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Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.



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\$6.99

Amateur Radio

COMMUNICATIONS & TECHNOLOGY

OCTOBER 2018



Emergency Communications Special

On the Cover: Peter Prabucki, VA3ELE, works moonbounce from CQ Zone 2 during a one-man gridXpedition in Canada. Details on pages 4 and 86.





New

APRS® / D-STAR®

TH-D74A 144/220/430 MHz Tribander

Introducing the TH-D74A for the ultimate in APRS and D-STAR performance. KENWOOD has already garnered an enviable reputation with the TH-D72A handheld APRS amateur radio transceiver. And now it has raised the bar even further with the new TH-D74A, adding support for D-STAR, the digital voice & data protocol developed by the JARL, and enabling simultaneous APRS and D-STAR operation – an industry first.

- ▶ APRS compliance using packet communication to exchange real-time GPS position information and messages
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- ▶ Four TX Power selections (5/2/0.5/0.05 W)
- ▶ Dust and Water resistant IP54/55 standards

APRS (The Automatic Packet Reporting System) is a registered American trademark of WB4APR (Mr. Bob Bruninga). D-Star is a digital radio protocol developed by JARL (Japan Amateur Radio League).

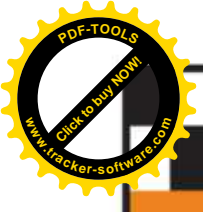
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ADS#29116



Congrats!

Congratulations to Martti Laine, OH2BH for winning the All Asian DX Contest 2018 – single operator, high power.

Martti operated in Guam as KH2X at the ham station of Ed Poppe KH2L, who fearlessly undertook the task of installing the 3 Element SteppIR Yagi with 40m/30m loop dipole in the midst of typhoon conditions!



Above: John Mertel WA7IR, CEO of SteppIR Communications, shown with SteppIR Advisory Board member and world-renowned DX'er Martti Laine OH2BH at Tokyo Ham Fair 2018



“Thank you to SteppIR Communication Systems as well as many other supporters, all of who acted as my Formula-1 technical team – making sure that my racing package was competitive, lasted the entire 48-hours without failures... and ultimately cut the finish line first! Special thanks to Leena, OH2BE who has supported me dearly during these 50+ years of serious racing!” – Martti Laine



PRODUCT DETAILS & ORDERING:

www.steppir.com 425-453-1910



ANNOUNCEMENTS



OCTOBER

ALPENA, MICHIGAN — The Thunder Bay Amateur Radio Club will hold the 5th Annual Alpena Swap Meet from 9 a.m. to 1 p.m., Saturday, October 6 at the Alpena Mall, 2380 U.S. 23 South. Email: <w1up@thunderbayarc.org>. Website: <http://thunderbayarc.org>.

BELTON, TEXAS — The Temple Amateur Radio Club will hold HamEXPO from 7 a.m. to noon, Saturday, October 6 at the Bell County EXPO Center, 301 Loop 121. Email: <hamexpo@tarc.org> or <expo@tarc.org>. Website: <www.tarc.org>. Talk-in 146.820- (PL 123). VE exams.

BOWLING GREEN, KENTUCKY — The Kentucky Colonels Amateur Radio Club will hold the 7th Annual Vette City Hamfest from 7:30 a.m. to 2 p.m., Saturday, October 6 at the WKU-Knicely Conference Center, 2355 Nashville Road. Contact: Frank Armstrong, KI4HEJ, (270) 781-0349. Email: <frankarmstrong@insightbb.com>. Website: <www.vettecityhamfest.com>. Talk-in 147.33 (PL 107.2).

HOLLYWOOD, MARYLAND — The St. Mary's County Amateur Radio Association will hold its 6th Annual TailgateFest from 8 a.m. to 2 p.m., Saturday, October 6 at the Hollywood Volunteer Fire Department Bingo Hall, 24801 Three Notch Road. Contact: Chuck Gantz <k3wjx@yahoo.com>.

LAKESIDE, CALIFORNIA — The Lakeside Amateur Radio Club will hold the San Diego Hamfest from 6 a.m. to 3 p.m., Saturday, October 6 at the Lakeside Rodeo Grounds, 12584 Mapleview Street. Email: <kc6qsl@cox.net>. Website: <www.sdamfest.org>. Talk-in 146.55. VE exams, T-hunt.

MITCHELL, INDIANA — The Hoosier Hills Ham Club will hold the 57th Annual Hoosier Hills Hamfest from 8 a.m. to noon, Saturday, October 6 at the Lawrence County 4H Fairgrounds, 11265 U.S. Hwy 50 West. Contact: W.W. Warren, KB9TMP, (812) 675-2450. Email: <hamfest@w9qqyq.org>. Website: <www.w9qqyq.org>. Talk-in 146.73- (PL 107.2). VE exams, foxhunt.

OLIVE BRANCH, MISSISSIPPI — The Chicksaw Amateur Radio Association and the Olive Branch Amateur Radio Club will hold the 2018 ARRL Day in the Park from 9 a.m. to 2 p.m., Saturday, October 6 at the Olive Branch City Park, 8267 Goodman Road. Contact: Glen Popiel, KW5GP, <kw5gp@arrl.net>. Talk-in 147.255+ (PL 79.7). VE exams.

ROCK HILL, SOUTH CAROLINA — The York County Amateur Radio Society will hold the 66th Annual Rock Hill Hamfest from 7 a.m. to noon, Saturday, October 6 at the New Kirk Baptist Church, 175 Museum Road. Contact: Brent Case, K4BSC, <k4bsc@arrl.net>. Website: <www.ycars.org>. VE exams.

WICHITA, KANSAS — The Valley Center Amateur Radio Club will hold the 2018 Wichita Area HAM-FEST from 8 a.m. to 1 p.m., Saturday, October 6 at the RiverWalk Church of Christ, 225 N. Waco. Contact: Steve Perriman, NØYYI, (316) 617-1658 or Bruce Barley, KKØS, (316) 744-3555. Email: <wichitaareahamfest2018@gmail.com>. Website: <www.vcarc.org>. Talk-in 146.94-. VE exams.

FLUSHING MEADOWS, NEW YORK — The Hall of Science Amateur Radio Club will hold its HamFest 2018 and Electronics Bazaar from 9 a.m. to 2 p.m., Sunday, October 7 at The New York Hall of Science, 47-01 111th Street. Contact: Steve Greenbaum, WB2KDG, (718) 898-5599 (evenings only). Email: <wb2kdg@arrl.net>. Website: <http://hosarc.org>. Talk-in 444.200+ (PL 136.5). VE exams.

LONG ISLAND, NEW YORK — The Long Island Mobile Amateur Radio Club will air special event stations W2V, W3VL, and WV2LI on Sunday, October 7 to commemorate the 110th Anniversary of the Long Island Motor Parkway. QSL \$2 and a SASE to LIMARC, P.O. Box 392, Levittown, NY 11756-0392. Website: <www.limarc.org>.

LONGMONT, COLORADO — The Boulder Amateur Radio Club will hold the 64th Annual BARCfest Hamfest beginning 8 a.m., Sunday, October 7 at the Boulder County Fairgrounds-Exhibit Building, 9595 Nelson Road. Contact: Mike, W3DIF, (303) 404-2161. Email: <barc70@arrl.net>. Website: <www.qsl.net/w0dk>. Talk-in 146.700-. VE exams.

WEST FRIENDSHIP, MARYLAND — The Columbia Amateur Radio Association will hold the 2018 CARAFest beginning 8 a.m., Sunday October 7 at the Howard County Fairgrounds, 2210 Fairgrounds Road. Contact: David Parkison, KB3VDY, (443) 492-9501. Email: <info@carafest.org>. Website: <www.carafest.org>. VE exams, card checking.

WEST LIBERTY, IOWA — The Muscatine Amateur Radio Club and the Washington Area Amateur Radio Club will hold the 34th Annual SE Iowa Hamfest and 2018 ARRL Iowa Section Convention from 7 a.m. to 2 p.m., Sunday, October 7 at the Muscatine County Fairgrounds, 101 N. Clay Street. Contact: C. Scott Richardson, NØMRZ, (563) 506-0304. Email: <muscatine@iowaares.org>. Website: <www.waarc.net>. Talk-in 146.910- (PL 192.8) or 147.760-. VE exams, DXCC / VUCC / WAS / WAC card checking.

FAIRBORN, OHIO — The Midwest VHF-UHF Society will hold Microwave Update 2018 from Thursday, October 11 through Sunday, October 14 at the Holiday Inn-Fairborn, 2800 Presidential Drive. Email: <mud2018info@mvus.org>. Website: <www.microwaveupdate.org>.

DEERFIELD, NEW HAMPSHIRE — The New England Amateur Radio Festival (NEAR-Fest) will held from 9 a.m. to 6 p.m., Friday, October 12 and from 7 a.m. to 3 p.m., Saturday, October 13 at the Deerfield Fairground, 34 Stage Road (NH 43). Website: <www.near-fest.com>. Talk-in 146.700- (PL 88.5).

MELBOURNE, FLORIDA — The Platinum Coast Amateur Radio Society will hold the 53rd Annual Melbourne HAMFEST from 1 to 7 p.m., Friday, October 12 and from 9 a.m. to 3 p.m., Saturday, October 13 at the Melbourne Auditorium, 625 E. Hibiscus Boulevard. Email: <hamfest@pcars.org>. Website: <www.pcars.org>. Talk-in 146.852-. VE exams, DXCC card checking.

BREMERTON, WASHINGTON — The Kitsap County Amateur Radio Club will hold the KCARC Hamfest from 9 a.m. to 1 p.m., Saturday, October 13 at the West Side Improvement Club, 4109 West E Street. Contact: Jim <hamfest@kcarc.org>. Website: <www.kcarc.org>.

MINERAL WELLS, WEST VIRGINIA — Wood County Emergency Communications will hold the Wood County / Parkersburg Area 2018 Hamfest from 8 a.m. to 2 p.m., Saturday, October 13 at the Wood County 4-H Fairgrounds, 2230 Butcher Bend Road. Contact: Ken Harris, WA8LLM, (304) 679-3470. Email: <wa8llm@yahoo.com>. Website: <www.wc8ec.org>. Talk-in 147.255 (PL 131.8). VE exams, WAS / WAC / VUCC / DXCC card checking.

MORRILTON, ARKANSAS — The Randy Griffin Memorial Radio Club will hold the K5BOC Memorial Ham Fest from 8 a.m. to 3 p.m., Saturday, October 13 at the Petit Jean Lutheran Camp, 110 Montgomery Trace. Phone: (501) 771-1111 or (501) 626-6252. Website: <http://k5boc.org>. Talk-in 146.520. VE exams.

REDDING, CALIFORNIA — The Anderson California Amateur Radio Club and ARES will hold the ARCA & ST-ARES Swap Meet from 10 a.m. to 2 p.m., Saturday, October 13 at 141 Locust Street. Contact: Bill (530) 246-2227. Website: <www.st-ares.org>. VE exams.

TOWNSHIP OF WASHINGTON, NEW JERSEY — The Bergen Amateur Radio Association will hold the BARA Fall Hamfest from 8 a.m. to 1 p.m., Saturday, October 13 at Westwood Regional Jr./Sr. High School, 701 Ridgewood Road. Contact: Jim Joyce, K2ZO, (201) 664-6725. Email: <k2zo@arrl.net>. Website: <www.bara.org>. Talk-in 146.19+ (PL 141.3) VE exams, DXCC card checking.

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A publication of

 CQ Communications, Inc.
17 West John Street
Hicksville, NY 11801 USA.

CQ Amateur Radio (ISSN 0007-893X) Volume 74, No. 10. Published monthly by CQ Communications, Inc., 17 West John Street, Hicksville, NY 11801, Telephone 516-681-2922. E-mail: cq@cq-amateur-radio.com. Fax 516-681-2926. Web site: www.cq-amateur-radio.com. Periodicals Postage Paid at Hicksville, NY 11801 and at additional mailing offices. Subscription prices (all in U.S. dollars): Domestic-one year \$38.95, two years \$70.95, three years \$102.95; Canada/Mexico-one year \$51.95, two years \$96.95, three years \$138.95; Foreign Air Post-one year \$63.95, two years \$120.95, three years \$177.95. Single copy \$6.99. U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government including military services, only on a cash with order basis. Requests for quotations, bids, contracts, etc. will be refused and will not be returned or processed. Entire contents copyrighted 2018 by CQ Communications, Inc. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the U.S.A.
POSTMASTER: Send address changes to:
CQ Amateur Radio, 17 W. John Street., Hicksville, NY 11801



HAM RADIO NEWS

Will WWV, WWVB and WWVH Go QRT?

The National Institute of Standards and Technology has proposed shutting down radio stations WWV, WWVB, and WWVH as part its budget request for the 2019 fiscal year, which begins October 1. WWV — in Colorado — and WWVH — in Hawaii — transmit standard time, frequency, and propagation information on the HF bands. WWVB, on 60 kHz, provides digital time signals to set and synchronize so-called “atomic” wristwatches, clocks, and myriad other consumer devices. NIST says closing the stations will save \$6.3 million in the coming year, after noting elsewhere in its budget request that “for every tax dollar invested in NIST, almost \$50 of value is created in the economy year over year.”

It is up to Congress to make final decisions on the federal budget, and as we went to press in early September, efforts were under way to persuade key representatives and senators to restore the funding for these stations that have provided and continue to provide essential time and frequency services to radio amateurs and other HF spectrum users for nearly 100 years. Please check the CQ Newsroom <<http://cqnewsroom.blogspot.com>> for updates.

Howard Michel, WB2ITX, Named ARRL CEO

The ARRL Board of Directors has chosen a leader in the robotics and artificial intelligence industry and a former president of the IEEE (Institute of Electrical and Electronics Engineers) as its new Chief Executive Officer. Howard Michel (pronounced MICK-ul), WB2ITX, takes the reins as ARRL CEO on October 15, succeeding Barry Shelley, N1VXY, who had served as the League’s Chief Financial Officer for 25 years before becoming CEO this past January.

Michel, who lives in Dartmouth, Massachusetts, comes to the League from a Chinese-based robotics and artificial intelligence firm, according to the ARRL. UBTECH Robotics makes humanoid robots for consumer and industrial use. Michel was the company’s Senior Vice President as well as Chief Technology Officer of its education subsidiary. In 2015, he served as president of the IEEE and is a retired U.S. Air Force officer. He has been a ham since his teens and enjoys building and repairing his own equipment. Michel says one of his top priorities at ARRL will be “to develop new products and services so all licensed hams, whatever their license class or interest, find value in League membership.”

4U1UN Briefly Returns to Air; Permanent Return is Planned

After being QRT for nearly a decade, the United Nations Headquarters amateur radio station, 4U1UN, returned to the air briefly in late August as it prepares to get back on the air regularly. According to the *ARRL Letter*, the unannounced 20-meter operation was conducted to test a newly-installed antenna and drew a pileup resulting in about two dozen contacts. The station plans to have an operating position on the third floor of the Secretariat building, from which it will remotely control a transceiver located closer to the roof. For more details, see “News Bytes” on page 10 of this issue.

Hamvention Officials: No New Building for 2019

There will still be tents for some commercial exhibitors at next year’s Dayton Hamvention®. General Chairman Jack

Gerbs, WB8SCT, and Assistant General Chairman Rick Allnutt, WS8G, announced on August 5th that they had been unable so far “to reach an agreement on a long-term contract (with Greene County officials) where both the Fairgrounds and Hamvention would feel comfortable erecting a new building.”

The announcement was made “in the spirit of being transparent,” they said. Gerbs and Allnut stressed that the overall relationship between the Dayton Amateur Radio Association and Greene County remains excellent and the Hamvention will continue to be held at the fairgrounds in Xenia. They cited improvements made for the 2018 show and promised more for 2019. However, a new commercial exhibits building will not be among them.

The 2019 Dayton Hamvention is scheduled for May 17-19.

Two Firsts for Amateur Satellites

Two Chinese satellites carrying amateur radio transmitters were launched toward the moon in May, and have now been designated as Lunar-OSCAR 93 and 94. LO-93’s signals were lost the day after it began transmitting, but the AMSAT News Service says LO-94 successfully achieved lunar orbit and has been sending back telemetry and SSDV (slow-scan digital video) signals, which have been received so far by more than 40 hams around the world. It is the first amateur satellite in lunar orbit.

Awaiting launch later this year is Es’hail-2, a geostationary commercial broadcasting satellite that will also carry two amateur radio transponders. If it is successfully orbited and becomes operational, it will be the first amateur satellite in geostationary orbit, which means it will always appear to be in the same position in the sky. According to the AMSAT News Service, Es’hail-2 — also known as Phase 4A — will orbit above 26° East latitude, providing a “footprint” stretching from Brazil to Thailand. It will have amateur transponders on the 2400-MHz and 10-GHz bands.

Space Station’s Packet System Back on the Air

The packet radio system aboard the International Space Station, which failed last year after 17 years of service, spontaneously returned to the air in August, and was immediately put to use by hams on the ground. According to the ARRL, it brought back memories of OSCAR-7, which mysteriously came back on the air several years ago after being QRT for more than a decade. Meanwhile, a duplicate of the original packet module is scheduled to be flown to the ISS later this month, and the AMSAT News Service says a newly-designed “Interoperable Radio System” — with packet and other capabilities — is expected to be sent up to orbit early next year.

Milestones: MARS Members Recognized by President, Ham Advances Cloaking Technology, W3XO and TA3D are Silent Keys

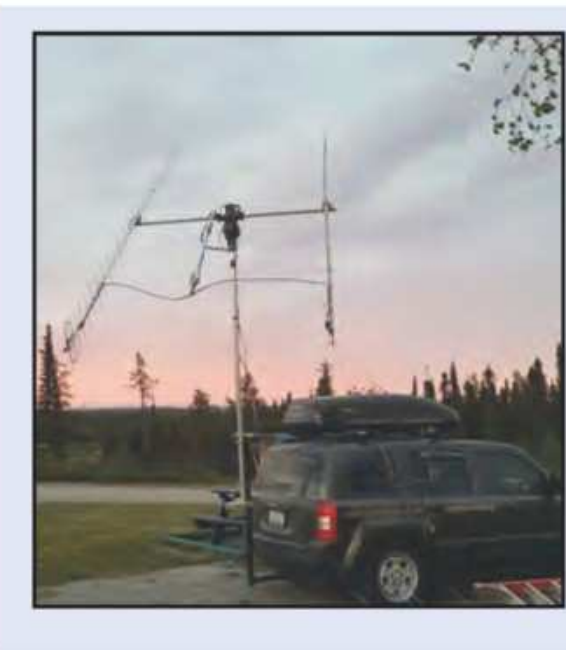
Five Army MARS (Military Auxiliary Radio System) members are being recognized by the President for more than 4,000 hours each of volunteer service. The ARRL says two of these Lifetime Achievement Awards have already been presented — to Bill Sexton, N1IN/AAR1FP, and Dave Popkin, W2CC/AAR2BU — while three more await formal presenta-

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86 COVER: VHF PLUS

Spring Sprints, Central States VHF Conference, and a Canadian GridXpedition

By Tony Emanuele, K8ZR

Peter Prabucki, VA3ELE, of Mississauga, Ontario, activated more than two dozen Canadian grids – many of them rare – during a 2800-mile roundtrip expedition last summer. He made terrestrial and moonbounce contacts on 144 and 432 MHz and had "a mini pile up off the moon." (Cover photo by Peter Prabucki, VA3ELE)



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EMCOMM SPECIAL:

Ham radio is a lot of fun most of the time, however, when disaster strikes and all else fails, ham radio is the only way to get through. This month, CQ reports how hams prepare and answer the call to serve their communities' in its time of need. **See pages: 12, 18, 23, 28, 30, 34, 52, 61, 62, 68, and 70!**

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AR-DV1

Multi-mode Digital Voice Receiver

It's the **FIRST** multi-mode digital voice receiver to receive and decode virtually **ALL** popular digital modes including: **MOTOTRBO™, DMR, dPMR™, APCO P25, NXDN™, Icom D-Star™, Digital CR, Yaesu, Kenwood®, and Alinco EJ-47U** as well as conventional analog signals.

With this breakthrough development, AOR offers the monitoring community a powerful new tool that receives multiple digital formats in addition to traditional analog operations in a compact receiver built for high sensitivity and selectivity.



The AR-DV1 can be used with or without a computer. It features:

- wide band coverage from 100kHz to 1300MHz*
- computer control for easier programming and monitoring operation
- a micro USB computer interface
- built-in SD/SDHC card reader for audio recording
- higher 1st IF frequency 1705 MHz provides higher image rejections
- CSV memory data capability for frequency uploads/ downloads and firmware updates
- 2000 memory channels (50 channels X 40 banks)
- alpha-numeric channel labels
- offset reception and priority channel selection
- auto-notch filter
- noise reduction
- voice inverter
- discriminator output

Available in a professional version or in a U.S.A. consumer version, in addition to its multiple digital mode capabilities, the AR-DV1 also receives analog modes including AM, wide and narrow FM, upper and lower sideband and CW.*

Giving monitoring operators the ability to receive a wide variety of digital and analog frequencies, the AR-DV1 can be used by military, federal, state and local law enforcement agencies, emergency managers, diplomatic services, news-gathering operations, and home monitoring enthusiasts in areas where government, law enforcement, amateur radio operators and public safety agencies use different digital formats.



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ZERO BIAS: A CQ Editorial

BY RICH MOSESON,* W2VU

“This is Their Ham Radio” – K9EID

“**W**hat draws kids to ham radio today?” I was asked by a reader at the Huntsville Hamfest in August. “After all, they’ve got their smartphones and the internet.” I don’t remember my exact reply, but I’ve given it more thought since I’ve gotten home, especially in light of events later that same day. In retrospect, my response should have been, “maybe the fact that it *isn’t* a smartphone or the internet. It’s a challenge, just as it always has been, and kids love a challenge.” Smartphones and the internet offer many things, but challenges are not high on that list. Another part of the answer is, in some cases, “the same as it’s always been — DX and contesting.”

This was reinforced in several ways at Huntsville, where CQ joined in the presentation of the 2018 Bill Pasternak, WA6ITF, Memorial Newline Young Ham of the Year Award (YHOTY) to 14-year-old Bryant Rascoll, KG5HVO (CQ has been a co-sponsor of this award since its earliest days). It started at the YHOTY ceremony itself, where past recipients have tended to be pretty much alone as young people in a sea of older hams. Perhaps a friend or former YHOTY recipient was there as well. Not this year. This year, it seemed there were amazing young hams everywhere!

The ceremony started more locally, with Warren Whitby, W4RRN, being presented with the 2018 Alabama Outstanding Youth Ham Award. That presentation was made by Kaitlyn Cole, KS3P, the 2011 Newline Young Ham of the Year and, until very recently, ARRL Alabama Section Youth Coordinator. Kaitlyn has begun college this fall and passed the section youth coordinator hat to her assistant ... 2018 YHOTY Bryant Rascoll, KG5HVO! Also at the ceremony was Bryant’s good friend and fellow outstanding young amateur Christopher Brault, KD8YVJ. The two of them met last year as participants in the Dave Kalter Memorial Youth DX Adventure program in Costa Rica. Bryant was also one of three young hams among the competitors at last summer’s World Radiosport Team Championship (WRTC 2018) in Germany.

In the audience for the YHOTY ceremony was equally-amazing young ham Faith Hannah Lea, AE4FH, along with her parents and three siblings, all of whom are hams. She and her dad, James, WX4TV, were barely off the plane from South Africa, where Faith Hannah represented IARU Region 2 (North and South America) at the annual Youth on the Air (YOTA) camp program.

At the YHOTY presentation, I made the somewhat counter-intuitive comment to Bryant that one of the greatest things about this year’s event was that he was *not* unique, but rather that we were surrounded by outstanding young hams.

So back to our earlier question ... what draws young people to ham radio today? Here are a couple of examples: On Saturday night, most of downtown Huntsville — including the hamfest hotel — was hit with a power outage (reportedly courtesy of a squirrel that managed to fry itself and take out a transformer, which caused a cascade of additional breakers to trip). Bryant and Chris found a quiet corner of the hotel lobby (which had generator power) to plug in their laptops and connect via an internet hotspot to a remote station to operate in the summer SSB weekend of the North American QSO Party! Bob Heil, K9EID (Heil Sound is another YHOTY corporate sponsor, along with CQ, Yaesu, and RadioWavz), who snapped the photo that we’re borrowing here, watched how much fun they were having and



Newsline Young Ham of the Year Bryant Rascoll, KG5HVO (L), and friend Chris Brault, KD8YVJ, operate a contest remotely from the hotel lobby in Huntsville during a power blackout. (Photo by Bob Heil, K9EID)

commented that “this is *their* ham radio. It’s not your grandfather’s ham radio, or your father’s. It’s theirs.”

Earlier in the day, Faith Hannah’s dad was telling me about the YOTA camp and related a story of the group being introduced to slow-scan TV and one of the campers asking what it could be used for. One example given was chess-by-radio, with moves photographed and sent to a fellow player via SSTV. Another participant suggested a different way to do that — substitute each chess move (e.g. q3r5) for the grid square (e.g., FN30) in FT8 data and transmit the moves via this quickly growing digital mode. He also volunteered to write the code when he got home to send the data to a chessboard on a computer screen and automatically show each move! *This is their ham radio!*

Each generation of hams has customized the hobby to take advantage of advances in technology. The first generation’s ham radio was spark. The second generation’s was CW and AM phone. Next came SSB and FM repeaters, followed by the generation that first connected computers to ham gear to communicate via packet radio. The next generational group began integrating the internet into our hobby, and today’s young hams are using FT8 to play chess by radio and contesting in the dark from a hotel lobby via remote links. This is *their* ham radio, and they are our future. Our hobby is in good hands.

EmComm Special

This issue is our annual Emergency Communications Special. As always, we’ve got a stack of great articles on different ways in which hams are helping their communities, along with projects to help ensure your EmComm equipment is as reliable and flexible as possible. We encourage you to read everything and see how the experiences of others can be applied to your station and your skills.

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

– 73, Rich W2VU



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1.4dB @ 50MHz	1.5kW	73%
2.4dB @ 150MHz	.83kW	57.1%
4.5dB @ 450MHz	.45kW	35.8%

Part #	Length/Ft
2213A-PL-3	3
2213A-PL-25	25
2213A-PL-50	50
2213A-PL-75	75
2213A-PL-100	100
2213A-PL-150	150



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235-5X-10	10
235-5X-5	5
235-5X-3	3



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233/2-4X-12	12
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233/2-4X-3	3
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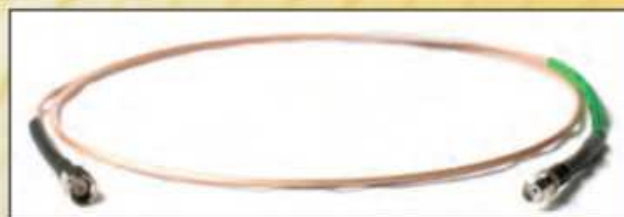
Part#	Length/Ft
233/2-G4-10	10
233/2-G4-5	5
233/2-G4-3	3
233/2-G4-1.5	1.5



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0.9dB @ 10MHz	2.16kW	80%
1.6dB @ 30MHz	1.24kW	69%
2.1dB @ 50MHz	0.96kW	62%
3.6dB @ 150MHz	0.55kW	43.5%
6.3dB @ 450MHz	0.31kW	23.2%

Part #	Length/Ft
218XA-PL-1.5	1.5
218XA-PL-3	3
218XA-PL-6	6
218XA-PL-9	9
218XA-PL-12	12
218XA-PL-18	18
218XA-PL-30	30
218XA-PL-40	40
218XA-PL-50	50
218XA-PL-75	75
218XA-PL-100	100
218XA-PL-125	125
218XA-PL-150	150
218XA-PL-200	200



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Part#	Description	Length/Ft
23316-NM-3	N Male Both ends	3
23316-NM-6	N Male Both Ends	6
23316-SM-SF-3	SMA Male-SMA Female	3
23316-SM-SF-6	SMA Male-SMA Female	6
23316-SM-SF-9	SMA Male-SMA Female	9
23316-SM-SF-12	SMA Male-SMA Female	12
23316-SM-SF-15	SMA Male-SMA Female	15
23316-SM-3	SMA Male Both Ends	3
23316-SM-6	SMA Male Both Ends	6
23316-SM-PL-3	SMA Male-PL259	3
23316-SM-PL-6	SMA Male-PL259	6
23316-SM-SO-3	SMA Male-SO239	3
23316-SM-SO-6	SMA Male-SO239	6



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1.1dB @ 50MHz	2.14kW	78.5%
1.8dB @ 150MHz	1.22kW	65.4%
3.3dB @ 450MHz	0.69kW	47.3%

Part #	Length/Ft
25400F-PL-1.5	1.5
25400F-PL-3	3
25400F-PL-6	6
25400F-PL-12	12
25400F-PL-18	18
25400F-PL-35	35
25400F-PL-50	50
25400F-PL-75	75
25400F-PL-100	100
25400F-PL-150	150



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Attenuation per 100ft	Power Rating	Efficiency%
0.8dB @ 30MHz	2.77kW	83.0%
1.1dB @ 50MHz	2.14kW	78.5%
1.8dB @ 150MHz	1.22kW	65.4%
3.3dB @ 450MHz	0.69kW	47.3%

Part #	Length/Ft
25400F-NM-3	3
25400F-NM-6	6
25400F-NM-12	12
25400F-NM-18	18
25400F-NM-25	25
25400F-NM-35	35
25400F-NM-50	50
25400F-NM-75	75
25400F-NM-100	100
25400F-NM-150	150

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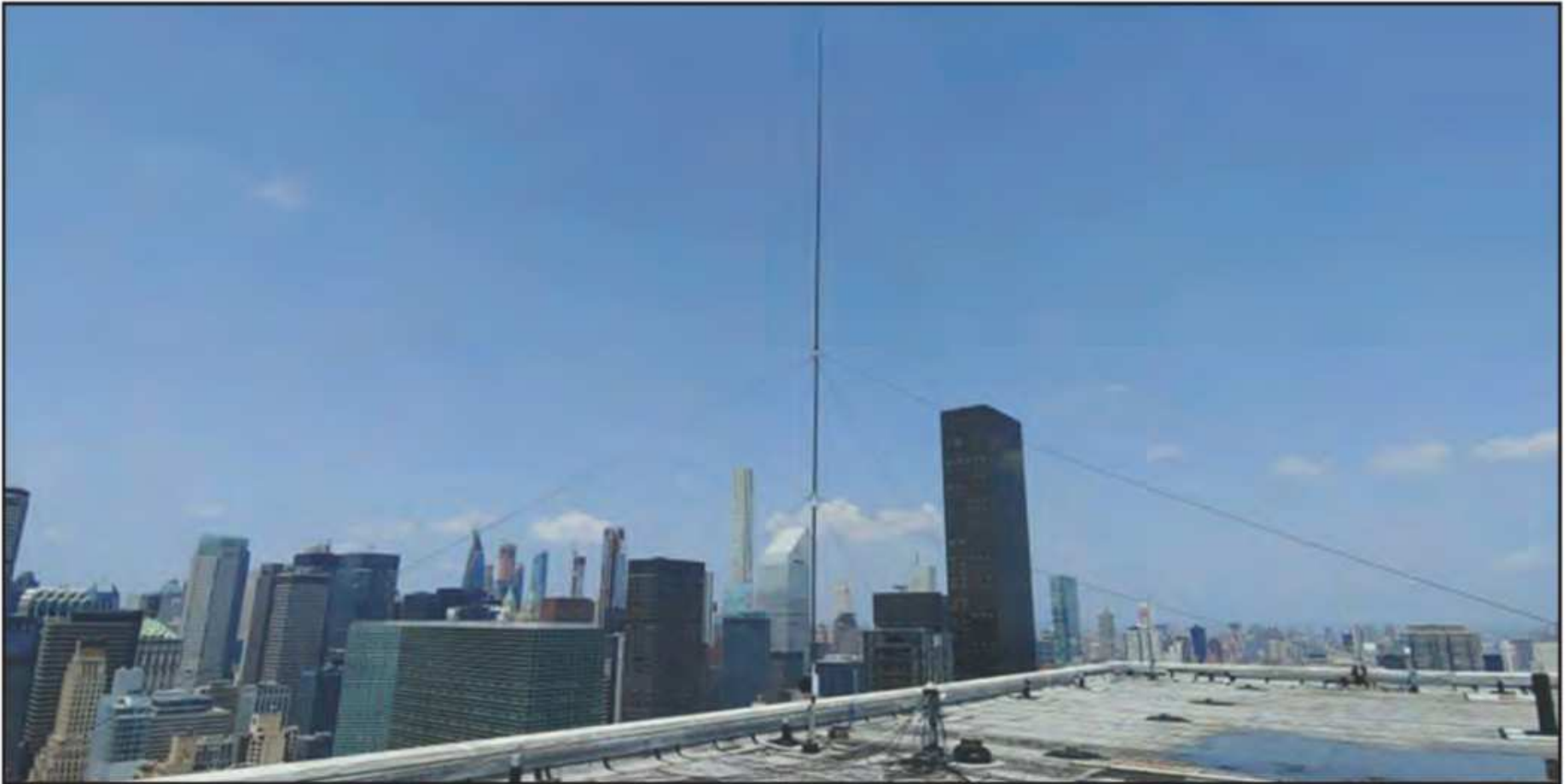
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NEWS BYTES



The newly-installed SteppIR BigIR vertical antenna atop the United Nations Secretariat building in New York City. At press time, arrangements for getting station 4U1UN back on the air were still being finalized. (Photo from 4U1UN Facebook page)

The Return of 4U1UN

United Nations headquarters amateur radio station 4U1UN may be back on the air by the time you read this. United Nations Staff Recreation Council Amateur Radio Club President James Sarte, K2QI, reported on the club's Facebook page in August that "we're one step closer to being back on the air," with the installation of a SteppIR "BigIR" vertical antenna on the roof of the UN Secretariat building in New York City (see photo). 4U1UN has been off the air for several years as a result of major renovations at the Secretariat and tightened security following the 9/11 terrorist attacks.

Sarte said that he, along with Dmitri Zhikharev, RA9USU, and Adrian Ciuperca, KO8SCA, have been working with the UN administration to secure space for a new station and that Dima and other hams have been able to arrange equipment donations. The new station, he says, will include a rack-mounted Elecraft K3 transceiver, along with another K3 to act as a remote head, plus an Acom 2000 linear amplifier, associated network control hardware and the aforementioned SteppIR vertical. At press time, there was no firm date for getting the station back on the air, but Sarte was confident that it would be quite soon.

KA6LMS Back on the Air

"Last Man Standing" is back on the air on Fox (after being canceled by ABC), and the on-set ham station, KA6LMS, is back on the air as well. The comedy features Tim Allen, KK6OTD, as outdoors store manager Mike Baxter, KAØXTT. Ham radio has played a role in several episodes over the program's first six seasons, and the on-set station is used between taping sessions by licensed crew members as well as invited guest

operators. "Last Man Standing" is produced by John Amodeo, AA6JA.

The FCC's Novel Justification for Shutting Down an FM Pirate

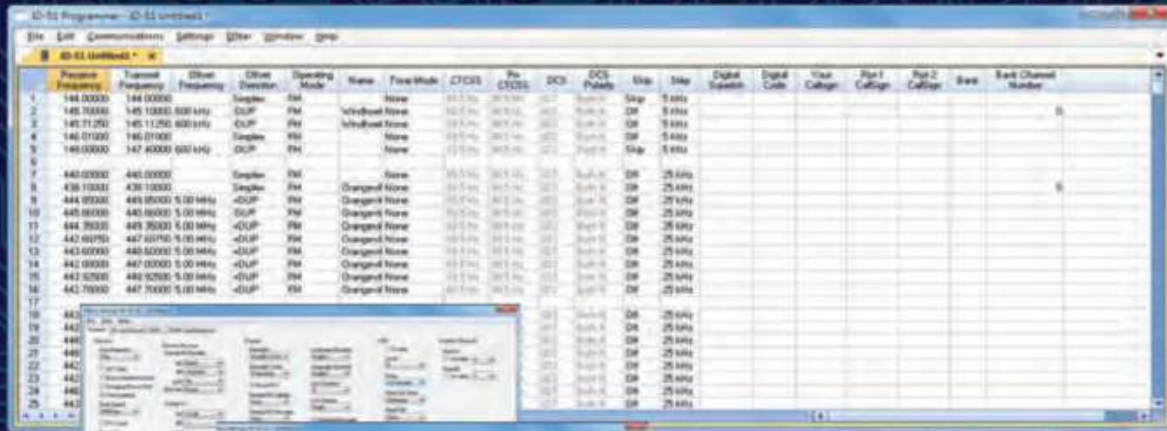
The FCC has been engaged recently in a major crackdown on unlicensed ("pirate") stations, but apparently only on the FM broadcast band. Now, the Commission has a novel new justification for these enforcement actions. In a



Actress Molly Ephraim, who plays Mike Baxter's daughter Mandy – KFØXIE – on the sitcom "Last Man Standing," relaxing at her "dad's" ham station on the program's set. (Photo courtesy John Amodeo/Last Man Standing)



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Forfeiture Order issued in early August assessing a \$15,000 fine for unlicensed broadcasting by a man in Van Nuys, California, Enforcement Bureau Regional Director Lark Hadley wrote that "Commission action in this area is essential because unlicensed radio stations do not broadcast Emergency Alert Service (EAS) messages, and so create a public safety hazard for their listeners."

Editorial comment: Seriously? A public safety hazard? Give us a break! There are so many legitimate reasons for shutting down an unlicensed broadcaster, including "interference to licensed communications and undermin(ing) the Commission's authority over FM broadcast radio operations" that are also cited in the letter that one has to wonder why the FCC felt the need to create this real stretch as its primary reason for acting.

The Mystery of STEVE

If you live in Canada or the far northern U.S., there's a chance you might have seen STEVE in the night sky. An acronym for *Strong Thermal Emission Velocity Enhancement*, SpaceWeather.com reports that STEVE is a ribbon of purple light that often appears alongside auroras during geomagnetic storms, but apparently is *not* a type of aurora itself. Researchers at the University of Calgary who study the precipitation of energized space particles into Earth's upper atmosphere that causes aurora recently compared data from a satellite that measures these particles with visual observations of STEVE directly beneath its orbital path in March 2008. They found no "rain" at all. "Our results verify that this STEVE event is clearly distinct from the aurora borealis since it is characterized by the absence of particle precipitation,"

the researchers noted in their paper published in August's issue of *Geophysical Research Letters*. "Interestingly," they added, "its skyglow could be generated by a new and fundamentally different mechanism in Earth's ionosphere."

VHF weak-signal enthusiasts: Have you or anyone you know ever tried bouncing radio signals off of STEVE? Did they sound the same as AU signals (which are characterized by rapid fading and the loss of tone on CW signals) or did they have different characteristics? If you've worked "STEVEbounce" or do so in the future, please let our VHF-Plus editor know what you learn.

Drones in Emergency and Disaster Assessment

A growing number of municipal governments are using drones to capture video of accident and disaster scenes in hard-to-reach places, or to allow emergency managers to make decisions about resource deployment without physically being at the scene of an emergency. The online "GovTech" newsletter reported in August that a city in North Carolina is using a \$10,000 grant to test a live-streaming app to transmit video from an accident or fire scene via a high-speed internet link, and that the FAA has a pilot program in place to make it easier for municipalities to experiment with unmanned aerial systems (the technical term for drones) for a variety of purposes.

Ham groups can also make use of drones under Part 97 rules, without the need for an internet connection. Are you connected with a ham group that's using drones as part of its emergency communications toolkit? If so, we'd like to hear from you about what your group is doing and how you're integrating it with your local emergency management agency.



Photo A. This Penobscot Bay, Maine, firehouse is home to a pilot Neighborhood HamWatch program organized between the Pen Bay Amateur Radio Club and the local volunteer fire department. See sidebar, "RRI Launches Pilot HamWatch at Penobscot Bay," for details. (Photo courtesy Pen Bay ARC)

Emergency Communications Special

Neighbors helping neighbors is a cherished American tradition. Radio Relay International is organizing a program by which local ham clubs can not only provide direct communications assistance in an emergency but also serve as organizers and trainers for broader community communication networks.

Neighbors Helping Neighbors – Ham Style

Radio Clubs in Service to the Community

BY JOSEPH AMES,* W3JY

Local amateur radio clubs are well positioned to organize their hometowns against disasters that disrupt or destroy normal lines of communication.

Club members share much more than a common interest in amateur radio. The club's presence itself demonstrates a

degree of organizational competence in the areas of governance, finance, and internal communication. Most clubs also engage in recruitment, event planning, teaching, and community service. Members are drawn from the community and represent its many facets with vested interests and reciprocal goodwill.

At the same time, public awareness of two-way radio's utility, and the inexpensive peace-of-mind it provides, is heightened after the telecommunications infrastructure has been

* National Chairman, Radio Relay International
Email: <joseph.ames@radio-relay.org>



RRI National Communication Strategy

- Information is structured by the radiogram format for accurate, accountable, intermodal messaging.
- Amateur radio clubs publicize, train and manage the plan for their communities.
- Civic groups include neighborhood watch, CERT, scout troops, churches, etc.
- NCERT is the RRI National Communications Emergency Response Team concept.

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Figure 1. RRI's National Communication Strategy plan.

flattened spectacularly and repeatedly in the years since Hurricane Katrina.

Radio Relay International calls on our nation's radio clubs to organize and train their communities, using their considerable expertise to lead in the structured, purposeful, use of radio as a means of "neighbors helping neighbors" in keeping with the best of American tradition.

The National Communication Strategy

Based on our operators' experience as hams and traffic handlers, parents, homeowners, neighbors, and sometimes as duly appointed authorities, Radio Relay International developed the National Communication Strategy as a roadmap to organizing neighborhoods and towns using the Personal Radio Services, such as the Family Radio Service (FRS) and General Mobile Radio Service (GMRS). See Figure 1.

We saw no need to reinvent the wheel, so to speak. We drew together the best existing initiatives developed in recent years. We modernized long-standing programs to meet contemporary needs. We've met and talked with dozens of emergency managers, government officials, community and civic groups, and perhaps scores of radio club members and officers. We polled our own operators and members of our affiliated radio nets. We stood up working communication plans and tested them in exercises and drills as well as routine operations. More than that, we participated in recent communication disasters, relaying thousands of welfare mes-

sages and requests for materiel, while "reading the mail" on thousands more. We spoke with veteran operators from those disasters and heard what worked and what didn't work and we learned a lot.

One overarching scenario was obvious, even before a formal analysis: There is a pressing, critical need for *local* communication between neighbors and neighborhoods. The implication of this scenario was equally obvious. Such capability must be in place and ready before a disaster or its value is diminished.

The Inter Area Traffic Net and the Digital Traffic Network

The Inter Area Traffic Net follows in the tradition of ironman CW ops and dedicated traffic skeds but moreso. This past summer, our IATN ops established regular skeds with counterparts in Australia and Germany. RRI already has regular contact with both countries thanks to our Digital Traffic Network, an HF Pactor backbone system that grew out of the original APLINK network. DTN today boasts area and regional hubs covering all of the continental U.S. and Alaska. Many hubs offer Winlink RMS connectivity as an added service. Learn more about both at <www.radio-relay.org/IATN> and <www.radio-relay.org/DTN>. (As of presstime, the link was password protected).



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RRI subtly revised the traditional radiogram form by adding space for a proper signature line while removing word count limitations. Long requested by EmComm volunteers, we introduced a special ICS-213 radiogram that is fully compliant with FEMA's published specifications.

See the new RRI radiogram forms and more at <https://tinyurl.com/yaq6bg6x>.

A second conclusion was less obvious but equally important. While government at all levels invested heavily in robust, interoperable communication technology after Hurricane Katrina, ordinary Americans are perhaps more vulnerable than ever to communication blackout. This is attributable to functional economic dependence on the internet, accessed largely by battery-powered wireless technology, and government's primary focus on the continuity of government itself. The traditional preparedness benchmark of 72 hours of self-sufficiency is as valid today as it was in 1968, yet the American economy has transformed almost completely to "just in time" inventory management, a trend adopted by the American consumer.

At the same time, America enjoys a surfeit of food and packaged consumer goods to ease the suffering of disaster victims. As demonstrated too often, needed materiel sits spoiling in a warehouse and willing volunteers wait for deployment orders until they receive sufficiently accurate information to justify mobilization. This is almost completely attributable to communication difficulties. Dependence on high technology is an inherent system fragility unlikely to be resolved in the foreseeable future.

Under these conditions, responsible people have no choice but to provide their own means of communication independent of the internet, the public switched telephone network, and commercial electric power for at least the first 72 hours of an emergency or disaster, long established as the bare minimum time for outside help to arrive. As we know, it may in fact take weeks for help to arrive. During that period, we are on our own.

Neighbors Helping Neighbors with the Personal Radio Services

RRI believes our radio clubs can help bridge those 72 hours using common-sense, practical programs we've gathered into our national communication strategy.

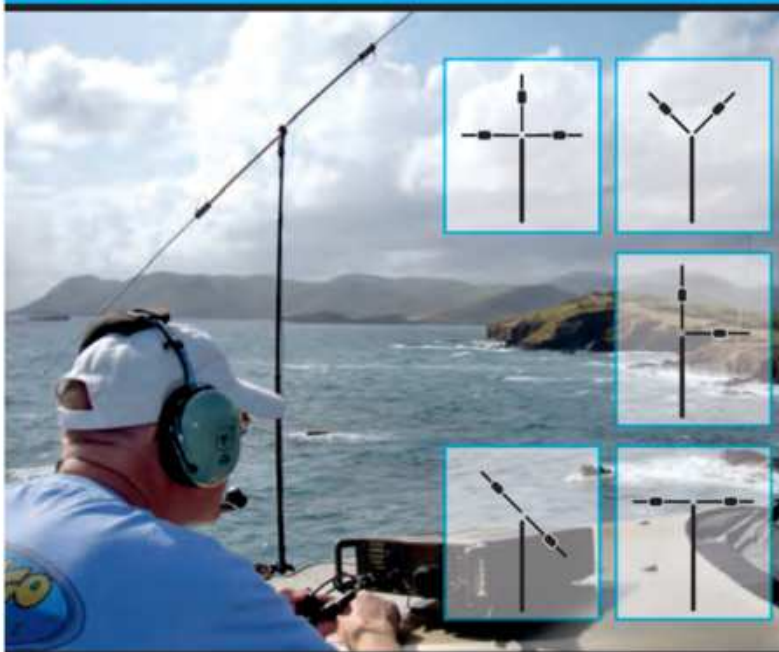
Three program levels offer increasing capability at the cost of increasing complexity. Existing programs, well-designed and compatible over a variety of circumstances, are recommended as templates for local efforts to be modified as desired, so long as interoperability is maintained between levels and systems. RRI's training department has a grow-



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ing library of material to assist compatibility and interoperability hosted at <<https://tinyurl.com/yaq6bg6x>>.

Level 1: The Neighborhood

As the neighborhood is the basic unit of community, it is the first level of our strategy. Created in 2005 by Eric Knight, KB1EHE, a well-known philanthropist and entrepreneur, the proven, simple, life-saving “National SOS Radio Network” program (NSRN) was acquired by RRI in 2017 as the foundation of our public service and outreach effort.

As its name implies, NSRN saves lives by maintaining a standing watch on FRS channel 1, listening for distress calls within radio range. FRS/GMRS walkie-talkies are inexpensive and common, making NSRN available anywhere in the country.

A radio club's involvement in NSRN is two-fold, organizing a duty roster of monitoring stations and promoting the public's awareness of the program. A club member assigned watch duty needs only to couple an old scanner to an outdoor television antenna for a very satisfactory listening post. Distributing a simple flyer and giving short presentations to local service, outdoors, and youth organizations will quickly spread the word. In our experience, one or two members of your audience will be very interested in the program and its possibilities. This enthusiasm, seen all across America, accounts for the success of the National SOS Radio Network. They are its core.

RRI publishes professionally-designed fliers and studio-produced “Disaster Information” PSA files at the program's website, <www.NationalSOS.com>. A second radio spot, currently in production, will generate even more public awareness of the program.

Level 1 success factors: A fully-staffed, standing radio watch; continual public promotion; oversight, and training of participants.

Level 1a: Neighborhood Radio Watch

A more sophisticated implementation of FRS/GMRS communication is the “Neighborhood Radio Watch” concept. This plan was fully developed and given to the American public by Eric Forsman, KCØLWV, in his 2002 white paper, “Family & Neighborhood Emergency Communications.” A print version of the web original is published by RRI. (Forsman became a Silent Key earlier this year.) It introduces the use of discrete radio nets matched to specific functions. It emphasizes the desirability of an active radio amateur in each group. RRI highly encourages active organizational oversight for the initiative to succeed. Church groups, municipalities, fire companies, existing neighborhood watch units, even Scout troops, are ideal sponsors under the guidance of their local radio club.

At this program level, clubs typically train sponsoring organizations in the practical use of two-way radio and provide mentorship as required. Even better is the active participation of one or more club members. Care must be taken to limit the scope of training to the FRS/GMRS domain lest participants be overwhelmed and withdraw; KISS has never been more applicable.

Our experience is that a morning of classroom training followed by an afternoon in the field works well for a program kickoff. FEMA's “CERT Emergency Communications” participant training manual is the recommended textbook. RRI's publication library contains the CERT publications and other workbooks, handouts, and presentations useful for this purpose.



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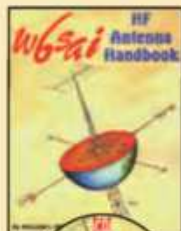
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Level 1a success factors: An enthusiastic community sponsor, hands-on training and guidance, direct membership participation, and a continual public awareness campaigning.

Level 2: Links to Ham Radio Nets and EmComm Professionals

Amateur radio clubs are direct participants in the "Neighborhood HamWatch" program. With the blessing of founder Andy Gausz, KG4QCD, RRI formally adopted his 2010 program to provide an operational framework providing direct links between FRS/GMRS units and amateur radio's established radio networks.

NHW features a promoted neighborhood presence through the use of professionally-designed window signs, informative flyers, and wallet cards. A key benefit to the community is direct interface with local authorities. With such capability, the program's scope may expand to encompass routine emergencies such as lost children, automobile accidents and other scenarios one might reasonably expect without advance warning.

Many radio clubs already have working relationships with municipal emergency departments and other radio clubs in the region, a primary service. Another traditional role is club station's ability to link with the global HF traffic network including RRI's nets. Most importantly, a club's organizational savvy is necessary to supply the operators, equipment, and discipline for orderly and efficient communication out of and into a disaster zone in their vicinity.

A Neighborhood HamWatch team is an obvious portal to the outside world should disaster befall a community. Demonstrated in the recent Caribbean catastrophe, technical proficiency in formal traffic handling and field operation cannot be acquired in the moment. Competence must be built and practiced continually against emergency mobilization. Having said that, enthusiasm should be modulated to realistic levels during, we earnestly hope, long uneventful years of peace and tranquility, lest burnout undo years of hard work.

Level 2 success factors: Organizational excellence, sustained public relations, training expertise, and operational traffic-handling proficiency including the universal radiogram.

Level 3: The Global Messaging Layer

RRI represents and coordinates traditional HF traffic nets operating in the state, region, and area domains. Amateur radio's "global messaging layer" also includes the high-performance CW-based Inter Area Traffic Net and the Digital Traffic Network's HF Pactor backbone with established, reliable links to Canada, Europe, and Oceania (see sidebar, "The Inter Area Traffic Net and the Digital Traffic Network").

For this layer to function, strict adherence to standards and protocol is mandatory. The benefits realized in traffic control/routing, delivery tracking, network load balancing, error correction, reply origination, and volunteer management far outweigh typical objections to the diligent use of the proven, fully interoperable, universal radiogram (see sidebar, "The Universal Radiogram Format").

RRI Launches Pilot HamWatch at Penobscot Bay

The Pen Bay ARC launched a pilot Neighborhood HamWatch program in Knox County, Maine, covering the area between St. George and Owl's Head. Three members are spearheading the rollout, including RRI's Steve Hanson, KB1TCE. The team has made good progress securing cooperation with local authorities including a fire company (see *Photo A*) that has agreed to stand 24-hour watch on FRS 1, the National SOS Radio Network's emergency channel.

As a seaside community subject to the full force of New England's fearsome Nor'easters, the National Weather Service relies on citizen weather reports delivered by telephone and the internet. However, these often fall victim to severe storms. "One thing we noticed during last October's windstorm is that, as soon as power and communications go down, the observations cease as well," notes NWS meteorologist Margaret Curtis. "This is exactly the scenario your [pilot] is working to improve."

St. George resident Amy Dyer is the town's ambulance director. She sees an immediate benefit to NHW. "When the phones go out, we have to drive around the community to make our wellness check-ins. Using FRS radio will save time and provide critical information in bad weather."

The pilot is documented at <www.ballyhac.com>.



Level 3 success factors: Dedication to formal traffic handling, robust station equipment, “Can Do!” attitude, commitment to mission success.

Benefits to a Sponsoring Club

With images of total catastrophe fresh in the public’s mind, there has never been a better time for clubs to promote two-way radio as a basic preparedness capability. Yet there are also direct benefits to be had from a well-designed and persistent publicity campaign.

One obvious benefit is increased public awareness of the value of two-way radio. Pilot programs prove pent up demand for two-way radio (see sidebar, “RRI Launches Pilot Ham-Watch at Penobscot Bay”). This is a radio club’s natural constituency and should be cultivated. Regardless of a specific interest in amateur radio, an informed citizenry’s good opinion of ham radio and its licensed operators is necessary.

Among those individuals and groups adopting two-way radio, a certain number will take interest in radio for its own sake. These are natural hams even if they don’t realize it at first. Such people are likely membership recruits and candidates for training classes, licensing exam sessions, field operations, and more.

Political influence is an important consideration for all hams. Developing cordial relationships with elected officials and appointed bureaucrats requires consistent effort over many years. Sponsoring a respectable community service lessens the worry and pressure on local authorities. Not only are you doing a good turn, you’re making friends with the people who will decide amateur radio’s future in your locale.

As the communication link between civic-minded groups, a club might go far in building a better community, serving as a hub for like-minded citizens, an explicit goal of the Neighborhood

REACT Links Up With RRI

REACT (Radio Emergency Associated Citizen Teams) units train for radiogram handling proficiency with Zello, the popular smartphone app. When leaders decided to build a “grid down” capability, REACT linked up with RRI for its long-haul traffic know-how. So far, we’ve held three joint training exercises with more in the pipeline. All ops enjoyed working the nets while proving the value of the interoperable radiogram. Learn more at <<https://tinyurl.com/ybpa55sn>>.

HamWatch program. Ideas are validated by their acceptance by others. Imagine a scoutmaster, on learning that his volunteer firefighter neighbor trained the neighborhood watch in the use of walkie-talkies, mentions it to a troop father who in turn is interested in using radio for his church’s men’s group. The scoutmaster remembers the radio components of the signaling and radio merit badges, which fit perfectly with the troop’s emergency preparedness training.

Three distinct groups come together to train and exercise, one designed specifically for young people of the sort that filled the ranks of ham radio in earlier times. With a newfound sense of mission, and the backing of a few community institutions, they will learn and use the radio arts in their training. Other youth groups will follow suit.

Implementing a Neighborhood Radio Watch

Implementing a Neighborhood Radio Watch is straightforward but requires clear thinking and a long-term view. It’s important to think in terms of phases or stages that are individually attainable.

Establishing the neighborhood watch committee is the first order of business, no matter what else might be contemplated. There are many ways to bring two-way radio to a town and existing programs might be confused without a carefully selected objective. It’s important to remember the motivation is to support “neighbors helping neighbors.” Care must be taken to avoid mistakes such as gatekeeping and credentialism when mentoring and expertise comprise our most valuable service.

A club’s experience determines how a program will develop but it’s important that it fit well with the club’s personality and the personality of the larger community. Chatting up the concept with potential partner organizations is not only a good source of “buzz” for a club, but also a great way to present the idea of two-way neighborhood radio in a digestible way, allowing plenty of time for laymen to absorb and process what is a technical proposition. You may be pleasantly surprised by what you learn.

We believe our National Communication Strategy answers a genuine need in our society. We believe the American tradition of neighbor helping neighbor is worthy of support. We believe our clubs have untapped talent and expertise that will directly benefit our communities. We believe clubs will find satisfaction and purpose through such service. We know amateur radio will play a part in making it all happen.

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WB2REM and K5PA expand on their 2017 article about connecting a wireless headset to your ham gear with a new base unit that adds to your flexibility and — importantly for emergency communicators — can bring back the phone patch for connecting people in disaster areas with relatives outside the affected region.

Beyond Untethered ...

Operating Your Station, Cell Phone, and Remote Simultaneously with a Wireless Headset

BY JIM MILLNER,* WB2REM AND GENE HINKLE,# K5PA

In our article published in the September 2017 issue of *CQ Amateur Radio* entitled “Go Untethered! Operate Your Station with a Wireless Headset,” we described the use of the Plantronics CS520 wireless headset with your radio setup. The headset allowed the operator to free themselves from the constraints of a headset cable and to operate their radio wirelessly from anywhere in or around the house. This gave the user an approximately 350-foot range of operation with the ability to mute the microphone when necessary and to transmit via VOX or PTT control.

The 2017 *CQ* article¹ described how to modify the cabling to work with most current amateur radio equipment. Since publishing “Go Untethered,” we have been contacted by a large number of hams who have completed the project and are enjoying the excellent audio capabilities of the Plantronics CS520 headset for amateur radio.

As an update to the article listed above, the authors have located, tested, and are now using an even more impressive wireless headset base unit with the Plantronics CS520 headset (*Photo A*). We have deployed the base unit/cradle of the Plantronics Savi W720 (Plantronics p/n WO2). The WO2 base unit uses the exact same headset as with the CS520 described in our original article. The WO2 base/cradle can be found on the used market, such as eBay, for as little as \$30, as well as new on the Plantronics website.

The WO2 base adds increased functionality to the previous CS520 setup. Therefore, anyone who previously completed the CS520 project can now use the same wiring connections to their equipment by just swapping out the Plantronics CS520 base with the WO2 base. For new adopters of this technology, the Plantronics W720 can be purchased from outlets such as eBay or Amazon, and it includes the headset, base, and power supply. Our website provides a lot of source information and model numbers to help you make the appropriate selections based on your needs.



Photo A. The Plantronics Savi W720 wireless headset with WO2 base unit providing multiple connects to a local radio, cell phone, and remote radios. (All illustrations courtesy of the authors)

** <wb2rem@verizon.net>
<k5pa@arrl.net>

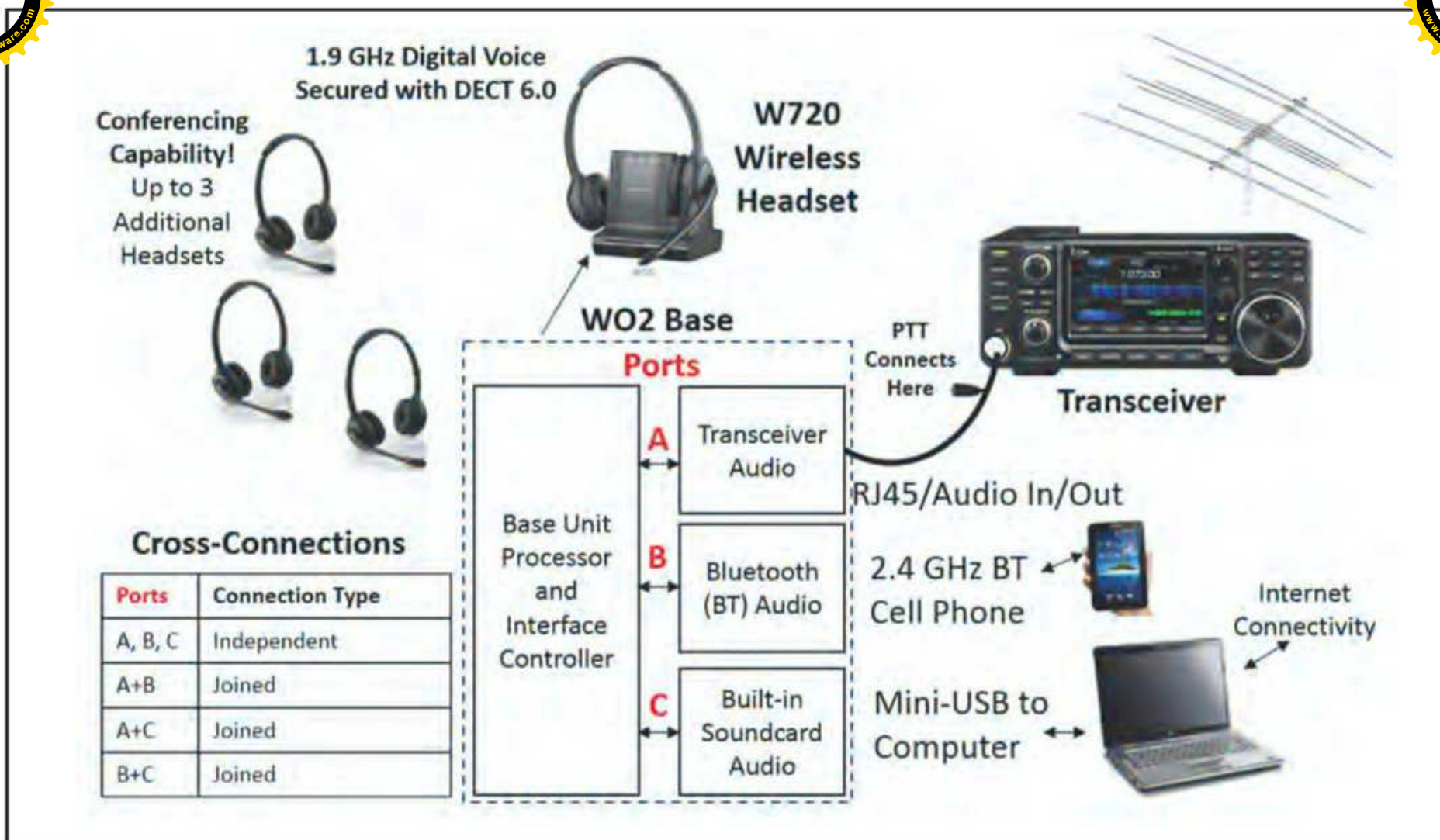


Figure 1. Wireless Headset with connectivity to transceiver, cell phone, and computer (Internet)

In addition to the basic functioning as before, the new base includes Bluetooth and built-in sound card capabilities. In this article, these audio channels will be referred to as transceiver, Bluetooth cell phone, and sound card. Simply tapping buttons on top of the base unit will correspond with connecting the headset to those audio sources. However, only two audio sources can be merged or bridged at a time.

Connectivity

The real power of using the WO2 base unit is the high degree of connectivity in such a small package. The diagram in Figure 1 lists of all the interfaces that can be made with the base unit, including transceiver audio, Bluetooth audio, and the internal sound card. The base unit itself connects with the headset using 1.9-GHz DECT 6.0 with AES encryption over its wireless link. The wired connections are the transceiver and internal sound card audio, and the Bluetooth connection is available for cell phones.

The base unit is powerful enough to create a conference connection to three additional headsets. This allows each of the other headsets to partake in listening or talking over the wireless connection.

The base unit can also cross-connect any of the three main connections, listed as A-B-C, in the figure. Any two of the three connections can be bridged.

Applications

Transceiver to cell phone (transceiver/Bluetooth) — By cross-connecting the cell phone's Bluetooth to the transceiver, the audio is shared between all users. This allows you to patch in a person from your cellular phone to your radio simply by pushing two of the buttons on top of the base and connecting any two audio sources together. This is sim-

ilar to the phone patches that were so prevalent prior to the introduction of cell phones. However, during emergency situations, there is still a need to locate loved ones who may only be reachable using ham radio communications. With so many people (including many hams) using cell phones as their only phones, a ham on the receiving end of a call from a disaster area may be unable to connect his/her ham rig to a phone line to allow relatives to speak with each other directly. This setup permits phone-patching to a cell phone.

Transceiver to remote radio connections (transceiver / sound card) — Cross-connecting the transceiver sound to the sound card of the computer, distant radios can be connected together. We use this mode to listen and share the audio of our signals that are received at a remote site. This is excellent for monitoring signal quality from distant locations. In this mode, caution needs to be taken to avoid simulcasting (transmitting at the same time on the same frequency from two locations) which is not allowed by FCC regulation.

Remote radio to cell phone (Bluetooth/sound card) — Cross-connecting the Bluetooth to the sound card in the base unit, the cell phone audio can be joined to a remote radio site anywhere in the world. This is similar to connecting the Bluetooth to your local radio; however, here the radio is remote. Of course, as with any cross-connection, third-party radio regulations must be followed for all concerned.

You can also add a third audio source from your computer and, for example, merge audio from Skype or Instant Messenger into either your telephone or radio.

Operating Headset in Solo Mode (No Cross-Connections)

The normal solo mode of the headset provides untethered

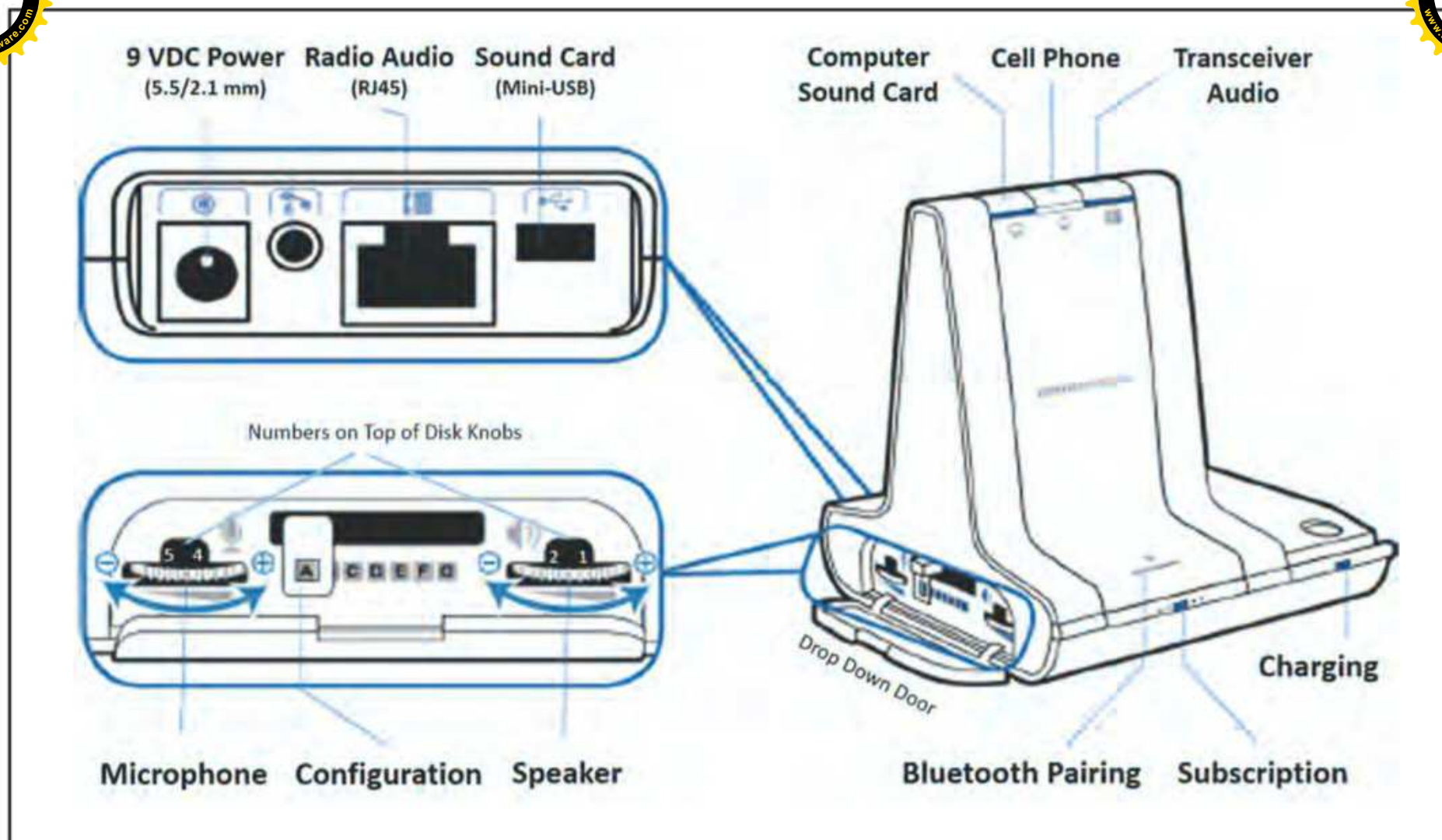


Figure 2. WO2 Base Unit Showing Connections and Controls

wireless access to your ham radio transceiver, your cell phone in close proximity to the base unit, and with remote radios using your computer's internet connections. This is our normal daily usage, but it is nice to know we can always join other connections at the press of a button on the WO2 base unit using the Plantronics headset.

Connectors, Controls and Indicators

The diagram in *Figure 2* shows the location of each of the connections, controls, and indicators on the base unit. Each point is labeled so it can be referenced in the following discussions.

Connectors

- 9 VDC Power – to power plug from wall power supply
- Radio Audio (RJ45) – to ham radio microphone and speaker connections
- Sound Card (Mini-USB) jack – to computer USB port

Buttons to Press

- Computer Sound Card button – connects internal sound card audio
- Cell Phone button – Bluetooth
- Transceiver Audio button – ham radio transceiver microphone and speaker
- Bluetooth Pairing – button and LED
- Subscription – silver color, thin button with LED in middle
- Charging – LED indicator

Volume Control Knobs (side view, number in white on top of disk)

- Microphone Volume – set to about 4 or 5 as shown on top of disk knob

- Configuration Slider Switch – normally set to A but can be changed to improve reception if needed
- Speaker Volume – set to about 2 as shown on top of disk knob

Note: These controls are accessed by lowering the door located on the left surface of the base unit (refer to the figure).

Connecting to Ham Radio Transceivers

The WO2 base unit needs a custom cable to connect to your ham radio microphone and speakers. The connections require an RJ45 plug from the base unit with wires connecting to your radio's microphone and speaker jacks. Unless you are strictly using VOX for controlling your transmission, a push-to-talk (PTT) connection is also required.

Fortunately, the connections for the CS520 base unit described in our prior CQ article are the same ones needed for the WO2 base unit. The interfaces between the two base units are totally interchangeable. Therefore, the "CS520/W720 Interfaces to Ham Radio Catalog" (*Figure 3*) is still available and even expanded to include newer radios such as the ICOM IC-7300, IC-7610, and FLEX radios!²

Once the WO2 base unit is connected to your radio, you can establish the radio connection simply by pressing the top right button (Transceiver Audio button). You will hear receiver audio in the headset and be able to talk on the radio.

Connecting to Bluetooth Cell Phones

The Bluetooth in the WO2 base unit must first be paired with your cell phone. To begin pairing, press and hold down for four seconds the Bluetooth Pairing pushbutton on the front bottom-left side of the base. The LED will flash red/blue, indicating a pairing operation. It will continue flashing for 10 min-



...s, at which time you will have to press it again if you were unable to pair with your cell phone. While flashing, look at your cell phone Bluetooth connection menu and search for "Savi 7xx" from the list of found devices. If prompted for a passcode, enter four zeroes (0000). Once paired, the red/blue flashing becomes a steady blue.

After the WO2 base is paired with your cell phone, you can make a call and use the headset by simply pressing the middle button at the top (Cell Phone button). You can end the call by pressing the end call button on the headset (center button) or the center button (Cell Phone button) at the top of the base unit. An alternate way to disconnect the Bluetooth, which is not recommended, is to press the actual Bluetooth button (Bluetooth Pairing) on the WO2.

When you press the Bluetooth Pairing button, you will unpair the base unit from your mobile device. This means you will have to pair the two again in order to use your cell phone. By keeping it paired all the time, the cell phone will remain ready for use with the base unit.

One very nice application is to be able to place your cell

phone in the best location in your home for receiving cell service (i.e., the highest number of bars) and then being able to talk freely as you roam across your home without worry that the cell coverage might be spotty!

Connecting to Computers

The WO2 base unit can also be connected to your computer using a cable between the Mini-USB connector on the base and a USB port on your computer. Once you have made the cable connection, the WO2 base will appear as a sound card. You will have microphone and speaker volume controls on your computer sound panel that you can adjust.

When you open your software programs that use a sound card, scroll to the list of available sound cards and select the "Savi 7xx" from the list.

Once the sound card is selected on your computer, you can connect the headset to the sound card simply by pressing the Computer Sound Card button at the top, left button of the WO2 base.

One of the great applications for connecting to computers

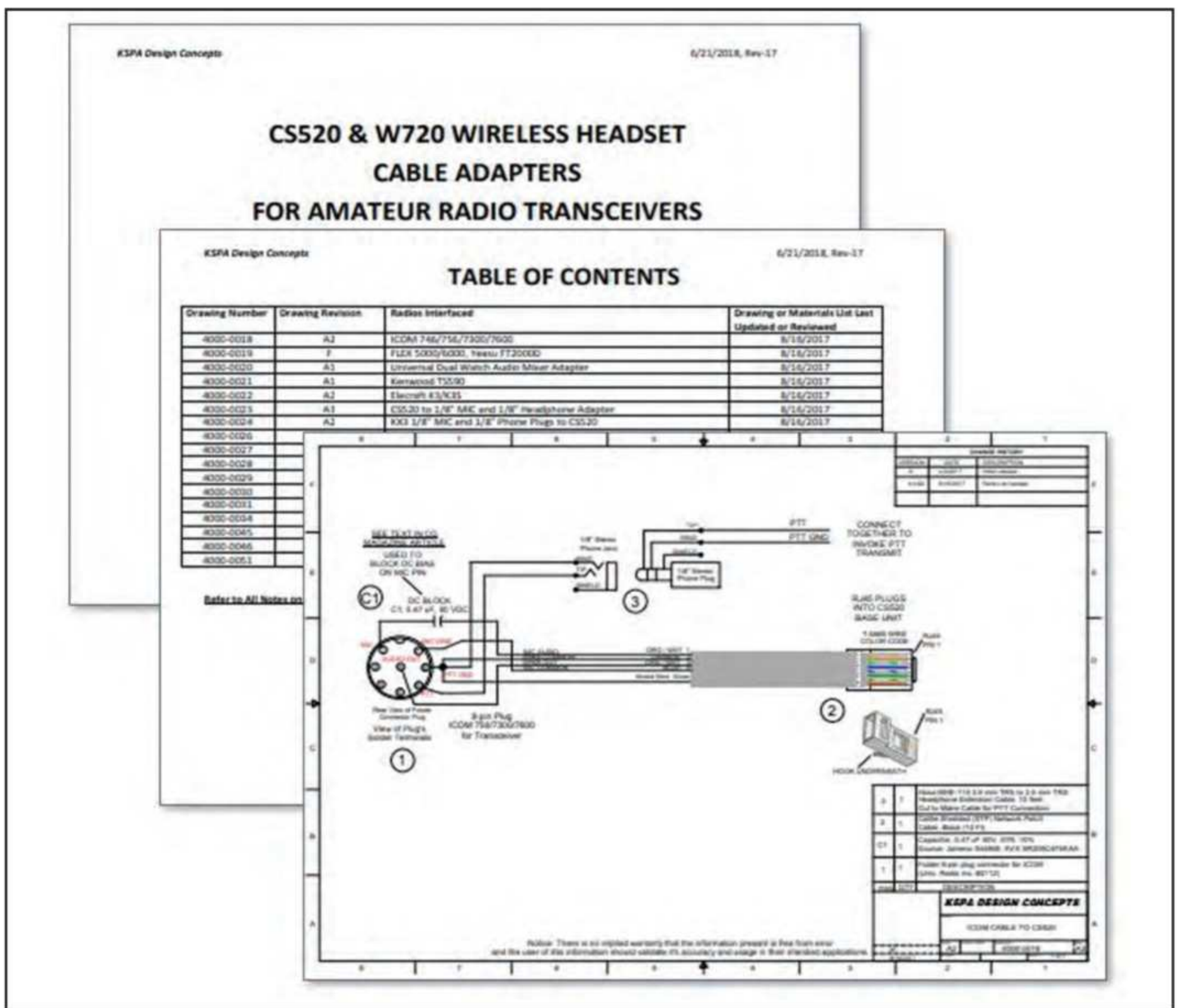


Figure 3. Wireless headset base unit interface wiring diagrams for selected ham transceivers that are available at the authors' website.

Purchasing Savi W720, WO2 Base Unit from the USA Marketplace

The WO2 base unit must be purchased with the correct headset cup so the headset can be charged when in the cradle. *Photo B* shows how the WO2 should appear when it has the correct cradle already attached.

If you find a WO2 base with a different headset charging cradle, it can be snapped off by pulling up. Now, you can snap the proper one in its place. Preferably, you should buy the WO2 unit with the correct cradle already installed for the binaural (2-ear) headset as shown in the figure.

If you want to replace your existing cradle, the headset cup is Plantronics P/N 83776-11 which, again, can be snapped in place onto the WO2 base. It can be purchased separately from eBay or the Plantronics Outlet Store.



Photo B. The Plantronics WO2 wireless base unit showing the proper charging cup mounted to the right side.

is to have your remote radio software running on your computer and being able to use the wireless headset to talk and listen while roaming around the house.

Connecting Multiple Sources

The truly amazing feature of this wireless headset is the ability to connect any two of the three available sources. Applications include connecting your transceiver to a cell phone to essentially create a phone patch, to connect your cell phone to your computer that is connected to a remote radio application, or to connect a remote radio to your ham radio transceiver using your computer's sound card and internet connection.

To combine the two sources simultaneously, just hold any two of the three buttons until both LEDs turn green.

Connecting Multiple Headsets

A favorite application is to connect other headsets to the same connection already in progress. This is useful when multiple operators are listening or even talking on the radio at the same time during events such as Field Day or contesting.

To conference up to three additional headsets on the same connection already in progress, simply place each headset into the cradle of the WO2 base unit. The base unit's subscription LED flashes from green and yellow to a solid yellow. The primary headset user will hear a beep and can accept the conference request by pressing the call button in the center of his/her headset within 10 seconds. Additional headsets can be conferenced in the same manner.

Any conferenced user can exit the call by simply pressing the headset's call button or by placing the headset in the WO2 cradle to disconnect.

Increasing Your Talk Range

The talking range of the wireless headset with WO2 base unit is a whopping 350 feet! You can adjust the base unit to lower ranges with the benefit of increased talk time. There are three settings of High (up to 350 feet), Medium (up to 150 feet), and Low (up to 50 feet).

With the base and headset not connected to anything, press

the Subscription button and the Transceiver Audio button for 3 seconds. The Transceiver Audio button's LED will flash green to indicate High range. If you press both buttons again for 3 seconds, the Transceiver Audio button's LED will flash yellow to indicate Medium range. Press both buttons again for 3 seconds, and the Transceiver Audio button's LED will flash red for Low range. Repeating the dual button presses will cycle through these options again.

Summary

In our 2017 article, "Go Untethered," we introduced a relatively long-range wireless headset giving you flexibility in operating your radio without being attached to a microphone or headset cable. Now, with the simple replacement of the Plantronics CS520 base with the WO2 base, you can expand this capability exponentially.

During emergency situations, with the new WO2 base, you can merge Bluetooth audio from your cell phone (which can also be conferenced to numerous other emergency services) into your radio creating a high-tech, modern-day phone patch.

If that is not enough, the base will merge any two of the three connected audio sources. For example, this could include merging audio from online VOIP software such as Skype, Instant Messenger, or WhatsApp to your phone or radio. Like the original article stated, the wireless headsets with the WO2 base unit continues to broadcast crystal clear audio and will tremendously expand your range of home operation. Don't wait for the next emergency or complain that you have to leave the air to do a chore. Instead, go wireless and expand the horizons of your radio operation and preparation for emergency situations.

Notes:

1. For further information on the September 2017 CQ article, go to <www.k5pa.com>. On the website, you'll find a catalog of wiring diagrams for different transceivers (see Note 2) as well as references to user manuals and other pertinent information of interest.

2. The radio interface catalog can be downloaded from <www.k5pa.com/catalog.pdf>.



Some digital modes used in emergency and public service networks involve transmitting at full power for fairly long durations. And that creates a lot of heat. WAØSPM shares the method he uses to keep his transceiver cool during MARS operation using Automatic Link Establishment, or ALE. But he says it can be useful with any radio and for any mode with long “key-down” periods.

Build a Transceiver Cooler

BY GARY GEISSINGER,* WAØSPM

Continuous duty digital communications can make a typical HF transceiver run hot. Some transceivers can become destructively hot. This article gives a design for a simple cooler that can be added to most any transceiver. To date, this design has been applied to a pair of HF transceivers intended for ALE (automatic link establishment) transceivers used for MARS (Military Auxiliary Radio System) digital communications.

When calling another station on ALE, an HF transceiver sequentially transmits full power on a series of widely spaced channels until the other station responds or is determined to not be responding. This process can take several minutes and it is not unusual for a station to call multiple members in a talk group one after the other or to call stations in a different talk group. All of this results in considerable thermal dissipation by the radio over a long period of time, even if a two-way ALE link is not established. Once an ALE link is established with another station, a period of extended duration digital communication can occur. That also will heat up a transceiver. All of this is compounded by the simple fact that the broadband antennas used in ALE service never have a good match on every channel. Transmitting with a poorly-matched antenna adds to a transceiver’s thermal dissipation. Virtually any transceiver used in this service will get hot. Without additional cooling, some smaller transceivers don’t have adequate cooling and are of the greatest concern for overheating. Two examples of small transceivers used by MARS stations in ALE service are the Micom-Z and the ICOM IC-F8101. Both can run very hot in ALE with digital operation, which is what motivated this article.

The Elbit Micom-Z is a land mobile transceiver intended for ALE operation. The Micom-Z heat sink covers almost the entire bottom of the transceiver. Without any modifications, the heatsink rests directly on the station table, which inhibits good air flow. The cooler described in this article improves air flow and thus, heat dissipation. In the design for the Micom-Z, the cooler enclosure is constructed from a 12- x 10- x 3-inch aluminum chassis with bottom plate. The heat



Photo A. The Micom-Z land-mobile transceiver used for ALE (automatic link establishment) service in MARS digital networks sits on top of the cooling unit.

* email: <geissingergary@yahoo.com>



Photo B. The cooling unit is mounted on top of ICOM's F8101 land-mobile transceiver.

sink on the radio fits into a rectangular hole cut into the chassis (*Photo A*). The hole is lined with rubber gasket material that protects the radio's heat sink from abrasion, acts as an air seal, and damps any fan vibration from getting into the transceiver. The fan mounts to the chassis bottom plate and draws in cool air through a large round hole. The bottom plate stands off the table using four threaded stand-offs and rubber feet. The warmed air is exhausted from the rear of the enclosure through four 1-inch diameter holes.

Given that the enclosure needed to be big enough to support the entire radio, there was room for additional circuitry including an L-pad for controlling transmit level to the modem. The radio heatsink sits completely inside the cooler enclosure. The radio simply rests on the cooler box and is held in place by the heatsink fitting into the hole in the cooler enclosure.

Another transceiver that can benefit from added cooling is the ICOM F8101 (*Photo B*). This is also a land mobile transceiver and its heatsink is on top. In this case, the cooler rests on top of the transceiver. This cooling enclosure is constructed using a 7- x 5- x 2-inch aluminum chassis. Air is taken in from above, cools the radio heat sink, then is exhausted from the rear through the heat sink fins. The cooler box mounts to the radio using two aluminum brackets that fasten to the existing mobile mount holes in the transceiver.

The cooler electronics (see schematic, *Figure 1*, and *Photo C*) are powered directly from the station's 13.8-VDC power supply. While some radios have accessory power ports and even have cooler control wiring, this design is more general purpose and can be applied to virtually any transceiver. The thermal sensing is done using a negative-temperature-coefficient thermistor. The key is to mount the thermistor to the heat sink, giving good thermal contact but not mounted directly in the air flow. On the F8101, there was a small tapped hole that was perfect. All that was need-

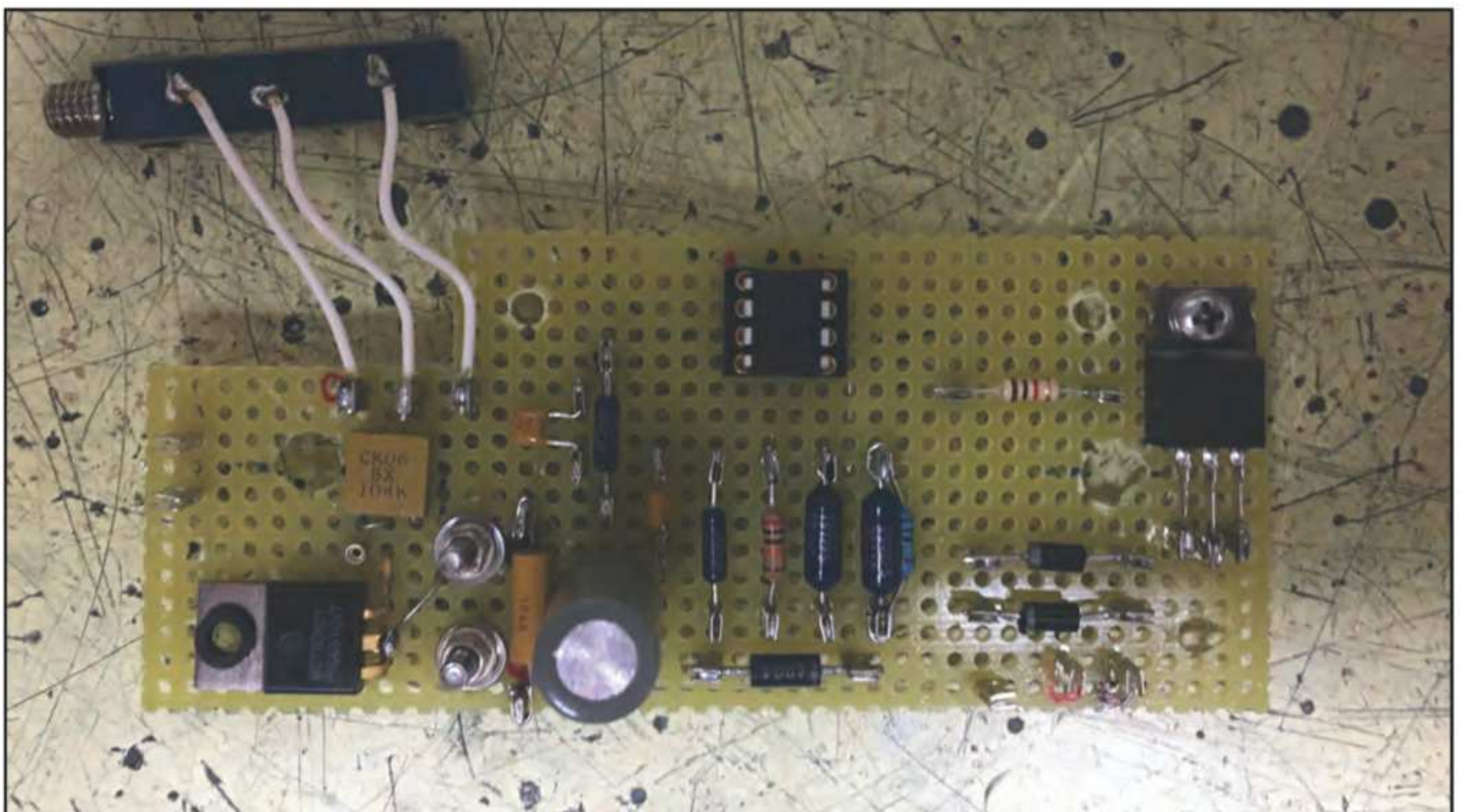


Photo C. Cooler electronics circuit board



ed was to lightly sand around the hole to remove the paint and give the thermistor good thermal contact.

The thermistor chosen is in a bead type package with an insulated pair of leads leaving the package. It was purchased from Digikey and is part number NTCLE413E2103F102L. The thermistor was bonded into a #4 ring terminal (*Photo D*) that was then screwed into the hole in the transceiver heatsink. The ring terminal was reformed to securely hold the thermistor, then thermal epoxy was used to

bond the thermistor into the ring terminal. While any epoxy would probably work, I chose to use TRA-DUCT 2902 silver epoxy, which I had on hand. The bottom of the ring terminal was lightly sanded using a flat surface to make it show bare copper on the now flattened mounting surface. A little Dow 340 heat sink compound was used to improve the thermal coupling between the thermistor and the radio heat sink (*Photo E*).

The cooler electronics are built using 0.062-perf board with flea-clips. None of the resistors have large power dissipation so any convenient wattage rating will be fine. One percent tolerance resistors were used for parts that determine the cooler operating parameters. A 10-turn trimmer potentiometer was used for selecting the thermal set point.

Photo D. Ring terminal with thermistor bonded inside it. The bottom of the ring is sanded and attached firmly to the transceiver (see text for details).

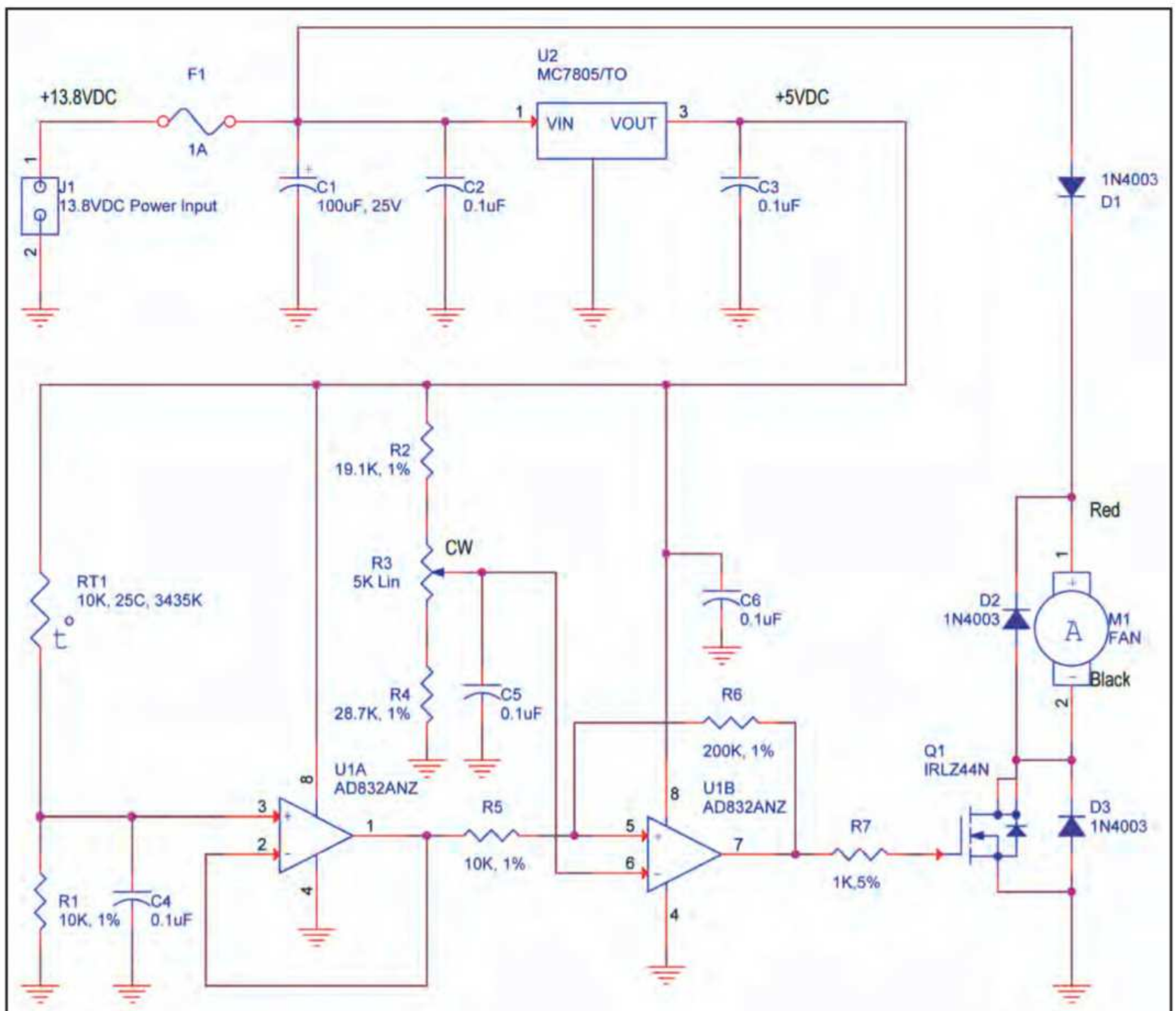


Figure 1. Schematic of the transceiver cooler circuitry



WISCONSIN RAPIDS, WISCONSIN — The Wisconsin ARES/RACES will hold the **20th Annual Wisconsin ARES/RACES Conference and 2018 ARRL Wisconsin State Convention** from 9:30 a.m. to 4:30 p.m., Saturday, October 13 at the McMillian Memorial Library, 490 E. Grand Avenue. Website: <www.wi-aresraces.org>.

SAN RAMON, CALIFORNIA — The Mount Diablo Amateur Radio Club will hold **Pacificon 2018** and **2018 ARRL Pacific Division Convention** from 4-7 p.m., Friday, October 19; 9 a.m., to 5 p.m., Saturday, October 20; and 9 a.m. to 1 p.m., Sunday, October 21 at the San Ramon Marriott, 2600 Bishop Drive. Phone: (925) 288-1730. Email: <info@pacificon.org>. Website: <www.pacificon.org>. VE exam, special event station W1AW/6.

BELTON, MISSOURI — The Southside Amateur Radio Club will hold the **SouthSide ARC 2018 Hamfest** from 8 a.m. to 1 p.m., Saturday, October 20 at Mill Creek Upper Elementary School, 308 South Cleveland Avenue. Contact: Jay Duthler, KE0U, (816) 607-1330. Email: <info@southsidearc.net>. Talk-in 147.12+ (PL 151.4). VE exams.

EAST RIDGE, TENNESSEE — The Chattanooga Amateur Radio Club will hold **Hamfest Chattanooga** and **2018 ARRL Tennessee State Convention** from 8 a.m. to 2 p.m., Saturday, October 20 at the Camp Jordan Arena, 323 Camp Jordan Parkway. Phone: (423) 308-3477. Email: <info@w4am.net>. Website: <http://w4am.net>. VE exams, card checking.

GREENVILLE, TENNESSEE — The Andrew Johnson Amateur Radio Club will hold the **Greenville TN Hamfest** beginning 7 a.m., Saturday, October 20 at the Greene County Fairgrounds, 123 Fairgrounds Road. Email: <ke4eac@greenvillehamfest.com>. Website: <http://greenvillehamfest.com>. Talk-in 145.390- (PL 186.2) or 147.060+.

RICKREALL, OREGON — Mid-Valley ARES will hold **Swap-Tober-Fest** from 9 a.m. to 3 p.m., Saturday, October 20 at the Polk County Fairgrounds, 520 S. Pacific Highway. Contact: Chris Portal, W7CLP, <w7clp@w7clp.net>. Website: <http://swaptoberfest.net>.

SHELBYVILLE, INDIANA — The Blue River Valley Amateur Radio Society will hold the **Shelbyville Tailgate 2018** from 8 a.m. to noon, Saturday, October 20 at the Shelby County Fairgrounds, 500 Frank Street. Website: <http://brvars.com>. Talk-in 145.48 (PL 88.5).

SINTON, TEXAS — The South Texas Hamfest Association will hold the **South Texas Hamfest and Electronics Expo** from 8 a.m. to 2 p.m., Saturday, October 20 at the San Patricio County Fairgrounds Event Center, 219 West 5th Street. Contact: Diana MacGregor, K5DNG, or Gary MacGregor, KF5DZQ, (361) 947-5665. Email: <southtexashamfest@gmail.com>. Website: <www.southtexashamfest.org>. VE exams.

SOCORRO, NEW MEXICO — The Socorro Amateur Radio Association will hold the **Socorro Hamfest and 2018 New Mexico State Convention** from 8 a.m. to 2 p.m., Saturday, October 20 at the New Mexico Fire Academy, 600 Aspen Street. Website: <www.socorroara.org>. Fox hunt.

CAMBRIDGE, MASSACHUSETTS — The Harvard Wireless Club, MIT Electronics Research Society, MIT UHF Repeater Association, and MIT Radio Club will hold the **FLEA at MIT** from 9 a.m. to 2 p.m., Sunday, October 21 at the Parking Lot on Albany and Main Streets. Phone: (617) 253-3776. Website: <www.swapfest.us>. Talk-in 146.52 or 444.725- (PL 114.8).

KALAMAZOO, MICHIGAN — The Kalamazoo Amateur Radio Club and Southwest Michigan Amateur Radio Club will hold the **36th Annual Kalamazoo Ham-fest & Amateur Radio Swap and Shop** from 8 a.m. to noon, Sunday, October 21 at the Kalamazoo County Expo Center and Fairgrounds, 2900 Lake Street. Phone: (269) 205-3560. Email: <info@kalamazooamfest.com>. Website: <http://kalamazooamfest.com>. Talk-in 147.040 (PL 94.8). VE exams.

MERIDEN, CONNECTICUT — The Meriden Amateur Radio Club will hold the **26th Annual Nutmeg Hamfest and 2018 ARRL Connecticut State Convention** from 8 a.m. to 2 p.m., Sunday, October 21 at the Sheraton Four-Points Hotel, 275 Research Parkway. Contact: John Bee, N1GNV, (203) 440-4973 (days only). Email: <nutfest@qsradio.com>. Website: <www.nutmeghamfest.com>. VE exams.

SELLERSVILLE, PENNSYLVANIA — The RF Hill Amateur Radio Club will hold its **42nd Annual Hamfest** from 7 a.m. to 1 p.m., Sunday, October 21 at the Sellersville Fire House, 50 N. Main Street. Contact: Jim Soete, WA3YLQ, (215) 622-4344. Fax: (215) 257-0724. Email: <wa3ylq@arrl.net>. Website: <www.rfhillarc.org>. Talk-in 145.31- (PL 131.8). VE exams.

ARDMORE, OKLAHOMA — The Texhoma Hamarama Association will hold the **Texoma Hamarama** on Friday, October 26 and Saturday, October 27 at the Ardmore Convention Center, 2401 Rockford Road. Contact: Ed Harwood, (580) 504-7378. Email: <w5cve@arrl.net>. Website: <www.texomaharama.org>. VE exams.

CONWAY, SOUTH CAROLINA — The Grand Strand Amateur Radio Club will hold **22nd Annual Grand Strand BEACHFEST** from 8 a.m. to 2 p.m., Saturday, October 27 at the Old Pee Dee School, 3521 Juniper Bay Road. Contact: Edward Jordan (843) 458-3856. Email: <kf4eck@w4gs.org>. Website: <www.w4gs.org>. Talk-in 145.110 (PL 85.4). VE exams, DXCC / VUCC / WAS / WAC card checking.

LAGRANGE, GEORGIA — The LaGrange Amateur Radio Club will hold the **LaGrange Hamfest** beginning 9 a.m., Saturday, October 27 at the Oakside Baptist Church, 1921 Hamilton Road. Contact: Rob Momon (706) 594-9035. Email: <n4vpi@charter.net>. Website: <www.lagrangeradioclub.org>. Talk-in 146.70- (PL 141.3). VE exams.

JACKSONVILLE, FLORIDA — The North Florida Amateur Radio Society will hold the **18th Jacksonville Free Hamfest** from 7 a.m. to noon, Saturday, October 27 at the Terry Parker Baptist Church Parking Lot, 7024 Merrill Road. Website: <http://nofars.net>.

KIRKWOOD, MISSOURI — The Saint Louis Amateur Radio Club will hold the **Saint Louis Halloween Hamfest** from 7:30 a.m. to noon, Saturday, October 27 at the Kirkwood Community Center, 111 S. Geyer Road. Contact: Bob Sluder, NØIS, (636) 285-7605. Email: <bcs luder@msn.com>. Website: <http://halloweenhamfest.org>. Talk-in 147.75-. VE exams.

LYNNVILLE, INDIANA — The Tri-State Amateur Radio Society will hold the **Southern Indiana HamtoberFest** from 7 a.m. to 5 p.m., Saturday, October 27 at the Lynnville Community Center, 318 IN-68. Email: <hamfest@w9og.net>. Website: <http://hamtoberfest.com>. Talk-in 146.790 (PL 88.5). VE exams, fox hunt.

MARICOPA, ARIZONA — The Maricopa Amateur Radio Association will hold **CopaFest 2018** from 7 a.m. to 1 p.m., Saturday, October 27 at the UltraStar MultiTainment Center, 16000 N. Maricopa Road. Website: <www.copafest.org>. VE exams.

PORT RICHEY, FLORIDA — The Gulf Coast Amateur Radio Club will hold its **Fall Hamfest** from 7 a.m. to noon, Saturday, October 17 at the Millennium Academy, 10005 Ridge Road. Website: <http://gulfcoastarc.org>. VE exams.

HICKSVILLE, NEW YORK — The Long Island Mobile Amateur Radio Club will hold its **Hamfest** from 9 a.m. to 1 p.m., Sunday, October 28 at Levittown Hall, 201 Levittown Parkway. Website: <www.limarc.org>. VE exams, DXCC / WAS card checking.

MADISON HEIGHTS, MICHIGAN — The Utica-Shelby Emergency Communications Association will hold the **USECA Hamfest 2018** from 8 a.m. to 1 p.m., Sunday, October 28 at the UFCW Local 876 Hall, 876 Horace Brown Drive. Contact: Gary Simms, KI8M, (586) 322-2134. Email: <ki8m@arrl.net>. Talk-in 147.180+ (PL 100). VE exams, DXCC card checking.

UPPERCO, MARYLAND — The Carroll County Amateur Radio Club will hold the **Mason Dixon Hamfest** on Sunday, October 28 at the Sportsman's Hall Roller Skating Center, 15500 Hanover Pike. Contact: Steve Beckman, N3SB, (410) 876-1482. Email: <n3sb@gis.org>. Website: <http://k3pzn.net>.

(Continued on page 37)

High power RTTY operation, contesting, and Field Day can all stress a radio. It's fair to call this stress because high temperature does impact the reliability of electronics.

Resistors R2, R3, and R4 determine the set point for the controller. Obviously, you could select other values if you want the transceiver to run cooler or you don't want the fan to run as often. I chose a range of 30°C to 40°C (86°-104°F) with a nominal setting of 35°C (95°F). Resistor R6 sets the controller's dead-band, or range of values at which no action occurs. A larger value for R6 could be used if a narrower deadband is desired. I decided that ±3°C (5.4°F) range was reasonable so that the fan doesn't constantly cycle on and off. When the thermistor senses 38°C (100°F) or more, the fan will turn on; when the temperature is back to 32°C (90°F) or below, the fan will go off. The diodes D1, D2, and D3 provide positive protection from any transients or noise generated by the fan motor. I used a fan from Digikey, part number AFB1212H. This fan was selected as a compromise between high cooling efficiency and low fan noise.

The board mounts inside the cooler enclosure on threaded stand-offs (*Photo F*). This design is not particularly sensitive to layout, but I would keep the motor wiring away from wiring to the controller op-amps.

In 100% continuous digital operation, the F8101 begins to heat up after about 3 or 4 minutes. At that point, the fan turns on and remains on until about 5 minutes after digital operation has ceased. During that time, the radio runs warm, but not hot. The timing is roughly the same for the Micom-Z in continuous digital operation, except that the fan remains on a couple minutes longer after digital mode transmission is over. By the way, both Elbit and ICOM offer fan kits for the two radios considered in this article. This cooler is less expensive.

Beyond ALE and MARS

There are other reasons an amateur transceiver can get warm or even hot. High power RTTY operation, contesting, and Field Day can all stress a radio. It's fair to call this stress because high temperature does impact the reliability of electronics. That is not just common sense or folklore. Calculating the reliability of electronics is a science and a career path in engineering. Operating temperature is a strong term when cal-





ating equipment reliability. If a radio's case is hot, then the power transistors inside will be even hotter. If you are interested in learning more about all this, then do a web search on "MIL-HDBK-217" or

"RIAC 217Plus." Consider how your transceiver is used and feel the case. Is it warm? If it's very warm, then you may want to build a cooler for your transceiver as well.

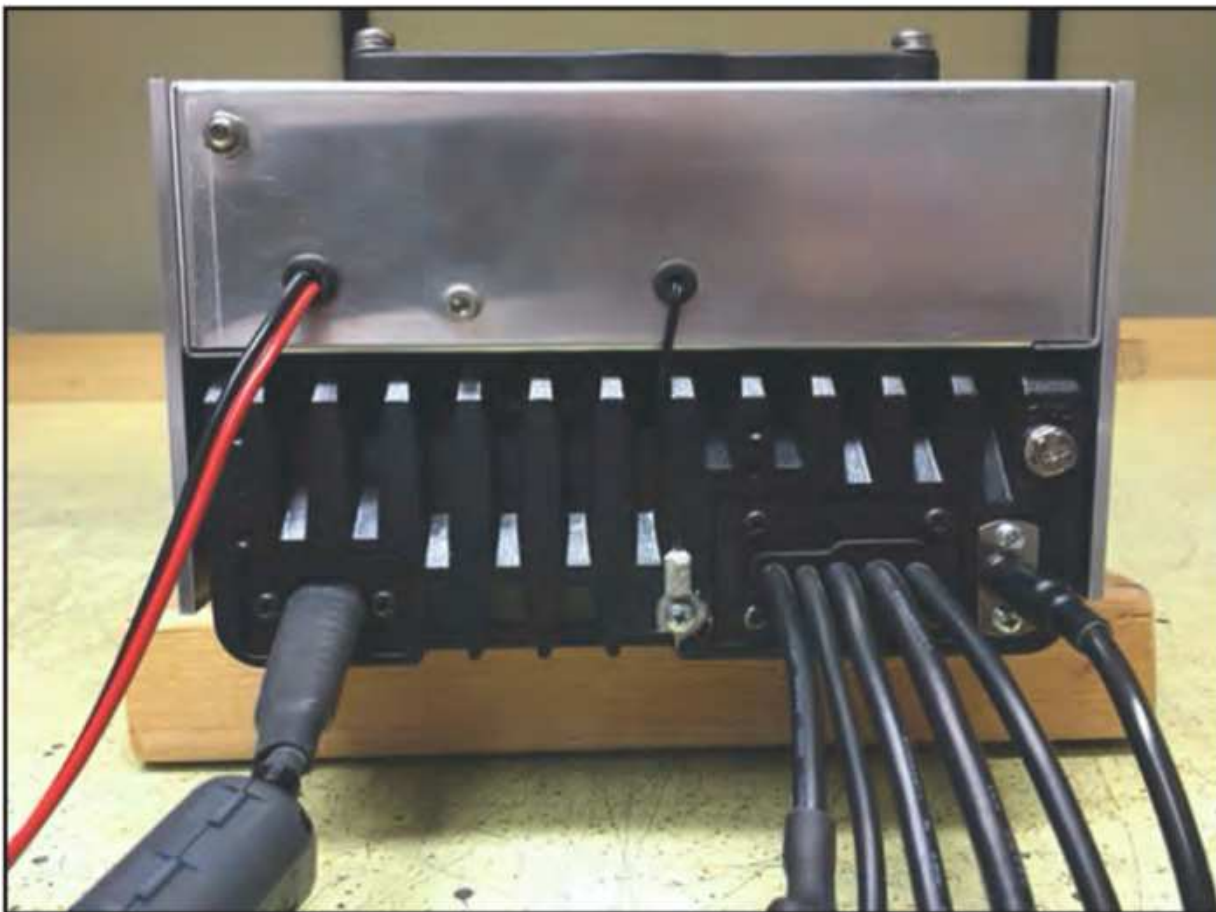


Photo E. Rear view of the cooler on top of the F8101. Follow the black wire in the center to see the thermistor and ring terminal attached to the heat sink.



Photo F. The cooler's circuit board is mounted inside the enclosure, but out of the direct path of the airflow.

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Amateur Radio Direction Finding — also known as ARDF or “foxhunting” — is a valuable emergency communication skill, especially when trying to track down the source of an interfering signal. Some hunts take longer than others, as “Sherlock” explains...

Sherlock Solves a 30-Year Transmitter Hunt

BY “SHERLOCK”

This transmitter hunt began more than 30 years ago on a VHF simplex frequency. The hidden transmitter was always mobile and always playing music. [Violation of 47 CFR Part 97.113 (d) and (e)]

Several “hunters” diligently recorded his transmissions over the years. The hunt seemed hopeless because even the direct surveillance techniques and “Transmitter Finger Printing” were unsuccessful. The first “fingerprint” of his signal was made in September 1986, using the technique described in the May 2017, CQ magazine article (p. 32).

- “There is nothing more stimulating than a case where everything goes against you.” Quotation from *Hound of the Baskervilles*.

He was known as the “Music Man” because he played unwelcomed music from his car FM radio onto the ham band. His operations began to get more frequent in 2015 and new hunters were added to the group.

Once he had an interruption in his travel and some expletive came from a man’s voice. We got his voice on tape.

- “Never trust to general impressions, my boy, but concentrate yourself upon details.” Watson, “There are no insignificant details.” Quotation from *A Case of Identity*.

Data Collection and Pattern-Tracking

Facts: He transmitted from the northern part of the city but only in motion at high speeds (fast flutter indicated speeds above 40 mph), so that meant he was on the freeway. Direction-finding bearings always showed his path to be from the north to the center of the city and frequently back again.

His daytime operating times were random, so he did not have a rigid 8-to-5 job. His operating days and times were plotted on a calendar to develop a pattern.

He never transmitted from a stationary position, not even stop signs. Once his flutter was slow but constant and we saw (on the traffic cams) that the northbound freeway had heavy traffic. By that we knew he was northbound (going home). The traffic counter showed 2000 cars per hour.

His signals were heard by others 50 miles away, so he had at least a 30-watt radio with an outside antenna. Several secret observation sites were used to scan the traffic on the



A simulated picture of Sherlock using a black “Elementary” Yagi at Reichenbach Falls (where Sherlock recounted the death of Professor Moriarty in *The Adventure of the Empty House*).

* c/o CQ magazine



Closeup of the black Elementary Yagi on a tribrach that was used for all the direction-finding work in the 30-year T-hunt.

freeway during his past routine. His car was seen once even though he was not transmitting at that time. Since we knew his travel pattern we were transmitter-hunting for him even when he was not transmitting. His transmissions times were about 10 to 20 minutes in length but sometimes occurring only once every six weeks.

Several suspect cars were identified because of external whips. These days only about 1% of modern cars have any whip antenna at all, so a VHF whip is easy to spot. Photos were also taken for later review. A list of other hams who were on the air at the same time as the Music Man was collected so we knew who he wasn't. These hams were available as "approved T-Hunters." A few times, his signal went north and then just faded out, sometimes the same to the west, which indicated that he left the city.

Closing In

The Final Day: His signals were tracked down south on the freeway, like many times before, but this time they kept going south for a half hour and got very weak. There are very few roads to the south-southwest from the city. Then the music stopped. (There are only a few remote cabins in that canyon and this is where there is an access road to a locked secure private location begins). An hour later, a ham started operating from that southern location on a different frequency. (We were scanning all other frequencies for such transmissions because he apparently never used the frequency he was jamming). He gave his callsign during his operation and about one hour after that activity stopped, The Music Man started up again from the same very weak southern location. The music continued to get stronger and went through the center of the city and north on the freeway as it usually had on other days. Then it stopped.

The QRZ.com website allowed us to search a callsign by address/ZIP code, so we knew where all the hams in that area lived. The QRZ locator for the callsign we heard (Extra Class) showed his home as being in the northeast part of the city. Using Google Maps' Street View brought up the picture of his house and his car was in the driveway. That car was the same one spotted on one of the freeway "stakeouts" with the VHF whip on the rear of the roof.

Follow-Up

The Next Step: Sharing this information with the authorities in hopes that the Music Man will soon disappear from the band.

"I am not the law, but I represent justice so far as my feeble powers go." Quotation from *The Adventures of the Three Gables*.

This article is from the notes of Sherlock but some of the direction-finding details (AN/PRD-12) and physical interdiction methods of this investigation had to be redacted to prevent future "music men" from avoiding detection.

Sherlock is monitoring, just waiting for another case ... The Game is Afoot.

"I should prefer that you do not mention my name at all in connection with this case, as I choose to be only associated with those crimes which present some difficulty in their solution." Quotation from *The Adventure of the Cardboard Box*.

[Note: The identity of the city and of Sherlock in this case must remain hidden because of requital. This is a real event and some music men are armed.]



Getting a fully-equipped ham station to a field location for emergency or public service communications can be a struggle. KDØKHD shows us how he solved that problem in a permanent, portable, manner.

Gator Case Project for the Yaesu FT-897D

BY RANDAL R. SCHULZE,* KDØHKD

It all started with ... The Big Radio Case. When I was a kid during the early 1970s, the high school I was attending had just completed a production of Rogers and Hammerstein's *South Pacific*. After the show, the props and other items they were going to throw out included an old Navy surplus radio in a heavy-duty case, and another similar radio case, which was empty. One of the older students laid claim to the radio, so I grabbed the empty case.

This thing was massive. It was about 32 x 12 x 18 inches. It was heavy, made of 1-inch thick wood, and was divided into three compartments; one large compartment at one end, and two at the other end. It had lids at each end that would clamp on and seal with rubber gaskets, and a small hinged trap door on the side. The case had carrying handles on each side, and as I recall, it had mounting points within for rack-mounted equipment. It was painted battleship gray and had decals with various numbers and USN stenciled on it at several locations.

I had big dreams of mounting radios, batteries, and power supplies, along with switches, knobs, and blinking lights, in the old case. Most radios and other electronic equipment were typically large in those days. They were still using tubes, and while "solid-state" circuitry was around, integrated circuits and the degree of miniaturization we enjoy today was not quite ready for prime time. The financial resources available to me at the time did not allow me to really invest in the equipment I wanted to install in the big Navy case, so that dream was more or less forgotten over time. I still have the case somewhere out in the garage, where it contains model airplanes and other toys from my youth.

Time Goes By

Many years and three successful careers later, I'm an amateur radio operator with various models of radio equipment suited for the various modes and roles hams enjoy. One of my favorite radios is my trusty Yaesu FT-897D. Over a few years, I've purchased various accessories for this rig, including the LDG AT-897 HF tuner and the external analog meter. For several years, this radio was configured as my base radio in the shack at my home. Later, I purchased a bigger radio with more advanced features and the FT-897D became the



Photo A. The Gator Case is designed primarily for safely transporting professional audio equipment but also works great as a ham radio "go kit."

radio I would use at outdoor events, such as Field Day, or the WW1USA special events.

To store and transport the radio, tuner, mics, and accessories, I used several hard-plastic gun cases with pluck & pull foam. These worked pretty well for storage, but when it came time to deploy, everything would have to be unpacked, assembled, and the various plugs plugged in. This often caused the need for troubleshooting if plugs were not plugged in to the correct ports or plugged in properly. One or more of the pins from the 8-Pin DIN/CAT cables would often get bent, or worse yet, break off.

A Great Idea

A friend of mine, Joe Krout, KRØUT, came up with a good idea for his field rigs. He mounted his ICOM HF radios in something called the Gator Case (Photo A). The Gator Case line of products came about to serve the live music industry, as a means to provide protection and portability to sound equipment deployed at various venues as large as concert

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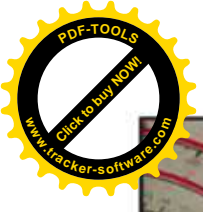


Photo B. The Samlex SEC-1235M power supply is available for rack-mounting as well as standalone operation.

Photo C. The Outrigger 4 power distribution unit from Electro-Resales was the perfect option for providing DC power to all the equipment in the Gator Case. (Photo courtesy Electro-Resales)

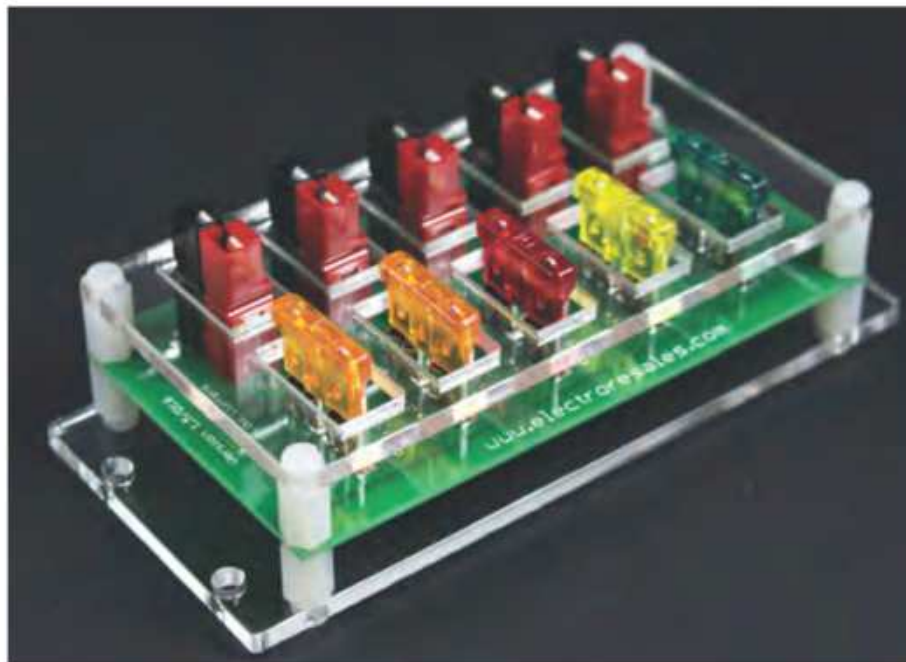


Photo D. Close up of the "blue meters."

halls, or as small as the corner bar. These cases come in various sizes and feature a lifetime warranty. The Gator Case is well-suited to hold any type of electronic equipment which can be rack-mounted.

It took me a while to come around, but after considering the monetary value of my radio equipment and accessories in question, it appeared that investing in a Gator Case project would be money well spent. I took my time and put a great deal of thought into exactly what equipment I would mount in the case, and how I would mount it.

One of my favorite power supplies has been the Samlex 1235M (Photo B), which has volt and amp meters mounted on the front. I also learned that Samlex makes a rack mount for this power supply, in models which will accommodate either one or two power supplies. Two seemed like overkill, so I opted for the single unit rack in my plans. Next, I searched for an electronics rack to mount the bulk of the other equipment and accessories, and came up with the Raxxess RAX Unitray, Universal Rack. My plans were starting to shape up.

While thinking, I felt that connecting the power supply directly to the radio really didn't make this configuration a "portable" radio for field work. I knew I would need a power distribution unit that would allow for flexibility, and perhaps some added protection for my equipment. After wandering around on the internet for a while, I stumbled across the Outrigger 4 Power Distribution Unit (PDU) by Electro-Resales <www.electroresales.com> (Photo C). I don't know how I could have overlooked these people up to this point, as they are located right here in the Kansas City area, where I live. I realized that I've talked to these guys before. This PDU is just the right size, is of very good quality and craftsmanship, and costs only a third of what the competitor is asking.


So, the power strategy is simple. Everything going in and out is fused. The power supply connects to the Outrigger 4 PDU. From there, power is supplied to the radio, and all the lights for the meters, with two more ports to spare. I'm considering other future additions to the project that utilize the spare ports. This also makes this arrangement a quasi-portable package. I can use the power supply with any standard 110-volt AC power source, such as the Samlex power supply, or I can quickly attach other options, such as batteries, solar, what have you, so long as they



Photo E. Front view of the finished project

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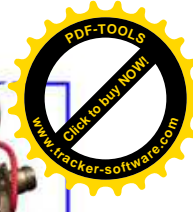


Photo F. Steve Cummings, K0BLR, operating the author's Yaesu FT-897D in the Gator Case during the 2018 Missouri QSO Party.

have Anderson Powerpole connections, which is nearly standard in the amateur radio community.

Initially, I purchased the Yaesu bracket for mounting an FT-897D to the underside of a vehicle dashboard. That was a mistake. While this was a high-quality bracket, it turned out this added

an additional two vertical inches to the top of the radio, thus making it two inches too big to fit in the case. I found that if I removed the wire stand from the bottom of the radio, (which was also adding height to the radio), I could use the same screws and the same threaded holes to secure the radio to the rack shelf. Since



These specific screws were used with the radio, I could ensure that the metal screws would not extend into the electronics, and cause a short.

Two more bells and whistles were added. LDG makes an external analog meter for the FT-897D, which connects to a port at the bottom of the radio, just under the main VFO knob, with a 1/8-inch plug. This meter also has a 12-volt power connection on the back, which I had not used before, but found that if power is supplied, the meter has a nice, blue-colored backlight. Cool. Let's hook it up. Next, I'm looking around my shop among the typical treasures most hams collect over the years, and find I have a few of those inexpensive LED volt displays which, when connected to power, shows the voltage at the power source. When hooked up, this reads a nominal voltage coming to the PDU of 13.7 volts. And what do you know? The LEDs are glowing in that same nice shade of blue as the analog meter ... cool! (See *Photo D.*) Let's hook that up, too!

Finished Project

Some Anderson Powerpoles, a few drops of solder here and there, some aluminum strapping formed into brackets, some heat shrink tubing, nuts, bolts, and putting everything in place like a tightly fit jig-saw puzzle, and voila. A plug-and-go radio station. (See *Photo E.*)

Take it into the field, connect the mic, the antennas, the computer, and the power option and get on the air (*Photo F*), all the while protecting my equipment in an attractive, easy to manage case.

When the radio is not being used, there is ample space below the equipment on either side of the power supply to store and carry a few additional, yet necessary, accessories such as microphones, cables, adaptors, and my foot switch. I expected this would be extremely heavy when fully loaded, and to an extent it is, weighing in at 36.4 pounds with everything stored on board. But this is far less than the 50+ pounds I expected. I may not want to lug this up to the top of a mountain on my back, but with the handles and shoulder strap supplied with the Gator Case, getting it from my car to the field is a breeze.

It occurred to me that that dream I had as a kid of mounting radios and electronics into a case with switches, knobs, and lights ... has finally happened!

More details about the construction of the Gator Case Project for the Yaesu FT-897D can be found at: <<http://hamsinspace.com/Gator/index.htm>>.



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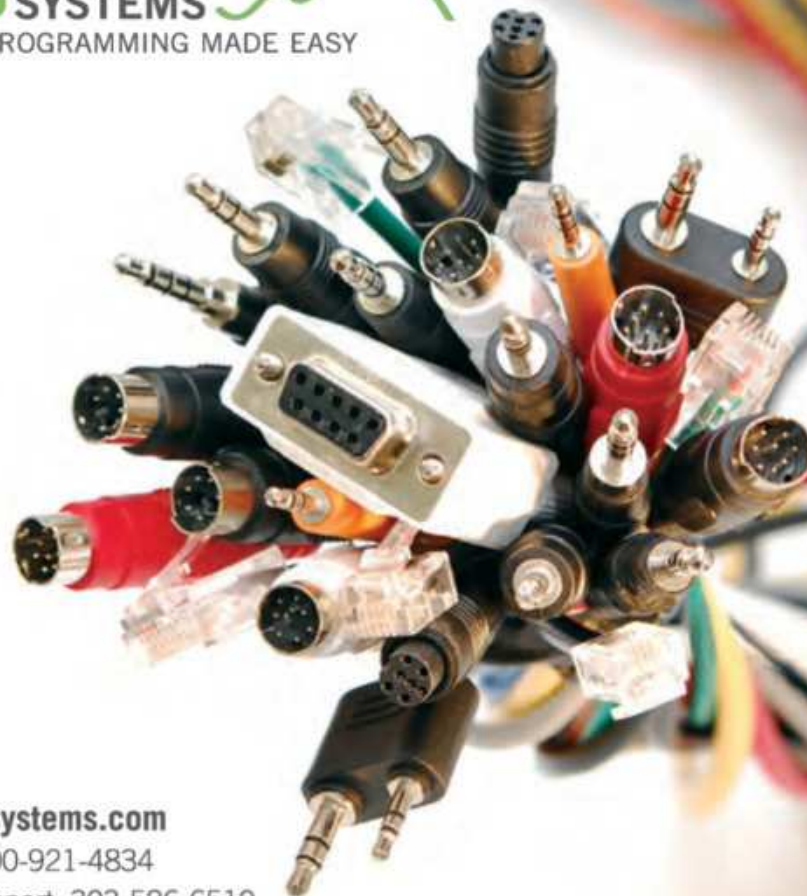
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When providing communications support at an emergency or public service event, the place you're needed may not be the best location for your radio signals. WB9YBM offers one solution if you're within range of your home station or another location where you can link together two radios.

Make Your Own Remote Base or Link

BY KLAUS SPIES,* WB9YBM

You'd like to extend the range of your handheld or mobile radio by using equipment in your own ham shack, but don't want (or need) the expense and complexity of a full-blown repeater. Maybe all you want is to be able to use the power and range of your favorite VHF or UHF radio located in your hamshack while lounging in your backyard with your HT, or maybe continue a QSO while running errands in your car without tying up the local repeater. Or how about working DX on 10-meter FM with your 440-MHz handheld?

Luckily, there *is* a way to accomplish this easily and with minimal cost: The answer is "remote base!"

All it takes to put together a remote base are two radios and some simple wiring. The simplest approach is simply tying the squelch signal from one radio to the PTT of another (and vice-versa). While one radio receives and transmits to your portable (or mobile), the other radio retransmits your portable or mobile signal with higher power and a fixed station antenna. To avoid signals from the two transceivers in your base station interfering with each other, a good frequency separation is needed. For example, my favorite band is 222 MHz, for which I have plenty of radios (in the car, a handheld, and one at home). My other band of choice is 10 meters — specifically, the FM calling frequency of 29.600 MHz. By tying together my home 222 transceiver and the 10-meter FM radio, I could easily work DX while puttering in the backyard. A remote base can just as easily be set up with other bands in any combination: 6 meters, 2 meters, 440 MHz, etc. (For the really industri-

Component	Qty	Value or ID	Description
C1-6	6	10 μ F	Capacitor
D1-4	4	1N914	Diode, switching, 1N914 or equiv.
R1, 2	2	51K	Resistor, 1/4-watt, 5%
R3, 4	2	100K	Resistor, 1/4-watt, 5%
R5-8	4	48K	Resistor, 1/4-watt, 5%
U1, 8	2	4538	I.C., dual monostable timer
U3	1	4069	I.C., inverter
U4, 10	2	555	I.C., timer/osc.
U5, 7	2	4040	I.C., counter
U6	1	4082	I.C., dual quad input AND gate
U2, 9	2	4081	I.C., quad 2-input AND gate

Table 1. Parts list

ous user, there is even a method by which than more than two bands can be linked. This was discussed in an article titled "Link it All!" in the October 1995 issue of 73 magazine.) You can also set up a remote base or link using two mobile rigs in your vehicle, which can increase your range and flexibility during an emergency response or public service event.

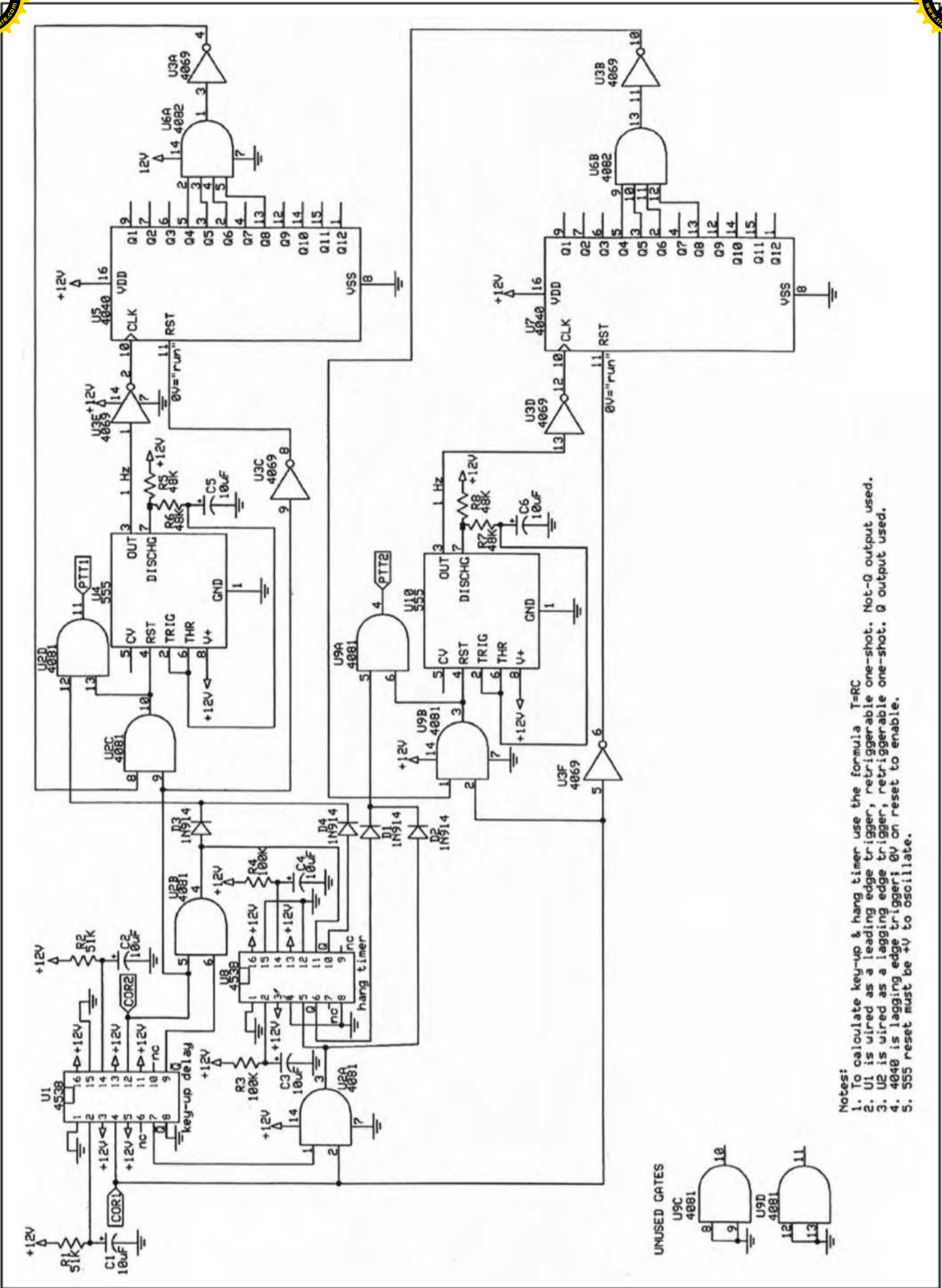
Theory of Operation

A schematic of the circuit is shown in *Figure 1*. Note that since identical functions need to be performed at one time or another for the two connected radios, there are actually two components (or two halves of a single component) performing each task, depending on which way the signal is traveling. They are labeled separately in the schematic but noted here as "U1A (U1B)," "U5 (U7)," or similar. The signal path from the receiver of transceiver 1 to the transmitter of transceiver 2 is shown by parts designators *without* parenthesis; the signal path going from the receiver of transceiver 2 to the transmitter of transceiver 1 in parenthesis. The parts list is in *Table 1*.

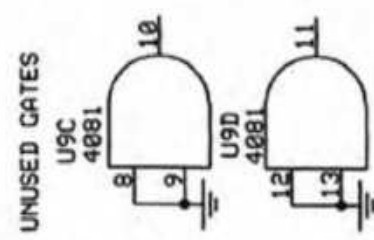
A signal detect from either radio 1 ("COR 1") or radio 2 ("COR 2") is fed into U1A (U1B), a 4538 dual monostable oscillator wired to trigger on the leading edge of a positive-going signal (half of the I.C. is used for each radio). This causes the not-Q output to go low as determined by $T=RC$. Once the not-Q output returns to a "1" (+V) output, it is combined with the "1" signal from the signal detect via U2B (U2A), a dual-input AND gate. The reason for this delay is so that if a radio's squelch is opened by a noise burst (hopefully of less than the predetermined period determined by $T=RC$), the transmitter will not toggle "on" unless there is a valid signal. This will provide one of the two valid PTT signals downstream via U2C and U2D (U9B and U9A) for PTT.

At the same time, the signal detect is fed to U2C (U9B) (another AND gate). The second signal for U2C (U9B) is provided by the time-out timer circuitry: As long as the 4040 counter U5 (U7) has not counted up to 3 minutes, U2C (U9B) will now have two "1" signals at its' input from U3A (U3B) since a valid 3-minute count (and subsequent "0" logic) has not been seen by U6A (U6B). This does

* email: <wb9ybm1@yahoo.com>



- Notes:
1. To calculate key-up & hang timer use the formula $T=RC$
 2. U1 is wired as a leading edge trigger, retriggerable one-shot.
 3. U10 is wired as a lagging edge trigger, retriggerable one-shot.
 4. U4040 is lagging edge trigger; 0V on reset to enable.
 5. 555 reset must be +V to oscillate.





J2 pin #	"Q"	Decimal	Binary									
9	1	1	0	0	0	0	0	0	0	0	0	0
7	2	2	0	0	0	0	0	0	0	0	0	0
6	3	4	1	0	0	0	1	0	0	0	1	0
5	4	8	1	1	1	0	1	1	1	0	1	1
3	5	16	1	1	1	1	0	0	0	0	1	1
2	6	32	1	1	1	1	1	1	1	1	0	0
4	7	64	0	1	0	1	0	1	0	1	0	1
13	8	128	0	0	1	1	0	0	1	1	0	0
12	9	256	0	0	0	0	1	1	1	1	0	0
14	10	512	0	0	0	0	0	0	0	0	1	1
15	11	1024	0	0	0	0	0	0	0	0	0	0
1	12	2048	0	0	0	0	0	0	0	0	0	0
	minutes		1	2	3	4	5	6	7	8	9	10
	seconds		60	120	180	240	300	360	420	480	540	600

Table 2a. How the 4040 counts, on the basis of 12 inputs, shown in both decimal and binary numbers.

two things: First it presents a “1” to the reset input of the 555 oscillator U8 (U10), which requires a logic high signal to begin running at 1Hz (more on this later), and secondly a valid “1” to one of the two inputs for U2D (U9A) (another two-input AND gate).

When U2C (U9B) sees a logic “1” valid signal detect from U2B (U2A) via D3 (D2) and from the 4040 counter U5 (U7) via U3A (U3B) before it reaches the 3-minute count, PTT 1 will be enabled. When the signal received from the radio is lost, U2C (U9B) turns off (logic “0” on the output), the 555 timer U4 (U10) stops, and U2D (U9A) loses one of two logic “1” inputs and unkeys the radio.

Diodes D1-D4 act like an “OR” gate so that the not-Q output of U1A (U1B) (discussed further momentarily) will provide a logic “1” to enable both the PTT and start the time-out timer.

U8A (U8B), also a 4538 monostable oscillator, is wired in *lagging* edge trigger so that when the squelch signal is lost (logic “0”), it will trigger an output (again, as determined by T=RC) through the diode “OR” gates, following the same sig-

nal path through the time-out and PTT signals as described above. This time period serves as the “hang” time after a received signal is lost before the transceivers in this remote base toggle back to receive mode.

At this point, there are a few things that need to be mentioned about the operation of the 4040 counter. First of all, the “reset” function is a bit contrary to what we’re used to: Unlike the 555 timer that needs its reset to be tied to a logic “1” (+V) to operate, the reset of the 4040 counter is actually requires a logic “0” in order to run, which is why a 4069 inverter (U3) is needed. Secondly, the clock triggers on the *lagging* edge trigger. To maintain the standard positive-going logic to which we’re all accustomed (and which is used throughout this circuit as well as being typical of the operation of the majority of IC in common use), a 4069 inverter (part of U3) is used on the clock input.

Using the 4040s reset input to turn the I.C. on and off has the benefit that when it starts counting, it will always start with a count of zero.

Since we want to enable the circuit when the counter has *not* reached a maximum count of 3 — when a four-input AND gate (U6, a 4082 I.C.) has a logic “0” on its output — we must create a logic “1” when 3 minutes has not been reached — switching to “0” when we have counted up to 3 minutes — we again use a portion of a 4069 inverter (U3). This will provide the “1” or “0” logic level to the second input of U2D (U9A) to enable the PTT.

When the 4040 has reached a count of 3 minutes, it disables the PTT through U2D (U9A) as well as turning U2C (U9B) off to stop the 555 timer until (going backwards — i.e. “upstream”) the received signal is lost and can be reset through the inverter on the counter’s reset line.

Therefore:		
Minutes	Seconds	Binary
1	60	111100
2	120	1111000
3	180	10111000
4	240	11110000
5	300	101101000
6	360	101101000
7	420	110101000
8	480	111100000
9	540	1000011100
10	600	1001011000

Table 2b. The binary counts for several commonly-used times for various applications.

Timer Considerations

Those who are familiar with timer circuits — specifically the 555 timer — might remember that the 555 can be wired as



monostable oscillator. While true, there were considerations that made me turn to an alternate approach. Theoretically, resistance and capacitance values can be calculated to provide a 3-minute time span. On the practical side, though, things aren't quite so easy. For example, high value capacitors — at least the commonly available, affordable types — have enough leakage that, when combined with the high resistance values also involved with this approach, won't work. The capacitors I've experimented with were just leaky enough that they would not charge to the point of allowing the circuit to work. Additionally, the common types I've seen have a rather wide tolerance range that would quite easily cause the timing to be off by quite a bit.

Since my design objectives include the sourcing of low-cost and readily available parts (making reproducing circuits easier for everyone), I had to find a more practical approach. I started off by finding the proper components, leading me to wire the 555 to operate at a more moderate speed. Since a 1-Hz signal could easily be divided down to whatever time length we need, I started my time-out timer design with those objectives in mind. I found that the 4040 counter was a good fit. Unlike other counters, it's able to count to a rather high number (see *Table 2*), making it very versatile for amateur radio applications. For example, by choosing different connection points of the 4-input AND gate on the 4040s output, I can have the circuit count as many or few minutes as would apply in the hamshack such as time-out functions, ID reminder, etc. — but let's save a few of those considerations for our next project!

In Conclusion

The circuit we've discussed provides all the basics we need to operate a remote base or link — connecting two or more radios together — while also meeting FCC requirements by including a time-out timer. If you want to get on the air quickly or simply get something running without a lot of complexity, you've got it made!

For the more adventurous builder, let your imagination be your guide. While this circuit will operate well as a stand-alone piece of equipment, there are always options to add, such as the DTMF decoder discussed in the March 2018 issue of *CQ*, or expand the number of bands that you can access as described in the "Link it All!" article in the October 1995 issue of 73 magazine (pages 32-33).

announcements (from page 26)

NOVEMBER

ENID, OKLAHOMA — The **Enid Amateur Radio Club** will hold the **2018 Enid Hamfest** beginning 8 a.m., Saturday, November 3 at the Garfield County Fairgrounds-Hoover Building, 302 E. Oxford Avenue. Contact: Bill, W5E1Y, (580) 716-4788. Email: <nokes3139@gmail.com>. Website: <www.enidarc.org>. Talk-in 147.375+, 444.825+, or 145.290-. VE exams.

INDEPENDENCE, MISSOURI — The **Raytown Amateur Radio Club** will hold its **2018 Hamfest** from 8 a.m. to 1 p.m., Saturday, November 3 at the American Legion Post 21, 16701 East U.S. 40 Highway. Contact: Dan, KCØNYT, (816) 674-8854. Email: <dlcole640@gmail.com>. Website: <www.k0gq.com>. Talk-in 145.17-. VE exams.

LAKEWOOD, COLORADO — The **285 TechConnect Radio Club** will hold the **2018 Fall TechFest** from 8 a.m. to 3 p.m., Saturday, November 3 at The Bridge Church at Bear Creek, 3101 S. Kipling Street. Website: <www.na0tc.org>. Talk-in 145.145- (PL 107.2).

LAWRENCEVILLE, GEORGIA — The **Stone Mountain Hamfest** and **2018 ARRL Georgia State Convention** will be held from 8 a.m. to 4 p.m., Saturday, November 3 and from 8 a.m. to 2 p.m., Sunday, November 4 at the Gwinnet County Fairgrounds, 2405 Sugarloaf Parkway. Contact: Stone Mountain Hamfest, P.O. Box 1282, Stone Mountain, GA 30086. Phone: (855) 786-8643. Website: <http://stonemountainhamfest.com>. VE exams.

MILWAUKEE, WISCONSIN — The **Milwaukee Repeater Club** will hold its **34th Annual Swapfest** from 8 a.m. to noon, Saturday, November 3 at the Elks Lodge, 5555 W. Goodhope Road. Contact: Karen, KC9WQJ, (414) 578-0492. Email: <kc9wj@gmail.com>. Website: <www.mrc91.org>. Talk-in 146.910- (PL 127.3).

NORFOLK, NEBRASKA — The **Elkhorn Valley Amateur Radio Club** will hold the **2018 Northeast Nebraska Hamfest** from 8:30 a.m. to 2:30 p.m., Saturday, November 3 at CHC Hall, 105 West Elm Avenue. Contact: Fred Wiebelhaus, KØFJW, (402) 992-7653. Email: <fwiebelhaus@cableone.net>.

APPLETON, WISCONSIN — The **Fox Cities Amateur Radio Club** will hold its **2018 Swapfest** beginning 8 a.m., Sunday, November 4 at Monarch Gardens, 2311 W. Spencer Street. Contact: Anthony Mach, AB9IO, (920) 858-6300. Email: <hamfest@fcarc.club>. Website: <www.fcarc.club>. Talk-in 146.76 (PL 100). VE exams.

CANONSBURG, PENNSYLVANIA — **Washington Amateur Communications Inc.** will hold the **WACOM 2018 Hamfest** from 8 a.m. to 3 p.m., Sunday, November 4 at The Printscape Arena at Southpointe, 114 Southpointe Boulevard. Contact: Bud, N3TIR, (724) 350-6745. Email: <bud@n3tir.com>. Website: <www.wacomarc.org>. Talk-in 146.790, 147.285, 147.390, 145.250, and 147.315 (PL 131.8 for all). VE exams, card checking.

ALPHARETTA, GEORGIA — The **North Fulton Amateur Radio League** will hold **HamJam 2018** from 8:15 a.m. to 1 p.m., Saturday, November 10 at the Mill Springs Academy, 13660 New Providence Road. Contact: Wes Lamboley, W3WL, <w3wl@aol.com>. Website: <www.hamjam.info>.

MANITOWIC, WISCONSIN — The U.S.S. Cobia's, a WWII submarine, radio (**NB9QV**) will be activated from 1400-2100 UTC, Saturday, November 10 and Sunday, November 11 to honor Veteran's Day. Frequencies include 7.240 and 14.240 MHz +/- QSL to W6BSF with a #10-sized SASE to 4932 S. 10th Street, Manitowic, WI 54220.

MARANA, ARIZONA — The **Oro Valley Amateur Radio Club** will hold its **Hamfest** from 7 a.m. to 1 p.m., Saturday, November 10 at the Marana Middle School, 11285 West Grier Road. Email: <hamfest@tucsonhamradio.org>. Talk-in 146.620-, 444.100+, 147.320-, 447.525- (PL 156.7 for all). VE exams, card checking.

MONTGOMERY, ALABAMA — The **Montgomery Amateur Radio Club** will hold its **2018 Hamfest** and the **2018 ARRL Alabama Section Convention** beginning 8:30 a.m., Saturday, November 10 at the Alcazar Shrine Temple, 555 Eastern Boulevard. Contact: Fred Beatty, K8AJX, (334) 270-0909. Website: <www.w4ap.org>. Talk-in 146.84-. VE exams, card checking.

PINELLAS PARK, FLORIDA — The **St. Petersburg Amateur Radio Club** will hold **SPARC Fest** from 8 a.m. to noon, Saturday, November 10 at Freedom Lake State Park, 9990 46th Street North. Contact: Ed Erny, NZ1Q, <vice-president@sparc-club.org>. Website: <www.sparc-club.org>. Talk-in 147.06+. VE exams.

FORT WAYNE, INDIANA — The **Allen County Amateur Radio Tech Society** will hold the **46th Annual Fort Wayne Hamfest & Computer Expo** and **2018 ARRL Central Division Convention** from 9 a.m. to 4 p.m., Saturday, November 17 and from 9 a.m. to 2 p.m., Sunday, November 18 at the Allen County War Memorial Coliseum, 4000 Parnell Avenue. Contact: Hamfest Chairman (260) 579-2196. Email: <chairman@fortwaynehamfest.com>. Website: <www.fortwaynehamfest.com>. Talk-in 146.880-. VE exams, DXCC / WAS card checking.

BENSON, NORTH CAROLINA — The **Johnston Amateur Radio Society** will hold its **Hamfest** on Sunday, November 18 at the Benson American Legion Post 109, 605 North Wall Street. Contact: Mark Gibson, (919) 614-6822. Email: <president@jars.net>. Website: <www.jars.net>. Talk-in 147.270+ or 146.970-.

WEST PALM BEACH, FLORIDA — The **Palms West Amateur Radio Club** will hold **The Fall 2018 WV41 Memorial Flea Market** from 8 a.m. to 1 p.m., Saturday, November 24 at the Alpert Family Service Center, 5841 Corporate Way. Contact: John, K2CIB, <radiowhiz@gmail.com>. Talk-in 147.045+ (PL 110.9).

WORLDWIDE — **FISTS Friday** will be held from 0000-23:59 UTC, Friday, November 23 to encourage FISTS/CW activity during the Thanksgiving weekend. Frequencies include 28.058, 24.908, 21.058, 17.085, 14.058, 10.118, 7.028, 3.558, and 1.808 MHz. QSL to <awards@fistsna.org>. Website: <www.fistsna.org>.

DECEMBER

DELTA, OHIO — The **Fulton County Amateur Radio Club** will hold its **Winter Hamfest** from 8-11 a.m., Saturday, December 1 at the Village of Delta Memorial Hall, 401 Main Street. Contact: Bryan Patterson, KBELG, (419) 822-5038 or (419) 250-6694. Email: <kb8elg@hotmail.com>. VE exams.

MESA, ARIZONA — The **Superstition Amateur Radio Club** will hold **Superstition SuperFest 2018** from 8 a.m. to 4 p.m., Saturday, December 1 at Mesa Community College, 1833 W. Southern Avenue. Email: <info@superstitionsuperfest.org>. Website: <www.sperstitionsuperfest.org>. Talk-in 147.120+ (PL 162.2), 448.275- (PL 100), 449.600- (PL 100). VE exams, card checking, fox hunt, special event station K7A.

OCALA, FLORIDA — The **Silver Springs Radio Club** will hold its **Hamfest** from 7:30 a.m. to 2 p.m., Saturday, December 1 at the Southeast Livestock Pavilion, 2232 NE Jacksonville Road. Email: <hamfest@k4gso.us>. Website: <http://k4gso.us>. Talk-in 146.610 (PL 123). VE exams.

MADISON HEIGHTS, MICHIGAN — The **L'Anse Creuse Amateur Radio Club** will hold its **46th Annual Swap & Shop** from 8 a.m. to noon, Sunday, December 2 at UFCW Local 876 Hall, 876 Horace Brown Drive. Contact: Russ Price, N8HAR, <n8har1977@gmail.com>. Website: <www.n8lc.org>. Talk-in 147.08+ (PL 100). VE exams.

PLANT CITY, FLORIDA — The **Florida Gulf Coast Amateur Radio Council** will hold the **43rd Annual Tampa Bay Hamfest and Electronics Show** and **2018 ARRL West Central Section Convention** from 1-6 p.m., Friday, December 7 and from 8 a.m. to 4 p.m., Saturday, December 8 at the Strawberry Festival Grounds Expo Building, at the intersection of Lemon Street and W. Palmetto Avenue. Website: <www.tampabayhamfest.org>. Talk-in 146.685- (PL 127.3) or 147.165+ (PL 136.5). VE exams, WAS / DXCC / IARU / VUCC card checking.



DX

BY BOB SCHENCK, N200

3D2EU Rotuma — an Unforgettable DXpedition

This month, I am turning the keyboard over to Ronald Stuy, PA3EWP, who will tell you about his recent DXpedition to Rotuma. The team consisted of Hans Werner Griessl, DL6JGN (team leader); Ernö Ogonovsky, DK2AMM; Heye Harms, DJ9RR; Ronald, PA3EWP; and Tony De Ramon N'Yeurt, 3D2AG. It is worth noting that the team did some humanitarian work in conjunction with the visit. I want to thank Ronald for sharing his story for this month's DX Column. I hope you all enjoy it. —N200

3D2EU DXpedition to Rotuma, IOTA OC-060

February 24 – March 15, 2018

BY RONALD STUY, PA3EWP

Rotuma is an island in the Republic of Fiji. It is 650 kilometers (404 miles) north of the main island, and is therefore a separate DX entity. Only a few amateurs have activated this island. Tony, 3D2AG, goes there a few times a year for his work and family visits. In 2014, a large

*Email: <n200@comcast.net>

group of amateurs was active from the island as 3D2R. Operating from Rotuma was on our wish list for a few years. This year we realized it, but certainly not without setbacks, including health issues, extreme humidity, and running out of beer!

Rotuma is not a tourist island — there are no hotels there. If you go to Rotuma (*Photo A*), you always have to stay with local people. You can get there by boat, which sails once a month from Fiji, or by a weekly flight from Suva, Fiji's capital. The plane that makes the trip is small because — until earlier this year — the runway on Rotuma was on a lawn. When the plane cannot land due to bad weather, the flight is postponed until the weather improves. During our stay, crews were working on a paved runway to help make flights possible even in bad weather.

The period we chose was in the winter months in order to make use of the propagation on the low bands. The disadvantage of this period is that it is also hurricane season in the Pacific.

Help From a Local Ham

In the middle of 2017, we contacted Tony, 3D2AG, who lives in Suva, asking about the possibilities of activating Rotuma. After many email exchanges, we decided to accept an offer Tony put before us. He would join our team and we would stay with his family in Fapufa, one of the villages on Rotuma. We were not happy with this location because it is directly



Photo A. Rotuma Island is part of the Republic of Fiji, but with a 400-mile separation from the main island, it is a distinct DX entity. If you get out a magnifying glass, you might be able to see the village of Maftoa on the far side of the bay. (Photos courtesy of 3D2EU team)

Behind a hill that faces toward Europe, which meant working Europe only via long path. After some discussions, we decided to take a second location on the north side of the island, in the village of Maftoa. This location had previously been used by American operators, and included a house (radio shack) at the beach with a clear view to Europe. We would stay with John and Harieta Bennet, whose guest house was



Photo B. Each day, fuel for the generator had to be pumped into a jerry can from one of the two barrels of diesel fuel the team brought along from Fiji.



Photo C. The 3D2EU DXpedition team on Rotuma. From left, author Ronald Stuy, PA3EWP; team leader Hans Werner Griessl, DL6JGN; Ernö Ogonovsky, DK2AMM; and Heye Harms, DJ9RR. Fifth team member Tony De Ramon N'Yeurt, 3D2AG, helped make many of the advance arrangements but was unable to join the operation.

about 400 meters from the radio shack. The plan was that two operators would be active from Maftoa and the other two would operate with Tony from Fapufa.

Tony arranged most of the things for us in Fiji — authorizations, customs documents, receipt of our shipped boxes, making local purchases of materials, and shipment of most things to Rotuma. Without Tony, it would have been even more difficult to realize our goal.

A few weeks before our trip, Tony told us he could not come along because he could not get the vacation days at work. The house in Fapufa was therefore not available. We decided that all four operators would stay and operate in Maftoa. In retrospect, this was much better than being active from two different locations.

Because we were very limited with our luggage on the flight to Rotuma, we had to send materials on beforehand from Fiji to Rotuma by boat. Two crates were packed with different materials such as: Fiberglass masts, coax cables, guy materials, bandpass filters, receiving antennas, tools, 220-volt junction boxes and extension cords, a homemade amplifier, power supplies, and so on. In total it was about 150 kilograms (330 pounds) of materials. The crates arrived in Fiji the first week of January.

There is very limited electric power on the island; each village has its own facilities. Fapufa has no mechanically-generated electricity at all — it's 100% solar. The village of Maftoa has a community generator that is only active from 1800 to 2100 local time. For us, this was not an option. We therefore bought a generator on Fiji for our time on Rotuma. We also took two barrels (400 liters/106 gallons) of diesel fuel on the ship. In this way, we had our own power supply and were independent of the village generator (*Photo B*).

There was a tropical storm around Fiji a week before our departure for Rotuma — all flights and the boat were postponed indefinitely. This was quite exciting, but fortunately it worked out well. We flew in on a Friday and the boat carrying our gear had arrived the previous day.

Arrival and Setup

We arrived on Rotuma about 2-1/2 hours later than expected (*Photo C*). We knew there would only be a few hours of daylight left and there was virtually no chance that we could be active that evening.

After a visit to the guesthouse, we went to the radio shack. This was a big disappointment. We found a building that had not been inhabited for 10 years, had no windows or doors, and a roof which was as leaky as a sieve (*Photo D*). There was mold on all the walls due to the moisture (*Photo E*). There was one room that was reasonably dry, so we used it (*Photo F*). The roof was sealed by a local resident with a piece of sail cloth. We also searched for a suitable place for the generator that was placed about 10 meters from the house. We also quickly looked at the beach for where to put the antennas the next day. After all these preparations it was dark and we went back to the guesthouse for dinner. That ended our work for the evening.

We started working at sunrise the next day. Unfortunately, we could not place the antennas on the beach because it was high tide, which left no beach available for antennas. Preparations were made to erect the antennas two hours later. It quickly became apparent that we wouldn't finish all of the antenna work that day, so we focused on the antennas for 10 to 40 meters. The low-band antennas would wait for the next day. We also realized that we would not be able to place the 18-meter (60-foot) fiber masts on the beach. We

asked John if there was someone in the village who wanted to climb the palm trees for us to hang a pulley for 80- and 160-meter wire antennas. John arranged for a climber the next day.

The 40-meter antenna was perfectly positioned on some rocks about 1 meter above sea level. The other two multi-band antennas were placed in a way that they were free of the trees. The biggest challenge was the guy wires, which had to be placed in the sea. Fortunately, there were some rocks found at low tide that we found to be suitable. The first day we were able to make QSOs on all bands up to 40 meters.

The next day, a local boy from village climbed into the selected palm trees to fix pulleys as high as possible (*Photo G*).

Heye and I focused on the 80- and 160-meter antennas. We first installed the 160-meter inverted-L. Unfortunately, it was not directed entirely towards the north (Europe) but we did not have other options. We only had room to install a single elevated radial. This also had certain “bends” in it. There was simply no space to put up a second radial. After some minor adjustments in length, the resonant frequency and SWR were good.

In the afternoon, we installed the 80-meter inverted-L, and had to hurry because the afternoon high tide was rapidly approaching. The palm tree we used for 80 was a little shorter than the 160-meter palm tree. The last 3 meters were horizontally pointed towards the north. Because of a lack of space, we

also had just a single elevated radial, which was pointed so that it hung free from the trees and could not affect the other antennas. Almost the entire beach was filled with our antennas — we could not do much more with the available space (*Photo H*). Fortunately, we had enough coaxial cabling with us because some antennas needed more than 60 meters (nearly 200 feet) of cable to get into the shack.

Generating Goodwill

With most of the antenna work behind us, we also had to find another place for the generator, because the neighbors complained about the noise. It was indeed very loud. We placed the generator under our house, which allowed the neighbors to sleep normally again. The disadvantage for us was that when the weather was calm, the exhaust gases came directly into the shack. We had to take regular breaks to breathe some fresh air for 5-10 minutes.

The next day, I put up the K9AY receive antenna, which was about 15 meters away from our house. This K9AY could be used on multiple radios thanks to a splitter and bandpass filters from Stockcorner (thank you, Casper). In most situations, the reception on 80 and 160 meters was better on the verticals than with the K9AY. The noise level on the verticals was extremely low.

Inside the Shack

Our station consisted of two Elecraft K3 transceivers and one Elecraft K2. Each station had an amplifier: An Expert 1.3K, a Tokyo High Power 1.1, and a 600-watt homemade amplifier. We used bandpass filters between the sets and the amplifiers.

During the day it was often difficult to be active with all three stations at the same time because we only had two multiband verticals. We regularly used the 40-meter vertical on 15 meters. This worked reasonably well. Later we assembled an additional vertical dipole for 17 meters, which allowed us to combine multiple bands.

Propagation Challenges

The propagation was certainly not optimal in the early days, and there were at least two hours each night when all the bands were dead. Fortunately, the propagation improved a bit later that week. Almost every day during the European sunrise and sunset, we were active on the low bands. However, the



Photo D. The group's “5-star” shack building had no doors or windows and the roof leaked like a sieve.



Photo E. Because of constant exposure to the elements, there was mold on all of the interior walls.

(Continued on page 93)



C4FM/FM 144/430 MHz Dual Band 5W
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DR-2X



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Does Anybody Really Know What Time It Is?

Does Anybody Really Care?

NEWS ANALYSIS AND COMMENTARY
BY RICH MOSESON,* W2VU, EDITOR

“Does anybody really know what time it is?” the rock group Chicago famously asked back in the ’70s, adding, “Does anybody really care ... about time?” The answer to both questions is yes, especially today, when so much of what we do, where we go, and how we get there are dependent on (our devices, at least) knowing the accurate time. It is perhaps appropriate that I’m writing this while on a (delayed) train, since it was the rise of rail travel that was responsible for standard time zones and the need for accurate timekeeping.

The reason I’m writing this is because the nation’s timekeeper, the National Institute of Standards and Technology, has proposed eliminating its time and frequency standard radio stations, WWV, WWVB, and WWVH, in an effort to reduce its budget for the 2019 federal fiscal year. Obviously, this would have significant impact on us hams, but we would be only a fraction of those affected, *unless the funding is restored by Congress*. And it looks to us like that is exactly what the folks at NIST are hoping will happen.

The NIST budget request document¹ is confusing and self-contradictory, at one point saying the services it provides are unique and then saying some are duplicated by others. And the services it is proposing to cut go beyond WWV and its sisters to include technology for safety of first responders, protocols for the electric grid and more.

Here’s the illogical logic of the proposal as it relates to WWV and related services:

“A clear example of the fundamental and infrastructural nature of NIST’s mission work is NIST’s work in the dissemination of the time and frequency standards. The dissemination of the time standard, traceable to NIST’s atomic clock in Boulder, CO, underpins a tremendous amount of activity in our modern commercial system. For example, NIST official time is used to time-stamp hundreds of billions of dollars in U.S. financial transactions each working day. NIST time is also disseminated to industry and the public through the Internet Time Service which receives about 40 billion automated requests per day to synchronize clocks in computers and network devices. Additionally, other technological breakthroughs that we now take for granted are dependent upon the accuracy and precision of NIST’s atomic clocks. This includes cellular telephones, Global Positioning System (GPS) satellite receivers, and the electric power grid.

“Furthermore ... for every tax dollar invested in NIST, almost \$50 of value is created in the economy year over year.

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



WWV Radio Station (U.S. Dept. of Commerce Photo)

There is no other private sector, or government entity having the capability, capacity of mission to provide the types of services as those provided by NIST.”

There you have it ... NIST’s time and frequency standards and their dissemination are essential to the efficient functioning of our financial system, computer networks, cell-phones, GPS location devices, and the electric power grid. There is no other private or private or governmental entity that can provide similar services, and every tax dollar invested in NIST pays a 50-fold return to the economy.

So ... let’s cut the budget for all of these essential and non-duplicatable services by one fifth. That’s exactly what NIST proposes just 10 pages later in the same document:

“The FY 2019 request will reduce NIST’s spending in areas of core metrology and measurement dissemination (by) 20.5 percent...

“Specifically ... NIST will discontinue the dissemination of U.S. time and frequency via the NIST radio stations in Hawaii and Ft. Collins, CO. These radio stations transmit signals that are used to synchronize consumer electronic products like wall clocks, clock radios and wristwatches, and may be used in other applications like appliances, cameras and irrigation controllers.”

Oh, and in case eliminating time synchronization for consumer electronics appliances and irrigation controllers isn’t enough...

“NIST will (also) reduce funding focusing on assessment of technologies for indoor location tracking of first responders, support for smart grid communications protocols, as well as the development of standards for the smart grid and other cyber physical systems, including the elimination of work on the development of standards and guidelines for wireless communications and process control for the manufacturing industry.”

Eliminating these services, says the NIST budget request, will permit it to “consolidate and focus work on NIST efforts in quantum science,” which is certainly important. On the other hand, the budget also calls for a reduction of \$4.1 million “in R&D targeting application of NIST quantum breakthroughs to applied measurement needs, including temperature and atmospheric gas metrology.”

The proposed budget also calls for reducing or eliminating funding for a program to accelerate technology transfer from federal laboratories to industry, and for several environmental research programs.

Impact on Ham Radio and Beyond

The loss of time signals from WWV would affect hams and other HF spectrum users in many ways, well beyond setting our station clocks. Several newer digital modes, including FT8 and other “JT” modes, are highly dependent on the station clocks at each end of a contact being accurate and in sync. The accuracy of internet time is dependent on the speed of your internet connection, which is subject to change, and assumes that you *have* an internet connection.

In addition, frequency calibration of receivers and transmitters is dependent on a known accurate signal source on a known frequency. You can’t calibrate your receiver to 10 MHz over the internet. Plus, WWV’s propagation data is very important to atmospheric and space scientists in addition to hams looking for DX.

Tom Loughney, AJ4XM, adds another dimension to the impact of a possible loss of WWV signals, that on the visually-impaired community.

“While most of the “atomic clocks” use WWVB, there are a lot of blind and low vision people in the US (millions) who use “talking watches” to tell them the time. I fix many of these watches when they fail. They are cheap, less than \$75, so this is just a free public service for those on very limited incomes. I do not charge for my assistance. About 2/3 can be repaired and 1/3 are not fixable due to lack of parts and info. Most use WWVB but a lot use WWV and WWVH. Circuit components are pennies less for those. All come from China or Asia. Getting rid of the 2 big stations will have a significant impact on the blind community.”

(Tom’s note was written before it became clear that NIST planned to shut down WWVB as well as WWV and WWVH.)

Analysis

Clearly, the impact of the NIST’s proposed changes is broad and wide-ranging, from self-setting clocks and watches to tracking systems for first responders inside hazardous structures, and of course, the on-air time and frequency services provided by WWV and WWVH. Overall, the proposal calls for a nearly 28% cut in NIST’s “Fundamental Measurement, Quantum Science and Measurement Dissemination” activities, which are its core missions.

The logic behind the proposed cuts is mystifying, as is the structure of the report, which on one hand explains how these services are essential to the country and cannot be duplicated by anyone else, and on the other hand proposes significant cuts to these very programs.

All we can speculate by reading these tea leaves is that the Commerce Department — NIST’s parent agency — demanded across-the-board budget cuts for the coming fiscal year. Management responded by proposing draconian cuts to its primary missions in the hopes that public outrage would prompt Congress to restore the cuts in the final federal budget. It is the only possibility that makes any sense.

Members of Congress — and particularly of those committees responsible for NIST’s budget — need to know how their constituents and the nation at large would be affected by these proposals and need to be urged to restore funding for these essential programs. According to the amateur radio club at Case Western Reserve University, these committees are the Committee on Science, Space and Technology in the House; and the Subcommittee on Commerce, Justice, Science and Related Agencies in the Senate. The Case ARC lists the members of each of these committees, along with their office phone numbers, on its website at <<https://w8edu.wordpress.com/save-www/>>, which also includes a sample script to read when calling to register your views. You should customize it to your personal uses, and be prepared to answer questions from Congressional staff members about how you use these services and how you would be impacted by their elimination.

Note: This is being written in early September and the situation may change as we approach the October 1 start of the new fiscal year (the final budget is rarely in place by then). Please check the CQ Newsroom at <<http://cqnewsroom.blogspot.com>> for updates before making any calls.

Note:

1. The NIST budget request summary for its Fundamental Measurement, Quantum Science and Measurement Dissemination division is online at <<https://tinyurl.com/y7mrbdxr>>.

what’s new

SOTABeams Tactical 7000hds Telescoping Mast

Designed specifically for mobile operation, the SOTABeams Tactical 7000hds (heavy-duty short) mast will extend up to 23 feet, but will collapse into a 23-inch package that weighs 3.64 pounds and can be tucked into a carry-on bag for air travel.

Constructed of non-conducting, low-loss fiberglass, the 7000hds has 14 sections that lock together using friction. To raise the antenna, users should pull the smallest section firmly with a twisting motion while working to the desired length. When taking down the mast, begin with the largest section. All sections of the mast are hollow to allow wires to be fed through.

The diameter of the base of the mast is 2.05 inches and tapers to 0.16 inches at the top. Wall thickness is 0.1 inches at the base and 0.05 inches at the top.

Mast sections may be removed by unscrewing the endcap at the bottom of the mast, pulling out the built-in base shock absorber and removing unwanted sections. Always replace the shock absorber before use. Unscrewing the end cap also gives you access to make in-the-field repairs.

The Tactical 7000hds mast has a military green finish and comes with a camouflage carry bag with draw strings. It is available now with a suggested retail price of \$91.02 in the EU, \$75.85 outside of the EU. For more information, contact: SOTABeams, Unit 1 The Green, Fountain Street, Macclesfield, SK10 1JN, United Kingdom. Phone: +44 (0) 1625 501643. Website: <www.sotabeams.co.uk>.





There once was a ham ... from Framingham ...
 With words he played tricks ... with a radio mix ...
 Little rhymes with a serving of ham (but no spam).

How I Invented the Hamerick

BY SUMNER WEISMAN,* W1VIV

It all started because of the jackets. Let me explain. After many years of active ham radio operation in Framingham, Massachusetts, I finally decided that it was time to join the local radio club, the Framingham Amateur Radio Association. At the very first club meeting I attended, the president announced that attractive club jackets could be purchased, with name and call letters handsomely embroidered. When I received the next monthly newsletter, I smiled when I saw, in a rather crude limerick form, an attempt to convince members to purchase the club jackets. Here was something I knew! In the past, I had won a couple of limerick contests. I think I have always been attracted to limericks because they allowed me to combine two of my favorite pastimes, humor and playing with language. So I mischievously sent this reply to the club mailing address.

*I have read your sales pitch for the jacket,
 But your limerick didn't quite hack it.
 I have sunk all my dough
 Into Ham Radiough
 And therefore, I'll just have to lack it!*

To my complete surprise, the limerick appeared in the club's next monthly newsletter. At the following meeting, I offered to supply more if they were interested, and again to my surprise, they accepted. That was how the "hamerick," or ham limerick, was born.

For the next issue of the newsletter, which was just before Field Day, I submitted,

*On Field Day in Framingham, Mass.,
 Everybody forgot to buy gas.
 When the generator sputtered
 The club members uttered
 Profanity totally crass.*

People liked it! For a long time after that, I had a wonderful time. Now I could add my third big interest, ham radio, to my other interests — a perfect poetic triple header.

The next month's Hamerick was written for my serious DX chasing friends. I wrote:

*Said young John, who sounded quite bored
 As he shut off the rig and ignored
 A Martian CQ
 That was barreling through,
 "It's the postage I just can't afford!"*

*43 Agnes Drive
 Framingham, MA 01701
 Email: <w1viv@rcn.com>

I found myself creating Hamericks in the shower, in bed, during my drive to work (dangerous), and even on walks with my XYL (definitely not recommended). Most came easily into my head — they almost created themselves. Others required hours of mental struggle to get them just right. The trick was to make them look easy, even if a lot of work was needed.

Each month, a new one was produced. Some, like these examples, were done just for fun.

*QSL cards? I've received nearly all.
 My collection is surely not small.
 From ceiling to floor,
 From window to door,
 See "The Ham-writing on the wall!"*

*An ambitious young Tech class named Willy
 Took the General class test with Aunt Millie.
 Well, Aunt Millie passed,
 But Willy? Alas...
 Aunt Millie made Willy look silly.*

*I will gladly admit that I'm
 On CW much of the time.
 The music of code
 Makes my troubles unload,
 -... ..- /.. /.- —- .. /..- .. — ..- ..- /..- .. -
- /
 -- /.- ..- — — .!*

Not all were just in fun, though. The monthly Hamerick could also be serious. It presented a fine opportunity to pass along some words of advice and tips on good operating practice to less experienced hams. Here are a few examples:

*Don't let code phobia hobble you
 If you can't copy high speed CW.
 There are nice folks on phone
 So you won't be alone
Just have fun and do not let it trouble you!*

*Way up at the top of 2 meters
 Dwell a couple of super-power cheaters.
 When they fire up their amps
 It dims all the lamps
 And blows out the local repeaters.*

*QSL, QRX, QRT...
 On code, they have meaning, you see.
 But when we meet on phone
 Leave "Q" signals alone,
 For the words are much better to me.*



Here is the challenge: In only five lines, and with a specific format, the writer has to tell a complete short story and create an image in the mind of the reader. It's not always easy. Some, like this one, take a while to work out.

*Old Sam died during operation
Of his excellent VHF station.
And I have no doubt
That his friends laid him out
With horizontal polarization.*

Occasionally, I found myself being controlled by the poetry rather than the other way around. In this whimsical example, I created a typical five-line Hamerick, and then realized that it was incomplete. Two more verses were needed to complete it.

*I clearly heard in my wall
A three-by-three CQ call.
It was quite a disaster
When I ripped out the plaster
And found a ham cricket – that's all.*

*Said I, "There's a chirp on your tone
That a CW man cannot condone.
Only 5-7-2
Is all I'll give you,
Clean it up or you should be on phone."*

*The cricket, with a bit of a sigh,
Said, "I'm sure you're correct that I
Have a chirp that sounds funny,
But I'm saving my money
For a regulated power supply."*

What about your local club newsletter? Wouldn't its editor like a little ham radio humor? Try your hand at poetry, in limerick or other form, or a short, funny story about your experiences. Editors need lots of material to fill each issue, and you may be surprised how quickly it will be accepted.

And what are my future plans? Well...

*Rhyming humor for hams – that's my plan.
I'll create it whenever I can.
And I'll make you smile
Every once in a while,
For I am the Hamerick man!*



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WA9PYH got the HF mobiling bug from a friend ... but discovered he could have a lot more fun on the bands with a properly tuned, well-matched, multiband mobile antenna system. He shares his modifications for making band changes quick, easy, and efficient.

Mobile HF Fun With a Well-Tuned Antenna System

BY JIM KOCSIS,* WA9PYH

I have been on the air since 1964 and, until now, have only operated 6, 2 and 450 FM mobile. Then, a ham friend of mine, John Raifsnider, W8JER, showed me his installation of an HF rig and antenna in his SUV. After he told me about the fun he was having, I just had to try HF mobile operation.

I bought the same rig (Yaesu FT857D), antenna, and antenna mount as John and have been very successful in my mobile operation. The cost of all antenna components was \$150. I drive a fairly small car (2010 Suzuki Forenza). With the antenna mounted at the bottom corner of the trunk lid (*Photo A*), the tip is, at most, 91 inches above ground level.

Making Mods

The antenna assembly consists of two parts: The OPEK model HVT-600 antenna (\$80) with built-in tapped loading coil/variable length whip, the Diamond model K400C base/mounting bracket (\$70), and a 15-foot length of RG58 coax. The antenna is described as useable on 80 through 2 meters but I use a separate antenna for 2 meters / 70 cm operation since my rig has separate antenna connections for HF and VHF/UHF). These are both excellent products, but being a ham, I modified them both to improve performance and reliability in my specific situation. The modifications include adding a metal collar / thumbscrew assembly that tightens the whip, replacing the jumper wire with solid wires, and building a small matching network. A length of #12 solid copper wire, banana plugs, a small chassis, two SO-239 connectors, and a ceramic rotary switch are all that are needed.

Except for the antenna and mount, I found all the parts in my junkbox. If you don't have them, check out your local hamfest before buying new.

Changes to the Hardware

John suggested a change to the antenna in which the supplied jumper wire

(with a banana plug at each end) is replaced with solid copper wire soldered to banana plugs. The supplied jumper is very flexible and thin. It will bounce around in the wind and likely fail. Also, a base-loaded antenna like this has a lot of current in the coil, so large conductors are needed to reduce

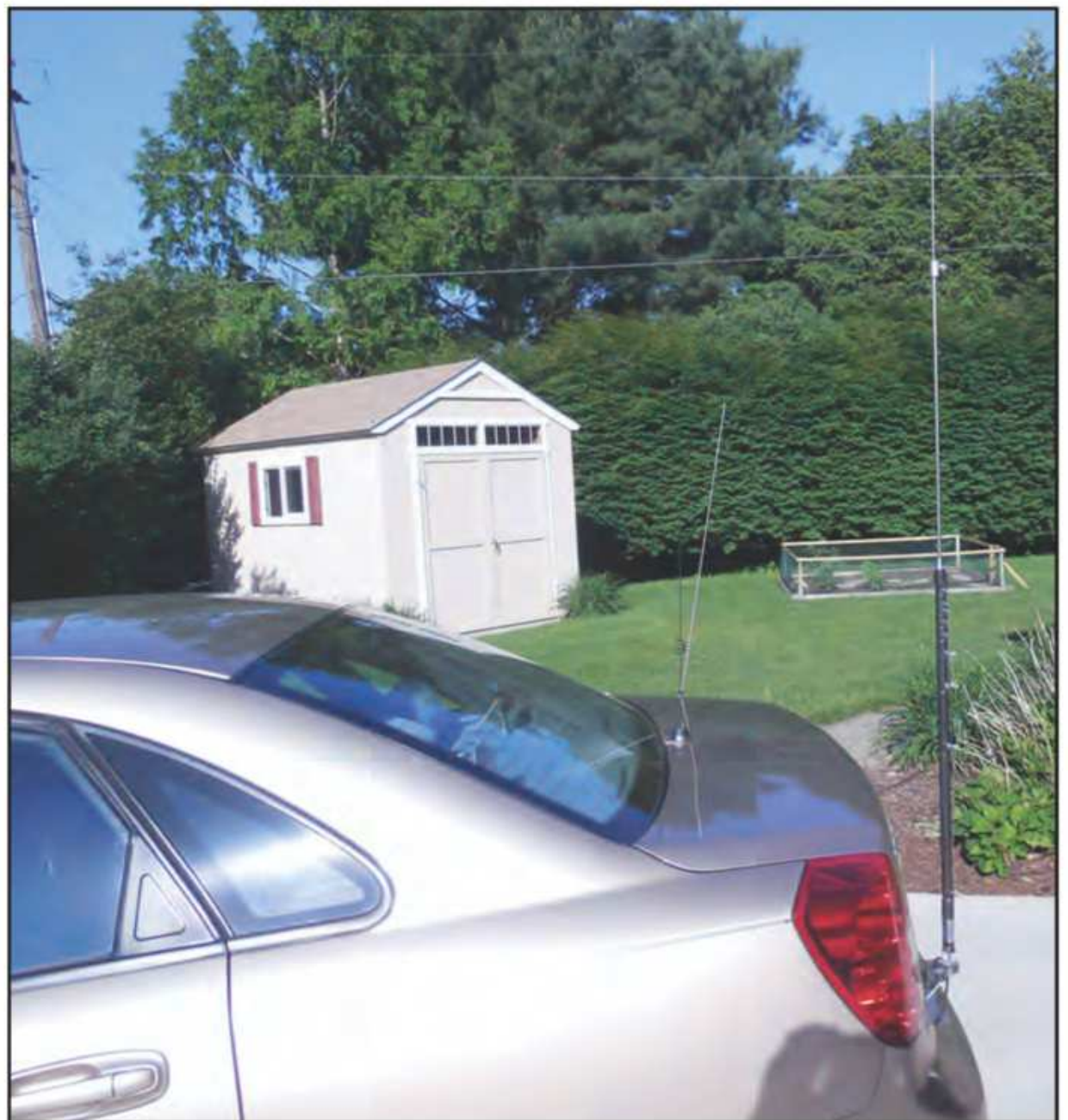


Photo A. The author's modified OPEK HVT-600 multiband HF mobile antenna, mounted to his car with a Diamond K400C base and mounting bracket.

* email <sadiekaty@sbcglobal.net>



Photo B. Comparison of the antenna's supplied jumper cable (bottom in photo) with band-specific, solid-copper jumpers fabricated by the author.



Photo C. The collar and thumbscrew with which the author replaced the Allen screw for tightening the whip. The whip length needs to be adjusted with each band change and the tiny Allen setscrew was too easy to drop and lose.

power lost in the form of heat in the jumpers. Power lost here cannot be recovered and, with a compromise antenna like this, you need to radiate as much power as possible. I fabricated jumpers for each band using #12 solid-copper wire and banana plugs soldered on at each end. See *Photo B* for a comparison of the supplied jumper vs. homebrew jumpers. In my installation, some bands need two jumpers as the inductance required the use of two separate sections of the loading coil. First, you will have to determine what jumpers are needed. I found the suggested jumper positions and whip length in the instructions to be way off from my final values. Tuning the antenna to resonance will require an antenna analyzer and a selection of capacitors (or possibly inductors) to cancel out the inductive (or capacitive) reactance at the feed-point. Jumper settings and capacitor or inductor values will

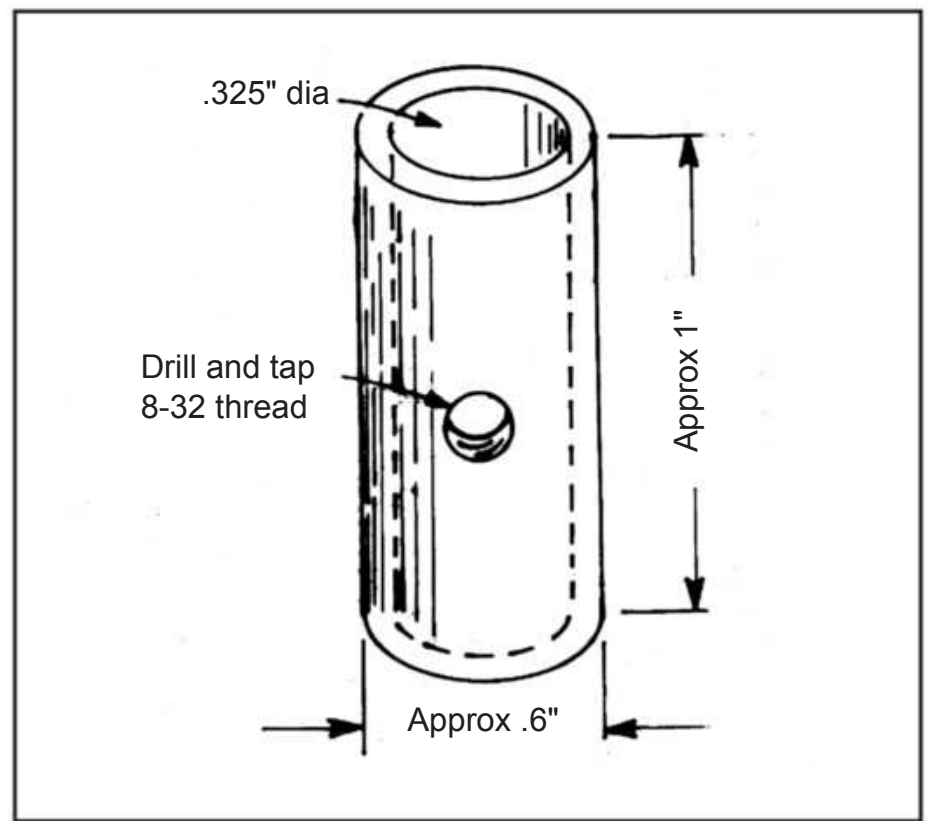


Figure 1. Dimensions for the whip collar shown in *Photo C*.

vary based on where you mount the antenna, the shape of your car, etc.

The whip part of the antenna is secured in place by a tiny Allen screw as it comes from the manufacturer. After dropping the Allen wrench underneath the car many times, I knew there had to be a better way. The mating threads in the bottom part of the antenna are cut into a very thin metal tube. I drilled out those threads with a 0.165-inch drill to pass an 8-32 thread and fabricated a collar/thumbscrew combination to make tightening/loosening the adjustment much easier and improve the reliability of the tightening mechanism. The fit of the new collar and thumbscrew is such that the thumbscrew goes all the way through to the whip and secures it in place (see *Photo C*). The dimensions of the collar are shown in *Figure 1*. The collar is aluminum and the thumbscrew is coated steel. I made my collar from a part I found in my junk box. A round collar is preferred but a square one will work just fine. This assembly has shown no signs of wear or rust

Photo D. Check the antenna base to ensure both the coax center conductor and shield are connected securely. In the author's case, the shield needed to be reconnected.



Photo E. The author also added a ground wire from the antenna base to the trunk lid to assure a good RF ground connection.

in over two years of exposure to rain and snow. It has been adjusted many times when lowering/raising the whip.

The base needs to be checked to ensure the shield of the coax fits tightly inside the base. When first installed, I noticed the coax was loose where it entered the base. I removed the large screw/plug at the bottom of the base and unsoldered the center connector. The shield was completely cut off and was not making any connection to the base. I cut back the insulation, folded back the braid, cut back the inner insulation and "threaded" the shield back into the base so that it fit tightly. I re-soldered the center conductor and replaced the screw/plug (*Photo D*). I added coax sealant where the coax enters the base to keep out water and

dust. I also added a ground wire from the base to the inside of the trunk lid since the RF connection there was inadequate (*Photo E*). This wire is held in place at the base by a washer and the nut is tightened to make a good connection. The other end inside the trunk is secured using a small metal tapping screw and star washer.

Tuning the Antenna

An antenna analyzer is absolutely required to tune the antenna. To do the testing, I used a Rig Expert AA-170 that graphically shows both SWR and inductive/capacitive reactance. As a starting point, connect the supplied wire jumper to the positions shown in the instructions and wind the wire around the antenna so that it is not too loose. Adjust

the whip to the length indicated in the diagram. Using an antenna analyzer, sweep the band to see if the SWR dips anywhere inside the band. If not, widen the sweep, checking for lower SWR. If the SWR curve is tending toward a lower value at the high end of the band, then lengthen the whip because it is resonating above the band. If the SWR curve is trending toward a lower value at the bottom of the band, then shorten the whip. If you don't see any change in SWR, try different tap settings. You may need two jumpers like my setup for 40 meters. Eventually, you will see a dip. If the SWR is low (e.g., below 1.5:1) you are "home free" and consider yourself lucky! If not, change the analyzer over to reactance curves to see if the antenna is inductive (X_L) or capacitive (X_C) and the value of the resistance (R). Three of the bands on which I operate (40, 30, and 20) were inductive, so I had to add capacitance across the feed-point. The other two bands (17 and 15 meters) didn't need a capacitor or inductor. I used a 700-pF variable capacitor, adjusting it a little at a time until I got the reactance down to zero and the resistance to near 50 ohms by varying the taps and whip length. Make changes to whip length in small increments, no more than 1/2 inch at a time. Keep all car doors fully closed during tuning. I ran all analyzer sweeps from inside the car and used the same length coax that is used in the final setup. Both will change with frequency, so once you get a response, do more adjusting at the center of each band. Typical 1.5:1 SWR bandwidths for my setup were: 50 kHz on 40 meters, all of 20 and 30 meters, and the lower portion of the phone band on 17 and 15 meters. The whip length, tap settings, and parallel capacitance per band are shown in *Table 1*.

The capacitance selector switch box is shown in *Photo F* and the schematic is in *Figure 2*. I used capacitors rated at 1,000 volts and have never had a problem while running 100 watts on all bands.

Performance

Generally, if stations are S5 to S7 on my receiver, I can work them. I have worked a few European stations on 20 meters and my friend John, W8JER, held regular contacts with a station in Slovenia on 17 meters. I've had many QSOs with eastern U.S. stations from my location in northern Indiana.

Additional Changes

- To reduce engine noise, bond the hood and trunk lid to the main chassis.

Band	Tap Setting(s)	Whip Length	Added Capacitance/Inductance
15M	P1-P6	26-1/2"	no added C or L
17M	P1-P5	30"	no added C or L
20M	P1-P4	33"	100 pF
30M	P1-P3	25"	195 pf (for WinLink2000/WinMor ONLY when stationary!)
40M	P1-P2 and P3-P4	35-1/4"	400 pf

Table 1. Tap settings, whip length, and added capacitance or inductance for each band on the author's installation. (Note: P1, P2, etc., refer to the jumper positions on the antenna as shown in the instructions; P1-P5 means the jumper goes from P1 to P5.)

I used the shield from RG8 coax, some metal tapping screws and star washers. Use a wire wheel and hand drill to grind down to bare metal to get a good electrical connection. Also, bind the back end of the tail pipe to the car body.

- To set the length of the whip, I cut a metal tape measure to the longest length needed for all the bands I operate. My measurements go from the tip of the whip to the top of the "cone" at the top of the loading coil. You will need

It's an entirely different world listening to HF while driving. Of course, be careful and keep your attention on the road.

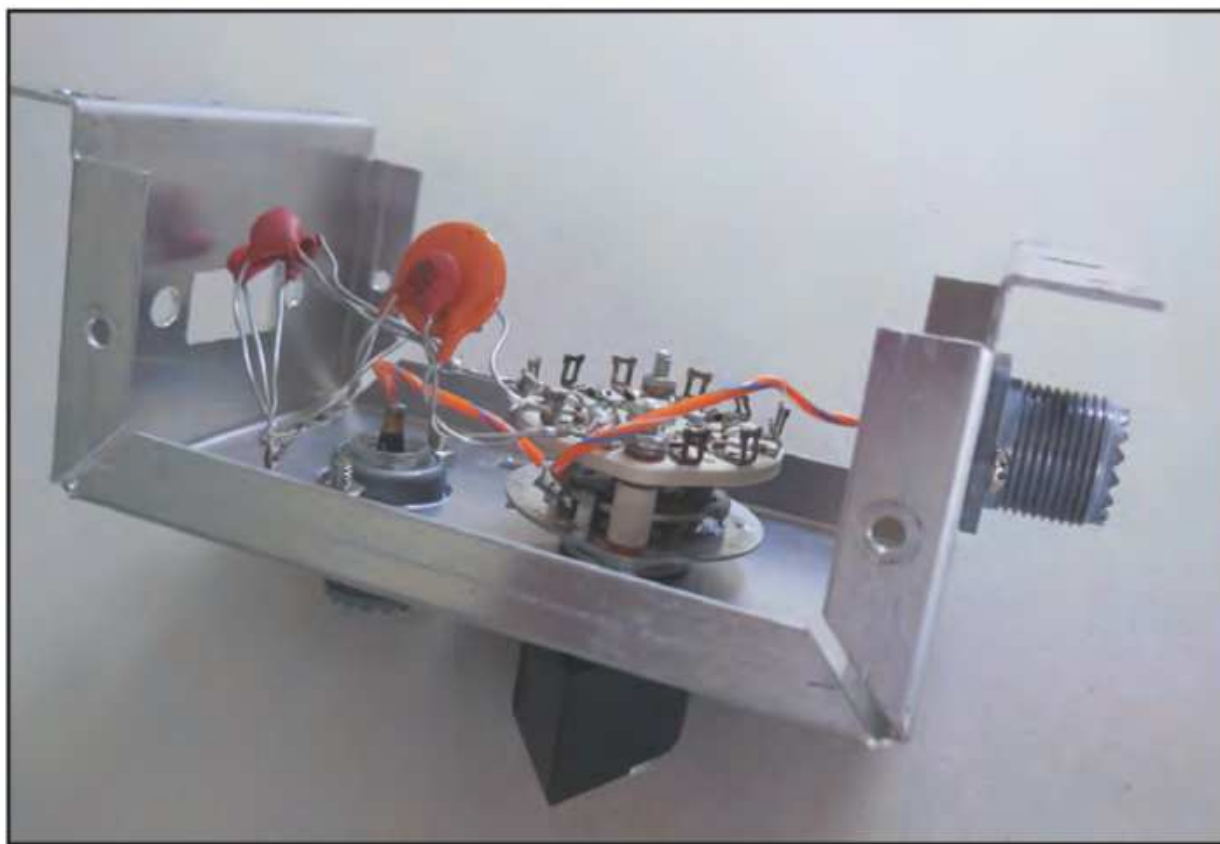


Photo F. The author's capacitance switch box used to make the antenna resonant on different bands. Schematic is in Figure 2.

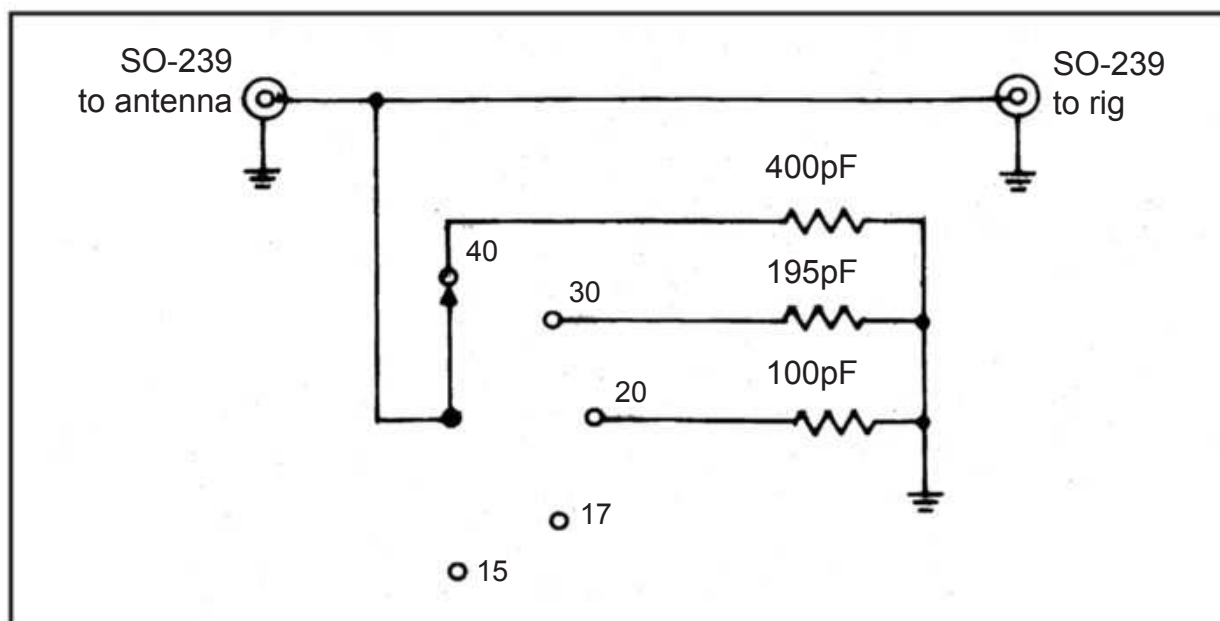


Figure 2. Schematic for capacitance switch box. Each band position adds the amount of capacitance measured as needed to eliminate any reactance on a given band. In his case, only 40, 30, and 20 meters needed additional capacitance.

to set the length of the whip each time you change bands or, for 40 meters, if you move more than 50 kHz from your current resonant point. When changing bands, you will need to change the taps, the whip length, and the capacitance. I made up a little card with a chart to show these settings versus frequency and band. While it's not as easy to use as a motor tuned antenna, it serves my operating style just fine, is relatively inexpensive and lightweight.

Two Warnings!

1: If you ever need to remove the antenna from the mount for any reason, DO NOT twist it by gripping the black plastic. Instead, use a pair of channel locks or large pliers to grip the metal part below the black plastic. I remove mine occasionally and put a small plastic cap on the SO-239 to keep out moisture and dust.

2: When entering a garage or other structure with a low entry, remember to lower the antenna **BEFORE** entering so you don't hit the garage door or frame and bend the antenna. So far, I have only forgotten three or four times and stopped the split second I hit the garage opening. Nothing got damaged except my nerves.

Summary

In two years, I've heard lots of DX, worked a few DX stations (Europe), made many stateside contacts and sometimes just listen to QSOs going on around the eastern half of the U.S. It's an entirely different world listening to HF while driving. Of course, be careful and keep your attention on the road. If you don't feel comfortable driving and talking at the same time, drive to a high, electrically quiet, location and operate from there. Happy HF mobiling!

MATH'S NOTES

BY IRWIN MATH,* WA2NDM

Ultra Low Frequency Communications (Part 1)

Last month, we described a vintage communication system that operated with the magnetic portion of an electromagnetic wave. This month, we will go even lower in frequency, actually into the audio range itself. Due to some personal interest in ultrasonics, we thought it would be interesting to see if you could actually communicate with sound waves themselves in regions just above the audible range. There has been some work done on this by others, including the U.S. government, in free air and underwater, but it seems that not much has happened. Perhaps this is a job for serious amateurs who may even open up a new “non-RF” spectrum. That is the point of our column this month.

Defining Ultrasonic Frequencies

The ultrasonic range most commonly employed is in the region of 40 kHz, which is usually used for remote controls, intrusion alarms, and similar applications; but actually, all frequencies above the top of the audio range that can be heard (roughly above 20 kHz) can also be thought of as

ultrasonic. While not exactly radio, 20+ kHz is normally above the range of human hearing and so-called transducers actually exist to make use of this frequency range. In addition, even some high-end audio tweeters are purported to be able to reproduce signals at frequencies as high as 100 kHz, and we mean audio, not RF. Transmission range does not seem to be very far at first thought, since the signals are still basically audio. But if you live in a community where there is a volunteer fire department (as an example), I am sure you have heard the siren calling members in the event of an emergency even miles away from the siren. Since these audible signals can actually travel several miles, one could infer that ultrasonic signals might at least travel over similar distances, especially when detected by “receivers” more sensitive than the human ear. Considering that Hertz’s initial experiments with electromagnetic waves only covered a few feet, perhaps ultrasonic signals have capabilities we are not aware of yet at this point in time.

Ripe for Experimentation

It is easy for home brewers to experiment in this region.

*c/o CQ magazine

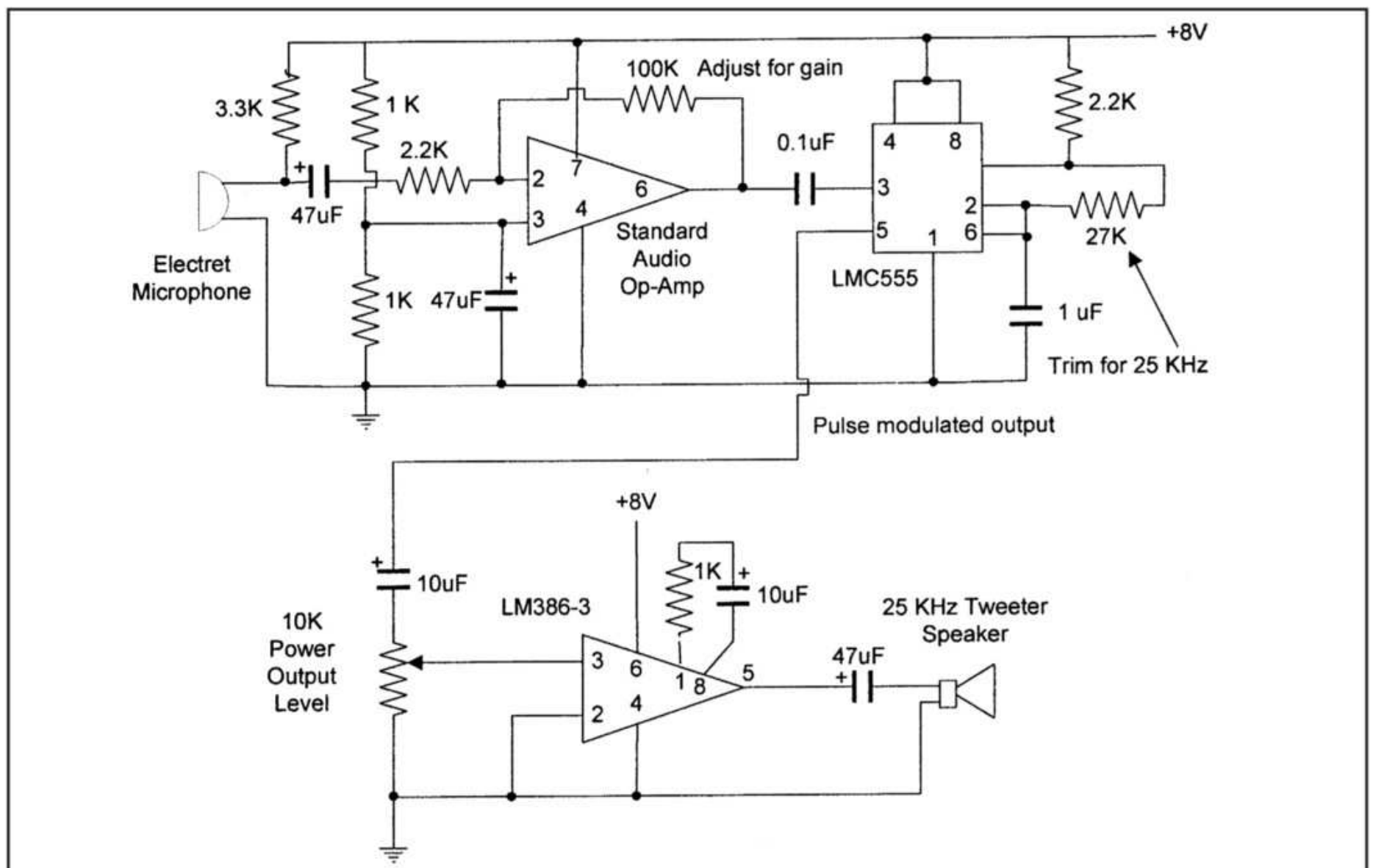


Figure 1. Simple ultrasonic transmitter



Figure 1 is a schematic of a simple pulse width modulated transmitter that converts audio from an electret microphone into a pulse-modulated 25-kHz carrier. We chose this frequency as it can be reproduced by many low-cost audio tweeter-type speakers and is a good, not overly expensive, starting point for experimenters. Unlike 40-kHz transducers, which sometimes have to be tuned, 25 kHz is within the realm of basically untuned transducers. The circuit uses a simple LMC555 that produces the carrier and, being digital, can drive an output stage at whatever power level you wish. The circuit is a modification of one we used for light beam transmission experiments and works quite well. You should adjust the value of the 100 K resistor in the opamp circuit to raise the output of the microphone you use to about 1-volt pp. Similarly, you can adjust the 27K resistor in the 555 circuit to 25 kHz to match the transducer you may have. The opamp is not critical and can be any common device with a bandwidth of at least a couple of hundred kHz.

Amplifier

We need an amplifier that can raise the output modulated pulse from the 555 to a level that can properly drive the "antenna" transducer. The lower portion of the schematic shows a suitable "starter" amplifier. In this case, we chose a common LM386 since it is readily available and low-cost. This chip will provide only around 3/4 of a watt, but you can find circuits that can produce hundreds of watts (in the audio range) if you intend to experiment further. When using higher audio levels, however, be very careful. Even though you may not hear them, high sound levels can still be harmful.

The circuit given here uses the standard data sheet application which results in a gain of about 20 and the 10K pot adjusts the output level to the "antenna" which, as we mentioned, is a common low-cost tweeter. You will note that the capacitor values in the circuit are smaller than in the application diagram because, in this case, we are interested in 25 kHz, not normal audio. Next month, we will describe a suitable receiver.

As a final note, as a reminder, if you do plan to experiment in this region, be very careful as high audio levels can be dangerous even though you cannot hear them.

– 73, Irwin, WA2NDM

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FTM-100/400	90'	TM-D700	100'	ID-4100A	65'
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MAGIC IN THE SKY

BY JEFF REINHARDT,* AA6JR

EmComm – Simpler is Better

Throughout this issue of CQ, you’ve been exposed to a treasure trove of EmComm wisdom. Much of this is gained from decades of hard-won experience from operators who had to overcome adversities when the chips were not falling in their favor. As one emergency management professional shared with me, “every event is a new learning lab.” Part two of these learning experiences is perhaps the larger challenge, which is making use of the lessons learned from previous events. Sounds easy – but it’s not.

Few things are more boring than reading through an operations manual. Sadly, many of these guidebooks sit gathering dust on bookshelves, sometimes located adjacent to aging “after-action reports” that analyze what was learned from previous experiences. Over time, these documents are considered dated and are either forgotten about or disposed of. This can happen anywhere, but is more likely in areas where there are few callouts or drills for EmComm operators. The unfortunate consequence is that many of the old mistakes are repeated. And when minutes count, you don’t want to be thumbing through an operations manual trying to solve a problem, like, “how do I open this repeater?”

Living in Southern California, I had the privilege of learning EmComm fundamentals from some of the best and we have been often pressed to put those skills to work in response to wildfires, floods, a few earthquakes, and large and small community events. Drawing on over 25 years of experience, here are a few nuggets I can share.

Know your role – On whose behalf are you working? (ARES, RACES, Red Cross, other) What are their communications needs? Are you a field responder or a net manager?

What is the mission? – What are you specifically charged with accomplishing? Is it overcoming a general communications breakdown? Damage assessment? Are you to establish communications links with remote locations such as evacuation centers or field operations bases?

What are the available resources? – Will a mobile operator with a handheld radio do the job or might a more extensive communications package be needed in the field? How many qualified volunteers do you have available for the mission, and is that number adequate, especially if the response will be over a sustained period? Are the resources correct for the mission? For example, you would rather use a sport-utility vehicle on a flood damage assessment sweep than you would a compact or sports car.

There’s safety in numbers – Use two-person teams whenever possible. Perhaps one is the driver while the one is the communicator. If they’re in a fixed location, two or more persons provide extra eyes and ears, extra radio gear and relief for when a break may be needed.

Avoid mission creep – Going beyond the original mission is fraught with hazards, real and institutional. In any emergency, danger is ever-present, yet much of EmComm

response requires patient “stand by and wait for further direction” periods. This can lead to boredom and the seeking of additional activity. Going outside the original mission can expose operators to unknown or unfamiliar challenges and/or stepping on the bureaucratic toes of another response entity.

Safety first – A hard-learned lesson is summarized in this statement: “Never bring additional victims to the scene in the form of rescuers.” In the large Mexico City quake a few decades back, the number of people saved from the rubble was roughly equal to the number of people who died trying to save them. While we all want to help in a time of peril, there’s no substitute for having the proper equipment and training, especially in urban search and rescue or HazMat operations. Also, do your field operators have personal protective gear, like reflective vests, dust masks, hard hats, and work gloves?

Keep records – Net controls need to maintain a log of each operator on duty, their locations, and assignments. This can



Chris Kregel is a member of ARES (Amateur Radio Emergency Service), which is helping to provide communication around the Hayman fire just south of Denver, Colorado. (Photo by Michael Rieger/FEMA News Photo)

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has a shared duty with a “scribe” in the operations center but is essential for good tactical response as well as meaningful after-action reports. Field personnel should also keep a log of their activities and locations. Photos are also useful both in the field and at the EOC. Recording the number of hours put in by volunteers in both drills and after-action reports is good data to have on hand.

Know your gear – The time to be learning how to program your handheld transceiver is *not* as the floodwaters are rising over your ankles. That’s why we hold drills.

Have a plan “B” – The local repeater used for your response just went out. Now what? Will everyone in the field know what to do?

Spontaneous volunteers are a liability, not an asset – In nearly every emergency, well-meaning folks show up and want to help. This is also true for some newer hams who may have very little experience, but they have a license and a radio. Sadly, if they’re not trained, they represent more in the way of risk than value. Some might be posted with other experienced operators, but “on the job training” during an emergency event is seldom a good idea.

Are you ready right now? – How much fuel is in the tank of your vehicle? Is your communications “go kit” in “grab and go” condition? Can you put your hands on a working handheld radio or two? Are the batteries charged? Are there extra batteries or a means of charging them available to you? Do you have a nominal supply of food and water to sustain you for a time in the field? Do you have the proper clothing? Where are your ID badges?

The Best Laid Plans

Among my enduring memories of Southern California’s Northridge earthquake in 1994 was the number of professional and volunteer responders who were *not* available to respond to the call when needed. There were many good reasons. Some had their transportation routes cut off by downed bridges and overpasses. Some were themselves victims, with severely damaged homes and in some cases, personal injuries. Others chose to stay at home with family members who were in fear during the frequent aftershocks. The upshot is, in the immediate aftermath of a larger event, all resources will be stretched. Nevertheless, an emergency net can call out to its members, even if they are at home, and gather information useful to responders. Knowing the extent of the damage, its

severity, and locations with the most critical needs are of utmost value.

Responding to You – means monitoring and maintaining your well-being throughout the event you’re supporting. If you and your family members are involved as victims of the emergency, it may be better to let others respond while you look after their safety and security before rushing to the aid of others. Even if everyone is safe and your property is secure, checking back with family members from time to time is important to them and to you.

The second part of looking after yourself is maintaining the correct mindset and balanced approach to your duties. It’s easy to get caught up in the urgency of a moment. With the adrenaline flowing and multiple priorities presenting challenges, it’s more likely a mistake will occur. Resist being drawn into situations that are perilous and ask yourself what a “prudent person” approach to the issue might be. And remember the adage above, “Do not bringing additional victims to the scene of a disaster in the form of responders.”

The focus on the well-being of respon-

ders is a relatively recent development in emergency management. Recent years have recognized the presence and treatment of Post-Traumatic Stress Disorder (PTSD) in both professional and volunteer responders. Seeing families devastated after their homes are damaged or destroyed is difficult and stressful, even more so when injuries to others occur. That’s why periods of rest and recharge are important. Many response profiles now include counseling professionals who work closely with responders during and after an event, helping them come to terms with the experience and cushioning the effects of the aftermath. Taking advantage of those services is not a sign of weakness, it’s exactly the opposite.

As members of the amateur radio community, we often focus on the hardware, facilities, and accessories that help us accomplish our various radio missions. But as with EmComm and other aspects of the radio arts, the hardware is nothing without a skilled and prepared operator at the controls, ready to come to the aid of others, by engaging The Magic In The Sky.

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52nd Edition: CQ World-Wide DX Contest All-Time U.S.A. Records

BY FREDERICK CAPOSSELA, K6SSS

Tabulated below are the record-high scores achieved by U.S. contesters in the CQ World-Wide DX Contest. Number groups following calls and bands are: year of operation, total score, contacts, zones, and countries. **NOTE: Complete records can be found at <www.cqww.com>.**

PHONE				
Single Operator/Single Band				
1.8	K1ZM('95)	55,420	251	15 70
3.5	K1ZM/2('96)	292,100	952	27 100
7.0	W4AAA (KK9A)('13)	635,769	1,964	32 109
14	KQ2M/1('08)	1,242,150	2,504	38 144
21	KQ2M/1('99)	1,327,139	2,624	39 148
28	W4ZV('01)	1,464,255	2,654	40 155

Single Operator/All Band				
Station	Band	QSOs	Zones	Countries
	1.8	97	11	38
K1DG	3.5	278	15	60
(2014)	7.0	321	20	79
9,552,092	14.0	841	37	112
	21.0	1,466	36	127
	28.0	2,039	31	116
	Total	5,042	150	532s

QRP				
Low Power				
KR2Q('00)		1,507,506	1,181	104 358
N1UR('13)		4,911,440	2,969	136 448
NN3W('11)		11,828,236	4,921	185 683

Multi-Operator/Single Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	46	12	39
K1LZ	3.5	293	22	89
(2014)	7.0	764	30	100
13,771,733	14.0	1,211	39	146
	21.0	1,554	39	146
	28.0	1,979	37	152
	Total	5,847	179	672

Multi-Operator/Two Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	42	13	36
KC1XX	3.5	518	25	85
(2013)	7.0	1407	35	123
23,851,137	14.0	1,782	39	149
	21.0	3,150	40	155
	28.0	2,625	38	155
	Total	9,524	190	703

Multi-Operator/Multi-Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	489	19	69
K3LR	3.5	999	28	100
(2013)	7.0	2,227	35	130
37,402,560	14.0	3,346	40	169
	21.0	3,739	40	163
	28.0	3,380	39	167
	Total	14,180	201	798

CW				
Single Operator/Single Band				
1.8	K3BU/8('06)	151,970	527	26 104
3.5	W1MK('06)	530,264	1,390	32 104
7.0	W3UA/1('11)	1,049,760	2,395	34 126
14	K2WK('98)	1,007,781	1,955	39 144
21	K3RV/4('13)	980,880	1,865	39 144
28	W4ZV('00)	965,874	1,984	37 137

Single Operator/All Band				
Station	Band	QSOs	Zones	Countries
	1.8	72	15	44
K3CR	3.5	552	23	81
(2014)	7.0	1,323	33	107
10,871,028	14.0	966	35	105
	21.0	1,074	34	108
	28.0	1,265	34	104
	Total	5,252	174	549

QRP				
Low Power				
K1TO/4('13)		2,758,313	1,651	138 449
WA1Z('14)		6,842,375	3,496	146 469
K5ZD/1('14)		12,768,365	4,993	190 697

Multi-Operator/Single Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	196	20	82
K1LZ	3.5	706	28	114
(2012)	7.0	1,571	37	137
15,586,106	14.0	1,200	39	154
	21.0	1,302	38	148
	28.0	885	32	138
	Total	5,860	194	773

Multi-Operator/Two Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	146	18	66
K1LZ	3.5	1,204	29	116
(2013)	7.0	2,187	38	149
24,945,250	14.0	1,715	40	140
	21.0	2,160	38	153
	28.0	1,817	33	145
	Total	9,229	196	769

Multi-Operator/Multi-Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	389	23	80
K3LR	3.5	1,534	35	120
(2014)	7.0	2,823	40	150
37,486,260	14.0	3,370	39	165
	21.0	2,664	38	161
	28.0	2,078	40	164
	Total	12,858	215	840

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These commercial values became hallmarks of many American manufactured products. LDG holds these same principles as our core values. In talking to our customers, we find that their priorities are value, quality, service and warranty; we couldn't agree more.

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AT-200ProII

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AT-600ProII

Perfect for mid-sized amps, the AT-600ProII is a great all-around tuner. 2000 memories store your matches for nearly instant recall. Handles up to 600 watts SSB on 1.8 to 30 MHz, 200 watts on 6M, 200 watts digital.



AT-1000ProII

Our Flagship 1000 watt tuner! Large, easy to read bar-graph meter shows forward power and SWR at the same time. Two position antenna switch; RF sensing; Auto and Semi tuning modes; 5 to 1000 watts SSB/CW, 250 watts digital; 1.8 to 54 MHz, 10:1 tuning range (3:1 on 6M).



IT-100

Matched in size for Icom desktop radios including the IC-7300. Enjoy control from the radio's Tuner button or the Tune button on the tuner. For any Icom radio that are AH-3 or AH-4 compatible.



YT-100

For Yaesu's FT-100, FT-857 and FT-897 transceivers. The operation is to key the radio in AM/FM/CW then press the tune button on the tuner. The tuner will find the match and you are ready to operate. Includes 3' CAT-DIN-8 cable.



YT-1200

Designed for Yaesu's FT-991A, FTdx-1200, FTdx-3000, FT-450 and FT-950 for seamless tuner integration. Powered by the radio and controlled by the tuner. With CAT-pass through to allow for computer operation. Use any baud rate. Includes 3' YC-1200 interface cable.

RT-100 and RT-600

RT-100 and RT-600: Remote tuners can reduce feedline loss due to SWR. These tuners are DC powered over the coax to allow operation from your shack. Includes mounting brackets and controller for on/off, Auto mode, Lock and Tune. 1.8 to 54 MHz. RT-100: 100 watts SSB. RT-600: 600 watts SSB.



RBA-1:1 and RBA-4:1

RBA-1:1 and RBA-4:1. Designed to allow easy conversion from ladder line, twin lead, and long wires (with a good ground) to coax cable. Covers 1.8 to 30 MHz. 200 watts SSB.



THE LISTENING POST

BY GERRY DEXTER*

Closures Hit Opposition Broadcasters, While Japan Scales Back Frequencies

~ The Voice of Khmer M'Chas Srok has left shortwave along with the Front for the Independence of Oromira. Meanwhile, Radio OMN (Oromi Media Network), Open Radio for North Korea, Radio Herwa International, Somaliland Voice, and Eye Radio, all opposition broadcasters, have ceased their operations!

~ Another month, another negative: Japan's Radio Nikkei has cut back on its frequency usage. Radio Nikkei will no longer use 9595 kHz from the Nagara site. Instead, 9595 kHz will be used only on a standby or emergency basis. Radio Nikkei also dropped 3925 and 9760 kHz from its frequency roster. The deletions are blamed on the usual suspects, namely the increased use of computers and cell phones.

~ Radio Kuwait has moved its English broadcasts to 15530

kHz at 0500-0800 UTC. It also uses 11970 kHz at those hours. Those times are obviously convenient for the station, but they are hardly in prime time for listeners in North America.

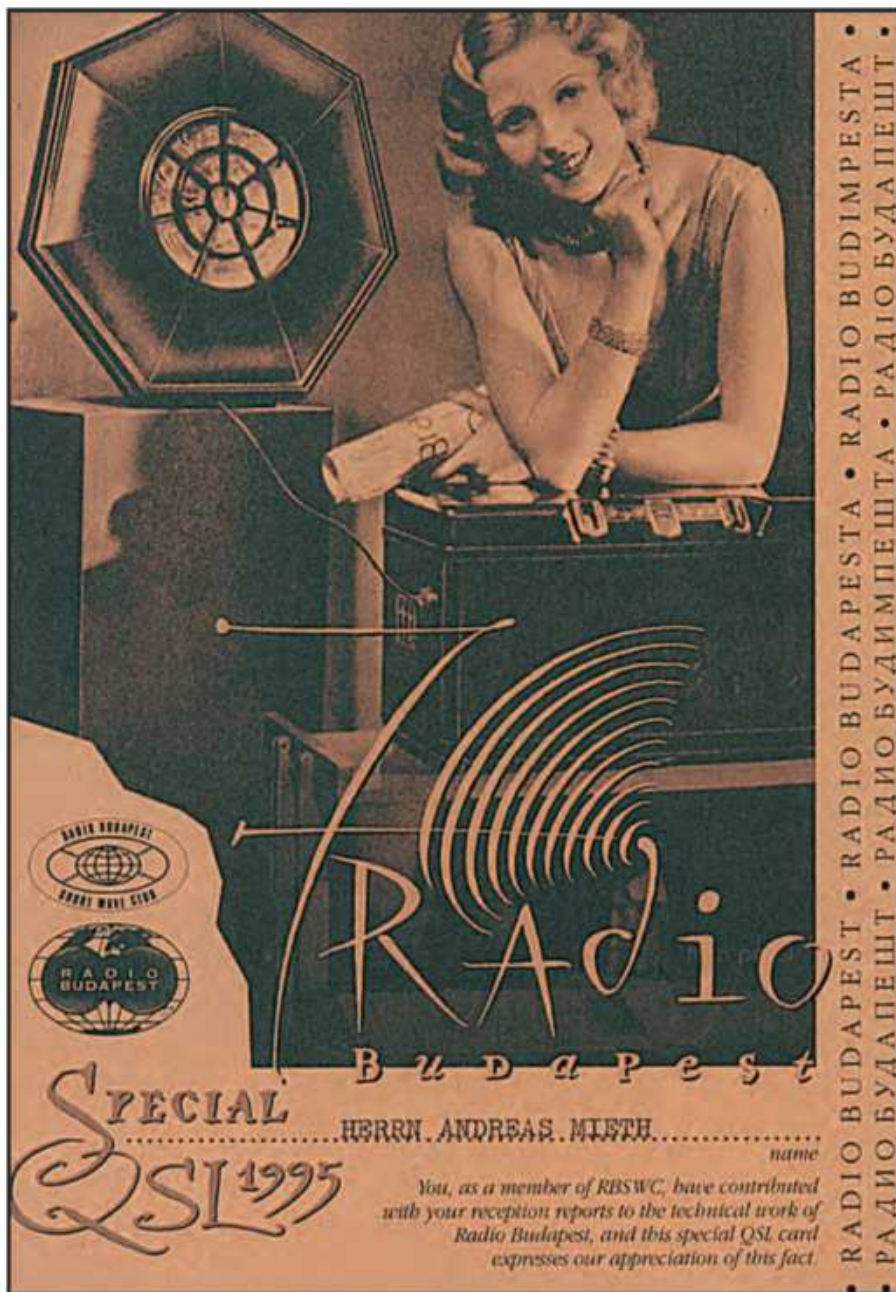
~ Well, I've got good news and bad news. First the good: The BBC reports that its global audience has reached 376 million. Now the bad: The BBC's shortwave audience continues to seriously decline. One of the reasons cited by others is the loss of so many other broadcasters who have dropped shortwave, (the initial bad boy being the BBC itself!)

~ Two rarely-heard All India Radio outlets have been noted in California: AIR from Port Blair (Andaman and Nicobar Islands) on 4760 kHz, and 4835 kHz from Gantok (Sikkim). Locations in parenthesis are separate countries on the NASWA Country List.

~ AIR has noted two 100-kilowatt transmitters have gone on the air — one of them from Delhi; the second should show up any time now on 4870, 7250, 7380, 7505, 7555, 9835 and/or 9950 kHz.

~ RAE Argentina to the World has announced a cutback to its hour-long English service, back to just half an hour, starting at 0100 UTC, this via the WRMI relay from Okeechobee on 9395 kHz.

*c/o CQ magazine



A very (very) old QSL from Radio Budapest. You can sorta tell its genesis from the look of the receiver.

The Sked Shed

The new schedule for the Zanzibar Broadcasting Corporation:

- 1800-1810 UTC daily on 11735 kHz in English and Swahili
- 1810-2100 UTC daily on 11735 kHz in Swahili
- 1500-1800 UTC daily on 11735 kHz in Swahili



AWR's QSL for its 20th anniversary in 1992. This on 11855 kHz via Novosibirsk.



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DR-03T
(Digital mode not supported.)

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Radio San Gabriel, La Paz, Bolivia on 6080 kHz sent this QSL in 1992.

- 0300-0600 UTC daily on 6015 kHz in Swahili
- All from the Dole transmitter site.

Leading Logs

Remember, your shortwave broadcast station logs are always welcome. Please ensure to double or triple space between

the items, list each logging according to the station's home country and include your last name and state abbreviation after each. Also helpful are spare QSLs, station schedules, brochures, pennants, station photos and anything else you think would be of interest. The same holds for you amateur radio operators

who also listen to shortwave broadcasts. You, too, are also most welcome to contribute!

Here are this month's leading logs. All times are in UTC. If no language is mentioned, English is assumed. After you've read the printed logs, you will find more logs online at <http://cqpluslisteningpost.blogspot.com>.

BANGLADESH—Bangladesh Betar, 15505, Dhaka in Hindi at 1538 with man hosting and Bengali music program. (Taylor, WI)

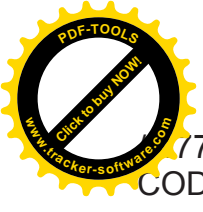
INDIA—All India Radio, 11560, Panaji (Goa) with G.O.S. at 1447 in Pashto, male announcer and Indian film music. (Taylor, LFP)

Athmik Yatra Radio, 15255 via Nauen at 1540 in Kok Borok. Man giving a long sermon, 15400 via Nauen (p) at 1616 and man speaking in Hindi. (Taylor, LFP)

MALAYSIA—Wai FM, 11665, Kajang at 1459 with man speaking in Malay, likely ID at top of the hour, fanfare, then the same man returned. (Taylor, LFP)

SUDAN—Sudan National BC Corp, 7305, Al Aitahab at 0345, weak, with low audio and hum on the carrier. Then it was clearly audible by 0415. (Strawman, IA)

SWAZILAND (Eswatini)—Trans World Radio, 3200 opening with IS and repeated station IDs, then English speakers,



775 stronger but still poor due to CODAR. (Sellers, BC)

QSL Quests

One SWBC DXer is suggesting a so-called “blacklist” of stations that are, shall I say, “troublesome” in the QSL department. What do you think? The stations he named really need just a bit more of

a push, unlike the really tough nuts that are nearly impossible to get a response from. Usually because the national state forbids — on pain of death or at least torture/imprisonment — any reply.

Quien Sabe

~ The 4920 kHz LA mystery mentioned last month has been solved. The station

is a new one: Ecos del Alba in Trujillo, Peru, OAZ9A, is a religious broadcaster on 4920.7 kHz being noted at 1100 UTC, which is a rather late hour for a Peruvian reception.

~ Mark Taylor has also noted Babcock (UK) testing on 15510 kHz with a Babcock ID and email as <testtransmission@gmail.com>, then various samples of world music. Repeated at 1432 UTC, another station ID at 1433 UTC, then off. No idea what broadcaster this was in preparation for, if any.

Back in the DAY

La Voz de Atitlan, TGOF, Santiago, Atitlan, on 2390 at 0225 in Spanish using 300 watts on January 8, 1972.

Just Sayin’

Now, as Jack Benny used to say on his radio show back in the good old days, “We’re a little late, so goodnight folks!”

Thanks for Your Logs

William Hassig, Mt. Pleasant, IL; Jerry Strawman, Des Moines, IA; Harold Sellers, Vernon, BC, and Mark Taylor, Madison and Lake Farm Park, WI.

Until next month ... Keep on keepin’ on, and ... Celebrate Shortwave!



Another early one, OTC from the Belgian Congo — a station I heard well and frequently.

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EMERGENCY COMMUNICATIONS

BY WALT PALMER,* W4ALT

Device Dependent?

A few weeks ago, my wife and I went on a long-overdue vacation. You know, a period of suspension of work, study, or other activity, usually used for rest, recreation, or travel; recess or holiday. We traveled from our secret home-base location on the beaches of Delaware to Seattle, Washington, where we joined up with two of our daughters and their families. With our large contingent and tons of baggage, we drove two vehicles to Anacortes, Washington, jumped a ferry to motor the Puget Sound to Lopez Island, a lovely area and part of the San Juan Islands. The weather was perfect, mid 70s and without the oppressive east coast summer humidity from which we escaped. But I digress.

As we departed the ferry, Daughter 1 took the lead as we headed toward our accommodations for the week. About a mile up the road, she pulled over and flagged down our vehicle to announce that the maps on her cell phone were not able to locate the address of our destination. As the other five adults pulled out their trusty cellular devices, they were all greeted by the notice of NO SERVICE. Suddenly, the pricey devices that we have become dependent to communicate, store contacts, navigate and entertain; the devices we carry in our pockets that are millions of times more powerful than the computers used by NASA to get man to the moon, had become rocks. Within seconds, our carefree vacation became lost in the woods. Sure, we had a computer-printed map that showed the island, but there were no roads depicted on the document. After a moment of lament, son-in-law #2 reached into his bag of tricks and pulled out his trusty, albeit aged, GPS mapping device. Within minutes, we were motoring to our vacation chateau.

Prior to our departure, I took time to look up repeaters in the Anacortes and San Juan Island areas. A quick search provided four local machines and their corresponding frequencies and data. I plugged my trusty HT into the computer and transferred the data, so I could enjoy carefree rag chewing. After arriving and getting settled for our week-long respite, I turned on my HT to discover the data transfer had become corrupted and caused the radio to lock up, making it no better than the cell phones with no service. I had my laptop and transfer cables with me, but I elected to crack open the user's manual and solve my issue manually. You do keep your handy, dandy HT quick guides in your Go Kit or travel bag, don't you? Within a few minutes, and a few choice words, I was able to reset the processor of my HT and manually program the local frequencies.

Making Lemonade

Not being one to let a good crisis go to waste, I began to turn my dilemmas into a learning experience. How dependent have you become on your devices when it comes to emergency communications? As noted in my examples, a cell phone without service becomes a rock. An internal error turned my HT into a paperweight.

For those of you who have experienced a natural or man-made disaster, you know your world changes rapidly. What was routine becomes extraordinary. Simple tasks become challenging.

Consider navigation. You are used to the modern conveniences of street signs and house numbers. After a big blow, those signs are probably gone. Visual landmarks, like Aunt Bessie's barn, could be a pile of rubble following a tornado. Damaged or flooded roadways may be impassable. What you used to know "like the back of your hand" is no longer.

Having worked activations in both my local area and places far afield, I find it most difficult to work my local area following a devastating event. The shortcuts I know and use are no longer available. The visual clues I am used to are gone. The road I drove just hours earlier is now under water and most probably washed away. I find I am more cautious when working in totally unfamiliar areas.

Discussing the topic of this article with my local Aux Comm leader, he told the story of working a major flood in the Pennsylvania foothills many years ago. As he was the "local," he was tasked to lead the out-of-town responders around the devastated area. As he relived the event some 40 years later, I could still hear the fear in his voice as he admitted he had become totally lost and disoriented in his own neighborhood, due to the sheer devastation caused by the flood. Roads were gone, bridges were washed out. Nothing was where it was supposed to be.

In my career in network television news gathering, I have been sent to a number of natural and man-made disaster scenes. For some predictable events, such as hurricanes, we would travel to a predicted hot spot in advance of the expected weather. This gave us the ability to show viewers how the local authorities and residents were preparing for the ensuing forces of nature. As we moved around each area, we were always aware of our surroundings and escape routes. Keep in mind, my career has spanned both the analog and digital eras. Paper maps were still the norm and available from most gas stations. We were free to move around the area to find our stories.

When we went to cover unpredictable events, such as fires, civil unrest, or mass casualties, we would report to a press area and be escorted to areas where we could shoot our pictures and tell our stories. While somewhat confining, it was in the best interest of all concerned. It prevented outsiders, i.e. the press corps, from contaminating evidence and getting into trouble and becoming part of the story we were there to cover.

Situational Awareness

The new catch phrase is "situational awareness." This is not a new concept, just a fancy new name.

Remember, as emergency communicators, we are not first responders. I don't always agree with this assessment as occasionally we find ourselves in the middle of things unexpectedly, but generally speaking, we are the second or third wave to enter a hot zone. This doesn't mean our go-kits don't need to be charged and ready, or need to be repacked or replenished when we're done. This time is well spent ensuring we have made appropriate plans and accommodations for our families and personal affairs.

Using the original premise of this article, are you really prepared should your equipment burp, belch, or fail?

As the old saying goes "familiarity breeds contempt," so be careful out there.

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



GORDO'S SHORT CIRCUITS

BY GORDON WEST, WB6NOA

"My Fear is My Family Will Sell My Radio Gear for the Price I Claimed I Paid for It"

Hardly "CB Radio Yard Sale" Items

Emergency communicators, like most hams, are always looking for good deals on radios and electronics at garage/estate sales. Me too.

So when I saw a sign that read: "CB RADIOS AND ACCESSORIES," at a driveway table full of gear, I went to take a look. "MORE INSIDE," added the kids cleaning out their parents' house, their parents having taken residence at a fabulous retirement complex.

"\$400 if you also get rid of the CB aluminum on the roof," added the son. "Take it all for \$400." The "CB equipment" that was laid out on the lawn was:

- Elecraft K3 transceiver
- Kenwood TS-940 AT transceiver

- Box of 6 HTs, including two D-72 dual banders
- Astron 35 M power supply
- ICOM IC-706 MKII G transceiver with Heil headset
- Collins 32S1 with matching power supply and speaker

I won't tell you what I found inside. OK ... a test lab/bedroom full of scopes, a Henry 2K amplifier, an IFR with pan-dapter, and a Kenwood 580 new in the box.

As most any responsible ham would do, I took the kids aside and told them they were missing a zero on the \$400 price, and I gave them the contact information for a West Coast company that clears out ham radio "shacks" and would likely pay the kids several thousand dollars in hard cash.

Ham&HiFi

At the Reno, Nevada, NVCON convention, I took a morning to visit the headquarters of Ham&HiFi (<www.hamandhifi.com>), in nearby Sparks. This 4-employee business is run

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Photo A. Ethan Brizendine, KG7LOV, of Ham&HiFi, showing lots of gear purchased from downsizing hams and SK estate sales.



Photo B. Multiple racks of equipment tested for sale at Ham&HiFi.

by Ethan Brizendine, KG7LOV, who specializes in buying entire ham radio stations from hams who may be downsizing, or from SK estates (Photos A and B).

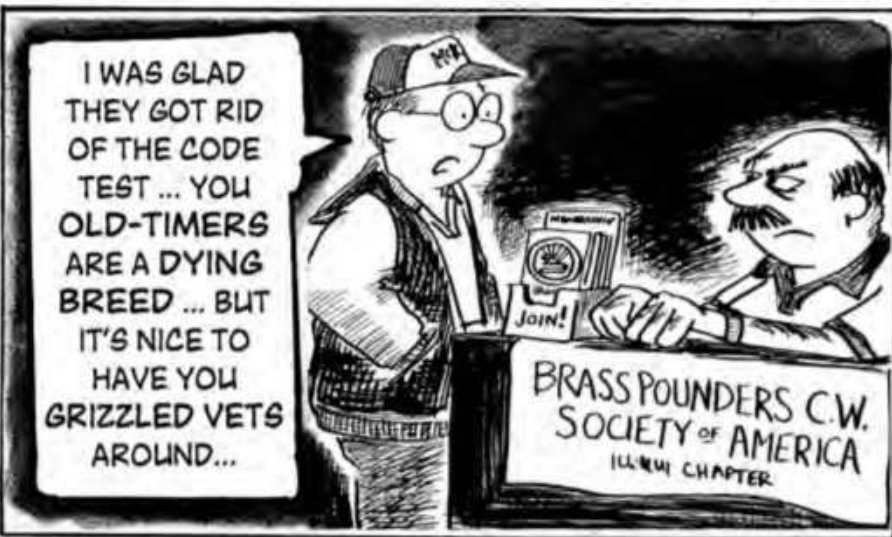
For estate sales, the company comes in and takes it all — *no cherry-picking!* They pay cash on scene, and show how they arrive at a value to clean out a shack, and *not*

leave weird stuff behind. The weird radio stuff goes into a FREE bin at their store for twice-a-year *major* giveaway to the locals.

Ethan arrives at a cash payout offer through calculations of retail price when bought new, minus about 1/3 that value we might see on e-Bay for mint year-old gear, minus some

SPURIOUS SIGNALS

By Jason Togyer W3MCK
spuriouscomic.blogspot.com



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Photo C. HamEstate crew member trimming down a 240 pound HF yagi antenna for disassembly. (Photos C, D, E courtesy of HamEstate)

additional money to operate his business and pay his staff.

Ethan travels all over the U.S., working with hams to clean up their shacks ... and get some extra cash as a bonus. For a SK sale of “everything,” it all goes into the truck, “and we even sweep out the garage and bedrooms,” adds Ethan.

HamEstate

HamEstate <www.hamestate.com> is a similar Midwest operation by Andre VanWyk, NJØF, covering all 48 continental U.S. states.

“We, too, are a business, to be able to provide reliable and quality service. We have a commitment to handle the estate, no matter what,” explains Andre.

HamEstate is a subscription-based service in which the ham pays either a monthly or yearly flat fee that covers upfront costs for dismantling and removing the ham’s equipment — including antenna and towers (see *Photos C, D, and E*) when the time comes. The company then sells the SKs gear at prevailing market prices and returns the proceeds to the family, minus a 30% commission.

All of us should take some photos of our ham shacks, and roof aluminum,

and set some realistic prices for a cash buyout in case we accidentally cash in. This gives our significant others peace of mind when we go permanently QRT. But for a total *get it out of here ... all*

of it, a reputable ham-run business takes the total burden off our survivors, and even the junk radio parts will live on, given out free, for hams in our future. Log in to <www.HamandHiFi.com>



Photo D. Antenna removed from tower, prepared for disassembly, and removal by HamEstate.



Photo E. In the final stage, the tower is dismantled and ultimately removed by HamEstate.

and <www.hamestate.com>, to get a complete explanation of their operations.

LiFeP04 Battery Run Times

Those lithium iron phosphate (LiFeP04) batteries really help the emergency communicator stay on the air, independent of

an AC power source. They are a third of the weight of traditional lead-acid batteries, plus they have almost four times the run time over lead-acid batteries. BioennoPower <www.bioennopower.com> is the brand most recognized at ham radio shows and gatherings.

When I am operating my EmComm station at a county fair ham radio booth, I easily get a day or two on my battery-operated, dual-band mobile transceiver. On the HF mobile in the booth at 100 watts TX out, I can easily go a full day on the 20 amp-hour LiFeP04 battery (see *Photo F*, plus *Table 1* for run-time comparisons).

Best of all, this technology is lightweight, non-spillable, and easy to recharge with the BioennoPower-included AC charger, or optional DC solar charger panel and DC regulator. And best of all for microwaving at 10 GHz, passing EmComm data, this battery technology voltage will not “sag” on transmit as a lead-acid battery can, and rests happily around 13.8 VDC, not 12.2 volts like on SLAs. Read up on all the advantages for emergency communicators using LiFeP04 battery safe technology.

Drone Controllers On Ham Frequencies?

The FCC is cracking down on non-ham AV drone controllers (*Photo G*) which the Commission has not approved under its equipment authorization process (See FCC enforcement advisory #

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aviation, and federal agencies with the point-to-point microwave systems. And for those of us on 2.4 and 5.9 GHz with our own MESH networks for EmComm, we, too, are seeing the effects of drone operation by non-hams coming in on our nearby microwave link systems. For complete FCC details, go to <https://tinyurl.com/yaloyuab>.

Thanks to you *all* for your emergency communications volunteering!

Notes:

1. The 13-centimeter band contains two segments, 2300-2310 MHz and 2390-2450 MHz. The 5-centimeter ham band extends from 5650-5925 MHz.

2018-02, DA 18-581). The drone itself must also be compliant with the FCC's radio frequency rules.

Ham operators *are* permitted to use ham-type gear, up to 1 watt, solely designed to work *only* within the 13-centimeter and 5-centimeter ham bands¹, and be operated by a licensed ham radio control operator.

But the Commission is finding 1-watt AV transmitters on 2.4 GHz and 5.9 GHz that may be half in and half out of the ham band limits, advertised and sold to non-ham operators, who may not realize this gear is not FCC certified for non-ham use.

The FCC contends that non-certified gear could interfere with public safety,



Photo F. Bioenno battery that ran all through Field Day, still ready to work.

TX Power	RX Power	Battery Amp-hours	Est. run time hours
10 watts	2 watts	6 Ah	20 hours on an HT
20 watts	2 watts	15 Ah	A day-and-a-half on V/U mobile
100 watts	2 watts	20 Ah	Full day on 12 VDC HF radio

Table 1. Comparative run times of different lithium iron phosphate (LiFeP04) batteries in different usage settings. Run times are based on a typical operating ratio of 80% receive and 20% transmit.



Photo G. Drones are big, but some are flying afoul of FCC frequency and power rules. Hams may operate them under Part 97 rules, but only if they operate fully within the 13- or 5-centimeter ham bands, with appropriate power levels. Drones can be great for emergency communications work.



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by Juergen A. Weigl, OE5CWL

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by Bob Haviland, W4MB

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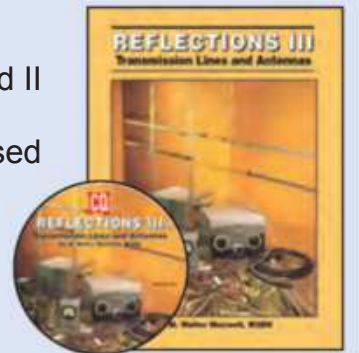
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CQ WORLD WIDE

BY TOM SMERK,* AA6TS

Emergency Communications Discussed, Chile Shares Its Plan, Sleuth Services in India, and 60 Meters for Slovenia

Emergency Communicators Meet at Friedrichshafen

About 20 emergency communicators attended the IARU (International Amateur Radio Union) meeting for emergency communicators during the 43rd HamRadio Exhibition at Friedrichshafen and were given reports on the state of emergency communications preparations in IARU's Region 1, which covers Europe, Africa and the Middle East.

The introductions and Region 1 report were followed by several presentations, after which an open forum session proved to be so interesting that it carried on beyond the official closing time of the meeting. If you would like to see what was discussed, the presentations are available at the links listed below. (Content is the opinion of the presenters).

- Region 1 Emergency Coordinator's Report:
<<https://tinyurl.com/ya2z625w>>
- SP-EMCOM:
<<https://tinyurl.com/y9oc8fkj>>
- Exercise Solar Flare (Austria):
<<https://tinyurl.com/ycrcbplv/>>
- RNRE DMR Network proposals
<<https://tinyurl.com/y9b8epx8/>>

[IARU Region 1]

Emergency Networks Established in Chile

Chile, which is geographically located along the notorious Pacific "Ring of Fire" is susceptible to a variety of natural disasters. The ongoing subduction, along the Peru-Chile Trench, of the Nazca Plate under the South American Plate is not only responsible for the Andes Mountains, but also for ongoing earthquake and volcanic activity. There have also been reports of forest fires caused by spontaneous combustion from the unsettled earth below.

Chile is always at risk for major forest fires. As recently as January 2017, a fire raged in the Maule and Bio-Bio River regions of southern Chile that significantly burned 40% of the land, especially in rural areas. The fires were so bad that outside help was requested and the U.S. responded with a Boeing 747 Super Tanker and Russia sent an Ilyushin tanker.

Since 1965, when there was a significant earthquake in central Chile, radio amateurs have been organized into the *Federachi* (Federation of Amateur Radio of Chile) and the

Radio Club of Chile and established emergency networks on 15, 20, 40 and 80 meters. All of these emergency networks still continue to work 24/7.

An earthquake measuring 8.5 on the Richter scale that shook three regions in February 2010 raised the awareness of amateur radio emergency communications to the next level when Chile's two disaster offices, the ONEMI (National Emergency Office of the Ministry of the Interior) and the SHOA (Hydrographic and Oceanographic Service of the Armada), began to utilize hams for emergency communications. Damage from the earthquake knocked out communications throughout Chile for four days, so the effectiveness of amateur radio was not difficult to appreciate.

This earthquake also caused tsunamis, adding a new disaster on top of all of the problems already occurring, and causing the deaths of 250 people in the affected area.

Chile's amateur radio call prefixes are based on the country's 9 territorial zones, plus some insular areas, with a call sign prefix of CEØ. Chile's 100% voluntary network of hams are distributed in each band and for each Zone of Chile.

Zone 1: From the extreme north of Chile to the zone included in the third region of Chile, such as the city of Copiapó, plus its area in the Cordillera de los Andes.

Zone 2: From the city of Vallenar (to the north) to the Port of San Antonio in the south of the Fifth Region, also including certain areas of the Andes mountain range, in the east.

Zone 3: Exclusively corresponds to the metropolitan area of Santiago de Chile.

Zone 4: From the historical city of Rancagua, to the port city of Constitución, from north to south.

Zone 5: From the city of Chillán and the entire area of the Bio Bio Great River, northern sector of Chile's largest forest reserves, to the south of the city of Concepción.

Zone 6: From the northern area of the City of Temuco to the southern area of Valdivia, also called the "Region of the Rivers."

Zone 7: From the north of the City of Puerto Montt to the Coyhaique Zone to the south, where one of the largest reserves of drinking water and ice on the planet, known as the Northern and Southern Ice Fields Zone, is located.

Zone 8: Closing the continental area, this zone extends from the Southern Ice Fields (in the north) to Tierra del Fuego and Cape Horn.

Zone 9: Corresponds exclusively to Chile's portion of Antarctica and its national and international bases.

Zone 0: Corresponds to a vast and disseminated area of insular portions of Chile, distributed by the South Pacific, and close to the coast.

The Radio Club Provincial Valparaíso, CE2AA, reports that it is a daily responsibility for the volunteer hams who cover the 10 zones to monitor the frequencies. CE2AA covers the

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Central Zone with provincial assistance from about 70 hams who utilize both HF and VHF, either simplex or using a repeater on 147.300 MHz.

[Thanks to Aldo Aste Sambuceti, CE2NFT, Secretary, Radio Club Provincial Valparaiso]

Ham Clubs in India Offer Unique Volunteer Services to Communities

A recent article on *OutlookIndia.com* features a story on the service of the West Bengal Amateur Radio Club (WBRC), which is routinely called upon to find missing persons by using their radios to coordinate activities. Sometimes this is done for the person's safety, and other times it may involve criminal activity. Ambarish Nag Biswas, club secretary, told *OutlookIndia.com*: "Our key function is to establish radio networks in order to communicate between ourselves (if there is a lead) as well as to intercept conversations. In a large number of cases, the missing person is a victim of kidnapping, trafficking, or other crime. There is almost always communication between the members of the criminal gang who don't use traditional methods of communication such as cell phones which are not difficult for the police to tap into. Our radio network, operating at several frequencies, is like a web picking up the minutest sounds traveling through the spectrum."

In India, there are close to 17,000 amateur radio license holders, although only around 7,000 are believed to be active. The Indian government and police services are recognizing hams as a resource in such times. In West Bengal, there are about a half dozen radio clubs, each with no less than a 100 to 200 members. Along with the West Bengal Amateur Radio Club, the other well-known groups are Amateur Radio Convention and Conference Samity (ARCCS), Bengal Amateur Radio Society (BARS), and Indian Wave of Amateur Radio (IWAR).

Other than tracking missing people, these clubs are involved in disaster assistance when earthquakes, cyclones, landslides, tsunamis, and other natural calamities cause communication failure.

A recent example of how the hams can help with missing people happened this past May when a man approximately 50 years old was found loitering and appearing in a confused state on the streets of Khardah in suburban Kolkata. The police determined that he was suffering from amnesia. He was also physically ill and was admitted to a local hospital. A month passed and the

police were unable to find his family. WBRC was contacted as a last option and successfully tracked down the family of the lost man using a wide range of techniques including setting up radio zones and intercepting conversations. An interesting twist to this story is that WBRC learned from the man's brother that he was mentally challenged and, with the permission and consent of the family, the club facilitated tattooing his arm with his contact details in case he ever gets lost again.

[*OutlookIndia.com*]

Thailand Ranks Third in Number of Licensed Hams

Thailand (population 68 million) has the third-largest population of ham radio operators in the world with a reported 101,763 licensed amateurs as of last February. While this is down from a reported high of 247,676 hams in May 2012, only the U.S. and Japan outpace Thailand in terms of the number of radio amateurs. The majority of the current Thai ham population are Novice class hams operating on 10 and 2 meters.

Thailand's late King, Bhumibol Adulyadej, HS1A, who reigned from 1946 until his death in 2016, was the patron of the Radio Amateur Society of Thailand (RAST) and inspired amateur radio activity in the country.

[ARRL News / Wikipedia]

60-Meter Band Allocation for Slovenia

The Association of Radio Amateurs of Slovenia (ZRS) has announced that as of July, all Class A licensees in Slovenia may operate on the 60-meter band on a secondary basis from 5351.5-5366.5 kHz with 15-watts EIRP.

[ARRL News]

Belgian Sample Exams Online

Belgium has made practice exams available online for the "Basic" (ON3) license, which is a 24-question exam requiring 24 minutes; and the HAREC (Harmonized Amateur Radio Examination Certificate) 40 question — 1-hour exam. Depending on your score, you can earn either a CEPT Novice (ON2) or CEPT Class 1 (ON1/4/5/6/7/8) license: 50-65% earns a CEPT Novice license and 66% or above gets you the CEPT Class 1 license.

The BASIC license permits 50 watts on portions of the bands from 3.5-52 MHz and 144/430 MHz. The CEPT Novice permits 50 watts on portions of the bands from 1.81-52 MHz and 144/430 MHz. The CEPT Class 1 license allows for full permitted power on all bands.

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You can skip the Basic exam and take only the 1-hour HAREC exam to go straight to a full Class 1 license.

The website is in Belgian, but can be translated by Google Chrome. The URL for the sample exams is <<http://harec.be>>.

[HAREC and Southgate Amateur Radio News]

In Closing

October is CQ's annual "Emergency Communications" special edition. In addition to presenting a few stories on that topic this month, I want to encourage any of you who might feel so inclined to volunteer with your club or emergency services team to assist in times of emergencies.

The government and other official agencies are finally realizing what an asset reliable amateur radio communications can be during times of disaster. You won't have to look too far to find someone who is willing to show you the steps to take to get started. I'm always happy to hear from you — please send me your stories and photos to <aa6ts@cq-amateur-radio.com>. Thank you!

— 73 de AA6TS

MF/LF OPERATING: Life Below the AM Broadcast Band

BY JOHN LANGRIDGE,* KB5NJD

Potential Roles for 630 and 2200 Meters in Emergency Communications

Like our new medium wave and long wave bands, emergency communications is a hot topic these days in many amateur circles, so I will focus this month's discussion on how 630 and possibly 2200 meters might meld well with some types of public service communications. Full disclosure: I'm really not an "EmComm guy," but over the last 30 years, I have handled quite a bit of message traffic in CW nets like the Texas CW net¹ which was formerly a National Traffic System affiliate, now part of Radio Relay International². I also functioned as a net control on a local 2-meter traffic net at the beginning of my ham career and even handled emergency traffic and phone patches during a number of the Gulf hurricanes in the 1990s. Aside from being a "mule" who moves traffic from local VHF nets to area CW nets, I have been mostly out of the loop in recent years on what is considered cutting edge in emergency communications. There have been a number of times, however, that propagation challenges during high frequency (HF) nets might have been mitigated by propagation modes available through the use of the medium frequency (MF) and low frequency (LF) bands.

My goal in this discussion is to start a conversation about adding a tool to our existing EmComm tool kit. I realize that change can be slow to come and there is often resistance to ideas that seem foreign and "outside of the box," regardless of how logical those ideas might be. I absolutely believe that there are scenarios in which medium-haul, point-to-point communications under adverse HF propagation conditions might be better served by propagation modes that do not utilize a man-made communications path infrastructure. MF and LF certainly can accomplish those requirements with high reliability. I will, however, focus on 630 meters with

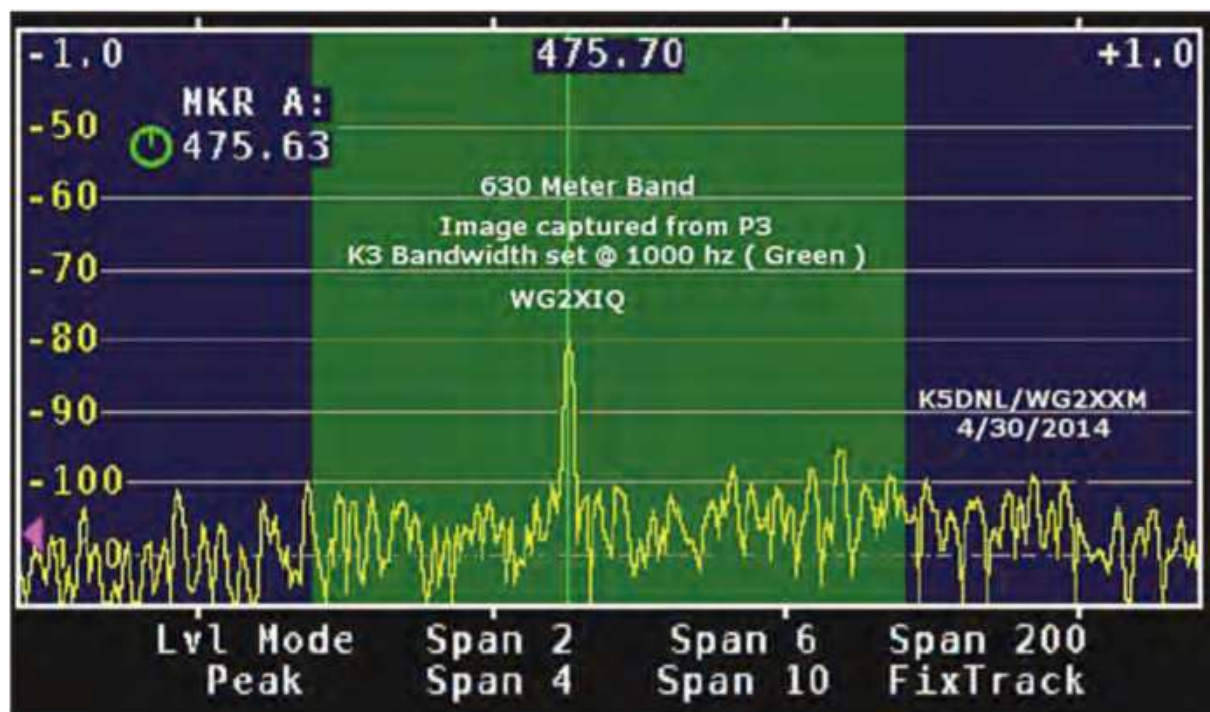


Photo A. WG2XXM (K5DNL) panadapter display showing a daytime signal from WG2XIQ (KB5NJD) during a 2014 test. Note that the signal is well out of the noise and easily audible and copyable at a distance of 200 miles via ground wave. (Courtesy of K5DNL)

the understanding that 2200 meters offers additional coverage possibilities at the expense of potential station construction and operational complications and I will point out some of those complications, where applicable. In general, station design for 630 meters can be duplicated on 2200 meters with reasonable results, particularly for the applications described herein.

NVIS and GWEN

In recent years, near vertical incidence skywave (NVIS) has been the go-to propagation mode for close-in communications at high frequencies for a variety of disciplines. But what if ionospheric absorption increased sufficiently to prevent reflections and refractions at usable signal levels, as might be observed from a large solar event? In a Carrington-class event³, ionospheric conditions may be the least of our worries as critical hard-wired infrastructure such as the internet may be inoperable due to physical damage, potentially rendering otherwise redundant systems useless. Similar results could be ob-

served from a man-made electromagnetic pulse.

In the 1980s, the United States government developed a system to respond to a loss of communications in the interest of continuity of government known as the Ground Wave Emergency Network (GWEN)⁴. This system was to utilize 240 transmitter sites operating in the 150-190 kHz frequency range but was canceled due to a number of problems. In recent years, amateur initiatives have attempted to accomplish similar results, providing uninterrupted regional communications by utilizing ground wave at high frequencies ... with mixed results. Unfortunately, ground wave communications at high frequencies have very limited range and requires that a network implement many nodes. This is one of the areas where MF and LF shine.

Phenomenal Daytime Ground Wave Capabilities at MF and LF

For many HF operators, one of the most surprising and often overlooked as-

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ects of the lower frequencies is ground wave communication performance. A recent examination of 630-meter WSPR⁵ data by Robert Brown, KR7O, indicated that ground wave signals from KJ6MKI, at a distance of 319 kilometers (198 miles), are 7 to 10 dB out of the noise during the day at his station. This is quite sufficient for just about any mode that might be comparably used on HF circuits. Robert added that KJ6MKI's signals have exhibited amazing seasonal stability, varying only 1 dB at the very most since May, and that other stations in the region exhibit similar signals levels and stability.

Robert's receive antenna during this exercise was nothing special. In fact, he found good results during the daylight hours when noise is often lowest by using his 630-meter transmit vertical. The vertical is a 43-foot tall Rohn H-50 push-up mast with two 100-foot top-loading wires that are supported at a height of 30 feet the far ends. The mast is insulated from ground using a combination of PVC tube and a fiberglass sleeve for mechanical strength and high voltage insulation. The entire system is fed against a radial system which could be scaled for portable operations. Top-loading wires could also be scaled down as well, even to the point of adding additional short wires to reduce the overall length, accomplishing the same capacitance as fewer, longer wires. A base-loading coil rounds out the system, allowing the user to resonate and match the system for the local environmental conditions. Robert's system requires 250-300 micro-Henries of inductance, which he easily accomplished with a 2-gallon bucket coil/variometer with room to spare (see page 32, September 2017 CQ magazine).

This type of system is not much more elaborate than many low band verticals used at Field Day each year and could be designed for quick implementation, disassembly, and storage. It could also be implemented on a building at an emergency operations center (EOC), even utilizing the building's safety and lightning ground system for part of its return path. Remember, we are not necessarily talking about optimized systems. They don't have to be perfect. The goal is to have enough capability for the required communication. Often that task is easier to accomplish than many operators realize.

Keeping Nets Going

Earlier I alluded to personal experiences while operating on area CW traffic nets where some of the features of MF and LF might find some usefulness in completing traffic-handling tasks. These particular nets, in which I participate, occur on 80 meters and are in two sessions, one early and one late. The early session, particularly in the summer, has often been subject to weaker signals and fading due to full sun conditions and, in some cases, covering distances of 300-400 miles. In many cases, operators are using considerable power to cover the required paths, sometimes doing so marginally. Often NVIS is relied upon but, as questioned earlier, what if that is not an option? The ionosphere, after all, is nothing more than a piece of infrastructure, even if not man-made. The reality is that these communication problems are common and good operators fight through them. Attempts to transition to other bands like 40 meters have resulted in different communications challenges but on the same scale as those observed on 80 meters. While 160 meters has been used as a medium-wave backup band, few of the active participants have capabilities for the band and this might also be a challenge for prospective use of 630 or 2200 meters. Furthermore, ground wave on 160 meters, while better than on 80 meters, is not that great. This can often be observed when comparing signals at the top of the AM broadcast band with



Photo B. The W8CDX (NO3M) Field Day doublet was used on HF in addition to 630 meters where it was configured as a Marconi-T vertical. This approach could be duplicated just about anywhere that has an HF dipole and feed line, whether coax or open-wire line, that can hang in free space, including Field Day sites and portable emergency activations. (Courtesy of NO3M)

those at the bottom. Many large broadcast stations seek frequencies at the bottom of the AM broadcast band, when possible, because of the superior ground wave coverage which often best serves their target audience.

With some of these ideas in mind, 630-meter ground wave tests with Ken Roberson, K5DNL, (operating as Part-5 experimental stations WG5XXM and WG2XIQ in 2014) achieved signal levels during two-way digital and CW QSOs that were on par with those necessary for typical phone QSOs. Ken is located in Shawnee, Oklahoma, about 200 miles north of my station here in the Dallas-Fort Worth area. These tests were conducted near midday during the spring, using power levels that were consistent with those legal under Part-97 rules today. Both stations are well equipped for 630 meters but what one can take away from this test is that there is quite a bit of signal headroom with a noise floor near -100 dB S/N and desired signal at -80 dB S/N in a 1000-Hz bandwidth on this particular day (see *Photo A*).

Through the use of additional filtering, attenuation, and bandwidth controls commonly found with modern transceivers, and even the use of small, directional receive antennas such as portable loops, both signal-to-noise and usable ground wave range could be extended, in some cases significantly. Similar results were experienced using CW with K5DOG near Austin, Texas and AE5X near Houston, in full sun during fall 2018, following the opening of both the 630-



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

Joseph Ames, W3JY (“Neighbors Helping Neighbors – Ham Style,” p. 12), is National Chairman of Radio Relay International <<http://radio-relay.org>>. RRI provides an alternative message-handling network to the ARRL’s National Traffic System. As explained in this article, RRI’s local networks include Family Radio Service (FRS) and General Mobile Radio Service (GMRS) users in addition to radio amateurs. Long-haul message traffic is handled on amateur frequencies.

Jim Millner, WB2REM (“Beyond Untethered,” p.18), is a frequent contributor to CQ. A ham since age 11, he has operated from about a dozen different DX locations and has written on a variety of topics, from remote radio operation to the psychology of QRMers and “DX cops.” Co-author **Gene Hinkle, K5PA**, is a retired systems engineer specializing in radio geolocation and co-founder/trustee of the Hill Country Mountain Topper Association, which sets up and operates remote and/or temporary stations in the hill country of Texas.

Gary Geissinger, WAØSPM (“Build a Transmitter Cooler,” p. 23), has been licensed since 1968 and is a member of MARS. He holds a master’s degree in electrical engineering and spent 40 years as a design engineer in the aerospace field.

Randal Schulze, KDØHKD (“Gator Case Project for the Yaesu FT-897D,” p. 30), works in information technology but has a communications background that includes radio broadcasting and law enforcement. He is also co-founder of “Hams in Space,” which offers presentations at clubs and hamfests on how to work FM satellites. He is also affiliated with the Amateur Radio Club of the National World War I Museum (WW1USA) in Kansas City, Missouri.

“**Sherlock**” (“Sherlock Solves a 30-Year Transmitter Hunt,” p. 28), is not the author’s real name but this is his real story: When Sherlock was about 11 years old, he hung around the Baker Street Grocers because his uncle was a butcher there. That is how he got interested in ham radio. It was there on the magazine rack he first found CQ magazine. It was the 6- x 9-inch version. All of the ham abbreviations and terms were foreign to him. He didn’t even know what “CQ” was. He soon found an Elmer and became a ham.
1951, Real story. –*Sherlock*

and 2200-meter bands to amateurs. Appropriately equipped 2200-meter stations could extend the usable ground wave range considerably but noise conditions at any prospective operating site should be evaluated for the band of interest prior to beginning construction and comprehensive planning. At my station here in suburban North Texas, 2200-meter reception is virtually impossible during the day in any direction but becomes considerably quieter after dark, which may seem counterintuitive until considering that many local businesses are closed for the day and associated noise generators are probably powered off at night.

A Challenge for the Future

At the beginning of 2018 I was thinking about plans for Field Day and how those plans might include 630 and/or 2200 meters. Given that Field Day is intended to be as much a contest as it is an exercise in setting up portable or temporary operating positions sometimes using emergency power, it seemed like a good opportunity to look at the feasibility of MF and LF under potentially difficult (and often meager) conditions. While I submitted UTC notifications on the behalf of a number of larger clubs in the Dallas-Fort Worth area and their

respective Field Day sites, I ran out time to make a comprehensive push at club meetings to ensure that groups might actually set up a station at their sites and get on the air. In addition to making Field Day QSOs (of which several were, in fact, completed around North America), my local area vision focused on passing message traffic via CW or digital modes, and perhaps I would function as a clearinghouse and liaison to ensure that traffic passed on 630 meters (in my case) would be injected into the traffic network for routing to its final destination.

Just thinking out loud, it would make a lot of sense in the future for the ARRL to allow a “free station” that does not increase transmitter count for both 630 and 2200 meters as a demonstration opportunity at Field Day. Perhaps a meaningful number of points could be established for someone who set up a station and made at least one QSO on at least one of the bands. This approach to a fixed point value is already used for servicing message traffic to a Section Manager, completing a satellite QSO and having a public service agency representative in attendance.

Regardless of anything official that happens in 2019 or the future related to MF, LF and Field Day, I would encour-



Photo C. Loading and matching for the 630-meter Marconi-T at W8CDX were accomplished by this junk box gem. A shunt match coil (left) feeds a small variometer (center) to allow frequency agility and fine adjustment. The larger coil (right) is in series with the variometer and manages the bulk of the loading. Both sides of the open-wire feed line are connected to the top of the coil. Note the minimal radials and ground rod to the right. (Courtesy of NO3M)



Interested parties to build their Field Day low-band setups with one or both of these bands in mind. Perhaps there is an opportunity for a cooperative effort with another club in the region or area where back-channel communications could occur, including but not limited to the traffic-handling ideas that I put forth earlier. Just remember to send notification to UTC 30 days in advance (do it as soon as your site is nailed down so you don't forget) and then think about loading and matching methods for your low-band vertical or consider how you might load your 40- or 80-meter dipole as a Marconi-T vertical. There is plenty of wisdom on the air that will likely help you figure out how to get this done best for your situation.

Real-World Application at Field Day 2018

I mentioned earlier that a number of Field Day QSOs were completed in 2018, specifically on 630 meters. One such operation originated from W8CDX, portable from the back porch of Eric Tichansky, NO3M⁶, who was using his beautiful collection of homebrew "vintage" transmitters and receivers. Eric's antenna was the same 80-meter doublet that he was using for HF, fed with open wire line and about 60-foot to the apex (*Photo B*). Eric loaded and matched the antenna with a variometer and shunt match cobbled together from items found in his junk box (*Photo C*). His system used just 10, 100-foot long, radials which dropped his feedpoint resistance from 200 ohms to just 39 ohms compared to a 4-foot ground rod alone.

Using the W8CDX vintage transmitter (a push-pull 814 amplifier producing 250 watts of output for 5-watts EIRP) and receiver (a stock 1946 HRO5 with no separate receive antenna) configured for 630 meters, Mike Sapp, WA3TTS, completed the operation's first Field Day CW QSO and his first on 630 meters with Wayne Bartholomew, K3MF, across the state of Pennsylvania at a distance of 235 miles. Eric later completed a CW QSO with Bob Johnson, K9KFR, located in Indiana at a distance of 276 miles. This is not a trivial task during the summer at night, particularly when external receive antennas are not in use to improve the signal-to-noise ratio.

Don't Forget to Notify UTC of Your Intent to Operate!

It also cannot be repeated enough that both 630 and 2200 meters require notification of the Utilities Technology Council (UTC)⁷ at least 30 days prior to beginning transmissions in order to confirm that no frequency conflict exists with existing utility communications infrastructure. Notification can be submitted for any fixed operating location, including a home station, EOC, Field Day site, campsite, park, etc.

I was recently presenting on the topic of 630 and 2200 meters at Hamcom in Plano, Texas. While explaining the notification process to attendees, I submitted the required information on the behalf of the convention site for both bands and I am pleased to report that the 30-day window has come and gone with no indication of conflict, so future users could use the spacious site at Plano Centre on either band (think Field Day or an emergency communications exercise) and utility communication infrastructure can no longer be coordinated at those frequencies within one kilometer of the site.

Food for Thought

Hopefully, some of these thoughts can lead to further discussion in the emergency communications community. Are these bands potential game changers? Time may tell. There are definitely applications that might enhance existing emergency communications efforts and a lot of room for further development exists, but I am out of space for this quarter. If you have questions or comments, please contact me at <KB5NJD@gmail.com>.

For your convenience, all of the links in the notes, plus bonus material, may be found at my website at <<http://njdtechnologies.net/cq/>>.

Notes:

1. Texas CW Net: <<https://tinyurl.com/yag367zn>>
2. Radio Relay International: <<https://tinyurl.com/ycwpbftn>>
3. Carrington Event (solar storm of 1859): <<https://tinyurl.com/7jhtfte>>
4. Ground Wave Emergency Network: <<https://tinyurl.com/y8s2zcn0>>
5. WSPRnet: <<https://tinyurl.com/2v17a8k>>
6. NO3M: <<https://tinyurl.com/ybz3uon6>>
7. Utilities Technology Council amateur notification database: <<https://tinyurl.com/yab7cn00>>

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ANTENNAS

BY KENT BRITAIN, WA5VJB

CQ Reviews: Paradan Radio Antenna Disconnect Actuator

Plus Online Antenna Calculators and a Question for Readers

Trouble with my illustrations has limited some of the topics I wanted to talk about this month, so it looks like the next installment of Loop Antennas and some notes on E- & H-field antennas will have to wait until next time. –WA5VJB

I recently had an opportunity to test out a Paradan Radio Antenna Disconnect Actuator (*Photo A*), an interesting product to help protect your rigs from lightning. When the Actuator is in line, your antenna is disconnected and grounded anytime the rig is turned off. Even when the rig is on, a gas discharge tube is across the antenna connector. This NE-2 light bulb on steroids looks like an open circuit until there is a voltage spike on the antenna. When that happens, the gas ionizes and the gas discharge tube now looks like a direct short to ground, keeping the voltage spike from entering the rig. The manufacturer notes that the Actuator's automatic operation makes it ideal for protecting a remote station from lightning and voltage spikes.

There are several ways to power the Paradan Actuator. You can simply connect the Actuator to the same supply that powers your rig. This way, the Actuator is on whenever the rig is on, or if your rig has a 12 VDC accessory port, that is another good place to power the Paradan Antenna Disconnect Actuator. There is also the optional Radio ON Sensor that is connected in the 12 VDC line to the rig. The sensor detects the current pulled by your rig as you turn it on and connects the antenna.

The Paradan Radio Antenna Disconnect Actuator only pulls 10 milliamps when quiescent and 60 mA when powered. For a base price of \$110, it's a great way to protect that expensive rig. The Actuator protects rigs from HF to 6 meters and can handle power up to 1,500 watts of transmitter power. The standard model comes with SO-239 antenna connectors, but binding posts for twinlead are



Photo A. Paradan Radio Antenna Disconnect Actuator.

also available. For details, see <www.paradanradio.com>. Click on "Lightning Protection" and then "Antenna Disconnect."

Online Antenna Calculators

For years, I have played with different online antenna calculators. More re-

cently, I tested about two dozen of them. Results: Horrible. Not one, and I mean not one, of those online calculators properly calculated an antenna.

These seem to be written by folks who like to play with programs, not antennas. And popular ones seem to get copied and copied and copied, but were



Photo B. Wire with different insulators ... air, plastic, and dirt. Do any readers have good data on ground radial currents in dirt?

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never correct in the first place. They leave out critical dimensions like wire diameter. Driven-element impedance is never considered on any of the Yagi calculators, and others are based on formulas from the 1940s or earlier.

None of the calculators for log periodics calculated the dimensions for the booms. Normally, you start with the boom as a 100- to 125-Ohm parallel transmission line, then use the element spacing or element density to load that transmission line down to 50 or 75 Ohms, depending on the application. Diameter and spacing of the booms are critical to a good log periodic antenna.

The worst were the calculators for patch antennas. None of these even came close to coming up with a correct value. And just because the programmer gave you all the dimensions to the nearest .00001th of an inch, doesn't mean they knew what they were doing. Remember: Precision ≠ accuracy. Caveat Emptor!

Radials in the Dirt

Now a question for our readers ... I went nuts when I installed ground radials under my HF vertical, putting something like 300-400 radials in there. Most are

short, but several are over 100 feet long. In fact, my first CQ column covered some neat ways to install buried radials. Perhaps it's time to revisit that topic in the near future.

Now for my technical question. There's lots of stuff out there on buried radials, and most of it is wrong. When you put an insulator around a wire (*Photo B*), the dielectric slows down the radio wave. If you make a 40-meter dipole out of bare wire, then make one out of insulated wire, the insulated wire dipole will need to be about 2 feet shorter to resonate on the same frequency. Yes, the brand of wire/insulation and the thickness of the insulation are both variables in that experiment. But the bottom line is that insulation around an antenna element makes the element appear longer.

Back to radials ... When you use the dielectric constant for average dirt, a quarter-wave ground wire is about 1/3 as long as it would be in air. What about wet dirt? Now that quarter wave ground wire is about 1/5 the length it would be in air.

Also, with bare wire radials there is conduction between the wire and the dirt. Even if the wire is insulated, there is a lot of capacitance between the wire

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and the dirt. I have trouble believing much of that RF current is actually making it to the end of the radial. Maybe this explains why elevated radials are so popular, their results are consistent and predictable.

If any readers have some good data on ground radial currents in dirt, could you please share it with me? Interested in being a guest columnist?

Looking Ahead

As I said, I've got some more stuff on loop antennas in the works and we have a question from a reader for the next column. As always, our readers supply some of the best topic material. Email me at <wa5vjb@cq-amateur-radio.com> or, for many other antenna projects, visit <wa5vjb@wa5vjb.com>.

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QRP: Low-Power Communications

BY R. SCOTT ROUGHT,* KA8SMA

QRP on the Go: A Portable QRP Antenna Showdown

Every ham has a favorite antenna, right? Each time I flip the power switch on my QRP rig, I am faced with choosing between my homebrew 2-element HF beam (10-20 meters), my assortment of dipole antennas (10-80 meters), a longwire, or a 450-foot horizontal sky loop that drapes from tree to tree around the perimeter of my yard. I am always interested in which antenna is going to do the best job of propagating my pipsqueak 3-watt signal halfway across the world.

When operating at my home station, I have the luxury of choosing the antenna I believe will be the most effective radiator for the time of day, area of the world I want to contact, and HF band I want to operate. When working QRP portable, though, you generally do not have the option of switching between a variety of antennas. Typically, just one antenna is deployed, and you pray that it works well. Your choice of antenna will impact whether you make a lot of contacts, a few contacts, or no contacts at all.

Antenna Showdown Time!

Earlier this year (late spring) I received emails from hams who, like me, were anxious to hit the trail with their QRP gear and operate from a location other than their ham shack to shake off those wintertime blues. One question that arose was which antenna I prefer for portable operation and how it compares against other antennas. After considering how I would reply, I realized I could not completely answer this question.

My “old standby” is the inverted-V, but I have never performed a side-by-side comparison to determine which antenna in my arsenal of portable radiators is the most effective. It did not take long to convince myself that an old-fashioned antenna “showdown” was necessary. After all, the antenna is the most important element of your portable station and no ham (at least any I know) wants to hike to a remote destination or visit his/her local park or campground and set up a portable station with an antenna that is an average performer.

Choosing a Venue

The most difficult aspect of setting up the “showdown” was determining a location. I was in search of a spot that was “open” so I could erect up to four portable antennas, one that had trees or other structures that could be used for antenna supports, and most importantly, was away from the home QTH, so I would be truly portable when conducting the test.

My initial thought was a two-track trail located about 30 minutes from my QTH in Sleeping Bear Dunes National Lakeshore. At the top of the trail is a clearing with a terrific view of North and South Manitou Islands (well worth the hike). However, the walk is nearly a mile uphill and I was concerned that my jaunt over loose dune sand while toting four portable antennas, radio gear, and other accessories on a hot summer day would turn into a nightmare. Another option was a nearby city park. I quickly abandoned this idea after realiz-

ing soccer balls, baseballs, and hundreds of little feet running every which way would not mix well with an array of portable wire antennas strung between several trees and feedlines stretching over the ground’s surface. My XYL saved the day when she suggested I hold the showdown during our upcoming camping trip at Brimley State Park, located along the shoreline of Lake Superior in Michigan’s eastern upper peninsula. The campsite we had reserved fit all the criteria — sufficient space to erect four antennas, several trees to serve as antenna supports, and most importantly, I would be



Photo A. Magnetic loop set up at the campsite. The tree line supporting the inverted-V and end-fed is seen in the background.

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



Photo B. The homebrew antenna switch I used for the showdown.

operating portable away from home. This location also had the added benefit of eating camp food prepared over an open fire. I envisioned eating a well roasted hot dog topped with mustard and onion along with a s'more (or two) while tuning across the ham bands in search of contacts to compare the antennas. It did not take long for me to acknowledge my XYL with "great idea, honey ... it's a plan!"

The Players

For the showdown, I opted to use four antennas that I have used on the trail that are simple (and inexpensive) to construct and have a proven design, meaning they work. Each antenna is highlighted below with information on its construction and how it was set up in the field for the comparison. It is important to note that, although I am not an expert in experimental design, I did my best to create a level playing field, so no antenna would have an advantage over another.

Inverted-V Dipole – I constructed this antenna for the 20-meter band using 18-gauge stranded wire and fed it with approximately 70 feet of 300-ohm twin lead. An MFJ-971 portable antenna tuner was used to match the antenna to the Yaesu FT-817, the rig used for the showdown. I used a slingshot to send 30-pound test fishing line over a tree branch and hoisted the antenna upwards so its apex was approximately 30 feet above ground. I could have easily hoisted it higher; however, doing so may have created an unfair advantage when compared with the other antennas. Thirty feet is what I consider to be an average height for use on the trail and is not a difficult height to attain with a slingshot or other method. CQ's October 2017 column ("Quenching the QRP'ers Thirst for Antenna Height") contains information on various methods for achieving antenna height in the field.

End Fed Wire – I strung approximately one-half wavelength of 18-gauge stranded wire (approximately 33 feet for 20 meters) about 15 feet into a tree near my operating position and then across to another tree. The endpoint of the wire was slightly higher than the apex of my inverted-V. Like the inverted-V, I could have placed the wire higher in the tree but wanted to maintain a height that was manageable (and typical) for the trail. The wire was fed into a homebrew antenna tuner

(see CQ's August 2017 column, "The All-in-One ... Portable Antenna Tuner for the QRP Enthusiast," for additional information) for matching it to my FT-817. I also strung a counterpoise over the ground's surface to help create an efficient antenna system.

Ground Plane – The ground plane antenna is a radiator with two radial wires, all cut to a quarter wavelength of the frequency/band of interest. Since the antenna was cut for use on 20 meters (each wire cut to approximately 16.5 feet), I directly fed this antenna to my FT-817 with 20 feet of RG-8X coaxial cable. The top of the antenna (tip of the radiator) was hoisted into a tree to a height about 20 feet above ground, leaving just over 3 feet between the ground surface and base of the radiator. The two radials (soldered to the coaxial braid at the base of the radiator) drooped to the ground on an angle and were tied off at their endpoints.

Portable Magnetic Loop – The portable magnetic loop I used was featured in the July 2018 column of CQ ("The Portable Magnetic Loop ... An Antenna for the Low Power Enthusiast on the Go"). The loop is 36 inches in diameter, very travel-friendly (due to its PVC bracing) and performs well on 20 meters (Photo A). The loop was fed directly to the FT-817 with 10 feet of RG-8X.

Setting Up the Challenge – A Few Considerations

As I began to make plans for the antenna challenge, I thought about whether I should operate SSB or CW. Since pounding brass at 25-30 words per minute (wpm) is not my forte (I generally sputter along at 15-18 wpm), I quickly decided SSB would be my mode of operation. SSB would allow a quicker and better explanation to those I contacted about what I was trying to accomplish and allow me to receive as much information as possible about each antenna. It is important to note that when explaining the goal of this exercise to each person contacted, I asked that honest (real) signal reports be provided. I have watched too many YouTube videos in which hams are providing 59+ signal reports and the S-meter on their rig is barely reading S5.

Antenna orientation was another consideration. Except for the portable magnetic loop, I never reorient an antenna after it has been set up on the trail. The layout of trees and other objects I use to support portable antennas generally dictate the radiation pattern of the antennas. For the showdown, I oriented the inverted-V and end-fed so that maximum radiation from each antenna was in a northeast-southwest direction. Although the ground plane is omni-directional, I oriented its radials in the same direction as the two other antennas. I also oriented the magnetic loop in a northeast-southwest direction but rotated the loop after a contact was established (as often done by other hams who use this type of antenna) to achieve best performance.

My last consideration was an antenna switch. To quickly switch between all four antennas, I constructed a homebrew antenna switch (Photo B) using a five-position rotary switch I had in my junk box, a few SO-239 chassis connectors, a small section of sheet metal for mounting the switch and connectors, and a piece of wood (2x4). The three SO-239 connectors shown on the rear of the switch box were used for accepting feedlines from the end fed antenna (All-in-One Tuner), the ground plane antenna, and the magnetic loop. The two pieces of RG-8X coax exiting the back of the switch box were soldered directly to the switch with their ends fitted with PL-259 connectors for attaching directly to the FT-817 and the MFJ-971 antenna tuner (used for the Inverted V). I had only three SO-239 connectors in my junk box, which is



Photo C. My portable operating position for the showdown.

Antenna Type	Inverted-V	End-Fed Wire	Magnetic Loop	Ground Plane
Transmit (My Signal Report)	62	39	26	27
Receive (Signal Received)	70	49	37	34
Total Points	132	88	63	61

Table 1. Portable antenna showdown points summary. See text for how points were awarded.

why I used a combination of coax and SO-239 connectors to make the antenna switch.

Lastly, to help eliminate any antenna bias from the operator on the receiving end, I assigned each antenna a number for the comparison. For consistency, I called CQ (or answered a CQ) using the Inverted V (antenna number 1) and after explaining what I was trying to accomplish switched between antennas 2 (end fed), 3 (magnetic loop) and 4 (ground plane) before switching back to antenna 1 (Inverted V). I was sure to give a solid 5 to 10 second transmission after switching to a new antenna so the operator on the other end could provide a solid signal report. Only after receiving signal reports for each of the antennas did I reveal the types of antennas used and their corresponding number.

The Showdown

The showdown was spread over two days (one afternoon and one evening) in late June. *Photo C* shows the portable operating position with the FT-817, MFJ-971 portable antenna tuner (for the inverted-V), the All-In-One antenna tuner (for the end-fed) and the homebrew antenna switch. All contacts were made on 20 meters during a period of no sunspots with a Solar Flux Index hovering around 70. Fortunately, no geomagnetic disturbances were reported during the test period or the showdown would have had an early demise. A total of 18 contacts were made during the test period. I would have liked to have made more contacts, but explaining the showdown to each ham, obtaining antenna feedback, etc. was

time-consuming. In fact, I was so busy writing down information and having fun that I forgot all about eating those fire-roasted hot dogs and s'mores while on the air.

In lieu of listing each contact and the transmitted and received signal reports for each antenna, I assigned a point system for each signal received and transmitted. Signal reports that were S9 or above received 4 points, reports that ranged between S6 and S8 received 3 points, signals that were S4 or S5 received 2 points, and reports of S3 or below received 1 point. If a station could not hear me, or I could not hear them, no points were awarded for that signal report. *Table 1* summarizes the total number of points tallied for each antenna for my transmitted signal (my reception report) and the received signal (report I provided), and the combined point total to help determine the overall effectiveness of each antenna.

The Envelope, Please ...

The inverted-V received the most points (combined total) followed by the end-fed, magnetic loop, and finally, the ground plane. The inverted-V had more S9 signal reports (transmit and receive) and the end-fed had more S7 signal reports than any other antenna. Although the point system may not suggest it, the ground plane and magnetic loop were both solid performers but were not in the same class as the inverted-V and end-fed ... it was almost like comparing a 3-element beam at 60 feet with a dipole at 30 feet.

Contacts were made from California to Maine with two DX contacts in Russia and Belgium. The Russian station (near



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Moscow) gave me an S7 on the inverted-V and S2 on the end-fed. Unfortunately, he could not hear me on either the ground plane or magnetic loop. On my end (receiving end), he was S9 on the inverted-V and S3 or below on the end fed, ground plane, and magnetic loop. The Belgian station reported I was only heard (S3) on the inverted-V. On receive, he was S5 on both the inverted-V and end-fed, and just above the noise level on the magnetic loop. His signal was not heard on the ground plane.

The loop was the quietest antenna, followed by the inverted-V and end-fed. The ground plane was the noisiest antenna (likely due to its vertical orientation). In ease of portability and setup, no antenna is easier than the magnetic loop, due to its "pack and go" design. The inverted-V, end-fed, and ground plane all receive the same marks for portability. Since there are no drooping legs (inverted-V) or radials (ground plane) to secure after the end-fed has been hoisted upwards, this antenna has a slim advantage over the other two for setup.

Unfortunately, I heard more stations than I could contact ... yes, QRP sometimes has its limits. As part of the showdown I tallied the signal reports for all stations I received on each antenna. The same trend for "Signal Received"

as summarized in *Table 1* held true for the additional stations heard.

Wrapping it Up

First and foremost, it is important to note this was a non-scientific test based on my observations during several hours of contacts spread over two days in the field. No statistical analysis, modeling, or other scientific methods were performed. My eyes and ears were the sole judges for this showdown.

The inverted-V was the clear winner, followed by the end-fed. As discussed earlier, the magnetic loop and ground plane performed well, but simply are not in the same class as the other two antennas. I would be happy to take any of these antennas for a hike on the trail, but my preference is (and continues to be) the inverted-V.

If time had permitted, I would have conducted a similar showdown on other HF bands. I suspect the results for each antenna would be similar to those found for 20 meters. If anyone is up for the challenge, or has already performed a showdown of their own, let me know your findings and I will share them in a future column. I know that I am not the only person interested in other operators' observations and findings.

- Until December, 73, K8ZR

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KIT-BUILDING

BY JOE EISENBERG,* KØNEB

Climbing the Hill and is “The Shack” Back?

Here we are with the fall season at hand and the word is out that RadioShack products will be back in stores in more places than the very few outlets that Tandy retained after bankruptcy. Hobbytown USA, headquartered here in Lincoln, Nebraska, announced this past summer to its franchisees that they will be able to carry as much or as little of the RadioShack product line as they want. (RadioShack products remained available online even after the closure of most of the chain’s retail outlets.) Hobbytown stores (*Photo A*) carry things of interest to radio control (R/C) hobbyists, model railroaders, trading card gamers, and a myriad of other popular hobby items. Most Hobbytown stores will be carrying the RadioShack component parts — such as resistors, ICs, capacitors, connectors, etc. — that we hams all know and love, as well as such things as prototyping boards, project boxes, soldering tools, and more.

I spoke with one of the managers of the largest Lincoln store as he was putting RadioShack merchandise on the shelves in the first Hobbytown store to do so. Store Manager Joel Teply (*Photo B*) told me that over the next few weeks or months, RadioShack parts would be showing up in most of the 150-store Hobbytown USA chain. As time goes on, more RadioShack items will make their way into Hobbytown stores. He indicated to me that, after the demise of the three local RadioShack stores here in Lincoln, many customers who enjoy such hobbies as model railroading, R/C cars, airplanes and drones, were in search of common parts to complete their projects or repair their models. The synergies between electronic hobbyists and makers and the hobbyists Hobbytown USA serves made this an ideal solution for both RadioShack and Hobbytown. I have already taken advantage of the local availability of component parts and I am sure many more people will do as well. So, now we have the 150-store Hobbytown USA chain to visit to get our RadioShack fix again. You can

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Photo A. The 70th and Pioneers Hobbytown store in Lincoln, Nebraska now has RadioShack parts!

find your closest Hobbytown store at <www.hobbytown.com>.

A Visit to a Parts and Surplus Emporium

While in Dallas this past summer for the annual Ham-Com held in Plano, I paid a visit to a local electronics surplus store. Tanner Electronics is a very traditional electronics parts store with a huge selection of component parts (*Photo C*). In addition to the normal electronic parts, it carries a lot of surplus electronic items. I picked up a cute pocket-sized video projector for only \$20 while I was there, in addition to several parts I needed for different projects. The aisles were packed with about every type of part you could want, and a very friendly staff was there to help find what you were looking for. A peek in the back room revealed even more stock ready to be sorted and displayed. DFW residents are fortunate to have such a store in their midst. For more information, visit <www.tannerelectronics.com/>.

Climbing the Hill

I recently completed my assembly of the Four State QRP Group’s Hilltopper



Photo B. Lincoln, Nebraska, Hobbytown Store Manager Joel Teply shows off some of the RadioShack items on display at his location, taking up a whole aisle and including kits!

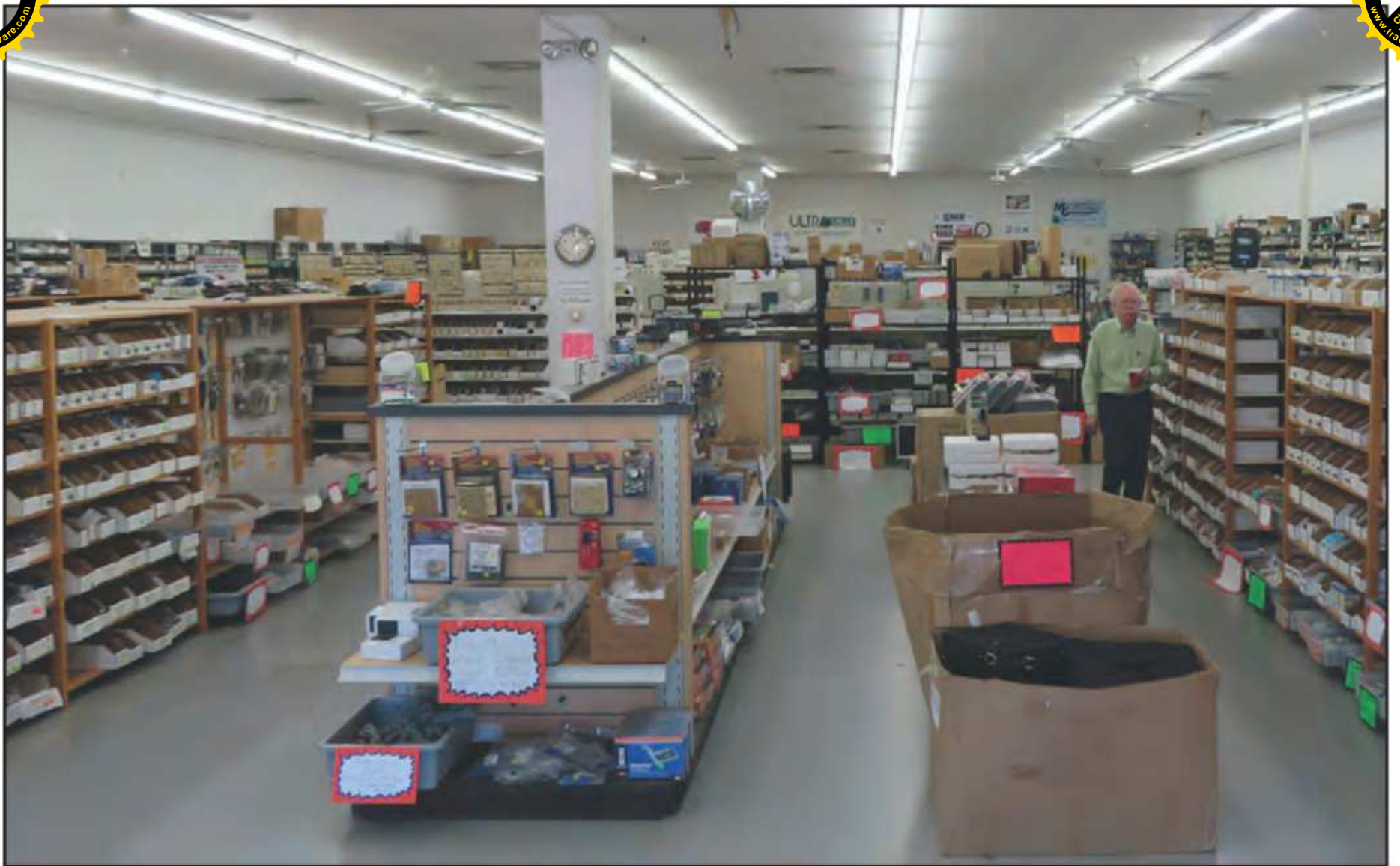


Photo C. Tanner Electronics serves the Dallas-Fort Worth area with lots of surplus parts and other electronic items useful to builders.

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BY ED TOBIAS, KR3E

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Photo D. The Hilltopper 20 assembled and ready for calibration. Note the DDS (direct digital synthesis) board at the upper right.



Photo E. Front panel of the finished Hilltopper 20 kit. The case is made entirely of PC board material and comes already drilled and labeled.

20, and I was not disappointed in its performance. Using a signal generator, I was easily able to hear a 1- μ v signal. My Hilltopper puts out a full 5 watts of RF and works great. The final assembly steps included finishing installing the parts on the main board (Photo D), and assembling the case (Photos E and F). The case is made from PC board material as are many other Four State kits. Once assembled, but before the front and back covers are installed, there is a calibration procedure that needs to be followed to be sure the VFO is where it says it is. The VFO tells the operator the operating frequency in Morse code, an approach taken in many previous QRP kits. The BFO offset is set during calibration as well.

The difference is that in this kit, the VFO is really a direct digital synthesizer (DDS). The DDS board mounts on top of the main board during its portion of the assembly process. In assembly, each group of parts comes in its own bag, making parts sorting unnecessary. Each bag has only a few parts, so simply emptying only one bag at a time onto your work surface lets you easily pick out the parts as they are needed to complete that part of the assembly. There are two 8-pin surface mount ICs that come already pre-mounted to the main board. The three toroids in this kit are all simple to wind, with no bifilar or trifilar windings or secondary windings. The toroids have 8, 12, and 14 turns, making for quick and easy winding. The wire supplied in this kit cannot be stripped using the hot sol-



Photo F. The back panel of the finished Hilltopper 20.

der technique. I suggest using an emery board and making sure you thoroughly clean about 1/4-inch of each lead measured from the base on the toroid.

Operation

Once assembled, operation is simple. Connecting 12 VDC, a key or paddle, headphones or ear buds, and a tuned antenna are all that is needed to enjoy 20-meter CW. Note that upon power-up, the radio defaults to 14.060 MHz. There are two dial step speeds, 100 Hz (default) and 20 Hz. A quick tap of the function button plays your frequency in Morse at the speed you've set for your paddle. The tuning knob also functions to allow for RIT (Receiver Incremental Tuning) by making a half-second tap down on the knob. There are also options to reverse the paddle, use an alternate startup frequency, and a tune mode. If a mono-type plug is used for a straight key, the

Hilltopper will automatically go into straight key mode. You can actually listen to the entire 20-meter band with the Hilltopper, a very nice feature.

As successful as this kit has been so far, look for other bands, such as 30 or 40 meters, to be made available in the future. Designed by Dave Benson, K1SWL, and David Cripe, NMØS, the Hilltopper sells for \$87.20 including shipping via U.S. Mail in the U.S. and can be ordered at <www.4sqr.com>.

MichiGone

Finally, I apologize to those expecting me to be in Michigan this month. The Great Lakes HamCon was cancelled, and no further information about a future venue was available at press time. I look forward to seeing as many of my readers as possible at any of the hamfests I attend year-round.

– Until next time, 73 de KØNEB



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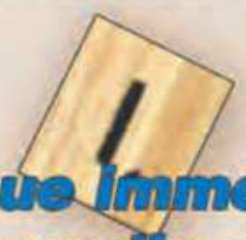


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LEARNING CURVE

BY RON OCHU, KOØZ

BIC ... With a Focus on the "C"

For those of us fortunate enough to spend time with our beloved hobby, long hours of fun can be spent before the transceiver. It doesn't matter if the band is VLF, HF, VHF, or above, these hours can pass like minutes while having fun making contacts or attempting to break a DX pileup (many stations calling a DX station all at the same time). Contesters encounter similar operating conditions and they understand the importance of "creature comforts" while contesting. Success in many aspects of ham radio requires a fair amount of "BIC" time – meaning Butt In Chair. I first heard this acronym used by well-known contesteer Skip Riba, WS9V (*Photo A*).

Perhaps not the most eloquent of ham radio acronyms, BIC is one that effectively captures the essence of successful ham radio operation, whether it be contesting, DXing or casual arm-chair operation. In my opinion, BIC comprises two major components. The first is finding a suitable, comfortable, chair that will integrate well into your shack. The second component is your ability to focus on the radio task at hand. If you have a chair that can keep your "B" comfortable for long periods of time, then you'll be more likely to be able to focus on your radio goal.

Component One: Selecting a Radio Desk Chair

Everyone's needs are a bit different, but I have visited quite a few "shacks" (ham radio parlance for a radio room) and a nice, spacious operating desk combined with a padded office chair on rollers tends to be the norm. I prefer a high-backed chair with a well-padded seat that curves towards the front to reduce leg strain (*Photo B*).

I've found, through experience, that it's best to get a chair base with heavy-duty wheels. Furthermore, do your homework and check the maximum load in pounds the chair will hold and then add a hundred pounds. I'm an oversized guy and I've bought chairs that are rated only few pounds over my weight and they all just didn't stand the test of time. Obviously, I pay more for



Photo A. Well-known contesteer and DXer Skip Riba, WS9V, in the black shirt, serves as a QSL card checker for awards. Skip is the op who first made me aware of the BIC acronym. (All photos by KOØZ)

my excess baggage, but in the long run, I am saving money, time, and aggravation.

Your chair should fit comfortably under your operating desk and there should be ample leg room to stretch. A lever-controlled pressure canister below the seat controls chair height. These tend to give out with time and that's where the maximum load research comes in handy. In addition, check the framework of the seat. Is it hardened steel or some weaker metal?

Over time, these all make a difference, especially for us "more robust" operators. I try not to scoot around my shack too much, but there are times when I need to reach a rotor control or bring another antenna online with my antenna switch. Since my shack has carpeting, I purchased a plastic floor mat that makes it a whole lot easier to slide from spot to spot (*Photo C*).

Oops, I've neglected a major factor in selecting a chair. It's advisable to get a chair wide enough to accommodate the B in BIC. Arm rests are a personal preference. I find them useful, but I can go

either way on that one. Color choice is another preference that had more aesthetic rather than practical applications.

For me, I need a chair for my radio desk that will comfortably support my weight, reduce leg and back strain during long sitting periods, and will easily slide when I need it to move.

What About a Workbench Chair?

The same requirements of comfort over long sitting periods and a seat that will accommodate the B in BIC still exists, but working at a bench may not require as much sliding around. Of course, an office type chair with rollers will work just fine. In my shack, my test bench is located directly across from my operating desk. I tend to do most of my work in just one location, so a stationary chair works fine for me. I still need a padded seat cushion, a high back, and a strong chair frame. I just don't need the lever-activated gas piston lift and wheels. Eliminating these features significantly reduces chair cost (*Photo D*). Of course,

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

The chair can do double duty, but I find switching chairs and tasks offers more flexibility and mental focus.

Component Two: Focus

The second component of BIC is mental focus and persistence. Having the right tools for the job makes the going easier. Having a reliable, comfortable chair is an essential ingredient for successful DXing and contesting. Even casual operating can benefit from a good chair. After all, if you're too uncomfortable to spend much time at the radio, then you won't be there to "hear them" and as the adage states, "you can't work them if you can't hear them."

Time spent with the radio is crucial. As Skip, WS9V, reminds local club members, it's not just the time in the chair, it's the quality of the time spent while in the chair. Skip is constantly evaluating himself to see if he is using his time in the chair to maximum efficiency. If he isn't, he'll change tactics, which at times may include mowing the lawn. There are those times when an antenna switch fails, an amplifier tube fails, band propagation dies, etc. The point is to make whatever time you spend in the operating chair count.

– 73 and thank you for reading CQ, de Ron KOØZ



Photo C. Note the heavy-duty wheels and base, but also note the plastic office floor mat on the carpeting that keeps the wheels from getting tangled up with the carpet fibers.



Photo B. This is the black office chair that I use in my shack. Please note the high backrest, the extra seat padding, and the curved front edge. The wheels are heavy-duty. This seat is comfortable for sitting over extended periods, allowing me to focus more on the DX or the contest.



Photo D. This blue office chair is fine for shorter times in front of the workbench. It is wide, padded, and offers back support. I don't need to slide around at the bench, so this chair offers a less expensive alternative to the black office desk chair.

VHF PLUS

BY TONY EMANUELE,* K8ZR

Spring Sprints, Central States VHF Conference, and a Canadian GridXpedition

VHF Plus Calendar

Microwave Update: Dayton, Ohio
 Pacific Northwest VHF Society Conference: Seaside, Oregon
 ARRL EME Contest (1st weekend) 50 MHz to 1296 MHz
 Leonids Meteor Shower Predicted Peak
 ARRL EME Contest (2nd weekend) 50 MHz to 1296 MHz
 Geminids Meteor Shower Predicted Peak

October 11th – 14th
 October 12th & 13th
 October 27th & 28th
 November 17th/18th
 November 24th & 25th
 December 13th/14th

The results of the 2018 Spring Sprints, sponsored by the Central States VHF Society, have been tabulated thanks to Kent O'Dell, KA2KQM; Mike Metroka, WB8BZK; and Jon Platt, WØZQ. See *Table 1* for the results. Participation remained at about the same level as 2017. As has been the case in previous years, the 144 MHz Sprint remains the most popular of the four-hour-long sprints with 111 logs submitted in 2018, followed by the 50 MHz Sprint with 78 logs. There were 65 submittals for the 222 MHz Sprint, 68 for the 432 MHz Sprint and 41 for the microwave Sprint. At least nine rovers made an effort on 144 MHz, along with four on 222 MHz, five on 432 MHz, nine during the microwave Sprint and eight during the 50 MHz Sprint. Of course, the 363 logs submitted over the five sprints is only

a subset of the total activity. There is really no excuse for not submitting a score as log details are not required at the time of score submission to the 3830 scores webpage – see: <www.3830scores.com>.

Central States VHF Conference Summary

Over 120 VHF enthusiasts attended the 52nd annual Central States VHF Society conference in Wichita, Kansas the last weekend in July. The conference was complete with an antenna range, noise figure measurements (*Photo A*), swap meet, rover row & dish-bowl¹ (*Photo B*), excellent technical presentations on a wide range of topics, and a Saturday evening banquet. The banquet entertainment broke with the traditional technical theme and featured Curtis the Mentalist, to the delight of the audience.

The society presented the Chambers Award to Tom Williams, WA1MBA (*Photo C*), for his ongoing technical

c/o CQ magazine

email: <k8zr@cq-amateur-radio.com>



Photo A. Tommy Henderson, WD5AGO, manned the noise figure bench at the 2018 Central States VHF Society Conference in Wichita, Kansas.



orts in pushing the limits on the microwave and millimeter bands, his on-the-air millimeter-wave activity and his hosting of the Microwave Reflector.

The Wilson Award was presented to Donn Baker, WA2VOI, for sustained

service to the society (*Photo D*). It was noted that Donn has been a fixture on the conference's microwave antenna range for over 20 years, has served on several conference host teams and as conference president in 2017. Outgoing

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144 MHz

Single Operator Fixed:	QSOs	Grids	Points
1st KA1ZE/3 Stan Hilinski	119	47	5,593
2nd K1RZ Dave Petke	122	39	4,768
3rd K1TEO Jeff Klein	127	37	4,699
Rover:			
1st VA3ELE/R Peter Prabucki	83	48	3,984
2nd K2EZ/R Andrea Slack	77	30	2,310
3rd K9JK/R John Kalenowsky	40	22	800

222 MHz

Single Operator Fixed:	QSOs	Grids	Points
1st K1RZ Dave Petke	53	28	1,484
2nd K3TUF Phil Theis	38	19	722
3rd K1TEO Jeff Klein	36	20	720
Rover:			
1st K2EZ/R Andrea Slack	43	26	1,118
2nd VA3ELE/R Peter Prabucki	34	28	952
3rd K9JK/R John Kalenowsky	25	17	425

432 MHz

Single Operator Fixed:	QSOs	Grids	Points
1st K1TEO Jeff Klein	78	29	2,262
2nd K3TUF Phil Theis	54	27	1,458
3rd K1RZ Dave Petke	53	25	1,325
Rover:			
1st VA3ELE/R Peter Prabucki	57	45	2,565
2nd K9JK/R John Kalenowsky	58	25	1,450
3rd K2EZ/R Andrea Slack	44	27	1,188

Microwave (902 MHz & Above)

Single Operator Fixed:	Points (Total km)
1st K1RZ Dave Petke	14,339
2nd K1TEO Jeff Klein	8,168
3rd N3RG Ray Golley	7,166
Rover:	
1st VA3ELE/R Peter Prabucki	6,478
2nd W7GLF/R Ed Cannon	3,588
3rd KF2MR/R Jarred Jackson	3,084


50 MHz

Single Operator Fixed:	QSOs	Grids	Points
1st K2DRH Bob Striegl	50	32	1,550
2nd KB8U Russ Dwarshuis	42	28	1,176
3rd N2NC John Golomb	54	18	972
Rover:			
1st ACØRA/R Wyatts Dirks	53	50	2,650
2nd N2DXT/R Shawn Zupp	28	12	336
3rd WA9TT/R Larry Peterson	18	13	234

Table 1. Top scores in each of the 2018 Spring Sprint competitions, for both fixed stations and rovers.

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Photo B. "Rover Row" at the 2018 CSVHF Conference. This photo features the rover setup of Andrea Slack, K2EZ. See Note 1 for details on Rover Row.

society president Mel Graves, WRØI, presented the President's Award to Steve Kostro, N2CEI (Photo E), for his boundless energy and methodology in securing future conference sites. The 2019 CSVHF Conference will be held in Lincoln, Nebraska on July 25th through 27th.

Tommy Henderson, WD5AGO, a fixture at the CSVHF conference noise figure measurement bench for many years (along with Al Ward, W5LUA), gave an interesting presentation this year titled: *End of Life: What has happened with our old low-noise devices?*² Henderson pointed out that many of

the popular low-noise devices have gone obsolete over the past 15 years, presenting a challenge for those who occasionally need to replace a blown device from an older pre-amplifier design or try their hand at building their own version of an LNA³. Today, the few state-of-the-art devices that are still available are in surface-mount packages that are difficult for the typical amateur to solder to a printed circuit board.

The affordable and readily available MMIC⁴ has been around for 20+ years and of late MMIC noise figures, though not yet that of discrete HEMT⁵ devices, are approaching 0.5



Photo C. Tom Williams, WA1MBA (left), accepting the Chambers Award from Central States VHF Society Awards Chairman (and CQ Antennas Editor) Kent Britain, WA5VJB. Williams was honored for his pioneering work on the millimeter-wave bands.



Photo D. WA5VJB (right) presenting Donn Baker, WA2VOI (left) with the society's Wilson Award in recognition of his many years of volunteering on the conference's microwave antenna range.



Photo E. Steve Kostro, N2CEI, of Downeast Microwave, was this year's recipient of the CSVHFS President's Award, in recognition of his work in securing conference locations.

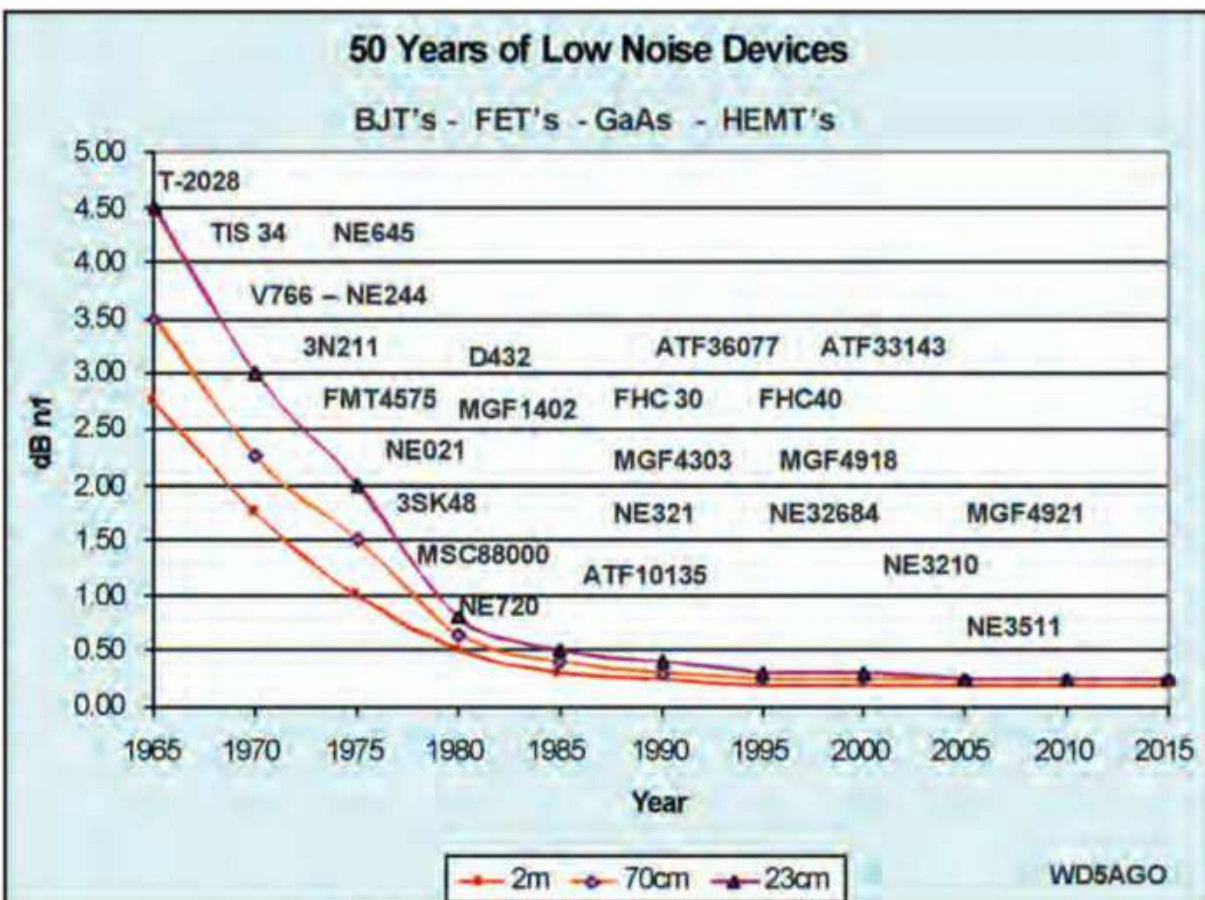
dB. Today's MMICs sport wider gain response with tighter control of stray inductance, making it generally easier to realize a low noise figure with, as a bonus, a much higher P1dB — an important consideration when using an

LNA in the presence of strong signals. This is a common occurrence during band openings or during a contest. Many MMICs are in leadless SMD 6 or 8 DFN packages, measuring 2 x 2 millimeters, again a presenting soldering challenge.

For the more popular devices used in amateur preamplifier design, Henderson charted their typical noise figures and the year that each device became available, giving a historical perspective on where we have come from with respect to the noise figure (NF) of low-noise preamplifiers over the past 50 years. See *Table 2*.

On the Bands

Peter Prabucki, VA3ELE, made a one-man mini-DXpedition over six days, driving nearly 4,500 kilometers (~2,800 miles) round-trip to Radisson Campground in Quebec, FO13te. His 432 EME activity from Zone 2 (*Photo F*) was over the Canada Day holiday weekend of June 30th & July 1st. Peter reports that even though moon conditions were not favorable due to high degradation of -2.9 dB, many of the JT65B signals were audible. At times he decoded five signals per sequence and noted that there is "nothing like a mini pile up off



BJT: Bipolar junction transistor
FET: Field-effect transistor
GaAs: Gallium arsenide field-effect transistor (GaAsFET)
HEMT: High Electron Mobility Transistor

Table 2. Low Noise Devices the past 50 years. (Courtesy WD5AGO)

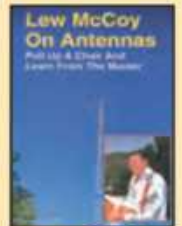
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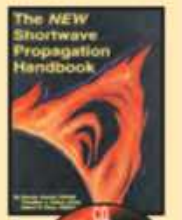


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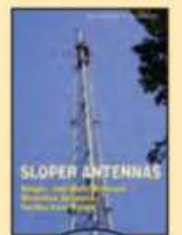
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Photo F. Peter Prabucki, VA3ELE, made a one-man mini-DXpedition over six days, driving some 2,800 miles and activating 26 grids. In this photo, he's operating 432-MHz EME from FO13te in CQ Zone 2.

what's new

N3FJP Amateur Contact Log v.6.3

N3FJP Amateur Radio Software has updated its Amateur Contact Log to version 6.3 and the primary change is that the software now feeds DX spots from AC Log directly to Flex Radio panadapters.

Flex users should navigate to the rig interface form, select Flex API to enable rig interface and receive the spot postings. N3FJP said he hopes to have this feature incorporated into all of his major contest programs before the fall/winter contest season goes into high gear.

While improved support for Flex radios was the impetus behind the update, there are some other new goodies in 6.3, such as adding a CW "Tab Sends Message" (TSM) feature. With TSM enabled, when you tab from the Call field, the F2 string will be sent. When you press enter, the F3 string will be sent. It makes for a smoother flow. To enable the Tab Sends Message (TSM) option when you are running a frequency, press Ctrl + Shift + G from the main form.

Other added features include making it no longer necessary to select a CW keying option if you want to use your rig's internal memories, query options are now saved and will appear next time you load either awards form, and adding an entry for the new FT8+ mode to the "Mode" drop down menu.

Amateur Contact Log is available now and is free to download and try for 45 days, \$24.95 to keep using it after 45 days. Upgrades are free to all users of N3FJP software. For more information, contact: G. Scott Davis, 118 Glenwood Road, Bel Air, MD 21014-5533. Website: <www.n3fjp.com>.

the moon." Stations worked on 432 EME included: NC1I, HB9Q, DL7APV, OK1DFC, OK1KIR, W5LUA, UT6UG, ON4AOI, K2UYH, and W7MEM.

During the drive to and from FO13te, he activated the following grids on 2 meters via tropo or MSK144: FN03, 04, 14, 24, 25, 26, 27, 28, 18, and 19; FO10, 11, 12, 13, 03, and 02; FN19, 09, and 08; EN98, 88, 87, 86, 96, and 95; and FN05. Stan Hilinski, KA1ZE/3, in FN01xt, was worked from 22 different grids. The best tropo DX was with Peter at 795 kilometers (~500 miles). The other QSOs took place via MSK144. Peter's best 2-meter MSK144 meteor scatter DX was with NX3B, FM28, at 1,729 kilometers, followed by KF2T, FM18, at 1,659 kilometers. During the final leg of his journey through EN96, EN95, and FN05, Peter experienced a nice tropo opening, working many stations on 2 meters via SSB and CW. From start to finish, Prabucki made 143 QSOs via meteor scatter, tropo, and EME.

– 73 & CU on the bands, Tony, K8ZR

Notes:

1. The "rover row & dish bowl" is an opportunity for rovers and microwave operators to display their rovers and portable microwave gear at the conference. This year's dish bowl included portable microwave gear for the 10-, 24-, and 47-GHz bands. There are talented individuals in our hobby, to be sure!
2. Proceedings of the 52nd Conference of the Central States VHF Society. ARRL, Newington CT. 2018. Pages 29-34.
3. LNA = Low noise amplifier.
4. MMIC = Monolithic microwave integrated circuit.
5. HEMT = High electron mobility transistor.



AWARDS

BY TED MELINOSKY,* K1BV

Slovakian Awards to Aim for This Fall

Special USA-CA Honor Roll: All 3077 Counties

Patty Jo Chiles, ACØCU, USA-CA #1266
awarded July 24, 2018

On New Year's Day in 1993, what was known as Czechoslovakia underwent a nonviolent "velvet divorce" into its two components, Slovakia and the Czech Republic. It's encouraging to know that at least some countries can agree in a peaceable manner.

Both countries offer well-designed amateur radio awards, and there are plenty of licensed stations. They can be found in large numbers during contests, and Slovakian "OM" prefixes are NOT rare.

This month's column covers four awards that are offered by the Slovakian Amateur Radio Association (SZR), which is a selection of the organization's most popular award programs. A following column may expand on the rest of the program. (For example, there is also a Castles program, as Slovakia is home to many castles during its 1,200 years of history.)

All of the following awards require that you supply a list of contacts that have been verified and signed by two witnesses, with the applicant's signature and a formal declaration of compliance with the diploma conditions. You must submit your application along with the relevant fees to the diploma manager: Milan Horváth, OM3CDN, Lopenická 23, 831 02 Bratislava, Slovakia. You can email him at <om3cdn@omradio.sk> or visit the SZR website at <www.hamradio.sk/> for complete instructions.

Slovakian Districts Award

When you receive a QSL from Slovakia, you will find that a "District Award" indicator will be prominently displayed on approximately 90% of the cards received. The "districts" are really abbreviations for a town or larger area and if you are in the U.S., you need only 15 districts, but it's possible to work 50 or 75 in just a few years.

The diploma is issued by the SZR for contacting radio amateurs after January 1, 1997 from various districts in Slovakia. You may use all amateur bands and all modes of operation except for contacts via land repeaters (FM voice or digital). The same rules apply to shortwave listeners (SWLs). To qualify for the certificate, stations located in OM, OK, HA, OE, SP, and UR need 50 different districts. Other EU stations need 30; DX stations (including US) need 15. It is possible to get endorsements for contacts with all 79 districts. For contacts via satellites and Earth-Moon-Earth (EME), you must contact at least five different districts.

A comprehensive list of all Slovakian districts can be found at <www.hamradio.sk/>. Click on the link "Zoznam spojeni." A different 3-digit code is used by each district.

Certificate fees are based on location, so OM stations pay

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Columbia, CT 06237
E-Mail: <k1bv12@charter.net>

USA-CA Honor Roll

500		2000	
ACØCU.....	3746	ACØCU.....	1469
K6DLB.....	3747		
JR1BAS.....	3648	2500	
JA1WSK.....	3749	ACØCU.....	1388
W4JNC.....	3750		
		3000	
1000		ACØCU.....	1291
ACØCU.....	1904		
		1500	
ACØCU.....	1583		

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.

2 ; OK stations pay 2.70 ; DX stations: 10 IRCs, 5 , or \$7 U.S. Endorsement stickers for OM and OK stations are 0.70 each; DX stations: 2 IRCs or \$2 U.S.

Worked 100 OM Stations

If you have spent a decent amount of time chasing DX or working contests, you probably have verified contacts with 100 different Slovakian stations, which is what you need to earn this certificate. Contacts are valid only on or after January 1, 1993, using all bands with the following modes: CW, SSB, FM, AM, and RTTY. The certificate can also be earned by SWLs.

The diploma is issued separately for each mode, along with a mixed category which is a combination of allowed modes [CW, Phone (SSB, AM, FM), RTTY (Baudot only)]. Special endorsements (such as HF, VHF, satellites, and QRP) are also available.



Time to start collecting all of the districts of Slovakia to earn this certificate.



Make 100 contacts with Slovakian stations and this certificate is yours to hang in the shack.



If you have been on the HF bands, chances are you have enough to contacts to qualify for the Diploma Slovakia.



And if you were aiming for Diploma Slovakia certificate, you probably made enough contacts in Bratislava to earn the Bratislava Award.

For each diploma, a supplementary endorsement is issued for 200 to 700 contacts and a special endorsement for 850 and 1,000 contacts. The fee for each diploma for OM stations that are also SZR members is 1.70, 2 for non-member OM station. OK stations pay 3.30 (valid Slovak marks may be sent). All other stations must pay 10 IRCs, 5 or \$7 U.S. Endorsement fees are 0.70 for OM stations that are SZR members, nonmembers pay 0.85. OK stations pay 1 (valid Slovak marks may be sent). All other stations pay 2 IRCs or \$2 U.S.

Diploma Slovakia

Similar to the Worked OM Stations certificate, but there are some slight differences. You may use only the HF bands and there must be some contacts with stations located in Bratislava, Slovakia's capital. All contacts must have been made on or after January 1, 1993 using all bands and modes. SWLs can join in the fun as well.

The number of QSOs required for OM stations is 10, of which 3 QSO must be with stations from Bratislava. Other EU stations must make 5 QSOs with OM stations, of which 2 must be with stations in Bratislava. DX stations only need 3 QSOs with OM stations, of which 1 must be with a station from Bratislava. The fee for the certificate is 1.70 for SZR members, 2 for other OM and OK stations, and 10 IRC, 5 or \$7 U.S. for EU and DX stations.

The Bratislava Award

This award program is focused completely on contacts with stations located in the city of Bratislava. Contacts made on or after January 1, 1991 are valid using all bands and modes. The diploma is also available for SWLs.

To qualify for the Bratislava Award, OM stations need to make 10 QSO with various Bratislava stations, other EU stations need 5 QSOs, while DX stations need 3 QSOs.

The fee for the certificate is 1.70 for SZR members, 2 for other OM and OK stations, and 10 IRC, 5 or \$7 U.S. for EU and DX stations.

I am always seeking the next interesting award. If you think it's new, please send me an email <k1bv12@charter.net> and I'll check it out.

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X (from page 40)



Photo F. The station was set up in the building's one relatively dry room. Here, Ernö, DK2AMM, and Heye, DJ9RR, are on the air.

propagation was poor. On 160 meters, only a few Europeans made it into the log, virtually all from Central and Eastern Europe. On 80 meters, there were only three or four reasonable openings into Western Europe. Forty meters was much better; around sunrise/sunset in Western Europe — the signals peaked above S9.

The higher bands, 10, 12, and 15 meters, were not good for Western Europe, and even on 17 meters we logged fewer than 100 QSOs with Zone 14. Ten and 12 meters were good for Asia and North America with nearly 1,000 QSOs logged from there. However, these band openings were often no longer than one hour, so you had to be there or you missed them. On average, we made between 1,500 and 2,000 QSOs per day.

Health and Hygiene Issues

At the end of the 2nd week, Ernö became seriously ill, so the QSO number dropped. We went to the local hospital twice to try and find out what was wrong with him. Fortunately, after some medicine and enough rest, Ernö felt much better. All four of us had health issues. Because the temperature was far above 30° C (86° F) with humidity of around 90%, every wound on your body was infected within a day. This, in combination with a lot of flies and generally poor hygiene, made conditions particularly unhealthy. I had to wear a pair of

long pants with socks after the third day in order to keep flies away from my infected wounds. With the high temperatures, that was certainly no fun.

Due to the high humidity, everything was clammy. We slept outside in a cabin above the water (Photo H), lying on thin mattresses under a mosquito net. However, after a few days, these mattresses were wet due to the high humidity. I can assure you it was not comfortable. Also, all of our clothing was just clammy. If you hung a T-shirt on a line before sleeping, a few hours later it was wetter than when you hung it up. There was regularly no running water from the tap. If you had rinsed your clothes, it would take 2-3 days before they were dry enough to put on again.

We drank all the beer on the island. We were able to buy the last two boxes in a shop on the other side of the island. There was nothing more in the shops. We practically drank only water, coffee, or tea; there was nothing else to buy on the island.

I was the only SSB operator on our team. My favorite mode is CW, but I did enjoy the flexibility of working all modes. I noticed after about 20 minutes of making QSOs in a certain mode, that the pile-up was as good as gone. I then went to another mode and got the same results again. So, I changed from CW, SSB to RTTY and FT8. Strangely enough, there were always signals on FT8. It seems that more and more hams

The WPX Program

CW

3869 VA3VF 3870 MØDHP

SSB

4151 NR3C 4158 KB1IRB
 4152 W5TZX 4159 W05R
 4153 W7AH 4160 W4FEB
 4154 ZL3DW 4161 KØGUR
 4155 YB8NT 4162 K7HKR
 4156 AC8TO 4163 ON7MIC
 4157 9K2HM 4164 LA7JGA

Mixed

3687 NR3C 3698 KD6HOF
 3688 KEØBRZ 3699 JF2QNM
 3689 W7AH 3700 W05R
 3690 HB3YFP 3701 XE1XZQ
 3691 W1PEF 3702 K5VSD
 3692 KB3HHA 3703 PV8AJ
 3693 AC8TO 3704 KI4RFM
 3694 KB7AK 3705 JK1VXE
 3695 KC4G 3706 N5ITO
 3696 G8GNI 3707 KØGUR
 3697 NF4J 3708 LA4JGA

Digital

872 K5EY 885 N1RR
 873 K6PDL 886 KD6HOF
 874 PU8RFL 887 HB9GVX
 875 KEØBRZ 888 XE1XZQ
 876 SAØBMV 889 K5VSD
 877 NN4IR 890 N4YCI
 878 N8AWB 891 VE7VIB
 879 W7AH 892 AA8SW
 880 W8DOL 893 KI4RFM
 881 GØMGX 894 AB1NS
 882 NØDZ 895 K7YVO
 883 KB3HHA 896 N5ITO
 884 KB7AK 897 N3HYM

CW: 500: N8IK. **750:** W8RLS, JA1GQC. **2100:** KB1EFS. **2950:** PY5EG.

SSB: 350: NR3C, K4HDW, KB1IRB. **400:** ZL3DW, N8IK, AB1NS. **550:** W5TZX, W7AH, W1PEF. **600:** GØHEU. **1250:** KB1EFS. **1700:** W4QNW. **2100:** KB1EFS.

Mixed: 450: GW6VEI, KEØBRZ, XE1XZQ, N5ITO, KØGUR, LA4JGA. **500:** ZL3DW, AC8TO, PV8AJ. **550:** IW2JBB. **600:** W1PEF, K4HDW, KC4G, N6ZDH. **650:** KB7AK, ON7MIC, W1KE. **700:** NF4J, JP1KHY. **750:** AB1NS, DF2GH. **800:** 9K2HM, N4YCI, W5BR. **850:** N8IK, WR7X. **950:** W5TZX, GØHEU. **1000:** JA1GQC, G8GNI, VA7QI, K6DLB. **1050:** VK3BDX. **1300:** W8RLS. **1350:** K6UM, K5QR. **1650:** W7AH. **1700:** W4QNW, IZØFUW. **1800:** JF2QNM. **3150:** KB1EFS. **3800:** PY5EG.

Digital: 350: KEØBRZ, KB3HHA, KD6HOF, K5VSD, K7YVO, N5ITO. **400:** SAØBMV, AB3U, HB3YFP, KI4RFM, AB1NS. **450:** ON7MIC. **500:** W8RLS, KB1EFS, N6ZDH. **550:** PU8RFL. **600:** VE2SYQ, JP1KHY, GØHEU. **650:** 9K2HM, KB7AK, N1RR, W1KE. **700:** AA8SW. **750:** GØMGX, K2YYY, K6DLB. **900:** W7AH. **1050:** VK3BDX. **1300:** PY5EG.

160 Meters: W1PEF, KB1EFS, N6PEQ
80 Meters: AB3U, HB3YFP, K5QR, G8GNI, AA8SW, KB1EFS
40 Meters: NR3C, KEØBRZ, W1PEF, K2YYY, K4HDW, 9K2HM, KB7AK, G8GNI, KD6HOF, AA8SW, KB1EFS, N6ZDH
30 Meters: KB7AK, AA8SW
20 Meters: IW2JBB, GW6VEI, JF2QHQ, ZL3DW, W1PEF, 9K2HM, N8IK, KB7AK, G8GNI, XE1XZQ, K5VSD, AA8SW, KB1EFS
17 Meters: AA8SW, K6DLB
15 Meters: PU8RFL, WR7X, N8IK, KB1EFS, JK1VXE
10 Meters: N8IK, KB1EFS
6 Meters: K6UM

Africa: NØVVV, K5QR, KB1EFS
Asia: IW2JBB, K2YYY, 9K2HM, G8GNI, KB1EFS, JK1VXE
Europe: PU8RFL, HB3YFP, ZL3DW, K2YYY, MØDHP, 9K2HM, N8IK, G8GNI, W5BR, KB1EFS, ON7MIC, LA4JGA
Oceania: KB1EFS, JK1VXE
North America: IW2JBB, K5EY, NR3C, K6PDL, PU8RFL, KEØBRZ, N8AWB, W8DOL, W1PEF, NØDZ, KB3HHA, 9K2HM, KB7AK, KB1IRB, KD6HOF, XE1XZQ, K5VSD, N4YCI, VE7VIB, KI4RFM, KB1EFS, N5ITO, KØGUR, K7HKR, N3HYM, GØHEU
South America: IZØFUW, KB1EFS

6M Bar: K6UM

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.



Amateur Radio Roundtable



Katie Allen WY7YL

Bringing ham radio to you



Tom Medlin W5KUB



A weekly program with guests from around the world.

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Wed 0100 Mar-Nov

Wed 0200 Dec-Feb

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are active in this mode. Here the pile-up was huge. Unfortunately, the DXpedition mode of the WSJT-X software was not yet available, so we still had to do it the "traditional" way. If the signals were fine, we could make one QSO per minute. I worked a few Europeans in this mode. When I noticed that the band was open to Europe, I immediately went to CW or SSB. In any case, working the FT8 mode was a nice experience. In total, we logged 1,212 QSOs in this mode. We were very focused on working Europe, which accounted for nearly one-third of our QSOs.

We tried to upload our log each day to Clublog. This was not always possible. Our internet was very slow, and busy. From six in the morning to the late evening, it was impossible to use the internet at all. We uploaded the logs



Photo G. A young man from the nearby village was hired to help install wire antennas by climbing the tall palm trees. This is the tree we used for our 160-meter antenna.

The WAZ Program

SINGLE BAND WAZ

6 Meter

132.....K6KLY, 25 Zones 135.....UW8SM, 25 Zones
133.....DK2LO, 26 Zones 136.....JA2NDQ, 27 Zones
134.....JA1QJI, 25 Zones

10 Meter CW

220.....K3XA

12 Meter CW

101.....S53R 102.....JA7OUV

15 Meter CW

367.....K3XA

15 Meter SSB

678.....DF2SE

17 Meter CW

122.....S53R

20 Meter CW

638.....W6RW 640.....K3XA
639.....UA0BA

30 Meter CW

151.....S53R

40 Meter CW

316.....W6RW 317.....K3XA

160 Meter

531.....JA2NDQ, 35 Zones 533.....R7NA, 33 Zones
532.....DK8MCT, 30 Zones 534.....EA5BYP, 30 Zones

ALL BAND WAZ

CW

950.....W4NDX 955.....5P5Q
951.....KA5M 956.....AB6Z
952.....SM3OMO 957.....VA7KO
953.....JA2NDQ 958.....HB9II0
954.....IK1JJM

Digital

44.....YO6HOY 47.....JM7UBI
45.....JA2NDQ 48.....JE2UFF
46.....DF3VG

Mixed

9564.....KV7N 9573.....AB6Z
9565.....K9DY 9574.....N8TEM
9566.....N2HO 9575.....SQ5NRY
9567.....W8RLS 9576.....KE3X
9568.....I1JTQ 9577.....EW1LM
9569.....W7AH 9578.....IZ1DUI
9570.....JA2NDQ 9579.....WD8KND
9571.....K2JK 9580.....DK4VF
9572.....IV3IXN 9581.....YO2LLL

SSB

5406.....KE4KMG 5408.....IK1JJM
5407.....YO6HOY 5409.....DK5VF

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>.



Photo H. Antennas filled up nearly every available inch of space on the beach. In this photo are verticals for 40 meters and the WARC bands (30, 17, and 12 meters), plus the 160-meter inverted-L.



Photo I. The group slept in this cabin over the water. While in much better shape than the shack building, the constant humidity led to damp mattresses and never-quite-dry clothes. The weather conditions led to health issues for all four team members, who were much more accustomed to the drier climate of Germany and the Netherlands.

CQ DX Awards Program

New Awards RTTY

4F3BZ84

Endorsements CW

K8SIX.....338

Endorsements SSB

N7YB315 K8SIX.....340

Endorsements RTTY

K8SIX.....334

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.



Rotuma and Its People

About 2,000 people live on the island of Rotuma and speak their own language, Rotuman. Everyone we met was friendly and hospitable. While children learn English at school starting at age six, Rotuman is always spoken at home. Children can go to school on Rotuma until about age 17, after which they have to go to Fiji or beyond to continue studying.

All of the houses on Rotuma are owned by families, and they are not allowed to sell these houses. Each home always stays in the family. This may sound good at first, but on average, one out of three houses on the island is empty for many years (including our radio shack).

The island's export products are mainly fruit, coconuts, wicker mats, and baskets. John and Harieta have a company specializing in a natural healing oil. The hefau trees produce nuts that contain this oil. Many Rotumans work for them. For years, John has had great interest in Botanica, and then specifically focused on medicinal plants. The last week we drove around the island, and John gave us a very educational tour of the interior of Rotuma. Fortunately, it was dry and sunny that morning.

Gifts for the Residents

We brought several small things for the children in our village; for the boys, Matchbox cars and baseball caps; and for the girls, hair bands and bracelets. We also took many T-shirts to hand out. They were greatly appreciated.

At the end of our operation, we had more than half a barrel of diesel fuel left, and we gave it to the people in the village, who could use it for the village generator. We gave our generator to our host and made an agreement with him that if Tony, 3D2AG, is active again from Faputa, he could borrow a small generator from John. That way, Tony would not have to rely on solar energy and batteries, and would be able to use a small amplifier.

For Tony, we left two pieces of 10-meter glass fiber masts. Jan, DJ8NK, had given us an 18-meter Spiderbeam mast, which we also donated to Tony. We also left him our wire antennas for 80 and 160 meters. Now Tony can also become active on the low bands. We also left him over 100 meters of coax cable and hundreds of tie-wraps.

overnight. And even that was not always possible. When I was on the low bands, most of the time I was also active on the ON4KST chat site. This gave many advantages. What is also very clear is that fewer and fewer amateurs are searching the bands for DX; rather, they are waiting for a spot on the DX Cluster. We often called CQ for 10 minutes and did not receive any responses, but when we spotted ourselves on the DX Cluster, a pile-up started less than a minute later.

Beginning of the End

On Thursday, March 15, we started to take down most of the antennas since Friday was the day that we would fly back to the world from which we came. Except for the 10/15/20-meter tribander, 40-meter vertical and one complete station, everything was cleared by the beginning of the evening. That way we could remain active until the last moment. We wanted to be sure that we would log a little bit more than 30,000 QSOs. At 5 a.m. local, I had the last shift and had planned to make some QSOs on 40 meters during our last sunrise. First, I started to

upload the complete log on Clublog. It took a little more time than expected. While doing this, I noticed that there were already more than 30,000 QSOs in the log and decided not to make any more. I started to take down the last radio setup and packed it for transport. When daylight came, the shack was as good as empty. After breakfast, we packed the last two antennas and cleared everything. The crates were closed and ready to be transported to Fiji. Around midday we were completely ready for our return journey.

Around 1500, we left for Fiji, and four hours later, we were in our hotel in Suva. This was a paradise for us. Almost no flies, hot water while showering, a normal dry bed, no mold on the walls, no cockroaches, no exhaust from the generator, normal windows, air conditioner, a menu card in the restaurant, plenty of beer, etc. At that moment, we realized what we had missed in the previous three weeks. From that moment on, we will always appreciate the smaller things that are otherwise considered normal.

5 Band WAZ

As of August 15, 2018
2,069 stations have attained at least the 150 Zone level, and
986 stations have attained the 200 Zone level.

As of August 15, 2018
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
AK8A	199	17	W1FZ	199	26
DM5EE	199	1	W2LK	199	23
EA7GF	199	1	W3NO	199	26
H44MS	199	34	W4LI	199	26
HAØHW	199	1	W6DN	199	17
HA5AGS	199	1	W9XY	199	22
I5REA	199	31	WAØMHJ	199	23
IKØFVC	199	1	WA2BCK	199	23
IKØXBX	199	19 on 10M	WO7R	199	21
IK1AOD	199	1	9A5I	198	1, 16
IK8BQE	199	31	EA5BCX	198	27, 39
IZ3ZNR	199	1	F5NBU	198	19, 31
JA1CMD	199	2	G3KDG	198	1, 12
JA5IU	199	2	G3KMQ	198	1, 27
JA7XBG	199	2	JA1DM	198	2, 40
JH7CFX	199	2	JA3GN	198	2 on 80 & 40
JK1BSM	199	2	JA7MSQ	198	2 on 80 & 10
K1LI	199	24	K2EP	198	23, 24
K4HB	199	26	K2TK	198	23, 24
K4XP	199	23	K3JGJ	198	24, 26
K5TR	199	22	K3LR	198	22, 23
K7UR	199	34	K4JLD	198	18, 24
K9KU	199	22 on 15	K5FUV	198	18, 23
KBØEO	199	23	K6FG	198	17, 18
KZ4V	199	26	KZ2I	198	24, 26
N3UN	199	18	N2QT	198	23, 24
N4NX	199	26	N4GG	198	18, 24
N4WW	199	26	N8TR	198	18, 23 on 10
N4XR	199	27	OK1DWC	198	6, 31
N8AA	199	23	UA4LY	198	6 & 2 on 10
RA6AX	199	6 on 10M	UN5J	198	2, 7
RU3DX	199	6	US7MM	198	2, 6
RWØLT	199	2 on 40M	W4UM	198	18, 23
RX4HZ	199	13	W5CWQ	198	17, 18
RZ3EC	199	1 on 40M	W6OUL	198	37, 40
S58Q	199	31	W6TMD	198	34, 40
SM7BIP	199	31	W9RN	198	26, 19 on 40
VE2TZT	199	23	WC5N	198	22, 26
VO1FB	199	19	WL7E	198	34, 37
W1FJ	199	24	ZL2AL	198	36, 37

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

5BWAZ #	Callsign	Date	# Zones
2061	KE4KMG	2018-07-16	156
2062	LG1LFR	2018-07-18	150
2063	JA2NDQ	2018-07-20	184
2064	DF3VG	2018-07-23	150
2065	AB6Z	2018-07-27	166
2066	W4GE	2018-08-01	161
2067	KE3X	2018-08-03	174
2068	EW1LM	2018-08-03	189
2069	HB9IIO	2018-08-14	167

Updates to the 5BWAZ list of stations:

5BWAZ #	Callsign	Date	# Zones
2005	W6RW	2018-07-19	195
1311	W7AH	2018-07-18	177
1800	IW9HII	2018-07-23	200
1994	AD5Q	2018-07-25	200
2060	JR1TEQ	2018-07-25	200
2050	W1TSP	2018-07-30	171
2063	JA2NDQ	2018-08-06	200

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

5BWAZ #	Callsign	Date	All 200 #
1800	IW9HII	2018-07-23	983
1994	AD5Q	2018-07-25	984
2060	JR1TEQ	2018-07-25	985
2063	JA2NDQ	2018-08-06	986

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>.

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



After a good night's sleep, we went to a medical clinic to have another look at the wounds on our legs. They have more experience with this in Fiji than in Europe. After a check, we all got antibiotics and ointment. The doctor suggested that we should have another look at the wounds again in Europe if they were not any better. But after three days, we all noticed some improvements. We also received anti-worm tablets as a precaution because the drinking water on Rotuma sometimes carries these parasites.

In the afternoon, we visited Tony, 3D2AG, who lives on the other side of Suva in a beautiful location near the sea. You can hardly have a better location for our hobby. We offered him several ideas to improve his antenna situation, such as replacing his many dipoles with verticals which, being less than 10 meters away from the saltwater, would function much better. After a few hours we went back to our hotel after our pleasant and unforgettable meeting with Tony.

Homeward Bound

On Sunday morning, we had a farewell breakfast with John and Harieta, who had flown back to Suva with us from Rotuma. After a day of playing tourist, we flew by plane to Nadi on the

other side of the island. We stayed for another two days Nadi before flying back to Europe. These additional days had been planned as a buffer to minimize risk if the small plane could not fly from Rotuma to Suva. We were active on the air from Nadi, but only on 17 meters with a simple dipole from the balcony. More than 300 QSOs were made in CW and FT8 as 3D2EU/P. On Tuesday evening, we returned to Frankfurt via Singapore, and headed home from there.

A big thanks to all the club and individual sponsors. The realization of this DXpedition was made easier by this financial and material support. We want to thank our regular sponsors and especially GDXF and Jan, DJ8NK. Check our website for an overview for some additional information: <www.rotuma2018.de>.

All QSOs have been uploaded to LOTW and all QSLs have been sent, either direct or via the bureau. In the meantime, we are already busy with the preparations for our next DXpedition.

– On behalf of the entire team, 73, Ronald, PA3EWP

* This story originally appeared in the INDEXA Newsletter and is republished here with permission.

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.

CW

DL3DXX339	K3UA339	N7FU339	YU1AB339	JA7XBG335	K6LEB331	N7W0324	RA1A0B313	YU1Y0295
HB9DDZ339	K4CN339	N7RO339	K8LJG338	F6HMJ334	N7W0331	YT1VM322	WA4DOU312	WA2VQV292
K4IQJ339	K4JLD339	NØFW339	K8SIX338	K1FK334	K6YK329	4Z5SG321	YO9HP312	K6YR284
K9MM339	K4MQG339	OK1MP339	KA7T338	K9OW334	W9IL329	N2LM321	W6WF309	K7CU282
N4MM339	K5RT339	W3GH339	WA5VGI338	PY2YP334	IKØADY328	ON4CAS321	KT2C307	PP7LL282
WB4UBD339	K7LAY339	W40EL339	W1DF338	WG5G/334	OZ5UR328	HB9DAX/321	W4ABW306	WR7Q282
WS9V339	K7VV339	W5BOS339	W9RPM338	QRPP334	AB4IQ327	QRPP319	K7ZM305	N2VW280
EA2IA339	N4AH339	W7CNL339	G3KMQ337	WD9DZV334	K6CU326	HA1ZH318	K8IHQ301	K4EQ280
F3TH339	N4CH339	W7OM339	W7IIT337	K2OWE333	KE3A326	N6PEQ318	HA5LQ301	WB5STV277
K2FL339	N4JF339	W8XD339	K8ME336	K5UO333	EA5BY325	W6YQ318	RN3AKK300	YO6HSU275
K2TQC339	N4NX339	WK3N339	KØKG336	N6AW333	KA3S325	CT1YH316	WA9PIE298	
K3JGJ339	N5ZM339	WØJLC339	W6OUL336	W4MPY333	N3RC324	EA3ALV315	K4IE295	

SSB

AB4IQ340	K5TVC340	VE3MR340	KØKG339	EA3BMT335	OE3WWB333	N1ALR328	YO9HP320	K7SAM301
DJ9ZB340	K6YRA340	VE3MRS340	W4UNP339	F6HMJ335	WD9DZV333	N2LM328	W1DF318	KA8YYZ301
DL3DXX340	K7VV340	VE3XN340	K3UA338	HB9DQD335	AA1VX332	AE9DX327	XE1RBV317	4X6DK298
DU9RG340	K8SIX340	VK2HV340	K7LAY338	IKØAZG335	KE3A332	K7HG327	N7YB315	K2HJB295
EA2IA340	K9MM340	W3AZD340	K9HQM338	IW3YGW335	N2VW332	K6GFJ326	IV3GOW312	F5MSB293
EA4DO340	KE5K340	W3GH340	N4NX338	OE2EGL335	N5YY332	KE4SCY326	N8SHZ312	W9ACE291
HB9DDZ340	KZ2P340	W4ABW340	W9RPM338	VK2HV335	K5UO331	KF4NEF325	KU4BP310	N3KV289
I8KCI340	N4CH340	W5BOS340	YU1AB338	W4WX335	KC2Q331	W6WF325	W6NW310	W6MAC289
IK1GPG340	N4JF340	W6BCQ340	4Z4DX338	WB3D335	SV3AQR331	W9GD325	I3ZSX309	K7CU287
IN3DEI340	N4MM340	W6DPD340	K1UO338	AA4S334	WØROB331	WØULU324	G3KMQ308	IZ1JLG282
K2FL340	N5ZM340	W7BJN340	K8LJG338	EA5BY334	W6OUL331	VE7EDZ324	KA1LMR308	WA9PIE282
K2TQC340	N7BK340	W7OM340	N7WR338	K9OW334	XE1MEX331	F6BFI323	RA1A0B308	WD8EOL281
K3JGJ340	N7RO340	W8ILC340	WA5VGI338	PY2YP334	KD5ZD330	ON4CAS323	XE1MEX308	IWØHOU277
K4CN340	NØFW340	W9SS340	W2CC338	VK4LC334	WA4WTG330	VE6MRT323	IK5ZUK307	N5KAE276
K4IQJ340	OK1MP340	WB4UBD340	W2FKF338	W8AXI334	WØYDB330	W5GT323	IØYKN306	WA5UA276
K4JLD340	OZ3SK340	WK3N340	W7FP338	XE1J334	ZL1BOQ330	N6PEQ322	XE1MW305	NØAZZ275
K4MQG340	OZ5EV340	WS9V340	W9IL338	CT3BM333	AD7J329	W4MPY322	K4IE304	SQ7B275
K4MZU340	VE1YX340	XE1AE340	IØZV336	IK8CNT333	N3RC329	K8IHQ321	K4ZZR304	
K5OVC340	VE2GHZ340	YU3AA340	K3LC336	K8LJG333	VE7SMP329	KW3W320	K7ZM303	
K5RT340	VE2PJ340	JA7XBG339	K8ME336	N6AW333	CT1AHU328	TI8II320	4Z5FL/M302	

RTTY

NI4H 338	WK3N 338	OK1MP 337	K8SIX 334	K3UA 332	AB4IQ 323	K4IQJ 291	K8ME 278
WB4UBD ... 338	N5ZM 338	K4CN 334	W3GH 333	W9RPM 330	K4WW 323	N4MM 290	IN3YGW ... 275

CONTESTING

BY DAVID SIDDALL,* K3ZJ

Getting Ready for CQWW and Improving Skills

Fall Contests Large and Small Provide Training Opportunities; European Big Gun Station 4O3A Returns to the Air; WRTC 2018 Photo Book Published by EY8MM; WRTC 2018 Award Certificates Available for Download; FCC Chairman Climbs 131-foot Tower, Can Ham Radio Contesting Be Next?

October marks the peak of the fall contest season. It culminates with the CQWW Phone and CW contests at the end of October and November, respectively. Last year in the phone contest, a record 8,608 logs were submitted, more than in any other contest, ever. CQWW CW was runner-up, with 8,450 logs submitted.

This month, we consider fall contests that can be employed as training grounds to improve our equipment reliability and operating skills. We also welcome back Ranko, 4O3A, as he continues to reconstruct his “Big Gun” station’s antennas that were destroyed last year. (See this column in the October 2017 issue of CQ.)

In WRTC 2018 matters, Nodir, EY8MM, has followed up his WRTC 2014 photo book with an excellent one with photos from WRTC 2018. See photo and information below. And the WRTC 2018 awards committee finished evaluating all 3500+ logs submitted to it immediately after conclusion of this year’s IARU HF Championship. All awards earned by participants worldwide are available on its website without further application; see the links below for each of the five awards.

Finally, the FCC Chairman made news in August when he donned climbing gear and ascended a 131-foot cell tower. The man obviously has the talent, maybe ham radio is (or should be) in his future?

Fall Contests for Equipment Reliability Testing and Operator Training

How might one best prepare to most effectively participate in CQWW or another large contest (such as ARRL’s Sweepstakes)? The following are good places to start.

(1) Ensure that antennas are the best possible for your situation and that they

are securely installed to survive winter’s wrath;

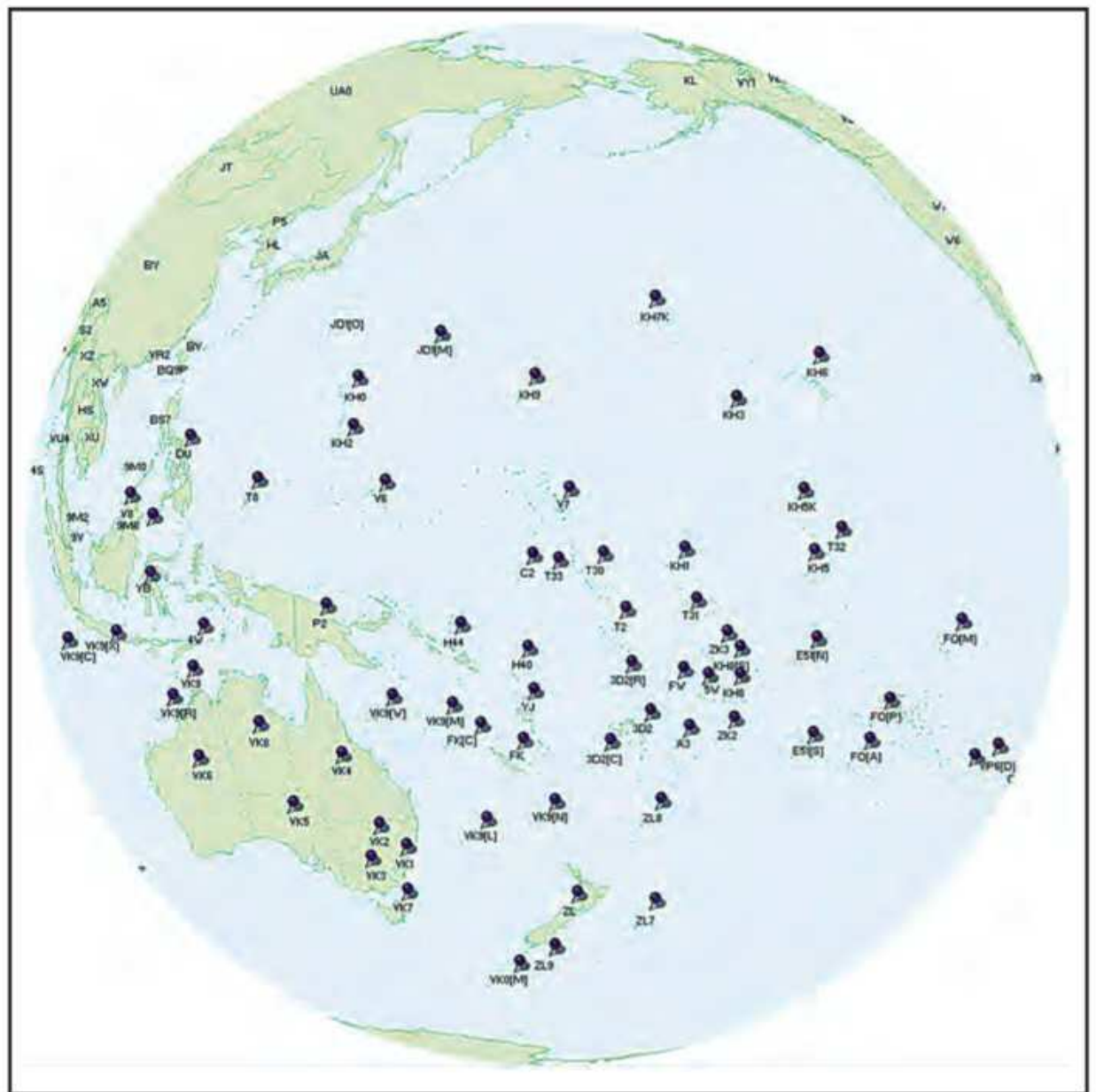
(2) Double-check that all the equipment is working and in good shape;

(3) Ensure your physical comfort is looked after: Comfortable chair, everything needed within easy reach, least strain on your body; and

(4) Once the above items are addressed, devote attention to your skills. Contests that lead up to your favorite(s) provide multiple opportunities to practice and improve your operating abilities. Unless you are exclu-

sively a guest operator at someone else’s station, regularly operating in smaller competitions also will help to discover and fix problems with equipment and antennas that might not otherwise be noticed.

Operating a few hours each weekend in smaller contests also will help you to become intuitively familiar with the strengths and weaknesses of your station. It is useful to know, for example, whether your station plays best on 20 meters to Europe when the band is just opening and the angle of radiation is



This map depicts the entities that are multipliers in the Oceania DX Contest. (From the Oceania DX Contest website.)

email: <k3zj@cq-amateur-radio.com>



or whether its strength is mid-opening when angles of radiation tend to be higher than at the beginning. Of course, it is ideal if you have stacked antennas on relatively flat ground to take maximum advantage of both situations, but you still have to know when and whether it's worth trying to use the low antenna alone.

In my own case, I know from operating for years at the same location that I have a very competitive signal toward Europe during the early part of band openings on 20 meters. The comparative strength of my signal compared to others in my geographic area then decreases as the opening matures. By mid-opening, I have trouble running stations and competitors

with modest tribanders at low heights consistently beat in pileups. This knowledge is from experience, so now I try to be on 20 meters when the band opens but I do not hesitate to move to 15 and 10 meters when those bands open. I do not try to maximize my time on 20 meters just because it is "open."

Ensuring that antennas and equipment are reliable and gaining experience with your station will help you make the most of your competitive situation, even if your station is just a 100-watt transceiver with a wire antenna. See my April 2018 column, if you think a wire or two is not enough to participate and do well.

Calendar of Events

All year October

CQ DX Marathon

<http://bit.ly/vEKMWD>

Oct. 3	German Telegraphy Contest	http://bit.ly/291wozN
Oct. 3	UKEICC 80m SSB Contest	http://bit.ly/2cv97YF
Oct. 4	SARL 80m QSO Party	http://bit.ly/H0lqQf
Oct. 5-7	YLRL DX/NA YL Anniversary Contest	https://tinyurl.com/y7slsvuq
Oct. 6	FISTS Fall Slow Speed Sprint	https://tinyurl.com/ybtuck5x
Oct. 6-7	California QSO Party	www.cqp.org/Rules.html
Oct. 6-7	Oceania Phone DX Contest	www.oceaniadxcontest.com
Oct. 6-7	TRC DX Contest	www.trcdx.org/trcdxc/index.html
Oct. 7	RSGB DX Contest	http://bit.ly/2LUpYSI
Oct. 10	10-10 Intl. 10-10 Day Sprint	http://bit.ly/1FrFeBc
Oct. 13	FISTS Fall Unlimited Sprint	https://tinyurl.com/ybtuck5x
Oct. 13	QRP ARCI Fall QSO Party	www.qrparci.org/contests
Oct. 13-14	Arizona QSO Party	www.azqsoparty.org
Oct. 13-14	Pennsylvania QSO Party	http://paqso.org/
Oct. 13-14	Makrothen RTTY Contest	http://bit.ly/2uZd6oF
Oct. 13-14	Oceania CW DX Contest	www.oceaniadxcontest.com
Oct. 13-14	Scandinavian SSB Activity Contest	www.sactest.net/blog/rules
Oct. 13-14	South Dakota QSO Party	https://sdqsoparty.com
Oct. 15-19	ARRL School Club Roundup	http://bit.ly/MaLmBs
Oct. 19	LZ Open 80m Contest	www.lzopen.com
Oct. 20-21	10-10 Intl. Fall CW Contest	http://bit.ly/1FrFeBc
Oct. 20-21	JARTS WW RTTY Contest	http://jarts.jp/rules2018.html
Oct. 20-21	New York QSO Party	www.nyqp.org
Oct. 20-21	Worked All Germany Contest	http://bit.ly/2uDQRSV
Oct. 20-21	Stew Perry Topband Distance Challenge	https://tinyurl.com/y9ypf57d
Oct. 21	Asia-Pacific CW Sprint	http://jsfc.org/apsprint
Oct. 21	RSGB RoLo CW Contest	http://bit.ly/2mOHyfz
Oct. 21-22	Illinois QSO Party	www.w9awe.org/ILQP.html
Oct. 31	UKEICC 80 Meter CW Contest	http://bit.ly/2cv97YF
Oct. 27-28	ARRL EME Contest	www.arrl.org/eme-contest
Oct. 27-28	CQWW DX SSB Contest	www.cqww.com/index.htm

November

Nov. 3-4	Ukrainian DX Contest	http://urdx.org/rules.php?english
Nov. 3-5	ARRL CW Sweepstakes	www.arrl.org/sweepstakes
Nov. 4	High Speed Club CW Contest	www.highspeedclub.org
Nov. 7	UKEICC 80 Meter Contest SSB	http://bit.ly/2cv97YF
Nov. 10-11	Worked All Europe RTTY Contest	http://bit.ly/2vufgcb
Nov. 10-11	JIDX Phone Contest	http://jidx.org/jidrule-e.html
Nov. 10-11	OK/OM CW DX Contest	http://bit.ly/19rrRjl
Nov. 10-11	10-10 Digital Fall Contest	http://bit.ly/1FrFeBc
Nov. 10-12	CQ-WE Contest	http://cqwe.cboh.org/rules.html
Nov. 16	YO Int'l PSK31 Contest	http://bit.ly/2w93WEd
Nov. 17	RSGB 2 nd 1.8 MHz Contest CW	http://bit.ly/2LUjcw0
Nov. 17-18	All Austrian 160M Contest	http://bit.ly/2w9yHsL
Nov. 17-18	LZ DX Contest	https://tinyurl.com/y9b94qc4
Nov. 17-19	ARRL SSB Sweepstakes	www.arrl.org/sweepstakes
Nov. 24-25	CQWW DX CW Contest	www.cqww.com/index.htm
Nov. 24-25	ARRL EME Contest	www.arrl.org/eme-contest
Nov. 28	UKEICC 80 Meter Contest CW	http://bit.ly/2cv97YF
Nov. 30-Dec. 2	ARRL 160-Meter Contest	www.arrl.org/160-meter

operating build expertise that only experience will develop. Some choice operating opportunities this Fall are listed below.

October 6-7

The first weekend of October offers two well-known and established contests. Fortunately for many of us, the antenna direction for California isn't too far off from that for much of Oceania.

The Oceania DX Contest (Phone) is SSB only and runs from 0800 UTC Saturday, October 6, until 0800 UTC Sunday, October 7. This contest employs 160-10 meters (no WARC bands). Stations outside Oceania contact only Oceania stations for contest credit. Oceania stations contact both other Oceania stations and stations outside Oceania. QSO alert-



The beginning of 4O3A's new towers and antennas overlooking Kotorška Bay in Obosnik, Montenegro. Pictured is the first tower and multiple antennas completed in August 2018 for use by the Region 1 IARU Youth Team in September's CQWW RTTY contest. From top-to-bottom: 2 elements for 40 meters, 2 X 10/15/20 meter multiband stack, and 6-element 6-meter Yagi. (Courtesy of 4O3A)

ing assistance is permitted for all categories without distinction, but self-spotting is not allowed. Multipliers are each prefix, counted separately for each band.

In this contest, signal reports with consecutive serial numbers are exchanged. If a station worked does not send a serial number for the contest, the number 001 should be logged. Complete information and rules are available at <<https://tinyurl.com/y9up2e5q>>.

The accompanying map depicts the boundaries of Oceania for contest purposes. There are many semi-rare to rare DX locations in Oceania, which makes this contest fun when the bands are open, and activity is picking up. One special operation, already announced, for both SSB and CW this year is E6Y on Niue that is planned by a group of ZL operators.

Last year a record 1,300-plus logs, phone and CW combined, were submitted. On both phone and CW, 40 and 20 meters are where most QSOs are made during this low part of the sunspot cycle. And finally, a sign of the times: Last year, entrants from Indonesia outnumbered those from Japan for the first time. And although fewer, there also was a significant increase in logs submitted from the Philippines. Activity is growing in these areas, even as it is decreasing in others. The complete 2017 results are at <<https://tinyurl.com/y8rnolaq>>.

The California QSO Party ("CQP") overlaps the Oceania Phone DX contest, and for many, CQP is a good warm-up for the ARRL Sweepstakes that is coming up in November. CQP runs on 160-10 meters (no WARC bands) from 1600 UTC Saturday, October 6, through 2200 UTC Sunday, October 7. This is a multimode contest employing both phone and CW. Historically, equal numbers of QSOs have been made in each mode even though each CW contact counts 3 points but each phone contact counts only 2 points.

Stations outside California send a consecutive serial number and their 2-letter state or Canadian area abbreviation, or "DX." Multipliers for stations in California are states and Canadian entities, with DX counting only for points. Multipliers for those of us outside of California are the 58 counties that comprise California. Multipliers count only once, regardless of band or mode.

The top 20 single operators in California and top 20 outside California receive a bottle of Northern California Contest Club ("NCCC") wine. There is an alternative prize for winners under the age of 21. There are special awards for youth under the age of 18, YLs, and school entries. In addition, CQP T-shirts can be ordered by all participants, regardless of score. Complete information on rules, categories, and time limitations are available at <www.cqp.org>.

October 13-14

The weekend of October 13-14 offers additional opportunities for CW and Phone operator training and equipment testing. The Oceania CW Contest starts things off at 0800 UTC Saturday, and for phone operators, the Scandinavian Activity Contest kicks off a few hours later at 1200 UTC. Unlike the immediately preceding weekend, these contests are single-mode — one CW and the other phone — so there will be no confusion as to who is operating in which contest.

The Oceania DX Contest (CW) plays from 0800 UTC Saturday, October 13, until 0800 UTC Sunday, October 14, on 160-10 meters (no WARC bands). This provides another opportunity for CQWW CW practice that may be more interesting than just operating Morse Runner (or similar program) on your computer. The contest is discussed immediately above, and an accompanying graphic depicts the target area of Oceania.



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The Scandinavian Activity Contest (SAC) phone weekend is from 1200 UTC Saturday, October 13, until 1200 UTC Sunday, October 14, on 80-10 meters (no WARC bands). This contest was discussed in the August column. The SAC Committee recently announced the below two minor changes to the rules after our earlier columns went to press.

- This year and going forward, in the multi-operator single transmitter category (MS), the 10-minute rule no longer applies. The main (run) transmitter must remain on a band for a full 10 minutes after changing bands, but the multiplier transmitter(s) can change bands at will.

- Also, if stations do not give a serial number, "000" should be filled in the box. (Not to be confused with the rule for the Oceania DX Contests, above, for which in the same situation "001" should be entered.)

The SAC Contest Committee (SM5AJV, OZ1BII, and OH6EI) also has emphasized and clarified that any QSOs made outside the specified frequencies do not count and will be deleted from entrants' logs. For the phone weekend, the only permissible frequencies for valid QSOs are: 3600-3650, 3700-3800, 7060-7100, 7130-7200, 14125-14300, 21151-21450, and 28320-29000 kHz. (For reference, the only permissible CW frequencies are 3510-3560, 7000-7040, 14000-14060, 21000-21070, and 28000-28070 kHz.)

Complete information for the SAC is at www.sactest.net/blog/.

October 20-21

The Pre-Stew Perry Topband Distance Challenge ("TBDC") is a 160-meter CW-only "friendly competition" run in prepa-

ration for the TBDC itself, which is run at the end of December. No outside assistance is allowed, although one may use their own skimmer and even a remote receiver if it is within 100 kilometers of the transmitting station. Nearly 300 people entered the October fray last year, compared with close to 1,000 for the December TBDC.

One's score is based purely on the distance traversed between the two stations and each station's transmit power (QRP, low power, or high power). The distance calculation is made based upon the center of your grid square and that of the station you contact. There are no awards for the Pre-Stew, just an opportunity to try out your 160-meter capabilities the weekend before CQWW Phone.

Given that we are at the low point in the sunspot cycle, doing whatever we can on 160 meters is a good thing. Check the unique rules for this one at www.kkn.net/stew/. And have fun!

October 27-28

The CQ World Wide DX Phone contest attracts more entries and participation than any other contest all year. The CW running at the end of November comes in second for logs submitted.

Up-to-date rules changes were published in last month's column. Reserve the weekend and review the information at <http://cqww.com>. Note especially the rules and the rules FAQ. The rules are available on the website in 16 different languages (including English). To get answers to any questions, use the web form located at <http://cqww.com/contact/>.

Many operators schedule trips to coincide with the CQWW Phone or CW weekends. An up-to-date list of special operations is available at www.ng3k.com/Contest/. One semi-



The operation already announced at this writing will be made by a group of Slovenian operators traveling to Burkina Faso to put XT2XZZ on the air.

November 3-5

For a change of pace, try the ARRL Sweepstakes, CW mode. This annual domestic (U.S. and Canada) contest was first held in 1930. It begins at 1800 UTC on Saturday, November 3 and runs through 0300 UTC on Monday, November 5 (Sunday evening in the contest area). Bands used are 160-10 meters minus the WARC bands.

This is a great contest for those with limited antennas to do well. With an 80-10 OCF dipole even 20-30 feet high, one can easily make hundreds of QSOs all over North America. For a relative newcomer who struggles in DX contests, Sweepstakes can be a welcome change, build confidence, and improve one's abilities.

The maximum operating time is 24 hours out of the available 30-hour period. Multipliers are each of the 83 ARRL sections, and they count once regardless of band. This provides an incentive and opportunity to call CQ and try to run

stations, even with low power and a simple antenna. Sundays are especially productive for small stations, and moving a little higher in the band often avoids QRM issues with high radiated power.

Last year there was only very limited operation in Sweepstakes from multipliers Puerto Rico (KP4) and the U.S. Virgin Islands (KP2) due to category 5 hurricanes Irma and Maria having destroyed most stations' antennas and power sources. This year hopefully they will be back and enable many more stations to work all 83 multipliers for a "clean sweep."

The Phone Sweepstakes will follow on the weekend of November 17-19.

4O3A Returns to the Air

In last year's October column, we reported on the devastation that forced Ranko's "Big Gun" station, 4O3A, off the air in Montenegro. We are happy to report that Ranko began rebuilding his station this summer after participating in the WRTC 2018 competition in Wittenberg/Jessen, Germany. The first tower is functioning (see photo), and he also has new equipment that enables remote operation. When I spoke with Ranko in July, he was planning to resume hosting youngsters participating in the IARU Region 1 Young Contesters Program (YCP) at his station for this September's CQWW RTTY contest.

WRTC 2018 Photo Book by EY8MM

Nodir Tursun-Zade, EY8MM, is a photographer of note in addition to being a contester and DXpeditioner. He did double duty at WRTC 2018 in Wittenberg/Jessen, Germany. He served on the judging committee, as he had in two previous WRTCs. And he was omnipresent with his camera, photographing the happenings.

As he did after WRTC 2014 in Boston, Nodir compiled an outstanding book of WRTC 2018 photographs. Viewing the online collection is free, and a good quality printed book can be purchased. View his excellent WRTC 2018 photo collection on Google Drive at <<https://tinyurl.com/y6wrz42z>>. A printed book of the photos can be viewed and purchased at <<https://tinyurl.com/y96bcz9a>>.

WRTC 2018 Awards

The WRTC 2018 certificates for all five awards have been completed and are available to winners by web download. These award certificates are available



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Cover of EY8MM's Photo Book *Depicting Events at this year's WRTC 2018 in Wittenberg, Germany.* (Courtesy of EY8MM)

to non-WRTC competitors for working the WRTC stations and submitting logs shortly after the contest was completed. You can review the results and, if eligible, download your certificate(s) from the Web at the below links.

- Worked All WRTC Stations: <<https://tinyurl.com/yaelucaa>>
- Most QSOs: <<https://tinyurl.com/yc3cp4or>>
- Distance Challenge: <<https://tinyurl.com/yajnud75>>
- Assistant Judge: <<https://tinyurl.com/ya7xqv7q>>
- Sprint: <<https://tinyurl.com/yb75zbe9>>

FCC Chairman Ajit Pai Climbs 131-foot Tower. Can Ham Radio Contesting be Next?

Many ham radio contesters know what it is like to climb a 100-foot-plus tower. Some years ago, I served at the Federal Communications Commission as Chief of Spectrum Allocation, and later, as legal advisor to one of the FCC Commissioners. It was pretty well known among the commissioners and staff that I was a ham radio operator and worked on my own tower and antennas. As a result, I was sometimes the recipient of some wondering comments about why anyone would risk voluntarily climbing a tower as part of a hobby.

Looking Ahead...

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

- CW Results, 2018 CQ WPX Contest
- IOTA: An Introduction
- The 2-Meter Tetrabeam

Plus...

- Rules, 2019 CQ DX Marathon, CQ WW 160-Meter Contest
- A Period-Appropriate Digital Dial for Single-Conversion Receivers

Upcoming Special Issues

December: Technology

February: QRP

June: Take it to the Field

Do you have a hobby radio story to tell? Something for one of our specials? **CQ** now covers the entire radio hobby. See our writers' guidelines on the **CQ** website at <<http://bit.ly/2qBF0dU>>.

So it was with some interest that I learned that FCC Chairman Ajit Pai had strapped on a harness and climbed a 131-foot cell tower (see photo). In my all my years (actually decades) of experience with the FCC, he is the first chairman (or commissioner) that I know of to actually climb a tower and experience what it is like from that vantage point. My hat is off to him for that.

– Until next month, 73, Dave, K3ZJ



FCC Chairman Ajit Pai (center) after climbing to the top of a 131-foot cell tower in Colorado. (Courtesy of the Office of the FCC Chairman)



PROPAGATION

BY TOMAS HOOD,* NW7US

Good Conditions Predicted for 2018 CQWW DX SSB Contest

A Quick Look at Current Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots:

Observed Monthly, July 2018: 1
12-month smoothed, January 2018: 9

10.7 cm Flux:

Observed Monthly, July 2018: 70
12-month smoothed, January 2018: 74

A_p Index:

Observed Monthly, July 2018: 6
12-month smoothed, January 2018: 9

One Year Ago: A Quick Look at Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots:

Observed Monthly, July 2017: 11
12-month smoothed, January 2017: 17

10.7 cm Flux:

Observed Monthly, July 2017: 78
12-month smoothed, January 2017: 79

A_p Index:

Observed Monthly, July 2017: 9
12-month smoothed, January 2017: 11

HF radio enthusiasts celebrate the arrival of the winter DX season. From October through November 2018, we will see a steady annual improvement in the DX bands. During the CQ World Wide DX contests taking place in both months, we should experience good success — despite the fact that we are witnessing the very lowest phase at the end of Sunspot Cycle 24.

The 2018 CQWW SSB Contest <www.cqww.com> will start at 0000 UTC, Saturday, October 27, and run through 2359 UTC Sunday, October 28. Looking at the 27-day rotation of the Sun, taking into consideration the current solar activity at the time of writing this column two months before the contest, propagation should be good on both days. Expect conditions to be comparable with those of last year's contest weekend.

Predictions for one 27-day rotational period are far more accurate than for two to three rotational periods. Be sure to carefully check conditions on September 30 and October 1, since this would be one rotational period before the SSB contest weekend. There is better than a 90% chance that conditions observed on those days will recur during the October contest weekend.

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LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for September 2018

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 1-4, 6-8, 13, 15-18, 21-31	A	A	B	C
High Normal: 5, 9-12, 14, 19	A	B	C	C-D
Low Normal: 20	B	C-B	C-D	D-E
Below Normal: n/a	C	C-D	D-E	E
Disturbed: n/a	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

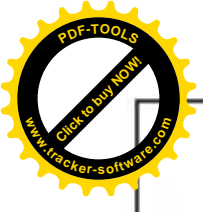
1. Find the **propagation index** associated with the particular path opening from the Propagation Charts appearing in "The New Shortwave Propagation Handbook" by George Jacobs, Theodore J. Cohen, and R. B. Rose.
2. With the **propagation index**, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening on a given signal path between two stations as shown in the Propagation Charts with a propagation index of 2 will be good on October 1 through October 4, fair on October 5, and so forth.
3. Alternatively, you may use the *Last-Minute Forecast* 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 ionosphere supports the path that is in consideration.

Table 1

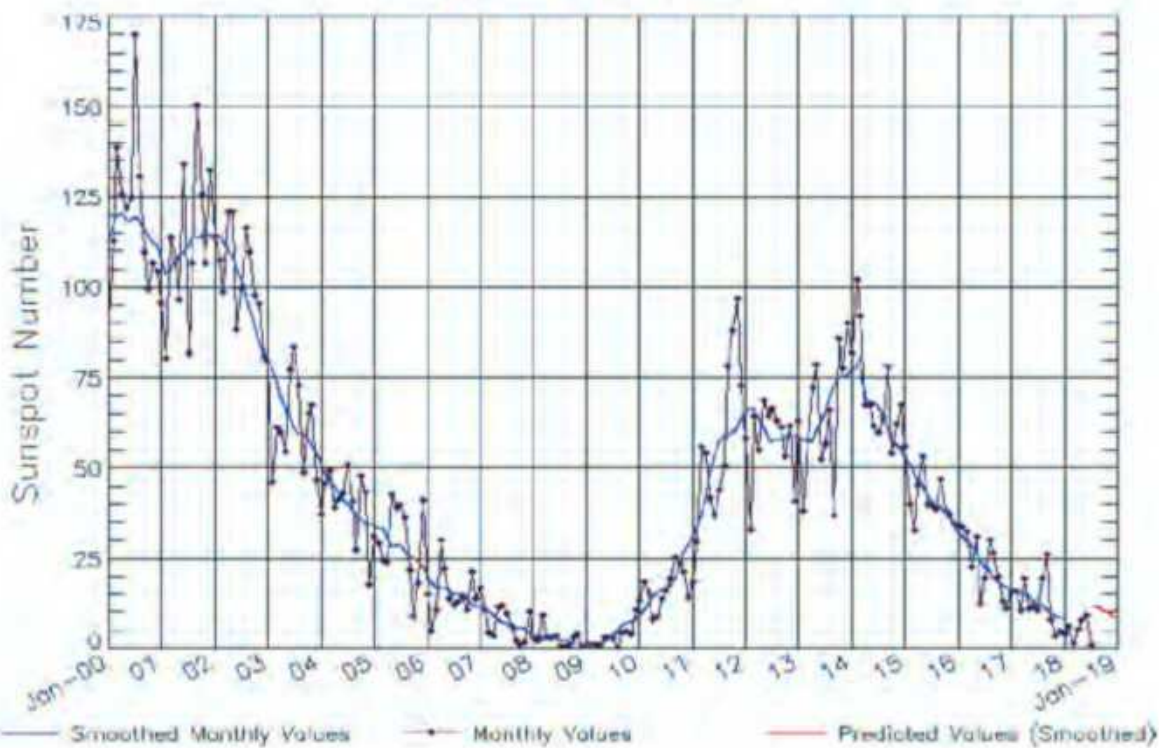
	2007	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18
October	6	2	7	23	60	59	75	58	39	19	8	*9
November	6	2	8	27	61	60	75	57	37	18	4	*9

* Predicted sunspot values expected during the 2018 contests

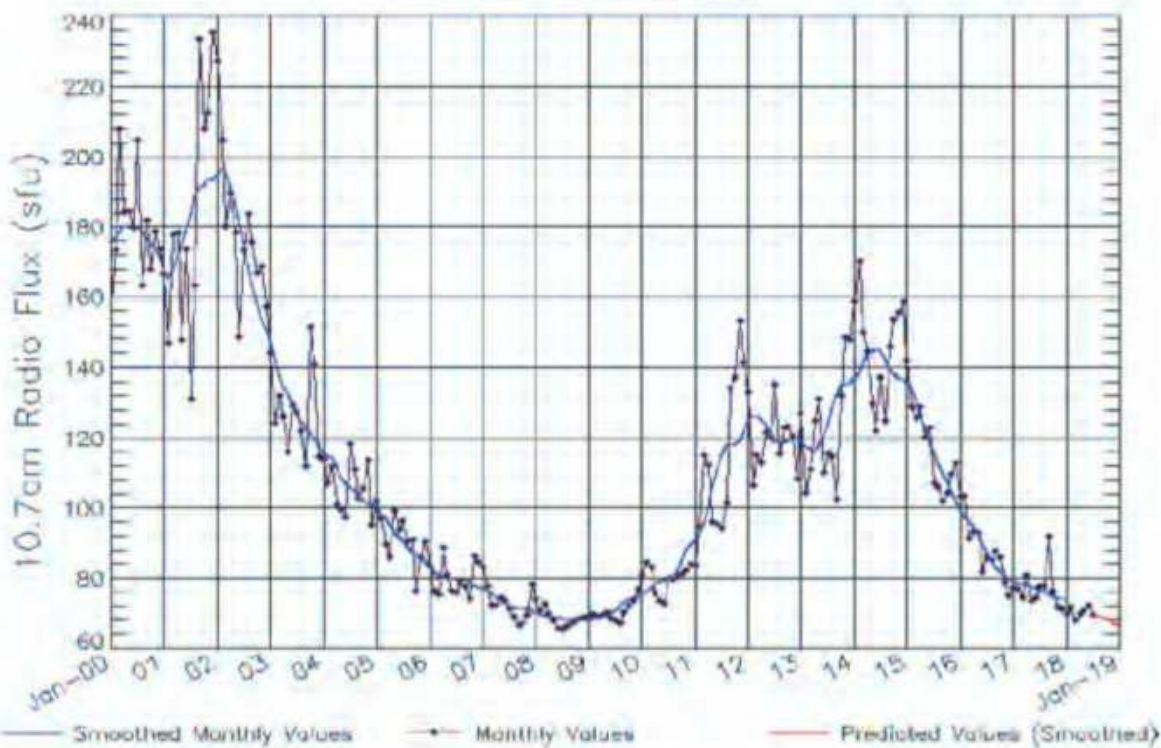
Sunspot numbers during CQ World-Wide DX Contests since 2007 (October SSB, November CW)



ISES Solar Cycle Sunspot Number Progression
Observed data through Jul 2018



ISES Solar Cycle F10.7cm Radio Flux Progression
Observed data through Jul 2018



ISES Solar Cycle Ap Progression
Observed data through Jul 2018



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See the "Last-Minute Forecast" for expected day-to-day conditions for the entire month of October. An updated day-to-day forecast for the SSB contest weekend will appear on the CQ Newsroom <<http://cqnewsroom.blogspot.com>> prior to the contest. You can also see an up-to-the-day "Last-Minute Forecast" on my propagation resource center, at <<http://sunspotwatch.com/>>.

Table 1 tabulates the smoothed sunspot count during previous CQWW DX Contest periods since 2007, and what's predicted for the 2018 contest. Contest conditions should be fairly similar to those of last year. Low to middle latitude propagation paths should be good on the lower HF bands (160, 80, and 40 meters). There is a moderate chance for reasonably long windows of propagation on the higher HF bands (above 20 meters) along paths spanning lower latitudes over sunlit and gray-line termination regions. However, it is expected that the higher bands will have a lot of fluctuation in performance. The lower

Figure 1. Sunspot Cycle 24 progression charts from August 2018. As can be seen, the ending of Cycle 24 is here. (Courtesy of SWPC / NOAA)

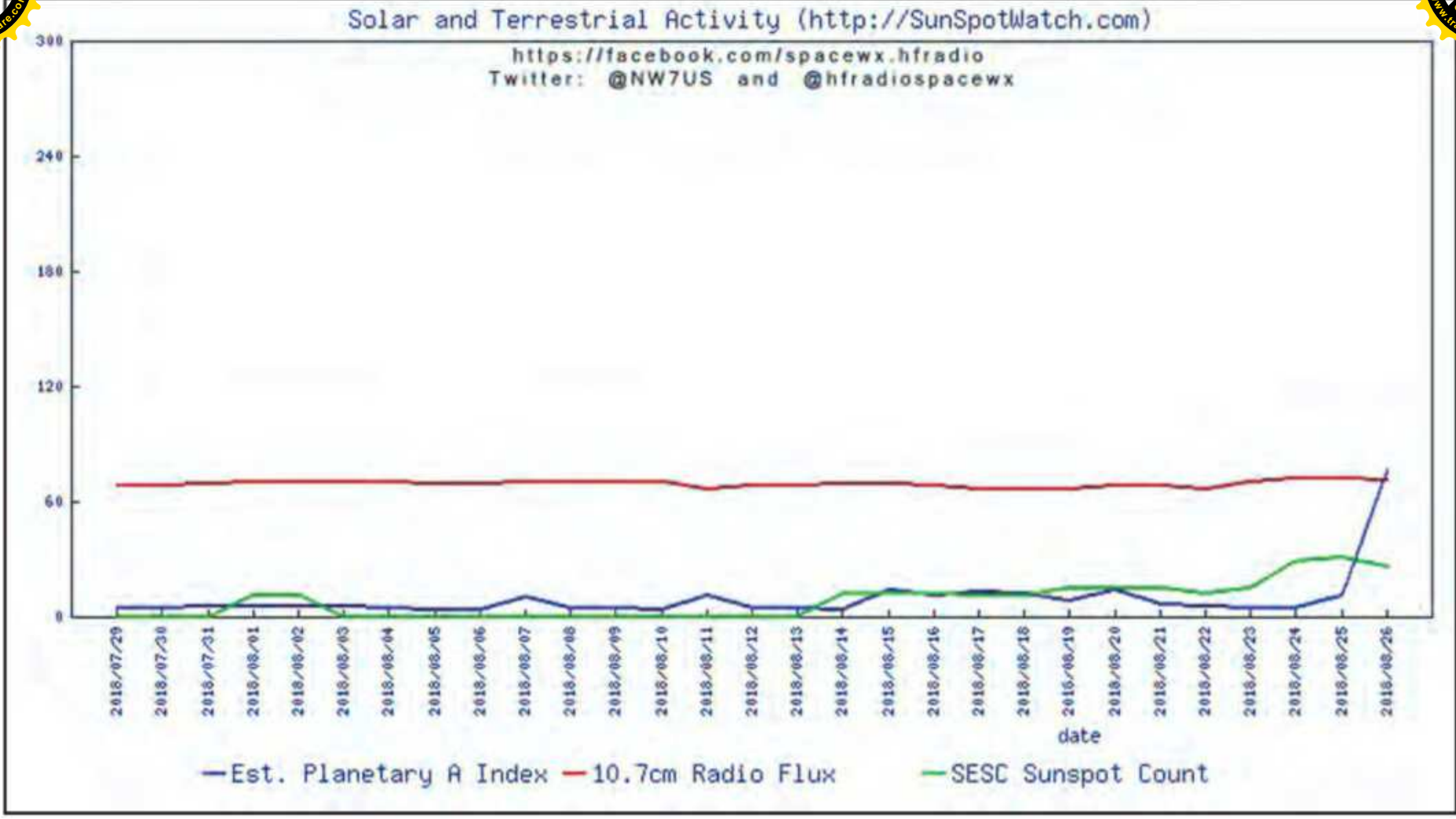


Figure 2. Toward the end of August, a coronal mass ejection (CME) was emitted from the Sun right into the path of the Earth. Once the CME glanced the Earth's magnetosphere, it caused storm-level activity (at the G3-level) in the geomagnetic field. This, in turn, lowered the Maximum Usable Frequency for most propagation paths on shortwave. (Courtesy of NW7US)

frequency bands will be quiet, much like last year.

Even if you are not a dedicated competitor you should give this contest a try. If you are trying for your DXCC or other paper, this is the contest of choice.

October Propagation

The following is a band-by-band summary of DX propagation conditions expected from mid-October through mid-December and centered on the two CQWW contest weekends. Next month's column will update this summary.

160 Meters: As usual, this slice of radio spectrum begins to turn attractive for DXing, as well as everyday use, with autumn's considerably decreased static levels. However, with the geomagnetic field somewhat more active, the "top band" will be somewhat more variable than a year ago during this season. The longer hours of darkness in the northern latitudes should provide a number of DX openings on this band. These openings will often be weak due to the relatively high signal absorption, since we are not yet to the longest periods of daily darkness. But give this band a try, as some fairly good openings should be possible toward Europe and the south from the eastern half of the United States, and toward the south, the

Far East, Australasia, and the South Pacific from the western half of the country. Other DX openings might also be possible. The best propagation aid for this band (and for 80 and 40 meters

as well) is a set of sunrise and sunset curves, since DX signals tend to peak when it is local sunrise at the easterly end of the path.

80 Meters: Here is the workhorse

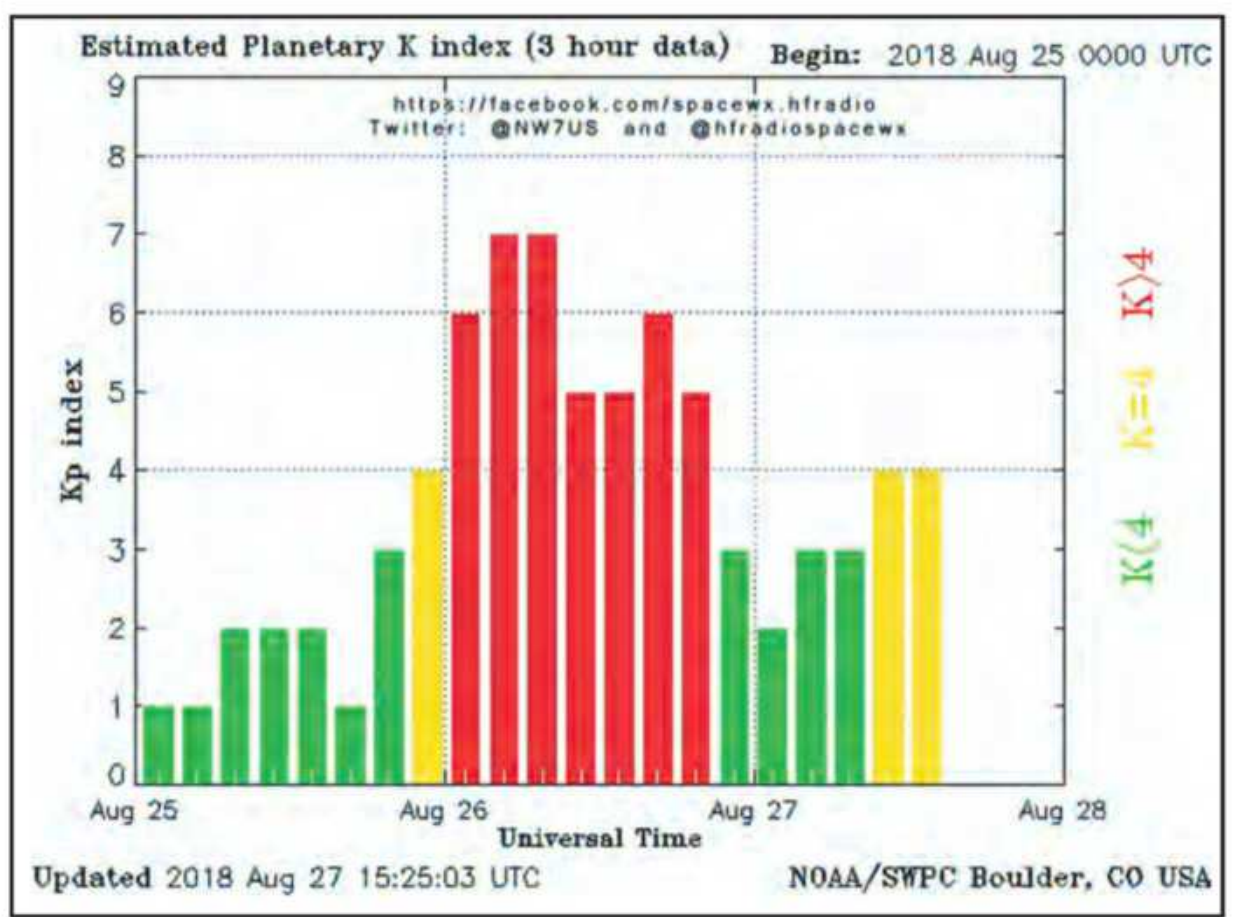


Figure 3. The geomagnetic field became very active — to the G3 level, with a K-index reaching 7 — toward the end of August. This was the result of a passing coronal mass ejection (CME). (Courtesy of NOAA/SWPC)



joint-time band for those with a well-designed antenna system. This band provides great DX openings to many areas of the world during the hours of darkness and into the sunrise period. The band should peak towards Europe and in a generally easterly direction around midnight. For openings in a generally western direction, expect a peak just after sunrise. The band should remain open towards the south throughout most of the night. Propagation on this band is quite similar to that expected on 40 meters, except that signals will be somewhat weaker on average, noise levels will be a bit higher, and the period for band openings in a particular direction will be a bit shorter.

40 Meters: This should be the hottest DX band during hours of darkness as the seasonal static levels are lower than they were during the summer. The band should be open first for DX toward Europe and the east during the late afternoon. Signals should increase in intensity as darkness approaches.

During the hours of darkness, expect good DX openings to most areas of the world. Signals should peak from an easterly direction about midnight, and from a westerly direction just after sunrise. Excellent openings toward the south should be possible throughout most of the nighttime period.

20 Meters: DX openings should be possible on this band both day and night. Conditions should peak for about an hour or two after sunrise and again during the late afternoon and early evening hours. Expect to work into some areas of the world between sunrise and sunset, when conditions are a mix of low geomagnetic activity and an increase in solar activity. Good openings should be possible to many areas of the world during the dusk and dawn periods, following the gray line. When conditions are above normal, expect 20 meters to offer a few surprise worldwide DX openings during the night. Look for long-path openings for about an hour or so after sunrise and again for an hour



Figure 4. Several sunspot regions appeared during the end of August, a welcome sight. These were about the size of Earth, but produced very little activity. It is possible during the bottom of a solar cycle to see occasional sunspots. (Courtesy of NASA/SDO)

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tions: Steve Hadjucek, N2CKH; Neal Morris, NØTTV; and Orlo Brown, K6SUJ.

A new patent for cloaking technology has been granted to Fractal Antenna Systems, a company founded by radio amateur Nathan “Chip” Cohen, W1YW. According to the *ARRL Letter*, the new patent is for a method of turning invisibility cloaks on and off, allowing the person or sensor inside the cloak to “see” what is around him/her/it.

Two well-known amateurs became Silent Keys in August. Amateur satellite pioneer Bill Tynan, W3XO, passed away at age 91. Bill was a founding member and director of AMSAT and former VHF editor of *QST* magazine. He served as AMSAT president from 1991 to 1998. (A more complete obit is on the CQ Newsroom). In addition, well-known Turkish amateur and contester Yasar Gocet, TA3D, became a Silent Key on August 1. According to friend and fellow contester Berkin Aydogmus, TA3J, Yasar died in a fall while repairing an antenna. He held a pair of 80-meter world records in the CQ World Wide and WPX Contests.

A HAARP's WSPR...

No, we're not misspelling anything and this has nothing to do with soft music... a citizen science experiment involving hams was conducted at the end of July and beginning of August by University of Alaska Fairbanks scientists operating the High-Frequency Active Auroral Research Program (HAARP) transmitters in Gakona, Alaska. According to the *ARRL Letter*, the researchers — led by Chief Scientist Chris Fallen, KL3WX — ended their work on each of three days by sending a series of 2-minute transmissions on 80 and 40 meters using the Weak Signal Propagation Reporter (WSPR) digital mode. They then collected “spots” or automated reception reports over the WSPRnet internet page. Several hundred reports were collected from throughout the United States and Canada, with the most distant being in Boca Raton, Florida. The HAARP transmitter operates under an FCC experimental license with a special temporary authority (STA) to transmit on amateur frequencies.

Indonesian Hams Rely on Amateur Satellite After Earthquake

Hams in Indonesia used traditional nets on 40 meters and 2 meters, as well as an amateur satellite, IO-86, for emergency communications following a second earthquake within a week in the Lombok region, the AMSAT News Service reports. IO-86 is an Indonesian satellite launched in 2015. It was built by that country's national ham radio organization, ORARI, which was also coordinating ham radio emergency response after the quakes.



or so before local sunset. Signal levels are expected to be exceptionally strong during the October contest period.

15 Meters: This year, 15 meters may play less often as a DX band. During the daylight hours, this band should see some significant action, but not better than the last few years. Fair to good conditions are expected from shortly after sunrise through the early evening hours. The band could remain open into the evening toward southern and tropical areas.

VHF Conditions

Watch for possible tropospheric ducting conditions during October because of the changing weather patterns. Two meters is the best band to watch for this.

There is a moderate to strong chance to work meteor scatter VHF propagation off this year's Draconids shower, active October 6 through October 10. This shower is not expected to produce more than about 10 meteors per hour. The best time to check for radio propagation would be from about midnight onward until dawn, locally.

Draconid meteors are exceptionally slow moving, a characteristic which helps separate genuine shower meteors. This shower could produce meteor scatter mode (M_s) propagation openings on VHF and UHF. Predictions are indicating that the only interaction with these meteors will be from a thin wispy trail of debris that will intersect Earth's orbit, this time around.

Check out <<https://tinyurl.com/y9psfr5u>> for a complete calendar of meteor showers in 2018. If you use Twitter, you can follow <[@hfradiospacewx](https://twitter.com/hfradiospacewx)> for hourly updates that include the K index numbers. You can also check <<http://sunspotwatch.com>> for the latest numbers.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for July 2018 is 1.0. That's low. The lowest daily sunspot value of 0 was recorded on July 1-12, 16-20, and 22-31 — a total of 27 days with zero sunspots. The highest value of 13 was recorded on July 13 and July 14. The 12-month running smoothed sunspot number centered on January 2012 is 8.6. A smoothed sunspot count of 9, give or take about 9 points is expected for October 2018.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 69.7 for July. The 12-month smoothed 10.7-cm flux centered on January 2018 is 74.0. The predicted smoothed 10.7-cm solar flux for October 2018 is 61, give or take about 9 points.

The observed monthly mean planetary A-Index (A_p) for July 2018 is 6. The 12-month smoothed A_p index centered on January 2018 is 9.3. Expect the overall geomagnetic activity to be varying greatly between quiet to moderate storm level during October. Refer to the Last-Minute Forecast for the outlook on conditions during this month. You can find the online version of this outlook at <<http://sunspotwatch.com>>.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may email me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <<http://forums.hfradio.org/>>. 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>.

– 73, Tomas, NW7US



READER FEEDBACK

BY DARREN JOHNSON,* KØSZ

Who Says FT8 is Killing the Personal Connection in Ham Radio?

CQ's "Zero Bias" editorial in the July issue looked at complaints that the new FT8 mode is going to kill ham radio — and why it isn't likely to happen. KØSZ shares a personal experience that reflects a similar theme. — W2VU

As of late, I have heard and read a lot of grumblings at hamfests, radio forums, and the like, that the FT8 digital mode is ruining amateur radio and the personal connections hams make during QSOs, nets, or while ragchewing. The foundation of amateur radio is communicating and connecting with others. The waterfall and grid square exchange of FT8, with no other personal connection except a callsign, is what some claim is the end of personal connections within amateur radio. Well, I'm here to share with you that that isn't the case, and in my experience couldn't be further from the truth.

A Radio Respite

While going through some rough times recently, I was questioning a lot of things in my life. Looking for answers, and just wanting to get away from things, I turned to what makes me happy, amateur radio. I headed down to my shack to see what I could find on the bands. I started by checking out FT8 and JT65 on 20 meters.

I made a few contacts and even grabbed a few new grid squares. I switched to 15 meters and the FT8 waterfall was all but nonexistent, about the same as the last few times I'd checked the band. I was about to change bands again when, all of a sudden, a stream came trickling down the waterfall. I clicked on the signal and made the standard FT8 QSO with John Whitt, AI4FR, from Florida. After that contact, I went on to make a few DX contacts and then, as quickly as the trickle in the waterfall showed up, it was gone again. I waited a bit to see if conditions would change, and when they didn't, I switched back to 20. That's when my bad week took an unexpected turn.

"You've Got Mail..."

I received an email notification on my computer. Thinking it was spam and not wanting to be bothered by it, I continued on with my FT8 endeavors. I was about to turn off the radio for the day and retire with an adult beverage when something told me to check and see what the email alert was. The email was titled FT8 QSO and it was from John, AI4FR.

He thanked me for the FT8 QSO and noted it had been some time since he had contacted KØSZ. However, he said my name as owner of the call didn't match his log. After checking further on my QRZ.com page, he saw that I had my dad, Dayle's (SK), call and wanted to offer his condolences. He also said if I ever had a longing for one of my dad's old QSL cards, he would be happy to send it to me, as they made a PSK31 contact in 2007.

After a few exchanges of emails with John, it seemed that

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Hastings, NE 68901
email: <Dlj77@icloud.com>



Photo A. My dad's KØSZ QSL card. Does anyone have a card from his original call, WBØQPA?

we were meant to connect with each other. I told John I would more than appreciate him sending me my dad's old card, as when he passed, things were hectic and I didn't get to save any of his old radio paraphernalia. When I got my license, I wanted to craft my QSL card after my dad's in some way, but I had no example to work from.

Another email from John revealed that he had his son help him go through his old QSLs and was getting nervous about the offer of the card, as his log showed he received a card from my dad but he hadn't actually checked to see if he still had it before offering it to me. John sent a follow-up email and said the very last card in his Nebraska QSL box was indeed my dad's and he included a photo of it (Photo A). On the card there was a cartoon character with a conversation bubble saying, "Is anybody out there listening?" This is when I was really blown away, as I was asking myself that very question, due to the bad week I'd had.

The Personal FT8 Connection

I am grateful to John for going the extra mile and reaching out to me. We have exchanged numerous emails about our connection and the more we talk, the more we find we have in common. Isn't this how "lifelong" amateur radio friendships are forged?

A lot of people have said that the FT8 and JT65 type digital modes are ruining the spirit of ham radio, as there is no more personal connection of operators; rather just computers sending grid locators and signal reports. John is definite proof that this is not the case. We as hams make our hobby what we want it to be, whether that is net operations, volunteering, DX chasing, contesting, etc. The mode or facet of radio we use to communicate with others doesn't dictate whether we make connections with others; we do!

When I chose to get licensed, I never planned to actually get on the air. I was missing my dad and since he was such a huge proponent of amateur radio, I thought studying and learning about amateur radio would somehow help to fill the

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model my next batch of QSL cards after my dad's. Amateur radio doesn't get much more personal than that.

Do You Have a WBØQPA Card?

I put John's and my dad's QSL cards and some DX cards for him that I received from the bureau shortly after I took over his call, into a holder on display in my shack (*Photo C*). I also have some old Heathkit items of my dad's that had ended up with my buddy Dan, who then returned them to me. It's nice to have a part of my dad's shack with mine.

I was never able to enjoy amateur radio with my dad while he was alive. However, thanks to Joe Taylor, K1JT; Steve Franke, K9AN; and the introduction of the FT8 mode, a very personal connection has been made in two hams' lives. Every time I look at the cards, I think of John and our friendship that was created from a simple grid and signal exchange, that some say is ruining the camaraderie of amateur radio. John and I are proof that is not the case.

I am now in search of my dad's other card. His original call-sign was WBØQPA. If, by chance, any readers out there have a WBØQPA QSL card, I would love to have it or at least a picture of it. Better yet, I would like to make an on-air contact with you, as I did with John.

Note: Opinions expressed in Reader Feedback are those of the writer(s) and do not necessarily represent the views of CQ magazine.

gap of missing him. Once I got my Technician license, it brought me back into contact with my best friend from high school, Dan Sellmeyer, WBØYYE. He and I had been out of touch for about 20 years, but that's a story for another time. Dan encouraged me to progress in radio all the way to Extra, so I could take my dad's callsign. "Your dad's call is tattooed on your back," Dan reminded me. "You don't want someone else to have it and then have someone else's call inked on you" (*Photo B*). He made a valid point, so I went the distance to get Extra. In doing so, I got very intrigued by what I was studying and all the options amateur radio had to offer. So I got a rig and got on the air, which brought me into contact with John. Thanks to John's effort to connect with me, I can now

Photo B. The tattoo I have as a memorial for my dad. He was a welder by trade and a ham, so I combined his two loves for the tattoo.



Photo C. This cardholder is on display in my shack, with my dad's and AI4FR's cards at the top, and DX cards for my dad that I received from the QSL bureau after taking his call.



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HAM TRAVELERS Discount travel, tours, cruises, more. www.GreatExpectationTravel.com

PROMOTIONAL VIDEO: 15-minute DVD describes amateur radio's fun and public service. Details: <www.neoham.org>.

WANTED: OLD QSL CARD COLLECTIONS. Collector seeks US & DX cards. W2VRK, 9 Laird Terrace, Somerset, NJ 08873; e-mail: <tpllrs@comcast.net>.

TELEGRAPH KEY INFORMATION AND HISTORY MUSEUM: <<http://w1tp.com>>

HAM RADIO GIFTS: <www.mainestore.com>

FT243 AND HC6U CRYSTALS: www.af4k.com

OLD QSLs Available. 50's and 60's, DX and USA. Specify call, send SASE. W5SQA@arrl.net

RFI Filters <www.RFchoke.com>

SOTA BEAMS: <<http://www.sotabeams.co.uk>>. G3CW

CRANK-A-WATT Power & More via KE5NYS. Visit <www.FactorReady.com>

FMTV ARTICLES: Comprehensive transmitter and receiver deviation calibration, standards, intermodulation, power amplifier calculations. WB9OQM, <http://mathison.freeshell.org>

Wanna ham in the **CAYMAN ISLANDS?** Go to <www.martykaiser.com/24a.htm>.

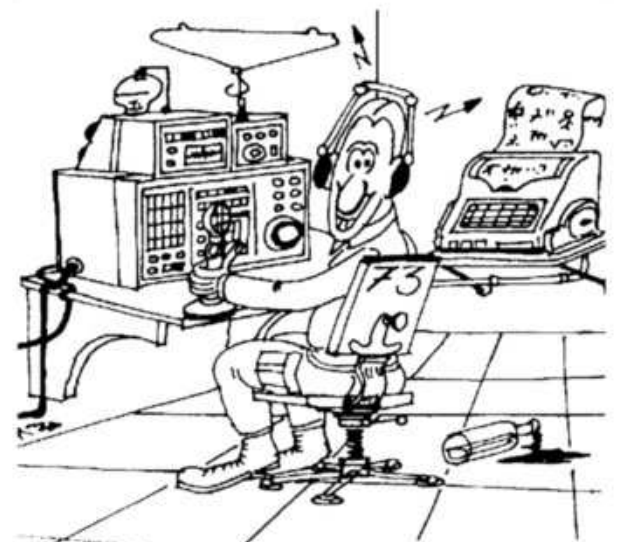
www.SecondHandRadio.com

HF Mobile or Fixed Virtual X Antenna Patent: For Sale or License. Request Free Power Point Presentation file. Shows design details, pictures, prototype tests. Design applies to a broad frequency range for mant antenna arrays/beams/verticals. <lgslay@sbcglobal.net>. Larry Slay, K5WUL

FOR SALE: Samlex Power Supply Model SEC 1223, 13.8V @ 25 amps. Not working. Includes operating manual and schematic. Price \$50 or best offer. Contact Harry, W9HRQ, at <harrygraziano@gmail.com> or phone 1-773-334-4492.

YAESU FT-840, has FM-747 FM unit, YF-112A 6 kHz AM filter and manual. Problem with main tuning, otherwise good \$150. FC-800 1.8-30 MHz 150W remote ATU for FT-840 or FT-890. wotking with cables and manual, \$125. Shipping additional. KB2DMD, (215) 541-1099.

ANTENNA & TOWER HARDWARE: Aluminum plates: Boom to elements, boom to mast, GP/ Vertical antenna-ground plates, Rohn 25/45 to cross arms plates, Hexabeam/spiderbeam Hubs, Moxon hubs, U bolts with sadles. **All info at: e78WW@yahoo.com or at e-bay store: stores.ebay.com/yz4iz0**





Go portable with LDG!

IN THE FIELD!



One of the great things about ham radio is that you can take your hobby with you wherever you go. You're not limited to the shack, but can operate mobile from your car, handheld just walking around with an HT, and of course portable in the field. Whether picnicking, camping, putting parks, islands, lighthouses or mountain peaks on the air, or on Field Day, you can set up a portable station just about anywhere. And of course, when things go bad like a hurricane, earthquake or other natural or manmade disaster you can set up an emergency station near the action to help coordinate rescue and relief.

A lot of modern ham equipment is ideal for portable operation. You can get a 100 watt radio that's about the size of a hardback book, weighs only a few pounds, and will run off a battery for hours. The hard part about portable operation is always the antenna. There are generally two ways to go: you can put up a temporary wire antenna like a dipole or long wire, or you can use a portable antenna like a vertical or a hamstick dipole. In any case, for efficient operation you'll need a tuner to match the antenna to your radio.

LDG makes several tuners that are ideal for portable operation. They are light weight, compact, and can run on internal batteries so they require no external power source at all; they're literally just plug and play. The Z-100Plus and Z-11Proll handle up to 125 watts, and the Z-817 up to 20 watts. And, they all include a free internal battery holder. These tuners use latching relays to hold the tuning settings, so in standby mode once tuning is complete they use essentially no power at all. A set of AA batteries will typically last for months of normal operation.

As you plan for the fun and utility of portable operation, complete your portable kit with an LDG tuner. Visit us on the web at www.ldgelectronics.com.

ZERO POWER TUNERS

These tuners include a AA battery pack and are zero power once tuned!



Z-100Plus

Low cost and Portable, the Z-100Plus operates from any 7 to 18 volt DC source. AA batteries will run it for a year of normal use. Internal frequency counter stores tuning parameters for fast recall. Handles 100 watts SSB or 30 watts digital.



Z-11Proll

Designed for Battery Operation. Operates from 0.1 to 100 watts SSB or CW, 30 watts digital. Great for both QRP and standard 100 watts transceivers. Matches dipoles, verticals, inverted vees and most coax fed antennas.



Z-817

The ultimate QRP autotuner. Seamless integration to the Yaesu FT-817 and FT-818 provide one button tuning. 2000 memories covers 160 through 6 meters, 20 watts SSB, 5 watts digital.

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