SPECIAL PUBLIC SERVICE/EMERGENCY PREPAREDNESS ISSUE

QST

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September 2012 WWW.ARRL.ORG

Preparing for the Unexpected

QST reviews:

Inside:

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Official Journal of ARRL The national association for AMATEUR RADIO®

SEPTEMBER 2012 QST Vol 96 No 9

The radio... YAESU

HF/50 MHz 100 W Transceiver

FT DX 3000

New Crystal Roofing Filters provide ultimate weak signal receiver performance in crowded, strong signal environments

The amazing Crystal Roofing Filter performance

The Down conversion 9 MHz 1st IF frequency receiver construction, can realize narrow 300 Hz (optional), 600 Hz and 3 kHz bandwidth roofing filters.

Outstanding receiver performance, the heritage of the FT DX 5000!

The high dynamic range IP3 performance that was realized and proven in the FTDX5000.

IF DSP provides effective and optimized QRM rejection

Independent Frequency display

The newly developed LCD has a wider viewing angle and higher contrast.

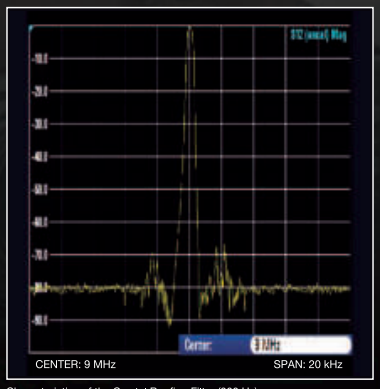
4.3-inch Large and wide color LCD display with high resolution

High Speed Spectrum Scope built-in

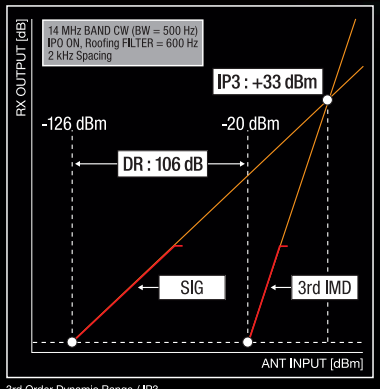
AF SCOPE display and RTTY/PSK encoder/decoder (optional)

Other features

The specialized Receiver amplifier for 50 MHz is built in / Three antenna connectors are provided / The “ANT-3” terminal may be assigned to “RX-only” / Signal output for an external receiver and the 9 MHz IF output are furnished / High speed Automatic antenna tuner built in / Optional μ-tune unit available / USB interface equipped



Characteristics of the Crystal Roofing Filter (300 Hz)



3rd Order Dynamic Range / IP3

YAESU
The radio

YAESU USA
6125 Phyllis Drive, Cypress, CA 90630 (714) 827-7600

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http://www.yaesu.com

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

The FTDX3000 has not been approved by the FCC. This product may not be sold or leased, or offered for sale or lease until FCC approval has been obtained.

NEW COMPACT HF TRANSCEIVER WITH IF DSP

A superb, compact HF/50 MHz radio with state-of-the-art IF DSP technology, configured to provide YAESU World-Class Performance in an easy to operate package.
New licensees, casual operators, DX chasers, contesters, portable/field enthusiasts, and emergency service providers- YAESU FT-450D...This Radio is for YOU!

Compact size: 9" X 3.3" X 8.8" and Light weight: 7.9 lb

HF/50 MHz 100 W All Mode Transceiver

FT-450D

With Built-in Automatic Antenna Tuner

NEW **Illuminated Key buttons**

NEW **300 Hz/500 Hz/2.4 kHz CW IF Filters**

NEW **Foot stand**

NEW **Classically Designed Main Dial and Knobs**

NEW **Dynamic Microphone MH-31A8J Included**

■ **Large informative Front Panel Display, convenient Control knobs and Switches**
■ **The IF DSP guarantees quiet and enjoyable high performance HF/50 MHz operation**

Handy Front Panel Control of Important Features including:

- **CONTOUR Control Operation**
  The Contour filtering system provides a gentle shaping of the filter passband.
- **Manual NOTCH**
  Highly-effective system that can remove an interfering beat tone/signal.
- **Digital Noise Reduction (DNR)**
  Dramatically reduces random noise found on the HF and 50 MHz bands.
- **IF WIDTH**
  The DSP IF WIDTH tuning system provides selectable IF passband width to fight QRM.
  SSB - 1.8/2.4/3.0 kHz, CW - 300 Hz/500 Hz/2.4 kHz
- **Digital Microphone Equalizer**
  Custom set your rig to match your voice characteristics for maximum power and punch on the band.
- **Fast IF SHIFT Control**
  Vary the IF SHIFT higher or lower for effective interference reduction / elimination.

■ **The rugged FT-450D aluminum die-cast chassis, with its quiet, thermostatically controlled cooling fan provides a solid foundation for the power amplifier during long hours of field or home contesting use.**

MOS FET RD100HHF1

More features to support your HF operation

●10 kHz Roofing filter ●20 dB ATT/IPO ●Built-in TCXO for incredible ±1 ppm/hour (@+77°F, after warm-up) stability ●CAT System (D-sub9 pin): Computer programming and Cloning capability ●Large, Easy-to-See digital S-meter with peak hold function ●Speech Processor ●QUICK SPLIT to automatically Offset transmit frequency (+5 kHz default) ●TXW to monitor the transmit frequency when split frequency operation is engaged ●Clarifier ●Built-In Electronic Keyer ●CW Beacon (Up to 118 characters using the CW message keyer's 3 memory banks) ●CW Pitch Adjustment (from 400 to 800 Hz, in 100 Hz steps) ●CW Spotting (Zero-Beating) ●CW Training Feature ●CW Keying using the Up/Down keys on the microphone ●Two Voice Memories (SSB/AM/FM), store up to 10 seconds each ●20 second Digital Voice Recorder ●Dedicated Data Jack for FSK- RTTY operation ●Versatile Memory System, up to 500 memory channels that may be separated into as many as 13 Memory Groups ●CTCSS Operation (FM) ●My Band / My Mode functions, to recall your favorite operating set-ups ● Lock Function ●C.S. Switch to recall a favorite Menu Selection directly ●Dynamic Microphone included ●IMPORTANT FEATURES FOR THE VISUALLY IMPAIRED OPERATOR – Digital Voice Announcement of the Frequency, Mode or S-meter reading

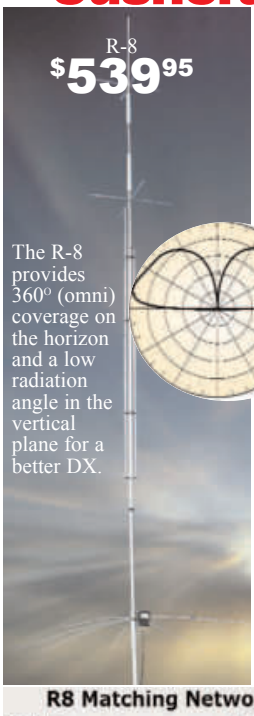
For the latest Yaesu news, visit us on the Internet:
http://www.yaesu.com

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

YAESU
The radio
YAESU USA
6125 Phyllis Drive,
Cypress, CA 90630 (714) 827-7600

Cushcraft R8 *8-Band Vertical*

Covers 6, 10, 12, 15, 17, 20, 30, and 40 Meters!



The Cushcraft R8 is recognized as the industry gold standard for multi-band verticals, with thousands in use worldwide. Efficient, rugged, and built to withstand the test of time, the R8's unique ground-independent design has a well-earned reputation for delivering top DX results under tough conditions. Best of all, the R8 is easy to assemble, installs just about anywhere, and blends inconspicuously with urban and country settings alike.

Automatic Band Switching: The R8's famous "black box" matching network combines with traps and parallel resonators to cover 8 bands. You QSY instantly, without a tuner!

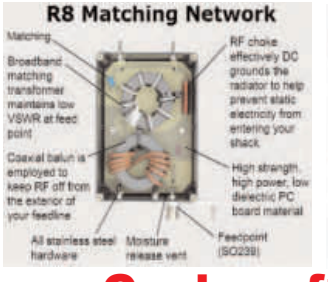
Rugged Construction: Thick fiberglass insulators, all-stainless hardware, and 6063 aircraft-aluminum tubing that is double or triple walled at key stress points handle anything Mother Nature can dish out.

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

Legal-Limit Power: Heavy-duty components are contest-proven to handle all the power your amplifier can legally deliver and radiating it as RF rather than heat.

The sunspot count is climbing and long-awaited band openings are finally becoming a reality. Now is the perfect time to discover why Cushcraft's R8 multi-band vertical is the premier choice of DX-wise hams everywhere!

R-8GK, $56.95. R-8 three-point guy kit for high winds.



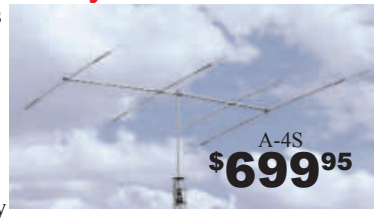
MA-5B *5-Band* Beam

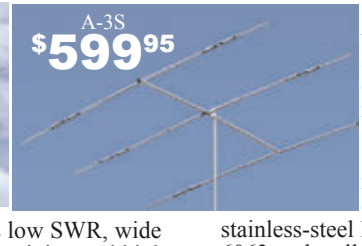
Small Footprint -- Big Signal

The MA-5B is one of Cushcraft's most popular HF antennas, delivering solid *signal-boosting directivity* in a bantam-weight package. Mounts on roof using standard TV hardware. Perfect for exploring exciting DX without the high cost and heavy lifting of installing a large tower and full-sized array. Its 7 foot 3-inch boom has less than 9 feet of turning radius. Contest tough -- handles 1500 Watts.

The unique MA-5B gives you 5-bands, automatic band switching and easy installation in a compact 26-pound package. On 10, 15 and 20 Meters the end elements become a two-element Yagi that delivers solid power-multiplying gain over a dipole on all three bands. On 12 and 17 Meters, the middle element is a highly efficient trap dipole. When working DX, what really matters are the interfering signals and noise you *don't hear*. That's where the MA-5B's impressive side rejection and front-to-back ratio really shines. *See* ***cushcraftamateur.com*** *for gain figures.*

Cushcraft 10, 15 & 20 Meter Tribander Beams





Only the best tri-band antennas become DX classics, which is why the Cushcraft World-Ranger A4S, A3S, and A3WS go to the head of the class. For more than 30 years, these pace-setting performers have taken on the world's most demanding operating conditions and proven themselves every time. The key to success comes from attention to basics. For example, element length and spacing has been carefully refined over time, and high-power traps are still hand-made and individually tuned using laboratory-grade instruments. All this attention to detail means low SWR, wide bandwidth, optimum directivity, and high efficiency -- important performance characteristics you rely on to maintain regular schedules, rack up impressive contest scores, and grow your collection of rare QSLs!

It goes without saying that the World-Ranger lineup is also famous for its rugged construction. In fact, the majority of these antennas sold years ago are still in service today! Conservative mechanical design, rugged over-sized components, stainless-steel hardware, and aircraft-grade 6063 make all the difference.

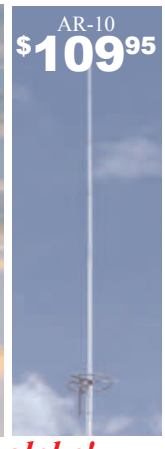
The 3-element A3S/A3WS and 4-element A4S are world-famous for powerhouse gain and super performance. **A-3WS**, **$499.95,** 12/17 M. **30/40 Meter** *add-on kits* available.

Cushcraft Dual Band Yagis

One Yagi for Dual-Band FM Radios

Dual-bander VHF rigs are the norm these days, so why not compliment your FM base station with a dual-band Yagi? Not only will you eliminate a costly feed line, you'll realize extra gain for digital modes like high-speed packet and D-Star! Cushcraft's A270-6S provides three elements per band and the A270-10S provides five for solid point-to-point performance. They're both pre-tuned and assembly is a snap using the fully illustrated manual.

Cushcraft Famous *Ringo* Compact FM Verticals



W1BX's famous *Ringo* antenna has been around for a long time and remains unbeaten for solid reliability. The Ringo is broad-banded, lighting protected, extremely rugged, economical, electrically bullet-proof, low-angle, and more -- but mainly, it just plain works! To discover why hams and commercial two-way installers around the world still love this antenna, order yours now!

***Free* Cushcraft Catalog**
and Nearest Dealer . . . 662-323-5803
Call your dealer for your best price!

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308 Industrial Park Road, Starkville, MS 39759 USA
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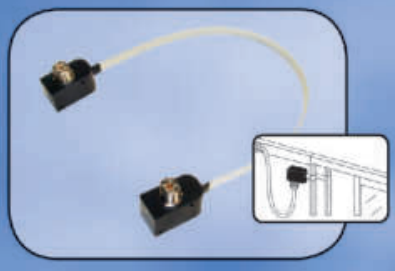
Life is a JOURNEY, Enjoy the ride!



NEW! COMET CTC-50M
Window Gap Adapter!

Max Power: HF 100W PEP
VHF: 60W FM
UHF: 40W FM
900MHz - 1.3GHz: 10W
VSWR: <500MHz 1.3:1
>500MHz 1.5:1
Impedance: 50Ohm
Length: 15.75"
Conn: 24k Gold Plated SO-239s

MALDOL HVU-8
Ultra-Compact 8 Band Antenna!

Unique ground radial system rotates 180 degrees around the base if building side mounting is required.

Max Power: HF 200W SSB/100W FM
6M - 70cm: 150W FM
TX: 80/40/20/15/10/6/2M/70cm
Impedance: 50 Ohm
Length: 8'6" approx
Weight: 5lbs 7oz
Conn: SO-239
Max Wind Speed: 92MPH

Each band tunes independently.
Approx 2:1 band-width:
80M 22kHz
40M 52kHz
20M 52kHz
15M 134kHz
10M 260kHz

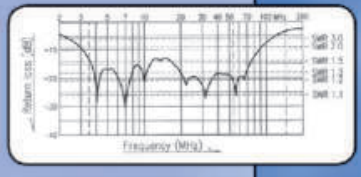
COMET CHA-250B
Broadband HF Vertical!

3.5 - 57MHz with SWR of 1.6:1 or less!

- *NO ANTENNA TUNER NEEDED*
- *NO RADIALS*
- *NO TRAPS*
- *NO COILS*

If you suffer in an antenna restricted area, must manage with space restrictions or you simply want to operate incognito you will be forced to make significant antenna compromises. The CHA-250B makes the most of the situation, making operating HF easy!!

Max Power: 250W SSB/125W FM
TX: 3.5– 57MHz
RX: 2.0– 90MHz
Impedance: 50Ohm
Length: 23'5"
Weight: 7lbs 1 oz
Conn: SO-239
Max Wind Speed: 67MPH



NEW! COMET H-422
40/20/15/10M compact, broadband, rotatable dipole!

Assemble in either a "V or horizontal ("H") configuration.
CBL-2500 2.5kW balun and heavy duty hardware included.

Max Power: 1000W SSB / 500W FM
SWR: Less than 1.5:1 at center frequency
Rotation Radius: "V" 12' 6" "H" 17' 5"
Length: "V" 24' 5" "H" 33' 10"
Weight: 11 lbs 14 ozs
Wind load: 3.01 sq feet
Max Wind Speed: 67 MPH

COMET and Maldol

For a complete catalog, call or visit your local dealer.

Or contact NCG Company. 15036 Sierra Bonita Lane, Chino, CA 91710
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Our mission: To promote and advance the art, science and enjoyment of Amateur Radio.

In This Issue

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Technical

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News and Features

Our Cover

As wildfires devastated more than 160,000 acres in Colorado, local and state agencies called on radio amateurs to help with disaster communications. The largest of the fires, the High Park Fire, alone claimed more than 87,000 acres. In the background photo, by David Johnston, KD8BQN, it rages out of control near Fort Collins. In the inset photo, taken by Rob Strieby, WØFT, David, KD8BQN, is communicating from the ICP for the High Park Fire to ARES members at the Poudre Park Fire Department, Poudre Canyon, Colorado. See page 73.

Radiosport

Columns

Departments

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Field Gear That Goes The Distance!

FT-897D

HF/VHF/UHF Portable Operation Powerful Transceiver

- The Ultimate Emergency Communications Radio
- Rugged, Innovative Multi-Band
- Operates on the SSB, CW, AM, FM, and Digital Modes
- Wide Frequency Coverage
- 20-Watt Portable Operation Using Internal Batteries
- 100 Watts When Using an External 13.8-Volt DC Power Source

FT-817ND

The Ultimate Backpack, Multi-Mode Portable Transceiver

- Self-Contained
- Battery-Powered
- Covering the HF, VHF, and UHF Bands
- Provides up to Five Watts of Power Output
- SSB, CW, AM, FM, Packet, or SSB-based Digital Modes like PSK31

FT-857D

The World's Smallest HF/VHF/UHF Mobile Transceiver

- Ultra-Compact Package
- Ideal for Mobile or External Battery Portable Work
- Wide Frequency Coverage
- Optional Remote-Head
- High-Performance Mobile Operation

FT-450D

HF/50 MHz 100 W Easy to Operate All Mode Transceiver

- Illuminated Key Buttons
- 300Hz / 500Hz / 2.4 kHz CW IF Filter
- Foot Stand
- Classically Designed Main Dial and Knobs
- Dynamic Microphone MH-31 A8J Included

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The radio

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Heavy-Duty FM Dual Band Mobile with Exceptionally Wide Receiver Coverage*

*108 to 520 MHz/ 700 to 999.99 MHz (Cellular blocked)

The King of Mobile

75 WATTS

NEW

50 W 2 m/70 cm* DUAL BAND FM TRANSCEIVER

*70 cm 45 W

FT-7900R

Size: 5.5" (W) x 1.6" (H) x 6.6" (D) / Weight: 2.2 lb

2 m/70 cm DUAL BAND

Best Selling, Reliable Mobile

55 WATTS

2 m MONO BAND

HEAVY-DUTY 75 W 2 m FM TRANSCEIVER

FT-2900R

NEW

Size: 6.3" (W) x 2.0" (H) x 7.3" (D) / Weight: 4.0 lb

NEW

ULTRA RUGGED 55 W 2 m FM TRANSCEIVER

FT-1900R

2 m MONO BAND

Size: 5.5" (W) x 1.6" (H) x 5.8" (D) / Weight: 2.2 lb

Commercial Grade Field Radio Submersible Construction

COMPACT 5 W 2 m FM HANDHELD TRANSCEIVER

FT-270R

Size: 2.4" (W) x 4.7" (H) x 1.3" (D) Weight: 13.8 oz.

2 m MONO BAND

NEW

Compact Field Radio with Top Mounted LCD and Loud Audio

ULTRA-COMPACT 5 W 2 m FM HANDHELD TRANSCEIVER

FT-250R

Size: 2.3" (W) x 4.3" (H) x 1.0" (D) / Weight: 12.4 oz.

2 m MONO BAND

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New Advanced VX-8 Series GPS/APRS® Handheld Transceivers
Choose the Yaesu that meets your APRS® operating preferences in the field

50/144/(222)*/430 MHz
FM 5 W/AM 1W (50 MHz) Triple Band Handheld

VX-8DR * 222 MHz/1.5 W (USA version)

(7.4V 1,100 mAh Lithium Ion battery/FNB-101LI and battery charger/NC-66A included)

Actual Size

144/430 MHz
FM 5 W Dual Band Handheld

VX-8GR

(7.4V 1,100 mAh Lithium Ion battery/FNB-101LI and battery charger/NC-66A included)

Actual Size

VX-8DR NEW

All-in-one Prestigious Tri-band Transceiver
Bluetooth® for hands-free Operation with optional accessories
Waterproof/Submersible IPX 7 rated - 3 ft for 30 minutes

Optional GPS and antenna unit for GPS/APRS® operation

The optional GPS Antenna Unit FGPS-2 attached to the optional speaker Microphone MH-74A7A

Bluetooth®

Attached to the radio (microphone input) using the optional GPS Antenna Adaptor CT-136

VX-8GR NEW

144/430 MHz Dual Band Transceiver with GPS unit included
Built-in GPS Antenna - Waterproof
Wide Band Receive for 108-999 MHz (Cellular blocked – US Version)

Supports APRS® communication by the Built-in Worldwide Standard AX.25 Data TNC

The VX-8 series radios are compatible with the world wide standard APRS® (Automatic Packet reporting System) using the GPS system to locate and exchange position information.

- SmartBeaconing™ Function
- Memories to list 50 stations
- Memories to store 30 APRS® messages
- DIGI-PATH routing indication function
- 8 DIGI-PATH routing settings
- GPS Compass Display - "Heading Up" or "North Up"
- APRS® Symbol Icon pre-set function
- Clearly displayed APRS® Beacon Messages
- Selective Message Received indicated by Flashing LED

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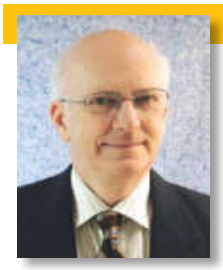

David Sumner, K1ZZ – dsumner@arrl.org
ARRL Chief Executive Officer

Endurance

"International Amateur Radio Union (IARU) President Emeritus Richard L. Baldwin, W1RU, died on June 21 at the age of 92."

Dick Baldwin, then known as W1IKE, joined the ARRL Headquarters staff in September 1948 armed with a brand new master's degree in physics, wartime combat experience as a Navy Communications Officer, and more than a decade as a licensed radio amateur. Except for a brief sojourn in the telecommunications industry in the '50s he remained on the staff until 1982, capping his professional career with seven years as General Manager of the ARRL after serving as Assistant Secretary, Managing Editor and Assistant General Manager.

In the '60s Dick became heavily involved in the international arena. Amateur Radio was facing many challenges at the International Telecommunication Union (ITU) stemming from the onset of the Space Age and the resulting creation of new satellite services, Cold War pressures for access to the radio spectrum for military and propaganda purposes, and the emergence of newly independent African nations. A new approach to defending amateur access to the spectrum was needed.

While he would have been the last person to claim personal credit, during the 15 years leading up to the 1979 World Administrative Radio Conference (WARC-79) Dick Baldwin was involved in every major initiative that contributed to Amateur Radio's success at that all-important event. He invigorated the Intruder Watch, the network of volunteers now known as the IARU Monitoring System that challenges the use of the amateur bands by non-amateur stations in violation of the international Radio Regulations. He provided staff support for what amounted to a reinventing of the IARU, developing strong ties to the IARU Region 1 organization that already existed for Europe and Africa and helping to build complementary regional IARU organizations in the Americas and the Asia-Pacific area. He helped establish the International Amateur Radio Club, 4U1ITU, right inside ITU Headquarters in Geneva. He traveled extensively in parts of the world where Amateur Radio was not well developed, explaining its benefits and seeking friends who might be of assistance in the future.

In 1973, as the United States began its preparations for WARC-79 Dick served as the only non-government member of a four-man study group that defined amateur spectrum requirements, including an audacious proposal for new bands at 10.1, 18.1 and 24 MHz. Recognizing the desirability of new amateur allocations is one thing; achieving the vision is quite another. Working with IARU officials throughout the world, Dick helped put together a team that accomplished just that. Assuming overall responsibility for ARRL Headquarters operations as General Manager in 1975 did not distract him from the WARC-79 mission, which he correctly saw as a once-in-a-lifetime opportunity.

Dick's seven-year tenure as General Manager was one of rapid change and continuing challenges for Amateur Radio and the ARRL. Much of the first year was spent on the planning and redesign of *QST* to the larger page size to which we are now accustomed. The initial plan was for 128-page issues, but the journal soon grew and has remained well above that size ever since. Then came the CB boom and the perception of an enormous opportunity to expand our ranks. Taking advantage of that opportunity required an addition to the Headquarters building to house the needed staff. The CB boom came and went, but the ARRL has benefited greatly from the building expansion ever since.

When Dick Baldwin retired from paid employment in 1982 his legacy to the Amateur Radio community already was substantial. Had he spent his later years simply sailing his beloved 35-foot ketch *Endurance* along the coast of Maine and operating on the bands he had worked so hard to defend and expand, he would be long remembered for his contributions. But Dick didn't stop there. He accepted the volunteer post of IARU President and — at great cost to the time he might otherwise have spent on the water and on the air — proceeded to guide the organization through a transition to a new Constitution that recognized the regional organizations and formally incorporated them into the governance structure. He continued in that office for 17 years, ensuring the health of the IARU while making him its longest serving President in history. From the day he first reported for work at ARRL Headquarters until his retirement from Amateur Radio's premiere volunteer post in 1999, Dick's service to Amateur Radio spanned more than a half-century.

As much as he loved Amateur Radio, Dick Baldwin's greatest passion — other than for Phyl, his wife of 63 years — was for the sea. Dick's last note to me, sent about three months before he died, described the progression of Parkinson's Disease and his adjustment to the loss of handwriting skills and the use of his legs. In spite of that my mental image of Dick will always be of him at the helm of *Endurance*, with his gaze — as always — fixed firmly on the far horizon.

David Sumner, K1ZZ

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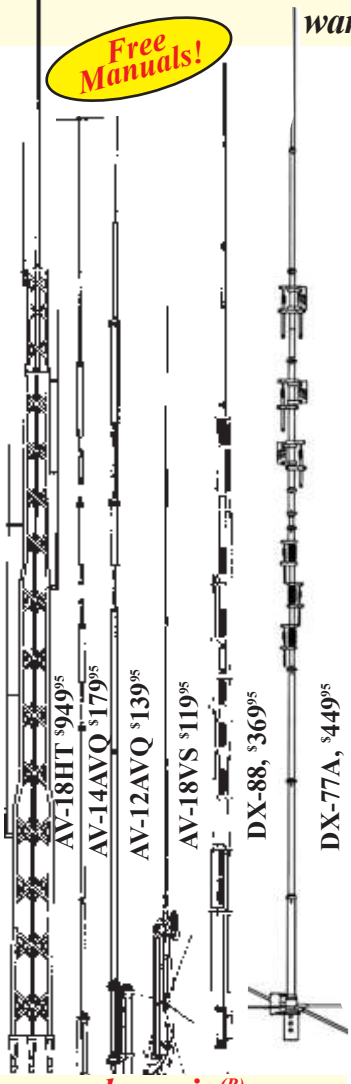

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AV-14AVQ	**$179.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$139.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$119.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 80 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 40 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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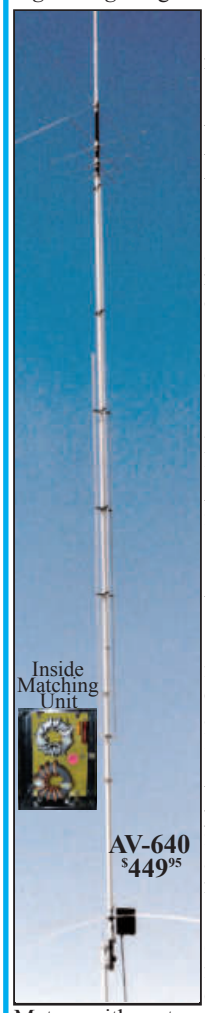

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Joel P. Kleinman, N1BKE – jkleinman@arrl.org

In Brief

- The ARRL Board of Directors met in Windsor, Connecticut July 20-21. A report appears elsewhere in this issue.
- Citing its 1985 PRB-1 ruling, the FCC denied an Arizona ham's *Petition for Rulemaking* that asked the FCC to expand its policy of limited preemption of state and local regulations regarding the ability of Amateur Radio operators to erect antennas.
- Three hams (one from the US, one from Russia and one from Japan) arrived at the International Space Station in mid-July.
- Illinois now has a state-level PRB-1 law mandating that state and local authorities must reasonably accommodate Amateur Radio communications.
- The ARRL hosted a webinar in July that presented information about the 2012 hurricane season and the Amateur Radio response.
- The ARRL has launched the integration of Logbook of The World with *CQ* Magazine's Worked All Prefixes Award.
- The former three levels of Amateur Radio Emergency Communications courses have been reconfigured into two new courses: An introductory course and a course for leaders and managers.
- In June, the ARRL Executive Committee awarded Education & Technology Program grants to 11 schools.
- The ARRL has added additional tools and reports to the Diamond DXCC Award.
- Richard L. Baldwin, W1RU, the former ARRL General Manager and IARU President died in June. M. Walter Maxwell, W2DU, best-known for his *QST* series and subsequent book explaining transmission line concepts in plain English, died in July.
- The winner of the June *QST* Cover Plaque award is Dennis Johnson, KF0QR, for his article "A 160 and 75/80 Meter Folded Dipole."

Media Hits

Allen Pitts, W1AGP – apitts@arrl.org
Media & Public Relations Manager

Where can I begin? To simply tell you that I have accumulated over 60 pages, single spaced, small font type, of just the titles and links to media hits from June 2012 does not do justice to the flood of publicity that came in. It was a record-setting month! Not only the quantity but the *quality* of the hits was outstanding. The sad part is that I cannot list them all here. Too many excellent hits must be left out to fit this page.

There was everything from "Cleveland's Amateur Radio Club celebrates 50th year" in the *Cleveland Daily Banner* to "Amateurs Broadcast from Local Submarine War Museum" on KTUL. Fox News reported on an Amateur Radio operator's previously dismissed radio signal report being credible last transmissions from Amelia Earhart. **Cincinnati.com** and others quoted my saying "The fastest way to turn a crisis into a total disaster is to lose communications" and NPR bluntly promoted ham radio as "the communications method that is seen as best option in a disaster." This was reinforced by stories of the hams serving at the tragic wildfires in Colorado, repeatedly noted by the *Denver Post.*

Then came Field Day, and there were hundreds of hits in *Newsday, Dallas News, Dayton Business Journal, News Blaze, Reuters, The Seattle Times, Technology News, Technology Today, The Sacramento Bee* and Dustin Cox, NØDRC, had PSAs running on three stations and was in the *Pueblo Chieftain*. Hits were in *Hernando Today, Fort Bend Southwest Star, Mohave Valley,* **MyCentralJersey.com**, **TMCnet**'s *Technology News* and *Education Technology News*, *Akron Beacon Journal, Cleveland Daily Banner, Kalispell Montana News, Emergency Management Magazine*...there were pages and pages of them.

Radio and TV station postings and stories included KAAL, KADI, KAIT, KALB, KATV, KAUZ, KAZT, KBMT, KCAU, KCBA, KCBD, KCEN, KCOY, KCTV, KDFM, KDUH, KEYC, KFDA, KFJX, KFMB, KFRE, KFSY, KFVE, KFVS, KFWB, KGWN, KHNL, KHQ, KIII, KING, KION, KIWA,KJAS, KKOB, KLFY, KLJB, KLKN, KLNT, KLTV, KMEG, KMPH, KNDO, KNDU, KNOE, KOAM, KOLD, KOLR, KOTA, KOTV, KPHO, KPLC, KPTH, KPTM, KPTV, KQCW, KRHD, KRIV, KROI, KSLA, KSTP, KSTWT, KSUI, KSWO, KTEN, KTIV, KTRE, KTRV, KTTC, KTUL, KTVG, KTVN, KUAM, KVVU, KWES, KWQC, KWTV, KWWL, KXJB, KXLT, KXMB, KXVO, KXXV, KYTV, KYTX, KYW, Nebraska Public TV, NOCO, Northwest Cable, WAFB, WAFF, WALB, WAND, WAOW, WATZ, WAVE, WBAY, WBCB, WBMA, WBOC, WBOC, WBOY, WBRC, WBTV, WCAX, WCIV, WCSC, WCWG, WDAM, WDAY, WDRB, WDSI, WECT, WEHT, WFFF, WFIE, WFLX, WFMJ, WFMZ, WFSB, WFXG, WFXR, WFXS, WFYI, WGCL, WGEM, WGFL, WHBF, WHNS, WHTM, WIBC, WICU, WIST, WKOW, WKRN, WLAX, WLBT, WLII, WLNE, WLNS, WLOX, WLTZ, WMBB, WMBF, WMC, WMDT, WNEM, WOI, WOIO, WOLF, WOWK, WPFO, WQOW, WRCB, WREX, WRIC, WSET, WSFA, WSFX, WSHM, WSJV, WSMV, WTEN, WTHR, WTLH, WTNZ, WTOC, WTOL, WTRF, WTVG, WTVM, WUPV, WVNS, WVNY, WVVA, WWBT, WWTV, WXIX, WXOW, WXTX, WXVT, WZDX — and I am sure I missed some of them here.

None of this success could be possible without the enthusiasm and efforts of the many PIOs and others who took the time to make sure their local media not only received the information, but also got the story behind it. This did not happen by folks just emailing in a copy of some press release. It happened because people took extra time to follow it up, make personal calls, set up interviews and share of themselves. We all say we want Amateur Radio to grow, but the people who made June's Media Hits happen are the ones who actually walk the walk. Without them, none of us would have the frequencies and privileges we now enjoy. If you have not done it yet, be sure to find your ARRL or group's Public Information Officer and tell them thank you. If you would like to join them and promote our hobby in the media, online ARRL training is available for free at **www.arrl.org/pr-courses**.

You can download a PDF file of most of the media hits at **www.arrl.org/media-hits-d**.

The ARRL International Humanitarian Award

ARRL President Kay Craigie, N3KN, presented Andrey Fedorov, RW3AH/KL1A, with the ARRL International Humanitarian Award when their paths crossed at Ham Radio 2012 in Friedrichshafen, Germany in June. The former chief coordinator of the Russian Amateur Radio Emergency Service (RARES), Fedorov has been involved in providing communications support via Amateur Radio for almost 25 years. The ARRL established the award to recognize Amateur Radio operators who have used ham radio to provide extraordinary service to others in times of crisis or disaster.

Andrey, RW3AH/KL1A, receives the 2011 ARRL International Humanitarian Award from President Kay Craigie, N3KN. [photo courtesy Andrey Fedorov, RW3AH/KL1A]

Harold Kramer, WJ1B – hkramer@arrl.org
ARRL Chief Operating Officer/*QST* Publisher

Proudly Serving the Public

Although you'll find lots to read in this special issue, hams can provide public service and disaster communications whenever and wherever we're needed.

Welcome to the 2012 "Public Service/Emergency Preparedness issue of *QST*. In this issue just about all of the featured articles are related to Public Service, Emergency Preparedness, Emergency and Disaster Communications.

This month's Public Service column is definitely worth reading. It's a moving, first-hand account of W2JK's experiences at Ground Zero. Rick Palm, K1CE, the editor of the Public Service column, also edits the monthly *ARES E-Letter* that is free to members. If you are not a subscriber, you can sign up for it on your ARRL web profile page.

Technical articles that pertain to Emergency Communications include Tone Magic by Steve Ford, WB8IMY. If you have ever been bewildered by the different types of tone systems used on repeaters (and who hasn't?), this article will explain how they work and help you keep track of all the various tones that your FM rig uses for everyday use and in public service and disaster situations. You may be surprised when your read Joel Hallas' article called "Storage Battery Planning for Public Service." Joel discusses what those amp-hour ratings really mean and he provides a method to determine how long a storage battery will actually last. Tim Factor, KT7F, has written an article about an inexpensive, yet fully functional, approach to putting together a VHF/UHF go-kit in a bag using modest equipment and solar power. There's also a piece about building a Mini Go-box in this month's Hints and Kinks.

The recent Colorado fires devastated hundreds of square miles and destroyed hundreds of homes and everything else in their paths — and ARES® volunteers were there to help. This photo was taken from the photographer's home in West Fort Collins. [David Johnston, KD8BQN, photo]

Here inside HQ we continue to improve the Ham-Aid program that provides equipment that temporarily replaces or augments Amateur Radio equipment that is lost after a disaster occurs. Thanks to some generous donations, new equipment has been added including HF/VHF/UHF transceivers, VHF/UHF mobile transceivers and new shipping cases. To learn more about the Ham-Aid, visit **www.arrl.org/ham-aid**.

We've also added more digital modes and functionality to W1AW for emergency communications and other uses. During the past few years, we have added IRLP, EchoLink and D-STAR on 2 meters, 70 cm and 23 cm, including 23 cm high speed data link capabilities. We also increased our MARS (Military Auxiliary Radio System) capability and improved our emergency backup power systems.

During the past few years, we have increasingly focused on improving and expanding our relationships with served agencies at a national level to make our presence known and better define Amateur Radio's role in disaster communications. Along with existing relationships, we have reached out to many other organizations and agencies that are involved with Emergency Communications.

We will be publishing a comprehensive handbook devoted to Public Service and Emergency Communications later in the year. It will be an all-inclusive reference book for Amateur Radio operators who want to improve their skills and knowledge in situations such as disasters, emergencies and community events.

One final note. "EmComm" is an Amateur Radio expression that key decision makers, such as legislators and regulators, sometimes have a hard time understanding, so from now on we will be using the fully spelled out term "Emergency Communications" here in *QST*.

Virginia Club Supports Marine Corps Historic Half

In late May, members of the Rappahannock Valley Amateur Radio Club (RVARC) supported the running of the Marine Corps Historic Half in Fredericksburg, Virginia. This was the fifth running of this annual event and once again the hams of the RVARC donated their time, skills and equipment to support the Marine Corps and the athletes who participated in the 13.1 mile race. Club President Tom Harmon, AK1E, and Event Coordinator Warren Lee, W4SHS, manned phone, packet and APRS radios and computers in the net control station at the command and operations center while 26 other club members were stationed around the course at mile markers, aid and water stations, and in the lead and trailing vehicles escorting the runners. — *Warren Lee, W4SHS*

Tom Harmon, AK1E, prepares a packet message in support of the Marine Corps Historic Half in the Rappahannock Valley Amateur Radio Club's net control station. RVARC operated phone and APRS on 2 meters and packet on 70 cm. [Warren Lee, W4SHS, photo]

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ARRL Technical Information Service — www.arrl.org/tis

Get answers on a variety of technical and operating topics through ARRL's Technical Information Service. ARRL Lab experts and technical volunteers can help you overcome hurdles and answer all your questions.

ARRL as an Advocate — www.arrl.org/regulatory-advocacy

ARRL supports legislation and regulatory measures that preserve and protect access to Amateur Radio Service frequencies. Members may contact the **ARRL Regulatory Information Branch** for information on FCC rules; problems with antenna, tower and zoning restrictions; and reciprocal licensing procedures for international travelers.

ARRL Group Benefit Programs* — www.arrl.org/benefits

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Eimac *3CX800A7* Amplifiers

Suggested Retail
AL-800
$2595
1 *Eimac*(R) tube, 1250 W
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$3895
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AL-1500F
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Imported tube
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Joel P. Kleinman, N1BKE, upfront@arrl.org

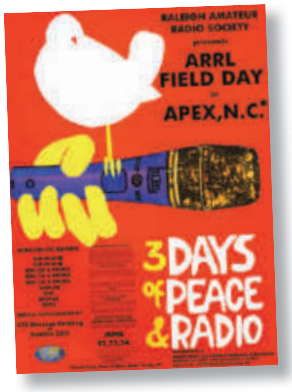
Emergency Preparedness Pays Dividends In Colorado

The High Park fire northwest of Fort Collins burned almost 90,000 acres before it was contained. Area ham volunteers supported the Red Cross while the fire burned. [David Johnston, KD8BQN, photo]

Interior Secretary Ken Salazar, a Colorado native, visited some ARES® volunteers in Fort Collins on June 14. [Michael Rieger — FEMA photo]

First it was the High Park Fire near Fort Collins. Then came the Waldo Canyon Fire near Colorado Springs, which became the most destructive in state history. Between them, they destroyed more than 600 homes and burned more than 100,000 acres. Other, smaller fires added to the challenge. Volunteer ham radio operators assisted with disaster communications almost from the outset. Emergency preparedness exercises such as Field Day and the Simulated Emergency Test (see the article elsewhere in this issue) are invaluable in ensuring that trained hams are available when disaster strikes.

There's more on how Amateur Radio assisted during the Colorado fires in Happenings elsewhere in this special Public Service/Emergency Preparedness issue.



By the Time I Got to Field Day…When Bob Starkenburg, W4TTX, of Raleigh, North Carolina set out to promote his club's Field Day operation, he thought of the iconic Woodstock Festival poster from the 1969 gathering of a half a million rock music fans. "We used the poster to make over 80 T-shirts for club members and visiting dignitaries," he writes. [poster designed by Bob Starkenburg, W4TTX, with permission from Woodstock Ventures and Bob Heil, K9EID]

Washington state aurora: This photo, taken by my neighbor, shows an unusual Aurora Borealis shower over Langley, Whidbey Island, Washington June 19. My shack is in the upstairs of this barn on my farm. The HF beam is a KLM KT34XA up 60 feet. — *Bob Frause, K7PVT* [Rich Frishman photo]

Stealth Vine Antenna

I'd been operating 10-20 meters for over a year with my vertical loop on our third floor condo patio in the Dominican Republic when someone called up from 35 feet below, "Hi, what's the rope hanging down?" With some fast thinking I blurted out, "A trellis for my flowering plants!"

What flowering plants? Both vertical legs of my 20 meter ¾ wave square loop were partially visible but only if one looked real hard to see the white #14 wire on a white painted patio background. I headed to the local garden store to see what they had for plastic vines with flowers. Now I believe I won't have any more questions. Well, maybe one more: "Where do I get flowering vines year-round?" — *John Reisenauer, HI3/KL7JR*

HI3/KL7JR's artificial vine/antenna. Note the air choke at the feed point of one vertical sections of the loop. [John Reisenauer, KL7JR, photo]

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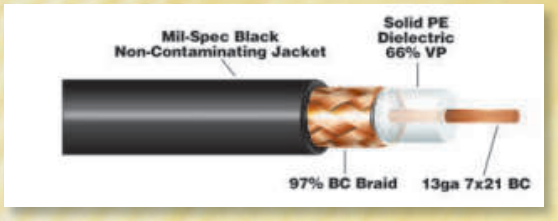

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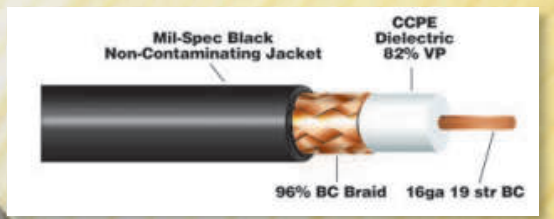
• 0.6dB @ 10MHz	3.43kW	87%
• 1.0dB @ 30MHz	1.95kW	79%
• 1.4dB @ 50MHz	1.5kW	73%

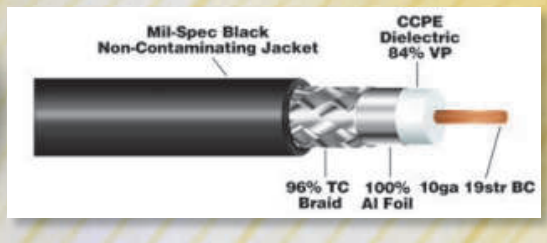
Part #	Length/Ft	Price/ea
2213A-PL-3	3	$12.95
2213A-PL-6	6	$16.95
2213A-PL-50	50	$62.95
2213A-PL-75	75	$87.95
2213A-PL-100	100	$108.95
2213A-PL-150	150	$157.95



218XA RG8X (240F)
Non-contaminating Direct-Burial Ultra-Violet Resistant Jacket.
W/SILVER-TEFLON PL259 & WEATHERPROOF HST each end.

Attenuation per 100ft	Power Rating	Efficiency%
• 0.9dB @ 10MHz	2.16kW	80%
• 1.4dB @ 30MHz	1.24kW	69%
• 2.1dB @ 50MHz	0.96kW	62%

Part #	Length/Ft	Price/ea
218XA-PL-3	3	$10.95
218XA-PL-6	6	$11.95
218XA-PL-18	18	$16.95
218XA-PL-50	50	$29.95
218XA-PL-75	75	$39.95
218XA-PL-100	100	$48.95
218XA-PL-150	150	$68.95



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• 0.8dB @ 30MH	2.77kW	83%
• 1.1dB @ 50MHz	2.14kW	78.5%
• 1.8dB @ 150MHz	1.22kW	65.4%
• 3.3dB @ 450MHz	0.69kW	47.3%

Part #	Length/Ft	Price/ea
25400F-PL-3	3	$13.95
25400F-PL-6	6	$16.95
25400F-PL-18	18	$28.95
25400F-PL-35	35	$48.95
25400F-PL-50	50	$60.95
25400F-PL-75	75	$91.95
25400F-PL-100	100	$109.95
25400F-PL-150	150	$164.95

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Letters from Our Members

Birds in the Sky

I have been enjoying the digital edition of *QST*. I just started reading the August issue and saw the article by Dave Palmer, KB5WIA ["Backpacking with Satellites," Aug 2012, pages 65-67] on activating the "Lost Coast" via satellite. When he announced his plans on the AMSAT bulletin board, I had 96 grid confirmed via sats. His plans to operate from a four-grid corner would qualify me for the VUCC Satellite award. I e-mailed him and told him I need the grids for VUCC and asked him to listen for my call. He assured me he'd keep an ear open for me and wished me luck. I was able to work him on the Sunday afternoon pass of AO-27, I was the first call he responded to after the usual flurry of calls when the bird turns on. It was nice to finish off the VUCC with four rare grids. Dave did great job handling all the calls looking for him. He also gave me three other grids, including DM17 in Death Valley. It's always a pleasure to hear him on the air.

Rick Tejera, K7TEJ
Glendale, Arizona

Going Clubbing

The editorial by ARRL Chief Executive Officer David Sumner, K1ZZ ["It Seems to Us: Lessons from Dayton," Jul 2012, page 9] really hit the mark. Clubs clearly need several forms of diversity to remain vibrant. I recently left a club that solely focused on ARES®/RACES preparedness and had forgotten embracing "the enjoyment of Amateur Radio." Their club meetings focused on governance and accreditation, but never on the fun part.

Perhaps the ARRL should create a template for a radio club charter to include the committees that the club should have, and what the purpose of each committee should be. For example, a membership committee that periodically invited non-member hams to its meetings, arranged transportation for those that need it and reached out to schools and other clubs with parallel interests to obtain new members and to train them into being active hams.

One of the clubs I joined had a roster of 30, with only a third paying dues. Should seniors and youngsters be exempt? Should new members be exempted for the first year?

Another interesting factor is where the club meetings are held. These locations need to have ample parking and be readily accessible by the public. Holding meetings in the local Emergency Operations Center can be intimidating to some of those who'd like to attend. This also goes for Field Day — sure, that remote mountain top may be great for departure angles, but without an off-road vehicle, how do you get there?

We all need to work harder to ensure that the Amateur Radio wireless spectrum is being used routinely, or it will be overtaken by the needs of commercial mobile wireless operators. The only way I see this happening is by having more active hams, so all of us need to make sure usage is expanding. Our clubs need to have this as an objective.

Robert Rennard, N7WY
Cheyenne, Wyoming

Editor's Note: The ARRL has a page on its website chock-full of resources for Amateur Radio clubs and information on how to make your club an ARRL Affiliated Club. Visit it at **www.arrl.org/affiliated-club-resources**.

Powering Up

I read with interest the article by Bob Bruninga, WB4APR ["Rethinking Electrical Power for the Ham," Aug 2012, page 41-43]. I agree that electrical systems have come a long way in efficiency; however, the dream for many people in the Midwest and other parts of the country is the 0.1% power outage rate that he mentions. This may have been true 20 years ago. Apparently, due to the aging electrical grid and damage due to increasing adverse weather, many people experience power outage durations per year that are easily 10 times that number. In my own case, I have recorded an average power outage rate of 1.2% a year over the last four years. Just coming off the multi-state severe storms of June 29, my outage rate for this year is already at 1.4%, with five months to go. "...[T]hat dream 10 kW generator rust bucket in the backyard..." is not only my reality, but a well-used necessity.

William Hopstetter, W8LGX
Logan, Ohio

Confessions of a 2 Meter Simplex Addict

It's not that I don't like repeaters. I really do. I have the latest edition of *The ARRL Repeater Directory*. I use our club repeater and other local repeaters. But what I really enjoy is the challenge of reaching out with whatever my best 2 meter antenna is at the time and really going for the distance. I feel simplex provides more of the challenge of getting the distance, as opposed to using repeaters. I understand that FM has some limitations compared to sideband, all other things being equal. On sideband, I always start on 144.200 MHz, unless I hear something faint in the distance. When the initial contact is made on the calling frequency, we always go to another frequency to continue the QSO.

I often encourage my other friends to try 2 meter simplex, and several of them have been surprised at the results. With only a handheld transceiver, you can make contact with land-based mobiles, aeronautical mobiles, marine mobiles, back packers on a hiking trail somewhere in the mountains — or even with a hang glider!

Often my friends and I will experiment with seeing how much reduction, and then attenuation, of our lowest power settings can be made and still be heard. Once, using not so perfect Yagi beams, we were able to maintain readable voice copy on FM with only (as calculated) about 5 millionths of a watt, over a distance of about 18 miles. Amazing! That led me to better appreciate how scientists were able to maintain contact with the *Voyager* spacecraft, long after it had completely exited our Solar System.

I strongly encourage you to consider the fun that can be had by trying this style of addiction... er, I mean communications. It can be most gratifying.

Steve Jones, N1JHJ
Concord, New Hampshire

DX Disparity

I suppose many others have noticed the disparity between North American-based hams vs those in other parts of the world when it comes to ease of accumulating entities for DXCC awards. Now retired and with more time on my hands than I need, I decided to try to try to attach a quantitative value to this dilemma. Using the Google Earth Tools function, I was able to come up with some interesting numbers. Drawing a 1000 mile circle around my home in Mission Viejo, California, I was able to gather one entity for my DXCC award: Mexico. If I extended that to 2000 miles, I was able to capture two more entities: Canada and, just barely, Guatemala. Grand total: three for a 2000 mile circle.

Now doing the same with Prague — a location that seemed to be centrally located in Europe — I was able to count 53 entities at the 1000 mile radius. Expanding that number to 2000 miles, the count jumps to 86. It is only in the Southern and Southeastern US where there is easy access to Caribbean hams does the ratio begin to become competitive; for most of the US and Canada, the easy pickings are far between. There may be only one other point on the globe where things are equally bad, and that appears to be Perth in Southwest Australia. Maybe with some continental drift things will even out over time. I can't wait.

Dick Martin, W6WVW
Mission Viejo, California

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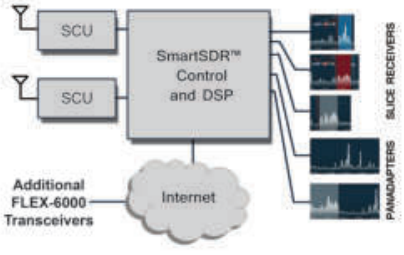

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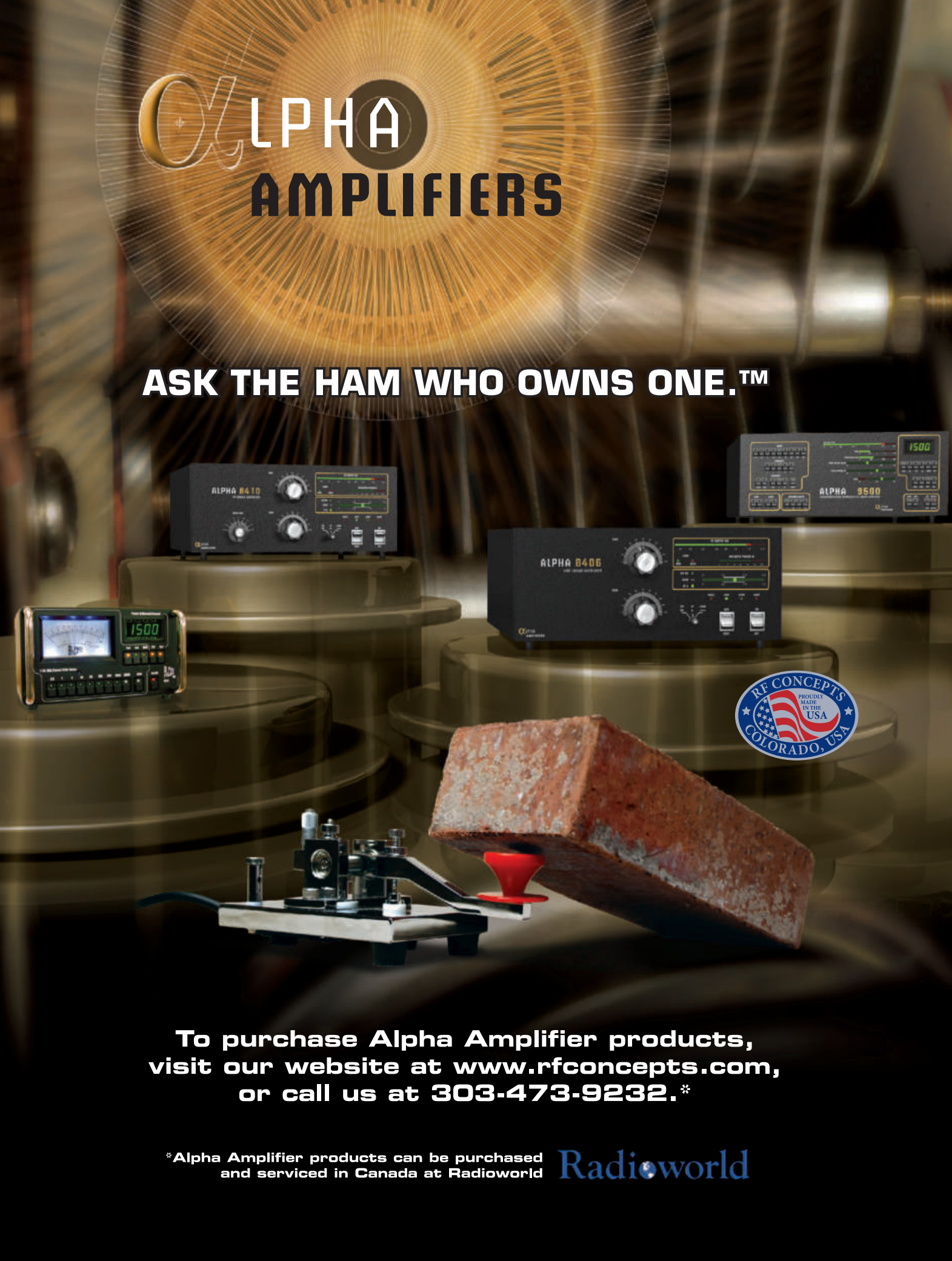
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2, 3, and 4 Element Yagis

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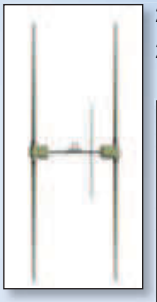
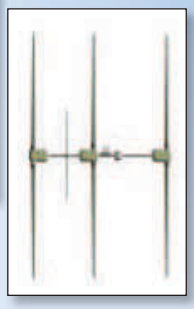


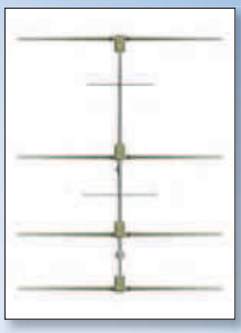
2 Element 20m-6m Yagi

2 element Yagi, 20m-6m continuous coverage; 57" boom, 36 ft longest element, 18.2 ft turning radius, 6 sq ft wind load, 30 lb; SDA 100 controller included.



3 Element Yagi 20m-6m

3 element Yagi, 20m-6m continuous coverage; 16 foot boom, 36 ft longest element, 19.7 ft turning radius, 6.1 sq ft wind load, 51 lb; SDA 100 controller included.



4 Element Yagi 20m-6m

4 element Yagi, 20m-6m continuous coverage; 36 ft longest element, 24.1 ft turning radius, 9.7 sq ft wind load, 99 lb; SDA 100 controller included.

Vertical and Dipoles

For the ham who may not have a tower, but a tree or two for a dipole. SteppIR verticals work great when there are no tall structures around to hang some wire. And, the low take-off angle can be your friend.

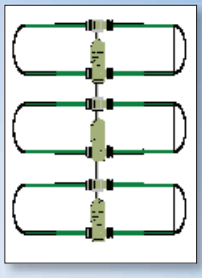
BigIR Vertical Antenna, 40m-6m
BigIR vertical antenna, 40m-6m continuous coverage, 32 ft length, 15 lb total weight, 2 sq ft wind load; EIA 222C wind rating when guyed; Comes with SDA 100 controller and 1.5"mounting pole ; Does not include optional 80m coil.

SmallIR Vertical Antenna 20m-6m
20m-6m continuous coverage, 18 ft total length, 12 lb weight, 1 sq ft wind load; EIA-222C wind rating without guys.

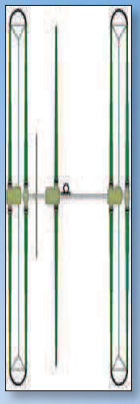
20m-6m Dipole
20m-6m continuous coverage dipole; 36 ft element length; Comes with SDA 100 controller.

Dream Beam Series Yagi's

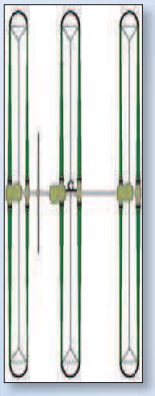
The Dream Beam series offers antennas for both space limited Hams as well as the "Big Guns" who have the space and want the very best.



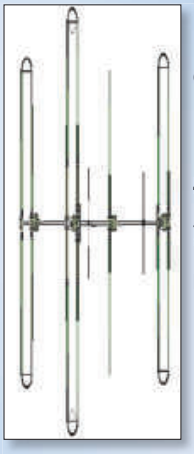
DB11 Yagi Antenna
DB11 Yagi, 18.5 ft element length, 11 ft boom, 10.8 ft turning radius, 61 lb, 5.9 sq ft wind load; 2 active elements on 20m; 3 active elements on 17, 15, 12, 10, 6m.



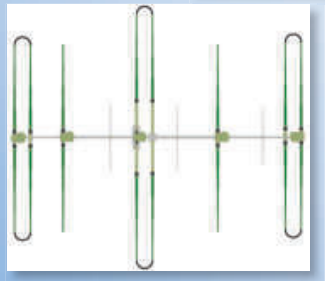
DB18 YAGI
Dreambeam DB18 yagi, 3 el on 20m-6m, 2 el on 40/30m, 18 ft boom; Does not include optional 6m passive element kit; Includes SDA100 controller.



DB18E YAGI
Dreambeam DB18E, 3 el 30m-6m, 2 el 40m, three looped elements, does not include optional 6m passive element kit, 18 foot boom; Includes SDA 100 controller.



DB36 DreamBeam Yagi, 40m-6m
DreamBeam DB36 4 element Yagi, 40m-6m continuous coverage; 36ft boom, 48 ft longest element, 26 ft turning radius, 17.5 sq ft wind load, 160 lb; SDA 100 controller included.



DB46 DreamBeam Pro Yagi
5 elements on 20m-6m and 3 elements on 40/30. DB42 provides coverage from 80m through 6m (with optional 80m dipole kit). The DB42 has a 49 ft looped driven element. End loop elements only 39 feet long, yet the performance is as if all 3 of the loop elements are 49 feet long. 29 ft turning radius, 19.9 ft wind load. Includes basic SDA100 electronic controller, connector junction box and Astron LS3 power supply with cable.

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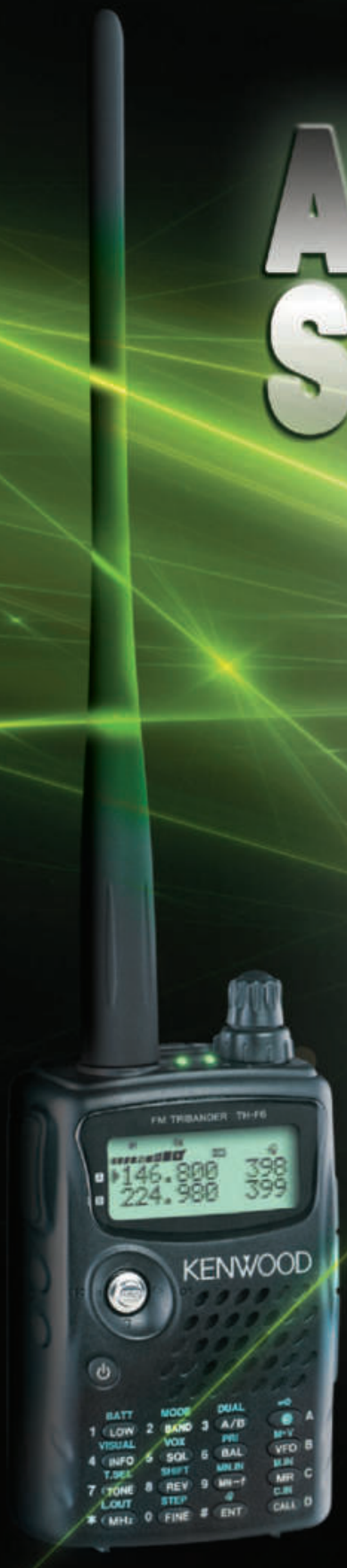
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

[1]Note that certain frequencies are unavailable. [2]5W output



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The Uncooperative Tree

How to put up a 75 meter NVIS antenna in a postage stamp yard.

Allen Pitts, W1AGP

In common with many, I have a small, single family home on an urban lot. The back yard has only 48 × 51 feet of usable space and I wanted a 75 meter antenna for EmComm use. The usual HF frequency for Connecticut ARES® work is 3.965 MHz. Other New England EmComm operations are usually close by.

I have tried verticals, but the background noise in central Connecticut just pegged the needles and I needed the high angle radiation of a low horizontal antenna for near vertical incidence Skywave (NVIS) to support medium range operations. What I needed was some form of loaded dipole that could fit along one side of the yard. Major considerations included the problem that my neighbor's yard on that side is a good 5 feet higher than my yard and there is a sharp drop off at the property line. Our home has aluminum siding and there are no supports for antennas on two other sides. But, on one side, there is that oak tree (see Figure 1).

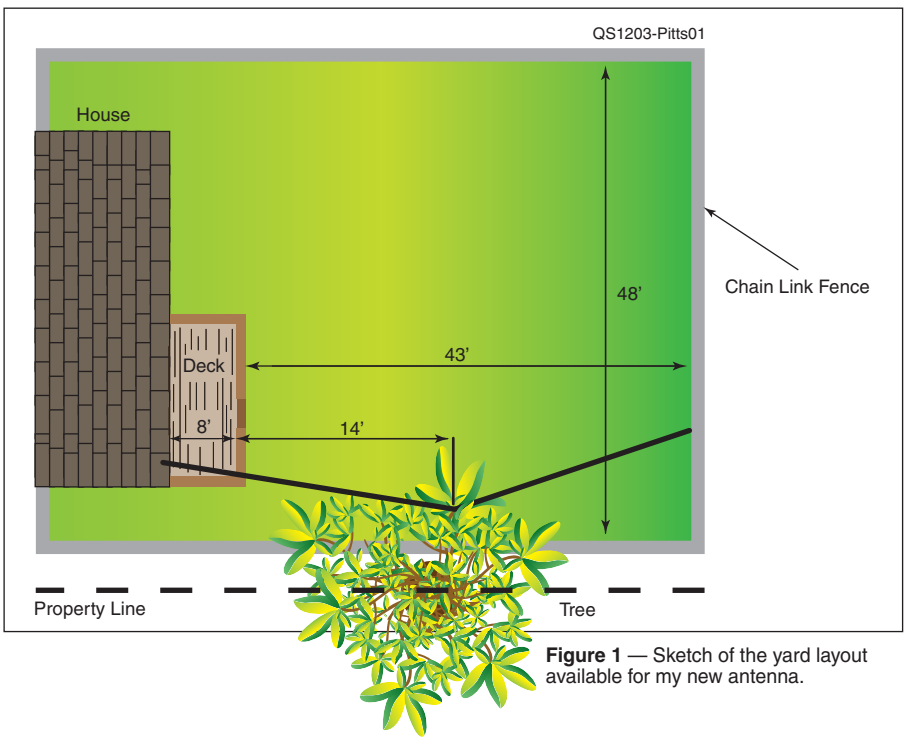


Figure 1 — Sketch of the yard layout available for my new antenna.

A Plan is Hatched

I first approached *QST* Technical Editor Joel Hallas, W1ZR, about the idea of putting an antenna up there and we looked at some options. It should be fairly easy to put a short loaded inverted V up 50 feet or so. Joel came up with a design, set up and ran an *EZNEC* model and soon returned to my office with a printout of a plan (see Figure 2).[1]

[1]Several versions of *EZNEC* antenna modeling software are available from developer Roy Lewallen, W7EL, at **www.eznec.com**.

Just to be on the safe side, I initially ordered 105 feet of the #13 AWG insulated, stranded copperweld, wire. With the dipole only 22 feet per side, that should be more than enough for the antenna and the two loading coils. It wasn't. By the time I made all the coil turns around a 2 inch diameter PVC pipe, just one side used close to 62 feet of wire (see Figure 3). A second order for another 70 feet had to be made. Winding the coils was not hard at all and the rest of the assembly proceeded normally.

We Are Meant to Stay on the Ground

The problems really started when I tried to get a line into the tree. I used a good hunting slingshot, nylon line and some 510 grain bullets from a .45 inch caliber buffalo rifle for the shots. The first one was

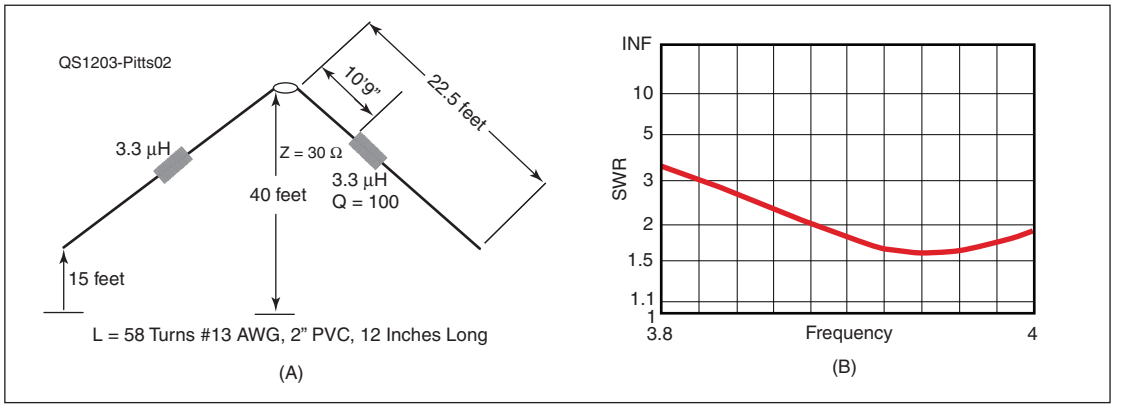


Figure 2 — Design of inverted V antenna for 75 meter NVIS use. At (A) the dimensions, at (B) the predicted SWR.

Figure 3 — View of loading coil.

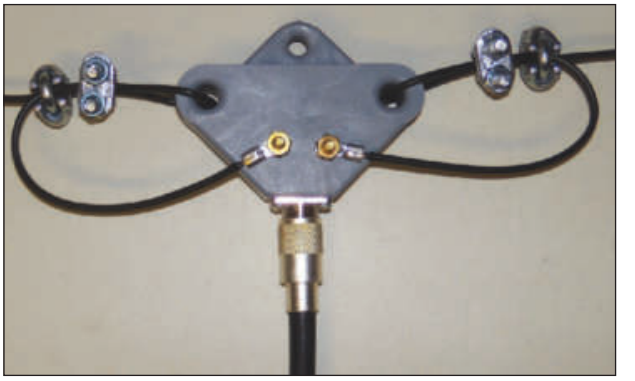


Figure 4 — Center insulator connection and mechanical detail. The wire is secured using wire rope clamps — tightened just to be solid — not so tight that the insulation or wire is deformed. Terminals are crimped and soldered and secured with stainless lock washers to ensure contact. After it's all finalized the coax connector is socked down and taped and all connections and the clamps are sprayed with clear lacquer.

Figure 5 — The coil choke balun keeps common mode currents off the outside of the coax.

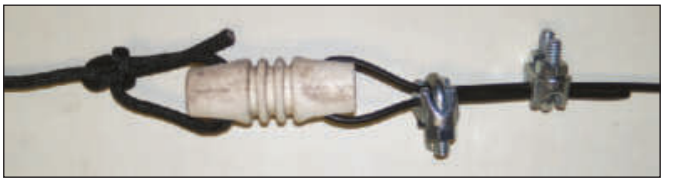


Figure 6 — End insulator detail. The same type of clamps are used as those in the center. These make length adjustment easy.

high enough and in the right place, but it bounced back. Ducking quickly, I avoided a lump on the head. The second and third shot also came back at me. Aiming higher, the next shots went through the canopy, but the thin nylon line got stuck up there and would not move forward or back. The strings are still up there. This went on for three hours! Anywhere I went around that 45 to 50 foot level either sent the lead back at me or got stuck. Eventually running out of daylight, I gave up and went for 35 feet.

Having the main line at 35 feet now posed two new problems. It was not as high as predicted, and that will throw off the SWR curve. I also had to get at least one leg of the dipole to also weave through the canopy of branches.

The following day and many tries later, I got a line through to lift up the northern leg of the dipole and carefully bring it over several

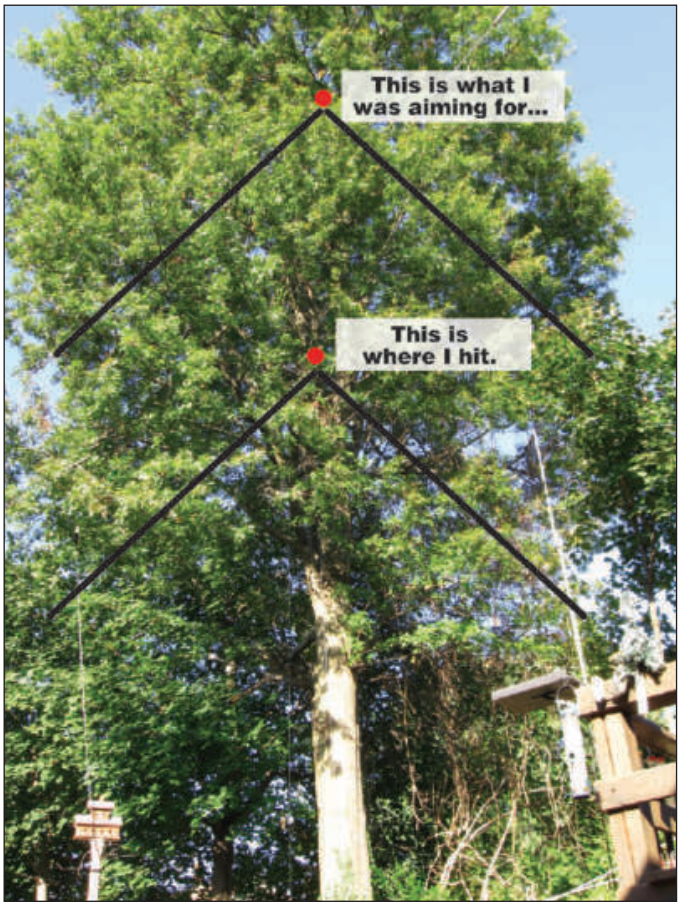


Figure 7 — Antenna installed in tree.

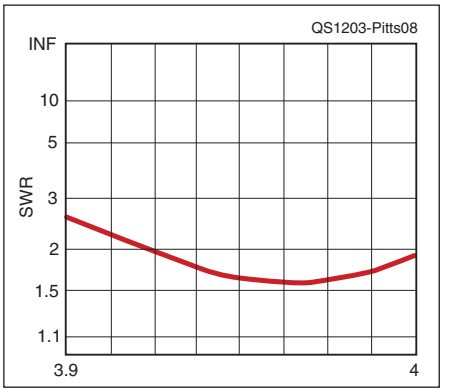


Figure 8 — Measured antenna SWR, just as predicted by ***EZNEC***.

branches before draping down into the familiar V formation. Thankfully, a route for the south leg was easily cleared using a ladder and pole saw.

Tuning it Up

My MFJ antenna analyzer then showed a very sharp SWR curve with a 1.2 reading at 3.54 MHz. The wire was too long. It would have been best to unwrap some of the coil, but I simply could not face taking it all down and starting the erection process all over again. Trimming 3 inches at a time, I removed a total of 22 inches from each end to bring the resonance up to what had been predicted in the plan. The cause of the variation is because of the lower height above grounds — plural as one side of the tree has ground 5 feet higher than the other.

Making it Play

I checked the antenna and feed with an SWR meter and got results that were very much like those predicted by *EZNEC* (see Figure 8). I then hooked it up to my ICOM IC-756PRO transceiver and verified that everything worked. The autotuner in the radio will successfully tune the antenna from 3.86 to 4.0 MHz, covering all local EmComm channels, with the best reading at 3.97.

On the Air — My Test

The antenna did everything I had hoped it would, at least as well as I had expected. I was able to successfully check into all the local and regional nets that I tried, a significant improvement over previous efforts. For a relatively low cost and, once I got a line over the tree, small effort, I'm back on 75 meter SSB for EmComm. A couple of contacts out as far as Ohio also told me that it had a lobe that went westward, not just straight up and down. As a dipole, it should also have the ability to work to the east, but I have not yet gotten a European contact with it. The ARRL's SSB Sweepstakes should resolve that.

The Tree Strikes Back

In an unscheduled stress test, the antenna survived tropical storm Irene. While there were gale force winds in Connecticut, it survived well. But then came the pre-Halloween 2011 snowstorm. The wet snow falling on trees still in full leaf brought down branches and trees by the millions here. Power went out for days to weeks to hundreds of thousands of people. It was a time when you were glad you had ham radio — and needed it! So, of course, this is when the tree struck back.

A branch about 5 inches in diameter snapped in the night with a crack loud enough to be heard inside the house and it hung up on the wire. Like a rabid CCR enforcement swat team, it tried mightily to pull my antenna down or break it, but the antenna held. For three days and nights it hung up there in the winds, too high to reach and not falling on its own. Still the antenna held. Finally, on the third day the oak surrendered at last, the branch fell off and we are at peace (for now).

Photos by the author.

Allen Pitts, W1AGP, is ARRL Media and Public Relations Manager. You can reach him at **w1agp@arrl.org**.

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

New Products

Plum Valley Systems High Temperature Alarm

The TA-100 from Plum Valley Systems is a general-purpose high-temperature alarm with applications as an amplifier overheat alarm. The stainless steel sensor can be glued directly to a heat sink or fastened in the air exhaust area of a tube amplifier. Then the trip temperature is adjusted to be slightly above the value that turns off the alarm while operating the amplifier under normal load conditions. When running hotter, the alarm will activate. Trip temperature is adjustable between 77 and 212 °F. The monitor features a piezoelectric audible warning alarm and bright flashing LED, and an extruded aluminum remote monitor case. The sensor includes a 4 foot connecting wire and uses standard RJ-11 connectors for easy extension (female-to-female adapter included). The TA-100 requires 12 V dc. Price: $62 including sensor, monitor, power cable, RJ-11 adapter, mounting hardware, instruction sheet and shipping within the US. For more information, or to order, visit **www.plumvsys.com**.

MFJ 28 Amp Switching Power Supply

The MFJ-4128 can power HF, VHF or UHF mobile or base transceivers requiring 13.8 V dc. Rated at 25 A continuous (28 A maximum), this basic power supply has five-way binding posts for high current connections and quick disconnect connectors for low current accessories. It also has a 7 A cigarette lighter socket. The MFJ-4128 weighs 4 pounds and measures 2.25 × 7 × 7.5 inches (HWD). It features overvoltage and overcurrent protection and has an internal cooling fan. It operates with line voltages from 85-135 and 170-260 V ac. Price: $84.95. For more information, to order, or for your nearest dealer, call 800-647-1800 or see **www.mfjenterprises.com.**

Tone Magic

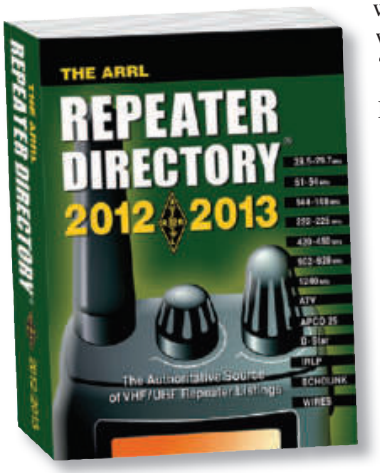
Your FM transceiver sends more than just your voice.

Steve Ford, WB8IMY

"Listen to them — FM transceivers in the night. What music they make!" — *with apologies to Bram Stoker's* Dracula.

I remember the music of FM transceivers in the night — and throughout the day, too.

Back in the early days of amateur FM — excuse me while I adjust my rocking chair — I was a mere high school pup driving a beat-up Chevrolet Impala that carried an ancient General Electric "Progress Line" transceiver in its trunk. The Progress was a VHF FM tube radio that had spent most of its life in a taxi before I stumbled across it at the Dayton Hamvention.® With new crystals and a rough realignment I managed to turn it into a 2 meter amateur FM rig. The behemoth pulled so much current that the poor Impala's headlights dimmed with every transmission. I thought the rig was pretty cool regardless.



The 2012/2013 edition of the *ARRL Repeater Directory*.

The local repeater was a brand-spanking new creation, as were most FM repeaters in those halcyon days. It served a vital purpose as our teenage nerve center, relaying signals from our slapdash radios and allowing us to debate the artistic merits of Pink Floyd well into the night.

The repeater was cobbled together by a group of remarkably patient adults (we called them "repeater gods") who spent their daylight hours working in two-way radio shops. They had easy access to all the surplus FM gear that had recently hit the streets and they used the hardware to fan the flames of what some called the "repeater craze."

For reasons unknown to me, the gods soon decided that our favorite repeater would remain dormant most of the time. It would not "wake up" and begin relaying signals until it heard a particular tone on the input. I don't recall the tone frequency, but on the musical scale I believe it was C#.

To awaken the machine you had to "whistle it up," as they said. If you were a competent whistler you could pucker your lips in front of the microphone and bring the repeater online by starting at the bottom of the scale and sliding upward. The guys with perfect pitch could bring it to life with one precise blow. Others, like me, carried tiny wood or copper whistles in their cars for the purpose (I kid you not). Once the repeater was up and running you could carry on a conversation without need to whistle with each transmission.

Needless to say, we've come a long way in 40 years. Today our FM transceivers send various tones depending upon the application. Some are just single tones, others are dual tones sent together, some are multiple tones sent in rapid sequence and still others are tones that can barely be heard at all.

Tone Burst

The immediate successor to the penny whistle approach was the *tone burst*. As the name implies, this involved an oscillator in your radio that generated a brief tone whenever you needed to bring up the repeater. The built-in tone burst did away with the need to splatter your microphone with saliva or grope in the glove compartment for your whistle.

Tone burst quickly fell out of fashion among amateurs in the United States as better technology became available. However, you'll still find it in use in other parts of the world. In Great Britain, for example, many FM repeaters require a 1750 Hz burst before they will activate. That is why most FM transceivers still include tone-burst capability.

Continuous Tone Coded Squelch System

The technology that made tone burst obsolete was the *Continuous Tone Coded Squelch System*, or *CTCSS*, and it remains the most widely used selective calling system in Amateur Radio today. It has a pedigree that stretches back to a scheme originally devised

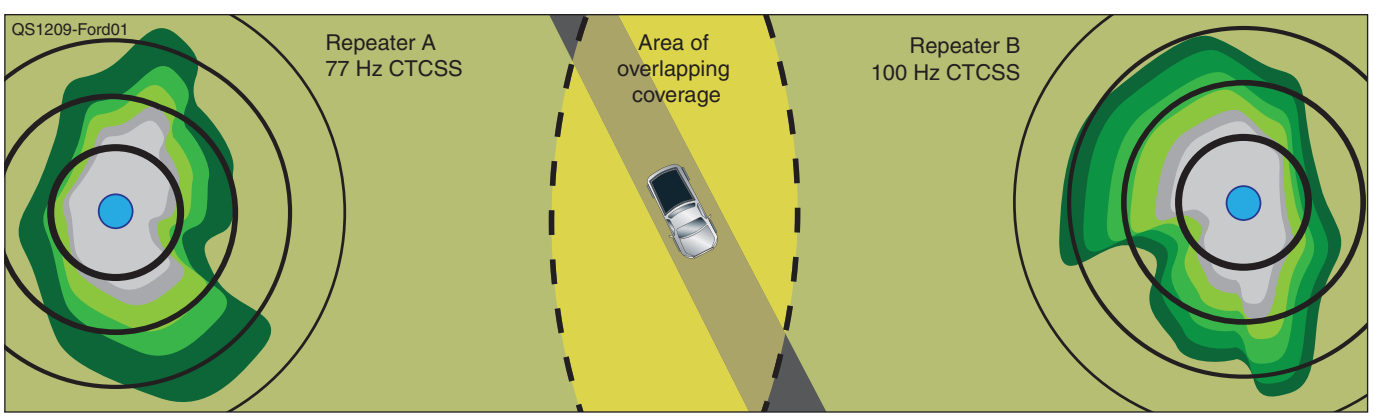


Figure 1 — Let's say we have a mobile operator cruising through an area that just happens to be covered by two FM repeaters that use the same input frequency. When he drives through the coverage overlap zone, his signal will be heard by both machines and both will respond. Thanks to CTCSS, our mobile ham can set his FM rig to transmit a 100 Hz tone that only Repeater B will recognize. Repeater A, which is set up to respond to a 77 Hz tone, won't retransmit his signal and will therefore remain silent.

Table 1
Commonly Used CTCSS Frequencies (in Hz)

67.0	69.3	71.9	74.4	77.0	79.7	82.5	85.4	88.5	91.5
94.8	97.4	100.0	103.5	107.2	110.9	114.8	118.8	123.0	127.3
131.8	136.5	141.3	146.2	151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2	189.9	192.8	196.6	199.5
203.5	206.5	210.7	218.1	225.7	229.1	233.6	241.8	250.3	254.1

by Motorola and known as *Private Line*™, or simply *PL*. You'll still hear hams refer to CTCSS as PL in conversation. They often employ PL as a verb, as in, "The trustees want to PL the repeater."

CTCSS tones are at low audio frequencies. The highest tone in common use is at 254.1 Hz; the lowest is at 67 Hz. See Table 1.

A repeater that uses CTCSS is configured so that its receiver is constantly "listening" for the designated tone. If a transmission isn't accompanied by the proper tone, the repeater won't respond. This isn't a technological secret handshake designed to keep undesirables off repeaters. On the contrary, it has everything to do with keeping interference in check so that repeater systems can serve their users more effectively.

Take a look at Figure 1. In this diagram we have a hypothetical example of a mobile operator who is cruising through an area that just happens to be covered by two FM repeaters using the same input frequency. When he is driving through the coverage overlap zone, his signal will be heard by both machines and both will respond by keying up their transmitters. As a result, the discourse our driver intended for Repeater B will be heard by listeners of Repeater A as well — whether they like it or not!

Thanks to CTCSS, our mobile ham can configure his FM rig to transmit a 100 Hz tone that only Repeater B will recognize. Repeater A, which is set up to respond to a 77 Hz tone, won't retransmit his signal and will therefore remain silent. Everyone is happy.

Since CTCSS is so widely used, you might wonder why you don't hear these tones coming over the repeaters. The answer is that repeaters sharply reduce or "roll off" low-frequency audio after they process the CTCSS tones.

In addition to listening for CTCSS, repeaters often *transmit* CTCSS as well. Again, this usually is done to solve interference issues. Let's say that you live in an area where you can occasionally hear a distant repeater on the same frequency as your local repeater. If the local repeater is transmitting a CTCSS tone and your transceiver has a *CTCSS tone squelch* feature — as most do these days — you can set it to "open" only when it receives the CTCSS tone from the local repeater. That way, you'll never hear sporadic bursts of conversation from the distant machine.

But what about the CTCSS tones sent by the repeater? Shouldn't you at least able to hear those? No. Just like the repeater's receiver, the receiver in your FM rig is also designed to decode CTCSS tones and discard the low-frequency audio before it reaches your speaker.

The *ARRL Repeater Directory* and *TravelPlus* list tone frequencies for every repeater system that uses CTCSS. See Figure 2. Some repeater coordination groups recommend that certain CTCSS frequencies be used by all repeaters in specific areas. If that's the case, the *Repeater Directory* shows this as well. If an individual repeater is using CTCSS on both its input and output, the frequencies are shown with a slash. The CTCSS input frequency is on the left and the output frequency is on the right. For example, "77/123."

DTMF

DTMF stands for Dual Tone Multi-Frequency, more commonly known as *Touch-Tone*™. This signaling method was developed by Western Electric and began showing up in telephones in the early 1960s.

Before Touch-Tone, if you wanted to place a telephone call you had to operate a rotary dial. It created pulses on the line by opening and closing a switch, effectively making and breaking a circuit.

Touch-Tone revolutionized the telecommunications industry because it greatly expanded the versatility and capability of the average telephone. It also made telephones easier to use, as anyone who has fumbled with a rotary dial will attest.

The DTMF signaling scheme itself is ingenious. With the press of each keypad button the telephone generates two pure tones simultaneously (see Figure 3). At the receiving end, a decoder recognizes the tone combinations — and only those combinations — and takes whatever action is required.

Hams quickly capitalized on DTMF. The early and mid '70s found amateurs repurposing surplus Touch-Tone units and using them to control repeater systems. One of the most popular DTMF applications was a type of mobile telephone system known as an *autopatch*. Thanks to autopatches, hams were making phone calls from their cars long before anyone had ever uttered the words "cellular telephone."

A repeater equipped with an autopatch listened for a special DTMF sequence on its input frequency. The magic access code might consist of something like *879. If you wanted to make a call, you keyed your transceiver and pressed *879 on the DTMF pad. The repeater responded by connecting it's receive and transmit audio circuits to a telephone line. You knew you'd hit the jackpot when you heard the repeater sending back a dial tone. That's when you squeezed your radio's push-to-talk switch again and punched in the telephone number you desired.

Autopatch calls were half-duplex affairs,

PENNSYLVANIA

Location	*Output*	*Input*	*Notes*	*Call*	*Sponsor*
Repeater Output	146.4900				
Repeater Output	146.5050				
ALTOONA 123.0					
Altoona	146.6100	–	O 123.0aez	W3QZF	HARC
Altoona	146.8200	–	O 123.0aez	W3QW	HARC
New Germany	145.2100	–	O(CA)elrz	KB3BLF	CCDES
BEAVER 131.8					
Beaver	146.8500	–	Oer	N3TN	TAARA
Beaver	147.1350	+	Oer	N3TN	TAARA
Beaver	147.1650	+	O 100.0r	N3CYR	N3CYR
Beaver Falls	145.3100	–	O 100.0aelr z	W3SGJ	B.V.A.R.A.

Figure 2 — Here's an excerpt from the *2012/2013 ARRL Repeater Directory*. In the left-hand column you'll notice "ALTOONA 123.0" and "BEAVER 131.8." This means that 123 and 131.8 Hz CTCSS tones are recommended for all repeater systems in these two metropolitan areas respectively. In the *Notes* column you will see CTCSS frequencies as well. The strings of letters adjacent to the frequencies indicate particular features each repeater provides (a legend is printed in the front of the *Directory*).

which meant that both parties had to talk in turns. The result was typically an equal measure of frustration and hilarity. (I often resorted to saying "over" during my auto-patch calls.) You also needed to let the other person know that the call wasn't private — everyone listening to the repeater could hear the conversation. Between the half-duplex stumbling and occasional Jerry Springer-esque chatter, autopatch calls often had a certain entertainment value for those of us in the audience.

The non-ham public was highly impressed by this technology back in the day and it came into frequent use during emergencies and other public service activities. Many repeaters still have autopatches, but they have largely fallen into disuse thanks to the wild proliferation of cell phone technology. Even so, DTMF signaling is still used for other remote-control and controlled-access applications, not to mention EchoLink and IRLP. That's one of the reasons most FM transceivers still include DTMF keypads, keypad-equipped microphones or some other form of DTMF functionality.

LiTZ

LiTZ — Long Tone Zero — is a byproduct of DTMF technology. It is basically a method of sending an alert tone to call attention to an emergency situation. The "i" is included in the acronym to make it easier to pronounce.

At its most basic, LiTZ is simply the act of pressing and holding the "0" key on your DTMF keypad and transmitting that tone for at least three seconds. (Think of the Emergency Broadcast System "attention signals" you used to hear on your radio.)

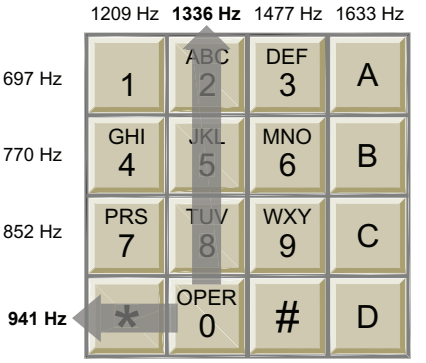


Figure 3 — When you press the buttons on a DTMF keypad, two tones are generated and combined simultaneously. For example, by pressing "0" you'll generate a tone combination consisting of one tone at 941 Hz and another at 1336 Hz.

After sending the alert tone, you are supposed to briefly announce the nature of your emergency and your location. If all goes well, your alert will grab someone's attention and they'll respond.

Some repeaters are configured to respond to the LiTZ alert automatically with prerecorded messages describing how to access the autopatch or other functions. Repeaters with LiTZ support may also alert the control operators and others so they can come on frequency and assist.

Digital Coded Squelch

You can think of Digital Code Squelch (DCS) as an expansion of CTCSS in the digital age. DCS, at least as it is used in analog repeater systems, is essentially a low-speed binary data stream sent over the air using low frequency audio tones. In fact, Motorola calls it Digital Private Line or DPL.

DCS consists of a 32 bit "message" sent repeatedly at about 134 bits per second. If you have DCS encoding switched on, the message is sent continuously whenever you transmit. Since the data is sent using low-frequency audio, no one hears it for the same reasons described previously.

The advantage of DCS is that it uses a large, versatile code set and is more reliable when it comes to decoding the message on the receiving end. Although many FM transceivers have DCS capability, it is seldom used. That said, there are repeater systems that prefer DCS to good old CTCSS. You'll find these listed in the *Repeater Directory*.

DCS also comes in handy when you want to indulge in selective calling, whether it is over a repeater or on a simplex frequency. If your friend has a DCS decoder in his radio, he can activate it and configure the decoder to respond only to a particular DCS code. When you come on the air and begin transmitting with the DCS code you've both agreed upon, your friend's radio will "open" and he will hear you speaking. Some transceivers will even behave somewhat like answering machines, sending alert tones to get your buddy's attention or at least leaving a message flag to let him know you had called.

Steve Ford, WB8IMY, is the Editor of *QST*. You can contact him at **sford@arrl.org**.

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

ARRL VEC Volunteer Examiner Honor Roll

The ARRL VEC Honor Roll recognizes the top 25 Volunteer Examiners according to the total number of exam sessions they have participated in since their accreditations. Since each session requires an average time commitment of 2-4 hours or more, the thousands of hours these VEs have invested is extraordinary! Whether you are one of our VE Teams that test once a week, once a month or once a year, we want to express our warmest appreciation to all volunteers for their generous contribution to the ARRL VEC program.

If you are an ARRL VE, you can see your session stats online at **www.arrl.org/ve-session-counts**.

If you're not a VE, become one! See **www.arrl.org/become-an-arrl-ve**.

Examiner	*Sessions*	*Accreditation Date*
Harry Nordman, AB0SX	520	09-Jan-02
Sammy Neal, N5AF	516	20-Nov-84
David Bartholomew, AB0TO	421	22-Mar-02
Franz Laugermann, K3FL	399	01-Dec-91
Kevin Naumann, N0WDG	398	17-Nov-02
John Moore, III, KK5NU	378	21-May-95
Karen Schultz, KA0CDN	377	06-Sep-84
Royal Metzger, K6VIP	368	29-Apr-85
Bill Martin, AI0D	365	01-Nov-84
John Mackey, Jr, KS0F	348	01-Oct-90
Paul Maytan, AC2T	341	06-Sep-84
Jeanette Nordman, AB0YX	334	21-Aug-03
Victor Madera, KP4PQ	330	01-Mar-92

Examiner	*Sessions*	*Accreditation Date*
Richard Morgan, KD7GIE	326	11-Aug-00
Gerald Grant, WB5R	325	04-Jan-85
John Hauner, K0IH	315	11-Jan-85
David Fanelli, KB5PGY	312	01-Oct-91
Daniel Calabrese, AA2HX	300	01-Nov-91
Adolph Koehler, K5VCR	294	29-Sep-95
E. Drew Moore, W2OU	292	01-Aug-90
Robert Hamilton, N0RN	289	19-May-87
Michael Faucheaux, N5KBW	287	15-Jul-96
Loren Hole, KK7M	287	06-Sep-84
Gary Mangels, AD6CD	286	30-Jul-97
Frankie Mangels, AD6DC	282	14-Oct-97

Power Carts for Scouts and Field Operations

For Jamboree or a public service activity — roll your power to where you need it.

Larry Sack, N8QNM
Ron Doyle, N8VAR
Jim Storms, AB8YK
Mike Weyant, KC8VKG
Andy Sack, KD8OKQ

Working as a member of the K2BSA staff at a National Scout Jamboree® is a labor of love, sweat and passion for teaching radio to youth. Alongside Jamboree On The Air (JOTA), it is a premiere event to introduce Scouts and Venturers to the world of radio.

Every four years, the Boy Scouts of America (BSA) holds a National Scout Jamboree at which 40,000 youth and 8000 staffers create a once-in-a-lifetime event. The 2010 jamboree was especially noteworthy. It was delayed a year to coincide with the 100th anniversary of Scouting in the US and was the last held at Fort A. P. Hill in Caroline County, Virginia.

K2BSA staffers teach Radio Merit Badge, demonstrate all radio modes, teach license classes and hold volunteer examination (VE) sessions. Additional functions, such as Scout traffic nets including health and welfare message delivery, are handled by the staff. While some staffers live in barracks, the majority live in tents large enough to have their own weather systems. Electricity is sparse with one 40 W bulb for a dozen staff. Tapping into this system is strongly discouraged and actively enforced. The conditions are similar to those at many emergency preparedness deployments. [These details may be different in 2013 and later. — *Ed.*]

All of the authors are involved in Scouting in some capacity. Mike Weyant, KC8VKG, is a long-time Radio Merit Badge counselor while Ron Doyle, N8VAR; Jim Storms, AB8YK, and Larry Sack, N8QNM, were selected as K2BSA staff members for 2010.[1] Andy Sack, KD8OKQ, is an Eagle Scout and ham who attended the National Scout Jamboree as a participant.

This project grew out of a desire to provide temporary power for the 10 days of the National Scout Jamboree. Later, these units are intended to be used for powering stations at summer camps and weekend outings and any emergency or public service events.

Even though we weren't able to size the units for 10 days of air conditioning in the hot humid days of Virginia's July, we were able to establish a workable power budget to allow for LED lighting, a VHF/UHF radio, cell phone recharging and laptop use. HF operation is also possible, but with the fantastic K2BSA station just yards away, why bother? To make the power budget work, we built two of these power carts, each with two batteries. As the lessons learned on the first cart were applied to the second, they were aptly named Power Cart Alpha and Power Cart Beta.

The Functions

The main components include batteries, charging, distribution, inverters, and safety and monitoring devices. We purposefully left out an onboard charging source so we could use any external nominal 12 V charging source such as wind, solar, automobile, generator or Scout muscle power. We also wanted to make the power cart flexible by providing a variety of dc power connections. In addition to the ubiquitous Anderson Powerpoles, the power cart also sports accessory ports, automotive cigarette lighter sockets and binding posts. This arrangement allows for hams, as well as non-hams, to charge their consumer electronics. A computer uninterruptable power supply (UPS) is included to provide 120 V ac if desired.

The Batteries

Early on we included Mike Weyant, KC8VKG, as our power consultant. Mike's expertise and contacts proved not only educational, but he was able to secure the mother of all batteries for our use. The

Figure 2 — Power cart with table top in operating position.

Figure 1 — Andy, KD8OKQ, mounting the power cart chassis to the cart.

[1]Notes appear on page 40.

original concept for each cart was to use standard size deep cycle batteries. This would have required four batteries per cart, set up in two banks of two paralleled batteries to get close to the desired capacity. The prospect of needing eight high end deep cycle batteries was quickly becoming a huge cost driver.

We contacted EnerSys, a battery manufacturer, to discuss our plans and power budget. The batteries they recommended and donated that we used in the power carts are Odyssey brand Model PC2250. These are similar to NATO 6T size tactical vehicle batteries also made by EnerSys.[2] These are absorbent glass mat (AGM) batteries rated at 120 Ah (1225 CCA), that are said to be able to function as new after more than 120 very deep discharge cycles.

[These batteries, while ideal, would be quite expensive if purchased. An alternative would be to use AGM marine batteries. These are also intended for deep cycle use and can be found at a lower price at marine supply dealers. — *Ed.*]

Their steel armored cousins are used in your average tank and armored personnel carrier. These batteries weigh 88 pounds each and have a very low internal resistance. We were very wary of the 5000 A short circuit capability so avoided the prospect of vaporizing a wrench or screwdriver. The weight of the batteries, as well as the charger and inverter, drove the next major component — the packaging.

The Carts

At nearly 300 pounds, the power cart components are not only unwieldy but dangerous to handle. Since Lord Baden-Powell, the founder of Scouting, said "never do for a boy what he can do for himself," we wanted Scouts to safely transport power carts. After looking at hand trucks, trash toters and various chests, we settled on garden carts with a 500 pound rating and making our own cabinets from plywood. The large pneumatic tires are well suited to the rough terrain we see in Scout camps. These carts were procured at a local store at a going out of business sale. To keep the batteries stable in the cabinets, we included heavy eyebolts and ratcheting nylon straps. See Figure 1.

After sizing the components, we realized that a flat configuration was nearly high enough to serve as an operating platform. Andy, KD8OKQ, built the cabinets out of ¾ inch CDX plywood. The top is 20 × 36 inches and is 30 inches off the ground. The interior is 16.5 × 34 × 12 inches deep. See Figure 2. All power connections are directly below the power cords of the laptop and radios making up the station. When stowed, the entire power cart is sealed against the weather with all connections, cords and parts enclosed. Ventilation for these gel cell batteries is not needed during charging. Andy redesigned the support system when Power Cart Alpha's lessons revealed a more stable surface was needed for operating.

Wiring it Up

Wires from the batteries and main switches are #10 AWG stranded wire. The main power switch used is double position and the load is shared between both sides of the switch. This permitted use of a lower rated switch to hold down the cost. All secondary wire is #12 AWG stranded except for the monitoring circuit wiring, which is #16 AWG since it was available in the junk box.

Connectors for the wiring are neutral screw type bars available at any home supply store. These were used to simplify the connections and future wiring modifications. The use of separate positive, "boosted" positive, negative and ground bars provide ease of connection. Since we have not yet implemented the booster, a #10 AWG jumper interconnects the battery and boosted bars. We are considering rewiring the batteries in series to obtain a 24 V input to the booster in order to better supply a 100 W HF rig. Having these bars would simplify that change. Crimp style ring connectors are used on the switches. See Figure 3.

The panel is constructed of scrap polycarbonate and all switches, fuse holders and receptacles are arranged along the working edge of the operating platform. See Figure 4. Room is left for expansion. The MFJ-1124 with six Anderson Powerpoles is a good choice as we already have metering upstream and the binding posts will allow for creative wiring solutions. Inverters were scavenged from surplus computer UPS systems to ease the aching wallet. Minor (and delicate) surgery with a reciprocal saw outfitted with a metal cutting blade allowed these units to take up very little room in the case. A current reading meter was also mounted on the panel.

Charging and Electrical Safety

One of these batteries will accept all the juice you can give it and, if discharged, it appears as a virtual dead short to most chargers. So if you have a charger capable of 100 A or more, it will recharge very quickly. Be careful, though, to keep in mind your charger's duty cycle. A typical automotive battery charger is limited to about 20 A and at this rate it would take a long time to fully recharge these batteries. We were fortunate to obtain a charger from the manufacturer designed specially to recharge these batteries.

Diodes rated at 30 A from Mike's ample junk box were considered to allow safe use of the circuits while charging. This idea was quickly discarded due to voltage drops across those diodes, however. We also considered "kill plugs" with wiring such that the entire system was disconnected at the pull of a connector block. This idea was also discarded due to the inability to charge one battery while using another. We finally decided to use a DPDT switch of sufficient capacity and rotary battery cut off switches. After having searched the famed Mendelson's in Dayton for hours, we came to the conclusion that we couldn't afford a switch that could handle the current.[3] We did find a suitable 10 pound switch in a long forgotten corner of Dayton Electronics and Liquidation Outlet (formerly Mendelson's) third floor, but not everyone will hit that jackpot.

Figure 3 — Installing battery hold downs and wiring blocks.

Figure 4 — Plastic control panel, batteries and inverter mounted ready for wiring.

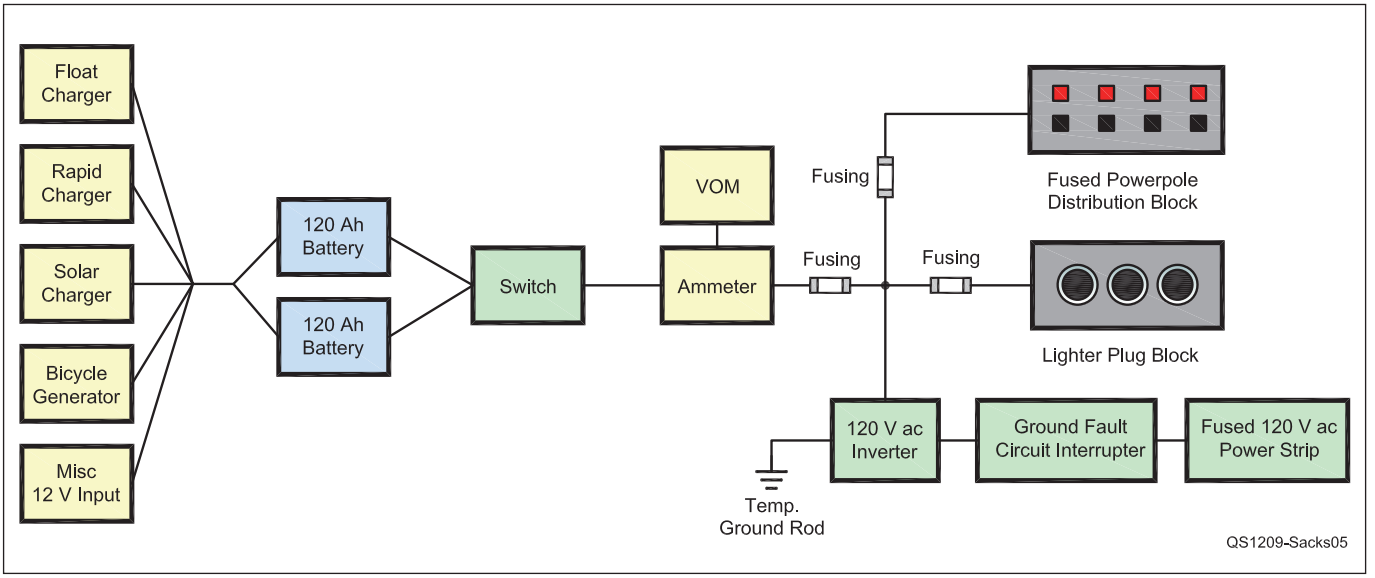


Figure 5 — The block diagram of the power cart.

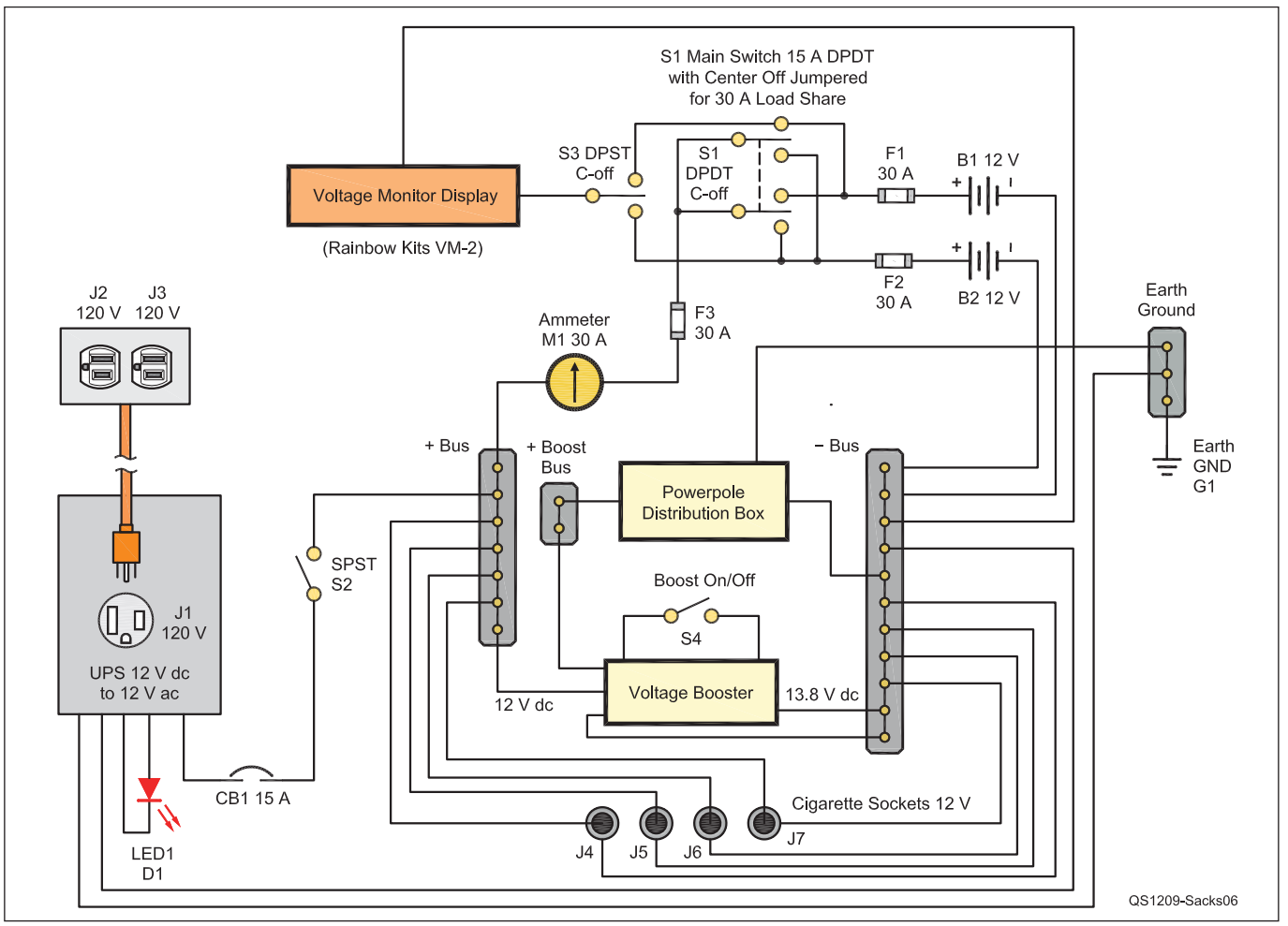


Figure 6 — Schematic diagram and parts list of the power cart.

B1, B2 — 114 Ah (1225 CCA), 12 V, AGM, gel cell Odyssey battery model PC2250 (or any NATO 6T size tactical vehicle batteries or deep discharge marine battery).
CB1, CB2 — 15 A, 12 V dc circuit breaker.
D1 — Power indicator LED removed from UPS and mounted on panel.
F1-F3 — 30 A dc panel mount fuse.
J1-J3 — 15 A grounded ac outlets.
J4-J7 — Automotive type cigarette lighter sockets.
M1 — 30 A dc ammeter.
S1, S3 — DPST center-off toggle switch, 15 A (see wiring notes in article).
S2, S4 — SPST toggle switch, 15 A (see wiring notes in article).
Four wheeled garden cart with a 500 pound rating.

Figure 7 — Control panel with power outlets. See text regarding lack of GFCI.

Figure 9 — Panel with fusing, meter, Powerpole strip and switches. See text regarding circuit breakers.

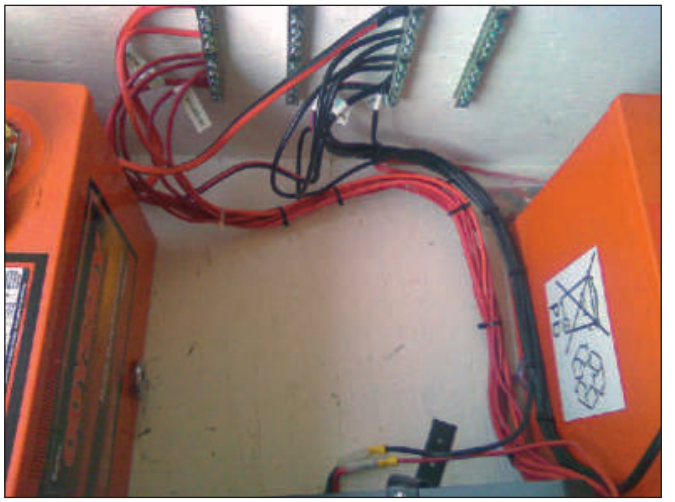


Figure 8 — Wiring blocks without jumpers for voltage maintainer.

Figure 10 — Inverter wiring to power ac operated equipment.

We also wanted to incorporate safety on the 120 V ac side of the circuit by installing a ground fault circuit interrupter (GFCI) and a ground rod. The ground rod was relatively easy to include and wire into the box. We found that placing a 90° bend in the top allowed the rod to be easily removed from the ground and fit in the case without shorting the circuits. We ran into an unexpected problem with the GFCI, however, as it would not reset on battery power. After substituting several different GFCIs and extensive testing using different grounding sources, we came to the conclusion that the UPS does not pass the ground through when operating from battery power. Consultation with *QEX* editor and fellow K2BSA staffer Larry Wolfgang, WR1B, revealed some possible reasons having to do with the capacitance and inductance being out of phase. We ultimately removed the GFCI from the project.

How it Worked

At its inaugural use, N8VAR and AB8YK were disappointed in the inability of the unit to maintain the required voltage for a 100 W HF rig. Probing with a meter identified a whopping 2.8 V drop across the 20 A circuit breaker originally installed. Replacing this with a glass tube fuse vastly improved the delivered voltage with only a negligible drop.

At the Jamboree we were able to run lights, cell phone chargers, handheld transceiver chargers and fans for three people for 16 days. With several days above 100° and the heat index even higher, fans were the biggest draw and the biggest need. Since we only drained one of the four batteries we brought, we're bringing bigger fans next time and seriously eyeing the air conditioner.

After the Jamboree, Scout Troop 390's JOTA station was powered by both power carts. This included Alinco DX-70TH, Kenwood TS-430S and TEN-TEC Argosy II HF transceivers and a Yaesu FT-8800R VHF/UHF transceiver. Performance of the carts was flawless — and we only needed one of the two batteries in each cart for 24 hours of operation.

Construction

The block diagram is shown in Figure 5 and a schematic is shown in Figure 6. Note the circuit was complicated by the desire to have a dual battery arrangement. To protect rigs from charging voltages, we isolated the two batteries via a DPDT switch. The UPS supplied 120 V circuit is controlled by switching the dc power lead to the inverter. The inverter we used required some modification, as a power-on button had to be pressed after the battery voltage was applied. Some experimentation revealed which switch we could bypass to make the power-on condition permanent. The power LED indicator was also moved to our cart panel.

Our cabinet, shown in a number of the photos,

works well for us, but any insulating container of suitable strength can be used. This cabinet is designed to provide a small operating desk. The lid is attached via two offset piano hinges that both raise the lid to the right height and bring it forward over the operator's knees. Andy's redesign with two supports make the lid solidly locked in place. Handles were attached at each corner. These must be very sturdy, for when the box is lifted off the cart it still weighs in around 250 pounds. So during an emergency preparedness event, not only are you providing your own power, you are also bringing your own operating desk.

Voltage monitoring was achieved by using a Rainbow Kits dc voltage monitor (VM-2) with a row of LEDs that operated like a fuel gauge.[4] This allows us to have a quick glance read on the voltage state of each battery. To better monitor the battery voltage during use, we opted to include a panel voltage meter in addition to the current meter.

Power Carts Charlie and Delta

We intend to build two more of these power carts applying what we've learned:

Since these batteries have a huge capacity, we may select a smaller deep cycle battery as the B side battery.

An upright configuration may prove easier to maneuver at the cost of an operating platform. Voltage monitoring is a key component and an inexpensive digital voltmeter tapped in at the radio itself may be useful. A voltage boost regulator would be a good addition to allow operation to continue after the batteries discharge below the point at which the radio will no longer operate.

Further experimentation with an oscilloscope might identify the reason why the GFCI won't reset on battery power. We'll be checking if the current and voltage are in the correct phase relationship.

This has been a very useful and enjoyable project that provides power for emergency deployments or while "roughing it" with Scouts. With all the electronics in our lives these days, having a little juice isn't a bad thing at all.

Notes

[1]"In Brief: 2010 National Scout Jamboree," *QST*, Oct 2010, p 12.
[2]**www.odysseybattery.com**
[3]**www.meci.com**
[4]**www.rainbowkits.com**

ARRL member Larry Sack, N8QNM, is a transportation engineer for LJB Incorporated and is the Committee Chairman of Troop 600, Phillipsburg, Ohio. This was his third Jamboree and first on K2BSA staff. Larry was first licensed in 1991 and holds an Amateur Extra class license. You can reach Larry at **n8qnm@arrl.org**.

ARRL member Ron Doyle, N8VAR, is employed as a MarkLogic Database Administrator at Elsevier. He has been a Scouter for 36 years and has been on K2BSA staff for the past three Jamborees. Ron was first licensed in 1992 and holds an Amateur Extra class license.

ARRL member Jim Storms, AB8YK, is an IT support professional and has served as a Scouter for over 16 years. This was his first Jamboree. Jim holds an Amateur Extra class license and was first licensed in 2002.

Mike Weyant, KC8VKG is an electrical power systems engineer for the US Air Force and has served in many Scout positions over the last 19 years. He was first licensed in 2002 and holds a Technician class license.

ARRL member Andy Sack, KD8OKQ, is a freshman studying mechanical engineering technology at Sinclair Community College. Andy was first licensed in 2010 and holds a Technician class license.

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

In The July/August 2012 Issue:

■ George, KJ6VW, and Shelley, KG4SRS, Works describe the extensive experiments they undertook while looking for "Confirmation Measurements of Vector Potential Waves." In an effort to duplicate the experiments Bob Zimmerman, NP4B, reported on in the July/August 2011 issue of *QEX*, they confirmed that the plasma tube does detect signals, but they may have an explanation that does not involve vector potential waves.

■ Glenn Elmore, N6GN, introduces a different way to think about how an antenna radiates signals in "A New Antenna Model." In the May/June issue we learned about surface wave transmission lines (SWTL). Now Glenn describes a way of looking at an antenna as a SWTL, providing an impedance match between the 50 Ω feed line and the 377 Ω impedance of free space. This can help us visualize radio waves travelling along dipole elements, and then radiating off the antenna.

■ Sivan Toledo, 4X6IZ, describes the "High Performance Sound-Card AX.25 Modem" that he developed. Sivan describes some common problems that AX.25 software modems exhibit, and explains how his modem solves those problems. The software modem is available for download from the ARRL *QEX* files website.

■ Dr Christopher Kunze, DK6ED, has used 80 and 160 meter Beverage antennas. The length of such receiving antennas is a deterrent to many Amateur Radio operators who might benefit from the low-noise characteristics of these antennas. Dr Kunze has some suggestions for solving that problem in "New Results on Shortening Beverage Antennas."

■ Steve Whiteside, N2PON, describes the design and construction of "A Linear Scale Milliohm Meter." This dedicated low-resistance measuring instrument can simplify many troubleshooting tasks. The author describes several ways the meter will come in handy around just about any ham shack.

■ You will find all this in the July/August 2012 issue of *QEX*!

QEX is edited by Larry Wolfgang, WR1B, (**lwolfgang@arrl.org**) and is published bimonthly. The subscription rate (6 issues) for ARRL members in the US is $24. For First Class US delivery, it's $37; in Canada and internationally by airmail it's $31. Nonmembers add $12 to these rates. Subscribe to *QEX* today at **www.arrl.org/qex**.

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Strays

QST congratulates...

ARRL member Linda McMillen, W5LMC, of Arlington, Texas, recipient of two awards — the Texas Citizen Corps Jack Colley Leadership Award and the City of Arlington Volunteer of the Month — for her public service activities following the April 3 North Texas tornadoes.

Radio in a Bag

Public service communications became personal to me after the Tohoku earthquake and tsunami.

Tim Factor, KT7F

I used to read about go-kits in Amateur Radio magazines more with curiosity than interest. It seemed that the go-kit concept had as its major theme the ability to set up an emergency communications station to assist authorities in an emergency. I have the greatest respect for those hams who provide the very important emergency communications required during life threatening emergency situations. I never saw myself suited for that level of emergency response, so I did not pay much attention to emergency communications. That is until March 11, 2011.

The News Hits Home

That was the day Tohoku Earthquake and the resultant tsunami happened in Japan. When I looked at those tsunami films, I realized that my location in coastal California is strikingly similar to Sendai, Japan and that's how disaster recovery communications became personal.

During the past year, I have tried to determine what public service communication meant to me. Since I am not interested in being a first responder, then what would be my personal needs for post disaster communications? What is it that I would need to communicate and to whom? The answer to that question was I would need to communicate with my wife, and she with me, to let her know that I am okay or on my way and to call for help. Now if the emergency requires us to evacuate our home, as was the case in coastal Japan, then I will need an Amateur Radio go-kit.

So, given my needs, I want a go-kit that is a fully functioning, self contained Amateur Radio station that is small enough that my wife Rosalind, KD7BTR, or I can grab it and go. The result is a radio in a bag.

So Why Use a Bag?

The answer is a medium size cloth tool bag that is rugged, flexible, easy to store, easy to carry and inexpensive. The size and type of bag is the result of the four essential components the bag must hold. I will talk more about the bag later.

The essential components for a complete radio station are a radio transceiver, a power source, a charging system and an antenna.

The Transceiver

Local emergency communications in our area are on VHF/UHF. That means 2 meter and 70 cm FM, so I limited the transceiver search to those that cover those bands. My next considerations were the radio's size, weight, power consumption and ruggedness. Remembering that everything has to fit in a bag, I selected a small dual band radio from Yaesu, the FTM-10R, but radios from other manufacturers may be a better match for your requirements.

This transceiver, in common with others of its genre, can transmit at the 50 W level using a nominal 12 to 13.8 V supply at 10 A or less. Of course it requires less at lower power and that should be used if it can get through. The transceiver had a small enough body to fit conveniently into the exterior pocket of my go-bag. The FTM-10R comes with a 10 foot control cable that provides plenty of freedom to move around.

In addition to the mobile transceiver, I have included a dual band handheld radio. I picked a Yaesu VX-6R 5 W dual band transceiver. This radio can also operate on 222 MHz at 1.5 W, if that is useful. It is also waterproof. This radio with a dry cell battery pack and an extra 1400 mAh Li battery is lightweight and takes little room.

The Power Source

Because my transmit time will be brief, my power demands will not be large, and since my power demands are not large, all I will need is a small rechargeable battery that will meet the following requirements.

I want to be able to transmit a 50 W signal if needed. That means my FTM-10R will need 12 V supply at around 10 A. I will not always need maximum power, but I want full transmit power for those occasions that require it.

The battery must be safe for traveling while in an enclosed cloth bag without leakage and for operating and being charged in an enclosed space. The battery needs to be small enough to fit in the bag and light enough to make carrying the bag practical for me and my wife.

The best technology for this application is one of the recombinant designs (AGM or gel cell) that don't release significant hydrogen while being charged, can't spill and can be recharged many times without losing much capacity. I found two in the 10 Ah range that met my needs. [See "Storage Battery Planning for Public Service" elsewhere in this issue. — *Ed.*]

Charging System

For the battery to be ready for emergency use, it is important that it be fully charged to start with, and I must be able to keep it charged for extended operations. These requirements suggest two solutions.

On the Grid

While I was developing this concept, it dawned on me that not every such communication need

Figure 1 — The ½ inch copper dual band J-pole antenna cut into 15 inch segments with ½ inch copper threaded fittings to screw together for reassembly. Notice that the antenna parts are wrapped in a ripstop nylon rain poncho.

will involve leaving the home station. As an added bonus the radio-in-a-bag can still serve as a home station. As long as the home utility is still providing power, I can use that energy source to keep the batteries charged. To prevent overcharging, I just need a trickle charger to hold the battery at a float charge.

Off the Grid

Since my energy demand is low, a small trickle charge system should be enough. That means while my station is not connected to the power grid, I will rely on solar power. It is important to note, that my solar power need is to recharge the batteries, not operate the equipment.

The Antenna System

The antenna must literally stand on its own and be able to handle a maximum 50 W of RF. The good news is there are a lot of good dual band UHF/VHF antennas on the market. In this application we want to avoid the complications and space required for a radial or counterpoise system, if feasible. It must be resonant on our desired bands and support our transmitter output power.

With a little thought, I came to the selection of a dual band, copper tube J-pole antenna. I happened to have a J-pole that I had used on UHF/VHF years ago. The only problem is that with it fully assembled it would not fit into a bag, so I cut it into 15 inch segments (see Figure 1). I added copper male and female threaded joints so that it can be quickly assembled and disassembled. After making this modification and adding a five turn coil coax choke at the feed point (see Figure 2) I tested its resonance with my antenna analyzer and found my SWR to be under 2:1 on both bands.

The Antenna Support

I used to do a lot of outdoor target shooting and used to make target stands out of PVC tubing. This seemed like it might work for my J-pole. The J-pole has a 6 inch stub on the bottom that can be attached to a mount. I made a stand using a 24 foot long piece of ½ inch schedule 40 PVC pipe. I added a center piece made from a ¾ inch threaded PVC T connector. With the ¾ inch T pointing up, the 6 inch long, ½ inch diameter stub on the J-pole fits in nicely and the antenna was securely mounted (see Figure 3). Lastly, I am using a 15 foot ready made RG-58 coax cable to connect the radio to the antenna. This is lightweight and flexible, and it fits into the internal pocket of the bag. My cable gives me enough length to make a coil choke at the feed point of the J-pole. The cable length allows the antenna to be at least 10 feet from the operating position, sufficient to meet RF safety compliance requirements.[1]

Figure 2 — The feed point choke prevents current from coming back to the radio via the outside of the coax. It is five turns of the RG-58 transmission line held together with zip ties.

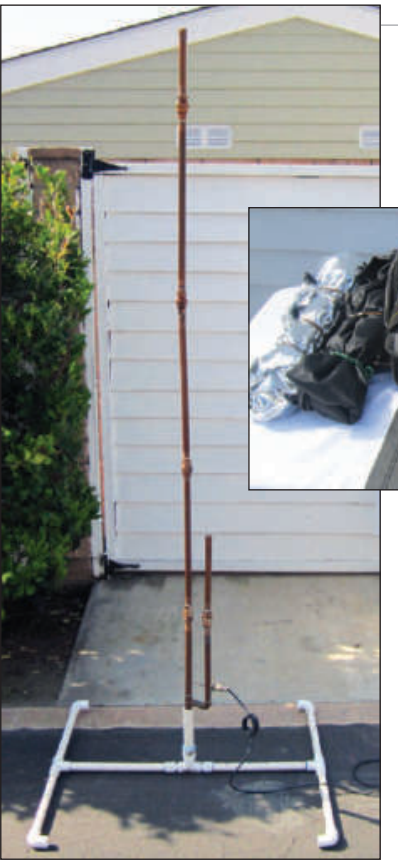

Figure 3 — The fully assembled J-pole antenna and stand ready for action.

Figure 4 — The bag surrounded by the equipment and gear it carries.

The Bag

Probably the most important consideration is that the station container must be large enough to carry the entire station, small enough so as not to be intrusive while setting next to my chair in the living room and light enough that my wife or I can carry it. The cost also must be affordable.

To achieve what I wanted, my container had to have both handles and a shoulder strap. The idea is that in an emergency you will need the use of both hands. The shoulder strap allows that. Since weight is always a concern, especially when you are using your shoulder, the container must not substantially add to the total weight of the station.

The last two considerations are that it must be either waterproof or water resistant and have external pockets to access the transceiver and power supply.

While shopping at a home improvement center one Sunday afternoon, I came across an American Work Products heavy duty polyester water-resistant tool bag.[2] The bag measures 19 × 11 × 10 inches with two 6 × 5 × 3 inch external pockets with hook and loop fastened flaps (see Figure 4).

The bag concept with a dual band VHF/UHF radio, SLA batteries and inexpensive antenna all combine to provide the additional benefit of a very affordable public service radio station. The radio in a bag is truly a go-kit that is meant to go.

Notes

[1]E. Hare, W1RFI, *RF Exposure and You*. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 6621. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop/**; **pubsales@arrl.org**.

[2]**www.awpconstructiongear.com/products.asp?cat=accessories**

ARRL member and Amateur Extra class operator Tim Factor, KT7F, has been an active ham since 1998 when he received his Technician class license and the call KC7ZJM. He earned his current license and call the following year. He enjoys making contacts worldwide using both CW and PSK-31.

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

Storage Battery Planning for Public Service

Ampere-hour ratings can be misleading — know what you can really expect from that lead-acid battery.

Joel R. Hallas, W1ZR

Lead acid batteries have long been the mainstay of remote public service and emergency operations if commercial power is unavailable. While portable generators are often another viable solution, they add their own logistic and noise issues, frequently making batteries the best choice.

Once you know the fuel utilization rate of a generator, it is pretty easy to plan on sufficient fuel for any anticipated operation. The same kind of planning should be applicable to lead-acid battery operation, but it is often more complicated.

Ampere-Hours — What Could Be Simpler?

Lead acid battery capacity is rated in ampere-hours (Ah). It seems like a simple concept, and there are batteries with a wide range of capacities. Available units range from small batteries at around 5 Ah, used in computer uninterruptible power systems and emergency lighting, through automotive size in the 80 Ah range to much larger systems for special purposes. In general, weight and cost increase with capacity. Let's take a fairly typical battery for many applications — my old, deep discharge, size 24, absorptive glass mat (AGM), 80 Ah Douglas Guardian DG 12-80 battery. A look at the 80 Ah rating may make you think that I could get 12 V at 1 A for 80 hours, or 12 V at 80 A for 1 hour. None of those numbers happen to be the case!

What the manufacturer means is that it will supply 80 Ah if discharged at a 4 A rate for 20 hours. At the end of that discharge, the voltage will have dropped from 12.6 to 10.5 V. At this point, the battery is not completely discharged. Pulling it down farther will result in a more rapid reduction in capacity for future charge-discharge cycles, however. Table 1 provides the discharge characteristics at various current levels, as specified by the manufacturer, including the delivered capacity for each case.

Two items should stand out. First, the 80 Ah rating applies to a specific current level; it will be less at higher currents. Second, the voltage from the battery will not remain at 12 V for long, and in relatively short order may not be sufficient to operate radio equipment. It may be functional for other applications such as lighting and heating, however. Note that this battery is a sealed recombinant deep cycle battery, all important characteristics for this service.

Table 1
DG 80-12 Discharge Data

Rate (h)	I (A)	V_{end} (V)	Ah
20	4.0	10.5	80.0
10	7.0	10.5	70.4
5	12.8	10.2	64.0
1	49.1	9.0	49.1

How Much Voltage Do I Need?

If you are using battery power directly, it is important to know how much voltage your equipment requires in order to operate properly. Most equipment specifications indicate required operating voltage, and recent *QST* Product Reviews of equipment indicate minimum voltage for satisfactory operation. The requirement is quite different for different equipment, so make sure that you understand what you need. Note that in most cases, a transceiver will receive fairly well at a low voltage, but if switched to transmit will fail. Make sure that you conduct any testing at the maximum power you will be using. Don't just look for some output, but check for signal quality. One HF transceiver that I used while testing a backup power system seemed to work down to 11 V — until another ham broke in to say I had spurious signals across the whole band!

Wire Resistance is Critical

One reason transceivers fail on transmit is due to the additional voltage drop in connecting wires with the higher transmit current. Table 2 in the *QST* Digital Edition shows the voltage drop in a 12 foot length (24 total feet of wire) of power cable for a typical HF transceiver that draws 20 A key down.

Avoiding Problems By Using a Boost Regulator

A boost regulator is a special kind of switching power supply that accepts an input voltage anywhere from above 13.8 down to perhaps 10.5 V dc (adjustable in some units) and provides a constant 13.8 V at the output. This not only compensates for the gradually decreasing voltage from the battery, but by supplying the full 13.8 V allows use of "home station" size power cable. Thus with the boost regulator, we can make use of more of the capacity of a battery, saving the cost of buying more or larger batteries. We have reviewed some of these in *QST*.[1]

Putting It All Together

With the above considerations in hand, you have the tools necessary to determine what your storage battery needs are. First list your requirements in terms of operating current. Determine the current drain of your radio equipment during receive mode and add your continuously operating accessories. Decide what your transmit *duty cycle* will be — the fraction of time you will be in transmit mode — perhaps 0.3 for a contest station, 0.10 in public service operations. Your average current drain will then be:

$$I_{AV} = I_T \times D + \{I_R \times (1 - D)\} + I_A$$

where:

D is your transmit duty cycle

I_T is your transmit current. For FM and RTTY, use the key down current, for CW and SSB use 50% of key down.

I_R and I_A are your receive and accessory currents.

For example, for an SSB station with a 0.3 transmit duty cycle, 20 A key down, 3 A receive and 1 A of accessories:

$$I_{AV} = \{(20 \times 0.5) \times 0.3\} + \{3 \times (1 - 0.3)\} + 1 = 6.1 \text{ A}$$

[1]P. Salas, AD5X, "Product Review — Battery Boost Regulators from TG Electronics and MFJ Enterprises," *QST*, Nov 2008, pp 46-49.

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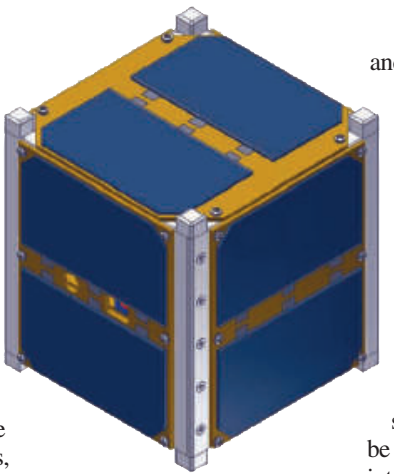
For updates to this article, see the *QST* Feedback page at www.arrl.org/feedback.

Steve Ford, WB8IMY, wb8imy@arrl.org

Great Things in Small Packages

Hams have built some impressively large satellites over the years, including the giant AMSAT-OSCAR 40, but we're also renowned for our prowess at designing much smaller spacecraft. For example, the Amateur Radio *MicroSats*, launched in 1990, were highly effective as analog and digital relays, along with serving as experimental platforms for their supporting organizations. On the outside they looked like little more than boxes covered in solar cells. They were so light you could hold one easily in two hands. Inside, however, they contained some fairly sophisticated circuitry.



An artist rendering of AMSAT's Fox-1 CubeSat. [AMSAT]

The idea behind MicroSat technology was to save development time and cost by relying on highly compact designs and cleverly integrated electronics. Because of their small sizes, MicroSats were also more likely to find rides to orbit when payload space was tight.

We didn't stop there, however. Our designs evolved quickly, giving us tiny CubeSats and even smaller nano and pico satellites. To this day the Radio Amateur Satellite Corpora-tion, better known as AMSAT, is still exploring the frontier of compact amateur satellites with their recent ARISSat and the upcoming Fox-1 CubeSat.

Our accomplishments haven't gone unnoticed, especially by the military. Planners at the Pentagon's Defense Advanced Research Projects Agency (DARPA) have been examining the idea of building small satellites that could be deployed on short notice into very low orbits (even lower than the International Space Station). These tiny birds would provide tactical information at times when existing military satellites were not available.

DARPA announced the project with the following statement: "We envision a constellation of small satellites, at a fraction of the cost of airborne systems, that would allow deployed war fighters to hit SeeMe on existing handheld devices and in less than 90 minutes receive a satellite image of their precise location to aid in mission planning." The statement adds that each constellation should consist of about 24 satellites able to stay in low-Earth orbit for 60 to 90 days before burning up on re-entry.

It's nice to see that our pioneering work has remained influential more than two decades after the first MicroSats took flight. We proved that small satellites could accomplish large goals and our string of successes continues. Consider this a note keep on hand for the next time someone asks if ham radio still has a role to play in blazing new trails for modern technology.

All this progress comes at a cost, of course. To keep Amateur Radio securely in the space technology spotlight consider donating to the AMSAT Fox-1 mission. You can easily donate online at **www.amsat.org/amsat-new/fox/**.

See your September digital *QST* for a video interview with Gould Smith, WA4SXM, about the Fox-1 satellite.

Portable Water Purifier

This being the emergency preparedness issue of *QST*, I sought a little "Emcomm Eclectic" among the wealth of new gadgets. What caught my attention was a pocket-sized device that is ideal for thirsty hams on long deployments in locations where safe drinking water is scarce.

This ultraviolet sanitizer produces two cups of pure drinking water in 40 seconds. The sanitizer is the device above the container.

Using the same technology trusted to sanitize hospital instruments, this gadget sold by Hammacher-Schlemmer allegedly eliminates 99.9% of germs from a container of water. The water sanitizer emits UV-A and UV-C light to penetrate bacterial membranes, destroying their DNA and thereby killing harmful microorganisms like E. coli, Staphylococcus and Salmonella. They claim it can purify two cups of water in 40 seconds when the wand attachment is inserted into the liquid. The built-in LCD screen counts down the time left until the water is sanitized and displays "OK" when the process is complete. It runs on four AAA batteries and is just 6 × 2 × 1 inches. Not a bad deal at $99.95, especially when you're desperate for a drink and there is no potable water in sight! You'll find it for sale at **www.hammacher.com/Product/82279**.

Mark J. Wilson, K1RO, k1ro@arrl.org

TEN-TEC R4040/YouKits HB-1B Four Band CW QRP Transceiver

Take four band CW to the woods with this petite transceiver

Reviewed by Chuck Skolaut, KØBOG
ARRL Field and Regulatory Correspondent
k0bog@arrl.org

The newest addition to the lineup of low power (QRP) equipment available from TEN-TEC is the TEN-TEC R4040/YouKits HB-1B. (We'll just call it the HB-1B for this review.) The HB-1B builds on earlier two band units, the R4020 (40 and 20 meters) and R4030 (40 and 30 meters), which we reviewed in February 2011 *QST*.[1]

Like its predecessors, the HB-1B was designed and manufactured in China by the company known as YouKits. TEN-TEC is the exclusive distributor for the United States. This addition to the lineup was anticipated by many QRP operators who followed announcements on the YouKits website (**www.youkits.com**). I eagerly received the radio to check out and try on the air as I was one of those following updates on the web.

Features and Enhancements

All of the good attributes of the two banders have been retained in this model plus some exciting improvements have been added. The HB-1B features full frequency coverage on the 80, 40, 30 and 20 meter bands for receiving and transmitting CW as well as reception of SSB phone signals. In addition to the four amateur bands, the receiver covers 3.2 to 16 MHz for shortwave listening. This can provide some additional entertainment when activity is slow in the ham bands. Memory storage increases from 20 to 30 addresses.

Probably the most important and appreciated feature is an adjustable four pole crystal filter, continuously variable from 400 Hz to 3 kHz bandwidth. In the two band radios, IF bandwidth was switchable among several fixed values. The HB-1B shows improved IMD dynamic range, several dB better on 20 meters compared to the R4020 two bander.

The original two band units are quite sophisticated and offer a nice array of features for the QRP operator. In the original review I fondly recalled the era of the classic Tuna Tin 2 transmitter featured in *QST* and marveled at how far modern QRP equipment technology has advanced.

The HB-1B is slightly smaller and lighter than the two band radios. This is welcome news for backpackers who value compact size and every little weight reduction that lightens their load. The radio weighs in at just over 13 ounces, about 3 ounces less than the two band unit without internal batteries, and is classified as a trail friendly radio (TFR). Aiding in the description of being trail friendly is the smaller size (5.2 × 3.4 × 1.4 inches, not including knobs).

The HB-1B features the same sturdy steel case construction as the two band radios, along with a BNC antenna connector. It is designed to lay flat on the operating position. The front panel features an easy-to-read bright blue LCD screen, the main tuning knob, four push button switches, IF filter and audio gain controls and a separate power switch. The LCD shows the frequency, mode, dc supply voltage, RIT offset, S meter on receive and power output on transmit. The main tuning dial and the four push buttons have multiple uses to enable selection of the various modes and functions.

A plus with the LCD frequency display is being able to know exactly where you are on the band. I've used some other QRP transceivers with vague frequency displays that make it a little more difficult to find the QRP calling frequency or keep a schedule with a friend. The main tuning steps can be changed by pressing the tuning knob to switch between 10 Hz, 100 Hz or 1 kHz. For verification of the change an underscore (_) appears on the display for the appropriate digit. For the general coverage frequency range outside the ham bands, the highest tuning rate is increased from 1 kHz to 5 kHz. For quick excursions, press and hold the tuning knob for 2 seconds to change the tuning step to 100 kHz.

To enter into the RIT mode, simply press the RIT/MOD button. A dash will be displayed and turn the tuning knob for your desired

Bottom Line

The TEN-TEC R4040/YouKits HB-1B QRP CW transceiver offers a wide array of features for its price range. With four bands (80, 40, 30 and 20 meters) to choose from, there's usually someone available for a low power CW QSO.

[1]C. Skolaut, KØBOG, "TEN-TEC R4020 Two Band CW QRP Transceiver," Product Review, *QST*, Feb 2011, pp 54-56. Product Reviews mentioned here are available to ARRL members online at **www.arrl.org/product-review**.

Key Measurements Summary

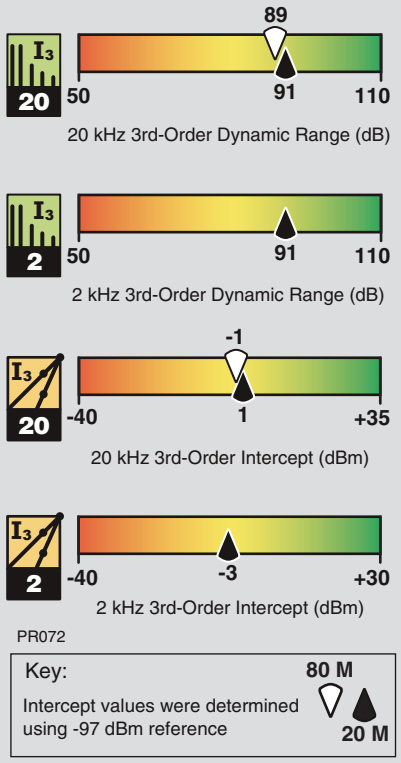


Table 1
TEN-TEC R4040/YouKits HB-1B, serial number N/A

Manufacturer's Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 3.2-16 MHz; transmit, 3.5-4.0, 7.0-7-3, 10.1-10.15, 14.0-14.35 MHz.	Receive, 3.1993-16.0007 MHz; transmit, 3.4991-4.00029, 6.9953-7.30429, 10.0967-10155.69, 13.9667-14.35569 MHz.
Current drain: transmit, 800 mA at 12 V dc; receive, about 80 mA; external supply voltage, 9-14 V dc.	13.8 V dc external power: Receive, max audio, no signal, 79 mA; transmit, 980 mA. Battery power (12 V dc): Receive, max audio, no signal 79 mA; transmit 890 mA. Minimum operating voltage, 6.0 V dc (0.5 W output).
Modes of operation: CW transmit and receive; SSB receive only.	As specified.
Receiver	**Receiver Dynamic Testing**
Sensitivity: Not specified.	Noise floor (MDS), IF filter set to minimum bandwidth, –130 dBm; IF filter set to maximum bandwidth, –126 dBm.
Noise figure: Not specified.	17 dB.
Blocking gain compression dynamic range: Not specified.	Not measured.*
Reciprocal mixing dynamic range: Not specified.	Not measured.*

ARRL Lab Two-Tone IMD Testing (IF filter set to minimum bandwidth)**

Band	*Spacing*	*Input Level*	*Measured IMD Level*	*Measured IMD DR*	*Calculated IP3*
3.5 MHz	20 kHz	–41 dBm	–130 dBm	89 dB	+4 dBm
		–33 dBm	–97 dBm		–1 dBm
14 MHz	20 kHz	–39 dBm	–130 dBm	91 dB	+7 dBm
		–32 dBm	–97 dBm		+1 dBm
		0 dBm	–17 dBm		+9 dBm
14 MHz	5 kHz	–39 dBm	–130 dBm	91 dB	+4 dBm
		–33 dBm	–97 dBm		–1 dBm
		0 dBm	–17 dBm		+9 dBm
14 MHz	2 kHz	–39 dBm	–130 dBm	91 dB	+4 dBm
		–34 dBm	–97 dBm		–3 dBm
		0 dBm	–17 dBm		+9 dBm

receiver offset. An up or down arrow on the display shows the direction. This RIT has a wide enough range to easily allow you to use split frequency operation to chase DX pileups. In the RIT mode, the tuning steps are 10 Hz and 100 Hz.

To change receiving modes, press and hold the RIT/MOD button for 2 seconds and then cycle through CW to USB to LSB. The HB-1B has 30 storage memories to store your favorite frequencies and modes to allow quick changes.

The ATT button permits turning the attenuator on and off. When the attenuator is on, the S in the S meter portion of the display will change to A. While transmitting, the HB-1B will display the approximate power output. The letter S on the dial will change to P followed with a series of vertical bars. Each three bars represent approximately 1 W of output power.

The HB-1B is set up for stereo headphones, and one of the cautions is to not use a mono audio plug. There is no built in antenna tuner or speaker, but amplified computer speakers would supply plenty of audio for relaxed listening in the home shack.

CW Features

Either a straight key or paddles for the built-in keyer can be used with this transceiver. It has an automatic function that determines what type of key is being used. On power up you will hear the letter A sent in Morse code if a paddle is connected or the letter M if a straight key is connected. If no key is connected you will hear the letter A. You must plug in a straight key before turning on the power if you desire that kind of operation. A TUNE feature is available, useful for checking antenna SWR or adjusting an external antenna tuner.

The built-in keyer has a range of approximately 6 to 36 WPM. Operation is very much like the keyers in the dual band units. To set the speed, press the CQ/SET button for approximately 2 seconds and the letter S will be heard, then release the button. Within 8 seconds, push the paddle to the dot side to increase the keyer speed or to the dash side to decrease the keyer speed. When finished,

Manufacturer's Specifications	Measured in the ARRL Lab
Receiver	**Receiver Dynamic Testing**
Second-order intercept point: Not specified.	14 MHz, +33 dBm.
S meter sensitivity: Not specified.	S9 signal at 14.2 MHz: 3.47 µV (minimum IF bandwidth), 2.19 µV (max IF BW).
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW and SSB; minimum filter bandwidth, 495-695 Hz (200 Hz). Equivalent rectangular BW: 217 Hz. Maximum filter bandwidth, 447 Hz-1690 Hz, (1243 Hz).
Spurious and image rejection: Not specified.	First IF rejection: 3.5 MHz, 59 dB; 7 MHz, 31 dB; 10.1 and 14 MHz, 40 dB. Image rejection: 3.5, 10.1 and 14 MHz, >140 dB; 7 MHz, 65 dB.
Receiver audio output: 0.1 W into 8 Ω.	27 mW at 7.5% THD into 8 Ω.
Transmitter	**Transmitter Dynamic Testing**
Power output: 13.8 V dc external supply, 4-5 W; 12 V dc supply: 3-4 W.	13.8 V dc external supply: 3.5 MHz, 5.8 W; 7 MHz, 5.4 W; 10.1 MHz, 5.7 W; 14 MHz, 5.0 W. 12 V dc supply: 3.9 W typ.
Spurious-signal and harmonic suppression: Not specified.	51 dB at 3.5 MHz; ≥60 dB other bands. Meets FCC requirements.
CW keyer speed range: Not specified.	6 to 36 WPM.
Iambic keying mode: Not specified.	Mode B.
CW keying characteristics: Not specified.	See Figures 1 and 2.
Receive-transmit turnaround time (tx delay): Not specified.	250 ms.
Composite transmitted noise: Not specified.	Not measured.†

Size (height, width, depth): 1.9 × 5.2 × 3.8 inches, incl protrusions; weight: 13.4 ounces.

Price: R4040/HB-1B, $299; 12 V dc power cube, $19.95; Lithium-ion battery pack, $29.

*The AGC could not be turned off. Blocking gain compression and reciprocal mixing measurements must be made with the AGC off.
**ARRL Product Review testing includes Two-Tone IMD results at several signal levels. Two-Tone, 3rd-Order Dynamic Range figures comparable to previous reviews are shown on the first line in each group. The "IP3" column is the calculated Third-Order Intercept Point. Second-order intercept points were determined using –97 dBm reference.
†Composite noise test not completed. Transmit frequency resolution did not permit tuning the transmitter to within 1 Hz of our low noise test oscillator, causing a PLL unlock on the test fixture.

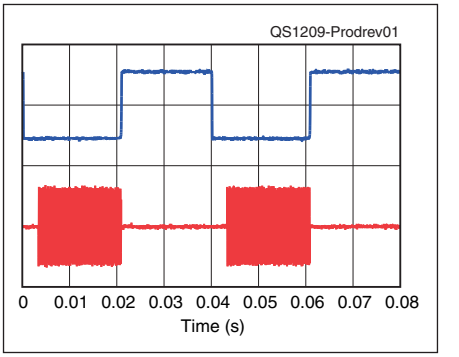


Figure 1 — CW keying waveform for the HB-1B showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. (Note that the first key closure starts at the left edge of the figure.) Horizontal divisions are 10 ms. The transceiver was being operated at 5 W output on the 14 MHz band.

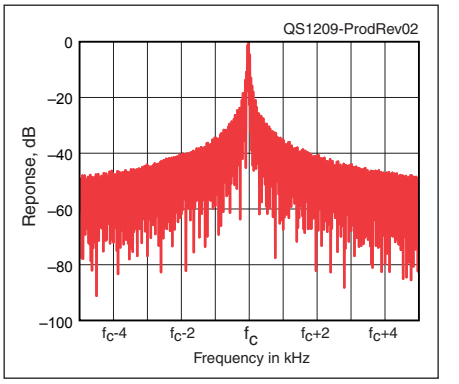


Figure 2 — Spectral display of the HB-1B transmitter during keying sideband testing. Equivalent keying speed is 60 WPM using external keying. Spectrum analyzer resolution bandwidth is 10 Hz, and the sweep time is 30 seconds. The transmitter was being operated at 5 W PEP output on the 14 MHz band, and this plot shows the transmitter output ±5 kHz from the carrier. The reference level is 0 dBc, and the vertical scale is in dB.

again press the CQ/SET button quickly to exit.

The keyer does not include user-defined memories but there is a memory preset to call CQ. To activate it, press the CQ/SET button quickly causing it to send CQ CQ CQ DE (your call sign three times) PSE K. Hitting the CQ/SET button for 1 second at any time during the CQ cancels it. To enter your call sign, press the CQ/SET button for about 2 seconds and you will hear the letter S. Continue to hold down the button until you hear the letter I, then release it and send your call sign with the paddle as usual. When done, a short click of the button will exit the setup. The PSE K format is a bit different than many are used to, but it works. This automatic CQ function is operational when using paddles but not with straight key use.

On the Air

How does it work in the shack? I was very favorably impressed with its operation and had no trouble making contacts with North Carolina, South Carolina, Pennsylvania, New York, Kentucky, Iowa, Ohio, Maine, Illinois and Virginia among others in a leisurely operating timeframe in the evenings on 40. This was with a basic 40 meter dipole only about 15 feet high — on par with many portable setups in the field. I found the audio output level and side tone volume very adequate. Full break-in (QSK) operation is smooth with few thumps.

I give the variable IF filter high marks for

performance in on the air use, finding a number of times when I could eliminate nearby interference that had crept into the passband with careful adjustment of the control. It would take several manually switched filters to match that versatility, and the variable feature ensured the enjoyable completion of the QSO. I had experienced this feature some years back from other manufacturers of QRP gear so it is good to see it incorporated in this model.

Power Sources

The HB-1B may be powered by a 9 to 14 V external power supply such as a battery or home station 13.8 V dc supply. It has a built in polarity protection circuit. Provision is made for an internal supply by using three AA size 14500 lithium-ion batteries (3.6 V, 900 mAh) in the included battery holder. TEN-TEC offers the optional R9411 rechargeable Li-ion battery pack (12 V, 2.2 Ah). It is certainly nice to be able to monitor the supply voltage on the LCD, especially while using the internal pack. Originally, a modification was necessary to be able to charge these batteries internally. A revision to the radio was made in March to add a charging jack and eliminate the need to make this modification.

During the review period I used both a gelled electrolyte 12 V battery and the optional regulated power cube from TEN-TEC. Good tone reports were received with both supplies. During Lab testing, we found that the HB-1B will operate from as little as 6 V dc and the transmitter will provide 0.5 W output at that level.

As with the two band units, SSB stations were easily tuned in and copied.

For better viewing of the display in the home shack atmosphere, I preferred to put a small spacer under the rear of the unit, but many in the field prefer the flat horizontal position. An accessory tilt bail would give an option in this area. TEN-TEC makes an attractive oak stand available for these QRP radios. The HB-1B comes with a four page instruction manual that is adequate but a more comprehensive manual would be a nice plus. A schematic diagram is available for download from the TEN-TEC or YouKits web page.

A Few Rough Edges

ARRL Lab Test Engineer Bob Allison, WB1GCM, noted a few things as he put the radio through its paces. The voltmeter on the display reads 0.5 V higher than the actual input dc voltage; all voltage readings appearing in Table 1 are the true values measured during the various tests. The radio can transmit slightly outside of each of the four ham bands covered; the user needs to keep that in mind if operating near the band edges.

We were disappointed that the keying waveform (Figure 1) and keying sidebands (Figure 2) are very similar to the two band units and could use some attention. The square corners on the waveforms in Figure 1 indicate "hard" keying. Figure 2 indicates signal energy only 40 dB down at ±2 kHz from the carrier. With typical 100 W all band transceivers that energy is 60 to 80 dB down. Given the QRP power levels involved we received no reports of key clicks but the potential is there. Operators will want to check their signal if they plan to use an amplifier together with high speed CW operation.

While using the HB-1B, I noted that the tuning dial has mechanical detents, and there is a bit of play in the shaft/bearing arrangement.

Wrapup

Overall I found the HB-1B to be a good performing CW transceiver that is easy and fun to operate. It offers a lot of features for QRP gear in this price range! For some hams this is a good entry to QRP or backpacking operation because the HB-1B comes assembled, tested and with a warranty.

For me the QRP world remains exciting and it's great to see so many changes and revisions to various models appearing often. Low power or portable operation may be a good alternative for an amateur who is having problems with antenna restrictions or RF interference with neighbors. QRP definitely works, but it may require more patience, timing and persistence than higher power operation. The resulting QSOs can be very satisfying and contribute to the WOW (wits over watts) factor. I would urge any active amateur to take a look at the gear that's currently available, accept a new challenge and give QRP a try!

US distributor: TEN-TEC, Inc, 1185 Dolly Parton Parkway, Sevierville, TN 37862, tel 800-433-7373; **www.tentec.com**.

See your digital edition of *QST* for a video overview of the YouKits transceiver.

N6BT Q-52 Portable HF Yagi

Reviewed by H. Ward Silver, NØAX
ARRL Contributing Editor
n0ax@arrl.org

When ordering my Bravo-7K multiband HF vertical from Tom Schiller, N6BT, I noticed the planned introduction of the two element Q-52 HF Yagi.[2] Tom had a prototype on display at a convention I attended last year, so I suggested a *QST* review when the antenna was ready for production and here it is!

General Specs and Design

The Q-52 is a *five* band, *two* element Yagi — thus the model name (there is also a Q-51 rotatable dipole). It is full size on 10 meters and loading inductors are switched in with relays to lower the resonant frequencies of both the driven and reflector elements for use on 12, 15, 17 and 20 meters. A control box (Figure 3) turns the relays on and off from the shack through a multiconductor control cable. Band switching is instantaneous and could probably be adapted to automated switching schemes.

A separate switch on the control box opens the reflector element for "bidirectional mode," using the driven element as a rotatable dipole. A small inductor is used for a hairpin match to 50 Ω. Ferrite beads create a choke balun between the unbalanced coaxial connection and the symmetrical loading networks. Thus, no additional balun is needed on the feed line. The control cable, I discovered, *does* pick up RF and *does* need a coiled or ferrite bead choke.

Physically, the antenna is lightweight (16 pounds) and has a turning radius of only 9 feet. The boom is just less than 9 feet long and a light duty rotator such as the Hy-Gain AR-40 would suffice. For portable or Field Day use, it could be supported by a guyed push-up mast or fiberglass pole up to about 20 feet and rotated by hand.

A plastic enclosure mounted on the boom houses a circuit board, loading inductors, switching relays and a terminal strip as shown in Figure 4. All supplied tubing is drawn aluminum and the hardware is stainless steel. The plastic enclosures are high impact ABS with sealing O rings (one enclosure did arrive with a minor chip received during shipping).

Table 2 summarizes the published specifications. At 30 feet in height, forward gain is specified to be a minimum of 3 dBd on 20 meters and increasing with frequency. Front-to-back ratio is given as typically 8 to 10 dB. Each antenna is assembled and tuned at a height of 30 feet before shipping.

Table 2
Q-52 HF Yagi

Manufacturer's Specifications

Boom length:	8 feet, 9 inches (9 feet, non-telescoping model).
Turning radius:	9 feet.
Weight:	16 pounds (approx).
Wind survival:	100 mph.
Wind load:	<2 square feet.
Feed point impedance:	50 ohms.
Power rating:	1 kW SSB, 750 W CW.
Minimum gain:	3.3 dBd (20 meters, 30 ft height).
Typical F/B:	8-10 dB (30 ft height).
Power requirement:	12 V dc.
Price: $549.	

First Impressions and Assembly

As with other products I've purchased from N6BT over the years, the mechanical portion of the antenna is robust and well built. Holes that were supposed to line up did so. U-bolts and other hardware were high quality. Welds had no gaps or blobs. Figure 5 shows the parts ready for assembly right out of the box.

The electrical relay assemblies appeared to be soldered well and the coils were made from heavy duty wire. Following the instructions is important but not difficult. I would like to see the photos and drawings integrated with the assembly checklist, though. Total assembly time was a little over an hour from opening the box.

One thing I definitely liked was that the switching enclosures and element center assemblies came already mounted on the boom. This saved a *lot* of time and probably eliminates numerous opportunities for assembly errors. All I had to do was bolt the

Bottom Line

The Q-52 is a compact rotatable gain antenna that covers the upper five HF bands. It is a good choice for an amateur with limited space or for portable operation.

[2]H.W. Silver, NØAX, "Bravo-7K Portable Vertical Dipole," Product Review, *QST*, Mar 2012, pp 52-53.

Figure 3 — The Q-52 control box has a single rotary switch for band selection and a toggle switch to open the reflector element for bidirectional mode.

Figure 4 — The driven element's relay and inductor assembly with the control cables to the shack and to the reflector element attached to the terminal strip.

Figure 5 — The pieces of the antenna as delivered. All pieces are 3 feet or shorter, making the Q-52 easy to transport for portable operation. Total weight of the antenna is 16 pounds.

boom together, telescope and mount the tapered element sections, and attach the control and coaxial cables. This antenna would be simple to deploy in the field.

Once I started the assembly and tuning process, I found several nits that are typical of new products. I've given N6BT a complete list of the things I noticed for future manual revisions. For example, the list of needed tools is missing a couple of items and some additional text or a drawing is needed in a few places. It would be a good idea to specify the use of anti-oxidant compound when assembling all of the metal-to-metal junctions, too.

The electrical assembly is very simple — stick the control cable through the hole and attach the wires in a certain order. The only complaint I have with this part of the process is that the terminal strip orientation makes it difficult to tighten the screws but it is not likely this will need to be done on a regular basis. I also had to tin the stranded wires of my control cable to clamp properly with the solid wire of the provided cable. This minor difficulty aside, the checkout routine went smoothly. It was roof time.

Installation and Tuning

The Q-52 is light so it was not hard to carry the antenna up onto the roof then hold it in place while wrestling the U-bolts into place around the mast. The antenna was easily balanced and mechanically aligned at the mounting point, as well. For a portable or temporary installation this would be a *big* plus. Finding the balance point for the boom-to-mast plate is a step that should be included in the ground level assembly section of the manual.

As you can see in Figure 6, the antenna is installed not far above a wood and composition shingle roof. I found this affected the tuning of the antenna on 20 meters quite a bit. The initial frequencies of minimum SWR were about 200 kHz lower than expected although higher frequency bands were less affected.

After some conversation with Tom, N6BT, a field readjustment procedure was created and has been added to the manual along with an explanation of the circumstances that affect element tuning. In general, any antenna with a standoff distance of less than ¼ wavelength from other antennas or surfaces will be detuned compared to the same antenna mounted in the clear. This is particularly true for Yagis and other parasitic arrays that are highly dependent on coupling.

Back on the roof, and starting with the as delivered element lengths and coil configuration, I was able to raise the 20 meter resonant frequencies easily by adjusting element lengths and the loading coil values. Coil inductance is adjusted by squeezing the turns together (more inductance) or spreading them apart (less inductance).

As you might expect, changing the 20 meter settings also required some tweaking of coils on the higher bands. All told, it took a bit more than a half-hour of adjustment and checking to get the antenna tuned to where I wanted it. The final settings are given in Table 3. The two 20 meter tuning positions overlap enough to keep SWR below 2:1 from the bottom of the band to about 14.300 MHz. My rig's internal tuner easily handled the mismatch above 14.300 MHz.

Since the Q-52 is likely to be installed at low heights, near roofs and buildings, and in the vicinity of other antennas, owners should expect to have to adjust the antenna's tuning on the lower bands, at least.

Rotating the antenna so that the elements were parallel to my 105 foot dipole, which is about 15 feet from the beam, did show some interaction, adding 0.2 to the SWR on 20 meters. No other bands seemed to be greatly affected and I am using both antennas without any problems.

On the Air Performance

I also have nearby a 14 foot vertical antenna/

Table 3
Q52 SWR Data, 50 Foot RG-8X Feed Line

Band Setting	Frequency (MHz)	SWR	2:1 SWR Bandwidth
20L	14.080	1.3:1	140 kHz
20H	14.220	1.3:1	170 kHz
17	18.090	1.3:1	250 kHz
15	21.120	1.5:1	900 kHz
12	24.95	1.1:1	1.5 MHz
10	28.7	1.2:1	1.9 MHz

auto tuner combination with the base height a few feet below the beam. I rewired the shack antenna switching so that I could quickly switch among the dipole, beam and vertical for comparisons. HF propagation is highly variable and very dependent on vertical takeoff angle so it is challenging to give a true comparison of the beam to the dipole and vertical using live signals. I often found signal levels changing by 20 dB or more in a matter of seconds among the three antennas as conditions along the signal path changed.

On 10 and 12 meters, where weak signals accentuate an antenna's strength and weaknesses, I found the Q-52 and dipole to be competitive in the dipole's most favored directions and the Q-52 regularly an S unit or two better away from the dipole's main lobes — the manual provides comparison patterns between a 102 foot G5RV antenna and the beam. The vertical generally came in third although at certain times and in certain directions it would out shine either of the higher antennas. I kept the antenna switch busy!

I found signals on the Q-52 to be up to an S unit stronger on the lower bands than either the dipole or vertical. The Q-52 performed better in directions where the dipole pattern had a null along its axis and on bands where the vertical's gain approached 0 dBd. It wasn't that the Q-52 had all that much more gain than the dipole or vertical but being able to aim the gain carried the day several times beaming over the North Pole and straight east or west to Africa and the Pacific on these bands. Sometimes the height of the individual antennas was just right for a particular signal at a particular time of day, too.

The Q-52's ability to reject noise in directions the symmetrical dipole and vertical could not was also welcome, improving signal-to-noise ratio significantly on occasion. Even at the low height of 30 feet (about ½ wavelength on 20 meters) the advantages of the Yagi pattern were apparent in rejecting interference from other signals and from local noise sources of which there are many in this urban location.

Figure 6 — The completed Q-52 installed on a rooftop mast about 30 feet above the ground. The antenna mounts easily on a 1½ inch mast and can be turned with a light duty rotator such as an AR-40.

Summary

The Q-52 is a very attractive option for a ham with limited space in need of a rotatable gain antenna that covers the upper five HF bands. It is light enough for a chimney mount and a roof tripod will handle it easily. It would be a great step up from a ground-mounted vertical or low dipole if a typical three-element multiband beam isn't a practical option.

For portable operation, the Q-52 is very competitive with other small Yagis. The modest amount of directivity improves the receive signal-to-noise ratio for easier copy of marginal signals and the extra gain over a dipole is always welcome. It seems to me that N6BT has created another winner in the small-antenna field.

Manufacturer: N6BT Antennas, PO Box 1859, Paso Robles, CA 93447; **www.n6bt.com**.

New Products

WXWarn Weather Software

WXWarn from Scott Davis, N3FJP, is designed to download and parse weather data published by the National Weather Service (NWS). *WXWarn* monitors NWS warnings, watches and forecasts and gives an alert as new ones are issued. Audio alerts announce the location and nature of each report. The software can be configured to monitor the entire United States or just a state, county or county list. It can also monitor and screen for specific alerts. *WXWarn* will display up to 12 real-time weather graphics that can be configured for content and size. The software requires *Windows* and an active an Internet connection for current NWS data. *WXWarn* is free of charge and fully functional for permanent use with a small banner ad, or the user can register for $7 to remove the banner ad. For more information, or to download, visit **www.wxspots.com**.

Larry D. Wolfgang, WR1B, tc@arrl.org

Changing to a Delta

Nested Full Wave Delta Loops (April 2011)

The article by Don McMinds, K7DM, "Nested Full Wave Delta Loops for 20 and 10 Meters," in the April 2011 issue of *QST*, pages 30 to 32 caught my attention. Don used separate loops for these 2 bands. This is not necessary, because you can use a single loop for this purpose.

I had experimented with delta loops in 1994 while seeking a DX antenna for 40 m that could be built using local materials in the Kalahari desert of South Africa. I opted to feed it with a 4:1 balun, resulting in an optimized version that I called the H5ANX Mk4 Delta Loop, which allows a single loop to operate on 2 bands without the aid of a tuner.

A full wave delta loop is, by nature, a highly efficient broadband antenna having 1.5 dB gain over a dipole and can be easily configured in multiple ways for polarization. Its impedance will vary between 50 Ω and 200 Ω. Gain and impedance are at the highest when the loop spans the greatest area for a given length. It is a ground independent resonant system that does not rely on the ground to complete the antenna circuit; this is highly desirable for 80 and 40 m. The length of wire for a full wave loop is given by: Length (feet) = 1005 / f (MHz).

Polarization and Feed Point Configuration

A delta loop is vertically polarized when fed from the side and horizontally polarized when fed from the bottom half or top half. Some common configurations are illustrated in Figure 1.

A delta loop works well especially for the lower frequency bands when the antenna is vertically polarized and height is a challenge. When it is fed as shown in Figure 1, Parts A and B, the delta loop will have vertical polarization, and give a low angle of radiation, approximately 28°. In horizontally polarized configurations as shown in Figure 1, Parts C and D, the antenna presents a very high angle of radiation. The configuration shown in Part E presents an exception that shows a moderately high angle of radiation, but also tends to have a low vertical component as well. The best configurations, in order of performance are B and then A, E respectively.

Matching a Delta Loop

I found the impedance of the antenna to be 150 Ω at the fundamental frequency and approximately 200 Ω at the 2nd harmonic.

The standard matching technique, which

Figure 2 — Here is a view of the delta loop configuration E in practice.

Table 1
Delta Loop Dual Band Configurations Fed as in Figure 1B

Full Size Loop	Matched Dual Bands	Intermediate Bands with 3:1 SWR Requiring a Tuner
80 m	80 m, 40 m	60 m
40 m	40 m, 20 m, 10 m, 6 m	17 m, 30 m, 15 m, 12 m
20 m	20 m, 10 m, 6 m	17 m, 15 m, 12 m

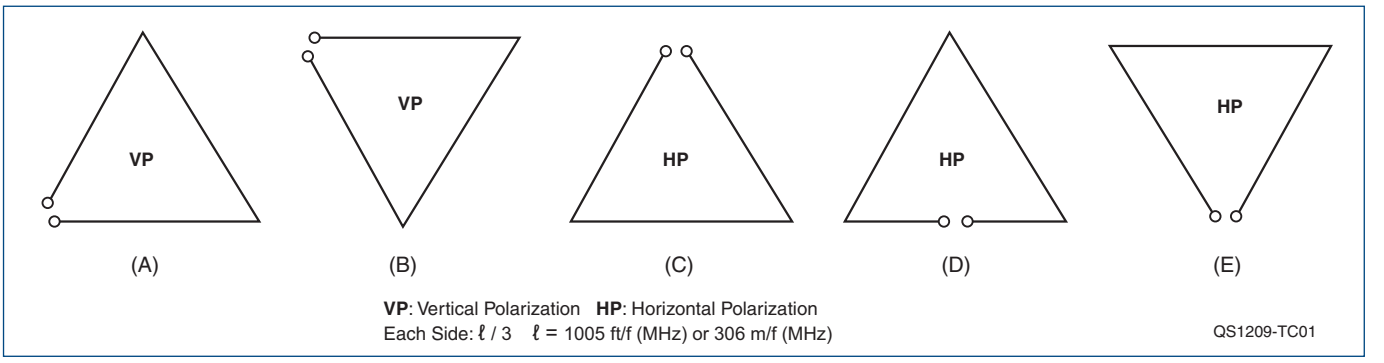


Figure 1 — There are various possible configurations and polarizations for a full size delta loop.

relies on a quarter wavelength 75 Ω transformer, gives a good match for the fundamental frequency but forfeits multi-band performance. I decided to use a 4:1 balun with a 50 Ω coaxial cable since 75 Ω coax was unavailable in the desert of South Africa. This provides an excellent match, giving two band operation on a single loop (200 Ω / 150 Ω = 1.3:1 SWR for the fundamental frequency, and 200 Ω / 200 Ω = 1:1 SWR for the second harmonic). It also opens up to tunable intermediate band operations with approximately a 3:1 SWR. Table 1 shows various band combinations. These full size versions have been successfully built and replicated numerous times by many Amateur Radio operators.

The next challenge in the Kalahari was to construct a 4:1 balun, because I did not have access to a ferrite core or a replacement commercial balun. I improvised by building an air core version based on a 1:1 air core balun by Bill Orr, W6SAI (SK). This balun costs around 3 dollars to build and it is the key to making this antenna perform. The balun can also be used for other purposes.

An Inexpensive 4:1 Air Core Balun That You Can Build

The balun is wound on a piece of white PVC pipe. The balun has two windings which are wound simultaneously.

Material:

1) 4 inch (10 cm) long white/gray PVC pipe.

- 1½ inch (38 mm) diameter for 7 MHz to 50 MHz frequency range.
- 2 inch (51 mm) diameter for 3 MHz to 20 MHz frequency range.

2) Two #16 multi-stranded insulated wires.

3) Stainless steel nuts and bolts (not shown on Figure 3) to terminate the wires and provide anchor points for the antenna wires.

Construction technique:

1) To wind the balun, first put a bifilar winding on the PVC pipe as a dry run, to identify the placement of the terminals.

2) Use a felt tip marker to indicate holes to be drilled for the terminals A, B, C and D.

3) Drill the holes and put in the stainless steel nuts and bolts.

4) Start winding with the top leads of the bifilar winding connected to terminals A and B.

5) Wind 8 to 10 tight turns with the wire from terminal A connecting at C and the wire from terminal B connecting at D.

6) A jumper cable goes from terminal A to D.

7) Cover the coils with a vinyl electrical tape for weather protection.

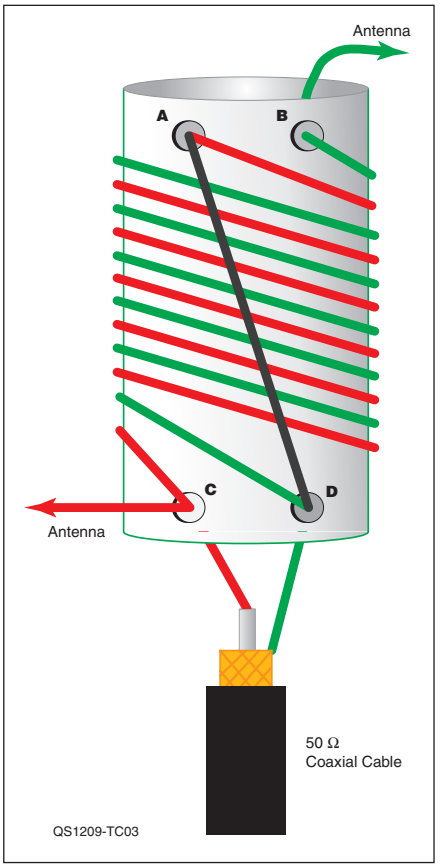


Figure 3 — This diagram shows the balun coil winding details. Stainless steel nuts and bolts are used at points A-D.

External Connections

1) The antenna connects to Terminals B and C.

2) A length of 50 Ω coaxial cable connects with the center lead going to terminal C and the cable shield to terminal D.

To summarize, an air core 4:1 balun, used with either configuration A or B from Figure 1 presents a very effective DX multiband antenna. The balun used with configuration E would be the second best choice. This antenna has given me flexibility and multi-band performance from a number of station locations over the years. The 20 m delta loop, in particular, goes with me everywhere for portable operations across 5 bands. — *73, Sajid Rahim, VA3QY/A22EW/H5ANX, 3474 Hannibal Rd, Burlington, ON L7M 1Z6, Canada;* **sajsanr@gmail.com**

Using a Noise Bridge (Mar 2011)

Walter Mellish, KC2ZKJ, wrote an excellent article, "Using a Noise Bridge and Spectrum Scope to Adjust Your Antenna Tuner," in the March 2011 issue of *QST*. He demonstrated how to use a noise bridge (RX bridge) to adjust your antenna tuner without stressing your transmitter or generating QRM. I'd like to expand on his information by passing along a technique I use to make it easier to hear an RX bridge null point when adjusting an antenna tuner.

My rig, like many, doesn't have a spectrum scope. The method I've been using makes it much easier to hear the null, especially for those with not so pristine hearing (because of age, hearing damage, and other hearing problems). When the null is easy to hear, consistently adjusting the tuner to an SWR of 1:1 or very close is easier.

- Tune to a signal at or close to the frequency you want to tune to. You will not cause QRM with an RX bridge. If you can't find another Amateur signal near your frequency, a steady source of RFI is often available. Now it is time to put the noise bridge to work for you.

- The S9+ noise level from your RX bridge should completely cover up the signal you tuned to. As the tuner adjustments get close to the null point, the signal begins coming out of the noise. Slowly adjust the tuner controls now. Small changes in tuner settings make a big difference in the noise level because impedance changes very quickly near resonance.

- When you can clearly hear the signal, the tuner is properly adjusted. Depending on band conditions and signal strength, the RX bridge noise level will range from barely audible to a noticeably lower level. The SWR should be very close to 1:1.

Why it works: Experienced operators can hear SSB signals close to the noise level, and CW signals below the noise level. The gray matter signal processor recognizes a signal in the noise much easier than a very small change in the noise level.

I do not claim that I discovered this method, but I have not seen it discussed in any articles about using an RX bridge. — *Lew Wallach, N9WL, PO Box 52071, Albuquerque, NM 87181*: **n9wl@arrl.net**

Technical Correspondence items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given idea will work for your situation, we make every effort to screen out harmful information.

Materials for this column may be sent to ARRL, 225 Main St, Newington, CT 06111; or via e-mail to **tc@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of *QST* assume no responsibility for statements made herein by correspondents.

Joel R. Hallas, W1ZR, w1zr@arrl.org

Two Bands for the Price of One

Q Ken, K9YO, asks: Is there a way to modify a marine VHF antenna so that it can be used both on the marine band and on 2 meters?

A There is at least one commercial antenna originally developed for government use, but generally available, that is designed to cover 136 to 174 MHz, a range including both bands (the marine VHF band extends from 156 to 162 MHz). It is the Shakespeare HS-2774-1 Wideband VHF Marine Antenna (see Figure 1).[1]

While a wideband antenna is an elegant solution, it is definitely possible to use regular marine antennas on 2 meters, but the details are dependent on the actual configuration of both antenna and radio system. The antenna part depends on the matching arrangement used. Perhaps the easiest to imagine is a ¼ wave whip for the 156 MHz marine range. My modeling indicates that such an antenna will have an SWR of about 2.3:1 at 146 MHz, which will likely work fine with most 2 meter radios.

It actually gets better. The coax loss makes the SWR seem better at the radio. For typical RG-8X marine coax, we have the results shown in Table 1 (based on *EZNEC* and *TLW* modeling).[2] As is evident, such an antenna should work well on both bands, with just a slight loss penalty due to the mismatch.

Unfortunately, the ¼ wave whip is about the best case, with most marine antennas that I have encountered having more complex feeding arrangements that may have a narrower bandwidth and a higher SWR resulting in higher loss, but still likely a reasonable SWR at the bottom of the cable, depending on cable length. Some radios are more tolerant than others.

On my sail boat, I use a ⅝ wave antenna with a tapped coil matching arrangement. The SWR (and thus loss) is higher, but my radio tolerates it. The height and clear line of sight from the top of the mast seems to more than make up for any loss making it work fine to my repeaters. So use an antenna analyzer to check the 2 meter SWR at the bottom of your cable and see how it compares to your radio's specification. If your 2 meter SWR is too high for your radio, you could use a VHF antenna tuner at the radio to make it work.[3] Note that the loss will not improve, just the match your transceiver sees. Make sure that when you switch to the marine radio, that the tuner is out of the circuit — your marine radio has priority and should work even if you are disabled and unable to operate it.

Table 1
Effect of Mismatched Cable Loss on SWR as Seen at Radio End of Coax

Cable Length (feet)	SWR at Bottom of Coax	Total Cable Loss	Loss due to SWR
25 (powerboat)	1.9:1	1.5 dB	0.35 dB
50 (sailboat)	1.6:1	2.9 dB	0.53 dB

Figure 1 — The Shakespeare HS-2774-1 wideband VHF marine antenna installed on a lay-down mount on the side deck of the sloop *Windfall*. Note that a permanent installation will require an additional support.

Q Ed, K9EGS, asks: My HF transceiver has a menu function for adjusting the transmit carrier point for USB and LSB both with the speech processor on as well as settings for the speech processor off. The manual for the radio does not fully explain this concept and I cannot notice any difference while using the monitor function to listen to my audio. The radio lets me adjust the transmit carrier point from –300 Hz to +500 Hz. Could you explain better what this is or what it does and why I would want to use it?

A Your SSB transceiver generates a single sideband signal using the filter technique as shown in Figure 2. The carrier oscillator signal is mixed in the balanced modulator with the mic audio to

[1]J. Hallas, W1ZR, "Product Review — Shakespeare HS-2774-1 Wideband VHF Marine Antenna, *QST*, Aug 2006, pp 61-62.
[2]Several versions of *EZNEC* antenna modeling software are available from developer Roy Lewallen, W7EL, at **www.eznec.com**. *TLW, Transmission Line Program for Windows*, software is provided on a CD with *The ARRL Antenna Book. The ARRL Antenna Book,* 22nd Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 6948. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop**; **pubsales@arrl.org**.
[3]MFJ offers the MFJ-924 VHF antenna tuner that looks like a good candidate. Or see J. Stanley, K4ERO, "Hairpin Tuners for Matching Balanced Antenna Systems," *QST*, Apr 2009, pp 34-36. It could be adapted for coax fed systems.

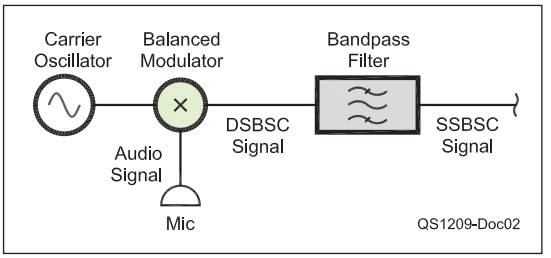


Figure 2 — Block diagram of a typical filter type single sideband generator. The carrier oscillator signal is mixed in the balanced modulator with the mic audio to result in a wideband double sideband suppressed carrier (the balanced modulator eliminates the carrier). The filter selects the desired sideband for transmission.

result in a wideband double sideband suppressed carrier signal (the balanced modulator eliminates the carrier). The filter selects the desired sideband for transmission. Figure 3 shows the frequency spectrum at various points in Figure 2, assuming a fairly typical filter bandwidth of 2400 Hz.

The spectrum from the mic will depend on the mic response and the voice of the operator, but might extend over the range shown. The DSB signal will contain two copies of the voice spectrum translated to frequencies surrounding the carrier oscillator frequency. The sideband filter eliminates the undesired sideband but also restricts the bandwidth to a portion of the wideband signal. By varying the carrier frequency offset (here shown as 300 Hz, a typical value) the desired portion of the speech waveform can be selected.

With a 300 Hz offset, the signal transmitted would include the audio frequencies from 300 Hz to 2400 + 300, or 2700 Hz. If your voice included lower frequency components that you thought would help you get through, by shifting the carrier 200 Hz closer to the filter low frequency limit, you would transmit a signal containing your audio spectrum from 100 to 2500 Hz. Note that the bandwidth is the same 2400 Hz; you are just adding some lows at the cost of some highs.

Q John, NN6JA, asks: I have a number of antennas at the house and prefer them to blend into the background. I've discussed the idea of painting the radials to match my tree line or dark gray (almost black) singles. I spoke to a number of antenna manufactures and this turns out to be a very controversial topic. As long as there are no metallic particles in the paint and I don't paint over any loading coils, why would it be a problem?

A I can't imagine a problem, as long as you don't bridge any insulating materials, just mask them before you paint. Adding a dielectric surface to an antenna conductor will tend to slow down the signal traveling on the conductor. This makes it act somewhat longer than its physical length, thus resonant at a lower frequency.

With wire antennas, going from bare wire to insulated wire results in an apparent lengthening on the order of 2%. I would think the effect of a thin layer of paint would be much less, and likely not noticeable. Still, if you notice a shift of resonant frequency, you may need to shorten things just a smidge.

Jim, W8KGI, wrote in regarding my discussion of the use of the "wedge" connector that was supplied with Vibroplex bugs in years past.[4] *He noted that those who tutored him in such things indicated that they inserted the wedge into the gap in a partially closed circuit closing switch as shown in Figure 4, rather than between the frame and the contact strap, as I indicated. He further points out that some of his keys had painted, rather than bare brass frames, so contact could not be made where I proposed.*

That is interesting to me and it makes perfect sense. I suspect that wedges were inserted wherever they could make contact. The circuit closing switch was a feature (essentially the transmit-receive switch) of land-line telegraph keys. The typical key (bug or straight key) designed for radio use did not have a switch at all. Thus for some the switch contact was the spot for a wedge, while for others the contact strap worked. The ingenuity of the operator faced with the key and station configuration would determine where it was connected.

[4]J. Hallas, W1ZR, "The Doctor is In," *QST*, Jul 2012, p 54.

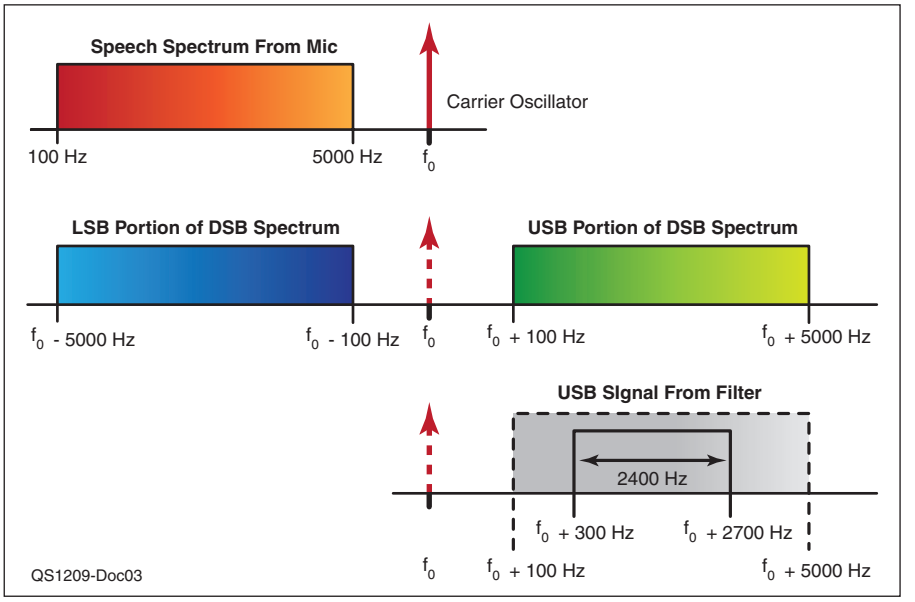


Figure 3 — The frequency spectrum at various points in Figure 2. The dashed carrier oscillator indicates that the carrier is suppressed in DSBSC and SSB modes. The spectrum from the mic will depend on the mic response and the voice of the operator, but might extend over the range shown. The DSB signal will contain two copies of the voice spectrum translated to frequencies surrounding the carrier oscillator. The sideband filter eliminates the undesired sideband but also restricts the bandwidth to a portion of the wideband signal. By varying the carrier frequency offset (here shown as 300 Hz) the desired portion of the speech waveform can be selected.

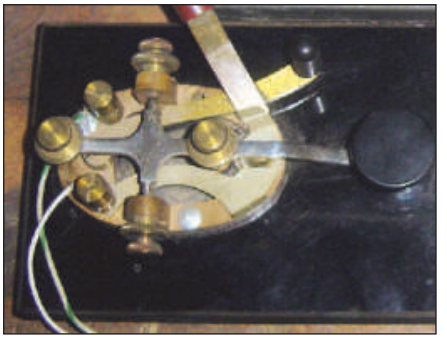


Figure 4 — W8KGI inserts his Vibroplex wedge between the contacts of the circuit closing switch rather than under the contact bar. [W8KGI, photo]

Do you have a question or a problem? Ask the Doctor! Send your questions (no telephone calls, please) to "The Doctor," ARRL, 225 Main St, Newington, CT 06111; **doctor@arrl.org**.

Comet CHV-5X HF Multiband Rotatable Dipole

Mike Corey, KI1U
ARRL Emergency Preparedness and Response Manager
ki1u@arrl.org

When you're operating in the field on a public service deployment, it helps to have an antenna that meets the demands of portability, multiband operation and ease of assembly. The Comet CHV-5X is just such an antenna. It is a rotatable dipole that covers the 6, 10, 15, 20 and 40 meter amateur bands — all within an exceedingly small footprint.

The Comet CHV-5X antenna attached to a mast on the author's deck.

Each arm of the CHV-5X dipole accommodates five "stinger" style antenna elements that screw into the ends, one for each band. The arms can be positioned in a V formation, a ground plane, or just horizontally by adjusting bolts at the center point. At the feed point there is a balun that accepts 50 Ω coax.

What's in the Box?

The CHV-5X arrives in a single box and contains surprisingly few parts; the feed point arrives partially assembled. Included for your assembly are the two arms of the dipole, the antenna elements, the feed point section, U-bolts for mounting, tape and a hex wrench to adjust the rods on the antenna elements. Other than an adjustable wrench few other tools are needed for assembly or installation.

The CHV-5X manual is well written. I found the assembly process to be pretty intuitive and referred to the manual only to double check my work. The manual does provide two pieces of information that are quite useful: (1) the required lengths of the antenna element rods to achieve resonance in each band (the lengths are expressed in millimeters, so you may have to make the conversion to inches), and (2) the 1.5:1 SWR bandwidths on each band. As expected, the SWR bandwidths are very narrow. More about that in a moment.

Putting it Together

Assembly is straightforward. The 40 meter elements screw into the ends of each arm. The other band elements screw in around the 40 meter elements in no particular order. Each arm is then screwed into the feed point assembly. There are collars on the ends of the arms that secure the arms to the feed point.

I assembled the antenna in the horizontal configuration and the total length was about 13 feet. I finally secured the CHV-5X to a mast on my deck using the included U-bolts. There was some noticeable sag due to the weight of the arms and elements.

Total time assembling the CHV-5X, including tuning, was about 30 minutes.

On the Air

I chose ARRL Field Day weekend to try the CHV-5X on the air. After installing the antenna I set up my Yaesu FT-857D transceiver and checked the bands. As expected, I heard far fewer stations on the CHV-5X compared to my full-sized wire dipole antenna. That said, I could still work any reasonably strong station I could hear.

The SWR performance seemed to be as advertised. With an automatic antenna tuner I was able to operate well outside the 1.5:1 SWR bandwidths. When operating without a tuner, be advised that the 1.5:1 SWR bandwidth on 40 meters is only about 22 kHz, increasing to 1.8 MHz on 6 meters.

A close-up view of the CHV-5X center feed point.

In a portable or emergency setup you would likely (1) be using specific frequencies on each band and (2) be communicating with fixed stations that are equipped full size antennas. So, the CHV-5X's limited SWR bandwidth and performance would not necessarily be a liability.

Kudos and Nits to Pick

The CHV-5X is a compromise antenna and that should be understood from the outset. Still, it has definite strong points.

The CHV-5X breaks down to a very portable size. I found that the arms and antenna elements can be packed into a tube similar to one used to transport a fishing rod. The feed point assembly could easily be put into a backpack or go-kit. There aren't too many small parts that could end up getting lost. Additionally the antenna covers some key HF bands, and having 6 meters is a plus. I would suspect that you could attach only the elements for the bands that you intend to use, but I'm not sure how that may affect performance. Such a configuration with only the 6 meter elements would be a handy setup for Field Day to monitor for band openings.

The one nit I have to pick is weight. The CHV-5X is not heavy in the hand, but it appears to put some strain on the feed-point assembly. Since the antenna is not designed for a permanent installation, however, this may not be a major issue.

Distributed in the US by NCG Companies, 15036 Sierra Bonita Ln, Chino, CA 91710; tel 800-962-2611; **www.cometantenna.com**. *Suggested list price: $339.95.*

H. Ward Silver, NØAX, n0ax@arrl.org

Experiment 116

The Quarter-Three-Quarter Wave Balun

As the 22nd edition of *The ARRL Antenna Book* was being prepared, Frank Donovan, W3LPL, suggested a balun design for the book.[1] "It's one of my favorites," he said enthusiastically, "and nobody seems to know about it. It's easy to construct and works great!"

The design doesn't have a catchy name, so perhaps that's why it's relatively unknown. I'll give it one — the *quarter-three-quarter wave (Q3Q) balun* — and maybe it will waltz into your antenna system. Shown in Figure 1, the professional literature shows the Q3Q balun to be a variation of the *hybrid ring* balun in Figure 2.[2] In both, λ/4-long transmission lines sections perform both impedance matching and insure equal and opposite currents in the load. But first — a word about baluns.

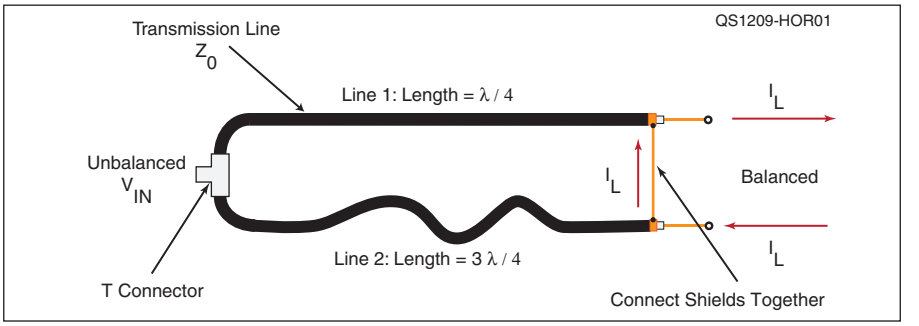


Figure 1 — The quarter-three-quarter wave balun uses the current-forcing function of odd λ/4 feed lines and the λ/2 delay of the longer line to cause equal and opposite currents to flow in the antenna terminals.

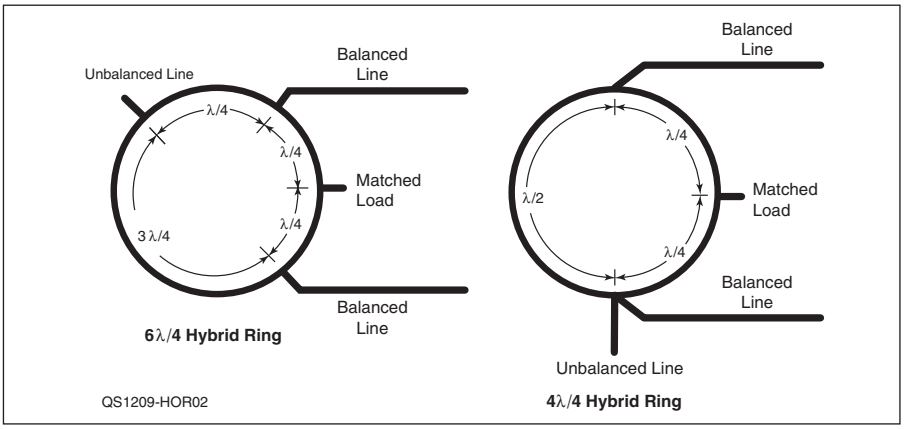


Figure 2 — Hybrid ring baluns use different combinations of λ/4 lines and delay sections to match impedances and balance load and line currents.

What is a Balun?

The word *balun* (pronounced "BAL-un") is a contraction of *balanced to unbalanced* and refers to any device that transfers differential-mode signals between a balanced and unbalanced system while maintaining symmetrical currents or voltages in the balanced system. The term applies only to that *function* — it doesn't matter whether the balun is made of transmission lines, flux-coupled transformers, or some other structure that simply chokes off unbalanced current.

An impedance transformer may or may not perform the balun function. There are balanced to balanced and unbalanced to unbalanced impedance transformers. Multiple devices are often combined and called a "balun." For example, a "4:1 balun" can be a 4:1 impedance transformer in series with ferrite beads forming a choke balun.

Other names for baluns are common, such as "line isolator" for a choke balun or they are named for their construction such as bead balun, coiled-coax balun and sleeve balun. What is important is to separate the function from the construction. Got it? Here we go!

Transmission Line Baluns

In the Q3Q balun, the λ/4 current-forcing property of transmission lines is used to perform the balun function. (For more uses of λ/4 transmission lines, see Hands-On Radio Experiment #81.[3]) If a transmission line is an odd number of quarter wavelengths long (λ/4, 3λ/4, 5λ/4 or more) the output current, I_L in Figure 1, is independent of the load impedance and equal to the line input voltage, V_{IN}, divided by the line's characteristic impedance, Z_0.

$$I_L = V_{IN} / Z_0$$

In effect, a voltage source at the λ/4 line's input is turned into a current source at the output. The same amount of power is transferred from the input to output — no power is created — less the line's loss at that frequency. Since line 1 is λ/4 long and line 2 is 3λ/4 long and they have the same input voltage at the T connector, their output currents will also be the same.

Since line 2 is λ/2 longer than line 1, its current will have a 180° phase difference from the current at the output of line 1. This results in equal-and-opposite currents flowing in each

[1] *The ARRL Antenna Book,* 22nd Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 6948. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop**; **pubsales@arrl.org**.

[2] Johnson & Jasik, *Antenna Engineering Handbook,* 2nd edition, section 43-6.

[3] All previous Hands-On Radio experiments are available to ARRL members at **www.arrl.org/hands-on-radio**.

terminal of the balanced connection. Looking closely at Figure 1, you can see the same current flowing right from the center conductor in line 1 as flows left to the center conductor of line 2. Since the currents on the inside of the shield are equal and opposite to the center conductor current, the shield currents balance, too. Thus, the balanced system sees equal and opposite currents flowing in each terminal without regard to their impedance (within reason).

Disconnecting the Shield

The Q3Q balun also solves another important problem — common-mode current on the outside of the transmission line. Connecting a coaxial feed line directly to an antenna connects the shield to one terminal of the antenna. This isn't a problem for current inside the transmission line — it flows into the antenna terminal just as it's supposed to. The problem comes from the *outside* surface of the transmission line.

Due to the skin effect, the outer surface of a coaxial shield is completely independent of the inner surface at RF.[4] The effect is to attach a "third wire" formed by the outer surface of the shield to the antenna. This creates a path for common-mode currents that can have a big effect on antenna system performance.[5]

A close look at Figure 1 shows the Q3Q balun does not have a "third wire" path created by the outside of the shield. Since the shield currents balance, the shields can be connected directly together and the current flowing out of the shield of line 2 flows into the shield of line 1. No connection of the shields to the balanced system is required — the unbalancing third-wire path is not present and no current from the antenna connection flows on the outside of either line 1 or line 2.

The feed line and balun may still have current induced on the outer shield surface from the antenna's radiated signal. Additional chokes may be needed along the line to minimize common-mode current. Because the shield connection is independent of the balanced connections, it may be connected (but doesn't have to be) to some other ground or common reference without upsetting the balanced system. For example, it can be connected to the boom of a Yagi that is insulated from a balanced driven element.

The Q3Q is a *monoband* design — that is, it only acts as a balun at the design frequency for which the transmission lines are the required number of λ/4 long. (The Q3Q design can be used over a bandwidth of about 10% centered on the design frequency.) That means this balun should not be used on triband or multi-band antennas. Nevertheless, many useful single-band applications exist around even a modest station — verticals, dipoles, J-poles and monoband Yagis including VHF+ antennas. The cost is modest: one T connector, two cable plugs and an extra 3λ/4 of coax. I think you should build one.

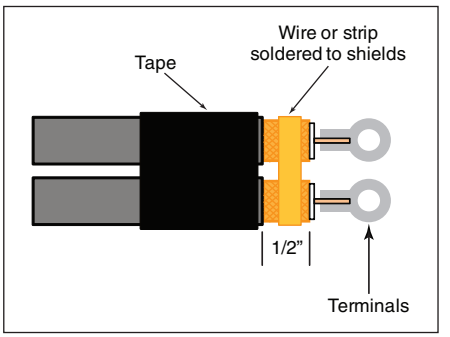


Figure 3 — The shield connection between lines 1 and 2 should be kept short for good high frequency performance. Precise adjustment of final line length for use at VHF+ should be performed with the terminals attached. At HF the connection length is not critical and the center conductors can be extended beyond the shields for easier feed point connection..

Building a Q3Q balun

Building a *synchronous balun* — meaning that its function is performed by precise timing of waves in the transmission line — requires that the line sections be precisely the right length at the design frequency. This can be done using an antenna or SWR analyzer. You can either measure the line's *velocity factor (VF)* and calculate how long the sections should be or you can use the analyzer to trim a section of line to the right length by estimating and trimming.

Whichever method you choose, do not assume that the VF for your coax is exactly what is published in tables for that type of coax. Variations of a few percent are common, particularly if the part number is not a current MIL SPEC designation, such as a manufacturer's proprietary cable or an obsolete designator such as RG-8.

The manual supplied with your analyzer may have instructions for determining the VF of transmission line or cutting lines to specific electrical lengths. If so, follow those instructions. In any case begin by installing the required cable plug on one end of the cable and attaching it to the T connector. Make all measurements through the T connector so that its length is included in both line 1 and line 2. If you do not use the T connector when trimming the lines to length, the assembled length will be too long for the desired frequency. The frequency at which the balun works best will end up too low. At HF and the lower VHF ranges, this will result in a small shift in frequency but at higher frequencies the error can be significant.

If you do not have the instructions for creating specific electrical lengths of cable, here is the basic procedure for making a Q3Q balun with a design frequency of f_0:

- Find the nominal VF for your cable from a table or handbook.
- Beginning with the λ/4 line (line 1 in Figure 1), install a cable plug on one end of the line and attach the T connector.
- Estimate the λ/4 length of cable as ¼ × VF × 983.6 / f_0 (MHz) and cut the cable a few inches long. Make a clean, square cut with no loose strands on the end.
- Using the antenna analyzer, find the *lowest* frequency at which the reactance (X) value reaches a minimum value. Use the digital display value and not the analog meter indication for the most accurate reading. This is the frequency at which the line is λ/4 long: f_{TEST}.
- Calculate the correct length as follows: correct length = current length × f_{TEST} / f_0.
- Cut the line to the proper length in a couple of steps, making measurements at each length. Attach terminals, if needed and make a final length trim if necessary.
- Repeat the trimming steps for a 3λ/4 line that is three times as long. The frequency f_{TEST} will be ⅓ the λ/4 frequency for the λ/4 line.
- Remove ½ inch from the jackets of the lines. Wrap a wire or a narrow metal strip around the exposed shields and solder it to both shields as in Figure 3 so that the connection between the cables is as short as possible.
- Waterproof the exposed ends and tape the line sections together to prevent the connection from being pulled apart. The balun lines can be coiled together as one package and you have made a Q3Q balun.

And Now for Something You'll Really Like

The noise reported as Jovian in Experiment #114 turns out to have considerably more mundane terrestrial origins. The noise from Jupiter looks rather different as it happens — tune to the Hands-On Radio website (**www.arrl.org/hands-on-radio**) for more information and links to sound files of the *real thing*. Thanks to Whitman Reeve and Dave Typinski, AJ4CO, for the correction.

[4] **en.wikipedia.org/wiki/Skin_effect**
[5] **www.eznec.com/amateur/articles/baluns.pdf**

Steve Sant Andrea, AG1YK, h&k@arrl.org

Mini Go-Box, Tiny Trickle Charger and a Quick-Whip Antenna

A Mini-station Go-box

Do you need to move your radio from house to car every time you want to go mobile? Ever wish you had a convenient "go-box" for your HF radio that can be connected in only a few seconds?

Searching for an Answer

I have one radio, a Yaesu FT-857 transceiver, which I use when at home or when going mobile. I had been looking for a "right sized" box in which to mount the radio and CW paddle. After many false starts (including an empty computer case my wife and I don't talk about any more), I happened upon the following idea.

I found a pair of fake decorative books at a local hobby store and decided to modify them for my HF radio. I decided to mount the smaller book with the CW paddle and microphone on top of the larger.

Building the Mini-station

I removed the bottom end board from the larger of the books and installed the FT-857, using materials found in my junk box (see Figure 1).

I added a right-angle PL-259 to the rear of the radio to keep pressure off the coax. A carpenters pencil (filed to the right thickness) was screwed to the floor of the book aligned with a ridge on the bottom of the radio. Then I secured the radio to the bottom of the book using a strip of hook and loop fastener, but I used it as a strap with a bolt, washer and nut at each end.

On the right side looking at the book cavity, the dc power cable and antenna connector were affixed to the rightmost board. I elected to use a PL-259 to BNC adapter to make all connections easier and faster for moving the radio back and forth between my shack and vehicle.

I bolted the smaller book to the top flap of the larger with small hardware. To mount the CW paddle, I drilled holes for the paddle's four feet and then held the paddle down with another strip of hook and loop bolted as before on each end to both the bottom of the smaller book and the top of the larger (transceiver) book (see Figure 2). The paddle cannot move.

I cut an access slot in the bottom edge of the smaller book to access the paddles and provide an exit for the microphone cord when using SSB. I then drilled a larger hole between the two books to allow the CW paddle and microphone cables to connect to the radio in the other book. The microphone fits snugly behind the paddle. If it hadn't fit so snugly, I would have mounted a microphone clip to hold it in place. I use another strip of hook and loop material as a book strap to hold the books shut when transporting.

Adding an External Speaker/ Headphone Jack

After the assembly of the mini-station, I found that the book blocked the sound from the FT-857's speaker. I elected to mount a remote speaker jack, with a small ⅛ inch right-angle stereo jack going to the headphone jack on the left side of the radio. Into this I plug a headphone splitter jack, which just happens to come out perfectly at the edge of the transceiver book. A screw angled into the book binding secures it firmly to the left side. When mobile, I connect the HF radio to the auxiliary jack of my car stereo. This arrangement allows me to change the volume without taking my eyes from the road. At home, I either plug in headphones or an external speaker.

Success!

All the connections were chosen to be on the front of the mini-station (bottom edge of the books), so it would be easy to connect and disconnect. When I am in my small truck, the books fit snugly in a hollow between the two seats, resting on the floor. (I plan to make a small seatbelt to keep it in place in case of a crash.) I can rest my arm on the truck armrest and the radio and paddle are right at my fingertips. It is probably the most comfortable station I've operated!

An added bonus of this setup is that, looking into your vehicle, if you tuck in or cover the wires, a would-be thief would see nothing but two books. You have your own clandestine

Figure 1 — In this view the larger book is open to show the FT-857's mounting arrangement. Note the use of the hook and loop strap and right-angle connector. The wires going through the open cover lead to the paddle. [Sam Moore, NX5Z, photo]

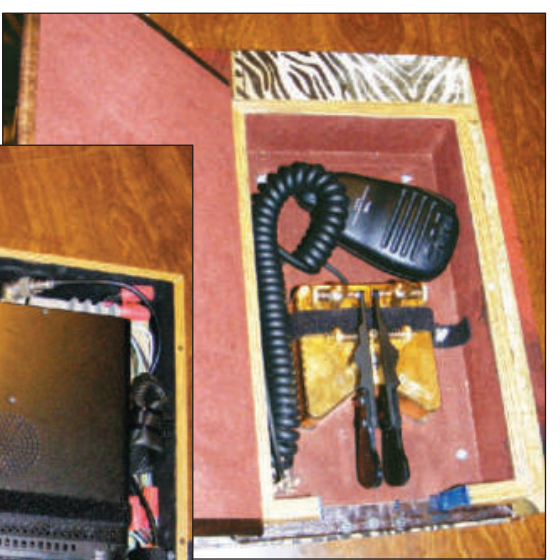


Figure 2 — This interior view shows the paddle bolted and strapped in the smaller book. There is plenty of space left for the microphone. [Sam Moore, NX5Z, photo]

radio mini-station. Another plus — you don't have to leave your expensive radio in the vehicle. You can take it inside the house or motel without fuss or problem, since it takes only seconds to connect or disconnect.

This mini-station will also serve as a great portable station, to "grab-and-go" when going to the lake, etc. The only other things you require are a battery and antenna. I wish I had done this a long time ago. — *73, Sam Moore, NX5Z, 22 Cundiff Dr, Sherman, TX 75092-6326*, **drsammoore@aol.com**

Quick Whip Antenna

A cookie tin can become a quick makeshift antenna with the addition of a vertical radiator. Many broadcast-band radio replacement whips from the local radio parts stores come with 6-32 threads for attachment. To mate one to a PL-259, just run a 6-32 tap into the end of the tip and all the way through the connector (see Figure 3). Then use a short length of brass 6-32 threaded rod or a cutoff screw for the connection. No soldering required. Add a layer or two of heat-shrink tubing for insulation at the bottom of the whip. Add an SO-239 and a cookie tin and you're on the air (see Figure 4). — *73, John Portune, W6NBC, 1095 W McCoy Ln Spc 99, Santa Maria, CA 93455-1105*, **w6nbc@arrl.net**

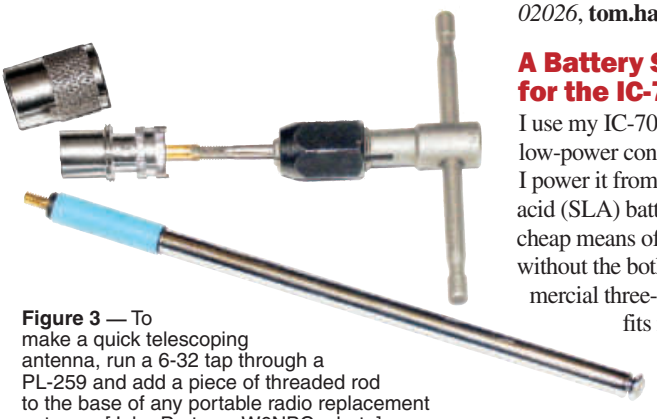


Figure 3 — To make a quick telescoping antenna, run a 6-32 tap through a PL-259 and add a piece of threaded rod to the base of any portable radio replacement antenna. [John Portune, W6NBC, photo]

Figure 4 — Mount an SO-239 connector to the top of a cookie tin, add the quickie antenna and you're on the air. [John Portune, W6NBC, photo]

Marble Bug Base

At some point, all of the trophies that our children won while participating in youth sports end up in the trash. When my sons decided to send theirs to the landfill, I thought I should save some of the marble bases for future projects. (The material may or may not be marble, but it is a white colored stone.)

When I decided to add a new base to my American Morse Express Porta-Paddle (**www.MorseX.com**) I chose a piece of marble that once graced a baseball trophy. By placing the marble in a plastic pan of water, I was able to use my drill press to make two holes for the screws that secure the paddle. [A carbide-tiped masonry bit will probably work best. — *Ed.*]

The water controls heat buildup, keeps stone dust out of the air and makes drilling very simple. Be sure to use safety glasses!

The screws go through the marble base into the bottom of the paddle. Then, for a final touch apply four stick-on felt feet. These allow clearance for the heads of the two screws that fasten the paddle. [Another option would be to countersink the holes and use flat-head screws. — *Ed.*] I am very pleased with the result and recommend recycled marble trophy bases for a variety of radio projects. — *73, Tom Hart, AD1B, 54 Hermaine Ave, Dedham, MA 02026*, **tom.hart@verizon.net**

A Battery Supply for the IC-703

I use my IC-703 as a bedside radio, for low-power contests and for Field Day. I power it from a 12 V, 7.5 Ah, sealed-lead-acid (SLA) battery. I needed a simple, cheap means of recharging the battery without the bother or expense of a commercial three-stage charger. This solution fits my needs perfectly and may interest others as well.

I solder an inexpensive male dc chassis mount connector to the negative blade of the battery, doing so in a way that does not preclude the use of wires with slip-on wire terminals. A 2 W, 10 Ω resistor connects the center pin of the connector to the positive terminal of the battery. Across the resistor I solder a 3 V, miniature, wire-lead lamp, which serves as a charge indicator. This lamp is the same used in the Littelfuse low-voltage indicator fuse post.

The power source is a 12 V dc wall wart, which plugs into the connector and charges the battery (see Figure 5).Wall warts come in many types, some regulated and others not. The unregulated type generating full-wave rectified ac having peaks reaching about 18 V

Figure 5 — This simple arrangement combined with an unfiltered wall wart works well as a trickle charger for SLA batteries. [David Gauger, W9CJS, photo]

is the type needed for this application. The regulated type will not work because the voltage is limited at too low a value to charge the battery.

The open circuit voltage of this type runs anywhere from 17-19 V peak and the waveform is full-wave, rectified ac. With this type of wall wart as a source, the current it supplies to the battery will start at about 150 mA with the battery at low charge and slowly diminish to a few milliamperes as the battery attains full charge.

The lamp is moderately bright at the onset, but diminishes to a very slight glow as the battery reaches full charge. We have a simple, automatic tapering charger. These very low charge currents produce no outgassing or heating of the battery but be advised, this is not a quick charge. It may take 24 hours or more to bring the battery up to full charge.

I've used this circuit for more than 3 years on batteries with excellent success. I can leave the IC-703 connected to the battery without danger of over-voltage during the charge cycle and the charger produces zero hash noise as might be present with the typical pulse width modulation type charger. Try it — it's a cheap and easy solution. — *73, David Gauger, W9CJS, 3900 Bluebird Ln, Rolling Meadows, IL 60008-2907*, **w9cjs@arrl.net**

"Hints and Kinks" items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters, 225 Main St, Newington, CT 06111, or via e-mail to **h&k@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments.

Ham Radio and Scouting — A Great Combination

A father and son Scouting team find that being prepared includes a handheld transceiver.

Our Philmont Crew standing in the Miranda meadow looking toward Mount Baldy, 12,441 feet, our next stop.

Don Kunst, W3LNE

The ARRL® and the Boy Scouts of America (BSA) have signed a Memorandum of Understanding designating the ARRL as a key resource for K2BSA and Radio Merit Badge training at the National Scout Jamboree. It also establishes the ARRL as the go-to source for Scouts interested in learning about and becoming involved in radio communication.

Andrew Koenig, KE5GDB, prepares to "peddle" K2BSA at the 2010 Jamboree.

In today's environment of Facebook, Twitter, cell phones and tight schedules it is difficult for ham radio to compete for the attention of today's youth. Ham radio, like Scouting, can be a life-long interest and it reinforces good citizenship and community service values as well as providing avenues for career development.

Since 1910, Scouting has served 114 million youths with 2 million (only 2%) achieving the rank of Eagle Scout and 181 (39 Eagle Scouts) becoming astronauts. Along the way, they earned 117 million merit badges.

For those of us who are involved in Scouting and are also ham radio operators, it is natural to combine the two and enjoy exploring new things with your Scout children and other Scouts in the area. I returned to Scouting 7 years ago with my son, Garrison, KB3LEZ, an Eagle Scout, and have found many ways to share my interests with not only my son, but with my father, Arthur, W3WM, and mother, Sylbia, KB3HYV.

Handy on the Trail

Scouting promotes the love of the outdoors and, yes, being prepared. Hiking and camping are my way of relaxing and staying in shape. I always carry a Yaesu VX-7 handheld transceiver with me. My son and I each have one we can use to monitor repeaters and weather alerts, to keep track of Scouts in our group and for listening to AM or FM broadcasts. Yes, I do carry a cell phone, but I can tell you that even on the Appalachian Trail in my area of Pennsylvania there are areas with no coverage. One winter night, while I was in my tent, I sent a health and welfare message to my spouse via a ham monitoring the Appalachian Amateur Radio Group (AA3RG) repeater. It only took one call to bring a response from a local ham.

Today there are many radios that are great companions in the out-of-doors. I use the Yaesu VX-7R (**www.yaesu.com**) because it covers the 6 meter through 70 cm ham bands with a 5 W output and has a wideband receiver. Add to this its 450 memories, water resistance, battery capacity and compact size and you have the perfect wilderness radio.

I added a water resistant microphone and earphones, an extra battery, a MFJ-1720S (**www.mfjenterprises.com**) triband high-gain flexible antenna and a Pryme AL800 telescoping antenna (**www.pryme.com**) for extra reach. I carry the VX-7 on my pack's shoulder strap for ease of access and to keep the antenna as high and clear as possible. The microphone and earphones allow for quieter listening and lower power consumption. For extended outings, I have added a 5 W PowerFilm (**www.powerfilmsolar.**

Ham radio, like Scouting, can be a life-long interest and it reinforces good citizenship and community service values....

Scouts on Window Rock looking down the valley to Base Camp at Philmont.

com) foldable solar roll to recharge batteries while hiking. I drape it over the back of the pack with bungee cords. I have used this configuration for several years with great success, year-round, rain or shine.

On the Road

In March of 2006, Garrison was visiting Pearl Harbor. Using his FT-60R handheld transceiver he talked to Sam Rose, KC2LRC, in Syracuse New York via the Internet Radio Linking Project. Sam taped their conversation and used it in his Dayton Youth Forum presentation, which Garrison attended, later that year.

In 2009 we brought our VX-7s on a trip to the BSA High Adventure Florida Sea Base. We talked with many hams along the way and checked the weather for the next day's diving. We also went on multiple hikes and campouts, attended Field Day, participated in Jamboree On The Air and the Dayton Hamvention all with our handheld transceivers.

In 2010 we traveled to New Mexico and the Philmont Scout Ranch for a 100 mile hike covering three peaks, the highest being Mount Baldy at 12,441 feet. It was great to be able to talk through the local repeaters, listen to the Philmont Rangers and hear a little news from the outside world. Later that year we traveled to the Boy Scout National Jamboree at Fort A. P. Hill, Virginia. Garrison joined 45,000 other Scouts and Scouters for a weeklong celebration of the 100th year of Scouting.[1] Cell phones were discouraged for Scouts at the event but ham radio was encouraged.

Don, W3LNE, and Garrison, KB3LEZ, at the 2010 Jamboree.

We visited K2BSA and met our good friend Andrew Koenig, KE5GDB, from Houston Texas, who was on staff. I attended as part of the EMS coverage of the event. My partner was Blake Edwards, W1IM, from Windsor, Massachusetts. We used our handheld transceivers for backup communications, to talk with Scouts, Garrison, K2BSA and the Radio Merit Badge booth. We also made use of their weather band capability to monitor the weather.

The highlight of the Jamboree was the open-air arena show held at night and attended by all the Scouts and their visitors, who together were about 55,000 people. Mike Rowe, an Eagle Scout and host of the Discovery Channel show *Dirty Jobs*, was a big hit.

Northern Adventures

In 2011 we visited Dayton for the Hamvention where Garrison spoke at the Youth Forum on selecting an antenna for hiking and camping. In June we headed to Atokokan, Canada and the BSA High Adventure Northern Tier camp for a week of canoeing and camping. We took handheld transceivers, with some extra antenna options, into this remote area where satellite phones are issued for emergencies. Check **www.arrl.org/international-operating** for reciprocal operating information when traveling outside the country.

I can't tell how many times people have been amazed and interested in the capabilities of our handheld transceivers. It has sparked a number of inactive hams to get active again. The Scouts always love to talk on the radio and they think it's pretty cool to combine the latest handheld technology with the Internet to talk around the world. There is now an IRLP Topic Channel Reflector 9091 for Scouting.

The BSA recently announced the new Morse Code Interpreter Strip, indicating a proficiency in Morse code. Also, at Dayton ICOM announced that it is now the BSA's official supplier for the National Jamboree. ICOM will provide equipment and support for the K2BSA radio operation, the Radio merit badge and Jamboree on the Air.

As you can see, ham radio and Scouting are the perfect marriage. I hope you will also be inspired to share your hobby with Scouts in your area. If so, you will reap the benefits of new volunteers and energy in your club. Let's open the eyes of Scouts to the adventure and fun of ham radio and make the Radio Merit Badge the one to get and be proud of. So get out there and share your hobby with some of the future leaders of America.

Please contact me, your local Scout council or go to **www.scouting.org** to join the fun.

[1]B. Morine, N2COP, "Amateur Radio and the National Scout Jamboree," *QST*, Jul 2010, pp 65-67.

Be Prepared — Ham Radio Style

When bringing ham radios into the wilderness there are several important points to remember as you plan your outings:

- Be sure someone knows your route and time schedule, and have specific check-in times.
- Set specific overdue rules.
- Know the local repeaters and their tones. Preprogram them into your radio and carry a list or the *ARRL Repeater Directory*.
- Don't forget the IRLP, EchoLink and D-STAR repeaters in your travel area.
- Check your repeater directory for information on the LiTZ (Long Tone Zero) DTMF protocol and the Wilderness Protocol's standard simplex frequencies and calling times.
- Don't forget to program the simplex calling frequencies.
- Know your location by map coordinates, GPS or grid square.
- You may want to carry a PDF copy of your radio's manual on your smartphone.
- Keep all the accessory plugs inserted when not in use to preserve the water resistance of the radio.
- Keep your batteries warm in cold weather to preserve their power.

Photos by Don Kunst, W3LNE.

Don Kunst, W3LNE, an ARRL member, is the assistant scoutmaster for Troop 147 in Carsonville, Pennsylvania. He was a Scout as a youth and is a Merit Badge counselor for seven badges including Radio. Don has been a paramedic for 30 years and is a wilderness first aid instructor together with being a member of RACES and an ARRL emergency coordinator. He was one of 20 paramedics selected for the 2010 National Jamboree at Fort A. P. Hill. Don is the secretary and webmaster of the Berry Mountain Amateur Radio Club (**BMARC.net**) and member of the Central Pennsylvania Repeater Association (**W3ND.org**). Don can be reached at 547 Luxemburg Rd, Lykens, PA 17048, **w3lne@arrl.net**.

"Your Antenna Is On Fire!"

Big brute amplifiers and plastic flowers don't mix.

Thomas Schaefer, NY4I

There are certain phrases in life one just never expects to hear. The night my spouse, Beth, walked into my shack and strenuously stated, "Your antenna is on fire!" was clearly one. As I had my headphones on, a little voice inside my head asked if I had really heard that right. Beth repeated, louder now, "*Your antenna is on fire!*" There was no mistake — that's what she said. Of course, after my disbelief subsided, I ran out to the backyard to see a sight I would have never imagined — the bottom of my Zero-Five (**www.zerofive-antennas.com**) 43 foot vertical in flames!

Thinking quickly, I grabbed the garden hose and starting spraying water on this unbelievable scene. All the while I was wondering exactly how to explain it to the fire department. As acrid smoke billowed from the antenna, I thought maybe I could blame it on the barbeque. Fortunately, after drenching the antenna, the flames subsided and mercifully, the smoke sailed downwind.

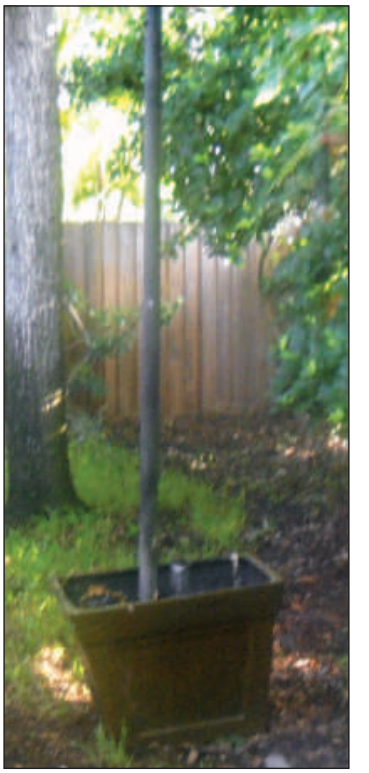
So one might ask, exactly what do you have to do to set an antenna on fire? Well, it all started with a seemingly innocuous attempt to hide the base of the vertical. I have always liked verticals and opted for a Zero-Five. I was even fortunate enough to be able to put down quite a few radials prior to sodding the backyard.

All was great in the world. But, since the bottom of the vertical is not that attractive (with the unun, fold-over mounting plate and radial plate), I decided to put a plastic planter around the base. Of course, what is a planter without some plants? So I added some *plastic* flowers and some Styrofoam to hold the *plastic* flowers in place. This looked great. I made sure to leave enough room between the vertical radiator and the flowers so nothing was touching.

Big Amp Upgrade

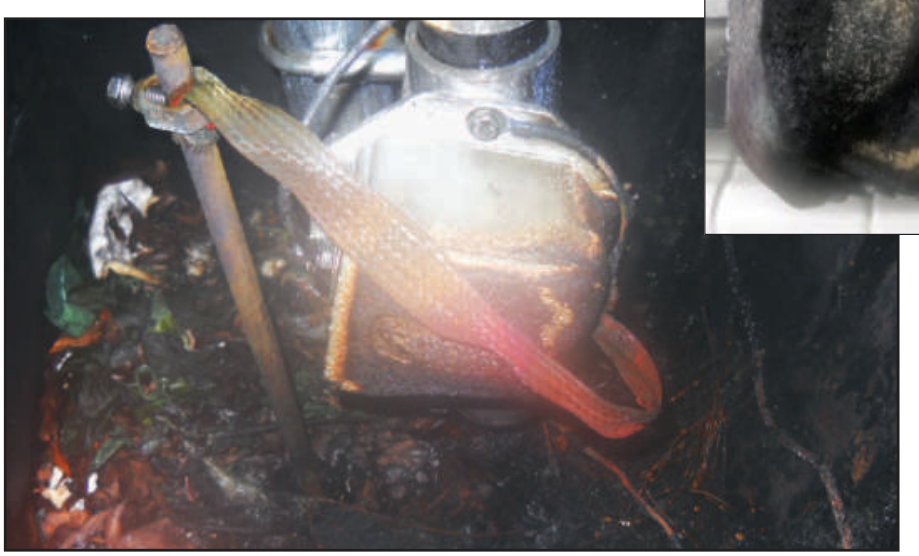
Now at this point, it is important to know that I originally ran my 200 W ICOM IC-775DSP transceiver barefoot. Well, not too long before this fateful evening, I purchased a brand new Alpha 9500 amplifier (**www.rfconcepts.com**). As you may know, the Alpha 9500 takes care of itself. It monitors the VSWR, grid current and many other parameters. At the first sign of trouble, it goes into standby mode. With the addition of the amplifier, I carefully considered the components of my antenna system to ensure everything was ready to handle its 1500 W.

I have about 150 feet of Times Microwave LMR400. The matching unun is rated at 5 kW. The antenna itself is rated at 5 kW. I even installed a nice ground rod at the base of the vertical and ran heavy duty strapping between the ground rod and the ground side of the antenna.



This is the vertical after the fire in its flower box. [Tom Schaefer, NY4I, photo]

Another view of the unun barbeque. [Tom Schaefer, NY4I, photo]



Here are the remains of the planter. You can see the charred ground braid, unun and antenna base surrounded by the remains of the plastic flowers. Note how close the braid was to the hot side of the unun. [Tom Schaefer, NY4I, photo]

Did I Mention the Flowers were Plastic?

While I was vigorously trying to work a pileup on 40 meter CW, something must have arced. My best guess is the proximity of the ground strap to the main radiator. Whatever the ignition source, something caused either the flowers or the Styrofoam to ignite.

In the aftermath, I dismantled the entire setup looking for the cause. The unun box was charred and melted on the outside but no damage inside so that was not the source. The insulation of the coax did melt off, but it clearly still worked as the amplifier never complained. I was still copying the pileup

even while flames were shooting from the antenna.

Other than some obvious soot on the aluminum, I did notice the large Delrin insulator between the radiator and ground was somewhat pitted. I called Tom at Zero Five and he asked me to send him some pictures of the antenna, then asked that I send the antenna's base. He graciously replaced the insulator and cleaned up the base as good as new. He still will not let me pay him for it (thanks, Tom).

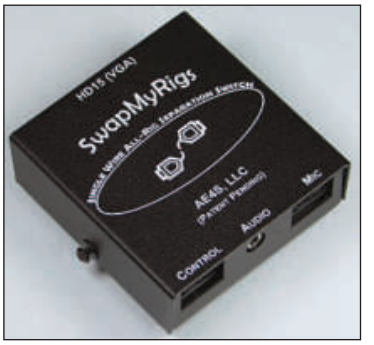
The fire destroyed its case but the unun survived the ordeal. [Tom Schaefer, NY4I, photo]

Tom Schaefer, NY4I, an ARRL® Life Member, was first licensed in Florida in 1980. He obtained his Amateur Extra license in 1982 at the age of 16. Tom is the vice-president of the St Petersburg ARC (SPARC) and president of the Upper Pinellas ARC (UPARC). He has been an active volunteer examiner since 1983. Tom's interests are DXing, PSK, JT65-HF, contesting, computer station integration, SDR, Field Day, APRS and working satellites. He lives with his spouse Beth, two kids (David and Jordan) and two dogs (Leo and Sparkle). He can be reached at 323 Old Oak Cir, Palm Harbor, FL 34683-5864, **ny4i@arrl.net**.

New Products

SwapMyRigs Radio Separation Kit

SwapMyRigs from Bill Jordan, AE4S, standardizes single-cable installation of mobile radios with remotable controls. By routing all connections through a common cable, any radio with industry-standard RJ jacks can be installed or replaced without using multi-cable separation kits. SwapMyRigs consists of two small field-configurable boxes called SMRs — one at the transceiver, the other at the remote location — connected by a standard computer VGA cable. The transceiver's microphone, control cable and speaker jacks are connected to corresponding jacks in the co-located SMR and the SMR maps those to conductors in the VGA cable. At the remote location, an identical SMR maps the VGA conductors back to the transceiver's connections. The microphone, control, and speaker plug into the SMR's jacks as if they were connected directly to the radio. By changing the SMRs' jumpers, different radios can be



used in the same car, or one transceiver can be used at home and also in the car. Replacement radios are installed by merely changing SMR jumpers. Price: $79.95 per pair; includes radio interface and VGA cables for any RJ-compatible radio (see website for supported radios). For more information or to order, visit **www.swapmyrigs.com**.

Compact Switching Power Supply with Meter from MFJ

The MFJ-4230MV switching power supply measures 2.5 × 5 × 6 inches (HWD) and weighs 3 pounds. It's rated at 25 A continuous or 30 A surge at 13.8 V dc. The voltage is adjustable from 4 to 16 V and a front panel meter displays voltage or current. A temperature controlled fan provides auxiliary cooling. The dc output is via five-way binding posts on the back of the supply. The unit operates from 120 or 240 V ac at 47-63 Hz. Price: $89.95. For more information, to order, or for your nearest dealer, call 800-647-1800 or see **www.mfjenterprises.com**.

TAK-tenna Compact HF Antenna

The TAK-tenna from Steve Tetorka, WA2TAK, is a high frequency multiband antenna with small physical dimensions that is intended for limited space or portable applications. The 80 meter multibander has a 48 inch boom and covers 80 to 10 meters; the 40 meter multibander has a 30 inch boom and covers 40 to 10 meters. Each model is designed to resonate on the primary band and operate off-resonance using an antenna tuner. The antenna is said to provide low impedance values to the tuner when operated off-resonance, resulting in low RF power loss in the transmission line. Price: 40 meter multibander, $148; single band models (30-10 meters), $128. For more information, or to order, visit **www.taktenna.com**.

A Life in Letters: W6ISQ

John Troster, W6ISQ, is one of the most prolific authors ever to grace the pages of *QST*.

Steve Ford, WB8IMY
***QST* Editor**

Find a magazine editor and ask him about how difficult it is to recruit good authors. What you'll hear is a tale of woe common to all who work in publishing. It is story of long hours spent with keyboards and coffee, massaging mediocre text while waiting for the next Ernest Hemingway to walk through the door.

When we are lucky enough to stumble upon talented writers, we cling to them for dear life. We smile when their e-mails arrive with new manuscripts because we know that (A) the writing will be top notch and (B) we will have little work to do. Good writers make happy editors and we nurture them because they are so rare.

John "Jack" Troster, W6ISQ, is one of those uncommon authors. Not only is he a wellspring of talent, he has the exceptional ability to write on any subject. As a result, Jack has a *QST* legacy that spans almost 50 years.

Many veteran amateurs are familiar with Jack's humorous articles, such as "The Bottle" reproduced here from the January 1964 *QST*. Jack's wit was often accompanied by cartoons from the legendary Gil Gildersleeve, W1CJD. However, Jack also wrote "serious" pieces, including technical articles. You can browse his work in the *QST* archive online at **www.arrl.org/arrl-periodicals-archive-search**. And for those who receive digital *QST*, we've included some additional samples of Jack's talent in the pages that follow. Read on!

The Bottle

John G. Troster, W6ISQ

"Let's see what's on the low end here…hmmmm...Europe-Africa...not bad…whoa, what's this?"

"SOS SOS SOS de KK8QQ/mm. SOS."

"QQ?? Gosh, this is awful. I worked his DXpedition yesterday on Emirau Island. Probably a new country, that is if we can educate them DXCC fellas at Headquarters. Wonder what's wrong with him?"

"SOS SOS QRRR de KK8QQ/mm. Ship sinking … heavy seas 100 miles north Emirau … SOS … "

"Oh my gosh, this is horrible. KK8QQ KK8QQ/mm de W6ISQ. K."

"W6ISQ de KK8QQ/mm … battered by heavy seas … hold filling fast...mast broken … sinking condition…notify USN … "

"KK8QQ de W6ISQ. Say OM, u got logs from Emirau?"

"ISQ-QQ. Logs safe in pocket. Call USN … SOS … "

"In his pocket! They'll be a pulpy mess, that's what! 'QQ-ISQ…pocket NG NG…wrap in oilskin or waterproof bag. QRX hr while u save valuable documents…hurry!'"

"ISQ-QQ...sinking fast...pls cl…have waterproof bag…will wrap logs ok…nw USN pse."

"QQ…ISQ…you got logs wrapped safely now?"

"ISQ-QQ/mm … QRX … ok, logs wrapped safely nw. Pse hurry… sinking lower…fire spreading…"

"FIRE??…he didn't mention fire! That's different. My gosh, those leak-proof bags will go up in flames if they even get warm. QQ/mm-ISQ… quickly…leakproof bag NG NG in fire…roll up log and stick in bottle… quickly…"

"ISQ-QQ…decks awash...fire spreading...USN..."

"QQ-ISQ…don't waste time…log into bottle-quick…bottle…"

"ISQ-QQ…QRX…QRX…no cork…"

"Find one. No time to lose. Make sure bottle light-colored so people can see valuable document inside … "

" ISQ-QQ/mm OK..log wrapped in oilskins…stuffed in pale blue bottle…corked…sealing wax…fire outside hatch…water rising in cabin... SOS USN..."

"KK8QQ/mm de W6ISQ. Righto. Keep your head, old man, don't panic. I'll handle this personally and immediately. We'll get you out of this ok, OM—citizens and USN working together, ya know."

"Hello operator, get me Chief of Naval Operations, Pentagon, Washington...hurry, Miss. This is a life-and-death situation...of course, you can...don't quibble at a time like this...never mind your Supervisor … get me the Pentagon … IMMEDIATELY…"

"Yes, that's right, I did say the Chief of Naval Operations… I said NOW, Captain…NOW….life-and-death struggle in the Pacific…public-spirited ham in conversation with the derelict…I mean the ship is the derelict…ha...don't waste time, Captain...the CNO…here…immediately…NOW…never mind the Joint Chiefs…now…"

"Hello CNO? Where ya been? In the old days … get to that later. Listen Admiral, there is a U.S. citizen in a sinking condition...errr...his ship is in a sinking condition and on fire about 100 miles north of Emirau…where's Emirau?...You an Admiral and don't know where Emirau is? Well anybody on the low end of 20 for the last week can give ya complete sailing directions — let me tell y'about this idyllic little isle...jewel of the Pacific...o.k. later..."

"Now this U.S. citizen has valuable documents which would be a tremendous loss to millions…thousands... err…*many* people if they got lost. I want you to get a ship...planes... marines...whatever ya got around there...save that man! One other thing...may find a bottle floating around in the wreckage...save the bottle...extremely valuable — right, a bottle…sealed…valuable documents — right…bottle."

"No, really Admiral, you embarrass me. No citation necessary...we public spirited … really Admiral...when emergencies arise we spring to action...coiled steel spring...no thought of reward...doing my duty as a citizen — 'Tis a far, far better thing I do — no really, Admiral...the President wouldn't have time for little old...well, maybe the Commandant of the Marine Corps would be o.k....first instant of danger...like lightning...well, if you insist...that's right. W6ISQ... W6ISQ...right. And don't forget to tell your boys Admiral, search the flotsam and jetsam closely for a bottle… sealed…valuable documents wrapped in oilskins…inside… right…that's I-S-Q — "It's Sinking Quickly" – ya follow that one, mate? Pretty good, eh? Right…valuable log…err…documents…in bottle."

"What was that, sir? Why yes, sir, of course — it's pale blue."

Wireless on His Mind

An early start in Amateur Radio led visionary engineer Mort Rogoff, W2EE, to develop some of today's most popular technologies.

Becky Schoenfeld, W1BXY

Cell phones and GPS have become staples of our daily lives. But did you know the technologies that power these popular tools (namely, spread spectrum communications and electronic navigational charts) owe a debt to Amateur Radio? Mort Rogoff, W2EE (SK), was the visionary behind these engineering achievements — just two among many in a brilliant career that grew out of Mort's early and continuing interest in ham radio.

Mortimer "Mort" Rogoff was born in Brooklyn, New York on May 2, 1921. Mort was hooked on radio by the age of nine; while other boys were playing outside, he was taking apart old radios and assembling new ones from the piles of tubes and hardware. In 1935, at the age of 14, Mort took the Amateur Radio license exams (there were two at the time — one pertaining to radio regulations and electronics, the other on Morse code) and was assigned the call W2ING, and began operating as one of the youngest hams in the country at that time. Some years later, he held the call W2DM, to which his wife, Sheila, objected.

"To me, it sounded like 'Too Dumb,'" Sheila recalled. Mort applied to the FCC for a replacement call, and chose W2EE — the "EE" stood for "Electrical Engineer." Mort retained this call for the rest of his life.

From Radio to Radar

Upon graduating from high school in 1938, Mort went to Rensselaer Polytechnic Institute to pursue a bachelor of science degree in electrical engineering. He was active in RPI's Radio Club, where he helped set up and operate a student station.

Mort spent four years in the Navy after college, eventually attaining the rank of Lieutenant. Much of Mort's time in the service was spent studying microwave radar, and thanks in part to his acumen for electronics and his background in ham radio, he became one of the earliest experts in this new technology. In 1943, he was transferred to Washington, DC to test and repair radar instruments for the Navy and Naval Air Force.

In late 1944, Mort joined the fighting overseas and was assigned to the USS *Chourre*, a supply and repair ship. Mort was responsible for maintaining the vessel's radio-radar equipment, as well as repairing radio and radar devices on aircraft in the vicinity.

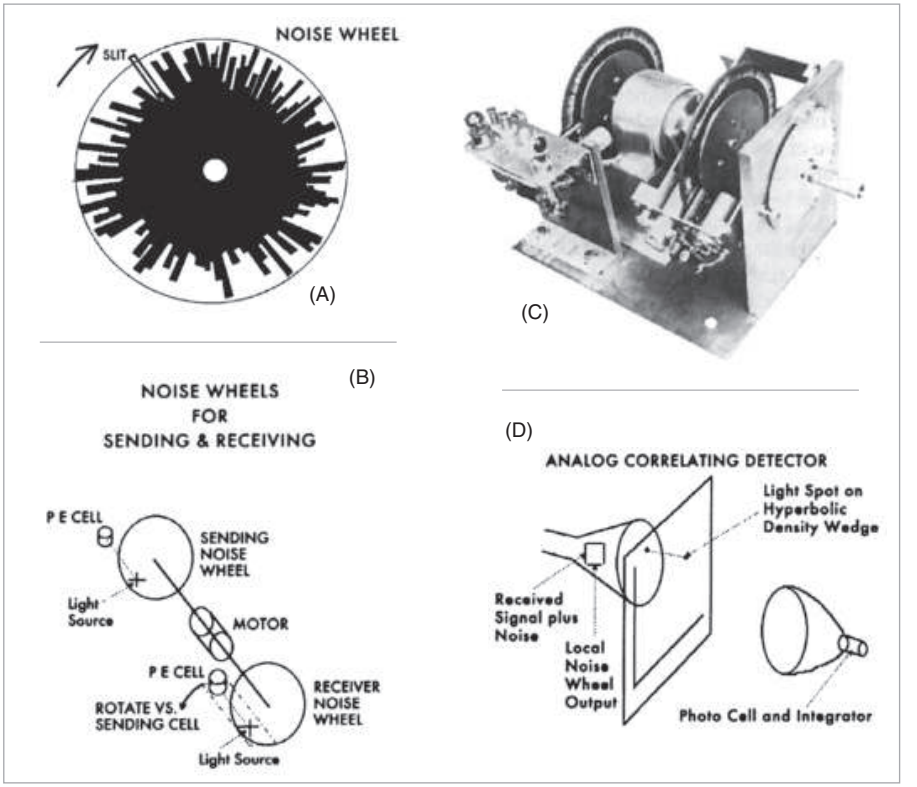
One night, a severe storm knocked out the ship's radio direction finding and loran tools. Mort was able to keep the *Chourre* on course using the new radar technology in which he was an expert, but the experience showed him that there was a need for detailed, reliable navigational tools — a need Mort would one day fill with a groundbreaking invention.

Spread Spectrum Gets Its Start

Upon returning home from the war, Mort enrolled in Columbia University to work toward a master's degree in electrical engineering (which he received in 1948).

Following a job lead from a Navy friend, Mort was hired in the Federal Telephone and Radio Laboratories group at the International Telephone and Telegraph Corporation (ITT), and in February 1946, embarked upon what would be a long and distinguished career. By spring 1947, that division was moved to a brand new, state of the art research facility in Nutley, New Jersey, and Mort's commute from the 37th Street apartment he shared with Sheila and their daughter Louisa (who was born in 1948; the Rogoffs welcomed two more daughters: Alice in 1951 and Julie in 1955) suddenly became a great deal longer, leading the Rogoffs to move to Nutley in 1949.

Mort's work at ITT's Federal Telecommunications Laboratory was often devoted to the development of long-range navigation and communication devices for aircraft. His first assignment was a military version of long-range navigation that would enable ground stations to guide bombers and missiles from distances of approximately 2000 nautical miles. The system's global wireless signal was transmitted at 100 kilohertz, because the low-frequency wave would travel over a



Mort's "noise wheel," (A) with a burst of black rays whose lengths correspond to a random sampling of numbers taken from the Manhattan phone book. Two wheels were needed: one to transmit, and one to receive, as shown in the diagram (B) of the piece of equipment Mort designed to test the system. The photograph (C) shows the finished piece of test equipment, with the noise wheels mounted on either side of a motor that turns the wheels in front of a light source that flashes with the varying lengths of the rays on the noise wheel, thereby creating the random noise signal. The Analog Correlating Detector (D) was used at the receiving end to extract the desired signal from the noise signal.

longer distance than a high-frequency wave. However, atmospheric noise interfered to the point where the system was not as effective as hoped for.

Noise became an ally in another project for the Air Force that would forever alter communications for civilians as well. ITT had received an Air Force contract for a navigation system. Mort, along with Paul Adams — his supervisor at ITT at the time — suggested that a method could be developed for sending messages cloaked in noise, so they couldn't be heard by unintended parties.

Mort created the noise code for the project through a process that began with randomly selecting 1400 phone numbers from the Manhattan phone book, and then creating a circular plot of the radio wavelengths that corresponded to the fifth and sixth digit of each phone number. The number 01 corresponded to the shortest length, and 99 corresponded to the longest length (00 was omitted from the random sampling).

He photographed the plot and pasted the film to a Plexiglas disc so it could be rotated in front of a beam of light. The light flashed at different intervals, representing the random noise code. When tests were made, the Morse code message was successfully picked out of the background noise each time. A key element of this technology involves spreading the signal over a much wider bandwidth than would normally be required, hence its name: spread spectrum.

Mort's take on spread spectrum, in its original analog form, became an important element of military communications. This meant the technology was secret; so much so that Mort was not issued a patent on it until 1979. Today the technology, now digital, is the backbone of cell phone communications and GPS technology, allowing numerous operators to use many channels simultaneously, without interference.

A 21st-Century Navigational Tool

GPS technology also depends upon another of Mort's inventions: the electronic navigational chart. Never having forgotten the stormy night on the *Chourre*, Mort wrote a book, *Calculator Navigation*, published by W.W. Norton in 1979. It occurred to him while writing the book that it should be possible to integrate all of a ship's incoming radio-transmitted data via computer onto a real-time, full-color display for use on the bridge of the ship.

Mort, who had left ITT by this time, started Navigation Sciences to develop and sell electronic navigational charting systems. His prototype, VIEWNAV, became available for purchase in 1981 and was patented in 1983. Adopters of the system included Carnival Cruise Lines, British Petroleum, private yacht owners, and fishing companies, but Mort found there was widespread resistance to giving up paper-and-pencil charting methods. He redirected his energy into a consulting firm he called Digital Directions, which worked to standardize the data components of electronic charting and draw up an international performance standard that would give electronic charts the credibility — and, eventually, confer the legality — needed for widespread adoption. To bolster these efforts, in 1994 Mort formed the Navigational Electronic Charts System Association (NECSA), a non-profit organization that protected the interests of the makers, users and regulators of electronic charts on a global scale. Standards for large ships were adopted in the mid-1990s, and Mort worked tirelessly to pass a set of regulations for smaller craft, which was adopted in the early aughts.

Mort (right) and Dr Whiting "Whitey" Willauer, Chair of the Board of Selectmen, Nantucket, with one of Mort's photos, which hangs in the Nantucket Yacht Club.

A Life Full of Imagining

Electronic charts were deemed legal for worldwide use in 2002. By 2005, charts for smaller crafts began to proliferate, and the US Navy had begun to adopt electronic charts as its primary navigation tool. Mort, 85 years of age at the time, decided to retire. He had closed Digital Directions, so he delegated his NECSA duties to a pair of colleagues and turned to his hobbies, which included digital photography and, of course, ham radio.

Washington, DC residents for most of the year, Mort and Sheila summered on Nantucket Island, Massachusetts, in a cottage on the grounds of the family compound built by Alice and her husband, David Rubenstein. Mort's antenna was concealed in a fiberglass flagpole, and he enjoyed the friendship of fellow hams John Ackley, KP2A, and L. Dennis Shapiro, W1UF. Mort and Dennis met on the air and were both members of the Nantucket Amateur Radio Association (NARA).

Dennis Shapiro had this to say to the author about his friend's tireless mind: "He was a man always amazed at the magic of technology, from the time he was a radio experimenter and teenage ham to the time of the GPS revolution. He continued to be that same wide-eyed boy enamored with radio."

"And putting together ideas; that was always there. Always," Sheila told *QST*. "Imagining, and working hard to get things to happen."

Mort Rogoff passed away on August 1, 2008, after living with bladder cancer for four years. His mind remained sharp to the end, as befitted a man credited with 17 patents, which include two interrelated inventions that aid communication and navigation — not only for the military and shipping companies, but for people like us, every day.

One of Mort's early electronic charts, showing a vehicle's location and its proximity to local points of interest.

Becky Schoenfeld, W1BXY, is the ARRL Book Editor. She can be reached at **w1bxy@arrl.org**.

ARRL Board Plans for 2014 Centennial Celebration

In addition to planning a celebration in Hartford in 2014, the ARRL Board of Directors voted to make the first major change to the Field Day rules in almost a decade.

S. Khrystyne Keane, K1SFA

When the ARRL Board of Directors met for it 2012 Second Meeting July 20-21 in Windsor, Connecticut, it did so with a full agenda. Besides hearing and approving recommendations from its two standing committees — the Administration and Finance Committee and the Programs and Services Committee — the Board voted to hold the 2014 ARRL National Convention July 17-20 in Hartford, Connecticut, the birthplace of the League in 1914.

Here are some highlights of the actions taken at the meeting:

Change to ARRL Field Day Rules: Due to concerns regarding extreme heat and weather conditions in many parts of the country, the Board voted to change the Field Day rules to permit Class A and B stations to begin to set up earlier. Prior to the rule change, these stations were not allowed to begin setting up their stations before 1800 UTC on the Friday before Field Day. Now these stations can begin setting up as of 0000 UTC on the Friday before Field Day (Thursday afternoon or evening, local time). Even though the rule change permits setup to begin 18 hours earlier, cumulative setup time shall not exceed 24 hours. This is the first major change to the Field Day rules since 2003, when a new class — Class F for EOC stations — was added.

Band Plans: The Board voted to approve the band plans for 13 cm, 23 cm and 33 cm — as proposed by the ARRL UHF/Micro-wave Band Plan Committee — as the ARRL National Band Plans. All ARRL Band Plans can be viewed at **www.arrl.org/band-plan-1**.

ARRL Southeastern Vice Director Andrea Hartlage, KG4IUM — flanked by ARRL President Kay Craigie, N3KN and Southeastern Director Greg Sarratt, W4OZK — announced her resignation from the Board, effective August 1.

ARRL President Kay Craigie, N3KN, presided over the 2012 Second Meeting of the ARRL Board of Directors. She is joined at the head table by Treasurer Rick Niswander, K7GM (far left), Second Vice President Bruce Frahm, KØBJ, First Vice President Rick Roderick, K5UR, and Chief Executive Officer and Secretary David Sumner, K1ZZ.

IARU Member-Societies: The ARRL Board of Directors voted to instruct the ARRL Secretary to cast a vote on behalf of the ARRL in favor of admitting The Federation of Radio Sport of Azerbaijan (FRSA) and the St Vincent and the Grenadines Amateur Radio Club (SVGARC) to the International Amateur Radio Union (IARU).

ARRL Awards and Honors

In recognition of his service to the ARRL, the Board named Thomas W. Comstock, N5TC, as Director Emeritus of the ARRL. Comstock served as ARRL West Gulf Division Director from 1991-1997; prior to that, he served as Vice Director from 1980-1991. Comstock was also a Director of the ARRL Foundation and the Scholarship Committee. A list of all ARRL Honorary Officials can be found at **www.arrl.org/honorary-officials**.

Technical Excellence Award: James Ahlstrom, N2ADR, of Stirling, New Jersey, was named the recipient of the *2011 Doug DeMaw, W1FB, Technical Excellence Award*. Ahlstrom was recognized for his "technical excellence in his research, design, construction and documentation of a homebrew all-digital HF transceiver" that was published in the January/February 2011 issue of *QEX*.

Technical Innovation Award: David Rowe, VK5DGR, of Adelaide, South Australia, was named the recipient of the *2012 ARRL Technical Innovation Award*. The Board noted that Rowe "has been a major leader and the primary technical author of an open-source CODEC2 protocol, designed to address the impediment to the development of amateur digital voice posed by closed-source protocols."

Silver Antenna Award: John T. Luebbers, K1AYZ, of Tavares, Florida, was named the recipient of the *2012 Philip J. McGan Silver Antenna Award*. Luebbers was recognized by the Board for his "outstanding volunteer public relations success on behalf of Amateur Radio at the local and regional levels."

Instructor of the Year Award: Joe Lowenthal, WA4OVO, of Memphis, Tennessee, was named the recipient of the *2012 Herb S. Brier Instructor of the Year Award*. The Board noted that Lowenthal "has a demonstrated record as an outstanding instructor for Amateur Radio classes, with hundreds of students benefiting from his expertise in the classroom and generous mentoring."

The next ARRL Board Meeting — the 2013 Annual Meeting — will be held January 18-19 in New Orleans, Louisiana.

The complete *Minutes* of the 2012 Second Meeting of the ARRL Board of Directors are available at **www.arrl.org/board-meetings**.

All photos by Steve Ford, WB8IMY.

S. Khrystyne Keane, K1SFA, is the ARRL News Editor. She can be reached at **k1sfa@arrl.org**.

How Much Radio Gear Do *You* Need?

Buying your first radio is like buying your first car, so make sure it fits who you are.

Rick Lindquist, WW3DE

In the mid-1990s, beleaguered cartoon software engineer Dilbert needed to render drawings in 3D. Ratbert in finance tells him a 286-class machine will suffice. "Besides," Ratbert asks, "how many times are you going to do 3D rendering in your career?" Replies Dilbert, "Once, if I hurry." Fortunately, Ratbert doesn't dictate how much ham radio suits your lifestyle and fiscal comfort zone — or whether you work DXCC at least once in *your* lifetime.

Some modest possibilities (clockwise from left): a YouKits four band, 5 W CW transceiver marketed by Ten-Tec (about $300); Wouxun VHF/UHF transceiver (about $100); used Yaesu FT-901DM HF transceiver (about $300), Kenwood TS-480 HF+50 MHz transceiver (about $1000; *QST* ad for ICOM IC-7410 HF+50 MHz transceiver (about $1900). [Rick Lindquist, WW3DE, photo]

Motorcycle or Maserati?

Images of well-appointed superstations with multiple towers and operating positions may tempt you to max out your credit card — if you haven't already. Back away from the plastic! First take account (no pun intended) of what you want from ham radio, then select wisely. Aim to trick out your shack for the kind of hamming you're *most* likely to do.

If You Were a Rich Man

No one wants to be "ham radio poor" but it's not just about money. It's about balance and appropriately addressing *your* particular situation. The plethora of equipment choices today can quickly overload your decision-making faculties, so focus is critical. The basics are a transceiver and an antenna.

Getting oriented in ham radio is not quite as clear cut as it once was, nor as inexpensive. But, it is easier. When I was first licensed more than a half-century ago, most hams operated solely HF. Do-it-yourself (DIY) ham radio was in vogue. Many hams just wanted to work DX and chat with friends. There was no discernible low-power community (some of us ran low-power but didn't know enough to call it that) and contesting was in its adolescence.

So, you cobbled together or bought an HF transmitter (many were kits, while others were fabricated with scavenged parts from old radios and TVs or military surplus gear), came up with some kind of HF receiver and put up some sort of antenna — often just a dipole. We *loved* it, even while trying to copy the other station on a Knight-Kit Space Spanner! Some hams I knew even fabricated towers from scratch — one out of railroad steel in Idaho, another out of wood in New Jersey.

Mere Paper Dollars

A newly minted Technician casting an eye toward emergency communication activities likely won't need acres of towers or a high-end HF transceiver. Most Amateur Radio emergency work happens on VHF and UHF, so this automatically narrows your gear choices. A handheld dual-band transceiver complementing a reliable dual-band mobile plus a selection of mobile and portable antennas should meet your needs without breaking the bank. Don't forget extra battery packs.

You don't need to invest a fortune in an HF station either, especially if you're just starting out. Consider a used rig (some have built-in power supplies) and a decent dipole or other wire antenna or array. For $500 or less you soon could be pursuing WAS or DXCC. Online flea markets such as **QRZ.com** and **QTH.com** are great places to look (I find eBay pricey). If you *must* have that new rig smell in the shack, an entry-level or mid-tier transceiver may fit the bill. Unless you're putting down deep roots, hold off on any elaborate tower projects.

If you're in tight quarters or live on the road, going mobile is yet another direction to keep in mind. Small, affordable transceivers and inexpensive antennas have made HF mobile far more viable than in years past.

Of course, more experienced operators who have acquired a taste for serious DXing or contesting (or both) may aspire to own a transceiver (or more than one) that's further up the food chain. Yes, Virginia, you can spend more than $10,000 for your radio; double that for a semi-elaborate antenna farm. The sky — almost literally — is the limit.

Taking the opposite tack is a minimalist low-profile, low-power approach to HF ham radio — low-power operating. For many hams, running 5 W or less, often with home-brew or kit gear, sufficiently scratches their ham radio itch. You can establish an on-the-air presence for less than $100, if you're truly frugal and if you're into DIY, sometimes for *far* less. Low-power operating is a challenge and well-suited for those who want to throw a little HF station in a bag to use while enjoying nature's wonders.

The Goldilocks Option

If you're dithering, consider guest-operating at friends' stations. This way you can see which setups are too little, which are too much and which are *just right*. This approach also works if your ham radio aspirations outstrip the sort of station you'd *like* to have but cannot for various reasons, such as antenna restrictions or fiscal constrictions. Some top contesters operate someone else's superstation.

As with fun, there may not be such a thing as too much ham radio, but there is a *sensible* level that's right for your circumstances. See **www.arrl.org/buying-your-first-radio** for additional insights and keep Ratbert out of your shack.

Rick Lindquist, WW3DE, is the managing editor of *National Contest Journal*. He can be reached at **ww3de@arrl.org**.

2011-2012 School Club Roundup Results

Here's a chance to get some young people on the air. The next School Club Roundups are scheduled for October 15-19, 2012 and February 11-15, 2013.

Lew Malchick, N2RQ
n2rq@arrl.net

When it comes to youth involvement in Amateur Radio, the School Club Roundup remains one of the best ways to get students on the air and enjoy all that the hobby has to offer. Elementary schools to universities all participate, with a lot of help from numerous teachers and volunteer Elmers.

The October 2011 and February 2012 School Club Roundup sessions saw some significant administrative changes. A team of volunteers from the Long Island Mobile ARC, LIMARC (Ken,WB2KWC and Bernie, K2YO) and SCR logging programmers Dave, AD8B and Nicholas, KC7MOD improved and sped up the process. Dave, W3KM, joined the team and helped with updates to his "CabEval" utility, and more support from contest logging programs helped participants submit their logs electronically, though more is needed. This made it possible for us to post February results and, for the first time, distribute certificates before the end of most school years. See **www.arrl.org/school-club-roundup-scr** for full results.

Participation

Once again the number of entries in October declined, this time from 40 to 34 submissions. On the plus side, the number of reported operators increased from 345 to 471. By contrast, the February session resumed an upward trend with more entries from elementary and middle schools, colleges, clubs and individuals. Total entries went from 46 to 61, up 32%. Total QSOs increased by 45% from 6696 to 9763, and the number of reported operators increased from 511 to 965. The increases in numbers of operators show that we are achieving our most important goal — to expose young people to Amateur Radio. This increased interest and participation may have been enhanced by improved propagation making operation more satisfying.

Soapbox

It's always fun to hear from the participants and see what their big moments were in the SCR. Here's a sample of comments:

"Wow! This was the year of 10 meters. This legendary band finally came to life and provided a fantastic pipeline between our school and the rest of the world. We worked almost 40 countries around the globe. Simply amazing! My students enjoyed the magic of working DX, and had fun speaking to other schools, too. It was the best of both worlds. — *LBJ High School ARC, K5LBJ, Austin, Texas*

Kristina Whitley is excited after making a QSO for W4FOS, the Chesapeake Center for Science and Technology HS ARC in Chesapeake, Virginia. Elmer Richard Siff, W4BUE, looks on. [photo courtesy Richard Siff, W4BUE]

"We had a blast operating this year with a new crop of students. We operated only on 10/15/20 meters due to damage to our 40/80 dipole support, but we still were able to work some close states on 20m for the first time. We also have some students that have expressed interest in serious contesting this year!" — *Glenn Raymond School Science Club ARC, W9GRS, Watseka, Illinois*

"The ionosphere smiled on us this time. After several years of sunspot minimums, we earned our best score ever. The important thing is, we put 83 students on the air and they had a ball." — *William Byrd Middle School Amateur Radio Club, K4WBM, Vinton, Virginia*

The Winners

After missing a few sessions, the North Clarion School ARC, W3NCS in Tionesta, Pennsylvania returned in February to reclaim the top Elementary School spot. In the Middle School class, the KC5CRF Crew from Eisenhower MS in Lawton, Oklahoma led the pack; William Byrd Middle School's effort as K4WBM in Vinton, Virginia nearly doubled their February 2011 score, yet it was not enough to beat KC5CRF in 2012. The High School category top honors go to the Burr and Burton Amateur Radio Club, K1BBS of Manchester Center, Vermont. Second place goes to another school in Vinton, Virginia: William Byrd HS WB4HS. Their 43% increase in score from 2011 was not enough to hold the High School category. The club station at Arizona State University in Glendale, W7ASU, topped all entries in numbers of QSOs in both the October and February sessions with 865 and 835 and also took first in the number of schools contacted, 33 and 47, respectively.

As with all on-air competitions, there are more participants than entries received. We like to commend some of the low scoring entries for fulfilling the purpose of the SCR. The following stations had more reported operators than QSOs: W7O, W5KS and W2CXN.

Get Involved!

We're always excited to hear about new schools participating. If you're passionate about Amateur Radio and want to help youth get involved in the hobby, see if one of your local schools would be interested in learning more about the School Club Roundup. Visit the SCR page online at **www.arrl.org/school-club-roundup-scr** for a link to getting SCR started at your school, or e-mail **SCR@limarc.org** for more information. Join the SCR yahoo group at **SCR-L@yahoogroups.com**.

The next School Club Roundups are scheduled for October 15-19, 2012 and February 11-15, 2013. We hope to hear your success stories!

How Big is Your World?

JOTA 55 is October 20 and 21.

Debra Johnson, K1DMJ
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The World Scout Bureau selected "How Big is Your World?" as the theme for the *55th Jamboree on the Air,* the annual Amateur Radio international on-the-air scouting event. This year's theme is an invitation to Scouts to reflect on how they can enlarge their own world by interacting with others, using modern methods of communication. Scouts are encouraged to "Let other Scout friends from around the globe step into your world by sharing your thinking, feeling, emotions, ideas, proposals and projects with them. Share your life experiences to enlarge your world...."

Hams can certainly resonate with this idea since Amateur Radio enables personal connections to people all around the world and so often does generate life enriching friendships. You'll find more information about the World Bureau's vision for this year's theme at **scout.org/en/information_events/events/jota**.

JOTA officially starts at 12 midnight Friday night/Saturday morning, ending at midnight Sunday local time. The official Scouting frequencies will be the center of operations. A listing of frequencies, information about third party traffic restrictions and other details can be found on the ARRL website at **www.arrrl.org/jamboree-on-the-air**, or the Boy Scouts of America JOTA site at **www.scouting.org/jota**.

Jamboree on the Air provides the opportunity for radio amateurs to reach out to youth in their neighborhood and welcome them to the on-the-air community of Amateur Radio. Long distance and locally, ham radio connects young and old in sometimes surprising and world-expanding interactions through the medium of the hands-on communication technology that is ham radio.

Webelos Scouts attending the Great Lakes Council's Ottawa District Unity Camporee talk with fellow Scouts across the country on the 20 meter band. The operator is Dave Edenfield, W8RIT. [Frank Maynard, NF8M, photo]

2011 JOTA

Here are some stories telling of the variety of ham radio communication modes US participants in JOTA 2011 utilized to enlarge their world:

■ *From WB8BSA, as reported by Frank Maynard, NF8M:*

We were perched high on a hill overlooking the Kensington Metropark Group Camp, giving us a good vantage point for our 80-meter dipole and VHF/UHF vertical. With a smaller than usual staff, we decided to concentrate on HF radio and operated 20 meter phone nearly all the time, except for a couple hours of PSK31 activity and some phone on 10 meters to work a handful of DX stations. Although we tried calling CQ for a while on CW, we didn't raise anyone. A steady stream of Scouts came by the radio tent, some of whom were genuinely attracted by the radio station but others who stopped in out of curiosity because we were near the fire building contest and tomahawk-throwing activity. We were able to put 30 to 40 Scouts on the air, enjoying conversations with other Scouts, Scouters and amateurs throughout the day. For most, it was their first exposure to amateur radio, and while Dave, W8RIT, put the boys on the air, Bill, KC8TVG, and I helped to explain ham radio to the parents and Scouters who came by.

Summary
Stations worked: 28
States worked: 17
Countries worked: 3
Scouts participating: Approx 60
Amateurs participating: 4 (W8RIT, KC8TVG, KE8HR, NF8M).

10 boys made a total of 63 contacts from station KMØBSA, from Columbia and Jefferson City, Missouri to Mexico City, from the East Coast to the West Coast. The Scouts also enjoyed going on several hidden transmitter hunts. Both the band conditions and the weather were great. Seeing the enthusiasm on these kids' faces made the whole event worthwhile for me. — *Corey Mesenbrink, KCØYNS.* Tune in to watch a video about KMØBSA 2011 JOTA activities recorded by a local television station. It is on YouTube at **www.youtube.com/watch?v=5LG-0UQ-nWg&sns=em**. [Don Moore, KMØR, photo]

■ *From Webelos Woods 2011, as reported by Harvey Jones, WØHGJ:*

White Buffalo District, Quivira Council held their Fall Webelos Woods at Camp Kanza during the Jamboree-on-the-Air (JOTA) weekend. Camp Kanza is about 1 hour northwest of Wichita, KS. Webelos Woods is an annual weekend camping adventure for 1st and 2nd year Webelos, staffed by Boy Scout troops from several Districts. Webelos are introduced to several Boy Scouting skills along with just plain old fun activities. The JOTA event was one of the positions in the Webelos Woods rotation. Every scout had the opportunity to get an overview of Amateur Radio and talk on HF or VHF/UHF radios. The event made 262 contacts with the Cub Scouts talking with other scouts and/or amateur radio operators. Cub Scouts also witnessed demonstrations of Slow Scan TV, PSK-31 and CW reception. Many scouts returned from last year, looking forward to getting on the radio again. Distance contacts included: San Diego, CA, Lansing, MI, Venezuela, France on PSK-31, Japan via PSK31, JOTA station K7RDG in Sierra Vista, AZ, among many others. Thanks to the local hams (WØHGJ, N5GUI, AJ7F, N7NGI, KDØELB, WAØROX, KCØNXF, KBØDTI, NØLD, KDØHTI, KCØIFQ) and the many amateur radio operators at the other end of the wire that provided the entertainment and education of the boys.

2012 Simulated Emergency Test

From the individual to the community and beyond, are we ready?

Steve Ewald, WV1X

Are you ready to respond to a local communications emergency? How about within your area, state or beyond? ARRL's Simulated Emergency Test (SET) is October 6 and 7, 2012. It's an exercise that enables you and your local, district, and section leaders to test equipment, modes, operating skills and emergency deployment plans to see if everything is in place and ready for an actual emergency event.

ARRL Field Organization Leaders at the section and local levels and many other volunteers who are active in public service and emergency communications are developing emergency-like scenarios in consultation with a variety of agencies for whom radio amateurs are known to provide service during emergencies.

Make this the year that you decide to create a personal plan and to be ready and help if and when you're needed. Taking part in an SET is one step toward doing just that. To find out how you can be a part of the local or section-level SET and other related activities, contact your Section Manager (refer to page 16 of *QST*). Additional contact information may also be found on the Section web pages at **www.arrl.org/groups/sections**.

The SET is one of the premier events of the year that invites the Amateur Radio Emergency Service® (ARES®), the National Traffic System (NTS), the Radio Amateur Civil Emergency Service (RACES), SKYWARN, members of the ARRL Field Organization and others groups to work in concert together to practice and prepare.

The wider community is also encouraged to be involved in the SET by way of working relationships and agreements with community and public service agencies. The ARRL Simulated Emergency Test is a chance to test and improve these cooperative agreements.

The ARRL maintains national agreements and/or memoranda of understandings with several organizations including the American Red Cross, the National Weather Service, the Federal Emergency Management Agency, the Salvation Army, Civil Air Patrol, the Association of Public Safety Communications Officials–International (APCO) and others. More information on these and other national served agencies and partners may be found at **www.arrl.org/served-agencies-and-partners**.

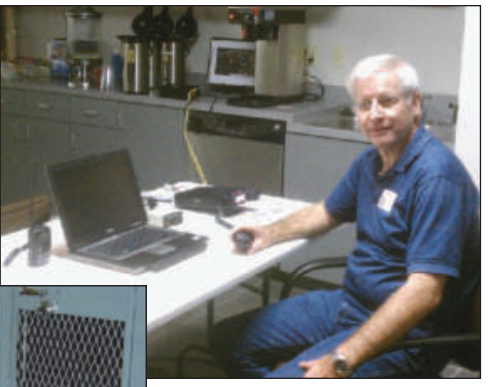
National Preparedness Month

ARRL is a National Preparedness Month Coalition Member. Held in September, National Preparedness Month (NPM) is a nationwide effort to encourage Americans to take simple steps to prepare for emergencies in their homes, businesses and schools. The US Department of Homeland Security is working with a wide variety of organizations (including ARRL) to highlight the importance of emergency preparedness and promote individual involvement through events and activities across the nation. We encourage you to consider this year's Simulated Emergency Test and all preparations for it as a demonstration of Amateur Radio's readiness and as an active participant in National Preparedness Month. More information on NPM is at **www.ready.gov/**.

SET on the Calendar

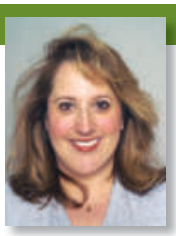
In consideration of local and section wide schedules with agencies and many others participants, ARRL Field Organization Leaders have the option of conducting their local or section wide Simulated Emergency Test on another weekend. Check with your local ARRL Field Organization leadership for the exact date in your area. Your help is needed, and the ARRL SET is a great way to get involved in emergency communications.

The Simulated Emergency Test guidelines and the 2012 SET reporting forms (including Emergency Coordinator Annual Report forms) are posted on the ARRL website at **www.arrl.org/public-service-field-services-forms**. If you are the Emergency Coordinator, Net Manager, or a Section Leader who is in charge of reporting this year's SET activity on behalf of your group, please feel free to download the forms on the web page, fill them out as appropriate, and return them to ARRL Headquarters as suggested on the forms. Thank you, and good luck in the SET!



Stuart Williams, AK4EX, operated from the Sandy Springs Police Headquarters in the 2011 Simulated Emergency Test conducted by the North Fulton County (Georgia) ARES. [Thomas Koch, W4UOC, photo]

Bret Arnold, W4BTA, was on the air from the Alpharetta Fire Station #1, to assist in the North Fulton County ARES SET that was held in October 2011. [Thomas Koch, W4UOC, photo]



S. Khrystyne Keane, K1SFA, k1sfa@arrl.org

Colorado Hams Provide Disaster Communications

As massive wildfires persist across the state, radio amateurs in Colorado continue to provide communications support to state and local served agencies.

Thanks to an extremely dry season, portions of Colorado were ravaged by wildfires in June and July. According to InciWeb, more than 160,000 acres were affected by nine fires; InciWeb is an interagency all-risk incident web information management system provided by the United States Forest Service. Since June 9 — when the High Park Fire, the first of the wildfires began — hams in Colorado have been assisting with disaster communications, providing communications support to the state and served agencies.

As wildfires raged across Colorado, hams provided communications support. Roosevelt National Forest in North Central Colorado (where this picture was taken) had two fires in its environs — the High Park Fire and the Hewlett Fire. Together, these two fires claimed more than 95,000 acres. [David Johnston, KD8BQN, photo]

Larry Arave, W7LRY, and John Cook, WA7NZE, both of Fort Collins, helped support disaster communications from the Larimer (Colorado) County Emergency Operations Center during the High Park Fire. [Rob Strieby, WØFT, photo]

Randy Long, K7AVV, of Masonville, told the *Denver Post* in an article published June 14 that beginning June 10, he "has been managing operators staffing eight-hour shifts around the clock. [The hams have been] doing such things as setting up portable radio repeaters and relaying messages between the fire lines and command posts. About 40 operators have volunteered [to help provide communications support]."

Along with Long, Robert Wareham, NØESQ, and a handful of ARES® volunteers reported to the National Guard Armory in Fort Collins as the High Park Fire encircled the Buckhorn and Horsetooth mountains, the sites for some of the public safety communications towers for Larimer County. "These are the kind of things we train for day in and day out," Wareham told the *Denver Post*. "We just want to keep the people in this county safe." The paper reported that there are about 50 repeater sites located in the mountains. See the article at **www.denverpost.com/news/ci_20852619/colorados-amateur-radio-operators-fill-wildfire-coverage-gaps**.

Shortly after the High Park Fire broke out, radio amateurs in Estes Park and Fort Collins were called upon to help provide communications support to the American Red Cross. Hams set up antennas and a crossband repeater to provide communications from Red Cross Headquarters in Estes Park to their facilities at the fire base, as well as to a Red Cross evacuation center that had been set up at a local high school.

ARRL Colorado Section Manager Jack Ciaccia, WMØG, and ARRL Boulder County Emergency Coordinator Allen Bishop, KØARK, were returning from the High Park Fire on June 26 when they were notified that Boulder County Office of Emergency Management had activated ARES for another fire, the Flagstaff Fire. According to Ciaccia, a lightning strike had hit just west of Boulder, causing a 20 acre that had spread to 230 acres in only 30 minutes, due to high winds.

"The Boulder Office of Emergency Management wanted Boulder County ARES (BCARES) positions manned at the Emergency Operations Center," Ciaccia told the ARRL. "They also wanted to send additional operators to video positions and set up packet and voice communications at a local school noted, as it would serve as the evacuation center. We set up a resource net on the local Boulder Amateur Radio Club repeater and assigned a Net Control Station to set up there."

Ciaccia said that within one hour, ATV hams with BCARES had a video camera set up, while other hams at the evacuation center team had set up packet communications, providing data and video, as well as 2 meter FM voice communications. "Another net was up and running simultaneously on our operations repeater, with another Net Control Station working at the EOC," he explained. "Other portable video positions were fully operational by the end of two hours. Our live video feeds were up on the huge video screens at the EOC, allowing the entire emergency staff to see helitankers and US Forest Service bomber aircraft making fire retardant drops. They could also see the fire live from the backside, which was not otherwise visible without our portable ATV teams live video feeds. When the Type I federal fire

teams showed up to determine whether the fire would escalate to their level, they noticed the live video feeds at the EOC and made special trips to our field video sites. They were unaware that a TV resource was available that could be used for their purposes and were quite pleased at that capability and wanted us to continue operations if it escalated to a Type I." The fire never grew beyond 300 acres and it remained at the Type II level.

"The served agencies — the Boulder County Sheriff's Office and their Office of Emergency Management — were extremely pleased that we responded so fast and so well," Ciaccia told the ARRL. "Joe Pelle, the Boulder County Sheriff, made it a point to stop by and thank us, as did Mike Chard, the Director of the Boulder Office of Emergency Management."

Former ARRL General Manager and IARU President Richard Baldwin, W1RU (SK)

Richard L. "Dick" Baldwin, W1RU, of Damariscotta, Maine, passed away on Thursday, June 21, after a long struggle with Parkinson's Disease. He was 92. An ARRL Charter Life Member, Baldwin capped a long career on the ARRL staff with service as General Manager from 1975 until his retirement in 1982. He served as Secretary of the International Amateur Radio Union (IARU) from 1976-1982. After retirement, he continued his involvement as a volunteer, serving as IARU President from 1982-1999 and as ARRL International Affairs Vice President from 1982-1986.

Former ARRL General Manager and IARU President Dick Baldwin, W1RU (SK).

According to his daughter Judy, Baldwin's life revolved around telecommunications. He first became licensed in 1934 as W1IKE. An Amateur Extra class licensee, he earned DXCC, WAS and WAC, as well as membership in the ARRL A-1 Operator Club. A graduate of Bates College in Maine, he earned an MS in Physics from Boston University in 1948. Baldwin spent five years in the US Navy during World War II. In March 1943, while serving as Communications Officer aboard the USS *Coghlan*, he participated in the longest American naval daylight battle of the war: the Battle of the Komandorski Islands. After the war he served in the US Naval Reserve, achieving the rank of Commander.

Baldwin began his career at ARRL Headquarters in 1948 as an Assistant Secretary. After a brief hiatus to work in the private sector in the early 1950s, he returned in 1956 as Managing Editor of *QST*, where he was responsible for production of the monthly member journal and all ARRL publications. In 1963, Baldwin became Assistant General Manager and almost immediately got involved with international matters. Dick organized the Intruder Watch one year later, and served as the ARRL Liaison between the amateurs who monitored the bands and the FCC. He was named by the ARRL Board to succeed John Huntoon, W1RW, on Huntoon's retirement as General Manager, the position now titled Chief Executive Officer, in 1975. In total, Baldwin wrote 234 articles and columns for *QST*.

ARRL Chief Executive Officer David Sumner, K1ZZ, who succeeded Baldwin as General Manager in 1982, observes that Dick is responsible for much of Amateur Radio's success in retaining and expanding its international frequency allocations. "Beginning in 1964, strengthening our position at the International Telecommunication Union in preparation for what ultimately became the 1979 World Administrative Radio Conference, was a major preoccupation in Dick's life. He played a key role in developing and implementing the strategy that led to success. Sitting at Dick's elbow in the years leading up to WARC-79 was an extraordinary learning experience for which I will always be grateful."

As IARU President, Baldwin led the development and adoption of a new IARU Constitution and oversaw the continued strengthening of the IARU as the spokesman for Amateur Radio at the ITU and in regional telecommunications organizations. In 1999, he was named IARU President Emeritus for his service to the IARU and the Amateur Radio Service.

"I was saddened to hear of the passing of IARU President Emeritus Richard Baldwin," said IARU President Tim Ellam, VE6SH. "Dick was instrumental in securing new HF allocations at 10, 18 and 24 MHz during WARC-79. He was a key figure in the work of the IARU, and the Amateur Radio Service is in a better place today because of his leadership."

Upon his retirement in 1982, Baldwin and his wife Phyllis moved to Maine where he became immersed in the local community. He was active in the Pen Bay Amateur Radio Club, the Bremen Historical Society and the Bremen Fire Department. He was also the Past President of the Maine Wood Carvers Association. Baldwin was a fan of Dixieland jazz — particularly the music of Louis Armstrong — astronomy and sailing. Sailing in his 35 foot ketch *Endurance*, named in honor of his hero Sir Ernest Shackleton, he taught himself how to navigate using a sextant. Baldwin also climbed Mt Katahdin many times.

In 1991, Baldwin received the Hall of Fame Award from the Quarter Century Wireless Association (QCWA). In 1992, he was named the Dayton Hamvention Amateur of the Year. In 2003, he was inducted into the *CQ* Amateur Radio Hall of Fame.

Baldwin was a keen proponent of the Amateur Radio Service, especially on the international level. In 1993, he traveled to Beijing, China to teach the Amateur Radio Administration course. [Chen Ping, BA1HAM, photo]

Baldwin is survived by his wife Phyllis, daughter Judy and son Glenn. A memorial service was held June 29 at Second Congregational Church in Newcastle, Maine.

Executive Order Poses No Threat to the Amateur Radio Service

On July 6, the White House released an *Executive Order* that addresses National Security and Emergency Preparedness (NS/EP) communications functions of the federal government. Contrary to some concerns raised in a few Amateur Radio circles, the *Order* does not appear to contain any threat to the Amateur Service or its ability to continue support communications during times of emergency or disaster. It also poses no threat to amateur spectrum.

"The purpose of the new entity, which would be created by this *Order* within the Executive Branch, appears to be to plan for future NS/EP communications and to ensure survivability, hardness and interoperability, as well as to develop a long-term strategic plan for NS/EP communications," said ARRL Regulatory Information Manager Dan Henderson, N1ND. "Based on the Amateur Service's ongoing, positive working relationship with officials at the Department of Homeland Security's Office of Emergency Communications, it is hard to envision that any new management plan would not include Amateur Radio. Nothing in this *Order* directly affects Amateur Radio's daily operations."

The full text of the *Executive Order* can be found at **www.whitehouse.gov/the-press-office/2012/07/06/executive-order-assignment-national-security-and-emergency-preparedness-**. A good summary of the content of the Order can be found at **www.federalnewsradio.com/519/2933910/Obama-assigns-new-responsibilities-for-keeping-government-connected-in-case-of-emergency**.

2011 ARRL Annual Report Now Available

The *ARRL Annual Report for 2011* — now available online — reviews the major events of the year and documents the renewed growth of both the ARRL and the activities of the Amateur Radio Service. For the fifth consecutive year, ARRL membership grew, totaling 157,813 members at year end.

According to ARRL Chief Executive Officer David Sumner, K1ZZ, Amateur Radio is flourishing: "Despite challenges on many fronts, Amateur Radio and the ARRL were in better shape at the end of 2011 than at the beginning. In September, we reached a milestone in amateur licensing, with 700,000 individuals licensed by the FCC, and reached 702,056 at the end of December, up .86 percent for the year."

Sumner noted that ARRL membership also grew at .86 percent, exactly the same rate as the licensing numbers. "While membership is still short of its all-time high, we have achieved five straight years of growth, straight through the recession," he said. "This record of success is testimony to the professionalism of our membership staff as well as to the diligent efforts of everyone, volunteer and staff alike, who contributes every day to a positive image of the ARRL in the Amateur Radio community."

"Although we were assured all along that we didn't need to worry about HR 607, in my view, every threat to Amateur Radio spectrum privileges has to be taken seriously, and opposed seriously, until it is buried with a stake in its heart," Craigie said, calling HR 607 "the first domestic threat to Amateur Radio spectrum privileges on a popular band, in this case, 420-440 MHz, in many years."

Craigie pointed out that the League's grassroots efforts helped bring the Amateur Radio community together on this issue; through their efforts, the inclusion of portions of our Amateur Radio spectrum was taken out of the bill. "We now have shown that our grassroots program can mobilize the membership on a legislative issue and we have learned that talented volunteers will step forward to offer us new ways of promoting grassroots action at little or no cost to the League," she said. "A volunteer produced an informational video about the bill that could be viewed or downloaded. Another volunteer created letter-generating software that continues to be enhanced. In addition to these volunteer efforts, we initiated a legislative affairs e-newsletter from Headquarters to keep members informed about what is going on and what we would like them to do about it. When we need to activate our grass-roots network for the next threat or opportunity, we know it will work. Possibly, even more capabilities will be added as members grow more attuned to legislative action and are moved to offer their expertise to our tool box."

Looking to 2012, Sumner noted that the ARRL "will continue to defend amateurs' access to the radio spectrum in the face of growing pressure to expand the frequencies available for mobile broadband. We also will accelerate our planning for a memorable celebration of the ARRL's Centennial in 2014, not only to honor the past but to set the stage for an equally exciting Second Century."

The ARRL Annual Report for 2011 is available at **www.arrl.org/annual-report**.

Walt Maxwell, W2DU (SK)

M. Walter Maxwell, W2DU, died July 3 at his home in DeLand, Florida of natural causes. He was 93. An ARRL Life Member, Maxwell was best known in the Amateur Radio realm for his ground-breaking series of articles, "Another Look at Reflections." Published in *QST* in seven parts from 1973-1976, the series explained in plain English concepts such as line loss, SWR, baluns and antenna tuners. The articles were later compiled into a book, *Reflections: Transmission Lines and Antennas*, that included additional material on matching networks, antennas and the Smith Chart. It was first published by the ARRL in 1990 and went through several editions. Later editions were published by WorldRadio and CQ Communications. He is survived by his spouse Jean Binkley Mayhew, three sons — William W. Maxwell, W2WM, of DeLand, Florida, Richard A. Maxwell, W8KHK, of Marietta, Georgia and John R. Maxwell, K4JRM, of Gainesville, Florida — and daughter Susan M. Glasnapp, ex-KC4UBZ, of Delray Beach, Florida. More details of Maxwell's life and work are available on his website at **www.w2du.com**.

Walt Maxwell, W2DU

Rick Palm, K1CE, k1ce@arrl.org

At Ground Zero

Disaster at the World Trade Center — one ham's story.

Bob Hejl, W2IK

September 11, 2001, the day our world changed, started like any other weekday morning: I dragged myself into work at Farmingdale Public Schools on Long Island and began setting up my schedule. I lazily turned on a television and heard the news that one of the World Trade Center's Twin Towers in New York City had caught fire. I half-listened — there have been fires in skyscrapers before. Shortly, the world discovered it was a terrorist attack on the United States.

When I saw the horrific scene of the second plane crashing into the second tower, I quickly surmised that victims would go to the various hospitals on Long Island. I also feared the beginning of a larger series of attacks that could possibly engulf Long Island. I took leave from my job and drove to my town's Emergency Operations Center (EOC) in Islip. As an ARES® Assistant Emergency Coordinator (AEC), I used my mobile rig to declare a radio emergency and started a net on the repeater.

Local ARES/RACES members began checking in. I planned to send operators to the area hospitals. We were well trained for hospital duty thanks to annual drills with their facilities and staffs. Upon arrival at the EOC, I turned on a bank of radios and put our communications "war room" in order. I asked on our repeater for a formal list of check-ins and availability of operators for deployment to hospitals, shelters, government buildings or other locations should other attacks be committed. Our tightly knit ARES/RACES group trained extensively for a variety of emergencies, including terrorist actions.

I called the area hospitals we covered. South Side Hospital in Bayshore requested support, so I immediately dispatched two hams there. Officials in New York City told the hospital they would transport victims who were Bayshore residents there — the number could be in the hundreds. A short time later, our "sister" town, Babylon, activated its net.

A few minutes later, the television at the EOC displayed the even more terrifying scene of the Twin Towers collapsing. Emptiness overwhelmed me, as I thought, "There might not be many victims to be transported to our hospitals." I continued getting our communications plan in order.

I received a phone call from New York City-Long Island ARES Section Emergency Coordinator Tom Carrubba, KA2D, who had been monitoring our town's operations. Since our operation was proceeding smoothly, he asked me to seek operators who could deploy to New York City and provide communications for the Red Cross. Several experienced operators would respond to the request and I was one of those deployed. When the Twin Towers fell, so did the many antennas for radios from varied agencies resulting in a critical loss of communications at a time when they were vital.

I consulted with a few veteran emergency operators and met them at the Islip train station. I brought my extended duty go-kit along with my dual-band 50 W VHF/UHF radio, a lightweight switching power supply and a magnetic-mount dual-band antenna. I also brought my handheld transceiver and a charger.

...the television at the EOC displayed...the Twin Towers collapsing.

Our train ride into Manhattan was somber. We had no idea what lay ahead for us. I was afraid that I wasn't qualified for the task at hand. When we arrived in Manhattan, Penn Station was subdued. Everyone seemed to be moving as if in a trance. Their faces revealed a wide range of dark emotions. Some were frightened. Some were crying. Deep anger painted most faces. The shock had truly struck home.

We took a subway train to Red Cross headquarters, where there was a long line of people wanting to either give blood or sign up to help, all with the look of helplessness in their eyes. As we walked toward the building, people spotted us in our crisp, white ARES/RACES uniforms with official patches. Several came running up and asked if they could help. Half were in tears. When we entered the building, we were escorted into the Red Cross' makeshift radio communications center where we were greeted by the ham responsible for signing in new operators. Personnel on telephones were arranging for others to report to the many Red Cross shelters. With airports closed for fear of additional jet plane attacks, there were thousands of displaced travelers who needed a place to stay.

I was told I was needed at the command center at ground zero. They gave me a special cell phone and I boarded a waiting van. My ARES/RACES uniform, with my Red Cross badges along with my AEC badge, was my pass.

Into the Mouth of Hell

The ride in the van to my post at ground zero took longer than expected; our route was clogged with hundreds of emergency vehicles. The slow advance to the site gave me time to prepare both mentally and emotionally. As we entered the disaster area, it looked as if several blocks of the city had

been bombed out, a vast expanse of ruins. The massive piles of "steaming" rubble, which once were two of the tallest structures in the world, lay directly in front of me. Smoke and dust hung in the air. Several buildings were still ablaze. Thousands of rescue workers and firefighters were scurrying to find survivors.

I got out of the van, but before I could turn to say anything to my ham buddy in the vehicle, it sped away to deposit its passengers at the next location. My "old world" had just left in that Red Cross van. I felt alone. It was now up to me to handle one of the most important communications tasks I or anyone might ever be assigned.

When the Twin Towers fell, so did the many antennas...resulting in a critical loss of communications...

It was time to go to work. Burying my emotions, I asked a police officer where the command center was. He pointed to an elementary school blanketed in a cloud of dust, closer to the site. As I slowly walked there, I noticed a unique smell, the smell of death. Yet there was also something in the air that reminded everyone of the possibility that people were still alive buried beneath the remains. Both men and machines were there, trying desperately to find them. I would be a part of that team for the next 3 days.

Upon entering the buzzing command center, I took stock of my surroundings, supplies that might be available and who was doing what. I reported to the Red Cross official in charge and told her that I was there on behalf of ARES/RACES to perform communications and other tasks. She looked tired and introduced me to five other Red Cross workers, all of whom looked as if their own families had died. She then showed me where they'd been working, an area at the back of the main room, which was encapsulated to keep the dust out.

Plugging in my radio, putting my magnetic-mount antenna on the metal frame of a folded twin lunch table and placing it up as high as possible, I attempted to check into the repeater that was supporting Red Cross communications, but couldn't hit it. I "stole" an extension cord and ran my radio, power supply and antenna up to the third floor. I called, held my breath and was then in touch with the Red Cross headquarters communications team — with a good full-quieting signal.

They immediately gave me a list of things to ask the "shelter manager," her designation, even though it wasn't really a shelter (there was fear that if my location was identified as a command center, terrorists might strike it to inhibit the rescue operations and to increase fear throughout the city). We were all aware that even our own communications might be intercepted and used against us. I even had to send phony messages so it appeared that I was at a shelter.

Not having communications with ground zero until I arrived, Red Cross HQ needed an update on several items such as food, cots, clothing and water. I was also asked to go to the high school across the street once each hour to assess it, as it was a relief/first-aid center, and report any needs.

All communications sites, ground zero, the mayor's command center and the various shelters were requested to give updates each hour on personnel, clients served, supplies and other items. We used tactical calls, ones that would not give exact locations away.

I had no idea that my "12 hour shift" would become three straight days of being on duty. In retrospect, my location was a hot spot, unlike a shelter detail, requiring smooth, continuous communications. This was not a duty site for a beginner. The air was filthy and there was the constant fear of further terrorist strikes. It was a dangerous location.

I passed many messages over my radio and knew that the press was listening. I tried to be as professional and as precise as I could. One slip, saying the wrong word, could easily be misinterpreted by the press and reported to the public. In the early stages, I arranged with my ham counterpart at the mayor's command center to use a unique frequency that we would shift on a time basis so it would be harder to intercept. It was our form of a "secured line" — a protocol we used only for a few extreme, sensitive messages.

I had no idea that my "12 hour shift" would become three straight days...

When I took one of my excursions closer to "the pile," there were many signs that lives had been snuffed out. Papers that hadn't been consumed in the inferno littered the streets surrounding the destruction. Picking up one such piece, I read a page from an appointment calendar. It had belonged to a person who worked for an insurance company in one of the towers. Although charred around the edges and somewhat blackened, I could easily make out a list. It was of items he was probably asked to pick up on his way home. I reverently placed it back on the ground.

So many brave rescue workers were trying with all their capacity to find survivors, all going through their own personal hell. Some workers just lay down on the dusty cement sidewalks for rests.

Not Just a "Radio Hugger"

I went back to the command center to see what else I could do. I assisted the MTA (Metropolitan Transportation Authority) to get a diesel generator working again. It was the same generator that I mooched power from for my radio. My back was turned to the disaster site when all of a sudden I felt a wall of dust and debris hit me — it was as if a dirty wind had struck me. When I turned around WTC Building #7 had just fallen.

I wasn't just a "radio hugger," performing communications duties only. I did whatever needed to be done. I unloaded cots so tired bodies could rest. I distributed food. I ran power cables to support the MTA's task of supplying power.

Since the entire area's power had been shut off, there was a great deal of scrambling to ensure needed lighting. My communications location on the third floor had no building lights, so I plugged the classroom's overhead projector into my power cord from the generator to supply light for my communications and writing. Light also seeped in through the dust-covered classroom windows from the towers supporting spotlights illuminating "the pile."

The dust was part pulverized building materials, including asbestos, and part cremated victims. I filled a large, empty Gatorade bottle with the dusty sediment. In the aftermath, I filled almost two dozen plastic test tubes and sealed them. I gave them to families who lost loved ones so they could have something to bury at the countless services. With each vial I handed out, it felt like someone was "returning home."

Terrible Truths

One evening at a particularly somber meeting, officials revealed a terrible truth: Toxic chemicals that were part of the twin towers physical plant operations had been released. The list of chemicals was long — and horrible. By themselves, each was a deadly toxin. An official started running scenarios of chemicals mixing into "soups." One soup mentioned, which caused a quiet to fall over all of us, was a form of mustard gas.

Next, it turned out that one of the smaller

buildings destroyed, number 7, contained a medical unit so there was also a chance biohazards might have been spread over the area and released into the air. All of us got the message: We were living and working at a much more hazardous place than anyone had ever thought. Requests for full-face respirators increased. We were told that if such a cache of poison were to be unearthed during the site operations, we would have to evacuate quickly, dropping everything and running for our lives.

...all of a sudden I felt a wall of dust and debris hit me...

I continued doing my job, but my hourly reports and requests took less of my time, so I was able to help in other ways. As time went by, and the incident management changed to less of a rescue operation and more of a debris removal job, the communications needs decreased. I had a chance to try that fancy cell phone I was given when my tour began. It didn't work. No one's cell phones worked. Most local cell sites were either destroyed or had no power to operate. The only real way I had to communicate was by Amateur Radio.

My Last Day in Hell

On my last day at ground zero, Damage Assessment teams checked to insure that it was safe for residents to return to the surrounding buildings. I didn't envy those inspectors going into dark buildings, checking for structural damage armed with only a flashlight and most without proper breathing protection. This disaster displaced thousands of downtown residents. The Red Cross housed many in shelters, staffed by Red Cross personnel and Amateur Radio operators who constantly handled traffic to and from the Red Cross headquarters. My next assignment would be at one of these shelters.

I was surprised when all of a sudden an Amateur Radio operator came in and replaced me. He told me he volunteered after seeing a ticker running along the bottom of the ABC news screen. The ticker announced that a lone ham radio operator had been at an undisclosed ground zero area for several days and there was a desperate need for a replacement experienced in emergency communications. Thank you, WABC-TV.

The most moving experience of my tour was my getting back to Red Cross HQ. It was after 2 AM. The gray dust stained my body, clothing and "go-bag." I, along with some nurses, spotted an SUV with a makeshift cardboard sign that read "Rides Uptown." We jumped in and got a ride up the West Side. Although the police passed us through most traffic lights, we did have to make a few stops. At every corner, at 3 in the morning, there were crowds of people cheering us; hundreds whistling, clapping and holding signs that read "Bless you, our heroes." At one stop, a young woman ran up to my window and gave me a flower. She told me how grateful she was that we helped. Ever see a grown man cry? I am no hero. I am just an Amateur Radio operator, doing what I could.

The driver dropped us off near Penn Station and then a police officer stopped a cab and ordered him to take me to Red Cross HQ. The cabbie didn't charge me for the trip. The cabbie was of Arabic descent and he told me how horrible he and others of his family felt about the attacks.

Epilogue

After a short respite at home, I once again volunteered for duty as a communicator. The Red Cross, by this time, had moved their operational headquarters from Manhattan to their Brooklyn complex. I walked into the Red Cross building. The person in charge of the communications operation came in and briefed us on what duties we might have. Mine would be at a shelter at a high school in midtown Manhattan. This was quite a distance from the disaster scene and housed mainly people who were either displaced when their buildings were damaged or whose travels were interrupted when the airports were shut down.

This was not a duty site for a beginner.

One night, at about 3 AM, a shelter resident who had become drunk, brandished a handgun. Everyone took cover, except the not-so-bright Amateur Radio operator — me. I looked at him and said "I had a gun like that when I was in Vietnam. It might be the same model. Can I take a look at it?" The gunman, in his state of drunkenness, said "sure" and handed me the gun. Another worker got the police who quickly cuffed him; I gave them the gun and it was over.

In 2009, I developed Post Traumatic Stress Disorder (PTSD). It is something I'll have to deal with for the rest of my life, just as I have to keep a careful eye on the particles in my lungs.

[A longer version of this article appears on the author's website, **www.w2ik.info**. — *Ed.*]

Postscript

Bob Hejl, W2IK, was first licensed in 1967 and has held the positions of Assistant Emergency Coordinator and Official Emergency Station. In addition to his 9/11 experience, Bob worked many disaster events including the "Storm of the Century" — also known as the Great Blizzard of '93 — that killed more than 300 people and the New England ice storm, which devastated parts of northern New England, northern New York and southeast Canada in January 1998.

He has activated three lighthouses on Long Island during Amateur Radio Light House Society (**arlhs.com**) events and during mini-DXpeditions. During the "Mile Beach March," part of the first Cedar Island (Point) lighthouse operation, he had to backpack all his gear and supplies a mile along a beach route just to operate.

Since 2005, Bob has conducted his annual "Jump Team Boot Camp" in Texas to field train disaster response communicators. The "boot camps" are not desktop drills, but real "get down and (very) dirty, do everything" 3 day exercises covering all aspects of disaster communications for both hams and Military Auxiliary Radio System (MARS) operators so they will be able to deploy to any location to create an operational communications system where *nothing* might be left standing.

Remembrances

On the first anniversary of 9/11, then ARRL President Jim Haynie, W5JBP, noted the role of Amateur Radio in the disaster: "As a ham, I will remember it as the day that the entire amateur community stood proudly together and provided the only foolproof communications system." "Literally within minutes of the incidents, teams of amateurs were mobilizing to provide emergency communications within the zones." "In metropolitan areas that no longer had phones or electricity, local hams were handling vital information out of the region and assisting their fellow man."

A United Flight 93 Memorial service held in Pennsylvania in 2002 had Amateur Radio providing communications support.

Len Signoretti, N2LEN, of Brooklyn, New York spearheaded a commemorative 9/11 net that logged more than 400 check-ins.

New York's Kings County Repeater Association (**kc2ra.org**) commemorates the disaster regularly with a special event station.

Bob Hejl, W2IK, can be reached at PO Box 6731, San Antonio, TX 78209-0731, **w2ik@arrl.net**.

Contest Corral – September 2012

Check for updates and a downloadable PDF version online at www.arrl.org/contests

Refer to the contest websites for full rules, scoring information, operating periods or time limits, and log submission information.

Start - Finish Date-Time		Date-Time		Bands HF / VHF+	Contest Title	Mode	Exchange	Sponsor's Website
1	0000Z	2	2400Z	3.5-28 / -	All-Asian DX Contest	Ph	RS, operator age (YL may send 00)	www.jarl.or.jp/English
1	0000Z	1	2400Z	3.5-28 / -	Russian Radio RTTY WW	Dig	RST and oblast or WAZ zone	www.radio.ru/cq/contest/rule-results/index2.shtml
1	1100Z	1	1700Z	28 / -	DARC 10-Meter Digital "Corona"	Dig	RST and serial	www.darc.de/referate/ukw-funksport
1	1200Z	1	See web	1.8-28 / -	CWops CW Open	CW	Serial and name	www.cwops.org/cwopen.html
1	1200Z	2	0400Z	1.8-28 / 50+	Colorado QSO Party	Ph CW Dig	Call sign, name, and county or S/P/C	www.ppraa.org/coqp
1	1300Z	2	1300Z	1.8-28 / -	IARU Region I Field Day	Ph	RS and serial	See IARU Society web pages
1	1300Z	1	1600Z	7 / -	Straight Key Party	CW	RST, serial, category, name, age	www.agcw.de
2	1800Z	3	0300Z	1.8-28 / 50+	Tennessee QSO Party	Ph CW Dig	RS(T) and county or S/P/C	www.tnqp.org
3	1600Z	3	See web	3.5 / 50, 144	OK1WC Memorial Contest	Ph CW	RS(T) and serial	www.hamradio.cz/ok1wc
3	2300Z	4	0300Z	1.8-28 / 50	Labor Day Sprint	CW	RST, S/P/C, MI QRP nr or power	miqrp.org
4	0200Z	4	0400Z	3.5-28 / -	ARS Spartan Sprint	CW	RST, S/P/C, and power	www.arsqrp.blogspot.com
7	8 PM	8	2 AM	3.5 / -	070 Club KA3X Memorial Sprint	Dig	Call sign, RST and S/P/C	www.podxs070.com
7	0200Z	7	0300Z	1.8-14 / -	SNS and NS Weekly Sprints	CW Dig	Serial, name, and S/P/C	www.ncccsprint.com
7	1800Z	8	1800Z	1.8-28 / 50+	QCWA Fall QSO Party	Ph CW Dig	Call sign, year lic'd, name, chptr or S/P/C	www.qcwa.org/qso-party.htm
8	0000Z	9	2400Z	3.5-28 / -	Worked All Europe DX Contest	Ph	RS and serial	waedc.de
8	1400Z	9	0200Z	3.5-28 / 144	Arkansas QSO Party	Ph CW Dig	RS(T), county or S/P or "DX"	www.arkanhams.org
8	1500Z	10	0300Z	1.8-28 / -	QRP ARCI Two Sidebands Sprint	Ph	S/P/C and ARCI member nr or power	www.qrparci.org/contests
8	1600Z	8	2400Z	3.5-28 / 50	Ohio State Parks On the Air	Ph CW Dig	"Ohio" or S/P/DX and Park ID	parks.portcars.org
8	**1800Z**	**10**	**0259Z**	**- / 50+**	**ARRL September VHF Contest**	**Ph CW Dig**	**Grid square**	**www.arrl.org/contests**
9	**0000Z**	**9**	**0400Z**	**3.5-14 / -**	**North American Sprint**	**CW**	**Call signs, serial, name, and state**	**www.ncjweb.com**
9	0000Z	9	2359Z	1.8-28 / 50	SKCC Straight Key Weekend Sprintathon	CW	RST, QTH, name, member nr if member	www.skccgroup.com
12	1300Z	13	See web	1.8-28 / -	CWops Monthly Mini-CWT Test	CW	Name and member number or S/P/C	www.cwops.org/onair.html
15	**6 AM**	**16**	**12 Mid**	**- / 10G+**	**ARRL 10 GHz & Up Contest**	**Ph CW Dig**	**6-character grid locator**	**www.arrl.org/contests**
15	1200Z	16	1200Z	1.8-28 / -	CIS DX PSK Contest	Dig	RST and DXDA code	www.eupsk.com
15	1200Z	16	1159Z	3.5-28 / -	Scandinavian Activity Contest	CW	RST and serial	www.sactest.net
15	1400Z	16	0300Z	3.5-28 / 50+	South Carolina QSO Party	Ph CW	RS(T) and county or S/P/C	scqso.com
15	1600Z	15	1800Z	1.8-28 / -	Feld-Hell Hell on Wheels Sprint	Dig	RST, S/P/C, Feld-Hell member nr	www.feldhellclub.org
15	1600Z	16	2400Z	1.8-28 / 50,144	Washington State Salmon Run	Ph CW Dig	RS(T) and county or S/P/C	www.wwdxc.org
16	**0000Z**	**16**	**0400Z**	**3.5-14 / -**	**North American Sprint**	**Ph**	**Call signs, serial, name, and state**	**www.ncjweb.com**
16	1300Z	17	0700Z	1.8-28 / 50,144	Classic Exchange	CW	Name, RS, S/P/C, type of equipment	www.classicexchange.org
17	7 PM	17	11 PM	- / 144	144 MHz Fall VHF Sprint	Ph CW Dig	4-character grid square	www.svhfs.org
17	0100Z	17	0300Z	1.8-28 / -	Run For the Bacon	CW	RST, S/P/C, Flying Pig nr or power	www.fpqrp.org
20	0030Z	20	0230Z	3.5-14 / -	NAQCC Monthly QRP Sprint	CW	RST, S/P/C, and NAQCC mbr nr or power	naqcc.info
22	0000Z	22	2359Z	1.8-28 / -	FOC QSO Party	CW	RST, name, FOC nr if member	www.g4foc.org
23	1300Z	24	0700Z	1.8-28 / 50,144	Classic Exchange	Ph	Name, RS, S/P/C, type of equipment	www.classicexchange.org
23	1700Z	23	2100Z	3.5-28 / -	BARTG Sprint 75	Dig	Serial	www.bartg.org.uk
25	7 PM	25	11 PM	- / 222	222 MHz Fall VHF Sprint	Ph CW Dig	4-character grid square	www.svhfs.org
26	0000Z	26	0200Z	1.8-28 / 50	SKCC Straight Key Sprint	CW	RST, QTH, name, SKCC nr or power	www.skccgroup.com/sprint/sks
26	0000Z	26	2400Z	3.5-28 / -	CQ WW RTTY Contest	Dig	RST, CQ zone and State/VE area (US/VE)	www.cqwwrtty.com
26	1400Z	26	See web	1.8-28 / 50,144	Texas QSO Party	Ph CW Dig	RS(T), county or S/P/C	www.txqp.net

All dates refer to UTC and may be different from calendar date in North America. Times given as AM or PM are local times and dates. No contest activity occurs on the 60, 30, 17 and 12 meter bands. Serial = Sequential number of the contact. S/P/C = State, Province, DXCC Entity. XE = Mexican state. Publication deadline for Contest Corral listings is the first day of the second month prior to publication date (September 1 for November *QST*) — send information to **contests@arrl.org**. Listings in blue indicate contests sponsored by ARRL or *NCJ*. The latest time for a valid contest QSO is the minute listed in the "Finish Time" column.

2012 ARRL DX Phone Results

I exceeded last year's score so life is good. — *AA6K*

Ward Silver, NØAX, n0ax@arrl.net

This year's phone weekend of the ARRL International DX Contest was eagerly awaited by thousands around the world after last year's oh-so-welcome return of the sunspots and the good conditions that graced the CW weekend fourteen days prior. Well, fourteen days is one-half of a solar spin on its axis and those good conditions were pointed somewhere else than Earth! Browsing Soapbox comments that came in with the logs, the strange and often-unexpected propagation was on the minds of many! 15 meter Single-Band competitor Mike, G4IUF wrote, "*Weird day, struggled till one-half hour after sunset, then (the band) went mad for 45 minutes, then (it went) auroral, then died!!*"

What's the deal? After having a look at the solar and geomagnetic data from NOAA the answer is pretty clear — we were a little bit early…or maybe the bands were a little bit late. The very day after the contest (of course) the solar flux jumped a dozen points, staying above 130 for a week! Cycle 24 has been nothing if not erratic — the Sun can't quite make up its mind whether to make like the peak or the pits. This contest's conditions were very similar to those of 2004.

How did that play out on the bands? A lot of stations decided to spend the weekend fishing at 10 Meter Lake instead of on a lower band, hoping for breakthroughs that turned out to be far and few between. Comparing the Single-Band logs to 2004, the shift was from 40 meters (2004 was a post-peak year and many were anticipating lower MUF) to 10 meters.

The odd conditions manifested themselves in unexpected ways at stations large and small. Contest veteran John, K1AR relates his experience at super-station K3LR on 20 meters: "*We were doing our usual 'waiting for EU to open' thing on Saturday...one unanswered CQ after another. Then, literally like someone turned on a switch, in the course of one CQ I had an instant pileup and a 225-hour after that. I've never heard anything like it. Usually, the rate builds over a 15-20 minute period, but this time it just started like someone turned on a light. Very strange indeed.*" Elsewhere, 10 meter operators report openings on Friday evening that heightened anticipation of bigger things to come but although the multiplier totals were good, the depth of the openings to large numbers of stations just didn't materialize.

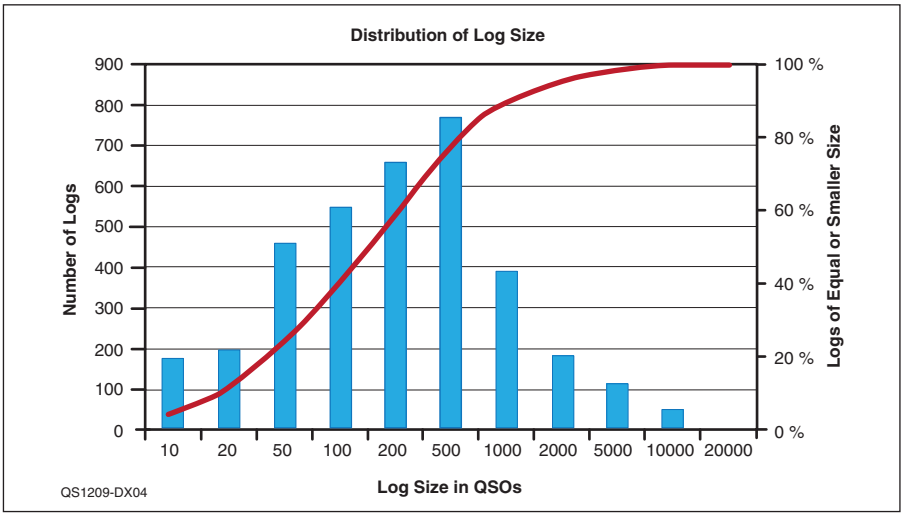


Figure 1 — The distribution of log sizes shows how important smaller logs are to a good contest. 58% of all logs have 200 or fewer QSOs, making up the majority of all contest entries.

Participation was quite lively, regardless, with a record 3527 logs submitted (1869 W/VE logs and 1658 DX logs) that exceeded last year's 3343 logs by a few percent. No doubt this is at least partially an aftereffect of the awesome 2011 10 Meter Contest conditions that saw a surge to more than 5000 submitted logs. Well, as many stations found out, even if conditions aren't at their peak, just being on the bands is a lot of fun!

Error Rate and Accuracy Index

Error rate equals the total of "bad" QSOs in your Log Checking Report, those with a "busted" call (B) or exchange (X) or that are "Not In Log" (N) — divided by the number of good QSOs remaining.

The Accuracy Index rewards lower error rates for large logs. For two logs with equal error rates, the log with more verified contacts has a higher index.

Accuracy Index = $\log_{10}$ (Good QSOs) + 10 × (1 - Error Rate)

The number of logs contributed to club totals in the ARRL Affiliated Club Competition was also up — to 2009 from last year's 1978. Overall, club log submissions jumped by about 12% with all of the increase in the rapidly-growing Medium and Local categories. The word must be getting around that contesting is a lot of fun and participating as a club makes it even more fun!

Yeah, yeah…but were we making more QSOs? Despite all of the propagational hand-wringing, DX stations logged 815,208 QSOs with us and we logged 669,554 with them. That's a little more activity on our side and a little less activity on their side — just 4000 QSOs below last year's totals. Once again, about 10% of the QSOs "went missing" between the log sheets and the log checking — a fraction we should work on reducing. Offering to help other club members send in a log is often a good way to help a potential contester become more active, whether they are new to HF or just haven't done it before.

Categorically Speaking

A good measure of the activity of different stations is to look at the top single-band QSO totals from DX and domestic stations. The 2011 10 Meter Contest's long coattails were in evidence as Sergio, PP5JR logged a whop-

W/VE Region Leaders

Table lists call sign, score, and power (A = QRP, B = Low Power, C = High Power).

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)			Southeast Region (Delta, Roanoke and Southeastern Divisions)			Central Region (Central and Great Lakes Divisions; Ontario Section)			Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)			West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT Sections)		
W2RE	4,246,440	C	K1TO	3,258,036	C	VE3EJ	4,374,360	C	N2IC	3,349,500	C	N9RV	2,966,301	C
VY2TT (K6LA, op)	3,902,121	C	N4RV (KE3X, op)	2,533,638	C	VC3A (VE3AT, op)	4,043,760	C	K5TR	2,830,449	C	K7RL	2,834,895	C
W3BGN	2,877,672	C	K4AB	2,294,784	C	W9RE	2,951,214	C	KU1CW	2,107,092	C	VE7CC	1,997,730	C
AA1K	2,847,960	C	W5WMU	1,230,552	C	VE3TA	1,817,091	C	K7KU (KØKR, op)	760,383	C	K6XX	1,700,460	C
NC1I (K9PW, op)	2,721,360	C	NR3X (N4YDU, op)	1,192,464	C	K8GL	1,619,085	C	NØKE	757,161	C	NC7M	843,453	C
N1UR	2,146,506	B	AD4Z	1,835,856	B	N4TZ	989,712	B	N5AW	1,186,500	B	K9JF	815,298	B
W2TF	485,685	B	N4XL	688,371	B	N8AA	697,248	B	NR9A	341,925	B	NN3V	329,640	B
WA2JQK	422,154	B	NA4K	555,894	B	NA8V	642,930	B	W5GFI	290,037	B	VE6EX	314,340	B
N1SV	314,682	B	W4PFM	400,803	B	KD9MS	484,962	B	K5ZCJ	262,971	B	N7IR	303,615	B
KD3HN	300,381	B	W4FT	352,350	B	VA3SWG	417,024	B	KYØK	239,259	B	K7ACZ	280,350	B
			KP4KOE	44,541	B							W6QU (W8QZA, op)	199,950	A
W2ID	423,360	A	NT4TS	167,322	A	VA3DF	320,100	A	NDØC	191,484	A	W7YAQ	66,150	A
N1TM	273,936	A	KS4X	85,260	A	N8XA	115,773	A	KA5PVB	64,800	A	N6LB	19,824	A
W1MR	256,608	A	K9ES	82,404	A	KT8K	78,690	A	KØOU	53,295	A	N6HI	11,400	A
KO1H	246,024	A	K3TW	77,268	A	VA3WPV	30,996	A	NØUR	24,768	A	AE9F	8,568	A
W2WGK	26,265	A	KC5WA	71,757	A	AJ4A	29,889	A	KB7QOS	11,850	A			

ping 3888 QSOs on 10 meters as PX5E. In addition, HK1T logged 3449 stations on 20 meters and the gang at TI5N pulled in 3412 different calls. From here at home, the K3LR 20 meter stack was able to hear 2323 different DX stations while the nearby 15 meter array at W3LPL found 2176 callers.

The top single-band DXCC hunters were once again at K3LR as the 20 meter team of K1AR and N2NT bagged 140 multipliers.

Single-Band log totals from W/VE stations were down from last year (214 compared to 247) but the 10 meter count was up to 65 — the only band to show an increase.

Recovering nicely from last year's single-band slump, 560 SOSB logs were received from DX call signs. As Figure 2 shows, the DX stations got busy on 15 and 10 meters. DXCC band-entity chasers, take note!

Another clear trend is the growing number of entries in the Single-Op, Unlimited (SOU)

Continental Leaders

Continent	Call	Score
Africa		
Single Operator High Power	5H3EE	211,014
Single Operator Low Power	EA8MT	1,169,136
Single Operator Assisted, High Power	CT3BD	63,648
Single Operator Assisted, Low Power	EA8BZH	36,000
Single Operator 20 Meters	EA8LS	38,367
Single Operator 15 Meters	CT3DZ	237,858
Multioperator, Single Transmitter, High Power	CR3L	2,884,260
Multioperator, Multi Transmitters	EF8R	8,961,225
Asia		
Single Operator High Power	JAØJHA	1,918,938
Single Operator Low Power	JH4UYB	348,984
Single Operator QRP	JH1APZ	24,624
Single Operator Assisted, High Power	JAØFVU	365,442
Single Operator Assisted, Low Power	HSØZJU	91,884
Single Operator 80 Meters	JE1SPY	858
Single Operator 40 Meters	A65BP (RV6LNA, op)	13,440
Single Operator 20 Meters	RK9QWM (RW9QU, op)	50,388
Single Operator 15 Meters	JR1CBC	227,136
Single Operator 10 Meters	JA7OWD	73,710
Multioperator, Single Transmitter, High Power	RUØFM	1,665,102
Multioperator, Single Transmitter, Low Power	RK9CZO	6,720
Multioperator, Two Transmitters	JA1YPA	1,241,460
Multioperator, Multi Transmitters	JA3YBK	2,340,831
Europe		
Single Operator High Power	CR6K (CT1ILT, op)	5,119,821
Single Operator Low Power	EA6AZ	217,251
Single Operator QRP	F5BEG	88,452
Single Operator Assisted, High Power	G6PZ (IZ1LBG, op)	2,750,814
Single Operator Assisted, Low Power	IB1B (IW1QN, op)	565,728
Single Operator 160 Meters	GW0GEI	432
Single Operator 80 Meters	GM3PPG (G4BYB, op)	79,110
Single Operator 40 Meters	TM9R	269,820
Single Operator 20 Meters	TM6M (F1AKK, op)	505,263
Single Operator 15 Meters	F6KHM (F8DBF, op)	450,729
Single Operator 10 Meters	CR2T (CU2AF, op)	56,745
Multioperator, Single Transmitter, High Power	CR2X	6,912,948
Multioperator, Single Transmitter, Low Power	EE5W	86,496
Multioperator, Two Transmitters	ED1R	4,455,360
Multioperator, Multi Transmitter	9A1A	3,743,250

Continent	Call	Score
North America		
Single Operator High Power	8P5A (W2SC, op)	9,722,772
Single Operator Low Power	HI3TEJ	5,039,685
Single Operator Assisted, High Power	V47JA	754,200
Single Operator Assisted, Low Power	8P6NW	949,905
Single Operator 160 Meters	KV4FZ	72,072
Single Operator 80 Meters	CL8AKY	50,055
Single Operator 40 Meters	ZF2AH	394,710
Single Operator 20 Meters	C6AZZ (K4IIO, op)	325,620
Single Operator 15 Meters	KP2MM (N2TTA, op)	497,943
Single Operator 10 Meters	HQ2GL	411,840
Multioperator, Single Transmitter, High Power	VP5H	8,158,941
Multioperator, Single Transmitter, Low Power	HI3K	4,805,097
Multioperator, Two Transmitters	6Y1V	11,719,305
Multioperator, Multi Transmitters	TI8M	7,285,140
Oceania		
Single Operator High Power	VK7ZE	437,031
Single Operator Low Power	KH6CJJ	459,576
Single Operator QRP	DU1AJ	897
Single Operator Assisted, High Power	ZL3IO	1,311,177
Single Operator Assisted, Low Power	YB1ALL	31,248
Single Operator 80 Meters	KH6QJ	1,302
Single Operator 40 Meters	DU9XO	20,160
Single Operator 20 Meters	WH7GG	105
Single Operator 15 Meters	KH7Y	521,460
Single Operator 10 Meters	KG6DX	103,824
Multioperator, Single Transmitter, High Power	KH7X	6,626,124
Multioperator, Two Transmitters	KH6LC	8,036,280
South America		
Single Operator High Power	9Y4W	5,188,320
Single Operator Low Power	P40V (W5AJ, op)	5,295,528
Single Operator QRP	LU7HZ	136,479
Single Operator Assisted, High Power	PJ4G (K2NG, op)	6,471,075
Single Operator Assisted, Low Power	P43E	1,035,567
Single Operator 160 Meters	LU2DVI	468
Single Operator 80 Meters	YW5T (YV5JBI, op)	123,144
Single Operator 40 Meters	PR7AP	167,067
Single Operator 20 Meters	HK1T	627,324
Single Operator 15 Meters	PR5B (PY2LSM, op)	522,660
Single Operator 10 Meters	PX5E (PP5JR, op)	673,554
Multioperator, Single Transmitter, High Power	PJ2T	8,998,236
Multioperator, Single Transmitter, Low Power	LU1UM	1,390,800
Multioperator, Two Transmitters	PT5T	7,361,070
Multioperator, Multi Transmitters	LP1H	7,469,304

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Yankee Clipper Contest Club	245,487,258	201
Frankford Radio Club	214,570,917	150
Potomac Valley Radio Club	187,702,503	192
Florida Contest Group	82,517,496	113
Northern California Contest Club	60,067,215	103
Minnesota Wireless Assn	48,775,248	108
Society of Midwest Contesters	44,822,133	81
Contest Club Ontario	44,266,113	67
Tennessee Contest Group	28,268,769	61
Southern California Contest Club	27,449,376	56
Arizona Outlaws Contest Club	16,023,492	65
Medium Category		
North Coast Contesters	61,423,068	22
Hudson Valley Contesters and DXers	39,058,104	43
South East Contest Club	33,631,356	33
Carolina DX Association	23,932,758	47
Mad River Radio Club	21,296,601	24
Alabama Contest Group	18,482,925	41
Central Texas DX and Contest Club	18,391,008	17
Willamette Valley DX Club	14,726,088	35
ORCA DX and Contest Club	11,586,411	25
CTRI Contest Group	10,672,080	10
Western Washington DX Club	10,414,629	24
Rochester (NY) DX Assn	9,957,549	20
Northern Rockies DX Association	9,888,291	7
Maritime Contest Club	8,097,726	22
Order of Boiled Owls of New York	8,098,152	14
Lone Star DX Assn	7,999,125	10
Grand Mesa Contesters of Colorado	6,981,882	24
Louisiana Contest Club	5,838,624	9
Contest Group Du Quebec	5,179,047	13
Utah DX Assn	4,388,613	21
Mother Lode DX/Contest Club	4,354,866	16
Delara Contest Team	4,103,055	12
Western New York DX Assn	3,938,868	11
North Texas Contest Club	3,484,323	11
Bristol (TN) ARC	2,220,534	12
Spokane DX Association	2,124,741	20
Metro DX Club	2,104,005	14
Bergen ARA	2,035,602	15
Allegheny Valley Radio	1,912,527	10
Alberta Clippers	1,668,192	3
Eastern Iowa DX Assn	1,138,629	5
Saskatchewan Contest Club	1,072,644	8
West Park Radiops	1,063,446	18
Kentucky Contest Group	956,013	6
Mississippi Valley DX/Contest Club	923,952	6
Radio Club of Redmond	221,172	4
Texas DX Society	191,034	3
Mt Airy VHF Radio Club	127,338	3
Central Arizona DX Assn	50,151	3

Local Category	**Score**	**Entries**
Central Virginia Contest Club	6,687,126	10
Iowa DX and Contest Club	4,787,178	3
Hilltop Transmitting Assn	2,604,204	8
Southwest Ohio DX Assn	2,472,951	6
Blue Ridge ARC	1,902,990	6
Kansas City Contest Club	1,833,654	6
Kansas City DX Club	1,571,532	9
CorTek Radio Association	1,159,731	6
Sterling Park ARC	1,061,367	7
San Diego DX Club	1,013,304	3
Northern Arizona DX Assn	910,239	4
Salt City DX Assn	669,504	3
Meriden ARC	659,280	5
599 DX Association	509,736	5
DFW Contest Group	480,087	6
Hazel Park ARC	428,445	3
Wireless Association of South Hills	423,315	4
Skyview Radio Society	339,834	3
Granite State ARA	313,053	5
New Mexico Big River Contesters	312,093	5
Lincoln ARC	296,022	3
South Jersey DX Assn	280,035	4
Midland ARC	264,798	3
Fort Wayne Radio Club	263,286	4
10-70 Repeater Assn	257,697	4
Portage County Amateur Radio	201,111	4
Southern California DX Club	179,793	4
Brazos Valley ARC	176,715	3
Albuquerque DX Assn	162,366	3
Low Country Contest Club	156,738	3
Southern Berkshire ARC	152,547	3
Great South Bay ARC	150,081	5
Heartland DX Association	143,046	5
Long Island Mobile ARC	86,703	3
Saginaw Valley ARA	76,047	5
Fox River Radio League	28,794	4
Hays-Caldwell ARC	3,222	3

category both here in the US and Canada and around the world. The red line in Figure 2 shows that the total number of Single-Operator logs is steadily increasing and more of them are in the growing fraction of SOU logs. While SOAB-LP representation is holding steady, SOAB-HP and SOSB are not as more stations are moving to the online-based category to make use of information about the contest from other participants.

Little Pistols and part-time or casual operators are the often-unsung majority of contest activity. Figure 1 shows that almost 58% of all logs received contained 200 or fewer QSOs. This fraction is steadily increasing, which I believe is a healthy trend for radiosport in general. The operators sending in small logs represent the vital "new blood" that any competitive activity needs to stay healthy. Welcome!

Records

As in 2011, another pair of all-time records was set. Jeff, K1ZM decided to tackle 160 meters from his station on Prince Edward Island, VY2ZM. He was rewarded with not only the Canadian record but the all-time W/VE record for SOSB-160. Whatever he puts his mind to, the VY2ZM hardware is ready and able to contend…IF he can make it through the snowdrifts! Jeff owns five ARRL DX Phone records, including a second all-time record (SOAB-QRP in 2001), as either VY2ZM or K1ZM.

The other new all-time record reflects a really exceptional effort. Not only did Dan, W7WA win the SOSB-40 W/VE title, he set the all-time record for 40 meters and turned in a Golden Log (a log with no detected errors)! And not only that, at 965 QSOs, it's the largest Golden Log that I've seen in my ten years of writing up these contest results. When you consider how difficult 40 meter phone can be, the only response is, "We are not worthy!" Dan now owns the 15, 20 and 40 meter records from the 7th district.

Even though the new SOU-LP and MS-LP categories have generated a big pile of records in the past two years (28 records were set in both 2011 and 2012), the monstrously excellent year 2002 still holds the title as the best year for records with 32. The oldest record broken was an old-timer from 1982 as the KH7X team added some more walnut, overtaking the KH6XX MS-HP record by 37%. Patrick, K6AAX was sharing the VY2ZM station and used the 80 meter antenna farm to nearly triple the old SOSB-80 Canadian record set in 1996 by VE9ST. The venerable 1979 KØRF MM record for the 10th district is still the oldest on the books.

What would a table of records be without some close calls? These records may not have been broken but they were seriously challenged. The 1992 M2 record in the 8th district was within 7% of falling to an aggressive challenge by the K8AZ group. As technology continues to improve, we'll see more of these records toppled before Cycle 24 decides to call it a day.

Accuracy Leaders

W-VE

Single-Op (Non-assisted)

Call	Category	QSOs	Error %	Index
VC3A (VE3AT, op)	SOAB-HP	3260	0.4	13.473
VE3EJ	SOAB-HP	3364	0.6	13.467
VY2TT (K6LA, op)	SOAB-HP	3388	1	13.430
K1TO	SOAB-HP	2804	0.4	13.408
N2IC	SOAB-HP	2906	0.6	13.403

Single-Op (Assisted)

Call	Category	QSOs	Error %	Index
K3WW	SOU-HP	2792	1.4	13.306
AA3B	SOU-HP	2118	0.9	13.236
N3RS	SOU-HP	1995	0.9	13.210
W1GD	SOU-HP	1738	1	13.140
N3RR	SOU-HP	2099	1.9	13.132

Multiop

Call	Category	QSOs	Error %	Index
K3LR	MM	6536	0.9	13.725
W3LPL	MM	6238	1.2	13.675
WE3C	MM	5330	0.9	13.637
KM1W	MM	3947	1.2	13.476
W2PV	MM	3407	1	13.432

DX

Single-Op (Non-assisted)

Call	Category	QSOs	Error %	Index
8P5A (W2SC, op)	SOAB-HP	9367	0.6	13.912
KP2M (N2TK, op)	SOAB-HP	6842	0.4	13.795
V26M (N3AD, op)	SOAB-HP	7129	1	13.753
P40V (W5AJ, op)	SOAB-LP	5620	0.7	13.680
LT1F (LU1FAM, op)	SOAB-HP	5693	0.8	13.675

Single-Op (Assisted)

Call	Category	QSOs	Error %	Index
PJ4G (K2NG, op)	SOU-HP	6706	1.1	13.716
ZZ2T (PY2MNL, op)	SOU-HP	4156	0.6	13.559
G6PZ (IZ1LBG, op)	SOU-HP	3822	0.9	13.492
PR2X (PY2ADR, op)	SOU-HP	3579	1.6	13.394
DR1D (PY2SEX, op)	SOU-HP	3162	1.2	13.380

Multiop

Call	Category	QSOs	Error %	Index
6Y1V	M2	11416	0.9	13.968
TI5N	M2	10449	0.9	13.929
LP1H	MM	9019	0.8	13.875
P40L	MS-HP	8690	0.7	13.869
EF8R	MM	9270	1	13.867

Club

They're up! They're down! They're up again! The knock-down, drag-out slugfest between the Frankford Radio Club (FRC) and Yankee Clipper Contest Club (YCCC) reversed again this year, scrambling the Club Competition table score card. YCCC was edged out of the top Unlimited club position by the slimmest of margins but jumped back up off the mat and delivered a slobber-knocker of 245 Mpoints to FRC's 214 Mpoints. YCCC's log totals jumped from 184 last year to 201 this year and those 17 extra logs made a lot of

difference. Congratulations to the Florida Contest Group as they jumped from 8th place to 4th by doubling their total score with only 4 additional logs. What will next year bring?

Among the Medium clubs, the North Coast Contesters looked a little vulnerable last year…but not in 2012 as they won the gavel going away. The Hudson Valley Contesters and DXers club put 50% more points on the board to overtake the competition and place second. Out west, the Orca DX and Contest Club made a big jump and more than doubled their totals — this will play well in the annual Pacific Northwest Challenge Cup competition (click "PNW Traveling Trophy" at **www.wwdxc.org**) as all three of the major Northwestern Division clubs are closely spaced.

Holy smokes, the Local clubs are coming out of the woodwork with 37 different entries this year — excellent! Last year's winner, the Iowa DX and Contest Club was dethroned by the Central Virginia Contest Club's strong surge in points and logs. The Hilltop Transmitting Association (love that name!) stole a march on everybody to place 3rd. Watch out for the Kansas City operators — the two KC clubs combined would have placed 3rd easily!

Down to the Wire(less)

Would you take a look at the W/VE SOAB-HP Top Ten! The race was decided by just 3% and the first four places were separated by a very competitive 12% top to bottom. In W/VE SOSB-20, the 2nd-3rd-4th race for place and show was extremely tight — all three stations were within 1% of each other and from opposite sides of the continent. The W/VE M2 Top Ten was also tightly packed with about 4% separating the first few places. K3LR and W3LPL roared through the entire race neck-and-neck with the K3LR team managing a slim 5% victory.

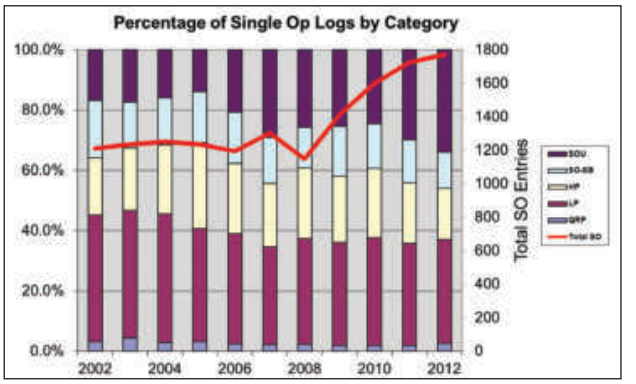


Figure 2 — The trend in Single-Operator logs shows a clear trend to the Unlimited category from the SO-HP and SO-SB categories.

Down in the Caribbean, 2nd and 3rd place in SOAB-HP was decided by only 3% as N3AD piloted V26M ahead of N2TK at KP2M. The SOAB-LP race was just as tight — W5AJ at the P4ØV station eked out a 5% win over HI3TEJ. One of the tightest races in the whole contest turned out to be in the DX SOSB-10 category — 0.2% was the difference between competitors on nearly opposite sides of the planet as PR5B with PY2LSM at the mike broke the tape just ahead of KH7Y. The big DX multiop teams were just as competitive as here at home — PJ2T was only 1.3% ahead of P4ØL when the scoring was over and VP5H was hot on their tails.

Accuracy

Accurate operating — as the preceding section indicates — is deciding more and more races around the world. Highly prized, the skill of pulling an entire correct call out of the pileups is something to which we should all aspire — Big Gun and Little Pistol alike. With over 90% of all contacts being checked by software, being able to complete the QSO with all the information correct has never been more important. And isn't that one of the reasons for having contests, anyway — to hone our operating skills for when more than a Top Ten finish is riding on accurate communication?

Take a look at the top five Accuracy Indexes and the Accuracy Records achieved by SOAB-HP/LP, SOU-HP/LP and MO stations. (See the sidebar for an explanation of the index.) Improving your own accuracy index from year to year is an excellent goal. Also note the Top Ten Golden Logs — the largest logs that incurred no log-checking penalties. See the Records section for more about W7WA's achievement.

I enjoyed the contest. U.S. is long distance....JA2HNP. DXing

We had a rare occurrence of a Single-Operator station out-multiplier-ing a Multioperator team as VY2ZM found another couple of multipliers on 160 meters from Prince Edward Island that Frank's Maryland Beverages couldn't pull in. Jeff's son Patrick had the top entity total Single-Op on 80 meters, second to the K3LR squad. Conditions on 80 meters just weren't good enough for any station to make the coveted 5-Band DXCC in a weekend. I'm sure the 10 meter operators are not complaining, though, with a second straight year of high multiplier totals. The best DXCC entity totals by a Multiop and Single-Op entry are listed below:

160: VY2ZM (SOAB-160) 61, W3LPL (MM) 59

80: K3LR (MM) 88, K6AAX/VY2 (SOSB-80) 84

40: K3LR (MM) 112, W7WA (SOSB-40) 98, 3 stations made DXCC

20: K3LR (MM) 140, W8TA (SOAB-HP) 110, 41 stations made DXCC

15: W3LPL (MM) 128, N7DD (SOSB-15) 118, 49 stations made DXCC

10: W3LPL (MM) 93, W5PR (SOSB-10) 89

Once again in the DX multiplier leader list, all of the calls are from the Caribbean or north shore of South America. We do have an unusual achievement this year in that there is a tie between the PJ2T MS-HP team and W2SC operating at 8P5A (SOAB-HP) — nice work by a single operator to not only make all the QSOs but find as many multipliers as the leading Multiop station!

PJ2T	348
8P5A (W2SC, op)	348
6Y1V	345
P4ØL	343
VP5H	343

Dale Slater is 12 years old and took to contesting at KL2R like a snow goose to water. She's being assisted here by Carl, WL7BDO. [KL7/N1TX photo]

Under the Sun's Thumb

What is it like to operate from one of the rarest of all domestic multipliers during a DX contest? Surely it must be non-stop pileup action with the DX rolling in! Well, not quite, as John, VE8EV writes online in "ARRL DX - The Best of Times, The Worst of Times..." (**ve8ev.blogspot.com/2012/03/arrl-dx-best-of-times-worst-of-times.html**).

Top Ten

W/VE

Single Operator, High Power

VE3EJ	4,374,360
W2RE	4,246,440
VC3A (VE3AT, op)	4,043,760
VY2TT (K6LA, op)	3,902,121
N2IC	3,349,500
K1TO	3,258,036
N9RV	2,966,301
W9RE	2,951,214
W3BGN	2,877,672
AA1K	2,847,960

Single Operator, Low Power

N1UR	2,146,506
AD4Z	1,835,856
N5AW	1,186,500
N4TZ	989,712
K9JF	815,298
N8AA	697,248
N4XL	688,371
NA8V	642,930
NA4K	555,894
W2TF	485,685

Single Operator, QRP

W2ID	423,360
VA3DF	320,100
N1TM	273,936
W1MR	256,608
KO1H	246,024
W6QU (W8QZA, op)	199,950
ND0C	191,484
NT4TS	167,322
N8XA	115,773
KS4X	85,260

Single Operator, 10 Meters

W5PR	166,608
W4SVO	120,978
K5KG	103,248
K5RR	87,750
NA4CW	62,568
K1WHS	60,279
W7RN (K5RC, op)	59,472
K2SSS	52,800
W3EP	52,428
K9BGL	37,026

Single Operator, 15 Meters

N7DD	612,066
K8PO	516,006
N4PN	431,310
KU2M	399,324
NA2U	338,451
N2PP	274,428
AG4W	232,098
N8BJQ	188,670
W4DXX	181,656
WB2REM	172,866

Single Operator, 20 Meters

W3FW	259,671
K6HNZ	154,704
VE9HF	153,120
K7AWB	153,090
WR2G	149,640
W1AVK	86,856
WF1G	61,200
KC2NB	55,350
NZ9Y	54,054
K4TRH	51,903

Single Operator, 40 Meters

W7WA	283,710
W6YI	257,928
N4NW	42,402
K8DJC	36,186
VE3FU	28,500
AD8C	19,110
KJ4EX	16,200
VE3SWS	12,972
W6RKC	12,882
K3NK	11,781

Single Operator, 80 Meters

K6AAX/VY2	152,460
ND8DX	40,257
KM1R	19,032
KU1T	18,408
W4QNW	12,546
WA8UEG	12,240
K0KT	5,328
W8JMF	5,145
WI9H	4,320
W8TM	3,393

Single Operator, 160 Meters

VY2ZM	44,286
W2MF	12,126
W2VO	3,360
K5RX	3,108
K1HAP	2,700
W3GH	1,794
AC5O	714
WD8DSB	147
N5JDT	27

Single Operator Assisted, High Power

K3WW	3,839,136
N3RR	2,799,357
AA3B	2,772,540
N3RS	2,594,469
N2MM	2,246,874
W1GD	2,177,412
N4ZC	2,051,322
W8MJ	1,895,820
W2IRT	1,720,488
N1DG	1,689,639

Multioperator, Single Transmitter, High Power

K1LZ	4,570,146
K1KI	3,774,378
K0RF	3,495,270
K9RS	3,447,900
N1MM	3,433,608
N1BA	2,823,246
W3MF	2,195,856
K3MD	1,874,964
W2MU	1,848,432
W4HZ	1,593,108

Multioperator, Two Transmitters

W4RM	4,611,963
KB1H	4,400,928
W6WB	4,244,448
K8AZ	4,071,858
K0TV	3,275,616
K9CT	2,937,768
W5RU	2,920,680
K2AX	2,726,844
W7IV	2,646,900
K1KP	2,629,536

Multioperator, Unlimited Transmitters

K3LR	11,762,118
W3LPL	11,210,844
WE3C	9,006,795
KM1W	6,031,341
K1RX	5,725,008
NR5M	5,645,184
W2PV	4,756,752
W0AIH	2,666,166
NE3F	2,652,507
AK7AZ	908,418

Multioperator, Single Transmitter, Low Power

W0UO	797,268
W2TZ	653,112
W6YX	534,540
W3ZGD	512,472
AB1OD	320,016
N6DZR	180,387
K5KDX	153,972
W3WN	116,130
NO2J	103,875
W8LRC	35,802

Single Operator Assisted, Low Power

K0UK	1,016,565
KT4ZB	977,499
N5DO	974,133
W3KB	748,584
KA2KON	741,150
WE9R	609,150
N2KPB	578,160
W1KT	566,352
VA2SS	547,560
WN6K	525,930

DX

Single Operator, High Power

8P5A (W2SC, op)	9,722,772
V26M (N3AD, op)	6,676,425
KP2M (N2TK, op)	6,500,556
TO5A	5,764,011
9Y4W	5,188,320
CR6K (CT1ILT, op)	5,119,821
LT1F (LU1FAM, op)	4,425,516
OA4SS	3,675,951
LX7I (LX2A, op)	3,521,700
CO2GG	3,008,448

Single Operator, Low Power

P40V (W5AJ, op)	5,295,528
HI3TEJ	5,039,685
J88DR	4,002,900
V31YK (DL2AYK, op)	2,925,252
J7Y (K1LI, op)	2,218,878
TG7/N6HD	2,151,279
EA8MT	1,169,136
V51YJ	1,132,509
XE1XOE	1,120,290
8P6EX	1,118,988

Single Operator QRP

LU7HZ	136,479
F5BEG	88,452
IV3AOL	28,539
JH1APZ	24,624
LU1VK	18,819
JA2MWV	18,669
DL8LR	14,964
IK1BBC	14,553
PY2BN	13,221
PU5ATX	12,084

Single Operator, 10 Meters

PX5E (PP5JR, op)	673,554
LU5FC	585,162
PY2LED	419,580
HQ2GL	411,840
CE1DY	284,439
PU2LEP	271,695
XE1BY	260,010
LU8EOT	258,552
KP4JRS	245,268
LW7DUC	240,816

Single Operator, 15 Meters

PR5B (PY2LSM, op)	522,660
KH7Y	521,460
KP2MM (N2TTA, op)	497,943
F6KHM (F8DBF, op)	450,729
TM1W (F5HRY, op)	450,180
CE3CT (CE4CT, op)	434,625
WH7Z (W0CN, op)	363,912
EI7M (EI8IR, op)	348,480
CM8AKD	316,476
TM7F (F6GLH, op)	306,033

Single Operator, 20 Meters

HK1T	627,324
YW4D (YV1DIG, op)	538,752
TM6M (F1AKK, op)	505,263
PX5C (PY2BK, op)	352,458
C6AZZ (K4IIO, op)	325,620
WP3A	314,280
DL0WW	250,527
TG9ANF	245,220
OL9Z (OK2PVF, op)	214,659
OH0X (OH2TA, op)	213,480

Single Operator, 40 Meters

ZF2AH	394,710
TM9R	269,820
OK1FFU	230,040
PR7AP	167,067
CE3EEA	140,391
HC2AQ	138,168
IO6A	131,904
IR2C (HB9DUR, op)	113,886
XE2S	99,528
ED3B (EA3BOX, op)	98,784

Single Operator, 80 Meters

YW5T (YV5JBI, op)	123,144
4M5W (YV5MSG, op)	115,344
GM3PPG (G4BYB, op)	79,110
CL8AKY	50,055
EA7EU	32,760
UU7J (UU1AZ, op)	26,532
SP3GTS	5,772
UT2II	3,876
EA1AAW	1,920
G4IIY	1,485

Single Operator, 160 Meters

KV4FZ	72,072
LU2DVI	468
GW0GEI	432
YV5IAL	192
EU3AR	12
EU2EU	3
SP5CJY	3

Single Operator, Assisted High Power

PJ4G (K2NG, op)	6,471,075
ZZ2T (PY2MNL, op)	3,063,294
G6PZ (IZ1LBG, op)	2,750,814
PR2X (PY2ADR, op)	2,419,308
DR1D (PY2SEX, op)	2,146,188
CE1TT	1,493,790
ZL3IO	1,311,177
EE7E (EA7RU, op)	1,148,295
HF8N (SP8BRQ, op)	980,958
PY5ARP (PY5ZD, op)	839,460

Single Operator, Assisted Low Power

P43E	1,035,567
8P6NW	949,905
3G1D (CE1VIL, op)	748,659
PY2VZ	602,832
IB1B (IW1QN, op)	565,728
HK3JJB	336,168
KP2BH	327,990
PY2ZR	319,422
EI/W5GN	263,451
EF1W (EA1WS, op)	204,702

Multioperator, Single Transmitter High Power

PJ2T	8,998,236
P40L	8,880,270
VP5H	8,158,941
CR2X	6,912,948
KH7X	6,626,124
TO11A	5,653,935
NP2B	5,386,605
CW5W	4,762,812
CS2C	4,348,050
LS1D	4,251,708

Multioperator, Two Transmitters

6Y1V	11,719,305
TI5N	10,550,358
KH6LC	8,036,280
PT5T	7,361,070
ED1R	4,455,360
II9P	2,082,816
PI4DX	2,030,742
HG7T	1,612,995
JA1YPA	1,241,460
GM7R	1,143,990

Multioperator, Unlimited Transmitters

EF8R	8,961,225
LP1H	7,469,304
TI8M	7,285,140
C6ANM	5,081,076
9A1A	3,743,250
JA3YBK	2,340,831
HG1S	1,942,920
JE1ZWT	1,098,279
S50XX	334,314
PY2PT	17,766

Multioperator, Single Transmitter Low Power

HI3K	4,805,097
VP9I	4,483,800
T48K	2,402,529
LU1UM	1,390,800
ZV2K	735,504
KP4MM	659,088
CV5K	556,365
PR5A	447,447
PS2R	216,144
EE5W	86,496

Good Practices, Please

There is always room for improvement on our operating practices — maybe that's why they call it "practice"! Well, not really, but if you're wondering how to improve your score and how the Big Guns make so many QSOs, it's likely that the least expensive station accessory to improve is the one between your headphones.

- Efficiency — no extra words or comments
- Full calls — use them on transmit and pull them out when called
- High-quality audio — put your watts where they count
- Identification — don't waste the time of others, give your call!
- Accuracy — no guessing, get it right or don't log it

If you get a chance, watch for a Contest University (**contestuniversity.com**) or similar program coming to a convention or hamfest near you. These one-day package of courses are a focused way of gaining a lot of know-how very quickly — kind of like a contest!

Top Ten Golden Logs

Call	QSO
W7WA	965
K7UA	500
VA3DF	485
K3OO	454
ZS2NF	406
N6DZR	393
VE4YU	323
EA3NO	305
W8BFX	264
KS4X	245

A New Voice in the Pileups

It's always great to learn of a new operator making a splash on the bands. This year, we heard of a new voice from the far Northwest — Alaska, in fact, as related by Larry, KL7/N1TX. "*We were no match for Mother Nature this weekend, but the team refused to cave and spirits remained high throughout the ups and downs of propagation. KL1AZ's 12-year-old granddaughter, Dale, proved to be an incredible contester-in-the-making. She*

Sponsored Plaque Winners

Thanks to the generous sponsorship of numerous clubs and individuals, we are pleased to announce the winners of a sponsored ARRL DX Phone plaque. The ARRL wishes to thank the plaque sponsors for their continued commitment to the ARRL Plaque Program. Without their support and dedication, the Plaque Program would not be possible. Unsponsored plaques may be purchased by the plaque winner. If you wish to purchase an unsponsored plaque or order a duplicate plaque, contact ARRL Contest Branch Manager Sean Kutzko, KX9X, at 860-594-0232 or by e-mail at **kx9x@arrl.org**. The cost for plaques is $75 (includes shipping).

Plaque Category	Plaque Sponsor	Winner
W/VE Single Operator High Power Phone	Frankford Radio Club	VE3EJ
W/VE 1.8 MHz Phone	Butch Greve, W9EWC Memorial	VY2ZM
W/VE 3.5 MHz Phone	Jeffrey Briggs, VY2ZM	K6AAX/VY2
W/VE 7 MHz Phone	Charles Wooten, NF4A	W7WA
W/VE 21 MHz Phone	Northern Illinois DX Association	N7DD
W/VE 28 MHz Phone	Ralph Fontaine AF7DX	W5PR
W/VE Single Operator QRP Phone	Jeffrey Briggs, K1ZM	W2ID
W/VE Single Operator Assisted, High Power Phone	Pete Carter, K3VW Memorial	K3WW
World Single Operator High Power Phone	North Jersey DX Association	8P5A (W2SC, op)
World 1.8 MHz Phone	Fred Race, W8FR, In Memory of ZL2BT	KV4FZ
World 7 MHz Phone	Jim Rafferty, N6RJ Memorial - Cayman ARS	ZF2AH
World 14 MHz Phone	Don Wallace, W6AM, Memorial Award	HK1T
World 28 MHz Phone	North Shenandoah DX Association NS4DX	PX5E (PP5JR, op)
Asia Multioperator Single Transmitter, High Power Phone	Yankee Clipper Contest Club	RU0FM
North America Multioperator Single Transmitter, High Power Phone	Nick Lash, K9KLR	VP5H
World Multioperator Two Transmitters Phone	W6NL and K6BL	6Y1V
Japan Single Operator Low Power Phone	Western Washington DX Club	JH4UYB
Seventh Call Area Single Operator High Power Phone	Willamette Valley DX Club	N9RV
World Multioperator Unlimited Phone	Stanley Cohen, W8QDQ	EF8R
Asia Single Operator QRP Phone	Sean Kutzko, KX9X	JH1APZ
World Single Operator Phone Low Power	Arizona Outlaws Contest Club	P40V (W5AJ, op)
Canada Single Operator Low Power Phone	Contest Club Ontario	VA3SWG
Great Lakes Division Single Operator Unlimited, High Power Phone	Northern Ohio DX Association	W8MJ

Active Winning Streaks (3 or More Wins)

W-VE

Call	Number	Category
N1UR	4	SOAB-LP
W5PR	4	SOSB-10
K1LZ	4	MS-HP
K3LR	3	MM (new)

DX

Call (@ QTH)	Number	Category
W2SC (@8P5A)	3	SOAB-HP (new)

Category Abbreviations

- SO: Single Operator (SOAB — All Band, SOSB — Single Band, SOU — Unlimited)
- HP/LP/QRP: High Power, Low Power, QRP
- MS: Multioperator, Single-Transmitter
- M2: Multioperator, Two-Transmitter
- MM: Multioperator, Multiple Transmitters

Propagation Indices for ARRL DX Phone

	Flux		Planetary Ap		Estimated K	
Year	Sat	Sun	Sat	Sun	Sat	Sun
2002	191	183	5	10	1.6	2.5
2003	138	147	14.5	11	2.8	2.6
2004	105	106	5	6	1.8	1.8
2005	81	84	10	36	2.5	4.3
2006	75	74	2	1	0.9	0.5
2007	73	73	2	3	0.5	0.8
2008	69	69	19	8	3.3	2.0
2009	69	69	1	8	0.3	2.6
2010	78	77	3	4	0.8	1.0
2011	135	143	5	5	1.1	1.2
2012	116	120	8	11	2.0	2.6

Data from **www.swpc.noaa.gov/ftpmenu/indices/old_indices.html**.

quickly learned the ropes of running and Search-and-Pounce with Win-Test. She may end up being better suited for CW and RTTY contests, though, because her high-energy requires a lot of stoking. A mouth full of sunflower seeds is incompatible with a phone contest…Larry, KL7/N1TX."

Maybe there are other Dales near your contest club? Why not offer them some chair time and be prepared for a surprise!

Extended Results

Look to the online extended version of these results (**www.arrl.org/contest-results-articles**) for more commentary and the following features:

- A PDF file of Top Ten call signs since 2002
- Changes in QSOs and multipliers as a percentage of the 2002 totals
- DX entries tracked by category from year to year
- Soapbox comments from W/VE and DX logs

You'll find a Regional Analysis for your Division or Continent written by a volunteer author from the area. There's also a close look at the results from the Caribbean's annual festival of DXing frenzy.

The Soapbox comments are great fun to read. Some are a simple "thanks, had fun" and others are detailed observations about the contest and the equipment used to participate. The ARRL Soapbox web pages (**www.arrl.org/soapbox**) contain more photos and stories, too. Even more Soapbox commentary is compiled by Dink, N7WA from the popular 3830 score posting website at **www.eskimo.com/~mwdink/3830/**. Browsing through all of these comments, you can find yourself thinking, "Were all of these people in the same contest?"

Two weeks after activating M5E during the CW weekend, Seppo, OH1VR and Kazu, JK3GAD traveled to California where they helped activate the W6NV station as W6WB. From left to right are Seppo, OH1VR; Kazu, JK3GAD, and Al, AD6E. Host Oliver, W6NV and Denny, KX7M are not in the picture. [OH1VR photo]

Concluding Remarks

Next year — even with a slowing solar cycle predicted — should be even better. Get the 2013 ARRL DX contests (February 18-19 and March 3-4) on your calendar now, polish up those high-band antennas and get ready for a healthy dose of radiosport! — *73, Ward Silver, NØAX*

Accuracy Index Records

***Bold* indicates an all-time record**

W/VE

Group	Call	Category	QSOs	Error Rate	Index	Year
SO	VY2ZM	SOAB-HP	4084	0.5	13.561	2010
SOU	W2RE	SOA-HP	3541	0.7	13.479	2011
MO	**K3LR**	**MM**	**7894**	**0.6**	**13.837**	**2011**

DX

SO	8P5A (W2SC, op)	SOAB-HP	9292	0.5	13.918	2011
SOU	PJ4G (K2NG, op)	SOU-HP	6706	1.1	13.716	2012
MO	**PJ4G**	**M2**	**12197**	**0.6**	**14.026**	**2011**

Bernie McClenny, W3UR, w3ur@arrl.org

3D2 — Conway Reef

Another Pacific equinox DXpedition

Conway Reef, known locally by the Fijians as Ceva-I-Ra, is located some 300 km (480 miles) southwest of Suva, Fiji. The sandy cay is about 300 feet wide by 700 feet long and is only 6 feet above sea level, as reported by the last DXpedition, 3D2ØCR, in October 2009. The reef, which was discovered by Captain C. Ramsey Drinkwater Bethune in 1838, is situated on a map at 21° 44' 18" South and 174° 38' 24" East. It was named after the HMS *Conway*, Bethune's ship (see How's DX? Jan 2001, pp 92-93).

To date there have been seven DXpeditions to Conway Reef, which was added to the ARRL DXCC list in February 1990 (see February *QST*, p 63) for QSOs dating back to day one (November 15, 1945), although the first DXpedition was in April 1989. That first DXpedition was 3D2CR followed by 3D2HL/3D2SI/3D2VT/3D2WV three months later. The other five DXpeditions were 3D2AM (May 1990), 3D2CT (March 1995), 3D2CI (February 2001), 3D2CI/3D2CY (October 2001) and 3D2ØCR (October 2009).

Next DXpedition

During September of this year many DXers will be keeping their antennas pointed at the Pacific Ocean. In the July How's DX? column we talked about the upcoming Swains Island (KH8/S) DXpedition taking place at the beginning of the month (September 4-18). At the end of the month and beginning of October Hrane Milosevic, YT1AD, will lead a team back to Ceva-I-Ra. This will be his third such DXpedition to Conway Reef. This time they will be using the call sign 3D2C sometime between September 24 and October 5.

During September of this year many DXers will be keeping their antennas pointed at the Pacific Ocean.

Getting There

The International team plans to meet at Novotel Lami Bay in the Fiji Islands with a departure expected around 1800 local (0600Z) on September 24. They will be sailing on the MV *Island Dancer II*. The first group of operators will begin to arrive on September 21 and the remaining team members the following day. Joining Hrane for this trip will be organizing co-leader Aleksej Romanov, UA4HOX; co-leader Paul Ewing, N6PSE; David Jorgensen, WD5COV; Vasily V. Kozerodov, RW4NW; David Flack, AH6HY; Alan Eshleman, K6SRZ; Alan Maenchen, AD6E; Sergej Yanovsky, RZ3FW; Craig Thompson, K9CT; Stanislav Vatev, LZ1GC; George Williams, N6NKT; Alexander Kuznetsov, RW3RN; Al Hernandez, K3VN; Peter Sprengel, PY5CC/PP5XX, and Mike Flowers, K6MKF. The team expects to arrive back in Fiji by October 6. Many of the team members were part of last year's 3D2 Rotuma Island DXpedition.

Activities

Plans are to be QRV on 1.8 through 144 MHz on CW, SSB, RTTY SSTV and PSK31 on the following frequencies:

CW — 1822, 3503, 7005, 10105, 14025, 18075, 21025, 24895 and 28025 kHz.

SSB — 1835, 3795, 5403.5, 7082, 14190, 18150, 21295, 24950 and 28495 kHz.

RTTY — 1835, 3582, 7035, 10145, 14081, 18100, 21081, 24920 and 28081 kHz.

SSTV — 3723, 7035, 14230, 21335 and 28680 kHz

PSK31 — 1835, 3582, 7035, 10145, 14081, 18100, 21081, 24920 and 28081 kHz.

They will also be on 2 and 6 meter EME using WSJT65 A, B and C on 50.375 MHz and 144.375 MHz.

QSLs will be handled by Hrane once he gets back home. Cards should be sent to Dr Hrane Milosevic, 36206 Vitanovac, Serbia. Direct requests should send SAE (self-addressed envelope) and payment for postage. Inside Europe one US dollar will cover, while outside Europe takes two US dollars. This won't be a cheap one to get to so I am sure they would appreciate any donations with your QSL request. They have a website, which will later contain a log search, at **www.yt1ad.info/3d2c**.

DX News from Around the Globe

8Q — Maldives

8Q7QE in the Maldives is September 3-14 with the operator's (Juergen, OE4JHW) departure from Vienna, Austria, on the 2nd, arriving on Kuredu the next morning. He says he will try to be on the air the afternoon of the 3rd, local time. The main modes will be SSB and BPSK, 40-10 meters. He says, "BPSK will be the mode of my choice during the nights," with his wife asleep. For gear he will have a Yaesu FT-857D, 10 meter fiberglass mast and ground planes for 40-10 including 12, 17 and 30, with a Buddipole as a backup. Juergen says this will not be a hardcore 24 hour operation during their vacation trip but, he says, "I will try to get on the air as often as possible." He will particularly focus on working his friends in DL, HBØ, HB9 and OE, plus North and South America.

P29 — Papua New Guinea

In what will probably be their last trip to Papua New Guinea a team of six will be activating several islands in P2 during late October and early November. Team members include Derek, G3KHZ; Hans, SM6CVX;

Eddy, K5WQG; Axel, DL6KVA; Hans-Peter, HB9EXE, and their friend Stig Nyman, who is not a ham. Their first stop will be from Emirau Island in the St Matthias group (OC-103) starting October 20. They will be operating as P29VCX until October 25. QSL viaSM6CVX. Then from October 27 to the end of the month they will be on Simberi Island in the Tabar Islands (OC-099) as P29NI. QSL via G3KHZ. Their last stop will be from Lihir Island (OC-069) starting November 2 through the 4th. For this location their call sign and QSL Manager is yet to be announced. They will be concentrating on 7 through 28 MHz, mostly on CW with some SSB. The team has a website at **www.p29ni.yolasite.com**. After these three islands SM6CVX, Hans, and Stig will sail via the chartered MV *Barbarian* to Bougainville Island (OC-135) for activity from November 6-9 as P29VCX. Afterward they will fly to Manus Island (OC-025) for operations as P29VCX from November 9-12. It may also be possible for a short operation from OC-240. QSL P29VCX via SM6CVX.

PYØS — St Peter and St Paul Rocks

There is a DXpedition being planned for St Peter and St Paul Rocks (PYØS) in the November/December time frame. As of press time details were still being worked out.

There is a DXpedition being planned for St Peter and St Paul Rocks (PYØS) in the November/ December time frame.

They have a website at **www.pt0s.com**. Watch your favorite DX newsletter for full details. Also while you are waiting for this one check out Cesar's, PY2YP, web page dedicated to past St Peter and Paul Rocks DXpeditions at **www.py2yp.com/spsprocks**.

RI1F — Franz Josef Land

RI1FJ, Franz Josef Land, will be put on the air the next two years by Eugeny Chepur, UA4RX. Victor, UA2FM, is working on renewing the RI1FJ license for Eugeny and will be sending a copy to the DXCC Desk when it comes through. UA4RX was expected to arrive on the island as of the writing of this column via the MV *Somov*, which takes the Arctic Island crews from the embarkation point, Archangelsk, dropping them off at their destinations, and picking up the departing crews.

Eugeny plans to have his 200 W IC-775-DX2 along, and a 3 element SteppIR that is already installed at the base, put up by RI1FJA and RI1FJL. There are also a 500 W amplifier and some wire antennas. Victor is the RI1FJ QSL manager and says Eugeny is a devoted CW operator and prefers that mode. He also "likes some RTTY/PSK and sometimes [does] a bit of SSB." QSL direct only, to UA2FM, "no bureau." Do not send cards to Eugeny's home address, "as all QSL activity comes from Kaliningrad," says Victor. "Japanese stations (as well as others) do not send IBRS please. This service is not recognized by the Russian Post." The RI1FJ 2010-2011 log was uploaded to LoTW in June. Victor adds, "We will try to use HF nets to send logs and small messages. Hopefully I will upload his log onto LoTW more often."

T3Ø — Western Kiribati

T3ØPY from Tarawa, Western Kiribati, will be October 16-25 with Brazilian operators. PT2OP, PY2WAS, PY2XB, PY3MM, PY4BZ and PY7XC plan to have several stations going on 160-10. A special 6 meter call sign will be T3ØSIX. They will be on SSB, CW and RTTY as well as EME on 6. QSL direct or bureau to PY2PT. There will be log search, OQRS and operating frequencies on **www.mdxc.org/t30py/**.

Topband Most Wanted Survey

Topband DXers Larry Gauthier, K8UT, and Garry Shapiro, NI6T, are conducting a most wanted survey for 160 meter DXers. You have until August 31 for your input to count for the 2012-2013 results. Go to **http://survey.hamdocs.com/?sid=11389** today!

VKØ — Heard Island

A Heard Island operation is being planned for early 2014. Led by KK6EK, Dr Bob Schmieder, with co-organizers ON6TT, DL1MGB and N6MZ, the operation includes operators DJ9ZB, NP4IW, AD6E, N4GRN, DJ5IW, N6PSE, W3WL, WØGJ and AA7XT. Additional support personnel are W6OP, N7XG and KY6R. A Clipperton Island operation for March 2013 is "being designed as a test/development project for Heard Island." Some of the ops will be part of both operations, which Bob is strongly encouraging. Additional operators are being sought. **www.cordell.org/CI** and **www.heardisland.org**.

ZK2 — Niue Island

6 meter and 2 meter DXers will want to mark their calendars as Lance, W7GJ, and Bob, ZL1RS, are heading to Niue Island in September. Lance's plans are to arrive on September 7 (September 8 GMT) and set up to be ready as ZK2GJ the following day. He expects to be QRV on 6 meters through his moonset on September 20. During about that same period Bob will also be there handling the 2 meter activity, most likely as ZK2RS. Lance has a web page at **www.bigskyspaces.com/w7gj/Niue2012.htm**.

Wrap Up

That's it for this month. Thanks to KE3Q, KK6EK, PY2XB, SM6CVX, UA2FM and *The Daily DX* for making this month's column possible. Please send your DX news, DX club newsletter and photos to **w3ur@arrl.org**. Until next month, see you in the pileups! — *Bernie, W3UR*

Tribute to Gene Zimmerman, W3ZZ

By now most of you probably have heard that Dr Eugene M. Zimmerman, W3ZZ, passed away on June 3. Gene was a longtime friend, confidant and 6 meter Elmer of your editor. He was a very good operator and had a "booming" voice. Gene was an icon to Amateur Radio in Contesting and VHF and was the former editor of The World Above 50 MHz as well as *CQ Contest* magazine's VHF contesting column. We operated many contests together on HF and even a few on VHF. Rest in peace my friend!

Jon Jones, NØJK, n0jk@arrl.org

Gene Zimmerman, W3ZZ

W3ZZ has swung his beam west to a World Above.

Gene Zimmerman, W3ZZ, of Gaithersburg, Maryland, passed away on Sunday, June 3, 2012. He was 71. He wrote "The World Above 50 MHz" from 2002-2011. A year ago Gene had asked me to consider taking over as column editor.

Gene observed: "When I accepted the duties of VHF Editor in 2002, I did so well knowing that my tenure would be circumscribed and likely not to exceed a decde in time," he wrote in his final farewell column. "There are many reasons for this, most importantly that an individual begins to run out of new ideas after a given amount of time and that the position — and the readership — would benefit from fresh viewpoints."

Gene Zimmerman, W3ZZ, in 2002 along side his impressive HF to UHF station. [photo courtesy Gene Zimmerman, W3ZZ]

Gene told me "it has been a pleasure to write 'The World Above 50 MHz' for almost the last decade. As I said in my July 2011 column, fresh blood is always a good idea in any such endeavor, and I had decided that 2011 would be my last year. Some health issues made me leave a few months early, but 2011 would have been it in any case. I feel privileged to have followed in the footsteps of outstanding previous authors of 'The World Above 50 MHz,' such as Ed Tilton, W1HDQ (SK) and Sam Harris, W1FZJ (SK). Ed and Sam were legends in their own times."

He also served on the ARRL® Contest Advisory Committee, edited the VHF contesting column for *CQ Contest* magazine and was director of the CQ VHF Contest from 2000-2002. An ARRL Life Member, Gene earned VUCC on 50, 144, 222, 432, 903 and 1296 MHz, as well as DXCC, Worked All States and Worked All Continents on 6 meters. He was an early proponent of — and participant in — aggressive contest log checking.

First licensed in 1956 — and an Amateur Extra since 1963 — Gene has logged several national Top-10 finishes in the ARRL November Sweepstakes (both modes), as well as a second-place North American finish in the CQ World Wide CW Contest. He also placed in the Top 10 several times in the ARRL VHF QSO Parties and in the VHF Sweepstakes. Early on, he "developed an interest in HF and VHF contesting. When I moved to Washington, DC, I became involved in HF contesting in a serious way, particularly building multi-op contest stations with Tom Peruzzi, W4BVV (SK). I returned to weak signal VHF in 1981 and built a pretty decent VHF station, which I have expanded to 10 GHz."

"Over the years, I have worked more than 140 DXCC entities on 6 meters, 38 states and 9 DXCC terrestrially on 2 meters, 36 states on 222 MHz and VUCC on 50-1296 MHz. In contests, I have also been in the top 10 nationally several times from my home station and have won the multi-unlimited category four times with K8GP, the Delmarva VHF and Microwave Society. I think once you have built an interest in the VHF+ bands, it never goes away." I recall working Gene on tropo at K8GP during the CQ VHF contest on 144 MHz a few years ago. I was running only 10 W from EM08, Gene was ecstatic over the contact.

I've had the pleasure of being his roommate...and I don't believe I've ever laughed harder or longer.

Gene, like me, was in the medical field. He earned a PhD in Microbiology from the University of Maryland in 1968. He began his professional career at the National Institutes of Health (NIH) studying respiratory viruses. This experience sparked an interest in virology and conquering the common cold. After this, he conducted early research at NIH, studying cancer, leukemia and the use of interferon. In 1976, he joined the NIH Grants Associate Program, which groomed promising scientists for careers in managing NIH research programs. Gene became the Scientific Review Administrator of the Allergy and Immunology Study Section of the Immunological Sciences Integrated Review Group, where he evaluated proposals for research in immunology.

Dr Donald Schneider, director of the CSR Division of Molecular and Cellular Mechanisms, summed up the sentiments of Gene's colleagues at the NIH: "Zimmerman has been wonderfully helpful, scientifically knowledgeable and delightful to work with."

In assessing his 35 year career at the NIH, Gene noted that "there still is no cure for the common cold. The great advances in technology have been no match for the multi-variant viruses that cause colds." He was nonetheless hopeful. In any case, Gene was very proud to have been part of a process that includes such possibilities.

"Gene brought the same intensity and depth of knowledge of his career at the NIH to understanding propagation," said Ward Silver, NØAX. "His tenure as the conductor of *QST*'s 'The World Above 50 MHz' usually resulted in a sharp recounting and

analysis of the month's unusual on-the-air events. I learned something from every single column. What most will remember about Gene, though, was his amazing capacity for storytelling and the twinkling of his eyes as he told of the undoing of scoundrels with obvious and undiluted glee. I've had the pleasure of being his roommate at Dayton and WRTC and I don't believe I've ever laughed harder or longer. Gene knew where all the bodies were buried and relished his role as sage and historian."

From New Zealand Bob Gyde, ZL3NE, noted "Gene and I had many e-mails to each other regarding propagation. No doubt you recall my three week trials with Gene and this was discussed in *QST*. I enjoyed his enthusiasm regarding VHF and UHF activities, the whole place is poorer for his passing. I look forward to your column each month, it being the first thing I read! Keep up the good work and give support to the 100 W folk!"

"Gene was a good friend to many of us in the VHF community — he will be missed — Very sad day." — *Vic, WB4SLM*

"It was a melancholy Sunday when I found out here." — *Dave, N3DB*

"I, for one, will miss him." Bill, W3XO/5, former conductor of "WA50."

...his amazing capacity for storytelling and the twinkling of his eyes as he told of the undoing of scoundrels...

"As many, I regret Gene is not with us any longer. I met Gene at Jimmy's BBQ in Austin." — *Ed, N5DG*

"Quite a shock for us to hear of Gene passing…" — *Ed, VP9GE*

"Amateur Radio has had its share of characters but none were more colorful or more widely respected than Dr Gene Zimmerman, W3ZZ — a man who in one breath could identify the source of the world's greatest hot dogs, explain once-in-a-lifetime propagation and recount the history of contesting and contesters." — *Ward, NØAX*

"Gene was my very best friend. He used to come out here at least 2 or 3 times a year and stay with us for a week at a time. He loved to visit, taste the different wines and see the vineyards. He wanted to try all the great places to eat in the wine country.

"I remember one time Gene was out here in solar cycle 23's peak and he wanted to run JA's in the afternoon. He was very disappointed when he couldn't get a pile up going only to find out that we forgot to turn the amp on. We were only running 10 watts! I will miss him very much." — *Bob, K6QXY*

So will I. — *Jon, NØJK*

On the Bands

50 MHz. "June 29 was definitely a historical day for 6 meter multihop E_s" — *CT1HZE*

This is a day 6 meter ops live for. This European opening lasted almost 7 hours and the Pacific Northwest worked deep into eastern Europe and even Asia (4X). Dan, NN7J, worked three Israeli stations! This opening was such a large and rare event that Dan, N7DB, is preparing a *QST* article about it.

The opening started around 1245 UTC with a spot by DK1MAX of NN7J (CN85) and lasted until at least 1920 UTC when GMØGAV posted W7EW (CN84) "559 again." N7DB worked DK3WR, SP2CNW and CT1HZE at 1345 UTC. Even small stations running 100 W (or less) were able to work the rare DX. From Montana, Matt, K7BG (DN47) worked Belgium, England, Netherlands, Poland and Scotland "with an ICOM 736 at 100 W with a burned out preamp to a 5 element Cushcraft Yagi at 70 feet." Mike, WB8VLC (CN84) worked CT1HZE with strong signals both ways, also SM7FJE and DK3WG. "I got into some pileups with the locals in CN85 and CN84 whose amps had not died and I had partial contacts with the following on CW - DL3BQA, SP2DDX and SP3RNZ." Mike was running 35 W from an old TS-690 to a "modified" 6M5X Yagi at 22 feet.

John, W7KNT (DN26) worked 16 countries including JW and eastern Europe down to 4Z1UF and 4X4DK in Israel. "It acted more like F2 rather than multi-hop E_s. This was probably the most amazing widespread opening into eastern Europe that I have ever seen on 6 meters."

Lance, W7GJ, who had said he would never work Europe on 6 meters except on EME, made nine European contacts from Montana. W7LR Bozeman, Montana worked Israel, Poland, Estonia and Svalbard with 100 W. From the DX side, Joe, CT1HZE, worked 25 stations in the Pacific Northwest "after waiting a decade!" His best DX was VE7DAY (CO70) and WB8VLC (CN84).

California was on the fringe but Chuck, NA6XX, worked ON4GG at 1701 UTC and SP3RNZ at 1802 UTC. It was rumored that a northern W6 with a small antenna on a high hilltop had a partial contact with A45XR.

The opening extended to Montana, Utah and Colorado. Jay, KØGU (DN70) notes "I had never worked Europe before 1400 UTC before but beat that by a bunch. I was awakened around 1215z by 49.750 MHz video. JW7QIA was truly loud for about an hour. I think if this opening had happened during a weekend, especially considering how early the first part occurred, many more stations would be in the log." Jay's best DX was almost 11,000 km to Israel.

Three "new ones" on 6 meters for KØGU on Jun 29:

15:41	JW7QIA #133	JQ68tb	599	599	6197 km
15:56	4O4A #134	JN92nb	559	579	9230 km
16:21	4Z1UF #135	KM71kx	529	449	10,939 km

Kansas and Texas were on the very fringe. NØLL (EM09) worked MMØAMW at 1209 UTC "the only DX station heard at the time" and LA7HJA at 1546 UTC. LA7HJA was also spotted by KØZX and KØEU (DM79). After seeing Larry's Norway spot, I went out portable with 100 W and a 2 element Yagi on a hilltop. JW7QIA (JQ68) popped up on a dead band at 1642 UTC. Peter, JW7QIA, was in for about 5 minutes on 50.093 peaking to 579 at 6228 km.

The VE4SPT/b (EO26) was 599 at the time. Peter hears very well using two 6 element Yagis on a 12 meter high "spider mast." Larry, NØLL, wonders "Does E-skip ever happen at the North Pole?" Now we know, Larry! Pat, W5OZI (EM00) worked JW7QIA as did K5XX (EM21). Ed, N5DG, one grid away in EM20 did not hear Peter, but worked MMØAMW along with IØJX. Florida was in it — Bob, W4VQ (EL98) worked Estonia, Finland, Iceland, Latvia, Norway and Sweden from 1230-1430 UTC, nice!

What was the propagation mode for the June 29 opening? "I would consider this as a multi-hop E_s propagation event with high MUF (> 70 MHz) on most parts of the paths and probably more hops than necessary for the distance, i.e. 5 or 6 hops for the 8000 to 9000 km paths considering the observed elevated angles with which the signals were received." — *CT1HZE*

Overall, June was an odd month for E_s. There were some rare and unusual openings but some of the "regular" paths such as the Midwest to the Caribbean and the "SSSP" path between North America and Japan were less frequent than prior years. Moreover, the K5N/N5K "grid expeditions" hit a rough patch with E_s taking a vacation during their activity.

On June 4 an "E_s link to TEP" opening occurred. These are rare in the summer months. N9IW (EN65) worked CX1CCC at 2043 UTC. Earlier, HI3TEJ worked the Midwest and into the Pacific Northwest. Ted was loud in Kansas at 1840 UTC for NØJK, and worked W7AT (CN84) 1847 UTC and VE7SL (CN88) at 2125 UTC. PV8ADI (FJ92) was 599 for WØWOI (EN22) and K9KU (EN65) around 2000 UTC.

On June 5, Ed, N5DG (EM20) worked Han, JE1BMJ (QM05) at 2305 UTC. June 6 W9DR and N3LL (EL86) worked JE1BMJ. W9DR worked LU5FF June 7, possibly E_s – TEP.

The June VHF QSO Party had E_s from Arizona (WA7JTM, DM46) to CU3EQ Saturday afternoon at 2309 UTC for Pete's #127 and a nearly all day E_s opening between W1, W2, W3, W8 and W9 to the West and Midwest. A contest European opening started around 1700 UTC Sunday June 10. K6QXY (CM88) spotted PA2M at 1727 UTC. Bob worked PA2M, ON7GB and DL8YHR. NA6XX found PA2M. At 1738 UTC VE7SL (CN88) worked PA2J with 559 signals, DK3EE and DKØED. Dave, N7DB, worked KF7PCL (CN76) and PA2M.

Rick, WØRT (EM27) had KH6HI (BL01) answer a contest CQ at 2100 UTC June 10. KH6HI also spotted WB9Z and WDØT. NU6O (CN70) caught KH6/K6MIO at 2200 UTC. He posted a YouTube video of what it sounded like here:

www.youtube.com/watch?v=Zc_hXxRwYJw&feature=plcp

Fred, KH7Y (BK29) worked as far east as KB3RHR and heard N1BUG and K1TOL. He ran some JAs during the contest both days. Fred worked K9KU (EN65) at 2306 UTC June 10 for Larry's, K9KU, state #50 on 50 MHz! Larry sent a letter to Fred, who shared it with me. K9KU notes he has worked every DXCC counter on HF except BS7, but working Hawaii on 6 meters was the highlight of his ham radio career! "My wife thought I had lost my mind when I ran around the house yelling 'I just worked Hawaii on 6 Meters!' Thanks for the contact. Thanks for the memory. This is what ham radio (and 6 Meters are about)" — *Fred, KH7Y*. Fred received a QSL for his 9MØL contact.

A big European opening between the eastern USA and Europe lit up the June contest Sunday afternoon. Hundreds of transatlantic contacts were made. Jeff, K1TEO, worked 26 countries. N3SL (EN12) worked 4O3A at 2217 UTC. CT1HZE made it to the heartland and worked by KA9CFD (EN40) and 10 W NØJK/p (EM18) at 2315 UTC. CT1HZE made 280 contacts in 90 grids on 6 meters in the contest. This may be an all-time contest record for a European station and it was open to Japan, too! Tim, NWØW (EM47) ran JAs and W5KI (EM36) logged JE1BMJ at 2341 UTC. I recall VE5 and VE6 stations were very loud at this time.

W5KI (EM36) copied Li, BA4SI, June 12 at 2345 UTC. Earlier, VY2ZM worked JE1BMJ with 599 signals at 2204 UTC. Mike, VE9AA, worked JL8GFB at 2232 UTC. Open the same time for W9DR to OY3JE. The 21st had C5YK to N3DB and NØXA (EM28) around 1540 UTC. Fred, NØXA, worked C5YK and said he was in for about 30 minutes. June 22 Ken, W8ND (EM79) logged three stations in France, G4RRA, and EI9FBB at 2300 UTC with 100 W and a Mosley TA-56 Yagi at 57 feet. On June 23 Bill, KØHA (EN10) worked JE1BMJ at 2345 UTC. Dave, N9HF (EL99) logged rare OX/DL3GCS June 25 at 2006 UTC for his #85.

TM60 Afghanistan Update

On June 8, Eric worked SV1GJX, IT9RZR, three 4Xs, SV8CS, SV1LK, SV8MQP and SV9AHZ around 0800 UTC. The next day he worked LZ2WO, YT1VP, LZ2CC, YT1Q, YU7EF and LZ1QI at 0840 UTC.

144 MHz Rare Midwest Tropo to North Dakota and Contest 2 Meter E_s!

Sunday evening of the June contest, 6 meters was red hot. Two meters popped open for E_s from South Dakota to W1 and W2. Dennis, W1WV (FN22) worked W7XU (EN13) at 0126 UTC. Arliss, W7XU, said 2 meter E_s was open from 0109-0245 UTC June 11. Arliss made 42 E_s contacts including W3CCX (FN21) with a "watery sounding signal" suggesting FAI (field aligned irregularities) as the mode for that contact.

Arliss said most of the 2 meter E_s were very strong, though some were weak. He worked KØSM (FN13) who was running "25 watts to a 20 meter HF dipole." This was the only significant 2 meters E_s opening reported in June for North America.

On June 25 rare tropo again appeared from Colorado. NØSP (DM79) worked W9MP (EN45) along with IA and MN. Gary, WØGHZ, reports a strong north–south tropo opening on June 26 from Kansas to rare North Dakota. John, KFØM (EM17) worked NDØB (EN07) at 0400 UTC with 59 signals.

432, 902, 1296 MHz and Up

By the time you read this, 6 meter E_s will be a distant memory and fall tropo will be here. Perhaps because of the extremely hot weather in June, tropo developed. On June 26, K2DRH (EN41) worked VE4MA (EN19) on 432, 902 and 1296 MHz ~ 0400 UTC. This is a rare path. W5LUA (EM13) worked K5LLL (EM10) on 10.368 MHz tropo June 22. WØGHZ (EN34) worked WA7KYM on 432 and NØSP (DM79) on 1296 MHz SSB June 25 at 1400 UTC.

EME

Lance, W7GJ, worked N5K (DL79/DL89) on 6 meter EME June 24. He had no E_s to them. He worked JW7QIA on 6 meter EME June 24 for his country #178.

Here and There

Due to the unusual June 50 MHz openings, the focus was on them. Next month will feature reports of the K5N/N5K and KB7Q grid expeditions and more on the higher bands.

Strays

Rotary International Net

The Amateur Radio community and the local clubs of Rotary International, have one fundamental thing in common: service. The Rotary Club is a group of professionals who meet regularly to deliver service to the community, locally, nationally and internationally. Local Rotarians are a part of a volunteer organization of 1.2 million people united worldwide to provide humanitarian service and help build goodwill and peace.

It's no coincidence that many Rotarians are also Amateur Radio operators. Although I have been a licensed ham for 50 years, I only discovered the Rotary Club about five years ago.

We would love to have you join us on any of the ROAR nets. For a complete rundown of all of the ROAR activities, go to **www.ifroar.org**. If you aren't a member of the Rotary Club and would like more information, feel free to contact me. If you aren't a member, and even if you don't plan to become a Rotarian, we still welcome your participation on the air. Find out more about Rotary International at **www.rotary.org**. — *Michael W. Babb, N4PF, 256 Indian Woods Trail, Cynthiana, KY 41031*

Special Events

Maty Weinberg, KB1EIB, events@arrl.org, www.arrl.org/special-event-stations

Contact these stations and help commemorate history. Many provide a special QSL card or certificate!

Aug 9-Aug 19, 0800Z-1000Z, WØISF, Truro, IA. Madison County DX Club. Iowa State Fair. 7.225 14.225. QSL. Mark Mease, 2989 Truro Rd, Truro, IA 50257. *Operating at various times.* **mmease@netins.net**

Aug 17-Aug 20, 1000Z-0000Z, PD6SHELL, Amsterdam, Netherlands. Radio Amateurs Amsterdam. Radioweekend Shelltower Amsterdam. 145.200. QSL. Shelltower, Buiksloterweg 5D, Amsterdam 1031cc, Netherlands. **www.shelltoren.nl**

Aug 18-Aug 19, 1300Z-2200Z, W8WML, Ludington, MI. West Michigan Lights Amateur Radio Club. Big Sable Point Lighthouse Activation — ILLW. 14.250; SSB and CW on 80 through 6. QSL. WMLARC - W8WML, 15437 Wisteria Ln, Spring Lake, MI 49456.

Aug 18-Aug 19, 1500Z-1600Z, W2GSB/LH, West Babylon, NY. Great South Bay Amateur Radio Club. Lighthouse/Lightship Weekend. 14.255 14.070 7.175 3.850. QSL. W2GSB/LH, PO Box 1356, West Babylon, NY 11704. *Operating from Fire Island.* **www.gsbarc.org**

Aug 26, 1300Z-2200Z, K2CT/100, Delmar, NY. Albany Amateur Radio Association. 100th Anniversary. 21.250 21.050 14.250 14.050 7.250 7.050. QSL. John Fritze, K2QY, 4 Normanskill Blvd, Delmar, NY 12054. **www.k2ct.net**

Aug 30-Sep 3, 2000Z-2000Z, K3S, Sinnemahoning, PA. 1900 Group. 50th Anniversary of Sinnemahoning State Park. 14.275 7.180 3.815 1.900. QSL. Jim Dallas, 609 Buttercup Dr, Monroeville, PA 15146. **www.1900group.net**

Sep 1-Sep 2, 1500Z-0200Z, K7A, Mukilteo, WA. Historic Flight Foundation. Vintage Aircraft Weekend. 14.240 7.240. QSL. Jack Rookaird, K7A/KC7YE, 8260 53rd Ave W Condo 407, Mukilteo, WA 98275. **historicflight.org**

Sep 1, 1400Z-2359Z, N6T, Bishop, CA. Bishop Amateur Radio Club. Opening of Bristlecone Pine Visitor Center. 28.385 21.285 14.285 7.285. Certificate. Bishop Amateur Radio Club, PO Box 1024, Bishop, CA 93514. **www.n6ov.com**

Sep 1-Sep 3, 1215Z-1800Z, K1R, Northfield, MA. 72 Rag Chew Group. 72 Rag Chew Labor Day Special Event. 7.271 8:15 AM to 9 AM, 7.272 9 AM to 2 PM. Certificate. Robert Lobenstein, WA2AXZ, 1958 E 36th St, Brooklyn, NY 11234. **www.ragchewers.com**

Sep 1-Sep 10, 0000Z-2359Z, K7T, West Jordan, UT. Utah DX Association. 85th Anniversary of the Invention of the Electronic TV by Philo T. Farnsworth. 21.300 14.250 7.240. QSL. Wesley Wilkinson, 7363 Galaxy Hill Rd, West Jordan, UT 84081.

Sep 6-Sep 9, 0000Z-2359Z, K5Z, Santa Fe, NM. Santa Fe Amateur Radio Club. The 88th Burning of Zozobra: 2012 Fiesta de Santa Fe. 21.380 14.280 7.260 3.815. QSL. Fred Homuth, K9GAJ, 3005 Siringo Rd, Santa Fe, NM 87507. **www.zozobra.com**

Sep 7-Sep 9, 1500Z-0500Z, WW6HP/K5WH/N7HP/NE1HP/WA7HP/W1HP/WW6HP, Nationwide. Hewlett-Packard Boise Amateur Radio Club. 100th Anniversary of HP Founder David Packard's (9DVR) Birth. 21.360 18.140 14.260 7.260. QSL. Aaron Rynearson, NØBOE, HPBARC Public Information Officer, 11311 Chinden Blvd MS403, Boise, ID 83714. *All stations logged by HP clubs will receive a QSL; collect them all.*

Sep 7-Sep 16, 1300Z-0200Z, N4F, Fletcher, NC. The Road Show Amateur Radio Club and the Amateur Radio Clubs of Western North Carolina. North Carolina Mountain State Fair. 50.135 28.425 21.325 14.290. Certificate & QSL. The Road Show ARC, 57 Echo Lake Dr, Fairview, NC 28730. *Sponsoring clubs include: Western Carolina ARS, Western Piedmont ARC, McDowell ARA, Mayland ARC, Haywood ARC, Blue Ridge ARC.* **n4f.theroadshowarc.com**

Sep 8, 1600Z-2359Z, N1N, Mitchell, IN. Daviess County Amateur Radio Club. Indiana Parks on the Air. 14.250 7.250. QSL. Ken Holland, 9 Sugarland Estates, Washington, IN 47501. *From Spring Mill State Park.* **daviesscountyarc.org**

Sep 8, 1600Z-2359Z, NI6IW, San Diego, CA. USS *Midway* (CV-41) Museum. US Air Force Birthday 1947; Patriot Day; first nuclear powered aircraft carrier USS *Enterprise* (CVAN-65) launched 1960. 14.320 7.250 PSK-31 14.070 D-STAR 012C. QSL. USS *Midway* Museum Radio Room, 910 N Harbor Dr, San Diego, CA 92101.

Sep 8-Sep 9, 1301Z-1301Z, K5LSA, Lafayette, LA. Acadiana Amateur Radio Association, Inc. Louisiana 200th Statehood Anniversary. 28.350 14.265 7.265 3.930. Certificate. Herman Campbell, KN5GRK, 416 Dale St, Lafayette, LA 70501. **www.w5ddl.org/k5lsa**

Sep 8-Sep 9, 1600Z-0000Z, N9D, Chesterton, IN. Lake County Amateur Radio Club. Indiana State Parks on the Air — Indiana Dunes. 28.400 21.300 14.250 7.235. QSL. Lake County Amateur Radio Club, PO Box 90, Crown Point, IN 46308. **mark@k9mq.com**

Sep 8-Sep 16, 0001Z-2359Z, W6A-W6Q & W6S-W6T, San Bernardino, CA. Citrus Belt Amateur Radio Club. 13th Annual Route 66 On The Air. 21.366 14.266 7.266 3.866. Certificate & QSL. Citrus Belt Amateur Radio Club, PO Box 3788, San Bernardino, CA 92413. **www.w6jbt.org**

Sep 9-Sep 14, 0900Z-2100Z, GB2HST, Minterne Magna, Dorset, England. Radio Society of Great Britain. High Stoy Shutter Telegraph Over 200 Years. 21.300 14.300. QSL. Via RSGB Bureau or direct to John Wakefield, Oakhurst, Lower Common Rd, West Wellow, Romsey, Hampshire SO51 6BT, England. **www.qrz.com/db/gb2hst**

Sep 9-Sep 28, 2300Z-2300Z daily, NM5S, Santa Fe, NM. Santa Fe Trail Bicycle Committee. Santa Fe Trail Bicycle Trek. Santa Fe, NM to New Franklin, MO. 14.062 7.032. Certificate. NM5S, 1224 Apache Ave, Santa Fe, NM 87505. *Portable QRP CW station on the air at approximately 5-5:30 PM and 7 to 7:30 PM local time daily. Times of operation at* **qrpspots.com**. **www.santafetrailbicycletrek.com**

Sep 13-Sep 23, 0000Z-2359Z, W5O, Edmond, OK. Edmond Amateur Radio Society. Oklahoma State Fair. 28.390 21.280 14.230 7.180. Certificate. Edmond Amateur Radio Society, PO Box 48, Edmond, OK 73083. **k5eok.org**

Sep 14-Sep 16, 1900Z-2200Z, NØB, Wray, CO. KØLMD and Wray Amateurs. Beecher Island Memorial Battle Ground Reunion. 14.230. Certificate. Ron Peterson, 1153 W 7th St, Wray, CO 80758.

Sep 15, 1400Z-2200Z, W4CA, Roanoke, VA. Roanoke Valley Amateur Radio Club. The Blue Ridge Bonanza. 7.235 7.225 7.215 7.205. Certificate. W4CA c/o Ray Crampton, 1670 Catawba Rd, Troutville, VA 24175.

Sep 15-Sep 16, 1400Z-2100Z, K4EG, Burlington, NC. Alamance Amateur Radio Club. Carousel Festival. 14.290 7.200. QSL. Alamance Amateur Radio Club, c/o Carousel Festival, PO Box 390, Elon, NC 27244. *Celebrating the historic Dentzel Carousel* **cwfun.org/funspots/carousel**. **k4eg.com**

Sep 15-Sep 16, 1500Z-2345Z, WØJH, White Rock, SD. Stillwater Amateur Radio Association and Radio City. White Rock South Dakota Special Event. 21.360 14.260 7.260 3.860. Certificate. Shel Mann, 1618 West Pine St, Stillwater, MN 55082. *Operating 3 field-portable stations from the corners of South Dakota, North Dakota and edge of Minnesota (Grid Square: EN15). QSL Certificates will ONLY be sent via e-mail in PDF.* **www.radioham.org**

Sep 15-Sep 23, 0000Z-2359Z, KDØMED, Boone, IA. Tall Corn Amateur Radio Club. Thomas the Tank Engine. 14.280. QSL. Ron Nelson, KNØR, 3918 Phoenix St, Ames, IA 50014. *At the Boone and Scenic Valley Railroad.* **www.qsl.net/kd0med**

Sep 19-Sep 23, 0000Z-2359Z, K4MIA, Loxahatchee, FL. PBSE Radio Society. National POW/MIA Recognition Day. 21.300 18.150 14.265 7.185. QSL. Michael Bald, 6758 Hall Blvd, Loxahatchee, FL 33470. *Please take time to honor our POWs/MIAs on Friday, Sep 21.* **qrz.com/db/k4mia**

Sep 21-Sep 23, 1800Z-1000Z, N2R, Budd Lake, NJ. NJ District Royal Rangers. 2012 Royal Rangers New Jersey Pow Wow. 28.450 14.240 7.210 3.840. QSL. Lawrence Stewart, O Hensyn Village 4A, Budd Lake, NJ 07828 **ka2hjh@optonline.net**

Sep 22, 1600Z-2400Z, W8DYY, Miamisburg, OH. Mound Amateur Radio Association. 50th Anniversary. SSB 28.400 14.250 PSK31 14.070 CW 7.028. Certificate. ARC W8DYY, PO Box 1262, Miamisburg, OH 45342. **w8dyy.org**

Sep 29-Sep 30, 1500Z-2130Z, N4WIS, Virginia Beach, VA. USS *Wisconsin* Radio Club. USS *Wisconsin* Final De-Commissioning. 14.264 7.264. QSL. USS *Wisconsin* Radio Club, PO Box 6682, Virginia Beach, VA 23456. **www.n4wis.org/n4wis/index.php**

Sep 29-Sep 30, 2000Z-0400Z, WE7GV, Sahuarita, AZ. Green Valley Amateur Radio Club. Fiesta Sahuarita. 14.248 14.246 14.244 14.242. Certificate & QSL. Green Valley Amateur Radio Club, 601 N La Canada Dr (SAV), Green Valley, AZ 85614. **tlang1080@gmail.com**

Sean's Picks

Sean Kutzko, KX9X, ARRL Contest Manager

All dates/times are in UTC.

- **State QSO Parties this month:** Arkansas, Colorado, South Carolina, Tennessee, Texas, Washington (State Salmon Run)
- **QRP Contests this month:** MI QRP Labor Day Sprint (September 3-4), ARS Spartan Sprint (September 4), QRP-ARCI Two Sidebands Sprint (September 8-9), Flying Pigs' Run for the Bacon (September 17), NAQCC Monthly QRP Sprint (September 20), NJQRP's Fall Homebrewer Sprint (September 25)
- **Fall VHF+ Sprint Schedule:** 50 MHz: August 11. 144 MHz: September 17. 222 MHz: September 25. 432 MHz: October 3. 902 MHz & Up: October 3. Complete info at **www.svhfs.org**.
- **All Asian DX Contest, Phone (September 1-2):** 48 hours of activity from all countries in Asia. Exchange is a signal report and your age; YL operators may send 00.
- **Russian Radio RTTY Worldwide Contest (September 1):** Everybody works everybody in this 24 hour digital donnybrook! Special multipliers are awarded for Russian oblasts (districts). How many oblasts can you work?
- **Worked All Europe DX Contest, Phone (September 8-9):** Sponsored by the DARC, the rest of the DX world focuses on working as many European stations as possible. EU stations can also ask for QTC, a list of other stations in your log. Do it and earn extra points very quickly!
- **ARRL September VHF QSO Party (September 8-10):** Grab your antennas for 6 meters and up and head for the highest point you can find! Exchange is simply your Maidenhead grid square.
- **North American Sprint, CW (September 9):** 4 hours of intense CW activity focused on North America. No more than 2 QSOs can be made on the same frequency. Some ops have said this is one of the purest CW contests in the world.
- **ARRL 10 GHz & UP Contest (September 15-16):** With only a few watts of RF, you can be a Big Gun on 10 GHz. Portable operation is heavily encouraged.
- **North American Sprint, Phone (September 16):** The same intensity as the CW Sprint above, but on SSB. You'll be an expert at QSY when this one is over.
- **CQ Worldwide RTTY contest (September 29-30):** The official beginning of the 2012-2013 contest season. 48 hours, everybody works everybody!

September 2012 W1AW QUALIFYING RUNS

W1AW Qualifying Runs are 10 PM EDT Friday, September 7 (0200Z September 8) and 7 PM EDT (2300Z) Wednesday, September 19 (10-40 WPM). The West Coast Qualifying Runs will be transmitted by station K6KPH on 3581.5, 7047.5, 14047.5, 18097.5 and 21067.5 kHz at 2 PM PDT (2100Z) Saturday, September 15. Unless indicated otherwise, speeds are from 10-35 WPM.

Strays

Hams Gather in the North Pacific

Aboard Cunard's *Queen Mary 2*, on a cruise from Sydney to Hong Kong and ports between, Judy, K4LEK, and I put an announcement in the daily *Programme* for any Amateur Radio operators to meet in one of the lounges. We had done this twice before with limited success, but the experience is very rewarding and one of the things we enjoy about ham radio.

This time four hams joined us, three Australians and one Scot. In addition, a seasoned commercial land telegraph operator, not a ham, joined us. We had a very enjoyable first meeting. The telegraph operator was surprised to hear that many of us were active on CW.

Our group included Roy, G4OLA, a member of the RNARS (Royal Navy Amateur Radio Society); Mick, VK2ETC, a Field Technician with Lockheed Martin Australia; David, VK5ABI, a senior unit controller of a power plant, and Greg, VK2FBAA, who spends time camping in the outback. Judy is a development officer for non-profit organizations and I am retired from a career in higher education and as an artist.

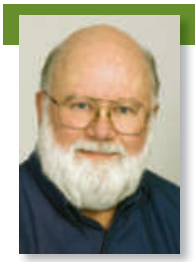
On a cruise ship like the *QM2* you can keep very busy or just sit and relax all day. This day I was SWLing on deck with my Kenwood TH-F6, Miracle antenna tuner and long a wire on 20 meters thrown over the side. In the North Pacific there are call signs I rarely hear never mind work and some I have never heard, like BG5CLC, B4TB and UAØUAN. [Before *transmitting* onboard a cruise ship, hams need to obtain permission to do so from the cruise line. — *Ed.*]

A gathering of ham radio ops aboard the *Queen Mary 2* in the North Pacific. From left to right, K2LEK, G4OLA, K4LEK, VK5ABI and VK2ETC. VK5FBAA and N6JVM are not in the photo. [photo courtesy Mike Wodynski, K2LEK]

At our third meeting, just before Hong Kong, where most of us were disembarking for home, San, N6JVM, appeared. Licensed but currently inactive, she made a late but welcomed addition to the group. We exchanged contact information and committed to carrying on this idea of cruise ship ham meetings.

Setting up a meeting is easy to do. Just contact the Entertainment Director or one of his staff and request a short announcement in the *activities program*. There are many announcements, so do something that a ham will immediately read through the QRM. Ours was ***CQ CQ! Ham Radio Operators Gathering.*** *An informal get together for ham radio operators on board the QUEEN MARY 2 in the "name" lounge. See you there! 73.*

Short, sweet and very rewarding. — *Mike Wodynski, K2LEK*



John Dilks, K2TQN, k2tqn@arrl.org

Historic Wireless Station

From CQD MGY to CQWW 160, WSC has a long and storied history.

In August 1901 Marconi built a station at Siasconset, on the island of Nantucket. The station's call letters were MSC (for Marconi Siasconset). This station was to become one of the most historic of the early wireless stations. (See my August 2010 column).[1]

"During the most famous sea-going disaster of the twentieth century, the Siasconset station played a critical role. Late on the night of April 14, 1912, duty operator Matt Tierney received distress signals from the sinking Titanic. Siasconset was the first [US] wireless station to receive them, and he immediately alerted all other stations of the tragedy.

"On September 25, 1914, the government closed it for an alleged violation of neutrality laws. A Navy ensign assigned as censor had reported the violation. The company questioned the legality of this closure but was overruled by the government. On January 17, 1915, the station reopened under Navy supervision, which lasted for the duration of the war."[2]

[1]J. Dilks, K2TQN, "Vintage Radio," *QST*, Aug 2010, pp 94-95.
[2]*Historic Nantucket*, Vol 38 no. 3, Fall 1990, pp 36-39 (**www.nha.org/history/hn/HN-fall90-wireless.htm**).

These are the operating positions in the old WSC. Note that each position has a mill (a typewriter that only prints capital letters) next to it. [K2TQN photo]

In 1920 the International Radio Telegraph Company announced its opening of WSC at Siasconset. In 1922 RCA announced its ownership of WSC, moving it to Tuckerton, New Jersey in 1924. In 1955, RCA again moved WSC to West Creek, 4 miles north of Tuckerton. WSC was finally closed May 8, 1978 and the site was sold to Mobile Marine Radio, Inc (MMR).

More WSC History from John Crovelli, W2GD

Back in the early 1980s WSC was owned by the same fellow (MMR) who owned other coastal stations in Mobile, Alabama, (WLO) and a station (KHO I think) just north of Seattle, Washington. A company called Telaurus Communications purchased the New Jersey and Washington properties in 2000/2001 with the intent of using the sites to provide HF digital communications with commercial shipping. Newer vertical dipoles were installed on some of the telephone poles out back in the marsh in 2001 by Telaurus to pursue this idea (Force 12 custom built these commercial antennas). For a number of reasons the HF approach was eventually abandoned.

This is the old WSC headquarters located on US Route 9, 2 miles north of the WSC site. [Raymond Brooks, K2LTX, photo]

WSC's Ownership Passes to a Ham

As time passed Telaurus no longer needed the asset and decided to sell the property. I got wind from fellow 160 CW team member Bob Schenck, N2OO, (who lives near the site) that Bob Wick, N2HM, was interested in purchasing the site for his FM station WYRS. I put him in contact with Telaurus management and a deal was struck. Full disclosure, I was one of the original employee's of Telaurus Communications and worked at the WSC site from time to time during the early 2000's, and N2OO had become a sort of local caretaker for us.

Our first 160M entry from the site took place in the winter of 2001-2002 before the property was sold to WYRS. And we've entered 160 meter CW contests from the WSC site every winter ever since. We share our 160M antennas with the co-located SJDXA (**www.sjdxa.org**) guys for their annual entry in CQWW 160 PH. Our 160 team has been at this since 1987, previously operating from my home station in Hunterdon Country, then later from the USCG base on Sandy Hook. We've had 40 different operators join these efforts over the years, most of them from NJ and PA, but some from other places, and have amassed 83,000 160M CW contest QSO's over the years. Many of the operators are

Here is a photo of Ray Brooks, K2LTX (SK), typing messages on a mill at one of the WSC operating positions. He was the chief operator there for several years after he left the sea. [Ray Brooks, K2LTX, photo]

One of SJDXA's biggest activities is the DXpedition QSL Manager Projects at the site. This picture shows (from left), Bob Pantazes, W2ARP; Bob Tomkovich, K2RET, and Bob Schenck, N2OO, at work opening piles of QSL mail for the Malpelo Island DXpedition, HKØNA, in 2012 at the club station site (WYRS/WSC). [Robert Schenck, N2OO, photo]

The new WSC building built on the old foundation in 1978. [Robert Wick, N2HM, photo]

A team working the 2011 CQ 160 contest. From the front, Gerald Kersus, W1GD; Dan Dembrowski, W2NO; Bill Keller, W2RQ; Craig Thompson, K9CT, and John Crovelli, W2GD, sleeping in the chair between shifts. [photo courtesy John Crovelli, W2GD]

currently or have been members of the Frankford Radio Club (**www.gofrc.org**).

I gave a presentation at the 2012 Top Band dinner in Dayton this spring. An Adobe version of the talk about our decades of 160M team contesting can be found at **http://topbanddinner.com/attachments/2012_W2GD.pps**. Many of the former WSC site pictures are in the presentation. It also documents our contesting accomplishments from this premier location the past 10 years.

South Jersey DX Association

Bob Schenck, N2OO, explains how it works:

> Two groups share the site, although SJDXA is a regular "DX Club" that meets at the site monthly and for occasional QSL Manager work parties (ie 3YØX, VU7RG/VU7MY, K5D and HKØNA DXpeditions). The W2GD gang is a group of contesters who operate under the umbrella of The Frankford Radio Club (FRC). But FRC does not use the site for meetings and such. W2GD heads a group of avid 160 CW Contesters who have designed, installed, and maintained the 160 meter antenna farm at the site. SJDXA supports them by providing assistance as able and as needed. Several are members of both clubs/groups but not all on either side. W2GD's team uses the 160 antenna farm in the ARRL® 160, Stew Perry 160 and the CQWW 160 CW Contests. SJDXA uses the 160 antenna farm every year in the CQWW 160 SSB Contest. The W2GD team members come from "all over," whereas most (not all) of the SJDXA N2CW team members come from Ocean, Atlantic and Cape May counties, although we welcome new members from anywhere anytime, especially Southern New Jersey.

SJDXA and N2CW won first place in the USA in the 2004, 2005 and 2007 CQWW 160 SSB Contest/Multi-Operator Class from the WSC site!

Antennas used by both groups are: a 300 foot 55G tower in a tidal marsh that supports a custom designed 3 element vertical transmit array at 240 feet and 50 acres of wooded fresh water marsh for seven 560-900 foot Beverages and a 20 foot vertical 2000 feet away for receiving.

Vic Poor, W5SMM, Receives ARRL President's Award

On July 9, Victor (Vic) Poor, W5SMM, of Melbourne, Florida, was awarded the ARRL President's Award at the Platinum Coast Amateur Radio Society's (PCARS) monthly meeting that was attended by nearly 100 hams and non-hams, many from out of town. There have been only a handful of recipients of this prestigious award.

Victor Poor, W5SMM, holding the ARRL President's Award and a hardbound copy of *The ARRL Handbook* signed by the ARRL staff. The award was presented recently by Eric Smitt, K9ES. [Dan Fisher, AI4GK, photo]

Poor — an ARRL member — developed an active interest in ham radio while still in high school and became W6JSO in 1951. He has also held the calls AH6AXV and K3NIO. He quickly developed an affinity for RTTY and later other digital modes of interest in Amateur Radio.

Poor has been instrumental in the development of many hardware and software innovations that are at the heart of modern day computing and communications technology, used both in Amateur Radio and in industry.

His early RTTY work focused on improving the designs of modulators, demodulators, and filters to improve the error rates achievable with RTTY in those days. This work continued into the development for schemes for simple message networking for amateur traffic before the availability of affordable PCs.

During the '70s and '80s new digital technologies, including packet, AMTOR and lower-cost computers became available. These advances motivated Poor to further improve digital transmission networking techniques. This included APLINK, a robust automatic global store-and-forward system that led the ARRL to include the system for use in their National Traffic System (NTS).

With the advent of widely available Internet service and continued improvements in signal processing using PCs and dedicated signal processing chips, including PACTOR and WINMOR, in 1999 Poor organized a volunteer amateur development team to replace APLINK with a much more advanced amateur message forwarding system that integrates with the Internet and other mail systems, handles multiple destination addresses, and accepts data files of any format. The system is named Winlink 2000 (WL2K) and is maintained and managed by the Winlink Development Team (WDT). Poor remains the principal architect of the system. This system has blossomed today to a major amateur-supported emergency communications network used by ARES and many government agencies including MARS, federal, state, county and city agencies, and NGOs.

In his professional career Poor has been instrumental in the development of many products that we take for granted today. He credits his interest in ham radio as the driving force behind his success in the commercial arena.

The ARRL Board of Directors voted to create the President's Award in 2003. It is awarded to an ARRL member or members who "have shown long-term dedication to the goals and objectives of ARRL and Amateur Radio" and who have gone the extra mile to support individual League programs and goals. Nominations for the award come from ARRL directors and are approved by the ARRL President and the Executive Committee.

President Kay Craigie's accompanying letter stated, in part: "It is my pleasure and honor to confer upon you the ARRL President's Award….Your contributions to the development of digital communications systems in the Amateur Radio Service have significantly enhanced the ability of our radio service to provide assistance during disasters. Many other amateurs active in emergency communications attribute their own accomplishments to your mentoring….

"As a result of your long, distinguished career in Amateur Radio and communications technology, you have more than earned the appreciation that is represented by this award from the American Radio Relay League."

Steve Waterman, K4CJX, Assistant Director of the ARRL's Delta Division, summed up Poor's humility: "I could have added many more accomplishments to that list," said Steve. "The only thing Poor really wants to know about is if something doesn't work." — *Dan Fisher, AI4GK*

QST congratulates…

ARRL member Grant H. Morine, W4GHM, a native of Wilmington, North Carolina, who has been commissioned as an Ensign in the US Navy. Grant was the 2007 recipient of the Young Ham of the Year award.

ARRL member Steve Johnston, WD8DAS, of Fitchburg, Wisconsin, who has earned a Master of Business Administration degree from the University of Wisconsin in Madison.

ARRL member Don Keith, N4KC, whose latest novel (and 24th book), *Firing Point*, has been published by Signet/Penguin.

ARRL member Ray Killian, KC7ZUM, of Cle Elum, Washington, who earned his Amateur Extra class license in April at age 92. In addition to being very active with local ham groups, Ray is a leader in the local VFW. — *Gloria Sharp, WA7GYD*

ARRL member Second Lieutenant John Shipp, KC8TPN, the fifth generation of the Shipp family to serve in the Army. Jerry, W1SCR, and Cindy, KB8WEI, pinned Lieutenant bars on their son in June. Lt Shipp was a 2008 winner of an ARRL scholarship toward his Criminal Justice degree at the University of Cincinnati.

Ham exam al fresco: Some may have found it hard to concentrate with this view of Monterey Bay as the backdrop to our ham exam, given at our Field Day site, but it was very successful nonetheless. The VEs: Eric Cain, AE6HZ; Suellene Petersen, K6CPA; Jerry Inman, AE6I, and Dan Selling, N6RJX. The examinees: Ivan Tenorio-Amador, KJ6WLB; George H. Lane III, KJ6WKG; Stephen T. Martin, KI6KYN; Jason Ragland, KJ6WLF, and Walter Condley, KJ6AQQ. Also shown is Chris Angelos, KG6DOZ. — *Suellene Petersen, K6CPA* [Suellene Peterson, K6CPA, photo]

Mary M. Hobart, K1MMH, k1mmh@arrl.org

ARRL Foundation Presents the 2012 Scholarship Winners

The ARRL Foundation is proud to present the winners of the scholarship awards for the 2012-2013 academic year. The value of the 74 scholarship awards for 2012 totals more than $82,200. These scholarship winners join the 2012 Goldfarb Scholarship winner, Jill Niemeier, ACØMX. The Board of Directors offers its heartiest congratulations to each of these bright young hams who represent the future of Amateur Radio. The application period for the 2013 Scholarship awards opens October 1, 2012.

Photos not available:
Lauren Rice, KC2LR, Dayton Amateur Radio Association Scholarship
Weston Scow, KE7GEN
Carole J. Streeter (KB9JBR) Scholarship

James Almeter, W4MJA
Northern California DX Foundation Scholarship

Cody Anderson, KI4FUV
Albert H. Hix, W8AH, Memorial Scholarship

Connie Bird, NR4CB
Orlando HamCation™ Scholarship

Katherine Boyle, KDØDWZ
PHD Scholarship

Kenneth Brackett, KC9WKB
Perry F. Hadlock Memorial Scholarship

Caitlin Brady, W3CJB
You've Got A Friend In Pennsylvania Scholarship

Alex Brech, KCØYLD
Earl I. Anderson Scholarship

Jeremy Breef-Pilz, KB1REQ
New England F.E.M.A.R.A. Scholarship

Nicholas Brennan, KD7YDD
Mary Lou Brown Scholarship

Morgan Burcham, KE5VFK
Fred R. McDaniel Memorial Scholarship

Gregory Burkhart, KCØIID
Bill, W2ONV, and Ann Salerno Memorial Scholarship

Meagan Chriswell, KDØNSS
Richard W. Bendicksen, N7ZL, Memorial Scholarship

Sterling Coffey, NØSSC
Ray, NØRP, & Katie, WØKTE, Pautz Scholarship

Michael Cox, KF7EEC
William Bennett, W7PHO, Scholarship

Matthew D'Arcy, KC2ZCI
New England F.E.M.A.R.A. Scholarship

Douglas Dawson, KD5ZBS
Ted, W4VHF, and Itice, K4LVV, Goldthorpe Scholarship

James Draper, KJ6ELZ
Charles N. Fisher Memorial Scholarship

Kylie Elwood, KE7NTS
ARRL Rocky Mountain Division Scholarship

Brian Ennis, KJ4IXD
Henry Broughton, K2AE, Memorial Scholarship

Joshua Epley, KC9LHA
Edmond A. Metzger Scholarship

Leo Fahmie, KG6UJK
Charles N. Fisher Memorial Scholarship

Zachary Feinberg, KC2RSS
Scholarship of the Morris County Radio Club of New Jersey

William Freeman, N4NJJ
Norman E. Strohmeier, W2VRS, Memorial Scholarship

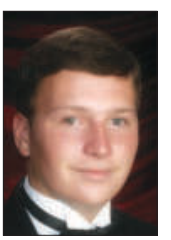
Forrest Gasdia, AB1LG
Dr. James L. Lawson Memorial Scholarship

Tinsley Griffin, KI4HAY
Gwinnett Amateur Radio Society Scholarship

David Hall, KCØWNP
Irving W. Cook, WAØCGS, Scholarship

Joshua Hallfrisch, KD8KKR
K2TEO Martin J. Green, Sr. Memorial Scholarship

Mark Hamby, KC9VFF
New England F.E.M.A.R.A. Scholarship



Logan Harbin, KI4RIN
Outdoor Hams Scholarship

Jason Harris, KJ4IWX
L. Phil and Alice J. Wicker Scholarship

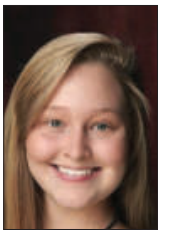
Christopher Hastreiter, AB9ZB
Six Meter Club of Chicago Scholarship

Robert Hoops, W3EGL
Earl I. Anderson Scholarship

Jordan Hoover, KC9PXM
Chicago FM Club Scholarship

Nina Jones, KF5CSC
Magnolia DX Association Scholarship

William Lian Kelly, KDØHDF
Bill, W2ONV, and Ann Salerno Memorial Scholarship

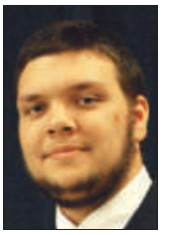


Erin King, AK4JG
Henry Broughton, K2AE, Memorial Scholarship

Ashley Krebs, KF5BFR
Jackson County Amateur Radio Association Scholarship

Sherman Lam, KJ6PJH
L.B. Cebik, W4RNL, and Jean Cebik, N4TZP, Memorial Scholarship

Tyler Lehman, KC9FKE
David Knaus Memorial Scholarship



Dillon Lisk, KJ4TIP
Henry Broughton, K2AE, Memorial Scholarship

Jonathan Mayo, AB3FX
Dayton Amateur Radio Association Scholarship

Carey McCachern, N5RM
Tom and Judith Comstock Scholarship

Nathan McFerrin, KJ4FDV
Charles Clarke Cordle Memorial Scholarship

Samantha Nield, KF7CNG
ARRL General Fund Scholarship

Kjerstie Olson, KI6VNG
ARRL General Fund Scholarship

Austin Phelps, AJ4QQ
IRARC Memorial, Joseph P. Rubino, WA4MMD, Memorial Scholarship

William Probst, KJ4RXM
Dayton Amateur Radio Association Scholarship

Alyssa Rios, KI6EEK
L.B. Cebik, W4RNL, and Jean Cebik, N4TZP, Memorial Scholarship

Thomas Ritter, WB5QZE
Mississippi Scholarship

Marc Robbins, KC2MJD
Henry Broughton, K2AE, Memorial Scholarship

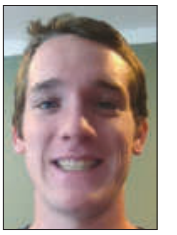
Kevin Rocheleau, KD8DJB
Dayton Amateur Radio Association Scholarship

Brenton Salmi, KB1LQD
New England F.E.M.A.R.A. Scholarship

Bryce Salmi, KB1LQC
New England F.E.M.A.R.A. Scholarship

Paula Satcher, KCØQBS
Paul and Helen L. Grauer Scholarship

Jeffrey Schlichter, KI4AJG
Don Riebhoff Memorial Scholarship



Alexander Scullin, KI6LXD
Northern California DX Foundation Scholarship

Blake Scullin, KI6LWV
Northern California DX Foundation Scholarship

Divya Seshadri, W2DIV
YASME Foundation Scholarship

Blake Silverthorn, KE5CIF
Challenge Met Scholarship

Linnea Simcik, KB1HTA
Androscoggin Amateur Radio Club Scholarship

Emelia Smith, KI4KOJ
Wayne Nelson, KB4UT, Memorial Scholarship

Gregg Sperling, KB9E
L.B. Cebik, W4RNL, and Jean Cebik, N4TZP, Memorial Scholarship

Laura Steinberger, W8JUZ
YASME Foundation Scholarship

Robert Stevens, KC9LIR
Earl I. Anderson Scholarship

Emily Stewart, KCØPTL
Paul and Helen L. Grauer Scholarship

Samuel Turner, KB1PHP
New England F.E.M.A.R.A. Scholarship

Robert Weiss, KF7QNN
Mary Lou Brown Scholarship

Michael Wertz KE7FXF
Central Arizona DX Association Scholarship

Lindsay Westerfield, KD5UVL
Louisiana Memorial Scholarship

Colleen Widmaier, KI4YVP
Gary Wagner, K3OMI, Scholarship

Matthew Williams, W1MAT
Yankee Clipper Contest Club Youth Scholarship

Andrew Young, KD8JAB
Thomas Porter, W8KYZ, Scholarship Honoring Michael Daugherty, W8LSE

Now — More Than Ever

Mike Burg, N8QQN

As the nation prepares to recognize the anniversary of the attacks on our country, I see, from a public safety aspect, that we are still ill prepared for a terrorist attack. Remember, the most common complaint on that day was poor communications between the responders and between departments.

It doesn't have to be an attack, either. Just look at the wild fires, tornados, hurricanes, earthquakes and floods this country has dealt with. Both of these, planned attacks and natural disasters, can and very often do severely disrupt the infrastructure of the local area they impact.

Scenario

Now let's imagine that someone plans to strike the infrastructure with planned, synchronized attacks. Imagine public safety trying to operate with no electricity, cell phones, Internet capabilities or landline telephone. Sure, we used to work without them but my guess is if you held a drill and asked the local police, fire and EMS to operate for 24 hours with none of those four, there would be chaos.

Imagine public safety trying to operate with no electricity, cell phones, Internet capabilities or landline telephone.

A structured, well planned and executed attack on the infrastructure would be devastating for an extended period and, I'm sad to say, it probably wouldn't be difficult to do. It's rather difficult to hide electrical substations, cell phone towers and telephone equipment.

We now have a populace who are in the dark and cannot communicate with loved ones. They begin to panic and call 911 — but there is no answer! If the attacker wanted to add extra stress the attack could be executed during a Northeast winter or a Southwest summer.

I'm not about to suggest that Amateur Radio has the "red cape" to make everything normal again. What I am suggesting is that now, more than ever, Amateur Radio operators need to plan and prepare to assist public safety when the time comes. We need to take our public service commitment to the next level.

In the past, during widespread power outages, I've overheard ham conversations go something like this:

"I think they have a generator over there, I have some coax here, he might have a regulated power supply at his place."

How efficient is that? What kind of disaster preparedness presence does that project to public safety officials?

Action Areas

Because of the numerous repeaters around and the ingenuity of many Amateur Radio operators, we can make a difference in disaster communications. Before we do that, we need to look at three areas of concern.

Equipment. If we don't have functional equipment stored in a place where numerous hams can access it then we fail before we even begin. The example I gave is an extreme, but it happens. By preplanning now and seeking out donations even a small group of hams can make a major contribution. Put what you need together now — before it's needed — and store it someplace safe.

Put what you need together now — before it's needed — and store it someplace safe.

I have a 2 meter station set up in my police department. That's all fine and good, but what happens if a natural disaster comes through and takes down that antenna — do I have a "Plan B"? Yes, I do. Our area hospitals have 2 meter stations set up so that in a disaster they can communicate hospital to hospital.

Training. While just having Amateur Radio operators available is an asset to public safety, you can increase your credibility by taking additional training such as the ARRL® Amateur Radio Emergency Communication courses (**www.arrl.org/emergency-communications-training**).

You can also go online to FEMA, which has two types of free online training courses that you can take. The National Incident Management System (NIMS) courses, of which there are 16, can be found at **www.fema.gov/emergency/nims** and the FEMA Independent Study Program (ISP) courses, of which there are over 100! There is an ISP course to fit your personal situation and needs at **training.fema.gov/IS/crslist.asp**. All of this additional training adds to your credibility as a disaster communications operator. It will also help you better understand what the police, fire or EMS needs, and why, during a disaster.

People. Last but certainly not least, we need good, dedicated, accountable, well-trained people to accomplish all of this. People to put supplies in order prior to an event, people to assist in event planning and people to support drills to test themselves and their equipment. They must also build trust and a strong working relationship with public safety prior to an event.

I don't mean to paint the rosy picture that if all Amateur Radio operators train and work closely with public safety agencies all disasters will be without problems — that's not realistic. There will be problems — things will go wrong. But by preplanning and working together prior to incidents we can minimize those problems and improve our response for the betterment of all.

Remember, if you fail to plan, you've planned to fail.

Chief Mike Burg, N8QQN, has been a policeman for 35 years and is currently serving as Chief of the Rittman, Ohio Police Department. Mike has been a ham since 1992. His main interest is public service/public safety. He has passed the AREC Level I, II and III courses and enjoys operating 6 meters as well. His wife, Ellen, is not a ham but she is supportive of his hobby. He is a graduate of the FBI National Academy — 168th Session. When he is not on the radio, Mike likes cruisin' town in his 1967 Pontiac GTO. He can be reached at 639 Crestwood Ave, Wadsworth, OH 44281-1930, **mburg@neo.rr.com**.

Op-Ed Policy

The purpose of Op-Ed is to air member viewpoints that may or may not be consistent with current ARRL policy.

1) Contributions may be up to 900 words in length.

2) No payment will be made to contributors.

3) Any factual assertions must be supported by references, which do not necessarily have to be included in the body of the article to be published.

4) Articles containing statements that could be construed as libel or slander will not be accepted.

5) The subject matter chosen must be of general interest to radio amateurs, and must be discussed in a way that will be understandable to a significant portion of the membership.

6) With the exception that the article need not be consistent with League policy, the article will be subject to the usual editorial review prior to acceptance.

7) No guarantee can be made that an accepted article will be published by a certain date, or indeed, that it will be published at all; however, only articles that we intend to publish will be accepted, and any article we have decided against publishing will be returned promptly.

8) Send your contributions to ARRL Op-Ed, 225 Main St, Newington, CT 06111 or via e-mail to **qst@arrl.org** (subject line Op-Ed).

Convention and Hamfest Calendar

Gail Iannone, giannone@arrl.org

Abbreviations
Spr = Sponsor
Tl = Talk-in frequency
Adm = Admission

Arizona (Marana) — Oct 6 D F H R S T V
7 AM-1 PM. *Spr:* Oro Valley ARC (with assistance from Old Pueblo RC). Marana Regional Airport, 11700 W Avra Valley Rd. Tucson Hamfest and Fly-In. *Tl:* 146.62, 444.1 (both 156.7 Hz). *Adm:* $1. Tables: $5. Randy Malick, KFØX, 2479 E Spring Pioneer Ln, Oro Valley, AZ 85755; 520-247-9999; fax 520-232-5413; **randy@kf0x.com**; **w0hf.com**.

Arkansas (Little Rock) — Sep 15
D F H R S T V
8 AM-3 PM. *Spr:* Central Arkansas Radio Emergency Net (CAREN). Catholic High School, 6300 Father Tribou St. All-Arkansas Hamfest. *Tl:* 146.94. *Adm:* $5. Tables: $10. Mark Barnhard, KD5AIV, 12563 Southridge Dr, Little Rock, AR 72212; 501-221-3909; **mbarnhard@aristotle.net**; **www.carenclub.com**.

Colorado (Longmont) — Sep 23 D F H R V
8 AM-1 PM. *Spr:* Boulder ARC. Boulder County Fairgrounds, 9595 Nelson Rd. 59th Annual Event, displays, demonstrations. *Tl:* 146.7. *Adm:* $5, under 13 free with paying adult. Tables: 6-ft with chairs, advance $10, door $15. Michael Derr, W3DIF, 13815 Meadowbrook Dr, Broomfield, CO 80020; 303-404-2161; **mderr44995@aol.com**; **www.qsl.net/w0dk**.

Florida (Odessa) — Sep 22 F H R T
8 AM-1 PM. *Spr:* Suncoast ARC. Gunn Hwy Flea Market, 2317 Gunn Hwy. Pasco County Hamfest. *Tl:* 146.64. *Adm:* $5 (nonham spouses and under 12 free). Tables: $1 (plus admission). Ron Wright, N9EE, 2265 Evenglow Ave, Spring Hill, FL 34609; 352-683-4476; **mccrpt@tampabay.rr.com**; **groups.yahoo.com/group/sarcmail**.

Florida (Orlando) — Sep 15 F H R T
Set up 7 AM; public 8 AM-2 PM. *Spr:* Bahia Shrine ARC. Bahia Shrine Center, 2300 Pembrook Ave. *Tl:* 147.39 (103.5 Hz). *Adm:* $4. Tables: $6. Robert Chernesky, W1ZGE, 2615 Alena Pl, Lake Mary, FL 32746; 407-302-6910; **cherneskyr@bellsouth.net**.

Florida (Punta Gorda) — Sep 15 F H R T
8 AM-2 PM. *Spr:* Peace River Radio Assn. Tropical Gulf Acres Clubhouse, 28268 Pasadena Dr. 5th Annual N4XJQ Lambiefest. *Tl:* 147.255 (136.5 Hz). *Adm:* $2. Tables: $5. Geahardt (Gay) Woster, K7CXW, 1510 Aqui Esta Dr, Punta Gorda, FL 33950; 941-575-9210; **k7cxw@arrl.net**; **www.w4dux.net**.

ARRL/TAPR DIGITAL COMMUNICATIONS CONFERENCE

September 21-23, Atlanta, GA
H S

The 2012 ARRL/TAPR Digital Communications Conference will be held at the Sheraton Gateway Hotel Atlanta Airport, 1900 Sullivan Rd, Atlanta, Georgia; tel 770-997-1100. Technical and introductory sessions Friday and Saturday followed by a Friday evening Social and Saturday evening Banquet. The Sunday seminar focuses on a topic and provides an in-depth four-hour presentation by an expert in the field. Register in advance by calling the Tucson Amateur Packet Radio (TAPR) at 972-671-8277, or online at **www.tapr.org/dcc**.

Coming ARRL Conventions

August 18
West Virginia State, Weston*

August 18-19
Southeastern Division, Huntsville, AL*

August 19
Kansas State, Salina*

August 24-26
New England Division, Boxborough, MA*

August 25
DXCC East, Frederick, MD*

August 26
Western Pennsylvania Section, New Kensington*

September 10-13
RV Radio Network Fall Rally, St Cloud, MN

September 14-15
W9DXCC, Elk Grove Village, IL

September 15
Virginia Section, Virginia Beach

September 21-23
ARRL/TAPR Digital Communications, Atlanta, GA

September 22
Washington State, Spokane Valley

September 22-23
Illinois State, Peoria

September 28-29
SEDCO/W4DXCC, Pigeon Forge, TN

October 12-14
ARRL National (Pacificon), Santa Clara, CA
Mid-Atlantic & Eastern VHF, Bensalem, PA

October 13
Iowa State, Sergeant Bluff

October 13-14
Florida State, Melbourne

November 3
Fall TechFest, Lakewood, CO

November 3-4
Georgia State, Lawrenceville

November 4
Iowa Section, Davenport

November 10
Alabama State, Montgomery

*See August *QST* for details.

Georgia (Swainsboro) — Aug 25
D F H R T V
9 AM-5 PM. *Spr:* Southeast ARA. Varner 4-H Center, 220 S Circle Dr. 1st Annual Hamfest. *Tl:* 147.0, 146.715 (88.5 Hz). *Adm:* advance $4, door $5. Tables: $5. Ronald Hill, N4SFU, 51 Bobwhite Rd, Twin City, GA 30471; 478-455-1909; fax 478-763-2740; **rhill2@pineland.net**; **www.kj4mks.com**.

W9DXCC CONVENTION

September 14-15, Elk Grove Village, IL
D H Q R S

The W9DXCC Convention (60th W9DXCC DX Convention and Banquet), sponsored by the Northern Illinois DX Assn, will be held at the Holiday Inn-Elk Grove Village, 1000 Busse Rd (Rte 83). Doors are open Friday eve for registration and Welcome Reception at 7:30 PM, Saturday registration at 8 AM, convention begins at 9 AM. Features include forums and presentations with world-renowned speakers; DX Basics Class (Friday, 1-5 PM; $25 by September 6, $30 after September 6); vendor displays; DXCC, WAS and VUCC card checking; CQ Awards; CW Copying Contest (Saturday, 5 PM); W9D Special Event Station; Hospitality Suites (Friday and Saturday eves at 10 PM), banquet (Saturday, 6:30 PM; guest speaker Fred Laun, K3ZO). Admission for full convention and banquet is $60 by September 6, $65 after September 6; convention only $35 by September 6, $40 after September 6; banquet guests $35 by September 6, $40 after September 6. Contact Paula Uscian, K9IR, 4965 Castaway Ln, Barrington, IL 60010; 847-358-6644; **pmuscian@sbcglobal.net**; **www.w9dxcc.com**.

ILLINOIS STATE CONVENTION

September 22-23, Peoria
D F H Q R S T V

The Illinois State Convention (54th Peoria Superfest), sponsored by the Peoria Area ARC, will be held at the Exposition Gardens, 1601 W Northmoor Rd. Doors are open for setup Friday 1-8 PM; public Saturday flea market 6 AM-dusk, indoor commercial exhibits 8 AM-4 PM; Sunday flea market 6 AM-1 PM, indoor commercial exhibits 8 AM-1 PM. Features include Amateur Radio/Computer/Electronics Show, flea market, commercial vendors, tailgating, numerous forums and special meetings, handicapped accessible, DXCC card checking (Saturday at ARRL booth), VE sessions (Saturday only, 11:30 AM-1 PM), refreshments. Talk-in on 147.075 (103.5 Hz), 146.76. Admission is $6 (with 2 stubs) in advance and $8 (with single stub) at the door, good all weekend; under 13 free. Tables are $20-$25; outdoor flea market spaces $5 per space. Contact John Coker, N9FAM, 133 Vonachen Ct, E Peoria, IL 61611; 309-369-7428 or info line 309-692-3378; **n9fam@comcast.net**; **www.peoriasuperfest.com**.

Indiana (Bedford) — Oct 6 D F H R T V
8 AM-2 PM. *Spr:* Hoosier Hills Ham Club. Lawrence County Fairgrounds, 11261 US Hwy 50 W. 51st Annual Hamfest. *Tl:* 146.73 (107.2 Hz). *Adm:* $5. Tables: $10. W. W. Warren, KB9TMP, Box 891, Bedford, IN 47421; 812-279-9429; **hoosier.hills.ham.club@gmail.com**; **www.w9qyq.org**.

Iowa (West Liberty) — Oct 7 D F H R T V
7 AM-1 PM. *Sprs:* Muscatine and Washington Area ARCs. Muscatine County Fairgrounds, 101 N Clay St. 28th Annual Southeast Iowa Hamfest. Annual Wiener and Brat Roast (Saturday, Oct 6, 6 PM). *Tl:* 146.91 (192.8 Hz). *Adm:* advance $6, door $7. Tables: $10

D = DEALERS / VENDORS
F = FLEA MARKET
H = HANDICAP ACCESS
Q = FIELD CHECKING OF QSL CARDS
R = REFRESHMENTS
S = SEMINARS / PRESENTATIONS
T = TAILGATING
V = VE SESSIONS

(includes electricity). Tom Brehmer, NØLOH, 1114 E Tenth St, Muscatine, IA 52761; 563-263-3097; **n0loh@arrl.org**; **kc0aqs.org/hamfest.html**.

Kentucky (Bowling Green) — Oct 6 D H V
7:30 AM-2:30 PM. *Spr:* Kentucky Colonels ARC. Sloan Convention Center, 1021 Wilkenson Trace. Vette City Hamfest. *TI:* 147.33 (107.2 Hz). *Adm:* $6. Tables: $8. Ed Gann, N4HID, 445 Elrod Rd, Bowling Green, KY 42104; 270-843-8911; **edwardgann@insightbb.com**; **vettecityhamfest.com**.

Kentucky (Richmond) — Sep 15
D F H Q R S T V
8 AM-3 PM. *Spr:* Central Kentucky ARS. Madison County Fairgrounds, 3237 Old KY Rte 52. *TI:* 145.37 (192.8 Hz). *Adm:* $6. Tables: advance $5, door $6. Mike Rogers, KE4ISW, 144 Allen Douglas Dr, Richmond, KY 40475; 859-624-9156; **ke4isw@arrl.net**; **www.qsl.net/ckars/hamfest**.

Maine (Windsor) — Sep 8 D F H Q R T V
8 AM-1 PM. *Spr:* Augusta ARA. Windsor Fairgrounds, Rte 32. *TI:* 146.88 (100 Hz). *Adm:* $5. Tables: Free. Bill Crowley, K1NIT, 150 Maple St, Farmingdale, ME 04344; 207-512-0312; **k1nit@arrl.net**; **www.w1tlc.com**.

Maryland (West Friendship) — Oct 7
D F H Q R S T V
6 AM-2 PM. *Spr:* Columbia ARA. Howard County Fairgrounds, 2210 Fairgrounds Rd. CARAFest. *TI:* 147.135, 147.39 (156.7 Hz). *Adm:* $6. Tables: $20. Dave Prestel, W8AJR, 10160 Tanfield Ct, Ellicott City, MD 21042; 443-812-4403; **dave.prestel@gmail.com**; **www.carafest.org**.

Massachusetts (Cambridge) — Sep 16. Nick Altenbernd, KA1MQX, 617-253-3776 (9 AM-5 PM); **w1gsl@mit.edu**; **www.swapfest.us**.

Michigan (Adrian) — Sep 16 D F H R T V
8 AM. *Spr:* Adrian ARC. Lenawee County Fairgrounds, 602 N Dean St. 40th Annual Hamfest. *TI:* 145.37 (85.4 Hz). *Adm:* $5. Tables: $10. Mark Hinkleman, NU8Z, 108 E Kilbuck St, Tecumseh, MI 49286; 517-423-5906; **cqnu8z@comcast.net**; **www.w8tqe.com/hamfest.htm**.

RV RADIO NETWORK FALL RALLY

September 10-13, St Cloud, MN
F V

The RV Radio Network Fall Rally, sponsored by the RV Radio Network, will be held at the St Cloud Campground and RV Park, 2491 2nd St SE. Features include flea market, Amateur Radio demonstration, Special Event Station, VE sessions, lots of fun and events are being planned. Talk-in on 146.48, 146.94 (100 Hz). Rally fee is $35 per person (includes pancake breakfast, biscuit and gravy breakfast, one supper). For camping reservations and rates call 800-690-7045 (mention RV Radio Rally for a 20% discount). Contact Pat Ryan, N9JIX, 4728 S County Rd C, Superior, WI 54880; 218-590-4665; **n9hnw@aol.com**; **www.RVRadioNetwork.com**.

Mississippi (Starkville) — Oct 5-6
D H R S T V
Friday 8 AM, Saturday 7 AM-2 PM. *Sprs:* ARRL Mississippi Section and MFJ Enterprises. McKee Park/MFJ Plant, 300 Industrial Park Rd. ARRL Day in the Park/MFJ 40th Anniversary, tours of MFJ Plant. *TI:* 146.805. *Adm:* Free. Tables: Free. Malcolm Keown, W5XX, 64 Lake Circle Dr, Vicksburg, MS 39180; 601-636-0827; **w5xx@arrl.org**; **www.arrlmiss.org**.

Missouri (Cameron) — Sep 15 D F H R V
9 AM-3 PM. *Sprs:* Missouri Valley and NWMOARES ARCs. United Methodist Church, 201 N Pine St. Pony Express Hamfest. *TI:* 146.895 (114.8 Hz), 442.675 (127.3 Hz). *Adm:* $5. Tables: 8-ft $20, 6-ft $15. Tom Kinard, WAØRTU, 16626 Hwy 169, Savannah, MO 64485; 816-217-9193; **wa0rtu@arrl.net**; **ponyexpresshamfest.webs.com**.

New Hampshire (Center Conway) — Sep 29
D F H R V
8:30 AM-1:30 PM. *Spr:* White Mountain ARC. Conway Recreation Center, 1634 E Main St. *TI:* 145.45 (100 Hz). *Adm:* $5. Tables: $15. Thaire Bryant, W2APF, c/o White Mountain ARC, Box 1932, Conway, NH 03818; 603-447-2376; **W2APF@hughes.net**; **www.w1mwv.com**.

New Jersey (Mullica Hill) — Sep 16
D F H Q R T V
8 AM-2 PM. *Spr:* Gloucester County ARC. 4-H Fairgrounds, 240 Bridgeton Pike (Rte 77). 34th Annual Hamfest. *TI:* 147.18 (131.8 Hz). *Adm:* $6 (kids and nonham spouses free). Tables: $10 (tailgating $5 per vehicle space). Bill Price, NJ2S, Box 370, Pitman, NJ 08071; 609-820-4699; **KingofBackswing@hotmail.com**; **www.w2mmd.org**.

New Jersey (Tinton Falls) — Sep 22
D R T V
Set up 7 AM; public 8 AM. *Spr:* Garden State ARA. MOESC (formerly called MAECOM), 100 Tornillo Way. *TI:* 147.045 (67 Hz) and NJ Linked Repeater System. *Adm:* $5 (nonham spouses and under 12 free). Tables: $10 per parking space. Joe Dreifuss, W2KQ, 6 Frederic St, Ocean, NJ 07712; 732-493-4236; **w2kq@arrl.net**; **www.gardenstateara.org**.

New Jersey (Township of Washington) — Oct 6 D F H Q R T V
8 AM-3 PM. *Spr:* Bergen ARA. Westwood Regional High School, 701 Ridgewood Rd. *TI:* 146.79 (141.3 Hz). *Adm:* $5. Tables: $15 (for 2 parking spaces). Jim Joyce, K2ZO, 286 Ridgewood Blvd N, Township of Washington, NJ 07676; 201-664-6725; **k2zo@arrl.net**; **bara.org**.

New Mexico (Alamogordo) — Sep 1
D F H R V
7 AM-2 PM. *Spr:* Alamogordo ARC. Otero County Fairgrounds, 401 Fairgrounds Rd. *TI:* 146.8 (100 Hz). *Adm:* Free. Tables: $5. David Pote, AE5OV, 32 Lake View Dr, LaLuz, NM 88337; 575-446-4441; **ae5ov@arrl.net**; **www.qsl.net/k5lrw/hamfest.htm**.

New York (Horseheads) — Sep 29
D F H R T V
8 AM-2 PM. *Spr:* ARA of the Southern Tier. Chemung County Fairgrounds, Grand Central Ave. 37th Annual Elmira International Hamfest/Computerfest, hidden transmitter hunt. *TI:* 147.36 (114.8 Hz). *Adm:* advance $5, door $6. Tables: 8-ft $17 ($14 if paid by Sep 15). Randy Viele, N2SYT, c/o ARAST, Box 614, Horseheads, NY 14845; 607-398-0411; **2012Hamfest@arast.org**; **www.arast.org**.

New York (Pompey/Syracuse) — Sep 15
D F H R S T V
8 AM-2 PM. *Spr:* Radio Amateurs of Greater Syracuse. Pompey Hill Fire Department, 7407 Academy St. 57th Annual Hamfest. *TI:* 147.3. *Adm:* $5. Tables: 8-ft $8 ($5 if you bring your own). Viv Douglas, WA2PUU, c/o RAGS, Box 88, Liverpool, NY 13088; 315-698-4558; **ragsonline@hotmail.com**; **ragsinreview.com**.

North Dakota (West Fargo) — Sep 29
F H Q R S V
8 AM-2 PM. *Spr:* Red River Radio Amateurs of Fargo, ND/Moorhead, MN. Red River Valley Fairgrounds (Hartel Ag Building), 1805 W Main Ave. *TI:* 145.35 (123 Hz). *Adm:* $7. Tables: $15. Tim Gooding, KDØYX, 421 12th Ave E, W Fargo, ND 58078; 701-361-5856; **kd0yx@cableone.net**; **rrra.org**.

Ohio (Berea) — Sep 23 D F H Q R S T V
8 AM-2 PM. *Spr:* Hamfest Assn of Cleveland. Cuyahoga County Fairgrounds, 164 Eastland Rd. Cleveland Hamfest and Computer Show. *TI:* 146.73 (110.9 Hz). *Adm:* $6. Tables: $12. Glenn Williams, AF8C, c/o Hamfest Association of Cleveland, Box 81252, Cleveland, OH 44135; 800-CLE-FEST; **info-list@hac.org**; **www.hac.org**.

Ohio (Cincinnati) — Sep 16
D F H Q R S T V
8 AM-2 PM. *Spr:* Greater Cincinnati ARA. Diamond Oaks Career Development Center, 6375 Harrison Ave. Hidden transmitter hunt. *TI:* 145.27, 146.88 (both 123 Hz). *Adm:* $6. Tables: $20 (indoor), $8 (per flea market space). General info: Stan Cohen, W8QDQ, 2301 Royal Oak Ct, Cincinnati, OH 45237; 513-531-1011; fax 513-531-3834; **stanco49@zoomtown.com**; Inside vendors and flea market info: Tom Denham, K8VOE, 513-779-3951; **tdenham@fuse.net**; **www.gcara.org**.

Oklahoma (Ada) — Sep 14-15 D F H R S V
Friday 5-9 PM, Saturday 8 AM-1 PM. *Sprs:* Ada RC, Durant ARA, Marshall County RC. Chickasaw Community Center, 700 N Mississippi. *TI:* 147.285 (114.8 Hz). *Adm:* $5. Tables: $6 each (with 1 free admission per table). Jack Skinner, KB5KKT, Box 1147, Kingston, OK 73439; 580-564-4186; **dewardskinner@yahoo.com**.

Pennsylvania (Belle Vernon) — Sep 30
D H R T
8 AM-1 PM. *Spr:* Monessen ARC. Rostraver Central Fire Hall, 1100 Fells Church Rd. *TI:* 147.225. *Adm:* $5. Tables: $5. Chris Grilli, W3CDU, 133 Main St, New Eagle, PA 15067; 724-258-8419; **grilli@verizon.net**; **www.w3csl.org**.

Pennsylvania (Butler) — Sep 9 F H R T
8 AM-3 PM. *Spr:* Butler County ARA. Unionville Fire Department, 102 Mahood Rd. *TI:* 147.36 (131.8 Hz). *Adm:* $5. Herb Gilliland, WA3YNX, 640 Fleming Rd, Sarver, PA 16055; 724-524-1303; **wa3ynx@zoominternet.net**; **w3udx.org**.

Pennsylvania (Talmage) — Oct 6
D F H R T V
7 AM-2 PM. *Spr:* Red Rose Repeater Assn. West Earl Community Park, Rte 772. *TI:* 147.015 (118.8 Hz). *Adm:* $2. Tables: $7. Edward Albright, KB3OWF, 237 N Fulton St, Strasburg, PA 17579; 717-669-9559; **kb3owf@gmail.com**; **www.w3rrr.org**.

Pennsylvania (Wrightstown) — Sep 30
D F H R T
6 AM-noon. *Spr:* Mount Airy VHF RC. Middletown Grange #684, Penns Park Rd. 41st Annual Hamarama. *TI:* 146.52. *Adm:* $5. Tables: indoor $15, outdoor $10. George Altemus, KA3WXV, 1561 Tennis Cir, Lansdale, PA 19446; 484-300-8070; **ka3wxv@gmail.com**; **www.packratvhf.com/Hamarama/hamarama.html**.

Rhode Island (Slatersville) — Sep 15
F H R T
8 AM-2 PM. *Spr:* Rhode Island Amateur FM Repeater Service. VFW Post 6342, 98 School St. 76 Flea Market and Auction. *TI:* 146.76

(67 Hz). *Adm:* Free. Tables: $5. Rick Fairweather, K1KYI, 106 Chaplin St, Pawtucket, RI 02861; 401-864-9611; **k1kyi@arrl.net**; **www.qsl.net/riafmrs**.

South Carolina (Rock Hill) — Oct 6

D F H R T V

7 AM-4 PM. *Spr:* York County ARS. Faith Assembly of Rock Hill, 2800 Faith Blvd. *TI:* 147.03. *Adm:* $5. Tables: $5. Brent Case, K4BSC, c/o YCARS, Box 4141, Rock Hill, SC 29732; **k4bsc@arrl.net**; **www.rockhillhamfest.com**.

SEDCO W4DXCC CONVENTION

September 28-29, Pigeon Forge, TN

D H Q R S

The SEDCO/W4DXCC Convention (W4 DX and Contest Convention VIII), sponsored by the SouthEastern DX and Contesting Organization, will be held at the MainStay Suites, 410 Pine Mountain Rd. Doors are open Friday 2-11 PM, Saturday 11 AM-11 PM. Features include a fellowship of DXers and contesters, dealers, miscellaneous radio-related displays, QSL card checking, great speakers, programs, buffet dinner (Saturday, 7:30 PM), handicapped accessible, refreshments. Admission is $25 in advance, $30 at the door. Tables are $60 max (vendors only); ARRL and others free. Contact Lynn Lamb, W4NL, 3134 Allen Dr, Maryville, TN 37803; 865-681-2279 (phone and fax); **W4NL@roslynn.net**; **W4DXCC.com**.

VIRGINIA SECTION CONVENTION

September 15, Virginia Beach

D F H Q R S T V

The Virginia Section Convention, sponsored by Tidewater Radio Conventions, will be held at the Virginia Beach Convention Center, 1000 19th St. Doors are open 8:30 AM-4 PM for advance tickets; general admission 9 AM. Features include hamfest and electronics/computer flea market, multiple dealers and vendors (Lew Steingold, W4BLO, **w4blo@cox.net**), tailgating ($30 per space, includes 1 admission; Bill Holland, WA4EUL, **wa4eul@arrl.net**), forums and programs, VE sessions (walk-ins welcome), DX dinner (Saturday, 6 PM; Buffet City, 3877 Holland Rd), handicapped accessible, refreshments. Talk-in on 146.97. Admission is $9 in advance, $10 at the door. Tables are $30 each for dealers, $25 each for non-dealers. Contact Carl Clements, W4CAC, 4500 Wake Forest Rd, Portsmouth, VA 23703; 757-484-0569; fax 757-673-7426; **w4cac@arrl.org**; **www.vbhamfest.com**.

WASHINGTON STATE CONVENTION

September 22, Spokane Valley

D F H Q R S V

The Washington State Convention (36th Annual Spokane Hamfest), co-sponsored by the Kamiak Butte Amateur Repeater Assn, NW Tri-State ARO, Palouse Hills ARC, Inland Empire VHF Radio Amateurs, Spokane DX Assn, University High School ARC, Lilac City ARC, and the Panoramaland ARC will be held at University High School, 12420 E 32nd Ave. Doors are open for setup Friday 7-9 PM, Saturday 8 AM; public 9 AM-5 PM. Features include commercial and non-commercial vendors, seminars and displays, Open Cry "Junque" Auction (3 PM), QSL card checking, ARRL Reps, EmComm Vans, VE sessions (11 AM, Mary, AA7RT, 509-991-2192, **aa7rt@arrl.net**), radio test gear table, no-host post hamfest dinner (Timber Creek Grill Buffet, 9211 E Montgomery Dr, 5 PM), free off-street parking for cars and RVs, refreshments. Talk-in on 147.38, 146.88 (123 Hz). Admission is $5, 18 and under free. Swap tables are $5 before Sep 2, $7.50 after Sep 2; commercial tables are $12 before Sep 2, $15 after Sep 2. Contact Bob Meenach, AC7GP, 4814 W Houston Ave, Spokane, WA 99208; 509-327-3188; **spokanehamfest@comcast.net**; **spokanehamfest.com**.

Wisconsin (Cedarburg) — Sep 29

D F H R T

Set up 6 AM; public 8 AM. *Spr:* Ozaukee RC. Fireman's Park, 796 Washington Ave. *TI:* 146.97 (127.3 Hz). *Adm:* $5. Tables: 10-ft $10 (as available; no power). Tom Ruhlmann, W9IPR, 465 Beechwood Dr, Cedarburg, WI 53012; 262-377-6945; **teruhlmann@sbcglobal.net**; **ozaukeeradioclub.org**.

To All Event Sponsors

Before making a final decision on a date for your event, you are encouraged to check the Hamfest and Convention Database (**www.arrl.org/hamfests-and-conventions-calendar**) for events that may already be scheduled in your area on that date. You are also encouraged to register your event with HQ as far in advance as your planning permits. See **www.arrl.org/hamfest-convention-application** for an online registration form. Dates may be recorded up to two years in advance.

Events that are sanctioned by the ARRL receive special benefits, including an announcement in these listings and online. Sanctioned conventions are also listed in the *ARRL Letter*. In addition, events receive donated ARRL prize certificates and handouts.

For hamfests: Once the form has been submitted, your ARRL director will decide whether to approve the date and provide ARRL sanction. *For conventions:* Approval must come from your director and the ARRL executive committee.

The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **September 1** to be listed in the **November** issue. Information in this column is accurate as of our deadline; contact the sponsor or check the sponsor's website for possible late changes, for driving directions and for other event details. Please note that postal regulations prohibit mention in *QST* of games of chance such as raffles or bingo.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to special discounted rates on *QST* display advertising and ARRL Web banner advertising. Call the ARRL Advertising Desk at 860-594-0207, or e-mail **ads@arrl.org**.

Strays

Have a *QST* Delivery Issue?

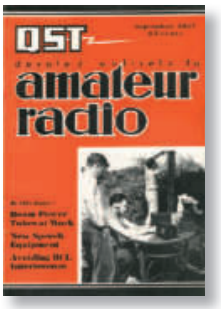
If your copy of *QST* does not arrive by the end of the month before the issue date, please contact the ARRL Circulation Department at **circulation@arrl.org**, tel 860-594-0200. Also contact them if your address changes or your copy of *QST* arrives in damaged condition.

Young man with wallpaper: Garner Fleming, KK4CLY, of Mebane, North Carolina earned his Technician license in June 2011 and caught the DX bug quickly. While still 12 years of age, he earned his Mixed and 10 Meter DXCC in December and his Phone and CW DXCC awards this past March. Garner enjoys contesting and participated with his local club's expedition effort in the 2012 Virginia QSO Party. — *Doug Fleming, KF4VTT* [Doug Fleming, KF4VTT, photo]

75, 50 and 25 Years Ago

Al Brogdon, W1AB

September 1937

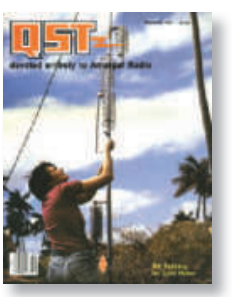


- The cover photo shows three hams operating their Field Day station.
- The editorial reports on interesting statistics that were developed following a questionnaire sent to League members. Among other interesting facts, the returns show that the average age of the licensed A.R.R.L. member is 27 years.
- In "The fourth C.C.I.R. at Bucharest Paves the Way for Cairo," Jim Lamb, W1AL, and John Stadler, VE2AP, report that I.A.R.U. representation at the conference obtained increased recognition of amateur radio.
- M. P. Mims, W5BDB, presents an interesting article for hams who have 220-volt D.C. power distribution, "A 50-Watt C.W.-'Phone Transmitter for 220-Volt D.C."
- Clark Rodimon, W1SZ, tells us how to use "Beam Tubes in a Push-Pull Amplifier" for 14 and 28 Mc.
- "A Six-Band Three-Tube Transmitter," by A. H. Riesmeyer, W8CHT, describes his compact 100-watt rig for C.W. or 'phone.
- By Goodman, W1JPE, comes up with a new use for the popular SW-3 receiver, by "Adding Super-Regeneration to an SW-3 for Use with the High-Stability 56-Mc. Converter" (the converter described in last month's *QST*).
- Two articles aim to solve the common problem of audio distortion in the 'phone speech amplifier and modulator: "An Electronic Volume Compressor," by Robert Bullock, W6MKP, and Harry Jacobs; and "An A.V.C.-Controlled Pre-Amplifier," by James Hanson, W2IGL.
- R. M. Ellis, W9YSA, describes "A Compact Airplane-Type 'Phone Transmitter with Vibrator Power Supply."

September 1962

- The cover announces that "KH6UK and W1BU QSO on 1296!"
- The editorial, "Chaos — or QSOs?" addresses the continuing need for us to make good use of our amateur bands.
- H. M. Meyer, W6GGV, describes "A Crystal-Controlled 1296-Mc. Converter" that provides top performance with simple circuits.
- In "QSY de Front Seat," Robert Olson, W4AVW, tells about the motor-driven remote tuner for his mobile antenna.
- Rene Goldberger, VE3ABU, discusses "Transmitting with Transistors."
- Gil Countryman, W4IA, improves a very popular Heathkit rig with his "DX-100 Modifications."
- Lew McCoy, W1ICP, uses some of the new TV sweep tubes in a 150-watt amplifier that can be operated as a linear or a class C amplifier, in "6GJ5s on 6 meters."
- Bill Orr, W6SAI, presents "Oscar I: A Summary of the World's First Radio-Amateur Satellite."

September 1987



- The cover photo shows KN3T setting up a vertical for her and K3NA to use in their VK9LT (Lord Howe Island) operation during the ARRL DX Contest.
- The editorial discusses the emotional and personal aspects of our amateur call signs.
- John Lindholm, W1XX, tells how "Amateur Radio Celebrates the Bicentennial of the United States Constitution," such as radio club "200" call signs and "We the People" WAS awards.
- Part 1 of "Alternative Energy — An Overview of Options and Requirements," by Michael Mideke, WB6EER, tutors us on operating "off the grid."
- Doug DeMaw, W1FB, discusses the use of voltage-variable capacitance diodes, in "Tuning-Diode Applications and a VVC-Tuned 40-m VFO."
- "Fiber Optics — It's Here Now," by Clarke Greene, K1JX, and Ellen Wilson, introduces us to fiber optics and their potential uses.
- Lee Aurick, W1SE, tells us how to human-engineer our stations for maximum comfort and efficiency, in "Cleaning up Your Act in the Ham Shack."
- In "How's DX?" Ellen White, W1YL reports on "A Pacific Crossing by G4AAL." John's Operation Raleigh is a four-year around-the-world multinational expedition that will ultimately involve some 4000 participants in the 17 to 24 age group.
- In "The World Above 50 MHz," Bill Tynan, W3XO, summarizes "A Sporadic-E Season to Remember" — the 1987 season being one of the best since the mode was discovered in the early 1930s.

Field Organization Reports

June 2012

Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories. Details on the program are at this Web page:**www.arrl.org/public-service-honor-roll**.

528 W5KAV
499 W7FQQ
495 W5DY KØIBS
425 KT2D
395 KI4KWR
374 WB8RCR
351 KK5NU
333 N9WLW
332 KC5ZGG
315 WA2PUU
310 KA2ZNZ
306 KC8QWH
305 W4LHQ
300 KB2BAA
290 KJ4JPE
281 WS6P KD8HPG
275 KB2ETO
267 W4JVM
266 W2MTA
265 K8RDN
260 N7CM K7EAJ
259 KA4IZN
255 WB8R
241 WB9FHP
240 NX8A
235 N8OSL
230 K2DYB KB1NMO
226 W9YQ
220 WD8USA
210 N8IO K2HAT
208 KJ4G
206 W3CB
205 WE2G W2DER
200 KB2KOJ
195 N7EIE K2TV
193 WA2BSS
190 KE5HYW
183 K2ABX
182 KB2URI
171 WW4CC
170 N2WKT
167 KB8VXE
165 WA3EZN KF5IOU WB9JSR
164 KD8EBY
162 KJ4OPX
160 KGØGG KB5SDU KB1RGQ KK3F
155 WK4P KB8RCR
154 WB8YYS
150 WA5LOU K4IWW
152 KF4JQP
143 W4AGA
142 AE5VY
141 KD8AAD
140 K7BFL WB2FTX W2EAG
135 K1PJS KC2UMX K7OAH W3YVQ W4DNA W4TTO
134 KB5PGY
130 KØVTT N5NVP KT5SR WØLAW K6JT WI2G KW1U
129 W2DWR K4BEH W7JSW KD7OED KA8ZGY
126 KC2SFU
125 N2JBA
120 K6HTN W9BGJ W8UL KF7PDV WM2C WB4ZIQ KA4FZI NA7G K8VFZ WB8WKQ
115 K6FRG N8CJS K4JUU
110 W7GB NØMEA W7QM WB8HHZ KA1G N8MN AA2SV K2GW KC5OZT K4BG K4GK N7XG N7YSS WB6OTS N1IQI NM1K KE4CB KD8QPF
109 W9WXN
105 KF7GC
103 NA9L
102 K4VWK
101 KØLQB
100 W7QM K4SCL N2DW WØCLS WAØVKC AD4BL N1JX WA1STU WB8SIQ WG8Z KA8IAF WD8Q KI4AAN W8IM NU8K W9OV KT4YA N3SW W3TWV KB2YAA W8CPG KB3LNM K3IN AA3SB
99 KK7DEB
97 KJ4NO
96 N2VC N1LKJ N2RTF
95 KJ6IJJ N8SY K1YCQ WA4BAM
94 KK7TN
91 WØRJA KC5MMH
90 W5CU N5RL N8DD KB8HJJ W8DJG N4ELI KJ4HGH KZ8Q WB4BIK KD2AXP N1TF N3ZOC NC3F N5ASU
89 W2CC
88 KE5YTA
87 AK4HU
85 N2WGF W8MAL
84 K6RAU
83 N2GS WDØGUF N8FVM
81 AK4RJ
80 NN7H KØDEU NIØI NØMHJ KFØXO KCØZDA KB5KKT K5AXW WD8DIP WB4RJW N2VQA KC2EMW KD7THV KB7RVF KJ4RUD K8KV
79 AA5VZ
78 K7FLI KD8LSM
77 W5GKH KBØDTI
76 W9LW
75 WB3FTQ
73 K7MQF K4MSG
72 K6GPZ
71 W5XX
70 KDØAYN KØDLK NØDUW NØDUX WØFUI N3NTV KØPTK KØRXC KD7ZUP KB2RTZ N2YJZ K1STM KC4PZA

Section Traffic Manager Reports

The following Section Traffic Managers reported: AK, AL, AZ, CO, CT, EMA, ENY, EPA, EWA, IA, IL, IN, KS, LA, LAX, MDC, ME, MI, MN, MS, NC, NFL, NLI, NNJ, NTX, OH, OK, OR, ORG, SD, SFL, SJV, SNJ, STX, UT, VA, WI, WNY, WV, WY.

Section Emergency Coordinator Reports

The following ARRL Section Emergency Coordinators reported: EWA, GA, IA, IN, ID, MDC, MN, MO, MT, ND, NLI, NM, NTX, OK, STX, SV, WTX, WWA.

Brass Pounders League

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

W5KAV 2567, WB2FTX 1702, N1IQI 1202, K6HTN 1085, W8UL 910, WØRJA 888, KW1U 883, WB8JSR 850, W9OV 790, KZ8Q 755, K6FRG 743, WB8WKQ 727, K8RDN 589, KB8RCR 514.

The following station qualified for BPL with Originations plus Deliveries: NM1K 109.

Silent Keys

Silent Keys Administrator, sk@arrl.org

It is with deep regret that we record the passing of these amateurs:

NX1A **Reynolds**, Barnie L., Westbrook, ME
K1CBF **Dandeneau**, James J., Cumberland, RI
W1EN **Stoltze**, Leon, East Hartland, CT
N1IPT **Ferguson**, John H., Buzzards Bay, MA
N1IUM **Phillips**, Bertram M., Greenfield, MA
KA1JNY **Girardi**, Valmore A., Roslindale, MA
KB1KHB **Barrett**, Kathleen H., Pinehurst, NC
N1LLB **Lunt**, Roland W., Gorham, ME
KE1MF **Szoke**, Michael P., Berlin, CT
KA1NET **Costello**, Sally L., Rockport, MA
♦K1QEN **McFayden**, Stuart A., Newington, CT
KA1QHO **Sadowski**, Doreen A., Coventry, RI
KA1RMV **Fontaine**, Edmond A., Colchester, CT
W1RTV **Theroux**, Edward J., Beaufort, SC
♦W1RU **Baldwin**, Richard L., Damariscotta, ME
KR1T **Fiske**, George F. Jr, Athol, MA
KA1TBK **McKnight**, Michael, Cranston, RI
WZ1Y **Mecsery**, Stephen, Old Greenwich, CT
K1YJG **Konrad**, Joseph A., Mystic, CT
K1ZHR **Hirshhorn**, Gordon L., Old Saybrook, CT
KD2BMG **Lyons**, Thomas Jr, Slate Hill, NY
K2CFV **Velten**, Charles, Brooksville, FL
N2GBK **Metzger**, Lawrence, Plainsboro, NJ
WA2GRS **Mark**, Augustus J., Sidney, NY
WB2HLV **Perez**, Andrew, Port Crane, NY
W2INY **Sykes**, Roger, Sarasota, FL
N2JBO **Kozuch**, David H., Wappingers Falls, NY
N2JGS **Pilus**, Joseph P., Cornwall, NY
N2KF **Brunner**, Franz J., Syracuse, NY
WA2KTI **Norberg**, Paul W., South Wales, NY
N2LZ **Cooley**, David O., Springville, NY
♦W2ML **Mendelsohn**, Stephen A., Dumont, NJ
WA2MXT **Trinkleback**, Edward, Oradell, NJ
N2OJG **Hatch**, Richard W., Colts Neck, NJ
AL2P **Sebring**, Michael V., Ketchikan, AK
♦WN2PNX **Yankovich**, Joe L., Schenectady, NY
KA2QNV **MacKenzie**, John M., Magnolia, NJ
N2RKH **Rymanowski**, Francis J., Cohoes, NY
KA2RQS **Krier**, James P., Williamsville, NY
WA2SWR **Bliss**, Newton F., Norwich, NY
W2TDD **Potter**, Ira H., Essex, NY
KC2UWH **Sperling**, Brian J., Wrightstown, NJ
N2YHU **Geib**, William, Cape May, NJ
W2YMI **Ciechanowski**, Daniel, Atlantic City, NJ
KF3CF **McGuire**, Richard J., Newark, DE
W3CM **Brewer**, John E., Denison, TX
W3DMJ **Morgan**, William E., Scranton, PA
N3EBO **Bergman**, Erik A., Hagerstown, MD
W3EFF **Asplundh**, Paul, Huntingdon Valley, PA
N3EPB **Supina**, Aura Lee, State College, PA
W3HCK **Henkin**, David E., Laurel, MD
AB3KH **Sedor**, David J., Wyoming, PA
K3KYT **Whetstone**, Lynn D., Everett, PA
WE3L **Buckingham**, William A., Osceola, PA
N3ONH **Fisher**, Jack N., Brecknock Township, PA
KB3PRE **Fisher**, Irvin, Huntingdon Valley, PA
K3QBQ **Robinson**, Elbert G., Green Bay, WI
♦W3QM **Claus**, Frederick R. III, Wexford, PA
KB3QPJ **Riemer**, Estelle S., Silver Spring, MD
WA3SLN **Calvert**, Michael J., Montoursville, PA
KB3WMO **Shields**, Peggy H., Breinigsville, PA
WA4AJG **Moseley**, Le Baron Jr, Roanoke, VA
KK4AJR **Darr**, David L., Valrico, FL
AB4BG **Trunk**, J. George, Rock Hill, SC
W4BHA **Hunt**, Henry, Friendsville, TN
KN4BS **Gingell**, Michael J., Raleigh, NC
KD4CFV **Davis**, Daniel M., Fort Myers, FL
KA4CMG **Morgan**, Terry C., Wilmore, KY
AB4CN **Grossman**, William M., Kendallville, IN
KB4DFC **Barnette**, William J., Jackson, TN
WA4DZL **Wood**, Russell, Havana, FL
KB4EFP **Blasdell**, Mary Lu, Manassas, VA
KD4ELB **Chandler**, Clyde S. III, Aberdeen, NC
KA4FLN **Faust**, Leo B., Payneville, KY
W4FOK **Farrior**, James S. Jr, Fernandina, FL
WW4GA **Kelley**, Ronald George, Macon, GA
KE4GIN **Lake**, Richard A. II, Raleigh, NC
WA4HPB **Franks**, Dorothea E., Okeechobee, FL
KB4IRS **Margolius**, Harry S., Mount Pleasant, SC
K4JWR **Richards**, William H., Sandston, VA
KJ4KIM **Bowers**, James R. Jr, Union City, TN
KI4KTA **Eckstein**, Christopher E., St Augustine, FL
N4LKX **Park**, Leon M., Winnsboro, TX
K4MBM **Mayes**, Emmett H., Huntsville, AL
N4MPX **Rabb**, Dan J., Sautee Nacoochee, GA
K4PDH **Cochran**, Howard E., O'Fallon, MO
♦K4PRT **Harris**, Bernard A. Jr, Scottsville, VA
KB4QER **Conner**, Alton E., Forest City, NC
WE4RON **Zaback**, Ronald S., Cary, NC
KD4RS **Young**, Newton H., Sebastian, FL
K4SKP **McPherson**, Donald S., Winston, GA
KF4UBJ **Goldstein**, Leonard, Melbourne, FL
AC4V **Rogers**, F. P., Birmingham, AL
WA4VND **Vaughn**, Randall, Greenville, KY
K4YMJ **Sands**, Clifford M., Madison, NC
N4ZOG **Crowther**, George E. Jr, Greencastle, PA
KA4ZTY **Hopkins**, Derek K., Silver Creek, GA
K5BDB **Barger**, Bobby D., Oklahoma City, OK
W5DC **Carter**, Duncan L., Boulder, CO
KJ5DZ **King**, John A., Wimberley, TX
W5EHY **Hawkins**, John E. Jr, Sallisaw, OK
N5EJ **Tanner**, Frank P. Jr, Dayton, TX
K5EJI **Lehrman**, Melford, Roswell, NM
W5FYR **Danes**, William R., Bryan, TX
AA5HI **Minton**, Willard C., San Antonio, TX
K5HZW **Hardie**, William F., Citrus Heights, CA
AB5I **Hargrove**, Loyd N., Newalla, OK
K5IMT **Causey**, Lloyd L., Vicksburg, MS
KB5IPQ **Vaughn**, William P., White Oak, TX
KA5IPY **Kinney**, Paul E., Oklahoma City, OK
KC5JNX **Hambric**, Lynne, Bryan, TX
♦KD5JSD **Sauer**, Joseph J., Blanchard, OK
K5OGI **Magouirk**, Carl M., Grapevine, TX
WW5RED **Thorton**, William B., Battiest, OK
W5RHB **Gomez**, Gregory, Las Cruces, NM
W5RJA **Pearson**, William D., Round Rock, TX
KD5ROL **Kemp**, Virginia S., Conroe, TX
W5RPY **Boutwell**, Jean W., Del Valle, TX
AD5U **Prince**, Alford M. Jr, Oklahoma City, OK
♦W5VEO **Becker**, Larry, Boerne, TX
K5VRF **Smith**, Robert C., El Paso, TX
W6BKC **Gardiner**, Robert J., Bakersfield, CA
W6CZM **Carey**, Donald E., Camarillo, CA
WB6DEV **Landskroner**, Ronald D., Cayucos, CA
K6DLV **David**, Philip W., Fallbrook, CA
W6FS **Furtado**, Arthur, San Jose, CA
WV6L **Sheehan**, John F., Oakhurst, CA
W6OVC **Bailey**, Warren E., La Mesa, CA
K6TGJ **Dickson**, Don, Benicia, CA
WA6TQL **Stovall**, Donald E., Visalia, CA
W6TWB **Curry**, David A., Chesterland, OH
KF6TZD **Phillips**, Millard D., Edwards, CA
W6UAA **Cloonan**, Clifford B., Los Osos, CA
KE6VDM **Jacobs**, Wray O., Ridgecrest, CA
N6XES **Woodside**, Hubert F., Doylestown, PA
W6YKP **Cease**, Joyce L., Union City, CA
KC6ZPE **Bailey**, Lee R., Corona, CA
K7ASA **Hesterman**, James S., Phoenix, AZ
K7AU **Ehrlich**, Murray, Port Orchard, WA
♦K7CTW **Graham**, Michael G., Richmond, BC, Canada
KA7FEF **MacKenzie**, Mary J., Portland, OR
KD7GZD **Early**, Charles A., Las Vegas, NV
KL7HJD **Steves**, Harold C., Roseburg, OR
KD7HVZ **Oden**, Laurance L., Bend, OR
W7JG **Kohler**, D. G., Tacoma, WA
KC7KOQ **Franke**, William P, Saint Helens, OR
WB7NDL **Pannier**, Clyde R., Salt Lake City, UT
W7RDA **Dietz**, William C., Portland, OR
KB7SHL **Rodeffer**, Peggy J., Colorado Springs, CO
WB7TFT **Jerome**, Lynette B., Seattle, WA
KG7TP **Karls**, Ralph E., Tualatin, OR
W7UHP **Beesley**, Aaron R., Bear River City, UT
W7UZB **McCafferty**, William H., Seattle, WA
N7WLD **Goranson**, Richard B., Kennewick, WA
AF7X **Bosworth**, David J., Lebanon, OR
K7ZIG **Bundy**, Leonard P., Clatskanie, OR
W8AXK **Eberwein**, Casper C., Richmond, MI
N8BA **Kissel**, William R., Ortonville, MI
KA8BIM **Schwab**, Adam W., Fraser, MI
W8BNH **Rogers**, Richard V., Marietta, OH
K8CJQ **Borgman**, William J., Allegan, MI
WD8DW **Wilson**, Richard L., Mentor, OH
N8GHG **Gallo**, Thomas F., Berkeley Springs, WV
WD8JMD **Koedoot**, Sandra L., Holland, MI
W8JRE **Bell**, Howard, Sunbury, OH
WA8KMK **Ruggs**, Calvin C., Copley, OH
W8KZX **Terrant**, Frank R., Lynchburg, VA
K8LNR **McCullen**, Harold, Saginaw, MI
K8LP **Peine**, Lester A., Chardon Township, OH
N8LSR **Bernhard**, William, Topeka, KS
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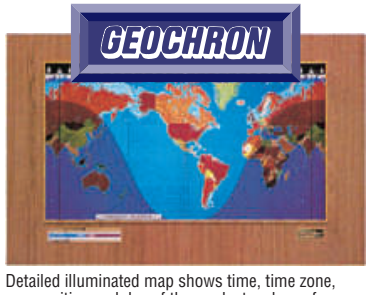

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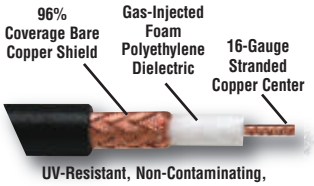

UV-Resistant, Non-Contaminating, Black PVC Jacket

DXE-8X Low-Loss Foam Dielectric Cable (also known as RG-8X or Mini-8)

- Very flexible; ideal for short, in-shack jumper cables
- .242" Type II jacket is non-contaminating and UV-resistant
- Direct-bury

Attenuation/ 100 ft.	Power Rating	Efficiency %
0.6 dB @ 5 MHz	3.0 kW	86%
0.9 dB @ 10 MHz	2.2 kW	81%
1.4 dB @ 30 MHz	1.2 kW	69%
2.0 dB @ 50 MHz	0.9 kW	62%
3.8 dB @ 150 MHz	0.4 kW	42%

Cable Only		
DXE-8X	By the foot	**$.31/ft.**
DXE-8X-1000	1,000 ft.	**$259.99**

Pre-cut Cable with Connectors		
Part Number	**Length/Ft.**	**Price**
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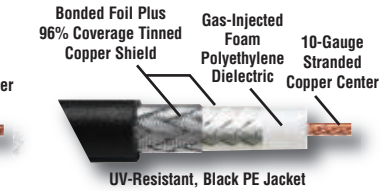

UV-Resistant, Black PE Jacket

DXE-400MAX Low-Loss Cable

- Low-loss, gas-injected foam polyethylene dielectric bonded tape foil covered by a braided copper shield
- .405" low-density polyethylene jacket is UV resistant, ideal for outdoor use
- Direct-bury

Attenuation/ 100 ft.	Power Rating	Efficiency %
0.3 dB @ 5 MHz	6.9 kW	93%
0.5 dB @ 10 MHz	4.8 kW	90%
0.8 dB @ 30 MHZ	2.8 kW	83%
1.1 dB @ 50 MHz	2.1 kW	79%
1.8 dB @ 150 MHz	1.2 kW	65%
3.3 dB @ 450 MHz	0.7 kW	47%

Cable Only		
DXE-400MAX	By the foot	**$.82/ft.**
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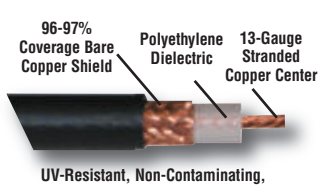
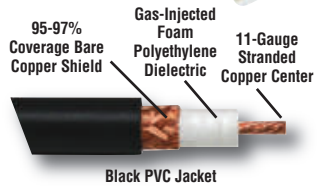


UV-Resistant, Non-Contaminating, Black PVC Jacket



Black PVC Jacket

Gas-Injected Foam Won't Absorb Water.

DXE-213U MIL-Spec Cable

- .405" Type II jacket is non-contaminating and UV-resistant, suitable for outdoor use
- Direct-bury

Attenuation/ 100 ft.	Power Rating	Efficiency %
0.4 dB @ 5 MHz	4.9 kW	90%
0.6 dB @ 10 MHz	3.4 kW	87%
1.0 dB @ 30 MHz	2.0 kW	79%
1.3 dB @ 50 MHz	1.5 kW	73%
2.4 dB @ 150 MHz	0.9 kW	57%

Cable Only		
DXE-213U	By the foot	**$.89/ft.**
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Pre-cut Cable with Connectors		
Part Number	**Length/Ft.**	**Price**
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DXE-8U Low-Loss Foam Dielectric Cable

- .405" high-flex PVC jacket
- Low-loss foam dielectric

Attenuation/ 100 ft.	Power Rating	Efficiency %
0.4 dB @ 5 MHz	5.1 kW	91%
0.9 dB @ 10 MHz	3.1 kW	81%
1.3 dB @ 30 MHZ	1.8 kW	74%
1.4 dB @ 50 MHz	1.6 kW	72%
2.2 dB @ 150 MHz	1.0 kW	60%

Cable Only		
DXE-8UDU	By the foot	**$.79/ft.**
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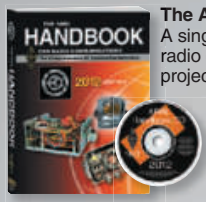

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- Full 360° grip for specified tubing size

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DXE-SAD-100A	1.00	1/4-20	$5.70
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DXE-SAD-150A	1.50	1/4-20	$7.40
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DXE-SAD-200A	2.00	5/16-18	$9.75
DXE-SAD-200B	2.00	3/8-16	$10.95
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DXE-SAD-250B	2.50	3/8-16	$13.25
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DXE-SAD-400A	4.00	3/8-18	$34.40
DXE-SAD-450A	4.50	3/8-16	$39.90

Dimensions in Inches.

V-Bolt Style, sized to accommodate ranges of tubing sizes

Part Number	Nominal Size	Thread Bolt Size	Price
DXE-CAVS-1P	0.50 to 1.75	1/4-20	$9.95
DXE-CAVS-11P	0.50 to 1.75	5/16-18	$10.45
DXE-CAVS-2P	1.00 to 2.00	5/16-18	$11.95
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Dimensions in Inches.

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- Cast stainless reinforcement plate included
- Armor coated bolt sets sold separately

Part Number	Tube O.D.	Price
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DXE-SDS-300P	3.00	$49.00

Dimensions in Inches.

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Securely mount tubing to any flat surface. An insulated mount between tubing and plates, ideal for antenna construction and electrical applications.

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Dimensions in Inches.

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- Provides strain relief of coaxial cable connections
- Grips the cable jacket without nicking or cutting

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V-Bolt Style Saddle Clamps with Stainless Steel Saddles

- Stainless Steel Saddles, serrated to secure hard pipe surfaces
- Stainless steel V-bolts and hardware

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Also available with a tab and 1/4" hardware for grounding as shown.

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- Stainless steel bracket supplied with stainless steel V-Bolt and hardware

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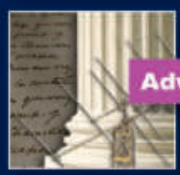

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US Patent Number 7,423,588

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Great for wire antenna spreaders or insulated stacking frames.

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Made in USA

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M-600 Meter sold separately

NEW! AT-600Proll

Building on the success of the AT-600Pro, LDG Electronics has refined and expanded the model with an optional external 4.5" analog meter. The new AT-600Proll keeps many of the same features of the previous model, but simplifies the operation. With the two-position antenna switch, there are 2,000 memories that store tuning parameters for almost instantaneous memory recall whenever you transmit on or near a frequency you've used before. Includes six-foot DC power cable.

Suggested Price $369.99; Optional M-600 external analog meter $129.99

Z-11Proll

Meet the Z-11Proll, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" × 7.7" × 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 through 6 meters. The Z-11Proll uses LDG's state-of-the-art, processor-controlled, Switched-L tuning network. It will match dipoles, verticals, inverted-Vs, or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. Includes six-foot DC power cable.

Suggested Price $179.99

radio not included

Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). Tuning is simple: one button push on the tuner is all that is needed, the Z-817 takes care of the rest. It will switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! 2,000 memories cover 160 through 6 meters. The Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the Tune button on the tuner. Powered by four AA internal alkaline batteries (not included), so there are no additional cables required.

Suggested Price $129.99

We have a tuner that will work for you!

We make tuners that will work with any transceiver. Don't know which one is right for you? Give us a call or see the ***Tuner Comparison Chart*** *on our web site for more selection help!*

radio not included

AT-897Plus for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897Plus Autotuner mounts on the side of your FT-897 just like the original equipment, takes power directly from the CAT port of the FT-897, and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier. ***Suggested Price $199.99***

M-1000 Meter sold separately

AT-1000Proll

LDG Electronics' new flagship 1KW tuner features: 5 to 1,000 Watts PEP; RF Sensing; Auto and Semi Tuning Modes; 1.8 to 54 MHz range; 6 to 800 ohm range (15 to 150 on 6M); simplified operation; and an optional external 4.5" analog meter. With the two-position antenna switch, there are 2,000 memories that store tuning parameters for almost instantaneous memory recall whenever you transmit on or near a frequency you've used before. Includes six-foot DC power cable.

Suggested Price $539.99; Optional M-1000 external analog meter $129.99

Z-100Plus

Small and simple to use, the Z-100Plus sports 2,000 memories that store both frequency and tuning parameters. It will run on any voltage source from 7 to 18 volts; six AA batteries will run it for a year of normal use. Current draw while tuning is less than 100ma. The Z-100Plus now includes an internal frequency counter so the operating frequency is stored with tuning parameters to make memory tunes a blazingly fast 0.1 seconds; full tunes take an average of only 6 seconds. Includes six-foot DC power cable.

Suggested Price $159.99

LDG Electronics, Inc. 1445 Parran Road, St. Leonard, MD 20685 ***Phone 410-586-2177 • Fax 410-586-8475***

Designed to handle the higher power of the Tokyo Hi Power HL-45B.

NEW! Z-817H

The ultimate autotuner for QRP radios including the Yaesu FT-817(D) with addition of the Tokyo High Power HL-45B. Interfaces to the CAT port (ACC) on the back of the radio with the provided cable. One button push on the tuner and the Z-817H takes care of the rest. Will also function as a general purpose antenna tuner with other QRP radios or QRP radios with up to 75 watt HF amps. Powered by four AA internal alkaline batteries (not included). 2,000 memories cover 160 through 6 meters.

Suggested Price $159.99

- *RF Sensing*
- *Tunes Automatically*
- *No Interface Cables Needed*

AT-100ProII

This desktop tuner covers all frequencies from 1.8–54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch with LEDs, allowing you to switch instantly between two antennas. The AT-100ProII requires just 1 watt for operation, but will handle up to 125 watts. Includes six-foot DC power cable.

Suggested Price $229.99

- *RF Sensing*
- *Tunes Automatically*
- *No Interface Cables Needed*

AT-200ProII

The AT-200ProII now includes LEDs to show antenna position and if the tuner is in bypass. A two-position antenna switch stores 2,000 memories per switch. Handles up to 250 watts SSB or CW on 1.8 to 30 MHz and 100 watts on 54 MHz. Rugged and easy to read LED bar graphs simultaneously show RF power and SWR. Includes a six-foot DC power cable.

Suggested Price $259.99

IT-100

Matched in size to the IC-7000 and IC-706, for either manual or automatic tunes, and status LEDs. Control the IT-100 and its 2,000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. For your Icom radio that is AH3 or AH-4 compatible. ***Suggested Price $179.99***

YT-100

For Yaesu FT-857, FT-897 and FT-100 (and all D models) an integrated tuner, powered by the interface. Press the Tune button on the tuner, and everything else happens automatically. ***Suggested Price $199.99***

KT-100

For AT-300 compatible Kenwood transceivers (except TS-480HX). The KT-100 actually allows you to use the Tune button on the radio. 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. ***Suggested Price $199.99***

YT-450

Designed for Yaesu's newest 100 watt radios. Interfaces directly with the Yaesu FT-450 and FT-950 radios. Press the Tune button on the tuner and the rest happens automatically. It will quickly match nearly any kind of coax fed antenna with an SWR of up to 10:1. 2,000 memories recall settings in an instant! Seamless connection to a PC.

Suggested Price $249.99

YT-847

YT-847 Autotuner is an integrated tuner for the Yaesu FT-847. An included CAT/Power cable interfaces with your FT-847. Just press the Tune button on the tuner and everything else happens automatically!

Suggested Price $249.99

FREE!

RBA-1:1 Balun or RU-4:1 Unun

When You Buy A S9V 43', 31' or 18' Multiband Antenna

Purchase an S9V 43', 31' or 18' antenna and fill out the included form. Mail it to LDG Electronics, and we will send you either a 200 watt balun or unun, your choice!

Antennas!

S9V 43' $199.99

80-6 meters *Fixed Operation*

The S9V 43' is a high-performance, lightweight, telescoping fiberglass vertical. The best value in high-performance "tall" verticals!

S9V 31' $99.99

40-6 meters *Fixed or Portable Operation*

S9V 18' $49.99

20-6 meters *Fixed or Portable Operation*

The S9V 31' and 18' are tapered, ultra-lightweight, fiberglass, vertical antennas. Friction-locking sections and high-tech polymer tube rings allow the antenna to be quickly and safely deployed in practically any environment without tools!

S9RP $39.99

Aluminum Radial Plate

Includes 20 sets of stainless steel nuts & bolts.

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hy-gain® Rotators

. . . the first choice of hams around the world!

HAM-IV

HAM-IV
$649.95

The most popular rotator in the world!

For medium communications arrays up to 15 square feet wind load area. *Has* 5-second brake delay, Test/Calibrate function. Low temperature grease permits normal operation down to - 30 degrees F. Alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. *Precision* indicator potentiometer. Ferrite beads reduce RF susceptibility. 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 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
with DCU-2

HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
Effective Moment (in tower)	**2800 ft.-lbs.**

TAILTWISTER SERIES II

T-2X
$799.95

T-2XD2
$899.95
with DCU-2
See more info below

For large medium antenna arrays up to 20 square feet wind load. Has 5-second brake delay and Test/Calibrate functions. Low temperature grease, tough alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, 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, North or South center of rotation scale on meter, low voltage control, $2^{1}/_{16}$ inch maximum mast size.

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

CD-45II

CD-45II
$449.95

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to - 30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to $2^{1}/_{16}$ inches. MSLD light duty lower mast support included.

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

hy-gain® DCU-2 Digital Rotator Controller

. . . gives you full automatic and manual control of hy-gain rotators

DCU-2
$399.95

New!

New hy-gain DCU-2 Digital Controller gives you fully automatic or manual control of your *hy-gain HAM or Tailtwister Rotators*. Just dial in your beam heading and press the rotate button or let *Ham Radio Deluxe* (or other program) control your DCU-2. Your antenna automatically rotates to your desired direction precisely and safely.

First, the DCU-2 makes sure your antenna is free and safely unlocked before turning begins and then turns off your motor before your antenna reaches its final destination. Your antenna gently coasts to a stop before the brake locks. This greatly reduces potentially damaging overshoot.

Fine tuning and full manual control is effortless with *automated* Left and Right direction buttons - - no more worrying about manually releasing and relocking the brake. Brake automatically releases before fine tuning begins and relocks after fine tuning is completed.

Bright blue LCD displays actual heading, dial-in beam heading, computer controlled beam heading in one degree increments and your call sign.

Advanced Features

AutoBrake *Release* - no need to remember to release brake or release too soon - release time is automatic and settable 0-8 seconds.

Coast feature allows antenna to gently stop before the brake locks. Adjustable coast delay (*0-10 degrees*) turns off motor before antenna reaches its final destination to reduce potentially damaging overshoot.

AutoJog unlocks and frees your antenna before turning begins. Great for older rotators with "sticky" brakes. It jogs your rotator backwards slightly to ease brake pressure enough to release.

Offset feature allows you to calibrate your display to show actual beam heading.

USB and RS-232 ports for computer control. Compatible with *Ham Radio Deluxe* and other programs. Adjustable LCD sleep time. Field upgradeable Firmware. 8.5W x 4.3H x 9D inches. 110 VAC. **Order** DCU-2X for 220 VAC.

HAM-VI

HAM-VI
$749.95
with DCU-2

New!

New HAM-VI, $749.95, like HAM-IV but with DCU-2 digital controller. For medium antennas up to 15 square feet wind load.

Rotator Options

MSHD, $109.95. Above tower heavy duty mast support. For T2X, HAM-IV, HAM-V, HAM-VI. Accepts $1^{7}/_{8}$ to $2^{5}/_{8}$ inch OD. Centers on 2 ½ inches.

TSP-1, $34.95. Lower spacer plate for HAM-IV, HAM-V and HAM-VI.

AR-40

AR-40
$349.95

For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. $2^{1}/_{16}$ inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power	350 in.-lbs.
Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight	14 lbs.
Effective Moment (in tower)	**300 ft.-lbs.**

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IC-V82 2M FM HT
- TX: 144-148 MHz • RX: 136-174 MHz
- Power: 7/4/0.5W • Memories: 200
- D-Star upgradable with optional UT-118

IC-T70A 2M/440 FM Handheld
- TX: 144-148, 430-450 MHz • RX: 136-174, 400-479 MHz
- Power: 5/2.5/0.5W • Memories: 302
- Comes with NiMH Battery and Wall Charger

IC-2200H 2M FM Mobile
- TX: 144-148 MHz • RX: 118-174 MHz
- Power: 65/25/10/5W • Memories: 207
- D-Star upgradable with optional UT-118

IC-V8000 2M FM Mobile
- TX: 144-148 MHz • RX: 136-174 MHz
- Power: 75/25/10/5W • Memories: 207

IC-208H 2M/440 FM Mobile
- TX: 144-148, 430-450 MHz • Memories: 512
- RX: 118-173, 230-549, 810-999 MHz (cell blkd)
- Power: 55/15/5W (2M), 50/15/5W (440 MHz)

IC-718 HF Transceiver
- TX: HF (except 60M) • RX: 0.03-30 MHz
- Power: 5-100W • Memories: 101 • DSP built-in
- SSB, CW, RTTY and AM (2-40W)

IC-7000 HF/6/2M/440 MHz Mobile
- TX: HF/6/2M/440 MHz • RX: 0.03-199, 400-470 MHz
- Power: 2-100W (HF/6M), 2-50W (2M), 2-35W (440)
- Memories: 503 • 41 band-widths with sharp or soft filter shape

IC-7200 HF/6M Portable
- TX: HF/6M • RX: 0.03-60 MHz • Power: 2-100W
- Memories: 201 • Rugged design for outdoor use
- 32-bit IF-DSPs + 24-bit AD/DA Converters
- USB Port for CI-V Format PC Control & Audio In/Out

IC-7410 HF/6M Transceiver
- TX: HF/6M • RX: 0.03-60 MHz • Power: 2-100W
- 15kHz 1st IF filter and optional 3kHz & 6kHz filters to protect against strong unwanted adjacent signals
- Much faster DSP unit compared to the IC-746PRO
- Automatic antenna tuner • USB connector for PC control

IC-7600 HF/6M Transceiver
- TX: HF/6M • RX: 0.03-60 MHz • Power: 2-100W
- Memories: 101 • 5.8 inch color screen
- High-resolution real time spectrum scope using a dedicated DSP unit • Automatic antenna tuner

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PSR-100

PSR-800

GRE PSR-100 Analog HT Scanner

• RX: 29-54, 108-174, 380-512 MHz • Memories: 200 • Same Weather Alert • Skywarn one button access • 5 Pre-programmed bands (Marine, Fire & Police Dept, Ham, WX) for one touch search

GRE PSR-800 Easy To Use Scanner

• Uses a 2GB SD card that is preloaded with the USA Radio Reference database • RX: 25-54, 108-174, 216-512, 764-782, 791-799, 806-960 & 1240-1300 MHz (celluar blocked) • Scans digital and analog trunked radio system signaling formats, including Project 25, Motorola Type I/II/Hybrid, EDACS and LTR systems

GRE PSR-700 Easy To Use Scanner

• Same looks and features of the PSR-800 but does NOT receive digital trucked systems • Receives Motorola type I/II systems, EDACS and LTR analog trunking systems

CLOSEOUT - VERY FEW LEFT!

GRE PSR-410
Triple Trunking Analog Mobile Scanner

• RX: 25-54, 108-174, 216-512, 764-781, 791-796, 806-823, 849-868, 894-960 & 1240-1300 MHz (less celluar) • Memories: 1,800 • Scans most common Trunked radio system signaling formats, including Motorola, EDACS Standard, EDACS Narrow, and LTR Trunked radio systems

GRE PSR-600
Analog/Digital Mobile Scanner

• RX: 25-54, 108-174, 216-512, 764-960 & 1240-1300 MHz (celluar blocked) • Memories: 1,800
• Digital Triple Trunking Desktop/Mobile Scanner
• Scans most common trucked systems such as Motorola, EDACS Standard, EDACS Narrow, LTR and P25 networks

ALINCO
AMATEUR RADIO'S VALUE LEADER™

DJ-V57T

DJ-G29T

DJ-V57T 2M/440 FM HT

• TX: 144-148, 420-450 • RX: 136-174, 400-512 MHz • Power: 5/2/0.5W on 2M & 4.5/2/0.5W on 440 • Memories: 200 • Quick-write function copies current VFO info to the lowest available memory channel

DJ-G29T 220/900 FM HT

• TX: 222-225, 902-928 • RX: 216-250, 902-928 MHz • Power: 5/2/0.8/0.3W on 220 & 2.5/0.8/0.3W on 900 • Memories: 500 • Quick-write function copies current VFO info to the lowest available memory channel

DR-135TMKIII 2M FM Mobile

• TX: 144-148 MHz • RX: 118-136 (AM), 136-174 MHz • Power: 50/10/5W • Memories: 100 • Optional EJ-41U TNC board for 1200/9600bps packet

DR-235TMKIII 220 FM Mobile

• TX: 222-225 MHz • RX: 216-280 MHz • Power: 25/10/5W • Memories: 100 • Optional EJ-41U TNC board for 1200/9600bps packet

DR-635T 2M/440 FM Mobile

• TX: 144-148, 430-450 • RX: 87.5-174, 335-480 MHz • Power: 50/20/5W on 2M & 35/20/5W on 440 • Memories: 200 • Cross Band Repeat • Dual Band Receive (V/V, U/U, V/U, U/V) • Optional EJ-50U TNC board for 1200/9600bps packet

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MFJ-259B *World's* most popular Antenna Analyzer is super easy-to-use!

MFJ-259B
$289.95

The MFJ-259B is the world's most popular Antenna Analyzer and the easiest to use! Just select a band and mode. Set frequency. Your measurements are instantly displayed!

Handheld Antenna Lab

Owning the MFJ-259B is like having an entire antenna lab in the palm of your hand!

Measure SWR quickly or make sophisticated measurements such as Return Loss, Reflection Coefficient, Resonance, Complex Impedance (R+jX), Impedance Magnitude (Z) plus Phase in degrees. Covers 1.8 to 170 MHz -- no gaps.

Coax Analyzer

Determine coax cable velocity factor (Vf), loss in dB, coax length, distance to open or short plus detect wrong coax impedance.

Frequency Counter

Measure frequency of external signals using the separate BNC counter input.

Signal Generator

Use as a signal source 1.8-170 MHz with digital dial accuracy for testing and alignment.

Inductance and Capacitance

Measure Inductance (uH) and Capacitance (pF) at RF frequencies not at audio frequencies used by most L/C meters.

Digital and *Analog* Meters

A high-contrast backlit LCD gives precision readings and *two* side-by-side *analog meters* make antenna adjustments intuitive.

Smooth, Stable Tuning

Velvet-smooth reduction drive tuning and precision *air-variable capacitor* makes setting frequency easy and stable.

Battery Saver & More

Battery-saver, low-battery warning, battery voltage meter and charger are all built in. Use ten Alkaline, NiCad or NiMH AA batteries (not included) or 110 VAC with MFJ-1312D, $15.95. 4Wx6¾Hx2D inches.

Here's What You Can Do

Find true antenna resonant frequency
Tune *antenna quickly for minimum SWR*
Match complex loads to your feedline
Adjust *mobile whips without stressing finals*
Determine safe 2:1-SWR operating windows
Adjust *tuners without generating QRM*
Find exact location of shorts and opens
Cut *stubs and phasing lines accurately*
Check cable for loss and contamination
Find *value of unknown coils and caps*
Test RF transformers and baluns
Troubleshoot *filters and networks*
Find self-resonance and relative Q
Check *patterns and compare gain*
MFJ-259B does all this and more!

MFJ Analyzer Accessories

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Special foam-filled fabric cushions blows, deflects scrapes and protects knobs and meters from harm. **MFJ-39C, $24.95.** Like MFJ-29C, but for MFJ-269.

MFJ-66, $24.95. Plug-in coils turns any MFJ Antenna Analyzer into a sensitive and accurate *band switched* dip meter. 2 coils.

MFJ-92AA10, $29.95. Ten MFJ *SuperCell*™ Ni-MH AA rechargeable batteries.

MFJ-99B, $88.90. ***Save $7!*** MFJ-259B Deluxe Accessory Pack: MFJ-29C Pouch, 10 Ni-MH batteries, dip coils, AC adapter. **MFJ-98B, $88.90.** Like MFJ-99B but for MFJ-269.

MFJ-99, $60.85. ***Save $5!*** Like MFJ-99B, less batteries, for MFJ-259B. **MFJ-98, $60.85.** Like MFJ-99 but for MFJ-269.

MFJ-99C, $40.90. ***Save $5!*** AC Adapter and 10 Ni-MH batteries for MFJ-259B/269.

MFJ-917, $29.95. Current balun lets you make balanced line antenna measurements on HF with your MFJ Analyzer. **MFJ-7702, $3.95.** MFJ-917 to MFJ Analyzer adapter.

MFJ-731, $99.95. Tunable RF filter allows accurate Antenna Analyzer measurements in presence of strong RF fields. 1.8-30 MHz.

MFJ-5510, $9.95. Cigarette lighter cord.

MFJ-269 ...1.8-170 MHz and 415-470 MHz plus 12-bit A/D!

The MFJ-269 does everything the MFJ-259B does - and much more!

Expanded Frequency Coverage

MFJ-269 adds UHF coverage from 415 to 470 MHz -- right up into the commercial band. With it, you can adjust UHF dipoles, verticals, Yagis, quads and repeater collinear arrays with ease -- plus construct accurate phasing harnesses and timed cables. Also use it as a signal source to check UHF duplexers, diplexers, IMD filters and antenna patterns.

Much Better Accuracy

New *12-bit* A/D converter gives much better accuracy and resolution than common 8-bit A/D converters -- *an MFJ-269 exclusive!*

Complex Impedance Analyzer

Read Complex Impedance (1.8 to 170 MHz)as series equivalent resistance and reactance (Rs+jXs) or as magnitude (Z) and phase (degrees). Also reads *parallel* equivalent resistance and reactance (Rp+jXp) -- *an MFJ-269 exclusive!*

MFJ-269
$389.95

CoaxCalculator™

Lets you calculate coax line length in feet given electrical degrees and vice versa for any frequency and any velocity factor -- *an MFJ-269 exclusive!*

Use any Characteristic Impedance

You can measure SWR and coax loss with *any* characteristic impedance (1.8 to 170 MHz) from 10 to over 600 Ohms, including 50, 51, 52, 53, 73, 75, 93, 95, 300, 450 Ohms -- *an MFJ-269 exclusive!*

Logarithmic Bar Graph

Has easy-to-read LCD *logarithmic* SWR bargraph and SWR meter for quick tuning.

Uses instrumentation grade N-connector to ensure minimum mismatch on all frequencies. Includes N to SO-239 adapter.

MFJ-269*PRO*™ Analyzer

MFJ-269PRO
$419.95

Like MFJ-269, but has extended commercial frequency coverage in UHF range ***(430 to 520 MHz)*** and *ruggedized* cabinet that protects LCD display, knobs, meters and connectors from damage in the field/lab.

MFJ-266 ...Wide range 1.5-185 MHz and 300-490 MHz!

New!

MFJ-266
$349.95

The compact MFJ-266 covers HF (1.5-65 MHz) in 6 bands, plus VHF (85-185 MHz) and UHF (300-490 MHz).

In *Antenna Analyzer* mode, you get Frequency, SWR, Complex Impedance (R+jX), and Impedance Magnitude (Z) *all displayed simultaneously* on a high-contrast backlighted LCD (SWR only on UHF).

In *Frequency-Counter* mode, the MFJ-266 functions as a 500-MHz counter with up to 100 Hz resolution and measures relative field strength of a signal and its frequency and can be used for tracking measurement interference.

MFJ-266 also functions as a 10 dBm signal source with digital-frequency readout. It can also measure inductance and capacitance at RF frequencies.

Features include solid-state band switching and electronic varicap tuning with a smooth 10:1 lockable vernier tuning drive.

Use eight AA *alkaline* batteries or 110 VAC with MFJ-1312D, $15.95. Includes N-to-SO-239 adapter. 3¾Wx6½Hx2¾D inches. 1.3 lbs.

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More hams use MFJ-949s than any other antenna tuner in the world!

Why? Because the world's leading tuner has earned a world-wide reputation for being able to match just about anything.

Full 1.8-30 MHz Operation

Tune your antenna for minimum SWR! Works 1.8-30 MHz on dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave receiving antennas . . . Use coax, random wire, balanced lines. Has heavy duty 4:1 balun for balanced lines.

Custom inductor switch

Custom designed inductor switch, 1000 volt tuning capacitors, *Teflon*(R) insulating washers and proper L/C ratio gives you *arc-free* no worries operation

MFJ-949E **$179.95**

up to 300 Watts PEP transceiver input power.

The MFJ-949E inductor switch was *custom* designed to withstand the extremely high RF voltages and currents that are developed in your tuner.

8-Position Antenna switch

Antenna switch lets you select two coax fed antennas, random wire/balanced line or dummy load through your MFJ-949E or direct to your transceiver.

Lighted Cross-Needle Meter

Full *size* 3-inch lighted Cross-Needle Meter. Lets you easily read SWR, *peak* or average forward and reflected power simultaneously. Has 300 Watt or 30 Watt ranges.

QRM-Free PreTune™

MFJ's *QRM-Free PreTune*™ lets you pre-tune your MFJ-949E *off-the-air* into its built-in dummy load! Makes tuning your actual antenna faster and easier.

Plus Much More!

Full *size* built-in non-inductive 50 Ohm dummy load, scratch-proof Lexan multi-colored front panel, $10^5/_8$x$3^1/_2$x7 inches. Superior cabinet construction and more!

MFJ-948, $159.95. Econo version MFJ-949E. Has all features except for dummy load.

***No Matter What*™ Warranty**

Every MFJ tuner is protected by MFJ's famous one year *No Matter What*™ limited warranty. We will repair or replace your MFJ tuner (at our option) for a full year.

More hams use MFJ tuners than all other tuners in the world!

MFJ-989D *Legal Limit* Tuner

MFJ-989D **$389.95**

New, improved MFJ-989D *legal limit* antenna tuner gives you better efficiency, lower losses and a new *true* peak reading meter. Easily handles *full* 1500 Watts SSB/CW, 1.8-30 MHz, including MARS/WARC bands. Six position antenna switch, dummy load. *New* 500 pF air variable capacitors. *New* improved *AirCore*™ Roller Inductor. *New* high voltage current balun. *New* crank knob. $12^7/_8$Wx6Hx$11^5/_8$D".

MFJ-986 Two knob *Differential-T*™

MFJ-986 **$349.95**

Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. $10^3/_4$Wx$4^1/_2$Hx15 in.

MFJ-962D *compact* kW Tuner

MFJ-962D **$299.95**

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. $10^3/_4$x$4^1/_2$x$10^7/_8$ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969 **$219.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. $10^1/_2$Wx$3^1/_2$Hx$9^1/_2$D inches.

MFJ-941E *super value* Tuner

MFJ-941E **$139.95**

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek $10^1/_2$Wx$2^1/_2$Hx7D in.

MFJ-945E HF/6M *mobile* Tuner

MFJ-945E **$129.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $6.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971 **$119.95**

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x$6^1/_2$x$2^1/_2$ in.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$99.95**

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-902 *Tiny Travel* Tuner

MFJ-902 **$99.95**

Tiny $4^1/_2$x$2^1/_4$x3 inches, full 150 Watts, 80-10 Meters, has tuner bypass switch, for coax/random wire.

MFJ-904H, $149.95. Same but adds Cross-needle SWR/Wattmeter and 4:1 balun for balanced lines. $7^1/_4$x$2^1/_4$x$2^3/_4$ inches.

MFJ-16010 *random wire* Tuner

MFJ-16010 **$69.95**

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$99.95**

MFJ-906 has lighted Cross-Needle SWR/Wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $69.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

MFJ-921/924 **$89.95**

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x$2^1/_2$x3 in.

MFJ-931 *artificial* RF Ground

MFJ-931 **$109.95**

Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. Creates artificial RF ground or electrically places far away RF ground directly at rig. **MFJ-934, $209.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

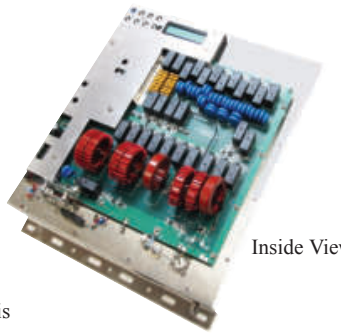
MFJ 1500 Watt *Remote* Auto Tuner

Place this MFJ-998RT remote tuner at your antenna to match high SWR antennas/long coaxes -- greatly reduce losses for high efficiency

. . . Match 12-1600 Ohms, 1.5 kW, SSB/CW, 1.8-30 MHz . . . Match coax/wire antennas . . . Weather-sealed . . . Remotely powered thru coax . . . Amplifier, radio, tuner protection . . . Output static/lightning protection . . . StickyTune™ always tunes when power folds back . . . DC power jack . . .

MFJ-998RT
$769.95

Bottom Chassis



Inside View

Tune your antenna AT your antenna!

Get greatly reduced losses and high efficiencies with long coax runs and high SWR antennas with this new MFJ-998RT 1.5 kW Remote Antenna Tuner.

Weather-Sealed

A tough, durable weather-sealed ABS cabinet with over-lapping lips, sealing gasket and stainless steel chassis protects the MFJ-998RT from all kinds of weather.

No Power Cable Needed!

No power cable needed -- remotely powered through coax. Includes MFJ-4117 Bias-Tee with on/off switch for station end of coax. Has 12 VDC jack for power cable, if desired.

Fully Protected

MFJ exclusive algorithms protect your tuner, radio and RF power amplifier from damage.

Automatic inductor and capacitor limiting prevents tuning extreme loads which can destroy your tuner.

Your tuner will not tune if more than 75 Watts with SWR greater than 3:1 is applied or if more than 125 Watts is applied.

Tuner output is static electricity and lightning induced surge protected.

MFJ exclusive StickyTune™

Very high SWR can fold back transmitter power and *prevent tuning* caused by extreme differences in loads (example: changing bands and other conditions).

But MFJ exclusive *StickyTune™ always* tunes with a simple on/off power cycle and re-transmit.

Tunes Coax fed and Wire Antennas

Tunes both coax fed and wire antennas. Has *ceramic* feed-through insulator for wire antennas. 2 kV *Teflon*® insulated SO-239 -- prevents arcing from high SWR.

High Power, Highly Efficient

A highly efficient L-network matches 6-1600 Ohms at *full* 1500 Watts legal limit SSB/CW 1.8 to 30 MHz with Hi-Q Ls, Cs.

MFJ-998RT Learns as you Operate

As you operate, the MFJ-998RT automatically tunes for minimum SWR and remembers your frequency and tuner settings. The next time you operate on that frequency and antenna, its tuner solution is restored in milliseconds and you're ready to operate!

Highly Intelligent, Ultra-fast Tuning

MFJ *InstantRecall™* recalls stored tuning solutions from 10,000 memories. For new frequencies, MFJ *Intelli-Tune™* measures your antenna impedance and instantly determines the correct matching components. If antenna impedances cannot be measured, MFJ *AdaptiveSearch™* searches *only* the relevant components that can match your antenna giving you ultra-fast tuning.

Field upgradeable firmware. Requires 12-15 VDC at 1.4 Amps maximum or 110 VAC with optional MFJ-1316, $21.95. Weighs 9.5 lbs. 13¼Wx6¾Hx17½D inches.

600W *Remote IntelliTuner™*

MFJ-994BRT
$399.95

MFJ-994BRT -- perfect for 600 Watt SSB/CW amplifiers like Ameritron's AL-811/ALS-600/ALS-500M. Matches 12-800 Ohms. Coax/wire antennas, 1.8-30 MHz. Fully *weather-sealed* for outdoor use. Remotely powered through coax. Tough, durable, *built-to-last* cabinet, 9¼Wx3Hx 14¼D inches, 4 lbs. Includes MFJ-4117 BiasTee Power Injector.

300W *Remote IntelliTuner™*

MFJ-993BRT
$299.95

MFJ-993BRT handles 300 Watts SSB/CW and matches an *extra-wide* 6-1600 Ohm impedances. Coax/wire antennas, 1.8-30 MHz. Fully *weather-sealed* for remote outdoor or marine use. Remotely powered through coax. Tough, durable, *built-to-last* cabinet measures 9¼Wx3Hx14¼D inches. Weighs just 4 pounds. Includes MFJ-4117 BiasTee Power Injector.

200W *Remote IntelliTuner™*

MFJ-926B
$279.95

MFJ-926B, 200 Watts SSB/CW, matches 6-1600 Ohms, Coax/wire antennas, 1.8-30 MHz. Includes BiasTee.

200W *Remote Econo Tuner™*

MFJ-927
$259.95

MFJ-927, 200 Watts SSB/CW, 6-1600 Ohms, Coax/Wire antennas, 1.8-30 MHz. Weather-sealed, BiasTee. 7½Wx5¼Hx8½D in.

MFJ-2990
$359.95

160-6 Meters 43 foot Vertical Antenna

Operate all bands 160-6 Meters at full 1500 Watts with this self-supporting, 43 foot high performance vertical! Assembles in less than an hour. Low profile blends in with sky and trees -- barely see it. Entire length radiates. Exceptional low angle DX performance on 160-20 Meters and very good performance on 17-6 Meters. Telescope it shorter for more effective low angle radiation on 17-6 M if desired. One of these wide-range *MFJ automatic tuners* at the antenna easily matches all bands 160-6 Meters. There's no physical tuning adjustments on the antenna -- you *simply put it up!* Requires ground system, at least one radial, more the better. Includes balun and base mount. **MFJ-1932, $34.95.** All band ground radial system.

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or call toll-free 800-647-1800

• 1 Year *No Matter What™* warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

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http://www.mfjenterprises.com

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these highly reliable 15, 22, 30, 40 or 75 Amp MFJ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

MFJ's *MightyLites*™ are so light and small you can carry them with one hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either! These super clean *MightyLites*™ meet all FCC Class B regulations.

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

You won't burn up our power supplies!

MFJ Power supplies are *fully protected* with Over Voltage, Over-temperature and Over Current protection circuits.

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

A whisper quiet internal fan efficiently cools your power supply for long life.

22 Amp Continuous

Ham Radio's smallest and lightest 22 Amp continuous power supply is also its best selling!

MFJ-4125 **$84.95**

22 Amps continuous/25 Amps max at 13.8VDC. 5-way binding posts on front, 5A quick connects on back. 85-135/170-260 VAC input. 2.9 lbs. 5¾Wx3Hx5¾D".

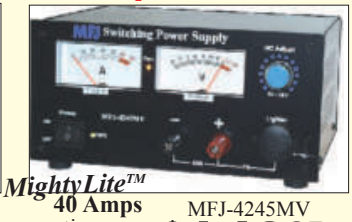
MFJ-4125P, $94.95. Adds 2-pairs *Anderson PowerPoles*™.

22 Amp Continuous

22 Amps continuous, 25 Amps maximum. Like MFJ-4125 but adds Volt/Amp meters, cigarette lighter plug. Adjustable 9-15 VDC Output. 5¼Wx 4½Hx6D in. Weighs 3.7 lbs. Use 85-135 VAC or 170-260 VAC input. Replaceable fuse.

MFJ-4225MV **$99.95**

40 Amp Continuous



***MightyLite*™**

40 Amps continuous, 45 Amps max. Adjustable 9-15 VDC output. Volt/Amp meters, cigarette lighter plug, front 5-way binding posts, two rear quick connects. 5.5 lbs. 7½Wx 4¾Hx9D inches. Use 85-135 VAC or 170-260 VAC input. Replaceable fuse.

MFJ-4245MV **$149.95**

70 Amp Continuous

75 Amps maximum and 70 Amps continuously. Adjustable voltage 4.0-16 VDC. Short circuit, overload and over-temperature protection, 10.5 lbs. 9¾Wx5½Hx9½D". Great for Ameritron's ALS-500M mobile amplifier!

MFJ-4275MV **$249.95**

High Current Multiple DC Power Outlets

Power multiple Transceivers/accessories from a* single *DC power supply . . . Keeps you neat, organized and safe . . .Prevents fire hazard . . . Keeps wires from tangling up and shorting . . . Fused and RF bypassed . . . 6 foot, 8 gauge color coded cable . . .

Versatile 5-Way Binding Posts

MFJ-1118, $84.95. Power two HF and/or VHF rigs and six accessories from your main 12 VDC supply. *Built-in 0-25 VDC voltmeter*. Two pairs 35 amp 5-way binding posts, fused and RF bypassed for transceivers. Six pairs RF bypassed binding posts provide 15 Amps for accessories. Master fuse, ON/OFF switch,"ON" LED. 12½x2¾x2½ in.

MFJ-1118 **$84.95**

MFJ-1116, $59.95. 8 pairs binding posts, 15A total.Voltmeter, on/off switch.

MFJ-1116 **$59.95**

MFJ-1112, $44.95. 6 pairs binding posts, 15 Amps total.

MFJ-1112 **$44.95**

MFJ-1117, $64.95. Powers *four* transceivers simultaneously (two at 35 Amps each and two at 35 Amps combined). 8x2x3 inches.

MFJ-1117 **$64.95**

All PowerPoles™

MFJ-1128, $104.95. 3 high-current outlets for transceivers. 9 *switched* outlets for accessories. Mix & match included fuses as needed (one-40A, one-25A, four-10A, four-5A, three-1A fuses installed). 0-25 VDC *Voltmeter*. *Extra* contacts, fuses. 12Wx1¼Hx2¾D".

MFJ-1128 **$104.95**

MFJ-1126, $84.95. 8 outlets, each fused, 40 Amps total. Factory installed fuses: two 1A, three 5A, two 10A, one 25A, one 40A. *0-25 VDC Voltmeter*. Includes *extra PowerPoles*®, *extra* fuses -- *no extra cost*. 9Wx1¼Hx2¾ inches.

MFJ-1126 **$84.95**

PowerPoles™ *AND 5-Way Binding Posts*

MFJ-1129, $114.95. 10 outlets each fused, 40 Amp total. 3 high-current outlets for rigs -- 2 *PowerPoles*® and one 5-way binding post. 7 *switched* outlets for accessories (20A max) -- 5 *PowerPoles*® and 2 binding posts. Fuses include (1- 40A, 2-25A, 3-10A, 3-5A, 2-1A installed). *0-25 VDC Voltmeter*. Includes extra *PowerPoles*® and fuses, 12½Wx1¼Hx2¾D inches.

MFJ-1129 **$114.95**

MFJ-1124, $64.95. 6 outlets each fused, 40 Amps total. 4 *PowerPoles*®, 2 high-current binding posts, Installed fuses: 1-40A, 2-25A, 2-10A, 1-5A, 1-1A. Includes extra *PowerPoles*® & fuses -- *no extra cost*.

MFJ-1124 **$64.95**

15 Amp Continuous

15 Amps continuous, 17 Amps max at 13.8 VDC. Over-voltage, over-current protection. 5-way binding posts. Load fault indicator and automatic shutdown. 90-130 VAC input. 1½ lbs. Tiny 3¾Wx2¼Hx3¾D inches fits easily in an overnight bag.

MFJ-4115 **$59.95**

30 Amps Continuous

Linear with 19.2 lb.Transformer

This heavy-duty linearly regulated MFJ-4035MV has *abolutely no RF Hash*. It delivers 30 Amps continuous, 35 Amps maximum from its massive 19.2 lb. transformer. Front panel adjustable 1-14 VDC output with convenient detent at 13.8 VDC. Volt/Amp Meters. 1% load regulation, 30 mV ripple. Over-voltage/current/temperature protection, 5-way binding posts, 2 pairs of quick-connects and a covered cigarette lighter socket for mobile accessories. Front panel replaceable fuse. 110 VAC input. 9½Wx6Hx9¾D in.

MFJ-4035MV **$149.95**

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MFJ 160-6 Meter Antenna

Self-supporting 43 foot vertical -- no guy wires required . . . 1500 Watts . . . exceptional performance . . . low-profile . . . includes base mount and legal limit balun . . . assembles in an hour . . .

MFJ-2990
$359.95

New!

Operate all bands 160 through 6 Meters at full 1500 Watt with this self-supporting, 43 feet high performance vertical! It assembles in less than an hour and its low-profile blends in with the sky and trees -- you can barely see it from across the street.

Exceptional Performance

The entire length radiates to provide exceptional low angle DX performance on 160 through 20 meters and very good performance on 17 through 6 Meters. You can shorten it by telescoping it down for more effective low angle radiation on higher bands if desired.

With an automatic antenna tuner there's no fuss -- just talk!

A wide-range automatic or manual antenna tuner *at your rig* easily matches this antenna for all bands 160-6 Meters. There's no physical tuning adjustments on the antenna -- you simply put it up!

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than ½ dB 60-6 Meters and less than 1 dB 160-80 M with good quality, low-loss coax).

Fully self-supporting, Extremely low wind loading, Very low visibility . . .

With just 2 square feet wind load, the fully self-supporting MFJ-2990 -- *no guy wires needed* -- has the lowest wind-loading and lowest visibility of any vertical antenna! The key is a six foot section of tapering diameter *stainless steel* whip that flexes in strong wind instead of stressing the bottom sections. Its 2-inch O.D. and .120 inch thick walled tubing bottom section makes it incredibly strong -- it'll stay up!

Weighs just 20 pounds -- you can easily put it up by yourself because its corrosion resistant *6063 aircraft aluminum* tubing and stainless steel construction make it light *and* super-strong.

Assembles in an hour

You can easily assemble it in an hour! Ground mounting lets you completely hide its antenna base in shrubbery. Includes ATB-65 high-strength antenna mount. Requires ground system -- at least one radial. More extensive ground system will give much better performance.

Great for Stealth Operation in antenna restricted areas

This very low-profile antenna is perfect for stealth operation in antenna restricted areas. Hide it behind trees, fences, buildings, bushes. Use it as a flagpole. Telescope it down during the day. Put it up at night and take it down in the morning before the neighbors even notice!

Quick and easy installation makes it great for DXpeditions, field day and other portable and temporary operations.

MFJ *Automatic* Tuners

MFJ-998
$699.95

For legal limit 1500 Watt SSB/CW amplifiers. Auto-ranging LCD and Cross-Needle SWR/Wattmeter, antenna switch, amp bypass, matches 12-1600 Ohms, 1.8-30 MHz.

MFJ-993B
$259.95

Dual power range -- 300 Watt range matches 6-1600 Ohms. 150 Watt/6-3200 Ohms. Auto-ranging LCD and Cross-Needle SWR/Wattmeter, antenna switch, 1.8-30 MHz.

MFJ *Manual* Tuners

MFJ-989D
$389.95

1500 Watts SSB/CW, 1.8-30 MHz. Active peak-reading Cross-Needle SWR/Wattmeter, balun, dummy load, antenna switch, aircore roller inductor.

MFJ-949E
$179.95

World's most popular tuner! 300 Watts, 1.8-30 MHz. Peak/Average Cross-Needle SWR/Wattmeter, 8 pos. antenna switch, dummy load, 1kV capacitors.

Window Feedthru

MFJ-4602
$69.95

Bring 3 coaxes, balanced line, random wire, ground thru window. Connectors mounted on *stainless steel* panel. ¾" thick *pressure-treated* weather-proof wood.

Free MFJ Catalog

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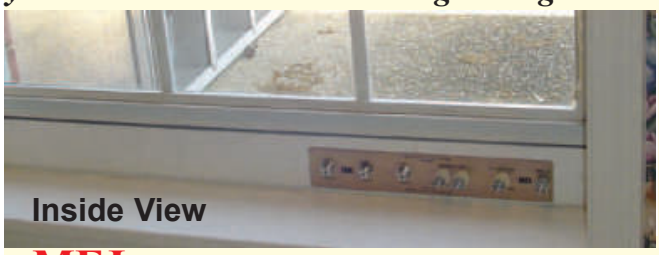
MFJ Weather-Proof *Window Feedthrough Panels*

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!



MFJ Weather-Proof *Window Feedthrough Panels* mount in your window sill. Lets you bring all your antenna connections into your hamshack *without* drilling holes through walls.

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.

Inside/outside stainless steel plates ground all coax shields. Stainless steel ground post brings ground in.

MFJ-4603 Universal Window Feedthru Panel

MFJ-4603 **$89.95**

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.

A 75 Ohm, 1 GHz *F-connector* makes it easy to bring in television, Satellite, HD, cable TV and FM radio signals.

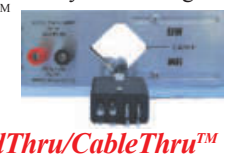
A pair of high-voltage *ceramic feedthru insulators* lets you bring in 450/300 Ohm balanced lines directly to your antenna tuner.

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 1/4X1 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**

4 Balanced Line, 2 Coax

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

New! MFJ-4600 **$79.95**

5 Cables, any-size

5 *Adaptive Cable Feedthrus*™. Pass any cable with connector: 2 cables with large connectors up to 1 1/4x1 5/8 inches and 3 cables with UHF/N size coax connectors. Seals out weather.

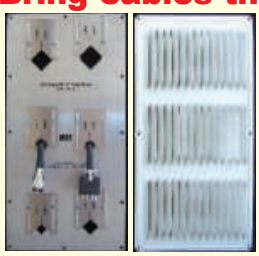
MFJ-4604 **$99.95**

All-Purpose FeedThru/CableThru™

***Stacks** MFJ-4603 **and** MFJ-4604!* Gives you every possible cable connection you'll ever need through your window without drilling holes in wall -- including UHF, N and F coax connectors, balanced lines, random wire, ground, DC/AC power and cables of any size for rotators, antenna switches, etc.

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**

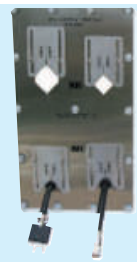
MFJ-4613 shown with standard half-size vent (not included) it replaces. For *3 Cables* **$14.95**

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 1/4x1 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 1/4x1 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**

MFJ-4611 *For 1 Cable* **$14.95**

Free MFJ Catalog
Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

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http://www.mfjenterprises.com for more info, catalog, manuals, dealers

MFJ All-Band G5RV Antennas

Operate all bands through 10 Meters, even 160 Meters, with a single wire antenna!

MFJ-1778
$44.95

***The** famous G5RV antenna is the most popular ham radio antenna in the world!* You hear strong signals from G5RVs day and night, 24/7.

And it's no wonder . . . it's an efficient, *all band* antenna that's only 102 feet long -- shorter than an 80 Meter dipole. Has 32.5 foot ladder line matching section ending in SO-239 connector for your coax feedline.

Use as Inverted Vee or Sloper, and it's even more compact and needs just one support.

With an antenna tuner, you can operate all bands 80 Meters through 10 Meters and even 160 Meters with an antenna tuner and a ground.

MFJ's fully assembled G5RV handles 1500 Watts. *Hang and Play™* -- add coax, some rope to hang and you're on the air!

MFJ-1778M, $39.95. *Half-size*, 52 foot *G5RV JUNIOR* covers 40-10 Meters with tuner. Handles full 1500 Watts.

MFJ All Band Doublet

MFJ-1777
$59.95

MFJ-1777 is a 102 foot *all band* doublet antenna that covers 160 through 6 Meters with a balanced line tuner. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft. included). Authentic *glazed ceramic* end insulators. Handles full 1500 Watts.

MFJ *Dual Band* 80/40 *or* 40/20M Dipoles

MFJ-17758
$89.95
80/40 Meters

MFJ-17758 is a short 85 foot long *dual band* 80/40 Meter dipole antenna. It's *full-size* on 40 Meters and has ultra-efficient end-loading on 80 Meters. Handles full 1500 Watts. Super-strong injection-molded center insulator with built-in SO-239 connector and hang hole. Solderless, crimped construction. 7-strand, #14 gauge hard copper wire. Connect your coax feedline directly, no tuner needed.

MFJ-17754, $59.95. Short coax fed 42 foot long *dual band* 40/20 Meter dipole antenna. *Full-size* on 20 Meters, ultra-efficient end-loading on 40 Meters. Same construction as MFJ-17758.

MFJ *Single Band* Dipole Antennas

Ultra high quality center fed dipoles will give you trouble-free operation for years. Custom injection-molded UV-resistant center insulator has built-in coax connector and hanging hole. Heavy duty 7-strand, 14-gauge hard copper antenna wire. Extremely strong solderless crimped construction. Authentic *glazed ceramic* end insulators. Use as horizontal or sloping dipole or inverted vee. Handles full 1500 Watts. Simply cut to length for your favorite frequency with cutting chart provided.

MFJ-1779A **$69.95** 160M, 265 ft.
MFJ-1779B **$49.95** 80-40M, 135 ft.
MFJ-1779C **$29.95** 20-6M, 35 ft.

True 1:1 Current *Balun & Center Insulator*

MFJ-918
$24.95

True *1:1 Current Balun/ Center Insulator* forces equal antenna currents in dipoles for superior performance. Reduces coax feedline radiation and field pattern distortion -- your signal goes where *you* want it. Reduces TVI, RFI and RF hot spots in your shack. *Don't build a dipole without one!* 50 hi-permeability ferrite beads on high quality RG-303 *Teflon*® coax and *Teflon*® coax connector. Handles full 1.5kW 1.8-30 MHz. Stainless steel hardware with *direct* 14 gauge stranded copper wire connection to antenna. 5x2 inches. Heavy duty weather housing.

RF Isolator

MFJ-915
$29.95

MFJ-915 *RF Isolator* prevents unwanted RF from traveling on the outside of your coax shield into your transceiver. This unwanted stray RF can cause painful RF "bites" when you touch your microphone or volume control, cause your display or settings to go crazy, lock up your transceiver or turn off your power supply. In mobile installations, stray RF could cause your car to do funny things even blow your car computer. Clear up these problems, plug an MFJ-915 between your antenna and transceiver. 5x2 in. Handles full 1500 Watts. Covers 1.8-30 MHz. **MFJ-919, $59.95.** 4:1 current balun,1.5 kW. **MFJ-913, $29.95.** 4:1 balun, 300 Watts.

Antenna Switches

MFJ-1704
$79.95

MFJ-1704 heavy duty 4-Positions *antenna switch* lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. 2.5 kW PEP. Less than .2 dB insertion loss, SWR below 1.2:1. SO-239 connectors. Handy mounting holes. 6¼Wx4¼Hx1¼D in.

MFJ-1702C
$39.95
2-Positions

MFJ-1702C Like MFJ-1704, but for 2 antennas. 3Wx2Hx2D"

MFJ-1700C
$99.95

MFJ-1700C *Antenna/ Transceiver Switch* lets you select one of six antennas and one of six transceivers in any combination. Plug in an antenna tuner or SWR wattmeter and it's always in-line for any antenna/transceiver combination. Has lightning surge protection. Handles 2 kW PEP SSB, 1 kW CW, 50-75 Ohm loads. Unused terminals are automatically grounded. 1.8 to 30 MHz. SO-239 connectors. 4¾W6½Hx3D inches.

MFJ-1701
$69.95

MFJ-1701 *Antenna Switch* like MFJ-1700C but lets you select one of six antennas only. 10Wx3Hx1½D inches.

33 ft. Telescoping fiberglass Mast

3.8 feet collapsed, 3.3 lbs.

MFJ-1910
$79.95

Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

Make your own antennas

Dipoles, G5RV, Random Wire, Doublets, Beverage Antennas, etc.

MFJ-16C06, $4.56. 6-pack authentic *glazed ceramic* end/center antenna insulators.
MFJ-16B01, $19.95. Custom injection-molded UV-resistant center insulator has built-in coax connector and hanging hole.
MFJ-18G100, $24.95. 100 ft. of flexible, 7-strand, 14-gauge solid copper antenna wire.
MFJ-58100X, $49.95. 100 ft. 50-Ohm RG-8X with PL-259s on each end.
MFJ-18H100, $34.95. 100 feet, 450 Ohm ladder line, 18 gauge copper covered steel.

Lightning Surge Protectors

Ultra-fast gas discharge tube shunts 5000 amps peak. Less than 0.1 dB loss. Up to 1000 MHz. SO-239s. **MFJ-270, $29.95.** 400W PEP. **MFJ-272, $39.95.** 1500W PEP.

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Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer. . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

The MIRAGE B-5018-G gives you 160 Watts output for 50 Watts input on all modes -- FM, SSB, or CW!

Ideal for 25-50 Watt 2 Meter mobile or base. Weak signals pop out with its low noise *GaAsFET* preamp and its excellent 0.6 dB noise figure. Selectable 5, 8 or 14 dB preamp gain.

Exclusive MIRAGE *ActiveBias*™ circuit gives *crystal clear SSB* without splatter or distortion.

B-5018-G is legendary for its ruggedness and is fully protected -- high SWR or excessive input power automatically bypasses the B-5018-G to prevent damage.

Heavy-duty heatsink spans entire length of cabinet. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

Has adjustable delay *RF sense* Transmit/Receive switch *and* remote external keying. 16-20 Amps at 13.8 VDC.12x3x5½ inches.

B-5018-G **$329.95**

B-1018-G, $409.95. MIRAGE's most popular *dual purpose* HT or mobile/base amplifier. 160 Watts out for 10 Watts in. For 0.25-10 Watt rigs.

B-2518-G, $329.95. Same as B-5018-G but for 10 to 25 Watt mobile or base. 160 Watts out for 25 Watts in.

RC-2, $49.95. Remote Control. On/Off,pre-amp On/Off, selects SSB/FM. With 25 foot cable.

Power Curve -- typical output power in Watts

B-1018-G	25	50	140	150	160	160	--	--	--	--
B-2518-G	5	7	40	60	80	100	125	160	--	--
B-5018-G	--	2	15	25	40	50	70	100	130	160
Watts In	.25	.5	3	5	8	10	15	25	35	50

35 Watts for 2 Meter HT

For handhelds up to 8 Watts. 35 Watts out for 3-8 Watts in (18 W out/1W in)! 18 dB *GaAsFET* preamp. All modes: FM, SSB, CW. RF sense T/R switch. Reverse polarity protection. Includes mobile bracket, 1 year warranty. 5¼Wx1¾Hx4¾D in.

B-34-G **$129.95**

35 Watts, $109.95, FM only

B-34, $109.95. 35 Watts out for 2 Watts in. Like B-34-G, FM only, less pre-amp, mobile bracket. 3⅛Wx1¾Hx4¼D in.

MIRAGE Dual Band 144/440 MHz Amp

Boost your *dual band* 144/440 MHz handheld to a powerful mobile/base -- 45 Watts on 2 Meters/ 35 Watts on 440 MHz! Works with all FM handhelds to 7 Watts. Includes *full duplex* operation -- lets you talk on one band, listen on other at same time. Auto band selection, RF sense T/R switch, single connector, reverse polarity protection, 5Wx1¾Hx5D in. Mobile bracket. One year warranty.

BD-35 **$199.95**

100 Watts for 2M HT

100 Watts out for 2-8 Watts in! Great for HTs up to 8W. FM, SSB, CW. 15 dB *GaAs-FET* preamp, RF sense T/R, high-SWR protected.

B-310-G **$249.95**

http://www.mirageamp.com

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the *finest* antenna tuner made!

. . . the VECTRONICS HFT-1500

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- ***SSB*Analyzer Bargraph™***
- ***Cross-Needle Meter***
- ***6 Position Antenna Switch***
- ***Built-in 4:1 Balun***
- ***Gear driven Turns Counter***

The VECTRONICS HFT-1500 is not just an antenna tuner . . . it's a beautifully crafted work of art, using the finest components available and the highest quality construction.

Every HFT-1500 aluminum cabinet is carefully crafted with a super durable paint that won't scratch or chip.

Attractive two-color Lexan front panel is scratch-proof. Take a quarter. Scratch the front panel. You won't leave a mark!

Arc-Free Operation

Two 4.5 kV transmitting variable capacitors and a massive roller inductor gives you arc-free operation up to 2 kW PEP SSB.

Precision Resetability

A sturdy hand cranked roller inductor lets you quickly fly from band to band. A precision 5-digit gear driven turns counter lets you accurately retune.

HFT-1500 **$479.95**

Large comfortable knobs and smooth vernier drives make tuning precise and easy. Bright red pointers on logging scales make accurate resetability a breeze.

Absolute Minimum SWR

You can tune your SWR down to the absolute minimum! **Why?** Because all network components -- roller inductor and variable capacitors are fully adjustable.

Tune any Antenna

You can tune any *real* antenna from 1.8 to 30 MHz, including all MARS and WARC bands. You can tune verticals, dipoles, inverted vees, Yagis, quads, long-wires, whips, G5RVs, and more.

SSB*Analyzer Bargraph™

Exclusive 21 segment bargraph lets you visually follow your instantaneous voice peaks. Has level and delay controls.

Accurate SWR/Power Meter

A shielded directional coupler and backlit Cross-Needle meter displays accurate SWR, forward and reflected power simultaneously. Reads both peak and average power on 300/3000 Watt scales.

6 Pos. Ceramic Antenna Switch

Select two coax fed antennas (tuned or bypassed), balanced line/wire or bypass.

Built-in Balun

A heavy duty two ferrite core 4:1 balun feeds dual high voltage Delrin terminal posts for balanced lines. 5.5x12.5x12 inches. One year limited warranty.

Call toll-free, 1-800-363-2922

Order the HFT-1500 from Vectronics. Try it for 30 days. If you are not completely satisfied, return it for a full refund, less shipping and handling -- no hassles.

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QST QuickStats

sta·tis·tics (st-tstks) n.
1. (used with a sing. verb) The mathematics of the collection, organization, and interpretation of numerical data, especially the analysis of population characteristics by inference from sampling.
2. (used with a pl. verb) Numerical data.

www.arrl.org/QuickStats

Online QuickStats Poll Results for June 6 through July 2, 2012.
Get on the web and vote today at **www.arrl.org/quickstats**!

Have you ever operated on a microwave band (1.2 GHz and above)?

Yes: **19%**
No: **81%**

How long is your longest wire antenna?

Less than 100 feet: **29%**
100 to 200 feet: **42%**
201 to 300 feet: **10%**
More than 300 feet: **5%**
I don't have any wire antennas: **14%**

What is your favorite way to read digital *QST*?

On my desktop computer: **34%**
On my laptop computer: **18%**
On my tablet device: **12%**
On my smartphone: **1%**
I don't read digital *QST*: **35%**

Do you own an RF spectrum analyzer?

Yes: **22%**
No: **78%**

MFJ 40th Anniversary

You're Invited!

Come and celebrate with us . . .

October 5 & 6, 2012 in Starkville, MS 39759

FREE PRIZES!

Major prizes from MFJ, Ameritron, Cushcraft, Hy-Gain, Mirage, and Vectronics. Drawing Oct. 6, 2 p.m. Must be present to win.

FREE FACTORY TOURS

Interesting, educational tours for the whole family at MFJ, Ameritron, Cushcraft, Hy-Gain, Mirage, Vectronics, MFJ Metal. Fri., Oct. 5, 8 am-4:30 pm and Sat., Oct. 6, 7 am-12:00 noon.

FREE LUNCH

Mississippi southern fried chicken in McKee Park, Oct. 6, 12-2 pm. Bring your own chair!

FREE TAILGATING

Haggle and deal in the MFJ parking lot and McKee Park, Oct. 6, 7 am- 2 pm.

FREE FORUMS/DEMOS

Chip Margelli, K7JA, famous DXer and other special guests.

FCC License Exams

Get your license or upgrade. W5YD Mississippi State University Club VEs. Bring government photo ID and $15 cash, Oct. 6, 4:00 p.m.

Thank You!

Dear Fellow Ham,

MFJ humbly started in a small downtown hotel room in Starkville, Mississippi in October of 1972. The original product, a CW Filter Kit, CWF-2, sold for $9.95.

Today, MFJ Enterprises, Inc. is a total of six different ham radio companies and manufactures over 2000 different products. More than 90% are made right here in Starkville, Mississippi, the *United States of America*.

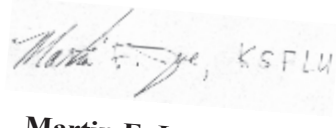
October, 2012 will mark the *40th Anniversary* of our ham radio adventure and I am deeply grateful for the incredible support we have had from our fellow hams.

Without the support of our fellow hams, the hard work and dedication of our employees and the tremendous support from our countless friends, this 40th Anniversary milestone could not have been achieved.

I want to thank each one of you for making this American dream come true.

Thank you, thank you very much . . .

Sincerely,



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ID-1

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D-STAR stands for Digital Smart Technology for Amateur Radio.

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October 12, 13 & 14 at the
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Pacificon—This premier west coast Amateur Radio convention features over 80 forums and presentations, plus a huge exhibit hall with commercial dealers and manufacturers, flea market and outdoor swap meet. Enjoy dozens of programs for QRP, DX, kit building, transmitter hunts, and demonstrations of Amateur Television (ATV/DATV), satellite, and more!

ARRL EXPO 2012—A large exhibit area featuring ARRL program representatives, activities and a huge ARRL bookstore.

All-Day Antenna Seminar (Fri.)

Law Forum (Saturday morning)

DXCC Card Checking—and other ARRL operating awards

Saturday Banquet

Licensing Class and Exam Sessions

W1AW/6 Special Event Station

International Space Station—scheduled ARISS radio contact

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Online Registration is OPEN!
www.pacificon.org

TICKETS
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General admission
in advance $23
at the door $28

Youth 17 and under are FREE (registration and Youth Convention Badge is required).

See www.pacificon.org for more information including lodging options and travel information.

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California's Great America theme park (next door!)

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Computer History Museum

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Triton Museum of Art

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IC-7410 HF + 6m

100 Watt Output (40W AM)

RX: 0.030–60.000MHz*

32 Bit Floating Point DSP Unit

+30 dBm 3rd Order Intercept Point*

Double Conversion Superheterodyne System

Built-in 15kHz 1st IF Filter (Optional 3kHz/6kHz)

USB Port for PC Control and Audio In/Out

USB Control Audio

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Digital Twin Passband Tuning

USB Port for PC Control and Audio In/Out

Flexible Selectable Filter Width and Shape

USB Port for PC Control and Audio In/Out

IC-7000 HF/6m/2m/70cm

100W (40W AM),
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35W on 70CM (14W AM)

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Digital IF Filters

Digital Voice Recorder

Front Panel Separation
with Optional 3.5m
or 5m Cable (As Shown)

USB Control Audio

IC-9100 HF + 6m + 2m + 70cm + 23cm[1]

100/100/100/75/10[1] Watt Output[3]

RX: 0.030–60.000[2], 136.000–174.000[2],
420.000–480.000[2], 1240.000–1320.000[2,3]MHz

AM[3], FM, SSB, RTTY, CW, & DV[1]

Satellite (Mode B/J/L[1])

+30dBm TOI[2]

Two Independent 32-bit DSP Systems

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Double Conversion Superheterodyne
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*Frequency coverage may vary. Refer to owner's manual for exact specifications.
[1]Optional UX-9100 required. [2]HF (14MHz) [3]See manual for AM output power.

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And we sell only *genuine* Anderson Powerpoles.
No Chinese copies here!

The Ultimate Powerpole *and* Coax Prep, Strip & Crimp Kit

Includes full-cycle ratchet crimper with our Andy-Crimp Pro™ die set plus two coax die sets, two coax strippers, wire strippers and coax cutter; all in a sturdy ABS case. Crimps 15-30-45-50-75A Powerpoles, Molex connectors, insulated and uninsulated terminals, LMR-400, 9913, RG-8, RG-213, RG-8X, RG-58, RG-316, RG-174, and more.
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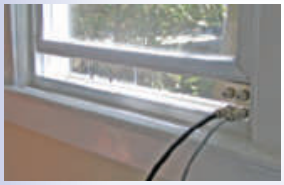

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JETSTREAM®

3 Position Coax Switch

JTCS3M

DC - 1 Ghz, Connector: SO239, Power rating: 1.5 kw, Insertion loss: DC-500 Mhz < .05db, Isolation: DC-500 Mhz > 70db

$54.95

2 Position Coax Switch

JTCS2M

DC - 1 Ghz, Connector: SO239, Power rating: 1.5 kw, Insertion loss: DC-500 Mhz < .05db, Isolation: DC-500 Mhz > 70db

$32.95

JTSEAL1 Single roll of WIDE seal weather proofing material also available. 1 roll 2" x 24"

$3.95

TS-590S

High Performance HF Transceiver

The TS-590S marks a bold new chapter in Kenwood's proud history of manufacturing high-performance transceivers. Featuring a narrow-band Roofing Filter the TS-590S significantly reduces interference from unwanted signals that would be hidden to lesser rigs. With IF AGC based on advanced DSP technology, Kenwood has essentially redefined HF performance. Built to satisfy the most demanding DX'er, this high-performance HF transceiver takes Amateur Radio to the next level continuing the Kenwood tradition of operating ease and rugged reliability.

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MC60A Desk top mic	149.95
MC90 Desk top mic	249.95
PS60 Heavy Duty Power Supply	429.95
SO3 TCXO	109.95
SP50B External Mobile Speaker	54.95
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KENWOOD

TH-D72A

144/440 MHz FM Dual Bander

Featuring the SiRFstar III high-performance GPS receiver, Kenwood's TH-D72A dual-band transceiver is compatible with APRS® data communications. Built-in high-performance GPS receiver, APRS® firmware equipped as standard, USB (Mini-B) port, Built-in 1200/9600 bps TNC compliant with AX.25 protocol, Stand-alone digipeater, Simple node access with EchoLink® memory, Enhanced operating ease and visibility, MIL-STD810 & IP54 weatherproofing, Long operating hours (high-capacity battery included), Kenwood Sky Command System II, Weather Alert/RX

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KSC32 Desktop Rapid Charger	52.95
PB45L 1800 mAh Li-Ion Battery Pack	73.95
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2012 ARRL Photo Contest

Antenna Time

A total of 79 ARRL members who also enjoy taking photos sent us their best work this year, making it a challenge for the judges to pick the best images. After the dust settled, Editorial and Production staff members had chosen the top 6, and we are pleased to present them on these pages.

In addition to publication in this article, any of the submitted photos may find their way into *QST*, the ARRL Amateur Radio Calendar or other ARRL publications. In fact, one of them — the Overall Winner — has already been published on the front cover of last month's issue.

Congratulations to the winners of this year's ARRL Photo Contest! We didn't intend for all the winning photos to be antenna-related, but that's how it turned out.

The announcement for the 2013 Photo Contest will appear in a spring 2013 issue of *QST*. Our thanks to all who entered this year's contest — and to the judges, who had to choose among a host of worthy entries.

— *Joel Kleinman, N1BKE*

Overall Winner

MARC FRANCO, N2UO

Homebrew Dish

Hearty congratulations to the overall winner: Marc Franco, N2UO, of Summerfield, North Carolina. Marc shot his homemade 20 foot parabolic antenna just before sunrise during the 2011 ARRL EME Contest.

Second Place

BILL GLYNN, WAØARM

A Sign of Hope 10 Years On

Another sunrise photo took Second Place. As the photographer, Bill Glynn, WAØARM, of Topeka, Kansas describes it: "The sun rises on September 11, 2011, 10 years after the event that continues to inspire VHF/UHF contesting as an exercise in skills preparation. The photo was taken during the 2011 VHF QSO Party while I was operating in a pasture in EM19, northeast Kansas, on 6 and 2 meters and 70 cm."

2012 ARRL Photo Contest

Antenna Time

Third Place

FRANZ LANGNER, DJ9ZB

Malpelo Island Sunset

The Third Place winner is Franz Langner, DJ9ZB, whose impressive sunset photo was taken during the 2012 HKØNA Malpelo DXpedition. An experienced DXpeditioner, Franz is also clearly quite handy with a camera. Malpelo Island is a tiny speck in the Pacific, west of Colombia and south of Panama.

Fourth Place Tie

ROBERT LECLERC, VA2RPL

Nighttime QRP in Quebec

There was a three-way tie for Fourth Place.

Robert Leclerc, VA2RPL, sent us this atmospheric photo of a laser voice and CW operation on Mont Hereford, Quebec. Using all-homebrew equipment, he and his group achieved line of sight contacts spanning 121 km (75 miles) using as little as 5 mW modulated lasers between FN45eb (Mont Hereford) and FN46id (near Thetford Mines).

Continued on page 144

Antenna Time

Fourth Place Tie

TOM TAORMINA, K5RC

Wild Horses with Antenna Backdrop

Also coming in Fourth was a photo taken by Tom Taormina, K5RC. As he explains: "Wild mustangs are virtually daily visitors to the Comstock Memorial Station, W7RN. They coexist very well with ham radio antennas. The station is located at K5RC/K7AFO's home on open range outside Virginia City, Nevada."

Fourth Place Tie

SCOTT MCDONALD, KA9P

Hangin' Low...For Now

Another Fourth Place winning entry was submitted by Scott McDonald, KA9P, of Hinsdale, Illinois. Scott took this shot of his newly installed Tennadyne T6 log periodic antenna after a winter storm had coated it with about 3 inches of ice. "Happily," he writes, "after the thaw everything was okay."

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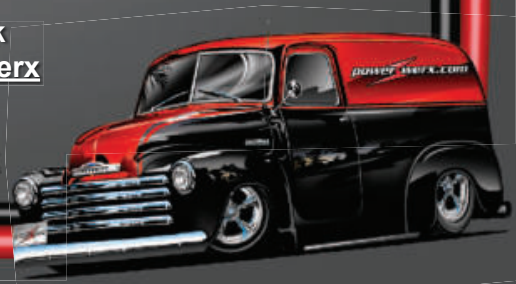

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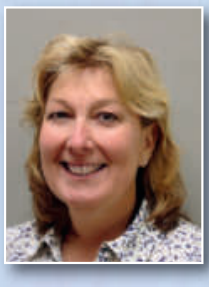

For more information, please contact:

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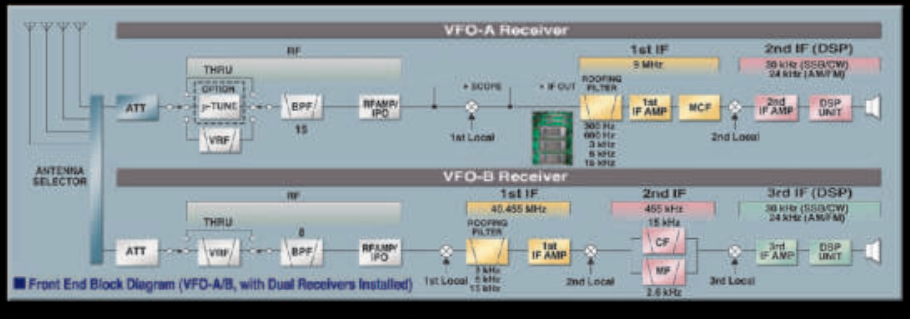

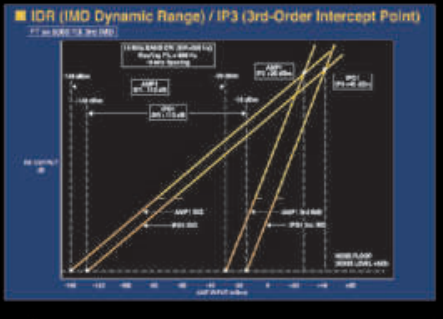

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