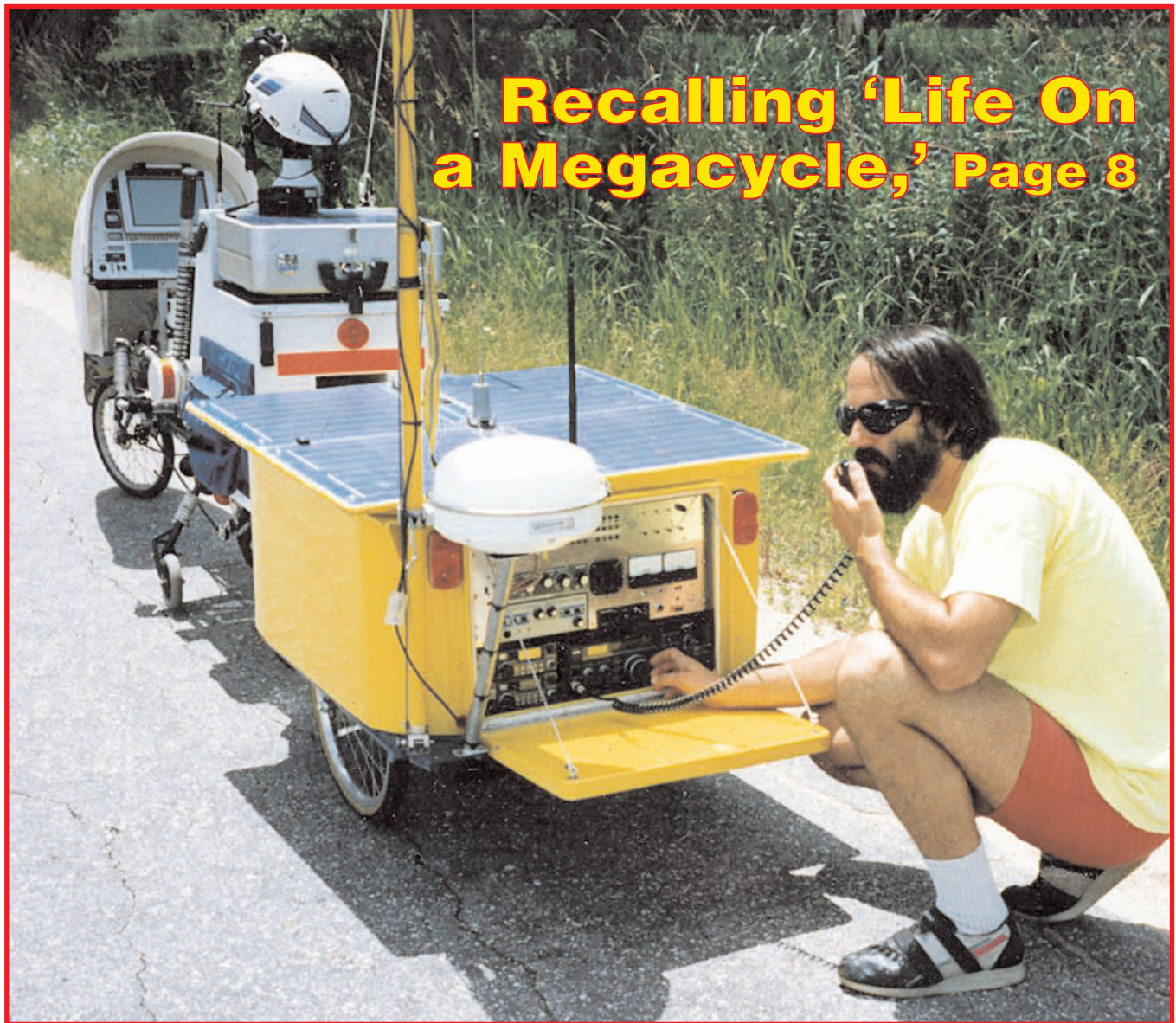


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ONLINE

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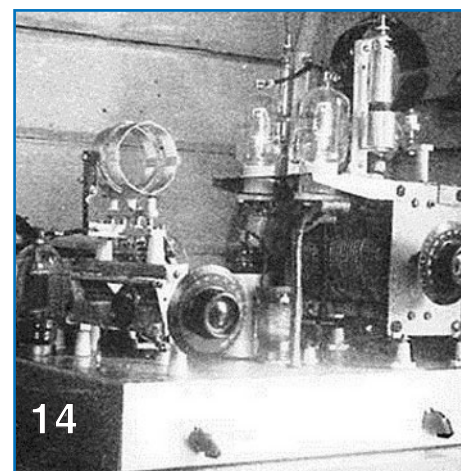
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On the Cover: Steve Roberts, N4RVE’s, \$1.2 million BEHEMOTH – featured in this month’s *Station Appearance* – now resides in the *Computer History Museum* in Mountainview, California – Silicon Valley. (Courtesy of N4RVE)



HAMFESTS & SPECIAL EVENTS

JULY

WAYNESVILLE, NORTH CAROLINA — WCARS Hamfest July 30 at Haywood County Fairgrounds, Waynesville, North Carolina. Sponsored by Western Carolina Amateur Radio Society. \$5 per ticket if you buy in advance. \$7 at the gate. \$12 for vendors per table. The club will be giving VE Exams. Free tailgating and parking with the purchase of a ticket. Contact: Randy Harris, KI4VLW, <rstp71@aol.com>. On the Web: <<http://www.wcars.org>>.

OKLAHOMA CITY, OKLAHOMA — 36th Annual Ham Holiday 2011, July 29-30. Presented by the **Central Oklahoma Radio Amateurs Inc.**, at the Biltmore Hotel/Conference Center, I-40 and Meridian, Oklahoma City <<http://www.biltmoreok.com>>. From 4 p.m. to 8 p.m. Friday, July 29; and 8 a.m. to 3 p.m. Saturday, July 30. Technical and nontechnical programs, DXCC/WAS card check, VE testing, flea market. Pre-registration \$8; at door \$10; flea markets \$15/table in advance; \$20/table at door (if available). Online registration available in early May. Under 16 years of age free with adult. Talk-in: 147.03 (+ offset, PL 167.9Hz). Additional information and registration forms available on the CORA Web site: <<http://www.HamHoliday.org>>. Vendors, contact <kc5qev1@att.net> for details. See the CORA webpage <<http://hamholiday.org>> for preregistration information.

OSHKOSH, WISCONSIN — Special Event Station W9ZL, from **EAA Airventure 2011**, July 27-31, 1500-0000 UTC. World's largest airshow and fly-in. Fox Cities Amateur Radio Club, Inc., will operate W9ZL from the EAA grounds on 14.250 and 7.250 MHz, and 52.550 MHz FM. Certificate available. Send QSL and large SASE to FCARC AirVenture 2011, PO Box 2346, Appleton WI 54912.

OAK CREEK, WISCONSIN — South Milwaukee Amateur Radio Club 44th annual SWAPPFEST, July 9, 6:30 a.m. to at least 2 p.m. CDT, American Legion Post No. 434 grounds, 9327 S. Shepard Ave. Free parking, picnic area, extremely limited free overnight camping. Hot and cold beverages, and donuts and sandwiches available. Admission: \$5 per person. Prizes will include \$100 at noon. Talk-in: 146.52 simplex and local repeaters. Free flyer with map: The South Milwaukee Amateur Radio Club Inc., Post Office Box 222, South Milwaukee, WI. 53172-0222. On website: <<http://www.qsl.net/wa9txe>>.

NORTH BEND, NEBRASKA — Pioneer Amateur Radio Club 14th Annual Flea Market at St. Charles Parish Center. North Bend, Nebraska. July 30 from 9 a.m. to 12:30 p.m. Free coffee and tea. Admission \$2. Each table is \$5 in advance or \$7 at door. Prizes. Complete details: <<http://www.k0jfn.com>>.

OAK CREEK, WISCONSIN — South Milwaukee Amateur Radio Club Summer Swapfest, July 9 at American Legion Post No. 434, 9327 S. Shepard Ave., Oak Creek, Wisconsin. 6:30 a.m. to about 2 p.m. Limited free overnight parking. Breakfast and lunch served by the auxillary. Flyer and a map with a link to Mapquest: <www.qsl.net/wa9txe/>. There is a \$100.00 prize given away at noon. Contact: WB9TIK, <wb9tik@sbcglobal.net>.

KIMBERTON, PENNSYLVANIA — Valley Forge Hamfest and Computer Fair, July 17 at Kimberton Fire Company Fairgrounds, Rt.113, Kimberton, Pennsylvania. Sponsored by The Mid-Atlantic ARC. Full details including a printable flyer can be

found at <<http://www.marc-radio.org>>. Sellers, 7 a.m. Buyers 8 a.m. Talkin: 145.13/- and 147.06/+ ctcss 131.8. Contact Mike Pilotti, KF3CD at <kf3cd@arrl.net> or (610) 696-5040.

INDIANAPOLIS, INDIANA — Indianapolis Hamfest, July 9. Gates open 6 a.m. Air-conditioned commercial building, large outdoor flea market, MARS meeting, forums, contest, dual-band HT given away each hour. More information: <<http://www.indyhamfest.com>> or (317) 261-6658.

NORTH BEND, NEBRASKA — Pioneer Amateur Radio Club 14th Annual Flea Market at St. Charles Parish Center. North Bend, Nebraska. July 30 from 9 a.m. to 12:30 p.m. Free coffee and tea. Admission \$2. Each table is \$5 in advance or \$7 at door. Prizes. Complete details: <<http://www.k0jfn.com>>.

AUGUST

HUNTINGTON, WEST VIRGINIA — Tri-State Amateur Radio Association Hamfest and Computer Show, August 13, 8:30 a.m. to 1 p.m., Veterans Memorial Field House, 2590 5th Ave., Huntington, West Virginia. ARRL-sponsored exams. Talk-in: 146.76, (PL 131.8). Admission: \$6. Table fee: \$10 each. Information: <<http://www.qsl.net/tara/>>. Contact: Judy Taylor, WD8EOP, (304) 525-4237.

ALLIANCE, OHIO — Special Event Station W8LKY, Alliance Amateur Radio Club, is celebrating **Alliance Carnation Days**, Alliance, Ohio. August 20 from 1400Z to 2100Z on 7.045, 7.240+/-, 14.045, 14.200, 21.250. For certificate, write: AARC-W8LKY, P.O. Box 3344, Alliance, OH 44601.

MONTEZUMA PASS, ARIZONA — Special Event Station W7SVD. Operating August 27 from Montezuma Pass high in the Huachuca Mountains of southeastern Arizona at Coronado National Memorial. Commemorating the **establishment of the National Park Service in 1916**. Portable operation will be from 1500-2300 UTC on 7.225, 14.275, 21.285 and 28.350 SSB; 7.050, 14.050, 21.050 and 28.050 CW, PSK31 and JT65 on 40, 20, 15 and 10 meters. Send QSL and SASE to: W7SVD, 1955 Santa Teresa Dr, Sierra Vista, AZ 85635. Additional information: <<http://www.w7svd.net>>.

SEPTEMBER

CHICAGO, ILLINOIS — Radio Expo 2011. Hosted by **The Chicago FM Club**. September 10-11, Boone County Fairgrounds. Radios, computers, electronics. 8 a.m. to 3 p.m. both days. VE Testing both days. Advance tickets \$8. At the gate: \$10. Tickets good for both days. Talk-in: 146.760/147.255 (PL 114.8) and 146.550 simplex. For more information, e-mail: <cfmc.radioexpo@yahoo.com>, or call (224) 353-9721.

OCTOBER

DENISON, TEXAS — Special Event Station W5I. October 15 from 1500Z-2300Z in celebration of the **121st birthday of Dwight Eisenhower**, 34th President of the United States. Frequencies: 14.250 MHz. For QSL card, send QSL and SASE to David Booth, 409 Umstead, Colbert, OK 74733.

Have your hamfest or special event listed . . . click here!



CONTEST CORNER

CONTEST: RAC Canada Day
DATE & TIME: 0000-2359Z 1 Jul
BANDS/MODE: 160-2M CW/SSB/FM/AM
POINTS: 2 Pts outside Canada; 10 Pts Canadian Contacts; 20 Pts Contacts with RAC official stations
MULTIPLIERS: CA Provinces/Territories (13 possible)
EXCHANGE: Canadians give RS(T) and Province/Territory; All others give RS(T) + Serial #
ENTRY CATEGORIES: Single op - Single band; Single op - QRP (5W max); Single op - Low (100W max); Single op - High; Multi-op, Low (<100W); Multi-op High (>100W); Multi op - multi XMTR
ENTRIES: 31 July Radio Amateurs of Canada 720 Belfast Road, Suite 217, Ottawa, Ontario, Canada K1G 0Z5
 Entry forms and Cabrillo format guidelines available at: www.rac.ca/en/rac/programmes/contestsCanada
 E-mail: canadaday@rac.ca
 Rules at: <http://www.rac.ca/en/rac/programmes/contests/files/2011%20Canada%20Day%20Rules-Entry%20Form.pdf>

CONTEST: DL-DX RTTY
DATE & TIME: 1100Z 2 Jul – 1059Z 3 Jul
BANDS/MODE: 80-10M RTTY/Digital
POINTS: 5 Pts. own country; 10 Pts. other country, same continent; 15 Pts. other continent
MULTIPLIERS: DXCC countries each band; Call areas in VK, VE, JA and U.S. each band
EXCHANGE: RS(T) + serial #
ENTRY CATEGORIES: Single op, Multi-band; Multi op, Multiband; Club
ENTRIES: 10 Aug. Cabrillo logs to: logs@drcg.de
 Rules at: http://drcg.de/index.php?option=com_content&task=view&id=24&Itemid=36&lang=en

CONTEST: MI QRP 4th of July Sprint
DATE & TIME: 2300Z 4 Jul - 0300Z 5 Jul
BANDS & MODES:
POINTS: 2 Pts. non-member sta; 4 Pts. non-member, DX contacts; 5 Pts. member sta's
MULTIPLIERS: States/Provinces/Countries each band
EXCHANGE: RST + QTH + member # (non-members give power)
ENTRY CATEGORIES: A = <250mW; B = 250mW - 1W; C = 1 - 5W; D =>5W
ENTRIES: 30 Days Hank Greeb, N8XX 5727 11 Mile Rd. NE, Rockford, MI 49341-9502
 E-mail: n8xx@arrl.org
 Rules at: www.qsl.net/miqrpclub/contest.html

CONTEST: FISTS Summer Sprint
DATE & TIME: 2000 – 2359 EDT 8 Jul
BANDS/MODE: 80-10M CW
POINTS: 2 Pts non-member sta; 5 Pts. QSO with FISTS members
MULTIPLIERS: State/Provinces
EXCHANGE: RST + State/Province/DXCC Country + Name + FISTS # (non-members give power)
ENTRY CATEGORIES: QRP (<5W); QRO (>100W); Club
ENTRIES: 30 Days Gil Woodside, WA1LAD 30 Hilltop Ave., West Warwick, RI 02893-2825
 E-mail: wa1lad@cox.net (Cabrillo or ASCII)
 Web site: www.fists.org/sprints.html
 Rules at: www.fists.org/sprints.html

CONTEST: IARU HF World Championship
DATE & TIME: 1200Z 9 Jul - 1200Z 10 Jul
BANDS/MODE: 160-10M CW/SSB
POINTS: 1 Pt. own ITU zone; 3 Pts Same continent, different ITU Zone; 5 Pts. Different continent and zone
MULTIPLIERS: ITU Zones + IARU HQ sta;s
EXCHANGE: IARU Member society HQ stations give RS(T) + society abbreviation; All others give RS(T) + ITU Zone
ENTRY CATEGORIES: Single op - Phone, CW or Mixed; Multi op - Single XMTR, Mixed Mode only!
ENTRIES: 9 Aug. IARU HF Championship IARU International Secretariat Box 310905 Newington, CT 06111-0905
 E-mail: (Cabrillo format) iaruhq@iaru.org
 Rules at: www.arrl.org/iaru-hf-championship

CONTEST: DMC RTTY
DATE & TIME: 1200Z 16 Jul – 1200Z 17 Jul
BANDS/MODE: 80-10M RTTY
POINTS: 1 Pt. per QSO
MULTIPLIERS: DXCC, JA, W, VE, VK (One time only!)
EXCHANGE: RS(T) + serial #
ENTRY CATEGORIES: Single op, All bands, QRP, Low (<100W) High (>100W), 12-Hour or 24 Hour; Multi op, All-bands, Single XMTR
ENTRIES: 21 Aug DMC Contest Committee P.O. Box 8 6000 Stara Zagora, Bulgaria
 Cabrillo logs to: dmcrtty@digital-modes-club.org or dmc@digital-modes-club.org
 Rules at: http://digital-modes-club.org/index.php?option=com_content&view=article&id=58&Itemid=56&lang=en

CONTEST: North American QSO Party
DATE & TIME: 1800Z 16 Jul - 0600Z 17 Jul
BANDS/MODE: 80-10M RTTY
POINTS: 1 Pt. per QSO
MULTIPLIERS: State/Provinces/Territories/NA Countries
EXCHANGE: Name + State/Province/Territory/NA Country; non-NA sta's give name only
ENTRY CATEGORIES: Single Rules at: www.ncjweb.com/naqprules.php
 op; Multi op, 2 XMTRS (100W power limit for all categories)
ENTRIES: 14 Days Mark Aaker, K6UFO 300 Berry Unit 100, San Francisco, CA 94158-1668
 Cabrillo to: rtynaqp@ncjweb.com
 Rules at: www.arrl.org/iaru-hf-championship

CONTEST: CQ Worldwide VHF Contest
DATE & TIME: 1800Z 16 Jul - 2100Z 17 Jul
BANDS/MODE: 6 & 2M
POINTS: 1 Pt. 6M; 2 Pts 144 MHz
MULTIPLIERS: Grids per band
EXCHANGE: Maidenhead Grid Locator (4 digit)
ENTRY CATEGORIES: Single op - single band (6 or 2M); Single op - QRP (all bands); Single op - All band portable limited (6 Hrs max continuous); Rover; Hilltop; Multi op; Club
ENTRIES: 1 Sep CQ VHF Contest 25 Newbridge Rd., Hicksville, NY 11801;
 E-mail: (Cabrillo format) cqvhf@cqww-vhf.com
 Web page: www.cq-amateur-radio.com
 Rules at: <http://www.cqww-vhf.com/rules.htm>

CONTEST: Run for the Bacon
DATE & TIME: 2100-2300 PM Eastern 17 Jul
BANDS/MODE: 80-10M CW
POINTS: 1 Pt. non-member QSO; 3 Pts. Flying Pig member; 5 Pts. FP member different continent
MULTIPLIERS: States/Provinces/Countries
EXCHANGE: RST + State/Province/Country + FP #; (non-members give power)
ENTRY CATEGORIES: Single band; All band
ENTRIES: Must be submitted via Autolog at: <http://www.fqqr.com/autolog.php>
 Rules at: <http://www.fqqr.com/fqqrprun.php>

CONTEST: NAQCC Sprint
DATE & TIME: 0030-0230Z 22 Jul
BANDS/MODE: 80/40/20M CW
POINTS: 1 Pt. non-member QSO; 2 Pts. member QSO
MULTIPLIERS: States/Provinces/Countries
EXCHANGE: RST + State/Province/Country + Member # (non-members give power)
ENTRY CATEGORIES: SWA (simple wire antenna); GAIN (antennas other than simple wire antenna)
ENTRIES: 4 Days John Shannon, K3WWP, 478 E. High St., Kittanning, PA 16201
 E-mail: naqcc33@windstream.net
 (Submit log as plain text, NO attachments!);
 Online logger (preferred method) at: <http://naqcc.info/sprintlog.html>
 Rules at: http://naqcc.info/sprint_rules.html

CONTEST: MARAC County Hunters
DATE & TIME: 1200Z 30 Jul – 0600Z 31 Jul and 1200-2359Z 31 Jul
BANDS/MODE: 160-10M SSB/CW
POINTS: Fixed sta's - 1 Pt. U.S. fixed, 2 Pts. non- U.S., 15 Pts. U.S. mobile; Mobile sta's - 1 Pt. U.S.fixed, 5 points for non-U.S., 15 Pts. U.S. Mobile; DX – 1 Pt. U.S. fixed, 15 Pts. U.S. mobile
MULTIPLIERS: Total of U.S. Counties (3,077)
EXCHANGE: U.S. sta's give RS(T) + County + State; DX gives "DX"
ENTRY CATEGORIES: Single op only!
ENTRIES: 31 Aug Scott Petty 2063 N. turnpike Rd., Dalton, PA 18414
 E-mail: ka3qlf@comcast.net
 Rules at: <http://marac.org/cwrules.htm>

CONTEST: RSGB IOTA
DATE & TIME: 1200Z 30 Jul - 1200Z 31 Jul
BANDS/MODE: 80-10M CW/SSB
POINTS: 3 Pts own IOTA Reference or non-island sta's; 15 Pts. Other IOTA islands
MULTIPLIERS: Total of different IOTA references each mode
EXCHANGE: RS(T) + Serial # + IOTA reference # (if applicable)
ENTRY CATEGORIES: Single op - 12 HRS (CW, SSB or mixed); Single op - 24 Hrs (CW, SSB or mixed); Single op - 12 Hrs, Assisted (CW/SSB/Mixed); Single op - 24 Hrs Assisted (CW/SSB/Mixed); Multi op – Mixed; All categories – QRP (<5W), Low (<100W), High
ENTRIES: 21 August RSGB IOTA Contest, Radio Society of Great Britain, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK44 3WH, UK
 Cabrillo to: iota.logs@rsgbhfcc.org
 Rules at: www.rsgbcc.org/hf/rules/2011/riota.shtml
 Free logging software at: www.rsgbcc.org/hf/sd.shtml

Click here for information on listing your contest in the next issue of WRO!

Visit Your Local Radio Club



COLORADO

Denver Radio Club (DRC) meets 3rd Wed., 7:30 PM, El Jebel Shrine Temple, 4625 W. 50th Ave., Denver, CO. Learning/Tech sessions 6:30 PM. Oldest club in Colorado (1917). Net Sun 8:30 PM 145.490/448.625 rpt, w0tx@arrl.net: www.w0tx.org 01/12

MICHIGAN

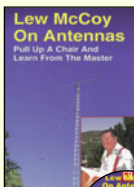
Muskegon Area Amateur Radio Council meets the 1st Thursday of every month at 7 PM at our clubhouse at 2888 Scenic Drive. Visit our website: <http://w8zho.org> 01/12

Click here to have your club listed!



BOOKS

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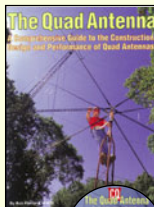


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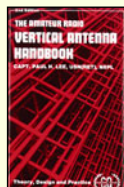


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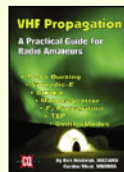


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VE EXAMS

As a service to our readers, WorldRadio Online presents a feature listing of those VE exams, times and locations which are sent to us. Please remember that our deadline for publication is two months in advance. For example, if your group is scheduling an exam for December, please have the information to us by October 1st. *World Radio Online*, VE Exams, 25 Newbridge Road, Hicksville, NY 11801. List the location (city and state), any information examinees should have (advance registration, etc.) and the name of the person to contact for further information. Examinees should bring their original license (along with a photo copy), two forms of identification (at least one should be a photo), and required fee.

p/r pref. = pre-register preferred but w/i OK
p/r = pre-registration only-no w/i

w/i = walk-in only
w/i pref. = w/i preferred to p/r

CITY	DATE	CONTACT	NOTES	CITY	DATE	CONTACT	NOTES
ARIZONA				NEVADA			
Mesa	3rd Mon	Steve KY7W, 480-804-1469, kj7wk@cox.net	w/i	Stagecoach	2nd Sat	Jack, AC6FU, 775-577-2637 ac6fu@arrl.net	
Phoenix	4th Sat	Gary Hamman, 602-996-8148, K7GH@arrl.net		NEW JERSEY			
ARKANSAS				Roselle	4th Sat	Gerry, AA2ZJ, 732-283-2795, aa2zj@arrl.net	
Sherwood	1st Sat	James Cope, KE5OVE, 501-796-3910	w/i	Winslow	4th Tues	Mark, K2AX, 609-820-1523, JTRA@comcast.net	
Vilonia	3rd Sat	James Cope, KE5OVE, 501-796-3910, ke5ove@arrl.net	p/r pref.	Pennington	7/16	Don, AA2F, 609-737-1723, aa2f@arrl.net	
CALIFORNIA				NEW YORK			
Highland	7/16	Ed, WU6I, 909-864-0155, wu6i@arrl.net	p/r pref.	Bethpage	2nd Tues	Bob, 631-499-2214, w2ilp@optonline.net	p/r
LaVerne	Last Sat	Frank, K6FW, 909-628-8661, k6fw@arrl.net	p/r	Canandaigua	1st Wed	Squaw Island ARC, David A. Foster, 585-398-0216, www.siacr.us	w/i
Long Beach	3rd Sat	Louise, N6ELK, 562-429-1355	p/r	Valhalla	Call	Stanley, WA2NRV, wa2nrv@weca.org	
Manteca/Tracy	4th Sat	David, N5FDL, 209-835-6893, n5df@arrl.net	p/r	Yonkers	Call	Paul, AC2T, 914-237-5589, w2yrc@hotmail.com, www.yarc.org	w/i ok
Redwood City	Call	Al, WB6IMX@arrl.net, www.amateur-radio.org	w/i	NORTH CAROLINA			
Sacramento	Hotline!	916-492-6115, n6na@arrl.org		Fayetteville	Call	Patricia Edwards, N4UGH, n4ughpat@aol.com, 910-584-1801	w/i
San Francisco	See site	www.hamcrams.com	p/r pref	OHIO			
Santa Rosa	Hotline!	Hotline-Recording 707-579-9608	w/i ok	Cincinnati	1st Sat	Dale, KC8HJL, 513-769-0789	p/r pref
Sebastopol	Hotline!	Recording 707-579-9608		Sandusky	Call	Luther, N8HC, 419-684-7864, n8hc@arrl.net	p/r
Sunnyvale	Visit Site	Gordon, W6NW, Sv@amateur-radio.org, www.amateur-radio.org	w/i	OREGON			
COLORADO				Astoria	Call	AA7OA, 503-338-3333	p/r
Englewood	1st Sat	Dave, N0HEQ, 303-795-5718, n0heq@arrl.net, Commerical Exams also	p/r pref	Bend	Weds	Joe, K7SQ, 541-385-3152	p/r
FLORIDA				Lincoln City	1st Sat	Carl, w7li@arrl.net, 503-965-7575	w/i ok
Longwood	4th Sat	James, N4ZKT, 407-333-4245	w/i ok	McMinnville	Call	Mark, AC7ZQ, 503-843-3580	w/i only
Melbourne	1st Sat	John, AA8IS@earthlink.net, 321-412-2779	w/i pref.	Sisters	Call	Dave, N7IYO, 541-549-7831	p/r
North Port	Call	Bill Norris, KC7TSG, 941-426-0214	w/i pref.	Tigard	Call	John, KS0F, 503-626-7399	p/r
St. Pete	Call	Mark, NP3R, 727-528-0071		PENNSYLVANIA			
Sanford	4th Sat	James, N4ZKT, 407-333-4245, n4zkt@bellsouth.net		Erie	3rd Sat	Ron, KB3QBB, 814-833-6829, kb3qbb@arrl.com, www.wattsburg-wireless.us	p/r
HAWAII				Lebanon	3rd Sat	Wa3gpm@arrl.net	
Oahu Is.	Call	Lee, KH6BZF, 808-247-0587	p/r	PUERTO RICO			
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IOWA				Charleston	3rd Wed	Robert Johnson, ae4rj@amsat.org; www.qsl.net/wa4usn/	w/i
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Roselle	2nd Tues	Sam, W9SFB, 630-894-0708, w9sfb@aol.com	p/r	Vancouver	Hotline!	CCARC, 360-896-8909	p/r
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Richmond	8/6	Mike, 765-969-3932, w1idx@arrl.net	w/i	WEST VIRGINIA			
South Bend	3rd Mon	Alan, NY9A, 574-232-6883	p/r	Parkersburg	2nd Mon	Dana Pickens, WV8G, 304-422-6101	w/i, p/r
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Brookline	Call	Jim, N1ICN, 617-364-4658, n1icn@arrl.net	p/r	Racine	1st Sat	Robert, W0WLN, 262-886-8551	w/i pref.
Marlboro	3rd Sat	Bill, K1IJ@mmra.org, mmra.org/exam	w/i pref.	WEST VIRGINIA			
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Garden City	Call	Ken Wardell, AB8ZD, 734-421-7730, gsnapshot@att.net	w/i ok	Tacoma	2nd Tues	Radio Club of Tacoma, 253-759-2040, www.w7dk.org	
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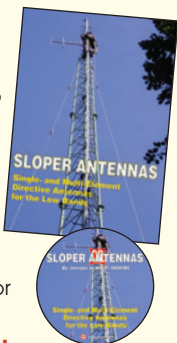
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Which to Choose? The 1:1 or the 4:1 Balun?

By Kurt N. Sterba

Harry McGavran, W5PNY, of Los Alamos, New Mexico, writes about the book *The Easy Way — HF Antenna Systems*, by John Haerle, WB5IRR (SK) and published by WorldRadio Books.

“He states in several places that a really good way to feed multiband antennas is with a tuner in the shack, a short piece of coax to a 4:1 balun and 450-ohm line to the antenna.

“While I really support the information in the book and am glad to see another attempt to dispel all the misinformation about antennas one gets when talking to most hams, I think that is one statement that isn’t quite on.

“I’ve found references to this occasionally among the antenna savvy types, but not often. I’m guessing a 1:1, 50-ohm balun is a better choice. So except for the 4:1 balun, I agree with what he is saying.

“Why? I’ve found if one does full spectrum scans with something like an AIM 4170 < <http://bit.ly/ix2FhR> > at the end of a typical 450-ohm line to a multi-band antenna he will see wide excursions in the impedance — but what is interesting is that they usually have very narrow peaks and wide valleys.

“This means most of the time the impedance one sees at the end of a 450-ohm line to such antennas is much closer to 50 ohms than to 450 ohms. So, for most frequencies, it seems to me you’d be better off with a 1:1 balun.

“What do you think?”

(Unfortunately, as far as we can tell, “The Easy Way — HF Antenna Systems” is no longer in print. You may want to check online auction sites for a copy. — Ed.)

The Krusty One Responds . . .

Kurt has always advised using a 4:1 balun in this setup so he agrees with the book’s author. To see why, let’s look at a 40-meter dipole and its impedance on other amateur bands.

The dipole is high enough above ground, so its feed point impedance on 40 meters is 75 ohms. And, to keep things simple, the 450-ohm feeder is a half-wave on 40.

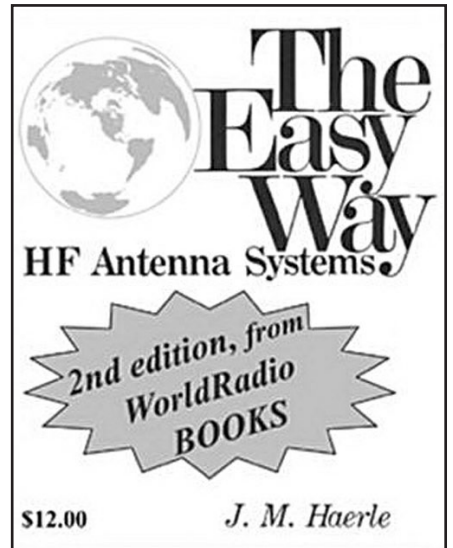
The ARRL *Antenna Book* has a plot of the impedance of a 5-MHz dipole over a large frequency range. Kurt has changed the dipole frequency to 7 MHz and converted the R + jX figures to the actual impedance for the major amateur bands. Then, using the TLW (Transmission Line for Windows) computer program, he found the impedance at the transmitter end of the 450-ohm transmission line. Refer to the accompanying chart. (*The SWR figures are based on a short run of 50-ohm coax between the transmitter and balun. — Ed.*)

It is apparent that on the harmonic frequencies the antenna impedance is much higher than on the fundamental frequency (except for 21 Mhz). The transmission line changes the impedance some but it is still high. The SWR on the coaxial cable going to your tuner is mostly a lot higher using a 1:1 balun than for a 4:1 balun. This is why a 4:1 balun is preferred.

The numbers change for other lengths of transmission line but, generally speaking, you will have lower SWR with the 4:1 balun — and Kurt recommends it.

Radiation Resistance

Donald Chester, K4KYV, of Woodlawn, Tennessee, comments on Kurt’s recent kolumn, *The Power Play: Non-Resonant vs. Resonant Antennas* (April 2011 *WRO*).



“I wish to point out a slight error in the statement regarding increasing the length of the antenna, but otherwise the explanation is perfectly correct.”

Kurt wrote: *Now, suppose the dipole is too long for the frequency. Now it looks like Figure 1(b), the same radiating resistor as before but with an inductor in series. This inductor’s reactance increases rapidly as the antenna is lengthened and can be much more than 70 ohms.*

K4KYV writes:

“Actually, the radiating resistor will be different from before. It will not stay exactly the same when the length of the radiator is changed. If only a few feet are added to or subtracted from the antenna length, the difference will be small, but there will still be a difference.

f, MHz	Antenna Impedance	Transmitter-end Impedance	1:1 Balun SWR	4:1 Balun SWR
3.5	1,000 Ω	1,000 Ω	20	5
7	75	75	1.5	2.6
14	3,700	2,400	48	12
21	100	100	2	2
28	1,900	1,500	25	7.5

"If we lengthen or shorten the antenna to a large degree, the effective change in value of the 'resistor' will be large. For example, if the total length of the dipole is shortened from a half-wave to a quarter-wave the radiation resistance will drop from 72 ohms in free space down to about 12 ohms.

"The reactance can still be tuned out as described and the antenna will take a load, but the efficiency will take a drop because resistive losses in the system become a much larger percentage of the total."

Kurt's Turn . . .

K4KYV is absolutely right and has explained it very well. Of course, when we are looking at just one amateur band the change is small. Possibly two or 3 ohms change from one end of the band to the other.

Meanwhile the reactance may change 200 or 300 ohms. But when you move to another band there is a big difference.

Look at the table for the 40-meter dipole. On 80 meters the impedance is shown as 1,000 ohms. Kurt simplified this — the actual figures are 1,000-ohms reactance and 15-ohms resistance. This is quite a drop from the 75-ohms resistance on 40 meters.

This rarely is a problem with dipoles because we usually can make them fairly long in wavelengths and with heavy-enough wire to have low loss resistance.

But vertical antennas on the low frequency bands are another matter. A 30-foot vertical is nearly a quarter-wave on 40 meters and will have a radiation resistance of about 36 ohms.

That same vertical on 160 meters, though, will have a radiation resistance of about 6 ohms. When you consider that a modest backyard radial system is likely to have more than 15-ohms resistance, you can see right away that your antenna's efficiency suffers because of that low radiation resistance.

In this case, for 100 watts into the antenna you get only 29 watts radiated. And that's for a good installation.

On these bands, always try to keep that radiation resistance up by making the vertical as high as you can and then use top loading to make it look even higher. "T" and inverted "L" arrangements are easy ways to do this.

Kurt welcomes questions of general interest from readers and will answer them in his kolumn. Write to him at: < WorldRadioOnline@gmail.com >.

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