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FT-710 AESS

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FT-710 Field

- Includes Carrying Belt
- To use the AESS 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 AESS

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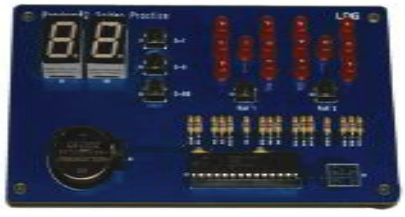

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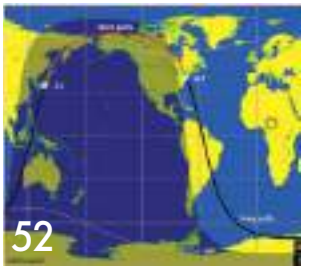
Our Cover
The holiday cheer on this month's cover is courtesy of Ted Holland, WB3AVD, who says, "I've spent the last dozen years doing little more than building strange, exotic telegraph keys." In that time, Ted has designed and built more than 100 unusual keys, most of which he has used on the air. 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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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				
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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
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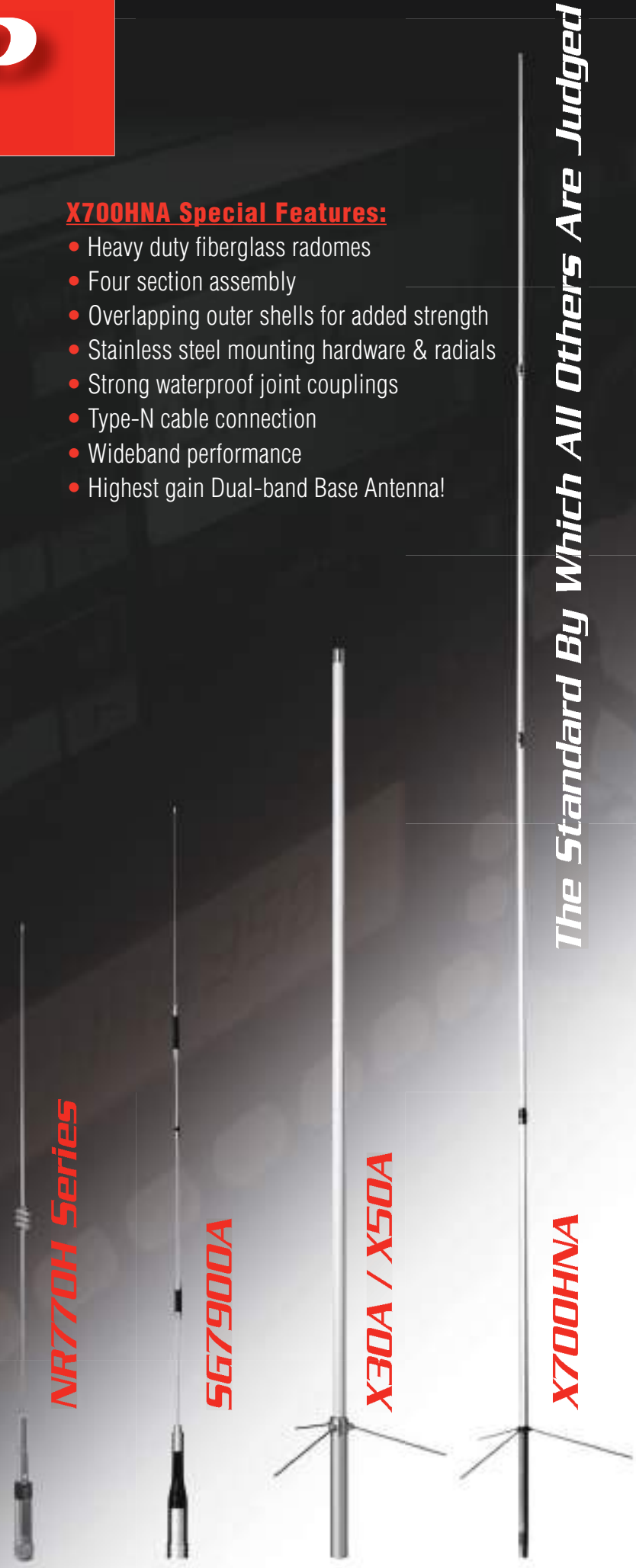

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David A. Minster, NA2AA, ARRL Chief Executive Officer, na2aa@arrl.org

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, KØCA, 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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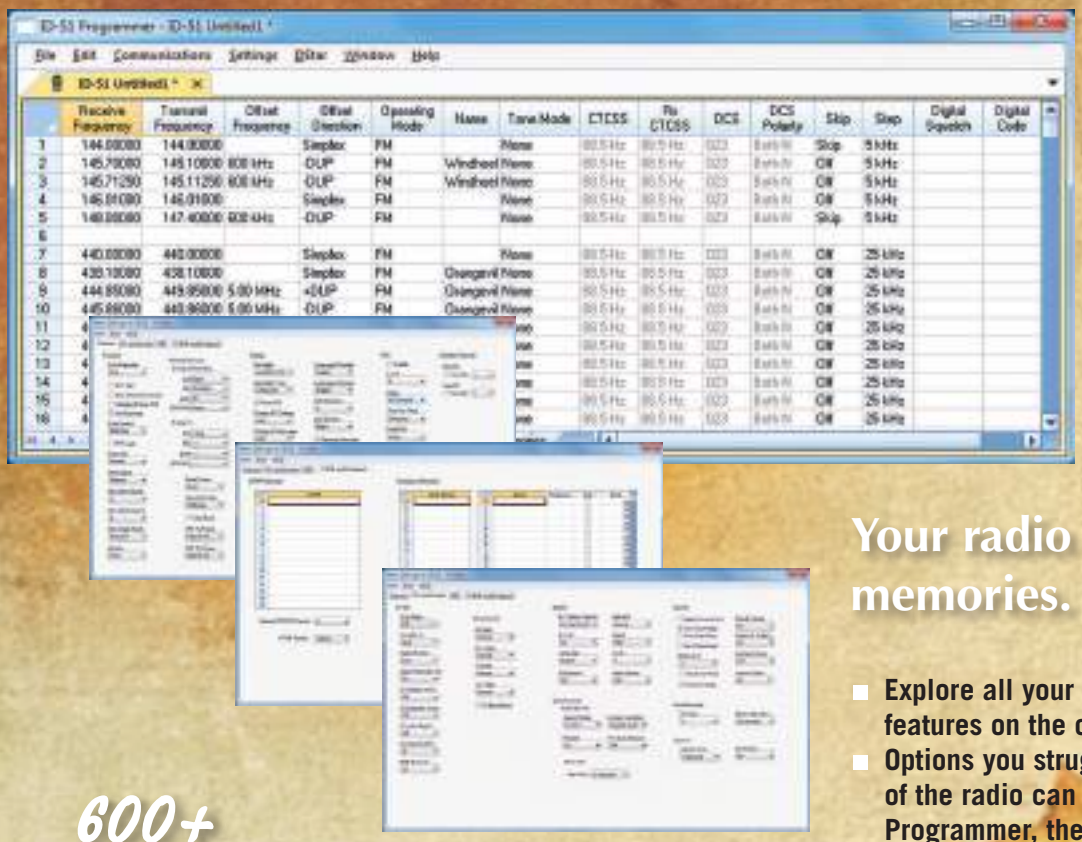

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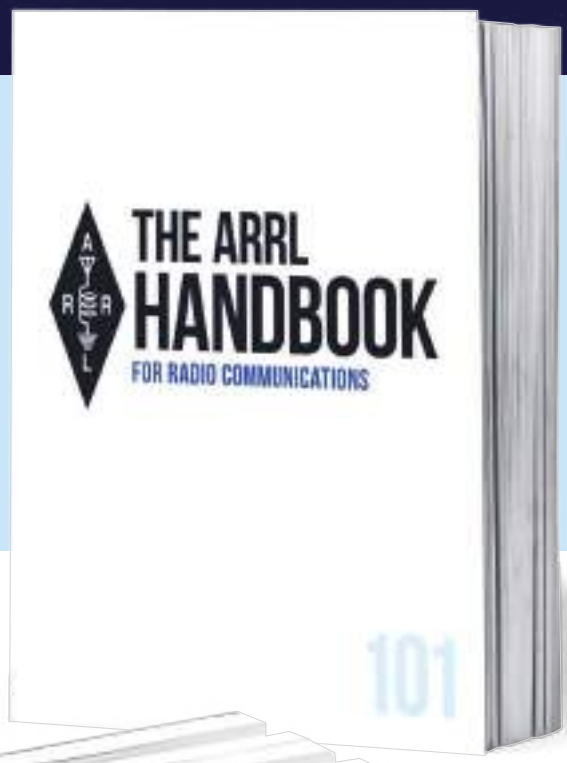

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Member Spotlight

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, WØSGR, 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. "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 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.

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

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

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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]

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]

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]

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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 something 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

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QST Dec 2019 review *"easy-to-use device that improves the audio clarity of amateur signals"*

In-Line Module

In-Line Module connections

5W amplified DSP noise canceling In-Line module - 8 filter levels 8 to 40dB - Use in-line with a loudspeaker - Audio bypass feature - 3.5mm mono inputs and outputs - Headphone socket - Audio input overload feature - Use with an extension speaker - Supplied with a fused DC power lead, 3.5mm mono jack plug lead and user manual

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- 7 watts mono speaker output
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Compact In-Line

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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 ¼-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 ¼ 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-

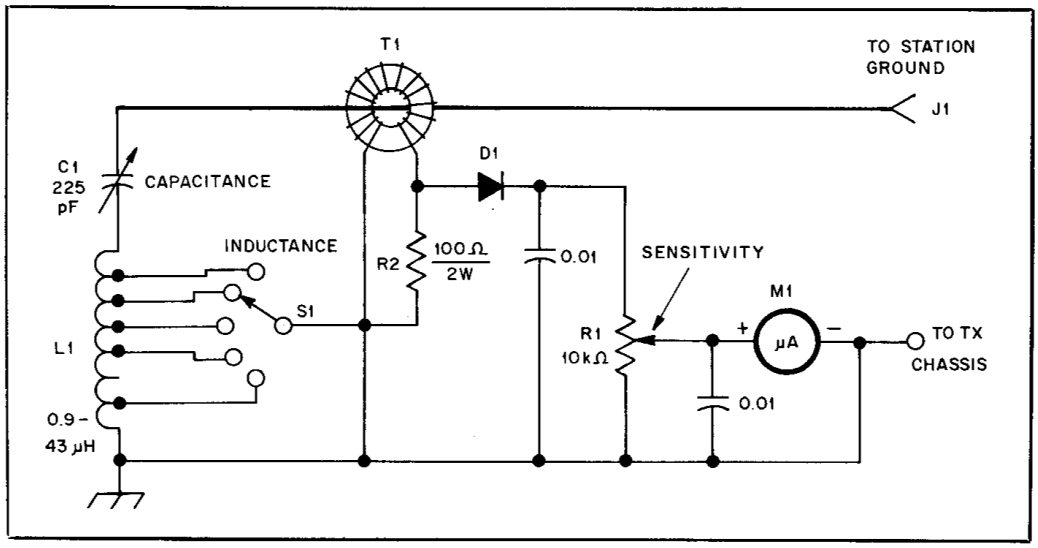


Figure 1 — The MFJ-931 circuit, as depicted in the April 1988 *QST* Product Review by Doug DeMaw, W1FB (SK).

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 ¼-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

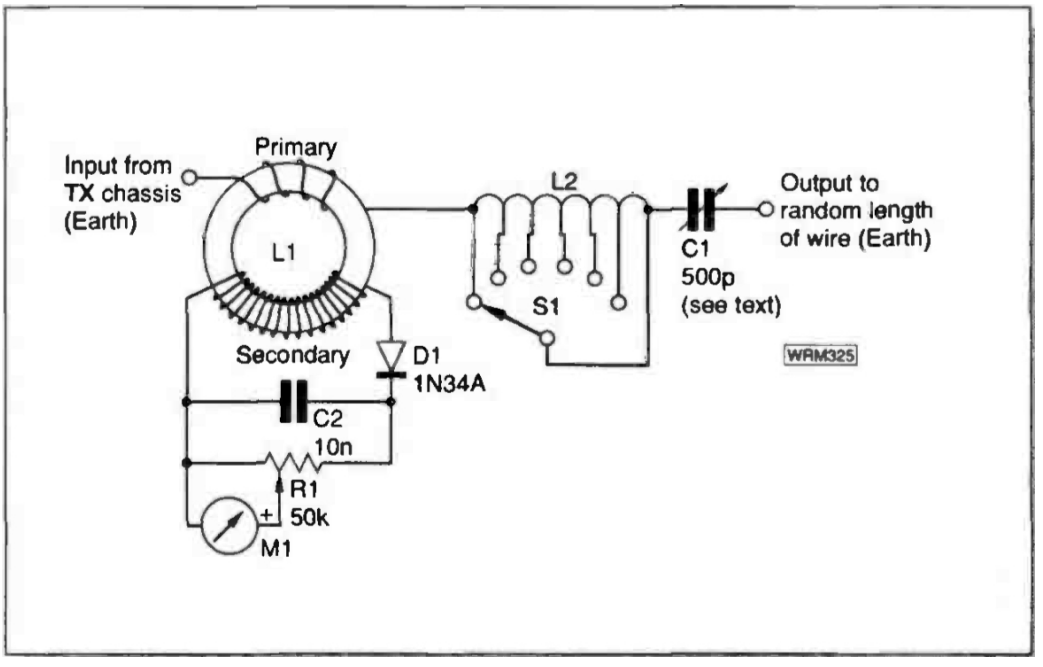


Figure 2 — The "Earth Tuner" Figure 2 schematic, as depicted in Dr. Colyn Baillie-Searle's, GD4EIP, article in the October 1990 issue of *Practical Wireless*.

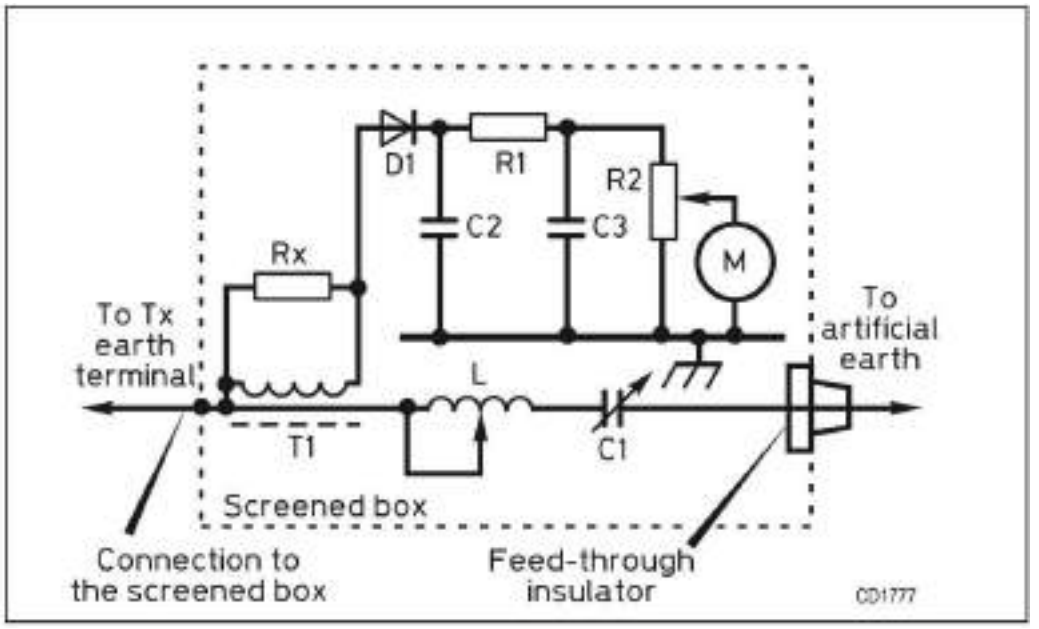


Figure 3 — The artificial ground schematic, as depicted in Figure 3.7 of *Backyard Antennas* by Peter Dodd, G3LDO (SK).

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 Remeeus, PAØQ, you can see a device built with the GD4EIP circuit. This nice work was carried out without Remeeus 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 PAØQ, 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 Remeeus, PAØQ, 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.

The completed countdown timer.

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 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 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.

Figure 2 — The Waveshare Pico LCD 1.14 backpack.

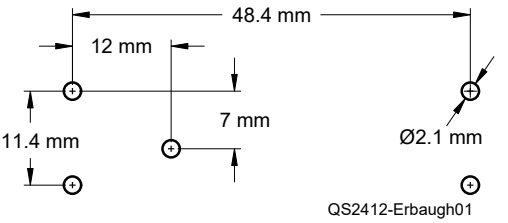


Figure 3 — Battery holder drilling template.

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

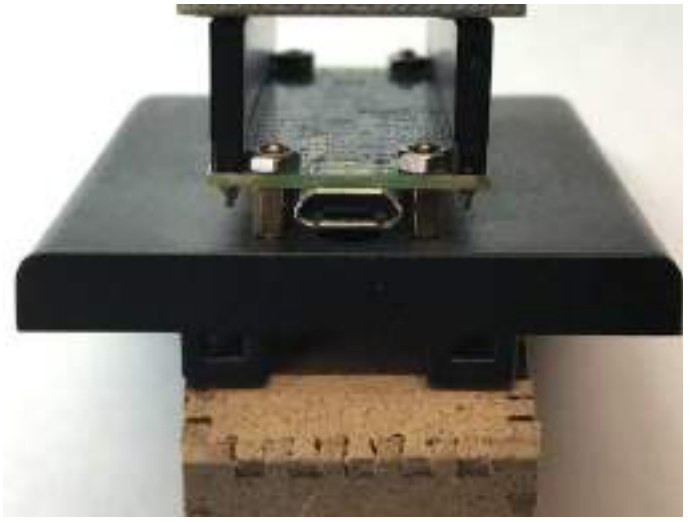
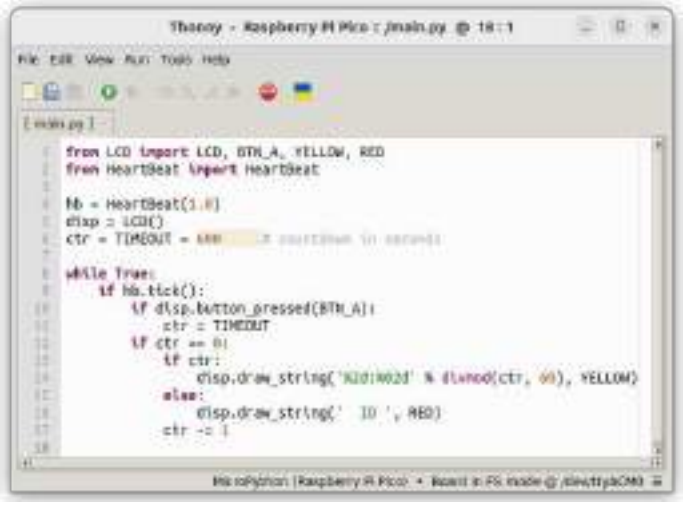


Figure 4 — Pico mounting on battery pack.

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**).



```
from LCD import LCD, BTN_A, YELLOW, RED
from HeartBeat import HeartBeat

hb = HeartBeat(1.0)
disp = LCD()
ctr = TIMEOUT = 600    # countdown in seconds

while True:
    if hb.tick():
        if disp.button_pressed(BTN_A):
            ctr = TIMEOUT
        if ctr == 0:
            if ctr:
                disp.draw_string('%2d:%02d' % divmod(ctr, 60), YELLOW)
            else:
                disp.draw_string('  ID ', RED)
            ctr -= 1
```

Figure 5 — The complete ID timer program.

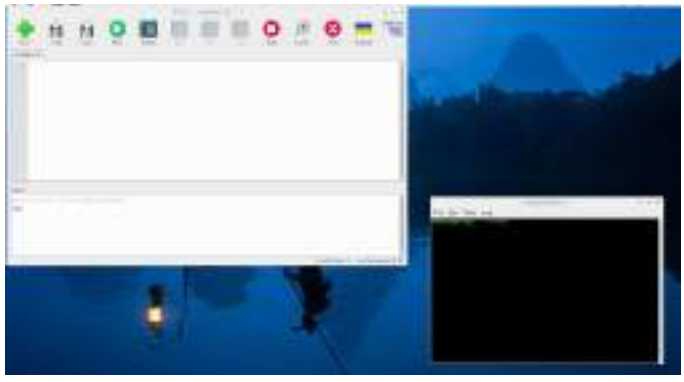
Final Touches

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**.

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

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 touchscreen 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 (⅛-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 ¼"-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.

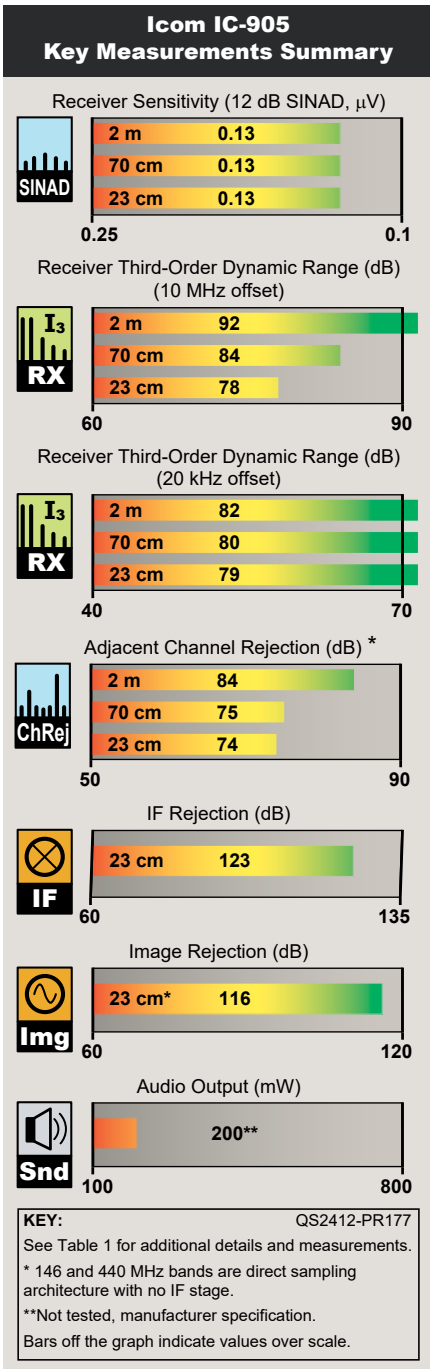


Table 1

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

Manufacturer's Specifications	Measured in the ARRL Lab
Frequency coverage: Receive/transmit 144 – 148, 430 – 450, 1240 – 1300, 2300 – 2309.999999, 2390.000001 – 2450, 5650 – 5925 MHz.	As specified.
Power requirements: 13.8 V ±15%. Receive, 2 A standby, < 3 A max. audio. Transmit, < 5.5 A at max. RF output.	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.
Modes of operation: SSB, CW, AM, FM, DV, DD, ATV.	As specified.
Receiver	**Receiver Dynamic Testing**
SSB/CW sensitivity, 10 dB (S+N)/N, SOFT filter, 144/430/1200/2400 MHz bands: < –19 dBµV (0.11 µV), 5600 MHz band: < –16 dBµV (0.15 µV). Preamp on for 144/430/1200 MHz bands.	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)
AM sensitivity: 10 dB (S+N/N), 144/430/1200/2400 MHz bands: < 0 dBµV (1.0 µV), 5600 MHz band: < +3 dBµV (1.4 µV). Preamp on for 144/430/1200 MHz bands.	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)
FM sensitivity: 12 dB SINAD, 15 kHz BW, 144/430/1200/2400 MHz bands; < –15 dBµV (0.17 µV), 5600 MHz band; < –12 dBµV (0.25 µV). Preamp on for 144/430/1200 MHz bands.	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 2.39000001 – 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.

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.

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.
FM two-tone second-order IMD dynamic range: Not specified.	146 MHz, 109 dB, 440 MHz, 104 dB.
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

Transmitter Dynamic Testing

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	As specified.
Spurious-signal and harmonic suppression: 144/440 MHz; > 60 dB, 1200 MHz, > 53 dB, 2400/5600 MHz; > 46 dB.	144/440 MHz; > 70 dB. All others as specified. Complies with FCC emission standards.

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.

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).

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

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.

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
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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.

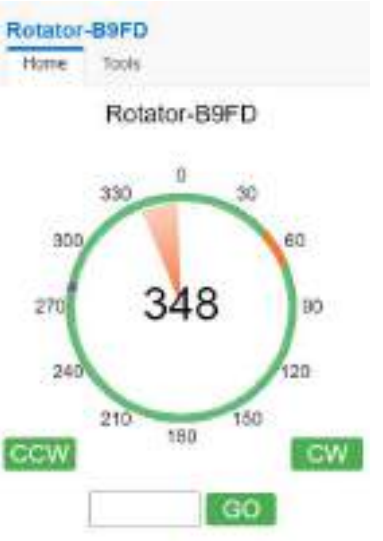

Figure 12 — The PWRC web-based application main menu.

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 around the green circle to point and shoot, or click/tap and hold the arrow until it points in the direction you want, then release to stop (see Figure 12).

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

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 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
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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 connection 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.

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.

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.

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

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.

Dave Casler, KEØOG, askdave@arrl.org

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!

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.

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

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

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.

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

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**

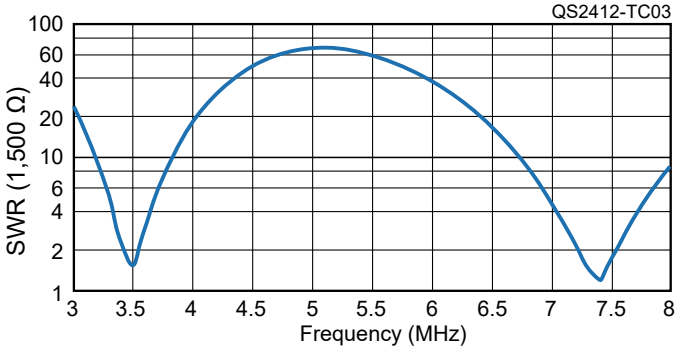


Figure 3 — The *NEC* SWR plot of an EFHW antenna fed with a high-ratio unun, redrawn for clarity. The wire is 130 feet long.

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.

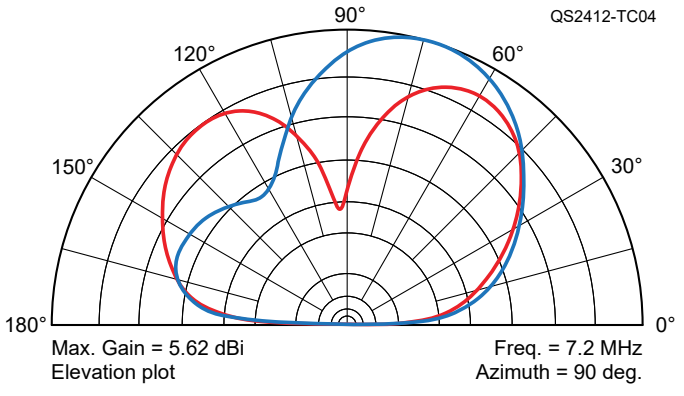


Figure 4 — Vertical radiation plots for an EFHW antenna. The blue plot represents 80 meters, and the red plot represents 40 meters.

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@arrl.net**

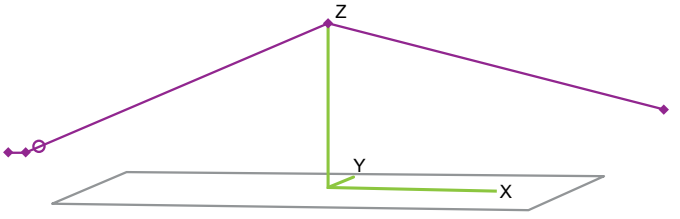


Figure 6 — The EFHW antenna modeled with the following dimensions: 33 feet high in the center, 15 feet high at the far end, and about 6 feet high at the fed end. There is a small counterpoise at the fed end, and the wire is ½ wavelength long at 3.8 MHz.

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@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number, and email address on all correspondence. Whether you are praising or criticizing 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.

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).

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 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.

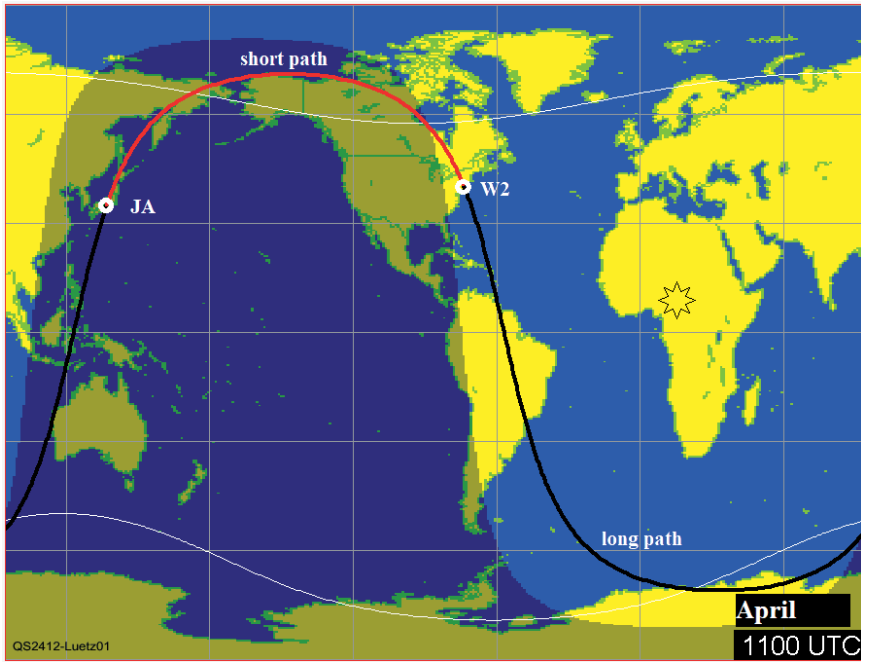


Figure 1 — East Coast 10-meter long path on an April morning.

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.

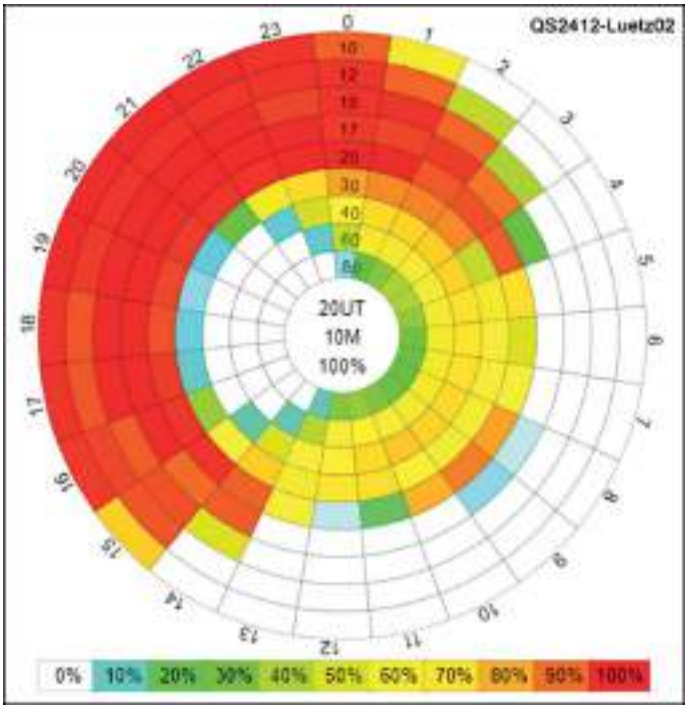


Figure 2 — December 2024 prop wheel for K9LA's location to Los Angeles.

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@arrl.net**.

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

Sierra Harrop, W5DX, sharrop@arrl.org

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.arrl.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.

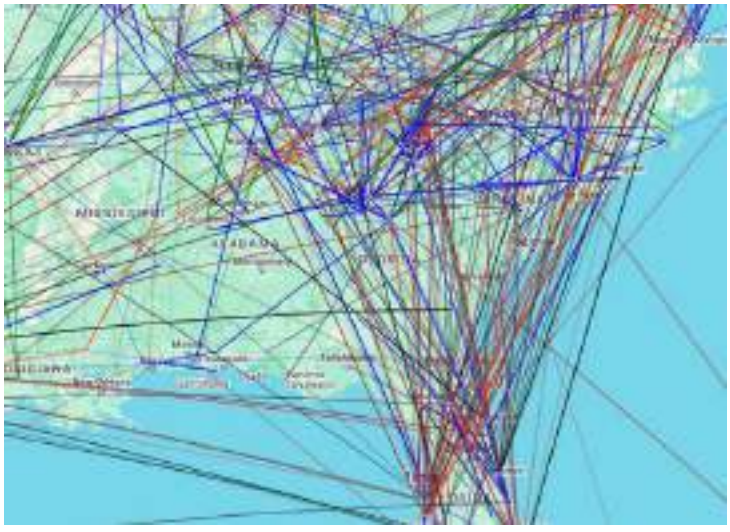
In Florida, Amateur Radio Emergency Service® (ARES®) volunteers were embedded with county officials and at the State Emergency Operations Center.

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.

Rick Palm, K1CE, k1ce@arrl.net

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.

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]

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.

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.

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]

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 radiocommunications 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.

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]

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."

Happy Holidays

and Peace on Earth from the ARRL Staff and *QST* Contributing Editors

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Margie Bourgoin, W1MRG
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Sam Shaner, KE1SAM
Jon Siverling, WB3ERA
Kai Siwiak, KE4PT
Maria Somma, AB1FM
Marc Spardello, W1NJ
George Spatta, W1GKS
Bill Spring
John Stanley, K4ERO
Jill Stelmack
Cathy Stepina
Sharon Taratula
Lisa Tardette, KB1MOI
Edwin Torres
Marvin Turner, WØMET
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	**qrpcontest.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	**proradiocontestclub.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	**qrpcontest.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	**qrpcontest.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	**okrtty.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 precautions were taken. Three hundred fifty-four participants claimed the Field Day Responsibilities bonus as part of their entries.

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	

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%

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 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 powert 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, KØBAK, 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.

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]

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]

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					
KØAJW	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					
NØLAC (+WXØND)	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					
WØKY	296	2	11	1,642	NE
Central WA ARC					
W7TT	279	2	15	1,626	EWA
Wood Co. ARA					
WC5TX	210	2	18	1,610	NTX
Central Dakota ARC					
WØZRT	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					
KØVRC	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					
WØBM	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					
WØVGW	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.					
WØMRM	225	2	5	700	MO
Samuel F. Morse ARC					
W6SFM	83	2	8	682	SV
Dallas Co. ARES					
KØDCI	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					
KØPEA	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 ARG					
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
WR6E	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					
KSOAT	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					
KØWBG	1	2	3	252	NM
Boston Mountain RC					
K5JTB	50	2	6	250	AR
KCØWEI	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.					
WØBJ	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					
WVØH	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.					
AAØB	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. ARES 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
KØOV 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.
KDØCI 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
WØKCK (+WØLB)
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
WØCLA 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 (+AI4QC)
891 2 47 6,079 AL
Baldwin Co. ARC
N4MZ (+WB4EMA)
1,164 2 27 5,902 AL
Kansas City DX Club
WØCW 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 (+KI5YDV)
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
NØSS 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
KØIIT (+AAØEL)
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
WØYL (+AEØS)
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
WØCGM (+NAØL)
803 2 12 3,938 MN
Devanooga
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
WA4HH 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 Srvc.
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
WØWR (+KFØJNO)
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
NØIWN 629 2 8 3,102 IA
Peekskill Cortlandt ARA
W2NYW 783 2 19 3,090 ENY
Charleston ARS
WA4USN (+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 (+KC8WVH)
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 (+AI5NR)
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
KØQIK 440 2 16 2,688 MN
NØSFF 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.
KØPRA (+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 (+KI5TKL)
340 2 11 2,252 MS
First State ARC
K3F 454 2 12 2,234 DE
Iowa City ARC
WØJV 682 2 15 2,224 IA
North Central MO ARC
KFØPLP (+WØPGH)
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 (+KO4ENO)
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
WØGKP 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
West Palm Beach ARG
W4HAW (+WS4FSC)
218 2 27 1,999 SFL
Highline ARC
NC7G (+WA7ST)
218 2 26 1,989 WWA
Orrville ARS
KD8SQ 551 2 4 1,988 OH
Pasadena RC
W6VIO 608 2 4 1,986 LAX
Ashe Co. ARC
K4J (+W4FD)
234 2 15 1,980 NC
Saskatoon and District ARA
VE5AA 403 2 20 1,962 SK
Ogden ARC
W7SU (+KZ7O)
289 2 42 1,962 UT
Addison Co. ARA
N1FS 328 2 6 1,912 VT
Stillwater ARA
WØJH 570 2 34 1,908 MN
NXP ARC
W7MRF 390 2 5 1,888 AZ
Lancaster Co. ARES
WE4LC 514 2 8 1,882 VA
Androscoggin ARC
W1NPP 299 2 18 1,878 ME
Radio Amateurs of Skagit Co.
W7TAO (+N7GDE)
382 2 15 1,874 WWA
Culver City ARES
K6CCR (+AJ7C)
300 2 24 1,870 LAX
Oakland Radio Comm. Assn.
WW6OR 659 2 17 1,868 EB
Shelby ARC
W4NYR (+N4K)
158 2 22 1,849 NC
Scottsdale ARC
W7UF (+N7ELL)
294 2 32 1,818 AZ
Eastern Shore ARC
K4BW 278 2 13 1,814 VA
Owensboro ARC
K4HY 307 2 14 1,814 KY
Jamestown ARC
WØFX 364 2 8 1,802 ND
Independent Radio Crew
K3ODX 343 2 3 1,776 EPA
Turkey Heaven Mtn. Repeater Assn.
N4THM 255 2 16 1,772 AL
Broken Arrow ARC
W5DRZ (+KJ5DVM)
248 2 35 1,751 OK
Columbia (MD) ARA
K3CUJ 311 2 44 1,746 MDC
The Villages ARC
K4VRC 908 1 40 1,740 NFL
Wiregrass ARC
W4DHN 371 2 15 1,732 AL
M&M ARC
W8PIF 411 2 29 1,718 MI
Etowah Valley ARC
W4EVC (+KQ4MFE)
296 2 14 1,689 GA
Matagorda Co. ARC
W5WTM 257 2 22 1,678 STX
OK Rovers
NØLD 420 2 5 1,658 OK
Small Town ARS
W5STR 449 2 15 1,650 AR
Phillips Co. ARC
WØZXN 289 2 6 1,622 KS
Antelope Valley ARC
K6OX (+K6A)
153 2 17 1,620 LAX
Central VT ARC
W1BD (+K1LNR)
431 2 15 1,597 VT
Sunnyvale ARES
K6SNY 236 2 54 1,590 SCV
Indianapolis RC
W9JP (+W9ISF)
176 2 38 1,586 IN
Tarboro RC
KO4YJA 106 2 13 1,510 NC
Bankhead ARC
N4IDX 260 2 10 1,504 AL
West Point Fire CERT
W6WPT (+KI6UTW)
236 2 6 1,499 SJV
Washington Area ARC
WØARC 224 2 22 1,490 IA
Remote Base Contest Club
WX8S 261 2 3 1,484 OH
Stanly Co. ARC
K4OGB (+N4JAT)
190 2 10 1,478 NC
West Chester ARA
WC8VOA 334 2 11 1,472 OH
Muncie Area ARC
N9RI 154 2 16 1,470 IN
Sunnyvale ARES
K6ANY 176 2 54 1,470 SCV
Traveling AR Team
AC7YT 1,206 1 4 1,456 IA
Barron Co. ARA
KD9EJA 235 2 10 1,440 WI
Club Radioamateur de la Vallee du Richelieu
VE2CVR 229 2 15 1,436 QC
Cedar Creek ARC
K5CCL 260 2 14 1,430 NTX
Ft. Madison ARC
WFØRT 125 2 13 1,420 IA
First Batist Church Huntsville ARC
K4FBC 211 2 5 1,394 AL
Pen Bay ARC
W1PBR 109 2 10 1,382 ME
West Alabama ARC
KC4UG 132 2 20 1,374 AL
North Country ARA
K8TTE 305 2 4 1,368 MI
Mt. Tom Amateur Repeater Assn.
W1TOM (+KC1KEZ)
55 2 17 1,365 WMA
Hayward RC
K6EAG 145 2 12 1,356 EB
Boaz-Albertville ARC
KN4UPN (+KD4BJW)
214 2 28 1,340 AL
Plattsmouth ARC
KBØSMX 161 2 18 1,338 NE
Butler Co. ARA
W8WRK (+WA6EZV)
174 2 15 1,326 OH
HacDC ARC
W3J 304 2 15 1,322 MDC
Pioneer Valley RA
W1HDN 287 2 16 1,316 CT
Poway ARS
N6PWY 185 2 25 1,316 SDG
Farrell-Gray
KØW 47 2 4 1,296 CO
Sooland ARA
KØTFT 264 2 14 1,284 IA
Hiawatha Valley ARC
AAØRW 286 2 21 1,284 MN
YARS/MVRC/SAC ARC/Yolo Co. ARES/BARC
W6YAR 75 2 16 1,282 SV
North Eastern DX Club
KP4DXC 208 2 5 1,266 PR
Smithsonian ARG
NN3SI 260 2 5 1,260 MDC
Southington ARA
W1ECV 268 2 10 1,258 CT
Kenton ARC
W8KTN 192 2 10 1,234 OH
Winona ARC
WØNE 236 2 6 1,224 MN
Sam Houston AR Klub
AI5M 245 2 5 1,222 STX
Powhatan Area RC
N4POW 210 2 19 1,214 VA
Club Radioamateur de Drummondville
VE2CRD 119 2 12 1,206 QC
Alcorn Co. ARC
W5AWP 209 2 11 1,192 MS
Brightleaf ARC
W4AMC 214 2 15 1,192 NC
York Co. (ME) ARC
W1YAC 367 2 5 1,184 ME
Greenwood ARC
VE1ARC (+VE1WN)
156 2 22 1,176 NS
KC8EHR 280 2 4 1,172 MI
Team Billy Goat
KE5AKL 262 2 4 1,172 NM
Cabarrus ARS
K4WC 185 2 21 1,172 NC
Nashville ARC
K4CPO 176 2 12 1,154 TN
The Albemarle ARS
K4WO (+NC4EC)
195 2 15 1,143 NC
Abbotsford ARES Soc.
VE7ECC 296 2 12 1,142 BC
Club Radio Amateur VE2CWQ
VE2CWQ 211 2 13 1,138 QC
Eaton Co. ARC
K8CHR 139 2 5 1,128 MI
Playground ARC
W4ZBB 132 2 3 1,114 NFL
Woodford Co. ARC
KY4WC 31 2 11 1,112 KY
Adams-Arapahoe Co. ARES
WAØRES 18 2 19 1,106 CO
Convair/220 ARC
W6UUS (+K6PFG)
112 2 44 1,091 SDG
North Franklin ARS
N2NNY 211 2 3 1,072 NNY
North East IA Radio Amateur Assn.
WØMG 263 2 13 1,070 IA
Audrain EmComm
AAØRC 64 2 12 1,068 MO
Elmore Co. ARC
K7ECI 129 2 3 1,066 ID
Genesee Radio Amateurs
W2RCX 297 2 7 1,058 WNY
Cowichan Valley ARS
VE7CVA 240 2 12 1,058 BC
Montgomery ARC
W4AP (+K1AZE)
144 2 18 1,053 AL
Mayerthorpe Flying Tigers
VE6FT 474 1 4 1,052 AB
Heart O' Texas ARC
W5ZDN (+K5ZDN)
42 2 16 1,038 NTX
Manotick ARG
VE3AIR 86 2 4 1,022 ONE
Means/Snyder Family
AE4WX 94 2 4 1,018 NC
Goose River ARC
WØFLT 98 2 5 1,014 ND
Laurel ARC
W3LRC 242 2 10 1,014 MDC
Harrisburg Radio Amateurs Club
W3UU 57 2 11 1,010 EPA
SPARC
KH6Z 163 2 25 1,006 PAC
Young Co. ARC
W5Y 130 2 10 998 NTX
Univ. of Michigan ARC
W8UM 85 2 21 980 MI
San Jose ARES/RACES
AF6ZF (+AJ6DU)
135 2 13 970 SCV
Niagara RC
W2QYV 302 2 3 954 WNY
Juniata Valley ARC
K3DNA 164 2 17 950 WPA
White Rock Lake ARC
WA5WRL 53 2 5 946 NTX
Club Radio Amateur Laval-Laurentides
VE2CRL 119 2 5 936 QC
Delaware Lehigh ARC
W3OK (+AB3BD)
241 2 50 932 EPA
Great River ARC
WØDBQ 211 2 18 912 IA
Hampden Co. Radio Assn.
W1NY 138 2 17 906 WMA
River City AR Comms. Soc.
N6PGQ 165 2 4 880 SV
Sarasota Em. RC
W4IE 34 2 16 862 WCF
Carolinas Airstream Club
WB4CAC 75 2 3 860 NC
Montana Prairie ARC
KJ7ZWR 89 2 17 834 MT
Metuchen RC
K2YNT 273 2 9 824 NNJ
Arkansas Radio Em. Srvc.
N5AT 137 2 57 824 AR
Newaygo Co. Amateurs
NA8M 124 2 6 818 MI
TLSC Ham Radio Grp.
KC3TL 31 2 15 812 WPA
Peconic ARC
W2AMC 71 2 15 792 NLI
Barrow ARC
WR4BC 80 2 6 770 GA
Williams Co. ARA
KT8EOC 9 2 3 768 OH
Mesabi Wireless ARC
NTØB 55 2 10 760 MN
Cascades ARS
W8JXN 124 2 12 758 MI
Islip ARG
K2IRG (+W2TOI)
52 2 8 754 NLI
Meriden ARC
W1WRG 147 2 14 744 CT
Skyline Tower ARC
W7DTV 204 2 4 730 OR
Victoria ARC
W5DSC 136 2 4 722 STX
VE6CJ 259 2 3 720 AB
Atlantic Region Repeater Legion
W2XTV 179 2 3 708 NNJ
Westside ARC
WA6RC 24 2 5 706 LAX
Parkland ARC
VA5PAR 197 2 3 644 SK
Univ. of Southern California ARC
W6YV 73 2 3 638 LAX
Aerospace Employees Assn. ARC
W6AGO 31 2 5 632 LAX
South Bay ARC
W6SBA 30 2 11 632 LAX
Copper Country Radio Amateur Assn.
W8CDZ 47 2 35 606 MI
North GA Tri-State ARC
AE1MS 22 2 20 594 GA
North GA Tri-State ARC
W4NGT 20 2 20 590 GA
Pine State ARC
N1ME 165 2 12 580 ME
Pioneer Radio Operators Soc.
K2PRO 161 2 6 572 WNY
Lee Co. EOC
KX4LEE 8 2 10 568 NC
Eastern AZ ARS
K7EAR 86 2 9 558 AZ
Northern IL Quad Co. ARG
K9T 44 2 6 552 IL
ARC of El Cajon
WA6BGS 133 2 8 532 SDG
Old Times Ham RC
KM4OT 98 2 5 514 NC
Crescenta Valley RC
AD6IZ 61 2 15 492 LAX
Hays/Caldwell ARC
KE5LOT 32 2 10 478 STX
Irving ARC
WA5CKF 91 2 10 452 NTX
American Legion Post 82 ARC
NØTAL 43 2 4 436 CO
Lincoln Co. ARC
K7LBY 36 2 8 424 MT
Bellevue ARC
WØWYV 18 2 3 408 NE
Calaveras ARS
N6FRG 79 2 6 408 SJV
Live Free or Die
W1BPM 26 2 4 402 NH
Lowndes Co. ARC
KC5ULN 42 2 12 366 MS

2A — Battery

Colorado QRP Club
WØCQC (+KCØVFO)
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
Wilsons 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
KØKWO 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 (+W5AUY)
491 2 26 2,595 NTX
Mountain State Transmitters
K8VNQ (+AD8DA)
248 2 8 1,957 WV

Douglas Co. ARC
W0UK (+N0TFU)
541 2 22 1,792 KS
Hambuds
AF5M 303 2 15 1,670 STX
Lake Whitney ARS
NZ5T 334 2 20 1,548 NTX
Kansas/Nebraska ARC
N0GJ 239 2 34 1,464 KS
Green Valley ARC
N7GV 345 2 26 1,422 AZ
Cascade RC
W7EK 299 2 12 1,404 WWA
Iroquois Co. ARC
AD9L (+W9GRS)
134 2 17 1,374 IL
National Trail ARC
K9UXZ 865 1 12 1,315 IL
Lisbon Area ARA
K8GQB (+K8BXT)
402 2 13 1,254 OH
Statesboro ARS
KF4DG (+KO4JKO)
302 2 22 1,254 GA
Scioto Valley ARC
W8BAP 274 2 4 1,146 OH
Indian River ARC
AJ4IR (+W4NLX)
345 1 6 1,095 SFL
River Hills ARC
W0RHX 102 2 14 954 MO
Carbon ARC
W3HA 272 2 20 918 EPA
Richmond Amateur Telecom. Soc.
W4RAT 276 2 40 802 VA
Moose Jaw ARC
VE5MA 191 2 14 778 SK
Prescott-Russell ARC
VE3PRD 234 2 7 652 ONE
Southern IN Tri-Co. Club
KC9OLF 241 2 4 632 IN
Pony Express Re-Ride Radio Relay Station
N7E 57 2 3 624 NV
Osage Co. ARC
N0OC 161 2 10 598 KS
Clallam Co. ARC
W7FEL 92 2 10 574 WWA
Mackenzie Regional RC
VE6MRF 116 1 8 473 AB
Eden Prairie RC
K0EPR 89 2 9 432 MN
Eastern NM ARC
KA5B 164 2 15 402 NM
Southeast LA ARC
WM5T 23 2 10 396 LA
Leflore Co. Comm. Support Team
N5CST 27 2 4 250 OK
Brandon ARC
VE4QD 30 2 5 160 MB

3A

North Fulton ARL
K4JJ (+NF4GA)
3,905 2 96 16,234 GA
Rochester (NY) DX Assn.
W2RDX (+W2AN)
3,342 2 30 15,562 WNY
Prairie Dog ARC
W0OJY (+W0EJ)
3,268 2 34 13,230 SD
North Shore RC (IL)
K9SS (+NS9RC)
2,784 2 107 12,189 IL
Randallstown ARC
N3IC (+K3MZ)
2,749 2 21 12,028 MDC
Fulton Co. (IL) ARC
K9ILS 2,580 2 17 10,568 IL
Providence Radio Assn.
W1OP (+W1C)
2,718 2 48 10,520 RI
Forx ARC
N0GF (+ND0GF)
2,475 2 24 9,629 ND
United Radio Amateur Club
K6AA 2,592 2 12 9,414 LAX
ARES of Douglas and Elbert Co.
N0KV (+N0IVN)
2,324 2 28 9,400 CO
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
Stanwood-Camano ARC
W7PIG (+KJ7FGG)
1,934 2 25 9,008 WWA
Central WV Wireless Assn.
K8DF (+WV8HC)
2,169 2 18 8,992 WV
Lynchburg ARC
K4CQ (+W3CQ)
2,191 2 57 8,945 VA
North Shore Radio Assn.
NS1RA 2,178 2 27 8,864 EMA
Johnson Co. Radio Amateurs Club
W0ERH (+W0AR)
2,531 2 72 8,863 KS
Signal Hill ARC
K4NN (+KK4PH)
2,181 2 8 8,660 WV
Columbus ARC
W4CVY (+W4FIZ)
2,191 2 45 8,615 GA
Delaware ARA
K8ES (+W8JK)
1,700 2 35 8,387 OH
Piglet Radio
N9BCN (+KD9YPY)
2,174 2 19 8,183 IN
Utah Valley ARC
K7UVA (+K7GSL)
1,870 2 43 7,901 UT
Vienna Wireless Soc.
K4XY (+K4HTA)
1,691 2 80 7,736 VA
Oakland Co. ARS
W8TNO (+W8O)
1,532 2 10 7,661 MI
Tallahassee ARS
K4TLH (+KZ4EA)
1,746 2 51 7,653 NFL
Sun Parlour ARC
VE3SPR 2,125 2 20 7,618 ONS
St. Louis ARC
K0LIR 1,888 2 17 7,482 MO
Boulder ARC
W0DK (+WE7A)
1,948 2 32 7,397 CO
Annapolis Valley ARC and Kings Co. ARC
VE1LD (+VA1AVR)
1,397 2 35 7,363 NS
Oh-Ky-In ARS
K8SCH (+N8YC)
1,640 2 30 7,303 OH
Valley and Massanutten ARA
W4XD (+K4MRA)
1,429 2 42 7,283 VA
Okaw Valley ARC
K9O (+AD9OV)
1,641 2 70 7,232 IL
Port City ARC
K1R (+W1WQM)
1,846 2 25 7,094 NH
Cedar Valley ARC/Collins ARC
W0CXX (+W0GQ)
1,975 2 50 7,049 IA
Dial RC of Middletown
K8PI (+W8BLV)
1,499 2 27 6,997 OH
Virginia Beach ARC
W4UG (+K4IX)
1,700 2 41 6,852 VA
Williamsburg Area ARC
K4RC (+AI4WU)
1,354 2 134 6,842 VA
Tennessee Valley DX Assn.
N4LT 1,543 2 26 6,798 TN
The 415 ARC
N9WH (+W9JM)
1,299 2 30 6,797 IL
Macoupin Co. ARC
K9M (+K9MCE)
1,804 2 28 6,664 IL
Ellsworth Amateur Wireless Assn.
W1TU (+KB1NEB)
1,312 2 15 6,645 ME
Nixa ARC
W0A (+K0NXA)
1,978 2 20 6,122 MO
Central OR DX Club
N7LE 1,528 2 14 6,114 OR
XRX RC/Monroe Co. ARES
W2XRX (+WB2EOC)
1,111 2 40 6,102 WNY
Monkey Lover's Radio Consortium
K6MMM (+N6OTA)
1,418 2 90 6,095 SCV
Nashua Area Radio Soc.
N1FD (+W1SMN)
1,412 2 20 5,852 NH
Gold Coast ARA
N4FL 1,218 2 66 5,850 SFL
Holland ARC
K8DAA 1,512 2 54 5,796 MI
Cumberland Plateau ARC
W8EYU (+WA4WSZ)
1,124 2 28 5,720 TN
Dallas ARC
W5FC 1,134 2 50 5,664 NTX
San Mateo RC
W6UQ (+AJ6VY)
1,183 2 70 5,615 SCV
Kanawha ARC
W8GK (+KB2HSV)
1,513 2 47 5,609 WV
Barnstable ARC
W1MA 1,410 2 30 5,486 EMA
Larkfield ARC
W2LRC (+WA2PNU)
1,075 2 53 5,350 NLI
Susquehanna Valley ARC
W3VPJ (+KA3IRJ)
1,214 2 46 5,306 EPA
CARESS-NWARC
VE7SCC 1,213 2 50 5,170 BC
Albemarle ARC
W4DO (+WA4TFZ)
1,100 2 39 5,017 VA
Brunswick Shores ARC
N4GM (+K6RM)
841 2 35 4,847 NC
Panoramaland ARC
K7JAR (+KL7LL)
761 2 32 4,672 EWA
Paducah ARA
W4NJA (+KQ4IKS)
818 2 22 4,664 KY
Ski Country ARC
K0RV 1,283 2 31 4,656 CO
Garden State ARA
W2GSA (+KE2BRG)
918 2 40 4,598 NNJ
Idaho Mountain ARS
KX7ID (+KB7ZPU)
860 2 10 4,488 ID
Summit Co. ARS
W8ORC (+W6VM)
1,444 2 8 4,481 OH
Grand Strand ARC
W4GS (+N4BAK)
958 2 43 4,473 SC
Michiana ARC
W9AB (+N9YOU)
1,098 2 15 4,471 IN
McKinney ARC
W5MRC 1,325 2 67 4,446 NTX
Moreno Valley ARA
AB6MV (+KO6CGU)
878 2 18 4,414 ORG
Springhill Repeater Assn.
W4C (+WT4CC)
823 2 20 4,354 TN
Central MI ARC
W8MAA (+KD8ONC)
896 2 50 4,352 MI
ARTS of Louisville
W4CN (+KY4DX)
992 2 13 4,320 KY
Tippecanoe ARA
W9REG 902 2 27 4,186 IN
Sudbury ARC
VE3AC (+VE3GSU)
700 2 12 4,175 ONN
Morris RC/Hanover Township OEM
W2YD 888 2 21 4,158 NNJ
South Orange ARA
K6SOA (+K6WO)
804 2 85 4,143 ORG
Jefferson Co. (TX) ARC
W5SSV 843 2 38 4,112 STX
Utah ARC
W7SP 1,573 2 21 4,060 UT
Blue Ridge ARC
W4YK (+NA4X)
770 2 44 4,005 NC
Riverside Co. ARA
W6TJ (+KO6DEZ)
707 2 14 3,994 ORG
Hughes ARC
W6HA (+N6VZF)
799 2 31 3,979 LAX
Tri Co. ARC (GA)
WX4TC 1,291 2 30 3,968 GA
Oklahoma City Autopatch Assn.
W5MEL (+W5TJS)
697 2 19 3,945 OK
Delaware Repeater Assn.
K3WJV 906 2 12 3,854 DE
High Appalachian Mountain ARS
KE4MH (+KQ4NAV)
540 2 4 3,782 NC
Yellowstone RC
K7EFA 682 2 10 3,718 MT
Schuylkill Amateur Repeater Assn.
W3SC 956 2 11 3,690 EPA
Nassau ARC
K2VN 682 2 41 3,546 NLI
Mammoth Cave ARC
KY4X 718 2 10 3,542 KY
North Augusta Belvedere RC
K4NAB (+KK4AMJ)
941 2 25 3,539 SC
Athens RC
W4H (+W4U)
878 2 32 3,528 GA
Lehigh Valley ARC
W3OI 584 2 25 3,496 EPA
Maui ARC
KH6RS 2,020 1 11 3,493 PAC
Denver RC
W0TX 774 2 35 3,422 CO
Livingston Co. AR Klub
W8LRK (+K8JBA)
739 2 30 3,418 MI
Southern KY AR Transmitting Soc.
KY4AR (+WB2UBW)
566 2 40 3,400 KY
Spokane DX Assn.
K7SDX 706 2 13 3,362 ID
West Carroll
W6WU 793 2 3 3,362 MDC
Ak Sar Ben ARC
K0USA 770 2 20 3,356 NE
Ole Virginia Hams
W4OVH 499 2 15 3,336 VA
South West Idaho ARC
K7SWI (+KK4ADO)
648 2 47 3,333 ID
Blue Springs ARC
K0M (+N0NNP)
665 2 11 3,321 MO
Mining ARC/St. Paul RC
W0MR (+K0AGF)
550 2 61 3,230 MN
Middle TN ARC
W4UOT (+KE4LPL)
519 2 14 3,161 TN
Fond du Lac ARC
W9EBV (+N9RPU)
476 2 19 3,125 WI
Barrie ARC
VE3GCB (+VE3WEX)
754 2 18 3,107 ONS
The Noise Blankers Radio Grp.
WR5P 769 2 4 3,074 AR
Delta and Neshoba ARC Memphis
W4BS (+W4NRC)
508 2 52 3,060 TN
Austin ARC
W5KA (+K5LBJ)
446 2 45 3,060 STX
Decatur ARC
W4ATS (+K4HNH)
604 2 50 3,041 AL
Murray State Univ ARC
K4MSU (+W4GZ)
501 2 46 3,038 KY
Central MA ARA
W1BIM (+WK1H)
703 2 19 3,032 WMA
Joplin ARC
W0IN (+KB0STN)
797 2 20 2,944 MO
Hamfesters RC
W9AA (+KC9CDL)
434 2 33 2,913 IL
Helena ARC
W5HAR (+KD5BS)
500 2 32 2,890 AR
Lenoir ARC
N4LNR 627 2 32 2,878 NC
Pilot Knob ARC
W0EBB (+KS0LV)
552 2 19 2,873 KS
Virgin Valley ARC
KE7END (+KE7EIF)
362 2 14 2,865 NV
Motorola ARC
W7MOT (+K7BLT)
385 2 15 2,864 AZ
HPT/SPARK/PARC/NNACT
W4MT 471 2 58 2,856 VA
Pikes Peak Radio Amateur Assn.
AF0S (+K0NTS)
437 2 20 2,835 CO
Wichita ARS
N5WF 583 2 12 2,830 NTX
Gulf Coast ARC
WA4GDN 536 2 10 2,824 WCF

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
Rolla Regional ARS
WØGS 641 2 12 2,702 MO
Faulkner Co. ARC
N5GK (+W5AUU)
543 2 35 2,698 AR
Santa Fe Trail ARC
KSØKS (+KDØRIU)
412 2 46 2,694 KS
Coshocton Co. ARA
W8CCA 485 2 14 2,666 OH
Tri Co. Radio Assn.
W2LI 355 2 25 2,660 NNJ
Piscataquis ARC
K1PQ 571 2 4 2,644 ME
Delaware ARA
W2ZQ 554 2 10 2,642 SNJ
The Kansas Antenna Club in Johnson Co.
KØANT 492 2 14 2,638 KS
North Okanagan RAC
VE7NOR 984 2 10 2,612 BC
North East WY ARA
NE7WY 824 2 14 2,606 WY
N3YPJ 733 2 3 2,596 MDC
Northwest OH VHF ARS
NØVRS 814 2 9 2,526 OH
Midwest ARC
WØQJ 586 2 4 2,522 MO
Coconino ARC
KC7KCN 468 2 8 2,478 AZ
Blount Co. ARC
W4BLT 709 2 22 2,476 AL
Randolph Co. Em. RC
K4RAN 457 2 10 2,472 AL
Baton Rouge ARC
W5GIX (+K5LSU)
458 2 45 2,467 LA
Paulding Co. ARC
W4TIY 513 2 11 2,442 GA
Easton ARS
K3EMD 350 2 12 2,438 MDC
New River Valley ARC
N4NRV 507 2 13 2,410 VA
Sandia Vista ARC
WV5X 551 2 6 2,406 NM
Arkansas River Valley ARF
K5PXP (+AJ5SJ)
384 2 26 2,403 AR
Batesville Area RC
K5BRC 825 2 25 2,400 AR
Parkersburg AR Klub
W8PAR 406 2 34 2,388 WV
Red River Radio Amateurs
WØILO 493 2 14 2,378 ND
St. Mary's Co. ARA
K3HKI 500 2 16 2,370 MDC
Northern AZ DX Assn.
W7YS 370 2 18 2,368 AZ
Lincoln ARC
KØKKV (+KØSMM)
413 2 53 2,340 NE
Northern Kentucky ARC
K4CO (+KY4DH)
418 2 44 2,335 KY
Lake Area AR Klub
K5LRK 402 2 32 2,326 NTX
Radio Operadores Del Este
KP3RE 468 2 21 2,322 PR
Hampstead Hams
NC4PC 615 2 20 2,270 NC
Fallbrook ARC
N6FQ 526 2 50 2,252 SDG
Cove Repeater Assn.
K5CRA 340 2 37 2,222 NTX
KARO-ECHO
W6ECK (+W6CUS)
308 2 25 2,215 EB
High Sierra Field Day Grp.
K6VT 375 2 5 2,166 SV
Sangre de Cristo ARC
NØSDC (+KØCKR)
213 2 17 2,159 CO
American Legion Post 91 ARC
KG7SPL 605 2 10 2,148 MT
Western Division SATERN
KØTSA 683 2 7 2,136 NE
Coal Country ARC
WV8CCC 512 2 12 2,130 WV
Grayson Co. ARC
K5GCC 303 2 60 2,126 NTX
Lake of the Ozarks ARC
NØZS 531 2 28 2,102 MO
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
KØEOR (+KFØHOG)
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
Utica ARC
K2IQ 307 2 16 2,004 WNY
West Allis RAC
W9FK 360 2 17 1,992 WI
Valley of the Moon ARC
W6AJF 371 2 15 1,988 SF
Sierra ARC of the High Mojave
K6R 194 2 28 1,982 SJV
GOTAHAMS
WG6OTA (+KC6WOK)
312 2 49 1,939 ORG
Hog Co. ARA
K4HOG (+KK4SBA)
265 2 8 1,938 NFL
The Olympia ARS
NT7H (+WW7RG)
269 2 20 1,925 WWA
Vermilion Co. ARA
W9MJL 464 2 23 1,924 IL
Roanoke Valley ARC
W4CA (+KJ4ZZX)
361 2 15 1,920 VA
Saratoga Co. ARA
K2DLL 275 2 18 1,918 ENY
BEARONS and MicroHAMS FD Extravaganza
W7FLY 346 2 35 1,898 WWA
Mid-Atlantic ARC
W3NWA 319 2 32 1,896 EPA
Northeastern IN ARA
W9OU 274 2 37 1,894 IN
Capital Clty ARC
N7RB (+KE7NLU)
256 2 15 1,887 MT
Central Toronto ARC
VA3CTA 459 2 15 1,884 GH
Milwaukee Radio Amateurs' Club
W9RH (+AC9BT)
315 2 14 1,881 WI
Putnam Em. Amateur Repeater League
K2PUT 271 2 32 1,868 ENY
Coweta RC
N4CRC 263 2 4 1,852 GA
Calhoun Co. ARA
W4S 227 2 10 1,852 AL
Indiana Co. ARC
W3BMD (+KB3JOF)
402 2 17 1,839 WPA
Kootenai ARS
K7ID 521 2 21 1,828 ID
Gateway ARC
K4GAR 247 2 20 1,826 GA
Western Piedmont ARC
KM4VIQ 435 2 15 1,822 NC
Red River Radio Amateurs
KØRQ 380 2 4 1,816 ND
Bryan ARC
W5BCS 266 2 50 1,812 STX
Bedford Co. ARS
K4T 453 2 34 1,788 TN
Chattanooga ARC
W4AM 297 2 23 1,778 TN
North Hills RC
K6IS 411 2 10 1,776 SV
Monroe ARC/Monroe Co. ARES
WZ4V (+N4POD)
271 2 22 1,758 TN
Tehachapi ARA
AC6EE 250 2 15 1,728 SJV
Cambridge ARA
W8VP 252 2 30 1,718 OH
Maple Grove RC
KØLTC (+KØCBP)
257 2 18 1,714 MN
Valley and Massanutten ARA
KO4CTF 377 2 6 1,672 VA
Ramona Outback ARS
N6ROR 375 2 30 1,656 SDG
Marin ARS
W6SG 497 2 15 1,656 SF
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
WØTRI 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
Wexaukee 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
KØSWI 232 2 7 1,454 IA
Skamania Co. ARES
W7SKA 108 2 10 1,448 WWA
Ozark Mountain ARC
NØOMR (+KFØPOL)
129 2 34 1,447 MO
Pueblo West ARC
NAØPW 278 2 12 1,422 CO
South Alabama RC
WC4M 208 2 18 1,420 AL
Northwest OH ARC
W8EQ (+KE8NRP)
120 2 26 1,400 OH
Twin City FM Club
WØEF 177 2 8 1,384 MN
Twin Cities Repeater Club
WØBU 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
Tidelands 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
W4RRC 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
WØYFZ 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
WØCBL 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
KCØRVS 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
Kittitas Co. ARC
N7KGS 24 2 4 998 EWA
South Side ARC
NØET 248 2 13 996 MO
Bloomfield ARC
W1CWA 101 2 14 990 CT
Mine Creek ARC
KKØY 82 2 13 986 KS
Bastrop Co. ARC
K5OQ 206 2 8 984 STX
Casper ARC
W7VNJ 125 2 7 982 WY
Detroit Lakes ARC
WØEMZ (+KFØIBC)
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
WØBXO 105 2 7 720 SD
Anritsu ARC
K6AAR 134 2 3 718 SCV

The Albuquerque Bois
NM2AT 56 2 3 692 NM
American Legion Post 283
KI6IRL 17 2 5 684 LAX
Keystone VHF Club
W3HZU 164 2 3 678 EPA
Highland ARA
K8HO 81 2 17 672 OH
American Legion Post 104 ARC
AL4US 54 2 19 666 TN
NE TN District 7 SKYWARN
WX4TN (+K4SDT)
45 2 3 640 TN
AI7PM 151 2 4 620 WY
Fulton Co. (IN) ARC
K9RCR 30 2 5 620 IN
Cape Ann ARA
W1GLO 31 2 5 612 EMA
Mayfield Graves Co. ARS
W4TZX 77 2 6 604 KY
West Desert ARC
W7EO 11 2 4 590 UT
Northern CO ARC
WØUPS 81 2 5 586 CO
South Texas ARC
N5CRP 19 2 4 526 STX
High Desert ARC
KF5QYG 43 2 15 522 OR
Team Ferret
AC1BZ 31 2 4 512 NH
Defiance Co. ARC
K8VON 42 2 3 476 OH
Sequoia ARG
N6KRV 9 2 5 468 SJV
Lake Cumberland ARA
N4LCA 106 2 21 386 KY
St. Mary's ARC
VE3SDF 35 2 5 220 ONS
Radio Amateurs of Corry
W3YXE 6 2 3 62 WPA

3A — Battery

NE TX QRP Contest Fed.
KA5CJJ 730 5 3 7,650 NTX
Sedan ARC
WØNP (+K3UQ)
580 5 3 6,700 WV
South Plainfield ARC
NJ2SP (+K2DFSI)
432 5 15 5,135 NNJ
Southern VT ARC
K1SV 264 5 8 2,725 VT
Western Hemisphere Amateur Contest Club
VA3WHC 155 5 3 2,075 GH

3A — Commercial

Bella Vista RC
W5NX (+N5BVA)
2,523 2 103 9,720 AR
Sawnee ARA
N4NE (+WX4EOC)
1,974 2 82 8,001 GA
Mobile ARC
W4IAX (+K4DSR)
1,298 2 22 5,150 AL
Sterling Park ARC
K4NVA (+NQ4K)
908 2 17 4,199 VA
Voice of Idaho RC
W7VOI (+WH6FIG)
868 2 3 3,831 ID
Drake ARC
K8UU 914 2 11 3,740 OH
SMARTS RC
WBØRMK (+KØLLT)
648 2 12 3,399 MN
Stubblefield Repeater Club
KF4UTJ (+KE4YRI)
628 2 15 3,380 KY
Orlando ARC
K1AA (+W1SE)
697 2 35 3,218 NFL
Keowee Toxaway ARC
K4WD (+K4MDI)
770 2 30 2,749 SC
Metrocrest ARS
KB5A (+NN5R)
496 2 36 2,683 NTX
Cumberland ARC
K3IEC (+AF3I)
421 2 23 2,446 EPA
Radio Assn. of Western NY
W2PE 596 2 16 2,224 WNY
Macon Co. ARC
NØPR 518 2 5 2,170 MO
Patoka Valley ARC
KD9LLH 522 2 22 2,146 IN
Rockingham Co. ARC
N4IV 457 2 8 1,852 NC
Madison Co. ARC
KE8RV 264 2 25 1,766 OH
East Pasco ARS
K4EX 272 2 43 1,730 WCF
Country Pond ARG
W1CPG 396 2 11 1,670 NH
Portsmouth RC
N8QA 479 2 19 1,604 OH
Hidden Valleys ARC
KC9KQ (+KC9MCC)
287 2 18 1,392 WI
Kennehoochee ARC
W4BTI 420 2 12 1,368 GA
Splitrock ARA
WS2R 140 2 15 1,348 NNJ
Hocking Valley ARC
K8LGN 125 2 19 1,090 OH
Cross Co. ARC
WA5CC 169 2 6 972 AR
Fannin Co. RC
K5FRC 221 2 23 904 NTX
West River RC
WR1VT 159 2 12 738 VT
Big Bend ARC
KC9LMF 22 2 9 724 IL
Eau Claire ARC
W9EAU 153 2 13 702 WI
Wellesley ARS
W1TKZ (+W1HEB)
141 2 25 696 EMA
W4IBM ARC
W4IBM 186 2 7 676 GA
Nanticoke ARC
W3TBG 164 2 4 596 DE
Henderson ARC
W7HEN 133 2 65 538 NV
The Beekers
W6BCE 66 2 3 500 ORG
Twin Rivers ARC
W9TRA 72 2 3 498 IL
Aiken RC
KE2HG 99 2 6 420 SC
Langley ARA
VE7LGY 77 2 8 380 BC
Bartlesville ARC
W5NS 88 2 12 360 OK
Suncoast ARC
VE7SYR 41 2 6 354 BC
Sachse ARA
W5SRA 38 2 10 266 NTX

4A

Indy United ARC
W9SU (+W9RCA)
5,063 2 42 20,915 IN
Huntsville ARC
K4BFT (+K4GIG)
4,064 2 78 15,176 AL
Sierra Foothills ARC
W6EK (+NN6H)
3,355 2 178 14,221 SV
Midessa Field Day Grp.
KD5C (+W5QGG)
3,412 2 20 13,490 WTX
Portage Co. ARS
K8BF (+AC8NT)
3,553 2 66 12,230 OH
Rocky Mountain Ham Radio
NØSZ (+WØKVA)
2,861 2 51 11,601 CO
Arrow Comm. Assn.
W8A (+W8RP)
2,185 2 48 9,901 MI
Livonia ARC/Ford ARL
K8UNS 2,765 2 66 9,674 MI
Ozaukee RC
W9CQO (+AE9MY)
2,250 2 40 8,517 WI
Clark Co. (WA) ARC
W7AIA (+N7HR)
2,100 2 130 8,433 WWA
Sun Country ARS
N4EK 1,928 2 23 8,106 NFL
Alachua EOC RC
NF4AC 1,643 2 15 7,890 NFL
West Fork ARC
W5T (+W5FKN)
2,627 2 20 7,268 NTX
Platinum Coast ARS
W4MLB (+K5LD)
1,595 2 33 7,123 SFL
Kent Co. ARC
N3Y (+W3DOV)
1,814 2 18 7,004 DE
Albany ARA
K2CT (+K2ALB)
1,409 2 31 6,531 ENY
Shelby Co. ARC
K4W 1,314 2 15 6,386 AL
Fauquier ARA
W4VA (+N4HKZ)
1,297 2 32 6,327 VA
Boston ARC
W1BOS 1,496 2 25 6,234 EMA
W7YED 1,438 2 8 5,674 WWA
Yonkers ARC
W2YRC (+KF2FK)
1,229 2 58 5,400 ENY
Hazel Park ARC
W8HP (+W8JXU)
1,137 2 19 5,384 MI
Ft. Smith Area ARC
W5ANR 1,212 2 10 5,280 AR
Radio Club of Tacoma
W7DK 1,554 2 66 4,982 WWA
Radio Amateurs of Greater Syracuse
W2AE (+KC2HO)
786 2 38 4,956 WNY
Barstow ARC
WA6TST (+K6B)
1,242 2 11 4,943 ORG
Oregon Tualatin Valley ARC
W7OTV 1,454 2 67 4,908 OR
N4N Field Day Grp.
N4N (+WB4SQ)
1,021 2 13 4,707 GA
Superstition ARC
K7K (+WB7TJD)
1,264 2 32 4,676 AZ
Lakeland ARC
K4LKL 1,068 2 38 4,630 WCF
Edmond ARS
K5EOK 855 2 80 4,586 OK
Glynn ARA
K4E 1,045 2 5 4,556 GA
Northeast ARC
N1ERC 1,210 2 22 4,556 EMA
Columbia-Montour ARC
WE3U (+W3ZR)
671 2 14 4,548 EPA
Ocean Monmouth ARC
N2MO 868 2 20 4,456 NNJ
Westchester EmComm Assn.
N2SF (+W2ECA)
1,016 2 25 4,415 ENY
Lewisville ARA
W5LVC 731 2 8 4,260 NTX
Riverland ARC
W9UP (+AB9NE)
674 2 17 4,059 WI
York Region ARC
VE3YRA (+VE3YRK)
696 2 56 3,980 GH
Grande Ronde Radio Amateurs Assn.
W7GRA 865 2 22 3,946 OR
Williamson Co. ARC
N5TT 871 2 29 3,874 STX
Washington Amateur Comm.
WA3COM (+NY9H)
756 2 31 3,844 WPA
Grand Rapids ARA
W8DC 1,090 2 36 3,786 MI
Steubenville-Weirton ARC
W8CWO (+KE8NKV)
801 2 23 3,743 OH
Southeastern CT ARS
W1QV 737 2 25 3,736 CT
Los Angeles City ACS
N6ACS 911 2 14 3,636 LAX
Solivita RC
N4SRC 794 2 8 3,578 WCF
Island Co. ARC
W7AVM 665 2 46 3,574 WWA
Two Rivers ARC of McKeesport
W3OC (+KC3YKT)
870 2 16 3,552 WPA
RF Hill ARC
W3AI 1,007 2 16 3,434 EPA
Elko ARC
W7V (+KM7SC)
706 2 30 3,400 NV
Chesapeake Bay Radio Assn.
WD3E (+WA3SFJ)
547 2 41 3,398 MDC
Columbia ARS
NF4CQ 626 2 10 3,344 NFL
Coos Co. RC
K7CCH 739 2 31 3,342 OR
St. Clair ARC
K9GXU 791 2 11 3,318 IL
Fair Lawn ARC
W2NPT (+KD2KLN)
559 2 26 3,254 NNJ
Mt. Vernon (OH) ARC
K8EEN 774 2 23 3,204 OH
Reading RC
W3BN 752 2 70 3,164 EPA
Windmill ARG
W3LTR (+N3AGG)
655 2 16 3,148 EPA
South Lyon Area ARC
N8SL 736 2 31 2,998 MI
Basin ARC
W7BAR (+KG7VYS)
759 2 30 2,891 UT
Santa Barbara ARC
K6TZ (+N6SBA)
504 2 12 2,839 SB
Mt. Diablo ARC
W6CX 493 2 42 2,814 EB
Appalachia ARC
WC4NC 877 2 15 2,804 NC
South Bay ARA
KU6S 1,353 1 18 2,781 EB
Four Lakes ARC
W9JZ 645 2 20 2,748 WI
Hernando Co. ARA
K4BKV 617 2 6 2,740 NFL
Lapeer Co. ARA
W8LAP (+KD8YUK)
473 2 32 2,713 MI
Bowie Wireless Assn.
K3BWA 744 2 12 2,710 MDC
Tompkins Co. ARA
AF2A 554 2 13 2,694 WNY
St. Louis and Suburban RC
WØSRC 494 2 50 2,676 MO
Warminster ARC
K3DN (+K3KH)
560 2 30 2,669 EPA
Coffeyville ARC
WRØMG 430 2 32 2,662 KS
Culpeper ARA
W4CUL (+KO4NMJ)
316 2 28 2,647 VA
Daytona Beach ARA
K4BV (+N4HSA)
284 2 30 2,645 NFL
Granite State ARA
N1QC (+N1JUR)
514 2 20 2,614 NH
Bledsoe Co. ARC
N4BCT (+KC4AC)
363 2 8 2,560 TN
Medina Co. AR Corp.
KD5DX 599 2 48 2,498 STX
Maury ARC
W4GGM (+KO4HUV)
479 2 23 2,443 TN
Royal Gorge ARC
KBØTUC (+NCØA)
354 2 12 2,438 CO
Quinte RC/Prince Edward RC
VE3RL 574 2 20 2,432 ONE
Eastern Fulmont ARC
W2F 352 2 8 2,428 NNY
Sangamon Valley RC
W9DUA 537 2 10 2,428 IL
Southern PA Comm. Grp.
K3AE 477 2 25 2,370 EPA
Central MO Radio Assn.
KØSI (+KEØSIY)
285 2 30 2,364 MO
Newton ARC
NØNK (+WØBZN)
496 2 9 2,340 KS
North Richland Hills ARC
W5R (+K5R)
335 2 13 2,338 NTX
Peterborough ARC
VE3RB 613 2 23 2,248 ONE
Alford Memorial RC
W4BOC 323 2 8 2,234 GA
Downey ARC
W6TOI 417 2 11 2,208 LAX
McMinn Co. ARC
K4RST 367 2 16 2,092 TN
Lakes Region Repeater Assn.
W1BST (+WX1NE)
305 2 14 2,086 NH
Southern OH Friends of AR
W8PU 445 2 12 2,074 OH
Jackson Co. ARES
K4A 549 2 19 2,056 AL
ARC of Parker Co.
W5PC 599 2 16 2,052 NTX
Niagara Peninsula ARC
VE3VM (+VE3GGR)
358 2 15 2,001 GH
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 (+KO4FFB) 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
WØNED 309 2 6 1,714 CO
Wichita ARC
WØW 344 2 27 1,690 KS
Florence ARC
W4ULH 230 2 26 1,686 SC
Northern Lakes ARC
KØGPZ 261 2 8 1,680 MN
Jones Co. ARC
WØCWP 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
NØWKF 406 2 4 1,412 IA
Kay Co. ARC
N5PC 207 2 15 1,404 OK
Clinton Co. ARA
W8GO (+KS8P) 145 2 11 1,404 OH
Longmont ARC
WØENO (+KØITP) 128 2 40 1,392 CO
Kent ARS
K3ARS 171 2 4 1,380 MDC
Iola ARC
WIØLA 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
WØRRZ 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
KZ8U (+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
WØBLK 99 2 10 408 SD
Villa Rica RC
WR4VR 96 2 20 242 GA

4A — Battery

St. Louis QRP Soc.
NØA 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
Koomer 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
WØALX 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
WØRRC 198 2 28 1,454 MN
Pioneer ARC
KØSW 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 (+KZ4CR) 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
WØOFK 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
Tyler ARC
K5TYR 2,111 2 60 6,794 NTX
MGRA/CGARC
W4R (+KN4DH)
2,076 2 35 6,718 GA
Lake Monroe ARS
N4EH (+N4BT)
1,604 2 45 6,520 NFL
Cherokee ARS
K4R (+WX4CAR)
1,461 2 46 6,419 GA
Cowtown ARC
K5COW 1,104 2 43 5,872 NTX
LEFROG/MAARS
W9FRG 1,405 2 9 5,324 WI
Baytown Area ARC
K5BAY (+AA5RX)
1,245 2 10 5,260 STX
NC TRI-CLUB
N4C (+W4HS)
1,319 2 48 5,086 NC
Chesapeake ARS
W4CAR (+K4AMG)
1,013 2 50 4,996 VA
Medina Co. ARC
W8HN 1,012 2 33 4,846 OH
Smoky Mountain ARC
W4OLB (+W4W)
1,172 2 68 4,740 TN
Valley RC of Oregon
W7PXL 790 2 125 4,022 OR
Andrew Johnson ARC
W4WC (+N7HPE)
945 2 45 3,989 TN
Antietam Radio Assn.
W3CWC 736 2 20 3,948 MDC
Seneca RC
W8ID 641 2 40 3,746 OH
Somerset Co. ARC
K3SMT (+KR3L)
649 2 23 3,692 WPA
Salem ARC
W7SAA (+K7KVN)
861 2 25 3,634 OR
Calhoun Co. ARG
W4CEM 800 2 7 3,536 SC
Wabash Valley ARA
W9UUU 732 2 20 3,532 IN
Lancaster ARC
W2SO 577 2 11 3,346 WNY
Lincoln Hills ARG
W6LHR (+KN6DRN)
526 2 5 3,329 SV
Mountain ARC
W3YMW (+KB3CS)
739 2 10 3,324 MDC
Alexandria RC
W4HFH 517 2 21 3,234 VA
Cherryville Repeater Assn. II
WW2CRA 635 2 12 3,186 NNJ
HP Boise ARC
AB7HP 616 2 12 3,110 ID
Overlook Mountain ARC
N2LL (+K2KMM)
748 2 25 2,914 ENY
Thousand Islands RC
K2I 500 2 22 2,858 NNY
Eastern MI ARC
K8EPV 539 2 21 2,698 MI
Red River Valley ARC
W5W 384 2 30 2,678 NTX
Vilas Co. ARC
W9VRC 771 2 5 2,580 WI
Klamath Basin ARA
W7VW (+N2RSN)
305 2 25 2,570 OR
Orange Co. (IN) ARC
W2HO 343 2 34 2,450 ENY
NOARS/LCARA
K8G (+K8KRG)
207 2 8 2,354 OH
Nanaimo ARA
VE7NA 471 2 25 2,238 BC
David Sarnoff ARC
N2RE 169 2 31 2,168 NNJ
Butler Co. AR Public Srvc. Grp.
K3PSG 333 2 30 2,148 WPA
ARC of Butts Co.
WX4BCA 252 2 12 2,132 GA
Whitman ARC
NI1X 301 2 30 2,112 EMA
Catalina RC and Radio Soc. of Tucson
K7RST (+WN7BSA)
268 2 42 2,095 AZ
Ottawa Co. ARES
N8O (+W8MAL)
139 2 6 2,015 OH
Snoqualmie Valley ARC/
Issaquah ARC/ICC/ICST
W7BI 298 2 28 2,006 WWA
Lincoln Co. ARA
W4BV 337 2 5 2,004 TN
Humboldt ARC
W6ZZK 281 2 15 1,970 SF
Comox Valley ARC
VE7CVW 312 2 6 1,962 BC
Federal Way ARC
WA7FW (+WA7DR)
127 2 20 1,921 WWA
California City ARC
KE6RN 328 2 10 1,870 SJV
London ARC
VE3LON 308 2 40 1,866 ONS
Sabin Field Day
W0HNV 298 2 9 1,812 MN
Black River ARC
K8BRC (+KI8Z)
317 2 23 1,780 MI
Lewis and Clark RC
K9HAM 71 2 27 1,732 IL
Queen Anne's ARC
K3QAC 158 2 5 1,724 MDC
Warrensburg Area ARC
W0AU 452 2 7 1,700 MO
Utica Shelby EmComm Assn.
K8UO 301 2 17 1,650 MI
West Virginia Univ. ARC/Monongalia
Wireless Assn./Monongalia Co. ARC
W8CUL (+KC8YUI)
350 2 20 1,634 WV
Western Carolina ARS
W4MOE 291 2 16 1,506 NC
Maryland Mobileers ARC
W3CU 295 1 39 1,470 MDC
San Luis Valley ARA
K0SLV 89 2 7 1,464 CO
Burlington ARC
VE3CJ 203 2 5 1,456 GH
Mt. Vernon (VA) ARC
K4US (+KU8V)
55 2 17 1,448 VA
Keuka Lake ARA
N2AAR 166 2 7 1,422 WNY
QSY Soc.
K2QS (+N2SKP)
72 2 23 1,401 ENY
Anderson Island ARC
WA7AI (+KK7RJO)
43 2 7 1,386 WWA
Zero-Beaters ARC
WA0FYA 191 2 6 1,332 MO
Toledo Radio Amateur Club
K8ALB 208 2 5 1,298 OH
The 220 MHz Guys
WM9W 198 2 10 1,268 IL
Denver Radio League
KE0NCQ 77 2 5 1,210 CO
Jefferson Co. (MO) ARC
KB0TLL 110 2 9 1,120 MO
Southwest Columbus Ham RC
WB8MMR 82 2 24 1,014 OH
Johnston ARS
K4SWR 190 2 10 976 NC
Drumlins ARC/Skenoh Island ARC
WA2AAZ 122 2 6 966 WNY
Cheshire Co. DX ARC
AD1T 147 2 15 944 NH
Montgomery ARS
NC4MC 70 2 5 710 NC

5A — Battery

W6TRW ARC
W6TRW (+WA2KDL)
905 5 34 9,665 LAX
Wayne Co. ARC
W3ARO 453 5 14 5,710 EPA
Upper Canada QRP Club
VE3UCC 338 5 5 3,675 ONE
North Coast ARC
N8NC 224 5 9 3,040 OH
Snake River ARC
K7SI 169 5 9 2,410 ID
Ulster & Northern Dutchess
Readiness Grp.
N2RDY 159 5 12 2,055 ENY

5A — Commercial

Pottstown Area ARC
W3U (+K3ZMC)
769 2 20 2,841 EPA
All Things ARA
W8ATR 454 2 50 1,880 OH
EWEphoria RC
K1EWE 168 2 6 1,060 NFL
North Okaloosa ARC
W4AAZ (+W4Z)
97 2 6 1,060 NFL
Yadkin Valley ARC
NC4TT 253 2 5 1,014 NC
Watertown ARC
W9TTN 307 2 5 808 WI
Castle Rock Repeater Grp.
KE0NVB 53 2 5 462 CO

6A

Mike & Key ARC
K7LED (+AE7G)
5,619 2 60 20,900 WWA
Orange Co. (CA) ARC
W6ZE (+W6NGO)
5,717 2 30 19,409 ORG
South Jersey Radio Assn.
K2AA (+W2EA)
4,809 2 69 18,198 SNJ
Lake ARA
K4FC (+N4FLA)
3,566 2 38 12,978 NFL
Central KY ARS
AJ4A 3,253 2 30 12,482 KY
Franklin Co. (NC) ARC
AA4RV (+KO4HUL)
2,827 2 38 10,957 NC
Cuyahoga ARS
W8BM 2,021 2 35 9,108 OH
Mississauga ARC
VE3MIS 1,871 2 27 7,594 GH
Broughton Memorial Field Day Grp.
W2IR (+K2AE)
1,547 2 75 6,783 ENY
Lake Area Radio Klub
W0WTN 1,613 2 36 6,700 SD
Warren ARA
W8VTD 1,422 2 30 6,374 OH
Kitchener-Waterloo ARC
VE3IC (+VE3HEC)
1,922 2 15 6,273 ONS
Owatonna Steele Co. ARC
K0HNY 1,272 2 21 5,978 MN
Long Island Mobile ARC
W2VL (+WV2LI)
1,228 2 60 5,656 NLI
Lake Co. ARA
N8BC 895 2 16 4,468 OH
Saginaw Valley ARA
K8DAC 772 2 15 4,430 MI
Hoodview ARC
W7Q 883 2 40 4,150 OR
Ft. Myers ARC
W4LX 691 2 11 3,806 SFL
North Ottawa ARC
W8CSO 564 2 14 2,944 MI
MARC/DECT
W3M 384 2 140 2,896 MDC
Five Flags ARA
W4UC (+KB4HAH)
367 2 39 2,869 NFL
Hamilton ARC
VE3DC 471 2 45 2,614 GH
Phil-Mont Mobile RC
W3EM (+W3AA)
593 2 20 2,604 EPA
Vero Beach ARC
W4OT 253 2 38 2,484 SFL
Ft. Herkimer ARA
W2FHA (+KD2TDB)
166 2 19 2,467 WNY
Oak Hill ARC
N5OAK 642 2 10 2,400 STX
Shy-Wy ARC
WY7HR 329 2 30 2,356 WY
Iredell Co. ARS
W4SNC 312 2 15 2,352 NC
East River ARC
W8MOP (+W8ZBR)
172 2 31 2,248 WV
Mississippi Coast ARA
W5SGL 412 2 30 2,148 MS
Goshen ARC
K9TSM 249 2 10 2,088 IN
North Bay ARA
K6LI 293 2 25 2,076 EB
Peak Radio Assn.
W7PRA 541 2 10 2,072 OR
Grundy Co. ARC
W9G (+KB9SZK)
184 2 10 1,802 IL
Treasure Valley Radio Assn.
K7OJI (+KE7KE)
158 2 6 1,756 OR
Bear Bait RC
W2JST 125 2 19 1,732 NNY
Clairemount Repeater Assn.
N6CRA 104 2 10 1,730 ORG
Susquehanna Co. ARC
N3SRC 223 2 16 1,700 EPA
Limestone ARES
N4SEV 224 2 31 1,664 AL
St. Croix Valley ARC
WW1IE 160 2 20 1,642 ME
Twin State RC
W1FN 230 2 12 1,568 NH
Marple Newtown ARC/Mobile Sixers RC
K3MN (+W3AWA)
126 2 15 1,402 EPA
Salt Spring Island ARS
VE7RAS 235 2 20 1,320 BC

6A — Commercial

Central LA ARC
K5M (+N5AEX)
1,614 2 21 7,100 LA
Intercity ARC
W8WE 428 2 20 2,002 OH
South Wake ARC
N4SWC 114 2 6 678 NC

7A

Ventura Co. ARS/Simi Settlers ARC
N6R 1,877 2 49 6,044 SB
Panhandle ARC
W5WX (+KI5KGC)
1,149 2 36 4,664 WTX
Piedmont ARC
K4PAR (+K4P)
579 2 20 4,591 GA
Penn Wireless Assn.
W3SK (+WE3F)
752 2 34 4,533 EPA
Haywood Co. ARC
KW4P 773 2 100 4,508 NC
Silvercreek ARA
W8WKY 1,125 2 30 4,442 OH
Western Reserve ARC
W8WRC (+WF8U)
799 2 18 4,071 OH
Delta ARS
VE7SUN 481 2 35 3,390 BC
Tulsa ARC
W5IAS (+K5AEB)
333 2 52 2,812 OK
Sierra Nevada ARS
W7TA (+KB7QOD)
337 2 48 2,780 NV
Vaca Valley RC
W6VVR (+KJ6DLF)
213 2 20 2,335 SV
Bay Area ARC
K8BAY 357 2 24 2,198 MI
Muskegon Area AR Council
W8ZHO 221 2 34 2,108 MI
Bridgerland ARC
W7IVM 208 2 45 1,690 ID
Tonto ARA
N7TAR 1 2 38 1,202 AZ
Sandusky Radio Experimental League
W8LBZ 193 2 5 1,196 OH

7A — Commercial

L'Anse Creuse ARC
N8LC 982 2 30 4,132 MI

8A

Woodbridge Wireless
W4IY (+W4AD)
2,554 2 42 11,085 VA
Fox River Radio League
W9NE (+W9CEQ)
2,528 2 80 10,503 IL
Mahoning Valley ARA
W8QLY 2,896 2 32 9,968 OH
Rappahannock Valley ARC
K4TS (+KJ4MHD)
2,463 2 24 9,378 VA
Black Swamp ARC
K8BSR 2,024 2 16 6,924 OH
Gwinnett ARS
W4GR 1,461 2 45 5,916 GA
San Antonio RC
AA5RO 307 2 41 2,682 STX

Meridian ARC
W5FQ 194 2 10 2,366 MS
Stanislaus ARA
W6ERE 256 2 30 1,830 SJV

9A

Raleigh ARS
W4DW (+N4RAL)
4,650 2 81 19,742 NC
Gloucester Co. ARC
W2MMD (+W2KBF)
2,123 2 50 9,791 SNJ
Forsyth ARC
W4NC (+W4WS)
1,765 2 65 8,702 NC

10A

Brazos Valley ARC
KK5W (+KT5TX)
5,319 2 130 20,604 STX

11A

Benicia ARC
KB6BEN (+KB6EOC)
309 2 13 2,939 EB

12A — Battery

West Valley ARA
K6EI (+W6ZZZ)
2,426 5 20 23,690 SCV

13A

Potomac Valley RC
W3AO (+KE3Q)
10,350 2 45 36,542 MDC
Ventura Co. ARC
K6MEP (+K6QV)
603 2 30 4,874 SB

21A

Conejo Valley ARC
AA6CV 2,033 2 50 9,196 SB

One or Two Person Club/Non-Club Portable

1B — One Operator

Mad River RC
KW8N 1,422 2 1 6,086 OH
K1LT 1,148 2 1 4,842 OH
K8RYU 1,044 2 1 4,152 OH
K3II (+K3CT)
1,000 2 1 4,150 EPA
W2FU 913 2 1 4,002 WNY
Potomac Valley RC
KB4CG 865 2 1 3,694 VA
K8ER 620 2 1 2,730 MI
Catalina RC and Radio Soc. of Tucson
N7DZ 539 2 1 2,404 ID
WA9Z 536 2 1 2,394 IA
W4KAZ 482 2 1 2,172 NC
Frankford RC
KC3FQF 518 2 1 2,122 DE
AF0E 462 2 1 2,098 CO
W0H (+WB0TUA)
463 2 1 2,002 MO
Ham Assn. of Mesquite
KG5AUU 380 2 1 1,972 NTX
Southern CA Contest Club
N2JNR 400 2 1 1,934 NV
Florida Contest Grp.
NK4DX 332 2 1 1,878 NFL
KI7KY 451 2 1 1,838 UT
Wilson ARC
K4AL 413 2 1 1,802 TN
Oregon Tualatin Valley ARC
WS7L 411 2 1 1,794 WWA
Mike & Key ARC
AG7T 311 2 1 1,744 WWA
HP Alumni RC
W1HP (+K1KP)
361 2 1 1,674 ME
W0RX 375 2 1 1,650 MN
KD9MAB 296 2 1 1,624 IN
W8AN 326 2 1 1,554 OH
N0UY 350 2 1 1,550 MN
AK0A 281 2 1 1,474 KS
Florida Contest Grp.
NF6P 304 2 1 1,452 EPA
NW2K 335 2 1 1,390 NFL
The World RC
W3WRC (+WE6Z)
300 2 1 1,390 SV
K0VK 435 2 1 1,320 CO
South Mountain Radio Amateurs
W3AND 285 2 1 1,290 EPA
K7EBO 287 2 1 1,286 UT
K7SW 604 2 1 1,258 UT
KC1BDJ 263 2 1 1,202 VT
AA4JW 119 2 1 1,168 SC
WA8RC 253 2 1 1,162 MI
K5TFL 405 2 1 1,160 NM
KJ2U 221 2 1 1,134 WWA
Arizona Outlaws Contest Club
W7AWE 1,055 1 1 1,105 AZ
N7DLV 242 2 1 1,084 WWA
WJ1T 263 2 1 1,072 VA
KU7K 203 2 1 1,062 OR
W9DKB 200 2 1 1,050 WI
N6VHF 243 2 1 1,046 ORG
N2MD 402 2 1 954 NFL
Cleveland ARC
AE4GS 173 2 1 942 TN
SOTA LEOs
WA6LE (+WA9STI)
202 2 1 942 SB
Oneula Beach Expedition
WH6GZH 159 2 1 934 PAC
AG3I 257 2 1 924 WPA
West Valley ARA
KC7XE 207 2 1 902 UT
W6ZD 75 2 1 850 SFL
WB0OFR 289 2 1 828 CO
AG7TX 140 2 1 772 NV
WA2CRQ 116 2 1 748 SCV
Pentagon ARC
W9TCV 60 2 1 720 NFL
WO4O 104 2 1 716 NFL
KR4LW 115 2 1 710 NFL
WT2X 114 2 1 706 WNY
CHIRP Field Day Team
KK7DS 200 2 1 700 OR
W9ZK 223 2 1 696 OK
K3DI 65 2 1 690 DE
Tri-Town RAC
K9PMV 82 2 1 678 IL
WS4Y 106 2 1 674 NFL
KC8RJS 108 2 1 666 OH
Patoka Valley ARC
KD9RPS 255 2 1 660 IN
KB9S 97 2 1 638 WI
N4NR 122 2 1 638 NFL
Davis Co. ARC
K7JTO 125 2 1 632 UT
W6OBB 88 2 1 626 SB
KE0ITC 231 2 1 612 IA
Northern CA Contest Club
K7TDM 152 2 1 588 NV
AA5HK 95 2 1 584 NM
W8FWY 83 2 1 582 OH
N3DMV 171 2 1 580 MDC
Shreveport ARA
AI5DQ 77 2 1 578 LA
AI5NQ 161 2 1 572 NTX
AC9OT 55 2 1 570 WI
KG0E 84 2 1 568 ND
Allegheny Valley Radio Assn.
W3RA (+W3WC)
90 2 1 556 WPA
KJ4KW 100 2 1 550 NFL
Tri-Town RAC
K9EGS 30 2 1 548 IL
KC3FVN 99 2 1 546 EPA
ARES of Douglas and Elbert Co.
W0BDT 49 2 1 546 CO
KF0BWA 137 2 1 544 IA
AF0F 160 2 1 518 KS
Tortolita RC
K9PM 66 2 1 514 AZ
W8MKR 122 2 1 512 MI
K5JSG 39 2 1 506 WNY
K8OB 75 2 1 500 MI
K6WRJ 136 2 1 498 SCV
San Juan Co. ARS
AF4PM 110 2 1 470 WWA
NT7R 99 2 1 456 AZ
W2MSA 100 2 1 454 ENY
W5DLW 51 2 1 452 WTX
NK4I 22 2 1 444 TN
N0NS 116 2 1 430 IA
Orange Co. (IN) ARC
K9RBH 37 2 1 424 IN
KJ7MLK 68 2 1 422 OR
W7RET 82 2 1 414 ID
West Allis RAC
W9JSP 69 2 1 412 WI
Calgary ARA
VE6FXL 80 2 1 410 AB
KI6Y 79 2 1 408 AZ
KO4JBD 115 2 1 408 VA
W0VO 79 2 1 408 CO
Quaboag Valley ARC
WB1DX 129 2 1 408 WMA
KD8APE 62 2 1 394 VA
Sussex ARA
WA0CIE 11 2 1 394 DE
Mound ARA
N8JXJ 20 2 1 390 OH
KD2RPX 68 2 1 386 CO
Issaquah ARC
W7ETZ 67 2 1 384 WWA
WX5LOK 66 2 1 382 UT
N9JFK 115 2 1 380 WI
AB5SS 57 2 1 378 STX
KD3KP 63 2 1 376 EPA
KA2OEE 112 2 1 374 AR
WM2W 112 2 1 374 TN
AD7GU 4 2 1 358 AZ
K1DS 33 2 1 356 SFL
K7NWR 52 2 1 354 WWA
K9QA 52 2 1 354 IL
KQ6KC 26 2 1 342 CT
Queen Anne's ARC
N1AHO 73 2 1 342 MDC
KN6KHV 56 2 1 330 SCV
NG4V 40 2 1 330 TN
Fox Cities ARC
AJ9L 39 2 1 328 MI
Quaboag Valley ARC
KC1TIW 87 2 1 324 WMA
Warminster ARC
K3FMQ 18 2 1 322 EPA
N2TO 44 2 1 322 NNJ
N5YIZ 33 2 1 316 STX
WT8P 44 2 1 316 WWA
KK1J 31 2 1 312 AZ
KB1RZA 80 2 1 310 VT
W6AGZ 80 2 1 310 OR
K5WXV 59 2 1 308 NTX
Franklin Co. (NC) ARC
NY4NC 28 2 1 306 NC
AE6R 19 2 1 304 EB
KE8DMB 27 2 1 304 WPA
Saratoga Co. ARA
W2EMS 52 2 1 304 NNY
KF4FLY 25 2 1 300 NC
KC1FOZ 24 2 1 298 NH
Overlook Mountain ARC
KD2EYH 24 2 1 298 TN
KK7OYV 14 2 1 298 UT
W5RJJ 124 2 1 298 NM
KD8OZO 23 2 1 296 SB
W7AYQ 22 2 1 294 WWA
W5KFX 11 2 1 292 NTX
K8CSR 20 2 1 290 OH
KG4AFY 10 2 1 290 AL
N9HOX 70 2 1 290 IL
KK6JON 58 2 1 288 SV
AE4AW 17 2 1 284 WCF
NZ0B 16 2 1 282 IA
WA2PCN 33 2 1 282 CO
KT4X 128 1 1 278 GA
W7KFM 62 2 1 274 OR
Lake Area AR Klub
KF5VO 61 2 1 272 NTX
San Benito Co. ARA
W6KRK 60 2 1 270 SCV
W7PMR 10 2 1 270 WWA
KD0FAB 9 2 1 268 CO
KG7HVA 7 2 1 264 OR
KB3SPH 55 2 1 260 MDC
KM5VZ 5 2 1 260 NTX
Lake Area AR Klub
KF5OMH 52 2 1 258 NTX
WD9EWK 3 2 1 258 AZ
N8XCM 52 2 1 254 MI
K9DGY 31 2 1 250 MO
KC3EUU 50 2 1 250 EPA
K9MD 45 2 1 240 IN
Ft. Wayne RC
KD8YNG 43 2 1 240 IN
KA6BJR 42 2 1 234 SB
Virginia Beach ARC/Virginia DX Century Club
K4VBX 40 2 1 230 VA
KC8AAF 40 2 1 230 MI
K7KVH 38 2 1 226 SV
KF5RUO 37 2 1 224 TN
KJ5CLA 37 2 1 224 WTX
KM6SJO 18 2 1 216 EB
KJ6WEG 30 2 1 210 ME
VY1XY 15 2 1 210 TER
KC2USA 28 2 1 206 WNY
Calaveras ARS
N6IV 14 2 1 206 SJV
N8VBL 27 2 1 204 MI
W4AJJ 27 2 1 204 MO
Utah Valley ARC
KJ7FUB 26 2 1 202 ID
KN6HIP 12 2 1 198 SCV
K0BUF 23 2 1 196 EPA
W4BTH 72 2 1 194 KY
KE8SNO 19 2 1 188 WV
W9BON 19 2 1 188 IN
AI7DK 34 2 1 186 MT
KO4BWN 8 2 1 182 AL
N2DM 15 2 1 180 WNY
Mike & Key ARC
W6OHM 14 2 1 178 WWA
VA3ONO 13 2 1 176 GH
W0VZ 12 2 1 174 NC
K0BEN 11 2 1 172 MN
N2NFG 5 2 1 170 NLI
NR7Z 31 2 1 170 EB
KI4AZX 58 2 1 166 SC
ARA of the Southern Tier
AB1BL 57 2 1 164 WNY
KI5JKG 5 2 1 160 STX
NU6R 5 2 1 160 NTX
K5LGV 4 2 1 158 NTX
KE8YXK 4 2 1 158 MI
Moore Co. ARS
NZ4CM 1 2 1 154 NC
KG7HTE 49 2 1 148 OR
VE5DLC 48 2 1 146 SK
Minnesota Wireless Assn.
K0JJR 41 2 1 132 MN
KW7WP 40 2 1 130 OR
WD9EEK 36 2 1 122 IL
McMinnville ARC
WE7DW 32 2 1 114 OR
W5JOC 51 1 1 101 NM
KF0LJT 21 2 1 92 SCV
ARES of Douglas and Elbert Co.
W4MOV (+AB0VZ)
18 2 1 86 NC
WD5KED 17 2 1 84 NM
W3IYO 7 2 1 78 NC
Richardson Wireless Klub
N5MSH 10 2 1 70 NTX
WB7MAX 10 2 1 70 OR
VE6KRF 8 2 1 66 AB

1B — One Operator Battery

Arizona Outlaws Contest Club
KY7M 793 5 1 8,010 CO
Kentucky Contest Grp.
N4TY 761 5 1 7,760 KY
K3WW 601 5 1 6,360 EPA
Colorado QRP Club
KF7MD 614 5 1 6,285 CO
Driftless Zone Contesters
W9ET (+WB9SBD)
514 5 1 5,290 WI
N4DD 499 5 1 5,040 VA
W6AWG 415 5 1 4,465 LAX
Boulder ARC
KX0R 401 5 1 4,360 WY
W3TS 342 5 1 3,970 EPA
KE4Q 330 5 1 3,550 GA
K1MZM 327 5 1 3,520 VT
W9NJY 311 5 1 3,460 WI
N7UN 325 5 1 3,400 EWA
Del Mar QRP
WB9COY 299 5 1 3,340 SDG
Pasadena RC
N6ARA 313 5 1 3,315 LAX
KE0TT 316 5 1 3,310 MN
K4WY 292 5 1 3,235 VA
K7RE 287 5 1 3,020 NM
AF4CM 263 5 1 3,015 NC
Oro Valley ARC
KF0X 266 5 1 3,010 AZ
AC7A 270 5 1 2,950 AZ
KW9R 270 5 1 2,950 WI
KN3A 230 5 1 2,650 EPA
N8WXQ 246 5 1 2,590 WPA
KN1H 238 5 1 2,530 NH
W8MRL 209 5 1 2,525 OH
First Class CW Operators' Club
WG4FOC (+K3TW)
210 5 1 2,450 NFL
KI5WES 224 5 1 2,445 LA
VE3KQN 228 5 1 2,430 ONE
VA4ADM 214 5 1 2,390 MB
W1PID 203 5 1 2,380 NH
W3WT 199 5 1 2,340 EPA
KE2UK 216 5 1 2,310 NLI
WA4NKL 210 5 1 2,300 GA
WA6ARA 179 5 1 2,290 SJV

VA3FN	203	5	1	2,280	ONS
Contest Club Ontario					
VE3CT	211	5	1	2,245	ONE
KØBH	174	5	1	2,190	CO
WA7ZZB	150	5	1	2,100	EWA
N7RCS	193	5	1	2,080	SFL
West Baldwin City ARC					
WVØA (+NRØP)					
	210	5	1	1,990	KS
KU4A	181	5	1	1,960	KY
AA4HV	180	5	1	1,950	TN
Carolina DX Assn.					
W3SA	180	5	1	1,950	NC
Phil-Mont Mobile RC					
N3ZP	178	5	1	1,930	EPA
KB4IRR	162	5	1	1,870	MO
WB9CYY	152	5	1	1,870	WI
KC9NJZ	134	5	1	1,790	IL
West Allis RAC					
WO9B	108	5	1	1,780	MI
N4NTO	133	5	1	1,680	NC
Sun City Center ARC					
AD5EN	131	5	1	1,660	SC
Ventura Co. ARC					
NS6X	137	5	1	1,620	ENY
K8EG	152	5	1	1,615	OH
WD7Y	141	5	1	1,560	NV
Ottawa Valley QRP Soc.					
VA3RKM	97	5	1	1,515	ONE
Pasadena RC					
N9LFF	129	5	1	1,505	LAX
Utah Valley ARC					
WJ7S	115	5	1	1,500	UT
NØLMQ	108	5	1	1,475	MO
K5NOT	132	5	1	1,470	NTX
Fox River Radio League					
N5EP	131	5	1	1,460	WI
NØUD (+WBØOAJ)					
	119	5	1	1,440	ND
N3BEN	124	5	1	1,400	SV
American Legion ARC Post 33					
AB9BZ	110	5	1	1,350	IL
N5NAA	110	5	1	1,250	STX
WD5HNI	110	5	1	1,250	STX
N9OHW	111	5	1	1,230	SCV
WCARES Contest Grp.					
KO4DCO	78	5	1	1,135	TN
Montgomery ARC					
W5NZ	77	5	1	1,110	AL
Pasadena RC					
N6AN	106	5	1	1,085	LAX
Central WV Wireless Assn.					
K8PEC	101	5	1	1,060	WV
KØTTW	89	5	1	1,040	CO
K4GUF	88	5	1	1,030	TN
Columbia (MD) ARA					
NN3I	36	5	1	1,010	MDC
KFØXV	82	5	1	970	KS
KF5ZAP	72	5	1	970	NTX
KC4CR	55	5	1	950	OR
KW4JS	80	5	1	950	TN
VE3IPS	115	5	1	935	ONS
KCØZPS	88	5	1	930	CO
W7DLR	80	5	1	930	WWA
Maritime Contest Club					
VE9AA	73	5	1	880	NB
WA2WMR	83	5	1	880	VA
W8NNC	70	5	1	850	OH
Shreveport ARA					
WA5ARJ	58	5	1	830	AR
KM6ZX	46	5	1	810	ORG
N6NVO	36	5	1	810	SCV
Club Radio Amateur de l'Outaouais					
VE2KZW	56	5	1	810	QC
WB5IUG	49	5	1	790	NTX
K1TTW	73	5	1	780	CO
Gallatin Ham RC					
KJ7SSS	106	5	1	780	MT
WB3GCK	62	5	1	770	EPA
WE3Q	41	5	1	760	MDC
WUØL	51	5	1	760	SD
W4IFI	60	5	1	750	CO
KA2BEO	54	5	1	740	SNJ
KB7LJP	39	5	1	740	WWA
Central WV Wireless Assn.					
N8SLT	58	5	1	730	WV
WA9YEE	56	5	1	710	CO
VE6FAR Cycle 25					
VE6LK	43	5	1	700	AB
KØRGI	54	5	1	690	TN
Newport Co. RC					
K1NPT	52	5	1	670	RI
K3GX	41	5	1	660	EB
W2EB	31	5	1	660	WNY
KC3PIB	51	5	1	655	AZ
Minnesota Wireless Assn.					
KØCD	50	5	1	650	WI
WØBC	40	5	1	650	CO
WQ6P	55	5	1	630	ORG
N7QS	47	5	1	620	MT
VE3DQN	47	5	1	620	ONE
WØKDM	26	5	1	610	SB
KJ4AXB	25	5	1	600	WV
CARESS-NWARC					
VE7TL	44	5	1	590	BC
N1HOB	44	5	1	580	OK
KØAIZ	31	5	1	560	NE
W2AEW	31	5	1	560	NNJ
KØLAR	30	5	1	550	MN
W9YO	40	5	1	550	IL
Columbia-Montour ARC					
WA4THR	40	5	1	550	EPA
WB6VIC	39	5	1	530	SB
N6KM	28	5	1	525	RI
Bishop ARC					
NN7O	22	5	1	520	ORG
AJ4BB	26	5	1	510	EPA
KD5MOA	39	5	1	495	STX
WA1MAD	49	5	1	495	NNY
WD8RIF	14	5	1	490	OH
Ft. Wayne RC					
AC9XS	43	5	1	480	IN
K7GZP	33	5	1	480	OR
STARS ARC					
KE9JQ	25	5	1	475	IL
Palo Alto ARA					
K6NIA	32	5	1	470	EMA
N8NFE	22	5	1	470	WI
AE2T	31	5	1	460	WNY
NX1K	21	5	1	460	WMA
KM6TWJ	13	5	1	455	ORG
Echelon ARC					
KA4EPB	10	5	1	450	NM
David Sarnoff ARC					
N2LO	30	5	1	450	SNJ
N7QR	10	5	1	450	OR
K7JSG	39	5	1	445	UT
N9IVI	44	5	1	445	IN
KB8RTB	9	5	1	440	OH
Majors Field ARC					
NT5CN	38	5	1	440	NTX
N3JWJ	28	5	1	430	WCF
N4KPT	17	5	1	420	TN
WF4V	27	5	1	420	VA
KEØATL	20	5	1	415	KS
KB1HXO	32	5	1	410	WMA
VE3PYJ	32	5	1	410	GH
W6EFI	6	5	1	410	SCV
San Francisco RC					
K6TOR	24	5	1	390	SV
KC7WDL	24	5	1	390	WWA
North American QRP CW Club					
KI4DEF	24	5	1	390	NC
Utah Valley ARC					
KI7QCF	13	5	1	380	UT
N2JPR	22	5	1	370	NLI
W9TLS	12	5	1	370	NM
Pasadena RC					
WA6IFY	24	5	1	370	LAX
North Shore RC (IL)					
WB9UVJ	33	5	1	370	IL
Ft. Madison ARC					
NYØO	18	5	1	365	IA
KGØV	11	5	1	360	CO
KK4DX	42	5	1	360	CT
NH6O	1	5	1	360	PAC
K1DCT	10	5	1	350	CT
K4TRT	7	5	1	320	EPA
WWØWB	33	5	1	315	CO
VE3LVW	31	5	1	305	ONS
KC3SWR	15	5	1	300	WPA
NA5DX	15	5	1	300	IA
W4VG	25	5	1	300	VA
KG7JWN	14	5	1	290	UT
Southeast LA ARC					
KI5NMJ	6	5	1	280	LA
N4IX	46	5	1	280	GA
K7MSO	12	5	1	270	MT
KB9WFS	3	5	1	265	ORG
N8URE	3	5	1	265	SFL
KK7EWJ	21	5	1	260	UT
W9YES	11	5	1	260	IL
KD7ZYN	12	5	1	250	WWA
N2QFD	10	5	1	250	WNY
W1RFY	10	5	1	250	EMA
VE3JGO	17	5	1	235	ONS
KD9KYL	8	5	1	230	WI
AI5DD	6	5	1	210	OK
Club Radio Amateur de l'Outaouais					
VE2MW	12	5	1	210	QC
K2ORC	30	5	1	200	VA
N7CPM	4	5	1	185	WWA
KØFNS	13	5	1	180	CO
KB7YS	6	5	1	180	EWA
KC3WWC	3	5	1	180	MDC
Pride Radio Grp.					
KG5JST	3	5	1	180	OK
KI7URL	5	5	1	175	SD
K7BIK	4	5	1	170	OR
Palos Verdes ARC					
W6KCV	2	5	1	170	LAX
AE4TH	3	5	1	165	WWA
K2BCM	1	5	1	160	WNY
NR6T	1	5	1	155	TN
NS9U	1	5	1	155	OH
AG6AQ	10	5	1	150	SCV
K8WSR	18	5	1	140	MI
AL7JK	7	5	1	120	AK
KE3KD	7	5	1	120	WPA
KE8PCQ	11	5	1	105	MI
KI7VUX	4	5	1	90	WWA
Utica Shelby EmComm Assn.					
N8KZ	3	5	1	80	MI
Pasadena RC					
KN6ZOO	2	5	1	60	LAX

1B — One Operator Commercial

QRP Pals					
WAØMN (+NØUR)					
	400	2	1	1,650	MN
AD7DD	425	1	1	1,249	ID
Something Awful ARS					
AA2BG	167	2	1	718	ENY
K7BWC	189	2	1	662	UT
Highlands Hams					
WD5FCA	122	2	1	618	AL
Pamlico ARS					
KO4MHM	150	2	1	552	NC
K4XD	119	2	1	526	NC
KB8MQ	120	2	1	390	OH
Santa Clara Co. ARA					
KK6HWN	99	2	1	348	SCV
London ARC					
VA3NSS	122	2	1	316	ONS
KFØBLI	43	2	1	312	NE
KD5BBR	70	2	1	290	OK
WØCZ	47	2	1	284	ND
N1ADX	105	2	1	260	VT
KD7YVV	37	2	1	224	WWA
W3RSH	29	2	1	208	WPA
KN8AA	73	2	1	196	IA
W3JG	21	2	1	192	EPA
AI9K	33	2	1	182	IL
AD4AX	32	2	1	178	KY
NR9E	50	2	1	150	IL
KD9QGK	48	2	1	146	MO
KM4WYO	22	2	1	130	AL
WA5JM	37	2	1	124	CO
N4DE	18	2	1	122	NC
Cumberland Valley ARC					
KC3YBG	31	2	1	112	NC
K4BWI	12	2	1	90	VA
W1FJC	15	2	1	88	CO
W3PTH	7	2	1	78	EPA
WB7EBK	9	2	1	68	CO
KFØM	4	2	1	66	OK
KD7UXT	6	2	1	62	PAC

1B — Two Operators

GBoSH Field Day Gang					
WØCO (+KØEU)					
	1,980	2	2	8,818	CO
KH6AQ	1,076	2	2	4,554	PAC
Ted's Family Farm Grp.					
WR4T (+NI8S)					
	915	2	2	3,910	OH
Wistaria Wireless Soc.					
K6TY (WB6MLI, WB6VRN)					
	239	2	2	1,556	SJV
NC4SW (+NR4O)					
	281	2	2	1,474	NC
KO4YIN (+WGØY)					
	255	2	2	1,368	SF
Gratiot Co. Old Timers					
W8AWE (+W8DCQ)					
	297	2	2	1,330	MI
Puerto Rico Contest Team					
WP4TJG	406	2	2	1,062	PR
KM5TY	169	2	2	1,046	CO
Queen Anne's ARC					
NW3L	201	2	2	908	MDC
Ether Busters					
WØKU (+WØPER)					
	165	2	2	892	CO
WD8U (+N8JAX)					
	358	2	2	866	WCF
Carlyle Lake Fest					
KØPLC	155	2	2	760	IL
Desert Creek DX'ers					
KB7XL (+W6AAE)					
	230	2	2	710	NV
Wireless Assn. of South Hills ARC					
W3K (K3VX, W3WH)					
	101	2	2	554	WPA
K6WDE (+W6SJE)					
	201	2	2	552	UT
KØSV (+KBØZZJ)					
	200	2	2	550	MN
Yellowknife ARS					
VE8YK (VE8MN, VE8MT)					
	72	2	2	538	TER
NØUK (+KØHAC)					
	46	2	2	534	MN
Camp Rainfall					
NØUEP	86	2	2	522	MI
K3UWY (+K9HXO)					
	101	2	2	514	WCF
KZ7A (+KJ7IEF)					
	65	2	2	510	SD
N6MDV	46	2	2	498	LAX
WØAO (+KK7STX)					
	94	2	2	478	ID
KL4QZ	144	2	2	438	NTX
WA6SCR	39	2	2	428	ORG
KM4VCO (+NZ4N)					
	90	2	2	424	NC
AG4P	99	2	2	402	TN
W7WOW	66	2	2	392	VA
NØDR	100	2	2	370	WY
West Coast Crudders					
W6BDW	51	2	2	366	EB
Cole Co. Em. Response Team					
KDØEAY (KDØNJU, KFØQQX)					
	53	2	2	356	MO
AI6UG (+KE4TSA)					
	38	2	2	326	LAX
VE6AKS	10	2	2	320	AB
KI5JF (+KG5ROF)					
	60	2	2	292	MS
KB1UJS (+KB1VTD)					
	69	2	2	288	ME
KE8MYN	9	2	2	268	MI
Northeast ARC					
K5NEA (N5SEB, N5ASH)					
	50	2	2	250	AR
KCØLFQ (+KCØMJY)					
	26	2	2	202	CO
KC4KEZ	20	2	2	190	KY
WA3KOI	18	2	2	106	WPA

1B — Two Operators Battery

VA3YV	418	5	2	4,390	ONS
KE3V (+WB3CEG)					
	408	5	2	4,230	WPA
N4HAY (+AB4PP)					
	205	5	2	2,300	NC
NG4S	159	5	2	2,090	SC
KI4IO	167	5	2	1,820	VA
Central WV Wireless Assn.					
WC8L (+W8VAB)					
	163	5	2	1,780	WV
Wayne ARC					
N8IW	115	5	2	1,300	OH
N8DMT (+N8DKK)					
	78	5	2	1,025	IL
KH6RF	47	5	2	805	AK
W8KJ (+KC8CKW)					
	59	5	2	650	OH
N3OFR (+N3RLX)					
	57	5	2	635	EPA
AH7RF	15	5	2	580	PAC
KC7CCK (+KE7AUP)					
	54	5	2	520	EWA
Ottawa Valley Mobile RC					
VE3YY	22	5	2	260	ONE
Pine State ARC					
N1DAE	16	5	2	230	ME
KB1PGF	1	5	2	205	OH

1B — Two Operators Commercial

FOS Garage ARC					
NØBAK	284	2	2	1,186	MN
W7A (N7OMS, AD7LJ)					
	156	2	2	874	EWA
KR8E	193	2	2	636	OH
AB4V (+KM4TZD)					
	123	2	2	326	NC

2B — One Operator

KØVU	156	2	1	1,184	MN
KE7F	153	2	1	686	OR

2B — One Operator Battery

WA6TPO	53	5	1	1,165	AZ
AH6X	42	5	1	550	ID
Conejo Valley ARC					
W2AYZ	5	5	1	275	SB

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.					
KØWD (+KBØLF)					
	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
WØWH (+KG9OC)					
	239	2	2	1,306	NE
KXØA (+WØNCO)					
	243	2	2	1,262	CO
AC8QX	368	2	2	1,086	MI
K3WM (+AB3IK)					
	192	2	2	1,026	WPA
Friends Having FD 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
KFØKDI (+KFØQGN)					
	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
WBØPOH	102	2	1	558	VA
VE3SSR	275	1	1	553	GH
K9JK	36	5	1	510	IL
Northern Lakes ARC					
WWØTT	35	5	1	475	MN
Richardson Wireless Klub					
N4CD	103	2	1	462	NTX
WCØO	99	2	1	458	LAX
WØIS	55	2	1	456	MN
Arrowhead RAC					
NØEO	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					
KØBAK	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
NØEVH	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					
WØXXT	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
KFØKPA	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
Albemarle 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**.

Jim Wilson, K5ND, jim@k5nd.net

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, KI1P, 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, KI1P, 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 c**ontests@arrl.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	KØQB
Dakota Division Rover	Matt Holden, KØBBC	KCØP/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.arrl.org**. You'll find detailed analysis and more play-by-play, along with the full line scores. Improve your results by studying your log-checking report, too.

Top Ten

Classic Rover

VE3OIL/R	116,850
N7GP/R	53,724
KF2MR/R	26,520
K2ET/R	21,667
VE3WJ/R	20,736
KE2BUY/R	16,960
K9TMS/R	13,804
N9REP/R	13,272
N6UTC/R	10,960
AA9IL/R	6,156

Limited Rover

NV4B/R	96,875
KA5D/R	81,468
W5TN/R	62,457
KG9OV/R	57,706
W5OC/R	21,526
W4JST/R	19,093
N6GP/R	17,550
KC9NJZ/R	15,930
N5ZY/R	15,566
KM4OZH/R	11,556

Unlimited Rover

KG6CIH/R	42,825
KØDAS/R	13,950
K4CNY/R	3,339
WB2VVQ/R	2,883
KOØZ/R	2,610
VE3SST/R	1,472
VE3KGC/R	1,078

Single Operator, High Power

K1TEO	448,896
N2JMH	253,976
N4OGW	112,710
K1RZ	102,416
K9CT	97,632
W3IP	93,990
K9KLD	80,510
K1KG	74,168
AA5AM	72,839
K3DNE	70,253

Single Operator, Low Power

N2WK	127,654
NR2C	110,143
K2DRH	97,451
WA3NUF	86,496
KA2ENE	74,880
WB1GQR (W1SJ, op)	71,002
NF3R	54,872
AG6X	41,128
N2OA	39,208
N2SCJ	38,640

Single Operator, Analog Only, High Power

W2FU	97,790
WZ1V	84,512
K1TR	37,386
VE3ZV	30,888
W2KV	27,342
WB4WXE	13,416
N6KN	10,045
N2KW	9,891
KA3FQS	9,180
K4ZW	7,320

Single Operator, Analog Only, Low Power

AF1T	108,040
VE3DS	29,480
VE3KH	25,974
WA3EOQ	20,874
WB2JAY	16,575
KD2HZI	16,055
KAØPQW	13,875
WB2VVV	9,821
AC1J	7,400
KØSM	6,732

Single Operator, Portable

KE6GLA	5,358
NØJK	4,150
N2MAK	2,574
KF7NP	1,702
WQ6D	1,320
KN2K	999
NØSUW	850
K7FR	675
KN6OKY	455
K9XB	378

Single Operator, Analog Only, Portable

KJ7BJS	3,840
WB2AMU	2,263
AA6XA	1,258
WN1C	864
WA2CLP	817
N3AWS	651
NE3I	405
AB8CI	360
NU2H	341
KQ2RP	300

Single Operator, Three-Band

WN3A	96,300
W5TRL	63,048
K2PS	40,740
NS4T	35,581
WQ5L	29,016
WB5TUF	24,274
W3FAY	23,324
W2UA	23,142
KD2CDV	19,383
WA3LXD	18,690

Single Operator, Analog Only, Three-Band

N5BO	6,360
K6MI	5,192
WB6HYH	2,834
N7QOZ	2,603
W1SRH	2,190
KQ2N	1,976
N1JD	1,080
KN7Y	1,037
K7CX	1,008
WB7FJG	1,008

Single Operator, FM Only

K6ARK	5,270
VE3RWJ	1,010
AF6GM	936
K1CT	810
KI4POT	686
KO6BT	480
W6IA	423
KN6FKQ	306
KB1YNT	216
KN6VRM	186

Limited Multioperator

K9NS	314,035
AA4ZZ	294,975
N2NT	232,250
K5QE	217,775
KE8FD	118,104
VE3MIS	114,848
AD4ES	103,008
W2LV	74,176
W9VW	65,156
W4AD	44,157

Unlimited Multioperator

W2SZ	432,236
W3CCX	248,820
KD2LGX	117,400
W9XA	107,334
W4NH	97,850
N3NGE	97,370
N8GA	83,328
WQØP	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		
Atlantic	KF2MR/R	26,520
Central	K9TMS/R	13,804
Dakota	N0HZO/R	4,988
Dakota	KC0P/R	4,988
Great Lakes	N8AJM/R	522
Midwest	AF4JF/R	3,103
New England	WS1O/R	630
Northwestern	AC7SG/R	5,868
Pacific	KE6QR/R	5,376
Southeastern	AB4DX/R	5,488
Southwestern	N7GP/R	53,724
West Gulf	N5TJ/R	6
Canada	VE3OIL/R	116,850
Limited Rover		
Atlantic	WG3K/R	4,760
Central	KG9OV/R	57,706
Great Lakes	KF8QL/R	8,840
Midwest	AL1VE/R	11,550
New England	N1SFE/R	1,430
Northwestern	KA7RRA/R	1,577
Pacific	NN6U/R	2,996
Roanoke	W4JST/R	19,093
Rocky Mountain	AA5PR/R	3,690
Southeastern	NV4B/R	96,875
Southwestern	N6GP/R	17,550
West Gulf	KA5D/R	81,468
Canada	VA7FC/R	2,060
Unlimited Rover		
Midwest	K0DAS/R	13,950
New England	KG6CIH/R	42,825
Southeastern	K4CNY/R	3,339
Canada	VE3SST/R	1,472
Single Operator, High Power		
Atlantic	N2JMH	253,976
Central	K9CT	97,632
Dakota	K0AWU	25,573
Delta	N4OGW	112,710
Great Lakes	K8MM	44,436
Hudson	N2GHR	45,484
Midwest	W0ZA	8,875
New England	K1TEO	448,896
Northwestern	W7EW	12,810
Pacific	K6KLY	17,388
Roanoke	W3IP	93,990
Rocky Mountain	KB0NAV	15,010
Southeastern	K1TO	63,240
Southwestern	W7OJT	4,928
West Gulf	AA5AM	72,839
Canada	VE3CKO	32,249
Single Operator, Low Power		
Atlantic	N2WK	127,654
Central	K2DRH	97,451
Dakota	K0TC	2,760
Dakota	K0QB	2,760
Delta	KB5VKP	37,949
Great Lakes	KE8JCD	13,524
Hudson	WA2VNV	29,945
Midwest	WD0BGZ	24,024
New England	WB1GQR (W1SJ, op)	71,002
Northwestern	WZ8T	6,789
Pacific	K6USY	5,916
Roanoke	WA4LDU	10,240
Rocky Mountain	W0BX	8,137
Southeastern	W4MAA	25,573
Southwestern	AG6X	41,128
West Gulf	AE5FM	16,926
Canada	VE3SMA	15,150
Single Operator, Analog Only, High Power		
Atlantic	W2FU	97,790
Central	K9YR	1,064
Dakota	W0GHZ	3,268
Delta	WZ5M	5,100
Great Lakes	K2YAZ	768
Hudson	W2KV	27,342
New England	WZ1V	84,512
Northwestern	KB7IOG	240
Pacific	N6RO	5,043
Roanoke	K4ZW	7,320
Southeastern	WB4WXE	13,416
Southwestern	N6KN	10,045
West Gulf	K5MR	3,960
Canada	VE3ZV	30,888
Single Operator, Analog Only, Low Power		
Atlantic	WA3EOQ	20,874
Central	W9RE	128
Dakota	KA0PQW	13,875
Delta	KD5ILA	2,170
Great Lakes	K8MR	1,426
Hudson	WB2JAY	16,575
Midwest	K0CLW	3,870
New England	AF1T	108,040
Northwestern	K7ND	992
Pacific	K2GMY	4,620
Roanoke	K4FT	400
Rocky Mountain	WJ7L	112
Southeastern	N4T/45 (K3TW, op)	3,910
Southwestern	WD6E	3,552
West Gulf	WB5ZDP	99
Canada	VE3DS	29,480
Single Operator, Portable		
Atlantic	N2MAK	2,574
Central	K9XB	378
Dakota	N0SUW	850
Midwest	N0JK	4,150
Northwestern	K7FR	675
Pacific	KE6GLA	5,358
Roanoke	KN2K	999
Southwestern	KF7NP	1,702
Canada	VA2VT	342
Single Operator, Analog Only, Portable		
Atlantic	NE3I	405
Central	WN1C	864
Delta	N3AWS	651
Hudson	WB2AMU	2,263
Northwestern	KJ7BJS	3,840
Pacific	AA6XA	1,258
Roanoke	AB8CI	360
Canada	VE3EG	48
Single Operator, Three-Band		
Atlantic	WN3A	96,300
Central	W9AV	14,151
Dakota	N0UR	17,836
Delta	WQ5L	29,016
Great Lakes	KA8CNI	10,500
Hudson	NA2NY	10,530
Midwest	KS0AA	4,940
New England	K1HC	10,206
Northwestern	K5DTC	4,611
Pacific	K6TQ	627
Roanoke	K3FR	8,618
Rocky Mountain	K0NR	13,524
Southeastern	K2PS	40,740
Southwestern	K7KMR	3,116
West Gulf	W5TRL	63,048
Canada	VE3PJ	5,586
Single Operator, Analog Only, Three-Band		
Atlantic	KQ2N	1,976
Central	N9GH	805
Great Lakes	K8LG	176
Hudson	WI2M	24
Midwest	N0UI	108
New England	W1SRH	2,190
Northwestern	N7QOZ	2,603
Pacific	K6MI	5,192
Roanoke	KV4ZY	984
Rocky Mountain	KC0LFQ	25
Southeastern	N5BO	6,360
Southwestern	WB6HYH	2,834
West Gulf	N5LUL	126
Canada	VE3MLM	320
Single Operator, FM Only		
Atlantic	K3GM	119
Delta	K4NRT	18
Great Lakes	K8AEP	12
Hudson	KE2CCG	15
New England	KB1YNT	216
Northwestern	KL4LJ	28
Pacific	W6IA	423
Roanoke	KI4POT	686
Southeastern	K3TW	2
Southwestern	K6ARK	5,270
West Gulf	KG5UNK	185
Canada	VE3RWJ	1,010
Limited Multioperator		
Atlantic	WA3EKL	36,972
Central	K9NS	314,035
Dakota	N0EO	13,122
Great Lakes	KE8FD	118,104
Hudson	N2NT	232,250
New England	W1QK	22,372
Northwestern	AI7ID	18,709
Pacific	W7TR	4,000
Roanoke	AA4ZZ	294,975
Rocky Mountain	W0VB	19,266
Southeastern	AD4ES	103,008
Southwestern	WO1S	80
West Gulf	K5QE	217,775
Canada	VE3MIS	114,848
Unlimited Multioperator		
Atlantic	W3CCX	248,820
Central	W9XA	107,334
Delta	AG4V	50,160
Great Lakes	N8GA	83,328
Hudson	WE1P	45,430
Midwest	WQ0P	76,677
New England	W2SZ	432,236
Rocky Mountain	K7EMR	12
Southeastern	W4NH	97,850
Southwestern	N6MI	21,168
West Gulf	KC5MVZ	6,552
Canada	VE3WCC	60,047

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**.

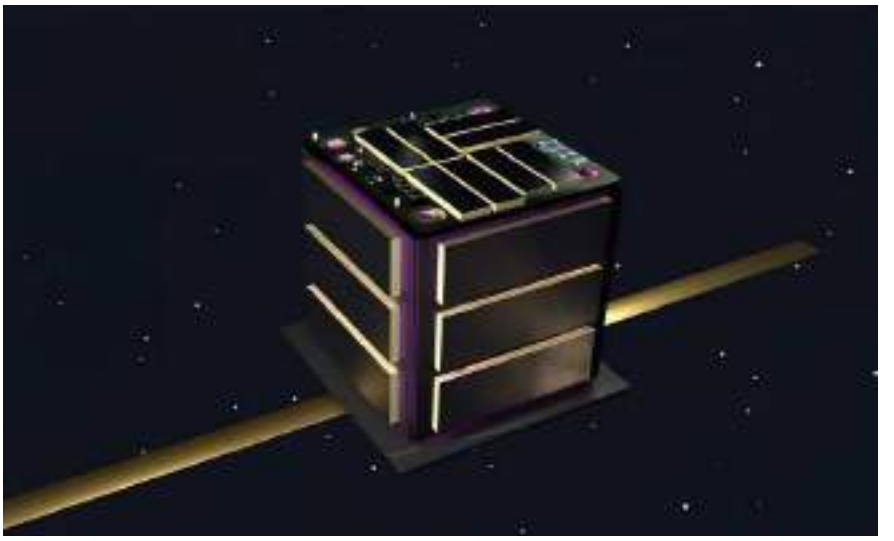
For even more information on what *QST* is looking for, and further details on how to submit manuscripts, see our Author Guide at **www.arrl.org/qst-author-guide**.

Steve Ford, WB8IMY, wb8imy@arrl.net

Amateur Radio World

Luxembourg Launches a Satellite

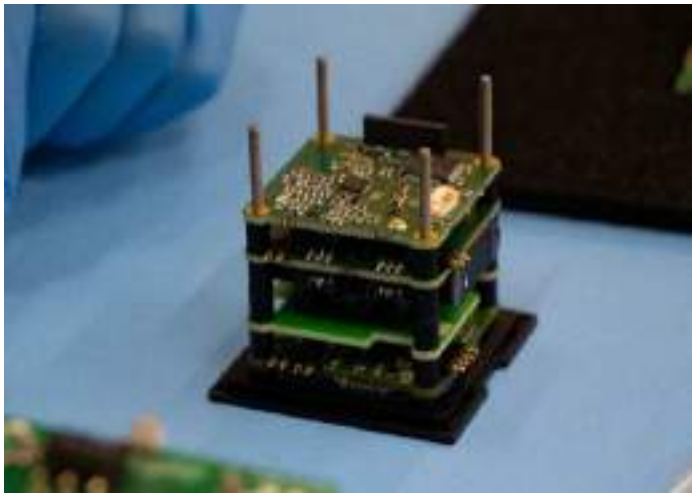
Late last year, Radioamateurs du Luxembourg received a frequency coordination request from the University of Luxembourg for a new satellite project. The association responded positively and assigned the call sign LXØPQT to a spacecraft that the university christened POQUITO.



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]

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]

Andorra in the IARU HF World Championship

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

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

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]

Mike Walters, W8ZY, mwalters@arrl.org

Club Station

A Virginia Club Creates a Middle School-Level Licensing Course

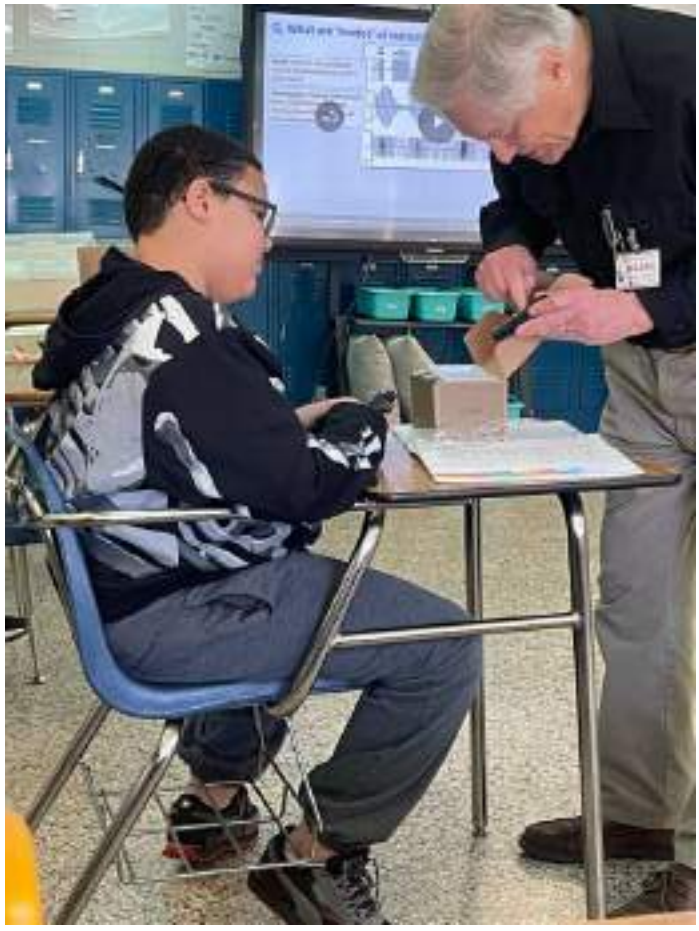
In 2023, on the last day of a week-long ham radio camp, 11-year-old Aiden Tyler and his sixth grade science teacher, Mrs. Alexandra Perry, sat for their FCC amateur radio exam and earned their Technician-class licenses. In this month's column, Richmond Amateur Radio Club (RARC), W4ZA, member and license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

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

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.

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	Pitman, NJ
South West Idaho ARC, K7SWI	Nampa, ID
Central Ohio Radio Club, W8AIC	Sunbury, OH

Steve Goodgame, K5ATA, sgoodgame@arrl.org

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.

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

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 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.

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

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

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

Fraser, MMØEFI, 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, MMØEFI, 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, MMØFMF, 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.

Bernie McClenny, W3UR, w3ur@arrl.org

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

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]

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, E7ØT, 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

Jon Jones, NØJK, n0jk@arrl.org

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:

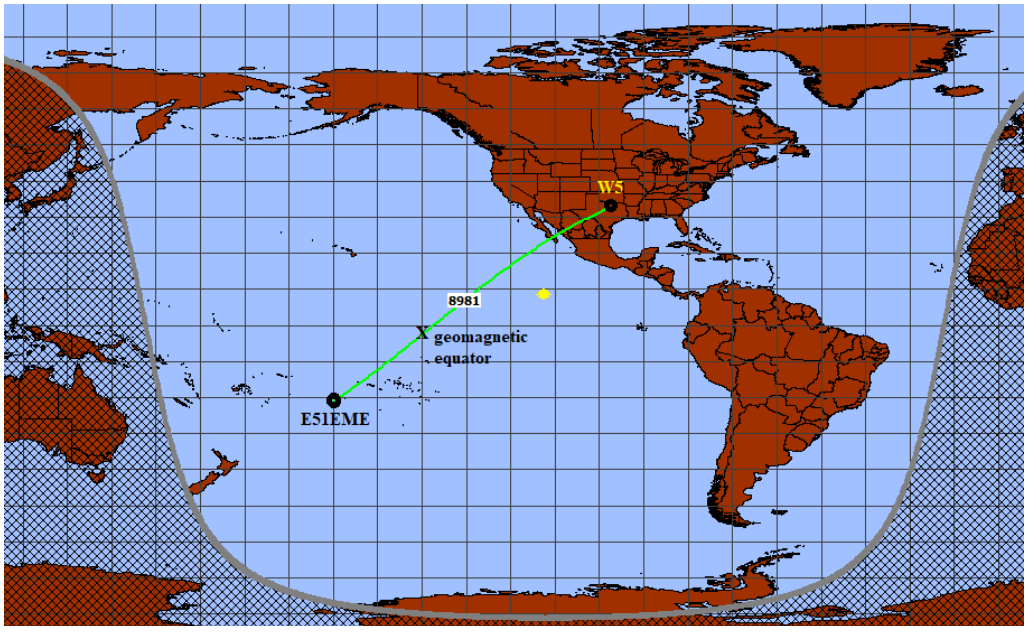
The signature of TEP is obvious on the *Proplab* map for a path from E51EME to W5 (Dallas, Texas) at 1930 UTC on August 28. There are two enhanced plasma densities on each side of the geomagnetic equator. The heights of the maximum F2-region electron densities along the path are around 400 kilometers,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



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]

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.

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, KØTPP (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. KØGU (DN70) received NØKP/B (EN35), KØGUV/B (EN26), and NØUD/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 HAØDU via Q65 EME on September 27. In the afternoon on September 28, LU1WFU (FE64) had FT8 PSK flags from California to Nova Scotia. I, NØJK (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, NØPB, 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. ARCNEM, 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.ww-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, NI6IW, 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/ni6iw**

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*
Atlantic		
***Collin Pike, KJ4AXB	6,767	26-Apr-11
James McCloskey, NS3K	351	14-Nov-94
Jobst Vandrey, AC0LP	324	23-Jun-08
George Brechmann, N3HBT	317	01-Apr-91
Edward Genoino, WA2NDA	298	10-Jul-85
Cully Phillips, N3HTZ	231	01-Sep-91
Donald Rees, K3PCT	224	28-Apr-23
Michael Harla, N2MHO	220	12-Apr-06
William Klepser, Jr., WB2AIV	215	09-Jun-99
Ralph Abbott, WA3ELQ	202	30-May-05
Central		
Ed Wagner, AB9FN	422	01-Jul-02
Allan Bukowski, N9ZD	356	01-Jun-92
Eldon Boehm, NK9U	345	21-Nov-86
Donald Hlinsky, N9IZU	336	01-Mar-91
Brian Eder, WB9UGX	310	01-Jan-92
Robert Begeman, W9KVK	296	01-Jun-92
Timothy Pechtold, AA9BV	283	01-Nov-92
James Rinehart, K9RU	268	01-Aug-91
Frederick Baguhn, W9GOC	266	16-May-02
Dennis Keyfauver, K3DCK	259	29-Dec-22
Dakota		
Jeffrey Goodnuff, W0KF	349	17-Jun-03
John Schwarz, Jr., AE0AL	331	26-Oct-94
Shep Shepardson, N0NMZ	320	12-Mar-01
Joel Dunham, NC1D	287	26-Jul-23
Douglas Nelson, AA0AW	253	01-May-90
Daniel Royer, KE0OR	250	01-Jul-91
James Rice, II, N0OA	233	04-Dec-00
Larry Larson, KR0K	230	16-Mar-09
Robert Tracy, N0TC	199	30-Jul-86
Karl Eriksen, WA2DEE	178	08-Jan-90
Delta		
Loma Westmoreland, KU5J	788	31-Jan-21
Monvel T. Maskew, Jr., K9FQ	765	18-Jul-18
Terry Partigianoni, W5TMP	535	27-Nov-07
Elmer McKenzie, Jr., K5MCK	471	23-Dec-22
Bryan McCammon, KI5HAV	431	03-Sep-20
John Waters, III, KC5FYA	330	14-Sep-21
Rodney Webb, W4WRE	324	21-Mar-17
Joe Lowenthal, WA4OVO	299	25-May-06
Bobbie Williams, W1BEW	299	01-Jun-92
Roger Gray, N5QS	285	01-Mar-93
Dawn Gray, N5QT	266	01-Mar-93
Great Lakes		
*Charles Tyrrell, KE8PCB	1,387	03-Sep-20
*David Potter, KE8OHG	1,372	03-Jun-20
Bruce Osmon, KE8LT	750	16-Nov-18
Earl Paazig, W8BR	742	16-Apr-02
Charles Hall, W8HF	286	01-Jun-92
William Bogle, Jr., KE8FZY	277	08-Jul-20
Lance Harvala, AB8Y	254	06-Nov-19
Archie Mack, Sr., AF4EB	253	19-Aug-97
Stanley Arnett, II, AC8W	235	06-Sep-84
Chris Anderson, K8VJ	231	09-Feb-90

Volunteer Examiner	*Sessions*	*Accreditation Date*
Hudson		
Alan Crosswell, N2YGK	516	26-Oct-94
Fritz Boigris, KB2O	498	26-Oct-84
Sid Markowitz, K2GG	454	27-Sep-94
John Kiernan, KE2UN	314	01-Jul-91
Walter Lesnowich, W2EE	303	06-Mar-08
Thomas Carrubba, KA2D	297	01-Sep-93
Robert Casino, N2GDY	290	03-Jun-08
Carlos Prior, KE2TT	266	01-Jun-90
Donald Younger, W2JEK	257	30-Jul-86
Allen Bender, W2QZ	256	02-Feb-88
Midwest		
David Bartholomew, AB0TO	805	22-Mar-02
Kevin Naumann, N0WDG	708	17-Nov-02
Harry Steger, Jr., W0HMS	663	26-Aug-08
Chris Hunt, N0YH	573	05-Aug-20
Roland Kramer, W0RL	559	21-Jun-01
Ralph Waldren, N0OTS	486	03-Jan-20
Kenneth Simila, KC0VMY	318	18-Feb-07
Edwin Berkel, AE0EB	257	06-Jan-15
John Mountain, Jr., KJ0MTN	255	28-Sep-09
Charles Wilmes, KW0K	229	28-Apr-09
New England		
**Paul Lux, K1PL	2,266	25-Jan-85
*Bob Phinney, K5TEC	1,672	20-Jan-14
Gregory Paul, KC1MND	548	03-Jun-20
Phillip Temples, K9HI	519	12-May-89
William Poulin, WZ1L	436	01-Sep-91
Robert Beaudet, W1YRC	411	01-Aug-90
Bruce Anderson, W1LUS	400	11-Feb-88
Barbara Irby, KC1KGS	368	05-Aug-19
Brandin Hess, AC1RU	328	24-Sep-15
Stefan Rodowicz, N1SR	321	20-Nov-84
Northwestern		
Richard Morgan, KD7GIE	448	11-Aug-00
Scott Robinson, AG7T	447	01-Aug-91
Erin Henrickson, ND7B	417	06-Jan-23
Loren Hole, KK7M	381	06-Sep-84
John Clarke, AC7WW	381	20-Jan-03
David Brooks, N7HT	332	10-Jun-87
Joseph Barry, K7SQ	312	21-Jun-95
Nathan Zane, KH6IHB	282	01-Apr-93
Wayne Schuler, AI9Q	282	01-Sep-91
Harley Leach, KI7XF	280	24-Jun-19
Klaus Neubert, AC7MG	274	10-Jul-01
Richard Heasty, KK7VH	263	07-May-01
Pacific		
Brian Torr, N6IIY	944	06-Sep-00
Morris Jones, AD6ZH	581	27-Nov-01
Dieter Stussy, KD6LVW	467	27-Jan-94
Larry Loomer, KI6LNB	379	03-Dec-08
Bill Nichols, NN7K	375	01-Sep-93
Robert Perlman, W6BP	373	26-Aug-08
Gordon Fuller, WB6OVH	363	06-Sep-84
Jim Brunk, N6BHX	315	13-Jul-95
Dennis Simon, KB7UTV	303	10-Dec-13
Jane Garwood, KB7YUZ	296	20-Jan-14

Volunteer Examiner	*Sessions*	*Accreditation Date*
Roanoke		
Judy Friel, AC4RG	322	01-Feb-91
Alan Ronald Moeck, WA2RPX	264	27-Sep-94
Terry Sanner, WV8V	256	06-Sep-84
David Snyder, W4SAR	255	01-May-93
Larry Withrow, AF4HX	232	17-Dec-98
David Poe, W8IW	215	13-Mar-07
Henry Wyatt, II, K4YCR	215	28-Jan-98
Edwin Williams, KN4KL	215	01-Jan-92
John Kanode, N4MM	208	07-Jun-85
Thomas Lewis, W4SIS	194	14-Nov-97
Maurice Brown, N8VA	192	31-Mar-97
Richard Brannen, Jr., KA3JCA	189	25-Jan-89
Rocky Mountain		
Robert Vosper, KZ1B	683	09-Jul-10
Robert Hamilton, N0RN	431	19-May-87
Jeffrey Weinberg, W0QO	342	01-Apr-93
David Avery, N0HEQ	302	13-Jan-88
David Sharpe, KI0HG	259	02-Feb-98
Gary Zabriskie, N7ARE	256	20-Nov-84
Martin Soffran, NM5MS	240	21-Mar-94
Peter Brisbine, NM5PB	232	20-Jan-14
David Bratcher, AK0MR	207	23-Sep-08
Denis Campbell, AA0YX	185	02-Feb-96
Southeastern		
***Gary Pike, KA4KBX	8,603	03-Sep-09
***Justin Pike, KJ4AXF	6,822	12-Nov-12
***Anna Pike, KD4PCU	5,181	18-Aug-09
***Patrick Pike, KJ4AXD	3,843	13-Oct-15
**Ryan Krenzischek, W4NTR	2,086	04-Jan-13
*John Reynolds, W4TXA	1,020	08-Jun-16
Robert Fauci, N1UVO	639	28-Mar-18
Stanley Whitfield, K4SHW	615	26-Sep-19
Eddie James, WD3D	615	01-Apr-21
Thomas Kocourek, N4FWD	448	09-Feb-04
Southwestern		
*Bill Martin, AI0D	1,075	01-Nov-84
David Morrill, N7TWT	520	20-Jul-00
Richard Buck, KC7OCT	354	21-May-97
Donald Kramer, Sr., WA6UVW	344	08-May-98
Bruce Ziemienski, WA6BZ	321	25-Mar-02
Ali Hassan, AA6WC	288	01-Jun-90
Norman Pilawski, WT6Y	284	17-Feb-87
Frank Westphal, K6FW	278	06-Sep-84
Dave Martin, AC7FF	266	04-Apr-14
Gary Hamman, K7GH	265	01-Aug-92
West Gulf		
*Franz Laugermann, K3FL	1,825	01-Dec-91
*Tanner Jones, W9TWJ	1,279	31-Jul-07
Daniel Quigley, N7HQ	793	24-Apr-20
John Paterson, Jr., KC5LAA	547	16-Mar-09
Gerald Grant, WB5R	535	04-Jan-85
Adolph Chris Koehler, K5VCR	526	29-Sep-95
David Fanelli, KB5PGY	502	01-Oct-91
Wilbert Cannonier, KK5JJ	475	03-Nov-95
Gerald Crenshaw, WD4BIS	450	27-Feb-98
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

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

400
N9VC

368
W1LEM

315
W4PXE

300
AC8NP

280
W7EES

270
N2LC

260
K7OED

258
KB3YRU

255
KT2D

245
WM5N

240
AC0KQ

235
W7PAT

232
W0PZD

208
W9RY

200
WD8USA

193
KO4KUS

190
ND8W

186
KD2LPM

185
KC9FXE

183
KC8YVF

178
KE8DON
WV5Q

175
W4DNA

169
KD2MNG

167
KM4WXX
WB8YYS

162
KT5SR

161
W5WMC

160
W4CMH
W2PAX

155
KF8ATJ

151
KT5EM

150
KK3F
KR4PI
N8SY
KD8ZCM

149
KB5PGY

146
NI2W

145
WB9WKO
WA3QLW
WM2C
NW3X

140
KV2J
AD4DO
W8MAL
W8DJG

135
AG9G

K9LGU
WO2H

134
K8AMH

133
KD8UUB

130
KF5OMH
K3JL
WK4WC
N2JBA
KW1U
N1UMJ
WZ0C
N1ILZ

128
WB9QPM
K8MDA

125
KY2MMM

122
W3YVQ

121
KE5YTA
N4NOA

120
WC4FSU
N2DW
W2AH
KY2D
KE4RS
KE8ANW

WA4VGZ
KD0HHN

115
W9GRG
KO4OL

112
K5OB

110
KA5AZK
N4CNX
W4NHO
KM4WHO
KB2QO
WB8TQZ
N1IQI

109
N3KRX

108
KE8HKA

107
W1RVY

106
N3GE

104
K5ANP
KV8Z

103
AD3J

101
WB8R

100
KF5IOU
N5RH
WB9EDL
AI9F
NX9K
W4EDN
KZ8Q
WB4RJW
K3YAK
KA2HZP
W1KX
KB8GUN
N8MRS
WB8SIQ
N1LAH
KC1KVY
W1TCD

97
WB4ZDU
KC1HHO

93
W8IM

92
K2MTG

91
KD2TDG

90
KB9GO
KC9UC
AA3N
W4KX
N0JAR
KL7RF
K8ED

KE8PGW
WX2DX
N1CVO

88
WA3QPX
KB3MXK
KT4WX
K8KRA
N8OD
KB8HJJ
W8GSR
KB8RCR

87
W4TTO
NT1N

86
W2ARP

85
WB8RGE

84
WW3S

82
K6JT
KF2GC
N2TSO

81
AA4XZ

80
KB4OLY
KR4ST
K2MJR
KG5AOP

KA8BJA
AE2EY
KB1NAL

78
NJ5R

77
W7MIN
KN4AAG
K2PHD

76
W2QMI
K8RDN

75
WB3FTQ
K1STM

74
W3ZR

73
W7FSC

72
W5XX

71
W2OOD

70
KB0DTI

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	$7.65
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-XR2A-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 µF 100 V capacitors	581-SR211C104KAR	$0.32
2	0.01 µF 1 kV capacitors	810-CK45-E3AD103ZYGN	$0.50
1	10 µF 25 V elec. capacitor	80-ESK106M025AC3AA	$0.22
1	0.33 µF 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 × 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-C503BRBNCY0Z0AA2	$0.21
1	Green LED	941-C5SMFGJFCX14Q7T2	$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 × 3.2 × 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 (**ksiwiak@arrl.org**), and is published bimonthly.

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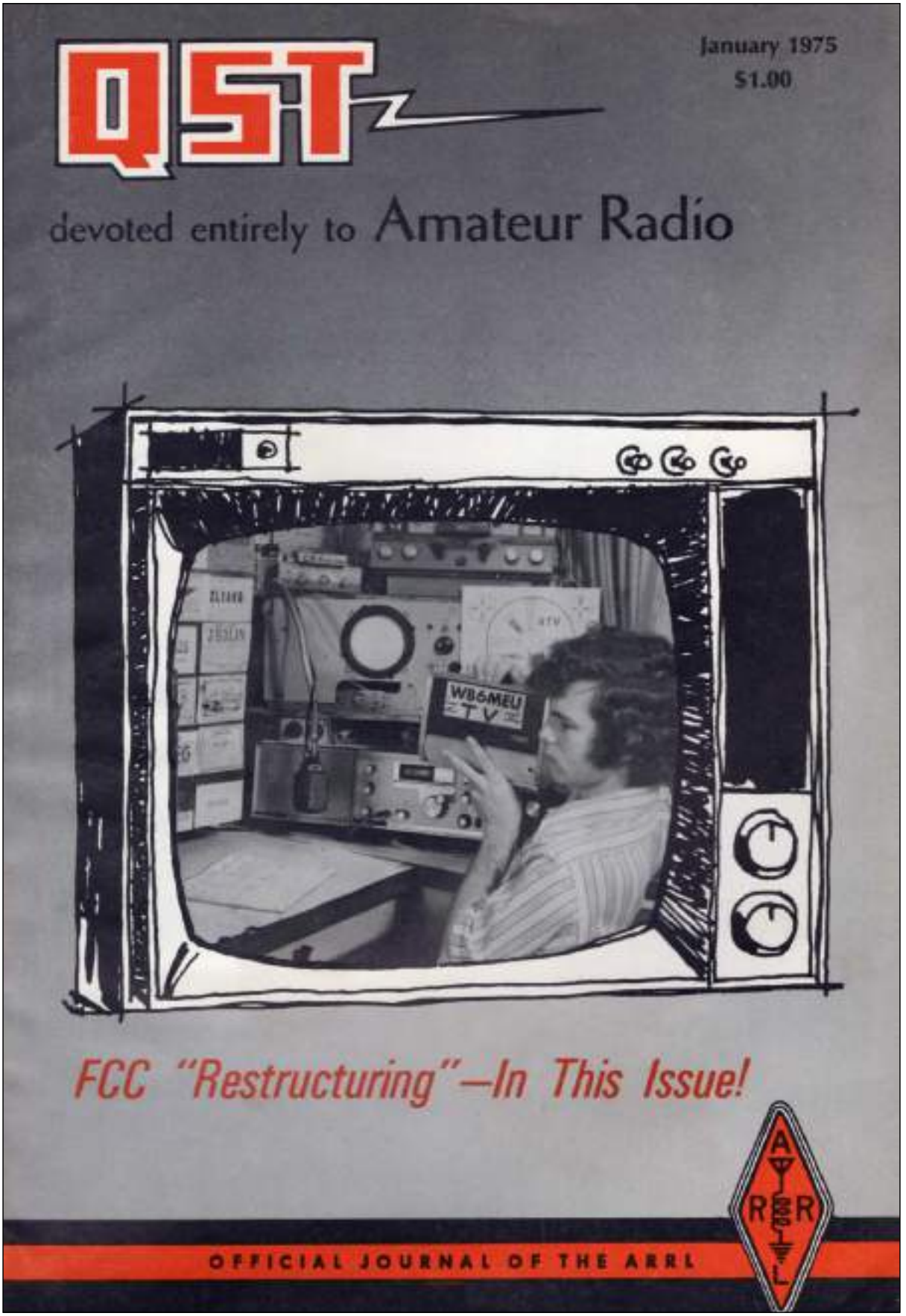
A Look Back


QST
January 1975
$1.00
devoted entirely to Amateur Radio
WB6MEU
TV
FCC "Restructuring"—In This Issue!
OFFICIAL JOURNAL OF THE ARRL

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

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

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@arrl.org**. Submissions selected for publication will be edited for space and clarity. Material published in "Celebrating Our Legacy" may also appear in other ARRL media. The publishers of *QST* assume no responsibility for statements made in this column.

George J. Misic, KE8RN, ke8rn@comcast.net

Classic Radio

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

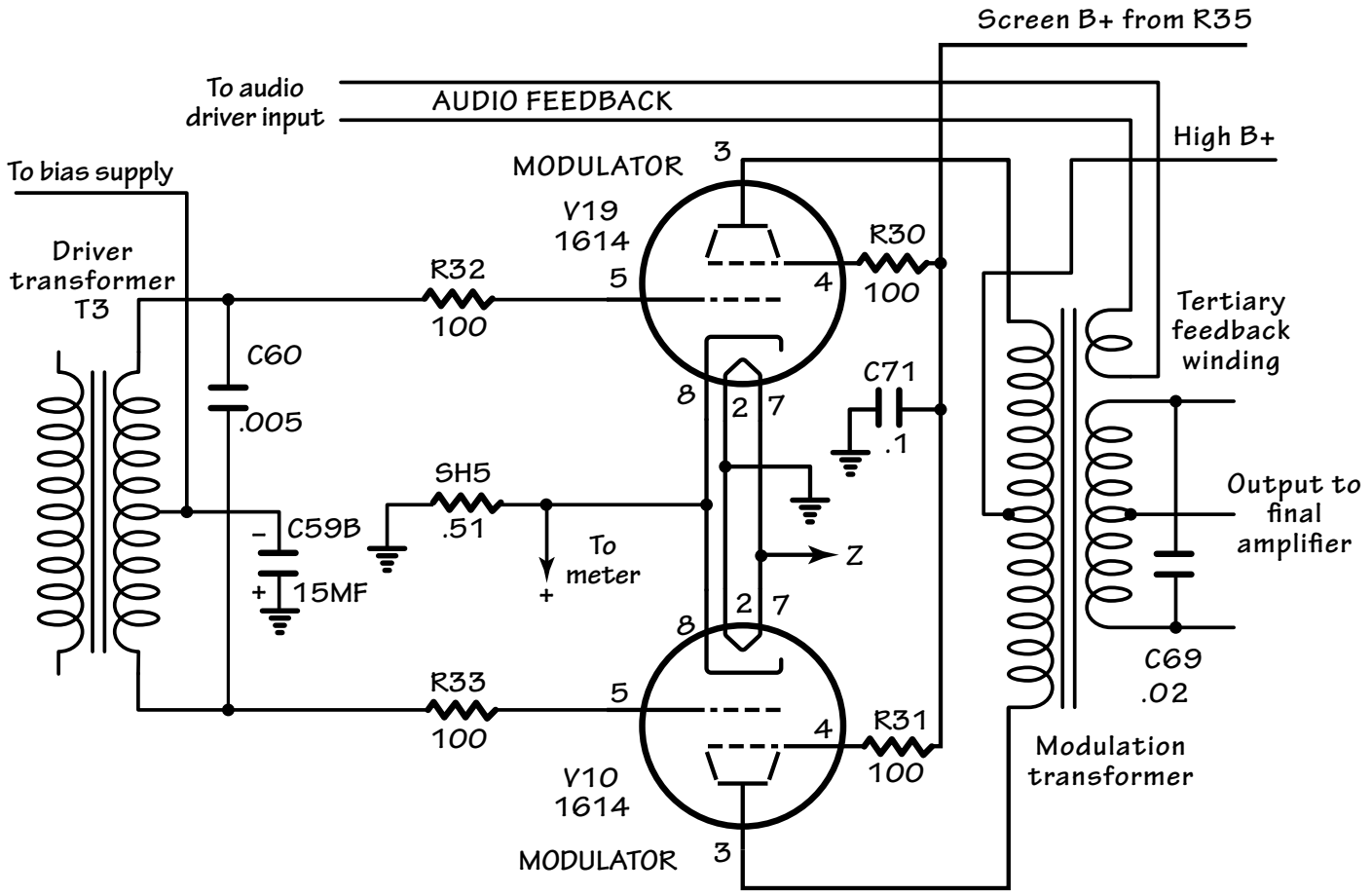
Starting in 1949, E. F. Johnson Company built several AM/CW transmitters. They had three premium transmitters with an internal variable frequency oscillator (VFO) and plate modulation, two of which received significant upgrades: the Ranger became the Ranger II, and the Valiant became the Valiant II. 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



Modular circuit schematic diagram for the Viking Ranger.

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

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 11⅝" 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.*

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.

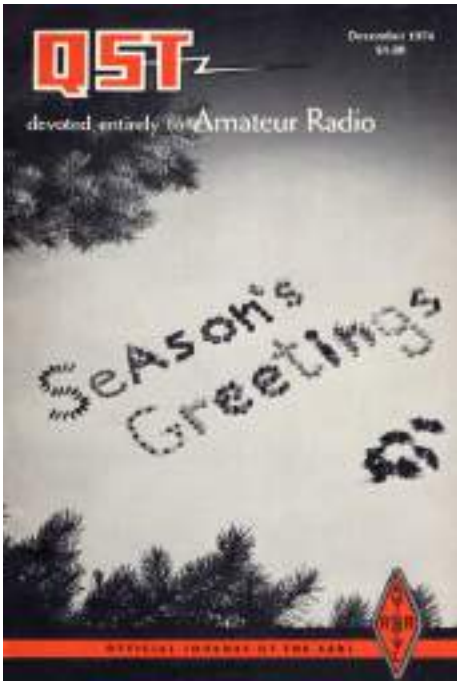
100, 50, and 25 Years Ago

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 Bliley, 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, WAØVTJ/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, SMØJFH, 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 Kennamer, 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 **Penta**, Anthony J., Medford, MA
•N1APK **Fresher**, Richard J., West Hartford, CT
vW1DQ **Elengo**, John, Cheshire, CT
vKA1JTN **Morgan**, William H., South China, ME
vK1KXW **Hooper**, Ralph F., Revere, MA
vKE1Q **Lund**, M. Craig, Biddeford, ME
♦AA1RO **Dourado**, Myron T., Seekonk, MA
WA1TDC **Peaston**, Richard W., Palm Coast, FL
KE2BFU **Simon**, Jay P., Lockport, NY
KA2DDN **Voorhies**, Gerald, Clay, NY
WA2GWL **Hutton**, Walter E., Jr., Hendersonville, NC
N2HFO **Lawrence**, Michael J., West Henrietta, NY
WB2PGL **Fuchs**, Lynda L., Syracuse, NY
KA2TWF **Viau**, Fred, Union City, NJ
KB2UXG **Lagares**, Manuel, Newburgh, NY
•WA2VAX **Dantz**, Timothy M., Anderson, SC
•N2YMI **Blank**, Stuart, Madison, NJ
W3BCH **Harmer**, Brian C., Media, PA
♦W3DET **Tabbutt**, David E., Belhaven, NC
NE3F **Dobbs**, Stephen, Reading, PA
♦W3FL **Forbes**, Marshall, Orange City, FL
N3GEO **Erikson**, William J., Hampstead, MD
vW3JDP **DiPietrantonio**, Joseph A., Rehoboth Beach, DE
K3MOB **Pato**, Andrew L., West Mifflin, PA
•K3NQV **Lukens**, Noel M., Townsend, DE
K3PJM **Mcgovern**, Philip J., Newark, DE
KB3QHC **Eicker**, Heywood M. "Woody," Bethel Park, PA
vWA3UMY **Butt**, Peter D., Lexington Park, MD
vK3ZMJ **Kaufmann**, Juergen A., Philadelphia, PA
WD4CJQ **Cook**, Jean, Gilbert, SC
W4DPS **Scalf**, Dayton P., Johnson City, TN
KC4EBV **Bethune**, James S., Pensacola, FL
WA4FEH **Arnold**, Richard O., Chesterfield, VA
N4FIX **Buford**, Earl D., Jr., Northport, AL
K4GK **Pennington**, Charles A., Jr., Sandersville, GA
vK4GQG **Sparks**, Harold E., Isle of Palms, SC
N4HES **Hess**, Arthur L., Lakeland, FL
vK4IDD **Clayton**, Gerald L., Greenville, NC
KE4JAC **Yarbrough**, Virginia L., Ridgeway, VA
vKI4KQE **Gulledge**, Dale A., Marbury, AL
vWB4KST **Smith**, Stokes J., Jr., Spartanburg, SC
vKK4LNY **Thomas**, Ronald, Lebanon, TN
vKI4LUE **Herring**, Robert W., Altamonte Springs, FL
KE4OBE **Callahan**, James M., Tallapoosa, GA
vNA4TH **Hering**, Thomas C., Crossville, TN
AG4UB **Tjarks**, Edward A., Sarasota, FL
v♦NS4V **Hourdequin**, David R., Hayesville, NC
KN4VGP **Graham**, Kenneth H., Hollow Rock, TN
vWB4YFY **Jackson**, Geary W., Nashville, TN
•KE5BCE **Scarberry**, Ronnie Lynn, Pickens, OK
K5BMD **Floyd**, Wilba J., Walnut Ridge, AR
vWD5CFF **Kelley**, Jack, Centerville, TX
WO5D **Maca**, Jeffrey D., Randolph, NJ
vN5DBM **Stepp**, Kenneth A., Edmond, OK
♦KA5DKS **McAninch**, Kenneth C., Arvada, CO
K5FFD **Chotiner**, Kenneth C., Egg Harbor Township, NJ
KF5FHA **Ellsworth**, Louise, Odessa, TX
K5GRV **Stone**, Malcolm L., Brandon, MS
vW5NDM **Melson**, Charles A., Jr., Pass Christian, MS
WJ5O **Hays**, William H., Montgomery, AL
♦W5RWR **Ratta**, Ralph W., China Spring, TX
vN5VN **Cockerham**, Walter, New Orleans, LA
KA5WOG **Whatcott**, Brian A., Garland, TX
vKE5ZSL **Turner**, William Edward, Palestine, TX
W6BK **Elliott**, David M., Murrieta, CA
v♦W6BUR **Chong**, George W., Oakland, CA
N6DJM **Mecham**, Douglas J., Seattle, WA
♦♦N6DSC **Wheeler**, Duane W., Murrieta, CA
vW6EW **Franklin**, Denis, Santa Barbara, CA
KJ6LJF **Clark**, William Byron, Lake Arrowhead, CA
vW6SXX **Carl**, Roger A., Gardnerville, NV
K6VWL **Thomas**, Baron E., San Diego, CA
AB6XG **Graham**, Richard E., Antioch, CA
♦KE7DX **Keck**, Gary L., Tucson, AZ
vN7JHE **Loshbaugh**, Bruce E., Cheyenne, WY
W7LQS **Haas**, Robert E., Tualatin, OR
KG7PIC **Selzer**, Carolynne D., Surprise, AZ
•WA7ROS **Reeves**, Anna M., Espanola, WA
NL7S **Engberg**, Robert J., Wasilla, AK
N7STR **Benefiel**, Charles B., Steilacoom, WA
K8CBT **Carlson**, Maurice W., North Muskegon, MI
WA8DZP **Hendricks**, Dewayne L., Fremont, CA
WA8GYP **Farmer**, John A., Toledo, OH
vKD8IUU **Masterson**, Stanley M., Galena, OH
W8KS **Simmons**, Jeffrey M., Norton Shores, MI
♦♦♦W8MM **Valentine**, Michael D., Cincinnati, OH
KE8MW **Sommers**, James K., Dexter, MI
•KB8PXK **Kannal**, Leonard D., Uniontown, OH
v•N8TIF **Burdick**, Larry D., Hickory Corners, MI
vKB9CIR **Willis**, Arnold A., Hayward, WI
vK9DBN **Berggren**, William M., Mount Pleasant, WI
N9FON **Guttschow**, Thomas A., Bloomington, IL
WD9FRF **Esser**, Jim R., Madison, WI
K9GDT **Sieverson**, George P., Sieverson, IL
vW9HRZ **Sherfick**, Stuart A., Sr., Spencer, IN
KB9KUL **O'Bryant**, Denise A., Warsaw, IN
KB9NCY **Ranney**, Robert M., Milwaukee, WI
W9OEQ **Beebe**, Matthew J., Marietta, GA
•W9PTO **Elrod**, Edward, Fort Myers, FL
N9UFO **Alspaugh**, Jackie E., Pawnee, IL
WA9UKB **Hankins**, Jerry W., Terre Haute, IN
•W9WZI **Strauser**, Robert R., Madison, WI
WB9YVD **Ketten**, Jerry K., Greenville, IL
K9ZYU **Brager**, Dennis L., Fitchburg, WI
KØAME **Beckley**, Boyd E., Neligh, NE
v•WDØAXF **Lewis**, Jess R., Fort Dodge, IA
NOØC **Andersen**, Tim L., Kearney, NE
WAØDQR **Reynolds**, John P., Circle Pines, MN
KFØFIA **Schrader**, Victor R., Salina, KS
♦NMØM **Taylor**, John H., Manhattan, KS
v•KDØNL **Hart**, John A., Sr., Loma, CO
KBØNWT **Newman**, David W., Memphis, MO
♦KCØQF **Blessin**, R. H., Denver, CO
KBØRSK **Woodman**, Diane, Belleville, KS
NØTLH **Nivens**, Roy F., Branson, MO
vKØTYC **Storey**, David J., Saint Louis, MO
vKØUJW **Caron**, Robert W., Aurora, CO
WAØUXI **Rawson**, Robert H., Wamego, KS
♦WAØVQY **Formaker**, Robin G., Ames, IA
WBØWHY **Marthaler**, Alice, Marshall, MN
♦NØXKL **Ashwell**, Jeanine L., Saint Louis, MO
vKNØY **Swift**, Leroy V., Jr., Rockdale, TX
♦WØZPE **Feuer**, Robert E., Stillwater, MN
VE3DHE **Petersen**, Neal K., Ottawa, ON, Canada
VE7ANT **Tomlinson**, K. R., Victoria, BC, Canada
G3TQZ **Allan**, Roger, Rushwick, Worcester, United Kingdom

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♦ Current Diamond Club
♦ Maxim Society
v Veteran
• Former call sign

For information on how to list a Silent Key in *QST*, please visit **www.arrl.org/silent-key-submission-guidelines**.

Note: Silent Key reports must confirm the death by one of the following means: a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address, and call sign. Allow several months for the listing to appear in this column.

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• HF/50/144/430/440 MHz Multi-band, Multi-mode, IF DSP • D-STAR DV Mode (Digital Voice + Data) • Intuitive Touch Screen Interface • Built-in RTTY Functions

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• VHF/VHF, UHF/UHF simultaneous receive • 50 watts of output on VHF and UHF • Optional VS-3 Bluetooth® headset • Easy-to-See large white backlight LCD • Controller attachment to the main Unit

ID-5100 AD

VHF/UHF Dual Band Digital Transceiver

• Analog FM/D-Star DV Mode • SD Card Slot for Voice & Data Storage • 50W Output on VHF/UHF Bands • Integrated GPS Receiver • AM Airband Dualwatch

IC-V3500 | *144MHz FM Mobile*

• 65W of Power for Long Range Communications • 4.5 Watts Loud & Clear Audio • Modern White Display & Simple Operation • Weather Channel Receive & Alert Function

ID-50A | *VHF/UHF D-STAR Portable*

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IC-T10 | *Rugged 144/430 MHz Dual Band*

• Disaster Ready - Excellent Fit for Your Emergency Bag • Loud Audio - New Speaker Design • Long Bettery Life - Up to 11 Hours • FM Broadcast & Weather Channels

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Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 Inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO

FTDX101D | *HF + 6M Transceiver*

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

FT-710 Aess | *HF/50MHz 100W SDR Transceiver*

• Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner

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Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control

FTM-300DR | *C4FM/FM 144/430MHz Dual Band*

• 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WiRES-X Portable Digital Node/Fixed Node with HRI-200

FT-2980R | *Heavy-Duty 80W 2M FM Transceiver*

• 80 watts of RF power • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users

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FTM-500DR | *C4FM/FM 144/430MHz Dual Band Xcvr*

• Front Firing Acoustically Enhanced Speaker System • True Dual Band Operation, C4FM/C4FM Digital D-D Dual Receive • 2.4" High-Resolution Full-Color Touch Panel Display • Built-in High Precision GPS Receiver • Wireless Operation Capability with Optional Bluetooth® Headset

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

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

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

• High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth© Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot

FT-65R | *144/430 MHz Transceiver*

Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power Within a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access

FTM-6000R | *50W VHF/UHF Mobile Transceiver*

• All New User Operating Interface-E2O-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can Be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset

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and featuring *DXpeditions*

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Includes:

- ARRL contests and other major ham radio contests
- National event dates: ARRL Field Day, Kids Day, JOTA, and more
- Phases of the moon and meteor showers
- Holidays and other important dates
- Bonus month — January 2026
- 2026 monthly planner

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Produced exclusively for ARRL The National Association for Amateur Radio® by Momobeam

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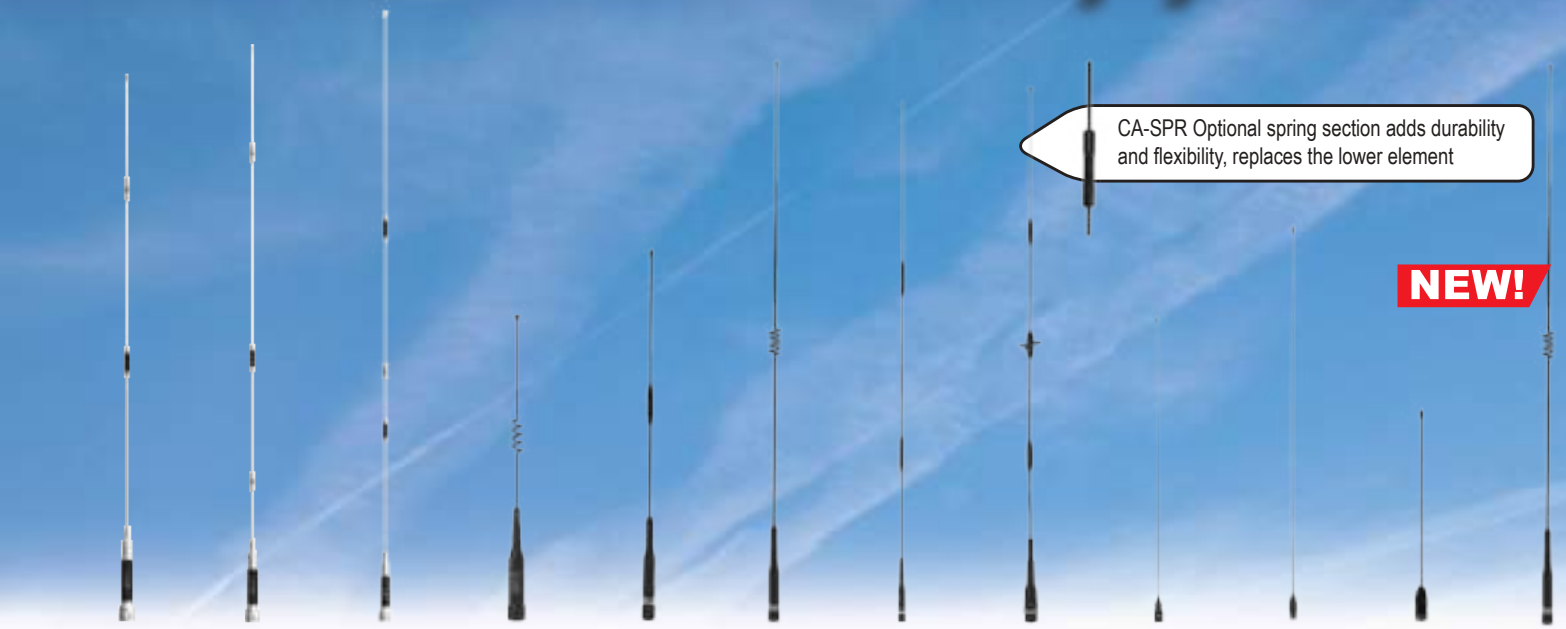

Mobile Antennas

❶ **CSB-750A** DUAL-BAND 2M/440MHz w/FOLD-OVER
2M: 1/2 wave • 440MHz: 5/8 wave x 2 • VSWR: 1.5:1 or less • Length: 42" • Conn: PL-259 • Max. Pwr: 150W

❷ **CSB-770A** DUAL-BAND 2M/440MHz w/FOLD-OVER
2M: 5/8 wave center load • 440MHz: 5/8 wave x 2 center load • VSWR: 1.5:1 or less • Length: 51" • Conn: PL-259 • Max Pwr: 150W

❸ **CSB-790A** DUAL-BAND 2M/440MHz w/FOLD-OVER
2M: 7/8 wave center load • 440MHz: 5/8 wave x 3 center load • VSWR: 1.5:1 or less • Length: 62" • Conn: PL-259 • Max Pwr: 150W

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

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

❻ **SBB-5/SBB-5NMO** DUAL-BAND 2M/440MHz w/FOLD-OVER
2M: 1/2 wave • 440MHz: 5/8 wave x 2 • Length: 39" • Conn: SBB-5 PL-259, SBB-5NMO - NMO style • Max Pwr: 120W

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

❽ **CA-2X4SR/CA-2X4SRNMO** WIDE-BAND 140-160MHz 435-465MHz w/FOLD-OVER
2M: 5/8 wave • 440MHz: 5/8 wave x 3 • Length: 40" • Conn: CA-2x4S PL-259, CA-2x4SRNMO NMO style • Max Power: 150W

❾ **BNC-24** DUAL BAND 2M/440MHz HT ANTENNA
RX range: 100-1200MHz • Length: 17" • SuperFlex featherweight whip • Conn: BNC

❿ **SMA-24, SMA-24J** DUAL BAND 2M/440MHz HT ANTENNA
RX range: 100-1200MHz • Length: 17" • SuperFlex featherweight whip • Conn: SMA-24: SMA-male / SMA-24J: SMA-female

⓫ **SMA-503, SMA-503J** DUAL BAND 2M/440MHz HT ANTENNA
RX range: 100-1200MHz • Length: 8.75" • Conn SMA-503: SMA-male, SMA-503J: SMA-female

⓬ NEW! **FC5/FC5NMO** DUAL-BAND GMRS & MURS w/FOLD-OVER
MURS: 1/2 wave • GMRS: 5/8 wave x 2 • Length: 37" • Conn: FC5 PL-259 style, FC5NMO - NMO style • Max Pwr: 120W

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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.

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.

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.

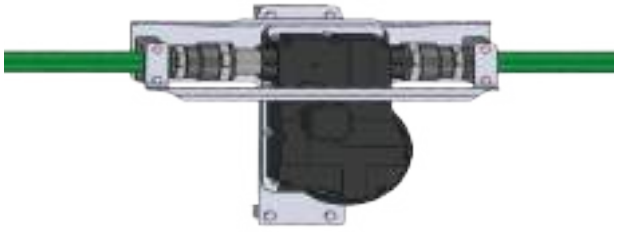
innovation

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!

AND THE LIST GOES ON...

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

With the factory pre-wiring and testing, wiring is greatly simplified for all antenna products. Eliminates potential new-installation wiring issues; Virtually plug-and-play on wiring; Connection junction box terminal strips also prewired; Standalone prewired control cable for existing antenna installations also available.



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 obsoletion 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

Handles dead short condition on the relay control lines; withstands over 5 kV coupled to control lines; Reduced RF noise.

IP 65 WEATHERPROOF STEPPIR MOTORS UPGRADE 05/24

New stepper motor provides water resistance upgrade and also has higher torque than the original stepper motors.

HIGH PERFORMANCE BALUN 05/24

High power saturation design with accompanying external choke; Improved high frequency performance.

NEW ACETAL (DELRIN) SPROCKET SHAFT 07/24

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Our new KPA1500 solid-state amplifier won't take over your entire desktop: it's just 4.5 x 13.5 x 11.5" (HWD; 11.5 x 34 x 29 cm). The lightweight companion power supply can be placed on the floor or in any other convenient location.

The KPA1500 was designed with the serious operator in mind. Its no-nonsense front panel shows all important parameters at a glance, with a high-contrast 32-character LCD and fast, bright LED bar graphs. Band switching is instantaneous, via control inputs or RF sensing. Protection and monitoring circuitry is extensive and foolproof, letting you focus on the job at hand — breaking pileups and overcoming the most difficult operating conditions. And it wouldn't be an Elecraft amp without robust PIN-diode T/R switching. Like our KPA500, the KPA1500 offers fast QSK without a noisy relay.

The amplifier's rugged internal ATU can handle full power with load SWR up to 3:1, while a wider matching range is allowed at lower power, including up to 10:1 in standby mode.

When it's time to make waves, you can rely on the compact, quiet, highly integrated Elecraft KPA1500.

KPA1500 Features

- 1500 W
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- Fast, silent PIN diode T/R switching
- Compatible with nearly any transceiver
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Amateur Radio Emergency Service® (ARES®)

The Amateur Radio Emergency Service (ARES)

Amateur Radio Operators use their training, skills, and equipment to provide communications during emergencies When All Else Fails®. The ARRL Amateur Radio Emergency Service (ARES) consists of radio amateurs who have voluntarily registered their qualifications and equipment, with their local ARES leadership, for communications duty in the public service when disaster strikes.

ARES volunteers provide communications for:

- Government agencies
- Disaster relief organizations
- Public service events
- Emergencies or disasters
- Training exercises

ARES radio operators receive training in:

- Message handling
- Communication technology
- Administrative procedures
- Disaster preparedness

ARRL's volunteer amateur radio operators help their communities in good times and bad through community events, disaster response, and various programs.

Get Involved in ARES

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

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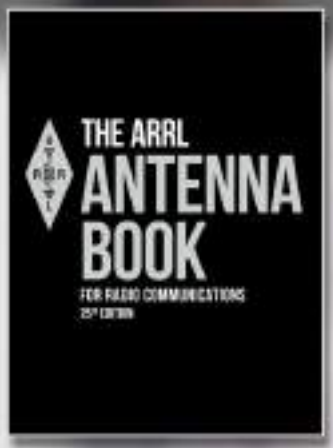

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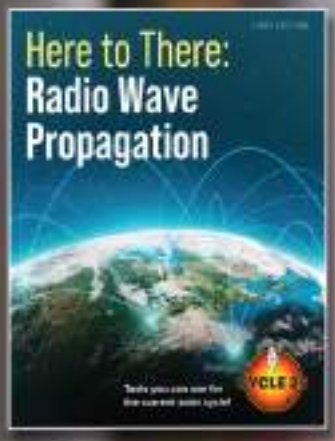

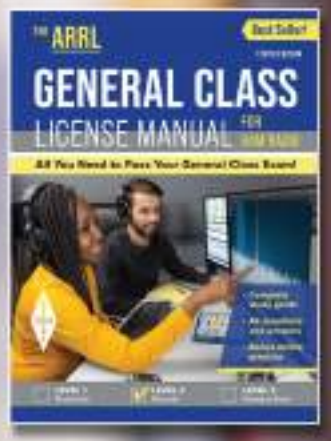

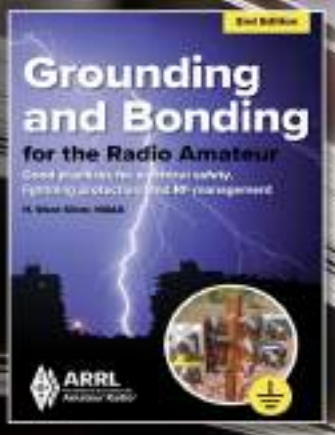

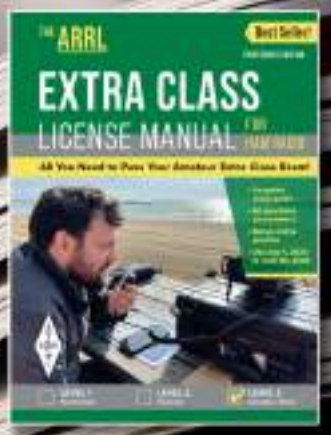

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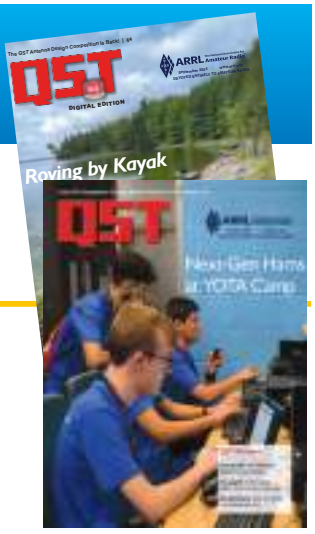

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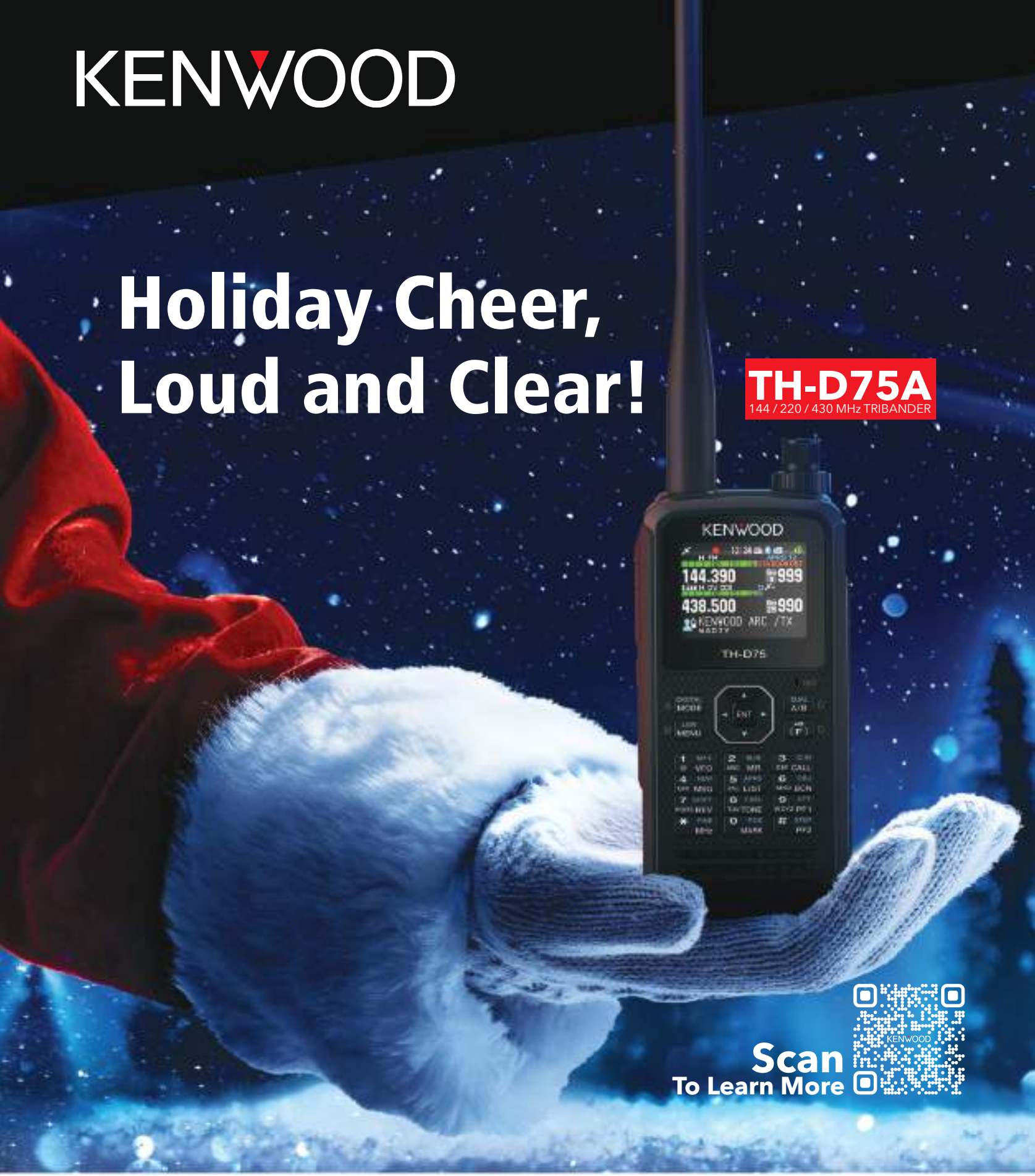

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Scores (continued from page 73)

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

Kansas City Contest Club					
NSØR	1,843	2	1	7,422	KS
AD4EB	1,343	2	1	5,422	TN
Broken Arrow ARC					
W5TM	1,272	2	1	5,138	OK
Contest Club Ontario					
VE3MGY	1,205	2	1	5,070	ONS
N5EE	1,253	2	1	5,062	AR
Arizona Outlaws Contest Club					
K6LL	1,200	2	2	4,950	AZ
AA2BJ	1,228	2	2	4,654	ENY
KØAD	1,079	2	1	4,258	MN
NØTT	1,014	2	1	4,106	MO
K5PI	955	2	1	3,870	STX
K6WSC	915	2	1	3,710	AZ
KS7T	1,032	2	1	3,646	MT
Yankee Clipper Contest Club					
K1C	926	2	3	3,498	WMA
K1USN RC					
K1DJ	817	2	1	3,318	EMA
N2MF	810	2	1	3,290	WNY
Fox River Radio League					
K9PW	843	2	1	3,276	IL
Niagara Frontier Radiosport					
W2PJ	1,583	2	1	3,216	WNY
South Jersey Radio Assn.					
WA2VYA	787	2	1	3,198	STX
Niagara Frontier Radiosport					
K2ZR	775	2	1	3,150	WNY
K9WWT	746	2	1	3,134	IN
Florida Contest Grp.					
WA1S	756	2	1	3,074	NFL
K5IMC	740	2	1	3,010	NTX
Potomac Valley RC					
K2WK	724	2	1	2,946	VA
Ozaukee RC					
WT9Q	711	2	1	2,894	WI
Franklin Co. (VA) ARC					
W4CB	704	2	1	2,866	VA
WN7S	665	2	1	2,710	VA
Florida Contest Grp.					
N8KH	622	2	1	2,688	SFL
Frankford RC					
NN3Q	650	2	1	2,650	EPA
W4KJ	1,262	2	1	2,596	ME
CorTek Radio Assn.					
KK9DX	633	2	1	2,582	TN
K9SH	1,114	2	2	2,560	IN
Paso Robles ARC					
KB6TAZ	1,243	2	3	2,536	SB
Radio Amateurs of Northern VT					
K1VMT	601	2	1	2,454	VT
Hampden Co. Radio Assn.					
N1YL	584	2	2	2,454	WMA
Macon Co. ARC					
NTØC	600	2	1	2,450	MO
Frankford RC					
WA3AAN	628	2	1	2,448	EPA
Collins Aerospace Radio Grp.					
W7CXX	603	2	1	2,440	UT
Franklin Co. (VA) ARC					
K4ORD	555	2	1	2,370	VA
Coshocton Co. ARA					
N8VV	551	2	1	2,254	OH
Dupage ARC					
KA9BHD	535	2	1	2,190	IL
VE2NTT	1,057	2	1	2,164	QC
KØVM	527	2	1	2,158	IA
Blossomland ARA					
KE3K	520	2	1	2,126	MI
Ft. Smith Area ARC					
W5TMC	1,020	2	1	2,090	OK
NOARS/LCARA					
W1PD	702	2	1	2,078	OH
WD9CIR	502	2	1	2,058	IL
Oh-Ky-In ARS					
N8BV	1,001	2	1	2,052	OH
Niagara Frontier Radiosport					
K2NV	500	2	1	2,050	WNY
Bullitt ARS					
K4WW	500	2	1	2,050	KY
N9BOR	500	2	1	2,050	IL
Boeing Employees ARS — St. Louis					
WØTT	500	2	1	2,050	MO
K2MK	487	2	1	1,998	WCF
Acadiana ARA					
NA5Q	489	2	1	1,982	LA
Potomac Valley RC					
N3AM	476	2	1	1,954	MDC
Central WV Wireless Assn.					
WJ8L	951	2	1	1,952	WV
Butler Co. AR Public Srvc. Grp.					
KC3RHQ	471	2	1	1,932	WPA
KA8JBK	470	2	1	1,930	MI
North Fulton ARL					
K4FPV	466	2	1	1,914	WCF
Niagara Frontier Radiosport					
KA2MGE	465	2	1	1,910	WNY
N2RI	439	2	1	1,906	NLI
WA2LMC	484	2	1	1,894	NC
Young Amateurs RC					
NRØQ	450	2	4	1,890	OK
Contest Club Ontario					
VE3AQ	458	2	1	1,882	GH
K1ZL	457	2	1	1,878	ME
Florida Contest Grp.					
N4KS	457	2	1	1,878	NFL
N1UZ	455	2	1	1,870	SC
N4CF	455	2	1	1,870	VA
Alabama Contest Grp.					
K4PV	619	2	1	1,854	NFL
Holmesburg ARC					
K3FI	447	2	1	1,838	EPA
K5MR	442	2	1	1,818	NTX
Anthracite Repeater Assn.					
AI3Q	430	2	1	1,770	EPA
Orange Co. (IN) ARC					
N2BEF	402	2	1	1,758	ENY
DFW Contest Grp.					
WØVX	425	2	1	1,750	NTX
Central WV Wireless Assn.					
NW8U	431	2	1	1,744	WV
K4MX	422	2	1	1,738	VA
Kicked Back Contesters Club					
WV5Y	395	2	1	1,730	STX
Lucas ARC					
W5MT	415	2	1	1,710	NTX
McMinnville ARC					
N1SLO	414	2	1	1,706	OR
Frankford RC					
KC3UII	461	2	1	1,690	EPA
Barnstable ARC					
W1WEF	476	2	1	1,682	EMA
Swamp Fox Contest Grp.					
K4QQG	531	2	1	1,666	SC
Blossomland ARA					
N8CBA	404	2	1	1,666	MI
W8JJ	500	2	1	1,662	MI
Potomac Valley RC					
N1EK	402	2	1	1,658	MDC
Adams Co. ARS					
K3DQB	400	2	1	1,650	EPA
Mad River RC					
K8MR	395	2	1	1,630	OH
Orca DX and Contest Club					
VE7WO	392	2	1	1,618	BC
Paducah ARA					
KO4XJ	387	2	1	1,598	KY
Raleigh ARS					
WA4BPJ	500	2	2	1,582	NC
WD4OBP	378	2	3	1,582	VA
N7RVD	356	2	1	1,574	WWA
WB2NVR	389	2	1	1,572	ENY
Tennessee Contest Grp.					
AF4T	355	2	1	1,570	TN
NB1N	368	2	1	1,522	EMA
Fair Lawn ARC					
KR2H	358	2	1	1,482	NNJ
North Shore ARC (ON)					
VE3LKS	356	2	1	1,474	GH
CW Operators' Club					
K3JT	354	2	1	1,466	WV
Portage Co. ARS					
WB2RPW	354	2	1	1,466	OH
K9UQN	353	2	1	1,462	TN
Livonia ARC/Ford ARL					
N8XI	358	2	1	1,458	MI
KM4FO	351	2	1	1,454	KY
Franklin Co. (VA) ARC					
N6DW	335	2	1	1,452	VA
Mobile ARC					
KN4AMX	350	2	1	1,450	AL
Cherryland ARC					
NS8K	350	2	1	1,450	MI
N8PFK	346	2	1	1,432	MI
K4RUM	357	2	1	1,428	NLI
Nittany ARC					
K3QP	342	2	1	1,418	WPA
Pasadena RC					
N6NO	341	2	1	1,414	LAX
BCI RC					
K4CC	353	2	1	1,410	WCF
Lake Area AR Klub					
KD2KW	280	2	1	1,410	NTX
Drake ARC					
WE8R	315	2	1	1,410	NFL
KG9X	338	2	1	1,402	IL
Salkehatchie ARS					
KY4GS	337	2	1	1,398	SC
K4BSK	334	2	1	1,386	NC
KO4TCL	333	2	1	1,376	GA
Grand Mesa Contesters of Colorado					
KØUK	330	2	1	1,370	CO
Southern Counties ARA					
KB2MN	400	2	2	1,370	SNJ
N1CCC	455	2	1	1,358	MO
VE5GC	326	2	1	1,354	SK
Montgomery ARC					
K8AJX	325	2	1	1,350	AL
W4GHV	342	2	2	1,346	NC
Big Island ARC					
KH6RDO	322	2	1	1,338	PAC
South Carroll ARG					
WA3FAE	318	2	1	1,328	MDC
Gloucester Co. ARC					
WB2GUK	294	2	1	1,326	SNJ
AD8J	314	2	1	1,306	NC
Minnesota Wireless Assn.					
KNØV	312	2	1	1,298	MN
W2UQ	311	2	1	1,294	VA
Rowan ARS					
N4YZ	310	2	1	1,290	NC
VE3TM	310	2	1	1,290	ONE
KØHX	309	2	1	1,286	MO
Madison Co. ARC					
N8CWU	311	2	1	1,286	OH
NFØT	285	2	1	1,286	IA
CTRI Contest Grp.					
KO1H	308	2	1	1,282	ME
Swamp Fox Contest Grp.					
WB4HRL	312	2	1	1,282	SC
Forsyth ARC					
AK4D	318	2	1	1,274	NC
KG5GYA	281	2	1	1,274	AR
N2DEE	281	2	1	1,270	CO
Red Mountain Radio Amateurs					
KB7MLK	610	2	2	1,270	NTX
McKinney ARC					
KE5VXZ	304	2	1	1,266	NTX
KO4PRE	304	2	1	1,266	VA
Richardson Wireless Klub					
K7IOL	278	2	1	1,262	NTX
Potomac Valley RC					
N3JT	303	2	1	1,262	VA
Turkey Heaven Mtn. Repeater Assn.					
K4PI	302	2	1	1,258	GA
KB3NSK	302	2	1	1,258	WPA
KN4LQN	300	2	1	1,250	VA
Order of Boiled Owls of NY and Radio Central ARC					
W2JV	508	2	1	1,250	NLI
Tri Co. ARC (WI)					
K9LGU	270	2	2	1,240	WI
Conejo Valley ARC					
K7SDW	275	2	1	1,238	SB
WE8L	284	2	1	1,236	OH
David Sarnoff ARC					
N2EIM	296	2	1	1,234	NNJ
Sierra Foothills ARC					
WU6X	295	2	1	1,230	SV
NE5A	293	2	1	1,222	OK
Williamson Co. ARC					
W5TA	234	2	1	1,216	STX
AG5B	275	2	2	1,208	MS
KE5HDE	289	2	1	1,206	WNY
Montvale OEM					
K2FJ	286	2	1	1,194	NNJ
Shy-Wy ARC					
N7WY	311	2	1	1,194	WY
VE5DWR	260	2	1	1,190	SK
Clark Co. (WA) ARC					
WU8T	285	2	1	1,190	WWA
WA5SNL	285	2	3	1,190	STX
KN4DS	259	2	1	1,186	GA
Grand Mesa Contesters of Colorado					
KØXF	322	2	1	1,184	CO
GOTAHAMS					
K6EV	283	2	1	1,182	LAX
985 Repeater Grp.					
N3ILS	296	2	1	1,182	EPA
N9MSG	296	2	1	1,178	IL
KT4XN	280	2	1	1,170	GA
Jim Bell Wireless Assn.					
AK4NF	266	2	2	1,164	AL
Hudson Valley Contesters and DXers					
WA2JQK	368	2	1	1,152	ENY
KØMPH	274	2	1	1,138	MN
El Paso ARC					
WD5FVQ	270	2	1	1,130	WTX
Central LA ARC					
WW5G	269	2	1	1,126	LA
Contest Club Ontario					
VA6RCN	306	2	1	1,118	AB
Barry ARA					
W8JRH	266	2	1	1,114	MI
Minnesota Wireless Assn.					
WAØLIF	265	2	1	1,110	MN
Wireless Assn. of South Hills ARC					
N3RDV	264	2	1	1,106	WPA
NE7D	264	2	1	1,106	OR
CW Operators' Club					
KI6OY	238	2	1	1,102	EB
WØQC	262	2	1	1,098	IA
Silver Springs RC					
W3VD	263	2	1	1,092	NFL
AF6G	223	2	1	1,090	NC
WØIZ	468	2	1	1,090	CO
AEØIB	269	2	1	1,088	MO
AE1MV	438	2	1	1,084	NNY
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Escondido ARS					
K7YMG	256	2	1	1,074	SDG
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KB1HKN	255	2	1	1,070	EMA
Catalina RC and Radio Soc. of Tucson					
ND8N	255	2	1	1,070	AZ
N4DLT	255	2	1	1,068	NC
WA4MAE	254	2	1	1,066	VA
VA2KBR	253	2	1	1,062	QC
David Sarnoff ARC					
AC2YD	251	2	1	1,054	NNJ
St. Croix Valley Radio Amateurs					
K9SCV	252	2	10	1,052	WI
Tennessee Contest Grp.					
WF7T	250	2	1	1,050	TN
VE2HEW	204	2	1	1,040	QC
Tri-Lakes ARC					
NZØT	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					
WBØCJB	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.					
KØTC	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
KCØUJC	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
NØYH	213	2	1	902	MO
ARC EmComm Srvc.					
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.					
NNØG	211	2	1	894	CO
Piedmont ARC					
KD4NGC	209	2	1	886	GA
KGØRD	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.					
KØIL	205	2	1	870	NE
Salkehatchie 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
KSØAA	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					
AEØTB	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					
WBØQLU	260	2	1	772	MO
K4RDU	180	2	1	770	VA
St. Charles ARC					
NØAX	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
KØUU	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
KBØJI	181	2	1	714	CO
Mining ARC/St. Paul RC					
WØCOE	165	2	1	710	MN
NØOK	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					
KA2JAI	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
KGØED	183	2	1	660	NE
Niagara Frontier Radiosport					
KM2L	152	2	1	658	WNY
Waypoint ARC					
WAØRC	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
KI7DAN	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					
KI3C	145	2	1	630	VA
Aero ARC					
WA3SWA	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	620	GH
KBØGT	142	2	1	618	MN
Barnstable ARC					
KC1QEM	142	2	1	618	EMA
N9NM	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
NZ5U	141	2	1	614	NM
Grand Mesa Contesters of Colorado					
KØAE	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					
KI4GGJ	150	2	8	602	AL
Minnesota Wireless Assn.					
WØADL	149	2	1	600	MN
W8TOM	159	2	1	600	MI
AG5HC	112	2	1	598	AR
KØYA	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
AAØKW	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
WAØLJM	135	2	1	590	GA
Egyptian RC					
WAØLIS	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

Toledo Mobile Radio Assn.
KD8EVN 128 2 1 562 OH
KD9IKN 130 2 1 562 IN
Hassayampa AR Klub
NE7TE 103 2 1 562 AZ
CTRI Contest Grp.
K1ECU 102 2 1 558 CT
N3KCB 127 2 1 558 DE
WA9ZDC 142 2 1 556 WMA
Ruckerville Amateur Transmitting Soc.
N4LSJ 126 2 1 554 OH
Saginaw Valley ARA
N8ERL 101 2 1 554 MI
Metrocrest ARS
WA5LXS 126 2 1 554 NTX
BEANOS
K8IJ 100 2 1 550 KY
Delara Contest Team
KE8LFC 125 2 1 550 OH
K5BG 128 2 1 548 NTX
KBØTUA 124 2 1 546 MO
Inverhuron Ham RC
VA3YLR 135 2 3 540 ONS
NY2H 153 2 1 538 NLI
KD9QS 243 2 1 536 MDC
Soc. of Midwest Contesters
NY1V 122 2 1 536 IN
VE3LFS 122 2 1 536 ONS
Minnesota Wireless Assn.
KAØCSW 121 2 1 534 MN
Boeing Employees ARS — St. Louis
NØAJ 120 2 1 530 MO
Richardson Wireless Klub
NT5AT 138 2 1 530 NTX
WB7UOF 120 2 1 530 AZ
AI4IC 137 2 1 526 TN
Montgomery ARC
N4AU 119 2 1 526 AL
Antietam Radio Assn.
WA3PTV 119 2 1 526 WPA
KDØLHI 60 2 2 520 ID
Bear Bait RC
N9ZSY 121 2 2 520 IN
Chehalis Valley ARS
AC7SR 116 2 1 514 WWA
AC6EG 115 2 1 510 SB
AK2U 120 2 1 510 WV
Hood Co. ARC
K7DWI 115 2 1 510 NTX
Brazos Valley ARC
N5MT 180 2 1 510 LA
L'Anse Creuse ARC
N8FYL 90 2 1 510 MI
VE3EP 126 2 1 510 ONE
Smoky Mountain ARC
W6UB 115 2 1 510 TN
WS6K 125 2 1 510 OH
KZ3P 190 2 1 508 SC
KDØLOS 89 2 1 506 MO
KN6BAZ 114 2 1 506 SCV
NOARS/LCARA
KA8ZEP 113 2 1 502 OH
NS2N 126 2 1 502 WNY
W7KK 121 2 1 500 MT
KE9WE 112 2 1 498 IL
Colorado QRP Club
NO2D 112 2 1 498 CO
NY9P 112 2 1 498 NM
KØKDS 147 2 1 494 IA
Rowan ARS
W4JNG 111 2 1 494 NC
N3PKJ 119 2 1 492 WPA
VA2YLB 134 2 1 492 QC
Cherryville Repeater Assn. II
W2TQ 146 2 1 492 NNJ
Frankford RC
K2CJ 110 2 1 490 NNJ
K6GB 110 2 1 490 ORG
AK4I 115 2 4 490 TN
Soc. of Midwest Contesters
K9EI 109 2 1 486 IN
N4MRM 109 2 1 486 KY
Falmouth ARA
K1GRP 58 2 1 482 EMA
Radio Activity of Savannah
K7UWR 83 2 1 482 GA
New Providence ARC
KC2WUF 83 2 1 482 NNJ
Arizona Outlaws Contest Club
N5MF 108 2 1 482 NM
Univ. of Alabama RC
W4UAL 108 2 8 482 AL
WB8USA 108 2 1 480 OH
AA4NP 107 2 1 478 SFL
K6NKO 106 2 1 474 SDG
Lake Area AR Klub
KG5LRL 81 2 1 474 NTX
KO6DGV 106 2 1 474 SB
N7RSC 106 2 1 474 UT
VE3MVM 106 2 1 474 ONS
W3PLS 106 2 1 474 EPA
Hayward RC
AA6MK 106 2 1 472 EB
KG4EXY 115 2 1 472 VA
Bella Vista RC
K5QBX 105 2 1 470 AR
CARCSC
KB4DE 105 2 1 470 SC
Northern Lakes ARC
KDØZYL 77 2 1 470 MN
Woodbridge Wireless
N4LJS 105 2 1 470 VA
Granite State ARA
NI1E 105 2 1 470 NH
VA2KD 160 2 1 470 QC
Zephyrhills Area ARC
W3LR 105 2 1 470 WCF
Alabama Contest Grp.
N4EMP 160 2 2 470 AL
N5VF 113 2 1 468 VA
KC8JRS 104 2 1 466 OH
Lake Area AR Klub
KI5YGT 104 2 1 466 NTX
Benton ARS
N2JAS 104 2 1 466 WPA
N3RM 104 2 1 466 EPA
W3BOO 104 2 1 466 ENY
Wireless Assn. of South Hills ARC
WB4GCS 104 2 1 466 WPA
Mike & Key ARC
NW7GO 104 2 1 464 WWA
AB4WL 103 2 1 462 AL
Lake Area AR Klub
AC5EZ 103 2 1 462 NTX
Golden Empire ARS
KO6ANK 103 2 1 462 SV
Stillwater ARA
N5LB 103 2 1 462 MN
KC4KZR 65 2 1 460 NC
AI7FF 102 2 1 458 MT
KB8ZR 102 2 1 458 OH
WX5ET 102 2 1 458 WTX
KK4VA 103 2 1 456 VA
W6FB 127 2 1 456 LA
K9TF 101 2 1 454 WI
Sky Valley ARC
KB7GFL 76 2 1 454 WWA
KD6SPN 101 2 1 454 SCV
N1SUZ 202 2 1 454 SC
Manitoulin ARC
VE3ETE 101 2 1 454 ONN
North Augusta Belvedere RC
WM4RT 101 2 1 454 SC
Snohomish Co. Hams Club
W9LD 101 2 2 454 ID
AA4LR 101 2 1 450 GA
K4HAL 100 2 1 450 AL
Potomac Valley RC
KB3Z 100 2 1 450 EPA
KE4JXF 137 2 1 450 NC
NØKJI 100 2 1 450 CO
Dial RC of Middletown
N8AA 100 2 1 450 OH
NF4L 108 2 1 450 GA
Keowee Toxaway ARC
W4SLT 200 2 1 450 SC
W8LX 99 2 1 446 NC
AD2L 98 2 1 442 EPA
ARC of Butts Co.
K3GWK 196 2 1 442 GA
Canton ARC
KA8MNT 98 2 1 442 OH
KD2REU 73 2 1 442 WNY
KD5ILA 98 2 1 442 AR
KC1CYT 86 2 1 438 CT
Skyview Radio Soc.
KC3SDJ 97 2 1 438 WPA
CTRI Contest Grp.
AI1TT 100 2 1 434 RI
KB8MYC 96 2 1 434 OH
AB5TN 95 2 1 430 NTX
K6AGA 94 2 1 426 LAX
VE2QV 69 2 1 426 QC
K4GSX 81 2 1 424 GA
Niagara Frontier Radiosport
AC2FA 93 2 1 422 WNY
West TN ARS
N4GMF 93 2 1 422 TN
Albany ARA
W2QCY 93 2 1 422 ENY
N8CDY 93 2 1 420 OH
CRES ARC
K3CTN 92 2 1 418 OH
Holmesburg ARC
K8PT 92 2 1 418 EPA
Comox Valley ARC
VE7PEY 92 2 1 418 BC
WA3TLT 92 2 1 418 WPA
WB4CW 92 2 1 418 NC
WA2VKG 98 2 1 416 SNJ
Rochester (MN) ARC
KØGMK 90 2 1 410 MN
Montvale OEM
K2TWI 90 2 1 410 NNJ
ARC EmComm Srvc.
N2LDV 130 2 1 410 NLI
VE2IAA 180 2 1 410 QC
Southwest IA ARC
WBØGXD 180 2 1 410 IA
N6BXO 64 2 1 406 CO
York Region ARC
VA3BXG 89 2 1 406 GH
Order of Boiled Owls of NY and Radio Central ARC
W2YK 89 2 1 406 ENY
AF4WR 88 2 1 402 VA
KØLAF 117 2 1 402 MO
St. Louis QRP Soc.
K4EQ 88 2 1 402 MO
WØPPA 88 2 1 402 MN
Radio Club of Tacoma
W7LKG 88 2 1 402 WWA
WDØANB 124 2 1 402 IA
Tri-Co. ARC (PA)
WU3Z 176 2 1 402 WPA
Florida Contest Grp.
KM4HI 99 2 1 400 NFL
W8XY 105 2 1 400 OH
South Bay ARA
WB9YVM 25 2 1 400 EB
Cape Ann ARA
AB1XK 80 2 1 398 EMA
K2EJT 87 2 1 398 WNY
Potomac Valley RC
N3CS 88 2 1 398 NC
Northeastern IN ARA
W9GOO 87 2 1 398 IN
WB9RRU 87 2 1 398 CT
Penn Wireless Assn.
K3FKW 67 2 1 396 EPA
Valley and Massanutten ARA
KB4OLM 86 2 1 394 VA
KE8ESJ 86 2 1 394 OH
West Kootenay ARC
VE7RK 86 2 1 394 BC
Contest Club Ontario
VE3KMQ 171 2 1 392 GH
AD2BO 85 2 1 390 NLI
N5XE 85 2 1 390 OK
N9HQ 170 2 1 390 IL
Brazos Valley ARC
AE5TG 84 2 1 386 STX
San Fernando Valley ARC
K6ZGW 84 2 1 386 LAX
Heart of America RC
KAØYJE 84 2 1 386 MO
KD2VCE 84 2 1 386 WNY
N6SAF 84 2 1 386 EB
W4BHJ 113 2 1 386 NC
W5SLG 100 2 1 386 WTX
WA1FKP 79 2 1 386 AL
KC8VMG 168 2 2 386 WV
KL1Y 92 2 1 384 WTX
N4ZY 89 2 1 384 NC
K1DRH 83 2 1 382 EMA
KE7KPY 83 2 1 382 NV
Alexandria RC
KW4UJ 103 2 1 382 VA
VE2ZS 101 2 1 382 QC
Kicked Back Contesters Club
WD5ACR 166 2 1 382 CO
KO4ZWD 155 2 1 380 GA
K6MLE 82 2 1 378 SV
KC2ZA 82 2 1 378 EPA
KTØD 82 2 1 378 CO
N1AL 82 2 1 378 UT
Plano AR Klub
W8OV 82 2 1 378 NTX
Ellsworth Amateur Wireless Assn.
N1EP 163 2 1 376 ME
Richardson Wireless Klub
KD4C 56 2 1 374 NTX
Hualapai ARC
WA7DHQ 81 2 1 374 AZ
WØPL 136 2 2 374 MN
Richardson Wireless Klub
KI5YYO 80 2 1 370 NTX
Panoramaland ARC
KM7H 80 2 1 370 EWA
N2FBV 80 2 1 370 NLI
Neos ARA
W7UGS 80 2 3 370 WWA
AG7E 122 2 1 368 NV
WBØULX 112 2 1 366 SD
KB6A 78 2 1 362 ORG
Southern PA ARC
W3DEN 78 2 1 362 EPA
Stone Tower Creek RC
K2POF 107 2 3 362 ENY
K2DAR 77 2 1 358 WNY
Meriden ARC
W1EDX 79 2 1 354 CT
Adams Co. ARS
W3HN 152 2 1 354 EPA
WO7T 76 2 1 354 AZ
WA5IEK 65 2 1 352 MS
Houston ECHO Soc./Oak Forest ARC
K5GZR 83 2 1 350 STX
McKinney ARC
KA5RBZ 75 2 1 350 NTX
NEMO ARC
KDØYTE 75 2 1 350 MO
Richardson Wireless Klub
KE5GLZ 75 2 1 350 NTX
Virginia Beach ARC/Virginia DX Century Club
KW4GF 84 2 1 350 VA
N7EKB 75 2 1 350 WWA
Halifax ARC
VA1CC 75 2 1 350 NS
VE3GSI 75 2 1 350 ONE
PART of Westford
W1XH 75 2 1 350 EMA
Putnam Em. Amateur Repeater League
W2CX 100 2 1 350 ENY
WB2AOZ 75 2 1 350 NTX
South Carroll ARG
N3DUE 100 2 2 350 MDC
N3UYI 74 2 1 346 WI
VE3MYE 148 2 1 346 ONE
W3LS 147 2 1 344 OR
Ozaukee RC
AC9JV 96 2 1 342 WI
Oh-Ky-In ARS
N8MRS 64 2 1 342 OH
N9LQ 73 2 1 342 IL
W5JEP 73 2 1 342 NTX
AEØG 78 2 1 338 NE
Newton ARA
NØNC 72 2 1 338 IA
N1EDF 72 2 1 338 EMA
East Bay ARC
N6RLS 64 2 1 338 EB
VE3SHO 72 2 1 338 GH
Northern Lakes ARC
AEØWX 58 2 1 336 MN
KC9LDR 93 2 1 334 IL
W6MX 142 2 1 334 LAX
Dallas ARC
AI5QK 116 2 1 332 NTX
3730 Grp.
KA1BZE 141 2 1 332 WMA
AG4HG 140 2 1 330 TN
KØEMT 70 2 1 330 IN
KJ5SO 90 2 1 330 LA
Tortolita RC
KM6JSR 70 2 1 330 AZ
KY6MM 70 2 1 330 KY
NØDCW 70 2 1 330 ID
W7WXR 45 2 1 330 ND
Potomac Valley RC
W8KRZ 70 2 1 330 VA
Eastern NM ARC
WS5D 70 2 1 330 NM
K3HH 71 2 1 328 ME
Highlands Hams
NØZO 69 2 1 326 AL
VA3TAR 68 2 1 322 GH
VE7AF 40 2 1 322 BC
WØXM 122 2 1 322 KS
Kentwater ARC
W5DMS 52 2 1 322 ORG
K1LK 76 2 1 320 EMA
KF4RAL 135 2 1 320 VA
Kingston Area Amateurs
VE3FMK 85 2 1 320 ONE
W5LIC 91 2 1 320 STX
K3SNO 134 2 1 318 EPA
K9BRS 42 2 1 318 IN
N5FZ 67 2 1 318 STX
WO3T 84 2 2 318 WPA
Eastern OH Contesters
KE8E 77 2 1 316 OH
NØKU 85 2 1 316 KS
AK7VV 66 2 1 314 WWA
Delaware Lehigh ARC
N3WR 89 2 1 314 EPA
N9TDE 82 2 1 314 SD
Orleans Co. ARC
W2RWC 66 2 1 314 WNY
KE4HD 66 2 1 312 VA
Cheshire Co. DX ARC
N1PCZ 68 2 1 312 NH
Sherlock ARA
K6ESS 73 2 1 310 SV

Tri-Co. ARC (PA)
KE3WN 65 2 1 310 WPA
Boston Valley Simplex Club
N2EJT 65 2 1 310 WPA
N4MCA 65 2 1 310 NC
London ARC
VE3IDT 130 2 1 310 ONS
W8NOR 65 2 1 310 AZ
VE3QEE 129 2 1 308 GH
KKØD 39 2 1 306 CO
N6PRZ 64 2 1 306 EB
NX4N 64 2 1 306 SFL
WYØB 64 2 1 306 MO
KA5ULE 128 2 2 306 WTX
Univ. of Alabama RC
KV4T 64 2 8 306 AL
New England Fusion Grp.
AC1MT 126 2 1 304 EMA
Garden State ARA
KB2RTI 64 2 1 304 NNJ
W7YG 127 2 1 304 WCF
N9DEK 126 2 1 302 IN
W8AND 63 2 1 302 MI
Cochise ARA
AA7JB 40 2 1 300 AZ
Toledo Mobile Radio Assn.
KB8PAI 125 2 1 300 OH
KX7L 65 2 1 300 WWA
AA7LE 62 2 1 298 PAC
AG6JA 80 2 1 298 EB
KC3VII 62 2 1 298 EPA
KMØF 124 2 1 298 SD
Maury ARC
KM1Z 62 2 1 298 TN
Orange Co. Radio Amateurs and Durham FM Assn.
W4AEN 62 2 1 298 NC
W4ELP 62 2 1 298 VA
WA1HXH 62 2 1 298 NH
KA1LHJ 49 2 1 296 CT
W6GLS 72 2 1 296 SDG
KD2UTL 122 2 1 294 NNY
Mound ARA
KE8RS 61 2 1 294 OH
Lodi ARC
N6NFB 122 2 1 294 SJV
AD8DM 60 2 1 290 OH
KØWRY 60 2 1 290 KS
KA6BMZ 120 2 1 290 ORG
KD3G 120 2 1 290 WV
Ft. Smith Area ARC
KI7AY 60 2 1 290 OK
KJ9C 60 2 1 290 MT
KO2F 60 2 1 290 VA
W1AVK 120 2 1 290 CT
Tamaqua Wireless Assn.
W3OFD 67 2 1 290 EPA
W4EVV 60 2 1 290 NFL
W4LT 60 2 1 290 WCF
W5APO 61 2 1 290 NFL
AC7CJ 69 2 1 288 EWA
W8RAD 119 2 1 288 MI
KØLJW 59 2 1 286 WCF
N8CPA 59 2 1 286 OH
Richardson Wireless Klub
W5SU 59 2 1 286 NTX
WB2DHY 59 2 1 286 VA
KB6QEW 76 2 1 284 ME
Southern CA Contest Club
KN6OKY 62 2 1 284 SDG
KT4OO 117 2 1 284 SC
K3PNW 66 2 1 282 WWA
NØDIM 66 2 1 282 SC
Shelby ARC
W4JL 58 2 1 282 NC
Hop River RC
WX1W 116 2 1 282 CT
Snohomish Co. Hams Club
KA7RRA 115 2 1 280 WWA
WA7YNU 47 2 1 280 MT
St. Paul RC/Mining RC
KCØINP 76 2 1 278 MN
W9ERE 57 2 1 278 CO
Western IL ARC
W9WE 57 2 1 278 IL
Calhoun Co. ARA
WJ4K 57 2 1 278 AL
Indy Midtown ARC
NE9T 33 2 2 278 IN
Heritage Hunt Hams
KM4IAJ 113 2 1 276 VA
W7BGG 113 2 1 276 AZ
AG1T 56 2 1 274 UT
AL7ID 36 2 1 274 AK
KØKEM 56 2 1 274 CO
WØMWI 56 2 1 274 KS
W1HSB 58 2 1 274 RI
KN6GXO 61 2 1 272 ORG
Falmouth ARA
N1AM 58 2 1 272 EMA
UCLA ARC
W6NYU 111 2 1 272 ORG
KD2PFH 55 2 1 270 WNY
Paducah ARA
KY4JDC 55 2 1 270 KY
Keowee Toxaway ARC
N4AHO 57 2 1 270 SC
Jefferson Co. (WA) ARC
N7TPR 110 2 1 270 WWA
Southern Counties ARA
W2KU 55 2 1 270 SNJ
WZ3J 102 2 1 270 MDC
High Point ARC
KN4OCX 59 2 1 268 NC
Cheshire Co. DX ARC
ACØWI 108 2 1 266 NH
Irving ARC
AI5NO 54 2 1 266 NTX
South Mountain Radio Amateurs
K3ZR 54 2 1 266 EPA
Richardson Wireless Klub
KØLOA 54 2 1 266 NTX
WD9IGL 54 2 1 266 WI
Frankford RC
WO2Y 54 2 1 266 SNJ
KQ4DRX 7 2 1 264 WCF
Willamette Valley DX Club
W7VC 107 2 1 264 OR
W8WFD 107 2 1 264 OH
WI7J 107 2 1 264 UT
Central MA ARA
AI1G 28 2 1 262 WMA
K3TXT 53 2 1 262 MDC
Allen Co. AR Technical Soc.
KC9EZP 104 2 1 262 IN
Mississippi Valley DX/Contest Club
WØNFS 53 2 1 262 MO
Potomac Valley RC
WA3AER 53 2 1 262 MDC
Bay Area DXers
WA8MDC 53 2 1 262 MI
WB4PWZ 53 2 1 262 EPA
Baylor ARC
WA5BU 106 2 6 262 NTX
K5KLO 105 2 1 260 GA
WA1HRE 61 2 1 260 NH
West Chester ARA
KB8ZYE 90 2 1 258 OH
KF8I 63 2 1 258 OH
Highlands Co. ARC
KW4G 104 2 1 258 WCF
McMinnville ARC
WB6RVP 52 2 1 258 OR
AD5DJ 103 2 1 256 NTX
NØSTP 62 2 1 256 MN
N4MMR 103 2 1 256 WCF
N7HYV 77 2 1 256 NV
VE3QC 52 2 1 256 ONE
EmComms Assn. of St. Charles
WSØZ 103 2 2 256 MO
Columbus Radio Enthusiasts Soc.
K8HTC 51 2 1 254 OH
Oh-Ky-In ARS
KC8HQS 102 2 1 254 OH
KD9YUO 51 2 1 254 IL
KG7MYX 51 2 1 254 WWA
KM4VI 51 2 1 254 TN
Garden City ARC
N8TW 51 2 1 254 MI
VE6GTX 62 2 1 254 AB
W4TLR 51 2 1 254 NC
WT3O 102 2 1 254 MDC
KØJEB 52 2 1 252 CT
N9RMH 101 2 1 252 IN
Contest Club Ontario
VE3IMU 86 2 1 252 GH
Waterbury ARC
W1LAS 101 2 1 252 CT
AC8AZ 50 2 1 250 MI
K6KAL 50 2 1 250 AZ
Tri-Town RAC
K9KO 25 2 1 250 IN
BCARS
KC3NAF 64 2 1 250 WPA
KD2GUT 50 2 1 250 NLI
KI4BBL 50 2 1 250 VA
KK7RZK 50 2 1 250 OR
Grant Co. ARC
N9PKL 100 2 1 250 IN
NS7B 50 2 1 250 UT
Potomac Valley RC
W3TAS 50 2 1 250 DE
W7JSS 50 2 1 250 OR
Sun Country ARS
WA4IPU 100 2 1 250 NFL
Village 7 ARC
ACØCO 99 2 1 248 CO
DFW Contest Grp.
K5ENS 92 2 1 248 NTX
Kicked Back Contesters Club
KD5YPH 70 2 1 248 CO
Lake Area AR Klub
AI5G 51 2 1 246 NTX
K6DW 98 2 1 246 LAX
K6JGA 98 2 1 246 SV
KE4FVU 48 2 1 246 TN
KJ5CAS 49 2 1 246 NM
South Wake ARC
NW3U 98 2 1 246 NC
Soc. of Midwest Contesters
WR9R 69 2 1 246 IN
Lake Area AR Klub
K8AMH 47 2 1 244 NTX
The FPL Grp.
K8ESQ 50 2 1 244 MI
KA4JRY 97 2 1 244 GA
KCØWIR 36 2 1 244 MO
Richardson Wireless Klub
KG5WRY 97 2 1 244 NTX
N6JTX 97 2 1 244 SV
Okaw Valley ARC
K9RZ 67 2 1 242 AZ
Silver Springs RC
KO4OIG 52 2 1 242 NFL
K7UOU 48 2 1 240 AZ
North Fulton ARL
W4FRA 95 2 1 240 GA
KA2IWK 22 2 1 238 WNY
KI5NYZ 47 2 1 238 WTX
N8DD 51 2 1 238 OH
N2YG 92 2 1 234 NLI
N9UXC 21 2 1 234 MN
Montachusett ARA
NZ1D 46 2 1 234 NFL
WD4RCG 46 2 1 234 AL
Assoc. Radio Amateurs of Long Beach
K6MUG 91 2 1 232 LAX
Bolingbrook ARS
K9NYO 72 2 1 232 IL
KD9HPN 91 2 1 232 IN
W7QF 45 2 1 230 OR
W8GNT 90 2 1 230 OH
Metro DX Club
WU9D 45 2 1 230 IL
Univ. of Alabama RC
KS4YT 45 2 8 230 AL
Jersey Shore ARS
AC2ZU 89 2 1 228 SNJ
KØJJM 89 2 1 228 KS
Calaveras ARS
KA9MDP 89 2 1 228 SV
N5MIS 89 2 1 228 MS
Grand Rapids ARA
N8UXN 89 2 1 228 MI
VA2SIB 44 2 1 226 QC
W3HDG 44 2 1 226 WPA
W8GV 88 2 1 226 WCF
WAØPFC 88 2 1 226 UT
WB5BHS 44 2 1 226 AR
K5EGA 43 2 1 222 NTX
KD9BRW 43 2 1 222 IL
NA7DO 43 2 1 222 WWA
Gulf Coast ARC
NG4L 43 2 1 222 WCF
VE3INE 43 2 1 222 GH
WA1VKO 86 2 1 222 NH
Westchester EmComm Assn.
N2GDY 85 2 1 220 ENY
Kendall ARS
W6TIR 51 2 1 220 STX
Binghamton ARA
WM2R 60 2 1 220 WNY
Villa Rica RC
AD5QA 42 2 1 218 GA
K9VQA 34 2 1 218 IL
Benton ARS
KB5QR 53 2 1 218 AR
KE4JVY 42 2 1 218 NC
Brantford ARC
VE3SXB 109 2 1 218 ONS
W8AIT 84 2 1 218 MI
VA3DVY 37 2 2 218 GH
KC3ZCH 49 2 1 216 WPA
Lake Conroe ARC
KD4MCB 83 2 1 216 STX
N6VH 50 2 1 216 SDG
Kachina ARC
AG7AB 43 2 1 214 AZ
AI6MW 41 2 1 214 SB
K2CVY 56 2 1 214 NLI
McKinney ARC
KI5QAX 41 2 1 214 NTX
KI5RHN 41 2 1 214 OK
KL7DUG 82 2 1 214 AK
MID-MO ARC
NNØJS 50 2 1 214 MO
Brazos Valley ARC
NZ5TX 41 2 1 214 STX
WA4HWN 41 2 1 214 AL
Olympia ARS
K5VMA 41 2 1 212 WWA
Cheshire Co. DX ARC
WA1ZYX 81 2 1 212 NH
AB5XM 40 2 1 210 STX
AD7OY 80 2 1 210 NV
AJ3M 40 2 1 210 MDC
KØGOB 80 2 1 210 MO
K4HXM 40 2 1 210 VA
K9HL 40 2 1 210 IN
WØNV 40 2 1 210 IA
WA6UIJ 20 2 1 210 ORG
Richardson Wireless Klub
AA5AH 61 2 1 208 NTX
W6JBR 40 2 1 208 SDG
AAØYY 39 2 1 206 MO
Arizona Outlaws Contest Club
K6VHF 14 2 1 206 AZ
Sierra Foothills ARC
KI6RT 61 2 1 206 SV
Anne Arundel RC
KB3IAI 14 2 1 204 MDC
East Bay ARC
KO6NO 77 2 1 204 EB
W1FRX 77 2 1 204 WNY
AAØK 13 2 1 202 CO
Warminster ARC
K3GMQ 38 2 1 202 EPA
East Greenbush ARA
KC2HRO 72 2 1 202 ENY
KD4TTP 63 2 1 202 VA
N4WIO 38 2 1 202 AL
W8VX 39 2 1 202 OH
K3BUC 75 2 1 200 VA
Port City ARC
KC1OXM 75 2 1 200 NH
KD5AYW 75 2 1 200 NM
Nashua Area Radio Soc.
WMØG 40 2 1 200 NH
21 Repeater Club
KA9QWC 75 2 2 200 IN
WCARES Contest Grp.
K9QJS 37 2 1 198 TN
KF4DJQ 74 2 1 198 TN
N2EJI 37 2 1 198 ENY
Brazos Valley ARC
W5GCX 37 2 1 198 STX
W5TTE 37 2 1 198 NM
W8NFR 37 2 1 198 OH
Bergen ARA
WA2CLP 13 2 1 198 NNJ
N6RIK 73 2 1 196 GA
Sussex ARA
KC3MAL 36 2 1 194 DE
KD8SPF 72 2 1 194 OH
Brazos Valley ARC
KZ5H 36 2 1 194 STX
East Greenbush ARA
N2WJR 72 2 1 194 ENY
W1WAB 11 2 1 194 WCF
Sierra Foothills ARC
AA6RS 44 2 1 192 SV
KØRVB 71 2 1 192 STX
Woodbridge Wireless
KM4KWZ 71 2 1 192 VA
N4BFR 71 2 1 192 GA
Brazos Valley ARC
K5WRN 70 2 1 190 STX
KC3AEZ 20 2 1 190 EPA
Southeast LA ARC
KE5KMM 35 2 1 190 LA
Spartanburg ARC
N4ULE 35 2 1 190 SC
N9WNJ 35 2 1 190 IN
NY4JB 35 2 1 190 TN
KB2TDT 69 2 1 188 WNY
Brazos Valley ARC
W5ALW 94 2 1 188 STX
K8MA 34 2 1 186 OH
KM4PDK 68 2 1 186 KY
Carolina ARES
KR4NO 34 2 1 186 SC
NØZTO 34 2 1 186 CO
Tri-Co. ARC (PA)
N3VYZ 68 2 1 186 WPA
VE7BC 34 2 1 186 BC
Convair/220 ARC
WB6SQA 68 2 1 186 SDG
K3LUE 67 2 1 184 NFL
Swamp Fox Contest Grp.
KB4FHA 67 2 1 184 SC
N7JVJ 67 2 1 184 WWA
N7QLK 67 2 1 184 NFL
WØMAR 67 2 1 184 CO

Brazos Valley ARC
WK5AT 67 2 1 184 STX
K1AUS 66 2 1 182 MT
STARS ARC
KB9REV 62 2 1 182 IL
KEØUNV 35 2 1 182 MO
Wayne ARC
KE8TIJ 33 2 1 182 OH
North TX ARS
N5TXL 66 2 1 182 NTX
The Kansas Antenna Club in Johnson Co.
WBØKSL 33 2 1 182 KS
WD9ITM 66 2 1 182 IN
AG7RF 65 2 1 180 ID
Falmouth ARA
K1PRD 65 2 1 180 EMA
Arlington ARC
KD5WBW 65 2 1 180 NTX
Tennessee Contest Grp.
K4KO 32 2 1 178 TN
South Bay ARA
KJ6DBE 32 2 1 178 EB
N4DLR 32 2 1 178 OH
Tusco ARC
N8BAG 64 2 1 178 OH
W1MJC 32 2 1 178 MI
Healing Springs Mtn. VHF Soc.
W4EXT 32 2 1 178 NC
Silver Springs RC
WA3LXD 14 2 1 178 NFL
Conejo Valley ARC
AJ6MJ 33 2 1 176 SB
N9FAT 63 2 1 176 MI
N9KIY 63 2 1 176 SC
Keuka Lake ARA
NB2L 36 2 1 176 WNY
NF2L 63 2 1 176 WNY
Hamfesters RC
K9ACM 32 2 1 174 IL
KB8UFP 62 2 1 174 SFL
KC3YQI 12 2 1 174 MDC
KD6VKF 31 2 1 174 SDG
KFØQPA 31 2 1 174 KS
KN6FKQ 12 2 1 174 SDG
Edmonds Woodway ARC
N4WZY 31 2 1 174 WWA
NJ7A 31 2 1 174 UT
Pasadena RC
WB6RJH 6 2 1 174 SCV
Generations ARC
K3LBD 61 2 1 172 CT
VE7LSI 33 2 1 172 BC
KD9VZD 28 2 6 172 IN
AC9PG 30 2 1 170 WI
K4NXS 30 2 1 170 SC
Pasadena RC
K6MAA 30 2 1 170 LAX
Sierra Foothills ARC
KB7QWC 30 2 1 170 SV
Framingham ARA
KC1NXT 30 2 1 170 EMA
Lehigh Valley ARC
KC3BLF 30 2 1 170 EPA
Albemarle ARC
N3US 60 2 1 170 VA
Wayne ARC
N8LFK 30 2 1 170 OH
Canton ARC
W8VE 30 2 1 170 OH
North Shore RC (IL)
WA9LKZ 30 2 1 170 IL
K9UJH 60 2 3 170 WI
Meriden ARC
K1LHO 31 2 1 168 CT
GOTAHAMS
KN6UMV 59 2 1 168 LAX
AA2YG 58 2 1 166 WNY
KD2UBH 33 2 1 166 WNY
KIØAR 58 2 1 166 CO
Alabama Contest Grp.
W4NBS 29 2 1 166 AL
W4PF 29 2 1 166 KY
WBØRUR 29 2 1 166 AR
KN2D 44 2 1 164 NFL
WA2GOT 42 2 1 164 ENY
KB3RKM 56 2 1 162 EPA
Columbia-Montour ARC
N3KCR 56 2 1 162 EPA
Young Amateurs RC
W3B 28 2 1 162 MS
W4JSW 6 2 1 162 NFL
W9ASS 28 2 1 162 IL
Jersey Shore ARS
WA2FAX 56 2 1 162 SNJ
AC9FL 55 2 1 160 IL
NOARS/LCARA
K2WJS 55 2 1 160 OH
KD9NUE 30 2 1 160 IN
KI6KGC 55 2 1 160 NM
N3BVQ 40 2 1 160 SFL
N4ACK 29 2 1 160 VA
VE3UWA 55 2 1 160 ONE
Dallas ARC
AE5FM 27 2 1 158 NTX
Orange Co. (CA) ARC
K6JEY 54 2 1 158 LAX
Meriden ARC
KE1AU 27 2 1 158 CT
KQ4CCC 27 2 1 158 NC
ARC EmComm Srvc.
N2LEB 4 2 1 158 NLI
WCARES Contest Grp.
NM4N 27 2 1 158 TN
NS9DX 54 2 1 158 IL
Orca DX and Contest Club
VA7KBM 27 2 1 158 BC
VE3AWS 54 2 1 158 GH
WB2DVE 54 2 1 158 WNY
WI4L 27 2 1 158 GA
Hualapai ARC
WS7T 54 2 1 158 AZ
K6AAI 53 2 1 156 SV
San Jose ARES/RACES
K6SW 3 2 1 156 SCV
K9MEV 30 2 1 156 NC
KF7DX 53 2 1 156 EWA
Minnetonka ARC
KJØP 29 2 1 156 MN
Lake Area AR Klub
K5LOL 52 2 1 154 NTX
K7ZX 26 2 1 154 OR
KAØHMQ 26 2 1 154 MO
St. Louis QRP Soc.
KKØU 26 2 1 154 MO
KO4KJV 35 2 1 154 NC
Binghamton ARA
N2EVI 27 2 1 154 WNY
N2OIG 29 2 1 154 NLI
N6DPL 52 2 1 154 ORG
N8ZKT 50 2 1 154 OH
Mabcom
VE6CA 52 2 1 154 AB
Goshen ARC
K9WPV 34 2 1 152 IN
KI7N 26 2 1 152 OR
Texas Em. Amateur Communicators
KK5DO 1 2 1 152 STX
Henderson ARC
N4NJJ 41 2 1 152 NV
W6UDT 31 2 1 152 EB
W5IOH 51 2 2 152 STX
AB9XT 50 2 1 150 IN
Silver Comet ARS
K4CGA 25 2 1 150 GA
K4IU 25 2 1 150 MN
Florida Contest Grp.
K4RFK 25 2 1 150 SFL
KA1PPV 25 2 1 150 CT
Piedmont ARC
KB4AS 50 2 1 150 GA
NA3F 25 2 1 150 WPA
NN5NN 50 2 1 150 WY
VY2ACC 50 2 1 150 PE
W9EMM 50 2 1 150 IL
WA6HOO 50 2 1 150 LAX
Patoka Valley ARC
WB9LIB 50 2 1 150 IN
WM5F 25 2 1 150 ID
N4JKO 32 2 1 148 KY
East Greenbush ARA
W2RBS 30 2 1 148 ENY
WD8BXP 49 2 1 148 MI
Bowie Wireless Assn.
K3JSJ 24 2 1 146 MDC
KA9OZP 48 2 1 146 IA
KM4NHN 24 2 1 146 VA
Conejo Valley ARC
KJ6GEU 47 2 1 144 SB
KK7HPM 47 2 1 144 UT
Central VA Contest Club
W4LEW 37 2 1 144 VA
Straight Key Century Club
WB8WUA 29 2 1 144 OH
AJ5S 23 2 1 142 MS
Wayne ARC
K8RMC 23 2 1 142 OH
KG9EP 23 2 1 142 WCF
N5DCH 23 2 1 142 NM
Rochester (MN) ARC
WBØU 23 2 1 142 MN
KD1W 23 2 1 140 NH
Assoc. Radio Amateurs of Long Beach
KI6ZDP 45 2 1 140 LAX
Phil-Mont Mobile RC
W3ZO 45 2 1 140 EPA
AC2ZZ 31 2 1 138 NNJ
KD5BPR 33 2 1 138 LA
Binghamton ARA
NE2B 28 2 1 138 WNY
NJ3A 44 2 1 138 DE
Gloucester Co. ARC
WB2QEF 22 2 1 138 SC
Univ. of Alabama RC
WX4DC 44 2 8 138 AL
KB2DX 43 2 1 136 ENY
KC9GRD 43 2 1 136 WI
KW7MJA 23 2 1 136 NV
W5VAN 43 2 1 136 AR
K7VBY 21 2 1 134 OR
KB9SIG 22 2 1 134 WI
KE8SRH 35 2 1 134 MI
N9ITO 21 2 1 134 IL
Calgary ARA
VA6BED 27 2 1 134 AB
San Fernando Valley ARC
W6ELI 21 2 1 134 ORG
Marshall Co. ARC
K9ZLQ 32 2 6 134 IN
Delaware ARA
KE8QPI 41 2 1 132 OH
N7FPA 41 2 1 132 OR
NØJNM 40 2 1 130 MN
Arlington ARC
N3DME 40 2 1 130 NTX
Granite State ARA
W1EAA 23 2 1 130 NH
W4JDS 20 2 1 130 GA
WA6HZT 20 2 1 130 SV
WA8ZID 20 2 1 130 AZ
South Wake ARC
WB4SMS 20 2 1 130 NC
K4CV 22 2 1 128 TN
KE5UGA 25 2 1 128 MS
RF Hill ARC
N3EOE 39 2 1 128 EPA
Univ. of Alabama RC
AE4AL 39 2 8 128 AL
KFØGKO 38 2 1 126 CO
KI4IHC 19 2 1 126 VA
KQ4NZL 38 2 1 126 NC
Rocky Mountain Ham Radio
NØPOH 19 2 1 126 CO
Northern Lights Radio Soc.
NØSUW 19 2 1 126 MN
Plano AR Klub
NT5TT 19 2 1 126 NTX
Greenwood ARC
VE1VEI 19 2 1 126 NS
San Fernando Valley ARC
W6DPM 38 2 1 126 LAX
Statesboro ARS
AB7HA 37 2 1 124 GA
K4VBL 37 2 1 124 VA
Des Moines Radio Amateurs Assn.
KAØDOS 37 2 1 124 IA
Toledo Mobile Radio Assn.
KE8VKY 37 2 1 124 MI
NØAPX 30 2 1 124 MO
VE4DL 20 2 1 124 MB
W2STE 37 2 1 124 MO
W8JDZ 37 2 1 124 OH
Daviess Co. ARC
KC9SFL 27 2 2 124 IN
K6EGM 18 2 1 122 LAX
K7WTA 18 2 1 122 AZ
Keowee Toxaway ARC
KK4CEW 36 2 1 122 SC
KARO-ECHO
KN6VTC 36 2 1 122 EB
Silver Comet ARS
KO4QZY 36 2 1 122 GA
Tortolita RC
NN7BH 36 2 1 122 AZ
Detroit ARA
W8ZZ 18 2 1 122 MI
Arkansas River Valley ARF
WB5JJJ 18 2 1 122 AR
Tusco ARC
WB8PLB 34 2 1 122 OH
Conejo Valley ARC
K6HB 35 2 2 122 SB
Explorer Post 599
N7XQA 36 2 3 122 AZ
Steubenville-Weirton ARC
AA8IA 19 2 1 120 OH
KC1TWR 35 2 1 120 NC
Bedford ARC
N5TLE 35 2 1 120 NTX
ND1L 35 2 1 120 EMA
South Wake ARC
WA4TCJ 35 2 1 120 NC
Northwest ARS
WJ9O 35 2 1 120 STX
CRES ARC
K3YBI 34 2 1 118 OH
NØSMX 17 2 1 118 NFL
N3YZ 17 2 1 118 MDC
Lambton Co. RC
VA3KSF 17 2 1 118 ONS
East Greenbush ARA
W2SAP 17 2 1 118 ENY
North Fulton ARL
W4QDV 17 2 1 118 GA
W7FD 34 2 1 118 NV
W8VFD 34 2 1 118 OH
Richardson Wireless Klub
KI5PPO 17 2 1 116 NTX
WØLHK 29 2 1 116 KS
Northeast OK Radio Amateurs
W5GFI 33 2 1 116 OK
WDØREW 23 2 1 116 MO
AK4GO 16 2 1 114 TN
Richardson Wireless Klub
KF5LJD 16 2 1 114 NTX
NØKWA 32 2 1 114 LA
N4ZLK 16 2 1 114 SC
N4ZQA 32 2 1 114 VA
Kitchener-Waterloo ARC
VE3RKS 17 2 1 114 ONS
VO1KGZ 16 2 1 114 NL
WBØNPR 32 2 1 114 IN
KA9NNR 31 2 1 112 IL
KB1SL 31 2 1 112 CT
Conejo Valley ARC
KD6NFD 31 2 1 112 SB
KG4BMG 31 2 1 112 TN
KK7RPI 20 2 1 112 WWA
AKØMR 15 2 1 110 CO
K6CDW 30 2 1 110 LAX
Snohomish Co. Hams Club
K7KFB 30 2 1 110 WWA
KC9QFH 30 2 1 110 WI
Northeastern IN ARA
KD9OKC 30 2 1 110 IN
KE8VRW 30 2 1 110 MI
Pasadena RC
KF6RRR 30 2 1 110 LAX
Albemarle ARC
KY4IE 15 2 1 110 VA
Schaumburg ARC
N9IBM 27 2 1 110 IL
W1UJ 15 2 1 110 WMA
Larkfield ARC
WB2CMF 15 2 1 110 NLI
KM4YC 29 2 1 108 VA
N8RI 29 2 1 108 MI
W1AZR 29 2 1 108 IN
Special Purpose ARC
N9CC 22 2 3 108 IL
AI5PY 28 2 1 106 OK
Alexandria RC
K2KT 14 2 1 106 VA
K8GNG 14 2 1 106 MI
KB1BYP 28 2 1 106 ND
Framingham ARA
KB1VXY 28 2 1 106 EMA
Queen Anne's ARC
KC3LUV 28 2 1 106 MDC
KG5YPK 3 2 1 106 STX
Ascension ARC
KJ5BJZ 14 2 1 106 LA
KQ3Q 14 2 1 106 SFL
NØJYZ 14 2 1 106 MN
VA3PAF 14 2 1 106 ONS
K4JSK 27 2 1 104 NC
Irving ARC
KB3RWT 26 2 1 104 NTX
KB6NTW 18 2 1 104 SCV
KE8OOK 27 2 1 104 MI
KM4TQD 24 2 1 104 GA
KP2J 27 2 1 104 VI
Granite State ARA
N1KWG 27 2 1 104 NH
N3UP 26 2 1 104 EPA
VA3IIF 15 2 1 104 GH
Aero ARC
W3JEH 26 2 1 104 MDC
W4YVA 27 2 1 104 VA
W9CMD 27 2 1 104 IN
Hi-Line ARC
AE7IZ 13 2 1 102 MT
AK1EB 13 2 1 102 VT
KC3WOV 13 2 1 102 WPA
KG6LPP 26 2 1 102 NM
Lake Area AR Klub
KI5JMG 13 2 1 102 NTX
KT4NN 13 2 1 102 NFL
Richardson Wireless Klub
N5JKW 26 2 1 102 NTX
N7LAN 13 2 1 102 OR
VA3EC 13 2 1 102 GH
W2FKN 13 2 1 102 NNJ

Williamson Co. ARES					
W4BJB	26	2	1	102	TN
WA2NLL	26	2	1	102	NLI
Wood Co. ARC					
K8LL	25	2	1	100	OH
Ozone ARC					
KE5QKR	15	2	1	100	LA
KJ4CCH	25	2	1	100	NFL
KK7SL	25	2	1	100	NV
KW4LP	25	2	1	100	TN
W6UA	13	2	1	100	SB
AA8Z	15	2	2	100	OH
AL5K	24	2	1	98	AK
K5TMH	24	2	1	98	OK
Lake Area AR Klub					
KC5LL	24	2	1	98	NTX
South Jersey Radio Assn.					
W2MC	24	2	1	98	EPA
K3RSS	23	2	1	96	MDC
Kentucky Colonels ARC					
K4WSR	23	2	1	96	KY
Minnesota Wireless Assn.					
W0LM	12	2	1	96	MN
KF5ZSD	13	2	2	96	STX
Billerica ARS/Billerica EMA					
KC1QKU	22	2	1	94	EMA
KI6QDB	11	2	1	94	SDG
Etowah Valley ARC					
KJ4LPI	11	2	1	94	GA
South Bay ARC					
KK6BY	11	2	1	94	LAX
KK6VZE	22	2	1	94	SF
Richardson Wireless Klub					
N4NZ	20	2	1	94	NTX
Piedmont ARC					
WB4JWM	11	2	1	94	GA
WA2MCT	18	2	2	94	STX
K1JWC	21	2	1	92	RI
K4IEY	6	2	1	92	ME
KA0B	21	2	1	92	NM
Granite State ARA					
KC2TV	21	2	1	92	NH
Orange Co. (IN) ARC					
KC2VTM	21	2	1	92	ENY
Findlay RC					
KD8BET	21	2	1	92	OH
WA2OMT	21	2	1	92	VA
K4OOO	20	2	1	90	CT
K9XE	10	2	1	90	IL
KB1EWM	20	2	1	90	CT
VE3JZT	10	2	1	90	ONS
Montgomery ARC					
W4HEA	10	2	1	90	AL
WA0BER	10	2	1	90	MO
KA5FDX	10	2	2	90	AR
K0MIS	19	2	1	88	CO
K4DUF	19	2	1	88	VA
KC5GFL	19	2	1	88	AR
W3PWF	19	2	1	88	NTX
WE6EZ	19	2	1	88	STX
Downey ARC					
K6ICS	18	2	1	86	LAX
South Bay ARC					
KA6ZTO	13	2	1	86	ORG
KD6GWQ	9	2	1	86	ORG
KJ7PQR	18	2	1	86	OR
N0VEY	18	2	1	86	SCV
Fox River Radio League					
N9TCA	18	2	1	86	IL
W7JSD	9	2	1	86	AZ
Driftless Zone Contesters					
WA9GON	9	2	1	86	WI
Sierra Foothills ARC					
KA6UAI	17	2	1	84	SV
Golden Empire ARS					
KC6UFE	42	2	1	84	SV
KQ4EYR	17	2	1	84	GA
Hamfesters RC					
WA9VYT	17	2	1	84	IL
K5VG	8	2	1	82	OR
K6ES	16	2	1	82	NC
KB2SNL	16	2	1	82	NNJ
KE5VJF	8	2	1	82	STX
KI4AMD	10	2	1	82	VA
KN4JGH	16	2	1	82	TN
Pasadena RC					
N6LL	9	2	1	82	LAX
VA6WWW	8	2	1	82	AB
Comox Valley ARC					
VA7CGM	16	2	1	82	BC
K6GRL	15	2	1	80	SCV
K9JPP	15	2	1	80	IL
Shiawassee ARA					
KG8LD	15	2	1	80	MI
Niagara Peninsula ARC					
VA3RFQ	15	2	1	80	GH
St. Louis QRP Soc.					
W0MFQ	9	2	1	80	MO
W6GRH	15	2	1	80	ORG
Lamorinda Area Radio Interest Grp.					
K6KWR	14	2	1	78	EB
Antietam Radio Assn.					
KD3JK	14	2	1	78	MDC
Mecklenburg ARS					
KM4OWA	14	2	1	78	NC
KO4KGA	11	2	1	78	NM
KR4CE	14	2	1	78	VA
Massillon ARC					
NX8G	7	2	1	78	OH
W0JOP	7	2	1	78	MO
W2HLM	7	2	1	78	WWA
WA3GOS	7	2	1	78	MDC
Chicago Suburban Radio Assn.					
WB9NLO	14	2	1	78	IL
West Allis RAC					
WB9OWN	7	2	1	78	WI
Broken Arrow ARC					
AI5HV	10	2	1	76	OK
K1MCO	13	2	1	76	NFL
Potomac Valley RC					
K3AU	9	2	1	76	MDC
K8AH	13	2	1	76	MI
Raytown ARC					
KF0KTE	13	2	1	76	MO
KO4JFH	11	2	1	76	TN
N2NRV	13	2	1	76	WNY
Niagara Peninsula ARC					
VA3TUK	13	2	1	76	GH
VE6FAR Cycle 25					
VE6ORM	13	2	1	76	AB
Port City ARC					
AA1IT	9	2	1	74	NH
Conejo Valley ARC					
K6MQA	8	2	1	74	SB
Hi-Line ARC					
KB7DUJ	12	2	1	74	MT
Port City ARC					
KN1WDS	12	2	1	74	EMA
Club Radio Amateur Sorel-Tracy					
VE2GT	7	2	1	74	QC
W1CHL	6	2	1	74	OH
Meriden ARC					
W1DQ	6	2	1	74	CT
AD6AD	11	2	1	72	SV
Conejo Valley ARC					
AD6TW	10	2	1	72	SB
KD2DJU	11	2	1	72	ENY
KD9YVJ	11	2	1	72	IL
KH6ML	7	2	1	72	PAC
Fluvanna ARES Grp.					
KQ4AWF	11	2	1	72	VA
N5RVT	11	2	1	72	STX
WB2GRX	11	2	1	72	NFL
AJ4FJ	5	2	1	70	GA
K3ZE	10	2	1	70	MDC
K7HQ	10	2	1	70	WY
K8WZY	10	2	1	70	OH
KC0QNB	10	2	1	70	NE
KD2OMV	5	2	1	70	NNY
KD8JCJ	10	2	1	70	WV
Shreveport ARA					
KI5LUS	5	2	1	70	LA
CRES ARC					
KI8KF	10	2	1	70	OH
KJ5AXC	10	2	1	70	STX
N5BLY	10	2	1	70	MS
N6EWG	5	2	1	70	SJV
Foothills ARS					
N6Y	5	2	1	70	SCV
N9MT	5	2	1	70	IN
Ottawa Valley Mobile RC					
VE3SYZ	10	2	1	70	ONE
W2KYM	5	2	1	70	WNY
WA4EFS	5	2	1	70	SC
Dupage ARC					
WB9RCE	9	2	1	70	IL
WO6D	5	2	1	70	SB
WS3D	10	2	1	70	WPA
WS8C	10	2	1	70	WV
Cuyahoga ARS					
K8MRC	9	2	1	68	OH
Charlestown ARC					
KB3CAN	9	2	1	68	MDC
KD9VAG	9	2	1	68	IN
N1JLF	9	2	1	68	ENY
Kitchener-Waterloo ARC					
VA3PMH	9	2	1	68	ONS
North Okanagan RAC					
VE7KWA	9	2	1	68	BC
AA5TA	4	2	1	66	OH
Cape Ann ARA					
KC1TUF	4	2	1	66	EMA
Grundy Co. ARC					
KD9SEB	8	2	1	66	IL
Albemarle ARC					
KN4LAU	8	2	1	66	VA
N0TYE	8	2	1	66	MN
W3BMG	8	2	1	66	SB
W7ZND	8	2	1	66	EWA
WK0C	4	2	1	66	NM
Kendall ARS					
N5SGM	7	2	1	64	STX
VE3BK	7	2	1	64	GH
WA2VAM	5	2	1	64	WNY
Highlands Hams					
WB4HUX	7	2	1	64	AL
AA3OB	6	2	1	62	EPA
Monessen ARC					
KA3VEB	6	2	1	62	WPA
Benton ARS					
KD5JSE	6	2	1	62	AR
KE8NSI	6	2	1	62	OH
N6SER	3	2	1	62	LAX
ARC of the Univ. of Arkansas					
K5GOE	5	2	1	60	AR
KK7JUM	5	2	1	60	WWA
KO6CAL	5	2	1	60	SDG
KS4FE	4	2	1	60	KY
VE2LJV	5	2	1	60	QC
AD8MD	4	2	1	58	OH
KD4ZVD	4	2	1	58	VA
N7MSI	4	2	1	58	MT
Portage Co. ARS					
W8KNO	4	2	1	58	OH
KA6HUM	2	2	1	54	SF
KB1WSE	1	2	1	54	SFL
KF6RQZ	1	2	1	54	ORG
KF6TWK	2	2	1	54	OR
KKD0QG	1	2	1	54	CO
KO8S	2	2	1	54	MI
N5BF	1	2	1	54	LAX
N9AJD	2	2	1	54	IN
W9TTY	2	2	1	54	IL
Marple Newtown ARC/Mobile Sixers RC					
WA3KFT	27	2	1	54	EPA
K7YJ	1	2	1	52	AZ
KA1RWY	1	2	1	52	CT
KD2LNQ	1	2	1	52	DE
Forsyth ARC					
KD4HWS	1	2	1	52	NC
VE2RRE	1	2	1	52	QC
K3QDA	12	2	1	48	EPA
W0PPF	34	1	1	34	IA
N6TCZ	11	2	1	22	LAX
KG5KKS	2	2	1	4	STX

2D

KC3WX	1,888	2	3	6,134	EPA
BEANOS					
W4GJ	1,478	2	2	6,062	NFL
Northeast LA ARC					
W5EA	1,718	2	19	4,848	LA
Dog Hollow Contest Grp.					
AK9D	775	2	2	3,250	KS
Yankee Clipper Contest Club					
W1FM	595	2	3	2,668	EMA
Southwest Dallas Co. ARC					
N5VDQ	688	2	11	2,300	NTX
VA2PM	540	2	2	2,210	QC
Sierra Nevada ARS					
WB2AWQ	500	2	2	2,150	NV
Wayne ARC					
W8TB	479	2	1	1,966	OH
All Idaho Contest Club					
AC7GL	508	2	3	1,906	ID
Lisbon Area ARA					
NN8B	425	2	1	1,750	OH
Brazos Valley ARC					
W5NN	460	2	2	1,680	STX
North AR ARS					
K5RM	403	2	7	1,640	AR
Moncton Area ARC					
VE9EMM	500	2	9	1,252	NB
Conejo Valley ARC					
KI6BTY	236	2	1	1,194	SB
Worldwide ARC					
WE1SPN	238	2	10	1,076	CT
N5VJX	224	2	3	808	AL
Arizona Outlaws Contest Club					
K9SAT	211	2	1	764	AZ
North GA VHF Soc.					
K4NGA	183	2	7	752	GA
Crooked River Contest Club					
K8VUS	150	2	2	750	OH
Old Barney ARC					
K2RET	183	2	1	730	SNJ
Clinton Co. ARC					
W8QW	196	2	5	706	MI
KD2PHN	201	2	3	636	EPA
Shenandoah Valley ARC					
W4RKC`	188	2	9	626	VA
K6P	176	2	6	574	SDG
Butler Co. VHF Assn.					
W8CCI	261	2	5	572	OH
NA7L	124	2	1	546	EPA
Smokin Hot Radio ARC					
KE0THN	43	2	6	422	IA
Coyote ARC					
KN5S	96	2	3	288	STX
Navarro ARC					
W5NFL	62	2	17	274	NTX
N9QID	86	2	3	242	MI
Western KS ARC					
K0WPM	62	2	2	216	KS
Alexandria RC					
KO4IJH	39	2	1	202	VA
West TN ARS					
WN8Y	58	2	2	166	TN
W5THB	38	2	1	126	NTX
KD5SHY	1	2	1	52	AR

3D

McDowell ARA					
W4HOG	1,209	2	42	4,822	NC
Westport Astro ARC/Housatonic ARC/ Greater Fairfield ARA					
K1WAS	956	2	31	4,430	CT
Great Salt Lake Contest Club					
K7KC	1,444	2	6	3,962	UT
Mound ARA					
W8DYY	702	2	8	2,842	OH
Nittany ARC					
W3YA	336	2	37	2,044	WPA
Low Country Contest Club					
NU4SC	467	2	5	1,844	SC
Columbia (OR) ARA					
N7EI	568	2	9	1,424	OR
Southeastern MA ARA					
W1AEC	316	2	6	960	EMA
W3CG	220	2	3	800	WPA
Mt. Shasta ARC					
W6BML	120	2	3	754	SV
N5VBP	285	2	8	700	OK
Lake Oswego ARC					
WA7LO	195	2	12	690	OR
KB4UF	214	2	3	660	NFL
Pecos Co. ARC					
KG5 0XR	7	2	5	64	WTX

4D

Bellbrook ARC					
W8DGN	946	2	25	3,616	OH
Steel City ARC					
N3LL	773	2	19	2,884	WPA
K1USN RC					
N1DC	488	2	4	2,002	EMA
Waterton ARS					
W0NT	426	2	9	1,180	CO

5D

Orange Co. Radio Amateurs and Durham FM Assn.					
W4EZ	2,002	2	25	7,038	NC
St. Petersburg ARC					
W4TA	1,924	2	47	6,796	WCF
Thunderbird ARC					
W7TBC	921	2	20	4,150	AZ

6D

Kern Co. Central Valley ARC					
W6LIE	366	2	15	922	SJV

7D

Findlay RC					
W8FT	475	2	17	1,780	OH

Home Stations — Emergency Power

1E

AA3B	2,509	2	1	10,286	EPA
NN2L	802	5	1	8,170	WNY
Florida Contest Grp.					
K9OM	1,676	2	1	6,954	WI
N4BP	1,528	2	1	6,362	SFL
Tortolita RC					
W8TK	1,353	2	6	6,062	AZ
KE0UI	1,209	2	1	5,086	CO
N8A	445	5	2	5,020	OH
DX Marathon Club					
W4DXM	1,049	2	2	4,496	SFL
N2CI	416	5	1	4,310	NNJ
KY0Q	388	5	2	4,230	IL
K7NEW	956	2	1	4,074	WWA
N6RK	966	2	1	4,014	SV

Piedmont ARC					
NZ2X	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
WZ2T	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
WO8L	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					
KI7VEM	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
AI3KS	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					
K8AJS	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
W0ZA	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					
N5OMM	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

Former President of the Stockton-Delta Amateur Radio Club Charlie Johnson, WB6NVB (left), and Matthew Cranny, KO6DHJ (right), operated on 40-meter phone from California. [Steve Cranny, KN6ZJJ, photo]

Who Cares ARG					
W8CPT	187	2	1	724	MI
NU6N	142	2	1	718	SCV
Yuba-Sutter ARC					
W6PNH	111	2	1	714	SV
W0ZC	101	2	1	712	KS
KF6IDK	165	2	1	710	SJV
W3KS	230	2	1	710	DE
Half Moon Bay ARC					
KK6VGE	164	2	1	706	SCV
KM6GCA	167	2	1	706	SB
Pamlico ARS					
AI4WL	115	2	1	702	NC
AE5MM	109	2	1	686	OK
K3UA	158	2	1	682	WPA
W1GKT	206	2	1	662	AL
Boulder ARC					
NC0B	251	2	1	652	CO
AA3SP	125	2	1	650	EPA
K5SMH	192	2	1	650	WTX
Valley and Massanutten ARA					
N4RLI	20	5	1	650	VA
Victoria-Haliburton ARA					
VE3MCF	40	5	1	650	ONE
WI0S	50	5	1	650	MN
Central MI Em. Network					
W8FSM	125	2	1	646	MI
WA3RSR	49	5	1	640	MDC
W0JYM	194	2	1	638	CO
N9DPP	242	2	1	634	IN
KN4TGU	95	2	1	630	NFL
KS6M	95	2	1	630	EB
Moreno Valley ARA					
N6BOX	67	2	1	630	ORG
Pottstown Area ARC					
W3REZ	82	2	1	628	EPA
K5MKS	98	2	1	626	NTX
Richardson Wireless Klub					
WX7V	130	2	1	626	NTX
KD9EBS	47	5	1	620	IL
KK9D	47	5	1	620	WI
N5KO	118	2	1	620	SCV
SC4 ARC					
K6TPS	92	2	1	618	SCV
Pottstown Area ARC					
W3RAB	117	2	1	618	EPA
WA3WIJ	112	2	3	618	EPA
KA2FIR	160	2	1	612	NNJ
St. Louis QRP Soc.					
AA0VE	26	5	1	610	MO
Contest Club Ontario					
VA3WB	115	2	1	610	GH
Granite State ARA					
WI1O	46	5	1	610	NH
Pasadena RC					
KN6DOQ	41	5	1	605	LAX
N0CS	131	2	1	600	NFL
Frankford RC					
N3SET	100	2	2	594	EPA
K7OG	44	5	1	590	WWA
Southwest Dallas Co. ARC					
W5CTW	96	2	1	584	NTX
KC2ELS	111	2	1	582	WWA
N4IN	108	2	1	582	KY
KN4ZXG	107	2	1	578	VA

Shenandoah Valley ARC					
W8BRY	126	2	1	576	VA
Macon Co. ARC					
KCØAMJ	237	2	1	574	MO
VA3NFL	106	2	1	568	ONS
Yankee Clipper Contest Club					
W1NR	104	2	1	566	EMA
KD8IPF	107	2	1	564	MI
N9DNB	53	5	1	560	IL
Tortolita RC					
K7AZT	102	2	1	558	AZ
Gloucester Co. ARC					
AC2PT	153	2	1	556	SNJ
KS2H	21	5	1	555	WCF
K9TY	141	2	1	554	WI
W4ZTH	119	2	1	554	NFL
AC4PQ	125	2	1	550	GA
Silver Springs RC					
KQ3K	100	2	1	550	NFL
Pasadena RC					
N3BKV	100	2	1	550	SJV
N4CSV	100	2	1	550	OH
San Fernando Valley ARC					
WA6KYR	100	2	1	550	LAX
Marconi ARC of Newfoundland					
VO1MRC	20	5	3	550	NL
KI6RIT	176	2	1	548	SF
W2TT	99	2	1	546	CT
KD9BDL	20	5	1	545	WI
Ozone ARC					
KD5GFG	195	2	1	540	LA
WB4JFS	169	2	2	540	NC
Grand Mesa Contesters of Colorado					
WØBX	73	2	1	538	CO
W6DSG	97	2	1	534	NV
W3QD	76	5	1	530	VA
WA9TKK	18	5	1	530	AZ
Amigos RC Ashtabula					
AA8DL	141	2	1	528	OH
NO5V	48	5	1	525	STX
KI7BCL	137	2	1	524	ID
WO3X	136	2	1	522	OH
Eastern Shore ARC					
WA2AIC	46	2	1	520	VA
KF6VAQ	84	2	1	518	ORG
WCARES Contest Grp.					
W4RG	92	2	2	516	TN
WA7PTM	5	5	1	515	WWA
AI4WM	42	5	1	510	MI
Jefferson Co. (WA) ARC					
K7DCJ	90	2	1	510	WWA
KB3ITQ	36	5	1	510	MDC
N8JIA	36	5	1	510	STX
WB2COY	115	2	1	510	ENY
VE2VY	90	2	1	504	QC
KJ6KCG	121	2	1	492	ORG
KI7CFO	120	2	1	490	ID
N8FKF	85	2	1	490	MT
KO4RVE	167	2	1	484	NFL
KE8UZF	83	2	1	482	MI
Cheshire Co. DX ARC					
WA1YZN	120	2	1	476	NH
AD1L	104	2	1	472	WMA
KI4EZC	32	5	1	470	TN
K7OWW	108	2	1	466	OR
KD3FG	110	2	1	466	MDC
KI5WKP	31	5	1	460	NM
W1SD	153	2	1	456	EMA
KK4QOE	51	2	1	454	NFL
AA5OY	30	5	1	450	LA
West Allis RAC					
AA9RK	20	5	1	450	WI
KC2TOO	50	2	1	450	WNY
KRØU	30	5	1	450	CO
KS4BG	100	2	1	450	TN
WH6CMO	74	2	1	446	PAC
KA3HFS	19	5	1	440	SV
Catalina RC and Radio Soc. of Tucson					
WØPZD	19	5	1	440	AZ
AD4IE	100	2	1	436	NC
KB9FU	93	2	1	436	STX
Skyview Radio Soc.					
N2MA	93	2	1	422	WPA
W7RT	95	2	1	422	AZ
Cape Ann ARA					
K1TT	35	2	1	420	EMA
Arizona Outlaws Contest Club					
N7GP	67	2	1	418	AZ
WQ9F	67	2	1	418	IL
Brunswick Shores ARC					
KO4ZL	65	2	1	410	NC
WA8UMT	40	2	1	410	MI
Mesa Co. ARES					
NØWKR	65	2	2	410	CO
Virgin Valley ARC					
W7TMO	129	2	1	408	AZ
KØRJK	71	2	1	406	CO
KF7PCL	53	2	1	404	WWA
Half Wave Soc.					
W4BXC	102	2	4	404	SC
AC8XA	63	2	1	402	MI
NE7RD	70	2	1	400	OR
W5ACW	100	2	1	400	NM
AJ4EY	72	2	1	398	VA
Metro DX Club					
K9GA	61	2	1	394	IL
KB7WHO	61	2	1	394	ID
Piedmont ARC					
K6DPL	11	2	1	392	GA
Larkfield ARC					
AA2TR	14	5	1	390	NLI
K1VG	60	2	1	388	CT
KE8NBC	119	2	1	388	OH
Bluegrass ARS					
KI4ENS	19	2	1	388	KY
KA2FHN	65	2	1	386	WNY
Binghamton ARA					
KE2AUS	92	2	1	384	WNY
Valley of the Moon ARC					
N7PIB	71	2	1	384	SF
Maury ARC					
KQ4AZN	115	2	1	380	TN
W6DOQ	29	5	1	380	LAX
KJ7GVL	57	2	1	378	OR
KR4GT	45	5	1	375	KY
K8UHL	56	2	1	374	KY
W5ETM	56	2	1	374	NTX
Sierra Foothills ARC					
KO6TH	10	2	1	370	SV
KBØOLA	109	2	1	368	UT
KB3KOC	109	2	1	368	MDC
Shreveport ARA					
KI5PUM	78	2	1	368	LA
K7SD	108	2	1	366	AZ
N5IY	24	5	1	365	OH
KH6DC	53	2	1	362	PAC
W1OHM	53	2	1	360	NH
WB6MPH	29	2	1	360	LAX
Honeywell-Glendale ARC					
N7TWB	54	2	1	358	AZ
Haldimand Norfolk ARC					
VE3DVC	62	2	1	358	ONS
Virginia Beach ARC					
KI5FJ	54	2	2	358	VA
K4IDT	102	2	1	354	KY
Tri-Co. ARC (TX)					
KI7GJG	52	2	1	354	NTX
WA4HWT	102	2	1	354	GA
K4PPF	101	2	1	352	AL
New Providence ARC					
K1DK	10	5	1	350	NNJ
K7MK	50	2	1	350	ID
N3TCR	100	2	1	350	MDC
VA4CQ	25	2	1	350	MB
Bolingbrook ARS					
W9GPB	40	5	1	350	IL
AC3MB	85	2	1	348	EPA
Hampden Co. Radio Assn.					
WA1QKT	99	2	2	348	WMA
AK6EP	50	2	1	346	SJV
VE3XEM	97	2	1	344	ONE
Cupertino ARES					
KI6DRN	96	2	1	342	SCV
KM6MTV	46	2	1	342	LAX
Thunderhawks ARC					
WAØAW	48	2	1	342	MO
N5KBX	95	2	1	340	STX
VE9CZ	95	2	1	340	NB
San Juan Co. ARS					
NM7A	38	5	3	340	WWA
KC3UZK	94	2	1	338	EPA
KN4ZIR	75	2	1	336	KY
San Benito Co. ARA					
W6WKB	61	2	1	336	SCV
AI5GU	42	2	1	334	NTX
KK7KQP	40	2	1	334	OR
VE3TOB	92	2	1	334	GH
Half Moon Bay ARC					
N6ZEN	21	2	1	332	SCV
VE7XBP	58	2	1	324	BC
K9CPO	43	2	1	322	WI
NK9R	77	2	1	322	GA
EVQRP					
W9JRF	86	2	1	322	AZ
Victoria-Haliburton ARA					
VE3KZJ	27	5	1	320	ONE
W1PQ	85	2	1	320	WMA
AA5UZ	30	2	1	318	LA
South Bay ARA					
AC6MM	34	2	1	318	EB
Oak Forest ARC					
KE5HDF	34	2	1	318	STX
KD8GIJ	48	2	1	314	OH
W5JJT	29	2	1	312	NM
K4IDB	80	2	1	310	TN
K9KAW	12	5	1	310	WI
WB9AYW	16	5	1	310	IL
Florida Contest Grp.					
N4MUH	39	2	1	306	NFL
KJ5MA	51	5	1	305	NTX
North Hills RC					
KB6ODH	77	2	1	304	SV
KD9ARD	76	2	1	302	IN
Eastern CT ARA					
N1FQI	38	2	1	302	CT
W5DLP	76	2	1	302	NTX
AA5UY	25	2	1	300	LA
N1WEB	48	2	1	300	TN
Bayouland Em. ARS					
KA5LMZ	23	2	1	296	LA
W4GAT	73	2	1	296	TN
AC2N	72	2	1	294	NFL
K6YUL	36	2	1	294	LAX
W8MYL	71	2	1	292	WY
Northeastern IN ARA					
KD9KMK	70	2	1	290	IN
KK4ZDZ	10	2	1	290	KY
Lamorinda Area Radio Interest Grp.					
N4DLA	4	5	1	290	EB
Maritime Contest Club					
VE9QR	27	5	1	290	NB
WØMB	27	5	1	290	MO
KEØAKH	110	2	2	290	CO
Lapeer Co. ARA					
W8DLK	69	2	1	288	MI
KE9NM	17	2	1	284	IL
HQ Doods Recreational Deployment Team					
N1SFE	66	2	1	282	CT
Swamp Fox Contest Grp.					
N4VZ	33	2	1	282	SC
WB9DLT	8	2	1	282	WI
Yellow Thunder ARC					
AF9FA	49	2	1	280	WI
Sierra Foothills ARC					
K6GPB	13	5	1	280	SV
David Sarnoff ARC					
KA2BXH	15	2	1	280	SNJ
KA6JLT	13	5	1	280	NV
NF1T	35	2	1	280	WCF
W5NAW	26	5	1	280	MS
Southern CA Contest Club					
W6ML	40	2	1	280	SJV
AD2TM	32	2	1	278	WNY
Bolingbrook ARS					
KD9NHZ	64	2	1	278	IL
K2FEO	63	2	1	276	WNY
KM4RZT	6	2	1	274	NH
KE3E	33	2	1	272	DE
AE9PM	10	2	1	270	IL
KF5QHQ	5	2	1	270	NTX
N9LPQ	30	2	1	270	WI
KC2HZW	59	2	1	268	IN
W6YXY	59	2	1	268	SDG
N6SAC	58	2	1	266	SV
KØVIK	57	2	1	264	MN
Ak Sar Ben ARC					
ADØLS	56	2	1	262	NE
K5MPS	55	2	1	260	STX
Fauquier ARA					
KK4UZK	11	5	1	260	VA
KW1W	11	5	1	260	EMA
St. Louis QRP Soc.					
W7AQB	1	5	1	260	MO
KV4ZY	104	2	1	258	VA
Delta and Neshoba ARC Memphis					
KC7ND	53	2	1	256	TN
W9OO	29	2	1	256	IL
KB9OFH	34	2	1	254	IL
Granite State ARA					
WA1N	36	2	1	254	NH
Mound ARA					
K8HEF	50	2	1	250	OH
N8TP	50	2	1	250	GA
WCARES Contest Grp.					
K4IRS	50	2	2	250	TN
KI7LDQ	24	2	1	246	WWA
Heartland Hams ARC					
NØMHK	48	2	1	246	IA
Tortolita RC					
W5OT	47	2	1	244	AZ
K7CTC	46	2	1	242	UT
Richardson Wireless Klub					
KJ5FSM	23	2	1	242	NTX
W6SWT	46	2	1	242	SJV
San Jose ARES/RACES					
K6CES	37	2	1	240	SCV
K7DFL	45	2	1	240	EWA
Smoky Mountain ARC					
W4LSM	25	2	1	240	TN
McKinney ARC					
WZ5V	22	2	1	238	NTX
K7PET	43	2	1	236	OR
K8EKG	43	2	1	236	MI
Parker Radio Assn.					
AEØCA	21	2	1	234	CO
NT7C	21	2	1	234	KS
KC1UER	8	5	1	230	CT
AC6CZ	18	2	1	222	SDG
Virgin Valley ARC					
K7LOM	35	2	1	220	ID
KE4D	7	5	1	220	NFL
Richardson Wireless Klub					
N5SKT	30	2	1	220	NTX
VE3DLS	34	2	1	218	ONS
West TN ARS					
KO4PUU	21	2	1	216	TN
W1MP	3	5	1	215	WPA
Montgomery ARC					
W4IJG	13	5	1	215	MS
KØCN	16	2	1	214	MN
K6KTS	31	2	1	212	ORG
KC3SER	31	2	1	212	EPA
Hi-Line ARC					
K7HEH	29	2	1	208	MT
KI5TEB	28	2	1	206	STX
Sierra Foothills ARC					
W6FTC	28	2	1	206	SV
Columbia ARC					
K3YMI	17	2	1	204	MDC
Shreveport ARA					
N2VOX	15	2	1	204	CO
KC6ZBE	13	2	1	202	STX
KI7MKQ	26	2	1	202	NV
Tortolita RC					
KJ7KNW	13	2	1	202	AZ
AC2JK	25	2	1	200	WNY
Grand Strand ARC					
N4ZEK	25	2	1	200	SC
AJ6VU	12	2	1	198	LAX
Ventura Co. ARC					
K6LWG	12	2	1	198	SB
KD7GOM	12	2	1	198	AZ
W2WCM	12	2	1	198	VA
W5MMC	12	2	1	198	LA
El Paso ARC					
W5ES	23	2	1	196	WTX
KI5WPW	11	2	1	194	STX
KM4RK	22	2	1	194	SC
KE4FGW	21	2	2	192	TN
Parker Radio Assn.					
AB4BA	10	2	1	190	CO
Zephyrhills Area ARC					
KB3SRU	14	5	1	190	WCF
VE3EJM	8	5	1	190	ONS
W4HH	4	5	1	190	VA
WB9BAT	10	2	1	190	IN
Arlington ARC					
AA5VZ	19	2	1	188	NTX
NØXMD	19	2	1	188	OH
Madison Co. ARC					
W8DPK	18	2	1	186	OH
K6COX	17	2	1	184	SB
Palos Verdes ARC					
AI6DF	16	2	1	182	LAX
KFØAED	16	2	1	182	MN
N6SEE	8	2	1	182	SDG
Superstition ARC					
AG7KU	65	2	1	180	AZ
Thunderbird ARC					
KF7CCC	15	2	1	180	AZ
Conejo Valley ARC					
KO6BGB	3	5	1	180	SB
VE6XAD	13	2	1	180	AB
W4CDO	15	2	1	180	TN
Brightleaf ARC					
N4PVH	14	2	1	178	NC
Niagara Peninsula ARC					
VA3WM	14	2	1	178	GH
AJ6PT	13	2	1	176	AZ
N5WRX	13	2	1	176	STX
N9VPV	13	2	1	176	IL
AA5RL	6	2	1	174	STX
K4OMC	31	2	1	174	SC
N3DFF	12	2	1	174	EPA
VA7TOM	12	2	1	174	BC
NOARS/LCARA					
KD8OCW	11	2	1	172	OH
Salt Spring Island ARS					
VE7PHM	11	2	1	172	BC
AI4EW	10	2	1	170	NC
KB5ILY	10	2	1	170	AR
Olympia ARS					
W7PLC	10	2	1	170	WWA
AJ4EE	9	2	1	168	NFL
AR Caravan Club					
N5UVQ	8	2	1	166	NM
KM4ALP	7	2	1	164	NFL
N4WKS	6	2	1	162	SC
Baytown Area ARC					
KJ5FMX	4	2	1	158	STX
Hi-Line ARC					
AG7ZJ	3	2	1	156	MT
K5KMS	3	2	1	156	NTX
KC3WCR	1	5	1	155	EPA
KJ5CRF	2	2	1	154	AR

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
WI7P	425	2	1	2,114	UT
Butler Co. AR Public Srvc. 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					
NO6B	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					
W0WWV	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 (+NF4EC)	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	WWA
Bergen Co. Em. Mgmt. RC					
NJ2BC	367	2	10	1,890	NNJ
Algoma ARC					
VE3SOO	316	2	12	1,850	ONN
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
Cupertino ARES					
K6KP (+AG6GX)	91	2	15	1,585	SCV
Club Radio Amateur de l'Estrie					
VE2TA	505	2	2	1,584	QC
Tri-State ARG					
W5AOK	116	5	17	1,530	OK
Santa Clara Co. ARA					
W6UW	371	2	10	1,526	SCV
ARL of Lawrence Co.					
K3ACS	360	2	12	1,440	WPA
Ft. Myers ARC					
N4A	258	2	9	1,432	SFL
Panama City ARC					
W4RYZ	226	2	12	1,416	NFL
Providence EMA RACES					
KK1PMA (+W1BSN)	65	2	12	1,385	RI
Desoto ARC					
W4MIN	183	2	6	1,336	WCF
Meriden ARC					
W1NRG (+W1FD)	169	2	7	1,306	CT
Raritan Bay Radio Amateurs					
K2GE	233	2	8	1,274	NNJ
Preble ARA					
K8YR (+KA8SBI)	304	2	15	1,249	OH
El Segundo ARG					
WB6VMV	115	2	6	1,200	LAX
San Angelo ARC					
W5SJT	233	2	32	1,194	WTX
Marshall ARC					
KB5MAR	199	2	6	1,182	NTX
Yavapai ARC					
W7YRC	337	2	7	1,162	AZ
Rochester (MN) ARC					
W0MXW	115	2	16	1,120	MN
Calhoun Co. EOC					
KN8EOC	220	2	7	1,090	MI
Lincoln Co. RACES					
NC4LC	163	2	6	1,056	NC
West TN ARS					
WF4Q	133	2	11	1,032	TN
Longview East Texas ARC					
K5LET	455	2	10	986	NTX
Oro Valley ARC					
K7T (+W7AI)	61	2	30	915	AZ
Marion Co. ARS					
N9UN	253	2	6	876	IN
Centralia Wireless Assn.					
KF9M	123	2	10	836	IL
Logan Utah Central Stake					
K7EM (+KF7YEM)	62	2	24	764	UT
Salvation Army SATERN					
W9SAC	85	2	5	720	IL
Liberty Co. ARES					
KQ4BBQ	56	2	8	712	GA
Great Falls Area ARC					
W7ECA	39	2	9	650	MT
McKean Co. ARC					
W3VV	144	2	3	638	WPA
Vigo Co. EmComm Team					
KC9SJJ	94	2	3	576	IN
Corona Police CSV Team					
W6CPD	136	2	6	576	ORG
Canadian Red Cross					
VY2CRC	78	2	2	572	PE
Anne Arundel Co. ARES					
W3AAC	87	2	10	560	MDC
KC2FTD	144	2	2	538	ENY
Adams Co. ARS					
W3KGN	143	2	8	536	EPA
Coachella Valley ARC					
NR6P	103	2	16	426	ORG
Top of Michigan ARC					
NM8RC	105	2	8	398	MI
Temple ARC					
W5LM	32	2	5	384	NTX
Humboldt Co. AUXCOMM Team					
KA6OES	27	2	5	304	SF
Vashon Maury Islands RC					
W7VMI	27	2	14	204	WWA

3F

Northwest ARS					
W5NC (+K5VFD)	1,805	2	71	7,679	STX
Central MS ARA					
K5XU (+KJ5BSF)	1,342	2	35	5,790	MS
Great South Bay ARC					
W2GSB (+W2TOB)	983	2	32	4,587	NLI
Clearwater ARS/Upper Pinellas ARC					
N4CLW	1,196	2	50	4,496	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 (+N0ZHZ)
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
KI5ERE 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

Club Name	Entries	Score
21 Repeater Club	1	200
3 Guys with Radios ARC	1	440
3 Rivers ARC	1	2,064
3730 Grp.	2	2,216
40 Gail Contest Club	1	1,160
444 DX Grp.	1	4,304
510 Radio Grp.	1	10,300
6 Meter Club of Crystal Lake	1	1,986
721st Mechanized Contest Battalion	1	2,720
985 Repeater Grp.	2	8,288
Abbotsford ARES Soc.	1	1,142
Acadiana ARA	1	1,982
Adams Co. ARS	3	2,540
Adams-Arapahoe Co. ARES	1	1,106
Addison Co. ARA	2	2,486
Adrian ARC	1	1,456
Aero ARC	3	1,490
Aeronautical Center ARC	1	704
Aerospace Employees Assn. ARC	1	632
Aiken RC	1	420
Ak Sar Ben ARC	2	3,618
Alabama Contest Grp.	3	2,490
Alachua EOC RC	1	7,890
Alamance ARC	1	2,088
Albany ARA	2	6,953
Albany ARC	1	1,102
Albemarle ARC	6	6,109
Albuquerque DX Assn.	1	12,147
Alcorn Co. ARC	1	1,192
Alexandria RC	4	3,924
Alford Memorial RC	1	2,234
Algoma ARC	1	1,850
All Idaho Contest Club	1	1,906
All Things ARA	1	1,880
Allegan Co. ARC	1	1,726
Allegheny Valley Radio Assn.	1	556
Allen Co. AR Technical Soc.	1	262
Amargosa ARC	1	1,810
Amateur Radio of Churchill Co.	1	394
American Legion ARC Post 33	2	4,397
American Legion Post 104 ARC	1	666
American Legion Post 283	1	684
American Legion Post 82 ARC	1	436
American Legion Post 91 ARC	1	2,148
Amigos RC Ashtabula	2	1,768
Anderson Island ARC	1	1,386
Anderson RC	1	1,658
Andrew Johnson ARC	1	3,989
Androscoggin ARC	1	1,878
Annapolis Valley ARC and Kings Co. ARC	1	7,363
Anne Arundel Co. ARES	1	560
Anne Arundel RC	2	1,054
Anoka Co. RC	1	1,220
Anritsu ARC	1	718
Antelope Valley ARC	1	1,620
Anthracite Repeater Assn.	1	1,770
Antietam Radio Assn.	3	4,552
Appalachia ARC	1	2,804
AR Caravan Club	3	672
ARA of Nebraska	1	1,082
ARA of the Southern Tier	2	2,166
ARC EmComm Srvc.	4	4,735
ARC of Augusta	1	1,812
ARC of Butts Co.	2	2,574
ARC of Columbia Co.	1	1,788
ARC of El Cajon	1	532
ARC of Parker Co.	1	2,052
ARC of the Univ. of Arkansas	1	60
Arctic ARC	1	3,137
ARES of Douglas and Elbert Co.	3	10,032
Arizona ARC	1	350
Arizona Outlaws Contest Club	13	24,961
Arkansas Diamond ARC	1	622
Arkansas Radio Em. Srvc.	1	824
Arkansas River Valley ARF	2	2,525
ARL of Lawrence Co.	1	1,440
Arlington ARC	3	498
Aroostook ARA	1	1,018
Arrow Comm. Assn.	1	9,901
Arrowhead RAC	2	2,512
ARTS of Louisville	1	4,320
Ascension ARC	2	2,110
Ashe Co. ARC	1	1,980
Assoc. Radio Amateurs of Long Beach	3	1,344
Assoc. Radio Amateurs of So. New England	1	3,506
Atchison Co. ARS	2	1,204
Athens Co. ARA	1	4,252
Athens RC	1	3,528
Atlantic Region Repeater Legion	1	708
Audrain EmComm	1	1,068
Augusta Univ. ARC	1	2,292
Aurora EMA ARC	1	362
Austin ARC	1	3,060
Bald Eagle Repeater Assn.	1	452
Baldwin Co. ARC	1	5,902
Baltimore Polytechnic Alumni RC	1	768
Bankhead ARC	1	1,504
Barnstable ARC	3	7,786
Barrie ARC	1	3,107
Barron Co. ARA	1	1,440
Barrow ARC	1	770
Barry ARA	1	1,114
Barstow ARC	1	4,943
Bartlesville ARC	1	360
Basin ARC	1	2,891
Bastrop Co. ARC	1	984
Batesville Area RC	1	2,400
Baton Rouge ARC	3	4,043
Bay Area ARC	1	2,198
Bay Area DXers	2	986
Baylor ARC	1	262
Bayouland Em. ARS	3	2,820
Baytown Area ARC	2	5,418
BCARS	2	1,730
BCI RC	1	1,410
BEANOS	2	6,612
Bear Bait RC	2	2,252
Bearcat DX Club	1	2,972
BEARONS and MicroHAMS FD Extravaganza	1	1,898
BEARS of Manchester	1	2,480
Beaufort Radio Amateur Grp.	1	2,393
Beaver Valley ARA	1	1,840
Bedford ARC	1	120
Bedford Co. ARS	1	1,788
Bedlington Terrier ARC of Tucson	1	5,964
Bella Vista RC	2	10,190
Bellbrook ARC	1	3,616
Bellevue ARC	1	408
Benicia ARC	1	2,939
Benton ARS	5	5,598
Bergen ARA	1	198
Bergen Co. Em. Mgmt. RC	1	1,890
Big Bend ARC	2	7,261
Big Island ARC	1	1,338
Big Signal ARC	1	964
Big Sky Contesters	1	5,624
Bill Gremillion Memorial RC	1	924
Billerica ARS/Billerica EMA	2	3,980
Binghamton ARA	5	3,090
Birmingham ARC	2	1,988
Bishop ARC	2	1,296
Black Hills ARC	2	2,266
Black River ARC	1	1,780
Black River Radio Ops	1	11,300
Black Swamp ARC	1	6,924
Blackstone Valley ARC	1	7,471
Blazing Paddles Field Day Team	1	7,414
Bledsoe Co. ARC	1	2,560
Bloomfield ARC	1	990
Blossomland ARA	4	7,285
Blount Co. ARC	1	2,476
Blue Ridge ARC	1	4,005
Blue Springs ARC	1	3,321
Bluegrass ARS	1	388
Boaz-Albertville ARC	1	1,340
Boeing Employees ARS	1	1,966
Boeing Employees ARS — St. Louis	3	3,352
Boerne ARC	1	1,976
Bolingbrook ARS	3	860
Bonner Co. ARC	2	4,398
Boone and Hamilton Co. ARES	1	1,545
Boonville ARC	1	2,166
Border City RC	1	960
Boston ARC	1	6,234
Boston Mountain RC	1	250
Boston Valley Simplex Club	1	310
Boulder ARC	4	13,003
Bowie Wireless Assn.	3	3,510
Brandon ARC	1	160
Brandon ARS	1	1,300
Brantford ARC	1	218
Brazos Valley ARC	12	28,442
Bridgerland ARC	1	1,690
Brightleaf ARC	2	1,370
Bristol ARC	1	874
Broken Arrow ARC	3	6,965
Broken Arrow Em. Mgmt. ARC	1	2,250
Brookings Radio Research Club	1	720
Broughton Memorial Field Day Grp.	1	6,783
Brunswick Shores ARC	3	6,083
Bryan ARC	2	3,067
Bullitt ARS	2	10,742
Burlington ARC	2	2,314
Burlington Co. RC	2	4,544
Butler Co. AR Public Srvc. Grp.	3	5,952
Butler Co. ARA	1	1,326
Butler Co. VHF Assn.	1	572
Cabarrus ARS	1	1,172
Calaveras ARS	3	842
Calgary ARA	3	3,814
Calhoun Co. ARA	2	2,130
Calhoun Co. ARG	1	3,536
Calhoun Co. EOC	1	1,090
California City ARC	1	1,870
Calumet Co. ARES Grp.	1	260
Calvert ARA	1	1,506
Cambridge ARA	1	1,718
Camden Co. ARS	1	346
Camp Kilowatt Contest Club	1	1,120
Camp Rainfall	1	522
Campbell River ARS	1	1,324
Canadian Red Cross	1	572
Candlewood ARA	2	5,492
Canton ARC	3	8,728
Cape Ann ARA	6	2,366
Cape Fear ARS	1	14,482
Capital City ARC	1	1,887
Carbon ARC	1	918
CARCSC	1	470
CARE/Rogue Valley ARC	1	4,810
CARESS-NWARC	3	6,840
Carlyle Lake Fest	1	760
Carolina ARES	2	1,694
Carolina DX Assn.	1	1,950
Carolinas Airstream Club	1	860
Carteret Volunteers ARC	1	2,860
Cascade RC	1	1,404
Cascades ARS	2	1,022
Case ARC	1	3,716
Casper ARC	1	982
Cass Co. ARC	1	1,576
Castle Rock Repeater Grp.	1	462
Castle Shannon VFD ARC	1	1,494
Catalina RC and Radio Soc. of Tucson	4	6,009
Cedar Creek ARC	1	1,430
Cedar Valley ARC/Collins ARC	1	7,049
Central Alberta ARC	1	2,290
Central Coast ARG	1	2,120
Central Dakota ARC	1	1,606
Central IL RC	1	3,931
Central IN Skywarn Club	1	1,254
Central KY ARS	2	13,292
Central LA ARC	3	8,916
Central MA ARA	2	3,294
Central MI ARC	1	4,352
Central MI Em. Network	1	646
Central MO Radio Assn.	2	4,044
Central MS ARA	1	5,790
Central OH Operators Klub Extra Novice	1	1,250
Central OR AR EmComm Team	1	888
Central OR DX Club	1	6,114
Central Toronto ARC	1	1,884
Central TX DX and Contest Club	1	2,762
Central VA Contest Club	2	2,564
Central VT ARC	1	1,597
Central WA ARC	1	1,626
Central WV Wireless Assn.	6	16,258
Centralia ARES	1	1,716
Centralia Wireless Assn.	1	836
Chaffee Lake ARA	1	6,754
Charleston ARS	1	3,081
Charlestown ARC	1	68
Charlotte ARS	1	11,704
Charlottetown ARC	1	2,205
Chatham AuxComm Soc.	1	2,044
Chattanooga ARC	1	1,778
Chautauqua Co. Amateur FM Assn.	1	1,214
Chehalis Valley ARS	2	1,100
Cherokee ARS	1	6,419
Cherokee Capital ARS	1	1,206
Cherryland ARC	3	3,664
Cherryville Repeater Assn. II	2	3,678
Chesapeake ARS	1	4,996
Chesapeake Bay Radio Assn.	1	3,398
Cheshire Co. DX ARC	6	3,516
Chester Co. ARES/RACES	1	1,318
Chew's Ridge Gang	1	3,970
Chicago FM Club	1	168
Chicago Suburban Radio Assn.	2	2,216
Chippewa Valley ARC	1	1,522
Chippewa Valley VHF Contesters	1	180
CHIRP Field Day Team	1	700
Citrus Co. ARC	2	3,350
Clairemount Repeater Assn.	1	1,730
Clallam Co. ARC	1	574
Clark Co. (IN) ARC	1	2,082
Clark Co. (WA) ARC	2	9,623
Clay Co. AUXCOMM	1	1,456
Clearwater ARS/Upper Pinellas ARC	1	4,496
Cleveland ARC	2	5,730
Clinton Co. ARA	1	1,404
Clinton Co. ARC	1	706
Clinton Co. Contesters	1	3,442
Club Radio Amateur de l'Estrie	1	1,584
Club Radio Amateur de l'Outaouais	3	2,032
Club Radio Amateur de Quebec	1	5,125
Club Radio Amateur Laval-Laurentides	1	936
Club Radio Amateur Sorel-Tracy	2	2,489
Club Radio Amateur VE2CWQ	1	1,138
Club Radioamateur de Drummondville	1	1,206
Club Radioamateur de la Vallee du Richelieu	1	1,436
Coachella Valley ARC	1	426
Coal Country ARC	1	2,130
Coastal ARS	1	1,940
Cochise ARA	2	2,048
Coconino ARC	1	2,478
Coffeyville ARC	1	2,662
Cole Co. Em. Response Team	1	356
Collington Community RC	1	3,316
Collins Aerospace Radio Grp.	1	2,440
Collins ARC	1	5,380
Colorado QRP Club	3	18,223
Columbia (MD) ARA	2	2,756
Columbia (OR) ARA	1	1,424
Columbia ARC	1	204
Columbia ARS	1	3,344
Columbia-Montour ARC	3	5,260
Columbus ARC	1	8,615
Columbus Radio Enthusiasts Soc.	1	254
Comm. Support Team for Puget Sound Fire	1	1,034
Community ARC	1	388
Comox Valley ARC	3	2,462
Conejo Valley ARC	11	12,783
Conejo Wireless Soc.	1	668
Contest Club Ontario	7	11,569
Contoocook Valley RC	1	8,166
Convair/220 ARC	2	1,277
Coos Co. RC	1	3,342
Copper Country Radio Amateur Assn.	1	606
Corona Police CSV Team	1	576
CorTek Radio Assn.	1	2,582
Coshocton Co. ARA	2	4,920
Cottonwood Heights ARC	1	2,916
Country Pond ARG	1	1,670
Cove Repeater Assn.	1	2,222
Coventry EMA	1	4,833

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

Kennedy Space Center ARC	1	520
Kennehoochee ARC	1	1,368
Kent ARS	1	1,380
Kent Co. ARC	1	7,004
Kenton ARC	1	1,234
Kentucky Colonels ARC	2	2,606
Kentucky Contest Grp.	1	7,760
Kentwater ARC	2	644
Keowee Toxaway ARC	4	3,591
Kern Co. Central Valley ARC	1	922
Keuka Lake ARA	2	1,598
Key City ARC	1	1,456
Keystone VHF Club	1	678
Kicked Back Contesters Club	3	2,360
King George AR Operators	1	1,324
Kings Point ARC	1	1,592
Kingsport/Bays Mountain ARC	1	1,210
Kingston Area Amateurs	2	5,592
Kishwaukee ARC	1	2,070
Kitchener-Waterloo ARC	3	6,455
Kittitas Co. ARC	1	998
Klamath Basin ARA	1	2,570
Knob Hill Krew	1	2,104
Koomer Ridge Contesters	1	4,298
Kootenai ARS	1	1,828
Korean Ham Club	1	1,255
KP4 Expedition Grp.	1	7,128
KTQA Irregular RC	1	1,804
L'Anse Creuse ARC	2	4,642
LA CQ Club	1	750
LA Fire Dept. ACS	1	66
Lafayette DX Assn.	1	5,118
Lake Agassiz RC	1	2,864
Lake ARA	1	12,978
Lake Area AR Klub	12	6,512
Lake Area Radio Klub	1	6,700
Lake Chelan ARC	1	338
Lake Co. ARA	1	4,468
Lake Co. RACES/ARES	1	3,321
Lake Conroe ARC	2	1,440
Lake Cumberland ARA	1	386
Lake Monroe ARS	1	6,520
Lake of the Ozarks ARC	1	2,102
Lake Oswego ARC	1	690
Lake Region ARC	1	2,688
Lake Whitney ARS	1	1,548
Lakeland ARC	1	4,630
Lakes Region Repeater Assn.	1	2,086
Lakeshore ARA	1	1,292
Lambton Co. RC	2	2,145
Lamorinda Area Radio Interest Grp.	3	1,950
Lanark North Leeds ARES	1	2,145
Lancaster ARC	1	3,346
Lancaster Co. ARES	1	1,882
Land of Lakes ARC	1	1,168
Langley ARA	1	380
Lapeer Co. ARA	2	3,001
Larkfield ARC	3	5,850
Las Moras ARC	1	876
Laurel ARC	1	1,014
Le Club de Radio Amateur de VE2CVA	1	752
Lebanon Valley Soc. of Radio Amateurs	1	920
Lee Co. EOC	1	568
Leflore Co. Comm. Support Team	1	250
LEFROG/MAARS	1	5,324
Lehigh Valley ARC	2	3,666
Lenoir ARC	1	2,878
Lewis and Clark RC	1	1,732
Lewisville ARA	1	4,260
Liberty Co. ARES	1	712
Limestone ARES	1	1,664
Lincoln ARC	1	2,340
Lincoln Co. ARA	1	2,004
Lincoln Co. ARC	1	424
Lincoln Co. RACES	1	1,056
Lincoln Hills ARG	1	3,329
Lisbon Area ARA	2	3,004
Live Free or Die	1	402
Livingston Co. AR Klub	1	3,418
Livonia ARC/Ford ARL	2	11,132
Lockport ARA	1	1,308
Lodi ARC	2	1,462
Logan Utah Central Stake	1	764
London ARC	4	3,482
Long Island Mobile ARC	1	5,656
Longmont ARC	2	2,146
Longview East Texas ARC	1	986
Los Alamos ARC	1	644
Los Angeles City ACS	1	3,636
Loudoun ARG	1	3,239
Low Country Contest Club	1	1,844
Lowndes Co. ARC	1	366
Lucas ARC	2	5,518
Lynchburg ARC	1	8,945
M&M ARC	1	1,718
Mabcom	1	154
Mackenzie Regional RC	1	473
Macon Area Ham Radio Soc.	1	1,258
Macon Co. ARC	3	5,194
Macoupin Co. ARC	1	6,664
Mad River RC	4	16,710
Madison Co. ARC	3	3,238
Mahoning Valley ARA	1	9,968
Majors Field ARC	1	440
Mammoth Cave ARC	1	3,542
Manalapan Township ARES	1	684
Manitoulin ARC	1	454
Manotick ARG	1	1,022
Mansfield-Johnson ARS	1	1,326
Maple Grove RC	1	1,714
Maple Ridge ARC	1	802
MARC/DECT	1	2,896
Marconi ARC of Newfoundland	1	550
Marin ARS	1	1,656
Marion Co. ARS	1	876
Maritime Contest Club	2	1,170
Marple Newtown ARC/Mobile Sixers RC	2	1,456
Marshall ARC	1	1,182
Marshall Co. ARC	1	134
Marshall's Minions	1	4,208
Maryland Mobileers ARC	1	1,470
Masonic Village ARC	1	2,452
Massillon ARC	2	3,126
Matagorda Co. ARC	1	1,678
Maui ARC	1	3,493
Maury ARC	4	4,123
Maury River Rain Dogs ARC	1	744
Mayerthorpe Flying Tigers	1	1,052
Mayfield Graves Co. ARS	1	604
McDowell ARA	1	4,822
McHenry Co. Wireless Assn.	1	7,593
McKean Co. ARC	1	638
McKinney ARC	6	7,492
McMinn Co. ARC	1	2,092
McMinnville ARC	4	3,222
Means/Snyder Family	1	1,018
Mecklenburg ARS	2	5,102
Medina Co. AR Corp.	1	2,498
Medina Co. ARC	1	4,846
Mel Mabry Memorial ARC	1	928
Melfort Repeater Grp.	1	872
Mercer Co. ARC	1	3,376
Mercury Net	1	272
Meriden ARC	7	3,810
Meridian ARC	1	2,366
Merrymeeting ARA	1	1,032
Mesa Co. ARES	1	410
Mesabi Wireless ARC	1	760
MESAC/Costa Mesa RACES	1	1,112
Mesilla Valley RC	2	3,066
Metro DX Club	3	6,259
Metro North Railroad ARA	1	488
Metrocrest ARS	2	3,237
Metropolitan ARC	1	726
Metuchen RC	1	824
MGRA/CGARC	1	6,718
Mich-A-Con ARC	1	2,025
Michiana ARC	1	4,471
Michigan QRP Club	1	1,890
Michigan State Univ. ARC	1	330
Mics & Beers	1	4,353
Mid Island Radio Assn.	1	1,526
Mid-Atlantic ARC	1	1,896
MID-MO ARC	2	5,112
Mid-State ARC	1	1,072
Middle Peninsula ARC	1	3,146
Middle TN ARC	1	3,161
Middlesex ARS	1	1,644
Midessa Field Day Grp.	1	13,490
Midway ARC	1	1,642
Midwest ARC	1	2,522
Midwest ARS	1	734
Mike & Key ARC	4	23,286
Milky Way Wireless Club	1	966
Milton ARC	1	1,014
Milwaukee Radio Amateurs' Club	1	1,881
Milwaukee School of Engineering ARC	1	1,959
Mine Creek ARC	1	986
Mining ARC/St. Paul RC	2	3,940
Minnesota Wireless Assn.	8	5,390
Minnetonka ARC	1	156
Mississauga ARC	1	7,594
Mississippi Coast ARA	1	2,148
Mississippi Valley ARA	1	8,447
Mississippi Valley DX/Contest Club	1	262
MIT Radio Soc.	1	3,158
Mizpah Shrine Radio Unit	1	3,436
Mobile ARC	2	6,600
Mohawk ARC	2	3,466
Moncton Area ARC	1	1,252
Monessen ARC	1	62
Monkey Lover's Radio Consortium	1	6,095
Monroe ARC/Monroe Co. ARES	1	1,758
Monroe Co. ARS	1	1,086
Monroe Co. Radio Comm. Assn.	2	4,762
Montachusett ARA	1	234
Montana Prairie ARC	1	834
Monte del Estado FD Crew	1	7,930
Montezuma Valley RC	1	2,854
Montgomery ARC	8	7,732
Montgomery ARS	1	710
Montreal ARC/West Island ARC	1	3,581
Montrose ARC	1	4,292
Montvale OEM	3	2,606
Moore Co. ARS	1	154
Moose Jaw ARC	1	778
Moosehorn ARC	1	2,804
Mora Open Repeater Assn.	1	384
Morehead ARS	1	1,534
Moreno Valley ARA	2	5,044
Morningside Mischief Makers	1	778
Morris RC/Hanover Township OEM	1	4,158
Morrow Co. Amateur Radio Srvc.	1	1,354
Motor City RC	1	3,342
Motorola ARC	2	3,272
Mound ARA	4	3,776
Mountain ARC	1	3,324
Mountain State Transmitters	1	1,957
Mountain Toppers	1	1,476
Mountaineer ARA	2	9,956
Mt. Diablo ARC	1	2,814
Mt. Magazine ARC	1	1,310
Mt. Shasta ARC	1	754
Mt. Tom Amateur Repeater Assn.	1	1,365
Mt. Vernon (OH) ARC	1	3,204
Mt. Vernon (VA) ARC	1	1,448
Muhlenberg ARS	1	416
Muncie Area ARC	1	1,470
Murgas ARC	1	1,869
Murray State Univ ARC	1	3,038
Muscle Shoals ARC	1	6,079
Muskegon Area AR Council	1	2,108
Muskogee ARC	1	13,319
N4N Field Day Grp.	1	4,707
Nacogdoches ARC	1	1,674
Nanaimo ARA	1	2,238
Nanticoke ARC	1	596
Narwhal ARS	1	1,700
NASA Marshall Space Flight Center ARC	1	2,804
Nashoba Valley ARC	1	4,832
Nashua Area Radio Soc.	3	6,834
Nashville ARC	1	1,154
Nassau ARC	1	3,546
National Electronics Museum ARC	1	4,200
National Trail ARC	1	1,315
Naturist ARC	1	1,102
Navarro ARC	1	274
NC TRI-CLUB	1	5,086
NCTAMS PAC	1	886
NE TN District 7 SKYWARN	1	640
NE TX QRP Contest Fed.	1	7,650
NEIA Red Cross AR Assn.	1	622
Nemaha Co. AR Org.	1	482
NEMO ARC	1	350
Neos ARA	1	370
New England Fusion Grp.	1	304
New England Radio Discussion Soc.	1	2,794
New Jersey Antique RC	1	2,106
New Providence ARC	3	4,508
New River Valley ARC	1	2,410
Newark ARA	1	202
Newaygo Co. Amateurs	1	818
Newport Co. RC	2	15,646
Newton ARA	1	338
Newton ARC	1	2,340
NHRC ARS	1	2,094
Niagara Frontier Radiosport	7	12,336
Niagara Peninsula ARC	5	3,125
Niagara RC	1	954
Nittany ARC	4	4,228
Nixa ARC	1	6,122
NM SOTA Guys	1	4,980
NOARS/LCARA	5	5,266
North American QRP CW Club	2	1,352
North AR ARS	1	1,640
North Augusta Belvedere RC	2	3,993
North Bay ARA	1	2,076
North Carolina Misfits	1	7,338
North Central AR ARS	1	11,792
North Central MO ARC	1	2,212
North Coast ARC	1	3,040
North Country ARA	1	1,368
North East IA Radio Amateur Assn.	1	1,070
North East Tarrant ARC	1	2,418
North East WY ARA	1	2,606
North Eastern DX Club	1	1,266
North Franklin ARS	1	1,072
North Fulton ARL	5	21,146
North GA Tri-State ARC	2	1,184
North GA VHF Soc.	1	752
North Hills RC	2	2,080
North Okaloosa ARC	1	1,060
North Okanagan RAC	2	2,680
North Ottawa ARC	2	3,878
North Richland Hills ARC	1	2,338
North Shore ARC (BC)	1	2,044
North Shore ARC (ON)	7	6,672
North Shore RA	1	8,864
North Shore RC (IL)	3	12,729
North TX ARS	1	182
Northeast AR RC	1	250
Northeast ARC	1	4,556
Northeast LA ARC	1	4,848
Northeast MD AR Contest Soc.	2	1,092
Northeast MO ARC	1	1,144
Northeast MS Radio Amateurs	1	2,462
Northeast OK Radio Amateurs	1	116
Northeast WI ARC	1	2,150
Northeastern IN ARA	5	6,112
Northern AZ DX Assn.	1	2,368
Northern CA Contest Club	3	2,136
Northern CO ARC	1	586
Northern IL Quad Co. ARG	1	552
Northern Kentucky ARC	1	2,335
Northern Lakes ARC	4	2,961
Northern Lights Radio Soc.	1	126
Northern New England Field AR Ops	1	1,180
Northville ARA	1	408
Northwest ARS	2	7,799
Northwest IL RC	1	1,002
Northwest IN DX Club	1	774
Northwest OH ARC	1	1,400
Northwest OH VHF ARS	1	2,526
Not Case ARC	1	7,086
Not Quite Workable Contest Club	1	4,554
Nurosa's Gopher Munchers	1	2,240
NWI DX Club	2	1,172
NXP ARC	1	1,888
Oak Forest ARC	1	318
Oak Hill ARC	1	2,400
Oak Mountain QRP Daredevils	1	6,175
Oak Ridge ARC	1	2,154
Oakland Co. ARS	1	7,661
Oakland Radio Comm. Assn.	1	1,868
Ocean Monmouth ARC	1	4,456
Ocean State ARG	1	446
Ogden ARC	1	1,962
Ogemaw Arenac ARS	1	823
Oh-Ky-In ARS	4	9,951
Ohio Valley ARC	1	880
OK Rovers	1	1,658
Okaw Valley ARC	2	7,474
Oklahoma City Autopatch Assn.	1	3,945
Old Barney ARC	2	1,712
Old Times Ham RC	1	514
Ole Virginia Hams	1	3,336
Olive Branch ARC	1	2,252
Olympia ARS	2	382
Oneula Beach Expedition	1	934
Onslow ARC	1	2,652
Orange ARC	1	1,068
Orange Co. (CA) ARC	2	19,567
Orange Co. (IN) ARC	5	6,240
Orange Co. Radio Amateurs and Durham FM Assn.	3	8,090
Orange Park ARC	1	2,834
Orca DX and Contest Club	3	4,928

Order of Boiled Owls of NY and Radio Central ARC	3	10,308
Oregon Tualatin Valley ARC	3	8,084
Orlando ARC	1	3,218
Orleans Co. ARC	2	5,525
Oro Valley ARC	2	3,925
Orrville ARS	1	1,988
Osage Co. ARC	1	598
Ottawa ARC	1	5,180
Ottawa Co. ARES	1	2,015
Ottawa Valley Mobile RC	4	6,234
Ottawa Valley QRP Soc.	1	1,515
Overlook Mountain ARC	2	3,212
Owatonna Steele Co. ARC	1	5,978
Owensboro ARC	1	1,814
Oxford Co. ARES	1	938
Ozark Mountain ARC	1	1,447
Ozaukee RC	4	12,911
Ozone ARC	3	1,482
Paducah ARA	6	9,666
Page Valley ARC	1	3,300
Palms West ARC	1	1,422
Palo Alto ARA	2	6,708
Palomar Mtn. WFD	1	3,014
Palos Verdes ARC	3	2,902
Palouse Hills ARC	1	1,557
Pamlico ARS	3	2,892
Panama City ARC	2	5,366
Panhandle ARC	1	4,664
Panoramaland ARC	3	5,944
Parker Radio Assn.	4	3,742
Parkersburg AR Klub	2	3,670
Parkland ARC	1	644
Parma RC	1	752
Parsippany-Troy Hills RACES	1	1,236
PART of Westford	6	12,081
Pasadena RC	17	18,801
Paso Robles ARC	2	5,273
Pathfinders ARC	1	2,336
Patoka Valley ARC	3	2,956
Paulding Co. ARC	1	2,442
Peak Radio Assn.	1	2,072
Peconic ARC	2	1,442
Pecos Co. ARC	1	64
Peekskill Cortlandt ARA	1	3,090
Pella ARC	1	532
Pen Bay ARC	2	3,407
Penn Wireless Assn.	2	4,929
Pentagon ARC	1	720
Perry Co. ARC	1	738
Peterborough ARC	1	2,248
Phil-Mont Mobile RC	4	5,759
Phillips Co. ARC	1	1,622
Pickens Co. Comm. Grp.	1	378
Piedmont ARC	10	15,977
Piglet Radio	1	8,183
Pikes Peak Radio Amateur Assn.	1	2,835
Pilgrim Amateur Wireless Assn.	1	4,495
Pilot Knob ARC	1	2,873
Pine Belt ARC	1	8,040
Pine State ARC	3	1,098
Pioneer ARC	1	1,448
Pioneer Radio Operators Soc.	1	572
Pioneer Valley RA	1	1,316
Pioneer Valley Radio Assn.	1	1,384
Piscataquis ARC	1	2,644
Plano AR Klub	3	1,668
Platinum Coast ARS	1	7,123
Platte Co. ARG	1	2,766
Plattsmouth ARC	1	1,338
Playground ARC	1	1,114
Point Loma Radio Ops. Grp.	1	6,150
Pontotoc Co. ARA	1	492
Pony Express Re-Ride Radio Relay Station	1	624
Port City ARC	5	8,140
Portage Co. ARS	3	13,754
Portland ARC	1	7,375
Portsmouth RC	1	1,604
Potomac Valley RC	19	65,108
Pottstown Area ARC	4	4,413
Poway ARS	1	1,316
Powhatan Area RC	1	1,214
Prairie Dog ARC	1	13,230
Preble ARA	1	1,249
Prescott-Russell ARC	1	652
Pride Radio Grp.	1	180
Princeton Ham RC	1	1,192
Proske's Posse	1	4,952
Providence EMA RACES	1	1,385
Providence Radio Assn.	1	10,520
PSRG/WSARC/Seattle ACS	1	3,836
Pueblo West ARC	1	1,422
Puerto Rico Contest Team	1	1,062
Putnam Co. AUXCOMM	1	478
Putnam Em. Amateur Repeater League	2	2,218
QRP Pals	2	11,760
QSY Soc.	1	1,401
Quaboag Valley ARC	2	732
Queen Anne's ARC	4	3,080
Queen City Em. Net	1	2,500
Quinte RC/Prince Edward RC	1	2,432
Radio Activity of Savannah	1	482
Radio Amateur Soc. of Norfolk	1	2,120
Radio Amateurs of Corry	1	62
Radio Amateurs of Greater Syracuse	1	4,956
Radio Amateurs of Manitoba/Winnipeg Senior Citizens RC	1	1,708
Radio Amateurs of Northern VT	2	23,116
Radio Amateurs of Skagit Co.	1	1,874
Radio Assn. of Erie	1	4,930
Radio Assn. of Western NY	1	2,224
Radio Club of Redmond	1	1,254
Radio Club of Tacoma	2	5,384
Radio Operadores Del Este	1	2,322
Radio Operators Assn. of Dallas	1	1,310
Radio Operators of Camden Co.	1	664
Rainbow Canyon ARC	1	1,632
Raleigh ARS	2	21,324
Ramona Outback ARS	1	1,656
Randallstown ARC	1	12,028
Randolph Co. Em. RC	1	2,472
Rappahannock ARA	1	4,558
Rappahannock Raiders	1	362
Rappahannock Valley ARC	1	9,378
Raritan Bay Radio Amateurs	1	1,274
Raytown ARC	1	76
Reading RC	2	3,732
Red Mountain Radio Amateurs	1	1,270
Red River Radio Amateurs	2	4,194
Red River Valley ARC	1	2,678
Red Rose Repeater Assn.	1	1,063
Redwood Empire DX Assn.	1	3,474
Reelfoot ARC	1	8,118
Remote Base Contest Club	1	1,484
Renewal	1	1,950
Renfrew Co. ARC	1	826
Reno Co. (KS) ARA	1	3,194
RF Hill ARC	2	3,562
Richardson Wireless Klub	23	12,163
Richfield RC	1	1,454
Richmond Amateur Telecom. Soc.	1	802
RICOMU/RIEMA	1	4,805
Ridge ARC	1	1,278
Ridge Runners RC	1	8,950
Rip Van Winkle ARS	1	810
River Bend Wireless Operators Club	1	8,425
River City AR Comms. Soc.	1	880
River City ARC	1	2,762
River Hills ARC	1	954
Riverland ARC	1	4,059
Riverside Co. ARA	1	3,994
Roanoke Valley ARC	1	1,920
Rochester (MN) ARC	3	1,672
Rochester (NY) DX Assn.	1	15,562
Rochester DX and Contest Club	1	1,164
Rockingham Co. ARC	1	1,852
Rockwall ARC	1	2,430
Rocky Mountain Ham Radio	5	16,951
Rolla Regional ARS	1	2,702
Rome RC	1	1,734
Rowan ARS	3	4,608
Royal Gorge ARC	1	2,438
Ruckerville Amateur Transmitting Soc.	2	2,190
Runestone ARC	1	2,138
Sabin Field Day	1	1,812
Sachse ARA	1	266
Saginaw Valley ARA	2	4,984
Saguaro Nights ARC	1	2,075
Salem ARC	1	3,634
Salkehatchie ARS	4	5,174
Salt Spring Island ARS	3	2,272
Salvation Army SATERN	1	720
Sam Houston AR Klub	1	1,222
Samuel F. Morse ARC	1	682
San Angelo ARC	1	1,194
San Antonio RC	1	2,682
San Benito Co. ARA	3	1,798
San Bruno ARC	1	1,238
San Clemente Island RC	1	1,272
San Diego Imperial Co. Chapter American Red Cross	1	556
San Fernando Valley ARC	5	2,638
San Francisco RC	2	1,735
San Jose ARES/RACES	3	1,366
San Jose EOC	1	6,208
San Juan Co. ARS	2	810
San Luis Valley ARA	1	1,464
San Mateo RC	1	5,615
Sandia Vista ARC	1	2,406
Sandusky Radio Experimental League	1	1,196
Sandy ARC	1	1,232
Sangamon Valley RC	1	2,428
Sangre de Cristo ARC	1	2,159
Santa Barbara ARC	1	2,839
Santa Clara Co. ARA	3	1,938
Santa Clarita ARC	1	828
Santa Fe Trail ARC	1	2,694
Sarasota Em. RC	1	862
Saratoga Co. ARA	2	2,222
Sask Alta RC	1	1,899
Saskatoon and District ARA	1	1,962
Sawnee ARA	1	8,001
SC4 ARC	2	3,610
SCAN/Red Ant Annihilators	1	2,474
Scarborough ARC	1	2,062
Scharks Ham Fam	1	4,305
Schaumburg ARC	2	5,026
Schuylkill Amateur Repeater Assn.	1	3,690
Sci-Tech ARS	1	500
Scioto Valley ARC	1	1,146
Scottsdale ARC	1	1,818
Scranton-Pocono AR Klub	1	2,582
Seaway Valley ARC	1	2,745
Sedalia Pettis AR Klub	1	1,770
Sedan ARC	1	6,700
SEDARES	1	356
Seneca RC	1	3,746
Sequoia ARG	1	468
Sevier ARC	1	492
Shelby ARC	2	2,131
Shelby Co. ARC	1	6,386
Shelby Co. ARES	1	462
Shenandoah Valley ARC	2	1,202
Sherlock ARA	1	310
Shiawassee ARA	1	80
Shingle Mill Hill Contesters	1	1,562
Shreveport ARA	5	2,050
Shy-Wy ARC	2	3,550
Sierra ARC of the High Mojave	1	1,982
Sierra Foothills ARC	10	17,625
Sierra Intermountain Em. Radio Assn.	1	648
Sierra Nevada ARS	2	4,930
Signal Hill ARC	2	13,120
Silver Comet ARS	5	3,938
Silver Springs RC	5	5,470
Silvercreek ARA	2	5,448
Simpson Co. ARS	1	910
Sioux Empire ARC	1	3,690
Skamania Co. ARES	1	1,448
Ski Country ARC	1	4,656
Sky Valley ARC	1	454
Skyline ARC	1	1,122
Skyline RC	1	1,252
Skyline Tower ARC	1	730
Skyview Radio Soc.	4	9,574
Skywide ARC	2	2,378
Small Town ARS	1	1,650
SMARTS RC	1	3,399
Smithchart ARS	2	9,732
Smithsonian ARG	1	1,260
Smokin Hot Radio ARC	1	422
Smoky Mountain ARC	3	5,490
Snake River ARC	1	2,410
Snohomish Co. Hams Club	4	2,942
Snoqualmie Valley ARC/Issaquah ARC/ICC/ICST	1	2,006
Snoring Beagle Ranchers	1	1,562
Soc. of Midwest Contesters	5	6,110
Socorro ARA	1	2,960
Solivita RC	1	3,578
Somerset Co. ARC	1	3,692
Something Awful ARS	1	718
Sooland ARA	1	1,284
SOTA LEOs	1	942
Souris Valley ARC	1	4,644
South Alabama RC	1	1,420
South Bay ARA	4	3,677
South Bay ARC	3	812
South Carroll ARG	2	1,678
South East Metro ARC	1	3,938
South GA ARC	1	3,400
South Georgian Bay ARC	1	2,894
South Hill Contest Club	1	3,186
South Jersey Radio Assn.	3	21,494
South Lyon Area ARC	1	2,998
South Mountain Radio Amateurs	3	2,934
South Orange ARA	1	4,143
South Plainfield ARC	1	5,135
South Side ARC	1	996
South Texas ARC	1	526
South Texas Rovers	1	7,130
South Wake ARC	4	1,174
South West Idaho ARC	1	3,333
Southborough Rod & Gun ARC	1	892
Southeast LA ARC	4	1,621
Southeast MN ARC	1	904
Southeastern CT ARS	1	3,736
Southeastern MA ARA	1	960
Southern AR Experimenters Club	1	1,074
Southern AR Union	1	1,178
Southern Berkshire ARC	1	674
Southern CA Contest Club	6	4,790
Southern Counties ARA	3	4,860
Southern IN Tri-Co. Club	1	632
Southern KY AR Transmitting Soc.	1	3,400
Southern OH Friends of AR	1	2,074
Southern PA ARC	2	1,588
Southern PA Comm. Grp.	1	2,370
Southern Sands ARC	1	1,744
Southern VT ARC	1	2,725
Southington ARA	1	1,258
Southtown ARS	1	2,162
Southwest Columbus Ham RC	1	1,014
Southwest Community Radio System	1	1,300
Southwest Dallas Co. ARC	3	5,479
Southwest IA ARC	2	1,864
Southwest MS ARC	1	1,818
Southwick Radio Grp.	1	4,774
Spa ARA	1	1,312
Space Coast ARS	1	430
SPARC	1	1,006
SPARGE	1	760
Spartanburg ARC	2	4,436
Special Purpose ARC	1	108
Spirit Mountain ARC	1	1,086
Splinter Grp. ARC	3	3,130
Splitrock ARA	1	1,348
Spokane DX Assn.	1	3,362
Spout Springs Repeater Assn.	1	1,984
Springhill Repeater Assn.	1	4,354
SSF Fire CERT	1	320
St. Augustine ARS	1	558
St. Charles ARC	2	2,556
St. Clair ARC	1	3,318
St. Cloud ARC	1	1,374
St. Croix ARC	1	2,708
St. Croix Valley ARC	1	1,642
St. Croix Valley Radio Amateurs	1	1,052
St. Louis and Suburban RC	1	2,676
St. Louis ARC	1	7,482
St. Louis QRP Soc.	6	9,826
St. Mary's ARC	1	220
St. Mary's Co. ARA	1	2,370
St. Paul RC/Mining RC	1	278
St. Petersburg ARC	1	6,796
Stamford ARA	1	4,682
Stanislaus ARA	1	1,830
Stanly Co. ARC	1	1,478
Stanwood-Camano ARC	1	9,008
STARS ARC	4	1,793
State Line RC	1	996
Statesboro ARS	2	1,378
Steel City ARC	1	2,884
Sterling Park ARC	1	4,199
Steubenville-Weirton ARC	2	3,863
Stillwater ARA	2	2,370
Stillwater ARC	1	716
Stone Tower Creek RC	1	362
Story Co. ARC	1	4,039
Straight Key Century Club	1	144
Stubblefield Repeater Club	1	3,380
Suburban UHF Amateur Repeater Soc.	1	1,260
Sudbury ARC	1	4,175
Summit Co. ARS	1	4,481
Sumter ARA	1	3,923
Sun City ARC	1	3,580
Sun City Center ARC	1	1,660
Sun City Hilton Head ARC	1	1,494
Sun Country ARS	2	8,356
Sun Parlour ARC	1	7,618
Suncoast ARC	1	354

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

Sunnyvale ARES	2	3,060
Sunset Empire ARC	1	886
Superstition ARC	2	4,856
Surrey AR Comms.	1	6,640
Susquehanna Co. ARC	1	1,700
Susquehanna Valley ARC	1	5,306
Sussex ARA	2	588
Sussex Co. ARC	1	11,254
Suwannee ARC	1	2,358
Swamp Fox Contest Grp.	7	6,044
Sweet Fruits On Air ARC	1	552
Sweetwater ARC	1	1,342
Tallahassee ARS	1	7,653
Tamaqua Wireless Assn.	2	1,802
Tamiami ARC	2	4,492
Tampa ARC	1	5,418
Tarboro RC	1	1,510
Tazewell Co. ARS	1	946
Team Billy Goat	1	1,172
Team Ferret	1	512
Team Montrose	2	1,420
Team Oonitos at Camp Motzi	1	160
Ted's Family Farm Grp.	1	3,910
Tehachapi ARA	1	1,728
Temple ARC	2	3,444
Tennessee Contest Grp.	5	4,654
Tennessee Valley Contest Club	1	1,818
Tennessee Valley DX Assn.	1	6,798
Terrible Twos	1	6,134
Texas DX Soc.	1	616
Texas Em. Amateur Communicators	2	1,300
The 220 MHz Guys	1	1,268
The 415 ARC	1	6,797
The 570-V Connection	1	3,678
The Albemarle ARS	1	1,143
The Albuquerque Bois	1	692
The Beekers	1	500
The Berwick Contest Team	1	6,488
The FPL Grp.	1	244
The Kansas Antenna Club in Johnson Co.	2	2,820
The Noise Blankers Radio Grp.	1	3,074
The Olympia ARS	1	1,925
The Unreal RC	1	1,974
The Villages ARC	1	1,740
The Whiskey Delta Contest Grp.	1	3,096
The World RC	1	1,390
Thermal Belt ARC	1	2,185
Thibodaux ARC	1	1,836
Thousand Islands RC	1	2,858
Thunder Bay ARC	1	1,182
Thunderbird ARC	2	4,330
Thunderhawks ARC	1	342
Tidelands ARS	1	1,326
Tie Siding WY ARRL FD	1	4,934
Tippecanoe ARA	1	4,186
Tipton ARS	1	863
TLSC Ham Radio Grp.	1	812
Toledo Mobile Radio Assn.	4	1,310
Toledo Radio Amateur Club	1	1,298
Tom's Garage ARC	1	11,221
Tompkins Co. ARA	1	2,694
Tonto ARA	1	1,202
Top of Michigan ARC	1	398
Tortolita RC	11	11,764
Traveling AR Team	1	1,456
Treasure Valley Radio Assn.	1	1,756
Tri Co. ARC (GA)	1	3,968
Tri Co. ARC (WI)	3	4,084
Tri Co. Radio Assn.	1	2,660
Tri State ARS	1	5,471
Tri-Co. ARC (NC)	1	306
Tri-Co. ARC (PA)	3	898
Tri-Co. ARC (TX)	1	354
Tri-Lakes ARC	2	2,598
Tri-State ARA	1	1,836
Tri-State ARG	1	1,530
Tri-States ARC	1	1,888
Tri-Town RAC	5	5,649
Triple A ARA	1	616
Troy ARA	1	1,206
Tulsa ARC	1	2,812
Turkey Heaven Mtn. Repeater Assn.	2	3,030
Tusco ARC	3	1,050
Twin Cities Repeater Club	1	1,362
Twin City FM Club	1	1,384
Twin Rivers ARC	1	498
Twin State RC	1	1,568
Twisted Arrow Contest Club	1	1,002
Two Rivers ARC of McKeesport	1	3,552
Tyler ARC	1	6,794
UCLA ARC	1	272
Ulster & Northern Dutchess Readiness Grp.	1	2,055
Union Co. ARC	2	7,452
Union Metropolitaine des Sans-filistes de Montreal	1	3,382
Uniontown ARC	1	4,188
United Radio Amateur Club	1	9,414
Univ. of Alabama RC	7	2,634
Univ. of Arizona ARC	1	1,022
Univ. of Michigan ARC	1	980
Univ. of Southern California ARC	1	638
Upper Canada QRP Club	1	3,675
Upshur Area ARC	1	1,330
Utah ARC	1	4,060
Utah DX Assn.	1	586
Utah Valley ARC	4	9,983
Utica ARC	1	2,004
Utica Shelby EmComm Assn.	2	1,730
Vaca Valley RC	1	2,335
Valencia Co. ARA	1	2,650
Valley and Massanutten ARA	4	9,999
Valley of the Moon ARC	2	2,372
Valley RC of Oregon	2	4,800
Van Wert ARC	1	4,010
Vashon Maury Islands RC	1	204
VE6FAR Cycle 25	3	1,184
Ventura Co. ARC	3	6,692
Ventura Co. ARS/Simi Settlers ARC	1	6,044
Vermilion Co. ARA	1	1,924
Vermilion Range ARC	1	1,404
Vero Beach ARC	1	2,484
Victoria ARC	1	722
Victoria-Haliburton ARA	2	970
Vienna Wireless Soc.	1	7,736
Vigo Co. EmComm Team	1	576
Vilas Co. ARC	1	2,580
Villa Rica RC	2	460
Village 7 ARC	3	1,474
Virgin Valley ARC	3	3,493
Virginia Beach ARC	3	8,188
Virginia Beach ARC/Virginia DX Century Club	2	580
Virginia Mountain ARC	1	3,260
Voice of Idaho RC	1	3,831
W/K ARC of Greater Milwaukee	1	5,018
W4IBM ARC	1	676
W6TRW ARC	1	9,665
Wabash Valley ARA	1	3,532
Wahkiakum Co. ARC	1	1,024
Waldo Co. ARA	1	3,952
Wall Lake Hams	1	292
Walton Co. Repeater Grp.	1	1,508
Warminster ARC	3	3,193
Warren ARA	1	6,374
Warren Co. EmComm Grp.	1	624
Warren Co. RC	1	4,164
Warrensburg Area ARC	1	1,700
Wasco ARS	1	546
Washington Amateur Comm.	1	3,844
Washington Area ARC	1	1,490
Washington Co. ARC	2	7,440
Watauga ARC	1	360
Waterbury ARC	1	252
Waterton ARS	1	1,180
Watertown ARC	1	808
Waupaca Co. ARES/RACES	1	794
Wayne ARC	7	7,786
Wayne Co. ARC	1	5,710
Waypoint ARC	1	658
WCARES Contest Grp.	7	6,073
WD6BNY Team	1	1,946
Wellesley ARS	2	810
West Alabama ARC	1	1,374
West Allis RAC	6	5,702
West Baldwin City ARC	1	1,990
West Carroll	1	3,362
West Chester ARA	3	2,408
West Coast Crudders	1	366
West Desert ARC	1	590
West Essex ARC	2	3,418
West Fork ARC	1	7,268
West Georgia ARS	1	3,102
West Kootenay ARC	1	394
West MI Repeater Assn.	1	980
West Palm Beach ARG	1	1,999
West Point Fire CERT	1	1,499
West River RC	1	738
West TN ARS	4	1,836
West TN Field Day Grp.	1	3,421
West VA AR	1	3,752
West Valley ARA	2	24,592
West Valley ARC	2	2,068
West Virginia Univ. ARC/Monongalia Wireless Assn./Monongalia Co. ARC	1	1,634
Westchester EmComm Assn.	2	4,635
Westcoast ARA	1	3,622
Western Carolina ARS	1	1,506
Western CO ARC	1	1,282
Western Division SATERN	1	2,136
Western Hemisphere Amateur Contest Club	1	2,075
Western IL ARC	2	1,916
Western KS ARC	1	216
Western Piedmont ARC	2	2,684
Western Placer ARC	1	842
Western Reserve ARC	1	4,071
Western Tidewater Radio Assn.	1	1,272
Westmoreland ARC	1	1,516
Westport Astro ARC/Housatonic A RC/Greater Fairfield ARA	1	4,430
Westside ARC	1	706
Wexaukee ARC	1	1,528
White River Radio Comm. Grp.	1	3,967
White Rock Lake ARC	1	946
Whitley Co. ARC	1	2,958
Whitman ARC	1	2,112
Who Cares ARG	2	1,314
Wichita ARC	1	1,690
Wichita ARS	1	2,830
Willamette Valley DX Club	1	264
Williams Co. ARA	1	768
Williamsburg Area ARC	1	6,842
Williamson Co. ARC	2	5,090
Williamson Co. ARES	2	2,859
Wilson ARC	2	3,088
Wilsons Wonders	1	7,470
Windmill ARG	1	3,148
Winona ARC	2	2,638
Wiregrass ARC	1	1,732
Wireless Assn. of South Hills ARC	3	2,126
Wireless Soc. of Lorain Co.	1	900
Wireless Soc. of Southern ME	1	9,326
Wisconsin Valley Radio Assn.	1	966
Wistaria Wireless Soc.	1	1,556
Wood Co. ARA	1	1,610
Wood Co. ARC	2	1,262
Wood Co. ARES/RACES	1	2,488
Woodbridge Wireless	3	11,747
Woodford Co. ARC	1	1,112
Woodmont ARA	1	1,080
Worcester ECT	1	1,280
Worldwide ARC	1	1,076
Wyandot Area Ham Operators Org.	1	3,273
Wyandotte Co. RACES/CERT	1	8,319
Xenia Weather AR Net	1	4,422
XRX RC/Monroe Co. ARES	1	6,102
Yadkin Valley ARC	1	1,014
Yankee Clipper Contest Club	3	6,732
YARS/MVRC/SAC ARC/Yolo Co. ARES/BARC	1	1,282
Yavapai ARC	1	1,162
Yellow Thunder ARC	2	1,198
Yellowknife ARS	1	538
Yellowstone RC	1	3,718
Yonkers ARC	1	5,400
York Co. (ME) ARC	1	1,184
York Co. (SC) ARS	1	860
York RC	1	2,078
York Region ARC	2	4,386
York Road Ham	1	745
Young Amateurs RC	2	2,052
Young Co. ARC	1	998
Yuba-Sutter ARC	1	714
Yukon ARA	1	898
Zephyrhills Area ARC	3	3,814
Zero-Beaters ARC	1	1,332
Zuni Loop MEF	2	3,135