119
Dakota	K0TC	2,760	Delta	K4NRT	18
Dakota	K0QB	2,760	Great Lakes	K8AEP	12
Delta	KB5VKP	37,949	Hudson	KE2CCG	15
Great Lakes	KE8JCD	13,524	New England	KB1YNT	216
Hudson	WA2VNV	29,945	Northwestern	KL4LJ	28
Midwest	WD0BGZ	24,024	Pacific	W6IA	423
New England	WB1GQR	71,002	Roanoke	K4POT	686
Single Operator, Analog Only, High Power			Southeastern	K3TW	2
Atlantic	W28T	6,789	Southwestern	K6ARK	5,270
Central	K6USY	5,916	West Gulf	KG5UNK	185
Dakota	WA4LDU	10,240	Canada	VE3RWJ	1,010
Delta	W0BX	8,137	Limited Multioperator		
Great Lakes	W4MAA	25,573	Atlantic	WA3EKL	36,972
Hudson	AG6X	41,128	Central	K9NS	314,035
Midwest	AE5FM	16,926	Dakota	N0EO	13,122
Canada	VE3SMA	15,150	Great Lakes	KE8FD	118,104
Single Operator, Analog Only, Low Power			Hudson	N2NT	232,250
Atlantic	W2FU	97,790	New England	W1QK	22,372
Central	K9YR	1,064	Northwestern	A17ID	18,709
Dakota	W0GHZ	3,268	Pacific	W7TR	4,000
Delta	WZ5M	5,100	Roanoke	AA4ZZ	294,975
Great Lakes	K2YAZ	768	Rocky Mountain	W0VB	19,266
Hudson	W2KV	27,342	Southeastern	AD4ES	103,008
New England	WZ1V	84,512	Southwestern	W01S	80
Northwestern	KB7IOG	240	West Gulf	K5QE	217,775
Pacific	N6RO	5,043	Canada	VE3MIS	114,848
Roanoke	K4ZW	7,320	Unlimited Multioperator		
Southeastern	WB4WXE	13,416	Atlantic	W3CCX	248,820
Southwestern	N6KN	10,045	Central	W9XA	107,334
West Gulf	K5MR	3,960	Delta	AG4V	50,160
Canada	VE3ZV	30,888	Great Lakes	N8GA	83,328
Single Operator, Analog Only, Low Power			Hudson	WE1P	45,430
Atlantic	WA3EOQ	20,874	Midwest	WQ0P	76,677
Central	W9RE	128	New England	W2SZ	432,236
Dakota	KA0PQW	13,875	Rocky Mountain	K7EMR	12
Delta	KD5ILA	2,170	Southeastern	W4NH	97,850
Great Lakes	K8MR	1,426	Southwestern	N6MI	21,168
Hudson	WB2JAY	16,575	West Gulf	KC5MVZ	6,552
Midwest	K0CLW	3,870	Canada	VE3WCC	60,047
New England	AF1T	108,040			
Northwestern	K7ND	992			
Pacific	K2GMY	4,620			
Roanoke	K4FT	400			
Rocky Mountain	WJ7L	112			

The 2025 January VHF Contest

1900 UTC Saturday, January 18 – 0359 UTC Monday, January 20, 2025

January is the time to gear up for a new season of VHF contesting. Between meteor scatter, winter E-skip, aurora, EME, and tropospheric scatter or ducting on all amateur frequencies of 50 MHz and above, there are many opportunities for enhanced propagation.

Whether you prefer CW, phone, or one of the newer digital modes, there are plenty of ways for hams of all experience levels to participate in the event. Single Operator participants can enter in all-mode or analog-only (CW/phone) categories.

Assistance is available to all entry classes, so stations can coordinate when to attempt contacts, whether they're at home, portable, or on the road. Coordinate with your local club or group and let them know when and where you'll be on the air for the event.

The contest exchange is your Maidenhead grid square. More information on grid squares can be found at www.arrl.org/grid-squares.



Peter Prabucki, VA3ELE/R, participated in the 2024 ARRL January VHF Contest in the Limited Rover category. He used this four-band rover setup to take third place in the category overall, and first place in Canada. [Peter Prabucki, VA3ELE, photo]

10-Day Log Deadline: Logs must be uploaded or postmarked no later than 0359 UTC January 30, 2025. Electronic Cabrillo-formatted logs must be uploaded to <https://contest-log-submission.arrl.org>, or paper summary sheets and logs must be mailed to ARRL — January VHF Contest, 225 Main St., Newington, CT 06111.

Complete rules can be found at www.arrl.org/january-vhf.

The 2025 ARRL Straight Key Night

0000 UTC – 2359 UTC Wednesday, January 1, 2025



James Kretzschmar, AE7AX, participated in the 2024 ARRL Straight Key Night using his homebrew 40-meter CW transceiver while portable at the Beaver Dam Wash National Conservation Area in Utah. He completed three contacts running 2 W into a temporary inverted-v antenna. [James Kretzschmar, AE7AX, photo]

Ring in the new year with the sounds of Morse code! Straight Key Night (SKN) is not a contest, so there's no need for quick exchanges. All you need is your favorite straight key or bug.

Many participants dust off their vintage rigs and keys, but all gear (new and old) is welcome. The number of contacts you make is not important, and many new and longtime friends get together on the air for the event.

Send your list of stations worked and SKN stories and photos, along with your votes for Best Fist and Most Interesting QSO, to straightkey@arrl.org before January 31, 2025. A paper summary of your activity can be mailed to ARRL — Straight Key Night, 225 Main St., Newington, CT 06111. Be sure to post your story and photos at www.arrl.org/soapbox.

More information can be found at www.arrl.org/straight-key-night.

The 2025 ARRL International DX Contest

CW: 0000 UTC Saturday, February 15 – 2359 UTC Sunday, February 16

SSB: 0000 UTC Saturday, March 1 – 2359 UTC Sunday, March 2

Join thousands of amateurs worldwide as they compete in this exciting international contest. Whether you're looking for casual DX contacts, or pursuing new countries toward awards or your DXCC counts, this event has something for everyone.

♦ W/VE stations send signal report and state or province; DX stations send signal report and transmit power.

♦ Upload your Cabrillo-formatted log to the ARRL web app at <https://contest-log-submission.arrl.org>, or send paper logs to ARRL — DX Contest, 225 Main St., Newington, CT 06111.

♦ Log submission deadlines are 7 days after the event. For this event, the CW deadline is 2359 UTC on February 23 and the SSB deadline is 2359 UTC on March 9.



Roger Caminal Armadans, EA3M, operated at EF6T on the Spanish island of Ibiza during the 2024 ARRL International DX CW Contest. He took first place in Europe and second place DX., logging almost 6,000 contacts in the event. [Roger Caminal Armadans, EA3M, photo]

Complete rules can be found at www.arrl.org/arrl-dx.

January 2025 Kids Day

1800 UTC – 2359 UTC Saturday, January 4, 2025



Audrey Delaney, KK7CZP, is one of the youth participants who got on the air during ARRL Kids Day hosted by the Yavapai Amateur Radio Club, W7YRC, in Prescott, Arizona. [Michael Belanger, W1DGL, photo]

The first Saturday in January is the time to encourage young people to get on the air and share the excitement and fun of amateur radio!

Sponsored by the Boring (Oregon) Amateur Radio Club, this event has a simple exchange suitable for younger operators: first name, age, location, and favorite color. After that, the contact can be as long or short as each participant likes.

Kids Day is the perfect opportunity for you or your club to open your shack doors and invite kids over to discover what amateur radio is all about!

Share your photos and stories of Kids Day via the ARRL soapbox at www.arrl.org/contests/soapbox.

Complete rules can be found at www.arrl.org/kids-day.

The 2025 ARRL RTTY Roundup

1800 UTC Saturday, January 4 – 2359 UTC Sunday, January 5

The 2025 ARRL RTTY Roundup begins Saturday, January 4. If you're new to the world of radioteletype (RTTY), this can be your opportunity to explore this fascinating mode. Getting started with RTTY is now easier than ever — all you need is a computer, a transceiver, and a sound card interface. Many of the newer HF radios have built-in interfaces that allow your PC to connect directly to your transceiver. Visit www.rttycontesting.com for tips on how to get started.

Bands and Modes: Only contacts made on the 3.5, 7, 14, 21, and 28 MHz bands are allowed. Only contacts made using the RTTY mode are allowed during the event. Automated operation is not permitted. Contacts made using other digital modes will not be allowed.

Exchange: W/VE stations send signal report and state; DX stations send signal report and consecutive serial number starting with 001.

7-Day Log Deadline: All logs must be received via web app or postmarked no later than 2359 UTC on January 12, 2025. Upload your Cabrillo-formatted logs to <http://contest-log-submission.arrl.org>, or mail paper logs to ARRL — RTTY Roundup, 225 Main St., Newington, CT 06111.



Danny Van Tricht, ON4VT, had a canine companion in the shack during the 2024 ARRL RTTY Roundup. He finished in second place in Belgium in the Single Operator Unlimited, Low Power category. [Danny Van Tricht, ON4VT, photo]

Complete rules can be found at
www.arrl.org/rtty-roundup.

Write for QST

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

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

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

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

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

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

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



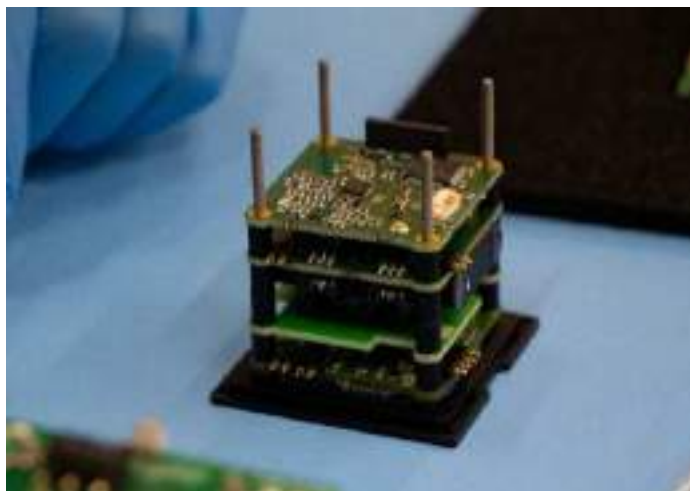
Amateur Radio World

Luxembourg Launches a Satellite

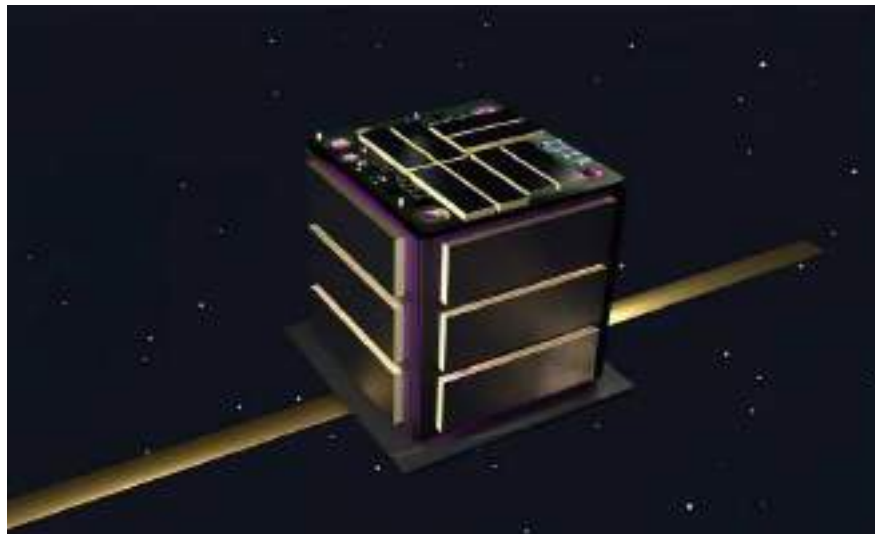
Late last year, Radioamateurs du Luxembourg received a frequency coordination request from the University of Luxembourg for a new satellite project. The association responded positively and assigned the call sign LXØPQT to a spacecraft that the university christened POQUITO.

The satellite is among a number of tiny “PocketQubes” that can be launched into orbit for as little as €25,000 each (about \$28,000 US) through rideshare services provided by Alba Orbital. PocketQubes offer numerous advantages over traditional satellites. They are cost-effective and quicker to build, and they provide versatile options for a variety of missions, ranging from educational projects to advanced technological demonstrations. They use UHF links for both uploading and downloading.

POQUITO will ride to space aboard a SpaceX Falcon 9 rocket that has been scheduled for launch in early October or November 2024. If all goes well, POQUITO may be in orbit by the time you read this issue of QST. The satellite is expected to have a lifespan of at least 3 years. POQUITO will feature a CW beacon as well as data downlinks using 9600-baud Gaussian frequency-shift keying at 437.050 MHz.



POQUITO undergoing final integration at the University of Luxembourg. [University of Luxembourg photo]



An artist's rendition of the POQUITO satellite in orbit. The launch was scheduled to take place in October or November 2024. [Alba Orbital image]

Andorra in the IARU HF World Championship

Members of the Union of Andorran Radio Amateurs operated station C37HQ last July during the International Amateur Radio Union (IARU) World Championship. The team was on the air from 1400 UTC on July

14 to 1800 UTC the same day. They got an early start on Sunday and operated again from 0800 UTC until the end of the contest.

The C37HQ team consisted of Beli Ojea Pereiro, C31KC; Michel de Diego Aznar, C31MO, and John Sauri, C31US. They made a total of 785 contacts, 78 of which were on CW with the remainder on SSB. They worked a total of 41 International Telecommunication Union Zones and 57 IARU Headquarters stations.

The Spectrum24 Conference

In September 2024, the International Amateur Radio Union Region 1, the Royal Belgian Amateur Radio Union, Microsystems, and SDR Technologies



C37HQ in Andorra made an impressive showing during the 2024 IARU HF World Championship. [Union of Andorran Radio Amateurs image]



The spectrum24 conference was held at the SmartCity campus in a former radio factory in Rambouillet, France. [Royal Belgian Amateur Radio Union photo]

combined forces to sponsor the spectrum24 conference.

The spectrum24 conference was inspired by amateur radio and software-defined radio (SDR) development activities that had taken place at the FOSDEM meeting held in Brussels, Belgium, in February 2024.

The spectrum24 conference had three primary themes:

- Amateur radio developments, including SDR receiver and transmitter hardware and software, novel antenna design, amateur radio infrastructure, new modes of communication, and alternative ways of accessing amateur radio spectrum.
- Non-technical amateur radio topics, including spectrum use, promotion, and bridging amateur radio to other technical communities, such as the maker community, etc.
- Open-source applications and access to non-amateur radio spectrum users (such as those at 433 MHz, 862 – 870 MHz, 2.4 GHz, and 5.8 GHz), radio astronomy, and amateur satellite spectrum users.

As the name of the conference implies, spectrum24 was aimed at anybody interested in fostering open systems that provide access to all available radio spectrum. The conference was held at the SmartCity campus in a former radio factory in Rambouillet, France. Admission was free.

SRAL Announces New Appointments

The Suomen Radioamatööriliitto (Finnish Amateur Radio League; SRAL) Board of Directors appointed new individuals to positions and committees at its meeting on August 8, 2024:

- John Miettinen, OH5SS, was appointed as OI liaison.
- Jukka-Pekka Gröhn, OH7JG/OH7MMT, was

appointed as a qualification researcher for the Joensuu area.

- Martti Laine, OH2BH, will continue as reciprocity permit coordinator.
- Erik Finskas, OH2LAK, was appointed as the new chairperson of the regulation working group. (Marko Wirtanen, OH8WM, left the position of chairperson of the regulation working group.)
- Jani Kontturi, OH7JANI, was appointed as the automatic station coordinator for the Eastern Finland region.
- Arto Liimatta, OH2KW, was appointed as a member of the competition committee.

DARC Hosts YOTA Subregional Camp

The Deutscher Amateur Radio Club (DARC) sponsored a subregional Youngsters On The Air (YOTA) camp in Baunatal, Germany, in October 2024. The YOTA program is an initiative of the International Amateur Radio Union that aims to bring young radio amateurs together and promote their activities and projects. The subregional camp was a gathering of young radio amateurs who wanted to meet people their own ages with similar interests.

All participants were accommodated in double rooms in the Hotel Stadt Baunatal, about 2 kilometers away from the DARC amateur radio center. The participation fee was only €50 (about \$56 US), which included rooms and meals.

The workshops were similar to so-called Makerspace events, where participants worked on pre-planned projects or items of their own design. The camp targeted DARC members ages 14 – 26. Young amateurs from abroad were invited to attend as well.



Participants attending the DARC YOTA subregional camp gathered at Hotel Stadt Baunatal. [Hotel Stadt Baunatal photo]

Club Station

A Virginia Club Creates a Middle School-Level Licensing Course

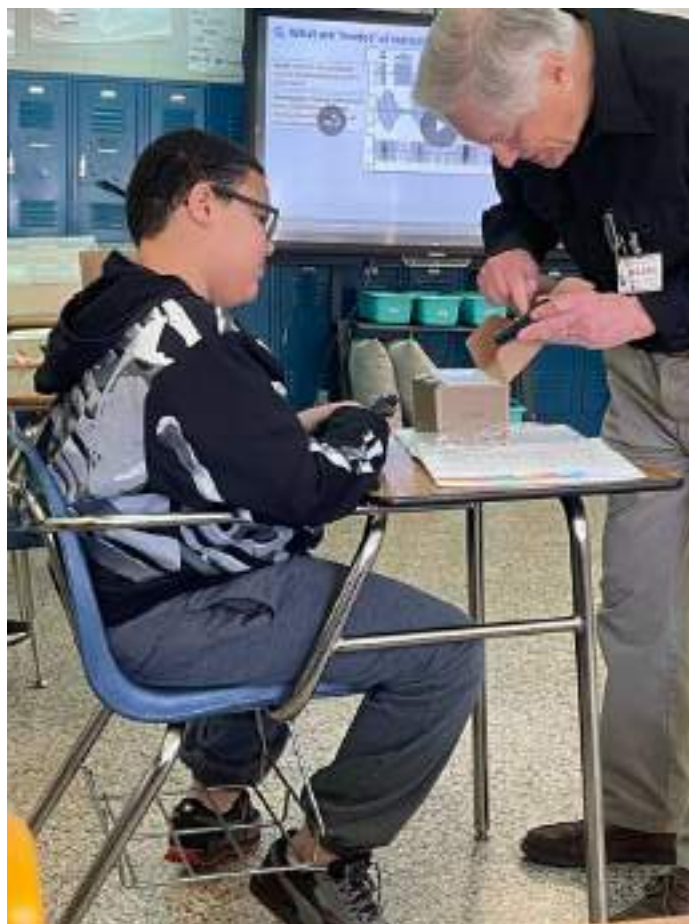
In 2023, on the last day of a week-long ham radio camp, 11-year-old Aiden Tyler and his sixth grade science teacher, Mrs. Alexandra Perry, sat for their FCC amateur radio exam and earned their Technician-class licenses. In this month's column, Richmond Amateur Radio Club (RARC), W4ZA, member and license prep class instructor Bruce MacAlister, W4BRU, discusses the creation of the week-long course.

This story began in 2021, when Mrs. Perry, a sixth grade science teacher at Carter G. Woodson Middle School in Hopewell, Virginia, searched for a way to stimulate her students, who had recently returned to the classroom after being home due to COVID-19. She had heard that it was possible for students to talk to an astronaut through the Amateur Radio on the International Space Station (ARISS) program, but discovered that licensed hams were needed, so she called RARC. Our club has experience contacting the ISS because we worked with the Science Museum of Virginia in 2016 to celebrate our 100th year as a radio club. The museum held a summer radio camp, and those young campers talked to an astronaut aboard the ISS.

We had retained good notes on what it takes to make an ARISS contact go smoothly, so we were ready to assist Mrs. Perry and her teaching team with putting together a plan and completing the ARISS paperwork. RARC's team of instructors taught four radio-specific classes for 80 sixth grade science students in preparation for the contact. Then, on February 28, 2022, 10 well-rehearsed students asked questions of astronaut Tom Marshburn, KE5HOC, as he traveled overhead on the ISS.

Radio Camp Creation

The ARISS contact was successful enough that Mrs. Perry and RARC decided to offer students the chance to earn a ham radio license, but it would have to take place outside of normal class time. Hopewell holds school year-round with periodic intersessions for the students to take time away or to go to an optional camp, so Mrs. Perry decided to create a week-long radio camp for the 2023 March intersession.



Bruce MacAlister, W4BRU, showing Aiden Tyler, KQ4HIU, how to put together the parts of a handheld transceiver.

That January, Dave Stevens, WB4DES, began planning the camp course. He was puzzled about how to teach middle school students the adult-level material needed to pass the exam. He combined resources from *The ARRL Ham Radio License Manual* and ARRL slides that RARC had been using for decades (more ARRL resources can be found at www.arrl.org/instruction-arrl-resources), the W5YI material that the club had used during the COVID-19 pandemic for teaching via Zoom, and other online videos. Stevens wanted to include tactile and visual exercises, as well as live demonstrations, while keeping the class lively and instructive by discussing the material interactively with students. Stevens' wife, Patty, is a retired teacher

and was a big help to him and his team as they prepared the lesson plans.

Because Stevens had done so much to prepare the adult-level testing material for his new younger audience, he decided that even if only one student showed up, he would teach the class. Two students signed up, but only one — Aiden Tyler — showed up to the class, so Mrs. Perry and Patty Stevens decided they would also join the camp, attend the classes, and take the test.

What Students (and Instructors) Learned

We learned that frequent breaks were necessary to maintain the sixth grade student's attention, so periodically we kicked an oversized balloon around the classroom to get our blood flowing. Certain foundational videos were important, but most of them made Tyler tired. Instead, we created a game of reading questions, jointly thinking about the answers, and discussing why the right answer was correct. Getting up and wandering around the room while looking at the questions and answers also helped maintain attention and focus. Movement is important for an 11-year-old (and that was true for, and appreciated by, the adult students as well).

To further enhance the tactile experience, we went outside the classroom to set up a vertical antenna, then rigged a handheld transceiver with an amplifier inside the classroom, and made a contact via a repeater 25 miles away. Students also assembled a handheld transceiver out of the box, pointing out the parts as they went along. We then practiced making simplex contacts with them. We also taught them how to solder together an FM radio from a kit.

Using a small digital multimeter, students learned how to take measurements, and they got to take the multimeter home at the end of camp. Finally, Dave Thomas, WD3O, and his ARRL-accredited Volunteer Examiner team (Catastrophic Amateur Tactical Squad, KC4TS) arrived on the morning of the last day of camp and administered the exams. All three students passed, and RARC gave Tyler and Mrs. Perry dual-band handheld transceivers.



Newly licensed Patty Stevens, WB4PES (left); Aiden Tyler, KQ4HIU (middle), and Mrs. Alexandra Perry, KQ4HJT (right).

In Summary

Throughout this process, RARC learned a lot about teaching the Technician-class license information to middle school students, and we documented all that we learned. This information would be useful for the Boy Scouts of America Radio Merit badge because many Scouts are middle school-aged. We're happy to share what we learned with other teaching teams! Send a note to school@rarclub.net.

All photos provided by the author.

ARRL Special Service Clubs

ARRL offers the Special Service Club (SSC) program for clubs that demonstrate that they're working to improve the amateur radio community by completing special projects, holding license classes, and working with local groups on events, among other activities. Visit www.arrl.org/ssc-application for more information about this program. Below is a list of new and renewing SSCs as of September 30, 2024.



Renewing SSCs

Gloucester County ARC, W2MMD
South West Idaho ARC, K7SWI
Central Ohio Radio Club, W8AIC

Pitman, NJ
Nampa, ID
Sunbury, OH

Ham Media Playlist

Operating in the Great Outdoors — SOTA

It's often said that amateur radio is a hobby of hobbies. Just when you think you've tried everything, another aspect of the Amateur Radio Service seems to grab your attention. For some, this may be kit building. For others, perhaps it's Parks on the Air® (POTA). The number of hams who enjoy operating outdoors is on the rise, and the number of hams operating Summits on the Air (SOTA) is reaching new heights.

SOTA is a program that encourages portable operation on summits. While it may seem clear cut, there are rules and nuances to the SOTA program that don't necessarily exist in other parts of amateur radio. So, with all these rules, where does one start to learn more about SOTA? On YouTube, of course. When it comes to looking for YouTube channels with great advice on activating summits, you can't go wrong with these three.

K6ARK Portable Radio

Adam Kimmerly, K6ARK, is a prolific SOTA activator. His channel, K6ARK Portable Radio, has videos ranging from topics like QRP, lightweight gear suitable



Adam Kimmerly, K6ARK, activates a national park using his lightweight POTA kit.

for hiking and climbing summits, and tips and tricks to make an activation successful, among others. Adam has a passion for SOTA and photography, which results in a collection of YouTube videos that are not only engaging and inspiring, but visually superb.

In addition to the course Adam leads in ARRL Learning Center, "Getting Started with Summits on the Air," he has some great tutorials on his YouTube channel. In his video titled "Smallest possible all-mode POTA kit?" (<https://tinyurl.com/k6ark-pota>), he uses a kit that weighs roughly 6 ounces. While the video title makes it apparent Adam is activating a park for POTA, it's important to note that everything he does is about keeping things lightweight and small, so this kit lends itself wonderfully to SOTA activations as well. Using a (tr)uSDX transceiver and a simple wire antenna, Adam attempts to not only activate the park, but to make contacts using three modes: CW, voice, and digital. Watch the video to see for yourself if Adam is successful.

Red Summit RF

Another great HamTuber for someone interested in SOTA is Red Summit RF (www.youtube.com/@RedSummitRF). Charlie Brown, NJ7V, is the content creator behind this channel, and he has a wealth of great information. Ranging from filming activations



Charlie Brown, NJ7V, and Chris Claborne, N1CLC, answer a question from KG6LI on the All Portable Discussion Zone livestream.



Fraser, MM0EFI, displays the contact map of his activation of Earl's Seat.



Fraser, MM0EFI, sits atop Earl's Seat and demonstrates how he'll activate the summit.

to reviewing gear not often seen reviewed (like CW paddles) to discussing equipment that can help make activations successful, there's something for everyone.

Charlie's channel hosts a regularly occurring live discussion with a group of other SOTA enthusiasts called All Portable Discussion Zone (APDZ). Charlie; Dan Devlieger, KC7MSU, and Brian Betz, W7JET, discuss topics related to portable operating and share great information, as well as answer questions from the audience.

During one recent episode of APDZ, Charlie and a guest host, Chris Claborne, N1CLC, discuss "Ham Radio Equipment Ideas for QRP Operation" (<https://tinyurl.com/redsummit-apdz>), Charlie and Chris go into great detail about their pack loadout for portable operations. Charlie goes through several scenarios that might require different gear, taking time to explain what's in each pack for each situation. While the planned discussion of each pack is a great resource, an added value is Charlie and Chris taking the time to answer questions live. So, if you're considering SOTA, be sure to hop on one of the All Portable Discussion Zone livestreams and bring your questions.

Charlie loves activating summits, and it shows in his videos. In his video titled "Rockmite Plus Plus QRP Transceiver Kit in the Field" (<https://tinyurl.com/redsummit-rockmite>), Charlie starts hiking to the Dixie Benchmark summit in total darkness. He combines his love for activating with discussing and reviewing a piece of gear — in this case, the Rockmite QRP Transceiver. He spends some time going through features of the radio before getting to where the proverbial rubber meets the road and starts calling CQ. One nice thing about the way Charlie films is that he tends to include footage of when he faces challenges or struggles with equipment, realizing that many of his

viewers may encounter similar situations. In this video, he realizes that the device he was using to record the audio was interfering with his ability to hear signals coming in, and viewers get to witness him troubleshoot the problem. Charlie closes out this video showing the internals of the radio and demonstrating how to change the frequency modules.

The Radio Rover

Summits on the Air is a worldwide program, and Fraser Wenseth, MM0EFI, gives his viewers a glimpse of SOTA on Scottish mountains through his YouTube channel, The Radio Rover (www.youtube.com/@theradiorover/videos). In his video "How to have fun with your amateur radio!" (<https://tinyurl.com/mmoefi-sota>), Fraser takes viewers on a brief hike over a "rather steep lump" to Earl's Seat for an activation on 2 meters. Fraser's excitement for SOTA is infectious; not even the wind, potential rain, or mud from a wet summer can keep him from ascending the summit and getting on the air. He starts calling CQ and is immediately rewarded with multiple hams reaching out to make contacts. His first contact is with Andy Sinclair, MM0FMF, who is on another summit with American ham Josh Gibbs, WU7H. Fraser manages to get Josh in his log, as well as in the video. He makes short work of the activation with 11 contacts.

Fraser does a great demonstration showing that hams who have access to only VHF/UHF can still have fun with Summits on the Air, with his farthest contact being 45 miles away.

There's a wealth of great YouTube channels focusing on various parts of amateur radio, but these three are true gems to showcase the Summits on the Air program. After getting yourself comfortable with the program, pack up your gear and activate a summit.

How's DX?

The 2024 N5J DXpedition to Jarvis Island

In this month's column, guest author Don Greenbaum, N1DG, notes the efficiency of the N5J team's Jarvis Island DXpedition.

The N5J team's DXpedition to Jarvis Island began 8 years ago, right after the successful Baker Island KH1/KH7Z DXpedition. On our way back to Fiji, George Wallner, AA7JV, said, "There has to be a better way [to conduct island DXpeditions]." And so began a 3-year process to create a remote system that includes a custom-made landing craft, software control systems, and custom-designed shortened antennas. George's Radio in a Box (RIB) design was funded by the Northern California DX Foundation, our main sponsor. This concept has been covered several times in "How's DX?"

The "better way" had several goals: safety, comfort, cost effectiveness, and proof to conservation agencies that minimally invasive ham radio activity is possible in environmentally sensitive areas. It had been 34 years since the US Fish and Wildlife Service (USFWS) allowed ham radio activity on Jarvis. The need for KH5 DX Century Club (DXCC) credits put it at Club Log's number 18 most-wanted overall (and number four for



The N5J team's RIB before deployment. [Don Greenbaum, N1DG, photo]



An N5J team picture on Jarvis Island. In the top row is Mike Snow, KN4EEI (far left); George Wallner, AA7JV (left); Adrian Ciuperca, KO8SCA (middle); Don Greenbaum, N1DG (right), and Tomi Pekarik, HA7RY (far right). In the bottom row are USFWS biologists Meagan (left), Beth (middle), and Anna (right). [Don Greenbaum, N1DG, photo]

mixed in central Europe, per Deutscher Amateur Radio Club/European DX Foundation statistics). On SSB, it ranked second in central Europe.

Securing Approval

Jarvis Island is a National Wildlife Refuge (NWR) and part of the Pacific Remote Islands Marine National Monument (PRIMNM). The coral island is uninhabited, approximately 4.5 square kilometers, and located in the South Pacific Ocean, about halfway between Hawaii and the Cook Islands.

A Compatibility Determination (CD) was needed for this DXpedition. In September 2022, I met with USFWS personnel in Honolulu to describe the RIB system and our minimally invasive methods. I emphasized that instead of the 15 operators, 10 tents, 12 tall antennas, a restroom, and seven generators that we had on Baker, we could instead use an amphibious boat containing all of the radios and generators, and only six or seven vertical shortened antennas. In doing so, we could also accommodate USFWS's need to have several biologists study the refuge. In January 2024, we received news that we would be granted the CD. The CD empowered the PRIMNM superintendent to issue a Special Use Permit with the terms and dates of our trip. The date was August 2024, which was based on available USFWS personnel.

Arranging Logistics

After securing the Special Use Permit in early 2024, we had little time to organize the DXpedition, including raising funds for fuel and boat personnel and recruiting remote operators. In 2023, the MV *Magnet*, owned by George Wallner, AA7JV, had already entered the Pacific, and by June 2024, we had successfully trained a core of remote operators with experience in FO, E5, VP6D, KH8S, and KH8. The at-island team would be

George; myself; Tomi, HA7RY; Adrian, KO8SCA, and Mike, KN4EEI. Contacts with any of these operators would also count for Islands on the Air (IOTA) and Parks on the Air® (POTA®) credit, which was a big change from previous program rules. That is how rare Jarvis was — the award program organizers knew the restrictive USFWS rules prevented on-island operators. Because we were operating in the island refuge, exceptions were made. Remote operators not in the refuge wouldn't count for IOTA or POTA.

We organized the two remote teams under Ned Stearns, AA7A (FT8), and Gerry Hull, W1VE (CW). The pilots were Donald, AA1V; Eiki, JH8JWF, and Manny, CT1FPQ. The call signs of the remote operators were as follows: W1UE, DL6KVA, K6MM, WD6T, AA7A, W7YED, CT1BOH, CT1ILT, CT1EEB, E21EIC, PB8DX, N6MJ, W8HC, F6EXV, K5GO, JK1KSB, KJ7KOJ (17 years old), W1VE, JE1CKA, KL2A, W1RM, JN1THL, E70T, N7NR, K6UFO, JH8JWF, E77DX, ZL3CW, N1QV, KK7EXT (14 years old), KN4EEI, PY5EG, AA1V, KL7SB, K6TD, CE3CT, KY7M, HA2NA, NP4Z, DJ4MX, ND2T, VE5MX, W2GD, VK3GK, K1IR, and K4NHW. All foreign remote operators (even those with US licenses) had to abide by FCC rules. Therefore, the radios on the island were completely controlled by the at-island operators. The remote laptops for CW and FT8 were air-gapped to the stations on the island, and radio control was not accessible by the remote teams.

Just like the 2018 Baker Island DXpedition with the first Fox and Hound activation of its kind, the Dateline DX Association was working with the *WSJT-X* developers to introduce another major advance in FT8 technology: Super Fox.

The Operation Begins

On August 3, we started our nearly 1,900-kilometer (1,180-mile) journey to Jarvis and arrived at around 0600 local time on August 6. By 0700, the first tender was loaded with Beth and Meagan (two of our USFWS monitors), George, and some supplies before heading to the island. Mike lowered and piloted the RIB boat. By 0750, the at-island team was situated and helping to position the RIB boat. You can watch a short clip of the RIB boat heading to Jarvis at https://youtu.be/4W3Q9iUhESI?si=_R8_cL6SsNoszCrc.

Within 4 hours of landing on the beach, five radios were up and running, the link was established, and three antennas were guyed and tuned. After a lunch break, George quickly made sure the ship's control PCs were all connected to the radios in the RIBs and let loose the first team of remote operators on three radios. Contacts appeared in the logs right away. A

drone view of the complete remote station after the first day can be seen at <https://youtu.be/L4bqsoHRLB4?si=K9P7OAC7qiWkwwcx>.

The three USFWS biologists were able to spend close to 2 weeks doing science on a remote island, courtesy of the amateur radio community. Our close work with the USFWS and their appreciative response will be essential in our efforts to activate more protected entities around the world.

DXpedition Results

In conclusion, the RIB concept overcame permitting issues, the DXpedition successfully introduced Super Fox, and all FT8 contacts were handcrafted. The total time spent at the island was 13 days and 7 hours, and all 13 days were spent operating. Other stats contrasting the Jarvis and Baker Island DXpeditions can be seen in Table 1. A team of five operators set up six radios and eight antennas to make 25,300 contacts. An incredible group of 46 remote operators also worked to make this a team success. Club Log shows that more than 14% of our contacts resulted in a new country, and more than 43% of them resulted in a new band counter or mode for those in its database.

The N5J team wishes to thank the staff of the USFWS in Hawaii for approving this minimally invasive operation on the Jarvis Island NWR and within the PRIMNM. The PRIMNM includes Howland Island, Baker Island, Jarvis Island, Johnston Atoll, Wake Island, Palmyra Atoll, and Kingman Reef.

Table 1 — Baker versus Jarvis Stats

	Baker	Jarvis
Club Log Most-Wanted Rank (During DXpedition)	12	18
Contacts/Uniques	69,000/18,091	106,892/21,298
Days on Island	12	13.5
Days Operating	9	13
People Camping	11	0
Showers/Restrooms	2	0
Radios/Amps	6/6	6/3
Antennas	12	8
Tents with Tables/Chairs	10	0
Generators	8	4
Gasoline (gallons)	300	120
Water (gallons)	400	1
Setup Time (hours)	48	4
Tear-Down/Pack-Up Time (hours)	24	3

The World Above 50 MHz

A Magnetized CME Tail and E51EME

A minor coronal mass ejection (CME) struck Earth on August 27. Early in the morning on August 28, magnetic fields in the CME's magnetized tail wake lined up with the south-pointing Bz vector of Earth's magnetic field, causing a surprisingly strong G2-class geomagnetic storm. The Kp index went to 6, and visual aurora was observed in Colorado. In the afternoon on August 28, Bob, ZL1RS, at E51EME (BG08), began working North America on 6 meters, starting at around 1845 UTC. Bob logged stations from coast to coast. Gary Krenzel, NØKQY (DM98), logged E51EME at 1900 UTC. Gary runs 500 W and an M2 Antenna Systems 6M5X Yagi elevated 50 feet. He saw many stations calling E51EME, but few getting a reply. Paul Sobon, NOØT/KØPRT (DM88), worked E51EME and received a -23 dB report, noting, "I was lucky to work him with 100 W." He copied both sides of Bob's contacts with North American stations (including Mexico) as well as Chile. Was this opening due to F-layer/transequatorial propagation (TEP) with the maximum usable frequency (MUF) boosted by the G2-class storm? Carl Luetzelschwab, K9LA, reviewed the opening and noted the following:

The signature of TEP is obvious on the *Proplab* map for a path from E51EME to W5 (Dallas, Texas) at 1930 UTC on August 28. There are two enhanced plasma densities on each side of the geomagnetic equator. The heights of the maximum F2-region electron densities along the path are around 400 kilometers, which translates the plasma densities to MUFs of around 25 MHz at low elevation angles.

The spike in the K index may have enhanced the F2-region electron densities. I suspect that's what happened, as the MUF over the Point Arguello ionosonde (at Vandenberg [Space] Force Base in southern California) was significantly greater at 1930 UTC than the predicted monthly median value at 1930 UTC. The ionosonde data says around 33.5 MHz, whereas the predicted monthly median is around 24 MHz.

I looked at the Point Arguello ionosonde, the Eglin Air Force Base ionosonde, and the Idaho National Laboratory ionosondes for sporadic E, but foEs values were around only 4 MHz. Thus, it looks like an F2 hop was needed to couple into TEP. From the Point Arguello data, the spike in the K index may have enhanced the F2 TEP region to support one F2 hop to get to the TEP region.

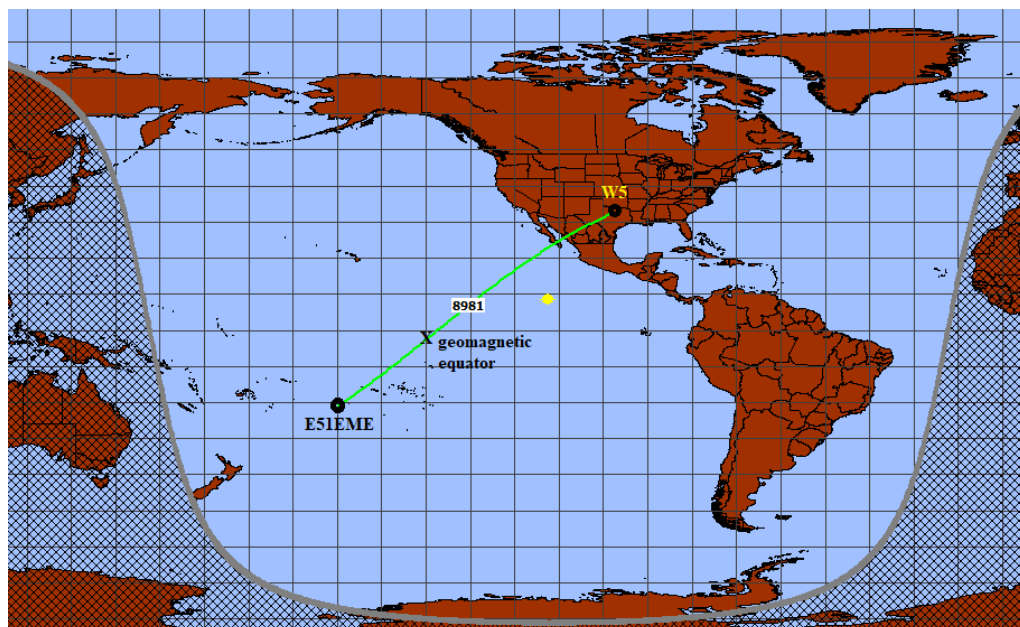
If the MUFs didn't get quite up to 50 MHz, there's always the advantage of FT8 over CW.

Thus, [there was] a nice chordal hop (TEP) across the geomagnetic equator at 35.5 MHz to 7,500 kilometers. It requires a very low elevation angle (1 degree).

E51EME ended 6-meter operations on September 9, after having worked more than 2,230 unique stations.

CY9C St. Paul Island DXpedition

The CY9C team covered 50, 144, and 432 MHz. Lee, WW2DX, was the primary VHF operator. John Price, WA2FZW (FN20), worked CY9C on standard 6-meter FT8 on August 27.



The August 28, 2024, *Proplab* map depicting Bob Sutton's, E51EME, path to W5 in Dallas, Texas. There were two areas of dense F-layer ionization north and south of the geomagnetic equator. [Carl Luetzelschwab, K9LA, image]

Dave Olean, K1WHS (FN43), worked CY9C on 432 MHz SSB on August 31. He related:

I had been trying with CY9C on 432 MHz Earth-moon-Earth, but I was having computer issues, and then my amplifier would cut out due to high voltage standing wave ratio [due to water in a connector]. Lee at CY9C suggested that we try on Q65 using [tropospheric propagation] from my VHF shack on the hill. We are almost 970 kilometers apart. I tuned to his frequency and heard a very loud Q65 signal that would not decode, so I called on SSB, hoping that it was CY9C — it was! We worked with 59++ signals on 432 MHz SSB.

September 6-Meter Long Path

E51EME (BG08) worked FR8UA (LG79) at 1901 UTC on September 6 via long path. FR8UA runs 20 W to a five-element Yagi. At around 1400 UTC on September 8, K0TPP (EM48) copied two decodes of 9V1SH (OJ11) on 50.313 MHz FT8 with signal strengths of -4 dB! The same morning, Carlos, WP4U, worked Japan and XT2AW (DF2WO was the operator) during a 6-minute opening. 9V1XX (OJ11) spotted TG9AJR (EK44) calling CQ on FT8 at 1615 UTC on September 27.

There was a remarkable long-path opening from south Texas to east Asia on October 1. Ed, K5YT (EM22), reported that VR2KW “started it all” at 1333 UTC. He logged three stations in China and copied XW4KV. Ed Stallman, N5DG (EM20), worked BA7NQ, BD7NWF, BA4SI, BA4RF, JE6KYA, JE6HJT, VR2KW, 9V1YC, and 9V1XX. Larry Burke, K5RK (EL29), said he “was late to the party,” but he worked 9V1YC and VR2KW. N5DG’s contact with 9V1YC was the first 6-meter contact between the US and Singapore. He added, “I saw and was called by many, many, JA and BY stations. The FT8 waterfall was amazing to look at.” NP2X (FK77) worked “53 JA stations” on FT8 and FT4.

On the Bands

50 MHz. Jim, K5ND (EM01), reported working CE6UFF (FF30), CE2EP, and CE3FFC via direct TEP on September 14. He was running just 10 W while operating low-power portable in the ARRL September VHF Contest. A G4-class geomagnetic storm took place on September 16. K0GU (DN70) received N0KP/B (EN35), K0GUV/B (EN26), and N0UD/B (DN96) via aurora. At 0016 UTC, Rich, K1HTV (FM18), worked Brazil at the end of the September VHF Contest. K1HTV had a 2-hour opening to South America at around 2030 UTC, and he worked 14 stations in the LU region, two in CX, and two in CE!

Abdallah, 9K2GS, worked Lance, W7GJ, who was operating at ZD9GJ, via TEP on September 12. On September 15, Mario, K2ZD (FN21), completed an EME contact with ZD9GJ at 0334 UTC; this was Mario’s 6-meter DX Century Club (DXCC) #226. The next day, Bob, K6QXY, and Josh, W6XU (CM88), logged Q65 EME contacts with ZD9GJ. ZD9GJ was Bob’s 6-meter DXCC #187. Lance reported 130 EME contacts as of September 27. For more information about Lance’s trip, visit www.bigskyspaces.com/w7gj/TDC%202024.htm.

Mike White, K7ULS (DN41), worked HA0DU via Q65 EME on September 27. In the afternoon on September 28, LU1WFU (FE64) had FT8 PSK flags from California to Nova Scotia. I, N0JK (EM28), copied LU1WFU’s signal at -17 dB while he was calling CQ at 2048 UTC.

144 MHz. Steve Sacco, NN4X (EL98), used tropospheric propagation on September 12 to work W3XTT (FN01) and K1TEO (FN31) on FT8. W9EWZ (EN52) copied K9MRI (EN71) on aurora CW on September 16. At 0110 UTC that same day, KP4EIT worked ZP9HTL (GG14) via TEP on SSB.

432 MHz. On September 19 at 0450 UTC, K7ULS (DN41) worked W6TCP (CM97) via Q65 EME.

Here and There

Phil Baldwin, N0PB, earned Fred Fish Memorial Award #58. His last grid was DN44, provided to him thanks to a contact with Jeffrey “Gus” Parker, WY7GUS.

The Geminid meteor shower is predicted to peak on December 13 – 14. Robert, W5AJ, is planning to operate on 6 meters from rare grid DL79 on December 13 – 14. In North America, the predicted peak rate of the Geminids is early in the morning (around 0800 UTC) on December 14. The best times for radio contacts will be around 0530 UTC, with a predicted rate of 103, and at 1230 UTC, with a rate of 78. Daily morning random meteors (with a rate of around 30) will increase the observed 1230 UTC meteor rate. The best path will be north to south. Mike, K6ML, finds that the VIRGO app is helpful to predict the best paths and times for meteor scatter (www.dl1dbc.net/Meteorscatter). Jeff, WB8LYJ, uses the MeteorActive app, which is available in the Apple App Store.

A major geomagnetic storm with widespread aurora occurred on October 10, 2024, and an epic 6-meter F2 opening happened the next day. More coverage of the event will be in next month’s column!

Special Events

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

Nov. 30, 0001Z – 2359Z, W3C, Pocono Lake, PA. Royal Air Force Amateur Radio Society. **150th Anniversary of Birth of Sir Winston S. Churchill**. 14.328. QSL. Michael Goodwin, KE2EH, 136 Ski Tr., Pocono Lake, PA 18347.

Dec. 1 – Dec. 7, 0000Z – 2359Z, W2MM, Sandpoint, ID. Quarter Century Wireless Association, Inc. **QCWA Annual Special Event — W2MM 77th Anniversary**. CW: 3.540 7.035 14.040 21.050 28.050; SSB: 3.810 7.244 14.262 21.365 28.325; FT8/FT4. Certificate. QCWA Activities Manager, 1613 Poplar St., Sandpoint, ID 83864. *Stations will be active from around the country with this call sign.* www.qcwa.org

Dec. 1 – Dec. 11, 1300Z – 2200Z, W2W, Hunt Valley, MD. Amateur Radio Club of the National Electronics Museum. **W2W Pearl Harbor Day Commemoration**. 7.041 7.241 14.041 14.241; digital 3.541 3.841 possible. Certificate & QSL. ARCNEEM, 338 Clubhouse Rd., Hunt Valley, MD 21031. *Primary operation will be Dec. 1 – 7, with additional operation possible Dec. 8 – 11 as operator availability permits.* www.wv-2.us

Dec. 1 – Jan. 31, 0000Z – 2359Z, K7S, West Jordan, UT. The Utah DX Association. **60th Anniversary of the Amateur Radio Stamp and the 110th Anniversary of ARRL**. 7.260 14.260 21.300 28.470; all bands, all modes. QSL. Wesley Wilkinson, 7363 S. Galaxy Hill Rd., West Jordan, UT 84081-3961. w7wes@yahoo.com, www.udxa.org, or www.qrz.com/db/w7wes

Dec. 7, 1300Z – 2100Z, K4P, Fort Lauderdale, FL. Parrot Amateur Radio Club, Inc. **Flight 19 — The Lost Avengers**. 7.210 14.240 18.150 21.315. QSL. Gerald Deitch, 2621 NW 105 Ln., Fort Lauderdale, FL 33322. fogdaddy1@gmail.com or www.parrotarc.org

Dec. 7, 1800Z – 2100Z, N3TAL, Lanham, MD. American Legion Post 275 Amateur Radio Team. **Pearl Harbor Remembrance Day**. 7.275. QSL. American Legion Post 275 Amateur Radio Team, 8201 Martin Luther King Jr. Hwy., Lanham, MD 20706. n3tal275@gmail.com or www.qrz.com/db/n3tal

Dec. 12 – Dec. 15, 1400Z – 2200Z, WX3MAS, Nazareth, PA. Christmas City Amateur Radio Club. **WX3MAS — Christmas City**. 3.850 7.270 14.265; SSB and FT8. QSL. Delaware-Lehigh ARC, 14 Gracedale Ave., Greystone Building, Nazareth, PA 18064. www.dlarc.club

Dec. 14, 1400Z – 2200Z, K3S, Baltimore, MD. Nuclear Ship *Savannah* Amateur Radio Club. **Ike's UN Atoms for Peace Speech (1953)**. 7.1 14.110 21.1 28.1; check spotting networks. QSL. K3LU, 980 Patuxent Rd., Odenton, MD 21113. www.qrz.com/db/k3s

Dec. 14, 1500Z – 2300Z, K5O, Alpine, TX. Big Bend Amateur Radio Club. **50th Anniversary**. 7.240 14.320 21.350 28.400. QSL. Big Bend ARC, 1402 N. 5th St., Alpine, TX 79830. www.bigbendarc.org

Dec. 14, 1700Z – 2359Z, N16IW, San Diego, CA. USS *Midway* Museum Ship. **Pearl Harbor Remembrance Day Special Event**. 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/n16iw

Dec. 17, 1400Z – 2100Z, W8W, Bellbrook, OH. Bellbrook Amateur Radio Club. **Wright Brothers First Flight**. 7.217 14.317 21.317; all bands, all modes. eCertificate. WrightFlight@bellbrookarc.org or www.bellbrookarc.org

Dec. 18 – Dec. 20, 0000Z – 2359Z, W4A, Bluff City, TN. N9EN. **Howard Armstrong Memorial Special Event**. 3.530 7.030 14.030 21.030. QSL. Bradley Anbro, 1118 Walnut Grove Rd., Bluff City, TN 37618.

Dec. 25 – Dec. 31, 0000Z – 2359Z, NW7US, worldwide. Olivia Digital DXers Club. **Winter Olivia Digital Mode QSO Party**. 7.071 14.071 21.071 28.121. Certificate. Tomas Hood, P.O. Box 110, Fayetteville, OH 45118. *This is an operating event.* www.OliviaDigitalMode.org

Dec. 26 – Jan 2, 0059Z – 0059Z, W2T, Trenton, NJ. Delaware Valley Radio Association. **Battle of Trenton**. 7.220 14.280 21.280 28.430. Certificate & QSL. Delaware Valley Radio Association, P.O. Box 7024, Trenton, NJ 08628. www.w2zq.com

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

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

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

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

Convention and Hamfest Calendar

A = AUCTION

D = DEALERS / VENDORS

F = FLEA MARKET

H = HANDICAP ACCESS

Q = FIELD CHECKING OF QSL CARDS

R = REFRESHMENTS

S = SEMINARS / PRESENTATIONS

T = TAILGATING

V = VE SESSIONS

Abbreviations

Spr = Sponsor

TI = Talk-in frequency

Adm = Admission

Alabama (Locust Fork) — Jan. 4 **D F H R T V**

8 AM – 1 PM. *Spr*: Blount Co. ARC. Locust Fork High School, 77 School Rd. *TI*: 146.70 (91.5 Hz). *Adm*: \$5. www.w4blt.org

ARRL WEST CENTRAL FLORIDA SECTION CONVENTION

December 13 – 14, Plant City, Florida

D F H Q R S T V

Fri. 1 PM – 5 PM, Sat. 8 AM – 3 PM. *Spr*: Florida Gulf Coast Amateur Radio Council. Strawberry Festival Expo Building, 301 N. Berryfest Pl. (was N. Lemon). *TI*: 145.410 (131.8 Hz). *Adm*: \$10 Advance, \$13 door. www.fgcarc.org

ARRL NEW YORK CITY-LONG ISLAND SECTION CONVENTION

January 4, Brookville, New York

R S

8 AM, forums start 9 AM. *Spr*: Ham Radio University, Great South Bay ARC. LIU Post Hillwood Commons, 720 Northern Blvd. *TI*: 146.85. *Adm*: TBD. www.hamradiouniversity.org

To All Event Sponsors

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

Events that are sanctioned by ARRL receive special benefits, including an announcement in these listings and online. Sanctioned conventions are also listed in *The ARRL Letter*. In addition, events receive donated ARRL prize certificates. 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 **January 1** to be listed in the **March** issue. Information in this column is accurate as of our deadline; contact the sponsor or check the sponsor's website for possible late changes, driving directions, and other event details. Please note that postal regulations prohibit mention in QST of games of chance, such as raffles or bingo.

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

Volunteer Monitor Program Report

The Volunteer Monitor (VM) Program is a joint initiative between ARRL and the FCC to enhance compliance in the Amateur Radio Service. This is the September 2024 activity report of the VM Program.

◆ Technician-class licensees in Indiana, South Carolina, and Mississippi received advisory notices regarding FT8 operation on 40 meters. Technicians have only CW privileges on 40 meters.

◆ Licensees in Alabama, Florida, Louisiana, Michigan, and New Jersey received advisory notices for excessively wide signals of 10 kHz or more. Commission Rule 97.307(a) provides that “no amateur shall occupy more bandwidth than necessary for the information rate and emission type being transmitted, in accordance with good amateur practice.”

◆ A licensee in Florida received an advisory notice for deliberate interference to a DX station, and to operators trying to work the DX station, on 14.252 MHz. Such operation is in violation of Section 97.101(b) of Commission rules. The operator was cautioned that FCC fines for such operation normally start at \$7,000.

◆ There was one general VM alert. There were two FCC referrals regarding apparent experimental high-speed stock-trading signals on amateur frequencies.

◆ The Program Administrator presented a program by video conference to the Wisconsin DX Club and participated in one FCC meeting.

The totals for August monitoring were 1,475 hours on HF frequencies, and 2,455 hours on VHF frequencies and above, for a total of 3,930. — *Thanks to Volunteer Monitor Program Administrator Riley Hollingsworth, K4ZDH*

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.

Our VEC program systems are operational again and we are starting to enter the backlog of VE participation data into our database following the security incident. The March 2025 Volunteer Examiner Honor Roll will be up to date.

Volunteer Examiner	Sessions	Accreditation Date	Volunteer Examiner	Sessions	Accreditation Date	Volunteer Examiner	Sessions	Accreditation Date
Atlantic			Hudson			Roanoke		
***Collin Pike, KJ4AXB	6,767	26-Apr-11	Alan Crosswell, N2YGK	516	26-Oct-94	Judy Friel, AC4RG	322	01-Feb-91
James McCloskey, NS3K	351	14-Nov-94	Fritz Boigris, KB2O	498	26-Oct-84	Alan Ronald Moeck, WA2RPX	264	27-Sep-94
Jobst Vandrey, AC0LP	324	23-Jun-08	Sid Markowitz, K2GG	454	27-Sep-94	Terry Sanner, WV8V	256	06-Sep-84
George Brechmann, N3HBT	317	01-Apr-91	John Kiernan, KE2UN	314	01-Jul-91	David Snyder, W4SAR	255	01-May-93
Edward Genoino, WA2NDA	298	10-Jul-85	Walter Lesnowich, W2EE	303	06-Mar-08	Larry Withrow, AF4HX	232	17-Dec-98
Cully Phillips, N3HTZ	231	01-Sep-91	Thomas Carrubba, KA2D	297	01-Sep-93	David Poe, W8IW	215	13-Mar-07
Donald Rees, K3PCT	224	28-Apr-23	Robert Casino, N2GDY	290	03-Jun-08	Henry Wyatt, II, K4YCR	215	28-Jan-98
Michael Harla, N2MHO	220	12-Apr-06	Carlos Prior, KE2TT	266	01-Jun-90	Edwin Williams, KN4KL	215	01-Jan-92
William Klepser, Jr., WB2AIV	215	09-Jun-99	Donald Younger, W2JEK	257	30-Jul-86	John Kanode, N4MM	208	07-Jun-85
Ralph Abbott, WA3ELQ	202	30-May-05	Allen Bender, W2QZ	256	02-Feb-88	Thomas Lewis, W4SIS	194	14-Nov-97
Central			Midwest			Maurice Brown, N8VA	192	31-Mar-97
Ed Wagner, AB9FN	422	01-Jul-02	David Bartholomew, AB0TO	805	22-Mar-02	Richard Brannen, Jr., KA3JCA	189	25-Jan-89
Allan Bukowski, N9ZD	356	01-Jun-92	Kevin Naumann, N0WDG	708	17-Nov-02	Rocky Mountain		
Eldon Boehm, NK9U	345	21-Nov-86	Harry Steger, Jr., W0HMS	663	26-Aug-08	Robert Vosper, KZ1B	683	09-Jul-10
Donald Hlinsky, N9IZU	336	01-Mar-91	Chris Hunt, N0YH	573	05-Aug-20	Robert Hamilton, N0RN	431	19-May-87
Brian Eder, WB9UGX	310	01-Jan-92	Roland Kramer, W0RL	559	21-Jun-01	Jeffrey Weinberg, W0QO	342	01-Apr-93
Robert Begeman, W9KVK	296	01-Jun-92	Ralph Waldren, N0OTS	486	03-Jan-20	David Avery, N0HEQ	302	13-Jan-88
Timothy Pechtold, AA9BV	283	01-Nov-92	Kenneth Simila, KC0VMY	318	18-Feb-07	David Sharpe, K10HG	259	02-Feb-98
James Rinehart, K9RU	268	01-Aug-91	Edwin Berkel, AE0EB	257	06-Jan-15	Gary Zabriskie, N8ARE	256	20-Nov-84
Frederick Baguhn, W9GOC	266	16-May-02	John Mountain, Jr., KJ0MTN	255	28-Sep-09	Martin Soffran, NM5MS	240	21-Mar-94
Dennis Keyfauber, K3DCK	259	29-Dec-22	Charles Wilmes, KW0K	229	28-Apr-09	Peter Brisbane, NM5PB	232	20-Jan-14
Dakota			New England			David Bratcher, AK0MR	207	23-Sep-08
Jeffrey Goodnuff, W0KF	349	17-Jun-03	**Paul Lux, K1PL	2,266	25-Jan-85	Denis Campbell, AA0YX	185	02-Feb-96
John Schwarz, Jr., AE0AL	331	26-Oct-94	*Bob Phinney, K5TEC	1,672	20-Jan-14	Southeastern		
Shep Shepardson, N0NMZ	320	12-Mar-01	Gregory Paul, KC1MND	548	03-Jun-20	***Gary Pike, KA4KBX	8,603	03-Sep-09
Joel Dunham, NC1D	287	26-Jul-23	Phillip Temples, K9HI	519	12-May-89	***Justin Pike, KJ4AXF	6,822	12-Nov-12
Douglas Nelson, AA0AW	253	01-May-90	William Poulin, WZ1L	436	01-Sep-91	***Anna Pike, KD4PCU	5,181	18-Aug-09
Daniel Royer, KE0OR	250	01-Jul-91	Robert Beaudet, W1YRC	411	01-Aug-90	***Patrick Pike, KJ4AXD	3,843	13-Oct-15
James Rice, II, N0OA	233	04-Dec-00	Bruce Anderson, W1LUS	400	11-Feb-88	**Ryan Krenzischek, W4NTR	2,086	04-Jan-13
Larry Larson, KR0K	230	16-Mar-09	Barbara Irby, KC1KGS	368	05-Aug-19	*John Reynolds, W4TXA	1,020	08-Jun-16
Robert Tracy, N0TC	199	30-Jul-86	Brandin Hess, AC1RU	328	24-Sep-15	Robert Fauci, N1UVO	639	28-Mar-18
Karl Eriksen, WA2DEE	178	08-Jan-90	Stefan Rodowicz, N1SR	321	20-Nov-84	Stanley Whitfield, K4SHW	615	26-Sep-19
Delta			Northwestern			Eddie James, WD3D	615	01-Apr-21
Loma Westmoreland, KU5J	788	31-Jan-21	Richard Morgan, KD7GIE	448	11-Aug-00	Thomas Kocourek, N4FWD	448	09-Feb-04
Monvel T. Maskew, Jr., K9FQ	765	18-Jul-18	Scott Robinson, AG7T	447	01-Aug-91	Southwestern		
Terry Partigianoni, W5TMP	535	27-Nov-07	Erin Henrickson, ND7B	417	06-Jan-23	*Bill Martin, AI0D	1,075	01-Nov-84
Elmer McKenzie, Jr., K5MCK	471	23-Dec-22	Loren Hole, KK7M	381	06-Sep-84	David Morrill, N7TWT	520	20-Jul-00
Bryan McCammon, K15HAV	431	03-Sep-20	John Clarke, AC7WW	381	20-Jan-03	Richard Buck, KC7OCT	354	21-May-97
John Waters, III, KC5FYA	330	14-Sep-21	David Brooks, N7HT	332	10-Jun-87	Donald Kramer, Sr., WA6UVW	344	08-May-98
Rodney Webb, W4WRE	324	21-Mar-17	Joseph Barry, K7SQ	312	21-Jun-95	Bruce Zieminski, WA6BZ	321	25-Mar-02
Joe Lowenthal, WA4OVO	299	25-May-06	Nathan Zane, KH6IHB	282	01-Apr-93	Ali Hassan, AA6WC	288	01-Jun-90
Bobbie Williams, W1BEW	299	01-Jun-92	Wayne Schuler, AI9Q	282	01-Sep-91	Norman Pilawski, WT6Y	284	17-Feb-87
Roger Gray, N5QS	285	01-Mar-93	Harley Leach, KI7XF	280	24-Jun-19	Frank Westphal, K6FW	278	06-Sep-84
Dawn Gray, N5QT	266	01-Mar-93	Klaus Neubert, AC7MG	274	10-Jul-01	Dave Martin, AC7FF	266	04-Apr-14
Great Lakes			Richard Heasty, KK7VH	263	07-May-01	Gary Hamman, K7GH	265	01-Aug-92
*Charles Tyrrell, KE8PCB	1,387	03-Sep-20	Pacific			West Gulf		
*David Potter, KE8OHG	1,372	03-Jun-20	Brian Torr, N6IY	944	06-Sep-00	*Franz Laugermann, K3FL	1,825	01-Dec-91
Bruce Osmon, KE8LT	750	16-Nov-18	Morris Jones, AD6ZH	581	27-Nov-01	*Tanner Jones, W9TWJ	1,279	31-Jul-07
Earl Paazig, W8BR	742	16-Apr-02	Dieter Stussy, KD6LVW	467	27-Jan-94	Daniel Quigley, N7HQ	793	24-Apr-20
Charles Hall, W8HF	286	01-Jun-92	Larry Loomer, KI6LNB	379	03-Dec-08	John Paterson, Jr., KC5LAA	547	16-Mar-09
William Bogle, Jr., KE8FZY	277	08-Jul-20	Bill Nichols, NN7K	375	01-Sep-93	Gerald Grant, WB5R	535	04-Jan-85
Lance Harvala, AB8Y	254	06-Nov-19	Robert Perlman, W6BP	373	26-Aug-08	Adolph Chris Koehler, K5VCR	526	29-Sep-95
Archie Mack, Sr., AF4EB	253	19-Aug-97	Gordon Fuller, WB6OVH	363	06-Sep-84	David Fanelli, KB5PGY	502	01-Oct-91
Stanley Arnett, II, AC8W	235	06-Sep-84	Jim Brunk, N6BHX	315	13-Jul-95	Wilbert Cannonier, KK5JJ	475	03-Nov-95
Chris Anderson, K8VJ	231	09-Feb-90	Dennis Simon, KB7UTV	303	10-Dec-13	Gerald Crenshaw, WD4BIS	450	27-Feb-98
			Jane Garwood, KB7YUZ	296	20-Jan-14	Jane Crenshaw, WB9ZPH	433	02-Oct-97

*Denotes participation in over 1,000 session. **Denotes participation in over 2,000 sessions. ***Denotes participation in over 3,000 sessions.



Certificate of Code Proficiency Recipients

Sponsored by



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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.

April 2024

Joseph P. Kononchik, KS1I	10
Bill Durham, KG5ZCI	15
Joseph P. Kononchik, KS1I	15
Glenn R. Barr, Jr., WB0KFC	20
Daryl I. Hammond, W0BZ	20
Gabriel E. Donley, WN7JT	25

May 2024

Tom J. Zajdel, AA3TZ	10
Tom J. Zajdel, AA3TZ	15
John H. Orkney, KA1LHJ	20
Tom J. Zajdel, AA3TZ	20
Daryl I. Hammond, W0BZ	25

June 2024

Robin L. Zinsmaster, N6PHP	25
----------------------------	----

July 2024

Theodore J. Jacobson, N6ZO	10
Jerry K. Nobles, N5MES	10
Charlene K. Lewis, K8XCO	15
David D. Koberstein, N9DK	20

August 2024

Thomas H. Busch, WB8WOR	10
Jeanne Martin, KC1SPX	10
Thomas S. Wright, ND9Z	10
Richard McCleaf, K3EYJ	15
Stephen C. Brandt, N7VS	30

George I. Levy, NC2M	30
Stephen C. Brandt, N7VS	35

September 2024

Tony Levenson, W4FRV	10
David E. McNeill, N7WMN	10
David W. Risik, WA3HSC	10
Sherrick A. Slattery, KA6NZB	10
Mark C. Guenther, WB7TLK	20
Robert Harrington, VE3OU	20

Congratulations to all of the recipients.

December 2024 W1AW Qualifying Runs

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

December 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, December 14, at 2 PM PST (2200 UTC) on 3581.5, 7047.5, 14047.5, 18077.5, and 21067.5 kHz. Unless indicated otherwise, sending speeds are from 10 to 40 WPM.

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

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

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

Members of the North Fulton (Georgia) Amateur Radio League (<https://nfarl.org>) are offering to subsidize the total cost of a Code Proficiency certificate or endorsement submission for any individual age 21 years and younger, and who

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

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

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



W1AW Qualifying Runs — December 2024 (All times are in Eastern Standard Time.)

Monday	Tuesday	Wednesday	Thursday	Friday
12/2 4 PM – 2100Z 10 – 35 WPM	12/3 7 PM – 0000Z (12/4 – UTC) 35 – 10 WPM	12/4 10 PM – 0300Z (12/5 – UTC) 10 – 40 WPM		
	12/10 7 PM – 0000Z (12/11 – UTC) 10 – 40 WPM	12/11 4 PM – 2100Z 10 – 35 WPM	12/12 9 AM – 1400Z 10 – 40 WPM	
12/16 4 PM – 2100Z 10 – 40 WPM		12/18 10 PM – 0300Z (12/19 – UTC) 35 – 10 WPM		12/20 9 AM – 1400Z 10 – 35 WPM
12/23 10 PM – 0300Z (12/24 – UTC) 10 – 35 WPM				12/27 7 PM – 0000Z (12/28 – UTC) 35 – 10 WPM

Field Organization Reports — September 2024

Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories. Details on the program can be found at: www.arrl.org/public-service-honor-roll.

570 AD8CM	232 W0PZD	161 W5WMC	K9LGU WO2H	WA4VGZ KD0HHN	100 KF5IOU N5RH WB9EDL	KE8PGW WX2DX N1CVO	KA8BJA AE2EY KB1NAL	77 W7MIN KN4AAG K2PHD	75 WB3FTQ K1STM	72 W5XX
400 N9VC	208 W9RY	160 W4CMH W2PAX AE5MI	134 K8AMH	115 W9GRG KO4OL	AI9F NX9K W4EDN KZ8Q	88 WA3QPX KB3MXK KT4WX K8KRA N8OD KB8HJJ W8GSR KB8RCR	78 NJ5R	76 W2QMI K8RDN	74 W3ZR	71 W2OOD
368 W1LEM	200 WD8USA	155 KF8ATJ	133 KD8UUB	112 K5OB	WB4RJW K3YAK KA2HZP W1KX KB8GUN N8MRS WB8SIQ N1LAH KC1KVY W1TCD	87 W4TTO NT1N		73 W7FSC	70 KB0DTI	
315 W4PXE	193 KO4KUS	151 KT5EM	130 KF5OMH K3JL WK4WC N2JBA KW1U N1UMJ WZ0C N1ILZ	110 KA5AZK N4CNX W4NHO KM4WHO KB2QO WB8TQZ N1IQI	109 N3KRX	97 WB4ZDU KC1HHO	86 W2ARP			
300 AC8NP	190 ND8W	150 KK3F KR4PI N8SY KD8ZCM	149 KB5PGY	128 WB9QPM K8MDA	108 KE8HKA	93 W8IM	85 WB8RGE			
280 W7EES	186 KD2LPM	146 NI2W	125 KY2MMM	107 W1RVY	92 K2MTG	84 WW3S				
270 N2LC	185 KC9FXE	145 WB9WKO WA3QLW WM2C NW3X	122 W3YVQ	106 N3GE	91 KD2TDG	82 K6JT KF2GC N2TSO				
260 K7OED	183 KC8YVF	140 KV2J AD4DO W8MAL W8DJG	120 WC4FSU N2DW W2AH KY2D KE4RS KE8ANW	104 K5ANP KV8Z	90 KB9GO KC9UC AA3N W4KX N0JAR KL7RF K8ED	81 AA4XZ				
258 KB3YRU	178 KE8DON WV5Q	135 AG9G		103 AD3J		80 KB4OLY KR4ST K2MJR KG5AOP				
255 KT2D	175 W4DNA									
245 WM5N	169 KD2MNG									
240 AC0KQ	167 KM4WXX WB8YYS									
235 W7PAT	162 KT5SR									

The following stations qualified for PSHR in these previous months, but have not been recognized in this column yet: (Aug.) W0PZD 198, K7OED 196, WD0BFO 110, W9GRG 100, KF7GC 88, KA0DBK 77. (July) WD0BFO 100, KA0DBK 75.

Section Traffic Manager Reports

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

Section Emergency Coordinator Reports

The following Section Emergency Coordinators reported: KY, MI, NLI, SCV.

Brass Pounders League

The BPL is open to all amateurs in the US, Canada, and US possessions who report to their SMs a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

KY2D 1,751, W2AH 1,124, NX9K 1,118, WB9WKO 656, KW1U 612, KE5YTA 596.

New Products

Notch Filters

Morgan Systems released a new line of notch filters as a standalone product or to complement their band-pass filters. A notch filter is the opposite of a band-pass filter: instead of allowing a band to pass signals and block everything else, it will remove the specified band and let everything else pass. In severe cases of interference from a nearby station, a notch filter will completely block the interfering band from the band you are operating on. Several models are available for 160, 80/75, 40, 20, 15, and 10 meters. For more information or to purchase one for \$80, visit <https://surgestop.com/filter-products/m-445.html>.



Congratulations

September 2024
QST Cover Plaque Award Winner

Phil Salas
AD5X

In his article, "External QSK T/R Switch for HF Amplifiers Using an Inexpensive Power Relay," Phil describes an inexpensive QSK switch that carries legal-limit power, has no contact bounce, and works with any amplifier.

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!

External QSK T/R Switch for HF Amplifiers Using an Inexpensive Power Relay

AD5X describes a low-cost external QSK switch that will work with any amplifier.



The author's new inexpensive relay-based QSK switch.

Phil Salas, AD5X

CW is my favorite mode. It occupies probably 98% of my operating time. I enjoy full break-in operation, especially when chasing DX. In the February 2008 issue of QST, I described an external legal-limit, full break-in QSK switch for HF amplifiers. While that design worked well, it was expensive because it used the popular Jennings RJ1A 26 V dc vacuum relay. Also, an internal 50 V dc power supply was needed to power the RJ1A and the 12 V transceiver-switching relay. Recently, fast-switching, high-current relays have become available at very reasonable prices. A relay that I found to be of great interest is the inexpensive Panasonic DK1a1b power relay. Besides carrying legal-limit power, this relay has no contact bounce. Table 1 illustrates the comparison between the Jennings RJ1A vacuum relay and the Panasonic DK1a1b relay.

Table 1 — Jennings RJ1A Vacuum Relay vs. Panasonic DK1a1b Mechanical Relay				
Relay	Switching Speed Max	Current Carrying	Lifetime	Cost
RJ1A	8 ms/8 ms operate/release	7 A at 32 MHz; higher current at lower frequencies	2 million operations	\$100+
DK1a1b	10 ms/8 ms operate/release	8 A	50 million operations	\$8

Table 2 — Parts List for External QSK Switch (Prices as of 7/2024)

Qty.	Description	Mouser Part Number	Price (each)
1	DK1a1b relay (RLY2)	769-DK1A1B-12V	\$765
1	DK2A-PS socket	769-DK2A-PS	\$4.29
1	DPDT signal relay (RLY1)	653-G6A-274P-DC12	\$5.32
1	16-pin IC socket	653-XP2A-1611-N	\$2.57
1	SPST switch	118-1MS9T1B1M1QES	\$5.34
6	4.7K Ω 1/4 W resistors	660-MF1/4LCT52R472G	\$0.11
2	22 pF 2 kV ceramic capacitors	810-CC45SL3DD220JYNA	\$0.35
1	15 pF 2 kV ceramic capacitor	810-CC45SL3DD150JYGN	\$0.37
1	10 pF 2 kV ceramic capacitor	810-CC45SL3DD100JYNA	\$0.37
3	0.1 μ F 100 V capacitors	581-SR211C104KAR	\$0.32
2	0.01 μ F 1 kV capacitors	810-CK45-E3AD1032YGN	\$0.50
1	10 μ F 25 V elec. capacitor	80-ESK106M025AC3AA	\$0.22
1	0.33 μ F capacitor	594-K334K20X7RF5TH5	\$0.86
1	78L08 regulator	863-MC78L08ACPG	\$0.60
1	2N3906 PNP transistor (TO92)	512-2N3906TA	\$0.31
1	2N3904 NPN transistor (TO92)	637-2N3904	\$0.10
1	Two-pin header	538-90120-0122	\$0.49
1	Jumper	538-15-29-1024	\$0.48
1	2.1 x 5.5 mm dc jack	163-1060-EX	\$0.75
4	SO-239 connectors	601-25-7350	\$2.65
1	Phono jack	502-BPJF02X	\$1.68
2	1N4001 diodes	583-1N4001-B	\$0.21
1	Red LED	941-C508RBNCY020AA2	\$0.21
1	Green LED	941-C55MFQJFCX14Q7T2	\$0.30
1	1/8-inch stereo jack	523-ACJS-MV35-3S	\$1.13
3	0.25-inch-long #4 AL standoffs	534-8714	\$0.47
4	#4 solder lugs	534-7325	\$0.20
1	2.3 x 3.2 x 4.8-inch aluminum box	563-CU-472	\$12.30
Misc.	4-40 screws, nuts, and split lock washers		

This Month in

QEX

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

Coming up in the November/December 2024 issue of QEX:

- Mark R. Titchener, ZL4CDE, shows a novel method for deciphering Morse CW.
- Ken Neubeck, WB2AMU, and Daniel J. Emmons use

amateur radio observations to track sporadic-E in the 10- and 6-meter bands.

■ Michelle Thompson, W5NYV, describes the design and implementation of the Zadoff-Chu AGC burst in the Neptune project.

■ Steve Stearns, K6OIK, explains methods for modeling single- and multiple-layer wire in modeling programs.

■ In his essay series, Eric P. Nichols, KL7AJ, expresses the importance of using proper instrumentation.

QEX is edited by Kazimierz "Kai" Siwiak, KE4PT (kswiak@arrrl.org), and is published bimonthly.

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A Look Back



Celebrating Our Legacy

Morse Code: A Major Part of My Life

In 1951, when I was a freshman in high school, my science teacher had a ham named Henry Grebe come to our class and give a demonstration. Henry had a surplus converted CW transmitter and an old receiver with a wire going out the window. He was transmitting to a priest about 15 miles away. The priest was using a microphone to answer. I was impressed with the display and asked my teacher to help me get a license.

I was having some trouble with Morse code, and my cousin, who had previously used Morse code in the military, spent about 2 weeks helping me learn. Eventually I was ready for the 13 WPM test.

When I joined the US Air Force Security Service, I was recognized for knowing Morse code. So, ham radio became a very important part of my duties.

I gave presentations about Morse code and the Civil War at Living History Day in Havensville, Kansas, for several years. The presentations included how important it was for the North to have an edge on communications, which affected the war's outcome. I was able to reach students from various parts of the country through these presentations.

Dennis Mason, K0BYK
Marysville, Kansas

Ham Radio Highlights

On July 26, 1969, the US Ambassador to South Korea and ARRL Life Member William J. Porter, K1YPE/HL9AA (SK), invited the Korean Amateur Radio League staff to his residence for a garden party. I had the pleasure of attending. One week



The garden party attendees in 1969. [Chong-Soo Hwang, HL3EA, photo]

earlier, Neil Armstrong became the first man to land on the moon. During the party, we watched the historic Apollo film.

Chong-Soo Hwang, HL3EA
South Korea

Operating from Country to Country

I received my Novice license at 15 years old in 1954. I built a WRL Globe Scout transmitter kit and had a Hallicrafters S-38B receiver, as well as a Windom antenna strung up between pine trees in our backyard. I got on the air, but I couldn't contact anybody outside of our city for some reason. I couldn't figure out what was wrong. I followed the manual, but nothing seemed to fix the problem. A local ham was happy to help, so I brought him my transmitter and manual and he had it fixed less than 24 hours later.

In 1968, while in Malaysia, I did not have any ham gear with me, but I became friends with several local hams. When I was on furlough back

in the US, I bought my first transceiver and took it back to Malaysia. I received a Malaysian ham license as 9M2DP. I had a ball operating DX from Malaysia! It was quite an experience getting on 20 or 15 meters, calling CQ on CW, and being the cause of a pileup!

After returning to the US in 1975, I continued operating from each location we moved to. I now live in an apartment in a retirement community and do little operating because of the lack of an antenna, but I continue to remember the good old days and give thanks for those times. I still look forward to the arrival of QST each month, as I have done for almost 70 years!

Don Poole, W4DXF
Asheville, North Carolina
Life Member

Send reminiscences of your early days in radio to celebrate@arri.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

Premium E. F. Johnson AM/CW Transmitters with VFOs

Starting in 1949, E. F. Johnson Company built several AM/CW transmitters. They had three premium transmitters with an internal variable frequency oscillator (VFO) and plate modulation, two of which received significant upgrades: the Ranger became the Ranger II, and the Valiant became the Valiant II. The large, heavy, and expensive Viking 500 never underwent a major upgrade. All these transmitters had high-level plate modulation on AM and an internal VFO. Johnson didn't build receivers — none of these transmitters could transceive with any receiver made by any manufacturer.

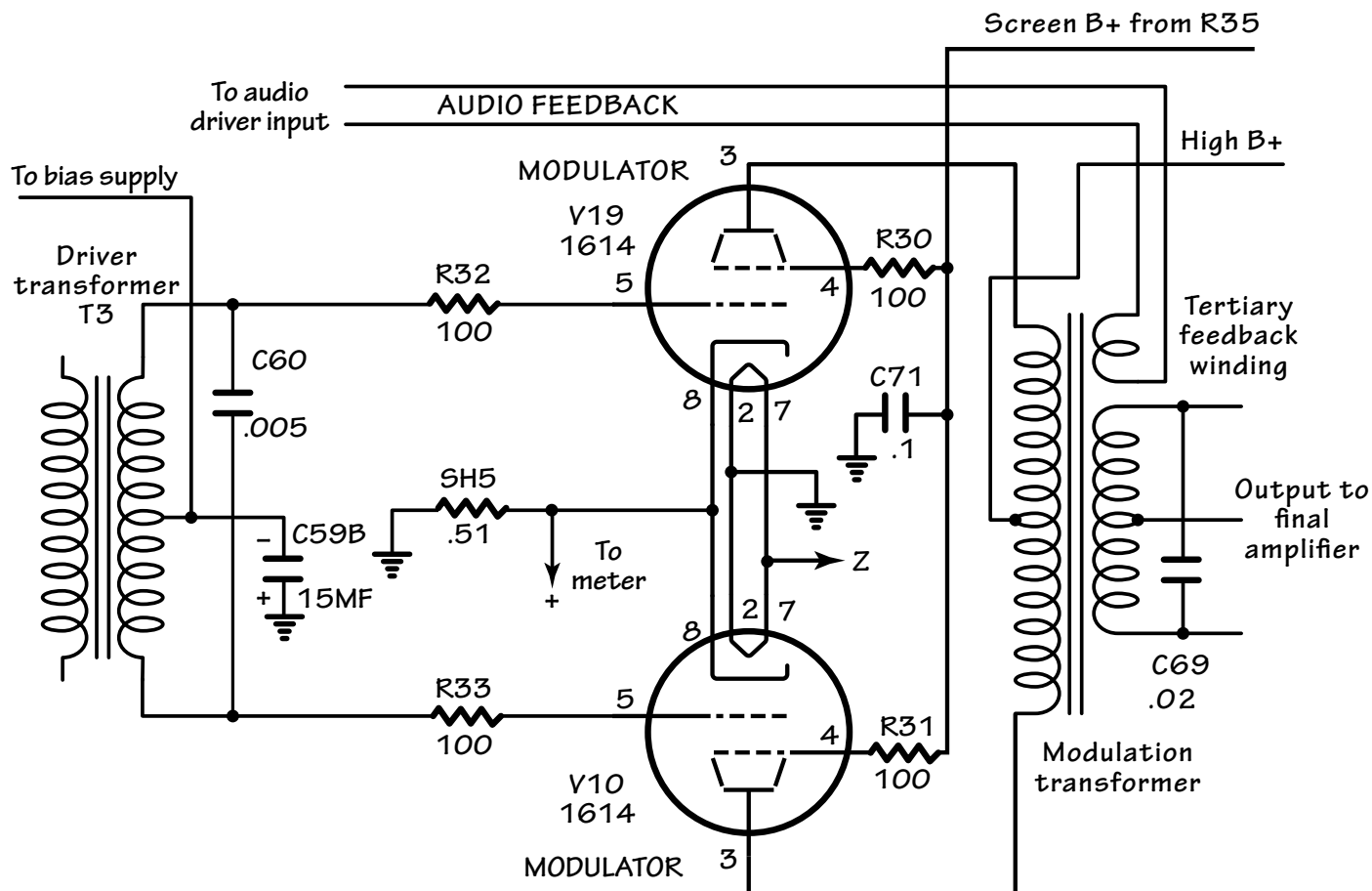
The Original Viking Ranger

The Viking Ranger was Johnson's first premium transmitter to have both a VFO and plate modulation

in 1954. The Ranger had a single 6146 beam tetrode by RCA as the RF output tube in the final amplifier; it ran 75 W input on CW and 65 W input on AM. The unit multiplied the VFO output to cover 160, 80/75, 40, 20, 15, and 10 meters. A pair of 1614 tubes served as modulators; the 1614 was a heavy service 6L6 beam tetrode. The Ranger offered VFO or crystal operation. A 6CL6 served as the doubler and driver tube for the 6146. A 5R4 rectifier fed the 6146 and 1614 modulators. The Ranger was an excellent-looking transmitter.

The Viking Valiant

The next in this group to be released was the Viking Valiant, which had three 6146 tubes in parallel running 275 W input on CW and 200 W input on AM, modulated by a pair of 6146 tubes. To get enough dc



power to operate the three 6146 beam-power tubes modulated by two more 6146 tubes from RCA, the Valiant employed two 866A mercury vapor rectifier tubes to feed the high-power stages. Like the Ranger, the Valiant operated on 160, 80/75, 40, 20, 15, and 10 meters. It looked similar to the lower-power Ranger but was a bit larger and heavier. I believe the plastic dial for the Valiant and Ranger was the same.

The Viking 500

The high-power AM/CW transmitter of this group, the Viking 500, used an Eimac 4-400A final amplifier tube driven by a 5763 nine-pin miniature tube. The 4-400A is modulated by a pair of 811As in push-pull, driven by a transformer-coupled 6B4 driver. High voltage was rectified by a pair of 866A mercury vapor rectifier tubes. The transmitter ran 600 W input on CW and 500 W on AM. The power supply and modulator were in a separate unit connected to the desktop RF unit by several cables. The Viking 500 could've been used with a separate SSB generator like the Johnson 240-305-2 Viking SSB adapter; by itself, it ran only CW and AM.

Upgrades to the Ranger and Valiant

In 1962, the Ranger and Valiant were both upgraded to their "II" versions. The Ranger gained 6-meter operation without losing any frequency coverage, except for the 11-meter band because it was no longer an amateur radio band after 1958. A 5763 tube was added as a doubler on 6 meters. The Valiant didn't gain any frequency coverage, but it also lost the 11-meter band. The Viking 500 was never upgraded. No Johnson transmitter went beyond the "II" version.

Johnson went completely out of the amateur radio business around 1970. The only amateur radio product they had after 1969 was the Viking Thunderbolt II linear amplifier. Oddly enough, the Thunderbolt II didn't upgrade to the Eimac 3-500Z tubes; it still used 3-400Z tubes.

Other E. F. Johnson Products

Not included in this summary are the Viking I and Viking II, as they didn't have VFOs built in. The Avenger and Challenger also didn't have VFOs or AM or plate modulation capabilities. The sought-after Johnson Navigator is not included here because it didn't have an AM modulator or AM capability. Also missing an



VIKING "RANGER" TRANSMITTER

Rugged and compact, the improved Viking "Ranger" has new (break-in) block grid keying system and adjustable wave shaping. Serves as a transmitter or an RF and audio exciter for high power equipment. Self-contained, 75 watts CW or 65 watts phone input. All amateur bands from 10 to 160 meters. Extremely stable built-in VFO or crystal control—100% AM modulation—high gain audio. Pi-network antenna load matching from 50 to 500 ohms—complete TVI shielding and filtering. No internal changes needed to switch from transmitter to exciter operation.

Tube line-up: 6AU6 VFO, OA2 voltage regulator, 6CL6 crystal oscillator, 6CL6 buffer, 6146 final amplifier, 6AQ5 clamper, 12AX7 dual triode speech amplifier, 12AU7 dual triode audio driver, 2-1614 push-pull modulators, 6AX5 low voltage rectifier, and 5R4 high voltage rectifier.

Only 15" x 11 1/2" x 9". Easily assembled—all parts, assembly and operating instructions included.

Cat. No.		Amateur Net
240-161	Viking "Ranger" Kit, with tubes, less crystals, key, and mike.	\$214.50
240-161-2	Viking "Ranger", wired and tested	293.00

This ad for the Viking Ranger appeared in the 1955 edition of *The Radio Amateur's Handbook*.

AM modulator were three transmitters with SSB capability: the Invader 200, the Invader 2000, and the Viking Pacemaker.

Contributions to E. F. Johnson's End in the Amateur Radio Market

Johnson did quite well in ham radio when they first started out with transmitters and kits in 1949, but the company failed to pick up on certain lessons taught by Collins Radio about crystal-controlled first conversion, the ability to transceive, and making equipment smaller and lighter. The SSB Pacemaker from 1956 used crystals, so the VFO covered the same range on all bands, but it couldn't transceive with anything. It was also expensive (\$495 in 1956) and heavy (75 pounds). Collins, Heathkit, R. L. Drake Company, and Japanese manufacturers kept up with advancing technology, ultimately contributing to the demise of older amateur radio companies.

100, 50, and 25 Years Ago

December 1924

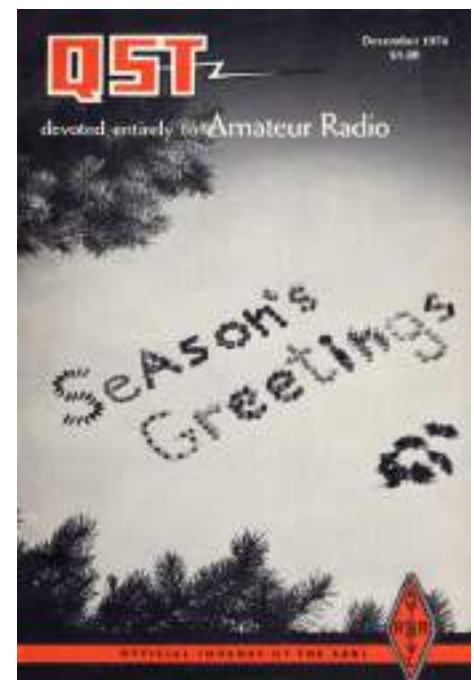
- The cover shows a gentleman with a copy of *QST* in his pocket as he shops for parts and books in a radio store.
- “Editorials” shares some thoughts on the outcome of the Third National Radio Conference in “New Problems” and “Exit the Spark.”
- Why all radio circuits should not be tuned as sharply as possible is discussed in “Superheterodyne Transformers.”
- New Zealand and British amateurs work 12,000 miles, reported by K.B. Warner, 1BHW, in “Antipodes Linked by Amateur Radio.”
- Amateur bands are confirmed, with some extensions and shifting, and all shortwaves are now allocated. K.B. Warner, 1BHW, reports on “The Third National Radio Conference.”
- F. Dawson Biley, 8GU, describes a meter that covers 20 to 220 in “A Short Wave Wavemeter.”
- The story of building the radio station on board Bigbill is told in “The Bigbill Installation.”
- Weather effects, corrosion, switching to phone, and other hints are shared in “Transmitting Hints.”
- H.P. Corwin, 2BRC, and E.C. Homer, 9UN, describe “A Well Designed Tuner” in this month’s installment of “The Amateur Builder.”

December 1974

- The cover simply states, “Season’s Greetings!” Sending best wishes for the holiday season.
- “It Seems to Us...Conference Preparation” discusses the working group recommendations for the 1979 World Administrative Radio Conference.
- Barry A. Boothe, W9UCW, gives construction details for this physically shortened 160-meter vertical antenna are given in “The Minooka Special.”
- Julius Bernstein, W2EV, shares a system he designed to protect his tower against windstorms in “The Tower-Guard System.”
- Mike Muench, VO1KE, describes how to build a bigger junk box in “Something for Nothing.”
- How a redesigned antenna coupler can be used to match a transceiver to an antenna is explained in “Some Ideas on Antenna Couplers” by Ulrich L. Rohde, DJ2LR/W2.
- A photo of Doug, WA0VTJ/mobile, on his Oliver 1800 tractor while farming 230 acres near Goldfield, Iowa, appears in “Strays.”
- Louise Ramsey Moreau, W3WRE, reports on YLRC/LA’s increasing number of amateur radio demonstrations in schools through their “Operation Classroom,” which appears in “YL News and Views.”

December 1999

- A holiday fantasy photo by Henryk Kotowski, SM0JFH, sets the mood on the cover, wishing Happy Holidays to all.
- The turn of the century seems like a good time to look back at the past and clear our palates to be ready to taste the future. In “It Seems to Us...Amateur Radio Heroes,” by David Sumner, K1ZZ, gives some highlights.
- Today’s Field Day evolved from humble beginnings in the Golden Age of Radio. Rol Anders, K3RA, chronicles the evolution in “Field Day: A Mirror of Amateur Radio History.”
- Bob Brown, NM7M, tells how he accidentally discovered the Rocky Mountains using simple radio equipment in “Bubbles in the Ozone Layer.”
- Bill Kenamer, K5FUV, shares some fresh DX challenges for the next millennium in “New DXCC Awards for the New Millennium.”
- L.B. Cebik, W4RNL, builds an easy antenna for local and DX work in “Whips, Tubes and Wires: Building a 10-Meter L Antenna.”
- You think you know where you are? Richard F. Gillette, W9PE, shows how to determine your location in “Latitude and Longitude the Easy Way.”
- “Amateur Radio World” reports on the 1999 IARU Region 1 Conference in “Norway Hosts Region 1 Conference.”



Silent Keys

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

♦N1AP •N1APK	Penta , Anthony J., Medford, MA Fresher , Richard J., West Hartford, CT	♦♦NS4V KN4VGP	Hourdequin , David R., Hayesville, NC Graham , Kenneth H., Hollow Rock, TN	WD9FRF K9GDT ♦W9HRZ	Esser , Jim R., Madison, WI Sievers , George P., Sievers, IL Sherfick , Stuart A., Sr., Spencer, IN
♦W1DQ ♦KA1JTN ♦K1KXW ♦KE1Q ♦AA1RO WA1TDC KE2BFU KA2DDN WA2GWL	Elengo , John, Cheshire, CT Morgan , William H., South China, ME Hooper , Ralph F., Revere, MA Lund , M. Craig, Biddeford, ME Dourado , Myron T., Seekonk, MA Peaston , Richard W., Palm Coast, FL Simon , Jay P., Lockport, NY Voorhies , Gerald, Clay, NY Hutton , Walter E., Jr., Hendersonville, NC	♦WB4YFY •KE5BCE K5BMD ♦WD5CFF W05D ♦N5DBM ♦KA5DKS K5FFD	Jackson , Geary W., Nashville, TN Scarberry , Ronnie Lynn, Pickens, OK Floyd , Wilba J., Walnut Ridge, AR Kelley , Jack, Centerville, TX Maca , Jeffrey D., Randolph, NJ Stepp , Kenneth A., Edmond, OK McAninch , Kenneth C., Arvada, CO Chotiner , Kenneth C., Egg Harbor Township, NJ	K9ZYU K0AME ♦WD0AXF NO0C WA0DQR KF0FIA ♦NM0M ♦KD0NL KB0NWT ♦KC0QF KB0RSK N0TLH ♦K0TYC ♦K0UJW WA0UXI ♦WA0VQY WB0WHY ♦N0XKL ♦KN0Y ♦W0ZPE VE3DHE	Alsbaugh , Jackie E., Pawnee, IL Hankins , Jerry W., Terre Haute, IN Strauser , Robert R., Madison, WI Ketten , Jerry K., Greenville, IL Brager , Dennis L., Fitchburg, WI Beckley , Boyd E., Neligh, NE Lewis , Jess R., Fort Dodge, IA Andersen , Tim L., Kearney, NE Reynolds , John P., Circle Pines, MN Schrader , Victor R., Salina, KS Taylor , John H., Manhattan, KS Hart , John A., Sr., Loma, CO Newman , David W., Memphis, MO Blessin , R. H., Denver, CO Woodman , Diane, Belleville, KS Nivens , Roy F., Branson, MO Storey , David J., Saint Louis, MO Caron , Robert W., Aurora, CO Rawson , Robert H., Wamego, KS Formaker , Robin G., Ames, IA Marthaler , Alice, Marshall, MN Ashwell , Jeanine L., Saint Louis, MO Swift , Leroy V., Jr., Rockdale, TX Feuer , Robert E., Stillwater, MN Petersen , Neal K., Ottawa, ON, Canada
N2HFO	Lawrence , Michael J., West Henrietta, NY Fuchs , Lynda L., Syracuse, NY Viau , Fred, Union City, NJ Lagares , Manuel, Newburgh, NY Dantz , Timothy M., Anderson, SC Blank , Stuart, Madison, NJ Harmer , Brian C., Media, PA Tabbutt , David E., Belhaven, NC Dobbs , Stephen, Reading, PA Forbes , Marshall, Orange City, FL Erikson , William J., Hampstead, MD DiPietrantonio , Joseph A., Rehoboth Beach, DE Pato , Andrew L., West Mifflin, PA Lukens , Noel M., Townsend, DE McGovern , Philip J., Newark, DE Eicker , Heywood M., "Woody," Bethel Park, PA Butt , Peter D., Lexington Park, MD Kaufmann , Juergen A., Philadelphia, PA	KF5FHA K5GRV ♦W5NDM	Ellsworth , Louise, Odessa, TX Stone , Malcolm L., Brandon, MS Melson , Charles A., Jr., Pass Christian, MS Hays , William H., Montgomery, AL Ratta , Ralph W., China Spring, TX Cockerham , Walter, New Orleans, LA Whattcott , Brian A., Garland, TX Turner , William Edward, Palestine, TX Elliott , David M., Murrieta, CA Chong , George W., Oakland, CA Mecham , Douglas J., Seattle, WA Wheeler , Duane W., Murrieta, CA Franklin , Denis, Santa Barbara, CA Clark , William Byron, Lake Arrowhead, CA Carl , Roger A., Gardnerville, NV Thomas , Baron E., San Diego, CA Graham , Richard E., Antioch, CA Keck , Gary L., Tucson, AZ Loshbaugh , Bruce E., Cheyenne, WY Haas , Robert E., Tualatin, OR Selzer , Carolynne D., Surprise, AZ Reeves , Anna M., Espanola, WA Engberg , Robert J., Wasilla, AK Benefiel , Charles B., Steilacoom, WA Carlson , Maurice W., North Muskegon, MI Hendricks , Dewayne L., Fremont, CA Farmer , John A., Toledo, OH Masterson , Stanley M., Galena, OH Simmons , Jeffrey M., Norton Shores, MI Valentine , Michael D., Cincinnati, OH Sommers , James K., Dexter, MI Kannal , Leonard D., Uniontown, OH Burdick , Larry D., Hickory Corners, MI Willis , Arnold A., Hayward, WI Berggren , William M., Mount Pleasant, WI Gutschow , Thomas A., Bloomington, IL	VE7ANT G3TQZ	Tomlinson , K. R., Victoria, BC, Canada Allan , Roger, Rushwick, Worcester, United Kingdom
WB2PGL KA2TWF KB2UXG ♦WA2VAX ♦N2YMI W3BCH ♦W3DET NE3F ♦W3FL N3GEO ♦W3JDP	Tabbutt , David E., Belhaven, NC Dobbs , Stephen, Reading, PA Forbes , Marshall, Orange City, FL Erikson , William J., Hampstead, MD DiPietrantonio , Joseph A., Rehoboth Beach, DE Pato , Andrew L., West Mifflin, PA Lukens , Noel M., Townsend, DE McGovern , Philip J., Newark, DE Eicker , Heywood M., "Woody," Bethel Park, PA Butt , Peter D., Lexington Park, MD Kaufmann , Juergen A., Philadelphia, PA Cook , Jean, Gilbert, SC Scalf , Dayton P., Johnson City, TN Bethune , James S., Pensacola, FL Arnold , Richard O., Chesterfield, VA Buford , Earl D., Jr., Northport, AL Pennington , Charles A., Jr., Sandersville, GA Sparks , Harold E., Isle of Palms, SC Hess , Arthur L., Lakeland, FL Clayton , Gerald L., Greenville, NC Yarbrough , Virginia L., Ridgeway, VA Gulledge , Dale A., Marbury, AL Smith , Stokes J., Jr., Spartanburg, SC Thomas , Ronald, Lebanon, TN Herring , Robert W., Altamonte Springs, FL Callahan , James M., Tallapoosa, GA Hering , Thomas C., Crossville, TN Tjarks , Edward A., Sarasota, FL	WJ5O ♦W5RWR ♦N5VN KA5WOG ♦KE5ZSL	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦ARRL Life Member ♦Current Diamond Club ♦Maxim Society ♦Veteran ♦Former call sign	
K3MOB ♦K3NQV K3PJM KB3QHC	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
WD4CJQ W4DPS KC4EBV WA4FEH N4FIX K4GK	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
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♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
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♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
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♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
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♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
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♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
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♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF		
♦K4GQG N4HES ♦K4IDD KE4JAC ♦K14KQE ♦WB4KST	W6BK ♦W6BUR N6DJM ♦N6DSC ♦W6EW KJ6LJF	♦W6SXX K6VWL AB6XG ♦KE7DX ♦N7JHE W7LQS KG7PIC ♦WA7ROS NL7S N7STR K8CBT	W6BK ♦W6BUR N		



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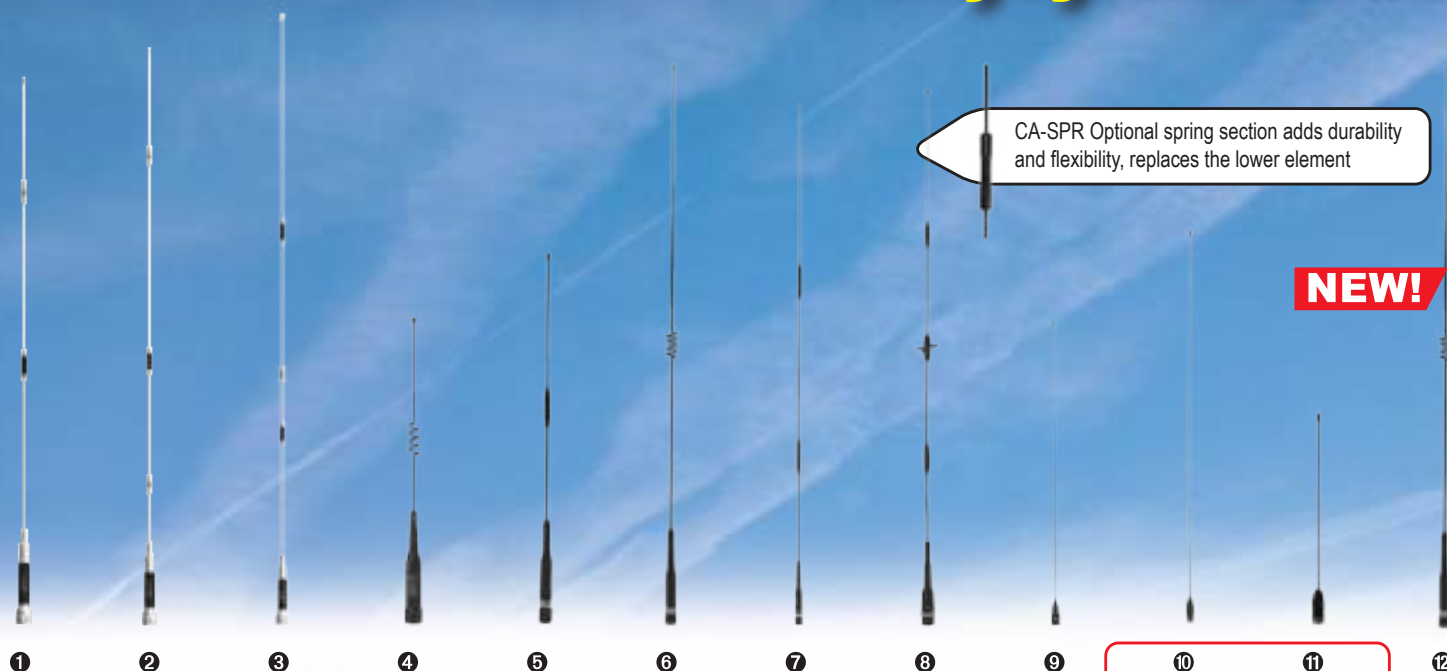


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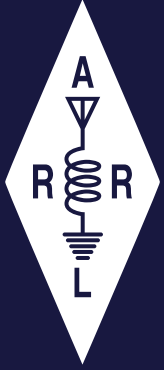


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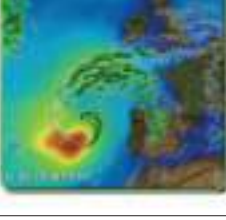
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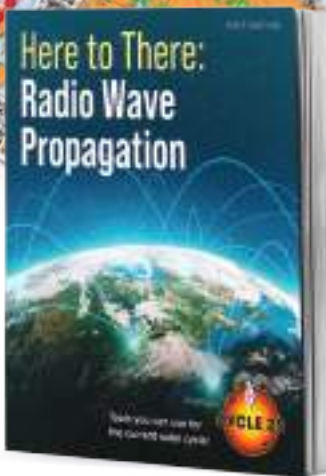
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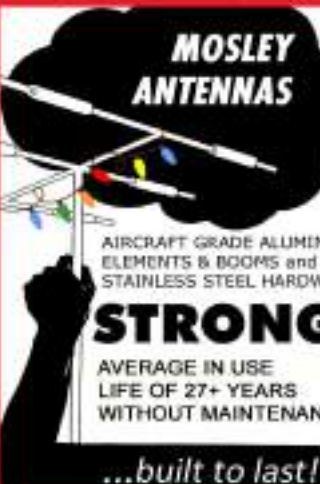
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NEW COPPER STRIP INDEXING 01/21

Our engineering team completely redesigned our copper strip indexing and crowning system, with completion and introduction to the market in January 2021. The project included extensive design and testing, along with a near total configuration of the entire system. The resulting improvement in accuracy, pitch and repeatability is now producing the most consistent and reliable product we have ever had.

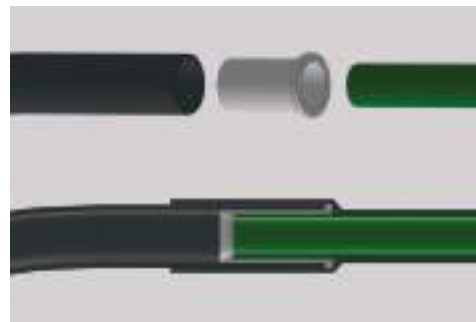


NEWLY DESIGNED BRUSH/ CONTACT ASSEMBLY 04/22

The new element housing unit (EHU) brush/contact assembly has greatly reduced friction buildup, with an average 36% friction reduction over the product life-cycle. The new assembly achieves this advantage without affecting product life expectations.

INTRODUCTION OF OPTIMIZIR 2.0 CONTROLLER 10/23

Robust, commercial grade grounding of controller circuitry, easy firmware updates, expanded memory, full remote control capability (coming soon).



NEW 40/30 SWEEP ASSEMBLY 06/22

The redesigned sweep system for our 40/30 loops makes the installation significantly easier and reduces potential for friction build-up. This system includes a sweep diverter for the sweep return, that ensures that the copper conductor always has a clear path through the sweep material.



innovation

At SteppIR, we offer the best performing antenna products in the world – the laws of physics agree with us! There is no substitute for a length adjustable, frequency optimized antenna, and we have been proving that over-and-over for the last 23 years. 4 years ago, our engineering department decided to embark on a QUEST to make our products not only the highest performing, but also the most reliable. This is a partial list of what we have accomplished!

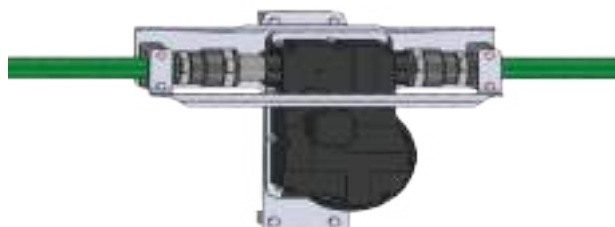


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PRE-WIRED CONTROL CABLE ON ALL NEW ANTENNA PURCHASES 10/23

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REDESIGNED ELEMENT MOUNTING PLATES FOR YAGI ANTENNAS 03/24

Our new reinforced mounting plate assembly for the element housing unit (EHU) is significantly stronger. This design redirects stress from the forces on the fiberglass poles away from the EHU and directly to the boom, greatly reducing the potential for damage in high winds or ice loading!



IMPROVED ALP DRIVER BOARD 05/20

Improved circuitry and introduced driver chip circuit board modules. The driver modules allow for flexibility in design/parts changes and guard against increasingly common parts obsolescence in the electronics industry



LOADING COIL PCB UPGRADES 12/22

The coil PCB's for BigIR, SmallIR and StealthIR were redesigned, with significant improvements for high voltage operation, including increased air gaps and better radius of RF traces and pads



STAINLESS STEEL CONTROLLER HOUSING – OptimizIR 2.0 12/23

Improved grounding and corrosion resistance.



NEW ALL RELAY CONTROL BOARD 01/24

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IP 65 WEATHERPROOF STEPPIR MOTORS UPGRADE 05/24

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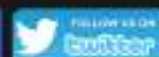
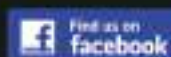
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It was previously thought that lightning discharge energy was in the VLF, Very Low Frequency, spectrum and that a narrow band bandpass DC blocked surge protector in that range provided adequate protection.

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Through careful design of the **Alpha Delta Model TT3G50 series broadband** precision constant impedance thru-line and ARC-PLUG™ module, allowing proper firing characteristics, this state of the art surge protector design allows effective protection throughout this entire spectrum.

- **Depending** on the connector style we provide excellent broadband performance through **3 GHz**, compared to narrowband DC blocked designs.
- **The impedance** compensated thru-line cavity design allows control voltages to pass through the device, instead of the "wire around" requirement of DC blocked designs. Our design also allows in circuit cable sweeps.
- **The innovative** field replaceable gas tube ARC PLUG™ module can be removed and replaced in the field with no tools required and without removing the surge protector from the circuit. The knurled knob does the trick. Connectors and knob are O ring sealed for environmental protection.
- **DC blocked** designs require the entire unit to be removed and discarded if hit with a surge beyond its rating. They are not field repairable.
- **As a result** of extensive testing and approvals within the military agencies, the Defense Logistics Agency (DLA) has assigned NSN numbers to our devices. Cage Code 389A5. All of our products are manufactured in the U.S.A. in our ISO-9001 certified facility for highest quality. Various connector styles available.

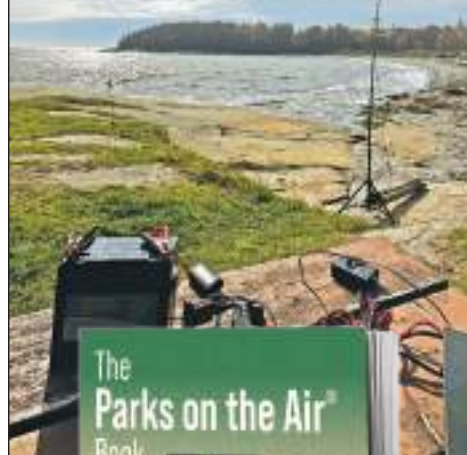


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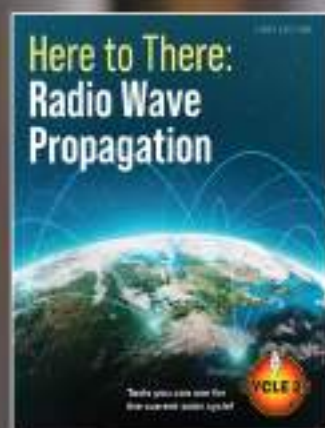
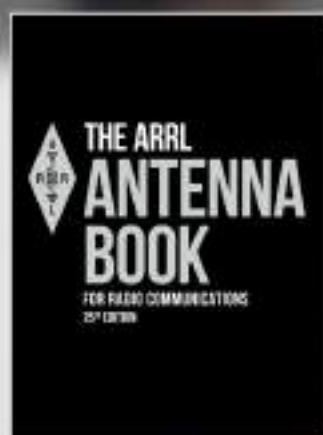
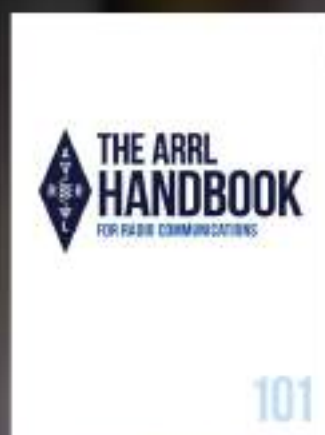
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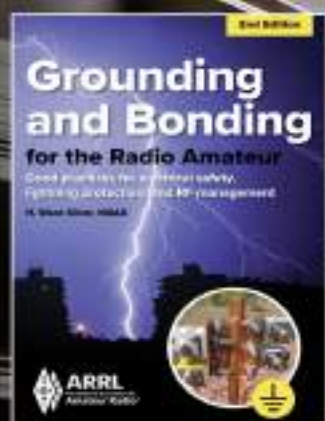
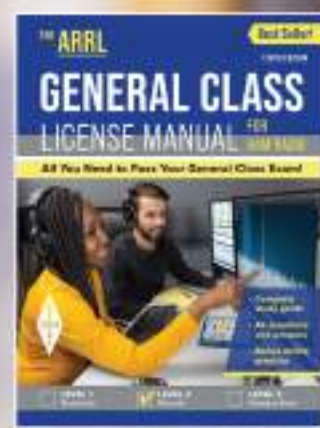


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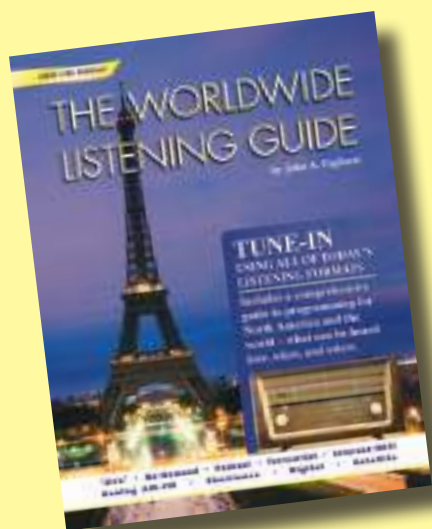
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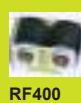
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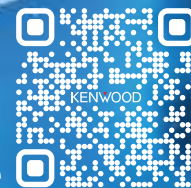
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Scores (continued from page 73)

Score listings are grouped according to the number of transmitters in simultaneous operation and their entry class. The listings show club or group name, call sign(s) used, total number of QSOs, number indicating power output used (5 is less than 5 W, 2 is from 6 W to 100 W, 1 is between 101 W and 500 W), number of participants, total score including bonus points, and ARRL Section. Entries are listed from highest to lowest claimed score in each class: Class A stations are clubs or groups portable with three or more participants; Class B stations are portables with one or two participants (when there are two operators, the second operator's call sign is listed in parentheses, if it is known); Class C stations are mobiles; Class D stations are home stations using commercial power; Class E stations are home stations using emergency power, and Class F stations are EOC stations. This listing contains Class D, E, and F home stations and Club Aggregate Scores.

Home Stations — Commercial Power

1D										K4WV 500 2 1 2,050 KY										K3JT 354 2 1 1,466 WV										Tri Co. ARC (WI)									
Kansas City Contest Club										N9BOR 500 2 1 2,050 IL										Portage Co. ARS										K9LGU 270 2 2 1,240 WI									
NS0R 1,843 2 1 7,422 KS										Boeing Employees ARS — St. Louis										WB2RPW 354 2 1 1,466 OH										Conejo Valley ARC									
AD4EB 1,343 2 1 5,422 TN										W0TT 500 2 1 2,050 MO										K9UQN 353 2 1 1,462 TN										K7SDW 275 2 1 1,238 SB									
Broken Arrow ARC										K2MK 487 2 1 1,998 WCF										Livonia ARC/Ford ARL										WE8L 284 2 1 1,236 OH									
W5TM 1,272 2 1 5,138 OK										Acadiana ARA										N8XI 358 2 1 1,458 MI										David Sarnoff ARC									
Contest Club Ontario										NA5Q 489 2 1 1,982 LA										KM4FO 351 2 1 1,454 KY										N2EIM 296 2 1 1,234 NNJ									
VE3MGY 1,205 2 1 5,070 ONS										Potomac Valley RC										Franklin Co. (VA) ARC										Sierra Foothills ARC									
N5EE 1,253 2 1 5,062 AR										N3AM 476 2 1 1,954 MDC										N6DW 335 2 1 1,452 VA										WU6X 295 2 1 1,230 SV									
Arizona Outlaws Contest Club										Central WV Wireless Assn.										Mobile ARC										NE5A 293 2 1 1,222 OK									
K6LL 1,200 2 2 4,950 AZ										WJ8L 951 2 1 1,952 WV										KN4AMX 350 2 1 1,450 AL										Williamson Co. ARC									
AA2BJ 1,228 2 2 4,654 ENY										Butler Co. AR Public Srvc. Grp.										Cherryland ARC										W5TA 234 2 1 1,216 STX									
K0AD 1,079 2 1 4,258 MN										KC3RHQ 471 2 1 1,932 WPA										NS8K 350 2 1 1,450 MI										AG5B 275 2 2 1,208 MS									
N0TT 1,014 2 1 4,106 MO										KA8JBK 470 2 1 1,930 MI										N8PFK 346 2 1 1,432 MI										KE5HDE 289 2 1 1,206 WNY									
K5PI 955 2 1 3,870 STX										North Fulton ARL										K4RUM 357 2 1 1,428 NLI										Montvale OEM									
K6WSC 915 2 1 3,710 AZ										K4FPV 466 2 1 1,914 WCF										Nittany ARC										K2JF 286 2 1 1,194 NNJ									
KS7T 1,032 2 1 3,646 MT										Niagara Frontier Radiosport										K3QP 342 2 1 1,418 WPA										Shy-Wy ARC									
Yankee Clipper Contest Club										KA2MGE 465 2 1 1,910 WNY										Pasadena RC										N7WY 311 2 1 1,194 WY									
K1C 926 2 3 3,498 WMA										N2RI 439 2 1 1,906 NLI										N6NO 341 2 1 1,414 LAX										VE5DWR 260 2 1 1,190 SK									
K1USN RC										WA2LMC 484 2 1 1,894 NC										BCI RC										Clark Co. (WA) ARC									
K1DJ 817 2 1 3,318 EMA										Young Amateurs RC										K4CC 353 2 1 1,410 WCF										WU8T 285 2 1 1,190 WWA									
N2MF 810 2 1 3,290 WNY										NR0Q 450 2 4 1,890 OK										Lake Area AR Klub										WA5SNL 285 2 3 1,190 STX									
Fox River Radio League										Contest Club Ontario										KD2KW 280 2 1 1,410 NTX										KN4DS 259 2 1 1,186 GA									
K9PW 843 2 1 3,276 IL										VE3AQ 458 2 1 1,882 GH										Drake ARC										Grand Mesa Contesters of Colorado									
Niagara Frontier Radiosport										K1ZL 457 2 1 1,878 ME										WE8R 315 2 1 1,410 NFL										K0XF 322 2 1 1,184 CO									
W2PJ 1,583 2 1 3,216 WNY										Florida Contest Grp.										KG9X 338 2 1 1,402 IL										GOTAHAMS									
South Jersey Radio Assn.										N4KS 457 2 1 1,878 NFL										Salkehatchie ARS										K6EV 283 2 1 1,182 LAX									
WA2VYA 787 2 1 3,198 STX										N1UZ 455 2 1 1,870 SC										KY4GS 337 2 1 1,398 SC										985 Repeater Grp.									
Niagara Frontier Radiosport										N4CF 455 2 1 1,870 VA										K4BSK 334 2 1 1,386 NC										N3ILS 296 2 1 1,182 EPA									
K2ZR 775 2 1 3,150 WNY										Alabama Contest Grp.										K04TCL 333 2 1 1,376 GA										N9MSG 296 2 1 1,178 IL									
K9WWT 746 2 1 3,134 IN										K4PV 619 2 1 1,854 NFL										Grand Mesa Contesters of Colorado										KT4XN 280 2 1 1,170 GA									
Florida Contest Grp.										Holmesburg ARC										K0UK 330 2 1 1,370 CO										Jim Bell Wireless Assn.									
WA1S 756 2 1 3,074 NFL										K3FI 447 2 1 1,838 EPA										Southern Counties ARA										AK4NF 266 2 2 1,164 AL									
K5IMC 740 2 1 3,010 NTX										K5MR 442 2 1 1,818 NTX										KB2MN 400 2 2 1,370 SNJ										Hudson Valley Contesters and DXers									
Potomac Valley RC										Anthracite Repeater Assn.										N1CCC 455 2 1 1,358 MO										WA2JQK 368 2 1 1,152 ENY									
K2WK 724 2 1 2,946 VA										AI3Q 430 2 1 1,770 EPA										VE5GC 326 2 1 1,354 SK										K0MPH 274 2 1 1,138 MN									
Ozaukee RC										Orange Co. (IN) ARC										Montgomery ARC										El Paso ARC									
WT9Q 711 2 1 2,894 WI										N2BEF 402 2 1 1,758 ENY										K8AJX 325 2 1 1,350 AL										WD5FVQ 270 2 1 1,130 WTX									
Franklin Co. (VA) ARC										DFW Contest Grp.										W4GHV 342 2 2 1,346 NC										Central LA ARC									
W4CB 704 2 1 2,866 VA										W0VX 425 2 1 1,750 NTX										Big Island ARC										WW5G 269 2 1 1,126 LA									
WN7S 665 2 1 2,710 VA										Central WV Wireless Assn.										KH6RDO 322 2 1 1,338 PAC										Contest Club Ontario									
Florida Contest Grp.										NW8U 431 2 1 1,744 WV										South Carroll ARC										VA6RCN 306 2 1 1,118 AB									
N8KH 622 2 1 2,688 SFL										K4MX 422 2 1 1,738 VA										WA3FAE 318 2 1 1,328 MDC										Barry ARA									
Frankford RC										Kicked Back Contesters Club										Gloucester Co. ARC										W8JRH 266 2 1 1,114 MI									
NN3Q 650 2 1 2,650 EPA										WV5Y 395 2 1 1,730 STX										WB2GUK 294 2 1 1,326 SNJ										Minnesota Wireless Assn.									
W4KJ 1,262 2 1 2,596 ME										Lucas ARC										AD8J 314 2 1 1,306 NC										WA0LIF 265 2 1 1,110 MN									
CorTek Radio Assn.										W5MT 415 2 1 1,710 NTX										Minnesota Wireless Assn.										Wireless Assn. of South Hills ARC									
KK9DX 633 2 1 2,582 TN										McMinnville ARC										KN0V 312 2 1 1,298 MN										N3RDV 264 2 1 1,106 WPA									
K9SH 1,114 2 2 2,560 IN										N1SLO 414 2 1 1,706 OR										W2UQ 311 2 1 1,294 VA										NE7D 264 2 1 1,106 OR									
Paso Robles ARC										Frankford RC										Rowan ARS										CW Operators' Club									
KB6TAZ 1,243 2 3 2,536 SB										KC3UII 461 2 1 1,690 EPA										N4YZ 310 2 1 1,290 NC										KI6OY 238 2 1 1,102 EB									
Radio Amateurs of Northern VT										Barnstable ARC										VE3TM 310 2 1 1,290 ONE										W0QC 262 2 1 1,098 IA									
K1VMT 601 2 1 2,454 VT										W1WEF 476 2 1 1,682 EMA										K0HX 309 2 1 1,286 MO										Silver Springs RC									
Hamden Co. Radio Assn.										Swamp Fox Contest Grp.										Madison Co. ARC										W3VD 263 2 1 1,092 NFL									
N1YL 584 2 2 2,454 WMA										K4QQG 531 2 1 1,666 SC										N8CWU 311 2 1 1,286 OH										AF6G 223 2 1 1,090 NC									
Macon Co. ARC										Blossomland ARA										NF0T 285 2 1 1,286 IA										W0IZ 468 2 1 1,090 CO									
NT0C 600 2 1 2,450 MO										N8CBA 404 2 1 1,666 MI										CTRI Contest Grp.										AE0IB 269 2 1 1,088 MO									
Frankford RC										W8JJ 500 2 1 1,662 MI										K01H 308 2 1 1,282 ME										AE1MV 438 2 1 1,084 NNY									
WA3AAN 628 2 1 2,448 EPA										Potomac Valley RC										Swamp Fox Contest Grp.										CARESS-NWARC									
Collins Aerospace Radio Grp.										N1EK 402 2 1 1,658 MDC										WB4HRL 312 2 1 1,282 SC										VE7WJ 415 2 1 1,080 BC									
W7CXX 603 2 1 2,440 UT										Adams Co. ARS										Forsyth ARC										Escondido ARS									
Franklin Co. (VA) ARC										K3DQB 400 2 1 1,650 EPA										AK4D 318 2 1 1,274 NC										K7YMG 256 2 1 1,074 SDG									
K4ORD 555 2 1 2,370 VA										Mad River RC										KG5GYA 281 2 1 1,274 AR										PART of Westford									
Coshocton Co. ARA										K8MR 395 2 1 1,630 OH										N2DEE 281 2 1 1,270 CO										KB1HKN 255 2 1 1,070 EMA									
N8VV 551 2 1 2,254 OH										Orca DX and Contest Club										Red Mountain Radio Amateurs										Catalina RC and Radio Soc. of Tucson									
Dupage ARC										VE7WO 392 2 1 1,618 BC										KB7MLK 610 2 2 1,270 NTX										N8BN 255 2 1 1,070 AZ									
KA9BHD 535 2 1 2,190 IL										Paducah ARA										McKinney ARC										N4DLT 255 2 1 1,068 NC									
VE2NTT 1,057 2 1 2,164 QC										K04XJ 387 2 1 1,598 KY										KE5VXZ 304 2 1 1,266 NTX										WA4MAE 254 2 1 1,066 VA									
K0VM 527 2 1 2,158 IA										Raleigh ARS										K04PRE 304 2 1 1,266 VA										VA2KBR 253 2 1 1,062 QC									
Blossomland ARA										WA4BPJ 500 2 2 1,582 NC										Richardson Wireless Klub										David Sarnoff ARC									
KE3K 520 2 1 2,126 MI										WD4OBP 378 2 3 1,582 VA										K7IOL 278 2 1 1,262 NTX										AC2YD 251 2 1 1,054 NNJ									
Ft. Smith Area ARC										N7RVD 356 2 1 1,574 WWA										Potomac Valley RC										St. Croix Valley Radio Amateurs									
W5TMC 1,020 2 1 2,090 OK										WB2NVR 389 2 1 1,572 ENY										N3JT 303 2 1 1,262 VA										K9SCV 252 2 10 1,052 WI									
NOARS/LCARA										Tennessee Contest Grp.										Turkey Heaven Mtn. Repeater Assn.										Tennessee Contest Grp.									
W1PD 702 2 1 2,078 OH										AF4T 355 2 1 1,570 TN										K4PI 302 2 1 1,258 GA										WF7T 250 2 1 1,050 TN									
WD9CIR 502 2 1 2,058 IL										NB1N 368 2 1 1,522 EMA										KB3NSK 302 2 1 1,258 WPA										VE2HEW 204 2 1 1,040 QC									
Oh-Ky-In ARS										Fair Lawn ARC										KN4LQN 300 2 1 1,250 VA										Tri-Lakes ARC									
N8BV 1,001 2 1 2,052 OH										KR2H 358 2 1 1,482 NNJ																				NZ0T 246 2 1 1,034 MO									



International Amateur Radio Union Secretary Joel Harrison, W5ZN (back), and ARRL Delta Division Director David Norris, K5UZ (front), operated CW in the 2F category at the North Central Arkansas Amateur Radio Service Field Day from Searcy, Arkansas. [David Norris, K5UZ, photo]

AG2J	220	2	1	1,030	SNJ
N2UU	243	2	1	1,022	SNJ
Potomac Valley RC					
W4YE	240	2	1	1,010	VA
Silvercreek ARA					
AA3CS	214	2	1	1,006	OH
Meriden ARC					
N1API	214	2	1	1,006	CT
Maury ARC					
WB0CJB	213	2	1	1,002	TN
Twisted Arrow Contest Club					
N6JF	238	2	2	1,002	ID
KC4TNQ	246	2	1	996	TN
AB4NH	210	2	1	990	TN
West Allis RAC					
N9AU	210	2	1	990	WI
London ARC					
VE3UZ	210	2	1	990	ONS
W4IDX	234	2	1	986	AZ
Forsyth ARC					
KC4X	233	2	1	982	NC
Old Barney ARC					
N2DSW	241	2	1	982	SNJ
Swamp Fox Contest Grp.					
N4IQ	233	2	1	982	SC
Hi-Line ARC					
NO7G	208	2	1	982	MT
McKinney ARC					
K5LY	232	2	1	978	NTX
Virginia Beach ARC					
KV4JM	157	2	1	978	VA
Paducah ARA					
KS4V	206	2	1	974	KY
N4KHI	263	2	1	974	NFL
Minnesota Wireless Assn.					
K0TC	230	2	1	970	MN
NY9X	185	2	1	970	IL
Potomac Valley RC					
W4VIC	229	2	1	966	VA
Milky Way Wireless Club					
KC7KFF	223	2	3	966	AZ
Paducah ARA					
KC4WPS	203	2	1	962	KY
North American QRP CW Club					
N3A	228	2	2	962	WPA
KC0UJC	231	2	1	958	IA
Cherryland ARC					
NU8A	227	2	1	958	MI
K1SEC	225	2	1	950	EMA
N9ZI	225	2	1	950	IN
NA2DX	224	2	1	946	WNY
Northern CA Contest Club					
AJ6V	222	2	1	938	SCV
K2TF	222	2	1	938	SNJ
K9NW	222	2	1	938	OH
Niagara Frontier Radiosport					
W2VM	220	2	1	930	WNY
K1MT	233	2	1	928	EMA
KK7PZE	263	2	1	918	AZ
Montgomery ARC					
KU4PY	192	2	1	918	AL
WT2J	217	2	1	918	NLI
HP Alumni RC					
W1DYJ	195	2	1	916	EMA

Monroe Co. Radio Comm. Assn.					
WA8YZB	216	2	1	914	MI
K9EEH	214	2	1	906	IL
Tortolita RC					
KJ7ZHG	213	2	1	902	AZ
N0YH	213	2	1	902	MO
ARC EmComm Svc.					
WB2BWU	188	2	1	902	NLI
K3UK	212	2	1	898	WNY
Florida Contest Grp.					
K4NMR	212	2	1	898	WCF
VE9KK	212	2	1	898	NB
K6FA	211	2	1	894	SJV
Parker Radio Assn.					
NN0G	211	2	1	894	CO
Piedmont ARC					
KD4NGC	209	2	1	886	GA
KG0RD	209	2	1	886	NE
W7ZDX	209	2	1	886	WWA
Silver Comet ARS					
K4SHW	213	2	1	880	GA
Bristol ARC					
AA4DD	206	2	1	874	TN
Citrus Co. ARC					
K3ABE	206	2	1	874	NFL
Splinter Grp. ARC					
K8ARY	206	2	1	874	SC
Heartland DX Assn.					
K0IL	205	2	1	870	NE
Salkhehatchie ARS					
K4HR	205	2	1	870	SC
Ft. Madison ARC					
KC9PL	205	2	1	870	IL
Southern CA Contest Club					
K6RO	203	2	1	862	SDG
Western Piedmont ARC					
KO4DBP	209	2	1	862	NC
KE2I	156	2	1	860	ENY
York Co. (SC) ARS					
KM4FLU	395	2	1	860	NC
Swamp Fox Contest Grp.					
W4GE	223	2	1	860	SC
KA3PMW	202	2	1	858	WPA
N1ET	205	2	1	858	RI
Burlington ARC					
VA3YVE	202	2	1	858	GH
K1USN RC					
K1VUT	201	2	1	854	EMA
KK7GC	200	2	1	850	NV
N1NN	200	2	1	850	EMA
Anne Arundel RC					
WA4GUD	216	2	1	850	MDC
KD2JC	205	2	1	848	NNJ
WA6URY	220	2	1	848	LAX
AB9UZ	149	2	1	846	WI
K1IB	199	2	1	846	VT
Tennessee Contest Grp.					
K4AMC	199	2	1	846	TN
KF7BWS	199	2	1	846	OR
Western Placer ARC					
KG6FCT	396	2	1	842	SV
KM6LBW	197	2	1	840	LAX
CRES ARC					
N9CX	200	2	1	834	OH
North Shore ARC (ON)					
VA3NLM	199	2	1	832	GH
KB9SCT	194	2	1	826	WI
Brunswick Shores ARC					
N3CKI	202	2	1	826	NC
N6BHX	121	2	1	826	EB
KA2ENE	219	2	1	814	WNY
KS0AA	191	2	1	814	KS
KX4TE	191	2	1	814	NC
WA9FZB	191	2	1	814	IL
Half Moon Bay ARC					
KN6IPE	190	2	1	810	SCV
Central KY ARS					
KO4OL	196	2	1	810	KY
WE6Z	172	2	1	808	SV
NQ9N	377	2	1	804	WI
Tri Co. ARC (WI)					
K9KEU	163	2	1	802	WI
K2MN	200	2	1	800	SNJ
KF3G	186	2	1	794	EPA
WP4QWH	161	2	1	794	PR
Niagara Peninsula ARC					
VE3SBI	185	2	1	790	GH
KE6JNO	195	2	1	788	UT
Richardson Wireless Klub					
K5MGY	184	2	1	786	NTX
N7DSX	219	2	1	780	AZ
Hazel Park ARC					
K8GT	182	2	1	778	MI
Valley RC of Oregon					
N6KHO	182	2	1	778	OR
Iowa Wireless AR Network					
AE0TB	181	2	1	774	IA
KO4RJE	181	2	1	774	NC

North Shore ARC (ON)					
VE3HIX	156	2	1	774	GH
Hocking Valley ARC					
KB8VOM	271	2	1	772	OH
Boeing Employees ARS — St. Louis					
WB0QLU	260	2	1	772	MO
K4RDU	180	2	1	770	VA
St. Charles ARC					
N0AX	180	2	1	770	MO
Baltimore Polytechnic Alumni RC					
W3CDI	200	2	2	768	MDC
K4GM	179	2	1	766	VA
N5ILQ	179	2	1	766	OK
Arizona Outlaws Contest Club					
NU7I	181	2	1	764	AZ
KW4LU	200	2	1	760	TN
KJ7RGW	177	2	1	758	OR
Brazos Valley ARC					
WB5TUF	176	2	1	754	STX
AK2X	150	2	2	750	WNY
VA2UT	194	2	1	748	QC
Univ. of Alabama RC					
W5LNX	349	2	8	748	AL
K2QB	174	2	1	746	WNY
VY2DM	149	2	1	746	PE
Desert Radio Amateur Transmitting Soc.					
W9JXT	149	2	1	746	ORG
Richardson Wireless Klub					
WB8QZM	148	2	1	742	NTX
WB9HFK	205	2	1	740	IL
Dixie ARC					
K7DLX	114	2	2	738	UT
KH2GM	171	2	1	734	AL
KA4JAM	170	2	1	732	NC
K0UU	170	2	1	730	MN
Team Montrose					
K3YLW	170	2	1	730	MDC
KB6JFL	176	2	1	726	SJV
K2KI	168	2	1	722	VT
K5VBA	168	2	1	722	AL
Mountaineer ARA					
K8YYY	168	2	1	722	WV
KK5KLK	170	2	1	722	AR
Heritage Hunt Hams					
K4FTO	167	2	1	718	VA
Tortolita RC					
AE9Q	166	2	1	714	AZ
KB0JI	181	2	1	714	CO
Mining ARC/St. Paul RC					
W0COE	165	2	1	710	MN
N0OK	155	2	1	708	MN
K4VSB	164	2	1	706	VA
Arizona Outlaws Contest Club					
KE2VB	164	2	1	706	AZ
KC4M	163	2	1	702	NC
N8RGA	170	2	1	702	MI
N5VAV	325	2	1	700	NTX
Port City ARC					
AC1PK	162	2	1	698	NH
KA3E	162	2	1	698	EPA
Albemarle ARC					
KN4LYF	161	2	1	694	VA
Team Montrose					
KC2JAI	135	2	1	690	MDC
Nittany ARC					
N3IW	135	2	1	690	WPA
Tortolita RC					
W6ZQ	160	2	1	690	AZ
Central LA ARC					
WA5CAV	160	2	1	690	LA
K9PLS	182	2	2	688	IL
K6ASN	127	2	1	686	ORG
Fluvanna ARES Grp.					
K4MSR	266	2	1	682	VA
AA5RN	314	2	1	678	NTX
West Chester ARA					
K8DEV	157	2	1	678	OH
AD2CM	208	2	1	674	SNJ
N3SW	81	2	1	674	VA
N7SE	156	2	1	674	CO
VE3YET	155	2	1	670	ONS
WG9X	165	2	1	670	WCF
Potomac Valley RC					
KG3V	173	2	1	666	VA
Sierra Foothills ARC					
KM7S	155	2	1	666	SV
Florida Contest Grp.					
W4EE	154	2	1	666	SFL
KE8UVX	158	2	1	660	MI
KG0ED	183	2	1	660	NE
Niagara Frontier Radiosport					
KM2L	152	2	1	658	WNY
Waypoint ARC					
WA0RC	237	2	10	658	KS
AG7UN	153	2	1	656	ID
Bowie Wireless Assn.					
N3XL	151	2	1	654	MDC
W5YDM	151	2	1	654	NTX
WB5DXG	151	2	1	654	MS

Benton ARS					
W4KRN	162	2	1	652	VA
Peconic ARC					
WM2Z	150	2	1	650	NC
El Dorado Co. ARC					
K6TQ	156	2	1	648	SV
KB1RVU	297	2	1	644	CT
K17DAN	147	2	1	638	UT
North Shore ARC (ON)					
VA3AG	147	2	1	638	GH
KB9LHT	171	2	1	634	AZ
West Essex ARC					
KC2NJ	146	2	1	634	NNJ
KE3VR	146	2	1	634	MDC
Potomac Valley RC					
K13C	145	2	1	630	VA
Aero ARC					
WA3SVA	145	2	1	630	MDC
KB6CA	119	2	1	626	ORG
W7RL	149	2	1	624	ID
Garland ARC					
K5DHY	194	2	1	622	NTX
K9PSM	143	2	1	622	AZ
KE5DG	118	2	1	622	STX
North Shore ARC (ON)					
VA3WEB	143	2	1	622	GH
KB0GT	142	2	1	618	MN
Barnstable ARC					
K1QEM	142	2	1	618	EMA
NN1M	142	2	1	618	STX
KE8DNF	55	2	3	618	OH
Texas DX Soc.					
AF5J	129	2	1	616	STX
K8NGW	134	2	1	614	MI
N25U	141	2	1	614	NM
Grand Mesa Contesters of Colorado					
K0AE	143	2	1	610	CO
K1SM	140	2	1	610	EMA
K8WS	140	2	1	610	OH
Northern CA Contest Club					
N6RZR	140	2	1	610	SV
VE2WNF	140	2	1	610	QC
NWI DX Club					
W9KTP	114	2	1	606	IN
N9OF	138	2	1	602	STX
Univ. of Alabama RC					
K14GGJ	150	2	8	602	AL
Minnesota Wireless Assn.					
W0ADL	149	2	1	600	MN
W8TOM	159	2	1	600	MI
AG5HC	112	2	1	598	AR
K0YA	137	2	1	598	STX
KB9HGI	137	2	1	598	IL
WA1FMM	153	2	1	596	CO
Boulder ARC					
KV5Y	136	2	1	594	CO
Richardson Wireless Klub					
N5KIP	136	2	1	594	NTX
KD9AIE	111	2	8	594	IL
AA0KW	137	2	1	592	MS
WX3F	145	2	1	592	MDC
AD9CA	178	2	1	590	IN
Ft. Wayne RC					
KC9UR	135	2	1	590	IN
Who Cares ARG					
KE8VSI	135	2	1	590	MI
WA0LJM	135	2	1	590	GA
Egyptian RC					
WA0LIS	135	2	2	590	IL
Blossomland ARA					
AD8BU	134	2	1	586	MI
CRES ARC					
W3CRZ	139	2	1	586	OH
Utah DX Assn.					
WR7Q	134	2	1	586	UT
WX2DX	84	2	1	586	WPA
Garden State ARA					
WA2SEM	133	2	1	582	NNJ
K4AVX	132	2	1	578	KY
Addison Co. ARA					
KE1VT	106	2	1	574	VT
VA3GE	131	2	1	574	ONE
Birmingham ARC					
WB4FAY	131	2	1	574	AL
Hocking Valley ARC					
KB8GUN	130	2	1	570	OH
W7WIA	130	2	1	570	AZ
Reading RC					
N3YQG	127	2	1	568	EPA
Silver Comet ARS					
K4BBH	190	2	1	566	GA
K6KQV	139	2	1	566	SCV
NWI DX Club					
KC9OYE	132	2	1	566	IN
W5MND	129	2	1	566	TN
Gloucester Co. ARC					
WA2IBZ	129	2	1	566	SNJ
N2LEC	138	2	1	564	NNJ
AA2MA	128	2	1	562	AL

www.arrl.org **QST** 2024 Field Day Results continued **3**

Tri-Co. ARC (PA)					Falmouth ARA				DFW Contest Grp.				Brazos Valley ARC										
KE3WN	65	2	1	310	WPA	N1AM	58	2	1	272	EMA	K5ENS	92	2	1	248	NTX	NZ5TX	41	2	1	214	STX
Boston Valley Simplex Club						UCLA ARC						Kicked Back Contesters Club						WA4HWN	41	2	1	214	AL
N2EJT	65	2	1	310	WPA	W6NYU	111	2	1	272	ORG	KD5YPH	70	2	1	248	CO	Olympia ARS					
N4MCA	65	2	1	310	NC	KD2PFH	55	2	1	270	WNY	Lake Area AR Klub						K5VMA	41	2	1	212	WWA
London ARC						Paducah ARA						AISG	51	2	1	246	NTX	Cheshire Co. DX ARC					
VE3IDT	130	2	1	310	ONS	KY4JDC	55	2	1	270	KY	K6DW	98	2	1	246	LAX	WA1ZYX	81	2	1	212	NH
W8NOR	65	2	1	310	AZ	Keowee Toxaway ARC						K6JGA	98	2	1	246	SV	AB5XM	40	2	1	210	STX
VE3QEE	129	2	1	308	GH	N4AHO	57	2	1	270	SC	KE4FVU	48	2	1	246	TN	AD7OY	80	2	1	210	NV
KK0D	39	2	1	306	CO	Jefferson Co. (WA) ARC						KJ5CAS	49	2	1	246	NM	AJ3M	40	2	1	210	MDC
N6PRZ	64	2	1	306	EB	W7TPR	110	2	1	270	WWA	South Wake ARC						K0GOB	80	2	1	210	MO
NX4N	64	2	1	306	SFL	Southern Counties ARA						NW3U	98	2	1	246	NC	K4HXM	40	2	1	210	VA
WY0B	64	2	1	306	MO	W2KU	55	2	1	270	SNJ	Soc. of Midwest Contesters						K9HL	40	2	1	210	IN
KA5ULE	128	2	2	306	WTX	WZ3J	102	2	1	270	MDC	WR9R	69	2	1	246	IN	W0NV	40	2	1	210	IA
Univ. of Alabama RC						High Point ARC						Lake Area AR Klub						WA6UIJ	20	2	1	210	ORG
KV4T	64	2	8	306	AL	KN4OCX	59	2	1	268	NC	K8AMH	47	2	1	244	NTX	Richardson Wireless Klub					
New England Fusion Grp.						Cheshire Co. DX ARC						The FPL Grp.						AA5AH	61	2	1	208	NTX
AC1MT	126	2	1	304	EMA	AC0WI	108	2	1	266	NH	K8ESQ	50	2	1	244	MI	W6JBR	40	2	1	208	SDG
Garden State ARA						Irving ARC						KA4JRY	97	2	1	244	GA	AA0YY	39	2	1	206	MO
KB2RTI	64	2	1	304	NNJ	A15NO	54	2	1	266	NTX	KC0WIR	36	2	1	244	MO	Arizona Outlaws Contest Club					
W7YG	127	2	1	304	WCF	South Mountain Radio Amateurs						Richardson Wireless Klub						K6VHF	14	2	1	206	AZ
N9DEK	126	2	1	302	IN	K3ZR	54	2	1	266	EPA	KG5WRY	97	2	1	244	NTX	Sierra Foothills ARC					
W8AND	63	2	1	302	MI	Richardson Wireless Klub						N6JTX	97	2	1	244	SV	K16RT	61	2	1	206	SV
Cochise ARA						K0LOA	54	2	1	266	NTX	Okaw Valley ARC						Anne Arundel RC					
AA7JB	40	2	1	300	AZ	WD9IGL	54	2	1	266	WI	K9RZ	67	2	1	242	AZ	KB3IAI	14	2	1	204	MDC
Toledo Mobile Radio Assn.						Frankford RC						Silver Springs RC						East Bay ARC					
KB8PAI	125	2	1	300	OH	WO2Y	54	2	1	266	SNJ	K04OIG	52	2	1	242	NFL	K06NO	77	2	1	204	EB
KX7L	65	2	1	300	WWA	KQ4DRX	7	2	1	264	WCF	K7UOU	48	2	1	240	AZ	W1FRX	77	2	1	204	WNY
AA7LE	62	2	1	298	PAC	Willamette Valley DX Club						North Fulton ARL						AA0K	13	2	1	202	CO
AG6JA	80	2	1	298	EB	W7VC	107	2	1	264	OR	W4FRA	95	2	1	240	GA	Warminster ARC					
KC3VII	62	2	1	298	EPA	W8WFD	107	2	1	264	OH	KA2IWK	22	2	1	238	WNY	K3GMQ	38	2	1	202	EPA
KM0F	124	2	1	298	SD	W17J	107	2	1	264	UT	K15NYZ	47	2	1	238	WTX	East Greenbush ARA					
Maury ARC						Central MA ARA						N8DD	51	2	1	238	OH	KC2HRO	72	2	1	202	ENY
KM1Z	62	2	1	298	TN	A11G	28	2	1	262	WMA	N2YG	92	2	1	234	NLI	KD4TTP	63	2	1	202	VA
Orange Co. Radio Amateurs and Durham FM Assn.						K3TXT	53	2	1	262	MDC	N9UXC	21	2	1	234	MN	N4WIO	38	2	1	202	AL
W4AEN	62	2	1	298	NC	Allen Co. AR Technical Soc.						Montachusett ARA						W8VX	39	2	1	202	OH
W4ELP	62	2	1	298	VA	KC9EZP	104	2	1	262	IN	NZ1D	46	2	1	234	NFL	K3BUC	75	2	1	200	VA
WA1HXX	62	2	1	298	NH	Mississippi Valley DX/Contest Club						WD4RCG	46	2	1	234	AL	Port City ARC					
KA1LHJ	49	2	1	296	CT	W0NFS	53	2	1	262	MO	Assoc. Radio Amateurs of Long Beach						KC1OXM	75	2	1	200	NH
W6GLS	72	2	1	296	SDG	Potomac Valley RC						K6MUG	91	2	1	232	LAX	KD5AYW	75	2	1	200	NM
KD2UTL	122	2	1	294	NNY	WA3AER	53	2	1	262	MDC	Bolingbrook ARS						Nashua Area Radio Soc.					
Mound ARA						Bay Area DXers						K9NYO	72	2	1	232	IL	WM0G	40	2	1	200	NH
KE8RS	61	2	1	294	OH	WA8MDC	53	2	1	262	MI	KD9HPN	91	2	1	232	IN	21 Repeater Club					
Lodi ARC						WB4PWZ	53	2	1	262	EPA	W7QF	45	2	1	230	OR	KA9QWC	75	2	2	200	IN
N6NFB	122	2	1	294	SJV	Baylor ARC						W8GNT	90	2	1	230	OH	WCARES Contest Grp.					
AD8DM	60	2	1	290	OH	WA5BU	106	2	6	262	NTX	Metro DX Club						K9QJS	37	2	1	198	TN
K0WRY	60	2	1	290	KS	K5KLO	105	2	1	260	GA	WU9D	45	2	1	230	IL	KF4DJQ	74	2	1	198	TN
KA6BMZ	120	2	1	290	ORG	WA1HRE	61	2	1	260	NH	Univ. of Alabama RC						N2EJI	37	2	1	198	ENY
KD3G	120	2	1	290	WV	West Chester ARA						K54YT	45	2	8	230	AL	Brazos Valley ARC					
Ft. Smith Area ARC						KB8ZYE	90	2	1	258	OH	Jersey Shore ARS						W5GCX	37	2	1	198	STX
K17AY	60	2	1	290	OK	KF8I	63	2	1	258	OH	AC2ZU	89	2	1	228	SNJ	W5TTE	37	2	1	198	NM
KJ9C	60	2	1	290	MT	Highlands Co. ARC						K0JJM	89	2	1	228	KS	W8NFR	37	2	1	198	OH
KO2F	60	2	1	290	VA	KW4G	104	2	1	258	WCF	Calaveras ARS						Bergen ARA					
W1AVK	120	2	1	290	CT	McMinnville ARC						KA9MDP	89	2	1	228	SV	WA2CLP	13	2	1	198	NNJ
Tamaqua Wireless Assn.						WB6RVP	52	2	1	258	OR	N5MIS	89	2	1	228	MS	N6RIK	73	2	1	196	GA
W3OFD	67	2	1	290	EPA	AD5DJ	103	2	1	256	NTX	Grand Rapids ARA						Sussex ARA					
W4EVV	60	2	1	290	NFL	N0STP	62	2	1	256	MN	N8UXN	89	2	1	228	MI	KC3MAL	36	2	1	194	DE
W4LT	60	2	1	290	WCF	N4MMR	103	2	1	256	WCF	WA2SIB	44	2	1	226	QC	KD8SPF	72	2	1	194	OH
W5APO	61	2	1	290	NFL	N7HYV	77	2	1	256	NV	W3HDG	44	2	1	226	WPA	Brazos Valley ARC					
AC7CJ	69	2	1	288	EWA	VE3QC	52	2	1	256	ONE	W8GV	88	2	1	226	WCF	KZ5H	36	2	1	194	STX
W8RAD	119	2	1	288	MI	EmComms Assn. of St. Charles						WA0PFC	88	2	1	226	UT	East Greenbush ARA					
K0LJW	59	2	1	286	WCF	WS0Z	103	2	2	256	MO	WB5BHS	44	2	1	226	AR	N2WJR	72	2	1	194	ENY
N8CPA	59	2	1	286	OH	Columbus Radio Enthusiasts Soc.						K5EGA	43	2	1	222	NTX	W1WAB	11	2	1	194	WCF
Richardson Wireless Klub						K8HTC	51	2	1	254	OH	KD9BRW	43	2	1	222	IL	Sierra Foothills ARC					
W5SU	59	2	1	286	NTX	Oh-Ky-In ARS						NA7DO	43	2	1	222	WWA	AA6RS	44	2	1	192	SV
WB2DHY	59	2	1	286	VA	KC8HQS	102	2	1	254	OH	Gulf Coast ARC						K0RVB	71	2	1	192	STX
KB6QEW	76	2	1	284	ME	KD9YUO	51	2	1	254	IL	NG4L	43	2	1	222	WCF	Woodbridge Wireless					
Southern CA Contest Club						KG7MYX	51	2	1	254	WWA	VE3INE	43	2	1	222	GH	KM4KWZ	71	2	1	192	VA
KN6OKY	62	2	1	284	SDG	KM4VI	51	2	1	254	TN	WA1VKO	86	2	1	222	NH	N4BFR	71	2	1	192	GA
KT4OO	117	2	1	284	SC	Garden City ARC						Westchester EmComm Assn.						Brazos Valley ARC					
K3PNW	66	2	1	282	WWA	N8TW	51	2	1	254	MI	N2GDY	85	2	1	220	ENY	K5WRN	70	2	1	190	STX
N0DIM	66	2	1	282	SC	VE6GTX	62	2	1	254	AB	Kendall ARS						KC3AEZ	20	2	1	190	EPA
Shelby ARC						W4TLR	51	2	1	254	NC	W6TIR	51	2	1	220	STX	Southeast LA ARC					
W4JL	58	2	1	282	NC	WT3O	102	2	1	254	MDC	Binghamton ARA						KE5KMM	35	2	1	190	LA
Hop River RC						K0JEB	52	2	1	252	CT	WM2R	60	2	1	220	WNY	Spartanburg ARC					
WX1W	116	2	1	282	CT	N9RMH	101	2	1	252	IN	Villa Rica RC						N4ULE	35	2	1	190	SC
Snohomish Co. Hams Club						Contest Club Ontario						AD5QA	42	2	1	218	GA	N9WNJ	35	2	1	190	IN
KA7RRA	115	2	1	280	WWA	VE3IMU	86	2	1	252	GH	K9VQA	34	2	1	218	IL	NY4JB	35	2	1	190	TN
WA7YNU	47																						

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Williamson Co. ARES						Lamorinda Area Radio Interest Grp.				W7ZND	8	2	1	66	EWA	Smokin Hot Radio ARC							
W4BJB	26	2	1	102	TN	K6KWR	14	2	1	78	EB	WK0C	4	2	1	66	NM	KE0THN	43	2	6	422	IA
WA2NLL	26	2	1	102	NLI	Antietam Radio Assn.						Kendall ARS						Coyote ARC					
Wood Co. ARC						KD3JK	14	2	1	78	MDC	N5SGM	7	2	1	64	STX	KN5S	96	2	3	288	STX
K8LL	25	2	1	100	OH	Mecklenburg ARS						VE3BK	7	2	1	64	GH	Navarro ARC					
Ozone ARC						KM4OWA	14	2	1	78	NC	WA2VAM	5	2	1	64	WNY	W5NFL	62	2	17	274	NTX
KE5QKR	15	2	1	100	LA	K04KGA	11	2	1	78	NM	Highlands Hams						N9QID	86	2	3	242	MI
KJ4CCH	25	2	1	100	NFL	KR4CE	14	2	1	78	VA	WB4HUX	7	2	1	64	AL	Western KS ARC					
KK7SL	25	2	1	100	NV	Massillon ARC						AA3OB	6	2	1	62	EPA	K0WPM	62	2	2	216	KS
KW4LP	25	2	1	100	TN	NX8G	7	2	1	78	OH	Monessen ARC						Alexandria RC					
W6UA	13	2	1	100	SB	W0JOP	7	2	1	78	MO	KA3VEB	6	2	1	62	WPA	KO4JH	39	2	1	202	VA
AA8Z	15	2	2	100	OH	W2HLM	7	2	1	78	WWA	Benton ARS						West TN ARS					
AL5K	24	2	1	98	AK	WA3GOS	7	2	1	78	MDC	KD5JSE	6	2	1	62	AR	WN8Y	58	2	2	166	TN
K5TMH	24	2	1	98	OK	Chicago Suburban Radio Assn.						KE8NSI	6	2	1	62	OH	W5THB	38	2	1	126	NTX
Lake Area AR Klub						WB9NLO	14	2	1	78	IL	N6SER	3	2	1	62	LAX	KD5SHY	1	2	1	52	AR
KC5LL	24	2	1	98	NTX	West Allis RAC						ARC of the Univ. of Arkansas											
South Jersey Radio Assn.						WB9OWN	7	2	1	78	WI	K5GOE	5	2	1	60	AR	3D					
W2MC	24	2	1	98	EPA	Broken Arrow ARC						KK7JUM	5	2	1	60	WWA	McDowell ARA					
K3RSS	23	2	1	96	MDC	A15HV	10	2	1	76	OK	K06CAL	5	2	1	60	SDG	W4HOG	1,209	2	42	4,822	NC
Kentucky Colonels ARC						K1MCO	13	2	1	76	NFL	KS4FE	4	2	1	60	KY	Westport Astro ARC/Housatonic ARC/ Greater Fairfield ARA					
K4WSR	23	2	1	96	KY	Potomac Valley RC						VE2LJV	5	2	1	60	QC	K1WAS	956	2	31	4,430	CT
Minnesota Wireless Assn.						K3AU	9	2	1	76	MDC	AD8MD	4	2	1	58	OH	Great Salt Lake Contest Club					
W0LM	12	2	1	96	MN	K8AH	13	2	1	76	MI	KD4ZVD	4	2	1	58	VA	K7KC	1,444	2	6	3,962	UT
KF5ZSD	13	2	2	96	STX	Raytown ARC						N7MSI	4	2	1	58	MT	Mound ARA					
Billerica ARS/Billerica EMA						KF0KTE	13	2	1	76	MO	Portage Co. ARS						W8DYY	702	2	8	2,842	OH
KC1QKU	22	2	1	94	EMA	KO4JFH	11	2	1	76	TN	W8KNO	4	2	1	58	OH	Nittany ARC					
KI6QDB	11	2	1	94	SDG	N2NRV	13	2	1	76	WNY	KA6HUM	2	2	1	54	SF	W3YA	336	2	37	2,044	WPA
Etowah Valley ARC						Niagara Peninsula ARC						KB1WSE	1	2	1	54	SFL	Low Country Contest Club					
KJ4LPI	11	2	1	94	GA	VA3TUK	13	2	1	76	GH	KF6RQZ	1	2	1	54	ORG	NU4SC	467	2	5	1,844	SC
South Bay ARC						VE6FAR Cycle 25						KF6TWK	2	2	1	54	OR	Columbia (OR) ARA					
KK6BY	11	2	1	94	LAX	VE6ORM	13	2	1	76	AB	KKD0QG	1	2	1	54	CO	N7EI	568	2	9	1,424	OR
KK6VZE	22	2	1	94	SF	Port City ARC						K08S	2	2	1	54	MI	Southeastern MA ARA					
Richardson Wireless Klub						AA1IT	9	2	1	74	NH	N5BF	1	2	1	54	LAX	W1AEC	316	2	6	960	EMA
N4NZ	20	2	1	94	NTX	Conejo Valley ARC						N9AJD	2	2	1	54	IN	W3CG	220	2	3	800	WPA
Piedmont ARC						K6MQA	8	2	1	74	SB	W9TTY	2	2	1	54	IL	Mt. Shasta ARC					
WB4JWM	11	2	1	94	GA	Hi-Line ARC						Marple Newtown ARC/Mobile Sixers RC						W6BML	120	2	3	754	SV
WA2MCT	18	2	2	94	STX	KB7DUJ	12	2	1	74	MT	W3KFT	27	2	1	54	EPA	N5BVP	285	2	8	700	OK
K1JWC	21	2	1	92	RI	Port City ARC						K7YJ	1	2	1	52	AZ	Lake Oswego ARC					
K4IEY	6	2	1	92	ME	KN1WDS	12	2	1	74	EMA	KA1RWY	1	2	1	52	CT	WA7LO	195	2	12	690	OR
KA0B	21	2	1	92	NM	Club Radio Amateur Sorel-Tracy						KD2LNQ	1	2	1	52	DE	KB4UF	214	2	3	660	NFL
Granite State ARA						VE2GT	7	2	1	74	QC	Forsyth ARC						Pecos Co. ARC					
KC2TV	21	2	1	92	NH	W1CHL	6	2	1	74	OH	KD4HWS	1	2	1	52	NC	KG50XR	7	2	5	64	WTX
Orange Co. (IN) ARC						Meriden ARC						VE2RRE	1	2	1	52	QC	4D					
KC2VTM	21	2	1	92	ENY	W1DQ	6	2	1	74	CT	K3QDA	12	2	1	48	EPA	Bellbrook ARC					
Findlay RC						AD6AD	11	2	1	72	SV	W0PPF	34	1	1	34	IA	W8DGN	946	2	25	3,616	OH
KD8BET	21	2	1	92	OH	Conejo Valley ARC						N6TCZ	11	2	1	22	LAX	Steel City ARC					
WA2OMT	21	2	1	92	VA	AD6TW	10	2	1	72	SB	KG5KKS	2	2	1	4	STX	N3LL	773	2	19	2,884	WPA
K4OOO	20	2	1	90	CT	KD2DJU	11	2	1	72	ENY	2D											
K9XE	10	2	1	90	IL	KD9YVJ	11	2	1	72	IL	KC3WX	1,888	2	3	6,134	EPA	K1USN RC					
KB1EWM	20	2	1	90	CT	KH6ML	7	2	1	72	PAC	BEANOS						N1DC	488	2	4	2,002	EMA
VE3JZT	10	2	1	90	ONS	Fluvanna ARES Grp.						W4GJ	1,478	2	2	6,062	NFL	Waterton ARS					
Montgomery ARC						KQ4AWF	11	2	1	72	VA	W5EA	1,718	2	19	4,848	LA	W0NT	426	2	9	1,180	CO
W4HEA	10	2	1	90	AL	N5RVT	11	2	1	72	STX	Dog Hollow Contest Grp.						5D					
WA0BER	10	2	1	90	MO	WB2GRX	11	2	1	72	NFL	Ak9D	775	2	2	3,250	KS	Orange Co. Radio Amateurs and Durham FM Assn.					
KA5FDX	10	2	2	90	AR	AJ4FJ	5	2	1	70	GA	Yankee Clipper Contest Club						W4EZ	2,002	2	25	7,038	NC
K0MIS	19	2	1	88	CO	K3ZE	10	2	1	70	MDC	W1FM	595	2	3	2,668	EMA	St. Petersburg ARC					
K4DUF	19	2	1	88	VA	K7HQ	10	2	1	70	WY	Southwest Dallas Co. ARC						W4TA	1,924	2	47	6,796	WCF
KC5GFL	19	2	1	88	AR	K8WZY	10	2	1	70	OH	N5VDQ	688	2	11	2,300	NTX	Thunderbird ARC					
W3PWF	19	2	1	88	NTX	KC0QNB	10	2	1	70	NE	VA2PM	540	2	2	2,210	QC	W7TBC	921	2	20	4,150	AZ
WE6EZ	19	2	1	88	STX	KD2OMV	5	2	1	70	NNY	Sierra Nevada ARS						6D					
Downey ARC						KD8JCJ	10	2	1	70	WV	Wayne ARC						Kern Co. Central Valley ARC					
K6ICS	18	2	1	86	LAX	Shreveport ARA						W8TB	479	2	1	1,966	OH	W6LIE	366	2	15	922	SJV
South Bay ARC						KI5LUS	5	2	1	70	LA	AC7GL	508	2	3	1,906	ID	7D					
KA6ZTO	13	2	1	86	ORG	CRES ARC						Lisbon Area ARA						Findlay RC					
KD6GWQ	9	2	1	86	ORG	KI8KF	10	2	1	70	OH	NN8B	425	2	1	1,750	OH	W8FT	475	2	17	1,780	OH
KJ7PQR	18	2	1</																				

Piedmont ARC					
N22X	891	2	1	4,014	GA
The 570-V Connection					
W3GQ	857	2	3	3,678	NC
W8UE	349	5	1	3,640	MI
CTRI Contest Grp.					
K1PAD	839	2	1	3,506	NH
Northeastern IN ARA					
KD9QDL	327	5	1	3,420	IN
N5JB	323	5	1	3,380	NTX
WB8SIG	800	2	2	3,350	OH
KE0FOE	744	2	2	3,326	MO
W3CB	297	5	1	3,320	MI
Hudson Valley Contesters and DXers					
NQ2W	300	5	1	3,250	ENY
N0XO	305	5	1	3,200	ID
K9KE	330	5	1	3,060	IL
Temple ARC					
N4TP	1,051	2	25	3,060	WCF
K4VSV	253	5	2	2,780	SC
Central TX DX and Contest Club					
N5AW	653	2	1	2,762	STX
K4FHI	250	5	1	2,650	NC
North Fulton ARL					
K4PQC	237	5	1	2,640	GA
Tri-Town RAC					
WD9HSY	559	2	1	2,586	IL
KA8HOK	620	2	1	2,580	AL
KJ7SLR	237	5	1	2,520	WWA
VE7NI	215	5	1	2,500	BC
Montgomery ARC					
K4TMR	222	5	1	2,470	AL
WB1BWQ	575	2	1	2,450	WTX
KA1O	229	5	1	2,440	NH
Central VA Contest Club					
WU4G	217	5	1	2,420	VA
N3RN	204	5	1	2,290	EPA
Nurosa's Gopher Munchers					
AE6C	204	5	2	2,240	SJV
Candlewood ARA					
W1QK	499	2	1	2,146	CT
Florida Contest Grp.					
WA1BXY	490	2	1	2,110	NFL
Pen Bay ARC					
W1RKD	188	5	1	2,025	ME
W9XU	433	2	1	1,982	WI
CW OPS of NY					
WR2I	334	2	1	1,956	ENY
KR4AE	175	5	1	1,900	GA
N7AGP	439	2	1	1,898	MT
Michigan QRP Club					
AB8DF	174	5	1	1,890	MI
W3POT	443	2	1	1,882	SFL
Rocky Mountain Ham Radio					
NR5ON	154	5	2	1,870	NM
Black Hills ARC					
AJ0GM	377	2	1	1,858	SD
K8GB	399	2	1	1,846	MI
K4RCA	611	2	1	1,844	VA
K3KEK	419	2	1	1,820	STX
WC7S	164	5	1	1,790	WY
St. Charles ARC					
W0DTM	390	2	1	1,786	MO
PART of Westford					
KC1DSQ	163	5	1	1,780	EMA
Ottawa Valley Mobile RC					
VA3THP	336	2	1	1,764	ONE
Florida Contest Grp.					
KQ4R	402	2	1	1,758	NFL
W3WYM	145	5	1	1,700	MDC
KF6I	411	2	1	1,696	ORG
KE5ES	142	5	1	1,670	WTX
W22T	152	5	1	1,670	NNY
K9JM	283	2	1	1,664	SV
WCARES Contest Grp.					
N4OPI	151	5	1	1,660	TN
Pamlico ARS					
K2TNO	347	2	1	1,638	NC
K7FR	148	5	1	1,630	WWA
N8RAT	726	2	1	1,602	WV
KW4RB	145	5	1	1,600	VA
W3ADP	132	5	1	1,570	MDC
W7GB	305	2	1	1,570	EWA
AA5UN	445	2	1	1,540	NTX
Hoosier Hills Ham Club					
AB9CA	316	2	1	1,514	IN
Rocky Mountain Ham Radio					
NA5N	136	5	1	1,510	NM
KD7LEE	341	2	1	1,498	WWA
Castle Shannon VFD ARC					
K3CSF	275	2	3	1,494	WPA
N0MA	316	2	1	1,486	IA
W7POE	280	2	1	1,470	WWA
AC2XC	326	2	1	1,462	WNY
AA8MI	120	5	1	1,450	OH
K0FJ	325	2	1	1,450	KS
CW Operators' Club					
KA5M	325	2	1	1,450	LA

Baton Rouge ARC					
N5IB	130	5	1	1,450	LA
Franklin Co. (NC) ARC					
K4GMV	119	5	1	1,440	NC
Tortolita RC					
N7GHZ	294	2	1	1,426	AZ
Palms West ARC					
AJ4LJ	293	2	1	1,422	SFL
Winona ARC					
W0VTT	316	2	1	1,414	MN
N7NB	116	5	1	1,410	WWA
W08L	126	5	1	1,410	NC
AB5SE	314	2	1	1,406	AR
K3WT	339	2	2	1,406	MN
W0DZ	288	2	1	1,402	CO
Fluvanna ARES Grp.					
N8OQ	115	5	1	1,400	VA
Arizona Outlaws Contest Club					
KE6K	303	2	1	1,382	AZ
Oregon Tualatin Valley ARC					
K17VEM	308	2	1	1,382	OR
East TN DX Assn.					
W4PV	304	2	1	1,366	TN
KN4FRG	325	2	1	1,356	MO
Arizona Outlaws Contest Club					
N6HI	120	5	1	1,350	AZ
Cross Roads Ham RC					
W5EEZ	120	5	1	1,350	STX
NK2J	315	2	1	1,342	AZ
Piedmont ARC					
K4EGA	244	2	1	1,326	GA
Mansfield-Johnson ARS					
NN5DE	319	2	1	1,326	NTX
KI0D	294	2	1	1,318	SD
Cheshire Co. DX ARC					
K1CHR	413	2	1	1,306	NH
Potomac Valley RC					
K3TN	271	2	1	1,294	MDC
W7LG	276	2	1	1,286	WPA
Parkersburg AR Klub					
WA8KAN	307	2	1	1,282	WV
W2EQ	281	2	1	1,274	SNJ
N2MTG	605	2	1	1,260	ENY
N4IU	101	5	1	1,260	NFL
Skyview Radio Soc.					
AB3GY	253	2	1	1,258	WPA
Central IN Skywarn Club					
W9NWS	602	2	1	1,254	IN
Central OH Operators Klub Extra Novice					
WW8OH	110	5	1	1,250	OH
N3MWQ	108	5	1	1,245	DE
Splinter Grp. ARC					
N8TCP	247	2	1	1,238	OH
W8JTW	201	2	2	1,232	OH
Lake Conroe ARC					
W5RIF	273	2	1	1,224	STX
Paducah ARA					
ND4X	212	2	1	1,198	KY
Ft. Madison ARC					
WB0B	262	2	1	1,198	IA
AA2GS	94	5	1	1,190	KY
WA2JLW	113	5	1	1,180	NC
W7CK	511	2	1	1,172	AZ
Southern CA Contest Club					
W6COW	100	5	1	1,170	LAX
W6ZBA	102	5	1	1,170	ORG
N2HMM	505	2	1	1,160	NNJ
40 Gail Contest Club					
W1FJ	111	5	1	1,160	EMA
N0WW	254	2	1	1,158	MO
Ozaukee RC					
W9KHH	177	2	1	1,158	WI
WB4BIN	100	5	1	1,150	NTX
WB7S	100	5	1	1,150	WY
Harrisburg Radio Amateurs Club					
K3URT	197	2	1	1,134	EPA
Mesilla Valley RC					
W6VJT	221	2	1	1,134	NM
N4CZ	57	5	1	1,115	AL
Arizona Outlaws Contest Club					
KN7Y	241	2	1	1,114	AZ
Naturist ARC					
NU5DE	476	2	2	1,102	STX
CW Operators' Club					
NS8O	212	2	1	1,098	OH
Piedmont ARC					
KB4MOX	111	2	1	1,092	GA
Phil-Mont Mobile RC					
KA3TTT	65	5	1	1,085	EPA
KJ6K	92	5	1	1,070	SCV
WD9EGW	92	5	1	1,070	IL
A13KS	153	2	1	1,062	EPA
Frankford RC					
NY3B	250	2	1	1,050	EPA
N2LK	88	5	1	1,030	DE
W7HRF	78	5	1	1,030	ID
N7HCN	67	5	1	1,020	EWA
Splinter Grp. ARC					
K0BIE	192	2	1	1,018	OH

Tennessee Contest Grp.					
K3FH	215	2	1	1,010	WPA
W8JWL	66	5	1	1,010	MI
Northeast MD AR Contest Soc.					
N3FJP	412	2	2	1,004	MDC
N6NKO	113	2	1	1,002	WI
N6WZQ	209	2	1	986	OR
AI4UC	208	2	1	982	VA
KF0IDT	381	2	1	980	CO
AJ2Y	182	2	1	978	GA
W6RKC	206	2	1	974	SV
KN4VFF	163	2	3	962	KY
KE7DOA	66	5	1	960	UT
Border City RC					
VE3KKA	82	5	1	960	ONS
KD5TKR	200	2	1	950	WTX
KD9YOO	199	2	1	946	IN
KE8LCM	261	2	1	936	WV
PART of Westford					
N1CEO	73	2	1	934	EMA
North Ottawa ARC					
W8RJC	196	2	1	934	MI
VA3WP	132	2	1	930	ONS
HP Alumni RC					
N1AU	163	2	1	902	EMA
Panoramaland ARC					
WB7WUQ	138	2	1	902	EWA
German Township Field Day Team					
N2GSB	151	2	2	902	OH
Huntsville ARC					
K4FTY	150	5	1	900	AL
AD8MP	149	2	1	896	MI
KO4GAR	323	2	1	896	SC
WB8REI	88	2	3	896	OH
K5OF	370	2	1	890	NC
NV5S	74	5	1	890	STX
KI5WWT	80	5	1	880	NTX
W7CEJ	185	2	1	868	UT
Wayne ARC					
K8AJUS	178	2	1	862	OH
K6VDU	184	2	1	858	SV
KF6JXM	177	2	1	858	SDG
Bayouland Em. ARS					
KA5HSL	175	2	1	856	LA
KC1OT	302	2	1	854	CT
Atchison Co. ARS					
K0HK	50	5	1	850	KS
N1SEP	350	2	1	850	CT
West Valley ARC					
W7TUE	70	5	1	850	AZ
K3HOC	270	2	1	828	WPA
WOZA	194	2	1	826	NE
N1VF	194	2	2	820	SCV
Pasadena RC					
KC7O	280	2	1	810	LAX
KP4IL	165	2	1	810	PR
NX6D	163	2	1	802	EB
WD7CW	163	2	1	802	WI
N3BAS	214	2	1	796	WPA
Waupaca Co. ARES/RACES					
KD9OAZ	161	2	1	794	WI
AC1BB	54	5	1	790	IL
Swamp Fox Contest Grp.					
W4Y	209	2	5	788	SC
AF9J	64	5	1	785	WI
Nashua Area Radio Soc.					
W1RUI	160	2	3	782	NH
Salt Spring Island ARS					
VE7GDH	78	5	1	780	BC
W6BIV	132	2	1	778	STX
N6ACA	108	2	1	776	EB
W4SNP	200	2	4	776	OH
Northwest IN DX Club					
N4SV	312	2	1	774	IN
Salkehatchie ARS					
NX3H	156	2	1	774	SC
North Shore ARC (ON)					
VE3VMP	154	2	1	766	GH
KD4WLE	128	2	1	762	SFL
W6MZ	41	5	1	760	SDG
Zuni Loop MEF					
W6SIY	61	5	1	760	SJV
Southeast LA ARC					
N50MM	121	5	1	755	LA
Orange Co. Radio Amateurs and Durham FM Assn.					
KF4O	153	2	1	754	NC
Longmont ARC					
W0KKI	151	2	1	754	CO
KE4UKX	126	2	9	754	VA
Tusco ARC					
KE8JNN	150	2	1	750	OH
K3NS	124	2	1	746	MDC
N8NCR	193	2	1	736	WPA
W9LRG	120	2	1	728	IL
KB7GK	115	5	1	725	ID
Bay Area DXers					
K0ACP	184	2	1	724	MI

Shenandoah Valley ARC						Half Wave Soc.					Florida Contest Grp.					KC1UER	8	5	1	230	CT		
W8BRY	126	2	1	576	VA	W4BXC	102	2	4	404	N4MUH	39	2	1	306	NFL	AC6CZ	18	2	1	222	SDG	
Macon Co. ARC						AC8XA	63	2	1	402	KJ5MA	51	5	1	305	NTX	Virgin Valley ARC						
KC0AMJ	237	2	1	574	MO	NE7RD	70	2	1	400	North Hills RC						K7LOM	35	2	1	220	ID	
VA3NFL	106	2	1	568	ONS	W5ACW	100	2	1	400	NM	KB6ODH	77	2	1	304	SV	KE4D	7	5	1	220	NFL
Yankee Clipper Contest Club						AJ4EY	72	2	1	398	VA	KD9ARD	76	2	1	302	IN	Richardson Wireless Klub					
W1NR	104	2	1	566	EMA	Metro DX Club						Eastern CT ARA					N5SKT	30	2	1	220	NTX	
KD8IPF	107	2	1	564	MI	K9GA	61	2	1	394	IL	N1FQI	38	2	1	302	CT	VE3DLS	34	2	1	218	ONS
N9DNB	53	5	1	560	IL	KB7WHO	61	2	1	394	ID	W5DLP	76	2	1	302	NTX	West TN ARS					
Tortolita RC						Piedmont ARC						AA5UY	25	2	1	300	LA	KO4PUU	21	2	1	216	TN
K7AZT	102	2	1	558	AZ	K6DPL	11	2	1	392	GA	N1WEB	48	2	1	300	TN	W1MP	3	5	1	215	WPA
Gloucester Co. ARC						Larkfield ARC						Bayouland Em. ARS					Montgomery ARC						
AC2PT	153	2	1	556	SNJ	AA2TR	14	5	1	390	NLI	KA5LMZ	23	2	1	296	LA	W4IJG	13	5	1	215	MS
KS2H	21	5	1	555	WCF	K1VG	60	2	1	388	CT	W4GAT	73	2	1	296	TN	K0CN	16	2	1	214	MN
K9TY	141	2	1	554	WI	KE8NBC	119	2	1	388	OH	AC2N	72	2	1	294	NFL	K6KTS	31	2	1	212	ORG
W4ZTH	119	2	1	554	NFL	Bluegrass ARS						K6YUL	36	2	1	294	LAX	KC3SER	31	2	1	212	EPA
AC4PQ	125	2	1	550	GA	KI4ENS	19	2	1	388	KY	W8MYL	71	2	1	292	WY	Hi-Line ARC					
Silver Springs RC						KA2FHN	65	2	1	386	WNY	Northeastern IN ARA						K7HEH	29	2	1	208	MT
KQ3K	100	2	1	550	NFL	Binghamton ARA						KD9KMK	70	2	1	290	IN	K15TEB	28	2	1	206	STX
Pasadena RC						KE2AUS	92	2	1	384	WNY	KK4ZDZ	10	2	1	290	KY	Sierra Foothills ARC					
N3BKV	100	2	1	550	SJV	Valley of the Moon ARC						Lamorinda Area Radio Interest Grp.					W6FTC	28	2	1	206	SV	
N4CSV	100	2	1	550	OH	N7PIB	71	2	1	384	SF	N4DLA	4	5	1	290	EB	Columbia ARC					
San Fernando Valley ARC						Maurly ARC						Maritime Contest Club					K3YMI	17	2	1	204	MDC	
WA6KYR	100	2	1	550	LAX	KQ4AZN	115	2	1	380	TN	VE9QR	27	5	1	290	NB	Shreveport ARA					
Marconi ARC of Newfoundland						W6DOQ	29	5	1	380	LAX	WOMB	27	5	1	290	MO	N2VOX	15	2	1	204	CO
VO1MRC	20	5	3	550	NL	KJ7GVL	57	2	1	378	OR	KE0AKH	110	2	2	290	CO	KC6ZBE	13	2	1	202	STX
KI6RIT	176	2	1	548	SF	KR4GT	45	5	1	375	KY	Lapeer Co. ARA						N47MKQ	26	2	1	202	NV
W2TT	99	2	1	546	CT	K8UHL	56	2	1	374	KY	W8DLK	69	2	1	288	MI	Tortolita RC					
KD9BDL	20	5	1	545	WI	W5ETM	56	2	1	374	NTX	KE9NM	17	2	1	284	IL	KJ7KNW	13	2	1	202	AZ
Ozone ARC						Sierra Foothills ARC						HQ Doods Recreational Deployment Team					AC2JK	25	2	1	200	WNY	
KD5GFG	195	2	1	540	LA	KO6TH	10	2	1	370	SV	N1SFE	66	2	1	282	CT	Grand Strand ARC					
WB4JFS	169	2	2	540	NC	KB0OLA	109	2	1	368	UT	Swamp Fox Contest Grp.						N4ZEK	25	2	1	200	SC
Grand Mesa Contesters of Colorado						KB3KOC	109	2	1	368	MDC	N4VZ	33	2	1	282	SC	AJ6VU	12	2	1	198	LAX
W0BX	73	2	1	538	CO	Shreveport ARA						WB9DLT	8	2	1	282	WI	Ventura Co. ARC					
W6DSG	97	2	1	534	NV	K15PUM	78	2	1	368	LA	Yellow Thunder ARC						K6LWG	12	2	1	198	SB
W3QD	76	5	1	530	VA	K7SD	108	2	1	366	AZ	AF9FA	49	2	1	280	WI	KD7GOM	12	2	1	198	AZ
WA9TKK	18	5	1	530	AZ	N5IY	24	5	1	365	OH	Sierra Foothills ARC						W2WCM	12	2	1	198	VA
Amigos RC Ashtabula						KH6DC	53	2	1	362	PAC	K6GPB	13	5	1	280	SV	W5MMC	12	2	1	198	LA
AA8DL	141	2	1	528	OH	W1OHM	53	2	1	360	NH	David Sarnoff ARC						El Paso ARC					
NO5V	48	5	1	525	STX	WB6MPH	29	2	1	360	LAX	K42BXH	15	2	1	280	SNJ	W5ES	23	2	1	196	WTX
KI7BCL	137	2	1	524	ID	Honeywell-Glendale ARC						KA6JLT	13	5	1	280	NV	K15WPW	11	2	1	194	STX
WO3X	136	2	1	522	OH	N7TWB	54	2	1	358	AZ	NF1T	35	2	1	280	WCF	KM4RK	22	2	1	194	SC
Eastern Shore ARC						Haldimand Norfolk ARC						W5NAW	26	5	1	280	MS	KE4FGW	21	2	2	192	TN
WA2AIC	46	2	1	520	VA	VE3DVC	62	2	1	358	ONS	Southern CA Contest Club						Parker Radio Assn.					
KF6VAQ	84	2	1	518	ORG	Virginia Beach ARC						W6ML	40	2	1	280	SJV	AB4BA	10	2	1	190	CO
WCARES Contest Grp.						KI5FJ	54	2	2	358	VA	AD2TM	32	2	1	278	WNY	Zephyrhills Area ARC					
W4RG	92	2	2	516	TN	K4IDT	102	2	1	354	KY	Bolingbrook ARS						KB3SRU	14	5	1	190	WCF
WA7PTM	5	5	1	515	WWA	Tri-Co. ARC (TX)						KD9NHZ	64	2	1	278	IL	VE3EJM	8	5	1	190	ONS
A14WM	42	5	1	510	MI	KI7GJG	52	2	1	354	NTX	K2FEO	63	2	1	276	WNY	W4HH	4	5	1	190	VA
Jefferson Co. (WA) ARC						WA4HWT	102	2	1	354	GA	KM4RZT	6	2	1	274	NH	WB9BAT	10	2	1	190	IN
K7DCJ	90	2	1	510	WWA	K4PPF	101	2	1	352	AL	KE3E	33	2	1	272	DE	Arlington ARC					
KB3ITQ	36	5	1	510	MDC	New Providence ARC						AE9PM	10	2	1	270	IL	AA5VZ	19	2	1	188	NTX
N8JIA	36	5	1	510	STX	K1DK	10	5	1	350	NNJ	KF5QHQ	5	2	1	270	NTX	N0XMD	19	2	1	188	OH
WB2COY	115	2	1	510	ENY	K7MK	50	2	1	350	ID	N9LPQ	30	2	1	270	WI	Madison Co. ARC					
VE2VY	90	2	1	504	QC	N3TCR	100	2	1	350	MDC	KC2HZW	59	2	1	268	IN	W8DPK	18	2	1	186	OH
KJ6KCG	121	2	1	492	ORG	VA4CQ	25	2	1	350	MB	W6YXY	59	2	1	268	SDG	K6COX	17	2	1	184	SB
KI7CFO	120	2	1	490	ID	Bolingbrook ARS						N6SAC	58	2	1	266	SV	Palos Verdes ARC					
N8FKF	85	2	1	490	MT	W9GPB	40	5	1	350	IL	K0VIK	57	2	1	264	MN	A16DF	16	2	1	182	LAX
KO4RVE	167	2	1	484	NFL	AC3MB	85	2	1	348	EPA	Ak Sar Ben ARC						KF0AED	16	2	1	182	MN
KE8UZF	83	2	1	482	MI	Hampden Co. Radio Assn.						AD0LS	56	2	1	262	NE	N6SEE	8	2	1	182	SDG
Cheshire Co. DX ARC						WA1QKT	99	2	2	348	WMA	K5MPS	55	2	1	260	STX	Superstition ARC					
WA1YZN	120	2	1	476	NH	AK6EP	50	2	1	346	SJV	Fauquier ARA						AG7KU	65	2	1	180	AZ
AD1L	104	2	1	472	WMA	VE3XEM	97	2	1	344	ONE	KK4UZX	11	5	1	260	VA	Thunderbird ARC					
KI4EJC	32	5	1	470	TN	Cupertino ARES						KW1W	11	5	1	260	EMA	K7FCCC	15	2	1	180	AZ
K7OWW	108	2	1	466	OR	KI6DRN	96	2	1	342	SCV	St. Louis QRP Soc.						Conejo Valley ARC					
KD3FG	110	2	1	466	MDC	KM6MTV	46	2	1	342	LAX	W7AQB	1	5	1	260	MO	KO6BGB	3	5	1	180	SB
KI5WKP	31	5	1	460	NM	Thunderhawks ARC						KV4ZY	104	2	1	258	VA	VE6XAD	13	2	1	180	AB
W1SD	153	2	1	456	EMA	WA0AW	48	2	1	342	MO	Delta and Neshoba ARC Memphis						W4CDO	15	2	1	180	TN
KK4QOE	51	2	1	454	NFL	N5KBX	95	2	1	340	STX	KC7ND	53	2	1	256	TN	Brightleaf ARC					
AA5OY	30	5	1	450	LA	VE9CZ	95	2	1	340	NB	W9OO	29	2	1	256	IL	N4PVH	14	2	1	178	NC
West Allis RAC						San Juan Co. ARS						KB9OFH	34	2	1	254	IL	Niagara Peninsula ARC					
AA9RK	20	5	1	450	WI	NM7A	38	5	3	340	WWA	Granite State ARA						VA3WM	14	2	1	178	GH
KC2TOO	50	2	1	450	WNY	KC3UZK	94	2	1	338	EPA	WA1N	36	2	1	254	NH	AJ6PT	13	2	1	176	AZ
KR0U	30	5	1	450	CO	KN4ZIR	75	2	1	336	KY	Mound ARA						N5WRX	13	2	1	176	STX
KS4BG	100	2	1	450	TN	San Benito Co. ARA						K8HEF	50	2	1	250	OH	N9VPV	13	2	1	176	IL
WH6CMO	74	2	1	446	PAC	W6WKB	61	2	1	336	SCV	N8TP	50	2	1	250	GA	AA5RL	6	2	1	174	STX
KA3HFS	19	5	1	440	SV	A15GU	42	2	1	334	NTX	WCARES Contest Grp.						K4OMC	31	2	1	174	SC
Catalina RC and Radio Soc. of Tucson						KK7KQP	40	2	1	334	OR	K4IRS	50	2	2	250	TN	N3DFF	12	2	1	174	EPA

W3ZF	1	2	1	152	CO
W7EWJ	1	2	1	152	OR
W8TGB	1	2	1	152	MI
Village 7 ARC					
K0GWR	20	5	1	150	CO
KB1YO	50	2	1	150	CT
N3BKW	25	2	1	150	WPA
PART of Westford					
AB1HD	23	2	1	142	EMA
K1RFD	19	2	1	124	CT
AE4JB	13	5	1	115	WCF
Wellesley ARS					
N1WEN	32	2	1	114	EMA
WW5N	30	2	1	112	MS
KF7VY	15	2	1	110	OR
Denver RC					
W6HAB	2	2	1	104	CO
K0HO	25	2	1	100	ND
Northeast MD AR Contest Soc.					
KA3YJM	19	2	1	88	MDC
KL3JY	16	2	2	82	AK
K9TWW	11	2	1	72	MN
KL3JZ	8	2	2	66	AK
Desert Radio Amateur Transmitting Soc.					
KM6RRS	5	2	1	60	ORG
KC3PIK	3	2	1	56	WPA
K7RDY	1	2	1	52	WWA
KC0AGX	1	2	1	52	MO

2E

The Berwick Contest Team					
WQ3N	2,025	2	2	6,488	EPA
Collins ARC					
N5CXX	1,662	2	5	5,380	NTX
Hilltop Transmitting Assn.					
W3ZGD	415	5	6	4,280	EPA
Burlington Co. RC					
AK2S	306	5	3	3,640	SNJ
Washington Co. ARC					
W5TRL	792	2	1	3,494	STX
W4MC	689	2	1	3,456	VA
Collington Community RC					
K3CCR	872	2	2	3,316	MDC
South Hill Contest Club					
N7PP	799	2	7	3,186	WWA
Orca DX and Contest Club					
VA7MM	700	2	5	3,152	BC
KB2BIT	200	5	1	2,370	NFL
AK7AT	485	2	2	2,290	ID
W17P	425	2	1	2,114	UT
Butler Co. AR Public Svc. Grp.					
N3WH	761	2	2	1,872	WPA
W3SW	670	2	2	1,852	WNY
AI6DO	162	5	1	1,850	LAX
Guadalupe Valley ARC					
WB5LVI	517	2	12	1,730	STX
Radio Amateurs of Manitoba/Winnipeg Senior Citizens RC					
VE4BB	230	2	15	1,708	MB
WG5F	150	5	5	1,585	OK
W0DYD	321	2	2	1,570	MN
VE6FI	481	2	2	1,212	AB
KA4ZZZ	220	2	1	1,208	GA
Pasadena RC					
N06B	167	5	2	1,185	LAX
AA6QI	190	2	2	1,182	LAX
Crawford Co. ARC					
KE8PNX	201	2	2	1,024	OH
N1NAZ	155	2	1	870	NH
Piedmont ARC					
K4IO	28	2	3	856	GA
VE3GE	105	2	1	770	ONS
Eastford EmComm					
KB1DGY	75	2	1	750	CT
WA9BD	72	2	1	638	IN
AJ6RX	30	2	1	142	ORG

3E

Southwick Radio Grp.					
K1II	1,316	2	14	4,774	WMA
Great Southern DX Assn.					
K5GDX	925	2	3	3,812	MS
Sun City ARC					
K5WPH	1,014	2	20	3,580	WTX
South GA ARC					
W4TFM/WA4NKL					
	295	5	4	3,400	GA
Potomac Valley RC					
K3PAX	950	2	7	3,378	MDC
Brazos Valley ARC					
WX5KR	265	5	3	3,340	STX
Jefferson ARC					
W5GAD	558	2	52	3,320	LA
NASA Marshall Space Flight Center ARC					
NN4SA	551	2	10	2,804	AL

Piedmont ARC					
KM4LFT	369	2	3	2,576	GA
K9LRD	429	2	3	2,298	WI
Southtown ARS					
W2E	612	2	14	2,162	WNY
KB2URI	280	2	1	1,814	WNY
Richardson Wireless Klub					
K5WFR	85	5	2	1,650	NTX
St. Cloud ARC					
W0SV	283	2	20	1,374	MN
AA9UF	178	2	3	936	IL
Mel Mabry Memorial ARC					
N4NVG	160	2	3	928	VA
Perry Co. ARC					
K3SRZ	194	2	13	738	EPA
N9BGU	39	2	2	678	CO
Southern Berkshire ARC					
W1BAA	93	2	14	674	CT
NC6V	45	2	1	530	ORG
KC3SMA	124	2	4	416	WPA
W8ESM	10	2	1	390	WWA

4E

Skyview Radio Soc.					
K3MJW	2,173	2	17	7,456	WPA
Radio Assn. of Erie					
W3GV	1,305	2	17	4,930	WPA
Masonic Village ARC					
K3WEB	387	2	11	2,452	EPA

5E

Contoocook Valley RC					
K1B	2,645	2	38	8,166	NH
Cleveland ARC					
KA4J	933	2	76	4,788	TN
Mercer Co. ARC					
W3JTV	1,086	2	50	3,376	WPA
Des Moines Radio Amateurs Assn.					
W0AK	729	2	15	3,294	IA
Suwannee ARC					
N4SVC	579	2	7	2,358	NFL
Binghamton ARA					
W2OW	302	2	30	2,194	WNY

9E

FM38 Repeater Grp.					
N9GMT	2,867	2	14	10,558	WI

EOC Stations

1F

Cottonwood Heights ARC					
W7RCH	355	2	12	2,916	UT
Augusta Univ. ARC					
WA4AUG	475	2	4	2,292	GA
Renewal					
K7EA	180	5	2	1,950	UT
Amargosa ARC					
N7A	267	2	3	1,810	NV
EmComms Assn. of St. Charles					
W0ECA	300	2	18	1,336	MO
Hillsborough Co. ARES/RACES					
N4HCA	134	2	8	1,278	WCF
Western Tidewater Radio Assn.					
WT4RA (+WB4GUH)					
	176	2	11	1,272	VA
Johnson Co. ARC					
W5JCR	254	2	56	1,268	NTX
Parsippany-Troy Hills RACES					
K2PTH	185	2	9	1,236	NNJ
ARA of Nebraska					
W0WWW	234	2	19	1,082	NE
Montvale OEM					
K2TO	180	2	4	1,002	NNJ
Franklin Co. (ME) ARES					
W1FCA	182	2	13	920	ME
Grupong Magellan Organization SRT					
VA3GMO	173	2	6	916	GH
NCTAMS PAC					
KH6UL	164	2	1	886	PAC
Fayette ARA					
K8FAY	235	2	1	720	OH
Manalapan Township ARES					
N2UUS	17	2	9	684	NNJ
NEIA Red Cross AR Assn.					
W0EQU	46	2	6	622	NE
Inverhuron Ham RC					
VA3KEO	89	2	2	584	ONS
San Diego Imperial Co. Chapter American Red Cross					
W6RDX	53	2	3	556	SDG
Sweet Fruits on Air ARC					
KP4SFA	1	2	7	552	PR

Nemaha Co. AR Org.					
KB0MU	93	2	3	482	KS
Putnam Co. AUXCOMM					
WB9EOC	14	2	5	478	IN
Shelby Co. ARES					
K8EMA	106	2	2	462	OH
Northville ARA					
NA1RA	29	2	24	408	CT
N6AKO	57	2	1	364	LAX
SEDARES					
W4ECA	135	2	6	356	GA
Camden Co. ARS					
KB4CC	98	2	1	346	GA
Cascades ARS					
K8JXN	107	2	9	264	MI
Santa Clara Co. ARA					
W6UU	7	2	3	64	SCV

2F

North Central AR ARS					
AB5ER (+N5HU)					
	2,450	2	32	11,792	AR
Bullitt ARS					
KY4KY (+W4KBR)					
	2,228	2	40	8,692	KY
Surrey AR Comms.					
VE7SAR (+VE7HME)					
	1,697	2	25	6,640	BC
San Jose EOC					
KE6PQV	1,352	2	2	6,208	SCV
Point Loma Radio Ops. Grp.					
W6A	1,672	2	9	6,150	SDG
Orleans Co. ARC					
W2ORC (+WA2DQL)					
	1,003	2	22	5,211	WNY
Greater Bridgeport ARC					
W1BPT (+K1PCN)					
	887	2	8	4,910	CT
Coventry EMA					
KC1CUE (+W1KDA)					
	1,115	2	40	4,833	RI
RICOMU/RIEMA					
WA1USA (+KR1EMA)					
	938	2	12	4,805	RI
Rappahannock ARA					
W4NNK	1,021	2	15	4,558	VA
Athens Co. ARA					
K8V	848	2	15	4,252	OH
Jackson ARC					
KS0JA (+K0CLW)					
	1,087	2	20	4,218	KS
BillERICA ARS/Billerica EMA					
W1HH	905	2	36	3,886	EMA
Monroe Co. Radio Comm. Assn.					
W8PI	981	2	13	3,848	MI
West TN Field Day Grp.					
N4B (+KM4EUG)					
	522	2	32	3,421	TN
Carteret Volunteers ARC					
K2ZV	882	2	7	2,860	NNJ
West Essex ARC					
W2EF (+K2EXX)					
	532	2	12	2,784	NNJ
Dixie AR Klub					
W4DAK (+N4EC)					
	441	2	6	2,736	NFL
Valencia Co. ARA					
K5OUR (+KC5OUR)					
	468	2	41	2,650	NM
Northeast MS Radio Amateurs					
W5NEM	469	2	9	2,462	MS
Boonville ARC					
K0FV	504	2	13	2,166	MO
Salkehatchie ARS					
KK4BQ	363	2	3	2,132	SC
York RC					
W9YRC (+W9YK)					
	464	2	14	2,078	IL
Chatham AuxComm Soc.					
NC4CH (+KE8NNJ)					
	257	2	23	2,044	NC
The Unreal RC					
W0WX	433	2	2	1,974	MN
Boeing Employees ARS					
K7NWS	329	2	21	1,966	WA
Bergen Co. Em. Mgmt. RC					
NJ2BC	367	2	10	1,890	NNJ
Algoma ARC					
VE3SOO	316	2	12	1,850	ON
Franklin Lakes OEM RC					
N2FLO	296	2	16	1,828	NNJ
Daytona Beach CERT AR Team					
N4DAB	329	2	6	1,770	NFL
Bayouland Em. ARS					
W5BMC	184	2	4	1,668	LA
Kings Point ARC					
W4KPR	290	2	18	1,592	WCF



Members of the National Press Radio Club, W3AO, participated in ARRL Field Day and kept the airwaves alive during the overnight shift. [Steve Campbell, KC3WPG, photo]

Xenia Weather AR Net W8XRN (+W1QFB) 826 2 31 4,422 OH Houston ECHO Soc./Oak Forest ARC W5ECO 668 2 15 3,696 STX Sioux Empire ARC W0ZWY 987 2 30 3,690 SD Lake Co. RACES/ARES K9IQP (+W9QL) 1,079 2 15 3,321 IL Wyandot Area Ham Operators Org. WY8DT (+KD8GWK) 434 2 12 3,273 OH Virginia Mountain ARC W4COV 793 2 8 3,260 VA Southern Counties ARA K2BR 664 2 28 3,220 SNJ Dickson Co. ARC WC4DC 699 2 11 3,196 TN Rowan ARS N4UH 636 2 15 2,824 NC Platte Co. ARG NR0AD 567 2 34 2,766 MO Queen City Em. Net W8VVL 864 2 15 2,500 OH Harford Co. ARES RACES KC3FHC (+W3H) 308 2 18 2,493 MDC Richardson Wireless Klub K5RWK 380 2 69 2,455 NTX Flagler Co. FL Combined Field Day W4FPC (+KA4LEC) 340 2 30 2,297 NFL Silver Comet ARS W4RSC (+WB3ILX) 508 2 21 2,220 GA Heart of America RC W0RR 386 2 6 2,176 MO Alamance ARC K4EG 392 2 8 2,088 NC Spout Springs Repeater Assn. WF7S (+N7EEL) 258 2 15 1,984 EWA Cochise ARA K7RDG (+N0ZHJ) 393 2 20 1,748 AZ Nacogdoches ARC W5NAC 271 2 17 1,674 NTX									
Anderson RC KY4LAW 384 2 12 1,658 KY Cass Co. ARC W9VMW 338 2 22 1,576 IN Hannibal ARC W0KEM (+W0MTL) 176 2 15 1,545 MO Key City ARC KC5OLO 434 2 53 1,456 WTX Chester Co. ARES/RACES W3EOC 248 2 9 1,318 EPA Spa ARA WB5SPA 135 2 22 1,312 AR Worcester ECT WE1CT 425 2 25 1,280 WMA Hill Country ARC W3XO 263 2 20 1,260 STX Hurst ARC W5HRC 367 2 15 1,214 NTX Aroostook ARA K1FS 167 2 8 1,018 ME Tazewell Co. ARS W9TAZ 226 2 20 946 IL Oxford Co. ARES W1OCA 287 2 9 938 ME Pontotoc Co. ARA K15ERE 21 2 14 492 OK Hockley Co. ARC WB5EMR 39 2 7 448 WTX Pickens Co. Comm. Grp. WX4PG 98 2 14 378 SC SSF Fire CERT N6SSF 85 2 8 320 SCV									
4F River Bend Wireless Operators Club W9XG (+NA9Q) 1,868 2 53 8,425 IL Kaw Valley ARC W0CET 1,331 2 25 5,578 KS Tri State ARS W9OG (+W9SIR) 1,232 2 38 5,471 IN Uniontown ARC W3PIE 893 2 24 4,188 WPA Warren Co. RC W2C (+W2WCR) 845 2 26 4,164 ENY									
Van Wert ARC W8FY (+KE8VCH) 1,204 2 12 4,010 OH Washington Co. ARC W5AUM 1,214 2 34 3,946 STX Wayne ARC W8WOO 595 2 21 3,164 OH Arctic ARC KL7KC (+KL3NJ) 522 2 20 3,137 AK Eastern CT ARA KZ1M (+K1MUJ) 659 2 22 3,024 CT Kentucky Colonels ARC KY4BG 541 2 15 2,510 KY Hiram Percy Maxim Memorial Station/ Meriden ARC W1AW 570 2 10 2,204 CT Murgas ARC K3YTL 301 2 20 1,869 EPA Four Co. ARES NC4CA 290 2 4 1,594 NC Tri-Town RAC W9VT (+N9WDG) 181 2 14 1,587 IL Morehead ARS KY4HS 317 2 6 1,534 KY Carolina ARES WX4SC 515 2 10 1,508 SC South Mountain Radio Amateurs N3TWT 129 2 40 1,378 EPA Gainesville ARS K4GNV 124 2 22 1,178 NFL Texas Em. Amateur Communicators W5SI (+W5S) 260 2 12 1,148 STX Woodmont ARA W1WDT (+KC1ADT) 195 2 12 1,080 CT Orange ARC W5ND 397 2 9 1,068 STX Howell Co. ARC W0HCA 147 2 9 968 MO Ozone ARC W5SLA 32 2 25 842 LA Denton Co. ARA W5NGU 173 2 28 740 NTX Arkansas Diamond ARC KE5FSY 136 2 18 622 AR									
5F Pilgrim Amateur Wireless Assn. KA1GG (+N1NTM) 1,427 2 20 4,495 EMA Endless Mountains ARC N3EP 848 2 30 3,100 EPA Broken Arrow Em. Mgmt. ARC WX5BA 377 2 7 2,250 OK Tri-State ARA W8VA 143 2 35 1,836 WV Sedalia Pettis AR Klub WA0SDO 134 2 26 1,770 MO BCARS K3NQT 234 2 10 1,480 WPA									
6F Lucas ARC W5AWL 824 2 20 3,808 NTX MESAC/Costa Mesa RACES W6MSC 171 2 13 1,112 ORG									
7F BEARS of Manchester W1BRS 383 2 25 2,480 CT Citrus Co. ARC W4CQF 402 2 25 2,476 NFL Jackson Co. ARA N5OS 469 2 10 2,370 MS ARA of the Southern Tier W2ZJ 466 2 48 2,002 WNY									
12F Johnson Space Center ARC/Clear Lake ARC W5RRR (+KC5KBO) 1,475 2 30 6,704 STX									

Club Aggregate Scores are listed below. Aggregate scores are listed alphabetically by club name and the number of individual entries, along with the total score of the individual entries attributing their score to a club.

Club Aggregate Scores			Arrowhead RAC			Boston Mountain RC			Charleston ARS		
Club Name	Entries	Score									
21 Repeater Club	1	200	ARTS of Louisville	1	4,320	Boston Valley Simplex Club	1	310	Charlestown ARC	1	68
3 Guys with Radios ARC	1	440	Ascension ARC	2	2,110	Boulder ARC	4	13,003	Charlotte ARS	1	11,704
3 Rivers ARC	1	2,064	Ashe Co. ARC	1	1,980	Bowie Wireless Assn.	3	3,510	Charlottetown ARC	1	2,205
3730 Grp.	2	2,216	Assoc. Radio Amateurs of Long Beach	3	1,344	Brandon ARC	1	160	Chatham AuxComm Soc.	1	2,044
40 Gail Contest Club	1	1,160	Assoc. Radio Amateurs of So. New England	1	3,506	Brandon ARS	1	1,300	Chattanooga ARC	1	1,778
444 DX Grp.	1	4,304	Atchison Co. ARS	2	1,204	Brantford ARC	1	218	Chautauqua Co. Amateur FM Assn.	1	1,214
510 Radio Grp.	1	10,300	Athens Co. ARA	1	4,252	Brazos Valley ARC	12	28,442	Chehalis Valley ARS	2	1,100
6 Meter Club of Crystal Lake	1	1,986	Athens RC	1	3,528	Bridgerland ARC	1	1,690	Cherokee ARS	1	6,419
721st Mechanized Contest Battalion	1	2,720	Atlantic Region Repeater Legion	1	708	Brightleaf ARC	2	1,370	Cherokee Capital ARS	1	1,206
985 Repeater Grp.	2	8,288	Audrain EmComm	1	1,068	Bristol ARC	1	874	Cherryland ARC	3	3,664
Abbotsford ARES Soc.	1	1,142	Augusta Univ. ARC	1	2,292	Broken Arrow ARC	3	6,965	Cherryville Repeater Assn. II	2	3,678
Acadiana ARA	1	1,982	Aurora EMA ARC	1	362	Broken Arrow Em.			Chesapeake ARS	1	4,996
Adams Co. ARS	3	2,540	Austin ARC	1	3,060	Mgmt. ARC	1	2,250	Chesapeake Bay Radio Assn.	1	3,398
Adams-Arapahoe Co. ARES	1	1,106	Bald Eagle Repeater Assn.	1	452	Brookings Radio Research Club	1	720	Cheshire Co. DX ARC	6	3,516
Addison Co. ARA	2	2,486	Baldwin Co. ARC	1	5,902	Broughton Memorial Field Day Grp.	1	6,783	Chester Co. ARES/RACES	1	1,318
Adrian ARC	1	1,456	Baltimore Polytechnic Alumni RC	1	768	Brunswick Shores ARC	3	6,083	Chew's Ridge Gang	1	3,970
Aero ARC	3	1,490	Bankhead ARC	1	1,504	Bryan ARC	2	3,067	Chicago FM Club	1	168
Aeronautical Center ARC	1	704	Barnstable ARC	3	7,786	Bullitt ARS	2	10,742	Chicago Suburban Radio Assn.	2	2,216
Aerospace Employees Assn. ARC	1	632	Barrie ARC	1	3,107	Burlington ARC	2	2,314	Chippewa Valley ARC	1	1,522
Aiken RC	1	420	Barron Co. ARA	1	1,440	Burlington Co. RC	2	4,544	Chippewa Valley VHF Contesters	1	180
Ak Sar Ben ARC	2	3,618	Barrow ARC	1	770	Butler Co. AR			CHIRP Field Day Team	1	700
Alabama Contest Grp.	3	2,490	Barry ARC	1	1,114	Butler Co. VHF Assn.	1	1,326	Citrus Co. ARC	2	3,350
Alachua EOC RC	1	7,890	Barstow ARA	1	4,943	Calaveras ARS	1	572	Clairemont Repeater Assn.	1	1,730
Alamance ARC	1	2,088	Bartlesville ARC	1	4,943	Calgary ARA	3	3,814	Clallam Co. ARC	1	574
Albany ARA	2	6,953	Basin ARC	1	360	Calhoun Co. ARA	2	2,130	Clark Co. (IN) ARC	1	2,082
Albany ARC	1	1,102	Bastrop Co. ARC	1	2,891	Calhoun Co. ARG	1	3,536	Clark Co. (WA) ARC	2	9,623
Albemarle ARC	6	6,109	Batesville Area RC	1	984	Calhoun Co. EOC	1	1,090	Clay Co. AUXCOMM	1	1,456
Albuquerque DX Assn.	1	12,147	Baton Rouge ARC	3	2,400	California City ARC	1	1,870	Clearwater ARS/Upper Pinellas ARC	1	4,496
Alcorn Co. ARC	1	1,192	Bay Area ARC	1	4,043	Calumet Co. ARES Grp.	1	260	Cleveland ARC	2	5,730
Alexandria RC	4	3,924	Bay Area DXers	2	2,198	Calvert ARA	1	1,506	Clinton Co. ARC	1	1,404
Alford Memorial RC	1	2,234	Baylor ARC	1	986	Cambridge ARA	1	1,718	Clinton Co. ARA	1	706
Algoma ARC	1	1,850	Baytown Area ARC	2	262	Camden Co. ARS	1	346	Clinton Co. Contesters	1	3,442
All Idaho Contest Club	1	1,906	Bayouland Em. ARS	3	2,820	Camp Kilowatt Contest Club	1	1,120	Club Radio Amateur de l'Estrie	1	1,584
All Things ARA	1	1,880	BCARS	2	5,418	Camp Rainfall	1	522	Club Radio Amateur de l'Outaouais	3	2,032
Allegan Co. ARC	1	1,726	BCI RC	1	1,410	Campbell River ARS	1	1,324	Club Radio Amateur de Quebec	1	5,125
Allegheny Valley Radio Assn.	1	556	BEANOS	2	6,612	Canadian Red Cross	1	572	Club Radio Amateur Laval-Laurentides	1	936
Allen Co. AR Technical Soc.	1	262	Bear Bait RC	2	2,252	Candlewood ARA	2	5,492	Club Radio Amateur Sorel-Tracy	2	2,489
Amargosa ARC	1	1,810	Bearcat DX Club	1	2,972	Canton ARC	3	8,728	Club Radio Amateur de Drummondville	1	1,206
Amateur Radio of Churchill Co.	1	394	BEARONS and MicroHAMS FD Extravaganza	1	1,898	Cape Ann ARA	6	2,366	Club Radio Amateur de la Vallée du Richelieu	1	1,436
American Legion ARC Post 33	2	4,397	BEARS of Manchester	1	2,480	Cape Fear ARS	1	14,482	Coachella Valley ARC	1	426
American Legion Post 104 ARC	1	666	Beaufort Radio Amateur Grp.	1	2,393	Capital City ARC	1	1,887	Coal Country ARC	1	2,130
American Legion Post 283	1	684	Beaver Valley ARA	1	1,840	Carbon ARC	1	918	Coastal ARS	1	1,940
American Legion Post 82 ARC	1	436	Bedford ARC	1	120	CARCSC	1	470	Cochise ARA	2	2,048
American Legion Post 91 ARC	1	2,148	Bedford Co. ARS	1	1,788	CARE/Rogue Valley ARC	1	4,810	Coconino ARC	1	2,478
Amigos RC Ashtabula	2	1,768	Bedlington Terrier ARC of Tucson	1	5,964	CARESS-NWARC	3	6,840	Coffeyville ARC	1	2,662
Anderson Island ARC	1	1,386	Bella Vista RC	2	10,190	Carlyle Lake Fest	1	760	Cole Co. Em. Response Team	1	356
Anderson RC	1	1,658	Bellbrook ARC	1	3,616	Carlyle Lake Fest	1	760	Collington Community RC	1	3,316
Andrew Johnson ARC	1	3,989	Bellevue ARC	1	408	Carolina ARES	2	1,694	Collins Aerospace Radio Grp.	1	2,440
Androscoggin ARC	1	1,878	Benicia ARC	1	2,939	Carolina DX Assn.	1	1,950	Collins ARC	1	5,380
Annapolis Valley ARC and Kings Co. ARC	1	7,363	Benton ARS	5	5,598	Carolinas Airstream Club	1	860	Colorado QRP Club	3	18,223
Anne Arundel Co. ARES	1	560	Bergen ARA	1	198	Carteret Volunteers ARC	1	2,860	Columbia (MD) ARA	2	2,756
Anne Arundel RC	2	1,054	Bergen Co. Em. Mgmt. RC	1	1,890	Cascade RC	1	1,404	Columbia (OR) ARA	1	1,424
Anoka Co. RC	1	1,220	Big Bend ARC	2	7,261	Cascades ARS	2	1,022	Columbia ARC	1	204
Anritsu ARC	1	718	Big Island ARC	1	1,338	Case ARC	1	3,716	Columbia ARS	1	3,344
Antelope Valley ARC	1	1,620	Big Signal ARC	1	964	Casper ARC	1	982	Columbia-Montour ARC	3	5,260
Anthracite Repeater Assn.	1	1,770	Big Sky Contesters	1	5,624	Cass Co. ARC	1	1,576	Columbus ARC	1	8,615
Antietam Radio Assn.	3	4,552	Bill Gremlinton Memorial RC	1	924	Castle Rock Repeater Grp.	1	462	Columbus Radio Enthusiasts Soc.	1	254
Appalachia ARC	1	2,804	Billerica ARS/Billerica EMA	2	3,980	Castle Shannon VFD ARC	1	1,494	Comm. Support Team for Puget Sound Fire	1	1,034
AR Caravan Club	3	672	Birmingham ARA	5	3,090	Catalina RC and Radio Soc. of Tucson	4	6,009	Community ARC	1	388
ARA of Nebraska	1	1,082	Birmingham ARC	2	1,988	Cedar Creek ARC	1	1,430	Comox Valley ARC	3	2,462
ARA of the Southern Tier	2	2,166	Bishop ARC	2	1,296	Cedar Valley ARC/Collins ARC	1	7,049	Conejo Valley ARC	11	12,783
ARC EmComm Srvc.	4	4,735	Black Hills ARC	2	2,266	Central Alberta ARC	1	2,290	Conejo Wireless Soc.	1	668
ARC of Augusta	1	1,812	Black River ARC	1	1,780	Central Coast ARG	1	2,120	Contest Club Ontario	7	11,569
ARC of Butts Co.	2	2,574	Black River Radio Ops	1	11,300	Central Dakota ARC	1	1,606	Contocook Valley RC	1	8,166
ARC of Columbia Co.	1	1,788	Black Swamp ARC	1	6,924	Central IL RC	1	3,931	Convair/220 ARC	2	1,277
ARC of El Cajon	1	532	Blackstone Valley ARC	1	7,471	Central IN Skywarn Club	1	1,254	Coos Co. RC	1	3,342
ARC of Parker Co.	1	2,052	Blazing Paddles Field Day Team	1	7,414	Central KY ARS	2	13,292	Copper Country Radio Amateur Assn.	1	606
ARC of the Univ. of Arkansas	1	60	Bledsoe Co. ARC	1	2,560	Central LA ARC	3	8,916	Corona Police CSV Team	1	576
Arctic ARC	1	3,137	Bloomfield ARC	1	990	Central MA ARA	2	3,294	CorTek Radio Assn.	1	2,582
ARES of Douglas and Elbert Co.	3	10,032	Blossomland ARA	4	7,285	Central MI ARC	1	4,352	Coshocton Co. ARA	2	4,920
Arizona ARC	1	350	Blount Co. ARC	1	2,476	Central MI Em. Network	1	646	Cottonwood Heights ARC	1	2,916
Arizona Outlaws Contest Club	13	24,961	Blue Ridge ARC	1	4,005	Central MO Radio Assn.	2	4,044	Country Pond ARG	1	1,670
Arkansas Diamond ARC	1	622	Blue Springs ARC	1	3,321	Central MS ARA	1	5,790	Cove Repeater Assn.	1	2,222
Arkansas Radio Em. Srvc.	1	824	Bluegrass ARS	1	388	Central OH Operators Klub Extra Novice	1	1,250	Coventry EMA	1	4,833
Arkansas River Valley ARF	2	2,525	Boaz-Albertville ARC	1	1,340	Central OR AR					
ARL of Lawrence Co.	1	1,440	Boeing Employees ARS	1	1,966	EmComm Team	1	888			
Arlington ARC	3	498	Boeing Employees ARS — St. Louis	3	3,352	Central OR DX Club	1	6,114			
Arroostook ARA	1	1,018	Boerne ARC	1	1,976	Central Toronto ARC	1	1,884			
Arrow Comm. Assn.	1	9,901	Bolingbrook ARS	3	860	Central TX DX and Contest Club	1	2,762			
			Bonner Co. ARC	2	4,398	Central VA Contest Club	2	2,564			
			Boone and Hamilton Co. ARES	1	1,545	Central VT ARC	1	1,597			
			Boonville ARC	1	2,166	Central WA ARC	1	1,626			
			Border City RC	1	960	Central WV Wireless Assn.	6	16,258			
			Boston ARC	1	6,234	Centralia ARES	1	1,716			
						Centralia Wireless Assn.	1	836			
						Chaffee Lake ARA	1	6,754			

Coweta RC	1	1,852	Edmond ARS	1	4,586	Glenn ARS	2	2,696	Hiram Percy		
Cowichan Valley ARS	1	1,058	Edmonds Woodway ARC	1	174	Gloucester Co. ARC	5	12,377	Maxim Memorial		
Cowtown ARC	1	5,872	Education Alliance for AR	1	2,546	Glynn ARA	1	4,556	Station/Meriden ARC	1	2,204
Coyote ARC	1	288	Egyptian RC	1	590	Gold Coast ARA	1	5,850	Hocking Valley ARC	3	2,432
CQ Octogenarians	1	7,852	El Dorado Co. ARC	2	3,138	Golden Empire ARS	3	3,181	Hockley Co. ARC	1	448
Crawford ARS	1	5,318	El Paso ARC	2	1,326	Golden Spike ARC	1	1,822	Hog Co. ARA	1	1,938
Crawford Co. ARC	1	1,024	El Segundo ARG	1	1,200	Goose River ARC	1	1,014	Holland ARC	1	5,796
CRES ARC	5	2,026	Elgin ARS	1	1,304	Goshen ARC	2	2,240	Holmesburg ARC	2	2,256
Crescenta Valley RC	1	492	Elk Co. ARA	1	1,522	GOTAHAMS	3	3,289	Honeywell-Glendale ARC	1	358
Crooked River Contest Club	1	750	Elkhorn Valley ARC	1	210	Graham-Conner	1	298	Hood Co. ARC	1	510
Cross Co. ARC	1	972	Elko ARC	1	3,400	Grand Mesa Contesters			Hoodview ARC	1	4,150
Cross Roads Ham RC	2	6,471	Ellsworth Amateur			of Colorado	4	3,702	Hoosier Hills Ham Club	1	1,514
CTRI Contest Grp.	4	5,780	Wireless Assn.	2	7,021	Grand Rapids ARA	2	4,014	Hop River RC	1	282
Culpeper ARA	1	2,647	Elmore Co. ARC	1	1,066	Grand Strand ARC	2	4,673	Hot Spring Co. AR Em. Net	1	570
Culver City ARES	1	1,870	EmComms Assn.			Grande Prairie Hams	1	314	Houston ECHO Soc./Oak		
Cumberland ARC	1	2,446	of St. Charles	2	1,592	Grande Ronde Radio			Forest ARC	2	4,046
Cumberland Plateau ARC	1	5,720	Emerald Coast ARA	1	178	Amateurs Assn.	1	3,946	Howell Co. ARC	1	968
Cumberland Valley ARC	2	846	Emergency ARC of HI	1	550	Granite State ARA	7	4,274	HP Alumni RC	3	3,492
Cupertino ARES	2	1,927	Endless Mountains ARC	1	3,100	Grant Co. ARC	1	250	HP Boise ARC	1	3,110
Cuyahoga ARS	2	9,176	Englewood ARS	1	820	Grassroots ARC	1	662	HPT/SPARK/PARC/NNACT	1	2,856
Cuyahoga Falls ARC	1	8,766	Enterprise ARS	1	578	Gratiot Co. Old Timers	1	1,330	HQ Doods Recreational		
CW Operators' Club	4	5,116	Escondido ARC	2	3,076	Grayson Co. ARC	1	2,126	Deployment Team	1	282
CW OPS of NY	1	1,956	Estero RC	1	2,703	Great Bay Radio Assn.	1	1,030	Hualapai ARC	2	532
Cy-Fair CERT	1	802	Etowah Valley ARC	2	1,783	Great Falls Area ARC	1	650	Hudson Valley Contesters		
Dade ARES	1	742	Eva ARC	1	752	Great River ARC	1	912	and DXers	2	4,402
Dallas ARC	3	6,154	EVQRP	1	322	Great Salt Lake			Hughes ARC	1	3,979
Dallas Co. ARES	1	674	EWEPhoria RC	1	1,060	Contest Club	1	3,962	Humboldt ARC	1	1,970
David M. Fiedler			Explorer Post 599	2	3,565	Great South Bay ARC	1	4,587	Humboldt Co.		
Memorial ARC	1	1,158	Fair Lawn ARC	2	4,736	Great Southern DX Assn.	1	3,812	AUXCOMM Team	1	304
David Sarnoff ARC	5	5,186	Fallbrook ARC	1	2,252	Greater Beloit ARC	1	2,508	Hunt Co. Packet Club	1	4,260
Daviness Co. ARC	1	124	Falmouth ARA	4	9,547	Greater Bridgeport ARC	1	4,910	Huntsville ARC	3	25,456
Davis Co. ARC	1	632	Fannin Co. RC	1	904	Green Bay Mike & Key Club	1	1,622	Hurst ARC	1	1,214
Daytona Beach ARA	1	2,645	Farrell-Gray	1	1,296	Green Valley ARC	1	1,422	Idaho Mountain ARS	1	4,488
Daytona Beach CERT			Faulkner Co. ARC	1	2,698	Greenwood ARC	2	1,302	Independent Radio Crew	1	1,776
AR Team	1	1,770	Fauquier ARA	2	6,587	Greenwood ARS	1	1,926	Indian Peaks RC	1	1,714
Decatur ARC	1	3,041	Fayette ARA	1	720	Greer ARC	1	7,969	Indian River ARC	1	1,095
Defiance Co. ARC	1	476	Federacion de Radio			Groupe de Communication			Indiana Co. ARC	1	1,839
Del Mar QRP	1	3,340	Aficionados de P.R.	1	188	d'Urgence	1	488	Indiana Co. Em.		
Delara Contest Team	1	550	Federal Way ARC	1	1,921	Groupe Radio VE2RMP	1	610	Mgmt. Agency RC	1	1,150
Delaware ARA	3	11,161	Federation of AR Ops	1	3,862	Grundy Co. ARC	2	1,868	Indianapolis RC	1	1,586
Delaware Lehigh ARC	2	1,246	Fidelity ARC	1	6,311	Grupong Magellan			Indy Midtown ARC	1	278
Delaware Repeater Assn.	1	3,854	Findlay RC	2	1,872	Organization SRT	1	916	Indy United ARC	1	20,915
Delta and Neshoba			First Baptist Church			Guadalupe Valley ARC	1	1,730	Inland Empire VHF		
ARC Memphis	2	3,316	Huntsville ARC	1	1,394	Gulf Coast ARC	2	3,046	Radio Amateurs	1	336
Delta ARS	1	3,390	First Class CW			Gwinnett ARS	1	5,916	Insurance City		
Delta Co. ARS	1	2,358	Operators' Club	1	2,450	HacDC ARC	1	1,322	Repeater Club	1	1,300
Denton Co. ARA	1	740	First State ARC	1	2,234	Haldimand Norfolk ARC	1	358	Intercity ARC	1	2,002
Denver Radio League	1	1,210	Five Flags ARA	1	2,869	Half Moon Bay ARC	4	4,368	Inverhuron Ham RC	2	1,124
Denver RC	2	3,526	Flagler Co. FL Combined			Half Wave Soc.	1	404	Iola ARC	1	1,360
Des Moines Radio			Field Day	1	2,297	Halifax ARC	2	2,514	Iowa City ARC	1	2,224
Amateurs Assn.	2	3,418	Flamingo Net	1	254	Ham Assn. of Mesquite	1	1,972	Iowa Wireless AR Network	2	3,876
Desert Creek DX'ers	1	710	Florence ARC	1	1,686	Hambuds	1	1,670	Iredell Co. ARS	1	2,352
Desert Radio Amateur			Florida Contest Grp.	14	25,602	Hamfesters RC	3	3,171	Iroquois Co. ARC	1	1,374
Transmitting Soc.	2	806	Fluvanna ARES Grp.	3	2,154	Hamilton ARC	1	2,614	Irvine Disaster EmComm	1	4,193
Desoto ARC	1	1,336	FM38 Repeater Grp.	1	10,558	Hampden Co. Radio Assn.	3	3,708	Irving ARC	3	822
Detroit ARA	1	122	Fond du Lac ARC	1	3,125	Hampstead Hams	1	2,270	Island Co. ARC	1	3,574
Detroit Lakes ARC	1	969	Foothills ARS	2	2,670	Hancock ARC	1	4,428	Islip ARG	1	754
Devanooga	1	3,932	Forsyth ARC	4	11,010	Hancock AUXCOMM Team	1	1,276	Issaquah ARC	1	384
Devils Tower ARC	1	2,158	Forx ARC	1	9,629	Hannibal ARC	1	1,545	Jackson ARC	1	4,218
DFW Contest Grp.	2	1,998	FOS Garage ARC	1	1,186	Harford Co. ARES RACES	1	2,493	Jackson Co. ARA	1	2,370
Dial RC of Middletown	2	7,447	Four Co. ARES	1	1,594	Harrisburg Radio			Jackson Co. ARES	1	2,056
Dickson Co. ARC	1	3,196	Four Lakes ARC	1	2,748	Amateurs Club	2	2,144	Jacksonville ARS	1	1,898
Dixie AR Klub	1	2,736	Fox Cities ARC	2	2,588	Hassayampa AR Klub	2	1,736	Jamestown ARC	1	1,802
Dixie ARC	1	738	Fox River Radio League	4	15,325	Hays/Caldwell ARC	1	478	Jasper RC	1	1,354
DJT Grp. ARC	1	850	Framingham ARA	3	1,064	Hayward RC	2	1,828	Jay Co. ARC	1	772
Dog Hollow Contest Grp.	1	3,250	Frankford RC	8	11,310	Haywood Co. ARC	1	4,508	Jefferson ARC	1	3,320
Douglas Co. ARC	1	1,792	Franklin Co. (ME) ARES	1	920	Hazel Park ARC	2	6,162	Jefferson Co. (MO) ARC	1	1,120
Downey ARC	2	2,294	Franklin Co. (NC) ARC	3	12,703	Healing Springs			Jefferson Co. (TX) ARC	1	4,112
Dr. Loomis Memorial Junior			Franklin Co. (VA) ARC	3	6,688	Mtn. VHF Soc.	2	954	Jefferson Co. (WA) ARC	3	992
Mechanics League	1	4,666	Franklin Lakes OEM RC	1	1,828	Heart O' Texas ARC	1	1,038	Jersey Shore ARS	3	2,845
Drake ARC	2	5,150	Frederick ARC	1	1,525	Heart of America RC	2	2,562	Jim Bell Wireless Assn.	1	1,164
Driftless Zone Contesters	2	5,376	Ft. Armstrong			Heartland DX Assn.	1	870	Jim's Farm Grp.	1	174
Drumlins ARC/Skenoh			Wireless Assn.	1	1,682	Heartland Hams ARC	2	1,658	Johnson Co. ARC	1	1,268
Island ARC	1	966	Ft. Herkimer ARA	1	2,467	Helena ARC	1	2,890	Johnson Co. Radio		
Dummy Loads	1	4,152	Ft. Madison ARC	4	3,853	Hell's Gate ARC	1	754	Amateurs Club	1	8,863
Dupage ARC	3	4,208	Ft. Myers ARC	2	5,238	Hellgate ARC	1	9,412	Johnson Space Center		
DX Marathon Club	1	4,496	Ft. Smith Area ARC	3	7,660	Henderson ARC	2	690	ARC/Clear Lake ARC	1	6,704
East Bay ARC	2	542	Ft. Venango Mike			Henry Co. ARC	1	2,726	Johnston ARS	1	976
East Greenbush ARA	4	662	and Key Club	1	1,040	Heritage Hunt Hams	3	4,340	Jones Co. ARC	1	1,636
East Pasco ARS	1	1,730	Ft. Wayne RC	4	3,144	Hernando Co. ARA	1	2,740	Joplin ARC	1	2,944
East River ARC	1	2,248	Fullerton RC	1	502	Hi-Line ARC	6	2,560	Juneau ARC	1	1,578
East TN DX Assn.	1	1,366	Fulton Co. (IL) ARC	1	10,568	Hiawatha Valley ARC	1	1,284	Juniata Valley ARC	1	950
Eastern AZ ARS	1	558	Fulton Co. (IN) ARC	1	620	Hidden Valleys ARC	1	1,392	Jupiter Tequesta		
Eastern CT ARA	2	3,326	Fulton Co. (KY) ARC	1	1,786	High Appalachian			Repeater Grp.	1	3,064
Eastern Fulmont ARC	1	2,428	Fulton Co. (OH) ARC	1	1,134	Mountain	1	3,782	K1USN RC	4	6,564
Eastern MI ARC	1	2,698	Gainesville ARS	1	1,178	High Desert ARC	1	522	Kachina ARC	1	214
Eastern NM ARC	2	732	Gallatin Ham RC	2	1,222	High Forest ARC	1	1,344	Kalamazoo ARC	1	2,104
Eastern OH Contesters	1	316	Garden City ARC	1	254	High Point ARC	2	2,744	Kanawha ARC	1	5,609
Eastern Ozarks ARC	1	2,075	Garden State ARA	3	5,484	High Sierra Field Day Grp.	1	2,166	Kankakee Area Radio Soc.	1	791
Eastern Panhandle ARC	1	1,254	Garland ARC	2	2,556	Highland ARA	1	672	Kansas City Contest Club	1	7,422
Eastern Shore ARC	2	2,334	Garrett Co. ARES	1	1,594	Highlands Co. ARC	1	258	Kansas City DX Club	1	5,868
Eastford EmComm	1	750	Gateway ARC	1	1,826	Highlands Hams	3	1,008	Kansas/Nebraska ARC	1	1,464
Easton ARS	1	2,438	GBoSH Field Day Gang	1	8,818	Highline ARC	1	1,989	KARO-ECHO	2	2,337
Eaton Co. ARC	1	1,128	Generations ARC	1	172	Hill Country ARC	1	1,260	Kauai ARC	1	2,624
Eau Claire ARC	1	702	Genesee Co. RC	1	1,456	Hillsborough Co.			Kaw Valley ARC	1	5,578
Echelon ARC	1	450	Genesee Radio Amateurs	1	1,058	ARES/RACES	1	1,278	Kay Co. ARC	1	1,404
Eddie and Joe Tech Club	1	5,650	Georgian Bay ARC	1	892	Hilltop Transmitting Assn.	1	4,280	Kendall ARS	2	284
Eden Prairie RC	1	432	German Township						Kennedy Family		
Edgefield Co. ARC	1	1,578	Field Day Team	1	902				Field Day Grp.	1	700

Kennedy Space Center ARC	1	520	Lowndes Co. ARC	1	366	Mississippi Valley ARA	1	8,447	Nixa ARC	1	6,122
Kennebec ARC	1	1,368	Lucas ARC	2	5,518	Mississippi Valley DX/Contest Club	1	262	NM SOTA Guys	1	4,980
Kent ARS	1	1,380	Lynchburg ARC	1	8,945	MIT Radio Soc.	1	3,158	NOARS/LCARRA	5	5,266
Kent Co. ARC	1	7,004	M&M ARC	1	1,718	Mizpah Shrine Radio Unit	1	3,436	North American QRP CW Club	2	1,352
Kenton ARC	1	1,234	Mabcom	1	154	Mobile ARC	2	6,600	North AR ARS	1	1,640
Kentucky Colonels ARC	2	2,606	Mackenzie Regional RC	1	473	Mohawk ARC	2	3,466	North Augusta Belvedere RC	2	3,993
Kentucky Contest Grp.	1	7,760	Macon Area Ham Radio Soc.	1	1,258	Moncton Area ARC	1	1,252	North Bay ARA	1	2,076
Kentwater ARC	2	644	Macon Co. ARC	3	5,194	Monessen ARC	1	62	North Carolina Misfits	1	7,338
Keowee Toxaway ARC	4	3,591	Macoupin Co. ARC	1	6,664	Monkey Lover's Radio Consortium	1	6,095	North Central AR ARS	1	11,792
Kern Co. Central Valley ARC	1	922	Mad River RC	4	16,710	Monroe ARC/Monroe Co. ARES	1	1,758	North Central MO ARC	1	2,212
Keuka Lake ARA	2	1,598	Madison Co. ARC	3	3,238	Monroe Co. ARS	1	1,086	North Coast ARC	1	3,040
Key City ARC	1	1,456	Mahoning Valley ARA	1	9,968	Monroe Co. Radio Comm. Assn.	2	4,762	North Country ARA	1	1,368
Keystone VHF Club	1	678	Majors Field ARC	1	440	Montachusett ARA	1	234	North East IA Radio Amateur Assn.	1	1,070
Kicked Back Contesters Club	3	2,360	Mammoth Cave ARC	1	3,542	Montana Prairie ARC	1	834	North East Tarrant ARC	1	2,418
King George AR Operators	1	1,324	Manalapan Township ARES	1	684	Monte del Estado FD Crew	1	7,930	North East WY ARA	1	2,606
Kings Point ARC	1	1,592	Manitoulin ARC	1	454	Montezuma Valley RC	1	2,854	North Eastern DX Club	1	1,266
Kingsport/Bays Mountain ARC	1	1,210	Manotick ARG	1	1,022	Montgomery ARC	8	7,732	North Franklin ARS	1	1,072
Kingston Area Amateurs	2	5,592	Mansfield-Johnson ARS	1	1,326	Montgomery ARS	1	710	North Fulton ARL	5	21,146
Kishwaukee ARC	1	2,070	Maple Grove RC	1	1,714	Montreal ARC/West Island ARC	1	3,581	North GA Tri-State ARC	2	1,184
Kitchener-Waterloo ARC	3	6,455	Maple Ridge ARC	1	802	Montrose ARC	1	4,292	North GA VHF Soc.	1	752
Kittitas Co. ARC	1	998	MARC/DECT	1	2,896	Montvale OEM	3	2,606	North Hills RC	2	2,080
Klamath Basin ARA	1	2,570	Marconi ARC	1	550	Moore Co. ARS	1	154	North Okaloosa ARC	1	1,060
Knob Hill Krew	1	2,104	of Newfoundland	1	550	Moose Jaw ARC	1	778	North Okanagan RAC	2	2,680
Koomer Ridge Contesters	1	4,298	Marin ARS	1	1,656	Mooshehorn ARC	1	2,804	North Ottawa ARC	2	3,878
Kootenai ARS	1	1,828	Marion Co. ARS	1	876	Mora Open Repeater Assn.	1	384	North Richland Hills ARC	1	2,338
Korean Ham Club	1	1,255	Maritime Contest Club	2	1,170	Morehead ARS	1	1,534	North Shore ARC (BC)	1	2,044
KP4 Expedition Grp.	1	7,128	Marple Newtown ARC/Mobile Sixers RC	2	1,456	Moreno Valley ARA	2	5,044	North Shore ARC (ON)	7	6,672
KTQA Irregular RC	1	1,804	Marshall ARC	1	1,182	Morningside Mischief Makers	1	778	North Shore RA	1	8,864
L'Anse Creuse ARC	2	4,642	Marshall Co. ARC	1	134	Morris RC/Hanover Township OEM	1	4,158	North Shore RC (IL)	3	12,729
LA CQ Club	1	750	Marshall's Minions	1	4,208	Morrow Co. Amateur Radio Svc.	1	1,354	North TX ARS	1	182
LA Fire Dept. ACS	1	66	Maryland Mobileers ARC	1	1,470	Motor City RC	1	3,342	Northeast AR RC	1	250
Lafayette DX Assn.	1	5,118	Masonic Village ARC	1	2,452	Motorola ARC	2	3,272	Northeast ARC	1	4,556
Lake Agassiz RC	1	2,864	Massillon ARC	2	3,126	Mound ARA	4	3,776	Northeast LA ARC	1	4,848
Lake ARA	1	12,978	Matagorda Co. ARC	1	1,678	Mountain ARC	1	3,324	Northeast MD AR Contest Soc.	2	1,092
Lake Area AR Klub	12	6,512	Maui ARC	1	3,493	Mountain State Transmitters	1	1,957	Northeast MO ARC	1	1,144
Lake Area Radio Klub	1	6,700	Maurice River Rain Dogs ARC	1	744	Mountain Toppers	1	1,476	Northeast MS Radio Amateurs	1	2,462
Lake Chelan ARC	1	338	Mayerthorpe Flying Tigers	1	1,052	Mountaineer ARA	2	9,956	Northeast OK Radio Amateurs	1	116
Lake Co. ARA	1	4,468	Mayfield Graves Co. ARS	1	604	Mt. Diablo ARC	1	2,814	Northeast WI ARC	1	2,150
Lake Co. RACES/ARES	1	3,321	McDowell ARA	1	4,822	Mt. Magazine ARC	1	1,310	Northeastern IN ARA	5	6,112
Lake Conroe ARC	2	1,440	McHenry Co. Wireless Assn.	1	7,593	Mt. Shasta ARC	1	754	Northern AZ DX Assn.	1	2,368
Lake Cumberland ARA	1	386	McKean Co. ARC	1	638	Mt. Tom Amateur Repeater Assn.	1	1,365	Northern CA Contest Club	3	2,136
Lake Monroe ARS	1	6,520	McKinney ARC	6	7,492	Mt. Vernon (OH) ARC	1	3,204	Northern CO ARC	1	586
Lake of the Ozarks ARC	1	2,102	McMinn Co. ARC	1	2,092	Mt. Vernon (VA) ARC	1	1,448	Northern IL Quad Co. ARG	1	552
Lake Oswego ARC	1	690	McMinnville ARC	4	3,222	Muhlenberg ARS	1	416	Northern Kentucky ARC	1	2,335
Lake Region ARC	1	2,688	Means/Snyder Family	1	1,018	Muncie Area ARC	1	1,470	Northern Lakes ARC	4	2,961
Lake Whitney ARS	1	1,548	Mecklenburg ARS	2	5,102	Murgas ARC	1	1,869	Northern Lights Radio Soc.	1	126
Lakeland ARC	1	4,630	Medina Co. AR Corp.	1	2,498	Murray State Univ ARC	1	3,038	Northern New England Field AR Ops	1	1,180
Lakes Region Repeater Assn.	1	2,086	Medina Co. ARC	1	4,846	Muscle Shoals ARC	1	6,079	Northville ARA	1	408
Lakeshore ARA	1	1,292	Mel Mabry Memorial ARC	1	928	Muskegon Area AR Council	1	2,108	Northwest ARS	2	7,799
Lambton Co. RC	2	2,145	Melfort Repeater Grp.	1	872	Muskogee ARC	1	13,319	Northwest IL RC	1	1,002
Lamorinda Area Radio Interest Grp.	3	1,950	Mercer Co. ARC	1	3,376	N4N Field Day Grp.	1	4,707	Northwest IN DX Club	1	774
Lanark North Leeds ARES	1	2,145	Mercury Net	1	272	Nacogdoches ARC	1	1,674	Northwest OH ARC	1	1,400
Lancaster ARC	1	3,346	Meriden ARC	7	3,810	Nanaimo ARA	1	2,238	Northwest OH VHF ARS	1	2,526
Lancaster Co. ARES	1	1,882	Meridian ARC	1	2,366	Nanticoke ARC	1	596	Not Case ARC	1	7,086
Land of Lakes ARC	1	1,168	Merrymeeting ARA	1	1,032	Narwhal ARS	1	1,700	Not Quite Workable Contest Club	1	4,554
Langleigh ARA	1	380	Mesa Co. ARES	1	410	NASA Marshall Space Flight Center ARC	1	2,804	Nurosa's Gopher Munchers	1	2,240
Lapeer Co. ARA	2	3,001	Mesabi Wireless ARC	1	760	Nashoba Valley ARC	1	4,832	NWI DX Club	2	1,172
Larkfield ARC	3	5,850	MESAC/Costa Mesa RACES	1	1,112	Nashua Area Radio Soc.	3	6,834	NXP ARC	1	1,888
Las Moras ARC	1	876	Mesilla Valley RC	2	3,066	Nashville ARC	1	1,154	Oak Forest ARC	1	318
Laurel ARC	1	1,014	Metro DX Club	3	6,259	Nassau ARC	1	3,546	Oak Hill ARC	1	2,400
Le Club de Radio Amateur de VE2CVA	1	752	Metro North Railroad ARA	1	488	National Electronics Museum ARC	1	4,200	Oak Mountain QRP Daredevils	1	6,175
Lebanon Valley Soc. of Radio Amateurs	1	920	Metrocrest ARS	2	3,237	National Trail ARC	1	1,315	Oak Ridge ARC	1	2,154
Lee Co. EOC	1	568	Metropolitan ARC	1	726	Naturist ARC	1	1,102	Oakland Co. ARS	1	7,661
Leflore Co. Comm. Support Team	1	250	Metuchen RC	1	824	Navarro ARC	1	274	Oakland Radio Comm. Assn.	1	1,868
LEFROG/MAARS	1	5,324	MGRA/CGARC	1	6,718	NC TRI-CLUB	1	5,086	Ocean Monmouth ARC	1	4,456
Lehigh Valley ARC	2	3,666	Mich-A-Con ARC	1	2,025	NCTAMS PAC	1	886	Ocean State ARG	1	446
Lenoir ARC	1	2,878	Michiana ARC	1	4,471	NE TN District 7 SKYWARN	1	640	Ogden ARC	1	1,962
Lewis and Clark RC	1	1,732	Michigan QRP Club	1	1,890	NE TX QRP Contest Fed.	1	7,650	Ogemaw Arenac ARS	1	823
Lewisville ARA	1	4,260	Michigan State Univ. ARC	1	330	NEIA Red Cross AR Assn.	1	622	Oh-Ky-In ARS	4	9,951
Liberty Co. ARES	1	712	Mics & Beers	1	4,353	Nemaha Co. AR Org.	1	482	Ohio Valley ARC	1	880
Limestone ARES	1	1,664	Mid Island Radio Assn.	1	1,526	NEMO ARC	1	350	OK Rovers	1	1,658
Lincoln ARC	1	2,340	Mid-Atlantic ARC	1	1,896	Neos ARA	1	370	Okaw Valley ARC	2	7,474
Lincoln Co. ARA	1	2,004	MID-MO ARC	2	5,112	New England Fusion Grp.	1	304	Oklahoma City Autopatch Assn.	1	3,945
Lincoln Co. ARC	1	424	Mid-State ARC	1	1,072	New England Radio Discussion Soc.	1	2,794	Old Barney ARC	2	1,712
Lincoln Co. RACES	1	1,056	Middle Peninsula ARC	1	3,146	New Jersey Antique RC	1	2,106	Old Times Ham RC	1	514
Lincoln Hills ARG	1	3,329	Middle TN ARC	1	3,161	New Providence ARC	3	4,508	Ole Virginia Hams	1	3,336
Lisbon Area ARA	2	3,004	Middlesex ARS	1	1,644	New River Valley ARC	1	2,410	Olive Branch ARC	1	2,252
Live Free or Die	1	402	Midwest Field Day Grp.	1	13,490	Newark ARA	1	202	Olympia ARS	2	382
Livingston Co. AR Klub	1	3,418	Midway ARC	1	1,642	Newaygo Co. Amateurs	1	818	Oneula Beach Expedition	1	934
Livonia ARC/Ford ARL	2	11,132	Midwest ARC	2	2,522	Newport Co. RC	2	15,646	Onslow ARC	1	2,652
Lockport ARA	1	1,308	Midwest ARS	1	734	Newton ARA	1	338	Orange ARC	1	1,068
Lodi ARC	2	1,462	Mike & Key ARC	4	23,286	Newton ARC	1	2,340	Orange Co. (CA) ARC	2	19,567
Logan Utah Central Stake	1	764	Milky Way Wireless Club	1	966	NHRC ARS	1	2,094	Orange Co. (IN) ARC	5	6,240
London ARC	4	3,482	Milton ARC	1	1,014	Niagara Frontier Radiosport	7	12,336	Orange Co. Radio Amateurs and Durham FM Assn.	3	8,090
Long Island Mobile ARC	1	5,656	Milwaukee Radio Amateurs' Club	1	1,881	Niagara Peninsula ARC	5	3,125	Orange Park ARC	1	2,834
Longmont ARC	2	2,146	Milwaukee School of Engineering ARC	1	1,959	Niagara RC	1	954	Orca DX and Contest Club	3	4,928
Longview East Texas ARC	1	986	Mine Creek ARC	1	986	Nittany ARC	4	4,228			
Los Alamos ARC	1	644	Mining ARC/St. Paul RC	2	3,940						
Los Angeles City ACS	1	3,636	Minnesota Wireless Assn.	8	5,390						
Loudoun ARG	1	3,239	Minnetonka ARC	1	156						
Low Country Contest Club	1	1,844	Mississauga ARC	1	7,594						
			Mississippi Coast ARA	1	2,148						

Order of Boiled Owls of NY and Radio Central ARC	3	10,308	Putnam Em. Amateur Repeater League	2	2,218	San Clemente Island RC	1	1,272	South Georgian Bay ARC	1	2,894
Oregon Tualatin Valley ARC	3	8,084	QRP Pals	2	11,760	San Diego Imperial Co. Chapter American Red Cross	1	556	South Hill Contest Club	1	3,186
Orlando ARC	1	3,218	QSY Soc.	1	1,401	San Fernando Valley ARC	5	2,638	South Jersey Radio Assn.	3	21,494
Orleans Co. ARC	2	5,525	Quaboag Valley ARC	2	732	San Francisco RC	2	1,735	South Lyon Area ARC	1	2,998
Oro Valley ARC	2	3,925	Queen Anne's ARC	4	3,080	San Jose ARES/RACES	3	1,366	South Mountain Radio Amateurs	3	2,934
Orrville ARS	1	1,988	Queen City Em. Net	1	2,500	San Jose EOC	1	6,208	South Orange ARA	1	4,143
Osage Co. ARC	1	598	Quinte RC/Prince Edward RC	1	2,432	San Juan Co. ARS	2	810	South Plainfield ARC	1	5,135
Ottawa ARC	1	5,180	Radio Activity of Savannah	1	482	San Luis Valley ARA	1	1,464	South Side ARC	1	996
Ottawa Co. ARES	1	2,015	Radio Amateur Soc. of Norfolk	1	2,120	San Mateo RC	1	5,615	South Texas ARC	1	526
Ottawa Valley Mobile RC	4	6,234	Radio Amateurs of Corry	1	62	Sandia Vista ARC	1	2,406	South Texas Rovers	1	7,130
Ottawa Valley QRP Soc.	1	1,515	Radio Amateurs of Greater Syracuse	1	4,956	Sandusky Radio Experimental League	1	1,196	South Wake ARC	4	1,174
Overlook Mountain ARC	2	3,212	Radio Amateurs of Manitoba/Winnipeg	1	1,708	Sandy ARC	1	1,232	South West Idaho ARC	1	3,333
Owatonna Steele Co. ARC	1	5,978	Radio Amateurs of Senior Citizens RC	1	1,708	Sangamon Valley RC	1	2,428	Southborough Rod & Gun ARC	1	892
Owensboro ARC	1	1,814	Radio Amateurs of Northern VT	2	23,116	Sangre de Cristo ARC	1	2,159	Southeast LA ARC	4	1,621
Oxford Co. ARES	1	938	Radio Amateurs of Skagit Co.	1	1,874	Santa Barbara ARC	1	2,839	Southeast MN ARC	1	904
Ozark Mountain ARC	1	1,447	Radio Assn. of Erie	1	4,930	Santa Clara Co. ARA	3	1,938	Southeastern CT ARS	1	3,736
Ozaukee RC	4	12,911	Radio Assn. of Western NY	1	2,224	Santa Clarita ARC	1	828	Southeastern MA ARA	1	960
Ozone ARC	3	1,482	Radio Club of Redmond	1	1,254	Santa Fe Trail ARC	1	2,694	Southern AR	1	1,074
Paducah ARA	6	9,666	Radio Club of Tacoma	2	5,384	Sarasota Em. RC	1	862	Experimenters Club	1	1,074
Page Valley ARC	1	3,300	Radio Operadores Del Este	1	2,322	Saratoga Co. ARA	2	2,222	Southern AR Union	1	1,178
Palms West ARC	1	1,422	Radio Operators Assn. of Dallas	1	1,310	Sask Altia RC	1	1,899	Southern Berkshire ARC	1	674
Palo Alto ARA	2	6,708	Radio Operators of Camden Co.	1	664	Saskatoon and District ARA	1	1,962	Southern CA Contest Club	6	4,790
Palomar Mtn. WFD	1	3,014	Rainbow Canyon ARC	1	1,632	Sawnee ARA	1	8,001	Southern Counties ARA	3	4,860
Palos Verdes ARC	3	2,902	Raleigh ARS	2	21,324	SC4 ARC	2	3,610	Southern IN Tri-Co. Club	1	632
Palouse Hills ARC	1	1,557	Ramona Outback ARS	1	1,656	SCAN/Red Ant Annihilators	1	2,474	Southern KY AR Transmitting Soc.	1	3,400
Pamlico ARS	3	2,892	Randallstown ARC	1	12,028	Scarborough ARC	1	2,062	Southern OH Friends of AR	1	2,074
Panama City ARC	2	5,366	Randolph Co. Em. RC	1	2,472	Scharks Ham Fam	1	4,305	Southern PA ARC	2	1,588
Panhandle ARC	1	4,664	Rappahannock ARA	1	4,558	Schaumburg ARC	2	5,026	Southern PA Comm. Grp.	1	2,370
Panoramaland ARC	3	5,944	Rappahannock Raiders	1	362	Schuykill Amateur Repeater Assn.	1	3,690	Southern Sands ARC	1	1,744
Parker Radio Assn.	4	3,742	Rappahannock Valley ARC	1	9,378	Sci-Tech ARS	1	500	Southern VT ARC	1	2,725
Parkersburg AR Klub	2	3,670	Raritan Bay Radio Amateurs	1	1,274	Scioto Valley ARC	1	1,146	Southington ARA	1	1,258
Parkland ARC	1	644	Raytown ARC	1	76	Scotsdale ARC	1	1,818	Southtown ARS	1	2,162
Parma RC	1	752	Reading RC	2	3,732	Scranton-Pocono AR Klub	1	2,582	Southwest Columbus Ham RC	1	1,014
Parsippany-Troy Hills RACES	1	1,236	Red Mountain Radio Amateurs	1	1,270	Seaway Valley ARC	1	2,745	Southwest Community Radio System	1	1,300
PART of Westford	6	12,081	Red River Radio Amateurs	2	4,194	Sedalia Pettis AR Klub	1	1,770	Southwest Dallas Co. ARC	3	5,479
Pasadena RC	17	18,801	Red River Valley ARC	1	2,678	Sedan ARC	1	6,700	Southwest IA ARC	2	1,864
Paso Robles ARC	2	5,273	Red Rose Repeater Assn.	1	1,063	SEDARES	1	356	Southwest MS ARC	1	1,818
Pathfinders ARC	1	2,336	Redwood Empire DX Assn.	1	3,474	Seneca RC	1	3,746	Southwest Radio Grp.	1	4,774
Patoka Valley ARC	3	2,956	Reelfoot ARC	1	8,118	Sequoia ARG	1	468	Spa ARA	1	1,312
Paulding Co. ARC	1	2,442	Remote Base Contest Club	1	1,484	Sevier ARC	1	492	Space Coast ARS	1	430
Peak Radio Assn.	1	2,072	Renewal	1	1,950	Shelby ARC	2	2,131	SPARC	1	1,006
Peconic ARC	2	1,442	Renfrew Co. ARC	1	826	Shelby Co. ARC	1	6,386	SPARGE	1	760
Pecos Co. ARC	1	64	Reno Co. (KS) ARA	1	3,194	Shelby Co. ARES	1	462	Spartanburg ARC	2	4,436
Peekskill Cortlandt ARA	1	3,090	RF Hill ARC	2	3,562	Shenandoah Valley ARC	2	1,202	Special Purpose ARC	1	108
Pella ARC	1	532	Richardson Wireless Klub	23	12,163	Sherlock ARA	1	310	Spirit Mountain ARC	1	1,086
Pen Bay ARC	2	3,407	Richfield RC	1	1,454	Shingle Mill Hill Contesters	1	1,562	Splinter Grp. ARC	3	3,130
Penn Wireless Assn.	2	4,929	Richmond Amateur Telecom. Soc.	1	802	Shreveport ARA	5	2,050	Splitrock ARA	1	1,348
Pentagon ARC	1	720	RICOMU/RIEMA	1	4,805	Shy-Wy ARC	2	3,550	Spokane DX Assn.	1	3,362
Perry Co. ARC	1	738	Ridge ARC	1	1,278	Sierra ARC of the High Mojave	1	1,982	Spout Springs Repeater Assn.	1	1,984
Peterborough ARC	1	2,248	Ridge Runners RC	1	8,950	Sierra Foothills ARC	10	17,625	Springhill Repeater Assn.	1	4,354
Phil-Mont Mobile RC	4	5,759	Rip Van Winkle ARS	1	810	Sierra Intermountain Em. Radio Assn.	1	648	SSF Fire CERT	1	320
Phillips Co. ARC	1	1,622	River Bend Wireless Operators Club	1	8,425	Sierra Nevada ARS	2	4,930	St. Augustine ARS	1	558
Pickens Co. Comm. Grp.	1	378	River City AR Comms. Soc.	1	880	Signal Hill ARC	2	13,120	St. Charles ARC	2	2,556
Piedmont ARC	10	15,977	River City ARC	1	2,762	Silver Comet ARS	5	3,938	St. Clair ARC	1	3,318
Piglet Radio	1	8,183	River Hills ARC	1	954	Silver Springs RC	5	5,470	St. Cloud ARC	1	1,374
Pikes Peak Radio Amateur Assn.	1	2,835	Riverland ARC	1	4,059	Silvercreek ARA	2	5,448	St. Croix ARC	1	2,708
Pilgrim Amateur Wireless Assn.	1	4,495	Riverside Co. ARA	1	3,994	Simpson Co. ARS	1	910	St. Croix Valley ARC	1	1,642
Pilot Knob ARC	1	2,873	Roanoke Valley ARC	1	1,920	Sioux Empire ARC	1	3,690	Radio Amateurs	1	1,052
Pine Belt ARC	1	8,040	Rochester (MN) ARC	3	1,672	Skamania Co. ARES	1	1,448	St. Louis and Suburban RC	1	2,676
Pine State ARC	3	1,098	Rochester (NY) DX Assn.	1	15,562	Ski Country ARC	1	4,656	St. Louis ARC	1	7,482
Pioneer ARC	1	1,448	Rochester DX and Contest Club	1	1,164	Sky Valley ARC	1	454	St. Louis QRP Soc.	6	9,826
Pioneer Radio Operators Soc.	1	572	Rockingham Co. ARC	1	1,852	Skyline ARC	1	1,122	St. Mary's ARC	1	220
Pioneer Valley RA	1	1,316	Rockwall ARC	1	2,430	Skyline RC	1	1,252	St. Mary's Co. ARA	1	2,370
Pioneer Valley Radio Assn.	1	1,384	Rocky Mountain Ham Radio	5	16,951	Skyline Tower ARC	1	730	St. Paul RC/Mining RC	1	278
Piscataquis ARC	1	2,644	Rolla Regional ARS	1	2,702	Skyview Radio Soc.	4	9,574	St. Petersburg ARC	1	6,796
Plano AR Klub	3	1,668	Rome RC	1	1,734	Skywide ARC	2	2,378	Stamford ARA	1	4,682
Platinum Coast ARS	1	7,123	Rowan ARS	3	4,608	Small Town ARS	1	1,650	Stanislaus ARA	1	1,830
Platte Co. ARG	1	2,766	Royal Gorge ARC	1	2,438	SMARTS RC	1	3,399	Stanly Co. ARC	1	1,478
Plattsmouth ARC	1	1,338	Ruckerville Amateur Transmitting Soc.	2	2,190	Smithchart ARS	2	9,732	Stanwood-Camano ARC	1	9,008
Playground ARC	1	1,114	Runestone ARC	1	2,138	Smithsonian ARG	1	1,260	STARS ARC	4	1,793
Point Loma Radio Ops. Grp.	1	6,150	Sabin Field Day	1	1,812	Smokin Hot Radio ARC	1	422	State Line RC	1	996
Pontotoc Co. ARA	1	492	Sachse ARA	1	266	Smoky Mountain ARC	3	5,490	Statesboro ARS	2	1,378
Pony Express Re-Ride Radio Relay Station	1	624	Saginaw Valley ARA	2	4,984	Snake River ARC	1	2,410	Steel City ARC	1	2,884
Port City ARC	5	8,140	Saguaro Nights ARC	1	2,075	Snohomish Co. Hams Club	4	2,942	Sterling Park ARC	1	4,199
Portage Co. ARS	3	13,754	Salem ARC	1	3,634	Snoqualmie Valley ARC/Issaquah ARC/ICC/ICST	1	2,006	Steubenville-Weirton ARC	2	3,863
Portland ARC	1	7,375	Salkehatchie ARS	4	5,174	Snoring Beagle Ranchers	1	1,562	Stillwater ARA	2	2,370
Portsmouth RC	1	1,604	Salt Spring Island ARS	3	2,272	Soc. of Midwest Contesters	5	6,110	Stillwater ARC	1	716
Potomac Valley RC	19	65,108	Salvation Army SATERN	1	720	Socorro ARA	1	2,960	Stone Tower Creek RC	1	362
Pottstown Area ARC	4	4,413	Sam Houston AR Klub	1	1,222	Solivita RC	1	3,578	Story Co. ARC	1	4,039
Poway ARS	1	1,316	Samuel F. Morse ARC	1	682	Somerset Co. ARC	1	3,692	Straight Key Century Club	1	144
Powhatan Area RC	1	1,214	San Angelo ARC	1	1,194	Something Awful ARS	1	718	Stubblefield Repeater Club	1	3,380
Prairie Dog ARC	1	13,230	San Antonio RC	1	2,682	Sooland ARA	1	1,284	Suburban UHF Amateur Repeater Soc.	1	1,260
Preble ARA	1	1,249	San Benito Co. ARA	3	1,798	SOTA LEOs	1	942	Sudbury ARC	1	4,175
Prescott-Russell ARC	1	652	San Bruno ARC	1	1,238	Souris Valley ARC	1	4,644	Summit Co. ARS	1	4,481
Pride Radio Grp.	1	180				South Alabama RC	1	1,420	Sumter ARA	1	3,923
Princeton Ham RC	1	1,192				South Bay ARA	4	3,677	Sun City ARC	1	3,580
Prose's Posse	1	4,952				South Bay ARC	3	812	Sun City Center ARC	1	1,660
Providence EMA RACES	1	1,385				South Carroll ARG	2	1,678	Sun City Hilton Head ARC	1	1,494
Providence Radio Assn.	1	10,520				South East Metro ARC	1	3,938	Sun Country ARS	2	8,356
PSRG/WSARC/Seattle ACS	1	3,836				South GA ARC	1	3,400	Sun ParLOUR ARC	1	7,618
Pueblo West ARC	1	1,422							Suncoast ARC	1	354
Puerto Rico Contest Team	1	1,062									
Putnam Co. AUXCOMM	1	478									



John Sager, WJ7S, operated along the Strawberry Reservoir in Utah. [John Mitton, KK7L, photo]

Sunnyvale ARES	2	3,060	Toledo Radio Amateur Club	1	1,298	Ventura Co. ARC	3	6,692	West Point Fire CERT	1	1,499
Sunset Empire ARC	1	886	Tom's Garage ARC	1	11,221	Ventura Co. ARS/Simi			West River RC	1	738
Superstition ARC	2	4,856	Tompkins Co. ARA	1	2,694	Settlers ARC	1	6,044	West TN ARS	4	1,836
Surrey AR Comms.	1	6,640	Tonto ARA	1	1,202	Vermilion Co. ARA	1	1,924	West TN Field Day Grp.	1	3,421
Susquehanna Co. ARC	1	1,700	Top of Michigan ARC	1	398	Vermilion Range ARC	1	1,404	West VA AR	1	3,752
Susquehanna Valley ARC	1	5,306	Tortolita RC	11	11,764	Vero Beach ARC	1	2,484	West Valley ARA	2	24,592
Sussex ARA	2	588	Traveling AR Team	1	1,456	Victoria ARC	1	722	West Valley ARC	2	2,068
Sussex Co. ARC	1	11,254	Treasure Valley Radio Assn.	1	1,756	Victoria-Haliburton ARA	2	970	West Virginia Univ.		
Suwannee ARC	1	2,358	Tri Co. ARC (GA)	1	3,968	Vienna Wireless Soc.	1	7,736	ARC/Monongalia		
Swamp Fox Contest Grp.	7	6,044	Tri Co. ARC (WI)	3	4,084	Vigo Co. EmComm Team	1	576	Wireless Assn./Monongalia		
Sweet Fruits On Air ARC	1	552	Tri Co. Radio Assn.	1	2,660	Vilas Co. ARC	1	2,580	Co. ARC	1	1,634
Sweetwater ARC	1	1,342	Tri State ARS	1	5,471	Villa Rica RC	2	460	Westchester		
Tallahassee ARS	1	7,653	Tri-Co. ARC (NC)	1	306	Village 7 ARC	3	1,474	EmComm Assn.	2	4,635
Tamaqua Wireless Assn.	2	1,802	Tri-Co. ARC (PA)	3	898	Virgin Valley ARC	3	3,493	Westcoast ARA	1	3,622
Tamiami ARC	2	4,492	Tri-Co. ARC (TX)	1	354	Virginia Beach ARC	3	8,188	Western Carolina ARS	1	1,506
Tampa ARC	1	5,418	Tri-Lakes ARC	2	2,598	Virginia Beach			Western CO ARC	1	1,282
Tarboro RC	1	1,510	Tri-State ARA	1	1,836	ARC/Virginia DX			Western Division SATERN	1	2,136
Tazewell Co. ARS	1	946	Tri-State ARG	1	1,530	Century Club	2	580	Western Hemisphere		
Team Billy Goat	1	1,172	Tri-States ARC	1	1,888	Virginia Mountain ARC	1	3,260	Amateur Contest Club	1	2,075
Team Ferret	1	512	Tri-Town RAC	5	5,649	Voice of Idaho RC	1	3,831	Western IL ARC	2	1,916
Team Montrose	2	1,420	Triple A ARA	1	616	W/K ARC of Greater			Western KS ARC	1	216
Team Oonitos at			Troy ARA	1	1,206	Milwaukee	1	5,018	Western Piedmont ARC	2	2,684
Camp Motzi	1	160	Tulsa ARC	1	2,812	W4IBM ARC	1	676	Western Placer ARC	1	842
Ted's Family Farm Grp.	1	3,910	Turkey Heaven Mtn.			W6TRW ARC	1	9,665	Western Reserve ARC	1	4,071
Tehachapi ARA	1	1,728	Repeater Assn.	2	3,030	Wabash Valley ARA	1	3,532	Western Tidewater		
Temple ARC	2	3,444	Tusco ARC	3	1,050	Wahkiakum Co. ARC	1	1,024	Radio Assn.	1	1,272
Tennessee Contest Grp.	5	4,654	Twin Cities Repeater Club	1	1,362	Waldo Co. ARA	1	3,952	Westmoreland ARC	1	1,516
Tennessee Valley			Twin City FM Club	1	1,384	Wall Lake Hams	1	292	Westport Astro		
Contest Club	1	1,818	Twin Rivers ARC	1	498	Walton Co. Repeater Grp.	1	1,508	ARC/Housatonic A		
Tennessee Valley DX Assn.	1	6,798	Twin State RC	1	1,568	Warminster ARC	3	3,193	RC/Greater Fairfield ARA	1	4,430
Terrible Twos	1	6,134	Twisted Arrow Contest Club	1	1,002	Warren ARA	1	6,374	Westside ARC	1	706
Texas DX Soc.	1	616	Two Rivers ARC			Warren Co. EmComm Grp.	1	624	Wexauke ARC	1	1,528
Texas Em. Amateur			of McKeesport	1	3,552	Warren Co. RC	1	4,164	White River Radio		
Communicators	2	1,300	Tyler ARC	1	6,794	Warrensburg Area ARC	1	1,700	Comm. Grp.	1	3,967
The 220 MHz Guys	1	1,268	UCLA ARC	1	272	Wasco ARS	1	546	White Rock Lake ARC	1	946
The 415 ARC	1	6,797	Ulster & Northern			Washington			Whitley Co. ARC	1	2,958
The 570-V Connection	1	3,678	Dutchess Readiness Grp.	1	2,055	Amateur Comm.	1	3,844	Whitman ARC	1	2,112
The Albemarle ARS	1	1,143	Union Co. ARC	2	7,452	Washington Area ARC	1	1,490	Who Cares ARG	2	1,314
The Albuquerque Bois	1	692	Union Metropolitaine des			Washington Co. ARC	2	7,440	Wichita ARC	1	1,690
The Beekers	1	500	Sans-filistes de Montreal	1	3,382	Watauga ARC	1	360	Wichita ARS	1	2,830
The Berwick Contest Team	1	6,488	Uniontown ARC	1	4,188	Waterbury ARC	1	252	Willamette Valley DX Club	1	264
The FPL Grp.	1	244	United Radio Amateur Club	1	9,414	Watertown ARS	1	1,180	Williams Co. ARA	1	768
The Kansas Antenna Club			Univ. of Alabama RC	7	2,634	Watertown ARC	1	808	Williamsburg Area ARC	1	6,842
in Johnson Co.	2	2,820	Univ. of Arizona ARC	1	1,022	Waupaca Co.			Williamson Co. ARC	2	5,090
The Noise Blankers			Univ. of Michigan ARC	1	980	ARES/RACES	1	794	Williamson Co. ARES	2	2,859
Radio Grp.	1	3,074	Univ. of Southern			Wayne ARC	7	7,786	Wilson ARC	2	3,088
The Olympia ARS	1	1,925	California ARC	1	638	Wayne Co. ARC	1	5,710	Wilsons Wonders	1	7,470
The Unreal RC	1	1,974	Upper Canada QRP Club	1	3,675	Waypoint ARC	1	658	Windmill ARG	1	3,148
The Villages ARC	1	1,740	Upshur Area ARC	1	1,330	WCARES Contest Grp.	7	6,073	Winona ARC	2	2,638
The Whiskey Delta			Utah ARC	1	4,060	WD6BNY Team	1	1,946	Wiregrass ARC	1	1,732
Contest Grp.	1	3,096	Utah DX Assn.	1	586	Wellesley ARS	2	810	Wireless Assn. of		
The World RC	1	1,390	Utah Valley ARC	4	9,983	West Alabama ARC	1	1,374	South Hills ARC	3	2,126
Thermal Belt ARC	1	2,185	Utica ARC	1	2,004	West Allis RAC	6	5,702	Wireless Soc. of		
Thibodaux ARC	1	1,836	Utica Shelby			West Baldwin City ARC	1	1,990	Lorain Co.	1	900
Thousand Islands RC	1	2,858	EmComm Assn.	2	1,730	West Carroll	1	3,362	Wireless Soc. of		
Thunder Bay ARC	1	1,182	Vaca Valley RC	1	2,335	West Chester ARA	3	2,408	Southern ME	1	9,326
Thunderbird ARC	2	4,330	Valencia Co. ARA	1	2,650	West Coast Crudders	1	366	Wisconsin Valley		
Thunderhawks ARC	1	342	Valley and			West Desert ARC	1	590	Radio Assn.	1	966
Tidelands ARS	1	1,326	Massanutten ARA	4	9,999	West Essex ARC	2	3,418	Wistaria Wireless Soc.	1	1,556
Tie Siding WY ARRL FD	1	4,934	Valley of the Moon ARC	2	2,372	West Fork ARC	1	7268	Wood Co. ARA	1	1,610
Tippecanoe ARA	1	4,186	Valley RC of Oregon	2	4,800	West Georgia ARS	1	3,102	Wood Co. ARC	2	1,262
Tipton ARS	1	863	Van Wert ARC	1	4,010	West Kootenay ARC	1	394	Wood Co. ARES/RACES	1	2,488
TLSC Ham Radio Grp.	1	812	Vashon Maury Islands RC	1	204	West MI Repeater Assn.	1	980	Woodbridge Wireless	3	11,747
Toledo Mobile Radio Assn.	4	1,310	VE6FAR Cycle 25	3	1,184	West Palm Beach ARG	1	1,999	Woodford Co. ARC	1	1,112