Teen Leads Space Station Contact, p. 88

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Amateur Radio

COMMUNICATIONS & TECHNOLOGY

CQ

FEBRUARY 2014

Introducing CQ Plus!
See page 8

QRP Special!

On the Cover: Dave Clausen, W2VV, operates NYC Resistor club station N2YCR at the group's makerspace in Brooklyn, New York.
Details on page 92.

Escape with the TM-281A

On or off the road, Kenwood's TM-281A is a mobile radio you can always count on.

As tough as nails, this MIL-STD-compliant transceiver delivers powerful performance, excellent audio clarity, and a host of advanced features. It offers superb operating ease day or night thanks to the large backlit LCD and illuminated keys. So the next time you take off, take the TM-281A.

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R9

80-6 Meters!

No Radials!

Cushcraft's world famous R8 now has a big brother!

Big Brother R9 now includes 75/80 Meters for local ragchewing and worldwide low band DX *without radials*!

It's omni-directional low angle radiation gives you exciting and easy DX on all 9 bands: 75/80, 40, 30, 20, 17, 15, 12, 10 and 6 Meters with low SWR. QSY instantly -- no antenna tuner needed**.**

Use full *1500 Watts* SSB/CW when the going gets tough to break through pileups and poor band conditions.

The R9 is super easy to assemble, installs just about anywhere, and its low profile blends inconspicuously into the background in urban and country settings alike.

Compact Footprint: Installs in an area about the size of a child's sandbox -- no ground radials to bury with all RF-energized surfaces safely out of reach.

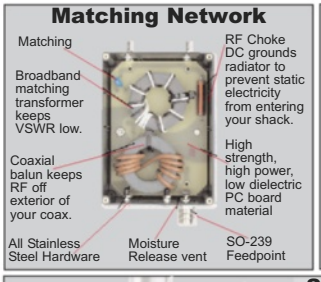
Rugged Construction: Thick fiberglass insulators, all-stainless steel hardware and 6063 aircraft-aluminum tubing is double or triple walled at key stress points to handle anything Mother Nature can dish out.

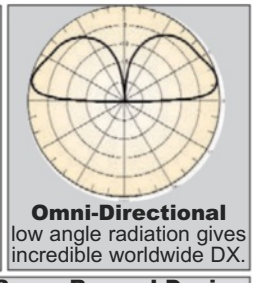
31.5 feet tall, 25 lbs. Mounting mast 1.25 to 2 inches. Wind surface area is 4 square feet.

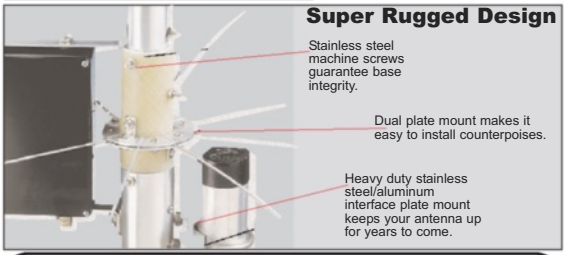
R8, $539.95. Like R9 antenna but less 75/80 Meters.

R-8TB, $79.95. Tilt-base lets you tilt your antenna up/down easily by yourself to work on.

R-8GK, $59.95. Three-point guy kit for high winds.







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Unrest in South Sudan Silences Ham Operators

The two licensed amateurs in South Sudan both report that they have taken their stations off the air and shipped their equipment out of the country "in order to avoid misunderstandings" with either side in the growing ethnic conflict that as of late December had claimed over a thousand lives. According to a report on the ARRL website, Massimo Stella, Z81B (also IZØEGB), and Diya al Asadi, Z81D (YI1DZ), said they expect to be off the air "for a while." Stella was in Europe while al Asadi remained in South Sudan. Both of them had been part of the Z81X operation from South Sudan in November, along with *CQ* DX Editor Wayne Mills, N7NG, who reports on that expedition and associated activities in his column this month (see page 94; note that Wayne filed his column prior to the outbreak of violence in the country).

Communications Act Update Planned

Citing the need for the law to keep pace with rapidly changing communications technology, the two Congressmen in charge of telecommunications policy in the House of Representatives say they are planning a comprehensive review and update of the Communications Act. Representatives Fred Upton (R-MI), Chairman of the House Energy and Commerce Committee, and Greg Walden, W7EQI (R-OR), Chairman of the Communications and Technology Subcommittee, say the effort will take over a year. Walden said the Communications Act, first passed in 1934 and last updated in 1996, is now "painfully out of date" and said the committee's goal is "to make sure this critical sector of our economy thrives because of the laws around it, not in spite of them." No timeline was given in the committee's announcement.

Listen for W100AW

The ARRL has been authorized by the FCC to use the special callsign W100AW during 2014, the League's centennial year. According to the *ARRL Letter*, the special call will be used in addition to W1AW, depending on the circumstance. Contacts made from the Maxim Memorial Station at ARRL Headquarters will use W100AW, as will those from regional conventions and during the IARU HF Championship this summer. However, regular bulletins and code-practice transmissions will still use W1AW, as will stations operating in the "W1AW WAS" program from each of the 50 states.

Solar Scientists: Cycle 24 Weakest in a Century

The current solar cycle is the weakest of the past ten cycles, according to four solar scientists reporting on "space weather" at the fall meeting of the American Geophysical Union. The *ARRL Letter* reports that the four—Nat Gopalswamy and Martin Mlynczak of NASA, Stanford's Leif Svalgaard and Joe Giacolone of the University of Arizona—say a weak polar magnetic field during Cycle 23 is thought to be the mechanism behind the weakness of Cycle 24. By continuing to track the polar magnetic field, said Svalgaard, it should be possible within a few years to predict the robustness (or lack of robustness) of Cycle 25. The group did not directly address the impact of the current weak cycle on radio propagation.

Hams Say "HI" to Juno Spacecraft

Hams around the world made coordinated transmissions last fall on 10 meters, sending "HI" in very slow Morse code to the sensors on the Juno spacecraft as it swung past Earth for a gravity boost on its journey to Jupiter. A video on the activity has been produced by NASA's Jet Propulsion Laboratory and is available on YouTube at <http://bit.ly/18PeGcI>. A more detailed article on the activity is planned for the March issue of *CQ Plus*.

Radio Arcala Tower Collapses in Storm

The massive 330-foot tower supporting the 160- and 80-meter Yagis at Radio Arcala's OH8X contest station in Finland collapsed under high winds in an early December storm that left some 200,000 families in the country without power. The 3-element 160-meter beam was reportedly the world's largest amateur radio antenna.

According to the *ARRL Letter*, group spokesman Jarmo Jaakola, OH2BN, speculated that the automation designed to enable the array "to find its most comfortable position in high winds" may have locked up and caused the structure to corkscrew. Jaakola said the tower—featured on the cover of the November 2011 cover of *CQ*—collapsed "peacefully" and caused no damage to any people or surrounding structures. At press time, inspectors were still trying to determine the exact cause of the failure.

Voice of Russia Leaves Shortwave

Many hams who came of age during the Cold War recall listening to the thinly disguised propaganda broadcasts of Radio Moscow booming in on their shortwave receivers. After the fall of the Soviet Union, the station was renamed the Voice of Russia but maintained a busy shortwave broadcast schedule. It began cutting back last year, though, and as of January 1, 2014, eliminated all shortwave broadcasting. The station will continue to reach out to international audiences via medium-wave broadcasting and the internet.

Astronaut-Hams Fix ISS Cooling System

Two American astronaut-hams repaired the International Space Station's cooling system during a dramatic Christmas Eve spacewalk, replacing a failed ammonia pump. According to *Newsline*, astronauts Mike Hopkins, KF5LJG, and Rick Mastracchio, KC5ZTE, each took two spacewalks as part of the repair mission, removing the faulty pump on December 21st and installing a new one on the 24th. The astronauts were outside the station for more than seven hours, in part because an ammonia fluid line sent frozen flakes of the substance right at them, with some sticking to their spacesuits. They had to wait until the ammonia on their suits dissipated before re-entering the station to avoid possible contamination.

In a related story, the *ARRL Letter* reports that former astronaut Susan Helms, KC7HNZ, has renewed her interest in amateur radio, regaining both her license and her callsign, which she'd allowed to expire in 2005. Helms, a Lieutenant General in the Air Force, is now the senior officer at Vandenberg Air Force Base in California. Her interest reportedly was reignited by an activity hosted by the Satellite Amateur Radio Club, W6AB, for Scouting's 2013 Jamboree on the Air. During a tour on the International Space Station in 2001, Helms used NA1SS for the first ARRL Field Day operation from space.

Ham Industry Changes

News of note from the ham radio industry:

• UK-based InnovAntennas has acquired Force 12 antennas of Bridgeport, Texas and consolidated its manufacturing activities with InnovAntennas America's facility in Grand Junction, Colorado. According to the InnovAntennas Facebook page, the combined facility "is in full swing and we are shipping, building and shipping antennas … daily."

• At the end of December, Japanese amplifier manufacturer Tokyo Hy-Power filed for bankruptcy and closed its manufacturing plant near Tokyo. The company's main website has also been closed down, although its US website remains active. According to a report on the ARRL website, company President and CEO Nobuki Wakabayashi, JA1DJW, said "the recent depression in the industrial RF power products area has led to the very difficult financial position."

• CQ Communications has realigned its publication lineup, merging *Popular Communications, CQ VHF* and *WorldRadio Online* into *CQ Plus*, a supplement to the digital edition of this magazine, effective with this issue. See "Zero Bias" on page 8 for more information.

Additional and updated news is available on the Ham Radio News page of the CQ *website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for* CQ*'s free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.*

hy-gain Antennas and Rotators

HF Verticals

Work amazing DX with these extremely low radiation angle omnidirectional antennas. All self supporting, 1500 Watts PEP SSB, low SWR. Heavy duty, slotted, tapered, swaged, aircraft quality aluminum tubing. Stainless steel hardware. Two year limited warranty.

AV-680, $549.95. 9 Bands: (6,10,12,15,17,20,30,40, 80 Meters). 26 ft., 18.5 lbs. *Our most popular vertical now has 75/80 Meters! Lets you work exciting DX with a low 17 degree radiation angle!* Easily mount on decks, roofs, patios. *No ground or radials needed.* Extra wide 2:1 SWR bandwidths. *Each* band tunable. Auto bandswitching, handle 1.5kW, 80 MPH wind survival, low 2.5 sq. ft. wind surface. Aircraft aluminum tubing, stainless steel hardware.

AV-640, $449.95. Like AV-680 less 80M. 25½', 17½ lbs.

AV-620, $349.95. Like AV-640 less 40M. 22½'/10½ lbs.

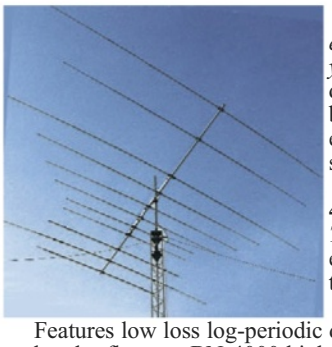
AV-14AVQ, $179.95. (10, 15, 20, 40 Meters). 18 ft., 9 lbs. *Classic* AV-14AVQ uses same trap design as famous Hy-Gain Thunderbird beams. 3 air dielectric Hi-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Automatic bandswitching.

AV-12AVQ, $139.95. (10, 15, 20 Meters). 13 ft., 9 lbs. Lowest priced *automatic bandswitching* tri-band vertical! Uses Thunderbird beam design air dielectric traps for extremely hi-Q performance in limited space.

AV-18VS, $119.95. (10,12,15,17,20,30,40,80M). 18 ft., 4 lbs. Hy-gain's *lowest priced vertical* gives you 8 bands. Easily tuned to any band by adjusting base loading coil.

See our website for even more hy-gain vertical antennas!

HF Beams



Hy-gain beams are *stronger, lighter, have less wind surface and last years longer.* **Why?** *Hy-gain* uses durable *tooled* components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- no failures!

TH-11DX, $1159.95. 11-element, 4.0 kW PEP, 10,12,15,17,20 Meters. *The choice of top DXers.* With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is the *"Big Daddy"* of all HF beams! Features low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

TH-7DX, $869.95. 7-Element, 1.5 kW PEP, 10,15,20 Meters. 7-Elements gives you *the highest average gain of any Hy-gain* tribander! Dual driven for broadband operation without compromising gain. SWR less than 2:1 on all bands. Combined monoband and trapped parasitic elements give you an excellent F/B ratio.

TH-3MK4, $469.95. 3-Element, 1.5 kW PEP, 10,15,20 Meters. Gives most gain for your money in full-power, full-size *hy-gain* tri-bander! Impressive gain and a *whopping* average front-to-back ratio and still fits on an average size lot. 95 MPH wind survival.

TH-3JRS, $359.95. Compact 3-Element, 600 W PEP, 10,15,20 Meters. *Hy-gain's most popular and lowest-priced tri-bander fits smallest lot*, 14.75 ft turning radius, 21 lbs. Excellent gain and front-to-back let you compete with the "big guns"! 80 MPH wind survival.

hy-gain Rotators . . . the first choice of hams around the world!

HAM-IV . . . $649.95

The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. *New* 5-second brake delay! *New* Test/Calibrate function. *New* low temperature grease permits normal operation down to -30 degrees F. *New* alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. *New* indicator potentiometer. *New* ferrite beads reduce RF susceptibility. *New* Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking *steel* wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of 2 1/16 inches.

HAM-VI, $749.95. For medium arrays up to 15 sq. ft. wind load. Like HAM-IV but has *new* ***DCU-2*** *Digital Rotator Controller*. Just dial in your beam heading or let your computer control your antenna.

HAM-VII, $799.95. Like HAM VI but with ***DCU-3*** digital controller with *six programmable memories*.

Tailtwister T-2X . . . $799.95

For large medium antenna arrays up to 20 sq. ft. wind load. Choose ***DCU-2*** *digital* controller (T-2XD2) or *analog* control box (T-2X) with *new* 5-second brake delay and *new* Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking *steel* wedge brake, N or S center of rotation scale on meter, low voltage control, 2 1/16" max. mast.

T-2XD2, $899.95. Tailtwister with ***DCU-2*** *digital* controller.

T-2XD3, $949.95. Tailtwister with ***DCU-3*** digital controller with *six programmable memories*.

AR-40, $349.95. For compact antenna arrays and FM/TV up to 3.0 sq. ft. wind load. Dual 12 ball-bearing race. Fully automatic.

CD-45II, $449.95. For antenna arrays up to 8.5 sq. ft. Bell rotator design gives total weather protection. Dual 58 ball bearing race.

Digital Rotator Controller with *6 Programmable beam headings*

New!

DCU-3

$449.95

New DCU-3 Digital Controller lets you program 6 beam headings! Gives you fully automatic or manual control of your hy-gain HAM or Tailtwister Rotators.

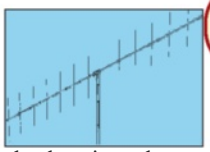
Push a memory button or dial in your beam heading or let *Ham Radio Deluxe* (or other program) control your DCU-3. Your antenna automatically rotates precisely and safely to your desired direction.

hy-gain VHF/UHF Antennas

V2R, $109.95. 2-Meter *vertical* has two *in-phase* 5/8 Wave collinear radiators for exceptional high omnidirectional gain. It has two sets of quarter wave radials that decouple radiator from mast. Covers 138-175 MHz. SO-239, handles 500 Watts. 9 feet.

V4R, $109.95. UHF *vertical*. Like V2R but covers 400-475 MHz. Type N, handles 500 Watts, 4 foot.

V42R, $169.95. *Dual band* covers 144/440 MHz bands. Two 5/8 Wave collinears.



VB-214FM, $89.95. *14-element* 2-Meter FM *beam* antenna provides exceptional front-to-back ratio and maximum obtainable gains.

VB-23FM, $49.95. 3-element.

VB-25FM, $59.95. 5-element.

VB-28FM, $79.95. 8-element.

Threaded stub for feedpoints. Accepts up to 2 inch mast.

DB-2345, $89.95. Dual band 144 (3-elements) 440 (5-elements) MHz.

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VOLUME 70 NUMBER 2

CQ February 2014

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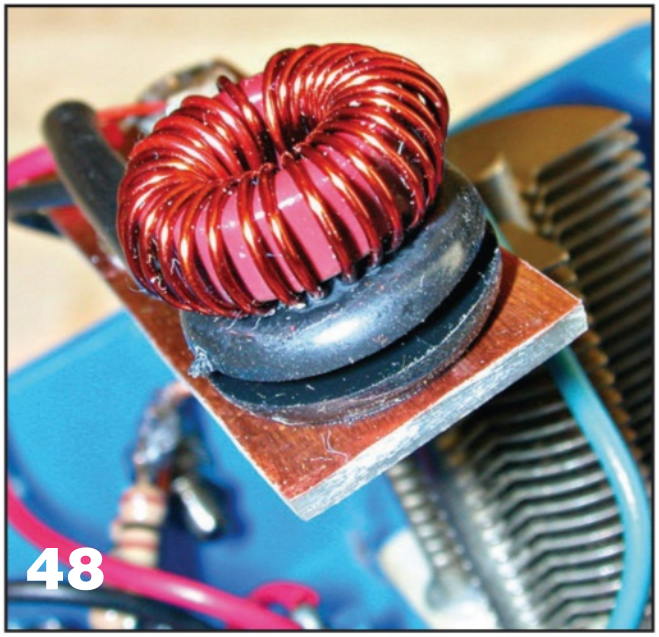
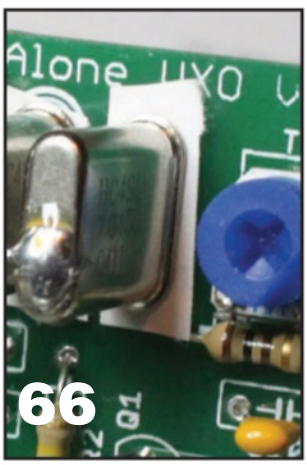




FEATURES

QRP Special

DEPARTMENTS

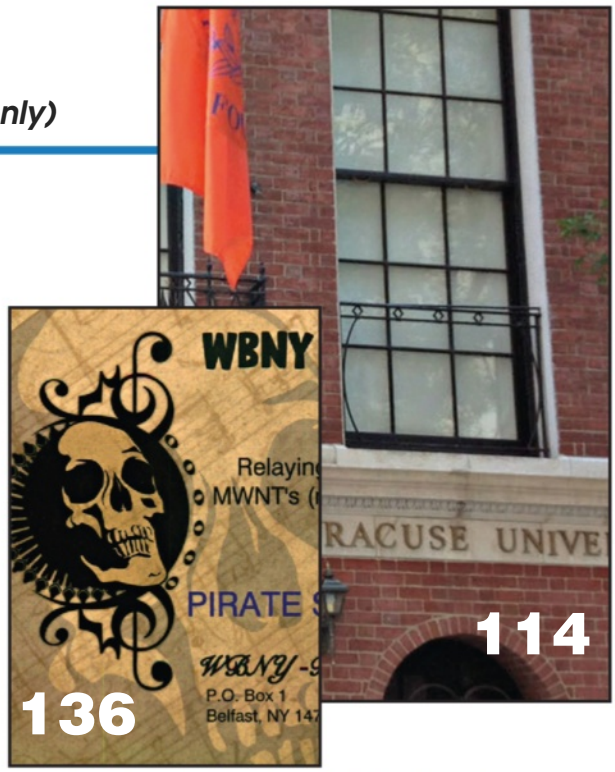
Welcome to CQ Plus!

Beginning with this issue, *CQ*'s digital edition includes a supplement called *CQ Plus*. It includes content from *Popular Communications, CQ VHF* and *WorldRadio Online*, all of which have been merged into this new, expanded, version of *CQ*. Please note that this additional content is available only in the digital edition. There are no changes to the print edition. Print subscribers interested in adding a *CQ* digital subscription should contact our office for a special offer.

CQ plus *(digital edition only)*

FEATURES

COLUMNS



System Fusion

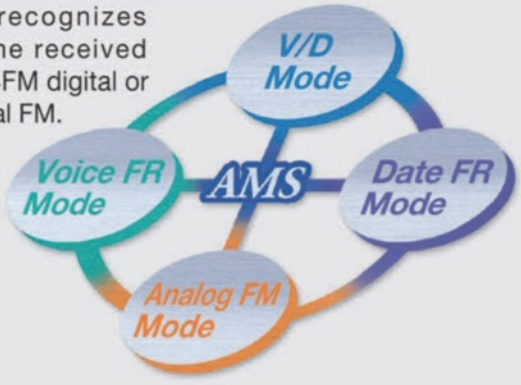
Get the Integrated Solution

System Fusion provides total integration of Digital and Conventional FM

System Fusion delivers integrated operational functionality that enables you to communicate with other Amateur Radio operators using conventional FM mode while you enjoy advanced digital communication features, such as image, text data and GPS position data using C4FM digital. System Fusion is designed to enable seamless communication between conventional FM and C4FM Digital Communication using a single unified platform.

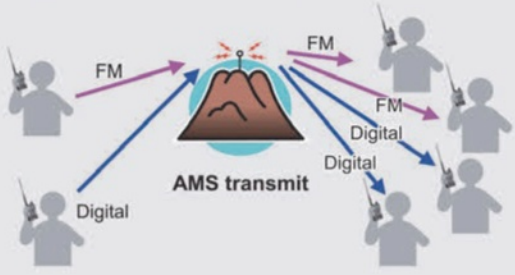
AMS (Automatic Mode Select)

- Instantly recognizes whether the received signal is C4FM digital or conventional FM.



FM Friendly Digital

- System Fusion can be used in multiple ways, for digital communication, for conventional FM communication and even internet communication.



New Functions Enabled by C4FM Digital Communication

Digital Group Monitor (GM) Function

- Automatically checks whether members registered to a group are within the communication range.

Snapshot Function (Image Data Transmission)

- Image data can be sent easily to other C4FM FDMA digital transceivers.
- Image data can be displayed on the screen. (FTM-400DR ONLY)

Smart Navigation Function

- Real-time navigation function enables Location checking at any time.
- Backtrack function for returning to your departure Point.

For latest Yaesu news, visit us on the Internet: http://www.yaesu.com

System Fusion Lineup

C4FM Digital Communication
Clear and Crisp Voice Technology

144/430 MHz DUAL BAND
C4FM/FM DIGITAL REPEATER

DR-1

- Three digital modes and a Conventional FM mode
- Emergency Operation: Supports operation on an emergency battery

Exciting New Amateur Digital Transceiver

C4FM Digital Communication
Clear and Crisp Voice Technology

C4FM FDMA 144/430 MHz DUAL BAND
5W DIGITAL/FM TRANSCEIVER

FT1DR

- Three digital modes and a Conventional FM mode
- Automatic Mode Select (AMS) Function
- Snapshot Picture Taking Capability
- Digital Group Monitor Function
- Smart Navigation Function

Equipped with advanced touch panel operation and full-color TFT large-scale display

C4FM Digital Communication
Clear and Crisp Voice Technology

C4FM FDMA 144/430 MHz DUAL BAND
50W DIGITAL/FM TRANSCEIVER

FTM-400DR

- Three digital modes and a Conventional FM mode
- Automatic Mode Select (AMS) Function
- 3.5-inch Full Color Touch Panel Operation
- Snapshot Picture Taking Capability
- Digital Group Monitor Function
- Smart Navigation Function

Amateur Radio Internet Linking Kit

WIRES-X

HRI-200

In addition to the convenient and easy to use digital function, advanced VoIP wireless WIRES-X

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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

CQ Plus – We're Changing to Better Serve You

How did you get started in the radio hobby? Did you dive right into ham radio, or did you start out doing something with an easier learning curve, such as shortwave listening or CB? Do you still enjoy some of those other aspects of hobby radio?

I certainly didn't start out in the deep end of the pool. I got started at about age 10, lying in bed late at night, listening to faraway AM broadcast stations in between the locals and trying to figure out where they were. This was followed by cold winter nights sitting in the family car, after I realized that the car radio was more sensitive than the old tube set in my bedroom (and had an external antenna outside the house, but I didn't know about that stuff yet). Then came CB, shortwave listening and finally, ham radio. I still dabble in SWLing and like to listen to airplanes and local public safety folks on my scanner.

I don't think my experience is at all uncommon. Most every ham I've ever met got started in a different branch of the radio hobby and worked his or her way up to the ranks of a licensed amateur. Do you still enjoy other parts of the radio hobby? I'm guessing yes. That's why virtually every HF transceiver on the market today includes a general coverage shortwave receiver, and why virtually every VHF/UHF transceiver includes wide coverage receive and scanning capabilities. We have collectively demanded it because we don't want to be limited by edges of the ham bands.

Very few of us are one-dimensional radio hobbyists. Yes, we may have a favorite part of the hobby, but most of us keep our fingers in other parts as well. Yet, hobby radio magazines have tended to be one-dimensional, specializing in one aspect of the hobby or another. Our focus in *CQ* has always been nearly exclusively on amateur radio, while our sister magazines have focused on other areas, either the broader listening part of the radio hobby or even narrower interests, such as contesting or VHF/UHF hamming. But no one magazine is really meeting all of your radio needs.

Well, we're about to change that. We're returning to the pre-1945 days of our predecessor magazine, *Radio*, and transforming *CQ* into your one-stop support center for all types of hobby radio!

Introducing *CQ Plus*

Beginning this month, selected content from our three sister publications, *Popular Communications, CQ VHF* and *WorldRadio Online*, will be incorporated into *CQ*'s digital edition as a supplement to be called "*CQ Plus.*" Take a look at our expanded table of contents (appearing in the print issue as well as the digital edition) to see what new offerings we have for you this month, from an update on the state of AM broadcasting and the FCC's efforts to "fix" it to an interview with a pirate broadcaster who regularly runs for President! The best of all four of our magazines is now combined into one—this one!

For our print readers, nothing will change. You will be getting the same *CQ* you've always gotten, with the same great features and columns you've come to expect. Digital subscribers will get both the print content and *CQ Plus* in a seamless, expanded, digital edition. Subscribers to *Pop'Comm, WRO* and *CQ VHF* have had their subscriptions transferred to *CQ*, with specifics based on the type of subscription they've had (print or digital) and the value of the remaining issues. Questions should be directed to our circulation department at <circulation@cq-amateur-radio.com> or 1-800-853-9797.

Yes, there is also an economic component at play here. First of all—as we've said here before—even though ham radio is growing at a nice pace, we're not seeing those increased licensing numbers translating into growth in radio clubs, ARRL membership or *CQ* readership. All of these are stable, but not keeping pace with growth in the number of licensees. Beyond amateur radio, the number of shortwave broadcast stations on the air is steadily shrinking, as cash-strapped governments decide they can effectively communicate with the rest of the world via the Internet and satellite, and without needing to maintain and operate expensive radio transmitter sites. Scanning options are shrinking as well, as more public safety agencies encrypt their (now mostly-digital) communications in the name of added security.

The bottom line for us is that *CQ* has been subsidizing *Pop'Comm, WRO* and *CQ VHF*. We can't continue to do that. Add in the glacial pace of the overall economic recovery and this has resulted in the delivery delays of both print and digital editions that have frustrated us as much as they have frustrated all of you. We are looking forward to a bigger, better, more comprehensive, *CQ* bringing us greater stability while continuing to serve our loyal readers throughout the radio hobby. We greatly appreciate your patience and your support as we have navigated these choppy waters, and we welcome the readers of *Pop'Comm, WRO* and *CQ VHF* to the pages of *CQ* and *CQ-Plus.* And speaking of which…

QRP Special

This month's issue is our annual **QRP Special**. We're focusing this year on the wide variety of ham radio activities that fall under the low-power umbrella, from operating QRP during lunch to using digital modes that copy signals you can't even hear! Of course, we've got non-QRP articles as well, from N2IRZ's column on how to build an inexpensive software-defined receiver to N2GA's fascinating suggestion that we try to make contesting a spectator sport as well as a participation sport.

A Sad Note

It is with great sadness that we pass along the news that former *CQ* Editor and CQ Amateur Radio Hall of Fame member Arne Trossman, W4EIP (ex-W2DTJ), became a Silent Key in November. In addition to his time at *CQ* (1960–64), Arne helped develop the Cosmophone, an early amateur SSB transceiver.

On a personal level, Arne was one of my first ham radio "Elmers" or mentors. I grew up a couple of towns away from Arne and he was my Radio Merit Badge counselor when I was a Boy Scout. I still remember going down to his basement ham shack and workbench, where he taught me to solder and helped me learn Morse code. It wasn't until many years later that we made the connection, realizing it was his work with a kid trying to earn a merit badge that set me on the path to eventually become his successor in the *CQ* editor's chair. 73, Tross. We'll miss you.

73, Rich, W2VU

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announcements

RICHMOND, VIRGINIA – Richmond Amateur Telecommunications Society (RATS) Frostfest 2014, Saturday, February 1 at the Richmond Raceway Complex. Contact: RATS/Frostfest, P.O. Box 14828, Richmond, VA 23221-0828. Commercial booth sales: Mike Hacket, AC5PT, (804) 657-7038. Website: <http://www.frostfest.com>.

ELYRIA, OHIO – Northern Ohio Amateur Radio Society Winter Hamfest & Computer Show 2014, Sunday, February 2 at the VFW Post 1079. Contact: Darlene, KA8VTS, (216) 398-8858. E-mail: <dohman@roadrunner.com>. Website: <http://www.noars.net>. (Talk-in 146.70– [PL 110.9])

WASHINGTON, PENNSYLVANIA – Washington Amateur Communications special event station W3C from 1400 to 1600 UTC daily, Wednesday, February 5 through Sunday, February 10. For a complete list of frequencies and photos visit <http://www.wacomarc.org>. Contact: Bill Steffey, NY9H, (224) 436-4262. E-mail: <ny9h@arrl.net>.

BRIGHTON, COLORADO – Aurora Repeater Association, The Cherry Creek Young Amateur Radio Club, and Rocky Mountain Ham Radio Swapfest, Sunday, February 9 at the Adams County Fairgrounds. Contact: ARA, P.O. Box 471802, Aurora, CO 80047-1802. Wayne Heinen, NØPOH, (303) 699-6335. E-mail: <n0poh@arrl.net>. Website: <http://n0ara.org>.

YUMA, ARIZONA – Yuma Amateur Radio Hamfest Organization and the Amateur Radio Council of Arizona 10th Annual Yuma Hamfest, Friday, February 14 and Saturday, February 15 at the Yuma County Fairgrounds. Contact: YARHO, P.O. Box 1843, Yuma, AZ 85366-1843. E-mail: <info@yumahamfest.org>. Website: <http://www.yumahamfest.org>. (Talk-in 146.840– [PL 88.5])

B**ROOKFIELD, WISCONSIN – Milwaukee Radio Amateur's Club and the Milwaukee Area Amateur Radio Society Mid-Winter Interclub Swapfest**, Saturday, February 15 at the Channel 10 Auction Building. Contact: MRAC, P.O. Box 26233, Milwaukee, WI 53226. Phone: (414) 459-9741. E-mail: <w9rh@arrl.net>. Website: <http://www.w9rh.org>.

GLOUCHESTER CITY, NEW JERSEY – Glouchester City Amateur Radio Club Hamfest, Saturday, February 15 at the Pine Grove Fire Association Hall. Website: <http://www.nj2gc.org>. (Talk-in 146.820 [PL 131.8] or 447.775 [PL 146.2].

OAK HILL, WEST VIRGINIA – Plateau Amateur Radio Association Hamfest, Saturday, February 15 at the Lewis Community Center. Contact: PARA Hamfest, P.O. Box 96, Fayetteville, WV 25840. General contact: Jane Hardy, WV8JH, (304) 640-1120. E-mail: <wv8jh@frontier.com>. Charlie Hardy, WV8CH, (304) 719-2241. E-mail: <wv8ch@arrl.net>. (Talk-in 146.790 [PL 100])

SALEM, OREGON – **Salem Repeater Association Salem Hamfair**, Saturday, February 15 at the Polk County Fairgrounds. Contact: Wayne Silver, KE7ANM, (971) 599-1270. E-mail: <hamfair@w7sra.org>. Website: <http://www.w7sra.org>. (Talk-in 145.33– [PL 186.2])

LIVONIA, MICHIGAN – Livonia Amateur Radio Club Swap-N-Shop, Sunday, February 16 at the Civic Park Senior Center. Contact: Livonia ARC, P.O. Box 51532, Livonia MI 48151-0532. Phone: (734) 941-5043. E-mail: <k8uns@arrl.net>. Website: <http://www.livoniaarc.com>. (Talk-in 145.35 [PL 100] or 146.52)

MANSFIELD, OHIO – Intercity Amateur Radio Club, Inc. MidWinter Hamfest & Computer Show, Sunday, February 16 at the Richland County Fairgrounds. Contact: Danny Bailey, KB8STK, 70 Euclid Street, Shiloh, OH 44878. Phone: (419) 896-3603 (after 3 p.m.). Website: <http://www.w8we.org>. (Talk-in 146.94 [PL 71.9])

NEW PROVIDENCE, NEW JERSEY – New Providence Amateur Radio Club Annual Auction, Friday, February 21 at the New Providence High School. Contact: Barry, K2JV, <bgcohenusa@verizon.net>. Website: <http://www.nparc.org>. (Talk-in 147.225+ [PL 141.3])

BISMARK, NORTH DAKOTA – Central Dakota Amateur Radio Club Hamfest, Saturday, February 22 at the St. Mary's Grade School. Contact: Dick Veal, KAØETO, (701) 223-7481. E-mail: <georgev@bis.midco.net>.

BROWNSBURG, INDIANA – Hendricks County Amateur Radios Society Brownsburg Hamfest, Saturday, February 22 at the American Legion Post 331. E-mail: <hcars46122@gmail.com>. (Talk-in 147.015+)

DALTON, GEORGIA – Dalton Amateur Radio Club Inc. Dalton Hamfest, Saturday, February 22 at the North Georgia Fairgrounds. Contact: DARCI, P.O. Box 211, Dalton, GA 30722-0211. Vendor contact: James Jordan, K4FLG, (706) 278-0630 or David Stanley, WI4L, (706) 537-5090. Website: <http://www.w4drc.com>. (Talk-in 145.230–)

GEORGE, WASHINGTON – Columbia Basin DX Club, WS7G, special event station from 0001 UTC, Saturday, February 22 to 0001 UTC, Sunday, February 23. Frequencies include 14.250, 18.135, and 3.850 ±QRM. QSL via W7BJN. Website: <http://cbn.homestead.com/WS7G.html>.

LaPORTE, INDIANA – LaPorte County Amateur Radio Club Cabin Fever Hamfest, Saturday, February 22 at the LaPorte Civic Auditorium. Contact: LPCARC, P.O. Box 148, Michigan City, IN 46361. E-mail: <cabinfeverhamfest@gmail.com>. Website: <http://lpcarc.org/hamfest>. (Talk-in 146.610 [PL 131.8])

PERRY, IOWA – Hiawatha Amateur Radio Club WinteRFest, Saturday, February 22 at the Crossroads Church. Contact: Bob Dittert, (515) 465-2383. E-mail: <n0qix@arrl.net>. Vendor e-mail: <hamfest@harciowa.org>. Website: <http://www.harciowa.org>. (Talk-in 145.190 [PL 114.8])

SOUTH BURLINGTON, VERMONT – Radio Amateurs of Northern Vermont HAM-CON, Saturday, February 22 at the Holiday Inn Convention Center. **Special event station, W1V** will be on the air during HAM-CON. Contact: RANV, (802) 879-6589 afternoon and evenings. Email: <w1sj@arrl.net>. Website: <http://www.ranv.org>. (Talk-in 145.15– or 146.67)

ANNANDALE, VIRGINIA – Vienna Wireless Society Winterfest,The National Capital Area Ham Radio Fair, Sunday, February 23 at the Northern Virginia Community College-Annandale Campus. Contact: Vienna Wireless Society, P.O. Box 418, Vienna, VA 22183. General contact: Jack, AI4SV, (314) 266-8426. Email: <winterfest2014@viennawireless.org>. Vendor contact: Doug, AK4AO, (703) 698-6158. E-mail: <tablesales2014@viennawireless.org>. Website: <http:// www.viennawireless.org>.

CASTLE SHANNON, PENNSYLVANIA - Wireless Association of South Hills WASHfest 2014, Sunday, February 23 at the Castle Shannon VFW Memorial Hall. Contact: Carol Danko, KB3GMN, (412) 884-1466. E-mail: <n3sbf@comcast.net> or <washarc@yahoo.com>. Website: <http://www.n3sh.org>. (Talk-in 146.995– or 443.650+ [PL 131.8])

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Welcome Once Again to the Fun World of QRP Operating!

BY CAM HARTFORD,* N6GA

Hello, and welcome to *CQ*'s third annual QRP Special edition! The first QRP Special was published in April 2012, the second in March 2013, and this year we find ourselves in February 2014. Management at *CQ* Central deemed the forward creep of one month a year a necessity to accommodate scheduling changes in contest reporting . I suspect that it's something entirely different—that it's really the pressure of the QRP world wanting to make itself known. As I noted two years ago, there are QRP contesters, DXers, SSBers, digi-ops, home-

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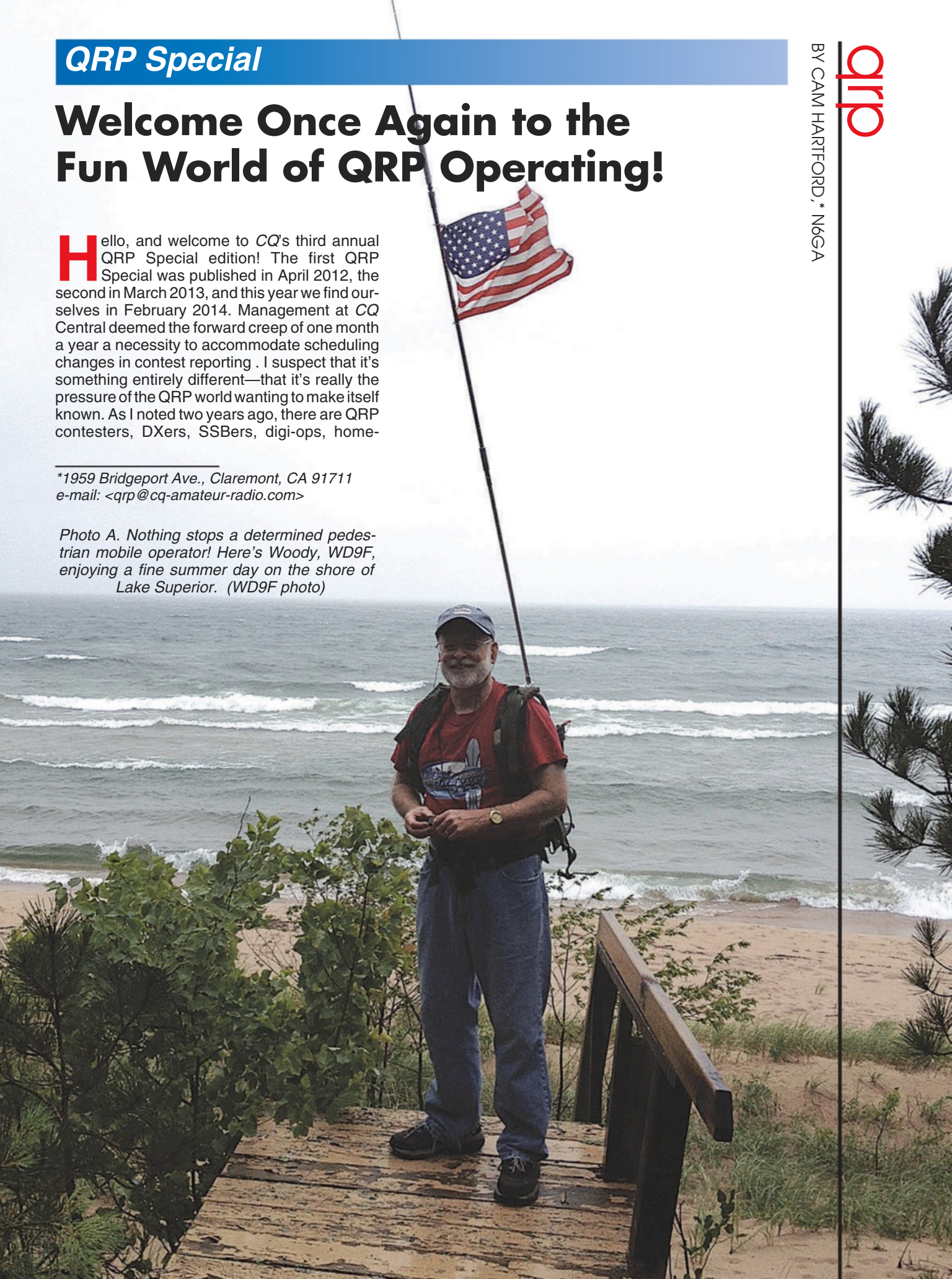

Photo A. Nothing stops a determined pedestrian mobile operator! Here's Woody, WD9F, enjoying a fine summer day on the shore of Lake Superior. (WD9F photo)

brewers, kit-builders, to-the-fielders, SOTAers, park-bench operators, fox chasers, net QNIers, and ragchewers. Oh yes, don't forget the pedestrian mobile ops. Read on!

Walkin' and Talkin'

I recently received this report from Woody Hester, WD9F (photo A). It seems Woody was bitten by the pedestrian mobile bug, and after an initial shakedown cruise has been stepping out in fine P/M style. Here's Woody's account:

Photo B. WD9F's p/m rig. (WD9F photo)

"After hearing Ed Breneiser's (WA3WSJ) excellent presentation on QRP pedestrian mobile operation at Four Days in May 2012, and having worked the amazing 'Father of /pm operation,' Paul Signorelli, WØRW, operating pedestrian mobile in three different states (Colorado, Florida, and Texas) over the last few years, I just had to give this QRP/pm thing a go.

"I bought a like new ALICE Pack frame on eBay, an antenna mirror mount at a truck stop near my home, and then began attaching the needed items to the pack frame to make up my /pm station (see photo B). What did we ever do without bungie cords?"

Fortunately, Woody has graduated to a hybrid mounting system which incorporates both bungie cords and zip ties. I'm not a big fan of bungies, having seen too many accidents where bungies sprung when it was least convenient, but at least in this case there's nothing more at risk than a few radio bits.

Woody continues: "I ended up using an MFJ 9020 transceiver for 5 watts on 20 meters, a 5-amp/hour SLA battery, an LDG auto tuner, and my Palm mini paddles. For my antenna, I attached a Hustler mobile antenna with a 20-meter resonator and included a 14-foot drag wire (24-gauge black silky from The Wireman). Total height is right at 12 feet.

"My first outing started in my Central Illinois backyard. ... I then proceeded out onto the nearby Sangamon Valley Bike Trail, and in about an hour of walking, I netted five solid QSOs. Tom, KM4CU, in Jax, Florida gave me a 559; Jean, VE2JCW, near Montreal gave me a 579; John, KN5L, in Austin, TX a 539; Michel, VE2TH, in Quebec running a new KX3 a 559; and Christian,VE1/F8BMG, running an IOTA station in the St. Lawrence a 579."

Wow, nice run of contacts for a first outing! It's hard to believe that a person can reach that diverse a crowd with such a small antenna and low power, but as Dave Ingram, K4TWJ (SK), used to say, "QRP Rocks!"

Here's a little more detail on Woody's /pm setup: "It's all built on an "ALICE Pack" frame. 'Alice' stands for 'all-purpose lightweight individual carrying equipment'. It's the pack frame that was adopted by the U.S. Army as the new standard in 1972 or so. It's made out of aluminum, it's strong, and it really is light weight. The pack frame can be had on eBay almost any day for around $20 plus shipping. I also bought two optional aluminum shelves specifically designed for the ALICE frame. They

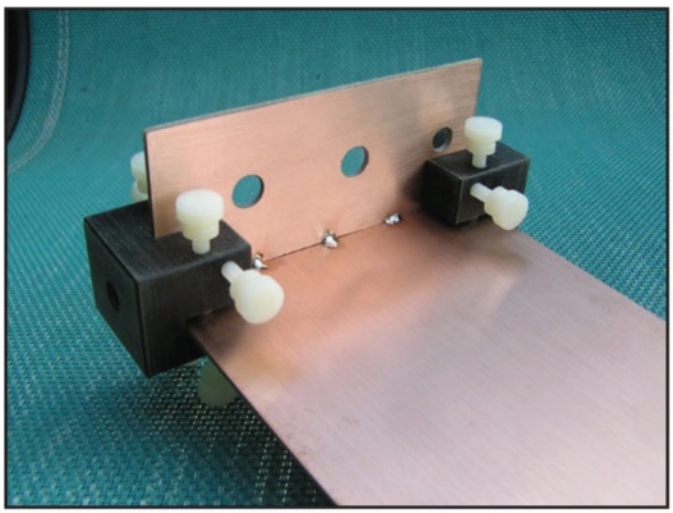

Photo C. A pair of SBSSs from QRPme hold this front panel in place while it's being soldered to the cabinet bottom.

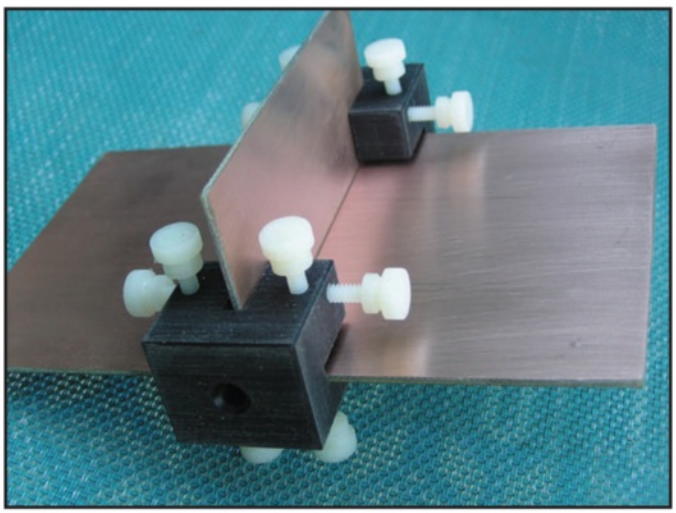

Photo D. Here the SBSSs are holding an interior shield in place for soldering.

were about $10 each on eBay and they really make it easy to attach things. ... Things I've learned on the trail are that I can always make contact with someone. Getting up high helps, too. We have a small hill (no mountains here in the flatlands) about a mile away, and when I get up on that it helps. The noise level drops way down when I get away from civilization and I hear very weak signals I don't normally hear. People watch me closely. Some ask what I'm doing, but most don't. They just give me a wide berth and keep moving. I always smile real big and give them a thumbs up. I do have to watch for overhead objects/tree branches, I carry a couple of extra drag lines in case one gets pulled off and I don't notice, and my earbuds and palm mini paddles are just perfect for this application."

This past summer Woody and his wife traveled to the southern shore of Lake Superior. "Yep, I took my pedestrian mobile gear along and spent several enjoyable hours hiking along the beach. The included picture was taken on a cold and windy day with light rain blowing horizontally down the beach. I still made several contacts. Highlights of my trip were two /pm to /pm contacts. One with Paul Signorelli, WØRW, who was /pm in Colorado; and Ed Breneiser, WA3WSJ, another widely acclaimed and accomplished /pm op who was pedestrian mobile on Pikes Peak. Ed had gone to Colorado from his home in Reading, PA to see the sights, operate pedestrian mobile, and visit Paul Signorelli. ... These contacts weren't planned. They took place on different days and just happened. I was thrilled. Paul had a great 589 signal from me, gave me a 559, and Ed and I were 559 to each other, all on 20 meters. That's my workhorse band for /pm. It's always open to somewhere. There's always someone around the QRP/SOTA watering holes, and my /pm antenna really likes it. I also worked Steve Galchutt, WGØAT, of Rooster and Peanut fame. Steve was at home in Colorado trying out his brand new ATS 4."

It sounds like Woody is now a true convert to world of QRP/pedestrian mobile. If you hear him around 14060, be sure to give him a call. He's probably out on the trail, ducking low-hanging trees and making QRP Qs!

Passing the Torch in the Northeast

A visit to the Small Wonder Labs website <http://www.smallwonderlabs.com/> yields a farewell message from Dave Benson, K1SWL, proprietor. It's not really a surprise, as Dave has been busy building his retirement home in the woods of New Hampshire while slowly reducing his involvement in kit production. Over the past 20 or so years the QRP community has benefited greatly from Dave's offerings. In this shack alone I can lay my hands on several SWL kits, including an early 2-board 20-meter transceiver that appeared in the *ARCI QRP Quarterly* from January 1993, an NN1G 20-20, a 20-meter DSW, a Warbler, a White Mountain SSB rig, and a couple of Rockmites. I even

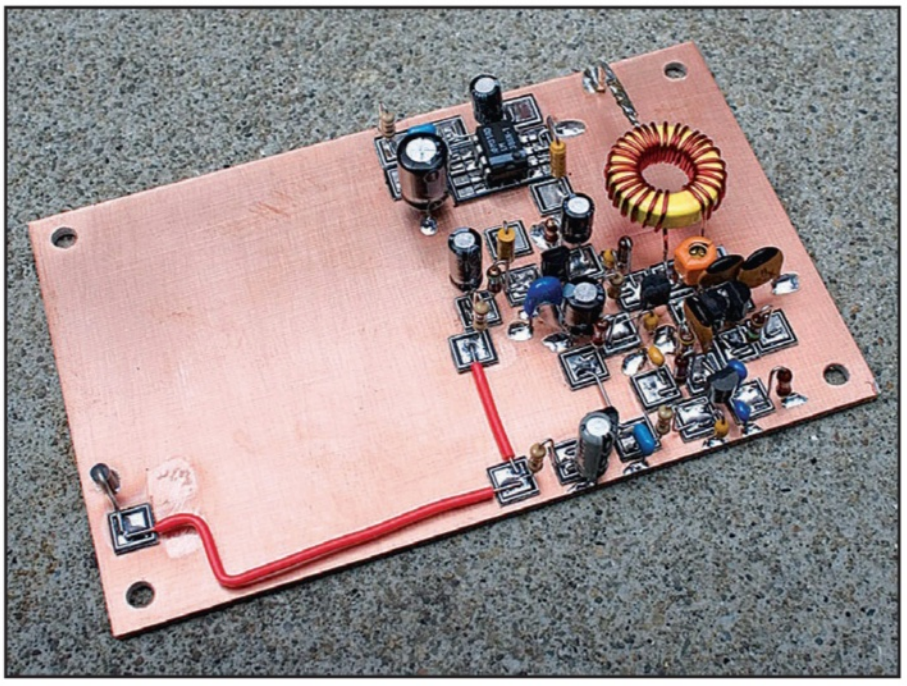

Photo E. Dave, AA7EE, used both MePADs and MeSQUAREs in this Manhattan project. Along the top edge of the board is an LM-386 soldered to a MePAD designed for an 8-pin IC. (AA7EE photo)

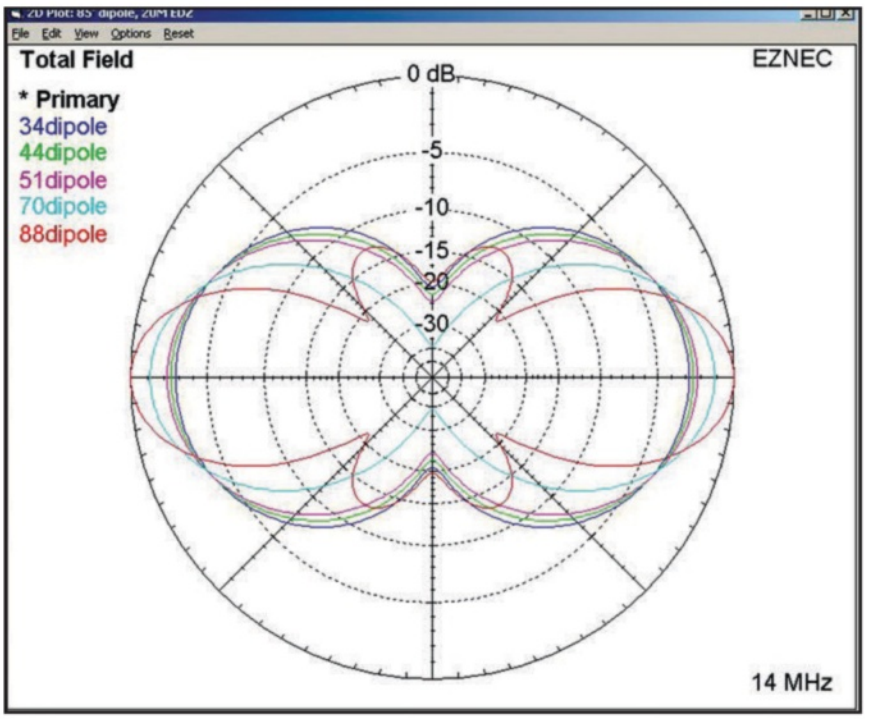

Fig. 1. EZNEC plots of several lengths of dipoles, all at 60 feet elevation and driven at 14 MHz.

have an 80-meter transceiver that I built from scratch from an article Dave published in the October 1991 issue of the *QRP Quarterly*. Thus, I hate to see Dave go. We all benefited greatly from his kits and support over the years, but he deserves a well-earned rest.

But wait! A little bit of Small Wonder Labs lives on! Rex Harper, W1REX, of QRPme (http://www.qrpme.com), the Tuna Tin place, has picked up the RockMite design and will continue to sell the very popular little rig. According to Rex: "The Small Wonder Labs RockMite design grew out of K1SWL's desire to offer a one-evening CW transceiver kit that would be both affordable and easy to construct. ... It appeared in *QST* magazine in 2003, and since then, it's been wildly successful. Approximately 8000 of these have been fielded so far!" Rex and Chuck Carpenter, W5USJ, have done some updating to the design, including bringing it up to current FCC requirements for harmonic suppression.

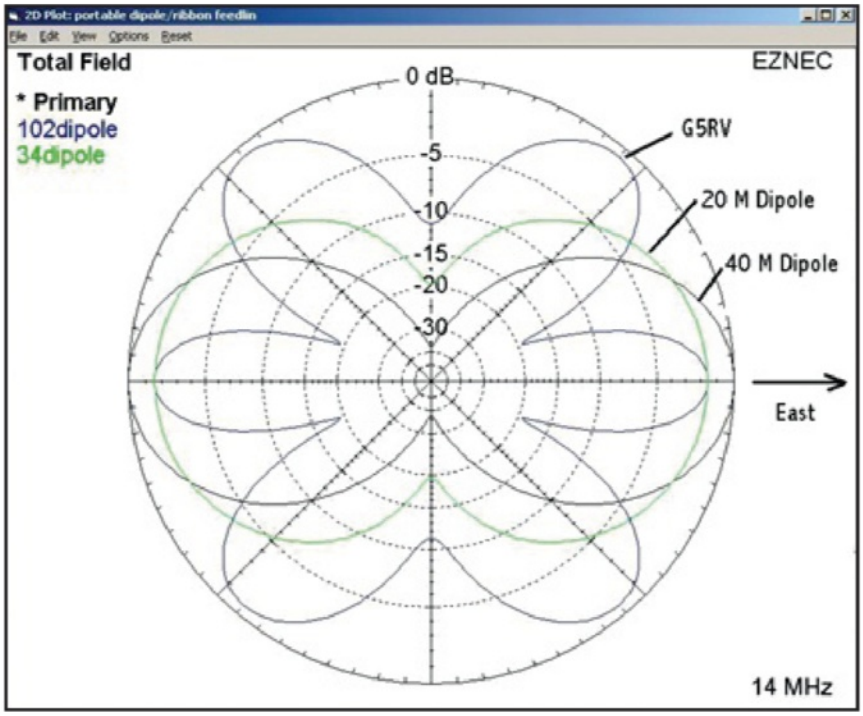

Fig. 2. Plots of a G5RV, 20- and 40-meter dipoles. Notice the difference between the lobes of the G5RV and the 40-meter dipole in the direction of interest.

More QRPme Bits

I was wandering around Rex's website and came across something I'd never seen before. They are called the "SBSS" which stands for—oh, I don't really know—maybe Solder Bot Square Something. Anyway, I saw these and immediate administered myself a thump on the forehead. Brilliant idea! Why didn't I think of that? There are lots of reasons which we won't waste time discussing here. Photo C shows a pair of the little things holding together a couple of pieces of PC board material ready for soldering. They hold the pieces at right angles so you can concentrate on doing the soldering ,and, hopefully, your chances of coming up with a straight, square enclosure for your next project will be greatly enhanced. You can also use them for making Tee joints, as in photo D, if you have the need to place a shield somewhere inside the box.

Also worth checking out are Rex's MePADS and MeSQUARES. (See photo E.) These little bits are made for the homebrew enthusiasts who favor the Manhattan style of construction. The sheet of Squares snap apart into hundreds of pre-tinned pads that you only have to glue down. Also, each Pads sheet consists of 28 pre-etched IC pads that you can snap apart and glue down. As Rex says, "They make it 'wicked easy' to mount both DIP and SOIC integrated circuits in your project." Photo E is an in-process shot taken by Dave Edwards, AA7EE, of a regenerative receiver he was making with the use of MePADS and MeSQUARES. Check out <http://aa7ee.wordpress.com/2011/07/24/the-wbr-a-simple-high-performance-regen-receiver-for-40m-by-n1byt> for an in-depth look at this homebrew project!

A Tale of Two Dipoles

Last September a couple teams of QRPers assembled with the intent of competing with the big boys in the CW Ops Open. The CW Ops run a couple of short sprints each month as well as an annual competition called the Open. You can find all the info about this organization at <http://www.cwops.org/>. Hank Greeb, N8XX, rallied the troops for this venture, and I have to say, fielding a team of Davids to take on the Goliaths is a bunch of fun. We never hurl a big enough rock to do serious damage, but we do place well enough to show what QRP can do.

What distinguishes this contest from many others is that there is an effort to include CW ops from around the world. Total operating time is 12 hours, but that is broken up into three 4-hour sessions timed for good propagation in Europe, Asia, and the Americas. For those of us in the Pacific time zone that means session One is from 5 to 9 PM Friday evening, session Two is from 5 to 9 AM Saturday morning, and session Three is from 1 to 5 PM Saturday afternoon. Taking into account the oddball session times and the fact that some local noise source had been making life very miserable at my home QTH, I made the decision to flee to the local mountains and do a portable setup. There might be fewer honey-do's up there, too.

This would be like a mini Field Day but without the crack team of experienced antenna erectors. I'd have to do this on my own, limiting me to fairly simple antennas. A 120-foot tower with stacked Yagis would be an excellent choice, but not this time. It was looking like I'd have to fall back on that dependable workhorse of antennas, the dipole.

From southern California most of the country is centered around an azimuth of 75 degrees, Europe is about 30 degrees and JA is at about 320. However, the sunspots had been puny in the days leading up to this contest and the outlook for DX was rather dim so I chose to optimize the antennas for in-country use. I could put up two, one aimed across the country and another aimed north-south so as to pick up the western states.

The next question facing me was exactly what dipole to use. Twenty meters would be the bread-and-butter band, but after dark 40 and even 80 came into play. There also could be some action on 15 meters, complicating the decision.

I lined up the usual suspects, which

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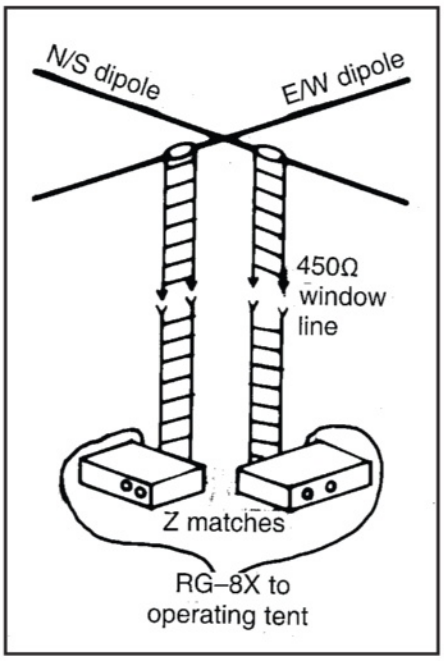

Fig. 3. Layout of the David vs. Goliath antenna farm.

were, from smallest to largest, 34 feet, 44 feet, 51 feet, 70 feet, 88 feet, and 102 feet. The smallest one is a 20-meter dipole, which would work fine for 20 and 15 but not for the lower bands. The 44 is known as a "Half 88." I believe L. B. Cebik popularized these sizes as usable for multi-band dipoles when fed with ladder line. The 51-footer is known as a "Half G5RV" for obvious reasons. The 70-foot antenna is a 40-meter half-wave dipole. The 88 foot antenna is, coincidentally, an Extended Double Zepp on 20 meters.

Fig. 1 is a composite of the radiation patterns of each one of these antennas on 14 MHz, all at a height of 60 feet. I've left off the G5RV for the sake of clarity. The 34-foot antenna shows the classic pattern of a half-wave dipole. As we lengthen the wire, two things happen: The gain in the lobe increases, while the width of the lobe, or its beamwidth, decreases. From the 34- to the 44- to the 51-foot dipole you can see a slight lengthening of the lobe (increasing gain), while at the same time the beamwidth narrows slightly. There's not a lot to choose from amongst these three antennas, as the gains are all within 1 dB of each other. There's a noticeable jump when we go to the 40-meter dipole, however, at 70 feet in length. Here the gain over the 20-meter dipole is about 1.6 dB and the beamwidth is noticeably narrower.

Referring back to fig. 1, the 88-foot antenna also shows a substantial jump in the gain, but once again at the expense of beamwidth. The Extended Double Zepp is a significant length for a dipole, because at 1.25 wavelengths, it's the longest dipole that exhibits its maximum directivity broadside to the wire. Any longer and the main lobes start to shrink and the little side lobes grow, spreading your power in many points around the compass.

The G5RV, at 102 feet, would have been a good antenna for 40 and 80 meters, but on 20 meters the main broadside lobe has shrunk to a skinny little thing. See the plots in fig. 2. This shows the G5RV, 20- and 40-meter dipole plots. On 20 meters, there's lots more signal headed across the country using the 40 meter dipole. However, I noticed something interesting about this antenna. The two biggest lobes are at about 40 degrees either side of the axis of the wire, meaning that if I needed to head for the hills for a DX contest I could conceivably put up a G5RV with the wire on a north-south axis and the big lobes pointed at Europe and Asia. Food for thought.

In the end, I chose to use the 40-meter dipoles. At 70 feet long this antenna is resonant on 40 meters and has some gain and directivity on 20 meters. The EDZ would have had more gain but at the expense of beamwidth. Additionally, on 15 meters at 88 feet of length the major lobes split to form an almost

perfect clover leaf, aiming a nice deep null across the country. It's never helpful to have your antenna aimed at every place but where the potential contacts are! Even the 40-meter dipole scatters the 15-meter signal around, but with two antennas at right angles I was able to get a lobe aimed sufficiently well to snag plenty of 15-meter Qs.

Having the two dipoles set at right angles covered the country pretty well. The patterns of the antennas overlapped somewhere in the direction of the Dakotas on both 40 and 20 meters. Switching between the two with the A/B antenna switch confirmed this. Mother Nature was thoughtful with her tree placement, so I was able to get the antennas up within about two degrees of perpendicular. This is necessary to minimize coupling between the antennas and hence skewing of the patterns. I fed both antennas with 450-ohm window line down to ground level, where I had a pair of homebrew Z-match tuners, and from there ran coax into the operating tent. Here the two coaxes went into the A/B antenna switch.

With this setup I had 40, 20, and 15 covered pretty well, but not 80 meters, and 80 would provide plenty of Qs if there were an easy way to incorporate it. The problem with running 80 meters on a 40-meter dipole is one of efficiency. The 40-meter dipole will radiate a signal on 80 meters, but the feedpoint impedance is highly reactive with a low resistive component. This will result in substantial feedline loss, even if you are using ladder line. Recommended reading on the subject is this page from the W8JI website at <http://www.w8ji.com/short_dipoles_and_problems.htm>. Modeling the 40-meter dipole on 80 meters in EZNEC shows a feedpoint impedance of 14.6 – j1110 ohms. Using the VK1OD transmission line loss calculator referenced by W8JI <http://vk1od.net/calc/tl/tllc.php>, we find the loss on the line to be 5.5 dB. Add to that another dB or so of loss in the tuner and the 5 watts coming out of your transmitter shrinks to 1 watt by the time it reaches your antenna.

What to do? I cut two pieces of wire 20 feet long. On each one I soldered a big alligator clip to one end and tied a 10-ounce fishing sinker on the other. When it came time on Friday night to change bands to 80 meters, I dropped one of the dipoles and clipped one of the wires to each end; the resulting antenna looking like an upside-down U. The resulting antenna was 110 feet long, so the feedline loss was substantially less. Something closer to four watts was actually making it to the feedpoint. Unfortunately, I hadn't visualized making this change after dark so things didn't work exactly as planned. When I hauled the antenna back up after clipping on the end wires, one end got tangled in an antenna-eating tree and all operations stopped for a good half hour of yanking and swearing by the puny beam of a flashlight. I got back on the air with 7 minutes left in the session and had a total of three 80-meter QSOs to show for it. *Note to self:* Visualize things better!

There were lots of lessons learned in this venture. The 40-meter dipoles worked well for the bands and the directions I wanted to cover. The 80-meter extensions would have served well but for what we'll call "cockpit problems." Most importantly, a high dipole can be a very effective antenna and shouldn't be overlooked if you are going out on a Goliath-slaying venture! (See fig. 3.)

Sign-Off

Thanks for riding along on this QRP adventure. Fun as it may be, nothing beats the real thrill of getting on the air and doing it yourself! 72/73, Cam N6GA

No time to get on the air? Consider W2LJ's approach to squeezing some quality QRP DXing into his busy day.

QRP à la Carte

BY LARRY MAKOSKI,* W2LJ

For those of us still actively participating in the workforce, it's a common tale of woe: Between full-time employment (in some cases, more than one job), kids' activities, civic or church responsibilities, home improvement tasks, house chores, etc., what time is left for amateur radio? By the time I get home from work, eat dinner, walk the dog, and do whatever other chore I have in front of me, I'm ready for bed ... not the shack! Weekends can be even worse with the myriad of home-improvement projects and yardwork tasks that seem to never end. What's an avid QRPer to do?

Fortunately, I have an hour thrust upon me each day which provides a little "off" time. That hour, otherwise known as lunchtime, has become a golden opportunity for getting in some QRP time. Instead of sitting in the cafeteria, or at my desk with a sandwich while absentmindedly gazing at YouTube, you will find me on the air, either scanning the bands or pounding out a CQ.

Quick Setup and Teardown

The key to successful lunchtime QRP operation is quick setup, easy-to-operate equipment, and quick disassembly when you're done. You don't want to spend your time fussing with equipment while you could be making contacts. If your setup is a permanently mounted mobile HF rig, that's all the better. Hopefully, you can turn your power output down to 5 watts and take off running. However, if you just tote along some QRP gear in a backpack like I do, then there are some considerations that must be made.

The first major consideration: From where will you operate? Your options may or may not be limited. If you're fortunate enough to work very close to a public park, this can be a perfect place to set up (photo A). At my last job, I had a park only five minutes away. I was able to get there, set up, and operate within a very reasonable amount of time (photo B). Others are not so lucky. In this case, you may want to consider just going out to your car in the company parking lot and setting up from there (photo C). Your circumstances will dictate your setup.

Antenna Choices

The next consideration is what to use for an antenna. While it has to be a com-

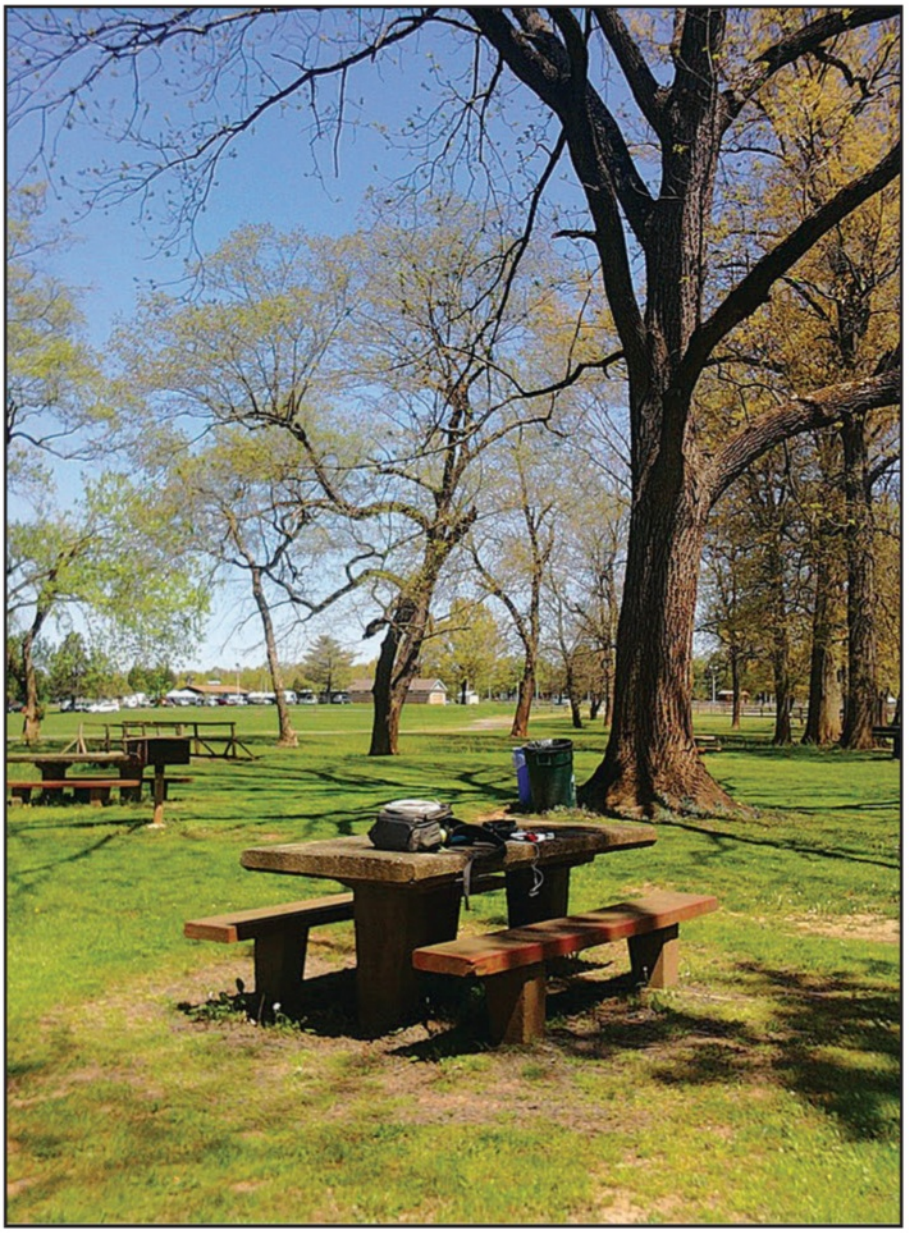

Photo A. A picnic table can make an ideal lunchtime operating position, if you're lucky enough to work near a public park. (Photos by the author)

*e-mail: <w2ljqrp@gmail.com>

Photo B. No picnic table? Try operating from your car. In this photo, we see a quick-setup antenna supported by a mast with a baseplate that sits underneath a tire.

promise for quick setup for a short portable operation, you do want it to be somewhat efficient. There's no fun in trying to make contacts while sending your 5 watts into a dummy load. Over the years, I have tried many different solutions. Your chosen operating location will influence your choices. Operating from a picnic table in a park will give you more options. Remembering that limited lunchtime is a factor, you may want to just heave an end-fed wire up into a tree. An end-fed such as the commercial PAR ENDFEDZ or a home-made end-fed using a 31-foot length of wire to a 9:1 UNUN is perfect for this type of operation. I have also put up an end-fed where no trees were available by using a 31-foot Jackite pole as a temporary mast.

If your operations are going to be confined to a parking lot, your options are probably going to be more limited, but in no way does this mean you cannot be successful. I used Hamsticks on a mag-mount for years and was somewhat successful.

Just this past year, I was turned onto an even better solution by my good friend Bob Reisenweber, W3BBO. We both own Buddisticks. I had always used mine in the conventional manner, attaching it to a tripod or painter's pole, unwinding the counterpoise wire and going from there. Bob suggested a different approach. He was living in an apartment at the time and was limited to working from his car. He took

Photo C. Can't get away to a park to operate? Your company's parking lot might be an effective spot from which to operate, especially if you have a roof-mounted antenna.

Photo D. A Buddistick attached to a heavy-duty magnet mount can be a very effective antenna that's quick to set up and tear down. Also, no counterpoise is needed as long as your vehicle has a metal roof.

his Buddistick to his car in the lot and attached it to his car's mobile antenna mount (photo D). I tried it and had great success! Not only is it a quick and easy setup and tear-down, but by its very nature, the Buddistick is oriented towards multiband operation. Changing a tap on a coil when changing bands is so much easier than changing individual resonators, and the car provides a very nice ground plane for the antenna. No counterpoise wire is needed with this set up.

Selecting a Rig

As far as rig choice goes, there are many available to you as a QRPer. Just about any of the commercially offered QRP rigs, or any of those offered as kits, can be operated from the field quite easily. Toss one in a case, along with a key or microphone and a battery, and you are good to go. My weapon of choice is the Elecraft KX3. I use a Whiterook single-lever paddle, some earbuds, and a small 9800 mAH lithium-ion battery. It makes for a perfect portable station, light and easy to carry in a Lowepro 150 travel case (photo E).

The results have been fantastic! I can get into my car, break out my KX3, set up the Buddistick, and be on the air within mere minutes. For 40 meters, I don't tap the Buddistick's coil. For 20, 17, 15, 12, and 10 meters, I have found one tap position that allows the KX3's internal tuner to work effortlessly with the Buddistick.

Since last April, I have over 160 QSOs with this setup, making CW contacts using 5 watts or less with 48 different DX entities, 19 states, and 5 SOTA (Summits on the Air) peaks.

Photo E. The author's lunchtime-portable QRP station, built around his Elecraft KX-3 transceiver.

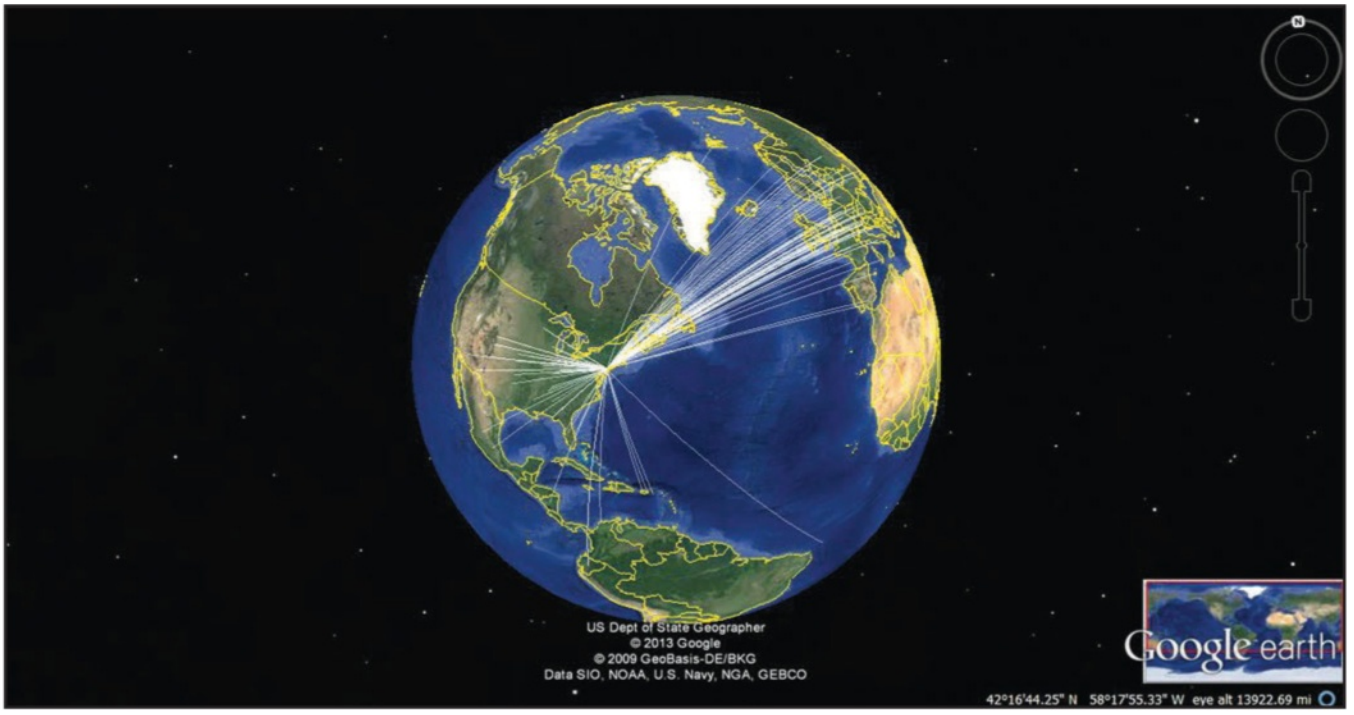

Photo F. A Ham Radio Deluxe overlay of W2LJ's 2013 lunchtime contact paths on a Google Earth® map. This view shows the contacts from a western hemisphere perspective.

Contacts are routinely made with stations 6,000 and 7,000 miles away, easily achieving the 1,000-mile-per-watt category. My most distant contact so far has been with R6YY at the eastern edge of European Russia at 8,522 miles. Photos F and G are screen-shots from my computer showing contact paths overlaid on Google Earth® maps by Ham Radio Deluxe.

Staying Sane

Even though lunchtime is limited, you can make a lot of contacts and more importantly you can have a lot of fun. I sometimes kid with my ham friends that if it weren't for lunchtime, I'd never get on the air at all. This hour has been my salvation. It supplies my daily needed fix of QRP, it breaks up my day, and it helps keep me sane. If you are in the same situation that I am, you should give this a try. You'll be glad you did and you just might be amazed by your results.

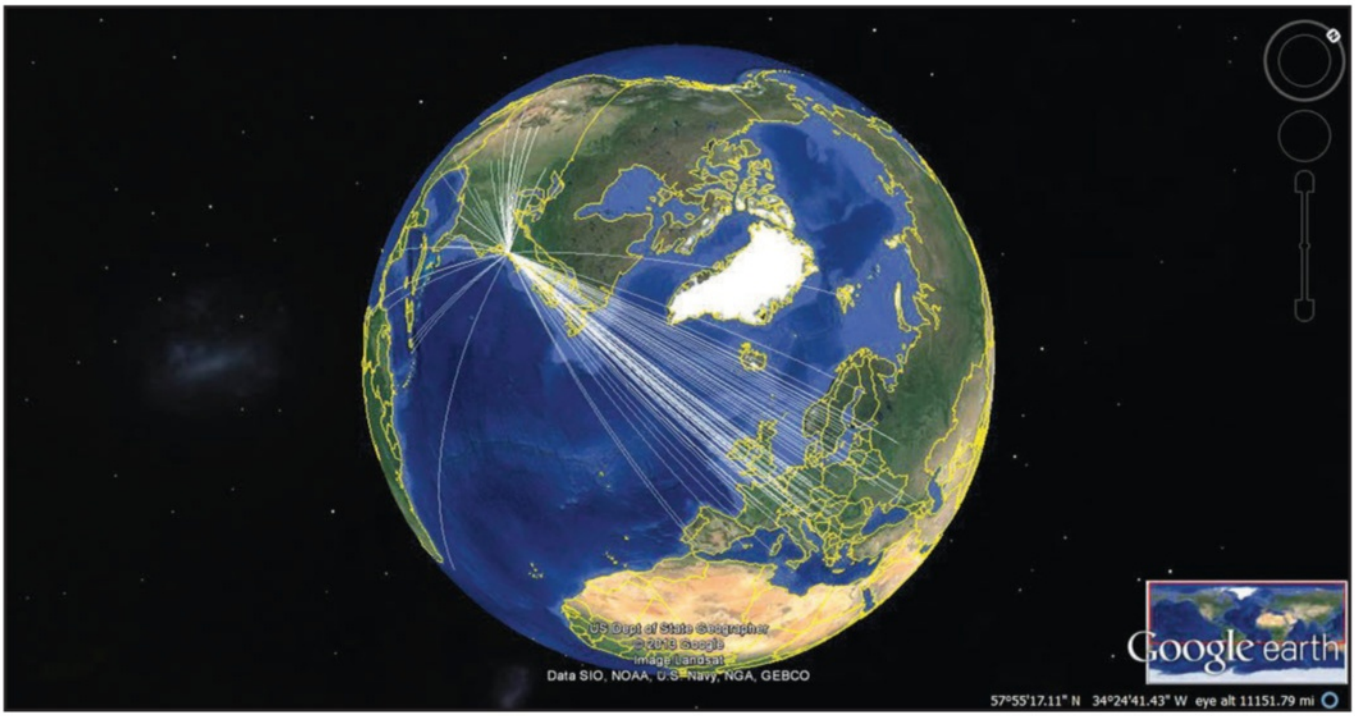

Photo G. The same contact paths as shown in photo F seen from an eastern hemisphere perspective. Five watts can travel quite a long way!

What at first seemed to the author like "a painful process" rutned into an adventure in learning while collecting contacts with all 50 states using just one-tenth of a watt.

Worked All States with 100 Milliwatts

BY JOHN WATKINS,* NØEVH

Working all 50 states with an accumulated power of 5 watts or an average of 1/10 watt for each state... I had heard of amateurs achieving this goal, but it sounded like a painful process that certainly one would not consider as part of an enjoyable hobby. But here I am…

It started innocently for me back in May of 2003 when I worked a killer-signal station in Michigan from my home state of Missouri on 40 meters. K8CV was so very strong into my QTH, and since Walt normally operated QRP, I thought the band must be in great shape. I quickly dropped my power to 1/10 of a watt and gave him a call. We continued our QSO with no problem.

With my courage up, I looked around 20 meters for a strong signal and worked a Virginia station within the hour, still at 100 milliwatts. Going to higher frequencies always helps the low-power enthusiast because of a better signal-to-noise ratio. I'm not sure whether I was lucky or if the bands were just amazing, but I began to watch for unusually strong signals from stations and to make note of how much power they were running.

Photo A. The author at his station in Missouri. His Elecraft KX-3 (lower right, behind pad) was his main "weapon" in contacting all 50 states at a power level of 1/10 of a watt.

Antenna Experiments

I recently had moved my vertical antenna from a ground mount to a chimney mount and noticed some improvement in performance. I did not have anything to compare it with, so I decided to install a horizontal 80-meter loop so that I had a choice between a vertical and a horizontal antenna. The average height of my loop was 25 feet, all I could muster in my yard. I began to compare antennas and was pleased to find that the loop was a killer antenna in close on 80 and 40, easily beating the vertical. Then on the upper bands—20 and above—the loop actually performed slightly better than the vertical. I about wore out my A/B antenna button the next few years doing comparisons. I feed the loop with 450-ohm ladder line back to the shack and through a 4:1 balun to my rig. As the experiments continued, my states total continued to grow.

I did not pursue the goal hard, just let it happen over the years whenever I heard great band conditions. Along the way, I hit a couple of fantastic openings and finally worked Hawaii and Alaska on 10 meters at the end of a contest when stations were hungry for contacts and had no answers to their CQs. You probably know the callsigns if you're a contester; those guys have excellent stations and copying skills. The 80-meter loop was my go-to antenna on about 90 percent of my Qs. So now I had the hard ones in the log, right?

Not really. The hard ones sometimes are the close ones or those with fewer ham radio stations on the air. Most of these states are close to my home QTH in Missouri (photo A), so I had a double-whammy. What to do?

I wanted to add 160 meters to my bands, so I went with the only antenna that would fit in my lot. It was an inverted L at 30 feet and the horizontal portion even had a dogleg in it because of my small lot. Thinking that I now had added a band, I was amazed when the inverted L began to beat out my 80-meter loop on some stations. I was feeding the L with a 9:1 balun, had two 80-foot above-ground radials attached at the ground feed point, and they ran around the house on the wooden hardscape. It was not ideal by the antenna book, but it sometimes beat the loop. I have now had the loop for ten years and the L for four. They split the very low-

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power contacts at 50% each. I think it depends upon incoming/outgoing take-off angle of the signal.

The Hunt Begins in Earnest

Now that I had some success, I wanted to pursue some competitive stations and add to my state count. I felt the close-in states would be worked on 40 and 80 meters, so I needed to chase states during the winter months when thunderstorms were not raising the noise floor. Avoiding the QRN would go a long way to my signal being heard. Between my two best antennas—the loop and the inverted L—I figured that I could now present a decent signal on 80 through 10 meters. A few years passed and my total state count reached 40.

With the ARRL Sweepstakes contest coming in the fall of 2013, I checked the family calendar and discovered that I would have time to get on the air. Of my remaining ten states many were the small- or low-population ones. Checking the ARRL contest record website, I identified the top-scoring stations for those states and made my own personal hit list. I then set up CW Skimmer and married it to my Elecraft KX3 I/Q output so I could watch 48 kHz of whatever band I was on. This would give me an extra set of eyes trying to spot my targets. CW Skimmer produces a list that can be sorted by time, frequency, or callsign (see fig. 1), so when I took a stretch break, it was still watching for my targets. My final preparation step involved analyzing my logbook to see when I had heard my target states, on what bands and at what time of the day during the month of November. I now had a plan for working the Sweeps.

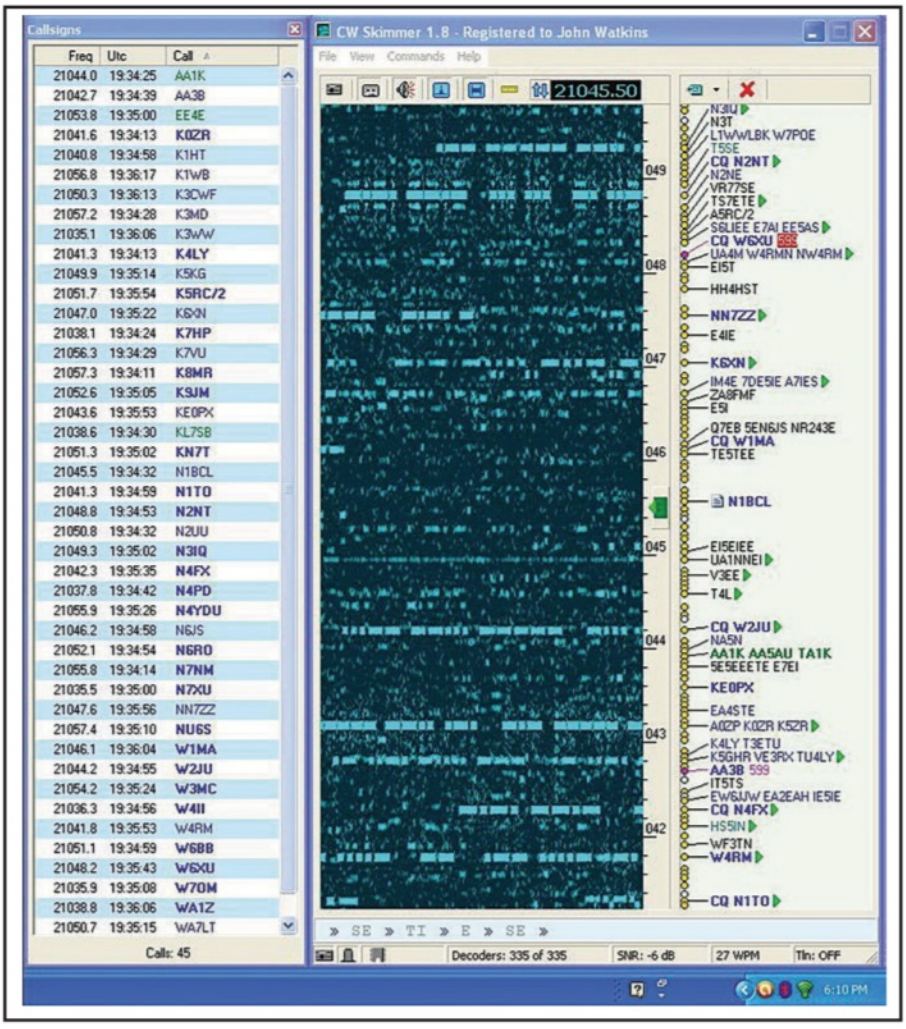


Fig. 1. Screen capture of CW Skimmer running on the right half of the screen. Taken during the heat of Sweepstakes action, you can see the list of stations that have been identified by the skimmer. They are sorted alphabetically by callsign.

Going All Out

On the first day of the contest, I jumped in with my 1/10 of a watt. In five hours I had logged eight of my ten target states with only two of them asking for repeats. Bands were in great condition and things were going very well. The fall weather and absence of thunderstorms across the nation were providing great signals and low QRN on 40 and 20 meters. States in the range of 400 to 600 miles—such as Indiana, Minnesota, and Oklahoma—were collected on 40. Kansas was logged on 80 in the early evening, before that band went long. The more distant states of New Mexico, Wyoming, and Montana were logged on 20.

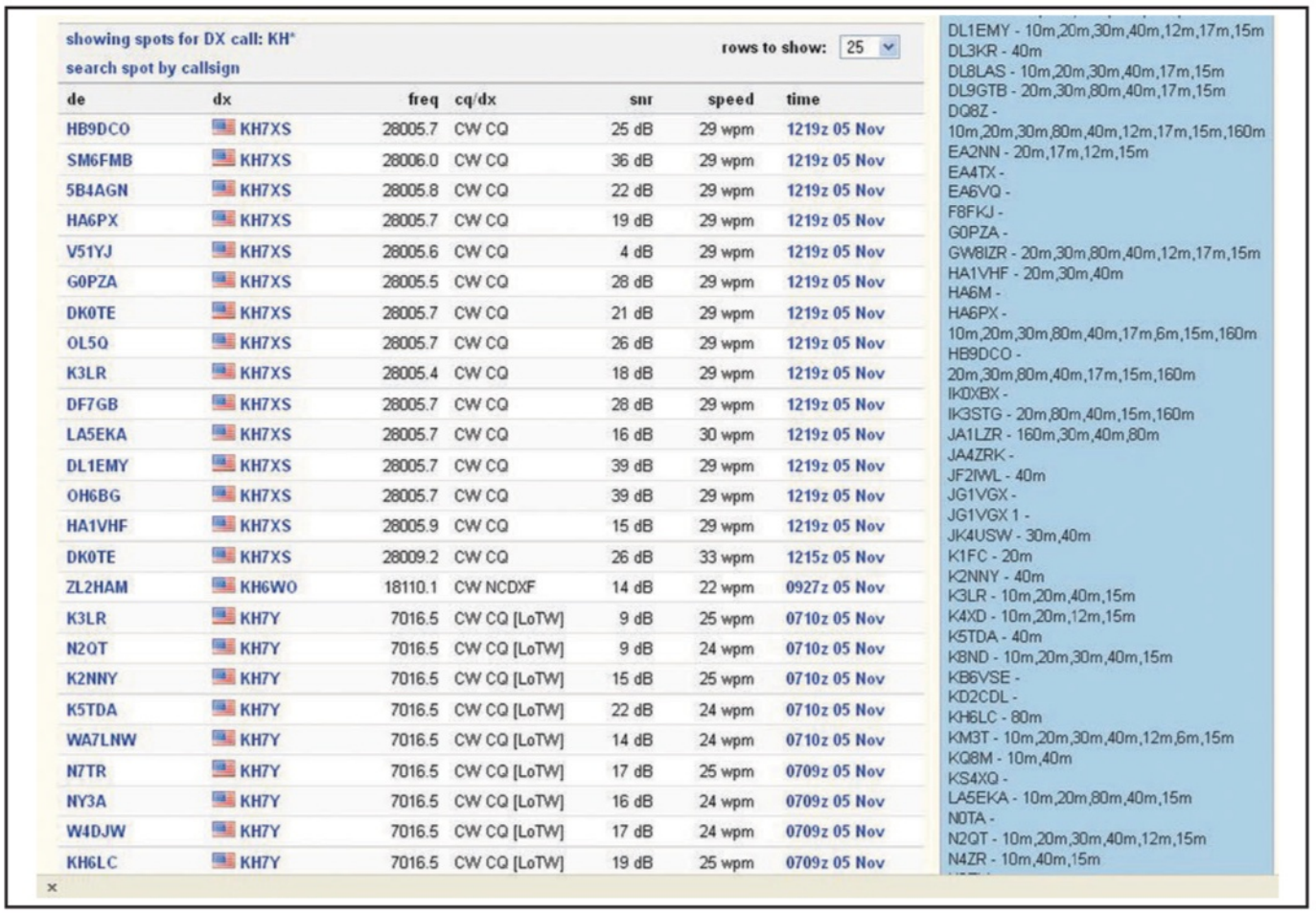
To be heard at these power levels you need to call in the clear (no one else calling the CQing station) and have great propagation and low noise at the other end. Now only West Virginia and Delaware were needed in my log, but reaching the East Coast from the Midwest was not going to work for me for the rest of the evening. While 40 meters was in great shape and signals to me were strong, the band was wall-to-wall signals, so the QRM was too intense for my little signal. I would have to wait for West Virginia and Delaware. There would be less signal congestion on Sunday morning, I reasoned, so I pulled the plug for the night.

The Sweeps event has 83 sections and many stations want to collect them all for a "clean sweep." Others are going for the sweep plus high score. Thus, the odds were in my favor that on the second day the sweep hunters would have moved on to other targets.

One great feature of CW Skimmer beyond the obvious is that it calculates the signal-to-noise ratio of the station tuned. I was running power 30 dB below most stations in the contest, so I was looking for signals that were at least 40 dB above my noise. Of course, too, I was hoping that the noise level was also low at their end. No point in calling a station that can't hear you. Once you have found your target station, listen to him/her work through the callers. Watch the ebb and flow of the action. Every few minutes the CQing station will get a brief lull in activity. No callers. That is your opportunity, so be ready with your memory keyer set at his speed and make it happen. Don't use your key, as this is not the time to make mistakes.

The Final Two

The next morning, West Virginia was in my log on 20 meters by 10 AM. I tried to get his attention for one-and-a-half hours. His signal was holding just fine at 45 dB over the noise, so once the competition had been worked and he had few callers, he was mine. A final snack from the kitchen and then back



showing spots for DX call: KH*
search spot by callsign

rows to show: 25

de	dx	freq	cq/dx	snr	speed	time
HB9DCO	KH7XS	28005.7	CW CQ	25 dB	29 wpm	1219z 05 Nov
SM6FMB	KH7XS	28006.0	CW CQ	36 dB	29 wpm	1219z 05 Nov
5B4AGN	KH7XS	28005.8	CW CQ	22 dB	29 wpm	1219z 05 Nov
HA6PX	KH7XS	28005.7	CW CQ	19 dB	29 wpm	1219z 05 Nov
V51YJ	KH7XS	28005.6	CW CQ	4 dB	29 wpm	1219z 05 Nov
G0PZA	KH7XS	28005.5	CW CQ	28 dB	29 wpm	1219z 05 Nov
DK0TE	KH7XS	28005.7	CW CQ	21 dB	29 wpm	1219z 05 Nov
OL5Q	KH7XS	28005.7	CW CQ	26 dB	29 wpm	1219z 05 Nov
K3LR	KH7XS	28005.4	CW CQ	18 dB	29 wpm	1219z 05 Nov
DF7GB	KH7XS	28005.7	CW CQ	28 dB	29 wpm	1219z 05 Nov
LA5EKA	KH7XS	28005.7	CW CQ	16 dB	30 wpm	1219z 05 Nov
DL1EMY	KH7XS	28005.7	CW CQ	39 dB	29 wpm	1219z 05 Nov
OH6BG	KH7XS	28005.7	CW CQ	39 dB	29 wpm	1219z 05 Nov
HA1VHF	KH7XS	28005.9	CW CQ	15 dB	29 wpm	1219z 05 Nov
DK0TE	KH7XS	28009.2	CW CQ	26 dB	33 wpm	1215z 05 Nov
ZL2HAM	KH6WO	18110.1	CW NCDXF	14 dB	22 wpm	0927z 05 Nov
K3LR	KH7Y	7016.5	CW CQ [LoTW]	9 dB	25 wpm	0710z 05 Nov
N2QT	KH7Y	7016.5	CW CQ [LoTW]	9 dB	24 wpm	0710z 05 Nov
K2NNY	KH7Y	7016.5	CW CQ [LoTW]	15 dB	25 wpm	0710z 05 Nov
K5TDA	KH7Y	7016.5	CW CQ [LoTW]	22 dB	24 wpm	0710z 05 Nov
WA7LNW	KH7Y	7016.5	CW CQ [LoTW]	14 dB	24 wpm	0710z 05 Nov
N7TR	KH7Y	7016.5	CW CQ [LoTW]	17 dB	25 wpm	0709z 05 Nov
NY3A	KH7Y	7016.5	CW CQ [LoTW]	16 dB	24 wpm	0709z 05 Nov
W4DJW	KH7Y	7016.5	CW CQ [LoTW]	17 dB	24 wpm	0709z 05 Nov
KH6LC	KH7Y	7016.5	CW CQ [LoTW]	19 dB	25 wpm	0709z 05 Nov

DL1EMY - 10m,20m,30m,40m,12m,17m,15m
DL3KR - 40m
DL8LAS - 10m,20m,30m,40m,17m,15m
DL9GTB - 20m,30m,80m,40m,17m,15m
DQ8Z - 10m,20m,30m,80m,40m,12m,17m,15m,160m
EA2NN - 20m,17m,12m,15m
EA4TX -
EA6VQ -
F8FKJ -
G0PZA -
GW8IZR - 20m,30m,80m,40m,12m,17m,15m
HA1VHF - 20m,30m,40m
HA6M -
HA6PX - 10m,20m,30m,80m,40m,17m,6m,15m,160m
HB9DCO - 20m,30m,80m,40m,17m,15m,160m
IK0XBX -
IK3STG - 20m,80m,40m,15m,160m
JA1LZR - 160m,30m,40m,80m
JA4ZRK -
JF2IWL - 40m
JG1VGX -
JG1VGX 1 -
JK4USW - 30m,40m
K1FC - 20m
K2NNY - 40m
K3LR - 10m,20m,40m,15m
K4XD - 10m,20m,12m,15m
K5TDA - 40m
K8ND - 10m,20m,30m,40m,15m
KB6VSE -
KD2CDL -
KH6LC - 80m
KM3T - 10m,20m,30m,40m,12m,6m,15m
KQ8M - 10m,40m
KS4XQ -
LA5EKA - 10m,20m,80m,40m,15m
N0TA -
N2QT - 10m,20m,30m,40m,12m,15m
N4ZR - 10m,40m,15m

Fig. 2. Screen capture from RBN (Reverse Beacon Network) website showing a search on KH (* is a wildcard) for this search engine. This provides one method for finding active stations from a given part of the world or targeting a specific station with its callsign.*

to the bands. The only Delaware station I had spotted was doing search-and-pounce, so my progress was stalled. I scouted 10 meters for about an hour, but it became obvious that the east and west coast stations were working each other, not the "fly-over" states. I then dropped down to 15 meters and found that my Delaware target station had begun to call CQ. Got him in just a couple of minutes!

Ten years, three radios, and multiple antenna experiments, what fun it was along the way! And that tough Delaware station I finally found and logged; the morning after the Sweeps I got my confirmation for the QSO via Logbook of the World (LoTW)! Got to love electronic logging! For those who like stats, here are states per band: 10m-6, 12m-0, 15m-6, 17m-1, 20m-20, 30m-1, 40m-14, 80m-2, 160-0.

There were some interesting highlights recorded in my log during my 10-year adventure. Three states were worked when I was calling CQ with 1/10 of a watt. While working in the shack on a project I would put the rig on a slow CQ repeat and listen on an open frequency. Five additional states were logged while they were running 1000 watts, 40 dB above my station. They heard me on my first call in the clear. When Mother Nature gives you the reflection, you just have to be there! About half of my states were worked during casual non-contest periods, and it was always fun to chat with the other ham about low-power radio. One old timer said he had never worked a station at a tenth of a watt and asked me to stand by while he turned his QRO rig down to 5 watts to give QRP a try. Another ham in Washington had been a World War II Army radio operator and carried radio gear on mules. You just never know whom you will run into on the bands.

Your odds of being on the right band for those great reflections can be increased by using the *Reverse Beacon Network* (fig. 2). If you are collecting states and are not restricted by assisted rules in a contest, you simply do a search on KH* if looking for a Hawaiian station or KL* if Alaska is not in your log. Of course, in my case I was looking for known big-station contesters, so I searched their specific callsigns. No need to fish where there are no fish.

Preparing that target station list was also valuable because several big contest stations had callsigns out of their call districts. For example, I would have never taken a second look at an 8 station while searching for my 50th state of Delaware.

What's Next?

So what to do now? Well, I am still working on DXCC at 1 watt. Guess I will close that out this winter, then maybe start on DXCC at 1/10 of a watt, but oh, I already have. Along the way while working on my states goal, I worked 17 DX entities at a 1/10 of a watt, so here we go again!

By the way, as an extra benefit of running very low power, you will end up with some great antennas! The ones that are marginal will have been taken down and redesigned by the time you get your 50 states in the logbook. Give it a go and enjoy the journey at whatever power level you choose to set as your goal.

MFJ Weather-Proof *Window Feedthrough Panels*

Weather-proof window feedthrough panels bring coax, balanced lines, HF/VHF/UHF antennas, random wire antennas, ground, rotator/antenna switch cables and DC/AC power into your hamshack without drilling through walls!

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Simply place in window sill and close window. One cut customizes it for any window up to 48 inches. Use horizontally or vertically. Connectors are mounted on inside/outside stainless steel plates and attached to a 4 foot long, $3^{1}/_{2}$ inch high, $^{3}/_{4}$ inch thick *pressure-treated* wood panel. Has excellent insulating properties. Weather-sealed with a heavy coat of long-lasting white outdoor enamel paint. Edges sealed by weather-stripping. Seals and insulates against all weather conditions. Includes window locking rod.

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Four 50 Ohm *Teflon*(R) SO-239 coax connectors lets you feed HF/VHF/UHF antennas at full legal power limit.

A 50 Ohm *Teflon*(R) coax *N-connector* lets you use any antenna up to 11 GHz, including 450 MHz, UHF, satellite, moon bounce and 2.4/5.8 GHz Wi-Fi antennas.

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A pair of high-voltage *ceramic feedthru insulators* lets you bring in 450/300 Ohm balanced lines directly to your antenna tuner.

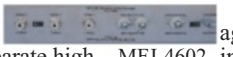
Has random/longwire antenna *ceramic feedthru insulator*.

***5-way** binding posts* lets you supply 50 Volts/15 Amps DC/AC power to your outside antenna tuners/relays/switches.

Stainless ground post brings in ground connection, bonds inside/outside stainless steel panels together and drains away static charges.

MFJ's exclusive *Adaptive Cable Feedthru*™ lets you bring in rotator/antenna switch cable, etc. without removing connectors (up to $1^{1}/_{4}$X$1^{5}/_{8}$ in). Adapts to virtually *any* cable size. Seals out rain, snow, adverse weather.

3 Coax, Balanced Line, Random Wire



Best Seller! 3 *Teflon*(R) coax connectors for HF/VHF/UHF antennas. Separate high voltage *ceramic* feed-thru insulators for balanced lines and longwire/random wire, Stainless steel ground post.

MFJ-4602 **$69.95**

6 Coax

6 high quality *Teflon*(R) coax connectors for HF/VHF/UHF antennas. Stainless steel ground post. Full 1500 Watt legal limit.

MFJ-4601 **$59.95**

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4 pairs of high-voltage *ceramic* feed-thru insulators for balanced lines and 2 coax connectors.

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5 Cables, any-size

5 *Adaptive Cable Feedthrus*™. Pass any cable with connector: 2 cables with large connectors up to $1^{1}/_{4}$x$1^{5}/_{8}$ inches and 3 cables with UHF/N size coax connectors. Seals out weather.

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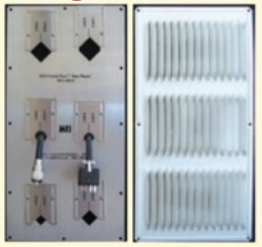
MFJ-4605 **$159.95** **New!**

Bring cables thru eave of your house



MFJ-4616 shown with standard full-size vent (not included) it replaces. For *6 Cables* **$26.95**

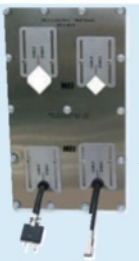
MFJ-4613 shown with standard half-size vent (not included) it replaces. For *3 Cables* **$14.95**

Replace your standard air vents on the eave/sofitt of your house with these *MFJ AdaptiveCable*™ *Air Vent Plates* and…

Bring in coax, rotator, antenna switch, power cables, etc. *with connectors* up to $1^{1}/4$x$1^{5}/8$ inches!

Sliding plates and rubber grommets adjust for virtually any cable size to seal out adverse weather, insects and varmints. Use existing vent hole, mounting screws and screw holes.

AdaptiveCable™ Wall Plates



MFJ-4614 *For 4 Cables* **$34.95**

Bring nearly any cable -- rotator, antenna switch, coax, DC/ AC power, etc. -- through walls *without removing connectors* (up to $1^{1}/_{4}$x$1^{5}/_{8}$ inches). Sliding plates and rubber grommets adjust hole size to weather-seal virtually any size cable.

Includes *stainless steel* plates for each side of wall, sliding plates, rubber grommets, weather stripping and screws.

MFJ-4612 *For 2 Cables* **$24.95**

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Announcing:

The 2014 CQ World-Wide WPX Contest

SSB: March 29–30, 2014 CW: May 24-25, 2014
Starts: 0000 UTC Saturday Ends: 2359 UTC Sunday

I. OBJECTIVE: For amateurs world wide to contact as many amateurs and prefixes as possible during the period of operation.

II. PERIOD OF OPERATION: 48 hours. Single Operator stations may operate 36 of the 48 hours – **off times must be a minimum of 60 minutes** during which no QSO is logged. Multi-operator stations may operate the full 48 hours.

III. BANDS: Only the 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. **Observance of established band plans is strongly encouraged.**

IV. EXCHANGE: RS(T) report plus a progressive contact serial number starting with 001 for the first contact. Note: Multi-Two and Multi-Unlimited entrants use separate serial number sequences on each band.

V. SCORING:

A. Score: The final score is the result of the total QSO points multiplied by the number of different prefixes worked.

B. QSO Points: A station may be worked once on each band for QSO point credit:

1. Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7, 3.5, and 1.8 MHz.

2. Contacts between stations on the same continent, but different countries, are worth one (1) point on 28, 21, and 14 MHz and two (2) points on 7, 3.5, and 1.8 MHz. Exception: For North American stations only—contacts between stations within the North American boundaries (both stations must be located in North America) are worth two (2) points on 28, 21, and 14 MHz and four (4) points on 7, 3.5, and 1.8 MHz.

3. Contacts between stations in the same country are worth 1 point regardless of band.

C. Prefix Multipliers: The prefix multiplier is the number of valid prefixes worked. Each PREFIX is counted only once regardless of the band or number of times the same prefix is worked.

1. A PREFIX is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, LY1000, etc. Any difference in the numbering, lettering, or order of same shall count as a separate prefix. A station operating from a DXCC entity different from that indicated by its call sign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. Example: N8BJQ operating from Wake Island would sign N8BJQ/KH9 or N8BJQ/NH9. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (/W8, /AD8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. Example: PA/N8BJQ would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or other license class identifiers do not count as prefixes.

2. Special event, commemorative, and other unique prefix stations are encouraged to participate. Prefixes must be assigned by the licensing authority of the country of operation.

VI. ENTRY CATEGORIES:

A. Single Operator Categories: One person (the operator) performs all operating and logging functions. There is no limit on band changes. Only one transmitted signal is permitted at any time.

1. Single Operator: QSO alerting assistance of any kind is prohibited (see rule IX.2).

a. High Power (All Band or Single Band): Total output power must not exceed **1500 watts.**

b. Low Power (All Band or Single Band): Total output power must not exceed **100 watts.**

c. QRP (All Band or Single Band): Total output power must not exceed **5 watts.**

2. Single Operator Assisted: Entrants in this category may use QSO alerting assistance (see rule IX.E).

a. High Power Assisted (All Band or Single Band): Total output power must not exceed **1500 watts.**

b. Low Power Assisted (All Band or Single Band): Total output power must not exceed **100 watts.**

c. QRP Assisted (All Band or Single Band): Total output power must not exceed **5 watts.**

B. Single Operator Overlay Categories: Single Operator entrants may **also** submit their log for **one** of the categories shown below by adding an additional line in the Cabrillo log file header called CATEGORY-OVERLAY. All Overlay entries are grouped into high power and low power in the results.

1. Tribander/Single Element (TB-WIRES): During the contest an entrant shall use only one (1) tribander (any type, with a single feed line from the transmitter to the antenna) for 10, 15, and 20 meters and single-element antennas on 40, 80, and 160 meters.

2. Rookie (ROOKIE): To enter this category the operator must have been licensed as a radio amateur three (3) years or less on the date of the contest The date first licensed **must** be indicated in the SOAPBOX field. An operator who has won a plaque in any previously published CQ contest is not eligible for the Rookie category.

C. Multi-Operator Categories (All Band only): More than one person can contribute to the final score during the official contest period. Select category based on number of transmitted signals.

1. Single-Transmitter (MULTI-ONE): Only one transmitted signal is permitted at any time. A maximum of ten (10) band changes may be made in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a single serial number sequence for the entire log.

a. High Power. Total output power of each transmitted signal must not exceed **1500 watts.**

b. Low Power. Total output power of each transmitted signal must not exceed **100 watts.**

2. Two-Transmitter (MULTI-TWO): A maximum of two transmitted signals is permitted at any time on two different bands. Both transmitters may work any station. A station may only be worked once per band regardless of which transmitter is used. **The log must indicate which transmitter made each QSO** (column 81 of CABRILLO QSO template for CQ contests). Each transmitter may make a maximum of eight (8) band changes in any clock hour (00 through 59 minutes). Use a separate serial number sequence for each band. Total output power of each transmitted signal must not exceed **1500 watts.**

3. Multi-Transmitter (MULTI-UNLIMITED): A maximum of six transmitted signals, one per band, at any one time. Six bands may be activated simultaneously. Use a separate serial number sequence for each band. Total output power of each transmitted signal must not exceed **1500 watts.**

D. Checklog: Entry submitted to assist with the log checking. The entry will not have a score in the results and the log will not be made public.

VII. AWARDS: A single-band log will be eligible for a single-band award only. To be eligible for an award, a Single Operator station must show a minimum of 4 hours of operation. Multi-operator stations must operate a minimum of 8 hours.

A. Plaques are awarded to recognize top performance in a number of categories. View the current list of plaques and sponsors at <www.cqwpx.com/plaques.htm>.

Only one plaque will be awarded per entry. A station winning a World plaque will not be considered for a sub-area award. That award will be given to the runner-up for that area if the number of entries justifies the award.

B. Certificates will be awarded to the highest scoring station in each category listed under Section VI:

1. In every participating country.

2. In each call area of the United States, Canada, Russia and Japan.

3. At the discretion of the contest director second- and third-place awards may be made.

VIII. CLUB COMPETITION: A plaque will be awarded each year to the club that has the highest aggregate score from logs submitted by its members. To be listed in the results, a minimum of three logs must be received from a club.

A. The club must be a local group and not a national organization (e.g., ARRL or DARC).

B. Participation is limited to members residing in or operating from a local geographic area (except for DXpeditions conducted by members living within the defined club geographic area). Club contributions from DXpedition scores are a percentage of the number of club members on the DXpedition.

C. Single-operator entries can only contribute to one club. Multi-operator scores may be allocated to multiple clubs as a percentage of the number of club members participating in the operation. A minimum of four logs must be received for a club to be listed in the results. Checklog entries are not counted for the club score.

IX. DEFINITIONS OF TERMS:

1. Station location: The area in which all the transmitters, receivers and antennas are located. All transmitters and receivers must be within a single 500-meter diameter circle. Antennas must be physically connected by RF transmission lines to the transmitters and receivers.

2. QSO alerting assistance: The use of any technology or other source that provides call sign or multiplier identification along with frequency information to the operator. It includes, but is not limited to, use of DX cluster, packet, local or remote call sign and frequency decoding technology (e.g., CW Skimmer or Reverse Beacon Network), or operating arrangements involving other individuals.

X. GENERAL RULES FOR ALL ENTRANTS:

A. Entrants must operate within the limits of their chosen category when performing any activity that could affect their submitted score.

B. A different callsign must be used for each entry. Only the entrant's callsign may be used to aid the entrant's score.

C. Do not exceed the total output power limitation of the chosen category on any band. Total output power on any band at any time is measured at the final output of the active amplifier(s).

D. Self-spotting or asking to be spotted is not permitted.

E. All operation must take place from one station location. Remote operation is permitted if the physical location of all transmitters, receivers, and antennas are at one station location. A remotely operated station must obey all station license, operator license, and category limitations.

F. Remote receivers outside the station location are not permitted.

G. Only one signal on a band is allowed at any time. When two or more transmitters are present on the same band, a hardware device MUST be used to prevent more than one signal at any one time. Alternating CQs on two or more frequencies on a band is not permitted.

H. All requests for contacts, responses to calls, and copying of call signs and contest exchanges must be accomplished during the contest period using the mode and frequencies of the contest.

I. Correction of logged call signs and exchanges after the contest by using any database, recordings, email or other methods of confirming QSOs is not allowed.

X. LOG INSTRUCTIONS: Electronic submission of logs is **required** for all entrants who use a computer to log the contest or prepare contest logs.

A. The log MUST show the following for each contact: correct date and time in UTC, frequency (or band), call sign of the station worked, exchange sent, and exchange received. A log without all required information may be reclassified to Checklog. Contacts should be logged immediately as they are completed. Stations competing for World and Continent awards should provide accurate frequencies for all contacts in the log.

B. Single band entrants are required to include all contacts made during the contest period, even if on other bands. Only contacts made on the band specified in the Cabrillo header or summary sheet will be considered for scoring purposes. Logs with contacts only on one band will be classified as single band entries.

C. The CABRILLO file format is the standard for logs. See <www.cqwpx.com/lcabrillo.htm> for detailed instructions on filling out the CABRILLO file header. Failure to fill out the header correctly may result in the entry being placed in the wrong category or reclassified as a Checklog. Note: U.S. stations must indicate the station location in the CABRILLO header (e.g., LOCATION: OH).

D. E-mail or Web upload is the expected method of log submission. SSB logs in CABRILLO format should be sent to <ssb@cqwpx.com>. CW logs in CABRILLO format should be sent to <cw@cqwpx.com>. Include only the entry call sign in the "Subject:" line of the e-mail. Web upload of logs is available at <www.cqwpx.com/logcheck/>. All logs received will be confirmed via e-mail. A listing of logs received can be found at <www.cqwpx.com>.

E. Instructions for NON-CABRILLO electronic logs: If you are not able to submit a CABRILLO format log, please contact the Contest Director for assistance with submitting another format.

F. Instructions for paper logs: Paper logs may be mailed to CQ WPX Contest, P.O. Box 481, New Carlisle, OH 45344, USA. Each paper log entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS.

XI. LOG DEADLINE:

A. All entries must be emailed or postmaked WITHIN FIVE (5) DAYS after the end of the contest: SSB logs no later than 2359 UTC 4 April 2014, CW logs no later than 2359 UTC 30 May 2014 Resubmitting an entry after the deadline will result in it being considered as a late log.

B. An extension may be requested by e-mail to <director@cqwpx.com>. The request must state a legitimate reason and must be received before the log deadline. Extensions are granted only upon confirmation by the Contest Director.

C. Logs submitted or postmarked after the deadline may be listed in the results, but are not eligible for awards.

XII. JUDGING: The CQ WPX Contest Committee is responsible for checking and adjudicating the contest entries. Entrants are expected to follow the rules and best amateur radio practices. Violation of the rules of the contest or unsportsmanlike conduct may lead to disciplinary action by the Committee.

A. Unsportsmanlike Conduct: Examples of unsportsmanlike conduct include, but are not limited to:

1. ARRANGING or CONFIRMING any contacts during the contest by use of ANY non-amateur radio means such as telephones, Internet, instant messaging, chat rooms, VoIP, social media or web sites.
2. Transmissions by the entrant on frequencies outside of license limitations.
3. Changing times in the log to meet band change or off time rules.
4. Taking credit for excessive unverifiable QSOs or unverifiable multipliers.
5. Signals with excessive bandwidth (e.g., splatter, clicks) or harmonics on other bands.
6. Running stations making more than 3 contacts without sending their callsign.

B. Observer Program: The Committee may request of any entrant to accept a visit by an observer during the contest. Failure to allow a Committee appointed observer full access to the station during the contest period may result in the entry being disqualified.

C. Disciplinary Actions: In the event of a violation, the entrant is subject to disqualification at the discretion of the Committee.

1. DISQUALIFICATION: Entry will be listed at the end of the published results and is not eligible for an award.
2. Notification of Committee actions will be sent by email to the address provided with the log submission. The entrant has five days to appeal the decision to the Contest Director. After that time the decision is final.
3. An entrant may withdraw the submitted log for any reason within 30 days of the log deadline. Contact the Contest Director for instructions.
4. The Committee reserves the right to change the category of any entry based on its examination of the log or other information.

D. Log Checking: All logs are checked using custom software and human judgment.

1. Duplicate contacts are removed with no additional penalty.
2. Contacts with an incorrectly received exchange are removed with no additional penalty.
3. Call sign errors or call signs not found in the other log are removed and receive a penalty of two times the QSO point value for that contact.
4. Contacts that do not meet the band change rules for multi-operator entries are removed with no additional penalty.

XIII. DECLARATION: By submitting a CQ WPX Contest log, and in consideration of the efforts of the CQ WPX Contest Committee to review and evaluate that log, an entrant unconditionally and irrevocably agrees that he/she has: 1) read and understood the rules of the contest and agrees to be bound by them, 2) operated according to all rules and regulations that pertain to amateur radio for the station location, 3) agreed the log entry may be made open to the public, and 4) accepted that the issuing of disqualifications and other decisions of the Committee are official and final. If an entrant is unwilling or unable to agree to all of the foregoing, the entrant should not submit the entry or submit the entry as a Checklog only.

Questions pertaining to the CQ WPX Contest may be emailed to the CQ WPX Contest Director at <director@cqwpx.com>.

You may have heard about JT-65 for working moonbounce and meteor scatter. But what about JT-9, for working QRP on HF? Here's an introduction…

JT9: QRP with the Magic Multiplied

BY GARY LILJEGREN,* W4GAL

Operating with 100 watts of output power and bouncing a signal off the ionosphere when talking with stations thousands of miles away still seems amazing to me. I've done that for a long time. However, when I reduce the power level to one one-hundredth of that, and have many QSOs world-wide (photo A), that's beyond amazing; it's magic.

There is a relatively new mode available today that offers an opportunity for *multiplied magic*. The mode is *JT9,* created by Joe Taylor, K1JT, and friends. JT9 has been running on the bands a little more than a year. It functions a bit like PSK with an audio signal applied to SSB (upper sideband) in the CW portion of the bands.

Five Reasons Why the Magic is Multiplied

1. Surprising success operating QRP with results as if the "ERP" is considerably greater
2. Talking to stations that are below the noise level; they are inaudible in the speaker
3. The ability to easily have QSOs from any language to any other language
4. A perfect mode for a highly successful operation as a temporary or portable station
5. Visualizing the international reception results of your signal on a world map

Let's explain the magic of the five reasons:

1) FM and TV broadcast stations talk about their *effective radiated power* (ERP) in watts. The signal has been "amplified" at the receiving locations by the use of gain antennas at the transmitter. The ERP comparison is similar to JT9, but for a different reason. A near-broadcast-quality AM signal in ham radio is about 6,000 Hz wide. All of the transmitting power is going into that 6-kHz signal. On SSB, the signal is somewhere around 2,800 Hz wide and thus the ERP for SSB is maybe twice that of an AM signal. (An aside to you technically astute hams reading this: cut me a little slack on the technical specifics.) Without comparing other modes for efficiency, let's look at JT9. The width of the signal is about 16 Hz. That means the signal bandwidth is less than 1/100th that of an SSB signal. One watt on JT9 does somewhere

*e-mail: <gary@liljegren.com>

Photo A. The author's impressive station appears to have nearly as many computers in it as radios. (Photos by the author)

Photo B. Shirl Regis, W9OMG, operating JT9 at 5 watts with great results from her home in North Florida using an ICOM IC-718 and a temporary vertical antenna.

around the same job communicating information as a 100-watt SSB signal. QRP, enhanced! And this gets us to the next magic point.

2) When you hear the description of how JT9 works with very-weak stations (below), it won't sound possible at first to copy a station that is below the noise level. What Joe has done is apply the technology of weak-signal moonbounce and meteor-scatter data acquisition on UHF and VHF to the HF and MF bands. JT9 is intended for the latter two. He has created a way of transmitting and receiving minute changes of audio frequency to form letters and symbols. The transmitted signal is a steady tone but the audio pitch varies in frequency at specified intervals, depending on what the letter is. The WSJT-X software detects those audio changes when copying the transmission. The software also computes the received signal strength of the other station. When a contact is made, the software is brutally honest and displays the signal strength on the display operating panel in dBs. Joe says that if the signal is –15 or less, nothing is heard through the speaker; the received signal is inaudible. However, the software can copy it! I regularly talk with stations whose signals are at the –20 or –25 level. It is as if the noise is moving around and the software simply copies the letters from it. Magic. Multiplied.

3) If English is not your first language, or not one of your languages at all, this is an ideal mode. It is better than PSK, RTTY, and certainly better than SSB. It is the same as a brief contest contact in CW, in which the exchange is language-independent. With JT9, the QSO components are already established. Any language can communicate with any other language because the software arranges the QSO. Translating the explanation of JT9 into any language can cover the setup and operation of the WSJT-X software and you are on the air with JT9. K1JT has given permission to translate the WSJT-X User's Guide into any language as long as he is sent a copy of the translation so he can add it to the website.

4) What if you are a college student with a shiny new license, a limited ham radio budget, and questionable antenna possibilities? Or what if you just love seeing what you can do with low power and temporary antennas? With JT9, you can call CQ with 1 or 2 or 5 watts and get responses! You can have great success even over thousands of miles. This mode is perfect when you have a

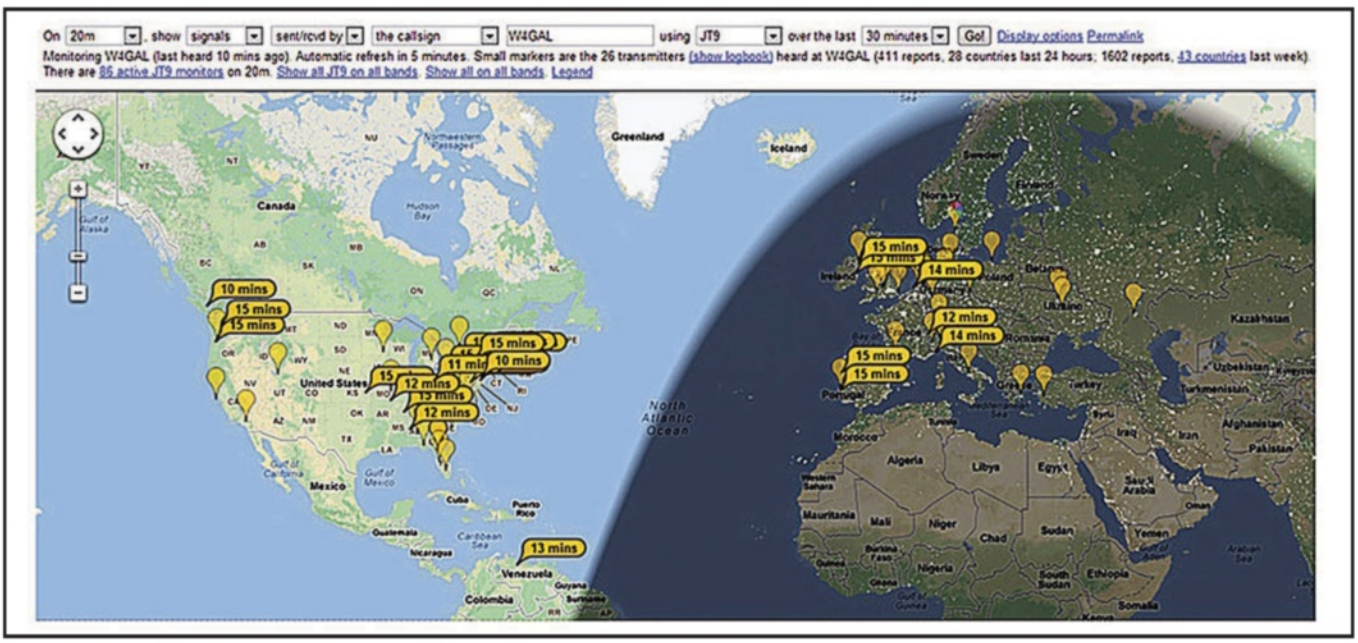


Fig. 1. Screen shot of stations hearing the author's 1-watt JT-9 signal from Florida, as displayed on the PSKREPORTER website.

little-pistol station. Photo B shows Shirl Regis, W9OMG, operating JT9 QRP with great results from her home in North Florida using an ICOM IC-718 cranked down to 5 watts and a temporary vertical antenna. Even if you have a big-gun station, see what you can do with 1 watt. Put the "wow" factor back into ham radio.

5) There is a powerful website available to us which displays signal reception reports from locations worldwide for a variety of modes. JT9 is one of the modes, and PSKREPORTER[1] is the site. After transmitting, you can look at PSKREPORTER and see which of the volunteer reporting stations received your transmission. I am having great success running somewhere between 1 and 5 watts, and I frequently look to see which stations, in which other continents, have also copied my signal.

Here is an example: I was using my TS-590 on a JT9 QSO with 1 watt power output through about 70 feet of RG8X to my vertical antenna in North Florida. I waited a few minutes after the QSO to do a "PrintScreen" because it takes a little while for the reporting stations to populate the PSKREPORTER map. Where was my transmission heard? Look at fig. 1. Holy smoke! My 1-watt

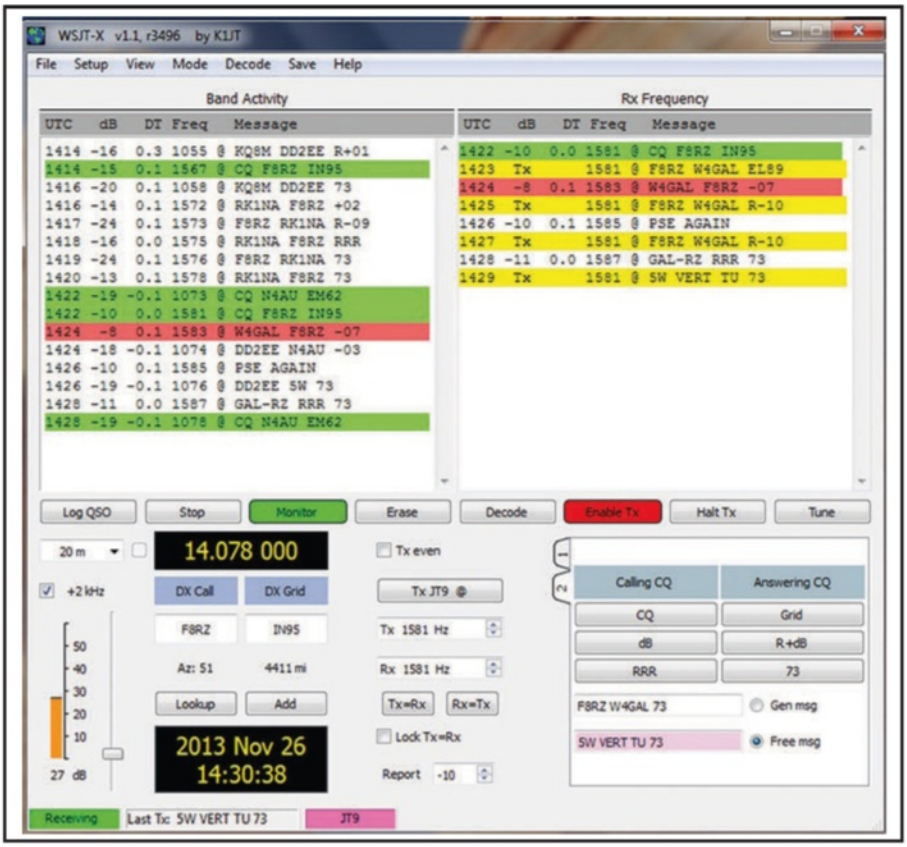


Fig 2. JT-9 software screen, showing band activity and a QSO between W4GAL and F8RZ. See text for details.

signal was heard across North America and into South America and Europe at that time of day.

How a QSO Works

Fig. 2 illustrates a JT9 QRP QSO with Jean Raynaud, F8RZ, in France. To explain the lines on the Band Activity screen, Jean called CQ (CQs appear in green). He was answered by RK1NA in Russia. At the end of their QSO, Jean called CQ again and I answered by double-clicking on his CQ. That started our QSO in the Rx Frequency window. He replied to me (his reply appeared in red) and said I was a –07 in signal strength. I replied that he was a –10. The software supplies the data automatically. He asked for a repeat and I sent it again. He acknowledged it and said 73. I said I was running 5 watts with a vertical, and thank you 73. End of QSO.

Here's the rub: It takes 50 seconds to send each 13-character message—which, I might add, gives you enough time to enjoy your cup of coffee and to look at QRZ.com and see who you are talking with during the QSO.

Equipment

You need a transceiver running 20 watts or less power, a computer, a sound-card interface to connect the two, and some free software. The standard SignaLink and Rigblaster types of modems work fine, and many rigs like my Kenwood TS-590 have a built-in sound card which does the job. I like using an outboard unit instead because it has a knob on it so I can adjust the drive level in real-time and choose the output power as I go. I can set the TS-590 at its minimum 5-watt level and dial-down the drive to where the output showing on my MFJ antenna tuner is 1 watt.

You will also need to sync your computer clock with a timing program such as Meinberg NTP.[2] If you can't get your computer to within one-half second of an international time standard, the WSJT-X program may not decode anyone. You can find what you need to know with instructions and downloadable software on the WSJT-X website.[3] Read the User's Guide first; don't wait until you have problems! And you can get help from hams experienced with JT9 if needed.[4]

Success, PLUS

When operating from your apartment with 5 watts and a stealth antenna hanging out the window, you can have amazing success on JT9. And it's true pretty much worldwide. You can call CQ and you will get responses. On JT9, if you're running 1 watt and not getting answered by the station you are calling but you can see on PSKREPORTER that you were "heard" by 10 others, it's not discouraging at all. You will also get a lot of eQSLs if you enjoy that. There seems to be a direct correlation between using a computer in your ham operating mode and the percentage of contacts confirming the QSO. It's true of PSK, JT65, and certainly of JT9.

For me, JT9 is the perfect QRP mode. Try it out!

Thanks, Joe, K1JT

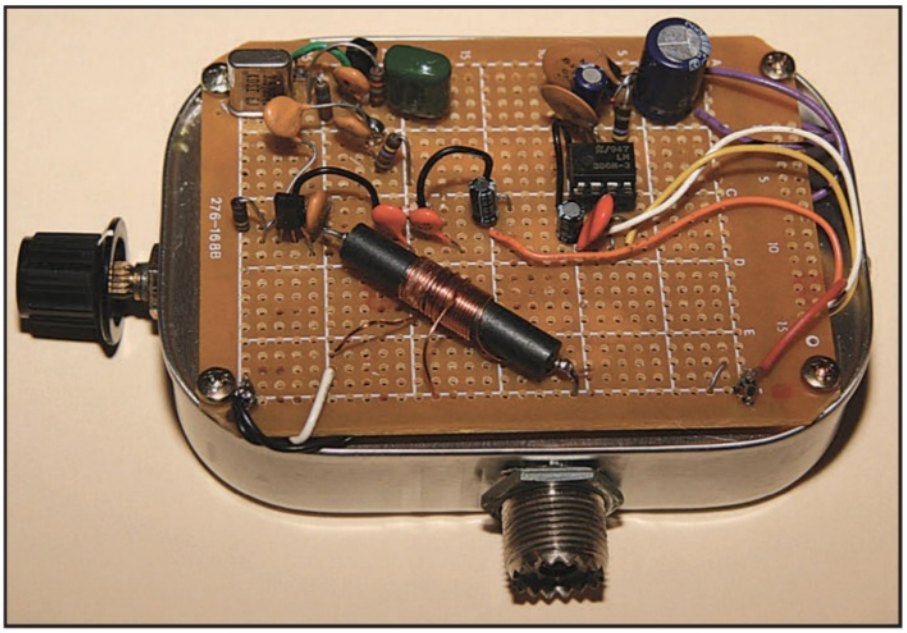
Notes

1. <http://www.pskreporter.info/pskmap. html>
2. Meinberg Network Time Protocol <http://www.meinbergglobal.com/English/sw/ntp.htm>
3. <http://physics.princeton.edu/pulsar/ K1JT/WSJT-X_Users_Guide.pdf>
4. <http://groups.yahoo.com/group/wsjtgroup/messages>

QRP is all about low-power transmitting, often translating into physically small transmitters. Here's a project to build a small receiver—that fits in a sardine tin!—to accompany your tiny transmitter.

Build the 80m Sardine-Ceiver

BY ERIK WESTGARD,* NY9D



NY9D's "Sardine-Ceiver" is a fun-to-build companion receiver for W1FB's classic "Sardine Sender" QRP transmitter.

The concept of an amateur radio "Junk Box" construction project has taken a beating over the last quarter century. Whenever I see one of these, they usually specify one or more components I don't have, even in my extensive inventory. This is after decades of diligent scrap collecting, and a fair bit of deliberate ordering ahead of normal radio construction parts (such as T50-2 toroids) from mail-order suppliers.

The late Doug DeMaw, W1FB, recognized this in his later construction books and articles. He started seeing the supply of variable capacitors and other staples of radio projects disappear from store shelves.Soon after converting the 1978 era all-RadioShack W1FB Sardine Sender to use the newer 100-µh RF chokes, I thought a companionreceiver with only common, locally available parts would be a good project.

I delved into Doug's books and my article archives. The design goals were to have no toroids and to avoid the NE602/612, as it was rare in local stores and in common scrap. I was eyeing a couple of non-working VCRs, which are loaded with RF chokes and other useful components.

I wanted to make the receiver tunable, so I tried out some VVC/varactor-diode tuned VFOs. This effort was very frustrating, and it would not use variable capacitors for tuning or even adjustments. This ruled out most of the available QRP receiver circuit diagrams. The final requirement was to not use dual gate MosFET devices, which were also getting scarce in the stores and scrap piles.

I gave a talk at the Dayton QRPCI meeting called Four Days in May in 2002, and met George Dobbs, G3RJV, a fellow W1FB fan and leading light of the G-QRP Club. He was selling a tiny book called *Minimalist Radio*, which featured a simple mixer based on the MPF102/NTE451 device and had no variable capacitors. The front end was for 40 or 20 meters, and so this book was not an immediate solution, but joined my growing pile of reference articles.

After a few long weekends and several dead-end prototypes, I was not getting far. I even built a Pixie, which was the right idea and the right band. However, the Pixie was prone to BCI (broadcast interference) from a powerful nearby AM station. The events of 9/11 sent me off in the direction of public service and packet radio, and later D-Star, and away from QRP for a while.

Re-awakening a Latent Interest

Recently, I was cleaning out my office and found a W1FB article on an 80-meter-band converter that had a single-ended mixer and an 80-meter front end. The light went on in my head after seven years and I raced for the shop.

The little receiver in George's book was fully modular; you could build it in sections. Therefore, I started with his mixer, and added in a VFO—really a basic crystal oscillator from the selection in Doug's book, *QRP Notebook*. The Colpitts oscillator used a common 2N2222A and a TV colorburst crystal and had no variable capacitors or trans-

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e-mail: <ny9d@arrl.net>

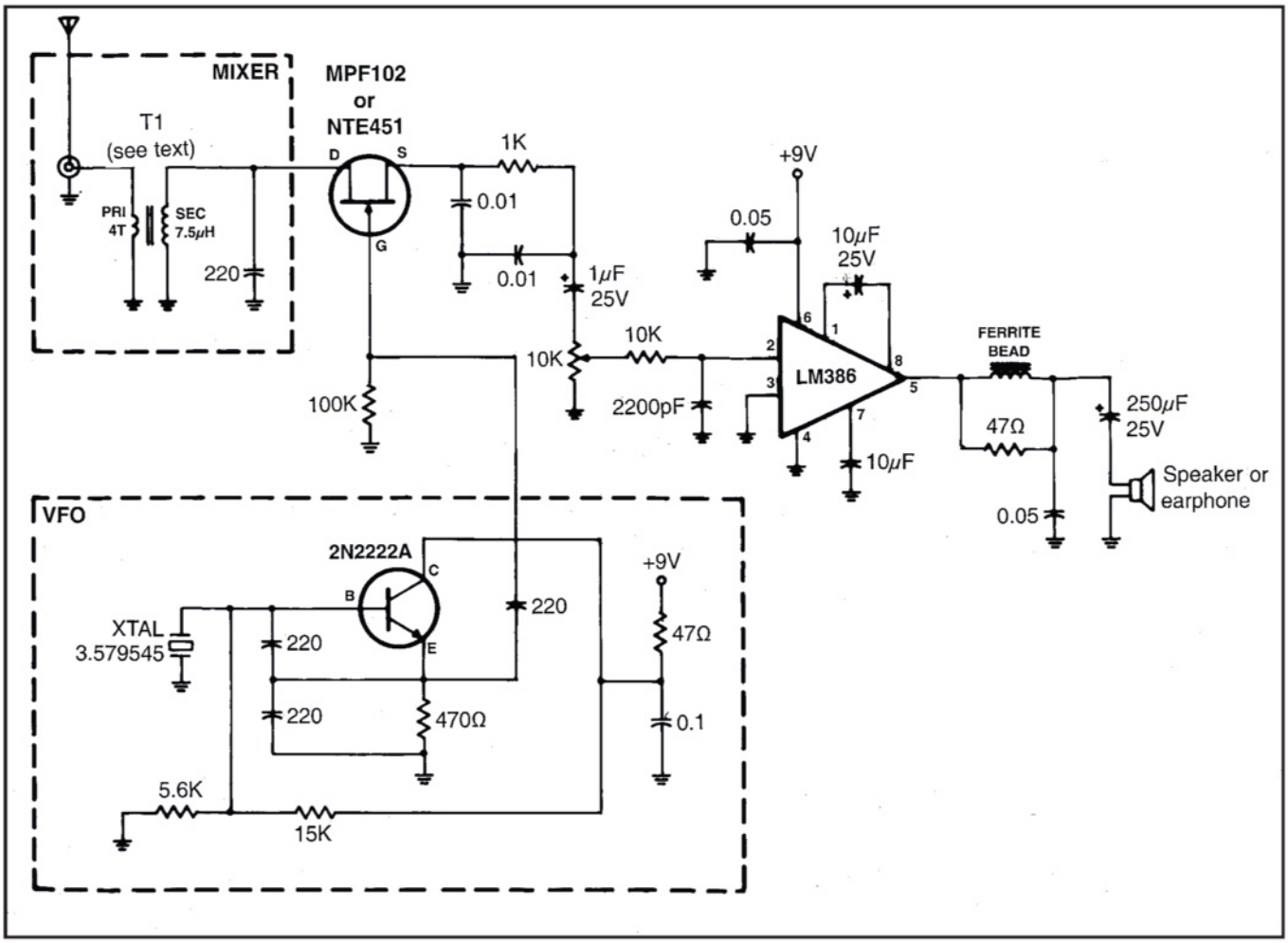

Fig. 1.The SardineCeiver merges a mixer circuit by G3RJV with a W1FB VFO design and a National Semiconductor audio circuit for the LM386. The ferrite bead comes from an old VCR.For T1. Remove all but 19 turns from a RadioShack 100 μH RF choke (273-102), leaving a 7.5 μH secondary; then used some of the removed wire to wind a 4-turn primary over the secondary winding.

formers. The math for the capacitors didn't work out, so taking a tip from Doug, I built a prototype and tried some different caps; 220 pF did the job and it started oscillating. For an audio amp, there was one for an AM radio amp in the National Semiconductor application notes for the LM386. Having had my fill of AM BC RFI, this might be OK.

And for the tuned front end there was Doug's converter article, 7.5 μH as a secondary on a T50-2 toroid and about 220 pF in parallel. Doug had the front end go to the gate on the MPF-102; for the G3RJV design it went to the drain. I said to myself, "Cross your fingers and solder to the drain."

I hooked it up to my RF signal generator and sent in a signal. Yes, it was a receiver, but at the millivolt level not the microvolt level. This was better than the last time, but not good enough. After several frustrating sessions of trying to change values and add stages, one night I took off the signal generator and

hooked up a tuned antenna—my G5RV. To my astonishment, clear CW signals from all over the USA were heard. I sat transfixed for a while. George makes the comment (disagreeing with Doug, who does not like single-ended mixers) that it "…works oddly well," which I think fits.

I made up a RadioShack 273-102 100 µH RF choke to match the 7.5 µH secondary (remove all but 19 turns for the secondary and use the leftover wire to make a primary winding over the secondary with four turns). I swapped out the T50-2 toroid transformer for the RadioShack homemade version and it worked the same. I next got out the prototype Sardine Sender transmitter and started calling CQ. After a few hours of that one afternoon in poor conditions, I sent an e-mail to QRP builder AAØZZ, who lived nearby, and asked him to get on the air. Soon I worked him, rusty CW and all. Then it was off to the store for a sardine can.

Most of the parts are available at RadioShack, where the components have moved off the pegboard into drawers in the back. Ceramic capacitors are used for the 220-pF applications. RadioShack has an assortment that might include those, or you can use 100-pF models in parallel. RadioShack used to sell the crystal, but for that now, an old VCR or TV will usually have one. If you don't have one to scrap out (the older the better for fewer surface-mount parts), ask around or check at thrift stores.

Troubleshooting the project consists of building it in stages; maybe start with audio. If it works, you should hear a hiss, and you can tap the input and have it click. The RF bead came out of an old VCR and can be omitted. I think it helps a bit with RF interference. The oscillator should oscillate, and you should be able to hear it in a nearby receiver. The front end and mixer should hear signals (CW, SSB, and even shortwave broadcast stations) if you have it right. Use a good antenna. This little radio is not very sensitive but was nice and clear here. I used a 9V battery, as the LM386 is famous for not liking normal 12–13.6-VDC ham shack power. I got a little local 80-meter SSB interference during the big sweepstakes contest, but no BCI.

The MPF102 is getting harder to find, but NTE451s are still around at places such as Allied Radio, so the mixer design might need to adapt to other locally available semiconductors. I do think the idea of a VFO of some kind is a worthwhile upgrade, as it would be nice to be able to move around the band a little. Of course, too, you can try different circuit modules yourself—such as the audio amplifier—depending on your interests or the parts you have on hand. It is reasonably cheap these days ($20 for one I saw on eBay) to buy a meter to measure inductance, so if you are modifying the RadioShack RF choke (or winding your own toroids) you can check your work.

References

DeMaw, Doug, "A Semi-Kit Receiver for 75/80 Meters", *QST,* August 1985 pp. 34–37

DeMaw, Doug, *W1FB's QRP Notebook*, ARRL, Newington, CT 1999

DeMaw, Doug "Build This Sardine Sender," *QST,* October 1978

Dobbs, George G3RJV, *Minimalist Radio*, G-QRP Club.

Westgard, Erik, "Updating the W1FB Sardine Sender," *QST*, November 2001

Wilson, Mark, *More QRP Power,* ARRL, 2006

Need proof of how far a QRP signal can travel? Try K1JT's WSPR program and see where you're being heard; plus which bands are open to where in real time.

Build Your Own WSPR Beacon

BY YANNICK DEVOS,* XV4Y

The *Weak Signal Propagation Reporter*, WSPR, is a real-time propagation tool invented by Joe Taylor, K1JT. I, for instance, use it as a way to learn the propagation on a band and determine the best time to work a given DX path. Thanks to WSPR, I learned that there is an 80-meter path between the US and Vietnam even in summer, and I got confirmation that the best openings are right after sunrise in North America.

Using WSPR requires a low-power beacon transmitter (the subject of this article) and an Internet-linked computer to let you see where your signal is being heard. If you'd like more background information about WSPR, please refer to G4ILO's excellent article at <http://www.g4ilo.com/wspr. html> or to the presentation by the software's author, K1JT, at <http://www.physics.princeton.edu/pulsar/K1JT/wspr.html>.

Who is This Circuit For?

If you're a homebrewer ham with basic digital and RF skills, this WSPR beacon project (photo A and fig. 1) is for you. There is no need for laboratory measurement equipment such as an oscilloscope. Everything should run straight from the beginning. However, some care and patience may be required, because the parts used will not accept any overvoltage or polarity inversion.

Component parts for this project (see photo B) are readily available (see below) or you can build it from a kit with a PCB and all the parts included. The kit I recommend is the Ultimate 3 QRSS Beacon from Hans Summers, GØUPL <www.hanssummers.com>. *(QRSS refers to very slow speed CW, as often used on the VLF, or very low frequency, bands.—ed.)*

I used to sell what I called "semi-kits" for this circuit (photo C), but now Hans has carefully refined its design and his kit offers more value for the money. Some of our choices are different (for example, my source code is freely available and easily customizable), but you can make your own decision.

Design Choices

I first started to work on this project two years ago. KD1JV (father of the ATS/MTR transceivers) introduced me to the MSP430 family of micro-controllers and I quickly wrote a small WSPR keyer to use with my QRSS beacon (original beacon kit from Hans, GØUPL). The main advantage of the MSP430G2553, as it is provided with the LaunchPad board from Texas Instruments, is the ability to drive a 32.768-kHz crystal like you find in clocks. Then with a few lines of code you can have a fairly accurate *Real-Time Clock (RTC).*

Photo A. Screen of the author's WSPR beacon while transmitting a Weak Signal Propagation Reporter *signal.*

Why do we need an RTC for a beacon? Because WSPR is very time sensitive. In order to recover the data through the QRM, it uses a known time frame to guess the missing digital symbols from the other good ones. If you're off more than 2 seconds from the other stations, you will see that the successful decoding rate will drop significantly. Most WSPR users have the K1JT software running on a computer with the time set via the *Network Time Protocol* (http://www.ntp.org/). The first WSPR standalone beacon designs all used a GPS-controlled clock. Two years ago, dedicated GPS modules were expensive (and they still are somewhat), so that was a no-go for me.

The MSP430 Launchpad enables me to have a WSPR beacon running for up to three days with accurate timing. For longer durations, it was drifting too much from real time, but the only thing I had to do was manually set it to second zero of an even minute, using my smartphone's internal GPS with an Android application such as "Atomic Clock."

Parts Providers for the LaunchPad, Display and DDS Module

Well, for the MSP430 LaunchPad evaluation board, you should go straight to Texas Instruments (http://www.ti.com/tool/msp-exp430g2). It's available there for less than $10 with all the required parts and even more.

*e-mail: <xv4y@nature-mekong.com>

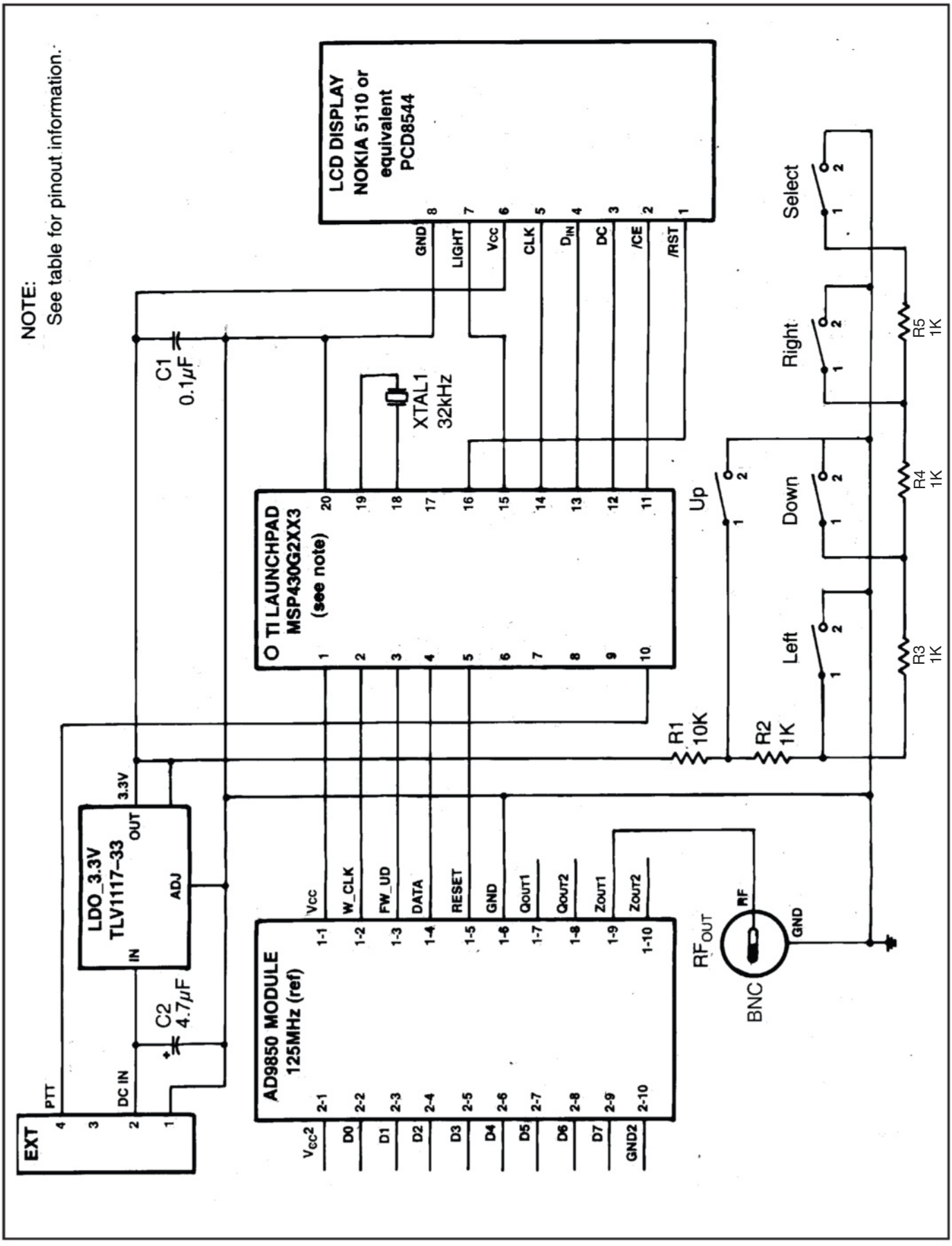

Fig. 1. Schematic of the WSPR beacon transmitter. See Table I for Launchpad chip pinout information.

Pin #	Function
1	DVCC
2	P1.0/TA0CLK/ACLD/A0*/CA0
3	P1.1/TA0.0/UCA0RXD/UCA0SOMI/A1*/CA1
4	P1.2/TA0.1/UCA0TXD/PUCA0SIM0/A2*/CA2
5	P1.3/V_{REF-}*/VEREF-*/
6	P1.4/V_{REF+}*/VEREF+*/TCK/ . . .
7	P1.5/TA0.0/UCB0CLK/TMS/ . . .
8	P2.0
9	P2.1
10	P2.2
11	P2.3
12	P2.4
13	P2.5
14	P1.6/TA0.1/TDI/TCLK/ . . .
15	P1.7/CAOUT/TDO/TDI/ . . .
16	_RST/NMI/SBWTDIO
17	TEST/SBWTCK
18	XOUT/P2.7
19	XIN/P2.6/TA0.1
20	DVSS

Table I. MSP430G2XX3 (TI Launchpad) Pinouts. See schematic, fig. 1, for additional connection information.

The DDS module, Nokia 5110-like display, and small parts (switches, cables) are readily available from Chinese sellers on eBay or many suppliers in the United States. My provider of choice is called "Chip_Partner" <http://www.ebay.com/sch/chip_partner/m.html>, but there are many. I also have had good experience with a website named IC Station <http://www.icstation.com/>. I have no relationship with either apart from the fact that they are my usual providers. Prices have decreased tremendously and should be around $5 for the DDS module and $3 for the LCD.

My own experience led me to buy the AD9850 modules with only two rows of pins and a big blue trimmer. I prefer the ones with a full-size canned oscillator (not the SMD version), as they usually have better frequency stability. An AD9850 with 125-MHz reference clock will allow you to generate signals between a few Hz and 30 MHz. (Pin 1 of each row is identified by a square.)

WSPR and QRSS are very demanding in terms of signal purity and frequency stability. I had only bad experiences with the AD9851 modules and the "three rows" modules. Even with the AD9850 two-rows modules, it is not unusual to have 10% of the parts that are a bit on the edge regarding specifications. It is not unwise to buy two of them, as they are cheap. Keep the best one for WSPR; the other one will be good as a VFO for a small receiver.

A last note about the LCD: It is not required in the WSPR beacon source code I am providing. However, given its price, I would not hesitate long, because without it you will lose a lot of flexibility.

Source Code for the Firmware

On my own website I made available three source codes for firmware running on this circuit. This programs must be compiled and uploaded to the LaunchPad's MSP430G2553 using

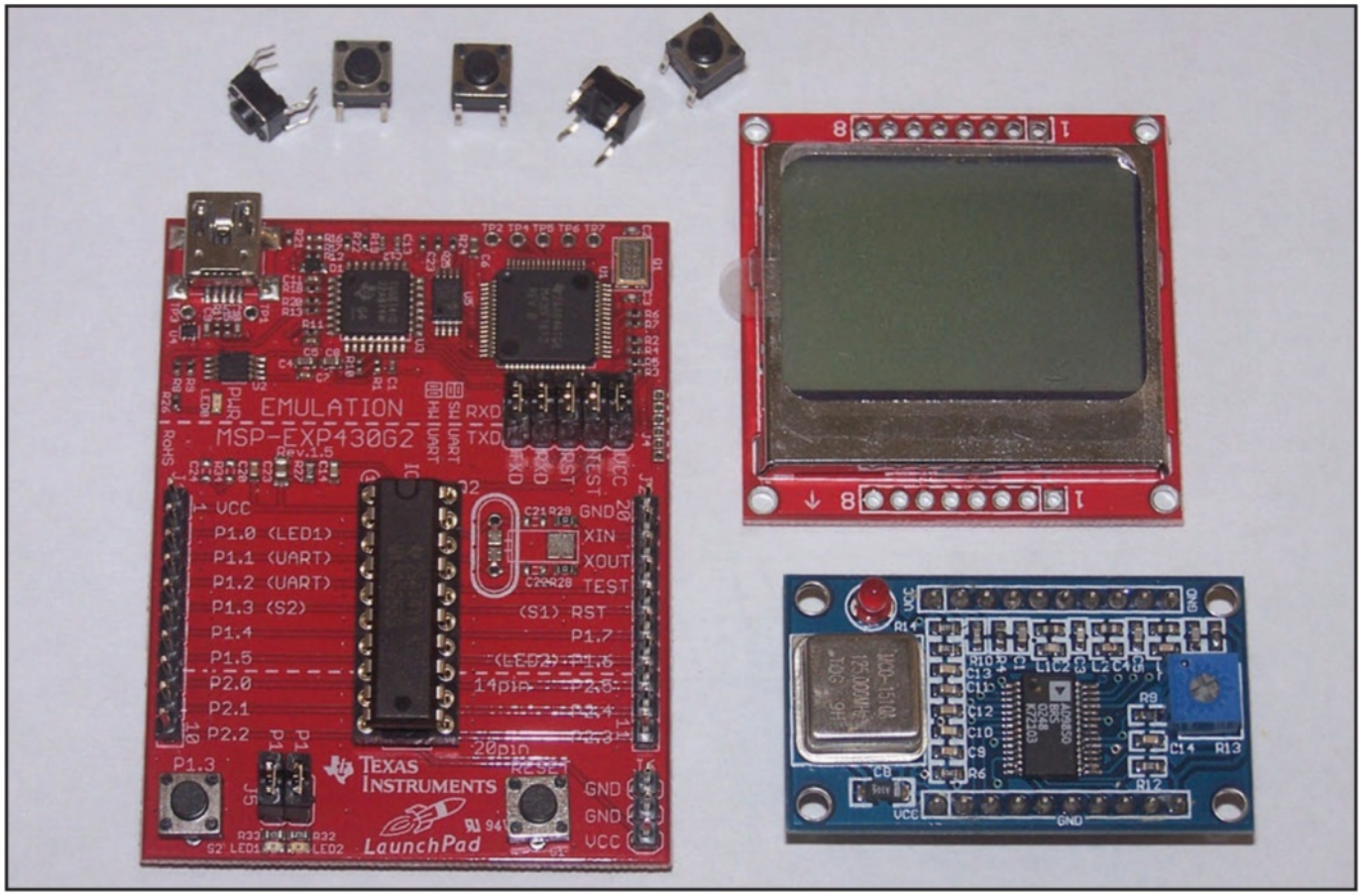

Photo B. Basic parts needed for the beacon include the Texas Instruments Launchpad (left), LCD display (upper right), AD9850 module (lower right), and several switches.

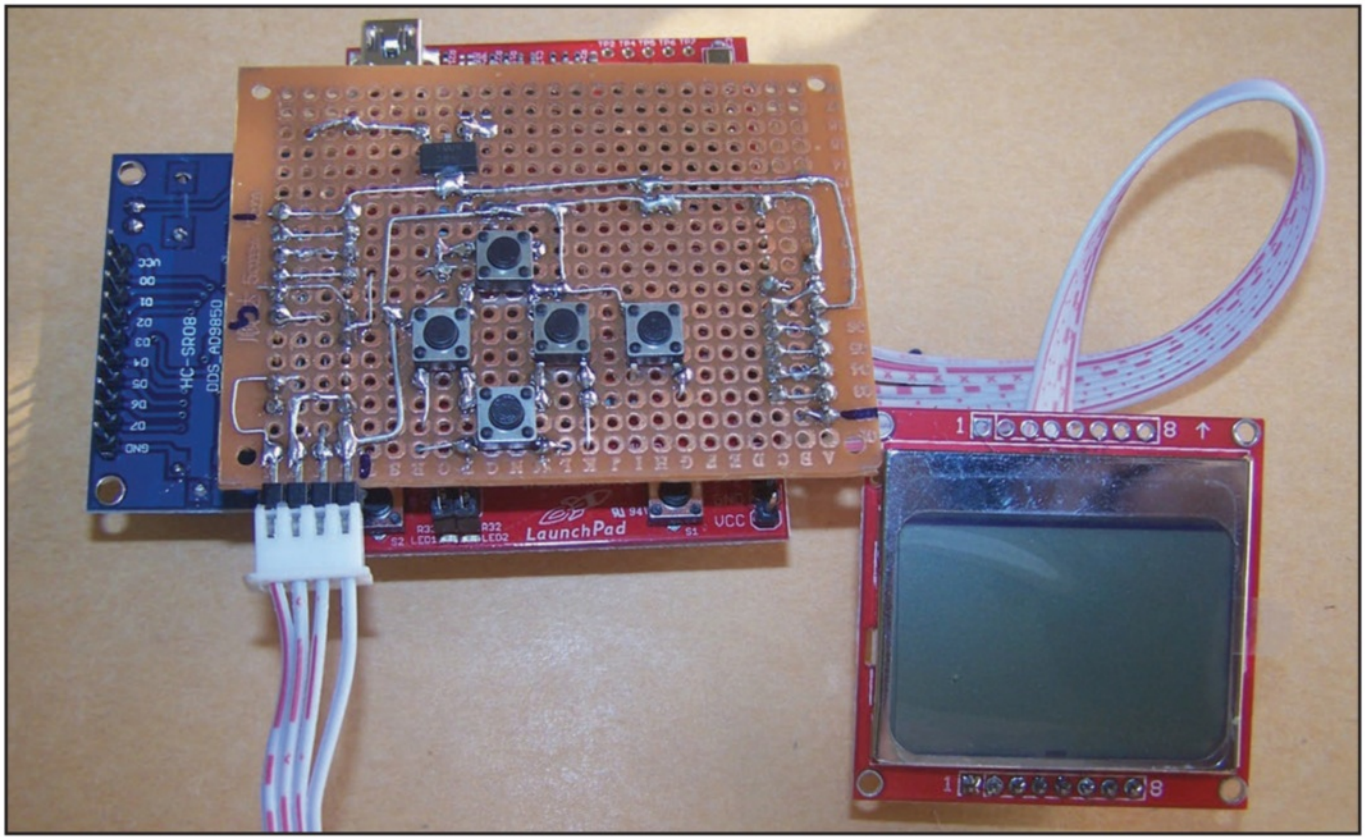

Photo C. The author's semi-kit for the WSPR beacon that he used to sell. He now recommends purchasing a kit from GØUPL (www.hanssummers.com).

the Energia IDE. All details are on this web page: <http://xv4y.radioclub.asia/cq-magazine-wspr-beacon/>.

With this circuit and compiling/uploading the firmware you can build:

- A full-featured WSPR beacon with runtime parameters to select the callsign, grid locator, band, frequency, and WSPR version (standard WSPR-2 or WSPR-15 for VLF).
- A QRSS beacon with menu selection for frequency, keying width, band cycling.
- A very simple DDS controller with VFO A/B and band selection to build a signal generator or a small transceiver local oscillator (LO).

In order to compile the given codes you will need to download and install them in the Energia libraries directory. Two are written by me (RTC Clock and AD9850 control) and one is a third-party library (Nokia-5110 display control). All are available on the previously indicated web page as well as the user's manual for the firmware explaining the settings and beacon behavior.

How to Interact with the Micro-controller

On my kits I used to install five push-buttons, four as up/down and right/left and one for validating. The WSPR firmware uses only three: up, down, and validate. You are free to only solder three buttons, but you may have to change the source code and will not be able to use the VFO software, which needs five buttons. For the price of two buttons and two 1k-Ω resistors, I recommend that you install all five buttons.

If you're using the same resistor values I am (10k and 1k), then the original source code should work. If you're using different values (or low-precision parts), you may need to adjust some numbers in the source code for mapping with the internal ADC measurements. In that case, the simple "AnalogInSerialOut" example code provided with Energia will give you the right values for each button-press.

There is also a PTT signal on Pin 2 of Port 2 of the MSP430. It is high when transmitting and low when idling. While idling, the DDS is put in "power saving" mode, turning off its output. If you run a class C or D/E amplifier, this will be enough to save power. If you want to do trickier things, feel free to use the PTT signal.

Which Voltage for DC Input?

Using a *Low Drop-Out* linear regulator such as the LVT1117-33, input voltage can be between 5V and 10V. If you want to power it from more than 10V (if you have a 12V rail from your PA), just add two or three 1N4007 diodes in series with the regulator input.

For simplicity, I only use one 3.3V Vcc rail for the MSP430G2553, the LCD screen, and the DDS module. The AD9850 is also happy at 5V and will even put out a little bit more RF power at this voltage. When using AD9851 modules (which I don't recommend), this is necessary because the 160-MHz clock may require them to be powered from 5V (even if the module's specifications states the opposite) in order to have reliable functioning.

You can add a separate 5V rail solely for powering the DDS, but take care not to mix both 5V and 3.3V rails because you can easily fry the MSP430 MCU.

At 3.3V, the circuit (LaunchPad + AD9850 + LCD) draws less than 500mA. If you run the AD9850 at 5V, it will draw more current.

Just as a comment, you can also power the circuit through the USB port of the LaunchPad. However, I don't recommend it except for testing and debugging. While using it "in pro-

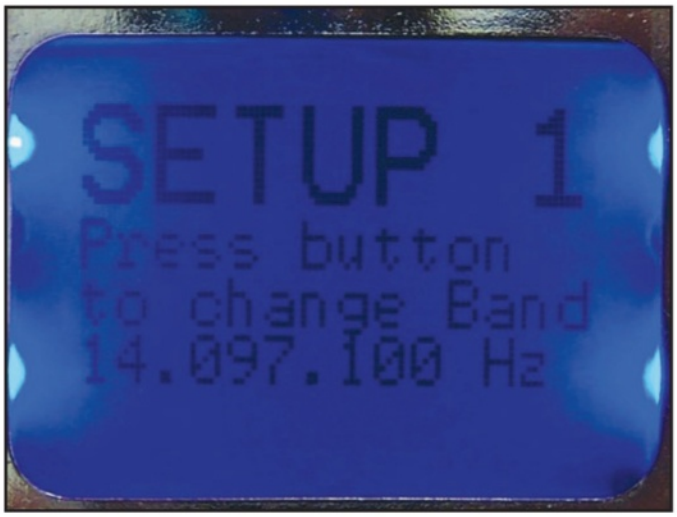

Photo D. Everything should work first time, every time. This is the setup screen you should see on initial power-up.

duction," I recommend that you open the five jumpers connecting the two parts of the LaunchPad and only power the LaunchPad from an outside source. Of course, never connect both power sources at the same time!

Building Advice

There are no special recommendations and everything should work from the first try (photo D). Sometimes, with some screens, when powering on the whole circuit, the LCD does not initialize itself well (maybe it is not ready while receiving the reset commands). If this happens, try to do a reset using the dedicated button on the LaunchPad board (putting the RESET signal to low).

Try to keep your connections short, but frankly speaking, I have been running "hairy" prototypes with long connections and everything still works well.

If you want to see pictures of how I actually built my own beacon, you can have a look at my blog. Most pages are in French, but an automatic translation is provided so you should understand what I'm talking about. Here is the latest article concerning this project: <http://xv4y.radioclub.asia/2013/06/23/montage-dun-kit-filtre-passe-bas-universal-de-kits-and-parts/>

Should You Use a Power Amplifier?

The DDS board output's spectral purity is rather good since it has a fairly high clock reference and 70-MHz low-pass filter. However, if you plan to use this kit for frequencies below 2 MHz or above 25 MHz with a high-gain amplifier, more filtering may be required.

As is, the DDS output power level is around 4 dBm. This is all right for a VFO or a signal generator, but a bit low for a beacon, even with WSPR. One watt is a good target level for such usage, as WSPR is considered at least 10 dB more "sensitive" than CW.

On HF, several class C power amplifier (PA) designs can provide output of about 5W for 10mW input. Kits and Parts (photo E) and the DL-QRP Group offer high-quality kits for this purpose. The latter is more expensive but may be used on higher frequencies. The ZOUT1 output of the DDS board has 50-ohm impedance, so you should be able to hook it directly to either of those PAs.

Using the comparator output (QOUT1) and adjusting the blue potentiometer to have a 50% duty-cycle, you can also feed the RF to a class E power amplifier as Hans, GØUPL, does on his Ultimate 2 and 3 QRSS beacon kits. You may grab its design or the one from Steve, KD1JV. They use digital parts such as the 74HC00 as driver and several Bs170s (or 2N7000s) in parallels for the final.

A Few Final Words

I hope you enjoyed reading this article and that you will have fun building your own project. All my source code is available under GNU GPL License for non-commercial use and may be modified to better fit your needs. Feel free to leave comments on my blog page dedicated to this article and I will try to answer your questions as soon as possible.

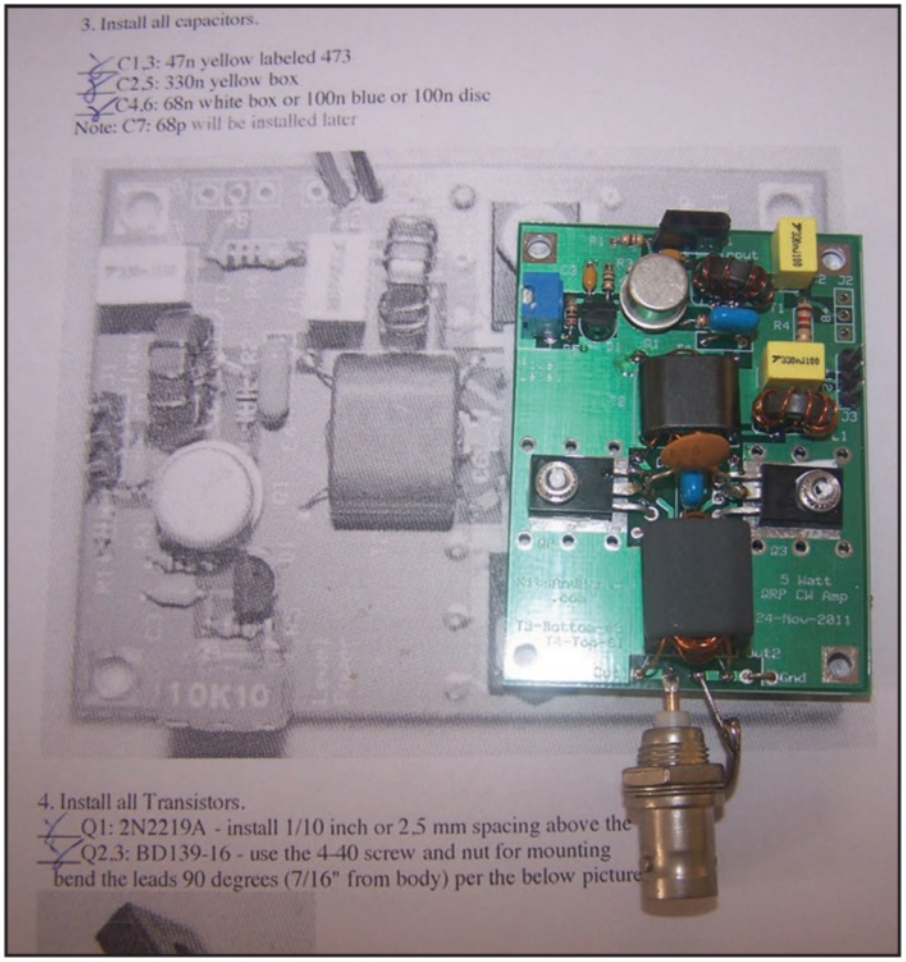

Photo E. Kits and Parts (www.kitsandparts.com) offers a class C power amplifier that may be used with the beacon transmitter. Similar amps are available from other sources as well.

Using a wireless digital network may not seem like traditional QRP, but transmitting with low power is at the core of how these networks operate. Here's a basic guide to setting up your own.

Setting Up a Mesh Network Node

BY J. GORDON BEATTIE, JR.,* W2TTT

You may have read about "mesh nodes" or "mesh networks" and wondered how these amateur radio nodes get configured to produce a functional network. Amateur radio mesh nodes based on the *Austin Broadband-Hamnet (HSMM-MESH) Group's* wonderful software take care of the identification requirements while also creating functional networks that can be used for both routine and emergency communications.[1] With this software, readily available Linksys WRT-54G/GS/GL routers (photo A) can be transformed into mesh network nodes that provide fast and robust self-organizing networks through which we can pass text, data files, video, and even voice traffic.

There is an inherent simplicity to the Linksys implementation that is quite attractive to the new user of this technology and it is strongly recommended as an entry-level system. In this article, we will be discussing the setup and configuration of the Linksys-based HSMM-MESH/Broadband-Hamnet nodes.

Getting Started

You will need to obtain a Linksys router, and that requires some care to get a model and version that are compatible with the mesh software. The compatible models use the Linux operating system. You can find the model and version information on the bottom of the router in the upper left corner of the label right under the Linksys logo as shown in photo B. See Table I for a listing of compatible models and required software. If you find a router on the Internet, it s likely to be pre-loaded with an aftermarket software build called "DD-WRT" which provides some additional conventional router functions. If you find such a unit at an attractive price, don't be worried about compatibility as long as the version is listed in Table I. Of course, the best unit is one that has the correct version, powers up, and is *free*, so check garage sales and local thrift stores. For reference, the WRT-54GS versions 1 through 3 are the best, because they provide the most memory for embedded applications to be resident on the mesh node.

Photo A. Three different models of Linksys routers (from top, WRT54GL, WRT54GS and WRT54G) that are ideal for use as nodes in Broadband/Hamnet (HSMM-MESH) networks.

*e-mail: <W2TTT@att.net>

Model	Version/Notes	Software Version
WRT-54	V1-4 (V1 is 5V only)	bbhn-1.0.0-wrt54g
WRT-54GS	V1-3 Most desirable has large memory capacity	bbhn-1.0.0-wrt54gs
WRT-54GS	V4	bbhn-1.0.0-wrt54gs_v4
WRT-54GL	V1.0–1.1	bbhn-1.0.0-wrt54g

Table I. Mesh network-compatible Linksys WRT-54/WRT54GS/WRT-54GL models.

Once you have your router, plug it in and make sure that it cycles up in a few seconds. If successful, the "Power" and "WLAN" LEDs will be lit. Next, connect your computer's Ethernet port to any one of the router's LAN ports, labeled 1–4, then open up a web browser and enter the IP address <http://192.168.1.1> to log on to the router's administrative console. If the router is in its default mode and is running Linksys software, then you will need to enter nothing in the user name field and "admin" in the password field. If you are repurposing a router with DD-WRT, then you will use the logon of "root" and "admin" as your password. One of these should let you into the router's administrative console.

Troubleshooting Router Access

If you have trouble accessing the router's logon screen, then you may need to get a new IP address from this router. For Windows® PCs, go to a system command prompt[2] and type "IPCONFIG/RELEASE <cr>" and then "IPCONFIG/RENEW<cr>" (see fig. 1). You should then be able to access the router and log on. Apple and Linux-based systems have similar commands.

If you have trouble with the logon and password because you either don't know them or forgot them, then power on the router while holding the reset button down with a pen for about 30 seconds. This will clear the whole configuration and should restore the router to default settings.

Obtaining and Loading the MESH Software

There are several different files to use with your Linksys router depending on its model and version. You will find the correct file name for your hardware in Table I. Download the needed file from either the Broadband-Hamnet web site <http://www.hsmm-mesh.org/software-download.html> or from the file section of the "ComTechGroup" Yahoo Group <http://groups.yahoo.com/group/ComTechGroup/>, which you can easily join by simply requesting access.

Once the file is saved on your computer and you have logged into the router, select the "Administration" section tab and then select the "Upgrade" button. You will be prompted for a filename. Browse over to the correct folder and select the file. *At NO TIME during this phase of the process should you unplug the router from the PC.* Once completed, you will note that the router reboots and is now an unconfigured mesh node. Your router will take a bit longer to boot the mesh software than it did the default Linksys or other router software. The "Power" LED will begin to flash, then the "DMZ" LED will come on. Once the "DMZ" LED goes off and the "WLAN" LED starts to flash, you have successfully loaded and rebooted your mesh node! You will see that the header of the page has your call sign and identifier on top, along with a page of statistical elements. *Congratulate yourself!*

Basic ASIC MESH Node Configuration

You're making progress, but you have more to do. First, you will probably need to repeat the process of releasing the old IP address and obtaining a new one as you did when initially accessing the console. (These addresses are generated by the router itself. See fig. 1.) Once you have the new IP address, then enter "http://localnode:8080 <cr>" to see the main mesh node console as shown in fig. 2. Click on the "Setup" button and enter a logon of "root" and "mesh" as your password.

You will then be presented with a basic configuration screen as shown in fig. 3. You will need to enter a new value for the "Node Name." It should include your call sign with an extension that makes the node unique with respect to its ID. Some folks use functional extensions with serial numbers, while other put in locations. There are no hard and

Photo B. The bottom of a Linksys router will show you its model number and version information.

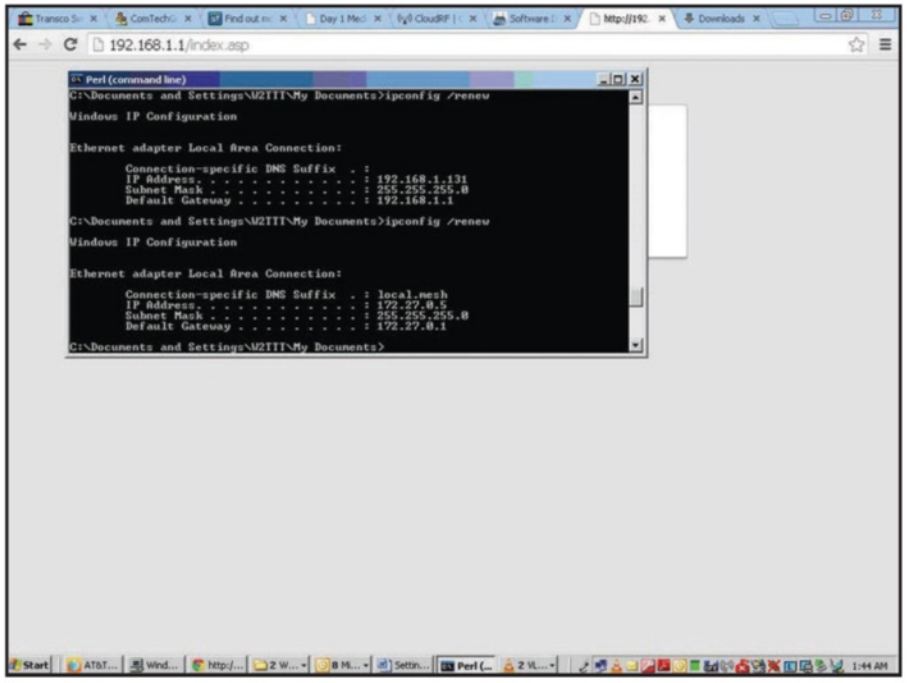

Fig. 1. Windows IPCONFIG example. Note the connection information of "local.mesh" in the lower part of the screen.

fast rules, but make sure that your call sign is at the beginning. You will also need to enter a new node password in two places. Make sure that you remember what you entered. You might even want to put a label on the bottom of the node with that password as long as you can maintain physical security, but in any case, *write it down—somewhere*!

Finally, it is strongly recommended that you move the node off of channel 1, 6, or 11, as they are the most popular ones in use for normal WiFi operations. We usually pick channel 3, but your local RF ecosystem may drive other choices. (*Note:* WiFi channels 1–6 are shared with the 2.3-GHz amateur band, so any planned activities under FCC Part 97

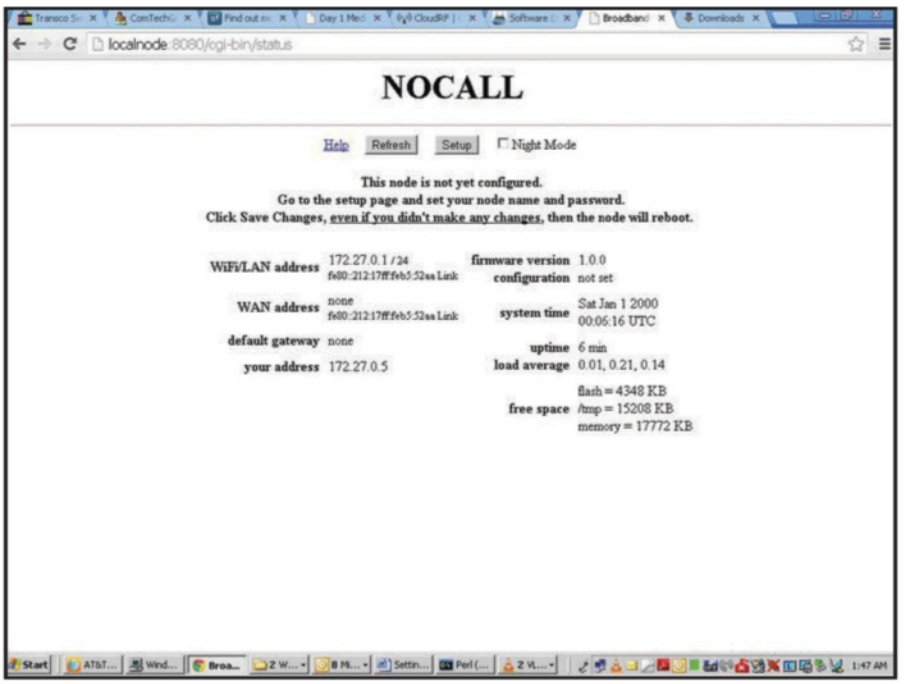

Fig. 2. This is the screen you will see after loading the mesh software but before configuring the node. You now need to do setup.

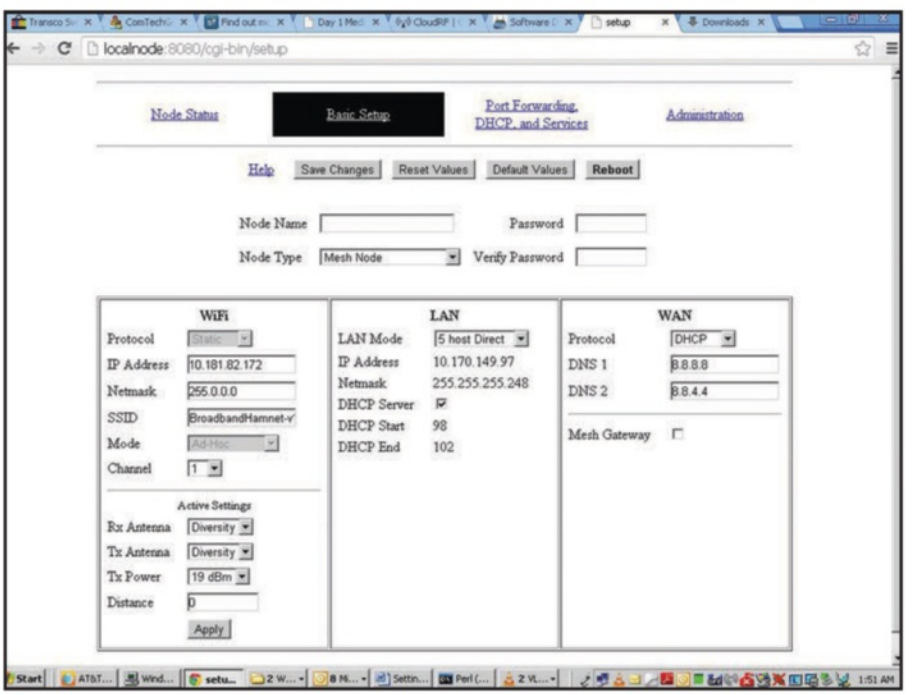

Fig. 3. The configuration screen will guide you through the steps needed for correct setup.

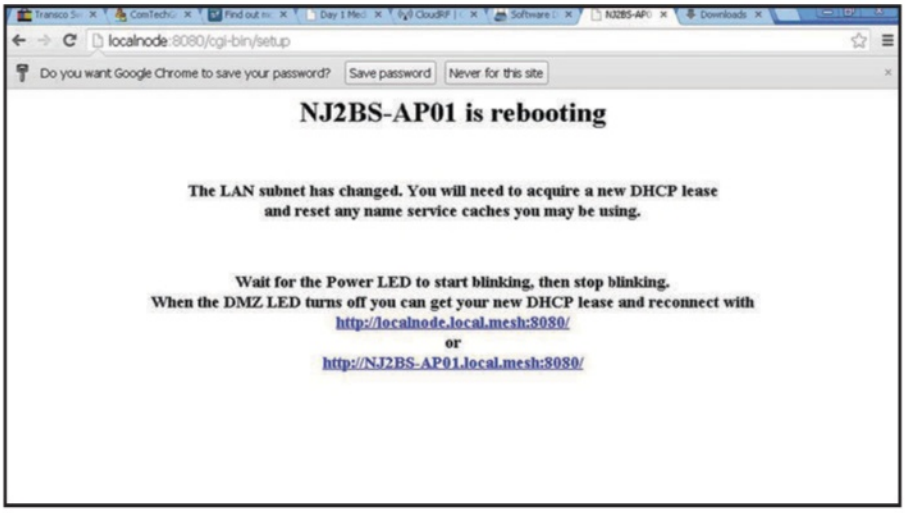

Fig. 4. Once you've entered all the necessary information, you'll get a screen that looks like this while the router is configuring and rebooting itself.

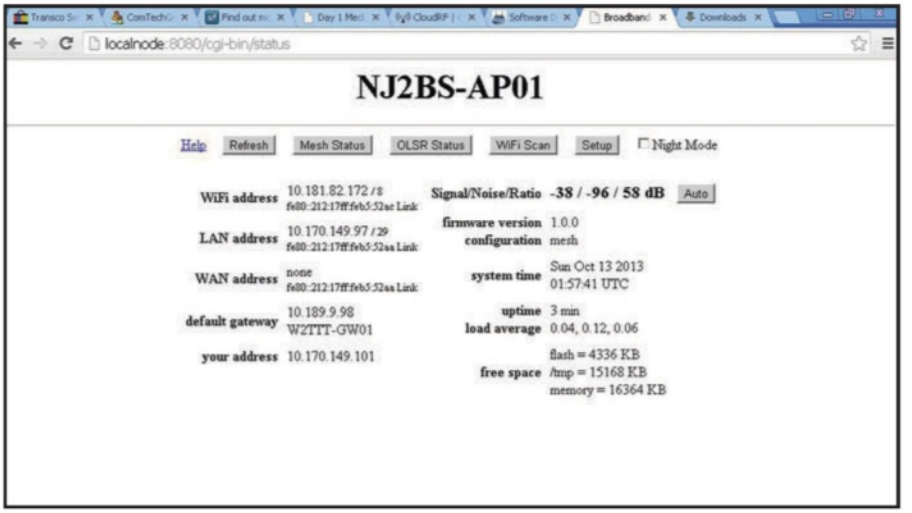

Fig. 5. Voila! Your mesh node is configured and ready to start communicating!

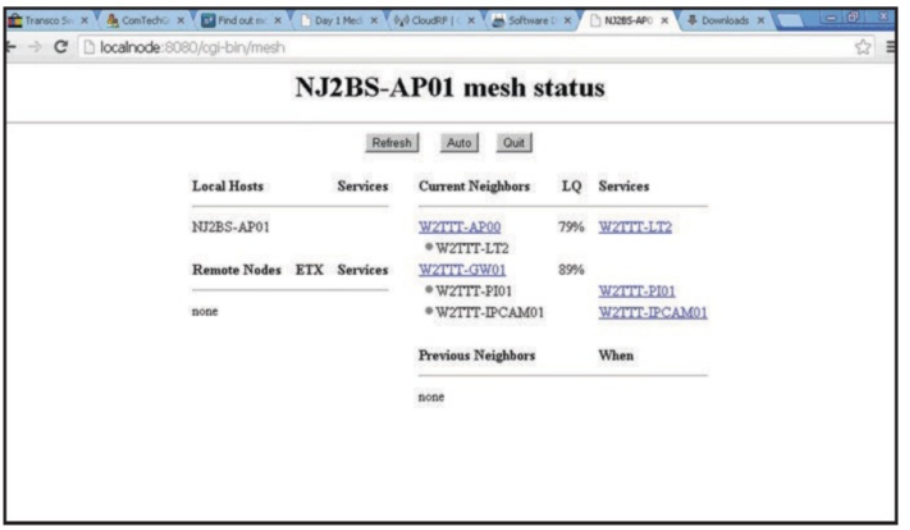

Fig. 6. The mesh network status screen shows you what other nodes are accessible to you as well as what features, or services, they offer.

rules—which allow more power and antenna flexibility than Part 15 rules—must be conducted on one of these channels.)

One interesting thing to note is that if two mesh nodes are on different channels, they will search out other nodes on other channels, but at a cost in network performance. Once it is all entered, press the "Save Changes" button and the node will save your entries and reboot. During that reboot period you will see a screen as shown in fig. 4. Once it comes up as described previously, you will need to once again ensure that the computer gets a new IP address. Once that is done, enter "http://localnode:8080 <cr>" in your web browser, and you will be presented with a screen as shown in fig. 5. You now have a functional configured mesh node that should be ready to communicate. *Congratulate yourself again!*

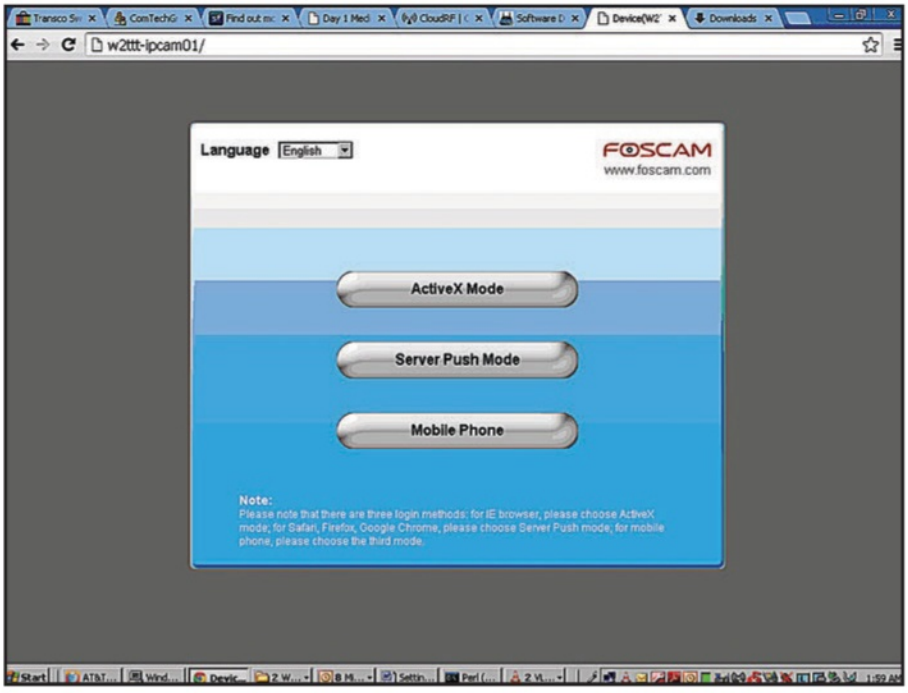

Fig. 7. The Foscam IP camera lets the user select different modes based on which one works best on your browser. The camera is accessed and configured over the mesh network.

Fig. 8. Example of what you might see from the IP camera once you've selected a mode on which to view its photos.

Is There Anybody Out There?

OK, I borrowed the title line from Pink Floyd, but there really is a need to put up more than one node and find out if they can communicate with each other. In order to see neighboring nodes, select the "Mesh Status" button. If you have two configured nodes or have a nearby node, you will see something like what's shown in fig. 6.

As you can see, there are two neighboring mesh nodes and each has some defined "Services." You can connect to these services if they are defined and are using a compatible device. For example, W2TTT-LT2 is a Telnet server that allows for keyboard-to-keyboard connections, while W2TTT-PI01 is a Raspberry Pi computer running an Internet Relay Chat (IRC) server. The W2TTT-IPCAM01 is an IP camera. Connecting to this Foscam brand camera is as easy as clicking on the camera link from your web browser and following the camera server connection sequence (fig. 7). Along the way you will be prompted for a camera logon and password, and then you will be provided with a choice of camera server modes. Try each one with your browser to determine which option will give you success (fig. 8). ActiveX Mode provides full recording and snapshot capabilities which are not shown here as that plug-in was not installed into the Chrome browser that was used for the screen shots in figs. 7 and 8.

Just Do It!

We all have become interested in a topic that we've read about, gotten really fired up, and then came the practical reality of making it happen. You know the type of issues that come up…"I'm distracted," "I don't know how to find or load the new software," "What happens if I do it wrong?" etc. This article is an attempt to help you conquer those issues, and *get on the air*! I hope that you found it helpful and interesting.

Notes

1. See Beattie, "HSMM-MESH Networking in EmComm Applications," *CQ* October 2013, p. 26

2. To access the system command prompt in Windows, click on the "Start" or Windows logo button, then type "CMD" in the search bar and click on "CMD.EXE" when it comes up.

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Ameritron ALS-600 *Solid State FET* compact desktop station amplifier is only 4 dB below 1500 Watts -- less than an S-unit!

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Covers 1.5-22 MHz, (10/12 Meters with $29.95 kit, requires FCC license), instant bandswitching, SWR/thermal protected, extremely quiet, lighted peak reading Cross-Needle SWR/Wattmeter, front panel ALC control, operate/standby switch. 12.5 lbs., 9½Wx7⅛Hx12D in.

Includes ALS-600PS transformer AC power supply for 120/220 VAC, inrush current protected. 32 lbs., 9½Wx6Hx12D inches.

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From QST Magazine, March, 2005

". . . the ampifier faulted only when it was supposed to. It protected itself from our boneheaded, sleep-deprived band changing manuevers . . . "

"I found myself not worrying about damaging this amplifier. It seems quite capable of looking out for itself. . . . Kudos to Ameritron."

"I couldn't hear any noise at all from the SPS (*switching power supply*) on the vertical or quad…"

"I came to greatly appreciate the size, weight, reliability and simplicity of this amplifier."

"The ALS-600S makes it possible to pack a transceiver and a 600 Watt amplifier, that together weigh less than 30 pounds."

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ALS-500MR, $979, ALS-500M/Remote Head
ALS-500RC, $49, Remote head for ALS-500M (for serial # above 13049).
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Free online manuals! Ameritron brings you the finest high power accessories!

ARB-704 amp-to-rig interface. . . $59.95

Protects rig from damage by keying line transients and makes hook-up to your rig easy!

RCS-4 Remote Coax Switch . . . $159.95

Use 1 coax for **4** antennas. No control cable needed. SWR <1.25, 1.5 - 60 MHz. Useable to 100 MHz.

RCS-8V Remote Coax Switch. . . $169.95

Replace **5** coax with 1! 1.2 SWR at 250 MHz. Useable to 450 MHz.<.1 dB loss, 1kW@ 150MHz.

RCS-10 Remote Coax Switch. . . $179.95

Replace **8** coax with 1! SWR<1.3 to 60 MHz.**RCS-10L, $219.95** with lightning arrestors.

New! RCS-12C Fully Automatic Remote Coax Switch Controller. . . $239.95

Band data from transceiver auto selects antennas. Antenna memories. No hotswitching. Rig-to-amp interface. For 3/4 BCD, 1 of 8 relay boxes. **RCS-12, $309.95**, auto controller with 8 coax relay box, to 60 MHz. **RCS-12L, $349.95**, with lightning arrestors.

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Active circuit gives *true* peak/average readings on lighted cross-needle meter.3000/ 300 Watt ranges, Remote sensor.

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1⅝ in. thin on dashboard. Remote sensor, 25' cable. True *peak*, Cross-Needle,1.5 kW, 1.8-30 MHz. *High-SWR* LED.

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Safely tune up for full power, best linearity. Prevents overheating, tube damage, power supply stress, component failure.

ADL-1500 Dummy Load with oil . . . $74.95

Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

ADL-2500 fan-cooled Dry Dummy Load, $219.95

Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

SDA-100 Mobile Screwdriver Antenna

$409.95 80-10M, fiberglass form, Pittman motor, CNC parts, magnetic sensors, #14 wire, 1.2 kW PEP. 6' whip, $24.95

800 Watts . . . $999
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AL-811H, $999. Plugs into 120 VAC outlet. All HF bands. Hi-silicon transformer, heavy duty tank coils, tuned input, operate/standby switch, Xmit LED, ALC, lighted meters, 32 lbs. 13¾Wx8Hx16D in.

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When a simple wire antenna is either all you want or all you can use for your low-power station, consider an end-fed half-wave (EFHW) with KI6SN's combo tuner and SWR bridge.

A QRPer's 40- through 17-Meter EFHW Antenna Coupler with Super-Sensitive SWR Bridge

BY RICHARD FISHER,* KI6SN

Some radio amateurs are QRPers by choice, leaning on efficiencies of their radios, antennas, and operating skills for the thrill of logging contacts up the block and around the world with transmit power of 5 watts or less. Others are QRPers by necessity. They live in cramped quarters where the guy next door's TV, AM-FM radio, and WiFi may be only a thin wall away. Even a 100-watt transceiver will cream them, let alone a kilowatt. Besides, the apartment manager or homeowners association may say outdoor antennas are *verboten.* Therefore, the op hunkers down at 5-watts output or less and lets necessity drive an aerial solution.

For all sorts of good reasons, the end-fed half-wave (EFHW) wire antenna with a counterpoise has been a popular means to that end—for good reasons. They are:

- Simple, inexpensive systems to make
- Suffer no feed-line loss, because *there is no feed line*
- Can be selected for the band or bands of operation based on what your real estate will bear, whether indoors or outdoors
- Need only one support to be erected

*(**IN DEPTH:** What is a counterpoise? Visit:* <http://bit.ly/19mwy9t>.*—KI6SN.)*

Of course, there is no free lunch. The catch here is that your transceiver is looking at an EFHW antenna impedance running in the range of 1,800 to 5,000 ohms—certainly not the 50 ohms for which your radio was designed.

Fortunately, there is a very simple solution. It is one that can be achieved through the work of your own hands:

Build an EFHW antenna coupler, and throw in a *super-sensitive* absorptive SWR bridge to boot (photo A)! We'll call it the *40- through 17-meter EFHW Antenna Coupler with Super-Sensitive SWR Bridge,* which grew from the ideas of two outstanding radio amateurs, who we'll get to in a minute.

First, a Word from Our Sponsor

There are, no doubt, some skeptics getting ready to turn the page. *"An end-fed antenna with a cheesy coupler at QRP levels? What kind of success can you expect with a lame set-up like that?"*

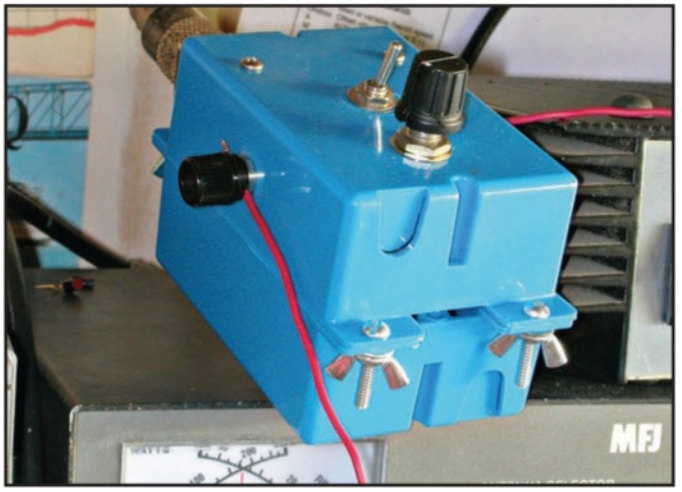

Photo A. With just a handful of parts and a couple of hours at the workbench, this 40- through 17-Meter EFHW Antenna Coupler with Super-Sensitive SWR Bridge *can be your ticket to getting on multiple bands with just a wire antenna and counterpoise. (Photos by KI6SN)*

Believe me, and others who swear by (*not at*) EFHW antennas: They work, even at 5-watts RF output. They can work *really well.*

Here's a KI6SN testimonial. After finishing this coupler-SWR bridge project and:

- Drooping the transceiver-end of a 66-foot, 40-meter half-wave wire from my operating bench through the rafters to the front of the garage ...
- Folding the wire back on itself across the roof to a PVC pole held to a pipe with a bungee cord ...
- And turning the wire 90 degrees horizontally to be tied off at the chimney ...

... We laid a 33-foot long counterpoise on the garage floor out onto the driveway and got on the air.

It was the Sunday morning of the CW leg of the CQ World-Wide DX Contest last November. I tuned the Kenwood TS-140S to 40 meters and peaked the SWR bridge for the best

*Contributing Editor, Public Service Editor, CQ
e-mail: <ki6sn@cq-amateur-radio.com>

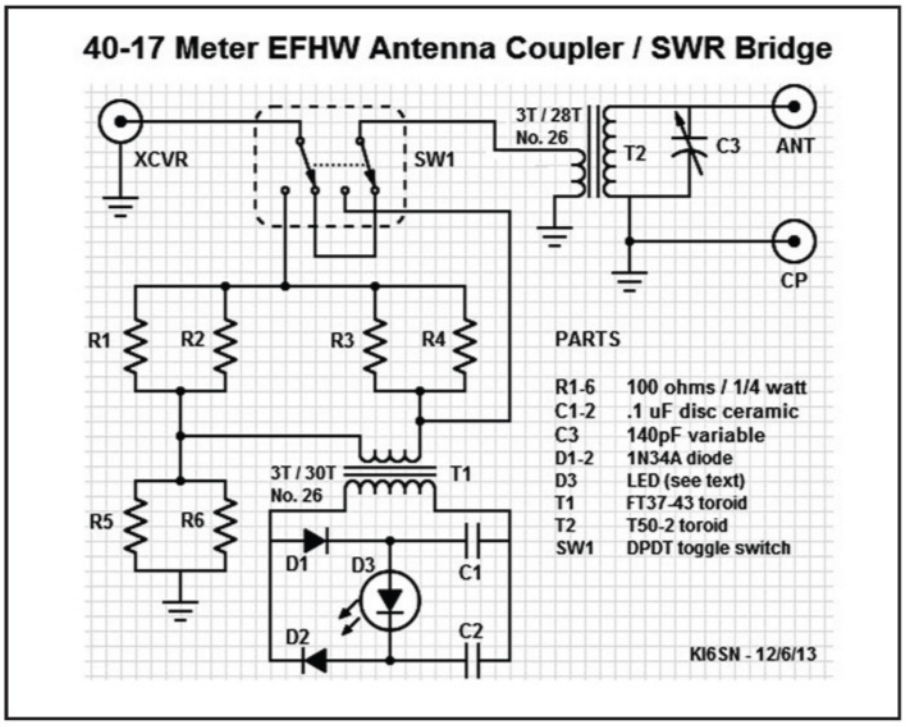

Fig. 1. Note that one wire crossing another without a dot means there is no connection between the two. For example, look at SW1. There are four solder points, left to right, shown at the bottom of the DPDT. Points 2 and 4 are connected, but do not connect to the wire going down and right from point 3. (Courtesy of KI6SN)

match. Running a full "QRP spoonful" (5 watts), I rattled off 14 Japanese stations, a Russian near the border of Mongolia, a Hawaiian, and several Canadians—all in the course of an hour around southern California local sunrise.

Later in the day on 17 meters —with an 18-MHz EFHW dangling about five feet off the garage floor—Randy Dominicak, WA6RKK, just south of the Canadian border in Rathdrum, Idaho, gave me a 5-7 on SSB. Again, I was running 5 watts. This time, though, with a completely "indoor" EFHW wire and counterpoise lying on the garage floor.

Yes, it's a tribute to WA6RKK's and all the DX stations' great operating skills, antennas, and receivers. By the same token, though, it proved an EFHW antenna, for all its simplicity, can be an amazing radiator.

Great Minds ...

When setting out to build a coupling unit capable of multi-band operation, we turned for inspiration to two experts in the amateur radio antenna game:

• Steve Yates, AA5TB, of Fort Worth, Texas, generally considered the world's

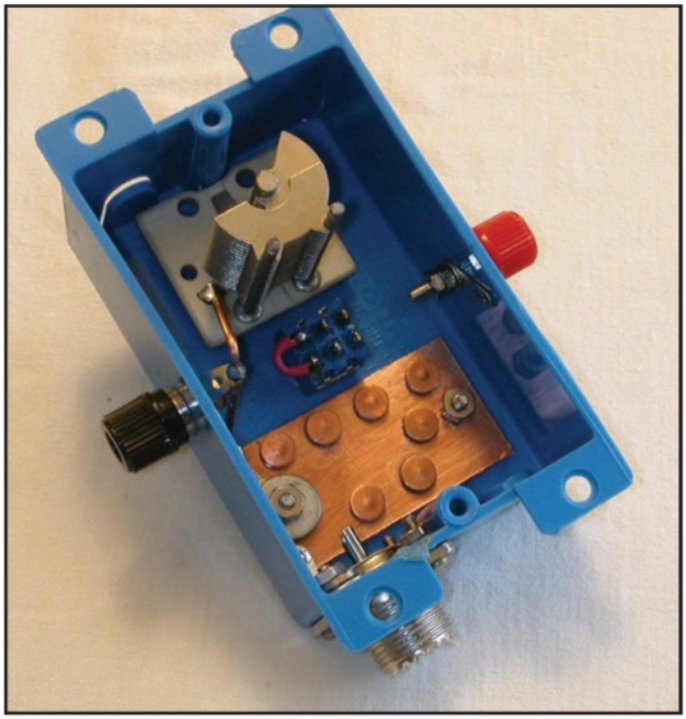

Photo B. The 140-pF air-variable capacitor, where the coupler circuitry will be positioned, is at the top of the box. The SWR PC board, with seven Manhattan pads attached, is at the bottom.

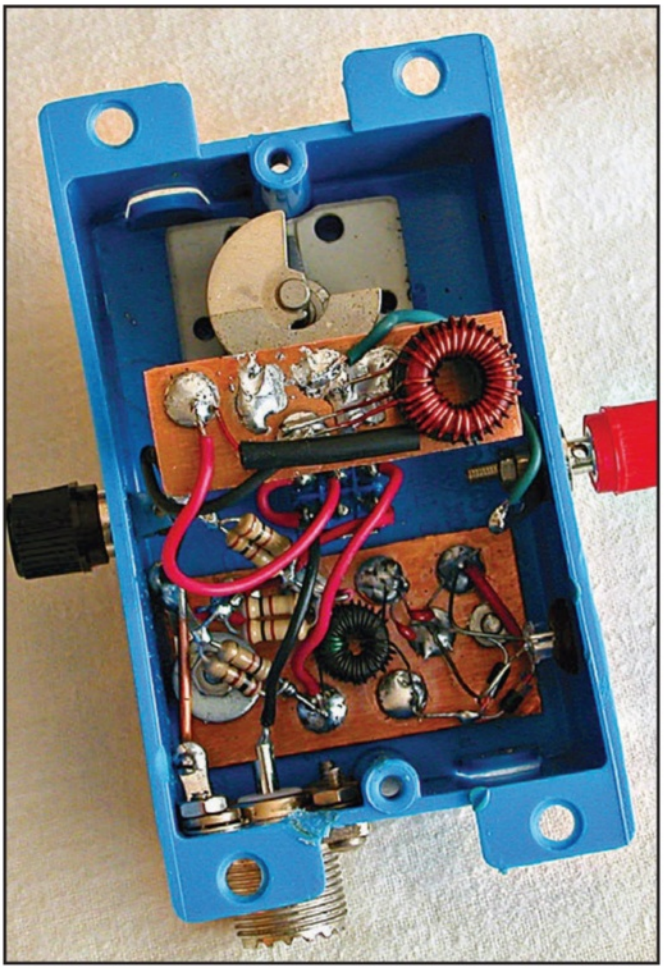

Photo C. It doesn't take long for 8 cubic-inches to be filled with antenna coupling and SWR-sensing components.

leading authority on EFHW antenna coupler design and operation. Visit his website for a textbook's worth of EFHW information at <http://bit.ly/ 1eMGWeL>.

• Glenn Leinweber, VE3DNL, of Hamilton, Ontario, Canada, recognized for his pioneering work in absorptive standing-wave ratio (SWR) bridges, made specifically for QRP operation. The catalyst for using one of his designs came from *An Improved LED SWR Indicator* under VE3DNL's byline appearing in the Spring 2000 edition of the NorCal QRP Club journal *QRPp.*

Of course, the coupler helps your transceiver "see" 50 ohms impedance going into your EFHW, while the SWR bridge allows the operator to "see," via light-emitting diode (LED), when a good match is achieved.

Settling on a Design and Finding Parts

An element from each expert's portfolio makes up the *40- through 17-meter EFHW Antenna Coupler with Super-Sensitive SWR Bridge* design. The schematic is shown in fig. 1. The portion of the circuit beneath SW1 comes from VE3DNL. Everything from T2 to the right is AA5TB's.

There are only a handful of parts needed for this coupler-SWR bridge combination, and many of the parts you may already have on hand. All are available through various parts houses.

Here are some examples:

• **R1-6,** 100 ohm, 1/4-watt resistors (RadioShack® <http://bit.ly/1eSTCRk>)
• **C1-2,** .1-µF capacitors (RadioShack® <http://bit.ly/1bjsyX9>)
• **C3,** 140-pF air-variable capacitor (Hendricks QRP Kits <http://bit.ly/1aCZ1aK>)
• **D1-2,** 1N34A diodes (Dan's Small Parts <http://bit.ly/1bKdKXI>)
• **D3,** LED (RadioShack® <http://bit.ly/1cd49nd>)
• **T1,** FT37-43 toroid (Dan's Small Parts <http://bit.ly/1bKdKXI>)
·**T2,** T50-2 toroid (Dan's Small Parts <http://bit.ly/1bKdKXI>)
• **SW1,** DPDT toggle switch (RadioShack® <http://bit.ly/Iuf3gS>)

For sure, there are many other parts sources for each of the components. By all means, shop around!

Sundry Hardware and Wire

With the exception of nuts and bolts, hardware can be found at RadioShack®:

• Binding posts <http://bit.ly/1d1DlZc>
• SO-239 coax connector <http://bit.ly/1kfFdQp>
• Rubber grommets <http://bit.ly/18FKktA>
• Hook-up wire <http://bit.ly/1dSMs2W>
• Magnet wire <http://bit.ly/1bkdFYV>
• Dual-sided PC board <http://bit.ly/18odZl6>

Once you've built the coupler/SWR bridge, the effort expended in gathering the parts and putting it together will pale in comparison to the enjoyment you'll have in using it.

Let the Soldering Begin!

I decided to construct the unit using Manhattan construction – using small copper-clad pads as solder points for the circuit's components. *(**IN DEPTH:** What is Manhattan construction? Details at* <http://bit.ly/1cXg5em>.*—KI6SN.)*

After scribbling out the point-to-point pad placement based on the schematic, I glued the seven pads on a printed circuit board (PCB) ground plane that had been sized specifically for the enclosure. By the way, the enclosure came from Home Depot. More on that later.

The air variable was mounted at the top of the enclosure where the tuning circuit would be (photo B). The PCB ground plane would go at the bottom of the box—home to the SWR bridge.

When AA5TB's and VE3DNL's circuits were completed, they'd be wired together and connected to the SO-239 coaxial cable transceiver input connector and the antenna (red) and counterpoise (black) binding posts. *(**NOTE:** In fig. 1, input is indicated as XCVR. The antenna is ANT and the counterpoise is CP.—KI6SN.)*

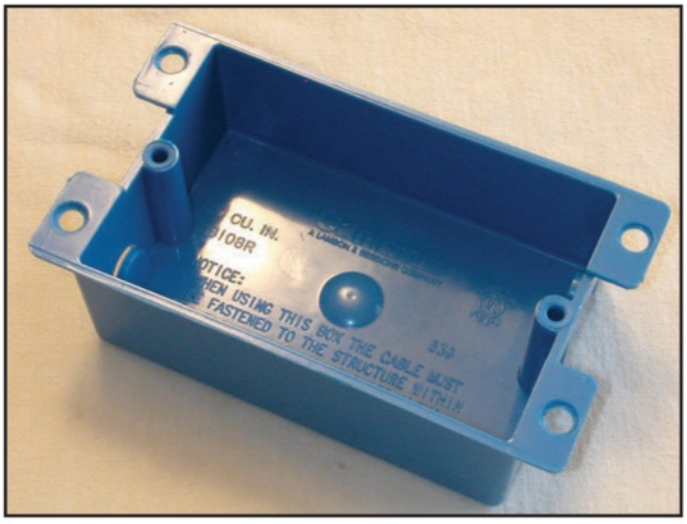

Photo D. Two Carlon 1-Gang, 8 cu. in. Old Work Flanged Shallow Boxes can make a great enclosure for this coupling/SWR bridge unit. Get a pair at Home Depot for less than $3.

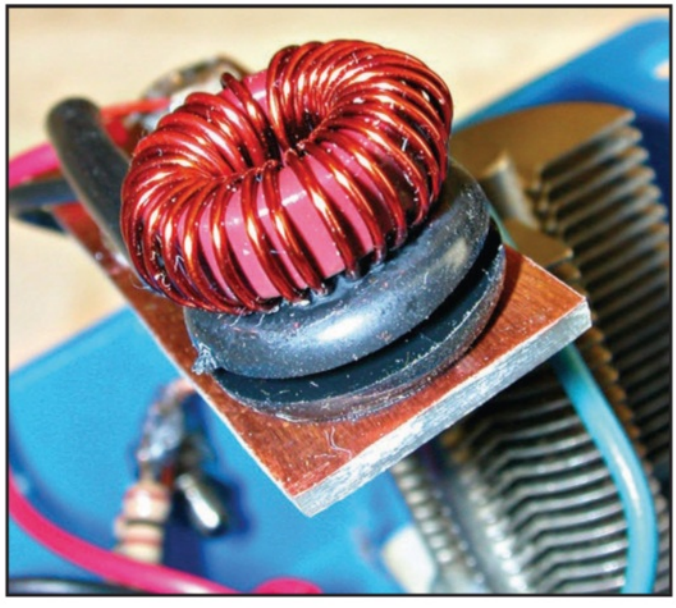

Photo E. Rubber grommets are used not only to insulate the toroid inductors from the PC board ground planes, but to add "shock absorption" to the transformers when the coupler/SWR bridge is being jostled around in a backpack.

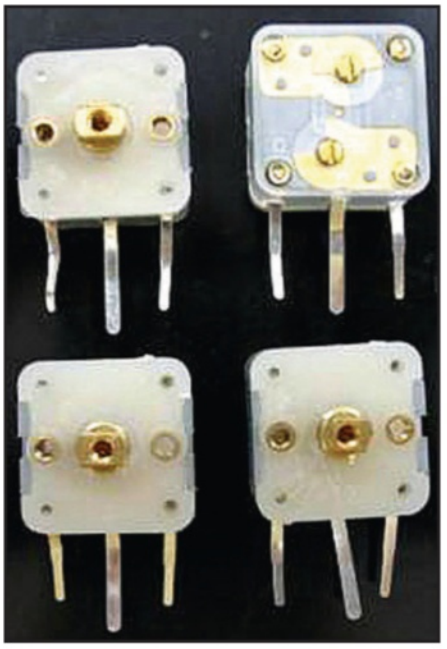

Photo F. There's no need to use an air-variable capacitor for C3. Polyvaricons, each with a 160-pF section, from Hendricks QRP Kits will work beautifully in this circuit. (Internet screen grab)

Since VE3DNL's SWR bridge is *absorptive*, it must be switched IN when tuning for lowest SWR and OUT when tuning is completed. That's the DPDT toggle switch's job. Only then is the operator ready to make contacts.

A view of the completed coupler/SWR bridge is shown in photo C.

What Makes VE3DNL's SWR Bridge 'Super Sensitive?'

VE3DNL branded his accessory *"An Improved LED SWR Indicator."* Here's why:

"To improve SWR sensitivity," he wrote in *QRPp,* "the RF voltage across the bridge arms should be made larger. A broadband RF step-up transformer is required. *(That transformer is made up of the primary and secondary windings on the FT37-43 toroid.—KI6SN.)*

Leinweber pointed out that many LED-based SWR bridge-indicators have a "dead zone" below 2 volts peak-to-peak, resulting in "the sensitivity problem." Back around 2000, "a test with a 2.7-watt transmitter was made to see how high the SWR had to rise before the LED glowed visibly," VE3DNL said. "For SWR below 1.3:1 no light (from the LED) could be seen. With the antenna short-circuited, (infinite SWR), the LED was blindingly bright."

The operator's goal is to tune the circuit so that little-or-no light is coming

Photo G. The SWR bridge's LED can be seen recessed behind the grommet to the right of the red ANT (antenna) binding post.

EFHW Antenna and Counterpoise Data

BAND	FREQ.	ANT	CP
40	7.15	65.45	32.73
30	10.125	46.22	23.11
20	14.175	33.02	16.51
17	18.118	25.83	12.92

Frequency in MHz;
ANT and CP lengths
in feet and decimal feet

Fig. 2. Here are EFHW antenna and counterpoise lengths for 40 through 17 meters. Calculations were based on the frequency at the center of each band. (Courtesy of KI6SN)

from the LED, indicating an impedance match. *Therefore, dead zones such as described are just not helpful.*

"When the 1:10-ratio step-up transformer was added," Leinweber continued, "the same sensitivity test was run. For SWR above 1.06:1, light could be seen." *Much better.*

Leinweber assured that users need not worry about burning out the LED from too much current. In his "improved" circuit, "you actually get less light," he wrote. "With lots of LED current flowing, the RF impedance of the primary winding is very low. It is much lower than the resistive bridge arms."

As a result of this mismatch of impedance, "less RF power is transformed into LED power," he said. "The LED should survive infinite SWR, even when driven by a *full spoonful* (5 watts RF output)."

Project Notes

Enclosure: The piggy-backed plastic enclosures housing the coupler/SWR bridge were $1.20 each at Home Depot and are a mouthful if you ask for them specifically: *Carlon 1-Gang, 8 cu. In. Old Work Flanged Shallow Box.* They're in the electrical department, (See photo D.)

Note that wing nuts are used to hold the top and bottom of the piggybacked enclosure together. This is just personal preference. The two sides are easy to separate if there's ever a need to get inside.

This may sound strange, but: I put several Band-Aids® inside the unit. That way I won't have to think about having a few on hand when I'm on the trail. They don't hurt coupler or SWR bridge performance. And if there's ever a cut or scratch that needs to be attended, I can pop open the box and grab 'em. *Let the wing-nuts fly!*

Resistors: *Why are the 100-ohm R1-6 resistors in three parallel groups?* We want 50 ohms of resistance in each of the three legs. Anyone who has tried to find 50-ohm resistors knows they can be pretty scarce. So by putting two 100-ohm resistors in parallel, we achieve 50 ohms resistance (*remember Ohm's Law—ed.*). Since each resistor is rated at one-quarter watt, that gives us one-half-watt power dissipation in each leg, as well. It's never good practice to "key down" for more than a couple of seconds when tuning up, so the half-watt rating is sufficient at QRP levels.

Inductors: There are two transform-

ers wound on toroids in this design, T1 and T2. Number 26 magnet wire is used for both the primary and secondary windings of each. Note that the 3-turn primary winding of T1 is wound over the middle of the secondary winding. The 3-turn primary of T2 is wound over the *ground end* of the secondary.

When winding is completed, T1 and T2 are glued to rubber grommets, which in turn are glued to the surface of the PC board. *Why?* The grommet separates the inductor from the copper ground plane and acts as a "shock absorber," as well—a nice feature for operators who like to operate trail-friendly radio, photo E. Things can get banged around quite a bit in the field, you know!

Variable capacitor: At KI6SN, a 140-pF air-variable capacitor was used at C3. I'll admit: that's overkill. Hendricks QRP Kits has 160-pF polyvaricon capacitors that are much less-expensive than an air variable. At QRP levels, they will work perfectly well in this circuit. Visit <http://bit.ly/1aCZ1aK>, photo F.

LED: A RadioShack® 5mm Red Wide Angle LED (RS 276-309) was used in the KI6SN version. By all means, though, experiment with any LED you have lying around. It's important to orient the LED properly in the circuit. When holding an LED in your hand, you'll note it has one lead longer than the other. That distinguishes its *cathode* from its *anode.* In fig. 1, the LED's long leg (anode) goes to the junction of D1-C1. The short leg (cathode) goes to the junction of D2-C2.

LED position: You may be wondering why the LED is not pushed through the grommet so it protrudes from the box at the right of the red binding post, photo G. Two reasons:

• If it protrudes, the LED could be damaged when the unit is knocking around on the trail.

• By recessing the LED, it's much easier to see when you're tuning in bright sunlight.

Make it your preference, though—*protrude if you'd like!*

The Easy Part: Making the ANT and CP

OK, it's time to put this jewel in line and on the air. The 50-ohm coax from your transceiver goes to the SO-239 antenna connector on the coupler/SWR bridge.

Now, on what band would you like to operate? Thirty meters might be interesting. Go to fig. 2 and note the figures:

At 10.125 MHz, the middle of the 30-meter band, an EFHW wire must be 46.22-feet long. For simplicity, we'll round that to 46.25 feet, or 46 feet, 3 inches. Pull out your roll of No. 22 insulated stranded hookup wire, measure and cut. *There's your antenna. (**CHECK:** RadioShack® 90-Ft. 22 Gauge Hookup Wire* <http://bit.ly/18p5jOC>.*—KI6SN)*

Referring again to fig. 2, note that a counterpoise for an EFHW 30-meter wire is 23.11 feet—or about 23 feet, $1^1/_2$ inches. Again, grab that roll of No. 22 stranded wire, measure and cut. *There's your counterpoise.*

Connect the 30-meter 46-plus-foot EFHW wire to the antenna (red) binding post and the corresponding 23-plus-foot counterpoise to the black post. Stretch the counterpoise from the coupler along the ground as straight as you can. Now put the EFHW antenna as straight and high as you can. *(**CAUTION:** Whether you're outside or inside, take care that these wires do not come in contact with any electrical wires, appliances and so on.—KI6SN)*

Whistling a Happy Tune-Up

Once the antenna and counterpoise are in place, it's time to match the antenna to your transceiver.

• Connect your coax from the transceiver to the coupler.

• Flip the DPDT switch to the TUNE position—the side of the switch that incorporates the SWR bridge.

• Find a clear 30-meter frequency and *briefly* key down on CW using the least amount of power possible to get an indication on the LED. You can increase to 5 watts if you like *after* the tuning procedure is completed.

• During key down, chances are the LED will be shining brightly from inside the grommet.

• In no more than a few seconds, turn the variable capacitor (C3) until the LED either dims or goes out completely.

• *Key up!* You've found the matching point.

• Flip the DPDT switch to OPERATE, bypassing the SWR bridge.

Whistle a happy tune! QRO (increase power)—up to a full *QRP spoonful*—if you'd like, because you're ready to get on the air. *Halleluiah!*

Return to fig. 2 and cut another EFHW antenna and counterpoise for another band. And another. And another. *What fun!*

Now It's Your Turn

It's a pretty simple antenna system, wouldn't you say? If a matching unit and SWR indicator are the only things standing in your way, build the *40- through 17-Meter EFHW Antenna Coupler with Super-Sensitive SWR Bridge*. You won't be disappointed, and with such a nice slice of amateur spectrum within reach—either on the trail or in your condominium or apartment building—you may be amazed by your success! I certainly was.

So here we are at the supposed peak of the weakest sunspot cycle in decades. What's a QRPer to do when the HF bands aren't open? WA6ARA has one suggestion: Look up!

Satellites and the QRPer . . . or Don't Worry About Sunspots

BY MIKE HERR,* WA6ARA

Imagine for the moment a new band, with propagation out to about 3000 miles. Band openings are brief but extremely predictable. Further, it is perfect for QRP operation. You tune across the new "band" at the appointed time and, suddenly, there are signals, some operating in contest style, others in a ragchew. CW and SSB can be heard. You join in, work many stations or just chat with a friend, all with modest antennas and low power levels. And again, at a predictable time, the "band" closes. The "band" I am describing does exist. It's called amateur radio satellites.

Amateur radio satellites, or OSCARs (Orbital Satellite Carrying Amateur Radio), are satellites orbiting above the Earth that contain equipment to relay amateur radio signals great distances. They represent a solution to poor propagation, the need for high power, and the need for large antennas. Many hams consider the use of amateur radio satellites as "fringe," only for the extremely technically inclined amateur, requiring high power, massive antennas, and intricate rigs. This is simply not so. The equipment is readily available, antennas are small, and the required power levels are low. In fact, low power is preferred. Many hams, including QRPers, already have some or all of the equipment that is needed.

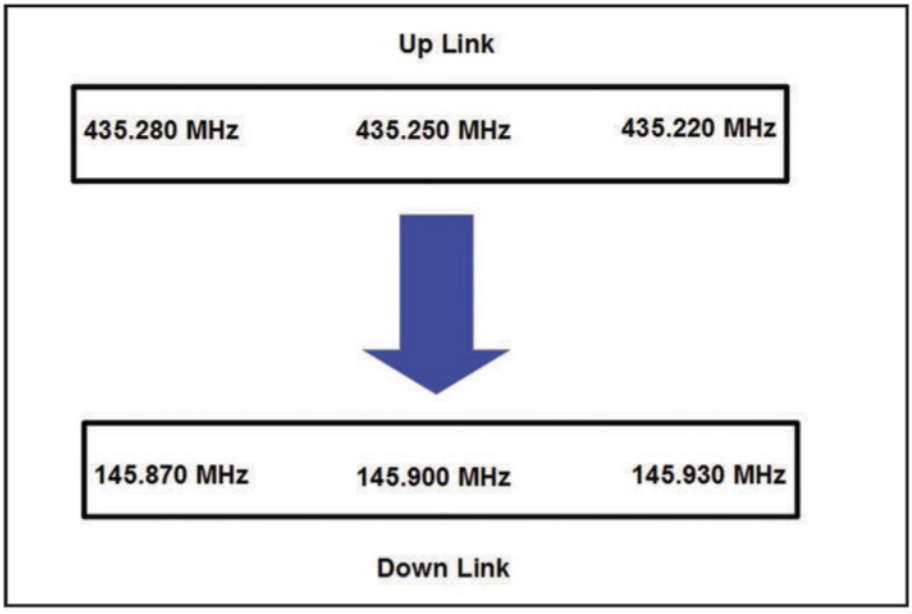

Fig. 1. How a satellite linear transponder works. All signals coming in on the uplink are retransmitted on the downlink. Note that this is an inverting transponder, so the "top" of the uplink passband is the "bottom" of the downlink passband, and what goes in on lower sideband comes out on upper sideband!

Different Satellite "Flavors"

There are basically three types of amateur radio satellites. The first are those doing some sort of scientific mission and using amateur radio frequencies to transmit their data. While it's interesting to track and decode the telemetry, these satellites are not useful for amateur radio communication (although some are opened for amateur use once the scientific mission is completed).

Next are the FM and digital satellites. These are repeaters and digipeaters in the sky. Like their terrestrial cousins, they allow only one user at a time, on a single frequency. These are the so-called "easy sats." You can work them with a handheld, *if* everything is optimum. SO-50[1] is an example of an FM "easy sat."

However, the main interest for the QRPer is the group of satellites containing *linear transponders*. The linear transponder (see fig. 1) takes a portion of one band, amplifies, filters, and heterodynes it to another band. SSB and CW are the primary modes. FM could be used but is *strongly discouraged* due to the bandwidth and 100% duty cycle.

Footprints

Each satellite has a *footprint*, that area of the Earth that it can see. The size of the footprint depends upon the orbital height of the satellite. Anyone inside the

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e-mail: <wa6ara@gmail.com>

footprint may communicate with anyone else inside the footprint. How long you can access the satellite depends upon its orbital speed, which is inverse to its height—i.e., the higher the satellite the slower its ground-path speed and the longer its visibility over any given point on the planet.

High Earth orbit satellites such as AO-10, AO-13, and AO-40 could effectively see half the Earth at a time and would do so for hours. Unfortunately, those magnificent birds are no longer functional. Our present crop of satellites has a more muted footprint and shorter accessibility times. The satellites are constantly moving, so your mutual window with any particular station may only be 5 to 10 minutes long. Fig. 2 shows the footprint of satellite AO-7 on a typical pass.

Amateur radio satellites are QRP-friendly, and low power is encouraged. On the linear transponders, an excessively powerful signal uses a disproportionate amount of the total power available to the transponder. This can cause distortion, drive other signals to become weaker, or even cause the satellite to shut down.

How much power do you need? This depends upon your antenna system. With a modest antenna and a 5-watt signal you can often work across the country. Photo A shows Dave, KB5WIA, having a nice roundtable QSO with W7JPI, VA3JW, WA6DIR, and XE1AO on satellite AO-7. The location is one of the most remote parts of the continental USA, Racetrack Valley, within Death Valley National Park. Note that Dave is using two Yaesu FT-817 transceivers barefoot for the QSO (see below for the reason two radios are needed). Often on a high-angle pass of the satellites I have had great QSOs with only 2 watts of power.

Station Equipment

Many contemporary HF radios have VHF and UHF capability. The FT-817, long a favorite of the QRPer, or the ICOM IC-706, each contain much of the capability you need to operate the satellites. The Elecraft KX-3 with the 2-meter module will also make an excellent portion of the station. If so inclined, as many QRPers are, equipment may be homebrewed.

At a minimum, you will need one radio to transmit and a second one to receive, unless your radio can simultaneously receive on one band and transmit on another. It is very important to be able to listen to your signal. Why? First, to make sure you are not using too much

← *Photo A. Dave, KB5WIA, having a roundtable QSO on the AO-7 satellite from Death Valley National Park in California, one of the most remote parts of the continental USA.*

power! You don't want to be the "lid" who causes the satellite to distort or shut down. QRPers will not have this problem! The second reason is to track your own signal. The satellite is moving, a lot, on the order of 17,000 mph. While operating, the signal will seem to drift. It isn't; it is the Doppler Effect.

As the satellite approaches your station, the frequency will be high, and as it passes and recedes, the frequency will drop. The same can be observed with a passing train. The sound of the horn changes frequency as it passes. By being able to separately adjust the receive and transmit frequencies, and hear your own signal, you can compensate as well as knowing if you are being heard.

If you have a computer and CAT-controlled radios, then the computer can adjust the radios for the Doppler shift. Otherwise, for manual control, the rule

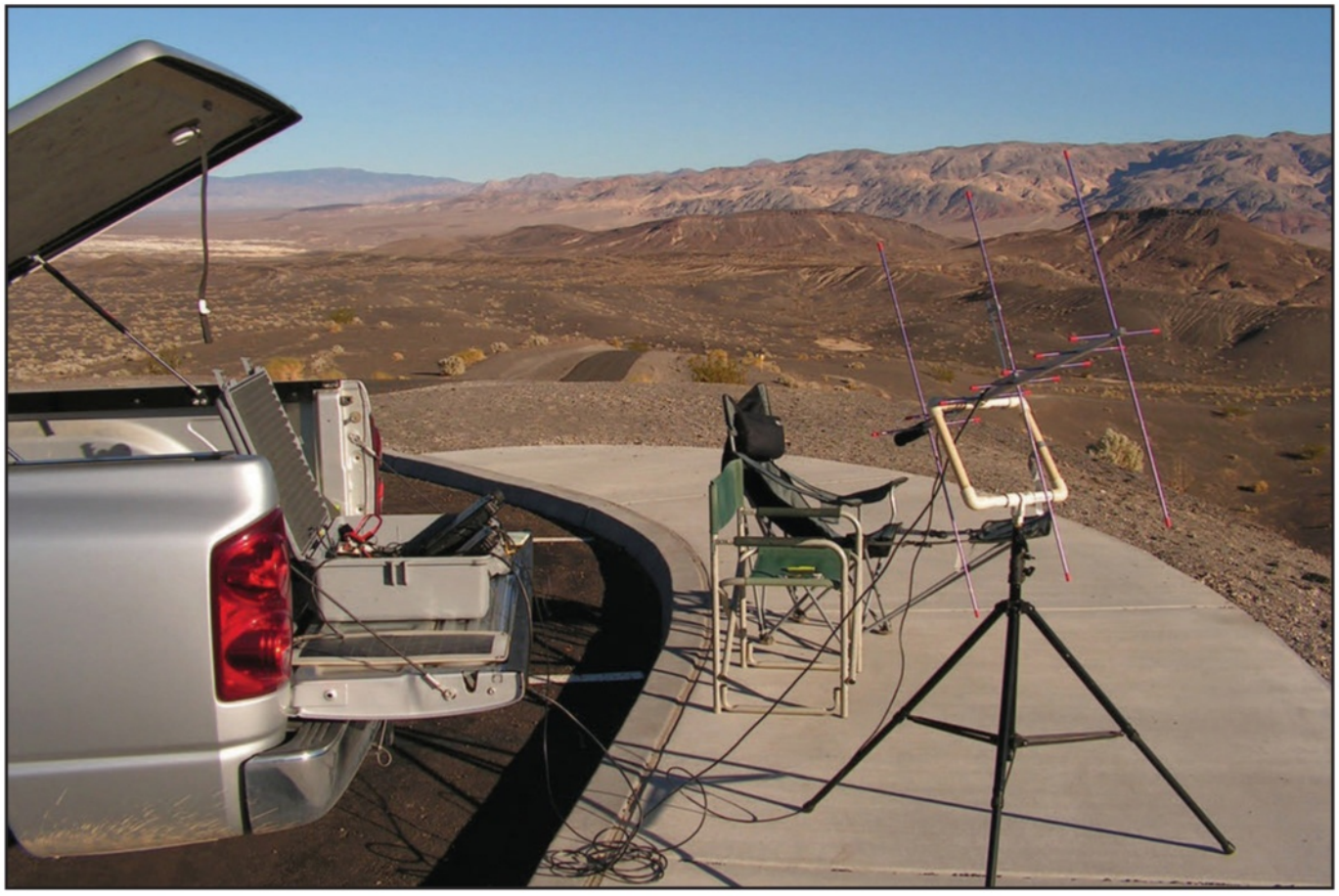

Photo B. The author's portable satellite setup at the edge of Ubehebe Crater in Death Valley, California.

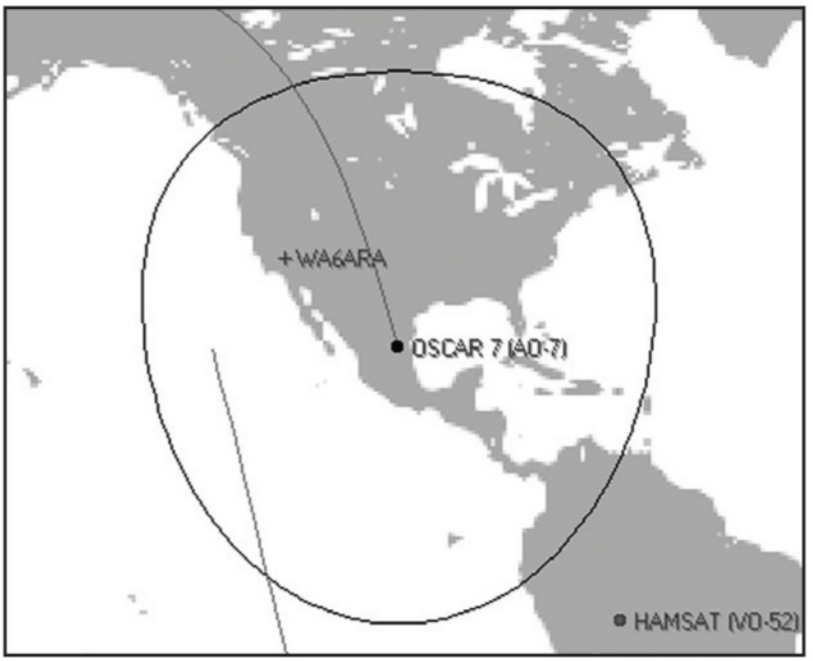

Fig. 2. "Footprint" of OSCAR-7, a nearly 40-year-old satellite that is still going strong. Any two stations within that "footprint" may communicate with each other via the satellite.

of thumb is to adjust only the *higher* frequency of the uplink or downlink. For example, on VO-52 you transmit on 435 MHz and receive on 145 MHz. Leave the receive frequency alone and only adjust the transmit frequency. Mark Spencer, WA8SME, has developed a way to computer control a single FT-817 for both transmit and receive, and to compensate for Doppler.[2] While you will not be able to hear yourself, at the 5-watt level you are not at risk of exces-

Where Are the Satellites?

There are a couple of ways to track amateur radio satellites, either online or with a computing device. Just about any computer will work … desktop, laptop, tablet or phone. Various programs and apps exist, some free, some for a nominal fee. All work well. Also, you will need what is called the *Keplerian elements* for the particular satellite of interest. These are the mathematical values which describe the orbit of the satellite, originally developed by Johannes Kepler in the 17th century. (Of course, he had no idea at the time that his calculations would someday be applied to manmade satellites.)

Online tracking has the advantage of not having to worry about the latest Keplerian elements. AMSAT has an excellent quick look tool at <www.amsat.org/amsat-new/tools/predict/>. Another one is at <www. heavens-above.com>. It has a specific tab for amateur radio satellites. Just open it, enter your location and select the satellite you want. You can get the pass info for several days if desired. The downside is that it only gives you the start location of the pass, the highest point and then the end-of-pass location. It is up to you to mentally interpolate the times and points in the sky as to where the satellite is during a pass. It sounds hard, but really isn't if you are moving the antenna manually. Another negative to online tracking is that you can't slave a rotor or radios to automatically follow the satellite in terms of location or Doppler shift.

If you want to use a computer, then there are a number of options available. For Windows®, the program **Satpc32** is considered the best and has a large support base. It is available for a nominal fee at the AMSAT store <http://store.amsat.org/catalog/index.php?cPath=2>. Also at the AMSAT store is **MacDoppler** for Mac users.

In the freeware world is the excellent program **Orbitron** at <www.stoff.pl>. Linux users should check out **gpredict** at <http://gpredict.oz9aec.net/>. All of these allow for the automatic updating of Keplerian elements as well as slaving the rotors and radios to the computer for automatic tracking and Doppler correction.

Tablet and phone users, especially those with the Android system, should check out **AmsatDroid** at the apps store. While you can't drive the rotors or radios with it, it does give you a nice listing of available passes as well as a world map showing the satellite's location. For the iPhone user, try **HamSat** or **ProSat**, available at the iTunes Apps store.

Your First Satellite Contact

Your first satellite contact, just like your first HF or VHF contact, can be very trying, even for a seasoned ham. I would recommend reading the "Getting Started" series at the AMSAT website <http://www.amsat. org/?page_id=1869>. While somewhat dated, it is still good information.

If the FM satellites are what you are interested in, then a good tutorial for SO-50, presently the only FM satellite we have, is at <www.g6lvb.com/articles/operatingso50.htm>.

For the linear transponder "birds," here is a plan:

First, I will assume you have the antennas and the radios ready to go. I am also going to assume that for your first contacts, you will be doing everything manually. What satellite to go after? I strongly suggest VO-52. It is very strong and reliable. Look at the available passes for your location. Select a time and pass with a high degree of success probability. Weekends tend to be more popular than weekdays; evenings tend to do better on the weekdays and daytime on the weekends. Think about who your audience might be. If you are on the west coast, don't select a pass that is largely over the Pacific Ocean. And don't pick a low-angle pass. While these hold the promise for the most DX, a nice high-angle pass, say above 45 degrees, will be easier for getting started.

Next, get everything ready at least 15 minutes prior to the start of the pass. You don't want to be searching for a coax adapter as the satellite comes up over the horizon. Know which way north is. That sounds simple but you want to know exactly which way *true*, not magnetic, north is as well as other compass points.

For this first pass, I suggest you only listen, do not transmit. Why? All of this is new—tracking time, azimuth and elevation angles as well as frequency—so eliminating transmitting will help out the first time. Select an open area, preferably one without trees or buildings to block your sky view. Have the pass information in front of you, receive radio all powered up, set to upper sideband (more on this later), and the antenna pointed at the approximate location of the beginning of the pass.

The appointed time has come! Start tuning around the satellite's downlink passband, mostly at the center. For VO-52 this is 145.900 MHz. Tune up and down about 15 kHz. Soon you will hear a voice or two, or maybe a CW signal. Move the antenna in both azimuth and elevation to maximize the signal, but keep your eye on approximately where it should be in the sky from the tracking information. More than once I have found myself tracking a satellite using a minor lobe of my antenna and wondering why it is so weak.

Once you find a QSO, listen and see how it is done. Typically, you will find two different types: the fast contest-style QSO and the rag chew. Sometimes the rag chew turns into a big round-table with stations checking in as the satellite comes within their view and others falling off as it leaves. You may have to touch up the receive frequency a bit during the pass. When the pass is over, it is over.

Once you have mastered the receiving end of things, it's time to transmit and hold a QSO. The setup is the same except for the transmitter. For VO-52, you will set it up at 435.250 MHz, lower side band. Why LSB? Because the transponder in VO-52 is *inverting,* so what goes in as lower comes out as upper, and upper sideband is the convention for satellite downlinks. The rest of the setup is the same as receiving.

Now the pass begins, and you hear someone calling CQ. The hard part is where to transmit. First, because the satellite inverts the signal, as you tune *up* in frequency on the uplink (435 MHz) it goes *down* in frequency on the downlink (145 MHz). And just to confuse you a bit more there is old Doppler messing with you. So I suggest you first go down to say 145.890 MHz and tune to 435.260 MHz transmit and send your call sign in CW. Tune with the receiver until you hear it. Once found, only tune the transmit side, not the receive side, of your radio set up. You might try this for a pass or two until you get the hang of finding where you are and correcting for Doppler. In fact, a good time to do this practice is at the times when you would not expect much traffic on the satellites, i.e. over the oceans or mid-day during the week.

Once you have the hang of it, try answering that CQ. Or call CQ yourself. Warning, it may take a time or two to get everything down with moving the antennas, correcting for Doppler and using two radios, but it will quickly become second nature. Adding computer control for antenna positioning and Doppler correction greatly reduces the overall workload and can make satellite operation a real pleasure. Enjoy!

The Next Step. After you have your feet wet on satellite operation, *become the DX*. Satellite operators love to chase Maidenhead grid squares. And the rarer, the better. I am in DM15, fairly rare, but I am on often, so it's not a big problem. I can drive a couple hours to Death Valley, though, and be in DM16 or DM17, which are rare indeed. When you get on the satellite from a rare grid, you can expect a pile up, as everyone wants your grid! Many of us live within a couple hours of grid squares that are rarely, if ever, activated on the satellites. So a day trip with a portable satellite station can be a lot of fun!

sive power and the Doppler correction is done for you. It makes for a nice single-radio package.

Satellite Antennas

Antennas really are the secret to successful satellite operation, just as they are for HF QRP work. For satellites, this means beams. Fortunately, the beam antennas necessary for 145- and 435-MHz operation (the primary bands for satellite operation) are relatively small and can be near ground level. Many operators use a simple tripod from the back yard or balcony, so there's no obvious antenna for the homeowners' association to get excited over.

For the homebrewer, *CQ* Antennas Editor Kent Britain, WA5VJB, has an excellent design for a 145-MHz/435-MHz antenna for satellite use.[3] It is effective, cheap, and simple to build. Commercial antennas by Elk[4] and Arrow[5] have been successfully used for portable and permanent QRP satellite operation. The Elk antenna is a 5-element dual-band log periodic. The Arrow antenna consists of a 3-element 145-MHz antenna with a 7-element 435-MHz antenna set at cross polarization on the same boom. I use one of these in the field with excellent results. Photo B shows my simple setup using an Arrow antenna at the edge of Ubehebe Crater, in Death Valley, California.

It is necessary to know when a particular satellite will appear and what its "track" will be as it crosses the sky. This can be worked out with home computers, tablets, or smart phones. Several excellent programs are available, both commercial and freeware. Once the satellite's pass is known, then the antennas need to track or follow the satellite during its "pass" over your location. At the home QTH, this is often done with rotors in both the azimuth (compass direction) and elevation (up and down) axes. The rotors may be driven by the computer, freeing up the operator of the tracking task. In the field, it is most often done by hand. Simply point the antenna at the approximate location in the sky and tweak slightly for best signal. A helper here is best, as the operator can easily become overtasked with tracking, frequency correction and operating.

Linear Transponder Satellites

There are presently three satellites in orbit with linear transponder capability. These include AO-7, FO-29, and VO-52. AO-7 is the granddaddy of them all. Launched in late 1974, it died in 1981, then amazingly came back to life in

2002. It operates only in daylight (when its solar panels are gathering energy) due to open batteries. The fact that a nearly 40-year-old satellite is still in service speaks highly of solid amateur radio engineering.

AO-7 contains two sets of transponders, one for 145 MHz up and 29 MHz down, and another for 432 MHz up and 145 MHz down. It cycles back and forth between the two transponders approximately every 24 hours. AO-7 is more susceptible to high-power distortion due to the lack of functioning batteries and QRP is very much welcomed here.[6]

FO-29 is another workhorse satellite.[7] Launched by JAMSAT (Japanese AMSAT) in 1990, it still performs well. FO-29's uplink is on 145 MHz and its downlink is on 435 MHz.

VO-52 was launched by India's AMSAT organization in 2005. This is a very strong signal satellite.[8] It receives on 435 MHz (uplink) and transmits on 145 MHz (downlink).

Looking in the Crystal Ball

What does the future hold for amateur radio satellites? Are you going to build a station just to have it be idle due to lack of satellites? No way! At the time of writing this article, several satellites which include linear transponders had just been launched. Their transponders will be activated once their primary scientific missions are completed, maybe about the time you are reading this. These include FUNcube-1 and Delfi-n2Xt.

This year should see the launch of FUNCube-2, KiwiSat, CAS-2A1, and CAS-2A2. In addition, a plethora of satellites with FM repeater capability are scheduled to be launched. AMSAT DL in Germany is actively working on an OSCAR-13 class satellite and there is word of AMSAT NA initiating work on a small "cubesat" satellite with high Earth orbit potential.

So the future is indeed bright. Check out the AMSAT NA web page (www.amsat.org) for specific information on these and future satellites, and consider joining AMSAT and supporting amateur radio satellites.

I have only touched on the use of satellites and QRP. Using satellites, the QRPer opens up a whole new field of operating. Power levels need not be high, antennas may be small and out of the way, homebrewing is encouraged, and the operating in the field, which many QRPers also enjoy, is perfect for including satellites. By all means, get on and give them a try!

Notes

1. See <www.g6lvb.com/articles/operatingso50.htm>
2 - Spencer, Mark, WA8SME, "Satellite CAT Interface for Working the Analog Birds," *QST,* Oct 2012
3. <http://www.wa5vjb.com/references/Cheap%20Antennas-LEOs.pdf>
4. <http://elkantennas.com>
5. <http://www.arrowantennas.com>
6. See <http://www.amsat.org/amsat-new/satellites/sat_summary/ao7.php> and <http://www.satview. org/?sat_id=07530U>. *(Note: While the AMSAT page cautions users about questionable legality of transmitting to AO-7 due to rule changes in the past four decades, the satellite is in regular use and we are unaware of any enforcement action ever being taken against any user.—ed.)*
7. <http://www.amsat.org/amsat-new/satellites/sat_summary/fo29.php>
8. <http://www.amsat.org/amsat-new/satellites/sat_summary/hamsat.php>

BY IRWIN MATH,* WA2NDM

How to Properly Listen to a Restored Antique Radio

Last month, as you may remember, we described the restoration of an antique Atwater Kent radio receiver we obtained at an extremely low price at a local flea market. Well, now that we had a working 1930s era receiver, the thought that if we could listen to some of those actual radio shows of yesteryear on the radio would truly be nostalgic. To do this, however, we needed two things—a recording of some old shows and a suitable transmitter to send them to the radio. As it turned out, the old-show recordings were readily available on the internet (at very reasonable prices) and we purchased a CD with several of our favorites. The transmitter was another matter.

This month we will describe what we came up with. Before starting, you should also realize that this same technique can be used to build a simple low-power (QRP) AM transmitter for almost any amateur band.

For the most part, old radios were AM receivers covering the broadcast band from around 550 to 1500 kHz (1.5 MHz). What we needed, therefore, was a small, low-cost AM transmitter with a range of 10 to 20 feet. Our plan was to have the transmitter hidden in another room, modulated with the old radio show recordings and then fool our guests by telling them that somehow our old radio could pick up stations from the past! To keep things legal we had to limit the power of the transmitter to less than 100 mw into a 10-foot antenna to properly comply with FCC regulations. In the past this would have been done by means of a so-called vacuum-tube-operated "phono oscillator," but we wanted something much more modern and battery operated if possible.

Our first attempt was to use a surplus 1-MHz oscillator (ECS 2100AX-1.0MHz available from Mouser Electronics for less than $5) that we had on hand. This was a TTL unit normally intended for microprocessor clock applications, but since its output was pretty much in the middle of the broadcast band, it seemed like an ideal choice. Applying 5 volts, a 1-foot length of hookup wire as an antenna a foot or so from the radio, and tuning the radio to "100" on the dial resulted in a strong carrier. Now to try to AM modulate it.

Since the output of the oscillator would vary in amplitude from about 3 volts to 5 volts depending on the input DC provided, our first attempt was to simply vary the supply voltage to the oscillator by means of a 1K to 8-ohm audio output transformer that we had on hand. The transformer, a RadioShack 273-1380, was connected backward in the classical plate modulated circuit shown in fig. 1. We then applied a 400-Hz tone from our signal generator to the 8-ohm winding, our scope to the output of the oscillator, and then adjusted the input level until we got a sine-wave modulation envelope. The first waveshape shown in fig. 2 was what we could get, but the second waveshape is what was really desired. When actual audio was applied to the transformer, the sound was clearly present when received by the radio but somewhat distorted, probably due to the non-symmetrical downward modulation. In addition, there were several harmonics due to the square-wave output. Not perfect, but usable.

To clean things up we added a class C tuned amplifier stage to the output of the oscillator as shown in fig. 3. We also moved the modulation transformer from the oscillator to the amplifier, thereby achieving the final modulation waveshape we desired. This stage not only increased the output amplitude but also cleaned up the wave form to make it more sinusoidal and reduce higher order harmonics. In addition, you will note that we con-

*c/o CQ magazine

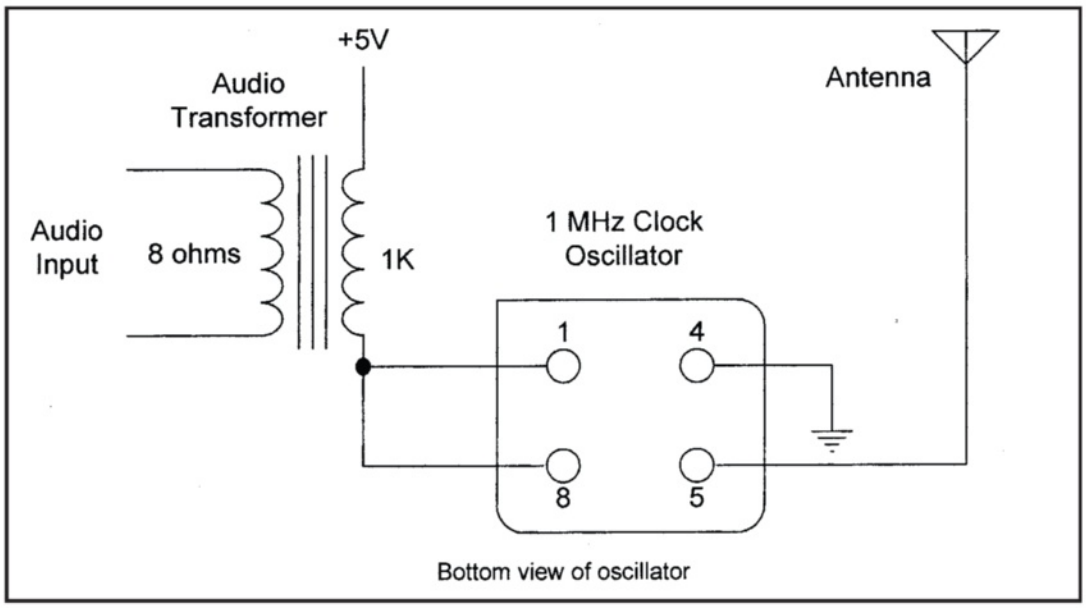

Fig. 1. Basic modulated AM "transmitter."

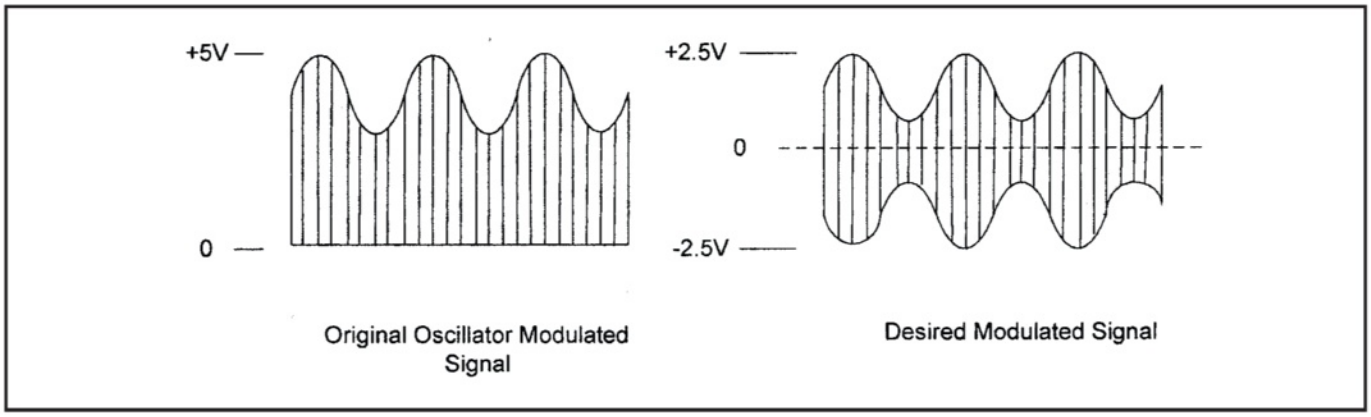

Fig. 2. Waveshapes from "transmitter."

nected the amplifier stage to 9 volts (for more output) and added a 3.9-volt Zener diode to drop the 9-volt supply to the 5 volts required by the oscillator. Note Ct and Lt. These values were chosen to resonate at approximately 1 MHz and were what we had on hand. You certainly can experiment with these values to peak the output signal as much as possible. When you do, adjust the values (and audio input level) as required to achieve a symmetrical modulated signal with no clipping (see fig. 2). Also, whenever using this type of circuit be sure to use only as much antenna length as you need to go a short distance. Too much and your audience may be the FCC!

As we mentioned before, you can use this same technique to build a low-power AM transmitter for any amateur band where you can purchase an oscillator with the correct frequency. Simply scan the catalogs of the various electronic suppliers and look for the frequencies available for clock oscillators. Then adjust the values of the tuned circuit as required for best results. You may be able to change the output transistor for a higher power device to achieve more output, and "key" pin 1 of many similar oscillators for CW operation, but that is a topic for another time. As a final reminder, be sure to check the data sheet for the oscillator you use. You will find additional information as well as any changes in wiring required for the particular unit you may have.

Our final result was a real nostalgic experience. What helped even more was that the old-time radio program CD we obtained also had commercials from the same time period. Under the right circumstances (if you were not in the 21st century) you would swear you were back in the golden age of radio! 73, Irwin, WA2NDM

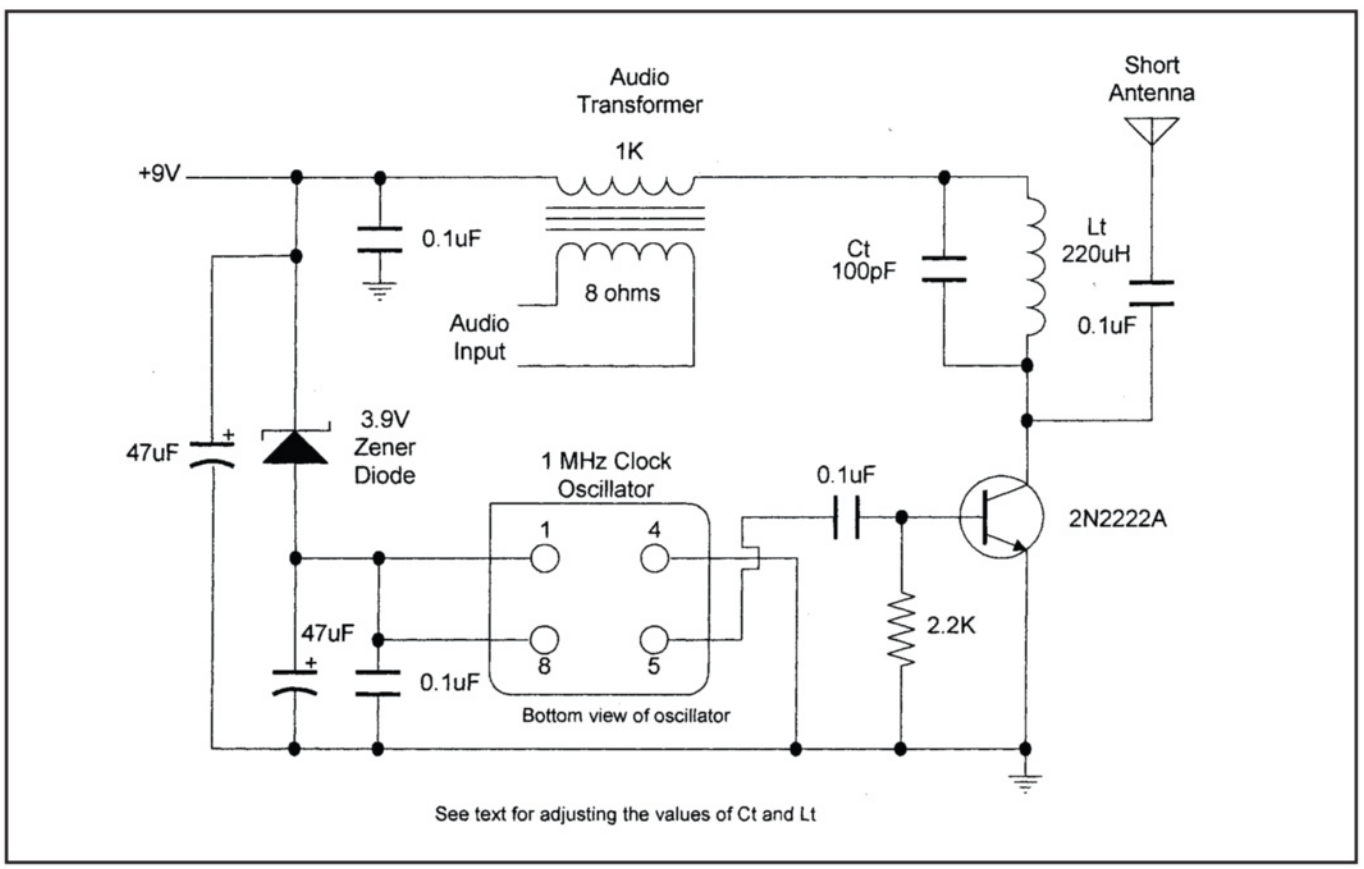

Fig. 3. Final modulated AM "transmitter."

BY RICHARD FISHER,* KI6SN

EmComm in the Sky and on the Ground

SKYWARN Hails Volunteers, while "Spokespersons" get Support from Florida Hams

While a large portion of the Midwestern and eastern United States were heading into a freak pre-winter storm December 7–8, it was "82 degrees and sunny" at the National Hurricane Center in Miami.

If you're an NFL fan, you remember the weekend "Snow Bowls" from Philadelphia to Washington, D.C.; Baltimore to Pittsburgh.

owever, the balmy WX (weather) report from South Florida was what operators at the NHC's WX4NHC issued in QSO exchanges during the annual SKYWARN® Recognition Day (SRD), an all-Saturday on-air activity in commemoration of the organization's thousands of volunteers (photos A and B).

"This is a nationwide on-the-air communications exercise that recognizes volunteer SKYWARN spotters for their dedication and skills in providing the National Weather Service (NWS) and their communities with real-time surface reports during severe weather," Julio Ripoll, WD4R, said. For more than three decades he has been WX4NHC Amateur Radio Assistant Coordinator. "These surface reports help NWS forecasters and local authorities provide the public with advance warnings of severe weather."

SRD is sponsored by Scott Mentzer, NØQE, and Matthew Mehle, KCØTER, of the National Oceanic and Atmospheric Administration (NOAA) <http://www.NHC.NOAA.gov >.

According to the SKYWARN website, it is "a volunteer program with nearly 290,000 trained severe-weather spotters. These volunteers help keep their local communities safe by providing timely and accurate reports of severe weather to the National Weather Service." ***(IN DEPTH:** For complete SKYWARN information, visit <http://www.SKYWARN.org>. – KI6SN.)*

Although spotters "provide essential information for all types of weather hazards," the site notes, "the main responsibility of a SKYWARN® spotter is to identify and describe severe local storms. In the average year, 10,000 severe thunderstorms, 5,000 floods, and more than 1,000 tornadoes occur across the United States. These events threatened lives and property."

During 2013 SRD, radio amateurs from around the world were invited to check in with WX4NHC, giving a brief weather report. It's an opportunity, as well, to test the reliability of each operator's communications equipment.

During the daylong event, "We tested all of our equipment and antennas, including HF, VHF, UHF, EchoLink/IRLP, APRS, and other digital and on-line modes," Ripoll said from WX4NHC.

"Although the HF (high-frequency) propagation from South Florida was not very good, we were able to make 124 contacts on 15, 20, and 40 meters, including 22 NWS offices. The VoIP NWS/NHC Net—run by the SKYWARN group WX1BOX at NWS's Taunton, Massachusetts site—was a success. This net had scheduled many NWS offices and linked EchoLink and IRLP repeaters on Conference room WX-Talk."

Ripoll noted that WX4NHC's most distant contact and weather report was from Tony Langdon, VK3JED, of Long Gully, Victoria, Australia, who was operating mobile using an IRLP repeater.

The lowest temperature reported was from the Arrowhead SKYWARN Response Team, KØNWS, in Duluth, Minnesota. *How cold was it, Johnny?*

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Photo A. Lloyd Kurtzman, W4KAM, left, and Julio Ripoll, WD4R, take their turn at the operating position at WX4NHC from the National Hurricane Center, Miami, for 2013 SKYWARN® Recognition Day. (Courtesy of WD4R)

How about –6 degrees Fahrenheit, with a wind chill factor of –26 . . . *and snowing?*

"We felt a little guilty when we gave them our report of *82 degrees and sunny* in South Florida," Ripoll said.

WX4NHC made contact with WFØEMA, at Federal Emergency Management Agency (FEMA) Headquarters, on 15 and 20 meters with Ted Okada, K4HNL, at the controls from FEMA.

"Ted had visited WX4NHC," Ripoll said, "and then installed the amateur radio station at FEMA Headquarters. This was the first HF contact between FEMA HQ and the NHC."

WX4NHC "appreciates all of the SKYWARN Spotters for their dedication and valuable surface reports," Ripoll said. "They are the eyes and ears for NWS and NHC."

He also thanked the VoIP Hurricane Net team operating from NWS Taunton "for sponsoring the net on EchoLink/IRLP."

Stations that contacted WX4NHC can request a QSL card via WD4R <http://www. QRZ.com/db/WD4R>. *(**VISIT:** The WD4R home page at <http://www.wd4r.com>.—KI6SN)*

Photo B. The Miami-based WX4NHC SRD team included, from left, Julio Ripoll WD4R; Alan Wolfe, WB4L; Phil Moldovan, N4LCZ; and Louis Cruz, N4LDG. (Courtesy of WD4R)

Photo C. Robert McNeill, W4MBD, and Ed Pitts, K5OF, take their post in the Newport, North Carolina NWS conference room during SRD 2013. (Courtesy of KJ4JPE and John Cole)

Grassroots SKYWARN® Activity was Brisk in North Carolina

While WX4NHC is widely regarded as the hub of the wheel during events such as SKYWARN® Recognition Day, there is a beehive of activity at the grassroots level, as well. Here is a snapshot of SRD action centered on the National Weather Service office in Newport, North Carolina.— *KI6SN.*

SKYWARN® Recognition Day 2013 began at 2400 UTC at NWS Newport with the arrival of Ron Civils, KC4WVV, of Deep Run, North Carolina, who spent the wee-hours of Saturday making contacts on 40 meters.

Photo D. William Moore, KK4SUF; David Kay, KJ4IGZ; Terry Passey, K4TRP; and Mike Miller, KK4VNH; oversaw operations from the Carteret County EmComm trailer during 2013 SRD. (Courtesy of KJ4JPE and John Cole)

Meanwhile, from her home in Swansboro, Janice Hopkins, KJ4JPE, made contacts as WX4MHX on the 2-meter K4GRW repeater using IRLP 9219. Later Saturday she carried on that activity from the NWS office in Newport. *(**MORE:** For a peek inside WX4MHX, visit <http://www.QRZ.com/db/WX4MHX>.—KI6SN)*

Terry Passey, K4TRP, made 10-meter contacts throughout Saturday using the Carteret County Amateur Radio EmComm trailer. Working inside NWS Newport was Ed Pitts, K5OF, using his Yaesu HF transceiver on 20 meters with the help of David Myers, KK4DEX, and Ed Myers, K4PEF's portable antenna trailer.

NWS Newport Chief Coordinating Meteorologist John Cole and Meteorologist Hal Austin, NC4HA, joined other staff members in welcoming more than thirty radio amateurs and their families, and giving tours of the facility.

Nineteen NWS contacts were made, along with many other SKYWARN amateurs (photos C and D).

*(**NOTE:** Information for this report was provided by Janice Hopkins, KJ4JPE, ARRL North Carolina Section Public Information Officer. She shared photography duties with NWS Newport's John Cole.—KI6SN)*

Photo E. Richard Pelchat, KK4KTX, maintained radio communications with Lake County ARES® net control station N4FLA from his Mount Dora Bicycle Festival (MDBF) rest stop radio post. (Courtesy of K1AYZ)

Florida Hams "Spoke Up" for Mount Dora Bicycle Festival

The Lake County (Florida) Amateur Radio Emergency Service provided radio communications to support the three-day Mount Dora Bicycle Festival sponsored by the Mount Dora Area Chamber of Commerce.

This was the 39th year for the annual event held each October.

"We had sunny weather for the three days with moderate temperatures and reasonable humidity so there were no reports of heat exhaustion," writes Ted Luebbers, K1AYZ, Lake County ARES® (Amateur Radio Emergency Service) Public Information Officer. "There were 703 bicycle riders registered this year, which was a slight increase over the past year" he said. "Most of the riders were from Florida, but there were some from various places in the United States. This is not a competitive race but a series of 15 separate bicycle tours through Lake County's countryside. The county has 1,400 named lakes and is considered to be Central Florida's hill country. This combination provides a scenic background and significant challenges for the riders. It keeps them coming back year after year."

The ARES group had 20 radio operators helping to keep track of the bicycle riders, K1AYZ reported. ARES also set up at rest areas, provided SAG wagons (vehicles that support cyclists) and radio-equipped mobile patrol vehicles (photos E and F).

"The ARES volunteers provided 255 man hours of service over the three days, Luebbers said. "All vehicles were directed by the N4FLA net control station, which had its mobile command trailer set up in the parking lot of the Mount Dora Chamber of Commerce.

"We used a 2-meter repeater provided by K4AUS on 147.390 MHz, and APRS (Automatic Packet Reporting System), with the 27-inch video monitor mounted in the trailer to keep tabs on the three SAG wagons. This video system can also be used to monitor weather conditions during any event."

Photo F. Strait Hollis, KT4YA, ARES® event coordinator for the MDBF, used his pick up as one of the mobile patrol vehicles and cyclist support wagons during the three-day festival. (Courtesy of K1AYZ)

A total of nine riders were transported to the Mount Dora staging area due to mechanical problems "or just getting tired out," K1AYZ said. "We had one report of *a rider down* with what appeared to be serious injuries . . . EMS was called and the fallen rider was transported by air to a local hospital for evaluation. Later we received a report that he was not seriously hurt and was released from the hospital."

Luebbers noted that the Lake Area Radio Association has been providing on-course radio communications for the Mount Dora Bicycle Festival for more than twenty years. LARA uses events such as this "to train its members to be ready to provide emergency radio communications for disaster situations such as hurricanes and tornadoes, which are not uncommon in this part of Florida. Members volunteer their time, radio equipment, and vehicles as a public service to the community," K1AYZ said.

*(**IN DEPTH:** For more information about amateur radio activity in Lake County, visit <http://www.n4fla.org> and <http://www.k4fc.org>.—KI6SN)*

Finis . . .

That's it for this month's *CQ* "Public Service" column. Remember, we're always on the lookout for the stories of your EmComm activities—whether it's from the scene of an emergency, training for one or your public relations efforts in supporting community activities. Please keep me on your mailing list via <KI6SN@cq-amateur-radio.com>. Every report helps us all to hone our EmComm skills. Let's hear from you or your organization soon!

73, Richard, KI6SN

BY JOE EISENBERG,* KØNEB

QRP Special

A Pair of QRP Quickies

When choosing a kit for building as a group or a first-time kit builder, the choices sometimes can be difficult. When building a kit as a group, the main limitations of time and space come into play. The need for a simple and quick-to-build kit becomes most important. Here is a kit that meets those requirements and puts out a great CW signal! The NS-40, designed by David Cripe, NMØS and sold by the Four States QRP Group is a great little 40-meter, crystal-controlled, 5-watt CW transmitter.

The NS-40 has a very small parts count, and no toroids to wind due to its unique design, making use of PC-board printed coils integrated into the PC-board design. Of course, the tradeoff with this design is that the board has to be a bit larger than would have been necessary if toroids had been used, but with no toroids to wind, you get a QSL-card-size board (more on that later). With just 14 parts to be soldered onto the board, this kit can be assembled by experienced builders in less than 30 minutes! This makes the NS-40 ideal for a beginning kit builder or for a group kit-building experience. I placed the resistors and capacitors first, followed by the other components.

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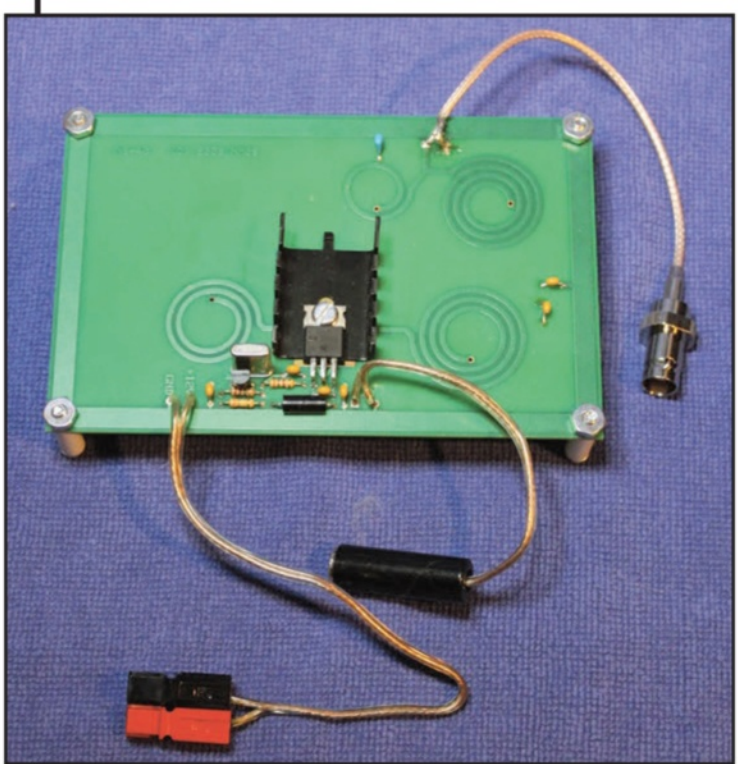
e-mail: <k0neb@cq-amateur-radio.com>



Completed NS-40 Kit. Only 14 parts make up this fun CW transmitter!

Unlike most kits, there aren't very many parts to sort, so the main cautions that apply are to be very careful in identifying the various capacitors and be sure that they are mounted in their correct locations. Watch your transistors to be sure they are mounted correctly as well, and be sure to use a little heat-sink grease on the final output transistor when mounting it to the board and its heatsink. The heatsink grease allows a more even and efficient flow of heat away from the transistor to the heatsink. The two transistors are the only polarized components in the kit, not including the wiring.

The PC board for the NS-40 is silkscreened and plated through and pre-tinned, making for quick assembly. What makes this PC board special is not only the built-in coils, but also the bottom of the board is printed in the form of a QSL card. Just fill in the particulars of your first contact, take a photo of it, and send that photo to your first contact! What a unique QSL card, and a great reminder of your very first QSO using this simple and fun kit.

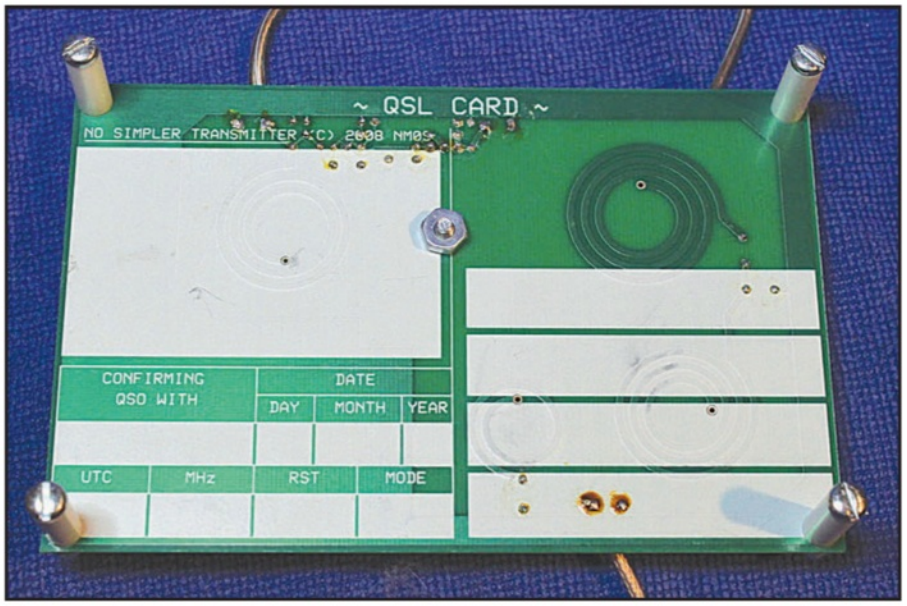
The NS-40 also does not come with any power cables or other connections. Those are easy to do yourself; just be sure that you double check your polarity, especially on the power leads. I advise building the pigtails before assembling the board so that the finishing step of making and attaching the cables goes easily and quickly. When I built my NS-40, I made three pigtails that connect to the board. The first pigtail I made is a connection to a Powerpole connector for 12 VDC. The next cable goes to an inline 1/8-inch jack for connection to either my straight key or keyer output. Finally, I used something I found in a flea market for the RF output. I had found a 4-foot RG-174 Teflon® coax cable that had a male SMA on one end and a female BNC on the other. I cut the female BNC end short to use for the RF output of the NS-40 and used the male SMA end with the longer cable for an RF DF kit connection to my HT. Scrounging this cable in hamfest flea markets, I got two cables for the price of one! Once the board is assembled, the legs for the PC board are attached and the transmitter is ready to go. The NS-40 puts out a full QRP "gallon" at 5 watts and requires no alignment at all.

The NS-40 can be used with either a manual T/R switch or a device such as the 4SQRP Magic Box automatic T/R switch. The NS-40 is on a fixed 40-meter frequency, mine being on 7.040, which is a known QRP watering hole. Of course, being hams, we like to improve on wonderful kits like the NS-40. A great little improvement for it is in the form of another 4SQRP kit, the SAVXO. The SAVXO was designed by Jim Kortge, K8IQY, and like the NS-40, it is sold by the Four States QRP Group.

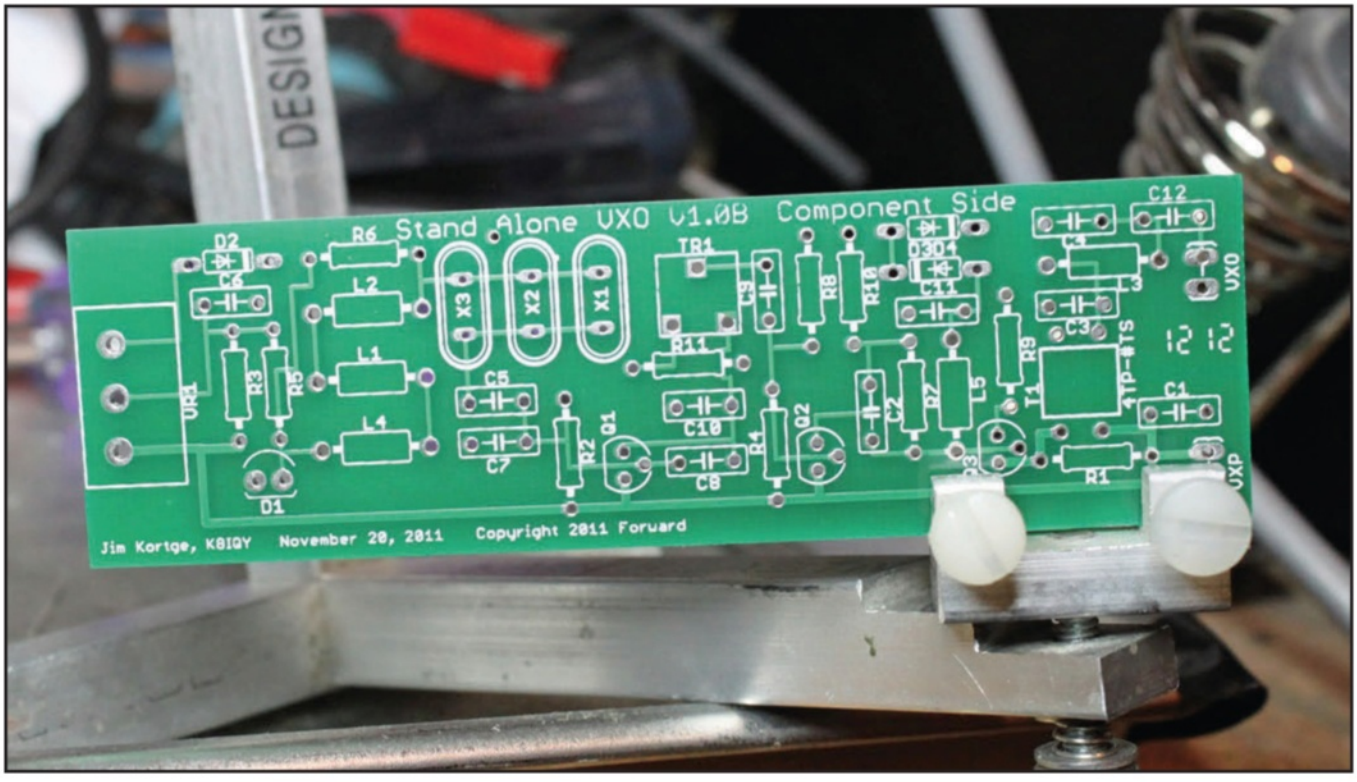
The SAVXO connects to the NS-40 CW transmitter in place of the crystal and provides a stable 7–8-kHz tuning spread. In addition, the SAVXO itself can put out as much as 250 mw, making it usable as a QRPp transmitter as well! There are

two build options in the manual, one for use as a VXO in most oscillator circuits and the other specifically to drive the 5-watt MOSFET final in the NS-40, which requires more drive. Be sure to carefully follow the part selection for your chosen options, as the components needed for either option are both provided in the kit. If you decide to use the SAVXO as a standalone QRPp transmitter, be sure to download the additional information on the web site for the SAVXO.

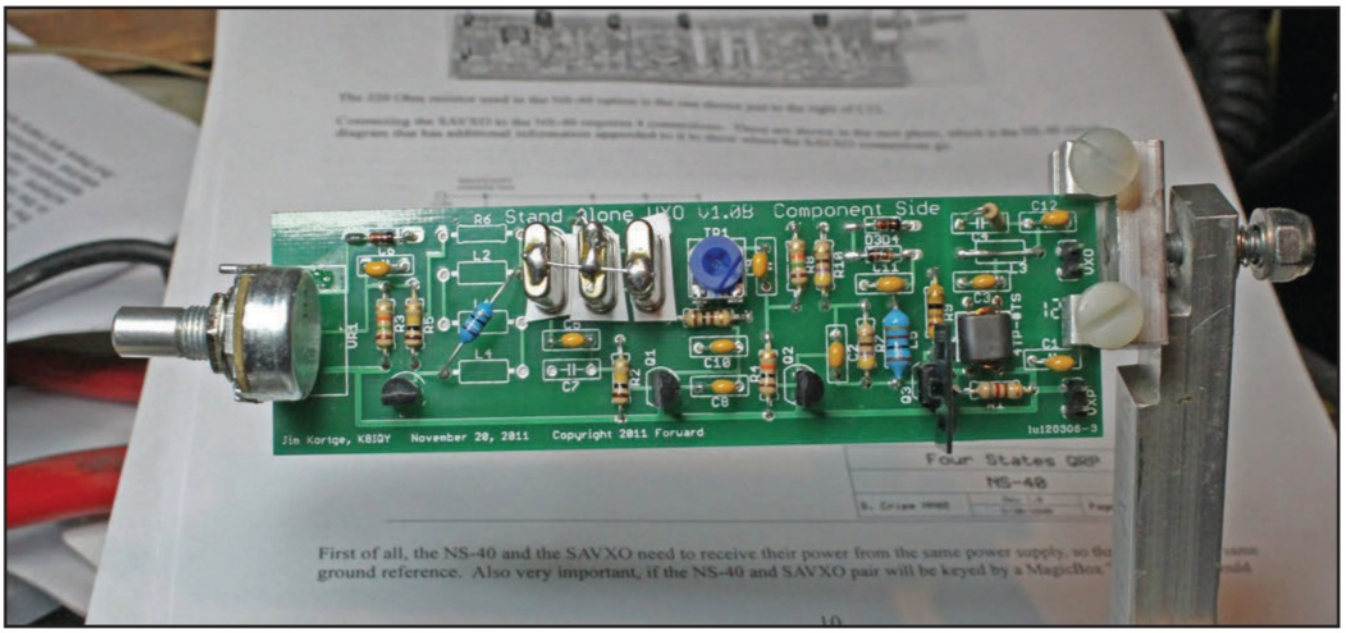
Building the SAVXO is pretty straightforward once you have selected your option. Be sure to only install the parts called for during the initial construction before adding your chosen option components. Also, be sure to follow the directions carefully when installing the crystals. A paper insulator needs to be made for each crystal before it is installed in order to prevent shorting it



Bottom of the NS-40a kit featuring the blank QSL card to be filled out with your first QSO.



SAVXO board ready for assembly.



Completed SAVXO board with NS-40 option 2 ready to be connected to the NS-40.

what's new

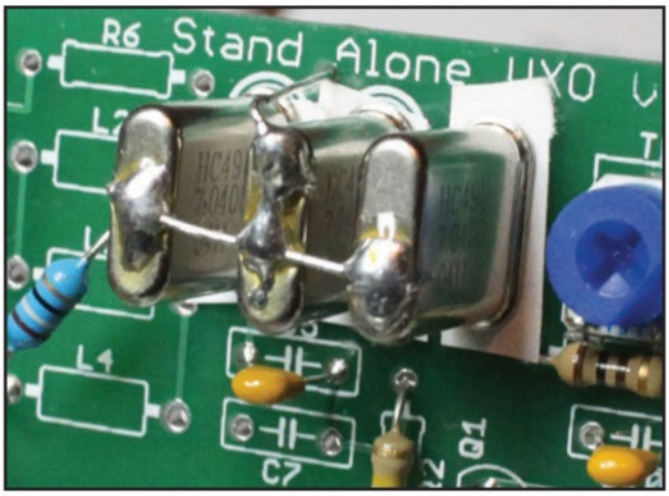
N3FJP Software Amateur Contact Log 4.5

Version 4.5 of N3FJP's Amateur Contact Log program is now available. Features include an update to accommodate Version 2.0 of the ARRL's TQSL software for Logbook of the World, support for the Wireless Institute of Australia's awards program, and a bug fix for interfacing with the Yaesu FT-847 transceiver. Upgrades are free to registered users. You'll find AC Log 4.5 at <http://www.n3fjp.com/aclog.html>; Steps to upgrading are at <http://www.n3fjp.com/upgradestepsaclog.html>.

RF Micro Devices 1.2-GHz Power Doubler Amplifier

Designed primarily for cable TV operators trying to meet new DOCSIS 3.1 cable specifications, the new RFCM3316 Gallium Nitride (GaN) power doubler amplifier from RF Micro Devices (RFMD) may be of interest to amateurs as well. It operates from 40 MHz to 1.2 GHz and has 20% less current consumption than equivalent Gallium Arsenide devices. The company also notes its small footprint as well as ruggedness and excellent linearity. Full-scale production is expected to begin in early 2014. For more information, visit <http://www.rfmd.com/>.

Note: *"What's New" is not a product review and does not constitute a product endorsement by CQ. Information is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of "What's New" is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*



Close-up of the three crystals in the SAVXO with case grounding wires attached.

during installation. There is also a small binocular-type toroid, but it is relatively easy to deal with. Just pay close attention to the number of windings needed for your chosen option. Once completed, a frequency counter or a good receiver is very useful to determine if the SAVXO is operating correctly. Expect to spend around two hours or so putting this kit together.

The NS-40 sells for $32 including shipping in the USA and is sold by the Four State QRP Group at <http://www.4sqrp.com>. The SAVXO is $25, also including USA shipping from 4SQRP.

This probably would be a great time to mention the upcoming Ozarkcon QRP Convention in Branson, Missouri on April 4–5, 2014. This fun weekend features lots of great QRP forums as well as a live hands-on kit building experience! With lots of family things to do in Branson, Ozarkcon is a great family weekend trip. Ozarkcon is at <http://www.ozarkcon.com>. See you in Branson! Until next time . . .

73 de Joe, KØNEB

What You've Told Us…

Our November survey asked about your ham radio-related holiday wish list. Just over half of you who responded either hoped or expected to receive at least one ham-related gift. (Did you get it?) On the other hand, when we asked if you were planning to give *someone else* a ham-related gift, only 9% said yes, 85% said no and 6% weren't sure.

If you could receive only one ham-related gift… 29% of you said you hoped it would be a station accessory, followed by an HF transceiver at 24%, and HF antenna (18%) and a tower to put it on (10%). If you could get *two* ham gifts, then nearly one in five of you each hoped the second one would be either a station accessory or a new/renewed subscription to *CQ* or one of its sister publications (Thanks!). Those were followed by an HF transceiver (15%) and an HF antenna (12%). All of the other options were "in the noise."

Among those of you hoping to get ham equipment of some sort, 56% of you were looking for new commercially-built gear and 32% wanted a new kit to build; and just a handful of you were looking either for parts from which to build something yourself or used gear to operate, modify or repair.

Finally, we asked what broad goal you'd like to accomplish with whatever new gear you got. Forty-nine percent said "enhance my station's capabilities for bands/modes I already use," followed by 19% who looked forward to making operation of their stations easier or more flexible and 13% who wanted to enhance their stations by adding new bands or modes.

This month's free subscription winner is Walt Smith, K1QS, of Naples, Maine.

Reader Survey February 2014

We'd like to know more about you … and especially what's important to you in ham radio and how we at *CQ* can help serve you better. There are two ways to respond to this survey:

*** Respond online** at <www.surveymonkey.com/s/CQFeb14> [From the digital edition, just click on the link].

- OR -

*** Cut out or photocopy** this page

*** Circle the numbers** that correspond to your answers

*** Mail your completed survey to:** November Reader Survey, CQ magazine, 25 Newbridge Rd., Hicksville, NY 11801.

We will continue to select one respondent to each survey to receive a free one-year subscription (or extension) to *CQ*. This month, as we expand our coverage to include more than just ham radio, we'd like to know a little more about your broad radio interests.

1. Which of the following hobby radio activities do you currently enjoy?

Amateur radio / HF 1
Amateur radio / VHF/UHF 2
Broadcast band DXing 3
Broadcast history 4
Personal 2-way radio (e.g., CB, FRS, MURS) 5
Radio technology (including building/restoring equipment) 6
Shortwave listening 7
VHF/UHF scanning/monitoring 8
Other (please specify) 9

2. Which of the following activities provided your *introduction* to the radio hobby?

Amateur radio / HF 10
Amateur radio / VHF/UHF 11
Broadcast band DXing 12
Broadcast history 13
Personal 2-way radio (e.g., CB, FRS, MURS) 14
Radio technology (including building/restoring equipment) 15
Shortwave listening 16
VHF/UHF scanning/monitoring 17
Other (please specify) 18

3. Before this month, to which CQ publication(s) did you subscribe? (Select all that apply)

CQ Amateur Radio 19
CQ VHF 20
Popular Communications 21
WorldRadio Online 22
None 23

4. What is your primary choice of device for reading a digital magazine?

Desktop computer 24
Laptop computer 25
Tablet (e.g. iPad) 26
E-reader (e.g., Kindle Fire) 27
Smartphone 28
None 29

Thank you for your responses. We'll be back with more questions in upcoming issues.

Survey Response for Issue:

Name _____ **Call Sign** _____

Address _____

City _____ **St/Prov** _____ **Zip/PC** _____

Country _____

E-mail _____

BY DON ROTOLO,* N2IRZ

How to Create an Inexpensive Software-Defined Receiver

It has been a while since we got into some deep digital, but with the new year we are changing that. This month we'll see how to create a very cheap (less than $15) software defined receiver with a frequency range of about 50 MHz to 2.2 GHz. What would you do with such a receiver?

The business end of this receiver is a USB TV reception dongle used to receive digital video in much of the world (but not the USA and Canada). In normal use, the receiver just down-converts the received signal and delivers I and Q data to the computer for TV decoding. (I and Q are the In-phase and Quadrature [90° phase] amplitude-modulated sinusoidal components of an angle-modulated signal. Reducing an angle-modulated signal [such as FM or PSK] to two AM signals greatly simplifies the post-processing of the signal in the digital realm.)

I found several suppliers for these receivers on eBay and ended up buying one from Hong Kong for $12.97 including shipping. It did take almost three weeks for it to arrive, but I was in no particular hurry. You can buy one from a USA-based seller for a somewhat higher price if time is a consideration.

What you want to buy is a DVB-T (Digital Video Broadcasting – Terrestrial) USB dongle that uses the Realtek 2832U control chip and the Elonics E4000 tuner chip. There are dongles that use other tuner chips, such as the FC0013 (22–1100 MHz) or the R820T (24–1766 MHz), and these will work but with a different tuning range. The E4000 has a specified tuning range of 64 to 1700 MHz, but it can be operated outside that range if we can accept less-than-optimal LNA (low noise amplifier) performance. Note that there is a gap in frequency coverage on the E400 from about 1100 to 1250 MHz.

To control this receiver I used a program called SDR# (pronounced "SDR Sharp"; see <http://sdrsharp.com/>). For me, the attraction of this particular program is that it runs under Windows®. If you have a Mac or Linux machine, you have other options such as Gqrx <http://gqrx.dk/>, or search the Internet for several other choices. SDR# can decode several common modes (SSB, FM, AM, and CW) using your computer's sound card and offers a familiar waterfall display.

If you find the frequency range of 50 MHz to 2.2 GHz somewhat limiting—I'm thinking of the HF bands here—you can buy an upconverter to shift the received frequencies up to where we can use the SDR to receive them. NooElec <http://www.nooelec.com> sells its Ham It Up v1.2 upconverter for $43, and it shifts received signals up in frequency by 125 MHz to allow signals from almost DC to about 65 MHz to be received. I'd wanted to buy one to try it out, but that wasn't in the cards; however, a review of the documentation on its web site has convinced me that it is easy to install and use. If you have or buy one, let me know what you find.

Of course, a receiver is only as good as its antenna. Outside the specified frequency range of 64 to 1700 MHz the receiver loses some of its sensitivity, making a good antenna that much more important. My SDR dongle came with an antenna, but for all but the most powerful broadcast-band stations it was useless. Its only real value is the connector and coaxial cable, on which I mounted a BNC connector, simplifying connections to my various antennas for testing. (See fig. 1.)

My outdoor ground-plane antennas for 2 meters and 70 cm worked well enough for the local repeaters, as did my loop Yagi on 23 cm. I was also able to use the 2-meter antenna to pick up some nearby aircraft on the local FAA approach frequency, as well as the town police and fire departments.

For the more adventurous among us, consider a low-noise preamplifier for the band(s) in question from Down East Microwave (http://www.downeastmicrowave.com/) or the PR-2 broadband

Fig. 1. The USB Dongle and unmodified antenna. The dime is there for scale. This particular unit receives from 52 to 2202 MHz, with a gap between 1102 and 12324 MHz. The antenna is only useful for the end connector that mates to the Dongle.

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e-mail: <n2irz@cq-amateur-radio.com>

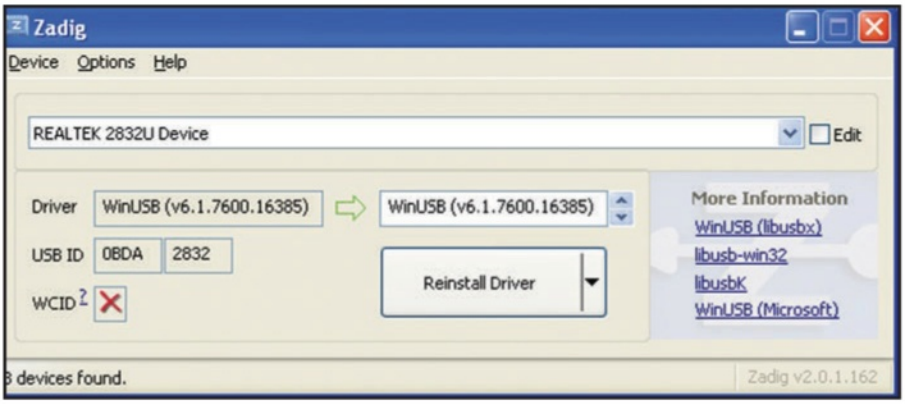

Fig. 2. The Zadig driver installer for Windows® XP. The WinUSB driver is absolutely essential to getting SDR# to recognize the dongle, and for me was by far the most difficult challenge in getting everything to work. Just make sure you install the driver for the USB Dongle and not for some other device! Check the USB ID as explained in the text to make sure.

preamp sold by Ramsey Electronics (http://www.ramseyelectronics.com/).

Hardware

The first step in making all this happen is to buy the DVB-T USB dongle. As I stated before, you want one with the Realtek RTL2832U control chip. The preferred tuner is the Elonics E4000, but any tuner will work, just with a different frequency range. On eBay, I did find several listings that mention the E4000, but upon careful reading I found the device they were offering had a different tuner chip in it. Some were claiming that this or that chip was an "Upgrade to the E4000," but don't believe it. Do your research, and buyer beware.

Once the unit arrives, the first step is to throw out the software disk that comes with it (although mine just came with a web address). If you happen to install the software and driver, I am told you'll have a devil of a time getting rid of it.

Software Installation

Visit the SDR# downloads page at <http://sdrsharp.com/index.php/downloads> and then find and download the file "sdr-install.zip." Unzip it to a directory in My Documents, and run the file "install.bat." This will automatically go to various websites, download the necessary files, and place them into a directory named "sdrsharp." You can go and download things manually, following the instructions in the *SDR# Quick Start manual*, but this batch file really does work nicely and eases installation considerably.

Note that by "installing" all these files to a directory, SDR# is not really "installed," but merely copied. This means that the Windows® registry is not touched, and you can move the entire installation from one computer to another simply by copying the files.

Zadig Driver

Once you have the USB Dongle, connect it to a handy USB port on your computer. With some luck, Windows® will recognize the device and install some kind of driver; allow it to search the Internet if it asks. It doesn't really matter which driver it installs, since we're going to replace it, but having a driver makes the next step easier. It took my computer a few tries before it installed a driver (and even then it took several minutes), so be patient and persistent.

Once a driver installs, you will want to *replace it with the Zadig driver.* The version of Zadig that is installed by the batch file is an older version that should work fine in Windows® XP or later, but if you download it yourself from the Zadig website <http://zadig.akeo.ie/> as I did, make sure you get the correct file for your version of Windows®.

This is a summary of the instructions that can be found at <http://rtlsdr.org/softwarewindows>, along with some of my own observations. Run Zadig.exe and, after you allow the program to run, you'll see the window shown in fig. 2. Select "Options" and check "List all devices." Then click on the devices list and pick the entry that says "Bulk-In, Interface (Interface 0)." If your list doesn't have this entry, don't panic: You instead may see an entry such as "RTL 2832" or something very similar. Mine said "REALTEK 2832U DEVICE" as shown in the image. To be certain, check the USB ID numbers against the hardware list at <http://

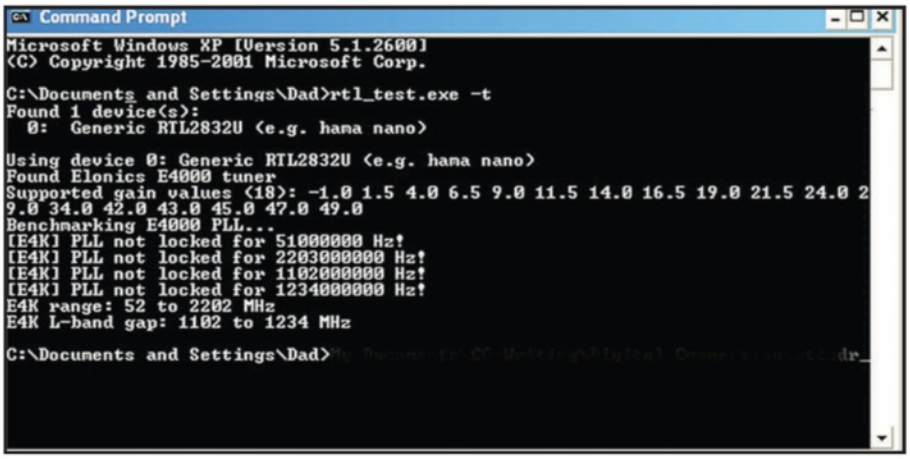

Fig. 3. Running rtl_test.exe –t in a Command prompt window verified my device was working properly, as well as telling me the expected bandwidth and gap, and verifying that I have a real E4000 tuner installed and not a less-capable "equivalent."

rtlsdr.org/hardware-usb>, and if yours are listed, you are on the correct entry. WARNING: Being on the *incorrect* entry can cause a problem. You are replacing the original driver, so whatever is using that driver (such as a keyboard) probably will stop working.

OK, so whatever the device name is, if you've verified the USB ID is on the hardware list, you should make sure you're going to install the *WinUSB* driver (and not the *libusb* driver). Go ahead and click the "Install driver" (or Reinstall Driver—the button text changes depending on what's in there) button. Installation should take about a minute.

Now that we've installed the driver, start SDR# by double-clicking the SDRSharp.exe file. (You might want to right-click it, and pick "Send to ... Desktop" to create a shortcut). You should see a display something like fig. 3.

Still a Few Bugs in the System

In theory, if you select the "RTL-SDR / USB" device at the upper left and set everything correctly (Select Wideband FM, connect a decent antenna, tune to a big local FM station, and click "Play") you'll be receiving signals. Ah, but sometimes reality gets in the way of theory. While most users report a completely problem-free installation, I was one of the lucky ones who had to spend a day fooling with the driver.

Oh, it was installed, but SDR# alternately didn't recognize the driver and the device, sometimes complaining the "RTL-SDR/USB is either not connected or its driver is not working properly," and other times complaining "RTL-SDR

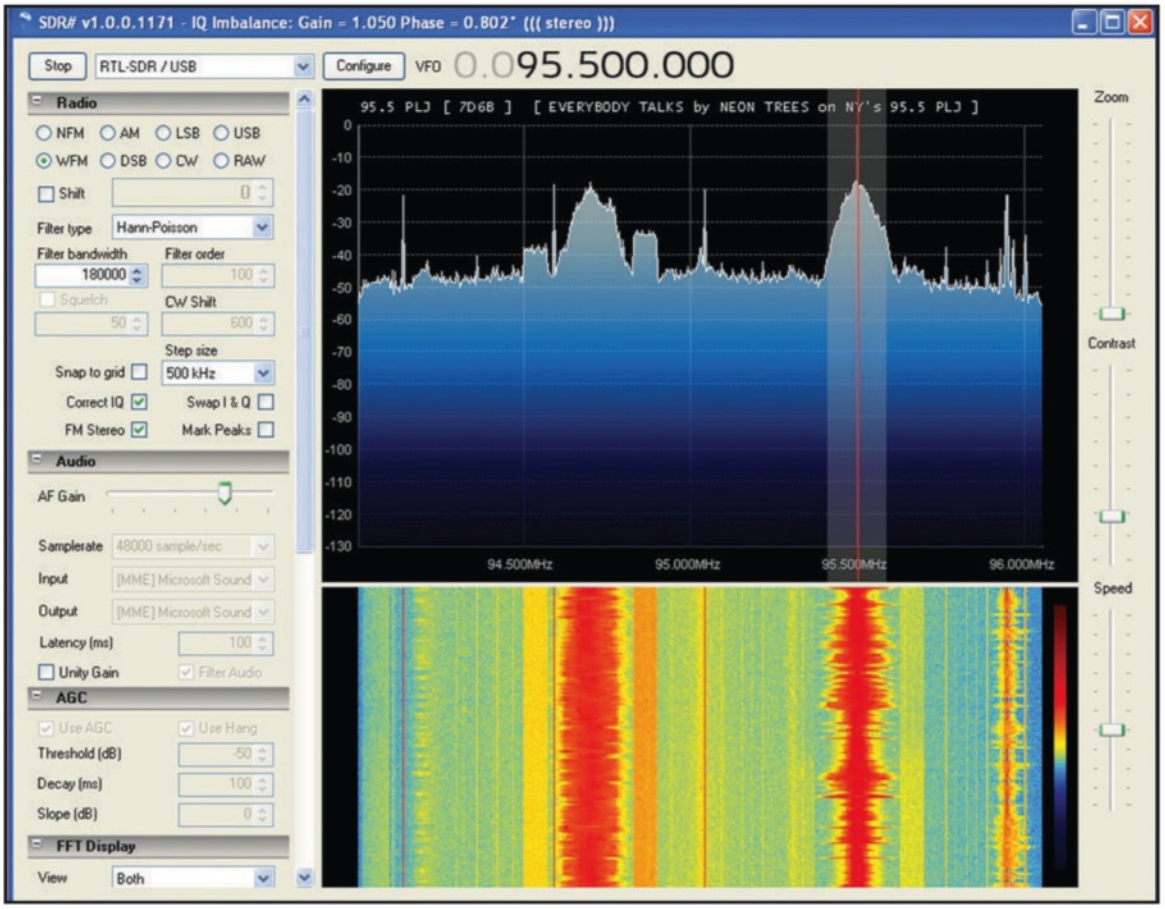

Fig. 4. SDR# tuned to New York FM station WPLJ, 95.5 MHz. Note the station's crawler text (along the top of the spectrum window). The station at 94.7 MHz has clearly visible HD Radio sidebands. I have SDR# configured for Wideband FM, with a filter bandwidth of 180 kHz, FM Stereo decoding enabled, and SDR#'s exclusive I/Q correction system, which helps correct any I/Q imbalances, also enabled.

USB device not found." I reinstalled the Zadig driver several times, also trying the "libusbK" driver, rebooting each time—maybe 25 times over the course of a whole day. In between tries, I was scouring the web looking for help. I found the USB Dongle itself was working normally by running "rtl_test.exe" with the "-t" option (found within the ZIP file at <http://bit.ly/HRswcR>); see fig. 3. I did manage to actually crash my PC once, and also had to reinstall SDR# twice. It would work a little sometimes, and not at all other times, including one time with no reception at all.

Ultimately, I cannot really say what happened to make it work, but it did actually work—and that's when I found out how important a decent antenna is. Even when it was working well, sometimes it would stop tuning, or stop receiving any signals, and this was usually cured by clicking "Stop" and then "Play" again, but sometimes I had to close and restart the software for it to come back. I suspect that a flaky USB connector might have had some effect on this.

I also forgot to mind the band edges, trying to tune in WABC-AM on 770 kHz, a very powerful local AM broadcaster. I noticed that one pretty quickly. I did manage to get most of the commercial FM band, where the HD Radio subcarriers are clearly visible (fig. 4), and SDR# even showed the low-speed text crawler that some stations have. I then monitored a local 2-meter repeater and found that the default 10-kHz filter bandwidth for Narrow FM was way too wide: Setting this around 5 kHz dramatically improved the received audio.

Fun with the Receiver

I've been having fun playing with this receiver. The software is easy to learn, although I did refer to the Quick Start Guide a few times for an explanation of some of the settings. The receiver itself is as small as a postage stamp, and almost as light, making it perfect for travel, a spare receiver for field work, and handy to have for emergencies: During superstorm Sandy last year, broadcast radio was about the only source for news and information, since phones, power, and internet were out almost everywhere.

3D Printers

Since my pair of columns on 3D Printers went out (October and December 2013 issues), the Oak Ridge National Laboratory, the Department of Energy's Advanced Manufacturing Office, America Makes (formerly NAMII), MakerBot, TNFIRST, 3D Systems, and MakerGear decided to make a 3D printer available to thousands of high schools around the world that have a FIRST Robotics Team <http://www.usfirst.org/>. They are starting with 400 printers this year and expanding it to most teams next year. Although we're not quite at the point where 3D printers are able to produce almost anything, we're not too far from that either.

A colleague compared the current state of the art in 3D printers to the state of the art in home computer printers in 1990. Back then, I had a 9-pin dot-matrix printer that was slow, noisy, jammed often, and used special paper with tractor feed holes along the sides. How primitive those were in comparison to what we can get today! In just a few years, 3D printers that can produce real and useful items of many materials will be available at Walmart for $29, but surely the "ink" will cost twice that! As for me, *I just can't wait.*

That's all this month, and I'll be back in this spot for the April edition. In the meantime, give the USB receiver in this month's column a try, and write to let me know how you made out, especially with that driver installation.

Until then . . . 73 de Don, N2IRZ

learning curve

BY RON OCHU,* KOØZ

Repeaters

In a previous edition of this column I wrote that a repeater serves as a club cornerstone. Many of us use repeaters and we want to "pay our fair share" by supporting the club sponsoring the repeater. Repeaters serve a vital ham radio function, for they allow us to communicate with each other with lower power radios and vertical antennas over a greater distance than would be possible without them (fig. 1). I think most hams are familiar with a repeater and have even used one, but how many hams have actually seen a repeater, much less be able to identify its specific parts?

Location, Location, Location!

Well, if you wanted to learn more about repeaters then today is your lucky day; read on, dear reader! I would like to thank Skip Riba, WS9V, for taking me on a tour of his UHF repeater (photo A). Skip's repeater is located on a 480-foot tower just northwest of Litchfield, Illinois (photo B). This is farmland and prairie country. The land around here is flat for miles. When I moved here about two years ago, I asked Skip if he knew of any high spots in the county and his response was "If I did know of any, my repeater would be on it!" Hence, his repeater is located on a former Western Union microwave relay site. From this location, Skip's repeater has consistently good coverage throughout a 60-mile diameter circle and fairly good coverage over a 100-mile diameter! Add icing to the cake, and Skip linked his repeater with ones in five nearby cities (fig. 2), giving hams in the area seamless FM coverage throughout most of central and southern Illinois!

In the VHF/UHF world height is everything. That's why out in the mountain states, repeaters are located on mountain peaks. Here in the Midwest, water towers, tall buildings, or former commercial microwave relay sites are sought after for their height above average terrain (HAAT). Unfortunately, these sites are becoming increasingly hard to find because of tightened security and commercial competition. Cell-phone companies want these sites, too, and they are willing to pay top dollar to rent antenna space, which is putting these sites well beyond the budgets of most clubs. Sometimes stressing the public-service aspect of amateur radio is one way to help secure antenna space at reduced cost on municipal government water towers or tall hospital buildings. The WS9V repeater system is directly linked

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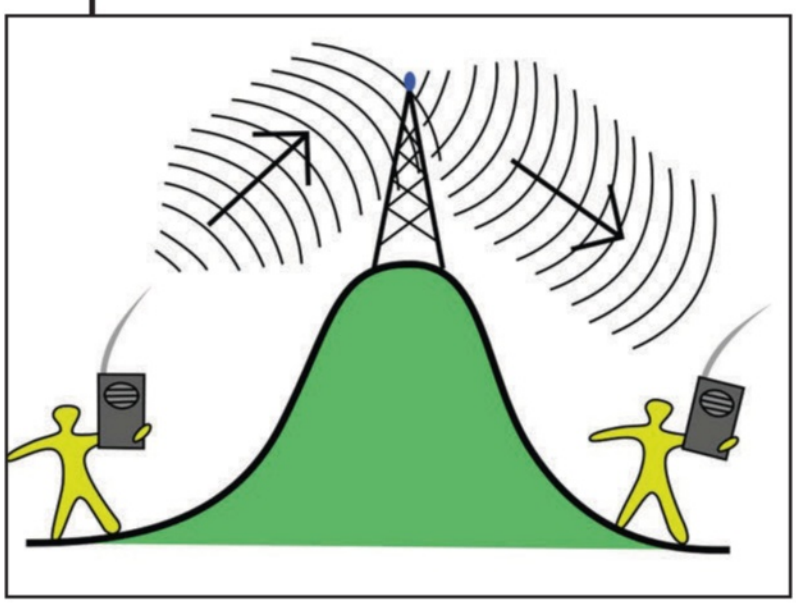

Fig. 1. Repeaters extend the range for HTs and mobile rigs. (Figure by Mouagip, via Wikimedia Commons)

Photo A. Skip Riba, WS9V, standing next to the mighty 444.250 linked repeater serving central and southern Illinois and providing a direct link to the St. Louis National Weather Service office. (Photos by the author)

Photo B. The WS9V repeater is at a former commercial microwave relay site near Litchfield, IL.

Photo C. An example of a commercial VHF 4-bay (folded-dipole configuration) repeater antenna.

back to the National Weather Service St. Louis office, and it provides an invaluable SKYWARN® link for that office's eastern counties watch area.

Let's Take a Look Under the Hood!

Once a high spot for the repeater is secured, the first thing to think about is putting up a durable commercial antenna. These antennas can withstand the harsh environment of a repeater site. It's no fun to replace a repeater antenna that weighs 24 lbs and is 20 feet in length, especially so at the WS9V/R site, which requires climbing a 480-foot tower clear to the top. Another feature of a commercially built antenna (photo C) is its radiation pattern. Besides being omnidirectional, it also can focus most of its energy out toward the horizon, which maximizes the gain (ability to transmit and to receive signals over greater distances). However, these antennas are not inexpensive. With shipping, they can cost nearly $1000, and many site owners require that you hire professional installers to put them up.

Minimizing Feedline Losses

Having a high-gain antenna is a must for a repeater site, but it is also vitally important to minimize feedline losses. This means that hardline coax is utilized to carry the signals between the antenna and the repeater (photo D). At WS9V/R, Skip uses Andrews 1-1/4-inch hardline to minimize signal losses. Again, this is a significant expense. New Andrew 1-1/4-inch hardline costs over $10 a foot. Connectors for each end are well over a $100 each.

Why use such large diameter hardline? The published specs for $1^1/_4$-inch hardline at 450 MHz show a predicted loss of .55 dB per 100 feet. Now compare that figure with that of high-quality LMR 400 low-loss coax, which at 450 MHz has a rated loss figure of 2.7 dB per 100 feet. With a 500-foot run to the antenna, the hardline has approximately 3 dB of loss, or about half the power that you started with. In the same situation, the LMR 400 would suffer losses of 13.5 dB! Keep in mind that every 3 dB either adds to the power by a factor of 2 (gain) or decreases it by one-half (loss). Thus, it's clear why you want to minimize feedline loss in this situation. Adding the connectors introduces some slight signal loss as well; therefore, good-quality "N" connectors are a must.

Are We There Yet?

Okay, we now have the RF from the antenna going down the tower leg and almost into the shack. Prudence and experience teach us to make sure that the hardline and the antenna are at a DC ground. Photo E shows a grounding strap from the hardline to the tower leg, which in turn goes to an earth grounding rod. Skip has his hardline grounded near the

antenna and halfway down the tower as well as at the bottom of the tower, and all of that goes to a common-point ground on a grounded copper plate inside the building. A quick-acting gas-filled cartridge lightning protector such as a Polyphaser is also part of the grounding system. Now we are ready to introduce the antenna system to the repeater system!

What Else Makes Up a Repeater?

A repeater typically consists of five major components in addition to the antenna and feedline (fig. 3 and photo F): a receiver, a duplexer, a controller, a transmitter/amplifier, and a heavy-duty power supply. Let's take a look at each of these elements and how they work together.

For starters, most repeaters listen on one frequency and transmit on another. The WS9V repeater system listens on 449.250 MHz and transmits on 444.250 MHz. Consequently, when I program my mobile FM transceiver or my HT, I need to include the proper "offset." By that I mean that when I dial in 444.250 MHz my radio is *listening* on that frequency, but when I press the push-to-talk (PTT) switch, my radio now trans-

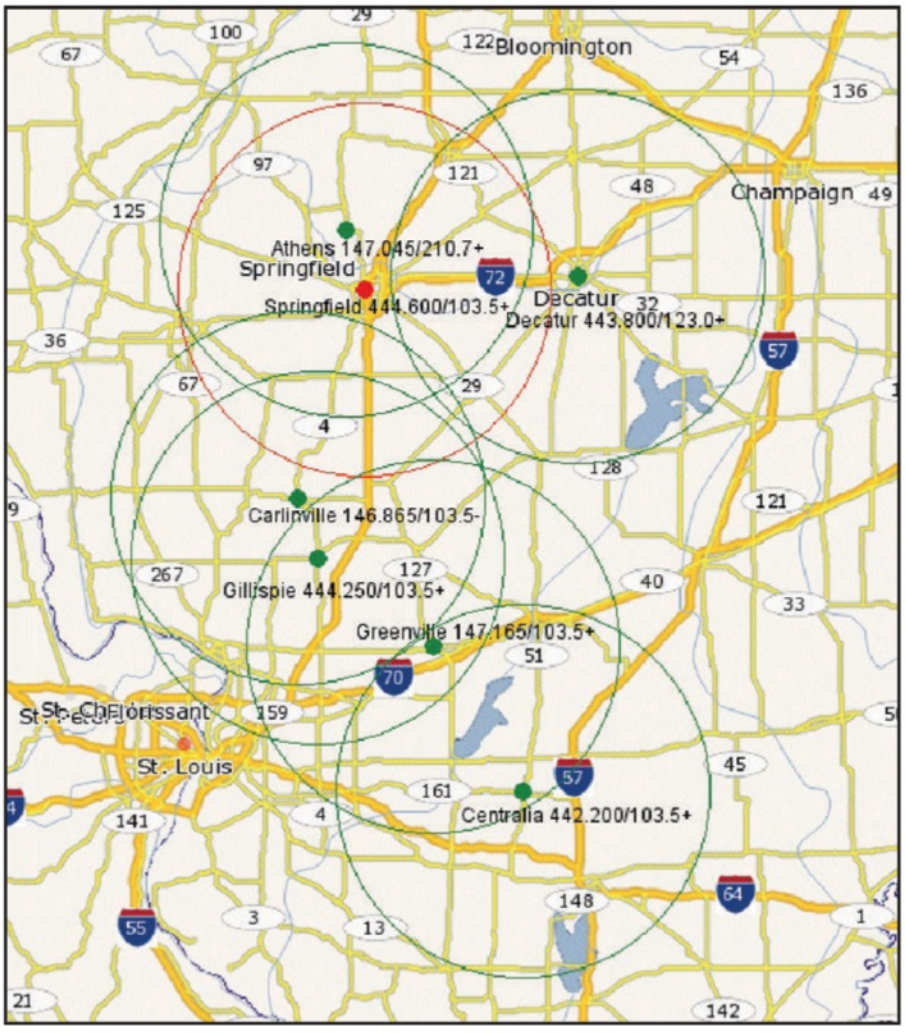

Fig. 2. WS9V linked repeater service area serving central and southern Illinois. (Used with permission, from the K9MCE.org [Macoupin County ARC] website)

Photo D. Some examples of 1/2-inch hardline (left) and 7/8-inch hardline (right). WS9V uses 1 1/4-inch hardline in his repeater system.

mits 5 MHz higher, at 449.250 MHz, which, not coincidentally, is the frequency on which Skip's repeater is listening! (A 5-MHz "split" is standard on 70 centimeters, or 440 MHz.)

By convention, hams name a repeater by its transmit frequency (your receive frequency). For example, "I am going to QSY to the 444.250 repeater." When I am in the St. Charles area, I use the 146.67-MHz WBØHSI repeater. That repeater transmits on 146.670 MHz and listens on 146.070 MHz. Notice that these frequencies are only 600 kHz apart, the standard for the smaller 2-meter band. It is important to program your radio with the proper offset. Current FM transceivers and HTs have automatic offset switching for each ham radio FM band.

Duplexer

Duplex means to transmit on one frequency and to receive on another. Most repeaters are "in-band," which means transmit and receive frequencies are within the same band, such as the WS9V repeater, which is on 70 cm. A duplexer allows a repeater to use only one antenna and one feedline, even though it is receiving and transmitting simultaneously on the same band. The other option is to have a separate transmit antenna with feedline along with a

Photo E. A good ground is a must for lightning protection and lowering noise levels.

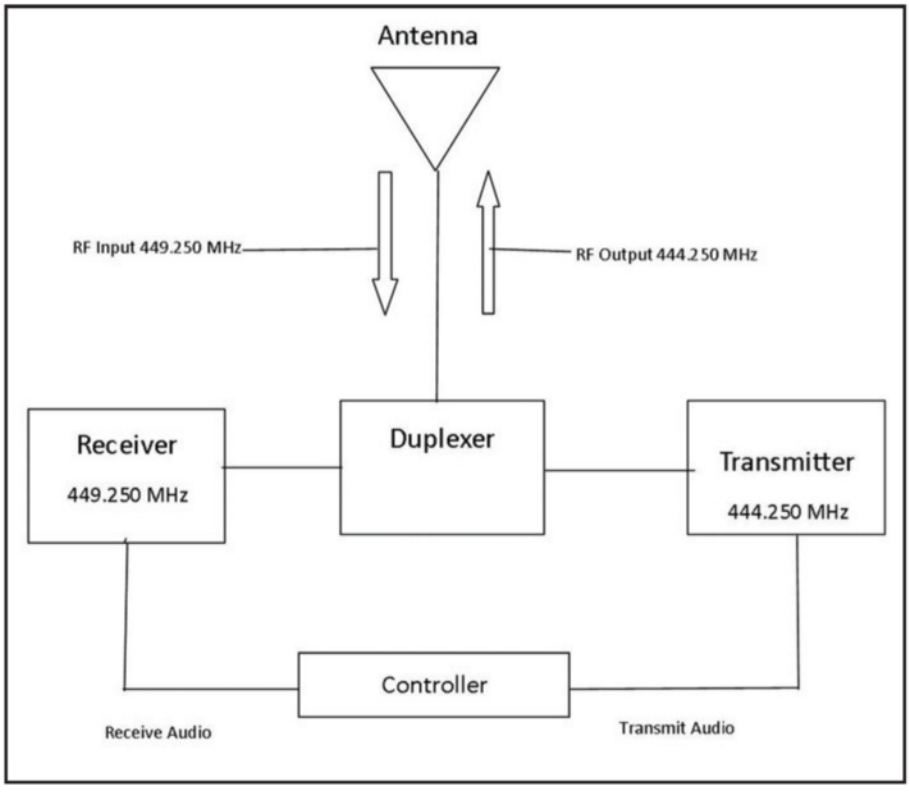

Fig. 3. A block diagram of a basic repeater system.

Photo F. The front side of the rack-mounted WS9V repeater system. On the top is the 449.250-MHz receiver and below that are the ACC RC-96 controller, the 444.250 MHz transmitter, the 70-cm BpBr duplexers, the TPL 180 watt amplifier, and the Astron 70 amp 13.8-VDC power supply. Not pictured is the battery back-up in case of commercial power failure.

separate receive antenna with its own feedline. If both antennas are going to be at the same site, then they need to be physically separated from each other—either vertically or horizontally—by a calculated wavelength distance, which greatly complicates the repeater's mechanical arrangement (not to mention the cost). Duplexers, on the other hand, make a repeater installation a whole lot simpler.

The WS9V repeater uses a four-cavity Wacom BpBr duplexer (photo G). Bp means *band pass* and Br means *band reject*. In essence, two cavities are connected to the repeater's transmitter/amplifier and they allow only the transmitter frequency of 444.250 MHz to pass on out to the repeater antenna. The other set of two cavities rejects all other frequencies and allows only signals on 449.250 MHz to pass through to the repeater receiver. It does this simultaneously using only one antenna and hardline for both transmit and receive! Like everything else, duplexers are not inexpensive. A vital part of a duplexer is to have low-loss coax cable connecting it to the receiver and the transmitter. This prevents unwanted noise and interference from getting into the system.

Receiver

Skip's repeater uses an old Spectrum Communications UHF receiver. Although this receiver is old, it still has high sensitivity and selectivity. After all these years, it keeps on working 24 hours a day and seven days a week. The audio from the receiver is now fed to the repeater controller through low-loss coax.

The Repeater Controller

The controller is the "brains" behind a repeater. It is a computer circuit that controls a number of functions such as when to come on or off. It has a built-in timer that is set to limit the amount of time the repeater transmits before "timing out," or automatically shutting down the transmitter. Most repeaters try to keep a person from being "long-winded" by timing out before three minutes have elapsed since the repeater was first keyed-up. That's why it is proper repeater etiquette to keep your transmissions short and to let the repeater reset its timer. You'll usually know when the timer is reset by the courtesy beep.

If the repeater is set up with tone access, the controller takes care of that function as well. Many repeater owners require the use of a CTCSS (Continuous Tone Coded Squelch System) tone—also frequently referred to by its Motorola trademark of PL, or Private Line—to access the repeater (WS9V/R uses a CTCSS tone of 103.5 Hz). This is a sub-audible tone that is transmitted on your RF carrier, which tells a repeater's receiver to allow your signal to be retransmitted. This system goes a long way toward reducing a lot of noise and interference during band openings.

The controller also has a carrier operated relay which senses an incoming signal and then sets all of the programmed repeater control functions into play. There is also a port for a phone line and a command receiver (222 MHz or higher) for control operator functions such as disabling the repeater, putting it into "weather mode," etc. Finally, the controller identifies the repeater with a voice or CW callsign identification. It now takes the receiver audio and passes it on to the transmitter/amplifier combination.

Transmitter/Amplifier

Once the controller sends the audio to the transmitter, it is now able to take the received audio and pass it on to the repeater's amplifier. The WS9V re-

peater uses a Spectrum transmitter and its RF output feeds a TPL UHF amplifier which amplifies the transmitter's RF to 180 watts. The transmitter and amplifier now send the received 449.250-MHz signal—at a much higher power level—back up to the repeater antenna on 444.250 MHz. This repeat function is exactly what greatly extends the range of an HT or a mobile radio! By using this repeater you have the equivalent of a 180-watt transmitter with an antenna at 480 feet!

Repeater Trustees are Rock Stars!

Hopefully this little tutorial has given you a better understanding of what goes on with the inner workings of a repeater system. When a repeater is up and running smoothly, almost everyone is happy, except for those poor chaps with nothing but an HT and an inefficient rubber-duck antenna in a low spot 20 miles from the repeater with hill in between, who complain that the repeater isn't working correctly. Perhaps this column will cause them to take pause and to think before speaking. Also, if perchance the repeater system ever malfunctions (and it will over time), don't be too quick to criticize the folks maintaining the repeater.

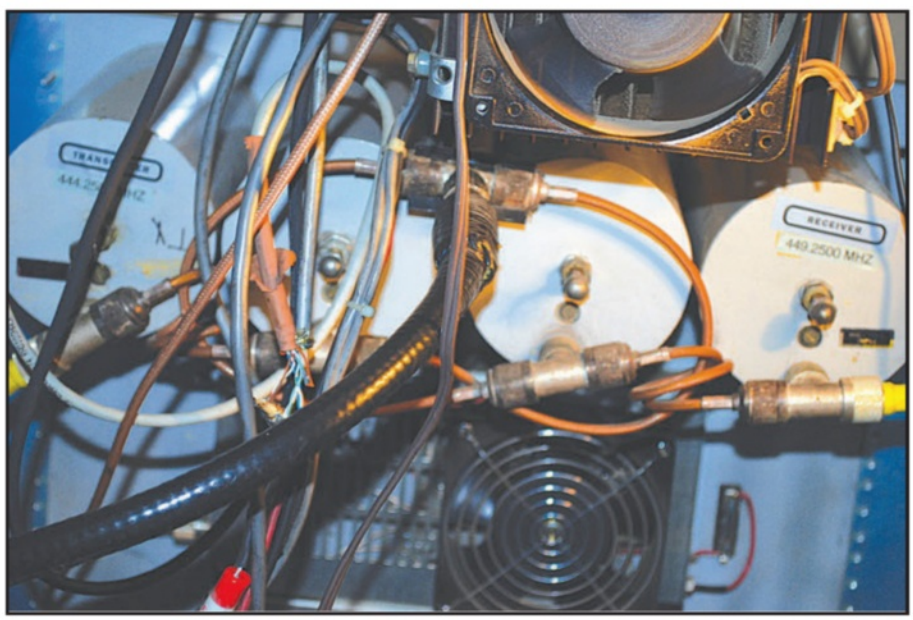

Photo G. These are the 70-centimeter duplexer "cavities," one pair each tuned to the WS9V input and output frequencies.

As you know now, there's a lot of work and a lot of expense in keeping up a system that we all take too much for granted. Therefore, the next chance you get and why not take a few moments to thank the repeater trustee for all that is done to make your daily work commute less boring and something that you even look forward to while in QSO with your buddies. That goes double when the repeater is needed during times of emergency. Please support all this work by joining the group that sponsors the repeater. 73, Ron, KOØZ

mobiling

BY JEFF REINHARDT,* AA6JR

No Holes in Your Vehicle, Cold-Weather Concerns, and Rovers

Thanks to the many *CQ* readers who responded to the call for photos, ham radio license plates for "The Wall," and for sharing their experiences installing and operating gear for mobile operations. Your contributions make this column more enjoyable—and beneficial—for others.

If you want to check out the growing photo wall, it's found at: <http://www.flickr.com/photos/cqphotogallery/sets>. We're doing pretty well on our quest for WAS with license plates but have yet to hear from some pretty prominent states. Is yours represented? If not, send a photo of your plate to me at the address shown on the first page of this column.

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Photo 1. Simple installation of magnetic mount dual-band on the wheel well.

No Holes?

Many hams express concern at the notion of drilling holes in their car or truck, with good reasons. An interior hole can damage whatever lies behind the panel being drilled, be it wiring, a computer module, fuel line, sensor, or other device. In some hybrid or all-electric cars, a very powerful battery or high-current cables can also be present! Of course, too, exterior holes, if not properly done, can damage paint, bring on the beginnings of corrosion, and diminish the vehicle's value when it's time to trade or sell—unless of course you sell it to another ham who sees the utility of your installation.

Therefore, we'll share a very thorough story submitted by *CQ* reader Grady E. McCright W5GEM, who sent the following:

"Several years ago, I splurged and purchased a 2008 Ford F-250, Super Duty, mostly to pull my travel trailer but also to satisfy a long-held desire to own one. Immediately, I was confronted with the installation of a mobile VHF/UHF dual-band transceiver. I had no desire to mar the appearance of my new pickup, so I endeavored to generate a no-holes installation that would both serve me well and meet my criteria of punching no new holes in the vehicle.

"I decided to make do with a magnetic mount, so I purchased a popular-brand dual-band antenna. First I installed the antenna in the bed of the pickup for testing, and I just placed the strong magnetic base on the left-side wheel well (photo 1). The best location, of course, would be at the center of mass and as high as possible. However, since my car port is too low to accommodate such an installation, and since I, without thinking, purchased an aluminum tool box, I would have to crawl into the bed and put the antenna on the roof after taking off the cover each I used the vehicle, and then remove the antenna again before parking in the carport. Therefore, to avoid that tiring issue and after testing the antenna with an antenna analyzer, I chose the wheel well as the permanent location since it tested in the more than acceptable range. The best of both worlds would be leaving the feed line long enough to accommodate the roof installation and simply store the antenna on the wheel well. The roof would be preferred for longer trips and serious operation, yet the wheel-well location would work for casual local contacts.

"I continued with my no-holes installation by routing the feed line through an existing penetration in the front corner of the bed. That access hole was covered by an easily removable rubber plug which

Photo 2. Closed ashtray door that is slanted toward the driver.

Photo 3. Control head lying on the ashtray door with the door spring holding it in place.

Photo 4. Microphone in its nesting place under the seat. The power wires can be seen behind the mic going to the main body.

I saved for future re-installation. Although there are many ways to enter the cab with the coax, I chose to route mine along the frame to the engine compartment using plastic flexible ties to secure the cable. I then penetrated the firewall through the rubber seal around the steering column.

"There is another easy way for the feed-line cable to enter the cab by going through the small air vent behind the rear seat. These small vents allow a small amount of air exchange with the outside and also to permit the doors to close without compressing the air inside the cab. I have used this path on fire trucks in the past and it works fine. Nevertheless, since my truck is a super cab (once called a crew cab), I felt it easier to go through the firewall and not be required to route the cables under the floor carpet or mat to the front-seat area.

"Transceiver power is routed through a fuse in each leg directly to the battery via the same penetration along the steering column through which the coax goes. My dual-band transceiver is an ICOM IC-208 that has a detachable control head, so the body of the transceiver is installed under the middle of the front seat resting on a Sticky Pad (available from automotive stores and used to temporarily hold cell phones, GPSs, etc}. I laid the Sticky Pad on the carpet and then simply set the transceiver body on the top. This installation has been over some really rough roads in the western United States and I have had no trouble with movement.

"The coax cable, the power cord, as well as the remote-control-head interface cable all are routed from under the front of the rubber mats to the main body location beneath the front seat. Lying on top of the carpet and under the rubber mats has made a neat and serviceable installation. The route of the cables is from the center of the floor to keep the cables away from the driver's feet.

"My control head is a perfect fit in the ashtray, I simply opened the ashtray door and placed the control head on the drop-down door where the door spring holds the head securely. It does not move during operation or travel. It is canted toward the driver's position and is effortlessly visible, easily assessable, and convenient. (See the closed ashtray door in photo 2 and the control head installed in photo 3.)

"While one could use an adhesive-backed microphone holder in a suitable location on the dash, I really did not want that nor did I find a good position on the dash, and I could not locate anything metallic on the surface of the

Photos 5 & 6. Kentucky reader Wayne Whitman, K4ELO, sent along these photos of his very clean-looking installation on his pickup truck.

dash. Therefore, I took a magnetic mic holder and placed it on the driver's seat frame just under my right leg (photo 4). When in use, I place the microphone in the seat under the center armrest. Since the microphone is stored and used in close proximity to the main body of the rig, I plug the mic cable into the jack on the main body. If I had the mic clip mounted on the dash, I would use the jack on the remote head.

"I'm sure there are many other options for installing a modern, light weight, and small dual-band or even HF rig, but this method proved to be satisfactory for me and upon removal, my treasured pickup truck will still be pristine with no new holes."

Photo 7. N6ZE/Rover in the Santa Monica Mts, CA during the Spring 2012, 222 MHz Sprint Contest.

Thanks, Grady! Your clever installation should inspire many "no-holes" projects, much to the relief of nervous hams and their XYLs. Readers are reminded that Grady's tips apply to his particular vehicle. Be sure all cables are properly routed away from sources of heat and moving parts as well as computer modules, and other wiring whenever possible. (Also see photos 5 and 6, K4ELO's very clean-looking installation on his pickup truck.)

Winter Mobile Operation

Most drivers know that the extremes of winter operations stress your vehicle. Pre-winter and mid-winter checkups are important; making sure your antifreeze, battery and charging system, lights, wipers, and that all-important washer fluid supply is ready for foul weather. However, have you thought about your radio gear? Nearly every radio comes with an owner's manual that also lists the radio's performance specifications, including its temperature tolerances. A transceiver that's too cold, or too hot, can do some wacky things, like transmit off the displayed frequency (perhaps even out of band), or have its display show erroneous information. If you're in an area where temperatures hit extremes, it's a good idea to let your

NOAA Weather Frequencies

Here's a handy list of NOAA Weather Radio Frequencies to program into your transceiver:162.400, 162.425, 162.450, 162.475, 162.500, 162.525.

All frequencies are in MHz; FM mode.

rig warm up a bit before transmitting. Your mid-winter check should also inspect power and coax cables, antenna connections, and grounds. Another good practice is to set your rig's time-out-timer to shut it down after a period of disuse. Some transceivers also come with a third power connection that shuts down the radio when power from the ignition switch is cut. Either of these methods can help prevent you from coming out to that most dreaded winter automotive malady—the dead battery. If your car does require a "jump start" be sure the mobile rigs are shut down, as some pretty significant voltage spikes can occur when your battery is getting a boost. A cold engine start can pull voltage down pretty low, followed by a spike when it starts and the charging system roars to life.

One more tip: Many VHF transceivers have the ability to receive the NOAA weather radio frequencies. It's a good idea to program those into some of the extra memory channels most mobile and hand-held radios seem to have (see sidebar list).

Rover?

For readers in less chilly climates, the art of VHF/UHF mountain-topping is a ticket to adventure and a lot of contacts. Grid-square and WAS award-chasers value these intrepid individuals who literally "head for the hills" to provide contacts for others. A longtime friend who often crests the hilltops is Peter Heins, N6ZE (see photo 7).

While I don't recommend an alpine adventure during the winter months, mountain-topping can be an exciting and rewarding mobile/portable pursuit, especially for those who enjoy camping and the great outdoors.

Also, if you're searching for WAS or *CQ's* coveted USA-CA All Counties Award, join the County Hunter's group usually found on 14.336 MHz. Beside the contacts, the group listens for requests for assistance from motorists across the USA, something to keep in mind during the winter travel months.

Travel safely and remember that spring isn't that far away!

73 & Happy Mobiling . .
Jeff, AA6JR

BY TOM SMERK,* AA6TS

An Anniversary in the UK, FCC License Exams in South Africa, and Philippines Typhoon Wrap-up

I enjoy locating and reading old amateur radio magazines from the 1940s through '60s. It is amazing how much our hobby has changed in some respects and remained the same in others. Just when everyone was thinking that ham radio would "fade away," we remain strong and connected to other hams through our interests. Our first story is about a notable group in the UK that recently celebrated its 60th anniversary.

UK Emergency Group Marks 60th Anniversary

Just over sixty years ago—on November 25, 1953—the UK volunteer emergency communications group RAYNET (The Radio Amateurs' Emergency Network) was started. At the time, the UK had no such organization, and the need arose from a devastating storm that year that caused extensive damage and the loss of 307 lives. Evacuations were hindered by the lack of effective communications, and ham radio operators filled the gap.

Today, RAYNET serves as the UK's premier volunteer communications group with 2,000 licensed amateur radio operators as members (see: <http://www.raynet-uk.net/main/index.asp>). In an effort to advance emergency communications as well as amateur radio, RAYNET and the RSGB (Radio Society of Great Britain) have entered into a formal agreement to work together. RAYNET not only provides vital communications for emergency responders but also assists with public-service events.

Over the years, RAYNET has been activated numerous times, including the Lockerbie air crash in 1988, several floods, and a major oil spill.

Concerning RAYNET, Chairman Cathy Clark, G1GQJ, was quoted by the *Yorkshire Post* as saying: "... despite advances in technology, (RAYNET) is needed now more than ever. With our current unpredictable climate and the high risk of failure of modern communications networks RAYNET volunteers can make a crucial difference."

[Nevada Ham Radio.com and Southgate Amateur Radio News]

And also happening in the UK ...

West London Radio Fair at Kempton Park

The West London Radio & Electronics Fair has been held at Kempton for the last 11 years and attendance continues to grow each year. The most recent event, held in conjunction with the Radio Society of Great Britain (RSGB), took place on November 10, 2013 and was well attended by dealers, clubs, and amateurs from across the country.

The air-conditioned main hall of more than 8200 square feet attracted many of the clubs in the region to take a space along with flea-market traders and charities and included the regionally popular "bring and buy sale" where people bring items for sale and buy those that others have brought. Also popular were the many lectures and seminars and competitions, including the TOP HAM contest.

[RadioFairs.co.uk]

New VE Team to offer FCC License Exams in South Africa

The United States Federal Communications Commission (FCC) will issue an amateur radio license to anyone with a US mailing address—no residence or citizenship is required. One of the reasons for a ham living in another country to possess an FCC license is that it enables you to operate from countries with which the US has a reciprocal agreement even if your home country does not have such an agreement. It also allows you to operate within the US, even if there is no agreement in place between your country and ours.

Recently, four members of the C82DX DXpedition team who were operating in Mozambique in October, 2013 agreed to assist Chris Burger, ZS6EZ, a South African resident, in conducting an FCC testing session near Pretoria, South Africa. C82DX was an international team consisting of

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members from the United States, South Africa, Canada, and Japan (see <http://c82dx.com>).

Six South Africans qualified for American licenses—three for General Class and three for Amateur Extra. The newly licensed South African hams have planned to become VEs (Volunteer Examiners) in order to establish a permanent testing team in Gauteng, one of the nine provinces of South Africa.

A second exam was planned for December 2013. If you are interested in participating in a future testing session in South Africa, please contact Chris Burger, ZS6EZ, ARRL Volunteer Examiner via his QRZ.com page.

[ZS6EZ and South African Radio League (SARL)]

Philippine Typhoon Update

According to the Philippines Amateur Radio Association (PARA), when Typhoon Haiyan (locally named Yolanda)—the fiercest typhoon ever recorded on land and 3.5 times the strength of Hurricane Katrina—struck the central Philippines on November 8, 2013, killing at least four people and disabling virtually all communications services, the HERO (Ham Emergency Radio Operator) network of volunteers immediately began helping authorities with reports and messages and by tracking the storm and related outages of communications and other services. Reports estimate that more than four-million people were affected by the typhoon (see additional coverage in last month's "Public Service" column).

Ramon Anquilan, DU1UGZ, of PARA explained that amateur radio operations were conducted on 7.095 MHz, 144.740 MHz, and via social media. Ramon said that RADNET with Nathan Eamiguel, DU5AOK, Vilma Eamiguel, DU5VIE, and the members of their local club were operating an HF station located on the second floor of the Tacloban City Hall, powered by a generator maintained by the local government. (Tacloban is the capital of the Philippine province of Leyte and one of the places hardest hig by the storm.) Two-meter band communications were limited to simplex because there was no electricity to power their repeater.

In addition to the wind damage from the storm, flash floods and landslides caused even more misery, sending millions of people in 20 provinces to shelters, all of this occurring only a month after a 7.2-magnitude earthquake in October killed 222 people and left at least 5,000 sheltering in tents. The HERO Network also assisted in that disaster.

At least five amateur radio operations were active throughout the region, some in areas where over 90% of the structures were leveled. Many more stations receiving outgoing traffic from Tacloban and the other affected areas were scattered throughout the Philippines. Other stations were also active in receiving outbound welfare traffic, mainly to notify family members and relatives of their conditions.

DU1UGZ also reported that more than a week after being hit by the typhoon, PARA representatives attended a meeting chaired by the Commissioner of the National Telecommunications Commission, Gamaliel A. Cordoba, at which extended coverage was requested. Ramon, DU1UGZ, said, "Given the new task that NTC wants us to do, we will be needing stations that can be deployed and dismantled at a moment's notice. On the excellent offer of the ARRL, I have requested it to provide at least four HF stations and a repeater."

New HF and VHF stations were set up, and when necessary, equipment was replaced with new equipment. Lester,

Members of the C82DX team, shown here during their DXpedition to Mozambique, helped administer FCC amateur license exams in South Africa, where newly licensed Extras are starting their own VE team. (Courtesy C82DX website)

DV5PO, said that in one of the worst hit areas of Tacloban that has lost 90 percent of its buildings, the NORAD7 (Negros Oriental Radio Assistance Dumaguete) team had provided an additional HF station.

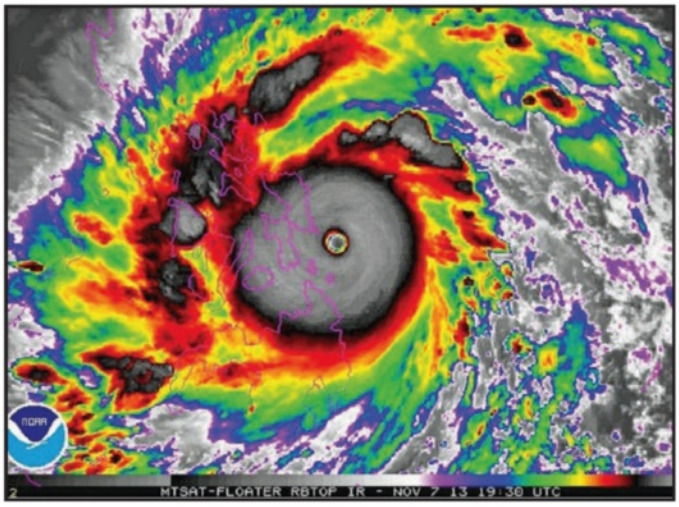
Assistance from many countries in the form of monetary donations, supplies, medical assistance, and manpower also began arriving. Earlier, the Philippine Consulate General in Guam and the United Filipino Organization said they would be starting fund drives to help victims of the super typhoon. Cell phone and Internet service were beginning to be restored as this was written, taking a lot of pressure off the ham volunteers, as victims and their families now have more options for keeping in touch and exchanging welfare reports.

Two weeks after the disaster, at the request of communication authorities in the Philippines, PARA began expanding locations and facilities and was hoping that requests for emergency communication gear, more repeaters, and even things such as more fuel for generators would be honored by the government and would provide the means for PARA's HERO network. Ramon, DU1UGZ, PARA's Vice-CEO, said the group had been working with the National Telecommunications Commission (NTC) and the National Disaster Risk Reduction and Management Council.

[Various news sources]

AA6TS comment: *People in the Philippines and other countries recently have had the unfortunate opportunity to deploy amateur radio operators to provide communications support under the worst of conditions and have had to meet extreme demands required by each situation. If any good is to come from these tragedies, it is my hope that emergency communication and disaster service volunteers from all countries are paying attention and taking notes, observing all of the unique situations that arose and noting how they were dealt with effectively so that each of us is better educated and prepared to deal with situations that might affect us at home. This author would like to extend sincere well wishes and gratitude to all of the amateur radio operators who volunteered their assistance.*

(Editor's note: As we prepared this issue for publication, we learned from ARRL that the Philippine HERO Network formally stood down on November 27 after several weeks of



Super typhoon Haiyan—one of the strongest storms ever recorded—left a path of death and destruction as it crossed the Philippines. Hams helped provide communications until normal channels were restored. (NOAA satellite photo)

Cebu Island in the Philippines (highlighted) is the home of a new RMS (Radio Message Server) system to provide digital amateur radio links to the Internet in the event of future large-scale communications outages. (CIA World Factbook map)

service, although four stations remained active in case additional needs arise.)

And in a related story . . .

Ham Radio RMS in the Philippines

In the wake of a major earthquake and a devastating typhoon, Jakob, DK3CW, reports that an RMS (Radio Message Server) has been installed on Cebu Island in the Philippines with WINMOR. Pactor (I/II and III), and other HF bands will be added later on, he says, as well as integration into the radio-only-WinLink network, to forward messages to another RMS outside the affected area if the communication infrastructure (including Internet) fails on Cebu Island.

The only other nearby WINMOR RMS is located in Australia (VK8AB), and propagation tests determined that VK8AB is not a reliable WINMOR RMS for the Philippines because of a high amount of timeouts and retries. Another RMS located in Indonesia (YBØAJZ) is only accepting PACTOR but not WINMOR for inbound sessions.

Frederick D. Medina, 4F7FDM, will be running the new system 24/7 using WINMOR 500 on 7036.5-kHz center frequency and VHF 9600-baud packet radio.

[DK3CW via Southgate Amateur Radio News]

Indian fishermen Want Free Ham Radio and GPS Gear

If you haven't heard about this yet, I want to share a story that I found both imaginative and perhaps disturbing at the same time—AA6TS:

According to India's *Deccan Chronicle*, there is a group of fisherman in that country that is upset about the lack of affordable and reliable communication equipment that they can use while deep-sea fishing, especially when they face severe storms. Currently, their only way to communicate location or safety-related information to their families is with mobile telephones that they claim are often unable to obtain a signal and have limited back-up power. Many are using portable FM broadcast radios to receive weather information.

Around 70,000 fishermen from several villages along India's coast have been demanding the state government provide them with free amateur radio gear and GPS equipment (as a subsidy) because they cannot afford to purchase this equipment on their own. They say that if they are equipped with amateur radio and GPS, it will help to get weather updates, receive directions, and find their location at sea to avoid impending danger.

The fishermen are backed by the president of the District Fisherman Welfare Association that was quoted in the article as saying that when the communication network fails during the storm, fishermen find no source of information unless they are equipped with ham radio and GPS to help them reach shore safely. The fishermen are awaiting a response from the government to their demand.

What caught my attention is the fact that the article did not mention any discussion of *licensing*, and I have a hard time believing that 70,000 fishermen are newly licensed but have not obtained their equipment yet. I will continue to watch this development with interest because I feel that the IARU would never condone the requested amateur radio equipment to be issued to unlicensed operators. I would delight in reporting in a future issue about the fact that India has added 70,000 new licensed amateur radio operators, not to mention the other family members at home! *(Another potential problem here is that the fishermen would improperly use ham gear for business-related communications.—ed.)*

Fishermen and boaters from all countries have discovered the benefits of obtaining an amateur radio license and having ham gear on-board for personal and emergency communications, but the fascinating part of this report is the huge number of potential new hams that are unified in their efforts to obtain amateur radio.

[Deccan Chronicle]

Until next month, please continue to share amateur radio news and happenings from your country. Send your stories and photos to <aa6ts@cq-amateur-radio.com>.

73, Tom, AA6TS

BY JOE LYNCH,* N6CL

Teenager Leads ISS Contact

School contacts with the International Space Station have become so routine that most of the time they are no longer covered in places such as this column. Therefore, it is news when something special happens during one of those contacts.

Something special did happen during the November 13, 2013 ISS contact: Sixteen-year-old Rebecca Rubsamen, KJ6TWM, was the lead engineer for the contact between students at Rancho Romero Elementary School and astronaut Mike Hopkins, KF5LJG. Rubsamen of Alamo, California, is a sophomore at Bentley School in Lafayette and built her own Elecraft™ K3, which included 2 meters. In her backyard she also built the two antennas used in the contact.

Rebecca's interest in amateur radio got started by her father, Reid Rubsamen, N6APC, two years before the contact. Not to be content with ordinary QSOs, she learned about the ISS and satellite communications so that she would be able to return to her former elementary school and lead this ISS QSO.

As we know, it is a tough process to be selected for an ISS contact. NASA and the Amateur Radio on the International Space Station (ARISS) arrange for about 50 contacts per year. Undaunted by her age, she applied for and received permission to be one of the youngest lead operators for an ISS contact.

According to Ashle Harris, a NASA spokes person, last year there were around 68 permissions granted. While most of them were international contacts, 20 were with stations in the U.S., of which three (including this one) were with California stations.

While Tim Bosma, W6MU, was the ARISS-assigned mentor for the contact, Rebecca ran everything from arranging the station's setup to making sure that the students were in queue so they could ask their questions. Tim was quite impressed with her professionalism, adding that he had not seen anything quite like it in his approximately thirty years of being a mentor. During the nearly 8-minute QSO most of the 15 students were able to ask Mike their questions. The audio of the contact can be found at: <http://www.youtube.com/watch?v=dDv0m-7C4Oo>.

Rebecca maintains a website (http://www.rebeccarubsamen.com/photos.html) in which she has posted a number of photos pertaining to the run-up to the launch. Among the photos is one with astronaut James Van Hoften and her on Science Night at her school. In that photo she displays her K3 and the 12-volt power supply that she used to power it. Local media coverage was supplied by the Contra Costa Times. Here is a link to its story: <http://www.contracostatimes.com/news/ci_24517766/headline>.

While it may be a tad bit too early for Rebecca to think about her career aspirations, it is clear that she already knows how to achieve what she sets her mind to do. Look for her to make more headlines in the not too distant future. Hopefully for our hobby, she could be making those headlines in connection with amateur radio.

VHF Plus Calendar

February 6	First quarter Moon
February 12	Moon apogee
February 14	Full Moon
February 22	Last quarter Moon
February 27	Moon perigee

Hector Martinez, CO6CBF, now also KF5YXV

This past November Hector Martinez, CO6CBF, earned his U.S. Technician class amateur radio license. He is probably the only Cuban national to also hold a U.S. amateur radio license. Here, from Southgate Amateur Radio News service is how he was able to become a licensed U.S. amateur radio operator:

The idea was first conceived during the 30th AMSAT Space Symposium in Orlando 2012 by Clayton Coleman, W5PFG, after hearing Hector Martinez, CO6CBF's desire to operate with his own callsign during his visit to the United States. Because there is no reciprocal agreement between the U.S. and Cuba, he was not able to do so.

A workaround was for Hector to earn a U.S. amateur radio license. At that time he was able to identify three Volunteer Examiners. However, they lacked the materials to test Hector at that time.

Fast forward one year to the 31st AMSAT Space Symposium in Houston.

A few weeks before the Symposium, Clayton contacted the AMSAT-BB, asking for AMSAT members who were ARRL or W5YI VEs to contact him in order to see if we might be able to set up a testing session for Hector. Clayton received many responses and four ARRL VEs stepped up

Shirley, N8LX, and Lynn, N8LXK, Roberts at the Handiham booth during the 2011 Hamvention™. See note at end of this column. (Photo courtesy Handiham)

e-mail: <n6cl@sbcglobal.net>

to assist the effort. Douglas Phelps, K9DLP, took the lead as Team Liaison and brought testing and filing materials with him. Others joining the team included EMike McCardel, KC8YLD, Patrick Stoddard, WD9EWK, and Jerry Buxton NØJY.

Late Thursday evening, rather serendipitously, three of the VEs happened to find themselves in the same place at the same time. Shortly thereafter Clayton, W5PFG, Patrick, WD9EWK, and Hector also happened by. The team immediately went into planning mode to set up a time and place to conduct the test, preferably early Friday. Then came the suggestion, why wait? Everyone is here, so why can't we do it now? When the team asked Hector if now would be good, his immediate response was, "Yes, yes, now!"

The team went to their rooms to collect their credentials and materials and then convened 15 minutes later in a quiet, well lit area of the hotel lobby and presented Hector with a copy of the Technician Exam. Hector took it and passed the exam.

The next morning the exam materials and application were forwarded on to the ARRL VEC by means of US Postal Priority mail, which assured delivery by Monday noon, in hope that his license would be granted before his return on Wednesday. At shortly before 3 pm CST Monday Hector's license cleared the FCC ULS database and he officially was granted callsign KF5YXV. We can't laud Maria Somma, AB1FM, and the folks at the ARRL enough for their efficiency.

Minutes after all became aware that Hector had been assigned his callsign, he began working the birds. Clayton reports, "We had a blast on Monday evening through Wednesday working every satellite pass available to us. He was as exciting to watch as a kid getting his license for the first time."

Hector adds, "Thanks very much for all your help and the great time! It was very fun to operate for first time on AO-7 mode B."

Congratulations to Hector and all who participated in this expression of International Goodwill.

Thanks go to Clayton Coleman, W5PFG, EMike McCardel, KC8YLD, and AMSAT News Service for the above information.

FUNCube-1 Satellite Launched

During the middle of November, 37 satellites carrying amateur radio payloads were launched. Among them was the much anticipated FUNCube-1 satellite, now designated AO-73. Here is the AMSAT-UK FUNCube website: <http://funcube.org.uk/>.

VK Waits for Full Return of the 6-meter Band

The following, from Jim Linton, VK3PC, by way of Southgate Amateur Radio News Service:

With only digital television being available in Australia from 10 December, and the loss of the last TV transmitter Channel 0, it does not automatically mean the unfettered return of 50–52 MHz to the amateur radio service.

Restrictions listed in the Licence Conditions Determination (LCD) on operation of amateur stations in Australia's eastern states on the lower end of 6 metres remain effectively in force until the document is changed by the Australia Communications and Media Authority (ACMA).

Channel 0 came on air in Australia in the 1960s, which meant radio amateurs lost the bottom 2 MHz of 6 metres.

Australia expanded its TV analogue allocation because of the need for more channels and so was born 45–50 MHz or Channel 0, initially for commercial telecasters, then the Special Broadcasting Service, and for translators.

The Melbourne and Brisbane telecasters left Channel 0 and became Channel 10, while the gap was filled by SBS, with it eventually settling on UHF Channel 28.

The Wireless Institute of Australia (WIA) has long argued that the 50–54 MHz band should be retained for, and allocated exclusively to, the amateur service, once the existing Channel 0 transmitters are removed.

The 50-MHz or so-called "magic band" is important to radio amateurs because it provides unique opportunities for propagation experiments.

The WIA has again written to the ACMA seeking the unrestricted return of the band. The latest letter on the subject last month is yet to be answered.

The ACMA reminded all in July this past year of their LCD obligations in relation to the 6-meter restrictions.

On previous occasions the limited resources of the ACMA have meant the change waits until the Australian Radio Frequency Spectrum Plan is amended, and that usually occurs in January.

The WIA has made a number of submissions to the ACMA on the subject over the years seeking a harmonization in Australia with the practice overseas.

The WIA is also to amend the Regulations licence assessment questions to reflect any change, while at the same time it will beef up its electromagnetic radiation emphasis in the papers from 2014.

Radio Amateurs Say Hi To Juno

The following is from AMSAT-UK (http://amsat-uk.org/2013/10/09/radio-hams-say-hi-to-juno/):

Radio amateurs around the world took part in an experiment with NASA's Juno spacecraft as it did a flyby of Earth. NASA's Juno spacecraft flew past Earth on Wednesday, October 9, 2013 to receive a gravity assist from our planet, putting it on course for Jupiter.

To celebrate this event, the Juno mission invited amateur radio operators around the world to say "HI" to Juno in a coordinated Morse Code message that would be detected by Juno's radio and plasma wave experiment, called Waves.

Radio amateurs transmitted Morse (CW) signals on a range of frequencies between 28.001 and 28.450 MHz. To give a random spread the precise frequency used depended on the last character of each station's call sign. The natural signals the team expect to measure at Jupiter will consist of a large number of discrete tones, so spreading the signals out in this manner was a good approximation to the signals Juno is expected to detect. But at Jupiter, they don't expect to be able to decode CW in the telemetry!

The Waves instrument is sensitive to radio signals in all amateur bands below 40 MHz. However, experience with the University of Iowa instruments on the Galileo and Cassini Earth flybys showed significant shielding by the ionosphere at lower frequencies, so the 28 MHz band was chosen for the experiment.

Juno's antenna consists of a pair of tapered 2.8 meter long titanium tubes, deployed from the bottom deck of the spacecraft under the +X solar array and magnetometer boom. A high impedance radiation resistant preamp sits at the base of the antenna and buffers the signals from 50 Hz

to 45 MHz. The elements are deployed with an opening angle of about 120 degrees. 28 MHz is above the resonant frequency of the antenna and NEC analysis indicates a lobe generally along the spin axis of the spacecraft. This will be good for detection on the inbound part of closest approach to Earth.

The Waves instrument uses four receivers to cover the frequency range of 50 Hz to 41 MHz. Signals up to 3 MHz are bandpass filtered, sampled by A/D converters and FFT processed into spectra using a custom FFT processor developed by The University of Iowa under a grant from the Iowa Space Grant Consortium.

Among those taking part were students at Virginia Tech using their club station K4KDJ. Here is a video of that effort: <http://www.youtube.com/watch?v=OaCRnSQf9sE>.

More on Juno

The following is from Southgate Amateur Radio News:

When NASA's Juno spacecraft flew past Earth on October 9, 2013, it received a boost in speed of more than 7.3 kilometer per second, which set it on course for a July 4, 2016 rendezvous with Jupiter, the largest planet in our solar system

During the flyby, Juno's Waves instrument, which is tasked with measuring radio and plasma waves in Jupiter's magnetosphere, recorded amateur radio signals. This was part of a public outreach effort involving ham radio operators from around the world. They were invited to say "HI" to Juno by coordinating radio transmissions that carried the same Morse-coded message. Operators from every continent, including Antarctica, participated. The results can be seen in this video clip at <http://photojournal.jpl.nasa.gov/archive/PIA17744.mov>.

Watch a four-minute video depicting the efforts of a few of the many amateur radio operators who participated in the event here: <http://www.youtube.com/watch?v=_yqHy_MpNiQ>.

One of Juno's sensors, a special kind of camera optimized to track faint stars, also had a unique view of the Earth-moon system. The result was an intriguing, low-resolution glimpse of what our world would look like to a visitor from afar.

"If Captain Kirk of the USS Enterprise said, 'Take us home, Scotty,' this is what the crew would see," said Scott Bolton, Juno principal investigator at the Southwest Research Institute, San Antonio. "In the movie, you ride aboard Juno as it approaches Earth and then soars off into the blackness of space. No previous view of our world has ever captured the heavenly waltz of Earth and Moon."

Watch the Juno Earth flyby movie with a music accompaniment by Vangelis here: <http://www.youtube.com/watch?v=CzBlSXgzql>.

The cameras that took the images for the movie are located near the pointed tip of one of the spacecraft's three solar-array arms. They are part of Juno's Magnetic Field Investigation (MAG) and are normally used to determine the orientation of the magnetic sensors. These cameras look away from the sunlit side of the solar array, so as the spacecraft approached, the system's four cameras pointed toward Earth. Earth and the Moon came into view when Juno was about 600,000 miles (966,000 kilometers) away—about three times the Earth-Moon separation.

During the flyby, timing was everything. Juno was traveling about twice as fast as a typical satellite, and the spacecraft itself was spinning at 2 rpm. To assemble a movie that wouldn't make viewers dizzy, the star tracker had to capture a frame each time the camera was facing Earth at exactly the right instant. The frames were sent to Earth, where they were processed into video format.

"Everything we humans are and everything we do is represented in that view," said the star tracker's designer, John Jørgensen of the Danish Technical University, near Copenhagen.

"With the Earth flyby completed, Juno is now on course for arrival at Jupiter on July 4, 2016," said Rick Nybakken, Juno project manager at NASA's Jet Propulsion Laboratory in Pasadena, California.

The Juno spacecraft was launched from Kennedy Space Center in Florida on August 5, 2011. Juno's launch vehicle was capable of giving the spacecraft only enough energy to reach the asteroid belt, at which point the sun's gravity pulled it back toward the inner solar system. Mission planners designed the swing by Earth as a gravity assist to increase the spacecraft's speed relative to the sun, so that it could reach Jupiter. (The spacecraft's speed relative to Earth before and after the flyby is unchanged.)

After Juno arrives and enters into orbit around Jupiter in 2016, the spacecraft will circle the planet 33 times, from pole to pole, and use its collection of science instruments to probe beneath the gas giant's obscuring cloud cover. Scientists will learn about Jupiter's origins, internal structure, atmosphere and magnetosphere.

Source:<http://www.jpl.nasa.gov/news/news.php?release=2013-360>.

And Finally . . .

Some of you who have seen my wife, Carol, W6CL, and me at the Dayton Hamvention™ have also seen us with Shirley, N8LX, and Lynn, N8LXK, Roberts. Shirley was Hamvention's Ham of the Year in 2011. Now Shirley is battling breast cancer. I ask you to please keep her in your thoughts and prayers. Also, please send her an e-mail of encouragement to: <n8lx@earthlink.net>.

This is all the news I have room for in this issue. Thanks to all . . .

73 de Joe, N6CL

what's new

Firmware Upgrade for ICOM IC-7800 Transceiver

ICOM America has released a new firmware upgrade for its popular IC-7800 HF/6-meter transceiver. Features include:

- Spectrum Waterfall Display
- PC Mouse Operation via USB
- Audio Scope Function
- Direct Remote Control Operation via the Internet
- Digital Voice Recorder

The firmware upgrade may be downloaded from the IC-7800 product page on the ICOM website at <http://bit.ly/JIfKEe>.

Note: *"What's New" is not a product review and does not constitute a product endorsement by CQ. Information is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of "What's New" is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

BY TED MELINOSKY,* K1BV

QRP Awards, plus a Very Short-Term Award

It's usually difficult to be able to feature very short-term awards in this column because the column is written well in advance advance of the time you receive your copy of CQ. However, first is an exception. The Punxsutawney Area Amateur Radio Club has published its rules to offer its annual "Ground Hog Day" certificate (it's free!).

For our overseas readers, the "Ground Hog" is also known as a woodchuck, a rodent belonging to the group of large ground squirrels known as marmots. The woodchuck is a lowland creature. It is widely found in North America.

Ground Hog Day is celebrated on February 2. According to folklore, if it is cloudy when a groundhog emerges from its burrow on this day, then spring will come early; if it is sunny, the groundhog will supposedly see its shadow and retreat back into its burrow and the winter weather will continue for six more weeks. (Thanks Wikipedia)

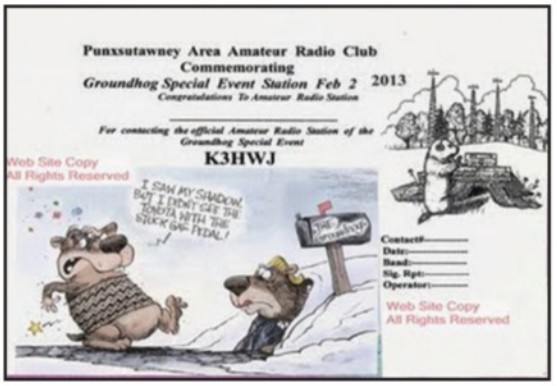
USA Ground Hog Day Special Event Certificate

Make just one contact with the Punxsutawney Radio Club station K3HWJ on Saturday, February 2, 2014 from about 9:00 a.m. until at least 3:00 p.m. or later depending upon band conditions. Look for activity on the following frequencies:

40 meters on or about 7183 ±about 5 kHz
20 meters on or about 14330 ±about 5 kHz
80 meter backup on or about 3845

Send your QSL card and a self-addressed, stamped envelope to: Punxsutawney Area Amateur Radio Club, Groundhog Contact No. ___, P.O. Box 3, Punxsutawney, PA 15767. Note: Put your contact number in the "___" above. This will help the club to process the certificate.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>



The Punxsutawney Area Amateur Radio Club has published its rules to offer its annual short-term "Ground Hog Day" certificate

USA-CA Honor Roll

500	2000
SMØMEM 3623	DK2OY 1437

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 in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or 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.

Internet: <http://www.punxyclub.com/special-events/ground-hog-day>

QRP Awards

Have you ever tried QRP? Most modern rigs will let you crank the power down to 5 watts or less for tuning purposes. Here are some QRP awards from the major and minor clubs that specialize in this area of ham radio.

The first is from the QRP ARCI International (QRPARCI) , probably the largest club of its type in the USA. It offers a dozen awards. Follow the link below in the rules to view all offered.

USA QRP ARC Series – Worked All States Award. QRP is defined by the QRP ARCI as using no more than 5 watts output on CW and 10 watts PEP output on SSB. This award is available to any amateur operator. Application forms may be found on the club's website: <http://www.qrparci.org/arciawds.html>. The fee for all awards or endorsement certificates for W/K amateurs is $US4, or for non-W/K $US5 or 10 IRCs. In addition, e-QSLs are now accepted. There are endorsements for band and mode, etc. Apply to:

The QRP ARCI Series Worked All States Award.

On the Cover

Dave Clausen, W2VV, is a co-founder of the NYC Resistor in Brooklyn, New York—the first "makerspace" in the United States—and trustee of its club ham station, N2YCR, where he is operating in the photo.

A ham since 2008, Dave's main interests are QRP (appropriate for our QRP Special!), portable operating, and activating summits for SOTA, the Summits on the Air program. He also enjoys building kits.

Dave's interest in ham radio came out of his involvement in NYC Resistor, which he helped to found in 2007. "I had no particular interest in radio," he recalls, noting that his main interest at the time was working with microcontrollers. "But one guy in the club had his license; I got mine, and so did others." Dave notes that the maker group is not a ham radio club as such, although there is a ham club that's part of it (N2YCR), and that there's "lots of overlap."

Dave says he sees more interest and excitement about ham radio among younger people today than five to ten years ago, and thinks one way to recruit more young people is through broader-based groups, such as a maker group, that include ham radio as part of their activities.

For readers who are not familiar with makerspaces or hackerspaces, Dave describes NYC Resistor as part clubhouse, part social group, part workspace with shared tools, and part business incubator. Several businesses have gotten their start there, he explains, most notably MakerBot, of which fellow co-founder Bre Pettis, W2BRE, is CEO. The group sponsors classes and holds weekly craft nights, which are open to the public as well as to members.

A software engineer for Google, Dave also has been the cameraman for many of the popular ham radio videos produced by his wife and fellow NYC Resistor co-founder Diana Eng, KC2UHB. And yes, they met at the club!

(Cover photo by Larry Mulvehill, WB2ZPI)

Just one QSO, of 100 kilometers or more, using 1 watt or less, qualifies you for the QRP$_p$ Award.

QRP ARCI Awards Chairman, QRP ARCI Awards Manager, Julio A Jimenez ,3341 Eastgate Street, Eastover, NC 28312, USA.

E-mail: <awards@qrparci.org>, Internet:<http://www.qrparci.org/content/blogsection/4/116/>

QRP All States Award. This award is issued to any amateur for confirming QSOs with stations in 20 or more of the 50 states of the USA while running QRP. A satellite endorsement is available. Endorsement certificates are issued at 30, 40, and 50 states confirmed. A satellite endorsement is available.

USA QRPp Low Power Award. Successfully using extreme low power to make contacts over long distances is always a fascinating subject. A long time ago, when I was newly licensed, I used just my VFO to call a big shot DXer a few towns away, and the antenna was a mismatched long wire. Yes, he heard me, sent QRZ? and his callsign at high power. I was convinced that QRP could really work.

This award was developed in order to encourage more low-power amateur radio operations.

1. Make one QSO using power of less than one watt. The output power during the period of qualifying communications was accurately measured to be less than one watt (QRPp).

2. The distance between the applicant's transmitting antenna and the receiving station was over 63.3 miles (100 kilometers).

3. No artificial means of active relay was used to complete the communications (i.e., repeaters, satellite transponders, digi-peaters, land-lines, etc.).

4. Send a signed statement to the custodian affirming that the transmitter power was less than one watt, the distance was greater than 100 kilometers, and no artificial means of active relay was utilized. Provide a photocopy of the station log, or photocopy of the confirmation QSL card (electronic QSL cards are not acceptable), clearly showing the date, time, mode, and frequency on which the qualifying communication took place. If desired, provide information concerning any endosements (such as longer distances, even lower power levels, WAC, WAS, WAZ, solar power, etc.) that you may want listed on your certificate.

5. Mail fee of $4.00 ($5.00 for foreign), to cover postage, paper, and printing along with the application materials shown above to: Roger J. Wendell, WBØJNR, QRPp Certificate Manager, P.O. Box 17174, Golden, CO 80402-6019 USA. Internet: <http://rogerwendell.com/qrpaward.html>

Italy's I-QRP Award. I like this one from Italy. Both sides of the QSO do not have to be made using QRP. It's somewhat hard to contact stations that both must use QRP to make and complete a contact. Here, if you are the QRP station and contact the Italian station who is using non-QRP, you still get credit, if only 1 point. And there are many, many Italian stations on the air, so your chances of being heard, under good conditions, with QRP are pretty good.

Earn a minimum of 50 points by contacting at least 25 Italian QRP stations. If both stations use QRP, each QSO = 2 points; if only you use QRP, the contact is worth 1 point. All bands may be used, including WARC. Each station may only be contacted one time. Send GCR list and fee of 7 Euros, $US7, or 7 IRCs to: Marcello Surace, IK7HIN, via Dante 239, I-70122 Bari, Italy.

E-mail: <marcello.surace@tiscali.it>; List of I-QRP members: <http://www.arimontebelluna.it/i_qrp/contest.htm>

We are always interested in learning of new awards for this column. Please contact me with any details; a URL on the internet would be fine.

73, Ted, K1BV

Italy's I-QRP Award.

Paul, N7JP, USA-CA All Counties #1238

Paul H. Nelson, N7JPF
USA-CA All Counties #1238
October 24, 2013

Isn't ham radio a fantastic hobby? There are so many different types of transmission modes and interesting areas a person can focus on. County Hunting is an area I started to work on many years ago and have never regretted the trip.

I was introduced to ham radio by some of my father's friends. My dad served in the Army Signal Corps during WW II, stationed in Alaska working in the Alaska Communication System. He wore headphones many hours a day for three to four years, hearing incoming code and typing it on the "mill." When he came home from the war, he was not interested in pursuing ham radio like many of his other signal corps buddies. My first radio recollection was visiting the home of one of his wartime friends and seeing his station. "Mack" Mackie, W7IJY(SK), was the first operator I ever knew, and I will never forget the warm glow of his station and the places he could talk to. Three decades later, when I got my ticket, I was thrilled to be able to have a QSO with him.

In the mid-1980s, married and with a family, I met my soon-to-be Elmer, Tom, WA7TC, who got me going on the code and license, and then into homebrewing antennas. With Tom, my ham skills were further practiced in ARES/RACES, SAR, and American Red Cross communications in Grays Harbor County, Washington.

Thumbing through a copy of CQ magazine one day, I became interested in the several awards that were offered by confirming contacts. I chose to work on the CQ USA-CA Counties Award, and spent the next 22 years toward its completion. There were many years of interruption because of moves, and a job that required many hours away from home, not to mention the obligation of raising a young family. Chasing counties is a hobby that can be put aside and come back to easily when you have time. I love the county hunting nets because you don't have to sit there for hours. It only takes seconds to get a needed county contact, and then you can go back to whatever you were doing.

Checking my logs, I see my first contact on the 14.336 County Hunter net was with Milt, KYØE, mobile in Apache, AZ, on May 19, 1991. My last contact, for the "whole-ball-of-wax" was with Bob, N8KIE, on October 10, 2013 from Towns, GA. Bob went out of his way in his recent trip to get my last four counties, two in KY and two in GA. Since there are 3,077 counties, there were a lot of other fantastic people between those two contacts.

Special thanks go to Bob, N8KIE, obviously. Also to Tom, WA7TC, for being such a great Elmer, and to Terry, WQ7A, and Bob, K7TM, for their help and inspiration. Several people helped with completing states in the last few months; NA8W, NØKV/NØDXE, WG9A, N8HAM, KM9X, and K5GE. I am sure there are more I have missed, and I am thankful for you as well. There are several CW operators who were very patient and forgiving of my fist, as I started to make the switch a few years ago, seeing that the path to the finish would come a lot faster on CW. A few of those great CW operators deserving mention are WØGXQ, N4CD, W7FEN, K1TKL, W4SIG, KC7YE, and K7TM. Also, special thanks to my wife, Darlene, who has listened to so much QSB as we drive, and the seemingly endless contacts as I give out a county. She has more patience than any ham operator I have ever worked.

I have met many mobile operators at the past MARAC conventions, and the friendships that have been made are wonderful. I want to thank the numerous county hunters for all the counties and the fantastic job of the net controls and relays. They are first-class operators, and they have made this possible. . .*UR 599 EWA TU. —Paul, N7JP*

BY WAYNE MILLS,* N7NG

A Look Back at 2013 and a Report from South Sudan

First off, I must apologize profusely for the mix-up last month. I finished the January column while spending more than 12 hours at John F. Kennedy International Airport in New York waiting to fly to Europe to join the Z81X DXpediton to South Sudan. Somehow, while traveling I failed to pass the column to CQ Headquarters. It seems I could have hand-delivered it! Once out of the country, access to the secure areas of my ISP were blocked. My ISP people said that it was normal, but I wonder...

Thus, with *this* column, I start the year 2014. This month I will include some of January's material, which was a review and update some of the topics that I talked about in my 2013 DX columns starting with April 2013. I will conclude with some thoughts—and photos—from the Z81X expedition.

April – Introduction

My April column contained a little bit about me and a little bit about my philosophy of DXing. I mentioned DXing skills and the lack thereof. What I didn't mention was the fun that I had in the early days and since. When I was much younger, talking to others in distant locations was very intriguing, and I always said that I someday would like to visit some of the people whom I meet on the radio. That "dream" has come true for me. Your prior DX column editor, Carl Smith, N4AA, often said that no matter what your focus, having fun is, in fact, what this hobby is all about. What we older DXers might regret is that newer hams our age don't have the same opportunity to appreciate such communications. However, that's life, and we need to cope with it. The young folks have their own joys, and we elders need to understand that.

May – DXing Tips, Thoughts on Kosovo

May brought some DXpeditioning tips and more thoughts on Kosovo. Recently, Rick, K6VVA, has made it a career to study pile-up behavior, and he has identified some interesting traits. I believe the most useful is that many DXers don't *really* know what's happening in a pile-up—whether the DX operator is speeding along at 39.9 words per minute or on SSB near the noise level. Communicating with the pile-up where, when, and how to call is imperative. To accomplish this, slower CW and clarity and repetition on SSB are vital. Languages and accents must be accounted for.

On CW, I don't mean 15 words per minute, but a comfortable 26–30 wpm is a good speed, slower perhaps if conditions are more difficult. Sending "UP" after every QSO is helpful, and sending your callsign at least every three QSOs is mandatory. Even using these techniques, it is impossible for everyone to know exactly what is going on if the operator isn't consistent.

On phone, it is equally important, but somewhat easier to communicate effectively with the pile-up. Keeping in mind that not all DXers in the world speak English as a first language is essential. In the end, we need to be more understanding of what is going on in a pile-up, especially the so-called "cops" who wish to keep the DX frequency under control, but usually are more QRM than those calling on the wrong frequency. If the DX op fails to inform the callers, chaos will ensue.

I also discussed the status of Kosovo. This new country is recognized by CQ and the German Amateur Radio Club (DARC). It is still not recognized by the ARRL and its DXCC program. In July, however, the ARRL Board tasked the DX Advisory Committee with reviewing *all* DXCC rules. Two of the important issues within that task are to consider country status criteria and remote-control operation. We can only presume that additional discussion will have taken place at the Board of Directors' January meeting.

And, again, I have gotten carried away until…

June – Too Much DX? And a Look at DXpedition Funding

For the June column, I lamented having to work the Pacific DXpeditions during the early hours of the morning. Four a.m. and I have never gotten along too well, and now in early November (when this column was originally written), I am again having to get used to these dark, early hours in order to scoop up whatever DX might be available in the Pacific on Topband. Ah well, whatever it takes.

The main topic in June, however, was DXpedition funding. Don, K1DG, had presented a paper describing where in the world DXpedition funds come from, and I counseled consideration of local customs and traditions regarding donations and charity.

In that column, there was an announcement of a large NCDXF grant made to the Amsterdam Island DXpedition due on the air last month. Reasonably large expenditures for such difficult destinations may be appropriate. Yet it may be that such large contributions only perpetuate the idea that the super-large-scale expeditions are feasible. The infrequency of such operations seems to beg for the largest possible range of band and modes, and the largest possible number of contacts. However, when the total cost approaches $8 to $10 per QSO, some rethinking might be in order.

*P.O. Box 1945, Jackson, WY 83001-1945
e-mail: <n7ng@cq-amateur-radio.com>

The WPX Program

CW

3465	WB9G	3479	WF2S
3469	G4FKA	3480	AF5DM
3471	R5QA	3481	AI6II
3472	F5UL	3482	WØHI
3474	WU1V	3483	NZ3D
3475	R3LC	3484	JP1EWY
3476	PY3IT	3485	KN7D
3477	YB7XO	3487	9H1SP
3478	K6CTA		

SSB

3386	IZØFUW	3417	SQ8OQE
3400	G4FKA	3418	KB3SGY
3406	KI7DG	3419	IKØOPS
3407	JR3UIC	3420	W3GLL
3409	BH4SCF	3421	AC7JM
3410	N6MM	3422	W7YED
3411	AG6OX	3423	JA1SCE
3412	N6ETO	3424	AB3TM
3413	R3LC	3425	KA8YYZ
3414	EA5FCW	3426	KG2U
3415	K1BZ	3427	WØBM
3416	XQ7UP	3428	9H1SP

Mixed

2600	R5DT	2649	AI6II
2604	IZØFUW	2650	SP5RE
2611	WB9G	2651	AA4OC
2622	DH3SR	2652	PA3HFX
2631	R5QA	2653	AB3TM
2623	I5OYY	2654	HA5NB
2639	F5UL	2655	NTØF
2640	R3LC	2656	WØHI
2641	UW1HM	2657	DD8BA
2642	K1BZ	2658	JP1EWY
2643	N3FHW	2659	KN7D
2644	SP5XOV	2660	KC9UNL
2645	N8WXQ	2662	IZ8GUQ
2646	W3GLL	2663	WØBM
2647	LZ4SU	2664	K4SBZ
2648	W8RLS	2665	9H1S

Digital

219	KØWIU	270	BX2ADE
244	JE1HRC	272	PA3HFX
267	IZØFUW	271	SP5XOV
268	PY3IT	273	KC9UNL
269	KB2GCG	274	K4SBZ

CW: 350 JE1HRC, WF2S, WB9G. 400 YB7XO, KC8UR, K6CTA, WØHI. 450 KN7D, R5QA, JP1EWY, K4MLD. 500 JR3UIC. 550 G4FKA, R3LC. 600 AB1OC, F5UL, K3CWF. 700 N4HB. 1100 9H1SP. 1200 V51YJ

SSB: 400 IKØOPS, WØBM. 450 K1BZ, IZ2BVN, IZ8GUQ. 500 F5VHQ. 550 N6ETO, G4FKA. 600 W3GLL, YBØDJ, AA4OC, N4FNB. 650 IZØFUW. 700 N4HB. 750 TA1HZ, NTØF. 850 XQ7UP. 950 KA8YYZ. 1500 AB1OC. 1550 R3LC. 1650 9H1SP

Mixed: 450 KK4FYV, IZ2BVN, WØHI, IZ8GUQ. 500 K4MLD. 550 AE4WG, R5QA, JP1EWY, PA3HFX. 600 PY3IT, JE1HRC, W3GLL, AA4OC, N4FNB, WØBM. 700 K1BZ, F5UL. 750 N8WXQ, KN7D. 800 TA1HZ. 850 IZØFUW. 900 N7ZO. 1000 JR3UIC, HA5NB. 1050 G4FKA, R5DT. 1100 K1DX. 1150 N4HB, AJ4FM. 1200 I5OYY. 1250 XQ7UP. 1300 K3CWF. 1600 R3LC, JG3FEA. 1650 WF2S. 1900 AB1OC, 9H1SP. 3550 K9UQN. 4000 K1BV. 5200 HA5DA.

Digital: 350 KK4FYV. 400 DD8BA, PA3HFX. 500 KØWIU. 550 WA5VGI. 650 JR3UIC. 850 AB1OC. 1150 WF2S.

160 Meters: K1BZ, R3LC, N4HB, WB9G, 9H1SP
80 Meters: R3LC, 9H1SP
40 Meters: R3LC, N4HB, TA1HZ, JG3FEA, 9H1SP
30 Meters: V51YJ, JG3FEA, 9H1SP
20 Meters: KK4FYV, R3LC, JR3UIC, IZØFUW, YBØDJ, N4FNB, KN7D, JG3FEA, WØBM, IZ8GUQ, 9H1SP
17 Meters: JG3FEA, 9H1SP
15 Meters: N6ETO, R3LC, JG3FEA, 9H1SP
12 Meters: JG3FEA, 9H1SP
10 Meters: G4FKA, R3LC, JG3FEA, 9H1SP
6 Meters: 9H1SP

Africa: AB1OC, 9H1SP
Asia: JE1HRC, R3LC, BD2AXE, IZØFUW, KN7D, JP1EWY, JG3FEA, 9H1SP
Europe: N6ETO, DH3SR, G4FKA, K1BZ, KK4FYV, R3LC, N3FHW, SP5XOV, F5VHQ, IZØFUW, WF2S, YBØDJ, AA4OC, WØHI, DD8BA, KN7D, JP1EWY, JG3FEA, WØBM, IZ8GUQ, 9HS1P, NZ3D
Oceania: JR3UIC, WF2S, KN7D, AB1OC, JP1EWY, JG3FEA, 9H1HP
North America: N6ETO, KI7DG, K1BZ, KK4FYV, R3LC, N3FHW, JR3UIC, KC8UR, WØHI, AC7JM, WB9G, KN7D, JG3FEA, WØBM, 9H1SP
South America: 9H1SP

Award of Excellence:
Award of Excellence with 160 Bar: AB1OC, 9H1SP
160M Bar: K6SIK
30M Bar: K6SIK, 9H1SP
17M Bar: 9H1SP
12M Bar: K6SIK, 9H1SP
6M Bar: 9H1SP
Digital Bar: AB1OC

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, N3XX, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, NN1N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC, OH3MKH, RA3CQ, UT3IZ, S55SL, RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE, TF8GX, S58MU, UX1AA, AB1J, DM3FZN, AG4W, UA3QNS, RX3AGD, WB5JID, LY3W, LY5W, RW4WZ, VO1CV, VE1YX, DK8MCT, HB9DDO, DL4CW, W9RPM, IZ3ENH, DM2DXA, EY8MM, K4HB, K6ND, TF3Y, K4CN, W1RM, W3LL, 4Z1UF, W3UA, N8VV, HA8QC, LU5OM, US3IZ, RV9CX, K6UM, RWØLT, 4L1MA, UR1MI, IV3ARJ, K6SIK, R3IS, R9MJ, DG7RO.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, N3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, NN1N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UR5FEO, N3RC, UT3IZ RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE, S58MU, UX1AA, DM3FZN, AG4W, UA3QNS, RX3AGD, LY3W, LY5W, VO1CV, HB9DDO, DL4CW, W9RPM, IZ3ENH, DM2DXA, EY8MM, K4HB, K6ND, W1RM, W3LL, 4Z1UF, W3UA, RV9CX, K6UM, UR1MI, IV3ARJ, R3IS, R9MJ, DG7RO, K0DEQ.

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.

Indeed, some rethinking has been occurring. The organizers of another DXpedition to such a southern spot have concluded that the expense for transportation is absolutely excessive. These folks are now considering a stripped-down effort with limited exposure, a limited number of operators and number of QSOs, and—most importantly—a greatly reduced budget. The thinking is that an expedition that can give everyone one to three contacts is better than no expedition, and certainly better than QSOs at a cost of near $15 or even $20 per QSO. All of this sug-

5 Band WAZ

As of December1, 2013 1850 stations have attained at least the 150-zone level, and 911 stations have attained the 200-zone level.

New recipeints of 5 Band WAZ with all 200 zones confirmed:

DL5AN

The top contenders for 5 Band WAZ (zones needed on 80 or other if indicated):

N4NX, 199 (26)	RWØLT, 199 (2 on 40)
KØQC, 199 (26)	JA1CMD, 199 (2)
W4DC, 199 (24)	I5REA, 199 (31)
N4WW, 199 (26)	RZ3EC, 199 (1 on 40)
W4LI, 199 (26)	W1FJ, 199 (24)
K7UR, 199 (34)	W6OUL, 198 (37,40)
IK8BQE, 199 (31)	EA5RM, 198 (1,19)
JA2IVK, 199 (34 on 40)	N8LJ, 198 (17,24)
IK1AOD, 199 (1)	EA5BCX, 198 (27,39)
VO1FB, 199 (19)	G3KDB, 198 (1,12)
KZ4V, 199 (26)	JA1DM, 198 (2,40)
W6DN, 199 (17)	9A5I, 198 (1,16)
W3NO, 199 (26)	G3KMQ, 198 (1, 27)
RU3FM, 199 (1)	N2QT, 198 (23,24)
N3UN, 199 (18)	OK1DWC, 198 (6, 31)
W1FZ, 199 (26)	W4UM, 198 (18,23)
SM7BI, 199 (31)	US7MM, 198 (2,6)
EA7GF, 199 (1)	K2TK, 198 (23, 24)
JA5IU, 199 (2)	K3JGJ, 198 (24,26)
RU3DX, 199 (6)	F5NBU, 198 (19,31)
N4XR, 199 (27)	W9XY, 198 (22,26)
HA5AGS, 199 (1)	KZ2I, 198 (24,26)
JH7CFX, 199 (2)	W9RN, 198 (26,19 on 40)
RA6AX, 199 (6 on 10)	W5CWQ, 198 (17,18)
RX4HZ, 199 (13)	UA4LY, 198 (6 and 2 on 10)
S58Q, 199 (31)	JA7XBG, 198 (2 on 80 & 10)
K8PT, 199 (26)	JA3GN, 198 (2 on 80 & 40)
N8AA, 199 (23)	N4GG, 198 (18,24)
IZ1ANU, 199 (1)	K4JLD, 198 (18,24)
IN3ZNR, 199 (1)	NS6C, 198 (17,22)
JK1BSM, 199 (2)	

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

N1WQ (172 zones)	9A2NO (172 zones)
ON6KE (150 zones)	KB4CL (163 zones)
DL7KL (170 zones)	

5 Band WAZ updates:

ON4CAS(194 zones)	LU5OM (200 zones)
F4GTB (173 zones)	

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

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. 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 Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

gests that we might need to reconfigure the thinking that every DXpedition must cater to the needs of those chasing the DXCC Challenge, and even more so, the competition engendered by the Club Log phenomenon. Is such extravagance good for DXing? Increasingly, we are just saying "No!"

By the time this column appears in print, we will know how the planned January DXpedition to Amsterdam Island ended. In early December, the Amsterdam Island webpage is stating that if they make 100,000 QSOs, each QSO will cost about $4.00. Although not the $10 to $20 per QSO that is envisioned for larger expeditions, it is still excessive. Budgets like that beg the question of whether we are thinking of all possible scenarios. I have said that such efforts will continue as long as they can be funded. Will such funding continue into the future? Or will DXers say "enough!"? Are there alternatives? The DX University will begin studying the issue in the coming months. If you have suggestions and alternative scenarios, please visit the DX University website and register your thoughts in the "Contact Us" section.

July – Remote-Control DXing

For July, I wrote about remote-control DXing. This topic has been simmering for some time. I must have been prophetic, because the ARRL Board of Directors resolved in July to ask the League's DX Advisory Committee to "…study and, if warranted, recommend changes to the DXCC Rules for the ARRL Board of Directors to discuss." There are probably two primary issues: One is that DXCC rules now rely primarily on the whims of the United Nations, which is currently paralyzed on some issues by the prospect of a veto. As a result, it appears that unless the DXCC rules are augmented, it will be a long time before Kosovo—*and other potential entities*—count for DXCC. Since this was published, we have come to further understand that *no ITU prefix will be forthcoming any time soon*. Hopefully, the DXAC and the BoD will grasp what this means and act accordingly. I will reserve judgment.

The other major issue is remote control of amateur radio stations. Through advances in Internet-based devices, it is simple and inexpensive to control your station from anywhere in the world. Many hams don't understand just how extensive the possibilities are: remote control of whole stations, control of receivers on other continents, control of mega-stations owned by others, virtually anything you can think of, and more. Remote control is not in the future. It is *now*. It's legal in most cases, and rules that attempt to regulate or restrict it are totally unenforceable.

August – DXpedition Fairness: "Who to Work"

The August column dealt with fairness by DXpeditions in working all areas of the world. If a DXpedition operates from the Indian Ocean, DXers in the western USA might have to scramble to make even a single contact. Low-band contacts to that area are even more difficult. The difficulty in making QSOs between relatively remote locations can be alleviated by DXpedition operators listening at the proper times for certain locations. This isn't always easy to do, but operations in recent months have done a reasonably good job in this respect.

September – Back in the Day, Some DXing History

The September column was something else! I just look at the picture of KN6ALH (me) in 1953 and shake my head. Certainly lots of DX has come and gone since then. Such a way to measure your life! I guess to stay young we need to keep making DX.

October –The DXPP

Closely tied to the matter of DXpedition funding is that of the DXPP, the *DXpedition Paying Passenger.* The term DXPP has been viewed by some as derogatory, but I believe it is important to first understand what it means. The DXPP is an amateur with (1) time, (2) resources, and especially (3) a good attitude and a willingness to learn the ropes. Of course, the DXPP might not even be interested in operating, but perhaps is simply interested in traveling to a remote location, or possibly just observing the whole thing. Unfortunately, if inadequately prepared or supervised, the DXPP can be a serious liability for a DXpedition. These operators are not capable of running pile-ups efficiently, can give the expedition a bad name, and among other negatives, make future fund raising difficult.

Since October's column I have learned another term. It's the *Inverse*

The WAZ Program

12 Meters CW

78 .....LU5OM 79 .....W6ENZ

17 Meters CW

102 .....LU5OM

30 Meters CW

122 .....LU5OM

80 Meters CW

97 .....DL4MO

160 Meters

435.....UT5IM (40 zones) 436.....R3VA (31 zones)

160 Meter Updates

N5FG (33 zones)

All Band WAZ
Mixed

9068 .....PA1NL 9072 .....AB4SF
9069 .....IZ8FTW 9073 .....N4QWF
9070 .....JL1BDI 9074 .....OZ4VW
9071 .....RN4CA

SSB

5279.....VK2SF

CW

737.....US3LR 739 .....K8BXD
738 .....K5ZE 740.....DD5KG

Satellite

028 .....AHØU (32 zones)

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, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. 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 Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

CQ DX Awards Program

CW

1150 .....WØOVM

SSB

2617 .....WØOVM 2618.....UX7QC

Endorsements

WØOVM.....(SSB 196)

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.

DXPP. This individual is such an expert at certain aspects of DXpeditioning, working exclusively on 160 meters, for example, that he is encouraged to come along on a DXpedition on a reduced or no-cost basis. Essentially, the remainder of the participants or even the foundations support these people because of their expertise. The Inverse DXPP.

November – The DXAC's New Assignment

Following up on my July premonition, I noted in November that the ARRL BoD asked the DXAC to study several issues. In fact, the board asked the DXAC to review *all* DXCC rules and report back. By the time you read this, the committee will have written an interim report, which most likely will have been reviewed by the ARRL Board at its January meeting. By the time this appears, we may well be hearing of progress by the DXAC.

December – DXing with a Modest Station

In the December column, I discussed how one might work DX with a modest station. When I solicited input, I was universally asked, "How do you define a modest station?" Generally, I consider a modest station to be one running 100 watts with an antenna that will fit on a small city property. Since hearing from some DXers who are running such stations, I find that they do very well, beating me out in many pile-ups. (Maybe my station is more modest than I thought.) What that says is that waiting for better or the best propagation will win out every time. Since this was written, we have had more excellent conditions, more sunspots. Perhaps this is the answer for those with modest stations.

There you have it, my thoughts from April through December 2013 with some updates. What will 2014 bring?

Missionary DXpeditioning from South Sudan

The mission of the November DXpedition to South Sudan, Z81X, was two-fold. First, it was to present a workshop on amateur radio to the Ministry of Telecommunications in Juba. While I don't have the space here to discuss this fully, I can say that a whole day was spent with the Director General of the Ministry and 20 other members of that administration. A presentation was made by Hans Blondeel Timmerman, PB2T, president of the IARU, Region 1; Martti Laine, OH2BH; and your columnist, with information on (1) Training regulators in the administration of the amateur service; (2) Assisting the administration in the creation of amateur radio regulations and related frequency table; (3) Discussing amateur radio's benefits for the society; and (4) Evaluating the prospects of establishing the amateur radio service for South Sudanese nationals. Several pictures taken at this workshop accompany this column.

The DXpedition Operating from South Sudan

While it's still fresh in my mind, I also want to make some observations about the operating I observed while operating Z81X from Juba, South Sudan at the end of November 2013.

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 341 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 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

OH2BN.....341
NØFW.....340
K2TQC.....340
WB4UBD.....340
K3UA.....340
N4JF.....340
K2FL.....340
WK3N.....340
W4OEL.....340
EA2IA.....340
N7FU.....340
K4IQJ.....340
K4MQG.....340
W8XD.....340
N7RO.....340
N5FG.....340
K4CN.....340
OK1MP.....340
N4AH.....340
F3TH.....340
DL3DXX.....340
K9MM.....340
K4CN.....340
K9BWQ.....340
W0JLC.....340
W7CNL.....340
N4MM.....340
K9IW.....340
K5RT.....340
W5BOS.....340
N4NX.....339
K4JLD.....339
N5ZM.....339
K9IW.....339
W7OM.....339
YU1AB.....339
N4CH.....339
K7LAY.....339
K3JGJ.....339
K8LJG.....338
KA7T.....338
W7IIT.....337
K8SIX.....337
G3KMQ.....337
W6OUL.....336
PY2YP.....334
K9OW.....334
K1FK..... 334
K2OWE.....333
W4MPY.....333
K5UO.....333
N6AW.....333
HB9DDZ.....333
K7VV.....333
F6HMJ.....332
K6LEB.....331
N7WO.....331
W1DF.....331
WG5G/ QRPp.....330
JA7XBG.....329
K6YK.....329
IKØADY.....328
W9IL.....327
KE3A.....326
K6CU.....326
KA3S.....325
EA5BY.....325
OZ5UR.....325
K8ME.....323
WD9DZV.....323
ON4CAS.....322
KØKG.....320
W6YQ.....319
CT1YH.....317
EA3ALV.....316
RA1AOB.....314
WA4DOU.....313
YO9HP.....313
N2LM.....313
HB9DAX/ QRP/p.....311
AB4IQ.....310
KT2C..... 306
K7ZM.....304
HA5LQ.....301
K8IHQ.....301
K4IE.....295
N3RC.....295
HA1ZH.....292
WA2VQV.....285
K7CU.....282
PP7LL.....282
N2VW.....280
K4EQ.....280
4Z5SG.....276
YO6HSU.....275

SSB

XE1AE.....341
NØFW.....341
K6YRA.....341
IK1GPG.....341
K2TQC.....341
K4MZU.....341
DJ9ZB.....341
WB4UBD.....341
N4JF.....341
WK3N.....341
K4JLD.....341
N7BK.....341
EA2IA.....341
K4MQG.....341
K9MM.....341
K3JGJ.....341
N5ZM.....341
N7RO.....341
K4IQJ.....341
N5FG.....341
K4CN.....341
OZ3SK.....341
OK1MP.....341
N4CH.....341
DL3DXX.....341
OZ5EV.....341
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The South Sudan workshop group, including Hans, PB2T; Martti, OH2BH; and Wayne, N7NG. See text for details.

Much has been said in recent years about the deteriorating operating ability and skills of the world's DXers. Overall, my experience doesn't support much of what I consider so much hand-wringing.

To start, I have to admit that my own operating revealed some roughness around the edges, particularly at the beginning. Besides having spent considerable time recently DXing rather than DXpeditioning and running pile-ups, dealing with unfamiliar equipment took its toll. Imagine sitting down at a station and realizing that the keyboard is in German (or Spanish) and that not all of the keys are in the same position as I was accustomed to. I did have my own computer with the same software, but changing them between shifts seemed initially more of a pain that it was worth.

The actual operating was lots of fun. On only a few occasions did I find the pile-up out of control, with stations calling when they should have been listening. Most of this was understandable, and when it was necessary to regain control, repeating a partial callsign several times proved sufficient.

There were only a few instances in

The workshop attendees were treated to a catered lunch. (OH2BH photo)

which I had to deal with stations calling out of turn to the point that I couldn't copy the desired station. There were also a few situations in which my frequency was being QRMed by stations calling me on the wrong (my) frequency. I did note a few of these cases where my rate suffered—because people couldn't hear me due to the QRM on my frequency—and I had to change my frequency by a few hundred Hertz. Generally, however, my rate was up to standards, indicating that the pile-up management was satisfactory. (Note that it doesn't really matter what *you* think of the QRM on my frequency. It's what *I* hear that is important.) Before we terminated the operation, I asked some of the operators (OHØXX, OH6KN, DL3DXX) what they thought of the operating in the pile-ups. Generally, their impressions were positive. They had no significant complaints. My own experiences echo their observations.

Next month I'll talk a little more about the South Sudan trip and also a little about an out-of-the-box possibility for organizing QSOs on an extreme DXpedition.

73, de Wayne, N7NG

Hans, PB2T, addresses the workshop group. (OH2BH photo)

The Director General of the Ministry of Telecommunications and Postal Services at the front of the class! (OH2BH photo)

BY GEORGE TRANOS,* N2GA

Can Contesting be Successful as a Spectator Sport?

Anyone is allowed to compete in amateur radio contests, regardless of their previous experience, skill level, or equipment. Get on the radio, put out a signal, make contacts, and you're part of the event! Even the least-experienced novice operator can make contact with the best of the best. As a matter of fact, the best operators *want* to interact with everyone—novices through experts.

So why doesn't everyone contest? Part of what intimidates some people about contesting may be the pages of rules and the seeming complexity of top-notch stations. That can also keep a spectator from appreciating the operating skills, decision-making, and effortlessness of the best contesters. Wouldn't it be nice to see and hear the best operators in the world right from their operating location? Can this be done in a way that allows contesting to become a successful *spectator sport* as well as a participation sport?

You can compare an amateur radio contest (also called *radiosport*) to a major sporting event. Watching sports is big business. Fans around the world spend many hours attending, listening to, and watching sporting events on television and the Internet. These events attract major advertisers who pay large fortunes to have their commercials play during them. Major sports are covered by media worldwide and produce some of the largest viewing audiences. The excitement created during and leading up to spectator sporting events is looked forward to by a major percentage of the world's population. Amateur radio competition should be no different, as it offers its own brand of excitement.

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Similarities

An amateur radio contest has a finite length of time, the contest period. This is equivalent to a "game"in any other sport. There is a distinct winner, along with second-, third-, and fourth-place achievements. The rules are available for anyone to follow. There are periods of great activity, such as a huge pile-up with many operators calling in at once, leading to high rates of contact. There are technological challenges similar to other sports, such as bobsledding or sailing, in which sophisticated software modeling contributes to maximizing the performance of the necessary equipment.

Operators from all continents and hundreds of countries participate in worldwide amateur radio contests. Contest spectators may want to cheer for operators from their country (or state or radio club, etc.), just like fans want to root for their home team. Hams may personally know and like some of the participants and this may form a bond for the spectator as well.

In most contests, operators from many different categories operate all at the same time but are only

Calendar of Events

All year	**CQ DX Marathon http://bit.ly/vEKMWD**
Feb. 1	AGCW Straight Key Party http://bit.ly/1dWd6V9
Feb. 1	Minnesota QSO Party http://bit.ly/1gho8b1
Feb. 1–2	Vermont QSO Party http://www.ranv.org/vtqso.html
Feb. 1–2	Delaware QSO Party http://www.fsarc.org/qsoparty/qsohome.htm
Feb. 1–2	Mexico RTTY Int'l Contest http://www.fmre.org.mx/
Feb. 1–2	10-10 Int'l Winter Contest http://bit.ly/yTsaDk
Feb. 1–2	Black Sea Cup Int'l http://www.bscc.in/index/rules_black_sea_cup_international_eng/0-21
Feb. 2	North American CW Sprint http://www.ncjweb.com/sprintrules.php
Feb. 8	Asia-Pacific Spring Sprint (CW) http://jsfc.org/apsprint/aprule.txt
Feb. 8	FISTS Winter Sprint http://www.fists.org/operating.html
Feb. 8–9	**CQ WW RTTY WPX Contest http://bit.ly/uYC0gp**
Feb. 8–9	Dutch PACC Contest http://pacc.veron.nl/
Feb. 8–9	New Hampshire QSO Party http://www.w1wqm.org/nhqso/
Feb. 8–9	SARL Field Day Contest http://bit.ly/H0IqQf
Feb.10–14	ARRL School Club Roundup http://www.arrl.org/school-club-roundup
Feb. 15–16	ARRL CW DX Contest http://www.arrl.org/arrl-dx
Feb. 21–23	**CQ WW 160M SSB Contest http://www.cq160.com/rules.htm**
Feb. 22–23	REF SSB Contest http://concours.ref-union.org/contest/?page_id=2
Feb. 22–23	UBA CW DX Contest http://bit.ly/W0gZiE
Feb. 22–23	North American RTTY QSO Party http://bit.ly/GLPfXz
Feb. 23	High Speed Club CW Contest http://www.highspeedclub.org/
Mar. 1–2	ARRL SSB DX Contest http://www.arrl.org/arrl-dx
Mar. 4	AGCW YL-CW QSO Party http://bit.ly/T0fKh9
Mar. 8	AGCW QRP Contest http://bit.ly/UKwb0L
Mar. 30–31	**CQ WW WPX SSB Contest http://bit.ly/hKqJjG**

competing against rivals in their own category. This is similar to some types of auto racing, in which different car classes drive on the same racetrack but only vie for positions within their own class.

Differences

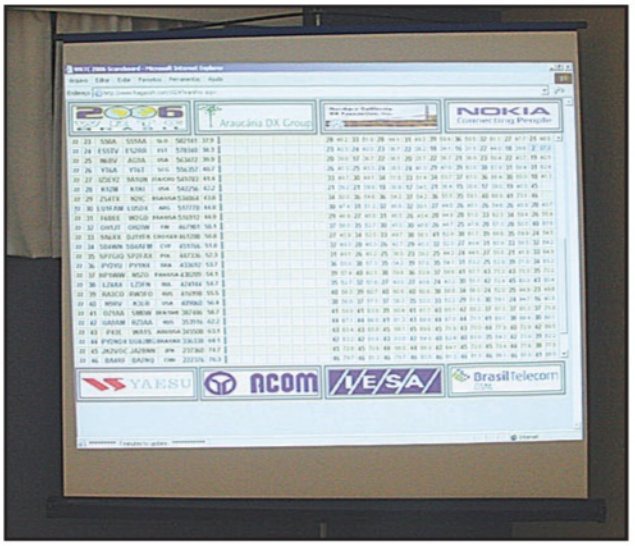
Contesters are geographically distributed and may be anywhere in the world. It may be difficult for a spectator to "watch" the competition from any one spot. When the contest is over, the raw scores can be compared to determine the winner, but the real winner is not known until log checking is performed. That might be "good enough" for the spectator, but the final results may show a different order of finish from the raw score, and that process takes several months.

Ingredients Needed for Success

When you're watching your favorite sports team, don't you want to know the background of the players? In a contest, wouldn't it be great if a spectator could know who the radio operators are and some background information about them personally as well as their station's information? The observer should be able to view the competition as it takes place in real-time, as if they were viewing the contest at each participant's location. There should be a way to compare the score and activity of each operator to other similar stations.

A necessary component for someone to observe and analyze the competition as a spectator would be a scoreboard. The current contest and time remaining should be shown. Without the ability to see the whole event at once, a viewer should be able to see a leaderboard with the competitors listed in order from highest to lowest. To make things more interesting, this scoreboard should show information right from the operators' logging programs. The callsign used, category entered, and current score are the basics. Other data that might make viewing more interesting include the current QSO rate for the last 10 and last 100 contacts; hourly breakdown of score, number of contacts, and multipliers; current active band; station and frequency of last contact.

There are existing websites such as getscores.org, Club Log, and others that provide a basis for just such a scoreboard. Computer program interfaces already exist between most contest logging programs and these websites. This is the key to real-time score reporting. As each contact is logged, it should update the scoreboard so spectators can see the latest score.



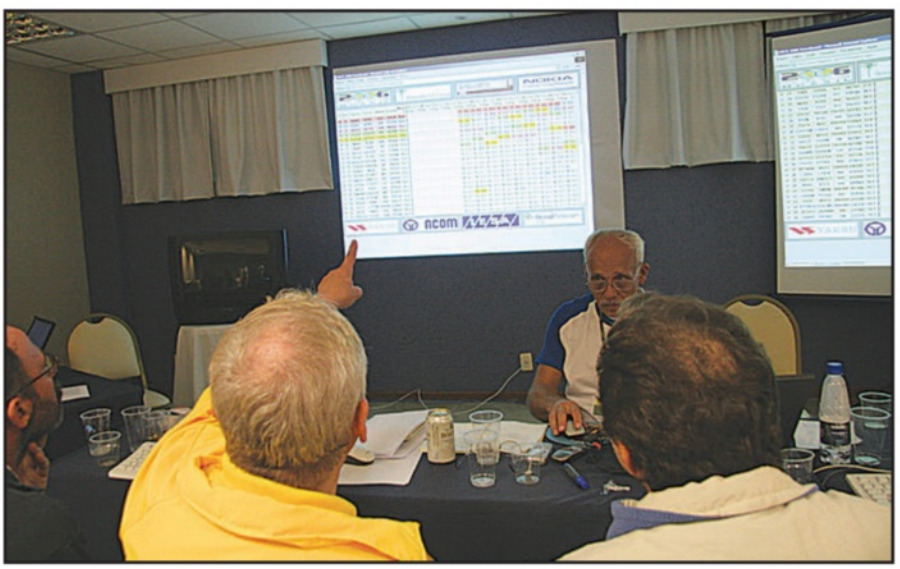
The scoreboard at the World Radiosport Team Championship 2006 in Brazil. Note listings for the placement and operator callsigns of each team, total score, and other information. (Photos courtesy of Diane Ortiz, K2DO)

Virtual Visiting

A nice option would be for a spectator to click on one of the callsigns to actually view and hear the operation currently in progress from that station. Video and audio could then be pulled up for the selected operator. For CW and RTTY contesting, a visual display of the on-air audio could show the contest operation as it takes place. Both sent and received information should be shown so the spectator could watch the contest in its entirety. Other logging windows as displayed on the operator's screen should also be available to allow the fan to view the operator display and be "in the cockpit" with the operator. The spectator should then have the option of switching to a competitor's station. All the same options would be available. Other operators should have the option of determining if they're in the log. This would allow others in the contest to participate and "spectate" at the same time!

Some other things that might create excitement would be the ability to compare callsigns. The viewer could select, say, up to three stations, and current data would be shown on the screen side-by-side. This real-time information would change every time a contact is logged. Comparative statistics would show which station is growing its QSO rate and which is slowing.

Other interesting items for viewers would be the station and antenna setup. Where is the station located? Is it on a mountaintop with views in all directions or is the operation on a small city lot? Station setup is a big part of contesting



The scoreboard at WRTC 2006 was visible at the headquarters hotel as well as over the Internet. People gathered to view the contest as it was taking place.

today, but operator ability distinguishes the top scorers from the also-rans. Some great operators do a fantastic job from a small station but can't compete with the leaders because the hardware is just not there. Knowing this helps the spectator put the station performance in perspective.

Statistics are other areas where fans glean information and can debate about sports. Contesters have histories that are available for comparison. How did this station do last year or the year before in the same contest? How does that compare with the second- or third-place operator? The more information there is available, the more interesting the contest can become to a fan.

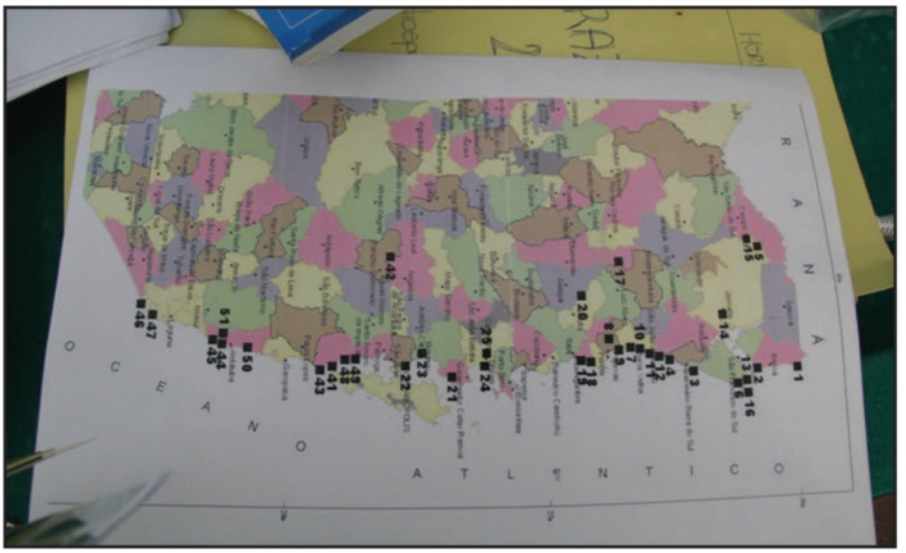
Summary

Contesting is an exciting sport but it's hard to demonstrate that excitement to non-contesters. If we can find a way to highlight our sport and actually show it in operation, we could perhaps get more hams interested in contesting. We might also be able to entice the general public into becoming ham radio operators and contesters. Kids today are really interested in gaming and online competition, and ham radio contests are very similar. If we could find a way to show them how exciting ham radio contesting can be, then they might want to get involved.

Could we get to the point where radiosport is treated like other spectator sports? That might be a stretch, but we currently have the technology to provide a more fan-friendly environment. Anything we can do to highlight the achievements and activity of contesters will go a long way toward promoting our sport and providing new blood for future contests. While contesting is already a growing activity in ham radio, it might expand even faster if non-contesters saw for themselves the fun and camaraderie the sport has to offer.

73, George, N2GA

Wouldn't it be nice to be part of the action by tuning into video and audio right from the contest site? Here's the operation of contest station PT5G by Pat Barkey, N9RV, and Tim Duffy, K3LR, during the World Radiosport Team Championship 2006. It took place at the station of PP5JR in Sambaqui, Brazil.



WRTC 2006 had stations spread out throughout the southern portion of Brazil. With Florianopolis as its headquarters, stations were distributed up and down the coast."

Looking Ahead in CQ *and* CQ *plus*

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

- **Results, 2013 CQ World-Wide RTTY DX Contest**
- **Results, 2013 CQ World-Wide Foxhunting Weekend**
- The CW Neighborhood
- 3 Scientists … and their Radio Roots

… and in the new CQ-Plus:

- The HI JUNO Project
- "Elmering" in the Internet Age
- Making the Most of AM BCB DXing Tools
- The 100-mW "AM Transmitter Challenge"

Upcoming Special Issues

June: Take it to the Field
October: Emergency Communications
December: Technology

Do you have a hobby radio story to tell? Something for one of our specials? *CQ* now covers listening and personal two-way services in addition to amateur radio. See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/cq_writers_guide/cq_writers_guide.html>.

Equinoctal Propagation

BY TOMAS HOOD,* NW7US

Beginning about the middle of February and continuing through March and early April, typical equinoctial propagation conditions can be expected on the HF frequencies. This usually means a noticeable improvement in conditions between the northern and southern hemispheres. Look for improvements between the United States and South America, Africa, Australasia, Antarctica, and parts of Asia. Equinoctial propagation occurs during the spring and fall months, when the sun is most directly overhead at the equator, producing similar ionospheric characteristics over large areas of the world. It tends to maximize during sunrise and sunset periods and over both short- and long-path openings.

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A Quick Look at Current Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, November 2013: 78
Twelve-month smoothed, May 2013: 60

10.7 cm Flux
Observed Monthly, November 2013: 148
Twelve-month smoothed, May 2013: 118

***Ap* Index**
Observed Monthly, November 2013: 5
Twelve-month smoothed, May 2013: 7

One Year Ago: A Quick Look at Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, November 2012: 53
Twelve-month smoothed, May 2012: 65

10.7 cm Flux
Observed Monthly, November 2012: 123
Twelve-month smoothed, May 2012: 126

***Ap* Index**
Observed Monthly, November 2012: 9
Twelve-month smoothed, May 2012: 8

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for February 2014

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 2-6, 8-12, 14-18, 22-27	A	A	B	C
High Normal: 13, 19-21	A	B	C	C-D
Low Normal: 7	B	C-B	C-D	D-E
Below Normal: 1, 28	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, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be poor (D) to fair (C) on Feb. 1st, excellent (A) from the 2nd to the 6th, Fair (C) to good (B) on the 7th, etc..

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

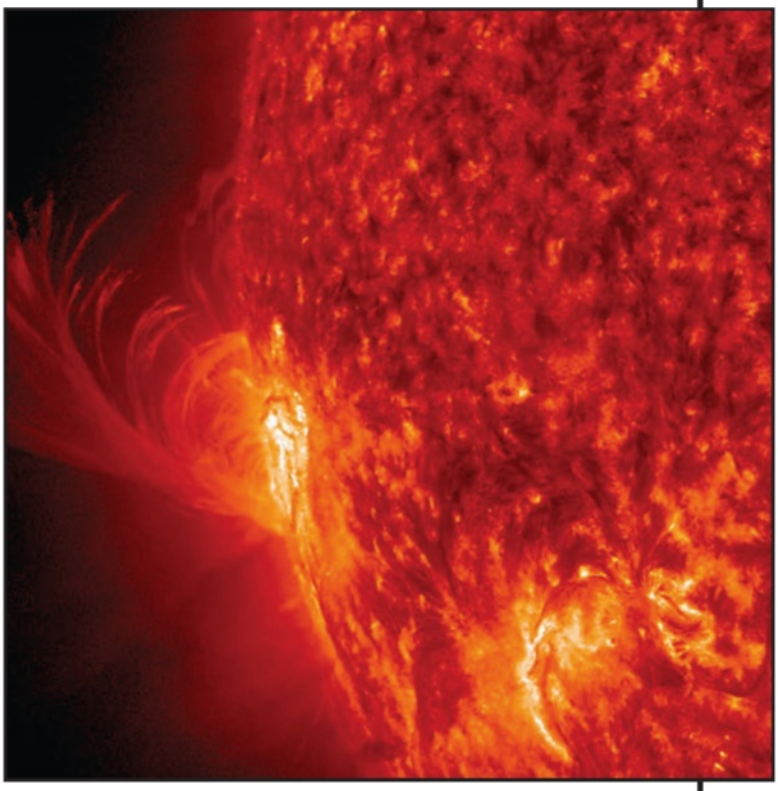


Fig. 1. The Sun burst out with a curling spray of plasma from an active region just coming into view on December 5, 2013. A number of smaller bursts also erupted from the same region, including at least one flare. All of the activity has its source in turbulent magnetic forces associated with the active region, the bright area seen in this image as the bright "patch" out of which the plasma sprays. The video at <http://g.nw7us.us/1dEMN4O>, taken in extreme ultraviolet light, covers about 5.5 hours beginning at 01:00 UTC (notice the x-ray flare, seen as a bright flash). This image was taken at about 02:52 UTC. (Credit: Solar Dynamics Observatory [SDO]/NASA)

During the daylight hours, optimum DX propagation conditions are expected on 15 meters. The band is forecast to open to all areas of the world sometime during this period, often with strong and stable signals with little fading or noise. Openings will be a bit shorter than those of the last few years. Conditions on 10 and 12 meters should run a close second, but with fewer openings expected into Europe and the Far East. Excellent worldwide DX openings to most areas of the world are forecast for 17 and 20 meters during the daylight hours. Conditions are expected to optimize for an hour or two after sunrise and again during the late afternoon. With increasing hours of daylight during February, expect the 10-, 12-, 15-, 17-, and 20-meter bands to remain open for an hour or so longer into the early evening than during the winter months.

Although the solar cycle is meandering along, be sure to check the 6-meter band for possible DX openings, particularly when a number of C-class or higher x-ray flares are occurring, and when the 10.7-cm flux is climbing. Openings are expected to be less numerous than in previous years of higher solar activity, but some openings may still be possible during the hours of daylight. The best bet is for openings toward Central and South America, but other openings may also be possible.

During the early evening hours and to as late as midnight, seven bands should be available for DX openings—15, 17, 20, 30, 40, 80, and 160 meters. Fifteen and 17 meters should hold up for openings toward Central and South America and the Caribbean, the Pacific area, Far East, and parts of Asia. Even better openings to many areas of the world should be possible on 20 meters during this period, with the strongest signals from southerly and westerly directions. Good DX conditions are also forecast for 30, 40, and 80 meters for openings toward the east and the south. Openings in the same direction, but with higher noise levels and weaker signals, should also be possible on 160 meters.

Between midnight and sunrise it should be a toss-up among 20, 30, and 40 meters for DX paths. These bands should open to many areas of the world with conditions favoring openings towards the south and the west. Expect similar conditions on 80 meters, but with weaker signals and higher noise levels. Be sure to check 160 for some unusual DX openings toward the south and the west during this period. Conditions on the bands between 160 and 20

CQ WW CW Contest Conditions

As you may remember, I predicted good to excellent conditions for the 2013 CQ WW CW Contest starting at 0000 UTC Saturday, November 23, and running through 2359 UTC Sunday, November 24. The weekend was, at least by the reports I've received, well within the prediction. The planetary Ap on the first day was a low eight on the first day, falling to a very quiet two by the second day of the contest.

With such quiet geomagnetic conditions, the lower HF bands were great players during the night; weaker signals were easier heard on those bands where openings provided signals weak yet present. During the day, the higher bands played nicely, as well.

The 10.7-cm radio flux was 136 on Saturday and 127 on Sunday, and the observed sunspot count on the first day was 65, while on the second day it was 69. There were ten minor C-class x-ray flares, and two M-class flares on day one. On day two, there were also 10 C-class flares. This activity helped higher-band propagation, but caused a bit of degradation on lower bands. These conditions still provided reasonable propagation on many of the contest bands. These conditions fit pretty well with the forecast.

How did you fare this year compared to last year? I am interested in hearing from you regarding the differences between last year and this year, and how you did overall this time.

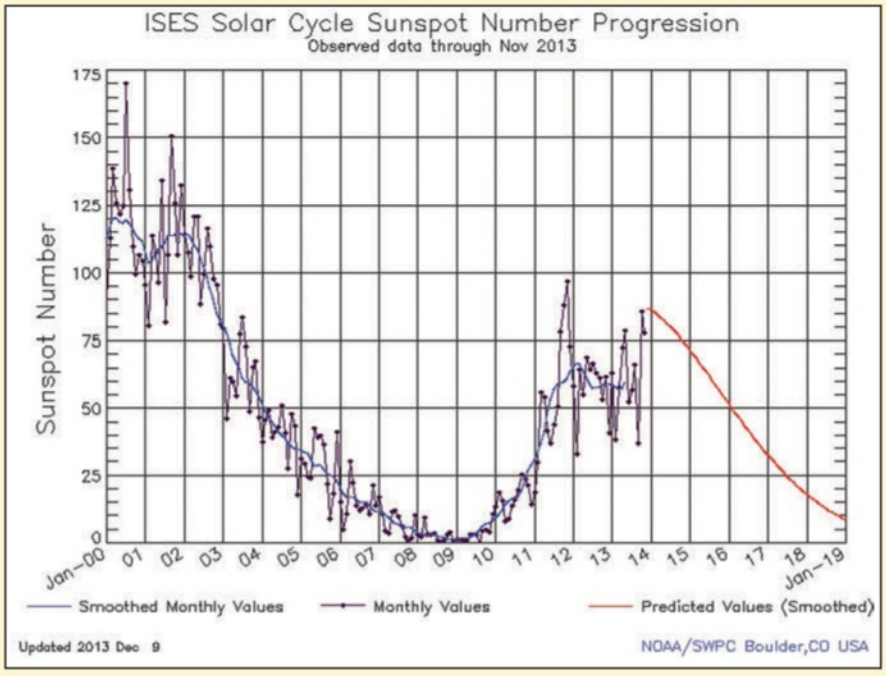


Fig. 2. The plots of current sunspot Cycle 24, as of December, 2013, reveal a significant increase of solar activity during the last months of 2013. While this cycle is much weaker than a number of past solar cycles, this recent uptick in activity has breathed new life in the high-frequncy amateur radio allocations. One might postulate that there is a second peak in Cycle 24. Keep in mind that, magnetically, the Sun is showing signs of reversing polarity (where the north and south solar poles are reversed), a sure sign that we're approaching the down-turn marking the decline phase of the cycle. (Credit: SWPC/NOAA)

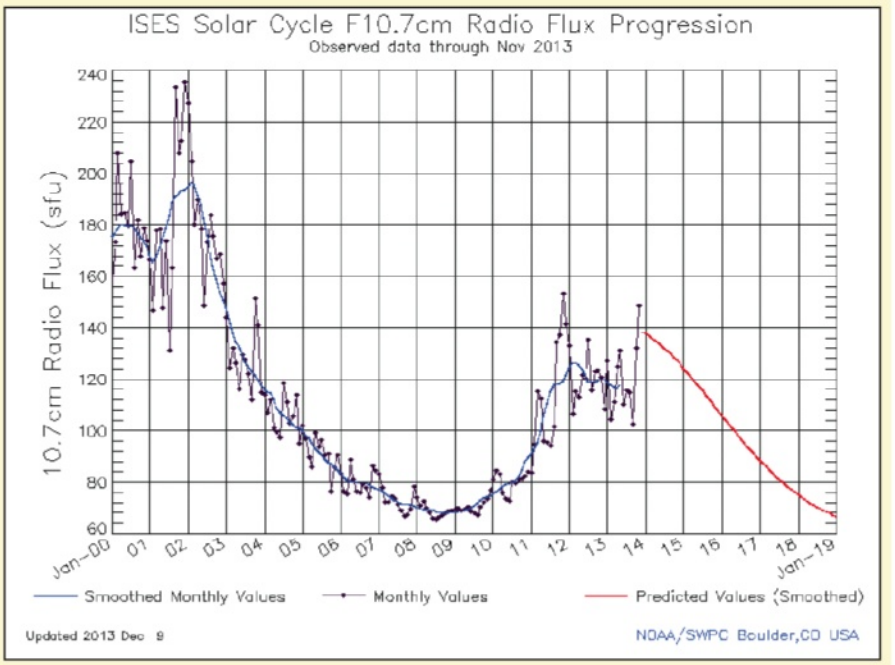
meters are expected to peak at local sunrise.

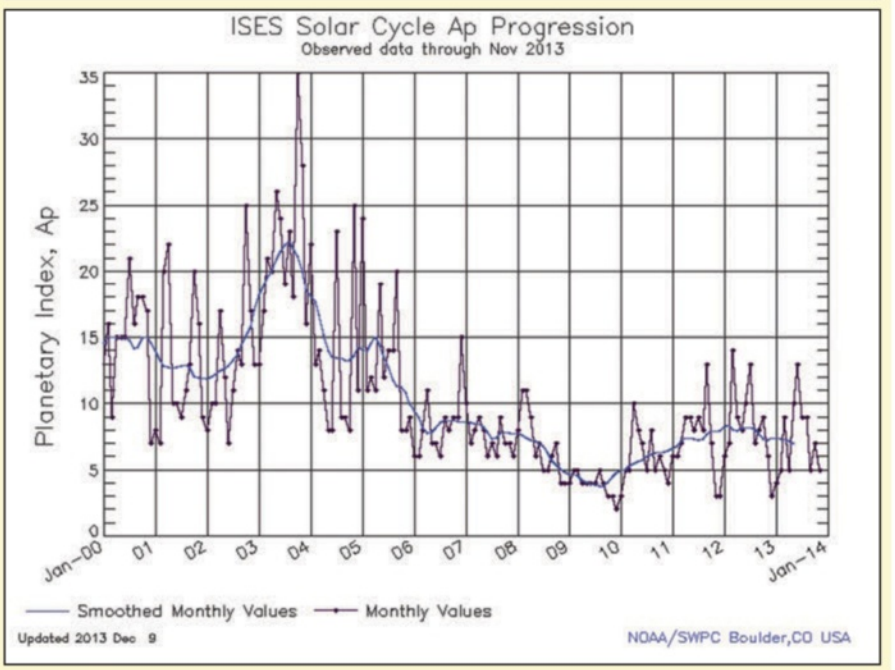
VHF Ionospheric Openings

As mentioned previously, check for 6-meter DX openings during the daylight hours. Some short-skip openings over distances of about 1200 to 2300 miles may also occur. Best times for such openings are during the afternoon hours.

Trans-equatorial (TE) scatter propagation tends to increase during the equinoctial period, and some 6-meter openings may be possible between 7 and 10 PM local time. The best bet for such openings is between the southern tier states and South America for paths approximately at right angles to the equator. An occasional TE opening may also be possible on 2 meters. Unlike F_2-layer or sporadic-*E* openings on 6 meters, TE openings are characterized by very weak signals with considerable flutter fading.

Auroral displays tend to occur somewhat more frequently during the equinoctial period. Unusual short-skip conditions often occur on the VHF bands during these displays. Openings, generally over distances of several hundred and up to about 1300 miles, may take place by means of reflection from





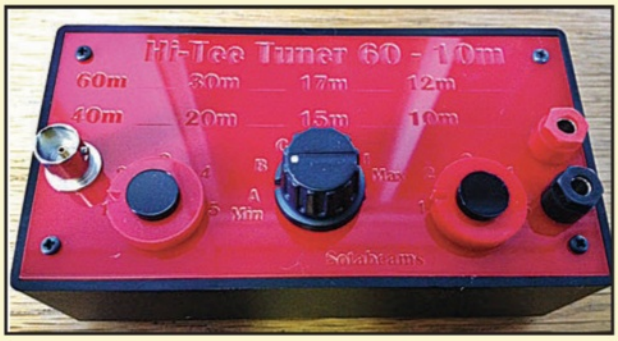
what's new

New Products from SOTAbeams

"Hi Tee" QRP Antenna Tuner

UK-based portable accessory specialists SOTAbeams has introduced the first in its new range of antenna tuners. The Hi Tee Tuner has been designed with performance and weight in mind, according to a company announcement. It weighs just over 5 ounces (150 grams) and covers 60–10 meters.

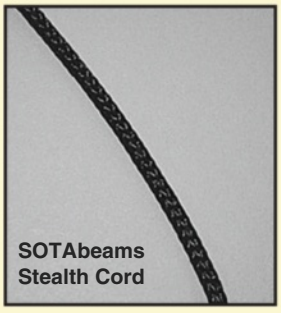
Unlike many QRP tuners, the company says, an air-core coil is used to minimize losses. The tuner has been optimized for portable use, although it is just as much at home in the shack. It includes space on the front to fill in the settings for each band for your favorite antenna. The tuner retails for just over $80US at current exchange rates (plus shipping). For more information, visit <http://www.sotabeams.co.uk/hi-tee-tuner/>.



SOTAbeams "HiTee" QRP Antenna Tuner

SOTAbeams Antenna Cords

Sometimes you want your antenna supports to be as invisible as possible; other times you want high visibility. The folks at SOTAbeams, who specialize in portable antennas, are now offering both options. On the hard-to-see side is *Stealth Cord,* a thin, woven nylon cord consisting of a green and brown weave. Formulated to have low visual impact, it is ideal for holding up stealth antennas. Stealth Cord is supplied on a spool in a generous 50m (160 ft) or 200m (720 ft) lengths, for approximately $12 and $28 US, respectively, plus shipping.


SOTAbeams Stealth Cord

For times when safety is more of an issue than stealth, SOTAbeams also is offering a new "hi viz" cord designed for use on busy hilltops or in emergency situations. It comes in the same lengths at the same prices. Both products are available in SOTAbeams' web-store at <www.sotabeams.co.uk>.

Note: *"What's New" is not a product review and does not constitute a product endorsement by CQ. Information is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of "What's New" is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

the ionized region produced by an auroral display. Flutter fading and multi-path echoes characterize auroral-type openings. To take maximum advantage of such openings, rotatable antennas should be beamed toward the auroral display, if it is visible.

Large areas of sporadic-*E* ionization also accompany most auroral displays. Reflection of VHF signals from these regions can make possible short-skip openings between distances of 750 and 1300 miles. Signals reflected in this manner are usually strong and stable as compared to those reflected directly from an auroral display.

Auroral activity often occurs during periods of radio storminess on the HF bands. Check the Last-Minute Forecast (also available online at <http:// SunSpotWatch.com>) for those days expected to be Below Normal or Disturbed during February. These are the days on which VHF auroral-type openings are most likely to occur.

Check out *CQ VHF* magazine's Propagation column for an in-depth look at propagation on VHF and above. Be sure to send in your reports to this columnist, as well.

Current Solar Cycle Progress

Canada's Dominion Radio Astrophysical Observatory at Penticton, British Columbia reports a 10.7-cm observed monthly mean solar flux of 148.4 for November 2013, up from 132.3 for October 2013, 46 points higher than September's 102.7! This indicates a clear resurgence of solar activity. This provided a lot of great DX and activity even on the 10-meter band. The 12-month smoothed 10.7-cm flux centered on May 2013 is 118.1, up from April's 116.6. A smoothed 10.7-cm solar flux of about 133 is predicted for February 2014.

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 77.6 for November 2013, down a bit from October's 85.6, yet still significantly higher than 36.9 for September 2013. The low for the month was 25 on November 26. The high of 131 occurred on November 17. The mean value for November results in a 12-month running smoothed sunspot number of 59.9 centered on May 2013. Following the curve of the 12-month running smoothed values, a smoothed sunspot level of 79 is expected for February 2014, plus or minus 14 points.

The geomagnetic activity as measured by the planetary A-index (Ap) for November 2013 is 5. The 12-month smoothed Ap index centered on May 2013 is a steady 7.0. Geomagnetic activity should be much the same as we have had during January. Refer to the Last-Minute Forecast for the outlook on what days that this might occur (remember that you can get an up-to-the-day Last-Minute Forecast at <http://SunSpotWatch.com> on the main page).

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail 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 <http://www.facebook.com/spacewx.hfradio> and <http://www.facebook.com/NW7US>. Speaking of Facebook, check out the CQ Amateur Radio Magazine fan page at <http://www.facebook.com/CQMag>.

I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!73, Tomas, NW7US

Oops…

It's all Greek, um, Russian, to us…

Reader Doug Bailey, K0FO, spotted a few errors—mostly in syntax—in our November article on Russian CW. There were a couple of typos in the table of compass directions shown in the original fig. 4 that resulted from "translating" the Cyrillic characters into a form that our computers could read. Corrections are below.

In the original fig. 11, Doug says, *"You translate the phrase contained in the box as 'No please don't reply in Russian at 40 WPM!' It doesn't say that at all. It tries to say, 'Sorry, this is all the Russian that I know.' The Russian word beginning the phrase means, colloquially, 'Sorry' or 'Regrets,' but is more commonly used in common speech when referring to the action of another person as in 'Sorry you're a dimwit.' In the context of this phrase, a Russian would more likely use a word which means 'unfortunately'."*

The "please don't reply in Russian at 40 WPM" line in the caption was an (obviously poor) editorial attempt at humor. The correct English is in the main text. Regardless, a modified form of "Unfortunately, this is all the Russian I know" is provided here as well. Sorry that we're dimwits!

North	СЕВЕР
Sent as	S E W E R
South	ЮГ
Sent as	ĪM G
East	ВОСТОК
Sent as	W O S T O K
West	ЗАПАД
Sent as	Z A P A D
Southeast	ЮГО- ВОСТОК
Sent as	IM G O W O S T O K
Southwest	ЮГО - ЗАПАД
Sent as	IM G O Z A P A D
Northwest	СЕВЕРО - ЗАПАД
Sent as	S E W E R O Z A P A D
Northeast	СЕВЕРО- ВОСТОК
Sent as	S E W E R O W O S T O

Revised fig. 4, showing corrected spellings of compass directions.

Clarification

In our "On the Cover" column in the November issue, we mentioned that the radio-computer interface used by "cover model" Chris Yody, KE7JBF, was designed and built by the Baton Rouge Amateur Radio Club in Louisiana. We received the following clarification from Dana Browne, AD5VC, one of the interface's designers:

Two members of the Baton Rouge Amateur Radio Club designed the digital interface mentioned in the article. I am one of them. However, we do not build the interfaces for other clubs, despite what the article implies in the last paragraph.

We designed it as a kit building project for our club members. Because of the minimum order needed for the circuit boards, we ordered extra boards and produced unbuilt kits that the club sold as a money-raiser. In fact, the Seattle club that you highlighted bought a large number of kits and then built them themselves.

We are now getting inquiries from hams about having us build interfaces for them, and we have no plans to do that. We may in the future do another kit run, but there is not enough interest yet to make it profitable to the club.

We apologize for any confusion.

(disclaimer)	**ЖАЛЪ, ЗТО - ВСЕЬ РУССКИЙ, ШТО Я ЗНАЮ**
sent as:	**VALX ŪITO WSEX RUSSKIJ YTO ĀA ŪI NA ĪM**

Revised fig. 11, no longer suggesting that anyone (except the editor) is a dimwit!

Club Trophies from SOTAbeams

Richard Newstead, G3CWI, SOTAbeams owner, says that "one of the most common problems that radio club members face is retaining and nurturing the interests of newer licencees. One way in which this might be done is to introduce some club awards. These could be for showing the most progress in the hobby, working the most DX or even for attending the most meetings."

To help clubs in that effort, SOTAbeams has introduced a club trophy that can be custom-engraved The trophy is laser cut from black gloss acrylic and is priced at £4.99 + p&p in the UK, or just over $8US (plus shipping) at current exchange rates. For more information, visit <http://www.sotabeams.co.uk/club-trophy/>.

SpeeCup Bluetooth™ Speaker-Mic

If you have a Bluetooth™-enabled ham rig, you might want to check out the SpeeCup hands-free speaker-mic. Designed to fit in a standard automotive cup holder (thus the name), the SpeeCup will also fit in many bicycle water bottle holders or can just stand on its own. The upward-facing speaker also features "gesture control," which allows you to answer phone calls or change music tracks with a sweep of your hand over the top of the speaker. *(Whether this would work as a PTT control for a Bluetooth-equipped ham rig is probably a function of the rig's Bluetooth circuitry—ed.)* It also has an audio line out jack for connecting to a home stereo, etc., and has been designated as a 2014 honoree in the Consumer Electronics Show Innovations Design and Engineering Awards. The SpeeCup retails for $129.95 and is available directly from the manufacturer at <http://speecup.com>.

The SpeeCup Bluetooth speaker-mic is designed to fit in a car's cup holder or a bicycle water bottle holder.

RF Torque Wrenches from Pasternack

We must admit that our first mental image here was of a wrench designed to allow a precise amount of RF to pass through a connection, but then realized that in critical applications, it is important for RF feedlines to neither be too loose nor too tight, and that's what these wrenches are about.

The PE5019-XX series of break-over torque wrenches allow accurate mating force (measured in "inch-pounds") when assembling and disassembling a variety of RF coaxial connectors. The unique feature of break-over torque wrenches, according to the company, is that they will "break" at the pivot point once the torque value force is achieved, effectively preventing the user from over tightening the coupling nut on the connector. A broad range of break-over torque wrench sizes is available. For more information, visit <http://bit.ly/19SVsxR>.

Two New Product Lines from RFMW

Sunny Electronics *FastClock™* Oscillators: Circuit designers and experimenters may want to check out the new line of Sunny Electronics *FastClock™* crystal and voltage-controlled oscillators, now offered by RFMW, Ltd. The devices offer a wide choice of frequency, voltage and output combinations, and operate from 10–1500 MHz. For more information, visit <www.rfmw.com>.

Florida RF Labs "Lab Flex" Cable Assemblies: RFMW is also supplying and supporting six different types of cable assemblies from Florida RF Labs. The Lab-Flex® assemblies offer >90 dB of shielding effectiveness and a wide range of connectors including, but not limited to, 7/16, TNC, SMA, 2.4mm, 2.92mm and 1.86mm interfaces in various configurations. Standard lengths are 24, 36, 48 and 72 inches. The cables support frequencies up to 65 GHz. For more information, visit <http://bit.ly/GX7C0B> or call RFMW at (877) FOR-RFMW.

Florida RF Labs "Lab-Flex" cables, available from RFMW. (Courtesy RFMW, Ltd.)

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BY IRICHARD FISHER,* KI6SN

Capitol Hill and FCC Actions Affecting Communications

Broadcasters and DoD Agree on Sharing 1755-1780 MHz

U.S. House Energy and Commerce Committee Chairman Fred Upton and Communications and Technology Subcommittee Chairman Greg Walden, W7EQI, say that they welcome the National Telecommunications and Information Administration's endorsement of an agreement between the Department of Defense and the National Association of Broadcasters on the relocation of a parcel of government spectrum to shared use.

The agreement was reached after bipartisan committee leadership worked with the Department of Defense, the National Telecommunications and Information Administration, and the Federal Communications Commission. It paves the way for the Department of Defense to move systems out of the 1755- to 1780-MHz band by creating a sharing arrangement between it and the broadcast community in the shared use of the Broadcast Auxiliary Service.

This spectrum is used by news organizations to originate material such as breaking news stories from outside of studio facilities. *(**FULL STORY:** <http://1.usa.gov/18yxltt>. – KI6SN.)*

Kansas Radio Amateur Nabbed As FM Broadcast Pirate

Glen Rubash, KCØGPV, of Dwight, Kansas, has been hit with a $4,000 Notice of Apparent Liability for operating an unlicensed FM transmitter on 88.3 MHz in the city of Manhattan.

The fine had originally been issued for $15,000 but was reduced after Rubash produced documentation showing his inability to pay.

The FCC said Rubash admitted over the telephone to its agents that he installed and owned the station's radio transmitting equipment. According to *Amateur Radio Newsline* (ARN), "he also demonstrated control over the station by stating that he would refuse to surrender the equipment to the agents from the Kansas City Office if required to do so."

The FCC said that "even though Rubash admitted via telephone interview to making the admissions, he later asserted that his statements were based on incorrect information ... In his written response he stated he owned and installed a low-power FM radio transmitter but that it operated within Part 15 unlicensed limits."

In denying most of Rubash's requests, the FCC said it affirmed the NAL, finding he violated Section 301 of the Communications Act by using equipment without the required Commission authorization.

More Musical Chairs at the FCC

Communications attorney Roger Sherman is the new Acting Chief of the FCC's Wireless Telecommunications Bureau, which oversees amateur radio as well as other two-way radio services. Sherman replaces former Bureau Chief Ruth Milkman, who was named Chief of Staff to new FCC Chairman Tom Wheeler.

According to the ARRL, Sherman previously served as the Democratic Chief Counsel to the House Committee on Energy and Commerce, along with other Congressional staff positions.

Oklahoma CBer's Linear Amplifier Brings $15,000 Fine

The FCC has issued a $15,000 Notice of Apparent Liability for Forfeiture to Carlton Lewis, of Enid, Oklahoma, alleging he operated a Citizens Band radio with an external power amplifier in violation of Part 95 rules.

In May 2013, agents from the Enforcement Bureau's Dallas office tracked down a strong signal on 27.1850 MHz — CB Channel 19 — coming from Lewis' residence.

For more than 30 minutes, no one answered an FCC agent's knock at the door. Ultimately, Lewis appeared and showed the agent his CB transmitter, which was warm to the touch.

According to an ARN report, "the agent observed that no coaxial cables were connected to the CB transmitter but also noted the coaxial cable coming into the residence and traced it to a linear amplifier hidden behind a sofa. The linear amplifier was also warm to the touch. Lewis did not respond when asked whether he had used the linear amplifier."

Prior to his most recent citation, the FCC noted Lewis' CB station had been issued two warnings from the Dallas Office, advising him that an amplifier voided his authority to operate. Based on previous experience, the FCC ruled a $15,000 fine was warranted.

Commission Upholds Fine for Marketing Unauthorized RF Devices

The FCC has issued a monetary forfeiture in the amount of $14,000 to Custom Interface Technologies, a Division of Thornstar Corporation, in Joshua Tree, California for "willfully and repeatedly violating rules against manufacturing and marketing of unauthorized radio frequency devices in the United States."

The company, alleged to have marketed uncertified video assist transmitters, told the FCC it did not have the ability to pay the $14,000 fine. "However in affirming the forfeiture amount the FCC says while Custom Interface Technologies did provide the Commission with three years of tax returns and a bank statement to support its claim of an inability to pay, after review of these financial documents that the FCC declined to reduce the forfeiture amount and that "the $14,000 fine is warranted."

This Month's Contributors

Sources for information in this month's Washington Beat include the U.S. House Energy and Commerce Committee, Amateur Radio Newsline, CQ Newsroom, ARRL, and other published reports. – KI6SN

*c/o CQ magazine

Photo A. *Syracuse University's Lubin House in midtown Manhattan was the site of September's Audio Industry Summit on the future of radio. (Photography courtesy of W2VU)*

There is good news for broadcast band DXers who like to listen to more than just a station's callsign and city at the top of the hour. Top radio industry execs say 'live and local' are making a comeback ...

CQ Plus Reports: 'The Power of the Microphone'

BY RICH MOSESON, *W2VU

Broadcast-band DXing was my first love in radio. In addition to the thrill of tuning in faraway stations, I was captivated by hearing about what was going on in those other places – the local news, the local commercials, the challenge of trying to figure out where the station was before hearing the ID at the top or the bottom of the hour.

The voices coming through the speaker into my bedroom drew me in . . . into radio as a hobby and into a career in radio, television and print journalism. It all started with those voices.

In recent years, though, the uniqueness of local radio has in many places given way to homogenized programming and shows delivered by satellite from New York or some other big city. Now, satellite radio is even taking local radio stations out of the equation, along with Internet "radio" sources such as *Pandora* and *iHeartRadio,* which lets listeners eliminate those voices altogether and simply package music that is sent over the Internet to your smartphone or even your car.

The Tide is Turning

Good news. "Terrestrial radio" is fighting back. And it is sending to the front lines the DJs and news reporters who

Photo B. *Newhouse School of Public Communications Dean Lorraine Branham said her advisors told her to call the session an "audio" industry summit because "radio" was too limiting. "But it's all about radio," she said in opening remarks.*

made broadcast radio such an important part of so many American communities, but who, in recent years have frequently been marginalized.

"Radio is not about music," CBS Radio President Dan Mason told an Audio Industry Summit in late September. "Radio is not about news, or traffic or sports. Radio is about the power of the microphone."

His feelings were echoed by Bob Boilen, host of "All Songs Considered" on National Public Radio. "I want somebody to talk to me," he said. "I want a storyteller. That's what I want out of the medium ... That's where radio wins."

The summit was organized by Syracuse University's Newhouse School of Public Communications and held at Lubin House, the university's "outpost" in New York City[1], **Photo A.**

Newhouse Dean Lorraine Branham, **Photo B,** opened the event by discussing her memories of growing up listening to the radio in Philadelphia, and pointed out that the meeting was being called an "audio industry summit" because "my advisers told me 'radio' was too limiting." Then she paused and added, "But it's really all about radio."

About 100 people attended[2], including two groups of panelists. Most were top executives of various media companies and, in a reflection of where we continue to be as a society, the group was overwhelmingly male, white, and over 50.

The first panel, **Photo C,** was supposed to discuss the current state of the radio industry and the second, **Photo D,** was supposed to look at its future, particularly in the face of competition from satellite and Internet radio "disruptors" such as Pandora and iHeartRadio (both of which were represented on the second panel). But they kind of got all that mixed up and both groups talked about both the present and the future.

Live and Local

The first panel was made up of executives of radio stations or station groups, including CBS Radio's Dan Mason, **Photo E**; Patrick Walsh, CEO, COO and director of Emmis Communications, which is one of 10 biggest radio station owners in the country; Deon Levingston, Vice President and General Manager of WBLS in New York City, **Photo F**; Buzz Knight, in charge of programming development for Greater Media and former Program Director of various stations, including the iconic WNEW-FM in New York; and Ed Levine,

Photo C. *The first of two panels was made up of top executives of traditional radio stations or station groups. (See text for a "Who's Who")*

Powerhouse WABC Radio Makes Shift to 'Local'

New York City's WABC-AM 770 is making dramatic changes to its talk radio line up, with a greater emphasis on "local" hosts and issues. Details:< http://www.CQPlusDigital.blogspot.com >.

Photo D. *The second panel, on radio's future, included a mix of people from "terrestrial" radio and Internet-based radio services.*

President and CEO of Galaxy Communications, which owns 14 radio stations in upstate New York.

All of the speakers were very positive and upbeat about the state of the radio industry and its future, with an emphasis on the need for radio stations to return to being "live and local" in order to set them apart from satellite and Internet competition. "Local is our job," said Levingston. Knight said his company is "now seeing the importance of good content and good personalities," citing the midday DJ at his company's station in Philadelphia – Pierre Robert – as "the heart and soul of Philadelphia."

Walsh echoed the theme of bringing the "local" back to local radio, while acknowledging that the two largest radio station groups in the country (Clear Channel and Cumulus) do not yet share that vision. But as far as his company is concerned, Walsh said, "Strategically, local makes sense, it's where our growth is. Our personalities drive us." And he added, "Being local is what differentiates us, what makes us special and different ... that connection with the listeners."

This attitude should come as welcome news to broadcast-band DXers, who should once again be able to reap the benefits of listening to uniquely local programming as they spin the dial, seeking out new stations in faraway places.

Photo E. *CBS Radio President Dan Mason told the group that radio is not about music, news or sports, but rather about "the power of the microphone."*

Photo F. *Deon Levingston, Vice President and General Manager of WBLS in New York City, noted that "local is our job."*

Goin' Mobile ...

A few years back, I wrote a guest editorial in *Popular Communications* about missing my transistor radio and lament-

ing that I couldn't listen to the baseball playoffs while shopping at my local supermarket[3]. Well, that topic also came up, with Walsh pointing out that the radio industry has recently put together an "app" that activates an FM receiver on some Android phones offered by Sprint. "On average," he noted, "people look at their phones 156 times a day, or every six minutes." Or as Mason put it, "the cell phone has become the new transistor radio."

WBLS's Levingston welcomed that development, noting that in recent years, "as an industry, we've lost our portability." He pointed out that there were three distinct stages of technological development in broadcast radio, starting with the home console radio that plugged into the wall. The next big leap was into cars in the 1930s and '40s, followed by the introduction of the battery-powered transistor radio in the '50s and '60s. But the last portable radio with any popularity, he pointed out, was the Sony Walkman in the 1980s. "This app," he said, "will help us regain our portability."

Car radios are now doing more than just playing music, and that was part of the focus of the second panel, which included representatives of the "disruptors" as well as traditional broadcasters. Along with "mobile devices" (smartphones, for example) getting radios, car radios are beginning to provide for Internet information sources, such as Pandora or iHeartRadio. And, just as the frequency display on your scanner or ham rig has now become a multifunction display providing a variety of information, so are car radio displays now offering station, song, and artist readouts as well as album art and other visual information.

Photo G. *Kevin Straley of TuneIn discussed the fact that after the Boston Marathon bombing, his service's listeners "tuned in" to Boston police scanners as much as they did to local and national news sources.*

Speakers on the second panel included Chris Oliviero, Executive Vice President of Programming for CBS Radio; NPR's Bob Boilen (introduced earlier); Owen Grover, vice president of "content partnerships" for Clear Channel Entertainment and a co-developer of iHeartRadio; Tommy Page, vice president of artist and brand partnerships at Pandora; Kevin Straley, VP of programming at TuneIn; and Ryan Delaney, a news reporter for public radio station WRVO, a 2010 Newhouse School graduate and token "young person" on the panels. The moderator was Doug Quin, a professor at the Newhouse School and do-director of its audio arts department.

Grover, Page, and Straley emphasized they consider the newer, Internet-based, entertainment media to be *additive* to traditional terrestrial radio rather than competitors, providing listener-controlled programming.

"I believe Pandora is the future," said Page. "The future is streaming, and small artists. Multiple platforms encourage new and small artists." He noted that the iPhone had prompted exponential growth in Pandora. "Two years ago, 80 percent of our listeners were on desktops. That's now reversed, but with no loss of the desktop audience. It has all been growth on the mobile side."

Grover, however, pointed out that radio over IP is still very young, reaching only 50 percent of the U.S. population, while streaming video already reaches 90 percent. "There is a lot of room for growth," he noted.

Not Just Broadcast

One aspect of the growth in radio over IP that should be of interest to many *CQ Plus* readers is that the medium is not restricted to music or even to broadcast radio stations. TuneIn's Kevin Straley, **Photo G,** said that in the aftermath of last spring's Boston Marathon bombing, "TuneIn had links with WBZ news radio, WRKO talk radio, CNN for a national perspective, and Boston police scanners . . . which rated as high in listenership as the national media sources."

Straley later said that "radio is just one part" of what TuneIn offers," noting that "we have more than 70,000 live streams, including scanners and FAA airport towers."

Indeed, when clicking the "local" tab on TuneIn.com's website from my home computer in northern New Jersey, the menu of choices included not only all of the FM, AM, and HD broadcast stations in the metro New York area, but a wide variety of amateur radio repeaters and public safety agencies as well.

Personal Connections

The overall emphasis of all the speakers – whether representing traditional broadcasters or Internet-based sources – was the necessity of engaging individual listeners. The Internet radio people see that as coming through providing listeners with individual control of what they hear, while the broadcasters are focusing on the personal connections and community involvement that come with the return of live, local disk jockeys.

"We want the DJ to once again be the biggest star in town," said CBS's Olivieri.

"Radio stations have always had the reputation of calling people to action," noted his boss, Dan Mason, while Clear Channel's Owen Grover later echoed that thought, saying, "My colleagues truly plant beacons in the center of tribes." But, these radio industry leaders are learning, those beacons are only jukeboxes if they don't use "the power of the microphone."

*(**LISTEN:** To a 2-hour, 45+ minute podcast of the Audio Industry Summit at <http://bit.ly/16HcJOE>. – W2VU.)*

Notes:

1 - The city of Syracuse is 250 miles from New York City, yet many of Syracuse University's students come from and return to the New York City area. Since 1965, the university has operated Lubin House as its "remote base" in New York City, featuring events for alumni, current, and prospective students. To learn more, visit <http://lubinhouse.syr.edu/>.

2 - The summit was also streamed live on SU's student radio station, WERW, making it accessible in real time to Newhouse students at the main campus in Syracuse. A podcast was also posted for later listening at <*http://bit.ly/16HcJOE*>.

3 - *Popular Communications*, August 2010

Digging Into Specifics of the Commission's 'Revitalization' Proposals

The FCC Moves to 'Fix' AM Broadcasting

BY ROB de SANTOS, K8RKD

This extended version of *Horizons* explains the recent FCC Notice of Proposed Rulemaking (NPRM) regarding the U.S. AM broadcast band and what it might mean for medium-wave broadcasting in the United States.

We've been covering the changes affecting the AM broadcast band for well over a year now.[1]

An AM Haze and Malaise

It's no surprise to many of us that the AM band is suffering badly from neglect and declining numbers of listeners, **Photo A**. After nearly 18 months and on the doorstep of a new leader at the FCC, a NPRM was issued on October 31, 2013 laying out the plans for the future. *(IN DEPTH: See FCC NPRM 13-139: "Revitalization of the AM Radio Service" at <http://fcc.us/18UO2xm>, Photo B. – K8RKD.)*

The FCC has proposed to make a number of changes, some that will be popular, and others likely to be controversial even among station owners and managers. It has not opted, at least for now, to go along with some of the more radical proposals including moving AM broadcasters to an expanded FM band or taking the band to entirely digital. With these choices off the table, it remains to be seen if what is now proposed will have the desired effects on the AM band.

As I've noted in earlier columns, listeners to medium-wave or AM broadcasting in the U.S. have declined radically over recent decades. As late as the mid-1970s the majority of all radio broadcast listening in the United States, and indeed worldwide, was in the AM mode — not FM. Today, by some measures, the band garners less than 10 percent of all listening hours in the U.S. and with the advent of digital services, that decline is accelerating. Among the youngest demographic sectors, the band is almost completely ignored. In the NPRM, the FCC noted that only 4 percent of listening time among those aged 25-34 was to AM.

Among the other issues facing AM, these include increased interference and low fidelity. The interference increase is due to several factors including the proliferation of more and more electronic and computerized devices, slack enforcement of the FCC's own standards for interference, the overlay of digital services on the band, and the changes in the FCC rules allowing higher power and extended hours for many stations.

It's No Longer the 1930s

What makes AM effective as a means to reach wide geographic areas

Photo A. *FCC proposals may bring big changes to AM radio across the United States. This Victor Model 3-RF-91 AM-FM radio was found by a lucky looker at a yard sale. After a bit of tender-loving care, it works and looks great. "This thing has an 8-inch speaker and sounds fantastic," writes the photographer. It may be hearing a whole new type of medium wave if all the FCC proposals are adopted. (Courtesy of AlexKerhead via Wikimedia Commons)*

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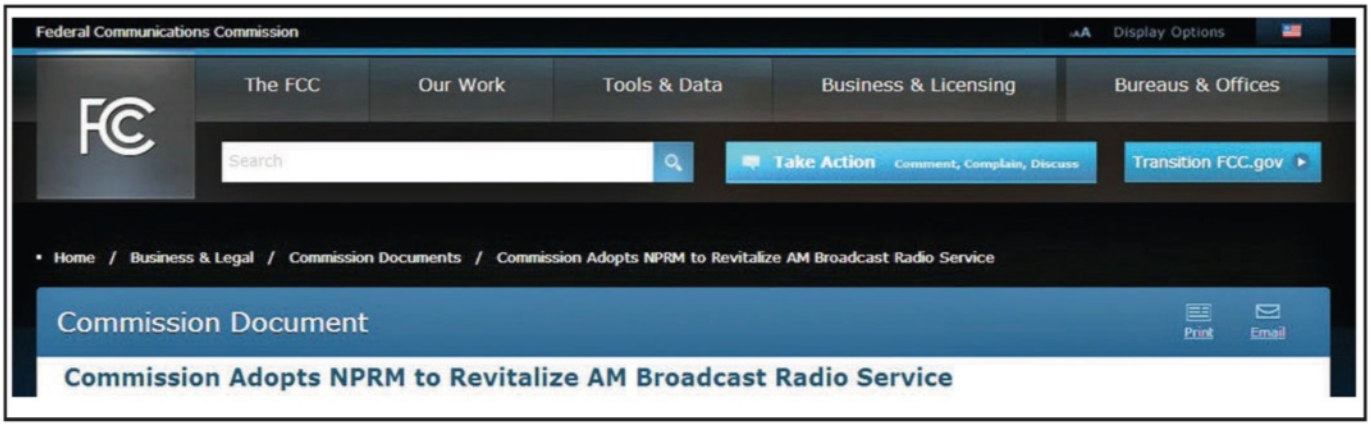

Photo B. *The full text of FCC Notice of Proposed Rulemaking (NPRM) 13-139, regarding U.S. AM radio, can be found at "Revitalization of the AM Radio Service" at <http://fcc.us/18UO2xm>. It can be viewed as a Word, PDF, or text document. (Internet screen grab)*

at night also makes it subject to nighttime interference. The low solar cycles haven't helped either as skywave propagation at night has suffered. While DXers and radio lovers might not be happy with the past changes to the AM band, the country is a different place than it was in the 1930s when the basics of the AM band plan were first fixed and "clear channels" set by regulation and treaty.

It was a reasonable assumption in 1934 that having a few stations that could be heard by most of the country provided a guaranteed communication backbone for the U.S. Many local stations back then could not have afforded to be on the air well into the night even if they were permitted to do so. Those assumptions may no longer be true.

Judging from the programming on many of the remaining stations with "clear channel" frequencies, the station programmers no longer think it important to cater to 30-or-more states at night and only to their local audiences even if they occasionally acknowledge others are hearing them.

Changing Technologies

With satellite and fiber distribution of programming, listeners in remote areas can be reached in emergencies without necessarily needing clear-channel stations. State emergency radio networks now reach every geographic corner of their territory in many cases. The advent of the Internet has made it possible for very low-wattage stations to be heard worldwide.

Changes in music listening and the growth of talk radio have also had an impact. FM brought static-free sound to audiences and imaginative programming saw migrations of listeners begin to move away from AM in the 1970s.

The number of AM stations in the U.S. has declined by an average of nearly 10 per year since 1990 while the number of FM stations has doubled. There are now more than three times as many FMs as AMs. Despite actions by the FCC in 1990-91, 2005, 2006, 2008, 2009, and 2011, the tide has not turned. The emergence of highly popular syndicated talk radio in the mid-1980s briefly seemed to save the band but now those very talk formats are increasingly moving to FM.

Specifics: What the FCC is Proposing

The NPRM contains at least six major changes. Some of them are highly technical adjustments that matter mostly to stations' engineers and owners and others have more broad impact. I'll try to give you a simplified explanation of each and what it means to hobbyists and listeners.

FM Translator Expansion

The agency has proposed to open an exclusive window for AM station owners to apply for new FM translators. This window would be open after the FCC has concluded processing the recent applications for low-power FMs for community and non-profit applicants and disposed of the thousands of remaining applications for FM translators from current FM station owners. *(**NOTE:** Some of the latter have been pending for many years. – K8RKD)*

There are some unique aspects to this particular proposal. The most important is that it would be restricted to current station licensees and permit owners and the translator could not be sold except with the primary station license.

The translator would be permanently linked to the primary AM station. In addition, the coverage area of the translator must be the smaller of either the station's primary daytime coverage area (2mV/m contour), or a 25-mile radius of the current transmitter site. *(**IN DEPTH:** See the accompanying "What Does mV/m Mean?" – K8RKD.)*

For many lower-power AMs or those with limited or no nighttime service, they would now be able to serve their primary market 24 hours a day.

Reduced Daytime Coverage Standards

One of the issues facing many commercial AM station owners, particularly those in highly urbanized environments, is that making any change to your transmitter site or antenna system that would improve listening for the majority of the audience or the stations market potential is not possible.

If the change reduces coverage of the primary city of license below 80 percent of either the population or area, whichever is higher (5mV/m contour for the techies), it will not be permitted.

The FCC has proposed to change the standard to be similar to that in effect for non-commercial stations: 50 percent of the population or 50 percent of the area the community of license at a minimum of 60 dBm – decibels per microvolt of signal strength.

Photo C. *"The interference-free contour means that many stations on a given frequency have a minimum protected area on that frequency," K8RKD writes. "For example, for clear-channel stations such as 1030 WBZ in Boston this can be half or more of the U.S., Canada, or Mexico." (Internet screen grab <http://cbsloc.al/1cNmZmG>)*

It is possible that any future waivers of the existing standard would also be eliminated. For readers, this would certainly affect the behavior of stations for DXing and casual listening purposes. Many stations would become unlistenable in some local areas while others would immediately become DX opportunities due to the facility improvements.

Station owners would gain considerable flexibility in making transmitter and power changes.

Nighttime Coverage Standards

Many AM stations have different antenna or different transmitter sites in order to meet the different technical requirements for daytime and nighttime service.

What's Does mV/m Mean?

The formula mV/m stands for milliVolt per meter and is a measure of the strength of the electric field at a certain distance.

Simply, if there is a voltage difference of 1 Volt and the two places you are measuring are 1 meter apart that is a strength of 1 V/m.

When talking about radio waves, the electric field varies inversely with distance. This is a one-dimensional measurement and it only varies by the inverse — *not* the square of the inverse. Double the distance and the electric field is half as strong. One hundred times the distance and one-hundredth the radio wave field strength.

The best way to view this as a listener is to think in terms of what your radio is capable of picking up. A typical car radio should be able to pick up any station which meets the 2mV/m standard for your listening point — local noise levels notwithstanding. – *K8RKD.*

As many readers know, AM propagates as groundwave during the day and skywave at night. Skywave propagation is similar to shortwave propagation while groundwave is limited by distance, geography, and power. *(**IN DEPTH:** In skywave propagation, signals reflect off the ionosphere and can be heard at great distances <http://bit.ly/1fZgToo>. – K8RKD.)*

During the day, stations must meet the aforementioned 80 percent coverage requirement. At night, there is the additional requirement that the signal cannot breach the guaranteed interference free contour of other stations.

The interference-free contour means that many stations on a given frequency have a minimum protected area on that frequency. For example, for clear-channel stations such as 1030 WBZ in Boston, **Photo C**, this can be half or more of the U.S., Canada, or Mexico. As such, other stations are thereby limited to their local market and nothing else. As you might guess, with skywave propagation, that is a tall order since the signal might bounce off the ionosphere and be heard several states away.

The FCC has proposed to modify the 80 percent rule. The FCC is proposing that stations be required to serve only 50 percent of their area or population, whichever is higher, (nighttime contour again) but still be subject to the non-interference rule.

Eliminate the 'Ratchet Rule'

The 'Ratchet Rule' regards a more technical requirement which affects higher power AM stations — in FCC parlance, Class A and B stations. The current rule requires AM stations to reduce — or *ratchet back* — their power levels such that it reduces skywave interference to other stations on the same frequency if they apply to make any facility (transmitter, power, antenna, etc.) changes to their license.

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ICOM

This rule was part of the FCC changes made back in 1991 when the band expanded adding channels up to 1710 kHz. The intent was to reduce interference. However, the FCC has now concluded it hasn't worked as intended.

Various petitions submitted to the FCC have argued the rule does, in fact, discourage stations from making improvements since any facility change such as transmitter relocation, antenna pattern change, and so on, mean the station must reduce its power to comply with the rule.

The result is a loss of interference-free service at night at minimal benefit to other stations. The stations most disadvantaged by the rule are those which are the oldest on the air while newer stations already accepted the interference conditions when they went on air and thus get little benefit.

The FCC has proposed to delete the rule entirely. For listeners outside the station's primary area of service, this might not have much impact. It won't reduce the interference-free zones of other stations on the same frequency. Their protection is retained. If anything, it will improve the quality of some stations heard at night outside their primary coverage area and have some marginal reduction in DXing of weaker stations on the same channel.

Modulation Dependent Carrier Level Control (MDCL)

MDCL is another very technical change. At present, with only a few dozen exceptions by waiver or experimental permit, broadcasters generally do not vary the power of the carrier frequency or the sideband as modulation is changed.

To do so would result in the input power to the antenna below levels permitted under FCC regulations. The FCC is proposing to permit carrier and sideband power to vary with modulation — generally, full/higher power maintained at low modulation and reduced power at higher modulation.

For station owners this could mean reduced costs due to lower power consumption by the transmitter. The FCC would permit stations to implement MDCL without prior FCC authorization and do so even if they provide hybrid (analog and digital) service.

If all of that means nothing to you, don't worry. Since only a few dozen stations have tested this. It is too early to say what it would mean for listeners, if anything. A few critics of poor AM signals would probably welcome a change that reduced modulation as it might improve the sound of some over-modulated stations.

Modified AM Broadcast Antenna Requirements

Currently, the FCC requires that any AM station seeking to make a change to its facilities, transmitter, and so on, must ensure that the new installation still meets the requirements for the class and power levels of their license. This is quite reasonable.

In practice, the station must demonstrate that either the antenna is of a certain minimum height above the surrounding terrain or its effective signal strength meets the minimums over its service area.

The FCC has proposed a 25 percent reduction in the minimum field strength requirements for each class of AM stations, which would provide more relief and flexibility to station owners to make station modifications. For fringe listeners, this might mean less service but it could also mean better service for the primary market if the newer antenna and transmitter system is of higher quality.

What and When

The NPRM requests extensive comment from the radio industry and public and it is quite possible that one or more of these proposals will change significantly before they are implemented by the Commission.

At this writing, the timetable is still a bit fuzzy. But barring extensions, the comment and reply period will have closed in late January 2014. We can then expect that the FCC will take some time to process all of the input and another NPRM or a Final Report and Order may be forthcoming by the middle of 2014.

These proposals largely address technical and financial concerns of station owners, managers, and engineers. They do little to address the fundamental market issues driving the decline of the band.

At best, they buy time for the radio industry to settle on and propose changes that are more radical. Even if interference is reduced and signal quality and reach enhanced, it is hard to see how these changes will result in stabilizing the band and preventing further declines in the longer term.

What is Your Reaction?

Listeners and DXers have quite a bit to consider here, too. It's time to think about what we want from the band going forward. If you have ideas, write to the FCC and your congressional representatives and let them know. Also, let us know.

Which of the proposals should the FCC adopt? Is it even possible to save the band at this point? What does it mean for your DXing? Share with me your reaction. Write to me via the magazine, or drop an email. We'll publish some of your thoughts in a future article. More on the future of communications in *Horizons* next month.

– K8RKD.

1. Horizons' *"There's A Crisis Brewing in U.S. AM Radio," Popular Communications November 2012*, and the debate that followed: *"The Agony: A Slow Death for AM Radio?" Pop'Comm March 2013.*

For Valentine's Day: Romancing the Key — A CW Love Story

BY RANDALL NOON, KCØCCR

Computer-generated digital modes require a keyboard with 104 buttons or more — most with more than one function — that have to be touch-memorized in order to enter messages competently into a transmitter.

Computer-generated digital modes then require a matching decoding program at the de-modulation end to convert the digital message into clear copy. Compare this to Morse code, requiring only one button and a trained ear. *Simple.*

When band conditions are poor, a message sent in CW can get through when the same message sent by single-side band (SSB) phone, amplitude modulation (AM) phone, frequency modulation (FM) phone, or RTTY cannot. To match the good signal-to-noise ratio of a modest 5-watt CW signal, an SSB phone signal needs more than 100 watts. *Practical.*

Morse Code also has an inherent rhythmic, musical quality. To some, it sounds pretty. Like a songbird. There are:

- Triplets, such as the letters *S* and *V* and number *3*
- Syncopations, like the letters *C, L, F,* and *Q*
- Short, rhythmic drum patterns, such as the comma, question mark, the letter *H* and the number *5*

In other words: *Musical.*

She: Betty Broome, VE3ZBB

Allow me to add one more Morse code descriptor to the list: *Romantic.*

The explanation of this adjective begins with FISTS member No. 1265, Elizabeth Broome — otherwise known on the air as VE3ZBB.

(**BACKGROUND:** VE3ZBB was instrumental in providing background to this story, along with *The Canadian Amateur*, which carried her story in 1998/ – KCØCCR)

FISTS is another name for the International Morse Preservation Society with more than 16,000 members worldwide. Elizabeth, or Betty as friends call her, earned her Canadian ham license in March 1988. She was the first and only one in her family to hold a license. In 1993, Betty became a member of FISTS.

As many do, Betty started using a hand key, then switched to using paddles, and now uses either one. She enjoys working CW on all the bands, but favors 30 meters, the only all non-phone band, and is not on voice at any time on HF.

When possible, Betty likes to work CW newcomers and encourage them by sending at a word-per-minute speed comfortable for them, no matter how slow. Like the FISTS motto: *when you work VE3ZBB, you have worked a friend.*

He: Rod Newkirk, W9BRD

On August 28, 1991 at 19:58 hours UTC, according to her log, VE3ZBB worked W9BRD on 30 meters at 10.107 MHz. Recalling that QSO, Elizabeth noted that, "for some reason, I knew at that moment that this radio operator was special."

The call W9BRD belonged to Rod Newkirk, an extra-class operator who lived in Chicago. As Betty recalls, "when Rod sent code it was beautiful to listen to and to copy."

Remembering Their Chance CW Meeting

Betty recalls that at first they exchanged signal reports and typical information. Despite poor band conditions that day, they drifted naturally into a lively CW conversation. Rod told Betty that he had been retired for four years and he was, "reliving his teen years with no responsibilities at all, *so you better watch out, lady."*

He said he'd been a widower for 17 years and mentioned to Betty he "... no longer signed any contracts." Rod was enjoying the best retirement hobby of all, he said. Unfortunately, the band kept fading. Finally and reluctantly, VE3ZBB and

Betty Broome, VE3ZBB, and Rod Newkirk, W9BRD, visit Glencoe Beach during their Chicago "first meeting" in 1993.

e-mail: <rknoon@nppd.com>

Mr. and Mrs. Newkirk, married June 27, 1997.

W9BRD had to say *73* (best regards) and end the contact after struggling to keep the conversation going with an uncooperative 10.1-MHz band. Betty hoped they would meet again on the bands. Over a half-hour had passed during their enjoyable CW banter.

As is often said, *and is true*, the final courtesy of a QSO is the exchanging of QSL cards. Betty and Rod were nothing but courteous. They also exchanged pictures. Rod sent along a letter to explain why his QSL had been delayed. It was sufficiently entertaining that Betty shared it with her husband, son, and daughter-in-law.

Rod Newkirk at his and Betty's Yaesu FT-1000. Note Betty's bulletin board with photographs above the transceiver.

Rod's photograph was put on Betty's bulletin board above her transceiver with many other photographs that other operators had sent to her over the years. She listened for his callsign to pop up again on the bands, but did not hear it.

Comfort in Loss via Amateur Radio

In March 1992, Betty lost her husband of 42 years. Adjusting to a new and different life is difficult after 4+ decades. Betty found free time hard to come by. However, amateur radio was a comfortable place where Betty could spare a few minutes now and then with both old and new on-the-air friends. She said it was, "an escape into another world, and an extremely pleasant one."

Almost a Year Later, Love is in the Air(waves)

On July 30, 1992 at 21:25 UTC a little CW magic happened. On 30 meters (10.107 MHz) Betty sent *CQ.* She again heard W9BRD's excellent Morse answer — big surprise! She replied right away. As Betty recalls, "Here again was the person I'd had such an enjoyable CW conversation with 11 months ago."

During the subsequent QSO chat, Rod told her that from time to time he had heard her on the bands, but that she had been busy with another operator. Betty shared with Rod her recent loss.

Since Rod had been through a similar rough patch, he well understood what was going on in her life. The reunion QSO lasted 45 minutes. This time, though, just before the 30-meter band dropped out, they agreed to a weekly schedule on Thursdays.

On-Air Date: Every Thursday ... and Monday

Betty recalls that she looked forward to the Thursday QSOs. Later, a Monday schedule time was added because, as Rod said, "Thursdays only weren't enough."

Soon, they began exchanging letters and telephone calls. In her first letter, Betty mentioned to Rod that he should have been a writer because she enjoyed his letters so much. Rod must have had a fun time telling Betty, who had not been a *QST* reader, that he had been a writer for the American Radio Relay League — having written *QST's* "How's DX" for more than 30 years.

Betty discovered, among many things, that Rod had been a ham since 1937. In earlier years, he had been a contester

Rod sends code on Betty's Heathkit HW-9 QRP transceiver at Green Lake Cottage.

VE3ZBB and VA3ZBB — t'was a wonderful life ...

and had also attained DXCC. Of the many certificates, Rod had achieved 55 wpm CW proficiency from the ARRL. He used a Vibroplex or Bencher paddle for CW, and sometimes used a straight key.

He still liked contesting and knew where to look for exotic stations. Often he was the first to answer their CQ, and then came the pile up. In his later years, however, he gave up contesting and simply enjoyed spending time on the bands making conversation and snagging a DX station or two.

With the increased frequency in CW QSOs, letters, and telephone calls, it was obvious to just about anybody — but perhaps *them* — that Betty and Rod had moved out of the narrow, friendship sub-band into a wider mode. Both Betty's and Rod's families encouraged them to meet.

They Meet in Chicago; Marry in *Shangri-La*

Betty traveled to Chicago in the spring of 1993 and the two CW aficionados finally met — one and a half years after that first CW QSO.

Rod and Betty became engaged in November 1994. Rod became FISTS member No. 7672 on June 1995, and the couple was subsequently married on June 27, 1997 in Ottawa, Canada. Rod was 75 and Betty, 68. *Rod and Betty (Broome) Newkirk*.

Rod subsequently moved to Ottawa, parked his keys and keyers in front of their shared transceiver, and christened their Ottawa cottage *Shangri-La.*

Betty recalls Rod could send code on any type of key, and even made one of his own on a simple wooden board. He was interested in indoor antennas and tested his new ideas in their radio room.

"Our radio room always had some kind of structure set up in it," Betty said, "and he tested each antenna individually, kept records of his designs along with construction details and eventually the contacts he made with them."

Rod became a Canadian citizen, studied and took the Canadian amateur radio examination, and was rewarded with the callsign, VA3ZBB. Sometimes this caused a bit of fun confusion when operators called Rod, Betty, and vice-versa. *They had a wonderful life together.*

Never Ending Stories

Rod continued to write and contributed to the *K9YA Telegraph E-Zine,* at <http://www.k9ya.org>.

Some of the pieces Rod wrote were gathered into *The Rod Newkirk Collection,* which was printed and bound by Lulu <http://www.lulu.com>. It is still available.

As noted by a reviewer, "Rod Newkirk joined the K9YA Telegraph staff in September 2004 with the publication of his story, '*A QSO with CRØOK*.' That first, short article about a legendary Chicago gangster and his predilection for Morse code set the benchmark for the 44 articles to follow."

Rod Newkirk, VA3ZBB (SK)

Sadly, VA3ZBB passed away November 19, 2012 after spending more than three years in the hospital following a stroke.

Betty visited him every day — sometimes two and three times a day. While his left arm was affected by the stroke, his mind was keen and his right hand was still able to operate a key. Betty, however, was not allowed to set up a transceiver in the hospital.

T'was a Wonderful Life

Betty and Rod shared a life that began with a just routine CW QSO. *A wonderful life.*

As Betty noted in *The Canadian Amateur* in February 1998, "Morse code telegraphy is a unique form of communication between two people ... My special way of expressing it would be an invisible thread that ties two people together."

Epilogue: Betty is on the air again and has a new Cushcraft R9 antenna that is working great. Check 30 meters for her CW CQ.

Simple, practical, musical, and even romantic. CW is so cool.

Acknowledgements

Background for this article was gathered from *The Canadian Amateur,* February 1998; page 35.

The Rod Newkirk Collection, by Rod Newkirk, published by the K9YA Telegraph, Robert F. Heytow Memorial Radio Club, is copyright 2011, and contains a story about Betty and Rod. A nice photograph of the two of them is on page 8. The book, by the way, is a fine read. I recommend it.

A personal *thank you* goes to Nancy Kott, WZ8C, FISTS Coordinator who remembers everything and helped kickstart this story. *73, Randall, KCØCCR*

BY GERRY L. DEXTER*, WPC9GLD

A Big SWL Shuffle for Radio Miami International

Strange twists are occurring in the shortwave world. In the midst of shutdowns, closures, permanent sign offs, penny-pinching governments, and other program producing organizations discontinuing operations, comes an odd situation.

Well-known broadcaster Radio Miami International has shut down its operations from Miami (on 9955). But not to worry, programming will immediately resume from the facilities of the former WYFR. In short, a mammoth turnover has taken place.

WRMI's single-frequency operation has instantly become one of the big boys, with access to Family Radio's 13 high-power transmitters — feeding 23 antennas — providing worldwide coverage.

The "new" WRMI will continue to carry Family Radio's programming for South America and the Caribbean and will add programming from Pan American Broadcasting, normally heard on 15190 from Equatorial Guinea. *Whew!*

That's what you call a "bombshell." Good luck to Jeff White and WRMI. Hopefully he'll have many, many years of successful operations from Okeechobee!

<gdex@wi.rr.com>

REE Relay Station Closed in Latin America

Radio Exterior de Espana has closed its relay station at Cariari, Costa Rica. *Now why would it do that?*

Your guess is as good as mine. REE didn't give us an explanation, but it was probably a money-saving move, although REE *does say* it will try to make up the decrease in coverage by upgrading its main (read that *only*) other facility at Nobeljas, Spain.

Here are three segments of the giant, multi-part QSL Ralph Perry received from the Voice of Han in Taiwan. Top that one for splendor if you can!

The Costa Rican facility has been around since it opened in October 1992.

Pirates, Get Out Your Checkbooks

The Voice of Croatia, Deanovic has been off the air for some time. Now it seems to be serious about it. It is offering its 100-kilowatt transmitter and all of its associated equipment for sale. *Any pirate operators out there with really deep pockets?*

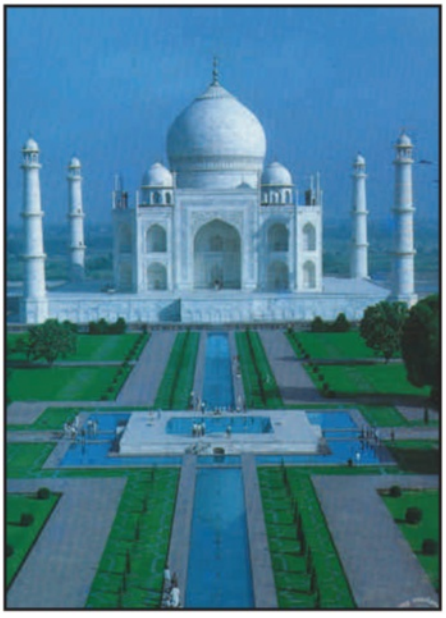
Good News: This Month's Shortwave-lets

• **Radio Aparecida** in Brazil's' like-named city, on 5030, 6135, 9630, and 11855 is installing new transmitters. I presume those will be of the same or higher power than those currently in use, which range in strength from 25 kilowatts down to one.

• I've seen reports to the effect that **Kol Israel** has returned to the air, using 15760 from 1400-1530 Sundays through Thursdays and closing five minutes earlier Friday and Saturday.

• Apparently shortwave from Greece isn't quite dead after all. A new public service broadcaster is in formation. It grew out of the ashes of the now-closed ERT (Voice of Greece). The new service, abbreviated as **NERIT**, initially focused on news reporting and will, presumably, add music and other programming as it develops.

• **Radio Sultanate of Oman** has added Arabic broadcasts on 9540 at 0400-1000.



All India Radio shows the Taj Mahal on this nice QSL received by John Miller in Georgia.

Rich D'Angelo got this nice card from RTE Radio, Ireland, broadcasting special coverage of the All Ireland Hurling Finals via Wooferton.

KVOH — The Voice of Hope confirmed one of its test broadcasts for Rich D'Angelo.

• **The Voice of Russia** says it ceased shortwave broadcasting on January first. There's some question as to whether that report is accurate. It may be that the cessation applies only to its broadcasts in Russian (a.k.a. *Golos Rossii*).

• **Radio Slovakia International** has returned to its former activity of airing half-hour transmissions. This challenging outlet is rarely heard in the early evenings.

SWLers: Now It's Your Turn

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or triple space between the items, list each logging according to home country and include your last name and state abbreviation after each.

And before you submit them, please proofread them. Several logs this month did not include the time and, thus, had to be omitted. Also needed are spare QSLs or good copies you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest.

And please include the transmitter site where appropriate. Also, how about sending a photo of you at your listening post? It's your turn to grace these pages. Feel free to send your photo via email.

Hint: Having your shack photo included would make you the envy of every reader of the *The Listening Post*.

SWL Listings:
For the latest SWL loggings, visit: <http://www.CQPlusListeningPost.blogspot.com>.

World News, Commentary, Music, Sports, And Drama At Your Fingertips

This listing is designed to help you hear more shortwave broadcasting stations. The list covers a variety of stations, including international broadcasters beaming programs to North America, others to different parts of the world, as well as local and regional shortwave stations. Many of the transmissions listed here are not in English. Your ability to receive these stations will depend on time of day, time of year, your geographic location, highly variable propagation conditions, and the receiving equipment used.

AA, FF, SS, GG, etc. are abbreviations for languages (Arabic, French, Spanish, German). Times given are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 4 p.m. PST.

UTC	Freq.	Station/Country	Notes
0000	7350	China Radio International	
0000	11595	Democratic Voice of Burma, Armenia	Burmese
0000	6055	Radio Exterior Espana	
0000	4765	Radio Progressso, Cuba	SS
0000	4786	Radio Difusora Roraima, Brazil	PP
0000	3310	Radio Mosoj Chaski, Bolivia	Quehua
0000	4717	Radio Yura, Bolivia	SS
0100	7475	Greek Radio, Greece	GG
0100	7375	Mighty KBC, Netherlands, via Germany	
0100	6185	Radio Educacion, Mexico	SS
0100	7280	Radio Farda, USA, via Germany	Farsi
0100	5025	Radio Rebelde, Cuba	SS
0100	9490	Radio Republica, via France	SS
0100	7335	Radio Romania International	
0100	6180	Radio Nacional Brasilia, Brazil	PP
0100	11765	Super Radio Deus e Amor, Brazil	PP
0100	9780	Voice of America, Sri Lanka Relay	
0100	4955	Radio Cultural Amuata, Peru	SS
0100	4985	Radio Brazil Central	
0200	9420	ERA, Greece	Greek
0200	9550	Islamic Republic of Iran Broadcasting	
0200	11710	Radio Argentina al Exterior	
0200	5910	Radio Japan	JJ
0200	7460	Radio Pyam e-Doost, via Moldova	Farsi
0200	9855	Voice of America	Tibetan
0300	9505	Adventist World Radio, via Austria	Farsi
0300	5980	Channel Africa, South Africa	
0300	7120	Radio Hargeisa, Somalia	Somali
0300	3320	Radio Sonder Grense, South Africa	Afrikaans
0300	4055	Radio Verdad, Guatemala	SS
0300	7205	Radio Omdurman, Sudan	AA
0300	9530	Trans World Radio, Swaziland	Vern
0300	4775	Trans World Radio, Swaziland	Vern
0300	7360	Vatican Radio	
0300	4930	VOA Relay, Botswana Relay	
0300	9515	Voice of Turkey	
0300	7506	WRNO, Louisiana	
0300	5950	Voice of Tigray Revolution, Ethiopia	Tigrinya
0400	6050	HCJB, Ecuador	SS
0400	9470	Deutsche Welle, Germany, via Rwanda	
0400	9625	Radio Fides, Bolivia	SS
0400	4950	Radio Nacional, Angola	PP
0400	6010	La Voz de Concencia, Colombia	SS
0400	4990	Radio Apinte, Suriname	Dutch
0400	4790	Radio Vision, Peru	SS
0400	4960	Voice of America, Sao Tome Relay	
0400	6010	Radio Inconfidencia, Brazil	PP
0500	7275	Radiodifusion Tunisienne, Tunisia	AA
0500	9820	Radio 9 de Julho, Brazil	PP
0500	11675	Radio New Zealand International	
0800	9700	Radio New Zealand International	
0800	1100	Radio Nikkei, Japan	JJ
0800	5930	Radio Rossii, Russia	RR
0900	4810	Radio Logos, Peru	SS
1000	3330	Ondas del Huallagua, Peru	SS
1000	9625	Radio Japan	
1000	5039	Radio Libertad de Junin, Peru	SS
1000	6140	Radio Twantinsuyo, Peru	SS
1000	4700	Radio San Miguel, Bolivia	SS
1000	3905	Radio New Ireland, Papiua New Guinea	Tok Pisin
1100	9870	All India Radio	Hindi
1100	4835	No.Territory SW Service, Australia	
1100	2325	No.Territory SW Service, Australia	
1100	5875	Radio Thailand	Khmer
1100	3925	Radio Nikkei, Japan	JJ
1100	5020	Solomon Islands Broadcasting Service	
1100	4940	Voice of the Strait, China	CC
1100	4750	Radio Repubik Indonesia	II
1100	3260	Radio Madang, Papua New Guinea	Tok Pisin

UTC	Freq.	Station/Country	Notes
1100	4755	The Cross Radio, Micronesia	
1100	5765u	Armed Forces Network, Guam	
1200	15195	Bangladesh Betar	
1200	5915	Myanmar Radio	Burmese
1200	6100	Radio Rossii, Russia	RR
1200	13805	Voice of Russia	Mandarin
1200	3325	Radio Republik Indonesia	II
1200	17660	Radio France International, via S. Africa	FF
1300	9410	China National Radio	CC
1300	9520	China National Radio	CC
1300	11510	Denge Kurdistan, via Moldova	Kurdish
1300	9335	Radio Free Asia, No. Marianas Relay	Burmese
1300	9950	Nippon no Kaze, Taiwan to N. Korea	KK
1300	7405	Radio Marti, USA	SS
1300	9580	Radio Australia	
1300	17520	Radio Pakistan	
1300	11640	Radio Taiwan International	Mandarin
1300	12055	TWR-India, via Russia	Bangla
1300	9526	Voice of Indonesia	
1300	9435	Voice of Korea, North Korea	
1300	11530	Radio Pakistan	Tamil
1300	9965	Radio Australia, via Palau	
1400	12065	Radio Australia	
1400	15330	Radio Veritas Asia, Philippines	Urdu
1400	15180	RFE/RL, via France	Turkman
1400	11990	VOA, via Russia	Mandarin
1400	7490	WWCR, Tennessee	
1400	13845	WWCR, Tennessee	
1499	15575	KBS World Radio, Souh Korea	KK
1500	15506	Bangladesh Batar	Urdu
1500	15660	Channel Africa, South Africa	Swahili
1500	17545	Islamic Republic of Iran Broadcasting	
1500	15320	Radio Veritas Asia, Philippines, via Vatican	Tagalog
1500	17690	Voice of America, via Vatican	
1500	11710	Voice of Korea	
1500	15550	WJHR, Florida	
1599	21540	Radio Kuwait	AA
1600	15150	Adventist World Radio, Austria Relay	Farsi
1600	15205	BSKSA, Saudi Arabia	AA
1600	15345	Radio Cairo, Egypt	
1600	13735	Radio Rossii	RR
1600	15485	Radio Taiwan International, via France	
1600	11765	Sound of Hope, Taiwan	Mandarin
1600	15265	VOA, Botswana Relay	Swahili
1700	12095	BBC, Seychelles Relay	
1700	15255	Channel Africa, South Africa	
1700	15385	ESAT Radio, via Bulgaria	Amharic
1700	15570	Vatican Radio	
1700	15120	Voice of Niigeria	
1800	15400	BBC, Ascension Island Relay	
1800	17795	BBC, England	
1800	15250	Far East Broadcast, Assn. via Ascension	FF
1800	17850	Radio France International	FF
1800	9840	WHRI, Indiana, via South Carolina	
1900	11670	All India Radio	
1900	11875	IBRA Radio, via Germany	Vern
1900	15540	Radio Kuwait	
1900	15140	Radio Sultanate of Oman	AA
1900	11635	Radio Exterior Espana, Spain	
1900	15630	Voice of Greece	GG
1900	15825	WWCR, Tennessee	
2000	11610	Adventist World Radio, via Germany	AA
2000	11730	Adventist World Radio, via France	Yoruba
2000	11820	BSKSA, Saudi Arabia	AA
2000	11750	Islamic Republic of Iran Broadcasting	
2000	11995	Radio France International	FF
2000	15190	Radio Africa, Equatorial Guinea	
2000	11765	Radio Algerienne, via France	FF
2000	11730	Radio Belarus	SS
2000	11850	Radio Japan, via Madagascar	FF
2000	11745	Radio Romania International	
2000	11885	Voice of America, Sao Tome Relay	
2000	9690	Voice of Nigeria	Hausa
2000	11840	Voice of Vietnam, via Germany	VV
2000	11625	Vatican Radio	
2000	11735	ZBC Radio, Zanzibar	Swahili
2100	7550	All India Radio	
2100	11720	BSKSA/Holy Qur'an, Saudi Arabia	AA
2100	7285	China Radio International, Albania Relay	
2100	11940	China Radio International	Bulgarin
2100	11865	Deusche Welle, Rwanda Relay	
2200	15525	HCJB, Australia	Mandarin
2200	12080	Islamic Republic of Iran Broadcasting	AA
2200	6060	Radio Agentina Exterior	SS
2200	11855	Radio Aparecida, Brazil	PP
2200	5860	Radio Farda, USA, via Sri Lanka	Farsi
2200	7450	Radio Makedonias, Greece	Greek
2200	11780	Radio Nacional Amazonia, Brazil	PP
2200	7450	Radio Romania International	
2200	9850	Radio Tirana, Albania	
2200	9465	Voice of Russia	
2300	6160	CKZN, Canada	
2300	5940	Magadan Radio, Russia	RR
2300	8989u	Pescador Preacher, Nicragua	SS
2300	4915	Radio Daqui, Brazil	PP
2300	4915	Radio Difusora Macapa, Brazil	PP
2300	9720	Adventist World Radio	Tibetan
2300	11765	Super Radio Deus e Amor, Brazil	PP
2300	9930	WTWW, Tennessee	
2300	5005	Radio Nacional, Equatorial Guinea	SS
2300	4319u	Armed Forces Network, Diego Garcia	
2300	9645	Radio Bandeirantes, Brazil	PP

Public Safety Monitoring Gets Its Just Due @ Last Month's Consumer Electronics Show in 'Vegas

Exciting New Scanners Expand Uniden's HomePatrol Family

BY GORDON WEST, WPC6NOA/WB6NOA

Last month at the Consumer Electronics Show <http://www.cesweb.org> in Las Vegas, Uniden unveiled two new scanners — its great new BCD436HP and BCD536HP — with a companion app that will advance the consumer's HomePatrol-1 into a mobile and handheld scanner for the *serious* public-safety monitor, **Photo A**.

"Several years ago, *[Popular Communications']* CES coverage included our new [at the time] HomePatrol-1 table-top scanner," Paul Opitz said, **Photo B**. He is *the main man* in Uniden marketing. "Any scanner listener who knows their ZIP code could easily and quickly be listening to the local action!"

*(**WATCH and LISTEN:** To Paul Opitz detail the features of the BCD436HP and BCD536HP scanners in a full-length video at <http://bit.ly/18dAtFt>, **Photo C**. – WPC6NOA)*

***Photo A.** Uniden's new BCD536HP, left, and BCD436HP scanners take the HomePatrol concept to a whole new dimension. New features and integration opportunities are all over this radio! (Internet screen grab)*

You Asked for It

Opitz noted that people *really into* public-safety monitoring wanted a traditional-size scanner product for rack or mobile-unit mounting. Those same scanner users also wanted a true handheld HomePatrol-type scanner, plus the added capability of programming local systems into the radio, thus keeping the programming up-to-date as systems changed in response to narrow banding, re-banding, and system upgrades.

The scanner information database provided by Radio Reference.com <http://www.RadioReference.com> is a great avenue to take to find thousands of frequencies, but the die-hard scanner operator may know about local system "secret channels" and want to program them from the front panel.

Narrow banding and re-banding is in full swing, with APCO Project 25 Phase II taking analog trunking and digital channels to *a new high.*

New Uniden Handheld with 'TrunkTracker V' Technology

The new Uniden BCD436HP and BCD536HP scanners

***Photo B.** The wildly popular HomePatrol-1 tabletop scanner was the catalyst for Uniden's newly-designed and upgraded public-safety scanners. (Internet screen grab)*

**CQ Contributing Editor at Large*
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and their companion app were on display at CES.

"Our new BCD436HP is the first scanner to incorporate the HomePatrol-1's ease of use in a traditional handheld scanner," Opitz said. To get started with this new scanner, all it takes is entry of your local ZIP code, and the new handheld springs to life.

"The four gigabyte micro SD card holds the entire USA and Canadian database of radio systems, with plenty of room for recording hours of off-air audio," he said. The alert indicator can also flash in a user-set color and pattern when a specific channel becomes active.

Opitz calls this new digital technology reception "TrunkTracker V" to support P-25 Phase I and II, X2-TDMA — TDMA Motorola, EDACS, and LTR trunked radio systems, **Photo D**.

The new Uniden handheld includes a band-scope, trunked system analysis, RF power plot, and EDACS LTR location finder. Simply choose the type of channels you want to hear — police, fire, paramedics, and so on — enter your zip code, and the scanner will do the rest. You can also tie it into a GPS receiver in case you are driving cross-country and always want the scanner to stay tuned to local radio activity.

I especially like the "Close Call®" RF

Photo C. *Uniden's Paul Opitz gives a 20-minute seminar on the new '436 and '536 in this online video at <http://bit.ly/18dAtFt>. Details about the new handheld scanner begin at 9:58. The new mobile unit is described in detail beginning at 14:53. (Internet screen grab)*

Photo D. *Uniden expects the retail price of the new BCD436HP to be $499. (Internet screen grab)*

Photo E. *Programming the mobile Uniden BCD536HP is a snap. Watch and listen as the scanner goes from shipping box to scanning in just minutes at <http://bit.ly/184C4AD>. Uniden expects the price to be $599 (Internet screen grab)*

Photo F. *Read the full Uniden BCD436HP and BCD536HP manuals at <http://bit.ly/18PN4lU>. (Courtesy of Uniden)*

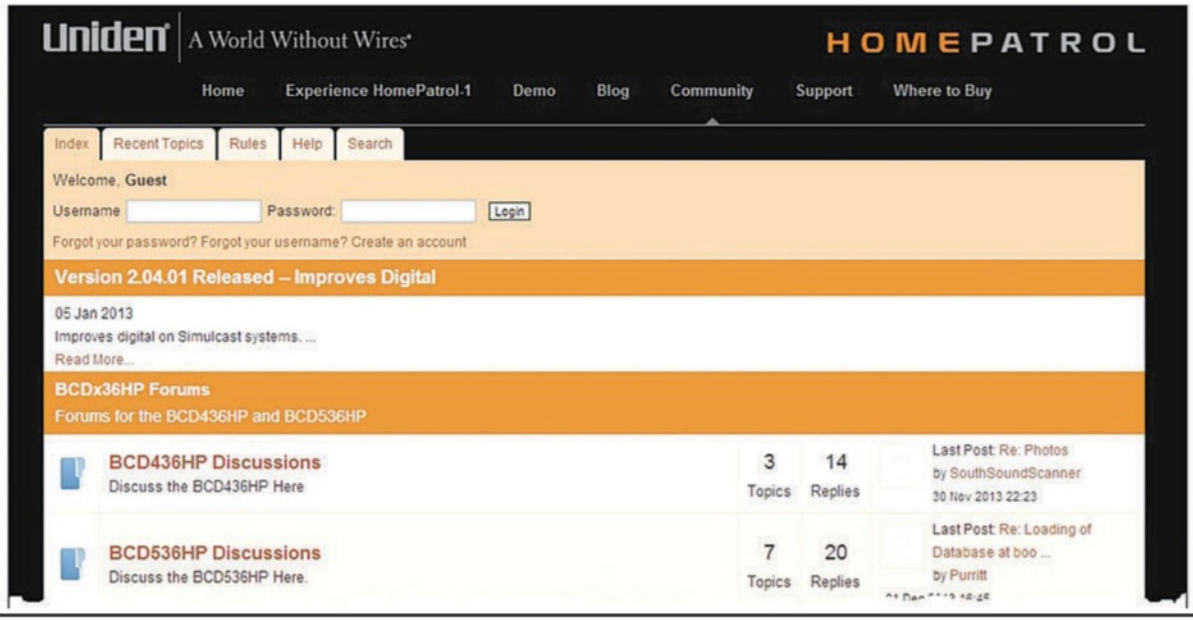


Photo G. *For even more information and insight, Paul Opitz suggests readers visit the Uniden HomePatrol discussion page at <http://bit.ly/1bb1fSa>. (Internet screen grab)*

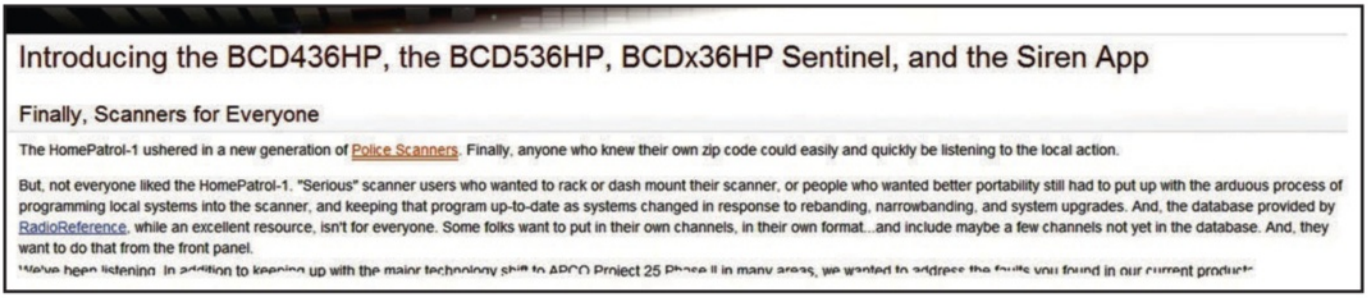


Photo H. *The Uniden website reflects on the HomePatrol-1 scanner and how the BCD436HP and BCD536 have taken the concept to a whole new level. (Internet screen grab <http://info.Uniden.com/NewScanners>.)*

Photo I. *A checklist of features in Uniden's newest handheld and mobile scanner shows the breadth of coverage these great units provide. (Internet screen grab)*

capture, that lets the scanner find nearby transmissions and its ability to program this mode without interrupting on-going scanner activity.

And for those of you in rural areas who still use two-tone paging, this handheld has you covered.

The handheld runs on three AA batteries and Opitz said it should play for up to eight hours on a set. I like the feel of this unit with its rubber sides and rubber bottom impact areas, in case it takes a trip down to the deck.

Mobile Scanner: Integration Opportunities Galore

Of course, the mobile scanner has all the same features as the portable scanner, and both units have *even more* features than the original HomePatrol-1. *(**WATCH and LISTEN:** To the Uniden BCD536HP mobile scanner on the air within minutes of being taken out of the box, **Photo E**, at <http://bit.ly/184C4AD>. – WPC6NOA.)*

Both scanners include Sentinel Software that will make the database and firmware updates simple. This software will allow you to create, edit, and manage your favorite channel list. It is USB-PC cable-ready to enhance managing all of the channels you have in memory. And, like the handheld, you can also program channels from the front panel, too.

Much More Information

Uniden expects the retail price of the handheld BCD436HP to be $499, and the mobile BCD536HP, $599. I talked Paul into giving us some nice sites to learn more about these two new scanners and the software app.

- BCD436HP and BCD536HP Manual, <http://bit.ly/18PN4lU>, **Photo F**
- The Uniden Home Patrol Discussion Page, <http://bit.ly/1bb1fSa>, **Photo G**
- Additional Uniden '436 and '536 information, <http://info.Uniden.com/NewScanners>, **Photo H**

Anxious Anticipation

No, at this writing I don't have one of these new scanners *yet.* I work the original HomePatrol-1 version regularly, so I can hardly wait for some hands-on time with the new mobile '536 and the new handheld '436 Uniden scanner receivers! **Photo I**.

BY RICHARD FISHER, KPC6PC/KI6SN

Getting Started in VHF-UHF Scanning Can Be Free and Easy as 'A, B, C, D!'

In this month's *Internet Radio* we're going to get serious about VHF-UHF scanner listening. There is a fascinating world of police, fire, aviation, governmental, radio amateur, weather, and so much more if you've got *a way to get there.*

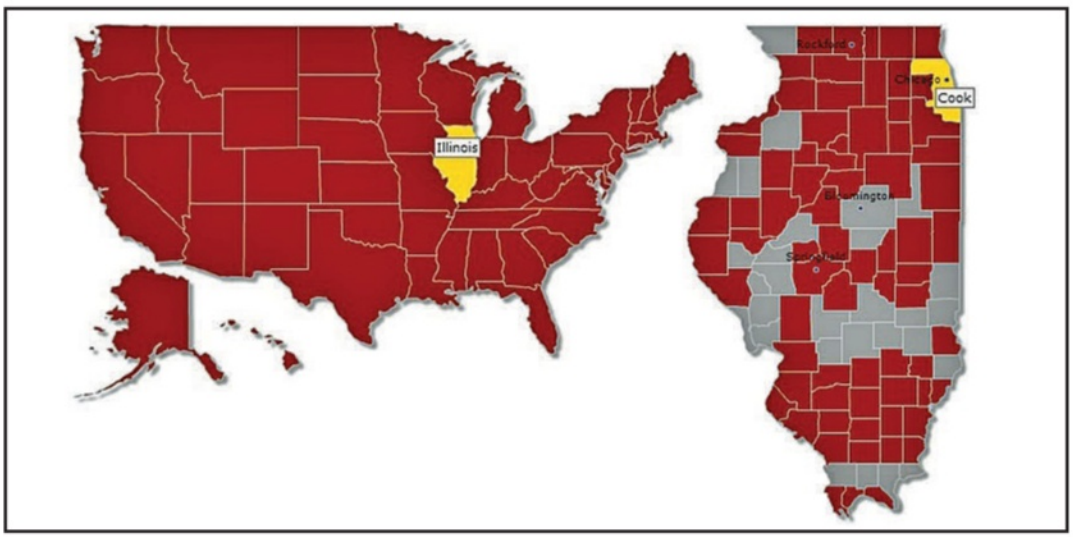
*1940 Wetherly Way, Riverside, CA 92506
e-mail: <CQPlusDigital@gmail.com>

Vagaries in wave propagation generally do not play a major role in "band conditions," so you'll find action in this part of the spectrum 24/7/365.

If you've never ventured into scanning, and would like to listen before making an investment in gear, there are portals on the Internet that will get you hooked up to scanners all over the United States.

Of course, there's no substitute for that radio

STEP A. *Link to the Broadcastify.com website at <http://www.broadcastify.com> and click on "Listen." We've circled it in yellow in this image to make it easy to find.*



STEP B. *Your next screen will look like the image on the left — the map of the United States. For our demonstration, we've chosen the Chicago Police Department as our target scanner. So we click on Illinois. That takes us to the image on the right: a map of Illinois segmented into counties. Chicago is in Cook County, so we click on it.*

STEP C. *Clicking on Cook County takes us to a list of all the scanners online from there. There are a lot! We scroll down to "Chicago Police Department" — which we've circled in red on the left. Click on the small triangle on the far left to activate the audio feed. Notice the number 409 on the right, also circled in red. This is a count of how many people are currently listening to this scanner feed. That's a pretty good indication that we're in for some urban police action.*

chattering away in the background, or hanging on your belt as you move around town — but "Internet Radio" offers you a no-cost way to test drive the spectrum before buying your gear.

To try things out, all you need is a computer or smartphone with audio and Internet access. Period. For our example, you'll get there by linking to Broadcastify.com <http://www.broadcastify.com>, a website that links users to 3,000+ VHF-UHF scanners across the country. Depending on your device's capability you may need to use another service such as TuneIn, Scanner Radio Deluxe, or other app. Just Google them and you're sure to find one that works.

With Broadcastify, simply follow our four-step process. There are no programs to download, accounts, or passwords to create, or antennas to put up.

STEP D. *Clicking on the triangle noted in STEP C brings you to this screen: Chicago Police Department Live Feed. There is a running clock ticking off the amount of time you are logged in. At the moment of this screen shot, we had been on the CPD site for 39 seconds. The orange blocks to the right of the clock bounce up and down with the modulation of the radio signals from the dispatchers and police officers. The bar below it to the right is the volume control. We have it cranked up to full volume and adjust the overall volume via our laptop.*

Imagine: Listen to the fire department in your town, or the town *you used to live in.* Or, you've just heard on the news there is a major incident going down that's got national attention. The Boston Marathon terrorist bombing, for example. Sure, you can get a TV or radio reporter's perspective. But how about tuning in a Broadcastify.com police or emergency service scanner and hear the action first hand? *It's really as easy as A, B, C, D!*

New Members: *Monitoring Station* Program

Here are the newest station monitors granted a station identification sign, authorized a Certificate of Registration, and welcomed to the *Pop'Comm Monitoring Station* program.

KPC and DX Prefixes

They are listed by name, station identification sign, and monitoring station location.

Donald Osmond, Sr., **KPC4SKT**, Tega Cay, SC; Stephen Piwonski, **VKPC3AIR**, Melbourne, Victoria, Australia; Mark Prock, **KPC5KQQ**, Allen, TX; Joseph Havens, **KPC9ZDA**, Yoder, IN; James Andrews, **KPC8SSS**, Kettering, OH.

WPC Prefixes

Also: Darwin McDonald, **WPC8DMD**, Madison Heights, MI; John Green, **WPC3BV**, York, PA; James O'Neil, **WPC7JSO**, Newsmanstown, PA; Paul Rehkopf, **WPC-8PRR**, Montpelier, OH; Christopher Gearhart, **WPC1HWQ**, South Windsor, CT; Gary Dobbs, **WPC8GD**, Sarver, PA; Michael Fontaine, **WPC4BBS**, Wesley Chapel, FL; Jeffrey Marker, **WPCØFYV**, Raytown, MO; Christopher Jerry, **WPC4CJ**, Jensen Beach, FL; William Abshear, **WPC1QDR**, Waynesville, OH; William Harrison, **WPC4SC**, Elgin, SC; John Bishop, **WPC4LPF**, Melrose, FL.

For complete information on the *Pop'Comm Monitoring Station* Program and to join, visit *Pop'Comm Monitors On the Web: <http://popcommmonitors.blogspot.com/>.*

– Jason Feldman, WPC2COD
Director, PCMS Registration
<PopCommMonitor@gmail.com>

BY STEVEN HANDLER, WPC9JXK

Commander Bunny, the Pirate Who Would Be President

With No Apologies, He Takes On the Government and the Human Race

This month we have an interview with long-time shortwave radio pirate Commander Bunny of WBNY fame. Not only will we look at his long pirate radio history, but we get a very interesting glimpse of the "inner Bunny." *(**LISTEN:** To a 6+ minute audio clip from Commander Bunny in a YouTube posting from February 2011 at <http://bit.ly/18jvo41>, **Photo A**. – WPC6JXK)*

***[Handler]** First, the obvious question: What motivated you to become a shortwave pirate broadcaster?*

[Commander Bunny] I have always had a shortwave around, listening to my dad's in the 1950s. During the '60s I heard of *pirate* broadcasters via *Popular Electronics* magazine. That set my imagination soaring and I searched often, and once in a while would find an errant ham playing music. But I felt there was a niche I could fill.

I picked up a Johnson Viking Ranger in 1965 from the wife of a *silent key* [deceased amateur radio operator] neighbor, **Photo B**, and decided after a year of being cautious and waiting that I would have some fun.

I had spent many hours in that neighbor's basement, being *Elmered* [mentored] by him on all things electronic. Plus my dad had been a telegrapher on ships in the 1920s and '30s. So I grew up around it.

e-mail: <Stevenhandler-popcomm@yahoo.com>

***Photo A.** A YouTube posting from February 2011 captures about six-and-a-half minutes of a Commander Bunny broadcast on shortwave. (**LISTEN:** At <http://bit.ly/18jvo41>.) (Internet screen grab)*

Fun has always been what I wanted to have and still to this day remains my motivation. That's fun *for me,* and hopefully fun for people listening. If there is any bigger rush than firing up a transmitter and throwing a signal into the ether, not knowing where it will go, or if you might get caught doing it, then I don't want to know about it.

Then you add to that a program that you created and there isn't a drug on the face of the planet that can give you a bigger adrenaline rush.

*(**NOTE: Photographs C** through **K** were provided to Pirate Radio courtesy of Commander Bunny. – WPC9JXK)*

***[Handler]** I understand that another pirate operator originally used the callsign of WBNY. When did you begin operating WBNY and how were you affiliated with the original WBNY pirate station operator?*

[Commander Bunny] Your understanding is wrong — just another nasty rumor floated by the shadowy figures who have nothing better to do with their time on supposed pirate blogs than throw out lies, gossip, and rumors.

This *rumor* didn't start up until the mid-2000s when I was on the air just about every weekend. This was also about the time that [Internet] *chatrooms* came along and the rumors about every pirate operator or suspected pirate operator became the norm.

If I went around denying or trying to correct all the rumors and gossip about me, I wouldn't have time to broadcast. This is the one part of [pirate radio] that detracts from the fun. Sadly this comes with pirate radio fame. The more famous and well known you become, the bigger target [you are] for the jealousy and snipes.

I've had one especially nasty stalker who has blamed me for everything from FCC busts to deleting one of his posts on a pirate website. *Trust me about this:* Only one person knows who I really am, and that's my drop operator [the person who receives mail and forwards it to the pirate broadcaster].

There are lots of rumors about who they *think* I am; who they *think* I sound like and some claim they know — but none of these [guesses have been] even close.

The first rule of pirate radio is *trust no one*. And I haven't.

WBNY has been on the air in one form or another every Easter since 1966. Were I any of the people the *know-it-alls* claim, I'd have been shut down long ago.

While the Internet has brought reception reports almost immediately, it has also given a big voice to the gossips and rumor mongers. Believe nothing you read on blogs and websites. These are just

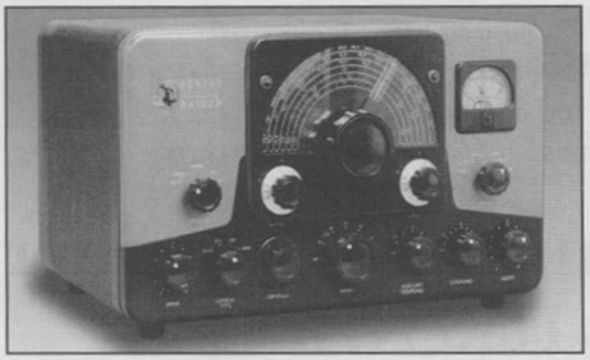


Photo 2– The Viking Ranger was one of more than a dozen E.F. Johnson radios and amplifiers to carry the Viking name plate.

Harbor Lunchboxes, appropriately named because they looked like a kid's lunchbox and Heath was headquartered in Benton Harbor, Michigan. T[illegible] 6 meter model was called the Sixer, and

fier. The company also had a line of smaller VHF transceivers aptly called the 22'er and the 66'er.

E.F. Johnson Company of Waseca, Minnesota had some of the more exciting ham radio names which suggested power and strength, principally the Viking series, which spanned nearly 20 years. The Viking radios were as strong and powerful as their name suggests! On the low-power, crystal-controlled side, there were the Viking Challenger and Viking Adventurer. Thus, even for a simple low-power Novice transmitter, you could still command the strength of a Viking. Johnson's lower power VFO transmitters included the Viking Navigator and the Viking Ranger (photo 2). As you climbed the power ladder, there were the Viking Valiant (I and II), the just-plain Viking (I and II), and the Viking 500. Then there was the Invader for medium power, followed by the Invader 2000 for high power.

For high-power amplifiers, E.F. Johnson offered the Courier and Thunderbolt. Your signal had to go up 12 dB alone just from the cool names such as Courier (photo 3) and Thunderbolt. I can imagine the pride you must have felt when you told someone you were turning on the Thunderbolt and *knew* the S-meter on the other end had just slammed to the side.

E.F. Johnson also offered an early SSB/AM/CW transmitter

Photo B. *A Johnson-Viking Ranger transmitter, given to him by the widow of an amateur radio operator neighbor, opened the transmitting world of pirate radio to Commander Bunny. (With permission, courtesy of CQ magazine)*

Photo C. *Here's an example of a WBNY Relay Service QSL. (Unless otherwise noted, images courtesy of WBNY and Commander Bunny)*

people who want attention because they can't broadcast or if they do anything worth listening to.

[Handler] *When you began operating WBNY what were you trying to accomplish, and along the way have your goals changed?*

[Commander Bunny] The first goal was not to get caught. Remember this was the '60s and the FCC agents of that day were the hard-core, no-nonsense guys you didn't want banging on your door at 2 a.m.

Seriously, I just wanted to have some fun, poke fun at the government, poke fun at the way human beings — [all of whom the Commander considers] *monkey-boys, ape-humans* — act and treat each other.

For the first 10 years of doing WBNY, at least the Easter broadcasts, I had no way of knowing if anyone even heard, except after I'd go off the air, someone would answer [on the airwaves] and say *that was funny* or *thank you!* It was enough to keep me trying.

Remember back in the day, you'd have to find a shortwave broadcast station that wasn't on the air and use that frequency before or after they came on the air.

Although 6 to 7 MHz has always been popular, I've gone to 4, 9, 13, and 20 MHz and even below and above the Citizens Band.

It was during the '70s that newsletters started popping up with some serious pirate listeners posting logs. But these newsletters were only published every other month, or so. But it at least gave you an idea that more than a couple people were hearing you.

The '80s brought not only monthly newsletters — *Free Air* and *The Association of Clandestine Radio Enthusiasts* (ACE) — but dial-up BBSs.

The '90s saw the Internet start to make some inroads — *Free Radio Network* — and establish some real two-way communications between listeners and operators.

The 2000s started off pretty good, but by 2010 it had attracted a lot of negative people who wanted attention at any cost. Pirate radio is about creating programs and broadcasting them, not blogging and posting.

It does appear that a lot of the negative folks have found other shiny objects to keep them occupied now ... but the mess they left will take a long time to clean up. Your question about *the original* is but one of the false rumors floating about.

[Handler] *You created the character of Commander Bunny, a rabbit that heads the "Rodent Revolution." The goal of this revolution apparently is having the rodents seize control of the planet from the human population — which you often refer to as "ape-humans," "monkey boys," and similar terms. What was your inspiration for the character of Commander Bunny?*

[Commander Bunny] I'm not sure I had an inspiration. Darwin? Making fun of the evolution deniers who can't see that all humans act like monkeys, most of the time?

Can anyone deny that things wouldn't be better if the rabbits ran things? I took a lot of what was in *Planet of the Apes* in the late '60s and incorporated that story line into the *Commander Bunny* persona.

Instead of monkeys running things it would be rabbits (rodents) and well, yeah, humans would be the slaves. Face it, humans — as we know them today — have only been

Photo D. *Commander Bunny is a candidate for U.S. President — at every opportunity.*

around for maybe 1 million years. Our planet is 4.5 billion years old. Who was running the show before humans? Who will run it when humans are gone? And there is no question humans will be gone at some point.

Has there ever been a more arrogant creature on Earth than people? Next logical *(?)* step would be for the rabbits — *rodents* — to take over.

[Handler] *At some point you came up with the idea of your character, Commander Bunny, running for U.S. President. When did you begin this story line and what was your inspiration for this idea?*

[Commander Bunny] It was 2004 and there were 12 — *count 'em* — 12 candidates on the election ballot. If John Kerry and Ralph Nader could run for President why not *Commander Bunny*? I had bumper stickers and QSLs made up for the event and the feedback was awesome. I don't know how many votes I got. I'm pretty sure the machines were rigged. But the shortwave community thought it was great! I got a lot of fun, positive feedback. And I still do to this day.

[Handler] *What were you trying to accomplish with the Commander Bunny for President story line and have you accomplished those goals?*

[Commander Bunny] My goal was to establish that *anyone* can run for President. I have run for President ever since. Hey, going in the direction we're going, my candidacy isn't looking so bad now, is it?

It was also a reason to have another type of QSL printed up. I really believe that a fun, different QSL makes the pirate radio experience worthwhile.

I know the newer generation of pirates do e-QSLs, but there isn't anything better than sending off to some strange post office box with your report, then waiting for a QSL to show up — a [card] you can hold in your hand, show your friends, and hang on your listening shack's wall. I fear the *real-QSL* event is being lost to technology.

[Handler] *Your broadcasts tend to have very high production values. Once you have envisioned the concept or theme of a show, please describe the artistic and production process it takes to move from an idea or concept to a final broadcast.*

[Commander Bunny] Sometimes the inspiration comes quickly, the elements of the show fall into place and I can put together a 45-60 minute show in two to four days [consisting] of six-hour sessions at the mixer and computer.

It may sound flawless and effortless, but *trust me*: It is a labor of love. I have a Yamaha 8-in, 4-out stereo mixer and lots of years' worth of parody songs and silly commercials. I work out the basic idea of the show in my head. Then, as I'm putting it together, all the pieces seem to fall into place. *Monkey* songs just seem to show up from listeners who send them or I'll find it at an old record store or at a yard sale.

[Handler] *Once you have your script written, about how long does it take for you to create one of your programs?*

[Commander Bunny] I usually get the idea in my head, think about what I'm going to do, write a basic script, then sit down at the mixer and keyboard. I'll get the thoughts about the program written down — script and technical notes — and the rest of it usually ***(NOTE:*** *usually)* comes after that. Sometimes it's like pulling teeth, but that's the exception, not the rule.

[Handler] *Are your program recordings done in a single take, or do you use multiple takes, and if so, about how many on average for a show?*

[Commander Bunny] The voice part of it is done in a single take. I want a flow to the program. Doing edits interrupts [that flow]. Remember, I've

Photo E. *This WBNY Relay Service QSL celebrates the recent FCC shutdown.*

Photo F. *A commemorative Commander Bunny for President coffee mug hails the Rodent Revolution and declares "America Needs a Hare Transplant."*

Photo G. *The WBNY Relay Service relays "the best of pirate for MWNT (monkeys with no transmitters)."*

Photo I. *Here's one of the official QSLs of the WBNY Relay Service.*

Photo H. *WBNY is the broadcast conduit for CHKN — Chickenman, FOWLEST Shortwave Pirate Ever!*

Photo J. *WCS, The Collective Soul Station, is on the air thanks to Commander Bunny and WBNY.*

already written the script in my head, then written it down so the script is more like notes. It's the editing that takes an enormous amount of time and sweat.

[Handler] *Your broadcasts have made use of satire, one of the oldest and most sophisticated forms of humor. Do you write all of your material or do you have someone who assists you?*

[Commander Bunny] Nope, there's no one but me to blame. I read newspapers, watch the news, follow politics, see posts on the FRN (Free Radio Network) and see how silly people act. Satire is simply observation of the obvious. I suppose it's a point-of-view issue. You see the United States Congress in session (when it isn't on vacation, in recesses, or during a shutdown) and I see monkeys acting (OK, so it isn't an "act") like idiots. Do you watch *CSPAN* or John Stewart on *The Daily Show?* **Photos L** and **M**.

[Handler] *In the use of satire, how do you balance your right to free speech against airing material that some in your audience may find offensive?*

[Commander Bunny] The only thing that any of my listeners have found offensive is my use of the *monkey-boy* and *ape-human* phrases. I am still amazed by how much those terms made people angry.

So someone who calls himself *Commander Bunny* calls you a *monkey-boy* and you're going to take it seriously? *Really?* That's too funny!

Anyone offended by language should probably find a nice PBS station, not pirate shortwave radio. There's not a lot of vulgarity in my shows, but you probably won't be hearing any of the WBNY programs on the local *Baptist Hour.*

[Handler] *I understand that beside WBNY and WBNY Relay Service, you have operated many other pirate radio stations with varying formats and persona. Commander Bunny's revolution is now in its second decade. Do you have a desire to try something different and if so, what?*

[Commander Bunny] *Commander Bunny* in his current state is in his *third* decade. WBNY is in its *sixth* decade. The majority of my broadcasts are relays for other pirates now, and I'll continue to do that. I never know what will happen until the urge strikes me.

[Handler] *Throughout your pirate broadcasting career, is there a single broadcast that stands out from the rest as your "best broadcast" and if so, please tell us about that program.*

[Commander Bunny] That's kind of like asking a parent — with their kids standing there: *Which child do love the most?* They have all been fun. Fun to think up, fun to write, fun to produce, and fun to air.

It has been fun to send QSLs and fun to hear the reaction of the QSL packages. I usually send a super QSL package to about the fourth confirmation, but if one hits me funny, I'll send them the whole tote-bag (spoof on PBS), coffee mug,

Photo K. *This QSL is for WHOF — Hall of Fame Radio — which broadcast through the facilities of the WBNY Relay Service.*

pens, magnets, *yadayadayada* as my appreciation of their getting the joke!

OK just thought of my favorite show: It was the *Good Monkey* show. I had asked both on the air and through the FRN (Free Radio Network) for people to send me audio with them saying, *I'm a Good Monkey.* I got more than I ever dreamed of. It took me weeks of daily editing to get them all in, but I did.

I counted 74 different clips of people saying *I'm a Good Monkey* on that show. It showed not only how many people listen but are willing to take the time to cut an audio piece for the show.

My favorite Easter show (that was what got me started with WBNY) is the Easter 2007 show where I incorporated a South Park program about why Easter eggs are painted and why the Pope has a big hat (to hide his bunny ears).

[Handler] *As a pirate shortwave radio operator, have you accomplished all of your goals and if not, what's left?*

[Commander Bunny] Well, since all I ever wanted to do was have fun, I think I have. Each station I have created over the years was for a specific purpose that, at the time, met the goal I wanted.

The one goal that I've accomplished and enjoyed is being a Relay for pirates who don't have transmitters. I've relayed hundreds of pirates who either didn't have a transmitter or just wanted to throw the FCC off by having them pop up from a different part of the country.

I've made many friendships because of the Relay function. A lot of very talented people are out there who have great, creative ideas but have no way of getting them on the air. It has been a ball to provide them with a way to get their programs broadcast. But the underlying goal of having fun has been met and continues to this day.

[Handler] *The licensed shortwave broadcasting community is contracting worldwide. Having been both a participator in, as well as an observer of shortwave radio broadcasting, what impact will the demise of many licensed shortwave broadcasters have on pirate radio broadcasting in North America?*

[Commander Bunny] It's not just shortwave. It's the entire broadcasting world. Have you listened to AM and FM radio lately? Broadcast listenership across the board is declining. Shortwave is a niche group of hardcore, "I love radio*"* kind of person. And the *pirate shortwave radio* kind of person is an even smaller niche, but in my opinion it will continue in spite of what commercial radio does.

The fact that they have a shortwave and listen to it speaks volumes to their commitment to a very unusual hobby. The demise of commercial shortwave should open up some frequencies for pirates.

The typical commercial shortwave broadcaster splatters for 50kHz +/-, so pirate listeners aren't going to miss them in the least. It is funny how the FCC will chase 50-watts-or-less pirates but can't seem to find the time to go after the 100-kilowatt "*splatter-the-entire-band"* commercial stations.

As long as they make shortwave receivers, there will be shortwave listeners and then a niche of folks who find pirate shortwave even more appealing than listening to commercial preachers begging for money or hams arguing over who *had the frequency first.*

During the era around 2005, there were some people who complained about the low-power pirates and *who wants to listen to a low-power pirate?* These are the Generation X, *gimme everything right now* group, that has since moved on to something less challenging than pirate radio.

The romance of hearing a low-power pirate broadcaster is lost on that generation. It wants FM high-powered, *don't make me work for stations.*

Pirate radio is not for them. But to the point, the demise of the big 100-kilowatt shortwave stations will make low-power pirate reception more attainable.

Photo L. *Commander Bunny tunes into John Stewart and The Daily Show for perspective on the content of WBNY broadcasts. (Internet screen grab <http://www.thedailyshow.com>)*

[Handler] *What role in pirate radio broadcasting do you envision for yourself in the future?*

[Commander Bunny] I'd say: staying at least one step ahead of the FCC!

I don't see me doing anything different in the future than what I've done in the past. It has worked for six decades. *Why stop now?*

I don't try to lead anyone or make anyone believe anything they otherwise wouldn't believe. My role isn't to be a leader in pirate broadcasting. My role is to practice my craft and have fun doing it.

WBNY, Commander Bunny, Radio Free Speech, and all the other stations were done as entertainment and for

Photo M. *The machinations of Congress, as covered by CSPAN, is a source of inspiration for Commander Bunny.*
(Internet screen grab <http://www.c-span.com>)

fun. Whatever role that has in pirate radio, then that's what I'll be doing. *Nothing more, nothing less.*

The people trying to bend public opinion or attempting to mold a movement or tell people they know who a pirate is, or have some tidbit about an operator — they have another agenda. It's an agenda I don't share.

These are the same people who sit next to you in a magic show and after the trick is performed have to tell you *how it's done.* I don't want to know how it's done, I want to be tricked into thinking it's something magical.

Pirate radio, at its very essence, is magic. It's some crazy guy (or gal) pretending to be some made-up personality, convincing you of it, putting that pretense on a shortwave transmitter, making it travel through the air and into your radio. *If that isn't magic, then nothing is.*

All of these people who have Internet blogs who pass along the latest rumor, or spread gossip, are in it for themselves *and no one else.*

My respect goes out to all the operators who create shows, then broadcast them for the entertainment of all. It's a shame someone would attach themselves to something that is so much fun, and have nothing but negative comments about who does it and how they do it.

Why would you set up a so-called pirate blog to *out* pirates' identities? How does that make you a part of pirate radio?

Pirate radio has been a wonderful outlet for my views and comments on society and government. It was a natural outlet for my technical abilities.

I am not a ham operator and never have been. I'm not going to agree to let the government come into my home, anytime they want, to *inspect* anything. But I know code, transmitters, and antennas.

Regulating radio waves is like telling people how much sunlight they can use. If you aren't interfering with anyone and operating a low-power HF station on a frequency that is not in use, I don't see what the problem is.

Like the guy on a deserted stretch of Interstate: No is one around. See how fast your car will go. *Who does that hurt?* This *Mama-government* mentality has led to what?

- Well, the latest government shutdown
- AM-FM and shortwave broadcasting collapsing

[It's just that] the average person can't tell the difference between the shutdown and when [the government isn't] working.

I don't *hate* government. I just think there is *way too much* of it. Tea Partiers are left-wing radicals (yes, I said *left wing*), in my view.

In Appreciation

I wish to thank Commander Bunny for taking the time and effort needed for this interview. – WPC9JXK.

'Commander Bunny' Pirate Stations

Alphabetically, here is partial list of pirate radio stations operated or relayed by Commander Bunny.

- Al Fansome Eulogy Radio – Ode to Kevin Miller
- All Average Music Radio
- Cathedral of Chris Radio
- Cell Phone Radio
- Comet Project Numbers Station Spoof
  (LISTEN: *<http://bit.ly/hpaVyv>)*
- Dobson Monkey Radio
- Elvis Annual Birthday Radio
- Family Radio spoof station
- Hitch Hikers Guide to the Galaxy Radio
- KDRM – K drum radio (all drums all the time)
- KRAP Radio – all crap all the time
- Marine Corps Birthday Radio
- Mouth of Mohammed
- My New Underpants
- Radio 9
- Radio Free Speech
- Radio Fudd
- Radio Slack – Church of the Sub-Genius
- Stairway to Heaven Radio
- VOM Voice of Mel (Blanc)
- VOTE – Voice of the Extremist
- We Monkey Radio
- WBNY – Radio Bunny
- WBNY – Relay Service
- WHOF – Hall of Fame Radio
- WJAY – Jay Smilkstein Radio
- WJVR – John Valby Radio
- WMDR – World Monkey Domination Radio
- WRAY – Link Wray tribute station
- WPDR – President's Day Radio
- WRRR – World Rabbit Rapture Radio
- WTKY – Turkey Radio
- WTPR – PT-1 & PT-2 Tire Pressure Radio
- WWWW – All W's all the time
- XENU – Over lord of the Universe (Scientology spoof)

Pirate Radio Listings:
For the latest Pirate Radio loggings, visit <http://www.CQPlusPirates.blogspot.com>.

trail-friendly radio

BY RICHARD FISHER, KI6SN

Measuring Your Location's Antenna Possibilities Without Leaving Your Computer

Space: The final frontier. OK, we're not aboard the *Starship Enterprise.* And for radio amateurs, the frontier of *space* is far from final. Indeed it's ongoing, especially where antennas are concerned. So let's strike that line of thinking.

Many hams who work the high-frequency (HF) bands — 1.8 through 28 MHz — find themselves refereeing a wrestling match with *Lot Space vs. Antenna Length* on the top of the card.

It can be hard to calculate the HLD (height, length, direction) possibilities when you're standing in the middle of your backyard craning to see the tops of a couple of trees with the Sun in your eyes.

"If my antenna goes from *there* to *there* and makes a turn *there,* can I fit an 80-meter dipole on this suburban lot?" is the question. "And what will my spouse think?"

Everyone: To the Web!

We'll leave the last question for another installment of *Trail-Friendly Radio.* As for the antenna and space calculation, though, there's a really cool site on the Internet that can take out almost all the guesswork. It's *FindLotSize.com* and can be used to measure point-to-point distances on virtually any piece of land in the world.

By the way, this program is perfectly suited for the shortwave-antenna builder, as well. *So, SWLer's read on!*

*1940 Wetherly Way, Riverside, CA 92506
e-mail: <CQPlusDigital@gmail.com>

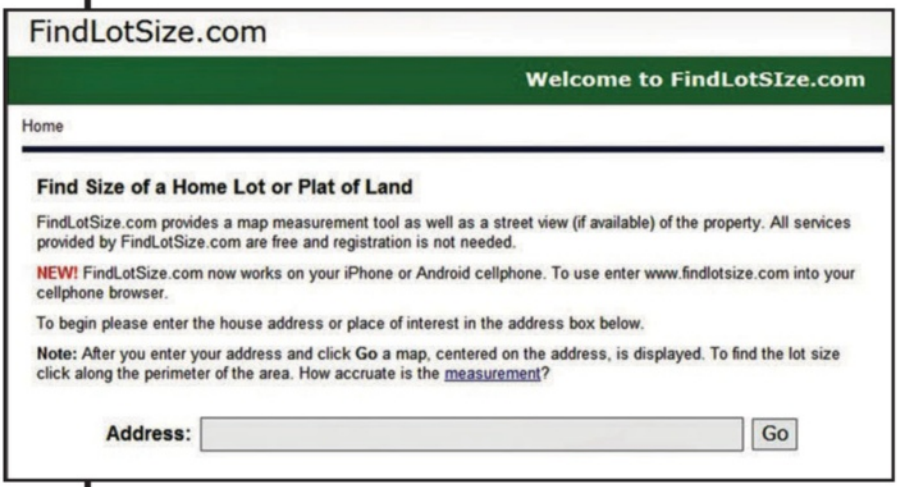


Photo A. *The welcome page at FindLotSize.com features an address box that will "find" the location of the antenna you're thinking about putting up. (Internet screen grab <http://www.FindLotSize.com>)*

Link to <http://www.findlotsize.com> and let the adventure begin.

Upon landing there you'll be greeted with a welcome page that invites you to punch in an address. In your case, the one at which you want to string your antenna, **Photo A**.

Trail-Friendly Calculations

For demonstration, Martha McLean Anza Narrows Park, at 5759 Jurupa Avenue in Riverside, California was typed in. Hit "GO" and you're linked to an aerial view.

This beautiful park in Southern California is a great place for trail-friendly radio operation. The sprawling open space is dotted by towering trees — many providing shade over picnic tables.

This location had been used here several times for portable operation on the higher HF bands — 20 and 10 meters. But what would be the possibilities for working, say, 80 meters from the park now that the summer static has given way to winter quiet?

Knowing the landscape, two giant trees on a gently sloping hill might be perfectly positioned for a dipole cut for 3.6 MHz. Would a half-wave dipole antenna fit? And where would its feed point fall?

By pointing and clicking on the top of each tree, FindLotSize.com — toggled for "Distance" — instantly gave the information needed, **Photo B**. The distance between the map pins is 177 feet — more than enough for a 130-foot-long, 80-meter, half-wave dipole cut for 3.6 MHz. In fact, it could hang in open space with the dipole's end ropes stretching about 24 feet from each treetop. The coax feed line would drop midway — about 88 feet from the base of each tree. All of this calculated from two simple clicks in the FindLotSize.com program. *How great is that?*

For City Slickers

But say we are on a city lot that could in no way accommodate a straight, horizontal low-band antenna. *Time to get creative.*

Let's imagine we're at the address of one of the childhood homes of radio pioneer Edwin Howard Armstong — on the Upper West Side of New York City. The SSB leg of the *CQ World-Wide 160-Meter Contest* is this month — February 21-23 — and we want in on it. But from New York City? *How?*

Turning again to FindLotSize.com, we punched in the legendary EHA's address and consider the possibilities.

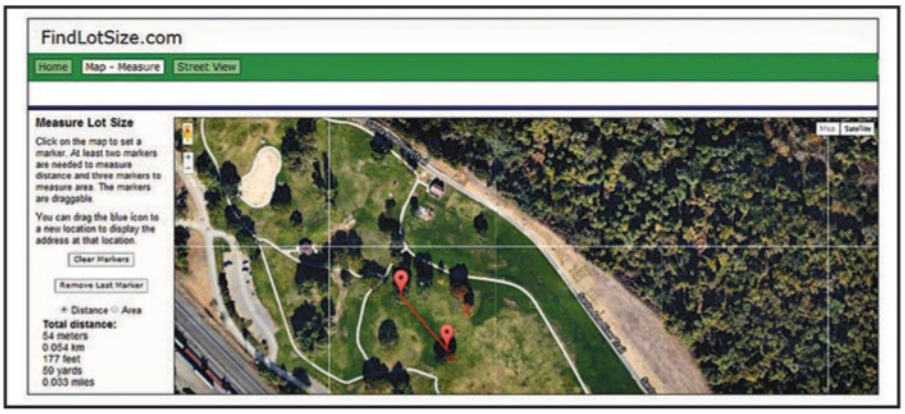


Photo B. *By clicking on the treetops shown in this aerial map at Anza Narrows Park in Southern California, it's easy to calculate the distance between them — 177 feet — which is displayed at the lower left of the FindLotSize.com page, provided the "Distance" button above it is clicked. (Internet screen grab)*

Photo C. *Got an antenna configuration that isn't in a straight line? FindLotSize.com handles such distance calculations easily. Put in as many map-pin turning points as you'd like. (See text.) (Internet screen grab)*

Yes, we have trees.

How long is a half-wave dipole for Top Band? Using [468/Freq. in MHz] we see it's 260 feet, or 130 feet per side [468/1.8 = 260; 260/2 = 130].

Hummmm. Starting from the tree in the backyard, **Photo C**, we plot a line to one in the front. Then turn left to a tree across the driveway entry. FindLotSize.com calculates 309 feet — circled in red in our graphic for reference. *Great!*

And imagine the center-fed coax would have had a rather short run to the top floor EHA's bedroom window facing the street. *Perfect!* Who says you can't work Top Band from the inner city?

*(**CAVEAT:** Remember, this is the "site" of the Armstrong house. Obviously, a lot has changed since he lived there as a child. We're only "imagining" the trees were there when he was. And who knows what the house and surrounding area looked like. – KI6SN)*

Add as many map pins as you'd like. The program is perfect for measuring the possibilities of dipoles, long wires, loops, rhombics — in the country or the city. Measure the circumference of your suburban lot. Let your imagination run wild.

But How Do I Calculate Tree Height?

Length is one challenge. Height, another.

Here are four easy steps to calculate the height of any distant object. In our case, a palm tree supporting a sloping G5RV at KI6SN certainly qualifies, **Photo D**.

- Find a stick that is equal in length to the distance from your cheekbone to your fingertips when your arm is fully extended in front of your face. Breaking a branch to proper length will work just fine. *This isn't rocket science.*
- Hold the stick vertical by the tips of your thumb and index finger and put it in front of you with your arm fully extended and parallel to the ground.
- Walk toward or away from the tree until the top of the stick is visually lined up with the top of the tree and the bottom of the stick is lined up with the bottom of the tree. Visually, think of the stick *eclipsing* the tree — like the Moon covers the Sun in a solar eclipse.
- *Viola.* The distance from where you are standing to the base of the tree is equal to the height of the tree. Use a measuring tape if there's one handy. If not, measure the approximate distance between your steps as you walk naturally. Count the number of steps you take to the base of the tree and multiply it by the number of feet and inches each of your steps cover.

Photo D. *A stick cut to the distance between your cheekbone and fingertips when your arm is extended is all you'll need to calculate the height of a tree you're eyeing for a new antenna. It's part of a simple four-step calculation that* works every time. *(See text.) (Courtesy of KI6SN)*

That's all there is to it. *(**WHAT'S UP?** The G5RV is 35 feet high in the palm tree at KI6SN. The stick used as the "eclipser" is piece of plastic cord channel 2-feet, 5 1/2-inches long — the distance between my cheekbone and extended fingertips. – KI6SN.)*

Next Steps ...

So, there you have it. If the weather's too crummy right now to do any meaningful outdoor antenna work, link to FindLotSize.com to begin preparing for spring and summer. It's never too early to determine if antenna dreams for your yard or 2014 ARRL Field Day site are going to "measure up!"

BY BRUCE A. CONTI, WPC1CAT

Listening Waters: A Prince Edward Island DXpedition

As in Real Estate, for AM BCB DXers It's 'Location, Location, Location'

Finding a DX location on Prince Edward Island during the November 2013 off-season was a challenge. Most rental properties, especially beachfront vacation cottages of primary interest for saltwater enhanced DX, were closed for the season by the end of October. Fortunately, thanks to the Internet and Google Earth, chances of finding a good spot improved considerably without ever leaving home.

After a successful 2012 DXpedition in Howe Bay on the southeast shore of Prince Edward Island, it was decided to do it again. This prime location provided saltwater paths to Europe, the Middle East, and Africa, along with the Caribbean and South America. Unfortunately the Howe Bay cottage was not available this time. So the search for a new site was underway, beginning with identification of desirable towns on the southeast shore of the island, followed by a Web search for cottage rentals in those towns. Then it was just a matter of checking the listings for properties that were open year 'round.

e-mail: c/o <CQPlusDigital@gmail.com>

PEI DXers. *Members of the 2013 Prince Edward Island AM BCB Listening DXpedition team, from left, were Bruce Conti, Walt Salmaniw, Niel Wolfish, and Brent Taylor — ready for action.*
(PEI images courtesy of WPC1CAT)

Once the search was narrowed to just a few still available in November, the sites were located on Google Earth for evaluation. Locations in a compact residential neighborhood, not actually on the beach, or in some cases not even close to being as advertised, were eliminated by Google Earth aerial visits.

What a great tool — something anyone can use to check out locations before ever setting foot on a site or contacting the landlord.

Culling the Choices

The search was narrowed to five potential properties. Now it was time for DXpedition leader and island resident Brent Taylor, VY2HF, to scout the sites with a portable radio to check for noise problems before making any final decisions.

Two properties were selected, but the first contact with a proprietor was negative, as it was not available off-season. Our next best site was on 17 acres of beach front; the Glistening Waters Victorian Farmhouse in Murray Harbour North.

Seventeen acres on the water was a rare find, and if available in November would be even rarer. *Success!* Although the owner had never before remained open so late in the season, she agreed to accommodate us for a week in November. In fact, she was intrigued by our upcoming adventure. *The DXpedition was on.*

It didn't take long for the word to get out about another Prince Edward Island Listening DXpedition either. The farmhouse — from here on dubbed *Listening Waters* — could accommodate four DXers comfortably: The core DXpedition team of Brent Taylor from Stratford, Prince Edward Island; Niel Wolfish, from Toronto; and me from New Hampshire, plus one more. In only a matter of days, Walt Salmaniw, of Victoria, British Columbia, secured the fourth seat. For Walt, an accomplished West Coast North America DXer, this would be his first East Coast DXpedition.

Pre-DXpedition Planning

"Planning ahead is essential anytime multiple operators are involved and when factors of significant travel distance, lodging expense, etc. are in play," recommended medium-wave broadcast band DXer Mark Connelly, WA1ION, as he took an interest in our pre-DXpedition planning.

DXpedition Ground Zero. *Here is the Listening Waters Victorian Farmhouse in Murray Harbour North, on the southeast shore of Prince Edward Island.*

"It's not quite the same as a solo — or maybe a two-person — local deal when at 2 p.m. you say, *Maybe I'll shoot over to the beach for a quick session at sunset,* and that beach is less than an hour's drive from the house," he said.

"If you forget some power cord or a BNC/UHF adapter and then — as you sit at the site in a non-functional DX state — you realize that you will have to bump things to another night, the most you've wasted is maybe a couple of hours driving around.

"If, on the other hand, you've taken days off from work, invested $1,000 or more just to get to (and) from the site, and, even worse, several of your friends who spent just as much to get there are depending on you, then you've really boned up if you left something important at home. *So plan ahead!"*

Strategies via Email: Things to Bring

The packing list was most critical for two DXpedition team members who would be flying in. Airport security, baggage fees, and the potential for lost luggage place limitations on what can be carried without risk. Some of the planning discussions via email exchanges went like this:

"Counting down the days!" exclaimed Walt. "A question for the group. Perhaps I've forgotten if you've already mentioned what to bring as far as DX equipment. What do you suggest as far as connectors, splitters, antenna switches, coax, etc.? I wouldn't want to come out having forgotten something crucial!"

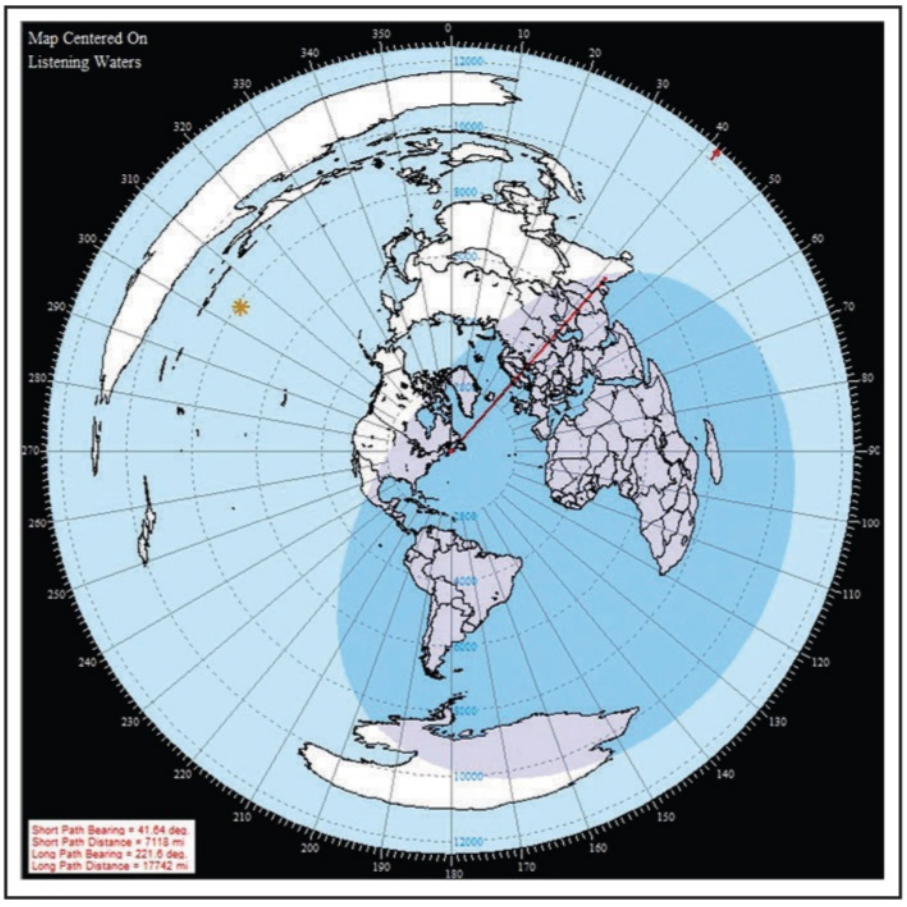
"I guess, from your perspective, you would want to have at least BNC cables to attach to each splitter and then a switch to select between/among antennas," replied Brent. "I have a Wellbrook active 4-way splitter and I believe Niel does also. I think last year we powered them from one of my 12-V storage batteries so that there is one less switching power supply on the go.

"There will be at least two and as many as 4 or 5 antennas to choose from — and now with Beverage possibilities, maybe even more. One can never have enough splitters and multi-position switches. I'm also going to pack my Quantum Phaser. Bruce has his own custom phasing box and I think Niel just switches on the fly. We'll each — I believe — have access to one feed from each 'community' antenna.

"As for gear power, my battery will be connected to an Anderson PowerPole strip with some empty ports. I also have some spare connectors and a crimper here, which I will ensure I get packed in one of my totes. As for other things, it's never a bad idea to have lots of PL259/BNC adapters and joiners. And, headphones!"

"Believe it or not, Brent, I have forgotten headphones, once!" said Walt. "I'm a BNC fellow. What do the others use? My Alpha Delta switches are PL259, of course, but I have the

Oh, Canada. *Prince Edward Island is part of a vast region in eastern Canada. (Courtesy of Wikimedia Commons)*



Pathfinders. *This AZ mapping of the path to India, a prime DX target, shows a 40-degree bearing from Listening Waters. The Beverage antenna was aimed at 60 degrees toward Europe, midway between India and Africa, which proved to be a good decision.*

adapters for those. My coaxes are all BNC, though. What about lengths? What's the minimum length you'd suggest? Questions, questions!"

"I am a BNC person," remarked Niel. "I pretty much bring everything I can think of that I believe will be useful and that will fit in luggage. I do, indeed, have a Wellbrook active four-way splitter. I think it last saw the light of day last year in Howe Bay."

"Typically Niel and I, and the 'import ringer' DXer set up at a dining room table, and Bruce is adjacent on a table of his own — due to the breadth of his equipment (two laptops, etc.)," said Brent. "So, for our purposes we just need 3-foot lengths for our on-the-table work. We try to port one or two of Bruce's feeds over to our table also, and if there are enough active splitters, we can all share."

"I will have one two-way and one four-way active splitter, both with BNC connections," I replied. "I'm planning on a bi-directional dual Delta aimed toward Japan and Argentina, and a 1,200-foot Beverage aimed toward North Africa. I'll have a couple of 150-foot coax cables, a 75-foot cable, some shorter lengths, twisted pairs, and an assortment of RF matching/isolation transformers for the antenna hook-ups. This week I'm going to build a special transformer for coupling twisted pairs between the two Delta antennas to a coax lead-in."

Aerial Guidance from Above

Antenna planning was facilitated by Google Earth. Satellite imaging allowed for pre-determining antenna layouts and positions. Beverage antenna placement within a 60- to 90-degree bearing would ultimately depend upon agricultural activity in an adjacent field, while there was plenty of room on the 17-acre site for positioning broadband SuperLoop and Delta antennas in any direction.

I was driving my car to the site, so I could bring plenty of wire and coax for antennas. If customs had any questions at the border crossing, I would describe it as *ham radio* gear, something most people understand versus trying to explain a broadcast DXpedition.

"It's always good to bring a back-up receiver," I continued in the email exchange. "There would be nothing worse than traveling a long distance for a DXpedition only to discover that your only receiver crapped out or was damaged during the trip. I will have an Excalibur SDR for the primary receiver, and an RFSpace SDR-IQ for backup. And don't forget to bring an AC power strip so you'll have enough outlets to plug in all your stuff."

The *2013 WRTH*, (World Radio-TV Handbook) and downloads of the latest EMWG (an index of long- and medium-wave stations in Europe <http://www.emwg.info>; PAL (Pacific Asia Log) <http://bit.ly191uqIO>; and MW Offsets (listing of exact frequencies for medium-wave stations) <http://bit.ly/10cLFyz>, were recommended for references. Internet references were to be downloaded to our laptops ahead of time, just in case we didn't have a reliable wireless Internet connection at the DXpedition site.

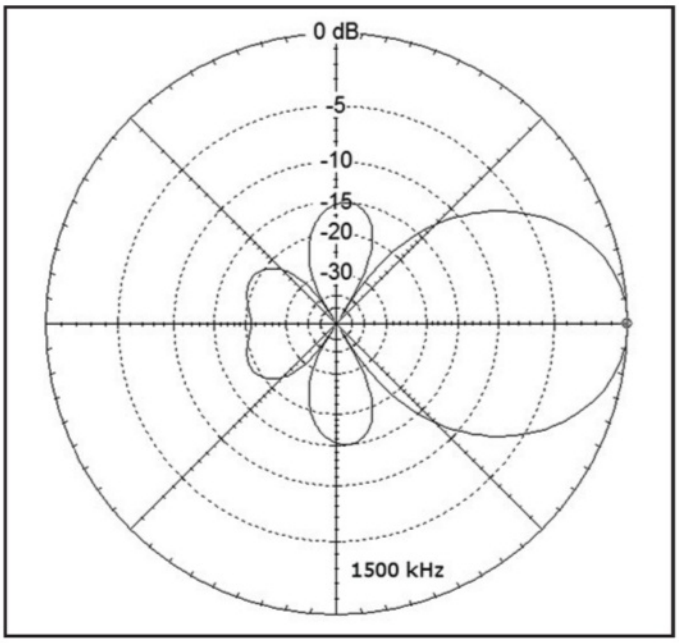
Members of the team also had copies of the NRC AM Radio Log <http://bit.ly/1geTc8M>, and the IRCA Mexican Log <http://www.am-dx.com>. Additionally, we charted sunrise and sunset times along with bearings for various DX target areas. *The DXpedition team was primed and ready to go.*

Savoring the Results

Everyone arrived safely with all their radio gear intact for what was to be an exciting week of AM broadcast DXing. Software-defined-radio receivers ruled the DXpedition, with a Perseus, RFSpace SDR-IQ, and two WiNRADiO Excaliburs capturing all the action, plus an ultralight just for fun.

"Once again, it was a delight to welcome DXers to our little corner of Atlantic Canada," said Brent. "We took full advantage of the 17 acres with a Beverage as well as other antennas. The week was a great time of fellowship, DX, and sharing best practices. While I would have hoped for a more favorable mix of solar-terrestrial indices, the solid captures of India 1071 and Botswana 909 made the whole week worthwhile for me. Grabbing India with my ultralight Sangean DT-400W — inductively coupled to the Beverage wire — was a personal highlight."

"What a treat it was to be totally immersed in fantastic European trans-Atlantic, medium-wave reception, in a lovely location, and very comfortable accommodations," said Walt. "The



A Good Antenna. *EZNEC antenna modeling of a terminated Dual Delta array demonstrates its highly directional capability.*

weather co-operated beautifully, even if the ionosphere didn't always. The thrill of hearing India before 3 p.m. local, and the great camaraderie of seasoned DXers, made the long journey very worthwhile.

"I'm already dreaming of return visits in the years to come. Brent's organizational abilities were much appreciated. Niel's expertise in the MW scene on the East Coast was evident daily, and we all enjoyed his humor. Bruce's technical expertise was very much in evidence, and to watch him rapidly erect Delta loops was something to behold.

"All in all, the total package was a perfect fit for me. Personal highlights in no particular order were: (1) AIR on 1071 daily in the afternoon with the sunshine streaming through the window. (2) LKB/LLE from Norway on 5895 with only 50 watts. (3) The numerous Europirates above 1600 kHz. (4) The magic of having the entire MW band light up starting at 1400 local and continuing throughout the afternoon and late evening, chock block full of European MW stations. Now to just begin to search the TB of Perseus .wav files. Countless hours of memories there, I'm sure!"

"This was another great location," concurred Niel. "Plenty of room for antennas and away from many noise-making devices. Although we did not get any trans-Pacific DX this time, and the Latin Americans were sparse, I'd say we had more than enough from Europe, Africa, and the Middle East to keep us busy from mid-afternoon until it was time to hit the sack. I was especially thrilled to meet Victoria DXer Walt Salmaniw for the first time.

"I had hoped that having him present would be a big help if the trans-Pacific DX began to roll in at sunrise. Still, Walt's presence was handy for identifying the Slavic language broadcasts coming from Europe and also spotting some interesting Europirates above 1600 and shortwave signals, especially the All India Radio outlets."

Assessing the DXpedition's Week

This was my fourth Prince Edward Island DXpedition, after having survived 2009 Priest Pond, 2010 Savage Harbour, and 2012 Howe Bay. Each of these DXpeditions has been a unique experience.

Last year at Howe Bay was most notable for its outstanding tropical reception. *Welcome to Bizarro World* might have been the moniker for this year, as it was the complete opposite of the 2012 experience.

Despite an experimental bi-directional dual Delta array aimed north-south which seemed to be doing the job as it was the only antenna receiving 1220 Brazil, atmospheric conditions weren't cooperating, with otherwise only the usual stuff from Cuba, Puerto Rico, Venezuela, and a couple other regulars received.

The Delta was later terminated to favor south, but still no

Seeing the Sites. *Panmure Lighthouse was among the sights noted as DXpeditioners took time out from their monitoring activities to tour the island.*

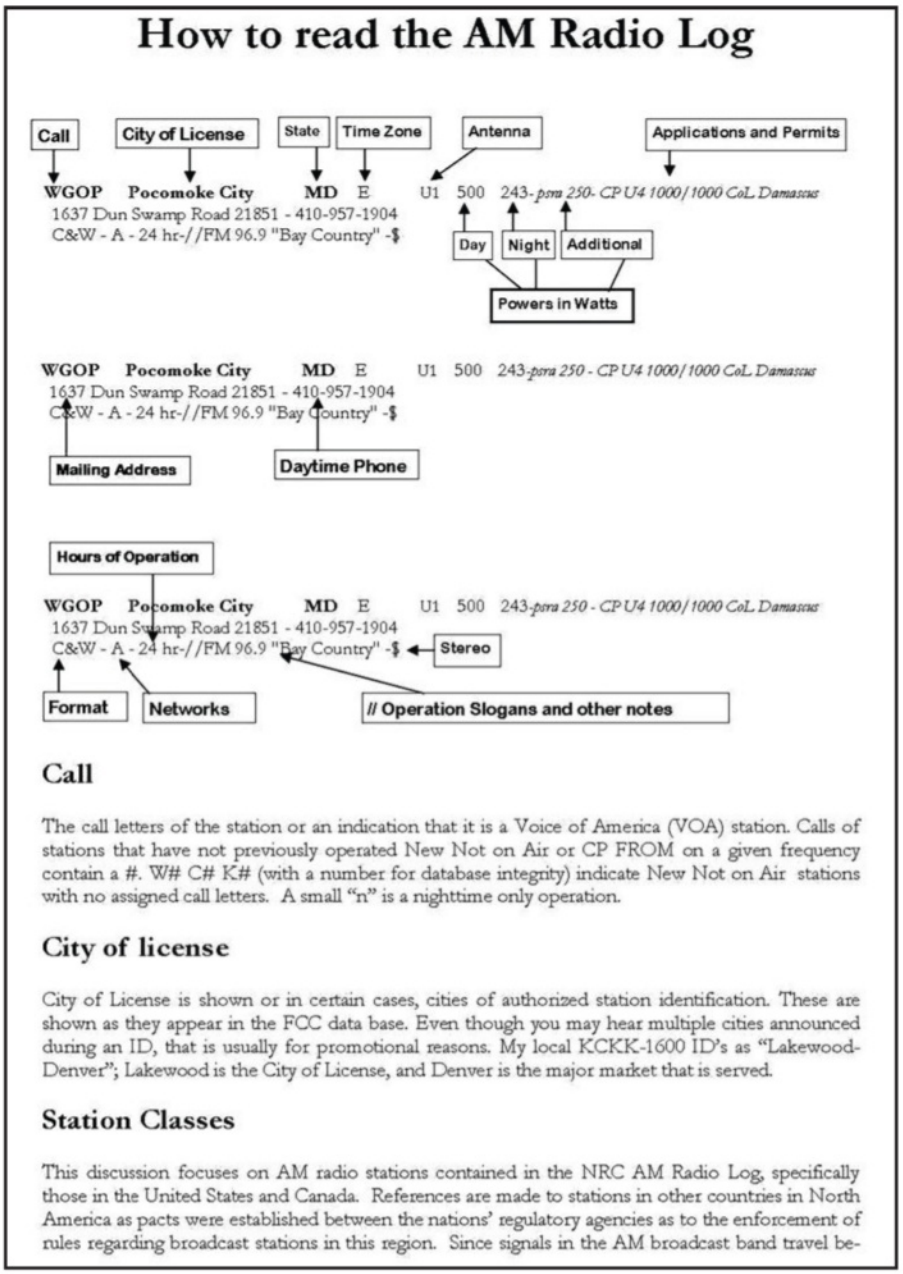
sign of Argentina, Paraguay, and Uruguay. That's OK though, as a trans-Atlantic DX overdose more than made up for it. Check out how we piled on 1071 kHz to hear India. I also enjoyed watching rookie Walt Salmaniw go after those Europirates in the x-band, while stations like "Bluebird" and "Dr. Einstein" provided entertainment between top of the hour RF spectrum captures.

Iran seemed to pop up everywhere, just as noted lately from home base, and the 60-degree Beverage attracted România Actualitati (at 56 degrees) and the U.K. (approximately 60 degrees) like bears to honey. However, there were no bears on this group, as we all collaborated to make this another exceptional DXpedition.

And yes, time does fly when you're having fun. The week flew by so fast that I hardly had enough time to get settled before it was already time to say goodbye.

'Listening Waters' Loggings

For a complete rundown of the DXpedition's loggings, visit: <http://www.CQPlusMediumWaves.blogspot..com>.



DXpedition Reference. *Here's the legend page of the National Radio Club AM Radio Log. The PEI team made sure to download pertinent information in case there was no Internet access at the Listening Waters site. (Internet screen grab <http://bit.ly/1geTc8M>)*

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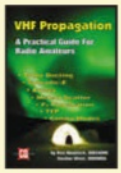

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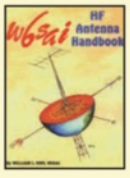

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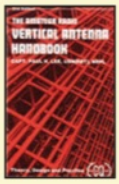

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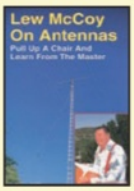

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BY CORY GB SICKLES, WPC2CS

Freeband: Intervention in a 'Love-Hate' Relationship

Now, stick with me. This setup is a bit long, but you'll soon see the necessity.

In February, we pause the bland, windy chill of winter to decorate with hearts, roses, and other signs of Valentine's Day. This increasingly commercial holiday is a boon for florists and chocolatiers, as well as restaurant owners.

Many a romantic proposal is executed on February 14, either in a public setting or a more private one.

As relationships move further along, though, we may find ourselves in something of a "love-hate" relationship with a *significant other* — a not-too-perfect mix of what we like and what we don't. Some call that "a typical marriage."

Well, this month I'm not thinking about a person — rather, *an activity*. It's one that I don't like, but have also found something about it to admire. It's much like consideration for Attila the Hun: If your village was one of those pillaged, you might find it difficult to admire his management style.

Outside the Lines

While Citizens Band operation beyond the designated channels has been around for some time, advances in technology have made the pursuit easier than ever.

*<wa3uvv@gmail.com>

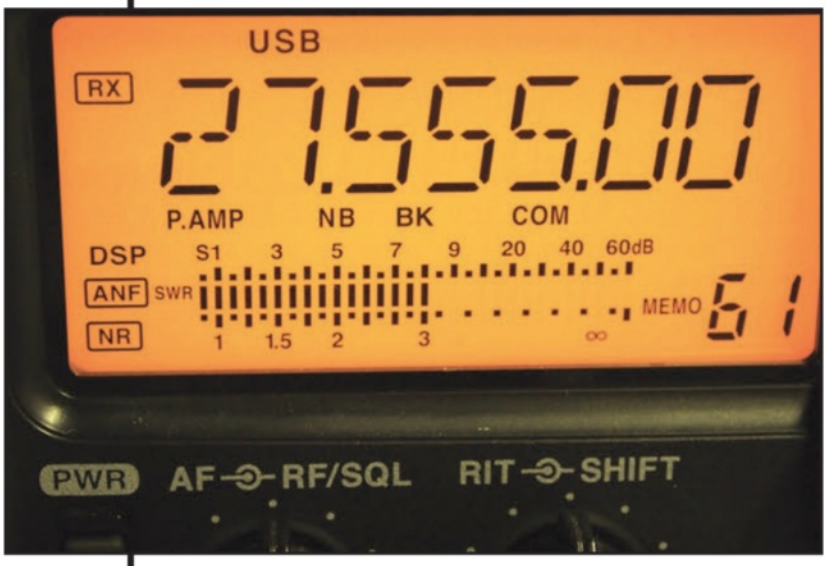

Photo A. *A popular Freeband meeting place — albeit illegal — is 27.555 MHz — not a frequency allocated for Citizen Band operation. (Courtesy of WPC2CS)*

Back in the days of the crystal-mixing-ways of generating 23 channels, some folks worked out ways to access channels 22A, 22B, 23A, and 23B — now known as 24, 25, 26, and 27, respectively, **Table 1**.

Still others, with 5- or 6-channel rigs that used a pair of crystals for each channel, occupied the radio control allocations of 3A, 7A, 11A, 15A, and 19A for communications that was a bit quieter and more secluded — while possibly sending the occasional radio-control (RC) model car to intermittently take off or shudder to a halt.

Still others found ways to incorporate variable frequency oscillator (VFO) technology — also known as a "slider" — to travel pretty much all over the 27-MHz region.

At the same time, others just re-configured amateur radio transceivers of the day to cover this unauthorized spectrum — with 100 to 500 watts of power; much more than allowed.

And With Its Own Name

The term identifying this clandestine slice of spectrum between CB channels is Freeband, occupied by Freebanders who are Freebanding.

All of this activity was — and remains — illegal. Thus, it was with a grimace and frown when I discovered a Freeband watering hole — 27.555 MHz, **Photo A**. This is apparently used by an international group of two-way communications enthusiasts as a calling channel.

That's much like CB Channel 11 was *supposed* to be:

- Make a call for a contact
- When someone answers, move to another channel to talk
- You leave the calling channel free when you move to another channel to chat

With '555, you place a call and let others know you're listening 10 kHz up, 20 kHz down or wherever is presumably clear.

All activity seems to be via SSB, leaving AM behind in these activities.

A Redeeming Value?

While I seriously frown on the whole idea of pirate operations on frequencies allocated to other services, I have to admit that in the case of '555, the channel runs in a relatively polite and professional manner — not unlike amateur radio. (***UNDERSCORE:*** *I'm not condoning this illegal activity. I'm merely marveling at its existence and*

dutifully reporting about it. ***VISUAL:*** *Right now, I'm flailing myself with wet rutabaga leaves just for drawing the Freeband-amateur radio comparison. – WPC2CS.)*

QSL cards are typically exchanged and my limited research shows there even seems to be a loosely run awards program for counties, states, provinces, countries worked, and so on.

As radio amateurs have used the Internet to enhance their interests with sites such as <http://www.QRZ.com>, so have the 11-meter Freebanders with <http://www.QRZ11.com>, **Photo B**. The 27.555-MHz Freeband crowd even has a Facebook page! Several, in fact! *(**VISIT:** For example, the 27.555-Mhz International Frequency DX page at <http://on.fb.me/1dwiJge>,* ***Photo C****. – WPC2CS.)*

A glance through some of the group members' pictures show impressive-looking stations.

27.555 Operators' Gear

What equipment are these Freebanders using? Most seem to have re-tasked amateur radio HF gear and more than a few amplifiers — many of which could produce more power than

Photo B. *The highly-organized Freeband community has a website modeled somewhat on the amateur radio community's QRZ.com. For Freebanders, it's the QRZ11 Forum at <http://www.QRZ11.com>) (Internet screen grab)*

Photo C. *Among several Facebook pages established by, and devoted to Freebanders is the 27.555-Mhz International Frequency DX page at <http://on.fb.me/1dwiJge>. (Internet screen grab)*

even amateurs are allowed. Others have more modest stations, based on "import" radios that allow for multiple blocks of 40 channels, which enable Freeband activities.

Such manufacturers and sellers in the United States skirt the law by marketing them as "10-meter" ham rigs. Trust me, hams aren't buying these, as they are too limited for our purposes and desires. Just cut the magic yellow, blue, or green wire inside (instructions, of course, on the Internet) and you are "good to go" with joining the Freebanders.

FCC Enforcement (?)

While I *do read* about cases where someone is investigated and fined by the Federal Communications Commission — *Huzzah!* — for excessive power and interference, I sadly don't see much, *if any,* in the way of stories about enforcement toward "out of band" activity. Occasionally, a company like ePower Amps will be fined for selling illegal amplifiers (a.k.a. CW transmitters), but I was seeing Facebook ads for its products months ahead of the crackdown. Who knows how many they sold before that? Plus, since the inventory was apparently not confiscated, who knows how they eventually may have "disposed" of the inventory? *(**IN DEPTH:** Read an FCC Citation and Order for "Illegal Marketing of Unauthorized Radio Frequency Devices" against ePower Amps at <http://bit.ly/1i9lxlp>. – WPC2CS.)*

I guess it's a matter of priorities. There's more illegal activity to go around than the Commission can address. Broadcasters and other business owners are easier targets — high profile, with serious bank accounts. If the harmonics of some poorly-made amplifier interfere with aviation or public service, then it becomes a higher priority. If not, it seems to be ignored.

Factor in all of the other countries and agencies involved and I imagine the task of enforcement and "putting the toothpaste back in the tube" becomes incredibly daunting. No doubt, that's what the Freebanders are counting on, too.

Simply Put ...

For me, *CB is CB* and *ham radio is ham radio.* I have all sorts of transceivers that could be modified and used for such clandestine activity and it would technically be easy to join the crowd on 27.555 (and 26.985) MHz.

But for more than 45 years, I've chosen to keep the two separate and enjoy each for what it is. *So have most of us.*

While I am duly impressed at the scale and sophistication that this activity has risen to, I have to ask why these folks don't just channel their energies — and money — into amateur radio?

An Invitation to Freebanders

If you are a Freebander and would like to "clean up your act" to experience a broader world of *legal* communications, I think the amateur radio community would welcome you. If the thrill of working outside of the law is the most important thing, then please stay where you are.

27-MHz Channels and Frequencies

Designators in this listing are:
** Class C Radio Control*
*** Original Designator*

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	26.965 MHz	19A*	27.195 MHz
2	26.975 MHz	20	27.205 MHz
3	26.985 MHz	21	27.215 MHz
3A*	26.995 MHz	22	27.225 MHz
4	27.005 MHz	23	27.255 MHz
5	27.015 MHz	24	27.235 MHz (22A)**
6	27.025 MHz	25	27.245 MHz (22B)**
7	27.035 MHz	26	27.265 MHz (23A)**
7A*	27.045 MHz	27	27.275 MHz (23B)**
8	27.055 MHz	28	27.285 MHz
9	27.065 MHz	29	27.295 MHz
10	27.075 MHz	30	27.305 MHz
11	27.085 MHz	31	27.315 MHz
11A*	27.095 MHz	32	27.325 MHz
12	27.105 MHz	33	27.335 MHz
13	27.115 MHz	34	27.345 MHz
14	27.125 MHz	35	27.355 MHz
15	27.135 MHz	36	27.365 MHz
15A*	27.145 MHz	37	27.375 MHz
16	27.155 MHz	38	27.385 MHz
17	27.165 MHz	39	27.395 MHz
18	27.175 MHz	40	27.405 MHz
19	27.185 MHz		

Table 1.

The Need for a Smoothed Solar Index — Accurate Propagation Predictions, Part II

BY CARL LUETZELSCHWAB, K9LA

In the first of this two-part series, I discussed why we need a smoothed solar index — to best characterize a solar cycle. This month's column addresses a second reason why we need a smoothed solar index — to achieve the best accuracy with propagation predictions. *(**NOTE:** See Part I on the CQ Plus Internet landing page at <http://www.CQPlusPracticalPropagation.blogspot.com>. – KI6SN)*

To analyze this accuracy issue, we'll focus on the *CQ World Wide SSB* contest, which took place at the end of October last year. By the way, the higher bands were excellent.

We'll use ionosonde data for the one-month period centered on October 26 and 27 — the weekend of the contest. We'll use the Boulder (Colorado) ionosonde from October 12 through November 10 at 1900 UTC as it had tabular data for both October and November 2013. **Figure 1** presents this data, along with the 10.7-cm solar flux for the same period.

There is a lot of information in **Figure 1**.

- The solid orange curve is the daily MUF (maximum useable frequency) over the Boulder ionosonde assuming it's the midpoint of a 3,000-km (1,864 miles) F_2 region hop. Note that it varied from a low of 29 MHz on October 12 to a high of 37 MHz on November 8. There were many ups and downs throughout the one-month period.
- The dotted orange curve is a linear trend line for the MUF and indicates that the MUF had an overall increasing trend during the period.
- The solid blue curve is the daily 10.7-cm solar flux. It started at a value of 128, dipped to a low of 125 on October 14 and 15, peaked at a high of 167 on October 27, decreased to around 140, and then increased at the end of the period.
- The dotted blue curve is a linear trend line for the 10.7-cm solar flux, and indicates that the 10.7-cm solar flux also had an overall increasing trend during the period.

We can draw two important conclusions from this data. The first is that the MUF and solar flux do not appear to be very well correlated on a daily basis. This is best seen from October 21 to October 30, when the solar flux reached its highest values but the MUF was up and down significantly. In fact, the highest solar flux on October 27 resulted in one of the lowest MUFs during the entire period.

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A better way to see the correlation between the daily solar flux and the daily MUF is through a scatter plot. Each daily solar flux value and daily MUF value is plotted and then a trend line is added to determine the correlation factor R-squared.

- An R-squared value of 1.00 means perfect correlation — all the data points would be on the trend line.
- An R-squared of 0.00 means no correlation — all the data points would be scattered widely about the trend line.

Figure 2 is the scatter plot for the data in **Figure 1**.

As expected, the extremely low value of R-squared (highlighted in red) tells us the correlation between the daily solar flux and the daily MUF is poor. For example, for a solar flux of 128, the MUF could have been 29 MHz or 34.5 MHz. In other words, a daily solar flux value does not map to a unique daily MUF.

The second conclusion is due to the fact that the solar flux and MUF trend lines are parallel, which tells us that solar flux and MUF follow a linear relationship. But this relationship is on a long-term basis — not on a daily basis. As can be seen, the higher the solar flux, the higher the MUF. This should not be new news. The fact that this does not apply on a daily basis may be new to you.

Why doesn't the daily MUF follow the daily solar flux? The reason is that although solar radiation certainly instigates the ionization process, ultimately the ionization at any given location is also

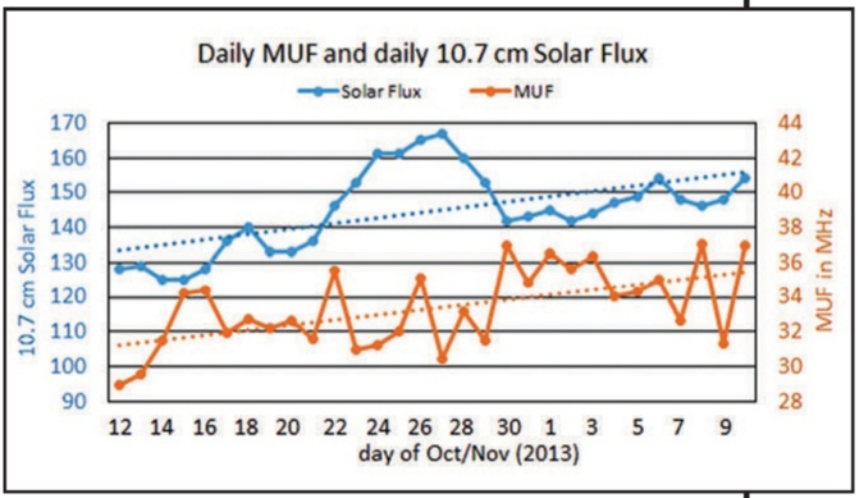


Figure 1. *Solar Flux and Boulder Data*

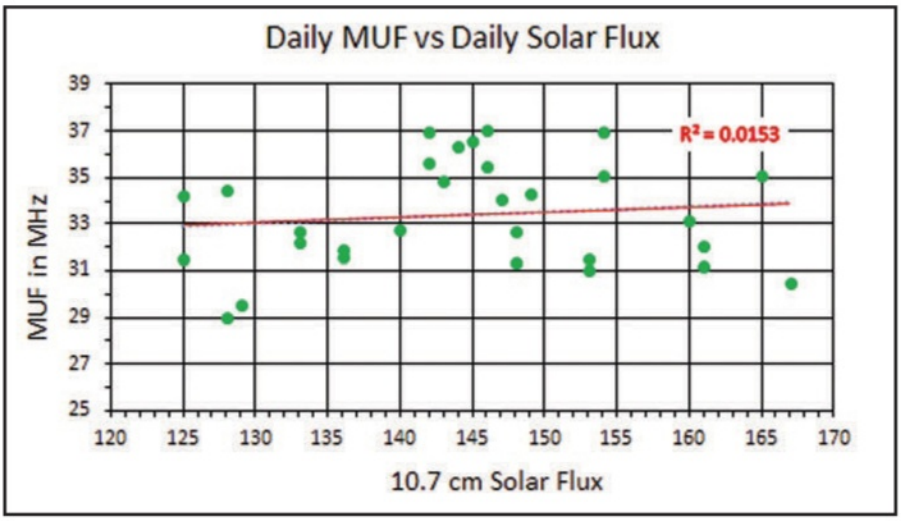


Figure 2. *Scatter Plot*

dependent on geomagnetic field activity and events in the lower atmosphere coupling up to the ionosphere.

*(**IN DEPTH:** See my August 2004 WorldRadio column titled "The Day-to-Day Variability of the Ionosphere" for more details on this issue. Visit <http://www.k9la.us>. Look under the General link. Included in the piece are scatter plots showing the poor correlation between the daily 10.7-cm solar flux and the daily MUF over the Millstone Hill (Massachusetts) ionosonde. – K9LA.)*

If the daily correlation is poor, how was a model of the ionosphere developed for propagation prediction purposes? When scientists discovered that the correlation was poor between daily values, they moved on to a longer-term correlation — which turned out to be between a smoothed solar index and monthly median parameters of the ionosphere. What this means is our model of the ionosphere is a monthly median model. This inherently says our propagation predictions are probabilities over a month's time frame.

To better understand the improved correlation with a smoothed solar index, let's look at some scatter plots that compare the daily correlation to the smoothed correlation. We'll do this for the Boulder ionosonde (but at a different date than the data in **Figure 1**) and the Canberra (Australia) ionosonde. **Figure 3** shows this data.

At both ionosondes, the daily solar flux versus daily MUF results in poor correlation. But the correlation between the smoothed solar flux and the monthly median MUF is extremely high.

What this means is a smoothed solar flux value maps much better to a unique monthly median MUF. This is what is needed for accurate propagation predictions, and is the second reason why we need a smoothed solar index.

Next month's column will review smoothed solar indices, monthly median ionospheric parameters and the interpretation of propagation predictions.

73, Carl, K9LA

NW7US February HF-VHF Outlook
For Tomas Hood, NW7US's SWL and VHF propagation outlook, visit <http://www.CQPlusPropagation.blogspot.com>.

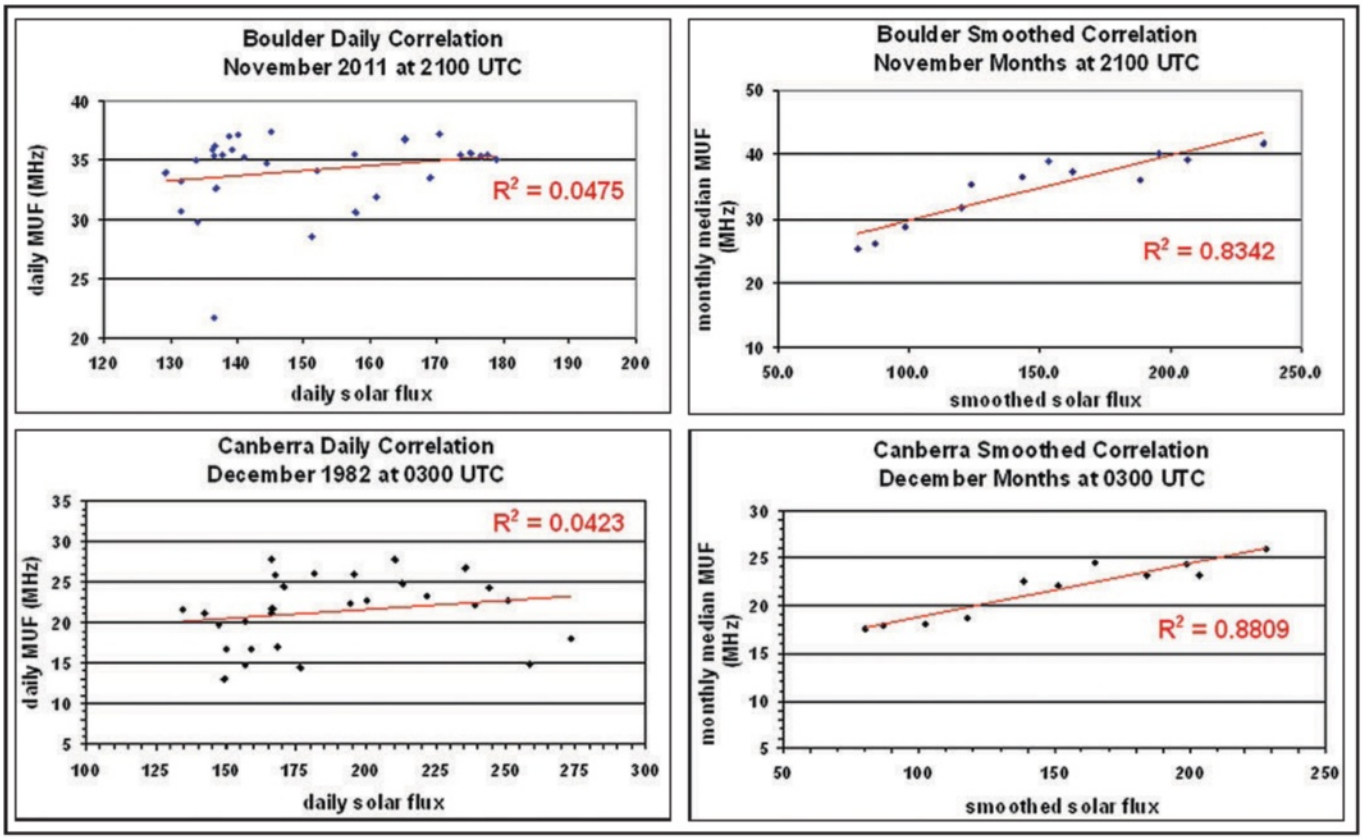


Figure 3. *Daily versus Smoothed Correlation*

Optimum Working Frequencies (MHz) - For February 2014 - Flux = 132, Created by NW7US

UTC TO/FROM US WEST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	24	22	17	14	13	13	12	12	11	11	11	11	11	11	18	22	24	25	26	26	27	26	26	25
NORTHERN SOUTH AMERICA	33	31	27	20	19	18	17	16	16	15	15	15	14	14	20	28	30	32	34	35	36	36	35	34
CENTRAL SOUTH AMERICA	33	30	26	19	18	17	16	16	15	15	15	14	14	14	23	29	31	32	33	34	35	35	35	34
SOUTHERN SOUTH AMERICA	35	33	30	26	22	20	19	18	17	16	16	15	15	15	14	26	30	32	33	34	35	36	36	36
WESTERN EUROPE	11	10	10	10	10	10	10	10	10	10	10	10	10	10	13	17	18	19	18	17	16	12	11	11
EASTERN EUROPE	10	10	10	10	10	9	9	10	10	10	10	10	10	10	10	12	12	12	11	11	10	10	10	10
EASTERN NORTH AMERICA	26	24	20	15	15	14	13	13	13	12	12	12	12	12	20	24	26	28	28	29	29	29	28	27
CENTRAL NORTH AMERICA	15	14	13	10	8	8	8	7	7	7	7	7	7	7	7	12	13	15	15	16	16	16	16	16
WESTERN NORTH AMERICA	8	8	7	6	4	4	4	4	4	4	3	3	3	3	3	4	6	7	8	8	8	8	8	8
SOUTHERN NORTH AMERICA	25	24	21	16	14	13	13	12	12	12	11	11	11	11	11	20	23	25	26	27	27	27	27	26
HAWAII	23	23	22	21	19	16	13	12	11	11	10	10	10	10	10	9	9	16	19	21	22	23	23	24
NORTHERN AFRICA	11	11	10	10	10	10	10	10	10	10	10	10	10	10	15	18	19	20	21	19	13	12	12	11
CENTRAL AFRICA	14	13	13	12	11	11	11	10	10	10	10	10	10	10	14	17	19	20	20	18	16	15	15	14
SOUTH AFRICA	24	22	17	14	14	13	13	12	12	12	12	12	12	11	20	23	25	26	27	27	27	27	26	26
MIDDLE EAST	10	10	10	10	10	11	11	10	10	10	10	10	10	10	10	15	17	18	13	12	12	11	11	11
JAPAN	22	22	21	21	19	17	12	12	11	11	11	10	10	10	10	10	10	10	10	10	10	17	20	21
CENTRAL ASIA	22	22	21	20	19	17	12	12	11	11	11	10	10	10	10	10	10	13	13	12	12	12	17	22
INDIA	17	17	17	16	13	11	11	10	10	10	10	10	10	10	9	9	10	10	10	9	9	11	14	16
THAILAND	21	21	21	20	18	16	12	12	11	11	11	10	10	10	10	10	10	14	14	14	13	13	13	12
AUSTRALIA	29	30	32	32	29	25	19	18	17	16	16	15	15	15	14	14	14	19	18	17	18	22	25	27
CHINA	19	21	20	19	18	15	12	12	11	11	10	10	10	10	10	10	10	10	10	10	10	10	10	16
SOUTH PACIFIC	33	34	34	32	29	23	21	19	18	17	17	16	15	15	15	15	18	18	18	22	25	28	30	32

UTC TO/FROM US MIDWEST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	26	23	19	18	17	16	15	14	14	13	13	13	12	19	24	27	29	30	31	31	31	30	30	28
NORTHERN SOUTH AMERICA	30	27	23	21	20	18	17	16	15	15	14	14	14	18	23	26	29	30	32	33	33	33	33	32
CENTRAL SOUTH AMERICA	31	28	23	21	20	19	18	17	16	16	15	15	15	24	27	29	31	32	33	34	35	35	35	34
SOUTHERN SOUTH AMERICA	34	32	27	25	23	21	20	19	18	17	16	16	15	16	26	28	30	32	33	34	35	36	36	36
WESTERN EUROPE	11	10	10	10	10	10	10	10	10	10	10	10	10	16	19	20	20	20	20	19	17	14	12	11
EASTERN EUROPE	10	10	10	10	10	10	10	10	10	10	10	10	10	14	16	16	16	16	15	14	11	11	10	10
EASTERN NORTH AMERICA	18	16	11	11	10	10	10	9	9	9	9	9	9	13	17	19	20	21	21	21	21	21	20	20
CENTRAL NORTH AMERICA	9	8	7	5	5	5	4	4	4	4	4	4	4	4	7	8	9	9	9	10	10	10	9	9
WESTERN NORTH AMERICA	15	14	13	10	9	8	8	8	7	7	7	7	7	7	7	12	14	15	16	16	16	16	16	16
SOUTHERN NORTH AMERICA	17	16	14	10	10	9	9	9	8	8	8	8	8	8	13	16	17	18	19	19	19	19	19	18
HAWAII	27	26	24	22	16	14	13	13	12	12	12	11	11	11	11	11	11	20	23	26	27	28	28	27
NORTHERN AFRICA	14	13	12	12	11	11	10	10	10	10	10	10	12	18	20	21	22	23	23	23	20	16	15	14
CENTRAL AFRICA	14	13	12	12	11	11	10	10	10	10	10	10	12	18	20	21	22	22	23	21	18	17	16	15
SOUTH AFRICA	24	19	18	17	16	16	15	15	15	14	14	14	19	27	31	33	34	35	35	35	34	32	29	26
MIDDLE EAST	10	10	10	10	10	10	10	10	10	10	10	10	10	16	19	20	21	19	16	13	12	11	11	11
JAPAN	21	21	19	17	13	12	11	11	11	10	10	10	10	10	10	10	10	10	10	10	10	16	19	21
CENTRAL ASIA	21	20	19	17	12	12	11	11	11	10	10	10	10	10	10	12	13	13	13	12	12	12	13	22
INDIA	13	15	14	12	11	11	11	10	10	10	10	10	10	10	14	17	16	14	11	11	10	10	10	10
THAILAND	20	19	18	15	12	11	11	11	10	10	10	10	10	10	10	14	16	15	14	14	13	13	13	12
AUSTRALIA	29	31	31	28	21	18	17	17	16	15	15	15	15	14	14	16	20	19	18	17	19	22	25	27
CHINA	18	19	18	15	12	11	11	11	10	10	10	10	10	10	10	11	11	10	10	10	10	10	10	14
SOUTH PACIFIC	34	34	32	28	22	21	19	18	17	17	16	16	15	15	15	20	19	18	20	24	27	29	31	33

UTC TO/FROM US EAST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	21	17	16	15	14	13	12	12	11	11	11	10	13	18	21	23	24	25	25	25	25	25	24	23
NORTHERN SOUTH AMERICA	27	25	22	20	19	17	16	15	14	14	13	13	14	19	22	25	26	28	29	29	30	30	29	28
CENTRAL SOUTH AMERICA	31	28	25	23	22	20	19	18	17	16	16	15	22	25	28	29	31	32	33	34	35	35	35	33
SOUTHERN SOUTH AMERICA	33	30	28	25	23	22	20	19	18	17	16	16	19	24	27	29	31	32	33	34	35	36	36	35
WESTERN EUROPE	11	10	10	10	10	9	9	9	9	9	9	14	18	19	21	21	21	20	20	19	17	15	11	11
EASTERN EUROPE	10	10	10	10	10	10	10	10	10	10	10	12	17	19	19	19	19	18	17	16	13	11	11	11
EASTERN NORTH AMERICA	8	6	5	5	5	5	4	4	4	4	4	4	5	8	9	10	10	10	10	10	10	10	10	9
CENTRAL NORTH AMERICA	19	17	12	11	11	10	10	10	10	9	9	9	9	14	18	20	21	22	22	23	22	22	21	21
WESTERN NORTH AMERICA	26	24	20	15	15	14	14	13	13	13	12	12	12	12	21	24	26	28	29	29	29	29	29	28
SOUTHERN NORTH AMERICA	21	18	14	13	12	12	11	11	10	10	10	10	10	15	19	21	23	24	24	24	24	24	23	22
HAWAII	27	25	21	16	15	14	14	13	13	13	12	12	12	12	13	13	12	22	26	28	30	30	29	28
NORTHERN AFRICA	14	13	13	13	12	12	12	12	12	12	12	21	24	27	28	29	29	29	27	25	21	16	15	14
CENTRAL AFRICA	15	15	14	13	13	13	12	12	12	12	12	21	25	27	28	29	30	29	27	23	20	18	17	16
SOUTH AFRICA	23	22	20	19	18	17	16	16	15	15	15	23	29	32	34	35	35	35	35	35	34	32	29	27
MIDDLE EAST	13	12	11	11	11	10	10	10	10	10	10	16	19	21	22	23	23	24	22	16	15	14	14	13
JAPAN	19	17	13	12	11	11	11	10	10	10	10	10	10	11	11	10	10	10	10	10	10	14	18	20
CENTRAL ASIA	18	16	12	12	11	11	11	10	10	10	10	10	10	15	14	14	13	13	13	12	12	12	12	20
INDIA	10	10	10	10	10	10	10	10	10	10	10	10	14	18	18	17	17	16	15	12	11	11	10	10
THAILAND	15	12	12	11	11	11	10	10	10	10	10	10	12	17	18	17	16	15	14	14	13	13	13	12
AUSTRALIA	30	30	25	19	18	17	17	16	15	15	15	15	14	14	23	21	20	19	18	17	19	23	26	28
CHINA	16	13	12	11	11	11	10	10	10	10	10	10	10	12	12	11	11	10	10	10	10	10	10	10
SOUTH PACIFIC	34	31	27	24	22	20	19	18	17	17	16	15	15	16	21	20	18	18	23	26	29	31	33	34

On an Electromagnetic Wing and a Snowy Winter Evening's Prayer

BY SHANNON HUNIWELL, WPC2HUN

Metaphorically, AM skywave signals are a bit like little joys in life. They're capriciously fleeting, though sometimes manage to have the power for appearing in the most unpredictable places. If they're long enough to be recognized by name, such a definitive callsign identified greeting almost always brings its recipient cheer.

My father has a favorite winter DX story that exemplifies this radio reception/life comparison. Dad made me a bit suspicious by prefacing the following tale with an uncharacteristic admission that he can't recall who told it to him, exactly where it occurred, or to what station the saga relates. After tightly closing his eyes and rubbing his temples, he was able to guesstimate that the story's listener was navigating some treacherously ice-covered road in northern Michigan and inadvertently snagged a 250 watter "approximately in West Virginia." Even so, he is willing to swear that "the episode took place just before midnight on a snowy winter night ... probably in the early 1970s."

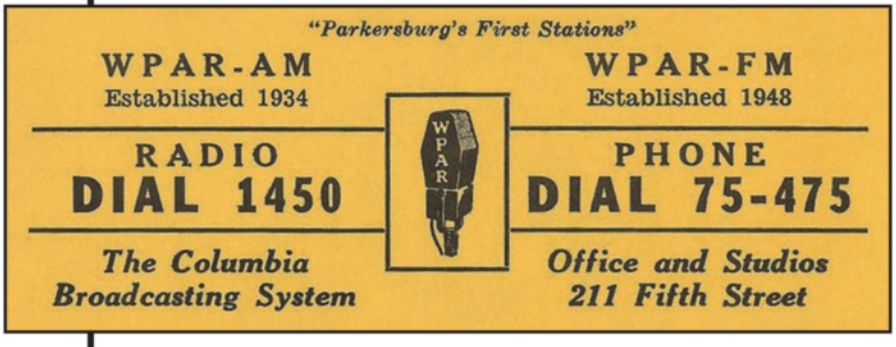
Dad, Are You Sort Of Reasonably Sure That This One Is At Least *Semi-Authentic?*

According to Huniwell legend, the driver of a 1963 Studebaker Champ pickup truck — how my father remembers that automotive detail above broadcast facts, always made me wonder, but anyway — this fellow had promised his elderly mother that he would come home for a visit sometime during the holidays. The old homestead was located near the top of the Upper Michigan Peninsula, a bit of a hike from the busy little St. Louis-area tool and die manufacturing shop where he served as manager. Crunch work had required him to oversee several priority projects that left him and a couple of loyal employees occupied all but part of Thanksgiving and Christmas day. Happily, their tenacity enabled the company to meet its customers' robust orders, and the firm's delighted owner rewarded his staff with a week of vacation starting on December 31st of whatever year Dad couldn't envision. The Studebaker driver — we'll call him, Joe — packed a few clothes, boxed a sample of the parts that had kept him so tied up, tossed the stuff on the front seat of the truck, and headed north to surprise his mom. Conveniently, the Studebaker was allegedly equipped with a "pretty darn good AM radio," an electronic feature that the fellow used as a constant roadway companion throughout the journey's many miles and hours.

My poetic license will have to kick-in here, as I conjecture that when the traveler encountered the icy highway somewhere around Routes 131 and 66 in Kalkaska County, Michigan. Local radio reception way up there and near the witching hour was probably none too great. Arguably, Joe was likely dialing big city skip or maybe a thread of 50-kilowatt ground wave from Chicago or Detroit.

Whatever was tickling the tuner, though, left suddenly when the Studebaker hit a patch of black ice that sent it spinning across the opposite lane. This rotation rapidly propelled Joe's luggage from the seat to the dashboard. A corner of the box in which the sample parts were packaged catapulted against the radio's tuning buttons before dumping its contents onto the passenger floor. Its crescendo coincided with the lengthy blast of an 18-wheeler's air horn from an oncoming tanker that had seemingly come out of the snowy nowhere. Joe braced himself for the impact and flash, but it never came. Instead, he found himself shaken-up and tightly gripping the wheel of his Studebaker, a trusty truck that was still very much intact, though, about a dozen feet off of the road and pointing south. Its engine had stalled, but when Joe regained his composure, he became conscious of a strong signal pouring through the radio.

e-mail: <Melodyfm@yahoo.com>



It's any reader's guess which West Virginia AM was fortuitously snagged by our first story's main character, Joe, while hundreds of miles away from "The Mountain State." Because my father, Sid Huniwell, was reticent about recalling the subject station's identity, I always suspected it might actually have been 50,000-watt country music giant WWVA 1170. "Absolutely not that flamethrower!" Dad would protest. "Besides," he claimed, "Joe's catch was definitely some tiny West Virginia outlet on a local channel." As such a broadcast facility arguably occupied some Class IV, "graveyard," or local channel, it might have been Parkersburg, WPAR 1450 — noted on this advertising card. Then again, 1240 WDNE, Elkins; WMON 1340, Montgomery, WV; or maybe Bluefield's WKOY 1240 could have been among the mighty little 250-watt signals that skipped to the tale's upper Michigan reception point.

In a decided drawl, the bucolic announcer was wishing whomever "might be listening" a happy New Year. The DJ hoped that the occasion would provide folks in his typically tiny audience opportunity for "visiting and cheer." And then the radio host introspectively mused about having lost his wife during the previous winter and that his daughter lived in California and they hadn't seen each other since the funeral. "But don't mind me," he said, "I should be glad that the Good Lord saw fit to let me stay at the microphone for another New Year's Day." With that, the announcer noted it was officially midnight, invited listeners back at 6 a.m., when he would be filling in for the regular morning DJ, and then read the sign-off copy.

Joe was incredibly surprised to hear that the station hailed from a little town in West Virginia and used only a quarter kilowatt after sunset. These facts prompted him to wonder what the announcer there might think if he were to know that Joe had received the fellow's heartfelt New Year's Eve message in a shallow ditch aside a slippery Michigan highway. Joe switched on his truck's dome light, fished a pencil from the glove compartment, and jotted the station's call letters and city of license on the cardboard box he'd retrieved from the floor. He hadn't even finished the fourth letter when the scratchy, wowing LP track of Auld Lang Syne, on a warped Guy Lombardo record that the old announcer had selected as his swan song, evaporated into the ether.

When one thinks of vintage pickups, the long-defunct Studebaker marque seldom comes to mind. While it is doubtful that the formally-dressed admirers in this 1960 ad realistically represent eager truck buyers, the pictured vehicle did attract enough attention from those wanting to show Ford and Chevy owners that some folks didn't care about following the commonplace crowd. Whether Joe's edition of the Champ was equipped with six or eight cylinders is unknown, though his did sport an optional AM push-button radio.

Mail Call!

This story's epilogue simply includes that Joe offered a thankful prayer to God for having spared him, for the Studebaker getting right back on the road, and then making it to his mother's house a couple of hours later, as well a note he penned to *The DJ On Duty New Year's Eve*, in care of the station's calls and locale.

Nearly a year later, a reply arrived. At first, Joe wondered why he was getting correspondence from a radio station in West Virginia, but the message inside quickly jogged his memory and warmed his heart. Again, I'm using poetic license here, although Sid Huniwell, my radio nut father who first told me this saga, claims it's "spot on and nearly word-for-word" what was written on Joe's correspondence:

Greetings from West Virginia,

First off, I want to officially confirm that you did, indeed, hear our signal all the way up in Michigan last December 31st! That's quite a haul for 250 watts part way across this great country. Our contract engineer thinks it is the farthest reception report we ever got and figures that conditions were just right for the skywave skip, especially since there are probably 30 stations between here and there on our local or Class IV frequency. So, it's a feat for us, too! Any DX'er (or long-distance radio listening buff) would be proud to post verification of such a catch in his radio shack (or on his pick-up truck dashboard, as the case may be)!

What I most want to tell you, however, is that your note made our old Bill Shumaker smile. He was the fellow you

My radio buff father emailed me this eBay seller's image of an early 1960s Studebaker radio. He wanted me to be sure to note the tiny CONELRAD Civil Defense triangle symbols at 640 and 1240 kilocycles. I was most interested, however, in the AM set's five plastic push buttons like the one that got rammed with flying cargo and ended up tuning some very good DX.

heard last New Year's Eve. Word of your long-distance reception even made a mention of a few lines in our local weekly newspaper. I know Bill sure appreciated your kind note about how he cheered you up after your near crash. Old Bill showed your letter to everybody at the station and then some. He wasn't much for writing so had asked me to send you a verification and thanks. I admit he asked me three or four times and always I just said "Don't worry, I'll get to it." Bill passed on this past October and I hate to say I'm just getting around to sending this letter. Anyway, I don't think it was any coincidence that you heard him that night. I guess you could say that it really put a nice cap on his radio career in this town and re-started Bill's once famous smile. What the Good Lord can do with a humble 250 watts when he wants to reach somebody's heart!

Sincerely,
Jim Pierce, Program Director

A Smudged Postmark And No Return Address

If you've ever misplaced a letter, only to find it years later, you'll understand my joyful squeal when flipping open a long dormant *Broadcasting Yearbook* and happening upon something just right for this month's second small AM radio station epoch. Inside the plain business-size envelope clumsily stamped with what sort of looks like the "Z" of an Arizona postmark, was a single sheet article from the September 1997 *Guideposts* magazine. The piece, titled "*My Computer Prayer*" by Lois Lonnquist of Helena, Montana, had little to do with keyboards, monitors, and hard drives. Rather, it focused on a previously defunct standard broadcast facility that the author and her husband had just returned to the airwaves surrounding Great Falls, Montana.

Reportedly, during the winter of 1987, Mrs. Lonnquist's husband, Del, was growing restless after selling their two Midwestern radio outlets and attempting to be retired. Like many authentic local radio guys, he quickly missed what he knew best — hometown station ownership/operation. That led to perusing media brokers' prospectuses and eyeing that Class IV, single-kilowatt Great Falls station that had gone off the air and was down for the FCC count of *12 months dark and get deleted*. Mrs. Lonnquist wasn't convinced that this AM should figure into their plans, but, as she recalls, "We had 25 years of experience in radio. So, Del and I prayed for guidance, put our home up for sale, and made our move." Once in Great Falls, though, she wasn't particularly impressed with their new investment, writing, "We found a weathered one-story building surrounded by knee-deep prairie grass, and a chilly wind whistled through the silent station's 240-foot tower greatly in need of paint." As any radio man might imagine, husband Del didn't see things so gloomily. "We're going to love it here," he exclaimed to his skeptical spouse. Del Lonnquist then used some of that enthusiasm and a hammer to "pry-off some boards from a porch window [through which they] climbed for their first glimpse of the sad AM's dusty microphones and turntables." It took the couple nearly a month to rig-up the gear for re-introduction into the rest of their revitalization project carrying the call letters, KXGF.

Mailed to a hardware store on July 2, 1954, this business envelope from 560 KMON survives as one of the few pieces of early Eisenhower-era Great Falls radio memorabilia floating around on the Web. It is likely to have contained an invoice seeking payment for advertising on the 5-kilowatt outlet then owned by the Montana Farmer-Stockman *agricultural publication. The original KMON construction permit was issued in 1946 to Sun River Broadcasting Company for a 5,000-watt AM on 970 kilocycles, and construction of the station began early the next year. It quickly signed with ABC for network affiliation.*
Jan Lowry's research showed that before KMON 970 was ever completed, however, its "permit was sold by Sun River Broadcasting to the Montana Farmer Broadcasting Corporation. That firm then turned in its own permit for partially-built KMFR 560 in Great Falls. The KMON permit was modified by the FCC from 970 to the more favorable 560 kilocycle dial position ... with three, 440-foot-tall, guyed towers situated five miles south of the city and overlooking the Missouri River." Logically, a reason for this amalgamation of uncompleted CPs was to eliminate some potentially stiff competition in a relatively small media market.

The Lonnquist's — including a son, Roger, who served as engineer — decided that a primarily satellite-delivered big band/nostalgia music focus and local information would play well in Great Falls, so instituted that brand of mature programming. "Listeners loved the format," Lois noted, "but many advertisers were wary and waited for us to prove ourselves."

This lack of anticipated ad revenue got exacerbated by "payments from the

buyers of their Midwestern stations that were slow in coming." The couple essentially lived at KXGF 24/7 in order to run it parsimoniously. Several months into this seemingly unending marathon, she sat at her modest station's business office computer and typed a letter to God. The missive concluded with the urgent question, "How long can we go on?" Mostly, she wondered why they had felt directed to put KXGF back together. These queries got followed by a strong depression onto the question mark key that accented Lois' quandary with a monitor filled with: ??????????

The Fan Letter Made In Heaven

Lois Lonnquist's mood wasn't much brighter the next morning as she negotiated a stack of mail predominantly comprised of bills and too few checks from advertisers. The last envelope in that pile, however, contained a simple note from an elderly man who wanted the folks at KXGF to know that he and his wife were instant fans of the reborn station.

"We've been so happy to hear its old familiar tunes." The next paragraph told of his wife's recent illness and how KXGF kept them both in pleasant company, especially when his wife was awake in the wee hours battling pain. "Your music soothed her," he thanked the "dear friends at KXGF. And then early this morning, your announcer played *I'll Be Seeing You*, our favorite song. My wife looked at me and smiled," the listener recounted before closing with, "A short time later, she passed away."

Suddenly, Lois Lonnquist was filled with renewed appreciation for her radio station's ability to reach people and make a positive difference in their lives, even if only for a little while. She felt that the reminder had been an answer to a prayer. By the end of the year, a group approached the Lonnquist's with a respectable offer for KXGF, and the family accepted it. The *Guideposts* piece ends with Lois indicating that she and her husband later found a couple more stations to buy. Out of all of those radio projects, though, she smiles, "KXGF is our favorite."

A Hobson's Choice Of Hertzian Waves

For at least a couple of decades, even the most fickle Great Falls area radio listener would have to admit that the process of picking his or her best-loved local station was a no brainer. That's because — with the fleeting early '20s exception of KDYS, a 50-watt experiment of the *Great Falls Tribune* newspaper — from 1922 until after World War II, radio fans in the Montana city of about 50,000 had but one hometown audio voice, KFBB (now KEIN 1310 5-kilowatts day/1-kilowatt night). Great Falls broadcast buffs anticipated a treat, however, when learning of the extreme aural expansion planned for their community circa 1947-48.

During that brief period, the *Broadcasting Yearbook* not only noted KFBB, but four full time AM construction permits, each with all of the serious promise of call letters and imminent on-air target dates: KMFR (560 kilocycles, 5 kilowatts), KMON (790 kilocycles, 5 kilowatts), KGFM (1150 kilocycles, 5 kilowatts), and KXLK (1400 kilocycles, 250 watts).

As things shook down and the prospective station owners reconsidered their likely return on investment, two of the 5-kilowatt permit holders merged — resulting in KMFR on 560 kilohertz — and the 790 CP never actually materializing. Nor did KGFM go beyond paper. At just a quarter kilowatt and a 150-foot rooftop tower, the smallest of the post-war lot, KXLK, beat these others to be KFBB's first real competitor. Officially, KXLK was FCC-autho-

Had this linen postcard of the Park Hotel been published about 10 years after its supposed late 1930s rendering, the picture would have included signage denoting tenant KXLK, predecessor to KXGF, the modest AM survivor in our story. No doubt, too, there's be pictorial evidence of a bit of the Great Falls station's tower pointing north from the five story venue's roof.

rized in late June 1946 as KSTR. But by its March 1947 debut, the little AM was called KXLK to reflect the "XL" family of sister Montana radio outlets, KXLF Butte, KXLJ Helena, KXLL Missoula, KXLO Lewiston, and KXLQ Bozeman.

The Park Hotel at the corner of Great Fall's Central Avenue and Park Drive served as KXLK's first home. Jan Lowry's research details that the establishment not only housed the station's studio and business offices, but also contained its transmitter (in the basement) and antenna on the roof. Not much out of the ordinary shows up on KXLK's history until a 1958 sale and callsign change in 1960 to KARR. Nearly coinciding with this new identity were an early 1961 daytime power increase to a kilowatt, as well as a new Great Falls studio/transmitter venue at 1900 Third Street, N.W. Jan cites an "upbeat Middle-of-the-Road music format on KARR from 5:30 a.m. until 2 a.m. daily" circa 1971, plus a litany of ownership transfers in 1973, 1977, 1982, 1986 (when soon thereafter, it apparently went dark), 1987, 1989, 1995, and 2006. Jan also notes a 1989 studio shift to 1300 Central Avenue, West. Along the way, KARR became KYOT (in summer 1984), and then KXGF during 1987. In addition to the longtime M-O-R offering, 1400 kilohertz in Great Falls once featured a religious format, "Hit Album Rock Music," C&W tunes, big bands/standards, hot adult contemporary, and sports talk programming KXGF uses its 680 watts (mandated in a 2000 tower move to a new Fox Road site just south of Great Falls) in order to broadcast today.

That Small Station In The Little *Guideposts* Magazine

Though not mentioned specifically in Jan's FCC-mined data, it appears that the Lonnquist's contribution to the resilient 1400 kilohertz Montana survivor was their 1987 re-casting it as KXGF after believing the station to have worth beyond its modest power. While they didn't keep the station very long, the radio family succeeded in resurrecting KXGF's signal so that it could bring a bit of joy to whomever needed the friendship available within the reach of its fleeting radio waves.

And so ends another broadcast day from the Radio Drama studios.

unwired

BY RICHARD FISHER, KPC6PC

The Weirder Side of Wireless, and Beyond

Au Naturel: 'No Antenna? Noisy Location? No Problem!

OK, imagine you're in the most remote, radio-quiet spot on the planet and want to hear what the rest of us city slickers can't. Put on your *"I'm Gloating"* hat and link to <http://www.ab9il.net/vlf>, "Natural Radio VLF Listening Via the Internet" where you can bask in some of the best RF that's ever bombarded Earth.

*(**HOUSEHOLD HINT:** Why invest in a "white noise" generator when you've got this? Crank it up and go zzzzzzzzzzzzzzzzzz ... – KPC6PC.)*

FCC: 'We Can Hear You Now'

What price ambience? It could ring up to more than $100K for Perfect Cuts Salon in San Antonio, Texas.

It seems the Federal Communications Commission does not like the cut of Ronald Bethany's lights, which it alleges have been putting out a signal on 705 MHz. Did we mention that's the frequency used for AT&T's 4G services? Did we mention its cell site *is right next door?*

AT&T tipped off the FCC which not-so-subtly warned it might take a little off the top of Perfect Cuts.

"If, after receipt of this citation Mr. Bethany again violates Section 15.5(b) of the Rules by engaging in conduct of the type described herein, the Commission may impose monetary forfeitures not to exceed $16,000 for each such violation or each day of a continuing violation, and up to $112,500 for any single act or failure to act."

There hasn't been a battle involving hair this fierce since the Beatles invasion of 1964.

(***READ:** The FCC citation at <http://bit.ly/1cxRlbP>. – KPC6PC.)*

Drawing a Blanc: 'You Bend It, We Mend It'

Bugs Bunny, Daffy Duck, Porky Pig, Tweety Bird, Sylvester the Cat, Yosemite Sam, Foghorn Leghorn, Marvin the Martian, Pepé Le Pew, Speedy Gonzales, Wile E. Coyote, the Tasmanian Devil, and lots of other characters from Looney Tunes and Merrie Melodies popped up on Los Angeles-area Citizens Band when Mel Blanc was on the air.

But that wasn't the only radio "show" in which he starred. For a year beginning in 1946, "The Mel Blanc Show" featured "the man of 1,000 voices" as the hapless owner of "Mel's Fix-It Shop."

Listen to 42 knee-slapping episodes free online at <http://bit.ly/16YKwgW>.

***SILICON VALLEY ADJACENT.** It doesn't take long on a walking tour of San Francisco to realize that while you might not be in Silicon Valley, you're awfully close. The **Kilowatt** is a sports bar on 16th Street, **The Fusion Hotel** towers above Ellis Street, and get an Earth-shaped pizza at **The Orbit Room Café** on Market Street. Radio, physics, and space travel all in one marquee-friendly stroll. Keep your head up and your cellphone camera ready! (Courtesy of KPC6PC)*

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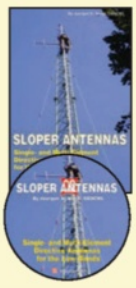

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18 Foot *Portable* Telescoping Antenna

Only 28 inches collapsed . . . Covers 40-6 Meters -- No gaps!

MFJ-2286
$99.95

The MFJ BigStick™ antenna is for the on-the-go Ham who is hungry for the next great QSO anywhere or anytime!

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For top portable performance, carry a *Big Stick* for the loudest, strongest on-the-go signal on the band!

MFJ's extra long 17 foot stainless-steel telescoping whip gives you *full-size antenna* for full size performance 20 to 6 Meters but collapses to just 28 inches.

An ultra low loss, high-Q adjustable *air-wound* loading coil gives you highly efficient operation 30 and 40 Meters.

This extra long radiator and ultra low loss loading coil is a winning combination that stands head and shoulders above shorter backpack antennas.

True Backpack Portability

Antenna is over 18 feet long fully extended, but disassembles and collapses to 28 inches in seconds. Fits into most backpacks or suitcases! And at just over 2 pounds you'll hardly know you are packing it!

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Tapped loading coil covers 7.0-55.0 MHz without gaps. Great for Ham Bands and outstanding for image-free shortwave broadcast!

Everything you need

Everything is included for instant operation. Pipe/Mast mount quickly and easily mounts to any pipe or mast up to 1/2 inch. SO-239 for coax. 3/8-24 antenna connector.

Counterpoise kit included: Ensures low SWR, high efficiency.

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All aluminum, stainless steel construction ensures years of excellent performance. *One Killowatt rated* components guarantee electrical safety.

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MFJ-1622 universal mount/clamp lets you attach it to window frames, balconies and railings. Works great indoors mounted to table/bookshelf. It's not a 5-element yagi, but you'll work your share of exciting DX! Highly efficient air wound *"bug catcher"* coil, telescoping 4½ foot radiator. Collapses to 2½ feet for easy storage and carrying. Includes coax, choke balun, counterpoise wire, safety rope. Operating frequency adjusted by moving "wander lead" on coil and adjusting the counterpoise for best SWR. ***Optional DX-Getter,*** MFJ-1977, $44.95. Stainless-steel 12-ft whip, 26 inches collapsed.

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MFJ-1919EX, $139.95.

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QuickClamps™ easily collapses mast to 5 feet. Mast has thick 1/8 inch wall, .75 inch diameter top, 1.5 inch bottom. 15 lbs.

All tripods are black heavy-duty steel with braced triangle base, non-skid feet and mast lock.

MFJ-1918EX, $89.95. MFJ-1918 *tripod with super strong 9.5 foot telescoping fiberglass mast.* Collapses to 3.8 feet. *QuickClamps™*. Mast has thick 1/8" wall, ¾ inch top, 1 inch bottom. Weighs 6.5 lbs.

Tripods Only

MFJ-1919, $89.95, *Large tripod.* Supports 100 lb. antenna. Built-in 1.4 inch diameter mast extends 7.8 feet. Collapses to 4.5Hx.5D feet. Triangle base spreads to 4.8 feet on a side. Weighs 9.75 lbs.

MFJ-1918, $49.95, *Smaller tripod.* Supports 66 lbs. 1 inch diameter mast extends 6 foot. Collapses to 3.2Hx.3D feet. Triangle base spreads to 2.75 feet. Weighs 6.75 lbs.

17 foot *Stainless Steel* Telescoping Whip

MFJ-1979, $59.95. Super-strong, super long *17 foot stainless steel* telescoping whip. 27 in. collapsed. 10 sections. 3/8-24 threaded base. **MFJ-1977, $44.95**/12ft;**MFJ-1796, $39.95**/10ft **MFJ-1974, $34.95**/8ft;**MFJ-1972,** $14.95/4½ft

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