Ham Radio Citizen Science, p. 90

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# CQ Amateur Radio

COMMUNICATIONS & TECHNOLOGY

FEBRUARY 2018

## QRP Special!

...plus results, 2017 CQ WW Foxhunting Weekend, p. 39

On the Cover: Students at the Don Bosco Institute of Technology in Mumbai, India, participate in a foxhunting antenna-building workshop run by the Mumbai Amateur Radio Institute. Details on page 107.

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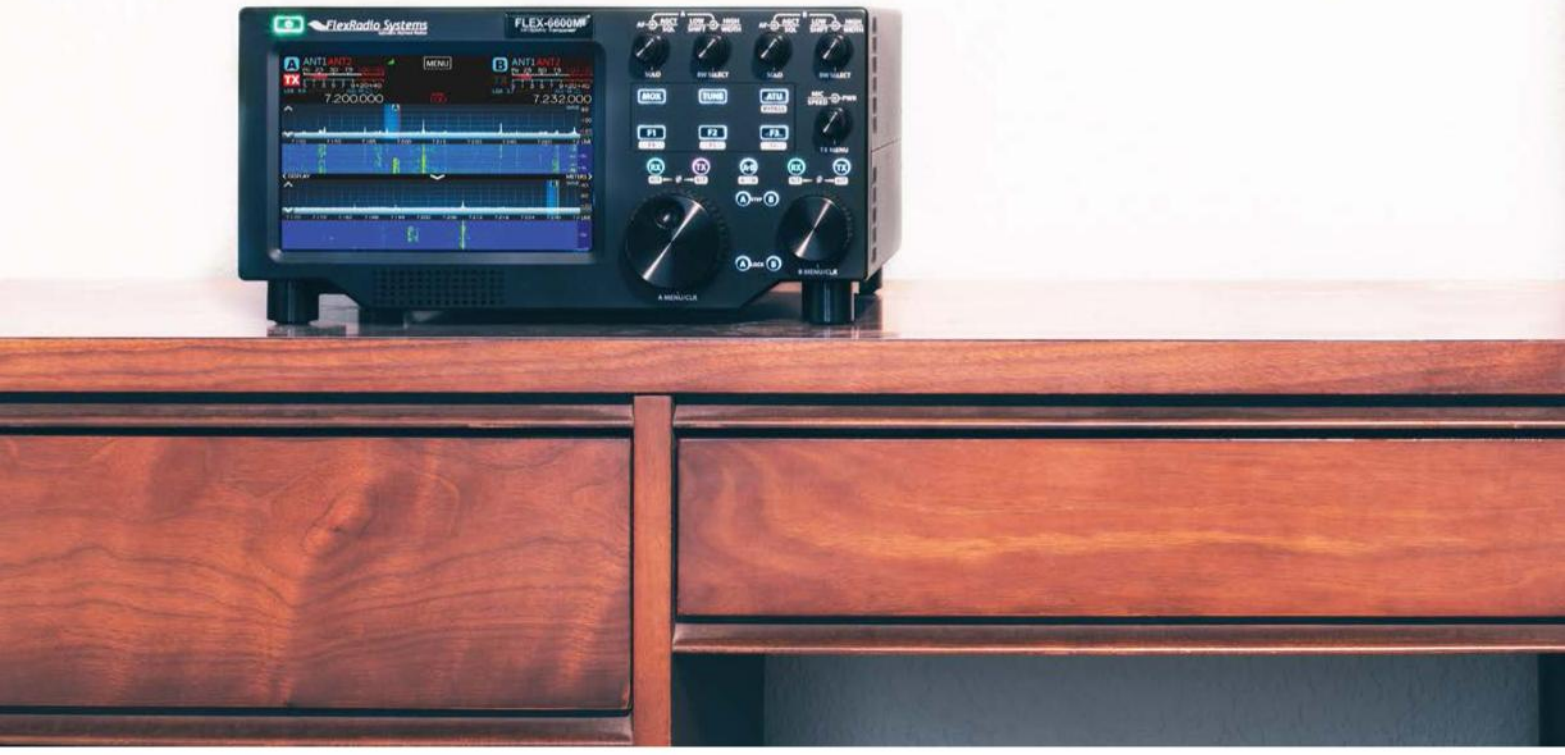


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announcements

## FEBRUARY

**HOOSICK FALLS, NEW YORK — The Conerstone Fellowship Radio Club** will hold its **Ham Swap Fest** on Saturday, February 3 at Hoosick Falls High School, 21187 NY Route 22. Contact: Greg Fox (518) 330-9244 or Tim Colaneri (518) 431-9750.

**NEGAUNEE, MICHIGAN — The Hiawatha Amateur Radio Association** will hold its annual **Swap Meet** on Saturday, February 3 at Negaunee Township Hall, 42 Highway M-35. Contact: John Veight (906) 458-1708. Email: <carczar52@gmail.com>. Talk-in 147.27 (PL 100).

**NORTH CHARLESTON, SOUTH CAROLINA — The Charleston Amateur Radio Society** will hold the **45th Annual Charleston Hamfest** and **2018 ARRL South Carolina State Convention** on Saturday, February 3 at the Armory Park Community Center, 5000 Lackawanna Boulevard. Contact: Steven Lamendola, KE4THX, (336) 740-4382. Email: <steven.lamendola@gmail.com>. Talk-in 146.790-. VE exams.

**RICHMOND, VIRGINIA — The Richmond Amateur Telecommunications Society** will hold **Frostfest 2018** on Saturday, February 3 at the Richmond Raceway Complex, 600 East Laburnum Avenue. Contact: RATS/Frostfest, P.O. Box 70613, Henrico, VA 23255. Website: <www.frostfest.com>. Talk-in 146.880- (PL 74.4). VE exams.

**WORLDWIDE — The 2018 AM Rally** is scheduled for 0000 UTC, Saturday, February 3 through 0700 UTC, Monday February 5. Website: <www.amrally.com>.

**ORLANDO, FLORIDA — The Orlando Amateur Radio Club** will hold the **Orlando HamCation** and **2018 Florida State Convention** from February 9 through Sunday, February 11 at the Central Florida Fairgrounds, 4603 West Colonial Drive. Phone: (407) 841-0874 or (800) 214-7541. Email: <info@hamcation.com>. Website: <www.hamcation.com>. Talk-in 146.760- (PL 103.5), 146.820- (D-STAR), or 145.015- (PL 103.5). VE exams, special event station: K1AA.

**TRAVERSE CITY, MICHIGAN — The Cherryland Amateur Radio Club** will hold its **45th Annual Swap-N-Shop** on Saturday, February 10 at the Immaculate Conception Middle School, 218 Vine Street. Email: <email@cherrylandarc.com>. Website: <www.cherrylandarc.com>. Talk-in 146.860- (PL 114.8). VE exams.

**YUMA, ARIZONA — The Yuma Amateur Radio Hamfest Organization** will hold the **Yuma Hamfest** and **2018 ARRL Arizona State Convention** on February 16 and Saturday, February 17 at the Yuma County Fairgrounds, 2520 East 32nd Street. Email: <info@yumahamfest.org>. Website: <www.yumahamfest.org>. Talk-in 146.780- (PL 103.5). VE exams, DXCC card checking, transmitter hunt.

**HOXIE, ARKANSAS — The Lawrence County Amateur Radio Club** will hold **Winterfest 2018** on Saturday, February 17 at the Hoxie Service Center, 500 SW Lawrence Street. Contact: Glendal Floyd, W5WEC, 104 N. Larkspur Lane, Walnut Ridge, AR 72476. Phone: (870) 886-1360. Email: <w5wec@suddenlink.net>. Website: <http://w5wra.org>. Talk-in 147.045.

**RICKREAL, OREGON — The Salem Repeater Association** will hold the **38th Annual Salem Hamfair** on Saturday, February 17 at the Polk County Fairgrounds, 520 S. Pacific Highway West. Contact: Wayne Silver, KE7ANM, (503) 779-6998. Email: <hamfair@w7sra.org>. Talk-in 145.33- (PL 186.2).

**SEBRING, FLORIDA — The Highlands County Amateur Radio Club** will hold its **HamFest** on Saturday, February 17 at the First Baptist Church of Lake Josephine, 111 Lake Josephine Drive. Contact: John, (863) 556-4656. Email: <highlandsamateur@gmail.com>. Website: <http://highlandsamateurradio.org>.

**BRIGHTON, COLORADO — The Aurora Repeater Association**, the **Cherry Creek Young Amateur Radio Club**, and **Rocky Mountain Ham Radio** will hold the ARA Swapfest on Sunday, February 18 at the Adams County Fairgrounds, 9755 Henderson Road. Contact: Wayne Heinen, NØPOH, (303) 699-6335. Email: <info@n0ara.org>. Website: <http://n0ara.org>. Talk-in 147.15+ (PL 100). VE exams.

**LIVONIA, MICHIGAN — The Livonia Amateur Radio Club** will hold its **48th Annual Swap-N-Shop** on Sunday, February 18 at the Civic Park Senior Center, 15218 Farmington Road. Contact: Livonia ARC, P.O. Box 51532, Livonia, MI 48151-0532. Phone: (734) 941-5043. Email: <k8uns@arrl.net>. Website: <www.livoniaarc.com>. Talk-in 145.35 (PL 100).

**MANSFIELD, OHIO — The Intercity Amateur Radio Club** will hold the **Mid*Winter Hamfest & Computer Show** on Sunday, February 18 at the Richland County Fairgounds, 750 North Home Road. Contact: Danny Bailey, W8DLB, 70 Euclid Street, Shiloh, OH 44878. Phone: (419) 566-3267. Email: <w8dlb@gmail.com>. Website: <www.iarc.club>. Talk-in 146.94 (PL 71.9). VE exams.

**WINTERHAVEN, FLORIDA — The ARRL West Central Florida Section** will hold its **4th Annual TECHCON** on Friday, February 23 and Saturday, February 24 at the Polk County Emergency Operations Center on County Road 540. Website: <http://arrlwcf.org>.

**ALBUQUERQUE, NEW MEXICO — Rocky Mountain Ham Radio** will hold the **2018 New Mexico TechFest** on Saturday, February 24 at the New Mexico Veterans' Memorial Event Center, 1100 Louisiana Boulevard, SE. Email: <techfest@rmham.org>. Website: <www.rmham.org>.

**BIG FLATS, NEW YORK — The KA2LIM Contest Site** will hold its **Winter Hamfest** on Saturday, February 24 at the Big Flats American Legion, 45 Olcott Road S. Phone: (607) 739-7305. Website: <www.ka2lim.com>. VE exams.

**BISMARK, NORTH DAKOTA — The Central Dakota Amateur Radio Club** will hold the **CDARC 2018 Hamfest** on Saturday, February 24 at St. Mary's Grade School, 807 East Thayer Avenue. Contact: Jeff Stranger, KØCMS, <k0cms@arrl.net>. Website: <http://cdarcnd.com>. Talk-in 146.94-. VE exams.

**BROWNSBURG, INDIANA — The Hendrick's County Amateur Radio Society** will hold the **2018 Hendricks County Hamfest** on Saturday, February 24 at the American Legion Post 331, 636 E. Main Street. Email: <hcars46122@gmail.com>. Website: <www.hcars.org>. Talk-in 147.015+.

**FARMINGTON, UTAH — The Utah VHF Society** will hold its **2018 Swap Meet** on Saturday, February 24 at Building #2, Legacy Events Center-Davis County Fairgrounds, 151 S. 1100 W. Website: <http://utahvhfs.org>.

**LA PORTE, INDIANA — The La Porte County Amateur Radio Club** will hold its **Cabin Fever HamFest** on Saturday, February 24 at the La Porte Civic Auditorium, 1001 Ridge Street. Contact: LPARC, P.O. Box 148, Michigan City, IN 46361. Phone: (219) 851-2133. Email: <cabinfeverhamfest@gmail.com>. Website: <http://lpcarc.org/hamfest>. Talk-in 146.610 (PL 131.8). VE exams.

**ORANGE, TEXAS — The Orange Amateur Radio Club** and the **Jefferson County Amateur Radio Club** will hold the **Orange Hamfest 2018** on Saturday, February 24 at the Orange County Convention & Expo Center, 11475 FM 1442. Contact: Rocky Wilson (409) 988-8906. Email: <n5mtx@gmail.com>. Website: <www.qsl.net/w5nd>. VE exams.

**SOUTH BURLINGTON, VERMONT — The Radio Amateurs of Northern Vermont** will hold **HAM-CON** and the **2018 ARRL Vermont State Convention** on Saturday, February 24 at the Holiday-Inn Convention Center, 1068 Williston Road. Contact: Mitch, W1SJ, (802) 879-6589. Email: <w1sj@arrl.net>. Talk-in 145.15-. VE & FCC Commercial exams, WAS / DXCC / VUCC card checking.

**HICKSVILLE, NEW YORK — The Long Island Mobile Amateur Radio Club** will hold its semi-annual **Hamfest** on Sunday, February 25 at Levittown Hall, 201 Levittown Parkway. Contact: Dave, AK1NS, or Richie, K2KNB, (516) 694-4937. Email: <hamfest@limarc.org>. Website: <www.limarc.org>. Talk-in 146.850 (PL 136.5). VE exams, DXCC / WAS card checking.

**SOUTH PARK TOWNSHIP, PENNSYLVANIA — The Wireless Association of South Hills Amateur Radio Club** will hold **WASHfest 2018** on Sunday, February 25 at the Home Economics Building, South Park, 3735 Buffalo Drive. Contact: Carol Danko, KB3GMN, (412) 884-1466. Email: <n3sbf@comcast.net> or <washarc@yahoo.com>. Website: <www.n3sh.org>. Talk-in 146.955- or 443.650+ (PL 131.8).

## MARCH

**IRONDALE, ALABAMA — The Birmingham Amateur Radio Club** will hold **BirmingHAMfest 2018** on Friday, March 2 and Saturday, March 3 at the Zamora Temple, 3521 Ratliff Road. Contact: Jeff Drew, N4JDU, <birminghamfest@w4cue.com>. Website: <www.w4cue.com>.

**CAVE CITY, KENTUCKY — The Mammoth Cave Amateur Radio Club** will hold the **42nd Annual Cave City Hamfest** on Saturday, March 3 at the Cave City Convention Center, 502 Mammoth Cave Street. Contact: Larry Brumett, KN4IV, 108 Withers Street, Glasgow, KY 42141. Phone: (270) 651-2363. Email: <lbrumett@glasgow-ky.com>. Website: <www.ky4x.org>. Talk-in 146.34+. VE exams.

**ZEPHYRHILLS, FLORIDA — The Zephyrhills Area Amateur Radio** will hold its **Hamfest** on Saturday, March 3 at St. Elizabeth Episcopal Church, 5855 16th Street. Email: <kk4itx@arrl.net>. Website: <www.zaarc.org>. Talk-in 146.910- (PL 146.2).

*(Continued on page 109)*




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## Logbook of the World Adding Support for WAZ Award

Support for *CQ*'s Worked All Zones (WAZ) award program is being added to the ARRL's Logbook of the World (LoTW) electronic confirmation system. Beta-testing was getting under way at press time in mid-December. Once activated, hams who participate in LoTW will be able to use credits for contacts confirmed via the online system to apply for new or updated WAZ awards and endorsements. LoTW has supported CQ's WPX award program since 2012. Applicants may use all LoTW contacts or mix them with traditional QSL cards and eQSL-confirmed contacts in applying for WAZ. Standard fees apply for LoTW credits and CQ award applications (and are collected separately). Instructions will be posted on the LoTW website.

Check the CQ Newsroom at <http://cqnewsroom.blogspot.com> for updates and a notice on when WAZ support will be available to all LoTW users. Rules for the WAZ award program are on the CQ website at <http://bit.ly/2uE8O5L>.

## New Building Approved for Hamvention Site

The Greene County (Ohio) Commissioners and the Greene County Fair Board have approved construction of a new building at the Fairground/Expo Center in Xenia, which is the new home of the Dayton Hamvention®. According to the Dayton Amateur Radio Association, the new building is expected to be completed in time for use during the 2018 Hamvention this May. In addition, the "Fairgrounds Furniture" building, which was not available for Hamvention use last year, is being vacated and will also be available. DARA says it's been told that the combined new floorspace will cover an area larger than the tents used at the 2017 Hamvention, meaning that all exhibitors should be able to have indoor booths. (*Having been in one of the tents last year, we are really looking forward to this! –ed.*)

## Hams Support Evacuation Shelters in California's "Thomas Fire"

Amateur radio operators staffed evacuation shelters in two California counties in mid-December as the wildfire known as the "Thomas Fire" continued its path of destruction. At press time, what was described as the largest California wildfire in history, had burned nearly a quarter-million acres and destroyed more than 700 homes. The *ARRL Letter* reported that hams were providing communication support for Red Cross shelters in Ventura and Santa Barbara Counties, with at least some of the volunteers also being evacuees. In Santa Barbara County, ham support included an amateur radio digital MESH network that provided live-streamed video from several locations. Maintaining power was a challenge, as commercial power was out in many places and the heavy smoke made solar panels unreliable for recharging batteries. At press time, the fire was only partially contained and hams were continuing to provide communication support.

## Generators for Hams In Puerto Rico

While California battles wildfires, slow recovery from Hurricanes Irma and Maria continues to hamper Puerto Rico. The island's electrical and communications infrastructure was damaged by Irma and then virtually wiped out by Maria. As of mid-December, power had been restored to roughly two-thirds of Puerto Rico, but generators remained in high demand and short supply. The *ARRL Letter* reports that the World Wide Radio Operators Foundation (WWROF) is organizing the"KP4 Generator Project," which will raise funds to purchase generators for hams in Puerto Rico. WWROF says it will match the first $5,000 in donations. Prominent Puerto Rican amateur Angel Vasquez, WP3R, will coordinate distribution of the generators to amateurs on the island. More information is available at <http://bit.ly/2DnEzBM>, including multiple methods of making donations.

## FCC Advisory Panels Makes Interference Proposals

The FCC's Technological Advisory Council (TAC) has issued a set of recommendations for reducing and/or tolerating interference, with a subtle suggestion that the FCC needs to consider placing more responsibility for interference reduction with receiver designers. According to the *ARRL Letter*, the TAC asserted several "interference realities," specifically that harmful interference "is affected by the characteristics of both a transmitting service and a nearby receiving service in frequency, space or time," and that stations "should expect occasional service degradation or interruption." The council also proposed certain responsibilities of radio services, including that "transmitters are responsible for minimizing the amount of their transmitted energy that appears outside their assigned frequencies and licensed areas," and that "receivers are responsible for mitigating interference outside their assigned channels." The group accompanied this statement with an acknowledgment that the FCC generally does not regulate receiving systems. The TAC also proposed that the FCC "apply interference limits to quantify rights of protection from harmful interference," using these limits as a means to reduce interference in receivers "without mandating receiver performance specifications." Comments were being accepted on ET Docket 17-340 through January 31, 2018.

## NASA Celebrating Multiple Anniversaries This Year

The year 2018 is a big one for NASA, and it plans to include amateur radio in its celebrations. This year marks the agency's 60th anniversary, the 50th anniversary of the first manned orbit around the moon in Apollo 8 and 20 years since the launch of the early building blocks of the International Space Station. Squeezing back a little, December 11, 2017 also marked the 45th anniversary of Apollo 17's lunar landing — the last manned craft thus far to visit the moon. According to *Newsline,* this combination of anniversaries is being observed on the ham bands with the

*(Continued on page 110)*

VOLUME 74 NUMBER 2

# CQ FEBRUARY 2018

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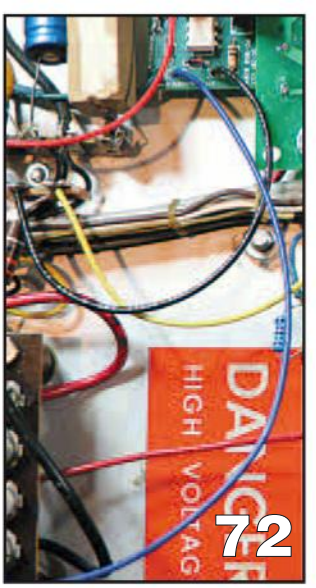





## QRP SPECIAL: FEATURES



## COLUMNS



## FEATURES



## COLUMNS



## DEPARTMENTS

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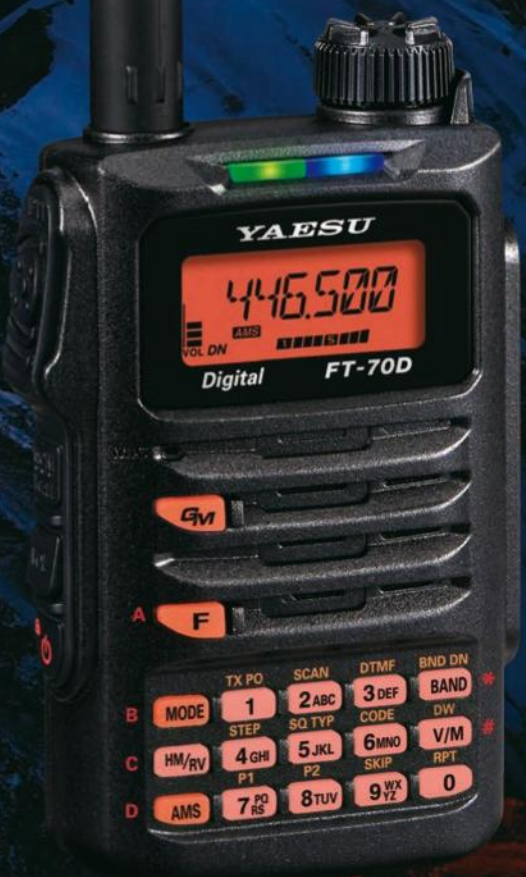


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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

# Challenges...

Why operate QRP, or low power? Isn't it easier to make more contacts with more power? Yes, it is. And that's exactly the reason for operating QRP. It *isn't* easy! It's a challenge.

My most recent pack of QSL cards from the bureau included a confirmation from OK1MBZ in the Czech Republic (see photos). From my station in New Jersey, working into Eastern Europe with 100 watts and a multiband vertical (my basic station) is not a big deal, as long as propagation is even moderately cooperative. But what about one-half watt? Now, *that* is not easy. And that's why — to me, at least — my contact with OK1MBZ *was* a big deal.

Our contact was on 30-meter CW, early in the evening, nearly four years ago, my second QSO on the QRPMe RockMite ][ transceiver I'd just finished building. Its power output is one-half watt. According to QRZ.com, Zdeno's station is 4,131 miles from mine. At one-half watt, that's 8,262 miles per watt! And that's a pretty big deal, at least to me.

The opportunity to do more with less is one of QRP's main appeals. Another is that QRP is at the center of the revival in building among today's hams, and it got me back into building stuff as well, after an absence of too many years. It's also heavily dependent on CW, especially for portable operations (another appeal) where it isn't practical to bring a computer to do digital modes. CW is not my favorite mode, and I'm far from the world's best code operator. Working QRP, and thus working CW, has forced me to use and improve my code skills. It's also gotten me back into packing up a rig in my bike bag and setting up a temporary station in a park or other outdoor location (but not in February, HI!).

It's a challenge to build my own radio. It's a challenge to troubleshoot it if it doesn't work. It's a challenge to pack up and transport that radio to a remote location and put it on the air. It's a challenge (for me) to work CW. It's a challenge to make a contact with a pipsqueak signal. But when it all comes together, and I cover half the world with half a watt, then it's all worthwhile. And isn't that what a hobby is all about? Whether it's stamp collecting, model rocketry, woodworking, gardening. or ham radio … taking on a challenge, working hard to meet it, and then enjoying whatever success you achieve. And you did it all because you *wanted to*, not because you *had to.* It isn't work; it's your hobby. And that's why QRP has become a big part of my ham radio hobby. If it's also part of yours, I hope you enjoy our QRP Special in this issue. If it isn't don't worry — we've got plenty of great articles on a wide variety of topics, from analyzing propagation changes during last summer's eclipse and modifying vintage mics to work with modern rigs, to loop antennas and the challenges (there's that word again) of installing mobile ham gear in today's electronics-heavy cars and trucks.

***"The opportunity to do more with less is one of QRP's main appeals. Another is that QRP is at the center of the revival in building among today's hams, and it got me back into building stuff as well, after an absence of too many years."***

## QRP Special

Back to the subject of low-power operating, welcome to our annual QRP Special. As always, we have a wide selection of QRP-focused articles in this issue,

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



*OK1MBZ is located more than 4,000 miles from W2VU, and a contact between them with VU running a half watt more than qualified Rich for the QRP Amateur Radio Club International's "One Thousand Miles Per Watt" award.*

***"In mid-December, CQ and the ARRL jointly announced that the League's Logbook of the World (LoTW) online QSLing system would soon begin supporting CQ's Worked All Zones (WAZ) award program in addition to the WPX program, which has been supported by LoTW since 2012"***

ranging from building a QRP rig into the case for a World War II frequency meter, a current limiter to help you keep from blowing up your tiny radios on power-up, a review of a new QRP kit, and using PC board material to build enclosures for your QRP projects. In addition, QRP Editor KA8SMA takes a look at the Chinese Pixie rigs you can pick up online for little more than pocket change, and Emergency Communications Editor W4ALT shows us how learning QRP skills can also help your EmComm skills.

We've also got another great history lesson from W4YO on the geopolitics that shaped the places we talk to; a lesson from K9ARZ on the difference between nations, countries and political states; and — our cover story — KØOV's report on last year's 20th annual CQ World Wide Foxhunting Weekend.

## WAZ and Logbook of the World

In mid-December, CQ and the ARRL jointly announced that the League's Logbook of the World (LoTW) online QSLing system would soon begin supporting CQ's Worked All Zones (WAZ) award program, in addition to the WPX program, which has been supported by LoTW since 2012. We hope that, by the time this issue reaches your mailbox or your inbox, beta testing will be complete and LoTW/WAZ access will be a reality. (Check our Newsroom for updates.)

Please expect a few bumps in the road in the early going, no matter how thorough the beta testing has been. Also, since this has been a source of confusion with WPX and LoTW, please understand that the Logbook QSO credit fees are paid to ARRL for the use of its system, and that these are separate from the $6 or $12 CQ award fees, which are paid directly to each volunteer award manager to help cover his/her out-of-pocket expenses in administering the award programs. Since these fees go to the managers and not to CQ, it would be a logistical nightmare to try to combine them with the ARRL LoTW credit fees. We realize there is a slight inconvenience in having to make separate payments, but just consider the LoTW fees as your cost of getting the confirmations (as opposed to printing and mailing traditional QSL cards), while the award fee is the same as you would have had to pay in the "olden days" when QSLs were on postcards, not servers.

If it's February, it must be time to work on the antennas! If you're not that bold (or crazy) — after you've finished reading this issue — curl up with a nice warm soldering iron, build something for your station and remember, spring is just a few short weeks away.

*– 73, Rich, W2VU*

# News Bytes

## "Flying COW" Helps Restore Cell Service in Puerto Rico

Puerto Rico is still in the process of recovering from Hurricane Maria's devastation to its electrical and communication infrastructure, and AT&T is using drone technology to provide temporary cell phone service in certain areas.

You might be familiar with the term "COW" for a temporary "Cell on Wheels" network access site. In Puerto Rico, AT&T teamed up with drone-maker Vanu to create a "Cell on Wings" version of the COW. The phone giant installed an LTE cell site on one of Vanu's Pulse Vapor 55 drones, which looks and flies like a tiny helicopter (*Photo A*), and has it hover 200 feet above the ground, according to AT&T. The company says it is the first-ever successful deployment of an LTE cell site on a drone. It was initially used in San Juan in early November, but the company planned to use it in other places as well.

AT&T says flying COWS have a lot of potential for users of the "FirstNet" system it is developing for use by first responders in disasters.

## SOTABEAMS Has a New Home

British antenna and accessory manufacturer SOTABEAMS has moved to new, larger, and heated (!) quarters. According to CEO Richard Newstead, G3CWI, the company had been operating out of an historic 19th century silk mill in Macclesfield, England. "However," he writes, "the growing needs of our business has required new premises." The new facility is in a modern, 2-story, office block which Newstead says "gives us a much improved lab area for product development and more space," adding that "most importantly for our five staff (*Photo B*), it's actually warm in the winter, too!" For more information, visit <www.sotabeams.co.uk>.

## A Ham Radio Last Wish

John Nugent, WA2EQJ, is a Vietnam veteran and retired electrician, currently living in a veterans' housing complex in North Chicago. Suffering from terminal cancer, Nugent recently told a social worker there that he'd been a ham since age 16 and wished he could have one more opportunity to get on the radio. According to the Lake County (Illinois) *News-Sun*, facility staff got in touch with the Lake County Veterans Assistance Commission and quickly got offers to help from the American Legion Amateur Radio Club, the North Shore Amateur Radio Club, and the county's emergency management and sheriff's offices.

After all the competing offers were sorted out, Lake County RACES members came to the complex in early December, set up an antenna in a courtyard and a station inside, and got John back on the air one more time. He made contacts as far away as Texas and California before growing tired.

Nugent served in the Army Signal Corps and then built circuit boards for General Electric in New York State. Ham radio, said his son Chris, a well-known Chicago chef, was "his one true love…It was above and beyond everything," noting that his dad had built his first radio out of a cigar box when he was 9 years old.

## Training a Computer to Identify Digital Ham Modes

"Hackaday" reported in December on a "neural network" that's been interfaced with a software-defined radio "SDR dongle" and trained to automatically differentiate between different digital modes.

"What else could you do with an intelligent radio?" asks the article's author, Al Williams, noting that "(w)e've already seen a different kind of neural network decode Enigma traffic."

In the comments section, Virginia Tech professor Bob McGwier, N4HY, notes that he and his students have been doing similar work for the past two years, adding that one of his grad students, Tim O'Shea, just published his thesis on the subject. An abstract of Tim's paper is at <https://arxiv.org/abs/1712.04578>.

*Photo A. Vanu Pulse Vapor 55 drone, outfitted with AT&T LTE cellsite equipment, serves as a "flying COW" or "Cell site on Wings." (AT&T photo)*


*Photo B. The now-defrosted staff of SOTABEAMS outside the company's new headquarters in Macclesfield, England.*

# The SteppIR Advantage

## PROBLEM SOLVED!

Yagi antennas are basically single frequency devices that work well only over a very narrow range, typically 0.5% change in frequency. Fixed length yagis compensate by using a variety of techniques, all of which result in serious degradation of performance, especially in Front to Rear rejection, and added complexity, size, and weight. Dipoles have a much broader bandwidth but still cannot cover the entire 80m and 40m bands and maintain a low SWR (<1.5:1). Our patented solution is to simply adjust all of the antenna elements to the optimal length for the desired frequency with none of the compromises in performance that all fixed antennas require. This is accomplished remotely using an electronic controller that can automatically follow the radios' frequency. SteppIR antennas enjoy optimal performance on all frequencies within their specified frequency range (varies by model), and that includes non-ham radio frequencies as well!

## THE INHERENT ADVANTAGES OF A STEPPIR:

### Create/Modify Mode

The create modify mode allows the user to change the length of each individual antenna element on all bands of operation -and frequencies outside the ham bands as well – and then save the new antennas to memory. This can be incredibly useful to "tune" out potential objects that may be causing interaction with the SteppIR antenna, or to create your own custom antenna designs.

### 180 Degree Mode

The 180 degree mode feature is one of the most popular among SteppIR owners. For our Yagi antennas, this feature allows a user to electrically "rotate" the antenna from the forward beam heading, to the reverse (180 degrees) beam heading, with a click of a button – the entire process takes approximately 2 seconds.

### Bi-Directional Mode

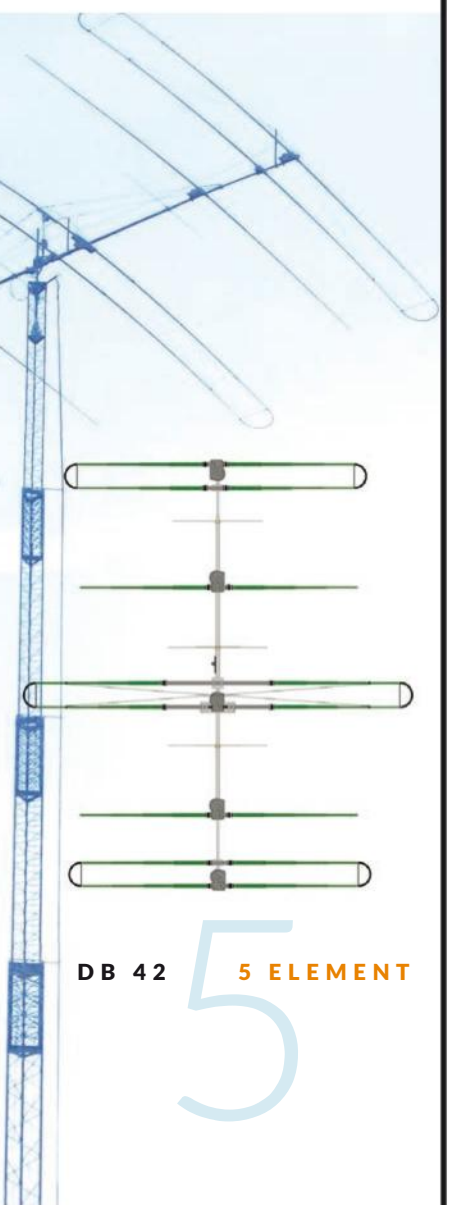
The bi-directional mode works similarly to the 180 function, except when enabled, the Yagi antenna will now be operating with gain in both directions – forward and backwards, simultaneously!

### Retract Elements

With a touch of a button, SteppIR antennas can be fully retracted into their housing, which helps to protect the most valuable part of the antenna during extreme weather events.

### Emergency Communications

Many times, emergency communications occur outside the standard amateur radio allocated bands of operation. All SteppIR antennas are optimal within the entire scope of their specified frequency range.



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*Inspired by NO9E's October article about his impromptu contesting from Easter Island, NCØB related his story of operating QRP from CEØY a few years ago, in 2014...*

*Photo A. Easter Island, also known as Rapa Nui, is best-known for the hundreds of "Moai" statues built by early residents hundreds of years ago. (Photos by the author)*

# QRP on Easter Island

**BY ROB SHERWOOD,* NCØB**

My XYL, Terri, and I had never been out of North America, so when she asked me where I would like to go for our first real adventure, I said Easter Island (*Photo A*). She thought I was joking, and later bought me a 16-inch high Moai statue[1] on eBay, saying that is as close as I would likely ever get to the South Pacific island, also known as Rapa Nui. About a year later, she asked again where I wanted to go, and I again answered Easter Island!

The trip was now on, with her doing all the logistical planning, and me wondering about radio equipment. This was a trip for the two of us (*Photo B*), not a DXpedition. On the other hand, how can one go to the middle of nowhere in the Pacific Ocean and not consider operating from that exotic location? Terri said, "If you don't take a radio, you will regret it for the rest of your life. Just do it!" How about that for support from your wife?

With that decided, I did the legwork as to how to get a reciprocal license from Chile, of which Easter Island is a territory. No organization in the U.S. was any help, but I was pointed to a group in Europe that put me in touch with the main ham club in Santiago, Chile's capital. All I had to do for them was send a copy of my passport and amateur license. They did all the heavy lifting and I soon had my license, good for two weeks. I could operate as either CEØY/NCØB or NCØB/CEØY, and I chose the first option.

*Photo B. The author and his wife in front of some Moai statues. The visit was mostly a sightseeing trip, but there was also an hour-and-a-half a day of ham radio time built into their schedule.*

## Shack in a Backpack

Our luggage had to be kept reasonable for a trip of 17 days, and besides the obvious clothes and cameras, I had to come

* <rob@sherweng.com>

up with a radio solution that would fit in one backpack. I could not see trying to bring a 100-watt rig and power supply, along with the obvious antennas, feedline, microphone and key, so QRP was the chosen solution.

I contacted Wayne Burdick, N6KR, at Elecraft about borrowing a KX3, as that was my radio of choice since using one in a CQWW 160-Meter CW Contest. Elecraft was happy to provide the transceiver, and I started working on a battery and charger solution. The KX3 cable can come with a PowerPole power connector to keep things simple. Weight would be an issue, so I chose an A123 Systems LiFePO4 4.6-AH lithium battery and a charger that looked much like a laptop power supply. The CP1215 charger was even available with a PowerPole connector already installed, and the LED light would go from red to green when the battery was fully charged. The 4.6-AH battery was more than adequate for each day's allotted operating time.

*Photo C. A dead tree behind their cabin served as an excellent antenna support.*

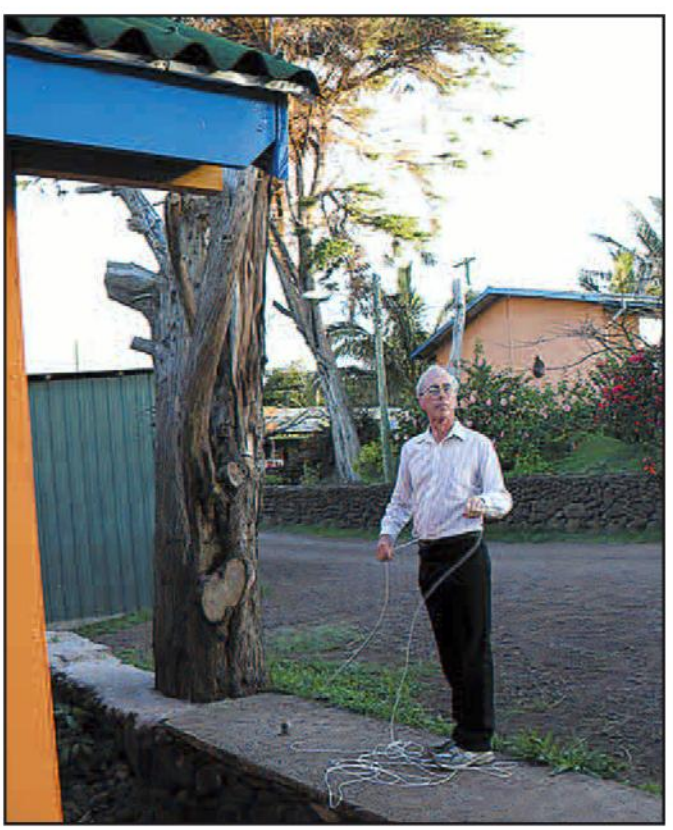

*Photo D. The author put up two wire antennas in about a half hour, with the help of a rock, some twine, and gaffer's tape.*

## Antenna Choices

The next decision was what to do for an antenna, since I had no idea what options I would have at the cabin we were renting for four nights on the island. I decided to take a chance that the high HF bands would be open (this was 2014, much higher up in the current sunspot cycle than we are now), since a long antenna wire low to the ground seemed likely to be a problem. I made up a fan dipole arrangement for 10 and 15 meters, and two 24-foot lengths of RG-58/U feedline. Since the KX3 antenna port is BNC, everything was BNC, including the feedline and the coax attachment point.

With more luck than good sense, there was a dead tree just outside our cabin's rear window (*Photo C*). Armed with some twine, a rock and some gaffer's tape (*Photo D*), I had an inverted V on 15 meters and an inverted U on 10 meters operational within 30 minutes. The 48 feet of feedline was a perfect length to set up the station in the cabin bedroom area (*Photo E*).

I suppose I cheated, as I ran the KX3 at full power, which is 12 watts, providing an extra 3.8 dB that I figured would come in handy. The feedpoint apex of the antenna was only 15 feet high, which is close to a half wave on 10 meters. The terrain sloped downward towards the ocean, and the antenna was broadside north-south. I was really surprised when I learned the time zone on Easter Island is the same as Eastern Standard Time[2], so the antenna did need to be radiating to the north. As you can see in the picture, the feedline connection was a BNC "T" with two BNC-to-dual banana plug adapters (*Photo F*).

## CEØY/NCØB On the Air

My operating hours were 9:30 to 10 a.m. and 4 to 5 p.m. EST for three days. Friday and Saturday had good conditions on both 10- and 15-meter SSB, and we used both bands to see which was best when talking to my stateside friends. Contacts were made in Colorado, Ohio, Florida, and Texas on 10- and 15-meter sideband.

Propagation degraded seriously on Sunday, so I had to change to CW for the final day of operation. Contacts were made with stations in Sweden, Alabama, Ohio, Alaska, New York, and Colorado. In all, I logged 25 QSOs during six operating periods. Contacts on SSB were "rag chew" style, not the typical 5-seconds-long DXpedition-style contact. I got a 339 CW report out of Alaska, which I had not been able to work on SSB the previous two days, but at least we made the contact.

This may seem amusing, but on CW, I used my trusty Novice J-38 straight key my dad bought for me in 1960, as I never mastered the paddle one can easily attach to the KX3.

## Looking Back

Overall, I couldn't have been happier with my QRP operation during our trip. It didn't interfere at all with our private


*Photo E. CEØY/NCØB … the QRP station featured an Elecraft KX-3 transceiver, a rechargeable battery and an old J-38 hand key. The author made 25 QSOs during his brief operating periods, the farthest away being Alaska.*

*Photo F. Detail of the antenna feedpoint. See text for description.*

guided tour of the island and its nearly 1,000 Moai statues that took up the bulk of each day (*Photo G*). I must say, having continued our travels out of the country since this trip, the experience on Easter Island was just phenomenal. It is such a unique place with a very unusual cultural history. Thank goodness the ionosphere cooperated on 10 and 15 meters.

**Notes:**

1. The approximately 900 "moai," or ancient statues built by early residents, are Easter Island's prime tourist attraction.

2. Yes, Easter Island really is on U.S.east coast time, even though it aligns geographically with the U.S. Mountain Time Zone. See <http://bit.ly/2AMI8UI>.

*Photo G. Touring the island and the Moai took up most of each day.*

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*Is it a World War II-vintage frequency meter or a well-disguised QRP transceiver? Well, this IS our QRP Special, so we'll let you figure that one out on your own… even though the title gives it away!*

# Ten-Watt Rig Disguised as a BC-221 Frequency Meter

**BY PAUL SIGNORELLI,* WØRW**

Yes, I am running 10 watts with my BC-221, World War II-vintage frequency meter (*Photo A*). This is a repurposed BC-221-Q that looks like a gray lunch box from the outside. It has a fold-down table in front (*Photo B*) and a hatch in the rear for the battery or power supply. All of the WWII radio maintenance shops had a BC-221 to keep the radios they serviced on the correct frequencies. Even some post-war broadcast stations used the BC-221. Today's new digital frequency counters have made the BC-221 relatively obsolete, so I figured, why not use mine as a very sturdy case for a QRP transceiver?

The original components of my BC-221 were removed and it now contains a "1 Watter" QRP Transceiver Kit from kitsandparts.com[1], with a Pacific Antenna 10-watt amplifier kit from QRP Kits[2] (*Photo C*). I have the amplifier set for Class "C" for more efficient operation. This is a 40-meter-only rig but other bands are available. Mine has a range of 7019 to 7037 kHz. The boards can be built with connectors for easy board change-out.

The main gear drive for the BC-221's tuning had to be removed. The "1 Watter" requires a pot for tuning, and I had to make a small right-angle mounting bracket for the new "tune" pot (*Photo D*). The main tuning capacitor was totally black from cigarette smoke and silver tarnish. Lemon juice and Lysol® removed the musty odors. None of the original parts were used for the VFO.

## Not a Lightweight

My repurposed BC-221 weighs 15 pounds with a 12-volt (3S2P-26650) Lithium Ion battery pack, so it isn't really a

* email <w0rw1@msn.com>


*Photo A. The author converted a BC-221 frequency meter — a military staple during World War II — into a 10-watt transceiver for 40 meters. (Photos by the author)*


*Photo B. The original BC-221 featured a fold-down table in the front, which the author now uses for his logbook, memory keyer reference, and frequency calibration table for the "1-Watter" transceiver now built inside.* →

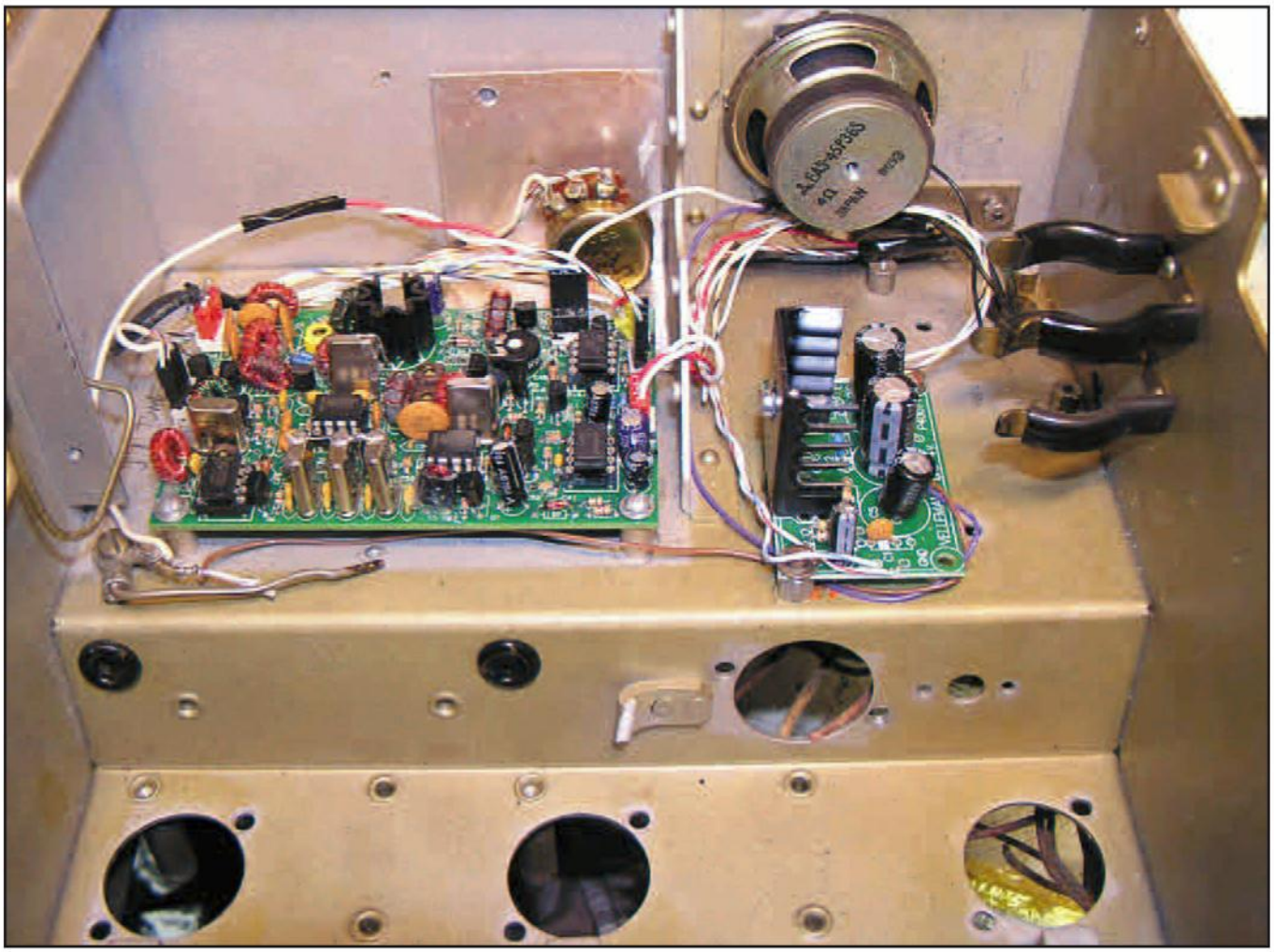


*Photo C. The rig-in-a-frequency-meter. The boards on the left are the transceiver and amplifier circuits; the one on the right is an audio amplifier to drive the speaker.*

good backpacking radio. A small switching power supply could fit in the rear, or an external 3-amp wall wart could power it. Physically, it is about 9 x 10 x 12 inches with a handle on top. The battery compartment is huge, 10 x 6 x 7 inches. The spare parts section has four clips for extra octal tubes, wrenches, etc.

The little fold-down calibration table shelf holds my "Rite-in-the Rain" logbook, memory keyer reference, and the calibration chart for the "1-Watter's" exact frequency. From the outside, it looks like a real BC-221. All of the controls are essentially the same, the big "Dial Units" knob is the main tuning knob. The "Gain" control is the audio gain, the "Off/Operate" switch is still the on/off switch, the "Freq Band: High/Low" switch is now the power 10-watt/1-watt switch, The "Corrector" dial is now the CW speed control. The small board (at the right in *Photo C*) is a Velleman K4001 audio amplifier for a speaker. The original wires are cotton-covered so it is Rad Hard, better than Teflon, which de-polymerizes and falls apart.

BC-221s are still available at hamfests and on eBay. I hope you can find one and fix it up.

*Photo D. A new tuning pot replaced the old (and unusable) gear-drive tuner, but the author needed to make a right-angle bracket in order to mount it at the appropriate spot on the front panel.*

**Notes:**

1. 1-Watter QRP transceiver, $49 from: <http://bit.ly/2opUneR>
2. Pacific Antenna 10-watt amplifier kit, $55 from: <http://bit.ly/2pycuB3>

*Here's a QRP transceiver kit that even includes its own test instruments for alignment when you're finished building it! W8TEE got one and fell in love...*

## CQ Reviews:

# QRP Labs QCX 5-Watt Transceiver Kit

**BY JACK PURDUM,* W8TEE**

I recently acquired an early model of QRP Labs' new QCX 5-watt transceiver. Yeah, I know...just what the world needs is another QRP transceiver. Well, actually, that is the case here. This rig has an impressive list of features including:

- Through-hole printed circuit board
- Choice of 80, 60, 40, 30, 20, or 17-meter operation
- 3- to 5-watt CW output (dependent on supply voltage, 7-16 volts)
- Efficient Class E power amp; no heatsinks required!
- 7-element low-pass filter
- CW envelope shaping (no key clicks)
- Amazing receiver with at least 50dB unwanted sideband cancellation
- 200-Hz CW filter
- VFO via a rotary encoder
- 16x2 LCD display with backlight
- Iambic or straight key (even has a micro switch that can be used as a straight key)
- CW decoder
- S-meter
- Full/semi QSK (break-in) operation
- Frequency presets, A/B VFO split, RIT, configurable CW offset
- Configurable sidetone and volume
- Beacon mode, for automatic CW or WSPR operation
- GPS interface for frequency calibration/time-keeping

… and one of the best assembly manuals I've ever seen. The rig is so well thought out that it has built-in test capability including a voltmeter, RF power meter, frequency counter, and signal generator (more later). This thing's a joy to build.

### Getting Started

When you get the package delivered, there are two poly bags, as seen in *Photo A*. The bag on the right contains the majority of components for the transceiver. The bag on the left contains the parts that are determined by which band you ordered. The rig is capable of working any one of the 80-, 60-, 40-, 30-, 20-, or 17-meter bands. My version is designed for 20-meter operation.

There are a lot of parts packed onto a PCB that measures 4 x 3.25 inches. That means there are relatively few "pico acres" to hold all those components; it's a dense board. Also, there are four toroids to wind plus a transformer. For those reasons, I would not classify this as a beginner's project. The two SMD (surface-mount) parts come affixed to the board and everything else is thru-hole. Still, I would think some kit building experience would be desirable.

### The Build

First, you're going to love the manual...all 137 pages of it. Don't misunderstand. It's not one of those "dense" manuals devoid of illustrations or anything


*Photo A. The "parts bags" for the QCX transceiver kit. The bigger bag on the right contains components common to all units; the smaller bag on the left holds parts determined by which operating band you choose. (Photos courtesy of the author)*

* <jjpurdum@yahoo.com>

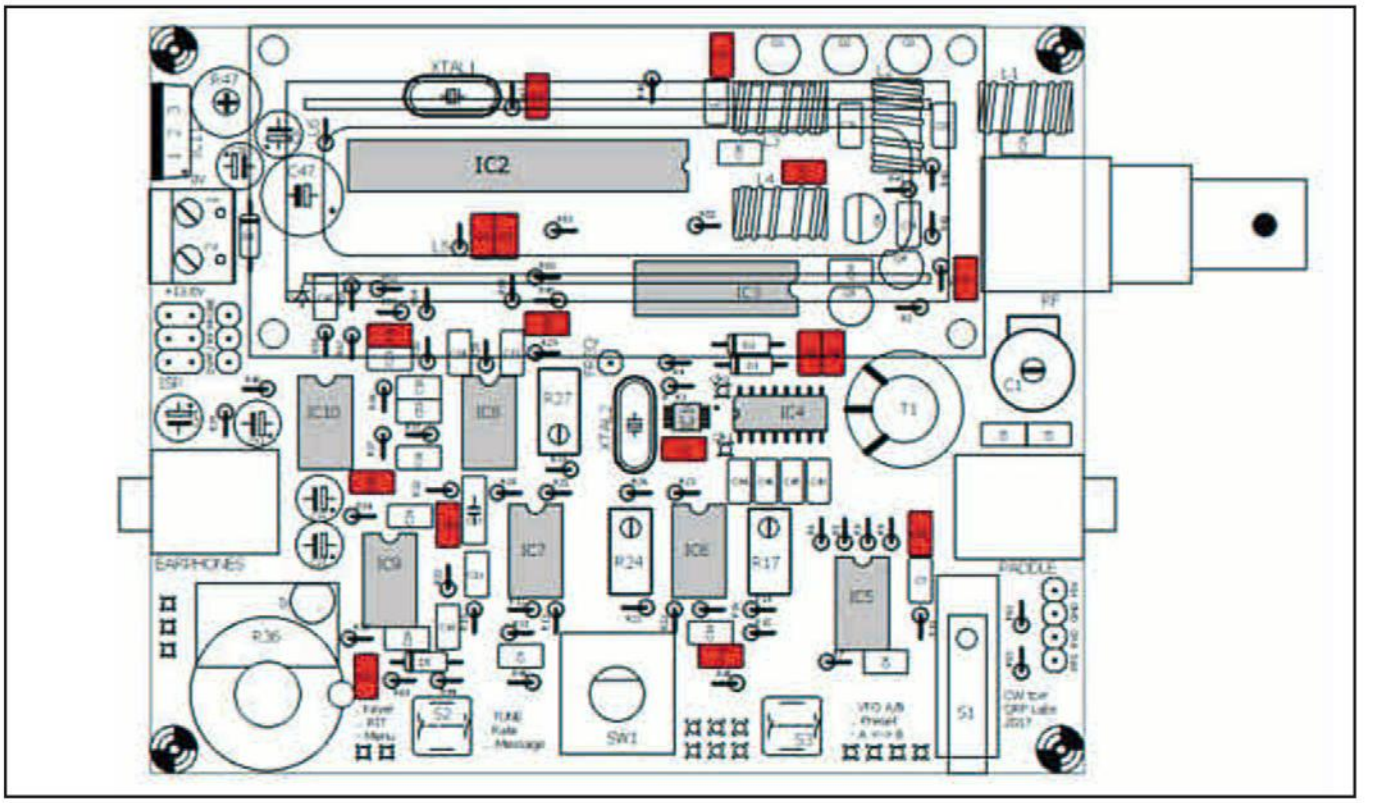



*Figure 1. Layout diagram of the QCX transceiver board with all of the 0.1-µF capacitors highlighted. The manual uses this diagram several times, with each group of components to be installed at that point highlighted in red.*

interesting. Far from it. The reason it's fairly long is because there are just under a bazillion illustrations in it. Each time you are to add a "series" of components (e.g., resistors, capacitors, ICs, etc.) to the printed circuit board, the same illustration of the PCB appears, but all the components to be added are highlighted in red (see *Figure 1*).

**A Component Placement Plan of Attack**

I really appreciate the component highlighting. If you've ever worked with a heavily-populated board, you know how hard it can be to find the location of part C15 by searching the board for the proper silk screen legend. *Figure 1* shows the illustration for adding all of the 0.1-µF capacitors to the board. As you can see, it becomes very easy to place the capacitors on the board because their positions are highlighted in red on the diagram. The capacitors highlighted in *Figure 1* will be "grayed out" in the next parts placement illustration. Somebody did a very thoughtful job writing this manual. The illustration in *Figure 1* is used frequently during the building of the board and is a major reason why the manual has such a high page count.

While we're discussing 0.1-µF capacitors, if you have any kit-building experience, you know that such capacitors have a standard code printed on them; 104 for this capacitor. You will also recognize that the guy who printed that number on the cap is the same guy who printed the U.S. tax code on a gnat's knee. Maybe it's just me, but I struggle reading cap codes. Now, I don't even try. I use the component tester shown in *Photo B* (This is a separate item, purchased online).

Using a component tester has several advantages when constructing any kit. First, you don't have to struggle trying to read the value. Just plug the leads into the Ziff socket, throw the lever, and press the button. It can test capacitors, resistors, inductors, transistors, diodes...just about anything that is normally used to build an electronics kit. The second advantage is that you can spot a defective component before you solder it in place. Not only does it tell you if the part is defective, even if it tests good, its actual value could be out of spec. It's nice to know that, too, before soldering the component in place. Third, while it is battery powered, it is supplied with a USB cable that can be used to recharge the tester. The tester costs about $20 online and it is the smartest $20 I've spent in a long time.


*Photo B. A separate component tester, available online in the $20-$30 range, is immensely helpful in identifying component values, especially if the printed codes are too tiny to decipher.*

In all fairness, with my LED-lighted magnifying glass I could read the cap numbers. Since there are 16 bypass caps to be installed, I just dumped all of the caps on the towel and sorted them. (I work on a solid core Lauan door, which has 15 coats of varnish, and I cover the work area with a towel. Without it, dropped parts have the ability to bounce amazing distances in any direction at blindingly-fast speeds, landing on a carpet the XYL selected for its camouflage capability for electronic parts.) *Photo C* shows the PCB holder I use, along with my LED magnifying glass and the 0.1-µF caps. (No one said the towel was clean.) I find it a lot easier to have the board in a holder so I can quickly rotate it from front to back while mounting/soldering parts.

Because QRP Labs took the time to highlight the caps in red (*Figure 1*), the time to locate and mount each cap is pretty quick. Out of habit, I mount each cap so it can be read from a single viewpoint on the board. Because parts are often oriented in two directions, my viewpoint for this board is from the right and bottom sides.

**A Few Helpful Tips…**

On page 104 of the manual is a schematic of the transceiver. When building, I like to print out a copy of the schematic and use a highlighter pen to mark off each component on the schematic as I place it on the PCB. I think this especially helpful when one board serves as the base for many different (i.e., bands) kits. It is quite possible that a silk screen pad ends up without a part being added to it. However, if you have all the components highlighted on the schematic when you complete the build, you should feel pretty confident that all the parts are in place.

Before I trim off the excess lead length of a component, I take my thumbnail and "strum" the lead. If it makes an almost-musical note, I'm pretty certain it's a good solder joint. If it goes "clunk" when I strum it, I reheat the connection to avoid a cold solder joint. I'm now ready to clip the leads. I used to use toenail clippers to cut the leads, but I bought a nice clipper in Dayton and it's a joy to use. Wear protective glasses as clipped leads know how to fly at the speed of light. (*I also hold the part of the lead to be clipped with a pair of pliers to try to keep it from flying away – ed.*)

I then followed the directions and mounted the rest of the capacitors. Note that some of the remaining capacitors have values that are dependent upon the band you selected. Other than that, mounting the remaining caps is straightforward.

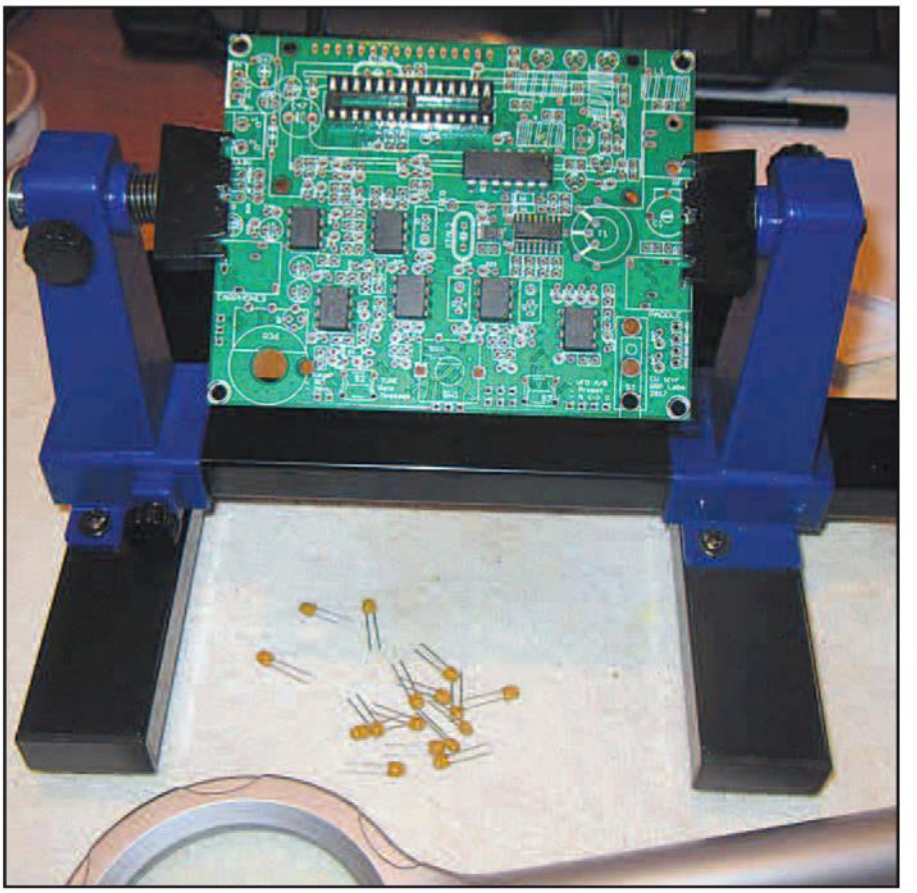


*Photo C. The QCX board in a holder for easy parts placement and installation, along with a handful of capacitors on the anti-bounce towel in front of it.*


*Photo D. The completed QCX transceiver, powered up, on the air and decoding a received CW signal.*

The manual then has you mount the diodes. Some components get a little cranky when you apply too much heat to them (e.g., transistors, diodes, etc.). For that reason, I usually solder one leg of the component and move to the next component and solder one leg there, too. When I'm done with all of the sensitive components, I go back and solder the remaining leg on each. This gives the component a little time to cool before the second leg is soldered.

Mounting the rest of the components will be familiar to any experienced kit-builder. However, mounting header pins might be new for some builders. I find that, if I place the header pin(s) into the hole, I can then take a piece of Scotch® tape, push it over the header, and hold it in place while I flip the board and solder it in place. The header pins for the LCD display are divided into two strips of seven pins each. Place one 7-pin header strip into the mounting holes and tape it into place. Flip the board over and solder just one of the end pins. Remove the tape and set the board on edge so you can get to both sides of the board. With your thumbnail, push on the plastic pin collar of the pin you just soldered and with your other hand touch the hot iron to the solder on that pin. The header will quickly slide down snugly to the PCB. Now solder the remaining six pins on that header. Repeat for the other 7-pin header.

**Toroids**

I don't know why, but some builders are afraid of winding toroids. First, toroids are your friends and if I find a transceiver kit that doesn't have any, I run the other way. They play an important part in the filters that most rigs have and are there to enhance the rig's performance. QRP Labs has done a great job in detailing how the four toroids in this kit must be wound. The wire used to wind the band-specific toroids comes in a loose coil in the "band filter" selection bag. (It's a good idea to keep the contents of this bag in the bag as some parts are specific to certain steps and you are instructed to remove the part from the band-selection bag at that time.) Also, note that L4 is wound on the smaller "red" core (T37-2) (the larger one — T50-2 — is used for T1). Remove the (smaller red) coil from the filter bag.

Be careful when uncoiling the wire, as if you do it in a hurry, you run the risk of putting a kink in the wire...not good. Once you have the wire uncoiled, grab both ends with two sets of pliers and gently stretch it just a little bit. That will help keep the wire from coiling on itself while you're winding the toroids.

Be sure to leave enough lead length on each toroid to mount it to the board. The manual points out that, even though it may not look like it, there is a thin coat of enamel on the wire that must be removed. I take a box cutter and scratch the blade lightly over the wire a few times, taking care not to nick the wire. I then flip the toroid and do the same thing on the other side of the wire. I then mount the toroid to the board and solder it in place. However, rather than following the 3-S-2 soldering rule (3 seconds of heat on the joint, apply solder, 2 more seconds of heat so the solder wicks up into the hole), I leave the iron on the joint after applying the solder for 5 or 6 extra seconds to make sure I burn off the enamel insulation. If the room fills with the smell of feet, you'll know the enamel has been melted off the wire. Apply your ohmmeter probes to each end of the toroid. If properly installed, the meter will read 0 ohms resistance.

**Transformer T1**

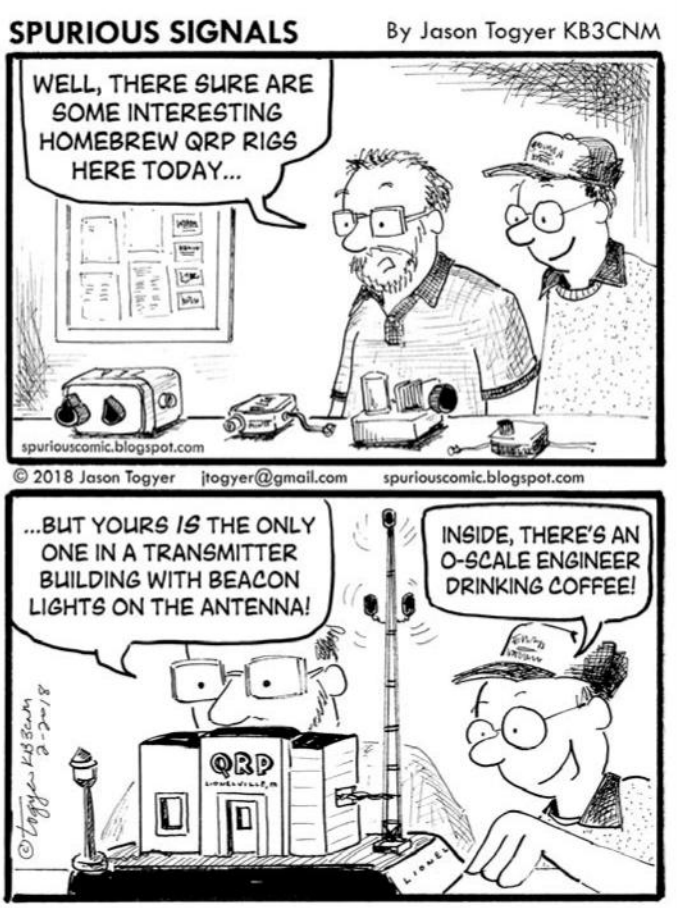
Page 49 starts the instructions for winding transformer T1 by stating: "Now we come to the only really tricky piece of

the assembly...” That’s kinda like saying Michael Phelps is a pretty good swimmer. There are four windings on the core: Three of three turns each, and one with 30 turns. Oh...did I mention that the T1 core (T50-2), while larger than L4 (T37-2 core), is still smaller than a dime? Add to the mix a guy who is two years younger than dirt, has a set of Mickey Mouse hands, and can’t even see an eye chart, and you begin to get the picture. If you didn’t do the math, that means fitting eight hair-like wires into eight different holes. I felt like I was going to be wrestling a burlap bag full of bobcats...until I read the rest of the directions on T1.

The manual details a method for winding the transformer that makes it much easier. There’s also a new drawing now included in the manual that makes winding the transformer even easier. I was dumb enough to see the turns count for each winding and didn’t read any farther. After all, I’ve done this a hundred times before, right? Without thinking, I did not pay attention to the phase of the windings as I wound the transformer. When I got done, I returned to the manual, picking up where I had left off in the instructions and immediately knew I had blown it. Man! Another flat-forehead mistake. (You know: Where you slam the heel of your hand into your forehead asking how you could be so stupid!) I looked to see if I had wound the coils with the correct phasing. Of course not. I had to undo the smaller windings and start over.

Actually, the manual clearly shows it’s much simpler if you wind one large coil, but with winding loops interspersed as needed for the three smaller windings. Another advantage of doing it the way shown in the manual is that you’re sure that the coils are all wound with the same phase. Just ensure the winding loops are large enough to manipulate them easily. Again, take your time unwinding the coil of wire to avoid kinks and gently stretch it to reduce twisting as you wind the transformer.

Once T1 is in place, the rest of the kit is very easy to finish. As you read the manual, I think you’ll agree that considerable thought went into not only the writing of the manual, but the sequencing of the build.




## Alignment

This is just stupidly cool! Built into the QCX are the following tools:

- signal generator
- voltmeter
- RF power meter
- frequency counter

When you are done building the kit, the first task is to adjust the LCD backlight so you can read the display. This is done with a screwdriver and an easily-accessed pot on the board.

I should mention that when I finished the build and applied power in preparation for the backlight adjustment, nothing happened. The display lit up, but there were no characters or blocks visible on the display. I adjusted the trim pot...still no joy. For reasons I can’t explain, I unplugged the rig and then quickly plugged it back in. Immediately, I was greeted with the QCX splash screen. (I think the issue is caused by a reset of the Atmel 328 microcontroller chip, but I can’t be sure.) I then followed the alignment instructions, which involves little more than tweaking three pots and a trimmer cap on the board. The entire process took perhaps five minutes.

Next, I connected my antenna and started tuning around (*Photo D*). I could only hear remnants of the Big Bang on 20 meters at the time, but I kept tuning. Suddenly, Bang! I heard a CW station and decoded Morse started crawling across the bottom of the LCD display. Turns out the guy was in Oklahoma and was a solid 599 on the transceiver. I tried to contact him, but my temporary antenna wasn’t up to the trip. (We had some bad storms in the past few months, including one tornado, which left parts of my antenna system two states away.) Since then I’ve tried the rig during better band conditions and have made contacts coast-to-coast, plus two European contacts, with an antenna most of you would throw rocks at.

There are a ton of options for the QCX that I haven’t even mentioned, but each is clearly documented in the manual. I’ve mentioned them when I listed the features of the transceiver, but you really need to experience them yourself to appreciate them. Indeed, as a software guy myself, I’m not sure how he crammed all of those features into the limited memory of the 328.

## Conclusion

Obviously, I’m very happy with the QCX; it far exceeded my expectations. Indeed, for the price of a week’s worth of designer lattes, there’s little reason not to build one of these for your favorite band. Indeed, my only regret is that I didn’t realize before the build how much I would like the QCX. There’s a section in the manual that tells you how to mount some of the controls “off-board” (e.g., tuning, gain, menu selection) on an enclosure. I have had a Pelican case waiting for a good QRP rig to hide inside of it for over a year, and this is probably going to be that rig. As the old TV ad said: “Try it...you’ll like it!”

*The QCX is available from QRP Labs </www.qrp-labs.com/qcx.html> for $49 U.S. plus shipping. The kit does not include an enclosure at this time.*

*"Am I really getting out?" How many times have you asked yourself this question when repeated calls go unanswered? Is it propagation or is there a problem with your station? K8CJU has a way to help, with plans to use a simple digital voltmeter module as the core of a field strength meter you can read remotely from inside your shack.*

# Build a Remote Reading RF Field Strength Meter

**BY GARY A. VANDER HAAGEN,* K8CJU**

How often have you wondered, "Why are my CQs and calls not being answered?" All the metering looks normal. With my 5- to 6-watt QRP transceiver, it is usually propagation conditions and a luck problem. But sometimes it can be an antenna partially on the ground, water in coax or connectors, or any number of other issues that still allow the antenna tuner to deliver a reasonable match and the meter readings to be within the normal range ... while the reality may be that you have very little RF getting into the air.

With the WSPR program (Weak Signal Propagation Reporter), you can check if you are "getting out" but have only partial knowledge due to the propagation variability at distant locations. While an RF field strength meter could help answer the question, I have no suitable meter available and I don't feel like trekking into the nearby marsh where my antenna is located. Additionally, without reference measurements when I know all is well, I'm still in the dark.

To address this once-in-a-while concern, I decided to build a field strength meter sensitive enough for my low-power transceiver and capable of being remotely located at least two wavelengths from the antenna at my lowest operating frequency. This separation puts the measurements in the "far field," indicative of the actual radiated energy. I also wanted a readout next to the rig, and for the sensing antenna to remain outside in the same position year-round for minimal effect from nearby conductive buildings, wiring, and absorbing objects. Other considerations were being unobtrusive, low-cost, and capable of operating with my 5-watt signal over 40-10 meters and optionally at 2 meters. After considering several different circuit options, a very simple solution emerged as shown in *Figure 1*. A classic voltage multiplier "souped-up" with high-performance Schottky diodes provides sensitive broadband RF detection. At circuit point C1-D1, the incoming signal is converted to the RF peak voltage and so forth up to 4X the RF peak voltage at P4. This circuit provides enough sensitivity for transmitting antenna-to-detector separations of 130-200 feet at 5 watts. The DC output voltage is sent over a twisted pair to the readout located up to several hundred feet away and read out on a self-contained 2-volt digital voltmeter module (DVM). The sensitivity is calibrated using a combination of R1 and R3. The digi-

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*Photo A. These are capacitors C1-C4 with attached Schottky diodes D1-D4. In this arrangement, for low power, load resistor R1 was not used; load and calibration were provided by R3 and R4 at the readout. The antenna is attached at the upper left capacitor terminal with black ground wire attached below. The twisted white and blue wires go to the output connector.*

tal voltmeter has input impedance of hundreds of megohms, so there is no load on the sensitivity pot R3. The DVM's very low supply current of 0.4 milliamps enables long battery life when using a low-current Zener at D5.

## Building the Units

Construction of both the detector and the readout is straightforward with no circuit boards or difficult wiring required. The detector is shown in *Photo A*. The four capacitors (C1-C4) can be held together with cable wraps or glued with anaerobic adhesive to make wiring easier. The four Schottky diodes are soldered between the four capacitor leads and four wires accordingly. We used 22-gauge stranded wire for the antenna and earth ground connections, but neither is critical.

## But First, an Experiment

Before completing the detector assembly, a short experiment needs to be run. Tape the detector with antenna on an 8-foot-long piece of wood such as a 2x4 and attach a DVM dig-

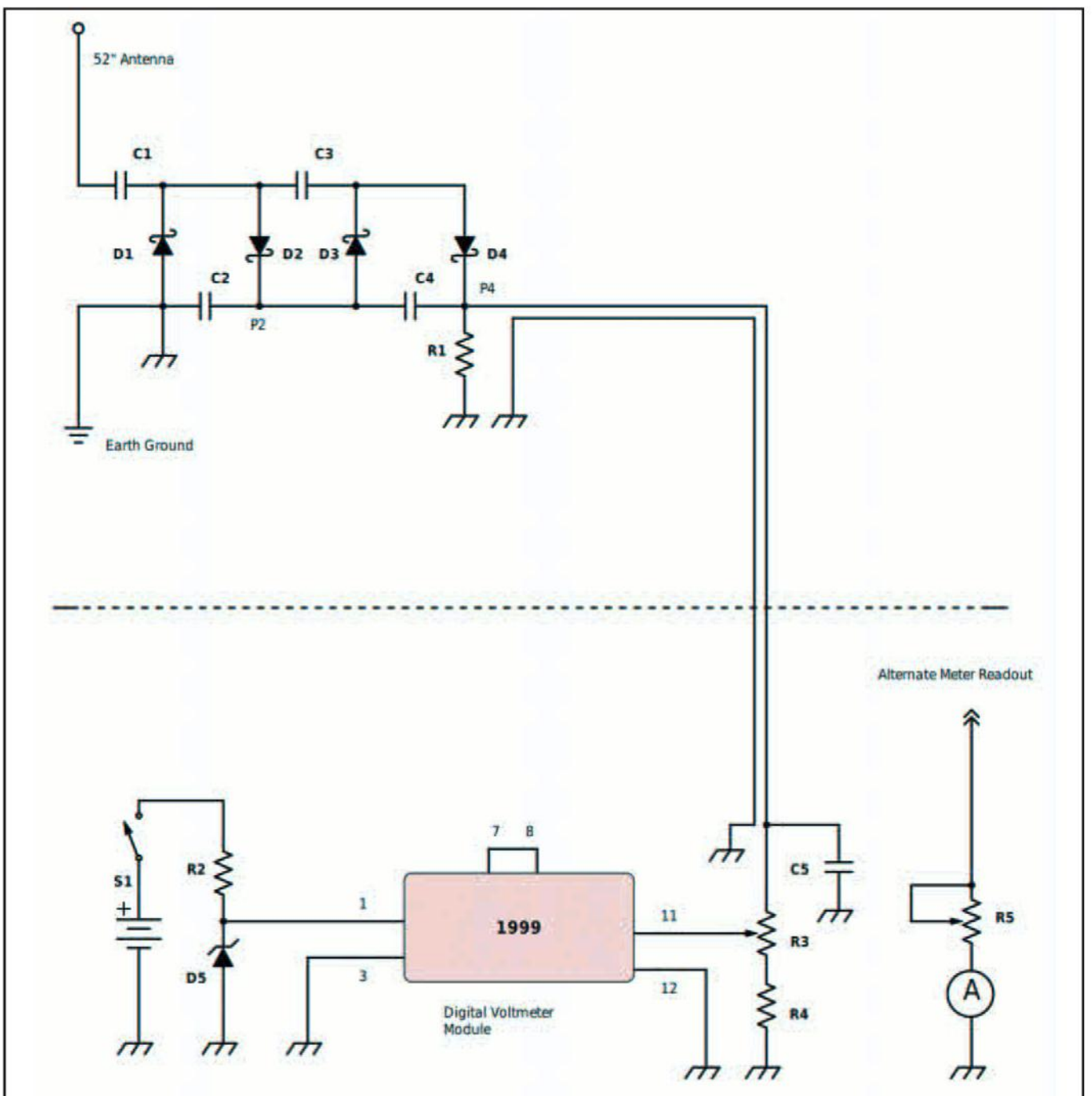


*Figure 1. Schematic of the remote reading field strength meter. The upper circuit is the remote RF detector and voltage quadrupler. The DC voltage from the detector is fed to the remote readout through a twisted pair cable. The readout is a 2-volt self-contained DVM (digital voltmeter module) requiring a 5-volt DC supply and calibration pot R3. If the remote feature is not needed, the entire circuit can be placed in a single metal box with an external whip antenna.*

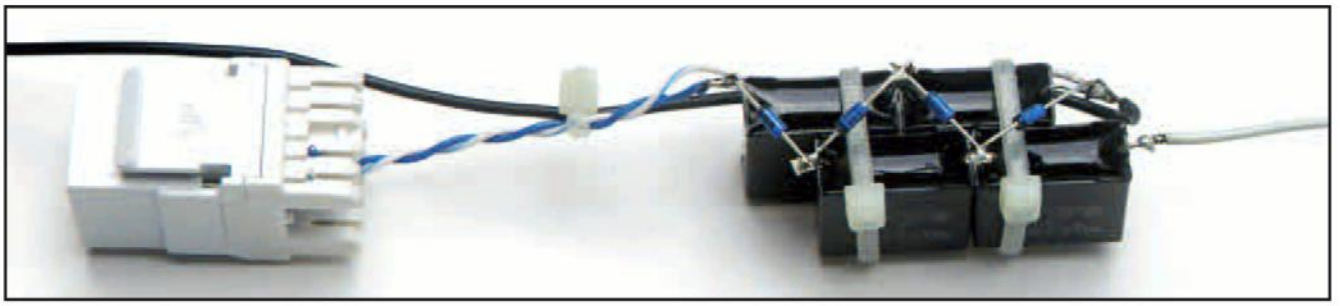

*Photo B. The completed detector assembly with antenna wire to the right and ground to the left.*

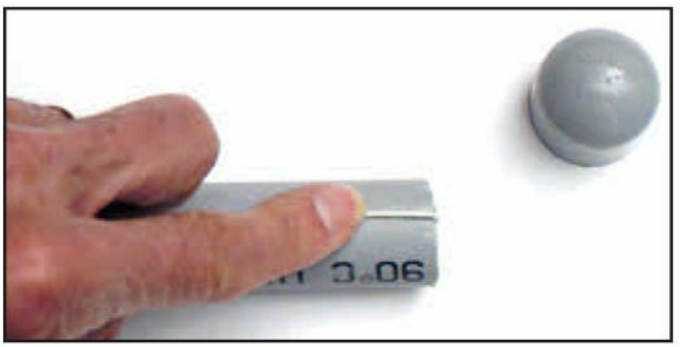

*Photo C. Attachment of the antenna wire using the groove cut into the PVC conduit and held in place with the cap. The antenna wire is cut off below the cap and sealed with a silicone adhesive.*

ital voltmeter to the detector's output. Place the output resistor (R1) across the output; start with 100K for low-power transmitters (5-10 watts), 10K for 100-watt transmitters, and 2K for 500-1,000 watts. You may need to change the values once you start the experiment. You are looking for 3-4 volts output with the chosen resistor at your potential detector location. The output voltage can get quite high at higher powers or small separations. Field measurements are more consistent at greater distance from the transmitting antenna but 75 feet or greater was found acceptable. If the detector output voltage is too high, take the output off at the voltage doubler point P2. As you load the detector with lower values of R1, the output voltage will decrease. Once you find a value of R1 that gives 2-4 volts output over the bands you wish to operate, permanently attach R1. The final sensitivity adjustment and calibration will take place with pot R3. If you end up needing only a 2X voltage multiplier, remove or disable the remain-

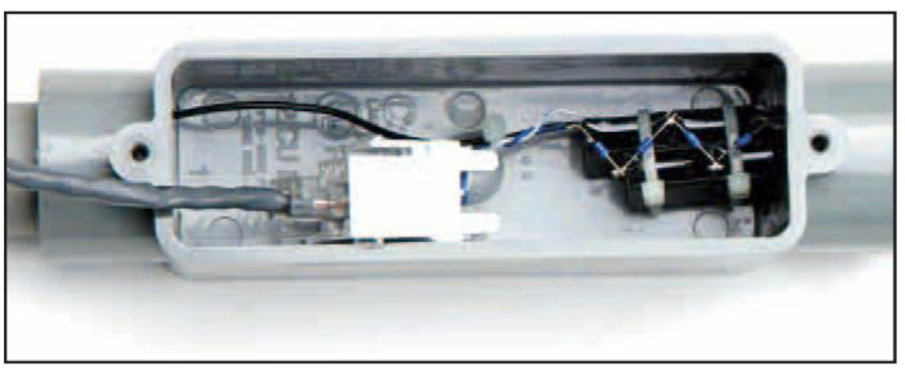

*Photo D. The completed detector assembly mounted in the PVC access-fitting box. The black ground wire (left) passes through the lower PVC conduit to the ground connection, the connecting cable exits the box through a groove filed in the wall, and antenna passes through the PVC and is terminated as shown in Photo C. The access fitting cover has a soft rubber seal for moisture protection.*

## Remote Field Strength Meter Parts List

| | |
|---|---|
| C1-C5 | 0.22µf, 275v, polyester metalized capacitor (Digi-Key P10732-ND) |
| R1 | 1/4-watt, refer to text for value |
| R2 | 3.9k, 1/4-watt |
| R3 | 100k, 1/2-watt linear pot (Digi-Key PDA241-SRT02-104B0-ND) |
| R4 | 10k, 1/4-watt |
| R5 | as required (see text) |
| D1-D4 | 1N5711 Schottky diode, 70v, 15ma, STMicroelectronics (Digi-Key 497-2499-1-ND) |
| D5 | 1N4625, 5.1v Zener diode, 250mw (Digi-Key 1N4625-ND) |
| DVM | Murata 3.5D, 5v, 2v-LCD, DMS-20LCD-1-5-C (Digi-Key 811-1015-ND) |
| S1 | SPST switch |
| 8' PVC | 3/4" 41UM rigid PVC conduit |
| PVC Box | 3/4" access fitting with weather sealed cover |
| Cap | 3/4" PVC cap |
| Battery | 9v alkaline battery with snap connector |
| Connectors | As required for connecting cable used |
| Knob | 1/4" shaft knob with calibration marks; used center portion of a 10T counter knob |
| Utility Box | Hammond, 4.34" x3.23" x 1.8", 1590S (Digi-Key HM158-ND) |

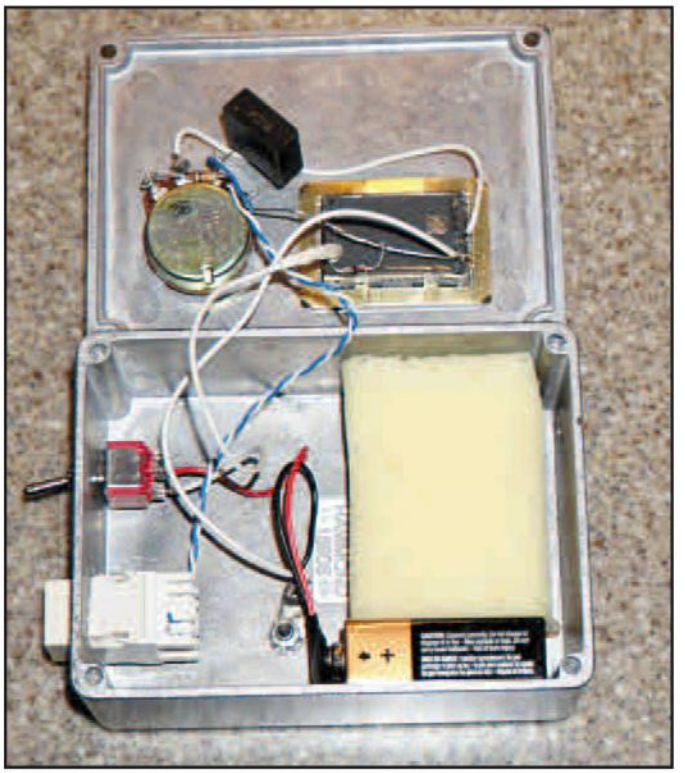

*Photo E. The completed remote readout. Note the use of existing terminals on the display and pot to make connections. The 9-volt battery is held snugly using a piece of foam.*

ing portion of the circuit. The circuit can now be completed as shown in *Photo B*. The cable and connectors are not critical. I chose Cat5e Ethernet cable using one of the four pairs and RJ connectors because they were available and the cable has good noise immunity. Regular indoor Ethernet cable has lasted reasonably well outside in several applications. However, any good twisted pair or shielded cable should work.

The detector assembly is housed in a 3/4-inch PVC conduit with a PVC access fitting. The upper section is 53 inches long to accommodate the antenna. The length is not critical. The antenna wire runs up the upper section and is wrapped around and into a groove cut into the PVC as shown in *Photo C*. This joint and the lower PVC joints are sealed with silicone sealant for moisture protection and easy disassembly if necessary. The lower PVC section is 64 inches and, again, not critical. That length allows space enough to push 12 inches or so into the soft soil and keep the antenna above the vegetation. The ground wire is threaded down the lower section, the insulation stripped off and brought back up the side to provide an easy ground. With harder, less conductive, soil, a ground rod is necessary. The Ethernet cable was cable-wrapped to the lower PVC and enters the access fitting via a groove filed in the lower housing wall as shown in *Photo D*.

Wiring of the readout module is also straightforward. *Photo E* shows the aluminum utility box and placement of key parts. The terminals of the digital display module and pot, along with a main chassis ground lug and a ground lug under the cover-mounted pot, accommodate the connections.

In the initial sensitivity experiment, you will have chosen the load resistor, R1. For low power operation that value will likely be around 100K. For QRP, R1 can even be eliminated as long as you use the specified values for R3 and R4,

*Photo F. The detector and antenna are mounted remotely in the PVC conduit, approximately 120 feet from the transmitting antenna. The length of the connecting twisted pair cable is not critical as long as RF bypassing is addressed properly by C5.*

100K and 10K, respectively. For higher power operation, R1 should be in place at P4 and the specified values for R3 and R4 should be used as well. The instructions that come with the digital display module or DVM also note you can add a decimal point (DP). The DP was not used for this application. Should you wish to eliminate the DVM, a low current 0.25- or 1.0-ma meter can be substituted with an appropriate R5 sensitivity pot.

## Testing the Meter

With both assemblies complete, you are ready to try a few detector locations and check on all bands. I have generally chosen one R3 sensitivity setting that is a good compromise on all bands from 40 to 10 meters. This allows me to write down typical readings for each band and keep them available for later comparison. The unit has worked fine on 40 to 10 meters, and on 2 meters as well. There is no reason it should not work 160 and 80, but it was not tested.

The detector unit shown in *Photo F* was located in a marsh about 120 feet from the vertical antenna. The connecting

*Photo G. The remote readout shows how easy it is to access the field strength reading at the operator's position.* →


cable was left on the marsh surface until it reached the mowed lawn and then run through a buried half-inch PVC conduit, just below the lawn surface, to the transceiver position shown in *Photo G*.

## Mods and Miscellaneous Notes

If you're interested in an RF field strength meter, but without the remote reading capability, the entire circuit can be fabricated in a single metal box. A telescoping whip can be used for the antenna and the circuit wired the same as the remote version. Also recommended is keeping the C1 capacitor lead to the antenna as short as possible and bypassing pin 1 of the DVM with a 0.01- to 0.1-microfarad capacitor.

Some things you may notice. If you have other amateurs near you, their signals may also show up, particularly if they are using higher power and a directional antenna. Be sure you are looking at your signal. There is no selectivity with this approach and the signals are combined in quadrature. For example, your actual signal, Sig = $\sqrt{Sc^2 - Sf^2}$ , where $S_c$ is the reading of both your signal and the interfering signal, and Sf is the *constant* interfering signal. So if the interference is averaging 160 and the combined reading is 890 when you are transmitting, your signal (Sig) is actually 875. This is not generally a problem, but is useful to know.

You may also notice that your automatic antenna tuner or manual tuning is not always done to the same perfection as evidenced by the radiated signal strength shown on the meter. I've found that with all things "normal," the readings from day to day vary by +/- 5%.

The remote field strength meter is also useful for antenna comparisons, effects of grounding changes and radials, and generation of accurate antenna patterns; rotate the antenna and record the signal strength versus angular position.

Good luck and have fun better understanding what your rig is really radiating and how local conditions influence the readings.

*Help keep the smoke inside your QRP projects' components with this low-cost, easy-to-build circuit that lets you control both the voltage and the current going into your newest homebrew goodie.*

# A Current Limiter Accessory for Batteries or Power Supplies

**JIM GIAMMANCO,* N5IB**

Have you ever flipped the switch to perform that ritual "smoke test" on a new homebrew project only to produce exactly that — a sickening popping sound accompanied by an accusatory curling wisp of acrid smoke?

Many builders have no alternative but to power their creations with battery packs or husky station power supplies capable of tens of amperes. An adjustable bench power supply with a current limiting feature would be far more appropriate, but one can cost as much as a good QRP rig.

This frugal add-on accessory (*Photo A*) adds both adjustable voltage regulation and adjustable current limiting to any power supply or battery pack, up to about 40 volts. It can be set to limit the supplied current to the value expected for the circuit being tested, minimizing the chances of vaporized circuit board traces or ruptured components. It's also just the thing to power projects that require voltages lower than that which nominal 12-volt batteries or power supplies deliver. A case in point is the Four State QRP Group's recent Cricket transceiver kit, which specifies a 9-volt power source.

## Circuit Description

The heart of the circuit is the LT3086 linear voltage regulator integrated circuit from Linear Technology Corp[1]. Priced at about $8 in single quantities from traditional suppliers[2], the chip boasts a host of useful features, including:

- Input voltage can range from 1.4 to 40 volts
- Regulated output voltage is adjustable from 0.4 to 32 volts
- Low dropout — input voltage needs only be about a half volt above the output
- Output current limit is adjustable from a few mA to over 2 amps
- Internal reverse polarity protection provided for both input and output
- Internal temperature limiting shuts the chip down if it overheats

Refer to the schematic diagram in *Figure 1*. The regulated output voltage is determined by the combined series resistance of R6 and potentiometer R4, both expressed in kΩ:

$$V_{out} = 0.4\ V + (R4+R6)(0.05\ mA)$$

The current limit, in mA, is set by the combined series resistance (in kΩ) of R2 and potentiometer R1:

$$I_{lim} = \frac{800}{R1+R2}$$

You can channel your ninth grade algebra teacher and rearrange these to select the values needed for your application, again using units of volts, kΩ, and mA:

$$R4 + R6 = \frac{V_{out} - 0.4\ V}{0.05\ mA}$$

$$R1 + R2 = \frac{800}{I_{lim}}$$

Using the resistor and potentiometer values shown on the *Figure 1* schematic, the output voltage adjustment range will be about 2.8 to 12.8 volts, while the current limit can be set between 40 and 2,000 mA.


*Photo A. Completed current limiter in the suggested die-cast enclosure.*

* *email: <n5ib@juno.com>*
*web: <http://n5ib.net/Index.xht>*

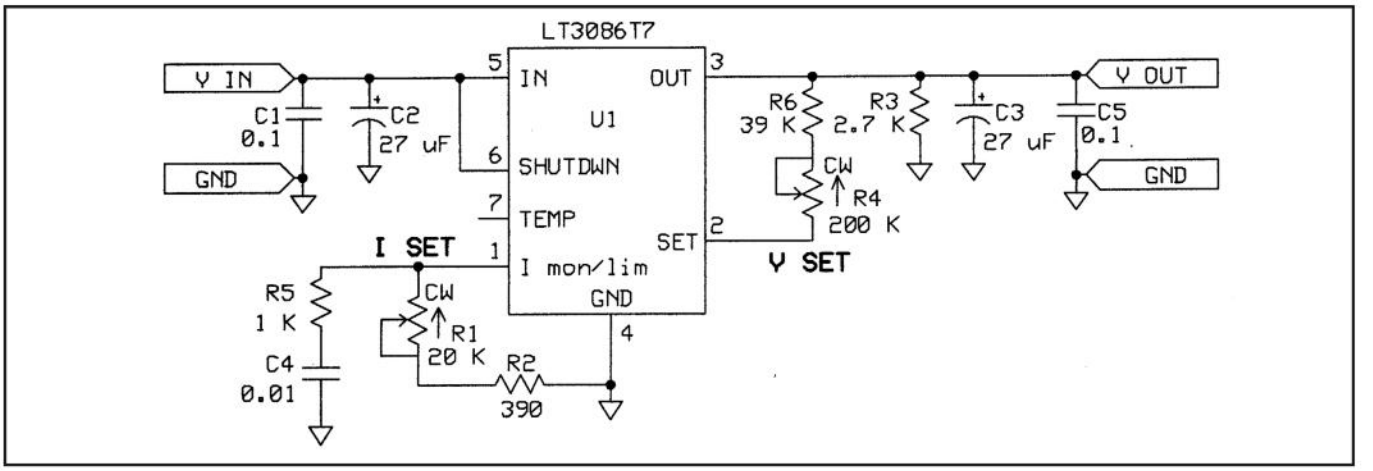


*Figure 1. Schematic diagram*

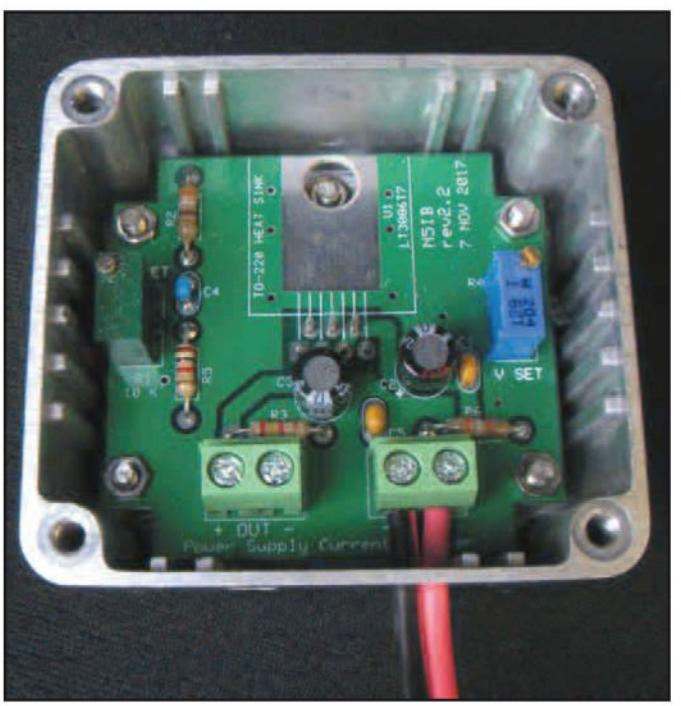


*Photo B. Populated circuit board mounted in the enclosure, with the LT3086 fastened to the box, below the circuit board.*

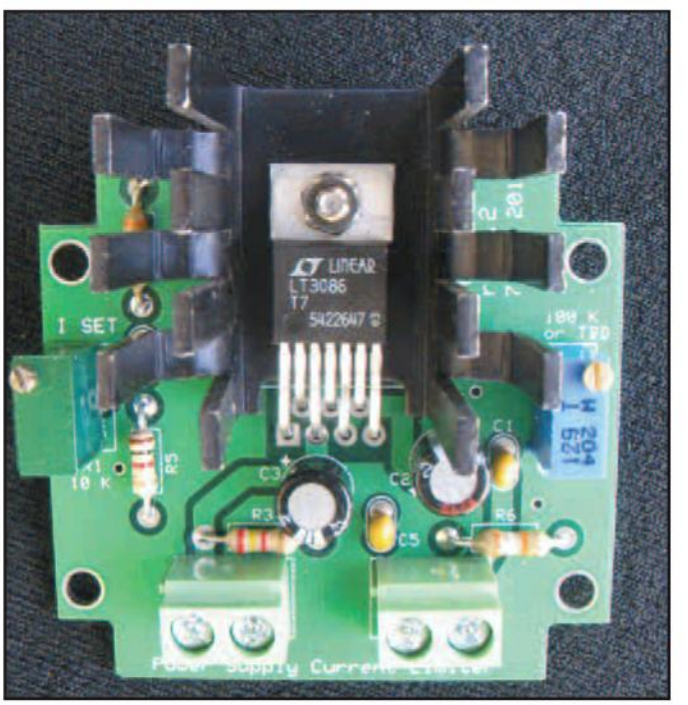


*Photo C. Alternative regulator mounting on PC board, with TO-220 heat sink.*

Capacitors C1, C2, C3, and C5 provide bypassing and decoupling at the input and output. The manufacturer recommends that C2 and C3 be low ESR (equivalent series resistance) types, with an ESR of less than a tenth of an ohm, but standard aluminum electrolytics have been satisfactory in several builds. The RC network of R5 and C4 ensures the stability of the regulator for occasions when the current limit has been set to less than one ampere. R3 maintains at least 1 mA of load current drawn from the output.

## Construction

Perfboard or point-to-point wiring could be used, but a printed circuit board is much more convenient. For those who can etch their own, a full-sized layout pattern is posted on the author's webpages[3]. Alternatively, a commercially-prepared, two-sided, silk screened and solder-masked circuit board is available from the author[3].

*Photo B* shows that the circuit board is sized to fit into a small aluminum die-cast box[4], so that the box itself can be utilized as a heat sink for the regulator chip. If the grounded mounting tab of the chip is not attached to the wall of a metal enclosure, a TO-220 heat sink should be added, as shown in *Photo C*.

Referring to *Photo D*, use the holes in the unpopulated circuit board as a marking guide to drill and countersink holes for five #4-40 flat-head machine screws. Gently re-form the regulator's leads so they can be inserted upwards through the bottom of the circuit board after the regulator has been mounted onto the inside bottom of the box (*Photo E*). Use a #4-40 x 1/4-inch screw, lock washer, and nut to loosely secure the chip to the bottom of the box. Do a dry fit to confirm the alignment of the pins with the circuit board.

After the dry fit has confirmed that all the mounting holes are aligned, decide how you wish to bring the input and output wires through the enclosure (an example is shown in

**Table 1. Bill of Materials**

| | | |
|---|---|---|
| C1, C5 | 0.1 µF 50 V, ceramic capacitor, 0.1" (2.5 mm) lead spacing | Digi-Key 399-9870-1-ND |
| C2, C3 | 27 µF 50 V, aluminum capacitor, 0.1" (2.5 mm) lead spacing | Digi-Key 493-11456-1-ND |
| *C2, C3 | 33 µF 25 V, aluminum, 0.1" (2.5 mm) lead spacing<br>*alternative selection, if low ESR part is desired | Digi-Key 493-6661-1-ND |
| C4 | 0.01 µF 50 V, ceramic capacitor, 0.1" (2.5 mm) lead spacing | Digi-Key 399-9858-1-ND |
| R1 | 20 kΩ multi-turn trimmer potentiometer | Digi-Key 490-2881-ND |
| R2 | 390 Ω 5% 1/4W carbon film resistor | Digi-Key CF14JT390RCT-ND |
| R3 | 2.7 kΩ 5% 1/4W carbon film resistor | Digi-Key CF14JT2K70CT-ND |
| R4 | 200 kΩ multi-turn trimmer potentiometer | Digi-Key 490-2882-ND |
| R5 | 1.0 kΩ 5% 1/4W carbon film resistor | Digi-Key CF14JT1K00CT-ND |
| R6 | 39 kΩ 5% 1/4W carbon film resistor | Digi-Key CF14JT39K0CT-ND |
| U1 | Linear Technology Corp. LT3086T7 regulator, TO-220 pack | Digi-Key LT3086IT7#PBF-ND |
| Enclosure | Die-cast aluminum box & lid, 60 mm x 55 mm x 30 mm | Marlin P Jones 16281 BX |
| Connectors | 2 ea, 2-conductor screw terminals, 0.2" (5 mm) pitch | Marlin P Jones 18318 TS |
| PC Board | DIY etching, or available from author | *http://n5ib.net/index.xht* |
| Hardware | 1 ea #4-40 x 1/4" flat head machine screw<br>1 ea #4 lock washer<br>4 ea, #4-40 x 1/2" flat head machine screw<br>5 ea #4-40 hex nut<br>4 ea #4 x 1/4" unthreaded standoff | |

*Photos A* and *B*) and drill the appropriate holes before proceeding with the rest of the assembly. You can then add a dab of heat sink compound, then re-install and tighten the nut fastening the regulator in place.

The board should then be populated with all of the components except the LT3086 regulator. When installing the trimmer potentiometers, if you pay attention to the "CW" markings on the parts and on the PC board you will end up with the convenient feature that the output voltage and current limit both increase as the adjustment screw is turned clockwise.

Four #4-40 x 1/2-inch screws and 1/4-inch standoffs will be used to mount the PC board to the bottom of the box as shown in *Photo E*. Insert the mounting screws for the PC board from

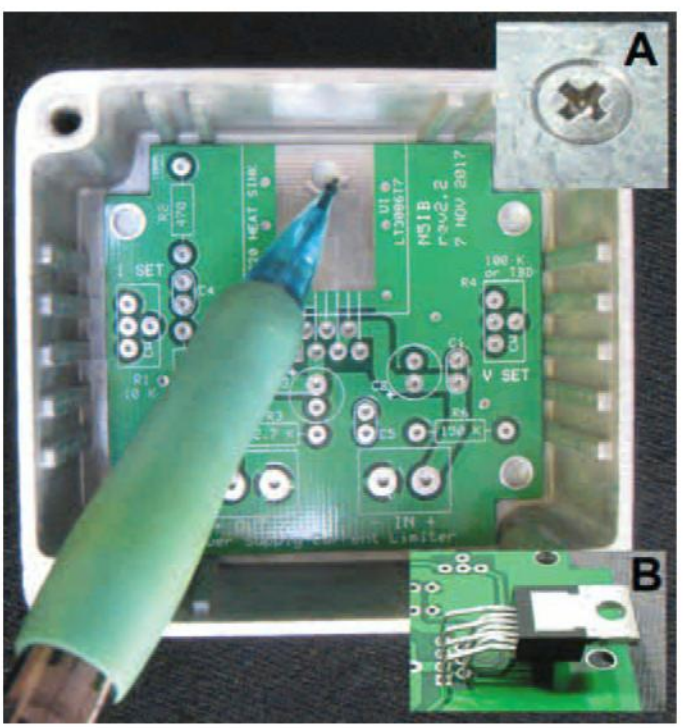


*Photo D. Marking for the mounting holes. Inset **A**: countersunk screw; Inset **B**: regulator leads re-formed to insert from bottom of circuit board.*

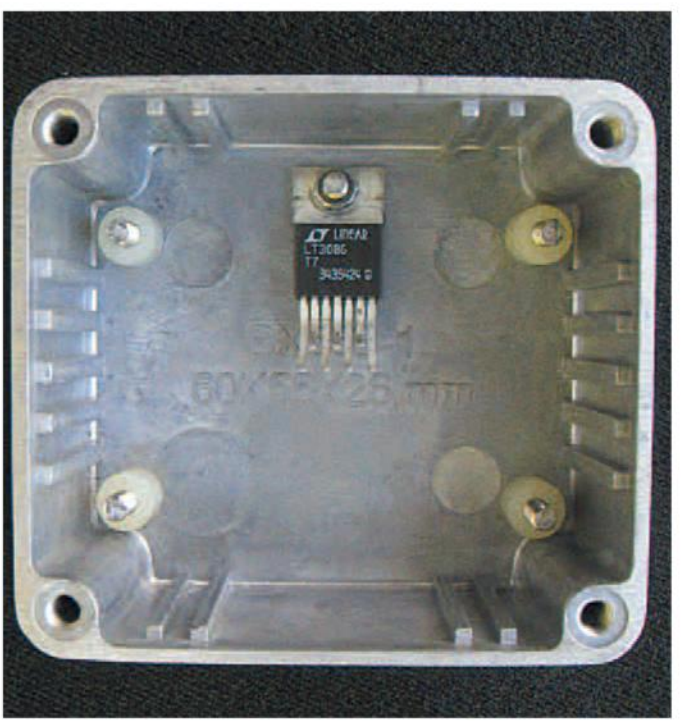

*Photo E. Regulator mounted on the bottom of the enclosure, with standoffs and screws prepared to the receive circuit board.*

the outside of the enclosure and use bits of masking tape to keep them from falling out. Slide the standoffs over the screws and slip the circuit board into place, making sure all seven regulator leads protrude through the board for soldering. Install and tighten the nuts onto the mounting screws before soldering the pins if the LT3086. Finally, locate and drill access holes in the enclosure's lid to permit adjustment of the trimmers.

An alternative assembly could replace the board mounted trimmers with panel mounted potentiometers if the voltage and current settings will need to be adjusted frequently.

## Operation

Connect the input leads to an appropriate DC power source such as a battery or a regulated or unregulated, but filtered, DC supply. Monitor the voltage across the output terminals and adjust the *V SET* potentiometer for the desired output voltage. Remember that for proper regulation, the output voltage must be set at least few tenths of a volt lower than the minimum expected value of the input voltage. For example, if used with a nominal 12-volt battery whose terminal voltage is expected to be 12.3 volts or more, you can set the output voltage as high as about 11.9 volts. If used with a nominal 13.8-volt station supply, outputs of up to 13.4 volts are possible.

To set the desired maximum current limit, first set the output voltage as above. Then place a DC ammeter (capable of handling at least 2 amperes) directly across the output terminals — effectively short-circuiting the output though the meter. *That's right — intentionally short-circuit the output!* Adjust the *I SET* trimmer for the desired amount of maximum allowed current.

***Before initially powering up that new project, check the specifications, or do some estimating, to determine how much current the circuit is expected to draw.***

If creating intentional short circuits offends your sensibilities, a kinder and gentler way is to disconnect the device from the main power source and measure the resistance from pin 1 of LT3086 to ground. Pin 1 is the square pad on the left-hand side of the group of seven pins. Use the equation above for (R1 + R2) and adjust *I SET* for the necessary resistance.

## Conclusion

You can't lock Murphy out of your workshop, but you can deprive him of one of the tools in his kit. Before initially powering up that new project, check the specifications, or do some estimating, to determine how much current the circuit is expected to draw. Set the current limit about 10% or 15% higher than that estimated value. Monitor the voltage at the output of the limiter. If the voltage sags when your project circuit is energized, you'll know it's trying to draw too much current and you can start the troubleshooting before serious damage is done.

**Notes**

1. Linear Technology Corp. datasheet for LT3086: <http://bit.ly/2AEJAVV>
2. DigiKey Electronics: <http://bit.ly/2BJMDeK >
3. N5IB webaite: <http://n5ib.net/Index.xht>
4. Marlin P. Jones, Inc.: <www.mpja.com/>

*Tired of repurposing mint tins for your QRP projects? WA4MNT has some tips on making customized, professional-looking, enclosures with printed circuit board material.*

# Fabricating a Project Enclosure From Clad PC Board Material

BY KEN LO CASALE,* WA4MNT


*Photo A. The author used copper-clad printed circuit board to build a custom enclosure for his Ft. Tuthill 80 QRP transceiver. The steps shown in this article are specific to this project but may be adapted to your needs.*

How many times has the finished appearance of an electronics project been based on whatever box you had lying around, rather than what you would like to have? It may even have extra holes or cutouts that aren't used, and it is apparent to everyone what took place.

With some effort, project boxes or chassis can be constructed using copper-clad PC board material and the most common hand tools. More expensive tools can be used to save time, but the same quality end product can be obtained with readily available hand tools that you probably already have. With the addition of laser water slide decals, you can produce cases with professional-looking results (see *Photo A*).

Fiberglass printed circuit board material is very desirable to work with. It is strong, readily available online, easy to cut using various methods and, being copper-clad, it solders easily and therefore has excellent electrical shielding. I use double-sided board on all my chassis. The extra layer of copper makes the final product more rigid.

This exercise will use 1/16-inch thick, double-sided copper, G10, using simple tools (see sidebar). You basically cut the pieces, finish to size, solder, add holes, finish paint, and apply decals.

The items you want to address are your basic shape, size, how you are going to attach internal boards or assemblies, what edges you want exposed, and how you would like the cover to fit (or even if you want to have a cover at all). Simple projects can be an "open frame" concept.

## Plan First

The more time that you spend planning, the better. Ideally, you already have your project completed and working, and just need to have a chassis or enclosure. Items you need to consider at this point deal mostly with physical layout. For instance, will the knobs I'm using be too close to one another, do you really want that phone jack on the front, as opposed to the rear?

It is a good idea to make a rough sketch of what you would like the chassis to look like (*Figure 1*). Pencil, paper, ruler, and eraser are my preferred method. This chassis described here — for my Ft. Tuthill 80 QRP transceiver — will have a painted base and cover.

For illustration, this chassis is 4-1/2-inches wide, 4-1/2-inches deep, and 2-inches high. The cover will overhang 1/8 inch to the front and rear. We will make the cover 0.01-inch wider to allow for a non-interference fit. The bottom chassis will have two narrow sides connecting the front and back panels. On these strips, I will solder brass nuts to the inside, so the cover has something to attach to. These strips also act as corner supports for the joints between the front and rear panels and the bottom. It is not a good idea to depend only on the soft solder joint to provide all the strength for a 90° unsupported panel. As we proceed, you will see that these are not continuously-soldered joints, only stitches. We will use gussets on the cover to support the sides (see *Figure 2*).

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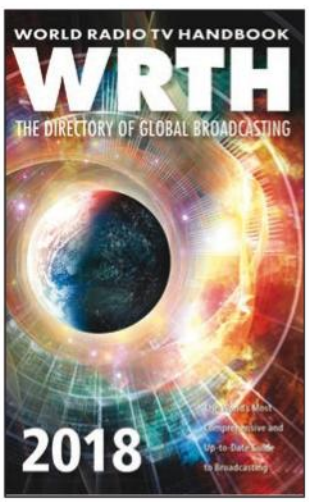
*<www.qrpbuilder.com>*


**We are very pleased to announce the publication of the 2018 edition of *World Radio TV Handbook*, the bestselling directory of global broadcasting on LW, MW, SW & FM**

**The Features section for this 72nd edition contains articles on an Anipodean Journey, Receiving Noise, Radio Romania International, A New Voice of Hope, and Radio Voices from the South Seas, as well as equipment reviews and other articles of interest to radio amateurs and DXers**

**The remaining pages are, as usual, full of information on:**

- National and International broadcasts and broadcasters by country with frequencies, powers, languages, contacts, and more, including Clandestine and other target broadcasters
- MW frequency listings by region. International and domestic SW frequency listings, and DRM listings
- International SW broadcasts in English, French, German, Portuguese & Spanish.
- Reference section with Transmitter locations, DX clubs, Internet Resources, and much more




**Available December 2017**

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## SOME COMMENTS ON WRTH 2017

*I am delighted to learn that the latest edition of the* WRTH *will soon be off the presses and on the tables of DX enthusiasts everywhere. Your continuing effort on this most critical publication is very much appreciated* – Bill Matthews, USA

*Thank you for your amazing book. This is my second year as a DXer and the second edition of the* WRTH *I've purchased. I'll be buying the new volume every year from now on!* – John P. Zavacki, USA

*I am an SWL and wanted to congratulate your entire team for publishing the fantastic edition of* WRTH *2017 which I have received today* – Anirudh Sharma, India

*I just finalized the order for my copy of* WRTH *2017. I've being purchasing WRTH for the last 20 years and I always found it a very useful tool for an old SWL like me* – Alessandro Roscini, Italy

*This year's 71st edition continues* WRTH's *reputation as a comprehensive exemplary reference book for the radio listening audience. It remains the very best, most authoritative reference book for the radio and television hobbyist* – Gayle Van Horn W4GVH, Teak Publishing, USA

*Please keep up the good work with the Book. Many SWLs are waiting every year for* WRTH. *I make sure I have a copy one way or another. Flicking through the pages of* WRTH, *when I hear a shortwave or mediumwave station, still thrills me* – Dimitrios Valaris, Greece

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*I like* WRTH *as it is* – John Komdat, USA

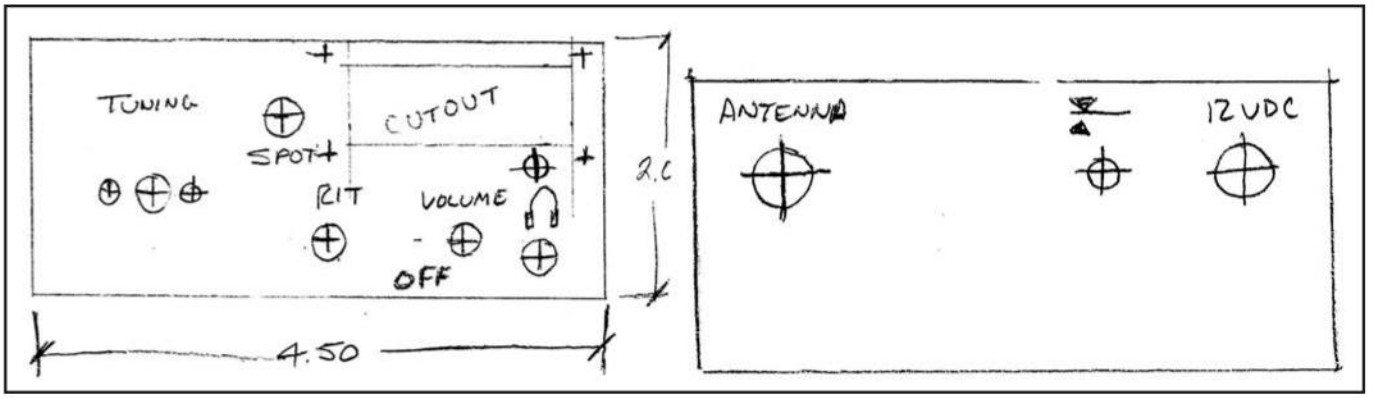


*Figure 1. Start out with a sketch of what you'd like to be placed where.*

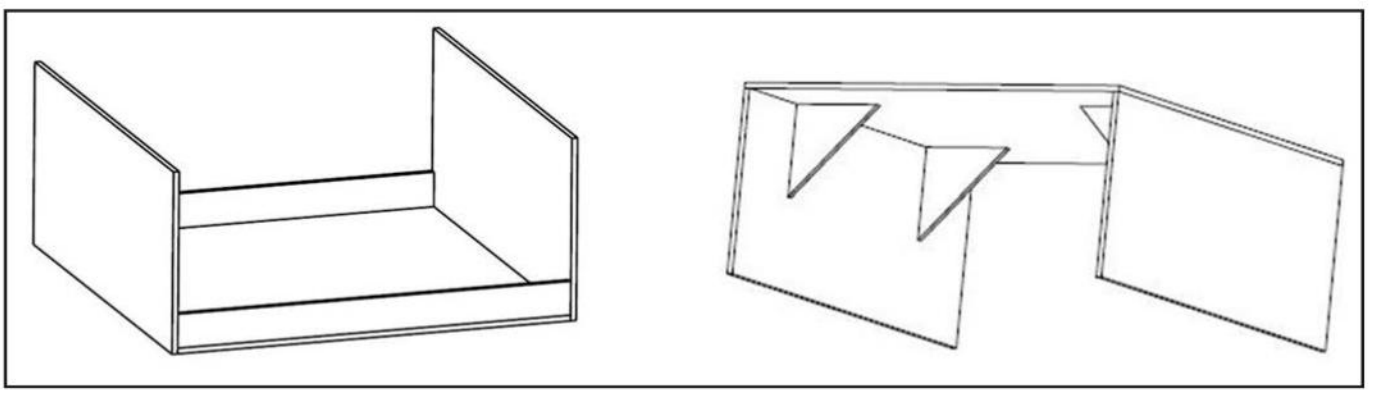

*Figure 2. Gussets, also made from PC board, provide added structural strength to the assembly. Be sure to place them where they won't interfere with any components inside the case.*

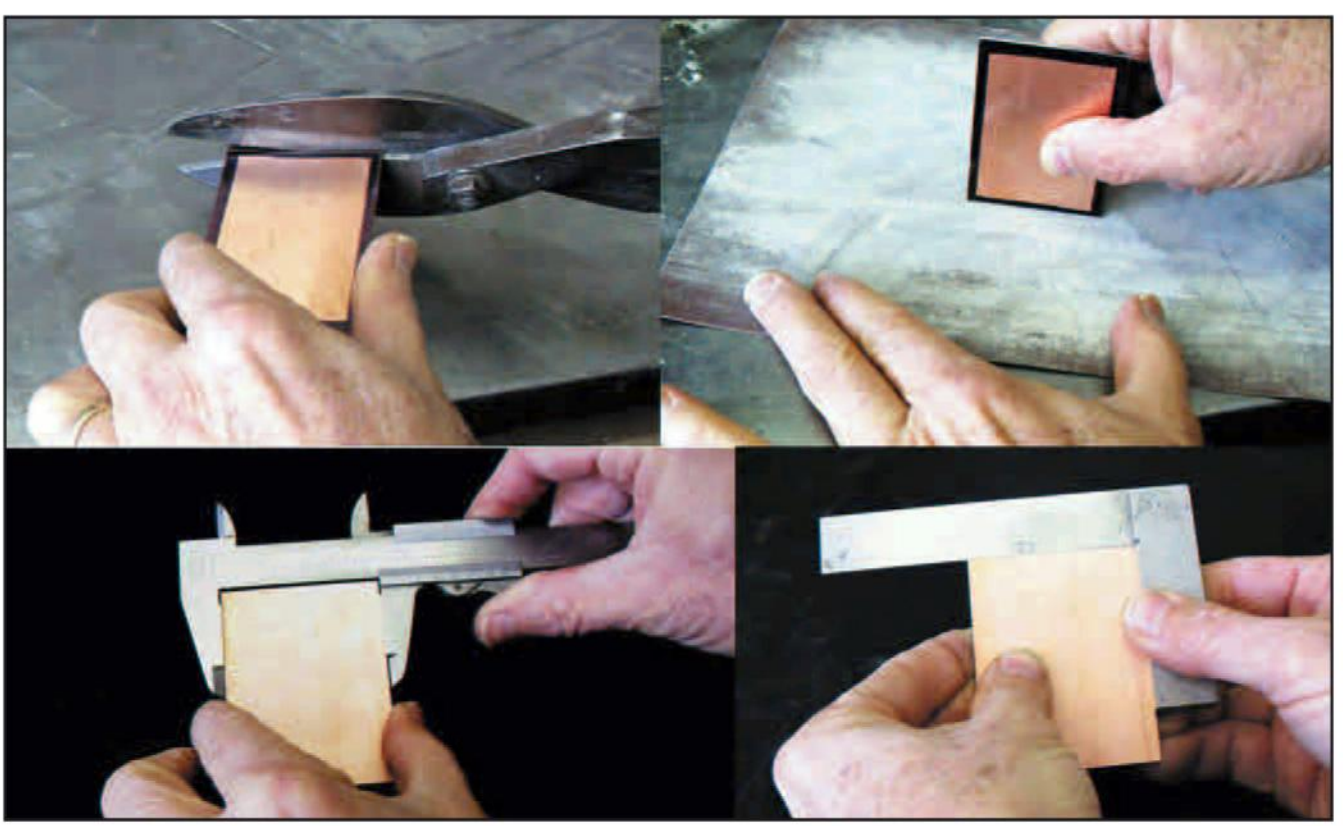

*Photo B. Four-step process to ensure each piece is square and of the correct thickness. You will need to repeat these steps several times for each piece.*

| | | |
|---|---|---|
| *Bottom chassis:* | | |
| Front and rear panel | 2ea. | 4.50 x 2.00 |
| Bottom | 1ea. | 4.375 x 4.50 |
| Sides | 2ea. | 4.375 x .375 |
| *Cover:* | | |
| Top | 1ea. | 4.51 x 4.75 |
| Sides | 2ea. | 4.75 x 2.00 |
| Gussets | 4ea. | 1.00 x1.00 x 45° |

*Table 1. PC Board dimensions for the author's Ft. Tuthill 80 transceiver enclosure (units are in inches).*

Next, write up a materials list of all the bits and pieces that will make up your chassis. *Table 1* shows the list for my Ft. Tuthill 80 project.

### Measure Twice, Cut Once

I start by adding about 1/32-1/16 of an inch to the overall length and width of each piece needed. Use a wide-tip black permanent marker to mark approximately where the scribed line is going to be made, and scribe over the marker band. This gives contrast to your scribed line. Scribe the PCB material.

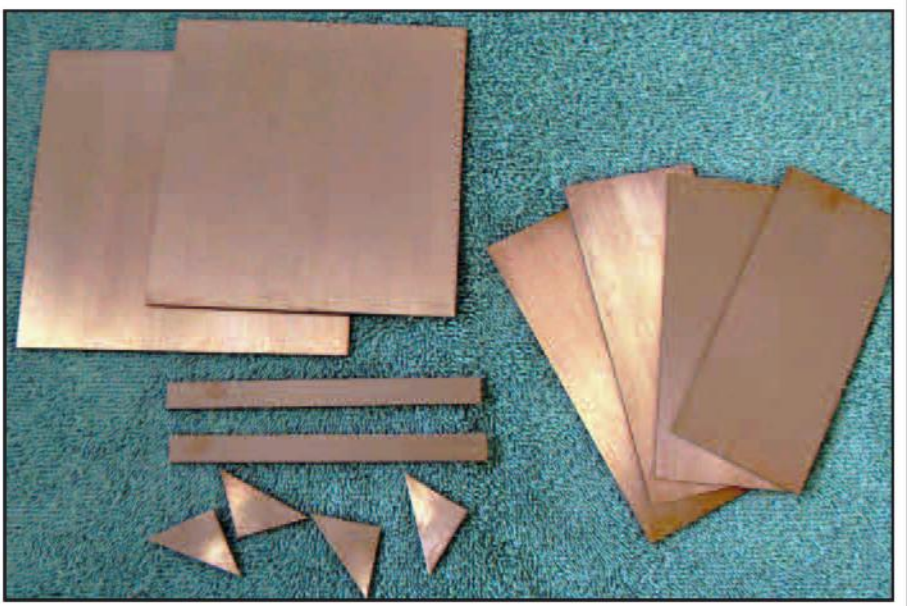

*Photo C. Once all the pieces are correctly sized, squared, and smoothed, take them all to the sink and scrub them with some Scotchbrite® to prepare their surfaces for soldering.*

### Required Tools for Building PC Board Enclosures

- Something to cut the PC board material. I use a heavy pair of tin snips
- Scribe
- A scale to measure and scribe cut lines and hole locations
- An inexpensive dial or digital caliper is not necessary, but extremely helpful
- Small square is required to check that the finished pieces are square, and later to check for soldered joint squareness
- Piece of 2-inch angle iron about 6-inches long; can also be aluminum angle
- A few spring-loaded clamps
- Sheet of 80-grit emery paper
- Soldering iron (40-watt should do)
- Rosin core solder
- Solder Wick®, for repair, if needed
- Scotchbrite® pad
- Any flat surface on which to place the emery paper for finish-sizing of the individual pieces; a cut piece of mounted Formica® would be ideal
- Smooth file, for radiusing edges, and de-burring
- 4-40 brass nuts, and stainless steel 4-40 screws for holding nuts in place while soldering
- Assorted drills and files for holes and cutouts

*It is assumed that the builder knows how to safely use hand tools and will apply the appropriate safety equipment and practices. If you aren't sure, work with someone who's more experienced.*

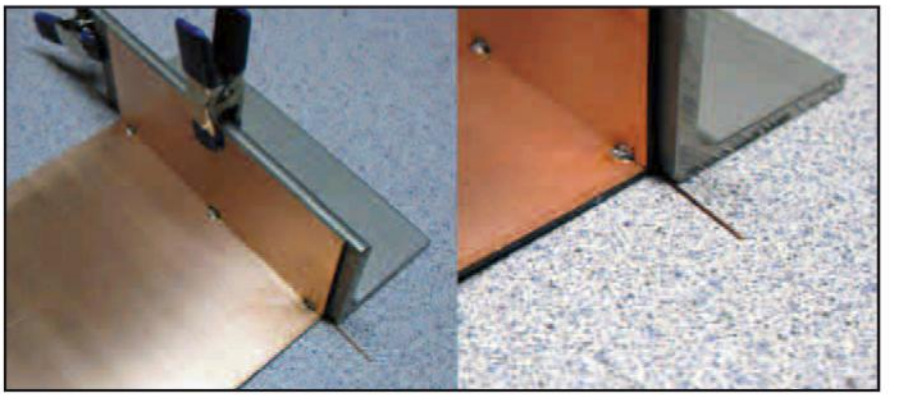

*Photo D. Since solder contracts as it cools, you'll want to set your corners at 92°, using a piece of 20 awg wire to make that slight bend.*

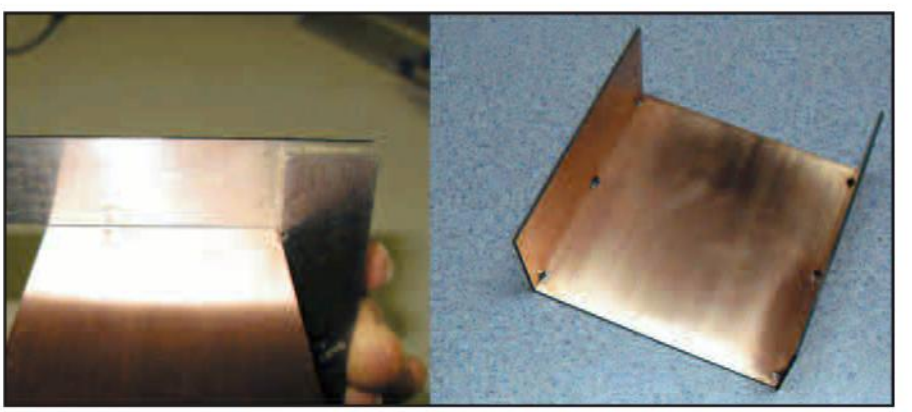

*Photo E. Once the solder has cooled and contracted, your 92° corners now square up at 90°.*

Be clever; measure twice and cut once. Cut out your pieces with a tin snip.

Cutting leaves the edge thickness a little ragged, and slightly de-laminates it. Once you have all the pieces cut, you will want to make sure you have nice square corners to the finished size and a square corner at the thickness, on all four edges. To do that, you need to rub all four edges on the emery paper, lying on a flat surface. *When working fiberglass or any material that produces dust, use the appropriate face and breathing protection to keep from inhaling dust.*

Start out slowly, as the size can change very quickly, and it is easy to get undersize, or out of square. Check the four corners for squareness frequently during the process, and adjust accordingly, as shown in *Photo B*. Repeat this for all the pieces required. Take your time and make sure you are getting the stock to the correct size and square. It will be time well spent.

Now is a good time to double-check that you did your math correctly.

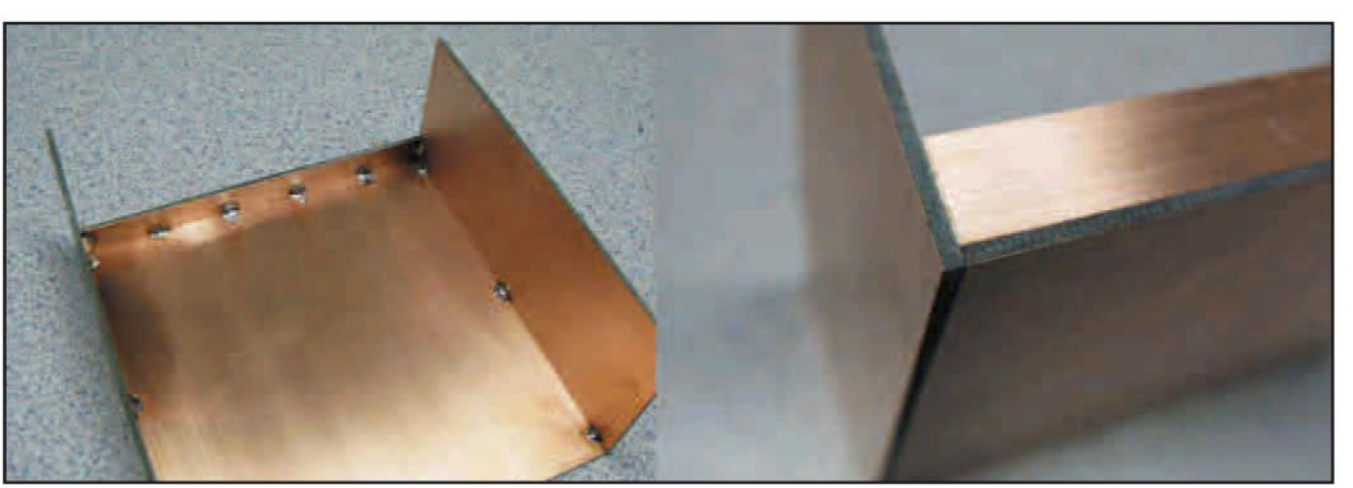

*Photo F. Here are the side pieces soldered to the base between the front and rear panels. Having the edges sanded square allows the side pieces to be flush with the outside surfaces.*

*Photo G. Using a spring clamp to position a cover gusset at the location you desire. Again, ensure the gusset will not interfere with any internal components.*

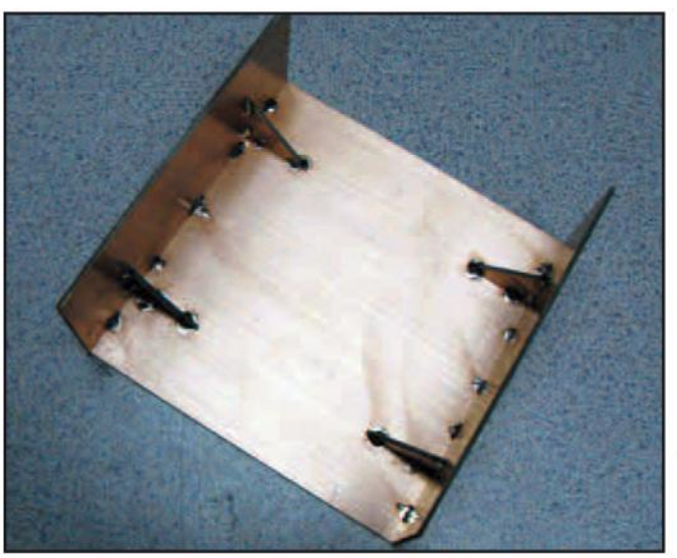

*Photo H. Note that the solder end stitches for the cover are not at the edges. This is to allow for the 1/8-inch overhang, to keep the bottom chassis edge from contacting the solder stitch of the cover when assembled.*

Position the pieces together to see if you have the correct basic fit. If you are off a material thickness somewhere, it will show up, and you can make a replacement part with the correct dimensions. After you have assured yourself that all is correct, take the pieces to the sink and scrub them with some Scotchbrite® to prepare their surfaces for soldering, as shown in *Photo C*. This removes any surface corrosion, oils, and traces of the marker so that the copper is shiny and will solder easily.

## Putting the Pieces Together

When assembling the pieces, you need to allow for the physical characteristic of solder that it contracts when it cools off. Knowing this ahead of time, you can allow for it. When two pieces of the PCB material are clamped 90° apart, and you apply solder at the joint, the joint will close about 1°-2°, no matter how well you clamp it, and you will end up with an 88° corner. That doesn't sound like a lot, but it will make your project turn out poorly. We allow for it in *Photo D* by positioning it at 92°. You do this by placing a piece of 20-awg wire at the bottom, between the angle iron and the part, and clamping at the top we achieve the 92° angle we are seeking.

As you see in *Photo E*, when you solder, the stitches the board will contract to the 90° angle you desire. *Do not try to bend or straighten the angle without applying heat to the stitch. If you try to force the joint, you will lift the copper off the board, and the union at that point is useless.*

*Photo F* shows the side pieces soldered to the base between the front and rear panels. Here you see the importance of having the edges sanded square. It allows the side pieces to be flush with the outside surfaces. At this point, add solder stitches every 3/4 of an inch.

To assemble the cover, attach the two sides, as you did for the bottom chassis. Do not depend on the gussets to square up the sides; they are only for mechanical support and to strengthen the assembly. *Photo G* shows using a spring clamp to position a cover gusset at the location you desire. Be sure the gusset will not interfere with any internal components.

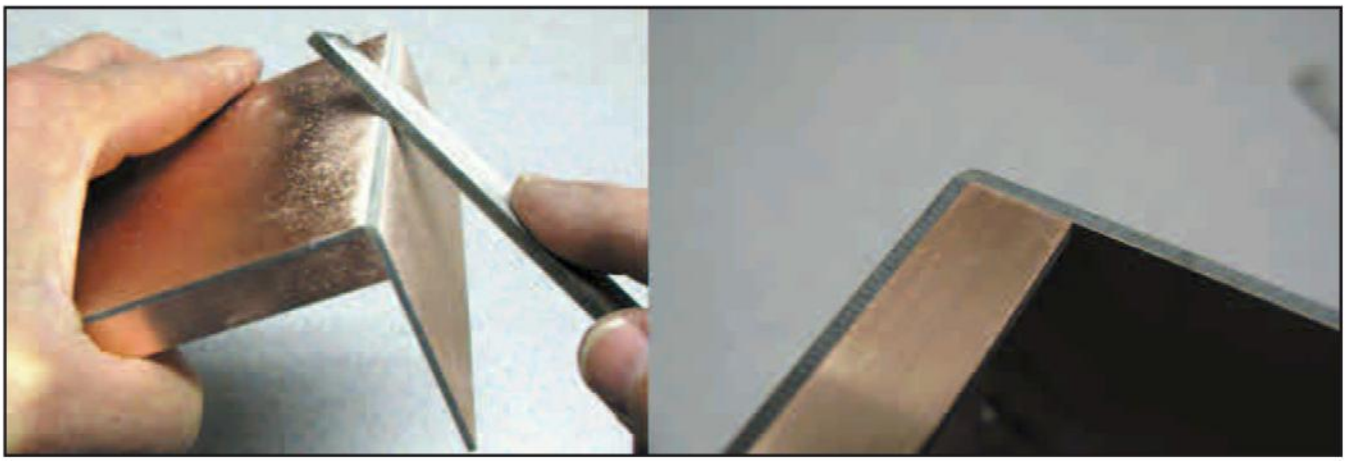

*Photo I. Using a file to "radius" the outer surfaces for a smooth feel.*

*Photo J. Carefully measure and scribe the locations of your screw holes. Once again, measure twice and cut once to ensure that everything will line up properly.*

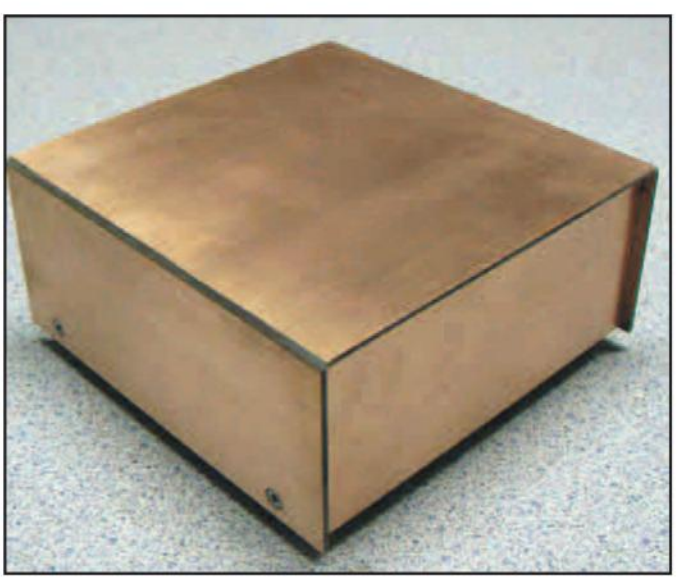

*Photo K. The completed enclosure, ready to be drilled for component mounting, painted (if you'd like) and labeled. The finished product is back in Photo A.*

Proceed to the other gussets, and finish-solder on both sides. You will notice in *Photo H* that the end stitches for the cover are not at the edges. This is to allow for the 1/8-inch overhang, to keep the bottom chassis edge from contacting the solder stitch of the cover when assembled.

In *Photo I*, you see how to radius the edges that would normally be radiused for a smooth surface if this was a sheet metal chassis.

## Drill, Baby, Drill!

Mark where you want your cover mounting holes, as in *Photo J*. Carefully scribe, center-punch the locations, and drill a clearance hole for the screws you want to use. Use stainless steel screws to temporarily hold the brass nuts in place, so they can be soldered to the inside. *Do not use any screws to which the solder may stick, as you may end up soldering the screw to the nut.*

The completed chassis, in *Photo K*, is shown with four self-adhesive rubber feet and flat-head hardware, is now ready for any holes. With the time and effort you have invested, you want to measure and drill carefully. *Again, be sure to take proper precautions to avoid inhaling fiberglass dust.* Mistakes can be repaired, but it's nice to do it right the first time. Good luck with your project.

homing-in:

# Results of the 20th Annual CQ World Wide Foxhunting Weekend

**BY JOE MOELL* KØOV**

"I guess we must have looked odd to everyone in Quilon, driving around helter-skelter with Yagi antennas connected to a transceiver hoisted in the air." That's how Vilas Rabde recalled last June's hidden transmitter hunt in Quilon, a seaport on the west coast of India. He was speaking to a reporter for *The Pune Mirror*, a newspaper in Rabde's hometown. The paper described how these radio direction finding (RDF) contests have grown in popularity. Local clubs organize events that draw foxhunting teams from far and near.

As in the U.S. and other countries such as Australia and the UK, mobile "T-hunts" in India have one or more transmitters to find within defined boundaries. Sometimes the hiders are with their transmitters, perhaps speaking on them, while other times the transmitters are concealed, cycling on and off automatically. At Quilon, the transmitter squawked for one minute and then was silent for five minutes, making the quest especially challenging for hunters navigating the busy city streets. You can see the long line of starting vehicles, most with rotating beams mounted to the front bumper, in a YouTube video[1].

## Years of Fun

Since 1998, *CQ* Magazine has encouraged hams to discover and rediscover the fun of hidden transmitter hunting by participating in the annual CQ World Wide Foxhunting Weekend. "Foxhunting" is just one name for this activity, you also may hear it called T-hunting or bunny hunting. As usual, the 2017 CQWWFW brought reports of hams enjoying foxhunting in a wide variety of ways. Rules were determined locally, so few hunts were alike, except for the on-foot radio-orienteering events that followed standard rules of the International Amateur Radio Union (IARU). As you prepare for Foxhunting Weekend 2018, read on to find out how your fellow hams had a blast doing transmitter hunting all last year.

Some clubs have just one foxhunt annually, on or close to Foxhunting Weekend. For the Peekskill-Cortlandt Amateur Radio Association (PCARA) in New York, May 14 brought continuous heavy rain, so the yearly hunt was postponed until June 3. Mike Ardovino, N2EAB, was the fox. In accordance with the club's rules, he started the hunt with a 5-minute transmission, a 5-minute silent period, then nine 3-minute-on-7-minute-off cycles. After 90 minutes, transmissions ended and the hunt was over, ready or not, with Mike announcing his location. First to find and declared as winner this time was Malcolm Pritchard, NM9J.

PCARA rules require that the fox's antenna be horizontally polarized. This makes it easier for hunters with RDF Yagis, because mounting them becomes easier. However, Doppler RDF sets are likely to give misleading readings on horizontally-polarized signals. They will respond instead to vertically-polarized reflections from buildings and terrain features.

As NM9J reported in *The PCARA Update*, "following the foxhunt, several members expressed a desire to improve their skills and to have more than one foxhunt per year. On

*Hidden transmitter hunting, both on foot and in cars, is a growing sport all over India. These girls in Mumbai have just completed a measuring tape Yagi and are off to find a 2-meter transmitter. (Courtesy of Shailesh Deshmukh, VU2LOC)*

*CQWW Foxhunting Weekend Moderator
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email: <homingin@aol.com>
Web: <www.homingin.com>

September 16, they gathered at Walter Panas High School for Foxhunt University, organized by Karl Zuk, N2KZ. Karl distilled years of RDF experience into his illustrated talk."

NM9J brought RadioShack scanners to act as flea-power signal sources. With the scanners set to receive on 157.415 MHz and with a first intermediate frequency of 10.85 MHz, their local oscillators radiated on the hunt frequency of 146.565 MHz.

"These scanner-transmitters were used by Karl to demonstrate polar diagrams of different directional antennas, including null points, harmonic operation, and the effect of attenuators," Malcolm wrote. "They also made it easy for students to check the directional patterns of their own antennas."

## Chicago vs. San Diego

Transmitter hunters in southern California and the Chicago area are in constant contention for the most active T-hunting region in the U.S. There is a hunt every Saturday in the Windy City, with different sponsoring clubs and starting points for each weekend of the month. Reports are published and statistics are compiled by Mike Brost, WA9FTS, in the monthly *Chicagoland Foxhunters Report*.

On New Year's Eve, Chicago's T-hunters gather for a holiday party where awards are presented for each club's hunt, plus an overall annual Chicagoland T-hunting award. In 2016, Matt and Patty Sanderson, KC9SEM and N9PLS, took top honors for the second year in a row. Visit the Society Radio Operators foxhunting page[2] for the 2017 winner(s), who had not been announced by press time in mid-December.

Southern California has two T-hunting hot spots, Los Angeles and San Diego. San Diego hams experiment with unusual hunt formats throughout the year. For April Fool's Day last year, Tom Franks, N2TEN, created and set out two lashups that looked like non-transmitting decoys, but were actually sending signals. One of these non-hidden transmitters was made from a discarded satellite dish and the other looked like a non-functional Yagi. There were six transmitters total in this hunt, a powerful one to get the mobiles into the area, two fake decoys, and three more foxboxes scattered in the neighborhood.

In July, San Diegans Robert Dexter, N9SCD, and Tim Everingham, N6CUX, organized a "Capture the Flag" foxhunt, with an after-hunt restaurant as the flag. Hunters were instructed to intercept the two as their vehicle approached the flag with its mobile transmitter sending a signal with 15-seconds-on-15-seconds-off timing.

"We allowed 20 minutes for the hunters to organize and take up positions to defend the flag," Robert wrote. "Then we turned on the transmitter and started our approach from Grossmont Center. We could have wandered around a bit to try and confuse them prior to the final approach, but we decided on a direct route. The hunters could tell we were coming from a given direction but would not know the distance until we had already passed. Our plan worked to get us past Joe Loughlin, KE6PHB, and Tony Boegeman, WA6ZMZ, who were guarding the southwest corner.

"We intended to go behind a building along the east edge. Unfortunately, we were spotted by Dick Foran, WB6ZAM, and Mark Ording, K6MHO, at the end of the building at the southeast corner. Dick made the call to identify the gray Honda Civic on the hunt frequency. It was 'game over' in less than 15 minutes."

September's Saturday morning transmitting-mobile hunt in San Diego was more difficult for the hunters. It was intended to simulate the search for a pair of mobile jammers driving around California's second most populous city. Joe Corones, N6SZO, and Greg Spaulding, W6BAF, were the first fox team and Ron Johnson, KK6I, and Garry Cannon, NA6NA, were the second.

*Is this a hidden ham transmitter or not? At first glance, it looks like a satellite dish. At second glance, the incomplete wiring makes it appear to be a decoy. But actually, there is a micro-transmitter in the feedhorn arm. It was one of five foxes set out by Thomas Franks, N2TEN, for an April Fool's Day hunt in San Diego. (Courtesy of N2TEN)*

For three weeks prior, hunters were encouraged to collaborate to develop a strategy for finding the foxes quickly and efficiently. There was plenty of clever collusion, but some hunting teams forgot to turn off their vehicles' APRS beacons. Also, the hiders figured out which repeater the hunters were using for coordination and eavesdropped on them. So the hunt turned into a game of cat-and-mouse lasting for over four hours until the "jammers" were busted.

For the full play-by-play description of this intrigue, plus tracks of one hider and some of the hunters, visit the excellent San Diego T-hunters website[3]. There are also plenty of other unusual hunt reports and photos there.

## Try 10 Meters

In the 1950s, mobile T-hunts were on the HF bands. To minimize skywave QRM, 75 meters was best during the day and 10 meters was preferred at night. There is still plenty of RDF fun to be had on these bands. Larry Berger, WA2SUH, reported on an impromptu 10-meter hunt on Long Island with Andy Kirschenbaum, WA2CDL, as the fox.

Andy told Larry that since others weren't available for a 2-meter hunt that evening, he wanted to hide on 10 meters for Larry to find. "He sounded desperate," Larry wrote, "so I said

*Bill Wright, WB6CMD, gets ready for on-foot RDF at Fullerton Radio Club's Antennas In The Park picnic on Foxhunting Weekend 2017. Practice sessions like this helped prepare Bill for the USA ARDF Championships in Ohio, where he won three medals. (Photo by Joe Moell, KØOV)*

*Twenty people participated in the annual on-foot transmitter hunt and picnic of the Ski Country Amateur Radio Club near Glenwood Springs, Colorado. In front is the hunt winner, 9-year-old Sofia Harwood, daughter of Jeremy Harwood, KEØHQO. Behind Sofia are Bill Mohrman, NØMID; Debbie Buckley, NØLDB; Betty Rahn, KDØYDH; Frank McKibben, NÚAFO; and foxmaster Brent Williams, KDØWAK. (Courtesy of Bob Cutter, KIØG)*

that I would ride around by myself and look for him, but with no external direction finding device. I have a 10-meter loop, but with that I really need a co-pilot for safety purposes.

"I tuned my IC706MkIIG to 28,720 kHz AM and used the Hustler vertical mast with a 10-meter resonator," Larry continued. "Andy uses a Lafayette HA-410 AM transceiver which puts out 20 watts. At the local school parking lot, I heard his voice and spun the car around in a circle. With the antenna on the left rear, the maximum signal is in the direction of the right front of the car. That told me that Andy was northwest of me.

"I took local streets and when I got to Old Country Road, the signal was pinning the S-meter. I made a loop around the railroad tracks in Mineola and quickly came back to Franklin. Even when the signal was full scale on the mobile rig, I could still get the peak by spinning the car in a circle.

"Finally, I stumbled upon Andy in the parking lot behind police headquarters. I would say in a straight line, he was six or seven miles from where I started. It took about 30 minutes to find him. With

the loop I might have found him 5 minutes faster."

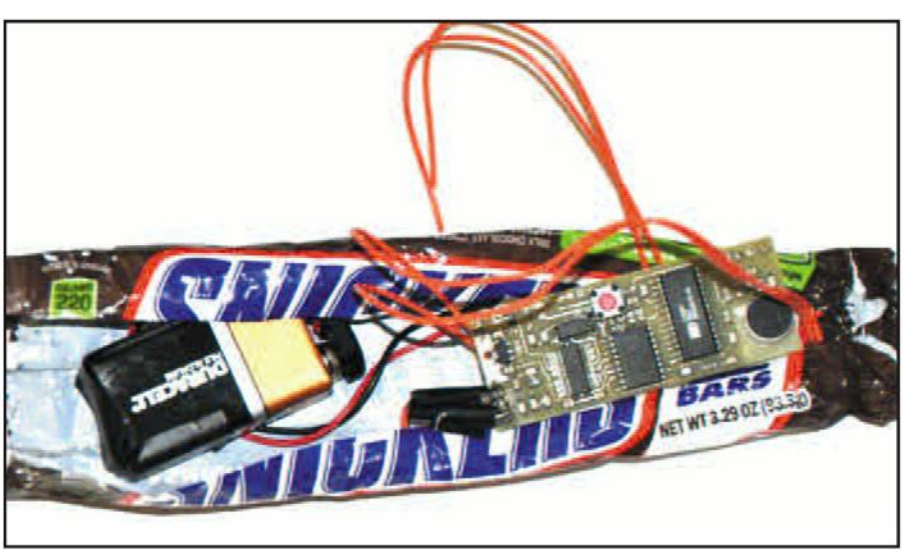
## Walk or Run

Every year brings more reports of Foxhunt Weekend events that are all on foot, no vehicles involved. The on-foot hunts attract young people because they reward physical ability instead of street navigation skills. Kids don't need driver's licenses or ham licenses to receive and to hunt. RDF gear for 2-meter, on-foot hunts can be very simple, just a handi-talkie with a small beam and RF attenuator.

Walking foxhunts, often combined with a picnic or potluck, have become a tradition in many areas. In 2017, I received reports of the annual events of Surrey ARC (British Columbia), Fullerton RC (California), San Diego T-Hunters (Lakeside, California), and Ski Country ARC (Glenwood Springs, Colorado). All of them have been featured in previous years' results.

As always, there was a fine report from the hams of OH-KY-IN Amateur Radio Club, which puts on a walking hunt with about two dozen transmitters for the annual Hamvention®, this year in Xenia, Ohio. New this year was a Foxhunting Weekend hunt announcement from the York County Amateur Radio Society in South Carolina. Unfortunately, I didn't receive a follow-up report.


*Winner and second place finishers at the annual Hamvention® on-foot foxhunt for 2017 were Colin Oleniczak, KD9AHH, with 23 foxes found; and Matt Sanderson, KC9SEM, with 22 found. The hunt takes place in a large park on Sunday. (Courtesy of Bob Frey, WA6EZV)*




*It looked like an ordinary candy bar, but inside the wrapper was a hidden transmitter. It was one of five unique foxes that the transmitter hunters of San Diego put out for newcomers at their Lakeside Hamfest demonstration. (Courtesy of Joe Corones, N6SZO)*

Increasing numbers of clubs are taking on-foot foxhunting to the public at hamfests. "There's a transmitter on the air around here. Take this direction-finding set and see if you can find it." This can be surprisingly effective at getting hams to try RDF and then participate in local hunts. This same technique works well at Jamboree-on-the-air for Scouts.

After a three-year hiatus, the Radio Club of Tacoma (RCT) in Washington got back into hidden transmitter hunting with a workshop for 2-meter antenna building on April 15. That was followed by an on-foot event on May 21st in the Fort Nisqually Historical Area at Point Defiance Park. Rich Patrick, KR7W, hid five 2-meter transmitters, one just 300 feet away for practice, and the remainder scattered through the park up to a half-mile away. For newcomers, there was loaner gear and instructions from Bob Heselberg, K7MXE; Mike Finnie, W7FMW; and Red Cranefield, WB7EC. Soon everyone was out on the course with their maps and self-score sheets.

The RCT hunt was unusual because everyone left the park without knowing who won. That was not revealed until the June club meeting. Four factors were under consideration as the committee deliberated. The winner would have constructed his or her own equipment, participated in club building projects, found the maximum number of "bunnies," and had a respectable time.

The trophy went to Mike Drorbaugh, W7MKE, who used his home-built gear to find all transmitters. His enthusiasm was evident. It also may have helped that he handmade small embroidered patches and gave them to each of the participants.

To increase interest and participation, clubs have foxhunting presentations at their meetings and hold antenna-building workshops. Those who do well at on-foot foxhunting are encouraged to advance to formal Amateur Radio Direction Finding events. The 2017 USA ARDF Championships, combined with the ARDF championships of International Amateur Radio Union (IARU) Region 2 (North and South America) took place in western Ohio during early August[4].

In addition to classic five-fox courses in large wooded parks, ARDF championships now include two newer events, the sprint and *foxoring*. Foxoring is a

combination of direction-finding and classic orienteering in which competitors are given a map marked with numerous small circles. They use map-and-compass skills to navigate to each circle, where they will hear a QRP transmitter to find by RDF. This would be a fine way to introduce your local orienteering club to ARDF. To see what it's like to go out on a foxoring course, watch the video from Australia[5] listed in Note 5.

## Next Foxhunting Weekend — May 12-13, 2018

Mobile or on-foot, one transmitter or many, a radio foxhunt is sure to stir up activity in your ham club. Now is the time to plan for this year's CQ Worldwide Foxhunting Weekend, which will be May 12-13. CQ doesn't impose any rules or offer any awards for Foxhunting Weekend. That's up to you and the hams in your hometown. Your hunt can be for mobiles or all on foot. Use the international rules or make up your own.

For many clubs, Foxhunting Weekend kicks off a season of regular transmitter hunts. For others, it's a special once-a-year event, like Field Day. Since the primary objective is lots of hunt participation, we don't insist that your event be on that particular weekend. Any time in the spring is fine with us!

If your club has always had one kind of hunt on Foxhunting Weekend, why not try something different this year? Some hams prefer the formalities of carefully crafted boundaries, specifications for signal parameters, time limits, and so forth. Others are content just to have one or more signals to hunt. No need for any regulations, they say. Talk it up on the local repeater and social media to find out what your friends have in mind.

Foxhunting teaches an important skill — the ability to find the source of signals from afar. RDF is useful for public service and volunteer enforcement. It can even save lives. Most of all, it's fun. Give it a try, but ensure your group has safe fun. See to it that no one can be injured by your hidden transmitter or by trying to get to it.

Don't let the excitement of the hunt make you an unsafe runner or driver. Make sure that all transmitting and receiving antennas are eye-safe. Always be mindful of your own physical limitations and never take chances behind the wheel or in the forest.

Make your Foxhunting Weekend activities into a magnet for every club member. Better yet, include the whole community, especially young people. Invite a Scout troop to experience on-foot transmitter tracking or to ride along with the mobile hunters. Look for opportunities to incorporate foxhunting into Scout activities such as Camporees, Scout-O-Ramas, and Jamboree-On-The-Air. Seek out other youth groups that might be interested.

Afterward, write up the results and send them to me. The list of information in a complete CQ Foxhunting Weekend report is posted at <www.homingin.com>. In addition to the details of date, location, hiders and winners, *CQ*'s readers also want to know what was unique about your hunt and what lessons (positive and negative) you learned from it. Don't forget to include some sharp action photos. The higher the resolution, the better.

I am eager to read your reports of this year's foxhunting activities and the new ideas that you come up with. Happy hunting!

**NOTES**

1. http://bit.ly/2BImoW4
2. http://bit.ly/2nCh9oI
3. www.sdthunters.com
4. Detailed report in "Homing In" column in *CQ* Magazine for November 2017
5. http://bit.ly/2iZyHt8

*Cold power-up for a vintage linear amplifier can affect the life of its tubes and switches. K9ARZ has a cheap and easy way to protect those hard-to-replace components with a simple soft-start circuit.*

# Simple and Inexpensive Power Amplifier Soft-Start Protection

**BY LAWRENCE W. STARK,* K9ARZ**

If you are like me, using a linear amplifier from an earlier generation, you are well aware of the shortcomings associated with switching the unit on from a cold start. Without current inrush protection, my old Heathkit SB-200 or Drake L4 amplifier would initialize with a loud thump when the rocker switches were turned to the "on" position. The high capacity in the power supply circuit would act as a momentary dead short for the plate transformer. Also of concern is the inrush current as the filaments are simultaneously lit.

The answer to this concern is already present in most modern amplifiers. The circuitry involved may be rather complex, but it need not be. I have found an already wired soft-start board on eBay that will do the job for you for as low as $8.50, often with free or relatively inexpensive shipping from China. When I purchased mine, the boards were about $12 with free shipping, and the item was in my hands in about 3-4 weeks.

The theory behind the circuit is to place some resistance (in the form of a thermistor) in series with half of the AC line for a period of about 5 seconds. Afterward, a heavy-duty relay bypasses the resistance, thereby applying the full line voltage to the filament and plate supplies. I have constructed similar circuits for my home built amplifiers in the past, but this makes things much easier to use and is considerably smaller than my homebrew efforts.

The Chinese-produced soft-start boards are rated at 240 volts AC at 40 amps of current. That should suffice for most commercially produced legal-limit amplifiers currently on the market. The boards are actually designed for builders of high power "Class A" audio amplifiers, but I must say they perform very nicely for amateur radio amplifiers operating in any class.

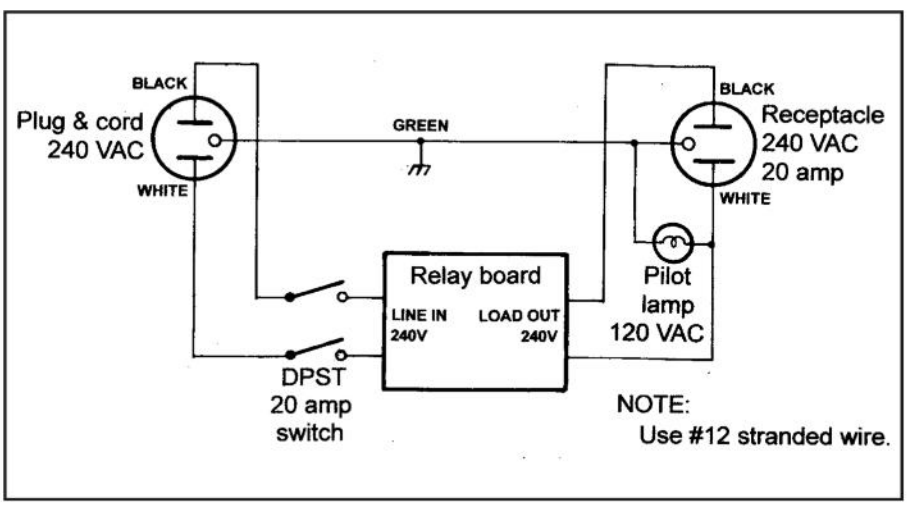



*Figure 1. Schematic of the soft-start circuit wiring. Use #12 stranded wire and 240-volt/20-amp connectors and switches.*

## Construction

*Figure 1* is a simple schematic diagram of the soft-start wiring. I used a heavy duty 240-volt, 20-amp line cord with plug to fit the 240-volt wall receptacle in my ham shack. The on-off switch I chose is a DPST toggle switch rated at 20 amps. The wiring inside the chassis box uses #12 stranded wire with tinned ends and spade terminals for connection to the 240-volt receptacle in the box (using stranded wire makes it easier to dress the wires inside the box during assembly).

A 120-volt pilot lamp assembly is wired between the green common post and one half of the 240-volt line out. The board is mounted on four standoffs with 4x32 machine screws to the bottom of a 4.75- x 6- x 2.25-inch extruded aluminum cabinet that previously housed a serial switching circuit. You can use any similar enclosure that you might have on hand.

*Photo A* is a close up photo of the circuitry shown in the schematic. *Photo B* shows the back panel of the soft-start box, illustrating the type of plug and receptacle used for the project. *Photo C* shows the soft-start box perched atop my Drake L4 amplifier currently in use.

## Using the Soft-Start Box

When using the soft-start box, the AC switch on the amplifier is turned to the "on" position *first.* In the case of the L4, it is the "CW on" switch. *Next*, switch the toggle switch on the front of the soft-start box to the "on" position. The pilot lamp will light immediately, and the relay will quietly click in after 5 seconds.

After the relay clicks in, it is OK to tune

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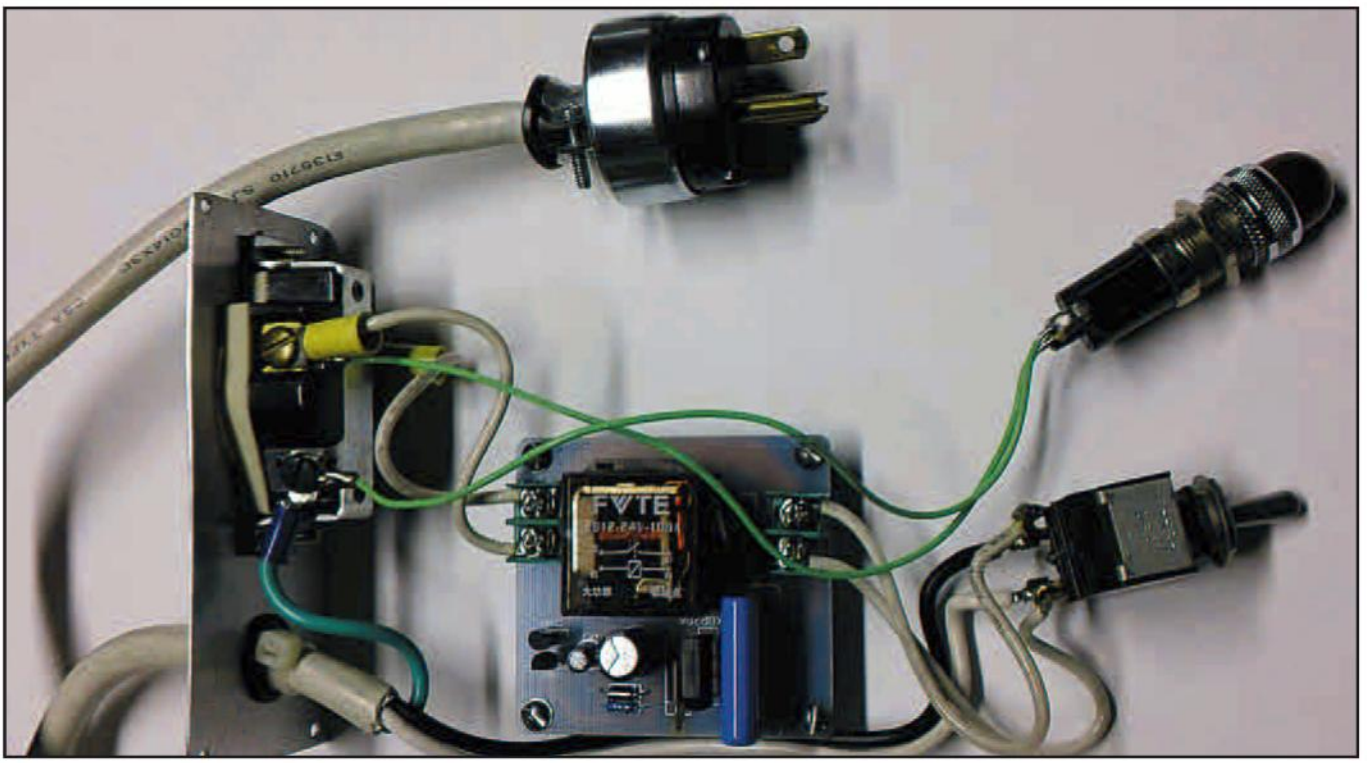


*Photo A. The soft-start circuit after construction but before mounting inside the enclosure.*

*Photo B. Back panel of the soft-start box, showing both the receptacle and plug used in the project.*


*Photo C. The soft-start in use in the author's shack, atop his Drake L4 amplifier. Remember: Turn on the amplifier's power switch first, followed by the soft-start switch.*

the amplifier or, in the case of the Drake L4, to switch to SSB position if that mode is desired. Using the soft-start will not only help protect your power supply and amplifier tube/s, but will increase the life of the amplifier's rocker/toggle switch contacts. The contact issue is a common problem with SB200, SB220, Drake L4/B, and 30L-1 amplifier switches.

The Chinese soft-start boards can be found by doing a search on eBay for "Amplifier Soft-Start Power Supply Boards." There are about a half dozen different boards available; just make sure that the board you choose is capable of handling 240 volts at 40 amps (just to be safe).

You may have wondered why I didn't just build the board inside the amplifier. I thought of doing just that, but I hate to change the original circuitry if I don't need to. Also, this way, I can use the soft-start with any of my amplifiers and I don't use more than one at a time.

*In our December 2017 issue, K1EHZ and several colleagues wrote about propagation changes observed on 80 and 160 meters during last summer's total solar eclipse. The author promised an update if further data analysis turned up anything of interest. It did, and here's his report.*

# Update: WSPR Propagation on 20 and 40 Meters During the 2017 Solar Eclipse

**BY JAY TAFT,* K1EHZ**

After submitting our original article[1], I continued to analyze the data related to observations of WSPR (Weak Signal Propagation Reporter) propagation during the solar eclipse on August 21, 2017. The eclipse began here in southern New Hampshire at 17:27 UTC, peaked at 18:45 UTC and ended at 19:57 UTC. I found interesting results on 20 and 40 meters. My 20-meter signals were heard at stations 400 to 16,000 kilometers (250 to 9,940 miles) away, except during the middle part of the eclipse (*Figure 1*). This suggested there was a change in the Maximum Usable Frequency (MUF) so that the 20-meter signals were passing through the ionosphere without being refracted.

The 40-meter WSPR data in the original article did not reveal clear eclipse effects such as we observed on 80 and 160 meters. However, local hams Tom Perkins, AC1J, and Jack Duffy, NF1L, observed changes in distances of stations received on 40 meters during the eclipse. These distance changes were subtler than the eclipse effects on 80 and 160 meters. Their observations were made here in New Hampshire, which prompted me to look more closely at my own 40-meter WSPR data for subtleties.

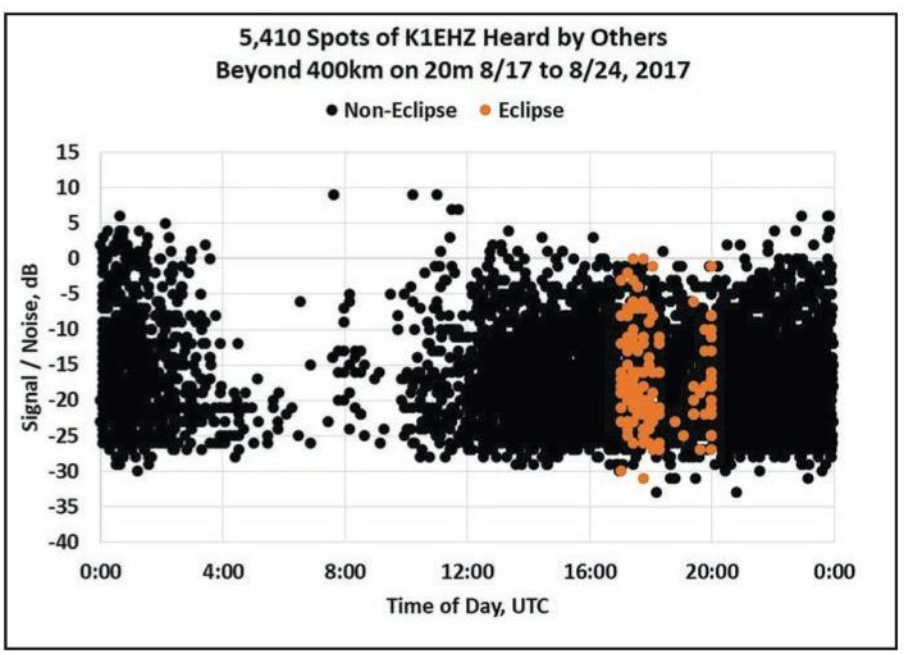


*Figure 1. Graph of the author's WSPR (Weak Signal Propagation Reporter) signals heard on 20 meters, at distances of 250-9,940 miles between August 17 and 24, 2017. Orange dots indicate reception reports during the solar eclipse on August 21.*

## MUF

Maximum Usable Frequency is a calculated estimate based upon the critical frequency of the ionosphere's $F_2$ region and a factor, M. The M factor considers incidence angle, Earth's curvature, altitude of the refracting region, total electron content, and corrections to the basic algorithm proposed by various authors. MUF is commonly expressed for a 3,000-kilometer (1,865-mile) path, approximating the distance of one DX propagation hop via the $F_2$ layer. MUF can be calculated at other distances as well. Refraction of radio waves from the ionosphere improves as the incidence angle becomes more oblique from the vertical. So a vertical MUF might be 3-4 MHz, and the corresponding oblique angle MUF refracting out to 3,000 kilometers might be 15-20 MHz.

The International Telecommunication Union states, "...instantaneous basic MUFs may only be determined from the examination of oblique incidence ionograms measured over the propagation path. An approximation to this may be obtained by using well placed vertical incidence soundings and assuming ionospheric homogeneity along the path[2]."

As a practical matter, the vertical incidence method is typically used to estimate MUF at various distances from a

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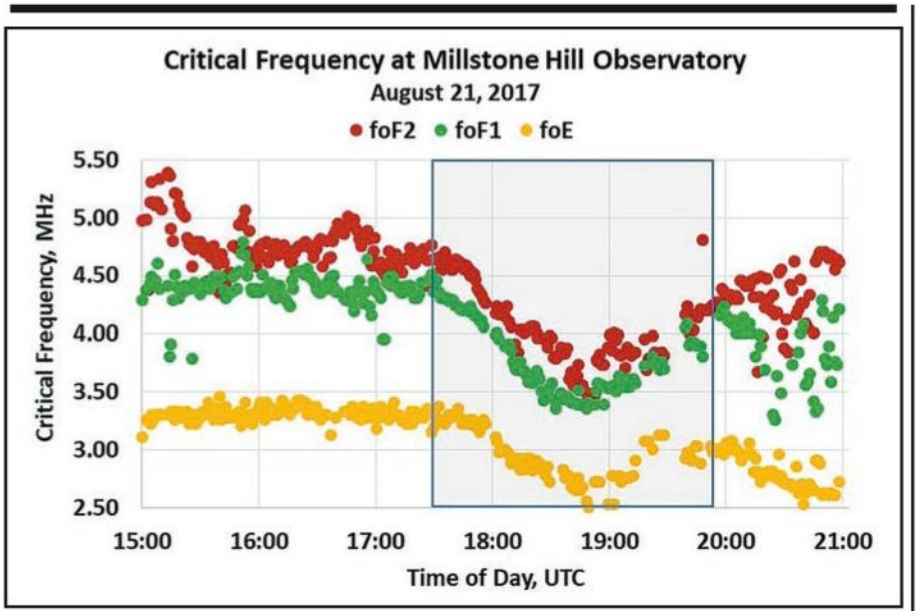


*Figure 2. Critical frequency data for August 20-22 as recorded on ionograms by the Millstone Hill Observatory near the author's home. The dip during the period of the eclipse (in the box) is clear.*

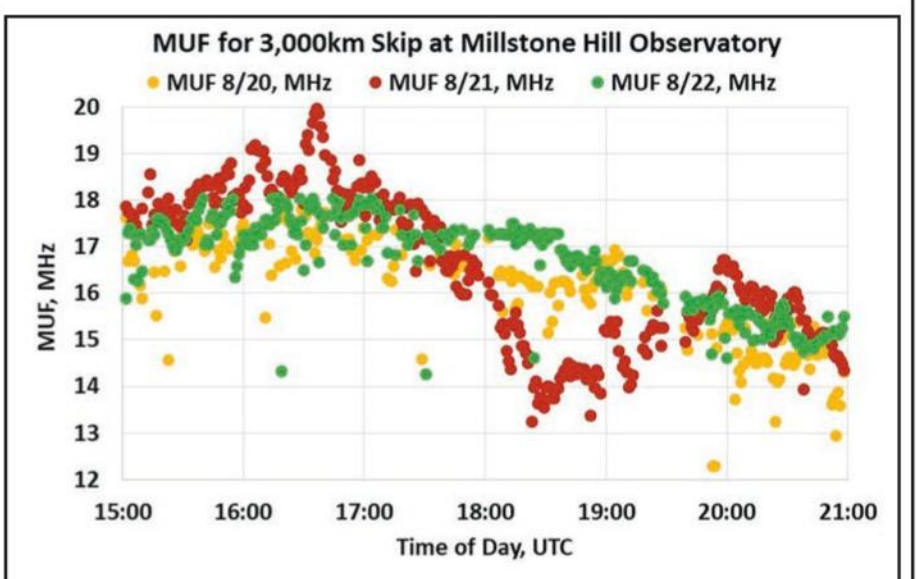


*Figure 3. Maximum Usable Frequency (MUF) data calculated by the Millstone Hill Observatory on the day of the eclipse (red dots) as well as the day before (yellow dots) and the day after (green dots). Again, the dip during the peak of the eclipse around 1845 UTC is obvious.*

vertical sounding. The assumption of ionospheric homogeneity does not necessarily hold over long distances or time spans. Ionospheric variability results in differences between calculated MUFs and the propagation we actually experience along oblique signal paths.

## Ionograms

To explore the effects of MUF, I used ionograms for Millstone Hill Observatory, 42 kilometers (26 miles) south of my home[3, 4]. Critical frequencies measured directly above the digisonde and MUF calculations for various distances are tabulated on each ionogram. Times for the critical frequency measurements are coordinated by GPS time across the global digisonde network and should correspond very closely to WSPR transmission time.

Ionograms taken on August 20, 21, and 22, 2017 contained critical frequencies for $F_2$, $F_1$ and E regions (*Figure 2*). MUF calculations were extracted for 15:00 to 21:00 UTC on each day (*Figure 3*). August 20 and 22 were controls for August 21 to identify MUF

changes during the eclipse. On the two control days, there were brief dips with the MUF approaching or dipping below 14 MHz. In contrast, on August 21, the MUF began to decrease at about 17:30 UTC and continued to decline from 17 MHz to a low of 13.24 MHz. The MUF varied around 14 MHz from 18:25 to 19:12 UTC, bracketing peak eclipse here at 18:45, after which it began to increase toward control levels. The MUF decrease appeared to correspond to the timing of my 20-meter signal gap during the eclipse.

## 20-Meter Results

To obtain a direct visual comparison between the timing of the gap in 20-meter WSPR signal-to-noise data and MUF, the MUF data were adjusted in two ways. First, the MUF values for each time from the control days were averaged and subtracted from the eclipse MUF taken at the same time of day. To maximize the use of eclipse data, if there was a MUF value on only one control day at a particular time, that single control MUF was subtracted from the eclipse MUF. Second, the resulting differences in control and eclipse MUF values were multiplied by 10 to expand the scale for clearer comparison to the WSPR signal-to-noise data.

Only stations heard both before and after the gap are shown in *Figure 4* because I wanted to minimize propagation effects that may have occurred only before or only after the eclipse. The stations ranged 1,094 kilometers to 2,483 kilometers (680-1,543 miles) away from my station at azimuths of 216° to 284°. The adjusted MUF values are color-coded for those greater than 15 MHz (green), 14-15 MHz (orange), and less than 14 MHz (red).

The decrease in MUF calculated from measurements 42 kilometers away corresponds very closely to timing of the gap in 20-meter signals. MUF is calculated from ionosphere data directly above the digisonde, while the signals were refracted from the ionosphere midway between stations, for example, at 1,200 kilometers (745 miles) for stations 2,400 kilometers (1,490 miles) apart. So it is not surprising that the WSPR gap corresponds to a range of MUF values around 14 MHz and not just to values below 14 MHz. This is likely due to ionospheric variations from the homogeneous condition assumed in MUF calculations.

## 40-Meter Results

Closer review of my 40-meter WSPR transmissions revealed an apparent shift in stations hearing my signals during the eclipse. *Figure 5* shows reports of receiving my transmissions by stations 19 to 1,645 kilometers (12 to 1,022 miles) away. Only stations receiving signals both before and after the eclipse are included in the graph. Fewer stations heard signals at 200 to 600 kilometers (125-375 miles) during mid-eclipse than before or after.

MUF calculations from the GIRO (Global Ionosphere Radio Observatory) digisonde at Millstone Hill Observatory also showed mid-eclipse decreases in MUF (*Figure 6*). However, the MUF for 400 kilometers (250 miles) was consistently below the 40-meter band for the entire time graphed. Nevertheless, WSPR signals were heard between 200 and 400 kilometers (125-250 miles) away at times other than mid-eclipse. Fewer stations within 600 kilometers (375 miles) being heard during mid-eclipse suggests ionosphere patchiness (non-homogeneity) similar to what we observed on lower bands in the original article.

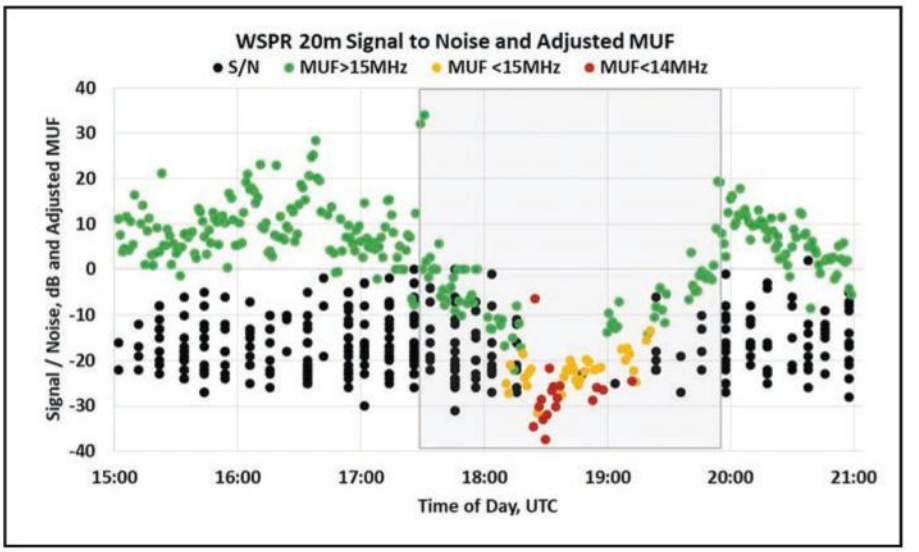


*Figure 4. Comparison of signal-to-noise ratio on 20 meters during the eclipse to MUF readings. See text for details.*

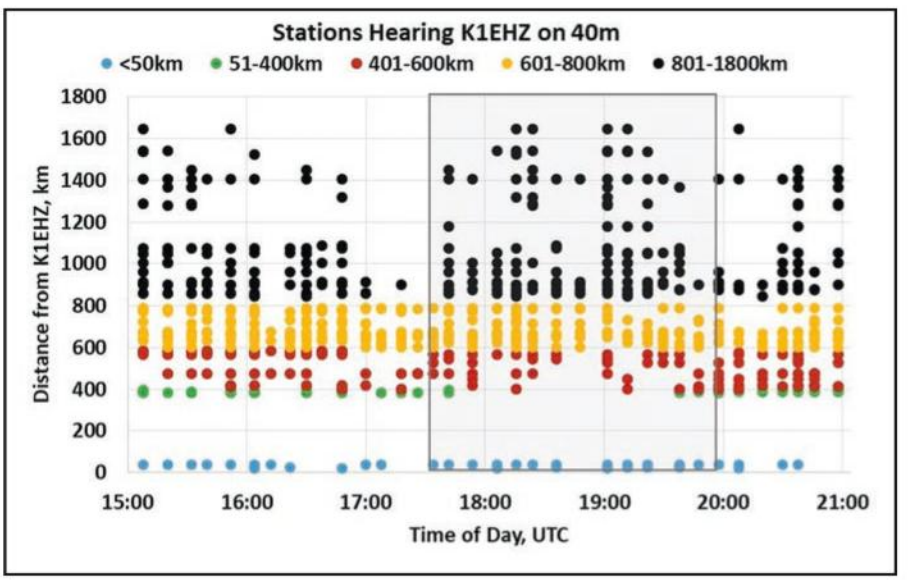


*Figure 5. Graph of reception reports of the author's transmissions on 20 meters before, during, and after the eclipse. Note that fewer close-in stations heard him during the eclipse than either before or after.*

## Ionospheric Gravity Waves

Actual propagation frequencies differ from estimated MUF values due to ionospheric variability. Gravity waves

are major ionospheric features contributing to variability. The high electron density regions that refract signals oscillate vertically with the peaks and troughs of traveling gravity waves.

Altitude measurements of the high electron density areas in the $F_2$, $F_1$ and E regions above Millstone Hill Observatory indicate the presence of gravity waves before, during, and after the eclipse (*Figure 7*). $F_2$ wave peak-to-trough distances ranged from about 230 kilometers (143 miles) to 170 kilometers (106 miles) and moved vertically very quickly. The eclipse peaked here at 18:45 UTC. At 18:41 the $F_2$ was at 182 kilometers (113 miles); by 18:45 it rose to 206 kilometers (128 miles), and by 18:51 it dropped to 171 kilometers (106 miles).

These vertical oscillations indicate short-term vertical velocities reaching 80 to 140 meters per second. Refracting region oscillations are dynamically significant in the ionosphere and the altitude of the oscillating refracting region influences MUF calculations through the M factor. However, it is not clear from the WSPR data exactly how vertical oscillations during the eclipse influenced the observed propagation.

## Summary

Considering the results in the original article and those presented here, WSPR signals on 160, 80, 40, and 20 meters responded to the eclipse differently by band. D-region disruption allowed 160- and 80-meter signals to be refracted from higher ionosphere regions during daylight hours. Even though there was a dip in MUF during the eclipse, MUF calculations for the $F_2$ region were above 4 MHz for the entire period, based on critical frequency at Millstone Hill Observatory. Therefore, refraction of 160- and 80-meter signals was supported by the $F_2$ region. $F_2$ region MUFs dipped low enough to create a gap in 20-meter propagation, and to cause an apparent shift in 40-meter propagation from shorter to longer distances.

These propagation changes followed the patterns of MUF changes but did not necessarily conform exactly to MUF calculations. MUF changes during eclipses are generally known from previous studies. Nevertheless, concurrent ionospheric data provide interesting insights into the processes shaping observed propagation events.

*Acknowledgement: Many thanks to Phil Erickson, W1PJE, for informative discussions about GIRO and ionosphere dynamics.*

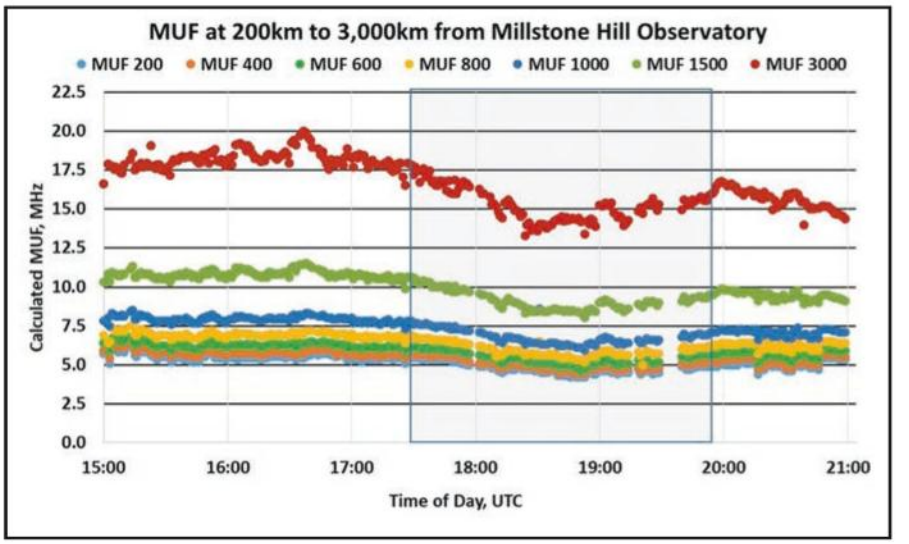


*Figure 6. MUF calculations by the Millstone Hill Observatory for paths of various distances on the day of the eclipse. Note that the MUF for 400-kilometer (250-mile) paths (orange dots) was below 40 meters for the entire time graphed. Yet, the author's signals were heard at this distance, most likely due to variations in the composition and density of the ionosphere at various times.*

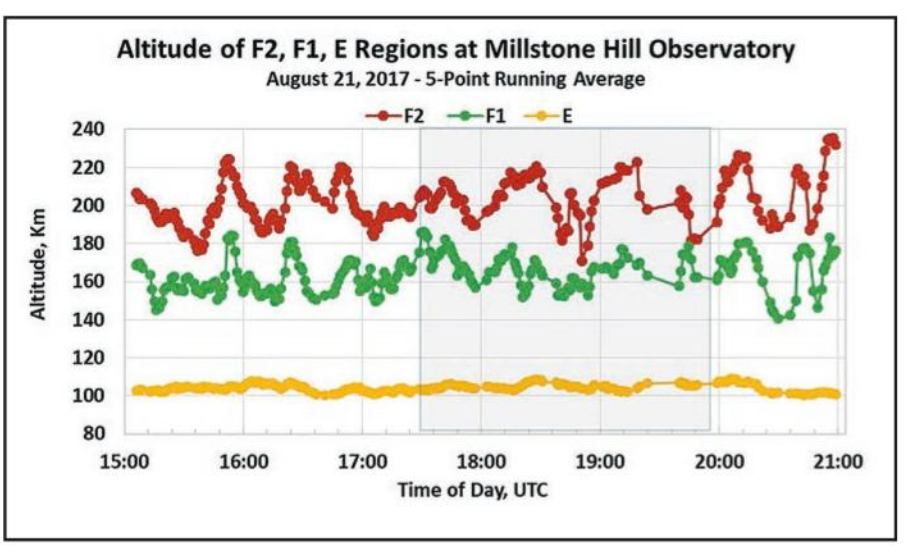


*Figure 7. Measured altitude of various ionospheric layers at the Millstone Hill Observatory on the day of the eclipse. Note the sharp drop in the $F_2$ layer altitude at the peak of the eclipse around 1845 UTC, and its quick recovery afterward.*

**Notes**

1. "Low Band WSPR Propagation During the 2017 Solar Eclipse," Taft, et. al., *CQ*, December 2017.
2. "Propagation at Frequencies Above the Basic MUF," ITU Report ITU-R P.2011, 1997.
3. Ionograms are available from the Global Ionosphere Radio Observatory (<giro.uml.edu>) operated by the University of Massachusetts Lowell.
4. For more information on ionospheric dynamics, readers could refer to the *ARRL Handbook* and numerous online resources. I found the website of Carl Luetzelschwab, K9LA (<http://bit.ly/2Ane69I>), to be a good place for a non-engineer like me to start.

*It's an undersea mountain range that pokes its "head" above water in just a few spots in the Indian Ocean … and each of those spots is a DX entity. W4YO takes us on a radio tour.*

# The Chagos-Laccadive Ridge: Point of Origin for Three DX Entities

**BY EDMUN B. RICHMOND,* W4YO**

Stretching from the central to the northern Indian Ocean is a large undersea volcanic ridge and plateau which extends approximately 1,460 miles (2,350 kilometers) from 9° south to 14° north latitude. It breaks the water surface in three widely-separated places to form the dry land of the Chagos Archipelago, the Maldive Archipelago, and the Lakshadweep Archipelago. This article will take a brief look at the history of these three island entities, including their DX background, from colonial times to the present.

## Chagos Archipelago (Prefix VQ9)

The Chagos Archipelago is a group of seven atolls[1] totaling more than 60 individual tropical islands about 310 miles (500 kilometers) south of the Maldive Islands. This island chain is the southernmost archipelago of the Chagos-Laccadive Ridge. The largest island is Diego Garcia, which accounts for almost three-quarters of the total land area of the territory, a mere 37 square miles (60 km$^2$). The terrain is flat and low, with most areas not exceeding about 6.5 feet (2 meters) above sea level. The climate is tropical marine; hot, humid, but moderated by trade winds.

The islands of this archipelago were charted by Portuguese explorer Vasco da Gama in the early 16th century. They were claimed by France in the 18th century and were made a dependency of Mauritius. The islands were first settled in the 18th century by Indian contractors and African slaves brought there to begin building an industry based on coconut harvests. In 1810, during the Napoleonic Wars, Mauritius was captured by the United Kingdom. France ceded the territory to the UK in 1814 under the terms of the Treaty of Paris.

In 1965, the United Kingdom split the Chagos Archipelago from Mauritius, along with the islands of Aldabra, Desroches, and Farquhar from the Seychelles, to form the British Indian Ocean Territory, or BIOT (these three islands each became DXCC entities). The purpose was to allow the construction of military facilities on Diego Garcia for the mutual benefit of the United Kingdom and the United States. The islands were officially established as an overseas territory of the United Kingdom on November 8, 1965. On June 23, 1976, Aldabra, Desroches, and Farquhar were returned to Seychelles as a condition of that country's attaining independence (they then became deleted entities). As a result, BIOT now consists only of the original main island groups of the Chagos Archipelago.

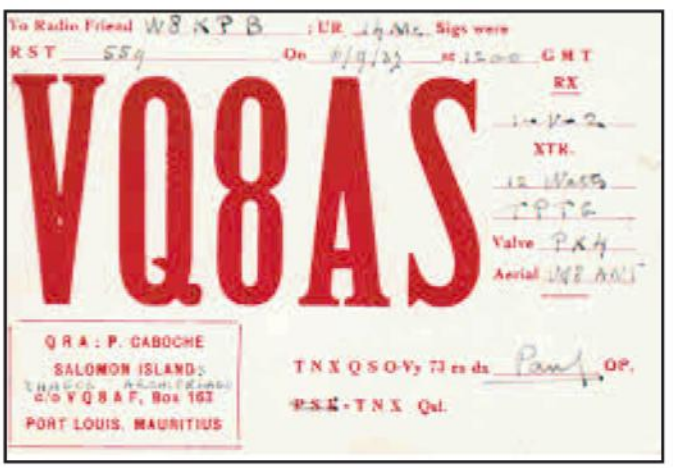


*Photo A. VQ8AS was one of the earliest amateur radio operations from Chagos, back in 1937. (All QSL card photos courtesy the K8CX Ham Gallery <www.hamgallery.com>)*

## Fantasy Island

Diego Garcia is an atoll located south of the equator in the central Indian Ocean. It is jocularly (or sarcastically) called *Fantasy Island* because of its location and distance from other landmasses[2]. The atoll is located some 2,195 miles (3,536 kilometers) east of the African coast; 1,115 miles (1,794 kilometers) south-southwest of the southern tip of India, and 2,935 miles (4,723 kilometers) west-northwest of the coast of Western Australia. It is the only inhabited island of the BIOT. The population is composed solely of military personnel and supporting contractors. Tourists, members of the media, and casual visitors are strictly forbidden.

The horseshoe-shaped atoll is heavily vegetated, has a land area of approximately 65.5 square miles (170 km$^2$) and is 37 miles (59.5 kilometers) long from one end to the other. The maximum elevation is 22 feet (6.7 meters), with an average elevation of 4 feet (1.2 meters) above sea level. There are three small islands at the mouth of the lagoon, and the shape of the atoll gives the impression of a footprint.

Between 1968 and 1973, the indigenous people of the BIOT, known as Chagossians, were forcibly removed from these islands by the British and transplanted to Mauritius and Seychelles. The British then authorized the United States to

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*St. Helena Island, SC 29920-1269*

build a large naval and military base on Diego Garcia, which has been in operation ever since. In 2010, 210,426 square miles (545,000 km$^2$) of ocean around the islands was declared a Marine Protected Area reserve. The exiled Chagossians have been in court, claiming that their forced expulsion and dispossession was illegal. In December 2010, Mauritius initiated proceedings against the UK under the United Nations Convention on the Law of the Sea (UNCLOS) to challenge the legality of that protected reserve. In March 2015, the UN Permanent Court of Arbitration unanimously held that the Marine Protected Area around the Chagos Archipelago was created in violation of international law. A legal battle on that question and on the question of the plight of the approximately 2,000 dispossessed Chagossians is ongoing.

### DX History

Chagos has had a long history of activity on the ham bands. The K8CX QSL website[3] shows the earliest cards dating back to 1936 (VQ8AH) and 1937 (VQ8AS; see *Photo A*). A total of 23 cards are included in the collection. Most of the more modern activity with VQ9 calls has been on Diego Garcia. However, some QSLs show activity on other islands in the archipelago. Blenheim Reef is represented by a Don Miller expedition in 1967 as VQ8CB/A and W9WNV/VQ8, and another by Gus Browning in 1970, as AC9A/BR.

Other islands at one time on the air were the Salomon Group, by Paul Caboche as VQ8AS; the Egmont Group by V.C. Harvey-Brain as VQ8BFC (*Photo B*); and another Don Miller effort as VQ8CBN from Nelson Island, in the Great Chagos Bank. The British military authorized a club station on Diego Garcia with the callsign VQ9X, but it was closed in 2013, fell into disrepair, and is not in use at the present time. Any licensed amateurs wishing to operate from the island in the future will have to provide their own antenna and radio equipment.

### Maldive Archipelago (8Q7)

Continuing north along the Chagos-Laccadive Ridge, the next land area is the Maldive Archipelago, located southwest of India and Sri Lanka, in the Laccadive Sea. The Maldives consist of 1,192 coral islands and sand bars, spread over roughly 35,000 square miles (90,000 km$^2$), making it one of the world's most widely-dispersed countries. It lies on top of the Chagos-Laccadive Ridge between latitudes 1° S and 8° N, and longitudes 72° and 74° E, and is only 115 square miles (298 km$^2$) in total area. The atolls are composed of coral reefs and sandbars. It is the lowest country in the world, with average natural ground level of just under 5 feet (1.5 meters) above sea level. As a result, the Maldives are at high risk of being submerged due to rising seas. According to the calculations of the UN's environmental organization, at current rates, the sea level will rise high enough to make life on the Maldives unsustainable by 2100.

European colonial interests dominated the islands starting in the mid-16th century: Portugal, the Netherlands, and Britain all held power here. Maldivians received their independence from the British in 1965. The capital city is Malé, located on North Malé Atoll. It has a population of just over 153,300 and an area of approximately 3.6 square miles (5.8 km$^2$), making Malé one of the most densely populated cities in the world. The Maldives have a tropical-monsoon climate, which is affected by the large landmass of the Indian subcontinent to the north. The presence of this landmass causes an imbalance between the heating of land and water. This imbalance sets off a rush of moisture-laden air from the Indian Ocean over

# Behind the Bylines…

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

Rob Sherwood, NCØB ("QRP on Easter Island," p. 10) — has been a ham since 1961. His company, Sherwood Engineering <www.sherweng.com>, started out in 1974 offering upgrades to Drake equipment (still available), and has since conducted technical measurements on over 100 different amateur receivers. His Ault, Colorado, QTH features two operating positions and six towers.

Paul Signorelli, WØRW ("Ten Watt Rig Disguised as a BC-221 Frequency Meter," p. 14) — is a regular contributor to *CQ*. His areas of greatest interest right now are QRP, portable HF operating, and our new low-frequency bands.

Jack Purdum, W8TEE ("CQ Reviews: QRP Labs QCX 5-Watt Transceiver Kit," p. 16) — is a regular contributor to *CQ*. He's a retired computer programming professor at Purdue University and has written several programming books, including two recent ones on his current interest in microcontrollers, especially the Arduino. His most recent title is *Arduino Projects for Amateur Radio*, which he co-wrote with Dennis Kidder, W6DQ.

Gary A. Vander Haagen, K8CJU ("Build a Remote-Reading RF Field Strength Meter," p. 21) — has been licensed since the mid-1950s and built all the Heathkits he could afford with his paper route, starting with the AT-1 transmitter. His interest in electronics led to him earning three electrical engineering degrees and working first in electro-optics (lasers and holography) and then automotive electronics, eventually retiring as General Manager of Ford Motor Company's Electronics Division. Gary is also interested in astronomy and has had over 25 articles published in astronomical journals. On the ham bands, he enjoys QRP CW on 40-10 meters.

Jim Giammanco, N5IB ("A Current Limiter Accessory for Batteries of Power Supplies," p. 26) — is an avid homebrewer and QRP CW enthusiast. He's also trustee for the Louisiana State University Amateur Radio Club's stations W5YW and K5LSU. Jim has over a dozen projects on his website, <n5ib.net/index.xht>.

Ken Lo Casale, WA4MNT ("Fabricating a Project Enclosure From Clad PC Board Material," p. 28) — is a proponent of homebrewing and maintains a website <http://qrpbuilder.com> with some 20 different projects for QRPers.

Jay Taft, K1EHZ ("Update: WSPR Propagation on 20 and 40 Meters During the 2017 Solar Eclipse," p. 42) — enjoys QRP portable operation and first wrote a portable antenna article for *CQ* in 2015. His research on propagation during last summer's solar eclipse typifies the type of amateur radio citizen science VHF+ Editor K8ZR writes about in his column this month (p. 90). Jay also enjoys wildlife photography and works some of his photos into his QSL cards.

Lawrence W. Stark, K9ARZ ("Nation, Country, Political State," p. 50) — has been an amateur since 1969 and holds both an Extra Class amateur license and a commercial General Radiotelephone license. Over the years, he has built transmitters, receivers, and over a dozen RF amplifiers. He has had several articles published previously in *CQ*, as well as other amateur radio magazines.

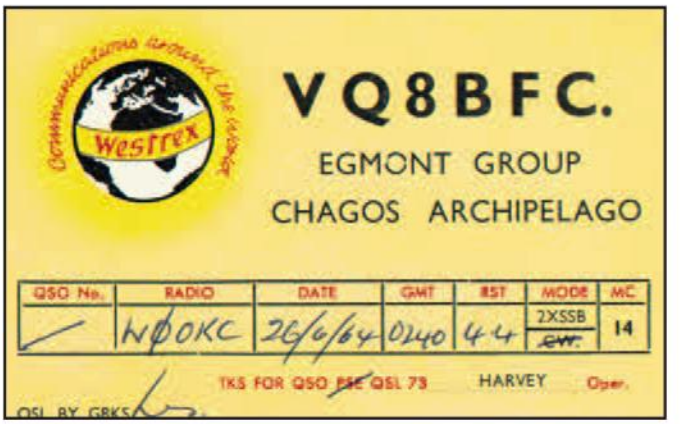



*Photo B. V.C. Harvey-Brain operated from the Egmont Group in the Chagos Archipelago as VQ8BFC.*

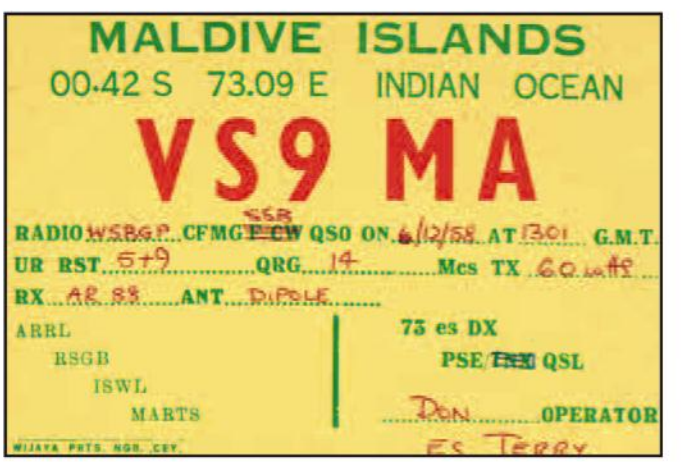



*Photo C. This card from VS9MA is from one of the earliest DXpeditions to the Maldives, in 1958.*

South Asia, resulting in the southwest monsoon. Two seasons dominate the Maldives' weather: The dry season associated with the winter northeastern monsoon and the rainy season, which brings strong winds and storms to the area with the southwest monsoon.

### RAF Gan

Gan is the southernmost island of Addu Atoll, as well as the southernmost island of the Maldives. It is the second largest island in the atoll (Hithaddoo is the largest). It measures a mere 0.87 square miles (2.25 km$^2$) in area. Gan was formerly inhabited by local, indigenous people, but its inhabitants were moved to neighboring islands after the British built a naval base, communications center, and airbase on the atoll. Addu was an unpopular military posting due to the hot, humid climate, lack of recreational facilities, and lack of ability to socialize with the local population. In 1957, the naval base was transferred to the Royal Air Force (RAF). From 1957 throughout the Cold War, it was used as an outpost base known as *RAF Gan*. The base remained in intermittent service until 1976, when British Forces withdrew. After the British military left, the airstrip remained almost unused and was neglected for many decades. In more recent times, it has been redeveloped into what is now *Gan International Airport.*

### DX History

During Britain's colonial period, the Maldives were assigned the radio prefix VS9M. The K8CX and F6AJA websites show

many QSL cards with these older calls, for contacts made between 1958 and 1975. The earliest operations were VS1BD/VS9A, an expedition by R.A.F. Seletar in Singapore in 1958, and VS9MA (*Photo C*), also from that same year. More modern QSLs are shown with calls using the 8Q7 prefix of the Maldives after independence. Two of the more regular visitors to this entity are members of Russia's Ural Contest Group with the callsign 8Q7DV, and Noel, F8BGC, with the call 8Q7NC.

## Lakshadweep (Laccadive) Archipelago (VU7)

Lakshadweep, formerly known as the Laccadive, Minicoy, and Aminidivi Islands, is a group of islands in the Arabian Sea, 120 to 270 miles (200 to 440 km) off the southwest coast of India. They were also known as Laccadive Islands, although geographically this is only the name of the central subgroup of those islands. They are also the northernmost islands of the Chagos-Laccadive Ridge.

The islands form the smallest Union Territory of India. Their total surface area is just 12 square miles (32 $km^2$); their territorial waters have an area of 7,700 square miles (20,000 $km^2$), and the Exclusive Economic Zone (EEZ) area is 150,000 square miles (400,000 $km^2$). The archipelago consists of 12 atolls, three reefs, and five submerged banks, making a total of about 39 islands. Ten of the islands are inhabited. The population of the area is about 65,000. The capital of the territory is Kavaratti. The main islands are Kavaratti, Minicoy, Agatti, and Amini. There is an airport on Agatti, with direct flights from Kochi (Cochin)[4], in the State of Kerala on the Indian mainland.

The islands of Lakshadweep are small, none exceeding 1 mile (1.6 kilometers) in width. The Amindivis are the northernmost islands of the group, and Minicoy Island is the southernmost island. The higher eastern sides of the islands are the best-suited for human habitation, while the low-lying lagoons on the western sides protect the inhabitants from the southwest monsoon. Temperatures generally range from about 70°F (about 20°C) to nearly 90°F (about 32°C) throughout the year. Cyclones moving across the Arabian Sea rarely strike these islands, but the winds and waves associated with them can drastically change the features of the landscape.

## DX History

One of the first DXpeditions to the Laccadives was VU2NRM, in 1961[5], and then another in 1971 by VU5KV. It appears that it was not until 1989, with the activity of VU7JX (*Photo D*), that the now-used VU7 prefix became standard for this entity. The K8CX website contains cards for 19 operations from Lakshadweep. It was with the availability of scheduled air service to these islands that Lakshadweep appeared on the air with more regularity, and cut into the rarity of this entity.


*Photo D. VU7JX appears to be the first callsign from the Laccadives with the VU7 prefix.*

## Final Thoughts

The three DX entities of the Chagos-Laccadive Ridge can be discussed in terms of similarities and of differences. They are all in the same corner of the world. Their geographical coordinates are remarkably similar[6]. They are all tropical in nature. They are all surrounded by water, which affords them excellent take-off angles and reception of radio signals. At some time in their history, they were under European colonial control, either Portuguese, French, Dutch, or British, or a combination thereof. DX-wise, they probably would be classified as semi-rare. The Maldives (8Q7) probably remain as such. Lakshadweep is becoming less rare, due to the availability of regular air travel. Diego Garcia can be classified as becoming extremely rare.

In a recent email from Larry Arneson, NØQM and ex-VQ9LA, he writes regarding the demise of radio station VQ9X, "The big signal from VQ9 is probably gone forever![7]" Further, there are no active hams on the island at the present time.

**Notes**

1. Those seven atolls are Speakers Bank, Blenheim Reef, Peros Banhos, Salomon Islands, Great Chagos Bank, Diego Garcia, and Egmont Islands.

2. There are actually some websites, which advertise selling tee shirts with the inscription, Fantasy Island-Diego Garcia.

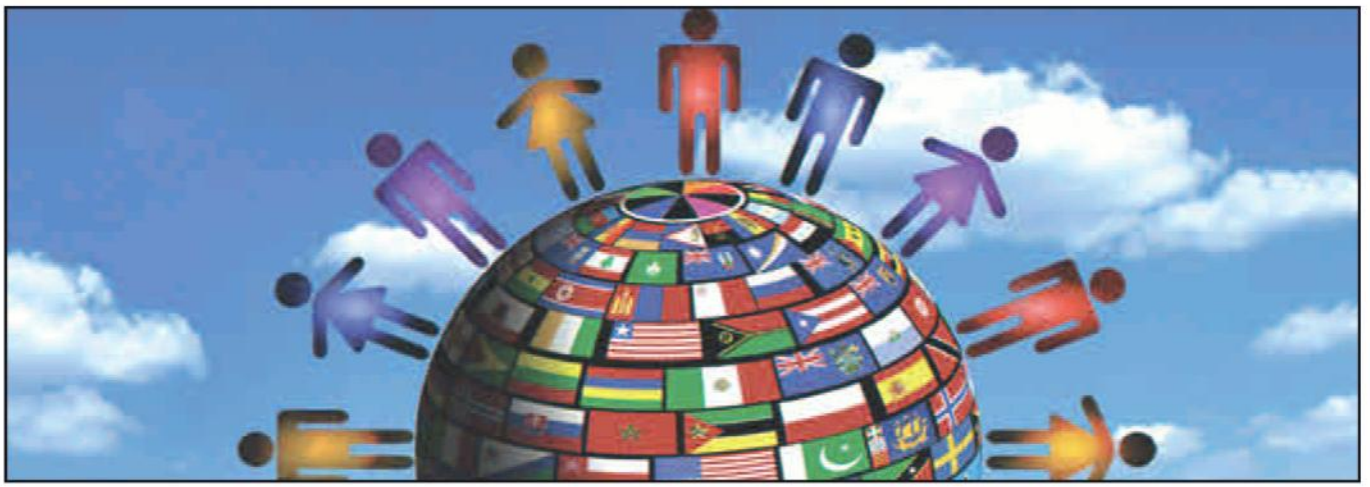
3. There are several websites dedicated to old QSLs, the most extensive being <http://hamgallery.com> by K8CX; <http://lesnouvellesdx.fr> by F6AJA; and <http://qsl-history.webs.com> by G4UZN.

4. Occupied by the Portuguese in 1503, Kochi was the first of the European territories in colonial India. After the arrival of the Portuguese, and later the British, the name Cochin stuck as the official name of the city. Some of the city fathers chose a closer spelling to its Indian name, Kochi, in 1996. This change in name was challenged by the city municipal corporation and officially, the city is still called Cochin.

5. This was followed by a questionable 1967 operation by Don Miller as VU2WNV, which the ARRL disallowed with no DXCC credit given.

6. Diego Garcia at 7°18' S, 72°24'40" E; Malé at 4°10' S, 73°30' E; Lakshadweep at 10°57' N, 72°63' E.

7. "The Navy (Commanding Officer) was really angry when the local ISP provider saw excess use on the internet when the first-class club was closed, and they traced the use back to the ham shack. There was a guy there who would rag chew on SSB and have a live video feed on the internet so his buddies could see him talk from a rare spot. MWR (Morale, Welfare & Recreation) no longer supports the ham radio club so hams must operate with their own equipment. The big signal from VQ9 is probably gone forever!" Larry Arneson, NØQM, ex-VQ9LA, personal communication, March 2016.



*Did you ever wonder why the lists for certain DX awards identify the different places you might contact as "entities" rather than the plain-language "countries"? As K9ARZ explains, the language of geography and sociology isn't always what it may seem.*

# Nation, Country, and Political State: A Primer for the DXer

**BY LAWRENCE W. STARK,* K9ARZ**

With the recent deletion and subsequent reinstatement of Midway and Kure Islands from the ARRL's DXCC "Entities List," we are again made aware of the difficulties involved in the maintenance of this list and the geopolitical vagaries that complicate the decisions of which *entities* make it onto the list and which ones are dropped. At one time we referred to the list as the *Official ARRL Countries List*. But what does that mean?

The purpose of this article is to articulate the terminology associated with *nations*, *countries*, and *political states*, and to look at related terminology so that we might correctly apply these terms to people and places we are likely to encounter in our search for DX on this planet. Often in our daily conversations we use and misuse terms, interchanging nation, country, and political state. The terms are not interchangeable and have distinctly different meanings. Let us clear the air once and for all considering their real meanings.

## What is a Nation?

The term *nation* does not refer to a political unit, or piece of real estate. The term nation refers to people, or more correctly, a group of people. It usually refers to *a large group of people who exhibit a strong feeling of unity because they share a common culture.* Nations have grown out of tribes and originally out of extended family groupings. The common culture that they share includes such *culture traits* as language (first and foremost), religion or religious denomination in some cases, style of dress (clothing), diet, traditions, and other customs that have been passed down through many generations. *These cultural traits have given the nation its identity.*

An example of a nation of people would be the "English." At one time, the people of England represented characteristics of many nations; there were Celts, Angles, Saxons, Norsemen, Danes, Frisians, and Norman French. Over the centuries, their cultural traits blended together and, out of the Latin-based French and the various Germanic languages, English was born. Like England, the United States of America is a land of immigrants and, although we speak of an American nation, we haven't quite made it there yet. In our infancy of just a little over 200 years, we have yet to overcome our negative attitudes toward recent immigrant arrivals. Plus, issues of racial and ethnic discrimination still exist in many parts of the United States. Each day, we see barriers to integration fall and we move closer to true nation status, which is essential if we are to become a truly strong and united nation of people.

Some other examples of true *nations of people* (some you may argue in light of current developments) include the French, Germans, Norwegians, Swedes, Danes, Poles, Czech, Slovaks, Croats, Serbs, Lapps, Kurds, Turks, etc. I could go on and on, listing nations that have existed for hundreds of years, including *Native American* nations, although smaller in size.

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Nations are frequently compromised when they are subject to large immigrations from other parts of the world. The new immigrants may be reluctant to integrate into the predominant culture of a particular country or region. Also, resistance to allow acceptance of another cultural group into the larger, more homogeneous, group may result from the mistrust or lack of understanding of the culture traits of a newly arrived group of immigrants. For example, when *Irish* and *German* immigrants arrived in the United States during the 19th century, the largely Protestant Anglo-Americans feared that the new immigrants (who happened to be predominantly Roman Catholic, would be politically guided by Rome. These immigrants were derided as "Papists," and waited several generations to be fully accepted as "real Americans."

My own family arrived from Germany in 1848, and raised dairy cattle on the plains of northern Illinois. They clung to their native culture for three generations because of their familiarity with the culture they brought with them. But they also continued their practice of German traditions and customs within their isolated community because they were not totally accepted by the "Anglo" culture groups around them. They had their own German-language schools (usually parochial, either Roman Catholic or Evangelical Lutheran). They also subscribed to German-language newspapers and periodicals to keep in touch with other German-Americans. This tradition continued throughout the remainder of the 19th and early 20th centuries, until the beginning of World War I when it became very unpopular to speak the German language or tout German cultural traits. Violence against German-Americans was common and one could be beaten or even killed for being a German-American. The generations of German-Americans after that either forgot their German-ness or never bothered to carry on the old traditions and quickly adopted "English" ways of speaking, writing, dressing, and communicating with others.

Here in the United States, we have undergone a steady influx of new immigrants from areas of the world other than Western Europe, and that has created unrest among segments of the rest of the population. They can't understand why Hispanics, for instance, cling to their cultural heritage and traditions. They don't realize that their own forefathers may have done the same thing. Beside the earliest settlements of English and Dutch in the Northeast, there was a large wave of German immigrants into the colony of Pennsylvania. The number of early immigrant Germans was so great that we came very close to having German chosen as our primary language at the time of the founding of the United States of America.

New waves of immigrants from Africa and Asia have created upheavals in Western Europe as we have seen and read about in the news. The traditional nation of the French appears to be under attack by new immigrants and will remain that way until full integration has had a chance to be realized. Germany, Sweden, and a few others have opened their doors to the new immigrants and are striving to maintain "open societies." In time, if integration occurs, their "nation" will continue as before but will be a little richer from the process.

## Countries

*Countries* do not refer directly to people, but do refer to *areas of land occupied by nations of people*. The English are a nation of people, and England is their country. The Lapps are a nation of people and Lappland is their country, even though it is spread across the land of four political states, Norway, Sweden, Finland, and Russia. The Kurds are another nation of people whose country, "Kurdistan," is spread over parts of Turkey, Syria, Iran, and Iraq. Most countries, however, tend to occupy the land of a single political state.

## Political States

I hope this idea of "nation" and "nationality" are a little less obscure than they were before, so let us go on to consider *states* or *political states*. A political state refers to an area of land under the control of a "sovereign" government. *Sovereignty* is simply the "authority" to govern. In a "democratic state," this authority originates with the governed, that is, the people. During the medieval period, the authority to govern was given to monarchs (kings, queens, princes, caliphs, etc.) by religious authorities deriving that power from God, Allah, or whichever deity was invoked. A monarch is said to rule by "Divine Right." In some sovereign states, such as totalitarian states or dictatorships, the authority to govern is "seized." However one governs, sovereignty is necessary for the state to exist.

Then, what is the deal with the *states* of the United States?

They are not independent and are not really sovereign, so why do we call them states instead of just "provinces?" Well, at the time the United States of America were created under the *Articles of Confederation,* the United States consisted of 13 independent and sovereign political states that were "loosely" joined together by treaty for the purpose of gaining independence from the British. This loose confederation was so weak that the "federal government" did not have the authority to raise taxes to support the war effort. It could make a request of the member colonies for resources, but could not compel them to do what was requested. The federal government under the Articles had less sovereignty over its members than the European Union has over its member states today.


### MFJ Enterprises Now Exclusive Distributor of Xiegu Products

MFJ Enterprises announced that it will be the exclusive North American distributor of Xiegu's products. Making its North American debut is the Xiegu X5015 transceiver, which seems positioned to challenge Elecraft's venerable line of portable transceivers.

This 5-watt transceiver comes in a very small package measuring just 6-5/8 inches wide x 3-5/8 inches high x 1-7/8 inches deep and weighing in at 2.1 pounds. This means the X5015 is equipped for desktop or portable use and covers 500 kHz to 30 MHz plus 6 meters with the following modes: SSB, CW, AM, and FM. Tuning through the frequencies will be aided by digital smooth tuning with 1-Hz VFO resolution.

Features include a built-in, highly-efficient automatic antenna tuner, A/B split frequency XCVR function, RIT receive fine tuning, noise-blanking suppressor, NR digital-noise reduction, number notch, and computer-aided control functions.

In addition, the X5015 has multiple band pass filters built in, plus selectable AGC speed computer interface for digital modes. A built-in keyer and CW trainer, multi-function microphone, and high-capacity battery pack (3800 mAh) round out its features.

On the front, a large 3.6-inch LCD screen dominates the real estate along with buttons for various functions and a speaker.

The Xiegu X5015 is available now and has a suggested retail price of $669. 95. For more information, visit MFJ Enterprises <www.mfjenterprises.com>.



Under our Constitution, the states of the United States *share sovereignty (*authority to govern) with the *federal government* in Washington, D.C. Any issues of government not spelled out in the Constitution are left to the individual states to decide. Not all political states are federated. France, for instance, is a *unitary state.* It has no regional governmental units. It has one sovereign government for all of France. It is divided up into administrative districts for the convenience of dealing with local affairs, but there is only one government for all of France (exception being its role in the *European Union,* which itself is a type of *federation*).

During the 14th through the 19th centuries, European political states rushed to accumulate colonies in "newly discovered" regions of the world. These added entities became territories, overseas provinces, possessions, and protectorates of their mother countries (political states in reality).

Although most of these colonies had been relinquished by the middle of the 20th century, you can still find some, such as *French Guiana,* which is considered part of France (overseas). Spain has lost most of its colonies but still holds onto Ceuta and Melilla in North Africa, the Balearic Islands in the Mediterranean, and the Canary Islands off the coast of North Africa.

What we need to remember is that *nations* refer to people, *countries* are places that are occupied by nations of people, and *political states* are areas of land under the control of a sovereign government. A political state may contain many nations of people or countries, as in the case of the former State of Imperial Russia, or the former Soviet Union. Other examples of Multi-National States would include: The United Kingdom of Great Britain and Northern Ireland (England, Scotland, Wales, and Northern Ireland), the former State of Yugoslavia (Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Montenegro, Macedonia, and Kosovo), and Czechoslovakia (Bohemia, Moravia, and Slovakia).

There also exist *divided countries* that are members of more than a single political state such as: Ireland (The Republic of Ireland and Northern Ireland, which is part of the U.K.), Korea (North and South), the former East and West Germany, the former North and South Vietnam, and China (Peoples Republic of China and Taiwan).

### The Nation-State

One final classification should be discussed, and that is the *nation-state.* A nation-state exists when a political state is predominantly occupied by a single *nation of people.* This concept, which was very common in the past, is less evident today. The process of "globalization" has brought with it waves of immigration by people seeking better lives in areas that were once off-limits to them. The homogenization of Europe as a result of the European Union has brought large numbers of Muslim Turks to Germany. The dissolution of French colonies in North Africa has caused an influx of Arabs and Berbers to urban areas of France. The political disruption and ongoing wars in Syria, Iraq, Afghanistan, Yemen, Libya, and many states of Sub-Saharan Africa have driven countless refugees teeming into Europe and any other region that will accept them. This influx of refugees is changing the character of many former nation-states. Hopefully, programs to promote full integration of the immigrants will lead to greater acceptance and harmony in those states so they may maintain their traditional stability.

The next time you hear someone use the terms *nation, country,* or *political state*, see if they are being used in the proper context. Perhaps this text will help in understanding the many "entities" that concern us as we pursue our ongoing goal of — as the FCC puts it in Part 97 — "continuation and extension of the amateur's unique ability to enhance international goodwill."

### SOTABeams Click2Tune for ICOM

If you use an ICOM HF radio with an antenna tuner or amplifier, you may have noticed the lack of any straightforward way to send a low power carrier for tuning. This can be a big problem if you use a narrow-band antenna such as a magnetic loop that needs frequent re-tuning. SOTABeams has a solution with its new Click2Tune for ICOM system that provides you with complete and reliable control. It transmits a low-power carrier (user selectable level on some radios), without any need to change the mode, and for as long as you press the button.

SOTABeams said it engineered the unit to fit nicely in your hand and even trialed three types of buttons before finding one that had the right size and feel. Click2Tune for ICOM works with any radio that supports their auto-tuner. Tested on: IC-7300, IC-7600 (ant. 1), IC-7100, IC-730, IC-746 (ant. 1), IC-9100 (ant. 1), IC-706 (all variants), IC-703, and 746.

The Click2Tune for ICOM is available as a kit or ready built with a suggested retail price of $10.64 (Europe) or $8.86 (worldwide). For more information, contact SOTABEAMS, 2nd Floor, Paradise Mill, Park Lane, Macclesfield, SK11 6TL UK. Phone: +44 (0) 7795 517513. Website: <www.sotabeams.co.uk>.

# Using Microphones From the Past With Modern Rigs

BY IRWIN MATH,* WA2NDM

As I have mentioned in several previous columns, I am a collector (to some degree) and admirer of equipment from the past. In fact, my amateur radio station consists of a Kenwood TS-830S and all of the accessories that came with it, such as the VFO-230, the SP-230 speaker, the AT-230 antenna tuner, and even the SM-230 pan-adapter. To complete the set, I also have the matching Kenwood MC-50 microphone and HS-6 headphones. All of these 1980s marvels have been faithfully and lovingly restored and work perfectly, and in my opinion can give some of the more modern rigs a run for their money. For the uninformed, these are all fully solid-state devices with the exception of the transmitter finals that are 6146s, and the driver, which is a 12BY7. Using this equipment sends one back into the past, at least emotionally.

Over the past several years, I have inherited a couple of microphones made to operate with vacuum tube equipment that I would like to use with my station. One of these is the classic high-impedance Astatic D-104 "lollypop" microphone, made to work

*c/o CQ magazine

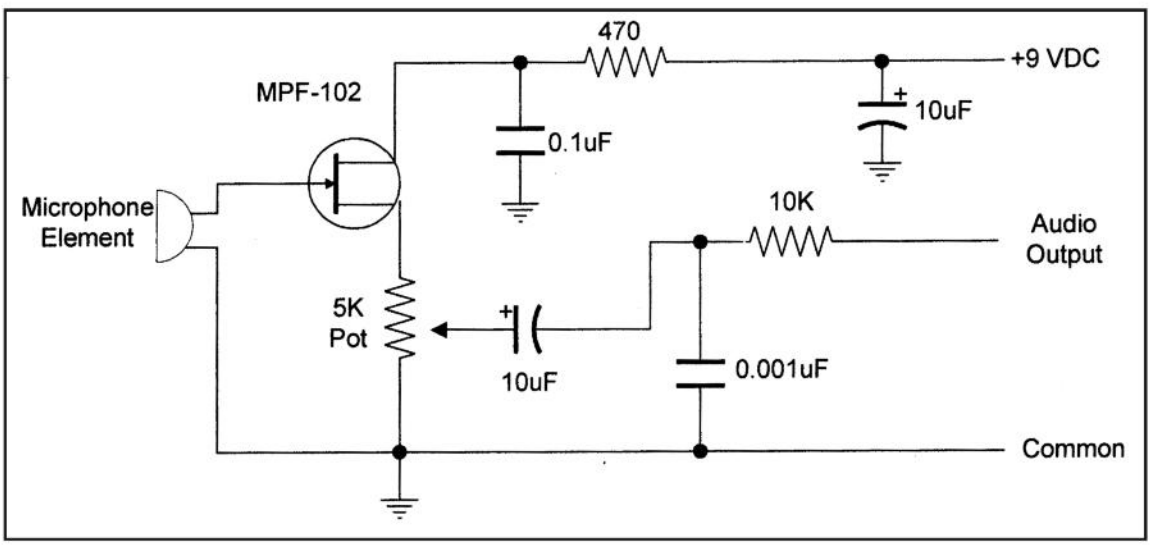


*Fig. 1. D-104 Matching Network.*

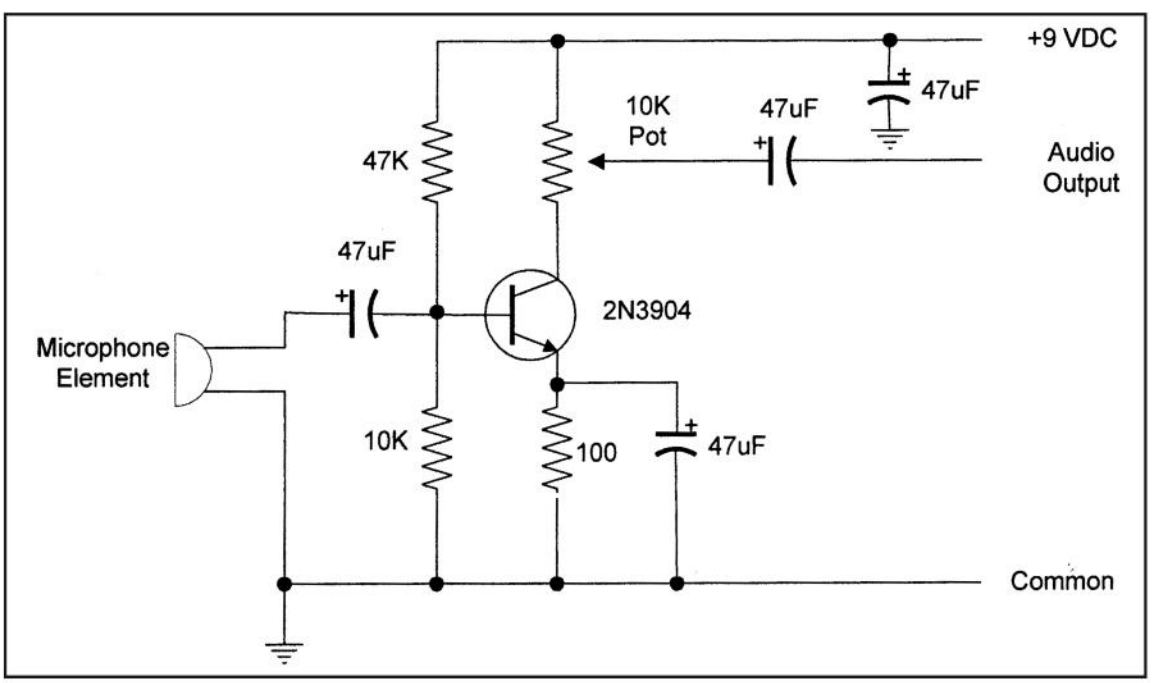


*Fig. 2. Low Impedance Matching Network.*

into a 50K or higher impedance load. The other microphone is a very low impedance device, almost like a simple miniature speaker in a microphone style housing. The D-104 produces plenty of voltage into a high impedance but almost nothing usable into a 600-ohm load. The dynamic microphone produces a few tenths of millivolts (into a high-impedance load) when you yell at it. The question is how to interface both of them properly. My solution was to take some older technology and actually build it into the base of the microphone. *Figure 1* is the circuit of the D-104 interface.

The D-104 microphone element is a piezoelectric type that requires a very high-impedance load. The element is connected to the gate of a MPF-102 FET which presents a load of many megohms. The FET is then connected in a simple so-called source follower that allows the high-impedance microphone to drive loads in the thousands of ohms region. A 5K pot is then used to trim the output to the desired level. Power is obtained from a common 9-volt battery and drain is less than 1 mA so battery life is quite long. If you are adventurous, you can actually wire the push-to-talk switch in the microphone to turn the battery on only when talking. The purpose of the 0.001-µF capacitor is to limit the audio highs somewhat and to shunt any RF that might be present. You can "play" with its value to shape the audio frequency range and you can also vary the 10K resistor to make a decent match to your rig. Not much is critical. Also note that this circuit can work with most high-impedance microphones and, in the case of the D-104, there is enough room in the base to actually contain everything.

*Figure 2* is the circuit of the low-impedance microphone interface. It consists of a single stage of amplification with a common 2N3904 that is enough to bring the audio up to a reasonable level. As in the previous case, power is obtained from a common 9-volt battery and drain is less than 5 mA, so again, battery life is quite long. As in the previous circuit, if you can also wire the push-to-talk switch in the microphone to turn the battery on only when talking, it will increase battery life. The 47K and 10K resistors biasing the base of the transistor can be varied for best results, depending on the signal level of the microphone.

I have used circuits such as these in the past to allow several "antique" microphones to work with my rig. With a little patience, you can easily use them today while recapturing a bit of the past.

*– 73, Irwin, WA2NDM*

BY GERRY DEXTER*

# African Shortwave Heats Up, While Middle Eastern Stations Change Frequencies

**Let's get going with another set of shortwave-lets:**

~ There appears to be a lot of shortwave broadcasting action in the Horn of Africa (HOA) these days, along with some generally increased signal strengths as well. Most recently, the activity has been on 7238 kHz where the Voice of the Broad Masses (VOBM) has turned up complete with a huge signal just before 0400 UTC. The modulation is reported to "stink" and is hardly even "there" on this Eritrean outlet. The new frequency use also removes VOBM from its amateur band "intruder" status. [Note: 7200-7300 kHz continues to be allocated to broadcasting outside of the Americas.]

~ What's this we hear? Opposition broadcaster Radio Biafra is back on the air, now using 11530 kHz from its London studios around 1600 UTC and again at 0500 UTC, both via WRMI. They're also on 7240 kHz via Issoudun. Ralph Perry has noted this one already and reports the announced email address <radiobiafra@gmail.com> is a dud.

~ Radio Bata in Equatorial Guinea has returned to the air on 5005 kHz, usually audible from sign-on at around 0430 UTC or later. It's been on this frequency since I began listening in the early 1950s.

~ It appears that Oman has temporarily added 11975 kHz from around 1400 to 1700 UTC close. It continues to operate on 15140 kHz as well.

~ Radio Kuwait seems to have moved to 9750 kHz from around 1400 UTC. It's unknown whether the 31-meter outlet has replaced the transmissions on 19 meters.

~ The gentleman who owns/operates pirate radio station European Music Radio has had to close it down due to poor health. He hopes to resume broadcasts sometime later this year.

~ Harold Sellers (BC) reports reception of the seldom-heard Radio El Buen Pastor in Nicaragua. This one is apparently an unlicensed semi-pirate and is the only shortwave broadcaster from this country. It has been inactive for a year or more and is usually not very well heard here. It seems to have an outlet on 94.9 FM, as well as an internet feed. I've just listened to it online and, as Harold notes, there are a lot of "hallelujahs" mentioned. There is no mention of the station in the 2017 *World Radio Television Handbook*.


*Rich D'Angelo got this reply from Pan American Broadcasting.*

~ Australia's Ozy Radio now seems to occupy 4835 kHz. That frequency was used by the now-closed ABC-Alice Springs. Ozy had earlier tested on 5045 kHz and seems to still be using that spot at times. (See Australia's logs.)

~ All India Radio continues to expand, adding new services to Canada, South Africa, Germany, even the Maldives and some members of the Commonwealth of Independent States (formerly the USSR.) AIR's External Services Division reaches some 150 countries in 27 languages.

~ The Voice of Hope-Iran is coming to — Israel. It has already built and equipped a studio to broadcast in Farsi, and now needs to ship an older 100-kilowatt transmitter from Germany to Israel. Just one hitch: The station's owners need to raise $1.1 million to do so.

~ Papua New Guinea has a new Minister of Communications who says he intends to look at reinstating shortwave — especially to the more remote areas of the country — and generally seek overall improvement in NBC operations. More power to him. Maybe that'll include smoother QSLing practices.

~ WBCQ in Monticello, Maine, plans to begin tests on 3265 kHz in the evenings.

~ Japan's Radio Nikkei is undergoing maintenance. All four active frequencies (3925, 6055, 9595, and 9760 kHz) will be "down" periodically over the next couple of months.

~ The eighth edition of John Figliozzi's excellent *World Listening Guide* is now available. The book

*c/o CQ magazine

discusses every mode of listening from shortwave broadcast to podcasts, Wi-Fi, AM, FM, On-Demand — every mode you can think of — are all covered in this complete guide to every current format. Many programs are sorted by content type. Most, if not all, of the usual book-selling suspects carry it — including CQ.

## Leading Logs

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double- or triple-space between the items (it's much easier on my eyes), list each logging according to the station's home country and include your last name and state abbreviation after each. Also needed are spare QSL info, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. The same holds true for you amateur radio operators who also listen to shortwave broadcasts. 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. After you've read the printed logs, you'll find more online at <http://cqpluslisteningpost.blogspot.com>.

**ANGUILLA**—Caribbean Beacon, 6090 noted back on the air at 0200 on 11/1 with religious programming. However, the next night there was no signal at 0100, so things aren't back to normal yet. (D'Angelo, PA)

**ANGOLA**—Radio Nacional, (p) 4949.8 in Portuguese at 0213 with Afropops and man speaking in Portuguese. (Taylor, WI)

**BAHRAIN**—Radio Bahrain, 9745, Manama, with Arabic pops on brief peaks once the co-channel QRM left at 2030, short, canned jingle at 2111 by woman. (Valko, PA) (A testosterone log! –*GLD*)

**CANADA**—CFVP, Calgary (ALB), 6030 at 2318, man mentioning Calgary then into commercials. (Sellers, BC)

**ERITREA**—Voice of the Broad Masses, Asmara, 7140 same as on 7180 (INTRUDERS) at 1831. Weak, but definitely still there, 7181.5 at 1830, getting blasted by hams on both sides. (Valko, PA) 7181.5 at 0330-0402 with man speaking in possible Amharic and HOA music. The first night it had a loud

*These ruins are shown on a QSL from Radio Romania International, received by D'Angelo.*

growl QRM, but the next night it was in the clear. (TNX Perry tip, D'Angelo, PA) 7234.4 at 0401 in Tigrigna with HOA music and occasional low level announcement. (Strawman, IA)

**ETHIOPIA**—Amhara State Radio, Addis Ababa, 6090 at 0324-0403 with man speaking in Amharic, man/woman talk segments, carrier off for about a minute at 0350, again at 0358 for about two minutes. (D'Angelo, PA)

**NICARAGUA**—Radio El Buen Pastor, 8989u at 2310 with preacher in Spanish, many mentions of "hallelujah" and some mentions of "señor" and "Cristo." (Sellers, BC)

**PERU**—Radio Twantinsuyo, Puno, 6173.9 at 1038 apparent news, then ads, seeming futebol excerpt, more ads and back to news. (Valko, PA)

**SOMALIA**—Voice of the People of Somaliland, 9600 via Madagascar with O/C from 1850, then opening in Somali at 1900 with music clip, man speaking in Somali, brief Koranic chant and discussion program. (Perry, IL)

**SWEDEN**—IBRA Radio, 12125 via Armenia at *1630-1659* popped on after FEBA closed, woman speaking with echo effect open and going into Amharic. Woman with an apparent closing at 1658. (D'Angelo, PA)

## Who Goes There?

Art Delibert (MD) noted a potential pirate on 5010 with rock from 1959 tune in. Art notes a somewhat improved strength with an east-facing antenna but a big drop-off when facing north.

*A Radio Lebanon QSL from 1963. They seem to have seen many more fireworks since then. (Courtesy of John Cooper)*

## QSL Quests

*CQ's* W2VU, Rich, forwards word from the Euro pirate Radio Caroline noting and appreciating reports from "keen" DXers in Finland and Italy, also citing one from Japan. Radio Caroline notes they appreciate all reports, especially those from their target areas.

Rich D'Angelo checks in with replies from Radio Romania International and Pan American Broadcasting for its Radio Africa Network via Okeechobee/WRMI.

## Back in the Day

Sierra Leone Broadcasting Service, Goderich, Sierra Leone, 3306 kHz in English at 0608, July 11, 1989 using 10 kilowatts for its domestic service. Sign-on was at 0600.

## Just Sayin'

You know, lately I've taken to closing the column with the admonition to "celebrate shortwave." How would one go about doing that? Well, you could do anything you could think of to promote it. You could join (and support!) buying or subscribing (to) *CQ* Magazine, and hopefully, this column too, joining and supporting the North American Shortwave Association <www.naswa.net>, Ontario DX Association <www.odxa.on.ca>, or the Canadian International DX Club <www.cadx.ca>. Certainly that also includes writing to shortwave radio stations, not necessarily just to ask for a QSL, but would include your comments, content questions, and yes, even complaints. Pick out half a dozen to contact every month. It's far easier with email today. That would be a pretty good beginning. If you have additional ideas, I'd sure like to hear them.

## Thanks for You Logs

Arthur Delibert, North Bethesda, MD; Ralph Perry, Wheaton, IL; Rich D'Angelo, Wyomissing, PA; John Figliozzi, Half Moon, NY; Mark Taylor, Madison, WI; Jerry Strawman, Des Moines, IA; Steven C. Wood, Harwich, MA; Harold Sellers, Vernon, BC; Hector Frias, CE3FZL, Puerto Alta, Chile; Richard Parker, KB2DMD, Pennsburg, PA; Dave Valko, Dunlo, PA; and Bob Brossell, Pewaukee, WI. Thanks to all of you!

Until next month … Keep on keepin' on … and … Celebrate Shortwave!


*A voice of America QSL showing the dish set up at one of their (unspecified) German relay sites. (Courtesy of John Cooper)*

*A studio building shot graces this QSL from Radio Mozambique back when they were active on 60 meters. (Courtesy of John Cooper)*

# QRP and EmComm

BY WALT PALMER,* W4ALT

QRP operation refers to transmitting at reduced power while attempting to maximize one's effective range. The term QRP is derived from the standard Q code used in radio communications, where "QRP" is used to request that a station "reduce power." The opposite of QRP is QRO, or high-power operation.

When thinking about emergency communications, low power seems counterintuitive. Why would you not want to blast your emergency information far and wide? Let's explore this.

* email: <w4alt@cq-amateur-radio.com>

Most radios today can transmit a range of power outputs. Some from milliwatts to 5 watts, others are capable of 100 watts up to the legal maximum of 1,500 watts. The FCC says one must use "the minimum power necessary to carry out the desired communications." Yeah, but when there's an emergency all bets are off, right? Not necessarily so.

## Consider This

When all else fails and commercial power and communications go down, you are dependent on your batteries, solar, and fuel-generated power. Transmitting at high power places a drain on your now precious commodity. Though judicious use of

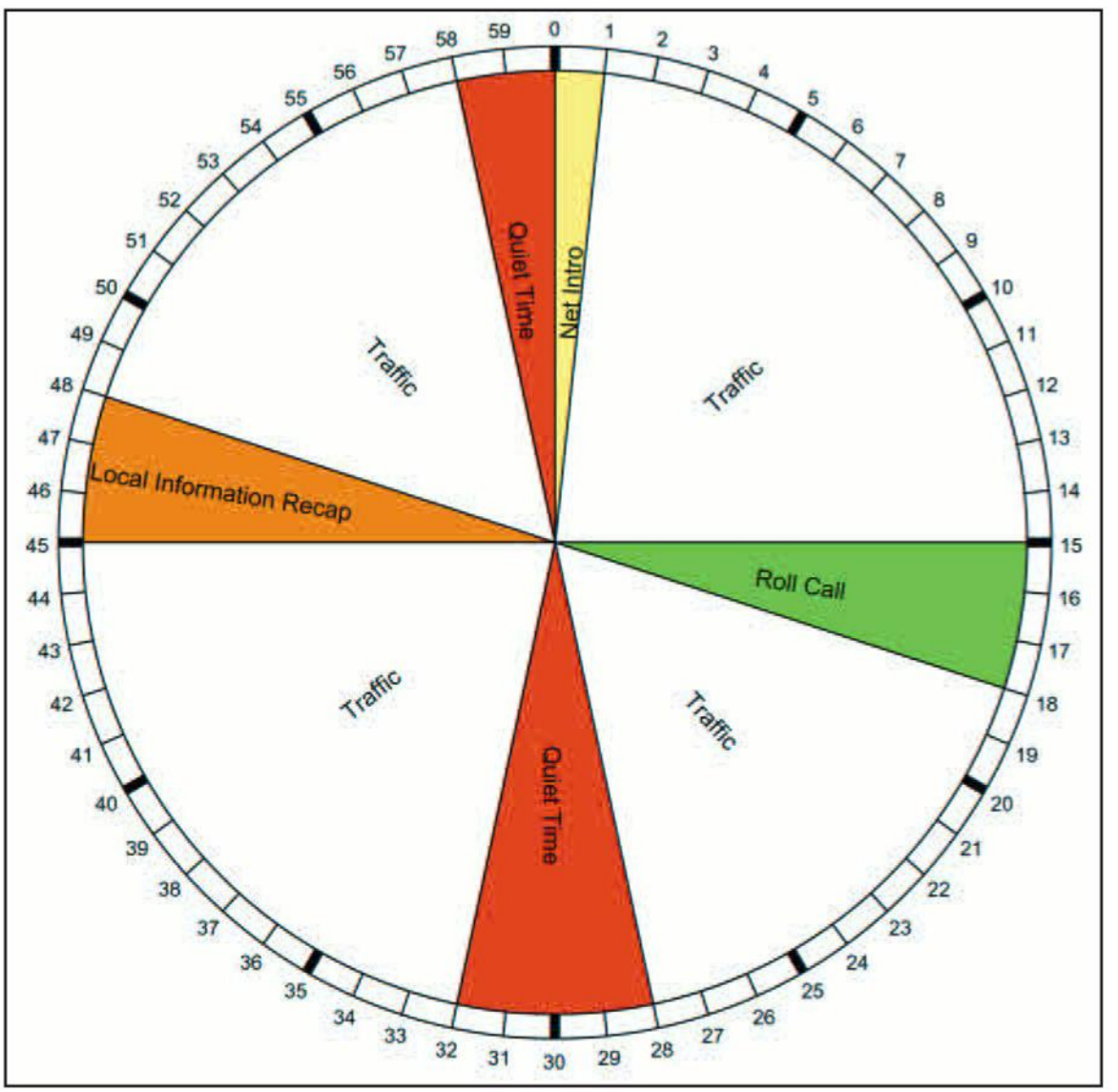


*Figure 1. An hourly task clock for W4ALT's local RACES net, borrowed from the broadcast industry and modified for ham use. This clock specifies certain "quiet times" at the top and bottom of each hour to listen for distant or low-powered stations.*

power and proper antennas, signals can be directed to where we need them to go.

Also keep in mind the lessons learned following 9/11. Emergency communicators as well as other well-meaning hams were getting on the amateur bands at full power to make their conditions known. Unfortunately, their high-power signals were bouncing all over the U.S. and the world, effectively blocking out others attempting to use the same bands to transmit emergency traffic.

More recently, during the hurricane season of 2017, emergency traffic nets in the Caribbean were interrupted by other non-emergency nets. While not intentional, high power stations on adjacent frequencies caused emergency organizations, such as SATERN, to move their nets to other frequencies, often resulting in confusion and slowing message handling.

## Quiet Time

As a net control operator, do you permit "quiet time" to listen for QRP stations? My day job is as a program director and chief engineer for a local broadcast radio station. Those of you in the broadcast business are familiar with a broadcast clock. This clock gives us a plan for time utilization, such as when to air news, commercials, program content, etc. A clock can also be used during a net, especially a long-term emergency net, to give net control and members guidance for time management.

In my example of our local RACES emergency net clock (*Figure 1*), I have included several tasks with a suggested time frame for performance. Often simple or repetitive tasks, such as top of the hour re-introduction of the net, roll call for health and welfare of net members, and quiet time.

Quiet time is a period during which everyone on our net listens for low-power and/or distant stations trying to make contact with the net. With most tasks, the time within the hour can be moved or adjusted as required, but the quiet time is a fixed position. We chose the top and bottom of the hour in our example, so our teams know if they have a challenging situation, such as low battery, poor signal, etc., they can have a fighting chance to contact the net during quiet times.

## Q Codes

The *Q code* is a standardized collection of three-letter codes, all of which start with the letter "Q." It is a brevity code initially developed for commercial radiotelegraph communication and later adopted by other radio services, especially amateur radio. To distinguish the use of "Q" codes transmitted as questions from those transmitted as statements, operators used the Morse question "INT" (di-dit dah-dit dah) as a prefix to the "Q" code or a question mark (di-di-dah-dah-di-dit) after it.

### Table 1: Q Codes as Adapted for Use in Amateur Radio

| Code | Question | Answer or Statement |
|---|---|---|
| QLE | What is your expected signal? | The expected signal is low... |
| QNI | May I join the net? | You may check in... |
| QRA | What is the name (or callsign) of your station? | The name (or callsign) of my station is ... |
| QRG | Will you tell me my exact frequency (or that of ...)? | Your exact frequency (or that of ... ) is ... kHz (or MHz). |
| QRH | Does my frequency vary? | Your frequency varies. |
| QRI | How is the tone of my transmission? | The tone of your transmission is (1. Good; 2. Variable; 3. Bad) |
| QRJ | How many voice contacts do you want to make? | I want to make ... voice contacts. |
| QRK | What is the readability of my signals (or those of ...)? | The readability of your signals (or those of ...) is (1 to 5). |
| QRL | Are you busy? | I am busy. (or I am busy with ... ) Please do not interfere. |
| QRM | Do you have interference? [from other stations] | I have interference. |
| QRN | Are you troubled by static? | I am troubled by static. |
| QRO | Shall I increase power? | Increase power. |
| QRP | Shall I decrease power? | Decrease power. |
| QRQ | Shall I send faster? | Send faster (... wpm) |
| QRS | Shall I send more slowly? | Send more slowly (... wpm) |
| QRT | Shall I cease or suspend operation?/ shutoff the radio | I am suspending operation. /shutting off the radio |
| QRU | Have you anything for me? | I have nothing for you. |
| QRV | Are you ready? | I am ready. |
| QRW | Shall I inform ... that you are calling him on ... kHz (or MHz)? | Please inform ... that I am calling him on ... kHz (or MHz). |
| QRX | Shall I standby / When will you call me again? | Please standby / I will call you again at ... (hours) on ... kHz (or MHz) |
| QRZ | Who is calling me? | You are being called by ... on ... kHz (or MHz) |
| QSA | What is the strength of my signals (or those of ... )? | The strength of your signals (or those of ...) is (1 to 5). |
| QSB | Are my signals fading? | Your signals are fading. |
| QSD | Is my keying defective? | Your keying is defective. |
| QSG | Shall I send ... telegrams (messages) at a time? | Send ... telegrams (messages) at a time. |
| QSK | Can you hear me between your signals? | I can hear you between my signals. |
| QSL | Can you acknowledge receipt? | I am acknowledging receipt. |
| QSM | Shall I repeat the last telegram (message) which I sent you, or some previous telegram (message)? | Repeat the last telegram (message) which you sent me (or telegram(s) (message(s)) numbers(s) ...). |
| QSN | Did you hear me (or ... (callsign)) on … kHz (or MHz)? | I did hear you (or ... (callsign)) on ... kHz (or MHz). |
| QSO | Can you communicate with ... direct or by relay? | I can communicate with ... direct (or by relay through ...). |

Although Q codes were created when radio used Morse code exclusively, they continued to be employed after the introduction of voice transmissions. To avoid confusion, transmitter callsigns are restricted; the International Telecommunication Union (ITU) never issues any country a callsign prefix starting with "Q."

Codes in the range QAA-QNZ are generally reserved for aeronautical use (the ARRL has adopted a set of QN codes specifically for use on CW nets — see <http://bit.ly/2l2MnEu>); QOA-QQZ for maritime use, and QRA-QUZ for all services.

With the adoption of the National Incident Management System (NIMS) and Incident Command System (ICS), use of Q codes in emergency communications is officially frowned upon as they are not considered "plain language" or "plain English." However, many hams continue to use them, both on CW and voice, in both everyday and emergency communications. *Table 1* lists the most commonly used Q codes for those of you who either aren't familiar with them or need a refresher (Quick: What's "QRJ"?)

In addition to the official codes and meanings, hams have added a couple of their own, and/or expanded on the original meanings. Some examples include:

**QLF** – "Are you sending with your left foot? / Try sending with your left foot!" A humorously derogatory comment about the quality of a person's Morse code sending ability.

**QSK** – "I can hear you during my transmission" – refers to a particular mode of Morse code operating often called QSK, or full break-in, operation in which the receiver is quickly enabled during the spaces between the dits and dahs, which allows another operator to interrupt transmissions. Many modern transceivers incorporate this function, sometimes referred to as *full break-in* as opposed to *semi-break-in* in which there is a short delay before the transceiver goes from transmit to receive.

**QSY** – "Change to transmission on another frequency"; colloquially, "move [=change address]," e.g., "When did GKB QSY from Northside to Bayside....?"

**QTH** – "My location is…"; colloquially in voice or writing, "location," e.g., "The OCF *[antenna]* is an interesting build, but at my QTH a disappointing performer."

As you can see, use of Q codes is helpful when communicating with Morse code, but use of plain language on voice modes is preferred.

## Add QRP to Your Training

Working QRP can be challenging and rewarding. If your organization offers low-power practice sessions, seriously consider taking the training. If not, consider adding them. It's better to know if you'll be able to get a message through on low power than to guess.

– *73 de W4ALT*

| Code | Question | Answer or Statement |
|---|---|---|
| QSP | Will you relay a message to ...? | I will relay a message to ... |
| QSR | Do you want me to repeat my call? | Please repeat your call; I did not hear you. |
| QSS | What working frequency will you use? | I will use the working frequency ... kHz (or MHz). |
| QST | (no question version) | Here is a broadcast message to all amateurs. |
| QSU | Shall I send or reply on this frequency (or on ... kHz (or MHz))? | Send or reply on this frequency (or on ... kHz (or MHz)). |
| QSW | Will you send on this frequency (or on ... kHz (or MHz))? | I am going to send on this frequency (or on ... kHz (or MHz)). |
| QSX | Will you listen to ... (callsign(s) on ... kHz (or MHz))? | I am listening to ... (callsign(s) on ... kHz (or MHz)) |
| QSY | Shall I change to transmission on another frequency? | Change to transmission on another frequency (or on ... kHz (or MHz)). |
| QSZ | Shall I send each word or group more than once? | Send each word or group twice (or ... times). |
| QTA | Shall I cancel telegram (message) No. ... as if it had not been sent? | Cancel telegram (message) No. ... as if it had not been sent. |
| QTC | How many telegrams (messages) have you to send? | I have ... telegrams (messages) for you (or for ...). |
| QTH | What is your position in latitude and longitude (or according to any other indication)? | My position is ... latitude...longitude |
| QTR | What is the correct time? | The correct time is ... hours |
| QTU | At what times are you operating? | I am operating from ... to ... hours. |
| QTX | Will you keep your station open for further communication with me until further notice (or until ... hours)? | I will keep my station open for further communication with you until further notice (or until ... hours). |
| QUA | Have you news of ... (callsign)? | Here is news of ... (callsign). |
| QUC | What is the number (or other indication) of the last message you received from me (or from ... (callsign))? | The number (or other indication) of the last message I received from you (or from ... (callsign)) is ... |
| QUD | Have you received the urgency signal sent by ... (callsign of mobile station)? | I have received the urgency signal sent by ... (callsign of mobile station) at ... hours. |
| QUE | Can you speak in ... (language), – with interpreter if necessary; if so, on what frequencies? | I can speak in ... (language) on ... kHz (or MHz). |
| QUF | Have you received the distress signal sent by ... (callsign of mobile station)? | I have received the distress signal sent by ... (callsign of mobile station) at ... hours. |

*Source: en.wikipedia.org*

# Brrr... Winter Specials!

## The Quad Antenna

**by Bob Haviland, W4MB**

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## Reflections III

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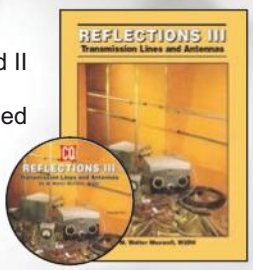

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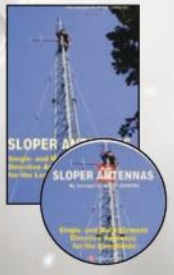

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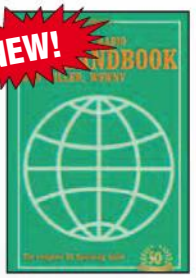

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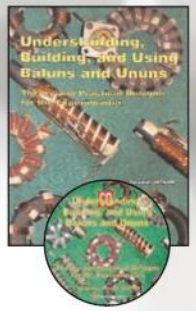


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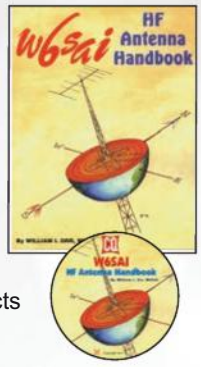


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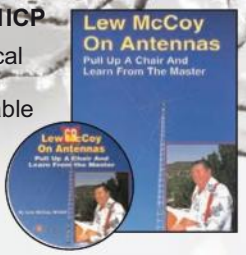


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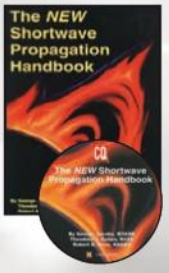


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BY R. SCOTT ROUGHT,* KA8SMA

QRP Special

# The Chinese Pixie Craze … Great Fun For a Few Dollars!

Nine dollars and 21 cents…my total cost for a Chinese Pixie, a low power CW transceiver kit I purchased online. No misprint…for less than $10 I purchased a single-band QRP transceiver kit equipped with a crystal for the 40-meter band and had it delivered right to my doorstep within a few days. These inexpensive kits are manufactured in China and are based on the well-documented and popular Pixie design that has been written about in books and magazines for several years. Over the last couple of years, I have heard a lot of jabbering about these kits…some good, some bad, but what I *do* know is that a lot of hams have purchased these kits. Not to be left out, I purchased the "Qianson HAM Radio 40M CW Shortwave Transmitter Receiver Version 4," just one of the many Chinese Pixie kits available online, then built and tested it to answer the question: "Do these kits really work?"

* <ka8sma@cq-amateur-radio.com>

## The Purchase

I try to stay abreast of QRP equipment for sale online and, in late 2016, I took an interest in the Pixie kits being advertised. These kits are regularly listed for sale on eBay, Amazon, and other online stores at such low prices it begs the question, "is it too good to be true?" Having built several more expensive QRP kits in the past, I was dumbfounded that I could purchase a QRP CW transceiver and have it shipped directly to my QTH for the price of a burger and fries…and if I upgrade my order to include a milkshake, I could order the kit already built and mounted inside an enclosure. After several months of deliberation, I ordered the kit from Amazon. After all, how could I lose? If the kit did not work, I had a handful of parts for the junk box.

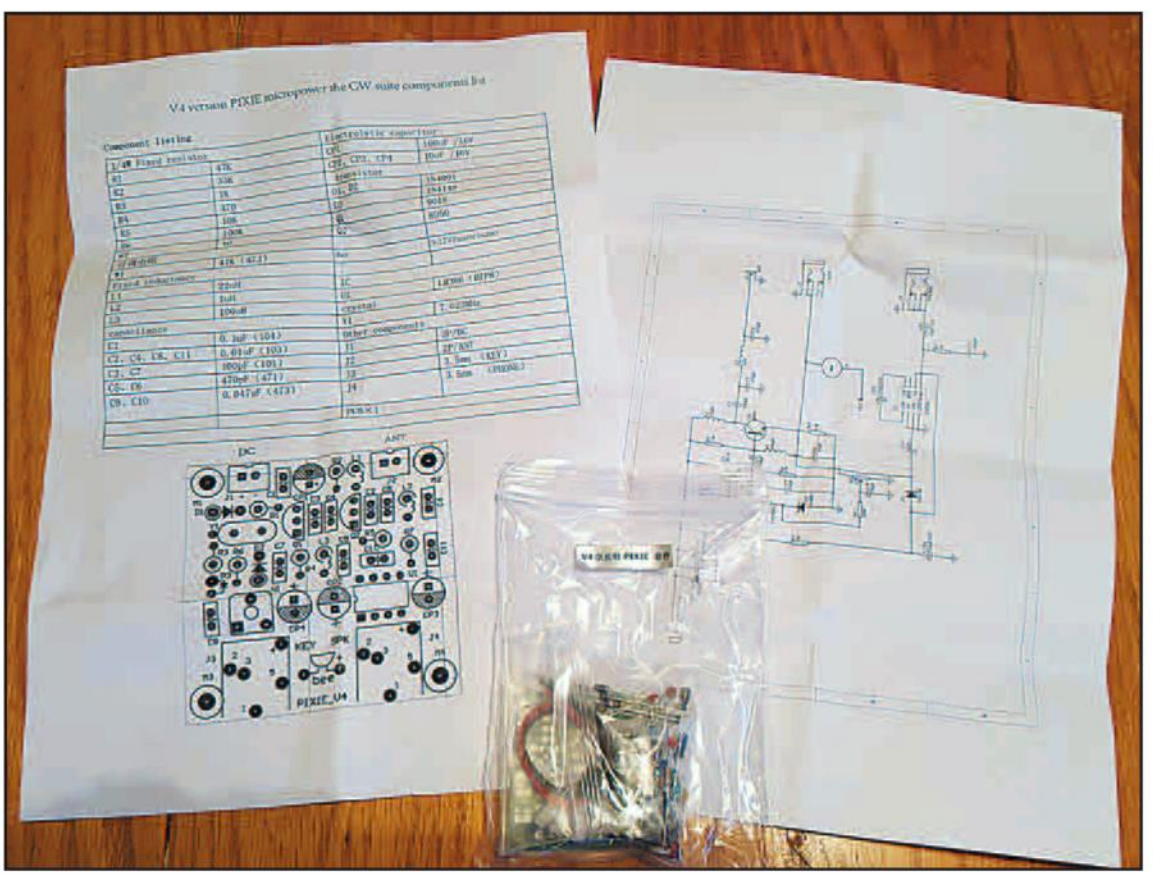

*Photo A. The Qianson Pixie Kit…bag of parts, schematic, and parts layout diagram.*

When I placed my Amazon order, I was pleasantly surprised to see the Chinese Pixie qualified for expedited two-day shipping at no extra charge under Amazon Prime membership (my XYL sees to it that all of her Amazon orders arrive as quickly as possible!). I ordered the kit Monday morning and it arrived Wednesday afternoon.

I opened the shipping envelope not sure what to expect inside. Enclosed was a clear sealed bag containing a PC board, a handful of parts and two pieces of paper (*Photo A*). One sheet of paper was the transceiver's schematic and the second sheet contained a table listing the components and their associated values along with a parts layout diagram for the PC board. No other information or written instructions were provided.

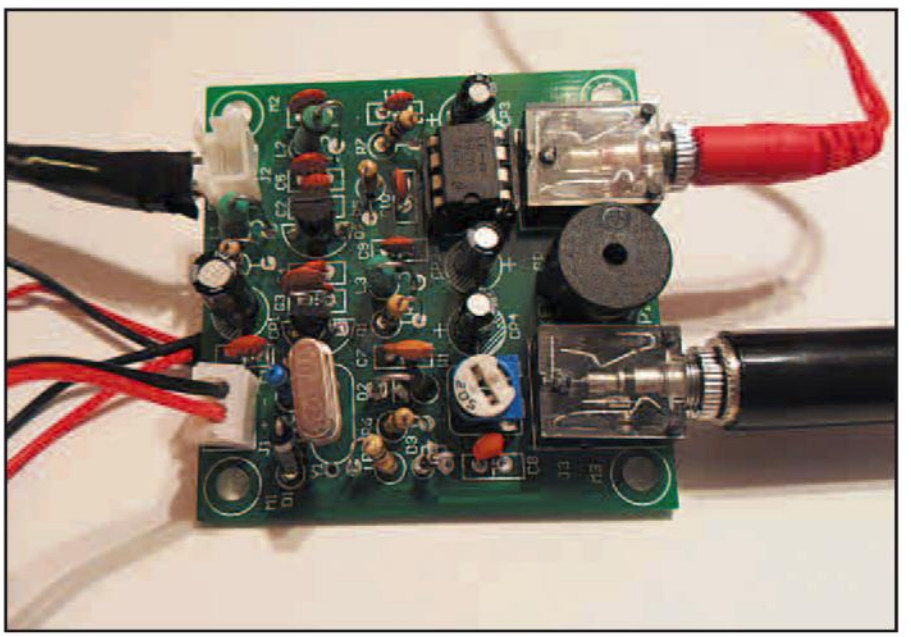

*Photo B. Close-up of the Pixie PC board after assembly.*

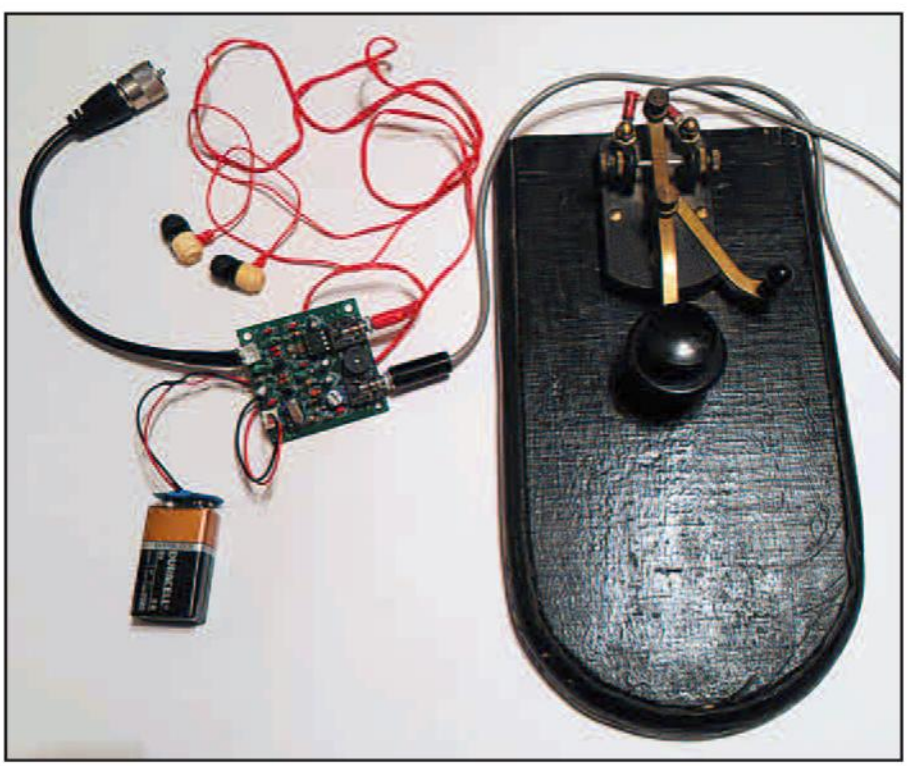

*Photo C. The completed Pixie…ready for the "smoke test."*

## Heating Up the Iron

As with any kit, the first step is to sort and catalog the parts. I use scrap pieces of foam insulation and masking tape for this purpose. I push each part into the foam, determine its part number, and then write the number on a piece of masking tape that I affix to the foam next to the part. Another method is to tape each part to a piece of paper then write the corresponding part number next to it. I have found it is always best to sort and label all parts as the first step in building a kit. It is much easier to switch parts around *before* they are soldered in place.

The most time-consuming element in building this kit was determining resistor and inductor values. The parts table only indicates the value of each resistor and inductor. For example, "R1" is 47K, "R2" is 33K, etc. Some kits include a cheat sheet listing the order of each color band (i.e. yellow, violet, black) to denote the value of resistors and inductors…you will not find that here. You need to determine the value of each component. If you are like me and cannot remember the numeric value associated with each color band, visit an online resistor/inductor color code calculator for a refresher. Be sure to look closely, and double-check the color bands on resistors and inductors when determining their values. I have difficulty in differentiating between red and orange color bands and find it helps to sort these types of parts on a white sheet of paper. The remaining parts (diodes, transistors, capacitors, etc.) are less difficult to sort as their values generally are printed directly on each component.

After sorting the parts, I stuffed the PC board (approximately 2.5 inches by 2.5 inches in size) with the resistors and inductors and soldered them in place. I then installed the diodes and capacitors and, after soldering, installed the transistors, integrated circuit (LM386 audio amp), and a buzzer which acts as a sidetone when sending CW. I "tack- soldered" the crystal to the PC board. I did this by inserting the crystal through the holes, heavily tinning the crystal's lead wires with solder, and holding the wires to the pads on the bottom of the PC board while briefly applying some heat from the soldering iron. This was done so I could easily remove the crystal from the board for a modification (described later). Removing components from a board after inserting them through the holes and completely soldering in place

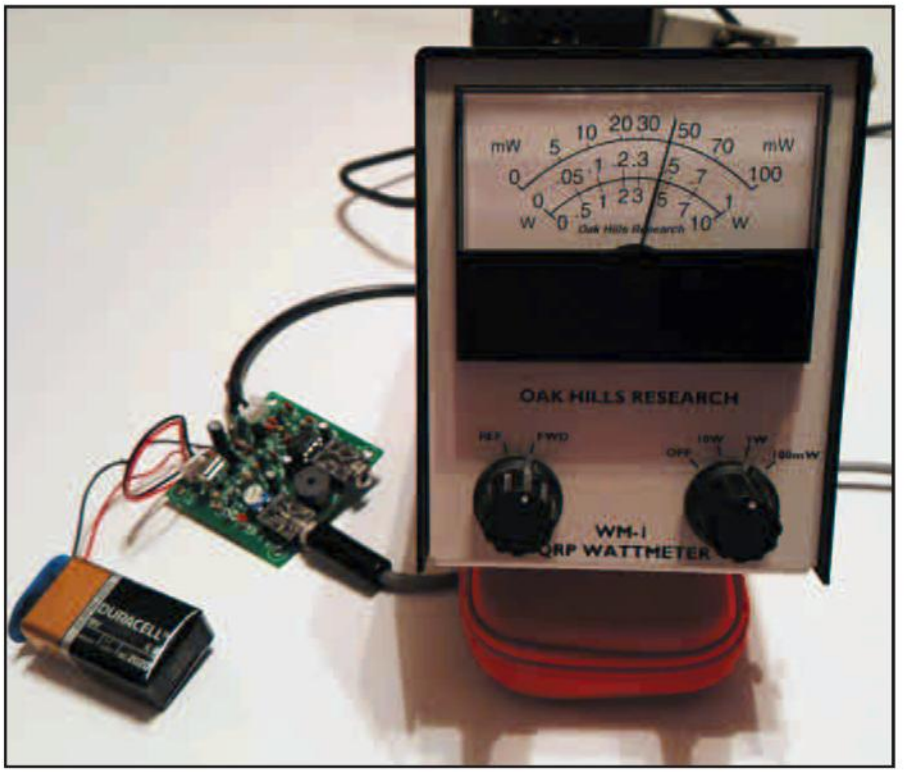


*Photo D. Pixie's output on my Oak Hills Research Wattmeter…nearly one-half watt with 9-volts input.*

can be a real challenge. Tack-soldering is my work-around when I know I may later remove a part.

The kit came equipped with 3.5-millimeter phone jacks for a key and headphones. Soldering these components to the PC board along with pins for DC voltage (9-12 volts DC, per the schematic) and the antenna were the final steps in completing assembly. *Photo B* shows a closeup of the assembled board and *Photo C* shows the board with all the plug-ins (key, earbuds, and 9-volt battery). Note in both photos that there is a piece of coaxial cable (RG-58/U) exiting the underside of the board. I soldered a short piece of coax (finished with a PL-259 connector on its other end) to the pads on the bottom of the board (beneath the antenna pin assembly) for connecting to a wattmeter, antenna tuner, etc. I could have removed the pin assembly and soldered the coaxial cable directly to the board, but I left the pin assembly in place so I would have other options available if I wanted to do something different in the future.

## The Smoke Test

According to the schematic, input voltage can range from 9 to 12 volts DC. I decided to power the unit via a 9-volt battery since I am planning to use this rig in the field and need to minimize weight and size as much as possible. I had a 9-volt battery connector in my junk box and wired it directly to the transceiver's voltage input leads. Prior to attaching the battery, I connected the transceiver to a QRP wattmeter that was fed into a 50-ohm dummy load. I also fired-up my Kenwood TS-530S and tuned it to the Pixie's crystal frequency so I could hear the tone of the oscillator as soon as I connected the battery. The Pixie's crystal oscillator is always powered up whether you are receiving or transmitting; therefore, the oscillator can be heard (tone) on a nearby receiver when power is supplied to the unit. When the transmitter is keyed, the audio is muted and the transmitter's power is amplified and fed into the antenna.

A big smile hit my face as soon as I snapped the cap on the 9-volt battery and heard the whine of the oscillator in my TS-530S. I keyed the transmitter, checked the wattmeter and saw the Pixie was putting out nearly one-half watt (*Photo D*). No smoke, no odor, and no hot components…happy times. The Pixie worked the first time I fired it up and I did not need to crack open a bottle of aspirin.

After the dummy load test, I connected the Pixie to my MFJ 971 portable antenna tuner and plugged in my horizontal sky loop antenna for the real test. The passive buzzer that acts as a sidetone when sending CW emits a pitch that is pleasant on the ear. A piece of masking tape over the top of the buzzer will help attenuate it if it's too loud. After sending a series of CQs I was heard by a "0" lander. I received a 559 signal report from western Kansas…not bad for one-half watt from Michigan.

The audio amplifier is the popular LM386, which I find just right for a pair earbuds or small headphones. I prefer earbuds as they are small, lightweight and can be easily rolled-up for portable operation. A small speaker can also be used; however, without a separate audio amplifier a speaker may be difficult to use unless you are operating from a quiet environment. The first time you are operating portable and hear a nearby bird chirp, you will likely wish you were using earbuds and not a speaker.

It is important to bear in mind that this is a direct conversion receiver with no audio filtering. If you are not familiar with direct conversion receivers, you hear signals just above and below your crystal's operating frequency in addition to the station you are working. This takes a little getting used to, especially if listening to the receiver in a loud environment. The Qianson Pixie has a trim pot that helps fine-tune the receiver and reduces some of the nearby signals.

## A Little Upgrade for the Little Pixie

The Pixie is a solid performer by itself, but an upgrade or two may make your Pixie a bit more enjoyable. So I would not be rock-bound on one frequency and to give myself a little wiggle room, I added a variable capacitor to swing the crystal's frequency a few kilohertz. I salvaged a variable capacitor from an AM clock radio I purchased at our local Goodwill and placed the variable capacitor (using terminals "C1" and "C2" on the capacitor) in series with the crystal (See the August 2017 QRP column for more information on salvaging this component and contact numbers on the variable capacitor). To make the connection to the PC board, I removed the crystal I had "tack-soldered" to the board and installed two pieces of 24-gauge stranded wire through the holes on the board for wiring to the variable capacitor and crystal. *Photo E* shows the wiring layout. The variable capacitor allows me to swing the crystal's fre-

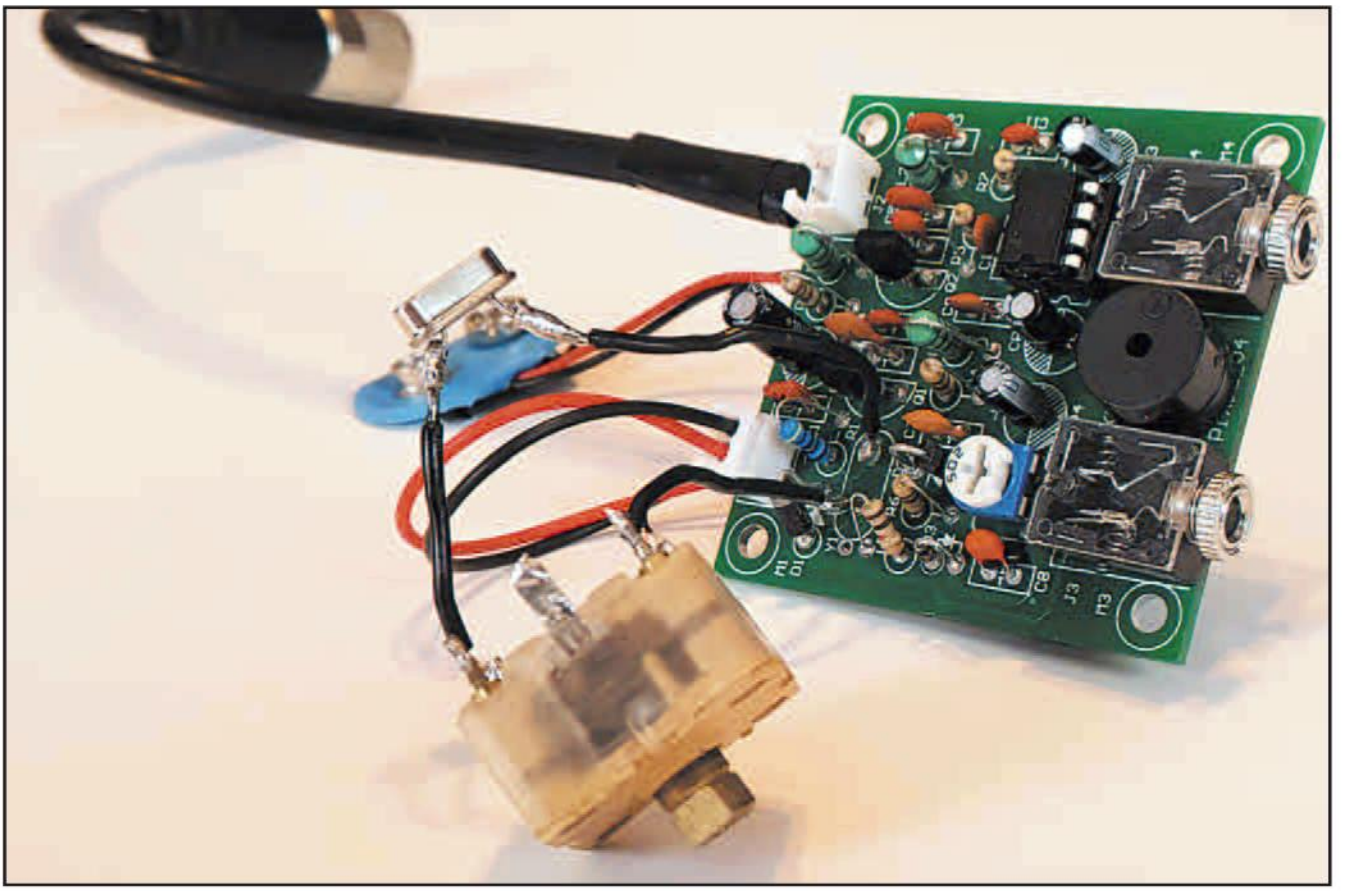

*Photo E. Addition of the variable capacitor for some extra swing room.*

quency about three kilohertz so I can snag a nearby station calling CQ or move away from a loud station on or near my frequency. If you salvage a variable capacitor from an older radio, be sure to snatch the tuning knob (connected to the variable capacitor) and 9-volt battery connector (if present), too…these items can also be used in dressing up your Pixie.

Other upgrade ideas include adding an On-Off SPDT switch and a second crystal to toggle between two different frequencies. A variable capacitor could be placed in this arrangement to add some swing room on each frequency. It is important to note that the crystal supplied with my Qianson Pixie was for the Extra Class portion of the 40-meter CW band. Other crystals can be purchased (online or at hamfests) to replace the supplied crystal. I experimented with several FT-243 type crystals I had in my junk box and found they work well with the Pixie. Not all crystals are the same size and may not "fit" into the PC board. I overcame this obstacle by soldering short jumper wires to the board and soldering their ends directly to the prongs to one of my FT-243 crystals. Sockets for a variety of crystal types can also be purchased online.

Another upgrade I plan to make is the addition of an On-Off switch to the 9-volt battery lead. Since I plan to mount the Pixie inside an enclosure (including the 9-volt battery), the On-Off switch will allow me to easily turn off the unit without the need to open the case and disconnect the battery when not in use.

As for finishing your Pixie, the sky is the limit. Be creative and do what works best for you. I may use an Altoids® tin since they are thin, have a good clasp and there is room to store an extra 9-volt battery (always good to have backup power), but I am also considering incorporating the Pixie into the "All-in-One Portable Antenna Tuner" (an L-network tuner in a tennis ball container with an end fed wire) that was discussed in the August 2017 column. I am intrigued by the idea of mounting a transceiver, antenna tuner, and antenna all into one package. If I give this a try I will snap a photo for a future column.

***Its low cost makes it affordable for anyone who wants to experience the joy of kit building and making a contact with a rig they built themselves.***

## Final Thoughts

The Qianson Pixie is a bare bones QRP transceiver that is fun to build and use on the air. Its low cost makes it affordable for anyone who wants to experience the joy of kit building and making a contact with a rig they built themselves. The lack of instructions can be frustrating; however, with a little patience even the ham with limited or no kit building experience can successfully tackle this kit. For less than the cost of a movie ticket, you will be entertained for several hours and likely have more fun than a night out in a crowded theater (although your XYL might disagree!)

Finally, if you have any ideas, topics to be covered, or an interesting QRP story to share, let me know and I will work it into an upcoming column. *– Until April, 73*

kit-building

BY JOE EISENBERG,* KØNEB

# "Am I Going to The Dark Side?" Part III

## *Installing the Harbach Kits Into the SB-200*

In the previous two columns about the Harbach kits, I presented the kits needed to restore an aging Heathkit SB-200 amplifier. In this part, I install them and test the restored amplifier.

Once all three of the Harbach kits are assembled, it is time to install them into the amplifier. Removing the screws on the bottom holding the four rubber feet in place allows the chassis to be removed from the case. Now is the time, if needed, to repaint the outer case.

Once the chassis is out, be sure all capacitors are discharged so the unit is safe to work on. Be sure all high voltage capacitors are discharged before going on. *Safety first!*

The top RF shield cover needs to come off, and there are a lot of screws involved, so be sure you have a safe place to store them during the installation process. The first thing I did was to use compressed air to blow out any dirt from the inside and wipe down the insides if needed. Removing the tubes is also important. Keep them in a safe place if you are re-using them, or even if replacing them. It is also a good idea at this time to be sure the plate cap connections are clean as well.

### Installing the Power Supply Kit

The first kit to be installed was the power supply. I found I needed to remove the front panel of the SB-200 a bit sooner than the manual suggests in order to facilitate removing certain screws from the old power supply. Getting the old power supply out is a bit of a challenge, due to the height of the filter capacitors on the original board. The new board is a lot easier to get into place. The old board has a hole that several wires pass through. This hole is replaced by a much bigger opening on the new board, so no cutting of the wires is needed.

The Harbach manual suggests cutting the old board with wire cutters to release the wires from the hole. I found the old phenolic type PC board to be quite brittle with age, making this task not too difficult. It cracks very easily, and once a few cuts are made, the pieces fall off and the wires can be freed from the hole. Also, be sure to tag the old wires as the colors may have faded to the point of not always being able to see what color or colors they used to be marked. They will be connected to about the same physical position as they used to occupy, making identification simple.

Placing a couple of the screws in place holds the new power supply in position to allow for wiring to take place. Instead of the hole, the wires now get placed into the new corner notch. One set of a screw, lockwasher, and nut will be surplus, as the new power supply board uses one less than the original. It is really amazing how much smaller the new electrolytic capacitors are compared to the old ones. Once all the power supply screws are in place, the front panel can be reinstalled. It won't be in the way of the other two boards yet to be installed.

### Next: The Soft-Start Board

After the power supply board is installed, it is time to work on the bottom of the chassis and install the Soft-Start board. This board installs upside-down, and is attached to the chassis either by drilling a hole and using your own screws and standoffs or simply using a dab of RTV adhesive on the tops of the two relays. Be careful not to cover up the tiny vent holes on the tops of those relays. You will need to remove the lacing on the cable bundle that goes

*The amplifier tube section with tubes removed.*

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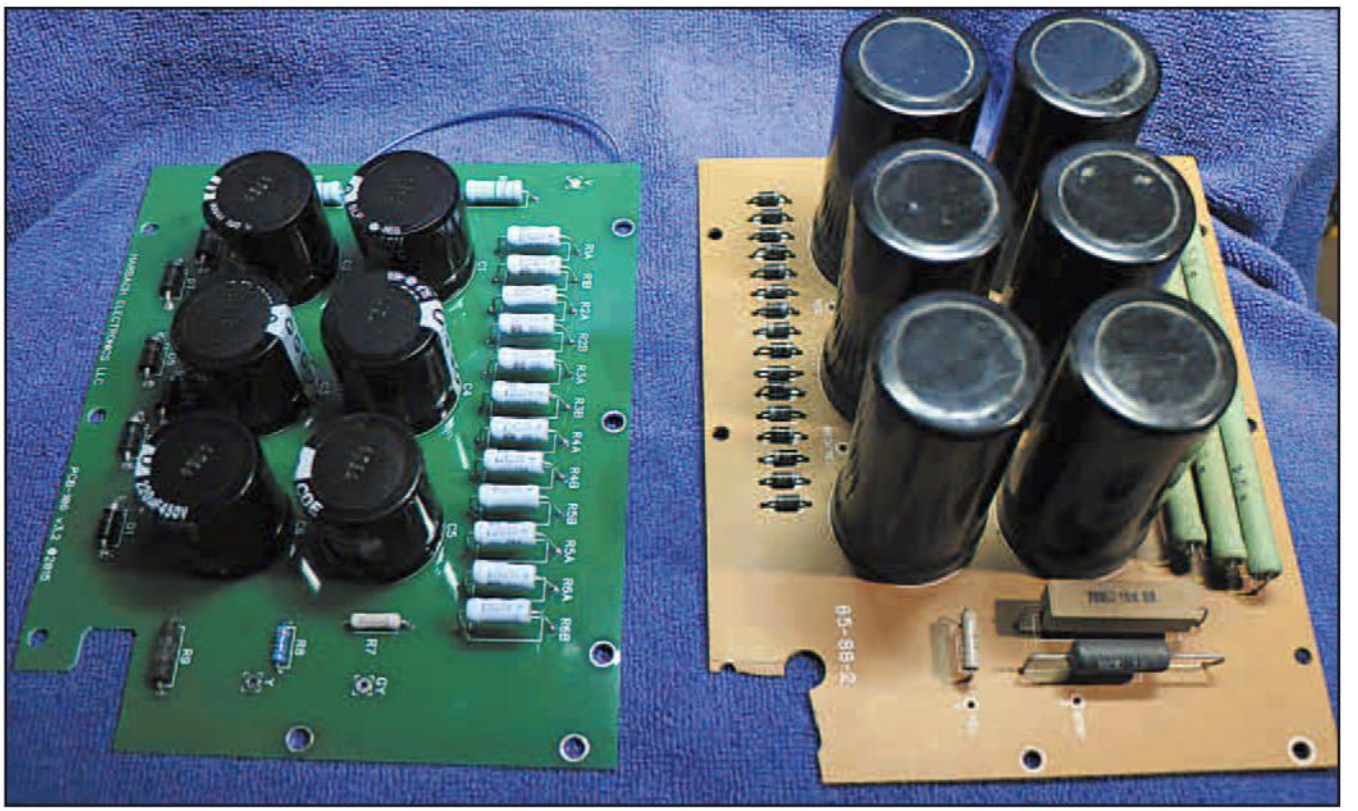


*The old power supply (brown board) and new power supply (green board) side by side for comparison.*

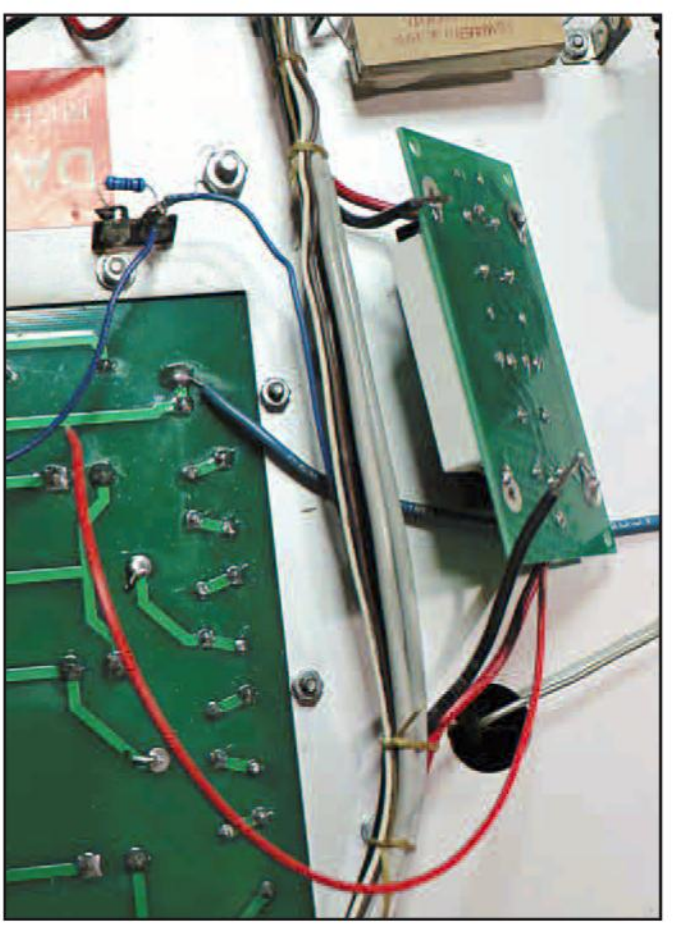
up the middle of the chassis and cut the larger red and black wires to connect them to the new board. The Soft-Start lets the initial surge of power be dissipated by the load resistors before the relays pull in to connect the full AC power to the circuits. This gives components a much better power-up, increasing the life of the tubes and other parts.

## From Soft-Start to Soft-Key

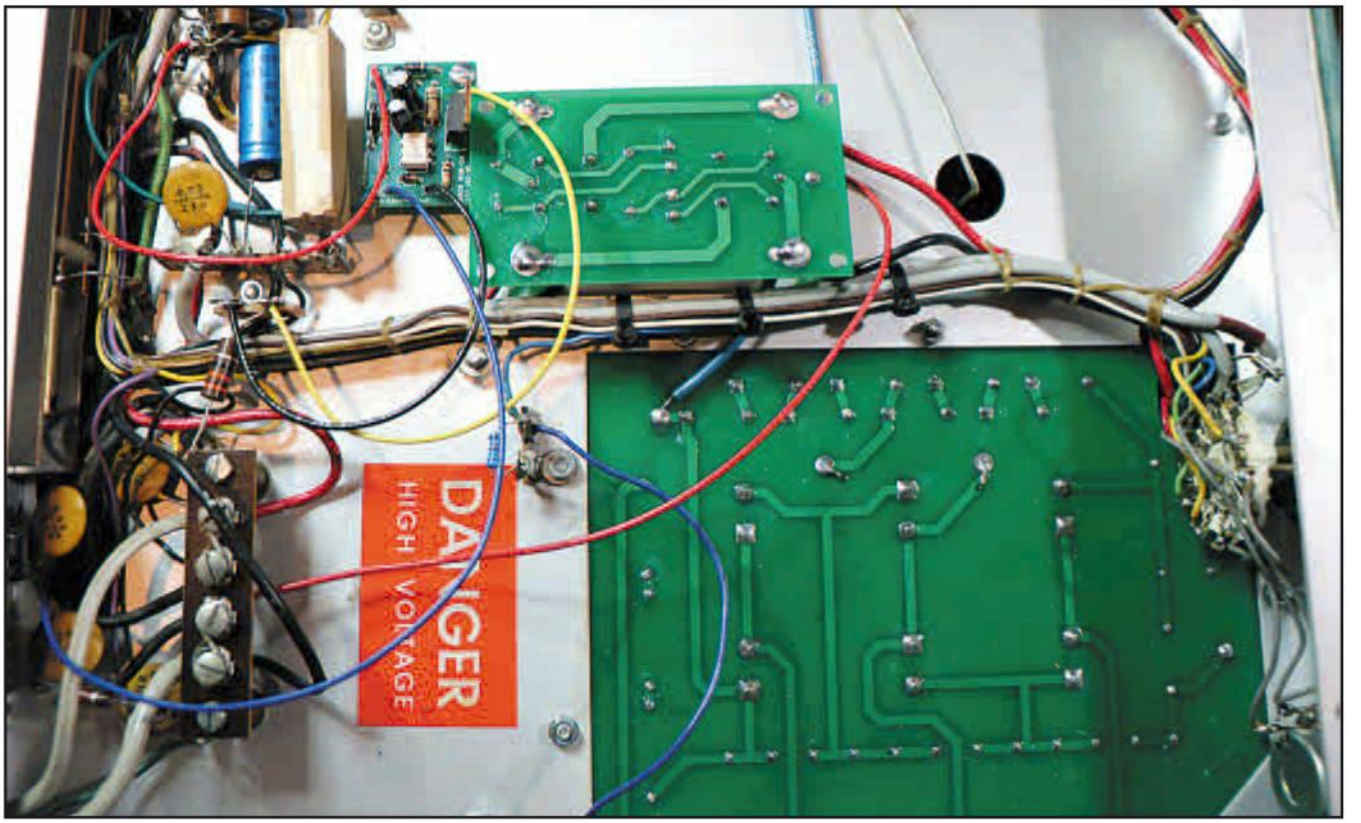
Adjacent to the Soft-Start board is the Soft-Key board. This board requires a hole to be drilled to allow for the mounting of this smallest of the three kit boards. There is also a two-terminal lug strip that needs to be installed on the same screw that holds an existing terminal strip in place. The Soft-Key reduces the 135-volt relay voltage to about 1.5 VDC. This lower voltage (and current) prevents damage to modern solid-state transceivers, which rely on either very small relays or solid-state switching to key an external power amplifier. There are lots of external solutions to this problem, but as long as we are inside the SB-200, it is preferable to have the modification already done, so any type of radio, both older and newer, can safely key the amplifier. There are five wires to be connected, and following the instructions carefully will make this task easy. There is one wire on the PC board that has to be squeezed up through a grommet already occupied by a bundle of wires, but it seems to fit, albeit tightly.

## Make a Visual Inspection

Once all three boards are installed, it is time to look it all over once again to ensure all the wires are correctly placed. Replacing the removed lacing from the wire bundle with a few zip ties is in order at this time as well. Installing the tubes is next, followed by replacing the RF shield cover with all of those screws you safely stored. Finally, I replaced the RF input RCA jack on the back with a BNC connector. Using a



*The Soft-Start inrush protection board being installed.*




*All three Harbach boards (green) installed in the SB-200.*

screw-in type connector, I didn't have to make any modification to the hole where the RCA jack for the RF input used to be. After reconnecting the RF input connector to the relay, I slid the chassis back into the case.

## Testing Time

Turning it on, I was relieved to see that even after letting it idle for an hour, no smoke appeared, and the filaments on the tubes glowed nicely. The amplifier high voltage was reading a steady 2,300 VDC, and so it was ready for RF testing. Because my shack is not quite ready to accommodate this power amplifier yet, I enlisted the help of John Mardock, KRØP, to assist me in properly testing the amplifier. John has had extensive experience performing these upgrades to the SB-200 amplifiers.

John had a couple Bird 43 wattmeters handy as well as the proper slugs and a dummy load capable of handling a kilowatt. Adjusting the level of drive slowly upward brought up a point about this kind of amplifier. As you increase the amount of power input, you need to fine tune the plate and load con-


*SB-200 hooked to an exciter and dummy load. Eighty watts drive on 20 meters gives 700 watts output.*

trols. With about 80 watts of drive, I was able to get a full 700 watts output of steady carrier.

### You Next?

All three of these kits I used, as well as replacement fans, T/R relays and some other hard-to-find parts are available from Harbach Electronics at <www.harbachelectronics.com>. Jeff Weinberg, W8CQ, at Harbach also has kits and parts for many other amplifiers and radio power supplies from this era including Kenwood, Yaesu, Swan, Drake, Collins, and others. The pair of 572B tubes I used came from DX Engineering and can be found at <www.dxengineering.com>.

*– Until next time, 73 de KØNEB*


*Closeup of Bird wattmeter monitoring power output measured at 700 watts.*


*A steady 2,300 VDC is measured on the plates of the output tubes.*

# what's new

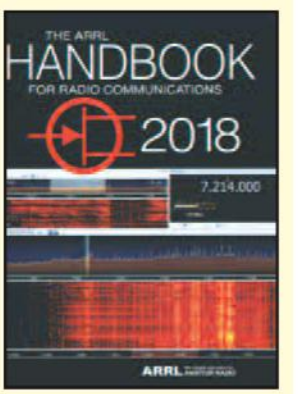
### 2018 ARRL Handbook

As we've said many times before, no ham's technical library is complete without a copy of the *ARRL Handbook for Radio Communications.* It isn't cheap, but you don't need to get a new one every year. If you don't have one yet, or your copy is a few years old, the 2018 edition is said to be the book's most comprehensive revision since 2014.

Among the changes:

• The Fundamental Theory section has been redone, with chapters on Electrical Fundamentals, Radio Fundamentals and Circuits & Components, the latter two replacing previous chapters on Analog Basics and Digital Basics (now in the downloadable supplement — more on that later).

• There are new chapters on the fundamentals of digital signal processing (DSP) and software defined radio (SDR); plus analog and digital filtering and an SDR-focused chapter on transceiver design basics. In addition, there is updated content on Solar Cycles 24 and 25, tower safety and building remote control stations. (Curiously, there does not appear to be anything specifically focused on our new 630- and 2200-meter bands.)

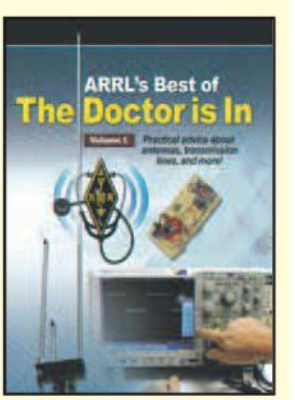



• New projects in the 2018 edition include filters and transmission lines for VHF/UHF and microwave bands; software-controlled and manual preselectors for 160-10 meters; an audio-based VOX/PTT interface for digital modes; a PICAXE-based timer and an Arduino-based CW IDer; CW reception filters and several antennas.

In a departure from the past 10+ years, the included CD has been replaced by access to a downloadable digital edition of the *Handbook*, plus a downloadable supplement including chapters on station accessories and projects, as well as radio math (and the Digital Basics chapter that was dropped from the main book).

The 2018 edition of the *ARRL Handbook* retails for $59.95 (hardcover) or $49.95 (softcover) in the U.S., and is available from ARRL dealers or directly from the League at <www.arrl.org>.

### "ARRL's Best of 'The Doctor is In,' Volume 1"




The ARRL has compiled antenna- and feedline-related installations of its popular "The Doctor is In" series in *QST* into a new book called *ARRL's Best of "The Doctor is In."* The book is organized into five chapters: VHF/UHF Antennas, HF Wire Antennas, HF Vertical Antennas, HF Yagi Antennas, and Transmission Lines.

This edition is labeled as Volume 1, so additional topic-based anthologies are presumably in the works. The book retails for $22.95 and is available from ARRL dealers or directly from the League at <www.arrl.org>.

learning curve

BY RON OCHU,* KØOZ

# Watt's Up, Doc?

This month's column will focus on what I consider to be an almost indispensable shack accessory, the wattmeter. Perhaps, my need for wattmeters stems from my undergraduate days as a DJ for the university FM station. The station ran 100 kilowatts and one of my duties was to periodically log the transmitter's output and deviation.

Meters abounded in the KWMU control room and I had to be aware of each one's function, especially the wattmeter's output. It's not enough to know that your transceiver's red transmit light is on when you're transmitting.

Why not?

For one reason, your finals may be blown, and your rig isn't putting out much power at all. Your transceiver's meter may show output, but how much is your rig really putting out? A good wattmeter in line between your transceiver and antenna will tell you exactly how much power is being fed to your antenna. Furthermore, the wattmeter provides redundancy to your rig's multimeter system and it offers a way to compare the accuracy of your transceiver's output meter. In addition, if there is an intermittent connection with the antenna, such as when the wind's blowing, a bouncing wattmeter needle will grab your attention.

Over time, you will be able to establish a data baseline. For example, antenna "A" normally receives 100 watts from the transmitter. However, when it is icy outside, the power output drops a few watts. This can be a good indicator of antenna icing and a temporary increase in SWR (standing wave ratio). That's important to know.

It's not a good idea to bump the power upwards to compensate for the temporary decrease in power. A newly hired staff member at the college station where I worked noticed the station power output was lower one cold, wintry, icy day. He bumped the power output upwards until it reached its normal reading on the meter. However, since the ice created a higher SWR on the station antenna bays, the real power output was considerably higher resulting from high SWR. So much higher, in fact, that the transmitter driver, final, and vacuum variable capacitor went up in smoke and cost the university thousands of dollars in repairs and forced our station to reduce power to 25% for a few weeks.

If a normal power output reading begins to change, that is a good indicator of something going amiss in the antenna, feed line or transmitter. Antenna connections and coax age with weather, time, and UV (ultra violet) exposure. A good wattmeter can be an early indicator of a potential problem. Keeping notes in the margin of your station logbook regarding forward and reflected

*Email: <ko0z@cq-amateur-radio.com>


*Photo A. SO-239 connectors are common with most SWR/wattmeters. (All photos by KØOZ)*

*Photo B. The Bird model 43 wattmeter operates on HF, VHF or UHF frequencies, depending on the "slug" that's used. The "N" connectors have better accuracy and lower loss at VHF and UHF.*

# CQ 2018-19 calendar


Fifteen spectacular color images of some of the biggest, most photogenic shacks and antennas from across the country and...also this year... a number of favorite shots from *CQ* magazine thrown in for good measure!

Calendars include dates of important Ham Radio events, major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. CQ's 15-month calendar (January 2018 through March 2019) is truly a must have!

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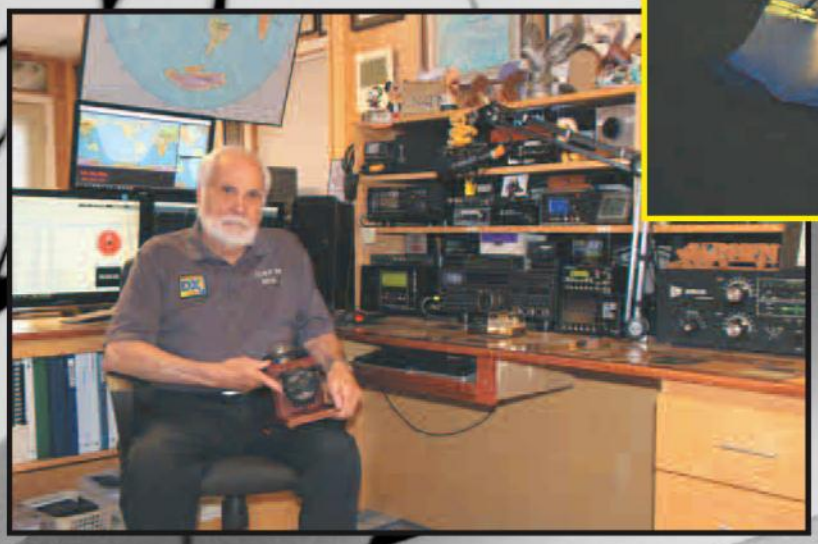

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watts, SWR, and power levels is a great way to keep on-going station performance records. Don't rely on memory alone.

## How Does it Work?

For the most part, all wattmeters work in a similar fashion. The wattmeter enclosure has two ports, usually SO-239 (*Photo A*) or N (*Photo B*), connected with a through-line strip. One port is for the transceiver and the opposite port is for the antenna. Along the strip is a sensing loop that connects to a feed-through capacitor, a diode, a terminating resistor and a meter. RF (radio frequency) is detected when a signal is transmitted, then rectified into a voltage that is translated on the meter scale as a watt value. Many wattmeters offer forward and reflected wattage readings that can be used to determine SWR in addition to transmitted power output.

## A Meter for Every Antenna?

There's a plethora of wattmeters, new and used, on the market today. Determining the right one for your needs can appear to be a bit daunting. When I first started in this hobby, I had one wattmeter that I used for testing transmitter output. I dreamt of the time when I could put a wattmeter on every antenna coax going into my shack.

One way to turn that dream into a reality, I discovered, is to get a coax switch. Antenna feed lines go into one port and the switched port goes into the wattmeter's antenna port. The rig's antenna port now attaches to the wattmeter's TX port. The antenna switch in *Photo C* allows me to monitor four separate antennas with just one wattmeter. Still, there's the issue of which wattmeter is the right one for me? Here are some suggestions.

## New vs. Used

Generally, I like to purchase new wattmeters because they are under warranty. Granted, new meters cost more, but I know they are a safer purchase. A used wattmeter may have problems. I've seen a used wattmeter


*Photo D. The Jetstream JTWVUHF SWR/wattmeter covers HF through UHF. Note the various power settings.*


*Photo C. A good coax switch allows multiple antennas to be connected to a single transceiver … and a single wattmeter.*


*Photo E. Rear panel of the JTWVUHF meter. Notice the VHF/UHF SO-239 connectors for the antenna and transmitter on the left. The HF through VHF connectors are on the right. The selector switch connects the meter circuitry to either port. Note the pushbutton switch for higher power readings of up to 400 watts.*


*Photo F. Top plate of the Bird Model 43 wattmeter, a very fine test instrument.*


*Photo G. A Bird Model 43 wattmeter. Notice the 25-watt, 200- to 500-MHz slug in the front of the meter.*

from an estate sale that looked like it was in good condition, only to find out later that it had once been submerged in water, perhaps from a flooded basement. If a used wattmeter looks to be in reasonably good shape, gently tapping the meter to see if there's a little needle movement or none at all is a good, precautionary test. If the needle swings across the entire meter face with a gentle tap, that may not be a good sign. I'd recommend that you put that one down and continue looking. Another feature to look for is its frequency response.

There are meters for HF and there are meters for VHF and UHF. A few wattmeters have multiple antenna ports for HF, VHF, and UHF. For example, Jetstream offers the JTWVUHF SWR-Wattmeter (*Photo D*) that has two frequency sections. Two SO-239 connectors (one for antenna, the other for transmitter) cover the frequency range of 140 to 525 MHz, while the other side covers 1.8 to 160 MHz (*Photo E*).

This is important because it tells you that Jetstream designed its wattmeter-SWR circuitry to accurately respond to the range being measured. I know quite a few hams who have taken an inexpensive CB (Citizens Band) SWR-wattmeter to test their 6-meter antenna only to find themselves panicking because their meter is indicating poor SWR and lower than expected power output.

Make sure that the meter's upper range covers the 6-meter band (50-54 MHz) when testing a 6-meter antenna. Most HF


*Photo H. Three Bird Model 43 slugs. From left to right, 5 watt, 100- to 250-MHz slug, 500-watt, 200- to 500-MHz slug, and a 1,000-watt, 2- to 30-MHz slug.*

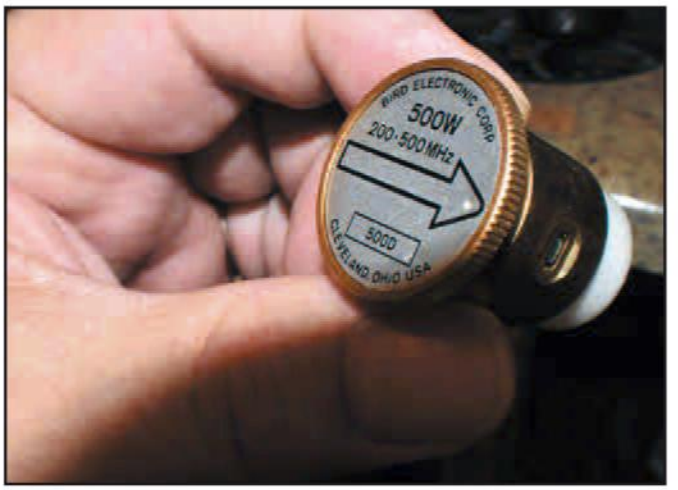


*Photo I. Close-up of a Bird slug. The arrow indicates either forward or reflected power, depending on its position within the meter housing. The white area at the bottom of the slug houses the sensing loop.*


*Photo J. Jetstream VHF/UHF meter will indicated power output and SWR at the same time.*

SWR/wattmeters have an upper range limit of 30 MHz. They will indicate power levels at 6 meters, but don't expect accurate measurements. This suggestion also applies for 2-meter and 70-centimeter SWR/wattmeters. By the way, frequency response also applies to coax/antenna switches. Check to see that the switch will handle not only the frequency but the power levels of your station. Not all meters and switches are created equal.

## SO-239 vs. N Connectors

Good quality SO-239 connectors will work up through UHF frequencies. Most wattmeters/SWR bridges come with SO-239 connectors. In my opinion, serious VHF/UHF, watt/SWR meters are equipped with N connectors for VHF and higher frequencies. N connectors offer a better constant impedance at higher frequencies than SO-239 connectors. In addition, N connectors can handle higher power levels at UHF frequencies than SO-239s. These factors, combined with a few others such as return loss and impedance bump, make the N connector better-suited for more accurate readings in the VHF/UHF range. The venerable Bird Model 43 wattmeter is equipped with N connectors. For many ops, the Bird Model 43 is the gold standard of wattmeters.

## Bird Model 43

Bird wattmeters have been in production for a long time. Bird's Model 43 (*Photos F and G*) is extremely accurate and it is ruggedly manufactured. A major reason this instrument is so accurate is that Bird uses frequency dependent slugs


*Photo K. Jetstream JTWVUHF meter. HF through UHF in a single meter combination.*

(*Photos H and I*). Each slug responds to a specific frequency range and power level to provide more accuracy. A slug contains a terminating resistor, a diode, pickup loop, and a feed-through capacitor suited to the frequency range and power level being tested.

Although the Bird Model 43 is not a SWR meter per se, the slug can be rotated 180 degrees in its socket to obtain a forward or a reflected power level. Knowing the forward and reflected power level allows SWR to be calculated.

Bird slugs are categorized. H slugs cover frequencies between 2 and 30 MHz. B slugs cover 50-125 MHz, C slugs cover 100-250 MHz, D slugs cover 200-500 MHz and E slugs cover 400-1,000 MHz. There are other categories, but these are the most commonly used within amateur radio. Obviously, owning a collection of slugs and a meter can be somewhat costly, but quality and accuracy aren't cheap. Still, there are bargains out there for the patient, careful, and savvy shopper.

## SWR/Wattmeter Combos

Jetstream and Welz are just some of the manufacturers selling SWR/wattmeter combinations (*Photos J, K, L, and M*). Some of these meters currently range in price between $60 and $150. Meters


*Photo L. Welz SP45 M SWR/wattmeter covers VHF-UHF.*


*Photo M. Welz SP 600 covers 1.8 to 500 MHz, which makes it very versatile in the shack.*


*Photo N. Heathkit HM 102 indicating about 75 watts out on HF. This meter is no longer available new, but can be found at hamfests and on the internet.*

that offer HF, VHF, and UHF frequency ranges also offer antenna ports for these bands. So it is possible to connect two to three antennas to just one meter and select between bands, which can save money as opposed to providing a meter for each band. Just ensure that the proper antenna is selected when using one of these meters. Another good meter, which is no longer manufactured but often found at hamfests, is the Heathkit HM 102 (*Photo N*). This meter covers the HF bands with good accuracy and it will handle legal limit power levels.

## Professionals Monitor

Professional radio engineers monitor their station's transmissions. Engineers monitor not only signal quality, but power output as well. As ham radio operators, we want to carry on the time-honored tradition of maintaining professional-quality signal emissions and knowing your station's power output is vital. In fact, the FCC requires us, as licensees, to determine our station's RF exposure levels. A good, accurate, wattmeter really should be included as a part of our stations. Thank you for reading *CQ* and I hope to hear you on the air.

– *73 de Ron, KOØZ es GL*

mobiling

BY JEFF REINHARDT,* AA6JR

# It's Getting (More) Complicated

Our last few visits have explored the challenges posed by newer cars and trucks when attempting to mount amateur radio gear for mobile operations.

In short, the "old days — old ways" of connecting your mobile transceiver (or other accessories) directly to the vehicle's battery are not necessarily the best practice anymore. That's because vehicle engineers are attempting to squeeze ever greater efficiency out of every drop of fuel burned by the engine. That includes reducing the drag caused by parasitic accessories such as power steering, air conditioning and, of particular interest to us, the alternator.

Automotive engineers have been very clever in thinking through the challenges posed by efficiency. For example, in many cars, power steering "assist" now falls off as speed increases. In some cars and trucks, alternators are now programmed to basically "float" the battery as you motor along. Some vehicles only direct a heavy charge to the battery when you apply the brakes, using the drag of the alternator to help slow the car and make the most of energy that would otherwise have been converted to heat in the brake rotors. Of course, vehicle electrical demands change all the time. Powered accessories such as wipers, climate control, brake lights, entertainment systems, headlights, rear window defoggers, seat heaters, power windows, and more all represent a fluctuating power demand environment.

As mentioned in a previous column, modern electrical systems often rely on one or more sensors that monitor the flow of power into and out of the battery. By connecting a transceiver (or other accessory) directly to the battery, you bypass the sensors and that can create problems, like a dead battery or worse, damage the car's electrical system.

These new challenges are frustrating to those who want to enjoy a mobile transceiver, as evidenced by this email I received:

*Hi Jeff:*
*Your CQ magazine article was timely. N4CD and I have corresponded a little bit about how to avoid bypassing the negative lead sensor by connecting the new cable's negative line to the chassis. And I understand all that.*
*But my new Chevy Traverse puts a sensor in the positive line off of the battery. This sensor construction is a little different in that the sensor includes a loop of about an inch diameter with the positive cable*

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e-mail: <aa6jr@cq-amateur-radio.com>


*The CQ Garage website <http://bit.ly/2BTkfXp> has ham radio license plates from around the U.S. Is your state represented? If not, please send us a photo of your ham tag and we'll get it posted. These plates, from Ohio and elsewhere, have been collected by Ohio's Portage County Amateur Radio Service. (Courtesy of Portage County ARS)*

*running through it and then the main positive line is routed on through the firewall and under the hood for power distribution. Yes, the battery is mounted under a cabin floor plate, probably to free up room under the hood and to avoid higher ambient temperature under the hood. I first thought this was great because I would not have to route the new radio power cable through the firewall.*

*I imagine the sensor picks up current flow via transformation to the sensor pickup loop, and then on to a digitized sensing circuit to communicate with a computer that controls battery charge rate. Theoretically, if I route my rig's positive cable through the same sensor ring, the effect should be additive with the main bus. I'm not sure if this is true for this design. Apparently, local dealer people are not up on this. I would like to find a GM person with this knowledge who would share with me if my idea is correct. Do you know anyone? I will try to find a phone number in the owner's manual and plan on spending time being transferred to various extensions. Hi-Hi!*

*A local car audio amplifier installer recommends that since he does not have knowledge of this new GM sensing arrangement, I should connect both leads of the new cable to the battery terminals without running the new positive cable through the loop. He rationalizes that I will only operate with the engine running, the battery load during transmit has a very low duty cycle at maybe 15-18 amps, and the receive load is minimal. This arrangement seems no different than what N4CD described that would pose a problem.*

*Any ideas?*

*– 73, Harry Jones, K9DXA*


*Almost Heaven … Hamming in West Virginia. (Courtesy of W3HI)*


*No question about W4DOD's main on-air interest! (Courtesy of W4DOD)*

For Harry and our other faithful readers, I have good news and so-so-news.

As to the advice from the sound system installer, I'd be wary unless his response is based on a manufacturer's service bulletin. I have spent considerable time searching the web for solutions to this issue. Here's some of what I have found.

• There is no simple answer or "one size fits all" response to this problem. The ability to use and support mobile transceivers in newer cars and trucks varies greatly by manufacturer and in some cases by vehicle model.

• The manufacturer's websites are of little use when searching for guidance on how to properly install a radio transceiver. Manufacturers typically do not post technical service bulletins online.

• If you search online for installation guidance, be aware that there is a lot of dated information that can lead you down the wrong path.

• Some vehicle owner's manuals do address the installation of electrical accessories, others do not.

• You can call a manufacturer's customer service help line to request assistance. This approach often requires a great deal of time and patience, as it is quite likely you will be switched from place to place. You may get an answer, or like Harry, K9DXA, you may not. Be prepared to be patient.

• You can contact your dealer's service department, preferably the service manager. This may be the most direct method. Dealers have avenues into technical support information that retail customers do not. This approach may require several days before a response is received.

• Some manufacturers have placed limits on the maximum output power of a transceiver. They may also have specific routing for power leads and antenna coax cables.

• Doing it right is a must. If your transceiver or installation causes damage to the vehicle or its intricate management systems (like engine management or air bags), the repairs could be costly and may not be covered under warranty.

• If you're about to purchase a new car or truck, find out in advance what the procedure is to integrate a transceiver with the vehicle. A dealer anxious to make a sale may be more highly motivated to provide you with the information you need.

And here's an invitation — please forward to me the experience you had in obtaining info from your manufacturer or dealer and I'll be glad to share it in a future column.

### All Is Not Lost

The major manufacturers most likely have a policy to address your particular

# what's new

### NTE Parts Direct Adds White to Split-Loom Product Line

Hams looking to organize their cables have a new white color option from NTE Parts Direct for its plastic split loom product line.

Available in six different diameters (from 1/4 to 1 inch), this new color joins their previous offerings of orange, green, red, yellow, and standard black. The split loom is available in 100-, 10-, and 5-foot lengths.

NTE Parts Direct says it is available now with retail pricing varying by diameter and length. For more information, contact: NTE Parts Direct, 44 Farrand Street, Bloomfield, NJ 07003. Phone: (866) 285-3959. Email: <custserv@ntepartsdirect.com>. Website: <www.ntepartsdirect.com>.


## Oops…

We introduced a new podcast feature in our December Emergency Communications column, called *EmComm Overtime*, with complete audio recordings of interviews excerpted in the column. But we neglected to put in the web address for finding it…*EmComm Overtime* and other expanded CQ features may be found on the *CQ Overtime* web page at <www.cq-amateur-radio.com/cq_ot.html>.

In the October 2017 "Math's Notes" column, Figures 1 and 3 show two Pin 6s on the LM555 IC. The one at the top, which is connected to Pin 4, should be labeled as Pin 8 (we got it right in Figure 4!). *Thanks to eagle-eyed reader Devon Wroblewski, K5KDA, for the catch.*

## Looking Ahead in CQ

Here are some of the articles we're working on for upcoming issues of ***CQ***:

- Results, 2017 CQWW RTTY DX Contest
- A Simple and Inexpensive Amplifier Soft-Start
- Citizen Science: 10 Years of Propagation Data from the Reverse Beacon Network

***Plus…***

- A Life in Ham Radio: K7TX – On the Air for 77 Years

***Upcoming Special Issues***

**June:** Take it to the Field
**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 listening and personal two-way services in addition to amateur radio. See writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/cq_writers_guide/cq_writers_guide.html>.

installation dilemma. Why? It's quite common for their vehicles to be used in commercial (e.g.: taxi, delivery) or government service (public safety, administrative) applications, many of which require two-way radios. So they're familiar with the need and they're not likely to count themselves out of the high-volume fleet sale marketplace.

### Gadgets!

I'm impressed with the ever-increasing array of accessories that can be used to integrate your radio(s) with the mobile environment. A recently-arrived ham radio catalog contains several items of interest. A recent trip to an electronics store also provided a mother lode of items that are either intended for communications devices or are easily adapted for their use. If you're really looking for some industrial quality gear, take a look at the suppliers to law enforcement agencies. There you'll find secure mounts for everything from HTs up through tablet and laptop computers.

At a recent hamfest, I met a pleasant vendor who specializes in "no holes" mounting solutions. (Full disclosure: I have no connection with him, commercial or otherwise, nor is this an endorsement.) He offers a number of interesting products; some are specific to ham radio equipment manufacturers. You can check his website at <www.lidomounts.com>.

In your winter reading, also be sure to review online or printed catalogs for products offered by the antenna manufacturers. In addition to the "old reliables," there are some new skyhooks and mounts worth examining. As vehicle manufacturers seek to reduce weight, aluminum, plastic, or composite body panels are not friendly to that old standby, the magnetic mount.

### Are You In the CQ Garage?

It's been a while since I mentioned the excellent and diverse collection of ham radio license plates in the CQ Garage: <http://bit.ly/2BTkfXp>

Is yours among them? I would love to see us accumulate a "Plates From All States" accomplishment!

We would also appreciate photos of your mobile rig installation along with any tips as to how you overcame the challenges posed by your project. Just send the info to the email address at the start of this column. After all, sharing info with others is one of the best ham traditions!

Stay safe through the winter, and happy mobiling! – *Jeff, AA6JR*

# Loop Antennas – Pat I

BY KENT BRITAIN, WA5VJB

Got a lot of loop antenna material (*Photo A*) and several topics I want to talk about, so this gives me a head start on the next antenna column. For 10 years, I was the net control for a VHF net on HF (We met on 80 meters to talk about what we were doing on VHF). These guys might have had stations that bounced signals off the moon, but few had a decent 80-meter signal. I had three antennas, a vertical with several hundred radials and two loop antennas. One loop favored the northeast, the other the northwest. When there was a weak signal, I would flip between antennas to see which one was hearing it best. Now the loops were passive and the signals dropped about 5 S-units, but noise would usually drop more. Of course I went back to the vertical when transmitting, but the loops worked great pulling in the weak ones. So let's take a closer look.

## The Loopstick

We will start with the most common loop antenna around, the *loopstick* AM broadcast antenna in *Photo B*. It's not a particularly good antenna as gain goes, with gains in the -40 to -50 dBi range. But we are talking about wavelengths over a quarter-mile long and, with the high power of the broadcaster and the high atmospheric noise levels, they are good enough.

But we have all seen one important characteristic of the loop: When pointed at the radio station, we lose the signal. Loops have that bidirectional sharp null we can take advantage of.

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email: <wa5vjb@cq-amateur-radio.com>

Photo A. MFJ-1886 Receive Loop Antenna

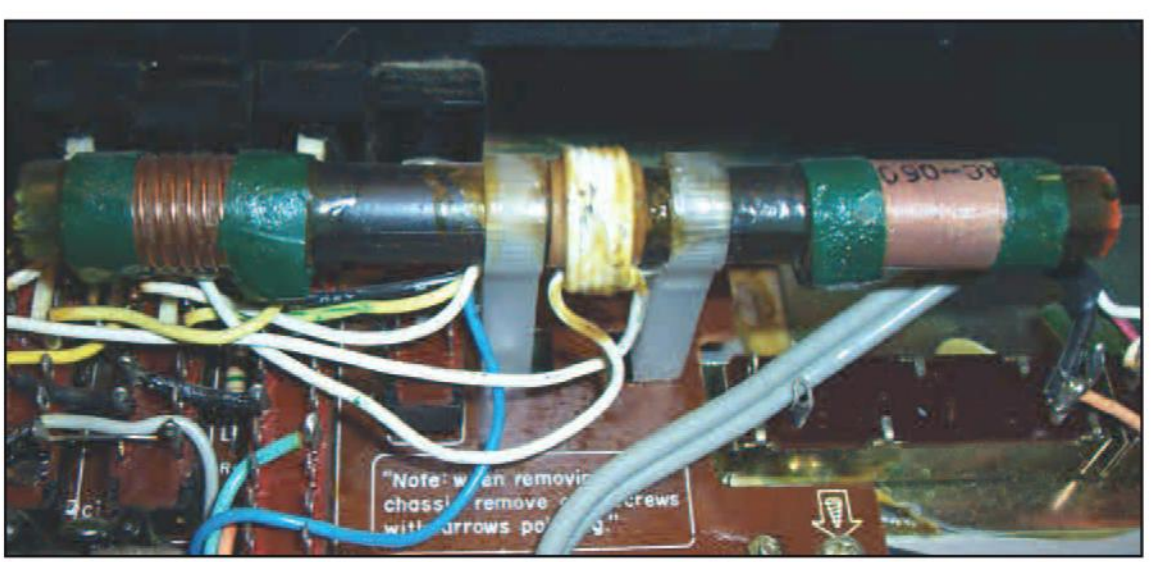

Photo B. Loopstick antenna

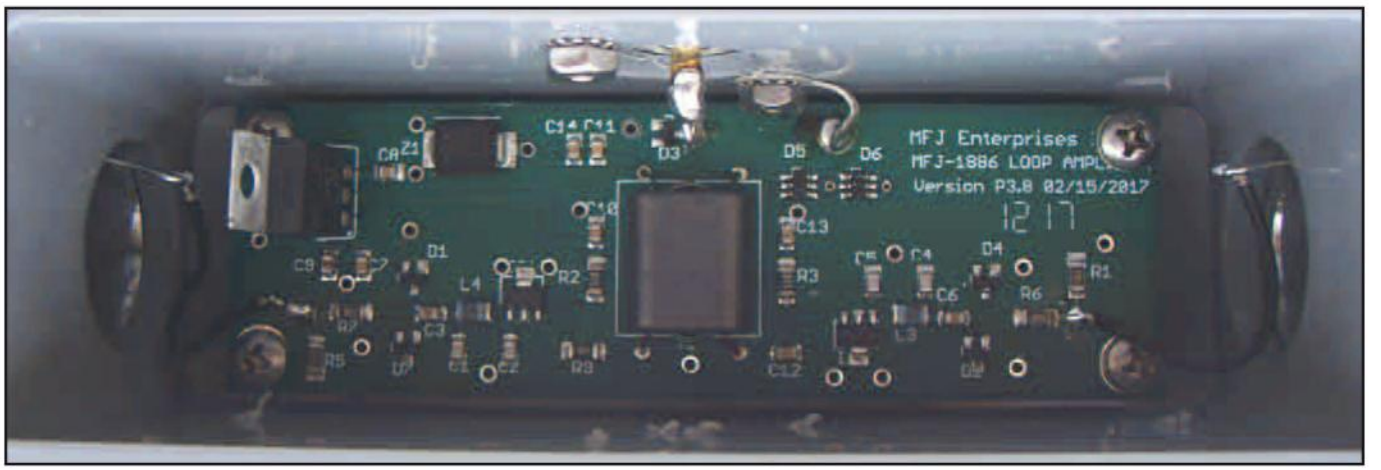


*Photo C. MFJ-1886 differential preamp*

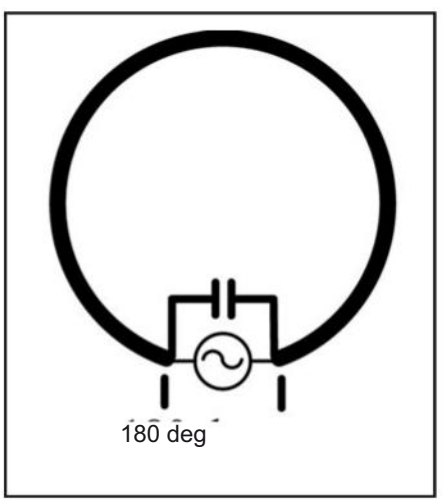


*Figure 1. Voltage phase in a loop antenna*

I need to touch on "Q" a bit here. "Q" or *quality factor,* is a way of measuring just how good an inductor or inductor-capacitor circuit is. (Yes, I know, it applies to quartz crystals and SAW resonators as well, but we will skip over those in this column.) The lower the losses in the circuit, the higher the Q. The secondary result is that the circuit has a very narrow bandwidth. So a low-Q antenna might be 50-kHz wide with a good SWR on 80 meters while a high-Q antenna might only have a good match across 10 kHz.

Back to our AM loopstick antenna. The designers actually have to lower the Q of the loopstick circuit or the antenna would be narrower than the AM signal, especially below 600 kHz. As a side note, the first use of single sideband modulation back in the early 1920s by AT&T was because their transatlantic wireless antenna didn't have the 6 kHz of bandwidth needed for an AM signal.

## A Standalone Loop

Now we get to *Figure 1*, showing the circuit for a loop antenna. The loop is acting like an inductor tuned by the capacitor. The loop can be driven by an AC source for transmit or generate an AC voltage when used as a receive antenna. What I want to you look at again is that the opposite sides of the feedpoint are 180 degrees out of phase from each other. This happens in resonant circuits.

*Figure 2* is a simplified schematic for the MFJ-1886 loop antenna seen in *Photo A*. The antenna uses an amplifier on both ends of the loop (*Photo C*),

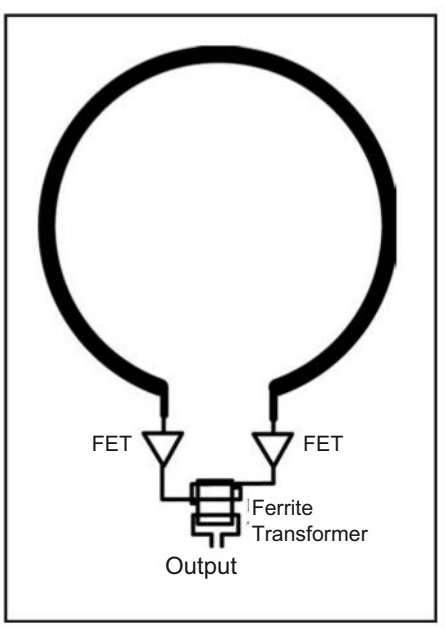


*Figure 2. Forced 180° phase shift*

*Photo D. Three cell phones…yes, they're all phones. See text for explanation*

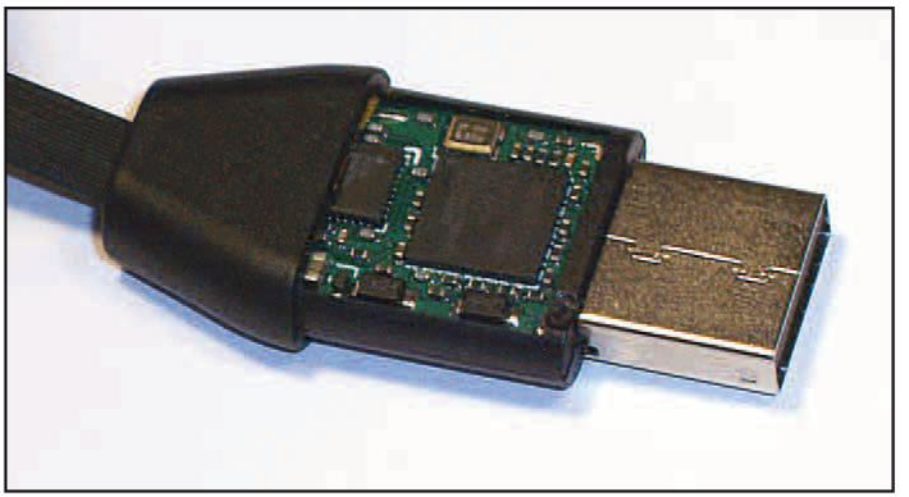

*Photo E. The USB plug that's really a phone. Most of the space on the top side of the plug (top) is taken up by the SIM card slot; the bottom of the plug/phone is shown in the bottom photo.*



but then the outputs of the amps go into a ferrite transformer, but with opposite windings. Now we have our 180-degree phase shift without using a resonant circuit. While a resonant HF loop antenna typically works over a few hundred kHz, the MFJ-1886 is specified from 500 kHz to 30 MHz, yet still has the deep null in the pattern that a resonant loop has. I'll have to argue with that 500-kHz rating a bit. I listened to several VLF aircraft beacons with good signals. With the amplifiers always in the circuit, the MFJ-1886 is for receive only.

Unless you know where a local noise source is, I suggest mounting your MFJ-1886 on a rotator to better null unknown noise sources or to help pull out DX signals by nulling out that California Kilowatt. A bit more on impedance matching loops based on relative areas and more the MFJ differential amp in Part II.

## Which One's the Phone?

I used to write for *Popular Communications*, another CQ Communications publication, and back in those days, this would have been a feature article. A bit off-topic, but very important these days. In *Photo D*, we have three cell phones. I can just hear it now, "You fool, that's a cell phone, charger, and USB cable, you don't even know what you have photographed!" I repeat, in *Photo D*, we have three cell phones.

Imagine taking that flip phone on the right. Remove the display, you don't need it. Remove the keypad, you don't need it. Remove the battery. And remove the speaker, you don't want it! Not much left. Now, have a close look at the USB connector in *Photo E* with the cover off – the SIM card slot takes up much of the space. And on the left in *Photo D* we have a cell phone that can charge your cell phone. Drop in a SIM card with a good plan and lots of minutes. They accept many instructions by text messages. Now, from most anywhere in the world, someone can call in and just listen and listen and listen. So if you get any similar presents from an ex or a questionable business associate, have a real close look if it is powered.

## Looping Ahead to Part II

Got some more stuff on loop antennas in the works and we have a question from a reader on the antennas hidden around cars these days for the next column. As always, our readers supply some of the best topic material. Email to <wa5vjb@cq-amateur-radio.com> or for many other antenna projects, visit <wa5vjb.com>.

BY TOM SMERK,* AA6TS

# UK Sees License Increases, Repeater Shutdowns, Online License Exams

***Africa sees a couple of firsts, Ireland sees Hurricane Ophelia, frequency privileges expand worldwide, and Iceland reconsiders how it assigns callsigns***

## Ham Licenses Increase in the UK

The amateur bands are getting a little more crowded in the UK as Ofcom (the UK's version of the FCC) released statistics showing a 10% increase in ham radio licenses since 2010. Thanks to a Freedom of Information request from Peter Bowyer, G4MJS, Ofcom released statistics for the period from June 2010 through August 2017 that show that there were 52,195 Full licensees, 9,739 Intermediate licensees, and 22,649 Foundation licensees.

Prior to 2007, Ofcom would issue "Amateur Full (Reciprocal) License" M*Øxxx callsigns to any UK citizen who took the U.S. Technician exam and applied for an FCC license. Since the U.S. Technician exam is a short entry-level exam, many in the UK took this approach rather than having to take the three more difficult UK exams. Either approach gave the UK ham a M*Øxxx call with the full legal power limit. New regulations in 2007 put a stop to this practice. (The * indicates regional prefix letters, such as MM for Scotland and MW for Wales.)

Ofcom denied a separate Freedom of Information request from Derek Flewin, 2WØFLW, asking for a list of available (unassigned) amateur radio callsigns. The regulator stated: "We no longer hold a list of available amateur radio callsigns, as we now use a system that randomly allocates callsigns upon request."

[ARRL News, Ofcom and other news sources]

## Two More UK License Exams Go Online

Spurred on by positive feedback from exam centers, clubs, and license candidates following the online launch of Full examinations last year, the Radio Society of Great Britain (RSGB) announced that the Foundation and Intermediate licensing exams would also be administered online, starting November 1, 2017 for the intermediate exam and January 2, 2018 for the Foundation license.

Applicants must still take the online ham tests at designated exam centers with the same level of supervision as the old paper tests.

[Amateur Radio Newsline]

## UK Repeater Group Shutting Down Network

In what the South Yorkshire Repeater Group referred to on its Facebook page as an "unprecedented decision," the group announced that it was closing down its whole network of seven repeaters, stating that "Due to a number of factors, we cannot continue to provide the service we have for a number of years."

The group is at the same time putting out an invitation to any other groups or individuals who would like to take over the financing and time to run one or all of the repeaters. If you are interested, contact the SYRG at <comms@southyorkshirerepeatergroup.co.uk>.

[South Yorkshire Repeater Group Facebook page]

## A First for Swaziland

The African nation of Swaziland has successfully completed its first successful EME (Earth-Moon-Earth) communication.

In early November, John Sygo, ZS6JON, Chris Ploeger, and Lins Berben, PA3CMC, set up a temporary station in a rural area and operated as Z21EME. The group made EME contacts on 2 and 6 meters, plus 70 and 23 centimeters, with about 500 stations in 50 different countries over the course of four days.

[Amateur Radio Newsline]

## South African Sets Digital Microwave Record

South African ham Alex Artieda, ZS6EME, has been setting some records on microwave bands using QRA64D, which is a new digital mode, and 50 watts. In late October, Alex logged the first microwave EME QSO from South Africa on 10 GHz in a contact with HB9Q in Switzerland and went on to make 10 more QSOs on the same frequency the next day.

Two days later, Alex completed the first digital EME QSO on 5.7 GHz with PA3DZL in the Netherlands, and subsequently achieved an additional seven QSOs.

[Amateur Radio Newsline]

## Hams Ready as Hurricane Hits Ireland

Ireland had to generate its first-ever severe weather alert as Hurricane Ophelia struck the mainland of Ireland and created the biggest wave recorded off the Irish coast during a weather event.

Although not officially deployed to assist with disaster operations, the Amateur Radio Emergency Network (AREN) used this as an opportunity to test members' readiness by checking on the well-being of people in their communities using battery- and generator-powered radios.

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Email: <aa6ts@cq-amateur-radio.com>

AREN members were advised to prep for water shortages, outages, and to get their go-kits ready.

Three people were left dead by the storm and the total losses from the storm are estimated at 1 billion Euros ($1.18 billion U.S.).

[Amateur Radio News and Wikipedia]

## Iceland Proposes Changes to Callsign Assignment

The Icelandic Radio Amateurs (IRA) has asked the Ministry of Transport and Local Government to change its procedure on issuing callsigns so they appear less "discriminatory." Currently, the letter N is added after the suffix if the person has a novice license rather than the more advanced G license. When N licensees pass a test to the G license, the letter N is deleted from their callsigns.

The IRA is asking that novice licensees no longer be required to have N at the end of their callsign because the IRA considers it discriminatory. The IRA also proposed that callsigns no longer be separated by geographical areas within Iceland as that is also discriminatory, and the IRA feels there is no need for this practice.

Another provision of the amendment is that hams using a mobile or portable station shall add the letter M or P after their callsign.

The Ministry has reacted favorably to the proposed amendment, while also proposing adding more frequencies that have been internationally approved.

As of presstime, the regulations have been posted for comment but have not been officially announced. Keep an eye on my column for future updates.

[Icelandic Radio Amateurs]

## New Frequencies for Argentina, Colombia, Germany, Thailand, and Croatia

After a decade of efforts by the Radio Club Argentino, the Argentine government agreed to assign to hams the 630-meter band from 472 to 479 kHz and the 60-meter band from 5351.5 to 5366.5 kHz.

In addition to the new bands, 160 meters was extended to 1800 to 2000 kHz, the 80 meter band is now 3500 to 4000 kHz, and the 30-meter band now covers 10100 to 10150 kHz.

The changes should be effective this month.

The IARU Region 2 website reports that the Colombian Amateur Radio League has announced that Colombian hams have now been granted new allocations on the 2200-, 630-, and 60-meter bands. The new allocations for Colombia are 135.7-137.8 kHz on the 2200-meter band, 472-479 kHz on 630 meters, and 5351.5-5366.5 kHz on 60 meters. The changes will be effective whenever the Colombian Communications Ministry grants the privileges by administrative act.

The Deutscher Amateur Radio Club (DARC) reports that German hams now have the 60-meter band on a secondary basis from 5351.5-5366.5 kHz with a maximum power of 15 watts EIRP. Germany also expanded its 6-meter band from 50.08-51.0 MHz to 50.03-51.0 MHz with a maximum 25 watts ERP.

DXNews reported that as of September 2017, licensed hams in Thailand may operate on the 2-meter band from 144 to 147 MHz. Previously, the cutoff was 146.5.

In November, the Croatian Regulatory Authority for Network Industries (HAKOM) announced new amateur radio regulations in *Narodne Novine*, the Official Gazette of the Republic of Croatia. The changes include access to the 60-meter band from 5351.5-5366.5 kHz with 15-watts EIRP as well as access to the 160-meter band from 1810-2000 kHz. Maximum power of 1.5 kW will be permitted from 1810-1850 kHz and limited to 1 kilowatt from 1850-2000 kHz.

[Radio Club Argentino, IARU Region 2, ARRL News, DXNews.com, Southgate Amateur Radio News]

## In Closing

I hope the new year is going well for you and continues to improve. I'm always anxious to hear your stories and see photos you took at your meetings, events, ceremonies, training drills, or incidents. Please send your stories and photos to me at <aa6ts@cq-amateur-radio.com>. *– 73 de AA6TS*

BY TONY EMANUELE,* K8ZR

# Radio Amateurs as Citizen Scientists

## VHF Plus Calendar

| | |
|---|---|
| DUBUS EME Contest 144 & 432 MHz: | February 24th & 25th |
| DUBUS EME Contest 13 cm: | March 24th & 25th |
| 144 MHz Spring Sprint: | April 9th 7-11 p.m. local |
| 222 MHz Spring Sprint: | April 17th 7-11 p.m. local |
| N.E.W.S. VHF Conference: | April 20th - 22nd, Manchester, CT |
| DUBUS EME Contest 1296 MHz: | April 21st & 22nd |
| Lyrids meteor shower: Predicted peak | April 22nd & 23rd |
| SEVHF Conference: | April 26th- 29th, Valdosta, GA |
| 432 MHz: Spring Sprint: | April 25th @ 7-11 p.m. local |
| Microwave Sprint – 902 MHz & Up: | May 5th 8 a.m. to 2 p.m. local |
| 50 MHz Sprint: | 2300z May 12th – 0300z May 13th |
| Dayton (Xenia) Hamvention® VHF/UHF/ Microwave Forum: | May 19th |

In his recently published article, *Upper-Level Lows and Sporadic E*[1], author Joe Dzekevich, K1YOW, advances a theory that mid-latitude sporadic-E openings could be the result of, or at least enhanced by, weather events such as low pressure systems or hurricanes that increase wind shear in a given area of the atmosphere contributing to the formation of ionized layers in the *E* region. During the 2016 and 2017 sporadic-E seasons, Dzekevich reviewed readily-available online data from DX Maps[2] and weather sites[3] to formulate his hypothesis. Time and, more importantly, data will tell if Joe's efforts will help contribute to our complete understanding of the mechanism behind sporadic-E. Eventually, armed with that knowledge, the hope is to someday be able to predict sporadic-E openings. (*Editor's note: The possible relationship between weather events and sporadic-E is hardly a new topic of discussion among amateurs. This column has included installments on these possible relationships as far back as 1994*[4]*. Of course, additional research, especially using newly available tools, is most welcome.*)

*c/o CQ magazine*
*email: <k8zr@cq-amateur-radio.com>*

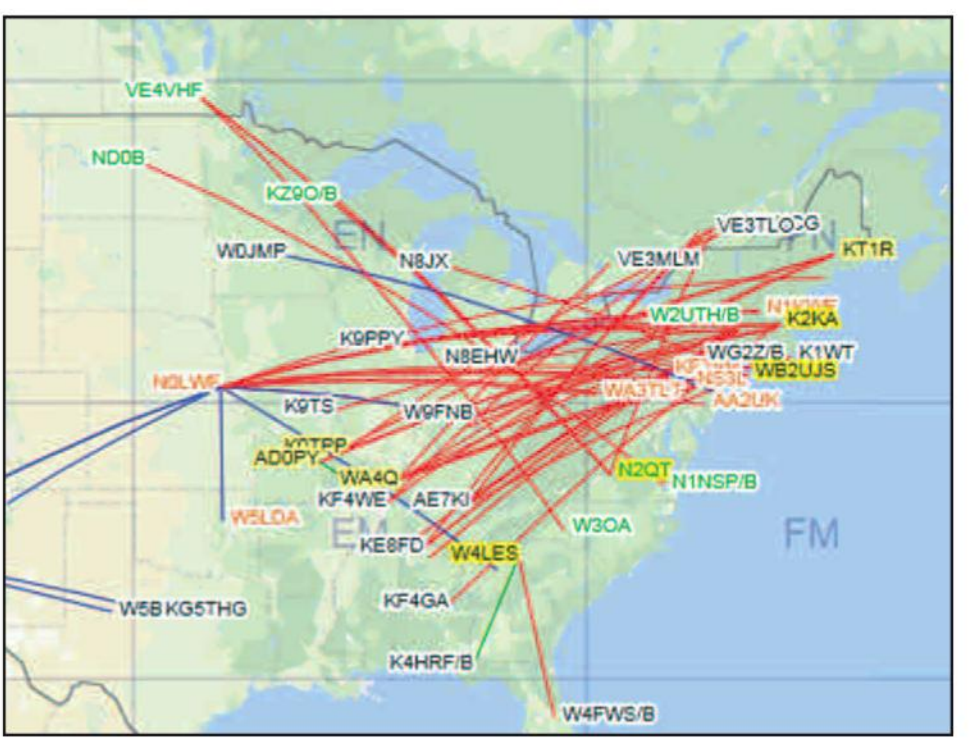



*Figure 1. The winter Sporadic-E season got off to a good start in December. This map of 6-meter contacts from DX Maps is from 1525 UTC on December 12.*


*Figure 2. Six-meters was also hot during the annual Geminids meteor shower in mid-December, as seen in this DX Maps snapshot of 50-MHz meteor-scatter contacts at 0120 UTC on December 14.*

As K1YOW noted at the conclusion of his article, more study is needed and suggested that his fellow amateurs as citizen scientists can make valuable observations (i.e., collecting data) that could eventually help solve the mystery of sporadic-E. Citizen science, also known as community science, crowd science, volunteer monitoring, or networked science, is scientific research conducted in part by amateurs or nonprofessional scientists, often in collaboration or in concert with, or under the direction of, professional scientists or a scientific institution.

This magazine's readers were among the earliest citizen scientists, working with then-Propagation Editor Perry Ferrell between 1946 and 1950 on the *Radio Amateur Scientific Observations* project, a federally-funded program of VHF ionospheric research. *CQ* readers and other hams also made valuable contributions to ionospheric research during the 1957-58 International Geophysical Year, which happened to coincide with the peak of the greatest solar cycle on record, with sunspot numbers peaking at 201 in November 1957[5].

## Acid Rain, Butterflies and Amateur Astronomy

Outside of amateur radio, an often-cited early example of citizen scientists in action occurred in 1989 when over 250 volunteers across the U.S. collected rain samples to assist the National Audubon Society in its efforts to monitor acid rain. There are other examples, such as butterfly counting and the tracking of migrating birds. For example, the North American Butterfly Association conducts a one-day butterfly census with volunteers across North America recording the number of butterflies observed in selected 15-mile-diameter areas with the results tabulated and posted online[6].

Another example more in tune with amateur radio is amateur astronomy. Both hobbies are multifaceted and by necessity, participants must focus their limited time and resources. For some radio amateurs, the main focus is the observation of the various types of propagation or even one type of propagation — perhaps sporadic-E. Amateur astronomers, with a host of celestial objects to observe, make a similar choice: Observe the planets, the sun or variable stars, to name just a few. Other similarities exist as amateur astronomers can and do build their observing devices, i.e. telescopes, and radio amateurs can and do build their own observing devices, namely receivers/transverters and, of course, antennas.

Many amateur astronomers/citizen scientists who elect to observe variable stars are members of the American Association of Variable Star Observers (AAVSO). The AAVSO is an organization of amateur and professional astronomers who are interested in stars that change in brightness — variable stars[7]. As noted on the group's website: *"Professional astronomers have neither the time nor the telescopes needed to gather data on the brightness changes of thousands of variables, and amateurs make a real and useful contribution to science by observing variable stars and submitting their observations to the AAVSO International Database[8]."*

The above statement succinctly states the challenges that professional scientists must overcome in their research efforts regardless of field — limited resources, including financial, human, equipment, and time. In the study of radio propagation, the geographical area of interest is large, often spanning multiple continents. The number of data collection devices, i.e. receivers and antennas, necessary for the collection of sufficiently large number of samples, i.e. reports, in the aggregate is costly. And a large staff is necessary to collect and report the data.

Perhaps no other group of citizen scientists has made as significant contributions to their respective fields as have radio amateurs, starting in the 1940s and continuing today.

Case in point is that the worldwide amateur radio community voluntarily developed, constructed and operates the Reverse Beacon Network (RBN), Weak Signal Propagation Reporting Network (WSPRNet) and PSKReporter, all providing real-time and archival data that is a treasure trove for amateur and professional scientists in their studies of HF and VHF propagation. The costs associated with developing, building and maintaining the equivalent commercial network involving the over 100 receiver/skimmers, is likely beyond the financial means of most research projects.

What cannot be overlooked in any citizen science effort is the importance of trained technical observers/data collectors. This requirement is to ensure data accuracy, thus eliminating or at least limiting the introduction of any bias by the data collectors. Fortunately, by definition, radio amateurs meet those criteria.

## HamSCI: Ham Radio Science Citizen Investigation

HamSCI was started in 2015 by ham-scientists who study the upper atmospheric and space physics. Dr. Nathaniel Frissell, W2NAF, assistant research professor at the New Jersey Institute of Technology Center for Solar-Terrestrial Research (NJIT-CSTR), is the lead organizer of HamSCI. The intent of the HamSCI project is to help advance our understanding of radio propagation by taking advantage of the network of radio amateurs as citizen scientists to observe and collect data in support of ongoing research activities.

As pointed out on the HamSCI website[9], Part 97.1 of the FCC regulations states that one of the purposes of the Amateur Radio Service is the *"Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art."* Today, the Reverse Beacon Network, WSPRNet, PSKReporter, DX Cluster, and ClubLog are generating large sets of data that was unthinkable just a few years ago. Over time, the data set is likely to confirm with greater certainty what we do know about propagation as well as reveal new insights.

HamSCI was instrumental in organizing and promoting the Solar Eclipse QSO Party (SEQP) in August 2017. The SEQP generated over 30,000 QSOs, 618,000 RBN spots, 630,000 WSPR spots, and 1,237,000 PSKReporter spots. In total over 2.5 million spots were recorded during the 8-hour-long SEQP[10]. Without question, a staggering amount of data that is now being analyzed.

Two other HamSCI projects currently in progress are the *ePOP CASSIOPE Experiment* and the *Ionospheric Response to Solar Flares* studies. The CASSIOPE (CAScade, Smallsat and IOnospheric Polar Explorer) satellite was launched in 2013 by SpaceX. One of ePOP's eight instruments, the RRI (Radio Receiver Instrument), monitors between 10 Hz and 18 MHz.

During Field Day 2015, the RRI monitored the 80- and 40-meter amateur bands. According to the researchers, the experiment demonstrated the feasibility of conducting further HF amateur radio-satellite coordinated propagation studies[11].

The *Ionospheric Response to Solar Flares* project uses the Reverse Beacon Network, PSKReporter and the Weak Signal Propagation Network for remote sensing, i.e. data collection, providing real-time and archival data for use by researchers. The impact of solar flares on HF propagation paths has been examined by monitoring RBN during such events. Though the SEQP was not, and the two current projects are not, directly related to the VHF portion of the spectrum, they clearly demonstrate the impact that amateurs can have on advancing the state of our understanding of ionospheric propagation.

The *Resource* page of the HamSCI website lists a number of how-to guides and links and the *Publications* page will be of interest to any student of radio propagation. In addition to a number of papers and presentations with an HF focus, Dzekevich's previously-cited article is available for download.

The 2018 HamSCI Workshop will take place at the New Jersey Institute of Technology in Newark, NJ on February 23rd and 24th. The workshop will focus on the solar eclipse analysis, amateur radio data sources and databases and the development of a "personal space weather station." The workshop is open to all interested amateurs and scientists alike.

Though you may not think of yourself as a citizen scientist, any time you post a VHF spot to DX Maps or other similar site, you are generating a data point that will become part of a larger data set which, when analyzed, may in some small way advance our understanding of radio propagation.

## On the Bands

The winter sporadic-E season got underway in December with several openings across North America. See *Figure 1*. The level of activity during the Geminids meteor shower in mid-December was high. See *Figure 2* for a snapshot of the activity. Many hundreds of MSK144 QSOs were made during the days preceding the peak, the day of the peak on the 14th and the following day, mostly on 50 MHz. MSK144 activity on both 2 meters and on 222 MHz continues to grow.

*– 73 and CU on the bands, Tony, K8ZR*

**Notes:**

1. Dzekevich, Joe, K1YOW; "Upper-Level Lows and Sporadic E,: *QST* vol. 101, no 12. ARRL Newington, CT. Pages 30-35.
2. See: <www.dxmaps.com>
3. See: <www.windy.com> and <http://bit.ly/2ftbTiA>
4. "VHF-Plus" columns in the January 1994; February 1995; April 1996; January 2007; and March 2011 issues of *CQ*, along with additional articles in *CQ VHF*, have covered possible relationships between meteorological events and Sporadic-E.
5. Jacobs, George W3ASK, "CQ: Taking the Mystery Out of HF Propagation," *CQ,* January 1995, p. 81
6. See: <http://bit.ly/2BuuC56>
7. For reasons why the study of variable stars is of interest see: <http://bit.ly/2jUaq7w>
8. See: <https://www.aavso.org/>
9. See: <http://www.hamsci.org/>
10. See: <http://bit.ly/2kGFRPP>
11. ePOP RRI Observations of Amateur Radio HF Transmissions. N.A. Frissell, G. Perry, E.S. Miller, M. Moses, and A. Shovkoplyas. See <http://bit.ly/2zlpcK6>

BY TED MELINOSKY,* K1BV

# Austria Jumps on FT8 Bandwagon, Offering Awards Based on New Digital Mode

## *Plus Greek History Provides Inspiration for Award Series*

**Special Honor Roll: All 3077 Counties**
Gary Hoehne KB9AIT, USA-CA 3076 #1262
dated November 3, 2017

**USA-CA Honor Roll**

| | |
|---|---|
| **500** | **2000** |
| N6YG.....3730 | KB9AIT.....1465 |
| **1000** | **2500** |
| N6YG.....1891 | KB9AIT.....1383 |
| K6YEK.....1892 | **3000** |
| **1500** | KB9AIT.....1287 |
| K6YEK.....1579 | |

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

Here are the rules just recently established in November 2017 by The FT8 Digital Mode Club (FT8DMC), an Austrian group dedicated to the new digital mode of FT8. If you have ever wanted to learn more about this extremely low-power mode, and to obtain another way to make contacts under the worst of conditions, you can read what our own *VHF Plus* columnist wrote about it in September 2017 (p. 74). All of the club's certificates are offered as free downloads, and they offer a selection of awards that copy some of the popular award programs from CQ and the ARRL, but use only the FT8 mode. One of the group's goals is to educate stations on this new mode.

The FT8 Digital Mode Club (FT8-DMC) was founded in July 2017 by Jo Engelbrecht, OE4VIE, and Hannes Grünsteidl, OE3SGU, after recognizing a need for a club for FT8 users whose members would help newcomers and less experienced operators learn and improve this brand new mode. Within only two days, the club added more than 100 members worldwide. Everyone with a love of FT8 is welcome to join the club. If you are interested in joining, lifetime membership is free and each new member will receive a certificate by email. Joining the club also allows members to use the club's logo on their QSL cards, personal websites, etc. To become a member, send an email request with your full name and callsign to <oe4vie@gmail.com>.

To be eligible for the awards program, please be sure to read the full rules for each award, available on the club's website <http://ft8dmc.oe4yla.com/>. Then you must send lists of QSOs to the award manager <oe4vie@gmail.com>. The award manager requests that you do NOT send a log file in ADIF format, just send a list with QSOs (Use: LOG/TXT/CSV or XLS). You will receive your award (usually a JPEG file) by email free of charge.

Mail: oe4vie@gmail.com
Internet: http://ft8dmc.oe4yla.com/
Internet: ft8dmc.oe4yla.com/AWARDS

### FT8 Worked All Continents Award

The FT8DMC issues the Worked All Continents certificate to amateur radio stations all around the world that have made FT8 QSOs with stations in each of the six continental areas of the world, specificlly Africa, Asia, Europe, Oceania, North America and South America. All contacts must be made from the same country or separate territory within the same continental area. The QSO listing must show the callsign, band, and continent.

### FT8 100 Countries Award

Very similar to the ARRL's DXCC award program, the FT8-DMC will grant you a certificate if you make


*FT8 was a brand new digital mode that came roaring to life this summer. Austria's FT8 Digital Mode Club offers award programs similar to CQ and ARRL. This is the Worked All Continents certificate.*

*12 Wells Woods Rd., Columbia, CT 06237
E-Mail: <k1bv12@charter.net>


*Similar to ARRL's DXCC program, FT8-DMC will grant this certificate to amateurs who contact 100 countries using the FT8 digital mode.*

FT8 contacts with amateurs in 100 different countries, based on the ARRL's DXCC list. All contacts must be made from the same country. Again, you must provide a QSO listing that shows the callsign, band, and country. Endorsements are available for 150, 200, 250, 300, and Honor Roll. However, band endorsements are not available.

**FT8 WAZ Award**

Based on the CQ Worked all Zones award, the applicant must make FT8 contacts with amateurs in all 40 CQ Zones. All contacts must be made from the same country and the QSO list must show the callsign, band, and CQ Zone. Band endorsements are not available for this award.

**FT8 WAS Award**

FT8-DMC's Worked All States program is similar to the ARRL's Worked All States program. You can qualify for this award by making FT8 contacts with amateur stations in all 50 U.S. states. All contacts must be made from the same country and the QSO list must show the callsign, band, and U.S. state. Band endorsements are not available for this award.

## Greece—RAAG Series

The Radio Amateur Association of Greece (RAAG) offers some very interesting awards and certificates based on Greek history and geography. To apply for the awards, you will need to pay the fee for each award, which is 10€ or 10 IRCs. Endorsements are 2€, $2 U.S., or 4 IRCs. It is possible to pay any award fees by using PayPal. (Links to this service are located in several spots on their website <www.raag.org>.) Send the fee and application to: R.A.A.G., Award Manager, PO Box 3564, 10210 Athens, Greece. Awards are issued for SSB, CW, mixed, or single mode.

Email: raag-hq@raag.org
Website: www.raag.org

**Athenian Award**

Issued for contacts with 25 stations in the Athens area using any mode in the following three classes: First class is achieved by making QSOs on 160 and 80 meters, Second class are QSOs made on 40 and 30 meters, and Third class are QSOs made using any band. Endorsement stickers are available for each 25 new contacts.


*The Radio Amateur Association of Greece offers many awards based on the geography and rich history of Greece. The Athenian Award is granted to amateurs who make contacts with hams in and around Athens.*

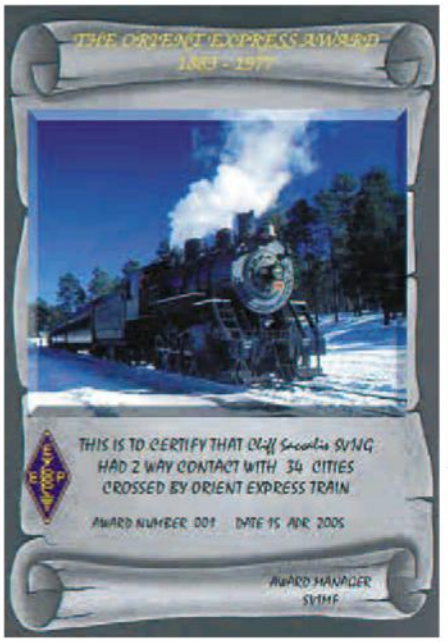

*The certificate for the Alexander the Great Award is given to amateurs who contact countries that Alexander the Great passed through as he built the Greek empire. A plaque is awarded when you make contacts with all of the countries.*

**Alexander the Great Award**

The award is intended for radio amateurs or SWLs who have confirmed contacts with countries crossed by Alexander the Great. Only one contact should count from each country, except for Greece where at least two contacts are needed, one of them from the SV2 call area (Macedonia). Contacts must be made on or after January 1, 1958. May be endorsed for CW, SSB, RTTY, or mixed modes. There are two levels to this award. The first level is achieved when you make contacts with 15 countries (SV2 and SV or SV5 required). Second level is achieved when you make contacts with all 24 countries listed.

Country List:

| | | |
|---|---|---|
| SV Greece | Z3 Fyrom (Macedonia) | TA Turkey |
| 5A Lybia | EZ Turkmenistan | SV2 Macedonia |
| LZ Bulgaria | YK Syria | YI Iraq |
| EY Tajikistan | SV2/A Mt. Athos | VU India |
| 4X Israel | EP Iran | UJ Uzbekistan |
| SV5 Dodecanese | 4K Azerbaijan | OD Lebanon |
| AP Pakistan | JY Jordan | ZA Albania |
| E4 Palestine | SU Egypt | YA Afghanistan |
| EK Armenia | | |




*The Orient Express is perhaps the most famous train in history. You can contact the countries it passed through and earn this certificate.*

A paper award is offered for the first level; and a paper award plus a plaque with the face of Alexander the Great is awarded when you make all 24 contacts. The IARU or RAAG's award manager must certify the list of contacts. If you do not belong to an association that is a member of IARU, the cards must be sent. Fee for the certificate is 10€ or 10 IRCs, 25€ or 25 IRCs for the plaque and certificate.

**Orient Express Award**

The award is issued to radio amateurs or shortwave listeners who have had contacts with stations in all European cities through which the famed "Orient Express" passenger train passed. There are 34 total. Contacts must have been made on or after January 1, 1958. The award may be endorsed for CW, SSB, digital, or mixed mode.

List Of Cities:
Athens (SV1)
Basel (HB9)
Belgrade (YU)
Berlin (DL)
Brussels (ON)
Bucharest (YO)
Budapest (HA)
Calais (F)
Chur (HB9)
Cologne (DL)
Constantinople (Istanbul) (TA2)
Dijon (F)
Frankfurt (DL)
Giurgiu (LZ)
Innsbruck (OE)
Lausanne (HB9)
London (G)
Milan (I)
Munich (DL)
Nis (YU)
Oostende (ON)
Paris (F)
Plovdiv (LZ) Prague (OK)
Ruse (LZ)
Sofia (LZ)
Strasburg (F)
Trieste (I)
Thessalonica (SV2)
Varna (LZ)
Venice (I)
Vienna (OE)
Zagreb (YU)
Zurich (HB9)

Available in two categories:
1st Category: Contacts with 34 cities (all)
2nd Category: Contacts with 16 cities minimum

We're always interested in the discovery of new awards, whether they are by your club or by those you've run across while exploring the internet. Send me the URL and I'll take it from there.

## Profile: Gary Hoehne KB9AIT, USA- CA All Counties 1262, earned November 3, 2017

I received my Novice ticket in April 1988 and quickly upgraded to General and Advanced Classes in June of the same year. During my first years as a ham, I found a net and a great bunch of hams on the OMISS net. They taught me a lot about ham radio operations and how to be a ham. My early interests were DX, chasing awards, and operating mobile.

In October or November of 1988, I ran across a net on 14.336 MHz. What I found was a lot of fellow hams working each other trying to collect as many U.S. counties as possible. This intrigued me, so I asked a few questions and decided that county hunting would be a good award to go after. I thought it would take 4 or 5 years because there was a net every day and lots of fellows giving out counties.

Nothing could have been further from the truth. Fast forward to October 2017 — I needed two more counties that were not located in my home state of Wisconsin: Musselshell County in Montana and Schuyler County in New York. One of my ham buddies Larry, WA9TT, was traveling to Washington DC and he went out of his way (driving 300 miles!) so I could get Schuyler County on 40 and 20 meters.

To work the county in Montana, I searched the QRZ database for a ham located in Musselshell County and sent him a letter asking if we could make a schedule. A few emails back and forth and he told me I would find him on the Cowboy Net on 80 meters. I checked in and Bill, WB7MT, was there. I worked him and soon a card was on the way. Needing my last county in Wisconsin, I promised a local ham that he would be my last county worked. A week after I made the Montana contact, I finished up by working KA9JAC in Calumet County, Wisconsin.

It took 29 years to complete the CQ County Award and it was worth it. I'm looking forward to doing it a second time. There are a lot of hams to thank who helped along the way by going the extra mile to give me one I needed. Thanks to all the fellow county hunters who helped. A last thank you is to the 14.336 net control operators as half of my counties were worked on that net.

*– Gary Heohne, KB9AIT*

BY BOB SCHENCK, N2OO

# Memories of DXing, circa 1965, de WN2RJJ (N2OO in a Previous Life)

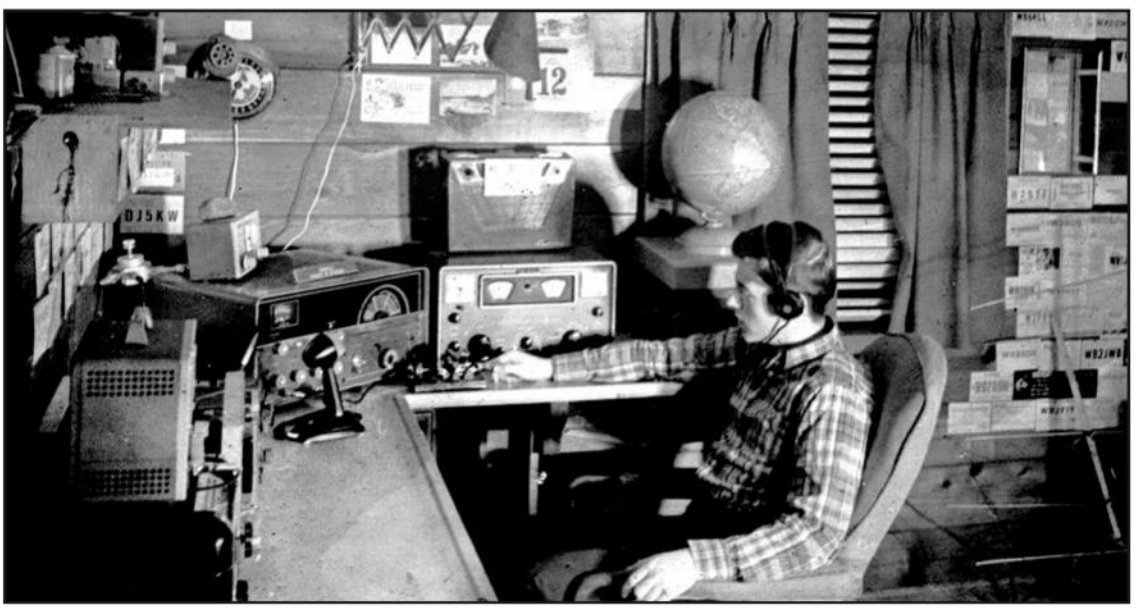


*Photo A. Bob Schenck, N2OO (then WB2RJJ), in 1965.*

It was a cold night in New Jersey, February 1965. I had just received my Novice license. WN2RJJ! (See *Photo A*) Finally, after waiting for two months, it had arrived. I had been anxiously listening to the ham bands while I waited for it. Santa gave me a Knight Kit T-60 transmitter kit (*Photo B*) and a Lafayette HA-63 receiver (*Photo C*) for Christmas. My elmer, Jim Clay, K2EPT (now SK), provided me with an old J38 key and a 40-meter crystal. My dad helped me install a 40-meter dipole using a guyed mast attached to the front of the dormer on our Cape Cod house to hold up one end and a large tree in the rear neighbor's yard to hold up the other end with a rope. It was probably up about 40 feet overall. The property was a 50- x 100-foot lot, so there wasn't much real estate to install antennas. That would be my first antenna. I had the T-60 built before New Year's Day, as I recall. So I was ready, willing, and able to get on the air as soon as the license arrived. The wait was torture. But finally it arrived.

When I turned on the radio that first day, I remember calling CQ over and over. Nobody came back. Finally, frustrated, I called another local "elmer," Phil, K2DZX (also now SK), and asked him to listen for my signal. He lived only two blocks away so I knew that HE would hear me. He did, and he became my very first QSO.

But a few days later, something weird was happening on the novice bands. Everybody was send-


*Photo B. A Knight Kit T-60 was my first transmitter and I built it!*

*Email: <n2oo@comcast.net>

*Photo C. My first receiver, a Lafayette HA-63. It used a "band-spread" to tune the 40-meter novice band.*

*Photo D. When I upgraded to General, I wanted to be able to use that new mode, SSB. This Hallicrafters HT-37 would be my first SSB transmitter.*

ing CQ NR de their call. NR? What is that? So, I listen and hear "locals" sending a number and "NNJ." I conclude that they are sending a QSO number and Northern New Jersey. I check with my elmer and he explains briefly what NR is all about. It's the Novice Roundup, which is an opportunity for all Novice class licensees to work each other. A contest? What's this all about? So, blindly off I go. CQ NR de WN2RJJ.

The contest ran from February 6 though February 21. I lost track of time. I was getting on the radio right after I finished delivering newspapers every day, and stayed on into the night. Weekends were blurs as the band was crammed with many stations. I only had two or three crystals, so I had to get as close as I could to the other stations I was calling. It wasn't always an easy task — 7190 kHz was my favorite, as I recall. Another was 7163 kHz, but that frequency seemed to always have broadcast stations on it at night. Don't ask me how many QSOs I made. But for a 1965 novice, it was quite a few. Actually, I didn't even know when it was supposed to end. I just kept getting on the air working as many as I could as I attempted to work all states. Then, on February 22, the bands quieted down and regular CQs were heard. Huh? I guess it is over? I talk again with my elmer and he fills me in, it ran through the 21st, and one more thing, you were limited to a total of 40 hours of operation. I probably had double that or more. Oh, well. Ignorance is bliss. I never submitted a score. I wasn't in it to win it. I was just

## The WAZ Program

**ALL BAND WAZ**

**Mixed**

9399 .....PAØFVH 9400.....WA1ASL

**SINGLE BAND WAZ**

**40 Meter CW**

309 .....K7LFY

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, John Bergman, KC5LK, 125 Deer Trail, Brandon, MS 39042-9409. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to John Bergman. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. KC5LK may also be reached via e-mail: <kc5lk@cq-amateur-radio.com>.

## 5 Band WAZ

As of December 15, 2017
1962 stations have attained at least the 150 Zone level, and
967 stations have attained the 200 Zone level.

As of December 15, 2017
**The top contenders for 5 Band WAZ** (Zones needed on 80 or other if indicated):
CHANGES shown in BOLD

| Callsign | Zones | Zones Needed | Callsign | Zones | Zones Needed |
|---|---|---|---|---|---|
| DK8MCT | 199 | 1 | W4DC | 199 | 24 |
| EA7GF | 199 | 1 | W4LI | 199 | 26 |
| H44MS | 199 | 34 | W6DN | 199 | 17 |
| HA5AGS | 199 | 1 | W9XY | 199 | 22 |
| I5REA | 199 | 31 | **WO7R** | **199** | **21** |
| IK0FVC | 199 | 1 | 9A5I | 198 | 1, 16 |
| IK1AOD | 199 | 1 | AK8A | 198 | 17, 22 |
| IK8BQE | 199 | 31 | DK2LO | 198 | 2, 19 |
| IZ3ZNR | 199 | 1 | DM5EE | 198 | 1,31 |
| JA1CMD | 199 | 2 | EA5BCX | 198 | 27, 39 |
| JA5IU | 199 | 2 | F5NBU | 198 | 19, 31 |
| JA7XBG | 199 | 2 | G3KDG | 198 | 1, 12 |
| JH7CFX | 199 | 2 | G3KMQ | 198 | 1, 27 |
| JK1BSM | 199 | 2 | JA1DM | 198 | 2, 40 |
| K1LI | 199 | 24 | JA3GN | 198 | 2 on 80 & 40 |
| K4XP | 199 | 23 | K2EP | 198 | 23, 24 |
| K7UR | 199 | 34 | K2TK | 198 | 23, 24 |
| K9KU | 199 | 22 on 15 | K3JGJ | 198 | 24, 26 |
| KZ4V | 199 | 26 | K4HB | 198 | 24, 26 |
| N3UN | 199 | 18 | K4JLD | 198 | 18, 24 |
| N4NX | 199 | 26 | K5FUV | 198 | 18,23 |
| N4WW | 199 | 26 | K6FG | 198 | 17, 18 |
| N4XR | 199 | 27 | KB0EO | 198 | 22, 23 |
| N8AA | 199 | 23 | KZ2I | 198 | 24, 26 |
| RA6AX | 199 | 6 on 10M | N2QT | 198 | 23, 24 |
| RU3DX | 199 | 6 | N4GG | 198 | 18, 24 |
| RW0LT | 199 | 2 on 40M | OK1DWC | 198 | 6, 31 |
| RX4HZ | 199 | 13 | UA4LY | 198 | 6 & 2 on 10 |
| RZ3EC | 199 | 1 on 40M | US7MM | 198 | 2, 6 |
| S58Q | 199 | 31 | W4UM | 198 | 18, 23 |
| SM7BIP | 199 | 31 | W5CWQ | 198 | 17, 18 |
| VE2TZT | 199 | 23 | W6OUL | 198 | 37, 40 |
| VO1FB | 199 | 19 | W9RN | 198 | 26, 19 on 40 |
| W1FJ | 199 | 24 | WA2BCK | 198 | 23, 24 |
| W1FZ | 199 | 26 | WC5N | 198 | 22, 26 |
| W2LK | 199 | 23 | WL7E | 198 | 34, 37 |
| W3NO | 199 | 26 | ZL2AL | 198 | 36, 37 |

**The following have qualified for the basic 5 Band WAZ Award:**

| 5BWAZ # | Callsign | Date | # Zones |
|---|---|---|---|
| None | | | |

**Updates to the 5BWAZ list of stations:**

| 5BWAZ # | Callsign | # Zones |
|---|---|---|
| 1480 | WO7R | 198 |
| 1701 | K3STX | 186 |

**New recipients of 5 Band WAZ with all 200 Zones confirmed:**

| 5BWAZ # | Callsign | Date | All 200 # |
|---|---|---|---|
| None | | | |

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, John Bergman, KC5LK, 125 Deer Trail, Brandon, MS 39042-9409. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to John Bergman. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. KC5LK may also be reached via e-mail: <kc5lk@cq-amateur-radio.com>.


*Photo E. My neighbor worked for Hammarlund and helped me purchase this fine receiver of the day.*

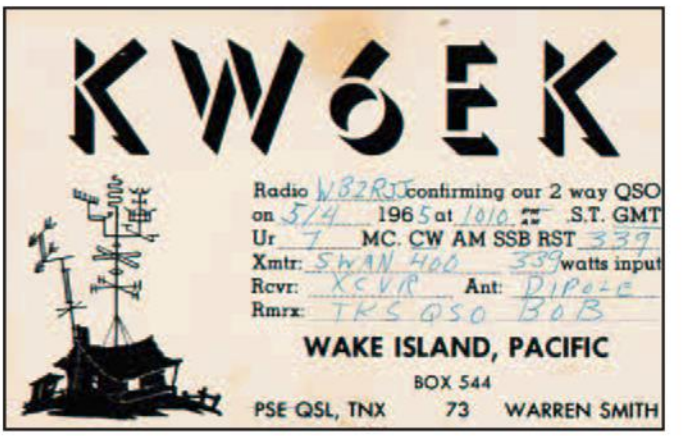



*Photo F. My very first DX in the Pacific was KW6EK on Wake Island.*

having fun. The HF bug bit, and bit hard. Contesting became a focus along with chasing the WAS award, and eventually DXCC.

Over the next couple of months, my priority was to upgrade to General. CW was never a problem for me. It came naturally, and I had a lot of practice in that Novice Roundup. Studying for the General written exam was torture for me. Drawing Hartley and Colpitts oscillators took a lot of effort for this 14-year-old, for sure. But in April, I teamed up with my new friend on the Novice bands, Tom, WN2PAR, and we traveled together by bus and subway to the Federal Building in New York City to take our tests. I can't imagine parents allowing their kids to travel into New York City this way today, but it was a different time. We BOTH passed and we celebrated by wandering through "Radio Row," which was in the same area.


*Photo G. KW6EK QSL was postmarked on Wake Island too! That doesn't happen anymore.*

Passing the General was probably one of the most exciting things I ever did as a teenager. Now it was time to move up with the big boys. Back then, the Generals had access to all frequencies. And, that new mode (SSB) was catching on fast. So it was already time to upgrade the station. Crystal control was no longer a viable alternative. At first, I got a new Lafayette HA-90 VFO! (Lafayette had a store in Paramus, New Jersey, which became the best local ham radio store in my area). I soon discovered that I often got 598 reports. Hum was apparently an issue with these VFOs. It was time to keep looking around.

I don't remember where I got it, but I eventually came across a used Hallicrafters HT-37 (*Photo D*). I could finally get on SSB, or so I thought. Also, a neighbor worked for Hammarlund and offered his employee discount for me to buy a new HQ-110-AC (*Photo E*). So, I was moving pretty fast in upgrading the station. My parents were very supportive of my ham radio activity.

A few months after the Novice Roundup, I got up early one Tuesday morning

## The WPX Program

### CW

| | |
|---|---|
| 3838 . . . . . KR4U | 3841 . . . . . N6LL |
| 3839 . . . . . JQ1CIV | 3843 . . . . . W3ASW |
| 3840 . . . . . AC7JM | |

### SSB

| | |
|---|---|
| 4084 . . . . . VK2RT | 4088 . . . . . N6LL |
| 4085 . . . . . K4CAE | 4089 . . . . . NC4VA |
| 4086 . . . . . LU9DDJ | 4090 . . . . . N5PD |
| 4087 . . . . . AC5Q | |

### Mixed

| | |
|---|---|
| 3503 . . . . . KC3HFW | 3513 . . . . . GW1AKT |
| 3504 . . . . . SP5NZZ | 3514 . . . . . N6LL |
| 3505 . . . . . KN4BBC | 3515 . . . . . K1ECU |
| 3506 . . . . . KR4U | 3516 . . . . . KM4SFF |
| 3507 . . . . . KB1RI | 3517 . . . . . NC4VA |
| 3508 . . . . . K4CAE | 3518 . . . . . SA7CJO |
| 3509 . . . . . AC5Q | 3519 . . . . . N8GAS |
| 3510 . . . . . RNØF | 3520 . . . . . DL1MRD |
| 3511 . . . . . RC7LI | 3521 . . . . . KC5RR |
| 3512 . . . . . KF4EKA | 3522 . . . . . TI5LUA |

### Digital

| | |
|---|---|
| 694 . . . . . OH1NHU | 706 . . . . . PA1FRA |
| 695 . . . . . KC1GWX | 707 . . . . . W7KKC |
| 696 . . . . . KR4U | 708 . . . . . N1HO |
| 697 . . . . . NA9L | 709 . . . . . VE2ZWA |
| 698 . . . . . KB1RI | 710 . . . . . KN4AME |
| 699 . . . . . K4CAE | 711 . . . . . SA7CJO |
| 700 . . . . . AC5Q | 712 . . . . . KYØDZ |
| 701 . . . . . GW1AKT | 713 . . . . . AF7XD |
| 702 . . . . . GØHEU | 714 . . . . . K7CTV |
| 703 . . . . . NA1VT | 715 . . . . . KC5RR |
| 704 . . . . . PY1ZA | 716 . . . . . EA3IAA |
| 705 . . . . . RK3ARQ | |

**CW: 350:** KR4U. **400:** EA2AA. **450:** W6AER, N6LL. **800:** N6PEQ. **1100:** AC7JM. **1150:** JH1APK. **5250:** N6JV.

**SSB: 350:** N6LL. **450:** K1KQC. **500:** PG9HF, NC4VA. **600:** JH1APK. **650:** DD9WL, EA3IAA. **800:** K4CAE, AC7JM. **1250:** IZØFUW. **1700:** EI7JZ.

**Mixed: 450:** KN4BBC, KC5RR. **500:** KF4EKA, RK3ARQ. **550:** AC5Q. **600:** KC3HFW, AL4Y, NA9L, W7KKC, N1HO, TI5LUA. **650:** N4YCI, N5PD. **700:** KØSDW, GØHEU, N6LL, DD9WL, SA7CJO, DL1MRD. **750:** KB1RI, JQ1CIV, VK3LDB, N6DBF. **850:** VK2RT. **900:** EA3IAA. **950:** K4CAE. **1150:** KR4U. **1400:** AE4WG. **1450:** AC7JM, W6AER. **1550:** IZØFUW. **1700:** JH1APK. **2150:** WF2S. **2500:** KA4RRU. **6350:** HA5DA.

**Digital: 350:** KN4BBC, AC5Q, KC5RR, EA3IAA. **400:** OH1NHU, AL4Y, JF2OHQ, KB1RI, K4CAE, GW1AKT, RK3ARQ, N5PD. **500:** KC1GWX, N6DBF, IZ1XBB. **550:** NC4VA, TI5LUA. **600:** KØSDW, JQ1CIV, WA9ONY, IZØFUW. **650:** SA7CJO. **700:** VK2RT. **750:** VK3LDB, EA2AA. **800:** JH1APK. **850:** AE4WG. **950:** KR4U, W6AER. **1050:** AC7JM. **1100:** K8YAH. **1450:** WF2S.

**160 Meters:** N6LL, KA4RRU, SA7CJO, KYØDZ, N5PD
**80 Meters:** EI7JZ, K8YAH, WF2S, K4CAE, N6PEQ, KA4RRU
**40 Meters:** AL4Y, WA9ONY, K4CAE, AE4WG, N6LL, EA2AA, KA4RRU, K7CTV, EA3IAA, TI5LUA
**30 Meters:** W6AER
**20 Meters:** VK2RT, K4CAE, AC5Q, RNØF, AC7JM, N6LL, KA4RRU, NC4VA, EA3IAA
**17 Meters:** AE4WG
**15 Meters:** VK2RT, KA4RRU, IZØFUW
**10 Meters:** LU9DDJ, N6LL, KA4RRU

**Asia:** RNØF, AC7JM, SA7CJO, EA3IAA
**Europe:** N4YCI, KB1RI, VK2RT, K4CAE, AC5Q, RC7LI, GW1AKT, GØHEU, PA1FRA, EA2AA, N1HO, SA7CJO, EA3IAA, TI5LUA
**Oceania:** EI7JZ, AL4Y, VK2RT, EA2AA
**North America:** KN4BBC, KC1GWX, NA9L, KB1RI, VK2RT, K4CAE, LU9DDJ, AC5Q, AC7JM, NA1VT, N6LL, K1ECU, KM4SFF, EA2AA, N1HO, VE2ZWA, NC4VA, KN4AME, SA7CJO, KYØDZ, AF7XD, K7CTV, N5PD, TI5LUA
**South America:** HA9PP, AC7JM, N6LL

**Award of Excellence with 160 Bar:** N6PEQ
**Digital Bar:** N6PEQ

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.

before getting ready for school, sat down with a bowl of cereal and turned on the rig, waiting for the tubes to warm up. My station was set up in my bedroom, so I didn't bother the family much. Yes, hams back in the earlier days of DXing were actually able to warm the ham shack by 10° or more just by keeping their radios turned on. And if you had enough disposable cash to actually own an amplifier (not me), you might even raise the temperature by 20° above outside temperature. As a 14-year-old, my only real source of funds for my ham radio gear was my paper route delivering "The Bergen Evening Record" to about 100 customers 6 days a week after school. My profit was 3 cents per customer per week plus tips (maybe another 2-17 cents depending on the generosity of the customer). So, no amplifier for me.

After the Hammarlund had warmed up, and the drift had settled down, I hooked up the 40-meter dipole and began to tune the band. Wow. The band was quiet that morning. It was so nice to have a quiet 40-meter band, which was something that I had not yet grasped at this time since I was only licensed for a few months. Slowly, I spun the main tuning dial on the Hammarlund. Yup, I spent the extra money to have that clock built into the receiver. It was a 24-hour clock and a timer, too. It was time to tune up the transmitter; an old 80-pound Hallicrafters HT-37 that I had just gotten to replace my Knight Kit T-60 which was used during my three months as a Novice and the beginning of my General activity. Never could get the HT37 to transmit on "single" sideband. I often got reports that my opposite sideband sounded stronger and better. I tried and tried to adjust the phasing. Never did get it right. But, I was mostly a CW op, so it never rose to the level of "need" to get it fixed right. I just suffered with it.

Slowly, I began tuning across the lower 40-meter CW band listening for any weak signals. Dahhhh dit dididit dahhh… (*"test" for the CW-illiterate –ed*) crackled from my homebrew speaker. Time to put on the Bakelite headphones. Nobody had cushioned earmuffs on their headphones back then. Ahhh, the feel of cold Bakelite on your ears and that tinny sound of a weak CW signal. Nothing else like it. Dahhhh dit dididit dahhh… there it was again… Dahhhh dit dididit dahhh… dahhhdidit dit Dah… and the signal faded into the noise floor. Then silence. Hmm. What have we here? Who could this be? Something told me, like a faint whisper in my ear not to touch that dial. So, I sat there listening to the hiss of a quiet band waiting for this guy to return. After what seemed like an eternity, there it was again. Dahhhh dit dididit dahhh… dahhhh dit dididit dahhh… dahhhhdidit dit DahhhhhdiDahhhhh… and back into the noise he went.

Now, I'm just a kid at this point in my ham radio life. Patience is a virtue that is learned over years of experience, of which I had very little. But something was telling me to stay on this frequency and keep listening. I decided to prepare the transmitter just to be ready. I blindly set the frequency of the HT-37

## CQ DX Awards Program

### New Awards CW

AK7O .....1170

### Endorsements SSB

VE6MRT .....323
KC2Q .....331
W4UNP .....339
KØKG .....333

### Endorsements RTTY

VE6MRT .....333

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, Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604 USA. We recognize 341 active countries. Please make all checks payable to the award manager. Photocopies of documentation issued by recognized national Amateur Radio associations that sponsor international awards may be acceptable for CQ DX award credit in lieu of having QSL cards checked. Documentation must list (itemize) countries that have been credited to an applicant. Screen printouts from eQSL.cc that list countries confirmed through their system are also acceptable. Screen printouts listing countries credited to an applicant through an electronic logging system offered by a national Amateur Radio organization also may be acceptable. Contact the CQ DX Award Manager for specific details.

transmitter a few kilohertz higher than where I was listening and proceeded to it load up carefully but quickly squeezing out all 100 watts available. Then I zero-beat it to the receive frequency. Back to listening. Nothing. Quiet band hiss is all I could hear. But I dare not move. There were few signals on the air anyway. An eternity passes and I am beginning to think that I had better start thinking about getting ready to go to school. Today is going to be another dreaded day at high school. Ninth grade was not my favorite.

Just as I reach for the off switch, there it goes again, not even moving the S-meter this time. Dahhhh dit dididit dahhh… dahhhh dit dididit dahhh… dahhhh dit dididit dahhh… dahhhhhhhdidit dit dahhhhdidahh didahhhdahhh dahdididit… (noise) then dahhhhdahhdidahhh didahdit dahhhdahhdidit. Now, all I hear is a KW6 for his call. But for some strange reason every time he sends his call, all I get is the prefix "KW6." I hear TEST every time. I am determined to get this guy's call! Finally, I just send "dahdahdidah didahdit dahdahdidit dahdidit dit didahdah dahdididit dididahdahdah didahdit didahdahdah didahdahdah... ("QRZ de WB2RJJ").

Immediately, I hear him come back… dahdahdidah didahdit dahdahdidit dahdidit dit dahhhhhhdidahhhhdahhhhh crackle, spit, dahdidah ("QRZ de K - crackle, spit, K"). To sum this up, over the next 30 minutes, I continually send my call, and he continually sends QRZ. Finally, he comes up just long enough for me to hear that he finally got my call correct. I begin to send KW6? Over and over. And again, after numerous attempts, I hear that the full call is KW6EK and my RST was 339, which he repeated over and over again. I send TU and 73 over and over. My fist was notably shaky because my hand was shaking from the intense workout that I had pounding that straight key. I had a J-38 that I had to screw down to the desktop because I pounded it so hard.

I pull out my DXCC list in the back of my callbook. There it is. Wake Island! Did I just work Wake Island? I look for it on my DXCC map. Wow! That was FAR AWAY! I search through the callbook for KW6EK and there he is. Complete with an address on WAKE ISLAND. This was one QSL card I just had to have. I sent off for it right away and a couple of months later, it arrived (*Photo F*) — postmarked on Wake Island, too! (*Photo G*). Wow. What a thrill. My very first Pacific DX station is Wake Island.

As a matter of fact, that Wake Island QSO was only the third DX station that I had worked, with the first ones being CO5EG and EA1HF, both of which I worked as a novice. Actually, KW6EK was my very first DX station worked after I got my General license and it would take me another 15 years to work Wake Island again.

The thrill of DX. There is absolutely nothing like it anywhere! Hooked for life.

See ya' in the Pileups! – *De Bob Schenck, N2OO*

## CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 340 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. (Stickers for the 340 level and Honor Roll are available.) Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604 USA.

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BY DAVID SIDDALL,* K3ZJ

# February Signals Start of Annual "Spring Contest Sprint"

## *CQ WPX RTTY Contest; Russian DX Contest; CQWW WPX Contest; CQ Hall of Fame Nominating Period Open; Storm Destroys DL1A Antennas; Record-breaking Number of Logs in 2017 CQWW Phone and CW; WRTC2018 Referees Selected*

February and March are the heart of the spring contest season. Within a 7-week period, there are six contests with high participation. They are, in order: CQ WPX RTTY (February 10-11); ARRL DX CW (February 17-18); CQ 160 SSB (February 23-25); ARRL DX SSB (March 3-4); RUDXC SSB & CW (March 17-18) and CQ WPX SSB (March 24-25).

Last month, we discussed the rules and gave a brief overview of the CQ 160 and ARRL DX contests, both CW and Phone. Below, we briefly discuss the CQ WPX RTTY, Russian DX Contest, and CQWW WPX SSB and CW contests. Links to the full rules are included below.

*email: <k3zj@cq-amateur-radio.com>*

### Calendar of Events

| | | |
|---|---|---|
| **All year** | **CQ DX Marathon** | **http://bit.ly/vEKMWD** |
| Feb. 3 | AGCW Straight Key Party | http://bit.ly/1jKUszA |
| Feb. 3 | FISTS Winter Sprint | www.fistsna.org/operating.html |
| Feb. 3 | Minnesota QSO Party | http://bit.ly/2BAtqNH |
| Feb. 3-4 | British Columbia QSO Party | http://bit.ly/2B2OMlT |
| Feb. 3-4 | Vermont QSO Party | www.ranv.org/ranv.html |
| Feb. 3-4 | Mexico RTTY Int'l Contest | http://bit.ly/1Ml59qF |
| Feb. 3-4 | 10-10 Int'l Winter Contest | http://bit.ly/1FrFeBc |
| Feb. 3-4 | Black Sea Cup Int'l | http://bit.ly/10qlpGu |
| Feb. 4 | North American CW Sprint | http://bit.ly/2ByXoS9 |
| Feb. 7 | UKEICC 80m Contests SSB | http://bit.ly/2cv97YF |
| Feb. 10 | Asia-Pacific Spring Sprint (CW) | http://jsfc.org/apsprint/ |
| Feb. 10 | FISTS Winter Sprint | http://bit.ly/2D7rJr8 |
| Feb. 10-11 | CQWW RTTY WPX Contest | www.cqwpxrtty.com/ |
| Feb. 10-11 | Dutch PACC Contest | http://pacc.veron.nl/ |
| Feb. 10-11 | OMISS QSO Party | http://bit.ly/2BeG0VJ |
| Feb. 10-11 | SARL Field Day Contest | http://bit.ly/H0IqQf |
| Feb.12-16 | ARRL School Club Roundup | http://bit.ly/2clip47 |
| Feb. 17-18 | AWA Amplitude Modulation QSO Party | http://bit.ly/1DEIKTK |
| Feb. 17-18 | ARRL CW DX Contest | www.arrl.org/arrl-dx |
| Feb. 21 | AGCW Semi-Automatic Key Evening | http://bit.ly/1OmoGv8 |
| **Feb. 23-25** | **CQWW 160M SSB Contest** | **www.cq160.com/rules.htm** |
| Feb. 24-25 | REF SSB Contest | http://bit.ly/1PaQNxF |
| Feb. 24-25 | South Carolina QSO Party | http://scqso.com/rules/ |
| Feb. 24-25 | UBA CW DX Contest | http://bit.ly/W0gZiE |
| Feb. 24-25 | North American RTTY QSO Party | http://ncjweb.com/naqp/ |
| Feb. 25 | High Speed Club CW Contest | www.highspeedclub.org/ |
| Feb. 25-26 | North Carolina QSO Party | http://bit.ly/1OAHHrt |
| Feb. 28 | UKEICC 80m Contests CW | http://bit.ly/2cv97YF |
| Mar. 3-11 | Novice Rig Round-Up | http://novicerigroundup.com/ |
| Mar. 3-4 | ARRL SSB DX Contest | www.arrl.org/arrl-dx |
| Mar. 4 | SARL Hamnet 40M Simulated Emergency Contest | http://bit.ly/H0IqQf |
| Mar. 6 | AGCW YL-CW QSO Party | http://bit.ly/1uNZkyi |
| Mar. 7 | UKEICC 80m Contests SSB | http://bit.ly/2cv97YF |
| Mar. 7-8 | AWA John Rollins Memorial DX Contest | http://bit.ly/1DEIKTK |
| Mar. 10 | AGCW QRP Contest | http://bit.ly/14XJyHs |
| Mar. 10 | Spring Thaw SSB Sprint | www.qrparci.org/contests |
| Mar. 10-11 | EA PSK63 Contest | http://concursos.ure.es/en/eapsk63/bases/ |
| Mar. 10-11 | Idaho QSO Party | http://bit.ly/2kaOX9j |
| Mar. 10-11 | Oklahoma QSO Party | http://k5cm.com/okqp.htm |
| Mar. 10-11 | QCWA QSO Party | www.qcwa.org/qcwa.php |
| Mar. 10-11 | RSGB Commonwealth CW Contest | www.rsgbcc.org/ |
| Mar. 10-11 | SARL VHF/UHF Analogue/Digital Contest | http://bit.ly/H0IqQf |
| Mar. 11-12 | Wisconsin QSO Party | http://bit.ly/2Byl8oq |
| Mar. 11 | North American RTTY Sprint | http://bit.ly/2ByXoS9 / |
| Mar. 17-18 | Louisiana QSO Party | http://laqp.org/ |
| Mar. 17-18 | Virginia QSO Party | http://bit.ly/2AoUXko |
| Mar. 17-18 | Russian DX Contest | http://bit.ly/2jZyunR |
| Mar. 17-19 | BARTG HF RTTY Contest | http://bit.ly/2kt4aA6 |
| Mar. 24 | FOC QSO Party | www.g4foc.org/qsoparty/ |
| **Mar. 24-25** | **CQWW WPX SSB Contest** | **www.cqwpx.com/** |
| Mar. 28 | UKEICC 80m Contests CW | http://bit.ly/2cv97YF |
| **May 26-27** | **CQWW WPX CW CONTEST** | **www.cqwpx.com/** |


*Photo A. Geoff, WØCG (L), and Al, W1FJ (R), hold the original K2GL trophy awarded to PJ3CC when it won the world multi-multi category in the 1967 CQWW CW contest. Fifty years later, W1FJ returned for the half-century celebration of the event and again is on what looks like the world multi-multi championship team. In fact, Al had the highest rate hour among all the operators. See more in our October 2017, column at p.104. (Photos courtesy of WØCG.)*
*Photo B. Close-up of the 1967 CQWW trophy.*

Of special note, the nomination period for the CQ Contest Hall of Fame is open through March 1. If you know of someone deserving, anywhere in the world, please nominate him or her. Below is the information needed to submit a nomination.

We congratulate those individuals chosen to be referees at the WRTC2018 Championship. The complete list is posted here: < http://bit.ly/2kldAit>.

As of this writing, there remain six or seven tents available for sponsorship. If you haven't already, please consider a sponsorship for you, your group, or your club. Tent sponsorship is a deserving remembrance for a silent key or keys, or to mark the presence of your club on the world championship stage. Information is at: <http://bit.ly/2s10rkC>.

With the accompanying picture(s), we note that raw scores indicate the likelihood that the world championship multi-multi trophy for the 2017 CQWW CW is likely to return to Curacao reside in the PJ2T shack. *Photo A* shows Geoff, WØCG, and Al, W1FJ, holding the 1967 trophy for the operation that started the Coral Cliff madness. *Photo B* is a close-up of the trophy. The dedication of these contesters traveling to Curacao for each major contest has resulted in many of us working PJ2 on all six bands in contest after contest. Thank you.

In the October column, we noted that the operators planned to celebrate the 50-year anniversary of contesting's arrival at that location. Al, W1FJ, is the only remaining operator from the original 1967 operation. Not only did he visit for the 50th anniversary, but he ran the highest QSO total/hour of the entire weekend. Congratulations to everyone involved. You can view a K3LR video in which he interviews WØCG about the PJ2T station at: <http://bit.ly/2BAkwQl>.

On a different note, other pictures (*Photos C-F*) depict the destruction of the superb contesting station DL1A in Bavaria, Germany. A guy wire to the main tower snapped during a storm, and the falling tower took out the other towers. The "monster" rotating tower held beams for 10 through 80 meters. All were lost, but the group has vowed to find a new location and to rebuild. We hope to hear them on again soon. We are thankful that there were no injuries at the DL1A site, nor nearby where a large construction crane also collapsed during the same storm.

Finally, we note that number of logs submitted for this past fall's CQWW Phone and CW contests broke records. Thanks to everyone for operating during the contest and for sending in your log. As of mid-December, the phone weekend record of 8,482 logs, set in 2013, was broken with 8,578 logs having been received to date. Also for the CW leg, the 2016 record of 8,341 logs received has been broken, with 8,414 logs already received. Thank goodness for computer checking!

## CQ WPX RTTY Contest

This year's rules for the CQ WPX RTTY Contest are the same as last year's. It will be held from 0000 UTC February 10 through 2359 UTC February 11. Complete rules in nine different languages and associated information may be found at: <www.cqwpxrtty.com>. Note that 160 meters is not used in this contest.

Interest has been growing in RTTY contesting, and in particular in the CQ WPX RTTY contest. Last year, 3,283 logs were submitted, just slightly down from the all-time high of 3,546 reached in 2012. Will the 2018 WPX RTTY Contest join this season's CQWW SSB and CW events by also setting a new log submission record? Please do get on and submit your log. Over 20,000 different callsigns generally participate during the single weekend, which is very healthy. Participation is likely to be very good this year, with many interesting stations available to be worked with many — sometimes unique — prefixes.

This contest is somewhat unusual in that it also accepts shortwave listener (SWL) logs for competition. Marek, SP7DQR, and Dan, I1-12387, perform the SWL log checking. See the website link above for full information.

Like all CQ contests, logs must be received at the CQ contest server no later than 5 days after the contest ends to be eligible for an award. For this contest, the log deadline is 2359 UTC on February 16. It is greatly preferred that submissions be made directly over the internet, rather than by email, as the log-checking software examines logs and detects errors. If errors are found, the software will prompt you for corrections. This log-checking facility is easy to use and speeds successful log submission for everyone concerned. The


*Photos C-F: An unusually severe mid-December storm destroyed the DL1A contest station towers and antennas that were located about a 30-minute drive west of Munich, Germany. Pictures show the towers and antennas before and after the storm. According to an account posted on the DL1A website, a guy wire on the main rotating tower snapped and the falling tower took out the other towers. Fortunately, no injuries resulted. DL1A was hosted by DJ6ZM and the towers were built on the roof of a furniture company. The station is QRT "until a new location is found." (Photos courtesy of DL1A.)*

screen immediately indicates when your log has been submitted successfully and you can expect to receive a receipt for in your email within minutes. The log submission link is: <www.cqwpx.com/logcheck/>. Emailed logs continue to be accepted at: <rtty@cqwpx.com>.

Finally, please note that if you miss the deadline, your log still will be scored and listed in the results. You will have missed the opportunity for an award in your category, but can still make an entry. You are encouraged to submit your log, even if late, so that other logs can be more accurately checked and a better measure of interest in the contest made.

### Russian DX Contest (RDXC)

The Russian DX Contest combines both phone and CW and runs in a 24-hour format. This year, it will run from 1200 UTC March 17 through 1159 UTC March 18.

There are a number of rules that distinguish the RDXC from the many of the other competitions, so a participant is well-advised to read the rules at: <http://bit.ly/2jZyunR>. The major distinguishing aspects of the RDXC rules include the following.

- CW and Phone run simultaneously. Enter CW, Phone, or Mixed.
- If in the mixed category, you can work each station twice on the same band, once on CW, and once on Phone.
- Multipliers count only once per band (even though you can work any station twice per band if in the mixed category).
- Everyone works everyone, but points vary by continent and each Russian station counts for more points than one not in Russia.
- There is no "pure" single operator (unassisted) category.

## *OH2BH on the Road Again…*




*Martti Laine, OH2BH, journeyed to Sri Lanka and operated as 4S7BHG during the 2017 CQWW SSB DX Contest. Here he is shown (1) receiving his license at the Telecommunications Authority in Colombo; (2) speaking to the members of the Radio Society of Sri Lanka (RSSL) at their monthly meeting; and (3) operating from his hotel room. Using a small kilowatt and wire dipole, Martti has the 11th high-claimed score from Asia. (Photos courtesy OH2BH and 4S7 Hamtourism, see <www.hamtourism.com>.)*

All forms of assistance, including RBN, packet cluster, etc., are permitted in all categories.

• One can compete and enter in two single-band categories using the same station and callsign. (See the rules for limitations.)

• Scoring: Credit is earned for a QSO only if both you and the other operator copy the callsign and exchange correctly. If either operator makes an error, the QSO is removed from both logs without additional penalty.

• If competing for an award (top 3 in any category), your log (1) must show the exact frequency of each QSO, and (2) must be emailed to the sponsors within 36 hours of the contest's end. If not competing for an award, entries have a 14-day log deadline.

• Participants also entering their scores in the club competition may submit their score for any club worldwide, without regard to residence, but only for one club.

The RDXC is an interesting contest and attracts a lot of participants, especially in the remote regions of Russia that are not so commonly found on the bands. Try it, especially if you want to keep in top form between the ARRL DX SSB and CQ WPX SSB weekends.

## CQ World Wide WPX Phone

The CQ World Wide WPX Contest is the world's second-largest contest! (CQWW DX is #1.) Everyone works everyone for points and multipliers, regardless of their location. There is a lot of participation worldwide, with close to 10,000 logs submitted in recent years for CW and SSB weekends combined, and many more stations are on the air participating.

Keep the following points in mind.

• Single contestants may operate only 36 hours of the 48-hour contest period for score. (Contacts in your log completed after the first 36 hours will be deleted without penalty.)

• QSOs on the low bands — 40, 80, and 160 meters — earn double points. With relatively low sunspots, this will be a significant factor for all-band entries this year.

• Competitors wishing to be considered for top world, continent, or U.S. awards in all categories must include accurate frequencies for all QSOs in their logs.

• Competitors in any one of the single operator (no assistance) categories wishing to be considered for top world, continent, or U.S. awards also must record both the transmit and receive audio *as heard by the competitor* for the entire contest. The recording must be supplied to the Committee only if requested. Note that this requirement is for the audio AS HEARD BY THE OPERATOR. So if one does not listen to their own audio — common especially for SO2R operators — one is not required to record their own audio. Several recording options were discussed in our October 2015 column at page 104 and footnotes 1-3.

If you intend to be a serious competitor, be sure to review the current rules and Frequently Asked Questions (FAQ)! The rules are available in multiple languages. Go to: <www.cqwpx.com/rules.htm>. To review the FAQ, go to: <www.cqwpx.com/rules_faq.htm>.

## CQ Contest Hall of Fame

If you or your club want to nominate someone for the CQ Contest Hall of Fame, now is the time. A maximum of two (2) people may be inducted into each of the Contests and DX halls of fame each year.

Nominations for the Contest Hall of Fame are made by individual contesters, contesting clubs, and national organizations. Nominations must be submitted by March 1 to be considered. Send nominations to: CQ Contest Hall of Fame, c/o CQ magazine, 17 W. John St., Hicksville, NY 11801 USA; or preferred, by email to <hall-of-fame@cq-amateur-radio.com>. Be sure to specify "Contest Hall of Fame" in the subject line. More information is here: <http://bit.ly/2jarYtk>.

Rich, W2VU, editor of *CQ* magazine, handles the nomination process. Election is secured by vote of the CQ contest directors and contesting editor. Nominations are not held over from year to year, so if you nominated someone who was not elected in an earlier year, please resubmit the nomination and add any new information that you think may help with the selection. Past recipients of the Contest and DX Hall of Fames are listed here: <http://bit.ly/2B3wUXX>.

*– Until next month, 73, Dave, K3ZJ*

BY TOMAS HOOD,* NW7US

# CQWW CW Contest Conditions Better Than Expected

**A Quick Look at Current Cycle 24 Conditions**
*(Data rounded to nearest whole number)*

**Sunspots:**
Observed Monthly, November 2017: 3
12-month smoothed, May 2017: 14

**10.7 cm Flux (current):**
Observed Monthly, November 2017: 72
12-month smoothed, May 2017: 78

**$A_p$ Index:**
Observed Monthly, November 2017: 11
12-month smoothed, May 2017: 11

***One Year Ago:* A Quick Look at Solar Cycle Conditions**
*(Data rounded to nearest whole number)*

**Sunspots:**
Observed Monthly, November 2016: 130
12-month smoothed, May 2016: 27

**10.7 cm Flux (current):**
Observed Monthly, November 2016:79
12-month smoothed, May 2016: 93

**$A_p$ Index:**
Observed Monthly, November 2016: 10
12-month smoothed, May 2016: 12

As you may remember, I predicted poor-to-fair conditions for both contest days for the 2017 CQWW CW Contest starting at 0000 UTC, Saturday, November 25 and continuing until 2400 UTC, Sunday, November 26. I postulated that the Planetary A-index ($A_p$) would decrease by Sunday.

In reality, conditions that weekend were much better than predicted. The $A_p$ on the first day was 7, falling to 3 by the second day of the contest. The high-latitude A-index was 5 and 1, making over-the-pole propagation paths highly reliable. The Planetary K-index never got above four. With such quiet geomagnetic conditions, weaker signals are more likely to be heard on those bands where openings are weak yet present. Stable ionospheric conditions allow weak signals to propagate reliably.

The 10.7-cm Radio Flux was 74 and 76, and the observed sunspot count on day one was 13 and on day two 15, a nice bump for day two. The conditions resulted in reasonable propagation on many of the contest bands. These conditions were better than expected.

How did you fare this year, compared to last year? I am interested in hearing from you regarding the differences between last year and this year, and how you did overall this time.

## February Propagation

From the middle of February through early April, typical equinoctial propagation conditions can be expected on the HF frequencies. This usually means a noticeable improvement in conditions between the northern and southern hemispheres. Look for improvements between the U.S. and South America, Africa, Australasia, Antarctica, and parts of Asia. Equinoctial propagation occurs during the spring and fall months, when the sun is most directly overhead at the equator, producing similar ionospheric characteristics over large areas of the world. It tends to maximize during sunrise and sunset periods and over both short and long path openings.

We continue seeing sunspot activity, but with more periods of no sunspots. Little-by-little, we'll see a decline in the propagation at higher frequencies over

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*Omaha, NE 68127*
*Email: <nw7us@nw7us.us>*
*@NW7US*
*@hfradiospacewx*

## LAST-MINUTE FORECAST

**Day-to-Day Conditions Expected for February 2018**

| | Expected Signal Quality | | | |
|---|---|---|---|---|
| **Propagation Index** | **(4)** | **(3)** | **(2)** | **(1)** |
| **Above Normal:** 1-3,7-9,16-17,19, 22-23,28 | A | A | B | C |
| **High Normal:** 4,6,12-15,18,20-21,24,27 | A | B | C | C-D |
| **Low Normal:** 5, 26 | B | C-B | C-D | D-E |
| **Below Normal:** 10-11, 15 | C | C-D | D-E | E |
| **Disturbed:** na | 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. Find the ***propagation index*** associated with the particular path opening from the Propagation Charts appearing in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. 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 good on February 1 through February 3, fair on February 4, then poor to fair on February 5, and so forth.

3. Alternatively, the *Last Minute Forecast* may be used as a general guide to space weather and geomagnetic conditions through 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 conditions. In general, when conditions are **High Normal** to **Above Normal**, signals will be more reliable on a given path, when the path is supported ionospherically.

long-distance paths. However, it is always a surprise to the casual op to get on a band like 10 meters during the solar minimum, and discover that there is still some life on the band, beyond short-skip distances. Especially during periods when sunspots occur, and the daily 10.7-cm flux levels increase enough to wake up the higher frequencies. However, the currently weak solar activity does not support worldwide DXing on the highest HF bands for any significant length of time.

During the daylight hours, optimum DX propagation conditions are expected on 20 meters. The band is forecast to open to all areas of the world sometime during this period, though often with moderate to strong fading. Conditions on 17 and 15 may be good, too, but usually for far shorter distances than during peak solar cycle years. Conditions are expected to become optimal for an hour or two after sunrise and again during the late afternoon. For short-range paths (regional), 40 meters

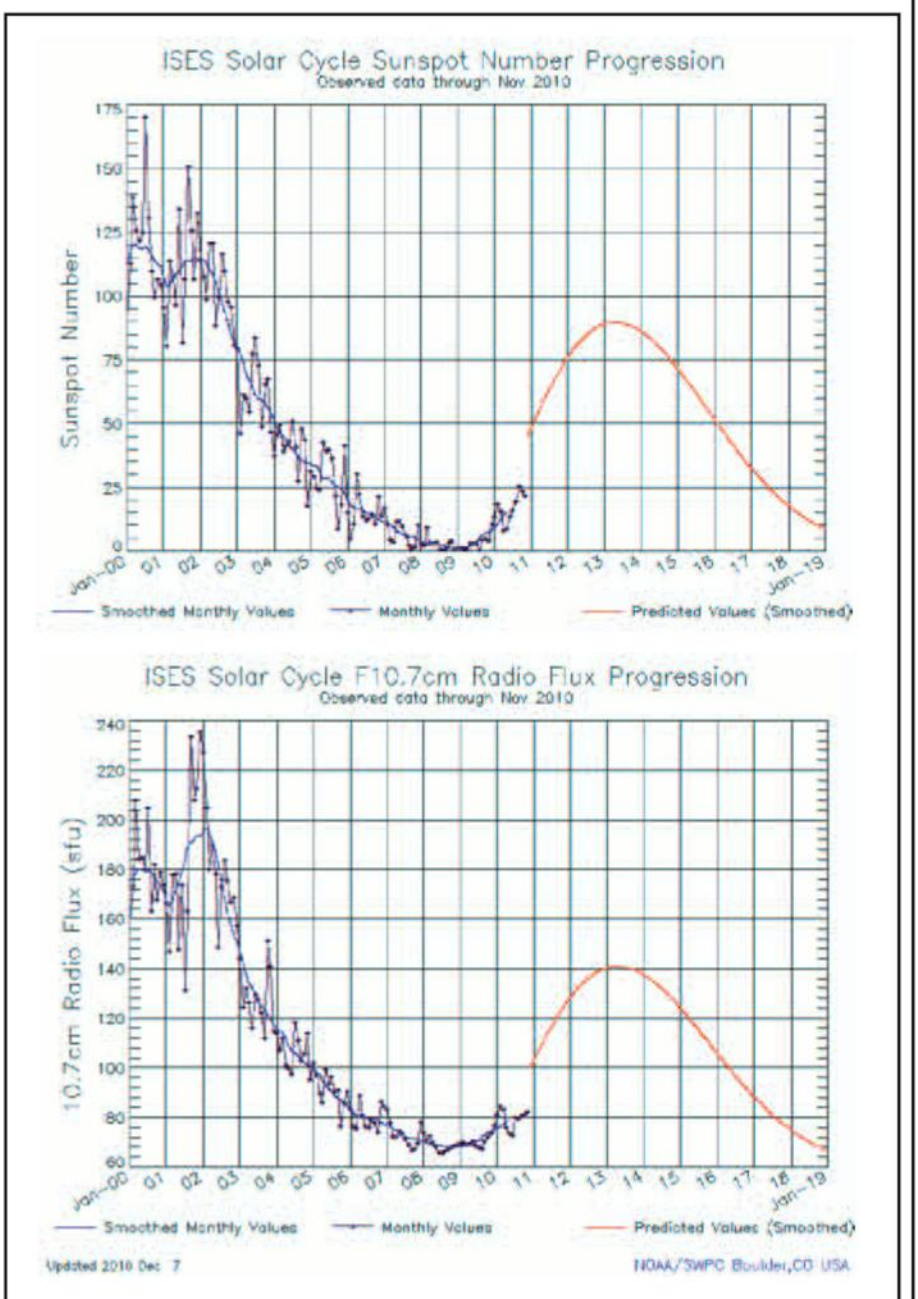


*Figure 1. Sunspot Cycle 24 progression charts from December 2010. As can be seen, the ending of Cycle 23 was evident in a rather quick decline in sunspot numbers over the course of the last 24 months of Cycle 23. Note the red prediction line for Cycle 24, as plotted at the end of 2010. (Courtesy of SWPC/NOAA)*

## On the Cover –

Students at the Don Bosco Institute of Technology in Mumbai, India, head out in search of a hidden 2-meter transmitter using an antenna they'd just finished building at an antenna-building workshop and foxhunt organized by "Team MARI" from the Mumbai Amateur Radio Institute, VU2BPA. The activity is part of the group's ongoing amateur radio awareness programs in various schools throughout Mumbai, India's largest city and financial hub. About 50 engineering students participated in this event, held in 2016. Additional photos are online at <http://bit.ly/2DnRjZ9>, as well as a video at <http://bit.ly/2Bt3s1H>.

Last year, MARI teamed up with the Mumbai Section of the Institute of Electrical and Electronics Engineers (IEEE) to put on a two-day session, with the antenna-building workshop on the first day and the hidden transmitter hunt on the second. The antenna-building workshop started with an introduction of amateur radio, followed by antenna physics and fundamentals. A total of 57 students and faculty members participated in the workshop, and 19 teams homebrewed tape-measure Yagi antennas and learned how to tune them using an antenna analyzer. On the second day, participants were introduced to hidden transmitter hunting and four foxhunts were held throughout the day. The third one was the most challenging, with students taking about an hour and a half to find the transmitter. See the results of the 2017 CQ World Wide Foxhunting Weekend — the 20th running of this event! — on page 37. *(Team MARI info and photo courtesy Shailesh Deshmukh, VU2LOC, and the Mumbai Amateur Radio Institute)*

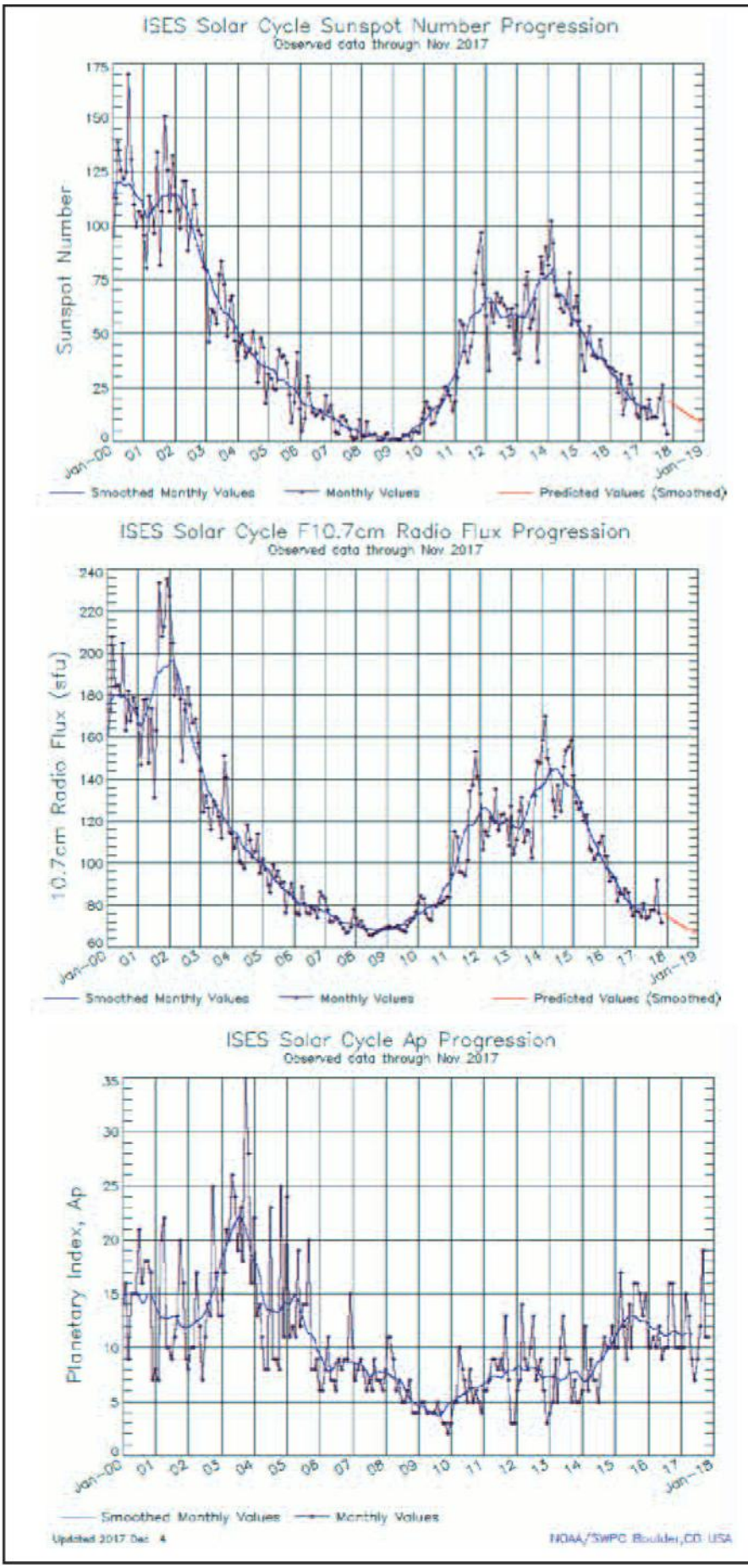


*Figure 2. Sunspot Cycle 24 progression charts from December 2017. As can be seen, the ending of Cycle 24 is becoming evident in a rather quick decline in sunspot numbers over the last year (2017). Note how Cycle 24 fulfilled the red prediction line as seen in the plotted red line in Figure 1. We are right at the edge of solar cycle minimum between current Sunspot Cycle 24 and the next cycle. (Courtesy of SWPC/NOAA)*

should be usable during most of the daylight hours. With increasing hours of daylight during February, expect the HF bands to remain open for an hour or so longer into the early evening than during the winter months.

During the early evening hours and to as late as midnight, many bands should be available for DX openings: 15, 17, 20, 30, 40, 60, 80, 75, and 160 meters. Fifteen and 17 meters should hold up for openings towards Central and South America and the Caribbean, the Pacific area, Far East, and parts of Asia. Better openings into many areas of the world may be possible on 20 meters during this period, with the strongest signals from southerly and westerly directions. Good DX conditions are also forecast for 30, 40, 60, and 75/80 meters for openings towards the east and the south. Openings in the same direction, but with higher noise levels and weaker signals, should also be possible on 160 meters.

Between midnight and sunrise, it should be a toss-up between 20, 30, and 40 meters for DX paths. These bands should open to many areas of the world with conditions favoring openings towards the south and the west. Expect similar conditions on 80 meters, but with weaker signals and higher noise levels. Be sure to check 160 for some unusual DX openings towards the south and the west during this period. Conditions on the bands between 160 and 20 meters are expected to peak at local sunrise.

## VHF Conditions

Trans-equatorial (TE) scatter propagation tends to increase during the equinoctial period and some 6-meter openings may be possible between 7 and 10 p.m. local time. The best bet for such openings are between the southern tier states and South America for paths approximately at right angles to the equator. An occasional TE opening may also be possible on 2 meters. Unlike $F_2$-layer or sporadic-E ($E_s$) openings on 6 meters, TE openings

## announcing *(from page 2)*

**ELYRIA, OHIO — The Northern Ohio Amateur Radio Society** will hold the **NOARS Winter Hamfest** on Sunday, March 4 at the John A. Spitzer Conference Center-Loraine County Community College, 1005 N. Abbe Road. Contact: Darlene Ohman, KA8VTS, (216) 398-8858 (before 11 p.m.). Email: <winterhamfest@noars.net>. Website: <www.noars.net>. Talk-in 146.70 (PL 110.9).

**CONCORD, NORTH CAROLINA — The Mecklenburg Amateur Radio Society** will hold the **Charlotte Hamfest** on Friday, March 9 and Saturday, March 10 at the Cabarrus Arena & Events Center, 4551 Old Airport Road. Contact: Charlotte Hamfest, 2425 Park Road, Room 023, Charlotte, NC 28203. Phone: (704) 948-7373. Email: <info@charlottehamfest.org>. Website: <http://charlottehamfest.org>. Talk-in 146.655 or 146.940 (PL 118.8). VE exams, card checking.

**PUYULLUP, WASHINGTON — The Mike & Key Amateur Radio Club** will hold its **37th Annual Electronics Show & Fleamarket** on Saturday, March 10 at the Washington State Fair Grounds-Pavilion Exhibition Hall, 1110 9th Avenue SW. Phone: (253) 631-3756. Email: <ddmdink@gmail.com> or <n7wa@arrl.net>. Talk-in 146.82- (PL 103.5). VE exams.

**TULLAHOMA, TENNESSEE — The Middle Tennessee Amateur Radio Society** will hold its **Hamfest** on Saturday, March 10 at the First Methodist Church, 208 West Lauderdale Street. Contact: Michael Glennon, KB4JHU, 302 Twelve Oaks Road, Tullahoma, TN 37388. Phone: (931) 588-0302. Email: <kb4jhu@arrl.net>. Website: <www.mtars-ham.org>. Talk-in 146.700- (PL 114.8). VE exams.

**PUNTA GORDA — The Peace River Radio Association** will hold the **Charlotte County Hamfest** on Sunday, March 11 at The Punta Gorda Boat Club, 802 West Retta Esplanade. Contact: Dave, WB4GVZ, <a1steel@verizon.net>. Website: <www.prra.club>. Talk-in 147.255+ or 442.925+.

**YOUNGSVILLE, PENNSYLVANIA — The BSA, Venture Crew 73** will hold the **Warren County Hamfest 2018** on Sunday, March 11 at the Youngsville Vol. Fire Department, 222 East Main Street. Contact: Russ Bush, N3YD, (814) 564-9202. Email: <n3yd@usa.com>. Talk-in 145.110 (PL 186.2). VE exams, ARRL card checking.

**ROSENBERG, TEXAS — The Brazos Valley Amateur Radio Club** will hold the **2018 Greater Houston Hamfest** and **2018 ARRL South Texas Section Convention** on Friday, March 16 and Saturday, March 17 at the Fort Bend County Fairgrounds, 4310 Texas 36. Phone: (713) 502-5896 or (713) 569-8799. Email: <info@houstonhamfest.org>. Website: <www.houstonhamfest.org>. Talk-in 146.940 (PL 167.9). VE exams.

**GEORGETOWN, TEXAS — The Williamson County Amateur Radio Club** will hold the **WCARC Swapfest** on Saturday, March 17 at the San Gabriel Park Community Center, 455 E. Morrow Street. Website: <http://wcarc.com>. Talk-in 146.64 (PL 162.2). VE exams.

**KALAMAZOO, MICHIGAN — The Southern Michigan Amateur Radio Society** will hold the **Michigan Crossroads Hamfest and Radio Swap** on Saturday, March 17 at Wings Event Center, 3600 Vanrick Drive. Contact: Jay Jarrett, N8ARR, (269) 815-8007. Email: <crossroadshamfest@w8df.com>. Website: <www.w8dt.com>. Talk-in 147.000- (PL 94.8). VE exams.

**LOOMIS, CALIFORNIA — The Sierra Foothills Amateur Radio Club** will hold its **Hamfest 2018** on Saturday, March 17 at the Historic Loomis Train Depot, 5775 Horseshoe Bar Road. Website: <www.w6ek.org>. Talk-in 145.430- (PL 162.2) or 440.575+ (PL 162.2).

**MIDLAND, TEXAS — The Midland Amateur Radio Club** will hold the **63rd Annual St. Patrick's Day Hamfest** on Saturday, March 17 at the MLK Community Center, 2300 Butternut Lane. Phone: (432) 520-4003. Email: <w5qgg@arrl.net>. Website: <hamfest.w5qgg.org>. Talk-in 147.300+ (PL 88.5). VE exams, DXCC / WAS / VUCC card checking.

**STUART, FLORIDA — The Martin County Amateur Radio Association** will hold the **2018 Stuart Florida Hamfest** on Saturday, March 17 at the Martin County Fairgrounds, 2816 SE Dixie Highway. Phone: (772) 349-7820. Website: <www.stuarthamfest.com>. Talk-in 147.060. VE exams.

**ANNANDALE, VIRGINIA — The Vienna Wireless Society** will hold its **Winterfest** on Sunday, March 18 at the Richard J. Ernst Cultural Center-Northern Virginia Community College, Annandale Campus, 8333 Little River Turnpike. Contact: Doug, AK4AO, (703) 698-6158. Email: <tablesales@viennawireless.net>. Website: <www.viennawireless.net>. Talk-in 146.91. VE exams, WAS / DXCC / VUCC card checking.

**PERRYSBURG, OHIO — The Toledo Mobile Radio Association** will hold the **TMRA Hamfest** on Sunday, March 18 at the Student Health and Activities Center-Owens Community College, 30335 Oregon Road. Contact: TMRA Hamfest Tables, P.O. Box 9673, Toledo OH 43697-9673. Website: <www.tmrahamradio.org>. Talk-in 147.270+ (PL 131.8).

**SOUTHINGTON, CONNECTICUT — The Southington Amateur Radio Association** will hold its **Flea Market** on Sunday, March 18 at Southington High School, 720 Pleasant Street. Contact: John, WA1JKR, (860) 621-8791. Email: <johnrogus@aol.com>. Website: <www.chet-bacon.com/sara.htm>. Talk-in 144.345 or 444.200 (PL 77). VE exams.

**BUFFALO, MINNESOTA — The Maple Grove Radio Club** will hold the **35th Annual Midwinter Madness Hobby Electronics Show** on Saturday, March 24 at the Buffalo Civic Center, 1306 County Road 134. Email: <swap@k0ltc.org>. Website: <www.k0ltc.org>. Talk-in 147.000+. VE exams, card checking.

**CHARLESTON, WEST VIRGINIA — The Kanawha Amateur Radio Club** will hold the **34th Annual Charleston Area Hamfest** on Saturday, March 24 at the Charleston Civic Center, 200 Civic Center Drive. Contact: Rich Cummings, WV8RC, (304) 610-6404. Email: <rickwv8rc@gmail.com>. Talk-in 145.35. VE exams, DCXX / WAS / VUCC card checking.

**RALEIGH, NORTH CAROLINA — The Raleigh Amateur Radio Society** will hold **RARSfest** and **2018 ARRL North Carolina State Convention** on Saturday, March 31 at the Jim Graham Building-North Carolina State Fairgrounds, 1025 Blue Ridge Road. Contact: Jeff Wittich, AC4ZO, (919) 362-4787. Email: <jwittich@nc.rr.com>. Website: <www.rars.org>. Talk-in 146.64 or 146.88. VE exams, ARRL & CQ card checking, fox hunt.

### APRIL

**FRAMINGHAM, MASSACHUSETTS — The Framingham Amateur Radio Association** will hold the **Framingham Flea** on Sunday, April 8 at Keefe Tech School, 750 Winter Street. Contact: Andy, KC1DMN, (508) 310-5913. Email: <tables@fara.org>. Website: <http://fara.org>. Talk-in 147.15. VE exams.

**BOSTON, PENNSYLVANIA — The Two Rivers Amateur Radio Club** will hold its **47th Annual Hamfest / Computer Show** on Sunday, April 8 at The Boston Spectrum, 6001 Smithfield Street. Phone: (412) 398-1092. Email: <petersondt@verizon.net>. Website: <www.trarc.net>. Talk-in 146.73. VE exams.

**BARTLETT, TENNESSEE — The Mid-South Amateur Radio Association** will hold the **Memphis FreeFest** on Saturday, April 14 at the Bartlett Station Municipal Center, 5868 Stage Road. Contact: Art Barnett, WA4PSS, (901) 619-5573. Email: <wa4pss@gmail.com>. Talk-in 147.03+ (PL 107.2). VE exams.

**CUYAHOGA FALLS, OHIO — The Cuyahoga Falls Amateur Radio Club** will hold its **64th Annual Hamfest** on Saturday, April 14 at the Emidio and Sons Party Center, 48 E. Bath Road. Contact: Mike Luoma, K9MAL, (234) 206-0270. Email: <hamfest@cfarc.org>. Website: <www.cfarc.org>.

**GEORGETOWN, DELAWARE — The Sussex Amateur Radio Association** will hold the **Delmarva Amateur Radio & Electronic Expo** on Saturday, April 21 at the Cheer Community Center, 20520 Sand Hill Road. Contact: Vic, KC3BUI, (302) 628-3060. Website: <www.radio-electronicsexpo.com>. Talk-in 147.090 (PL 156.7). VE exams, card checking.

are characterized by very weak signals with considerable flutter fading.

Do expect moderate coronal hole activity on occasion. With the influence of coronal mass ejections or elevated solar wind streams, the geomagnetic field may reach minor storm levels. While most days will see quiet conditions, there is a fair chance that geomagnetic storms will trigger modest auroral activity. Auroral activity tends to occur more frequently during the equinoctial period.

Check out <www.imo.net/calendar/> for a complete calendar of meteor showers in 2018. Have you worked any of these meteors? Please drop me a note and let me know. I'll construct a summary from your reports for this column's readers to enjoy.

## Current Solar Cycle Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 3.4 for November 2017, down from 7.9 for October. The mean value for November results in a 12-month running smoothed sunspot number of 14.0 centered on May 2017, down from April's 14.9. Following the curve of the 13-month running smoothed values, a smoothed sunspot level of 15 is expected for February 2018, plus or minus 14 points.

Canada's Dominion Radio Astrophysical Observatory at Penticton, British Columbia reports a 10.7-cm observed monthly mean solar flux of 72.1 for November 2017, down from 76.4 for October. The 12-month smoothed 10.7-cm flux centered on May 2017 is 77.7, down slightly from April's 78.4. A smoothed 10.7-cm solar flux of about 75 is predicted for February 2018.

The geomagnetic activity as measured by the Planetary-A index ($A_p$) for November 2017 is 11. The 12-month smoothed $A_p$ index centered on May 2017 is 11.5. Geomagnetic activity this month should be about the same as for January 2018. Refer to the Last-Minute Forecast for the outlook on what days that this might occur (remember that you can get an up-to-the-day Last Minute Forecast at <http://sunspotwatch.com> on the main page).

Don't forget to check out this columnist's educational tweets on Twitter.com; you can follow @hfradiospacewx <https://Twitter.com/hfradiospacewx> for hourly updates that include the K index numbers, as well as @NW7US <https://Twitter.com/nw7us> which will provide the daily dose of educational tidbits about the Sun and propagation. You can also check <http://SunSpotWatch.com> for the latest numbers.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. Please check out the space weather and radio propagation self-study course that this columnist is offering at <http://NW7US.us/swc>.

You may email me, write me a letter, or catch me on the HF amateur bands. If you are on Facebook, check out <www.facebook.com/spacewx.hfradio> and <www.facebook.com/NW7US>. Speaking of Facebook — check out the *CQ Amateur Radio* Magazine fan page at <www.facebook.com/CQMag>.

I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!

*– 73, Tomas, NW7US*

NASA On the Air, or NOTA, program. Special event stations will be active throughout the year at several different NASA centers, sending out commemorative QSL cards for contacts and special certificates to those who qualify. For details, visit <https://go.nasa.gov/2p9K6Jm>.

## Radio Caroline Gets Legal

Legendary pirate broadcaster Radio Caroline has apparently gone legit. *Newsline* reports that the station, which broadcast from a ship off the English coast from 1964 to 1991, is now licensed and operating on the medium-wave frequency of 648 kHz, a frequency formerly used by the BBC World Service. The station is also streaming its broadcasts over the internet. Some programs still originate from the station's shipboard studios aboard the restored Ross Revenge, but the ship is now moored in the River Blackwater. Reception reports have come from as far away as Italy and Japan. For more info, visit <www.radiocaroline.co.uk>

## D-Star Satellite Apparently Lost in Launch Failure

D-Star One, the first amateur satellite to use the Japan Amateur Radio League's digital voice and data format, was among 20 secondary payloads apparently lost in a partial launch failure on November 28. The *ARRL Letter* reports that the three-stage Soyuz 2.1 booster was launched without a problem from the new Vostochny Cosmodrome in far-eastern Russia. However, it appears that the third stage, the *Fregat* space tug, apparently failed to deploy the satellites it was carrying. Russia's space agency is investigating the failure.

## FCC: No-Times-Two on Callsign Request

The FCC says it sees no need to add a new callsign format for amateur stations, rejecting the second such request in less than 10 years. Thomas Alessi, K1TA, of Stamford, Connecticut, asked the Commission last May to consider issuing Extra Class operators calls consisting of a single-letter prefix, two digits and another single letter (e.g., W22D). According to the *ARRL Letter,* Alessi said the FCC was running out of desirable 1x2 and 2x1 calls for Extras, and that his idea would add 7,800 possible new calls to the pool. Scot Stone, the Wireless Telecommunications Bureau Mobility Division's Deputy Chief, rejected the petition in a letter to Alessi, noting that approximately 15 million possible callsign combinations currently exist, that the Commission had considered and turned down a similar proposal in 2010, and that "(y)ou have not demonstrated any changed circumstances or other reason that would warrant revisiting this decision."

## JOTA Participation Down in 2017, But Still Good

Last year's scouting Jamboree on the Air (JOTA) didn't have quite the level of participation as in 2016, but was on par with activity in 2014 and 2015, according to *Newsline* and the K2BSA Amateur Radio Association. The worldwide scouting activity last October saw participation in the U.S. by 958 amateur radio operators, over 7,800 scouts and more than 4,700 non-scout visitors. Collectively, they made 7,177 contacts.

Also in radio scouting news, preliminary plans are being made for an amateur radio presence at the 2019 World Scout Jamboree, scheduled for next July and August at The Summit in West Virginia. Planners have already secured the callsign NA1WJ (North America 1 World Jamboree) for use during the event. More information is available on Twitter at @NA1WJ_Scouting; general information on radio scouting may be found at <www.k2bsa.net>.

## ARISS Forms Education Committee

Amateur Radio on the International Space Station, or ARISS, has been connecting astronauts and cosmonauts aboard the ISS with school groups around the world for over a decade. Now, according to *Newsline*, a new committee has been formed to get more input from teachers on how ARISS can better help meet their educational goals. The U.S. Education Committee of Amateur Radio on the International Space Station is made up of teachers from kindergarten to college level, all tasked with making recommendations for an even better experience and a better tie-in with curricular goals, especially in "STEM" fields — science, technology, engineering, and math.

## Milestones: KF7DSY to Houston; "World's Oldest Ham" SK

Purdue University sophomore Jacob Nunez-Kearny, KF7DSY, is taking the spring semester off from classes to work as an intern at NASA's Johnson Space Center in Houston. According to the *ARRL Letter*, Nunez-Kearny, a William R. Goldfarb Memorial Scholarship winner, is majoring in aerospace engineering and will remain a full-time student during his internship. He will resume regular classes next fall, and still expects to graduate in four years because he earned several college credits while still in high school.

He was said to be the world's oldest ham — nobody keeps official records — but French amateur Jean Touzot, F8IL, had a pretty good claim to the title at age 109! The *ARRL Letter* reports that Touzot became a Silent Key last fall. Up until he "retired" from active hamming in 2014 (at age 105) for health reasons, Touzot could be found daily on 80-meter CW. He was born in Algeria and was a licensed amateur since 1936. Touzot had retired in 1966 from a career as an industrial designer.

## W1AW Returns to 6 Meters After Nearly Three Decades

W1AW bulletins and code practice have returned to the 6-meter band after an absence of nearly 30 years. Regular transmissions on the band were suspended in late 1989, according to the *ARRL Letter*, which says the station's only 6-meter operations since then have been by visitors and during contests. Code practice and bulletin transmissions resumed this January 2, on 50.350 MHz, with an additional function of serving as a beacon for band openings from the northeastern U.S. on "the magic band."

## Visiting New Brunswick from the US? Put Down That Mic!

If you're licensed in the U.S. (or anywhere other than Canada, for that matter), and visiting the Canadian province of New Brunswick, don't be tempted to operate your mobile ham rig while driving. *Newsline* reports that the province's new distracted driving law contains an exemption for licensed hams, but only those licensed in Canada! Apparently, there's also an exemption for CB use, but only by drivers of trucks and other commercial vehicles. The report says the law applies only in New Brunswick.

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