Field Day's New Playing Field, p. 83

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MAY 2022

Morse Code Mini-Special!

- **Who Really Invented Morse Code?** p. 8
- **CW Results, 2021 CQ WW DX Contest,** p. 11
- **CQD, SOS and the Sinking of the Titanic,** p. 24

Plus...

- **DX Under the Volcano,** p. 76

On the Cover: A rainbow over the Caribbean creates the perfect backdrop for W2APF's Buddipole Hexbeam antenna as he operated a one-person DXpedition "under the volcano" from Montserrat as VP2MDX. Details on page 76.

VISIT…

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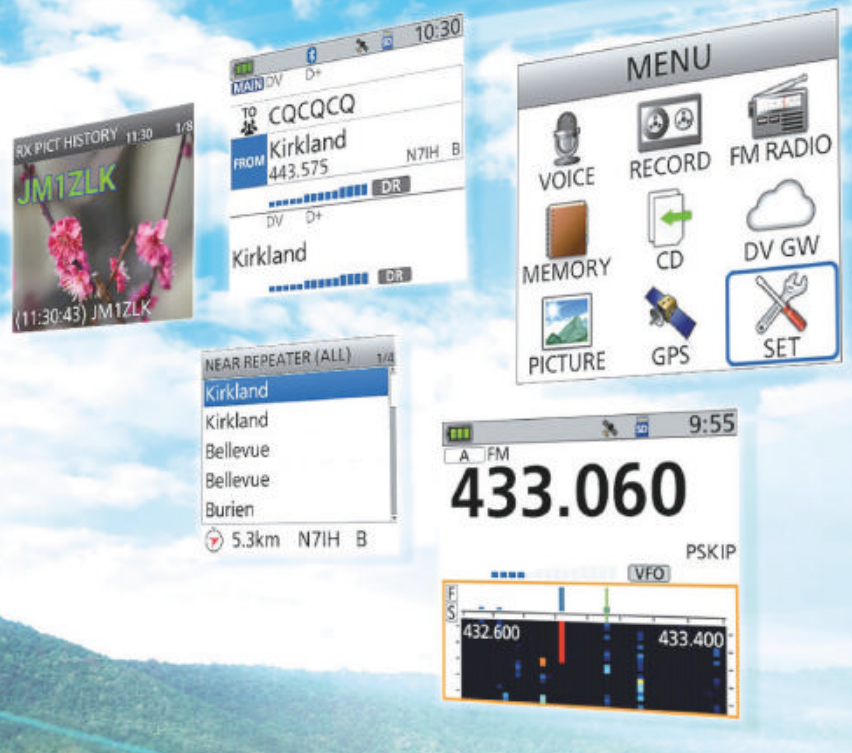

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ANNOUNCEMENTS

MAY

SANDWICH, ILLINOIS — The Kishwaukee Amateur Radio Club will hold The **Dekalb Hamfest** from 8 a.m. to 1 p.m., Sunday, May 1 at the Sandwich Fairgrounds, 1401 Suydam Road. Contact" Bob Yurs, W9ICU, (815) 757-3219. Email: <w9icu@arrl.net>. Website: <www.karc-club.org>. Talk-in 146.730 (PL 100).

TOLEDO, OHIO — The Lucas County Amateur Radio Emergency Services will hold its **Trunk Sale & Swap Meet** from 9 a.m. to noon, Sunday, May 1 at the Toledo Speedway, 5639 Benore Road. Phone: (567) 318-2291. Email: <lucascountyares@gmail.com>. Website: <http://tinyurl.com/lcaresswap>. Talk-in 146.610- (PL 103.5).

CADILLAC, MICHIGAN — The Wexaukee Amateur Radio Club will hold the **Cadillac Amateur Radio and Computer Swap** from 8 a.m. to noon, Saturday, May at the Mackinaw Trail Middle School, 8405 Mackinaw Trail. Website: <www.wexaukeearc.org>. Talk-in 146.98. VE exams, card checking

PERU, INDIANA — The Cass County, Grant County, Miami County, and Kokomo Amateur Radio Clubs will hold the North Central Indiana Hamfest and 2022 ARRL Indiana State Convention from 9 a.m. to 2 p.m., Saturday, May 7 at the Miami County 4-H Fairgrounds, 1029 W. 200 North. Contact: Mitch Miller (765) 661-5893. Email: <ncihamfest@gmail.com>. Website: <http://nci-hamfest.com>. Talk-in 147.345+ (PL 131.8). Free VE exams.

SUCCASUNNA, NEW JERSEY — The Splitrock Amateur Radio Association will hold the **2022 North Jersey Tailgate Hamfest** beginning 8 a.m., Saturday, May 7 at the Roxbury Senior Center, 72 Eyland Avenue. Email: <hamfest@splitrockara.org>. Website: <www.splitrockara.org>. Talk-in 146.985- (PL 131.8). VE exams, DXCC card checking.

SUPERIOR, WISCONSIN — The Arrowhead Radio Amateur Club will hold its **HAMFEST!** From 9 a.m. to 1 p.m., Saturday, May 7 at the Head of Lakes Fairgrounds-Multi-Purpose Building, 4700 Tower Avenue (WI Hwy. 35). Contact: Robert Schultz, KCØNFB, (218) 481-7458. Email: <arac_hamfest@charter.net>. Website: <http://thearac.org>. Talk-in 146.940- (PL 103.5), 147.000- (PL 103.5), or 146.940- (PL 151.3). VE exams, card checking.

XENIA, OHIO — The Dayton Amateur Radio Association will hold the **Dayton Hamvention** from 9 a.m. to 5 p.m., Friday, May 20; 9 a.m. to 5 p.m., Saturday, May 21; and from 9 a.m. to 1 p.m., Sunday, May 22 at the Greene County Fairgrounds, 120 Fairgrounds Road. Phone: (937) 276-6930. Email: <info@hamvention.org>. Website: <http://hamvention.org>. Talk-in 146.940- (PL 123) or 146.985- (PL 123). VE exams, special event station W8BI.

DEPAUVILLE, NEW YORK — The Thousand Islands Repeater Club will hold its Sixth Annual Hamfest / Swapmeet from 8 a.m. to noon, Saturday, May 21 at the Depauville Fire Department Banquet Hall, 15191 School Street. Email: <kc2tirclub@gmail.com>. Website: <www.tirepeater-club.com>. VE exams.

GOSHEN, CONNECTICUT — The Southern Berkshire Amateur Radio Club will hold its **30th Annual Hamfest** from 8 a.m. to noon, Saturday, May 21 at the Goshen Fairgrounds, 116 Old Middle Street. Contact: Lee, K1LEE, (860) 435-0051. Email: <k1lee@arrl.net>. Website: <www.sberk.org>. Talk-in 147.285+ (PL 77). VE exams.

VERDI, NEVADA — The Sierra Nevada Amateur Radio Society will hold the **Reno Ham Swap** beginning 8 a.m. Saturday, May 21 at the Cabela's Parking Lot, 8650 Boomtown Garson Road. Email: <info@renohamswap.com>. Website: <www.renohamswap.com>. Talk-in 147.210+ (PL 100).

WEST FRIENDSHIP, MARYLAND — The Maryland FM Association will hold the **Memorial Day Tailgate Hamfest** from 7 a.m. to 1 p.m., Sunday, May 29 at the Howard County Fair Grounds on Route 144. Phone: (301) 641-5313 (6-10 p.m.). Email: <marylandfm@verizon.net>. Website: <http://marylandfm.org>. Talk-in 146.16+ (PL 107.2) or 449.0- (PL 107.2). VE exams.

JUNE

FAIR LAWN, NEW JERSEY — The Fair Lawn Amateur Radio Club will hold its **Hamfest** beginning 8 a.m., Saturday, June 4 at Memorial Park on Berdan Avenue & 1st Street. Phone: (201) 791-3841. Email: <fairlawnarc@yahoo.com>. Website: <hamfest.fairlawnarc.org>. Talk-in 145.470- (PL 167.9).

HILTON, NEW YORK — The Rochester Amateur Radio Association will hold the **93rd Rochester Hamfest** from 7 a.m. to 2 p.m., Saturday, June 4 at the Hilton Exempt Club, 137 South Avenue. Phone: (585) 210-8910. Email: <hfproducer@rochesterham.org>. Website: <www.rochester-ham.org>. Talk-in 146.61 (PL 110.9) or 444.45 (PL 110.9).

HUDSONVILLE, MICHIGAN — The Independent Repeater Association will hold the **2022 Hudsonville IRA Hamfest** from 8 a.m. to noon, Saturday, June 4 at the Hudsonville Fairgbrounds, 5235 Park Avenue. Phone: (616) 209-9296. Email: <hamfest@w8ira.org>. Website: <www.w8ira.org>. Talk-in 147.16. Free VE exams.

SPRINGFIELD, MISSOURI — The Southwest Missouri Amateur Radio Club will hold its **Annual Hamfest** from 8 a.m. to 1 p.m., Saturday, June 4 at the Salvation Army Springfield Headquarters, 1707 W. Chestnut Expressway. Website: <www.smarc.org>. Talk-in 146.910- (PL 162.2). VE exams.

CHELSEA, MICHIGAN — The Chelsea Amateur Radio Club will hold its **44th Annual Chelsea Swap & Shop** from 8 a.m. to 4 p.m., Sunday, June 5 at the Chelsea Fairgrounds, 20501 W. Old US Highway 12. Contact: Michelle Dye, KD8GWX, (734) 717-5660. Email: <wd8iel@gmail.com>. Website: <www.wd8iel.com>. Talk-in 145.450 (PL 100). Card checking.

MENDOTA, ILLINOIS — The Starved Rock Radio Club will hold its **Hamfest** from 8 a.m. to 3 p.m., Sunday, June 5 at the Mendota Tri-County Fairgrounds, 503 1st Avenue. Email: <starvedrockhamfest@gmail.com>. Website: <www.w9mks.org>. Talk-in 147.120+ (PL 103.5). VE exams.

LIME RIDGE, PENNSYLVANIA — The Columbia-Montour Amateur Radio Club will hold the **30th Annual Bloomsburg Hamfest** from 7 a.m. to 1 p.m., Saturday, June 11 at the Lime Ridge

(Continued on page 10)

A publication of

CQ Communications
45 Dolphin Lane
Northport, NY, 11768 USA.

CQ Amateur Radio (ISSN 0007-893X) Volume 78, No. 5, Published monthly by CQ Communications, Inc., 45 Dolphin Lane, Northport, NY, 11768, Telephone 516-681-2922. E-mail: cq@cq-amateur-radio.com. Fax 516-681-2926. Web site: www.cq-amateur-radio.com. Periodicals Postage Paid at Northport, NY 11768 and at additional mailing offices. Subscription prices (all in U.S. dollars): Domestic-one year $42.95, two years $77.95, three years $111.95; Canada/Mexico-one year $57.95, two years $107.95, three years $156.95: Foreign Air Post-one year $72.95, two years $137.95, three years $201.95. Single copy $6.99. U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government including military services, only on a cash with order basis. Requests for quotations, bids, contracts., etc. will be refused and will not be returned or processed. Entire contents copyrighted 2022 by CQ Communications, Inc. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the U.S.A.
POSTMASTER: Send address changes to:
CQ Amateur Radio, P.O. Box 1206, Sayville, NY, 11782

HAM RADIO NEWS

Icom, DX Engineering, Team Up for Dayton Megaprize

Icom America and DX Engineering have joined forces to assemble the largest-ever grand prize in the history of the Dayton Hamvention.® The prize package, which will be given away on the closing day of the 2022 Hamvention, has been dubbed the "Icom America Dream Station Package" and is valued at close to $20,000.

According to DX Engineering, the package includes four transceivers, covering 1.8 MHz to 1.2 GHz and designed for home, mobile, and portable use, along with a variety of station accessories. The transceivers include the IC-7851 home station for HF/50 MHz; the portable IC-705 for QRP on HF through 450 MHz, the IC-9700 multimode VHF/UHF/1.2 GHz rig and the ID-52A VHF/UHF/D-STAR handheld. A complete list of the equipment and accessories included in the Dream Station Package may be found at <https://tinyurl.com/5dy22dzj>.

New FCC License Fees Take Effect, Crash Licensing Computers

The new $35 fee for most amateur radio license applications (exceptions: license upgrades and administrative updates) took effect on April 19th and the updated software for processing batch applications from the volunteer examiner coordinators crashed within hours. According to the ARRL, the system was down for four days, going back online on April 23rd, but resulting in a backlog of unprocessed applications. The League says applicants should expect delays in normal FCC turnaround times.

A related item: The ARRL-VEC reports that the League's Youth Licensing Grant Program took effect along with the new fees on April 19th. Under the program, ARRL will reimburse the $35 filing fee for successful new license candidates younger than age 18 for tests administered through the ARRL-VEC. The League has also reduced its exam fee for candidates under 18 from $15 to $5. Details may be found at <https://tinyurl.com/mv3zjwct>.

IARO Region 1 Youth Summer Camp to be Held in Croatia

The International Amateur Radio Union's Region 1 youth summer camp is back after a 2-year Covid hiatus, and is scheduled for August 6-13th in Croatia. According to *Newsline*, attendance is open to amateurs ages 15-25 living in Europe, Africa, and the Middle East, along with guests from other parts of the world. Campers will be organized into teams led by a team leader between the ages of 18 and 30. Attendance is limited to 80 total participants. For more information, visit the IARU Region 1 Youngsters on the Air website at <http://ham-yota.com>.

The Youth on the Air program for IARU Region 2 — North and South America — is seeking a host for its 2023 summer camp program. The timeframe would be one week between June 1st and August 15th and the host would need to be able to arrange meeting rooms, event space, and lodging for up to 55 campers and staff, along with space for three simultaneously operating HF stations. Detailed information and a host application form are available at <http://youthontheair.org>.

Finally in this month's young ham roundup, May 31st is the deadline for nominating candidates for Amateur Radio Newsline's Bill Pasternak Memorial Young Ham of the Year award. Nominees must be age 18 or younger, living in the continental United States, and demonstrating "talent, promise, and a commitment to the spirit of ham radio," according to Newsline. Nomination forms may be found at <http://arnewsline.org>. [*CQ* is a co-sponsor of the Young Ham of the Year award.]

Hams in Bosnia and Herzegovina Respond After Earthquake

An earthquake measuring 5.7 on the Richter scale rocked Bosnia and Herzegovina on April 22nd, resulting in one fatality, many injuries, and considerable property damage. Southgate Amateur Radio News reports that the nation's ham radio emergency network was activated within 5 minutes after the quake, which was felt as far away as Croatia, Serbia, and Montenegro.

Following established emergency plans, three teams were mobilized and established a network on VHF repeaters, along with a digital link to the capital of Sarajevo and HF nets on 80- and 40-meter voice and digital modes. The networks were planning to remain active until the risk of aftershocks had passed.

Hawaiian Hams Conduct Statewide Disaster Drill

Hawaii's Amateur Radio Emergency Service (ARES®) sponsored a statewide disaster drill on April 16th to assess its members' abilities to provide emergency communications in the event of a natural disaster. The scenario was a 4-day rain and windstorm battering all of the state's islands, taking out power, internet, and cell phone towers, according to the *ARRL Letter*. The hams operated under the structure of the Incident Command System. State, local, and federal agencies also took part. Hawaii Office of Homeland Security Statewide Interoperability Coordinator Everett Kaneshige noted that "having multiple outlets for communication during a crisis is critical," and added that it was "exciting to see the incorporation of innovative technology, such as the amateur radio-developed GPS software mapping capabilities."

INDEXA Names Humanitarian Fund in Memory of JH1AJT

The International DX Association (INDEXA) has renamed its humanitarian fund the Zorro Miyazawa, JH1AJT, Hams with Hearts Fund, in memory of Zorro, who founded and endowed the fund in 2016. JH1AJT, also a member of the CQ Amateur Radio Hall of Fame, became a Silent Key in March. According to *Newsline*, the fund helps provide assistance to humanitarian aid projects undertaken by amateurs during DXpeditions. INDEXA said it is "proud and grateful to be able to sustain Zorro's legacy through this fund."

Canadian Hams Authorized Special Prefixes to Honor Queen's Jubilee

Canada's communications regulator is allowing hams to use special prefixes between May 15th and July 14th in honor of Queen Elizabeth II's Platinum Jubilee, marking her 70 years on the throne. The *ARRL Letter* reports that all hams in Canada may choose to use the special prefixes. They include VG, VX, XK, and XJ. In addition, the Canadian government's special event station listing shows two specific Jubilee-related special event operations planned, with callsigns XM3A and VB3Q70.

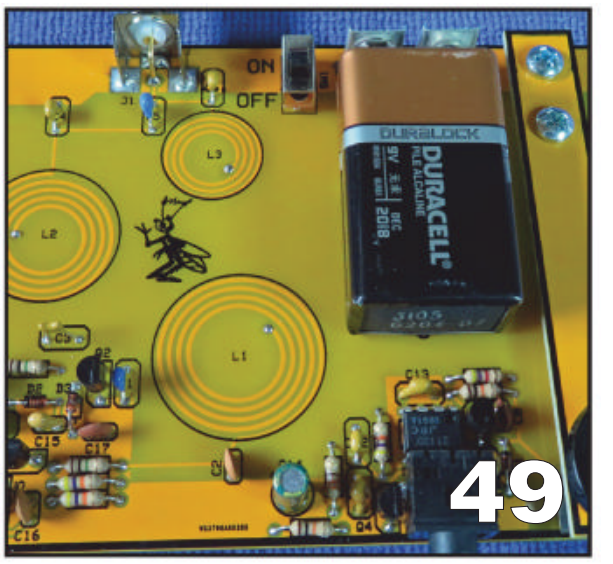
CONTENTS

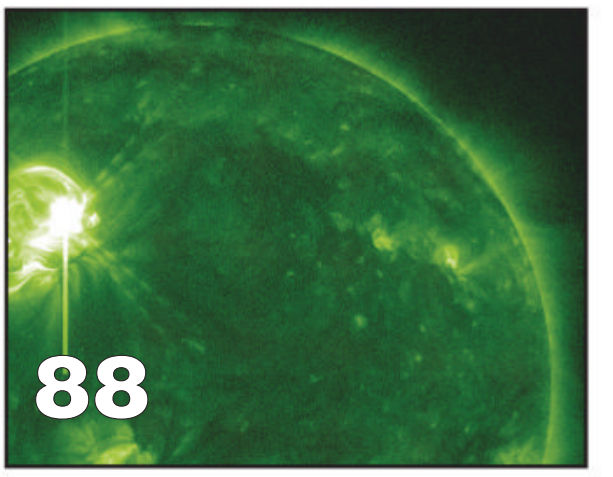
MAY 2022 • VOLUME 78 NUMBER 05

76 COVER: DX: UNDER THE VOLCANO: A DXPEDITION TO MONTSERRAT

By Thaire Bryant, W2APF

After Covid cut short a trip to the Canary Islands in 2020, W2APF and his wife were finally able to return to winter traveling this past February, escaping the New Hampshire winter to spend time in the sun – and Thaire on the air as VP2MDX – from Montserrat, in the shadow of the Soufriere Hills volcano. But his Buddipole Hexbeam had a clear shot over the Caribbean from their rented house on Garibaldi Hill. *(Cover photo by Thaire Bryant, W2APF)*





FOCUS ON: The 73rd running of the CQWW DX CW Contest filled up the bands with Morse code. How did you do this year? Find out on pages 11 & 94! That's not all, read all about who invented Morse Code on page 8, and the role it played in the sinking of the Titantic on page 24!

FEATURES

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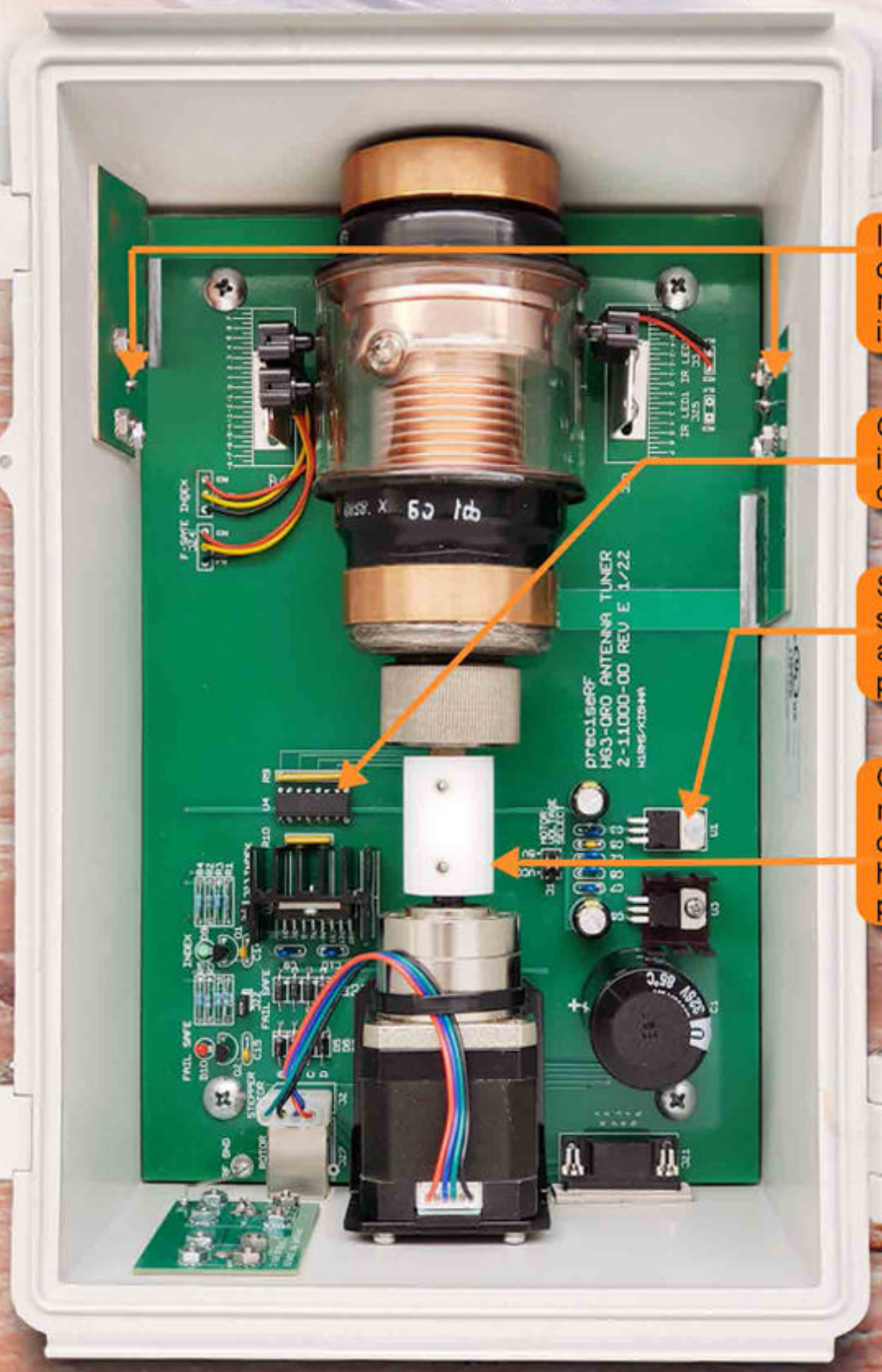

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ZERO BIAS: A CQ Editorial

BY RICH MOSESON,* W2VU

Ham Radio's Cultural Heritage

Dah-di-dah-dit dah-dah-di-dah. For the yet unschooled, that's our name (CQ) in Morse code. For over 100 years, Morse code has been an essential part of the fabric of amateur radio, starting in the earliest days of radio communication, when it was the only available option, and continuing today, when knowledge of the code is optional but still very popular. Today, in fact, hams are pretty much the sole protectors of this cultural heritage of communications technology.

I bring this up because this issue turned itself into a Morse code mini-special, with three code-focused articles that span the history of its use as a communication tool. Our lead feature, "Who REALLY Invented Morse Code?" (p. 8), goes back to its earliest days, before the days of radio, when the telegraph produced the first revolution in modern communications technology. (You may be surprised by N5SK's answer to the question in the title, so be sure to read his article.) Our third article, "CQD, SOS and the Sinking of the Titanic" (p. 24), recounts the event that cemented the importance of wireless as a tool for emergency communications and led to the regulation of radio by the U.S. government, including formal recognition of amateur radio (via licensing and limiting us to "useless" wavelengths below 200 meters, which set the stage for the next revolution, instantaneous worldwide communication via shortwave). In between those two articles, we have the results of last year's CW weekend of the CQ World Wide DX Contest (p. 11), in which more than 8,600 hams submitted logs containing some 4.5 million Morse code contacts.

In the wake of additional telecommunication revolutions, from satellites to cell phones and the internet, Morse code has kind of been left behind, except by us hams, even 15 years after the elimination of the code test requirement for getting a ham license in the U.S. Here in ham radio world, the code is alive and well, and growing in popularity. We've lost track of how many hams licensed in the past 15 years have told us of their goal of learning and using code on the air.

You may have noticed that so far, I have made only one reference to "CW" as an abbreviation for Morse code. That's not an accident. That's because the two historical articles I've discussed predate CW, but not Morse code. The telegraph, of course, was the original form of landline communication. And the wireless stations of 1912, when Titanic sank, consisted of spark-gap transmitters using "damped waves," which started out very strong (and broad) as a spark was generated and then lost strength, or amplitude, as the energy from the spark dissipated. The revolution that led to narrower signals on specific frequencies was the development of *continuous amplitude wave* transmissions, which maintained the same level of strength as long as the transmitter was generating a signal. This was soon shortened to continuous wave, and abbreviated CW. Just as AM and single sideband later battled for supremacy in HF voice communication, spark and CW sparred on the airwaves a century ago. CW eventually became not only the dominant means of sending Morse code, but the only means after spark was outlawed due to its extreme spectrum inefficiency. The battle is long over but the abbreviation remains!

Fifteen years ago, when the FCC dropped the code test requirement for ham licenses, many amateurs predicted a quick death for CW on the ham bands. We disagreed strongly at the time, predicting that all the benefits that made CW a popular mode would keep it that way, even without anyone being forced to learn it. We're not big on saying we told you so, but we told you so. CW remains highly spectrum-efficient, highly power-efficient, capable of being encoded and decoded without a computer, ideal for low-power and portable use, and able to get a message through when voice won't cut it. All of these benefits are keeping Morse code alive and well on the ham bands, and keeping ham radio as a vital protector of this living cultural heritage connecting us with the earliest days of electronic communication.

We'll close with this poem by H. Russell Smith, NØQLT, from his book, *Time Machines, Annoying Minotaurs, and Other Childish Pursuits,* and published with his kind permission:

CW

It's not noise; very comforting
Sounds issue from the cans
My ears, they hear through static
Tap, tap in echoing rhythm.
It is a song from a faraway land
Something I heard long, long ago.
I feel for the key, no, for the bug—
And sing back in ghostly refrain.

Some Staff Changes…

We would like to welcome two new members of our contributing staff. Martin Butera, PT2ZDX/LU9EFO, is now a Contributing Editor-at-Large. Martin has been providing a steady stream of fascinating interviews and other articles recently from his home base in Brazil, and he's got more in the pipeline. This month, he fills in as guest Emergency Communications editor, a position we're still looking to fill on a permanent basis, so if you're interested, drop me an email.

We also welcome José Castillo, N4BAA, as our new Worked All Zones (WAZ) Award Manager. José has been licensed since 1977 and holds 37 out of the 38 different "flavors" of WAZ, needing only 80-meter RTTY to have them all and — we believe — become the first person to do so. José succeeds John Bergman, KC5LK, who has stepped down after administering ham radio's second-oldest active award program for nearly a decade. We thank John for his contributions and look forward to working closely with José in the future. All WAZ-related correspondence should be directed to José at <n4baa@cq-amateur-radio.com>.

Dayton

The Dayton Hamvention® will be back in person this year for the first time since 2019, but we have decided to wait one more year before returning to Xenia. We weighed many factors, including the once-again climbing Covid numbers as well as the very high cost of travel and shipping right now and our still-very-tight finances. On balance, we determined that the benefits of being there — which are many — were outweighed this time around by the costs, monetary and otherwise, of making the trip and being in close indoor contact with 30,000 or so fellow hams. We hope to see many of you there next year. *– 73, Rich, W2VU*

*Email: <w2vu@cq-amateur-radio.com>

NEWS BYTES

Be Prepared: Another Active Hurricane Season Predicted

Researchers at Colorado State University[1] are predicting an above-normal Atlantic hurricane season for 2022. Hurricane season runs from June 1st to November 30th each year, although the storms don't always respect those dates.

CSU's center for Tropical Weather and Climate Research issued its annual forecast in early April, predicting 19 named storms, 9 hurricanes and 4 major hurricanes this year, versus the 30-year average from 1991-2020 of 14.4, 7.2, and 3.2 respectively.

The forecasters noted that "Current weak La Niña conditions look fairly likely to transition to neutral ENSO (El Niño Southern Oscillation) by this summer / fall, but the odds of a significant El Niño seem unlikely. Sea surface temperatures averaged across the eastern and central tropical Atlantic are currently near average, while Caribbean and subtropical Atlantic sea surface temperatures are warmer than normal. We anticipate an above-average probability for major hurricanes making landfall along the continental United States coastline and in the Caribbean."

The researchers concluded, "As is the case with all hurricane seasons, coastal residents are reminded that it only takes one hurricane making landfall to make it an active season for them. They should prepare the same for every season, regardless of how much activity is predicted."

Hams living in hurricane-prone areas should first ensure that they and their families are well-prepared for hurricane damage and extended power outages, then take advantage of available training through FEMA, the National Weather Service, and local emergency communication groups in order to be able to help effectively if needed.

Amateurs in potentially affected areas should monitor the Hurricane Watch Net on 14.325 MHz USB during the day and 7.268 MHz LSB at night. The net is activated whenever a tropical system reaches hurricane status and is within 300 miles of a populated land area, or at the request of forecasters. For more information on the Hurricane Watch Net, visit <www.hwn.org>.

Note:

1. When asked "Why study hurricanes in Colorado?" the late Dr. Bill Gray, founder of the Tropical Weather and Climate Research Center at Colorado State, responded simply, "Storm surge can't get you at 5,000 feet!"

2022 Atlantic Hurricane Names

The World Meteorological Organization (WMO) has issued the following list of names for Atlantic tropical storms and hurricanes in 2022: Alex, Bonnie, Colin, Danielle, Earl, Fiona, Gaston, Hermine, Ian, Julia, Karl, Lisa, Martin, Nicole, Owen, Paula, Richard, Shary, Tobias, Virginie, Walter. If there are more than 21 named storms in a given season, names will be used from a supplemental list maintained by the WMO. Name lists repeat on a six-year basis, except that names of storms that are exceptionally deadly or costly will be replaced on the rotating lists.

For many years, the author — and your editor — were firmly convinced that the "Morse code" of dots and dashes was actually invented by Morse's assistant, Alfred Vail. But N5SK says recent research he has conducted tells a different story.

Who REALLY Invented Morse Code?

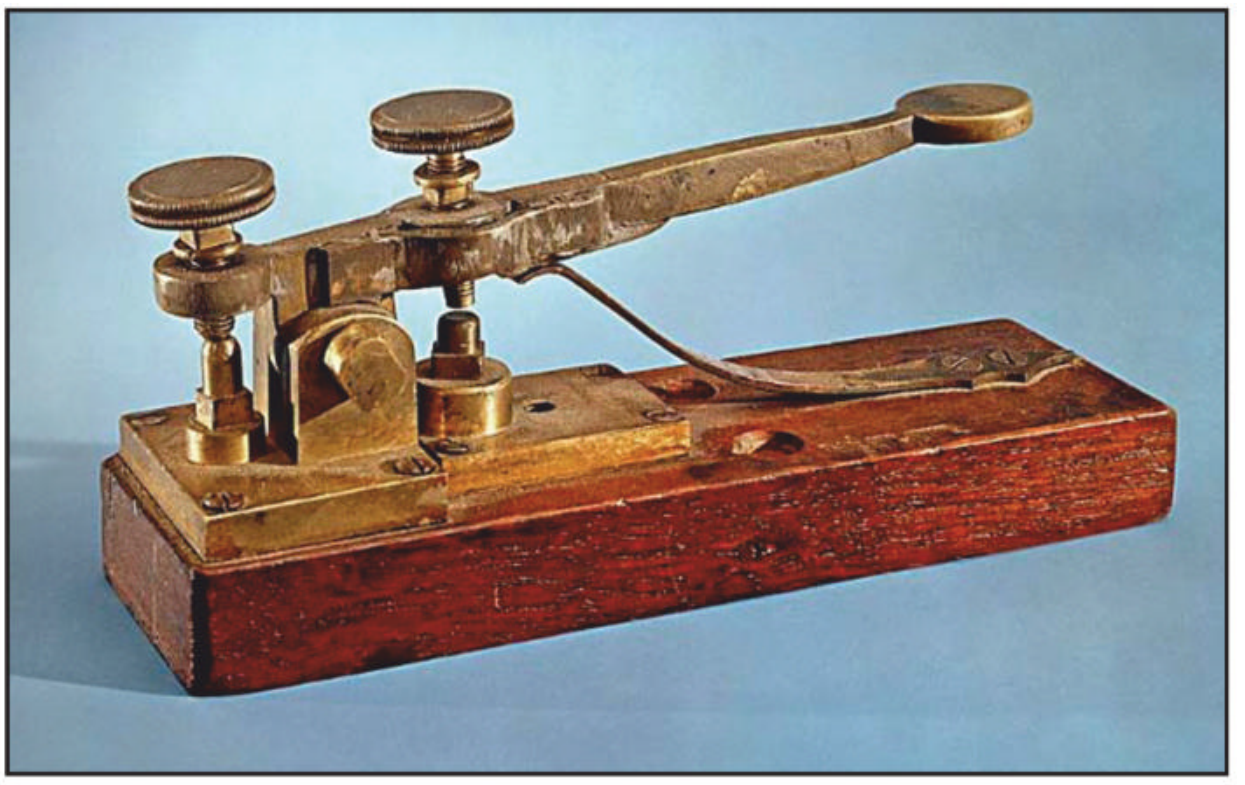
BY STEVEN KARTY,* N5SK

Who really invented Morse code? This is almost like asking, "Who's buried in Grant's Tomb?"

Many publications, including encyclopedias and reference books, credit the invention of Morse code to Samuel F.B. Morse. Many people know that Morse sent the message "What hath God wrought?" from Washington, DC to Baltimore, but few know that Alfred Vail (Morse's collaborator) received that message. When I was learning CW for my Novice license in 1960, I found a library book that said how upset Vail was because he wasn't credited for inventing Morse code.

Many years later, I found some Internet sources[1,2] and YouTube videos[3,4] that say Alfred Vail invented Morse code. These fit into my preconception, and I was convinced that Alfred Vail invented Morse code. My belief was also reinforced when I found that Fort Monmouth, New Jersey used to be named Camp Alfred Vail, in recognition of Vail inventing Morse Code. This is supported in a booklet entitled *A Concise History of Fort Monmouth, New Jersey* (Prepared by the Staff of the Historical Office, U.S. Army Communications-Electronics Command, Fort Monmouth, NJ, 1985) that states:

"On 15 September 1917, only three months after its establishment, the camp was placed on a semi-permanent basis and officially named Camp Alfred Vail. [4]
Vail, an associate of Samuel F.B. Morse, inventor of the telegraph, was credited with devising the Morse alphabet of dots, dashes, and spaces. It was felt that in view of his great contributions to wire communications it was proper that his name be commemorated in a Signal Corps Camp.



This 1844 telegraph key by Alfred Vail, improving on Morse's original design, is believed to be from the first Baltimore-Washington telegraph line. (Photo from National Museum of American History, Smithsonian Institution)

4. Order 122, Office of the Chief Signal Officer, 21 Aug 17. Born at Morristown, NJ, in 1807, Alfred E. Vail graduated from the University of the City of New York in 1836 and early became associated with Samuel F.B. Morse. Vail's mechanical knowledge greatly expedited the first experiments in telegraphy. He devised the Morse alphabet of dots, dashes, and spaces. His automatic roller and grooved lever embossed on paper the characters that were transmitted. Vail was the superintendent of construction of the original telegraph line between Washington and Baltimore. Inventor of the finger key, he received the first message successfully transmitted in 1844. In view of the great contributions made by Vail to wire communications, it was proper that his name be commemorated in a Signal Corps training camp."

But more recently, I found another YouTube video from a much more credible source than any of the others: It is a presentation[5] by Dr. David P. Hochfelder, N2HTA, Associate Professor of History, University at Albany, who uses primary source material for his research. His talk covers the historical controversy between supporters of Alfred Vail and Samuel Morse over the issue of which man actually invented the telegraph code commonly known as Morse Code. This video was taken on September 12, 2016 at the Schenectady Amateur Radio Association General Meeting. Professor Hochfelder is author of *The Telegraph in America, 1832-1920* (Johns Hopkins University Press, 2012). As much as I wanted to believe Vail invented Morse code, none of the references I found supporting this identified any primary source material to substantiate their contentions.

Morse's original receiving apparatus was too fragile to be practical. Vail was a skilled and experienced machinist

* Email: <kartys@gmail.com>

who developed his expertise working in his father's machine shop (Speedwell Iron Works) that built steam engines. Vail invented and built a greatly improved receiving apparatus for Morse that used a steel point to make sequential marks (corresponding to numbers) on a moving paper tape. Vail's receiving apparatus used a solenoid to pull the steel point down onto the moving paper tape, which was advanced by a clockwork mechanism. Morse's original code used numbers corresponding to words so that the receiving operator would have to count the number of marks on the paper tape and manually transcribe them into words from a dictionary (lookup table). Morse and Vail both realized that Morse's original code was cumbersome and impractical. According to Professor Hochfelder's YouTube video, Morse completely revamped his original number code (without Vail's help) to make it into a usable alphabet code. The resulting alphabet code (known as Morse code) uses combinations of short and long marks corresponding to individual characters (alphabetic letters, numbers, and punctuation).

Telegraph operators noticed they could hear the steel point hitting the paper tape and that it was easier to copy by ear than it was to look at the paper tape. Telegraph sounders eventually replaced Vail's receiving apparatus. A sounder is similar to an electromechanical relay, so its armature produces audible clicks. The original, or American, Morse code was used on wirelines but not on radio. The code used on radio is the International Radiotelegraph Code, which consists of short and long tones called *dits* and *dahs*. Although many characters are similar between both codes, some are completely different. Other inventors had previously developed other codes for different uses.

Professor Hochfelder believes that Vail had no hand in developing the alphabet code because Vail never claimed inventing it. Vail published a pamphlet in which he only claimed inventing three things: The transmitting key, the recording register (the receiving apparatus), and a particular method for lengthening the lifespan of batteries. Vail also wrote his father a private letter that said, "Professor Morse has invented a new plan of alphabetic and has thrown aside the dictionaries." This is supported by another Website I found[6] and in the last three references[7,8,9] that contain the primary source material Professor Hochfelder mentioned to me. The story continues that Morse's brother Sydney owned a New York newspaper, and Morse went to its printing shop, determined what the more frequently used letters were (by counting the number of type pieces in each bin), and developed the alphabet code to use shorter codes for the more frequent letters.

Vail was an outstanding inventor who wrote several pamphlets about his own electromechanical inventions in the 1840s. Morse was a talented portrait painter and a successful businessman but he wasn't an engineer and had no scientific background. Morse had nowhere near Vail's technological abilities with electromechanical devices. Professor Hochfelder's YouTube video also mentions that Morse used Joseph Henry's and Michael Faraday's work without crediting them.

Speaking of credit, one other contribution by the Vail family was a loan to Morse from Alfred's father, Stephen Vail, for developing, patenting, and improving the telegraph. When a working system was not completed by the agreed-upon deadline of January 1, 1838, both Morse and the elder Vail became impatient. Alfred got the system working several days later and, with 2 miles of wire looped around his workshop at his father's Speedwell Iron Works in New Jersey, he sent Morse a message written down by his father, "A patient waiter is no loser." It was the actual first message sent by telegraph, on January 6, 1838, rather than the better-known "What hath God wrought?" message sent by Morse at the telegraph's first public demonstration in 1844.[10]

Vail's personal profit from his work on the telegraph was negligible, and he died poor in 1859, just before the outbreak of the Civil War, in which the telegraph became an indispensable tool of communication.

Back to Grant's Tomb…

I assume that President Grant is buried in Grant's Tomb, and now I also believe that Samuel Morse really did invent the code named after him. I am ending this article on a related joke that one of my sons (KD4BYW) made up while he was studying for his Novice license — back when it still required copying 5 WPM code: What swims underwater and goes *dah di dah dit*? Morse Cod.

Notes:

1. Morse Code or Vail Code? in the April 2001 issue of The Propagator on pages 5 to 7. <https://tinyurl.com/2m3rec4x>

"Did Samuel F.B. Morse Invent the Code as We Know it Today? Franklin Pope and William Baxter give some answers." By Neal McEwen, K5RW

Franklin Pope was a telegraph inventor, entrepreneur, and writer. He may be best known for his partnership with Thomas Edison in the telegraph services business in the early 1870s. Alfred Vail was one of Samuel Morse's partners and a contributor in the development of the telegraph. William Baxter was Vail's laboratory assistant at the Speedwell Iron Works where early developments were made. Quoting from Pope's article in April 1888 issue of The Century: Illustrated Monthly Magazine, titled "The American Inventors of the Telegraph, with special references to the services of Alfred Vail": Alfred Vail and his young assistant, William Baxter, were engaged night and day in pushing forward the construction of the new machinery. Writing of this period, Mr. Baxter says: Alfred's brain was at this time working at high pressure, and evolving new ideas every day. He saw in these new characters the elements of an alphabetical code by which language could be telegraphically transmitted in actual words and sentences, and he instantly set himself at work to construct such a code. His general plan was to employ the simplest and shortest combinations to represent the most frequently recurring letters of the English alphabet, and the remainder for the more infrequent ones. … After going through a computation, in order to ascertain the relative frequency of the occurrence of different letters in the English alphabet, Alfred was seized with sudden inspiration, and visited the office of the Morristown local newspaper, where be found the whole problem worked out for him in the type cases of the compositor.

2. Did Samuel F.B. Morse Invent the Code as We Know it Today? in the January 2010 issue of the CAARA Newsletter on pages 14 to 17. <https://tinyurl.com/4f5t7tzt> (This article is the same as the previous reference. Neal McEwen said Karen Weiss found and sent it to him.)

3. Man Behind Morse Code <https://tinyurl.com/4b6bf5pd> — Morse's original code was too complicated because it only transmitted numbers to represent each word. The operator had to go through thousands of pages in a codebook (lookup table) to find the number that matched the word, which was slow and cumbersome. Vail in just a few months developed a better way to send a message, which was letter by letter. Vail had his assistant William Baxter help him go through newspapers and count letters to see which signals should be shortest for the letters that are used the most. The telegraph patent that was granted to Morse listed both codes, but Vail's was easier to use and was quickly adopted. Morse got all the credit because Vail's name was not on the patent.

4. How Samuel Morse, a Racist Painter, Stole the Telegraph. By Kathy Joseph Balistreri <https://tinyurl.com/mrxcn9r7>

Kathy Joseph Balistreri contends that although Samuel Morse is known as the inventor of the telegraph, it was really invented by Joseph Henry, Leonard Gale, and Alfred Vail. Morse collected and applied their ideas to gain fame and money. But his primary motivations were ego, tragedy, and xenophobia. Morse received a lot of help from Professor Leonard Gale (head of Chemistry at the University of the City of New York where they both worked), but Professor Gale never received anything from Morse for all of his work. Joseph Henry once said, "If I could live my life again, I might've taken out more patents."

(Kathy Joseph Balistreri is a Physics teacher and historian who makes videos on YouTube under the title "Kathy Loves Physics & History." She

recently finished a book which will be available in 2022 on the history of electricity called "The Lightning Tamers: Wild Tales of How We Electrified Our World". Go to <http://kathylovesphysics.ck.page> to join her mailing list.)

5. "Who Invented Morse Code?" by Professor David P. Hochfelder, N2HTA <https://tinyurl.com/5645sbak> — This YouTube video was presented by Dr. David P. Hochfelder, N2HTA, Associate Professor of History, University at Albany. His talk covers the historical controversy between supporters of Alfred Vail and Samuel Morse over the issue of which man actually invented the telegraph code commonly known as Morse Code. This video was taken at the Schenectady Amateur Radio Association General Meeting on September 12, 2016. Professor Hochfelder is author of "The Telegraph in America, 1832-1920" (Johns Hopkins University Press, 2012. His presentation is much more credible than anything else I've been able to find.

6. Alfred Vail Explained <https://tinyurl.com/yuthh9je> — Morse supporters say that Alfred Vail, in public and private writings, never claimed that he developed the alphabet code. According to one researcher, in a February 1838 letter to his father, Judge Stephen Vail, Alfred Vail wrote "Professor Morse has invented a new plan of an alphabet, and has thrown aside the Dictionaries." In an 1845 book that Alfred Vail wrote describing Morse's telegraph, he also attributed the code to Morse."

7. The following is from Vail's papers at the Smithsonian Institution Archives: Alfred to Messrs S. Vail & Son, Feb. 7, 1838, from DC.

We exhibited to Franklin Institute on Thursday, "with perfect satisfaction though the Machine did not exhibit its writing so successfully as at New York — for this reason — Prof. M has invented a new plan of an Alphabet — and has thrown out the Dictionaries — When this plan is improved it will no doubt be better than the old …"

(Hence Professor Hochfelder's conclusion that Vail did not come up with the code, though it's clear that Morse's telegraph couldn't have worked without Henry's work on electromagnets and Vail's work on the instrument.)

8. "Two Controversies in the Early History of the Telegraph" by David Hochfelder <https://tinyurl.com/mw9anzyw> — IEEE Communications Magazine, February 2010, Pages 28 to 32.

The following is from the "Introduction By Editor" (Mischa Schwartz) to the History of Communications column, which featured this article by David Hochfelder: "Two related questions emerge from these controversies over the invention and early commercialization of the telegraph. First, how could Morse, a man with little scientific training or mechanical skill, invent the telegraph? Second, how should we apportion credit for the telegraph among Morse, Henry, and Vail? The author's conclusion is clear: Morse was the one who succeeded in reducing the invention of telegraphy in the United States to practice, but he relied on the substantial contributions to the then-new science of electricity by Henry and the mechanical ingenuity of Vail. Without the help of either one, the Morse telegraph would not have been successful as a commercial system. As another interesting note, the author points out that the Morse code was developed by Morse himself, despite frequent comments that Vail was the one who developed the code."

The article itself contains the following: "The most controversial question surrounding Vail's work on the telegraph is whether he invented the alphabetic code commonly known as Morse code. However, this claim surfaced only after his death in 1859; his widow and sons seem to have generated this claim to enhance his reputation. In both his public and private writings Vail himself never claimed to have invented the code, but forcefully asserted his claims to the sending key and recording register. On the contrary, during the few times he discussed the code he always credited Morse. For example, in February 1838, while Alfred and Morse were exhibiting the telegraph at Philadelphia's Franklin Institute, Alfred wrote his father, "Professor Morse has invented a new plan of alphabet and has thrown aside the Dictionaries."

9. "Description of the American Electro Magnetic Telegraph: Now in Operation Between the Cities of Washington and Baltimore" by Alfred Vail <https://tinyurl.com/4b4arjxp> — Page 32 of this booklet contains the alphabet code followed by "Such is the alphabet given above. This conventional alphabet was originated on board the packet Sully, by Prof. Morse …"

10. "'A patient waiter is no loser': Today in history," The Star-Ledger, Newark NJ Jan 6, 2008 <https://tinyurl.com/3mwrxddn>

ANNOUNCEMENTS *(from Page 2)*

Community Center, 6405 4th Street. Contact: Dave, WC3A, (570) 951-9694. Email: <ten_speed_99@yahoo.com>. Website: <http://qsl.net/cm-arc>. Talk-in 147.225+ (PL 85.4). VE exams.

LOCKPORT, NEW YORK — The Lockport Amateur Radio Association will hold its **First Annual Summer Hamfest** beginning 8 a.m., Saturday, June 11 at the Cambria Volunteer Fire Hall, 4631 Cambria-Wilson Road (Rt. 425). Website: <www.lockportara.us>. Talk-in 146.820 (PL 107.2). VE exams.

KAUKAUNA, WISCONSIN — The Fox Cities Amateur Radio Club will hold its **Sunshine Swapfest!** Beginning 7 a.m., Saturday, June 18 at the Starlite Club, W2091 County Road JJ. Contact: Anthony Mach, AB9IO, (920) 858-6300. Email: <hamfest@fcarc.club>. Website: <www.fcarc.club>.

KNOXVILLE, TENNESSEE — The Radio Amateur Club of Knoxville will hold its **55th Annual Hamfest** from 8:30 a.m. to 3:30 p.m., Saturday, June 18 at the Kerbela Temple, 315 Mimosa Avenue. Contact: Lou Dreinhoefer, WB3JKQ, (865) 621-0715. Email: <ldreinho@att.net>. Website: <www.w4bbb.org>. VE exams.

MONROE, MICHIGAN — The Monroe County Radio Communications Association will hold the **Monroe Hamfest and Computer Show** from 7:30 a.m. to 1 p.m., Sunday, June 19 at the Monroe County Fairgrounds, M-50 at Raisinville Road. Contact: Fred VanDaele, K8EBI, <ka8ebi@yahoo.com>. Website: <www.mcrca.org>. Card checking.

JULY

HARRISBURG, PENNSYLVANIA — The Harrisburg Radio Amateurs' Club will hold its **51st Annual Firecracker Electronics Expo and Hamfest** and **2022 ARRL Pennsylvania State Convention** beginning 8 a.m., Saturday, July 2 at the Harrisburg Postal Employees Picnic Grounds, 1500 Roberts Valley Road. Contact: Terry Snyder, WB3BKN, (717) 896-0256. Email: <wb3bkn1@gmail.com>. Website: <www.w3uu.org>. Talk-in 147.075 (PL 123). DXCC / WAS/ VUCC card checking.

PLAINS, PENNSYVANIA — The Murgas Amateur Radio Club will hold the **43rd Annual Wilkes-Barre Hamfest and Computerfest** beginning 8 a.m., Sunday, July 3 at the Polish American Veterans, 2 South Oak Street. Contact: Herb, K2LNS, (570) 829-2695. Email: <murgasarc@gmail.com>. Website: <http://hamfest.murgasarc.org>. Talk-in 146.610- (PL 82.5). VE exams

CAMILLUS, NEW YORK — The Radio Amateurs of Greater Syracuse will hold **Roger's RAGS Hamfest 2022** from 7:30 a.m. to 12:30 p.m., Saturday, July 9 at the Camillus Elks Lodge #2367, 6117 Newport Road. Contact: Jerry Wright, NK2C, <wrightjk@gmail.com>. Website: <www.ragsclub.org>. Talk-in 146.91- (PL 103.5). VE exams.

ROSEVILLE, MINNESOTA — The MAGIC Repeater Club will hold the **MAGIC TAILGATER** from 8 a.m. to noon, Saturday, July 9 at the Galilee Lutheran Church, 145 N. McCarrons Boulevard. Contact: Leon Dill, WØCOE, (651) 688-9964. Email: <w0coe@arrl.net>. Website: <www.magicrfepeater.net>. Talk-in 145.170 (PL 100). VE exams.

SMITHTOWN, NEW YORK — The Suffolk County VHF/UHF Association will hold its **Hamfest 2022** beginning 8 a.m., Saturday, July 9 at The Elks Lodge Field, 120 Edgewood Avenue. Contact: Scott Miller, NQ2F, (516) 658-5120. Email: <nq2f@optonline.net>. Website: <http://hamradioexamsny.yolasite.com>. VE exams, DXCC card checking.

FERNDALE, MICHIGAN — The Flying Beers International will hold the **Flying Beers International Swap Meet III** from 9 a.m. to 2 p.m., Sunday, July 10 at the Ferndale FOP, 2233 Burdette Street. Website: <www.facebook.com/flyingbeersinternational>. Talk-in 442.600+ (PL 123). VE exams,

ALEXANDER, NEW YORK — The Lancaster Amateur Radio Club will hold the **Batavia Hamfest** beginning 6 a.m., Saturday, July 16 at the Alexander Firemen Grounds, 10708 Alexander Road (Rt. 88). Contact: Luke, M2GDU, <luke48@gmail.com>. Website: <www.w2so.org>. Talk-in 147.285 (PL 141.3).

ATHENS, TENNESSEE — The McMinn County Amateur Radio Club will hold its **18th Annual MCARC Hamfest** beginning 7 a.m., Saturday, July 16 at the McMinn County Expo Center, Athens Regional Park on Decatur Pike. Phone: (423) 368-1473. Email: <kc4jiy@yahoo.com>. Website: <www.mcminnarc.com>. Talk-in 146.060- (PL 141.3) VE exams.

PEOTONE, ILLINOIS — The Kankakee Area Radio Society will hold **KARSFEST 2022** beginning 8 a.m., Sunday, July 17 at the Will County Fairgrounds, 710 S. West Street. Contact: Art Reis, K9XI, (815) 348-7752. Email: <karsfest@gmail.com>. Website: <www.w9az.com>. VE exams, card checking.

LA CROSSE, WISCONSIN — The Central States VHF Society will hold the **54th Annual CSVHFS Conference** from Friday, July 22 and Saturday, July 23 at the Radisson Hotel La Crosse, 200 Harbor View Plaza. Email: <registration@csvhfs>. Website: <http://2022.csvhfs.org>.

CW Results of the 2021 CQ World Wide DX Contest

The CQWW Fills the Bands — Again!

"My first contest from home using an L-match to a rain spout! But it was the CQWW and always great fun! –DM5US

BY JOHN DORR,* K1AR

If there is any doubt that you've seen the last of the CW glory days, don't give up hope just yet. All one needs to do is to listen to the bands during a CQWW CW contest and you'll discover that our cherished mode is still alive and well. It was no different in the running of the 73rd CQWW. The bands were jam-packed from end-to-end with contest activity; 20 and 15 meters experiencing activity well above 14/21.100 MHz.

Of course, another measure of activity is the number of logs we receive. On CW, 8,613 logs were received, bringing the "both modes" total for 2021 to 17,720 entries — a new record for the CQWW. These logs represent over 9.6M (million) total QSOs or an average of 522 contacts per log. The numbers are simply staggering.

One of my favorite parts of this job is reading your soapbox comments. Believe it or not, I read them all! You can do so for yourself by checking out <cqww.com/results>. Here's just a representative sample, reflecting the enthusiasm and excitement created by the CQWW each year:

"This was my first CQWW in 62 years of hamming! It was fun to see what could be done with low power and very modest antennas." –K7ZX

"Every QSO is a sip of joy when made with 5 watts." –ON6NL

"I really had a ball this year and enjoyed working all bands. What a nice contest! –PA3DTR

" … It's amazing when 40,000 friends get on the air and make some noise!" –K5GN

Here's the PJ2T team that won World #1 in Multi-Multi from Curacao. Kneeling from left to right were: Roger, G4BVY; Geoff, WØCG/PJ2DX; Rich, NN3W; Jon, KL2A. Standing left to right were: Martin, G4XUM; Pete, K8PGJ; Brooke, N2BA; Ray, ND8L; and Rich, M5RIC.

So, now that the case has been made for the CQWW being a great contest, let's move on to the results.

Some Fantastic Results this Year!

While band conditions weren't quite as good as they were during the SSB weekend, there was still plenty of excitement and fun to be had by all on CW. The impact was felt from an increase in multi-op entries (2021 – 298; 2020 – 191). Let's all hope they'll be back in full force for 2022.

The World Single Operator race was dominated, yet again, by perennial top-finisher Dan Craig, N6MJ, as he drove the TI7W superstation to a dominant victory at 16.1M, besting the amazing effort by CR6T (op. CT1ILT) at 12.1M. Dan perfectly played the 2BSIQ (Two Band Synchronized Interleaved QSOs) game to a grand total of 11,300 QSOs. That's an average of 235 QSOs/hour for the entire 48-hour contest! If you want to hear what his 464-hour sounded like, take a listen to <https://tinyurl.com/4cpfd93v>.

The U.S. Single-Operator All Band (SOAB) results were also led by another top-tier operator, Kevin Stockton, N5DX, who piloted N2QV to a 10.1M win, besting super-op W1KM who came in second at 7.5M. It's worthy of note

*Email: <cqk1ar@gmail.com>

that several non-East Coast stations made the Top-10 this time around, led by N2IC (NM) at 5.7M, W9RE (IN) at 5.2M, and N9RV (MT) at 4.5M. Congrats to all!

The SOAB Low Power (LP) category was a little closer as Bud, AA3B, fired up his V26K station, achieving a final tally of 11.5M, beating out the SSB SOABHP winner, Juan, EA8RM, who posted an impressive score of his own at 10.9M. Bud has enjoyed an amazing run from Antigua, having won this category 16 times in the past 23 years. It finally took a pandemic to end his last winning streak at seven consecutive victories.

The SO Assisted race was won again by P44W (W2GD) who continues to travel to Aruba each year and post winning results. John's 11.9M final score bested outstanding op Stan, ZF5T (K5GO)'s, solid effort of 9.0M. Randy, K5ZD, led the U.S. field again with a terrific score of 8.9M, coming in third in the world.

2021 WWDX CW PLAQUE WINNERS AND DONORS

SINGLE OPERATOR, ALL BANDS

World
TI7W (Opr.: Dan Craig, N6MJ)
Donor: Vibroplex

World - Low Power
V26K (Opr.: Bud Trench, AA3B)
Donor: Slovenia Contest Club

World - QRP
PZ5CO (Opr.: Dimitry Kryukov, RA3CO)
Donor: Bob Evans, K5WA

World - Assisted
P44W (Opr.: John Crovelli, W2GD)
Donor: Robert McGwier, N4HY

World – Assisted Low Power
P3AA (Opr.: Sergey Popov, RN3QO)
Donor: Mike Charteris, VK4QS

World – Assisted QRP
DM2M (Opr.: Pit Schmidt, DK3WE)
Donor: Steve "Sid" Caesar, NH7C

U.S.A.
Kevin Stockton, N5DX
Donor: Frankford Radio Club

U.S.A. - Low Power
Mark Speck, KØEJ
Donor: North Coast Contesters

U.S.A. - QRP
Doug Zwiebel, KR2Q
Donor: Andy Blank, N2NT - W3ZZ Memorial

U.S.A. - Assisted
Randy Thompson, K5ZD
Donor: John Rodgers, WE3C

U.S.A. – Assisted Low Power
Jim Bowman, KS1J
Donor: LA8W/LN8W & LA Contest Club

U.S.A. - Zone 3
Bob Wolbert, K6XX
Donor: Arizona Outlaws Contest Club

U.S.A. - Zone 4
Steve London, N2IC
Donor: Central Texas DX and Contest Club - K6RV Memorial

U.S.A. - Zone 5
Greg Cronin, W1KM*
Donor: Carolina DX Association - N4ZC Memorial

Europe
CR6K (Opr.: Filipe Lopes, CT1ILT)
Donor: Florida Contest Group - W3AU Memorial

Europe - Low Power
IY3A (Opr.: Matteo Marzilli, IZ3EYZ)
Donor: Tim Duffy, K3LR

Europe - QRP
Tine Brajnik, S5ØA
Donor: Sergio Cartoceti, IK4AUY - I4FAF Memorial

Europe - Assisted
ERØDX (Opr.: Sergiy Rebrov, UT5UDX)
Donor: IR4X Monte Capra Contest Team - I4IND Memorial

Africa
Juan Hidalgo, EA8RM
Donor: Ralph "Gator" Bowen, N5RZ - K5KA Memorial

Asia
Masaki Masa Okano, JH4UYB
Donor: DFW Contest Group - W5PG Memorial

Carib./C.A. – High Power
V48A (Opr.: Bob Brockman, WX4G)*
Donor: DFW Contest Group - W5PG Memorial

Carib./C.A. – Low Power
VP9I (Opr.: Jeff Kinzli, N6GQ)*
Donor: Albert Crespo, NH7A

Oceania
VK6T (Opr.: Kevin Smith, VK6LW)
Donor: Ken Hoppe, KH7R

Oceania -Assisted
John Hillyer, NH7T
Donor: Koa Contest Club

South America
Alexey Ogorodov, HC2AO
Donor: Dave Farnsworth, WJ2O

South America - Southern Cone (CE, CX, LU)
CB3R (Opr.: Dercel Gonzalez (Willy) Williams, XQ3SK)
Donor: Dale Long, N3BNA

Scandinavia (LA, OH, OZ, SM)
Seppo Sisatto, OH1VR
Donor: Chas Weir, Jr., W6UM - W3FYS Memorial

Baltic (ES, LY, YL)
Jonas Urbonas, LY4T
Donor: Lithuanian Radio Sports Federation - LY2OO Memorial

Canada – High Power
VE2IM (Opr.: Yuri Onipko, VE3DZ)
Donor: John Sluymer, VE3EJ & Jim Roberts, VE7ZO

Canada – Low Power
Igor Mordick, VA3FF
Donor: Maritime Contest Club - VE1AL Memorial

Japan – High Power
JE6RPM (Opr.: Katsuhiro Kondou, JH5GHM)*
Donor: Phil Yasson, AB7RW

Japan - Assisted
Hajime Hazuki, JR2GRX
Donor: Aki Nagi, JA5DQH

ASEAN (XZ, HS, XW, XU, 3W, 9M, 9V, V8, YB, DU)
Nikorn Deesai, HS5NMF
Donor: Champ C. Muangamphun, E21EIC - Siam DX Group

ASEAN (XZ, HS, XW, XU, 3W, 9M, 9V, V8, YB, DU) - Assisted
Ron Schiltmans, DU3T
Donor: Champ C. Muangamphun, E21EIC - Siam DX Group

SINGLE OPERATOR, SINGLE BAND

World - 28 MHz
PR5B (Opr.: Alan Laure Santamaria, PY2LSM)
Donor: Joel Chalmers, KG6DX

World - 21 MHz
PX2A (Opr.: Fabio Alexandre Azevedo, PY2BK)
Donor: CWOps

World - 14 MHz
OH8X (Opr.: Pasi Luoma-aho, OH6UM)
Donor: North Jersey DX Assn. - W2JT Memorial

World - 7 MHz
KP2M (Opr.: Philip Allardice, KT3Y)
Donor: John Rodgers, WE3C

World - 3.5 MHz
4L/LY4ZZ (Opr.: Algis Sadaunikas, LY2BMX)
Donor: Family of Fred Capossela, K6SSS

World - 1.8 MHz
NP2J (Opr.: Daniel Flaig, K8RF)
Donor: Kenneth Byers, Jr., K4TEA

U.S.A. - 28 MHz
Jeff Stuparits, W4DD
Donor: John Rodgers, WE3C

U.S.A. - 21 MHz
Marvin Bloomquist, N5AW
Donor: Adrian Ciuperca, KO8SCA

U.S.A. - 14 MHz
Dan Handa, W7WA
Donor: Northern Illinois DX Association

U.S.A. - 7 MHz
Brian Edward, N2MF
Donor: Gene Shablygin, W3UA

U.S.A. - 3.5 MHz
K2ZW (Opr.: Hajime Kato, JO1RUR)
Donor: Bill Feidt, NG3K

U.S.A. - 1.8 MHz
John M Slusser, WF2W
Donor: Jeff Briggs, K1ZM

Europe - 28 MHz
Lluis Presseguer Capdevila, EA3NO
Donor: Jay Pryor, K4OGG

Europe - 21 MHz
Dmytro Pavlik, UZ5DX
Donor: John Rodgers, WE3C

Europe - 14 MHz
DMØA (Opr.: Heiko Marschollek, DK3DM)
Donor: World Wide Radio Operators Foundation

Europe - 7 MHz
4O3A (Opr.: Dragan Djordjevic, 4O4A)
Donor: Ivo Pezer, 9A3A

Europe - 3.5 MHz
OHØTA (Opr.: Pekka Holstila, OH2TA)
Donor: Frankford Radio Club - K3VW Memorial

Europe - 1.8 MHz
S5ØC (Opr.: Sine Mermal, S53RM)
Donor: Pat Barkey, N9RV & Terry Zivney, N4TZ

Asia – 14 MHz
UPØL (Opr.: Vladimir Vinichenko, UN9LW)
Donor: Ralph "Gator" Bowen, N5RZ - W5FO Memorial

Asia – 7 MHz
UP4L, Valeriy Zhilyayev, UN7LZ
Donor: Rich Gelber, K2WR

Carib./C.A. (21 MHz)
WP4WW (Opr.: Jose A. Rivera-Salaman, KP4JRS)*
Donor: David Hodge, N6AN

Canada (14 MHz)
Gabor Horvath, VE7JH
Donor: John Sluymer, VE3EJ

Japan - 21 MHz
Akito Nagi, JA5DQH
Donor: Bob Wilson, N6TV

Japan - 14 MHz
Tsutomu Kubota, JK1OLT
Donor: Chris Terkla, N1XS

OVERLAY CATEGORIES

World – Classic
Doug Grant, K1DG
Donor: CWops

U.S.A. – Classic
W4CB (Opr.: Bud Hippisley, W2RU)*
Donor: CWops

Despite conditions being slightly down from SSB, LU2DX still managed to make 1,910 QSOs on 10 meters to place first with a score of 670,000 (K). The "money" bands of 15 and 20 meters supported million+ winning scores from ZY5T (PP5JR) and ED8W (EA1DAV), respectively.

The Classic overlay folks were also out in force this time around as Doug, K1DG, captured the World high with a HP score of 3.5M. Winning the world from the U.S. is no easy feat. One of our accuracy champions this year, VP9I (N6GQ), outpaced his competitors with a LP entry of 2.9M.

As already mentioned, the bands were again alive with multi-ops. It began to feel like the old days as P33W posted a 23M Multi-Single score, beating LZ5R by over 8M points. W3LPL stepped back from its usual Multi-Multi (MM) configuration to win U.S. Multi-Single with a fine score of 14.2M. The Multi-Two (M2) teams were led by the CR3DX team, who

Japan – Classic
Kunishige Shimokawa, JA6BZI
Donor: Hajime Kato, JO1RUR

World – Rookie
LS2D (Daniel Dours, LU1DJK)
Donor: CWops

U.S.A. – Rookie
Stan Swanson, W4SSF
Donor: CWops

Europe – Rookie
Serge Kurskov, EU1VA
Donor: EA Contest Club

ASEAN (XZ, HS, XW, XU, 3W, 9M, 9V, V8, YB, DU) - Rookie Setio Wahono, YC4SIZ
Donor: Champ C. Muangamphun, E21EIC - Siam DX Group

World – Youth
Janko Mihailovic, YTØC
Donor: Zoli Pitman, HA1AG

North America – Youth
Dawson Morton, KE8HBV
Donor: IARU Region 2 for YOTA

Europe – Youth
Sven Lovric, DJ4MX
Donor: IARU Region I Youth Working Group

Asia – Youth
Riku Suda, JR2KHB
Donor: YOTA Japan

Oceania – Youth
Karunya Saka Listianto, YD2UWF
Donor: IARU Region 3

World – Explorer
Single Operator
9G5FI (Opr.: Tom Hitzner, DL2RMC)
Donor: World Wide Radio Operators Foundation

World – Explorer
Multi-Operator
RWØA (Oprs.: RAØAM, RAØAAC, RØAI, RGØA, RMØA, RUØA, RUØAM, RVØAR, RWØAR, RZØAT, UAØAPV, UFØB, RC9O, UA9PM, RA9P, R9IR, RM9I, RU9I, RC9HB, RC9HC, RW9USA, RV9UP, UA9UR, RZ9UN, RK9UE, RA9USU, RX9UK)
Donor: World Wide Radio Operators Foundation

MULTI-OPERATOR, SINGLE TRANSMITTER

World
P33W (Oprs.: RA3AUU, RW4WR, UA4FER, R4FO, R3DCX, RA2FA)
Donor: Friends of Rich - KL7RA Memorial

World – Low Power
FY5KE (Oprs.: F5HRY, FY5FY, F6FVY)
Donor: EA Contest Club

U.S.A.
W3LPL (Oprs.: W3LPL, NI1N, K3MM, N3OC, K3RA, W3UR, NN3W, WR3Z, KD4D)
Donor: Douglas Zwiebel, KR2Q

U.S.A. – Low Power
K1XM (Oprs.: K1XM, KQ1F)
Donor: CWOps

Africa
CR3X (Oprs.: R7KW, RW7K, YL3JM)
Donor: World Wide Radio Operators Foundation

Asia
RA9Y (Oprs.: RA9Y, RW9OW, RZ9YI, RL9Y, R8OA, R8OM, RO9O, RQ9O)*
Donor: Steve Merchant, K6AW

Carib./C.A.
ZF1A (Oprs.: W9KKN, KI6RRN, KN8U, WD6T, NT6V, N2NL)
Donor: CWOps

Europe
LZ5R (Oprs.: LZ1NK, LZ2HM, LZ2PL, LZ2XA, LZ3ND, LZ3ZZ, LZ5DB)
Donor: Gail Sheehan, K2RED

Europe – Low Power
DP7D (Oprs.: E79AA, DH6JL, DH8AF, DC9RI, DL1REM, DJ4MH)
Donor: Marco Holleyn, DJ4MH

Oceania
DX9EVM (Oprs.: DU9XL, DU9CA, DU9HRG, DV9ARA, DV9BTO, DU9AQB, DV9ILK)
Donor: Junichi Tanaka, JH4RHF

South America
PJ4A (Oprs.: KU8E, K4BAI, PJ4NX)
Donor: Araucaria DX Group

Canada
VE3EJ (Oprs.: VE3EJ, VE3EK, VE3MM, VE5MX)
Donor: John Sluymer, VE3EJ - VE3TA Memorial

Japan
JA7ZFN (Oprs.: JH7XMO, JG7PSJ, JI7GBI, JP7DKQ, JA1CTB)
Donor: Madison Jones, W5MJ

ASEAN (XZ, HS, XW, XU, 3W, 9M, 9V, V8, YB, DU)
E2A (Oprs.: E24OYI, E25KAE, E29TGW, E2ØNKB, E21EIC)
Donor: Bruce Frahm, KØBJ

MULTI-OPERATOR, TWO TRANSMITTERS

World
CR3DX (Oprs.: OM2VL, OM3BH, OM3GI, OM3RM, RC5A)
Donor: Array Solutions

U.S.A.
KC1XX (Oprs.: K1CC, K1QX, K1TR, KM3T, KC1XX, N1EZ, NN1C, W1FV, WA1Z)
Donor: Robert Kasca, S53R

Europe
ES9C (Oprs.: ES2MC, ES2NA, ES2RR, ES4RD, ES5JR, ES5NY, ES5QA, ES5RY, ES5TV, ES6QC, ES7GM, OK1JD, OZ1AA, OZ7AM, SMØOEK, YL3DW, YL3JA)
Donor: D4C Monteverde Contest Team - IR4X Monte Capra Contest Team - I4EAT memorial

ASEAN (XZ, HS, XW, XU, 3W, 9M, 9V, V8, YB, DU)
7A2A (Oprs.: YBØECT, YC1SDL, YB2DX, YB2XVT)
Donor: Champ C. Muangamphun, E21EIC - Siam DX Group

MULTI-OPERATOR, MULTI TRANSMITTER

World
CR3W (Oprs.: DJ2YA, DK7YY, DL1CW, DL5AXX, DL5CW, DL5LYM, DL7UGN)
Donor: The K2GL Operators - K2GL Memorial

U.S.A.
K3LR (Oprs.: K3LR, DL1QQ, K4RO, K3UA, N2NC, W2RQ, N3SD, K5GN, N4YDU, N6TV, N6AN, N3GJ)
Donor: Ham Radio Outlet - W6RJ & N6RJ Memorial

Europe
TKØC (Oprs.: S53F, S53MM, S53BB, S53CC, S53WW, S53RM, S53ZO, S57AL, S57L, S57K, S55OO)
Donor: Finnish Amateur Radio League

Africa
3B8M (Oprs.: GØCKV, MØSDV, MØCFW, KX7M, W6NV)*
Donor: EA9EO Memorial

Asia
JA3YBK (Oprs.: JG3KIV, JG3MRT, JG3WDN, JH4NMT, JR4ISF, JF4FUF, JM4MGM)
Donor: Nodir Tursun-Zade, EY8MM

CONTEST EXPEDITIONS

World – Single Operator
C56XA (Opr.: Alan Ibbetson, G3XAQ)
Donor: Friends of Phil - N6ZZ Memorial

World – Multi Operator
9X4X (Oprs: 4X1VF, 4Z1DZ, 4Z4KX, 4Z5MU, 4Z5LA)
Donor: CWOps

SPECIAL AWARDS

World SSB/CW Combined
Juan Hidalgo, EA8R
24,349,929
Donor: Hrane Milosevic, YT1AD

U.S.A. SSB/CW Combined
Robert L. Shohet, KQ2M
13,324,236
Donor: Bob Shohet, KQ2M

Europe SSB/CW Combined
Richard Tucek, OM7RU
5,403,595
Donor: World Wide Radio Operators Foundation

Triathlon Award - World RTTY/SSB/CW Combined
Yuri Onipko, VE3DZ
20,390,645
Donor: DX Lodge Roatan (HQ9X)

Triathlon Award - Europe RTTY/SSB/CW Combined
Andrius Ignotas, LY7Z
15,540,569
Donor: Bavarian Contest Club – DL8WPX Memorial

World Combined SSB/CW Score 16Ø Meters
NP2J (Opr.: Daniel Flaig, K8RF)
232,644
Donor: Team IB9T/IR9Y - IT9ZGY Memorial

World Combined SSB/CW Score
Multi-Operator Multi-Transmitter
PJ2T (Oprs.: WØCG, NN3W, KL2A, G4BVY, G4XUM, M5RIC, K8PGJ, N2BA, ND8L, K1EP, NG7M, KO8SCA, YO8WW, AC6ZM, N6AA, WI9WI, VE4GV)
57,162,464
Donor: Friends and Family of Gene – N2AA Memorial

CLUB

U.S.A. SSB/CW
Frankford Radio Club
4Ø7,77Ø,996
Donor: Northern California Contest Club

DX SSB/CW
Bavarian Contest Club
278,153,499
Donor: John Rodgers, WE3C

*Second Place

Table 1

Total Op Hrs	AF	AS	EU	NA	OC	SA	Total	% of all
0.1-5	1	144	306	331	22	26	830	15.3
5.1-10	6	155	512	382	22	22	1,099	20.2
10.1-15	2	133	505	312	18	24	994	18.3
15.1-20	5	88	452	261	11	11	828	15.3
20.1-25	3	92	364	197	11	10	677	12.5
25.1-30	2	58	201	110	6	9	386	7.1
30.1-35	2	56	249	142	6	11	466	8.6
40.1-45	2	10	62	31	4	5	114	2.1
45.1-48	0	5	20	9	0	0	34	0.6
Total	23	741	2,671	1,775	100	118	5,428	

Median for all logs – 13.9 hours
*SOAB entries only

Table 1. Total number of SOAB logs by operating time and continent.

2021 CQWW DX CW TOP SCORES

WORLD
SINGLE OPERATOR
HIGH POWER
All Band
TI7W (N6MJ).....16,102,800
CR6K (CT1ILT).....12,055,652
N5DX (@N2QV).....10,090,280
VE2IM (VE3DZ).....8,339,100
VY2TT (K6LA).....8,035,280
VY2ZM (K1ZM).....7,865,424
EA6FO (EA3M).....7,577,968
W1KM.....7,479,282
KQ2M.....6,595,160
CF3A (VE3AT).....6,350,676

28 MHz
PR5B (PY2LSM).....751,940
PY2YU.....316,134
OA4O (EA7TN).....287,056

21 MHz
PX2A (PY2BK).....1,225,431
5Z4VJ (G3AB).....1,074,502
4Z4AK.....729,864

14 MHz
OH8X (OH6UM).....1,102,304
UPØL (UN9LW).....945,345
DMØA (DK3DM).....873,216

7 MHz
KP2M (KT3Y).....1,392,000
UP4L (UN7LZ).....1,371,534
EY8MM.....1,247,376

3.5 MHz
4L/LY4ZZ (LY2BMX).....648,733
K2ZW (JO1RUR).....387,226
OHØTA (OH2TA).....382,916

1.8 MHz
NP2J (K8RF).....190,848
VE3ZI.....149,876
R3XA.....68,796

LOW POWER
All Band
V26K (AA3B).....11,459,091
EA8RM.....10,918,560
VP9I (N6GQ).....5,040,460
IY3A (IZ3EYZ).....3,347,729
HC2AO.....3,220,700
LY4L.....2,725,757
KØEJ.....2,538,729
4U1A (HB9RB).....2,146,428
OL5Y.....1,919,152
N4TZ.....1,897,198

28 MHz
PY2EX.....180,705
EA3NO.....63,570
JT1CO.....30,228

21 MHz
FR4KR (FR8UA).....509,232
LS2D (LU1DJX).....461,160
EC7R.....204,156

14 MHz
4L2M.....491,840
C56XA (G3XAQ).....422,928
PY2NY.....371,228

7 MHz
VK9DX.....560,959
RX1A.....306,204
EU2F.....306,016

3.5 MHz
CO2JD.....112,608
OM3ZWA.....103,923
UN7LDR.....82,244

1.8 MHz
YT8A.....78,988
OM5NL.....64,255
HI3AA.....36,960

QRP
All Band
PZ5CO (RA3CO).....4,187,771
3V8SS (KF5EYY).....2,063,608
S5ØA.....1,297,660
KR2Q.....888,998
LY5G.....597,870
OK7CM.....450,840
N3CZ.....449,350
JH1OGC.....361,944
DL1JDQ.....342,954
JR4DAH.....311,520

28 MHz
VR2T (VR2ZQZ).....69,651
EA5Y.....16,281
DG3T (DF5RF).....4,130

21 MHz
LZ2RS.....71,944
UT5EOX.....42,840
JQ1NGT.....40,588

14 MHz
US5VX.....87,668
NK3U.....87,300
EA2CAR.....63,714

7 MHz
E77T.....90,432
IW3ILM.....35,928
AC2YD.....33,046

3.5 MHz
E77Y.....63,217
OK1FKD.....16,830
SM6DOI.....16,695

1.8 MHz
DL1AOB.....14,681
HA1TI.....8,568
YT2T.....6,364

ASSISTED
HIGH POWER
All Band
P44W (W2GD).....11,884,950
ZF5T (ZF9CW).....9,024,639
K5ZD.....8,943,750
TO7A (UT5UGR).....8,616,426
K1ZZ.....8,145,450
VA2WA.....8,080,182
4X6FR.....7,939,968
K3WW.....7,359,330
ERØDX (UT5UDX).....7,068,072
AA1K.....6,951,717

28 MHz
LU2DX.....670,473
VR2XAN.....265,306
VK4SN.....195,225

21 MHz
ZY5T (PP5KR).....1,213,950
CR2X (OH2GEK).....989,010
9A3TR.....806,607

14 MHz
ED8W (EA1DAV).....1,154,264
YT3X.....1,104,928
HGØY (HA7GN).....896,289

7 MHz
V3X (K4XS).....1,253,440
S52AW.....1,038,606
S51YI.....949,268

3.5 MHz
9A6A.....568,282
RD8D (R9GM).....527,202
OMØM (OM3CGN).....519,420
YL3CW.....519,384

1.8 MHz
9A5W.....240,350
LY7M.....226,904
YL3FT.....211,310

ASSISTED
LOW POWER
All Band
P3AA (RN3QO).....6,046,456
R8CT.....3,896,280
9A2EU.....3,062,748
UT4LW.....2,854,645
OE2S (OE2VEL).....2,646,952
SN7O (SP7IVO).....2,628,285
UW6E (UR6EA).....2,438,289
DJ5MO.....2,412,860
DJ4MX.....2,409,584
PA9M.....2,185,920

28 MHz
PX5M (PP5BT).....205,308
4F3BZ.....122,775
IR9K (IT9BXR).....72,944

21 MHz
HK3RD (HK3TU).....581,276
CO8LY.....435,996
PY2WH.....354,688

14 MHz
RA9AP.....501,819
GW5R (GW3YDX).....489,216
UR7GO.....468,625

7 MHz
OL9R (OK6RA).....591,712
UA9CTT.....410,312
UA9W.....356,278

3.5 MHz
UX2X (UT2XQ).....307,280
YT5DM.....206,030
M6W (G3WW).....161,116

1.8 MHz
HAØHV.....92,224
SP2EWQ.....85,095
E79D.....82,004

ASSISTED
QRP
All Band
DM2M (DK3WE).....1,627,480
ON6NL.....1,034,450
LZ6O (LZ3DX).....737,702
KP4AA.....645,344
US3EO.....508,431
K8ZT.....415,820
TM7Y (F8BDQ).....412,920
MW9W (GWØKRL).....410,225
M7R (GØTPH).....372,912
HG5O (HA5OB).....370,735

28 MHz
4I1EBC.....64,113
LT7D (LU7DZ).....49,056
YT2RX.....8,544

21 MHz
SP7M.....60,960
HA3JB.....59,040
CT9/MØBLF.....43,656

14 MHz
EF3O (EA3O).....263,664
RT4W.....148,292
DL1EFW.....131,040

7 MHz
EA5DF.....150,892
M3A (MØUKR).....104,178
HA4FY.....45,738

3.5 MHz
HA6FQ.....129,948
OL4W (OK1IF).....122,304
SP5ES.....58,044

1.8 MHz
OL1A (OK1CW).....55,708
IKØXBX.....19,530
US1UP.....18,338

MULTI-OP
SINGLE TRANSMITTER
High Power
P33W.....23,465,442
LZ5R.....15,150,240
PJ4A.....14,785,245
TM6M.....14,715,348
W3LPL.....14,233,680
IR4M.....13,497,792
K1LZ.....13,441,032
OM7M.....13,349,390
ZF1A.....12,380,560
E7DX.....12,333,750

Low Power
FY5KE.....10,398,990
CR3X.....9,440,051
UN4Q.....5,879,500
DP7D.....5,034,042
E7CW.....4,397,645
SX9V.....3,807,069
V31MA.....3,792,492
IO3F.....3,717,888
PY3CW.....3,608,252
K1XM.....3,546,447

MULTI-OP
TWO TRANSMITTER
CR3DX.....31,115,616
PJ4K.....27,498,782
KC1XX.....17,591,384
ES9C.....16,974,906
UA4M.....12,893,463
ED1R.....12,669,750
K9CT.....11,848,431
NP4Z.....11,633,400
N4WW.....11,145,765
HG7T.....11,135,828

MULTI-OP
MULTI-TRANSMITTER
CR3W.....36,547,042
PJ2T.....27,176,800
TKØC.....24,945,742
3B8M.....23,263,935
K3LR.....21,666,486
M6T.....19,115,393
LZ9W.....18,651,576
NR4M.....16,390,766
OL3Z.....16,257,684
DFØHQ.....16,242,592

EXPLORER
SINGLE-OP
9G5FI.....5,094,778
RL6M.....2,437,624
LT6M.....1,716,975
OP5T.....1,291,806
OH2XX.....910,140
HB9CVQ.....808,752
W6CZ.....121,912
RUØLL.....73,710
KB2S.....34,625
YO2GL.....16,936

EXPLORER
MULTI-OP
RWØA.....22,823,619
RM9A.....19,537,012
W9SN.....10,080,180
EA4KD.....9,278,269
9H6A.....3,019,275
RT4D.....2,932,900
IQ4RN.....1,814,472
DQ6ØANT.....922,875
SN6E.....862,638
W5NN.....601,236

ROOKIE
High Power
LB5GI.....490,471
ED2B (EA2ESB).....480,754
W4SSF.....443,256
KD9PLD.....364,180
AC3LZ.....110,143
DM2HK.....91,512
SP6MAA.....23,424
VA6BGE.....13,392
W6DMW.....10,010

Low Power
LS2D (LU1DJX).....874,551
EU1VA.....759,610
OK5MAX.....580,890
VA3OKG.....443,520
EA4HKF.....173,964
UBØAZR.....119,441
SQ5VCO.....104,650
IR4Q (IU4MRU).....79,734
ZS6KVZ.....58,608
N3AML.....57,986

CLASSIC
High Power
K1DG.....3,547,492
VA2EW.....3,226,264
OHØZ (OH6EI).....2,949,753
G9W (MØDXR).....2,774,376
UA9MA.....2,683,878
IR1G (IZ1LBG).....2,669,224
WH7T (WH7W).....2,518,999
W4CB (W2RU).....2,414,160
PS2T (PY2ZEA).....2,373,555
W1WEF.....2,357,783

Low Power
VP9I (N6GQ).....2,935,723
4U1A (HB9RB).....2,146,428
N8II.....1,341,780
EI7EE (OZ2I).....1,150,253
ON4CT.....1,013,498
UW8SM.....953,544
RA9SF.....854,441
EC3A.....756,945
WQ5L.....704,536
OK1TA.....683,235

YOUTH
High Power
YTØC.....2,782,500
SA6NIA.....209,019
IR1N (IU1LCU).....157,950
R5CA.....150,336
EI8KW.....118,320
JR2KHB.....114,882
KE8HBV.....85,932
W7AOF.....51,182

YOUTH
Low Power
DJ4MX.....2,409,584
LY5AX.....601,868
IU4FNO.....478,800
DB5DY.....278,239
SP5WAZ.....155,448
YD2UWF.....123,695
VE3OMV.....73,872
IUØLJD.....69,440
JI1UPL.....61,620
YO2NWW.....47,472

achieved a tremendous score of 31.1M. The MM giants were dominated by the effort of CR3W, beating the PJ2T group with a final score of 36.6M. The U.S. presence was alive and well with the K3LR group back on the air again as a MM, placing fifth in the world and first in the U.S. at 21.7M.

A well-deserved set of kudos go out to those of you who participated in our new overlays: Youth and Explorer. As a reminder, the Explorer overlay has been created to allow amateurs to competitively participate in the CQWW Contest while experimenting creatively with internet-linked stations and other new technologies. The goal is to encourage innovation in operating strategies, station design, and technology adaptation.

It was exciting to see first-time Youth entry Janko, YTØC (YU3EEA), handily win the HP category with a final tally of 2.9M and Sven, DJ4MX, top the LP list with score of 2.4M. Our Explorers were out in force as 22 entries checked out the new category won by 9G5FI (SO) and RWØA (MO).

Finally, congratulations to this year's club winners — the Frankford Radio Club (U.S.) and the Bavarian Contest Club (DX). The number of club entries continues to grow as we received entries from 74 U.S.-based groups and 211 DX organizations. The criteria for being a valid club entry is simple: Any group with

UNITED STATES

SINGLE OPERATOR
HIGH POWER
All Band
N5DX (@N2QV).....10,090,280
W1KM.....7,479,282
KQ2M.....6,595,160
N2IC.....5,757,054
NN7CW.....5,314,569

28 MHz
W4DD.....24,420
K4WI.....20,591
KJ9C.....13,965

21 MHz
N5AW.....537,180
KU2M.....507,702
K2SSS.....358,730

14 MHz
W7WA.....455,295
N7TU.....422,890
W6YA.....389,532

7 MHz
N2MF.....864,912
W7RM (N6TR).....663,375
NN1N.....572,859

3.5 MHz
K2ZW (JO1RUR).....387,226
W3BGN.....163,125
K9ZO.....161,200

1.8 MHz
WF2W.....41,625
W5ZN.....33,291
N4XD.....18,711

LOW POWER
All Band
KØEJ.....2,538,729
N4TZ.....1,897,198
K4OAQ.....1,424,505
K1VUT.....1,348,704
N8II.....1,342,920

28 MHz
K8FF.....9,108
N4HA.....4,968

21 MHz
WB4TDH.....201,480
W1MU.....122,520
W8JGU.....70,914

14 MHz
WA7BNM.....93,100
N6MA.....76,410
W2TZ.....63,578

7 MHz
W3EF.....138,990
WA1FCN.....137,830
W1NN.....102,960

3.5 MHz
W3LL.....69,635
NGØC.....10,620

1.8 MHz
WD8DSB.....1,656

QRP
All Band
KR2Q.....888,998
N3CZ.....449,350
W6JTI.....278,710
NDØC.....203,625
WB2CPU.....125,741

21 MHz
KW7R.....15,488
KH6KG/W5.....8,060
KF4AV.....5,838

14 MHz
NK3U.....87,300
K2GMY.....15,876
N1AIA.....15,372

7 MHz
AC2YD.....33,046
N5ER.....16,640

3.5 MHz
WØCW.....9,844
KQ2RP.....3,280

ASSISTED
HIGH POWER
All Band
K5ZD.....8,943,750
K1ZZ.....8,145,450
K3WW.....7,359,330
AA1K.....6,951,717
N3RS.....6,413,205

28 MHz
N6SS.....24,217
KU5B.....12,430
K5FP.....6,396

21 MHz
WB9Z.....438,087
N7AT (K8IA).....360,503
N4ZR.....304,260

14 MHz
W8AV.....445,704
W2UP.....298,112
N5YT.....262,636

7 MHz
NA3M.....871,998
W1VE.....593,640
WA3C.....429,918

3.5 MHz
K9GS.....293,733
W3NO.....170,496
WA1T.....147,196

1.8 MHz
N1PGA.....26,122

K2KW.....17,608
W8UVZ.....15,870

ASSISTED
LOW POWER
All Band
KS1J.....2,042,975
NF3R.....1,837,374
W3KB.....1,710,345
W1QK.....1,610,308
N1EN.....1,476,540

28 MHz
NJ4Q.....1,612

21 MHz
W9XT.....231,012
N3UA.....123,318
WF7T.....72,800

14 MHz
K4FN.....47,544
K2RK.....45,153
N2EIM.....27,477

7 MHz
AA4NP.....54,684
KØXP.....54,611
W4RN.....48,925

3.5 MHz
N4IJ.....81,782
WB2AA.....48,380
KU1N.....20,060

1.8 MHz
K4YJ.....2,790

ASSISTED
QRP
All Band
K8ZT.....415,820
KR4AE.....104,139
N4NM.....41,846
KA4RRU.....15,288
KG7CW.....11,900

21 MHz
KG1E.....11,776

14 MHz
W2VRK.....21,483
K9AXT.....9,486

3.5 MHz
N6MZ.....1,886

MULTI-OP
SINGLE TRANSMITTER
High Power
W3LPL.....14,233,680
K1LZ.....13,441,032
W2FU.....9,683,139
K9RS.....7,498,491
K8AZ.....7,295,499

Low Power
K1XM.....3,546,447
NJ4P.....2,350,560

K1RQ.....398,970
KT4XA.....206,114
W1FM/6.....9,424

MULTI-OP
TWO TRANSMITTER
KC1XX.....17,591,384
K9CT.....11,848,431
N4WW.....11,145,765
K1RX.....11,126,227
ND7K.....8,072,136

MULTI-OP
MULTI-TRANSMITTER
K3LR.....21,666,486
NR4M.....16,390,766
K1TTT.....13,880,754
KØRF.....8,302,584
K1KI.....6,995,950

EXPLORER
SINGLE-OP
W6CZ.....121,912
KB2S.....34,625
N1RBD.....3,977

EXPLORER
MULTI-OP
W9SN.....10,080,180
W5NN.....601,236

ROOKIE
High Power
W4SSF.....443,256
KD9PLD.....364,180
AC3LZ.....110,143
W6DMW.....10,010

Low Power
N3AML.....57,986
W1VKE.....34,404
KD9OIN.....11,520
KD2SGM.....9,063
W7VC.....6,815

CLASSIC
High Power
K1DG.....3,547,492
W4CB (W2RU).....2,414,160
W1WEF.....2,357,783
K2NV.....1,916,112
K9MA.....1,569,006

Low Power
N8II.....1,341,780
WQ5L.....704,536
N1DC.....670,677
K1HT.....667,926
WB8JUI.....507,863

YOUTH
High Power
KE8HBV.....85,932
W7AOF.....51,182

Low Power
KG5HVO.....35,061

Table 2A

Category	AF	AS	EU	NA	OC	SA	ALL	% of Total Logs
SOAB High Asst	2	141	655	701	18	19	1,536	26.8
SOAB High U	5	155	277	248	26	13	724	12.6
SOAB Low Asst	4	126	700	347	20	41	1,238	21.6
SOAB Low U	10	285	868	427	28	37	1,655	28.8
SOAB QRP Asst	1	7	59	14	2	3	86	1.5
SOAB QRP U	1	27	112	38	6	5	189	3.3
Explorer M	0	2	6	2	0	0	10	0.2
Explorer S	1	1	6	3	0	1	12	0.2
Multi-2	1	13	23	19	3	2	61	1.1
Multi-Multi	2	6	13	12	2	1	36	0.6
Multi-Single High	0	22	66	32	1	2	123	2.1
Multi-Single Low	2	19	31	6	5	5	68	1.2
ALL	29	804	2,816	1,849	111	129	5,738	100.0
% by Continent	0.5	14.0	49.1	32.2	1.9	2.2	100.0	

Table 2A. Number of All Band / Multi-Op entries by category and continent

Table 2B

Type	AF	AS	EU	NA	OC	SA	Total
Assisted	30.4	37.0	52.9	59.8	40.0	53.4	52.7
Non-Assisted	69.6	63.0	47.1	40.2	60.0	46.6	47.3
Total Logs	23	741	2,671	1,775	100	118	5,428

Table 2B. % split between Assisted / Non-Assisted SOAB logs by continent

2021 CQWW DX CW BAND-BY-BAND BREAKDOWN — TOP ALL BAND SCORES

Number groups indicate: QSOs/Zones/Countries on each band

WORLD SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
TI7W	474/14/47	1431/26/79	3039/29/101	2899/35/102	2923/31/94	534/17/25
CR6K	597/15/62	1367/20/74	2594/28/97	2064/33/91	2138/34/92	929/25/75
*V26K	263/12/41	1145/16/73	2232/26/96	2071/31/94	2091/30/91	323/15/44
*EA8RM	149/10/40	1004/18/64	1849/24/79	1309/22/67	2027/25/75	1219/23/69
N5DX	179/18/52	1041/27/85	1867/35/98	1695/28/91	1153/26/90	67/17/29

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
N5DX	179/18/52	1041/27/85	1867/35/98	1695/28/91	1153/26/90	67/17/29
W1KM	208/15/48	1087/23/72	1175/27/87	1119/28/89	1153/26/92	60/13/23
KQ2M	100/12/45	544/18/69	1146/26/88	1151/33/96	1250/30/104	64/17/34
N2IC	37/16/20	194/23/59	1428/34/89	1213/32/94	1043/29/90	84/15/33
NN7CW	86/14/38	376/18/64	1270/23/82	1149/27/87	1103/25/84	26/9/10

WORLD SINGLE OPERATOR ASSISTED ALL BAND

P44W	328/18/59	825/22/81	1377/32/113	1083/33/107	1571/32/108	880/20/61
ZF5T	535/17/64	844/25/82	1065/31/103	1510/35/104	1848/34/103	158/15/28
K5ZD	124/16/58	564/25/87	1311/32/111	1417/32/113	1110/29/115	77/19/38
TO7A	235/13/41	896/22/70	1825/28/92	1634/30/95	1725/27/84	358/20/37
K1ZZ	92/16/53	500/27/93	1354/34/116	1616/32/116	456/30/115	72/18/40

USA SINGLE OPERATOR ASSISTED ALL BAND

K5ZD	124/16/58	564/25/87	1311/32/111	1417/32/113	1110/29/115	77/19/38
K1ZZ	92/16/53	500/27/93	1354/34/116	1616/32/116	456/30/115	72/18/40
K3WW	69/14/46	495/22/86	1376/34/119	1395/31/111	770/27/101	51/18/29
AA1K	113/17/56	463/26/89	1050/33/112	1380/34/113	841/29/108	41/16/24
N3RS	60/13/44	452/23/83	1039/33/115	1007/33/111	905/28/111	47/18/29

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

P33W	421/21/80	1497/32/105	2846/37/131	2369/39/131	2159/36/129	399/30/87
LZ5R	181/19/73	1203/32/107	3183/38/137	2518/39/133	1804/37/133	175/29/87
PJ4A	150/16/50	925/25/82	1684/36/118	1732/36/110	1745/32/116	997/22/68
TM6M	178/18/74	1094/32/101	2513/37/130	2294/38/129	1857/37/130	355/27/78
W3LPL	73/21/70	1041/31/102	2150/39/128	1618/38/133	1433/33/124	57/22/54

USA MULTI-OPERATOR SINGLE TRANSMITTER

W3LPL	73/21/70	1041/31/102	2150/39/128	1618/38/133	1433/33/124	57/22/54
K1LZ	163/19/75	1099/28/100	2040/36/129	1266/36/124	1397/32/120	136/24/69
W2FU	102/17/54	763/26/93	1468/34/124	1292/37/124	1146/32/119	57/20/43
K9RS	61/17/49	451/26/92	1308/34/116	1165/35/118	923/30/117	31/18/29
K8AZ	64/17/54	505/26/88	1122/33/118	1191/34/118	828/31/117	42/20/41

WORLD MULTI-OPERATOR TWO TRANSMITTER

CR3DX	580/18/66	1419/29/91	3406/36/124	2743/38/121	3805/38/118	1553/30/89
PJ4K	473/18/64	1222/29/95	3901/37/125	3103/36/117	3210/34/116	815/21/65
KC1XX	197/20/69	1523/32/105	2199/38/126	2068/36/128	1768/32/124	155/24/63
ES9C	1047/23/82	2435/34/105	2733/39/133	2670/38/126	2059/36/127	324/28/78
UA4M	773/20/74	1827/33/103	2927/37/130	2029/38/124	1874/34/117	392/25/64

USA MULTI-OPERATOR TWO TRANSMITTER

KC1XX	197/20/69	1523/32/105	2199/38/126	2068/36/128	1768/32/124	155/24/63
K9CT	178/22/64	722/31/96	1675/37/121	1915/38/131	1276/32/120	133/19/38
N4WW	70/17/54	682/26/93	2045/37/126	1635/37/123	1220/32/119	106/16/37
K1RX	145/16/57	833/26/89	1499/29/105	2077/34/121	1375/29/104	91/19/38
ND7K	74/17/30	449/29/73	1625/38/116	1573/36/121	1223/34/113	88/16/25

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

CR3W	1073/18/67	2328/31/97	3480/37/126	3419/37/130	3089/38/129	1624/29/94
PJ2T	756/21/68	1717/27/91	3123/32/109	2999/36/109	3205/34/109	1187/25/75
TKØC	1970/20/82	3435/33/107	4698/36/130	3666/36/119	2719/37/125	877/27/89
3B8M	201/13/44	670/32/76	1915/35/108	2880/38/117	3302/37/125	1897/30/98
K3LR	493/23/74	1621/32/105	2674/38/134	2656/38/136	1901/35/130	405/25/64

USA MULTI-OPERATOR MULTI-TRANSMITTER

K3LR	493/23/74	1621/32/105	2674/38/134	2656/38/136	1901/35/130	405/25/64
NR4M	364/20/68	1281/31/101	2301/37/129	2218/36/126	1701/29/117	209/20/49
K1TTT	425/20/68	1110/29/98	1888/36/122	2010/36/120	1213/29/114	355/21/54
KØRF	186/21/48	408/30/86	1227/37/117	1963/36/117	980/34/118	106/18/34
K1KI	90/15/54	499/25/90	1244/33/114	984/34/107	987/30/105	65/17/26

Often confused with a NASA ground control operation, here is the TI7W station that Dan, N6MJ, steered to a solid #1 World SOAB win!

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
CR6K	597/15/62	1367/20/74	2594/28/97	2064/33/91	2138/34/92	929/25/75
EA6FO	498/12/51	1488/19/71	2276/28/83	1996/31/78	1438/26/76	374/15/46
YR8D	554/12/53	1565/20/70	1108/27/84	1914/28/84	757/30/85	32/9/13
J42L	341/9/42	791/22/58	1675/24/79	1692/29/73	1057/31/75	104/18/39
G4BUO	255/12/42	580/14/56	1022/25/81	1039/27/77	662/26/67	105/14/41

EUROPE SINGLE OPERATOR ASSISTED ALL BAND

ERØDX	266/6/39	1561/25/86	1656/33/117	1552/35/110	1301/33/113	76/17/39
HA8A	380/13/60	670/21/74	1991/37/120	1064/34/109	642/36/117	115/25/58
SN7Q	290/17/65	1075/30/93	1009/35/115	1070/34/104	833/33/98	104/19/47
HG8R	285/17/60	716/26/82	1458/37/122	995/32/106	838/37/106	93/20/43
UW1M	94/10/48	614/19/76	2428/37/127	1489/34/108	751/33/105	112/22/42

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

LZ5R	181/19/73	1203/32/107	3183/38/137	2518/39/133	1804/37/133	175/29/87
TM6M	178/18/74	1094/32/101	2513/37/130	2294/38/129	1857/37/130	355/27/78
IR4M	130/20/76	902/31/100	2223/38/137	2395/39/135	1432/37/122	93/29/83
OM7M	244/23/86	1317/35/107	2208/38/135	2289/39/131	1305/38/126	83/27/81
E7DX	204/19/79	1057/34/106	2339/37/133	2057/38/131	1435/38/134	151/30/79

EUROPE MULTI-OPERATOR TWO TRANSMITTER

ES9C	1047/23/82	2435/34/105	2733/39/133	2670/38/126	2059/36/127	324/28/78
UA4M	773/20/74	1827/33/103	2927/37/130	2029/38/124	1874/34/117	392/25/64
ED1R	467/16/68	1408/29/95	2726/37/124	2339/34/109	2065/37/118	477/20/63
HG7T	519/17/68	1580/32/98	2364/37/129	2050/36/119	1136/36/111	108/20/48
SK3W	809/22/75	1467/33/97	2256/38/135	1944/35/117	1162/37/118	129/23/62

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

TKØC	1970/20/82	3435/33/107	4698/36/130	3666/36/119	2719/37/125	877/27/89
M6T	1320/18/75	2841/37/114	3741/38/137	2509/39/132	1409/37/122	514/28/92
LZ9W	1326/17/75	2269/36/114	3969/36/135	2949/39/130	1716/37/124	290/26/65
OL3Z	1231/16/67	2399/30/95	3435/37/135	2296/37/125	1335/37/117	288/27/81
DFØHQ	1251/19/80	2061/32/101	3596/38/142	2113/38/128	1199/37/125	328/27/81

TOP SCORES IN VERY ACTIVE ZONES

Zone 3

K6XX 2,950,973
K6NA 1,870,506
WJ9B 1,761,823
VA7ST 1,110,417
W7YAQ 1,054,620

Zone 4

CF3A (VE3AT) 6,350,676
VE3JM 6,012,744
N2IC 5,757,054
W9RE 5,233,512
N9RV 4,469,155

Zone 5

N5DX (@N2QV) 10,090,280
VY2TT (K6LA) 8,035,280
VY2ZM (K1ZM) 7,865,424
W1KM 7,479,282
KQ2M 6,595,160

Zone 14

CR6K (CT1ILT) 12,055,652
EA6FO (EA3M) 7,577,968
G4BUO 3,561,980
G9W (MØDXR) 2,774,828
MØX (MØRTI) 2,088,304

Zone 15

*IY3A (IZ3EYZ) 3,347,729
OHØZ (OH6EI) 2,963,072
OM7RU 2,917,980
*LY4L 2,725,757
IR1G (IZ1LBG) 2,669,224

Zone 16

EW2A 1,921,565
RD4F 1,637,820
R5AJ 1,575,180
UA6CC 1,422,891
EW1I 1,362,030

Zone 20

YR8D (YO8TTT) 5,142,790
J42L (N5ZO) 5,052,874
C4W (5B4WN) 3,097,192
YM7KA (TA7I) 1,847,040
4Z4AK 729,864

Zone 25

JH4UYB 4,541,460
JE6RPM (JH5GHM) 3,965,890
JO4JKL 3,767,720
JF2QNM 2,071,779
DS4EOI 1,560,287

*Low Power

Table 3

Call	Cont	Category	Raw QSOs	% Error Rate	Bad QSOs
VP9I (N6GQ)	NA	SOAB LP	5,014	0.84	42
W1KM	NA	SOAB HP	4,846	0.91	44
NN7CW	NA	SOAB HP	4,050	0.99	40
N2IC	NA	SOAB HP	4,031	0.79	32
OM7RU	EU	SOAB HP	3,360	0.98	33
LY4T	EU	SOAB HP	2,804	0.89	25
9N7AA (S53R)	AS	SOAB HP	2,280	0.88	20
VE6BBP	NA	SOAB HP	2,111	0.76	16
LB6GG	EU	SOAB LP	2,078	0.72	15
YL2VW	EU	SOAB HP	2,055	0.73	15
VA7ST	NA	SOAB HP	2,034	0.79	16
K8GL	NA	SOAB HP	1,853	0.70	13
RD4F	EU	SOAB HP	1,818	0.50	9
K6NA	NA	SOAB HP	1,645	0.85	14
SP1AEN	EU	SOAB LP	1,644	0.73	12
JI1RXQ	AS	SOAB LP	1,496	0.60	9
HB9ARF	EU	SOAB LP	1,422	0.84	12
K1GU	NA	SOAB HP	1,235	0.65	8
9A2EY	EU	SOAB LP	1,230	0.81	10
JH1QDB	AS	SOAB HP	1,165	0.77	9
R5AK	EU	SOAB HP	1,150	0.96	11
RA3NC	EU	SOAB HP	1,147	0.52	6
UA4AGT	EU	SOAB LP	1,124	0.80	9
EA3ICJ	EU	SOAB LP	1,114	0.54	6
SP7IIT	EU	SOAB HP	1,104	1.00	11
NAØN	NA	SOAB LP	1,070	0.19	2
VE3KP	NA	SOAB HP	1,045	0.96	10
G3ZGC	EU	SOAB HP	1,041	0.38	4
W7YAQ	NA	SOAB HP	1,010	0.59	6
S58MU	EU	SOAB LP	1,010	0.69	7
UD6M	EU	SOAB LP	1,006	0.80	8
G4DDL	EU	SOAB LP	1,005	0.80	8

Table 3. Single Operator accuracy leaders (>1,000 QSOs)

Table 4

Year	160	80	40	20	15	10	Total
2021	280	786	1,337	1,322	1,059	158	4,944
2020	278	873	1,350	1,367	1,133	213	5,213
2019	296	832	1,325	1,494	448	46	4,441
2018	290	791	1,382	1,485	402	16	4,367
2017	265	800	1,289	1,301	673	48	4,376
2016	257	747	1,175	1,247	672	78	4,175
2015	190	681	1,276	1,197	1,263	421	5,027
2014	180	557	1,104	1,090	1,268	1,399	5,598
2013	172	575	1,121	1,019	1,218	1,165	5,270
2012	193	601	1,016	1,058	1,193	852	4,913
2011	177	554	1,108	924	1,051	1,286	5,100
2010	246	744	1,181	1,147	905	169	4,392
2009	240	663	1,137	1,142	529	50	3,761
2008	244	691	1,043	1,133	284	21	3,415

Table 4. Number of total QSOs in CQWW CW per band by year (in '000s)

four or more entries can compete in this popular part of the CQWW contest.

Congratulations to everyone who participated and especially those who submitted your logs.

How Much Time Did You Operate in the CQWW CW Contest?

Well, the Single Ops backed off just a little in median operating time for the 2021 contest (See *Table 1*). Last year's metric of 14.7 hours dropped by 5.5% to a level of 13.9 hours, still impressive when you consider that half of us operated at least 29% of the total available hours in the contest. For many of you, I think you can break down a typical CQWW this way:

- Friday night: Operate the contest until you get tired. Sleep.
- Saturday AM: Work the high bands for a few hours.
- Saturday Afternoon: Run errands for XYL / partner.
- Saturday Evening: Work contest for an hour or two. Go out to eat with XYL / Partner. Return to contest. Sleep.
- Sunday Morning: Work the high bands.
- Sunday Afternoon: Watch TV with XYL / Partner in between an occasional hour here and there to operate.
- Sunday Evening: Eat quick dinner with XYL / Partner and finish last hour or two of contest.
- Sunday Evening after contest: Brief conversation with XYL / Partner; Pass out.

And, of course, there is that "special" group of 45+ hour ops. That train has long since left my station, but it's exciting to see 34 operators making that level of commitment (I will add that there were 51 last year!).

Which Category is Your Favorite?

The popularity of the Assisted category continues to grow as it has now become the dominant leader in all CQWW categories (see *Tables 2A* and *2B*). For example, when considering all assisted category groups, there were 2,860 entries vs. 2,568 unassisted logs. For the first time, more than half of this year's Single Operators used assistance, a 3% year-over-year increase from 2020. Use of assistance was particularly popular in North America and Europe, which is in striking contrast to Asia, where nearly 63% of entrants chose to be unassisted. As the sunspots light up the ionosphere, I expect this trend to continue.

Table 5

Entity	AS	EU	NA	OC	Total
BY	5	0	0	0	5
DL	0	2	0	0	2
E7	0	1	0	0	1
EI	0	1	0	0	1
I	0	4	0	0	4
JA	6	0	0	0	6
K	0	0	4	0	4
LY	0	2	0	0	2
SM	0	1	0	0	1
SP	0	1	0	0	1
UA	0	1	0	0	1
VE	0	0	1	0	1
YB	0	0	0	2	2
YO	0	1	0	0	1
YT	0	1	0	0	1
Total	11	15	5	2	33

Table 5. Total number of Youth entries received by entity / continent

Accuracy at its Finest!

Yet again, there were some standout accuracy champions in the CQWW. It's a true accomplishment to see incredible sub-1% results (see *Table 3*) with so many competitors. Whether you marvel at VP9I (op. N6GQ) only busting 42 QSOs out of 5,014 contacts or NAØN logging just two bad QSOs in a log of over 1,000 contacts, the results are equally impressive for everyone making this chart. Congratulations on a job well done!

Here Comes the Sun!

There's no debate that the CQWW contest is a QSO machine and the 2021 CW edition was no exception: ~4.9M QSOs (see *Table 4*). In fact, if you do the math, over the past 10 years (2011-2021), there have been approximately 53.4M QSOs made in the CQWW CW contest alone! That's 31 QSOs per second for all 480 hours of operation.

While the best is yet to come in Cycle 25, I'm happy to report that 10 meters is slowly coming back to life. A quick look at the peak years of Cycle 24 is the proof to that claim. Let's keep our fingers crossed for this fall being a banner year.

Some Youthful Entries

While the total number of youth overlay CW entries in this first year was a little disappointing, there was broad participation from around the world (see *Table 5*). For the 2021 CQWW as a whole, however, we received 136 entries — a decent overall showing for the first year of this new overlay category. Several of this year's youth participants submitted logs for both modes. It's fair to say that 100% of you were enthusiastic and excited to participate in this new approach in the CQWW contest.

I'm optimistic that participation will grow as the word continues to spread. You can help us by passing the word — at your club meetings, on email reflectors, social media and, yes, even "on the air." Enthusiasm breeds enthusiasm as we strive to support more youth activity in the world's largest contest.

Being Careless About Spots

I thought it would be helpful to provide some representative samples of busted callsigns that we found in this year's logs

Table 6

Real call	Bad spot	# QSOs made
TKØC	TK9C	62
	TKØK	8
	KØC	4
	AKØC	1
	EKØC	1
	TKØF	1
	TKØN	1
	TK1C	1
		Total – 79
UA4S	UA4I	55
	UA4H	8
	UA4SE	6
	UA4A	2
	UA4N	1
		Total – 72
RWØA	RMØA	16
	RW9A	10
	NWØA	4
	RWØW	3
	RUØA	3
	RW1A	2
	RWØT	2
	RWØI	1
	RWØAF	1
	RWØAE	1
	RWØAD	1
		Total – 44
ES9C	EI9C	73
	IS9C	8
	ES6C	5
	ES9CE	2
		Total – 88
JF1NHD	JF1NSD	56
		Total – 56
EE3M	EI3M	55
		Total – 55
VE7JH	VE7JS	47
		Total – 47
DFØHQ	DLØHQ	12
	DF1HQ	10
	DLØSQ	8
	DFØSQ	7
	DFØFQ	5
	DFØHMT	2
	DFØQH	1
		Total – 45
EA8RM	EA9RM	34
	EA8IM	11
		Total –45

Table 6. Representative sample of busted spots found in CW logs

Being an Explorer — The RWØA Contest Story

The successful performance of UCØB in the Multi-Distributed category in last year's CQWW WPX CW contest stimulated our Siberian team (Krasnoyarsk, RWØA; Novosibirsk, RC9O; Tomsk, R8IZ; Kemerovo, RT8U; and Prokopievsk, UA9UR) for another experiment. This time, we decided to try the new CQWW category for Multi-Multi stations — M/M Explorer. The new category promised new possibilities. Why not try it?

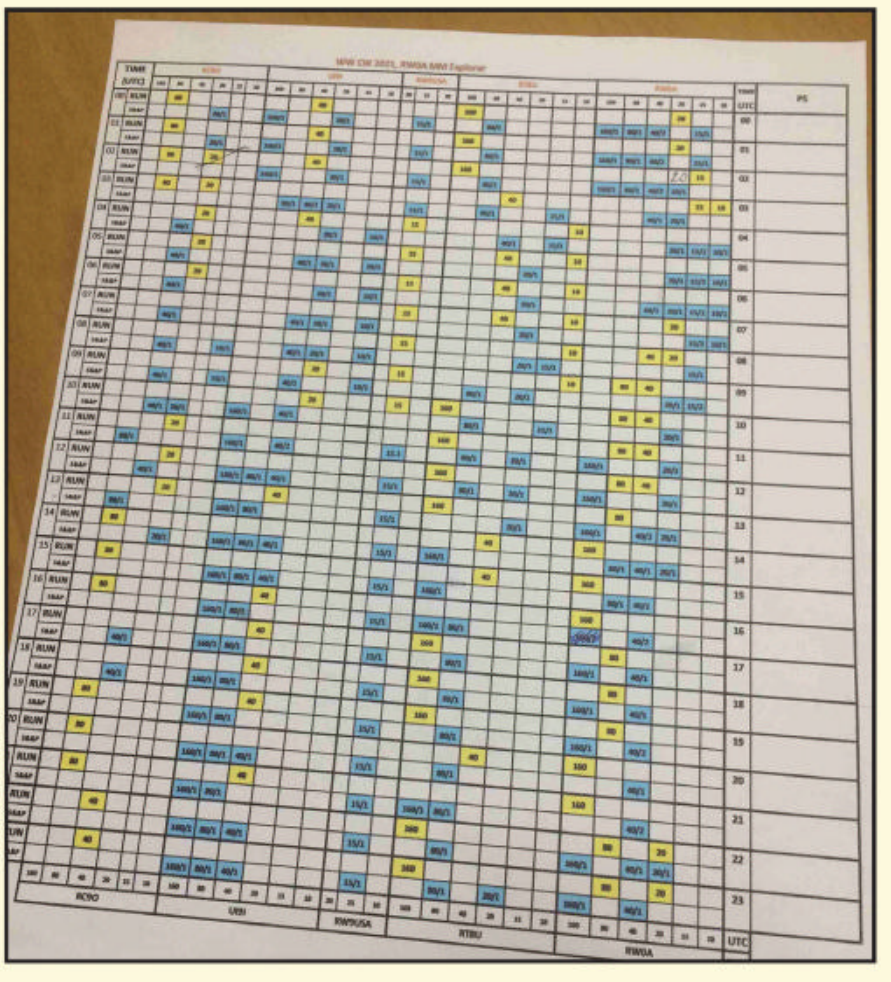
All the distributed team positions had improved their antenna setups during the summer. A simple analysis of spring contests showed that the number of participants from YB on 21 MHz become larger than the traditionally active group of JAs! At RWØA, we built a new 2x5-element Yagi stacked beam antenna fixed at 135°, to take advantage of all the YB signals coming into our QTH. We also installed another 2x5-element 21-MHz system fixed into the direction of Europe. The guys from RT8U built a Spitfire antenna for 80 meters, switchable to EU/AS. The team from UA9UR also improved their stacked beams for 21 and 28 MHz. Not to be outdone, RC9O used a large crane to repair his 3-element 160-meter antenna.

Explorer Team staffing the station from RWØA.

Even with all the station improvements, we were realistic about achieving a top score. We simply hoped to have a lot of fun operating in the Explorer category with a multi-QTH distributed team. This pushed us to prepare and participate in all of the contest action.

Similar to the CQWW WPX, we organized a DXLOG network of 17 computers along with a central server located in Kemerovo. Our band-by-band operating schedule for each QTH (RUN and S&P) was made based on propagation analysis and the review of our logs from previous CQWW contests. The concept remained the same — maximize the time of operation from RWØA on each band with a minimum of three transmitters simultaneously. We also utilized permitted networked resources such as KiwiSDR and WEBSDR for remote receiving and for our own signal checking, which helped us to move a RUN station from position to position and stay away from bad frequencies.

The first 10 hours of the contest were especially exciting. Our QSO summary rate did not go below 400 per hour and actually hit more than 500 per hour with more than 15 QSOs per minute a few times! The 40-meter band turned out to be very effective and was open almost all the time except for two hours on Sunday morning when the level of our signals in EU dropped to almost zero. The first night surprised us with good propagation on 20 meters. We logged NA stations for about 2 hours, which



Organizing five distributed Explorer teams across six bands and 24 hours from RWØA. Not an easy task!

is usually very rare. It was also unusual to see the QSO rate on the 80-meter band being nearly the same as 20 meters. The ionosphere was quiet for the whole contest, so we had good openings on the 21- and 28-MHz bands during daytime.

There is no contest without Mr. Murphy playing jokes on us. The team at Kemerovo had to repair a Beverage antenna during a cold night in the forest. One of the amplifiers became intermittent in Krasnoyarsk. Our team members in Prokopievsk were spending time fixing a high-voltage power supply. But every problem we encountered was successfully overcome by the team. In the end, we finished with 13,000 QSOs and 24M points on Monday morning!

Of course, we have lots of log data, but here is the rough distribution of QSOs for each station:

RWØA: 4,000 QSOs
R8IZ: 2,700 QSOs
RC9O: 2,550 QSOs
RT8U: 1,700 QSOs
UA9UR: 1,700 QSOs

Perhaps even more exciting was the fact that we had 27 Siberian operators participating on the "**Central Siberia DX Club**" team from five positions:

RWØA: RAØAM, RAØAAC, RØAI, RGØA, RMØA, RUØA, RUØAM, RVØAR, RWØAR, RZØAT, UAØAPV, UFØB
RC9O: RC9O, UA9PM, RA9P
R9IZ: R9IR, RM9I, RU9I, RC9HB, RC9HC
UA9UR: RW9USA, RV9UP, UA9UR
RT8U: RZ9UN, RK9UE, RA9USU, RX9UK

We hope it was not our last team effort. Thank you to all who called us and who answered our calls! Special thanks to the teams of CR3W and TKØC who stimulated us to concentrate and work harder!

– 73, Leonid, RAØAM, on behalf of the RWØA team

A Youthful CQWW

BY SVEN, DJ4MX (19 years old!)

CQWW CW Low Power Youth champion, Sven, DJ4MX, ready for action.

This past CQWW was my first serious entry in the world's best contest. It was a blast! Although having received my license in 2017, I officially fell in love with CW contesting just 18 months ago.

My initial strategy was to participate with a Multi-Op team. The plan was that my dad (DJ2MX) and I travel to Bosnia and join the Multi-Single team at E7DX. Unfortunately, we had to cancel the trip, so I decided to try out the new Youth overlay as a single operator from our home station in Munich after my dad found a local club station to use. With just a few days to go and the contest rapidly approaching, I was really motivated to get the best results possible. My goal was to operate more than 40 hours, even though I had never previously operated so many hours. But, before the contest even started, I unknowingly made the mistake of going into the contest with 15 hours of "awake time."

After the first 24 hours and having 1,200 QSOs in my log without a break, I was thrilled to see what was possible with 100 watts from our modest station. Additional motivation came from my real-time standing in the online scoreboard. As a result, I somehow got the crazy idea to operate the next 24 hours without a break! But, even at my young age of 19 years, it wasn't easy! Within just a few hours after my crazy idea began, I struggled to stay awake, hoping for sunrise and the expectation that daylight and new action on the high bands would keep my eyes open. My wish came true as the band was filled with JAs on 15 meters, keeping me really busy. However, the inevitable feeling of tiredness came again as I fell asleep a few times, albeit for only one or two minutes.

It turned out that the last four hours were the hardest, and especially the 35 minutes right before the end of the contest. At that point, I decided to stop, because I was simply too tired to get any new QSOs into my log. In the end, however, I logged almost 2,200 QSOs with my logging program showing an operating time of 47:26 hours, an accomplishment that makes me especially proud.

The new youth overlay is a great addition to the CQWW, and I really hope it gets more people of my age into CW operating and contesting overall. Thanks for a great contest and see you in the next one!

– 73, Sven, DJ4MX

CLUB SCORES

UNITED STATES

Club	# Entrants	Score
FRANKFORD RADIO CLUB	271	407,770,996
YANKEE CLIPPER CONTEST CLUB	250	370,916,531
POTOMAC VALLEY RADIO CLUB	256	189,861,299
SOCIETY OF MIDWEST CONTESTERS	175	87,903,698
SOUTHERN CALIFORNIA CONTEST CLUB	76	72,709,639
FLORIDA CONTEST GROUP	96	67,807,030
NORTHERN CALIFORNIA CONTEST CLUB	99	54,156,776
NORTH COAST CONTESTERS	22	54,073,386
ARIZONA OUTLAWS CONTEST CLUB	70	39,771,679
MINNESOTA WIRELESS ASSN	131	37,759,237
TENNESSEE CONTEST GROUP	50	31,910,518
SOUTHEAST CONTEST CLUB	49	28,838,318
CENTRAL TEXAS DX AND CONTEST CLUB	28	25,692,346
WILLAMETTE VALLEY DX CLUB	54	20,213,427
DFW CONTEST GROUP	41	17,737,700
MAD RIVER RADIO CLUB	30	16,378,060
ALABAMA CONTEST GROUP	30	15,884,909
NE MARYLAND AMATEUR RADIO CONTEST SOCIETY	36	14,777,587
BAY AREA DXERS	17	14,564,287
GRAND MESA CONTESTERS OF COLORADO	36	14,221,240
HUDSON VALLEY CONTESTERS AND DXERS	33	12,823,759
WESTERN WASHINGTON DX CLUB	49	12,791,964
SWAMP FOX CONTEST GROUP	26	11,431,180
CAROLINA DX ASSOCIATION	27	11,172,920
KENTUCKY CONTEST GROUP	24	9,401,579
NIAGARA FRONTIER RADIOSPORT	22	8,489,032
GEORGIA CONTEST GROUP	5	7,590,051
SPOKANE DX ASSOCIATION	26	6,497,770
KANSAS CITY CONTEST CLUB	14	6,299,259
BIG SKY CONTESTERS	7	6,092,283
TEXAS DX SOCIETY	15	5,036,406
THE VILLAGES AMATEUR RADIO CLUB	16	4,067,968
DEEP DIXIE CONTEST CLUB	12	3,410,596
ROCHESTER (NY) DX ASSN	20	3,315,558
CWOPS	11	3,185,108
NORTH TEXAS CONTEST CLUB	8	3,181,429
CTRI CONTEST GROUP	10	3,015,399
HILLTOP TRANSMITTING ASSN	5	2,770,354
ARKANSAS DX ASSOCIATION	9	2,605,417
NORTH CAROLINA DX AND CONTEST CLUB	7	2,529,857
SILVER SPRINGS RADIO CLUB	7	2,477,214
BRISTOL (TN/VA) ARC	12	2,149,655
LOUISIANA CONTEST CLUB	5	1,858,218
NORTHEAST WISCONSIN DX ASSN	7	1,779,098
IOWA DX AND CONTEST CLUB	4	1,555,877
FORT WAYNE RADIO CLUB	6	1,404,188
MILFORD OHIO AMATEUR RADIO CLUB	4	1,337,064
MOTHER LODE DX/CONTEST CLUB	13	1,075,694
KANSAS CITY DX CLUB	7	1,022,235
MERIDEN ARC	12	969,594
SOUTH JERSEY RADIO ASSOCIATION	8	957,908
BELLBROOK AMATEUR RADIO CLUB	6	846,494
CENTRAL VIRGINIA CONTEST CLUB	4	667,945
SOUTHWEST OHIO DX ASSOCIATION	7	517,459
METRO DX CLUB	9	491,973
MISSISSIPPI VALLEY DX/CONTEST CLUB	6	480,309
SKYVIEW RADIO SOCIETY	5	450,775
NEW PROVIDENCE ARC	7	450,104
HEARTLAND DX ASSOCIATION	7	407,237
GREAT PLACES CONTEST CLUB	4	383,541
PORTAGE COUNTY AMATEUR RADIO SERVICE	4	352,904
NORTHERN ARIZONA DX ASSN	5	256,341
ARC EMCOMM SRVC	7	201,742
PANHANDLE AMATEUR RADIO CLUB	4	189,493
ALEXANDRIA RADIO CLUB	4	153,921
REDWOOD EMPIRE DX ASSOCIATION	4	153,393
BOLINGBROOK ARS	5	116,416
LAKE AREA AMATEUR RADIO KLUB	5	91,387
STERLING PARK AMATEUR RADIO CLUB	4	70,258
UTAH DX ASSOCIATION	4	55,841
LONG ISLAND CW CLUB	5	28,266
OH-KY-IN ARS	4	22,080
NORTH SHORE RADIO CLUB IL	4	13,942
DOWNEY ARC, INC.	4	6,438

DX

Club	# Entrants	Score
BAVARIAN CONTEST CLUB	327	278,153,499
ITALIAN CONTEST CLUB	269	235,056,854
RUSSIAN CONTEST CLUB	130	156,872,655
EA CONTEST CLUB	94	146,376,317
RHEIN RUHR DX ASSOCIATION	168	133,767,930
CONTEST CLUB ONTARIO	103	108,603,466
BALTIC CONTEST CLUB	32	96,589,338
UKRAINIAN CONTEST CLUB	181	82,061,536
ARAUCARIA DX GROUP	72	71,544,438
CONTEST CLUB SERBIA	57	55,249,019
CLIPPERTON DX CLUB	27	53,297,454
CROATIAN CONTEST CLUB	61	51,931,579
BELOKRANJEC CONTEST CLUB	22	50,945,302
CONTEST CLUB FINLAND	56	46,904,745
KAUNAS UNIVERSITY OF TECHNOLOGY RADIO CLUB	56	38,388,482
LZ CONTEST TEAM	4	37,166,882
LU CONTEST GROUP	43	35,149,174
CONTEST CLUB BELGIUM	60	34,049,850
HA-DX-CLUB	18	32,419,199
LA CONTEST CLUB	13	32,063,479
SP DX CLUB	116	27,626,169
CHILTERN DX CLUB	26	26,044,175
SLOVENIA CONTEST CLUB	43	24,342,313
VK CONTEST CLUB	41	21,201,613
RIO DX GROUP	93	18,900,031
CZECH CONTEST CLUB	30	16,854,397
CONTEST GROUP DU QUEBEC	15	14,070,495
SOUTH URAL CONTEST CLUB	19	13,559,356
LATVIAN CONTEST CLUB	36	13,554,654
ORCA DX AND CONTEST CLUB	39	13,445,966
BELARUS CONTEST CLUB	31	12,944,628
CATALONIA CONTEST CLUB	25	12,319,383
URAL CONTEST GROUP	24	11,925,032
RSGB CONTEST CLUB	11	11,418,058
SIAM DX GROUP	23	10,560,938
NICOSIA CONTEST GROUP	4	10,385,416
5NNDXCC	35	10,280,120
CENTRAL SIBERIA DX CLUB	8	10,095,623
MARITIME CONTEST CLUB	16	9,786,894
RUSSIAN CW CLUB	60	9,395,298
599 CONTEST CLUB	18	9,118,325
BOSNIA AND HERZEGOVINA CONTEST CLUB	9	8,845,795
WEST SERBIA CONTEST CLUB	11	8,446,059
RTTY CONTESTERS OF JAPAN	4	8,333,160
DANISH DX GROUP	36	7,870,859
RADIO AMATEUR ASSOCIATION OF WESTERN GREECE	6	7,664,042
NORFOLK AMATEUR RADIO CLUB	13	7,340,880
ARCK	32	6,761,842
INTEREST GROUP RTTY	9	6,238,392
JSFC	4	6,159,002
ASSOCIACAO DOS RADIOAMADORES DO PARANA	10	6,098,997
THRACIAN ROSE CLUB	43	5,822,661
VU CONTEST GROUP	18	5,565,899
ARIPA DX TEAM	10	5,564,713
ARABIAN GULF DX GROUP	5	5,484,742
SKY CONTEST CLUB	4	4,913,906
EUROPEAN DX CONTEST CLUB	4	4,881,644
THREE A'S CONTEST GROUP	9	4,859,892
CS PETROLUL PLOIESTI	7	4,483,772
CE CONTEST GROUP	16	4,338,929
GIPANIS CONTEST GROUP	13	4,264,659
GMDX GROUP	9	3,889,761
RADIOSPORT MANITOBA	6	3,887,123
KEYMEN'S CLUB OF JAPAN	44	3,699,668
COCKENZIE AND PORT SETON ARC	6	3,586,290
SOUTHERN OSAKA CONTEST CLUB	11	3,563,084
WORLD WIDE YOUNG CONTESTERS	17	3,546,893
ORARI LOKAL KAB BOGOR	12	3,509,079
IRKUTSK RADIO CLUB	9	3,489,762
RADIOCLUBUL RADU BRATU	6	3,471,437
YB-LAND DXING PASSION IS	177	3,277,362
VERON A63 FRIESE WOUDEN	4	3,134,327
RADIO CLUB BUNSCHOTEN	5	2,833,168
ARKTIKA	14	2,809,128
CDR GROUP	39	2,739,356
VLADIMIR CONTEST GROUP	12	2,677,874
UNION FRANCAISE DES TELEGRAPHISTES	10	2,606,379
GUNMA CONTEST CLUB	9	2,564,348
VYTAUTAS MAGNUS UNIVERSITY RADIO CLUB	14	2,533,688
SASKATCHEWAN CONTEST CLUB	10	2,523,314
INDIOS DX TEAM	4	2,164,210
CABREUVADX	47	2,056,385
LITHUANIAN CONTEST GROUP	5	2,023,742
UA2 CONTEST CLUB	12	1,918,614
SHARKS DX TEAM	10	1,916,718
SP-CW-C	8	1,904,482
SANTIAGO DE CUBA CONTEST TEAM	4	1,839,194
CLUB DE RADIO EXPERIMENTADORES DE OCCIDENTE	6	1,786,914
IVANOVO DX CLUB	7	1,785,165
KOREA DX GROUP	6	1,763,126
SPANDAU DXERS	8	1,748,043
UBRO	8	1,711,397
RIIHIMAEN KOLMOSET	6	1,662,311
FUCHU AMATEUR RADIO CLUB	10	1,644,540
S51DSW	7	1,539,539
NORTHERN GREECE CONTEST TEAM	4	1,521,633
DE MONTFORT UNIVERSITY ARS	4	1,511,194
ZRHB	7	1,462,083
YU1ANO & YU1A CONTEST TEAM	13	1,408,682
OKAYAMA DX CLUB	10	1,408,539
VOT PZK	13	1,384,626
STOCKPORT RADIO SOCIETY	7	1,364,405
SAO PAULO CONTEST GROUP	8	1,335,548
599 DX GROUP	20	1,309,206
ALRS ST PETERSBURG	11	1,287,414
YB LAND DX CLUB	43	1,246,467
GUARA DX GROUP	13	1,099,964
LKK LVIV SHORTWAVE CLUB	15	1,073,219
RADIO CLUB VENEZOLANO CARACAS	7	1,032,921
SHAKHAN CONTEST CLUB	6	1,012,122
ALBERTA CLIPPERS	4	953,081
NOVOKUZNETSK RADIO CLUB	11	941,177
SK5AA VASTERAS RADIOKLUBB	15	938,837
JAPAN LID CLUB	4	924,735

Club	# Entrants	Score
DEBRECEN UNIVERSITY RADIO CLUB	4	864,001
HEREFORD AMATEUR RADIO SOCIETY	8	834,703
CSA STEAUA BUCURESTI	5	822,202
RU-QRP CLUB	16	798,630
KING'S LYNN AMATEUR RADIO CLUB	6	791,676
VERON A03 AMERSFOORT	6	785,402
UR-QRP-CLUB	12	772,916
GRUPO ARGENTINO DE CW	5	771,207
SK6AW HISINGENS RADIOKLUBB	7	770,722
ADMIRA ARAD	8	705,521
PEMBROKESHIRE CONTEST GROUP	7	695,610
NEWBURY & DISTRICT ARS	5	693,686
CWJF GROUP	5	692,597
VRZA VERENIGING VAN RADIO ZEND AMATEURS	5	689,331
JAPAN CONTESTER'S CLUB	4	640,637
YO DX CLUB	12	627,073
CSR BRAILA	8	621,403
CLUB RADIOAMATEUR VE2CWQ	6	621,080
SK6QA STENUNGSUND AMATEUR RADIO CLUB	6	616,239
YYP CLUB	6	608,284
UNIO DE RADIOAFECCIONATS DEL VALLES ORIENTAL	4	551,730
RADIO CLUB VENEZOLANO	4	544,248
R4F-DX-G	5	532,936
BAHIA DX GROUP	4	523,895
SWINDON & DISTRICT AMATEUR RADIO CLUB	4	522,919
KRIVBASS	7	521,491
MDXC	4	484,963
GERMAN DX FOUNDATION	6	484,561
VOLYN CONTEST GROUP	7	476,521
OBNINSK QRU CLUB	5	452,223
YB6_DX COMMUNITY	18	437,561
9M HF & DX CONTEST GROUP	6	428,839
CHILEAN PACIFIC DX GROUP	8	428,620
CMDXGROUP	14	411,162
FALCONS DX GROUP	13	391,654
BLACKWOOD & DISTRICT AMATEUR RADIO SOCIETY	4	388,086
SK6EI SKOVDE AMATORRADIOKLUBB	6	387,420
RADIO CLUB KVARNER RIJEKA	11	384,169
JUST FOR FUN CONTEST CLUB	8	356,914
NATIONAL CHILDREN'S PALACE	8	355,559
CSM BOTOSANI	6	346,674
CWSP	8	338,966
CS SATU MARE	4	337,055
RUSSIAN DIGITAL RADIO CLUB	7	327,051
MOSCOW RADIO CLUB	4	321,296
MEDITERRANEO DX CLUB	8	317,731
SHARP HAM CLUB	5	317,614
GRUPO DXXE	10	300,336
OK QRP KLUB	6	294,354
7A DX-CONTEST CLUB	10	290,486
LA-DX-GROUP	5	282,047
CSM CRAIOVA	6	281,569
LITTLE GUN CLUB	4	280,432
FIFTH OCEAN	5	274,652
GRIMSBY AMATEUR RADIO SOCIETY	4	271,399
SAYAN DX CLUB	6	268,561
PHILIPPINE AMATEUR RADIO LEAGUE	7	267,709
VFDB	4	255,610
GLOUCESTER AMATEUR RADIO & ELECTRONICS SOCIETY	4	254,558
HARWELL AMATEUR RADIO SOCIETY	4	242,342
YO3KEX	4	235,085
TDR	4	209,821
TORBAY ARS	6	209,461
CS SILVER FOX DEVA	5	185,345
MISSISSAUGA ARC	4	182,942
SP9PGE	4	172,204
TALL TREES CONTEST GROUP	6	161,339
DONBASS CONTEST CLUB	4	153,822
KOREA CONTEST CLUB	5	134,571
MUMBAI AMATEUR RADIO INSTITUTE	7	122,545
KIROVOGRAD REGION RADIO CLUB	4	110,790
SPORT CLUB MIERCUREA-CIUC	4	108,262
YB7-DX CLUB	15	106,891
LA4O	4	102,028
ECHELFORD ARS	4	99,238
DX2EVM SCAN INTERNATIONAL	6	95,686
TRAC	5	94,229
THE AKITA DX ASSOCIATION	7	91,987
SP9PBB	5	87,822
CSM CLUJ-NAPOCA	4	68,187
LOMZA AND DISTRICT RADIO SOCIETY CONTEST GROUP	4	67,484
IFM DX-TEAM	4	63,360
RADIO CLUB DE PANAMA	4	55,717
RADIO CLUB ETERNAUTAS	6	55,298
HAMILTON ON ARC (AGGREGATE)	5	55,259
DX1EVM SCAN INTERNATIONAL	5	47,315
G8AMC	4	44,930
ORARI LOKAL KEDIRI	18	44,594
SPDXT	5	34,934
ORARI LOKAL BOGOR	5	34,808
SATARA INSTITUTE OF HAMS	4	34,026
EDIT14	5	30,066
BOGOR DX CLUB	5	25,220
SINGLE FIGHTER DX GROUP	5	22,776
NORTHEAST RADIO GROUP	4	21,356
OLDHOUSERADIOCLUB	4	8,326
LABRE-RS	4	2,259

coming from bad Cluster spots (and the occasional RBN reporting error) (see *Table 6*). I'll admit, especially when you are in search & pounce (S&P) mode, that it's tempting to engage in the "click, work, next" mode of operating. What's missing? LISTEN! As with previous years, there were literally thousands of bad calls in submitted logs that came from logging a bad call on the screen vs. the one that was actually being used on the air. Taking a few extra seconds to listen and ensure you have it right is just good operating!

Some Thoughts From Your Director

Well, after countless hours of work, thousands of text and email messages, phone calls, Zoom sessions, and other methods of communicating, I'm happy to say the results for the 2021 CQWW contest season are now complete. I'm proud of the progress we have made as a committee in advancing the state of the art in log-checking as each year more progress is made to ensure the results that we publish are as accurate as possible. It's almost unfathomable to think of the days of paper logs and checking without computers. But we are still years away from simply hitting a magic function key to generate the results that you read each year. Manual intervention is inevitable as we strive to "get things right."

One piece of advice I can offer to everyone — experienced or not — is to be sure to read the rules as there are almost always a few updates from one year to the next. A significant number of warnings were issued to some entrants this year that came from their lack of reading and understanding the rules of the game.

As I mentioned in the SSB results, one of the ongoing challenges we face continues to be the lack of recording your audio during the contest as clearly stated in the rules for top competitors. My suggestion is to view this requirement as a tangible way to improve your operating skills vs. a burdensome act by the log-checkers. I learn something new every time I listen either to my own recordings or those of someone else. Don't put yourself in the position of being reclassified (or worse) if asked to supply this log-checking tool that we use, albeit on rare occasion, when needed.

Some Closing Words

Unfortunately, I only get two opportunities per year to publicly offer my sincere thanks to a special group of dedicated contesters — the CQWW Contest Committee. With respect and great pride I acknowledge the following members who helped produce the results you are reading: CT1BOH, José Nunes; EA4KD, Pedro Vadillo; ES5TV, Tonno Vahk; F6BEE, Jacques Saget; GØMTN, Lee Volante; HA1AG, Zoli Pitman; IK2QEI, Stefano Brioschi; JH5GHM, Katsuhiro (Don) Kondou; K1DG, Doug Grant; K1EA, Ken Wolff; K3LR, Tim Duffy; K3WW, Charles Fulp; K3ZO, Alfred A. (Fred) Laun, III; K5ZD, Randy Thompson; KR2Q, Doug Zwiebel; LA6VQ, Frode Igland; LU5DX, Martin Monsalvo; MØDXR, Mark Haynes; OH6LI, Jukka Klemola; PA3AAV, Gert Meinen; RA3AUU, Igor (Harry) Booklan; S5ØA, Tine Brajnik; S5ØXX, Kristjan Kodermac; UA9CDC, Igor Sokolov; VE3EJ, John Sluymer; VK2IA, Bernd Laenger; and YO3JR, Andrei (Andy) Ruse. Without a doubt, this is the best team in all of contesting!

As I finish writing these results, the Solar Flux Index is sitting at 101 (156 two weeks ago!). Indeed, the sun has come to life, creating great promise for another amazing CQWW this year. I hope to hear you on SSB on October 29th and 30th and CW on November 26th and 27th, 2022! *– 73, John, K1AR*

(Scores on page 94)

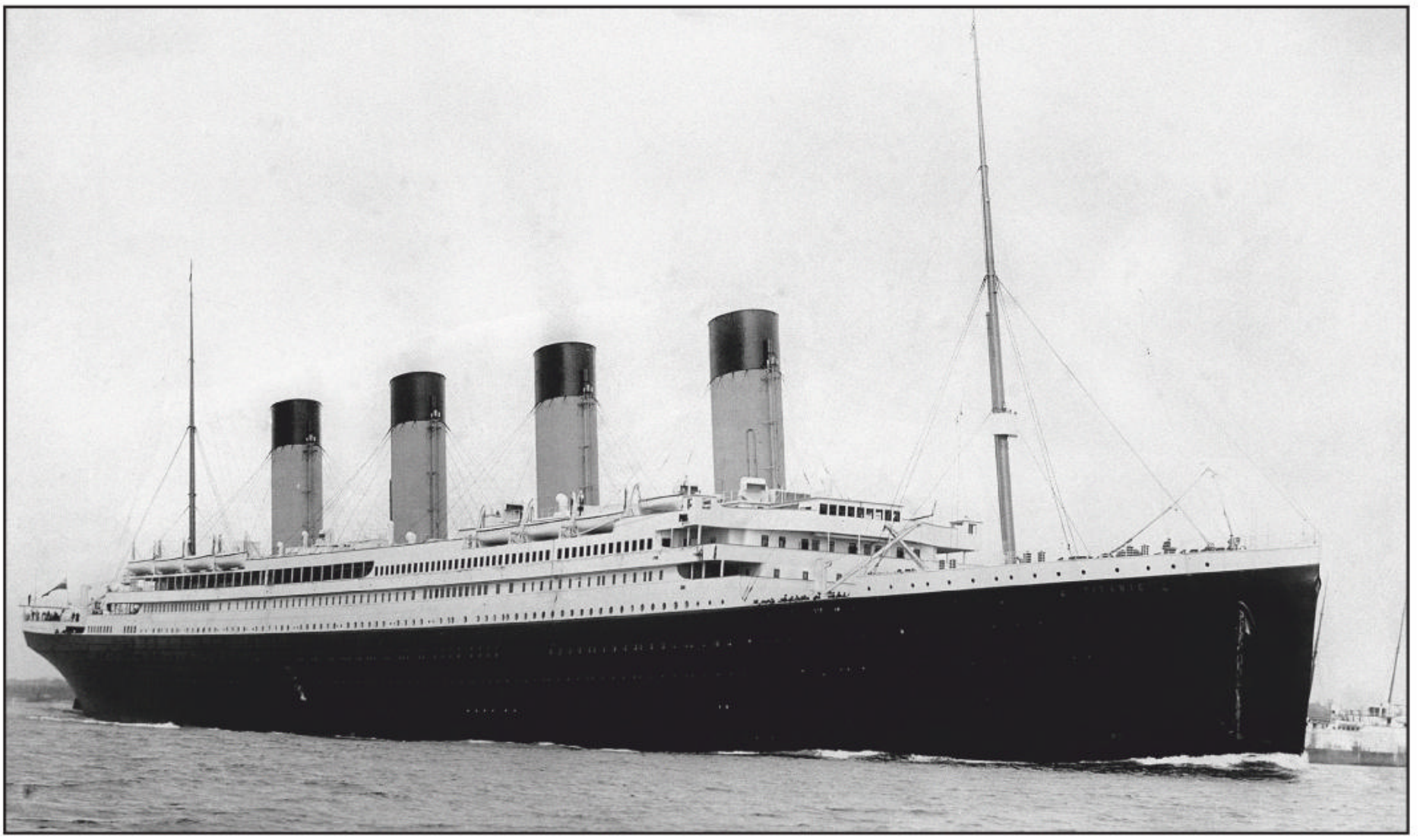


Photo A. The RMS Titanic departing Southampton on April 10, 1912. (Photo by John Parrot / Stocktrek images / GettyImages)

Two different distress calls, an arrogant radio operator and intense competition between cruise lines were among the issues that contributed to the sinking of the RMS Titanic in 1912 and the associated loss of life. Could the tragedy have been prevented? KA8TVY looks at the role of wireless in events leading up to the sinking and the efforts to save lives after the ship struck an iceberg.

CQD, SOS and the Sinking of the Titanic

Was the Tragedy Preventable?

BY HORACIO FALCIGLIA,* KA8TVY

Ham radio, our hobby, emphasizes the art of communication. Our art is unselfish and compassionate to others, and we mobilize quickly to help others in cases of emergencies such as tornados, hurricanes, floods, earthquakes. Our roots of service go back 110 years ago when the radio operators on the RMS Titanic helped to save 705 lives.

A recent article by Erin Blakemore in *National Geographic*[1] has corrected some misconceptions I had on that tragic event I would like to share it with my fellow hams. I am also motivated by a recent court ruling[2] by U.S. District Judge Rebecca Beach Smith in favor of RMS Titanic, Inc. (May 18, 2020) that paved the way to the future recovery of the Marconi telegraph from the wreck of the Titanic. The recovery was postponed until this year, due to financial, legal, and Covid pandemic factors. Yet numerous organizations — including the National Oceanic and Atmospheric Administration (NOAA) — are strongly opposed to the salvage plan. NOAA argues that the planned expedition violates an agreement between United States and the United Kingdom that ban commercial exploitation of the ship's remains. "The wreck is a recognized memorial to the 1,522 passengers who went down with the ship."

* *1256 Crestwood Ave.*
Cincinnati, OH 45208
Email:<Tandil@zoomtown.com>

"Just like a lion is much better appreciated in the wilds of the African savannas than it is stuffed in a museum, so too does the Marconi apparatus best tell its story and share its value where it is," wrote David Conlin, Chief of the U.S. National Park Service's Submerged Resources Center, in a court filing quoted by *National Geographic's* Kristin Romey.

Even though Conlin's court filing is supported by many investigators, in my opinion, years of rust, corrosion and a continuous 6,000 pounds of pressure per square inch over time will destroy the Marconi telegraph, and I am in favor of its recovery. Among other values, it has a great historical significance. The telegraph is located in the "silent" radio room within the bow section of the wreck. As I wait for the recovery of the Marconi invention that lies at a depth of two and a half miles on the Atlantic Ocean floor, I reflect on the communications between Titanic and surrounding ships on that frigid night of April 15, 1912.

Before the Iceberg

The White Star Liner RMS Titanic (*Photo A*), 882 feet 9 inches, was the largest steamship in the world the time, and on its maiden voyage sailed out from Southampton, England to New York on April 10, 1912, and it was outfitted with a powerful Marconi telegraph in its radio room. The "MGY," radio callsign of Titanic, had an emitting power of 5 kilowatts and worked in the frequency of 500 kHz (600 meters). Unfortunately, many other ships used the same frequency, leading to frequent interference.

The radio room (similar to *Photo B*) actually consisted of three different rooms: The operator's room, a bedroom and the "silent" room that contained the transmitting equipment. It was built with "state-of-the-art" wireless in use at the time, including the most advanced synchronous rotary spark discharger on the transmitter. It had guaranteed a working range of up 250 miles but it could maintain communications up 2,000 miles at night. It had a four-wire antenna suspended between the ship's two masts, 250 feet above the sea.

At that time, the telegraph was not intended to be used as an emergency device. Two radio operators were employed by the Marconi Company, Chief Telegraphist Jack Phillips (*Photo C*) and his assistant, Harold Bride, were on the night of April 14th very busy sending "Marconi-grams" from passengers to both shores. Earlier that day, Phillips and Bride had spent 7 hours repairing a burned out and grounded secondary transformer in the Marconi wireless set. The backlog of outgoing messages was overwhelming as the two operators tried to send them to the Marconi station at Cape Race, Newfoundland. In addition to the telegrams, there was also a famous poker game going on that required a torrent of personal messages from well-to-do passengers, at around 11 p.m., Phillips received a Morse message from Cyril F. Evans, also a 20 years old Marconi operator, on a nearby British ship, the SS California. Evans warned Phillips, "we have seen three large icebergs 5 miles to the south".[3] The California was closer to Titanic than any other ship, only 6 miles away, and it could have reached Titanic before it sank. Jack Phillips was unfortunately overwhelmed with traffic between the ship and the east coast and he rudely answered Evans, saying, "Shut up! I am busy! I am working Cape Race!" Obviously, Phillips ignored the warning.

Captain Edward J. Smith was a veteran sailor of 43 years. He was also planning to retire after this maiden voyage of Titanic. Smith was sailing the massive ship at the top speed of 22 knots in iceberg-heavy waters of the North Atlantic. The previous Artic winter was a very mild and allowed many icebergs to be transported south by the Labrador Current.

There was a very cold artic front, a moonless night with the air very clear. The lookouts noticed a haze on the horizon ahead of them and could not see the iceberg until too late. then 370 miles off the coast of Cape Race, Titanic struck the iceberg at 23:40. Once seawater begun flooding Titanic's compartments Smith asked Phillips to transmit for help. Phillips shifted from telegram sending to the Marconi distress message, "CQD." This code was sent by merchant ships since 1899. It was proposed by the Marconi Company and adopted in 1904. It meant CQ "calling anyone," plus "D" for distress or danger. The CQ call was originally used in landline telegraphy in the United Kingdom. French was the official international postal service language and the word "securite" was used to mean "safety" and "pay attention." The letters CQ, when pronounced in French, resemble the first two syllables of "securite" and it was quickly adopted as a shorthand for the word. In English-speaking countries, the meaning of the abbreviation was changed by some to "seek you."[4] To add to the confusion of

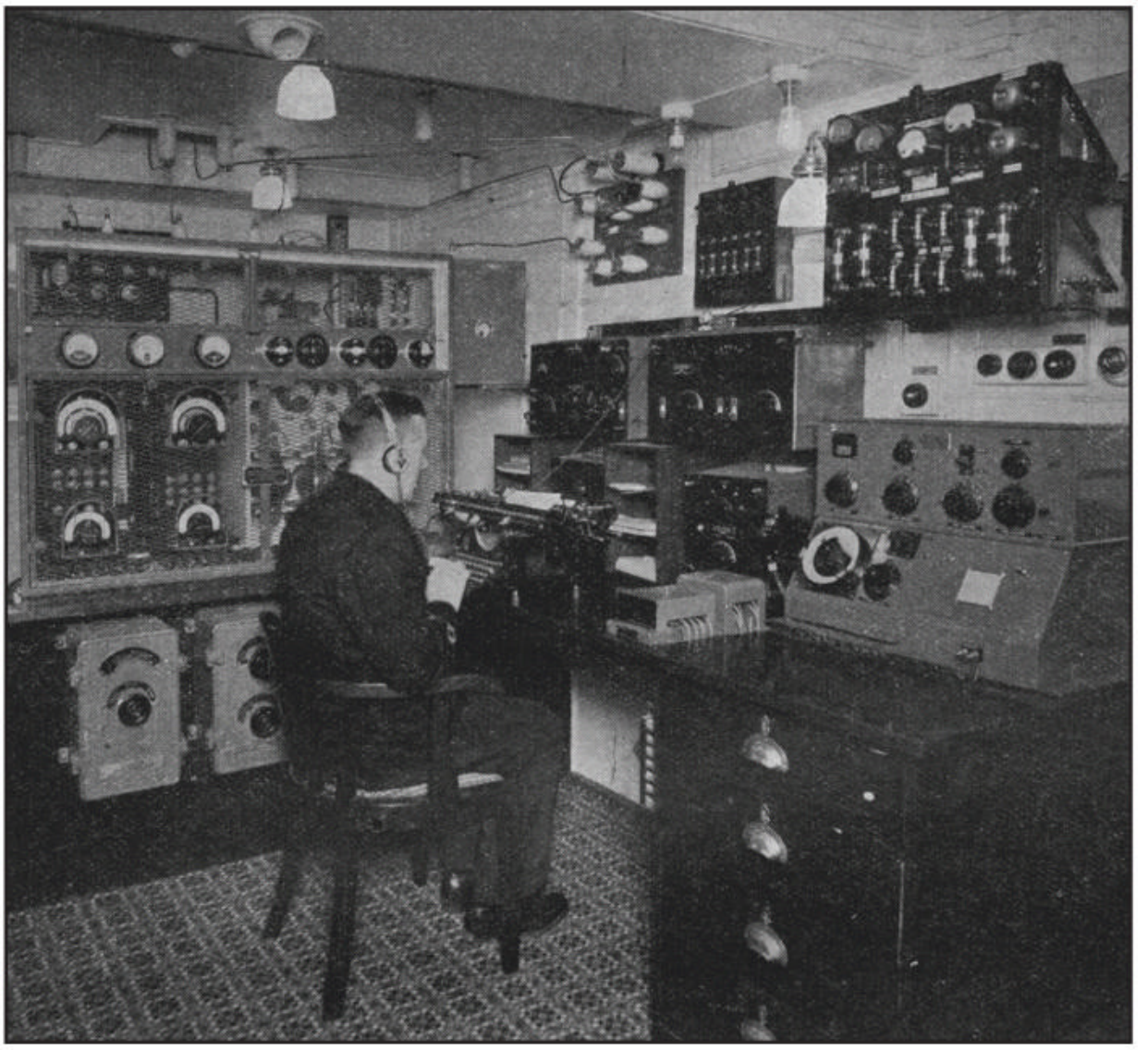


Photo B. Marconi wireless operator receiving wireless messages as the Empress of Britain ship crosses the Atlantic Ocean, circa 1934. (Photographer unknown; Heritage image.com)

Photo C. Titanic telegraph operator Jack Phillips sent CQD and SOS messages for help until the ship lost power and sank. His transmissions were received by liners hundreds of miles away. (1912, photographer unknown, Heritage image.com)

From SOS to GDMSS

Germany was the first country to adopt the SOS distress signal On April 1, 1905.[11] The first recorded use of the SOS as a distress signal was June 10, 1909, by the Cunard liner Slovenia when she was wrecked off the Azores. Two ships received the SOS and went to the rescue. Two months later, the wireless operators of the Arapahoe sent the SOS signal when their ship was disabled by a broken propeller off the coast of Cape Hatteras, North Carolina.

In 1908, an international group including the United Kingdom had ratified SOS as the official distress signal[2] and eventually replaced the CQD call, but British and Marconi telegraph operators took their time adopting the new signal. The United States did not initially sign the SOS agreement. In 1912, after a Congressional inquiry into the Titanic sinking, the Senate concluded that wireless communications at sea should be 24 hours a day and called for regulation of the American radio industry that resulted in the Radio Act of 1912. The new law also made SOS the official distress call for U.S. shipping. The law also restricted amateur use of longwave frequencies.

Today, large ships have stopped using Morse code in favor of the satellite Global Maritime Distress and Safety System (GMDSS).[2] In 1995, the Coast Guard abandoned Morse code, the casualty of newer technologies, and today Morse code is used primarily by ham radio operators.

that moment, there was another competing distress signal, "SOS," which was coming into use at the time. As most of us know, three dots . . . , three dashes - - - and another three dots . . . SOS is very simple to send in an emergency and impossible to confuse with other calls. Some have interpreted it to be short for "save our ship" or "save our souls." The article by Erin Blakemore mentioned that the assistant telegrapher, Harold Bride, "was more relaxed, enough to joke that perhaps Phillips should try and send SOS as well." He said to Phillips, "it's the new call and it may be your last chance to send it."

Response to the Distress Call

One of the first ships to receive the Titanic CQD was the German SS Frankfurt.[5] The Frankfurt was 150 miles from Titanic. Its crew included a Telefunken wireless operator, W. Zippel, who had not heard the first distress call. He answered a second call from Phillips who was sending Titanic's coordinates. Zippel transmitted, "What's up old man?" Phillips was tense enough to answer, "you fool, you stand by and keep out!" It was later revealed that Phillips has miscalculated Titanic's coordinates and the Frankfurt then was only 20 miles away. Bride was also upset with Zippel because of longstanding competition between Marconi and Telefunken operators. Marconi policies had forbidden operators to trade contacts with competitors. In the meantime, Cyril Evans the SS California operator, after what he considered an insulting answer by Phillips, consulted his captain who said, "It is not safe to keep going, because of the icebergs we have seen; let's stop sailing for the night," and he allowed Evans to go to sleep at 11:30 p.m. There is also another version and it's that Evans was following the law that said, "Wireless operators from American and British vessels must shut off their receivers at midnight." This was another tragic twist of events that prevented the California from helping to save more lives.

According with Blakemore, "these messages were downplayed by other operators and sloppily related to others. Phillips and Bride could send or receive one message at a time and their frequencies were 'jammed' by other radio operators with irrelevant questions."

Harold Thomas Cottam was the Marconi operator on the SS Carpathia, a British Royal Mail liner.[6] The Carpathia was about 58 miles from Titanic. Cottam received a message from Cape Cod, Massachusetts, stating they had private traffic for Titanic. So Cottam, knowing Phillips was overwhelmed, decided to give him a hand. Roughly 10 minutes after Titanic begun transmitting CQD, Cottam relayed the Cape Cod message to Titanic. In reply, Jack Phillips answered, "Come at once. We have struck a berg. It is CQD old man. Here is the position, report it, and get here as soon as you can."[6,7] Phillips continued to plead for help, now switching between CQD and SOS following Bride's advice.

At the Senate inquiry following the disaster, Carpathia's captain, Arthur Rostrom, stated: "The whole thing was absolutely providential. I will tell you this, that the wireless operator was in his cabin at the time, not on official business at all, but just listening as he was undressing. He was unlacing his boots at the time. He had this apparatus on his ear. And then the message came in. In 10 minutes, maybe he would have been in bed, and we would not have heard the message."[8]

Construction defects in Titanic produced a 300-foot-long gash that flooded six or more of the ship's 16 compartments. Four were the critical number of flooded compartments that the ship could tolerate without sinking and this was Titanic's undoing. At 01:40 on April 15th, Jack Phillips sent to the Russian American Line ship, the SS Birma, the message, "we are sinking fleet passengers being put into boats." The first lifeboat was lowered to the sea at 12:45 a.m., one hour after the ship struck the iceberg, but Titanic carried life boats for only 1,178 passengers of a total of 2,227.

Around 1:45 a.m. Cottam received from Titanic the final

As a ham radio operator, I meant to write this article to pay homage to the three radio operators — Jack Phillips, Harold Bride, and Harold Thomas Cottam — who, in addition to the Marconi telegraph, were instrumental in saving 705 lives that night.

message, "Come as quickly as possible, old man, the engine room is filled up to the boilers." Carpathia's operator Cottam replied that, "All our boats were ready and we are coming as hard as we could come."[7] Carpathia arrived to the distress position after 4:00 a.m., one and a half hours after Titanic went down and five hours before any other ship.

The musicians and the orchestra, trying to maintain the spirits up and distract the passengers from panicking, kept playing on the deck until the end. Jack Phillips had been relieved from his post and he could have survived, but instead heroically kept transmitting until 2:17, when he lost power, just three minutes before sinking. Captain Smith was last seen going to the bridge and before he went down with the ship said, "Well boys, you have done your duty and done it well. I ask no more of you. I release you." At the time of sinking, radio operator Phillips was seen swimming toward an upturn boat, but he perished, most likely from hypothermia; his body was never recovered. Harold Bride survived in an upturn boat and was rescued by Carpathia with only a frostbite foot injury. At the time of Carpathia arrival to the place of sinking, Cottam recalled seeing floating wood and debris at the scene but no bodies. For the next four and a half hours, the ship took 705 survivors from Titanic's 20 lifeboats before setting course for New York. Titanic was lost with 1,522 souls. Cottam and Bride knew each other and were personal friends. The irony was that, in the closing months of World War I in 1918, off the southern coast of Ireland, the Cunard steamer Carpathia was struck by three torpedoes from a German U-boat and sank very quickly. However, only five sailors lost their lives. Carpathia joined the Titanic at the bottom of the ocean.

As a ham radio operator, I meant to write this article to pay homage to the three radio operators — Jack Phillips, Harold Bride, and Harold Thomas Cottam — who, in addition to the Marconi telegraph, were instrumental in saving 705 lives that night. I revere them as true heroes and I am honored and proud to do so.

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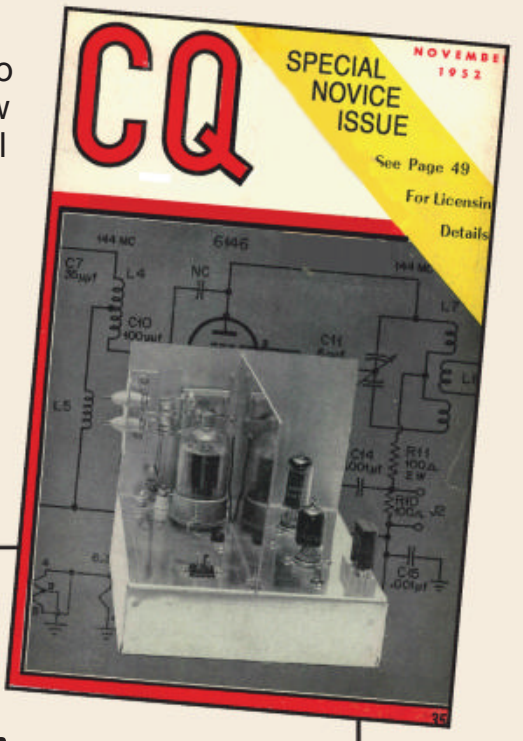
CQ CLASSIC: A Novice Transmitter for 2 Meters

This issue contains an article by Steven Perry, W2HAF, about his experience 65 years ago building a transmitter from a 1952 *CQ* article along with his dad. To help you better follow along with his project, we reprise that original article here, from the November 1952 "Special Novice Issue," published soon after the introduction of the Novice class license.

A note for those of you who looked at this article's headline and said, "A Novice transmitter for 2 meters? How can that be? Novices don't have privileges on 2 meters." Back in the day, they did. The original Novice license — non-renewable and good for only one year — granted limited (crystal control and 75 watts maximum power) CW privileges on 80 and 11 meters (yes, 11 meters was still a ham band in the early 1950s) as well as voice privileges on a portion of the 2-meter band.

Here's WN2IHM's article on a simple 2-meter transmitter that even a Novice could build…



Putting the 6146 on Two Meters

BY ROBERT V. MORRIS, WN2IHM

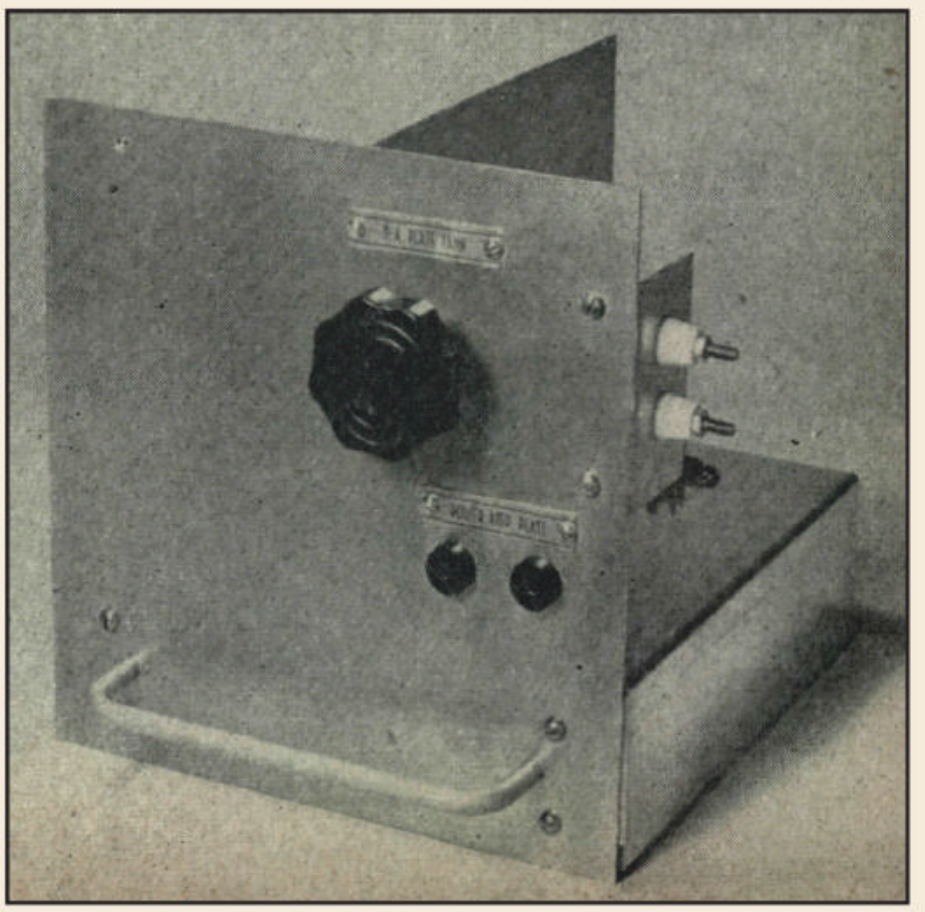
This transmitter is representative of a modern attempt to fire up on 144 mc. With the usual precautions in making short direct leads the Novice, or old-timer, should have no trouble airing a healthy sounding signal. One word of advice: provide plenty of ventilation for the 6146 final amplifier and do not place any pressure on the plate cap when the tube is hot.—Editor.

A number of months ago I decided to concentrate on designing a two-meter transmitter that would fit in nicely with my existing power supply (about 200 ma.) and modulator. Basically, it should be very simple and straightforward, using the latest tube types in the v.h.f. category. I wanted to use a starting crystal frequency around 8 mc. and multiply it 18 times in easy steps. The transmitter was for Novice operation, so the power input could not be more than 75 watts. I settled for something under this to be on the safe side.

Reviewing the currently available tubes showed that the final product could be constructed with far greater ease than I had anticipated. A dual triode tube (12AU7) would work as a crystal oscillator on an overtone mode from the 8-mc crystal[1] with the 24-mc output from the first triode section coupled to the second triode. This section would then triple the frequency to about 72 mc. At this point a 5763 tube would be able to double the output of the 12AU7 stage into the two-meter band. The one watt from the doubler is more than sufficient to drive the 6146 final amplifier. Coupled to my 25-watt modulator, the 6146 would draw approximately 40 or 45 watts input—a nice respectable figure for a Novice phone transmitter. Also, if a smaller modulator was available it would be possible to directly substitute a 2E26 tube for the 6146 final amplifier. This would cut the power requirements about in half.

Construction

The assemblying, wiring and chassis preparation need only take a few hours. The chassis itself is a *Bud AC-405* aluminum with the dimensions of 7x7x2 inches. The panel



The front view shows the clean simplicity of the transmitter. Only four tuning adjustments are necessary and three of them are mounted behind the panel. The tip jacks are for a 0-200 millammeter to measure the plate current.

1. As an overtone oscillator it will probably work on a very large percentage of 8-mc crystals. However, there may be one or two crystals that will refuse to oscillate. Obviously, if you are sure of the circuit wiring the best solution is to replace the crystal. The new one will probably start right off.—Tech. Ed.

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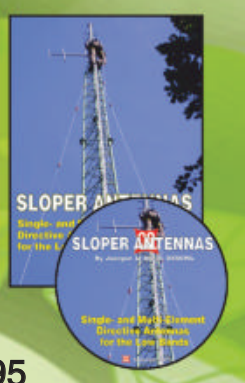

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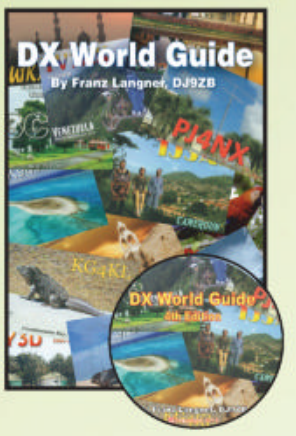

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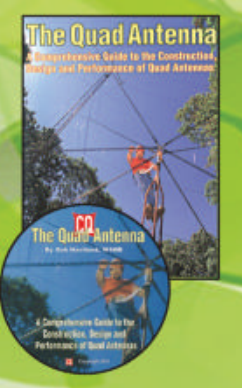

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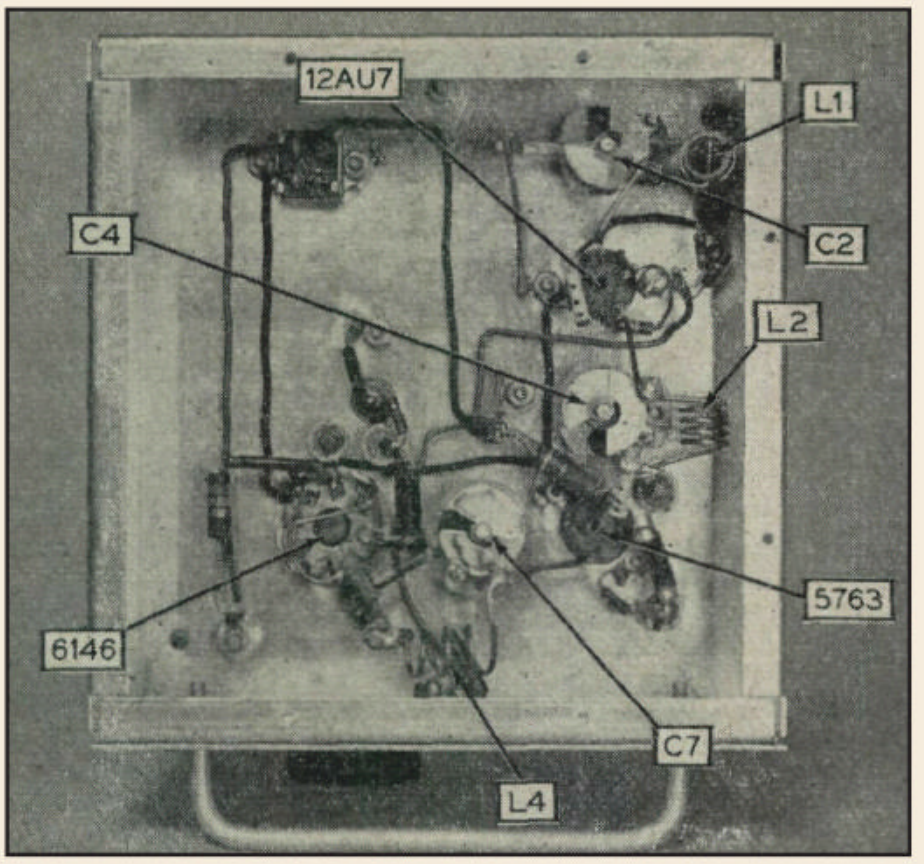
was a piece of 1/16 inch thick 7x14 alumnium cut to make two equal 7x7 pieces. One piece is the front panel and the other is used as the bottom plate of the chassis. We also cut out a $4^3/_4$ x 7 inch piece which is mounted on spade lugs to become the shield between the driver and final output stages. Lastly, a small piece of aluminum that is about 2 x 2 should be bent to make the L-bracket that supports the antenna output terminals.

The actual location of tube sockets, etc. is not a critical item. The photographs show the positions of the major components quite clearly as very few parts are required in the construction of this transmitter. The tip jacks on the front panel are across the 100-ohm resistor *R10*. Variable condensers *C2*, *C4* and *C7* are all mounted to the top of the chassis to insure short leads. The power cables go to a 4-prong Jones plug which could be easily replaced with a terminal strip if so desired.

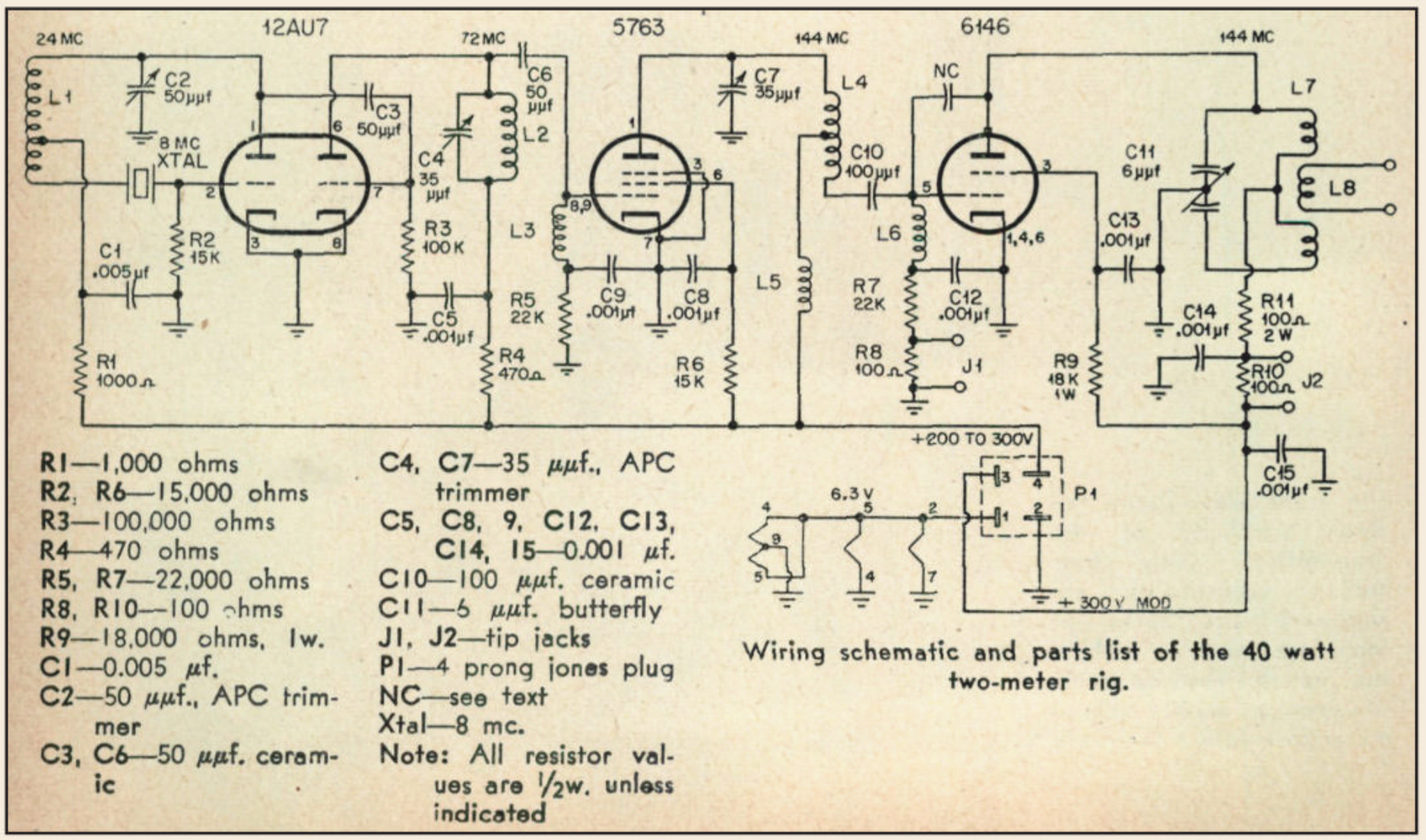
Tuning Up

The first thing to look for after the wiring has been completed and thoroughly double checked is that the oscillator circuit is crystal controlled. The old stunt of pulling out the crystal is not a good check with this type of oscillator. A much better one is to apply about 15O volts to the first triode section of the 12AU7 tube. Connect a milliammeter in the lead to the tap on coil *L1*. Then adjust condenser *C2* for a dip in the plate current. Also tune in the signal around 24 mc. that should show up in your receiver. Once the crystal is oscillating the frequency as observed on the receiver should not vary appreciably when tuning *C2*. If it does vary the tap on *L1* is too close to the plate end of the coil and should be moved towards the crystal end. If the stage refuses to oscillate with a good crystal the tap is too close the crystal end and should be moved further up the coil towards the plate.

After disconnecting the temporary arrangement outlined above plug in all the tubes and measure the resonant frequencies of the LC circuits in the 12AU7 plate and the 6146 plate and grid. If they are too far out adjust the coils till they peak up near the appropriate multiple of our 8-mc crystal. Now connect an 0-10 milliammeter into the tip jacks *Jl*. Disconnect the plate and screen voltages on

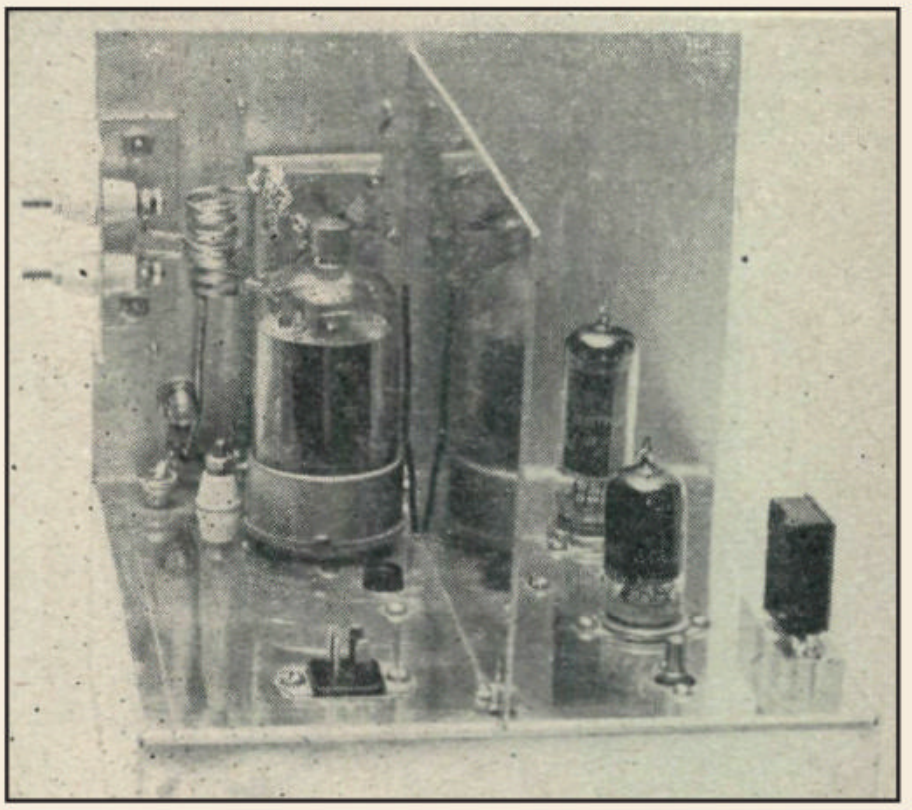


It probably doesn't seem possible to crank up on two-meters with so few parts. Any modulator having up to 25 watts output can be used with the 6146 power and a 2E26 final.



R1—1,000 ohms
R2, R6—15,000 ohms
R3—100,000 ohms
R4—470 ohms
R5, R7—22,000 ohms
R8, R10—100 ohms
R9—18,000 ohms, 1w.
C1—0.005 μf.
C2—50 μμf., APC trimmer
C3, C6—50 μμf. ceramic
C4, C7—35 μμf., APC trimmer
C5, C8, 9, C12, C13, C14, 15—0.001 μf.
C10—100 μμf. ceramic
C11—6 μμf. butterfly
J1, J2—tip jacks
P1—4 prong jones plug
NC—see text
Xtal—8 mc.
Note: All resistor values are 1/2w. unless indicated

Wiring schematic and parts list of the 40 watt two-meter rig.



A rear view showing the shield between the final amplifier and doubter stages.

COIL TABLE

L1—18 turns #16, 1/2" dia., close wound, tap 5 turns from xtal
L2—4 1/2" turns #14, 1/2" dia., 1/2" winding length
L3, L5, L6—Ohmite Z-144 choke
L4—4 turns #14, 1/2" dia., 1" winding length
L7—6 turns #14, 1/2" dia., 1" winding length, 1/4" space for L9
L8— 2 turns #14, 1/2" dia.,

the 6146, but apply about 250 volts to the 12AU7 and the 5763. Adjust *C2*, *C4* and *C7* for a maximum reading (grid current). It is not advisable to adjust C2 unless absolutely necessary. This condenser should be set so that the oscillator will start off everytime that power is applied to the transmitter.

When the circuits have been aligned the final amplifier grid current should be about 1.6 ma. This will drop the very slightest amount when plate voltage is applied to the plate of the 6146 tube.

It was found that the grid to plate capacitance of the final stage was effectively "negative" and additional capacity was added to neutralize the final.* A wire was brought through the chassis from the grid side of the 6146, as shown in the photograph.

The final plate voltage should not exceed 300 volts. Adjust the loading to bring the plate current up to about 140 ma. with a 200 milliammeter inserted in *J2*. With the plate voltage applied it may be necessary to retouch the tuning of *C4* and *C7*. With everything working properly a dummy load consisting of a 25-watt lamp should light to full brilliance. If the builder wants to key this transmitter it will be necessary to place some fixed bias in series with R8 and then key the oscillator and doubler stages.

*This process is detailed in the very handy booklet released by Eimac as their Application Bulletin No. 8. It is entitled. "The Care and Feeding of Power Tetrodes." See particularly page 18 and figure 82.

Sixty-five years ago, W2HAF and his dad built a 2-meter transmitter from plans in a 1952 CQ article. He's still got both — the radio and the magazine … and here's his story.

Looking Back: A Classic CQ Transmitter Project

BY STEVEN E. PERRY,* W2HAF

Seventy years ago, in November 1952, *CQ* published a "Special Novice Issue."[1] (*Photo A*). The front cover photo showed a three-tube 2-meter transmitter (*Novices originally had limited phone privileges on 2 meters – ed.*) I recently pulled that issue off the shelf and reread a well-written issue. I found it to be an enjoyable trip down memory lane since I grew up in and started my early engineering education and career in the vacuum tube era.

I am now 81 years old and have been continuously licensed since 1955, starting as KN9AXG. My father, Rollo, was KN9AXF. Dad's interest shifted to restoring a 1925 Model T, although he remained interested in the hobby and what I was doing in it. He did not pursue another ham license for a number of years, when he became WB9VEU.

Building the Transmitter

Back to the 1952 *CQ*, that cover photo came from an article inside by Robert Morris, WN2IHM, titled "Putting the 6146 on Two Meters." (*The original article is reproduced as this issue's "CQ Classic." See page xx. – ed.*) My father and I had looked over Morris's article a couple of times and found the transmitter to be an interesting and uncomplicated project. One Saturday evening in 1957, while I was working in our ham shack, Dad came in and suggested we start building it. We quickly agreed on a division of labor. He would do the sheet-metal work and I'd do the wiring and testing. Dad was very skilled at metalwork without the typical tools of a metal shop, such as a shear, brake and hole punches. This was a chance for me to learn his tricks and I jumped at it.

We went to work and covered the existing holes in a preciously used chassis and made the front panel using aluminum from a pre-World War II 5-meter transmitter. When we finished the sheet-metal work around midnight, new holes for the tube sockets had been

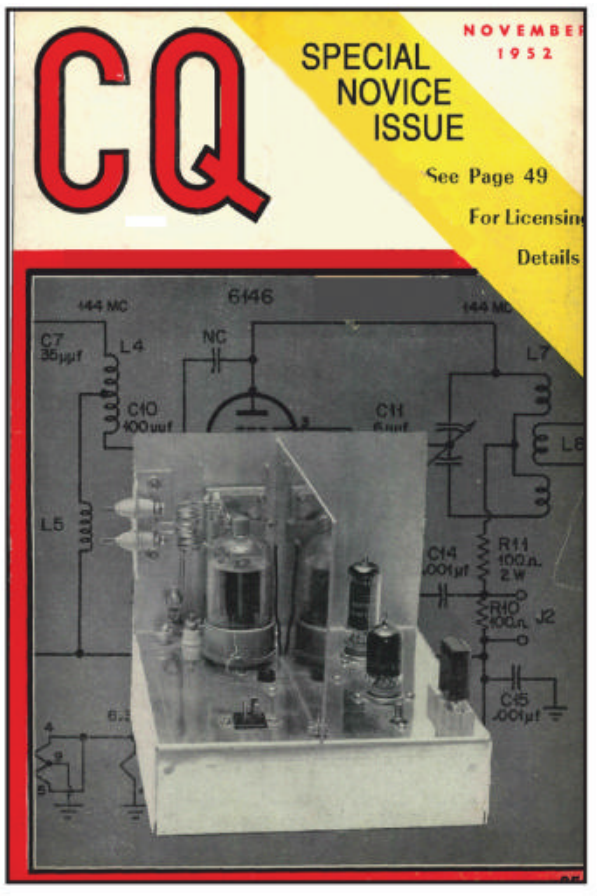


Photo A. The November 1952 issue of CQ was a "Special Novice Issue" featuring a 2-meter transmitter built around a 6146 final amplifier tube. The original Novice license included voice privileges on 2 meters.

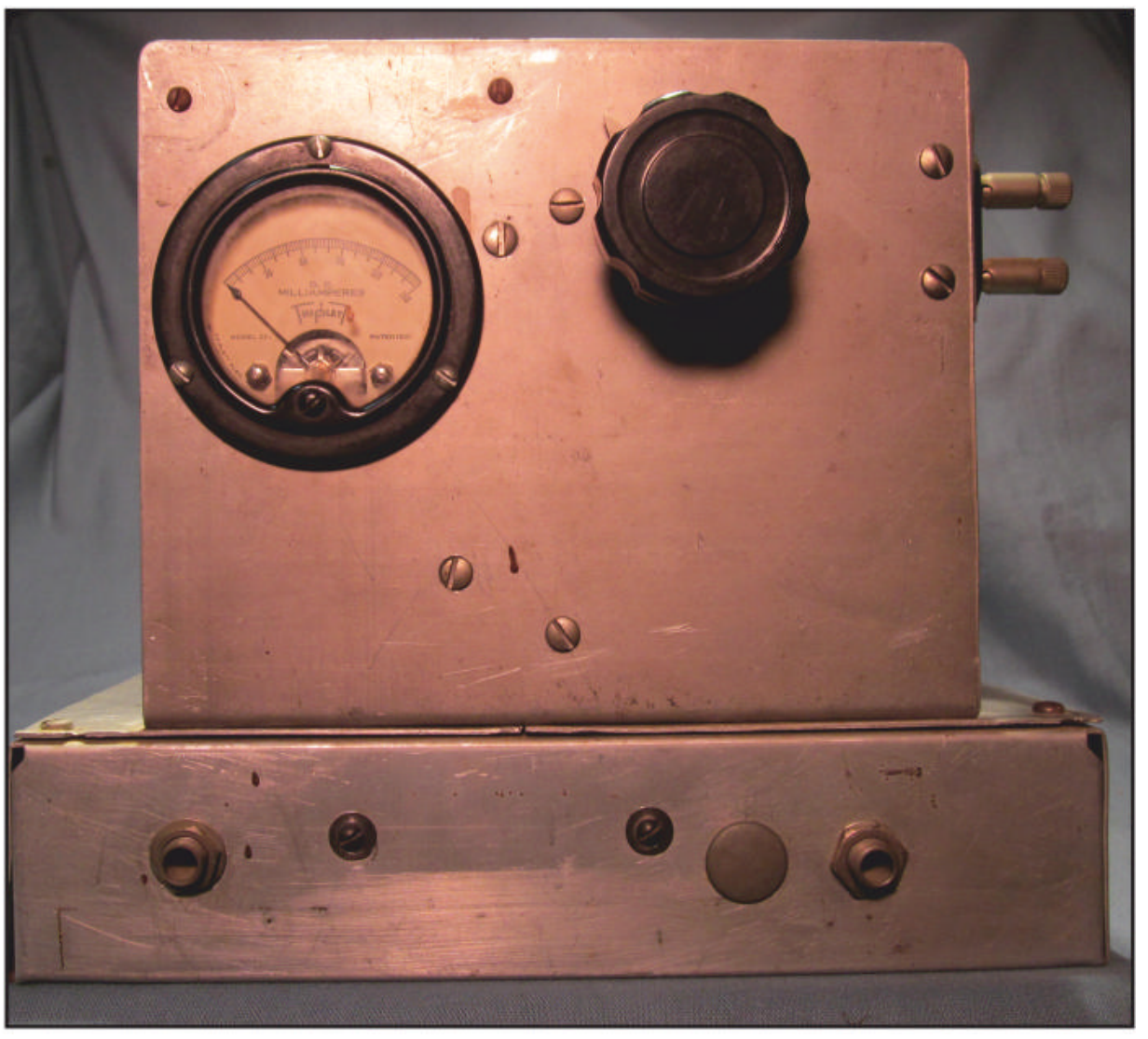


Photo B. Front view of the transmitter based on Robert Morris's 1952 CQ article that was built by the author and his father. (Photos B-D courtesy of the author)

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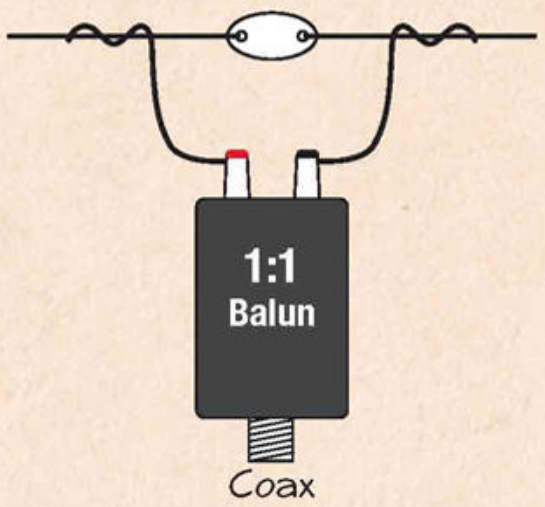
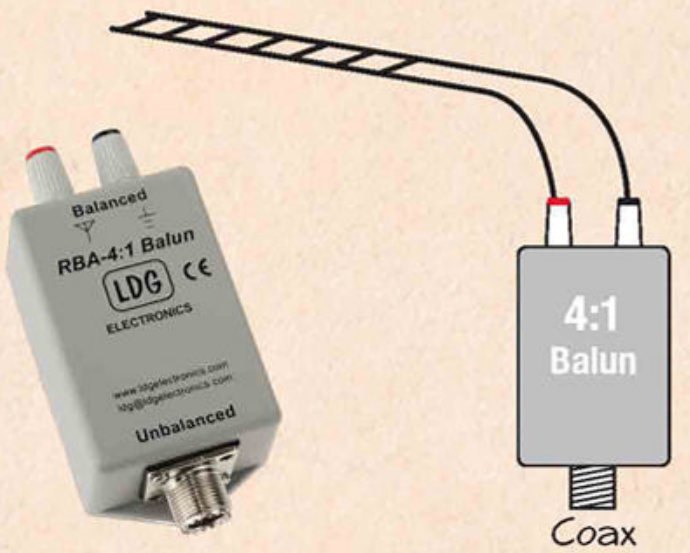
$30 ea. | 200 Watts PEP 1.8-30MHz

DIPOLE
Length = 468/freq

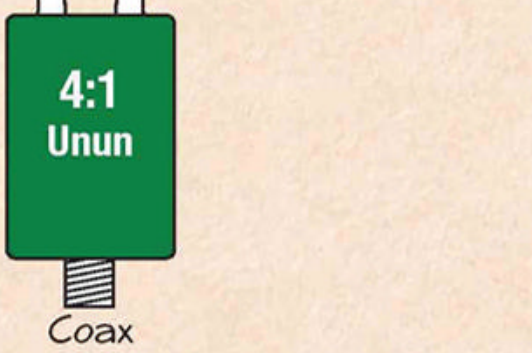


LADDER LINE/TWIN LEAD

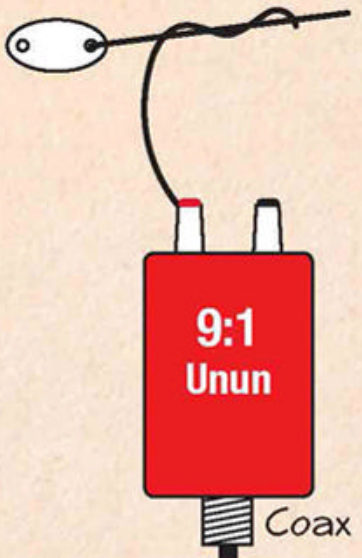


18' THRU 43' VERTICAL

GROUND PLANE



END FED WIRE
30' - 135'



>30' Coax Cable

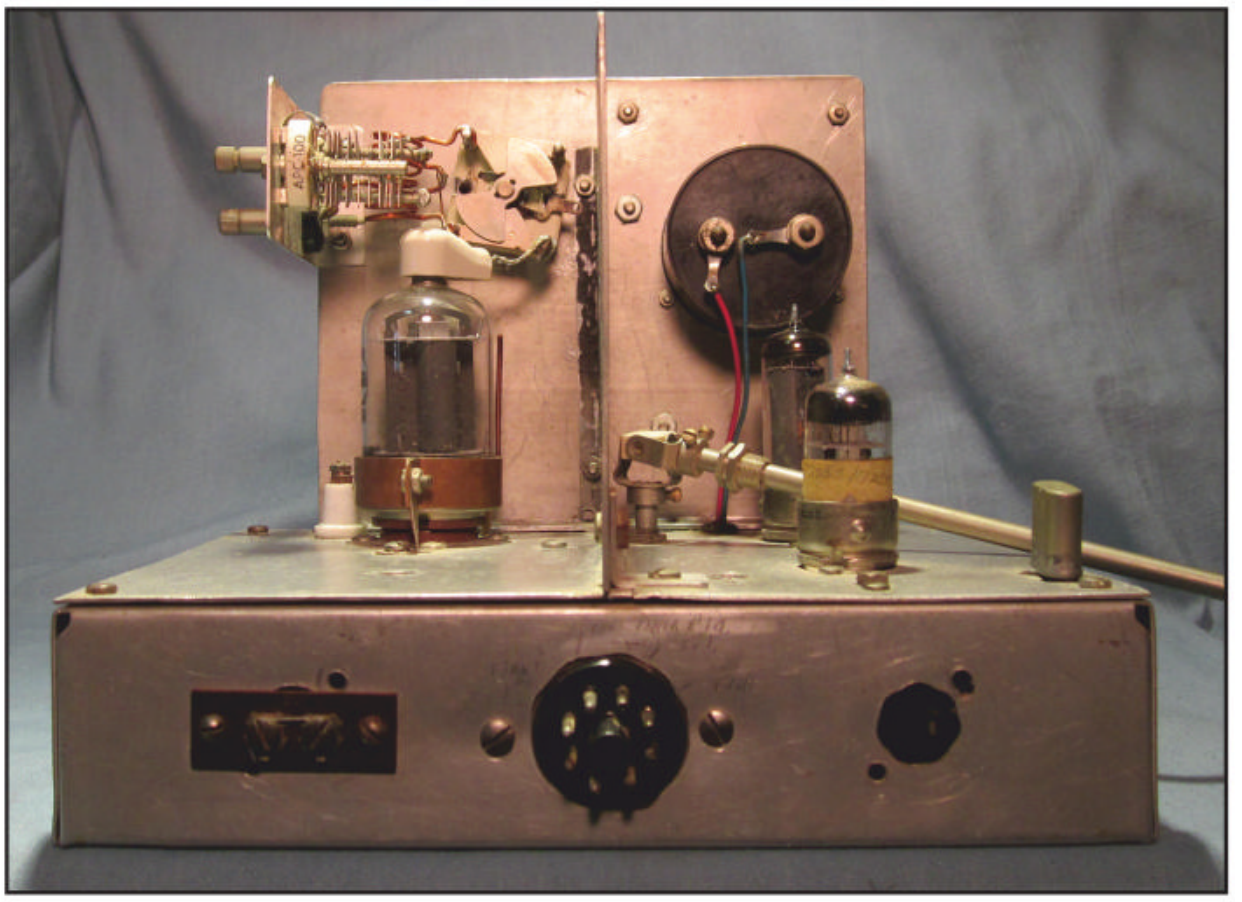


Photo C. Rear view of the completed transmitter.

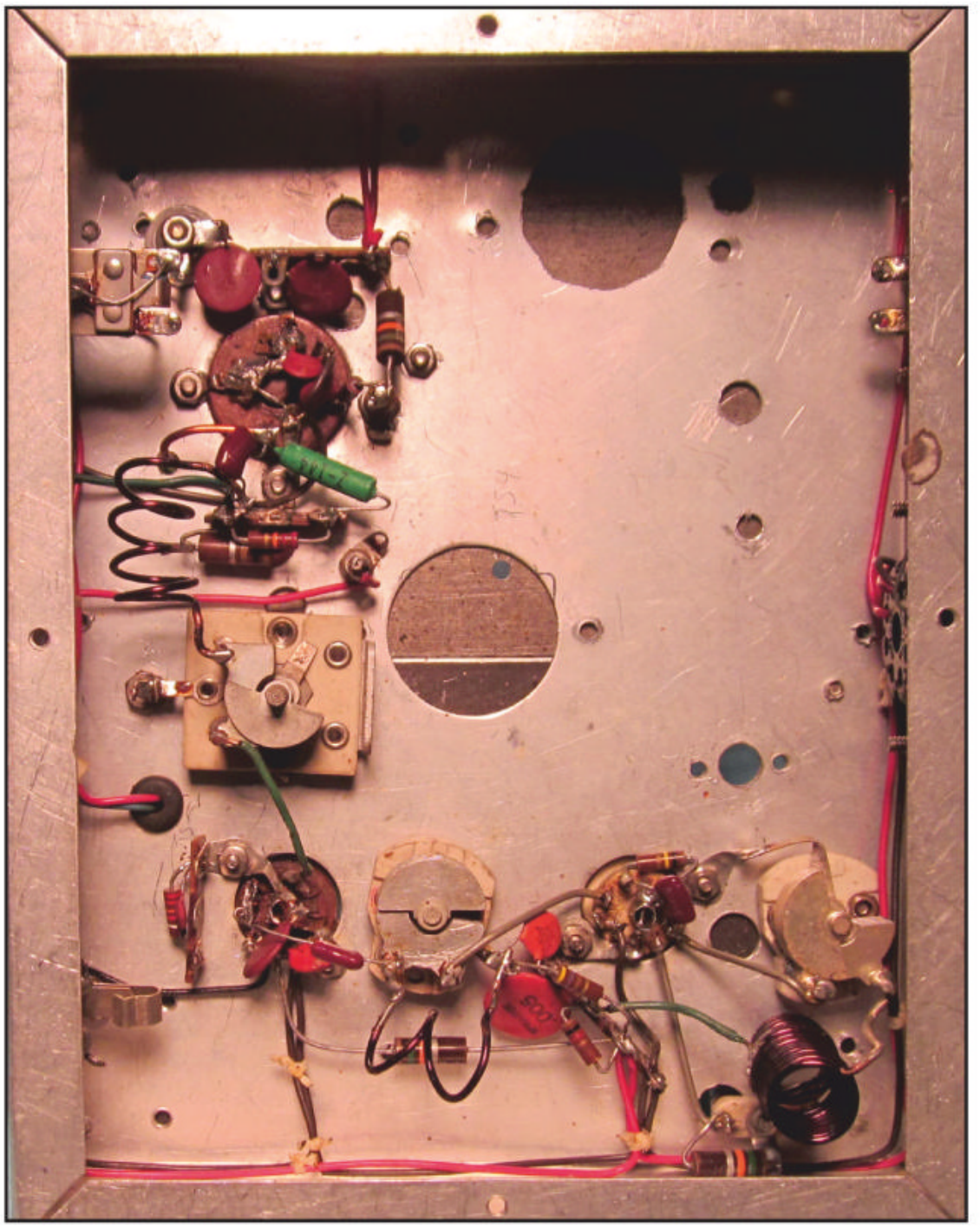


Photo D. Underside of the transmitter. Note the discrete components and point-to-point wiring of these days before the advent of printed circuit boards, and the covered holes for components from the chassis previous life.

made in the chassis and a meter hole had been cut in the front panel.

Over the next couple of weeks, when schoolwork permitted, and with a couple of trips to Selectronic Supply in Peoria (our go-to ham supplier) for parts we did not have in our junk box, I completed the transmitter's wiring (see *Photos B*, *C*, and *D*).

The Next Step…

Testing did not go well. I could not get the oscillator working. A couple of ham friends looked at it and threw up their hands or suggested other but more complex oscillator circuits. It turns out the solution was right there in the article, in black and white, but more on that later. The transmitter was placed on a shelf. There it languished for nearly two decades while I went off to college, moved to Long Island, got married and began my career as an electronic engineer. Finally, this little transmitter made the trip east from Illinois in the mid-1970s when my parents came for their annual vacation.

Take Two

I resolved at that point to get that transmitter working or learn the reason why it wouldn't, so Dad and I took it into my shop. We had the oscillator running in less than an hour after I re-read the article, including the note about moving the tap on the oscillator tank coil. A 15-watt light bulb dummy load was glowing shortly thereafter. I have asked myself many times why I did not adjust that tap initially instead of walking away. While I believe it was immaturity, schoolwork, and pressure to make progress on a DeVry correspondence course also contributed.

Today, this little transmitter remains on a shelf, waiting to go on the air. All it needs is a power supply and a modulator (*and probably some new capacitors after all these years – ed.*), but I have not been active for many years. It would be fun to make at least one contact with it, but I no longer have a shack and most of my gear is packed away.

It would be interesting to know — but we never will — how many hams built the transmitter from Morris's 1952 article. But I thought you might like to look back 70 years and see that at least one ham did, and got it working.

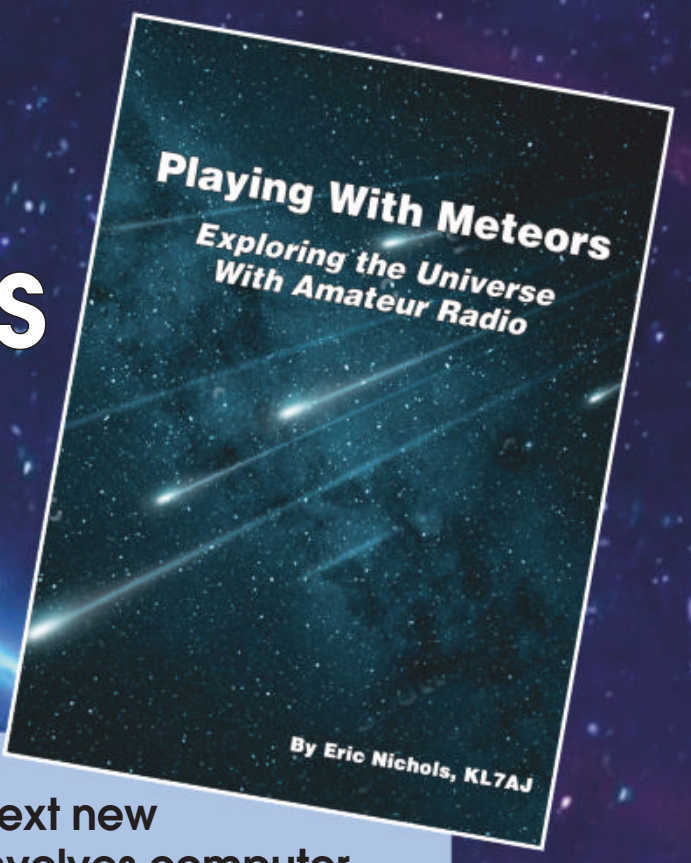
Notes:

1. The "Special Novice Issue" followed the FCC's creation of the Novice license in 1951. At the time, it was a one-year non-renewable license with limited privileges, including CW on the 80 and 11-meter bands (yes, 11 meters!) and phone on part of 2 meters. (Source: *CQ* 50th anniversary issue, January 1995)

Playing With Meteors

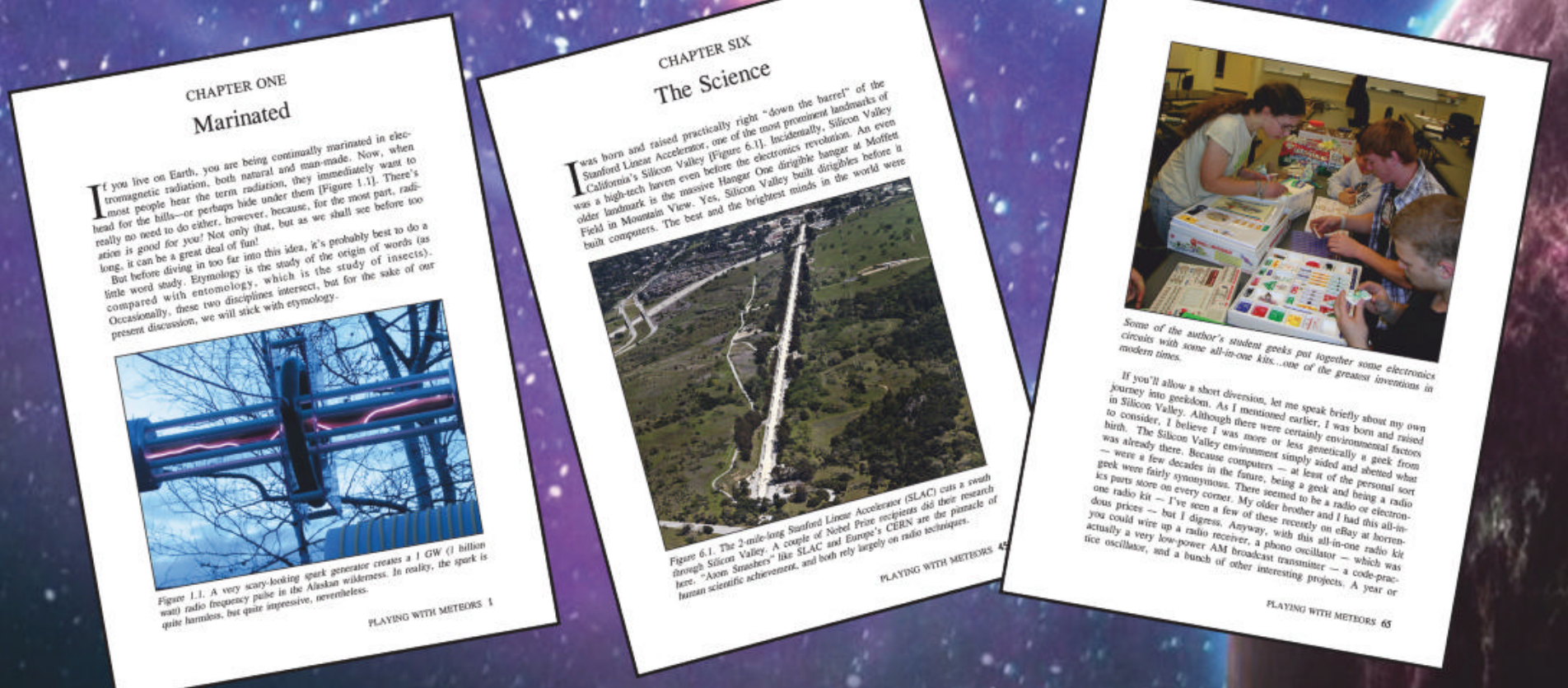
Exploring the Universe With Amateur Radio

By Eric Nichols KL7AJ



Wouldn't it be a blast to be a master of technology rather than to be at its mercy? Or better yet, to actually create the next new thing? While it's true that a lot of what we consider high-tech involves computer technology, an equal or greater part of the next new thing is going to involve wireless, also known as radio. In fact, our entire universe is connected by radio, and the entire universe is the radio amateur's sandbox.

In *Playing With Meteors*, author Eric Nichols takes you on a tour of the opportunities that amateur radio can bring you, and how you can leverage the knowledge you gain in "hobby radio" to a career in hi-tech, or just to being smarter than your "smart devices" (and maybe even some of your friends).



CHAPTER ONE

Marinated

If you live on Earth, you are being continually marinated in electromagnetic radiation, both natural and man-made. Now, when most people hear the term radiation, they immediately want to head for the hills—or perhaps hide under them [Figure 1.1]. There's really no need to do either, however, because, for the most part, radiation is good for you! Not only that, but as we shall see before too long, it can be a great deal of fun!

But before diving in too far into this idea, it's probably best to do a little word study. Etymology is the study of the origin of words (as compared with entomology, which is the study of insects). Occasionally, these two disciplines intersect, but for the sake of our present discussion, we will stick with etymology.

Figure 1.1. A very scary-looking spark generator creates a 1 GW (1 billion watt) radio frequency pulse in the Alaskan wilderness. In reality, the spark is quite harmless, but quite impressive, nevertheless.

PLAYING WITH METEORS 1

CHAPTER SIX

The Science

I was born and raised practically right "down the barrel" of the Stanford Linear Accelerator, one of the most prominent landmarks of California's Silicon Valley [Figure 6.1]. Incidentally, Silicon Valley was a high-tech haven even before the electronics revolution. An even older landmark is the massive Hangar One dirigible hangar at Moffett Field in Mountain View. Yes, Silicon Valley built dirigibles before it built computers. The best and the brightest minds in the world were

Figure 6.1. The 2-mile-long Stanford Linear Accelerator (SLAC) cuts a swath through Silicon Valley. A couple of Nobel Prize recipients did their research here. "Atom Smashers" like SLAC and Europe's CERN are the pinnacle of human scientific achievement, and both rely largely on radio techniques.

PLAYING WITH METEORS 45

Some of the author's student geeks put together some electronics circuits with some all-in-one kits…one of the greatest inventions in modern times.

If you'll allow a short diversion, let me speak briefly about my own journey into geekdom. As I mentioned earlier, I was born and raised in Silicon Valley. Although there were certainly environmental factors to consider, I believe I was more or less genetically a geek from birth. The Silicon Valley environment simply aided and abetted what was already there. Because computers — at least of the personal sort — were a few decades in the future, being a geek and being a radio geek were fairly synonymous. There seemed to be a radio or electronics parts store on every corner. My older brother and I had this all-in-one radio kit — I've seen a few of these recently on eBay at horrendous prices — but I digress. Anyway, with this all-in-one radio kit you could wire up a radio receiver, a phono oscillator — which was actually a very low-power AM broadcast transmitter — a code-practice oscillator, and a bunch of other interesting projects. A year or

PLAYING WITH METEORS 65

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Announcing:

The 2022 CQ World Wide VHF Contest

Starts: 1800 UTC Saturday, July 16, 2022
Ends: 2100 UTC Sunday, July 17, 2022

***IMPORTANT NOTE:* Paper logs are no longer accepted, see Section XII**

I. Contest Period

27 hours for all stations, all categories. Operate any portion of the contest period you wish. *(Note: Exception for QRP Hilltopper.)*

II. Objectives

The objectives of this contest are for amateurs around the world to contact as many amateurs as possible in the contest period, to promote VHF, to allow VHF operators the opportunity to experience the enhanced propagation available at this time of year, and for interested amateurs to collect VHF Maidenhead grid locators for award credits.

III. Bands

All amateur radio frequencies on 50 MHz (6 meters) and 144 MHz (2 meters) may be used as authorized by local law and license class. Note exceptions in Rule XI for common repeater frequencies and 146.52 MHz.

IV. QSO Alerting Assistance

Definition: The use of any technology or other source that provides callsign or multiplier identification along with frequency information about a signal to the operator. This includes, but is not limited to, use of DX Cluster, packet, local, or remote callsign and frequency decoding technology (e.g., CW Skimmer or Reverse Beacon Network), or operating arrangements involving other individuals.

1. All stations are allowed to use QSO Alerting Assistance. **No self-spotting or asking to be spotted is allowed**.

2. Stations attempting digital EME or digital meteor-scatter QSOs are allowed to spot the callsign, frequency, and sequence only. Caution: To ensure strict compliance with these rules, the adjudication process will include review of real-time and archived transcripts from websites used to coordinate alerting data during the contest period.

3. The use of non-amateur means to effect a QSO is not allowed. This includes use of the telephone, and website posts providing information beyond that of callsign, frequency, and sequence.

4. Rovers may use APRS to announce their location.

V. Categories of Competition

For all categories (except Rover): Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee's address, whichever is greater.

1. Single Operator—All Band. Only one signal allowed at any one time; the operator may change bands at any time.

2. Single Operator—Single Band. Only one signal allowed at any one time.

3. Single-Operator All-Band QRP. There are no location restrictions — home or portable — for stations running 10 watts output or less.

4. Hilltopper. This is a single-op QRP portable category for an all-band entry limited in time to a maximum of 6 continuous hours. Backpackers and portables who do not want to devote resources and time to the full contest period are encouraged to participate, especially to activate rare grids. Any power source is acceptable.

5. Rover. A Rover station is one manned by no more than two operators, travels to more than one grid location, and signs "Rover" or "/R" with no more than one callsign.

6. Multi-Op. A multi-op station is one with two or more operators and may operate 6 and 2 meters simultaneously with only one signal per band.

Stations in any category, except Rover and QRP Hilltopper, may operate from any single location, home, or portable.

VI. Exchange

Callsign and Maidenhead grid locator (4 characters, e.g., EM15). Signal reports are not required and should not be included in the log entry.

VII. Multipliers

The multiplier is the number of different grid locators worked per band. A grid locator is counted once per band. Exception: The rover who moves into a new grid locator may count the same grid locator more than once per band as long as the rover is himself or herself in a new grid locator location. Such change in location must be clearly indicated in the rover's log.

1. A rover station becomes a new QSO to the stations working him or her when that rover changes grid locator.

2. The grid locator is the four-character Maidenhead grid (e.g. EM15).

VIII. Scoring

One (1) point per QSO on 50 MHz and two (2) points per QSO on 144 MHz. Allowed modes are "PH" (SSB, AM, FM), "CW" and "DG" ("digital" modes such as FT8, FT4, and MSK144). **Entrants are requested to stop using "RY" or "PH" for QSOs made using "digital" modes**. Work stations once per band, regardless of mode. Multiply total QSO points times total number of grid locators (GL) worked.

Rovers: For each new grid locator visited, contacts and grid locators count as new. Final Rover score is the sum of contact points made from each grid locator times the sum of all grid locators worked from all grids visited.

Example 1. K1GX works stations as follows:

50 QSOs (50 x 1 = 50) and 25 GLs (25 multipliers) on 50 MHz

35 QSOs (35 x 2 = 70) and 8 GLs (8 multipliers) on 144 MHz

K1GX has 120 QSO points (50 + 70 = 120) x 33 multipliers (25 + 8 = 33) = 3,960 total points.

Example 2. W9FS/R works stations as follows:

From EN52: 50 QSOs (50 x 1 = 50) and 25 GLs (25 multipliers) on 50 MHz

From EN52: 40 QSOs (40 x 2 = 80) and 10 GLs (10 multipliers) on 144 MHz

From EN51: 60 QSOs (60 x 1 = 60) and 30 GLs (30 multipliers) on 50 MHz

From EN51: 20 QSOs (20 x 2 = 40) and 5 GLs (5 multipliers) on 144 MHz

W9FS/R has 230 QSO points (50 + 80 + 60 + 40) x 70 multipliers (25 + 10 + 30 + 5) = 16,100 total points

IX. Awards

Electronic certificates will be made available for download for everyone who submits an entry.

Geographic areas include states (U.S.), provinces (Canada), and countries, and may also be extended to include other subdivisions as justified by competitive entries. U.S. Rover certificates are issued on a regional basis.

Plaques will be awarded to the highest scoring stations where sponsored. They are offered in various categories on a sponsored basis. Clubs and individual plaque donors are sought and may find information on how to sponsor a CQWW VHF Contest plaque at <www.cqww-vhf.com/plaques.htm>.

X. Club Competition

The club score is the total aggregate score from logs submitted by members. There are two separate club competition categories.

1. USA Clubs: Participation is limited to club members residing within a 250-mile radius circle from the center of club area.

2. DX Clubs: Participation is limited to club members residing within EITHER the DXCC country where the club is located OR within a 400-kilometer radius circle from the center of club.

General club rules:

1. National organizations (e.g., JARL, REF, or DARC) are not eligible for the club competition.

2. Spell out the full name of the club. See examples of active club names at <https://cqww-vhf.com/clubnames.htm>.

3. Single-operator entries may only contribute to one club. Multi-operator scores may be allocated to multiple clubs as a percentage of the number of club members participating in the operation. The log entry must spell out the full club name (and club allocations if multi-op).

4. A minimum of three logs must be received for a club to be listed in the results. Checklog entries are not counted for the club score.

XI. Miscellaneous

An operator may sign only one callsign during the contest. This means that an operator cannot generate QSOs by first signing his callsign, then signing his daughter's callsign, even though both callsigns are assigned to the same location.

A station located exactly on a dividing line of a grid locator must choose only one grid locator from which to operate for exchange purposes.

A rover cannot give out a different multiplier without moving the complete station at least 100 meters.

Making or soliciting QSOs on the national simplex frequency, 146.52 MHz, or your country's designated national simplex frequency, or immediately adjacent guard frequencies, is prohibited. Use of commonly recognized repeater frequencies is prohibited. Recognized FM simplex frequencies such as 146.49, .55, and .58, and local-option simplex channels may be used for contest purposes.

Aeronautical mobile contacts do not count.

Contestants should respect use of the DX window, 50.100-50.125 MHz, for intercontinental QSOs only. UTC is the required logging time.

XII. Log Submissions

Log entries must be submitted by **July 28, 2021** to be eligible for awards.

The CABRILLO file format is the standard for logs. See <cqww-vhf.com/cabrillo.htm> for detailed instructions on filling out the CABRILLO file header. Note: U.S. stations must indicate the station location in the CABRILLO header (e.g., LOCATION: OH).

Web upload of Cabrillo log files is the only method of log submission. Web upload is available at <cqww-vhf.com/logcheck>.

An ADIF Converter is provided for convenience and, at present, is suitable only for FIXED station logs (sorry Rovers). It is available at <https://cqww-vhf.com/adif/>.

Entry Confirmation: All logs received will be confirmed via email. A listing of logs received can be viewed at <https://cqww-vhf.com/logs_received.htm>.

XIII. Declaration

Your submission of a log entry affirms that: (1) you have abided by all the rules of the contest as well as those of your country's licensing authority; (2) you accept any decisions made regarding your entry by the contest's adjudication process which are official and final.

Message from the Director

Thank you all for your interest and participation. Let's hope for some good propagation conditions on the 50- and 144-MHz bands during this coming July. And don't let your computer make all of your contacts. Remember that microphones and keys can also be used and such use is encouraged.

MATH'S NOTES

BY IRWIN MATH,* WA2NDM

Inexpensive Lightning Protection

This month, as we have promised, in our efforts to produce projects that are useful, easy to build and low cost, we would like to offer an interesting accessory that will be of use to almost any amateur with an outdoor antenna.

We are all familiar with the damage and havoc a lightning strike can cause when it occurs in the vicinity of an amateur radio station with an outdoor antenna, particularly one mounted high up and in the clear. While nothing can prevent the disastrous results of a direct strike, measures can be certain be taken to prevent the problems of a nearby strike. A typical lightning strike of millions of volts can easily cause thousands of amperes to flow with the result that the field created by such a strike can induce dangerous voltages into nearby antennas or transmission lines. The best prevention is, of course, to always disconnect the antenna during any potentially hazardous weather but the projects described here can help when one doesn't have the time, simply forgets or is away from home during a thunderstorm. This is the "lightning arrestor." Before starting, however, I would like to state that neither of the lightning arrestors to be described are equal to the commercial types specifically made for this purpose. They will, however, protect against some discharges that could easily take out your equipment and, at the least, are certainly better than no protection at all.

Coaxial Lightning Arrestor

Since most antennas are connected to transmitters, receivers, or transceivers with coax we will start there. An inexpensive coaxial cable compatible lightning arrestor can be easily made from a common PL-259 female-to-female adapter such as the Amphenol type 83-1J. You will need a #51 drill bit, a 2-56 tap (and tap handle), a 2-56 x 1/2-inch long machine screw, a #2 lock washer, a crimp-type #2 lug and two 2-56 hex nuts. Referring to *Figure 1*, first carefully drill a hole through one side of the adapter at the center as shown. Very slowly and carefully start drilling through the brass outer sleeve of the adapter but stop as close to the center conductor as you can without actually passing through it. Be careful with the drill bit as it can break easily. Using a power drill (at a slow speed) or a drill press to cut through the brass is OK, but as soon as you are through the metal, immediately remove the drill bit and use your thumb and forefinger to finish the job through the plastic. If you look through one end of some versions of the adapter, the insulating plastic material is clear enough (Amphenol in particular) and, with a good light on the other side, you can actually see the progress of the drill. Remember to avoid damaging the center conductor. Next carefully tap the hole you just drilled. Allow the tap to pass only through the brass. Try not to damage the plastic insulation. Now thread one hex nut, the crimp-type lug, the second hex nut and finally the lock-washer onto the screw. Now screw the assembly into the hole you just tapped. *Figure 2* is an exploded view of what the final assembly should look like. Such an assembly should be fine for transceivers in the 100-watt class. Higher powered units or linear amplifiers would need a bigger gap.

To adjust the unit, first connect your ohmmeter to the center conductor of the adapter and the shell. Slowly turn the machine screw clockwise until it just shorts to the center conductor, then turn it two full turns counterclockwise. If there is any plastic left preventing actual contact, clear it out with a needle or

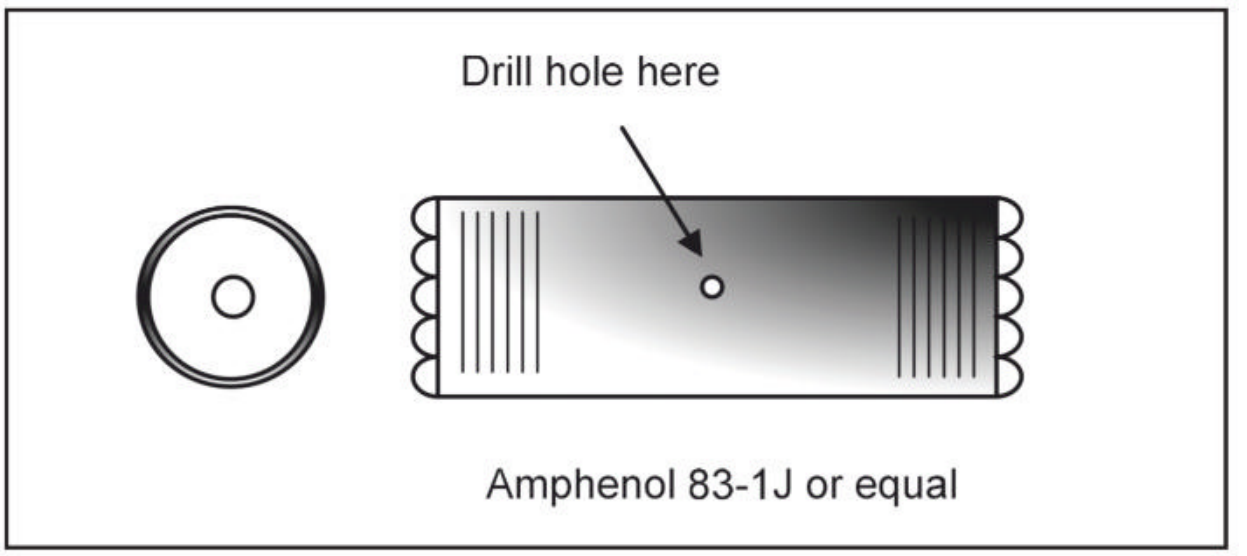

Figure 1. Location for tap drill

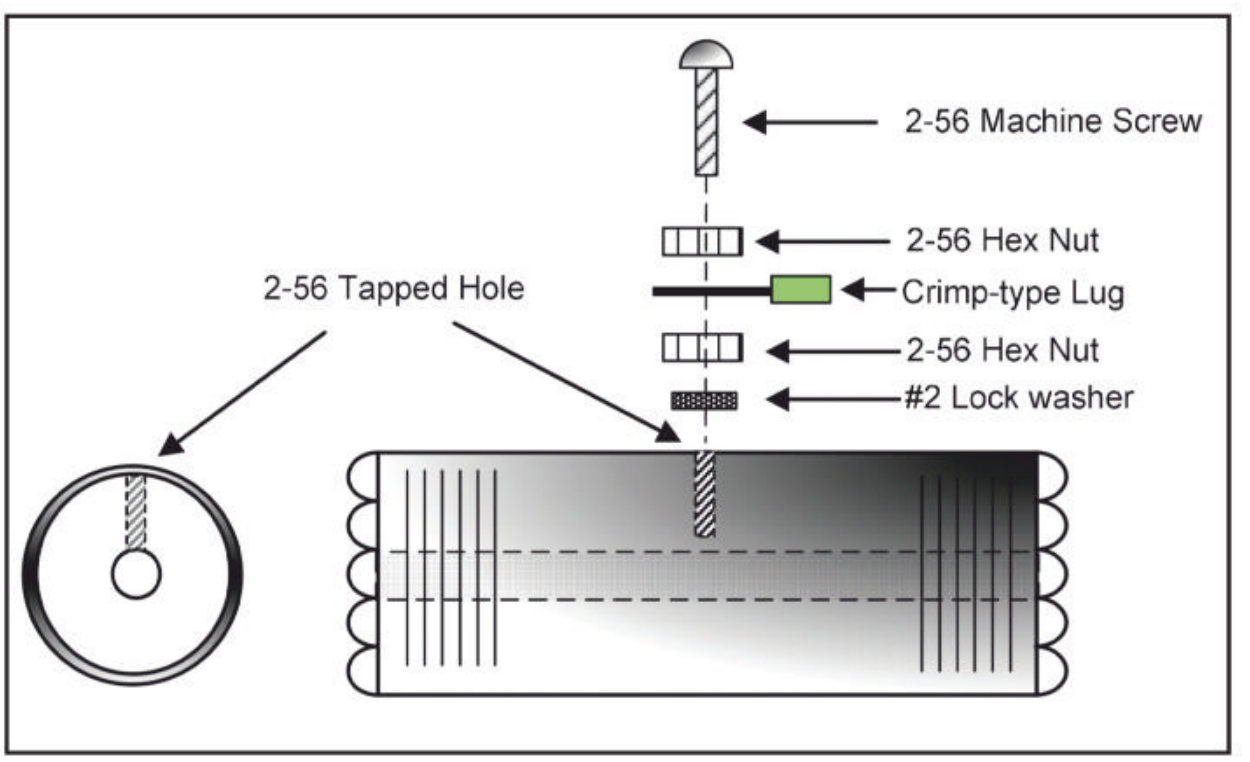

Figure 2. Component assembly details

*c/o CQ magazine

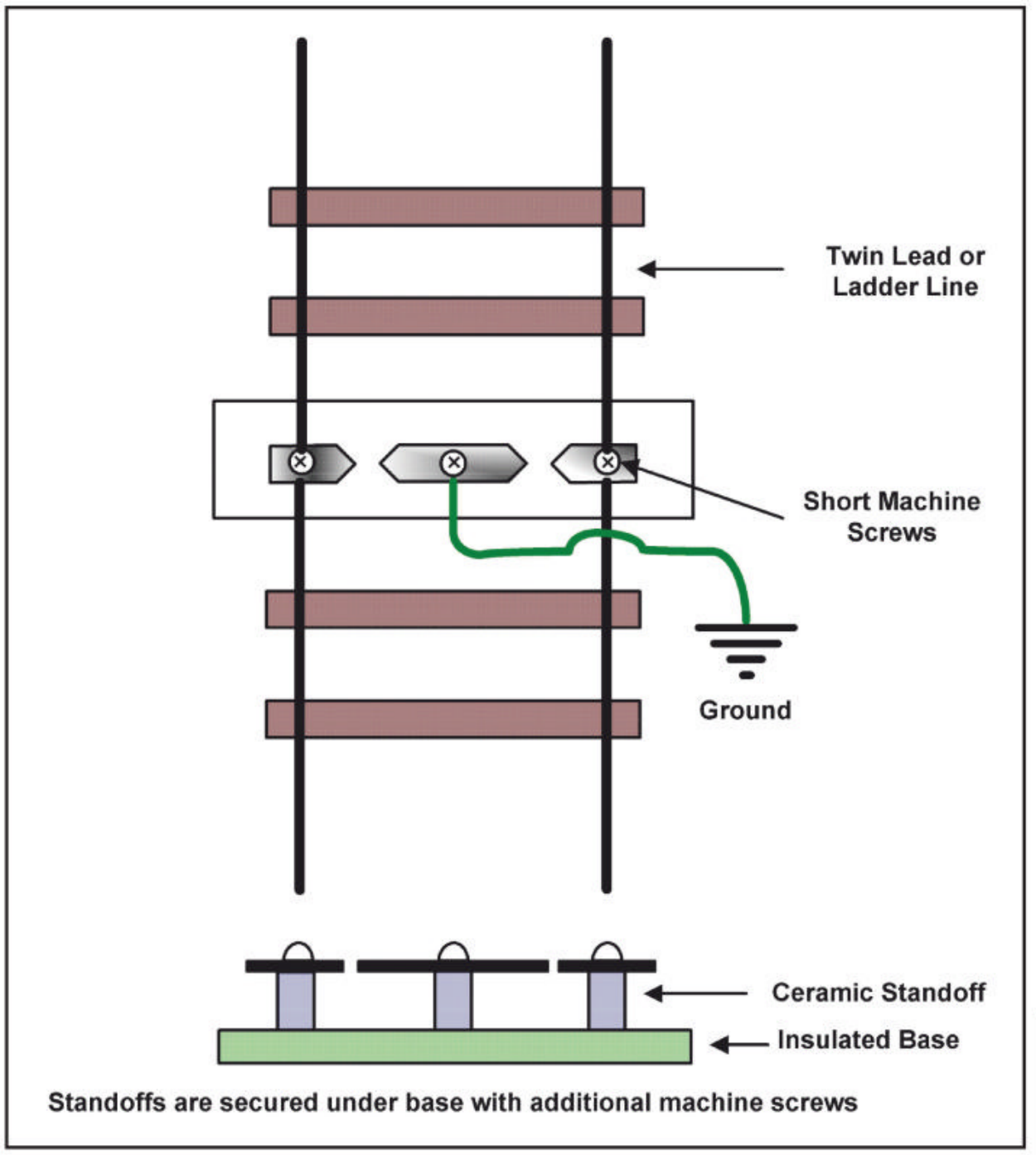

Figure 3. Lightning arrestor for balanced lines

other such implement that will fit into the hole.

Next, ensuring that there is *no* actual contact, connect the adapter in series with your transmitter and a 50-ohm dummy load. Now key your transmitter (in the CW mode) at full power (a duration of one "dit" will be enough) to be sure that the gap doesn't arc. If it does, turn the 2-56 screw another full turn counterclockwise and repeat the procedure until you reach the point where the gap doesn't arc at the maximum power level you plan to use (or that your radio will produce). Now repeat this process with the actual antenna you plan to use. This will assure that the gap will not short the coax on signal peaks.

If the actual SWR with the antenna is higher than that of the dummy load, the gap may again arc and you will have to turn the 2-56 screw a bit further counterclockwise. Once you have found the correct setting, tighten the first hex nut (on top of the lock-washer) to secure the screw in position. It would be a good idea to also use a bit of paint or nail polish to make sure the screw will not move in the future. Next, tighten the second nut over the crimp-lug and connect a #10 to #14 wire from the lug to a good earth ground. Once again recheck that the center conductor of the adapter to be absolutely sure it is not shorted to the shell. Finally, if the arrestor is located outdoors, cover it with some sort of weatherproofing material. While this arrestor is obviously not as perfect as a gas discharge or similar commercial type, it is certainly better than using nothing at all.

Balanced Line or Twinlead

Figure 3 is a lightning arrestor designed for use with balanced line or twinlead. This is an older design and has been described many times in the past. Three insulated stand-off insulators are arranged on an insulating base with approximately the same spacing as the twinlead or ladder line you are using. A double-sided metal gap and two single gap elements are then cut from 1/16-inch-thick sheet metal and secured to the insulators as shown. It is a good idea to use sheet metal that is treated to prevent rust, such as copper or even the galvanized-type iron or steel that heating ducts and accessories are made of. The two conductors of the transmission line are then secured under screws and washers as shown. Finally, the center gap portion is connected to ground through a #10 to #14 wire. The insulators are of the type that is not threaded through but only a short distance in on either side such as the Keystone 7700 series. If ceramic is not available, you can always use polystyrene rod instead and thread each end a short distance into the rod. The spacing of the gaps is adjusted in a similar manner as the coaxial arrestor, just wide enough to prevent arcing at maximum power and worst-case SWR.

Both of the arrestors described are generally passive and should not upset the impedance (or SWR) of your setup significantly from 160 meters to at least 10 meters.

Good luck and please let us know of your successes (or failures).

– 73, Irwin, WA2NDM

THE LISTENING POST

BY GERRY DEXTER

Radio Ukraine Lives On Via WRMI

~ Lately, the media have been focused on the war in Ukraine and it's virtually impossible to keep up with daily — sometimes hourly — news updates. So far, about the only semi-stable news is that WRMI is airing Radio Ukraine International from 1200-1300 UTC, currently on 5010 kHz. (RUI, itself, is long gone from shortwave). You might also check other WRMI frequencies just in case. There is a l-o-n-g listing in the 2022 *World Radio TV Handbook* (WRTH [p. 512]).

~ Radio Japan (NHK) has discontinued its service in Spanish, effective as of last March.

Listener Logs

Your shortwave broadcast station logs are always welcome. But please ensure to double or triple space between the items, list each logging according to the station's home country and include your last name and state abbreviation after each. Also needed are spare QSLs, station schedules, brochures, pennants, station photos and anything else you think would be of interest. The same holds true for amateur radio operators who also listen to shortwave broadcasts ... I know you're out there! You, too, are also most welcome to contribute!

Here are this month's logs. All times are in UTC. If no language is mentioned, English is assumed.

ALASKA—KNLS via Anchor Point on 9520 at 1200 with woman giving an introduction, brief singing, man continued into a brief radio play which included traditional Chinese music. (Taylor, WI)

ASCENSION—BBC-South Atlantic Relay on 15400 at 1224 with short talks in French. (Brossell, WI)

AUSTRIA—Austrian Radio International, 6155 via Moosbrunn at 0559 with music opening and a man speaking German, right into the news. (D'Angelo, PA)

AUSTRALIA—Reach Beyond on 11900 via Kununurra with talks in Kurdish at 1245. (Brossell, WI)

BOLIVIA—Mosoj Chaski via Cochabamba on 3310 with woman speaking in Quichua at 0940. (Taylor, WI)

BOTSWANA—Voice of America Relay via Mopeng Hill on 6175 at 0426 with man speaking possibly in Shona. (D'Angelo, PA)

BRAZIL—(*all in Portuguese –GLD*)

Voz Missionaria possibly via Camboriu on 9665 at 2206 with an apparent sermon, (Brossell, WI) On 9666.6 at 0053 with man preaching and frequent screaming outbursts. (Taylor, WI)

Radio Brazil Central via Goiania on 11815 at 0155 with man hosting program of nice pop vocals. (D'Angelo, PA)

Radio Inconfidencia via Belo Horizonte on 15190 at 1253 with the clearest signal from them I've ever heard. (Brossell, WI)

CANADA—Bible Voice on 13300 via Nauen (Germany) at 2142 with a slow-paced sermon in Nuer. (Taylor, WI) On 15310 at 1614 with talks in Oromo. (Brossell, WI)

CHINA—China Radio International on 11620 via Xi'an in Japanese at 1210; on 11875 via Urumqi in Russian at 1728; on 11630 via Mali at 2011 with program on the wealthy vs. those without. (Brossell, WI) On 11820 via Xi'an at 0034 with Chinese vocals, talk in Cantonese, woman hosting program of local vocals to 0057*. (D'Angelo, PA) On 13770 via Xi'an at 0003 with woman reading the news in Vietnamese followed by talk features. (D'Angelo, PA) On 15125 via Beijing at 0015 in English with an interview on China / Russia. (Sellers, BC)

Grrr! Wolverine Radio issued this QSL recently. Its content may not be much but some pirates do have attractive QSLs.

CNR-1 via Ge'ermu on 4800 in Mandarin with alternating male and female announcers; also on 6175. (Taylor, WI)

Voice of the Strait on 4940 via Fuzhou at 1240 in Mandarin, man and woman alternating short sections each; on 4900 which was running a few seconds behind. (Taylor, WI)

PBS Xinjiang on 6120 via Urumqi in Uighur with man droning on at 1232. (Taylor, WI)

ECUADOR—HCJB on 6050 via Pinchincha at 0349 with woman in Spanish hosting music, flutes at 0400, man giving station ID, then more vocals. (D'Angelo, PA)

ENGLAND—BBC on 12065 via Madagascar with interview in Somali; on 21470 via Vatican at 1455 in Somali Arabic, news headlines at 1449, off at 1500. (Taylor, WI) On 15325 via Philippines in Burmese at 1333. (Brossell, WI)

FRANCE—Radio France International, 5925 via Issoudun at 0601 with woman giving announcements in French, then man reading the news. (D'Angelo, PA) On 15340 via Issoudun at 1758 with program going off and being jammed by possible Oromo Media (to Ethiopia) which also went off with tones at 1801. (Taylor, WI)

GERMANY—Deutsche Welle on15275 via France relay in Amharic at 1605. (Brossell, WI)

Radio Oomerang on 15215 via France at 1604 in Frisian, German, and English on the German high school system, including general information in English in this annual broadcast. (Taylor, WI)

GUAM—Adventist World Radio on 9975 via Agana in Cantonese at 1338. (Brossell, WI)

INDIA—All India Radio on 9620 via Bengaluru at 1826 with South Asian music alternating with Indian film soundtrack music, man with Arabic commentary to 1900 close. (Taylor, WI) On 11560 via Bengaluru in Dari at 1417. (Brossell, WI) On 15030 via Bengularu in Swahili at 1253. (Taylor, WI)

**c/o CQ magazine*

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TWR India on 12075 via Armenia in Maghi at 1343 with South Asian music, man with closing announcements, opening in Hindi at 1345. (Taylor, WI)

IRAN—VOIRI on 9510 via Sirjan in Pashto at 1310 with woman with flat intonation reminding me of the "dead lady" on Radio Tirana years ago. (Taylor, WI) (*Or the "dead lady" with news at 0100 on RAI-Italy back then? –GLD*)

JAPAN—Radio Japan on 6190 slightly on top of PBS-Xinjiang; Japan had a periodic chiming musical bridge over talk; it was really a mess here, must have been a cacophony for listeners in Asia. (Taylor, WI) On 15130 at 2013 in Japanese. (Brossell, WI)

KUWAIT—Radio Kuwait in 5960 via Sulaibiyah with two men and a discussion in Arabic, another man with announcements and more music from 0426. (D'Angelo, PA)

MYANMAR—Myanmar Radio on 5985 via Yangoon in Burmese at 1248 with distinctive BB music and a male announcer. (Taylor, WI)

NIGERIA—Voice of Nigeria on 11770 via Abuja at 1842 with woman speaking in English but poor modulation left only a few words intelligible. (Taylor, WI)

NORTH KOREA—KCBS on 11710 in Korean at 1213. (Brossell, WI)

OPPOSITION—Voice of Tibet (via Tajikistan to China) on 9864 at 1306 with woman speaking in Tibetan, later the frequency had jumped to 9886 with man and woman alternately talking; off on sked at 1330. (Taylor, WI)

Radio Erisat (via Madagascar to Eritrea) on 11690 with man speaking in Tigrinya, vocal segment, another talk; seemed to go off at 1857. (D'Angelo, PA)

Dimitse Weyane (via France to Eritrea) on 15160 in Tigrinya at 1539 with slow speaking woman, later station ID, announcement and close at 1559. (Taylor, WI)

Iran International (via Tajikistan to Iran) on15629.8 in Pashto at 1248 with man and woman alternately talking. (Taylor, WI)

Radio Manara International (via France to Nigeria) on 15285 at 1608 with man speaking in Hausa, instrumental music, another man talking until the station went off at 1658. (D'Angelo, PA)

Echo of Hope (South Korea to North) on 9105 with distinctive flute, station ID, announcement, and apparent news. (Taylor, WI)

Radiyoni Diree Shaggar (via France to Somalia) on 15415 at 1617 in Somali against pulse-type jammer. (Brossell, WI)

Denge Welat (via France to Turkey) on 9525 at 2122-2159* with non-stop Kurdish vocals; then cut in mid-song. (D'Angelo, PA) On 11540 (via Moldova) at 1450 in Kurdish with man and woman talking alternately. (Taylor WI)

Radio Rayceep (jammer from Turkey against Kurds) at 1446 with man (possibly Erdogan) giving a speech. (Taylor, WI)

PERU—Radio Tarma via Tarma on 4775 at 1012 with contemporary Andean music, commercial mentioning Tarma, more similar music. (Taylor, WI)

PHILIPPINES—Far East Broadcasting on 9875 via Bocaue with woman speaking in the Mein language to 0000 close. (Taylor, WI)

PIRATES—Philo Radio (Zeeky) on 6927 upper sideband (u) at 2323 ending song, wicked laugh, music box, man talking, electric guitar, heavy metal. **HellifIknow** on 6927 at 2207 with man talking about the music, causing QRM to 6925, more rock at 2305 then a station ID at 2308. **Not Clever Name Radio** on 6920 at 2132 with woman and station ID, then rap, possible FDR speech. **Lincolnshire Poacher** (possibly) on 6915u at 0110 with woman giving 5-digit numbers. **Texas Radio Shortwave** on 6205u at 2318 with pop, Slow-Scan TV (SSTV) / FAX. **Incel Alert Radio** on 6932 lower sideband (lsb) at 0002 with man speaking at length, occasional station IDs, Rolling Stones. (Hassig, IL)

10 Watts and a Wire on 4185 at 0018 with all ZZ Top things, SSTV at 0037, another at 0056, off at 0200. **Hellifiknow Radio** on 6930 at 0224, indistinct, then contemporary dance things, station ID over music at 0226, possible station ID

All India Radio highlights its Asian language offerings.

Hams marked the Voice of America's 80th Anniversary with this QSL.

again at 023, SSTV, poor at 0300 with another SSTV. **WFDR** on 6940 at 2223 with FDR speech. **Radio Ronin Shortwave** on 6940 at 2159, IS, station ID, talk, blues number, off briefly, canned station ID with frequency and sound effects. **Radio Casablanca** on 6905u at 2359 with novelty country, email, part of Texas Shortwave's memorial service for Dr. Tim who had passed away. **Good Times Radio** at 2229 and remixed numbers, then other era pop. **Radio Pushka** on 6020 at 0050 with mellow vocals. **CDO** on 4185 at 0146 with an SSTV that didn't decode; others followed that did. **Wasteland Radio** on 6925u at 2149 with an echoey station ID and off at 2151. (Taylor, WI)

REPORTED IN EARLIER LP COLUMNS: **Outhouse Radio**, **Radio Free Whatever**, **Mix Radio International**, **Clever Name Radio**, **Undercover Radio**, **Sycko Radio**, **Wolverine Radio**, **WTF Radio**, **Hellifiknow Radio**, **Captain Morgan Shortwave**, **Radio**, **WDOG**.

MALAYSIA—Sarawak FM on 9835 via Kajang at 1254 with contemporary vocals, no Iran that morning. (Taylor, WI)

MYANMAR / CHINA—Thazin Radio / CNR-6 via Beijing on 6165 at 1241; Thazin with mellow Burmese music, CNR in Mandarin. (Taylor, WI)

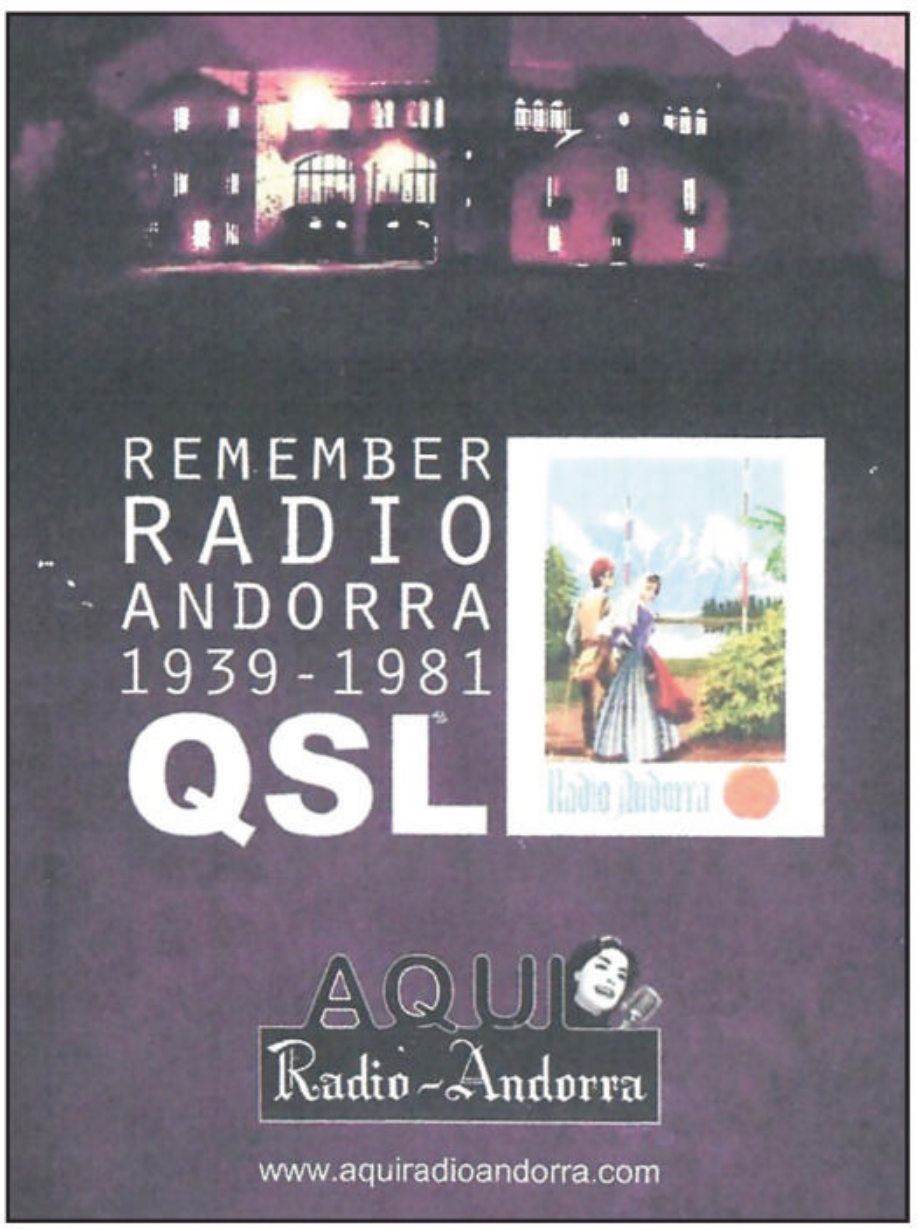
ROMANIA—RRI on 5990 via Galbeni at 0123 with man talking about Ukraine, into music bridge; also on 7315. (Sellers, BC)

SOUTH KOREA—KBS World Radio on 15575 in Korean at 1435. (Brossell, WI)

SPAIN—REE on 11685 via Noblejas at 2302 with man readin the news in English, many items about Spain. (D'Angelo, PA)

SUDAN—Republic of Sudan Radio on 7205 via Omdurman in Arabic at 0115 with a man talking and Arabic music. (Taylor, WI)

SRI LANKA— Sri Lanka BC on 11905 via Trincomalee, carrier on, NA, indigenous music, then woman into Bangla, man with



Radio Andorra was saluted recently on its 40th anniversary via Gavar, Armenia. The real Radio Andorra has not been on shortwave since 1981.

WHAT'S NEW

Electric Radio's New March-April Issue Ships

No reference on radio books of interest would be complete without mention of a modern classic, *Electric Radio* magazine. *Electric Radio*, or "ER" as it is known by its readers, is the modern-day equivalent of 1940/50s vintage *QST*. Published once per month, each issue numbers close to 60 article pages relating to equipment, people, and companies that influenced the growth of amateur radio in the past and present. The current publisher and editor is Ray Osterwald, NØDMS. The magazine was first established in May 1989 by Barry Wiseman, N6CSW. In 2002, ownership of ER changed to Ray, who continues the tradition of providing interesting reading to the vintage communications equipment user and collector. Visit the ER website for complete information and to purchase a subscription: <www.ermag.com>.

SPURIOUS SIGNALS By Jason Togyer W3MCK
spuriouscomic.blogspot.com

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BEHIND THE BYLINES...

... a little bit about some of the authors whose articles appear in this issue

H. Russell Smith, N0QLT (Poem, "CW," within Zero Bias, p. 6), is an electrical engineer and author of *Time Machines, Annoying Minotaurs, and Other Childish Pursuits* and *Windmills*. He is a citizen of the Cherokee Nation and lives near Joplin, Missouri. Although he's not super good at it, CW is—and always has been—his favorite mode.

Steven Karty, N5SK ("Who REALLY Invented Morse Code?" p. 8), is a former manager of the Department of Homeland Security's SHARES (SHAred RESources) High Frequency program. Licensed since 1960, has written extensively in the ham literature on digital communications as well as several articles for *CQ* on protecting your station from lightning and electromagnetic pulse (EMP) voltage surges. He has recently been researching the early history of Morse code.

Dr. Horacio Sergio Falciglia, KA8TVY ("CQD, SOS and the Sinking of the Titanic," p. 24), is a Professor Emeritus of Pediatrics at Cincinnati Children's Hospital / University of Cincinnati College of Medicine in Ohio. He holds a General Class amateur license and belongs to the ARRL and the OH-KY-IN Amateur Radio Society. He lives in Cincinnati.

Steven E. Perry, W2HAF ("Looking Back: A Classic CQ Transmitter Project," p. 32), says his early ham radio experiences launched his career as an electronic engineer. He's arranging with a nearby ham who's a "boat-anchor" enthusiast to try to get his little transmitter working and maybe even make a contact or two with it! He'll let us know if they're successful.

Martin Butera, PT2ZDX/LU9EFO (Guest columnist, "Emergency Communications," p. 45), has been a frequent contributor to recent editions of *CQ* and is now our newest Contributing Editor. He has an "at large" portfolio which will let him continue to write about a wide variety of topics.

possible Islamic prayer, woman at 0037 then more vocals. (Sellers, BC)

TAIWAN—RTI on 9555 via Paochung in Mandarin at 1203. (Brossell, WI)

THAILAND—Radio Thailand on 13750 via Ban Dung on with bells / gongs, HSK9 station ID repeated several times to 0005, then woman hosting program in English and splatter from Cuba on 13740. (Sellers, BC) At 0023-0029* with business news in English, station ID, and woman reading station promos. (D'Angelo, PA)

TURKEY—Voice of Turkey on 6125 via Emirler at 0424 with woman hosting English program with Turkish music and short talks, nice station ID at 0439. (D'Angelo, PA) On 15450 with opening English station ID at 1300. (Brossell, WI)

UNITED STATES—VOA / Deewa Radio on 11825 via Thailand at 1253 in Mandarin; on 12035 via Thailand in Pashto at 1318. (Brossell, WI)

Radio Free Asia on 9305 via Tajikistan at 1251 with man and woman speaking in Tibetan, a CNR-1 jammer almost always here but not to 9255 today. (Taylor, WI) On 11955 via the Northern Marianas Relay with woman reading the news in Burmese at 1000. (Taylor, WI) On 15265 via Biblis (Germany).

Radio Liberty (RFE/RL) on 15310 via Woofferton (England) in Uzbek at 1425. (Brossell, WI)

Radio Farda on 12005 via Woofferton in Farsi at 1346. (Brossell, WI)

Adventist World Radio on 15215 via Nauen in Hindi at 1554, (Brossell, WI) on 11730 via Germany at 1733 in Oromo with woman and man talking briefly then back to woman talking. (Taylor, WI)

WBCQ via Monticello on 4790 at 2254-0002 with multiple station IDs opening test message at 2300 and old-time jazz, nice station ID at 2359 followed by *Alan Weiner's Worldwide* program at 0000, this block started on March 1. (D'Angelo, PA) At 0147 with test in English, eventual WFMU station ID with FM frequency and 6190 WBCQ station ID and web address, off at 0201. (Taylor, WI)

WJHR via Milton (Florida) on 15555 at 1801 with usual male preacher, station ID sequence of gospel singers, then a full legal station ID. (Taylor, WI)

VIETNAM—Voice of Vietnam on 9840 via Son Tay at 1300 signing on in Indonesian, woman and man talking, second man giving longer talk section, brief digital signal on 9833 for about 30 seconds. (Taylor, WI) At 2331 with woman reading the news. (Sellers, BC) On 12020 via Son Tay at 1311 in Indonesian. (Brossell, WI)

ZAMBIA—Voice of Hope on 11680 via Makeni Ranch at 0410 with religious vocal, woman with "Living by Faith" feature, later man giving station ID, then more religious vocals. (D'Angelo, PA)

Quien Sabe (Who goes there?)

~ On 9290 at 1301 with woman possibly reading the news, then into religious format, signal was too poor to get an idea of the language but seemed almost English or Korean at time, suddenly disappeared in mid-sentence at 1334. (Taylor, WI)

As Time Goes By

~ La Voix du Pathet Lao clandestine from Sam Neua, Laos, at 1212 UTC on January 29, 1972 in Lao.

Thanks for Your Logs

Thank you to the good guys this month, who include: William Hassig, Mt. Pleasant, IL; Harold Sellers, Vernon, BC; Rich D'Angelo, Wyomissing, PA; Mark Taylor, Madison, WI; Rick Barton, El Mirage, AZ; and Bob Brossell, Pewaukee, WI.

Until next month ... Keep on keepin' on, and ... be sure to Celebrate Shortwave!

Radio Club Venezolano Participated in the CARIBE WAVE 2022 Emergency Exercise

BY MARTIN BUTERA,* PT2ZDX / LU9EFO

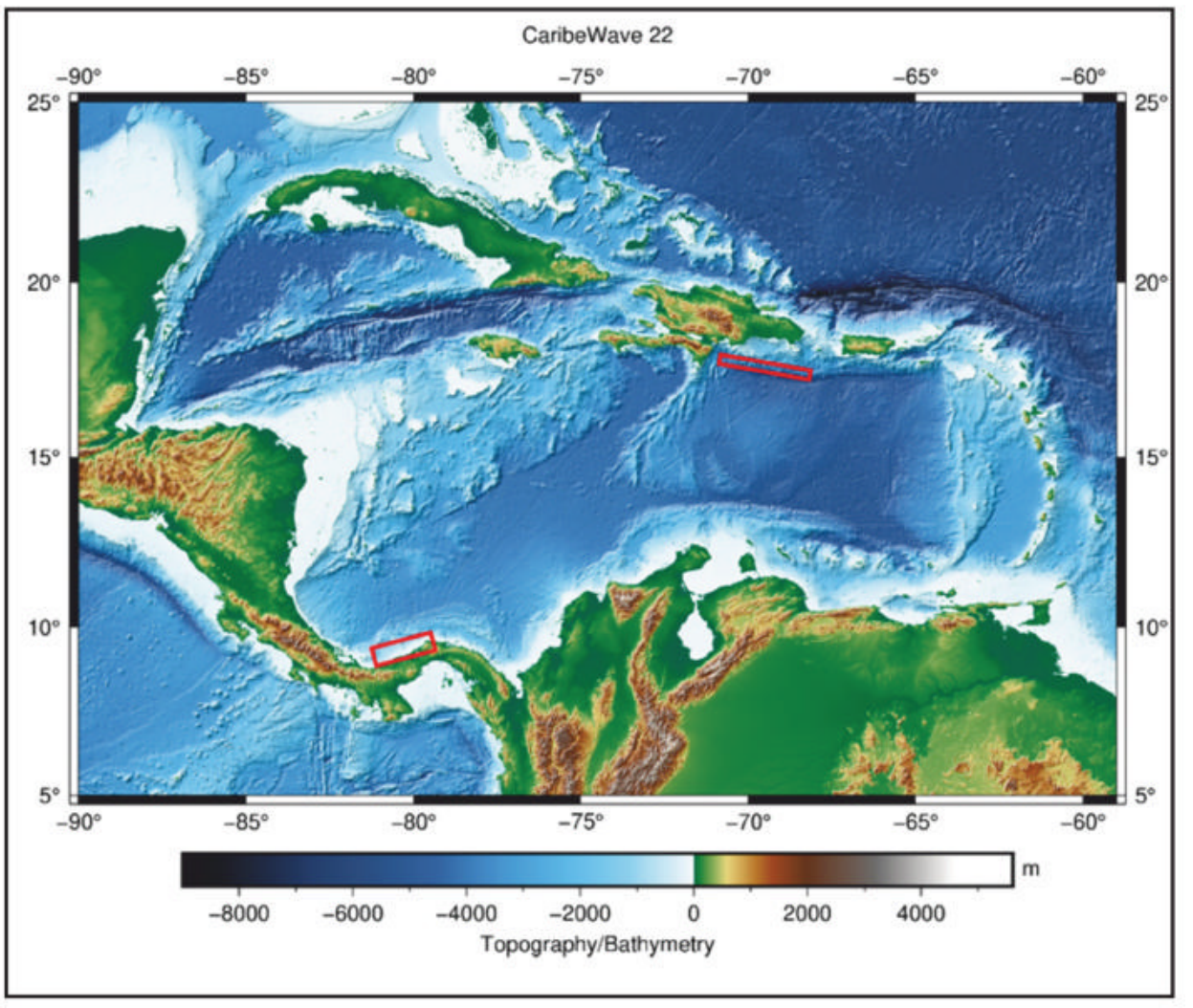


Figure 1. CARIBE WAVE 2022 simulated two different scenarios, each involving a tsunami touched off by a large earthquake. The two red rectangles indicate the locations of the exercise earthquakes. (Map courtesy tsunamizone.org)

Our correspondent in Brazil fills in once again this month as we continue to search for a permanent Emergency Communications Editor, sharing another report on amateur radio EmComm in South America and an interview with the editor of the Venezuelan Radio Club's magazine, Henry Hernández Gonzales, YV5TT. –W2VU

The Venezuelan Radio Club (YV5RCV – YV5AJ – YV5RNE) is one of the oldest amateur radio institutions in South America, this year celebrating the 88th anniversary of its founding. It is a radio club that has always been committed to society, through its permanent collaboration in different catastrophes and emergencies.

And on this occasion, it was one of many institutions taking part this past March in the important CARIBE WAVE 2022 exercise.

With its lengthy coastline along the Caribbean Sea, Venezuela is not immune to the risk of tsunamis, which is why its participation in CARIBE WAVE 2022 was very significant, if not crucial.

CARIBE WAVE is the annual tsunami exercise of the Intergovernmental Coordination Group for the Warning System against Tsunamis and other Coastal Hazards in the Caribbean and Adjacent Regions (ICG/CARIBE-EWS) of the Intergovernmental Oceanographic Commission (IOC), which is part of UNESCO, the United Nations Educational, Scientific, and Cultural Organization. The U.S. National Oceanographic and Atmospheric Administration, NOAA, is also a key participant.

The NOAA / UNESCO IOC International Tsunami Information Center Caribbean Office serves as the exercise coordinator for the Caribbean Tsunami Information Center. The Caribbean regional risk management organizations CEPREDENAC [Coordination Center for the Prevention of Natural Disasters in Central America], CDEMA [Caribbean Disaster Emergency Management Agency] and EMIZA [French Interministerial for the Main Zone of the Antilles], also contribute to the success of the exercise.

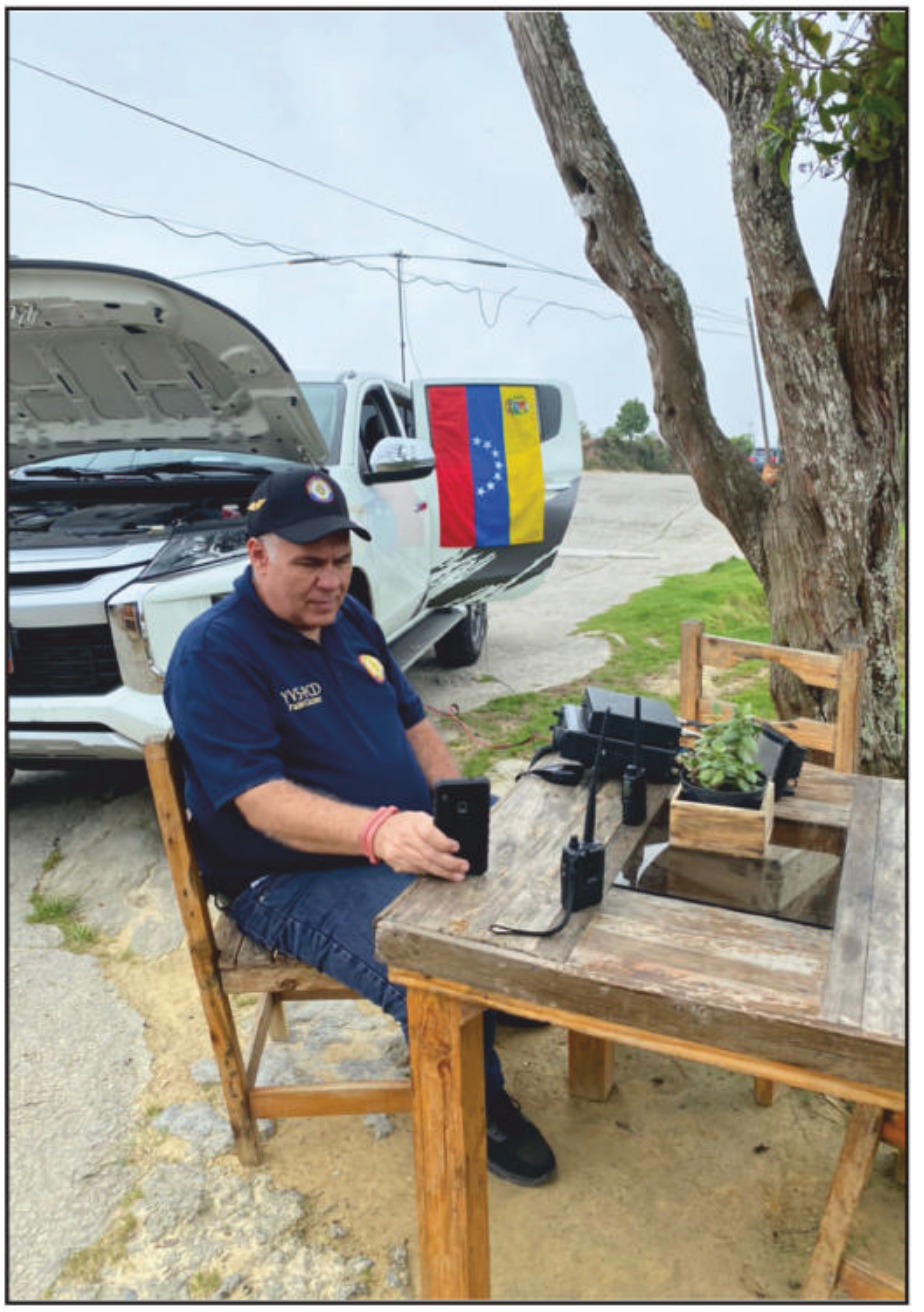
The purpose of CARIBE WAVE 2022 is to validate and promote tsunami preparedness efforts in the Caribbean and adjacent regions. An annual regional exercise, CARIBE WAVE 2022 was held on March 10, 2022, beginning at 1400 UTC.

CARIBE WAVE 2022 simulated two different scenarios. Each participating country selected the scenario that best fit its objectives. The first scenario simulated a tsunami generated by a magnitude-8.0 earthquake located west of the "Trench of the Dead," south of the Dominican Republic. The second scenario simulates a magnitude-8.3 earthquake and tsunami along the North Panama Deformed Belt (see *Figure 1*).

For them, CARIBE WAVE 2022 tested communications between the Pacific Tsunami Warning Center (PTWC) and

* Email: <martin_butera@yahoo.com.ar>

Venezuelan hams participating in CARIBE WAVE 2022 set up their portable stations on a cool, foggy, morning. (Photos courtesy Radio Club Venezolano and YV5TT)



The HF portion of the portable station, getting power from the truck battery. The weather had improved by the time this photo was taken!

the Tsunami Warning Focal Points (TWFP) and the National Tsunami Warning Centers (NTWC). Each country and territory decided if and how the messages would be disseminated within its area of responsibility.

Each of the 48 CARIBE-EWS member countries and territories participated in CARIBE WAVE 2022, for which local coordination was freely left to the corresponding activities within each jurisdiction. All National Tsunami Warning Focal Points and Warning Centers officially designated by CARIBE-EWS will receive products from the PTWC.

Venezuela's national amateur radio association, Radio Club Venezolano, participated in CARIBE WAVE 2022. To learn more about the club's participation, we interviewed Henry Hernández Gonzales, YV5TT, editor of the only magazine on radio amateurs that exists today in Venezuela, called "Magazine de Radio del Radio Club Venezuela." [Its next issue will be its 100th, which is quite an achievement in light of the political and economic crisis that Venezuela is currently going through.]

***CQ:** Henry, which scenario did Radio Club Venezuela choose and for what reason?*

Henry Hernández Gonzales, YV5TT: In the case of Venezuela, the first scenario was chosen and with good reason. The Trench of the Dead is considered the second fault system of high seismic hazard for the Dominican Republic. It is a production structure that is located in the Caribbean Sea, to the south of the island and forms part of the northern fringe of the Caribbean Plate, a very complex zone from a geotectonic point of view.

Experts in the area have already begun to study this area due to that it has produced large-scale movements. The most recent was the magnitude-5.8 earthquake that occurred in May 2021 on Saona Island. In this trench, there is an area of a large landslide and that is a bit worrying, because a landslide can occur there and cause a tsunami.

***CQ:** Henry, I know there are studies on this fault zone. What else can you tell us about this?*

YV5TT: Yes, this fault is already being studied. There are very interesting studies carried out by Santiago Muñoz, director of the island's National Geological Service (SGN).

In the last four years, there have been 146 telluric movements of magnitude 3.5 to 6 in the country. In the Surco de los Muertos, as it is also known, only nine have originated with a magnitude of 3.5 to 5.6. Close to it, 26 events have originated, according to statistical data provided by the Seismological Institute of the Autonomous University of Santo Domingo (UASD).

However, this little seismic movement that the trench presents should not be a reason for indifference. According to Santiago Muñoz and the geologist Osiris De León, when an

Yves Reol, YV5YVE, reports information on his VHF/UHF handheld during the exercise.

Net control for the amateur radio portion of the exercise was at YV5FUN, the amateur station at the Fundacion Venezolana de Investigaciones Sismologicas, or Venezuelan Foundation for Seismological Investigations.

active fault is not releasing energy, it is because there is a "lock," which indicates that it is "extremely dangerous" because the energy is accumulating and the day it released, it produces a highly dangerous seismic event.

Muñoz himself said he was very concerned, since the "trench of the dead" is only approximately 80 to 100 kilometers to the south of the island, in a depression 5.5 kilometers (3.4 miles) deep and there is data from historical earthquakes that caused damage at times when the city of Santo Domingo was not so developed, but now any type of earthquake that occurs in this area would be significant.

Both experts recalled that "Azua" in 1751 suffered an earthquake accompanied by a tsunami, which destroyed a large part of this province, and its epicenter also occurred in this trench.

In addition to the places mentioned, according to Osiris De León, Santo Domingo and the towns in the eastern part of the country, such as San Pedro and La Romana, could also be impacted by a movement in this area. "It can even affect the southern area of Puerto Rico, because that fault extends to there. Everything will depend on where the fault breaks." There is also an oceanographic study sponsored by the Spanish government, which showed that the so-called "Megasplay of the Dead," located in the middle part of the slope of the Deformed Belt of the Dead, shows similarity to another existing fault in Nakai, Japan, which has generated earthquakes of magnitude 8 on the Richter scale.

The researchers of the Caribenorte project determined that "the Megasplay of the Dead, almost in all probability, was the cause of the earthquakes of magnitude 8 of 1751, and magnitude 6.7 of 1984," being the first cause of destruction in the south of the Dominican Republic.

According to the developers of the oceanographic work, it is an area with active deformation, with seismic danger and in a certain form of tsunami, which contains a high level of danger.

CQ: *Can you estimate the occurrence of the next intense event at this location?*

YV5TT: Well, according to Osiris De León, the calculation of the recurrence period of earthquakes is a statistical analysis that is made based on the historical behavior of the fault, "but it does not necessarily mean that it is so, because these data fall within the range of probability … You have a probability that the next seismic event on that fault could happen in the next 30 to 40 years, but it doesn't necessarily have to be that way. It all depends on the amount of energy stored on that fault and the energy that was released. with that earthquake."

CQ: *Do you know the reason for the origin of the name of the "Trench of the Dead"?*

YV5TT: Yes, of course. In colonial times, when the pirate ships came to attack, since this place is very deep, great movements were generated in the water, so it seems that on this edge between the exit of Santo Domingo and that difference in elevation when going down to 5,000 meters, caused many pirate ships to disappear, and since then they warned each other of the danger of the "Trench of the Dead."

CQ: *Knowing about this fault, if one day there is a major event there, what can be done?*

YV5TT: Well, the specialists recommend that the population stay informed about these issues, to know how to react in the event of a tidal wave or earthquake. "If you hear on the radio that the earth trembled in a certain place and the epicenter was in the sea, then what you should do is remain calm, if you are near the site, get away and try to go up to an area of less danger."

***CQ:** Henry, finally tell us how the Radio Club Venezolano participated in the simulation of CARIBE WAVE 2022?*

YV5TT: Well, according to what was established and ratified by decree of the national government, the radio amateurs, through the National Emergency Network of the Venezuelan Radio Club, in one of its functions such as providing support to authorities in communications, in conditions of adverse natural events, as was the case of the CARIBE WAVE 2022 simulation. All radio contact logistics were deployed throughout the areas foreseen as affected within the exercise, in addition to the support of all colleagues who from their stations were attentive to any report or relief during it.

The confluence of information was received from the headquarters of FUNVISIS (the Venezuelan Foundation for Seismological Investigations), which, operating under its callsign YV5FUN, was the link between our operators and the Vice Ministry of Risk Management, whose operational base was at the headquarters of VEN911.

We thank the Radio Club Venezolano and colleague Henry Hernández Gonzales, YV5TT, for the interview, photographs and data provided for this article.

Sources:
- <www.tsunamizone.org>
- *Radio Magazine*, Year 9, number # 99 March / April 2022
- Radio Club Venezolano, Regional House San Antonio de los Altos Urb. Rosaleda Sur – San Antonio de los Altos Miranda State – Venezuela

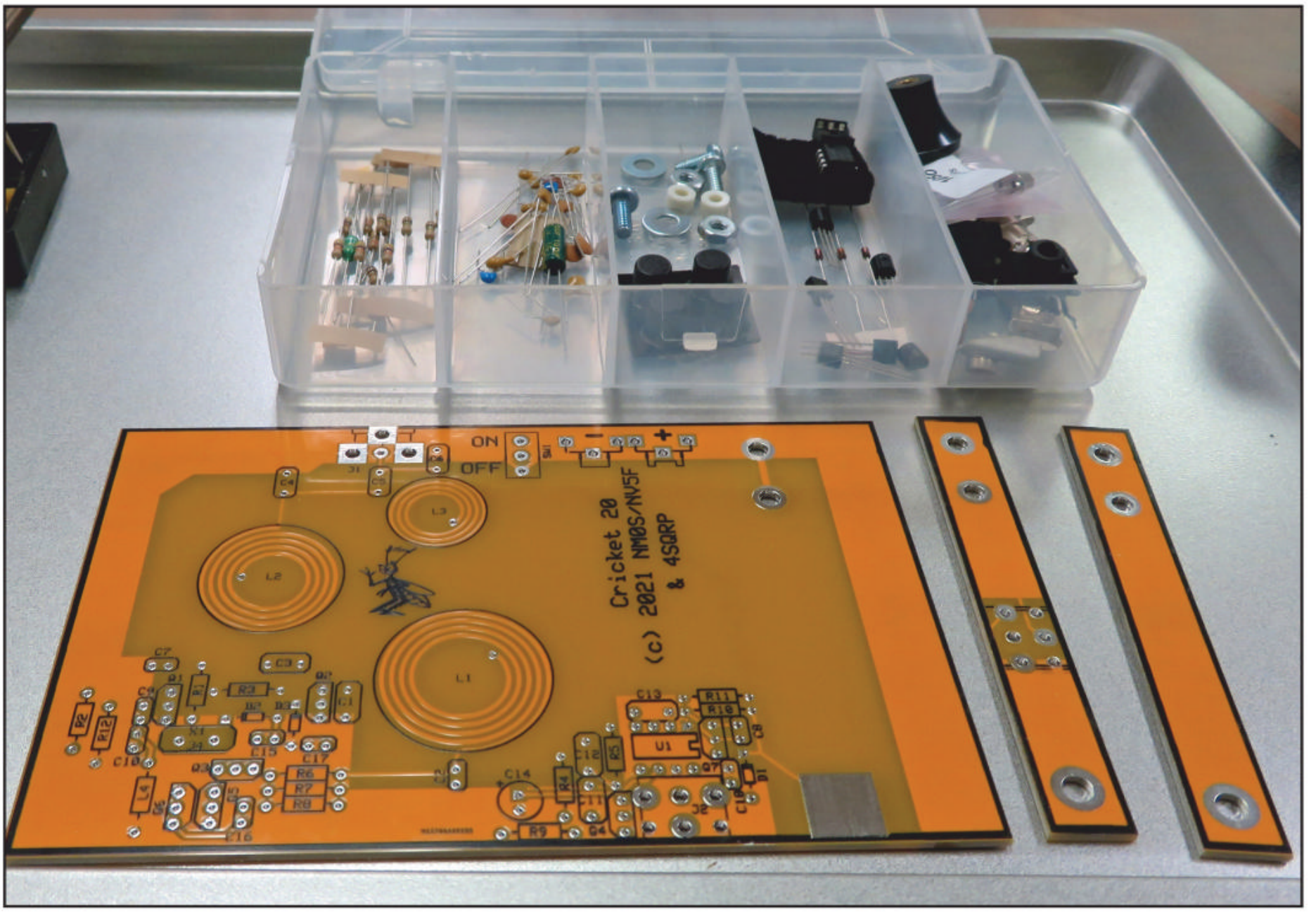
Help Wanted – Emergency Communications Editor

CQ continues to look for a new Emergency Communications Editor. If you're an experienced EmComm leader and at least a reasonably good writer, with time to prepare and write a monthly column, please contact Editor Rich Moseson, W2VU, via email at <w2vu@cq-amateur-radio.com>.

KIT BUILDING

BY JOE EISENBERG,* K0NEB

Warm Weather Brings Out the Crickets!



The PC board and parts are sorted and ready to begin assembly.

With warmer weather here, the sound of crickets becomes a staple of our Midwest evenings. The other sound of Crickets (with a capital C) comes from the new kit from the Four State QRP Group. The 20-meter version of the popular Cricket series of kits is now available. The previous versions of these kits covered 80, 40, and 30 meters. Originally designed by David Cripe, NMØS, the 20-meter version was developed by David as well as Virginia Smith, NV5F. Virginia also designed the new Cricket logo present on the 20-meter kit.

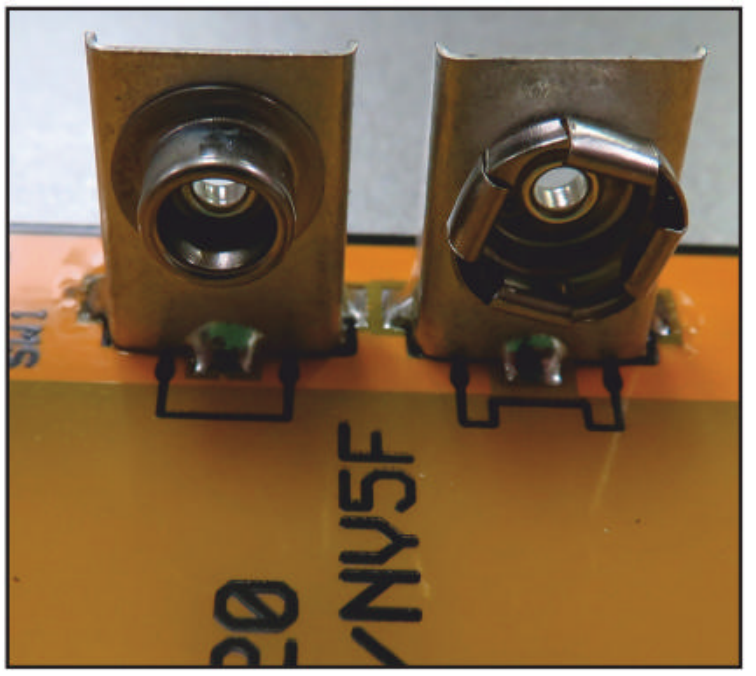
Like its predecessors, the 20-meter Cricket puts out almost 1 watt of CW RF and receives quite well. There are no controls for volume or fine tuning, but the genius of many kit builders have added those features as documented in the groups.io bulletin board devoted to this series of kits. There are no toroids to wind as the inductors are spiral wound on the PC board. I fill the vias with solder on those coils. There is a debate about the need to do this, but it takes so little time that I do it just to be sure. The reason for this is to reinforce the connections between the top and bottom layers on the PC board that make up the inductors. Vias are the tiny copper cylinders that connect the top and bottom layers of a double-sided PC board. In the case of this type of inductor, soldering them gives that connection added strength.

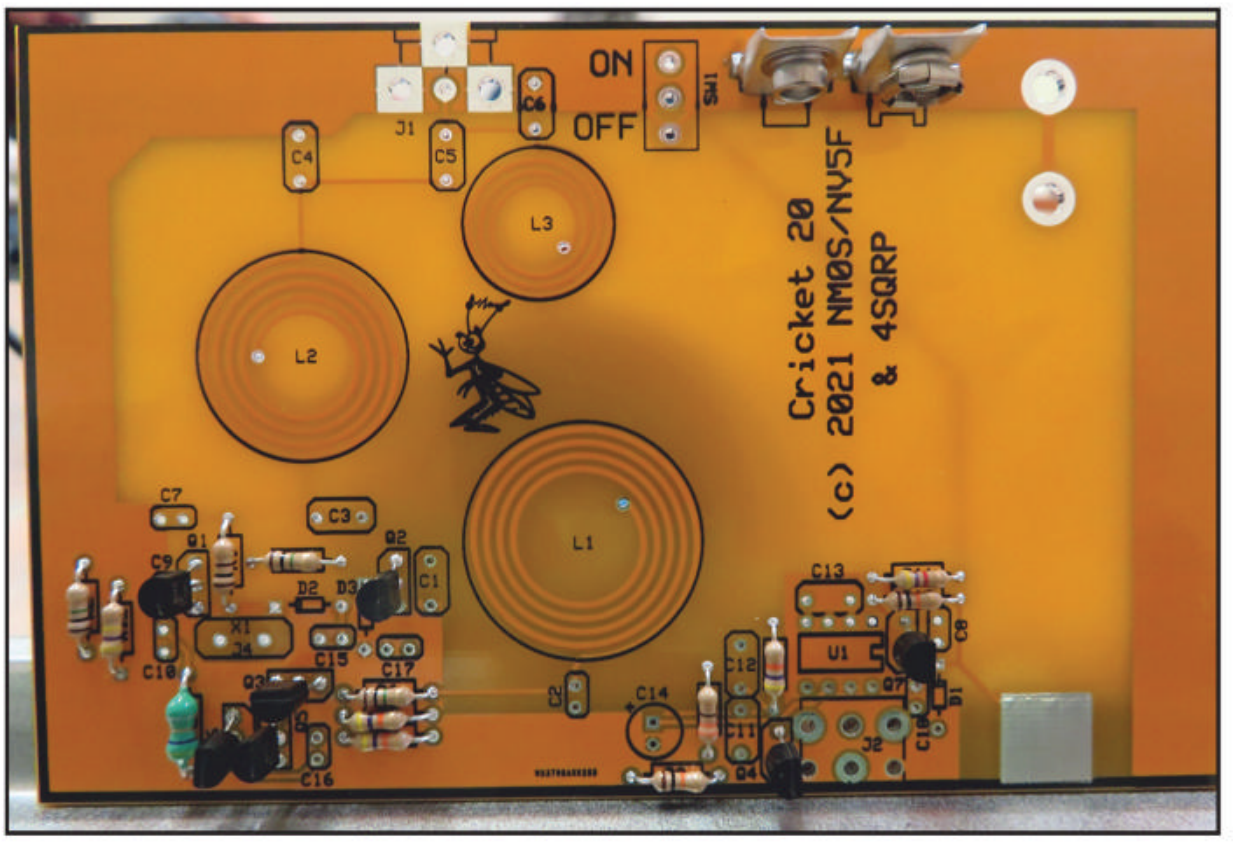
I partially assembled my Cricket at a local QRP/kit-building club to share the experience with others and finished it at home. Using a small parts container made it easy to sort the parts and safely transport them when building partly away from home. I noticed that, like many recent kits, the capacitors are very difficult to read. Using a component tester made that an easy task and made sure the capacitors being used were within tolerance and ready to go. Using a lighted magnifier, especially on the tiny blue capacitors, still makes it very difficult to read their value markings. A component tester makes identification an easy task.

A small 6-pin IC socket is provided with the kit, but not for mounting the 8-pin IC. It is to be cut apart and used as a crystal socket as per the instructions. The 8-pin IC is sol-

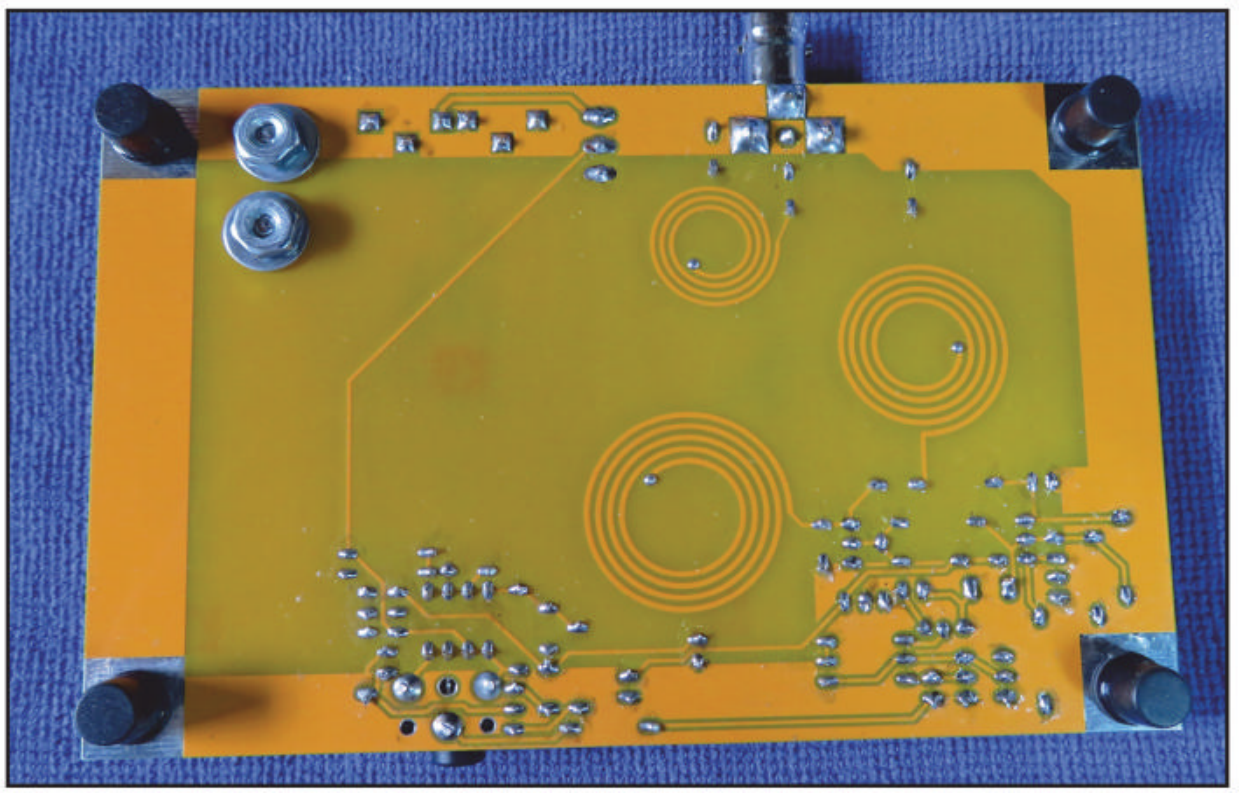
*7133 Yosemite Drive, Lincoln, NE 68507
email: <k0neb@cq-amateur-radio.com>
Hamfest Hotline #5855

The 9-volt battery tabs are the first things placed on the board and I recommend soldering them using enough solder to secure them to both the top and bottom sides of the board to provide the strength needed to handle repeated removal and installation of the 9-volt battery. Be careful to not cause a short between them when soldering.





Partially completed Cricket PC board. Notice the three vias in the spiral wound inductors have not been filled yet.



A view of the bottom of the PC board before the modification was made under D1.

dered directly to the board. The 20-meter Cricket comes with two crystals, one for 14.050 MHz and the other for 14.060. The previous kits only came with one crystal. There are sources for additional crystals for this band as well as for previous versions of the Cricket.

Expanded Spectrum Systems is a great source of high quality crystals in different sizes for this series of kits as well as most other QRP kits. Go to <www.expandedspectrumsystems.com> to check out their big selection of crystals.

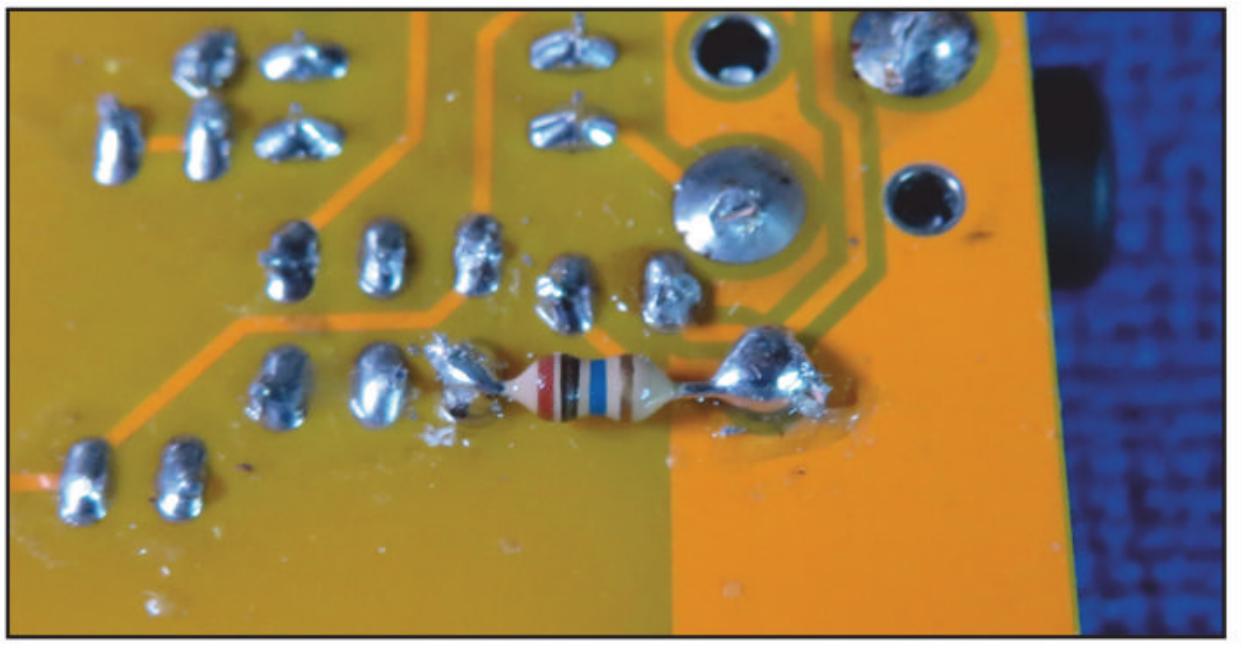
Rex Harper, W1REX, also has a variety of crystals available at <www.qrpme.com>. Look for a good, affordable, component tester at <www.wiredco.com>.

The Cricket series of kits are great for someone who wants an easier experience in building a good solid QRP CW transceiver. The parts placement is very straightforward. The instructions have you mounting all the resistors and one molded inductor first, followed by the semiconductors and the capacitors. The jacks and key installation follow. Yes, the straight key is a part of the kit. The material for it just snaps off the main board as well as a keyer adapter, which allows you to choose to use your own straight key or paddle with keyer. When snapping off these pieces from the main board, a very rough edge is exposed. Using an emery board very quickly smooths the edges that were exposed.

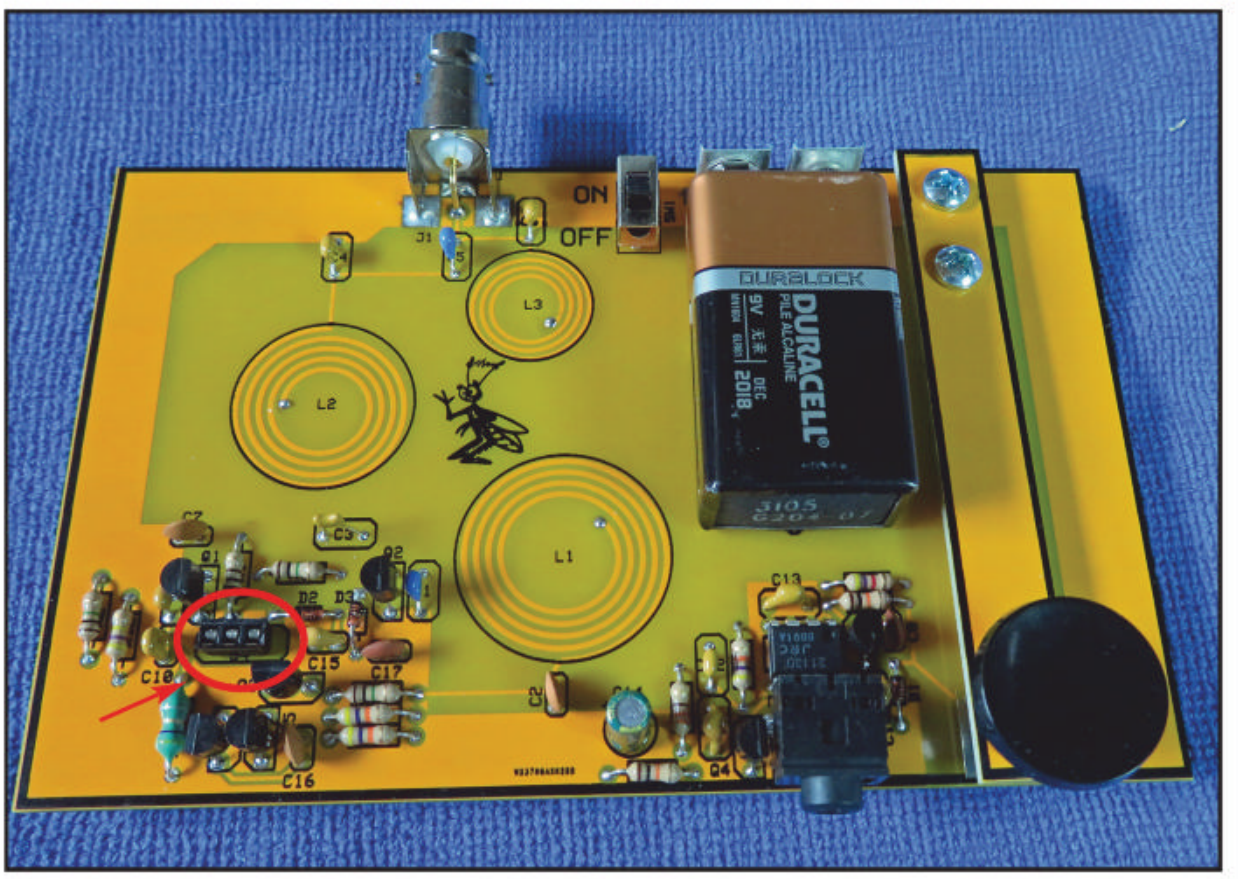
Fixing an Earlier Issue

An issue with lower receive audio output was discovered by many builders and using a 10-megohm resistor across D1 seems to help. Another issue is that when using certain kinds of headphones, the CW sidetone goes away. This is because of the way the audio output is configured. When I used a set of Bose noise-cancelling headphones, the sidetone was not audible. The reason is that the Bose headset has active noise-cancelling electronics between the input and the transducers. Using an unamplified Heil ProSet 7 headset, the sidetone was audible. Using an external amplified speaker works as well, but some of these will keep the CW sidetone from working.

Testing my Cricket, I got about 0.8 watts out with a fresh 9-volt battery. The Cricket lends itself better to being put into a 3D printed plastic case than a metal case. The reason is that the inductors on the PC board would be adversely affected by placement close to or inside a metal structure. The Cricket series of kits, including this lat-



The 10M resistor is soldered below D1.



The completed Cricket 20 with the crystal unplugged to show the crystal socket made from part of a 6-pin IC socket.

est one, are available from the Four State QRP Group at <www.4sqrp.com>. Look for more kits coming from the Four State team in the near future.

Coax Switch and a BNC Adapter

When recently adding a coax switch to my station at home, I got one with four inputs so I can select between four different HF rigs and have one output being a cable with a BNC connector on the end so that I do not need to use a coax adapter when connecting to a kit radio placed on my main radio desktop. Most kit radios use the BNC type of RF connector, so an adapter is only needed if the kit has an SO-239 output. A good quality coax switch allows me to keep my radios connected and lets me quickly connect a kit to my full array of HF antenna options. I use the AlphaDelta 4-position coax switches which can be seen at <www.alphadeltaradio.com>.

Hamvention® is almost here, so be sure to say hi if you see me wearing my famous hat at Dayton as well as at other regional hamfests. I plan on going to Huntsville as well as being a speaker at the Northeastern HamXposition in Marlborough, Massachusetts in August right after Huntsville.

– Until next time,
73 de KØNEB
Hamshack Hotline #5855

HOMING IN

BY JOE MOELL,* KØOV

Foxhunting Pranks and Championship Opportunities

Jammer tracking, noise location, search-and-rescue — these are some of the reasons why hams learn about radio direction finding (RDF). But no matter what your purpose, you'll find that it takes experience out in the field to become proficient with your equipment. Fortunately, practicing is lots of fun when hams get together to hold mobile hidden transmitter hunts, which they call T-hunts, foxhunts, or bunny hunts.

Hams sometimes ask, "What's so tough about mobile T-hunting? You just take a bearing, plot it, and follow it to the T. No problem!" Well, either these people haven't done much hunting, or they're incredibly lucky, or they have never gone up against a world class hider.

Even in the simplest hunts, it's typical for one or more teams to become completely baffled at some point. When the goal is to bamboozle everyone, there is no end to the stunts that an imaginative huntmaster can employ (see example in *Photo A*).

Photo A. It's not easy to tell, but one of these innocent-looking scraps of wood has a hidden QRP transmitter and wire antenna inside. Walking by the pile, would you have suspected it? The clever carpentry was done by Tom Curlee, WB6UZZ. (Photo by Joe Moell, KØOV)

Dirty Tricks 101

Most of my "Homing In" columns provide ideas to help the hunters. To even the score, it's time to help the hiders to prolong the suspense and the fun. But don't let the title fool you. You don't have to do anything illegal or unsafe to put on a tough hunt (and you shouldn't). Just use your ingenuity.

When a T-hunt is a difficult challenge, everyone benefits. The hider gets the satisfaction of knowing that the winners are working for their reward. The hunters gain valuable experience that may be useful on an RDF search / rescue effort, when lives are at stake. Most RDF fans would rather be foxhunting than doing any other ham activity. So, the longer the hunt lasts, the more fun they have that day.

Devious hiding tricks fall into four basic categories:

1. Deceptive signal parameters
2. Inaccessibility
3. Indirect signal paths (reflections)
4. Concealment and camouflage

Typical rules for beginners' hunts call for the fox to transmit a continuous carrier with constant power and antenna polarization. If the fox is on a repeater input, the hider may transmit for 15 seconds, then be silent for a minute or so.

If hunt rules allow it, vary the hidden transmitter power. This is particularly hard on hunters who use a beam, attenuator, and S-meter to get bearings, because that method relies on constant signal level for its accuracy. On the other hand, variable signal strength will not affect Doppler[1] or time-difference-of-arrival[2] RDF sets, so long as the signal exceeds the set's minimum sensitivity threshold.

To advance to an even higher degree of difficulty, try sending very short bursts of signal, if rules permit. Legendary southern California foxhunter Milt Ronney, WA6FAT, turned an easy hunt into tricky one on a very rainy night when he put the T in a replica of a medieval tower, transmitting for a fraction of a second every few seconds. This also favored the hunters with Doppler sets.

If you don't mind waiting a long time for the hunters to arrive and you are prepared to be the object of their outrage, combine short transmissions with varying power. This gimmick was used some years ago at a hamfest hunt in San Diego, where expensive prizes were at stake. The hider, wanting to separate the skilled hunters from the lucky ones, set up the T to cycle on and off every half second, with each transmission at a different power level, randomly selected.

Not to be outdone, other hiders such as John Moore, NJ7E, of Phoenix, have built microprocessor or PIC-based controllers that generate random transmission lengths, random time between transmissions, and random power levels.

Antenna Antics

If rules allow it, use creativity in your transmitting antenna system. A well-placed directional antenna can make your fox signal appear to come from the wrong direction and the wrong location. This technique is popular in southern California due to the many local hills and nearby mountain ranges that can reflect VHF signals.

**P.O. Box 2508, Fullerton, CA 92837*
email: <k0ov@homingin.com>
Web: <www.homingin.com>

Horizontal signal polarization is tough on hunters with Dopplers or other sets with vertical whips. When you hunt a cross-polarized T, the direct signal is attenuated while bounces from buildings and terrain features tend to stand out. With any luck, the contestants will spend valuable time chasing reflections.

Every so often, a fox uses circular polarization. Depending on the terrain, it can confound the hunters. If you have unlimited real estate available at the hiding site, try a very long Yagi suspended by ropes, or a circularly polarized helix with screen reflector like the one in *Photo B*.

Photo B. Gary Holoubek, WB6GCT (pictured), and Tony Levand, now AA9CC, assembled this 16-foot-long circularly polarized beam with 6- x 6-foot screen reflector in a wilderness park for a Fullerton Radio Club mobile T-hunt. It shot lots of signal down the canyon, where it was several miles to the closest road. But it gave very little signal to the rear, where the approaching road came within a hundred yards. (Photo by Joe Moell, KØOV)

Photo C. Christie Edinger, KØIU, under the tattered straw hat, plays a "bag lady" as fox for the Fullerton Radio Club's monthly nighttime mobile hunt. Look closely to see the battery in the shopping cart. (Photo by Joe Moell, KØOV)

How about a moving antenna? One hunter adapted a motorized camera pan-tilt mount to slowly change the polarization of his Yagi from vertical to horizontal and back again, giving a very interesting effect. Steve Sable, N8NYU, made a similar setup using a windshield wiper motor.

By rotating a transmitting beam in azimuth, you can "light up" nearby hills in various directions. If you're with the T, you can turn the antenna manually. For an unattended setup, add a motor. Consider a mechanism that sweeps the beam like an oscillating fan instead of making it go in circles, so you don't need slip rings in the coax line. The antenna should move slowly, so that the effect is not too obvious.

Concealed in Plain Sight

When asked to name a memorable T-hunt, most RDFers will bring up one in which the T was concealed from view in a particularly clever way. Christie Edinger, KØIU, showed her acting skills by portraying a bag lady in a mall parking lot on a Fullerton Radio Club night hunt. She pushed a junk-laden shopping cart around the lot for three hours with the transmitter concealed among the refuse (*Photo C*). After 15 miles of mobiling and a drive around the parking lot, would you have suspected her?

Shopping carts are "liberated" from supermarkets every day, but KØIU asked permission to borrow this one. "In case security guards thought we had stolen the cart, we had the manager give us his business card with a note on the back," she explained. "He was willing to loan us a brand new cart, but we picked out a ratty looking one with good wheels. After the hunt, we took it right back."

Even a so-called "beginners" hunt can include a clever concealment surprise. At an ARRL convention in Ventura, California, Darryl Widman, KF6DI, put on an event especially for brand new RDFers, an on-foot hunt on the hotel grounds. Darryl encouraged everyone to give it a try, even those with no special RDF gear. He said that the "body shielding" maneuver with a handi-talkie or scanner was adequate for getting bearings.

As usual, most of these new hunters assumed that the hidden T would be in plain sight, so they hunted mostly with their eyes, not their radios. That was the wrong thing to do! The rig was concealed inside a hollowed-out telephone book underneath a pay phone in the hotel lobby. (OK, this was quite a few years ago!) Most hunters ignored the

Photo D. This is Blue, who had a great time hunting radio foxes with her dad, Byon Garrabrant, N6BG, at a Yuma Hamfest. (Photo by Joe Moell, KØOV)

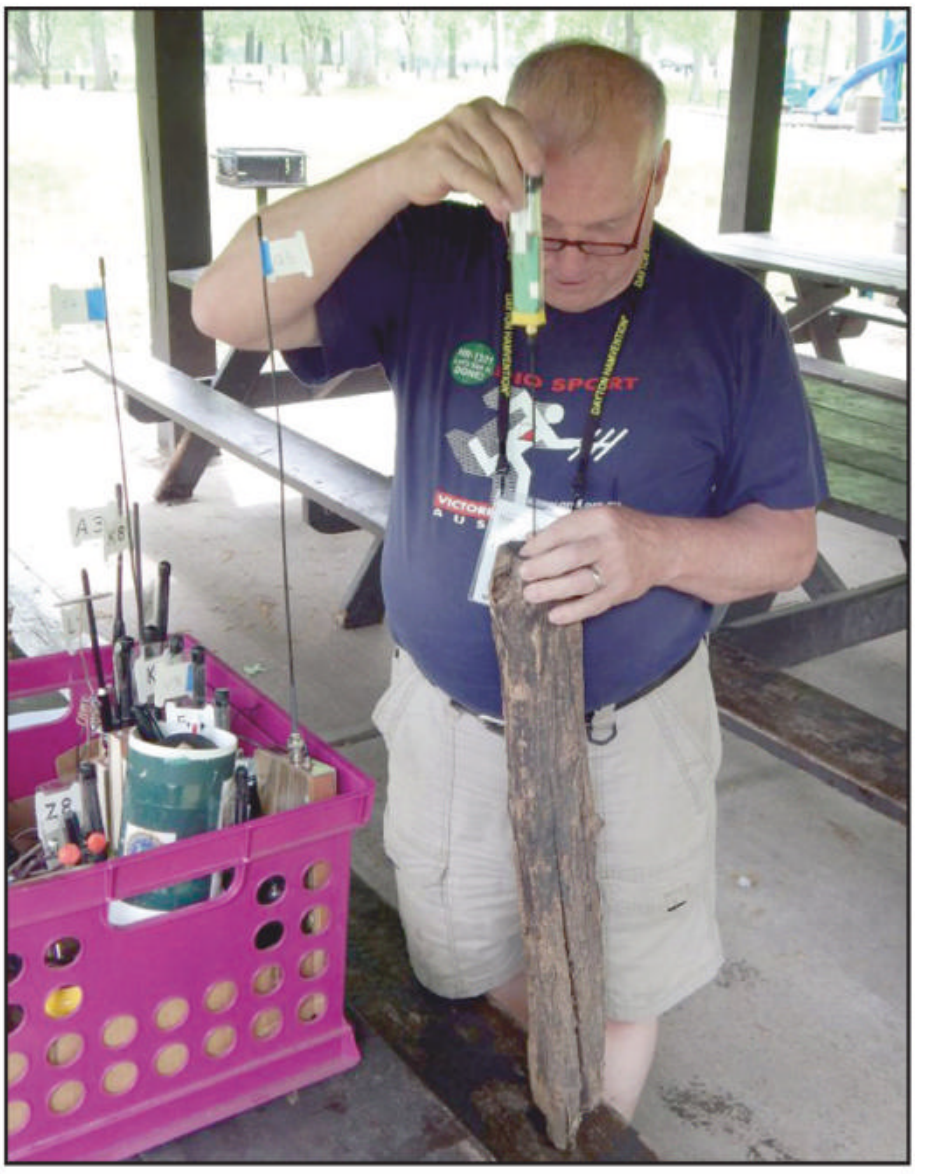


Photo E. Dick Arnett, WB4SUV, conceals a miniature 2-meter transmitter inside a log for the on-foot transmitter hunt at a pre-Covid Hamvention. There will be another multi-fox hunt at Hamvention 2022. (Photo by Bob Frey, WA6EZV)

innocent-looking white pages and kept poking around for something in plain sight that looked like a radio.

Many memorable T-hunts involve lakes and rivers. Baffling bearings can result when the signal source is at the surface of a body of water, due to signal reflections from nearby and distant shores. For one Fullerton Radio Club hunt, the hiders transmitted from a rubber duck. No, not a flexible helical 2-meter whip, it was a real rubber duck, floating on a small lake in Tri-County Park. The real ducks ignored it, mostly.

Keep It Fun

As you can see, being the hidden fox is an opportunity to unleash all your creativity. But don't forget to be fair and to match your subterfuge to the skill level of the hunters. If the majority of them are beginners, go easy by giving plenty of signal, frequent (if not continuous) transmissions, and lots of encouragement. Give them a challenge, but not an impossible task.

As your group's average skill level and equipment inventory increases toward the "expert" category, you can make hunts tougher by including stunts like those described above. Of course, you shouldn't do anything illegal or make the hunt unsafe for yourself or any hunter. Remember that if participants don't have fun (however they define it), they won't come out to hunt you again next time. Your goal should be to increase the level of camaraderie of the hunt group.

CQWW Foxhunting Weekend May 14-15

An excellent time for your club to have foxhunting fun is the annual CQ World Wide Foxhunting Weekend, which takes place May 14-15, 2022. This is the most informal of all the CQ contests — just an opportunity for your club or other ham group to have some fun finding transmitters, either in vehicles or all on foot. Use the international rules or write your own. Make it easy or hard, depending on the skill level of the foxhunters in your area. Talk it up on the local repeater and social media to find out what your friends have in mind.

More about Foxhunting Weekend is in the February and April issues of *CQ*. It's also on my website.[3] After the foxhunting, be sure to send me stories and photos for the follow-up article.

Convention Fun and Championship News

On-foot foxhunting was on the program at the 2022 Yuma Hamfest and Southwestern Division ARRL convention on February 16 (*Photo D*). Marvin Johnston, KE6HTS, led a workshop for building measuring-tape antennas and offset attenuators from kits he provided. Then the attendees put their new tools to the test on a five-fox walking course set by Joe Loughlin, KE6PHB, and Joe Corones, N6SZO, of San Diego. Several other foxhunters from San Diego were there to provide instruction and assistance, including going out on the course with the fledgling foxhunters when appropriate.

The annual record for most transmitters in an on-foot foxhunt is almost always achieved by the OH-KY-IN Amateur Radio Club. Their Hamvention® hunts (*Photo E*) seem to get bigger every time. With the move to Xenia, the hunt organizers found a new location at James Ranch Park, directly across from Greene County Fairgrounds.

Foxhunting at Hamvention 2022 is scheduled to begin with a 90-minute forum on Saturday at 9:15 a.m. in Room 3. Moderator will be Dick Arnett, WB4SUV, with additional information from Bob Frey, WA6EZV; Brian DeYoung, K4BRI; and others. Then on Sunday, it's back to James Ranch Park for another challenging on-foot hunt with prizes for the winners.

It would be great if more hamfests and ham radio conventions would offer RDF talks, demonstrations, and contests as part of the official program. If you're on the planning committee for such a get-together, why not add a T-hunt as a change of pace? If you do, please let me know at least three months in advance, so I can mention it in this column.

International-rules, on-foot transmitter hunting (also called radio-orienteering and ARDF) is finally making a comeback in 2022. After being postponed twice, the International Amateur Radio Union (IARU) ARDF World Championships will take place from August 28th through September 3rd in Zlatibor, Serbia.

World Championships feature classic competitions on 2 meters and 80 meters, plus sprints and foxoring (a blend of foxhunting and orienteering). National teams may send only three persons per age / gender category. Team members are responsible for their own registration / room / board fees and for transportation expenses to and from Serbia.

USA's Letter of Intent to Participate has been sent to the organizers. The final team roster will be submitted in July. Team USA selection in competed categories where more than three wish to attend is being based on performances and standings in the 2021 USA ARDF Championships last October in North Carolina and the 2022 USA ARDF Championships in Virginia during April. The categories for males under 50 and for females of all ages are likely to have uncontested openings, so it may be possible for inexperienced radio-orienteers in these ranges to join the team.

Even if you don't qualify to be on USA's team to the World Championships, you can compete for awards in Serbia. For three days prior to the World Championships, the Serbian organizers will put on the third ARDF World Cup with classic competitions and the sprint for individuals. This will be excellent training and there will be medals for the best performers in each age / gender category for each event, regardless of nationality.

If you are interested in traveling to the 2022 ARDF World Championships as a member of Team USA or as an individual to the World Cup, please contact Ruth Bromer, WB4QZG, the Chair of USA's Selection Subcommittee, by email.[4] Do not contact the championships organizers in Serbia directly. If you have not been to an overseas ARDF event before, include your full name, callsign, mailing address, phone number, and date of birth.

If you wish to participate as a citizen or resident of another North or South American country, contact IARU Region 2 ARDF Coordinator Ken Harker, WM5R.[5] Canadians should also contact that country's ARDF Coordinator Joe Young VE7BFK.[6]

For more about the 2022 ARDF World Championships and World Cup, visit the World Championships website of the Amateur Radio Union of Serbia,[7] where you can download the latest bulletins and learn about Covid protocols.

Next time, I'll have a wrap-up of USA's national ARDF championships for 2022 at a new venue near Triangle, Virginia. Happy Hunting!

NOTES:

1. <www.homingin.com/SCalStyle.html#doppler>
2 <www.homingin.com/equipment.html#tdoa>
3. <www.homingin.com/joek0ov/nfw.html>
4. <ruth@treklite.com>
5. <kenharker@kenharker.com>
6. <jyoung@islandnet.com>
7. <https://ardf2022.org>

MOBILING

BY JEFF REINHARDT,* AA6JR

Spring Into Action!

For mobile radio enthusiasts, spring is *"the most wonderful time of the year …"* (apologies if that's your favorite Andy Williams holiday tune). The snow, ice, and frigid temperatures have left the northern states and hopefully highway departments have been busy filling in those annoying potholes. All that and more begs us to once again hit the open road, assuming we get some relief from elevated fuel prices, which in my part of the world have been quite impressive, *(Photo A).*

But don't let high fuel costs keep you locked in your den. Here's a little perspective: If you've traveled overseas to Europe or Asia, or recently visited California, you're already familiar with the notion that some folks here, and across the pond, have been paying $6, $7, $8 or more per gallon for a long time, and they've adjusted to it. Some of the coping mechanisms include driving more efficient vehicles, making shorter trips, combining trips with others, and perhaps giving up on fossil fuels completely by purchasing an electric vehicle.

How does this relate to mobiling? Easy! Let's say you've been working on an elusive award like Worked All States on a given band or the CQ USA Counties Award. A short trip to a hilltop or into a nearby county can make you both a "hunter" and perhaps a valued contact for others. And with most of us sporting laptop computers these days, digital operations and/or logging (while stationary, of course, unless you have a driving teammate along) are easily accomplished without the need for external power. More on that topic later.

Another method is to combine pleasures and take a portable "go kit" on your vacation. Mine consists of an Outbacker tri-split antenna, a Diamond K-400 hatch / trunk mount antenna, and a Yaesu FT-857 transceiver, all of which fit easily into a suitcase. I bring along power adapters that include a cigar lighter plug and spring-loaded battery clamps. A few years back, I had a most enjoyable mobiling experience in Hawaii with this setup, visiting three different islands and using that versatile gear in rental cars. It was the first time I had to manage significant pileups.

So, it's possible to be resourceful, fuel-efficient, and active on the bands with just a dash of imagination and perhaps taking on some new challenges.

Who Has the Power?

In previous editions of this column, we have discussed the many nuances now encountered when providing power to your mobile transceiver, especially in newer vehicles. As discussed, going directly to the vehicle's 12-volt battery is no longer recommended by several manufacturers, as it interferes with the power management systems found in modern vehicles. Some systems monitor the negative side of the battery, others the positive, depending on the automaker. Best to check with your manufacturer or dealer before connecting your rig.

However, I'll offer another creative workaround solution. As I live in an area prone to blackouts, I recently purchased a Duracell PowerSource™ "gasless generator" (*their term, not mine –ed.*) *(Photo B).*

What it really is, is a large battery with an inverter that can deliver up to 1,440 watts continuous through a number of outlets. They include four 120-volt AC, a 12-volt DC accessory socket, USB ports, and 12-volt DC rear terminal binding posts, the latter intended for supplemental power *to* the unit through the connection of an external "daisy chain" battery. But I see no reason why those binding post terminals couldn't be a source of 12-volt power for mobile or portable radio operations. The Duracell package also includes an informative LCD panel that monitors the unit's various functions.

Consider the advantages of placing one of these units, well-secured of course, in the trunk or storage area of your car or SUV to power your mobile rig. No concerns about draining your vehicle's battery or upsetting its charge management

Photo A. Fuel prices can seem daunting, but the smart planner can manage costs and still enjoy summer travel. (Photo by AA6JR)

Photo B. The Duracell PowerSource™ battery package is a versatile package for home, mobile, portable, or field use. (Courtesy of Duracell)

**5904 Lake Lindero Drive, Agoura Hills, CA 91301*
E-mail: <aa6jr@cq-amateur-radio.com>

system. No electrical noise making its way into your radio's power leads from the vehicle's computers or electrical motors like fuel pumps, wipers, electric power steering, or HVAC systems.

The versatile Duracell unit can be recharged by plugging it into an AC outlet, but it can also receive power directly from a solar panel (40 to 100 watts), as it has its own internal solar panel regulator. The unit might also prove to be a handy item to have for Field Day or other portable operations, as well as mobile.

The one downside is that it's heavy — you won't want to carry it very far. I'm also unsure if the product is still manufactured. However as this was written, it was available through several online vendors. I bought mine through Costco. Also bear in mind there are at least two different output capacities and the prices vary. While this may sound like a commercial, it's not, I paid for the unit out of my own pocket. While I have not yet had to use it under power failure conditions, it's nice to know my refrigerator has something to fall back on when the commercial power goes away, without the need to run a noisy gas-powered generator.

Road Trips

What with the sunspot cycle perking up, and summer's Sporadic-E (E_S) propagation opportunities abounding, it would seem to be smart to monitor the airwaves as one makes tracks for various vacation or pleasure trip destinations, be it to national park, a hamfest, or to visit Aunt Minnie. While high-frequency (HF) and 6-meter opportunities may present themselves, don't overlook the opportunity to monitor the national calling frequency on 2 meters, 146.52 MHz, especially in areas where cell phone service is "iffy." I've seen a few RVs and SUVs with 146.52 placarded on the back of the vehicle, which is a standing invitation to meet another ham, or perhaps pick up a call from someone who has a special need for assistance.

Also remember that most VHF or multiband transceivers have extended receive capabilities that include the NOAA weather frequencies. They can prove to be useful when adverse weather conditions occur along your travel route. Make sure they're programmed into your memory channels before you depart.

Got a Checklist?

All good pilots have a checklist to ensure a safe and well-executed trip. Today we have the advantage of cell phones that can hold a permanent checklist of items to take along or double-check before departure. It can help avoid that awful, "how could I possibly have forgotten that cable?" moment that it seems we all have encountered at one time or another.

Don't Forget a Radio "Checkup"

With the winter weather behind us, it's a good time to double-check your radio's electrical and antenna connections to ensure they're solid, free of corrosion, and protected from the elements. Remember, your vehicle and radio gear are subject to wide swings in temperature and humidity throughout the year and the laws of physics make no exceptions. Put another way, a well-maintained installation makes for a happy operator.

Have a great summer season, and happy mobiling! *– 73, Jeff, AA6JR*

THE HAM NOTEBOOK

TEXT AND PHOTOS BY WAYNE YOSHIDA*, KH6WZ

What's That Noise?

This is a follow-up from my August 2021 QSO Today Expo presentation called "No Tools Troubleshooting" in which I introduced a thinking process to observe and assess things to achieve a result or conclusion. This thinking process can apply to other things besides ham radio equipment, and the more you practice this way of thinking, the better you become. It is a powerful tool for troubleshooting all aspects of life.

If you missed that online event, you can read my supplemental information posted on my blogsite, <https://tinyurl.com/3w73yjrc>.

One of the observations that drew several comments was the section on using our sense of hearing as a troubleshooting tool. "What's that noise?" can be a useful path to take in diagnosing a radio problem.

Let's take a look at some of the unusual or abnormal noises that may happen as we use our radios.

First, we should define or distinguish "noise" versus "sound." For this discussion, we will define noise as something bad or unwanted and a sound as something normal or good.

In addition, because noise is so broad and affects many things in a radio, let's limit this discussion to mobile and portable FM operations and equipment.

Quiet is Good

When talking about FM, we should have a simple understanding of a technical term called "quieting." This term described how strongly an FM signal is heard in a receiver. If a receiving station is close to the transmitting station, and there is no interference, the signal is said to be "full quieting." It is a descriptive term and the signal is not only strong, but it is also clear and without any noise. It is as if the person at the transmitter is speaking clearly to you in person.

If the station moves away or something blocks the signal path, the signal strength diminishes, and the signal begins to sound noisy. This noise can often be described as "crunchy" or distorted. Many times, the receiver S-meter will go up and down quickly, and the signal has a "fluttering" quality. This means that the radio signal is becoming weaker, and is no longer quieting the receiver as the noise is becoming stronger than the radio signal.

Try this experiment on your FM rig: Move the radio squelch control fully counterclockwise. This "opens" the squelch, and the receiver produces an irritating hissing noise. This is the sound of no signal. Nothing is coming in to quiet the receiver.

But when someone transmits on frequency, the signal makes the noise go away (the receiver is quieting) and you hear the person talking.

A few nights ago, as I drove home from dinner with a friend, I put my dual-band rig in scan mode. Most of the stations on the various repeater channels were coming in loud and clear.

But a few stations made me think, "what's that noise?" since there were some other noises coming in along with their voices. Well, okay, the dog barking in the background is easily diagnosed, but not so easily fixed.

However, there were two or three stations that had a slight "buzzing" or "growling" noise superimposed on top of their voices. While not terribly offensive, the noise was enough to make me wonder if it's my radio, the repeater, or the other station's transmitter.

Then I realized something: All of the repeaters programmed into my radio require a certain PL or sub-audible tone for access.

One of the main purposes of a sub-tone is to make a repeater "private," that is, that the tone is a secret and those who do not belong cannot access the repeater. Another purpose for sub-tone access is to help prevent interference from other repeater systems.

But wait a second. If CTCSS is sub-audible, then how come I can hear it when listening to the repeater?

One reason could be my excellent hearing. Another, more likely, reason is a maladjusted tone generator in the transmitting radio. If the tone is set too high, the tone can be heard as a slight buzzing noise on the transmitted signal.

Oddly, in some radios, there is no adjustment for the tone output. Equally odd is that not everyone will hear the

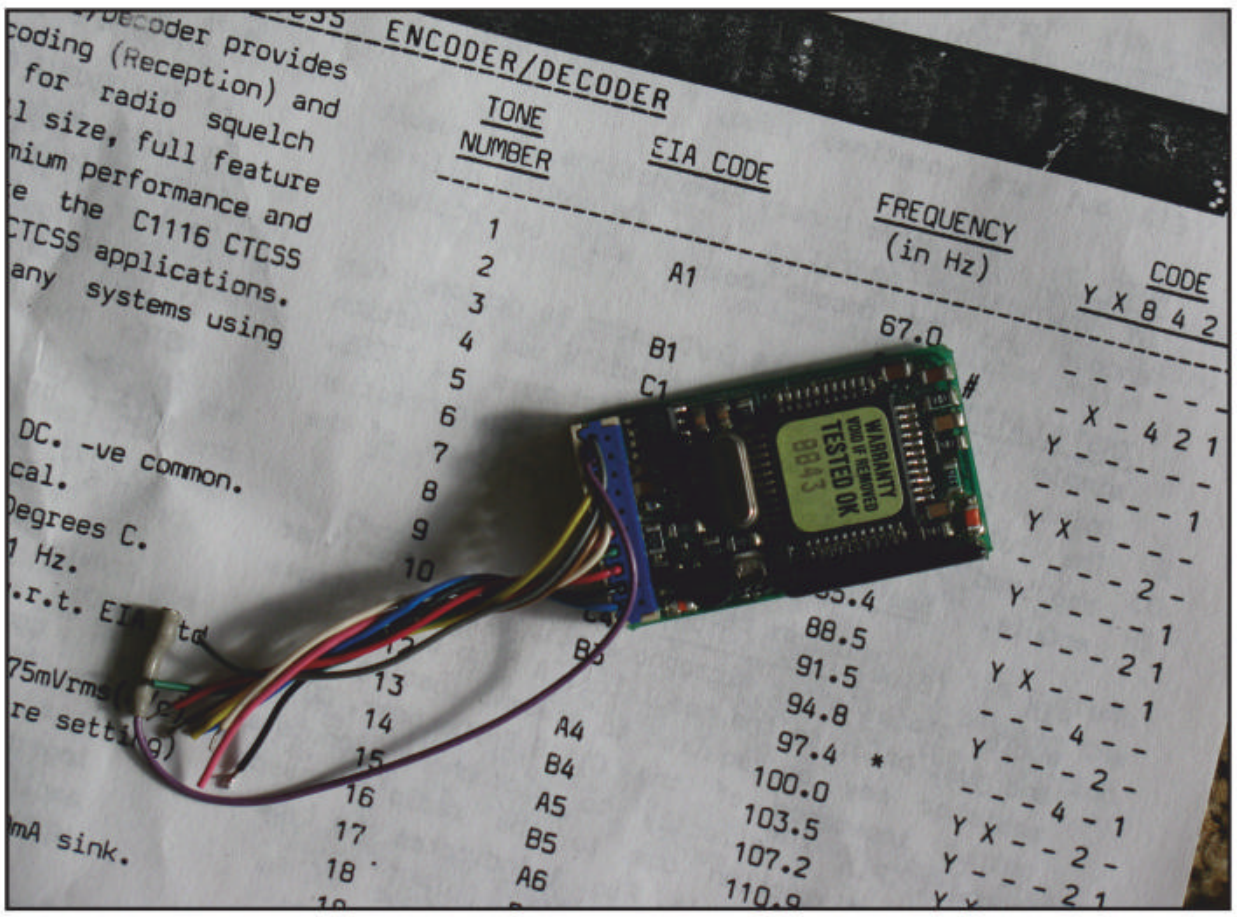


Photo A. A very old tone generator board with an adjustment for the tone output. Most radios today have a sub-audible tone generator built-in. (All photos by KH6WZ)

email: <kh6wz@cq-amateur-radio.com>
Linkedin:
www.linkedin.com/in/wayneTyoshida

PL noise, or it is not loud enough to be an annoyance to some people.

In some radios, the tone generator has a variable control, either as a part of the radio or on the tone generator itself (*Photo A*). Sometimes, it may be a selection from the radio menu.

This is one of the noises that happens in many, but not all radios, and there may or may not be anything you can do to correct it.

Similar, But Different Noises

The "PL buzz" described above is different from a noise coming from an AC-operated power supply, as when a mobile radio is used in a fixed station.

In this case, the power supply that converts household AC into 12-volts DC is not working right, and it is allowing some of the AC to come out of the DC output. Something is likely to be wrong with the filter circuit in the power supply.

An easy way to verify whether the power supply is broken is to swap out the power supply. Even if you do not have a second power supply, you can substitute another high current, 12-volt power source for your station power supply. This is most easily done with a portable automotive booster battery, like the one shown in *Photo B*. You can easily make one like I did, as shown in *Photo C*.

If you do not have one of these you can try using your automobile battery and connect your radio to your car battery with a pair of jumper cables. Be careful when you do this, to ensure you do not touch the positive line from the battery to any part of the car body or the radio case (ground).

If this procedure makes you nervous, ask a friend with some radio and/or car experience to help you. The idea here is to verify that the noise problem goes away when you change the power supply: This verifies that the problem is not in the radio, but rather something happening outside of the radio, in other words, the power supply.

So, if you are able to say the buzzing or humming noise is coming from a bad power supply, now what?

You can either buy a new power supply, or have it checked so that it can be repaired. This decision should be based on the cost of a new power supply, versus the cost of repairing the old unit. Generally, a new 12-volt power supply capable of handling the typical 50-watt, 2-meter FM mobile rig should be rated at about 12 amps minimum. To be sure, check the radio specifications for the power supply requirements during transmit.

Typical power supplies for ham radio applications are rated at 12 volts and 20 amps, so this provides some extra power for a small accessory, such as a battery charger. The cost of a new 20-amp power supply varies from about $60 to $250 or more, so it may be worth checking to see if it can be repaired. Your local ham radio dealership would be a good place to ask for assistance on this, or they can recommend a place that may be able to repair the unit.

Condition Substitution

Quite often, particularly in mobile stations, a high-pitched whine comes from a transmitting station. Most of the time, the noise varies with engine speed. Generically, this automotive noise is called "alternator whine" even if it is caused by something else.

This whine can be caused by the electrical charging system, most likely the alternator, but it can also come from an electric fuel pump, the ABS system, or the ignition system. In addition, all current automobiles have at least one microprocessor, and many vehicles have several. Because these car computers run many complex digital signals to control various systems, and because digital signals usually mean

Photo B. A booster battery like this can be used to power a mobile rig temporarily as you make tests and adjustments. Do not touch the positive cable to any electrical ground!

Photo C. I made this handy portable power box for portable operating.

"square waves," the car computers can be a source of interference and noise. Remember, square waves produce an infinite number of odd harmonics, and sine waves produce an infinite number of odd and even harmonics. In any case, a computer can be a source of many noises we do not want to hear in our radios.

A simple cure to the alternator noise, even if the noise is not caused by the alternator, but something else in the vehicle, is a large filter choke. This is a large coil of wire, would around a big ferrite "donut," as shown in *Photo D*. Commercial versions of this automotive filter choke are available from your ham radio equipment dealer, or car audio shops. Check to ensure the filter's current rating is enough to run your radio equipment. It may be a good idea to buy the biggest noise filter available, so you can be sure it will run without any problems. This filter is inserted into the positive power lead, between the battery and your radio. One of the best places to mount a power line filter is inside the vehicle, just before the wire goes into the radio, as you can see in *Photo E*.

I have found that a noise filter installed in this way cures 99% of the alternator whine types of noises coming from mobile radio stations. I have to mention one instance of a noise that I could not cure, however. Years ago, I had a two-seat Toyota sports car. Since there was very little room in the cockpit for radios, I mounted the radio on the passenger side of the center console. I mounted a very tiny external speaker near the top of the windshield, underneath the rear-view mirror, using the mirror bracket for support. This car produced enough noise that the speaker would produce a high-pitched whine *even when the radio was turned off.*

Somehow, I determined that this was most likely coming from the electronic ignition system. When the radio was on, and the receiver was working (that is, when someone was transmitting to me), the radio receiver was strong enough to override the whining noise. But when the radio was in standby mode, the whining was very loud. I installed a small

Photo D. Left: A toroid choke found in my junk box. Right: A store-bought DC line filter.

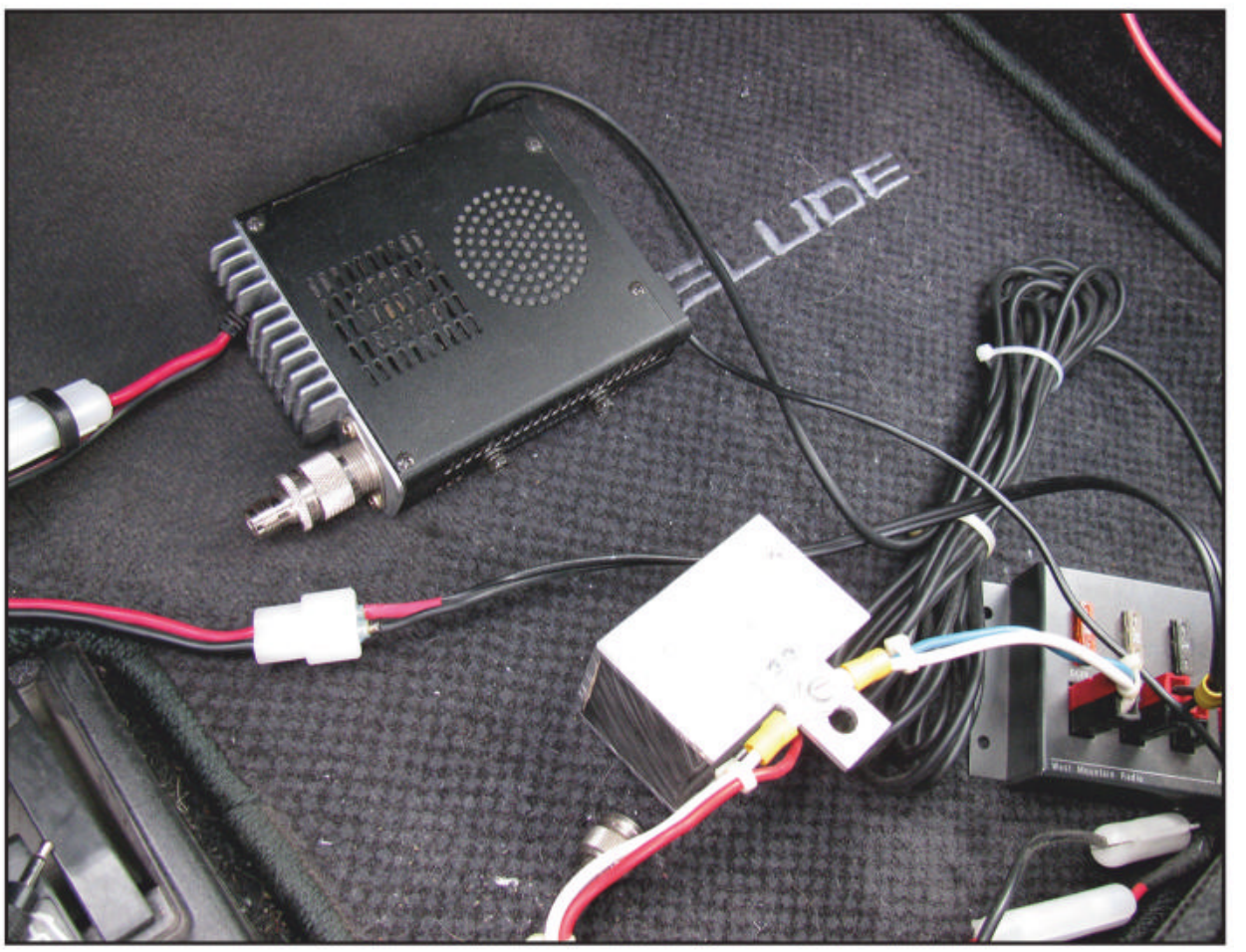


Photo E. A mock-up / breadboard of a mobile rig, noise filter, and multiple 12-volt DC outlet.

switch in one of the speaker-mounting holes so that I could disconnect the speaker from the radio, which made the noise go away. When I wanted to use the radio, I would flip the switch so the speaker was connected to the radio. This was a minor inconvenience, but it did mask the whining noise. I call this a "band-aid" solution, because I never solved the problem, I only masked it to make the problem go away.

Something In the Air

So far, most of these noises have been coming from the radio or the radio power supply. But there are many noises that come from the surrounding radio-garbage in the air around us.

For example, in some parts of the U.S., hams operating on the UHF-FM band (420 to 450 MHz) may hear noise from radar systems. The noise sounds somewhat like an electric shaver, but higher in pitch, and it usually comes and goes in strength and sometimes in frequency, probably due to the "sweeping" of the radar signal. We must understand that amateur radio is a "secondary user" in the 420 to 450 MHz band, so if ham radio operations cause interference to radar, or other licensed, shared services, the ham radio operations must move, shut down, or eliminate interference.

In any case, this noise must be tolerated, since the radar system is the primary user of this band.

A Bad Mix

No discussion of VHF-FM and repeater operating would be complete without a mention of an interference noise called *intermod*. Intermod is short for intermodulation. This is when two or more transmitted radio signals on different frequencies mix, and are received at the same time. As you can imagine, this can create a messy situation, and this can be heard on your radio as a very irritating noise.

In many areas, this intermod situation seems to be growing. Pagers, cellphones, data links, alarm systems, and other wireless devices contribute to radio wave pollution — the noise floor. As the number of systems grows, so does this mixing of different frequencies, and the result is a noisy radio. In addition to this RF pollution, many radios are capable of receiving more than the ham radio bands, meaning that such radios may be more susceptible to intermod.

One way to deal with this is to advance the squelch control. But this adjustment must be balanced between getting rid of interference and completely locking out the desired signals. Another way to battle intermod is with a suitable filter, to minimize the unwanted frequencies coming into your radio. But remember, if you like a fully quieting FM repeater signal, and want to also listen to the out-of-ham band services like the local air traffic controllers, a filter will limit your enjoyment of the non-ham frequencies.

As we can see, along with all of the good sounds coming from our radios, there are many unwanted and irritating noises in our ham radio equipment, too. Some are considered normal and must be tolerated, and some noises can be cured, either by finding the core cause of the problem, or finding some solution or alternative to make it "just go away."

– 73, Wayne, KH6WZ

LEARNING CURVE

BY RON OCHU, KOØZ*

DIY Coax Service Entrance

Photo A. Allan Koch, KA8JJN, with his son Brian, NØBMK. (Photo by KOØZ)

Photo C. Brian's exterior wall. Note the siding removal and placement of the weatherproof enclosure. (Photo by NØBMK)

My thanks go out to my friend Allan Koch, KA8JJN's, son, Brian Koch, NØBMK of Allendale, Michigan for this month's column topic (*Photo A*). Not too long ago, Brian texted me for suggestions on where to mount his antenna (*Photo B*), how to ground it, and how he could route the coax into his QTH (home). I was happy to offer suggestions to get him started. Brian has a very nice, suburban home and he wanted to safely and aesthetically route his coax into his radio shack (radio room). Before starting, NØBMK wisely networked with his local ham radio buddies for their input, and the final product of his research is a functioning work of art.

Coax Service Entrance Planning

Once NØBMK determined where he wanted to locate his coaxial cable service entrance on his home's exterior wall, he first called his local utility companies to see where he could safely hammer an 8-foot, copper-clad ground rod next to his service entrance. With the help of his father-in-law, Alan

*Email: <ko0z@cq-amateur-radio.com>

Photo B. NØBMK's roof-mounted dual-band antenna. (Photo by Brian Koch, NØBMK)

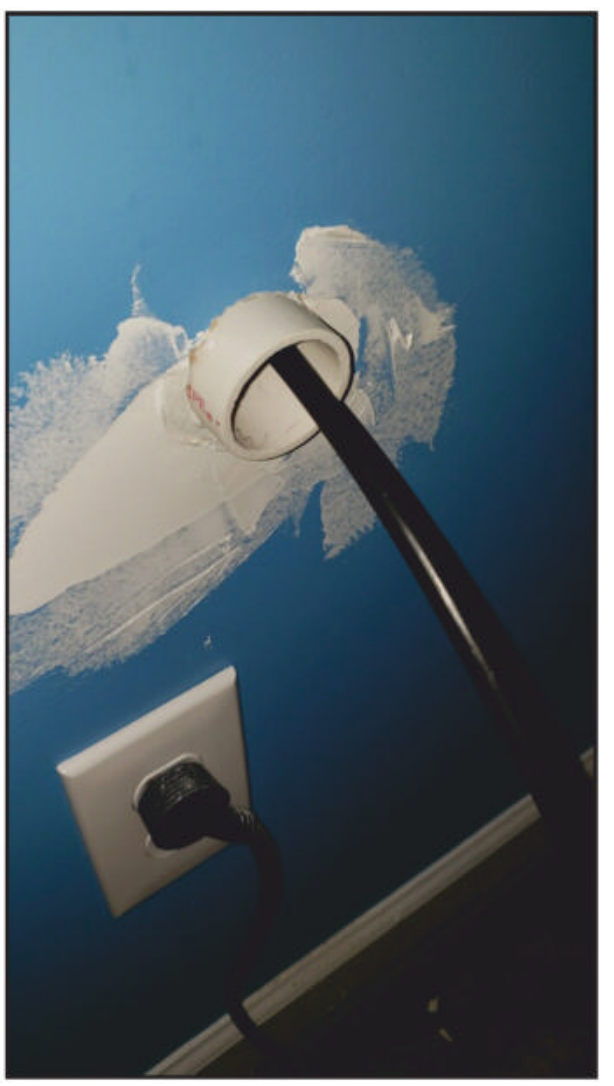


Photo D. Brian's interior wall with the 1.9-inch OD PVC pipe protruding into his shack. (Photo by NØBMK)

Photo E. One can never have enough GREAT STUFF™ foam spray on hand. (Photo by KOØZ)

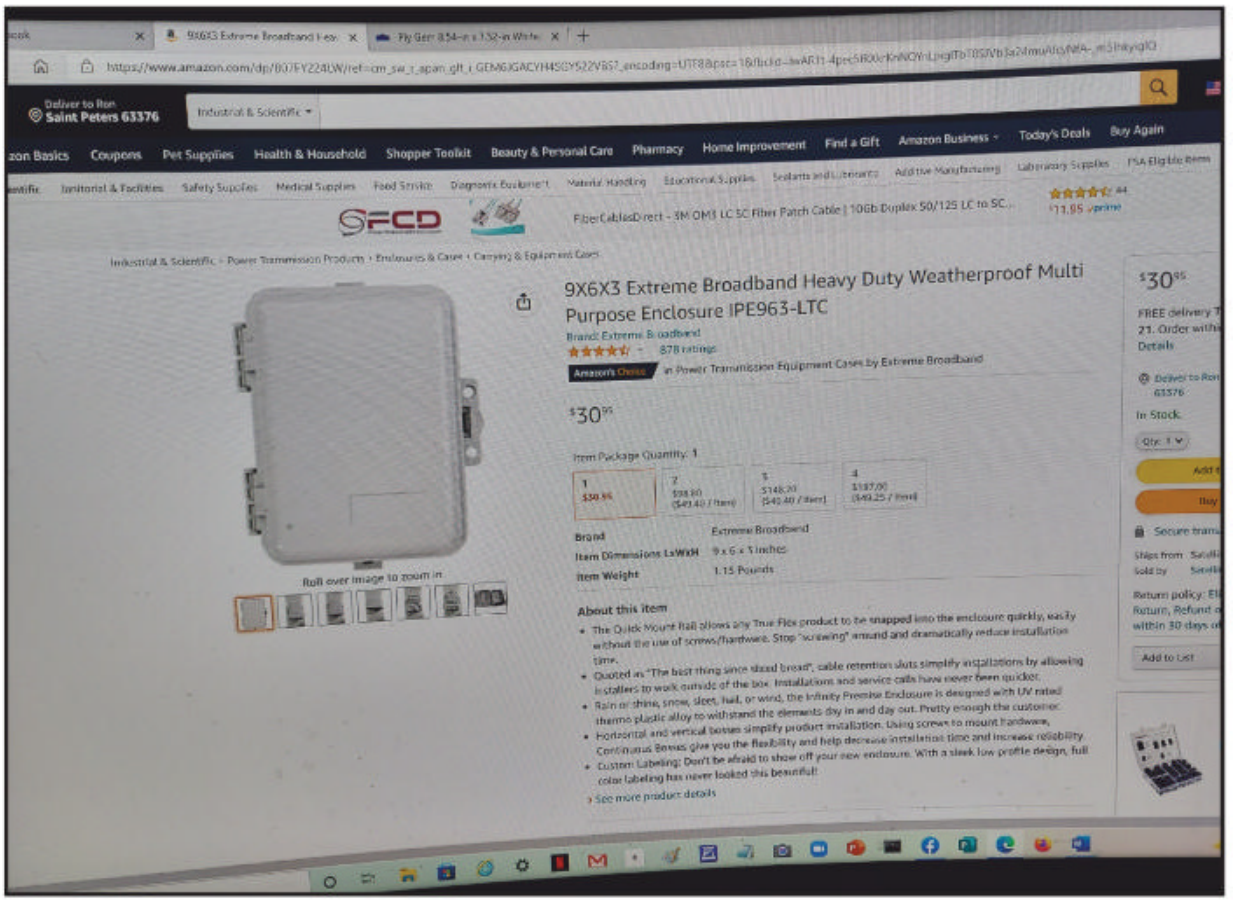


Photo F. Weatherproof enclosure from Amazon serves as an exterior coax service entrance into the QTH. (Photo by KOØZ)

Weber, they removed some of his home's siding, drilled a 2-inch hole through the exterior wall and into his shack (*Photo C*) to insert a PVC pipe (*Photo D*). The 2-inch hole nicely accommodates a 1.5-inch PVC pipe, which has a 1.90-inch OD (outside diameter) to serve as a coax conduit between the exterior and interior walls. Brian recommends keeping a can of GREAT STUFF™ spray foam (*Photo E*) handy for filling in gaps or crevices around the PVC pipe and the hole to eliminate openings for unwanted bugs and critters. After coax is routed into the PVC pipe, any remaining empty space inside the PVC is filled with steel wool to discourage any pests that may somehow manage to find their way into the entrance.

Installing the Exterior Enclosure

All of Brian's research paid off with his selection of an exterior weatherproof enclosure that he found on Amazon.

Photo G. NØBMK's finished exterior coax entrance. (Photo by NØBMK)

Photo H. Inside NØBMK's weatherproof enclosure. Note the Alpha Delta gas discharge lightning protector in line with the antenna coax and the grounding cables from the Alpha Delta and from the shack to an outside ground pipe. (Photo by NØBMK)

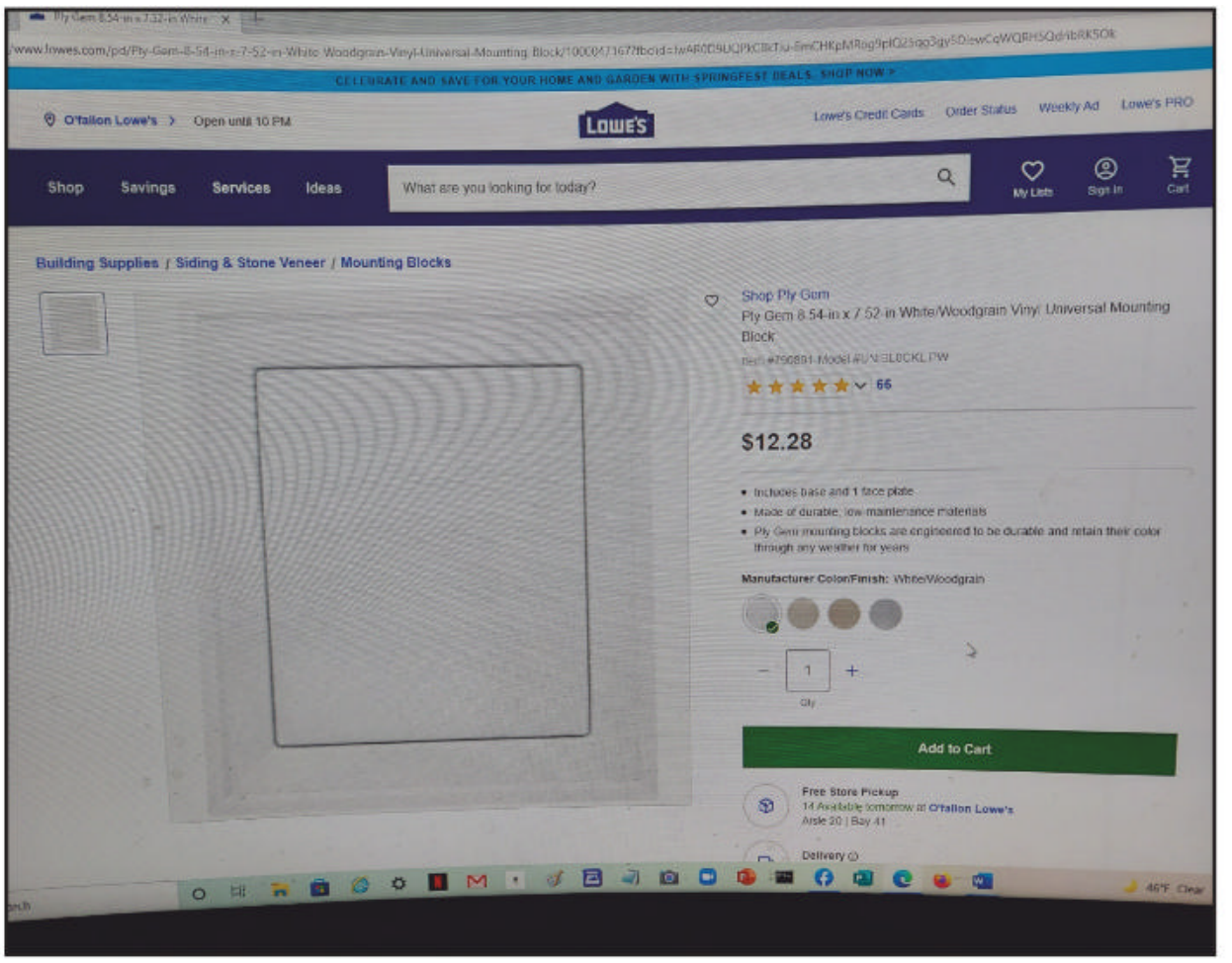


Photo I. Lowe's mounting block used to accommodate the PVC pipe into Brian's interior shack wall. (Photo by KOØZ)

com <https://tinyurl.com/4htaynw4> (*Photo F*). It is aesthetically pleasing, it looks very professional, is weatherproof, and it was easy to work with.

He drilled a hole in the enclosure's backside to accommodate the 1.90-inch OD PVC pipe (*Photo G*). The enclosure's bottom has openings lined with foam rubber to allow coax, lightning protection, and a ground wire to placed inside the weatherproof enclosure away from the elements (*Photo H*).

Interior Aesthetics

With the exterior entrance completed, it was time to put the finishing touches to the interior service entrance. Brian selected a mounting plate from Lowe's <https://tinyurl.com/3nvfhb84> (*Photo I*). A hole was drilled into the mounting plate to accommodate the PVC pipe. NØBMK placed the mounting block over the PVC pipe, and he now has a nice-looking coax entrance inside his shack that leads to the outside entrance (*Photo J*). Better yet, an XYL (ham jargon for wife) could overlook and approve this addition to her hubby's "man cave" without too much difficulty. As an additional bonus, the 1.9-inch OD pipe offers Brain extra room to run more coax through if he ever chooses to expand his antenna farm.

Worth the Effort

A little planning can go a long way. Initially, Brian reached out to as many hams as he could to seek out their advice. In the process, NØBMK learned more about antenna mounting, grounding, coax cable, and coax service entrances that he could ever have dreamt possible. He now has a FB (ham jargon for "fine business," which means great) operating system in his shack (*Photo K*). If you need further information, please feel free to contact Brian via his email address: <Bmkjunkmail13@gmail.com>. Thank you, Brian, for this month's topic and thank you for reading *CQ* magazine.

– Until next month, 73 and GL,
Ron KOØZ

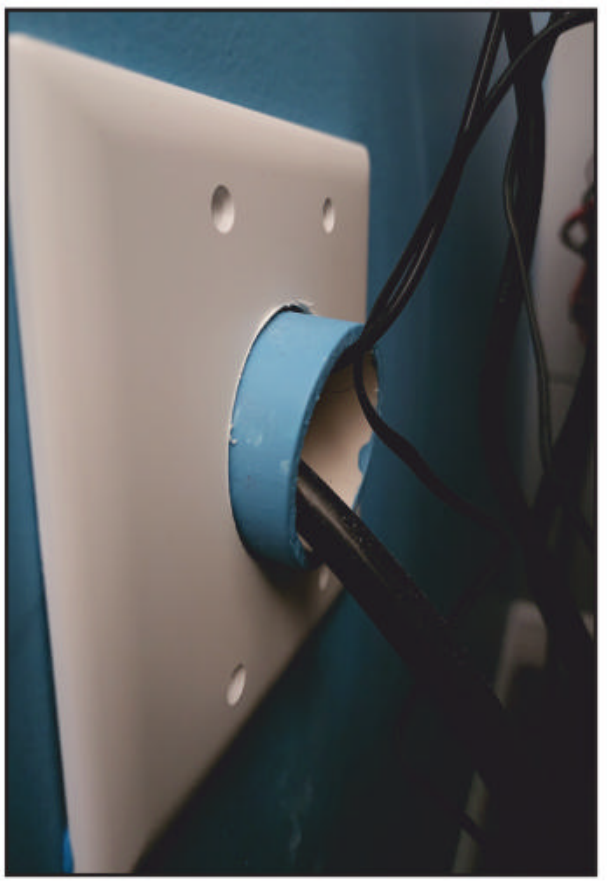


Photo J. Adding the mounting block nicely finishes Brian's coax entrance into his shack. (Photo by NØBMK)

Photo K. Brian, N0BMK's, rigs. (Photo by NØBMK)

MICROCONTROLLERS IN AMATEUR RADIO

BY JACK PURDUM,* W8TEE

The C Preprocessor

When you hit the compile button for your compiler, there's a whole bunch of stuff that takes place that isn't obvious while the code compiles. In general terms, the C compiler:

1) invokes a preprocessor pass on the code;
2) performs syntax / semantic checking;
3) if everything is correct, the compiler generates an intermediate code file, and
4) the linker then stitches your code and library code together to produce an executable program.

It does all of this very quickly.

Unfortunately, a lot of C tutorials overlook some of the things you can do using *preprocessor directives*. *Table 1* presents the preprocessor directives. Note that preprocessor directives are processed by the preprocessor pass, not actually by the compiler. Also note that none of the preprocessor directives ends with a semicolon. Let's take a closer look at some of these.

#define and Symbolic Constants

I really don't like "magic numbers" in my code, especially numbers that might be scattered throughout the program. Back in the 1970s, there was a gas shortage and the federal government required states that wanted to continue receiving federal highway funds to implement a new maximum speed limit of 55 miles per hour. Many state programs that figured out fines for speeding tickets used code like:

```
if (currentSpeed >= 70) {
  FigureTicketCost(currentSpeed);
}
```

It would seem simple enough to change the above to 55 and be done with it. Unfortunately, there may be dozens of places that had something similar, but applied to trucks with so many axles, buses, etc. No problem, you say: Just do a global search-and-replace. Bad idea.

If you do a global search-and-replace on 70, guess what happens to this statement:

```
milesViaRoute70 = thisCity – thatCity;
```

The statement becomes:

```
milesViaRoute55 = thisCity – thatCity;
```

after a global search and replace. Not good.

Instead, suppose we torch the magic number and instead use:

```
#define MAX_FED_HWY_SPEED          70
// some left-out code...
if (currentSpeed >= MAX_FED_HWY_SPEED) {
  FigureTicketCost(currentSpeed);
}
```

A *#define* can be used to define a *symbolic constant* for use in the program. The convention is to use uppercase letters for symbolic constants so they are not confused with variables. Technically, symbolic constants don't have an entry in the compiler's *ad hoc* symbol table. Now, anywhere the preprocessor finds the text MAX_FED_HWY_SPEED in the source code, it removes that constant and replaces it with the two text characters "70". If the Feds change the maximum speed to 55, one change:

```
#define MAX_FED_HWY_SPEED          55
```

a recompile of the code, and you're done! No risky global search-and-replace, or otherwise search the source code. Also, which makes more sense?

```
if (currentSpeed >= 70) {
```

or

```
if (currentSpeed >= MAX_FED_HWY_SPEED) {
```

Symbolic constants make the code easier to read.

* <jack52443@yahoo.com>

Table 1. Preprocessor Directives

Directive	Meaning
#define	Define symbolic constants or macros
#include	Include the text in a file at this point in the program
#ifdef	Like an if statement block based on a symbolic constant or macro
#ifndef	If the symbolic constant or macro is not defined
#undef	Undefine a symbolic constant or macro
#if	Preprocessor if control block
#else	Preprocessor else control block
#elif	Continuation of if block (like and else-if)
#endif	End preprocessor if control block
#error	Indicate an error during the compile process
#pragma	A compiler specific action taken based on a token value in the #pragma

WHAT'S NEW

PreciseRF Updates its QRO Mag Loop

PreciseRF has updated its high-powered magnetic loop antenna with an improved stepper motor and a bump to the full legal limit. The HG3 QRO-A remotely-tuned mag loop antenna covers the 80- to 10-meter bands and can handle a full 1,500 watts of power.

Most of the improvements were made to the stepper motor with a new high-Q vacuum capacitor, which allows for the full legal power limit. Additional enhancements include:

- Integrated capacitor-to-radiator connections with six times more copper surface for improved efficiency
- Optical isolated driver interface allows for a longer control cable and RFI rejection
- Separate logic circuit and stepper motor power supplies allow for smoother and more precise tuning.
- Custom high-voltage Delrin motor-to-capacitor shaft coupler for greater high-power and high-voltage protection

PreciseRF also fine-tuned the stepper motor as it now offers 45,000-step resolution and 511 Hz of resolution bandwidth, which allows users to set their band preferences spot on. Included Rapid Tune technology automatically scans each band for the lowest standing-wave ratio (SWR) and is compatible with most high-frequency radios. The HG3 Plus controller also received a new firmware update, which allows for better SWR performance.

The new HG3 QRO-A is available now and has a suggested retail price of $3,025. For more information, contact PreciseRF, 13690 Wisteria Drive NE, Aurora, OR 07002. Phone: (503) 915-2490. Website: <www.preciserf.com>.

#define and Macros

Another magic number you see a lot in source code files is something like:

```
int numberOfStudents[200];
// some more code...
for (int i = 0; i < 200; i++) {
```

If the number of students increases to 210, you now have to go through the entire program and change all uses of 200 as it pertains to the array. Again, an error-prone process, especially in C because C contains no runtime checks on array bounds. Some languages do such checks, but to me, that's a language that still hasn't shed its training wheels.

What if we did this instead?

```
#define NUMBER_OF_ELEMENTS(x)  (sizeof(x) / sizeof(x[0]))
// left out code...
for (int i = 0; i < NUMBER_OF_ELEMENTS (numberOfStudents); i++) {
```

Note that the *#define* in this example is creating an expression that contains a variable (e.g., *x*) in its definition. Because the macro is passed a parameter for use in the macro, such macros are called *parametized macros*. Now, if you change the size of the array, it is automatically adjusted where the macro is called.

Another parametized macro that many people have seen is:

```
#define MAX(a,b) ((a)>(b) ? (a): (b))
// left out code
biggestValue = MAX(x, y);
```

The *MAX()* macro finds the larger of the two parameters passed to it. Both parametized macros should cause an itch on the back of your neck. Why? Note that there is nothing defining the data type used in either macro! That is, they can be used with any data type ... the macro is typeless! If you wrote regular C code to find the maximum of two numbers, you would have to define the data type being used in the comparison. If you needed to find the maximum value for an *int*, *long*, and *double*, you'd have to write three different functions. This makes macros more flexible than straight C code.

#if, #else, #ifdef, #ifndef, #elseif, #endif

This group of preprocessor directives are all variations of *if* and *if-else* C statements. For example:

```
#if key == straightKey
  portPin = 22;
#else
  portPin = 23;
#endif
```

If this case, the preprocessor directive is used to assign the pin number for a key port depending upon the value of *key*. All of the #if** preprocessor directive blocks are terminated with a *#endif*

One directive I use a lot is to toggle debugging code (i.e., aka scaffolding code) into and out of a program. Example (the first line shown below is near the top of the source code file):

```
#define DEBUG            // Comment out for production code
// a bunch of left out code...
#ifdef DEBUG
  Serial.print("Variable x = ");
  Serial.println(x);
#endif
```

Note what happens when the symbolic constant DEBUG is defined. In that case, the debugging print statements are compiled into the program. However, if I comment out the *DEBUG* symbol, that symbolic constant is no longer defined, so the *#ifdef DEBUG* expression is logic false, and the debugging code is not present in

the compiled program. This is a good way to have debug code when you need it, but don't generate the debugging code when you don't need it.

Answer this: What would happen if I replace the line above with *#ifdef DEBUG1* instead of *#ifdef DEBUG*? Because DEBUG1 is not defined, the print statements are not compiled into the code.

So what?

Think about it. What if you have several dozen such pieces of scaffolding code scattered throughout the program? This would result in an avalanche of debugging print statements creating a forest-for-the-trees problem. You can use the trailing digit trick (DEBUG1) to turn off a single debug block while leaving all the others intact.

#include

This preprocessor directive has two main variations:

```
#include <myHeader.h>
#include "yourHeader.h"
```

The difference is whether the include file name is surrounded with angle brackets (<>) or double quotes (" ").

<> When you use angle brackets (we are assuming you are using an IDE and not a command line version of a compiler), the compiler searches the default path name for the compiler's libraries. For example, if you are trying to include a library for an Arduino Nano and the compiler is installed on **C:\Arduino1.8.19**, the brackets cause the compiler to look in **C:\Arduino1.8.19\libraries**, because that is the default include directory. If the compiler cannot find it, it issues an error message.

" " When you use double quote marks, the compiler first looks in the directory where the source code files are located. If it cannot find the specified file in the source code directory, it then searches the default include directory (i.e., the one search when using brackets). If the file is still not found, the compiler sets fire to your compu ... no it doesn't. It just issues a "file not found" error message.

Non-Standard Libraries

More and more, we are seeing programs that take advantage of special libraries that are written for various displays, sensors, and other external devices. For example, suppose you wrote a library named MyLibrary and you host it on your website. I urge you to include it in your programs using the following format:

```
#include <MyLibrary.h>   // http//MyWebsite.com/Libraries
```

All too often, people use non-standard libraries (i.e., a library that is not distributed with the IDE or one of its software patches) but don't tell the reader where to find the code. You can avoid a lot of support headaches if you simply supply the URL where they can download the library as a comment in your #include directive.

Conclusion

While we haven't covered all of the preprocessor directives, we have discussed those most-frequently used. Of all of these, try to use the #define directive to get rid of magic numbers. Even if you don't think the constant will change, a symbolic constant can make it a lot easier to read your code.

DIGITAL CONNECTION

BY DON ROTOLO,* N2IRZ

Computer Security

Avoiding Computer Maladies Like the Plague

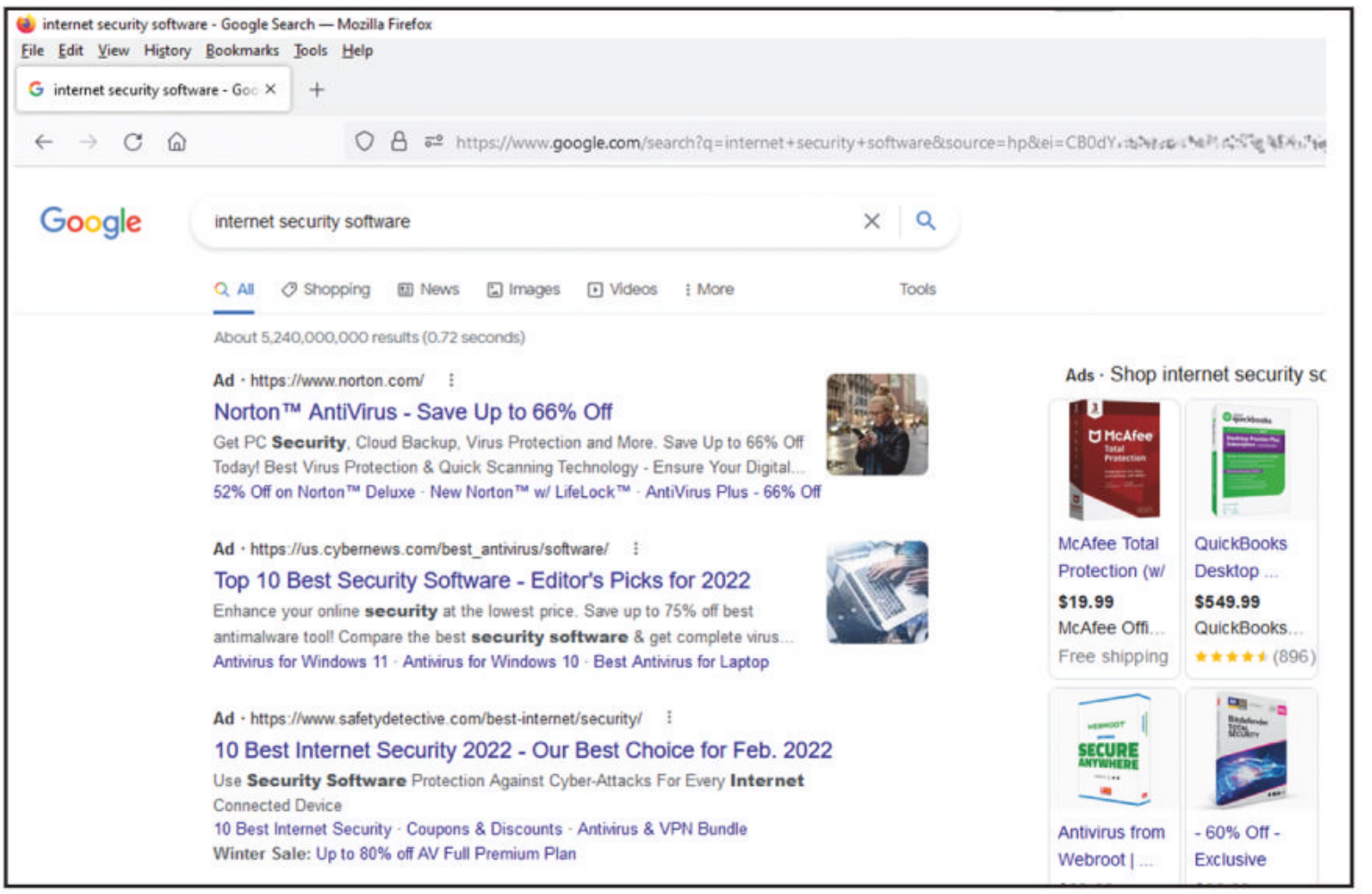


Figure 1. Internet security software options abound. This search found over 5 billion web pages associated with internet security software, and the advertisements show some for under $20. Just pick a reputable company and you should be fine. Check out online reviews (from neutral third parties like magazines; beware of sites with a bias) to learn about features and problems.

I get on the security soapbox every couple of years, and this is the month for that. If you run modern internet security / anti-virus software and manage your home network settings, then you might not find a lot new here. But with the dramatic increase in new computer viruses and malware attacks, at least some cursory protection is mandatory. I'm not going to blame any particular country, but some actively encourage hackers.

Hopefully, your home system is a small fish in a big sea, and for the most part you're not an interesting target. One of my relatives, who is much older than me and therefore should know better, flat-out refuses to pay for virus protection. I convinced him to get the free version his cable company was offering (which is actually pretty good), but he goes out into the dangerous world with little protection. The last time he lost his data to a virus (late last year), I finally refused to help him. He ended up having to buy a new computer and was a little humbled, but not nearly enough in my opinion. Don't be like him!

Passwords

I still meet people who admit their password is "password" or "12345". Unbelievable. I've written before about using a password system (March 2018 for example) which allows you to generate good passwords that are almost trivial to remember, yet very strong and different for each application or website you use. If you use just one or two passwords for everything, you open yourself up for massive fraud or identity theft should the password become known somehow.

I use two password systems, along with the password wallet application KeePass. The "weaker" system is for things of little consequence, such as for a local retailer's "loyalty" club. The "strong" system is for things of greater importance, such as my Google account. KeePass is used for really important things, like bank accounts. The password systems allow me to access websites (for example) that I may not have visited for years, without having to look up my password, handy when I'm not at home where my master password file is found.

KeePass creates passwords that are particularly complex and random, the kind you don't really want to have to type in. The security benefit is not outweighed by the inconvenience. I do have KeePass on both my home system and as an app on my phone, so as long as I have one of those, I can access things. The KeePass database is portable, meaning that it can be stored on multiple devices and accessed from any of them. KeePass does require a master password to open the database, but I've committed a particularly strong one to memory.

Wait a sec: Master password file? Yup. Although it is a bad practice to store your passwords on paper (safe deposit box or fire safe being an exception), I do but I don't. The website, user name, and password *system* in use is written down, but not the actual password. That means you might see "weak

*c/o CQ magazine
Email : <N2IRZ@cq-amateur-radio.com>

core" as the password, but you can't do much with it. Plus, the file is stored encrypted and password-protected by Microsoft Excel. This security can be broken, but not easily — and even if it is, a thief won't see any passwords, just which system I use there. But having such a document would be very handy should my wife become a widow.

The bottom line is this: Use strong passwords. There are many ways to do this, including with apps like KeePass, which I trust because it is open source. But do it, somehow.

Your Phone

That small but powerful computer in your hand also has its vulnerabilities. Instead of a simple 4-digit passcode, use the more secure setting of 6 or more characters, and set the phone to erase itself after 6 or so incorrect guesses. Biometric identification (your face or fingerprint for example) is fairly secure, unless you're involved in a business where they won't hesitate to chop off your index finger to get access. (Sorry, my Sicilian heritage is showing. There is no Mafia and we'll kill anyone who says there is).

Anti-Virus Software

I had been a many-decade user of McAfee products until recently. While the performance was perfectly fine, the constant pop-ups for advertising purposes and the apparently ineffective settings to suppress them finally got to me. I went with another vendor and so far I am satisfied, but time will tell. There are hundreds of options out there. See *Figure 1* for a sampling.

The key is that for just a few dollars — less than a nice lunch — you can buy anti-virus software on sale that's good for multiple devices for a year. Prior to renewal time, check local retailer's websites for the sale again, and repeat the cycle. If necessary, call the company and whine that you'd like to renew but full price is too much, can they do anything for you? As a ham, frugal is my middle name.

Set the software to update and scan regularly and automatically. If it has a "paranoid" setting use it, later throttling it back to eliminate any really bothersome things like flagging every website as dangerous. The idea is to check every file, email, USB stick, etc. that goes in to or comes out of your machine, along with "signature" detection, flagging suspicious activity that could be a virus it doesn't yet know about. Most AV software does this intelligent monitoring automatically, and can prevent most big headaches.

Email

Of course, you also have to be intelligent. You know of the Nigerian prince who died and left you US 37 million$ if you just verify your bank account, but phishing emails are even more pervasive than ever. I get messages all the time posing as FedEx, LinkedIn, UPS, USPS, several banks, credit cards, even Facebook. Messages with foreign alphabets, or professing her lust for me, are also not good. Don't even open them, just delete them.

If you do happen to open one, be extremely cautious. Clicking on a link could download a virus. Anyone asking for details (fill in this form to unlock your banking account) not only gets the details you typed in, but a pretty good idea of where and who you are: Your browser is generally quite promiscuous in spilling details like your IP address, physical location, computer and local network details, and far more. Unless you protect yourself, that email link you clicked can gather all that info, even if you angrily decide to "show *them*" by entering false information. They can get to know a lot about you, most importantly that you're a genuine address and you clicked on the message: You are now a target.

Firewall

A firewall can help limit this information spillage. There are many kinds of firewall, but the one you get with your internet security software (a step up form basic anti-virus) is probably just fine, considering the small fish — big sea situation. Use your favorite internet search engine — remembering that

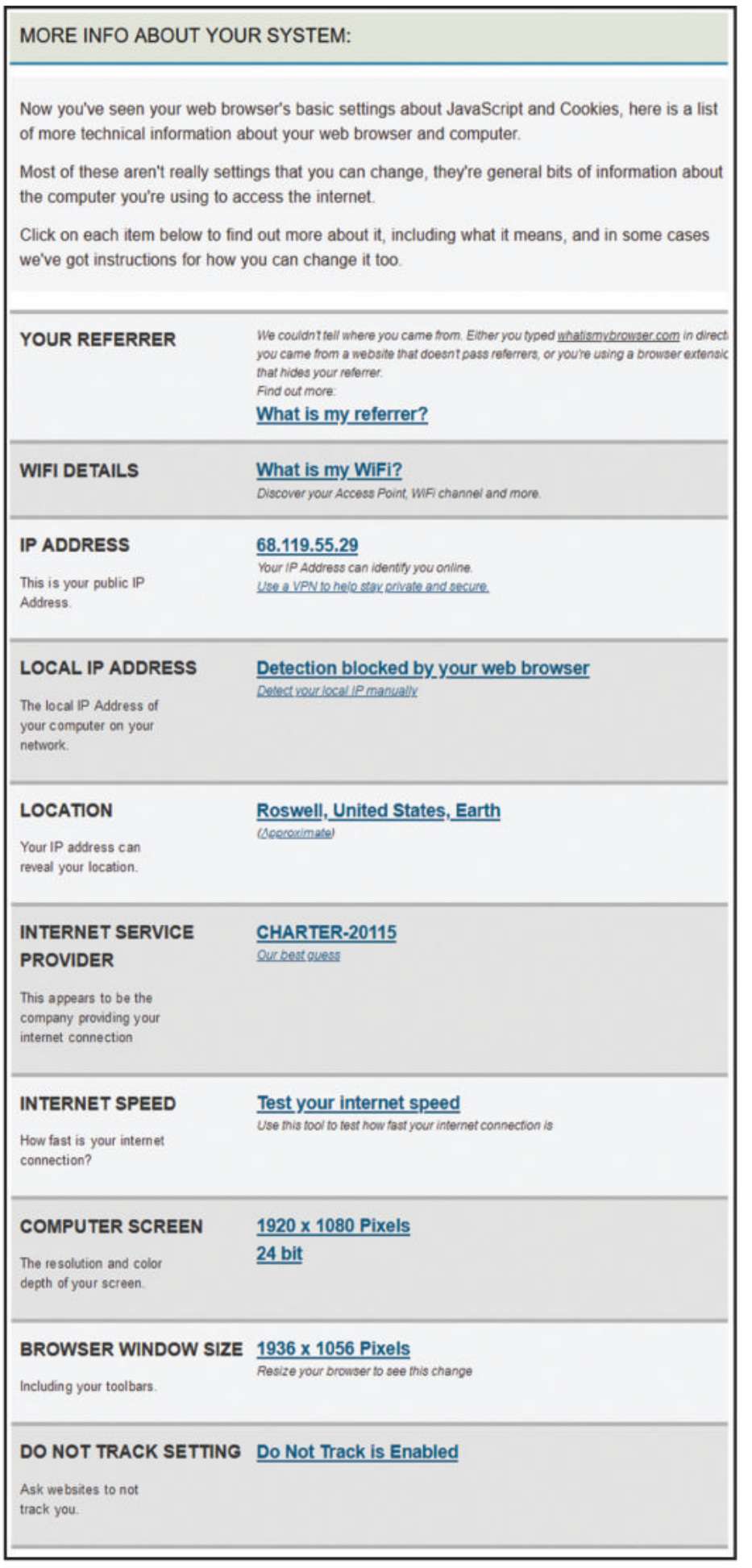


Figure 2. Here is an example of some of the information that is collected from your browser and computer system. Using a VPN along with effective firewall and browser settings can limit this significantly. Most of my settings were left open to collect this image.

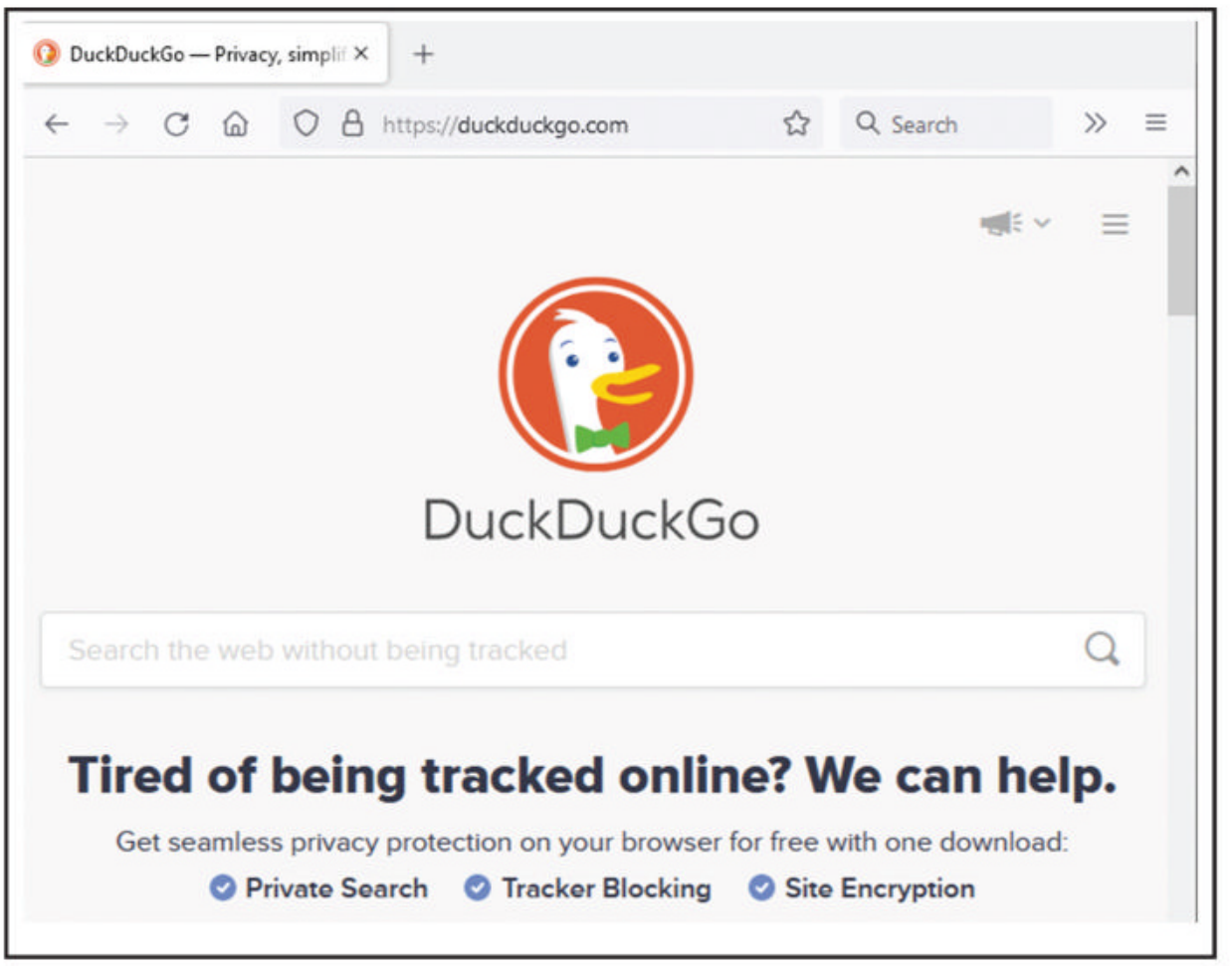


Figure 3. If you don't want your web search information tracked and sold, look for a search engine (such as Duck-Duck-Go) that will help you find what you're looking for without the tracking stuff. (This is not an ad for Duck-Duck-Go; it's just the best-known of non-tracking search engines.)

Google records this along with all that spillage info and uses it to make money — and look for "info from browser." It can be an eye-opener, but use care: A malicious site can fool you info clicking on something. I used <www.deviceinfo.me> which did not require me to click anything.

Google and others collect information about every search you make, and ties that together with anything else it can learn about you (*Figure 2*). They make money by selling this information to advertisers and others who think you are swell and want to know more about you. Some search engines, such as the much-advertised Duck-Duck-Go (*Figure 3*) are just as effective, without the tracking stuff.

VPN

Many internet security packages include a Virtual Private Network, or VPN, to significantly limit what information can be gathered. A VPN acts like a tunnel or wormhole … you go in one side and what comes out the other side isn't easily linked back to you. The other end sees the VPN's IP address and details, not yours. VPNs also encrypt the data, so someone listening in to your traffic won't be able to read it easily. Some VPNs cost a few dollars, some are included or free. Just remember that the VPN company itself can see both sides of the connection, so be sure you trust *them*.

Using a VPN is generally simple. You just turn it on, but because of the extra computing happening, it may slow your connection a little. Using a VPN on an open Wi-Fi system — think Starbucks or the airport — helps prevent someone from seeing all your information. Without one, it is actually easy to hack into the Wi-Fi and gather all sorts of details that can be used to attack you. Search on sidejacking, packet sniffing, evil twin, and man-in-the-middle hacks for some basic examples.

The bottom line here is that a VPN goes a very long way towards keeping your internet presence secure. Use one if you can.

Local Router

The internet router used at your home (or business or ...) should also be secured. At a minimum, change the default password for accessing it, set a good password for Wi-Fi, and disable "remote administration" so someone can't come in from outside your network and access the router. It can be a good use of your time to learn about the other features of the router and use them. A website like <https://routersecurity.org> has good advice for this.

You can also use network-attached devices to enhance your security. These live on your local network and look at the traffic passing through, taking action as needed. One such device is the Pi-hole <https://pi-hole.net> which has a focus on blocking advertising. You can use a Raspberry Pi to run it, and it replaces the default Domain Name Server (DNS) assigned by your internet provider.

The intent of this month's column is to motivate you to think about and take action for your digital security. There is a lot of evil out there, and nobody else is going to protect you from it. Take some action, the more the better, because eventually even a small fish gets caught and eaten.

– Until next time, 73 de N2IRZ.

VHF PLUS

BY TRENT FLEMING,* N4DTF

Waiting for Sporadic-E

Plus Meteor Scatter Mornings

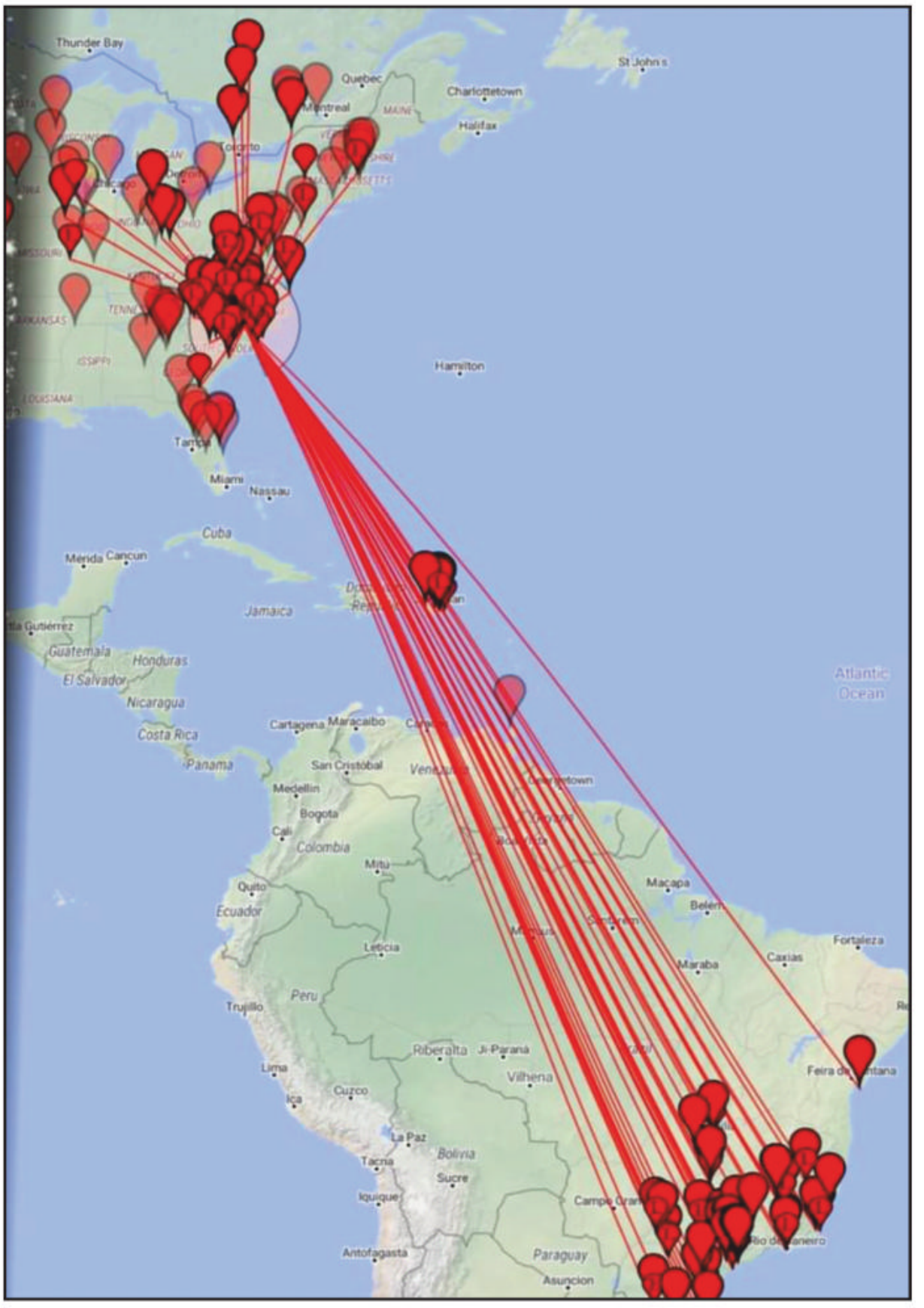
As I write this, many of us are eagerly awaiting the spring/summer Sporadic-E (E_s) season on 6 meters. I'm seeing a lot of FT8 activity, less phone and CW for now. Both E_s and Transequatorial Propagation (TEP) have been active modes, with a number of U.S. hams working into South America recently (see *Photo A* for a graphic of the March 15th opening). As previously mentioned, I have FT8 fully functional now, using my IC-7700, and will look forward to not only phone, but FT8 contacts. Please keep those activity reports coming so that I can share them.

Getting the Most Out of Our Hobby

You'll recall that one of my recurring themes has been helping new hams get the most out of their license privileges. This time I wanted to discuss the educational value of catalogs. Call me old-fashioned, but I love catalogs. In the spring, various fly-fishing catalogs show up that to me serve as harbingers of better weather and days on the water. I often read these cover to cover. I feel the same way about ham radio catalogs, any time of the year. Websites and new product emails are great, but the catalog presents a different experience. In addition to its portable, offline capability (*just like a print magazine! –ed*), a full-line catalog from any vendor presents — are you ready? — an educational opportunity. For most of us, perusing the pages of ham radio and electronics catalogs gave us early insight into the wide range of radios, antennas, and accessories available, as well as an understanding of the use of these components. Sure, there is a Sears Wishbook element to these, drooling over the next cool thing, etc., but there is also an education to be had in terms of what's available, components that solve a problem you are having (or didn't realize you had), and a general understanding of the basics of getting a shack up and running.

N4DTF Shack Report

Keeping you updated on developments at my station … Most importantly, I was able to lower my 6-meter antenna and troubleshoot what was causing high SWR. My first harmonic provided a lot of the heavy lifting. Fortunately, it was as simple as replacing the cable, and all is now well as I prepare for another 6-meter season. Other projects include a successful implementation of HF in my Tahoe, using an FT-857D and a 40-meter monoband antenna. The problem, as is apparently the usual in mobile



* <n4dtf@cq-amateur-radio.com>

Photo A. Six-meter TEP (transequatorial propagation) opening on March 15, 2022 between the southeastern U.S. and central South America (Maps courtesy DXmaps.com)

Photo B. A bracket mount on the hood of N4DTF's vehicle solved problems in his mobile installation caused by poor grounding.

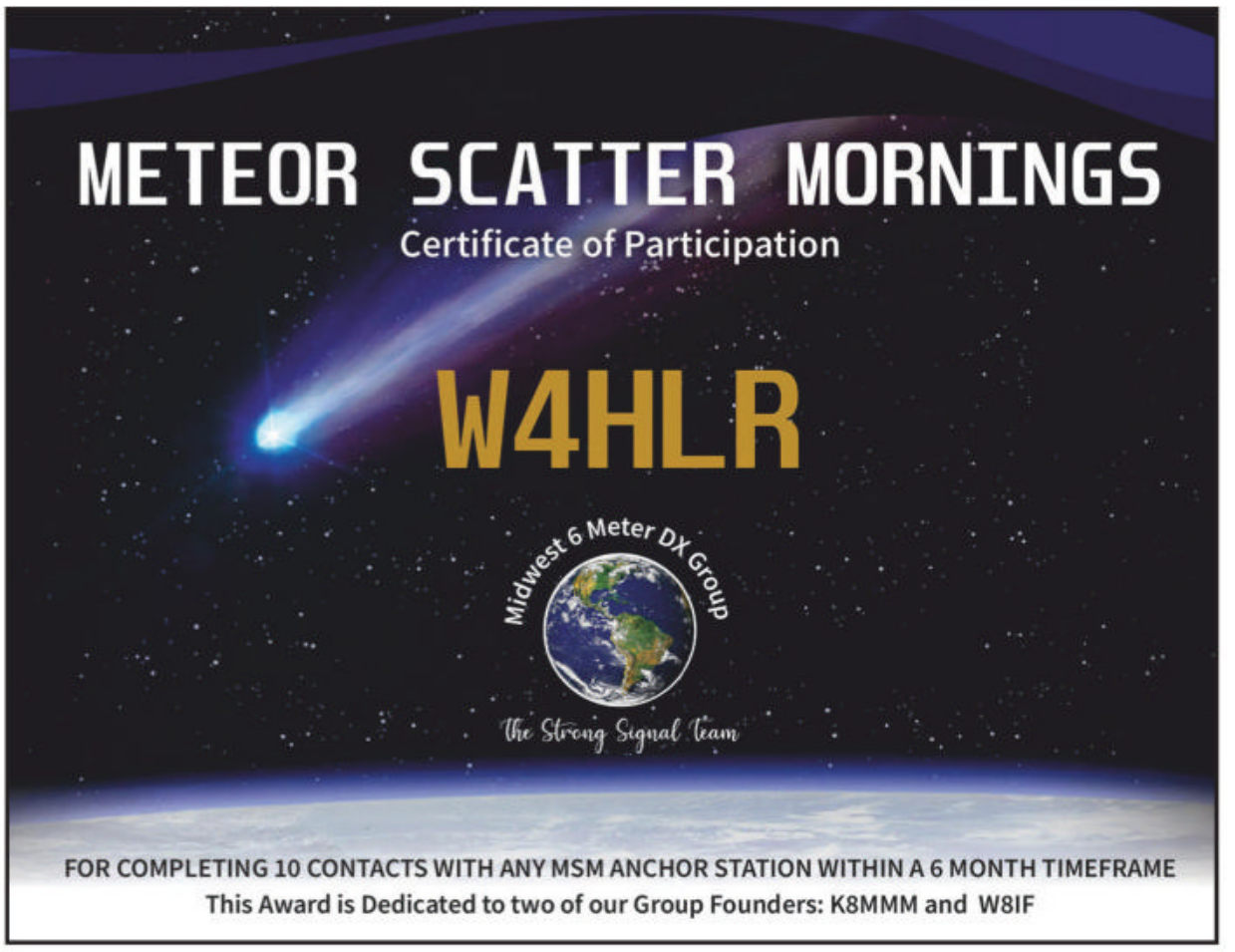


Photo C. Meteor Scatter Mornings certificate for working at least 10 of the group's "anchor stations" within six months via 6-meter meteor scatter (CW or voice only).

implementations, was grounding. A bracket mount, firmly attached under the hood, solved the issue (*Photo B*). So far, the antenna also performs well on 15 and 6 meters, with very little tuning. I hope to have some success mobile on both FM and SSB on 6 meters this year. If you are mobile on either mode, please do send along reports of your activities.

New 6-Meter Operating Award

Lee Kermode, KZ4RR, writes with news of a new operating award for the Meteor Scatter Mornings group. Previously you've seen me write about this group that meets beginning around 7 a.m. eastern time on 50.145 MHz to attempt phone contacts on meteors. From Lee:

Meteor Scatter Mornings was started in 1981 when Tom, K8MMM, and Lee, WA8LRE (KZ4RR), started working every morning on 6-meter (meteor) scatter. In 2006, Mike, W8IF, and DeRG, K9DRG, joined in on the fun. Since then, over 100 stations representing 20 states, the Cayman Islands, Canada, and Mexico have participated. The group focuses on weak-signal scatter and tropo using conventional modes of SSB and CW only. Meteor Scatter Mornings meets every morning on 50.145 MHz from 7-8 a.m. ET. MSM is not a net — just a place to meet and make weak-signal contacts — please join us.

Table 1
Meteor Scatter Mornings Anchor Stations as of March, 2022

Alabama - N4WXU, K4WI
Cayman Islands - ZF1EJ
Connecticut – WZ1V
Florida - KZ4RR, W4ICU, KZ4TT
Georgia - K4CKS
Indiana - K9DRG, W9FNB
Kentucky - W9DR
Louisiana - KE5JXC
Michigan - W8JER, N8JGG
Minnesota - KØGUV, KØKIF
Missouri - KØKKO
North Carolina - W4MW
Ohio - WZ8D, KW8F
Ontario - VE3EDY
Tennessee - W4HLR
Texas - W3UUM, NZ5F
Virginia - KG4HOT, N4ASF, KD4AA, W4TJ
Wisconsin - K9KHW, W9NHE
Wyoming - K7TNT

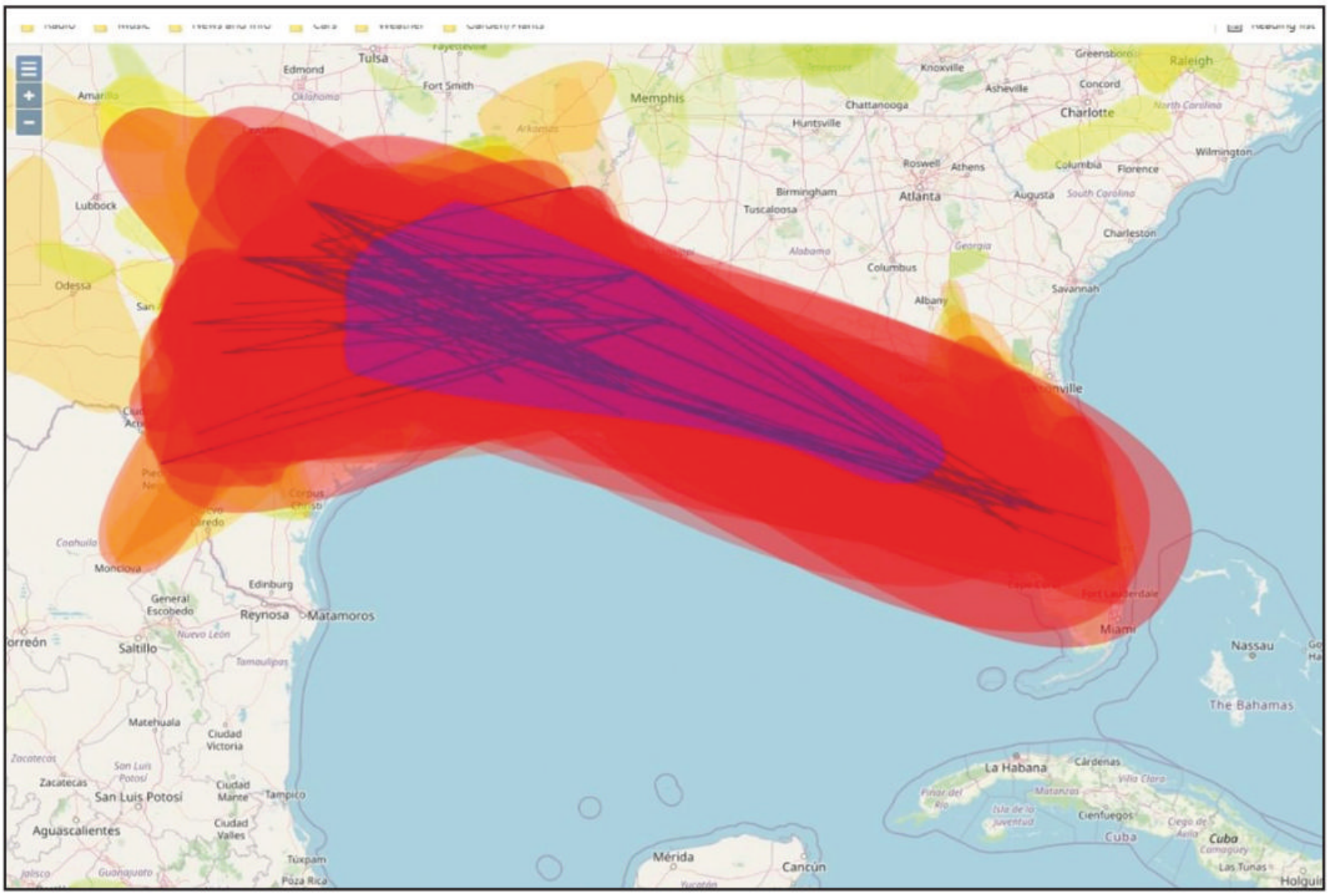
To qualify for the certificate (*Photo C*), a station must make 10 contacts with any "anchor station" within a 6-month timeframe. See *Table 1* for a list of anchor stations. Lee says it's permissible to work the same anchor station 10 times, but the group encourages participants to work as many anchor stations as possible within the 6-month timeframe.

Submit date, time, and Anchor Station Worked to: Howard Runions, W4HLR, Program Administrator, email: <hireddux@yahoo.com>.

We appreciate Lee sending along this information, and hope that many of you will try to get on the air with the Meteor Scatter Mornings group.

On the Air

Around these parts (I'm in EM55, near Memphis, Tennessee), we enjoy the Florida and Alabama Gulf Coast. Many pilgrimages are made each year to enjoy the sunshine and surf along this stretch, alternatively referred to as the Emerald Coast or the "Redneck Riviera." For hams, there is another reason to love this area, and that's the outstanding tropospheric propagation. Our friend David Thier, WA3GWK, lives along the coast in this paradise and keeps us posted on tropo activity. See *Photos D* and *E* for examples of the outstanding propagation on March 27th and 28th.



Photos D and E. March 27th and 28th saw great tropo openings along the Gulf coast.

AWARDS

BY STEVE MOLO,* KI4KWR

Parks On The Air (POTA) Awards

Recently I was attending a Parks On The Air (POTA) activation here in Alabama and a new amateur mentioned that there are awards for POTA activators and hunters. So let's dive into this and see what you are possibly eligible for already.

POTA awards are available in two categories: for *activators* who operate portable from a designated park, and for *hunters* who are the amateurs who make contact with the activators. Let's start with what the POTA website describes as Standard Awards:

For Activators:

- Bronze Award (*Photo A*): Work from 10 different reference areas (POTA's name for a designated park; POTA limits its eligible parks to state / provincial or national / federal parks — county and municipal parks don't count).
- Silver Award: Work from 20 different reference areas.
- Gold Award: Work from 30 different reference areas.
- Platinum Award: Work from 40 different reference areas.
- Diamond Award: Work from 50 different reference areas.
- Sapphire Award: Work from 75 different reference areas.

For Hunters:

- Bronze Award: Work 10 different reference areas.
- Silver Award (*Photo B*): Work 20 different reference areas.
- Gold Award: Work 30 different reference areas.
- Platinum Award: Work 40 different reference areas.
- Diamond Award: Work 50 different reference areas.
- Sapphire Award: Work 75 different reference areas.

Getting Advanced

The next set of POTA awards available are Advanced Awards, named for endangered plants and animals found in some of the POTA areas and around the world.

Versions of each are available to Activators and Hunters:

- Arizona Agave Award: Work/work from 100 different reference areas.
- Enrubio Award: Work/work from 200 different reference areas.
- Ouachita Mountain Goldenrod Award: Work/work from 300 different reference areas.
- Stenogyne Kanehoana Award: Work/work from 400 different reference areas.
- Howard's Spectacular Thelypody Award (*Photo C*): Work/work from 500 different reference areas.
- Texas Wild Rice Award: Work/work from 600 different reference areas.
- Wiggin's Acalypha Award (*Photo D*): Work/work from 700 different reference areas.
- Georgia Aster Award: Work/work from 800 different reference areas.
- Rafflesia Flower Award: Work/work from 900 different reference areas.
- Western Prairie Fringed Orchid Award: Work/work from 1,000 different reference areas.
- Echinacea Paradoxa Award: Work/work from 1,500 different reference areas.
- Glandularia Tampensis Award: Work/work from 2,000 different reference areas.
- Heliconia Angusta Award: Work/work from 2,500 different reference areas.

Photo A. Sample Bronze Activator certificate, the first Parks on the Air award level for activators. See text for details (Images courtesy POTA website)

Photo B. The second POTA standard award level is silver. This certificate shows the version for "hunters," who seek out contacts with activators.

*Email: <KI4KWR@cq-amateur-radio.com>

• Argyroxiphium Sandwicense Award: Work/work from 3,000 different reference areas.
• Acacia Koaia Award: Work/work from 3,500 different reference areas.
• Kokia Drynarioides Award: Work/work from 4,000 different reference areas.
• Acampe Longifolia Award: Work/work from 4,500 different reference areas.
• Virginia Big Eared Bat Award: Work/work from 5,000 different reference areas.
• Tipton Kangaroo Rat Award: Work/work from 5,500 different reference areas.
• Sierra Nevada Bighorn Sheep Award: Work/work from 6,000 different reference areas.
• Red Wolf Award: Work/work from 6,500 different reference areas.
• Pronghorn Antelope Award: Work/work from 7,000 different reference areas.

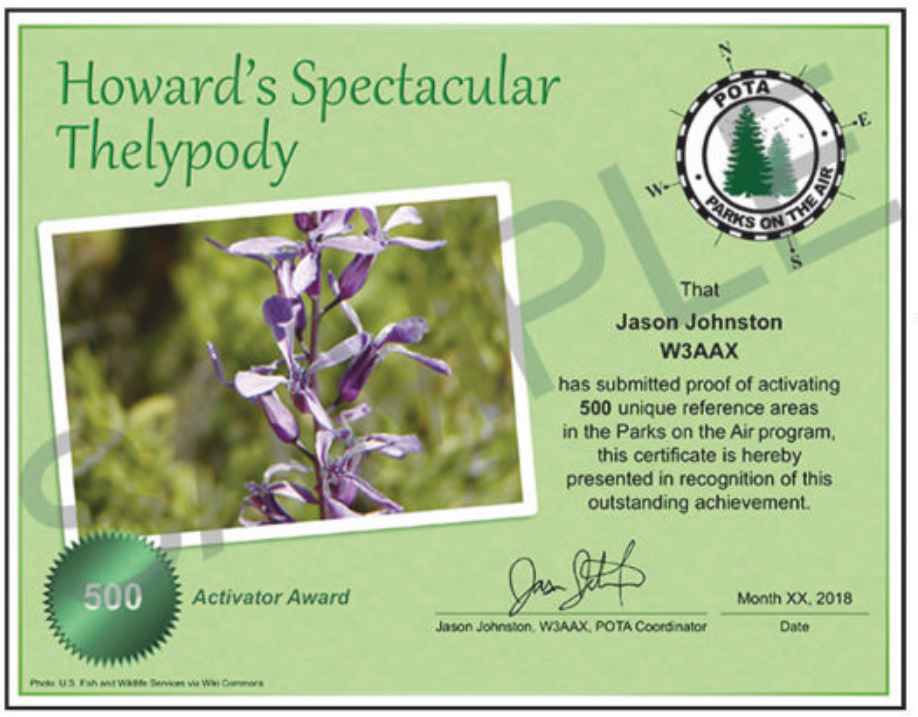


Photo C. Advanced awards are named after endangered species, with versions of each available to both activators and hunters. This one is for activating 500 or more designated park locations.

Photo D. This advanced POTA award goes to hunters who make contact with activators in at least 700 approved park locations.

• Ocelot Award: Work/work from 7,500 different reference areas.

There are several more categories that I could mention and the article would cover 4-7 pages of content on each award and sample photos. Obtaining the awards is easy once you've worked the required number of stations (or from the required number of locations). All it takes is logging into the POTA webpage at <https://pota.app/#/> and signing up if you aren't already. This page shows current activations and has a spot page that updates every minute or so, which is very handy. Nobody thought that POTA, which had its inception several years ago, would be what it is today.

Any questions you may have about POTA and how it is all done, check out <https://parksontheair.com>, which not only includes the U.S. but is now international, with over 111 DX entities and growing.

Parks on the Air would not be as big as it is today without Jason Johnston, W3AAX, and his team of administrators and support staff who keep this program alive. Don't forget to support the program since, like any program, it does have costs on the back end. If interested, you can donate via the link on the POTA website.

Hope to see some of you at Dayton Hamvention® in Xenia this month ... 73.

BY BOB SCHENCK,* N2OO

Under the Volcano: A DXpedition to Montserrat

BY THAIRE BRYANT, W2APF

DX conditions continue to get better every day. I hope everyone is enjoying the slow increase of sunspots that we are seeing. I've been catching frequent openings to Asia and Southeast Asia on 20, 17, and 15 meters. It has been a lot of fun! This month we turn the keyboard over to Thaire Bryant, W2APF, so he can share his experience operating from one of the most beautiful islands in the Caribbean, Montserrat. –N2OO

VP2MDX QSL Card (all photos courtesy W2APF)

In February 2020, my wife and I had escaped the ice and snow of northern New Hampshire and rented a house in Fuertaventura, the Canary Island closest to Africa. I brought my trusty KX3, KXPA100, a Delta Loop, and an 88-foot doublet and was ready to spend a month working the world as EA8/W2APF. The weather was a lot better than New Hampshire's, I was interesting DX, and the local restaurants were great. The only big negative was the seasonal "la calima" or sandstorm that carried red sand from the Sahara across the Canaries. During these storms, visibility was down to 10 feet and everyone stayed in their houses.

Near the end of the month our son-in-law, an infectious disease physician at Massachusetts General Hospital, began to sound the alarm about this new thing called Covid. He advised getting home as fast as possible. That warning was prescient as Las Palmas shut down a hotel and quarantined 1,000 guests for this new disease brought to the Canary Islands by some visitors from northern Italy.

Our plans had called for a three-day stop in Madrid on the way home to visit the great museums. Instead, we hid in our hotel room and ordered room service until we could get a plane home. Arriving in New Hampshire, we went directly into quarantine and luckily had not contracted anything nor brought anything home with us.

Fast forward through two years of masking, vaccinations, boosters, and a lot more radio time than even I had dreamt possible, and we were both looking for a change of scenery. We also wanted to get away from winter in New Hampshire. Debbie had a new knee, and I had a new carbon fiber and titanium leg (thanks to an accidental fall while dismantling a tower), so neither of us was interested in skiing or any other winter activity. The question was where to go safely with Covid still an issue. In August, we settled upon the island of Montserrat, VP2M. We had been there in 1995, just a few months prior to the volcano starting to act up, and had loved the island for its beauty and very friendly local population. They had locked down very successfully, had begun a successful masking protocol and had reasonable success with vaccinations. Through February 2022, they had had only two deaths due to Covid, and only 164 cases in total. We were safer there than in New Hampshire! As of the 19th of February, the day we returned home, they had zero active cases of Covid on the island!

*email: <n2oo@comcast.net>

A Radio-Friendly Location

We found a house that looked to be both comfortable and very radio-friendly on a promontory called Garibaldi Hill. It had a clear takeoff in all directions and space for antennas. The big problem was that the island was still closed to visitors. We quickly found a workaround. Montserrat had a "remote worker program" and was admitting folks who could come for longer periods and work remotely. The island has great internet, much better than New Hampshire's rural areas, and the program enabled the island to replace some of the income lost by the tourist trade. It entailed us getting an interview and background check by our local sheriff, providing proof of income, health insurance, vaccination, a place to live, and a job description. I explained that I was planning on doing research into worldwide HF radio propagation

Montserrat station all packed to fly.

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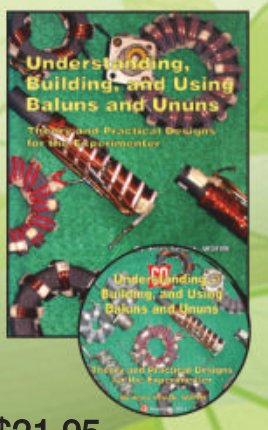

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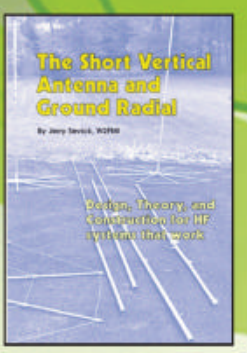

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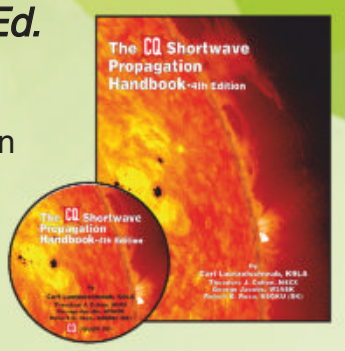

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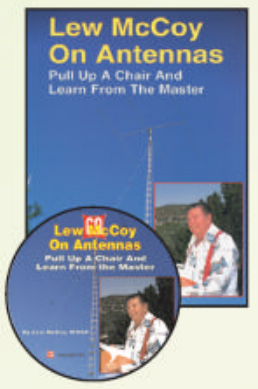

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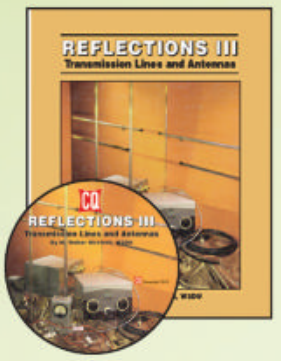

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The author's Elecraft station set up at VP2MDX.

using simple wire antennas. I applied for and received the callsign VP2MDX and the remote worker stamp.

We had our permit to travel, our airline tickets and a house to rent. My next job for equipment and antennas. I have traveled the world for years pre-Covid with my KX3 and had just received the 12-year-old wonder back from Elecraft after a tune up. My KXPA100 amp had always worked well and with a PX3, a Begali Adventurer paddle and a power supply, I was ready to go. All I needed was to settle on antennas. I had read a lot about Hexbeam antennas and saw a lot of pluses over the 88-foot doublet I usually traveled with. The big problem was weight and set up. I even planned a lunch with Mike Traffie, the original developer of the Hexbeam. Mike assured me that the design would meet my needs but, sadly, he had no parts left to construct one. I checked out others on both sides of the Atlantic and found that they were either too heavy, too expensive, or unobtainable in time for our trip.

In researching Hexbeams, I came across a YouTube video of Jason, KC5HWB, putting up a Hexbeam made by BuddiPole. It was easy to assemble, weighed less than 7 pounds, and paired very well with a Mastwerks mast and tripod. It all fit nicely in a snowboard carrier made by SportTube and made the airline weigh-in at under 50 pounds, including 75 feet of coax and a 12-meter Spiderbeam mast for my doublet to use for 30, 40, and 80 meters. The only problem was that they were not yet available for sale.

I have known Budd Drummond (BuddiPole's founder) for many years, both though BuddiPole and his many DXpeditions to the Caribbean. I found out that the company was now being managed by his son, Chris. I took a chance, emailed Chris and explained my plans for a trip to Montserrat. I asked if there was any chance of getting one of his Hexbeams in time for the trip and

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll lisiting is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604.

Mixed

K2TQC....288	N8PR....229	OK1AOV....208	HA1ZH....190
W1CU....267	HA5AGS....228	F6HMJ....206	BA4DW....188
VE7IG....254	9A5CY....227	KF8UN....205	K2AU....187
HAØDU....253	K9YC....227	OM2VL....205	K8YTO....186
OM3JW....253	VE3ZZ....226	VE7SMP....204	WO7R....185
W6OAT....252	KØDEQ....221	RW4NH....203	N3RC....184
HA5WA....250	WI8A....219	K1NU....201	K2SHZ....182
IK1GPG....245	HA1AG....218	HB9AAA....200	KJ6P....180
OK1ADM....245	JN3SAC....214	N5KE....200	W6XK....180
K8SIX....240	HA9PP....213	W3LL....199	W5ODD....177
HA1RW....239	WA5VGI....213	NIØC....196	NØFW....176
VE3XN....239	IV3GOW....211	ON4CAS....194	WA9PIE....176
I6T....230	W4UM....210	HB9DDZ....193	HB9BOS....175
K8OOK....229	N4MM....208	N4NX....192	NKØS....175

SSB

W1CU....249	KØDEQ....198	N4MM....189	NØFW....176
W4ABW....202	W4UM....198	WA5VGI....189	DL3DXX....175
VE7SMP....201	JN3SAC....191	W3LL....187	

CW

W1CU....253	JN3SAC....211	OK1AOV....198	N4MM....186
HA5WA....234	DL3DXX....210	WA5VGI....197	OK2PO....184
DL6KVA....233	DL2DXA....209	NIØC....196	N4NX....177
KØDEQ....214	W4UM....201	HB9DZZ....189	N7WO....175

Digital

W1CU....195	HA5WA....177	KØDEQ....175

he graciously let me order one along with the Mastwerks mast and tripod. SportTube supplied the case and it all arrived about three weeks before our departure. I had wanted to do a dry run of the assembly process but the weather in New Hampshire refused to cooperate.

My entire Elecraft station travels in a Pelican case that I take as carry-on. The SportTube held the antennas and was checked. I also brought my KX2 for radio on the beach with a new AX-2 17-meter whip. Even though we had eight cancelled flights in eight hours, we managed to get to Antigua an hour early with all our luggage and equipment. The 15-minute flight to Montserrat was in a 6-passenger plane and the only way to enter with Covid restrictions. A taxi brought us to our house, our host did grocery shopping, and we went into quarantine for five days.

Quarantine Hamming

We arrived on Saturday evening and by early afternoon on Sunday, the antennas were up and an operating position was established on the deck overlooking the pool, lush green vegetation, and the blue waters of the Caribbean. Nevis and Redonda were just 30-40 miles away. On a few days, pods of humpback whales swam past the island. We could hear the surf at Isles Bay beach just 400 yards below the house. It was the perfect Covid and winter getaway. The island was so safe that we left the station set up all month, protected from the rain and looking out at the rainbows we saw nearly every day. By 4:00 p.m. local (2000 UTC), I was ready to check into the Collins Collectors Net and got to chat with old friends, Michael, WØJAM, and David, K2DP. I am a regular net control on this net from New Hampshire using my Elecraft K4D, KPA1500 and M^2 log periodic at 60 feet. The reports I

CQ Names New WAZ Award Manager

Jose Castillo, N4BAA, has been named the new CQ WAZ award manager. All inquiries regarding the WAZ award program should be made to N4BAA.

Jose Castillo, N4BAA
6773 South State Road 103
Straughn, IN 47387
Email: Jose-Castillo@verizon.net

Unfortunately, the WAZ update for May will be combined with the June update as N4BAA assumes the manager's position from John Bergman, KC5LK.

The WPX Program

CW

4045.....VE3UZ
4046.....N1CEO
4047.....K1OJ
4048.....OK2CSU
4049.....N7MB
4050.....K5QR
4051.....DC1YY

SSB

4410.....N5UWY
4411.....VE3UZ
4412.....IU4LEC
4413.....WQ9F
4414.....IZØFYW
4415.....N7MB
4416.....K5QR
4417.....4X6HX
4418.....W9CHI

Mixed

4382.....N5UWY
4383.....W1DNP
4384.....VE3UZ
4385.....NN3Y
4386.....ZR2BK
4387.....N2YCH
4388.....W2SUB
4389.....AE5FY
4390.....JL1UXH
4391.....JJ1MBU
4392.....KE8OTO
4393.....NQ7G
4394.....JE1WBA
4395.....W4RFA
4396.....K1OJ
4397.....N9BSA
4398.....EA2EXS
4399.....N7MB
4400.....WP4JLZ
4401.....JQ2MPJ
4402.....W1BUB
4403.....UT7EF
4404.....W9CHI
4405.....R0LHQ
4406.....W9HJ
4407.....K3LSU

Digital

1687.....N5UWY
1688.....W1DNP
1689.....NN3Y
1690.....ZR2BK
1691.....GØOFD
1692.....W9NB
1693.....KA5WMF
1694.....CT1BWU
1695.....KDØFYF
1696.....N2YCH
1697.....W2SUB
1698.....AE5FY
1699.....JL1UXH
1700.....JJ1MBU
1701.....NQ7G
1702.....W4RFA
1703.....OE3SMA
1704.....KD2RUY
1705.....W4MRW
1706.....N9BSA
1707.....KDØFYF
1708.....JR8SUM
1709.....DU1/NFØO
1710.....K5QR
1711.....KE8LFC
1712.....W1BUB
1713.....G1III
1714.....JHØEJF
1715.....JG1JPE
1716.....W9HJ
1717.....WA4TG
1718.....K3LSU

CW: 650: N7MB, OK1UU. **900:** VE3UZ. **1000:** N6PEQ, OK2CSU. **1500:** K5QR. **1750:** JA7FFN. **2500:** W3LL. **5150:** W8IQ.

SSB: 350: PU4MMZ, K1OJ, K5QR. **400:** IU4LEC, IZ7AUE. **500:** N5UWY. **550:** GØOFD. **600:** N7MB. **650:** VE3UZ, AI1W. **750:** IZ4DPV. **850:** OK1UU. **950:** K6VXI. DK6MP. **1200:** 4X6HX.

Mixed: 450: JJ1MBU, AB5WX, UT7EF. **500:** NN3Y, IW7DVM, IZ7AUE, W1BUB, N9BSA. **550:** N2YCH. **600:** W1DNP, N8OCJ, K3LSU. **750:** GØOFD, NQ7G, W4RFA, N3AML. **800:** JE1WBA. **850:** KF8QL, WQ9F. **900:** N1CEO, AJ6X. **1000:** IZØFYW, K6VXI, N7MB. **1050:** N5UWY, KM4VI. **1100:** IZ4DPV, JL1UXH, DK6MP. **1150:** AIWW. **1200:** W4DWS, HB9ECS. **1250:** HB9HIT. **1350:** KC1ERO, W9HJ. **1450:** PU4MMZ, NU6S. **1750:** VE3UZ. **2000:** OK1UU. **2100:** K5QR. **2300:** JR3UIC. **2550:** K4HB. **4200:** W3LL.

Digital: 350: KD2RUY, KE8LFC, G1III. **400:** ZR2BK, W2SUB, AE5FY, JJ1MBU, AB5WX, W1BUB. **450:** IZ4DPV, NN3Y. **500:** N5UWY, N9BSA, N8OCJ. **550:** N2YCH, W3LMC, OK1ZHV, JR8SUM, JG1JPE. **600:** W1DNP, N3AML, K3LSU. **700:** NQ7G, IZØFYW. **750:** AI1W, W4RFA, WQ9F. **800:** KF8QL, CT1BWU, N1CEO. **850:** KC1ERO. **900:** K5QR, AJ6X. **1000:** JL1UXH, WW5XX, KM4VI. **1050:** W4DWS. HB9ECS. **1250:** HB9HIT. **1350:** PU4MMZ, W9HJ. **1450:** OK1UU. **1950:** JF3UIC. **3050** W3LL.

160 Meters: W4DWS, VE3UZ, AI1W, N7MB, W9HJ
80 Meters: KF8QL, GØOFD, HB9ECS, N7MB, K5QR, NU6S, W9HJ
60 Meters: W9HJ
40 Meters: W1DNP, HB9HIT, GØOFD, AI1W, W4RFA, N7MB, G1III, OK1UU, W9HJ, K3LSU
30 Meters: HB9HIT, HB9ECS, N6PEQ, W9HJ
20 Meters: N5UWY, VE3UZ, KF8QL, NN3Y, AI1W, AE5FY, NQ7G, JE1WBA, W4RFA, OK2CSU, W3LMC, N3AML, N7MB, K5QR, DK6MP, UT7EF, W9CHI, JHØEJF, W9HJ, N8OCJ
17 Meters: HB9ECS, OK1UU, W9HJ
15 Meters: W4DWS, HB9HIT, VE3UZV, HB9ECS, LA7EIA, N7MB, K5QR
12 Meters: OK1UU
10 Meters: IZ4DPV, PU4MMZ, KE8OTO, LA7EIA, KC1ERO, 4X6HX, WP4JLZ, OK1UU
6 Meters: IZ4DPV

Africa: K5QR
Asia: VE3UZ, CT1BWU, IW7DVM, JL1UXH, JJ1MBU, JE1WBA, OK2CSU, N7MB, KC1ERO, JR8SUM, DU1/NFØO, K5QR, 4X6HX, DK6MP, UT7EF, RØLHQ, JG1JPE
Europe: N5UWY, VE3UZ, ZR2BK, GØOFD, IU4LEC, CT1BWU, N2YCH, AI1W, JL1UXH, JE1WBA, W4RFA, OK2CSU, OE3SMA, IZØFYW, EA2EXS, N7MB, JR8SUM, K5QR, 4X6HX, DC1YY, DK6MP, G1III, UT7EF, W9HJ, N8OCJ
Oceania: JL1UXH, JJ1MBU, JE1WBA, LA7EIA, K5QR, OK1UU, JG1JPE
North America: N5UWY, W1DNP, VE3UZ, NN3Y, CT1BWU, KA5WMF, N2YCH, N1CEO, PU4MMZ, W2SUB, AI1W, AE5FY, JL1UXH, KE7OTO, NQ7G, W4RFA, K1OJ, OK2CSU, KD2RUY, WQ9F, IZØFYW, W4MRW, N9BSA, N7MB, K5QR, 4X6HX, WP4JLZ, KE8LFC, W1BUB, W9CHI, W9HJ, WA4TG, K3LSU
South America: HB9HIT, VE3UZ, HB9ECS, AI1W, N6PEQ, K5QR, OK1UU, W9HJ

30M Bar: N6PEQ
17M Bar: KØDEQ
6M Bar: KØDEQ

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. and the ARRL Logbook of The World (LoTW).

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

The CQ DX Field Award Program

Endorsements — Mixed

K8OOK.....229
OK1ADM.....245

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604 USA. Please make all checks payable to the award manager.

CQ DX Awards Program

New Award SSB

KM4VI.....2667

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18+

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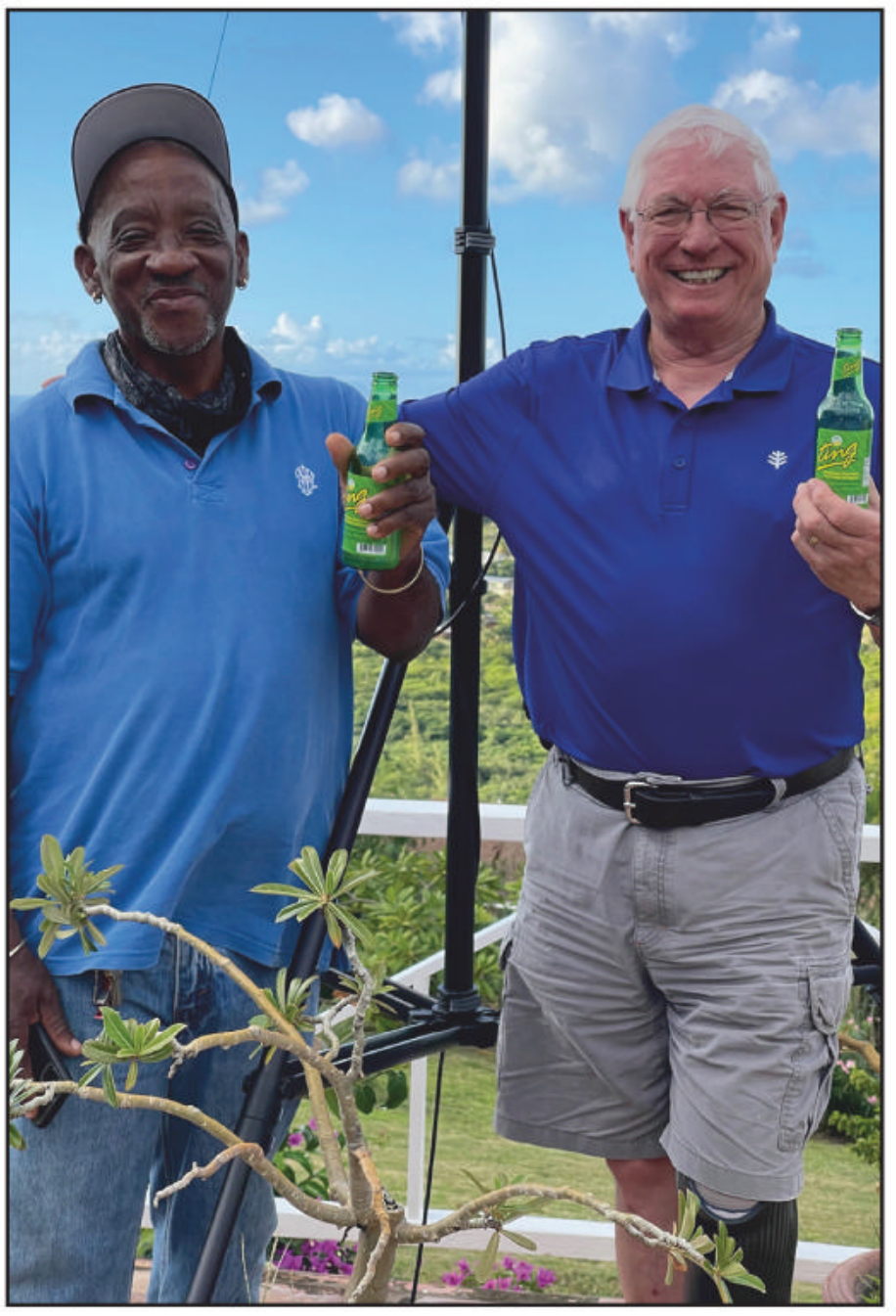
BuddiPole Hexbeam on Garibaldi Hill

Woodland's Beach on Montserrat

Montserrat's "Soufriere Hills" Volcano



Frankie, VP2MNI, and Thaire, VP2MDX/W2APF

got showed that I was just as strong with 100 watts and the Hexbeam. So good, in fact, that I operated as net control on two other Sundays. That first QSO led to over 1,300 more, about 500 on CW and over 800 on SSB.

Contacts in Demand

I had not expected that Montserrat would be as sought after as it was. There are relatively few local amateurs active on HF and with Covid, not many other operators had visited. I enjoy CW and at home, operate CW about halfthe time.

On Montserrat, every time I went on CW I got spotted immediately by W3LPL's skimmers and would be deluged with calls. I tried working split and it helped some, but my logging skills and lack of computer rig control made it very difficult. Next year, I will be ready with a new logging program, computer control of the rig, and with a lot more CWT's under my belt, I hope to better handle the pileups.

In all, I worked every state but Hawaii, six of seven continents, 66 DX entities and had the thrill of giving an ATNO (*All-Time New One*, for the uninitiated) to a lot of folks. The propagation gods smiled and 10, 12, 15, and 17 meters were great. Best DX was VK9 on 40-meter CW and TZ4 on 10-meter CW. I got Jacky, ZL3CW, on 10-meter CW and SSB as well as Roger, ZL1XR, on 15 meters.

The BuddiPole Hexbeam and the Elecraft KX3 station made an awesome combination. I almost forgot to mention one of the great touches on the MastWerks mast and tripod. The tripod has a hand crank rotator like the window cranks we used to have in cars. How many of us are blessed with an XYL who not only appreciates the hobby but will run out to the pool deck and crank the Hexbeam orientation from Europe to the U.S. as propagation changes? Or bring out a cold Carib for the parched operator running a pileup!

Fun Off the Air as Well

It wasn't only ham radio. We got to explore the island, hike

(with permission and a police escort) into the volcano exclusion zone and see the devastation in Plymouth that in 1995 was the prettiest capital city in the Caribbean. We peeked at the ruined hulk of Air Studios. It was built by Sir George Martin, the Beatles' manager, in 1979 as a state-of-the-art recording studio. From then until it was destroyed by Hurricane Hugo in 1989, it hosted, among others, Paul McCartney, Elton John, Sting, Jimmy Buffet, Dire Straits, Culture Club, Duran Duran, and the Rolling Stones. Sir George's house is now a restaurant, Olveston House, located on Penny Lane!

We met a lot of the local expats who spend the winter there away from the U.S., Canada, and the UK. We found a wonderful house for next winter and we found a new winter home for years to come. I joined the Montserrat Amateur Radio Society and made a lot of new friends. DXing under the volcano was one of our most enjoyable vacations. I'll be listening for you next year in Montserrat!

The WPX Honor Roll

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

9459 9A2AA	4757 I2MQP	3099 N6FX	2400 N7ZO	1870 N5KAE	1480 K4JKB	1217 AB1QB	1032 DG5LAC	757 WB3D
8188 K2VV	4681 JH8BOE	3077 K1PL	2394 AE5B	1828 K7LV	1462 AC7JM	1204 VA2IG	1023 N4WQH	736 JA3MAT
8143 W1CU	4673 NN1N	3059 NXØI	2391 WO7R	1824 WF7T	1462 DL4CW	1201 K9BO	1016 W9QL	711 AG1T
7922 9A2NA	4574 JN3SAC	3028 IK2DZN	2391 IZØFUW	1821 PY5FB	1447 K3XA	1167 WA9PIE	1012 NØVVV	695 W8WDW
7059 EA2IA	4517 IK2ILH	2987 AG4W	2356 NE6I	1746 K6UXO	1437 KC1UX	1153 N3CAL	1010 VE3RZ	682 AI8P
6577 KF2O	4462 K1BV	2968 AB1OC	2322 N6PM	1741 N6PEQ	1422 I2VGW	1148 SP8HKT	1007 AA4QE	675 AB1Q
6040 KØDEQ	4342 WB2YQH	2963 N3RC	2225 JH1APK	1711 NS3L	1408 NH6T	1141 4F3BZ	1006 NØRQV	674 N5JED
5715 S53EO	4298 VE3XN	2712 W2YR	2203 KI1U	1707 K4WY	1398 ES4RLH	1137 YO5BRZ	1000 WB6IZG	661 AL4Y
5677 ON4CAS	4251 N1RR	2697 AK7O	2176 V51YJ	1667 AD3Y	1361 VA3VF	1136 KO9V	999 N3DF	633 TI5LUA
5602 ON4APU	4249 WD9DZV	2651 HK3W	2159 VA7CRZ	1643 SV1DPI	1333 AF4T	1116 YU7FW	995 PU2GTA	621 K4HDW
5539 N4NO	4241 N6QQ	2642 AA8R	2133 KØKG	1639 N7QU	1322 AA4FU	1112 N6MM	966 W6WF	616 AC6BW
5509 N8BJQ	4215 W3LL	2616 9A2GA	2113 W2FKF	1616 TA1L	1301 KB9OWD	1107 PY2MC	953 JP1KHY	605 IW2FLB
5482 VE1YX	4201 YO9HP	2591 IK2RPE	2077 JH1QKG	1612 W1FNB	1301 K1DX	1100 WA3GOS	919 ON7MIC	
5453 YU1AB	3818 K9UQN	2589 DG7RO	2056 NKØS	1590 JF1LMB	1301 KM5VI	1109 KE8FMJ	889 WU1U	
5396 N6JV	3793 AB1J	2583 PA2TMS	2046 YO8CRU	1570 PY5VC	1299 JA6JYM	1088 NJ4Z	866 K2KJ	
5387 W9OP	3538 9A4W	2550 K6ND	2016 N2WK	1568 N3AIU	1295 NIØC	1084 KG4JSZ	857 R1AV	
5215 I5RFD	3459 W9IL	2457 K5UR	1995 JR3UIC	1524 NH6T/W4	1280 WF1H	1069 IZ4MJP	835 K6RAH	
4970 WA5VGI	3130 SV1EDY	2538 K4HB	1972 K3CWF	1540 WU9D	1260 UR6LEY	1058 N6DBF	801 N2YU	
4934 W9OO	3109 W6XK	2420 WA6KHK	1955 NIØC	1484 FG4NO	1219 K6HRT	1036 DL5KW	758 N4JJS	

SSB

7045 OZ5EV	3172 YO9HP	2515 W9IL	2093 W2WC	1587 N3XX	1146 SQ7B	1004 WA5UA	758 IV3GOW	637 K5WAF
6334 9A2NA	3141 DL8AAV	2483 AG4W	2084 K5UR	1550 IK2RPE	1136 K3CWF	978 EA7HY	724 WF1H	630 W6US
6145 K2VV	3127 N8BJQ	2451 EA3GHZ	2082 WD9DZV	1442 DG7RO	1112 NH6T	957 W9QL	724 W3TZ	624 K6KZM
5404 VE1YX	3108 I4CSP	2443 JN3SAC	2076 K2XF	1393 N5KAE	1098 K4CN	934 PY5VC	717 KØDAN	606 KJ4BIX
5149 KF2O	3101 WA5VGI	2335 KG1E	2048 W4QNW	1389 NKØS	1096 JA7HYS	931 YB1AR	717 N3JON	604 GØBPK
4916 EA2IA	3090 N1RR	2327 K1PL	1955 EA3NP	1386 HK3W	1093 N6MM	929 NS3L	714 YB2TJV	600 WU1U
4410 I2MQP	3067 N6QQ	2326 CX6BZ	1935 SV1EOS	1386 IK4HPU	1089 IZ8FFA	919 KA5EYH	713 JH1APK	600 WA3PZO
4165 KØDEQ	2990 KF7RU	2209 IK2QPR	1884 WA6KHK	1371 VE6BF	1089 IT9ABN	893 W9RPM	710 WA9PIE	
3681 N4NO	2984 KI7AO	2201 NQ3A	1879 K3IXD	1338 NE6I	1063 W6XK	889 N3AIU	700 N4FNB	
3622 I8KCI	2946 PT7ZT	2200 N6FX	1848 AB5C	1334 EA3EQT	1042 IZØBNR	875 K7SAM	700 JA1PLL	
3585 SV3AQR	2903 IN3QCI	2198 AB1OC	1825 KQ8D	1264 N6PEQ	1032 DG5LAC	854 K6HRT	694 KG4HUF	
3505 NN1N	2857 4X6DK	2155 K9UQN	1812 K6ND	1262 K7LV	1031 K4CN	833 DK8MCT	690 W6PN	
3456 W9OO	2650 IK2DZN	2131 N3RC	1646 VE7SMP	1258 N1KC	1031 IK8OZP	808 UR6LEY	684 KO9V	
3416 W3LL	2595 EA1JG	2122 AE5B	1641 AE9DX	1222 YF1AR	1022 NW3H	802 N6OU	675 F1MQJ	
3348 CT1AHU	2582 PA2TMS	2113 W2FKF	1624 W2YR	1187 IZ1JLG	1012 KU4BP	801 K3XA	655 VA3VF	
3274 YU7BCD	2576 AA1VX	2106 NXØI	1622 K5CX	1183 KI1U	1006 NJ4Z	766 I2VGW	647 YB8NT	
3174 I3ZSX	2568 SM6DHU	2094 I8LEL	1611 W2ME	1150 VE6BMX	1004 K4HB	763 K4JKB	640 UA9YF	

CW

7543 WA2HZR	4162 WA5VGI	3031 EA7AAW	2357 W9HR	1708 NIØC	1421 KN1CBR	992 F5PBL	807 N5KAE	620 AF5DM
7200 K2VV	4076 I7PXV	2948 IK3GER	2291 N3XX	1691 KI1U	1389 IT9ELD	968 K3CWF	783 YB1AR	615 JH6JMM
6024 9A2NA	3974 JN3SAC	2943 N6QQ	2212 AC5K	1620 DG7RO	1342 VE6BMX	962 K7LV	752 K6HRT	608 W9RPM
5392 EA2IA	3804 W9OO	2915 KA7T	2160 NXØI	1595 PY5FB	1235 JH1APK	944 AB1OC	743 JA5NSR	600 NY4G
5261 KF2O	3675 NN1N	2811 OZ5UR	2022 AF5CC	1572 W2YR	1220 AA4FU	908 NH6T	738 NH6T/W4	600 IK2SGV
5160 N4NO	3555 N1RR	2679 W9IL	1998 K5UR	1555 K1PL	1210 DL4CW	897 HK3W	732 SQ7B	
5282 N6JV	3504 YU7BCD	2548 EA2CIN	1973 N3RC	1508 W6XK	1196 N3AIU	891 DK8MCT	727 JF1LMB	
4946 W8IQ	3462 K9UQN	2531 I2MQP	1905 WA6KHK	1505 R3IS	1098 LU5OM	890 NS3L	722 WA9PIE	
4916 IZ3ETU	3279 IØNNY	2497 W3LL	1832 N4YB	1483 VE1YX	1062 K3XA	889 N3AIU	720 K4CN	
4886 I3FIY	3214 SM6DHU	2490 N6FX	1762 K6ND	1480 WO3Z	1036 DL5KW	864 YO5BRZ	652 IK2DZN	
4874 KØDEQ	3159 WD9DZV	2477 VE6BF	1744 NE6I	1458 AG4W	1027 AE5B	848 PY5VC	636 NKØS	
4773 N8BJQ	3041 YO9HP	2424 W2WC	1727 K6UXO	1443 WA2VQV	997 N6PEQ	821 HB9DAX	629 IV3GOW	

DIGITAL

3187 KØDEQ	2139 WA5VGI	1704 IK2DZN	1309 WU9D	1093 KI1U	992 N3DF	862 JP1KHY	750 NH6T/W4	611 KO9V
2996 W3LL	2217 YO9HP	1643 N3RC	1308 NKØS	1091 VA3VF	992 K9UQN	855 R1AV	681 PY5VC	600 ADØFL
2948 N8BJQ	2103 K2YYY	1501W2/JR1AQN	1227 ES4RLH	1089 AC7JM	983 PU2GTA	812 UR6LEY	680 K2KJ	
2827 WD9DZV	2004 N6PM	1500 JH1APK	1218 W1FNB	1060 AF4T	966 NS3L	811 WF1H	672 K9AAN	
2690 KF2O	1836 AG4W	1426 AB1OC	1189 JF1LMB	1051 KH6SAT	947 I2VGW	810 N3CAL	670 IV3GOW	
2628 W6XK	1818 W1EQ	1378 K3CWF	1150 N1RR	1047 RW4WZ	917 K7LV	800 WA3GOS	668 KA5EYH	
2558 NT2A	1790 JN3SAC	1353 K1PL	1149 W9IL	1021 NN1N	881 NE6I	783 YB1AR	654 JA3MAT	
2251 EA2IA	1759 N7ZO	1345 KC1UX	1112 AB1QB	1009 GUØSUP	870 WB6IZG	758 N4JJS	640 WA9ONY	
2242 HK3W	1710 NXØI	1319 W2YR	1108 KE8FMJ	1002 NØRQV	866 SQ7B	750 ON7MIC	636 W9RPM	

REMOTE OPERATION

CW	MIXED	SSB	DIGITAL
7277 K9QVB	4026 N1RR	2953 N1RR	671 N1RR
3292 N1RR			

CONTESTING

BY TIM SHOPPA,* N3QE

Field Day's New Playing Field

The usual patterns of participation in ARRL Field Day were greatly upset in 2020 and 2021 by the Covid-19 pandemic and associated ARRL temporary rule waivers. As the pandemic fades away, the most impactful of the rule waivers — allowing home non-emergency class D stations to work other class D stations for points — is continuing, at least for 2022. This month we will look at the recent gyrations in Field Day participation and share some thoughts about maximizing your Field Day score.

Why write about ARRL Field Day in a contesting column? The deepest traditions of ARRL Field Day emphasize teamwork, community outreach, outdoor food and fun, and technical skills above any point total. At the same time, like any contest, Field Day also has a well-defined exchange, points, categories, a multiplier, extremely detailed rules, and a total score. All the usual contest strategies and communications skills can be pushed to their limits as hams make QSOs under low-power, portable, and emergency conditions.

email: <n3qe@cq-amateur-radio.com>

ARRL Field Day has six classes of entry. Yearly Field Day entry statistics by class are presented as the bar chart of *Figure 1*. For a typical club class-A entry, the participation of multiple members at the station, as well as potentially a separate GOTA (Get-On-The-Air) callsign and station, are collected under a single entry. As your eye moves from left to right across *Figure 1*, note that entry statistics changed slowly from 2002-2019, but in 2020 the Covid-19 pandemic upset many clubs' planning and entries under class A, with only a partial restoration to more normal category choices in 2021.

Class A Field Day stations, which are portable stations set up by three or more club members, have traditionally been the backbone of ARRL Field Day activity. *Figure 1* shows it was the most common entry class all the way up through 2019. In 2020, a sharp drop in class A entries occurred. You

Photo A: In June 2017, 80 members of the Columbia Amateur Radio Association and Potomac Valley Radio Club assembled an extensive portable station for ARRL Field Day at Triadelphia Ridge Elementary School in Ellicott City, Maryland. The W3AO entry was as a Class 16A station. The "16" denotes 16 active transmitters; the "A" refers to the entry being from more than three members in a club. In this view you see experienced contest operators busy racking up points at 10 active HF positions.

might recall that in 2020 we understood very little about how Covid-19 was transmitted and quarantine rules were being enforced at many municipal and school parks where class A stations have been set up in the past. The next year, 2021, many of us were vaccinated and we understood that outdoor activity had a very low risk of transmission, and class A entry statistics recovered at least partially.

Smaller portable stations, set up by just one or two persons, are class B in Field Day. Class B had been increasing slowly in popularity up through 2019, and the pandemic conditions of 2020 saw a marked rise in class B entries. Note that on *Figure 1*, despite the wild gyrations in entry statistics in 2020 and 2021, the sum of class A and class B entries remained nearly constant through the pandemic. One hypothesis consistent with this is that many medium-sized class A club efforts dropped down to just two participants.

Hams with mobile stations enter Field Day as class C. Numerically, this has always been the smallest of the entry groups, with the exception of 2020 when a sharp rise in popularity of class C resulted in 1,086 mobile entries submitted.

Hams with home stations operating on regular commercial power sources have always been able to enter Field Day via class D entries. *Figure 1* shows that class D entries had slowly been increasing in popularity up through 2019, but were never more than 25% of entries.

Prior to 2020, class D entries did not earn points for working other class D stations. This was consistent with Field Day's emphasis on portable and emergency-power operations, and made it unique among the ARRL on-air events. Up through 2020, calling CQ as a class D station was awkward and uncommon; any class D station that tried would get callers that were other class D stations and neither side would earn any points for the QSO. Instead, class D stations entered largely as search-and-pounce efforts, working the numerous emergency-powered and portable stations on the air.

In 2020 the ARRL issued a temporary rule waiver in response to the pandemic: "For Field Day 2020 only, class D stations may work all other Field Day stations, including other class D stations, for points." A record 6,318 hams chose to enter as Class D in 2020, more than 60% of the total entries.

Calendar of Events

All year	**CQ DX Marathon**	**http://bit.ly/vEKMWD**
Apr. 30-May 1	Florida QSO Party	www.floridaqsoparty.org
Apr. 30-May 1	SBMS 2.3 GHz and Up Contest and Club Challenge	www.n6nb.com/sbmsrules.htm
Apr. 30-May 1	UK/EI DX Contest, CW	www.ukeicc.com/dx-contest-rules.php
May 1	AGCW QRP/QRP Party	http://bit.ly/3bwH1aZ
May 4	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
May 4-5	MIE 33 Contest	www.ztv.ne.jp/isoda/33/index-e.html
May 7	Microwave Spring Sprint	https://bit.ly/3Fazrjf
May 7	RCC Cup	http://bit.ly/3rH8ttL
May 7-8	7th Area QSO Party	https://tinyurl.com/2p9cx67k
May 7-8	10-10 Spring CW Contest	http://bit.ly/1FrFeBc
May 7-8	ARI DX Contest	www.ari.it
May 7-8	Delaware QSO Party	www.fsarc.org/qsoparty/rules.htm
May 7-8	F9AA Cup, Digi	https://bit.ly/3JkNipO
May 7-8	Indiana QSO Party	www.hdxcc.org/inqp/index.html
May 7-8	New England QSO Party	www.neqp.org/rules
May 8	WAB 7 MHz Phone	http://bit.ly/31yE4kT
May 9	RSGB 80m Club Championship, SSB	https://bit.ly/31qpcJl
May 11	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en/
May 14-15	Canadian Prairies QSO Party	https://cpqp.ve6hams.ca
May 14-15	**CQWW Foxhunting Weekend**	**www.homingin.com/joek0ov/nfw.html**
May 14-15	CQ-M International DX Contest	http://cqm.srr.ru/en-rules
May 14-15	Veron SLP Contest	http://bit.ly/2L9eT1L
May 14-15	Volta WW RTTY Contest	www.contestvolta.it
May 14-15	50 MHz Spring Sprint	https://bit.ly/3Fazrjf
May 18	RSGB 80m Club Championship, Data	https://bit.ly/31qpcJl
May 18	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
May 21	Arkansas QSO Party	https://tinyurl.com/4wbxudfb
May 21	UN DX Contest	http://undxc.kz/rules-eng
May 21	YOTA Contest	www.ham-yota.com/contest
May 21-22	Baltic Contest	www.lrsf.lt/en
May 21-22	His Majesty King of Spain CW Contest	https://bit.ly/3IWxYjf
May 21-22	NZART Sangster Shield Contest	http://bit.ly/3aviX6h
May 21-22	SARL VHF/UHF Digital Contest	http://bit.ly/H0IqQf
May 23	QRP ARCI Hoot Owl Sprint	www.qrparci.org/contests
May 26	RSGB 80m Club Championship, CW	https://bit.ly/31qpcJl
May 26	QRP Minimal Art Session	https://tinyurl.com/4s9evnbj
May 28-29	**CQWW WPX CW Contest**	**www.cqwpx.com**
May 30	RSGB FT4 Contest Series	https://bit.ly/31qpcJl

In 2021, the class D waiver continued, with the text of the rule reading "For Field Day 2021 only" and implying that this was still a temporary condition. Comparing 2021 vs 2020 in *Figure 1*, you will find that Class D entries in 2021 certainly declined but it remained by far the most popular entry category.

The 2022 Field Day rules continue to allow class D stations to work any other station for QSO points. Field Day rule 4.6 has been reworded — no longer is this mentioned as a change for this year only, instead the rule reads "NEW for 2022: Class D may work all Field Day stations." This seems to me to imply a permanent shift in Field Day rules, enhancing the number of hams participating from their regular home stations. **It also makes Field Day less unique in the roster of ARRL on-air events: No longer will each point-earning QSO in Field Day meet the ARRL stated objective of encouraging hams to, "learn to operate in abnormal situations in less than optimal conditions."**

My prediction is that 2022 Class D entry counts will be similar to 2021. Certainly, some of them will be prominent on the air, calling CQ, and fundamentally changing the uniqueness of Field Day.

Hams with home stations who operate their radios on emergency power have always been able to enter Field Day as class E. A wide variety of power sources are used in this category, including batteries, solar power, portable generators, and whole-house generators. Class E entries showed strong growth in 2020, with a slight decline in popularity in 2021.

The class F entry for Emergency Operations Centers (EOC) was introduced first in 2003. There was a decline in 2020 in EOC entries, with a slight recovery in 2021.

Looking at the strong spike in 2020 entries in *Figure 1*, you will find that the 10,212 entries made in 2020 Field Day is a high-water mark for entries into any on-air amateur radio event. It even surpasses the record-high 9,797 logs submitted in the 2021 CQWW DX SSB contest.

Total participants in ARRL Field Day dropped dramatically in 2020. The form used to report ARRL Field Day results ask not just for your entry category, but also the number of participants in your effort. The count of participants includes

June 1	VHF-UHF FT8 Activity Contest	www.ft8activity.eu/index.php/en
June 3-5	PODXS 070 Club Three Day Weekend Contest	http://bit.ly/2Srdp8A
June 4-5	10-10 Open Season PSK Contest	http://bit.ly/1FrFeBc
June 4-5	ARRL International Digital Contest	https://contests.arrl.org/dig
June 4-5	IARC Region 1 Field Day	http://bit.ly/3cC0HKf
June 4-5	KANHAM Contest	https://bit.ly/3MG6jVR
June 4-5	Kentucky QSO Party	www.kyqsoparty.org
June 4-5	RSGB CW Field Day	https://bit.ly/31qpcJl
June 4-5	Tisza Cup CW Contest	https://tinyurl.com/55jbff22
June 4-5	UKSMG Summer Contest	https://tinyurl.com/mwh56dys
June 5	Cookie Crumble QRP Contest	https://w3atb.com/cookie-crumble
June 6	RSGB 80m Club Championship, Data	https://bit.ly/31qpcJl
June 8	VHF-UHF FT8 Activity Contest	www.ft8activity.eu/index.php/en
June 11	Asia-Pacific SSB Sprint	http://jsfc.org/apsprint
June 11-12	Portugal Day Contest	https://portugaldaycontest.rep.pt/rules.php
June 11-12	REF DDFM 6M Contest	http://concours.r-e-f.org/index.php
June 11-12	GACW WWSA CW DX Contest	https://bit.ly/3MGsrzr
June 11-12	DRCG WW (RTTY)	www.drcg.de
June 11-12	VK Shires Contest	https://tinyurl.com/2p8h4wen
June 11-13	ARRL June VHF QSO Party	www.arrl.org/june-vhf
June 15	RSGB 80m Club Championship, CW	https://bit.ly/31qpcJl
June 15	VHF-UHF FT8 Activity Contest	www.ft8activity.eu/index.php/en
June 16	SARL Youth Sprint	http://bit.ly/H0IqQf
June 18	AGCW VHF-UHF Contest	https://bit.ly/3lw91PK
June 18	ARRL Kids Day Contest	www.arrl.org/kids-day
June 18	FIRAC VHF Contest	www.firac.de/index.html
June 18-19	All Asian CW DX Contest	https://bit.ly/3HVjkra
June 18-19	IARU Region 1 50 MHz Contest	https://bit.ly/3r1kqvT
June 18-19	SMIRK Contest	www.smirk.org/contest.html
June 18-19	Stew Perry Topband Challenge	www.kkn.net/stew/stew_rules.html
June 18-19	Ukrainian DX Classic RTTY Contest	http://urdxc.org/rtty/ (If Ukrainian stations are back on the air)
June 18-19	West Virginia QSO Party	https://tinyurl.com/3dz7awsx
June 19	WAB 50 MHz Phone	http://bit.ly/31yE4kT
June 23	RSGB 80m Club Championship, SSB	https://bit.ly/31qpcJl
June 25	UFT QRP Contest	www.uft.net/concours-qrp-uft
June 25-26	ARRL Field Day	www.arrl.org/field-day
June 25-26	His Maj. King of Spain SSB Contest	http://bit.ly/1cKAR5V
June 25-26	*Ukrainian DX DIGI Contest*	*http://urdxc.org/ (If Ukrainian stations are back on the air)*
June 27	RSGB FT4 Contest Series	https://bit.ly/31qpcJl

not just the hams who operated on-air during Field Day, and for the larger efforts it usually includes club supporters (licensed and not licensed) who helped set up the station as well as those who support the operations either technically or nutritionally. The bar graph of *Figure 2* displays the number of Field Day participants as holding steady through 2019. In 2020, the number of class A participants dropped from over 30,000 to less than 6,000, sharply depressing the total participant count that year. In 2021, the participant count rebounded, especially due to class A stations that took advantage of the open-air ventilation to attract their club members back to an outdoor activity. My prediction is that in 2022, the total participant count will rise to the 30,000 level but not quite reach the 35,000 participants participating in Field Day events pre-pandemic.

In Field Day, your power level determines your multiplier. The widespread availability of rigs in the 100-watt class makes them by far the most common choice for Field Day operations. In Field Day, entering at 100-watts power earns you a multiplier of 2 applied to your QSO points. The smallest of gas-powered 120-volt AC generators is often pressed into service for Field Day stations using these rigs.

A substantially larger multiplier of 5 is available if you use no more than 5 watts, and your rig is powered on a battery charged from a source other than commercial mains or engine-powered generator.

If you've been activating for Summits on the Air (SOTA) or Parks on the Air (POTA) recently then you already have a portable battery-powered station that gets you most of the way to qualifying for the 5-point QRP multiplier. Many of these rigs have been optimized for low-current operation; for example the Elecraft KX3 draws less than 0.25 amps on receive, and under 3 amps on transmit, giving a net average battery drain under 2 amps in heavy contest-style duty cycle that is half receiving and half transmitting. This class of QRP rig is also usually spec'ed as working down to 8 volts of battery power, and battery choices frequently include lightweight lithium or lithium power cells.

A typical 12-volt-powered base or mobile 100-watt-class HF rig can also be pressed into QRP service with battery power, but will need a bigger battery because the final transistors in these rigs are biased to draw many amps even at QRP power levels. As an example of battery budget for this class of rig, my Ten-Tec Eagle draws 1.25 amps in receive and peaks over 10 amps while key-down, even when transmit power is only 5 watts. Look up the detailed requirements of your rig and you'll conclude that a much larger battery is needed, likely an automotive or — even better — deep-cycle marine battery.

If you plan to operate battery power throughout Field Day weekend, you'll need either a substantial battery fully charged before the event, or a smaller battery that you can charge during the event. Twelve-volt DC solar panels producing 80 or 100 watts in full sunlight have become readily available in recent years and are a popular choice.

Up through and including 2020, any Field Day station could go high power with a multiplier of only 1. As long as a handful of such stations were on the bands, the more common 100-watt stations could still effectively share the bands. If you look at *Figure 3*, where the distribution of multipliers is shown, you see that in 2020, the same year there

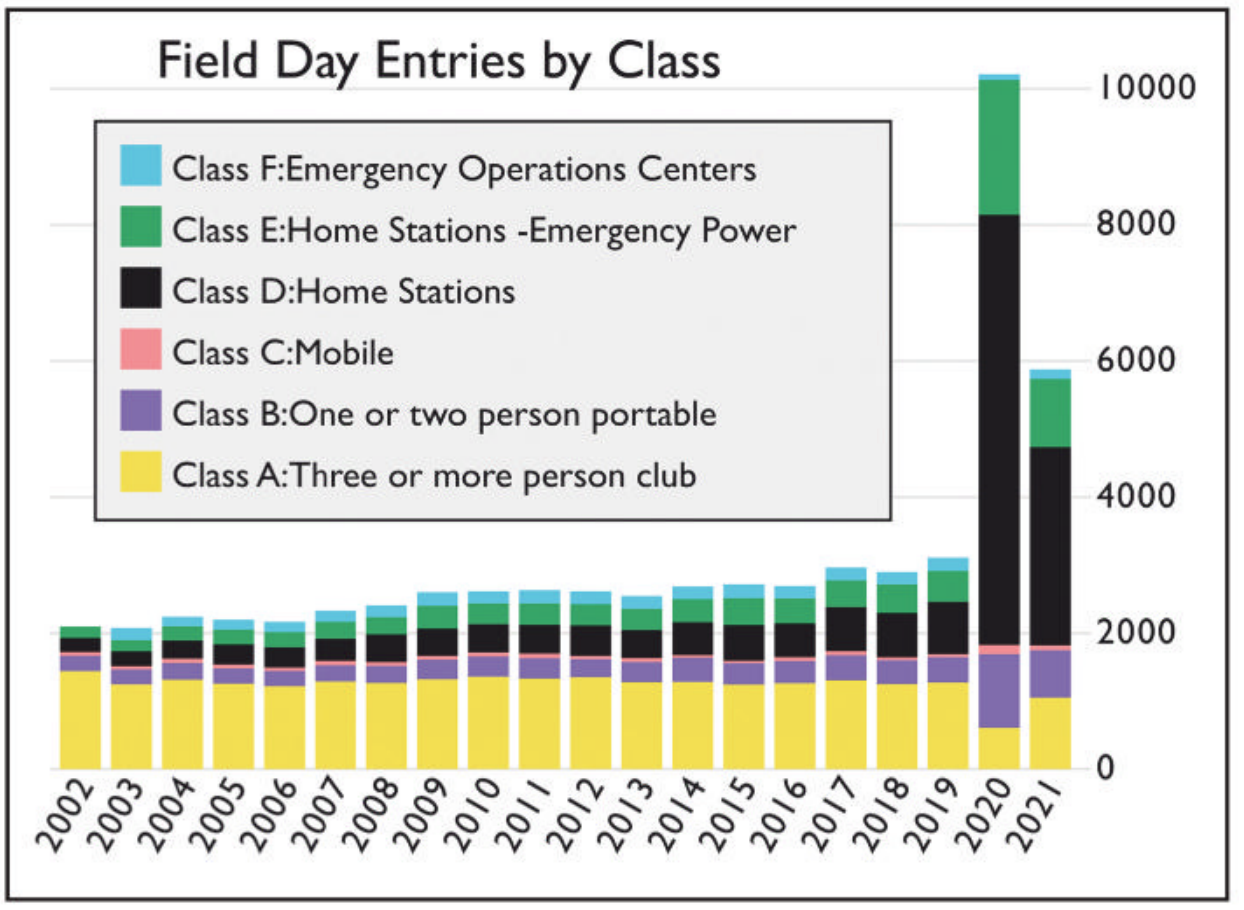


Figure 1. ARRL Field Day entries by class, 2002-2021.

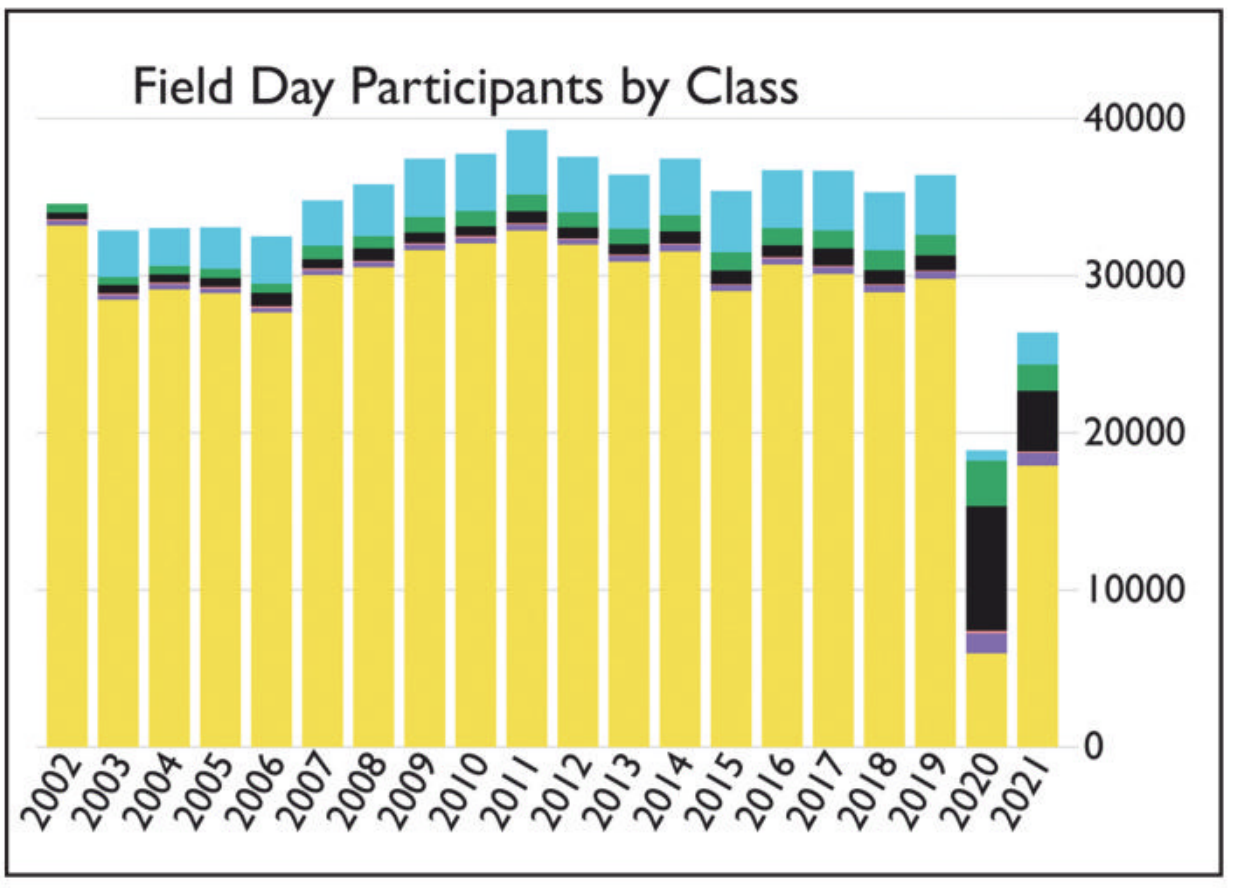


Figure 2. ARRL Field Day participants by class, 2002-2021. The color-coding for each class can be found in the legend of Figure 1*.*

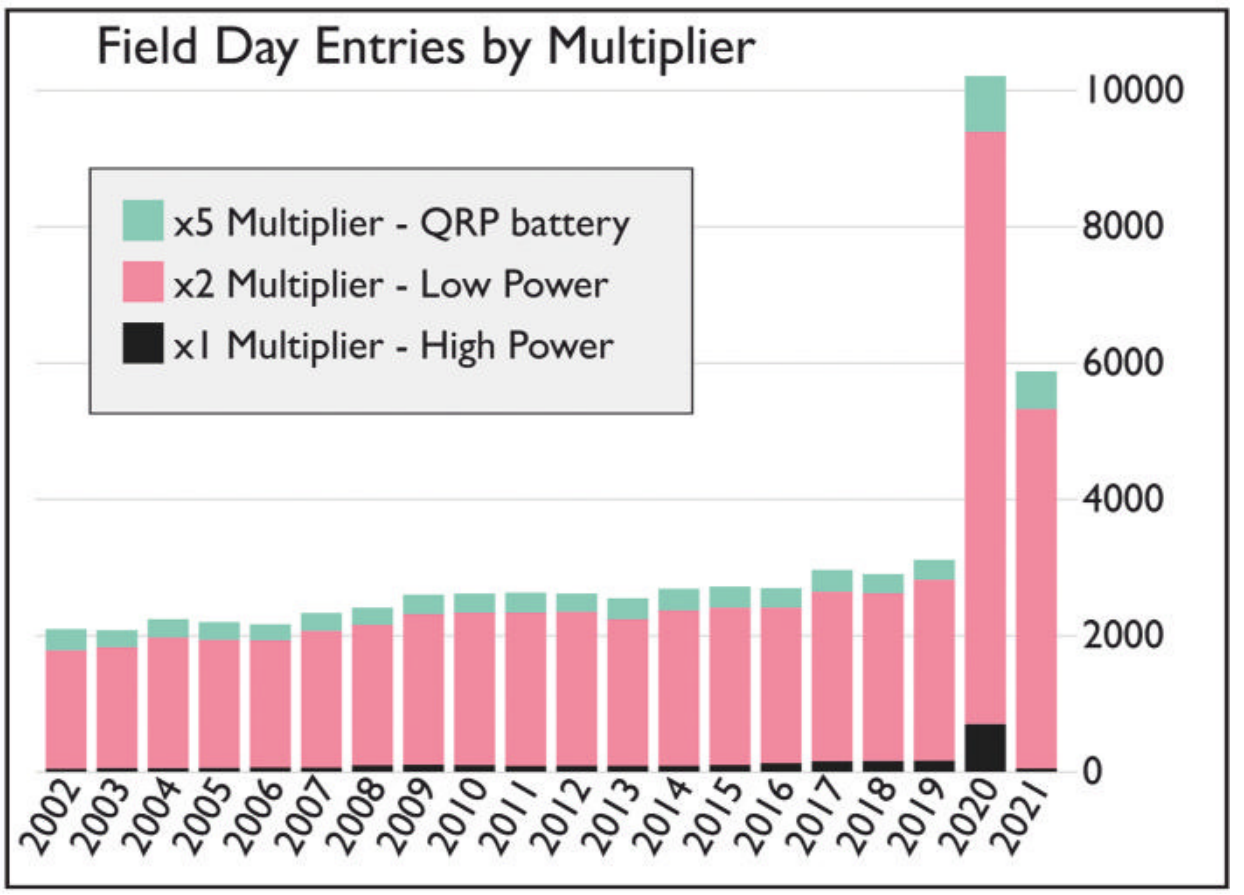


Figure 3: ARRL Field Day entries by multiplier, 2002-2021.

was a sharp growth in home class D and E stations, there was also a substantial increase in high power Field Day entries. The QRM from these high-power stations dominated the bands, especially the already crowded phone segments, prompting the ARRL to put a rule waiver in place for 2021: "Class D and class E stations are limited to 150 watts PEP."

In the 2022 rules, the ARRL has included Field Day in its new definition of low power as being a maximum of 100 watts, and the new Field Day rules eliminate the multiplier of 1 as "all Field Day stations are limited to a maximum 100 watts Peak Envelope Power (PEP) transmitter output, regardless of operating class."

The listing of club aggregate scores begun in 2020 for Field Day continues into 2022 as well. To ensure all members contribute to your club's aggregate score, communicate in advance to your club members the exact spelling they should use in the ARRL Field Day entry.

Maximize your Field Day score through choice of modes. ARRL Field Day awards 1 point for each phone QSO, and the phone segments of the 40-meter and 20-meter bands are completely packed from top to bottom. Highly skilled phone operators will be competing against each other for run frequencies, giving other Field Day stations the opportunity to search-and-pounce for 1-point phone QSOs in congested conditions. As sunspot numbers continue to rise through 2022, expect activity on the 15- and 10-meter phone bands to rise as well.

If your skillset and portable station support CW or digital mode operation, QSOs you make in those modes yield 2 points each. I've observed increasing CW activity on Field Day over the past decade, thanks in large part by efforts by the CW Operators Club (CWOps) to educate hams in this power-efficient and bandwidth-conserving mode. Note that while operating CW, calling CQ at speeds slower than 20 words per minute (WPM) broadens the pool of available callers who are not the operators who you would work during regular CW contest activity, that is almost all higher than 25 WPM today.

Digital activity in Field Day has shifted from RTTY to PSK31 to FT8 in the past years. The required Field Day exchange of class and ARRL section is not part of the usual FT8 exchange, and you must configure WSJT-X to use special Field Day exchanges. Full details on Field Day setup are in the WSJT-X Quick Start guide at <https://bit.ly/3DonOG9>.

Unlike a regular contest, the Field Day rules award bonus points for activities other than just QSOs. For 2022, the Field Day rules for the 100-point media publicity bonus explicitly mention your local news outlet's Facebook, Twitter, and Instagram presence. Also of note to contesters is that you can copy the special ARRL Field Day message for a 100-point bonus as early as Friday evening prior to any Field Day QSOs.

Submitting your Field Day log has extra steps over and above a typical contest. Review the online entry form at <https://field-day.arrl.org/fdentry.php> before Field Day weekend to make sure you collect all the needed documentation for your effort. Digital pictures are encouraged and accepted as evidence that you qualify for several of the possible bonus point categories. If you've used a contest logger during Field Day, you have a Cabrillo file you can submit, but you will still need to fill out the online "Band / Mode QSO Breakdown" form showing power and unique QSOs per band and mode. If you logged using paper, cellphone notes, or anything other than a Cabrillo log, you will need to supply a list of stations you worked per band and mode or a traditional dupe sheet.

Field Day 2022 is June 25-26th, with station setup for portable stations beginning the day before.

A new weekday CW event emphasizes activity between 20 and 25 WPM. The International CW Council's **MST** or **Medium Speed Test** emphasizes skill building in the 20-25 word per minute range using a friendly contest-like exchange of name and state (or DX country). This event will be held three times each Monday beginning May 2, 2022. Find more details at <https://bit.ly/3Dm55ee>.

May and June Contest Highlights

Contest University is being held in-person this year on Thursday May 19th, just before the beginning of the Dayton Hamvention®. Find registration details and the multi-track course outline at <www.contestuniversity.com>.

The **CQ World Wide WPX CW Contest** is May 28-29th (Memorial Day weekend in the U.S.). As sunspots and solar flux increase in this cycle, high-band 3-point DX QSOs during daylight hours will be easy, but don't neglect the 6-point intercontinental QSOs that will be possible on the 40-meter band even before sunset. Find full rules at <https://cqwpx.com/index.htm>.

The very next weekend, June 4-6th, is the inaugural running of the **ARRL International Digital Contest.** This new contest uses all non-RTTY digital modes, with the WSJT-X modes of FT4 and FT8 sure to dominate. Full details are at <https://contests.arrl.org/dig>.

The **ARRL June VHF Contest** is June 11-12th. While 6-meter FT8 operation will always have activity, when conditions are good you'll find much higher rates on the CW and SSB parts of the band. Full rules are at <www.arrl.org/june-vhf>.

PROPAGATION

BY TOMAS HOOD,* NW7US

Solar Cycle 25 is Very Much Alive

Quick Look at Current Cycle 25 Conditions:
(Data rounded to nearest whole number)

Sunspots:
Observed Monthly, February 2022: **66**
12-month smoothed, August 2021: **36**

10.7-cm Flux:
Observed Monthly, February 2022: **109**
12-month smoothed, August 2021: **86**

One Year Ago:
(Data rounded to nearest whole number)

Sunspots:
Observed Monthly, February 2021: **8**
12-month smoothed, August 2020: **9**

10.7-cm Flux:
Observed Monthly, February 2021: **74**
12-month smoothed, August 2020: **74**

So far, Solar Cycle 25 is outpacing the official predictions as we saw in April, which excited the ham radio community as the 10.7-cm radio flux daily readings peaked at 160, breathing life into the higher bands of the shortwave radio spectrum (*also known as HF, for the high frequency segment of radio spectrum [3-30 MHz] –ed*).

Some spectacular moments occurred in April, including the strongest X-ray flare, which measured X2.2 (See scales in *Figures 1a*, *1b*, and *1c*), peaking at 03:57 UTC (Coordinated Universal Time) on April 20th. This erupted from a sunspot region, numbered as Active Region (AR) 2992, that was just rotating out of Earth's view yet caused a radio blackout over the sunlit area of Earth, mostly over Asia during those hours.

The effects from a solar flare arrive in approximately 8 minutes because the emissions from the flare travel at the speed of light. If a flare erupts and triggers the ejection of coronal mass plasma, it results in a Coronal Mass Ejection (CME). If the CME is directed toward the Earth, this plasma might intersect with Earth within two to four days, depending how much speed is involved. Because a solar flare takes only 8 minutes to arrive, they usually result in radio blackouts of shortwave frequencies on the sunlit side of Earth. The X2.2 flare of April 20th caused an R3-level radio blackout (also known as a Sudden Ionospheric Disturbance, or SID). They can last from 10 minutes to several hours <https://g.nw7us.us/3vCJGdt>.

A large sunspot region, AR 2993, rotated into Earth view and on April 21st at 01:59 UTC erupted with a strong X-ray flare that peaked at M9.6. This caused a radio blackout over Asia and the Pacific region. An X1 flare was observed at 03:34 UTC on April 17th from newly numbered sunspot region AR 2994.

It is normal to see back-to-back X-ray flares during the active years of a solar cycle, and we are entering that period now. Of course, with such activity, we will experience radio blackouts, as well as CMEs that could result in significant geomagnetic storms. Cycle 25 has had a number of strong flares, and flares are occurring more frequently simply because there are more frequent and a greater number of sunspot regions (*for the top 10 X-ray flares so far in Cycle 25, see* Table 1 *–ed*).

All this activity raises the sustained energy level that creates our ionosphere. With more solar energy bombarding the ionosphere, higher frequencies are refracted, opening our upper amateur radio bands to worldwide DXing. Stay tuned to this column for the ongoing progress of Cycle 25.

May Propagation

Not only are we expecting the exciting return of F-region propagation on higher amateur radio bands like 10, 12, and 15 meters for long-range DXing, but we also expect the annual summer sporadic-E (E_s) season to begin around May 1st, sometimes during the last week of April. The E_s activity is usually sparse during the first two weeks of May and then it picks up to approximately 60% by the end of May. This is

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for May 2022

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 1, 3-4, 6, 11, 14, 16-20, 22-24, 28, 30-3	A	A	B	C
High Normal: 2, 5, 9-10, 15, 26, 29	A	B	C	C-D
Low Normal: 7, 13, 21	B	C-B	C-D	D-E
Below Normal: 25, 27	C	C-D	D-E	E
Disturbed: 8, 12	C-D	D	E	E

Where expected signal quality is:
A--Excellent opening, exceptionally strong, steady signals greater than S9
B--Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C--Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D--Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E--No opening expected.

HOW TO USE THIS FORECAST

1. Using the **Propagation Charts** appearing in "The CQ Shortwave Propagation Handbook, 4th Edition," by Carl Luetzelschwab, George Jacobs, Theodore J. Cohen, and R. B. Rose.

a. Find the *Propagation Index* associated with the particular path opening from the **Propagation Charts**.

b. With the *Propagation Index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the **Propagation Charts** with a *Propagation Index* of 2 will be fair to poor on May 1st, fair from May 2nd through 5th, and good on April 7th, and so forth.

2. Alternatively, you may use the *Last-Minute Forecast* as a general guide to space weather and geomagnetic conditions throughout the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet, and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these geomagnetic conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the ionosphere supports the path that is in consideration. This chart is updated daily at <http://SunSpotWatch.com> provided by NW7US.

** P.O. Box 110*
Fayetteville, OH 45118
Email: <nw7us@nw7us.us>
@NW7US (https://Twitter.com/NW7US)
@hfradiospacewx (https://Twitter.com/HFRadioSpaceWX)

great news for 10-meter enthusiasts because they will see a mix of both short-range communications via the E-region and an enhancement from the F-region when the 10.7-cm radio flux rises above 110 (and in April, it rose to at least 160). Certainly, this is the season to get those antennas and radios working on this author's favorite DX band.

Table 1

	Peak	Active Region	Date (UTC)
1	X2.2	AR 2992	20 April 2022
2	X1.5	AR 2838	31 July 2022
3	X1.3	AR 2975	30 March 2022
4	X1.1	AR 2994	17 April 2022
5	X1.0	AR 2887	28 October 2021
6	M9.6	AR 2975	31 March 2022
7	M9.6	AR 2992	21 April 2022
8	M7.3	AR 2992	20 April 2022
9	M5.5	AR 2929	20 January 2022
10	M4.7	AR 2860	28 August 2021

Table 1. Top Ten X-ray Flares in Cycle 25

On 15 meters, fairly good openings are possible toward the south during the late afternoon and evening but now east-west propagation paths are opening up for strong DX. Numerous short-skip openings, between about 600 and 2,300 miles, should be possible almost daily. Expect the same conditions, but with longer openings, on 17 meters.

During May, the 20-meter band is the daytime workhorse. Opening shortly after sunrise, good DX conditions are expected to one area or another, even into the nighttime hours. Expect the band to stay open to southern and tropical areas through much of the night, especially for stations at low to mid latitudes. DX conditions should peak around the gray-line terminators (morning and evening), with openings possible to almost all areas of the world. Very frequent short-skip openings are also forecast for distances between about 350 and 2,300 miles. Quite often, especially during the late afternoon, optimal conditions may exist for both short and long skip, and stations a few hundred miles away will be heard at the same time as DX stations from several thousand miles away, causing considerable interference (QRM).

Want a band that could well be your wild card player when geomagnetic conditions get rough after major CMEs pound the Earth's magnetosphere? Try the 30-meter band! Using

Scale	Description	Effect	Physical measure	Average Frequency (1 cycle = 11 years)
G 5	Extreme	**Power systems:** Widespread voltage control problems and protective system problems can occur, some grid systems may experience complete collapse or blackouts. Transformers may experience damage. **Spacecraft operations:** May experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites. **Other systems:** Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).	Kp = 9	4 per cycle (4 days per cycle)
G 4	Severe	**Power systems:** Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid. **Spacecraft operations:** May experience surface charging and tracking problems, corrections may be needed for orientation problems. **Other systems:** Induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).	Kp = 8, including a 9-	100 per cycle (60 days per cycle)
G 3	Strong	**Power systems:** Voltage corrections may be required, false alarms triggered on some protection devices. **Spacecraft operations:** Surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems. **Other systems:** Intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).	Kp = 7	200 per cycle (130 days per cycle)
G 2	Moderate	**Power systems:** High-latitude power systems may experience voltage alarms, long-duration storms may cause transformer damage. **Spacecraft operations:** Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions. **Other systems:** HF radio propagation can fade at higher latitudes, and aurora	Kp = 6	600 per cycle (360 days per cycle)

Figure 1. The NOAA Space Weather Scales were introduced as a way to communicate to the general public the current and future space weather conditions and their possible effects on people and systems. Many of the Space Weather Prediction Center (SWPC) products describe the space environment, but few have described the effects that can be experienced as the result of environmental disturbances. These scales are useful to those who are interested in space weather effects. The scales describe the environmental disturbances for three event types: Geomagnetic storms (G), solar radiation storms (S), and radio blackouts (R). The scales have numbered levels, analogous to hurricanes, tornadoes, and earthquakes that convey severity. They list possible effects at each level. They also show how often such events happen, and give a measure of the intensity of the physical causes. (Courtesy of Space Weather Prediction Center / NOAA) *(Continued on next page)*

Scale	Description	Effect	**Physical measure** (Flux level of >= 10 MeV particles)	**Average Frequency** (1 cycle = 11 years)
S 5	**Extreme**	**Biological:** Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **Satellite operations:** Satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage to solar panels possible. **Other systems:** Complete blackout of HF (high frequency) communications possible through the polar regions, and position errors make navigation operations extremely difficult.	10^5	Fewer than 1 per cycle
S 4	**Severe**	**Biological:** Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **Satellite operations:** May experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded. **Other systems:** Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.	10^4	3 per cycle
S 3	**Strong**	**Biological:** Radiation hazard avoidance recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **Satellite operations:** Single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely. **Other systems:** Degraded HF radio propagation through the polar regions and navigation position errors likely.	10^3	10 per cycle
S 2	**Moderate**	**Biological:** Passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk. **Satellite operations:** Infrequent single-event upsets possible. **Other systems:** Small effects on HF propagation through the polar regions and navigation at polar cap locations possibly affected.	10^2	25 per cycle
S 1	**Minor**	**Biological:** None. **Satellite operations:** None. **Other systems:** Minor impacts on HF radio in the polar regions.	10	50 per cycle

Scale	Description	Effect	**Physical measure**	**Average Frequency** (1 cycle = 11 years)
R 5	**Extreme**	**HF Radio:** Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector. **Navigation:** Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	X20 (2×10^{-3})	Less than 1 per cycle
R 4	**Severe**	**HF Radio:** HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. **Navigation:** Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	X10 (10^{-3})	8 per cycle (8 days per cycle)
R 3	**Strong**	**HF Radio:** Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. **Navigation:** Low-frequency navigation signals degraded for about an hour.	X1 (10^{-4})	175 per cycle (140 days per cycle)
R 2	**Moderate**	**HF Radio:** Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes. **Navigation:** Degradation of low-frequency navigation signals for tens of minutes.	M5 (5×10^{-5})	350 per cycle (300 days per cycle)
R 1	**Minor**	**HF Radio:** Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact. **Navigation:** Low-frequency navigation signals degraded for brief intervals.	M1 (10^{-5})	2000 per cycle (950 days per cycle)

Figure 1. Continued. Top scale is for solar radiation storms (S); bottom is for radio blackouts (R).

Morse code on CW or FT8, this band will play a major role in DX propagation, with somewhat better nighttime propagation than the 40-meter band, and solid daytime propagation into many areas of the world. Exotic DX can be found here on any of the authorized and popular modes. Check this band often during the day.

Because the hours of darkness are growing less as we move closer to the summer season, fewer DX openings are expected on the lower HF bands. The higher level of static that plagues the high frequencies, because of the summertime electrical storms and the propagation of this noise, makes it more difficult to receive the weaker DX signals.

On 40 meters, we still expect fairly good openings to several areas of the world from shortly before sunset, through the hours of darkness, until shortly after sunrise. Good daytime short-skip openings can be expected over distances between approximately 150 and 750 miles, with nighttime openings extending up to the one-hop limit of 2,300 miles. On the lower bands, though, long-range DX is becoming less likely. Do take advantage of the excellent short-skip openings that are forecast for the daylight hours over distances ranging between 50 and 250 miles. During the hours of darkness, the short-skip range should increase up to approximately 2,300 miles.

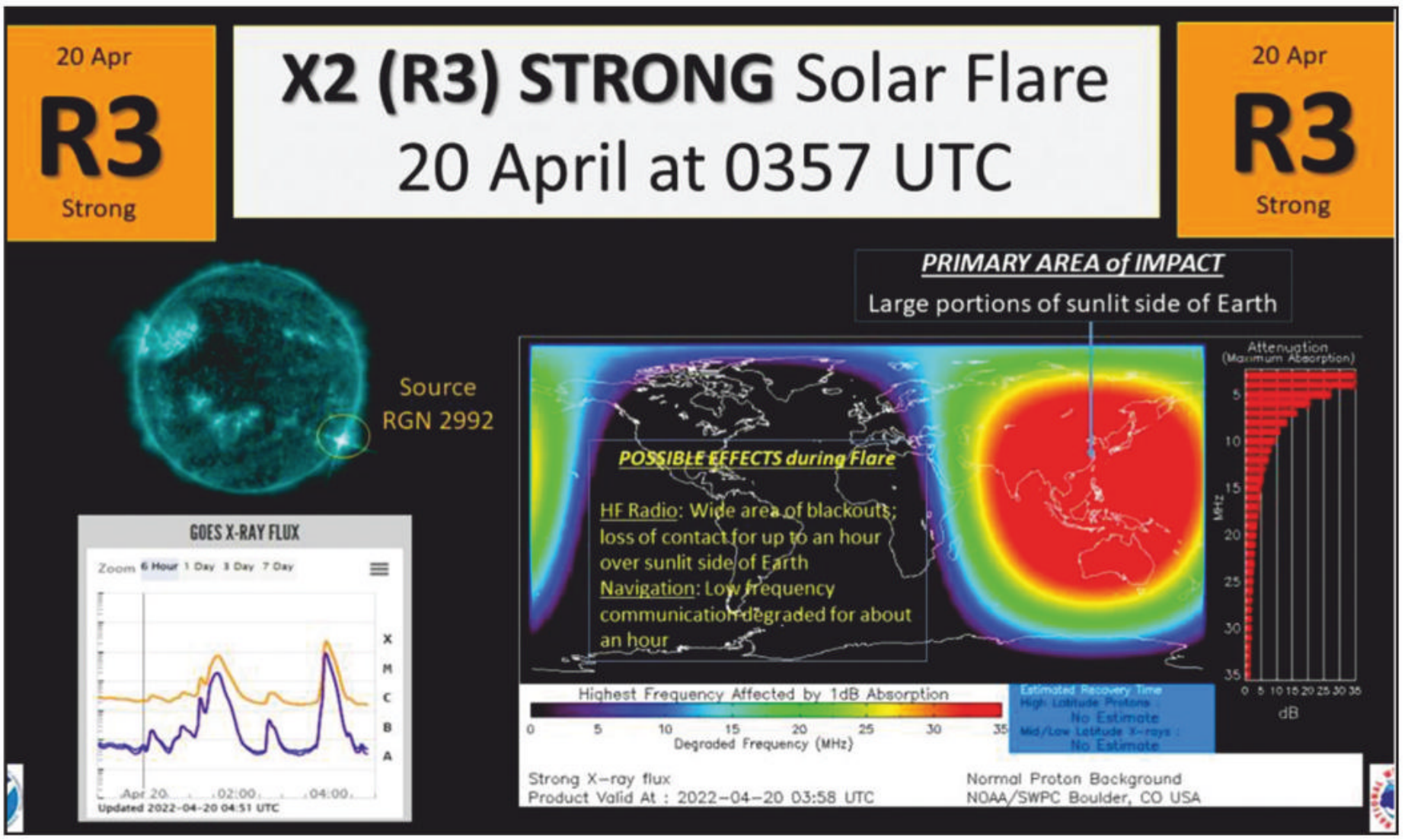
VHF Conditions

As expected on 6 meters, we should see opportunities for short- to medium-distance DX by way of E_s propagation with short-skip openings likely to occur over distances of approximately 1,000 to 1,400 miles. Although E_s openings can take place at just about any time, the best time to check is between 10 a.m. and 2 p.m. and again between 6 and 10 p.m. local daylight time. During periods of intense and widespread E_s ionization, two-hop openings considerably beyond 1,400 miles should be possible on 6 meters. Short-skip openings between 1,200 and 1,400 miles may also be possible on 2 meters. With higher 10.7-cm Radio Flux levels, we expect some F-region propagation on 6 meters, so watch for those openings!

It is possible that we could see occasional trans-equatorial propagation (TEP). A seasonal decline in TE is expected during May. An occasional opening may still be possible on 6 meters toward South America from the southern tier states and the Caribbean area. The best time to check for 6-meter TEP openings is between 9 and 11 p.m. local daylight time. These TEP openings will be on north-south paths that cross the geomagnetic equator at an approximate right angle.

For a detailed list of meteor showers, check out <https://tinyurl.com/f9v7fj2u> for a complete calendar of meteor showers in 2022.

If you use Twitter.com, you can follow <@hfradiospacewx> for hourly updates that include the K index numbers. You can also check the numbers at <https://SunSpotWatch.com>, where this columnist provides a wealth of current space weather details as well as links. Please report your observations of any notable propagation conditions, by writing this



An X2.2 flare (R3-Strong Radio Blackout) occurred at 11:57 p.m. EDT on April, 19, 2022 (20 / 0357 UTC). The flare erupted from a region just beyond the southwest limb of the Sun — likely former Region 2992. The strong flare was associated with multiple bursts on specific radio frequencies to include a burst of 509 solar flux units on 2695 MHz. Additionally, a Type II radio sweep was detected by the USAF Radio Solar Telescope Network (RSTN), with an estimated velocity of 1630 kilometers per second. This radio signature is often indicative of a potential coronal mass ejection (CME). SWPC forecasters are waiting for available coronagraph imagery from the NASA / SOHO LASCO instrument to confirm if a CME took place, and if so, analyze accordingly. However, as the source region of the flare was beyond the southwest limb, initial analysis suggests any CME is unlikely to have an Earth-directed component. (Courtesy of Space Weather Prediction Center / NOAA)

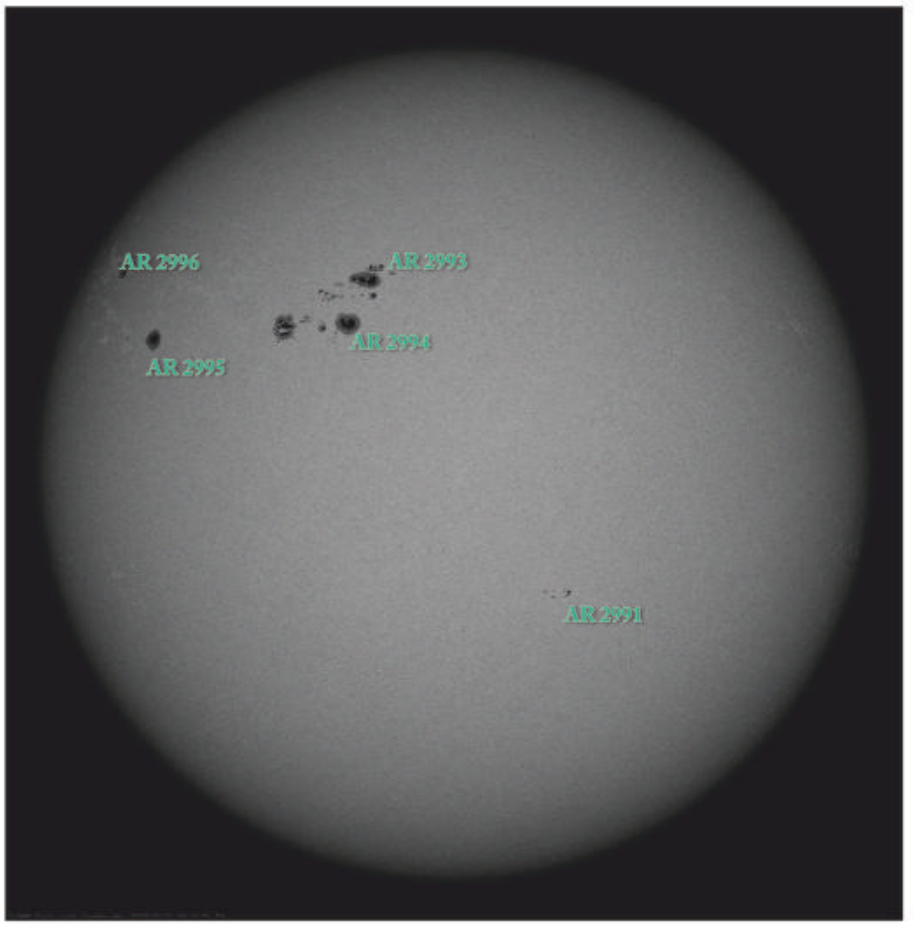


Photo A. On April 21, 2022 at 1511 UTC, the Solar Dynamics Observatory spacecraft HMI instrument captured this white-light (visible) image of the sunspots AR 2991, AR 2993, AR 2994, AR 2995, and AR 2996. At press time, moderately strong X-ray flares were erupting from these active regions. The Sun is truly coming awake, with the current cycle exceeding the expectations in the official forecast. (Courtesy of SDO/HMI)

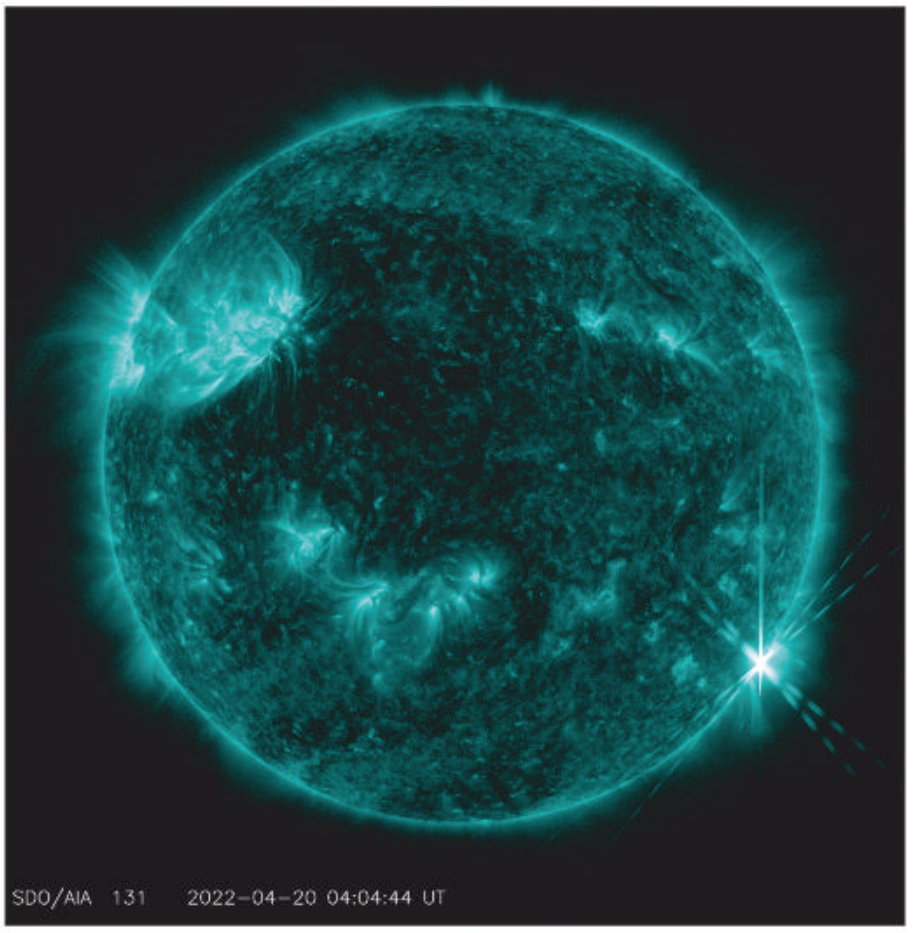


Photo C. In this view at the invisible wavelength of 131 Angstroms, we see the flash of the X-ray flare that erupted on April, 20 2022, peaking at 03:57 UTC with a peak of X2.2, which is the strongest solar X-ray flare yet recorded in Solar Cycle 25. This caused a radio blackout on the sunlit side of Earth, and originated in the departing (rotating out of view) AR 2992. This strong flare, even though off to the side of the solar disc and pointed away from Earth, produced a Type II Radio Emission and a 10-cm Radio Burst, which is notable. (Courtesy of SDO/AIA)

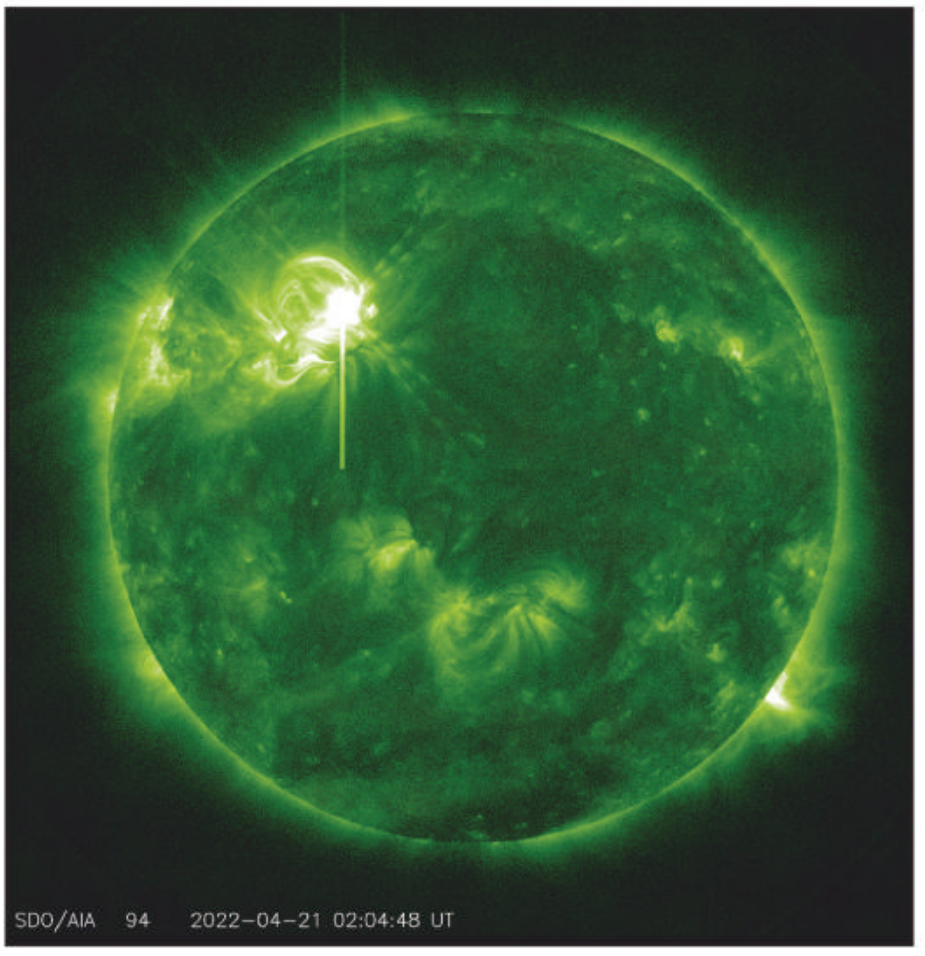


Photo B. In this view at the invisible wavelength of 94 Angstroms, we see the flash of the X-ray flare that erupted on April 21, 2022, peaking at 01:59 UTC with a peak of M9.6. This caused a radio blackout on the sunlit side of Earth. (Courtesy of SDO/AIA)

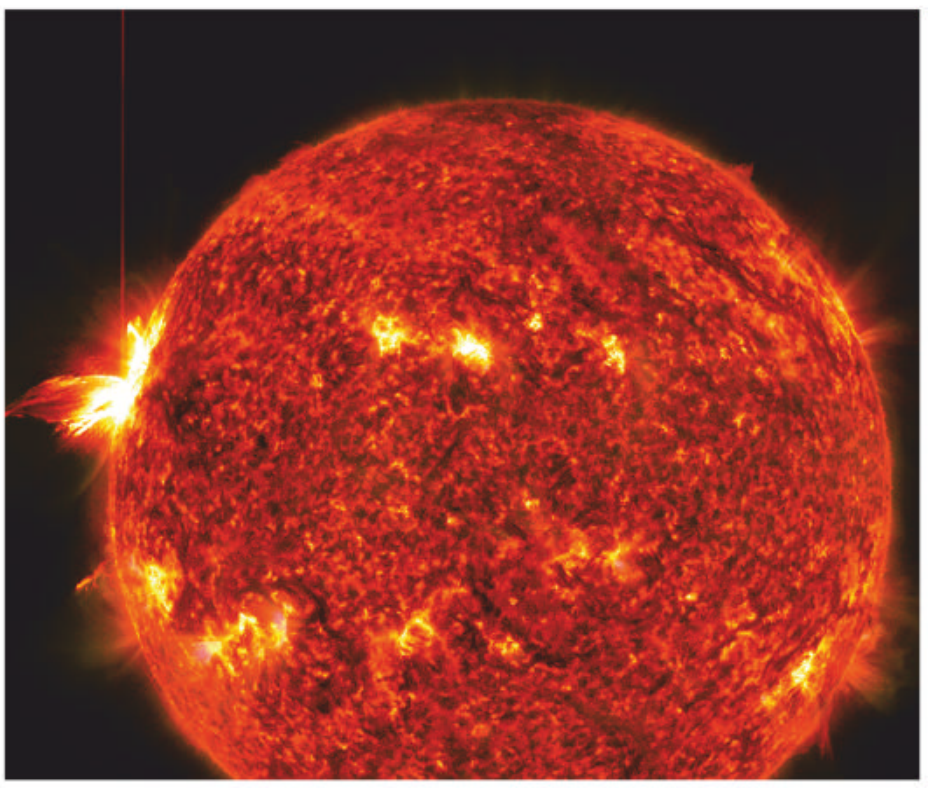


Photo D. This image was captured by SDO's AIA instrument at the invisible wavelength of 171 Angstroms on April 17, 2022 and records the X-ray flare eruption that peaked at X1.1. The source is from a sunspot active region just rotating into view, AR 2994. The event was responsible for a Strong (R3) level radio blackout affecting the sunlit side of Earth. (Courtesy of SDO/AIA)

columnist via Twitter, or via the Space Weather and Radio Propagation Facebook page at <https://fb.me/spacewx.hfradio>.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for February 2022 was 65.61, up from January's 56.97, but down from 69.42 in December 2021, yet still up from significantly up from November's 36.03. The 12-month running smoothed sunspot number centered on August 2021 is 36.1, up from February's 31.8. A smoothed sunspot count of 52, give or take about 7 points is expected for May 2022.

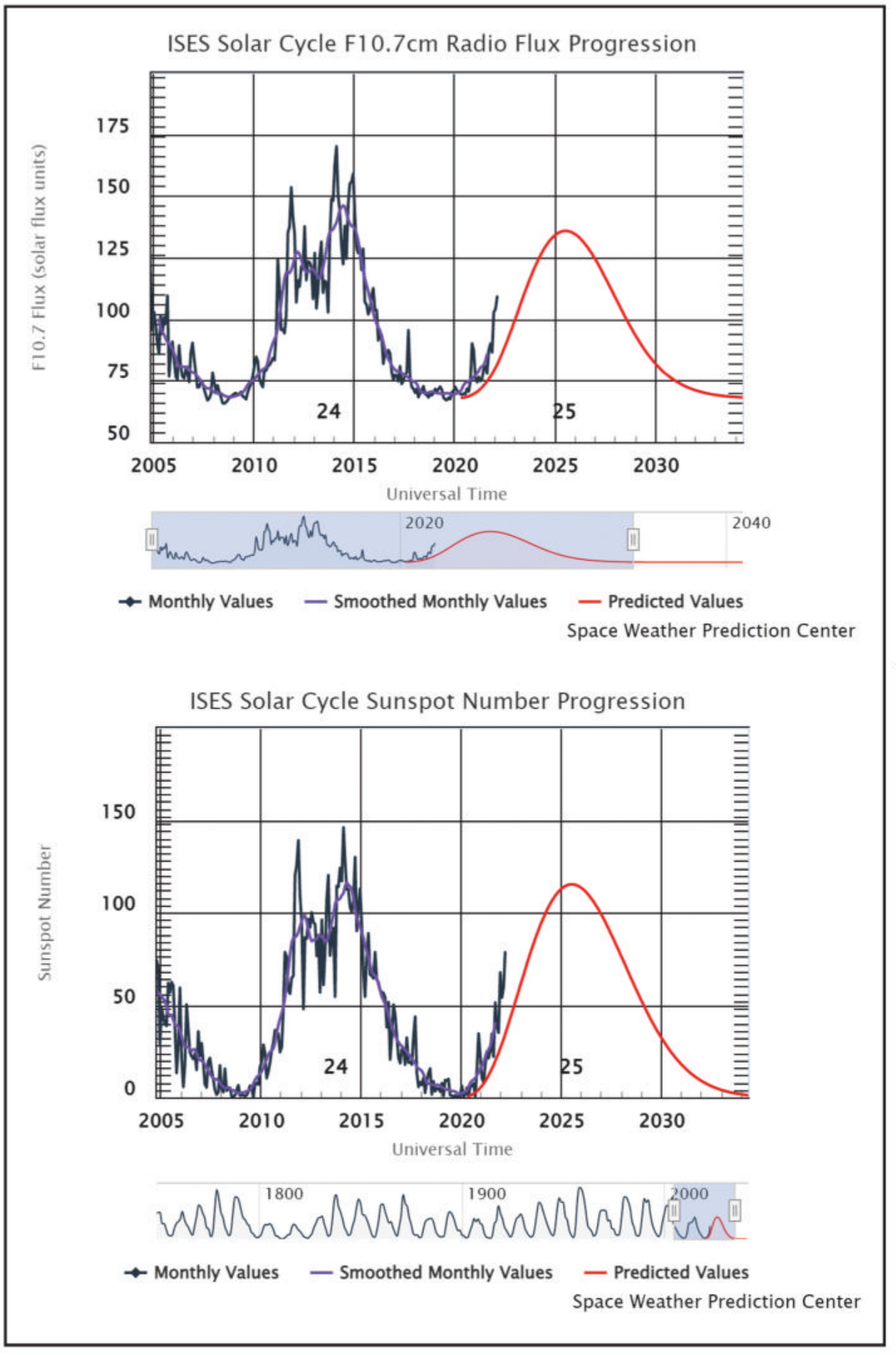


Figure 3. It continues to be clear that this cycle, Cycle 25, is outpacing the forecast (so far)! The increase in each plot shows a faster rise in overall solar activity and resulting solar flux each month of this cycle. With a 10.7-cm Radio Flux climbing at least to 160 during April 2022, the 10-meter band had plenty of east-west DX over 3,000 kilometers or greater paths. Could this cycle also prove to be a stronger one than is expected? (Courtesy of SWPC/NOAA)

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 109.15 for February 2022, up from 104.05 for January. The 12-month smoothed 10.7-cm flux centered on August 2021 is 85.70, up from 83.10 for July. The predicted smoothed 10.7-cm solar flux for May 2022 is 93, give or take 8 points.

Geomagnetic activity level this month is expected to range from quiet to stormy, resulting in occasional degraded propagation this month. Remember that you can get an up-to-the-day **Last-Minute Forecast** at <https://SunSpotWatch.com> on the main page.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may email me, write me a letter, or catch me on the HF amateur bands. If you are on Facebook, check out <https://fb.me/spacewx.hfradio> and <https://fb.me/NW7US> — speaking of Facebook — check out the *CQ Amateur Radio* magazine fan page at <https://fb.me/CQMag>. Also, please check out the new alternative social networking ham radio group at <https://amateurhamradio.locals.com> and please share this with your amateur radio friends and clubs. *– 73, Tomas, NW7US*

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, and Countries. An asterisk (*) before a call indicates low power. An "A" after the band indicates Assisted category. Certificate winners are listed in **bold**. Late logs and logs not eiligble for an award are listed in *italics*.

2021 CQWW DX CW RESULTS

SINGLE OPERATOR

NORTH AMERICA

United States

District 1

W1KM	**A**	**7,479,282**	**4802**	**132**	**411**
KQ2M	"	6,595,160	4255	136	436
N1UR	"	4,913,175	3271	125	420
K1DG	"	4,863,445	3455	119	374
KA1IS	"	4,162,902	3182	116	362
W1WEF	"	2,381,632	2147	93	305
W1JQ	"	1,817,000	1454	112	348
W1XX	"	661,716	803	71	226
K1RM	"	604,892	1073	46	148
WC1M	"	132,418	343	34	109
K3IU	"	119,187	287	38	115
N1NN	"	99,264	249	38	103
K1WR	"	50,600	163	30	85
K1ZK	"	15,106	64	29	54
W1OHM	**14**	**14,787**	**101**	**14**	**39**
W3AKD	**7**	**4,738**	**57**	**11**	**35**
AE1D	"	10	4	2	3
K2ZW	**3.5**	**387,226**	**1142**	**29**	**90**
			(OP: JO1RUR)		
W1HI	"	66,015	304	18	63
K1WHS	**1.8**	**12,350**	**122**	**11**	**39**
***K1VUT**	**A**	**1,348,704**	**1289**	**93**	**285**
*N1DC	"	670,677	758	79	248
*K1HT	"	667,926	696	89	253
*N1QY	"	461,396	659	49	198
*N1DID	"	359,100	520	66	204
*K1MD	"	312,520	449	74	186
*KG1V	"	305,539	462	67	180
*N1CGP	"	227,448	359	60	174
*W1ND	"	140,130	305	48	125
*W1ECH	"	97,380	221	57	123
*W1VIV	"	75,790	221	36	94
*KA1API	"	67,983	194	27	102
*WA1WCC	"	65,280	234	24	78
*W1CVE	"	37,401	127	47	90
*AJ1DM	"	37,185	123	32	79
*N1SEP	"	35,518	116	34	84
*W1EDX	"	34,965	133	34	77
*WA1N	"	22,098	104	26	61
*KA1DBE	"	17,208	105	15	57
*KX1E	"	14,042	89	13	46
*N1SP	"	11,682	81	20	46
*N1AM	"	8,784	59	18	43
*W1IS	"	6,500	49	16	34
*W1FWS	"	4,400	37	22	28
*K1SEC	"	3,239	43	12	29
*AK1P	"	2,738	34	13	24
*NA1VT	"	2,025	38	9	18
W1MU	**21**	**122,520**	**357**	**27**	**93**
*AB1J	"	64,293	263	18	69
*NC1CC	"	58,855	269	18	61
			(OP: WA1BXY)		
***KC1SA**	**14**	**800**	**19**	**6**	**10**
*KC1PTQ	"	648	17	5	13
K5ZD	**AA**	**8,943,750**	**4603**	**153**	**522**
K1ZZ	"	8,145,450	4090	157	533
K1IR	"	5,464,525	3001	149	492
			(OP: KE1J)		
K1AR	"	4,854,720	2798	141	483
W1GD	"	4,344,795	2604	130	455
W1NT	"	2,674,518	1773	124	415
NN1SS	"	2,333,135	1570	124	411
WX1S	"	2,156,517	1306	140	443
AA1ON	"	2,110,680	1846	101	328
N1DG	"	2,083,200	1182	141	479
W1FJ	"	1,998,425	1528	107	366
NB1N	"	1,722,608	1671	81	287
K1JB	"	1,697,939	1165	126	395
W1NG	"	1,664,930	1186	120	383
W1RM	"	1,637,582	1049	141	428
K1TZQ	"	1,551,144	1469	91	301
K1ESE	"	1,175,696	1056	90	304
KB1W	"	1,133,132	1176	86	278
AJ1AJ	"	1,054,098	1231	64	250
K1ZE	"	988,410	759	113	357
KA1IOR	"	948,234	806	103	319
W8HAP	"	887,090	767	97	333
K2RB	"	865,264	991	74	254
K1RV	"	824,070	768	93	297
K1VR	"	794,488	765	80	296
NE1B	"	756,855	685	99	318
K1YT	"	745,908	732	90	276
W1NK	"	685,344	662	94	269
AK1MD	"	682,762	883	86	251
W1DX	"	679,098	528	118	365
			(OP: W1AN)		
NF1O	"	572,202	549	92	291
W3SM	"	552,420	674	73	224
WJ1X	"	531,196	635	73	243
K7GM	"	522,150	525	96	258
N8RA	"	521,808	546	75	261
KE1VT	"	513,252	612	84	234
AE1T	"	431,424	608	63	189
WA3OFR	"	403,995	439	86	259
W1UK	"	375,440	377	83	278
NT1N	"	363,883	447	73	226
N1IXF	"	309,482	412	70	201
AB1KT	"	296,926	469	61	193
N3ER	"	263,466	481	41	148
K1DJ	"	253,378	316	88	214
N1KWF	"	247,812	447	50	164
KX1G	"	222,888	414	54	168
AA1SU	"	222,460	349	75	170
KV1J	"	207,616	311	78	178
K1SND	"	183,912	317	63	174
W1VEM	"	173,052	370	54	153
WJ1B	"	163,348	324	49	145
K1IB	"	155,907	386	37	116
W1ZT	"	150,776	287	51	137
N1SNB	"	146,730	359	32	114
K1DBO	"	144,304	236	71	161
W1HNZ	"	139,590	301	55	143
WK1J	"	96,873	299	43	104
KB1NO	"	94,536	238	41	115
KE8HBV	"	85,932	199	51	147
KA1O	"	82,134	181	49	120
W1JR	"	58,480	137	63	109
W7AOF	"	51,182	152	52	105
K1KA	"	47,223	120	50	109
NI1L	"	41,514	133	28	83
W1CU	"	34,224	103	29	95
K2KA	"	31,356	99	43	74
W1FA	"	27,170	148	17	48
KE1R	"	25,764	122	43	71
N9NC	"	25,568	107	22	72
W1DQ	"	12,720	61	26	54
K1MT	"	12,692	65	28	48
WA1ZYX	"	11,628	75	17	40
K1VK	"	8,844	60	26	41
NF1A	"	5,428	42	13	33
NE1F	"	3,105	27	19	26
NE1I	"	768	13	11	13
K2LE	**21A**	**288,260**	**749**	**30**	**110**
K1SM	"	129,234	399	26	93
W1/					
PY1MX	**14A**	**89,430**	**314**	**23**	**87**
W1VE	**7A**	**593,640**	**1436**	**34**	**119**
WK1O	"	413,220	1086	32	110
W1FQ	"	65,582	235	28	93
WA1T	**3.5A**	**147,196**	**547**	**21**	**77**
N1PGA	**1.8A**	**26,122**	**137**	**16**	**58**
***KS1J**	**AA**	**2,042,975**	**1678**	**99**	**338**
*W1QK	"	1,610,308	1421	92	306
*N1EN	"	1,476,540	1353	92	298
*WO1N	"	1,338,469	1084	112	337
*W1ARY	"	589,263	693	71	238
*K1TR	"	517,725	616	69	226
*K1VMT	"	465,170	711	68	189
*N1API	"	448,400	541	69	235
*W1DYJ	"	287,280	424	71	199
*N1MGO	"	244,984	435	59	167
*W1PY	"	191,557	319	51	172
*N1YU	"	159,413	256	64	175
			(OP: S56A)		
*K1ECU	"	116,775	245	47	126
*AE1P	"	97,382	233	37	109
*KA1YQC	"	75,012	156	52	136
*N1GSA	"	60,885	194	32	91
*K1XS	"	42,280	129	43	97
*N1DM	"	38,311	151	24	67
*W1VKE	"	34,404	146	26	68
*W1NSK	"	30,130	117	32	83
*W2TT	"	19,292	84	23	68
*N1QD	"	13,943	79	26	47
			(OP: @KB1EKN)		
*N1CEO	"	11,880	117	23	43
*KW1DX	"	6,552	50	24	39
*KA1SAW	"	5,712	40	17	34
*K1SX	"	5,075	49	9	26
*K1LHO	"	3,256	75	26	62
*K1NU	"	540	10	9	9
*WO1E	"	208	8	5	8
***N1IBM**	**21A**	**23,670**	**97**	**18**	**72**
***KU1N**	**3.5A**	**20,060**	**127**	**14**	**45**
*W1MI	"	682	16	8	14
***AG1A**	**1.8A**	**400**	**23**	**7**	**9**

District 2

N5DX	**A**	**10,090,280**	**6002**	**151**	**445**
			(OP: @N2QV)		
K2NV	"	2,824,320	2104	121	359
W2XL	"	1,723,313	1625	93	286
WS9M	"	803,950	910	87	263
K2ZJ	"	738,150	979	71	195
N2HMM	"	599,807	597	93	284
NS2N	"	559,004	639	91	225
KC2LSD	"	510,252	667	68	235
W2OIB	"	499,284	612	84	240
W2CN	"	80,964	231	45	111
WB2PJH	"	76,545	210	37	98
N2YB	"	29,580	118	39	63
K2OID	"	17,336	89	30	58
WA2BMH	"	9,044	52	24	44
WA2VIU	"	5,512	48	21	31
K2UA	"	3,002	28	13	25
W2KU	"	2,254	40	17	29
KU2M	**21**	**507,702**	**1332**	**29**	**109**
K2SSS	"	358,730	897	31	114
N2MF	**7**	**864,912**	**2128**	**36**	**112**
WF2W	**1.8**	**41,625**	**293**	**18**	**57**
***KE2WY**	**A**	**383,717**	**546**	**60**	**203**
*W2LC	"	310,527	495	53	164
*W2AAB	"	215,688	377	55	154
*WB2FUV	"	186,989	373	49	142
*WA2JQK	"	161,219	314	69	194
*K2TWI	"	158,415	324	44	133
*KA2FIR	"	135,590	280	53	129
*K2QB	"	115,080	265	46	122
*WA2QAU	"	101,673	252	43	100
*N2RI	"	100,440	239	45	117
*KC2WUF	"	43,008	136	31	81
*N1NQD	"	38,918	129	46	76
*WB2KSP	"	37,120	145	41	87
*NW2K	"	30,282	110	35	68
*N2CU	"	28,635	125	22	61
*WA2VQF	"	26,873	124	19	58
*WB2KWC	"	24,276	112	21	63
*K2MEN	"	24,099	109	27	60
*N2JNZ	"	23,052	99	39	63
*K2GLS	"	22,968	139	33	66
*KD2EPM	"	6,930	68	25	41
*AC2PB	"	6,156	40	21	36
*AA2TH	"	3,870	33	15	28
*K2JF	"	384	10	6	10
*N2GSL	"	242	14	10	12
*W2CLA	"	180	11	9	11
*KB2GD	"	180	8	6	6
***W3EH**	**21**	**2,001**	**27**	**9**	**20**
***W2TZ**	**14**	**63,578**	**275**	**19**	**64**
*WO2N	"	1,404	26	7	19
AB3CX	**AA**	**6,287,400**	**3649**	**139**	**461**
KV2K	"	4,762,464	2543	156	516
			(OP: K2NG)		
N2SR	"	4,038,715	2822	129	406
W2MKM	"	3,804,900	2457	129	421
N2GC	"	2,647,700	1627	137	443
N2MM	"	2,600,709	1831	118	401
N2RC	"	2,491,248	1720	124	392
WA2OAX	"	2,268,704	1675	124	372
NY6DX	"	1,768,398	1397	116	382
KA2K	"	1,535,977	1256	104	353
AB2E	"	1,410,645	1135	107	364
K3TS	"	1,402,392	1199	101	325
KF2O	"	1,319,714	900	130	408
K2RET	"	1,312,839	1062	109	338
W2MV	"	1,292,250	1203	82	293
WA2CP	"	1,213,632	1022	108	333
			(OP: KC2GOW)		
W2GDJ	"	1,212,834	941	114	355
W2YC	"	1,139,880	886	114	358
WR2G	"	1,110,726	1013	95	307
KR2AA	"	1,066,368	1034	91	293
K2CJ	"	1,002,429	871	95	316
N2NI	"	930,620	926	96	284
W2RD	"	854,480	711	105	335
K2TER	"	713,584	724	96	316
N2SQW	"	707,280	767	75	261
K2SE	"	693,780	987	72	238
AG2J	"	667,652	750	77	255
AF2F	"	622,872	619	104	265
NE2V	"	610,785	696	73	242
N2BA	"	559,790	557	101	284
WB2NVR	"	557,740	666	74	242
K2PAL	"	542,133	789	55	188
K2EP	"	445,360	526	70	223
N2JJ	"	385,815	546	57	198
W2HUV	"	344,960	504	77	203
WB2WPM	"	315,722	486	65	189
W2KA	"	306,802	425	69	193
WB2NFL	"	294,636	474	69	189
N1JP	"	247,247	378	55	192
NG2P	"	230,146	349	56	182
N2OO	"	226,285	309	65	206
AK2S	"	225,411	367	58	169
KM2L	"	195,806	315	59	162
KE2D	"	193,992	273	70	204
AI2N	"	190,570	250	86	209
W2JV	"	159,528	299	47	157
WO2X	"	158,860	258	70	165
K2QO	"	157,215	273	76	159
N2KHH	"	134,640	324	40	125
KK2U	"	131,040	266	45	137
W2VQ	"	123,391	293	38	125
NU2Q	"	118,013	317	42	119
WA2MCR	"	111,720	238	49	119
N2CG	"	110,316	226	49	125
K7RB	"	106,596	222	52	137
W2XK	"	98,235	197	45	132
K2QPN	"	96,450	230	35	115
WA2UBK	"	91,931	199	38	123
K2WR	"	91,784	227	43	106
W2OSR	"	80,976	190	45	123
W2CCC	"	79,866	197	50	103
			(OP: K2CS)		
AB2ZY	"	71,687	205	37	96
WO2Y	"	66,720	225	37	102
WK2H	"	63,531	200	27	90
K2BX	"	61,047	188	38	95
NN2NN	"	55,936	161	37	91
WO2T	"	29,088	118	33	68
K2DW	"	14,186	123	30	52
W3PR	"	9,420	60	19	41
N2CJ	"	7,257	47	22	37
KE2SD	"	4,185	37	15	30
K2YR	"	2,250	25	9	21
NO2C	"	550	14	12	13
WC2L	**7A**	**132,750**	**412**	**25**	**93**
WA3AFS	**1.8A**	**450**	**21**	**8**	**10**
***K4RUM**	**AA**	**769,530**	**802**	**85**	**254**
*W2YR	"	441,232	451	94	274
*K2ZR	"	400,752	588	76	200
*NM2A	"	395,450	522	68	207
*KA2D	"	356,132	411	77	239
*KD2P	"	311,656	488	60	179
*K3IB	"	272,916	378	67	199
*K1NY	"	251,685	384	71	184
*N2FF	"	243,432	414	50	166
*W2FDJ	"	231,610	376	68	162
*N2BEG	"	204,092	310	83	176
*W2YK	"	198,666	299	52	182
*WW2P	"	147,260	264	54	145
*W2VM	"	122,537	242	51	130
*KY2T	"	95,060	282	32	108
*W2LCQ	"	90,024	264	28	104
*K2PJC	"	87,279	227	36	105
*WE2DX	"	62,491	166	37	106
*KS2G	"	62,400	150	41	119
*W2QL	"	44,516	143	38	86
*KD2ST	"	31,396	132	30	64
*N2BZD	"	27,840	109	29	67
*K2SI	"	27,146	103	30	68
*KA2IRQ	"	24,800	101	27	73
*W2NPT	"	10,168	59	21	41
			(OP: NP4H)		
*KD2SGM	"	9,063	63	21	32
*KD2TUD	"	4,085	98	12	31
*N2OA	"	4,004	39	17	27
*AE2DB	"	3,330	30	15	30
*WA2CHV	"	2,232	24	15	21
*KI2D	"	448	11	6	10
***K2DFC**	**21A**	**48,124**	**175**	**23**	**83**
***N2EIM**	**14A**	**27,477**	**151**	**16**	**55**
***WB2AA**	**3.5A**	**48,380**	**230**	**16**	**66**

District 3

K3ZO	**A**	**2,850,080**	**2184**	**116**	**354**
K3UL	"	2,060,004	1626	121	353
WK2G	"	1,388,288	1596	79	240
K3TC	"	1,378,173	1145	108	335
N3FCP	"	877,558	898	85	268
K3TM	"	523,900	614	74	236
K3CWF	"	55,809	181	35	82
WS3M	"	50,274	240	33	100
NC3Y	"	36,180	146	27	63
N3ZP	"	20,640	97	25	55
KJ3I	"	10,360	68	22	48
K3DU	"	2,310	31	8	22
K3VA	**14**	**48,972**	**226**	**18**	**59**
WO3Z	**7**	**55,935**	**203**	**24**	**75**
W3BGN	**3.5**	**163,125**	**758**	**17**	**70**
N3RW	"	4,256	56	10	28
***NU3A**	**A**	**373,041**	**567**	**54**	**175**
*K3SWZ	"	349,845	476	79	202
*K3HW	"	300,160	532	65	215
*WA3EOQ	"	138,375	284	65	140
*N2EY	"	133,456	317	38	114
*WB2FUE	"	107,244	238	43	119
*WA4GUD	"	91,323	253	42	97
*W3WHK	"	91,266	231	48	111
*W3PNM	"	89,655	176	60	155
*KA3JNN	"	72,756	194	42	99
*W3WTD	"	58,888	181	40	96
*KE3MX	"	46,698	164	35	94
*KY3W	"	45,934	158	39	80
*KE3ZT	"	40,400	154	24	76
*KF3G	"	37,076	146	26	66
*AC3EK	"	35,910	158	30	75
*W3AVP	"	22,074	100	25	53
*K3KU	"	15,028	83	21	47
*KC3NNO	"	11,050	68	21	44
*N3TE	"	7,923	54	22	35
*K3VZ	"	7,200	60	15	35
*N3VO	"	6,800	49	15	35
*WE3Q	"	5,014	46	16	30
*WN3K	"	3,772	38	18	28
*WA3TD	"	2,914	54	17	30
*KC3SDJ	"	2,829	43	19	22
*WA3GPP	"	2,736	66	13	23
*AJ3DI	"	2,288	30	7	19
*N3JNX	"	272	9	8	9
*WA3GOS	"	198	8	6	5
*K3YMI	"	9	8	5	4
***KE3O**	**21**	**1,856**	**33**	**11**	**18**
***K1EFI**	**14**	**57,545**	**253**	**18**	**67**
*W3RLO	"	4,420	49	9	25
***W3EF**	**7**	**138,990**	**456**	**27**	**86**
*WA3FAE	"	49,068	215	20	67
*W3RJ	"	45,684	232	18	63
*K3JSJ	"	672	17	7	14
*W7IGC	"	4	1	1	1
***W3LL**	**3.5**	**69,635**	**292**	**20**	**75**
*KC3DLL	"	8	16	2	2
*KC3GJX	"	6	2	1	2
K3WW	**AA**	**7,359,330**	**4156**	**146**	**492**
AA1K	"	6,951,717	3888	155	502
N3RS	"	6,413,205	3510	148	493
NY3A	"	6,037,120	3358	147	493
W8FJ	"	5,154,780	2905	148	488
WY3A	"	4,197,531	2716	128	431
N3AD	"	3,851,656	2738	119	389
N3QE	"	3,842,516	2538	128	428
K3PP	"	3,591,532	2165	143	459
NW3Y	"	3,297,516	2128	134	432
W3MA	"	3,170,667	1959	137	460
NN3Q	"	3,016,884	2161	115	383
W3FV	"	2,941,967	2119	112	375
K3WJV	"	2,832,102	2005	123	384
KU2C	"	2,794,959	1901	133	416
K3MD	"	2,712,450	1841	125	410
WG3J	"	2,451,932	2081	110	359
N3AM	"	2,375,500	1683	115	385
W3FIZ	"	2,337,576	1636	115	404
K3SW	"	2,218,347	1766	109	350
K2XR	"	2,019,160	1387	117	403
K3ZA	"	1,911,660	1506	103	350
K3WU	"	1,614,816	1519	97	281
NT2DR	"	1,593,614	1580	85	289
K2LNS	"	1,350,909	1295	85	284
N3XF	"	1,324,461	1058	110	337
K3ATO	"	1,289,340	1276	89	288
K3TEJ	"	1,224,895	1016	101	342
K3OO	"	1,150,155	773	130	419
K3CY	"	1,116,711	1147	87	294
WA3AAN	"	1,088,912	1082	86	282
K3CCR	"	1,071,616	908	98	318
			(OP: N3UM)		
K3NM	"	1,036,569	809	118	383
AB3AH	"	1,026,414	1043	90	291
K3TN	"	1,012,544	884	103	313
KB3Z	"	1,003,011	985	89	278
WC3N	"	985,257	992	78	273
W3UM	"	929,989	815	104	317
N3FZ	"	820,800	982	66	234
N3EEN	"	806,988	812	91	273
N3FJP	"	783,730	769	89	273
K3FMQ	"	766,350	741	87	303
K3RL	"	764,400	709	100	290
KD3TB	"	621,244	689	77	261
W3OU	"	590,688	644	86	250
WA3AER	"	586,093	742	68	215
W3RE	"	512,866	563	88	259
N3RJ	"	511,162	705	58	204
W3YR	"	498,960	555	82	248
K3UW	"	458,672	633	60	203
W3BG	"	416,050	494	81	233
AA3K	"	405,232	513	72	232
W3JX	"	401,790	417	87	267
KA3D	"	365,040	375	84	276
KE3GK	"	348,355	527	62	197
NS3L	"	347,136	402	92	247
WT3K	"	313,600	490	49	175
NX3Z	"	305,102	417	66	200
WC3O	"	297,792	389	73	209
K1BZ	"	292,314	363	81	228
WW3S	"	258,300	270	97	253
NT3U	"	256,652	313	80	227
N3ZA	"	247,520	342	72	188
KW3Z	"	247,095	387	62	193
K3BHX	"	226,840	430	49	163
W3ICM	"	212,892	356	99	240
NN3RP	"	210,000	430	46	154
KX2S	"	180,614	329	48	146
AA3S	"	177,250	264	67	183
K3ZU	"	171,785	281	60	175
WX3B	"	149,855	273	53	152
AK3B	"	149,308	275	61	168
N3XL	"	148,800	300	47	145
K2EJ	"	140,790	265	47	143
W3SQ	"	134,710	275	52	138
NY3C	"	133,824	246	61	143
KC3M	"	112,316	230	45	127
AC3LZ	"	110,143	238	55	132
KG4USN	"	106,800	193	39	161
N3ST	"	96,990	221	46	113
W2DLT	"	82,800	193	54	130
KZ3W	"	81,432	203	52	122
NE3K	"	79,080	236	32	88
K3MM	"	64,650	162	33	117
WA3GM	"	63,733	173	52	111
KD3RF	"	62,856	163	38	124
K2CD	"	60,792	207	22	80
K3TEF	"	51,348	144	40	92
N3RM	"	47,348	157	38	95
AB3CV	"	47,068	206	18	64
W3NRJ	"	39,585	119	48	97
K3FH	"	29,830	114	23	72
N3NR	"	22,616	90	25	63
W3MF	"	2,627	27	14	23
N4ZR	**21A**	**304,260**	**801**	**28**	**104**
NA3M	**7A**	**871,998**	**1879**	**37**	**129**
W3UL	"	53,289	212	22	71
K6ND	"	28,864	129	21	67
W3NO	**3.5A**	**170,496**	**483**	**30**	**98**
***NF3R**	**AA**	**1,837,374**	**1570**	**113**	**349**
*W3KB	"	1,710,345	1341	107	348
*NS3T	"	1,135,472	997	105	319
*NJ3K	"	519,288	661	77	231
*K3SU	"	407,859	593	68	189
*AG4Q	"	348,704	534	62	210
*NR3Z	"	339,231	550	56	163
*K3QP	"	303,072	441	65	181
*KB3AAY	"	289,504	474	52	166
*AC5XK	"	257,922	481	50	157
*WA1HEW	"	162,070	354	48	142
*AG3I	"	106,288	239	53	129
*W3CC	"	105,468	223	49	138
*WM3O	"	102,805	274	35	110
*W3TAS	"	97,276	217	46	120
*N2MA	"	85,104	241	41	103
*NE3I	"	77,763	198	42	105
*W3MLK	"	63,012	144	57	120
*N3AML	"	57,986	149	45	113
*KC3RPO	"	43,520	141	40	88
*WB3FAE	"	43,432	143	37	85
*K3WGR	"	39,556	148	29	87
*W3IDT	"	33,496	138	27	79
*W2NAF	"	27,807	108	24	69
*KB3NSK	"	25,680	118	22	58
*K3BTE	"	8,580	63	16	36
*KC3TD	"	2,772	31	13	23
*AJ3M	"	1,102	17	13	16
*K3MAW	"	294	8	6	8
***K2RK**	**14A**	**45,153**	**197**	**21**	**66**
***N3DRL**	**7A**	**987**	**19**	**6**	**15**
***KO3T**	**3.5A**	**9,800**	**79**	**10**	**39**

District 4

NN7CW	**A**	**5,314,569**	**4010**	**116**	**365**
N4AF	"	5,267,392	3881	118	369
W4CB	"	3,212,920	2436	122	348
			(OP: W2RU)		
K4PV	"	1,318,128	1612	87	249
K1GU	"	1,312,080	1227	108	277
KQ4R	"	1,152,160	1394	67	237
WN7S	"	596,700	713	79	246
AI4WW	"	481,025	669	69	202
N4DJ	"	449,883	626	65	194
W8FN	"	336,756	533	53	175
K4WW	"	336,604	574	58	148
W4UT	"	235,200	389	64	160
W3SA	"	219,648	393	52	156
N4EK	"	205,303	355	57	154
N4QWF	"	176,945	337	61	154
N9CB	"	166,348	370	50	132
W4HG	"	152,721	292	67

*N4YHC	"	9,648	57	30	42
*K2HYD	"	9,315	92	28	53
*WB5KFP	"	9,216	53	30	42
*WØAAL	"	8,113	68	24	37
*AA2MX	"	7,293	62	14	37
*N4KGL	"	6,106	59	29	42
*NQ4K	"	6,075	50	15	30
*W4RYW	"	3,655	33	20	23
*K4OMD	"	3,458	33	11	27
*N8GU	"	2,808	31	15	21
*KEØL	"	2,747	26	17	24
*W4GDG	"	1,860	28	11	19
*KC4WQ	"	1,392	20	9	15
*W4JOV	"	1,178	21	14	17
*W4NBS	"	1,150	21	9	14
*NJ8J	"	1,080	20	15	15
*AI4QQ	"	899	18	15	16
*K4MZE	"	609	13	9	12
*AA4HG	"	425	14	11	14
*AI4UN	"	312	12	5	7
*KK6OKU	"	78	17	7	6
*WA2LMC	"	34	10	8	9
***N4HA**	**28**	**4,968**	**60**	**14**	**22**
***WB4TDH**	**21**	**201,480**	**587**	**29**	**91**
*K1TN	"	17,220	103	14	46
*W4DL	"	4,332	48	9	29
***N6MA**	**14**	**76,410**	**314**	**23**	**67**
*KG5HVO	"	27,840	126	25	55
*NW4V	"	13,805	88	15	40
*N4IU	"	2,573	57	10	21
*W4SCP	"	132	9	6	5
			(OP: WAØLJM)		
*K4DQP	"	90	5	4	5
*N2TNN	"	18	8	4	2
***WA1FCN**	**7**	**137,830**	**492**	**26**	**84**
*K4SXT	"	77,717	256	27	82
*AD8J	"	14,991	108	12	45
*W4TJM	"	14,942	121	18	44
			(OP: WB4OMG)		
*N8RW	"	2,448	36	10	24
*KO4AWC	"	660	14	7	13
***NY8Q**	**3.5**	**4**	**1**	**1**	**1**
***W4DWS**	**1.8**	**289**	**14**	**8**	**9**
KØZR	**AA**	**3,907,926**	**2537**	**135**	**426**
NO9E	"	3,775,478	2460	136	427
K4AB	"	3,704,256	2475	139	437
N1LN	"	3,469,120	2127	140	452
WO4O	"	3,009,646	1890	136	442
N4UU	"	2,995,650	2680	104	346
N6AR	"	2,970,648	1767	142	470
K4PI	"	2,826,368	1804	137	431
N3JT	"	2,772,728	1877	126	410
N4RV	"	2,573,667	1580	139	458
K5EK	"	2,500,373	1610	130	427
N3ND	"	2,427,093	1757	110	369
NU4E	"	2,331,328	1471	144	440
K3IE	"	2,259,584	1633	122	386
K2SX	"	2,213,470	1628	122	393
N4ZZ	"	1,973,071	1695	102	317
N4QS	"	1,858,206	1452	110	343
N1RM	"	1,857,492	1496	99	342
W4RM	"	1,705,892	1544	108	313
WJ2D	"	1,503,507	1208	108	345
N4IQ	"	1,291,136	1132	112	336
K3SV	"	1,288,280	1088	102	326
K4XL	"	1,278,662	1051	109	328
N4HB	"	1,132,572	1022	105	312
W3IP	"	1,124,992	797	126	391
NS4X	"	1,112,760	1033	100	296
W1AJT	"	993,776	775	113	354
K4JKB	"	831,285	825	99	278
N4DW	"	815,654	759	102	304
K2TE	"	754,020	782	85	270
N4PD	"	742,668	699	100	298
K5VIP	"	731,064	749	87	280
WA4JUK	"	690,625	797	85	240
KC4D	"	679,800	787	68	241
K2LS	"	671,445	754	90	257
K4WMS	"	657,600	583	97	314
N3CW	"	621,054	618	95	276
AF4T	"	603,780	645	90	258
AA8R	"	592,126	759	69	229
W4PM	"	573,300	719	66	228
KE4KY	"	570,711	720	77	204
W4CU	"	544,166	596	78	251
AA5JF	"	495,000	499	93	282
N4BP	"	485,109	379	118	359
K1GG	"	458,044	540	78	229
N3MN	"	454,200	549	71	229
W4SSF	"	443,256	587	69	207
K3JWI	"	386,188	536	58	210
N5TOO	"	376,616	547	69	194
N8KR	"	362,204	532	64	190
W3TB	"	360,584	508	78	196
W4NF	"	352,728	600	57	159
AB4SF	"	329,042	477	69	197
N4CF	"	310,845	459	78	187
W4JVN	"	296,070	404	72	206
K2SD	"	277,508	501	61	151
AC4MC	"	277,095	404	75	198
N4RF	"	272,118	470	58	173
W2XYZ	"	242,440	414	53	167
AA4DD	"	232,458	332	73	185
N3KN	"	215,046	351	65	169
AA4WW	"	214,249	348	60	181
W3GQ	"	213,528	310	69	177
K8KI	"	211,876	415	53	143
NZ4N	"	207,640	340	62	170
K3DNE	"	204,540	351	55	155
N2TU	"	196,652	350	56	155
KA8HOK	"	195,582	317	71	151
KG4W	"	193,500	387	34	138
W1BQ	"	185,136	300	67	165
KT4O	"	174,624	303	52	152
N4FX	"	171,776	280	67	189
AA4TI	"	155,800	290	58	147
N4PQX	"	154,780	248	51	167
W1ES	"	143,059	303	51	140
K8YC	"	141,462	205	75	186
KB4MD	"	140,920	238	72	199
NØOJ	"	137,902	278	52	139
N4TL	"	133,588	275	51	131
K8LF	"	130,640	265	55	129
N4FP	"	124,944	307	41	111
W2BJN	"	121,362	254	56	123
W4KLY	"	107,912	245	48	116
W4GHV	"	107,640	246	62	118
W4ATL	"	90,792	237	53	103
K4IDD	"	85,772	198	40	124
W4TG	"	82,008	162	55	146
W3US	"	76,075	164	61	118
WB5NHL	"	74,240	195	42	103
KD4S	"	64,436	148	59	122
N6DW	"	61,502	144	46	115
K4SO	"	54,180	152	31	98
W3OA	"	50,061	147	36	87
W4RQ	"	44,200	126	48	82
W4EAB	"	44,162	131	51	91
N1OKL	"	40,171	127	52	87
KB4FB	"	38,775	112	45	96
K2PS	"	38,720	147	43	78
N1MHV	"	36,869	123	49	112
KS4X	"	32,364	107	37	79
K8AC	"	27,772	103	21	85
NA4J	"	26,400	109	24	64
K4DXV	"	25,740	98	28	71
NN4NT	"	22,632	96	28	64
W4PF	"	22,272	101	30	57
K4NMR	"	20,240	100	22	58
W4WWQ	"	19,296	96	36	60
W4VIC	"	18,711	98	21	56
AJ4A	"	13,206	54	46	47
KG4QIV	"	12,784	81	23	45
K4AFE	"	10,492	70	16	45
K4ZRJ	"	7,620	47	21	39
N4LZ	"	7,526	55	17	36
N4OI	"	4,230	33	20	27
WS6X	*"*	*3,738*	*33*	*17*	*25*
N4DE	"	3,139	36	17	26
N4ES	"	2,394	25	16	22
W4JS	"	2,325	30	9	22
WC4X	"	2,067	22	17	22
N4XYZ	"	1,690	22	12	14
K4FW	"	1,377	17	11	16
WB4EHG	"	400	19	10	10
KR4F	**21A**	**178,068**	**490**	**29**	**103**
NØSMX	"	198	7	4	7
W2UP	**14A**	**298,112**	**769**	**30**	**107**
W4GD	"	17,025	85	21	54
N4JOW	"	2,077	31	8	23
K9OM	**7A**	**386,124**	**1076**	**31**	**107**
W4NZ	"	259,716	697	31	107
N4DU	"	46,137	208	21	70
K3RV	"	45,320	162	25	78
K3WT	"	40,362	164	20	73
W4PK	**3.5A**	**39,655**	**196**	**18**	**59**
K2KW	**1.8A**	**17,608**	**112**	**18**	**53**
WC4H	"	108	11	4	5
***N4XL**	**AA**	**1,449,700**	**1124**	**116**	**359**
*N4AO	"	1,060,800	958	102	314
			(OP: WC4E)		
*N3CKI	"	432,856	640	61	183
*AA4R	"	383,625	512	73	202
*WA4PGM	"	336,087	386	85	236
*N4PSE	"	297,275	394	71	204
*K2MK	"	279,669	487	53	160
*W4EE	"	265,028	423	64	172
*WB4MSG	"	233,258	430	51	172
*AAØO	"	233,000	366	59	174
*W4TM	"	182,286	290	71	176
*K3TW	"	172,416	336	53	139
*KG4IGC	"	171,121	312	62	149
*NG2O	"	167,608	357	38	126
*WN4AFP	"	166,200	339	59	141
*KT3T	"	155,644	277	70	163
*N4EEB	"	137,424	311	50	118
*KK4R	"	135,960	252	67	139
*K4AMQ	"	135,369	302	41	128
*N4WO	"	125,825	290	44	131
*AA9K	"	122,078	268	55	124
*N4NTO	"	116,512	252	48	128
*KC4LZN	"	88,433	200	60	131
*W7IY	"	79,316	195	43	115
*W5VS	"	76,302	180	45	112
*K4GM	"	66,748	167	51	97
*K4MM	"	65,780	186	33	110
*AA4GA	"	63,744	180	34	94
*N2OG	"	56,541	151	46	95
*K3UT	"	54,150	160	48	102
*K4KO	"	49,770	166	38	88
*N1KX	"	38,324	111	47	96
*K4RFK	"	37,375	125	32	83
*NN4RB	"	35,547	110	49	74
*WA4IPU	"	30,720	122	27	69
*KS4S	"	28,600	111	27	77
*WB2ART	"	27,360	106	29	66
*K4MQM	"	27,216	96	32	80
*WU4B	"	26,085	99	41	70
*K4HDW	"	25,452	111	33	68
*N4JRG	"	25,095	101	34	71
*KX4KU	"	24,395	102	43	76
*KO4OL	"	22,896	95	44	64
*W4CMG	"	22,272	103	33	63
*N8IK	"	21,021	115	24	53
*K4RLC	"	19,669	100	23	66
*K3ZGA	"	19,536	109	19	55
*K3TD	"	15,219	73	35	54
*NØYY	"	13,167	65	27	50
*K8SYH	"	12,636	63	29	49
*W4JUU	"	12,456	87	22	50
*K4RAB	"	12,006	69	26	43
*N3GTG	"	11,875	88	34	61
*NG2J	"	11,648	64	19	45
*N4GG	"	11,560	59	36	49
*WD4FMG	"	11,122	55	34	49
*WM4I	"	10,336	61	23	45
*WD4ETU	"	10,266	68	17	41
*KS4L	"	10,011	52	26	45
*K4LW	"	7,614	58	13	34
*KN4ZMA	"	5,700	52	17	33
*WO4X	"	5,488	47	16	33
*N4GL	"	4,746	48	14	28
*K3MZ	"	3,444	30	15	27
*NU4N	"	3,360	35	14	28
*N4SJK	"	2,541	42	11	22
*W2WCM	"	1,575	28	19	26
*KQ3K	"	1,258	29	13	21
*K4VBM	"	1,196	19	11	15
*KE4MKG	"	780	17	14	16
***NJ4Q**	**28A**	**1,612**	**25**	**12**	**14**
***N3UA**	**21A**	**123,318**	**374**	**26**	**91**
*WF7T	"	72,800	265	23	77
*KN8F	"	2,590	32	16	19
***K4FN**	**14A**	**47,544**	**207**	**20**	**64**
*N2QT	"	5,445	55	5	28
***AA4NP**	**7A**	**54,684**	**230**	**21**	**72**
*W4RN	"	48,925	169	23	80
*WA1PMA	"	22,468	112	19	63
***N4IJ**	**3.5A**	**81,782**	**303**	**25**	**78**
*N3HEE	"	14,690	101	16	49
***AA4LR**	**1.8A**	**16**	**2**	**2**	**2**
		District 5			
N2IC	**A**	**5,757,054**	**3999**	**149**	**385**
AD5A	"	2,506,776	2191	129	318
K5WA	"	982,808	1085	98	246
KZ5D	"	982,640	1155	94	261
K5RX	"	945,314	926	110	276
K1JD	"	419,124	527	97	221
KD5J	"	123,376	283	59	117
NE5A	"	120,576	293	45	112
W5KU	"	101,732	324	38	78
K5MV	"	79,442	202	45	112
K5GQ	"	45,260	138	40	84
KD5QHV	"	33,428	141	51	71
WA9JBR	"	32,508	122	32	76
AE5X	"	29,746	100	34	73
WQ5R	"	24,232	98	41	63
K5EMI	"	18,887	141	43	58
AD5CQ	"	5,445	88	26	29
N5EE	"	3,366	41	11	23
N5HZ	*"*	*2,632*	*37*	*18*	*29*
KF5TWJ	"	736	14	10	13
N5AW	**21**	**537,180**	**1385**	**33**	**107**
KZ5J	"	62,006	273	23	63
NN1N	**7**	**572,859**	**1496**	**37**	**110**
N5JJ	"	148,068	529	28	80
W5SJ	"	43,928	270	20	48
K5IB	**3.5**	**16,576**	**113**	**16**	**40**
W5ZN	**1.8**	**33,291**	**246**	**22**	**59**
***WQ5L**	**A**	**704,536**	**783**	**93**	**229**
*K5FUV	"	610,836	717	90	237
*NN5T	"	498,393	618	84	209
*K5XU	"	349,800	469	83	192
*WA5SOG	"	309,309	437	81	192
*AJ4F	"	203,574	362	75	147
*KG5U	"	192,096	353	72	160
*N5XE	"	187,026	327	74	145
*KN5A	"	133,216	299	57	124
*N5KWN	"	103,694	288	41	98
*KC7QY	"	82,362	215	63	96
*K5ME	"	69,464	180	51	101
*N9NM	"	64,116	182	46	91
*WA5LFD	"	62,816	197	52	99
*W5IO	"	34,500	130	28	72
*N9OF	"	30,420	102	42	75
*KC2LM	"	29,606	136	45	68
*K5ICW	"	28,726	131	34	72
*NO5W	"	28,413	134	19	58
*W8OV	"	27,474	111	40	74
*WB5BHS	"	22,230	95	35	60
*NA5YO	"	18,424	87	38	60
*AE5MM	"	6,579	49	16	35
*K7ZYV	"	3,645	35	18	27
*K5GM	"	608	15	9	10
*KG5STP	"	208	10	7	6
***NZ7Q**	**21**	**18,666**	**151**	**18**	**43**
*W5ESE	"	2,112	36	12	20
*K5MBA	"	224	17	7	7
***KD2KW**	**7**	**21,120**	**159**	**16**	**48**
*WA2VYA	"	880	18	7	15
N5RZ	**AA**	**3,651,564**	**2256**	**160**	**449**
KM5G	"	1,325,555	1300	102	283
W5GN	"	1,214,752	1275	93	281
WØVX	"	1,082,432	956	110	306
K5TU	"	849,528	761	113	301
K5NA	"	847,671	563	144	417
K5KLA	"	829,861	724	102	307
N5KD	"	633,750	808	86	239
N5TJ	"	633,747	531	122	331
K5UA	"	584,690	704	77	218
K5UV	"	516,154	667	80	209
K5PS	"	458,832	484	102	261
N5XJ	"	399,025	516	67	208
AC4CA	"	398,250	577	70	180
K5KJ	"	397,015	552	72	199
W5RYA	"	377,844	540	76	200
K5AX	"	361,950	509	83	202
N5WNG	"	338,660	441	84	211
K7IA	"	295,112	377	93	203
K5DU	"	293,280	447	78	182
WBØTEV	"	283,118	290	105	269
N5JB	"	279,552	421	77	179
K5LJ	"	231,770	302	88	213
KT5C	"	230,790	491	69	176
W2GS	"	185,545	337	68	147
W5TM	"	159,817	231	86	203
K5LY	"	151,410	321	74	136
AF5J	"	124,320	237	72	138
K6ZB	"	105,096	230	54	120
KA5M	"	102,336	225	43	121
WØZW	"	96,444	203	74	114
K5TIA	"	73,272	172	59	113
K5CKS	"	67,200	210	32	88
K5BG	"	49,692	151	38	85
N5KAE	"	45,144	128	45	87
K5FNQ	"	38,478	114	44	77
N3BNA	"	38,205	117	45	90
KE5MMT	"	27,398	99	34	69
AA5AU	"	24,462	115	22	59
K5YZW	"	21,165	139	20	65
WA5LHM	"	20,559	161	36	53
AA5AM	"	15,800	81	31	48
WW5W	"	15,390	134	34	61
N5OP	"	13,176	68	25	47
WA5BDU	*"*	*10,187*	*62*	*26*	*35*
K5DHY	"	9,100	60	22	43
WA5LXS	"	8,235	54	26	35
KU5B	**28A**	**12,430**	**133**	**21**	**34**
K5FP	"	6,396	64	14	27
K5VR	"	2,552	42	12	17
K5QR	**21A**	**176,715**	**470**	**30**	**105**
K5RM	"	25,137	141	14	49
N5YT	**14A**	**262,636**	**747**	**29**	**98**
W5ZO	"	178,728	554	33	99
AI5EG	"	870	28	13	17
NI2M	**7A**	**32,235**	**118**	**29**	**76**
K5LG	**3.5A**	**13,680**	**83**	**18**	**54**
W5ON	"	8,008	97	10	34
***W5VQ**	**AA**	**358,794**	**492**	**83**	**196**
*WA8ZBT	"	254,912	434	65	159
*WA5RR	"	104,532	228	59	127
*W5TMT	"	96,660	265	66	113
*N5SJ	"	83,022	264	55	82
*KE5LQ	"	80,676	199	56	106
*W2IY	"	72,535	181	66	97
*WB5N	"	69,715	208	62	129
*AF5CC	"	29,916	111	41	67
*K5AEM	"	22,523	113	37	64
*KØYA	"	21,828	81	43	59
*KC6ZBE	"	17,266	71	36	61
*NQ5M	"	15,288	75	37	47
*W5ZA	"	9,782	57	26	41
*K5YX	"	7,360	57	24	40
*NØVRP	"	2,067	27	17	22
*NS5S	"	1,650	25	13	20
*KF5DDV	"	1,089	27	17	16
***NK5G**	**21A**	**35,342**	**160**	**22**	**60**
		District 6			
K6XX	**A**	**2,950,973**	**2318**	**146**	**321**
K6NA	"	1,870,506	1631	138	285
AJ6V	"	638,960	978	94	151
W4EF	"	437,568	611	93	165
K6AR	"	307,665	514	62	153
W1PR	"	249,948	435	79	133
N6NZ	"	234,522	468	70	132
K6NR	"	233,673	401	77	142
K6YK	"	152,184	298	71	133
K6FA	"	137,223	290	73	120
W6FA	"	121,068	259	62	115
K6RB	"	110,366	300	59	80
WA6URY	"	98,778	237	66	97
N6TQ	"	86,652	190	69	105
N6KN	"	59,740	186	49	67
W6AYC	*"*	*57,780*	*202*	*45*	*63*
NG6X	"	35,595	156	45	68
N6GP	"	33,814	121	46	60
N6VI	"	21,204	109	29	47
N3FAA	"	20,640	99	35	51
K6VVK	"	15,050	102	37	49
KB6CA	"	4,450	55	22	28
K6XC	"	1,633	27	11	12
N6VOH	"	1,295	49	19	18
NA2CC	"	1,272	23	8	16
W6YA	**14**	**389,532**	**1095**	**32**	**100**
KB6A	*7*	*496*	*12*	*7*	*9*
W8KA/6	**1.8**	**8,320**	**197**	**17**	**23**
W6RKC	"	180	9	5	5
***W6ZL**	**A**	**213,353**	**388**	**71**	**132**
*KJ6MBW	"	96,720	234	58	97
*N6YEU	"	91,908	244	47	91
*N7VM	"	68,906	210	53	78
*W7XZ	"	66,548	200	51	76
*N6MU	"	48,516	136	66	90
*W6JK	"	38,184	129	46	65
*N6RVI	"	25,441	104	46	57
*AI6SL	"	25,192	122	40	54
*AC6YY	"	22,680	105	38	52
*W6NKR	"	14,112	85	33	39
*N7DA	"	8,064	66	20	28
*NC6V	"	6,370	77	22	27
*W6JBR	"	5,502	50	21	21
*N6PN	"	5,439	55	18	19
*KC8J	"	3,392	40	16	16
*W6YOY	"	2,988	92	19	17
*K6GTE	"	2,720	28	19	21
*KE6GLA	"	2,516	29	12	22
*K6GPB	"	1,995	24	19	16
*KN6BAZ	"	1,972	52	18	16
*KK6TV	"	1,326	37	14	12
WB6BDD	*"*	*1,276*	*36*	*15*	*14*
*K6JF	"	1,200	49	15	15
N6TTV	*"*	*1,020*	*18*	*15*	*15*
				(OP: N6TVN)	
*WB6AAJ	"	720	41	14	10
*WU6X	"	576	17	4	8
*K6CTW	"	260	7	6	7
*KN6EVH	"	224	10	9	7
*K6TPS	"	72	5	5	4
NF6R	*"*	*16*	*4*	*4*	*4*
***N6RM**	**21**	**13,400**	**103**	**23**	**27**
*N6BHX	"	168	12	5	7
*K6GHA	"	0	1	1	1
***WA7BNM**	**14**	**93,100**	**346**	**25**	**75**
*KW6AA	"	4,033	46	16	21
***KA9A**	**7**	**10,614**	**92**	**22**	**39**
*K6KQV	"	252	11	6	6
W6YX	**AA**	**3,424,446**	**2352**	**147**	**380**
				(OP: N7MH)	
N6RV	"	1,699,880	1445	128	327
N6JV	"	1,019,336	1033	115	261
N6IE	"	944,170	979	118	241
W6TK	"	725,382	832	106	236
K6KM	"	642,112	774	95	221
K6RC	"	631,800	791	96	204
K6OK	"	601,273	690	99	214
N6XI	"	550,179	715	98	189
K9YC	"	531,050	610	106	219
K6RIM	"	514,600	624	94	216
NC6K	"	491,904	714	99	189
N5KO	"	435,918	562	96	195
K6ANP	"	424,830	593	92	197
AD6E	"	419,375	559	85	190
WA6KHK	"	393,680	583	87	179
W6SX	"	360,451	631	83	150
W1SRD	"	348,664	395	108	220
N6US	"	293,280	473	100	160
N6WT	"	266,240	400	84	172
WC6H	"	161,014	296	64	153
N6CW	*"*	*158,112*	*284*	*75*	*141*
KT6LA	"	147,060	323	50	121
NK6A	"	138,061	305	56	107
K5OA	"	137,616	340	70	118
WØYK	"	132,745	286	79	112
WA7G	*"*	*128,340*	*298*	*72*	*114*
NW6P	"	89,872	238	66	98
W6TMD	"	83,721	214	63	114
K6GFJ	"	65,219	189	45	76
WE6Z	"	59,150	181	50	80
W6SC	"	49,220	167	46	61
W6KC	"	45,625	139	43	82
K6NV	"	44,660	158	39	77
W6IA	"	44,576	149	50	62
N6GEO	"	41,769	168	43	48
AF6DR	"	41,382	181	39	60
N6QQ	"	36,630	132	41	69
KG6AO	"	32,079	123	48	63
N6IC	"	26,414	138	34	60
WI6X	"	26,085	110	48	63
W1RH	"	23,594	96	38	56
K6MI	"	20,086	117	43	40
AF6SA	"	20,010	87	25	62
N6PM	"	20,008	95	38	44
KF6I	"	17,520	98	34	46
W6XK	"	16,704	79	34	53
W6TED	"	16,652	80	38	54
W6DMW	"	10,010	75	32	33
K8TR	"	7,800	66	29	46
W6BO	"	3,876	51	11	23
K6ZP	"	1,034	24	8	14
K6CTA	"	273	7	6	7
NT6X	**21A**	**276,768**	**870**	**32**	**92**
AI6Z	"	3,886	46	13	16
K6RO	**14A**	**90,797**	**313**	**28**	**81**
KD6X	"	65,448	244	28	73
K7GK	**7A**	**66,528**	**224**	**27**	**85**
AA6XX	"	37,286	139	29	74
***K6JS**	**AA**	**296,061**	**468**	**86**	**163**
*KA6U	"	118,885	301	30	125
*W8GJK	"	46,866	176	50	57
*NJ6Q	"	19,448	86	47	57
*W6SIY	"	6,300	41	29	31
*KØDTJ	"	4,838	36	27	32
*WF6F	"	4,140	38	19	27
*WQ6X	"	4,059	45	21	20
*W6NX	"	3,950	41	24	26
*AI6DO	"	3,555	34	21	24
*AB6BR	"	2,432	54	16	16
*KN6IPE	"	1,827	44	15	14
*K5CAO	"	1,539	23	9	18
*AG6JA	"	1,025	19	13	12
*N9DK	"	209	9	6	5
***K6ICS**	**28A**	**168**	**15**	**7**	**5**
***WU6P**	**14A**	**6,591**	**69**	**16**	**23**
		District 7			
N9RV	**A**	**4,469,155**	**3402**	**148**	**355**
WJ9B	"	1,761,823	1904	122	231
W7YAQ	"	1,054,620	1004	126	252
NX1P	"	780,096	1098	111	161
KC7V	"	224,100	377	75	150
KD7H	"	214,434	398	71	127
KS7T	"	188,564	397	68	120
N7RK	"	180,032	310	83	149
W7GTF	"	136,800	312	64	107
W7FI	"	130,312	283	63	119
AD7XG	"	76,032	230	53	91
N7RO	"	55,890	199	41	74
W7WR	"	47,994	166	48	66
N3QQ	"	33,966	127	48	63
K5MH	"	27,336

WB6JJJ	"	125,190	254	80	115
W7EE	"	122,830	348	52	90
K7VIT	"	122,772	296	67	89
KE7W	"	97,695	225	72	95
W6KGP	"	93,292	225	57	109
K7EG	"	81,486	200	51	111
W1YY	"	63,772	156	55	94
KI6QDH	"	48,616	157	33	85
K3WYC	"	43,168	116	48	94
WF4U	"	41,712	103	67	91
K9PY	"	39,984	131	59	77
W7PV	"	39,424	133	36	92
NQ7R	"	37,534	146	31	67
KB7HDX	"	36,888	150	40	66
K7HP	"	35,462	135	51	68
K7VM	"	25,300	142	42	68
K7HI	"	19,980	102	45	63
WC7Q	"	19,596	105	27	42
K7EKD	"	14,440	95	36	59
W7BP	*"*	*14,274*	*100*	*32*	*46*
W7VXS	"	6,201	52	24	29
KT7G	"	5,300	68	25	28
W7SLS	"	3,337	35	24	23
W7CO	*"*	*2,100*	*33*	*12*	*13*
KØIP	"	1,519	18	14	17
N6SS	**28A**	**24,217**	**186**	**22**	**39**
N7AT	**21A**	**360,503**	**973**	**35**	**108**
					(OP: K8IA)
N7DD	"	298,928	827	34	102
K7SS	"	174,100	684	31	69
K7AR	**14A**	**190,450**	**533**	**33**	**97**
K7PI	*"*	*72,120*	*238*	*32*	*88*
KA6BIM	"	4,982	37	22	31
K7NJ	**7A**	**395,560**	**928**	**36**	**119**
K7XH	**1.8A**	**2,146**	**50**	**13**	**16**
W6XI	"	2,135	33	15	20
***N7IR**	**AA**	**1,083,501**	**995**	**116**	**277**
*K7TQ	"	517,347	837	82	161
*K6WSC	"	422,115	485	102	219
*W7OM	"	263,438	504	78	139
*WAØWWW	"	228,636	398	80	139
*W7VO	"	115,752	255	70	112
*WN6W	"	90,890	233	63	86
*W7WSV	"	65,952	180	56	88
*AF7NX	"	58,590	175	50	76
*KK7RR	"	58,404	181	47	77
*NN7M	"	43,090	141	61	78
*WA7YAZ	"	28,215	111	41	58
*W7RIP	"	25,200	144	24	51
*NØBK	"	23,478	110	35	56
*N7UJJ	"	22,895	98	36	59
*KK7A	"	18,270	110	29	34
*K7HV	"	16,932	82	36	66
*KI7VEM	"	8,791	93	30	29
*W7VC	"	6,815	57	21	26
*WA7YXY	"	6,669	70	26	31
*AF9W	"	5,040	38	24	32
*AE7U	"	3,936	50	15	17
*N7ID	"	2,142	22	13	21
*NJ7G	"	1,248	24	17	22
*WM5F	"	80	11	8	8
***WZ8T**	**14A**	**26,334**	**142**	**21**	**56**
*WB7QMR	"	2,291	31	12	17
*N7LL	"	187	8	5	6
***KØXP**	**7A**	**54,611**	**234**	**28**	**69**
*WØBF	"	3,762	47	14	19
*KG9Z/7	"	1,200	42	12	13

District 8

NA8V	**A**	**4,179,945**	**2866**	**135**	**404**
K8GL	"	2,283,762	1840	111	326
K8PK	"	1,026,165	1166	89	248
N8AA	"	907,956	880	99	279
K8MP	"	903,474	962	91	247
K8NVR	"	433,948	506	89	225
NF8R	"	367,740	558	48	179
W8MET	"	277,775	421	77	194
N8KQ	"	210,320	394	70	150
KB8NNU	"	166,920	315	60	154
K8BB	"	166,104	293	60	156
WA8RCN	"	88,480	258	44	114
N8IW	"	81,104	200	41	107
N8LJ	"	62,248	184	38	86
K3XO	"	55,424	178	36	92
W8YV	"	46,116	139	39	87
N8HHG	"	46,018	159	40	93
AA8KY	"	9,048	62	18	40
KD8TNF	"	8,584	53	29	45
NS8O	"	6,006	49	28	38
KE8E	"	5,247	50	20	33
KD8EDC	"	4,644	74	16	27
N9CX	"	460	11	10	10
K8BKM	**21**	**151,250**	**482**	**25**	**85**
K8AJS	**14**	**238,914**	**755**	**27**	**90**
W8WA	"	167,940	463	35	100
N8DE	"	97,409	274	28	99
K8DO	**7**	**416**	**22**	**10**	**16**
***N8II**	**A**	**1,342,920**	**1271**	**100**	**280**
*WB8JUI	"	507,863	598	83	228
*N8VW	"	346,005	451	81	216
*N8CWU	"	312,040	441	79	190
*N8ET	"	283,696	456	72	166
*W8TWA	"	178,649	294	71	156
*KV8Q	"	176,860	372	49	136
*KT8Y	"	108,750	240	50	124
*W8RTJ	"	100,303	294	50	111
*WB8JAY	"	64,416	180	37	95
W9RNK	*"*	*64,125*	*200*	*41*	*84*
*KB8TL	"	55,118	165	41	86
*N6JRL	"	40,326	192	45	98
*W8ASA	"	34,282	109	38	84
*N8GZ	"	27,720	110	31	74
*AF8A	"	22,610	108	28	57
*KF8O	"	22,274	123	31	55
*AD8B	"	19,667	108	18	53
*NF8M	"	16,050	76	23	52
*WA8UMT	"	15,732	64	31	61
*KD8W	"	13,689	104	29	52
*W8NNC	"	12,426	81	15	42
*N8VWY	"	11,454	70	24	45
KB8QAP	*"*	*5,100*	*51*	*19*	*31*
*W8RU	"	4,851	36	17	32
*W8DN	"	2,800	28	13	22
*AA8CL	"	1,862	48	21	28
*N4HAI	"	1,820	29	16	19
*K8RGI	"	1,458	22	9	18
*K8AKC	"	1,200	44	15	15
*AD8EV	"	456	22	13	11
KE8GC	*"*	*16*	*12*	*4*	*4*
***K8FF**	**28**	**9,108**	**75**	**18**	**28**
***W8JGU**	**21**	**70,914**	**241**	**24**	**82**
*K7DR	"	8,592	68	14	34
***NU8A**	**14**	**29,575**	**164**	**16**	**49**
*W8GOC	"	28,259	138	23	54
*K8VT	"	6,072	63	13	31
***W1NN**	**7**	**102,960**	**358**	**26**	**84**
*W8FWY	"	54	32	3	3
*N8TCP	"	8	2	2	2
*KF8MZ	"	4	1	1	1
***W8XY**	**1.8**	**20**	**6**	**3**	**2**
K8CX	**AA**	**3,280,920**	**2060**	**143**	**427**
N4RA	"	1,667,584	1200	124	388
WA8Y	"	1,141,932	1034	98	324
N8TR	"	1,023,722	647	142	439
NW8U	*"*	*1,021,410*	*912*	*106*	*299*
N8BJQ	"	772,337	817	89	260
KE8M	"	496,252	444	92	296
W3HKK	"	365,190	527	76	206
NO8C	"	325,619	487	71	186
KB8KMH	"	245,514	364	72	177
KA8G	"	232,386	364	57	174
N4EL	"	179,130	308	50	160
W9VNE	"	125,668	254	51	127
N9RC	"	103,037	182	65	144
AB8M	"	99,680	234	44	116
W8EH	"	94,720	238	45	103
WB8AKW	"	86,172	193	58	114
W8JWN	"	72,400	153	52	129
KV8O	"	57,392	172	43	93
					(OP: K8PGJ)
K8YE	"	48,300	123	54	107
W8PI	"	40,565	114	39	94
WA8LRW	"	38,640	142	31	74
NR8Z	"	36,322	109	38	89
WA8KAN	"	31,212	125	32	70
N8GAS	"	29,970	114	50	61
KD8JDC	"	29,041	100	34	79
NR5N	"	28,441	99	42	77
WR4T	"	15,050	71	31	55
N8FTB	"	14,586	65	29	49
W8AJS	"	10,120	66	18	37
K8ESQ	"	9,504	51	21	45
KD8FS	"	7,849	62	19	28
WB8ASI	"	6,102	41	18	36
KG8CW	"	4,940	36	18	34
KD8VMM	"	3,520	31	13	27
WB8III	"	1,170	17	13	17
K8ALM	"	722	16	5	14
KO8Z	**21A**	**37,228**	**173**	**21**	**61**
W8AV	**14A**	**445,704**	**1131**	**34**	**113**
WA3C	**7A**	**429,918**	**1031**	**37**	**121**
W8CZN	**3.5A**	**34,489**	**156**	**19**	**72**
W8UVZ	**1.8A**	**15,870**	**118**	**15**	**54**
W8WTS	"	1,596	23	10	18
***KE3K**	**AA**	**265,584**	**398**	**80**	**184**
*K3DMG	"	262,000	386	60	190
*K8LY	"	207,603	350	69	164
K8LN	*"*	*183,040*	*341*	*56*	*152*
*KE8PX	"	145,992	242	70	167
*W8AN	"	123,318	249	51	135
*KE8G	"	116,176	388	18	88
*N8LR	"	102,856	216	49	123
*N8VV	"	57,084	154	42	92
*AB8OU	"	48,006	156	39	88
*K8MU	"	41,446	147	31	75
*K8WWS	"	31,262	125	28	70
*K8GT	"	19,691	84	40	57
*N8FYL	"	18,688	102	24	49
*W8EWH	"	16,530	70	34	61
*AK2U	"	16,400	81	27	55
*AA8P	"	10,148	69	17	42
*KC8ZKI	"	3,634	60	31	48
N8OH	*"*	*1,144*	*19*	*7*	*15*
***K4YJ**	**1.8A**	**2,790**	**54**	**11**	**20**

District 9

W9RE	**A**	**5,233,512**	**3488**	**139**	**413**
K9BGL	"	2,225,760	1660	127	353
K9MA	"	1,569,006	1392	113	289
W9OP	"	696,654	789	90	252
W9GT	"	623,076	887	72	202
KD9MS	"	617,700	664	102	253
KG9N	"	549,240	869	58	172
KY9KYO	"	294,096	442	83	181
KW9R	"	96,048	245	42	102
W9VA	"	62,335	179	44	93
KØVW	"	50,028	169	47	85
KZ9DX	"	49,816	205	35	69
N9EP	"	23,016	100	29	55
W9DZ	"	21,175	100	26	51
W9DGI	"	4,800	47	18	30
KJ9C	**28**	**13,965**	**111**	**19**	**30**
K9ZO	**3.5**	**161,200**	**627**	**24**	**80**
KØPJ	"	7,310	81	11	32
***N4TZ**	**A**	**1,897,198**	**1374**	**124**	**375**
*WD9CIR	"	170,060	304	66	154
*W8LVN	"	95,445	225	65	124
*KD9CLH	"	79,124	231	44	87
*WU9D	"	50,901	162	53	88
*K9PMV	"	37,407	124	38	73
*KZ9V	"	37,004	152	45	71
*K9QC	"	31,122	115	42	75
*K9KJ	"	27,604	108	39	64
*WA9LKF	"	21,583	156	38	75
*K9XR	"	20,178	152	42	76
*N9LYE	"	18,957	85	37	52
*WB9UGX	"	18,090	111	37	53
*K9WD	"	17,446	131	51	71
*W9FY	"	16,920	200	40	54
*WA9FZB	"	13,746	86	26	53
*AC9VC	"	11,613	74	32	47
*K7CS	"	10,048	60	20	44
*AB9CD	"	6,413	48	17	36
*N9BT	"	4,606	42	21	28
*W9WE	"	3,795	59	25	30
N9WVM	*"*	*2,432*	*42*	*18*	*20*
*KE9UA	"	1,632	35	12	22
*KD9EBS	"	870	17	16	13
*N9AEP	"	816	28	11	13
*KC9WOM	"	361	12	8	11
*NR9H	"	180	11	9	9
*KD9KHA	"	99	9	6	5
*K9WPV	"	16	5	2	2
***WB9HFK**	**21**	**31,682**	**156**	**18**	**55**
*W9QL	"	15,834	107	16	42
*N9XX	"	3,360	38	12	23
*WØXXX	"	2,009	34	14	27
*W9KHH	"	42	3	3	3
***N9SE**	**14**	**23,835**	**87**	**26**	**79**
*AC9PG	"	4,403	42	11	26
***K9UIY**	**7**	**39,512**	**206**	**21**	**67**
*WB9FMC	"	30	9	2	3
***WD8DSB**	**1.8**	**1,656**	**34**	**10**	**13**
K9NW	**AA**	**3,925,589**	**2229**	**152**	**477**
K9IMM	"	3,007,214	1956	136	417
WE9V	"	1,730,079	1277	115	362
N4BAA	"	1,591,019	1043	149	444
NF9V	"	1,551,580	1251	116	344
WT9U	"	1,002,240	867	108	324
N9CO	"	954,108	1102	75	231
KA9FOX	"	940,338	799	126	313
ND9G	"	783,285	712	98	297
K9YY	"	715,931	691	100	279
KT9L	"	609,528	495	120	346
WN9O	*"*	*605,304*	*447*	*124*	*380*
N2BJ	"	554,778	630	89	244
K9MMS	"	536,599	600	95	234
K9WO	"	535,428	611	85	236
N9OK	"	504,203	594	92	231
NS9I	"	373,449	498	85	196
KD9PLD	"	364,180	474	79	199
AI9T	"	338,688	393	96	240
KI9A	"	286,533	407	79	200
KK9N	"	277,836	404	84	190
AC9S	"	243,828	377	73	161
N5EP	"	220,472	390	54	163
AJ9C	"	219,024	375	56	160
W9KXQ	"	198,476	381	72	164
W3HDH	"	181,200	338	58	142
KC9K	"	178,435	248	85	196
N9GUN	"	170,820	341	48	132
N7US	"	146,487	222	76	177
WB8BZK	"	144,324	272	68	143
KØTQ	"	114,460	242	56	138
W9FFA	"	105,876	247	63	141
K9NO	"	104,104	233	48	121
KB9S	"	91,606	215	47	116
N9DR	"	78,050	203	63	112
K9DUR	"	66,015	194	42	93
AA9JS	"	64,617	203	57	124
WB9VGO	"	50,000	157	42	83
KC9EE	"	49,005	146	39	96
KR9U	"	47,481	140	41	106
KK9I	"	45,144	144	43	89
KB8RY	"	39,697	132	34	73
N9LQ	"	36,408	126	40	71
W9MS	"	29,072	121	25	67
WG9L	"	22,098	99	30	57
W9HT	"	19,872	93	36	56
N9TR	"	14,378	82	28	51
KØPG	"	9,492	61	33	51
KC9EOQ	"	144	16	8	8
WB9Z	**21A**	**438,087**	**1146**	**32**	**109**
W9PA	"	270,544	664	32	116
W9ILY	"	162,096	439	29	103
WA9AQN	"	72,924	257	25	78
N9AU	**7A**	**112,518**	**350**	**29**	**97**
W9RN	"	86,314	311	23	80
N9LR	"	39,060	180	21	72
K9GS	**3.5A**	**293,733**	**842**	**30**	**99**
K9LA	"	11,077	79	15	38
W9EWZ	**1.8A**	**4,488**	**45**	**17**	**34**
K9EL	"	2,356	37	12	19
***WE9R**	**AA**	**1,450,540**	**1158**	**111**	**344**
*WT9Q	"	637,468	712	91	247
*N9UA	"	617,118	691	81	245
*AB9YC	"	413,545	455	95	270
*K9PW	"	216,188	412	52	144
*KYØQ	"	170,800	311	57	143
*WA9LEY	"	120,315	248	62	133
*W9VQ	"	87,694	198	42	121
*N9SB	"	74,896	214	31	93
*KB9RPG	"	55,545	157	54	107
*K9PG	"	50,375	121	52	103
*NM9P	"	50,055	153	47	94
*KB9ML	"	48,069	185	42	67
*AA9L	"	43,036	186	36	80
*AC9BJ	"	38,318	138	41	78
*K9CW	"	37,800	138	39	66
*KD9LTN	"	13,986	170	23	40
*KD9OIN	"	11,520	78	25	47
*KC9YL	"	11,050	106	25	40
*W9NXM	"	9,585	72	30	41
*KE9SA	"	8,040	59	30	37
*AE9LL	"	5,390	43	21	34
*W9NZ	"	5,247	39	20	33
*N9VPV	"	3,870	32	20	25
*KF9VV	"	2,210	26	12	22
*K9AWM	"	1,161	30	13	14
*AA9RK	"	551	15	9	10
*K9MCK	*28A*	*20*	*2*	*2*	*2*
***W9XT**	**21A**	**231,012**	**582**	**31**	**107**
***KM9M**	**7A**	**266**	**8**	**6**	**8**

District Ø

NEØU	**A**	**733,436**	**939**	**88**	**228**
KØFX	"	501,193	748	89	194
WØETT	"	456,762	629	98	185
N7WY	"	364,392	546	68	173
KNØV	"	319,634	512	70	168
KØJJR	"	274,647	438	77	172
K9DU	"	248,008	397	70	162
NØOK	"	206,568	345	70	158
NGØT	"	159,430	280	70	144
NIØC	"	128,924	253	60	133
KJØI	"	113,726	212	67	135
NØUY	"	99,440	242	68	108
ADØH	"	70,992	194	53	100
KØUE	"	70,310	227	58	100
KØTC	"	60,210	188	47	88
KCØV	"	54,378	186	39	67
WKØP	"	26,520	113	45	59
WBØWIV	"	9,798	78	13	33
N6RSH	"	8,190	60	21	42
KØBJ	"	7,650	56	24	26
NØGN	"	5,130	42	27	30
KØSRL	"	4,300	63	20	23
KBØLF	"	4,002	43	27	31
KØKPH	"	2,100	53	22	28
KØDEQ	**21**	**94,251**	**392**	**21**	**68**
KØAV	**7**	**406,620**	**1156**	**31**	**104**
KØPK	"	44,010	179	25	65
KØIDX	**1.8**	**12,980**	**131**	**17**	**42**
NØTT	"	12,376	110	15	41
***NAØN**	**A**	**1,055,230**	**1068**	**98**	**264**
					(OP: @WØZT)
*WØPI	"	241,704	420	70	146
*ACØW	"	233,523	409	74	169
*KAØPQW	"	160,506	311	72	150
*NN7A	"	156,716	311	68	135
*WZØW	"	151,798	427	42	100
*AI6O	"	131,175	369	52	113
*KØXF	"	106,738	256	54	112
*NEØDA	"	73,566	210	45	89
*WØMB	"	71,309	173	58	109
*AEØEE	"	70,050	182	53	97
*WØPF	"	63,140	186	47	107
*WØYJT	"	52,682	173	49	93
*K5ZE	"	52,122	167	37	82
*KØJP	"	49,320	161	44	76
*KØKP	"	44,069	170	46	81
*WAØLIF	"	39,852	163	38	70
*KBØNES	"	28,254	118	43	59
*KØALT	"	26,643	123	29	54
*NØDL	"	25,186	184	42	56
*AEØIB	"	21,675	98	28	57
*WØZF	"	8,875	50	32	39
*NØAC	"	8,384	72	25	39
*KØWRY	"	8,060	50	23	39
*KYØO	"	6,840	80	20	37
*NN5SD	"	5,445	46	26	29
					(OP: KØJV)
*N7SE	"	3,458	101	18	20
*NO2D	"	3,403	34	19	22
*AFØE	"	3,010	32	17	26
*KSØM	"	2,256	47	22	26
*NØTXW	"	2,050	54	20	21
*WØSHL	"	1,650	34	15	18
*KKØSD	"	918	17	13	14
*WIØWA	"	507	28	7	6
					(OP: NØAC)
*ABØCD	"	336	14	12	9
*KGØTW	"	297	50	16	17
*KEØMCM	"	280	26	11	9
***W7UT**	**21**	**39,886**	**189**	**21**	**56**
*WUØA	"	4,440	41	15	25
*K7BG	"	1,260	31	8	7
*KØUU	"	1,224	21	9	15
*N9HDE	"	12	2	2	2
***WNØL**	**14**	**13,824**	**110**	**20**	**52**
*KØSV	"	1,219	25	11	12
***KCØQWE**	**7**	**0**	**2**	**2**	**1**
***NGØC**	**3.5**	**10,620**	**86**	**18**	**41**
***KØPHP**	**1.8**	**36**	**6**	**3**	**3**
NØAV	**AA**	**2,258,770**	**1507**	**137**	**398**
KØMD	"	2,097,630	1766	114	343
NØAT	"	1,474,319	1172	123	344
K7SCX	"	1,030,226	1015	106	267
WØBV	"	1,005,700	797	127	325
KØAD	"	996,252	1046	100	266
KØIR	"	939,546	934	102	279
WAØMHJ	"	834,000	745	117	300
KØYR	"	716,040	809	91	249
WØGJ	"	687,600	727	111	289
NG7A	"	655,626	772	93	246
KMØO	"	629,675	833	74	209
WØPR	"	626,314	721	97	241
NSØR	"	555,662	812	74	203
KEØUI	"	529,480	699	92	218
KTØA	"	527,352	650	86	215
KØTRL	"	424,536	636	66	200
NØBUI	"	401,128	571	73	193
AC5K	"	370,944	503	87	189
N9GB	"	347,424	498	90	239
W9MAF	"	316,294	458	65	177
NØTA	"	293,425	444	85	190
KBØEO	"	286,977	348	111	220
WØBM	"	271,173	393	75	184
W7II	"	270,646	398	79	183
N5TU	"	258,054	399	72	174
KØPC	"	237,336	374	77	155
WØPSY	"	200,661	363	74	137
NIØK	"	188,078	387	71	135
NWØM	"	172,688	350	49	123
KØHB	"	172,530	282	79	164
KEØA	"	167,728	344	60	116
NRØP	"	106,722	213	70	128
KØOB	"	91,640	219	54	104
NØZIB	"	75,026	217	45	116
NØKQ	"	68,182	187	54	92
WAØJZK	"	68,096	176	48	104
NØEG	"	63,848	143	60	124
WØGXA	"	61,716	171	51	88
WØGAS	"	53,865	125	64	107
NRØT	"	38,186	119	38	84
ADØAB	"	32,946	136	41	73
NFØN	"	28,449	103	43	66
WØLM	"	28,141	101	41	66
AKØBC	"	27,048	93	49	89
K5ZG	"	15,525	96	23	46
NØKK	"	15,288	78	31	53
KØZX	"	2,275	32	16	19
KØTLG	"	1,792	25	14	18
ADØRW	"	1,224	20	11	13
WØDET	"	50	6	4	6
K7TD	**21A**	**96,720**	**308**	**30**	**90**
NØRN	"	21,420	123	25	43
KFØIQ	"	8,370	49	20	42
KØWA	**14A**	**2,528**	**31**	**9**	**23**
WØMN	"	2,464	44	12	20
WØERP	**7A**	**2,204**	**31**	**10**	**19**
WD5ACR	"	280	8	7	7
K3PA	**3.5A**	**115,752**	**443**	**24**	**80**
NIØG	**1.8A**	**6,912**	**77**	**12**	**36**
KØXM	"	4,746	94	15	27
KØKT	"	888	20	10	14
***NØUR**	**AA**	**682,440**	**792**	**94**	**236**
*AD1C	"	539,600	702	79	205
*NØHJZ	"	523,800	562	95	265
*KØEA	"	497,457	674	87	192
*KØKX	"	383,364	533	81	195
*KØRC	"	345,475	407	99	226
*AAØAW	"	269,618	471	70	156
*K4IU	"	258,456	417	75	167
*AAØAI	"	206,916	312	71	187
*WBØN	"	194,110	321	76	159
*KIØJ	"	119,016	262	62	112
*KØMPH	"	98,098	253	45	109
*NØAX	"	94,656	199	68	136
*K4EQ	"	79,390	196	62	108
*K9OR	"	58,653	122	57	114
*KØIL	"	58,644	159	63	99
*KØUK	"	56,000	164	59	81
*KEØH	"	48,985	233	35	66
*AKØM	"	43,884	125	49	89
*KØVBU	"	35,346	112	53	84
*KKØU	"	22,878	92	29	64
*KO9V	"	19,671	95	35	48
*N5KB	"	17,458	94	32	54
*WO7U	"	16,640	84	24	56
*KØTG	"	15,405	75	29	50
*W6GMT	"	10,664	68	21	41
*W7RY	"	6,720	43	29	41
*AEØDX	"	5,976	116	32	51
*KEØQKF	"	3,240	30	13	27
*KØWOI	"	2,730	32	22	20
*KJØP	"	1,760	20	15	17
*KØGUZ	"	1,426	23	14	17
*W8XAL	"	1,144	21	12	14
*ADØYM	"	408	10	7	10
*KEØIAT	"	183	40	29	32
*KF6YU	"	54	20	14	13
***NØHOV**	**14A**	**3,720**	**57**	**15**	**25**

Alaska

AL7LO	**A**	**389,529**	**884**	**71**	**118**
AL1G	"	146,808	966	33	39
NL8F	**3.5**	**952**	**46**	**8**	**6**
AL2F	**AA**	**64,575**	**221**	**56**	**67**
NL7S	"	7,644	69	20	29
KL7KY	**1.8A**	**12,642**	**145**	**17**	**25**
KL2R	"	1,218	30	10	11
					(OP: N1TX)
***KL1JP**	**28A**	**80**	**4**	**4**	**4**

Antigua & Barbuda

***V26K**	**A**	**11,459,091**	**8125**	**130**	**439**
					(OP: AA3B)

Bahamas

***C6AQQ**	**A**	**655,434**	**1172**	**54**	**180**
					(OP: ND3F)

Barbados

***8P1W**	**A**	**2,116**	**43**	**13**	**10**

Belize

V3X	**7A**	**1,253,440**	**3112**	**38**	**122**
					(OP: K4XS)

Bermuda

***VP9I**	**A**	**5,040,460**	**4972**	**100**	**330**
					(OP: N6GQ)

Canada

District 1

VY2TT	**A**	**8,035,280**	**6283**	**111**	**395**
					(OP: K6LA)
VY2ZM	"	7,865,424	5304	136	431

VE3NNT	**AA**	**4,385,925**	**3333**	**122**	**383**
VA3DF	"	2,973,900	1945	135	440
VE3RZ	"	2,935,740	2068	132	433
VA3WB	"	991,935	1321	84	251
VE3NE	"	662,099	974	72	217
VE3TW	"	433,324	671	66	188
VA3TNM	"	260,150	377	82	193
VE3DZP	"	135,274	228	57	182
VE3ZZ	"	100,320	210	63	127
VE3YT	"	85,020	212	44	112
VE3EY	"	42,319	162	31	70
VE3RIA	"	28,815	161	27	58
VE3CX	**7A**	**264,143**	**988**	**29**	**92**
VE3NRT	"	3,120	29	12	27
***VE3KI**	**AA**	**1,822,668**	**1787**	**97**	**305**
*VE3MGY	"	1,375,216	1811	93	275
*VE3TM	"	707,175	889	83	232
*VE3GFN	"	507,528	822	61	191
*VE3PJ	"	476,771	611	81	226
*VE3MV	"	430,497	610	66	213
*VE3LC	"	174,356	387	52	130
*VA3AMX	"	154,008	346	52	132
*VE3KTB	"	126,453	270	52	131
*VE3NFN	"	94,466	293	34	115
*VE3XD	"	76,508	267	38	86
*VE3HG	"	64,887	176	31	98
*VE3FZ	"	61,787	192	43	94
*VE3CWU	"	33,384	124	38	69
*VA3ROC	"	28,392	155	33	58
*VA3PAF	"	22,707	143	30	57
*VE3XAT	"	19,107	78	26	73
*VE3QN	"	18,612	83	30	69
*VA3NGE	"	9,086	84	28	31
*VE3HLS	"	8,379	51	17	46
*VE3EP	"	6,372	54	20	39
*VE3OU	"	2,829	29	16	25
*VE3JSQ	"	2,765	40	9	26
*VE3JZT	"	2,322	38	22	32
*VA3JHQ	"	1,012	21	12	11
***VE3HEU**	**7A**	**19,662**	**183**	**17**	**41**
***VE3NZ**	**3.5A**	**77,155**	**558**	**13**	**52**

District 4

***VE4DL**	**A**	**26,500**	**306**	**28**	**25**
*VE4AKF	"	11,960	120	25	27
VE4VT	**AA**	**694,980**	**697**	**108**	**288**

District 5

VE5CPU	**A**	**46,256**	**201**	**47**	**65**
VE5WI	"	5,920	103	23	17
***VE5SF**	**A**	**543,712**	**1170**	**69**	**139**
*VE5GC	"	178,600	971	38	56
***VE5KS**	**28**	**3,304**	**43**	**11**	**17**
***VE5VA**	**14**	**7,614**	**60**	**14**	**33**

District 6

VE6BBP	**A**	**1,180,416**	**2095**	**90**	**166**
VE6UM	**21**	**105,536**	**790**	**23**	**41**
***VE6TN**	**A**	**440,818**	**695**	**84**	**175**
*VA6WWW	"	68,019	228	52	71
*VE6WR	"	43,680	256	36	44
*VA6RCN	"	21,450	135	36	39
					(OP: VE3RCN)
*VE6SK	"	555	20	9	6
VE6KC	**AA**	**343,068**	**611**	**75**	**151**
VA6BGE	"	13,392	117	30	24
VE6WQ	**14A**	**387,629**	**1322**	**31**	**100**
***VE6AX**	**AA**	**28,490**	**151**	**31**	**43**

District 7

VA7ST	**A**	**1,110,417**	**2018**	**87**	**166**
VE7VR	"	428,340	822	89	131
VA7MM	"	311,193	682	84	129
VE7JKZ	"	155,477	397	68	99
VA7RN	"	72,352	440	37	39
VA7XU	"	54,536	392	30	38
VA7GI	"	47,724	211	60	63
VE7JH	**14**	**599,508**	**2136**	**34**	**88**
***VA7MG**	**A**	**97,888**	**314**	**55**	**78**
*VA7EU	"	22,104	155	36	36
*VE7BGP	"	7,852	68	25	27
*VE7BLW	"	1,428	29	11	10
*VA7QCE	"	560	15	8	8
*VA7AON	"	112	16	9	7
***VE7MR**	**7**	**14,040**	**94**	**22**	**38**
VA7KO	**AA**	**763,587**	**1108**	**98**	**199**
VE7XF	"	208,520	306	97	163
VE7FO	*"*	*110,971*	*260*	*66*	*125*
VA7VK	"	74,424	396	39	45
VE7CV	"	69,496	205	55	81
VE7IO	"	30,780	195	31	45
VA7DZ	"	24,840	152	28	44
VA7UI	"	16,800	107	32	38
VA7JC	"	10,388	93	27	26
VE7CA	"	2,856	32	18	24
VA7OM	**14A**	**439,932**	**1565**	**34**	**88**
***VA7CRZ**	**AA**	**151,272**	**310**	**80**	**118**
*VE7AX	"	117,900	326	60	90
*VA7KH	"	75,130	299	42	68
*VE7ZX	"	59,424	272	47	49
***VE7UF**	**1.8A**	**4,140**	**138**	**8**	**10**

District 8

*VY1CO	*A*	*6,422*	*92*	*20*	*18*
***VY1KX**	**A**	**28,248**	**126**	**40**	**48**

Cayman Islands

ZF5T	**AA**	**9,024,639**	**5960**	**157**	**484**
					(OP: ZF9CW)

Costa Rica

TI7W	**A**	**16,102,800**	**11300**	**152**	**448**
					(OP: N6MJ)
***TI2OY**	**A**	**562,174**	**1287**	**63**	**143**
*TI5JON	"	25,992	154	27	49

Cuba

***CO8NMN**	**A**	**939,674**	**2067**	**56**	**158**
*CO8WN	"	397,383	1306	42	107
*CO2RQ	"	342,210	1038	51	114
*CO6WD	"	199,227	562	50	109
***CO8RH**	**21**	**105,375**	**633**	**19**	**56**
***T42K**	**14**	**146,412**	**931**	**20**	**63**
					(OP: CO2AME)
***CM8CF**	**7**	**39,150**	**309**	**13**	**45**
*CL2JR	"	7,568	101	13	30
*CL3OR	"	5,115	204	10	23
*CO2VDD	"	900	25	6	14
***CO2JD**	**3.5**	**112,608**	**747**	**15**	**57**
***CO8LY**	**21A**	**435,996**	**1698**	**24**	**84**

Dominican Republic

***HI8A**	**A**	**160,395**	**337**	**50**	**135**
***HI3Y**	**21**	**204,077**	**1066**	**23**	**66**
***HI3AA**	**1.8**	**36,960**	**327**	**12**	**43**
***HI8K**	**AA**	**1,023,309**	**1746**	**63**	**196**
*HI3K	"	263,700	375	82	218
*HI3MM	"	99,207	324	47	104

El Salvador

***YS1MS**	**A**	**61,050**	**230**	**35**	**76**

Grenada

***J35X**	**28**	**14,700**	**246**	**12**	**16**

Guatemala

***TG9AOR**	**AA**	**215,072**	**717**	**47**	**96**
*TG2ØØI	"	39,476	270	24	47
			(OP: TG9AFX)		
*TG9BBV	"	6,650	65	20	30
			(OP: VE7BV)		

Haiti

***HH2JA**	**21**	**198,800**	**1315**	**17**	**54**
			(OP: JK1UWY)		

Martinique

FM5FJ	**7**	**206,488**	**936**	**26**	**80**
***FM4SA**	**14**	**3,000**	**51**	**13**	**27**
TO7A	**AA**	**8,616,426**	**6673**	**140**	**419**
			(OP: UT5UGR)		

Mexico

XE2W	**A**	**27,280**	**210**	**27**	**53**
***XE1AY**	**A**	**72,215**	**343**	**38**	**63**
*XE1RE	"	27,777	324	22	25
*XE2AU	"	20,740	154	30	38
*XE3N	"	12,628	63	29	48
***XE1CT**	**14**	**304,370**	**1292**	**28**	**82**
XE2X	**AA**	**4,182,255**	**3720**	**134**	**363**
XE2S	**7A**	**103,761**	**589**	**26**	**55**
***XE2B**	**AA**	**1,137,576**	**1527**	**98**	**243**
*XE1HG	"	47,187	139	52	95
*XE2T	"	13,720	198	19	16

Panama

HP3SS	**A**	**652,595**	**1281**	**60**	**175**
***HP1RIS**	**28**	**949**	**27**	**6**	**7**
HO2T	**21A**	**222,768**	**875**	**27**	**85**
			(OP: K2GO)		

Puerto Rico

WP4WW	**21**	**529,008**	**2053**	**26**	**81**
			(OP: KP4JRS)		
***KP4JFR**	**A**	**79,200**	**258**	**45**	**87**
***NP3YL**	**7**	**17,520**	**176**	**9**	**31**
KP4/KA1R	**AA**	**2,749,500**	**2506**	**117**	**353**
KP3W	"	44,166	179	36	66

Sint Maarten

***PJ7/G4JEC**	**A**	**339,598**	**737**	**53**	**138**
			(OP: NØUK)		

St. Kitts & Nevis

V48A	**A**	**2,829,420**	**2948**	**85**	**311**
			(OP: WX4G)		

St. Martin

FS4WBS	*AA*	*40*	*3*	*2*	*3*

U.S. Virgin Islands

KP2B	**28**	**147,168**	**764**	**22**	**62**
KP2M	**7**	**1,392,000**	**3844**	**35**	**110**
			(OP: KT3Y)		
NP2J	**1.8**	**190,848**	**1028**	**19**	**65**
			(OP: K8RF)		
***KJØD/KP2**	**A**	**25,143**	**222**	**14**	**37**
NP2X	**1.8A**	**98,175**	**512**	**20**	**65**
			(OP: K9VV)		
***NP2KW**	**AA**	**187,775**	**387**	**55**	**148**
***KP2DX**	**1.8A**	**1,900**	**40**	**10**	**15**
			(OP: KP2BH)		

AFRICA

African Italy

***IH9YMC**	**1.8**	**3,510**	**69**	**4**	**22**

Canary Islands

EA8URL	**A**	**1,537,704**	**2213**	**66**	**177**
			(OP: EA4BQ/OHØXX)		
EA8ZS	"	113,665	362	51	76
EA8TZ	**21**	**13,960**	**124**	**13**	**27**
EA8DHV	**14**	**331,452**	**1300**	**28**	**80**
***EA8RM**	**A**	**10,918,560**	**7557**	**122**	**394**
*EA8CN	"	1,281,658	1504	72	229
*EA8BQM	"	684,252	1062	63	166
*EA8AQV	"	77,928	207	43	93
*EA8AUW	"	70,400	201	32	96
*EA8DHH	"	35,160	114	40	80
***EA8CYU**	**7**	**34,907**	**192**	**14**	**53**
ED8W	**14A**	**1,154,264**	**2565**	**37**	**120**
			(OP: EA1DAV)		
***EA8OM**	**AA**	**992,784**	**1095**	**73**	**239**
			(OP: DJ1OJ)		
*EA8CQW	"	25,839	103	26	61
***EA8/ LY9A**	**21A**	**32,700**	**184**	**17**	**43**
***EA8/ DL2DXA**	**14A**	**52,640**	**261**	**14**	**56**

Ceuta & Melilla

***EA9ACE**	**21**	**476,182**	**1467**	**27**	**86**
***EA9AZ**	**AA**	**428,720**	**760**	**51**	**182**

Kenya

5Z4VJ	**21**	**1,074,502**	**2542**	**34**	**109**
			(OP: G3AB)		

Liberia

***EL2DT**	**A**	**908,280**	**1533**	**57**	**159**

Madeira Islands

CT3KN	**A**	**6,312,271**	**4585**	**112**	**357**
CQ3J	**7**	**112,259**	**556**	**16**	**63**
			(OP: CT3MD)		
***CT3KU**	**7A**	**10,481**	**98**	**8**	**39**

Mauritania

***3B8BAP**	**A**	**765**	**16**	**8**	**9**

Morocco

***CN8WW**	**AA**	**155,520**	**432**	**42**	**102**

Mozambique

***C92R**	**21A**	**46,150**	**256**	**18**	**47**
			(OP: YT7AW)		

Reunion Island

***FR4KR**	**21**	**509,232**	**1742**	**25**	**78**
			(OP: FR8UA)		
FR8TZ	**14A**	**71,832**	**360**	**24**	**58**

South Africa

ZS1A	**A**	**1,248**	**24**	**13**	**19**
***ZS6KVZ**	**A**	**58,608**	**240**	**29**	**70**
ZS1C	**AA**	**217,672**	**490**	**50**	**111**
ZS4TX	"	41,544	205	27	45

St. Helena

ZD7BG	**A**	**370,620**	**724**	**50**	**124**

Tanzania

***5H3WX**	**A**	**104,517**	**307**	**40**	**107**
			(OP: OK2WX)		

The Gambia

***C56XA**	**14**	**422,928**	**1334**	**25**	**83**
			(OP: G3XAQ)		

ASIA

Asiatic Russia

District 9

UA9MA	**A**	**2,683,878**	**2743**	**91**	**275**
R8TA	"	431,600	913	58	150
RT9OM	"	296,100	548	62	173
RW9SW	"	269,600	509	49	151
UA9JLL	"	247,715	556	58	127
RZ9A	"	145,169	343	46	133
UA9JNT	"	107,164	301	40	106
RA9UAD	"	44,649	169	39	82
RU9US	"	10,731	55	33	40
R9LY	**14**	**133,988**	**607**	**19**	**67**
RX9CM	"	122,958	732	15	54
UA9CU	"	68,793	364	13	56
R9CD	"	5,236	61	8	26
R9TV	**3.5**	**9,656**	**114**	**7**	**27**
UA9OR	**1.8**	**19,125**	**178**	**10**	**35**
***RA9SF**	**A**	**854,441**	**1210**	**54**	**205**
*RU9AC	"	589,842	758	80	217
*RT9YA	"	439,632	627	81	203
*UB8A	"	360,306	635	56	166
*RT8O	"	349,239	710	56	153
*R9QQ	"	271,458	496	52	146
*RA9YE	"	267,750	599	68	157
*R8US	"	256,668	507	60	159
*RN9RF	"	243,485	442	57	152
*RW9UY	"	217,419	765	34	103
*RX9L	"	205,530	416	44	142
*RV9CVA	"	181,015	385	55	150
*RA9SN	"	173,664	403	35	127
*RW9AV	"	143,070	297	55	135
*R8JAJ	"	123,272	360	46	106
*RD8O	"	106,106	300	34	109
*R9JAP	"	83,070	293	37	93
*UA9CES	"	81,008	323	33	89
*RZ9WA	"	75,144	277	31	93
*RZ9UF	"	36,499	146	37	76
*RA9YUI	"	28,552	164	29	57
*R9OA	"	23,328	126	28	53
*RU9CK	*"*	*20,586*	*99*	*20*	*53*
*UA9CHL	"	19,923	98	36	51
*RJ9M	"	13,005	97	17	34
*RT9YW	"	3,840	40	11	29
*UA9OV	"	2,890	31	11	23
***RU9SO**	**28**	**1,512**	**40**	**9**	**15**
***RZ8U**	**21**	**118,272**	**767**	**19**	**58**
*RA9CCK	"	80,545	388	22	67
*RX9CC	"	80,068	398	18	56
*RL9L	"	79,048	378	21	61
*RC8SC	"	57,486	321	16	51
*R9HAG	"	55,280	327	21	59
*RV9CM	"	24,635	171	17	48
*R8WO	"	22,176	184	5	37
***R2ET/9**	**14**	**99,794**	**568**	**21**	**61**
*UF8C	"	98,400	455	19	63
*R9YU	"	64,347	311	20	69
*RD9DX	"	16,620	102	16	44
*RA9AFZ	"	7,059	64	9	30
***RX9AF**	**7**	**204,525**	**745**	**25**	**76**
*UA9LCY	"	33,528	197	18	48
***RD9U**	**1.8**	**2,394**	**46**	**5**	**16**
RT9A	**AA**	**5,398,147**	**3708**	**129**	**422**
R8WF	"	4,839,970	3324	119	396
R9AE	"	2,012,282	2080	101	282
UA9CDC	"	1,041,768	910	106	318
UA9AX	"	917,604	838	105	321
UA9BA	"	872,044	538	150	472
RK8I	"	653,760	869	71	217
UA9TF	"	573,448	634	87	257
RM8A	"	8,580	54	32	34
RX9DZ	"	8,544	66	22	26
RY9C	*"*	*4,080*	*37*	*24*	*27*
			(OP: UA8DX)		
UA9YE	**28A**	**25,844**	**221**	**17**	**35**
UA9LAO	"	21,866	175	19	39
RW9DX	**21A**	**385,308**	**1236**	**29**	**103**
RX9WN	"	363,787	1115	29	102
R8LA	"	281,210	970	28	94
RW9QA	"	247,221	931	28	89
R9SB	"	13,700	114	14	36
RA9V	**14A**	**301,692**	**1090**	**29**	**95**
UC8U	"	220,168	770	26	90
RJ9J	"	161,532	499	31	95
UA9AU	"	157,410	479	32	103
RA9AU	"	63,806	202	28	94
R8UT	"	12,691	99	10	39
RW9WT	*"*	*11,718*	*93*	*19*	*35*
RL9O	**7A**	**289,408**	**879**	**32**	**101**
RD8D	**3.5A**	**527,202**	**1692**	**29**	**88**
			(OP: R9GM)		
RK9DO	"	37,989	225	13	50
UA9LDD	*1.8A*	*16,840*	*151*	*8*	*32*
R8CT	**AA**	**3,896,280**	**2602**	**126**	**422**
*R9MJ	"	1,282,820	1403	89	285
*UA9R	"	1,100,508	1366	73	240
*RA9DZ	"	955,617	1091	76	245
*R9SS	"	809,472	1124	66	206
*UI8C	"	741,300	1008	72	228
*UA9D	"	628,191	818	73	240
*RU9TN	"	452,770	916	40	150
*R9RA	"	415,576	590	73	214
*R9CX	"	356,062	669	53	150
*RM9RZ	"	274,290	503	59	146
*R9YC	"	184,954	477	38	116
*UA9AR	"	181,653	448	32	119
*RO9L	"	167,676	420	37	120
*RZ9UO	"	144,596	409	50	98
*UA9OQM	"	144,495	360	49	122
*RG8U	"	144,171	344	62	131
*R9AB	"	94,564	202	63	125
*R9HCH	"	35,280	191	29	69
*R9RT	"	8,591	49	25	46
*RK9DR	"	8,100	53	17	43
***RK9AY**	**28A**	**15,129**	**135**	**11**	**30**
*R8WB	"	2,464	45	9	19
***RA9AP**	**14A**	**501,819**	**1297**	**34**	**107**
*R8FF/8	"	466,044	1275	35	107
			(OP: UA3FQ)		
*UG8C	"	141,600	548	24	76
*RA9JM	"	39,342	213	18	61
***UA9CTT**	**7A**	**410,312**	**1273**	**28**	**91**
*UA9W	"	356,278	924	35	107
***RA9MX**	**3.5A**	**102,621**	**486**	**18**	**61**
*R8AEZ	"	168	23	4	3
UA9UX	*"*	*117*	*5*	*4*	*5*

District Ø

UAØAGI	**A**	**1,316,349**	**1782**	**96**	**237**
UAØOK	"	476,850	985	76	179
RTØO	"	454,520	1064	62	158
UAØUV	"	286,121	791	67	142
RAØACM	"	24,582	92	38	64
RAØADQ	"	21,318	89	33	69
RUØSN	"	8,896	54	19	45
UAØLD	"	780	22	10	10
RØAA	**14**	**274,284**	**1017**	**28**	**86**
RØDX	**7**	**128,000**	**625**	**32**	**68**
***UBØAZR**	**A**	**119,441**	**348**	**44**	**107**
*UAØJF	"	117,450	368	55	107
*UAØC	"	100,440	554	51	69
*RØMZ	"	75,396	262	72	111
*RØUT	"	52,658	199	36	77
*RNØJT	"	41,847	201	45	66
*UIØA	"	29,160	142	28	62
*UAØLKD	"	27,775	200	42	59
*UDØO	"	24,800	193	41	59
*UAØCID	"	15,732	217	26	31
*UAØAAS	"	8,892	78	17	35
*RØCBS	"	7,800	87	23	27
*RNØCW	"	7,524	70	24	33
*RCØAJ	"	2,596	39	19	25
*UAØLDY	"	342	11	9	9
***RAØLMK**	**28**	**455**	**14**	**6**	**7**
***RØMR**	**21**	**8,094**	**66**	**22**	**35**
*RUØL	"	960	18	10	14
***UAØSDX**	**14**	**26,838**	**179**	**15**	**48**
*RCØUC	"	14	25	6	8
***RØCY**	**7**	**7,648**	**164**	**15**	**17**
UCØA	**AA**	**2,075,576**	**2121**	**100**	**301**
RAØLQ	"	1,852,292	2098	122	276
UAØSR	"	1,817,868	1437	129	387
RDØA	"	1,655,907	1741	108	309
RKØUN	"	904,401	1652	96	221
RWØUM	"	721,215	1669	90	189
UAØDAR	"	643,920	1265	91	149
UAØSE	"	363,090	690	66	181
RZØL	"	243,288	641	66	120
RAØAY	"	141,960	345	43	113
UBØA	"	31,842	142	28	59
RNØC	"	26,752	248	27	37
UAØWG	"	1,456	18	12	16
UAØLHS	"	828	16	8	10
RNØA	**21A**	**225,900**	**991**	**25**	**75**
RØXA	**14A**	**9,420**	**61**	**23**	**37**
UAØSU	**7A**	**107,457**	**367**	**30**	**89**
UDØW	"	22,873	114	27	62
UAØACG	**3.5A**	**41,956**	**290**	**17**	**51**
RØSR	**1.8A**	**81,000**	**497**	**18**	**54**
RMØF	"	13,040	223	17	23
***UAØDM**	**AA**	**323,232**	**645**	**75**	**149**
*UAØQNV	"	270,738	770	55	114
*UAØCDX	"	195,656	867	54	94
*RØCM	"	91,461	338	45	84
*RWØLD	"	17,325	126	36	41
*RAØAQQ	"	14,732	92	12	46
*RAØANO	"	10,098	61	22	44
*RAØF	"	988	21	12	14
***RMØW**	**28A**	**3,500**	**71**	**10**	**15**
***RWØAJ**	**21A**	**94,288**	**470**	**21**	**62**
*RØSBZ	"	9,065	81	13	36
***RØSBI**	**14A**	**94,164**	**498**	**22**	**62**
*UBØIBA	"	9,440	137	20	20

Asiatic Turkey

YM7KA	**A**	**1,847,040**	**2208**	**75**	**237**
			(OP: TA7I)		
TA2FE	"	336,864	747	42	132
TA2BS	"	21,440	110	16	51
TA2DE	"	16	2	2	2
TA4/ OH2KW	**A**	**507,600**	**891**	**43**	**157**
*TA2L	"	32,032	132	37	75
***TAØAS**	**14**	**6**	**1**	**1**	**1**
***TA3DJ**	**7**	**62,559**	**349**	**13**	**50**
*TA2TC	"	5,146	56	6	25
***TA4RC**	**AA**	**48,620**	**150**	**44**	**86**
TA4SO	*"*	*19,425*	*109*	*28*	*47*
***TA4AU**	**14A**	**35,636**	**228**	**14**	**45**

Azerbaijan

***4K9W**	**A**	**29,238**	**171**	**16**	**50**
***4K6FO**	**14**	**256,122**	**1002**	**25**	**68**

China

BA4TB	**A**	**684,588**	**1322**	**92**	**175**
BA4II	"	422,774	1004	84	158
BG9NJY	"	21,948	128	35	58
BA4DL	**7**	**76,875**	**548**	**22**	**53**
***BA3MM**	**A**	**702,976**	**1415**	**80**	**176**
*BGØARE	"	672,152	1429	44	140
*BI8CZM	"	335,442	697	64	158
*BA4WR	"	250,608	534	78	149
*BG7DOD	"	171,024	737	60	108
*BD3TE	"	150,920	571	54	100
*BI4JCM	"	67,858	336	48	83
*BD5II	"	59,882	241	63	95
*BG6QAL	"	50,716	247	53	71
*BH1HWF	"	26,100	162	30	57
*BA2BA	"	25,353	193	32	49
*BD2IAQ	"	25,330	158	32	53
*BH4AHC	"	20,724	215	26	40
*BH3PLA	"	16,400	129	36	64
*BD7BW	"	9,152	91	15	29
*BI4KWQ	"	6,072	113	21	23
*BI3OKC	"	5,841	92	27	32
*BH4UMN	"	5,520	68	22	26
*BI1JPC	"	4,128	54	24	24
*BH5HQQ	"	3,577	59	21	28
*BG5MVD	"	3,432	42	19	25
*BD2TBJ	"	3,240	97	19	21
*BI6MQT	"	1,364	49	16	15
*BD4LB	"	1,350	23	15	15
*BH3DAX	"	1,023	31	14	17
*BH1JHC	"	369	39	21	20
*BG2UKX	"	54	14	5	4
***BD7NQA**	**28**	**7,339**	**84**	**15**	**26**
***BG7TWJ**	**21**	**102,396**	**669**	**25**	**59**
*BD7LQM	"	57,600	484	15	49
*BGØATE	"	47,397	373	12	49
*BD5XM	"	24,960	355	20	28
*BG7SFE	"	17,200	132	14	36
*BG7XVX	"	13,860	125	18	37
*BG8BXM	"	12,584	104	16	36
*BG5UZW	"	6,426	81	16	26
*BD4JV	"	270	8	8	7
***BH8OCW**	**7**	**17,451**	**116**	**18**	**45**
*BH8MDV	"	2,380	32	7	21
BD3OD	*"*	*546*	*30*	*9*	*12*
*BD4QA	"	480	19	8	8
*BA5AB	"	16	2	2	2
*BH4EQC	"	4	2	1	1
***BA5CW**	**3.5**	**38,019**	**370**	**20**	**49**
*BG8SRK	"	2,244	47	14	20
*BG8PM	"	468	24	8	10
***BG3ODZ**	**1.8**	**64**	**10**	**4**	**4**
BG2AUE	**AA**	**903,312**	**1295**	**98**	**208**
BD2RJ	"	343,678	656	70	157
BA4AEO	*"*	*56,160*	*260*	*51*	*79*
BG6GQE	"	27,456	228	44	52
BA7NO	*28A*	*70,966*	*538*	*21*	*53*
BD7MM	**21A**	**391,020**	**1538**	**33**	**81**
					(OP: BD7LMD)
BG5TOX	**3.5A**	**38,808**	**432**	**17**	**46**
BA5DX	"	550	55	6	5
***BG2QMO**	**AA**	**274,040**	**616**	**73**	**148**
*BH4RRG	"	238,714	478	79	159
*BH7QP	"	193,674	620	62	129
*BH4TVU	"	135,600	682	39	81
*BH6KOK	"	131,370	363	55	119
BH3WNL	*"*	*107,694*	*301*	*69*	*124*
*BG3IYX	"	94,990	304	56	105
*BH4TYL	"	90,240	334	43	98
*BG5JND	"	49,950	214	33	78
*BG8TFN	"	49,420	228	57	83
*BG4FQD	"	43,384	234	46	70
*BG5JNT	"	35,249	218	45	56
*BH1

4X1MM	**14**	**692,404**	**2145**	**31**	**85**
***4X4YM**	**28**	**8,694**	**87**	**12**	**30**
***4Z5PN**	**7**	**174,494**	**777**	**18**	**68**
4X6FR	**AA**	**7,939,968**	**5107**	**133**	**419**
4X1IM	"	87,024	272	38	109
4Z5LY	**3.5A**	**173,952**	**991**	**15**	**57**
***4X1ST**	**AA**	**460,408**	**713**	**54**	**179**
*4Z1TL	"	34,968	140	27	67
*4Z5OI	"	1,520	26	14	24
***4Z5TK**	**21A**	**8,730**	**76**	**13**	**32**

Japan
District 1

JH1QDB	**A**	**936,360**	**1156**	**119**	**205**
JR1IJV	"	805,695	1071	105	180
JE1BMJ	"	444,367	577	121	198
JA1TMG	"	320,334	618	84	119
JH1HIC	"	268,660	591	72	130
JJ1VFE	"	175,904	395	74	110
JR1GSE	"	166,026	436	82	95
JF1UOX	"	153,576	403	65	93
JA1AYO	"	149,730	379	76	110
JH1OLB	"	147,764	387	68	96
JA1QOW	"	112,066	308	49	88
JG1LHB	"	99,099	279	60	83
JQ1CIV	"	96,064	234	63	95
JS1DEH	"	95,480	311	65	90
JI1CNA	"	70,224	218	59	93
JE1RXJ	"	65,856	208	63	84
JR1JCB	"	52,705	213	61	66
JL1LNC	"	51,527	195	47	72
JE1QHP	"	29,920	166	36	52
JJ1QLT	"	29,256	116	34	72
JH1JNJ	"	28,140	155	25	45
JA1YPA	"	27,027	141	28	49
			(OP: JA1PEJ)		
JH1FNU	"	25,632	156	25	47
JA1FFB	"	24,346	139	28	46
JA1MJN	"	22,240	112	33	47
JI1JPJ	"	21,590	114	40	45
JI1LNR	"	20,976	116	29	40
JH1LEM	"	20,358	103	31	47
JK1HIY	"	19,998	107	26	40
JJ1PFC	"	15,300	86	37	38
JA1BVY	"	14,450	68	38	47
JH1NXU	"	10,656	80	38	34
7K1JFM	"	4,018	54	22	19
JS1KQQ	"	3,567	35	18	23
JH1DGJ	"	2,356	28	18	20
JF1WQC	*"*	*1,155*	*21*	*14*	*19*
JK1UVL	"	1,118	29	14	12
JR1XIS	"	888	13	12	12
JH1HDT	"	150	5	5	5
JF1WLK	"	90	6	5	5
JA1PIG	*"*	*44*	*6*	*5*	*6*
JE1JNJ	**21**	**12,584**	**104**	**19**	**33**
JK1OLT	**14**	**212,524**	**694**	**34**	**88**
JF1KML	"	30,723	198	20	37
7K4GUR	**7**	**12,264**	**80**	**21**	**35**
JA1BBC	**3.5**	**1,456**	**31**	**13**	**13**
JI1AVY	**1.8**	**3,584**	**56**	**13**	**19**
***JI1RXQ**	**A**	**1,448,057**	**1487**	**126**	**251**
*JA1BJI	"	1,305,304	1469	125	239
*JH1EAQ	"	1,146,504	1255	124	248
*JS1OYN	"	1,144,053	1422	112	205
*JS1KKY	"	464,264	702	96	166
*JA1CXC	"	149,295	357	73	112
*JI1VAH	"	114,471	301	72	89
*JA1HNW	"	111,360	322	66	94
*JA1RRA	"	102,557	283	72	89
*JF1WNT	"	92,264	253	66	86
*JO1VVT	"	73,944	248	68	88
*JA1EMQ	"	71,651	212	60	77
*JK1JAS	"	66,314	202	60	82
*JH1HGI	"	65,893	224	55	76
*JR1LEV	"	63,662	224	64	75
*JM1VNJ	"	58,750	181	53	72
*JA3GZE/1	"	56,161	212	53	60
*JJ1JVC	"	56,146	199	58	76
*JA1CP	"	53,978	199	59	78
*JP1LRT	"	52,093	179	46	67
*JK1FNN	"	52,038	167	53	73
*JL1QQA	"	49,266	207	50	69
*JR1AQI	"	46,965	195	40	61
*JA8KSW/1	"	44,240	205	48	64
*JL1EUP	"	44,016	157	54	58
*JJ1KZZ	"	43,750	134	55	70
*JK1VMC	"	38,184	160	51	60
*7L3KJV	"	34,087	151	39	50
*7M2ALZ	"	32,204	142	42	55
*JA1IE	"	31,722	148	45	57
*JK1AKA	"	30,303	165	37	54
*JK1BVN	"	26,786	188	55	63
*JH1DJD	"	26,563	146	44	57
*JL1GPG	"	25,026	120	41	56
*JA7FYF/1	"	23,387	112	42	49
*JJ1GXY	"	22,770	114	43	56
*JG1AVR	"	21,576	116	40	47
*JJ1IVX	"	20,025	101	31	44
*JK1NSR	"	19,152	112	34	42
*JE1GWO	"	19,006	88	37	49
*JF1VVR	"	18,486	118	40	38
*JJ1XNF	"	18,407	107	38	41
*7K1III	"	18,343	98	41	42
*JK1AUY	"	17,120	98	37	43
*JM1KNI	"	16,748	100	39	40
*JK1EVU	"	16,274	98	32	47
*JL1LOF	"	16,013	108	33	34
*JH1EYM	"	15,219	67	39	50
*JS1BXH	"	14,874	87	33	41
*JH1HMC	"	14,544	112	34	38
*JI1RSF	"	13,365	83	37	44
*JAØIND/1	"	13,275	87	30	29
*JA1OHP	"	12,408	81	33	33
*JG1SWV	"	12,354	85	33	38
*JE1GZB	"	10,835	91	24	31
*JA1RGY	"	10,758	63	23	43
*JH1TJH	"	10,395	73	27	36
*JA1WQX	"	10,132	73	31	37
*JG1TGQ	"	9,164	68	27	31
*JH1YMC	"	9,072	76	30	33
			(OP: JF1VNR)		
*JF1OQM	"	7,548	54	23	28
*JH1SAR	"	5,355	51	26	25
*JK1BGV	"	4,704	46	22	26
*JP1JZR	"	4,700	56	24	23
*JQ1PCT	"	3,784	40	22	22
*JA1RXC	"	2,952	48	16	25
*JN1KWR	"	2,835	37	18	17
*JL1FAR	"	2,660	26	17	21
*JA1WBX	"	2,584	36	15	19
*JN1FAO	"	2,272	47	16	16
**JF1OPO*	*"*	*2,263*	*33*	*16*	*15*
*JE1ILP	"	2,190	31	11	19
*JA1LJW	"	1,976	30	20	18
*JK1DVP	"	1,364	22	12	10
*JI1LAI	"	1,344	18	14	14
*JJ1TQM	"	1,178	40	16	15
*JN1HYU	"	1,173	27	9	8
*JL1JJD	"	1,085	23	19	16
*JA1IZ	"	1,064	22	8	11
*JH1YDT	"	900	23	10	10
			(OP: JI1TMD)		
*JA1JNM	"	840	16	10	11
*JH1KCI	"	722	22	10	9
*JH1GTU	"	480	16	11	9
*JI1DGW	"	435	17	8	7
			(OP: JJ2TKX)		
**JF1EPL*	*"*	*396*	*22*	*10*	*8*
*JG1LMT	"	294	17	8	6
*JH1BCS	"	217	11	4	3
*JE1WBA	"	130	5	5	5
*JG1RRH	"	110	7	5	5
*JH1WOY	"	104	11	4	4
***JJ1LBJ**	**28**	**10,812**	**99**	**21**	**30**
*JG1TVK	"	918	22	8	9
*7M4AOE	"	338	12	6	7
*JJ1WRU	"	45	3	2	3
***7K4XNN**	**21**	**142,037**	**548**	**31**	**72**
*JK1JHU	"	111,530	483	30	65
*JG1UKW	"	32,486	195	26	48
*JA1SCE	"	32,154	207	24	45
**JF1CCH*	*"*	*25,596*	*132*	*24*	*55*
*JI1BBN	"	18,144	158	18	36
*JE1RRK	"	16,302	132	22	35
*JO1WIZ	"	15,768	112	20	34
*JH1VIX	"	11,376	111	20	28
*JO1KTD	"	3,816	62	17	19
*JA1DBG	"	3,471	44	16	23
*JI1NZA	"	2,328	47	12	12
*JP1EHC	"	495	11	5	10
*JN1DNV	"	384	16	6	6
*JA8NSF/1	"	345	11	8	7
*JA1LKY	"	130	12	7	6
*JM1IDR	"	77	5	4	3
***JJ1ENZ**	**14**	**40,108**	**216**	**24**	**50**
*JF1TEU	"	26,413	174	22	39
*JH1KYA	"	25,500	183	20	40
*7K1EQG	"	17,936	132	20	39
*JN1JYD	"	8,440	113	19	21
*7L4AKT	"	4,448	55	14	18
*JH1WHA	"	1,575	29	9	12
*JH1CFV	"	400	9	8	8
*JA1AVI/1	"	126	9	3	3
***JH1BBT**	**7**	**44,233**	**202**	**28**	**61**
*JA1WIO	"	14,674	99	23	35
*JR1MEG	"	6,996	98	15	18
*JM1LFA	"	6,669	77	16	23
*7L2VPL	"	1,060	21	11	9
*JI1HNC	"	462	13	7	7
*JG1VMK	"	330	14	6	5
*JL1NIE	"	240	16	3	2
*8J1SOUMU/1	"	110	8	3	2
*JR7KVA/1	"	12	2	1	1
***JP1GUW**	**3.5**	**8,976**	**96**	**21**	**23**
*JA1SKE	"	7,524	86	15	29
*JS1WWR	"	288	16	7	5
***JE1SPY**	**1.8**	**2,132**	**59**	**12**	**14**
*JA1JAT	"	198	14	6	5
JE1LFX	**AA**	**1,656,361**	**1429**	**139**	**310**
JL1CNY	"	1,131,469	1455	109	214
JE1NVD	"	937,748	1224	106	207
JA1PNA	"	875,440	1142	111	199
JM1XCW	"	717,464	814	111	230
JK1LSE	"	617,351	923	107	194
JJ1XBQ	"	588,731	786	100	199
JA1RPK	"	510,825	842	83	162
7K4VPV	"	442,728	684	91	167
JA1IAZ	"	411,720	628	95	187
JK1HIX	"	345,911	503	102	179
JN1THL	"	341,415	580	84	159
JH1CTV	"	317,520	564	85	160
JH1RFM	"	314,238	537	92	157
JA1CJP	"	238,160	416	88	141
JA1XUY	"	216,818	402	86	152
JF1LMB	"	211,762	391	92	134
JA1WWO	"	162,936	292	91	157
JM1GDA	"	119,394	320	86	115
JA1XRA	"	97,352	214	66	106
JA1KZP	"	93,456	242	77	100
JE1DXC	"	90,060	246	73	85
JJ1DJW	"	73,272	200	50	92
JG1EZF	"	62,514	201	51	87
JA1DKT	"	61,912	226	43	66
JQ1TIV	"	61,789	249	43	54
JA1ILA	"	61,593	170	66	81
JA1CRJ	"	56,304	172	59	77
JI1FOE	"	56,160	265	41	39
JE1FQV	"	55,968	142	62	97
JA1UXV	"	50,661	165	49	68
7K4AEA	"	41,511	170	31	70
JH1ACA	"	36,533	146	52	67
JH1ASG	"	27,720	148	45	54
JI1DCW	*"*	*27,328*	*133*	*50*	*62*
JA1ADU	"	26,432	107	41	71
JA1XEC	"	24,929	93	35	62
JH1XEF	"	22,785	97	42	51
JE1AEX	"	16,482	73	32	50
JH1SBE	"	9,540	64	21	32
JA1KIO	"	7,076	51	29	32
JI1ALP	"	6,768	48	22	25
JG1OGM	"	3,526	36	17	24
JF1KMC	"	3,053	29	18	25
JA1IXY	"	2,160	22	18	18
JH1ERJ	"	1,260	16	14	16
JN1RQV	"	1,200	16	14	16
JK1BAB	"	221	7	6	7
JH1SJN	**28A**	**8,379**	**88**	**21**	**28**
JH1BNC	**21A**	**129,248**	**448**	**34**	**78**
JR1NHD	"	69,524	295	30	61
JK1WSH	"	21,060	102	27	51
JF1DMY	"	20,646	124	29	45
7N3IJT	"	10,400	61	20	45
JE1CKA	**14A**	**456,456**	**1247**	**37**	**106**
JI1PBK	"	77,112	288	31	71
JH1USR	"	650	15	13	12
JA1TBA	**7A**	**102,300**	**358**	**30**	**80**
JG1FML	"	20,412	128	22	41
JH1AQN	"	14,326	112	21	37
JA1PTJ	**3.5A**	**8,950**	**79**	**20**	**30**
JF1RYU	**1.8A**	**595**	**17**	**8**	**9**
***JG1LFR**	**AA**	**843,448**	**1000**	**121**	**237**
*JE1SGH	"	214,704	397	86	130
*JA1CTZ	"	187,860	366	71	131
*JG1XIO	"	137,240	319	78	110
*JQ1COB	"	121,175	297	77	108
*JK1AKP	"	118,300	300	70	105
*JM1VDM	"	84,510	234	48	87
*JJ1CBY	"	77,924	264	60	94
*7K1PTT	"	72,980	179	63	101
*JA1UII	"	67,693	184	61	78
*JK1HWU	"	66,591	194	71	76
*JI1UPL	"	61,620	228	56	74
*JI1HFJ	"	60,990	201	39	75
*JA1SVP	"	52,536	157	47	85
*JA1GFD	"	49,404	160	54	84
*JA1KEB	"	44,799	151	41	68
*JE1LPZ	"	38,675	150	55	64
*JQ1EPD	"	31,110	135	49	53
*JI1HSV	"	27,451	164	44	53
*7N2TRM	"	18,620	96	40	36
*7N2JZT	"	18,509	95	40	43
*JK1WXM	"	15,912	98	32	36
*JA1PTO	"	13,752	96	34	38
*7K1VKU	"	13,395	91	27	30
*JK1BQC	"	8,165	49	32	39
*JN1GNL	"	7,729	59	28	31
*JA1WHG	"	5,888	56	31	33
*JH1KLE	"	3,555	39	20	25
*JJ1UBX	"	3,280	42	17	23
*JH1DWQ	"	1,080	24	12	15
*JG1CMT	"	400	10	10	10
*JG1APX	"	400	11	8	8
***JL1EEI**	**28A**	**9,486**	**90**	**19**	**32**
*JF1OVA	"	5,776	70	16	22
***JM1NKT**	**21A**	**171,654**	**574**	**35**	**87**
*7L1ETP/1	"	40,016	217	28	54
*JM1EKM	"	15,246	98	21	42
*JHØUUY/1	"	11,070	76	20	34
*JH1VMM	"	4,830	58	20	22
***JI1BDQ**	**14A**	**42,265**	**155**	**33**	**74**
*JA1QIF	"	20,956	136	23	39
*JK1FUP	"	7,602	82	19	23
*7L4FCN	"	2,964	49	17	22
***JJ1AEB**	**7A**	**38,700**	**175**	**29**	**61**
*JA1GQC	"	18,942	125	27	39

District 2

JF2QNM	**A**	**2,071,779**	**2264**	**130**	**231**
JR2PMT	"	711,080	942	104	186
JA2AXB	"	642,559	858	108	209
JA2VHO	"	282,388	506	78	149
JF2FIU	"	268,256	588	91	111
JH2XQY	"	95,116	220	72	100
JE2BOM	"	85,068	235	63	90
JF2BDK	"	46,400	160	45	71
JR2UBS	"	43,282	129	57	77
JE2GUV	"	35,534	143	45	64
JH2KKW	**28**	**5,460**	**61**	**15**	**24**
JE2PCY	**21**	**35,973**	**217**	**22**	**41**
JA2OZM	"	2,912	47	12	20
JR2IOB	**14**	**140,244**	**653**	**26**	**61**
			(OP: JA1KFX)		
JI2KUJ	"	12,460	82	24	46
JE2FJI	"	84	4	3	4
JA2PFO	**7**	**24,495**	**140**	**24**	**47**
JE2OTM	**3.5**	**11,781**	**108**	**19**	**32**
***7K1MAG/2**	**A**	**246,946**	**497**	**77**	**140**
*JA2FXV	"	187,572	408	83	120
*JA2ODB	"	186,960	384	69	121
*JA2QVP	"	131,306	320	72	94
*JG2RFJ	"	100,128	280	59	90
*JA2GHP	"	79,820	261	50	80
*JP2XYT	"	25,075	126	38	47
*JG2AIG	"	17,402	108	38	39
*JA2VZL	"	10,764	90	23	23
*JF2RVJ	"	10,640	57	28	48
*JI2TKX	"	10,117	53	30	37
*JG2KGS	"	5,044	67	25	27
*JR2UQU	"	1,938	25	17	17
***JA2HZA**	**28**	**666**	**16**	**8**	**10**
*JR2TRC	"	126	6	4	3
*JM2LEI	"	110	9	5	5
***JL2XMW**	**21**	**30,312**	**182**	**26**	**46**
*JA2KKA	"	28,274	172	21	46
*JA2JTN	"	27,755	190	24	41
*JH2MYN	"	15,512	108	22	34
*JE2HCJ	"	3,335	59	13	16
*JF2KWM	"	1,728	34	14	18
*JF2NLH	"	828	18	12	11
*JR1USU/2	"	608	16	7	9
***JH2JNU**	**14**	**5,152**	**92**	**20**	**26**
*JS2PHO	"	3,990	55	15	20
*JS2AZO	"	3,600	58	14	22
***JF2WXS**	**7**	**4,365**	**37**	**14**	**31**
***JH2GZY**	**1.8**	**25**	**5**	**3**	**2**
JR2GRX	**AA**	**4,179,411**	**3216**	**167**	**346**
JN2AMD	"	1,274,245	1586	121	222
JF2OZH	"	484,932	733	95	181
JJ2CJB	"	361,305	542	91	188
JA2HYD	"	327,382	549	90	163
JA2XCR	"	296,514	383	110	196
JE2LPC	"	198,973	385	67	144
JE2VFX	"	42,051	137	53	78
JA2VQF	"	17,169	83	41	56
JH2PWY	"	560	12	9	11
JM2LHB	**28A**	**104**	**5**	**4**	**4**
JR2KHB	**21A**	**69,280**	**335**	**30**	**50**
JA2GTW	**7A**	**25,972**	**128**	**27**	**59**
JA2FSM	**3.5A**	**595**	**15**	**7**	**10**
JF2XGF	**1.8A**	**2,788**	**45**	**13**	**21**
***JF2VAX**	**AA**	**971,913**	**1116**	**111**	**228**
*JA2KVB	"	584,924	671	124	225
*JR2NMJ	"	89,075	198	69	106
*JA2KPW	"	84,508	257	62	86
*JP2XSP/2	"	2,552	30	8	21
***JE2CPI**	**28A**	**3,008**	**39**	**14**	**18**
***JF2MBF**	**21A**	**110,853**	**413**	**33**	**80**
*JR2MIO	"	67,768	323	28	58
***JK2RCP**	**14A**	**162,615**	**594**	**33**	**78**
*JS2GYN	"	9,225	116	16	25
*JK2AQT	"	2,046	32	13	18
***JR2ALA**	**7A**	**43,522**	**197**	**31**	**63**
*JH2FXK	"	8,692	78	14	27
***JR2SCJ**	**3.5A**	**33,781**	**177**	**30**	**53**

District 3

JH3CUL	**A**	**993,334**	**1315**	**108**	**203**
JR3NZC	"	912,555	1105	107	208
JQ3ALW	"	443,487	690	95	172
			(OP: JH1TXG)		
JR3KQJ	"	407,856	722	93	139
JR3RIU	"	244,420	498	76	126
JR3BOT	"	225,231	465	73	120
JA3MQY	*"*	*173,809*	*411*	*70*	*109*
JL3JRY	"	168,360	568	46	76
JA3HBF	"	160,704	367	72	120
JR3RIY	"	122,657	314	67	106
JA3AVO	"	108,928	304	63	85
JF3DCH	"	90,218	263	67	91
JF3KCH	"	25,029	173	37	44
JA3IKG	"	23,100	122	23	47
JA3LIL	"	18,228	105	36	48
7J3AOZ	*"*	*7,564*	*63*	*30*	*32*
JR3UIC	"	6,099	49	28	29
JG3KMT	"	3,978	50	21	30
JA3KKE	"	3,978	41	16	18
JE3ECD	"	1,898	31	13	13
JE3RMQ	"	1,170	33	16	14
JA3XOG	**28**	**7,400**	**80**	**18**	**22**
JA3QOS	"	5,120	63	17	23
JF3NDW	**21**	**1,265**	**22**	**8**	**15**
JA3GOJ	**14**	**1,125**	**23**	**13**	**12**
JH3FUK	**7**	**74,736**	**280**	**32**	**76**
JE3VRJ	"	23,322	152	26	43
JA3IBU	"	22,945	151	22	43
JI3KDH	**1.8**	**4,752**	**75**	**15**	**21**
***JA3JM**	**A**	**165,822**	**399**	**66**	**108**
*JF3PLF	"	157,454	375	74	113
*JJ3TBB	"	110,721	303	65	102
*JA3NUT	"	55,699	213	43	66
*JJ3QJI	"	41,741	191	41	48
*JA3UWB	"	40,256	232	26	48
*JO3OEF	"	29,786	153	49	57
*JM3FUW	"	23,842	122	42	49
*JJ3KTW	"	19,481	111	33	44
*JE3TAT	"	19,184	113	41	47
*JJ3IUS	"	18,732	103	36	48
*JA3EBT	"	8,614	72	26	33
*JP3UBR	"	2,812	34	19	19
**JS3EOE*	*"*	*2,691*	*33*	*18*	*21*
*JI3XOK	"	2,523	37	12	17
*JA3PFY	"	1,798	42	16	13
*JF3CGN	"	1,078	27	11	11
*JO3JYE	"	532	16	7	7
*JG2CNS/3	"	440	16	11	11
***JE3EDJ**	**28**	**4,200**	**50**	**16**	**19**
*JA3RAZ	"	2,304	48	16	20
**JK3GWT*	*21*	*31,339*	*168*	*25*	*52*
***JA3JRI**	**"**	**15,960**	**124**	**22**	**35**
*JR3GPP	"	3,090	35	12	18
*JQ3BVC	"	2,848	55	15	17
*JR3XEX	"	2,187	40	14	13
*JG3SVP/3	"	36	4	2	1
***JP3AZM**	**14**	**8,694**	**89**	**13**	**29**
*JG3LDD	"	1,058	34	11	12
*JG3EHD	"	273	9	5	8
*JA3DAY	"	96	12	5	3
***JL3MCM**	**7**	**26,625**	**144**	**25**	**46**
*JF3IYW	"	11,610	109	19	26
*JF3PGW	"	9,500	82	20	30
*JE3EVI	"	833	23	9	8
***JL3DQX**	**1.8**	**4**	**2**	**2**	**2**
JS3CTQ	**AA**	**3,396,608**	**2470**	**157**	**355**
JF3IPR	"	1,155,504	1301	130	232
JN3TMW	"	405,022	546	111	202
			(OP: JF1RPZ)		
JN3SAC	"	357,760	562	88	172
JA3VOV	"	156,140	388	66	119
JM3UGA	"	132,158	260	80	141
JA3BXF	"	32,100	126	39	68
JF3KNW	"	24,480	89	37	65
JH3EQP	"	8,374	68	21	32
JK3NSD	"	1,650	22	13	12
JH3AIU	**14A**	**494,496**	**1310**	**36**	**108**
JH3QFY	"	45,000	189	26	64
JF3LOP	**3.5A**	**53,311**	**293**	**29**	**60**
***JG3FEA**	**AA**	**494,247**	**609**	**99**	**200**
*JF3EIG	"	223,440	357	90	155
*JI3DST	"	202,036	387	73	139
*JH4PUL/3	"	28,836	148	33	48
*JF3GFH	"	26,265	106	49	54
*JF3KQA	"	17,404	101	38	38
*JN3IWQ	"	5,616	55	20	28
*JA3EJG	"	3,172	27	27	25
*JR3KAH	"	630	18	11	10
***JR3RWB**	**28A**	**9,541**	**90**	**19**	**28**
***JF3BFS**	**21A**	**184,860**	**638**	**34**	**83**
***JN3DSH**	**14A**	**126,973**	**522**	**30**	**67**
***JA3YVI**	**7A**	**374**	**16**	**6**	**5**
***JP3WEL**	**3.5A**	**3,815**	**60**	**16**	**19**
			(OP: JG1EIQ)		
***JL3LSF**	**1.8A**	**1,218**	**43**	**9**	**12**

District 4

JH4UYB	**A**	**4,541,460**	**3680**	**145**	**317**
JO4JKL	"	3,767,720	3216	137	303
JI4WHS	"	158,730	356	78	117
JO4IPQ	"	40,014	145	44	73
JI4WAO	"	140	6	5	5
JH4DIT	**21**	**61,100**	**304**	**32**	**68**
JA4VNE	"	32,913	203	21	48
JG4AKL	**7**	**3,690**	**53**	**17**	**24**
JL4DJM	**1.8**	**338**	**16**	**6**	**7**
***JE4MHL**	**A**	**612,920**	**786**	**107**	**201**
*JH1MTR/4	"	121,296	323	63	105
*JA4LCI	"	44,619	180	44	63
*JE4FNC	"	20,800	102	43	61
*JA4JLT	"	16,110	119	35	55
*JA4YPE	"	8,509	73	34	33
			(OP: JM1QPR)		
*JA4BEV	"	1,512	32	14	14
*JR4PUR	"	483	11	10	11
*JA4GQD	"	64	4	4	4
***JH4FUF**	**21**	**3,298**	**46**	**16**	**18**
*JH4PUS	"	210	11	5	5
***JE4URN**	**3.5**	**49**	**5**	**4**	**3**
JH4ADK	**AA**	**674,494**	**799**	**108**	**218**
JA4CZM	"	237,626	436	97	144
JH4CPC	"	81,840	174	69	117
JA4GXS	"	81,663	214	71	92
JA4OPW	"	63,700	209	60	80
JA4AFT	**14A**	**36**	**3**	**2**	**2**
JH4UTP	**7A**	**406,737**	**1229**	**33**	**96**
JR4VEV	**3.5A**	**1,200**	**26**	**11**	**14**
***JM4WUZ**	**21A**	**62,730**	**296**	**29**	**61**
***JH4CES**	**3.5A**	**10,812**	**105**	**21**	**30**
***JR4CZM**	**1.8A**	**2,457**	**48**	**12**	**15**

District 5

JF5SIM	*A*	*5,050*	*45*	*26*	*24*
**JA5JG

*JR8NOD	"	155,496	398	72	114
*JM8FEI	"	62,186	233	51	67
*JA8AJE	"	4,560	56	18	20
*JH8IYN	"	1,653	35	14	15
*JE8UHY	"	1,600	34	12	13
***JH8DBI**	**21**	**12,200**	**116**	**19**	**31**
*JH8DHV	"	11,914	122	19	27
*JR8QFG	"	4,136	72	10	12
***JG8NKJ**	**14**	**31,892**	**190**	**22**	**45**
*JH8RXM	"	18,205	154	22	33
*JA8HBO	"	4,248	72	12	24
***JK8NIP**	**7**	**7,410**	**73**	**16**	**23**
JH8SLS	**AA**	**676,776**	**755**	**119**	**227**
JA8KSF	"	411,820	532	107	188
JR8PPG	"	22,971	113	41	52
JH8GEU	**14A**	**72,619**	**321**	**30**	**71**
***JK8CEE**	**AA**	**92,450**	**180**	**89**	**126**

District 9

JH9FCP	**A**	**432,640**	**769**	**100**	**156**
JA9LJS	"	182,376	400	81	123
JH9CEN	"	55,918	193	64	82
JA9CCG	"	9,112	76	31	36
JA9LNZ	**28**	**893**	**19**	**9**	**10**
JA9CWJ	**14**	**75,200**	**320**	**29**	**65**
JA9FHB	**1.8**	**1,007**	**27**	**10**	**9**
***JA9LX**	**A**	**56,120**	**200**	**50**	**65**
*JA9VOK	"	17,625	113	38	37
*JE9PFD	"	7,097	67	19	28
*JA9OJM	"	4,746	51	19	23
*JA9EJG	"	3,256	38	14	23
***JA9XAT**	**28**	**18**	**2**	**1**	**2**
JH9DRL	**AA**	**314,769**	**525**	**97**	**176**
JF9JTS	"	301,752	549	88	128
					(OP: JAØTEA)
JR9GMS	"	80,620	210	45	100
JA9NFO	"	73,164	212	55	79
JH9AUB	**14A**	**5,555**	**43**	**21**	**34**
***JH9KVF**	**21A**	**119,377**	**493**	**32**	**71**

District Ø

JGØEXP	**A**	**188,962**	**378**	**82**	**132**
JJØPJD	"	155,215	327	72	113
JHØOXS	"	126,000	297	76	99
JAØIOF	"	11,640	98	29	31
JAØBZY	"	9,954	62	29	34
JAØGCY	"	5,593	56	24	23
8NØJ	**14**	**325**	**13**	**7**	**6**
					(OP: JJØSFV)
JJØVNR	**7**	**464,817**	**1401**	**31**	**92**
***JAØBJY**	**A**	**56,385**	**205**	**41**	**64**
*JHØMUC	"	29,800	129	47	53
*JRØECQ	"	10,203	67	22	35
*JEØERZ	"	9,259	86	19	28
*JRØDZH	"	8,632	72	28	24
*JAØAVS	"	2,014	27	20	18
*JJØTWX	"	1,827	27	15	14
*JAØRCK	"	1,247	17	14	15
***JHØEPI**	**14**	**63,750**	**343**	**22**	**53**
*JAØMOQ	"	10,816	108	20	32
*JIØWVQ	"	7,047	109	10	17
***JRØBQD**	**3.5**	**9,900**	**110**	**19**	**26**
***JAØJHQ**	**1.8**	**16**	**4**	**2**	**2**
JJØJML	**AA**	**1,354,444**	**1462**	**125**	**239**
JAØFVU	"	858,000	1143	117	183
JIØVWL	"	681,120	1117	102	156
JHØGHZ	"	177,000	269	103	147
JAØRUG	"	87,234	197	83	103
JHØKHR	"	86,190	206	69	101
JAØGCI	"	2,015	33	16	15
JAØELB	"	1,624	22	15	13
JRØRBY	**3.5A**	**5,590**	**59**	**17**	**26**
***JHØNEC**	**AA**	**676,656**	**822**	**115**	**218**
*JHØDUG	"	49,731	211	54	67
*JJØVXN	"	8,400	77	28	32

Kazakhstan

UN7FW	**A**	**254,322**	**491**	**49**	**150**
UN5J	"	233,079	520	67	164
UN9GD	**21**	**345,060**	**1286**	**27**	**81**
UN7G	"	255,840	1156	24	72
UPØL	**14**	**945,345**	**2403**	**34**	**121**
					(OP: UN9LW)
UP4L	**7**	**1,371,534**	**3277**	**37**	**122**
					(OP: UN7LZ)
***UN8PC**	**A**	**146,294**	**318**	**56**	**137**
*UN7JX	"	109,252	322	36	107
*UN7EV	"	16,632	89	27	57
*UN7QF	"	2,920	38	15	25
***UN2E**	**21**	**109,890**	**455**	**25**	**74**
*UN7CN	"	44,457	258	20	53
*UN7ZZ	"	22,464	160	14	40
***UN7GF**	**14**	**10,944**	**118**	**17**	**47**
*UN6GSD	"	8,018	102	11	27
***UNØC**	**7**	**416**	**10**	**7**	**9**
***UN7LDR**	**3.5**	**82,244**	**573**	**11**	**47**
UN9L	**AA**	**2,834,160**	**1962**	**140**	**420**
UN3G	**28A**	**37,149**	**244**	**15**	**46**
UN7LV	**14A**	**47,278**	**340**	**16**	**61**
UN3M	**7A**	**310,905**	**794**	**36**	**111**
***UN4PD**	**AA**	**198,129**	**366**	**64**	**147**
*UN7MBF	"	22,222	117	20	62
***UN4PG**	**28A**	**14,063**	**113**	**15**	**34**
***UNØLM**	**21A**	**343,281**	**1083**	**30**	**97**
*UN4L	"	341,510	1082	29	101
*UN8PT	"	213,070	771	27	83
***UP7L**	**14A**	**123,093**	**530**	**25**	**72**
					(OP: UN6LN)
*UN7JID	"	45,327	216	23	64
*UN8GA	"	5,278	72	7	22

Kyrgyzstan

***EX8MJ**	**1.8A**	**3,172**	**48**	**7**	**19**

Lebanon

***OD5ZF**	**7A**	**33,217**	**229**	**12**	**47**

Mongolia

JT1CD	**A**	**73,695**	**622**	**31**	**54**
***JT1CO**	**28**	**30,228**	**347**	**13**	**31**
***JT1BV**	**21**	**109,381**	**602**	**22**	**67**
***JU1DX**	**3.5**	**5,250**	**102**	**10**	**25**
					(OP: JT1BV)
JT1CS	**AA**	**227,306**	**584**	**55**	**123**
***JT1KAI**	**7A**	**29,547**	**198**	**16**	**51**
					(OP: JT1BV)

Nepal

9N7AA	**A**	**1,517,400**	**2260**	**80**	**201**
					(OP: S53R)

Oman

***A42K**	**AA**	**124,267**	**341**	**36**	**107**
					(OP: A41CK)
***A45TT**	**7A**	**56,840**	**342**	**17**	**53**

Qatar

A71GO	**A**	**44,149**	**166**	**31**	**88**
***A71AE**	**21**	**2,312**	**28**	**13**	**21**
A71EM	**28A**	**57,564**	**299**	**24**	**54**

Republic of Korea

DS4EOI	**A**	**1,560,287**	**2330**	**105**	**206**
DSØAHQ	"	691,938	1635	83	151
					(OP: HL2BQG)
HL2WA	"	684,448	1173	103	190
HL2EIZ	"	56,032	174	61	75
HL3ØUN	"	11,703	191	22	25
HL4CEL	"	4,002	118	23	23
HL5BCH	"	675	16	12	15
HL2AHL	*"*	*572*	*25*	*10*	*12*
HL5IVL	**1.8**	**25,143**	**284**	**16**	**35**
DS2JJV	"	8,100	164	14	22
***HL2IDT**	**A**	**98,252**	**356**	**64**	**90**
*HL2CFY	"	74,266	242	52	90
*DS5DNO	"	72,464	373	45	67
*HL2DBP	"	910	19	13	13
*DS5VTG	"	836	20	11	11
***6K2EGQ**	**14**	**810**	**92**	**4**	**6**
***6K2ILX**	**7**	**8,514**	**99**	**20**	**23**
*HL1OVG	"	1,800	40	13	11
HL1TKF	*"*	*99*	*10*	*4*	*5*
HL2VXK	**AA**	**120,414**	**478**	**47**	**94**
HL5FEI	"	94,112	290	68	105
HL2ZN	"	43,429	183	54	83
HL2KV	**7A**	**15,930**	**130**	**21**	**38**
DS5TOS	**3.5A**	**2,490**	**58**	**12**	**18**
***HL5YI**	**AA**	**54,320**	**225**	**56**	**84**
*DS3EXT	"	5,368	64	30	31
***HL3AMO**	**28A**	**1,809**	**34**	**13**	**14**
*D7ØLW	"	1,232	24	11	11
					(OP: HL1VAU)
***HL1VAU**	**21A**	**43,200**	**226**	**22**	**58**

Saudi Arabia

HZ7C	**14A**	**383,875**	**1093**	**33**	**92**
					(OP: 7Z1SJ)
***HZ1TT**	**AA**	**670,558**	**1115**	**59**	**168**

Singapore

9V1YC	**A**	**912,603**	**1364**	**101**	**220**
***9V1KG**	**21**	**15,138**	**152**	**20**	**38**
***9V1HY**	**7**	**66**	**7**	**2**	**4**

Taiwan

BV5OQ	**3.5**	**4**	**3**	**2**	**2**
***BU2EO**	**A**	**186,480**	**766**	**62**	**106**
***BV3UN**	**14**	**30**	**4**	**2**	**3**
***BX6AD**	**3.5**	**120**	**16**	**6**	**6**
BV2LA	**AA**	**27,744**	**130**	**40**	**62**
BV4VQ	**21A**	**330**	**18**	**5**	**6**
***BU2EP**	**21A**	**12,528**	**106**	**18**	**40**
***BU2EV**	**14A**	**84**	**8**	**3**	**4**

Tajikistan

EY8MM	**7**	**1,247,376**	**3102**	**36**	**120**

Thailand

HS5NMF	**A**	**1,150,688**	**1716**	**106**	**246**
HSØZME	"	27,606	163	27	59
					(OP: SM6NT)
E21YDP	**21**	**110,670**	**556**	**27**	**66**
***HS8KAY**	**A**	**29,746**	**143**	**38**	**69**
*HS1NIV	"	9,180	67	24	44
***E2ØXMG**	**28**	**980**	**33**	**9**	**11**
*HS5ZLD	"	160	6	5	5
***E29AHU**	**21**	**9,666**	**97**	**18**	**36**
*HS8KGG	"	4,173	60	15	24
***HS3LSE**	**7**	**8,836**	**96**	**16**	**31**
E2X	**AA**	**215,000**	**459**	**86**	**164**
					(OP: E2ØGMY)
***HSØZLN**	**AA**	**382,445**	**756**	**70**	**175**
*HS8JWH	"	55,544	182	44	87
*HS2UPR	"	24,255	97	36	69
*HS4MLV	"	2,812	36	17	21
*HSØZDY	"	1,232	18	11	17
***HS8JYX**	**21A**	**9,700**	**101**	**19**	**31**

United Arab Emirates

A62A	**A**	**1,184,435**	**1482**	**68**	**233**
***A65DF**	**A**	**70,560**	**221**	**41**	**99**

Uzbekistan

***UK8IQ**	**A**	**317,280**	**783**	**36**	**124**

Vietnam

3W3B	**A**	**40,150**	**215**	**42**	**68**
***XV9NPS**	**A**	**148,635**	**579**	**50**	**85**

West Malaysia

9M2CLN	**14**	**3,172**	**104**	**11**	**15**
***9M2TO**	**AA**	**242,382**	**632**	**54**	**145**
*9M2SAF	"	1,711	45	13	16

EUROPE

Aland Islands

OHØZ	**A**	**2,963,072**	**3882**	**112**	**336**
					(OP: OH6EI)
OHØTA	**3.5**	**382,916**	**2303**	**29**	**87**
					(OP: OH2TA)
OHØV	**AA**	**5,081,436**	**4306**	**156**	**490**
					(OP: OH6LI)

Albania

***ZA1EM**	**A**	**106,752**	**796**	**26**	**102**
*ZA1F	"	41,769	283	30	89
*ZA1ME	"	15,576	231	15	73
*ZA1U	"	0	3	2	2
***ZA1AK**	**14**	**1,769**	**61**	**5**	**24**

Austria

OE1TKW	**A**	**254,926**	**693**	**61**	**201**
OE6VIE	"	63,123	291	52	107
OE3NHW	"	32,186	179	33	88
OE12ØBKC	"	23,920	185	32	83
					(OP: OE3BKC)
OE1SGU	**21**	**44,544**	**190**	**32**	**64**
***OE1CIW**	**A**	**228,938**	**695**	**61**	**165**
*OE5CYL	"	181,888	597	45	158
*OE3IAK	"	16,368	139	20	68
*OE6VWG	"	744	18	13	18
*OE1EBC	"	460	13	9	11
***OE2UKL**	**21**	**26,340**	**200**	**23**	**37**
***OE9WLJ**	**14**	**10,763**	**121**	**11**	**36**
***OE3WMA**	**7**	**68,888**	**793**	**17**	**62**
*OE7MOP	"	15,447	181	11	46
***OE6JXA**	**3.5**	**15,568**	**227**	**11**	**45**
OE5OHO	**AA**	**2,053,415**	**2082**	**120**	**335**
OE5TXF	"	1,676,736	2576	112	380
					(OP: G3TXF)
OE6MMD	"	1,281,408	1802	106	320
OE3KAB	"	1,235,104	1850	95	321
OE2LCM	"	642,674	1024	103	280
OE6MDF	"	533,808	932	92	245
OE6GC	"	812	20	13	16
***OE2S**	**AA**	**2,646,952**	**2225**	**142**	**474**
					(OP: OE2VEL)
*OE3MCS	"	47,859	250	33	96
*OE5HIL	"	2,652	46	15	19
*OE8ACT	"	2,640	46	18	26
***OE5JSL**	**28A**	**384**	**12**	**7**	**9**
***OE1ZZZ**	**14A**	**62,480**	**347**	**25**	**85**
***OE8TED**	**7A**	**240,690**	**1140**	**32**	**110**
*OE5CSP	"	74,942	484	21	85
*OE5AEN	"	59,059	480	20	71
*OE1VMC	"	2,847	60	6	33

Azores

***CU2ZG**	**A**	**5,304**	**75**	**16**	**36**
CR2X	**21A**	**989,010**	**3011**	**37**	**125**
					(OP: OH2GEK)

Balearic Islands

EA6FO	**A**	**7,577,968**	**8070**	**131**	**405**
					(OP: EA3M)
EA6NB	"	218,738	891	38	141
***EA6ZS**	**A**	**29,190**	**200**	**26**	**79**
EA6UP	**AA**	**570,724**	**1066**	**87**	**287**
EA6AJ	**7A**	**19,320**	**163**	**20**	**64**
***EA6SX**	**AA**	**911,346**	**1415**	**88**	**298**
*EA6AMM	"	250,332	515	62	214
***EA6BF**	**14A**	**55,208**	**488**	**15**	**52**

Belarus

EW2A	**A**	**1,921,565**	**1908**	**138**	**427**
EW1I	"	1,362,030	1409	137	410
EW8DX	"	765,254	1661	78	251
EW3LN	"	95,407	375	53	126
EW1OW	"	68,926	296	32	111
EU7SV	**14**	**101,136**	**396**	**28**	**84**
EW1FM	**7**	**1,508**	**44**	**6**	**23**
***EV6Z**	**A**	**418,695**	**1090**	**67**	**204**
*EW6EW	"	361,620	1076	57	195
*EW2ES	"	354,640	1195	56	192
*EU6O	"	143,034	503	50	136
*EW1NM	"	50,307	331	31	92
***EW1AFM**	**28**	**190**	**8**	**5**	**5**
***EW1TZ**	**21**	**97,980**	**350**	**31**	**84**
*EW1TO	"	41,998	253	24	59
***EU8U**	**14**	**287,520**	**1473**	**31**	**89**
*EU1DX	"	211,900	807	33	97
*EW8AX	"	149,628	767	29	82
*EW6F	"	6,336	140	9	27
					(OP: EW6GF)
***EU2F**	**7**	**306,016**	**1525**	**29**	**102**
*EV4R	"	29,600	295	19	61
***EU1AI**	**3.5**	**42,480**	**682**	**10**	**49**
*EW3ADI	"	76	30	5	14
EV1R	**AA**	**2,285,700**	**2132**	**135**	**435**
EW8OM	"	727,056	1566	75	249
EW7DK	"	137,562	391	56	171
EW3MM	"	6,512	44	31	43
EW3M	**7A**	**87,138**	**586**	**20**	**83**
EW4A	**3.5A**	**141,856**	**1381**	**19**	**69**
EW8R	**1.8A**	**84,480**	**966**	**16**	**64**
EU3AA	"	6,528	127	9	42
***EU1VA**	**AA**	**759,610**	**1397**	**89**	**281**
*EW1P	"	680,340	1001	102	289
*EU3A	"	541,413	849	99	288
*EW4R	"	162,432	471	58	158
*EW4GL	"	158,860	425	64	196
*EU8N	"	133,679	636	42	127
*EU1ST	"	128,516	608	40	138
*EU1DC	"	97,083	430	39	122
***EU1FQ**	**21A**	**127,658**	**385**	**34**	**108**
***EW4C**	**7A**	**41,710**	**358**	**18**	**68**
*EU2EU	"	25,344	200	20	68
***EW1M**	**1.8A**	**29,202**	**443**	**11**	**51**
*EU8R	"	12,587	303	6	35
*EU4T	"	8,869	162	7	42

Belgium

OQ4U	**21**	**24,196**	**204**	**19**	**27**
OSØS	**14**	**161,283**	**781**	**27**	**84**
OT5Q	**3.5**	**42,143**	**605**	**14**	**53**
***ON4CT**	**A**	**1,013,498**	**1691**	**92**	**266**
*ON5JT	"	844,332	1794	64	220
*ON6LO	"	80,068	490	31	117
*ON4CBA	"	19,897	162	22	79
*ON4LY	"	11,775	107	22	53
*OR3R	"	4,500	73	12	38
*ON5BC	"	3,640	67	13	27
*ON5IA	"	3,600	50	12	28
***OR2A**	**14**	**83,571**	**497**	**21**	**68**
					(OP: ON1DX)
***ON3ND**	**7**	**54,145**	**486**	**19**	**66**
***ON5WL**	**3.5**	**28,044**	**447**	**11**	**46**
OQ5M	**AA**	**5,663,504**	**4851**	**147**	**469**
					(OP: ON5ZO)
OR3A	"	3,720,840	3462	150	456
					(OP: ON6CC)
ON4TTT	"	1,074,478	1970	82	252
ON6MR	"	238,392	599	63	189
OR1Z	*"*	*203,680*	*840*	*41*	*111*
OR5T	*"*	*166,278*	*418*	*63*	*196*
ON6LR	"	6,912	48	22	32
OT1A	**14A**	**600,519**	**2129**	**34**	**107**
OP4K	"	475,050	1568	37	113
OR5Z	"	145,872	1004	19	53
ON4LDP	*"*	*64,076*	*427*	*21*	*62*
OO4O	**7A**	**87,120**	**566**	**24**	**86**
OR7W	*"*	*1,144*	*24*	*9*	*17*
OO4T	**1.8A**	**9,890**	**218**	**7**	**39**
					(OP: ON4BR)
***ON3DI**	**AA**	**748,410**	**1494**	**71**	**232**
*OP7T	"	249,260	701	51	169
					(OP: ON4IT)
*ON9TT	"	221,840	635	56	180
*ON6FC	"	191,105	815	40	145
*ON5AM	"	171,108	504	52	142
*ON7XN	"	166,221	535	53	154
*ON7KEC	"	134,000	357	57	143
*OT1V	"	54,526	174	51	86
					(OP: ON8VM)
*ON3ZZT	"	40,875	285	30	95
*ON4CAU	"	39,312	487	20	58
*OR5O	"	28,702	183	31	82
*ON5ZZ	"	10,508	121	22	49
*ON7BT	"	2,294	37	14	23
***OQ4B**	**21A**	**63,826**	**279**	**32**	**65**
					(OP: ON4BHQ)
***OT5Z**	**7A**	**74,646**	**597**	**18**	**69**

Bosnia-Herzegovina

E71A	**A**	**225,720**	**686**	**49**	**141**
***E74UK**	**A**	**216,457**	**826**	**47**	**186**
*E7ØAW	"	10,033	107	21	58
***E73KM**	**21**	**5,913**	**99**	**10**	**17**
***E77O**	**7**	**28,308**	**212**	**15**	**69**
*E73X	"	24,495	287	14	55
*E74SL	"	2,482	59	7	27
E73M	**AA**	**1,025,064**	**2095**	**71**	**205**
E72U	"	520,554	996	79	224
E74E	"	290,160	959	61	179
***E78T**	**21A**	**2,700**	**55**	**9**	**16**
***E73AA**	**7A**	**249,432**	**1763**	**22**	**92**
*E75AA	"	4,982	72	11	36
***E79D**	**1.8A**	**82,004**	**1061**	**12**	**64**

Bulgaria

LZ7J	**A**	**616,704**	**1435**	**78**	**214**
					(OP: LZ1CI)
LZ1RW	"	126,440	654	31	85
LZ1HW	"	108,679	300	63	128
LZ1GE	"	52,626	297	36	111
LZ1ST	"	14,017	159	25	82
LZ5M	**7**	**40,200**	**430**	**16**	**59**
LZ2GA	"	17,600	256	12	43
***LZ3QE**	**A**	**565,957**	**1081**	**88**	**259**
*LZ1FH	"	409,904	928	68	206
*LZ1IQ	"	106,023	432	51	126
*LZ7M	"	104,690	506	38	107
					(OP: LZ5VK)
*LZ2CH	"	82,050	350	37	113
*LZ5DI	"	55,180	237	44	111
*LZ3ZQ	"	52,700	196	39	116
*LZ5IY	"	39,700	197	36	64
*LZ1WF	"	25,864	184	34	72
*LZ1ON	"	17,388	122	28	56
LZ5PL	*"*	*6,608*	*80*	*17*	*42*
LZ14AZ	*"*	*2,499*	*60*	*11*	*38*
					(OP: LZ1KZ)
*LZ1IU	"	336	9	8	8
LZ5X	*28*	*10,974*	*90*	*24*	*38*
					(OP: LZ5PW)
***LZ6T**	*****	**9,169**	**82**	**20**	**33**
					(OP: LZ2JA)
*LZ1IA	"	4,025	57	14	21
***LZ2PS**	**21**	**31,758**	**230**	**23**	**44**
***LZ1DQ**	**14**	**30,118**	**330**	**19**	**55**
*LZ1DB	"	12,360	161	13	47
*LZ5GM	"	280	18	5	15
*LZ7VM	"	99	7	4	7
***LZ1BP**	**7**	**116,930**	**718**	**27**	**83**
*LZ4UU	"	624	21	7	19
***LZ7MM**	**3.5**	**17,214**	**286**	**9**	**48**
LZ4A	**AA**	**797,258**	**1164**	**112**	**322**
					(OP: LZ1YQ)
LZ4W	"	643,200	1206	97	238
LZ3FN	"	191,637	338	90	231
LZ3RM	"	186,111	511	47	136
LZ1UK	"	178,717	571	57	154
LZ3V	"	113,906	479	45	124
LZ5KW	"	46,280	198	46	84
LZ5K	**21A**	**292,650**	**1032**	**37**	**113**
					(OP: LZ1QZ)
LZ5QZ	"	42,332	269	23	53
LZ4T	**14A**	**53,025**	**264**	**29**	**72**
					(OP: LZ4TL)
LZ1EV	**7A**	**244,461**	**1111**	**37**	**110**
LZ6F	"	72,756	708	25	69
LZ6Y	**3.5A**	**398,664**	**2090**	**31**	**95**
					(OP: LZ1MC)
LZ9R	"	163,000	1167	22	78
LZ5XQ	"	109,032	1089	16	68
LZ3SF	**1.8A**	**3,417**	**62**	**8**	**43**
***LZ1AQ**	**AA**	**505,064**	**1121**	**69**	**242**
*LZ1ZP	"	484,092	625	98	259
*LZ1ZJ	"	271,743	825	55	184
*LZ3TL	"	147,764	540	47	165
*LZ7O	"	100,980	353	51	119
					(OP: LZ1ONK)
*LZ7DL	"	83,367	433	35	122
*LZ2GS	"	77,832	321	52	132
***LZ2DF**	**28A**	**14,152**	**112**	**21**	**37**
***LZ3DJ**	**21A**	**273**	**21**	**4**	**9**
***LZ6E**	**14A**	**372,500**	**1473**	**36**	**113**
					(OP: LZ1GU)
***LZ1QV**	**7A**	**198,272**	**1045**	**30**	**98**
LZ1QB	*"*	*11,410*	*81*	*17*	*53*
*LZ6M	"	3,131	53	12	19
					(OP: LZ2JU)
LZ2OQ/1	*"*	*24*	*2*	*2*	*2*
***LZ3SM**	**3.5A**	**28,024**	**410**	**11**	**51**
***LZ2ZG**	**1.8A**	**6,784**	**108**	**12**	**41**

Crete

SV9COL	**7**	**8,220**	**69**	**13**	**47**
***SV9MBH**	**AA**	**23,664**	**243**	**28**	**88**
***SV9RGI**	**7A**	**27,166**	**219**	**25**	**69**

Croatia

9A2AJ	**A**	**2,640,276**	**2713**	**144**	**418**
9A4WY	"	188,748	513	57	139
9A3EZ	"	55,454	299	29	90
9A9R	**21**	**426,948**	**1336**	**35**	**106**
9A5X	**7**	**1,026,480**	**3456**	**37**	**131**
9A6AR	"	72,492	749	20	64
***9A2EY**	**A**	**500,976**	**1220**	**61**	**223**
*9A9CW	"	103,816	320	47	105
*9A9XX	"	58,801	299	31	96
*9A3QB	"	48,144	284	28	90
*9A2IK	"	40,080	208	34	86
*9A7B	"	32,912	218	34	87
*9A2HQ	"	30,740	180	29	77
*9A2VX	"	21,045	113	34	81
*9A3SM	"	16,560	99	40	50
*9A4ZP	"	990	36	11	19
***9A8A**	**28**	**10,650**	**103**	**17**	**33**
***9A3TU**	**21**	**20,304**	**154**	**23**	**31**
***9A2MF**	**14**	**27,938**	**259**	**17**	**44**
*9A5ADI	"	2,968	78	6	22
***9A1VV**	**7**	**49,591**	**298**	**21**	**80**
***9A3DML**	**3.5**	**5,280**	**146**	**6**	**34**
*9A8TT	"	2,080	59	6	34
*9A1PKC	"	910	42	6	20
					(OP: 9A5AY)
***9A4AW**	**1.8**	**7,920**	**194**	**7**	**38**
*9A/IZ3NVR	"	1,377	50	5	22
9A/F5SNJ	**AA**	**443,612**	**824**	**81**	**166**
9A3JH	"	271,250	995	52	165
9A7Y	"	130,640	289	66	118
9A7V	"	24,750	164	29	81
9A2KD	**28A**	**67,932**	**405**	**31**	**77**
9A3TR	**21A**	**806,607**	**2049**	**38**	**133**
9A5D	"	596,886	1807	36	123
					(OP: 9A3ID)
9A4M	"	581,955	1491	37	128
9A2W	"	242,055	841	34	101
					(OP: 9A3PM)
9A9A	**14A**	**811,324**	**2189**	**39**	**133**
9A3XV	"	389,784	1233	37	112
9A3MR	"	150,297	728	34	85
9A3ST	**7A**	**133,773**	**591**	**31**	**98**
9A6A	**3.5A**	**568,282**	**2607**	**35**	**108**
9A5W	**1.8A**	**240,350**	**1642**	**22**	**88**
9A5M	"	190,332	1377	20	82
9A6D	"	1,240	25	10	21
***9A2EU**	**AA**	**3,062,748**	**2212**	**164**	**513**
*9A2U	"	651,375	999	97	278
					(OP: 9A2R)
9A4W	*"*	*422,863*	*782*	*88*	*225*
*9A4BA	"	175,448	714	42	140
*9A7ZZ	"	170,300	411	64	198
*9A3MA	"

***OK1CZ**	**1.8**	**34,209**	**509**	**11**	**52**	G1SCT	"	248,682	688	56	161	G3SVL	"	17,225	178	12	53	RK3T	"	1,033,515	2065	81	234	*UA3AB*	*"*	*171,430*	*542*	*44*	*114*
*OK1JOK	"	18,536	328	9	47	G4SGI	"	103,428	398	42	111	***G4U**	**AA**	**915,120**	**1760**	**81**	**291**				(OP: RX4W)			R2AX	"	168,054	491	59	163
*OK2BRQ	"	7,995	215	7	34	G3T	"	70,104	290	36	91				(OP: G4SGX)			R3FX	"	868,027	1859	93	260	RL3T	"	165,870	546	55	139
									(OP: G3VGZ)			*M3AWD	"	384,636	954	58	208	R3OM	"	773,277	1483	91	292	RM3A	"	162,740	652	39	119
OLØW	**AA**	**3,541,744**	**2970**	**162**	**494**	G5DXC	"	13,896	102	24	48	*G2K	"	375,446	915	54	208	RC3U	"	677,082	1210	90	253						(OP: RN3AC)
			(OP: OK1DSZ)						(OP: MØCTP)						(OP: MØICR)	R5AK	"	671,772	1139	93	263	RW3WX	"	161,568	478	62	154
OL5ØDJ	"	1,530,360	1771	126	394	G6VMR	"	10,962	79	23	35	*G4P	"	370,575	1046	56	169	RA3NC	"	583,083	1141	70	263	R5CA	"	150,336	500	52	180
OL7ØDG	"	1,482,152	2323	95	303	MØNPK	"	3,822	49	15	24				(OP: G3YPP)			R3OQ	"	300,032	756	78	215	UA3R	"	145,236	482	56	140
			(OP: OK1DG)			**G4FKA**	**28**	**18,135**	**221**	**15**	**50**	*GØMFR	"	360,646	811	70	216	UC5C	"	150,080	412	52	108						(OP: UA3RC)
OK1DO	"	1,254,528	1088	128	400	**M6O**	**21**	**345,138**	**1371**	**30**	**93**	*2EØINN	"	305,996	830	55	172	RT2H	"	144,270	525	46	164	RT3N	"	133,200	424	51	174
OK2QA	"	1,190,068	1913	99	275				(OP: G3WGN)			*G3VMW	"	222,888	543	54	168	R3BV	"	97,467	455	37	122	RA3U	"	127,836	397	60	152
OK1PI	"	314,875	629	83	146	G2O	"	38,340	294	19	52	*GØFGI	"	178,176	408	52	180	RC2A	"	90,916	230	71	167	RC3FL	"	122,570	387	58	180
OK2OP	"	298,110	753	63	222				(OP: GØUVX)			*G4RQI*	*"*	*73,370*	*297*	*32*	*78*	RA3BQ	"	80,272	242	63	110	RM5W	"	117,467	352	56	117
OK1LO	"	135,401	367	59	144	G9D	"	37,248	255	20	44	*GØOOR	"	65,272	247	45	119	RV3TG	"	23,387	149	26	65	RU3SD	"	98,230	315	47	162
OK4X	"	132,765	614	35	132				(OP: G6NHU)			*GØRXA	"	63,050	287	34	96	R325RF	"	17,160	206	20	68	RU3XY	"	88,740	353	46	128
			(OP: OK1UXH)			**G3WGN**	**1.8**	**2,565**	**46**	**9**	**36**	*G4BRK	"	59,099	386	27	86				(OP: RV1AQ)			RA3S	"	85,942	182	79	115
OK2FB	"	123,214	348	52	130	***G4DDL**	**A**	**443,088**	**997**	**64**	**208**	*G3RTU	"	43,032	244	34	98	RV3ZD	"	13,287	142	28	75	R5AF	"	74,053	398	34	115
OK2RU	"	53,911	154	63	106	*M2J	"	368,460	767	64	203	*G4PFZ	"	42,525	216	40	95	UA3LEO	"	11,340	59	35	49	R2IN	"	69,685	299	51	130
OK6CX	"	28,985	167	30	55				(OP: G4NBS)			*MØWJG	"	34,364	224	30	91	RU3XW	"	8,001	110	13	50	UA3AGW	"	64,515	160	56	109
OK7GU	*"*	*3,150*	*70*	*9*	*33*	*MØXUU	"	314,431	924	52	195	*2EØOBO	"	32,207	186	31	76	RV3FT	"	6,640	120	10	10	UA3MCH	"	48,162	192	41	97
OL5M	**28A**	**57,116**	**337**	**29**	**80**	*2EØCVN	"	247,213	840	52	181	*MØIPU	"	31,140	153	33	57	UA3UBT	"	6,313	75	15	44	RT5Q	"	28,925	160	29	60
			(OP: OK1GI)			*M3X	"	225,861	697	51	186	*G7TWC	"	28,188	138	33	75	*UA3DSN*	*"*	*72*	*4*	*3*	*3*	UA3QLC	"	15,600	72	34	46
OK8AW	**21A**	**102,544**	**442**	**29**	**75**				(OP: MØIHT)			*M9N	"	26,010	201	28	74	**R3LC**	**28**	**11,760**	**90**	**20**	**36**	UA3AIF	"	13,182	67	40	38
OL9Z	**14A**	**831,660**	**2425**	**37**	**129**	*G3SVK	"	165,007	758	39	118				(OP: G7WHI)			**RA3XM**	**21**	**203,840**	**688**	**32**	**108**	*RK3TT*	*"*	*3,760*	*59*	*15*	*32*
			(OP: OK2PVF)			*MØURL	"	136,880	574	35	110	*M3R	"	25,752	188	28	83	RV3VR	"	28,652	246	22	54	R2AOQ	"	1,890	21	15	15
OL8M	"	589,518	1692	37	125	*G4POF	"	121,899	374	45	134				(OP: G3RTU)			**RT5T**	**14**	**105,154**	**665**	**23**	**75**	*R3QF*	*"*	*1,334*	*16*	*13*	*16*
OL5W	"	8,732	111	13	46	*GØBKC	"	102,256	335	45	121	*G3WGE	"	24,476	135	34	82	**RY3F**	**7**	**36,404**	**380**	**17**	**59**	R3PJN	"	54	3	3	3
OL7R	**3.5A**	**484,843**	**2384**	**31**	**106**	*G3WRR	"	94,000	318	45	143	*GØJDL	"	21,093	211	21	68	UA3WF	"	19,765	203	18	49	**RM2E**	**28A**	**8,802**	**89**	**19**	**35**
			(OP: OK3RM)			*G4HZV	"	80,234	255	46	108	*G4RCD	"	19,656	155	28	63	**RW3YA**	**3.5**	**18,044**	**367**	**10**	**42**	**RL3A**	**21A**	**459,030**	**1332**	**37**	**128**
OK1DX	"	344,988	1835	29	97	*GØVWL	"	59,605	290	30	101	*G4OMG	"	14,940	178	21	62	**R3XA**	**1.8**	**68,796**	**742**	**16**	**68**						(OP: RL3FT)
OK1VK	"	272,867	1697	27	92	*G4DYC	"	40,992	220	29	83	*G3KNU	"	10,070	90	21	32	RM2P	"	22,260	390	10	50	UA3KW	"	174,584	632	33	106
OK1RR	"	185,004	1312	20	88	*G4EBK	"	31,578	171	31	83	*MØJSB	"	8,320	90	20	45	RK3DK	"	2,484	72	8	28	RA3SI	"	158,168	616	33	103
OK1TN	"	120,320	1037	20	74	*G4FEV	"	29,618	209	28	90	*2EØEBM*	*"*	*7,488*	*61*	*24*	*40*	***R5FQ**	**A**	**476,309**	**994**	**76**	**255**	RN3BL	"	104,228	408	34	108
OK1P	"	94,221	774	17	70	*MØCVO	"	28,667	245	27	82	*G4AWA	"	2,697	29	16	15	*RN5AA	"	450,109	873	79	240	RU3DNN	"	60,486	365	29	73
OK5M	"	53,889	695	12	59	*G4HYG	"	27,451	205	26	71	*2EØWPM	"	1,386	37	10	23	*RX3Q	"	386,941	1274	56	183	RV3LO	"	14,250	84	29	46
OK1CF	*1.8A*	*63,341*	*451*	*20*	*77*	*G5C	"	24,415	213	22	73	*MØTKM	"	1,160	26	10	10	*RT3C	"	355,470	897	68	221	**RM3F**	**14A**	**57,456**	**193**	**36**	**116**
OK5ET	**"**	**42,192**	**518**	**14**	**58**				(OP: G4OGB)			***GØTSM**	**28A**	**15,504**	**117**	**18**	**50**	*R2PA	"	301,126	597	76	198						(OP: UA3DPX)
OK1ATP	"	25,631	330	13	58	*G4OTV	"	23,230	200	29	86	*G4RGK	"	14,049	146	16	47	*R3OR	"	272,209	778	66	193	R2CA	"	37,318	182	25	69
OK2SG	"	16,678	247	13	49	*GØOSK	"	13,083	123	23	66	*MØNQN	"	2,356	42	10	21	*RV3ZN	"	261,722	955	51	163	R3EG	"	7,958	139	11	35
OK1DWJ	*"*	*2,535*	*27*	*16*	*23*	*MØLDW	"	11,869	84	28	55	***G8P**	**21A**	**247,648**	**761**	**35**	**107**	*R3AQ	"	174,908	370	66	226	**RC3W**	**7A**	**138,918**	**664**	**34**	**103**
***OK7W**	**AA**	**1,759,279**	**2574**	**100**	**333**	*G3KMQ	"	10,230	112	16	15				(OP: G4CLA)			*RT2X	"	171,094	610	50	152						(OP: RA5W)
*OK5MAX	"	580,890	1164	81	254	*G4BEE	"	7,104	76	23	51	*G3RXP	"	160,885	573	27	88	*RU5X	"	168,480	564	50	166	RN5M	"	3,000	29	17	23
*OK5OK	"	525,672	1228	66	232	*MØWEL	"	5,719	61	17	26	*G4ERW	"	52,779	289	20	53	*RM2T	"	156,816	536	50	148	**RV3A**	**3.5A**	**70,956**	**457**	**28**	**80**
*OK1MAW	"	430,012	675	91	246	*GØFCU	"	3,276	86	23	55	*M2U	"	12,427	129	14	29	*UA3DSS	"	148,114	424	62	144	R2DFD	"	20,618	324	11	50
*OK1SI	"	186,408	572	54	162	*G3XTZ	"	2,178	44	9	9				(OP: MØDHP)			*R2UZ	"	134,974	449	61	156	**RX3APM**	**1.8A**	**201,006**	**1166**	**28**	**89**
*OK1UKY	"	113,876	467	46	120	*G3YZO	"	1,692	33	11	25	*G4NXG/M	"	4,992	50	15	24	*RX3VF	"	133,536	488	46	168	R5WW	"	43,142	572	14	60
*OK1DPU	"	106,196	402	42	149	*G6GLP	"	1,247	25	12	17	*G7G	"	4,608	72	9	23	*UA3YDI	"	131,880	523	47	163	RT3G	"	33,594	472	12	54
*OK7TJ	"	97,908	362	38	126	*MØNPT	"	625	23	8	17	*G3WCB	"	475	12	8	11	*RZ3AV	"	128,466	514	46	137	RK3BX	"	29,040	498	11	49
*OK4DZ	"	95,580	314	44	74	*MØKNG	"	70	6	2	3	***MØVVC**	**14A**	**23,652**	**236**	**13**	**41**	*RA3AOS	"	122,683	377	53	156	R3XX	"	12,648	246	10	41
*OK1BLU	"	90,666	315	52	155	***G9V**	**28**	**10,098**	**110**	**14**	**40**	***G8X**	**7A**	**349,063**	**1646**	**33**	**110**	*RD3AD	"	118,482	499	40	146	RZ2A	"	2,960	65	6	34
*OK1BR	"	73,304	319	38	98				(OP: GØHVQ)						(OP: G4FJK)			*RA3GAA	"	117,480	454	46	132	*RD3AW*	*"*	*6*	*1*	*1*	*1*
*OK1KT	"	69,595	294	41	114	*G4AFS	"	7,072	68	15	37	*G4FJW	"	61,248	483	15	72	*R3CW	"	117,121	495	45	128	***RA3AN**	**AA**	**1,635,776**	**2053**	**113**	**375**
OK2YZ	*"*	*65,160*	*232*	*50*	*131*	*M4M	"	1,092	30	6	15	*G4DBW	"	55,029	461	15	68	*UA3YFL	"	112,875	492	40	135	*UA3RBR	"	1,150,780	2275	75	278
*OK1TRJ	"	55,728	303	32	97				(OP: MØPNN)			*G3YJQ	"	272	16	3	13	*RC5Z	"	111,315	351	57	148	*RA3Y	"	1,149,291	1550	90	333
*OK1FFW	"	51,696	201	47	97	*G4KIV	"	1,050	34	5	16	***M6W**	**3.5A**	**161,116**	**1258**	**19**	**75**	*UA3T	"	107,406	310	65	169	*RA3YDA	"	1,090,800	1511	99	305
*OK1WSL	"	45,954	295	36	102	***G6C**	**21**	**13,662**	**147**	**13**	**33**				(OP: G3WW)			*RD3FT	"	101,493	345	52	127	*R2HM	"	861,400	903	119	353
*OLØM	"	43,306	195	39	79				(OP: MØITR)			*M5EVT	"	64,175	558	16	69	*RX3QNE	"	89,117	349	50	153	*RA3FD	"	574,014	1262	74	272
			(OP: OK1CDJ)			*M3M	"	12,240	129	15	33	*G8AJM	"	34,020	327	16	68	*RA3XCZ	"	78,353	333	45	142	*RT5P	"	536,484	1145	86	276
*OK1DOY	"	32,318	122	45	98				(OP: G3PLE)			*G3VDB	"	33,280	376	12	53	*RV3X	"	78,210	386	45	120	*RN3S	"	529,425	1133	69	256
OK7SE	*"*	*26,260*	*140*	*32*	*69*	*G4OTU	"	10,812	149	13	38	***G3RLE**	**1.8A**	**4,018**	**91**	**8**	**33**	*RA3DSV	"	60,840	313	40	116	*RX3Z	"	305,505	721	71	208
*OK1DLX	"	23,868	86	43	59	*M1TZR	"	7,128	86	14	22							*RM3TO	"	60,632	207	47	96	*R3VL	"	287,521	1077	42	179
*OK7N	"	22,236	107	38	71	***MØSEV**	**14**	**27,600**	**312**	**15**	**45**				**Estonia**			*UA3RBP	"	45,678	292	36	102	*RN3YA	"	281,370	880	51	175
*OK2PF	"	19,110	118	32	66	*G4WGE	"	19,360	242	13	42	***ES1OX**	**3.5**	**12,100**	**231**	**8**	**47**	*RM2R	"	41,844	190	43	89	*R3ET	"	223,808	795	46	162
*OK1DSX	"	5,520	48	18	30	***G4N**	**7**	**55,505**	**441**	**17**	**68**	**ES2DF**	**21A**	**87,556**	**346**	**31**	**87**	*UG5F	"	39,808	299	26	102	*R3TKI	"	222,831	636	60	183
*OK1FMJ	"	1,692	19	18	18				(OP: G4ZVB)			***ES3RF**	**AA**	**122,811**	**407**	**52**	**149**	*RZ3DZ	"	34,840	133	47	83	*RA3FY	"	214,485	650	46	135
***OK2PYA**	**21A**	**133,930**	**469**	**34**	**84**	*G4RMV	"	19,782	186	15	48	*ES1BH	"	85,848	410	39	129	*RV3AJ	"	27,232	218	22	70	*UA3QAM	"	160,304	499	53	180
*OK1TD	"	81,432	350	26	78	***G4L**	**3.5**	**60,344**	**605**	**16**	**60**	***ES2TT**	**21A**	**150**	**7**	**4**	**6**	*UA3UAD	"	24,125	114	40	85	*UA3RFT	"	113,589	438	45	144
*OK1CLD	"	30,396	169	30	38				(OP: G4LDL)			***ES7GN**	**14A**	**448,570**	**1575**	**36**	**119**	*R5AV	"	22,644	148	27	75	*RX3ACO	"	102,134	333	45	178
*OK2TRN	"	5,640	66	17	13	*G3YRZ	"	480	25	4	16	***ES7GW**	**7A**	**37,290**	**192**	**29**	**81**	*RA3VE	"	21,659	166	34	87	*UA3X	"	101,388	243	67	146
***OL3R**	**14A**	**321,610**	**1052**	**36**	**109**	***G2X**	**1.8**	**26,733**	**416**	**11**	**46**							*RY2A	"	17,280	159	27	69	*R5AU	"	90,218	324	49	109
			(OP: OK1VWK)						(OP: GØDCK)									*RX3MM	"	15,189	134	21	62	*RU3VV	"	84,056	374	42	110
*OK3DM	"	69,732	478	17	61	*MØNDZ	"	8,352	151	10	38				**European Russia**			*RA3V	"	14,880	224	16	64	*RD3FV	"	84,018	262	50	159
*OK1VD	"	50,828	271	27	70										**District 1**			*R2RZ*	*"*	*13,846*	*133*	*33*	*53*	*RK2A	"	77,927	305	43	106
*OK1FGD	"	8,360	134	10	28	**G6T**	**AA**	**1,832,224**	**2115**	**117**	**379**							*R2DEM	"	13,286	188	17	56	*RA5BB	"	59,926	268	48	118
***OL9R**	**7A**	**591,712**	**2218**	**37**	**127**				(OP: G4MKP)			**RM1Q**	**A**	**862,155**	**1764**	**91**	**300**	*R3AI	"	11,408	108	24	68	*RN3P	"	41,265	273	30	101
			(OP: OK6RA)			MØBEW	"	1,609,770	3238	84	261				(OP: UA1QM)			*R2SAG	"	10,004	124	22	60	*UA3THY	"	38,880	195	34	86
***OK1USP**	**3.5A**	**91,938**	**1018**	**14**	**63**	GØMTN	"	1,333,179	1718	101	352	RT1L	"	195,000	459	69	181	*RN3AAB	"	9,639	122	22	59	*R2AT	"	29,028	174	35	83
*OL1AIY	"	55,260	612	18	72	G5K	"	1,151,712	1017	130	428	R1NW	"	86,592	344	53	123	**UA1ORK**	**21**	**135,966**	**623**	**33**	**96**	*RU3DM	"	26,565	101	40	75
			(OP: MØDJS)						(OP: GØBNR)			UA1AUW	"	6,156	128	11	43	**RM1T**	**3.5**	**21,240**	**318**	**12**	**47**	*UA3DUJ	"	18,837	107	32	59
*OK1AY	"	41,120	399	14	66	M1X	"	509,194	1011	58	201										(OP: R1TE)			*RJ2T*	*"*	*9,170*	*91*	*21*	*49*
*OK7T	"	17,584	250	11	45				(OP: GØCKP)									***RD1T**	**A**	**156,865**	**519**	**50**	**179**	*UA3DLD	"	6,328	80	17	39	*UB5MBA	"	6,528	94	15	36
			(OP: OK1FHI)			MØBPQ	"	433,752	550	101	271	*UA1CUR	"	149,256	520	45	171	*UA3MEG*	*"*	*4,234*	*47*	*25*	*33*	*RL3F	"	4,945	60	16	27
***OK6Y**	**1.8A**	**68,299**	**818**	**14**	**63**	G3VYI	"	197,106	545	56	191	*RX1AG	"	86,227	296	37	126	*RN3DKE	"	2,881	50	11	32	*R5FN	"	3,478	34	21	26
			(OP: OK2PTZ)			MØDSL	"	135,290	509	42	124	*R1QE	"	59,717	391	26	107	*RZ3DC	"	1,950	60	15	10	*RN3OG	"	2,585	31	19	28
*OL6B	"	8,056	232	4	34	G4LPP	"	109,158	281	63	163	*UA1ZZ	"	55,480	268	38	114	*UB3SAR	"	1,404	24	10	17	*RX3AFE*	*"*	*1,794*	*32*	*13*	*13*
			(OP: OK6AB)			MØWJE	"	104,566	307	45	109	*UA1D	"	51,770	239	43	112	*RV3YR	"	725	26	10	19	*RA3IAI	"	352	8	8	8
						G4RKO	"	103,156	550	29	119	*R8MB/1	"	50,816	313	38	90	*UA9QCP/3	"	672	23	10	18	***RX3RZ**	**28A**	**5,842**	**85**	**17**	**29**
			Denmark			MØNGN	"	44,574	283	28	74	*RM1F	"	42,456	250	28	88	***R3HD**	**28**	**6,302**	**62**	**17**	**29**	*UA3RAW	"	1,638	37	11	15
OZ1KEF	**A**	**148,720**	**391**	**62**	**146**	G3YBO	"	38,857	196	31	60	*R1BC	"	29,884	195	33	91	***UA3ABJ**	**21**	**45,700**	**292**	**24**	**76**	***UF5A**	**21A**	**110,776**	**566**	**31**	**91**
OZ2BKK	"	82,999	311	48	119	G4BSW	"	34,335	121	49	60	*RN1AO	"	28,072	159	31	85	*R3THA	"	22,509	331	15	46	*UA3PI	"	94,920	458	28	85
OZ7YL	"	44,660	268	30	86	M2E	"	33,734	232	28	73	*RN3Z	"	11,760	121	18	42	*RU3W	"	69,992	378	27	77						
OZ4ABH	**21**	**18,848**	**170**	**17**	**45**				(OP: GØRPM)			*UA1CBM*	*"*	*23,489*	*209*	*20*	*63*	*R3PIQ	"	11,650	131	14	36	*UA3YCX	"	8,928	99	15	33
OZ2J	**1.8**	**5,248**	**133**	**7**	**34**	*G3KHZ*	*"*	*33,117*	*172*	*30*	*53*	*R1CAA	"	22,932	116	29	88	*RA3DGH	"	3,672	99	8	26	***R3QA**	**14A**	**108,400**	**607**	**24**	**76**
***OZ5UR**	**A**	**181,692**	**574**	**48**	**158**	MØTDW	"	32,832	210	22	74	*R1AU	"	17,700	189	21	79	***RW3X**	**14**	**65,250**	**627**	**19**	**56**	*RZ3Z	"	77,420	487	23	75
*OZ6AGX	"	77,119	325	40	121	G4DRS	"	31,320	231	26	90	*RW1AM	"	14,274	105	20	97	*RK3Y	"	60,342	423	20	69	*UI3A	"	37,758	317	18	69
*OZ1TJ	"	68,552	303	42	122	G4RRM	"	30,510	129	39	74	*RT1I	"	10,857	95	27	50	*RO5K	"	48,620	375	20	65	*R3DAB	"	21,167	267	13	48
			(OP: 5QØX)			MØRNR	"	29,610	144	34	56	*UA1F	"	10,570	119	15	55	*RW5CW	"	43,602	332	17	61	*UA3UCD	"	13,481	170	11	50
***OZ5DX**	**21**	**2,310**	**36**	**14**	**19**	GØEFO	"	23,276	132	32	60	*UB1AHY	"	7,488	104	19	53	***RM1O**	**21**	**11,000**	**201**	**11**	**33**	***UA3QPA**	**7A**	**115,596**	**709**	**24**	**90**
***OZ1NF**	**3.5**	**13,983**	**204**	**12**	**47**	G3YSX	"	17,160	133	28	76	***RM1O**	**21**	**11,000**	**201**	**11**	**33**	*RU3WR	"	9,620	158	12	40	*R3RK	"	31,428	280	17	64
***OZ2JI**	**1.8**	**28**	**3**	**2**	**2**	**M3D**	**21A**	**468,017**	**1379**	**35**	**122**	***UA1COA**	**14**	**9,635**	**209**	**7**	**34**	*R3BB	"	4,720	60	11	29	*R5DF*	*"*	*4,617*	*66*	*9*	*18*
									(OP: G3XTT)			*UA1TES	"	2,496	76	8	24	*RA3RLJ*	*"*	*2,880*	*64*	*9*	*27*	*RA5AV	"	507	15	6	7
OZ8AE	**AA**	**1,262,380**	**1390**	**116**	**381**	M2G	"	429,940	1320	36	112	*UC1A	"	1,920	64	6	24	*UA3SDN	"	2,160	63	6	24	***UA3LID**	**3.5A**	**141,645**	**1010**	**24**	**81**
OZ3SM	"	1,053,594	2109	82	276				(OP: G4RCG)			***RX1A**	**7**	**306,204**	**1152**	**35**	**123**	***RW3VM**	**7**	**30,912**	**203**	**22**	**70**	*UI3F	"	18,536	305	8	48
OZ2U	"	981,994	1462	93	329	G4FNL	"	370,139	1119	36	125	*UF1A	"	17,136	190	18	50	*RW2WR	"	26,784	294	16	56	*RO2X	"	2,553	34	13	24
OU4N	"	761,046	1024	106	323	M8A	"	197,152	808	32	90	*R1BBL	"	3,666	68	8	31	*RL2D	"	6,656	142	10	42	***RA3RA**	**1.8A**	**41,071**	**639**	**12**	**55**
OZ8SW	"	495,656	780	87	284				(OP: MØHDF)			***RA1M**	**1.8**	**3,800**	**104**	**7**	**31**	***RA3EC**	**1.8**	**14,742**	**271**	**9**	**45**	*R2EC	"	18,738	383	9	45
OZ8PG	"	178,266	479	59	163	M2A	"	186,880	582	33	95	*R1NI	"	1,539	54	6	21	*UA3DCE	"	5,957	159	6	31						
OZ4O	"	120,870	584	30	123				(OP: G3ORY)									*R3SV*	*"*	*3,408*	*45*	*12*	*36*						
OZ1AXG	"	23,772	105	36	48	M7T	"	184,652	523	33	101	**RN1ON**	**AA**	**1,936,266**	**2723**	**111**	**352**	*R2ATC	"	1,488	60	5	26				**District 4**		
OZØJ	"	18,755	93	33	88				(OP: G3YYD)			RA1QD	"	1,245,972	1487	138	408							**RD4F**	**A**	**1,637,820**	**1809**	**126**	**414**
OZ1KIH	"	3,136	64	17	39	M5D	"	179,676	762	36	90	RV1CC	"	295,728	832	64	180	**RT5Z**	**AA**	**4,510,520**	**4155**	**155**	**468**	R4BZ	"	536,112	1186	71	221
OZ4MD	"	3,128	26	22	24				(OP: G4WQI)			RU1AC	"	233,820	1001	41	139				(OP: RA3CW)			UA4K	"	366,769	853	73	244
OZ1DJJ	**21A**	**41,292**	**152**	**32**	**92**	M7O	"	178,458	696	35	112	*RT1A*	*"*	*7,076*	*56*	*24*	*37*	RM5F	"	3,568,745	4357	134	443						(OP: RM4HZ)
OZ1IKY	**7A**	**306,983**	**1240**	**36**	**115**				(OP: MØVKY)			R1BHN	"	2,730	29	21	21	RL5A	"	2,401,692	2638	134	445	UA4PAQ	"	328,143	914	63	204
OZ7DK	"	11,628	118	12	45	G4ENZ	"	147,858	594	27	87	**RC1W**	**21A**	**86,595**	**344**	**29**	**86**	UA3AP	"	1,313,760	1999	99	321	UA4WW	"	271,680	680	63	177
OZ2TF	**1.8A**	**36,642**	**531**	**12**	**50**	G3PJT	"	130,784	499	30	92	**UA1NFA**	**14A**	**56,916**	**396**	**25**	**77**	UA3QGT	"	986,531	1173	126	355	UC4P	"	263,790	672	78	192
***OZ1AAR**	**AA**	**516,732**	**1249**	**62**	**236**	M4N	"	92,488	518	20	68	UA1ANA	"	44,440	287	21	67	RA3DNC	"	951,808	1375	99	317	RT4O	"	153,900	486	54	136
*OZ7BQ	"	427,560	1024	62	218				(OP: G4IZZ)			**R1DX**	**3.5A**	**169,521**	**1099**	**28**	**93**	*R2QA*	*"*	*932,586*	*1095*	*119*	*327*						(OP: UA4NCE)
*OZ2ABI	"	68,297	267	48	115	G4LPD	"	44,916	221	22	54	**UA1OMS**	**1.8A**	**100,646**	**911**	**20**	**71**	RK3ER	"	839,086	1596	103	288	RQ4F	"	149,596	399	62	189
*OZ6TM	"	10,044	82	21	72	GØORH	"	25,970	143	26	72	***RZ1OK**	**AA**	**403,260**	**823**	**76**	**206**	UA3RF	"	744,040	1269	95	285	R4RT	"	116,056	517	51	127
						MØXAC	"	11,856	90	19	33	*

*RW4AD	"	114,791	558	39	152
*RZ4M	"	96,320	403	39	133
*R4PBX	"	96,000	401	68	172
*UD4W	"	87,046	394	36	106
*RK4NB	"	81,774	337	45	132
*RA4AG	"	76,415	397	36	109
*UA4LCC	"	63,705	298	40	115
*R4AC	"	63,280	330	34	106
*RN4SC	"	56,575	259	41	114
*R4II	"	50,064	303	31	81
*UA4FDL	"	36,507	207	35	94
*UA4PRU	"	26,136	207	27	81
*RD4AQ	"	24,072	104	40	78
*RK4K	"	21,216	161	27	77
			(OP: UA4HGL)		
*RN4ZT	"	19,873	109	48	71
*UA4HJ	"	5,917	55	31	30
*RA4CCK	"	4,018	123	21	61
*R4LBP	"	3,321	45	13	28
*R4FBG	"	1,368	37	12	26
*R4AJ	"	1,254	41	12	26
*UA4LDP	"	0	3	2	2
***UA4QK**	**21**	**35,506**	**327**	**20**	**62**
*RN4AO	"	9,225	219	9	32
*RV4AS	"	5,719	55	18	25
***RK4S**	**14**	**21,420**	**225**	**14**	**56**
*RD4W	"	10,348	180	9	43
*RA4L	"	7,750	127	10	40
*UA4NU	"	1,247	34	6	23
***RA4AR**	**7**	**25,830**	**350**	**13**	**50**
*R4RM	"	20,148	214	18	55
*R4PFL	"	0	7	4	7
***RW4PP**	**1.8**	**420**	**23**	**5**	**15**
RM4F	**AA**	**3,218,892**	**2963**	**151**	**475**
RL4A	"	2,182,001	2016	154	475
RT4M	"	1,717,548	2109	127	381
RA4PQ	"	1,554,514	2122	109	333
R4ACY	"	806,432	1628	85	234
RG4A	"	711,168	923	123	340
R4SO	"	376,053	680	79	230
R4LC	"	303,450	822	68	221
RA4PBE	"	294,336	816	71	221
RM4N	"	110,891	435	44	143
RX4HX	"	68,510	224	50	120
RN4CA	"	63,104	205	48	80
R4HM	"	43,473	249	33	96
R4FCN	*"*	*25,740*	*275*	*18*	*72*
R4IO	**21A**	**209,024**	**1026**	**30**	**98**
R4MM	"	102,776	453	29	87
UA4C	**14A**	**300,820**	**1412**	**31**	**99**
UA4NE	**7A**	**322,515**	**1382**	**33**	**102**
RU4PU	"	186,183	706	38	113
RK4FM	*"*	*20,919*	*299*	*13*	*44*
***UG4I**	**AA**	**1,113,640**	**1803**	**101**	**339**
*RN4HAB	"	587,048	1450	65	243
*R4RN	"	542,440	877	90	292
*RU4LM	"	395,715	687	83	262
*R4YT	"	340,998	635	81	272
*RA4HBS	"	278,964	723	59	228
*R4DI	"	202,788	498	72	190
*UI4F	"	161,802	288	75	228
*RU4SS	"	144,485	554	48	137
*RA4DR	"	142,438	427	56	173
*UA4CNJ	"	141,648	447	48	160
*RN4SN	"	121,920	289	63	191
*RA4CL	"	110,090	350	56	146
*RA4WE	"	46,609	230	31	96
			(OP: RW4WZ)		
*RA4W	"	43,710	193	54	132
*RW4W	"	42,976	243	29	107
*R4WZ	"	40,326	194	47	94
*R4WT	"	30,240	225	25	87
*RO4A	"	17,082	97	33	45
			(OP: UC4A)		
*UB4Y	"	3,216	39	17	31
*RU4SW	"	2,184	42	11	31
*R4UAL	"	1,350	37	12	15
***RW4C**	**28A**	**3,848**	**54**	**15**	**22**
***RX4HJ**	**21A**	**64,064**	**397**	**26**	**78**
***RD4A**	**14A**	**385,944**	**1299**	**37**	**119**
*RZ4AG	"	197,024	812	32	99
*UG4A	"	69,564	464	23	70
*UA4LKU	"	1,404	35	6	33
		District 6			
UA6CC	**A**	**1,422,891**	**1886**	**113**	**358**
UC7A	"	922,896	1505	95	282
RA7A	"	590,700	1196	84	216
RK7X	"	410,791	1305	56	221
RM6Y	"	302,500	797	60	182
RV6LN	"	236,132	602	68	179
R6AF	"	181,251	795	40	97
R7AC	"	73,440	327	43	110
RK7F	"	56,924	357	33	100
RU6MO	"	54,793	281	40	117
RC6AA	"	35,175	248	24	81
RC7B	"	12,606	158	18	48
RU6DX	"	12,078	73	31	35
UA6AK	**28**	**4,515**	**109**	**9**	**26**
R6DM	**14**	**158,619**	**784**	**28**	**83**
RJ7M	"	41,013	264	24	69
RN6L	"	11,468	148	14	33
UA6HLN	**7**	**50,760**	**367**	**20**	**70**
R6CR	"	14,256	151	21	45
***UA6GO**	**A**	**1,108,261**	**1938**	**98**	**309**
*UD6M	"	413,180	998	69	214
*R7KX	"	351,936	887	71	211
*RM7C	"	309,672	920	55	221
*UA6HFI	"	216,258	511	67	204
*R6KX	"	165,006	491	56	150
*RA7R	"	159,714	691	38	133
*RL6C	"	116,920	294	57	91
*RN6MA	"	112,792	364	49	135
*UA6AUA	"	111,600	217	77	123
*RZ6BR	"	60,976	236	43	105
*R6KEE	"	42,256	186	48	91
*RX6LRU	"	34,320	217	32	78
*UA6J	"	28,536	197	34	82
*R7RC	"	25,413	113	36	93
*RQ7R	"	24,960	149	39	81
*RZ6D	"	23,985	187	33	90
*R7KA	"	15,215	80	40	45
*UA6AAK	"	9,983	103	17	50
*UA6ATG	"	8,432	89	19	49
RU6C	*"*	*8,052*	*72*	*25*	*41*
*R7AY	"	5,376	34	25	31
*RQ6A	"	300	14	6	4
***UA6HLP**	**21**	**1,150**	**34**	**9**	**16**
***R7MT**	**14**	**15,540**	**191**	**12**	**48**
***R6KY**	**7**	**11,109**	**105**	**14**	**55**
***RW6MAO**	**3.5**	**9,550**	**157**	**11**	**39**
*R7MU	"	6,854	151	9	37
***UA6JBX**	**1.8**	**650**	**24**	**6**	**19**

R6DJM	**AA**	**987,421**	**1573**	**101**	**330**
R6AP	"	802,389	1305	102	297
UA6YW	"	685,032	982	110	328
R7AT	"	577,512	1097	75	237
RV7C	"	478,641	1004	82	227
R7HF	"	394,680	958	76	210
RA6CA	"	381,888	746	73	215
R7KZ	"	304,182	630	74	188
RA6GW	"	284,610	527	70	195
R7AW	"	193,160	567	60	160
RV6AVU	"	162,877	544	52	169
RN6AT	"	162,624	417	60	182
RO7N	"	105,456	391	50	158
R7FF	"	94,248	306	49	155
RC7A	"	93,095	299	52	163
RX6AM	"	76,960	221	50	80
R7LV	**28A**	**66,780**	**337**	**28**	**78**
RU6AX	"	5,694	94	13	26
UA6LCN	**21A**	**232,952**	**882**	**32**	**116**
RN6CV	"	28,240	194	23	57
R7NW	**14A**	**397,026**	**1556**	**39**	**122**
R7RF	**7A**	**273,870**	**1053**	**36**	**117**
RY7A	"	64,192	341	30	88
RN6A	"	33,048	259	20	61
RU6YJ	**1.8A**	**7,155**	**154**	**6**	**39**
***R7MM**	**AA**	**1,372,763**	**1721**	**114**	**355**
**R7NQ*	*"*	*467,475*	*990*	*69*	*202*
*UA6FZ	"	459,627	877	80	221
*RG5A/6	"	432,245	935	72	247
*R7CT	"	191,142	409	70	217
*UA6YH	"	123,280	350	54	130
*R7MY	"	119,116	405	50	144
*R6KA	"	94,166	325	56	141
*RT6N	"	71,898	322	38	100
*R7TW	"	67,473	207	56	97
*RL6MF	"	46,800	309	26	104
*R7NA	"	40,004	140	48	89
**RX7K*	*"*	*35,670*	*159*	*36*	*87*
*RN7A	"	32,655	244	25	80
*RA6L	"	26,598	207	22	71
*R6DAZ	"	21,294	86	50	76
*RA6AAW	"	7,504	56	29	38
**RV6ASU*	*"*	*7,007*	*53*	*24*	*25*
*RX6AOB	"	5,635	43	24	25
*R6FY	"	4,251	41	15	24
*RA6DT	"	2,223	21	20	19
**R7KQ*	*"*	*255*	*13*	*9*	*8*
***RA7C**	**21A**	**28,392**	**183**	**25**	**53**
*R7RDE	"	12,525	85	24	51
***R7CA**	**14A**	**157,450**	**631**	**33**	**101**
*UA6LCJ	"	73,710	454	28	77
*UA6Y	"	61,886	365	24	73
***R6CW**	**7A**	**19,491**	**119**	**23**	**50**
***RA6C**	**3.5A**	**62,999**	**701**	**14**	**59**
***RT6C**	**1.8A**	**1,131**	**35**	**6**	**23**
		District 9			
R9FE	**A**	**120,204**	**401**	**57**	**155**
UA9FGJ	**21**	**59,892**	**436**	**23**	**69**
***R9FBT**	**A**	**161,280**	**435**	**60**	**192**
*R9XS	"	157,130	536	53	137
*R9FDJ	"	143,437	485	60	157
*RQ9F	"	92,928	553	39	137
***R8FT**	**21**	**60,168**	**372**	**27**	**65**
***UD8F**	**14**	**7,990**	**111**	**12**	**35**
***R9FCY**	**7**	**3,570**	**73**	**9**	**33**
*RA9XSL	"	756	33	7	11
RG8G	**AA**	**69,030**	**267**	**50**	**145**
RM9X	"	25,650	112	41	73
RC9F	**14A**	**4,750**	**77**	**10**	**15**
***RM8G**	**AA**	**289,800**	**721**	**67**	**213**
*UA9XX	"	71,371	545	34	115
**UA9XL*	*"*	*12,636*	*139*	*22*	*56*
***R8XF**	**21A**	**56,848**	**588**	**17**	**51**
		European Turkey			
***TA1NAI**	**A**	**154,160**	**535**	**51**	**154**
***TA1MK**	**21A**	**85**	**13**	**6**	**11**
***TA1UT**	**7A**	**15,872**	**186**	**13**	**49**
		Faroe Islands			
**OY9JD*	*14*	*16,352*	*162*	*14*	*42*
***OY4M**	**"**	**5,616**	**134**	**6**	**33**
OY1CT	**21A**	**214,524**	**1542**	**21**	**80**
		Finland			
OH1VR	**A**	**1,364,013**	**1999**	**114**	**327**
OH8NW	"	1,034,460	1724	112	308
OG4A	"	350,350	1016	68	207
			(OP: OH2BAI)		
OH3JF	"	266,508	1045	46	152
OF5YU	"	118,003	443	43	154
OG5G	"	64,296	300	39	102
OH6AC	**28**	**28,626**	**213**	**20**	**58**
			(OP: OH6CS)		
OH5BM	**21**	**268,157**	**1063**	**35**	**96**
OH5TS	"	234,260	888	32	98
OH8X	**14**	**1,102,304**	**3335**	**37**	**115**
			(OP: OH6UM)		
OH2VZ	"	30,498	238	16	53
OH7R	*7*	*240,030*	*1220*	*32*	*103*
OG6B	**"**	**6,500**	**115**	**10**	**40**
			(OP: OH1ZAA)		
OG9W	**1.8**	**67,313**	**751**	**17**	**66**
			(OP: OH2BCI)		
***OH3M**	**A**	**441,530**	**967**	**83**	**252**
			(OP: OH3MMF)		
*OH1SIC	"	97,893	521	33	116
			(OP: SM5SIC)		
*OH1TS	"	57,812	348	37	112
*OH6LW	"	40,866	316	32	107
*OH2DA	"	32,591	125	43	66
*OH1XY	"	21,364	102	38	60
*OH2LU	"	20,670	165	23	83
*OH2BN	"	15,136	155	17	69
*OH3HZ	"	13,728	106	27	51
***OH3HS**	**14**	**144**	**9**	**3**	**6**
***OF9SE**	**7**	**69,768**	**500**	**26**	**76**
*OH5UQ	"	37,037	272	21	70
*OH3MM	"	2,574	64	9	30
***OH6Z**	**3.5**	**21,204**	**312**	**10**	**52**
OG6N	**AA**	**2,289,182**	**1914**	**157**	**501**
			(OP: OH6NIO)		
OG7F	"	1,602,390	2131	114	351
OF3FM	"	1,252,793	2101	92	291
			(OP: OH3FM)		
OH3EX	"	423,151	692	89	278
OH6RE	"	397,710	564	102	303
OH6OS	"	264,028	452	79	219
OH1EB	"	212,751	517	63	168
OH7KBF	"	203,346	586	60	177

OH3Z	"	191,889	444	70	137
			(OP: OH1NX)		
OH7KC	"	157,920	455	60	180
			(OP: OH7MFO)		
OH3JR	"	129,684	217	99	204
OH6DX	"	114,390	264	63	92
OH8WR	"	87,822	469	39	114
OH6TN	"	80,088	210	53	89
OH5VT	"	77,525	234	49	126
OG2M	"	67,816	142	70	126
OH2ID	"	56,684	243	45	103
OH1O	"	56,000	238	40	120
			(OP: OH1TV)		
OH3GZ	*"*	*36,040*	*245*	*32*	*104*
OH1MM	"	32,214	139	38	80
OH1XX	"	23,310	87	47	64
OH7HM	"	17,280	150	27	69
OH6BA	"	10,508	122	15	59
OH2BBT	"	6,762	63	21	25
OF1D	"	2,232	22	18	18
			(OP: OH1JD)		
OG7A	**21A**	**434,588**	**1229**	**38**	**128**
			(OP: OH6MW)		
OF9W	"	147,375	505	31	100
			(OP: OH5BQ)		
OF8L	**14A**	**754,572**	**2342**	**38**	**118**
			(OP: OH8LQ)		
OH8A	**7A**	**510,680**	**2289**	**32**	**104**
			(OP: OH8WW)		
OF5C	"	5,616	45	19	29
			(OP: OH5CW)		
OH2R	**3.5A**	**403,380**	**2059**	**34**	**101**
			(OP: OH2PM)		
OG3B	"	180,477	1569	22	77
			(OP: OH3RB)		
OH1X	"	13,937	120	18	59
			(OP: OH3WW)		
OH8CW	"	391	14	7	10
OG2T	**1.8A**	**65,988**	**828**	**17**	**61**
			(OP: OH5LLR)		
OG4T	"	64,476	711	16	65
			(OP: OH4MFA)		
OG5O	"	54,020	828	14	59
			(OP: OG55W)		
OH3RF	"	30,208	444	13	51
OH2BO	"	15,484	127	17	62
OH2KI	"	7,448	110	14	35
OH2MAS	"	182	8	5	8
***OH7GGX**	**AA**	**490,637**	**1073**	**69**	**254**
*OF7KA	"	141,895	498	43	142
			(OP: OH3KAV)		
*OH2EA	"	135,864	389	47	169
*OH6JUM	"	76,812	314	40	133
*OH5BE	"	19,665	121	28	67
*OH3NAQ	"	15,566	89	35	51
*OH2MGA	"	5,655	71	12	27
*OF8KA	"	4,550	57	18	47
***OG4W**	**7A**	**84,074**	**417**	**30**	**97**
			(OP: OH4KZM)		
*OH8TU	"	15,930	213	13	46
*OH1HB	"	5,618	72	12	41
		France			
TM5T	**A**	**1,296,560**	**2218**	**76**	**228**
			(OP: F5VKT)		
F6BLP	"	247,996	400	88	150
F8AAN	"	198,380	631	55	127
F6HBR	"	164,052	442	48	141
F4VSR	"	57,018	423	22	80
F6ITD	"	42,343	150	53	108
F8DGF	"	39,897	211	29	70
F4HNP	"	39,897	256	29	88
F5PYJ	"	26,316	142	27	102
F6FET	"	25,530	163	36	75
F6IRE	"	1,431	25	14	13
F5PHY	**28**	**4,680**	**81**	**13**	**26**
TM6X	**14**	**525,837**	**1934**	**33**	**106**
			(OP: F5VHY)		
F4VSD	"	6,750	143	8	37
F6FYA	**1.8**	**26,975**	**387**	**15**	**50**
***F6FTB**	**A**	**744,766**	**1211**	**85**	**264**
*F5SGI	"	621,320	1119	72	245
*F5ICC	"	253,136	653	57	151
*F5TVG	"	243,892	425	69	172
*F5TRB	"	207,104	547	61	195
*F5JU	"	205,301	428	62	177
*F5OEV	"	189,996	383	63	160
*F5VV	"	151,316	475	45	136
*F5JNT	"	145,024	504	48	158
*F6BQG	"	128,968	390	49	147
*F6JOE	"	124,658	560	35	122
*F6GCI	"	102,102	319	50	104
*F4CZV	"	95,228	390	42	137
*F6KVJ	"	88,560	358	33	111
			(OP: F5INJ)		
*F5OKB	"	75,776	405	31	117
*F4HPZ/P	"	67,886	215	55	127
*F5GGL	"	59,792	201	44	104
*F6GGA	"	49,968	299	34	110
*F6FNA	"	48,620	198	44	99
*F5MMB	"	46,614	193	35	67
**F5ILS*	*"*	*45,162*	*216*	*37*	*80*
*F5ROX	"	38,420	217	31	82
*F5UFV	"	33,138	216	36	90
*F5IAE	"	27,348	146	31	75
*F5PP	"	26,248	223	33	103
*F8OOI	"	22,090	133	35	59
*F4HYY	"	14,742	159	19	62
*F5PNI	"	9,185	79	20	35
*F6ICA	"	8,533	113	14	39
*F4FRG	"	7,986	68	23	43
*F5VHQ	"	7,656	96	20	46
*F4DBD	"	4,500	50	16	29
*F2AI	"	4,355	76	17	50
*F5TYY	"	4,060	77	17	41
*F5MGD	"	3,360	64	12	28
*F4GFT	"	2,494	56	11	32
*F4DZR	"	1,189	28	11	18
*F4HTA	"	494	12	9	10
***F5DM**	**28**	**3,724**	**59**	**11**	**27**
***F5PJG**	**21**	**14,602**	**150**	**16**	**33**
*F8NUH	"	11,271	93	16	35
*F8FLK	"	420	20	3	4
***F1IWH**	**7**	**8,750**	**149**	**10**	**40**
*F5MLJ	"	8,484	195	7	35
***F5PLC**	**1.8**	**35,200**	**544**	**11**	**53**
*F6CWA	"	19,038	308	9	48
F8DGY	**AA**	**2,603,628**	**2470**	**135**	**423**
F5OHM	"	1,821,438	2333	108	315
F5NZY	"	1,256,409	1685	100	341
F6AUS	"	772,002	772	115	347
F6EZV	"	656,952	1182	90	282
F5CBQ	"	502,500	897	61	189

TM5A	"	472,500	674	94	284
			(OP: F5VHJ)		
F6HDI	"	471,912	532	99	325
F5FDC	"	314,648	560	86	210
F5JFU	"	285,190	431	92	269
F6GCP	"	178,816	409	43	133
F6FLU	"	172,926	340	62	172
F4HRM	*"*	*137,886*	*261*	*75*	*126*
F4ERS	"	82,002	307	46	127
F6GOE	*"*	*80,100*	*198*	*59*	*121*
F6GOX	"	64,141	198	61	126
F4FFH	"	53,592	214	39	93
F1TRE	"	48,191	249	36	107
F4KLW	"	45,346	294	22	57
			(OP: F5PAL)		
F6CZV/P	"	45,220	140	49	84
F5PCV	*"*	*38,908*	*205*	*24*	*47*
F4HPX	"	33,756	194	33	83
F5NBX	**28A**	**97,728**	**519**	**24**	**72**
TM4K	"	78,540	432	27	75
			(OP: F4EGZ)		
TM5J	"	2,838	47	14	29
			(OP: F5TMJ)		
F1UVN	**3.5A**	**528**	**20**	**7**	**15**
***F8CRS**	**AA**	**1,830,320**	**1573**	**135**	**413**
*F5NKX	"	1,276,778	1426	104	363
*TM5DX	"	800,360	1043	97	243
			(OP: F4HAU)		
*F4VTC	"	212,658	698	45	156
*F/DJ4MZ	"	207,694	617	49	177
*F5TGR	"	199,485	394	68	211
*F8KGW	"	199,104	480	60	144
			(OP: F5SDH)		
*F5OYM	"	187,765	369	73	162
*F5RDS	"	136,644	438	46	147
*F6DZD	"	119,890	392	46	144
*F4CVQ	"	109,564	302	56	140
*F5IND	"	105,600	383	46	130
*F4FLO	"	44,064	151	48	105
*F5OWL	"	39,008	171	34	72
*F6FDR	"	36,332	164	40	84
*F4EJL	"	31,280	169	31	84
*F6CEL	"	31,213	146	30	61
*F8CPA	"	26,190	158	31	66
*F4FHV	"	21,800	149	29	80
*F4IAA	"	18,032	210	23	69
*F6UGW	"	4,558	62	21	32
*F8FQJ	"	1,617	35	13	20
***F4FFZ**	**28A**	**33,976**	**249**	**18**	**44**
***F4BKV**	**7A**	**94,250**	**426**	**33**	**92**
*F1IKA	"	37,296	301	18	66
*F5DRD	"	4,935	97	11	36
***TM3Z**	**1.8A**	**748**	**29**	**5**	**29**
			(OP: F4DSK)		
*F1ULQ	"	450	28	4	21
		Germany			
DL2CC	**A**	**2,044,195**	**2414**	**105**	**284**
DL2SAX	"	1,811,160	2446	90	254
DKØPO	"	1,090,986	1529	106	320
			(OP: DK2CF)		
DC4A	"	406,844	978	53	140
			(OP: DL4NAC)		
DD2AW	"	391,996	1175	63	173
DK3GI	"	335,920	491	105	199
DF6RI	"	325,362	782	52	205
DL9SCO	"	266,509	559	72	185
DL3AO	"	232,071	394	89	168
DL7VMM	"	226,185	618	63	192
DL2VWR	"	201,778	434	67	166
DK1NO	"	187,013	689	46	127
DF1XC	"	153,400	483	48	152
DK4HH	"	150,944	474	59	153
DL1YCF	"	143,313	512	43	158
DL2DSA	"	108,031	309	67	186
DL2DX	"	103,008	500	30	57
DF1ZN	"	86,086	321	46	136
DH6BH	"	83,790	306	48	123
DL5DXS	"	81,738	282	38	76
DK3AX	"	63,114	295	43	114
DL3RHN	"	51,360	200	47	113
DK5PF	"	46,112	230	40	91
DJ2AX	"	38,592	198	40	94
DK5LY	"	38,121	214	31	66
DF5BX	"	37,584	258	28	88
DJ1YF	"	30,015	254	27	60
DL3XM	"	28,800	136	45	45
DK7TX	"	26,596	121	35	74
DF5DK	"	26,220	148	28	67
DL6NAV	"	21,663	137	30	53
DD1TT	"	13,851	97	24	33
DL6MIG	"	13,120	99	21	59
DL2JST	"	11,152	139	25	57
DF6QE	"	8,680	67	25	37
DK7YGL	"	8,437	86	23	36
DK1FW	"	5,029	45	20	27
DG2BAR	"	3,000	43	18	32
DL7LX	"	495	17	5	6
DL8FAJ	"	400	11	8	8
DL4DXF	"	48	4	2	2
DL4LBK	**21**	**142,080**	**534**	**30**	**81**
DL1DTL	"	104,320	399	31	97
DMØA	**14**	**873,216**	**2890**	**37**	**107**
			(OP: DK3DM)		
DL5JS	"	285,246	1225	29	77
DL9LM	"	89,900	468	25	75
DK4SG	**7**	**107,224**	**515**	**25**	**79**
DJ8QA	"	6,174	104	11	38
DJ8ES	"	1,073	29	7	22
DM5O	**3.5**	**972**	**33**	**6**	**21**
			(OP: DM5EM)		
DL5KVV	**1.8**	**17,100**	**323**	**11**	**46**
DL7DZ	"	8,526	178	11	38
DJ7WG	"	2,886	60	8	31
DM1BM	"	1,020	42	6	24
***DD5M**	**A**	**708,580**	**1204**	**88**	**267**
			(OP: DJØZY)		
*DJ2XY	"	681,291	1204	82	269
*DM2DX	"	598,827	814	108	303
*DK3YD	"	582,832	1322	69	223
*DF1DX	"	529,477	1024	64	177
*DF4ZL	"	484,314	1122	71	247
*DL1MAJ	"	343,962	594	66	225
*DJ2IA	"	340,725	804	63	212
*DL1SAN	"	308,826	822	59	199
*DL8ULF	"	305,360	1048	50	170
*DB5DY	"	278,239	676	61	160
*DL8HK	"	254,190	905	48	181
*DM5JBN	"	251,280	540	56	184
*DL4ZA	"	247,400	799	50	150
*DL9MFY	"	229,320	605	54	141
*DJ9CN	"	228,904	588	65	183
*DF8TY	"	211,464	450	76	188
*DJ3RA	"	211,357	668	58	183

*DL5YL	"	204,723	738	51	156
*DL1VJL	"	202,582	389	75	124
*DF6QC	"	194,098	682	47	167
*DL6NBS	"	186,205	499	56	167
*DM3XI	"	182,160	369	76	164
*DL3DRN	"	179,718	476	59	172
*DL7YAD	"	165,424	417	49	147
*DL2HYH	"	162,382	326	59	183
*DL2NEA	"	158,886	528	52	142
*DL2RUG	"	156,876	405	55	149
*DK6OR	"	150,080	474	49	175
*DF3CE	"	139,664	419	48	155
*DF3IS	"	135,992	403	57	134
*DL1EAL	"	131,539	415	50	149
*DL2F	"	130,368	744	38	130
					(OP: DL2FDL)
*DF8IU	"	124,033	502	47	156
*DG7EE	"	122,892	397	57	171
*DK3WJ	"	114,851	322	56	141
*DK5OCE	"	109,233	395	46	113
*DD5KG	"	100,598	355	47	132
*DM5B	"	99,120	418	42	126
					(OP: DG6IMR)
*DM3ZM	"	98,670	355	47	148
*DL4AMK	"	98,494	293	58	184
DK2AMS	*"*	*91,182*	*394*	*34*	*133*
*DL4XU	"	89,060	435	33	113
*DL4SL	"	88,556	402	40	129
*DG9MDM	"	88,

*DK4REX	"	30	11	3	7
***DJ9KH**	**21**	**59,286**	**376**	**22**	**60**
*DHØJAE	"	16,416	135	22	35
*DHØGDS	"	11,844	162	13	23
*DL5MEL	"	5,945	101	11	18
*DB8AH	"	2,250	55	9	16
*DL1SBF	"	1,896	44	9	15
*DK4YU	"	1,748	48	8	11
*DLØLA	"	1,530	20	15	19
			(OP: DL2LDE)		
*DJ6XB	"	210	10	4	3
*DM1AA	"	6	1	1	1
***DL9ZP**	**14**	**195,052**	**843**	**32**	**92**
*DM3CW	"	64,214	349	22	75
*DL8BV	"	28,248	208	20	46
*DL5CC	"	16,800	107	22	58
*DL1AKL	"	13,384	177	11	45
*DL3MB	"	10,388	130	11	38
*DLØGEO	"	8,892	135	11	28
			(OP: DL2YAK)		
*DF3SM	"	2,322	84	5	22
*DL2QT	"	1,045	31	8	11
*DL1HZM	"	686	19	6	8
*DK2CW	"	130	12	6	7
***DL4AAE**	**7**	**192,852**	**802**	**30**	**102**
*DL5KUD	"	79,073	482	25	82
*DK4LX	"	72,556	468	22	75
*DK2TX	"	47,971	414	15	62
*DL7ØTRS	"	46,904	509	17	65
			(OP: DJ8QP)		
*DL1THB	"	11,256	182	10	46
*DL1GZW	"	10,556	145	13	45
*DL9TU	"	3,360	72	8	34
*DL3AMB	"	2,688	74	6	36
*DL8UKW	"	2,016	53	8	24
***DL2HWB**	**3.5**	**23,714**	**257**	**14**	**57**
*DL1XW	"	10,230	131	11	44
*DL4ZZ	"	3,922	105	8	29
***DL4TJ**	**1.8**	**20,328**	**380**	**10**	**46**
*DF1DT	"	13,475	294	7	42
*DL6CGC	"	5,311	100	8	39
*DM2RM	"	4,360	123	7	33
*DL1AWD	"	837	45	4	23
*DL2RZG	"	713	34	3	20
*DL1KVN	"	672	33	4	20
DK9PY	**AA**	**5,490,960**	**3957**	**153**	**515**
DD2D	"	4,905,180	3264	156	531
			(OP: DK8ZB)		
DK6WL	"	4,375,392	2568	181	585
DK9IP	"	4,034,710	2347	175	555
DK3WW	"	3,810,789	2681	172	515
DL1WA	"	3,428,252	2897	146	482
DL7ON	"	3,190,112	2173	184	577
DF5UL	"	3,092,703	2412	147	444
DL3DTH	"	2,373,760	1882	154	486
DK5TX	"	2,209,339	1526	139	450
DP8M	"	2,130,084	1491	149	445
			(OP: DL6NDW)		
DF8XC	"	1,976,311	1649	131	416
DJ9DZ	"	1,778,970	1784	133	437
DL4WA	"	1,767,948	1641	130	416
DK8ZZ	"	1,646,596	1621	134	408
DM4X	"	1,583,764	1806	128	366
			(OP: DD2ML)		
DL8SCG	"	1,575,891	1553	134	395
DL5YM	"	1,511,334	1865	117	332
DL1BUG	"	1,489,995	1348	149	436
DL3UB	"	1,488,606	1679	125	404
DFØCI	"	1,446,584	1159	143	471
			(OP: DL8AKI)		
DL8WEM	"	1,378,479	1674	112	341
DL5GAC	"	1,326,928	1501	114	364
DL1NEO	"	1,258,064	1108	122	366
DL8UAT	"	1,250,494	1323	125	374
DL1NKS	"	1,229,695	1788	101	290
DC6O	"	1,227,825	1335	114	345
			(OP: DL3DW)		
DH7KU	"	1,195,210	1258	122	348
DJ5AN	"	1,190,286	1044	143	391
DM2X	"	1,161,537	1434	133	374
			(OP: DL2OE)		
DHØGHU	"	1,106,070	1066	116	367
DK1KC	"	1,092,420	1448	98	322
DF6QV	"	1,072,500	1361	87	303
DL4HRM	"	1,029,552	1304	115	367
DF1LX	"	974,776	1102	90	328
DK7A	"	861,822	1266	97	284
			(OP: DJ8VH)		
DF9XV	"	853,616	768	137	359
DFØGDX	"	790,010	882	136	379
			(OP: DL7VEE)		
DF2RG	"	786,429	1029	99	300
DF4PD	"	785,660	791	106	376
DL5NEN	"	769,860	945	102	321
DF5EG	"	738,680	823	115	357
DL1VDL	"	708,228	1109	103	279
DC3CC	"	701,190	1368	92	279
DJØIF	"	699,270	1020	103	287
DM5DM	"	688,577	1029	88	261
DQ5T	"	665,280	759	94	258
			(OP: DL4LAM)		
DK7ZT	"	644,394	882	109	313
DJ9RR	"	639,400	720	107	353
DL8RDL	"	611,280	889	99	261
DF1LON	"	608,542	746	96	302
DK2CX	"	599,865	662	116	319
DL1ATZ	"	599,260	853	105	310
DK2LO	"	593,216	772	104	299
DF2LH	"	580,853	605	128	363
DL6AG	"	563,673	941	86	255
DL7BO	"	550,329	660	109	302
DL2ARD	"	543,720	1235	47	150
DL7QU	"	517,816	796	87	251
DJ5IW	"	517,630	785	97	273
DK1AX	"	510,800	586	117	283
DJ7UC	"	468,789	589	94	213
DL5JQ	"	443,897	662	91	292
DJ8RS	"	439,484	571	99	182
DF4XX	"	430,646	742	88	238
DL4JLM	"	409,343	732	74	125
DL1QW	"	353,674	495	96	266
DQ1P	"	348,075	491	102	255
			(OP: DK1IP)		
DL5ST	"	341,411	665	76	247
DL6MRS	"	340,692	485	97	259
DL7UXG	"	332,636	659	72	202
DM3PKK	"	332,272	636	80	224
DP4X	"	327,680	428	84	236
			(OP: DJ2MX)		
DL5XAT	"	321,432	746	62	174
DL1STG	"	300,480	463	97	216
DJ4WT	"	299,264	637	70	186
DK2BJ	"	274,740	660	63	222
DL7YS	"	266,952	443	85	209
DH1TST	"	261,551	451	80	231
DK5JM	"	256,542	488	76	223
DL1SVA	"	254,240	508	71	209
DK8FS	"	252,010	515	77	213
DL5NAM	"	240,504	404	70	194
DL5DTG	"	216,124	478	74	210
DL1LOD	"	213,615	394	83	220
DJ1MM	"	208,962	605	52	182
DL2NFC	"	206,427	393	64	137
DF2TT	"	200,070	324	89	253
DK2AT	"	199,423	545	55	162
DM5I	"	196,142	439	47	155
			(OP: DF3VM)		
DF1HF	"	184,698	330	65	214
DF8V	"	182,477	419	70	181
			(OP: DF8VO)		
DL8QS	"	174,400	443	55	145
DK1MAX	"	173,420	439	75	185
DJ2BC	"	167,889	541	50	141
DF3CB	"	163,476	301	77	151
DL8CA	"	152,208	358	60	91
DM5TI	"	150,480	325	83	202
DD3FH	"	143,376	315	58	174
DK1TW	"	139,590	462	48	150
DK1FT	"	133,224	423	48	120
DL1KWK	"	122,120	580	33	109
DL6DVU	"	114,754	381	50	131
DL3IAE	"	109,200	249	71	137
DJ2TG	"	106,381	358	56	153
DL8KX	"	104,016	302	69	107
DF1JM	"	101,430	230	72	138
DL1DBR	"	100,701	345	40	127
DM2HK	"	91,512	358	59	189
DG9SEH	"	90,741	302	50	153
DG8HJ	"	82,080	238	57	183
DK6QW	"	76,712	264	45	127
DL9GCG	"	75,180	232	47	132
DL6HCC	"	66,304	185	57	91
DC8TT	"	59,640	295	32	108
DL9JON	"	54,612	269	31	133
DL8MKG	"	49,274	148	49	93
DL5NDX	"	42,780	179	39	85
DGØKS	"	42,636	269	30	84
DL2ZBO	"	41,625	290	27	84
DJ2SL	"	37,672	181	45	91
DM3ZF	"	37,224	218	36	105
DD1JN	"	32,292	224	31	86
DL8OBF	"	26,160	141	35	74
DF3QG	"	21,600	86	44	56
DL5ZB	"	20,736	80	43	53
DL9NDV	"	20,280	102	37	67
DK4QT	"	19,923	135	33	54
DH6DAO	"	19,136	92	34	58
DJ7OQ	"	17,313	77	37	50
DF5AU	"	13,984	78	36	56
DM4AO	"	13,816	81	27	61
DL3NCR	"	13,013	61	34	43
DK8CB	"	10,792	92	21	55
DM5DX	"	8,954	71	25	49
DL5OAB	"	8,584	77	19	39
DL6MFK	"	2,540	45	10	10
DM2CYN	"	1,184	19	15	17
DL2AMD	"	572	16	11	11
DL2VNL	"	390	21	9	17
DH8BQA	**28A**	**65,844**	**360**	**29**	**89**
DJ3CQ	"	5,733	74	14	25
DL1PAN	"	546	13	7	7
DL3FCG	**21A**	**312,117**	**850**	**37**	**114**
DL5XJ	"	303,399	830	37	116
DK2GZ	"	300,448	825	37	127
DM5EM	"	124,319	412	37	94
DJ1AA	"	38,000	145	32	68
DL5ZL	"	36,378	207	23	63
DKØAE	"	35,900	142	33	67
			(OP: DJ1AA)		
DLØLK	"	20,145	127	24	55
			(OP: DL1SO)		
DL3ARK	"	10,396	93	18	28
DL1QS	"	7,670	59	21	38
DP7X	**14A**	**406,221**	**1436**	**35**	**94**
			(OP: DL6IAK)		
DM3MM	"	223,509	823	38	105
DK5XG	"	77,841	441	24	69
DD7CW	"	37,296	307	18	45
DG4UF	"	20,398	169	19	43
DL6FBL	"	17,615	130	16	49
DJ6TB	"	3,240	50	11	25
DJ5KX	"	2,075	36	9	16
DL6RDE	**7A**	**257,136**	**1306**	**32**	**100**
DM3M	"	154,462	946	27	91
			(OP: DM3XRF)		
DL9NEI	"	152,620	695	33	97
DJ7TO	"	138,856	555	33	103
DL6LAU	"	104,545	353	37	108
DK1WU	"	72,928	597	26	80
DJ6TF	"	72,335	392	30	85
DL1OJ	"	46,784	428	23	63
DL3LJ	"	19,241	161	16	55
DK4RM	"	8,970	77	18	47
DL3ANK	**3.5A**	**325,596**	**1707**	**31**	**98**
DL7URH	"	204,288	1301	27	87
DL4ME	"	125,244	1003	22	76
DF6PB	"	93,258	676	21	78
DJ9AO	"	75,272	638	21	76
DL6DH	"	23,793	222	16	61
DM7C	**1.8A**	**191,510**	**1385**	**23**	**87**
			(OP: DL7CX)		
DR5X	"	185,481	1283	23	88
			(OP: DL8LAS)		
DL6MHW	"	110,208	957	20	76
DH1NBE	"	68,634	751	17	65
DL4CF	"	50,204	534	14	63
DK3UA	"	44,772	411	15	67
DF8AA	"	44,550	490	16	65
DL6JZ	"	41,138	578	11	56
DP7A	"	24,140	380	12	56
			(OP: DL3NCI)		
DL1AMQ	"	8,906	94	13	60
***DJ5MO**	**AA**	**2,412,860**	**1990**	**135**	**406**
*DJ4MX	"	2,409,584	2154	143	441
*DL4FN	"	1,958,060	2001	103	339
*DL6RAI	"	1,801,216	1908	114	398
*DL2NBU	"	1,665,083	1449	135	418
*DK5DQ	"	1,595,592	1469	132	402
*DF7EE	"	1,527,750	1252	138	444
*DK8NT	"	1,066,747	1802	95	312
*DL7ANR	"	1,045,072	1280	99	335
*DJ3HW	"	1,014,120	1583	90	270
*DR7T	"	976,212	1430	90	303
			(OP: DF1DN)		
*DJ1YFK	"	966,350	1527	85	300
*DL3IAS	"	953,209	1671	81	266
*DM7W	"	829,649	1157	78	281
			(OP: DL8MAS)		
*DF2AJ	"	819,432	1007	118	338
*DL4SDW	"	805,815	1089	92	289
*DL1TS	"	766,692	1266	84	288
*DJ1SL	"	733,278	1212	81	276
*DL2LDE	"	724,816	717	138	371
*DR5W	"	672,954	1131	89	265
			(OP: DL1RTL)		
*DL8TG	"	651,944	1128	79	280
*DL1GME	"	633,141	1252	70	239
*DK8AX	"	574,600	636	122	303
*DA3T	"	557,400	1248	65	235
			(OP: DL8DXL)		
*DK3DUA	"	490,314	747	87	287
*DF2KK	"	486,130	983	80	201
*DL5ARM	"	440,628	1013	67	225
*DF7TV	"	369,184	627	92	240
*DL3MXX	"	347,700	694	69	236
*DH7TNO	"	346,060	820	57	229
*DK9OY	"	340,614	676	70	228
*DK2FG	"	316,448	915	60	172
*DL3JAN	"	292,383	355	113	328
*DL5CL	"	281,517	506	73	248
*DF6LQ	"	274,824	610	63	201
*DJ3XA	"	243,712	622	59	197
*DJ6OI	"	230,868	502	62	180
*DM6EE	"	219,744	538	61	227
*DL2LRT	"	216,108	519	65	211
*DO4OD	"	214,730	490	55	163
*DL9SEV	"	209,061	568	60	201
*DF4XF	"	205,088	731	47	161
*DJØYI	"	191,528	709	48	130
*DJ6RN	"	179,095	489	54	161
*DF7TS	"	176,337	649	40	149
*DL5MFF	"	175,860	530	47	133
*DL5SDN	"	174,468	351	59	209
*DK5WO	"	160,704	477	44	142
*DL4VK	"	147,798	504	40	149
*DL5RDO	"	140,777	352	59	162
*DL4DRW	"	132,288	384	58	134
*DL8UI	"	123,753	301	66	147
*DL7ALM	"	119,900	372	50	168
*DF7CB	"	115,248	395	47	149
*DF9VJ	"	106,609	317	52	129
*DJ6OZ	"	96,775	356	45	130
*DG3FK	"	91,015	239	60	107
*DF1OE	"	85,683	309	45	124
*DC8SG	"	81,664	242	55	177
*DF3EC	"	81,315	229	57	82
*DF2DR	"	80,868	300	41	97
*DL1ONI	"	80,704	251	50	158
*DO9SR	"	79,716	464	31	115
*DL3RDM	"	71,965	307	42	143
*DL9DBZ	"	71,760	292	37	83
*DL8ZAJ	"	67,940	268	47	125
*DL4KUG	"	64,680	243	42	90
*DM2RN	"	64,321	349	29	102
*DKØKG	"	63,655	332	34	111
			(OP: DL7ACN)		
*DL4DTL	"	61,236	278	38	124
*DL5KBO	"	57,183	270	40	107
*DK8FD	"	55,050	281	39	111
*DG9OAY	"	49,392	272	39	108
*DL7UN	"	48,125	248	34	91
*DL3CX	"	46,698	233	33	96
*DG1VL	"	45,962	227	34	100
*DL6RBH	"	38,808	219	32	100
*DL8RB	"	36,322	150	39	104
*DG7LAN	"	35,784	204	34	92
*DL1GRC	"	34,650	185	33	93
*DJ2FR	"	34,047	205	34	83
*DF7IH	"	32,663	224	20	69
*DJ7IK	"	31,388	216	25	93
*DF9JL	"	31,326	203	40	98
*DL6UAA	"	30,888	119	45	111
*DK7TY	"	30,414	151	35	76
*DL1ARK	"	29,925	128	38	67
*DL8JDX	"	28,336	103	48	64
*DJ3WE	"	25,168	165	30	74
*DL2RTJ	"	23,842	177	20	71
*DHØAAC	"	20,874	109	37	61
*DJ1TO	"	20,596	123	25	51
*DL1EJD	"	18,512	150	24	65
*DL5ANS	"	16,150	99	26	59
*DL4AC	"	14,440	100	24	52
*DL4GBA	"	13,728	109	26	62
*DL1NKB	"	13,160	112	24	46
*DK5TRI	"	12,936	102	24	42
*DL6GV	"	12,798	87	24	30
*DF8TM	"	12,500	116	25	25
*DL3DUE	"	11,972	100	20	53
*DJ3JD	"	10,455	107	21	64
*DL3RAR	"	8,856	59	32	50
*DL1KLF	"	8,736	102	21	57
*DP5P	"	8,721	75	21	30
			(OP: DL1MHJ)		
*DK7XX	"	8,418	100	20	26
*DK9OV	"	8,188	92	20	69
*DA3A	"	7,938	117	18	31
			(OP: DK9VS)		
*DL1JHW	"	6,804	95	16	47
*DL6EZ	"	5,520	71	14	16
*DJ6PC	"	3,690	38	19	22
*DL7UPN	"	3,450	51	17	29
*DG6UAX	"	3,362	49	18	23
*DK9TN	"	3,105	49	13	32
*DJ5AM	"	2,891	98	9	40
*DL3GJ	"	2,720	49	10	30
*DD5VL	"	2,544	31	20	28
*DL6UM	"	2,368	52	12	25
*DL1DQW	"	1,888	32	12	20
*DL2ARN	"	1,827	23	12	17
*DJ6DO	"	1,020	67	20	48
*DL2SWR	"	980	17	10	10
*DF2AP	"	860	20	9	11
*DK4FT	"	780	17	9	11
*DL2BRN	"	625	13	12	13
*DFØSL	"	210	7	7	7
			(OP: DDØNM)		
*DL6KBG	"	15	13	6	9
***DL1NUX**	**28A**	**1,020**	**23**	**9**	**11**
*DK9ZQ	"	196	36	10	18
***DM4MN**	**21A**	**44,100**	**185**	**23**	**75**
*DL6DCD	"	26,910	162	21	57
*DF7JC	"	3,276	61	10	18
*DK2YL	"	414	16	4	5
***DM3F**	**14A**	**144,480**	**563**	**29**	**91**
			(OP: DH5FS)		
*DK5SP	"	792	37	4	20
***DL7NX**	**7A**	**144,204**	**769**	**28**	**94**
			(OP: E71DX)		
*DK2DQ	"	64,911	706	16	61
*DJ2XC	"	49,875	364	21	74
*DK3WN	"	46,035	313	21	72
*DK2ZO	"	27,880	219	17	68
*DL5A	"	22,878	205	16	66
			(OP: DL5KUA)		
*DG9VH	"	8,211	127	9	42
*DL7ULM	"	3,888	56	10	14
*DL5GA	"	1,748	41	8	30
*DL5KUA	"	247	9	4	9
***DF1MM**	**3.5A**	**113,850**	**1034**	**16**	**74**
*DJØMY	"	92,026	696	18	71
*DM7CW	"	11,115	188	8	49
***DF7GG**	**1.8A**	**24,339**	**364**	**11**	**50**
Greece					
J42L	**A**	**5,052,874**	**5660**	**133**	**366**
			(OP: N5ZO)		
SV1ME	**7**	**42,750**	**397**	**20**	**55**
***SV1CKZ**	**A**	**421,952**	**736**	**76**	**228**
*SX2ØØJFL	"	28,750	198	31	84
			(OP: SV1JFL)		
*SV1CEI	"	26,016	98	43	53
*SV2SIF	"	11,704	123	23	54
*SV7CUD	"	6,798	75	17	49
*SV1AZL	"	1,280	20	15	17
*SV3AWG	7	2,442	48	8	25
SX1T	**AA**	**1,378,722**	**2675**	**90**	**276**
			(OP: SV1ENG)		
SV2HXX	"	1,216,011	2254	103	294
SV4FFL	"	513,597	1579	60	199
SV1RK	"	230,608	500	69	163
SV1AER	"	39,349	208	31	78
SV2CCA	"	5,440	43	26	42
SV2KF	**21A**	**11,123**	**110**	**21**	**28**
SV2BXA	**7A**	**135,915**	**794**	**29**	**94**
SV2JAO	**3.5A**	**169,995**	**1323**	**23**	**82**
SV8BHN	**1.8A**	**7,722**	**103**	**14**	**52**
***SV1AJO**	**AA**	**135,044**	**581**	**43**	**139**
*SV1MO	"	11,088	90	30	47
*SV1VJ	"	1,276	18	13	16
***SV2BOH**	**28A**	**14,427**	**121**	**18**	**45**
***SV2AEL**	**21A**	**121,200**	**506**	**31**	**89**
***SV2DSJ**	**7A**	**93,896**	**502**	**31**	**90**
Guernsey					
GU4CHY	**14**	**280,893**	**1633**	**28**	**81**
***GUØBEZ**	**A**	**15,876**	**125**	**22**	**62**
***MUØFAL**	**21**	**41,726**	**307**	**15**	**47**
Hungary					
HA8DU	**A**	**845,924**	**1619**	**76**	**216**
HG6O	"	620,308	1107	76	240
			(OP: HA6OA)		
HA7LW	"	276,776	694	67	165
HA7PL	"	209,839	721	47	170
HA8LNN	"	196,960	813	41	119
HAØVI	**7**	**146,050**	**779**	**31**	**96**
HA8IH	**3.5**	**61,124**	**492**	**16**	**58**
*HA7UI	A	723,490	1428	84	271
***HA2EOU**	**"**	**526,812**	**1154**	**74**	**233**
*HA8AT	"	330,948	869	58	203
*HA3HK	"	265,290	764	63	176
*HA8WZ	"	188,410	612	54	173
*HA1TV	"	181,196	647	44	150
*HA7ME	"	160,816	622	51	133
*HA7SQ	"	136,219	480	49	130
*HA5ØVQ	"	131,600	499	49	151
			(OP: HA1VQ)		
*HA6OA	"	63,431	231	46	91
*HA9RC	"	43,197	202	36	83
*HA5GY	"	22,672	158	30	79
*HA7SG	"	19,900	138	23	27
***HA2MI**	**28**	**5,016**	**72**	**13**	**25**
***HAØLZ**	**21**	**35,668**	**234**	**26**	**48**
*HA5CRT	"	987	24	10	11
***HA8EN**	**14**	**26,432**	**286**	**14**	**50**
***HG8L**	**7**	**111,550**	**891**	**23**	**74**
			(OP: HA8RD)		
*HA9RP	"	65,879	264	30	83
***HA4N**	**3.5**	**48,576**	**702**	**10**	**56**
*HA5UA	"	5,032	120	8	29
***HAØIH**	**1.8**	**9,768**	**216**	**7**	**37**
HA8A	**AA**	**6,725,312**	**4862**	**166**	**538**
			(OP: HA8DZ)		
HG8R	"	6,234,656	4385	169	519
			(OP: HA8JV)		
HA8VV	"	1,443,793	1096	149	462
			(OP: DH8VV)		
HA5PP	"	1,220,488	1259	122	366
HA3OU	"	1,049,568	1315	112	352
HA9A	"	940,165	1448	89	206
			(OP: HA9AX)		
HA6P	"	746,550	1294	79	236
			(OP: HA6PX)		
HA7VK	"	675,675	1005	94	291
HA7SBQ	"	397,769	796	81	230
HG6Y	"	324,414	793	48	153
			(OP: HA6OI)		
HA5YG	"	292,032	677	58	176
HA5UX	"	256,802	676	69	169
HA2VR	"	193,050	412	77	193
HAØDR	"	94,068	439	44	112
HA3NU	**21A**	**682,416**	**1786**	**38**	**130**
HG1S	"	412,335	1123	37	128
			(OP: HA1DAE)		
HA8FK	"	400,372	1078	36	122
HGØY	**14A**	**896,289**	**2484**	**36**	**131**
			(OP: HA7GN)		
HA5JI	"	712,962	2059	39	124
HG2DX	"	597,261	1962	35	112
HA8M	"	369,096	1195	37	119
			(OP: HA8FM)		
HA3PW	"	333,472	1217	34	102
HA1AD	"	282,228	1202	29	87
HA8IB	"	70,200	343	28	72
HG3N	**7A**	**781,200**	**2883**	**37**	**131**
			(OP: HA3LN)		
HG5D	"	663,250	2426	40	135
			(OP: HA8QZ)		
HG4I	"	585,333	2168	37	126
			(OP: HA5LN)		
HA8TP	"	213,030	1047	32	103
HA2NA	"	101,090	636	30	80
HA1TJ	**3.5A**	**512,226**	**2190**	**35**	**108**
HA1A	"	236,145	1848	22	83
			(OP: HA1YA)		
HA2KMR	"	181,986	1560	20	78
HA8BT	**1.8A**	**18,480**	**275**	**10**	**50**
***HA5PT**	**AA**	**1,315,807**	**1771**	**104**	**333**
*HA8WY	"	1,076,048	1465	109	327
*HA7MF	"	655,588	1482	75	236
*HA8TKS	"	392,196	996	69	225
*HA1AC	"	194,010	677	51	172
*HA3JO	"	104,432	316	55	159
*HA3IC	"	63,200	264	45	115
*HA7HQ	"	48,060	291	33	102
*HA9TA	"	42,624	210	33	78
*HA3HA	"	38,776	334	39	109
*HA1WD	"	34,144	319	16	81
*HAØANA	"	513	15	7	12
***HA8BE**	**28A**	**28,244**	**154**	**27**	**65**
***HGØR**	**21A**	**235,867**	**687**	**35**	**114**
			(OP: HAØNAR)		
*HA2E	"	101,412	458	30	78
			(OP: HA2EAV)		
*HG8K	"	78,318	302	31	83
			(OP: HA8GY)		
*HA7PO	"	63,210	294	30	56
*HA3FMR	"	9,840	102	15	25
***HA7I**	**7A**	**286,130**	**1385**	**35**	**107**
			(OP: HA7JTR)		
***HA8V**	**3.5A**	**35,360**	**535**	**9**	**56**
*HA6VV	"	20,060	313	10	49
*HG8W	"	32	13	6	10
				(OP: HA8ZO)	
***HAØHV**	**1.8A**	**92,224**	**991**	**17**	**71**
Iceland					
***TF3VS**	**A**	**81,315**	**373**	**27**	**90**
*TF3EO	"	49,404	325	22	70
*TF8KY	"	11,160	99	21	51
TF3SG	**AA**	**834,344**	**1563**	**75**

*IZ8CLM	"	12,584	59	37	51
*IU6AIG	"	12,549	113	27	62
*IC8/ UR8QX	"	11,328	110	17	47
*IZ8HUW	"	10,873	186	19	64
*IN3ZWF	"	10,143	114	16	53
*IW2CAM	"	8,526	66	26	32
*IZ3EAX	"	8,190	98	16	49
*IUØMVD	"	7,009	84	13	30
*IK2UJF	"	7,006	86	13	49
*IZ2ABZ	"	6,873	79	16	63
*IK2CMI	"	6,767	87	14	53
*IWØAEN	"	6,014	74	20	42
*IK6XEJ	"	5,950	49	20	30
*IU6DVS	"	5,537	47	20	29
*IW2ENA	"	4,800	55	20	44
*IK7UKF	"	4,698	91	13	41
*IZ6WSJ	"	4,268	47	18	26
*I2ORX	"	3,818	57	15	31
*IK2NUX	"	3,780	45	16	29
*IZ5IMB	"	2,928	33	19	29
*IK2TKX	"	2,730	67	9	33
*IK2OVT	"	2,236	40	17	26
*IZ2ABI	"	2,193	50	17	34
*IU1CYF	"	1,960	36	13	27
*IKØALT	"	1,911	48	13	26
*IK2REA	"	980	25	10	18
*IU2MCH	"	760	19	7	13
*IZ5HQB	"	300	10	6	6
*IK8SCR	"	96	8	5	7
*IU3BPW	"	7	7	2	5
IR4Q	**28**	**4,644**	**77**	**11**	**25**
			(OP: IU4MRU)		
*IZ5TJD	"	943	39	8	15
*IZ2BMM	"	154	8	3	4
IQ2GM	**21**	**22,512**	**172**	**23**	**44**
			(OP: IK2WXQ)		
*IK2YGZ	"	3,052	79	12	16
*IW5ELA	"	450	14	11	14
IK1YRA	**14**	**41,625**	**238**	**27**	**84**
*I2DJX	"	27,968	199	17	47
*IW2ESL	"	9,408	121	11	37
*IU4CSS	"	4,551	67	13	24
*IZ2GMT	"	3,060	73	6	30
I4IKW	**7**	**112,036**	**402**	**36**	**112**
*IV3EAD	"	99,428	547	27	79
*IK8FIQ	"	85,011	455	31	98
*I3LGP	"	59,248	391	18	74
*IZ7XIB	"	42,330	387	16	67
*IU5ICR	"	33,390	361	12	58
*IQ5OX	"	31,076	387	13	55
			(OP: IZ5FDE)		
*IZ2AJE	"	24,120	295	17	50
*IZ4OSH	"	23,785	236	15	52
*IK5BDG	"	16,244	153	14	48
*IZ4GRP	"	15,428	190	12	46
*IK5AMB	"	7,344	94	10	38
*IK5OJB	"	7,007	123	8	41
*IN3EMI	"	1,888	69	6	26
*IZ3ZBP	"	1,624	30	10	19
IKØTUM	**3.5**	**26,904**	**400**	**10**	**49**
*IZ5OVP	"	15,060	223	11	49
*IK3AES	"	4,212	56	11	41
*IW5ECP	"	1,178	32	8	23
*IK1ZUV	"	0	1	1	1
II1R	**1.8**	**754**	**53**	**4**	**22**
			(OP: IW1CBG)		
*IK8YFU	"	342	23	4	14
IZ2DII	**AA**	**2,938,761**	**3271**	**121**	**390**
IR2Q	"	2,496,120	2457	122	366
			(OP: IK2PFL)		
IO6A	"	2,296,448	3043	116	350
			(OP: IK6QON)		
4U9A	"	1,922,349	2957	110	319
			(OP: 9A3A)		
IR3C	"	1,809,548	2465	104	338
			(OP: I3VJW)		
I2WIJ	"	1,749,843	1970	128	385
IO5P	"	1,674,800	1791	131	399
			(OP: IZ5NFD)		
IK3UNA	"	1,600,460	2016	107	323
IR4B	"	1,272,360	1604	117	343
			(OP: IK4AUY)		
IK3ORD	"	1,197,383	1079	139	408
IK1QBT	"	980,505	1399	101	304
II8M	"	864,506	2001	86	227
			(OP: IZ8EYP)		
IZ3NYG	"	768,432	1286	82	254
IZ8DVD	"	692,360	1040	104	276
I3FIY	"	670,786	1210	87	275
IK2SAI	"	457,792	773	83	228
IZ2BKC	"	457,744	964	79	189
I2SVA	"	401,016	833	64	184
IK3SCB	"	342,900	992	50	130
IZ8VYU	"	311,634	802	56	143
IZ3XEF	"	243,892	445	68	185
I3FDZ	"	128,466	408	49	134
IW2EVH	"	125,944	354	50	132
IV3CTS	"	105,395	399	30	77
IR1Q	"	97,088	512	31	117
			(OP: IU1JCZ)		
I5MPN	"	88,550	271	53	122
I2VXJ	"	73,700	349	31	79
IK3LLS	"	58,320	160	67	95
IK3XJP	"	51,972	138	60	82
IZ8GBT	"	41,921	208	35	68
IK2TDM	"	39,159	159	40	131
IK6GPZ	"	25,760	201	32	60
IØWBX	"	25,704	136	36	72
IZ2DLV	"	19,879	101	33	70
IK2YXB	"	14,580	78	36	45
IK8UIF	"	13,734	78	32	31
IKØLNN	"	7,840	105	13	15
IK2GWH	"	110	6	5	6
IK2XYI	**28A**	**5,488**	**50**	**20**	**29**
II8K	**21A**	**480,492**	**1525**	**37**	**125**
			(OP: IZ8EPX)		
IR4E	"	312,312	881	36	118
			(OP: IK4ZHH)		
IKØFUX	"	134,134	434	35	99
IZ5BRW	"	68,440	287	34	82
IK1NEG	"	28,840	235	20	50
I3FGX	"	17,820	78	32	67
IZ2EER	**14A**	**61,632**	**304**	**25**	**82**
I2IFT	**7A**	**558,360**	**2112**	**37**	**128**
IK2XDE	"	161,499	846	27	96
IK1MTZ	"	106,666	414	26	107
IB3N	**3.5A**	**338,184**	**1987**	**29**	**93**
			(OP: IV3SKB)		
IK1PMR	"	195,960	1262	26	89
IR1N	"	157,950	1372	15	75
			(OP: IU1LCU)		
IK5TBK	**1.8A**	**14,465**	**274**	**9**	**46**
IC8POF	"	13,504	169	13	51
I7CSB	"	5,781	111	8	39
IK6VXO	**AA**	**2,023,522**	**1840**	**131**	**395**
*IZ4JMA	"	1,223,851	2122	81	272
*IZ2MGN	"	728,688	935	113	343
*IQ8XF	"	581,328	888	84	283
*IK1SOW	"	507,350	824	78	287
*IU4FNO	"	478,800	722	84	258
*IK3YBX	"	404,240	729	77	233
*I1JTQ	"	391,248	745	74	230
*I2XIP	"	351,657	471	93	276
*IK1AYT	"	335,838	768	57	194
*IKØNOJ	"	275,370	653	71	203
*IØGOJ	"	254,400	871	58	182
*IV3DXW	"	235,352	333	101	302
*IW5EDI	"	222,363	489	68	211
*I1RJP	"	205,660	552	74	152
*IZ2FME	"	192,984	607	57	201
*IUØITX	"	191,406	609	48	171
*IK1TTD	"	187,935	583	56	199
*IZ2OOS	"	176,967	619	36	123
*IØ/S58Y	"	161,348	483	49	160
*IZ2JQP	"	156,123	439	56	153
*IR2X	"	141,904	445	51	145
			(OP: IK2WAD)		
*IK4OMU	"	121,624	351	44	140
*IC8FBU	"	115,241	458	46	117
*IK7LMX	"	105,664	288	57	151
*IZ1GSO	"	101,067	419	36	141
*IK4ZIF	"	82,488	215	70	98
*IK2RLS	"	74,998	280	46	108
*IW3IFJ	"	68,497	326	39	104
*IU2JWF	"	68,388	213	48	116
*IZ1DXS	"	61,858	220	44	113
*IW1RLC	"	56,248	312	35	123
*IK6OIN	"	55,836	234	41	91
*IW5EIJ	"	52,771	227	37	76
*IIØK	"	52,096	204	42	106
			(OP: IZØUME)		
*I3JUK	"	49,731	255	36	101
*II1A	"	46,800	273	28	47
			(OP: IK1SPR)		
*IU8LMC	"	42,456	213	39	144
*IK2QIK	"	40,128	241	32	100
*IV3IPS	"	39,690	202	30	60
*IV3HAX	"	35,787	127	45	106
*IK5AFJ	"	33,984	264	26	92
*IZ3ASA	"	28,224	153	30	96
*IW7DMH	"	26,520	160	32	88
*IZØAEX	"	20,696	144	28	76
*IW1CHX	"	18,624	102	36	61
*IK2LOL	"	14,620	101	23	45
*IZ3ZOO	"	11,036	118	17	72
*IUØPJS	"	10,332	101	26	56
*IK3TPP	"	8,284	56	30	46
*IZ7ECL	"	7,504	55	27	40
*IK8PGM	"	3,782	53	22	39
*IU4LGT	"	3,705	44	20	37
*IZ3QFG	"	3,600	57	19	41
*IU3EGK	"	1,475	37	11	14
*IUØKTT	"	323	11	8	9
*IZ2CSX	"	187	18	6	11
IZ5DKG	**28A**	**2,205**	**26**	**13**	**22**
IO3X	**21A**	**152,395**	**428**	**37**	**108**
			(OP: IV3JCC)		
*IK6PTH	"	18,886	105	26	45
*IW2MXY	"	3,870	102	13	17
IQ1DF	**14A**	**354,195**	**1152**	**38**	**115**
			(OP: IK1HJS)		
*IZ8EFD	"	218,260	959	36	104
*IR6R	"	45,276	401	16	61
			(OP: IK6QRH)		
*IZ1TRK	"	14,056	142	11	45
*IQ6SE	"	12,320	190	9	23
*IZ5IOV	"	10,537	120	10	31
*IV3CYT	"	9,576	110	14	43
*IZ1PKV	"	8,000	101	11	39
*IU3PGL	"	2,000	46	8	32
*IU2LTO	"	1,740	54	6	14
IZ4TOA	**7A**	**42,066**	**349**	**17**	**65**
*IW2FUT	"	21,582	213	13	53
*IK8TEM	"	2,646	62	9	40
IK1ZOF	**3.5A**	**44,526**	**380**	**16**	**66**
*IO3A	"	26,065	393	10	55
			(OP: IV3HAX)		
*IZ3GHP	"	4,945	79	10	33
*IK4RVG	"	600	23	4	20

Jersey

MJ5A	**7**	**539,760**	**2475**	**29**	**101**
			(OP: GU4YOX)		

Kaliningrad

UA2FZ	**A**	**1,263,046**	**1749**	**104**	**318**
R2FZ	"	102,480	656	28	112
RN2FQ	"	96,050	325	43	127
RA2FO	**A**	**41,789**	**265**	**29**	**102**
*UA2FAK	"	10,010	121	18	52
*UA2FBQ	"	7,260	107	18	48
RU2F	**7**	**18,960**	**297**	**9**	**51**
UA2CZ	**AA**	**73,030**	**311**	**41**	**93**
RN2FA	**AA**	**260,764**	**587**	**74**	**194**
*UB2F	"	67,773	387	32	91
*UA2FF	"	814	20	11	11

Latvia

YL2VW	**A**	**1,167,767**	**2040**	**96**	**287**
YL3JD	"	90,692	490	36	122
YL2EM	**1.8**	**17,765**	**323**	**9**	**46**
***YL2CV**	**A**	**343,434**	**833**	**59**	**214**
*YL3GQ	"	182,771	705	43	150
*YL2NK	"	61,288	356	39	124
***YL2PJ**	**21**	**60,384**	**279**	**29**	**73**
*YL2AG	"	20,224	167	20	44
*YL2LW	"	19,241	131	23	48
***YL5W**	**14**	**132,534**	**758**	**29**	**82**
			(OP: YL2GN)		
YL2SM	**AA**	**4,688,540**	**3570**	**178**	**540**
YL2KO	"	3,448,976	2990	154	474
YL9T	"	499,748	863	107	297
			(OP: YL2TW)		
YL5T	"	90,906	323	39	100
YL2GD	**21A**	**216,266**	**704**	**34**	**108**
YL7X	**14A**	**766,752**	**2288**	**37**	**126**
			(OP: YL2LY)		
YL2BJ	"	320,112	1112	34	118
YL3CW	**3.5A**	**519,384**	**2436**	**33**	**103**
YL7A	"	195,596	1352	24	83
			(OP: YL2GM)		
YL2EA	"	37,525	386	14	65
YL3FT	**1.8A**	**211,310**	**1363**	**26**	**87**
YL2PP	"	34,638	453	14	55
***YL3GX**	**AA**	**127,512**	**462**	**44**	**154**
*YL3BU	"	59,925	354	29	112
***YL3GAZ**	**3.5A**	**61,712**	**659**	**14**	**62**
*YL2II	"	7,056	134	11	38
***YL1ZF**	**1.8A**	**64,190**	**877**	**13**	**57**

Lithuania

LY4T	**A**	**1,942,250**	**2779**	**109**	**348**
LY1N	**14**	**6,426**	**72**	**15**	**39**
LY1DZ	**3.5**	**195,000**	**1299**	**26**	**78**
LY2NK	**1.8**	**66,920**	**907**	**13**	**57**
***LY4L**	**A**	**2,725,757**	**3532**	**128**	**375**
*LY2MC	"	209,842	594	61	178
*LY2N	"	165,482	467	50	144
*LY1M	"	57,200	336	32	98
*LY3KI	"	12,635	63	35	60
*LY2SQ	"	11,712	144	15	49
*LY3QN	"	2,480	54	12	28
***LY7X**	**1.8**	**27,864**	**522**	**10**	**44**
			(OP: LY3DA)		
LY7Z	**AA**	**5,300,632**	**3977**	**181**	**583**
LY5E	"	4,512,520	3510	181	559
			(OP: LY2IJ)		
LY5W	"	3,572,130	2820	171	542
LY5R	"	2,932,822	2472	151	468
LY4A	"	2,895,072	2817	159	477
LY9Y	"	1,901,229	2000	138	423
LY2TS	"	1,349,420	1949	101	335
LY2MM	"	1,213,674	1537	106	320
LY2SA	"	835,635	1055	123	370
LY2AX	"	595,211	735	107	324
LY2A	"	510,113	676	88	205
			(OP: LY2KA)		
LY2CX	"	273,105	488	108	249
LY4OO	"	244,305	429	85	182
LY3CY	"	216,522	768	44	163
LY1CT	"	190,518	617	52	174
LY2BAW	"	172,556	444	62	179
LY1LB	"	754	32	9	17
LY5O	**28A**	**6,292**	**79**	**17**	**35**
LY4G	**21A**	**302,176**	**927**	**36**	**116**
LY2NY	"	226,968	681	35	112
LY2K	"	56,444	308	31	72
LY2W	"	12,716	114	19	25
LY2CO	**14A**	**103,173**	**520**	**28**	**91**
LY2LE	"	3,872	32	22	22
LY2FN	**7A**	**303,116**	**1011**	**38**	**128**
LY2X	"	174,496	991	31	102
LY7M	**1.8A**	**226,904**	**1512**	**26**	**87**
***LY8A**	**AA**	**1,844,466**	**2157**	**124**	**383**
*LY5I	"	1,484,863	1851	118	369
*LY7R	"	1,390,770	2117	95	364
			(OP: LY2BKT)		
*LY2DX	"	729,960	1212	81	304
*LY5AX	"	601,868	1240	97	237
*LY5XX	"	593,058	1478	68	223
*LY3AB	"	472,164	1094	61	233
*LY7W	"	234,450	761	52	173
			(OP: LY2NZ)		
*LY3I	"	218,735	782	44	161
*LY2BAA	"	56,991	307	34	87
*LY4K	"	55,014	224	36	123
***LY2OU**	**28A**	**3,552**	**44**	**15**	**22**
***LY2AT**	**3.5A**	**33,696**	**337**	**14**	**64**

Luxembourg

***LX2KD**	**A**	**21,525**	**152**	**31**	**74**
LX5MF	**AA**	**647,782**	**1565**	**71**	**243**
			(OP: LX1NO)		
LX7I	**21A**	**486,180**	**1476**	**37**	**111**
			(OP: DF3VM)		
***LX1ER**	**AA**	**176,256**	**296**	**90**	**198**

Moldova

***ER1CS**	**A**	**90,000**	**467**	**35**	**115**
***ER5DX**	**"**	**34,780**	**158**	**44**	**50**
***ER1OO**	**3.5**	**39,150**	**623**	**10**	**48**
ERØDX	**AA**	**7,068,072**	**6412**	**149**	**504**
			(OP: UT5UDX)		

Montenegro

4O3A	**7**	**1,157,361**	**4160**	**36**	**123**
			(OP: 4O4A)		

Netherlands

PAØCT	**A**	**636,880**	**1376**	**67**	**237**
PA3HEN	"	182,000	581	48	152
PAØMIR	"	107,695	347	49	132
PA3EYC	"	99,299	621	25	84
PA3CJP	"	88,677	394	44	123
PA3ADU	"	84,250	316	38	87
PAØJNH	"	82,446	272	38	113
PA1AKM	"	72,450	386	56	119
PA3BWK	"	59,670	344	26	91
PA4B	"	51,084	240	32	76
PA4DOC	"	38,709	296	26	73
PA2CHM	"	8,840	102	21	44
***PA3ARM**	**A**	**416,412**	**1019**	**61**	**197**
*PA2PCH	"	164,220	523	55	155
*PA2ST	"	153,045	598	39	140
*PA2W	"	141,340	543	44	141
*PG7V	"	108,750	516	40	134
*PG7R	"	106,500	499	33	117
*PBØACU	"	86,289	386	34	113
*PAØRBA	"	82,314	320	45	108
*PA3CXB	"	78,064	350	37	99
*PA3ADG	"	62,363	345	29	122
*PA3EWG	"	60,852	347	29	103
*PA3EEG	"	58,725	295	33	112
*PA3DBS	"	43,553	471	21	76
*PA4DN	"	37,639	244	35	98
*PD7CJT	"	34,744	253	22	79
*PAØKBN	"	24,038	190	26	75
*PAØFVH	"	23,712	152	26	52
*PAØTCA	"	23,004	144	29	52
*PI4FL	"	21,168	153	30	68
*PA1FJ	"	10,990	107	19	51
*PC4Y	"	9,174	91	23	43
*PA7RW	"	9,000	106	18	57
*PA5GU	"	8,476	92	17	35
*PA5P	"	6,930	67	18	52
*PAØABE	"	4,142	113	10	28
*PA1BBO	"	4,050	73	9	36
*PA3GUO	"	2,035	42	19	36
*PA3CVR	"	1,050	39	9	26
*PC3H	"	805	43	8	15
*PAØJQD	"	665	40	10	25
***PA5DX**	**14**	**2,856**	**65**	**9**	**19**
PA3AAV	**AA**	**2,709,930**	**3158**	**126**	**389**
PA5KT	"	1,778,512	2027	117	347
PA4O	"	1,706,734	2354	97	324
PC3M	"	1,606,780	2117	114	346
PA2A	"	1,210,020	1532	103	317
PAØO	"	1,196,214	1404	129	257
PA2PKZ	"	1,140,005	1738	100	315
PA1T	"	1,079,677	1726	98	285
PA4WM	"	1,025,352	1382	103	301
PA1M	"	928,908	1205	96	327
PA5WT	"	786,980	1328	82	279
PAØVAJ	"	686,880	1696	63	207
PA3GRM	"	628,429	1309	67	240
PA6O	"	626,916	1232	72	195
			(OP: PA1CW)		
PA7LV	"	605,682	952	103	296
PA7JWC	"	513,765	1027	81	234
PE6Q	"	434,520	1077	68	216
			(OP: PA8AD)		
PA5N	"	358,678	999	61	201
PA4M	"	344,847	748	56	157
PG3N	"	333,508	703	74	227
PC4H	"	331,692	841	57	205
PA4OES	"	285,354	765	57	192
PA4EL	"	198,900	348	83	177
PA1BX	"	143,312	418	53	155
PA3GDD	"	114,000	545	36	114
PE1RDP	"	105,765	384	46	119
PAØM	"	98,841	298	47	94
PA5TT	"	76,160	263	44	96
PA1H	"	74,635	259	54	61
PA3GCU	"	62,964	290	35	97
PHØAS	"	43,358	186	43	90
PAØINA	"	38,640	152	49	89
PA5KM	"	26,992	104	46	66
PB5DX	"	22,610	166	20	65
PA5FN	"	12,545	150	13	52
PC2K	"	9,416	92	28	60
PF6W	"	8,892	92	16	23
			(OP: PD2R)		
PAØABM	"	1,856	47	7	25
PA1TK	"	1,540	33	11	17
PI4DX	**28A**	**86,576**	**479**	**29**	**83**
			(OP: PA3EVY)		
PA5MW	**21A**	**158,625**	**549**	**35**	**106**
PI4COM	**14A**	**691,656**	**1851**	**39**	**129**
			(OP: PA3EWP)		
PA3A	"	64,676	389	18	58
PA1WX	"	19,600	128	25	45
PE5TT	"	4,914	100	9	33
PA1CC	**7A**	**874,310**	**2795**	**37**	**133**
PAØQ	"	19,456	241	14	50
PC3T	**3.5A**	**166,380**	**999**	**28**	**90**
			(OP: PY2SEX)		
PA3C	"	21,600	153	18	72
***PA9M**	**AA**	**2,185,920**	**1920**	**130**	**446**
*PA2TA	"	629,674	1390	69	229
*PA8MM	"	523,005	1090	72	221
*PC1PM	"	505,080	1117	73	232
*PA3DUU	"	340,791	730	67	186
*PC5Q	"	332,189	774	66	187
*PG2AA	"	330,642	954	58	176
*PAØJLS	"	299,925	788	63	216
*PAØJED	"	288,960	613	66	174
*PG7M	"	265,503	511	68	201
*PD1RP	"	259,560	715	50	156
*PA2S	"	232,343	511	75	208
*PH7A	"	223,353	536	64	185
*PE1EEC	"	200,997	490	56	151
*PA8KW	"	194,650	483	58	171
*PA7KY	"	133,672	532	45	172
*PA3GCV	"	131,440	504	40	115
*PA1LEX	"	115,330	395	54	136
*PG6F	"	98,196	397	42	125
*PDØME	"	92,326	436	32	102
*PA3DTR	"	85,113	333	46	147
*PAØCMU	"	83,655	436	29	70
*PAØCMF	"	82,830	403	32	133
*PC9F	"	76,219	380	36	107
*PA2RU	"	73,548	385	47	115
*PAØKDV	"	65,709	342	32	117
*PA1FP	"	62,370	383	24	53
*PE1HWO	"	61,275	260	36	93
*PA3DRL	"	60,552	208	49	125
*PDØJMH	"	58,900	357	25	99
*PA1PE	"	56,270	176	61	109
*PE1FJN	"	49,149	296	32	95
*PAØHPG	"	49,046	266	34	103
*PA1BD	"	45,864	214	31	60
*PA8R	"	37,100	195	27	79
*PA3HGF	"	33,880	193	28	82
*PA3HCC	"	27,876	200	23	78
*PE4A	"	27,756	223	28	80
*PC5C	"	23,300	210	23	77
*PA2VS	"	22,264	202	22	70
*PA3DAT	"	20,608	142	25	67
*PEØCD	"	20,072	173	26	78
*PA3GEO	"	16,465	148	23	66
*PA5X	"	14,904	134	26	66
*PD7Q	"	14,820	136	22	73
*PC7E	"	14,535	156	20	65
*PA2T	"	12,792	160	21	61
*PAØWKI	"	9,875	127	16	63
*PE4KH	"	6,307	93	15	38
*PA1MAR	"	6,111	77	23	40
*PA4TJ	"	5,757	71	19	38
*PE4BAS	"	4,464	48	16	20
*PA2SQ	"	2,925	39	16	23
*PD1BHZ	"	1,272	22	11	13
***PAØB**	**21A**	**7,326**	**96**	**14**	**23**
***PD1DX**	**7A**	**228,276**	**984**	**36**	**117**
*PA3EMN	"	40,211	398	13	66
*PA3GVI	"	19,832	219	14	53
*PA3ADJ	"	8,851	166	9	44

North Macedonia

Z32ID	**21**	**12,852**	**193**	**10**	**17**
Z33B	**7**	**52,292**	**616**	**12**	**56**
Z35U	"	45,684	391	18	63
Z35F	**1.8**	**63,963**	**906**	**11**	**58**
***Z36W**	**A**	**902,776**	**1813**	**75**	**254**
*Z35M	"	306,495	1026	55	190
*Z35W	"	284,445	780	63	182
*Z32ZP	"	186,048	633	55	149
*Z31NA	"	128,979	737	35	118
*Z32ZZZ	"	28,224	216	27	85
*Z35Y	"	21,432	235	20	56
*Z31CZ	"	1,218	29	7	7
***Z33F**	**21**	**9,024**	**128**	**14**	**34**
Z35T	**28A**	**14,620**	**104**	**20**	**48**
Z3/KØAP	**7A**	**282,260**	**1501**	**25**	**85**
Z39A	"	100,204	870	20	74
***Z32TO**	**AA**	**341,325**	**930**	**55**	**170**
*Z32U	"	246,870	791	50	184
***Z32KF**	**28A**	**5,840**	**74**	**14**	**26**
***Z33C**	**21A**	**186,309**	**730**	**31**	**96**
***Z35Z**	**1.8A**	**2,542**	**106**	**5**	**26**

Northern Ireland

GI4FUE	**3.5**	**21,090**	**197**	**15**	**59**
***MI5I**	**A**	**1,501,904**	**2720**	**76**	**268**
			(OP: GIØRQK)		
*2IØWLZ	"	23,672	206	24	64
GI5I	**AA**	**1,873,880**	**3187**	**89**	**306**
			(OP: GI4DOH)		
MIØBPB	**21A**	**122,976**	**622**	**23**	**73**
***MIØI**	**AA**	**21,605**	**116**	**38**	**107**
			(OP: MIØRRE)		

Norway

LC7X	**A**	**116,000**	**845**	**27**	**89**
			(OP: LA7THA)		
LA7SI	"	83,496	348	41	127
LA6XI	"	27,730	150	40	78
LA9VPA	"	5,576	76	14	27
LA7NFA	**14**	**51,852**	**325**	**23**	**64**
LA3MHA	**1.8**	**15,892**	**248**	**15**	**43**
***LB6GG**	**A**	**939,726**	**2063**	**73**	**260**
*LA2HFA	"	307,184	720	68	224
*LB2WG	"	53,900	366	26	114
*LA4CIA	"	51,136	247	47	141
*LA/G3SWC	"	26,620	206	24	86
*LA9DK	"	16,368	140	24	69
*LA6GX	"	6,003	93	15	14

*SP3DOF	"	15,080	160	15	50
*SP6DHH	"	12,702	150	20	53
*SP2JFY	"	12,480	144	28	76
*SP3AMO	"	10,488	124	21	71
*SP9GKJ	"	9,048	68	29	49
*SP8FB	"	8,184	52	30	36
*SP3BES	"	7,080	90	17	42
*SQ9DEO	"	4,806	52	20	34
*SP5BYC	"	4,785	86	14	41
*SN1I	"	3,333	63	10	23
			(OP: SP1CNV)		
*SP1EGN	"	1,881	49	11	22
*SQ8OLL	"	1,806	49	11	31
*SQ7M	"	1,435	47	9	26
*SP2JJD	"	610	55	19	42
***SP3LWP**	**28**	**7,722**	**80**	**18**	**36**
*SP6JOE	"	4,500	64	11	25
*SP9W	"	1,000	21	10	15
***SP5EPP**	**21**	**45,773**	**270**	**29**	**62**
*SP7OGP	"	35,700	194	27	48
*SP3FPF	"	32,417	188	24	53
*SP5ENG	"	19,832	150	23	44
*SP9DTE	"	16,952	142	16	36
*SN4EE	"	12,978	97	23	40
*SQ8MFM	"	10,746	103	21	33
*SP7CVW	"	7,670	58	20	39
*SP4AAZ	"	3,036	55	9	13
*SP8AR	"	1,518	27	11	11
			(OP: SQ8BGR)		
*SQ1KW	"	1,426	28	8	15
***SP1R**	**14**	**139,545**	**748**	**26**	**79**
*SP6LMQ	"	22,774	216	16	43
*SP9GNM	"	9,614	137	15	23
*SQ7NSN	"	8,800	93	18	37
*SP6DMI	"	6,300	104	12	30
*SQ5LNU	"	3,718	81	12	14
*SP2EPV	"	1,376	89	12	31
*SP3FSM	"	986	26	7	10
***SQ3WW**	**7**	**97,263**	**583**	**23**	**84**
*SQ9IVD	"	42,600	450	16	59
*SP8IOV	"	29,546	320	18	61
*SP9OUV	"	12,222	112	14	49
*SQ6ELV	"	8,944	97	12	40
*3Z8Z	"	3,159	66	9	30
			(OP: SP9JPA)		
*SP9NSJ	"	1,815	53	5	28
*SP5Z	"	819	23	8	13
*SP5ETS	"	448	28	3	13
***SP6MQO**	**3.5**	**19,062**	**306**	**9**	**45**
*SP4TKA	"	11,250	206	9	41
*SP2N	"	7,498	145	9	37
*SNØZOSP	"	483	38	3	18
			(OP: SP9ODM)		
*SQ6ILZ	"	42	7	1	5
***SP9GFI**	**1.8**	**5,265**	**137**	**6**	**33**
*SP7QO	"	2,625	82	5	30
*SQ9JYK	"	2,272	73	5	27
*SP3JIA	"	2,080	69	5	27
SN7Q	**AA**	**6,316,950**	**4381**	**168**	**522**
			(OP: SP7GIQ)		
SP1NY	"	4,007,878	3373	169	489
SP2LNW	"	2,495,376	2222	143	416
SP4Z	"	2,025,260	1650	161	494
SN5N	"	1,621,800	2774	96	328
			(OP: SP5KP)		
SP8FHK	"	1,577,895	2548	96	297
SP2QG	"	1,507,320	2219	96	328
SQ8N	"	1,363,554	1185	132	381
SP3LPG	"	1,357,184	1683	134	327
SP5CNA	"	1,024,551	1547	100	293
HF1K	"	962,904	1462	95	329
			(OP: SP1MGM)		
SP2GWH	"	711,015	1184	88	233
SP9LAS	"	582,890	888	92	293
SQ9V	"	344,565	555	79	200
SP9KR	"	332,320	586	85	250
SP3JDZ	"	194,089	494	51	182
SQ5LTL	"	139,104	270	87	165
SP6NIF	"	136,713	382	63	166
SP2V	"	120,393	364	50	139
SN5Y	"	108,188	533	34	114
			(OP: SP5Y)		
SN6W	"	94,500	265	56	124
			(OP: SP6DNZ)		
SP2XX	"	86,366	248	69	130
SN6A	"	80,100	413	39	111
			(OP: SP6CES)		
SP4JWR	"	78,246	326	54	84
SQ6LJV	"	48,530	158	52	63
SP9MZH	"	23,124	110	35	47
SP9FUY	"	5,504	72	25	39
SN5X	**21A**	**493,845**	**1283**	**38**	**127**
			(OP: SP5GRM)		
SN2B	"	484,530	1341	35	120
			(OP: SP2MKT)		
SP4JTJ	"	29,440	144	27	53
SP5GNI	"	7,200	72	14	34
SQ2A	**14A**	**840,048**	**2160**	**39**	**137**
			(OP: SQ9UM)		
SP8PAI	"	559,579	1660	37	126
			(OP: SP8HZZ)		
SP7HKK	"	183,038	648	33	109
SP3A	"	110,617	453	32	95
SP5GQX	"	51,516	217	28	78
SP9EML	"	11,160	96	19	41
SN3A	**7A**	**342,089**	**1251**	**31**	**106**
			(OP: SQ2GXO)		
SQ9C	"	259,290	1480	32	97
SP3VT	"	156,954	1035	26	85
SQ7FPD	**3.5A**	**282,900**	**1733**	**26**	**89**
SP3GTS	"	230,840	1447	25	91
SP3HRN	"	82,560	701	22	74
SO4P	"	75,480	736	18	67
			(OP: SP4DEU)		
SP3CYY	"	73,695	704	17	68
SP2HWW	"	7,203	129	10	39
SQ2PHG	"	4,080	67	11	29
SP2PIK	**1.8A**	**162,690**	**1296**	**21**	**81**
			(OP: SP2MKI)		
SP3HLM	"	149,124	1280	21	81
SP2EBG	"	138,993	1077	21	86
SP9JZU	"	83,592	833	17	69
SN9Z	"	75,850	804	16	66
			(OP: SP6EQZ)		
SN1T	"	59,808	623	16	68
SP6AEG	"	51,319	614	14	59
***SN7O**	**AA**	**2,628,285**	**2818**	**131**	**430**
			(OP: SP7IVO)		
*SP2R	"	1,622,982	2253	117	381
*SN5J	"	1,229,525	2041	98	327
			(OP: SP5JXK)		
*SP7CF	"	879,641	1340	85	286
*SP9DLY	"	775,842	1319	95	287
*SQ3R	"	493,436	1035	68	213
			(OP: SQ3HMM)		
*SP2DKI	"	266,904	585	64	200
*SP2ADY	"	244,160	831	50	168
*SQ7BFC	"	198,135	368	74	241
*SP3BBS	"	180,605	576	51	154
*SP8HWM	"	166,170	714	38	153
*SN4D	"	161,670	796	34	136
			(OP: SP4GAP)		
*SP5WAZ	"	155,448	601	48	156
*SQ9IWS	"	129,642	397	55	131
*SP7Q	"	122,400	577	32	138
*SP9FMP	"	113,727	365	57	170
*SP7TEX	"	107,730	346	52	137
*SQ5VCO	"	104,650	492	43	132
*SQ9FMU	"	102,024	320	45	111
*SN8J	"	93,080	329	44	86
			(OP: SP8ALT)		
*SQ9S	"	89,544	332	48	108
*SQ1DNJ	"	87,449	410	43	114
*SN5WD	"	78,156	437	34	122
			(OP: SO5WD)		
*SP3SLU	"	62,560	214	52	132
*SP8GNF	"	51,792	284	41	115
*SQ3POS	"	38,500	220	31	79
*SP6FXY	"	37,669	137	51	88
*SP7CXV	"	34,686	131	44	79
*SP2HFH	"	33,578	208	28	75
*SQ6JNX	"	32,375	216	31	94
*SP2FOV	"	28,320	167	32	48
*SP2WGB	"	19,397	129	33	86
*SQ6IUS	"	19,264	144	29	83
*SP5DJ	"	18,180	213	20	70
*SP5TAT	"	15,312	107	27	61
*SQ5WAJ	"	14,495	147	23	42
*SP5TT	"	7,008	66	19	29
*SP5BN	"	5,300	54	19	34
*SP9RPW	"	4,704	46	22	34
*SQ5AM	"	3,784	55	38	48
*SNØW	28A	1,218	24	8	13
***SP3CMX**	**"**	**180**	**10**	**4**	**6**
***SP4DZT**	**14A**	**334,050**	**1049**	**36**	**114**
*SP9JZT	"	102,897	523	28	83
*SP2HOU	"	62,418	327	25	76
*SP6EIY	"	10,176	148	11	37
*SQ1WO	"	4,185	93	8	23
*SP2GOW	"	3,105	43	11	16
***SP5ELA**	**7A**	**222,828**	**1213**	**27**	**97**
*SN6S	"	172,546	1009	28	93
			(OP: SP6ZC)		
*SP3JUN	"	79,715	522	23	84
*SQ5CZP	"	55,593	405	18	69
*SN2S	"	18,352	145	18	56
			(OP: SP2MHD)		
*SO6XL	"	5,280	73	11	33
*SP9MX	"	2,660	62	9	29
*SP9IVD	"	1,134	41	5	22
***SP1GZF**	**3.5A**	**56,604**	**579**	**17**	**72**
*SP3MEP	"	21,924	336	9	54
*SQ3RX	"	15,219	264	10	47
***SP2EWQ**	**1.8A**	**85,095**	**767**	**19**	**74**
*SO6C	"	60,279	790	13	58
			(OP: SP6CIK)		
*SO3O	"	17,450	343	7	43
*SP8LBK	"	11,781	230	8	43
*SN3G	"	5,400	110	10	44
*SP3OL	"	3,420	120	6	30

Portugal

CR6K	**A**	**12,055,652**	**9689**	**155**	**491**
			(OP: CT1ILT)		
CT7AIX	**28**	**7,889**	**65**	**16**	**33**
***CR5O**	**A**	**1,224,624**	**1887**	**78**	**294**
			(OP: CT7AJL)		
*CT1ELZ	"	78,970	327	36	113
*CT1DRB	"	12,728	152	16	58
*CT1EHK	"	11,934	148	12	22
*CT1BWU	"	5,529	51	24	33
***CT1ESO**	**28**	**4,140**	**54**	**15**	**31**
***CS2BWW**	**21**	**21,210**	**144**	**24**	**81**
CT1AGS	**AA**	**82,890**	**243**	**51**	**84**
CS2C	**14A**	**740,888**	**2447**	**36**	**112**
			(OP: OK1RF)		
***CT7AUP**	**AA**	**237,888**	**594**	**52**	**172**
*CT1BOH	"	232,000	431	79	153
*CT1GFQ	"	96,585	384	36	105
*CT2IWW	"	53,975	215	38	89
***CT7AGZ**	**21A**	**132,408**	**655**	**27**	**81**
*CT1FOQ	"	6,169	77	10	21

Republic of Kosovo

Z61DX	**A**	**262,479**	**1025**	**45**	**158**

Romania

YR8D	**A**	**5,142,790**	**5930**	**126**	**389**
			(OP: YO8TTT)		
YO9AYN	"	343,850	680	76	223
YO9CB	"	73,010	292	46	103
YO4RST	"	60,996	301	37	119
YR8I	**28**	**17,856**	**131**	**24**	**48**
			(OP: YO8BIG)		
YO2MTG	**21**	**7,140**	**90**	**17**	**25**
YO3LW	**14**	**57,954**	**504**	**16**	**62**
YO6KPT	**7**	**128,068**	**947**	**24**	**77**
			(OP: YO6FGZ)		
***YO5DAS**	**A**	**288,611**	**723**	**65**	**192**
*YO4FHU	"	206,248	743	51	181
*YO8RFS	"	195,975	685	49	152
*YO2BLX	"	161,841	476	61	158
*YO4AAC	"	146,566	504	55	148
*YO8BDW	"	108,896	585	35	131
*YO4SI	"	94,482	353	51	130
*YO4AJ	"	66,868	335	33	113
*YO6HSU	"	56,485	223	46	97
*YO3YV	"	54,636	222	47	110
*YO2QY	"	47,596	196	46	100
*YO2NWW	"	47,472	267	36	93
*YO5YM	"	47,402	249	33	104
*YO6OEV	"	41,004	339	22	80
*YO5BXI	"	40,356	214	32	86
*YO8BDQ	"	19,923	105	34	53
*YO2LDU	"	11,234	130	19	63
*YO7LYM	"	10,336	138	19	57
*YO9HG	"	1,848	57	7	21
*YO9IJP	"	1,692	51	8	4
*YO5BQQ	28	224	12	4	4
***YO4CAH**	**21**	**58,425**	**320**	**27**	**68**
*YO2IS	"	37,772	264	20	51
*YO5AXF	"	30,774	214	21	48
*YP3A	"	18,564	160	22	46
			(OP: YO3GOD)		
***YO4BEX**	**14**	**40,470**	**405**	**17**	**54**
*YO5OAC	"	19,551	207	16	41
*YO5BTZ	"	15,675	183	14	41
*YO9CWY	"	13,340	214	10	36
*YO6DMR	"	11,077	109	14	39
*YO9GR	"	10,277	197	10	33
***YO5ODT**	**7**	**98,879**	**745**	**21**	**80**
*YO3FFF	"	62,780	510	21	65
*YO3JOS	"	35,024	254	20	68
*YO3ND	"	26,565	237	18	59
*YO6BGT	"	10,759	141	12	41
*YO2MJZ	"	6,815	83	12	35
*YO3JW	"	988	34	8	18
***YO4CSL**	**3.5**	**8,184**	**125**	**13**	**49**
*YO4FZX	"	4,403	109	7	30
***YO7CKQ**	**1.8**	**1,914**	**74**	**5**	**24**
*YO4BEW	"	900	49	4	16
YO8DOH	**AA**	**3,211,380**	**3008**	**128**	**412**
YO9HP	"	3,096,280	2832	152	468
YO4NF	"	1,956,734	3231	110	332
YO3APJ	"	748,800	1141	105	295
YO4AR	"	338,836	1130	59	195
YO7CW	"	319,243	1192	50	161
YO8SBQ	"	305,240	774	70	190
YO9BPX	"	127,488	349	62	130
YO9SW	"	121,752	449	44	134
YO4FPF	"	79,846	300	49	117
YO6ZS	"	44,505	270	32	97
YO2LCP	**21A**	**19,551**	**163**	**20**	**37**
YO9CX	"	2,376	55	14	22
YO3FF	"	308	14	6	5
YQ6A	**7A**	**746,364**	**2624**	**37**	**127**
			(OP: YO6BHN)		
YPØK	"	343,068	1726	31	107
YP5A	"	89,775	610	22	83
			(OP: YO5CBX)		
YO8BGD	"	56,056	341	25	73
YO3IJ	"	30,217	398	15	52
YO5CUQ	**3.5A**	**10,860**	**154**	**11**	**49**
YO5AJR	**1.8A**	**39,312**	**711**	**8**	**48**
***YO4DG**	**AA**	**630,540**	**1389**	**79**	**231**
*YO5FMT	"	139,956	494	51	163
*YO7BGA	"	100,800	407	46	134
*YO2DFA	"	90,630	283	55	135
*YO2URS	"	75,306	420	35	128
*YO2ARM	"	63,492	314	37	111
*YO6MT	"	59,410	301	36	94
*YO9GDN	"	29,250	144	35	40
*YO2CEQ	"	4,984	45	22	34
***YO5OBA**	**21A**	**26,625**	**163**	**25**	**50**
*YO8SAO	"	2,508	56	9	13
***YO8TNB**	**14A**	**113,960**	**563**	**30**	**80**
*YO2MKI	"	56,724	406	23	64
*YO3CVG	"	10,602	98	16	41
*YO6LA	"	1,175	49	8	17
*YO8AXP	"	12	4	3	3
***YO3GCL**	**7A**	**106,636**	**611**	**25**	**81**
***YO5AVN**	**3.5A**	**160,875**	**1330**	**19**	**80**

San Marino

***T77C**	**A**	**19,300**	**181**	**25**	**75**

Sardinia

ISØLYN	**A**	**31,752**	**197**	**26**	**58**
***ISØJXO**	**A**	**36,696**	**264**	**35**	**97**
*ISØILP	"	1,512	77	17	37
***ISØANT**	**7**	**8,160**	**133**	**8**	**43**

Scotland

GM7V	**A**	**1,406,592**	**2617**	**86**	**266**
			(OP: GM3WOJ)		
MMØT	"	1,373,124	2734	73	245
			(OP: GM3WUX)		
MM3T	"	937,332	2269	69	228
			(OP: GMØELP)		
GM2Y	"	206,147	564	55	156
			(OP: MMØDXH)		
***GM3W**	**A**	**166,170**	**500**	**52**	**139**
			(OP: GM3JKS)		
*GMØHKS	"	102,357	423	37	116
***GM3TAL**	**28**	**660**	**24**	**9**	**13**
***MM7N**	**21**	**70,231**	**410**	**19**	**60**
			(OP: G3RWF)		
***GM5M**	**14**	**21,375**	**241**	**14**	**43**
			(OP: GM4ZNC)		
GM4Z	**AA**	**959,225**	**1148**	**114**	**311**
			(OP: GM4ZUK)		
GM3YTS	"	532,611	901	80	199
GM3ZRT	"	463,792	776	87	241
GMØEGI	"	30,624	130	39	93
MMØGOR	**21A**	**48,952**	**302**	**17**	**41**
MMØAMW	"	29,988	190	18	50
MM1E	**3.5A**	**69,803**	**594**	**16**	**67**
			(OP: MMØGOR)		
GM3POI	**1.8A**	**66,900**	**732**	**14**	**61**
GM3YEH	"	45,091	557	13	54
***GM4X**	**AA**	**983,164**	**1920**	**86**	**278**
			(OP: GM4WZG)		
*MM2T	"	791,528	1673	70	256
			(OP: GMØLIR)		
*GMØAZC	"	157,941	469	55	152
*GM7A	"	112,674	350	35	143
			(OP: GM3ZRT)		
*GM4OSS	"	756	17	12	15
***GM4FDM**	**28A**	**10,431**	**95**	**17**	**40**
***GM4UYZ**	**14A**	**5,762**	**78**	**8**	**35**

Serbia

YT1T	**A**	**659,065**	**2012**	**63**	**190**
YT1A	**7**	**540,423**	**2406**	**33**	**116**
YU1RK	"	159,315	758	31	98
YT5M	"	42,228	416	16	53
YU1AO	"	20,020	136	18	52
YUØT	**3.5**	**237,215**	**1860**	**21**	**74**
			(OP: YU1WS)		
YU1A	"	38,590	305	18	67
			(OP: YT1AA)		
YT7B	**1.8**	**60,336**	**881**	**12**	**60**
***YT6M**	**A**	**429,904**	**985**	**72**	**205**
*YU1GU	"	79,651	332	37	106
*YT2U	"	78,468	391	35	121
*YU1JF	"	4,445	69	15	20
*YTØI	"	1,683	58	10	23
***YU1EA**	**28**	**5,740**	**81**	**14**	**27**
***YU1ML**	**14**	**2,100**	**66**	**6**	**24**
***YU7WW**	**7**	**305,816**	**1491**	**31**	**96**
*YU5T	"	88,566	704	17	70
*YT3E	"	83,200	505	23	81
*YU4BAH	"	4,620	123	7	35
***YT8A**	**1.8**	**78,988**	**812**	**17**	**74**
YU5R	**AA**	**4,559,328**	**3591**	**165**	**483**
			(OP: YT2AAA)		
YTØC	"	2,782,500	2749	130	370
YU7KW	"	2,655,968	2342	145	423
YT6X	"	1,880,424	2158	123	381
YU1DW	"	1,426,974	1935	108	309
YT1CI	"	832,676	1840	66	202
YU5A	"	119,952	555	40	113
YT1X	**28A**	**63,656**	**351**	**29**	**80**
YTØZ	**21A**	**559,253**	**1552**	**37**	**126**
			(OP: YU1ZZ)		
YUØW	"	237,640	875	32	98
YT7R	"	156,576	617	29	83
			(OP: YU7BW)		
YT7X	"	143,871	543	34	85
			(OP: YU7CF)		
YT3X	**14A**	**1,104,928**	**3216**	**39**	**133**
YT6T	"	209,802	758	34	112
			(OP: YU7CM)		
YT2ISM	"	123,832	921	26	66
YT3D	**7A**	**452,370**	**1476**	**39**	**131**
YT7KM	"	284,275	1249	31	106
YT5K	"	214,032	1220	26	86
			(OP: YT2SS)		
YT7AA	"	85,668	330	34	98
YT4T	**3.5A**	**242,650**	**1648**	**27**	**88**
YU1LD	"	21,156	151	19	67
YTØA	**1.8A**	**68,392**	**733**	**16**	**67**
			(OP: YU1EL)		
***YU3TA**	**AA**	**435,643**	**1036**	**74**	**225**
*YT5N	"	317,338	730	68	198
			(OP: YU7AF)		
*YU1KT	"	192,797	710	45	142
*YU7GMN	"	52,896	259	34	82
			(OP: YU7GM)		
*YTØX	"	39,611	237	32	111
***YT1DX**	**21A**	**7,503**	**79**	**11**	**30**
*YU8NU	"	3,104	61	11	21
***YU5M**	**14A**	**349,790**	**1388**	**34**	**99**
*YT1BX	"	25,020	333	13	47
*YU1LG	"	15,120	167	13	57
***YU1LA**	**7A**	**209,000**	**1178**	**27**	**98**
*YU1UO	"	156,090	769	33	96
*YT2B	"	126,540	775	26	85
***YT5DM**	**3.5A**	**206,030**	**1587**	**23**	**87**
*YU1ED	"	107,460	1023	18	72
*YT1914CER	"	70,800	827	15	65
			(OP: YT1WA)		
*YUØU	"	43,416	543	13	59
*YU1RM	"	40,870	598	10	51

Sicily

***IT9RGY**	**A**	**673,628**	**1365**	**83**	**249**
			(OP: IZ3NVR)		
*IT9CKA	"	67,340	316	39	109
*IT9AJP	"	60,320	242	44	101
*IT9VJO	"	37,128	236	33	103
*IT9IDR	"	16,368	95	30	63
*IT9RKR	21	56	5	3	5
IT9UFP	**AA**	**586,227**	**1257**	**71**	**192**
IT9QGH	"	519,200	915	75	200
IT9BLB	**21A**	**596,063**	**1705**	**38**	**131**
IB9A	"	401,672	1315	34	114
			(OP: IT9RBW)		
IT9RZU	**14A**	**872,298**	**2951**	**39**	**122**
IT9ESW	**7A**	**124,319**	**615**	**30**	**101**
IT9SSI	"	28,776	158	25	63
IR9R	**3.5A**	**272,126**	**1858**	**23**	**80**
			(OP: IT9PPG)		
IO9J	"	7,000	130	11	45
			(OP: IT9IMJ)		
***IW9GRL**	**AA**	**71,905**	**197**	**59**	**138**
*IT9ORA	"	20,240	146	27	65
*IT9VDQ	"	15,870	199	13	56
*IT9IVU	"	13,560	156	33	80
***IR9K**	**28A**	**72,944**	**458**	**25**	**69**
			(OP: IT9BXR)		
***IT9LKX**	**14A**	**130,914**	**620**	**33**	**93**

Slovak Republic

OM7RU	**A**	**2,917,980**	**3327**	**118**	**350**
OM6AL	"	328,050	1220	48	177
OM3R	"	321,860	794	62	204
			(OP: OM3CFR)		
OM5VS	"	22,659	201	17	66
OM3CM	**28**	**6,486**	**66**	**16**	**31**
OM1II	**21**	**11,000**	**98**	**20**	**30**
OM5WW	**7**	**851,296**	**3252**	**36**	**112**
OM2XA	"	36,080	311	18	62
OMØAS	**3.5**	**32,760**	**495**	**9**	**43**
***OM2DT**	**A**	**295,641**	**580**	**78**	**243**
*OM3ZU	"	266,760	997	52	182
*OM8ON	"	230,230	428	75	178
*OM7AG	"	210,066	790	47	176
*OM4DU	"	83,868	392	39	135
*OM4AY	"	77,910	406	36	111
*OM7SR	"	77,280	402	45	139
*OM3CMK	"	38,772	318	30	78
*OM3CDN	"	32,136	236	24	80
*OM7AT	"	23,326	174	29	78
*OM5MX	"	14,062	142	21	58
*OM5MI	"	2,280	61	12	28
***OM8JP**	**21**	**2,475**	**51**	**10**	**15**
***OM8FR**	**14**	**84,868**	**495**	**25**	**73**
*OMØMW	"	52,105	452	25	60
***OM7PY**	**7**	**78,694**	**639**	**21**	**77**
*OM8AQ	"	39,160	278	22	66
*OM8VL	"	5,676	117	7	36
***OM3ZWA**	**3.5**	**103,923**	**1046**	**16**	**65**
*OM6TX	"	36,480	513	11	53
*OM6TU	"	16,200	301	10	40
***OM5NL**	**1.8**	**64,255**	**860**	**12**	**59**
OM7JG	**AA**	**3,216,696**	**2814**	**140**	**434**
OM7LM	"	963,300	1513	95	285
OM8AA	"	466,587	1191	70	227
OM3SX	"	84	4	3	4
OM8CW	**21A**	**608,642**	**1654**	**37**	**126**
OM8LA	"	59,514	275	28	63
OM3DX	"	27,608	149	30	38
OM3CW	**14A**	**375,804**	**1313**	**33**	**110**
OMØWR	**7A**	**578,100**	**1978**	**38**	**126**
OMØM	**3.5A**	**519,420**	**2549**	**32**	**100**
			(OP: OM3CGN)		
OM6NM	"	477,830	2158	35	107
OM2XW	**1.8A**	**200,384**	**1510**	**20**	**81**
***OM7LW**	**AA**	**1,670,053**	**1721**	**128**	**401**
*OM5CM	"	365,024	1035	62	210
*OM3CQ	"	351,000	1066	54	180
*OM4O	"	189,176	456	56	158
			(OP: OM3NI)		
*OM6RM	"	180,616	542	54	157
*OM5UM	"	98,888	400	43	145
*OM6MS	"	86,597	599	24	115
*OM8MF	"	30,394	156	25	66
*OM6WW	"	19,400	164	24	73
*OM2RA	"	7,540	73	13	52
***OM3TZZ**	**7A**	**290,360**	**1320**	**34**	**106**
***OM5KM**	**3.5A**	**85,056**	**679**	**19**	**77**

Slovenia

S52NR	**A**	**1,531,222**	**1824**	**108**	**319**
S51DX	"	383,028	1165	42	135
S52TW	"	14,364	89	35	41
S57S	"	6,384	99	15	33
***S57NAW**	**A**	**482,328**	**844**	**92**	**256**
*S59MA	"	410,130	1323	53	192
*S58MU	"	330,460	1003	60	200
*S56C	"	296,880	1011	54	186
*S58KA	"	194,964	776	43	168
*S58RU	"	73,305	366	46	135
*S58D	"	54,312	340	27	97
*S53DT	"	43,928	226	41	111
*S5ØDK	"	39,303	229	28	71
*S55N	"	28,801	217	25	58
*S55AC	"	28,670	240	24	98
*S57WW	"	24,511	195	27	100
*S57C	"	3,965	57	19	46
***S52GO**	**14**	**94,188**	**579**	**23**	**71**
***S51J**	**7**	**64,680**	**620**	**17**	**67**
*S52FT	"	26,325	346	12	53
***S53AR**	**3.5**	**80,261**	**804**	**16**

*EA1CCM	"	143	9	4	7
***EC7R**	**21**	**204,156**	**1163**	**28**	**78**
*EA4BW	"	10,339	138	11	38
*EA1FBU	"	5,510	104	10	28
*EA3WX	"	3,887	69	10	13
*EA5VK	"	3,741	70	9	20
***EE5X**	**14**	**4,608**	**86**	**9**	**9**
			(OP: EA5KO)		
*EA3DMN	"	2,418	52	9	22
***EA1AUR**	**7**	**24,618**	**268**	**13**	**53**
***EC5C**	**3.5**	**14,356**	**157**	**15**	**59**
*EA2IF	"	3,610	93	8	30
EF1A	**AA**	**1,840,630**	**2886**	**76**	**243**
			(OP: EA1X)		
EA7A	"	1,146,465	1938	91	274
EA2W	"	1,081,584	1781	81	215
ED1K	"	1,047,690	1618	78	237
			(OP: EA1NK)		
EA4GOY	"	1,021,380	1265	105	330
ED2B	"	480,754	1241	55	216
			(OP: EA2ESB)		
EB5F	"	438,270	1119	48	162
EA7TG	"	349,364	553	85	249
EA2J	"	330,642	687	69	245
EA2BD	"	324,952	540	77	225
EA7TS	"	294,216	611	82	230
EA1BLI	"	264,192	418	90	294
EA1BNF	"	235,675	353	100	175
EA4UV	"	160,638	314	70	176
EA1S	"	142,164	367	62	136
EA3AKA	"	139,080	498	52	176
EA3PT	"	78,320	214	65	155
EA1B	"	53,835	228	32	79
EC3AIT	"	42,900	190	43	89
EA4UV	"	160,638	314	70	176
EA5O	"	25,323	175	25	44
EB3JT	"	6,360	67	18	35
EA7BUU	"	5,508	40	24	30
EA3AR	**28A**	**127,584**	**848**	**26**	**70**
EA7Q	"	47,600	391	18	67
EA5S	"	20,976	173	22	54
EA2KV	**21A**	**215,876**	**958**	**30**	**86**
EA5L	**14A**	**144,474**	**670**	**30**	**91**
EA1WX	"	121,440	523	27	93
EA5GIE	**7A**	**38,584**	**247**	**23**	**68**
EA2A	"	14,840	99	17	53
EA2CIA	*"*	*4,223*	*91*	*9*	*32*
EA1NE	"	3,159	51	11	16
EE3M	**3.5A**	**447,013**	**2132**	**31**	**102**
			(OP: EA3CX)		
***EA2AZ**	**AA**	**1,099,204**	**1667**	**94**	**294**
*EA3AKY	"	722,775	1407	80	265
*EA1G	"	624,597	1053	90	241
*EA3CWT	"	381,420	931	63	197
*EA1IQM	"	344,974	658	82	205
*EE2A	"	206,514	532	58	173
			(OP: EA2SN)		
*EA7RCS	"	202,797	486	49	154
			(OP: EC7AKV)		
*EA1CS	"	162,792	586	44	124
*EA2DDE	"	155,064	420	44	112
*EA3XR	"	106,406	308	46	120
*EA7MT	"	96,556	256	59	143
*EA2VE	"	94,248	543	59	179
*EA3AQ	"	90,270	275	51	126
*EA5LU	"	85,635	317	47	126
*EA2PA	"	76,032	368	30	78
*EB5CS	"	74,910	308	37	128
*EA2GM	"	69,426	392	29	104
*EA4XT	"	64,350	312	30	100
*EA7GZQ	"	47,821	245	28	69
*EA7VJ	"	46,280	159	47	83
*EA7GVR	"	45,480	246	29	91
*EA7Z	"	44,205	265	25	80
*EA3BV	"	39,911	245	31	76
*EA7ELY	"	29,736	163	27	57
*EF7A	"	26,950	221	18	31
*EA2EOW	"	25,521	139	30	111
*EB7KA	"	20,736	199	19	53
EA7AQR	*"*	*13,176*	*310*	*30*	*42*
*EA4FME	"	10,044	113	29	64
*EA1JCE	"	8,611	100	18	61
EB2RA	*"*	*6,780*	*67*	*19*	*41*
*EA4BAS	"	3,520	50	13	27
***EA4ZQ**	**"**	**2,756**	**34**	**21**	**32**
*EA3KN	"	2,336	25	15	17
*EA1DWI	"	1,596	27	16	26
***ED7O**	**21A**	**278,892**	**1176**	**32**	**95**
			(OP: EA7EU)		
*EA5WA	"	104,076	645	19	65
*EA5ASM	"	4,836	63	13	26
*EA7J	"	2,832	45	11	13
***EA1ASG**	**14A**	**5,848**	**92**	**14**	**20**
***EA2NN**	**7A**	**118,040**	**668**	**21**	**83**
*EA2CW	"	20,230	172	19	66
*EA7ZC	"	7,380	93	11	34
*EA3AMI	"	725	30	5	20
***EA3AVV**	**3.5A**	**43,440**	**451**	**17**	**63**
Svalbard					
JW7QIA	**3.5A**	**62,832**	**488**	**21**	**63**
			(OP: LA7QIA)		
***JW5E**	**14A**	**247,608**	**1185**	**28**	**86**
			(OP: SQ9CNN)		
Sweden					
SM2CEW	**A**	**931,020**	**1568**	**75**	**220**
SM5CCE	"	231,519	595	62	167
SD1A	"	183,768	489	57	171
			(OP: SM1TDE)		
SK6KU	"	131,400	464	54	146
			(OP: SM6NM)		
SM5Q	"	114,632	424	50	134
SA5CDO	"	99,912	431	42	142
SEØB	"	95,494	642	31	102
SM5AOG	"	41,114	245	28	94
SM6BGA	"	17,094	124	24	53
SM3BFH	"	12,558	106	23	46
SM5DGE	"	5,992	43	27	29
SM7ATL	"	2,772	53	11	25
SM6CMU	**21**	**59,892**	**247**	**26**	**66**
SB3W	**7**	**2,937**	**61**	**9**	**24**
			(OP: SM3RAB)		
SM6CPY	**1.8**	**42,478**	**638**	**14**	**53**
***SM5CSS**	**A**	**298,120**	**876**	**59**	**198**
*SM5DXR	"	162,206	766	40	162
*SF6W	"	153,850	747	37	133
			(OP: SM6EWB)		
*SM5LW	"	144,739	491	53	164
*SM7CIL	"	136,875	433	34	91
*SM5ACQ	"	134,919	702	39	132
*SE4E	"	131,250	486	47	163
			(OP: SM4DQE)		
*SM6TOL	"	116,688	537	37	119
*SM6S	"	107,961	541	33	126
*SK5AA	"	66,859	339	38	101
			(OP: SM5KRI)		
*SF7X	"	44,408	264	34	88
			(OP: SM7HVQ)		
*SM6OPM	"	13,720	140	23	75
*SGØM	"	3,850	47	18	32
			(OP: SAØAQT)		
*SM2BLY	"	3,007	40	15	16
*SM6MIS	"	1,452	49	7	26
*SM5FUG	"	598	31	6	17
***SM4JSF**	**21**	**2,619**	**55**	**8**	**19**
***SM2CVH**	**14**	**9,472**	**85**	**15**	**49**
*SG3O	"	2,233	49	9	20
			(OP: SM3AGO)		
*SM6NJK	"	56	7	2	6
***SE6J**	**7**	**21,518**	**309**	**11**	**47**
			(OP: SM6XHM)		
***SM6LRR**	**3.5**	**1,400**	**42**	**6**	**19**
SF1Z	**AA**	**1,166,137**	**1684**	**102**	**325**
			(OP: SMØHEV)		
SM6MCW	*"*	*703,644*	*996*	*111*	*271*
SM3U	"	631,995	721	117	338
			(OP: SMØMPV)		
SM6BZV	"	622,908	976	97	299
SM3OMO	"	574,488	994	73	243
SEØA	"	513,081	1187	69	210
			(OP: SMØJCA)		
SMØHRP	"	429,420	1173	64	191
SC7DX	"	403,461	994	73	220
			(OP: SM7GIB)		
SMØCXS	"	282,264	524	66	162
SDØW	"	259,842	689	70	184
			(OP: SMØFPR)		
SM6NZA	"	231,539	345	102	239
SA6NIA	"	209,019	985	42	151
SM6LJU	"	208,754	425	70	189
SD6M	"	135,408	723	33	123
			(OP: SA6BGR)		
SCØT	"	87,978	586	27	102
			(OP: SAØBVX)		
SM2OTU	"	43,470	245	33	93
SM5ENX	"	9,648	73	21	27
SMØNJO	"	9,000	78	30	42
SM5LNE	"	5,687	45	22	25
SM3LGO	"	5,605	53	19	40
SA4IPA/Ø	"	5,162	69	14	44
SM5COP	**21A**	**84,817**	**407**	**26**	**63**
SM6YNO	**14A**	**28,083**	**168**	**18**	**51**
SE5B	**7A**	**58,743**	**443**	**28**	**79**
			(OP: SM5CBN)		
SM6EAN	**3.5A**	**163,260**	**1419**	**19**	**71**
SEØX	**1.8A**	**98,345**	**1006**	**19**	**66**
			(OP: SMØMDG)		
SM5C	"	6,615	129	9	40
			(OP: SM5CBM)		
8SØDX	"	651	19	8	13
			(OP: SMØDSG)		
***SIØW**	**AA**	**411,687**	**830**	**68**	**239**
			(OP: SMØNSJ)		
*SD6F	"	394,131	1290	56	181
			(OP: SM6JWR)		
*SFØA	"	329,004	1069	53	181
			(OP: SMØLPO)		
*SE6K	"	115,028	565	40	153
			(OP: SM6FZO)		
*SM7RYR	"	95,708	612	32	110
*SM6LPF	"	84,078	252	48	125
*7S7V	"	80,000	313	48	112
*SF5X	"	66,442	362	32	107
			(OP: SM5EFX)		
*SM3EAE	"	61,131	301	34	89
*SI6T	"	46,292	166	47	116
			(OP: SM6LZQ)		
*SE6N	"	30,281	214	28	79
			(OP: SA6AXR)		
*SM6IQD	"	23,546	167	33	89
*SM6A	"	16,926	136	20	71
			(OP: SA6AQP)		
*SM6GBM	"	11,346	143	16	46
SA6IMI	*"*	*960*	*31*	*14*	*26*
***SM6F**	**21A**	**11,084**	**63**	**23**	**45**
			(OP: SM6CUK)		
***SD3A**	**14A**	**7,750**	**115**	**11**	**39**
			(OP: SM3FJF)		
***SM6FPC**	**7A**	**49,104**	**332**	**20**	**73**
***SF5O**	**1.8A**	**13,260**	**250**	**8**	**43**
			(OP: SMØEOS)		
Switzerland					
HB9AGA	**A**	**356,955**	**990**	**63**	**202**
HB9JOE	**3.5**	**3,680**	**86**	**8**	**32**
***HB9ARF**	**A**	**684,480**	**1410**	**76**	**234**
*HB9DCM	"	474,624	1000	74	214
*HB9AJY	"	214,240	665	49	159
*HB9HQX	"	66,360	427	27	113
*HB9FMJ	"	57,717	286	34	87
*HB9WDY	"	26,500	252	19	81
*HB9DND	"	19,285	145	27	68
*HB9FAI	"	9,594	75	28	54
*HB9BGF	"	2,546	45	10	28
*HB9GKM	"	1,400	34	13	27
*HB9HEI	"	850	29	10	24
***HB9DDE**	**21**	**13,132**	**140**	**15**	**34**
*HB3YGD	"	1,120	36	7	13
***HB9TSU**	**14**	**2,880**	**69**	**6**	**30**
***HB9HBY**	**7**	**3,040**	**68**	**8**	**32**
*HB9IIH	"	2,886	64	10	29
*HB9ESO	"	168	13	3	11
HB9DQL	**AA**	**2,420,980**	**2777**	**100**	**337**
HB9TOC	"	2,004,900	2386	110	379
HB9IJC	"	658,217	1159	87	256
HB9AWS	"	382,381	1135	63	208
HB9AUK	"	220,616	508	64	154
HB9DVZ	"	204,829	542	58	199
HB9CZF	"	171,147	351	70	197
HB9BAS	"	133,522	344	62	140
HB9KOG	"	76,406	285	47	104
HB9NE	"	20,776	116	30	76
			(OP: HB9DUR)		
HB1A	**21A**	**259,260**	**867**	**37**	**108**
			(OP: HB9BUN)		
HB9AFZ	**7A**	**33,384**	**288**	**17**	**61**
***HB9BXE**	**AA**	**1,139,336**	**1602**	**97**	**331**
*HB9CBR	"	192,660	591	42	153
*HB9TWM	"	108,035	336	51	154
*HB9FBA	"	81,120	327	36	120
*HB9DXB	"	54,756	280	36	120
*HB9EXR	"	39,312	210	33	93
*HB9AFH	"	35,584	137	45	83
*HB9LF	"	10,868	67	32	44
			(OP: HB9CRV)		
*HB9MIR	"	6,840	97	17	55
HB9DUS	*"*	*551*	*18*	*9*	*10*
***HB9FAP**	**1.8A**	**54,069**	**808**	**11**	**56**
Ukraine					
UT2UB	**A**	**1,101,891**	**1715**	**98**	**313**
UX1UX	"	1,066,165	1953	85	280
UV1IX	"	541,500	1290	72	213
UW1G	"	441,045	1174	69	228
			(OP: UY5HF)		
UY5QR	"	205,616	520	75	209
UZ1U	"	196,470	629	53	169
			(OP: US7UU)		
UR3QX	"	179,322	496	63	179
UR7FM	"	179,055	583	51	156
UR4IZ	"	74,244	372	31	107
US5QRW	"	70,840	244	42	98
UT5ECZ	"	53,949	190	37	110
UY5OO	*"*	*19,550*	*82*	*45*	*70*
USØVA	"	460	15	10	10
UZ5DX	**21**	**511,146**	**1553**	**37**	**109**
UT6EE	"	22,099	150	24	53
UR6IJ	"	14,063	120	21	28
US7IB	**14**	**27,456**	**261**	**16**	**50**
UW5U	**7**	**58,144**	**473**	**20**	**59**
			(OP: UY2UA)		
UT7ZM	"	8,745	132	12	43
UY3AW	**3.5**	**20,837**	**260**	**14**	**53**
UT1QQ	"	18,920	325	8	47
UT4WA	"	9,072	106	13	43
UT3QU	**1.8**	**18,504**	**216**	**15**	**57**
UX3UU	"	8,658	343	6	33
***UW8SM**	**A**	**953,544**	**1525**	**100**	**302**
*UR1HR	"	549,318	1100	83	236
*UT3UZ	"	536,250	967	80	250
*US7UK	"	514,321	1029	85	268
*UT5NR	"	496,888	1314	75	191
UXØLL	*"*	*470,253*	*727*	*88*	*255*
*UR5KO	"	414,000	1008	75	201
*UT7EZ	"	387,091	1058	65	204
*UR7EC	"	373,760	622	85	235
*UT4EK	"	355,618	998	58	211
UX1BZ	*"*	*316,216*	*1006*	*61*	*171*
*UT3SO	"	311,001	987	56	193
*UT5UN	"	302,775	640	76	199
*US3IZ	"	293,372	812	64	220
*UR7HY	"	277,905	580	68	223
*US8IM	"	272,197	609	87	206
*UY2UQ	"	233,503	832	55	184
*UT5EPP	"	221,996	701	57	197
*UT3KW	"	198,403	801	43	156
*UR5ZTH	"	196,826	617	58	180
*US7IID	"	194,416	675	46	186
*UT3NA	"	180,900	672	42	159
*UR3LM	"	178,055	555	49	190
*US3EW	"	170,286	562	50	152
*UTØCK	"	165,319	603	44	165
UT5VX	*"*	*137,250*	*636*	*40*	*143*
UT8EU	*"*	*2,025*	*32*	*12*	*13*
*UT5IZ	"	135,575	665	42	145
*UY5QJ	"	117,092	458	37	109
*UV3RT	"	115,140	492	44	146
*UY7RR	"	107,570	510	41	114
*UY5TE	"	105,776	509	38	138
*UW3WF	"	104,160	443	44	142
*UR8GX	"	103,418	520	36	130
*UT7QB	"	101,039	431	41	150
*UR4MF	"	99,680	404	42	136
*UT2QQ	"	99,567	384	46	161
*UT4UQ	"	92,220	372	43	131
*UT8MZ	"	84,836	391	38	129
*UR5EEW	"	82,810	407	41	128
*UX1CL	"	81,810	341	41	121
*UY5BQ	"	80,848	390	40	123
*UR7VA	"	74,503	390	31	112
UT8IV	*"*	*72,874*	*348*	*51*	*115*
*UR4LIN	"	68,640	355	38	118
*UX1HW/M	"	68,440	310	40	105
*UX7QV	"	67,083	313	44	133
*UT7NI	"	66,308	381	29	108
*UY2ZZ	"	65,688	303	38	130
*UR5AMJ	"	60,830	205	43	67
*UX6IB	"	60,555	264	41	124
*UT6UH	"	60,551	424	32	119
*UV1IW	"	60,264	449	26	98
*UT7MR	"	49,446	297	30	104
*UX8IA	"	39,078	203	50	117
*UT4UB	"	35,620	191	40	97
*UR6QU	"	32,640	245	22	74
*UT8AS	"	32,368	218	23	89
*UR5TMT	"	32,315	273	23	92
*UY9U	"	31,702	120	47	74
*US7LM	"	30,645	141	44	91
*UT4NY	"	28,886	202	26	75
*US7IA	"	27,405	226	22	83
*UR5WCQ	"	23,577	196	20	67
*UR5WQ	"	18,952	151	21	71
*UW7CF	"	15,750	137	21	69
*UR4CW	"	14,420	116	26	44
*US5WBJ	"	14,350	129	22	60
*US5CDH	"	11,869	119	21	62
*US2IW	"	11,340	74	26	28
*UR3GO	"	10,530	108	22	68
*UT5UHX	"	8,667	95	26	55
*US5EEK	"	7,820	77	16	52
UT1LO	*"*	*7,560*	*41*	*31*	*41*
*UR7AL	"	4,850	68	17	33
*US8UA	"	2,775	51	12	25
*UR7GM	"	624	30	7	19
UY3MW	*"*	*336*	*8*	*7*	*7*
UT2DW	*"*	*63*	*14*	*8*	*13*
***UR5FIL**	**28**	**14,740**	**101**	**23**	**44**
*UT4Q	"	880	24	9	11
			(OP: UR5QRB)		
*UR3EZ	"	756	26	9	12
*US8ZAL	"	247	10	9	10
***UV3QQ**	**21**	**27,027**	**194**	**24**	**53**
*UT3RN	"	25,612	215	18	58
*UR5CC	"	15,730	98	22	43
*USØHZ	"	11,232	112	15	33
*UT2MZ	"	11,076	73	27	51
*UX2HH	"	3,069	35	15	18
*UR5TA	"	2,470	51	10	16
***UX9ZA**	**14**	**61,005**	**519**	**19**	**64**
*UT1QR	"	9,858	148	10	43
*UT8UL	"	9,450	113	14	31
*USØGB	"	7,436	97	12	40
*UR5NLA	"	5,452	114	11	36
*UR5EU	"	5,375	85	9	34
***UV2IZ**	**7**	**54,648**	**437**	**18**	**70**
*US1VM	"	42,119	426	18	59
*UV3QF	"	27,740	334	13	60
*UT3IJ	"	24,258	202	19	59
*UR5PG	"	22,780	245	15	53
*UT6ER	"	16,948	141	19	57
*US5IIM	"	15,840	91	21	67
*UR4UQT	"	11,940	128	15	45
*UX1CW	"	8,424	126	11	41
*UR5WX	"	5,618	83	14	39
*UT5KL	"	4,864	130	15	49
***UW7EF**	**3.5**	**25,440**	**400**	**10**	**50**
*UT1WW	"	22,660	397	10	45
*UR5IFM	"	12,672	274	7	37
*UR3QTN	"	12,220	249	8	39
***UR5TEX**	**1.8**	**12,232**	**311**	**6**	**38**
*UR5VR	"	4,824	131	6	30
*UX7Q	"	2,475	72	6	27
			(OP: UR3QFB)		
*UT1KY	"	1,040	66	4	16
UW1M	**AA**	**6,120,860**	**5488**	**155**	**506**
UT5C	"	4,635,800	4244	157	493
			(OP: UX7CQ)		
UT4U	"	4,170,432	3147	169	527
			(OP: UT5UJO)		
UWØK	"	4,135,950	4006	142	443
			(OP: USØKW)		
UR7LY	"	2,141,744	2065	141	425
UR5R	"	1,570,212	2823	97	275
			(OP: UTØRM)		
UV5U	"	1,431,414	1384	146	420
			(OP: UX1UA)		
UY5VA	"	1,229,472	2005	99	333
EO5ØFF	"	1,151,476	1936	117	319
			(OP: UXØFF)		
UR8RF	"	1,086,624	1630	106	335
UT7NY	"	799,134	1468	92	279
UZ1WW	"	664,224	1032	85	289
UR5ECW	"	662,098	1078	96	266
UV2V	"	547,222	1159	76	262
			(OP: UX1VX)		
UT7IS	"	501,126	1221	70	219
UR5XMM	"	449,075	624	98	257
UX7IW	"	332,514	685	73	200
UR4QRH	"	257,166	484	66	168
US6IKT	"	207,480	701	51	177
UY2RA	"	169,728	536	51	157
UX5UO	"	158,080	401	61	147
UR5EDX	"	127,332	273	68	194
UT3UV	"	122,802	492	42	169
UT8RN	"	102,860	497	41	144
US7IM	"	90,282	653	33	90
US5IQW	"	89,136	314	50	94
UTØRS	*"*	*78,831*	*185*	*72*	*99*
UY2IZ	"	64,385	194	45	118
US3LX	"	38,376	149	47	76
US3LR	"	30,371	132	35	86
UR4EI	"	27,904	226	21	88
US8QQ	"	11,371	51	38	45
US5ETV	"	5,100	40	25	26
UR7EZ	"	2,960	26	17	23
UT5EL	**28A**	**41,106**	**242**	**25**	**68**
UR4LRG	"	4,560	54	15	25
UT8EU	*"*	*2,025*	*32*	*12*	*13*
UZ2I	**21A**	**219,042**	**918**	**31**	**98**
			(OP: UX6IZ)		
UW4E	"	177,463	641	35	108
			(OP: UR7EU)		
UZØU	**14A**	**309,175**	**1270**	**35**	**114**
			(OP: UY5ZZ)		
UR7R	"	108,426	646	26	76
			(OP: UX1RX)		
UW3U	"	84,993	369	30	93
			(OP: UT7UJ)		
US1IV	**7A**	**57,720**	**369**	**25**	**79**
UT2II	"	54,735	488	21	68
UT3N	"	99	9	4	7
			(OP: UT3NK)		
UT6UD	**1.8A**	**162,000**	**1212**	**24**	**84**
US6EX	"	73,603	717	18	71
UYØZG	"	68,060	706	17	66
UXØKR	"	63,828	776	15	66
***UT4LW**	**AA**	**2,854,645**	**3894**	**121**	**394**
*UW6E	"	2,438,289	3193	120	393
			(OP: UR6EA)		
*UX3I	"	1,015,090	1593	97	318
			(OP: US7IY)		
*UR7HCX	"	733,584	976	116	348
*UW1WU	"	409,906	1053	66	200
*UT5AX	"	395,632	987	76	237
*UT8IM	"	390,522	1060	62	229
*UW2Q	"	347,241	826	68	215
			(OP: UR6QS)		
*UR7HN	"	302,974	543	74	192
*UR5LF	"	252,416	699	59	197
*US1QA	"	215,541	684	59	184
*UT1UL	"	202,280	451	67	193
*UR7ZO	"	195,465	520	71	178
*UR3VKR	"	164,645	375	57	164
*UR5QU	"	129,675	224	76	209
*UT8IT	"	120,432	407	50	158
*UZ5Q	"	118,770	355	60	162
			(OP: UY5QZ)		
*UR5WIF	"	113,448	505	41	133
*UY2ZA	"	100,926	336	49	113
*US5ABI	"	92,048	289	50	126
*UX5UN	"	71,442	228	53	109
*UT3WM	"	69,394	273	42	115
*UT8EL	"	62,918	217	54	139
*UW3HM	"	51,852	225	41	108
*UT5PY	"	51,000	278	34	116
*UT4URX	"	48,465	238	34	101
*UT1US	"	45,426	264	28	106
*UY2IG	"	41,552	276	28	78
*UTØIG	"	36,300	184	43	78
*UT3WX	"	32,400	221	29	79
*UR1YAA	"	28,644	241	21	72
*US3IRX	"	23,108	89	50	56
*UT2HC	"	22,624	107	41	71
*UT4XU	"	21,663	100	39	44
*UR7IE	"	13,944	126	23	60
*UT6UZ	"	9,164	69	21	58
*UR5RP	"	8,448	201	65	127
*UT5ZY	"	6,380	42	29	29
*UR7QM	"	6,090	60	18	52
*UR2MO	"	4,655	38	23	26
*UT5Q	"	3,364	46	22	36
*UT8LN	"	1,802	21	16	18
*UX7UW	"	740	13	10	10
***US2IR**	**28A**	**29,722**	**198**	**25**	**52**
*UT5UT	"	6,519	68	20	33
*UX3IW	"	6,165	69	18	27
***UT1AA**	**21A**	**126,477**	**616**	**31**	**86**
*UR4CU	"	32,370	195	27	56
*US7IGN	"	21,125	151	24	41
*UX7LL	"	7,065	124	9	36
***UR7GO**	**14A**	**468,625**	**1754**	**39**	**124**
*UY5LQ	"	112,992	638	28	79
*UR2Y	"	67,877	288	23	80
			(OP: USØYW)		
***UR5WCW**	**7A**	**199,465**	**816**	**33**	**106**
*UR7MZ	"	133,632	646	29	99
*UR5UJ	"	66,267	449	25	86
*UT5WAA	"	7,285	110	11	36
*UX4CR	"	3,486	126	9	33
***UX2X**	**3.5A**	**307,280**	**1875**	**27**	**88**
			(OP: UT2XQ)		
*UR5IFB	"	24,444	185	17	67
***UT2IV**	**1.8A**	**66,666**	**757**	**15**	**67**
*UT8IO	"	63,882	583	20	71
*UR6LRC	"	6,923	171	6	37
Vienna Intl. Center					
***4U1A**	**A**	**2,146,428**	**2919**	**107**	**329**
			(OP: HB9RB)		
Wales					
MW2I	**21**	**126,735**	**619**	**21**	**64**
			(OP: GW4FRE)		
***MW6M**	**A**	**117,992**	**440**	**46**	**150**
			(OP: GW4BVJ)		
*GW4HBK	"	109,953	408	45	126
*MWØMUT	"	49,610	179	44	161
*MWØDNF	"	152	9	3	5
***GW5L**	**14**	**21,054**	**203**	**13**	**45**
			(OP: GW4ZAR)		
MWØSAW	**AA**	**22,365**	**119**	**31**	**40**
MWØIDX	"	15,663	119	23	46
MW5B	**7A**	**681,450**	**2537**	**37**	**128**
			(OP: G3WVG)		
GW4BKG	"	11,424	119	15	53
***GW

KH6Y	"	15,232	110	29	27
AH6T	"	2,700	61	27	27
			(OP: KH6FHI)		
AH6FC	**21**	**5,160**	**63**	**18**	**25**
***KH6CJJ**	**A**	**440,550**	**864**	**80**	**98**
*NH6DV	"	1,590	29	14	16
***KH6PE**	**7**	**741**	**25**	**7**	**6**
NH7T	**AA**	**4,640,640**	**4168**	**139**	**245**
WH6R	"	224,170	613	67	78
KH6U	"	74,936	211	62	74
***KH6OO**	**AA**	**17,289**	**128**	**25**	**26**

Indonesia

YB2MM	**A**	**211,220**	**415**	**60**	**119**
YB2IQ	"	154,048	341	54	112
YB8UTI	"	18,944	187	18	19
YB7HE	"	396	12	5	6
YB3DXG	**28**	**216**	**11**	**6**	**6**
YC9XYP	**21**	**27,816**	**187**	**23**	**38**
YE3WIL	"	24	2	2	2
YB2TS	**14**	**1,944**	**44**	**11**	**16**
YB1RKT	**7**	**6,255**	**53**	**16**	**29**
YB4IR	**3.5**	**3,630**	**44**	**11**	**19**
***YB1KK**	**A**	**50,283**	**163**	**35**	**76**
*YB1BML	"	27,176	130	29	57
*YD1FRU	"	24,016	118	27	49
*YB6MYO	"	18,395	112	28	37
*YB8RW	"	9,968	142	14	14
*YB9GDP	"	6,384	66	21	35
*YB1IQE	"	6,171	51	21	30
*YC1KFQ	"	4,902	52	20	23
*YCØBAS	"	3,700	35	13	24
*YC9BVB	"	836	16	7	12
*YC1EYS	"	231	19	10	11
*YC2CLH	"	140	7	5	5
*YC1KQV	"	140	19	8	12
***YB3BOA**	**28**	**240**	**13**	**6**	**6**
*YB1HR	"	25	3	3	2
***YC9FAR**	**21**	**138,417**	**567**	**26**	**61**
*YB7XO	"	25,428	181	21	31
*YC4SIZ	"	11,077	86	19	34
*YB1LUE	"	10,314	73	16	38
*YB3BGM	"	6,004	64	13	25
*YCØRNC/1	"	5,005	55	16	19
*YC2XCD	"	4,608	58	15	21
*YB1NXR	"	4,294	51	11	27
*YC1GDF	"	2,952	58	14	27
*YB8JEC	"	2,323	45	11	12
*YD2UFR	"	1,300	22	10	16
*YD3YGY	"	384	15	7	9
*YD3TSJ	"	252	17	5	9
*YB1ELP	"	90	5	3	3
***YE4IJ**	**14**	**14,268**	**98**	**21**	**37**
*YB9GV	"	1,102	36	8	11
***YD2DEW**	**7**	**1,125**	**28**	**9**	**16**
*YCØDMS	"	6	1	1	1
***YF8HYV**	**3.5**	**3,293**	**48**	**15**	**22**
*YB6DE	"	525	17	7	14
YB2BST	**AA**	**399,556**	**845**	**62**	**110**
YC1AYO	"	307,692	798	54	135
YC7YGR	"	44,368	150	47	71
YB2HAF	"	39,900	157	29	66
YB1TQL	"	22,145	139	33	70
YCØSAS	"	7,812	56	24	39
YB9DE	**21A**	**220,779**	**710**	**33**	**78**
			(OP: YB3MM)		
YB3BLJ	"	37,296	192	22	50
YBØNSI	**14A**	**28,980**	**153**	**22**	**48**
YC2KJC	"	7,632	65	16	32
YE3AA	"	2,884	48	14	14
YB7MYS	**7A**	**600**	**22**	**8**	**12**
***YB9ELS**	**AA**	**77,268**	**236**	**50**	**91**
*YB9UA	"	63,332	235	51	91
*YB1MIG	"	39,990	131	47	82
*YD9UW	"	25,899	151	36	61
*YC9AOS	"	3,936	55	21	27
*YC1CAR	"	1,914	23	14	19
*YB9BCS	"	713	14	9	14
*YC1DGG	"	544	16	8	9
*YC1DGR	"	88	7	4	4
*YC1AUI	"	72	4	3	3
*YDØRFS	"	48	4	4	4
***YD2UWF**	**21A**	**63,070**	**269**	**25**	**60**
*YBØANJ	"	44,160	200	23	57
			(OP: 4F3JX)		
*YC1LJT	"	5,510	63	11	27
*YD1EQX	"	2,871	51	12	21
*YF3FBV	"	2,706	42	14	19
*YD3ASV	"	1,924	38	12	14
*YC1JEL	"	1,248	41	18	21
***YC1IFR**	**14A**	**361**	**15**	**8**	**11**
***YB2ECG**	**7A**	**3,472**	**50**	**14**	**17**

Marshall Islands

***V73NS**	**21**	**19,034**	**220**	**16**	**15**

New Caledonia

FK8IK	**A**	**1,366,324**	**1801**	**94**	**190**

New Zealand

ZM1A	**A**	**3,264,384**	**3006**	**122**	**262**
			(OP: ZL3CW)		
ZL2AIM	"	2,204	31	17	21
ZL2AGY	**28**	**13,468**	**141**	**18**	**19**
ZL4TT	**AA**	**483,600**	**881**	**71**	**137**
ZL2RX	"	59,520	173	45	83
ZL4NR	"	28,200	120	37	57
ZL3JT	"	22,359	115	31	56
ZL1T	**21A**	**40,630**	**198**	**29**	**56**
			(OP: ZL1ANH)		
ZM1M	**14A**	**404,352**	**1107**	**35**	**93**
			(OP: ZL1BBW)		
ZL1IF	**7A**	**367,024**	**1154**	**30**	**82**
***ZM4G**	**AA**	**65,096**	**156**	**56**	**102**
			(OP: ZL2IFB)		
***ZL1TM**	**21A**	**187,340**	**578**	**33**	**83**

Norfolk Island

***VK9DX**	**7**	**560,959**	**1555**	**34**	**93**

Philippines

*DU1RB	*28*	*192*	*12*	*6*	*6*
DU1IST	**7**	**160,562**	**763**	**28**	**58**
4F3FSK	**3.5**	**477**	**23**	**4**	**5**
4F2KWT	**1.8**	**1,008**	**32**	**5**	**7**
***4E1AGW**	**A**	**142,976**	**433**	**54**	**74**
*DU1WBX	"	92,842	281	51	71
*DU1VGX	"	26,466	177	27	39
***DW3TRZ**	**28**	**198**	**15**	**3**	**3**
***4F3OM**	**21**	**64,575**	**382**	**25**	**50**
*4F1OZ	"	8,178	78	19	28
***4D3X**	**3.5**	**21,328**	**186**	**13**	**30**
DU3T	**AA**	**2,433,935**	**2471**	**100**	**253**
DU3TW	**28A**	**110,946**	**581**	**21**	**45**
***4F3BZ**	**28A**	**122,775**	**580**	**23**	**52**
***4I1EAY**	**21A**	**7,600**	**82**	**15**	**25**

Samoa

***5W1SA**	**21**	**179,800**	**1066**	**29**	**33**

SOUTH AMERICA

Argentina

LU8QT	**A**	**1,136,274**	**1723**	**88**	**158**
LU6D	"	859,005	1345	77	166
AZ1A/X	"	317,660	917	45	95
LW1D	"	129,636	645	36	42
			(OP: LW1EUD)		
LU8DZJ	**28**	**21,460**	**217**	**15**	**22**
LU6UO	**21**	**169,442**	**707**	**21**	**70**
LU7DW	**7**	**4,992**	**62**	**17**	**22**
LU5DF	**3.5**	**2,263**	**49**	**11**	**20**
LU8DPM	**1.8**	**10,656**	**130**	**11**	**21**
			(OP: LU5WW)		
***LU5YF**	**A**	**395,256**	**609**	**87**	**171**
*LV1F	"	229,104	694	39	90
			(OP: LU4FTA)		
*LU1WUD	"	143,916	489	44	90
*LT3V	"	127,170	368	58	99
			(OP: LU6OA)		
*LU4XAP	"	94,720	312	43	85
*LU2DGZ	"	28,480	197	29	35
*LU7CRA	"	5,238	48	17	37
*LU4JHF	"	2,304	35	15	17
*LU2AXF	"	357	21	9	8
*LU1RAF	"	180	10	6	6
***LW8DXR**	**28**	**24,860**	**174**	**18**	**37**
*AY8A	"	6,800	84	13	21
			(OP: LU8ADX)		
***LS2D**	**21**	**461,160**	**1376**	**29**	**91**
			(OP: LU1DJX)		
*LU4HK	"	64,480	361	21	44
*LU1II	"	15,158	105	18	35
***LU9OZA**	**14**	**2,624**	**41**	**15**	**17**
***LW8DRU**	**7**	**700**	**31**	**11**	**14**
***LU1QDQ**	**3.5**	**0**	**4**	**1**	**1**
LU1MA	**AA**	**1,137,380**	**1559**	**82**	**183**
			(OP: LU3MAM)		
LU1DZ	"	729,712	1146	73	163
LU6ETB	"	10,998	60	41	53
LU2DX	**28A**	**670,473**	**1910**	**28**	**95**
LO5D	**21A**	**532,266**	**1456**	**36**	**97**
			(OP: LU8EOT)		
***LW5HR**	**AA**	**1,254,074**	**1289**	**100**	**258**
*LQ3D	"	611,400	1169	65	135
			(OP: LW3DG)		
*LW3DC	"	18,662	159	23	20
*L77D	"	6,177	48	35	36
			(OP: LU6DC)		
*LU9HMB	"	1,200	29	12	18
***LU7HN**	**21A**	**31,437**	**220**	**16**	**47**
*LU1MAW	"	23,777	165	14	45
*LT5V	"	14,504	160	14	35
			(OP: LU8VCC)		

Aruba

P44W	**AA**	**11,884,950**	**6064**	**157**	**529**
			(OP: W2GD)		
P4ØXX	"	1,413,045	1304	110	295
			(OP: N3DXX)		

Bonaire

PJ4DX	**1.8A**	**2,940**	**31**	**10**	**25**

Brazil

PS2T	**A**	**2,569,560**	**2273**	**112**	**287**
			(OP: PY2ZEA)		
PY2KP	"	150,891	300	73	146
PY2MC	"	65,412	277	32	60
PV8DX	"	25,545	163	28	37
PY5DK	"	23,433	85	43	64
PY2EU	"	10,500	68	33	42
PY3LX	"	10,439	104	35	38
PR5B	**28**	**751,940**	**2059**	**31**	**100**
			(OP: PY2LSM)		
PY2YU	"	316,134	960	29	88
PX2A	**21**	**1,225,431**	**3068**	**35**	**106**
			(OP: PY2BK)		
PY6TS	**14**	**1,664**	**21**	**12**	**20**
ZZ5K	**7**	**17,073**	**213**	**20**	**43**
			(OP: PP5RT)		
***PY4ARS**	**A**	**175,968**	**362**	**69**	**139**
*PP5AX	"	139,524	405	49	83
*PY2BBQ	"	92,575	237	50	111
*PU2SZK	"	70,902	298	39	78
*PY2XL	"	41,531	145	48	71
*PY2AXH	"	36,312	177	39	63
*PY2TEY	"	13,612	112	37	46
*ZV2F	"	12,314	80	43	51
			(OP: PY2SFA)		
*PY3AKS	"	11,088	76	25	41
*PY2LPM	"	9,438	65	28	38
*PP5CW	"	9,009	102	25	38
*PY2VCP	"	6,090	71	24	34
*PY2OF	"	5,555	67	21	34
*PY3CAD	"	5,512	54	26	26
*PY1NX	"	5,445	43	18	27
*PY1CH	"	4,200	48	21	29
*PY2TI	"	2,680	33	20	20
*PQ8RS	"	870	21	14	16
*PU2NAX	"	688	18	8	8
*PP5ZX	"	322	9	5	9
*PY2YD	"	154	12	5	6
*PR7KSA	"	60	43	14	16
***PY2EX**	**28**	**180,705**	**623**	**26**	**79**
*PY1NSC	"	750	50	11	14
*PY1XW	"	500	18	8	12
*PU2USK	"	435	26	8	7
***ZZ7ZZ**	**21**	**47,684**	**403**	**17**	**35**
			(OP: PR7AR)		
*PU2WMW	"	33,078	182	22	52
*PU2UAF	"	27,459	170	32	81
*PU2MST	"	16,815	129	15	44
*PU1JSV	"	16,060	130	15	40
*PR7GY	"	11,289	126	19	34
*PP5TG	"	6,798	102	14	19
*PU2TNT	"	5,360	53	11	29
*PP5IP	"	2,058	68	15	27
*PY2ABN	"	603	47	5	4
*PV8AJ	"	45	3	2	3
***PY2NY**	**14**	**371,228**	**1119**	**34**	**84**
*PY3TD	"	39,010	180	29	65
*PS7AW	"	3,364	57	10	19
*PY2CP	"	2,232	34	13	18
*PY2ZW	"	2,064	30	8	16
***PY9MP**	**7**	**4,860**	**59**	**14**	**31**
*PY2KA	"	1,240	22	14	17
PY2KJ	**AA**	**2,056,857**	**1824**	**106**	**291**
PY5AMF	"	1,214,906	1345	96	247
PY2PT	"	875,976	1004	102	221
PV2K	"	513,360	736	84	192
			(OP: PY2KNK)		
PY1VOY	"	431,433	585	80	181
PP7JR	"	165,324	509	44	94
PY4EK	"	137,309	307	62	135
PY3DX	"	86,426	216	52	106
PY2IQ	"	31,862	138	28	61
ZY5T	**21A**	**1,213,950**	**2875**	**37**	**113**
			(OP: PP5KR)		
PY5ZHP	"	259,122	812	29	85
PW2F	"	47,492	289	19	43
PW7B	**14A**	**322,944**	**1152**	**31**	**85**
			(OP: PR7AB)		
PY2XJ	"	5,202	59	22	29
PP2DX	"	552	13	10	13
PY3TR	"	18	10	4	5
PY5EG	**7A**	**33,152**	**113**	**32**	**96**
PP5JR	**3.5A**	**30,452**	**163**	**24**	**68**
***PY2KC**	**AA**	**1,260,367**	**1321**	**98**	**275**
*PY2FRQ	"	843,648	1002	98	214
*PT7WM	"	426,684	804	58	164
*PY2WC	"	149,120	378	60	100
*PY2FSR	"	122,980	318	57	115
*PY2CX	"	95,160	257	49	107
*PY2WQ	"	91,155	244	61	116
*PY2UDB	"	54,522	204	37	80
*PP5DAN	"	46,830	212	43	62
*PY5IN	"	33,872	142	44	72
*PY2MIA	"	32,318	146	46	67
*PY2OT	"	29,193	110	43	68
*PY2NNM	"	21,600	127	31	49
*PY7ZC	"	21,032	100	30	58
*PT7CG	"	17,661	92	29	58
*PV8AAS	"	16,896	104	30	58
*PR8KW	"	14,418	82	29	52
*PY2XV	"	14,104	80	28	54
*PY1ZB	"	11,396	115	34	40
*PY2OKB	"	6,050	70	23	27
*PY1RCH	"	4,717	64	26	27
*PY2WND	"	3,040	31	17	23
*PU2VZV	"	2,822	46	15	19
*PY2GM	"	2,814	30	16	26
*PY1FI	"	1,425	26	13	12
*PU2TWZ	"	1,350	65	21	29
*PU8PSF	"	924	57	12	16
*PY2ZA	"	252	12	5	7
*PU2MEA	"	105	8	7	8
*PY2FGC	"	96	8	6	6
*PY2VOB	"	90	13	5	5
***PX5M**	**28A**	**205,308**	**720**	**26**	**82**
			(OP: PP5BT)		
*PY1MK	"	55,705	321	19	46
*ZZ1M	"	32,706	300	17	29
			(OP: PY1SAD)		
*PU1NAF	"	1,792	47	14	18
*PY4NF	"	60	6	3	2
***PY2WH**	**21A**	**354,688**	**1091**	**34**	**94**
*PY1DX	"	287,100	945	30	86
*PY2RSA	"	182,305	635	24	77
*PY2QT	"	103,041	397	28	79
*PY1KO	"	59,859	294	22	59
*PT9DX	"	33,969	184	19	48
*PY2DPM	"	19,560	136	18	42
*PY5ZW	"	17,568	148	16	32
*PY3ZZR	"	14,536	124	13	33
*PT2AW	"	7,141	83	13	24
*PP8ZAC	"	4,416	78	9	14
*PV8DC	"	2,584	44	13	21
*PY1KB	"	1,914	47	10	12
*PY5VE	"	1,746	57	8	10
*PU1LEO	"	1,012	34	9	13
*PV8DR	"	486	32	5	4
*PY2PIM	"	390	12	4	9
***PY4XX**	**14A**	**195,322**	**622**	**34**	**88**
*PY1AX	"	31,950	182	23	52
***PP2CC**	**7A**	**26,207**	**152**	**19**	**54**
*PT6N	"	6,716	88	14	32
			(OP: PP6EW)		
*PT2AZ	"	770	18	9	13

Chile

***CB3R**	**A**	**1,234,947**	**1718**	**83**	**188**
			(OP: XQ3SK)		
***XQ1CR**	**21**	**14,491**	**135**	**11**	**32**
*3G1D	"	6,622	67	13	30
			(OP: XQ1FM)		
CE6SAX	**28A**	**69,296**	**414**	**23**	**48**
XQ1KZ	**21A**	**586,359**	**1623**	**33**	**94**
CE2DX	**14A**	**94,039**	**561**	**24**	**59**
CE3WW	**3.5A**	**750**	**15**	**12**	**13**
***CE4WT**	**AA**	**2,950**	**36**	**25**	**25**
***CE1EW**	**3.5A**	**140**	**6**	**5**	**5**

Colombia

HK6J	**A**	**500,112**	**996**	**57**	**127**
HK1MW	**7**	**402,264**	**1478**	**27**	**84**
***HK3J**	**A**	**13,440**	**93**	**29**	**41**
*HK4NDF	"	1,066	31	16	25
***HK6RF**	**7**	**11,638**	**91**	**12**	**34**
HK3C	**14A**	**26,944**	**165**	**16**	**48**
***HK3RD**	**21A**	**581,276**	**1811**	**26**	**90**
			(OP: HK3TU)		

Ecuador

HD1A	**1.8**	**312**	**17**	**6**	**7**
			(OP: HC1HC)		
***HC2AO**	**A**	**3,220,700**	**3193**	**97**	**253**

Paraguay

***ZP6GG**	**28**	**4,108**	**66**	**12**	**14**
ZP5AA	**AA**	**4,724,400**	**3590**	**136**	**372**
			(OP: N2TTA)		

Peru

OA4SS	**A**	**1,206,940**	**1830**	**79**	**154**
OA4O	**28**	**287,056**	**942**	**27**	**85**
			(OP: EA7TN)		
***OA4DX**	**14A**	**47,082**	**329**	**19**	**38**

Uruguay

CX3AL	**14**	**38,318**	**152**	**29**	**69**
CX2BR	**AA**	**1,077,216**	**1758**	**71**	**158**
CX5UA	**"**	**918,904**	**1270**	**72**	**197**
CX5FK	**"**	**535,017**	**949**	**62**	**157**
CX7ACH	**14A**	**10,659**	**114**	**20**	**31**
***CX9AU**	**AA**	**435,085**	**795**	**79**	**138**
***CX1CAN**	**"**	**4,300**	**66**	**19**	**24**
***CX2AQ**	**7A**	**137,016**	**560**	**22**	**66**
***CW5W**	**3.5A**	**2,442**	**49**	**10**	**12**
			(OP: CX6VM)		

Venezuela

***YV5JGO**	**A**	**30,810**	**160**	**26**	**53**
***4M5K**	**21**	**14,004**	**183**	**15**	**21**
			(OP: YV5OK)		
YV6BXN	**AA**	**197,238**	**517**	**46**	**96**
***YV1JGT**	**AA**	**149,100**	**366**	**41**	**109**
*YV4ABR	"	4,324	40	22	24

QRP

PZ5CO	**A**	**4,187,771**	**3367**	**94**	**343**
			(OP: RA3CO)		
3V8SS	**"**	**2,063,608**	**2294**	**60**	**254**
			(OP: KF5EYY)		
S5ØA	**"**	**1,297,660**	**1867**	**100**	**303**
KR2Q	**"**	**888,998**	**869**	**101**	**273**
LY5G	**"**	**597,870**	**1377**	**68**	**247**
OK7CM	**"**	**450,840**	**1040**	**67**	**193**
N3CZ	**"**	**449,350**	**607**	**77**	**198**
JH1OGC	**"**	**361,944**	**580**	**99**	**165**
DL1JDQ	**"**	**342,954**	**794**	**59**	**202**
JR4DAH	**"**	**311,520**	**569**	**74**	**146**
HA5BA	*"*	*311,240*	*837*	*59*	*189*
UR5FEO	**"**	**293,479**	**839**	**55**	**214**
W6JTI	**"**	**278,710**	**447**	**84**	**151**
EA2AFV	**"**	**246,544**	**850**	**42**	**110**
DL3NAA	"	241,326	759	48	170
RW9RN	**"**	**225,618**	**449**	**47**	**139**
NDØC	**"**	**203,625**	**349**	**76**	**149**
UX8IX	"	187,322	691	51	178
C6A/ND3F	*"*	*181,049*	*555*	*45*	*106*
SQ2ICX	**"**	**175,474**	**492**	**54**	**167**
JH7UJU	**"**	**173,304**	**387**	**71**	**103**
UY7LM	"	161,626	490	58	153
G3YLA	**"**	**151,616**	**483**	**48**	**136**
SEØI	**"**	**145,692**	**738**	**36**	**135**
			(OP: SMØHPL)		
OK1KDN	**"**	**135,113**	**557**	**49**	**124**
			(OP: OK1NF)		
OM3CUG	**"**	**132,192**	**428**	**53**	**151**
HI3T	**"**	**129,046**	**562**	**41**	**72**
WB2CPU	**"**	**125,741**	**294**	**39**	**122**
MØRYB	"	124,532	496	41	122
DL1AQU	"	124,215	484	43	152
HG7J	**"**	**120,540**	**449**	**50**	**146**
EA7AAW	"	115,434	456	34	125
W6QU	"	113,568	260	70	99
			(OP: W8QZA)		
YL3FW	**"**	**110,475**	**366**	**48**	**177**
EA1GT	"	109,564	483	39	143
N7RCS	"	99,337	234	44	117
RZ9M	"	98,819	290	36	97
USØGJ	"	96,654	424	41	137
SMØGNS	"	95,448	436	39	125
RZ4AZ	**"**	**95,151**	**464**	**33**	**128**
HB9AYZ	**"**	**87,615**	**439**	**37**	**128**
OK2VWB	"	85,608	345	49	125
W7LG	**"**	**83,190**	**226**	**40**	**101**
YO8RAA	**"**	**78,715**	**377**	**44**	**129**
IV3DRP	**"**	**78,221**	**340**	**35**	**108**
IUØJGN	"	77,472	353	34	110
WI4T	"	74,871	203	49	92
N8AP	**"**	**73,344**	**227**	**36**	**92**
W1UU	"	72,450	171	46	115
ON6PJ	*"*	*70,518*	*328*	*34*	*104*
VE3SIF	**"**	**66,816**	**261**	**42**	**74**
SP9CXN	"	64,454	393	27	107
G3YMC	"	61,696	328	30	98
G4FPA	"	58,953	313	31	98
RM7F	**"**	**58,140**	**327**	**33**	**120**
IK2UZQ	"	51,013	229	36	103
DK8R	"	50,974	275	38	116
			(OP: DL8LR)		
DFØBV	"	50,764	202	43	105
			(OP: DL6MAO)		
IK3BVD	"	46,953	259	30	111
GWØFZY	**"**	**46,948**	**241**	**30**	**91**
KG5OA	**"**	**46,330**	**155**	**38**	**75**
W1IG	"	45,313	149	35	78
DF7XR	"	43,680	244	34	78
PAØRDT	**"**	**43,428**	**278**	**36**	**105**
UA3GDU	**"**	**43,099**	**241**	**31**	**100**
IZ4AFL	"	41,280	251	29	100
ON7CC	**"**	**38,934**	**273**	**23**	**80**
4Z5QQ	**"**	**37,130**	**150**	**20**	**74**
OK8GG	"	36,378	247	34	107
LW9EKA	**"**	**35,446**	**208**	**26**	**48**
G3WRJ	"	35,400	260	26	94
RV3DBK	"	34,542	338	17	84
OP4F	"	32,943	265	20	59
DL7UKT	"	29,555	257	25	90
NQ2W	"	28,896	110	43	69
F6HHR	**"**	**28,667**	**198**	**26**	**83**
UA3PP	"	27,071	243	24	83
DL2BIS	"	25,974	210	25	86
K2EKM	"	24,849	104	31	68
K2YG	"	24,824	81	35	81
UA7G	"	23,896	124	40	63
R5PW	"	22,816	211	21	71
YO8AZQ	"	22,528	189	26	62
EA4U	"	22,446	139	29	58
LZ3RR	**"**	**21,266**	**149**	**29**	**69**
G4TGJ	"	20,181	133	26	67
DL8DXW	"	18,761	163	25	48
OK1KUW	"	18,414	189	18	75
DL4EPM	"	17,100	148	22	73
W1IE	"	16,296	110	26	58
DK5CF	"	14,960	133	19	61
W7UDH	**"**	**14,400**	**87**	**29**	**43**
DM5KA	"	14,304	132	24	72
PA3MET	"	14,100	150	24	70
YC2VOC	**"**	**13,632**	**87**	**27**	**44**
F5IQJ	"	12,920	104	25	51
SQ5W	"	12,024	144	24	48
DL5OE	"	11,571	136	17	70
N6HI	"	10,472	65	31	37
PA3HGX	"	10,138	135	17	57
7L1DST	"	9,912	70	30	29
DL6UKL	"	9,855	120	22	51
LY2LF	"	9,843	136	12	39
R2AHS	"	9,660	98	22	62
K4PQC	"	9,594	71	27	51
CM3EFM	**"**	**9,515**	**88**	**21**	**34**
NH6O	**"**	**9,245**	**89**	**22**	**21**
UT1AM	"	9,009	102	18	59
DK7OG	"	8,778	125	16	50
DL6MWG	"	8,379	105	14	49
DK6YA	"	8,344	99	18	38
W6MZ	"	8,268	64	27	25
4X6FB/P	"	7,740	67	8	35
EA3ERD	"	7,553	122	23	60
IZ5RAQ	"	7,412	80	21	47
EA7HCB	"	7,300	86	21	52
PE1MR	"	7,228	111	12	40
JH1MDJ	"	6,806	60	18	23
KD8DNS	"	6,767	70	25	42
SP9VFX	"	6,634	111	14	48
Z33ST	**"**	**6,431**	**100**	**16**	**43**
DL7ED	"	6,006	84	19	47
JR1XKU	"	5,977	57	19	24
MMØIVR	**"**	**5,880**	**70**	**15**	**27**
DG2FDD	"	5,278	89	15	43
ISØESG	**"**	**5,258**	**85**	**11**	**11**
EA2NA	"	5,135	112	18	61
JM1DPL	"	5,112	60	19	17
DK6AC	"	4,959	71	21	36
M5AEF	"	4,620	73	10	32
KEØTT	"	4,386	43	17	26
DG3BZ	"	4,380	77	19	41
DL1BWM	"	4,352	62	18	46
JK1CNL	"	4,230	54	22	23
UAØSBQ	**"**	**4,218**	**44**	**13**	**24**
UW5KW	"	4,032	34	21	27
PAØZAV	"	4,032	52	17	31
AB8DF	"	3,906	36	13	29
YD6ROA	"	3,731	39	16	25
JR1UJX/2	**"**	**3,465**	**37**	**14**	**21**
K6RM	"	3,280	32	16	24
JH7BMF	"	3,036	45	23	23
WC5D	"	3,010	39	21	22
GØVCW	"	3,009	52	16	35
XQ5ME	**"**	**2,904**	**39**	**20**	**24**
DM3XB	*"*	*2,805*	*47*	*19*	*32*

OK3EE	"	1,170	43	7	11
JG1GOY/9	"	**1,150**	**24**	**13**	**12**
JR4BYH	"	**1,120**	**17**	**13**	**15**
LY5YY	"	*770*	*23*	*7*	*15*
I2IAL	"	280	12	5	5
7K2VNA	"	228	7	6	6
DU7OK	"	**100**	**9**	**5**	**5**
YB2CTE	"	**80**	**34**	**9**	**11**
AB8FJ	"	**72**	**7**	**4**	**5**
DO1HFS	"	6	1	1	1
US5VX	14	**87,668**	**474**	**27**	**74**
NK3U	"	**87,300**	**341**	**21**	**69**
EA2CAR	"	**63,714**	**432**	**19**	**63**
UY1IF	"	62,605	417	26	69
JE1RZR	"	**50,920**	**271**	**24**	**52**
G3L	"	**43,470**	**345**	**18**	**51**
			(OP: G3LHJ)		
GMØWED	"	**34,320**	**355**	**12**	**43**
JH1GNU	"	31,896	187	25	47
EA3QC	"	25,772	262	15	53
UT1XX	"	18,144	212	13	43
HAØGK	"	**17,119**	**245**	**12**	**41**
UA4WJ	"	**16,353**	**174**	**16**	**53**
K2GMY	"	**15,876**	**110**	**17**	**37**
N1AIA	"	**15,372**	**92**	**14**	**47**
JE1CAC	"	14,469	115	21	32
OK7NV	"	**10,506**	**147**	**12**	**39**
R4LA	"	9,381	106	15	44
CM2RSV	"	**8,213**	**120**	**13**	**30**
IZ5MMK	"	**7,830**	**103**	**14**	**40**
RW3AI	"	**6,345**	**106**	**9**	**38**
SP2HMY	"	**4,340**	**100**	**8**	**27**
CX7RL	"	**4,312**	**42**	**19**	**30**
OE3OPW	"	**3,990**	**89**	**10**	**28**
WK9U	"	*3,526*	*54*	*16*	*25*
GØUCP	"	2,912	65	7	25
RV1OM	"	**2,870**	**69**	**7**	**28**
KF9LI	"	**2,604**	**37**	**11**	**20**
SO2U	"	2,380	53	9	25
			(OP: SP2UUU)		
SOØA	"	2,214	46	11	16
M5OTA	"	1,536	36	8	24
IZ8EWD	"	1,449	37	7	16
W9YA	"	1,305	39	11	18
IU1HCC	"	875	23	8	17
YO8BGE	"	**375**	**17**	**6**	**9**
KC1NPZ	"	224	15	6	10
W5NZ	"	204	10	4	8
IN3YKS	"	153	11	6	11
JG3DHN	"	**130**	**11**	**5**	**5**
JJØSFV	"	**110**	**10**	**5**	**5**
KK6LHT	"	77	9	4	3
DD5DD	"	**65**	**5**	**3**	**2**
VE3NKL	"	**48**	**3**	**3**	**3**
R1LB	"	25	5	1	4
OZ6OM	"	**24**	**4**	**2**	**4**
OE5WEO	"	18	6	3	6
VE3HUR	"	4	1	1	1
AI5EQ	"	0	3	2	1
E77T	7	**90,432**	**647**	**20**	**76**
IW3ILM	"	**35,928**	**340**	**13**	**59**
AC2YD	"	**33,046**	**152**	**17**	**65**
F5MOG	"	**31,289**	**366**	**11**	**56**
LZ2A	"	**29,008**	**315**	**16**	**58**
			(OP: LZ2DB)		
OK6OK	"	**25,996**	**344**	**12**	**55**
OK2HIJ	"	23,400	229	12	63
CO8OH	"	**19,788**	**185**	**11**	**40**
DJ3DQ	"	*18,673*	*183*	*13*	*58*
DF9ZV	"	**17,422**	**170**	**14**	**48**
N5ER	"	**16,640**	**112**	**16**	**49**
RA9AMC	"	**13,202**	**103**	**10**	**36**
SP7BCA	"	**10,098**	**189**	**9**	**42**
R7RBE	"	**10,080**	**165**	**11**	**45**
SQ2RH	"	9,462	144	13	44
HS2JQC	"	**8,586**	**92**	**18**	**35**
UT5UUV	"	**7,644**	**132**	**9**	**40**
SP6NIV	"	6,450	114	9	41
UR5TGK/A	"	5,490	101	9	36
GW4OKT	"	**4,469**	**108**	**7**	**34**
US1UU	"	4,444	85	9	35
FS/KØCD	"	**3,248**	**70**	**9**	**20**
DL1TW	"	2,664	93	6	31
BI1EIH	"	**748**	**31**	**8**	**9**
IZ2QKG	"	500	25	5	15
JA1GZK	"	**490**	**13**	**7**	**7**
SQ8F	"	345	25	3	12
CM2DAH	"	299	20	6	7
IW2OGY	"	154	14	2	9
PB7RS	"	**143**	**9**	**5**	**8**
AF7T	"	**140**	**6**	**5**	**5**
KIØG	"	**135**	**15**	**6**	**9**
JN1VFV	"	12	3	3	1
E77Y	3.5	**63,217**	**715**	**15**	**62**
OK1FKD	"	**16,830**	**287**	**9**	**46**
SM6DOI	"	**16,695**	**198**	**14**	**49**
YO8RIX	"	**15,529**	**263**	**8**	**45**
SP6GNJ	"	**14,224**	**218**	**11**	**45**
DK1VD	"	**11,934**	**209**	**10**	**41**
WØCW	"	**9,844**	**99**	**14**	**32**
UY2IF	"	**3,895**	**91**	**7**	**34**
ON4ANE	"	**3,870**	**167**	**6**	**37**
KQ2RP	"	**3,280**	**39**	**11**	**29**
SP8D	"	2,970	116	5	28
7L3PFH	"	**1,125**	**27**	**9**	**16**
JH1APZ	"	1,040	29	11	9
F8DHE	"	**682**	**29**	**4**	**18**
IT9RJE	"	**432**	**27**	**4**	**14**
BI4MUH	"	**420**	**64**	**6**	**4**
F6EPO	"	280	24	5	15
DL1AOB	1.8	**14,681**	**284**	**8**	**45**
HA1TI	"	**8,568**	**212**	**5**	**37**
YT2T	"	**6,364**	**144**	**7**	**36**
YT1BD	"	3,827	84	5	38
SP3IOE	"	**2,880**	**99**	**6**	**26**
IZØORT	"	**522**	**31**	**3**	**15**
DF6DOM	"	40	10	2	8
DM2M	AA	**1,627,480**	**1924**	**119**	**369**
			(OP: DK3WE)		
ON6NL	"	**1,034,450**	**1360**	**91**	**334**
LZ6O	"	**737,702**	**1095**	**105**	**301**
			(OP: LZ3DX)		
KP4AA	"	**645,344**	**764**	**82**	**262**
US3EO	"	**508,431**	**1089**	**75**	**266**
K8ZT	"	**415,820**	**460**	**89**	**251**
TM7Y	"	**412,920**	**573**	**80**	**280**
			(OP: F8BDQ)		
MW9W	"	**410,225**	**997**	**61**	**208**
			(OP: GWØKRL)		
M7R	"	**372,912**	**970**	**58**	**214**
			(OP: GØTPH)		
HG5O	"	**370,735**	**1059**	**64**	**201**
			(OP: HA5OB)		
YU1LM	"	**367,284**	**981**	**62**	**192**
ES3TI	"	**310,026**	**702**	**79**	**238**
UX8IW	"	244,258	804	48	191
OK1DMP	"	**215,050**	**455**	**71**	**182**
DJ9MH	"	186,732	435	61	186
UW1U	"	159,408	606	44	172
			(OP: UT7UA)		
JA4XHF/3	"	**138,227**	**329**	**70**	**103**
EA1AER	"	**132,765**	**385**	**42**	**117**
G4OZG	"	115,753	507	40	147
LZ4UX	"	110,625	388	50	127
JK1TCV	"	**107,643**	**259**	**69**	**90**
PC2F	"	**106,656**	**485**	**40**	**136**
KR4AE	"	**104,139**	**252**	**48**	**123**
DL2AMT	"	88,368	481	35	133
PE2K	"	80,668	462	33	101
PC5D	"	74,160	344	37	107
DF5SF	"	69,713	312	39	122
YO8BSE	"	**69,006**	**251**	**52**	**134**
OK1QM	"	58,350	289	34	116
LZ2AF	"	57,640	311	31	100
DDØVS	"	53,044	211	38	111
R2AJA	"	**48,645**	**318**	**29**	**112**
DL8MF	"	43,056	216	40	98
G8OO	"	42,642	239	31	107
N4NM	"	41,846	150	36	86
DK3UW	"	40,238	304	24	94
YB1UUN	"	**36,360**	**151**	**37**	**53**
EI8FH	"	**33,060**	**207**	**25**	**91**
LZ2FV	"	26,299	166	35	84
DL2PR	"	25,300	224	24	76
OH6OG	"	**23,762**	**221**	**23**	**86**
LY3G	"	**21,896**	**148**	**23**	**69**
UTØEM	"	21,658	152	28	70
JH5OJH/5	"	**20,124**	**114**	**29**	**49**
BH3QKK	"	**18,700**	**131**	**39**	**61**
OM3WZ	"	**17,721**	**156**	**23**	**76**
SDØT	"	**17,710**	**215**	**15**	**62**
			(OP: SMØTHU)		
DL1JBE	"	16,324	175	22	84
HB9CEY	"	**15,824**	**143**	**18**	**68**
KA4RRU	"	15,288	79	22	56
BG6TVZ	"	*12,920*	*122*	*32*	*44*
DL1FY	"	12,852	94	22	29
SP9RQH	"	**12,584**	**110**	**29**	**59**
KG7CW	"	**11,900**	**67**	**31**	**37**
LZ7DP	"	11,448	146	16	56
K2AL	"	**10,780**	**51**	**26**	**51**
BA4WI	"	10,720	132	30	37
PA9CW	"	10,350	150	15	60
SP9RHN	"	9,440	139	15	65
DJ3EI	"	8,736	104	21	35
YB2NDX	"	8,586	74	18	35
PU2YMH	"	**7,372**	**77**	**31**	**45**
VE3KJQ	"	**7,264**	**110**	**13**	**19**
PE1RWL	"	5,967	103	12	39
VE6EX	"	**5,865**	**127**	**13**	**10**
BG2DVL	"	*3,818*	*85*	*22*	*24*
CT1FPQ	"	**3,763**	**37**	**26**	**27**
AA2MA	"	3,705	57	15	24
EA8/DL7AU	"	**3,492**	**35**	**13**	**23**
VA7UNX	"	**3,172**	**66**	**14**	**12**
VE3GMZ	"	3,051	54	14	13
LA3NGA	"	**2,952**	**40**	**15**	**21**
DJ7PRM	"	2,479	37	16	21
RW3M	"	2,365	42	14	29
DL3MFQ	"	2,352	36	15	27
G8AFN	"	2,160	40	15	30
OA4ASD	"	**1,296**	**32**	**14**	**13**
DL1AVH	"	1,200	37	15	25
OE5FDM	"	**966**	**20**	**10**	**11**
KX9RT	"	*693*	*12*	*9*	*12*
N3RC	"	**624**	**16**	**9**	**7**
DG8RCN	"	252	18	3	3
PA3DSB	"	225	13	6	9
PA4J	"	224	18	3	11
PY1II	"	210	41	16	19
G4ZZL	"	66	31	11	22
4I1EBC	28A	**64,113**	**530**	**17**	**26**
LT7D	"	**49,056**	**367**	**18**	**30**
			(OP: LU7DZ)		
YT2RX	"	**8,544**	**88**	**17**	**31**
LY1FW	"	**6,144**	**62**	**16**	**32**
TM3W	"	**1,242**	**23**	**10**	**17**
			(OP: F4FDA)		
PY1CMT	"	**924**	**22**	**9**	**13**
YO2CMI	"	**608**	**18**	**7**	**9**
S59GS	"	**560**	**20**	**6**	**8**
JI3XOM	"	**390**	**16**	**7**	**8**
GW9J	"	**90**	**7**	**4**	**6**
			(OP: GWØGEI)		
SP7M	21A	**60,960**	**246**	**33**	**94**
HA3JB	"	**59,040**	**291**	**28**	**62**
CT9/MØBLF	"	**43,656**	**229**	**16**	**52**
HA3HX	"	29,504	211	20	44
4Z4UO	"	**23,650**	**152**	**13**	**42**
S51Z	"	**20,215**	**133**	**24**	**41**
JK8VPQ	"	**15,824**	**158**	**18**	**25**
ON/S58J	"	**11,792**	**133**	**13**	**31**
KG1E	"	**11,776**	**102**	**13**	**33**
IT9KCD	"	**9,408**	**97**	**18**	**38**
GW5P	"	**3,627**	**80**	**11**	**28**
			(OP: GWØEGH)		
RM3G	"	**3,074**	**69**	**8**	**21**
PY2VQ	"	**2,755**	**41**	**13**	**16**
BG3UFC	"	**1,806**	**75**	**11**	**10**
PU2NBI	"	1,350	24	14	16
YB2BNN	"	**868**	**27**	**9**	**19**
9A5MPV	"	**864**	**38**	**6**	**12**
YC1RIK	"	114	7	3	3
EF3O	14A	**263,664**	**886**	**37**	**107**
			(OP: EA3O)		
RT4W	"	**148,292**	**678**	**32**	**99**
DL1EFW	"	**131,040**	**561**	**30**	**90**
YO3FRI	"	**117,974**	**535**	**30**	**92**
RØBI	"	**90,216**	**418**	**20**	**64**
DM7AA	"	78,565	482	22	73
HG6C	"	**56,118**	**405**	**25**	**69**
			(OP: HA6IAM)		
JK7DWD	"	**42,476**	**235**	**22**	**52**
BH4TQX	"	**30,567**	**265**	**19**	**50**
UT3EK	"	**30,358**	**212**	**20**	**66**
W2VRK	"	**21,483**	**145**	**15**	**48**
US5EFU	"	15,012	208	10	44
PS8CW	"	**9,639**	**91**	**15**	**36**
K9AXT	"	**9,486**	**73**	**12**	**39**
UW8U	"	*8,400*	*119*	*8*	*42*
			(OP: UR5MID)		
DF3IAL	"	5,520	127	6	34
R3IBT	"	**4,840**	**100**	**8**	**32**
ON9EEE	"	**2,920**	**74**	**8**	**32**
JR1LLD	"	**2,695**	**35**	**16**	**19**
LY2BGP	"	**1,955**	**48**	**8**	**9**
SP2MHC	"	*1,410*	*42*	*9*	*21*
DM5US	"	40	8	4	6
EA5DF	7A	**150,892**	**783**	**27**	**92**
M3A	"	**104,178**	**744**	**21**	**76**
			(OP: MØUKR)		
HA4FY	"	**45,738**	**485**	**14**	**63**
OK2AP	"	**34,489**	**277**	**20**	**71**
YT1S	"	**31,248**	**292**	**18**	**66**
			(OP: YU5TM)		
UD2F	"	**30,888**	**335**	**13**	**65**
9A6TT	"	**25,773**	**246**	**14**	**57**
RM5O	"	**19,758**	**145**	**21**	**53**
OU2V	"	**19,392**	**227**	**11**	**53**
			(OP: OZ1FJB)		
YO9RIJ	"	**18,980**	**211**	**16**	**57**
OF8UV	"	**12,400**	**157**	**13**	**49**
			(OP: OH8UV)		
SP5FKW	"	**11,026**	**157**	**15**	**59**
GWØGEI	"	**10,918**	**135**	**11**	**42**
PA3CWN	"	*10,431*	*70*	*25*	*32*
RW3XN	"	10,017	193	11	42
GØWAT	"	9,424	110	11	51
YU7ZZ	"	7,680	124	13	47
MMØOPX	"	**7,293**	**122**	**8**	**43**
IK7XNF	"	**4,653**	**94**	**9**	**38**
JH3DMQ	"	**4,433**	**59**	**14**	**17**
HB9LL	"	**4,092**	**75**	**9**	**35**
			(OP: HB9TPN)		
BG7NRG	"	**1,184**	**41**	**12**	**20**
KT3Q	"	*0*	*3*	*2*	*1*
HA6FQ	3.5A	**129,948**	**1176**	**17**	**74**
OL4W	"	**122,304**	**1153**	**18**	**73**
			(OP: OK1IF)		
SP5ES	"	**58,044**	**648**	**16**	**68**
MM2N	"	**52,744**	**548**	**15**	**61**
			(OP: MMØGPZ)		
UA4FCO	"	**46,644**	**514**	**16**	**62**
RM4W	"	37,814	409	16	57
RT2F	"	**33,465**	**437**	**12**	**57**
DJ4CW	"	**24,444**	**366**	**11**	**52**
UT4UBZ	"	**7,599**	**129**	**8**	**43**
LYØNAS	"	**4,223**	**101**	**8**	**33**
HA2ZB	"	4,033	107	6	31
N6MZ	"	**1,886**	**40**	**12**	**11**
EA1T	"	*209*	*14*	*7*	*12*
JH4RUM	"	**10**	**3**	**2**	**3**
OL1A	1.8A	**55,708**	**685**	**14**	**62**
			(OP: OK1CW)		
IKØXBX	"	**19,530**	**286**	**9**	**54**
US1UP	"	**18,338**	**333**	**8**	**45**
E7AA	"	**13,110**	**284**	**7**	**39**
DL5SFC	"	**11,501**	**218**	**8**	**45**
OT6M	"	**5,808**	**133**	**6**	**38**
			(OP: ON9CC)		
SP6IHE	"	**4,275**	**113**	**8**	**37**
EB1RL	"	**100**	**11**	**2**	**8**
HB9EHJ	"	*2*	*1*	*1*	*1*

ROOKIE

United States

District 1

***W1VKE**	**34,404**	**146**	**26**	**68**

District 2

***KD2SGM**	**9,063**	**63**	**21**	**32**
*KD2TUD	4,085	98	12	31

District 3

AC3LZ	**110,143**	**238**	**55**	**132**
***N3AML**	**57,986**	**149**	**45**	**113**

District 4

W4SSF	**443,256**	**587**	**69**	**207**
***KN4ZMA**	**5,700**	**52**	**17**	**33**
*KO4AWC	660	14	7	13

District 6

W6DMW	**10,010**	**75**	**32**	**33**

District 7

***W7VC**	**6,815**	**57**	**21**	**26**

District 8

***AD8EV**	**456**	**22**	**13**	**11**

District 9

KD9PLD	**364,180**	**474**	**79**	**199**
***KD9OIN**	**11,520**	**78**	**25**	**47**

NORTH AMERICA

Canada

District 2

***VA2YZX**	**3,608**	**53**	**18**	**23**

District 3

***VA3OKG**	**443,520**	**672**	**75**	**189**
*VE3KOT	6,954	58	19	38
*VE3JZT	2,322	38	22	32

District 6

VA6BGE	**13,392**	**117**	**30**	**24**

Cuba

***CL2JR**	**7,568**	**101**	**13**	**30**

AFRICA

South Africa

***ZS6KVZ**	**58,608**	**240**	**29**	**70**

ASIA

Asiatic Russia

District Ø

***UBØAZR**	**119,441**	**348**	**44**	**107**

China

***BI6MQT**	**1,364**	**49**	**16**	**15**

Israel

***4X6FB/P**	**7,740**	**67**	**8**	**35**

Japan

District 1

JK1BAB	**221**	**7**	**6**	**7**
***JK1AUY**	**17,120**	**98**	**37**	**43**
*JJ1TQM	1,178	40	16	15

District 3

***JQ3BVC**	**2,848**	**55**	**15**	**17**

District 6

***JS6UGC**	**2,275**	**29**	**16**	**19**

District Ø

***JJØVXN**	**8,400**	**77**	**28**	**32**

EUROPE

Austria

***OE3IAK**	**16,368**	**139**	**20**	**68**
*OE8ACT	2,640	46	18	26

Belarus

***EU1VA**	**759,610**	**1397**	**89**	**281**
*EW3ADI	76	30	5	14

Belgium

***ON3ZZT**	**40,875**	**285**	**30**	**95**

Bulgaria

***LZ5DI**	**55,180**	**237**	**44**	**111**

Croatia

***9A3LET**	**13,940**	**126**	**18**	**64**

Czech Republic

***OK5MAX**	**580,890**	**1164**	**81**	**254**

England

***2EØWPM**	**1,386**	**37**	**10**	**23**

European Turkey

***TA1TMY**	**210**	**12**	**5**	**10**

Germany

DM2HK	**91,512**	**358**	**59**	**189**
***DL5CZ**	**18,122**	**150**	**23**	**59**
*DK2CW	130	12	6	7

Ireland

***EI4KX**	**7,546**	**66**	**23**	**54**

Italy

***IR4Q**	**79,734**	**310**	**47**	**90**
		(OP: IU4MRU)		
*IU1OLR	32,900	209	35	105
*IUØMVD	7,009	84	13	30

Lithuania

***LYØNAS**	**9,591**	**133**	**14**	**55**

Northern Ireland

***2IØWLZ**	**23,672**	**206**	**24**	**64**

Norway

LB5GI	**490,471**	**798**	**84**	**229**

Poland

SP6MAA	**23,424**	**144**	**30**	**31**
***SQ5VCO**	**104,650**	**492**	**43**	**132**

Serbia

***YU4BAH**	**4,620**	**123**	**7**	**35**

Sicily

***IT9IDR**	**16,368**	**95**	**30**	**63**
*IT9IVU	13,560	156	33	80

Spain

ED2B	**480,754**	**1241**	**55**	**216**
		(OP: EA2ESB)		
***EA4HKF**	**173,964**	**569**	**54**	**174**
*EA1JCE	8,611	100	18	61

Sweden

SA6IMI	*960*	*31*	*14*	*26*

Switzerland

***HB9HBY**	**3,040**	**68**	**8**	**32**

Ukraine

***US5WBJ**	**14,350**	**129**	**22**	**60**
*UR4UQT	11,940	128	15	45
*UR6LRC	6,923	171	6	37

OCEANIA

Australia

***VL3M**	**196**	**10**	**7**	**7**

Indonesia

***YC4SIZ**	**11,077**	**86**	**19**	**34**
*YD1EQX	2,871	51	12	21
*YD2UFR	1,300	22	10	16
*YD2DEW	1,125	28	9	16
*YC1AUI	72	4	3	3
*YCØDMS	6	1	1	1

Philippines

***4I1EAY**	**7,600**	**82**	**15**	**25**

SOUTH AMERICA

Argentina

***LS2D**	**874,551**	**1578**	**60**	**141**
		(OP: LU1DJX)		
*LU9HMB	1,200	29	12	18

Brazil

***PU2TWZ**	**1,350**	**65**	**21**	**29**

CLASSIC

NORTH AMERICA

United States

District 1

K1DG	**3,547,492**	**2803**	**102**	**340**
W1WEF	2,357,783	2132	93	304
W1JQ	1,072,610	996	98	300
K1RM	604,892	1073	46	148
K2ZW	362,850	1080	30	88
		(OP: JO1RUR)		
W1HI	66,015	304	18	63
W3AKD	24,634	106	34	75
W1OHM	14,469	101	14	39
***N1DC**	**670,677**	**758**	**79**	**248**
*K1HT	667,926	696	89	253
*N1DID	235,350	410	51	174
*N1CGP	227,448	359	60	174
*W1ND	140,130	305	48	125
*AJ1DM	37,185	123	32	79
*AK1P	2,738	34	13	24
*WB2CPU	125,741	294	39	122

District 2

K2NV	**1,916,112**	**1623**	**104**	**314**
K2SSS	358,730	897	31	114
W2CN	80,964	231	45	111
N2YB	29,580	118	39	63
WA2BMH	9,044	52	24	44
***WB2FUV**	**186,989**	**373**	**49**	**142**
*K2QB	115,080	265	46	122
*NW2K	30,282	110	35	68
*N2CU	28,635	125	22	61
*K2GLS	22,968	139	33	66
*AC2YD	33,046	152	17	65

District 3

W3BGN	**163,125**	**758**	**17**	**70**
WS3M	50,274	240	33	100
NC3Y	36,180	146	27	63
***NU3A**	**373,041**	**567**	**54**	**175**
*WA3EOQ	138,375	284	65	140
*N2EY	133,456	317	38	114
*W3LL	69,635	292	20	75
*WA3FAE	49,068	215	20	67
*KY3W	45,934	158	39	80
*AC3EK	35,910	158	30	75
*K3VZ	7,200	60	15	35
*WN3K	3,772	38	18	28
*AJ3DI	2,288	30	7	19
*KC3DLL	8	16	2	2
*W7LG	83,190	226	40	101

District 4

W4CB	**2,414,160**	**2046**	**109**	**311**
		(OP: W2RU)		
K1GU	1,312,080	1227	108	277
KQ4R	994,056	1231	64	227
N4OX	551,040	959	52	153
N4DJ	449,883	626	65	194
W8FN	336,756	533	53	175
K4WW	336,604	574	58	148
W3SA	219,648	393	52	156
NR3X	166,644	545	24	84
		(OP: K4QPL)		
W3DQS	138,780	294	49	131
NN4SS	114,696	245	53	124
WA5POK	91,728	307	27	85
NJ4Z	74,034	190	42	120
KW4EE	60,190	204	30	100
N4UM	59,426	248	20	66
K4JC	32,636	146	23	59
K4NWX	23,715	103	26	67
K4AVX	22,100	104	38	62
AC4G	11,554	95	14	39
WN3F	10,260	85	16	44
K4EU	7,616	49	20	36
*NK4O	418,695	612	72	199
*K4WY	303,003	477	66	191
*N6MA	181,458	445	39	114
*K4FTO	137,740	293	59	135
*K4FT	137,494	315	45	116
*K4CBW	127,233	259	61	140
*N4ARO	116,622	241	51	135
*WZ4M	110,466	261	48	123
*ND4X	101,260	231	53	113
*K8MR	94,829	221	45	116
*K4SXT	79,365	257	28	83
*K4DR	76,033	206	41	98
*NA4A	60,270	201	46	101
*K3JT	39,211	138	32	81
*WBØCJB	32,944	133	38	78
*K1TN	25,275	120	18	57
*W4PJW	14,842	89	28	54
*K8LBQ	12,400	99	37	63
*N4HA	4,968	60	14	22
*W4DL	4,332	48	9	29
*K4OMD	3,458	33	11	27
*N4IU	2,573	57	10	21
***N3CZ**	**449,350**	**607**	**77**	**198**
*N7RCS	99,337	234	44	117
*K6RM	3,280	32	16	24
*W5NZ	204	10	4	8

District 5

KZ5D	**982,640**	**1155**	**94**	**261**
K5RX	945,314	926	110	276
KZ5J	62,006	273	23	63
KD5QHV	33,428	141	51	71
K5IB	16,576	113	16	40
***WQ5L**	**704,536**	**783**	**93**	**229**
*NN5T	498,393	618	84	209
*N5XE	187,026	327	74	145
*KC7QY	82,362	215	63	96
*K5ME	69,464	180	51	101
*N9NM	64,116	182	46	91
*WA5LFD	62,816	197	52	99
*N9OF	30,420	102	42	75
*K5ICW	28,726	131	34	72
*W8OV	27,474	111	40	74
*WB5BHS	22,230	95	35	60
*NA5YO	18,424	87	38	60
*KG5OA	46,330	155	38	75
*N5ER	16,640	112	16	49
*WC5D	3,010	39	21	22
*W9YA	1,305	39	11	18

District 6

AJ6V	**638,960**	**978**	**94**	**151**
K6AR	307,665	514	62	153
W1PR	249,948	435	79	133
K6NR	233,673	401	77	142
K6YK	152,184	298	71	133
WA6URY	98,778	237	66	97
N3FAA	20,640	99	35	51
K6VVK	15,050	102	37	49
W8KA

***K7AZT**	**67,500**	**207**	**48**	**77**
*N7XCZ	32,011	129	50	69
*N7VS	29,973	148	43	54
*W7GF	28,380	115	48	62
*N7JI	25,688	125	32	44
*AB5ZA/7	23,436	104	42	51
*K7ROG	16,920	94	33	39
*KNØW	15,477	96	36	41
*WA8ZNC	10,032	90	17	31
*KE7AUB	6,966	52	24	30
*NB7O	4,725	89	22	23
*KA6JLT	1,032	23	12	12
*K7SXN	48	10	3	3

District 8

K8MP	**903,474**	**962**	**91**	**247**
K8NVR	433,948	506	89	225
K8AJS	238,914	755	27	90
W8WA	167,940	463	35	100
K8BKM	151,250	482	25	85
N8IW	81,104	200	41	107
N8LJ	62,248	184	38	86
W8YV	46,116	139	39	87
KE8E	5,247	50	20	33
***N8II**	**1,341,780**	**1270**	**100**	**280**
*WB8JUI	507,863	598	83	228
*KV8Q	176,860	372	49	136
*WB8JAY	64,416	180	37	95
*AF8A	22,610	108	28	57
*NF8M	16,050	76	23	52
*WA8UMT	15,732	64	31	61
*K8FF	9,108	75	18	28
*K7DR	8,592	68	14	34
*W8XY	20	6	3	2
**KE8GC*	*16*	*12*	*4*	*4*
*AB8DF	3,906	36	13	29

District 9

K9MA	**1,569,006**	**1392**	**113**	**289**
W9GT	623,076	887	72	202
W9VA	62,335	179	44	93
W9DZ	21,175	100	26	51
W9DGI	4,800	47	18	30
***WD9CIR**	**170,060**	**304**	**66**	**154**
*N9SE	23,835	87	26	79
*WA9LKF	21,583	156	38	75
*W9QL	15,834	107	16	42
*WA9FZB	13,746	86	26	53
*AC9VC	11,613	74	32	47
*N9AEP	816	28	11	13
*K9WPV	16	5	2	2

District Ø

N7WY	**364,392**	**546**	**68**	**173**
NGØT	159,430	280	70	144
KJØI	113,726	212	67	135
KØTC	60,210	188	47	88
KØPK	44,010	179	25	65
***WØPI**	**241,704**	**420**	**70**	**146**
*KØJP	49,320	161	44	76
*W7UT	39,886	189	21	56
*KØALT	26,643	123	29	54
*WØZF	8,875	50	32	39
*NØAC	8,384	72	25	39
*NN5SD	5,445	46	26	29
		(OP: KØJV)		
*KGØTW	297	50	16	17
*WØCW	9,844	99	14	32

Alaska

AL7LO	**389,529**	**884**	**71**	**118**
NL8F	1,386	49	10	8

Bermuda

***VP9I**	**2,935,723**	**3351**	**86**	**285**
		(OP: N6GQ)		

Canada
District 1

VA1MM	**700,995**	**1159**	**66**	**189**
***VY2LI**	**26,207**	**156**	**22**	**51**

District 2

VA2EW	**3,226,264**	**2856**	**105**	**323**
***VE2QV**	**39,744**	**168**	**31**	**65**
*VA2LGQ	36	5	5	4

District 3

VE3KP	**607,568**	**1035**	**70**	**184**
VE3OI	373,758	706	68	163
VE3MDX	36,570	146	37	69
VE3BXG	29,848	175	33	49
VA3WW	576	20	9	9
***VA3FF**	**610,742**	**1003**	**72**	**181**
*VE3MA	287,600	597	56	144
*VE3VY	247,753	461	65	158
*VE3ZY	111,544	322	47	99
*VA3DBT	22,344	126	30	54
*VE3ADQ	14,476	151	13	34

District 4

***VE4AKF**	**11,960**	**120**	**25**	**27**

District 5

***VE5GC**	**140,610**	**838**	**35**	**51**

District 6

***VA6WWW**	**68,019**	**228**	**52**	**71**

District 7

VE7JKZ	**155,477**	**397**	**68**	**99**
VA7RN	72,352	440	37	39
***VA7QCE**	**560**	**15**	**8**	**8**

District 8

***VY1KX**	**28,248**	**126**	**40**	**48**

Cuba

***CO8NMN**	**589,750**	**1578**	**46**	**129**
*CO2RQ	342,210	1038	51	114
*CO8WN	327,966	1152	40	101
*CO6WD	199,227	562	50	109
*CO8OH	19,788	185	11	40

Dominican Republic

***HI3Y**	**204,077**	**1066**	**23**	**66**
*HI3AA	36,960	327	12	43

Haiti

***HH2JA**	**198,800**	**1315**	**17**	**54**
		(OP: JK1UWY)		

Panama

***HP1RIS**	**949**	**27**	**6**	**7**

Sint Maarten

***PJ7/G4JEC**	**339,598**	**737**	**53**	**138**
		(OP: NØUK)		

US Virgin Islands

NP2J	**190,848**	**1028**	**19**	**65**
		(OP: K8RF)		
***KJØD/KP2**	**25,143**	**222**	**14**	**37**

AFRICA
Canary Islands

EA8URL	**1,537,704**	**2213**	**66**	**177**
		(OP: EA4BQ/OHØXX)		
EA8ZS	113,665	362	51	76
***EA8BQM**	**512,322**	**879**	**56**	**150**
*EA8AUW	70,400	201	32	96
*EA8CYU	34,907	192	14	53

South Africa

ZS1A	**1,248**	**24**	**13**	**19**

ASIA
Asiatic Russia
District 9

UA9MA	**2,683,878**	**2743**	**91**	**275**
R8TA	431,600	913	58	150
UA9JNT	107,164	301	40	106
R9TV	9,384	114	7	27
***RA9SF**	**854,441**	**1210**	**54**	**205**
*RU9AC	589,842	758	80	217
*UB8A	360,306	635	56	166
*RA9YE	267,750	599	68	157
*RV9CVA	181,015	385	55	150
*RW9AV	143,070	297	55	135
*R2ET/9	99,794	568	21	61
*UF8C	98,400	455	19	63
*R9JAP	83,070	293	37	93
*RL9L	79,048	378	21	61
*RZ9WA	75,144	277	31	93
*R9YU	64,347	311	20	69
*R8WO	22,176	184	5	37
*UA9OV	2,890	31	11	23

District Ø

RTØO	**397,290**	**982**	**56**	**149**
***UAØJF**	**117,450**	**368**	**55**	**107**
*UAØC	92,547	519	49	68
*RØUT	52,658	199	36	77
*UAØLKD	27,775	200	42	59
*UDØO	24,800	193	41	59
*UAØCID	15,732	217	26	31
*RNØCW	7,524	70	24	33
*RCØAJ	2,596	39	19	25
*RUØL	960	18	10	14

Asiatic Turkey

TA2FE	**336,864**	**747**	**42**	**132**
***TA4/OH2KW**	**507,600**	**891**	**43**	**157**

China

BA4DL	**244,350**	**904**	**60**	**90**
***BD3TE**	**150,920**	**571**	**54**	**100**
*BG7TWJ	102,396	669	25	59
*BH8MDV	79,502	272	36	91
*BG7XVX	13,860	125	18	37
*BI1EIH	748	31	8	9

India

***VU2IT**	**48,811**	**161**	**47**	**86**
*VU2CVS	31,257	204	20	49
*VU2DCC	25,578	106	34	64
*VU3GDS	22,490	161	21	44
*VU2JOS	1,134	26	10	17
*VU2ACK	140	15	10	10

Israel

***4Z5QQ**	**37,130**	**150**	**20**	**74**

Japan
District 1

JR1GSE	**166,026**	**436**	**82**	**95**
JA1QOW	112,066	308	49	88
JF1KML	86,254	274	47	75
JL1LNC	51,527	195	47	72
JE1QHP	29,920	166	36	52
JA1MJN	22,240	112	33	47
7K4GUR	12,264	80	21	35
JK1UVL	1,118	29	14	12
***JS1KKY**	**464,264**	**702**	**96**	**166**
*JO1VVT	73,944	248	68	88
*JR1LEV	63,662	224	64	75
*JK1FNN	52,038	167	53	73
*JJ1KZZ	43,750	134	55	70
*JA1IE	31,722	148	45	57
*JK1AKA	30,303	165	37	54
*JH1DJD	26,563	146	44	57
*JL1GPG	25,026	120	41	56
*JJ1XNF	18,407	107	38	41
*JH1VIX	11,376	111	20	28
*JA1RGY	10,758	63	23	43
*JK1BGV	4,704	46	22	26
*JP1JZR	4,700	56	24	23
*JO1KTD	3,816	62	17	19
*JQ1PCT	3,784	40	22	22
*JA1RXC	2,952	48	16	25
*JE1SPY	2,132	59	12	14
*JK1DVP	1,364	22	12	10
*JN1HYU	1,173	27	9	8
*JA1JNM	840	16	10	11
*JH1KCI	722	22	10	9
*JS1WWR	480	18	9	7
*JH1BCS	217	11	4	3
*7L1DST	9,912	70	30	29
*JA1GZK	3,024	38	14	14
*JK1VUZ	266	10	7	7
*JN1VFV	12	3	3	1

District 2

JE2BOM	**85,068**	**235**	**63**	**90**
***JA2KKA**	**122,292**	**327**	**57**	**101**
*JG2RFJ	100,128	280	59	90
*JS2PHO	3,990	55	15	20
*JE2HCJ	3,335	59	13	16
*JR2UQU	1,938	25	17	17
*JF2NLH	828	18	12	11
*JR1UJX/2	3,465	37	14	21
*JH2DFJ	486	53	20	34

District 3

JR3RIU	**244,420**	**498**	**76**	**126**
JR3BOT	225,231	465	73	120
***JL3MCM**	**108,144**	**284**	**56**	**88**
*JJ3TBB	77,423	256	56	83
*JR3GPP	9,128	57	25	31
*JP3UBR	2,812	34	19	19
*JI3XOK	2,523	37	12	17
*JL3DQX	1,505	28	18	17
*JG3LDD	1,058	34	11	12
*JG3EHD	273	9	5	8
*JG3SVP/3	36	4	2	1
*JH3SIF	38,100	227	26	49

District 4

***JE4FNC**	**20,800**	**102**	**43**	**61**
*JH4FUF	3,298	46	16	18

District 5

152,523	**351**	**64**	**125**
***JG5DHX**				
*JA5CBU	26,828	147	30	46

District 6

JA6BZI	**1,097,460**	**1097**	**126**	**264**
JA6LCJ	208,312	788	33	71
JA6AVT	104,160	290	61	94
JA6BWH	95,776	254	66	98
JA6BCV	32,430	126	35	59
JA6CDC	1,221	19	15	18
***JA6CVR**	**53,504**	**196**	**56**	**72**
*JF6ABL	44,202	198	40	66
*JH6SCA	760	16	10	10
*JH6NBW	660	21	9	11
*JL6USD	105	5	4	3
*JA6UKY	24	2	2	2

District 7

JA7ACM	**351,540**	**512**	**106**	**173**
JA7UES	155,124	341	78	108
JA7KQC	600	30	11	13
***JH7QXJ**	**428,452**	**891**	**74**	**114**
*JA7MWC	28,710	154	46	53
*JA7RPC	27,264	160	25	46
*JF7VVL/7	6	1	1	1

District 8

JA8RUZ	**65,208**	**197**	**67**	**85**
JH8FIH	1,121	21	9	10
***JA8RWU**	**278,432**	**561**	**80**	**144**
*JK8PBO	196,652	431	81	130
*JG8NKJ	31,892	190	22	45
*JK8NIP	10,080	85	19	26
*JA8HBO	4,248	72	12	24
*JR8QFG	4,136	72	10	12
*JE8UHY	1,600	34	12	13

District 9

4,746	**51**	**19**	**23**
***JA9OJM**				
*JA9EJG	3,256	38	14	23

District Ø

188,962	**378**	**82**	**132**
JGØEXP				
***JHØMUC**	**29,800**	**129**	**47**	**53**
*JRØECQ	10,203	67	22	35
*JIØWVQ	7,047	109	10	17

Kazakhstan

118,917	**277**	**55**	**126**
***UN8PC**				
*UN7ZZ	22,464	160	14	40
*UN7EV	16,632	89	27	57

Mongolia

JT1CD	**73,695**	**622**	**31**	**54**

Nepal

9N7AA	**1,517,400**	**2260**	**80**	**201**
		(OP: S53R)		

Republic of Korea

***HL1OVG**	**1,800**	**40**	**13**	**11**

Singapore

***9V1KG**	**15,138**	**152**	**20**	**38**
***9V1HY**	**66**	**7**	**2**	**4**

Taiwan

***BU2EO**	**186,480**	**766**	**62**	**106**

Thailand

***HS3LSE**	**8,836**	**96**	**16**	**31**
*HS8KGG	4,173	60	15	24

United Arab Emirates

A62A	**1,184,435**	**1482**	**68**	**233**

Uzbekistan

***UK8IQ**	**317,280**	**783**	**36**	**124**

Vietnam

3W3B	**40,150**	**215**	**42**	**68**

EUROPE
Aland Islands

OHØZ	**2,949,753**	**3875**	**112**	**335**
		(OP: OH6EI)		

Austria

***OE9WLJ**	**10,763**	**121**	**11**	**36**
*OE1EBC	460	13	9	11

Baleric Islands

***EC6DX**	**2,622**	**40**	**20**	**37**

Belarus

EW2A	**1,921,565**	**1908**	**138**	**427**
EW1I	1,362,030	1409	137	410
EW8DX	745,514	1625	78	251
EU7SV	101,136	396	28	84
EW1FM	4,950	68	13	37
***EW2ES**	**237,398**	**938**	**47**	**170**
*EW1NM	50,307	331	31	92
*EW1AFM	3,822	43	17	32

Belgium

***ON4CT**	**1,013,498**	**1691**	**92**	**266**
*ON4CBA	19,897	162	22	79
*OR3R	4,500	73	12	38

Bosnia-Herzegovina

E71A	**225,720**	**686**	**49**	**141**
***E74UK**	**216,457**	**826**	**47**	**186**
*E73X	24,495	287	14	55

Bulgaria

LZ7J	**616,704**	**1435**	**78**	**214**
		(OP: LZ1CI)		
LZ1HW	108,679	300	63	128
LZ5M	40,200	430	16	59
***LZ7M**	**104,690**	**506**	**38**	**107**
		(OP: LZ5VK)		
*LZ7MM	17,214	286	9	48
**LZ5X*	*10,974*	*90*	*24*	*38*
		(OP: LZ5PW)		
*LZ7VM	117	8	5	8

Croatia

***9A2VX**	**21,045**	**113**	**34**	**81**
*9A8TT	2,080	59	6	34

Czech Republic

OK1OA	**803,400**	**1491**	**78**	**234**
OK2GG	156,750	520	58	132
OK1XC	106,215	475	28	69
OK2EQ	30,294	438	12	54
OK1DWF	10,710	251	8	37
***OK1TA**	**683,235**	**900**	**110**	**295**
*OK1KQH	270,568	665	70	178
		(OP: OK1GSB)		
*OL2A	262,848	702	57	165
*OK1MDK	257,676	632	58	160
*OK6N	255,524	699	66	188
		(OP: OK2PTS)		
*OK1HCG	212,055	814	44	167
*OL3E	91,104	359	44	102
		(OP: OK1JOC)		
*OK1AUO	52,865	230	38	71
*OLØA	40,006	201	30	53
*OK1LL	35,949	220	23	46
*OK1MMN	35,260	230	22	60
*OK1CZ	34,209	509	11	52
*OK8KM	32,480	239	26	90
*OK2VK	29,054	183	45	101
*OK1BPN	28,706	410	14	48
*OK1FFA	16,456	169	19	49
*OK4NN	12,236	124	19	19
*OK1JDJ	4,950	76	12	33
*OK1TVL	2,530	51	14	32
*OK1LV	25,460	184	27	49
*OK1FKD	16,830	287	9	46
*OK7NV	10,506	147	12	39

Denmark

OZ7YL	**44,660**	**268**	**30**	**86**
***OZ1TJ**	**68,552**	**303**	**42**	**122**
		(OP: 5QØX)		

England

G9W	**2,774,376**	**2861**	**116**	**336**
		(OP: MØDXR)		
G3WZD	435,831	721	78	203
M6O	345,138	1371	30	93
		(OP: G3WGN)		
G2E	320,978	1016	48	154
		(OP: MØORD)		
G3T	70,104	290	36	91
		(OP: G3VGZ)		
G9D	58,320	295	26	64
		(OP: G6NHU)		
MØNPK	3,822	49	15	24
*M2J	368,460	767	64	203
		(OP: G4NBS)		
***MØXUU**	**314,431**	**924**	**52**	**195**
*MØURL	136,880	574	35	110
*G4POF	121,899	374	45	134
*G4HZV	80,234	255	46	108
*G4L	60,344	605	16	60
		(OP: G4LDL)		
*G4EBK	31,578	171	31	83
*MØSEV	29,568	314	17	47
*MØCVO	28,667	245	27	82
*G5C	24,415	213	22	73
		(OP: G4OGB)		
*G4OTV	23,230	200	29	86
*G4RMV	19,782	186	15	48
*GØOSK	13,083	123	23	66
*M3M	12,900	130	16	34
		(OP: G3PLE)		
*G4OTU	10,812	149	13	38
*G9V	10,098	110	14	40
		(OP: GØHVQ)		
*MØNDZ	8,352	151	10	38
*G4BEE	7,104	76	23	51
*G3YZO	1,692	33	11	25
*M4M	1,092	30	6	15
		(OP: MØPNN)		
*G3YRZ	480	25	4	16
*G3YLA	151,616	483	48	136
*MØRYB	124,532	496	41	122
*G3YMC	61,696	328	30	98
*G3WRJ	35,400	260	26	94
*G4TGJ	20,181	133	26	67
*M5OTA	1,536	36	8	24
*G7PVZ	1,520	40	10	28

European Russia
District 1

UA1ORK	**135,966**	**623**	**33**	**96**
***UA1CUR**	**149,256**	**520**	**45**	**171**
*UA1ZZ	55,480	268	38	114
*RM1F	42,456	250	28	88
*R1BC	29,884	195	33	91
*R1AU	17,700	189	21	79
*RW1AM	14,274	105	20	97
*UA1COA	9,635	209	7	34
*UB1AHY	7,488	104	19	53
*R1NI	1,539	54	6	21

District 3

RM2U	**1,269,927**	**1634**	**112**	**335**
		(OP: RU3UR)		
R5AJ	1,181,520	1323	145	395
RK3T	1,033,515	2065	81	234
		(OP: RX4W)		
R3FX	852,544	1822	93	259
R5AK	541,167	887	92	249
RC3U	460,666	953	80	209
RY3F	36,404	380	17	59
RV3ZD	13,287	142	28	75
R3LC	11,760	90	20	36
RK3DK	8,052	109	20	46
***R5FQ**	**476,309**	**994**	**76**	**255**
*RN5AA	450,109	873	79	240
*RT3C	355,470	897	68	221
*RX3Q	247,080	901	50	163
*R3AQ	174,908	370	66	226
*RU5X	168,480	564	50	166
*RX3VF	133,536	488	46	168
*RA3GAA	117,480	454	46	132
*R3THA	49,588	392	29	69
*UA3ABJ	45,700	292	24	76
*UA3RBP	45,678	292	36	102
*R2ATC	43,790	291	32	119
*RW5CW	43,602	332	17	61
*RW3VM	30,912	203	22	70
*RA3VE	21,659	166	34	87
*RL2D	17,138	194	19	63
**RA3RLJ*	*12,382*	*118*	*23*	*59*
*RN3Z	11,760	121	18	42
*UA3DLD	6,328	80	17	39
**UA3MEG*	*4,234*	*47*	*25*	*33*
*RN3DKE	2,881	50	11	32
*UA3SDN	2,160	63	6	24
*RZ3DC	1,950	60	15	10
*R5PW	22,816	211	21	71
*R2AHS	9,660	98	22	62
*RW3AI	6,345	106	9	38

District 4

UA4K	**366,769**	**853**	**73**	**244**
		(OP: RM4HZ)		
RT4O	153,900	486	54	136
		(OP: UA4NCE)		
R4RT	116,056	517	51	127
RW4WD	6,992	145	8	38
***UA4AGT**	**363,622**	**824**	**67**	**199**
*R4WDX	340,732	825	72	211
*RA4ACX	315,832	701	78	218
*RW4YA	308,992	865	59	197
*UA4PBT	181,956	421	65	192
*UA4WAV	129,200	503	46	144
*R4RM	69,012	345	41	121
*RN4SC	56,575	259	41	114
*R4II	50,064	303	31	81
*UA4PRU	26,136	207	27	81
*RK4K	21,216	161	27	77
		(OP: UA4HGL)		
*R4FBG	1,368	37	12	26
*R4PFL	0	7	4	7
*R4LA	9,381	106	15	44

District 6

UC7A	**922,896**	**1505**	**95**	**282**
RJ7M	72,219	330	38	95
UA6HLN	50,760	367	20	70
RC6AA	35,175	248	24	81
UA6AK	34,960	286	22	73
R6CR	14,256	151	21	45
RN6L	11,468	148	14	33
***R7KX**	**351,936**	**887**	**71**	**211**
*RM7C	190,610	659	49	196
*R6KEE	42,256	186	48	91
*UA6J	28,536	197	34	82
*R7MT	15,540	191	12	48
*R7KA	15,215	80	40	45

District 9

R9FE	**120,204**	**401**	**57**	**155**
UA9FGJ	59,892	436	23	69
***R9FBT**	**161,280**	**435**	**60**	**192**
*R9FDJ	143,437	485	60	157
*RQ9F	92,928	553	39	137
*R9FCY	3,570	73	9	33

Finland

OH1VR	**1,364,013**	**1999**	**114**	**327**
OH8NW	1,034,460	1724	112	308
OG4A	350,350	1016	68	207
		(OP: OH2BAI)		
OH5BM	268,157	1063	35	96
OF5YU	118,003	443	43	154
OG9W	67,313	751	17	66
		(OP: OH2BCI)		
OG5G	64,296	300	39	102
OH2VZ	30,498	238	16	53
OG6B	6,500	115	10	40
		(OP: OH1ZAA)		
***OH1SIC**	**97,893**	**521**	**33**	**116**
		(OP: SM5SIC)		
*OH6Z	21,204	312	10	52

France

TM5T	**1,296,560**	**2218**	**76**	**228**
		(OP: F5VKT)		
***F5JU**	**205,301**	**428**	**62**	**177**
*F5VV	151,316	475	45	136
*F6GGA	49,968	299	34	110
**F5ILS*	*45,162*	*216*	*37*	*80*
*F4HYY	14,742	159	19	62
*F4GFT	2,494	56	11	32
*F8FLK	420	20	3	4

Germany

DL2CC	**2,044,195**	**2414**	**105**	**284**
DL2SAX	1,811,160	2446	90	254
DD2AW	391,996	1175	63	173
DF6RI	316,965	761	52	203
DK4HH	150,944	474	59	153
DK4SG	107,224	515	25	79
DL1DTL	104,320	399	31	97
DL5DXS	81,738	282	38	76
DK5LY	38,121	214	31	66
DF5BX	37,584	258	28	88
DJ7WG	2,886	60	8	31
***DJ2XY**	**679,000**	**1203**	**82**	**268**
*DL1MAJ	343,962	594	66	225
*DL8ULF	286,974	1013	48	166
*DM5JBN	251,280	540	56	184
*DJ3RA	211,357	668	58	183
*DF3CE	139,664	419	48	155
*DG7EE	122,892	397	57	171
*DK5OCE	109,233	395	46	113
*DD5KG	100,598	355	47	132
*DM5B	99,120	418	42	126
		(OP: DG6IMR)		
*DL4AMK	98,494	293	58	184
*DL4XU	89,060	435	33	113
*DK4LX	72,556	468	22	75
*DL3SYA	63,899	329	34	123
*DL7GEM	58,102	300	33	106
*DJ3CS	48,664	193	46	112
*DL7ØTRS	46,904	509	17	65
		(OP: DJ8QP)		
*DL9YED	35,916	153	33	90
*DL1KAS	29,670	203	26	89
*DK1LRS	25,228	149	31	88
*DM3AA	17,850	115	27

*DL2ZA	9,112	117	14	54
*DK9ZE	6,048	57	23	31
*DL6CGC	5,311	100	8	39
*DL2BUM	3,835	54	21	38
*DL1EAR	3,488	44	16	16
*DL9TU	3,360	72	8	34
*DL3AMB	2,688	74	6	36
*DL5ALW	2,226	34	16	26
*DL8UKW	2,016	53	8	24
*DL1SBF	1,896	44	9	15
*DL2RZG	713	34	3	20
*DH8MS	576	25	7	17
*DL1AQU	79,800	388	36	132
*DFØBV	50,764	202	43	105
		(OP: DL6MAO)		
*DK7HA	34,800	271	18	42
*DK5CF	14,960	133	19	61
*DK7OG	8,778	125	16	50
*DL2LFH	7,080	124	11	19
*DG2FDD	5,278	89	15	43
*DK6AC	4,959	71	21	36
*DL1BWM	4,352	62	18	46
*DL1TW	2,664	93	6	31
*DL1DXA	77	8	3	4

Greece

***SV1CKZ**	**283,214**	**537**	**70**	**187**
*SV7CUD	6,798	75	17	49
*SV1AZL	1,280	20	15	17

Guernsey

GU4CHY	**280,893**	**1633**	**28**	**81**
***GUØBEZ**	**15,876**	**125**	**22**	**62**

Hungary

HA8DU	**845,924**	**1619**	**76**	**216**
HG6O	620,308	1107	76	240
		(OP: HA6OA)		
***HA7SQ**	**136,219**	**480**	**49**	**130**
*HG8L	81,257	704	20	69
		(OP: HA8RD)		
*HA6OA	63,431	231	46	91
*HA5UA	5,032	120	8	29
*HA5CRT	987	24	10	11
*HAØGK	17,119	245	12	41
*HA1TI	7,160	189	5	35

Ireland

EI6FR	**545,500**	**1278**	**60**	**190**
***EI7EE**	**1,150,253**	**2194**	**69**	**230**
			(OP: OZ2I)	
*EI5DI	60,088	277	29	87

Isle of Man

***GD5F**	**91,840**	**703**	**21**	**59**
		(OP: GD4RFZ)		

Italy

IR1G	**2,669,224**	**2669**	**121**	**337**
		(OP: IZ1LBG)		
IOØA	1,582,137	2497	100	267
		(OP: IKØYUT)		
I1NVU	825,126	1469	96	243
IKØYVV	680,255	1537	64	201
IK2AHB	410,760	941	64	188
IK2SND	*361,398*	*1091*	*49*	*137*
IK3SSO	332,750	1065	63	179
IK1BPL	246,515	679	57	178
IZ2BVC	22,098	192	31	96
IV3IXN	14,276	80	37	46
IW2ETR	10,395	97	23	54
***IK1JJM**	**456,462**	**1156**	**63**	**174**
*IK1RGK	440,984	686	76	201
*IK4MTF	314,524	721	63	176
*IN3FHE	238,804	595	58	169
*IK7NXU	201,552	435	67	161
*IKØXFD	167,440	475	61	169
*I6FDJ	133,176	584	45	141
*IZ5AHB	120,705	439	42	153
*IK2AOO	86,946	479	25	104
*IU1HFK	56,887	309	39	124
*IK8ARF	56,007	246	39	88
*IKØVVP	48,195	247	33	86
*IK1YRA	42,714	239	28	85
*I2DJX	27,968	199	17	47
*IU6FUB	22,440	193	22	80
*IZ4GRP	15,428	190	12	46
*IZ5OVP	15,060	223	11	49
*IU8MOA	14,365	111	28	57
*IZ8CLM	12,584	59	37	51
*IN3ZWF	10,143	114	16	53
*IZ2ABZ	6,873	79	16	63
*IW2ENA	4,800	55	20	44
*IK2NUX	3,780	45	16	29
*IW5ECP	2,236	40	14	29
*IK2OVT	2,236	40	17	26
*IZ2ABI	2,193	50	17	34
IU1CYF	*1,960*	*36*	*13*	*27*
*IKØALT	1,911	48	13	26
*II1R	754	53	4	22
		(OP: IW1CBG)		
*IZ2BMM	154	8	3	4
*IU3BPW	7	7	2	5
*IK2UZQ	51,013	229	36	103
*IZ4AFL	41,280	251	29	100
*IZ5RAQ	7,412	80	21	47
*IZ3KMY	2,576	40	16	30
*IZ8EWD	1,449	37	7	16

Kaliningrad

UA2FZ	**1,263,046**	**1749**	**104**	**318**
***RA2FO**	**41,789**	**265**	**29**	**102**

Latvia

YL2VW	**1,167,767**	**2040**	**96**	**287**
***YL2CV**	**343,434**	**833**	**59**	**214**

Lithuania

LY4T	**1,071,735**	**1698**	**98**	**315**
LY2NK	54,604	751	13	55
***LY2N**	**165,482**	**467**	**50**	**144**
*LY1M	57,200	336	32	98

Netherlands

PA3HEN	**182,000**	**581**	**48**	**152**
PAØMIR	107,695	347	49	132
PA3EYC	99,299	621	25	84
PA3CJP	88,677	394	44	123
PAØJNH	82,446	272	38	113
PA2CHM	8,840	102	21	44
***PA2PCH**	**164,220**	**523**	**55**	**155**
*PA2ST	153,045	598	39	140
*PG7V	108,750	516	40	134
*PA3DBS	43,553	471	21	76
*PAØRDT	43,428	278	36	105
*PE1MR	7,228	111	12	40

North Macedonia

Z35F	**59,362**	**863**	**11**	**56**
***Z35M**	**306,495**	**1026**	**55**	**190**
*Z31NA	128,979	737	35	118
*Z33F	9,024	128	14	34

Norway

***LB2WG**	**53,900**	**366**	**26**	**114**
*LC4U	1,760	72	13	42
		(OP: LB1KG)		
*LB1R	1,600	47	11	29
*LB5DI	1,519	65	6	25

Poland

SP5AUC	**754,475**	**1693**	**72**	**221**
SP7IIT	596,160	1093	92	253
SP5ICS	76,596	339	37	119
SQ7U	22,880	428	10	45
SQ8LUU	22,780	244	15	52
SQ3HTX	14,626	120	21	50
SP9JBE	1,200	28	9	16
***SP1AEN**	**552,874**	**1129**	**68**	**254**
*SP9YFF	185,606	661	47	159
*SP5UFK	168,245	501	55	154
*SP9R	148,797	531	49	118
*SP1R	139,545	748	26	79
*SP6BEN	94,763	247	53	140
*SQ2EEQ	49,660	296	31	99
*SP9GMI	46,004	178	40	66
*SP5EPP	45,773	270	29	62
*SP8CGU	43,830	247	32	58
*SP2TMT	42,395	165	43	96
		(OP: SQ2BNM)		
*SP5KCR	36,064	301	24	88
		(OP: SQ5WWK)		
*SP7OGP	35,700	194	27	48
SP5ENG	*34,410*	*185*	*35*	*58*
*SP2N	26,400	243	22	78
*SP9DUX	18,421	116	35	74
*SP9DTE	16,952	142	16	36
*SN4EE	12,978	97	23	40
*SP6JOE	9,861	84	22	35
*SP9GKJ	9,048	68	29	49
*SQ7NSN	8,800	93	18	37
*SP9W	6,419	56	22	27
*SP6DMI	6,300	104	12	30
*SP2EPV	1,376	89	12	31
*SP9CXN	64,454	393	27	107
*SP4NKJ	13,296	135	17	31
*SQ5W	12,024	144	24	48
*SP7BCA	10,200	187	9	42
*SP9VFX	6,634	111	14	48
*SP2HMY	4,340	100	8	27
*SP8D	2,970	116	5	28
*SO2U	2,380	53	9	25
		(OP: SP2UUU)		
*SQ8F	345	25	3	12

Portugal

CT7AIX	**7,889**	**65**	**16**	**33**
***CT1DRB**	**12,728**	**152**	**16**	**58**
*CT1EHK	11,934	148	12	22

Romania

YO4RST	**60,996**	**301**	**37**	**119**
***YO4FHU**	**206,248**	**743**	**51**	**181**
*YO8BDW	93,333	509	34	125
*YO4BEX	40,470	405	17	54
*YO2IS	37,772	264	20	51
*YO3JOS	35,024	254	20	68
*YO5AXF	32,092	216	22	49
*YO4CSL	28,420	178	36	80
*YO3ND	26,565	237	18	59
*YO9CWY	13,340	214	10	36
YO6DMR	*11,825*	*111*	*15*	*40*
*YO7LYM	10,336	138	19	57
*YO4FZX	4,403	109	7	30
*YO9HG	1,848	57	7	21
*YO3JW	988	34	8	18

Sardinia

***ISØJXO**	**36,696**	**264**	**35**	**97**
ISØILP	*1,512*	*77*	*17*	*37*

Scotland

GM7V	**1,406,592**	**2617**	**86**	**266**
		(OP: GM3WOJ)		
MM3T	931,808	2261	69	227
		(OP: GMØELP)		
GM2Y	206,147	564	55	156
		(OP: MMØDXH)		

Serbia

YU1AO	**20,020**	**136**	**18**	**52**

Sicily

***IT9RGY**	**669,282**	**1358**	**83**	**248**
		(OP: IZ3NVR)		
*IT9CKA	67,340	316	39	109
*IT9VJO	37,128	236	33	103

Slovak Republic

OM1II	**11,000**	**98**	**20**	**30**
***OM2DT**	**236,448**	**518**	**67**	**221**
*OM7SR	77,280	402	45	139
*OMØMW	51,765	448	25	60
*OM3CDN	32,136	236	24	80
*OM7AT	23,326	174	29	78
*OM6TU	16,200	301	10	40
*OM8VL	5,676	117	7	36
*OM8JP	2,475	51	10	15

Slovenia

S52NR	**1,531,222**	**1824**	**108**	**319**
S51DX	383,028	1165	42	135
S52TW	*14,364*	*89*	*35*	*41*
***S57NAW**	**230,139**	**517**	**77**	**204**
*S58KA	151,152	632	41	160
*S51J	64,680	620	17	67
*S52FT	26,325	346	12	53
*S57WW	24,511	195	27	100

Spain

EA5M	**1,280,372**	**2112**	**75**	**248**
EA5IUY	88,500	526	22	78
EC1RS	57,890	725	17	53
***EC3A**	**756,945**	**1662**	**70**	**245**
*EA3ICJ	415,368	1065	53	163
*EC7R	204,156	1163	28	78
*EA5/RV2A	155,491	486	44	185
*EA3NO	63,570	503	20	58
*EA2AGV	58,078	294	29	113
*EA4FIT	33,517	185	33	88
*EC5C	16,482	161	19	63
*EC7C	7,395	92	18	33
*EA3DMN	2,418	52	9	22
*EA3TJ	2,337	59	15	42
*EA5JA	620	25	10	21
*EA2AFV	246,544	850	42	110
*EA2CAR	63,714	432	19	63
*EA2BO	28,350	209	18	57
*EA4U	22,446	139	29	58
*EA3FHC	6,336	99	13	35
*EA1BP	5,852	81	11	17
*EA2NA	5,135	112	18	61
*EA4LG	1,848	32	17	27

Sweden

SM2CEW	**931,020**	**1568**	**75**	**220**
SM5CCE	231,519	595	62	167
SD1A	183,768	489	57	171
		(OP: SM1TDE)		
SM6CPY	42,478	638	14	53
SM7ATL	2,772	53	11	25
***SF6W**	**153,850**	**747**	**37**	**133**
		(OP: SM6EWB)		
*SM5LW	144,739	491	53	164
*SM7CIL	136,875	433	34	91
*SM6LRR	1,400	42	6	19
*SMØGNS	95,448	436	39	125

Switzerland

HB9JOE	**3,680**	**86**	**8**	**32**
***HB9IIH**	**2,886**	**64**	**10**	**29**

Ukraine

UY5QR	**205,616**	**520**	**75**	**209**
UR3QX	179,322	496	63	179
UR7FM	179,055	583	51	156
UT5ECZ	53,949	190	37	110
UT3QU	19,240	217	16	58
UT1QQ	18,920	325	8	47
***UW8SM**	**953,544**	**1525**	**100**	**302**
*UT4EK	355,618	998	58	211
*UR1HR	347,616	754	76	208
UX1BZ	*311,850*	*993*	*61*	*170*
*UT3SO	311,001	987	56	193
*UR7HY	277,905	580	68	223
*UR3LM	178,055	555	49	190
*US3EW	170,286	562	50	152
*UY7RR	107,570	510	41	114
*UY5TE	105,776	509	38	138
*UR8GX	103,418	520	36	130
*UT7QB	101,039	431	41	150
*UT2QQ	99,567	384	46	161
*UT4UQ	92,220	372	43	131
*UY5BQ	80,848	390	40	123
*UX1HW/M	68,440	310	40	105
		(OP: UX1HW/M)		
*UT7NI	66,308	381	29	108
*UY2ZZ	65,688	303	38	130
*UV1IW	60,264	449	26	98
*UT3IJ	55,245	278	34	93
*UT6ER	37,942	187	35	87
*UV3QF	27,740	334	13	60
*UR5WCQ	23,577	196	20	67
*UR3QTN	12,220	249	8	39
*UT1QR	9,858	148	10	43
*UT5UHX	8,667	95	26	55
*UX1CW	8,424	126	11	41
*UR5WX	5,618	83	14	39
*US8UA	2,775	51	12	25
*UT4Q	880	24	9	11
		(OP: UR5QRB)		
*UR4MM	2,070	57	13	33

Vienna Intl. Center

***4U1A**	**2,146,428**	**2919**	**107**	**329**
		(OP: HB9RB)		

Wales

***MW6M**	**117,992**	**440**	**46**	**150**
		(OP: GW4BVJ)		
*GW4HBK	109,953	408	45	126
*MWØMUT	49,610	179	44	161
*GW5L	21,054	203	13	45
		(OP: GW4ZAR)		
*GW4OKT	4,469	108	7	34

OCEANIA

Australia

VL2B	**1,367,415**	**1548**	**100**	**215**
		(OP: VK2BJ)		
VL2N	601,323	974	80	147
		(OP: VK2PN)		
VK2W	156,060	347	70	110
		(OP: VK2ALR)		
VL3E	127,050	301	62	103
		(OP: VK3TZ)		
VL6T	*84,451*	*459*	*22*	*57*
VK7GN	55,590	262	36	49
***VJ4O**	**11,550**	**83**	**27**	**28**
*VJ3N	680	23	8	9
		(OP: VK3QB)		
*VL6K	24	2	2	2
		(OP: VK6WX)		

Hawaii

WH7T	**2,518,999**	**3027**	**118**	**169**
		(OP: WH7W)		
AH6FC	5,160	63	18	25
AH6T	2,700	61	27	27
		(OP: KH6FHI)		
***KH6CJJ**	**236,640**	**494**	**76**	**94**
*NH6DV	1,590	29	14	16
*NH6O	9,245	89	22	21

Indonesia

YB2MM	**211,220**	**415**	**60**	**119**
YB2IQ	154,048	341	54	112
YB1RKT	50,304	146	45	83
YC9XYP	27,816	187	23	38
YB8UTI	18,944	187	18	19
YB4IR	3,630	44	11	19
YB7HE	396	12	5	6
***YB1LUE**	**13,144**	**80**	**20**	**42**
*YB8RW	9,968	142	14	14
*YB1IQE	6,171	51	21	30
*YB3BGM	6,004	64	13	25
*YB8JEC	2,323	45	11	12
*YB9GV	1,102	36	8	11
*YC2CLH	140	7	5	5
*YC2VOC	13,632	87	27	44
*YB2CTE	80	34	9	11
*YD2NIR	12	2	2	2
*YC2AUP	10	7	5	5

New Zealand

ZM1A	**1,633,590**	**1829**	**111**	**204**
		(OP: ZL3CW)		

Philippines

4F3FSK	**477**	**23**	**4**	**5**
***DU1VGX**	**26,466**	**177**	**27**	**39**
*DW3TRZ	198	15	3	3

SOUTH AMERICA

Argentina

LU7DW	**4,992**	**62**	**17**	**22**
***LT3V**	**127,170**	**368**	**58**	**99**
		(OP: LU6OA)		
*LU2AXF	357	21	9	8
*LU1RAF	180	10	6	6
*LU1QDQ	0	4	1	1

Brazil

PS2T	**2,373,555**	**2123**	**111**	**284**
		(OP: PY2ZEA)		
PY2MC	65,412	277	32	60
PY6TS	1,664	21	12	20
***PP5AX**	**139,524**	**405**	**49**	**83**
*ZZ7ZZ	51,408	405	19	37
		(OP: PR7AR)		
*PY2XL	41,531	145	48	71
*PU2UAF	22,866	145	31	80
*ZV2F	12,314	80	43	51
		(OP: PY2SFA)		
*PP5CW	9,009	102	25	38
*PY1NX	5,445	43	18	27
*PU2TNT	5,360	53	11	29
*PY2CP	4,508	43	22	27
*PY2KA	2,226	29	18	24
*PY2ABN	603	47	5	4
*PY2YD	154	12	5	6

Chile

***3G1D**	**6,622**	**67**	**13**	**30**
		(OP: XQ1FM)		

Colombia

***HK4NDF**	**1,066**	**31**	**16**	**25**

Peru

OA4O	**287,056**	**942**	**27**	**85**
		(OP: EA7TN)		

Uruguay

CX3AL	**63,027**	**177**	**49**	**92**

YOUTH

NORTH AMERICA

United States

District 1

KE8HBV	**85,932**	**199**	**51**	**147**
W7AOF	51,182	152	52	105

District 4

***KG5HVO**	**35,061**	**137**	**31**	**62**

District 6

***KK6LHT**	**77**	**9**	**4**	**3**

Canada

District 3

***VE3OMV**	**73,872**	**320**	**43**	**71**

ASIA

China

BH3WNL	*107,694*	*301*	*69*	*124*
***BA7LAC**	**11,426**	**112**	**19**	**39**
*BG5UZW	9,512	93	24	34
*BD4TTU	3,973	129	16	13
BG2DVL	*3,818*	*85*	*22*	*24*

Japan

District 1

***JI1UPL**	**61,620**	**228**	**56**	**74**
*JH1DWQ	1,080	24	12	15
*JH1YDT	900	23	10	10
		(OP: JI1TMD)		
*JG1CMT	400	10	10	10
*JG1VMK	330	14	6	5

District 2

JR2KHB	**114,882**	**371**	**51**	**72**

EUROPE

Bosnia-Herzegovina

***E7ØAW**	**10,033**	**107**	**21**	**58**

European Russia

District 3

R5CA	**150,336**	**500**	**52**	**180**

Germany

***DJ4MX**	**2,409,584**	**2154**	**143**	**441**
*DB5DY	278,239	676	61	160

Ireland

EI8KW	**118,320**	**556**	**32**	**138**

Italy

IR1N	**157,950**	**1372**	**15**	**75**
		(OP: IU1LCU)		
*IU4FNO	478,800	722	84	258
*IUØLJD	69,440	254	45	110
*IU4LGT	3,705	44	20	37

Lithuania

LY1LB	**754**	**32**	**9**	**17**
***LY5AX**	**601,868**	**1240**	**97**	**237**

Poland

***SP5WAZ**	**155,448**	**601**	**48**	**156**

Romania

***YO2NWW**	**47,472**	**267**	**36**	**93**

Serbia

YTØC	**2,782,500**	**2749**	**130**	**370**

Sweden

SA6NIA	**209,019**	**985**	**42**	**151**

OCEANIA

Indonesia

***YD2UWF**	**123,695**	**322**	**48**	**95**
*YC1LJT	5,510	63	11	27

MULTI-OPERATOR SINGLE TRANSMITTER

NORTH AMERICA

United States

District 1

K1LZ	**13,441,032**	**6101**	**175**	**617**
N1MM	5,058,656	3308	125	419
K1KP	3,236,545	2316	114	379
W3UA	3,027,420	2317	116	368
W1SRG	316,575	510	50	175
***K1XM**	**3,546,447**	**2399**	**120**	**401**

District 2

W2FU	**9,683,139**	**4828**	**166**	**557**
K2QMF	7,005,278	3828	145	516
***K1RQ**	**398,970**	**475**	**76**	**234**

District 3

W3LPL	**14,233,680**	**6372**	**184**	**611**
K9RS	7,498,491	3939	160	521
K3AJ	5,177,484	3090	140	458
W3ZGD	1,896,440	1505	117	338

District 4

AD4ES	**4,807,194**	**3147**	**140**	**441**
N4CW	2,830,786	2134	111	371
W4THI	103,544	224	47	125
WW2R	30,422	166	21	61
***NJ4P**	**2,350,560**	**1976**	**124**	**374**
*KT4XA	206,114	313	80	177

District 5

K5TR	**7,106,880**	**3916**	**180**	**524**
WXØB	317,700	415	85	215

District 6

NX6T	**3,993,978**	**2727**	**162**	**429**
W6DR	640,053	671	123	238
***W1FM/6**	**9,424**	**60**	**35**	**41**

District 7

KU1CW	**4,398,576**	**2960**	**151**	**395**
W7VJ	1,994,398	1837	133	300

District 8

K8AZ	**7,295,499**	**3752**	**161**	**536**
W8BI	408,630	496	96	222

District 9

W9VW	*3,562,292*	*2390*	*130*	*426*

Belize

***V31MA**	**3,792,492**	**3508**	**120**	**351**

Canada

District 3

VE3EJ	**12,307,255**	**6304**	**176**	**579**
VE3YAA	494,844	737	73	201

District 6

VE6SV	**4,257,792**	**3830**	**145**	**359**

District 7

VA7DX	**2,115,414**	**2975**	**104**	**222**
VE7SAR	798,567	1577	86	145
VA7OO	496,650	1411	66	109

Cayman Islands

ZF1A	**12,380,560**	**7655**	**165**	**523**

Honduras

HQ9X	**5,285,460**	**4313**	**141**	**407**

AFRICA

Madeira Islands

***CR3X**	**9,440,051**	**4924**	**151**	**516**

Rwanda

***9X4X**	**2,415,985**	**2177**	**104**	**299**

ASIA

Asiatic Russia

District 9

RA9Y	**8,024,538**	**5040**	**146**	**488**
RC9J	1,271,535	1679	75	234
RK9CYA	1,123,156	1129	100	298
***RM8Y**	**386,835**	**620**	**54**	**201**

District Ø

RKØS	**232,898**	**961**	**38**	**84**
***RWØLL**	**17,748**	**132**	**38**	**49**
*RØMM	10,962	140	27	27

Asiatic Turkey

TC3X	**2,828,994**	**3008**	**74**	**275**
***TCØF**	**2,046,968**	**2523**	**63**	**245**
*TC3N	935,000	1457	55	195

China

B7P	**3,392,319**	**3207**	**134**	**357**
BY8DX	2,410,800	3100	98	238
B1Z	1,924,560	2508	118	278
BY6LY	846,032	1806	79	174
BY4SZ	818,748	1648	86	180
BA7MT	377,901	998	66	145
BY3CQ	368,847	1231	61	110
BY1OK	300,030	808	77	142
BY1HAM	215,212	828	54	119
BY6QS	150,560	620	59	101
BG5ERM	119,493	486	57	96
***BD7DT**	**3,021,597**	**2547**	**142**	**351**
*BH1EBF	818,532	1190	103	248
*BY4DX	787,814	1500	91	198
*BY8MA	672,808	985	88	208
*BA3RA	47,265	228	54	83
*BH4CAC	10,710	124	31	39
*BY1TL	98	14	7	7

Cyprus

P33W	23,465,442	9691	195	663

Japan

District 1

*8N1ING	267,954	519	77	136
*JS1YDX	81,135	275	48	87
*JA1YAD	41,745	161	49	66

District 2

JJ2YRE	1,318,174	1311	133	286
*JK2VOC	242,804	559	77	125

District 3

JL3ZHU	36,480	181	46	50

District 6

JG6YLY	1,373,090	1452	127	267

District 7

JA7ZFN	6,067,230	3535	184	478

Kazakhstan

*UN4Q	5,879,500	4116	130	420

Thailand

E2A	3,659,325	3350	140	363
*HS8NKB	279,072	622	68	160

West Malaysia

*9M2S	308	10	6	8

EUROPE

Austria

OE1XTU	8,968	93	15	44

Belarus

EW5A	10,743,174	7262	185	621

Belgium

*OT5X	278,055	1484	37	148

Bosnia-Herzegovina

E7DX	12,333,750	7243	196	662
*E7CW	4,397,645	3519	161	504
*E7AR	63,512	299	40	96
*E71FDE	21,248	257	12	52

Bulgaria

LZ5R	15,150,240	9064	194	670

Crete

*SX9V	3,807,069	4301	150	447

Croatia

9A5Y	9,947,518	6017	190	636
*9A2L	1,919,045	2205	130	405
*9A5G	44,640	227	37	118

Czech Republic

OK5Z	10,292,945	5785	189	656
OK7O	6,726,564	4881	167	535
OL1C	4,111,809	3841	147	442
OL7T	1,954,180	2295	118	373
OK1KKI	562,503	1302	72	219
*OK5SWL	552	23	7	16

Denmark

OZ5E	3,560,843	3166	161	512

England

*MØSQC	513,618	1366	71	223

European Russia

District 1

RU1A	10,246,632	7210	186	628
*R1ZY	282,731	955	47	120

District 3

RT2C	5,871,210	5698	158	532
*UG5R	55,277	259	44	123

District 4

UA4S	8,651,804	6834	180	592
RK4W	1,776,840	2540	121	415

District 6

RT6A	10,013,918	7472	179	590
R7GU	55,890	310	39	123
*RY6Y	246,934	404	90	221

Finland

OF1F	7,124,737	5164	175	576
OH2BAH	1,843,805	2408	128	371

France

TM6M	14,715,348	8291	189	642
TM2Y	9,640,512	5977	182	615
TM3R	9,357,348	5882	178	601
F8KCF	2,939,034	2504	145	464
TM1D	760,976	966	103	295
F6KJS	750,120	1854	69	213
F5KSE	242,319	610	59	172
*F8KGS	930,800	1557	82	243
*F8KLY	252,994	1134	28	91
*F6KRK	199,746	416	69	174
*F6KMB	132,890	463	46	148
*F5KCC	1,763	69	11	32

Germany

DA2X	8,077,892	4585	191	648
DP6A	5,865,310	3888	166	544
DD4A	5,794,200	4105	170	570
DF9LJ	4,946,726	3537	174	524
DAØT	4,108,685	3808	145	478
DJ5LA	645,745	885	96	259
DKØIU	276,640	673	68	212
*DP7D	5,034,042	3708	163	539
*DLØFTL	304,066	770	60	199

Greece

SZ1A	4,252,545	4646	154	485

Hungary

HG6N	9,864,660	6019	180	600
HG5A	6,003,000	4568	163	527
HA3DX	3,250,500	3127	142	408
HG1R	2,732,184	3226	119	385
*HG5C	1,395,016	2197	101	305
*HG6L	828,450	1692	86	264

Italy

IR4M	13,497,792	7175	194	653
IR4X	11,657,490	6448	192	650
IR2L	5,904,117	4260	168	509
IB8A	5,440,778	4010	159	524
II4L	1,457,255	2650	98	281
*IO3F	3,717,888	3623	153	465

Liechtenstein

HBØA	3,144,284	3526	104	374

Lithuania

LY2XW	3,556,814	3645	146	447
LY2FM	229,908	485	75	219
*LY2J	1,855,548	2438	116	370

Moldova

*ER3R	1,032,492	1804	97	320

Netherlands

PA6X	4,044,340	4249	132	419

Poland

SP8R	8,320,480	5166	186	619
SO4M	7,688,408	5254	178	589
3Z1K	2,284,985	2371	134	401
*SN9A	3,034	81	10	27

Romania

YO3GNF	274,800	849	53	176
YR2X	229,118	495	56	162
*YO4KAK	33,794	195	36	86

Sardinia

IQØID	1,203,320	2295	70	265

Scotland

*GM5G	1,024,434	1650	87	279
*MM4D	907,959	1563	99	304

Serbia

*YT1914KOL	198,387	740	54	147

Sicily

II9P	9,787,104	6340	189	627

Slovak Republic

OM7M	13,349,390	7446	200	666
OM4Q	2,916,045	3374	122	373

Slovenia

S53M	8,194,878	5137	182	601
S52C	2,025,232	3039	105	302

Spain

EA5RS	10,714,121	6423	185	626
EA5KM	5,854,576	4517	172	556

Sweden

SJ2W	9,203,228	5724	189	622
SM2U	2,725,872	3340	130	391
SKØQO	1,160,879	2091	89	302

Switzerland

HB9ON	1,716,726	2460	93	314
HB9EP	1,284,294	2133	78	288

Ukraine

UZ2M	11,815,533	8087	193	656
*UW6M	342,855	1005	66	219
*UZ5P	43,435	447	24	95

OCEANIA

Australia

*VL4A	78,667	295	35	62
*VJ3C	3,526	46	19	24

Indonesia

7AØD	10,498	123	27	31
*7E1T	1,170	23	9	9

Philippines

*DX9EVM	83,172	385	40	47
*DZ7CF	418	17	10	9

SOUTH AMERICA

Argentina

LT1F	5,644,240	3625	141	419

Bonaire

PJ4A	14,785,245	7233	167	544

Brazil

*PY3CW	3,608,252	2694	127	355
*ZW2D	12,369	107	22	35

Chile

*XR3W	960,848	1224	100	222
*CE3PCG	17,776	101	39	49

French Guiana

*FY5KE	10,398,990	5245	157	533

MULTI-OPERATOR TWO TRANSMITTER

United States

KC1XX	17,591,384	7910	182	615
K9CT	11,848,431	5899	179	570
N4WW	11,145,765	5758	165	552
K1RX	11,126,227	6020	153	514
ND7K	8,072,136	5032	170	478
N2AA	6,780,320	4052	142	478
K5KG	6,137,953	3850	141	458
K8LX	5,848,782	3672	143	435
K2AX	5,629,224	3251	143	489
AA7A	5,301,912	3406	166	461
N7DX	4,009,500	3100	145	355
KQ3F	*3,641,517*	*2358*	*133*	*416*
NJ3I	2,705,553	1740	131	446
K2DM	2,620,761	2226	107	340
KT7E	2,213,600	2040	123	277

NORTH AMERICA

NP4Z	11,633,400	8784	139	413
KL7RA	8,367,838	7028	150	352
VA2UR	6,795,432	4981	136	446
VE9ML	3,183,975	2627	107	370

Looking Ahead In CQ...

Here are some of the articles we're working on for upcoming issues of *CQ*:

Take it to the Field Special in June

- Peripatetic Morse
- Bandpass Filters for Multi-Transmitter Operations
- Exploring Lost Creek

Plus…

- Results: 2021 CQ DX Marathon
- An Antenna for the Birds
- Human Body Communication

Upcoming Special Issues

October: Emergency Communications
December: Technology
February: QRP

Do you have a hobby radio story to tell? Something for one of our specials? *CQ* now covers the entire radio hobby. See our writers' guidelines on the CQ website at <http://bit.ly/2qBFOdU>.

AFRICA

CR3DX	31,115,616	13506	189	609

ASIA

JH8YOH	5,809,424	4074	167	399
JF1SQC	3,670,937	2746	157	366
VU2XE	3,117,543	2671	105	324
BA7QT	1,942,752	2537	117	296
BH3GIY	1,554,984	2685	88	225
JA1ZGO	1,467,180	1681	113	229
BG6SNJ	581,389	1021	79	202
E2E	457,968	946	68	164
BY1AS	392,700	1063	63	141
BY1CQ	233,750	814	61	126
9M2U	185,859	483	64	129
JA1ZLO	6,466	64	23	30
JA2YKA	529	24	11	12

EUROPE

ES9C	16,974,906	11268	198	651
UA4M	12,893,463	9822	187	612
ED1R	12,669,750	9482	173	577
HG7T	11,135,828	7757	178	573
SK3W	10,952,568	7767	188	604
II2S	10,938,614	7512	181	580
ED7R	10,805,480	7873	174	566
OH5Z	10,558,940	7476	187	609
UA7K	10,529,040	8415	180	580
RT4F	10,129,614	8108	175	584
DQ1A	8,933,490	6311	172	566
DR4A	8,840,073	5694	176	583
RA5G	7,176,040	6873	158	522
SO4R	4,582,336	5117	138	428
G6XX	3,764,328	3621	134	402
UF5D	3,405,075	4371	126	421
MD4K	1,556,828	2822	82	282
G3V	1,009,219	1883	73	258
R2VA	742,224	1590	78	258
OZ5W	239,280	654	62	178
UW7RWA	162,045	615	48	147
G5O	105,412	502	30	116
GM6NX	47,243	188	39	80

OCEANIA

ZM4T	7,192,900	5091	151	352
7A2A	3,609,750	3489	109	266
ZL3X	3,075,150	2840	111	279

SOUTH AMERICA

PJ4K	27,498,782	12724	175	582
PT4A	5,925,858	4437	134	395

MULTI-OPERATOR MULTI-TRANSMITTER

United States

K3LR	21,666,486	9750	191	643
NR4M	16,390,766	8074	173	590
K1TTT	13,880,754	7001	171	576
KØRF	8,302,584	4870	176	520
K1KI	6,995,950	3869	154	496
N1RR	6,507,786	3879	141	473
N6RO	5,483,520	4034	165	411
W2AA	3,688,841	2379	128	431
K3PH	2,480,820	1686	121	398
NX3A	1,884,690	1422	115	372
KØOO	1,787,057	1359	135	392

NORTH AMERICA

C6AGU	3,124,059	3549	101	288

AFRICA

CR3W	36,547,042	15013	190	643
3B8M	23,263,935	10865	185	568

ASIA

JA3YBK	8,153,408	5082	190	477
JF1NHD	3,119,036	2952	139	280
BY1CY	1,158,170	2600	96	206
9M2A	1,031,550	1822	107	238
BH4XBU	620,844	1499	78	150
BH3FAL	199,782	772	66	132

EUROPE

TKØC	24,945,742	17365	189	652
M6T	19,115,393	12334	197	672
LZ9W	18,651,576	12519	191	643
OL3Z	16,257,684	10984	184	620
DFØHQ	16,242,592	10548	191	657
YT5A	16,118,828	11399	190	624
LN8W	15,176,503	10381	199	630
HB9CA	10,452,228	7230	176	556
F6KOP	9,537,836	7991	158	534
PI4CC	8,112,036	8334	134	463
LY2ZO	740,896	1510	76	262
SZ8ERS	465,900	1134	77	223
YT5L	242,814	580	73	213

OCEANIA

KH6LC	9,685,364	6900	161	333
7C1B	3,465,767	3293	117	266

SOUTH AMERICA

PJ2T	27,176,800	12987	175	561

EXPLORER SINGLE OPERATOR

9G5FI	A	5,094,778	3745	110	356
RL6M	"	2,437,624	2877	127	405
LT6M	"	1,716,975	1934	91	234
OP5T	"	1,291,806	1967	95	292
OH2XX	"	910,140	1700	87	221
HB9CVQ	"	808,752	1806	59	190
W6CZ	"	121,912	246	80	116
RUØLL	"	73,710	565	29	62
KB2S	"	34,625	107	37	88
YO2GL	"	16,936	302	12	46
N1RBD	"	3,977	51	15	26
UR3ABM	*"*	*1,798*	*41*	*10*	*19*

EXPLORER MULTI OPERATOR

RWØA	A	22,823,619	12258	181	586
RM9A	"	19,537,012	9916	173	575
W9SN	"	10,080,180	5456	154	506
EA4KD	"	9,278,269	7564	166	547
9H6A	"	3,019,275	4913	91	314
RT4D	"	2,932,900	3671	134	422
IQ4RN	"	1,814,472	2214	129	393
DQ6ØANT	"	922,875	1744	94	281
SN6E	"	862,638	1537	96	303
W5NN	"	601,236	658	98	24

Check Logs

4Z5OZ, 7N4LNK, 9A3YT, 9A5E, 9K2NO, AAØAJ, AA6KJ, AA8TA, AB3AI, AB5XM, AC2OC, AI9K, AK5X, BA7IO, BD1IIJ, BG9GXM, BH1MCB, CO2AN, CO2CW, CO2YQ, DA3X, DD2CW, DF5RF, DG1LQX, DJ1XT, DJ6TK, DK3RA, DK3RED, DK8NC, DL1BWU, DL1BZA, DL1MGB, DL1NOD, DL2AMC, DL3HRZ, DL3JON, DL3NSM, DL3TC, DL3TU, DL4LT, DL4MCA, DL5DBY, DL5KW, DL6KWU, DL6OAA, DL7JOM, DL7UCX, DL7UGO, DL8FMA, DL8WJM, DM3KP, DM5MA, DM6WAN, DU7HF, E73B, EA1W, EA2IA, EA3D, EA4EER, EA4FW, EA4S, EA5N, EA5R, EA6EJ, EA7BHO, EA7BJ, EA7HAB, EA7P, EA8TR, EC1DD, EH2EUS, EI6KW, EI7BA, ES5NC, ES7A, EU1KY, F3WT, F5VMN, F6KPQ, GØJSP, GØLHZ, G3VPW, G3VQO, GJ3YHU, GJ4CBQ, GU4EON, HA1AG, HA3KGC, HA3MN, HA6NN, HB9DGZ, HB9GNY, HF7A, HG3R, I8JIT, I8QFK, IK1YDB, IK2XSL, IK4VET, IN3NJB, IU8DKG, IU8JPG, IV3ARJ, IV3OKO, IV3TRK, IWØURG, IW1BCO, IW1QN, IW2MZX, IZ1DLU, IZ1PMC, IZ3GNG, IZ4DZD, IZ4UFB, IZ5MOQ, JA1JPM, JA2IFW, JA2KVD, JA5FBZ, JA7QVI, JA8AZN, JH1FSB, JH1FSF, JH1OAI, JI1TBQ, JJØMPK, JJ6CRH, JN1RVS, JS6RTJ, K1DW, K3WWT, K4XD, K7GQ, K8OZ, K8RXB, KA2MGE, KF6NCX, LA1U, LA4NL, LA6YIA, LA7AFA, LB8CG, LR3M, LT5A, LU2DD, LU3WC, LU5FF, LY2BNL, LY6A, LZ1JZ, LZ1MS, LZ1ND, LZ1YF, LZ2HR, LZ2JE, LZ2SX, LZ7DX, MØVAA, M4X, M5ADL, MIØRRE, N2JW, N3BAS, N4EFS, N4PL, N8EW, N8OO, OH1NDA, OH1ZK, OH2IS, OH5NZ, OH6QU, OK1AYU, OK1ES, OK1FAI, OK1FPG, OK1FRD, OK1ITK, OK1NF, OK2BHD, OK2CSU, OK2FD, OK2KG, OK2PAY, OK2RN, OK2TJ, OK2ZV, OK7SX, OL6P, OM5CD, OM7CV, ON4WW, OP4A, OZ6TL, PAØVLY, PA2REH, PA3FQA, PA3I, PA4T, PA6T, PA8ZB, PC4C, PFØX, PF5X, PP2RON, PU2VLW, PU8YPL, PY2KG, PY2OSD, PY4HO, PY7OJ, PY7ZY, RØRG, RØTV, R2AA, R2AB, R2EA, R2RA, R3AT, R3MR, R4PFF, R7NK, R8XA, R9JX, R9OK, RA1CE, RA3AL, RA3UAG, RA4AAT, RA4ADF, RA6FUZ, RA7E, RC7C, RD3R, RK1F, RK3MXT, RK7A, RK9JYY, RL8C, RM2A, RM3Z, RM8W, RU7K, RV1OO, RWØCR, RW3AG, RW3LA, RW3QM, RW3XW, RX3DTN, RZ1O, RZ1OA, RZ3AUL, RZ9OL, S5ØL, S51MM, S52WW, S53CO, S55VM, S57DX, S59A, S59MZ, SC3A, SF6J, SMØQ, SM5GLC, SM6MSG, SM6VJA, SM7PEV, SM8A, SN2M, SN5V, SP1HN, SP1IKK, SP2GTJ, SP2GUC, SP4W, SP5AUY, SP5JSZ, SP5NZF, SP6GCU, SP6HEQ, SP6LUV, SP6M, SP6OPC, SP6TRX, SP7IWA, SP7SQM, SP8GSC, SP8HKT, SP8SN, SP8UFT, SP9DNO, SP9MDY, SP9MOA, SP9NLI, SQ2GXO, SQ3F, SQ3PMX, SQ5NRY, SQ7IQM, SQ8L, SQ8LUV, SQ9IWT, SQ9MZ, SQ9RNR, SV1EJD, SV1RUX, SV2HXV, SV3AQT, SV3DCX, TA1BJ, TF3AO, TF3JB, TF3W, TK5MH, UAØCA, UA1NDX, UA1OSM, UA3EDQ, UA3SKV, UA6AA, UA6EC, UA6JQ, UA9CEP, UN7LAN, UR5WA, UR8GZ, US3IW, US5WE, UT1FG, UT1U, UT3EV, UT3NF, UT5ZC, UT6UA, UT7LW, UT7UX, UT7WZA, UW5RG, UW7CN, UX1IM, UX1VX, UX2HB, UX2IJ, UX5XK, UX7IA, UX7VA, VA3OB, VE7ARN, VK6YO, VR2KW, VU2LBW, VU2MB, VU2PTT, VU3BYD, WØHRO, WØUO, W2HDI, W4LJ, W4VG, WB9LUR, WD4GBW, WM4Q, WR4K, WX2S, YB3MM, YL2TD, YL3FO, YL3JI, YO5BIM, YO5IA, YO7NE, YR9F, YT3GTI, YT5ANA, YU1NR, YU5W, YU7EE, Z3K, ZL3GK, ZL4AS, ZP5KO, ZS5XT.

Disqualified: 9A3JB (self-spotting), **9Z4Y** (self-spotting), **BG7SSK** (use of spotting as a single-op), **CE2ML** (self-spotting), **DJØMDR** (use of spotting as a single-op), **DL1ET** (use of spotting as a single-op), **HA4A** (use of spotting as a single-op), **IKØGDG** (use of spotting as a single-op), **KM6Z** (use of spotting as a single-op), **M5W** (use of spotting as a single-op), **SP4AWE** (use of spotting as a single-op), **UA6ARR** (use of spotting as a single-op), **UW2U** (use of spotting as a single-op), **WP3C** (10-minute rule violations).

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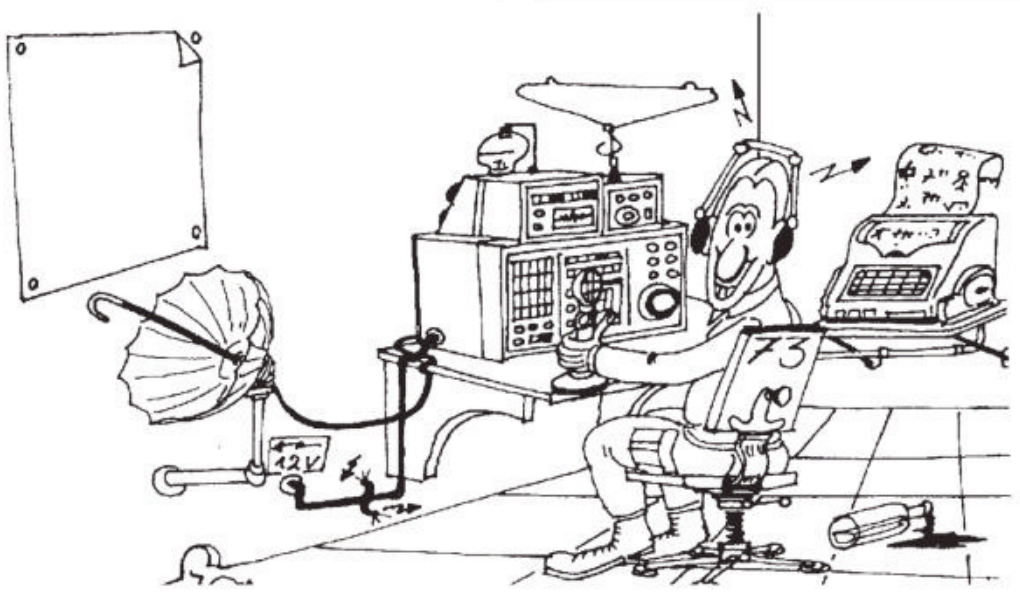

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