QST

Official Journal of ARRL — The national association for AMATEUR RADIO

Devoted entirely to Amateur Radio

www.arrl.org

July 2007

Head to Huntsville for the 2007 ARRL National Convention

August 18-19

QST reviews:

Ten-Tec Omni-VII HF/6 Meter Transceiver

Inside:

$4.99 US $6.99 can.

07

19260

0 843655 9

Visit the *ARRLWeb* at www.arrl.org

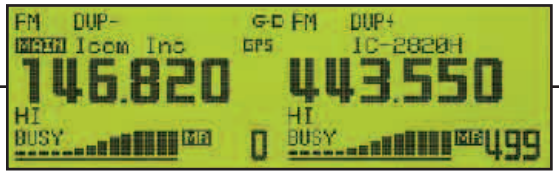
NEW IC-2820H

CAN YOUR DUAL BAND MOBILE DO THIS?

D-STAR optional D-STAR DV + GPS

Add the latest in digital functionality to your 2820H by installing the optional UT-123 module. You'll get D-STAR DV and on-board GPS operation. Show lat/long data, a virtual compass and more, right on your 2820H's display. Connect your 2820H to a PC via RS-232C with an optional cable (OPC-1529R) and you can plot your or your sender's location on a map using third party software, too. Find yourself at an authorized Icom dealer today! For free literature call 425.450.6088 or go online: www.icomamerica.com

Select your favorite display color, adjustable from amber to green



Dual display

Diversity reception with band scope

- 2M/70CM Dual Band
- 50/15/5W RF Output Levels
- Right Band RX: 118-173.99, 375-549.99, 810-999.99 MHz*
- Left Band RX: 118-549.99 MHz*
- 522 Memory Channels
- Optional DV (UT-123)
- V/V, U/U, V/U Simultaneous RX
- D-STAR Upgradeable
- Removeable Magnetic Head

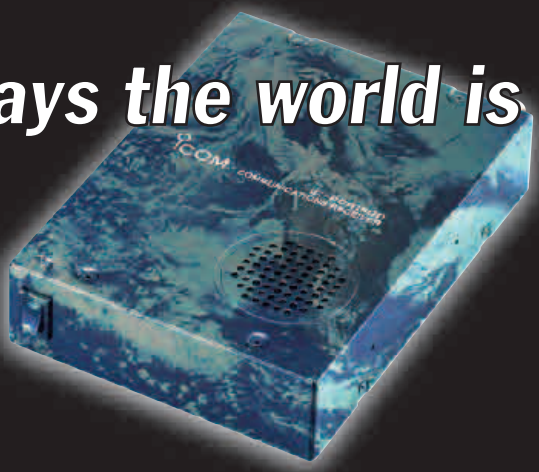
DIGITAL

AMATEUR | AVIONICS | LAND MOBILE | MARINE | RECEIVERS | SYSTEMS

*Frequency coverage may vary. Refer to owner's manual for exact frequency specs.

ICOM®

Who says the world is round?*

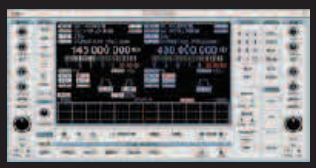


IC-PCR1500

- 0.01 ~ 3299.99 MHz***
- AM, FM, WFM, CW, SSB
- Record and Save Audio as .WAV File
- USB Cable Connection
- Optional DSP

IC-PCR2500

- 0.01 ~ 3299.99 MHz*** (Main)
  50 to 1300 MHz*** (Sub)
- AM, FM, WFM, CW, SSB
- Optional APCO 25 and D-STAR
- Dual Wideband Receivers
- Dual Watch PC window



Podcasting, anyone?

Icom's new black box receivers have wide spectrum coverage, USB connectivity, and .wav file recordability. Save your favorite radio programs for personal Podcasts!

IC-R1500

- 0.01 ~ 3299.99 MHz***
- AM, FM, WFM, CW, SSB
- Single Receiver
- Mobile or PC Controlled

IC-R2500

- 0.01 ~ 3299.99 MHz*** (Main)
  50 to 1300 MHz*** (Sub)
- AM, FM, WFM, CW, SSB
- Dual Wideband Receiver
- Mobile or PC Controlled
- Optional APCO 25 and D-STAR
- Dual Receiver Diversity

Buy a PCR2500 or R2500 and get a UT-122 module with P25 capabilities!**

THE WORLD IN YOUR HAND:

IC-R20

ADVANCED WIDE-BAND RECEIVER
0.150 - 3304.0 MHz***

IC-R5

COMPACT WIDE-BAND RECEIVER
0.5 - 1300.0 MHz***

download frequencies right from the web
www.icomreceivers.com

Download the FCC registered frequencies for any U.S. area–FREE.
Then download them straight into your radio using Icom's optional cloning software.

For free literature call 425.450.6088 or visit us at www.icomamerica.com

ICOM®

*Radio cover is actually black. World as seen from space artwork not included. **Refer to owner's manual for exact frequency specs.

hy-gain® ROTATORS

. . . the first choice of hams around the world!

HAM-IV

HAM-IV
$559.95

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

HAM 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
$699.95

T-2XD
$1079.95
with DCU-1

For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, $2^{1}/_{16}$ inch max. mast.

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
$389.95

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.**

HAM-V

HAM-V
$999.95
with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

ROTATOR OPTIONS

MSHD, $99.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $39.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

AR-40

AR-40
$289.95

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.**

HDR-300A

HDR-300A
$1379.95

For ***king-sized*** antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power	5000 in.-lbs.
Brake Power	**7500 in.-lbs.**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight	61 lbs.
Effective Moment (in tower)	**5000 ft.-lbs.**

Digital Automatic Controller

DCU-1
$699.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1° accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

AR-35 Rotator/Controller

AR-35
$79.95

For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.

RBD-5
$34.95

NEW! Automatic Rotator Brake Delay

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

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Antennas, Rotators & Towers
308 Industrial Park Road,Starkville, MS 39759, USA

Life is a JOURNEY, Enjoy the ride!

MINI COOPER SHOWN WITH CP-5M UNIVERSAL LIP MOUNT AND COAX CABLE COMBINATION. NO HOLES TO DRILL!

MODEL	ANT CONN / COAX CONN
CP-5M	SO-239 / PL-259
CP-5NMO	NMO / PL-259
CP-5 3/8-24	3/8-24 / PL-259

Heavy-duty adjustable lip mount bracket with 16' 6" deluxe cable assy includes 18" mini RG-188A/U type coax for weather seal entry.

Max antenna 70" Attaches to trunk side/ van door/SUV door/ truck doors etc..

COMET BNC-24 DUAL-BAND 2M/70CM HT ANTENNA RX range: 100-1200MHz
• Wavelength: 2M 1/4 wave • 440MHz 1/2 wave • Length: 17" • Conn: BNC Super flexible featherweight whip

COMET SMA-24 DUAL-BAND 2M/70CM HT ANTENNA RX range: 100-1200MHz
• Wavelength: 2M 1/4 wave • 440MHz 1/2 wave • Length: 17" • Conn: SMA Super flexible featherweight whip

COMET SMA-503 DUAL-BAND 2M/70CM HT ANTENNA RX range: 100-1200MHz
• Length: 8.75" • Conn: SMA

Maldol MH-209 *(BNC Conn)* **MH-209SMA** *(SMA Conn)* **2M/70CM DUAL-BAND HT ANTENNAS**
3" length, soft rubber cover. Good performance in a small package!

COMET NEW! CSB750A DUAL-BAND 2M/440MHZ W/FOLD-OVER
Wavelength: 2M 1/2 wave, 70cm 5/8 wave x 2 • VSWR: 1.5:1 or less • Length: 42" • Conn: PL-259 • Max Pwr: 150W

COMET NEW! CSB770A DUAL-BAND 2M/440MHZ W/FOLD-OVER
Wavelength: 2M 5/8 wave center load, 70cm 5/8 wave x 2 center load • VSWR: 1.5:1 or less • Length: 51" • Conn: PL-259 • Max Pwr: 150W

COMET NEW! CSB790A DUAL-BAND 2M/440MHZ W/FOLD-OVER
Wavelength: 2M 7/8 wave center load, 70cm 5/8 wave x 3 center load • VSWR: 1.5:1 or less • Length: 62" • Conn: PL-259 • Max Pwr: 150W

Maldol AX-50 DUAL-BAND 2M/440MHz
Wavelength: 2M 1/4 wave • 70cm 9/8 wave • Length: 21" • Conn: PL-259 • Max Power: 60W

Maldol AX-75 DUAL-BAND 2M/440MHz W/FOLD-OVER
Wavelength: 2M 1/2 wave center load • 70cm 5/8 wave x 2 • Length: 30" • Conn: PL-259 • Max Power: 60W

Maldol AX-95 DUAL-BAND 2M/440MHz W/FOLD-OVER
Wavelength: 2M 1/2 wave • 70cm 5/8 wave x 2 • Length: 38" • Conn: PL-259 • Max Power: 60W

COMET B-10 / B-10NMO DUAL-BAND 2M/440MHz
Wavelength: 146MHz 1/4 wave • 446MHz 1/2 wave • Length: 12"
• Conn: B-10 PL-259 ,B-10NMO - NMO style • Max Pwr: 50W

COMET SBB-2 / SBB-2NMO DUAL-BAND 2M/440MHz
Wavelength: 146MHz 1/4 wave • 446MHz 5/8 wave center load • VSWR: 1.5:1 or less • Length: 18"
• Conn: SBB-2 PL-259 • SBB-2NMO NMO style • Max Pwr: 60W

Maldol EX-107RB / EX-107RBNMO DUAL-BAND 2M/440MHz
Wavelength: 146MHz 1/2 wave • 446MHz 5/8 wave x 2 • VSWR: 1.5:1 or less • Length:29"
• Conn: EX-107RB PL-259 • Ex-107RBNMO NMO style • Max Pwr: 100W

COMET SBB-5 / SBB-5NMO DUAL-BAND 2M/440MHz W/FOLD-OVER
Wavelength: 146MHz 1/2 wave • 446MHz 5/8 wave x 2 • Length: 39"
• Conn: SBB-5 PL-259, SBB-5NMO - NMO style • Max Pwr: 120W

COMET SBB-7 / SBB-7NMO DUAL-BAND 2M/440MHz W/FOLD-OVER
Wavelength: 146MHz 6/8 wave • 446MHz 5/8 wave x 3 • Length: 58"
• Conn: SBB-7 PL-259, SBB-7NMO - NMO style • Max Pwr: 70W

COMET and Maldol Mobile

For a complete catalog, call or visit your local dealer.
Or contact NCG Company.1275 N. Grove Street, Anaheim, CA 92806
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Contents

This Month in QST

July 2007 Volume 91 Number 7

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Technical

News and Features

US & Possessions: Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $39. Age 65 and over, with proof of age, $36. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of $20. Life Membership, including a subscription to *QST* is available at $975.* Age 65 and over, $900.* Membership and *QST* cannot be separated. Libraries and institutions, $39 per year. Single copies $5.

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Membership without *QST* is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for $8 per year.

Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

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Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421.

QST Workbench

Operating

OUR COVER
Three…two…one…Blast off with us to the 2007 ARRL National Convention in Huntsville, Alabama and experience southern hospitality at its finest! Held in conjunction with the Huntsville Hamfest, celebrating its 26th year, the 2007 National will have something for everyone. Details are in the article on page 40. Rocket photo by Bob Inderbitzen, NQ1R; 2006 Huntsville Hamfest photos courtesy Frank Emens, W4HFU; Huntsville photos courtesy Huntsville/Madison County Convention & Visitors Bureau.

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Telephone: **860-594-0200**
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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-450...This Radio is for YOU!*

HF/50 MHz 100 W All Mode Transceiver

FT-450 Automatic Antenna Tuner ATU-450 optional

■ FT-450AT With Built-in ATU-450 Automatic Antenna Tuner

Compact size : 9" X 3.3" x 8.5" and Light weight : 7.9 lb

■ Large informative Front Panel Display, convenient Control knobs and Switches

■ The IF DSP guarantees quiet and enjoyable highperformance HF/50 MHz operation

Handy Front Panel Control of Important Features including:

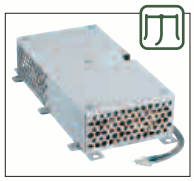
- **CONTOUR Control Operation**
  The Contour filtering system provides a gentle shaping of the filter passband.
- **Manual NOTCH**
  Highly-effective system that can remove an interfering beat tone/signal.
- **Digital Noise Reduction (DNR)**
  Dramatically reduces random noise found on the HF and 50 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 - 0.5/1.8/2.4 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-450 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

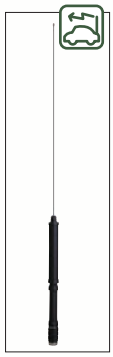
The rugged aluminum die-cast chassis with cooling fan

■ Operate anywhere using optional internal or external antenna tuning systems



Internal Automatic Antenna Tuner ATU-450
Covering 160 m to 6 m Amateur Bands Dipole or Yagi antennas
(The ATU-450 Antenna Tuner is included in the FT-450AT)

External Automatic Antenna Tuner FC-40
Covering 160 m to 6 m Amateur Bands (with 65+ ft end fed wire)



Active Tuning Antenna System ATAS-120A
Covering 40 m to 6 m Amateur Bands
(For mobile)

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 warmup) stability ●CAT System (D-sub 9 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 (between 400 to 800 Hz, in 100 Hz steps) ●CW Spotting (Zero-Beating) ●CW Training Feature ●CW Keying using the Up/Down keys on the optional microphone ●Two Voice Memories (SSB/AM/FM), store up to 10 seconds each ●20 seconds 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 ●Adjustable Main Tuning Dial Torque ●C.S. Switch to recall a favorite Menu Selection directly ●Hand Microphone included ●IMPORTANT FEATURE FOR THE VISUAL IMPAIRED OPERATORS - Digital Voice Announcement of the Frequency, Mode or S-meter reading

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

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

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YAESU
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Great New Features to Support Outdoor Motor Sports Activities
Mobile Transceiver... Great Appearance ...Easy to Operate

Actual Size

2 m/70 cm Band FM Dual Band Transceiver
(2 m 50 W/ 70 cm 40 W)
FTM-10R

- The keys and indicators are illuminated with high brightness LEDs. The bright ocean blue negative type LCD display is easy on the eyes and adjustable for day or nighttime viewing.
- The Front panel meets the IP57 standard. (Waterproof at 3 feet for 30 minutes, and protection against dust)
- The main body of FTM-10R is a solid die-cast aluminum sandwich structure. The compact size is: 4.48" W x 1.50" H x 7.12" D, Including the detachable front panel (The Panel is only 1.64" D.)
- The microphone and PTT button are built into the front panel. No external microphone is needed for operation.
- Completely hands free operation is possible using the optional wireless Bluetooth function and a headset.

Bluetooth®

The detachable Control Panel is shown here mounted on a motorcycle handlebar using the optional MMB-M11 multi-angle bracket.
The body section is not a waterproof structure.

- It is Equipped with a high power 8-watt audio amplifier and a PA function. When combined with the moisture and dust protected MLS-200-M10 optional loudspeaker, there is plenty of loud audio for a noisy outdoor environment.
- AM/FM radio is built in. Listen to your favorite AM or FM stereo station, and at the same time monitor the amateur band.
- Loaded with many functions for your convenience at outdoor motor sports activities.

●Includes event timer stopwatch, with an interval function ●With the intercom, you can communicate with a fellow passenger ●Tone Control ●Automatic Volume Control can adjust the speaker volume compared to nearby noisy environment ●External audio input is available to connect your iPod® ●Wireless cloning allows transfer of memory information without any cable ●The Control Head may be separated from the main body with the 10 feet cable and attached with a magnetic mount to a flat metal surface. Quickly put the radio in your vehicle or take it out with one touch release ●The simple hanger type bracket may be attached to the top or bottom, and the front may be tilted up or down 20 degrees with an adaptor bracket ●The message function can transmit alphanumeric messages you have entered beforehand ●The VOX function includes automatic audio delay on transmit, so the start of your message is not missing

YAESU
Choice of the World's top DX'ers℠

Vertex Standard
US Headquarters
10900 Walker Street
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For the latest Yaesu news, visit us on the Internet:
http://www.vertexstandard.com

The radio... YAESU
Choice of the World's top DX'ers

Loaded with Leading-edge Performance Capabilities. . .
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The Powerful FT-2000!

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ARRL v. FCC

"On May 17, attorneys representing the ARRL filed the initial brief in support of our petition for judicial review of the FCC's flawed rules governing Access Broadband over Power Line (BPL) systems. This is an important step on the road to what we hope will be a favorable decision by the US Court of Appeals for the District of Columbia Circuit."

If you tuned in late, in April 2003 the FCC opened a Notice of Inquiry (NOI) to consider amending its Part 15 rules as they apply to BPL systems. There are tens of millions of unlicensed "Part 15 devices" in daily operation. By and large, they do not represent a serious interference threat to licensed radio services because they operate for short duration, using very low power on limited frequencies. BPL is different. BPL devices may operate continuously, emitting energy across a wide range of the high-frequency (HF) radio spectrum from unshielded and unbalanced power lines. To its credit, the FCC recognized that its existing rules did not adequately address such devices. Much to its discredit, then-Chairman Michael Powell stated that "The Commission should be a cheerleader" and should do everything it could to encourage deployment of BPL technology, even though the Commission at the time knew very little about BPL.

Despite responses to the NOI that provided ample reason to proceed cautiously, less than six months after the deadline for reply comments the FCC issued a Notice of Proposed Rulemaking (NPRM) on BPL. Time and time again in the NPRM the FCC sought to reassure licensees that it remained firmly committed to the bedrock principle that licensed services were entitled to protection: "We believe that Access BPL systems can operate successfully under the non-interference requirements of the Part 15 rules. Under these rules, operators of Access BPL systems will be responsible for eliminating any harmful interference that may occur…. Notwithstanding compliance with the Part 15 emission limits, we wish to emphasize that Access BPL would also operate under our Part 15 non-interference conditions. Thus, operations must cease if harmful interference to licensed services is caused."

Barely eight months later, the FCC was ready with its conclusions and adopted a Report and Order in the proceeding. The new rules fell far short of ensuring that BPL deployment would be limited to systems with a reasonably low potential for causing harmful interference to licensed radio services. Accordingly, the ARRL (among others) filed a petition for reconsideration of several aspects of the new rules.

In contrast to its earlier haste, the FCC took a year and a half to act on the petitions for reconsideration — and then made matters worse. Most strikingly, the FCC abandoned its earlier "bedrock" position and adopted a new rule that allows BPL system operators to interfere with licensed mobile stations. That, along with other clear deficiencies in the Commission's handling of the BPL issue, led the ARRL — with support from the National Association of Broadcasters and the Association for Maximum Service Television — to seek judicial review of FCC actions that we believe to be unlawful.

The brief filed on May 17 sets out four ways in which the FCC failed to fulfill its legal obligations.

First, the Commission reversed 70 years of consistent application of Section 301 of the Communications Act without explaining why, and without even acknowledging that it was doing so. The FCC compounded its error by asserting — belatedly and utterly erroneously — that BPL devices do not fall within Section 301 at all. The brief sets out the history of how the FCC has treated unlicensed devices since they were first authorized in 1938 and demonstrates that the new rules change the bundle of rights and protections that radio licensees enjoy without a shred of the "reasoned analysis" that legal precedent requires.

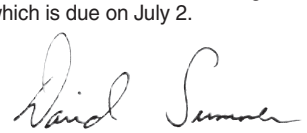
Second, the Commission failed to discuss or disclose significant information in the record that potentially contradicts its key interference findings. Not only did it withhold its internal studies until it was too late to comment, it still has not released portions of the studies that may not support its conclusions on the grounds that they are "internal communications that were not relied upon in the decision making process." In the words of the brief, "If the Commission's claim of nonreliance on the redacted material is taken at face value, then its failure to consider the contrary evidence *from its own engineers' field tests* strongly suggests a willful blindness toward any information not in accord with its preferred outcome. If, as seems more likely, the Commission actually considered and rejected the information contained in the redacted portions of its studies, then it had a duty to disclose the information and reasons for rejecting it. Either way, the FCC acted improperly."

The Commission's penchant for ignoring contrary evidence is illustrated even more vividly with regard to how quickly RF emissions are assumed to decay as one moves away from the source. This is important because if the signal is assumed to decay more quickly than it really does, the interference potential of the emissions will be underestimated. The FCC claimed that "many parties" presented experimental data supporting a 40 dB per decade (10 times increase in distance) rate. In fact, there is no such evidence in the record — and empirical evidence supporting a lower number was ignored. The FCC failed to consider a sliding-scale alternative proposed by the ARRL that would have avoided the logically indefensible situation that now exists in the rules: the extrapolation factor is 20 dB/decade at 30.001 MHz and 40 dB/decade at 29.999 MHz.

Finally, the FCC failed to limit BPL to the 30-50 MHz frequency range despite evidence that doing so would have eliminated the problem of interference to long-distance HF communications without exacerbating the situation for public safety licensees.

Our statement of the case concludes, "ARRL is not trying to stop the deployment of BPL. ARRL and other commenters provided the FCC with alternative proposals — ones that have been demonstrated to work in the real world — that would have allowed BPL to prosper without harm to licensees or to Congress's licensing regime. What is perhaps most unfortunate about the FCC's radical actions in this case is that they were entirely unnecessary."

We look forward to reading the FCC's response, which is due on July 2.



David Sumner, K1ZZ
ARRL Chief Executive Officer

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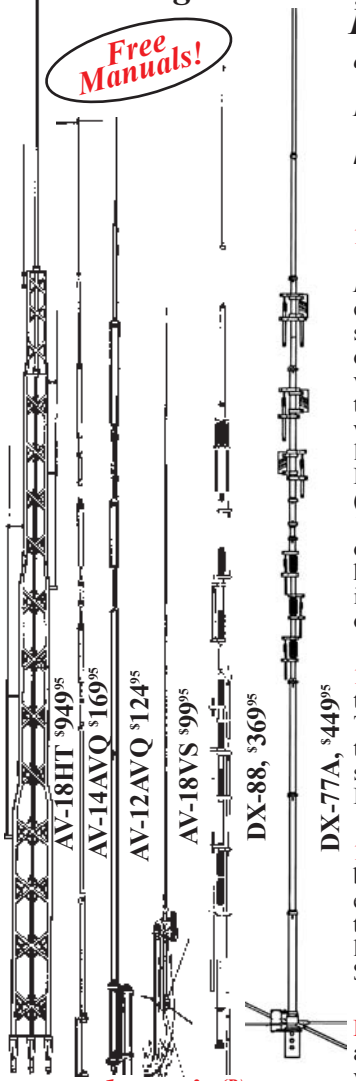

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AV-18HT, $949.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs. **Standing** 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands. Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. The addition of a base loading coil (**LC-160Q, $109.95**), provides exceptional 160 Meter performance. **MK-17, $89.95**. Add-on 17 Meter kit. 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising & lowering.

AV-14AVQ, $169.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $124.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

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DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. **All** bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $199.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs. ***No** ground radials required!* Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$134.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$99.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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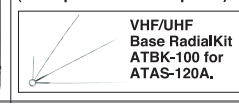

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This Just In

Joel P. Kleinman, N1BKE
jkleinman@arrl.org

In Brief

- The 56th Dayton Hamvention® featured ARRL EXPO and a plethora of forums, new gear and the giant flea market.
- A tornado with a magnitude of EF5 devastated the small town of Greensburg, Kansas, and ARES volunteers from Kansas and Colorado were on the scene in short order to provide emergency communications.
- AMSAT, The Radio Amateur Satellite Corporation, has announced its first call for papers for the 2007 AMSAT Space Symposium and Annual Meeting, to be held October 25-28 in Pittsburgh, Pennsylvania.
- The BS7H Scarborough Reef DXpedition team logged more than 45,000 contacts during its weeklong stay on the South Pacific rocks.
- The Quarter Century Wireless Association (QCWA) and *Amateur Radio Newsline*® have teamed up to cosponsor the Roy Neal, K6DUE, Amateur Radio Mentoring Program.
- Citing "widespread misconceptions" about it, the ARRL has withdrawn its Petition for Rulemaking calling on the FCC to establish a regulatory regime to segment bands by necessary bandwidth rather than by emission mode. Details appear in "Happenings," elsewhere in this issue.
- Registration was open for these ARRL Certification and Continuing Education online courses: The ARRL Ham Radio License Course, Amateur Radio Emergency Communications Level 1, Radio Frequency Interference, Antenna Design and Construction, Analog Electronics and Digital Electronics.
- The ARRL has submitted an interference mitigation plan to the US Department of Defense as part of an effort to resolve reported interference from dozens of 70 cm amateur repeaters to US military radar systems both on Cape Code, Massachusetts and in the Sacramento, California, area.
- Amateur Radio played a significant role in early May in rescuing two people from a foundering sailboat that had been en route to Colombia.
- The FCC has sent an official *Citation* to Tower Products Inc of Saugerties, New York, for marketing an unauthorized RF device capable of operating on 70 cm Amateur Radio frequencies.
- In a recent *Memorandum Opinion and Order* on cognitive or "smart radio" systems, the FCC has affirmed its favorable policy toward the regulation of amateur software defined radios (SDRs). Details appear in "Happenings," elsewhere in this issue.
- The winner of the *QST* Cover Plaque Award for April is Steven Pituch, W2MY, for his article "A Portable Equipment Support Frame."
- The ARRL DXCC Desk has approved the BS7H Scarborough Reef DXpedition for DXCC credit.
- The ARRL Foundation has granted an additional $2000 toward the cost of constructing and installing Amateur Radio antennas and equipment on the International Space Station's *Columbus* module, set to launch later this year.

Media Hits

Allen Pitts, W1AGP

The main publicity campaign for 2007 is based on the emergency communications and the options that our Service gives to families and communities in a crisis. In the past months, the ARRL has made professionally prepared materials available to PIOs around the country. These have been provided for free, or only for the costs of the postage in shipping them around the country. This is another way in which ARRL members aid all of Amateur Radio. The materials include brochures, videos, audios, "Talk on a Disk" and other aids to people presenting Amateur Radio to the public. You can see them listed at **www.arrl.org/pio**. Ideas and tips for PIOs have been published monthly in *CONTACT!* But it remains up to the PIO volunteers to actually use these opportunities to promote ham radio in their communities — and they do! By taking an imaginary, rambling trip across the USA, here are some of the recent results:

- "Reliable Radio" in the *NewsTimes* (Danbury, CT) related the creation of go-kits by the Heritage Village Radio Club.
- "County Radio Communicators Cited for Their Public Service" in the *Palladium Times* (Oswego, NY) showed that hams' efforts are appreciated in many ways.
- "19-year-old heads state's ham radio emergency corps" surprised readers in *The News Journal* (Wilmington, DE) when it publicized the role of SEC Justin Kates, KB3JUV.
- "Amateur Radio enthusiasts step up in emergencies" in *The Item* recognized the Sumter, SC hams and SKYWARN.
- "Ready and Reliable" was an excellent article in the *Ledger-Enquirer* (Columbus, GA) about ARES, WX4MAP and K4SPE.
- *The Gainesville Sun* (Gainesville, FL) article "Levy [County] turning to the old for help with the future" may have called us "old school technology" in their article, but they emphasized the reliability of ham radio in a crisis.
- "Ham radio operators stand ready" in the *Suburban Journals* (Town and Country, MO) predicted the critical need for hams following a major tornado.
- *The Vindicator* (Youngstown, OH) published a front page story about using hams to warn about coming storms in "Keeping their eyes on the storms" while the nearby *Dayton Daily News* (Dayton, OH) article "Ham tuned to world's wavelength" also promoted emergency capabilities.
- SKYWARN and ARES articles continued in the *Detroit News* article about the efforts of Macomb County Amateur Radio Public Service Corps and Scott County hams preparations in the *Savage Pacer* (Savage, MN) article "Staying Ready in case of disaster."
- Moving west, Fox 23 television of Tulsa, OK, had a major piece titled "Ham radio operators track storms" and the *Grand Junction Sentinel* (Grand Junction, CO) promoted the Garfield County RACES group.
- The long title, "In the age of the cell phone, Amateur Radio survives, saves lives" topped an article about hams in *The Albuquerque Tribune* (Albuquerque, NM).
- And finally, at the other end of the country, Hawaiian hams took a break from tsunamis and got great press as Alex Benton, KH6YY, used a 12 foot satellite dish antenna to bounce signals off the moon.

Space Day

AMSAT and the local ARISS (Amateur Radio on the International Space Station) team had an extensive exhibit for Space Day, May 5, at the Smithsonian's National Air and Space Museum in Washington, DC. Part of our exhibit included an ARISS contact with astronaut Sunita Williams, KD5PLB, aboard the International Space Station.

Participating in our demonstration was Esther Li, KI4LJD, and her teacher, Adam Kemp of Thomas Jefferson High School for Science and Technology in Alexandria, Virginia. The school is building a Cubesat with support from Orbital Sciences Corporation.
— Perry Klein, W3PK

MARK KANAWATI, N4TPY

Bird's eye view of the crowd of onlookers at Space Day at the National Air and Space Museum as hams tune in an ARISS contact with astronaut Sunita Williams, KD5PLB.

ART FELLER, W4ART

Ester Li, KI4LJD, a senior at Thomas Jefferson High School for Science and Technology, shows a model of a Cubesat the school is in the process of building.

Alt Ed Day at Oklahoma's Capitol

A group of 15 students from Take Two Academy in Ardmore, Oklahoma recently attended Alternative Education Day at the Oklahoma State Capitol. These students and their teacher, Creede Tibbs, KE5ISP, showed their class project of a 2 meter Yagi made from a used television antenna. The students also had the opportunity to meet legislators and other Alternative School students from around the state.

KEVIN O'DELL, NØIRW

Students from an Alternative High School in Ardmore, Oklahoma, demonstrated a class Amateur Radio project, a 2 meter Yagi made from a used TV antenna, at the state capitol recently.

Inside HQ

ARRL Sections

What is an ARRL Section, who are Section Managers and what are their responsibilities? Here's how it works. The ARRL Field Organization is divided into geographic territories called sections that divide the US Amateur Radio population into manageable administrative units. Sections make it easier and more efficient to coordinate emergency response and other Amateur Radio related activities within a given area. Each section is managed by an elected, volunteer Section Manager (SM).

There are 71 ARRL sections including the US territories of Puerto Rico (PR), The Pacific Islands (PAC) and The US Virgin Islands (VI). Most states, such as Connecticut designated as CT, are a single section although some States have more than one Section. For example, California has seven sections since there is a large population of radio amateurs that would make it difficult for one Section Manager to administer. In Washington, there are geographic barriers that make it difficult to coordinate both ends for emergency response, so there are two Sections: Eastern Washington (EWA) and Western Washington (WWA).

The members of each ARRL section elect their own Section Managers who serve two-year terms of office. All SMs' names and contact information are listed in the front of each issue of *QST* on page 16 and on the Web site at **www.arrl.org/FandES/field/org/secinfo.html**. Your Section Manager is the first person to contact when you have news about your activities or club or if you need assistance with a local problem. Each Section is also provided with its own Web page for announcements and section news. Members may sign up for this e-mail news service at **www.arrl.org/members-only/memdata.html**.

These dedicated and hard working Section Managers oversee more than 9,000 ARRL Section level field appointees. Each SM recruits, appoints, and supervises a team of volunteers who are responsible for coordinating emergency communications and other Amateur Radio related activities in their Section. These appointees include a Section Emergency Coordinator (SEC), District Emergency Coordinators (DEC), and Emergency Coordinators (EC). Section level appointees also handle message traffic, assist with technical activities, monitor the bands for compliance, get involved with government and public relations and work with local clubs. SMs monitor the performance of the Field Organization volunteers and provide guidance as necessary to ensure that appointees act in the best interests of Amateur Radio and in accordance with ARRL policies.

Here at HQ, Steve Ewald, WV1X, leads the Field Organization support team assisted by Chuck Skolaut, KØBOG, and Leona Adams. Steve and his team assist the Field Organization in a variety of ways including supervising SM elections during the four SM election cycles held per year. They also maintain a database of all Field Organization Appointees and provide training materials for SMs and Section level staff.

Finally, thanks to all of our Section level volunteers for their outstanding efforts, commitment and often extraordinary efforts on behalf of Amateur Radio and the general public.

73,

Harold Kramer, WJ1B
ARRL Chief Operating Officer
wj1b@arrl.org

Guide to ARRL Member Services

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Find an Exam Session: www.arrl.org/examsearch

Volunteer Examiner Coordinator (VEC):
www.arrl.org/arrlvec

Publications & Education

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www.arrl.org/*QST*
e-mail: qst@arrl.org

QEX — Forum for Communications Experimenters:
www.arrl.org/qex
e-mail: qex@arrl.org

NCJ — *National Contest Journal*:
www.arrl.org/ncj
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The American Radio Relay League, Inc.

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ARRL is an incorporated association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting members are elected every three years by the general membership. The officers are elected or appointed by the directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

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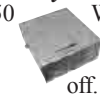

Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

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$379.95 80-10M, fiberglass form, Pittman motor, CNC parts, magnetic sensors, #14 wire, 1.2 kW PEP. 6' whip, $24.95

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AL-811H, $849. Plugs into 120 VAC outlet. All HF bands. Hi-silicon transformer, heavy duty tank coils, tuned input, operate/standby switch, Xmit LED, ALC, lighted meters, 32 lbs. 13¾Wx8Hx16D in.

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Up Front in QST

WWII CODE-BREAKERS GATHER AT BLECTCHLEY PARK

John Swartz, WA9AQN

On April 29, 2007, I attended a reunion of the British Radio Security Service and Special Communications Units veterans from WWII at Bletchley Park, site of England's top-secret — and highly successful — code-breaking effort during the war. The author of the book *The Secret Wireless War* (available from the ARRL) and some of those mentioned in the book attended the reunion.

I attended purely as an amateur historian and a great admirer of the diligence and effort these folks put forth in the war. They are genuinely unassuming people who did what they had to do and who aren't about to toot their own horns about it. Prominent among the hams in the photo is Pat Hawker, G3VA, who has written the "Technical Topics" column in *RadCom* for many years.

JOHN SWARTZ, WA9AQN

At the Bletchley Park gathering: **Those attending the April reunion of British communications security personnel were, left to right: *Back row* — Geoff Dean, G3NPO; Frank Gay, G3CFV; Harry Heap, G5HF; Don Wallis. MØZDW; Maurice Richardson; Pat Hawker, G3VA; Len Digby; Wilf Neal; Dave Williams, G3CCO; John McCafferty, G7SF; Leon Smith, G3HDY, and Bob Painter, G3BPF. *Front row* — Keith Taylor, GØXKT; Phil Luck; Ray Fautley, G3ASG; Geoffrey Pidgeon; John Hofer; Bob/Noz King, G3ASE; Wilf Elmore; Bill Lush; Ted Cooper; Roy Wilkins, G2ALM, and John Foster.**

JOHN CHAPMAN, KD6QDA

Juxtaposition: **John Chapman, KD6QDA, of Placerville, California, found these storefronts in Des Moines, Iowa.**

GRRRL OSCILLATOR

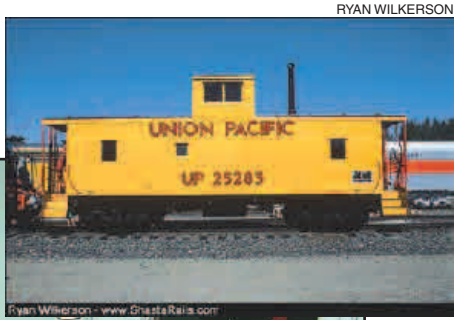
I recently began teaching Morse code to a young girl, Alyssa Sills, who has since gotten her ticket and is now licensed as KC9KEW. I remember when I was an 11 year old girl learning Morse code and how there were very few women in the Amateur Radio community and very little that was geared toward women. I not only wanted to motivate her to study up on her code but at the same time give her something that would be personally hers. The oscillator sounds great. It is made from a simple pine box and a very simple schematic. A little Dremel work and all the knobs fit perfectly. I then painted and glued on a few extras and the end result was a very practical code practice oscillator.
— *Ginger Downing, WB9ZHC*

Not your father's code practice oscillator: **Ginger Downing, WB9ZHC, put a special touch on a code oscillator for her student, Alyssa Sills, KC9KEW.**

UNIQUE OPERATING LOCATION

During a week of vacation in April, my wife Stephanie, KD7VON, son Will and I stayed at the Western Pacific Railroad Museum at Portola, California. I set up a station — a Yaesu FT-2800M for 2 meters fed to a Diamond SG-7900 on a mag-mount and my Kenwood TS-440SAT feeding a 100 foot random wire for HF on the conductor's desk in Union Pacific Caboose 25283, built in 1951. During our stay I made contacts on 40 meters spanning Lakewood, Washington to Richmond, Virginia, checked into several nets and handled a piece of message traffic. — *Matt Parker, N7TOD*

RYAN WILKERSON



The station Matt Parker, N7TOD, set up on the conductor's desk of Union Pacific Caboose 25283.

STEPHANIE PARKER, KD7VON

TWO NEW EXTRAS

Nathan Youngs, N1IDX, age 12, and his grandfather Dan Meloche, W1DPM, recently upgraded their licenses…to Amateur Extra class…on the same day! When Nate was 10, he "discovered" Amateur Radio through his grandfather, earning his Technician license. This prompted Dan to get more involved — just two years later both received their Amateur Extra class licenses in March at the same VE session. The Volunteer Examiners remarked that they had never heard of a grandfather and grandson upgrading to Extra at the same session. Both Nate and Dan live in Spencer, Massachusetts. You can read more about them at **www.arrl.org/news/features/2005/04/28/1/**.

COURTESY DAN MELOCHE, W1DPM

Congratulations! **Nathan Youngs, N1IDX, age 12, and his grandfather Dan Meloche, W1DPM, proudly display their new Amateur Extra class CSCEs. They earned them at the same VE session this past March.**

DAVE FLACK, AH6HY

"I acknowledge your need for a cell phone": **This photo shows (of course) a cell phone storefront in (naturally) Baguio City, Philippines, where AH6HY is currently on a work assignment.**

VINTAGE QSL CARD COMES HOME

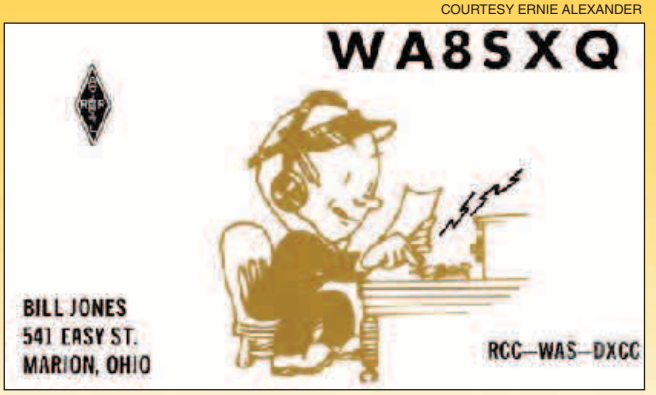
Checking mail the first thing every morning has become a habit for me. Recently one early morning session turned up a short message: "If you are the Bill Jones who was my roommate in Biloxi, MS during military electronics school in 1967 please contact me because I would like to catch up after all of these years."

Yikes, that was 40 years ago. I responded right away and said that I remembered a friendly, tall Texan with good common sense who had a motorcycle on the air base for a while.

Bingo. A flurry of cross-country e-mail exchanges quickly followed. We both touched upon our personal experiences and shared highlights of our lives over the past four decades. I pleasantly found that he was still a tall former Texan with good common sense.

Eventually I asked how he was able to locate my e-mail address. He replied that he found one of my QSL cards in his old military file. Searching on the call letters of WA8SXQ directed him to my Web site and from there e-mail contact was easy.

COURTESY ERNIE ALEXANDER



Lost, then found: **The original General class QSL card circa 1967 returned to K8CU after 40 years.**

My thanks to Ernie Alexander for returning the card to me, particularly since I hadn't saved one. It is now on display in my radio room. — *Bill Jones, K8CU, Westerville, Ohio*

USB SOUND CARD INTERFACES

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All four RIGblasters work with over 100 ham radio sound card programs in over 25 digital and analog modes. Three RIGblasters work with any computer old or new, USB or not, and over 2000 different radios with RJ45 or 8 pin round mic jacks. The RIGblaster data jack plug & play works with almost two dozen radios through a data jack.

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General coverage receive from 10-160 meters with 39 built-in DSP filters. 100 watts output on all bands. Green backlit LCD screen. The SSB transmit audio of this rig is so well regarded that we used the same controls for tailoring transmit audio on the new OMNI-VII! The same great QSK CW as used on our other transceivers. No other transceiver in this price class tops this level of performance.

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CORRESPONDENCE

GRID AND BEAR IT

♦ It can be fun to collect the Maidenhead grid squares ["The Importance of Being 'Square,'" May 2007]. But there is another grid system that could save lives.

The Federal Geographic Data Committee (FGDC) has established the United States National Grid (USNG). FEMA supports its adoption, and a number of state and local governments have implemented disaster plans using it. Some GPS devices and USGS maps display USNG data. Using the USNG, a code such as 18SUJ2348306479 locates a point with a precision of 1 meter. When you remember the scenes of a flooded New Orleans, you realize how useful this could be. When street signs are washed away and flood waters to the eaves hide house numbers, how do you efficiently direct rescuers?

Hams earnest about disaster preparedness may gain more information about the USNG by exploring **www.fgdc.gov/usng**.

JIM STEELE, AH6RN
Honolulu, Hawaii

NOT BY THE BOOK

♦ Gil McElroy's, VE3PKD, subdued review of Kristen Haring's book, *Ham Radio's Technical Culture* ["New Books," Mar 2007], piqued my curiosity enough to make me buy the book and read it. Canadians are masters of gentle understatement, but I found Gil's assessment dead on.

In my 38 years as a licensed ham, 99 percent of what I have read about Amateur Radio in the external press has been positive, especially hams' public service contributions. But unnecessary steps taken in avoidance of "contamination of research," or in pursuit of objectivity, ultimately end up weakening or invalidating the end result of the research. I think we have just such an instance with this book.

The author of the book completely ignored the *huge* diversity of Amateur Radio, especially things like grade school kids being able to talk to the space shuttle via ham radio. How about hams' huge and sustained contribution in the wake of hurricane Katrina, as well as their selfless service in every other major disaster, world wide? If, simply, as a byproduct of her research, had she purchased a cheap receiver and tuned around the bands at night, listened to nets, QSOs and rag chews, as well as situational responses to various calamities, her view of Amateur Radio would be completely different.

RALPH PRICKETT, NB4Q
Spartanburg, South Carolina

A SOUND IDEA

♦ When my May 2007 *QST* arrived, I was very excited to see your review of sound cards for Amateur Radio. For a software defined radio, the IF frequency is in the audio range. The sound card captures the IF, and further processing is done in the PC. Test data for sound cards is generally available only for audio frequencies up to about 24 kHz. Of course, sound cards are designed for this range. But for a software defined radio, we care about the performance over the entire bandwidth up to the sampling rate. Over this frequency range, we are concerned with the noise level (which often increases) and the frequency response.

While your review was a valuable introduction, it only provided data for the audio range. Perhaps in a future issue you could provide data over the full frequency range. I am sure this would benefit the many hams experimenting with sound cards in Amateur Radio.

JIM AHLSTROM, N2ADR
Stirling, New Jersey

MAKE NICE WITH NEIGHBORS

♦ The question of antennas in CC&R restricted locations is a problem for lots of radio amateurs [PRB-1 and CC&Rs — What Should I Do Now?" Apr 2007]. Here is the solution I worked out with my Home Owners Association.

Most HOAs have a committee whose responsibility it is to make sure there are no serious violations or the CC&R or By-laws. The first thing I did, immediately after I moved in, was to make social contact with the committee. I gradually brought hem up to speed on emergency communications. Our HOA also has a monthly newsletter, and I wrote a series of articles on EmComm and Amateur Radio. After about six months, I gave a brief speech on "When All Else Fails." I then applied for a waiver to put up a GAP multi-band vertical. It passed without comment, except that my neighbors said they felt better when they realized that I was a last ditch communication portal out of the area.

TOM SANDERS, W6QJI
Port Orchard, Washington

QSL QUANDARY

♦ When I was first licensed, I sent QSL cards for many grids on 6 meters. As my privileges increased, I did the same for the many DX contacts I made. For each and every QSL card I requested, I sent either a self-addressed envelope with either "green stamps" or IRCs for DX stations, or a self-addressed, stamped envelope for stations within the US and its territories. The final courtesy does not mean receiving a QSL card (especially a cheesy postcard) without a paid, easy method of return. Remember, *you* are requesting a card in return. Do not place that burden on the station you worked.

L. JAY ROSTOW, K4AZV
Wingina, Virginia

THANKS FOR THE CHUCKLE

♦ I read "It Seems to Us" each month, and June 2007's edition brought a bit of a chuckle to me. As an air traffic control operations supervisor, I love how Dave Sumner, K1ZZ, compared Field Day ops to the work of an air traffic controller. I talk every day for a living, but I find ham radio — especially special event stations and Field Day — to be the most enjoyable. These events are part challenge and part educational, but always fun. Thanks Dave, for all you do for the League.

GREGG HENDRY, W8DUQ, ARRL Life Member
Barboursville, West Virginia

INTERFERENCE IDEA

♦ With reference to the letter from Steve Rawlings, GW4ALG ["Correspondence," May 2006]. The answer to the continued contest interference is simple — mandatory adherence to the band plans for all contests. Non adherence would result in automatic disqualification. Such a move would take much of the heat out of the contest interference debate.

COLIN SHAW, M5FRA
Derbyshire, England

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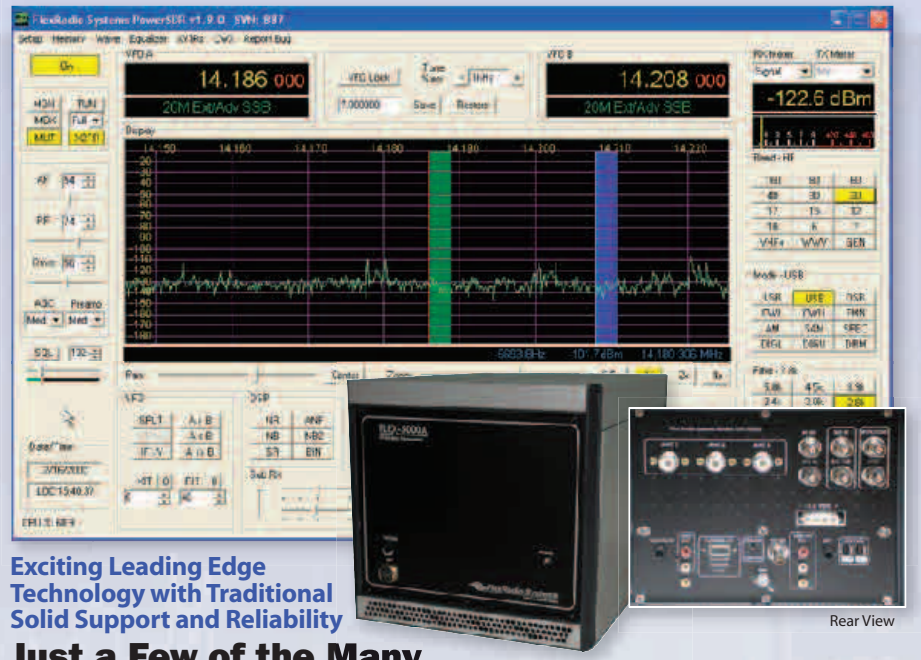
Mike, KM0T – I had always dreamed about a radio and interface like this; but never thought it would ever happen. I sometimes catch myself staring at the screen showing the microwave band frequencies thinking "Man this is awesome!" Seems every time I turn around, there is something new coming down the pipe to make the whole setup better.



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Typical output power is 1kW PEP/SSB on HF and 650W on 6m band with the drive power of 85-90W. Bands set automatically with the built-in band decoder. You can forget about the band setting when the amplifier is connected to your modern radio through supplied band data cables for ICOM CI-V, DC voltage (ICOM, Yaesu), and RS-232C (Kenwood). Manual band setting selectable as well.

All these data cables are included with the amplifier.

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HF/50MHZ 200W Auto Antenna Tuner

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- The advanced 16 bit MPU (micro processor) calculates the ratio of forward and reflected power. Our newly developed computing algorithm produces world class tuning speed.
- 256 capacitors (C) and inductors (L) are combined to form the inverted L-shape circuit. Depending on antenna, capacitances may be switched from one end of inductors to the other to form the reversed inverted -L shape circuit. Over 131,072 combinations of L & C. High current capacity relays are used in the L and C tuning network.
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Frequency Range:
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0 deg. to +40 deg. C
VSWR (Max.):
1.5 (typ.) or lower *
After tuning
Number of Memory:
10 ch.
Dimension:
195 x 60 x 242 mm (WxHxD)
7.7 x 2.4 x 9.5 inches
Weight:
Approx. 1kg. (2.2 lbs.)
Accessories:
DC power cable, 3.5mm dia. Plug **
** Ear-phone plug
Optional Parts:
1: 4 Unbal. To Bal. Balun
Model HBL-100
Remote control Cable for ICOM Radio
HTC-100AT/ICOM5 (5 meter)
Remote control Cable for ICOM Radio
HTC-100AT/ICOM10 (10 meter)

* This tuner does not tune wire antennas length with multiples of half a lambda or its vicinity.

HC-1.5KAT

HF 1.5KW Auto Tuner

Fast and Quiet, Auto Band Set!!

Features

- HC-1.5KAT is a high power HF auto antenna tuner designed to work with Tokyo HyPower HL-1 .5KFX and HL-2.5KFX linear amplifers.
- When combined with these THP amplifiers, band change is automatically made through the band data signal from the radio and the amplifier. It also works with other amplifiers as well, in manual mode.
- Tuning time is typically within one second, (2.5 sec. max.). It handles maximum power of 1.5kW pep/cw when the intrinsic antenna SWR is no more than 2.0
- Maximum impedance matching range is SWR of 4 to 1, there are three antenna connectors.
- Two of high quality 3kV rating 200pF air variable capacitors are employed to form a "T" match circuit being driven by high speed stepping motors.
- Our own tuning algorithm together with an advanced 16 bit micro-processor enables an extremely fast tuning.

Specifications

Frequency Range:
1.8 - 29.7MHz
Output Impedanc. Range:
12.5 - 200 ohms: Reduced range at lower band edges
Maximum Handling Power:
1.5kW (P.E.P./CW): RTTY 1kW
Input Impedance:
50 OHM
Tuning Power:
50W (80W max.)
Tuning Time:
1 sec. (typ.)
2.5 sec. (max.): Under typical worst SWR condition
4.0 sec. (max.): Under absolute worst SWR condition
DC Power Voltage:
DC 12V - 14 V: From External AC adaptor
Current Drain:
1.5A max.
Quiescent Current:
0.7A
Display:
LCD Module: 16 characters x 2 rows
Operating Temp. Range:
0 deg. to +40 deg. C
VSWR (Max.):
1.5 (typ.) or lower: Alter tuning
Circuit Type:
T-match network
Driving Motors:
Stepping Motors for Two Air Variable: 0.25 deg. resolution/step
Matching Algorythm:
Analog Control with MPU: Phase and IZI Magnitude Detected
Dimension:
Approx. 8x5.6x12 inches (WxHxD)
Weight:
Approx. 11 lbs.
Input Connector:
SO-239 (UHF)
Output Connectors:
Three SO-239's
Cooling:
Partial air forced cooling with fan.
Accessories:
DC power cable, 3.5mm dia. plug. Band Control Cable with DIN 7 pin plugs.

TOKYO HY-POWER

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Getting on 24 GHz

Making a microwave station isn't as hard as it used to be.

Wayne Yoshida, KH6WZ

I am sharing some information on my 24 GHz system for a selfish reason — to improve what I call the "dollars-per-contact ratio" on this band. As this is being written, this ratio is over $1000 per contact in the Southern California area. It is dropping, however, as more experimenters get on the band. I hope this article will help improve (lower) the dollars-per-contact ratio on 24 GHz.

Because surplus components can often be difficult to obtain and in unknown quantities, it is usually best to describe circuits in terms of "functional blocks" rather than detailed circuit schematics. This is also a nice way to simplify a complex system so that non- and semi-technical hams like me can understand how to put things together.

One of the things that inspired me to try the microwave bands is the 24 GHz conversion project that appeared on the San Bernardino Microwave Society (SBMS) home page several years ago. Dave Glawson, WA6CGR, published some preliminary information on how to convert surplus P-Com 23 GHz digital data outdoor units (ODUs) to the 24 GHz ham band. The unusual-looking canister in the title page photo still intrigues me to this day.[1]

I quickly discovered that building a rig for 24 GHz was a little more challenging than some of the other microwave bands, so the 23 GHz conversion idea was put on hold for a later time, as I gained more skills and experience on the various bands above 1000 MHz. I decided to start with 10 GHz.

In 2003, I discussed via e-mail some ideas for another 10 GHz system with Tony Long, KC6QHP. Tony interrupted my plans and said that rather than building yet another 10 GHz rig, I should build something for 24 GHz.

This made me stop and think, especially since I had been collecting bits and pieces for a 24 GHz system while building my 10 GHz rigs. To my surprise, I had enough ingredients to build something for 24 after about three years of collecting, buying and trading parts.

24 GHz Rig Research and Parts Procurement

My 24 GHz rig was originally going to be a straight-off "high-side P-Com conversion," as described by Kerry Banke, N6IZW, and Ed Munn, W6OYJ, of the San Diego Microwave Group (SDMG).[2] After talking to several SBMS members, I discovered that the conversion is a real challenge to get going right, so I continued to look for alternatives. Another hurdle is the vast number of "different" P-Com surplus outdoor units offered for sale, including some that may not be suitable for use on the ham bands.[3]

As I continued my research on 24 GHz rigs, fellow SBMS members Doug Millar, K6JEY, and Dave Glawson, WA6CGR, mentioned that using "Celeritek modules" would greatly simplify the project. I did some Internet research on 23 GHz Celeritek units, but even the power of the Google search engine could not provide me with much ham-useful information.

After more searching, I finally found an article that described these modules: "Using Surplus 23 GHz Modules at 24,192 MHz," by Al Ward, W5LUA. For easy reference, the paper appears in the *Proceedings of Microwave Update 2000* on page 27.[4]

In December 2003, I stumbled across a M/A-COM 23 GHz "white box" at a local ham radio swap meet. It contained a redundant wideband FM system, with a genuine Waveline WR-42 relay, and many other useful parts, for an extremely good price. I

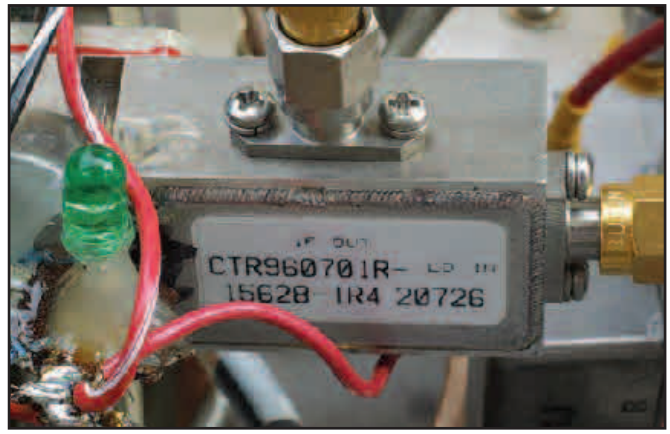


Figure 1 — The Celeritek receive module came with an isolator, which also adapts the hole pattern to a standard WR-42 flange. The 5 mm green LED indicates 12 V is at the module. The old-fashioned tie points help prevent breakage to the fragile leads coming out of the eyelets.

[1]Notes appear on page 30.

disassembled the unit, hoping that my first rig would be a pair of wideband FM units, using the 23 GHz Gunnplexers in the White Box. I sorted the parts and put them away in my 24 GHz project bin.

In May 2004, I won an auction for a set of Celeritek modules on eBay. I was the one and only bidder. Being the only bidder on something always makes me nervous, since I always wonder whether or not the things would be useful for a project. I added this assembly to my 24 GHz bin. The Celeritek modules I received from eBay included isolators, as shown in Figure 1.

During Microwave Update 2004 in Dallas, Texas, I ordered a major piece for my 24 GHz rig — a 2 W solid state amplifier from Paul Drexler, W2PED, as shown in Figure 3. With just –20 dBm input, the unit delivers +34 dBm or 2+ W output. This represents a gain of about 56.4 dB, all powered by a 12 V dc, 1 A supply.

More recently, I was able to get one of the "true" P-Com outdoor units from WA6CGR, along with a spare unit from John Klewer, N6AX. In 2005, Gary Lopes, WA6MEM, built a 24 GHz rig using a combination of P-Com and Celeritek parts. This was very similar to what I was thinking about.

Mixing and Matching the Ingredients

Figure 3 is a block diagram of my 24 GHz rig. It is very similar to the system built by WA6MEM. Figure 4 is an overhead view of the rig. The original system was unstable, and was traced to something in the 432 MHz to 2208 MHz up/down mixer/multiplier unit. This problem was documented and explained in the conversion article for the high-side P-Com unit by Banke and Munn. This oscillation was also observed by W6OYJ, and is documented in the revised notes posted on the SBMS Web site. More experiments are needed to cure the oscillations in the up/down converter unit.

Meanwhile, Dave, WA6CGR, suggested replacing the one-PCB module with a "discrete solution" consisting of an SMA relay for the 432 MHz IF, a splitter and independent mixers to convert the 432 MHz to 2208 MHz for receive and transmit.

Built for Serviceability

I call this rig "LightShow," because the rig includes many LEDs to reassure me that voltage is present at each module. The reassurance LEDs indicate more than just on or off: The color and size indicate voltage and function.[5]

Figure 5 shows how the original M/A-COM base plate is used to mount all modules. The entire transverter can be lifted out of the box for complete access during testing and troubleshooting.

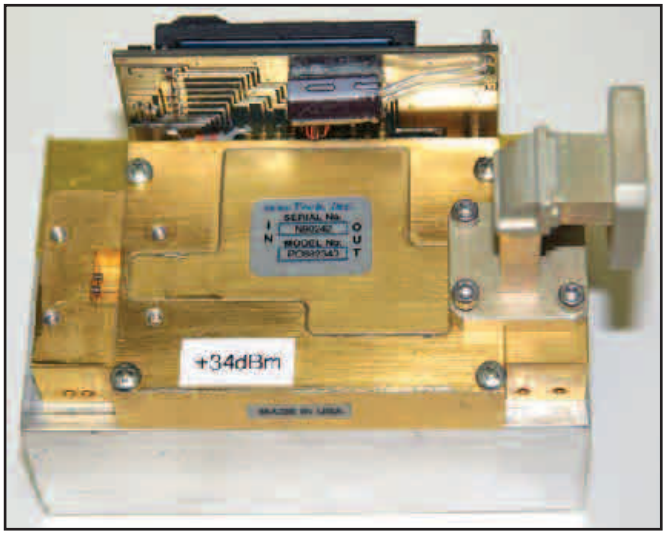


Figure 2 — A very nice module for any 24 GHz system: a 2 W SSPA.

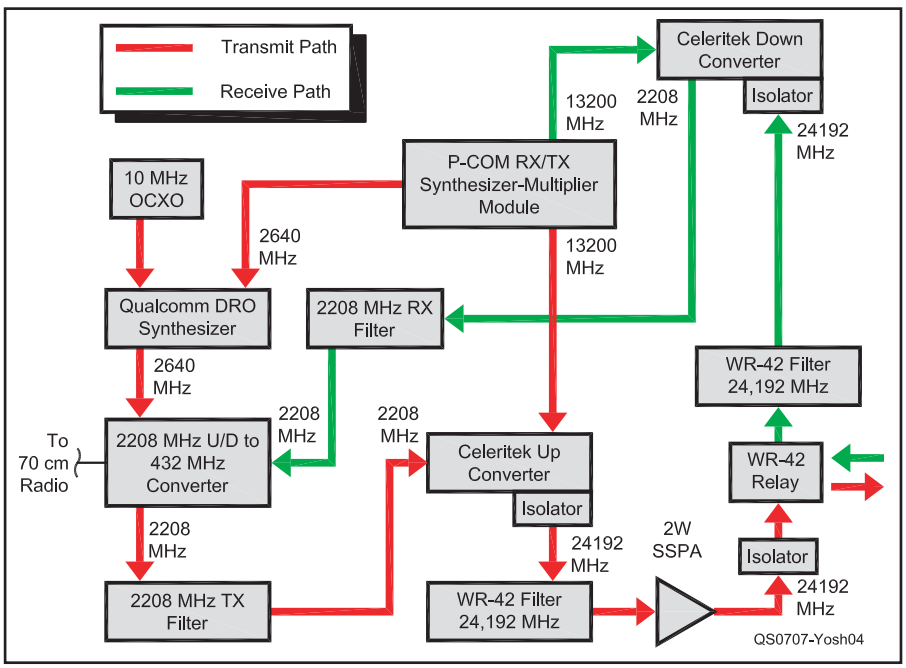


Figure 3 — Block diagram of "LightShow," the 24 GHz rig.

In addition, a modular approach is used. Thus, if something malfunctions, it will be a simple matter to remove and replace the broken module. This is also a benefit if modifying or improving a certain section, such as upgrading the 10 MHz OCXO to a rubidium or GPS-locked frequencystandard. Figures 6, 7 and 8 are views of my completed 24 GHz radio system.

Performance

My first actual 24 GHz contact was made from Signal Hill, near Long Beach, California (grid square DM03wt) to WA6MEM located near San Pedro (DM03ur) on April 9, 2006, a distance of about 10 miles.

Dave, WA6CGR, was right beside me, so we could compare performance. Dave's station performed much better than mine, so something was amiss on my end. Testing the rig after this field trial revealed that transmit power was around 800 mW, instead of the expected 2 W coming out of the amplifier. I increased the drive to the amplifier by changing the input attenuator pad from 30 dB to 18 dB. The transmit power output is now 1.5 W at the antenna port.

Receiver gain is 12 dB and the noise figure (NF) is above 20 dB. Dave had a spare 24 GHz low noise amplifier (LNA), and NF is now improved to about 7 dB. The gain is about 14 dB, still below my expectations, so more work needs to be done.

I hope my 24 GHz story inspires others to activate this band so that we can make the dollars-to-contact ratio go down. Although parts procurement took quite some time,

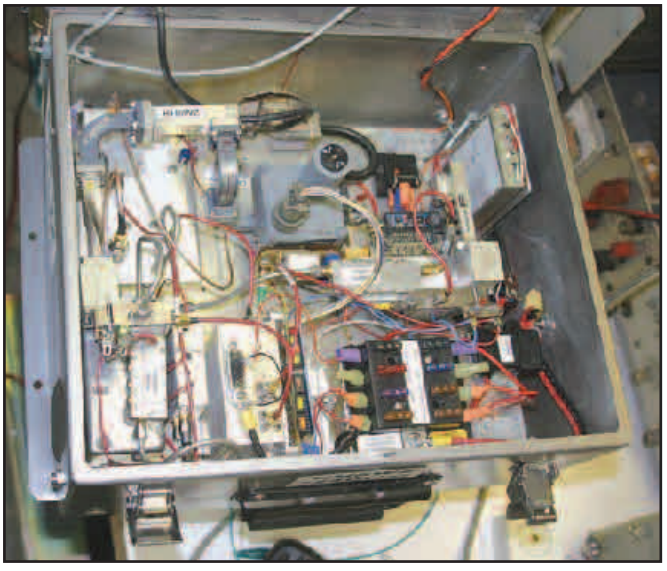


Figure 4 — Overhead view of the KH6WZ 24 GHz system, using surplus Celeritek modules from eBay, and an assortment of surplus components collected over several years.

Figure 6 — The completed 24 GHz system, from the operator's point of view.

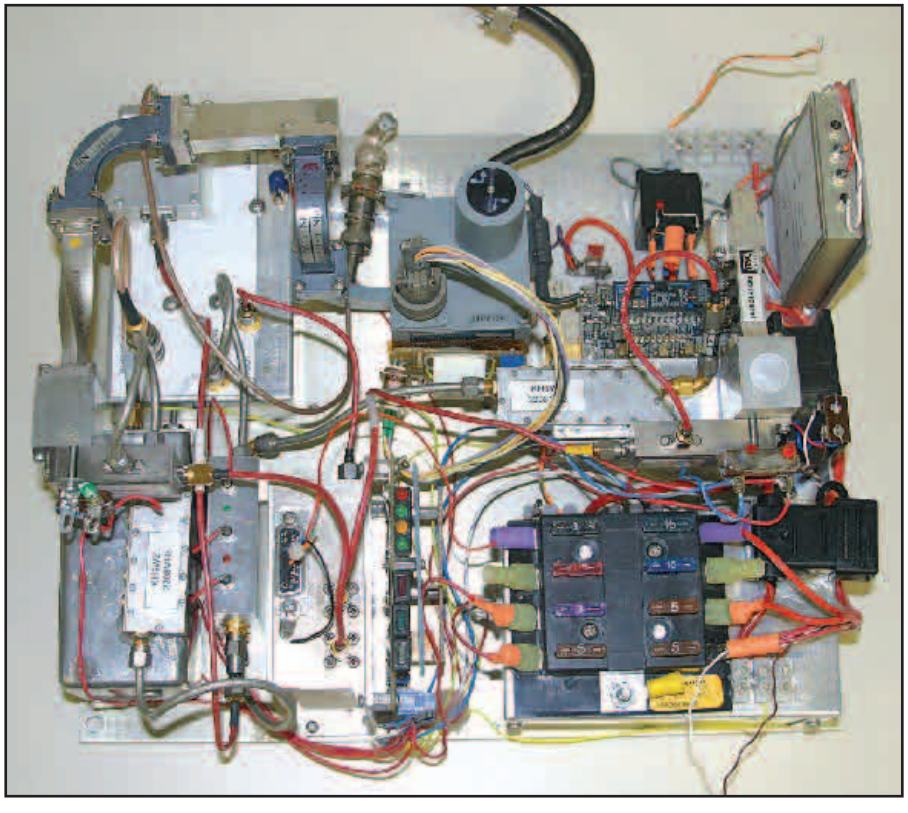


Figure 5 — LightShow is built on the original M/A-COM 23 GHz "White Box" base plate. All modules mount on this single surface. The entire transverter can be lifted out of the housing, making it easy to repair or modify.

Figure 7 — A rear view of the KH6WZ 24 GHz system. The aluminum block houses a "keylock" switch for sending a carrier beacon. The small shaft peeking out of the block is connected to a microswitch, for CW keying.

the development of this rig was very exciting. Perhaps one of the best features of 24 GHz equipment is its size: The complete rig, including dish antenna, fits comfortably into the trunk of my sports coupe.

Notes

[1]D. Glawson, WA6CGR, "24 GHz SSB Conversion of the P-Com Tel-Link 23 GHz ODU," **www.ham-radio.com/sbms/24 GHz**.

[2]K. Banke, N6IZW, and E. Munn, W6OYJ, "Modification of the P-Com 23 GHz 'High Side LO' ODU as a 24 GHz Transverter," **www.ham-radio.com/sbms/sd/hsmods1.htm**.

[3]R. Bynum, NR6CA, "Amateur Radio Use of P-Com Equipment," **www.nr6ca.org/pcomm.html**.

[4]A. Ward, W5LUA, "Using Surplus 23 GHz Modules at 24,192 MHz," *Proceedings of Microwave Update 2000*, p 27.

[5]Most of the SBMS members have names for their rigs, very much like the way sailors name their vessels. "LightShow" comes from the numerous LED status indicators in the rig, as explained in the text.

Wayne Yoshida, KH6WZ, is employed by M/A-COM, a Tyco Electronics company in Torrance, California. Licensed since 1976, Wayne is also the "Beginner's Corner" editor for CQ *magazine. Amateur Radio has had a considerable influence on his life and career. He is a past president of the UCLA Amateur Radio Group, W6YRA. His first job out of college was working at ARRL Headquarters as a Public Information Officer. Two years later, he became the regional sales manager for Amateur Radio products at a major communications equipment company. Wayne enjoys HF contesting, DXpeditioning and, of course, building microwave rigs. His most memorable ham radio experience was working in the press room at the NASA Johnson Space Center (Mission Control, Houston) during the 1983 Owen Garriott, W5LFL, operation aboard STS-9/SpaceLab-1. You can reach Wayne at 16428 Camino Canada Ln, Huntington Beach, CA 92649 or at* **kh6kine@earthlink.net**.

Balloon-Lifted Full-Wave Loop Antennas

Nothing beats a full sized antenna, way up in the air, for launching your signal. Here's how to build and deploy a balloon-lifted, high performance full-wave loop antenna for your next Field Day or contest operation.

Jim DeLoach, WUØI

FRED MARTIN, AE6CW

Figure 1 — Marc, W6ZZZ (left) and author Jim, WUØI (right) inflating a 6 foot balloon during Field Day 2006 in the Rancho San Antonio Open Space Preserve near Los Altos Hills, California.

Temporary operating events such as ARRL Field Day are a great opportunity to experiment with really interesting antennas that just wouldn't fit at home. My club has been flying balloon-lifted antennas since the mid 1990s for Field Day and other events.[1] Last Field Day we lifted full wave loops for 20 and 80 meters and both performed superbly.

In this article I'll show you how to build your own balloon-lifted full-wave loop antenna. I'll explain why full-wave loops work so well with balloons, discuss the unique operational details of flying balloon-lifted antennas, share performance impressions, cover safety procedures, review FAA regulations and provide links to additional information.

Why Full-Wave Loops?

Hams have been using balloons to lift vertical monopole antennas poised against a ground plane for years.[2, 3] There are some key advantages to using a full-wave loop, however, instead of a ground plane vertical.

- Loops are balanced and don't require a ground plane. For a temporary deployment this is a truly big deal, since ground radials are a pain to deploy and are easy to trip over.
- Loops can be horizontally polarized so they have less noise — a key advantage on the lower HF bands.
- Loops perform well even when relatively close to the ground.
- Loops are broadband and are easy to tune. They are far more likely to stay in tune as the antenna blows around in the wind.
- A loop's radiation pattern is quite broad. Thus the radiation pattern remains consistent as the antenna shape, altitude and orientation shifts in the wind.
- Loops fed with ladder line can be tuned for other bands and typically perform well on these bands, too.

So loops are great, but isn't it difficult to keep a diamond shape when lifting a full-wave loop with a balloon? It turns out that it's not that difficult to do.

Construction

The Loop

A full-wave loop is just one long piece of wire, shaped in some form of convex polygon, fed where the two ends come together. While theory says that a circular shape is best, loops still perform well with rectangular or elongated shapes. The balloon-lifted loop has a roughly diamond shape, as shown in Figure 2. One large balloon lifts the apex tip. The loop is fed at the bottom for horizontal polarization, and other smaller balloons spread and lift the two mid points. The size of a full-wave loop antenna is given in *The ARRL Antenna Book* as:

Circumference (feet) = 1005/Frequency (MHz).[4] [Eq 1]

You should use light wire to keep the loop's weight down. The sidebar "Materials" shows several choices for suitable wire. Cut the wire to the circumference length for the desired frequency. If you use stranded copper wire, strip and tin about an inch from each end.

The fishing line tethers serve as insulators for this antenna. These tethers are simply cable-tied to the antenna wire during the lifting phase. To strain relieve the loop

[1]Notes appear on page 34.

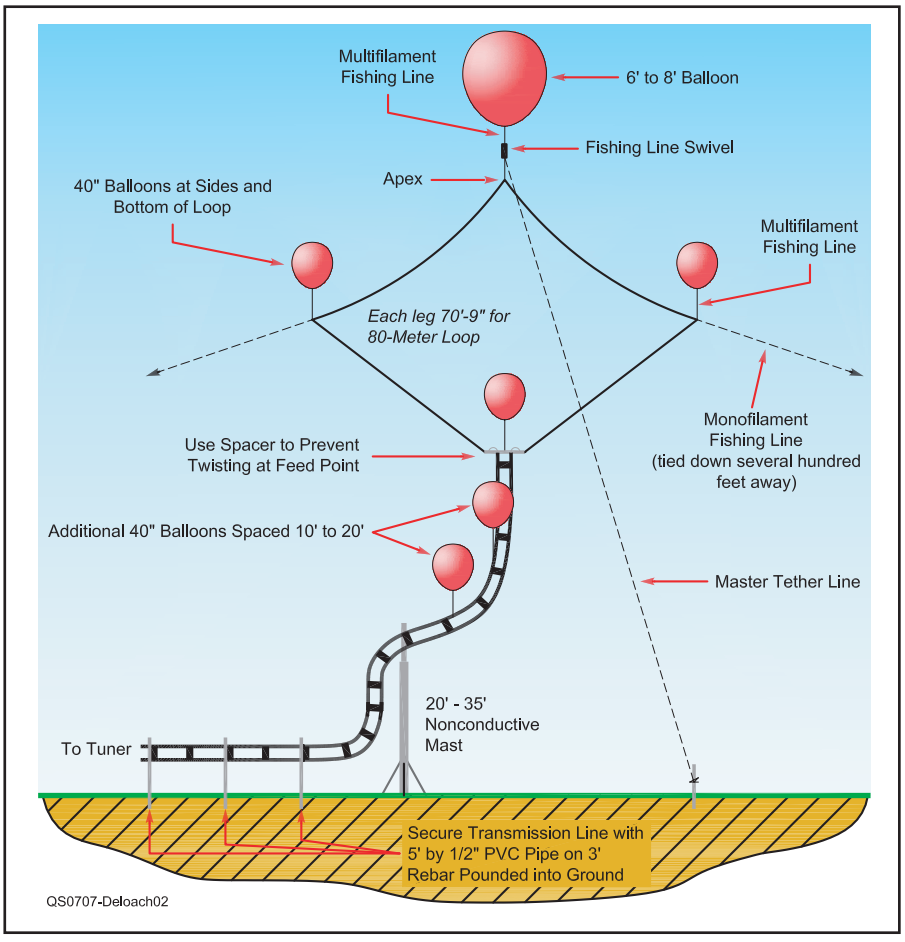


Figure 2 — Overview of balloon-lifted full-wave loop antenna.

wire at the tether points, preposition one or two approximately 1 inch sections of shrink wrap at the top and side corners of the diamond, as shown in Figures 4 and 5.

Feed one or two pieces of shrink tubing down the loop wire for each corner. Gently fold the wire in half to find the apex corner position. Be careful not to kink or bend the wire. Shrink the tubing at this halfway point (this is the apex corner.). Now, gently fold the antenna into quarters to identify the side corner positions. Install shrink tubing at these two positions as well.

Spread the wire out again halved, with the bottom two feed points side by side. Roll up the loop wire starting at these two feed ends. This will put the apex corner on the outside of the roll, which helps when deploying the antenna. Be careful not to kink, bend or knot the wire when rolling it up.

Preparing Balloons

I have used a single 8 foot balloon to lift an entire 80 meter antenna assembly, but my preference is to use one 6 foot balloon, along with several smaller balloons at the mid points. This makes compliance with FAA regulations easier (see the sidebar "FAA Balloon Regulations"), and helps keep the diamond shape better. A 6 foot balloon is also cheaper. Figure 2 shows the location and size of the balloons, and the sidebar provides balloon sources.

Materials

Antenna wire: I use surplus stranded #22 wire from Fair Radio Sales. Part number SEB-400X3, 306 foot spool for $12.95. **www.fairradio.com**. Other authors suggest using "fine aluminum welding wire" from welding supply shops.

Helium: Helium can be purchased from local party balloon suppliers (I use **www.peoplegreeters.com**), industrial gas or welding supply shops. Cost is typically about $0.25/cubic foot. Tank sizes vary widely. I use 176 ft^3 tanks that weigh 80 pounds. I have never needed a regulator given the types of tanks I use. Check with your supplier though. Balloon volume is given by $(4/3)*\pi*(diameter/2)^3$, but I typically only inflate to 80% of balloon capacity. Thus a 40 inch balloon needs 15.5 ft^3 and a 6 foot balloon needs 90.5 ft^3. If one 6 foot and five 40 inch balloons are desired, and you want to have double the helium just in case, then you need 336 ft^3. I typically get two 176 ft^3 tanks.

Balloons: I use latex or chloroprene "car dealer" balloons from my local helium source or the Web (eg, **www.balloonlovers.com;** also try eBay); 40 inch balloons are $2.50; 6 foot balloons are $18. Note that balloons last longest when stored in a cool, dark place. If you have several hundred dollars to spend and want to get serious, a heavy-duty vinyl advertising balloon will last for years, and you can put your club logo on it! Note that you will need to use much larger tether rope than discussed in this article. Place a drop cloth under vinyl balloons when inflating. I have successfully used Edmond Scientific and surplus weather balloons over the years. But since these balloons are meant to float free, they tend to be fragile and pop easily when moored. See the University of Hawaii site for additional balloon information.

Nonconductive mast: The MFJ-1910 fiberglass mast (**www.mfjenterprises.com)** works well for this purpose. Cost: $80. High voltage "hot sticks" also work. I have used the tripod from an AS-2236 log-periodic antenna (**www.fairradio.com**) to hold the mast.

Wire connectors: Screw compression type wire connectors taken from small mechanical lugs work well for me (**www.doityourself.com/invt/8017337**). Alternatively, use small "cap" style wire connectors or crimp butt splitters. Source: any hardware store. Cost: a few dollars.

Tether line and swivels: 100-pound-test tether lines are sufficient for balloons up to 6 feet in diameter. Any fishing store can sell monofilament line, multifilament line and swivels. Total cost: about $20.

Tuners: Use only a tuner made for balanced lines!* Others do not work as well. The MFJ-974HB costs $190 (**www.mfjenterprises.com**) and old Johnson Matchbox tuners work well.

Static bleed-off resistors: 1 MΩ or more, non-inductive power resistors rated for over 2 W should do for up to 100 W radiated power (Digikey PPC1.0MW-3JCT-ND).

Use only helium gas to inflate balloons! Hydrogen is *explosive* and not worth messing with. Helium is safe to transport and to use if a few simple rules are followed (see the sidebar "Safety Precautions").

Balloon lift is a function of size, weight, material type, altitude, pressure and temperature. Lift predictions have been published, but in my experience lift never quite matches up to predicted values.[5, 6] At an altitude of 600 feet I've found that 40 inch balloons give about a pound of lift. A 6 foot balloon achieves 3 to 5 pounds of lift, and an 8 foot balloon manages 10 to 15 pounds of lift. Your experience may vary, particularly at different altitudes.

Before inflating the balloons, prepare all the tether lines. Cut pieces of 100 pound test multifilament fishing line to the lengths shown in Figures 4 and 5. Make a bowline knot with a loop on one end at least as big as your fist.[7] Tie a simple slipknot on the other end to prevent unraveling.

Now you are ready to inflate the balloons. Have one person tightly hold the lip of the balloon over the tank nozzle while a second person carefully holds the tank steady and gently opens the valve. Have a third person judge the size of the balloon and warn the inflating person when it is time to stop. Inflate balloons only to about 80% of rated size to allow for some expansion and to prevent popping. Do remember that balloons pop! Always have spare balloons and helium to cover this possibility.

Note that a crack in the nozzle assembly can cause the helium tank to become a dangerous projectile. Any time the protective cover has been removed, be very careful not to let the tank fall. Keep the protective cover screwed on when not inflating, and consider securing the tank to a solid object.

Once inflated, secure each balloon to a tether, as shown in Figure 3, using a cable tie. This approach is simple and has worked flawlessly for me. Anchor each balloon to something solid until you are ready to lift the entire antenna. After use, the cable tie can often be snipped off without damaging the balloon, but note that used balloons are far more prone to popping.

Safety Precautions

Here are some simple rules to follow to fly your antennas safely:

- Make sure you have plenty of space! Never fly a balloon antenna where it could possibly come down on a power line, any other wire, any structure, roads or rail lines.
- Fly balloon antennas only in light to moderate winds. Pull the antenna down when winds rise and wait for the winds to subside.
- Use tether line sizes appropriate for the possible wind load. Do not use frayed or damaged tether lines.
- Wear gloves when handling tethers or antenna wire.
- Never fly a balloon antenna in a thunderstorm.
- Inflate with helium only.
- Always tether the balloon to the ground with a master line separate from the antenna support structure. Tether lines should be stronger than balloons. Use good knots like the bowline.
- Be careful with helium tanks. When transporting, secure tanks so that they cannot roll around in a vehicle. Tanks are heavy, so always have enough people around when lifting. Always keep the valve closed and the nozzle cover secured when not actually inflating balloons. Never let tanks fall — particularly when the nozzle is exposed.
- Secure tether lines to solid objects on the ground. Tie colorful flag tape to the lines so that pedestrians and cars see them and do not become entangled.

Raising the Balloon — the Tethering and Spreading System

Once all balloons are inflated and tethered, you are ready to launch your antenna. Connect the large balloon to the antenna apex, as shown in Figure 4. Also tie the master tether line to the bottom of the swivel. Use bowline knots throughout. The master tether line is for safety. It holds the apex balloon independent of the antenna, so the master tether should be kept clear of the antenna wiring and tether lines. Typically this means that it is secured a little upwind of the antenna.

Let the apex balloon slowly rise upward as you unwind the antenna wire and the master tether. Be careful not to allow the two antenna wires to kink or knot, or to tangle with the master tether. Continue to unwind the antenna wire and master tether until you reach the corner tether points.

Secure the spreading lines and additional balloons to each corner using the technique shown in Figure 5. Spreading lines pull the diamond apart, and they work best if they are light (25 pound test monofilament fishing line works well). Optionally, tie colorful flag tape to the bowline loops to improve corner visibility once the antenna is lifted.

Continue to unwind the antenna wire, master tether and the two spreading lines while walking the spreading lines apart. Continue unwinding until you reach the ends of the loop antenna wires.

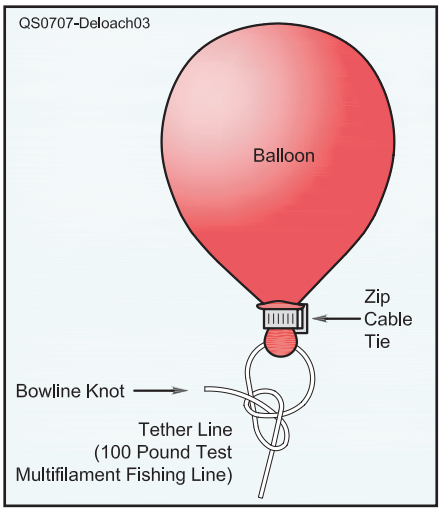


Figure 3 — Method for securing tether lines to balloons. After inflation, fold balloon neck over bowline loop and cinch cable tie around neck fold.

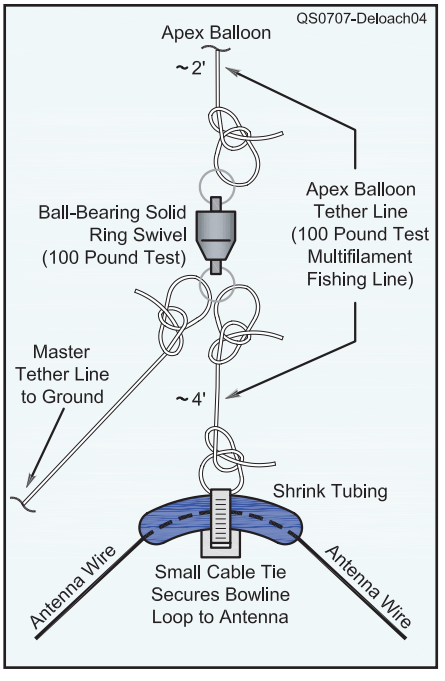


Figure 4 — Securing the apex balloon tether and the master safety tether.

Secure Feed Line

An insulating spacer is essential to prevent the feed wires from twisting and potentially shorting out. Use any convenient light, nonconductive material about 12 inches long for this spacer. Cable-tie the ladder line to the spacer and the balloon tether, as shown in Figure 6. Connect transmission line to antenna wires using screw compression type wire connectors or some other form of wire connectors (see the sidebar). Strain-relieve the antenna wires to the spacer using electrical tape.

Reel out feed line, tying on a 40 inch balloon every 10 to 20 feet, as shown in Figure 2. Once the antenna is in position,

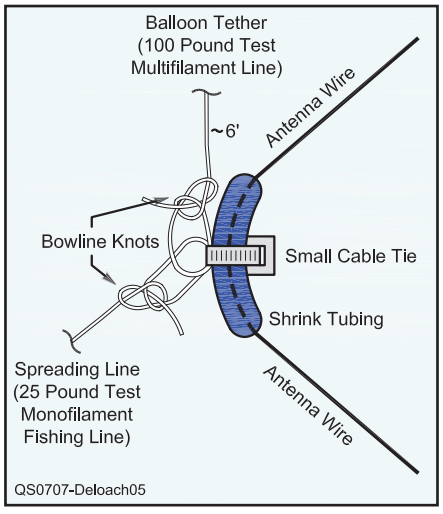


Figure 5 — Securing the corner balloons to tether and spreading lines. Note that the spreading line is looped inside the balloon tether line for safety in case the cable tie should break.

FAA Balloon Regulations

The United States Federal Aviation Administration (FAA) defines regulations governing the operation of moored balloons.* A moored balloon is exempt from all regulations as long as it does not create a hazard to persons or property, it is not more than 6 feet in diameter and its gas capacity is not greater than 115 cubic feet. If not exempt, it must be more than 5 miles from any airport, be operated in good weather and have an "automatic deflation mechanism." If operated above 150 feet, additional advanced notification, lighting and visual warning requirements kick in. Operation above 500 feet is banned outright.

The FAA regulations change from time to time, so read the regulations for yourself before you fly your balloon lifted antenna.

*Federal Aviation Administration regulations concerning "moored balloons" can be found in the *Electronic Code of Federal Regulations* (e-FCR), Part 101 — "Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons," at **ecfr.gpoaccess.gov/**. Look under Title 14, then Part 101.

experiment with tether and spreading line lengths to get the loop to take on as close to a diamond shape as possible.

Transmission Line

Balanced ladder transmission line (often called window line) is far more efficient than coax, tunes much easier and is a great choice for temporary operations. But it needs to be kept away from metal objects and you can't run it on the ground. To prevent the feed line from touching the ground as the balloons bob up and down in the wind, tape the feed line to the end of a nonconductive mast, as shown in Figure 2.

Jim, K6EI, came up with a great way to further distribute the transmission line, if needed. Pound 3 foot sections of steel reinforcing bar (rebar) in the ground, and then slip 5 foot sections of ½ inch PVC pipe over the rebar. Tape the transmission line to the top of the PVC. Space these pipes every 10 or 15 feet all the way to the balanced tuner. See the sidebar for sources for masts, ladder line and balanced tuners.

Static Buildup

Wind-induced static buildup has been reported for large balloon-lifted monopole antennas. Since loops present a short at dc, a differential mode voltage buildup will not occur. Common-mode build up is possible, however. Although we have never experienced this phenomenon, perhaps because we are in a low static area, we still connect two 1 MΩ, high wattage, noninductive resistors between the tuner's balanced antenna terminals and ground to bleed off any possible static charge.

Performance

How well do these antennas work? The ESL Radio Club has had numerous adventures using these balloon loops as part of their annual Field Day low power (QRP) operation. Jim, K6EI, recalls creating a pile-up after calling CQ, holding a frequency through the contest and even working Japan — all on 80 meters while running 5 W. Greg, N6GD, reports, "On 80 CW, there wasn't anybody I heard that I couldn't work with the loop. Pretty amazing considering we were running only 5 W!" These comments are typical. Our Field Day experience has always been that if the balloons stay up, the antenna rocks, even if we're running QRP. So join the fun and try a loop antenna and see what it's like to have the big signal!

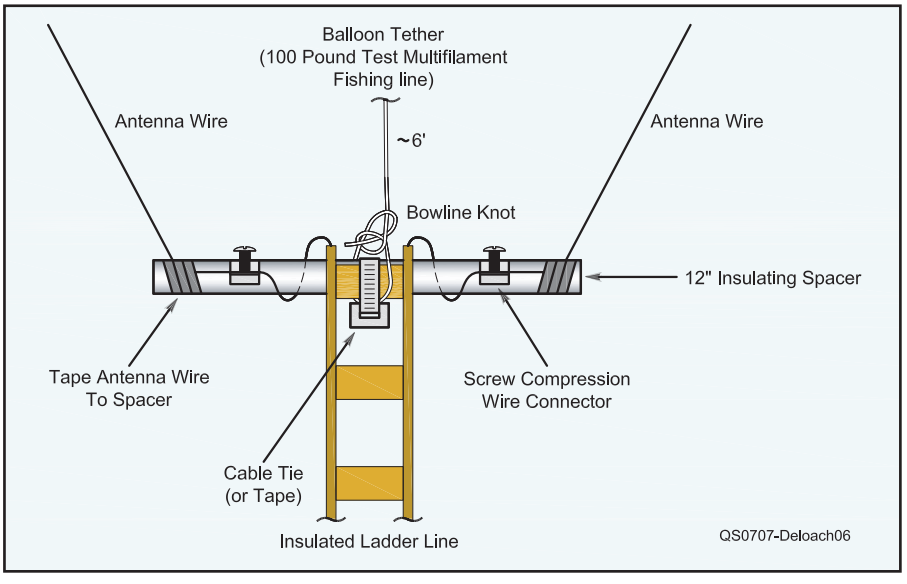


Figure 6 — Feed line assembly detail.

Notes

[1]The ESL Amateur Radio Club of Sunnyvale California, along with its partner club, the West Valley Amateur Radio Association of San Jose.

[2]S. Gibilisco, W1GV, "Balloons as Antenna Supports," *The ARRL Antenna Compendium, Vol 2*.

[3]The Kite and Balloon Antenna Site, YB5AQB (G4VGO), **www.qsl.net/g4vgo/**.

[4]R. D. Straw, Editor, *The ARRL Antenna Book*, 21st Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 9876. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop/**; **pubsales@arrl.org**.

[5]The University of Hawaii has an excellent Web site discussing balloon buoyancy, balloon materials and antenna construction materials at: **www.chem.hawaii.edu/uham/lift.html**.

[6]Another easy to read discussion of helium buoyancy can be found at: **www.howstuffworks.com/helium1.htm**.

[7]See **www.tollesburysc.co.uk/Knots/Bowline.htm** for an illustrated example of the bowline knot. Also see *QST*, Jun 2006, p 57.

Jim DeLoach, WUØI, was first licensed in 1976. He is a Principal Engineer with Qualcomm Inc, working on GPS and other location technologies for wireless devices. He loves to build high performance temporary contest stations, but prefers to get out of the way and let the real operators take over as soon as the station is up and running. He has been building and flying balloon-lifted antennas for Field Day since 1994. Jim lives in Los Altos, California, and can be reached at **jim@deloach.net.** *The author's balloon Web site is found at* **www.deloach.net/balloons**.

The Smart Keyboard

Build a low cost keyboard keyer that works well and can work with your paddles, too!

Joe Lunsford, N4YG

CW is my favorite operating mode; in fact it is really my only operating mode. As I grow older I prefer a nice long chat with someone on a topic of common interest rather than chasing DX, as in my younger years. I also like good CW. I think there are many who have the same operating style and preferences. Many of the hams with whom I have contacts use keyboards, allowing them to send code with fewer errors and at higher speeds.

Available for many years, CW keyboards have gained in popularity in the last 20 years as computers have become widely used. Most keyboard programs make use of available programming languages and use the computer as the sole source of timing for the generation of Morse characters. These and other limitations described below caused me to develop my own keyboard Morse system.

The Smart Keyboard

Recently I began to look into the possibility of keyboards for my shack, just to try out and use occasionally along with the paddles. I use a laptop computer for logging and it seemed that I could acquire a good keyboard program and little would change at my operating position, other than the addition of a cable and an interface between the computer and the radio. As I began looking around and talking with others who had experience with keyboards, I noticed three things in the available keyboard programs that caused me to reject most of them.

- Timing inaccuracy: This is a concern because users are not provided with the flexibility to take advantage of the inherent capability of computers to generate accurately timed intervals. In most cases, timing can be guaranteed only to an accuracy of about 1 millisecond (some are timed to an accuracy of 10 ms). At 25 WPM a dot lasts 48 ms and would be timed to an accuracy of 2 percent. While this may be sufficiently accurate for some CW operators, at speeds above 25 WPM it becomes a problem.
- Varied behavior among the many types of PCs and various versions of the *Windows* operating system: This can cause a keyboard program to perform very differently on the various PCs that may be found in ham shacks.
- Port incompatability: Most keyboard programs, especially those available at no cost, use the serial or parallel port to interface between the computer and the transmitter keying line. My computer is about two years old and has only USB ports — neither a serial nor a parallel port.

These issues caused me to consider development of a keyboard program along with an interface unit using the USB port of my computer. The fact that I had already written the code to support a low-speed USB peripheral made the decision easier. Had I not already done this for a previous project, I never would have attempted to develop the Smart Keyboard. The time required to develop the firmware for the PIC16C745 and the code for the host computer would have been unreasonable for such a project. The task of researching the USB specification and the protocol for the interaction of the host computer and the USB peripheral is significant.

Requirements

The USB *interface unit* and the graphical user interface (GUI) program I decided to develop would have none of these shortcomings. These are the major features that I desired:

- An interface unit with a low-speed USB port.
- A GUI compatible with most *Windows* operating systems.
- Dot, dash and space timing accuracy of less than 10 µs.
- An interface unit that can also serve as a fully functional stand alone keyer.
- A sidetone generator, with variable tone and volume, built into the interface unit.
- Keying of positive or negative keyed rigs.
- Selectable keying modes such as iambic, dot memory and dash memory.
- Keyer speed, weight and keying modes controlled by the host computer.
- User control of word and character spacing.

The design that satisfies each of these requirements also includes an interface unit with a low-speed USB port. This unit controls all timing and is also a fully functional electronic keyer. The USB port provides power for the operation of the interface unit. The host computer communicates with the interface unit whenever necessary. During keyboard operation, the host computer sends requests to the interface unit for Morse characters to be sent to the transmitter. Little information is sent from the interface unit to the host, only status information.

The Smart Keyboard

The *Smart Keyboard* solves all three of the problems I described. Timing is determined by the interface unit. The interface unit is a complete keyer that uses a microcontroller to generate dots and dashes to an accuracy of a fraction of a microsecond. This same microcontroller provides a USB port for com-

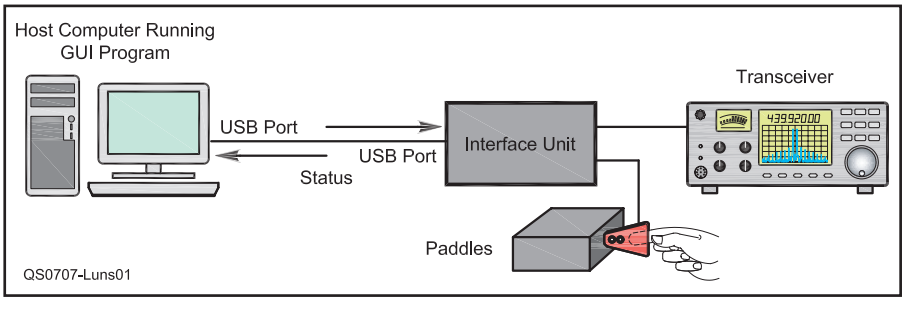


Figure 1 — Block diagram of the smart keyboard.

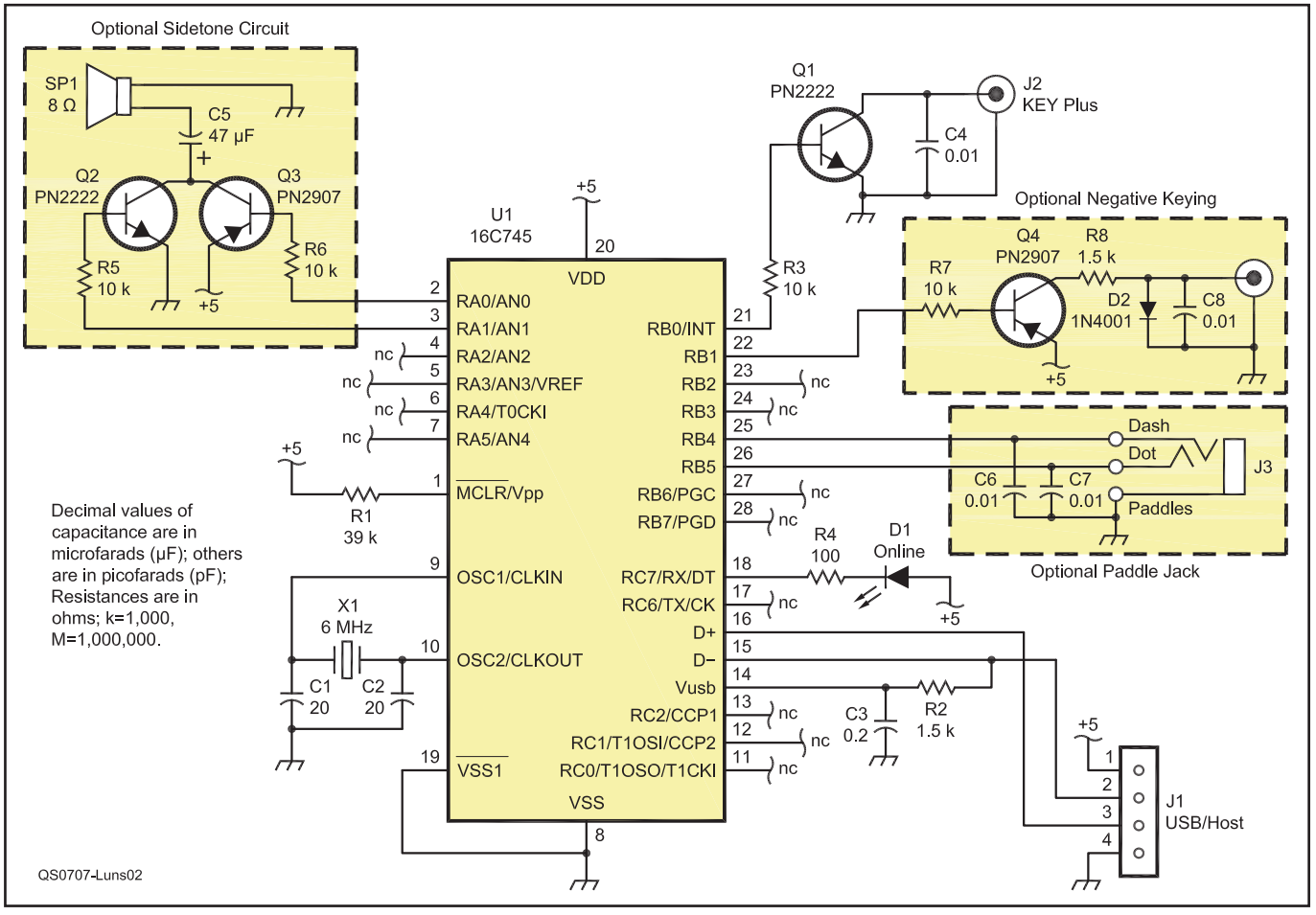


Figure 2 — Schematic diagram of the smart keyboard. Parts are listed in Table 1.

munication with the computer. Because the computer only asks the interface to generate dots, dashes and spaces, the behavior is independent of the computer used as the host. The *Smart Keyboard* program includes a GUI that allows the operator to control all the parameters of the keyboard and keyer. It also provides the operator with visual information on the status and operation of the keyboard.

Because the interface is also a keyer, paddles can be plugged into the interface and the operator can use the keyer or keyboard at any time interchangeably. A sidetone is provided in the interface and its tone and volume are controlled through the GUI, which also controls SPEED, WEIGHT, LETTER SPACING and WORD SPACING. The GUI program and the object code for the 16C745 microcontroller are provided. The interface unit hardware can be easily constructed for less than $50.

The Interface Unit

Figure 2 is a schematic diagram of Smart Keyboard interface unit circuit. The unit is amazingly simple in terms of hardware. The 16C745 is the heart of the unit. A 6 MHz crystal provides the timing reference for the oscillator. From this an internal phase locked loop (PLL) provides the 24 MHz clock for the processor. A very accurate 24 MHz clock is a requirement for operation of the USB module. The USB connector has four conductors, two of which supply 5 V with maximum current specified in 100 mA units.

Our interface unit requires much less than one unit of current. During the *enumeration* process the interface unit requests

Table 1
Parts List for Smart Keyboard*

C1, C2 — 20 pF, 50 V, ±5% disc capacitor (Mouser 140-50N5-200J).
C3 — 0.22 µF, 20% axial lead capacitor (Mouser 581-SA-105E224MAR).
C4, C6-C8 — 0.01 µF, 50 V, -20%, -80% disc capacitor (Mouser 140-50V5-103Z).
C5 — 47 µF radial lead electrolytic capacitor (Mouser 140-HTRL25V47-RC).
D1 — T-1 LED (Mouser 351-3102-RC).
D2 — 50 PIV rectifier diode (Mouser 621-1N4001).
J2, J4 — RCA phono jack (Mouser 161-2052).
J3 — ¼″ phone jack (Mouser 161-0023-E).
J1 — USB Type B connector PCB mount (Mouser 154-2442).
Q1, Q2 — PN2222A NPN transistor, TO92 (Mouser 511-PN2222A).
Q3, Q4 — PN2907A NPN transistor, TO92 (Mouser 511-PN2907A).
R1 — 39 kΩ, ¼ W carbon film resistor (Mouser 291-39K-RC).
R2, R8 — 1.5 kΩ, ¼ W carbon film resistor (Mouser 291-10K-RC).
R3, R5-R7 — 10 kΩ, ¼ W carbon film resistor (Mouser 291-1500-RC).
R4 — 100 Ω, ¼ W carbon film resistor (Mouser 291-47-RC).
SP1 — Mylar speaker, 1.18″ diameter (Mouser 254-PS605).
U1 — 16C745 Microcontroller OTP programmed with firmware (Mouser 579-PIC16C745ISP).
X1 — 6 MHz Parallel Cut Crystal (Mouser 559-FOX060-20).
USB cable, 1.8 meters (Mouser 172-1024).
Enclosure, aluminum (painted grey) (Mouser 537-101-P).
Threaded spacers (4) (Mouser 534-1891).
4-40 machine screws (8) (Mouser 534-9300).
Prepared Vero Board 2 × 2 ¾″ (Ocean State 12-618).
28-pin DIP socket (Mouser 571-3902622).

*All parts available from Mouser Electronics, **www.mouser.com**, or Ocean State Electronics, **www.oselectronics.com**. All listed items are included in the parts package available from the author for $60.

1 unit of power from the host. Enumeration is a process that occurs when a USB device is attached to the host computer. At this time the host requests information from the peripheral device so that it can identify it and communicate with it. Data is transferred over the D+ and D– lines. A 1500 Ω resistor connected between D– and V_{USB} is required for the host to recognize the interface unit as a low speed USB peripheral.

A light emitting diode (LED), D1 provides a visual indication that the host computer has enumerated the peripheral, in this case our interface unit. When D1 is illuminated, the computer has recognized the interface unit and is ready to use the peripheral to transfer data. The keying transistor, Q1, for keying positive voltage, is connected to pin 21.

The remainder of the circuitry is optional and could be omitted. These circuit blocks include the sidetone, negative keying and paddle circuits (required to use the unit as a manual keyer). While these may be omitted, I suggest that it is just as easy to include them all because the parts cost is minimal.

The tough task was writing the code for the interface unit, but I had already completed the difficult part, the code for USB support. Code was needed to make the interface a keyer that could take commands from the USB module. A small portion of the required code was taken from the Smart Keyer Lite.[1]

Graphical User Interface

The GUI program was written in *Visual Basic 6*. Figure 3 shows a screenshot of the program in operation. The window is resizable. I like to size the window so that it covers ¼ to ⅓ of the screen area so that other programs, such as my logging program, can be running and viewed simultaneously. At this size, there is ample area to view all that is going on with the keyboard and for the controls.

We will take a brief tour of the GUI window and discuss some of the important aspects of the window. The pulldown menus are at the upper left. The FILE menu allows you to select an operator whose call, personal data and preferences for SPEED, WEIGHT, SPACINGS, KEYER MODES (current modes are shown in the four little boxes near the bottom) and messages have already been specified. You may also define new operators and their specific data. You can also save current settings so that any changes will be saved and applied when the program is restarted.

You may define as many operators as you wish. You and your spouse might use the same station, for example. You may define more than one version for the same operator or call. One person may have several operator configurations defined for himself such as, one for working DX, one for contesting, one for ragchewing and one for Field Day.

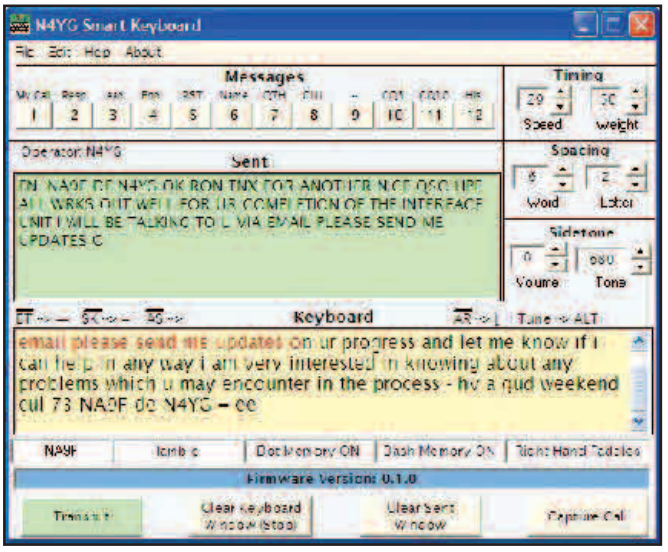


Figure 3 — Graphical user interface (GUI) of the smart keyboard's operating software.

The EDIT menu allows you to edit keyer features and messages. The 12 message buttons are just beneath the pulldown menus. These buttons have the same effect as pressing the corresponding function keys. When clicked (or if the corresponding function key is pressed), the contents of the particular message are copied to the keyboard window. Each of the message buttons is labeled with a short title, selected by the operator, to remind him of the contents of the message. You will appreciate these if you have been frustrated by programs that provide nothing regarding the contents of the message, forcing you to make a list to keep nearby. One can view the actual contents of a particular message by placing the cursor over a message button. The message can also be viewed by clicking EDIT / MESSAGES / MESSAGE BUTTON.

The SENT window is located just below the message buttons and shows text that has been sent to the transmitter. This window is for viewing only and cannot be edited. Just above and to the left of this window, the current operator's call is shown, for information. The KEYBOARD window is the center of most of the activity and is located just below the SENT window. In normal operation any text placed in this window is sent to the interface unit and in turn to the transmitter in the form of dots and dashes at the proper time. As a character is sent, its color changes from black to red and the character is also copied to the SENT window. Once all the text in the window is sent and there is a three-second period of inactivity in which no additional text is entered into the window, the KEYBOARD window is cleared. The KEYBOARD window is also used for composing or editing messages. The area above the KEYBOARD window contains a few reminders of characters that are surrogates for the prosigns $\overline{BT}$, $\overline{SK}$, $\overline{AS}$, $\overline{AR}$, meaning for example that when the character "=" is sent, you hear di-di-di-dah-di-dah, $\overline{SK}$. Pressing the ALT key causes a keydown condition for tuning.

An INFORMATION area is located beneath the KEYBOARD window and consists of one row of five boxes with a single wide box below. The far left box in the row of five boxes will contain the call of the station being worked, if it has been entered. When his call is entered, it is also copied to the *Windows* clipboard and can be pasted into other applications. I paste (by pressing CONTROL-V) the call into my logging program so I do not have to type it again. You can also paste it into **qrz.com**.

Your call, or that of the current operator, and the other station's call are available for reference in messages, so that your call as well as the call of the station being worked can be inserted at any place in a message. For example, if N4YG is the current operator and the entry in the HISCALL box is K4BFT, then when this text is ready for transmission K4BFT is sent instead. Similarly, if the message text contains MYCALL then N4YG is sent instead. The other four boxes in the row of five are for information only and can only be changed by editing keyer features from the EDIT menu.

The remaining box is just below the row of five and encompasses the entire width of the GUI window. This is the general information or ALERT window. In normal operation it gives an indication that the GUI has found the USB interface and shows the interface firmware version. When editing messages, it gives information on what action is appropriate during the editing process.

Four buttons are located below the alert window. The first is the TRANSMIT/PAUSE button. When clicked, this button changes color and its label changes to either

[1]Notes appear on page 39.

TRANSMIT or PAUSE, depending on its initial condition. When green in color, its label is TRANSMIT. In the transmit condition, any text in the Keyboard window will be sent beginning with the leftmost character. If the TRANSMIT/PAUSE button is clicked while in the transmit mode, transmission will cease, the button color will change to beige and its label will be PAUSE and transmission will resume if the button is clicked again. This button is very useful. I select PAUSE when I am listening to the other station. I can then begin to compose my responses if I wish and when my turn comes, I can click again to select TRANSMIT and begin sending what I have entered. The second button clears the keyboard window and in doing so immediately stops any further sending.

The keyboard window is also cleared if a paddle is tapped while the keyboard is transmitting.The third button simply clears the SENT window. The fourth and final button is another means for entering the call of the station being worked. When clicked, a window pops up for entry of the call.

Finally, the controls for setting keyer timing parameters are located at the upper right corner. Using the scrolling controls, SPEED, WEIGHT, WORD SPACE, LETTER SPACE, SIDETONE VOLUME and TONE can be set. Table 2 shows a bit about how these are calculated. Each time any of these parameters changes, new values for all necessary parameters (24 bytes) are calculated and sent to the interface unit.

The relationship between length or duration of dots, dashes and spaces is taken from *The ARRL Handbook for Radio Communications* and is the simple relationship — WPM (words per minute) = 2.4 × dots per second. This assumes a weight of 50%, or space and dot durations the same and dashes equal three dot intervals.[2]

Table 2
Description of Timing Parameter Calculations

Parameter	*Range*	*Units*	*Step Size*	*Meaning*
Speed	5-50	WPM	1	WPM = 2.4 × dots/s
Weight	30-70	Percent	1	Weight (dot + space) duration
Word Space	3-15	Dot Lengths	0.1	Number of 50% weighted dot lengths
Letter Space	2-11	Dot Lengths	0.1	Number of 50% weighted dot lengths
Volume	0-100	Percent	1	Percentage of log-weighted volume
Tone	400-1400	Hertz	10	

Construction

Figure 4 is a photograph of the completed interface unit. Figure 5 shows the internal layout of my implementation. The unit is quite small, so small that I was sure that the wrong enclosure had been shipped to me when it arrived. The enclosure is made by LMB and measures 4 × 2¼ × 1¼ inches. My implementation of the interface unit has the USB jack on the front of the unit and the paddle and keying jacks on the rear. If a wider enclosure is used, all jacks could be on the rear panel.

My first interface circuit was constructed on a 2 × 2¾ inch section of Vero board. The interface unit shown uses a printed circuit (PC) board that measures 1.6 × 1.8 inches. The USB jack and the ONLINE LED are mounted on the PC board as well, but note that the LED is mounted on the bottom of the board. A PC board is included in the parts package, along with all the parts needed to construct the interface unit. Vero board works well and is another option for one-time projects such as this. The board has a rectangular grid of holes spaced 0.1 inch apart and conducting copper foil strips centered on the holes, running in one direction. With the copper foil strips running east west and most parts oriented in a north-south direction, wire jumpers are used to connect parts as desired. Before placing parts on the board, the copper foil strips are broken by removing foil to eliminate undesired conducting paths.

Before placing parts on either the PC or the Vero board, use the board and the other parts to mark the location and mounting holes on your enclosure. Pay particular attention to the placement of the holes through which the USB jack and LED will protrude. Mounting holes for the board should be placed so that the USB jack will protrude only slightly from the surface of the enclosure. Cutting the rectangular hole for the USB jack will probably be the most difficult single task. You can drill holes for the other jacks. Mount the jacks and speaker first. You can glue the speaker as I did with silicone sealant if you wish. Assemble the circuit board while allowing the glue to dry. If you choose Vero board, solder carefully. I have found solder bridges to be much more likely with Vero board than with a printed circuit. Remember that the LED must be soldered on the bottom of the board. Do not mount the LED until you have made sure that everything else fits together properly.

Check the board thoroughly in good light before proceeding. Before mounting the LED, measure the height of the standoff on the board mounts. The LED should be mounted on the bottom of the board so that the distance from top of the small shoulder on the LED to the board is the same distance as the standoff height. Do not place the 16C745 into its socket until all soldering is completed.

Attach connecting wires to the completed board. I like to connect these to the bottom of the board. Make sure these have plenty of length and that they are marked appropriately. There should be seven wires attached as follows:

- For SPEAKER, two (one plus ground).
- For PADDLE JACK, three (dot, dash and ground).
- For KEYING JACKS, two (one each, share ground with PADDLE JACK).

Mount the circuit board to the enclosure using 4-40 hardware and threaded standoffs. Attach wires from the circuit board to the appropriate components. Insert the ICs into their sockets and verify pin 1 locations and proper insertion.

Figure 4 —Smart keyboard interface unit — rear view.

Operation

The smart keyboard interface

unit is now ready to use. All you need to do is connect it to your computer (running *Windows 98 Second Edition* or higher). Depending on the *Windows* version, the computer will probably tell you that new hardware has been found and may ask if you want to search for the best driver. Click YES and the computer should find the proper driver and install it. If you are running *Windows XP* or *Vista* all this will probably happen without your having to do anything. *XP* also gives you a *kerplunk* sound when a USB peripheral is found and enumerated. After the interface unit has been enumerated, the LED will also light.

You can see that the peripheral has been enumerated by looking at the hardware list in the *Windows Device Manager*. One way to do this is to right-click MY COMPUTER and select PROPERTIES. In the PROPERTIES window, click the HARDWARE tab and then click DEVICE MANAGER. In the hardware list, look under HUMAN INTERFACE DEVICES. There may be two entries for the interface unit, reading HID-COMPLIANT DEVICE and USB HUMAN INTERFACE DEVICES. You can identify the ones that apply to our interface unit by unplugging the USB cable. These entries should disappear but reappear when the unit is reattached.

The interface unit is now a fully functional keyer, with one exception. The keyer parameters are fixed (with default values I programmed) and cannot be changed until the GUI is up and running. Try out the keyer. Plug in paddles. Touch one of the paddles. You should hear dots or dashes. If the paddles are reversed (dots where dashes should be), don't worry, you can correct that when you run the GUI. The SPEED, VOLUME, TONE and WEIGHTING can also be changed from the GUI.

If all is well to this point, it is time to install and run the GUI program. When the SMART KEYBOARD window appears, it should have the message in the alert area at the bottom of the window as follows: FIRMWARE VERSION 0.2.0 over a blue background. Otherwise, the background will be red with alternating messages, INTERFACE UNIT NOT FOUND and PLEASE CONNECT THE SMART KEYBOARD INTERFACE TO THE USB PORT. Connecting the interface unit should result in the previous message. This message indicates that the GUI has found the interface unit. The GUI should now look like Figure 3, except that the KEYBOARD, SENT and CALL windows will be blank. N4YG will probably be the operator shown at the upper left. N4YG was one of the operator files in the setup package. If you click MESSAGE 1 button, you should hear my call, N4YG, in CW.

You will need to read the entire help message to see all of the things you can do with the smart keyboard. Try this short exercise just to get you started. Click FILE, then click NEW OPERATOR. Fill in your call, name and location (QTH) and click OK. Now click FILE and then click SAVE and respond YES to the message box. You have created an operator definition for yourself, but with the messages and options that are associated with N4YG. Your call now appears as the operator just above the SENT window. Press F1. You should hear your call instead of mine. You will find that in all the messages with which N4YG was heard, your call is now heard. You may edit all 12 messages to suit your needs. These will be saved. You can also change WEIGHT, SPEED, any other parameters, and then click FILE, then SAVE to save the new settings.

You will want to get a feel for typing into the KEYBOARD WINDOW while code is being sent. If the TRANSMIT/PAUSE button is labeled TRANSMIT, then as you begin typing, code will begin to be sent. You can type ahead if you type faster than the keying speed. As you type, the text displayed is black. Once a character is sent, it turns red and is copied to the SENT window. When you stop typing, code will continue to be sent until all text in the KEYBOARD WINDOW is red; then, if there is no activity for 3 seconds, the KEYBOARD WINDOW is cleared. The SENT window can only be cleared manually by clicking the button at the bottom of the window. The help file explains all the features of the GUI. You should read all of this file.

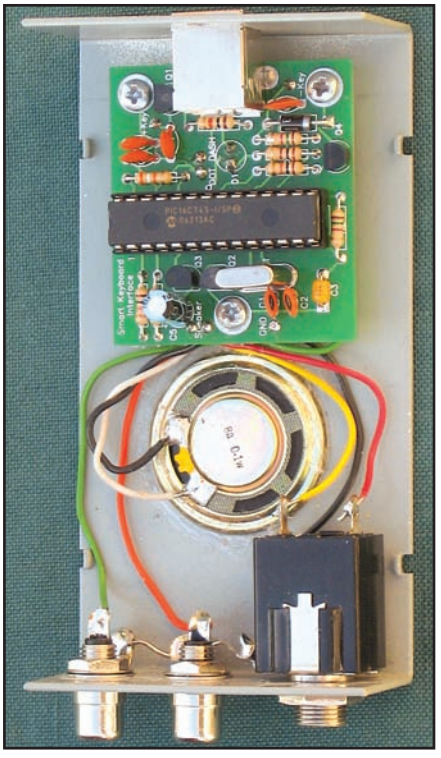


Figure 5 — Internal view of smart keyboard interface unit.

Final Remarks

I believe many of you will find the smart keyboard to be fun and easy to use. It should be relatively easy for you to construct the interface unit. I have been using mine for several months now and I love it. Ron, NA9F, Art, AB4RL, Joe, W4NKP, Dave, AA3EJ and Bill, W7NTA, have all completed this project without difficulty. I wish to thank them for their many excellent comments that have been invaluable in making the smart keyboard design much better than it would have otherwise been. Where do I go from here? Well, the *SMART Key-n-Log* is well underway. It is a GUI program that uses the same interface but includes a logging capability as well as the CW keyboard. Several of my friends are already using it.

Please report any bugs to me. The parts package is complete, including a PC board, the programmed 16C745 and even the enclosure and a USB cable. The only other items you will need in order to construct the interface unit are tools for preparing the enclosure, a soldering iron and solder. You may acquire the parts yourself if you wish. The code for the GUI and the firmware for the 16C745 are available for download.[3] The cost of the parts package is $60, which includes shipping within the USA. Have fun with it and I would love to hear from you.

Notes

[1] J. Lunsford, N4YG, "The Smart Keyer Lite," *QST*, May 2004, pp 42-45.

[2] *The ARRL Handbook for Radio Communications,* 2007 Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 9760. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop/**; **pubsales@arrl.org**.

[3] **www.arrl.org/files/qst-binaries/Lunsford0507.zip**

Joe Lunsford, N4YG, was first licensed as WN4RUF in 1969 and has held an Amateur Extra class license for 28 years. He has a Master's degree in electrical engineering. Joe recently retired from his job of over 36 years. He is an avid CW operator who in previous years chased DX regularly, but now enjoys a nice CW QSO. He has designed a dozen or more electronic keyers. The most notable of these is the smart keyer series. He is also the designer of the smart filter. These products were produced and sold in the '80s and '90s, and several hundred remain in service. This venture was discontinued in the late '90s. Since retiring, Joe continues to work part-time, but manages to spend more time operating. Most of his additional time is spent designing electronic products for ham radio and other applications, playing golf and enjoying his five grand-children. You can reach Joe at 1304 Toney Dr, Huntsville, AL 35802 or at **n4yg@comcast.net**. QST

The 2007 ARRL National Convention

What do you get when you combine Southern hospitality, the Heart of Dixie and Amateur Radio?

Charlie Emerson, N4OKL, and S. Khrystyne Keane, K1SFA

In 2002, the phrase *Stars Fell on Alabama* first appeared on Alabama license plates. It refers to the night of November 12, 1833 when a fantastic meteor shower seen across the Southeast caused this night to be known as "the night stars fell on Alabama." The shower created such great excitement across the state that it became a part of Alabama folklore and for years has been used to date events.

Stars will once again fall on Alabama during the weekend of August 18-19, 2007 for the ARRL National Convention, held at the Huntsville Hamfest, in the all air-conditioned Von Braun Center. The Global Amateur Radio Emergency Communication Conference (GAREC) will meet in Huntsville prior to the hamfest on Thursday and Friday, August 16-17.

Huntsville Happenings

This year, the ARRL is pulling out all the stops in planning the National Convention. According to ARRL Sales and Marketing Manager Bob Inderbitzen, NQ1R, "ARRL will have a big exhibit on the convention floor for ARRL EXPO 2007. The ARRL EXPO was first introduced as a major component of the 2005 National Convention in Dayton, Ohio. We're excited to bring this exposition to Huntsville." This special exhibit area will feature ARRL program representatives, activities, presentations and the huge ARRL bookstore.

Last year, more than 4000 people attended the Huntsville Hamfest. Held in conjunction with the ARRL National Convention, hamfest organizers expect 2007's attendance to top 5000, with more than 40 vendors displaying their Amateur Radio wares. Flea market chairman Dave Givens, K5RSI, plans on almost 400 tables available for rental. Unlike many other hamfests, the flea market is in an air-conditioned building, something much appreciated in Alabama in August.

Johnny Winter, KR4F, and Chuck Lewis, N4NM, have an exciting forums schedule in store. Dr David Hathaway, a nationally known and well-respected expert on sunspot activity and solar cycles, will be speaking. Also, Dr Monte Bateman, WB5RZX, will return to the hamfest this year. He is a member of NASA's lightning and thunderstorm science team, and he works with the panel that writes lightning-related rules. In the past, his forums have been standing-room only as he discusses lightning prevention as it applies to Amateur Radio. This year, an expanded forums schedule will include Sunday activity for the first time in many years.

Activities for All

Along with, and in conjunction with the National Young Ham of the Year (YHOTY) awards, Rebekah Dorff, WG4Y (2005's National YHOTY), will host Alabama's YHOTY activities, including an ARRL youth lounge for young hams, and prospective or new hams. The North Alabama DX Club (NADXC) will once again hold its DX Banquet at the Von Braun Center.

There are many activities for the family and non-hams in your group. Huntsville boasts many other attractions for folks of all ages, and is widely known as the "Space Capital of the Universe" for good reason. Plan some extra time to visit Alabama's top tourist attraction, the US Space and Rocket Center and Museum, home of the world-renowned US Space Camp. Take a tour of NASA's Marshall Space Flight Center. Make plans to see the Early Works Children's Museum, Cathedral Caverns State Park, Huntsville Botanical Gardens, Huntsville Museum of Art and Big Spring Park. Don't forget Huntsville's many great shopping venues. If you stop by the Huntsville Visitor's Center, you can pick up some coupons for some of these attractions. Check out **www.huntsville.org** to see all the fun things to do in and around the area.

For more information on the 2007 ARRL National Convention, please see **www.arrl.org/expo**. To find out more about the 2007 Huntsville Hamfest, see **www.hamfest.org**.

Experience Southern Hospitality at Its Finest

Just like that meteor shower way back in 1833, people will be talking about the 2007 ARRL National Convention and Huntsville Hamfest for years to come. Be a part of the great excitement and make plans to join us — we can't wait to welcome y'all to Alabama, the Heart of Dixie.

Charlie Emerson, N4OKL, is the Vice President of the Huntsville Hamfest Association. He can be reached at **n4okl@arrl.net**. *S. Khrystyne Keane, K1SFA, is the ARRL News Editor. She can be reached at* **k1sfa@arrl.org**.

Head to Huntsville for ARRL EXPO 2007

When: August 18-19, 2007
Where: Von Braun Center in Huntsville, Alabama
Information: **www.arrl.org/expo**

Program Highlights

- ARRL EXPO 2007 — This special exhibit area will feature ARRL program representatives, activities, presentations and the huge ARRL bookstore.
- Huntsville Hamfest — Featuring equipment dealers, manufacturers, forums and more!
- GAREC-2007 — The third Global Amateur Radio Emergency Communications Conference will be held at the Embassy Suites Hotel in Huntsville, August 16-17.
- DXCC Card Checking
- ARRL Youth Activities and Youth Lounge
- ARRL Wouff Hong Ceremony — Steeped in ritual and mystery, this ceremony also promises to be great fun. Attendees receive a special keepsake.
- W1AW/4 Special Event Station — Bring a copy of your license to operate.

And much, much more!

See **www.arrl.org/expo** for lodging options and links to travel information. See you in Huntsville!

A QRP Trek in Ireland

Packing light, QRP (and Irish) style.

Bill Vanderheide, N7OU

BILL VANDERHEIDE, N7OU

The 20 foot fiberglass fishing pole that supported my end-fed wire.

BILL VANDERHEIDE, N7OU

The shack in the pack: It's fun to see what you can do with such a little rig.

When I decided to go for a 120 mile trek around the western coast of Ireland, I also packed my Elecraft KX1. For 10 days I followed the Dingle Way, a signposted route along the Dingle Peninsula that winds along country lanes, steep sea cliffs and long stretches of sandy beach.

The KX1 was ideal for this kind of operation. Even with batteries it weighs less than a pound and is totally self-contained. The built-in tuner made it easy to load up a random wire directly with no feed line. I supported 26 feet of hook-up wire with my 20 foot Sunny Day fiberglass fishing pole. It collapses to 4 feet, weighs just 2 pounds and doubles as a walking stick.

Walkers on the Storm

Although I like to do long hikes, I am not as keen on backpacking or camping. With a heavy pack I feel like a beast of burden, and at night I want a restaurant meal and a real bed. So through the efficient services of an Irish agent specializing in walking tours, I spaced my nightly accommodations every 12-15 miles. These were either at guesthouses or bed and breakfasts. My reservations also included a luggage transfer each day. That way I could walk with just a light daypack.

I did no operating for the first several days so I could settle into my walk. Starting in the village of Camp, I climbed up a narrow lane and into green hilly countryside. Of course, Ireland is green for a reason, and within an hour I had my first encounter with its "soft weather." I soon figured out that it was best to be prepared and leave my rain gear on all the time. With map in hand, I followed the Dingle Way past grazing livestock and alongside hedgerows bright with wild fuchsia.

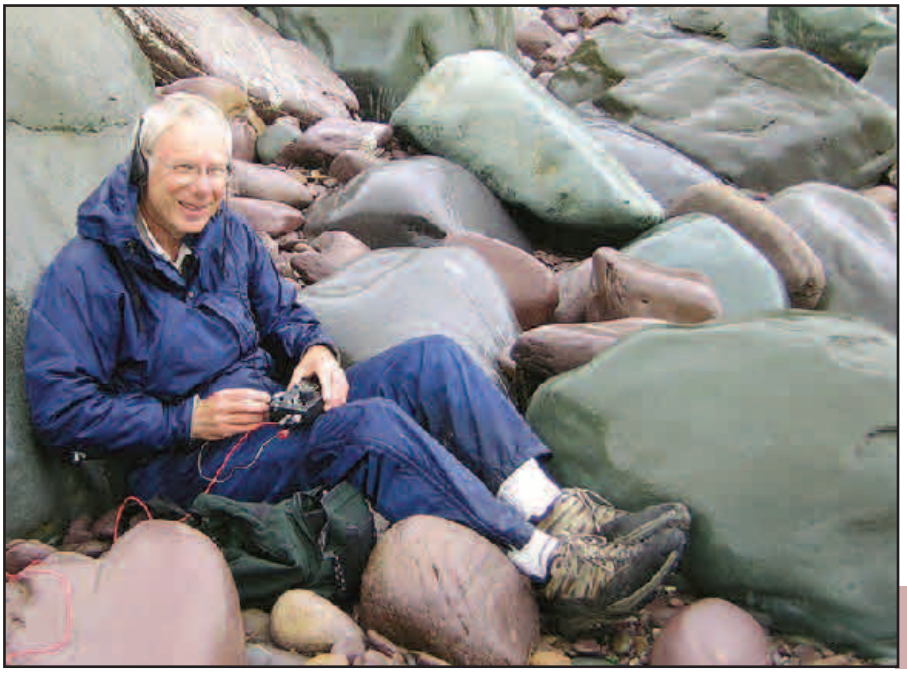
Three days of walking brought me to the village of Dunquin on the western edge of Europe. When my innkeeper saw my fishing pole, he warned me that fishing was not allowed; I had to explain what kind of fish I was *really* after. Here, with nothing between me and North America except thousands of miles of RF-friendly saltwater, I had high hopes of making a trans-Atlantic contact, even if I was QRP. It was a layover day for me, and I was eager to begin my operation as EI/N7OU/P.

The Dog Days of QRP

As I walked down to the sea cliffs, two friendly dogs joined me. The dogs and I found a good site next to a memorial to the sailors of the Spanish Armada who perished near here in 1588. I lashed my antenna to a nearby post and listened hard on 20 meters, but only heard a few weak stations, all of them in Europe. I managed to raise Bert Gay, F6FLH, but copy was difficult, made even more so when I had to explain what I was doing to a van of German tourists. Maybe it was the memorial, but they all had the impression that Bert was somewhere out on the stormy sea and in distress. I did my best to reassure them that he was okay.

Meanwhile, every time I went to send with the paddle, my two canine friends would affectionately lick my face. "Go home" was clearly a command they did not know. When a persistent drizzle turned to rain, I said 73 to Bert and packed up my gear for the day.

PAULA MOORE

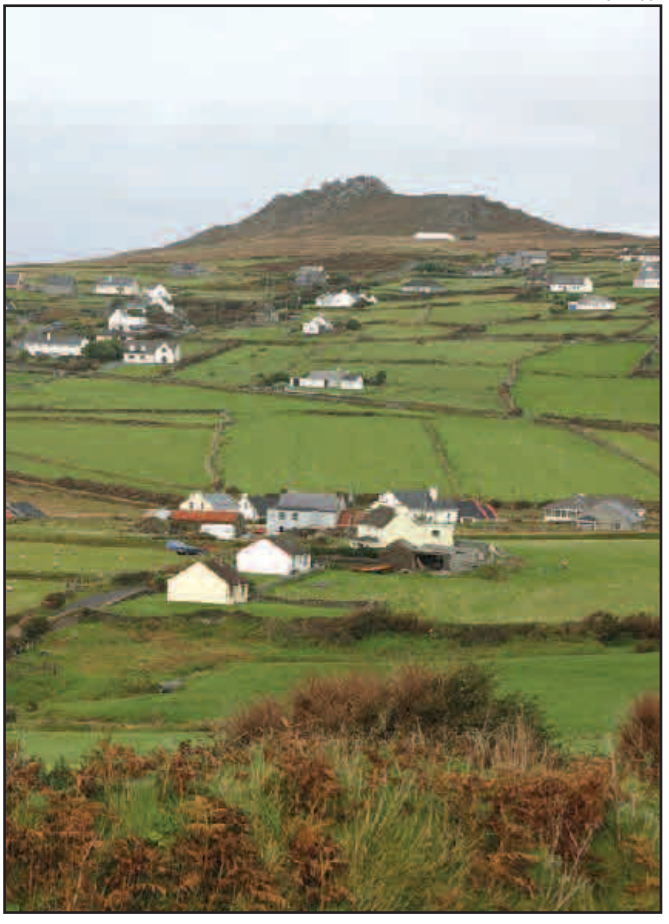


Nothing beats making contacts on the beach between rain showers.

DAVID ALUMBAUGH

Cliffs like these near Dunquin provided dramatic operating sites.

DAVID ALUMBAUGH



Old stone walls crisscross most of the fields on the Dingle Peninsula.

Signals, Spirits, Saltwater and Sheep

The next day I continued my walk along the dramatic west-facing cliffs. I worked several more Europeans, but signals were weak and I didn't hear anything at all from North America. I was disappointed with my results so far, but ahead of me I could see Mount Brandon. I knew that once I was on the other side I would have good radio views across saltwater to the north and east, where most of the signals were coming from.

My climb up the mountain began in fog and drizzle. I followed an old "green road" across boggy fields full of sheep. At a pass stood an ancient Celtic monument inscribed "Ronan, the Priest Son of Conigan." To the radio spirits I said a little prayer myself. Through the mist far below I could make out Brandon Bay.

The next day, another layover, I set up on an estuary near the village of Cloghane. I found an old rubber car mat to sit on and a convenient boulder to lean against. Most important, I planted my antenna 3 meters from a kilometer of saltwater in the direction of Europe. Now my phones were full of S9 signals. I quickly had solid contacts with Wales (GW) on 30 meters, and with three Germans (DL) on 20 meters. After the previous day's exertion, it felt good to kick back and enjoy a CW ragchew. I like the feel of the KX1's built-in paddle and I find it works best by simply resting the little rig on my thigh.

Irish Ops Are Smilin'

Encouraged by these results, the next day I hiked 12 miles down a sandy beach to a narrow peninsula between two broad bays. At the very tip I clambered over a stone wall and set up my antenna in a field full of wary sheep. Now I had saltwater within a 20 meter wavelength in three directions. Signals were the loudest yet, and I worked Germany (DL), France (F), Belgium (ON) and Russia (both UN and UX) in quick succession. Reports of 589 or 599 are even sweeter when you are running slightly more than a watt. I even broke a pileup to work LX/PA6Z.

On my last day I headed down the beach toward Camp where I had started. I tied my pole to some rocks, surf rolling in a few meters away, and again signals were loud and numerous. Soon Azerbaijan (4K4), Lithuania (LY), Hungary (HA), Switzerland (HB) and The Netherlands (PA) were also in my log. I made most of my contacts by calling CQ with the KX1's automatic keyer at or near 14.060 MHz. Most ops wanted to know the details of my operation, noting that QRP contacts from Ireland (EI) were not all that common.

Low Power, Low Weight, Loads of Fun

By the end of my walk I had worked 31 stations in 17 countries. Not bad for 3 pounds of radio gear, including antenna! I finally heard a couple of North American stations, but I couldn't raise them. Making a trans-Atlantic QRP contact as a portable station is one more reason I have for planning another radio hike in Europe.

Bill Vanderheide, N7OU, has been licensed for almost 50 years. A retired elementary school teacher, he enjoys CW, contesting, QRP, portable operation and DXpeditioning. Bill is a member of the Willamette Valley DX Club and is a sorter for the QSL Bureau. He operated from Fiji (3D2OU), Rotuma (3D2RO), North Cooks (E51PEN) and South Cooks (ZK1NOU and E51NOU) in 2006. Bill lives in Portland, Oregon and can be reached at **n7ou@arrl.net**.

Dayton Hamvention® 2007

Great Weather Reflects Upbeat Atmosphere

If you were at Hara Arena for this year's Hamvention®, you already know it was notable for its enthusiastic newly licensed hams, ARRL Guest of Honor NASA Astronaut Bill McArthur, KC5ACR, and tons of new gear.

Joel P. Kleinman, N1BKE

You can get a good feel for the state of mind of the 16,000 or so Amateur Radio operators and others who shared the Hara Arena May 18-20 by chatting with those who stop by ARRL EXPO. Based on this decidedly unscientific (and unplanned) survey, we Dayton-goers were a decidedly upbeat and enthusiastic group, perhaps reflecting the healthy state of the Amateur Radio Service.

Oh, there were setbacks, to be sure. Most involved the fact that Hara Arena lost its Internet connection virtually all weekend. That may not have been all that serious a few years back, but this year's crop of new equipment that needed the Internet to show potential customers what it can do could only sit there and look pretty. The Internet Café at ARRL EXPO sat unconnected. And Steve Ford, WB8IMY, had to gather his photos, videos and stories each morning and then scoot over to an area retail outlet that offered Wi-Fi in order to upload his Hamvention®/ARRL EXPO blog (check it out at **www.arrl.org/blog/**).

NASA Astronaut Bill McArthur, ARRL's Guest of Honor

The highlight of the weekend for me (as it was for many others) was the commanding

Bill McArthur on Space Travel

Speaking to an appreciative audience of 120 at the annual Donor Reception just before Hamvention®, NASA astronaut William S. McArthur Jr, KC5ACR, ARRL's Guest of Honor during the weekend, discussed his unprecedented ham radio accomplishments aboard the International Space Station. Here are some excerpts:

[While aboard the ISS] I'm finding the response over North America pretty good. [ARISS Ham Radio Project Engineer N5VHO] Ken Ransom said: "I think you can get DXCC. I know someone in Antarctica." I worked them on 2 meters then UHF. Wound up with [an honorary] WAC and DXCC. It was a tremendous experience.

On a Shuttle mission we're up maybe 10 to 14 days. Being gone 4 to 6 months isn't visiting space; it's living there. We left for launch [in Kazakhstan] about 2 months before launch. Shuttles were not flying at the time. For 176 days we saw no other human beings except the two of us [Russian Cosmonaut Valery Tokarev was the other crew member aboard Expedition 12].

We got along very well. We actually had a tremendous amount in common. It was a sheer delight to be in space with him.

After Colonel McArthur's presentation, he is flanked by ARRL Hudson Division Director Frank Fallon, N2FF, and former ARRL President Jim Haynie, W5JBP, who thanked McArthur for his contacts with "Big Project" schools while he was in orbit aboard the International Space Station.

ARRL President Joel Harrison, W5ZN, addresses the Donor Reception, as Chief Development Officer Mary Hobart, K1MMH, listens.

This was something I shared with folks back on Earth who were represented by about 1800 Amateur Radio operators on the ground. It added immeasurably to my enjoyment to know that the people of the world were participating in that adventure with us.

Thank all of you for your support of young people and making the time I spent in space a real blast.

"A Delightful Evening"

ARRL Chief Development Officer Mary Hobart, K1MMH, was extremely pleased with this year's Donor Recognition event and the Hamvention® that followed. She commented: "With 120 guests in attendance, the 6th annual Donor Recognition Reception was a delightful evening...and even the weather cooperated! Nearly half of the guests were attending for the first time, meeting old friends and making new ones over light supper.

"During the ARRL EXPO on Friday and Saturday, Development welcomed many good friends and made lots of new ones. Nearly a dozen donors took advantage of the opportunity to register for a brick in the new Diamond Terrace at ARRL."

A ham and his Shih Tzu in the gargantuan Hamvention® flea market.

JOEL R. HALLAS, W1ZR

Dayton Mayor Rhine McLin offers her congratulations to the three award winners at the conclusion of the Dayton Amateur Radio Association Awards Dinner. Left to right — ARRL Past President Jim Haynie, W5JBP; David Cameron, VE7LTD, DARA Technical Excellence Award Winner; Mayor McLin, and ARRL Lab Manager Ed Hare, W1RFI.

presence of NASA Astronaut Bill McArthur, KC5ACR. As impressive as his unparalleled Amateur Radio feats from the Shuttle and the International Space Station (he's the only ham to have Worked All Continents, Worked All States and 100 different entities from space) was his energy, enthusiasm and intelligence as he described what it's like to orbit the Earth…in his case for 27 weeks straight aboard the ISS! Always affable and approachable, Colonel McArthur answered questions from the groups he addressed and then less formally afterward. Some of his remarks to those attending the Thursday evening Donor Recognition Reception appear in a sidebar.

Business seemed to be booming at many booths inside (one well known manufacturer told me his sales were 64% ahead of last year!), with crowds gathered around small and large vendor spaces alike. When I circumnavigated the huge outdoor flea market on Saturday, however, I had less company (and there were fewer vendors) than in years past, despite the almost perfect weather. Prime time for the flea market is typically first thing Friday morning and Sunday, however, when bargain-hunters descend in droves.

ARRL EXPO Hits Home Run

This was my first experience with EXPO, the ARRL's huge presence at Hamvention®, and I was impressed! I already knew my coworkers who do sales, marketing and customer service under the leadership of Bob Inderbitzen, NQ1R, were top-notch. What I didn't fully realize was the immense scope of ARRL EXPO. If you can't find something to engage your interest at ARRL EXPO in the Ballarena, you aren't looking hard enough!

During this, the third year for ARRL EXPO, visitors found (to list just a few):

- *The ARRL Stage*, with a total of 27 quarter-hour presentations on all kinds of subjects. The FCC's Riley Hollingsworth spoke to a capacity crowd on the FCC rules and those who would break them. NASA Astronaut Bill McArthur also spoke to an SRO crowd; no surprise there. Other presenters included Gordon West, WB6NOA, who spoke on ham ambassadorship; Alabama Section Manager Greg Sarratt, W4OZK, on Emergency Communications, and ARRL's Dan Henderson, N1ND, who summarized Part 97 during his 15 minutes of fame.
- *DXCC card checking*, courtesy of Bill Moore, NC1L, of the Headquarters staff.
- *Youth Activities and Youth Lounge,* organized once again this year by Andrea Hartlage, KG4IUM, and her dad, Scott, KF4PWI. There's more on this in a sidebar.
- *QST, NCJ and QEX*, where visitors could pick up a free copy of each ARRL periodical while supplies lasted, and meet some editors/authors.
- *The ARRL Lab*, where visitors could get caught up on BPL and other Lab activities.
- *ARRL Great Lakes Division,* where Director Jim Weaver, K8JE, held forth.

ARRL President Emeritus Haynie and BPL Guru Hare Win Awards

At an awards dinner Saturday evening, former ARRL President Jim Haynie, W5JBP, accepted his Hamvention® 2007 Ham of the Year Award from Dayton ARA President Jim Simpson, WB8QZZ. Haynie was instrumental in initiating The Big Project — the ARRL Education and Technology Program, which has brought Amateur Radio to schools across the US. ARRL Lab Manager Ed Hare,

The FCC's Riley Hollingsworth and Bill Cross, W3TN, on Ham Radio's Scofflaws

Riley Hollingsworth, the FCC's rules enforcer, visited the ARRL Stage in addition to the forum he presented with Bill Cross, W3TN.

Riley, who's the FCC's Special Counsel for Amateur Radio Enforcement, and Bill, who's a Wireless Telecommunications Bureau staff member, presented the FCC Forum May 19. Excerpts of their remarks follow.

Cross: People are settling into [the new rules], making adjustments. The Amateur Radio Service seems to be adjusting to them very well.

Hollingsworth: It isn't about you, it isn't about your interests — it's about Amateur Radio. On the air you need to be more cooperative and less argumentative. Your assignment: Read Dave Sumner's editorial in May *QST*, especially the part that says we must be willing to be flexible in our frequency selection.

There are elements of Amateur Radio that too often reflect society in general. We all need to work together more and depend on the FCC less to solve problems.

To nets: All frequencies are shared. No net on Planet Earth is an oasis.

To widebanders: If you want to operate a broadcast station, apply for one.

Re contesters: If you don't like contests, go wash the car, cut the grass. There's a lot to learn from the contester.

To QRPers: Thank you for your vitality and enthusiasm. And for being builders.

Re DXpeditions: Lighten up and let them do it. Scarborough Reef — there was chaos for a few days, then it was over.

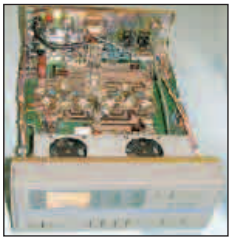
Re eliminating the Morse code exam: My bet is that dropping the code requirement will turn out to be a stroke of genius in 10 years. We need to try new things.

I can't imagine a better group of licensees to work with. I want to thank you all for your passion and dedication.

What's New? Quite a Bit!

Joel R. Hallas, W1ZR

This year those of us who made it to Hamvention® had the good fortune of having no fewer than six HF transceivers to ogle. And that's just the HF transceivers! In alphabetical order, some of the gear that debuted at Hamvention® 2007 or recently. Equipment appears at the right in order of mention:



HF Transceivers

Elecraft announced their new K3 HF and 6 meter transceiver. Perhaps *transceivers* would be a better word. There are so many options (all upgradeable later if you choose) that you can configure anything from a kit-built 10 W portable QRP radio to a fully featured, contest-ready 100 W rig with two high performance receivers. It is scheduled to ship starting in July. For more details see **www.elecraft.com**.

FlexRadio Systems, well known for their line of high-performance software defined radios, introduced the Flex-5000 HF and 6 meter transceiver series promising higher performance and more features. Included are the Flex-5000C, a fully integrated system in a single box, and the Flex-5000D with a second receiver. See **www.flex-radio.com** for more information.

Hilberling, the first Amateur Radio manufacturer from across the Atlantic for some years, announced their PT-8000 transceiver. This one's offered as a full-featured HF and VHF transceiver available in 10, 100 or 600 W versions and promises top performance. It is distributed in North America by Array Solutions, **www.arraysolutions.com**.

ICOM unveiled their new IC-7700 HF and 6 meter transceiver. This appears to be a single receiver version of their top of the line IC-7800, sharing the 200 W transmitter, high performance receiver and 7 inch display of its sibling. For more, see **www.icom.com**.

Ten-Tec displayed their new Omni-VII HF and 6 meter transceiver. Their new "distributed roofing filter architecture" promises ham-band-only receive performance with a general coverage receiver. Find out more at **www.ten-tec.com** and see our Product Review elsewhere in this issue.

Finally, Yaesu showed their new FT-450 HF and 6 meter transceiver. Just as last year's FT-2000 had its roots in their top of the line FT-9000, inheriting a substantial number of its features, the FT-450 has a similar relationship to the FT-2000, at a correspondingly lower price. For more information see **www.yaesu.com**.

What else has debuted since last year? Quite a bit!

HF Power Amps

Also distributed in North America by Array Solutions is the SPE Expert 1K-FA solid-state linear amplifier. It is a compact lightweight (44 pounds) fully automated, full-break-in capable amplifier that puts out 1000 W PEP on 160 through 6 meters.

Dishtronix showed off their 100% duty cycle, 1500 W PEP as well as 1500 W CW, RTTY, FM output solid-state linear.

Tokyo Hy-Power had a great debut at Dayton this year, bringing their collection of three HF amplifiers newly introduced to the US market (two shown at right).

In the VHF/UHF Realm

Kenwood announced a new V/UHF mobile transceiver, the TM-71A. Of particular note is free software that allows downloading repeater data from *TravelPlus for Repeaters* directly into radio memories.

Yaesu introduced a new V/UHF transceiver, the FTM-10, designed especially for hams on the go. It's designed to mount on the handlebars of your bike or motorcycle so you don't even need a mic — just talk into the front panel and you're on the air!

Accessories

Topping MFJ's list this year is the MFJ-998 1500 W *Intellituner*, a legal limit auto tuner. MFJ also introduced a stereo version of its speech intelligibility enhancer for receive audio, the MFJ-618. There is also a new battery booster, the MFJ-4416, a dc to dc converter that allows your partially discharged battery to provide up to 25 A at 13.8 V. They also offer a new *Superstrong Telescopic Mast,* the MFJ-1906/8 in either 33 or 43 foot lengths.

West Mountain Radio, the RigBlaster and RigRunner folk, introduced a DSP-equipped speaker designed for the HF operator who would like more signal and less noise. They also have a new DSP module to use with your speaker and a speaker that will sound good and can sit next to your computer monitor without causing distortion in either direction.

Antenna Tuners

In addition to the MFJ-998 discussed above, I noticed a few other antenna tuners in my travels. Palstar has a new version of their AT1 series, the AT1KP, covering 160 through 6 meters.

The Swiss Antenna Matching System from Heinz-Bolli is a legal limit remote controlled tuner designed for outdoor mounting. It is distributed in North America by Array Solutions.

Hara Arena, site of the impressive displays of some of Amateur Radio's largest vendors, was packed most of the weekend.

Youngsters in Abundance at ARRL's Youth Lounge

In case you're concerned about the graying of the ham population, you'd need only hang out for a bit at ARRL's Youth Lounge, part of ARRL EXPO 2007, to feel a whole lot better about our future. Although not all are yet licensed, a total of 80 young people signed in, according to Lounge coordinator Andrea Hartlage, KG4IUM, who's 17. This was an increase over last year, and the 25 who showed up for the Youth Dinner also represented an increase from '06.

The kids who took part in the scavenger hunts, games (such as "Are You Smarter than a Technician?") and other activities ranged in age from 2 to 21, according to Andrea, whose dad, Scott, KF4PWI, assisted. This year, a total of six Youth Volunteers helped the younger kids.

Not content to attract a gaggle of enthusiastic kids to their well planned youth activities, Andrea and Scott have ambitious plans: "We'd like to have an Assistant Section Manager for Youth [Andrea is one for the Georgia section] for every section; there are six now," says Scott. "And we want to have a Youth Lounge at every hamfest — a place for kids to hang out."

Youth Lounge coordinator Andrea Hartlage, KG4IUM, with one of the 80 young people who took advantage of a wide range of kid-based activities.

Scott Hartlage, KF4PWI, with one of the young fox-hunters who patrolled Hamvention® all weekend.

ARRL President Joel Harrison, W5ZN, draws one of the winning Passport entries as Hamvention 2007 winds down on Sunday.

W1RFI, received the Special Achievement Award for his work on the BPL (broadband over powerline) issue. In addition, David Cameron, VE7LTD, accepted the Technical Excellence Award for his part in the development of the IRLP, the Internet Radio Linking Project.

Photos by Joel Kleinman, N1BKE, except as noted.

Joel P. Kleinman, N1BKE, is QST Managing Editor. He can be reached at **jkleinman@arrl.org**. *Joel Hallas is QST Technical Editor. He can be reached at* **jhallas@arrl.org**.

The Doctor is IN

PROJECTS AND INFORMATION FOR THE ACTIVE AMATEUR

Q Larry, W1DYJ, asks: I am moving to Maine to a low coastal area full of tall pines and hardwoods. I am wondering about the effect of trees on the effectiveness of radiation from antennas. What is the effect on horizontal antennas such as dipoles or Yagis on modest towers in a forest of tall pines and hardwoods? Is there a difference between winter and summer, or between HF, VHF and UHF?

A "World above 50 MHz" column editor Gene Zimmerman, W3ZZ, was kind enough to share his observations across the spectrum. He says that everyone appears to have an opinion on this subject but definitive scientific works are more difficult to find. From a practical standpoint, he has observed that vertical antennas, particularly on 80 and 160 meters, do not seem to be bothered by deciduous hardwood trees. His station has all its Yagi antennas mounted on a 24 foot mast beginning on top of an 83 foot tower on a ¼ acre lot. The good news is that the tower sits at the edge of a group of hardwood trees so it is nearly invisible in spite of its size. The bad news is that the trees, once 70 feet tall, are now approaching the 90 to 100 foot range. He concludes that the trees don't bother either his HF tribander at 83 feet or his 7 element, 6 meter beam at 87 feet, but the 2 meter beam at 95 feet may be impacted. He thinks his 2 meter signal on moonrise/moonset for earth-moon-earth (EME) communications is at least 3 dB (half power) below what it should be. He also observes that at 432 MHz and especially above, trees are bad news.

The references that he has found agree that to avoid trees entirely is the best course. Anything at 100 MHz and higher may be unacceptably attenuated by trees, with non-deciduous pine trees being somewhat worse than deciduous hardwoods. At HF the effect may be quite a bit less noticeable. Verticals at HF may be more affected but again the difference is only a very few dB more.

Q Richard, KBØEMR, asks: I am thinking of adding a linear amplifier to my transceiver to beef up my signal. I believe that I will need coaxial relays to make the interconnections. How do I hook them up?

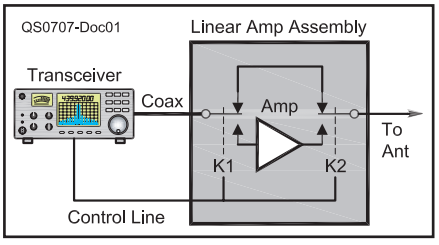


Figure 1 — Interconnections required to add a linear amplifier to a transceiver to increase power output.

A You are right that generally relays are required to route the RF through or around the amplifier, depending on whether you are receiving or transmitting and when transmitting whether you wish to amplify or bypass the amplifier.

Fortunately, all modern commercial amplifiers that I'm aware of have the relays built in. Figure 1 shows the usual setup. Most transceivers have a jack for amplifier control designed to switch the amplifier on or off with the transceiver transmit control arrangement. It couldn't be simpler — except there are two cautions that need to be observed:

- Check the transceiver specification to find out the maximum switching current (and voltage) that it will switch. Compare that with the requirements of the amplifier to make sure the rating is not exceeded by the amplifier's relay circuitry, or you may put the transceiver's switching transistor at risk. If the amplifier spec doesn't say, you can measure the voltage across the amplifier's control connector when open and the current when closed to find out. A number of manufacturers make relay boxes that can go in between if there is a problem.
- A bigger project is often the ac mains supply for the amplifier. If you are lucky enough to have a 240 V, 30 A dryer outlet near your shack, that will likely be perfect! While some smaller amplifiers can be run from 120 V ac, they often take the full capacity of a 15 A circuit, so check the specs to make sure you will be able to feed the beast when it arrives!

Q Bob, N9XAW, asks: I have been reading interesting articles about a new digital SSB modem.[1] The device simply plugs into your radio's mic jack and encodes analog voice into a digital data stream. On the receive side, it translates the received data stream back into analog voice to send to your speaker. Since this device uses digital data instead of analog signals for transmission, can it be used on 30 meters or other portions of the band plan that allow CW, RTTY and data modes?

A Bob, no; even though it's encoded into a data-like bitstream, it is still "voice." Frequency allocations by mode in the amateur rules, FCC Part 97, are based on the actual information type, not the transmission method. Thus voice must be transmitted in a band or portion of a band allocated to "voice" no matter how it is encoded for transmission.

Q Jon, KC5VH, asks: I have long thought that ladder or window line is better than coax because of its lower loss. I designed a half wave NVIS antenna to operate at 3.950 MHz using *EZNEC* and *TLW* and came away confused.[2,3] Apparently, I still do not have a good understanding of the significance of SWR at the transmission line to antenna junction.

The program results indicated that with 50 feet of RG-213, 50 Ω coax, I would have an SWR of 2.4:1 at the load, a reflection coefficient (ρ) of 0.41 and a loss of 0.374 dB or 8.2%. If I were to use 450 Ω window line instead, the SWR at the load would be 21.3:1, ρ would rise to 0.91 and the line loss would be 0.28 dB or 6.3%.

Clearly, the line loss is slightly lower with the window line, but what is the effect of the very high SWR at the load and where does all that reflected power go? Is it radiated from the window line?

[1] J. Hallas, W1ZR, "Product Review — AOR ARD9800 Digital HF Voice Modem," *QST*, Feb 2004, pp 80-81.

[2] **www.eznec.com**.

[3] *TLW* — A transmission line analysis program for *Windows*. included with purchase of R. D. Straw, Editor, *The ARRL Antenna Book*, 21st Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 9876. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop/**; **pubsales@arrl.org**.

A First, let's review some basic principles that have a direct bearing:

• If the currents on a transmission line are equal and opposite, it will not have significant radiation, as long as the wire spacing (for unshielded line such as window or ladder line) is small compared to a wavelength or the shield is fairly solid (for coax). It doesn't matter what the SWR is, the fields will cancel at a distance. This is true for both coax and balanced line.

Coax can radiate if there is net current on the outside of the shield. This can happen if you hook it directly to your dipole and the current going toward the shield side of your dipole splits between the dipole and the outside of the coax.

Ladder line can radiate if the currents are not equal. This can happen if you feed a dipole at a place other than the center, or if one side or the other of the dipole couples to the ladder line more than the other, or the dipole is not symmetric with respect to ground or other objects.

• Reflected power does not represent "loss." The reflected power represents one way of looking at the conditions on a transmission line — a mathematical model, if you will. A high SWR will result in higher losses on a transmission line, largely because the currents will be higher in places. In addition, there may be higher losses in a matching unit at the transmitter, but these are all the losses you can uncover using *TLW*.

So what happens? Well, if you use a transmatch (antenna tuner) at your transmitter to adjust the impedance at the bottom of either transmission line to the 50 Ω that your radio wants to see, and you measure the forward and reflected power on the cable between the radio and transmatch, you would see, let's say 100 W forward and 0 W reflected. So all your 100 W of power is leaving your transmitter.

If you had a 450 Ω directional wattmeter (not easy to find), and put it in the line between the transmatch and the ladder line, you would read a forward power of 555 W and a reflected power of 455 W (neglecting the small losses), for a net forward power ($P_F - P_R$) of 100 W. This can be obtained by noting that $\rho = \sqrt{(P_R/P_F)}$ and solving for the forward power with your ρ of 0.91 and under the condition that $P_F - P_R = 100$ W.

If you had a directional wattmeter designed to work at the complex impedance of the antenna, you would find that the 100 W (less 0.3 dB line loss) is going into the antenna, just where you want it!

What this means is that any "reflected power" from the antenna is reflected back towards the antenna from the transmatch and exists only on the mismatched transmission line, it doesn't matter — except to increase your line loss somewhat.

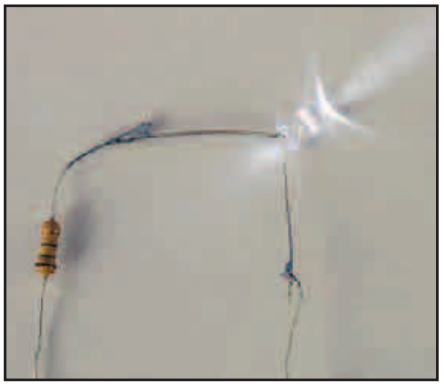


Figure 2 — Light emitting diode set up to measure current to determine required series resistance.

Now to your original question about losses in coax vs ladder line! The increased loss from SWR is a function of the matched loss. You have selected a pair of cases in which the matched loss in the coax is quite low — hence the additional loss due to SWR is not great. Just for fun, assume you use the same antenna on 40 meters, another nice NVIS band. The 120 foot dipole will have a much higher SWR on 40 and won't work very well with coax, but will work great with ladder line. I use a similar (albeit higher) antenna quite successfully on all bands from 80 through 10 meters.

Q Fred, N4WSR, asks: I want to build an emergency light source using a gel cell battery and ultra-bright white light emitting diodes (LEDs). The battery voltage, when fully charged, is slightly above 13 V under no load. The LEDs are rated at 3.0 V to 3.5 V at 20 mA. Assuming the LEDs are identical, four of them wired in series should drop approximately 3.3 V across each LED. I read online that it is necessary to use a "ballast resistor" to limit the current. I don't understand why the ballast resistor should be needed.

A The short answer is, yes, you likely want to have fixed resistance in the circuit. The problem is that the diodes are not linear — likely no news there, but you are looking at the maximum ratings and what actually happens will be different. I recently tried a similar arrangement at my home. My diodes are rated at 4.0 V_F and 30 mA, both maximum ratings. You might think that if you put 4.0 V on one, it should draw 30 mA and work fine. Not so. I just had a few diodes and resistors in the circuit, but found that the maximum rated current was reached with only a bit more than 3 V, not 4 as I expected. Had I applied a stiff 4.0 V source, the current would have been well in excess of the maximum rating.

I did some experiments, using a higher voltage power supply and bunch of resistors (see Figure 2), so I could sneak up on the optimum series resistor that results in just a bit less than rated current. I measured the voltage drops and then had a model that I could use to design my light system. It may be that this resistance is what is being called a "ballast" resistor in your readings.

Q John, WA2QQF, asks: I feed my antennas through an antenna tuner with cross needle tuner. I note that the minimum SWR indicated on the radio SWR meter does not occur at the same settings as the minimum on the tuner's meter. Operating at minimum SWR on either seems to work all right, with the transmitter putting out rated power in either case. Is there a reason for this behavior? Is it better to use one meter vs the other while tuning up?

A There are two answers that come to mind. First, it could just be a meter calibration problem. That seems unlikely, however. In my experience, while SWR meters are sometimes inaccurate as to the measured value of SWR, they are usually quite close to knowing when a 1:1 match is achieved. If there were a 1:1 match, and the coax between them were of 50 Ω characteristic impedance, I'd think they would both read 1:1.

You can easily check this by using a good dummy load at each point in the system, and setting the tuner to pass through and just be an SWR meter.

That leads me to the more likely problem. I can say this since I've accidentally done the same thing! If the coax between the tuner and radio is other than 50 Ω, the nicely matched 1:1 SWR at the tuner will be transformed to something other than 50 Ω at the radio! As an example, suppose you are operating on 14 MHz and have a 10 foot piece of 75 Ω coax between the tuner and radio. The input impedance the radio will see will be 93.4 $-j28.8$ for an SWR of 2.1:1.

If the two don't agree, I suggest tuning using the meter in the transmitter, since it is driven by the circuitry that will cut back power for a high SWR. To paraphrase an old saw: "If the radio ain't happy, ain't nobody happy!"

This is not a big problem, since the mismatched loss in the short piece of coax will be small. It will, however, slightly degrade the performance of anything else in that line, such as a low pass filter designed for 50 Ω. If there is a lightning arrestor in that section, the voltage could be $\sqrt{2.1}$ (for the hypothetical case above) or 1.4 times higher than you expect. Of course the number will be different for each band and will also depend on the length of coax.

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; www.arrl.org/tis/. QST

SHORT TAKES

Hendricks QRP Kits DC-40 Transceiver

My wife and daughter abandoned me the day after Christmas, 2006.

Well, "abandoned" may be a bit harsh. Truth is, they wanted to spend their Holiday vacation in Los Angeles at the home of my sister in law. They generously gave me the option of remaining in Connecticut and I grabbed it in a heartbeat.

Put yourself in my shoes. Would you enjoy spending $400 for the pleasure of flying for 6 hours in a cramped airliner, only to be imprisoned for five days in a house full of screaming toddlers and yapping neurotic dogs?

I didn't think so.

I dropped my loved ones at the airport, waved goodbye and then hurried home to my very quiet cat. She was already sitting on my station desk when I arrived, suspiciously eyeballing a small plastic bag bulging with electronic parts.

The DC-40

The object of the cat's curiosity was my embryonic DC-40 transceiver from Hendricks QRP Kits (that's Doug Hendricks, KI6DS). The DC-40 was designed by Steve Weber, KD1JV. It is a 40-meter low-power (QRP) CW transceiver that features a direct-conversion receiver; hence the "DC" in the model number. A direct conversion receiver works by taking the receive frequency and converting it directly to audio. There are no intermediate frequency stages in the conversion process. That yields a much simpler design using far fewer components. The frequency of the DC-40 is fixed at 7.040 MHz; there is no tuning available. The audio output is fixed as well. Again, however, this greatly simplifies the design.

On the transmit side, the DC-40 generates between 700 mW and 1 W. It also includes an electronic keyer, but it will work with a straight key as well.

The DC-40 comes to you as a bag of parts — none of which are surface mounted, thankfully — and a PC board. You're responsible for the enclosure. The assembly manual is in the form of a PDF file that you download and print from the Hendricks QRP Kits Web site.

An Afternoon of Jazz and Solder Fumes

Snowflakes swirled out of a gray New England sky as I slipped a John Coltrane CD into the station computer and sat down to the task at hand. The DC-40 manual is extremely well written, stepping you carefully through each stage of construction. Parts are packed tightly on the board, but not so much that I found it difficult to populate. The ICs are in sockets, which is helpful as well.

You'll find that you have to wind several toroid inductors. Winding is tedious, but the instructions tell you exactly how to go about it. I adopted a Zen attitude of becoming one with the toroid, counting each turn in a kind of meditative mantra as it passed through the center of the core.

Four hours later, the cat was asleep and the DC-40 was complete. All it needed was a bit of coaxial cable connected to the antenna terminals and the requisite dc power leads.

It's Alive!

My pulse raced as I connected the DC-40 to my 40-meter inverted-V antenna. I plugged a set of iPod-style earbuds into the headphone jack, held my breath and pushed the rocker switch on my dc power supply.

Let me tell you, there is nothing — *nothing* — in this life that compares to the feeling you get when you hear signals pouring forth from a radio you've built yourself. I sat before the DC-40 PC board in slack-jawed astonishment. Several signals, pure and beautiful CW notes at various pitches, filled my ears. The audio was low, but as I adjusted trimmer capacitor C8 at the receiver input, it rose to a comfortable volume.

I plugged in a set of CW paddles and used the DC-40's "tune" mode to measure the output: 800 mW. (This was later confirmed in the ARRL Lab. The Lab also confirmed that the output was quite clean.)

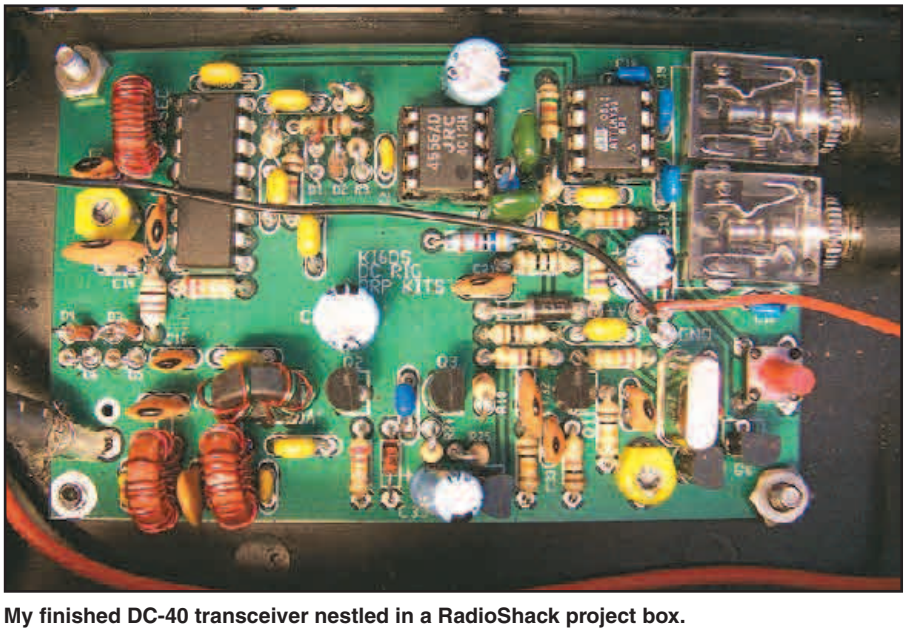
My CW was so rusty, I decided to wait a couple of weeks and practice off the air before attempting a contact. My first contact with the DC-40 took place on the evening of January 18 when KØZK responded to my CQ. I was so nervous, I mangled much of my practiced CW, but he was remarkably patient. My CW improved and I've made many contacts since.

You Can't Go Wrong

The DC-40 recently became the DC-40A, an upgraded design that adds an RF preamp, MOSFET QSK switching, a 5 V regulator and a modified driver stage. The DC-40A looks very much the same as the DC-40 and takes the same amount of time to build. If you're not a fan of 40 meters, you can get a kit for 30 or 20 meters. The price is the same — a mere $39 for a complete single-frequency CW rig that you can build in one evening.

So kiss the family goodbye and wish them a safe journey. Crank up your favorite music, plug in a soldering iron and enjoy.

Manufacturer: Hendricks QRP Kits, 862 Frank Ave, Dos Palos, CA 93620; tel 209-704-3522; **www.qrpkits.com**. QST



My finished DC-40 transceiver nestled in a RadioShack project box.

Steve Ford, WB8IMY ♦ *QST* Editor ♦ sford@arrl.org

A Simple Headset Adapter for the IC-706 Series Radios

Geoff Haines, N1GY

This little gem came about after I happened across an excellent Web site authored by Greg Ordy, W8WWV. Greg details a number of neat little accessories for the popular IC-706 series of ICOM radios. Using a circuit Greg suggested on his site, I planned out an adapter that allows me to make use of inexpensive computer type headsets, thereby leaving more money for other ham radio related toys.

The circuit uses only three electronic components, two resistors and one polarized capacitor, so construction is a snap. Any small enclosure will work, even the ubiquitous Altoids tin. I used a plastic electrical box from my local home improvement store. For the top cover I was going to use a regular blank wall plate, but it shattered while I was drilling it, so I used a scrap of ABS plastic left over from another project. The shallow type of blue plastic electrical box fits easily into my hand and I was able to position the requisite switches so that they fell ergonomically into place.

You can use that inexpensive computer headset with your ham rig — here's how.

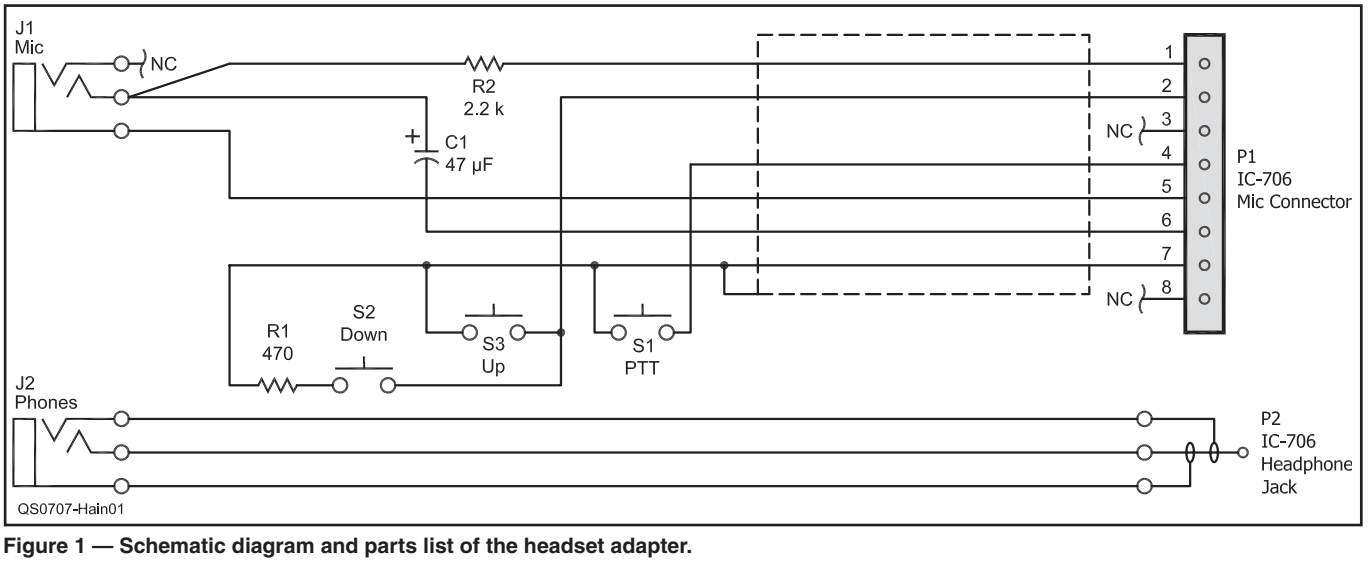


Figure 1 — Schematic diagram and parts list of the headset adapter.

C1 — 47 µF polarized capacitor.
J1, J2 — Stereo jack, ⅛″.
P1 — RJ-45 plug, wired with CAT-5 LAN wire, shielded if required.
R1 — 470 Ω, ⅛ W resistor.
R2 — 2.2 kΩ, ⅛ W resistor.
S1-S3 — SPST momentary contact, normally open push button.

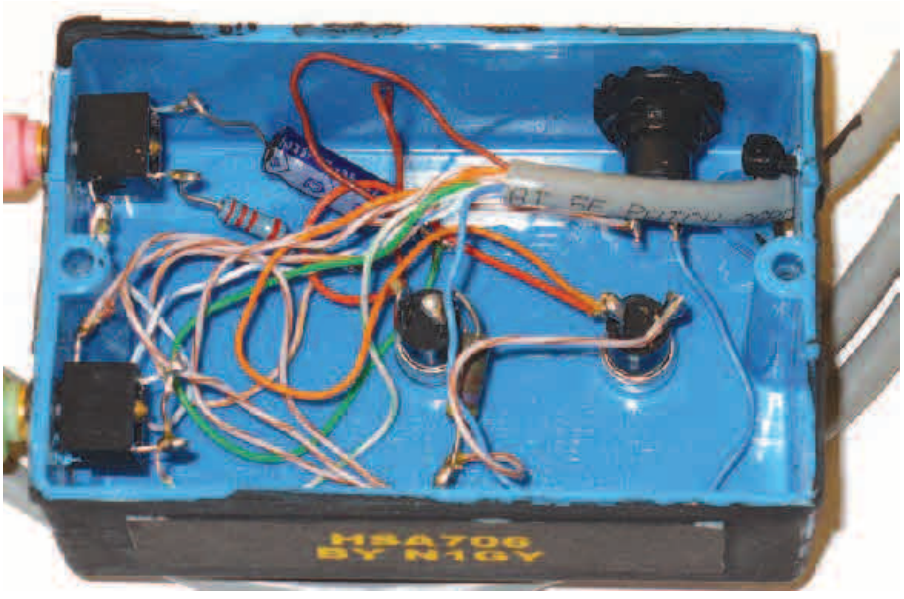


Figure 2 — Inside view of the headset adapter showing the wiring details.

Figure 3 — View of control module of the headset adapter showing the location of the buttons.

How's It Work?

The circuit (see Figure 1) should be self-explanatory. The shield over the CAT-5 cable is optional. In my radio room it was not needed. If you have a lot of RF in your operating location, you may need it and may even need a metal enclosure. If you have that much RF, however, perhaps a more diligent survey of the radio room is in order, to see where all that RF is coming from.

Most computer headsets use ⅛ inch stereo plugs and jacks. They are, however, generally wired for mono. Check out your plugs with an ohmmeter or VOM to be sure. The set I use is certainly wired this way and several other writers have noted the same thing. You still have to use stereo jacks because otherwise the ring contact will short to the ground side. However, in most cases the ring and tip contacts of the stereo jack can be wired together, and should be in the case of the phones' connection since otherwise you would only get audio in one ear.

The ⅛ inch stereo microphone connector was wired as shown because the microphone plug has the ring and tip wired together inside the plug, so it is unnecessary at the jack. The effect is the same, however.

After wiring up the adapter (see Figures 2 and 3) I plugged it into my IC-706MkIIG and dialed up a simplex frequency so I could hear myself on another radio without tying up the local repeater. To my surprise, my ID call got a response from another ham who just happened to be on that frequency. After exchanging pleasantries I asked him for an evaluation of my audio. He replied that it sounded fine, equal to the stock mic's audio in all respects. This of course is just one ham's opinion. I did not have access to the kind of test instrumentation that could quantify the results.

Making It Play

Overall, I think the project came out fine. For less than $10 in parts and a little time, I have a method of using a type of headset that costs about 70 to 80% less than the typical amateur equipment with little or no loss of audio quality. The circuit is easily adaptable to any rig using an electret microphone by simply changing the values of the components to suit the equipment. The values shown were taken from Greg's Web site because they were intended for the same radio as I have, an ICOM IC-706MkIIG.

Geoff Haines, N1GY, has been licensed since 1992 and holds an Amateur Extra class license. He retired after a career in respiratory care. He currently holds several ARRL appointments in the West Central Florida Section, including Technical Coordinator, Technical Specialist, Official Bulletin Station, Net Manager, Official Emergency Station and Official Relay Station. He is the President of the Manatee Amateur Radio Club, a member of the Manatee ARES group and member of the Bradenton Amateur Radio Club, the Yale University Amateur Radio Club and the Meriden CT Amateur Radio Club. In his spare time, he enjoys homebrewing antennas and accessories for his Amateur Radio operations. Geoff can be reached at 708 52nd Av Ln W, Bradenton, FL 34207; **n1gy@arrl.net**. QST

Feedback

♢In the Jun 2007 "Getting to Know Your Radio: The Next Step — Sound Card Modes," pp 55-57, the reference to "May 2006 Product Review" in the third paragraph should be to "May 2007 Product Review," as correctly noted in the footnote.

♢In "75, 50 and 25 Years Ago" [Jun 2007, p 92], in the third June 1957 item, my call sign was W8OPB, not W8QBP. — *R. J. Moser, W8XM*

Low Tones in High Places

If the repeater ignores you, try singing a "subaudible" song.

Steve Ford, WB8IMY

You've just grabbed the microphone of your brand-spanking-new FM transceiver and you are about to announce your presence on the local repeater. You mash the push-to-talk button and state your call sign with supreme confidence. When you release your death grip on the microphone, you are rewarded with the sound of…silence. No response, no repeater *kerchunk*, nothing. What happened?

Any number of things could be wrong, but high on the list of probabilities is forgetting to configure your transceiver to send a special low-frequency audio tone along with your voice. Many repeaters require this tone as a kind of secret handshake. No tone = no access.

The technical term for this method of electronic gate keeping is *CTCSS* — Continuous Tone-Coded Squelch System. That's a mouthful and you won't find many hams using that terminology in polite company. The more common moniker is *PL*, which is an acronym for *Private Line*. Both PL and Private Line are trade names belonging to the Motorola Corporation.

PL became part of general "hamspeak" in the early '70s when FM repeater systems began popping up like mushrooms. At the time, hams assembled repeaters from surplus two-way radio equipment. These were transceivers that had seen duty in police cruisers, taxis and other venues.

Many of the hams who built these first repeaters worked in the two-way radio industry. They were very familiar the Motorola's Private Line technology and adapted it for their amateur repeater systems. They didn't say, "I've added a CTCSS to the repeater." Instead, they defaulted to what they knew best and called it PL. Before long, PL became firmly entrenched in the amateur lexicon and, to Motorola's chagrin, is still used to refer to any type of access control that utilizes low-frequency (so-called "subaudible") tones. PL even shows up occasionally as a verb, as in "Hey! They PLed the repeater!"

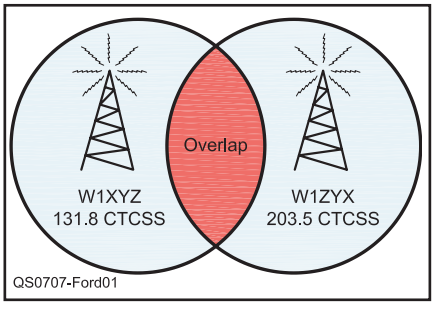


Figure 1 — By using CTCSS, the repeaters can prevent hams in the overlapping coverage area from inadvertently keying up both systems. The W1XYZ repeater will respond only to signals with 131.8 Hz tones and the W1ZYX machine will respond only to signals carrying 203.5 Hz tones. The hams program their radios to send the CTCSS tones for the repeaters they desire and everyone is happy.

Table 1
Common CTCSS Tones (in Hz)

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

How Does it Work?

CTCSS is a pretty simple idea. When you have this feature enabled, your radio sends a continuous audio tone, along with your voice, each time you transmit. The tone can be one of 50 in a range from 67 to 254 Hz (see Table 1).

At the repeater, a device known as a *CTCSS tone decoder* is listening. For the sake of discussion, let's say it is programmed to respond to a 67 Hz tone. When it hears the 67 Hz tone in your signal, it automatically opens the audio pathways and switches on the repeater transmitter to relay your signal. If the tone is missing, the audio pathways remain closed and the transmitter is mute. Your signal is *persona non grata;* the repeater ignores you entirely.

Not all repeaters utilize CTCSS, but many do. They primarily use CTCSS as a means of controlling interference from nearby repeater systems that share the same frequencies. Look at the example in Figure 1. Users in the area where coverage overlaps might accidentally trigger both machines each time they transmit. To prevent this from happening, the repeaters can set up CTCSS so that one system responds only to signals with 131.8 Hz tones and the other responds only to signals carrying 203.5 Hz tones. The users simply program their radios to send the correct CTCSS tones for their local systems.

Repeaters may also transmit CTCSS tones on their outputs to reduce interference and confusion among users who live in areas of overlapping coverage. Take a look at Figure 1 again and imagine that you live in the overlap area. You'll hear both repeater systems on the same frequency, which is confusing and annoying to say the least. But if the repeater you *want* to hear is sending a CTCSS tone, you can configure many newer radios to pass its signal while ignoring everything else. Keeping unwanted chatter at bay does wonders for your mental constitution.

All modern FM transceivers can send CTCSS tones and many also have built-in or optional CTCSS decoders to block undesired signals. The *ARRL Repeater Directory* and *TravelPlus* CD-ROM list CTCSS frequencies in use at repeaters throughout the country. You can add the designated CTCSS tones to your channel memories so that your radio will transmit them automatically for each repeater system you use. You won't hear these tones in your radio because your receiver is designed to "roll off" the low-frequency audio, but rest assured they are there.

The author is the Editor of QST. *You can contact him at* **sford@arrl.org**.

N0AX

HANDS-ON RADIO

Experiment #54 — Precision Rectifiers

Last month, we explored an RF application of a simple half-wave rectifier called a peak detector. Sometimes much more accurate rectification is required and here's how to get it.

Terms to Learn

Ideal diode — a diode with zero forward voltage drop and zero reverse current.

Linearize — change a nonlinear characteristic to a linear characteristic.

Voltage-current characteristic — the graph of voltage (X axis) versus current (Y axis) between two terminals of a device.

A Basic Op-Amp Rectifier

Passive rectifiers — those that use diodes in half or full wave configurations — are fine for rectifying large signals if the circuit is forgiving of the diode's forward voltage drop, V_F. For small signals, meaning those much smaller than V_F, passive rectifiers don't work well at all. Wouldn't it be nice if we could order an *ideal diode*? Vendors are often out of stock of ideal diodes, but we can make one by using the analog designer's favorite tool, an op-amp.

Semiconductor diodes "turn on" a little slowly before reaching a relatively constant voltage drop of 0.6 to 0.7 V (silicon) or 0.3 V (germanium). In a full wave circuit, this causes *crossover distortion* in the region the signal changes from forward to reverse current. Signals much smaller than V_F are attenuated as well, in both full and half wave circuits. By using feedback in an active circuit as shown in Figure 1, we can use the op-amp's high gain to *linearize* the nonlinear *voltage-current (V-I) characteristics* of a diode's PN junction. (A resistor's V-I characteristic is a straight line with a slope of A/V equal to its resistance in ohms.)

Figure 1 shows the basic half wave active rectifier circuit. Note the feedback connection between the cathode of D1 and the op-amp's inverting (–) input. When the input signal is positive, the op-amp's high gain causes its output to increase until the voltage at the (–) terminal (also the voltage at the diode's cathode) equals the input voltage at the noninverting (+) terminal. If you measure the op-amp's output at pin 6 you'll find it is V_F above the diode's cathode. This is true for all positive input voltages, so V_F of the whole circuit is zero!

Let's test the circuit to see the effect of feedback and gain. Connect a 1N4148 silicon diode and 10 kΩ potentiometer in series across a 12 V power supply after setting the potentiometer to full resistance. (The diode's anode should be connected to the supply's positive terminal and the cathode to the pot's adjustable terminal.) Measure voltage across the diode and current through it as the pot's resistance is reduced to 500 Ω ($I_{DIODE} = V_{SUPPLY} / R_{POT}$). You should see voltage increase slowly with current until at a few mA, V_F becomes almost constant, regardless of current. Take care not to reduce the pot's resistance much below 500 Ω to keep diode current below 25 mA.

Build the circuit of Figure 1, paying attention to op-amp pin numbers and the feedback connection. (If you connect the inverting terminal directly to the op-amp output instead of the diode's cathode, you'll just have a passive rectifier with a buffer amp driving it.) The power supply must output both +12 and –12 V so that the op-amp can operate properly with very small input signals. Connect V_{IN} to the supply's positive output and make the same plot as before. You should see that V_F (the voltage between the supply output and D1's cathode) is approximately zero for all currents through R2. (R1 provides a path for the op-amp's very small input bias current.) This circuit emulates an ideal diode and is called a *precision rectifier* because the error caused by V_F of real diodes is reduced nearly to zero. Even signals of a few mV peak-to-peak are rectified reasonably well by this circuit.

Fixing the Problems

Hold it — We're not quite finished yet! This circuit is pretty good, but it still has some shortcomings. It only has unity gain and it is just a half wave rectifier. Furthermore, when the input voltage to the circuit in Figure 1 is negative, what happens to the op-amp? It's still trying to create equal voltages at the inverting and noninverting terminals, but the diode isn't allowing any current to flow in the reverse direction, no matter how hard the op-amp tries. The op-amp output *saturates* at or near the negative supply voltage. (You can see this for yourself by connecting V_{IN} to a small negative voltage, such as from a 1.5 V battery, and measuring the op-amp output voltage.) Saturation makes the op-amp slow to recover from having all of its circuitry forced to one extreme, reducing high-frequency response of the circuit.

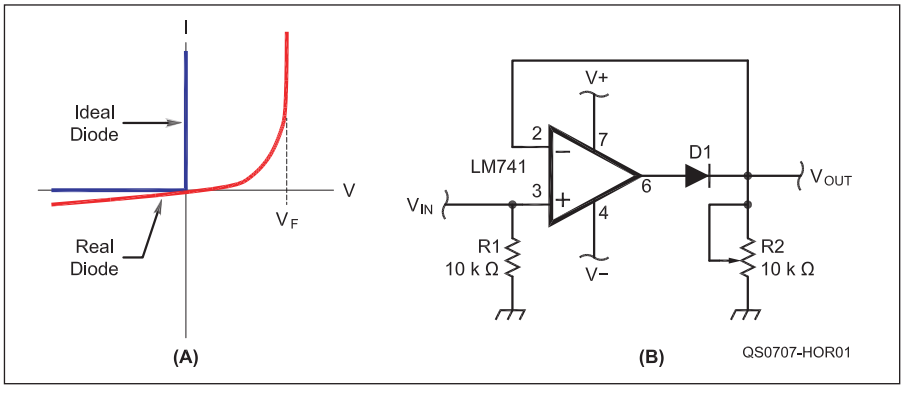


Figure 1 — The V-I characteristic curves for ideal and real diodes, showing V_F for real diodes. At B, a simple half-wave rectifier circuit with an adjustable load for measurements.

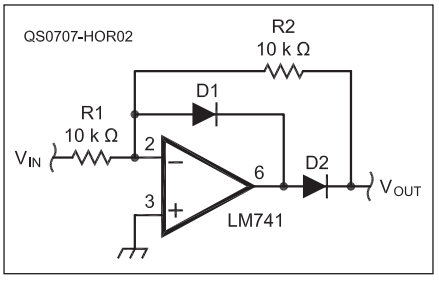


Figure 2 — A precision half-wave rectifier with adjustable gain controlled by the ratio of R1 and R2 with a diode clamp (D1) to prevent op-amp saturation.

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Variable gain is added in Figure 2, but the input signal is inverted. If D1 is removed and D2 replaced by a short circuit, the circuit becomes the standard inverting amplifier. (This circuit is described in Figure 3 of Hands-On Radio Experiment #3.[1]) For this circuit, an ac signal will be rectified such that negative inputs cause a positive output and positive inputs cause zero output. To understand the op-amp circuits in this experiment, keep in mind that the + and – inputs have a very high input impedance so that very little current flows into or out of them.

D1 solves the op-amp saturation problem. With a positive input signal, current flows from the circuit input to the inverting input of the op-amp. The op-amp balances this current with a negative output that draws current through D1 and keeps the op-amp's + and – inputs at zero volts. The op-amp output only needs to reach $-V_F$ of D1.

D2 works just as in the circuit of Figure 1. When the op-amp output goes positive (the input signal is negative), D2 conducts and supplies current to the output. The op-amp increases output voltage until the current flowing through R2 to the – input balances the current flowing to V_{IN} input through R1. The ratio of R2:R1 sets the gain of the rectifier as described in Experiment #3.

Build the circuit of Figure 2. A +12 and –12 V dc supply is required. Use 10 kΩ resistors for R1 and R2 and 1N4148 diodes for D1 and D2. If you have a signal generator and oscilloscope apply a 1 V_{PP} sine wave to the input or plot the V-I graph for both positive and negative input voltages. Confirm that the circuit half-wave rectifies the input signal and that negative input voltage results in positive output voltage. Vary the ratio of R1 and R2 to see the effect on gain.

A Full-Wave Version

Figure 3 is a full-wave rectifier circuit, easiest understood by separately analyzing negative and positive input voltages. Note that the input op-amp U1 once again has its + input connected to the circuit input so that its output voltage will be the same polarity as the input voltage. R1 and R4 provide a path to ground for input bias currents as before.

For positive input voltages, U1's output is also positive. The output is connected through D2 to the noninverting input of U2. U2's output also rises until its + and – inputs are at the same voltage. At this point, the – inputs of U1 and U2 are at the same because very little current is flowing through R2 or D1. The output of U1 continues to rise until its + and – inputs are equal. The output of U2 follows the input signal, supplying the positive half-cycle to the circuit output.

For negative input voltages, U1's output is also negative, reverse biasing D2 so it acts as an open circuit. U1's negative output pulls current through D1 and R2. U2's output rises until the current flowing in R3 exactly balances the current flowing in R2. If R2 and R3 are equal and their currents are equal, the voltage at the output of U2 will be equal and opposite polarity to the voltage at the – input of U1. U1's output raises the current through D1 and R2 until the voltage at its – input equals the input voltage. So the output of U2 is also positive for negative input signals as D1 and D2 switch the current paths.

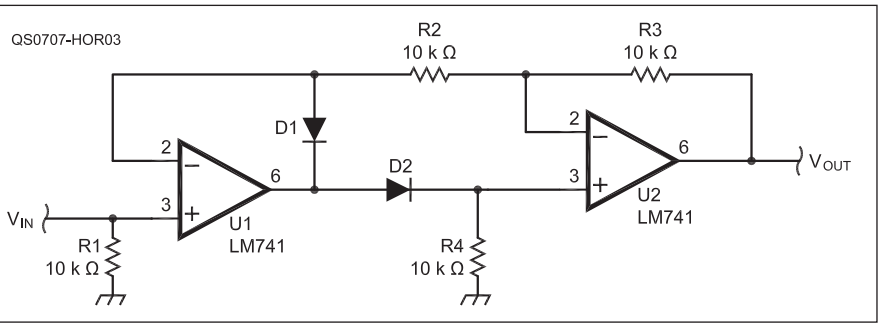


Figure 3 — Full-wave precision rectifier circuit with unity gain. D1 and D2 switch the feedback path between U2 and U1 so that the circuit alternates between inverting and noninverting gain to perform the rectification.

Build the circuit of Figure 3 and confirm its positive output for both input polarities. What happens when you change the ratio of R2 and R3? Their ratio only affects the gain when the input is negative! Increase the frequency of the input signal and determine the point at which the output is 3 dB (0.707 voltage ratio) below the input signal. This is rectifier's operating bandwidth and it is determined primarily by the speed of the op-amp. A more complex full-wave rectifier circuit with adjustable gain for both input polarities can be found at **sound.westhost.com/appnotes/an001.htm**.

Shopping List

- Four 10 kΩ, ¼ W resistors.
- Two LM741 op-amps, or equivalent (a single LM747 dual op-amp will also work).
- Two 1N4148 small signal diodes.
- 10 kΩ potentiometer.

Recommended Reading

The advanced reader will find a number of interesting rectifier circuits at **www.discovercircuits.com/R/rectifier.htm**. This circuit is also covered in detail in *The Art of Electronics* and the *Op-Amp Cookbook*.[2,3]

Next Month

Now that you have your op-amps all wired up, let's have some more fun with them by creating voltage-to-current and current-to-voltage converters!

[2]Horowitz and Hill, *The Art of Electronics*, Chapter 4, Cambridge University Press.
[3]W. Jung, *Op-Amp Cookbook*, Chapter 5, Prentice-Hall. QST

[1]**www.arrl.org/tis/info/HTML/Hands-On-Radio/**.

New Products

COMPACT POWER SUPPLY FROM GAMMA RESEARCH

◊ The HPS-1a from Gamma Research is a 13.8 V dc power supply that measures 3.37 × 1.55 × 5.25 inches and weighs 1.25 pounds. Rated at 5 A continuous and 22 A at 25% duty cycle, the HPS-1a is intended to power SSB and CW transceivers at up to 100 W output during normal operation. Transmit power should be reduced to 25-30 W for continuous duty cycle operation. The HPS-1a is rated to operate from 100-250 V ac, 50-60 Hz lines and includes current limiting and overvoltage protection. Price: $149. For more information or to order, visit **www.gammaresearch.net**.

HAMCALC ELECTRONICS UTILITY SOFTWARE

◊ Version 87 of *HAMCALC* software for *Windows* or *MS-DOS* contains more than 300 utility programs for radio amateurs and electronics professionals. Developed by George Murphy, VE3ERP, the software is said to contain much information not readily found in current popular handbooks. The latest version includes new or updated programs for calculating quadratic equations, converting decimal to binary numbers, deciphering ASCII character codes, designing a T-match or power supply and winding toroidal inductors. Most of the programs can be run in either metric or Imperial/USA units of measure. *HAMCALC* is available free of charge by download (1.4 MB file) from **www.cq-amateur-radio.com**. CD-ROM versions are no longer available.

Is Any Power Leaving my Rig?

Or — why doesn't anyone answer me?

Paul Danzer, N1II

Has this ever happened to you? You get on HF, call a few stations, and no one comes back. Feeling a little lonely, you put out a general call, CQ, and still no response. Hmm, I wonder if anything is getting to my antenna. The meter in the rig seems to read normally, but….

It has happened to me, and it has happened to hams as well as commercial and military operators from the very beginning. In fact, during the early 1940s, many military aircraft were equipped with an RF ammeter that actually measured the current going into the antenna system. After the war, hams were able to buy these meter assemblies for two or three dollars. Now, of course, these devices are long gone.

So, How Can You Tell?

Today, most rigs are equipped with some sort of output indication, but unfortunately many just measure the voltage at the output connector, which can give you a high or normal reading due to various imperfections in the load (antenna system) conditions. The circuit in Figure 1 will give you a measure of the current leaving the rig — as a double check that your precious RF is actually going somewhere.

The two coax jacks are spaced roughly 2 inches apart, leaving plenty of room to screw on PL-259 coax connectors. A 0.1 Ω resistor connects the center pins. For a 200 W radio you would like about 1 W of dissipation, and 0.1 Ω, 1 W resistors are not readily available. In the photo four 0.1 Ω, ½ W resistors are wired in series-parallel. Two in parallel provide ½ of 0.1 Ω, and two such parallel combinations in series combine to give you (0.1)/2 + (0.1)/2 or 0.1 Ω. The ½ W units provide 2 W of total dissipation capability. An alternate approach would put 10 identical 1 Ω resistors in parallel. Many electronic supply houses stock 1 Ω, ½ W resistors.

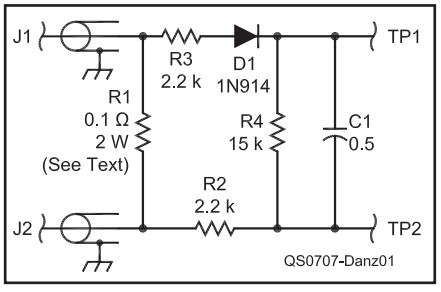


Figure 1 — Schematic and parts list of output indicator. Part values are not critical, except for R1. Almost any small signal diode (not a power rectifier) may be used for D1.
C1 — 0.5 µF, 100 V capacitor.
D1 — Silicon switching diode such as 1N914 (RadioShack 276-1122). For low power operation, use a germanium diode.
J1, J2 — SO-239 coax sockets (RadioShack 278-201).
R1 — 0.1 Ω, 2 W resistor assembly; see text.
R2, R3 — 2.2 kΩ, ½ W resistor.
R4 — 15 kΩ, ½ W resistor.
TP1, TP2 — Banana jacks (RadioShack 274-725).

The 2.2 kΩ resistors isolate the pin-jacks from the RF leads. The diode, capacitor and 15 kΩ resistor rectify the voltage across the 0.1 Ω resistors and smooth it a bit. Almost any inexpensive voltmeter, connected to the two pin jacks, will give a usable read-ing. Depending on your rig's power output, this voltage will vary from a few to over 100 V.

Making it Play

Connect either coax jack to the radio and the other to the coax cable going to the antenna. Set your rig on CW, press the key and note the reading. This is your CW reference. On SSB, just say a few words into the mike and this will be your SSB reference. Note that, depending on your antenna system, the reading may be different on different bands. If so, just make a chart for future reference.

Now, whenever you wonder if your rig is actually sending any power into the antenna, just read the voltmeter. If it is near the reference reading you originally saw, all is well. But if it is much lower — well, you have a problem!

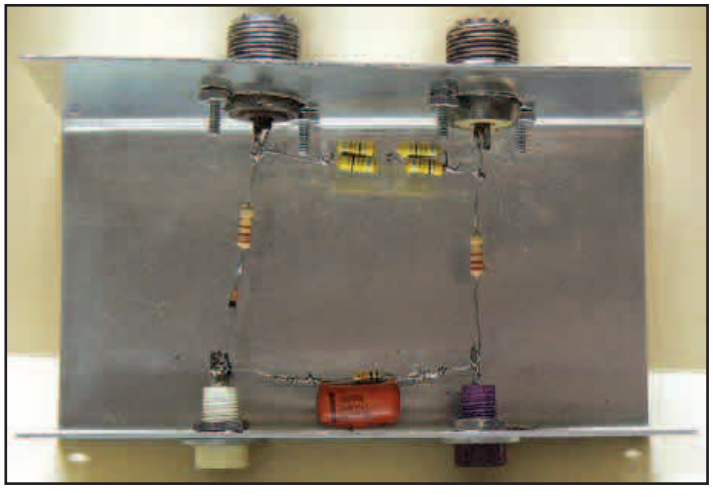


Figure 2 — Inside view of the current sensor. The space between the SO239 connectors allows the 0.1 Ω resistor assembly to fit between them. The enclosure is a 5¼ × 3 × 2⅛ inch aluminum project box, such as RadioShack 270-238.

A licensed amateur for over 50 years, Paul holds BSEE and MSEE degrees. After many years as a practicing electronics engineer in the aerospace industry he now teaches at Housatonic Community College in Connecticut. He was previously on the ARRL HQ staff writing and editing ARRL books. He is an ARRL Technical Advisor. Paul can be reached at 2 Dawn Rd, Norwalk, CT 06851 or **n1ii@arrl.net**.

WR1B

HINTS & KINKS

EASY MAINTENANCE OF A LOW VISUAL PROFILE ANTENNA

◊As a newly licensed ham, I found myself facing the same dilemma I've read about so often — getting an antenna up into the air where it could do some good, and not irritating the neighbors. After studying antennas, talking with the neighbors, and surveying the types of things the neighborhood has accepted, I settled in on the idea of a flagpole mast. In the process of finding a workable solution, I came up with an antenna mount system that extends to raise the antennas so that they clear my roof, yet is easy to lower for maintenance.

The flagpole I finally settled on is a Sunsetter 20 foot telescoping flagpole (**www.sunsetterflagpole.com**). The flagpole comes complete with a special sleeve that is set in concrete so the pole is easily removed for repair or replacement. I ordered the bronze anodized pole to reduce visibility and "shine," and had a concrete base poured that was a bit more than what the spec sheet required. Figure 1 shows my concrete base. I figure that the wind load of the antennas I was planning to use would actually be a lot less than the wind load of two 3 × 5 foot flags, which is what the flagpole was designed for.

Once the base was poured, set and cured, erecting the pole is easy. It just slides into the concrete sleeve, and is locked in place with a setscrew to stop it from twisting. See Figure 2. The top section of the four-section pole is 1.5 inches in diameter, perfect for most standard antenna mounting hardware. The greatest feature of using the telescoping pole is that it can be collapsed down to a comfortable working level, as shown in Figure 3, and then extended back into position rather easily.

KD7TOG

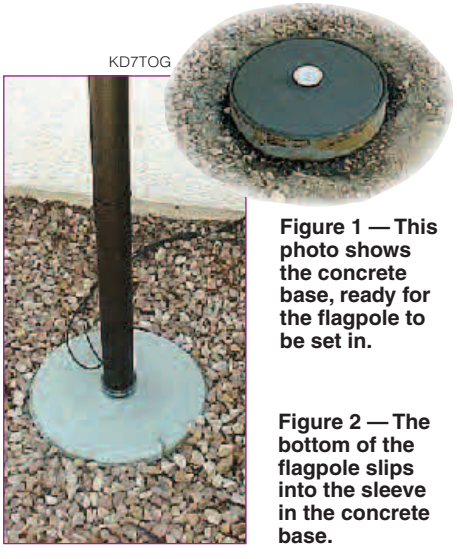


Figure 1 — This photo shows the concrete base, ready for the flagpole to be set in.

Figure 2 — The bottom of the flagpole slips into the sleeve in the concrete base.

For my main antenna, I decided on an Arrow dual band J-pole (**www.arrowantennas.com**). The antenna pattern has proven to be very effective for working the complete Las Vegas Valley, as well as easily making packet contacts via the International Space Station. One benefit of the Arrow J-pole design is that the longest/tallest element of the antenna is actually a grounded element. This will help drain to ground any ionized charges in the air around the antenna.

KD7TOG

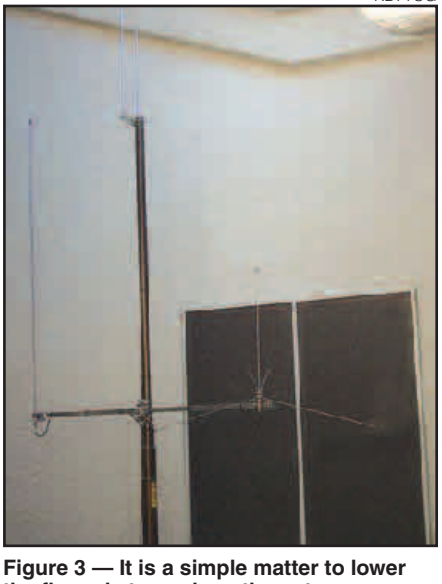


Figure 3 — It is a simple matter to lower the flagpole to work on the antennas.

KD7TOG

Figure 4 — With the flagpole fully extended, the three antennas are above the top of my house roof.

Over time, I have added a cross arm to the top pole section, and added two receive antennas for my ICOM R-75 and PCR-100 radios. The J-pole is used with a Yaesu FT-8800 2 m and 70 cm FM transceiver. The profile is a little less stealthy with the cross-arm-mounted antennas than with the J-pole alone. Figure 4 shows the flagpole and antennas in the fully raised position. I hope this idea helps give other hams another tool for getting in the air, and on the air! — *73, Tony Messina, KD7TOG, 5452 Painted Gorge Dr, Las Vegas, NV 89149;* **kd7tog@arrl.net**

HOMEBREW ANTENNA INSTALLATION EXTENDER POLE

◊It seems a good portion of our setup time during Field Day is spent trying to get a rope over a branch on a tree for a wire antenna. For Field Day 2005, we were fortunate to have a ham with a strong and accurate throwing arm. The first rope went up nice and easy. The second one, however, proved to be problematic. After several failed attempts, the thrower's arm gave out and I wound up having to climb the tree. No doubt this is a common problem for hams trying to put up antennas when they do not have the luxury of a cherry picker, crane, or large extension ladder. So, how best to tackle this problem?

Starting with a light line and a bow and arrow or slingshot, or surf casting are all possibilities but I discounted those ideas because of the inherent danger and unpredictable results. An extender pole of some sort seemed the best way to go. Unfortunately the commercially available fiberglass poles have such a thin top section that they wave around in even the slightest breeze. Invariably the weight at the top gets tangled around the pole, so it takes a lot of wiggling and jiggling to get it to drop.

I was determined to come up with a simple, quick and reliable solution to the problem. In addition, my solution should make use of materials I already had or that would be readily available. Finally, it had to be easy to put together and use. Here is what I came up with.

Larry D. Wolfgang, WR1B ♦ Senior Assistant Technical Editor ♦ h&k@arrl.org

K2RFP

Figure 5 — The top of the pole in its collapsed state, showing the cross arm, hose clamps and weights.

K2RFP

Figure 6 — The lower end of the pole, showing the string being held taut and the suggested safety equipment.

K2RFP

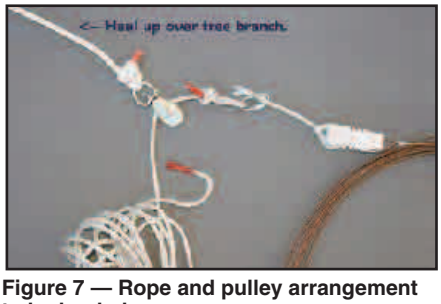


Figure 7 — Rope and pulley arrangement to be hauled up.

K2RFP

Figure 8 — The extender pole in use.

I assembled an extender pole made with three sections of EMT (electrical metal tubing) type steel electrical conduit and a wooden cross arm at the top. Figure 5 shows the top of the pole in its collapsed state with the cross arm attached.

The cross arm was made from a piece of ¼ pine I found in my scrap wood box. The dimensions are not critical. A measurement after construction showed the distance from the pole to the front screw eye as about ten inches. I tapered the front of the cross arm to reduce weight. The top section of conduit is ½ inch conduit with an outside diameter a little shy of ¾ inch so it was a loose fit to the ¾ inch hole in the cross arm. A few wraps with duct tape made a snug fit. Hose clamps above and below the cross arm keep it in place.

The center section of conduit is ¾ inch and the lower section is 1 inch. These tubes make for a very loose fit when telescoped together, so again I used a few wraps of duct tape to make a snug fit. I cut some slits in the upper ends of the lower and center tubes with a hacksaw, so I could squeeze down tightly on the inner tube with a hose clamp. The upper and center sections extend two feet into the section below. With this arrangement the total length of the pole is about 25 feet. I taped a 35 mm film canister to the bottom of the lower section to keep dirt out when standing the pole up on the ground.

To use the pole, lay it on the ground and extend it to the length you want, then secure it with the hose clamps. The golf ball weight works fine with low friction nylon string, but the extra weight provided by the rock does better with the thicker mason line. Pull the string taut and hold it temporarily at the bottom end of the pole with a spring clamp or some tape. See Figure 6. As with any situation when raising something overhead, it is a good idea to wear a hard hat. Sure grip gloves are also helpful.

Putting the bottom end against the tree or having someone hold it down with a foot makes raising the pole real easy. With this pole you can easily reach branches at 25 feet. With the aid of a ladder I was able to reach 32 feet.

Once you have the light line over the branch, use it to haul up the rope and pulley arrangement shown in Figure 7. Make sure you have enough rope to accommodate your particular situation. Figure 8 shows the extender pole in use.

If you use this pole for setting up a temporary antenna for field day or a special event station, you should consider using the pulley rope to haul back a light line to leave there when you take the antenna down. Choose a durable line that will make it through the weather until the next time you want to use it. For a more permanent situation you can periodically lower the rope and pulley arrangement for inspection and replacement if needed. Finally, you should be reminded that this is a *metal pole* and it should not be used anywhere it is possible to come in contact with overhead *power lines*. — *73, Richard Pav, K2RFP, 85 Radio Ave, Miller Place, NY 11764*; **k2rfp@arrl.net**

More on Lithium Battery Replacements

♢The July 2006 Hints and Kinks item, "Kenwood TS-940 Battery Replacement" is future trouble. Unless W8JV is exceptionally lucky, the dissimilar metals interface of that solder lug to the battery will not remain a good contact very long. I have found that many battery stores carry an extensive array of lithium cells with welded contacts. I have always been able to find one that is a suitable replacement for any of the ICOM and Kenwood radios in which I have updated the battery. They are usually very little more expensive than a plain lithium cell. Fortunately, we still have real radio stores in my area, and batteries with welded lugs are even cheaper in those stores. Mouser also lists them. — *73, George Munsch, W5VPQ, 160 County Rd 375, San Antonio, TX 78253*; **w5vpq@arrl.net**

♢One thing I've learned in my 45 years working in commercial broadcasting is that there is often more than one solution to a problem. The Hint about using heat shrink to hold lugs on coin cells is just one that has worked for me. I have two Kenwood TS-940s with this "fix" that are operating great over two years after these batteries were installed. I've received e-mails from other hams who are equally pleased. Nobody has reported a corrosion problem. It should be noted that even the expensive Kenwood replacement batteries have tabs of metal dissimiliar to the battery body. Otherwise the tabs wouldn't take solder. — *73, James Viele, W8JV, 161 Fox St, Hubbard, OH 44425*; **w8jv@yahoo.com**

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. QST

PRODUCT REVIEW

Ten-Tec Omni-VII HF/6 Meter Transceiver

Reviewed by Joel R. Hallas, W1ZR
QST Technical Editor

Ten-Tec has offered several HF transceiver lines over the years. Their Omni line has long been regarded as one of the best performers for contesters and DXers, especially in terms of receiver dynamic performance. When we reviewed it about 10 years ago, the Omni-VI Plus receiver was one of the best we'd measured in terms of close-in blocking dynamic range (BDR) and third order dynamic range.[1] It's not surprising that Ten-Tec named their new transceiver the Omni-VII, rather than say, the Paragon-III or Jupiter-II. They all are equally logical. Like the Paragon, the Omni-VII has a general coverage receiver (earlier Omni series radios are ham bands only). The Omni-VII operating software is built upon the code of the Jupiter, with which it shares a physical resemblance.

The challenge that Ten-Tec engineers accepted was to design and manufacture a transceiver that could compete with the others in its price range, have a general coverage receiver and still provide close-in receiver dynamic range that matched the earlier amateur-band-only Omni-VI. As seen in Table 1, they succeeded — very nicely thank you. They did so by defining a new design philosophy with a new name: "distributed roofing filter architecture." See the sidebar for details.

[1]L. Wolfgang, "Ten-Tec OMNI-VI Plus MF/HF Transceiver," Product Review, *QST*, Nov 1997, pp 58-61. *QST* Product reviews are available on the Web at **www.arrl.org/members-only/prodrev/**.

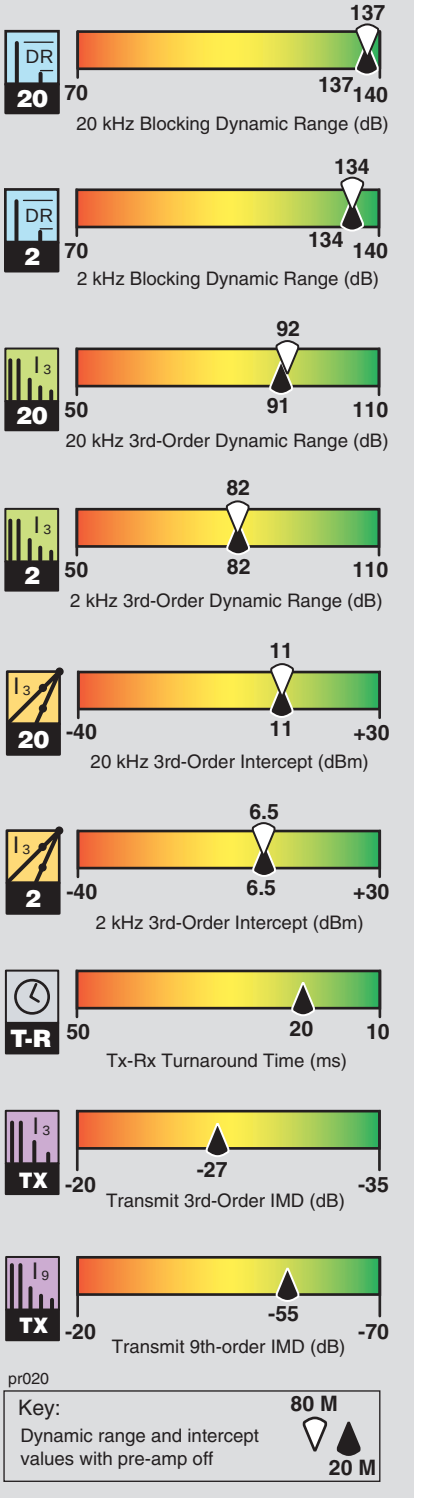
What's New in the Omni-VII?

The Omni-VII does almost everything the Omni-VI did but also offers quite a few new features. Perhaps the most unusual, besides its new receiver architecture, is the rear panel Ethernet connector that allows the radio to be operated remotely from anywhere in the world that has access to the Internet. Other radios have offered remote connectivity, but they required an adjacent PC to do the heavy lifting. The Omni-VII design simplifies the remote configuration and the setup is quick enough to support phone or CW (using the keyboard). More about "One Plug" operation later.

The most recent Omni-VI provided selectivity via two sets of crystal filters, one to set the roofing bandwidth and one to establish operating selectivity. It used AF digital signal processing (DSP) for noise reduction and notch filtering. The Omni-VII has the typical 20 kHz wide roofing filter at the 70 MHz first IF, a selection of intermediate roofing filters (20, 6 and 2.5 kHz supplied, 500 and 300 Hz optional) at the 455 kHz second IF, and then a choice of 37 IF DSP filters ranging from 200 Hz to 9 kHz to set the operating bandwidth at the 14 kHz third IF. Collins mechanical filters are used at the second IF. The combination is both flexible and effective.

While earlier Omnis were SSB, CW, RTTY, and in later models FM radios, the Omni-VII adds AM operation in transmit and receive.

Key Measurements Summary



Bottom Line

The Omni-VII combines a high-performance receiver with the features needed by most operators and delivers them in a compact package at a competitive price.

Mark J. Wilson, K1RO ♦ Product Review Editor ♦ k1ro@arrl.org

The adjustable AM receive bandwidths to 9 kHz make for very pleasant listening if signals are strong, with a noticeable improvement in high frequency response compared to the 6 kHz available in my Paragon.

This radio is controlled via intuitive buttons around the periphery of a 6 inch diagonal, 320 × 240 pixel color LCD panel (see Figure 1). The display provides information about all control settings and includes a one-shot spectrum scope that can be used to take a 3, 30 or 300 kHz snapshot of band activity, centered on the receiver frequency. In common with the Jupiter, the controls include a MULTI knob. This control is used to adjust any parameter selected by menu or a push button. If selected via the menu, a nice feature is that until a different parameter is selected, the MULTI knob continues to perform the adjustment even after the menu is closed.

User Friendly Features

I was struck by how clean, natural and quiet the receiver sounded in comparison to some DSP based radios. I found the Omni-VII a real pleasure to listen to — in any mode.

The main tuning knob has an easy-to-operate adjustable drag mechanism. Just hold the knob skirt while turning the inner knob. Audible and tactile feedback is provided by clicks as the adjustment proceeds, so you know something is happening. I liked the setting with the least drag, but others may like more resistance, particularly in a mobile setting.

In place of an analog meter, the Omni-VII provides a bar graph. It acts as an S-meter in receive, and as either an output power meter or SWR meter in transmit, as selected by the menu. I found that I didn't miss the old mechanical needle at all, since the response time and resolution of this arrangement was just fine. I had no problem using the display while setting my manual antenna tuner — the biggest challenge for such a device, in my view. In addition to the bar graph, a numerical value for the parameter is shown on the display.

The bar graph is particularly handy set to PWR during SSB transmission. In addition to the dynamic level of the green bar showing your voice peaks, there is a red peak hold indicator that shows what the maximum has been over an interval.

The receive S-meter is worth particular note on two counts. First, it is the only S-meter I've encountered that provides a reading that just indicates receive signal strength. Other S-meters show wild changes in value with a change in preamp or attenuator setting. Not this radio — its value automatically compensates for such changes and the readings are close whether the preamp is on or off or attenuation is inserted. Second, it showed S-9 with a 67 µV (only 2.5 dB, less than half an S-unit, from the original 50 µV standard that Collins established), then dropped one S-unit every 6 dB, just as it's supposed to. With this radio, you can give a meaningful S-meter comparison between received signals!

The TUNE button transmits a signal at about 20% of the set power level for antenna tuner setting or SWR verification. If you purchase the unit with the built-in automatic antenna tuner, the TUNE button initiates the internal antenna tuner if it's enabled on the menu. A nice feature for adjusting a linear amplifier is that if you poke PWR right after you hit TUNE, the output will jump to full power to allow setting of amplifier LOAD, after you set the amplifier TUNE at the lower power.

In common with the other radios in its price class, the Omni-VII includes coverage of 6 meters as well as the HF bands. The folks at Ten-Tec decided to provide for FM operation, perhaps useful to some in areas where 10 and 6 meter FM are popular, or for those who like to appear on distant repeaters when propagation conditions permit. To support repeater operation, any of the 40 standard CTCSS tones can be selected for transmit only. This makes the Omni-VII useful for FM, but not feature rich in comparison to specialized FM gear that usually includes auto repeater offset, CTCSS decode, digital coded squelch and yes, a SQUELCH control.

The automatic gain control (AGC) has settings for FAST, MED, SLO or OFF, which seem appropriate for any operating conditions we encountered. It should be noted that the OFF setting does not actually disable the AGC, but rather reduces the decay time to zero. The AGC can, however, be effectively disabled by turning down the RF GAIN control, which raises the AGC threshold. The RF GAIN does not actually control the RF gain (there is no effect on the receiver's sensitivity), but rather it just controls the AGC threshold.

One item not on the multifunction display is a clock. This may be the only feature of the Omni-VI that didn't make it to the VII! Some competitors provide not one, but two clocks, for UTC and local time. Well, I have UTC on my wall, and local on my wrist — not to mention what's on my computer display — so perhaps it is a good design decision, but worthy of note for those who would expect a clock on the display.

A single button selects the MENU, which provides a list of settable parameters in simple English — no translation using the manual required here! The tuning knob scrolls through the list and whichever item is highlighted will be adjusted by the MULTI knob. Unfortunately, the list is long and seems to have been appended randomly as new parameters were defined. Hopefully, some early firmware release will put them in a more logical sequence, perhaps grouped by mode, followed by the general ones that apply for all modes. Even better, in my opinion, would be to have them show up only if they relate to the mode in current use.

Ten-Tec offers an internal antenna tuner option with the Omni-VII. It is the same tuner used in the Orion II and it can match antennas with up to a 10:1 SWR. This allows matching of random wire and nonresonant multiband antennas, a plus compared to the competition's tuners that are designed to trim up a matched antenna with up to a 3:1 SWR. Our test unit included the tuner and it worked as expected, taking around 2 to 3 seconds to tune on a new frequency, less than a second if it had been previously memorized.

Remote Pod

A remote tuning knob and control system is also available as an option. This is similar to pods that Ten-Tec has offered since the introduction of the Pegasus computer controlled transceiver (that radio didn't have a real tuning knob of its own). The pod also has a keypad for direct frequency entry and three programmable buttons whose functions can be selected from the Omni's menu. The pod is designed for "armchair" operation, but might also prove very useful for operators with disabilities that make sitting in front of a radio difficult.

If I had an Omni-VII that I used remotely, I could covet a version of the pod that

Figure 1 — The Omni-VII's LCD screen shows all of the important operating parameters.

would plug into a USB port on my remote computer so I wouldn't have to tune using mouse clicks! If it also had a jack for my keyer paddles (a remote paddle adapter is promised by Ten-Tec, but was not available for this review), I'd be in hog heaven!

CW Operation

Ten-Tec is famous for making radios that have excellent CW operating characteristics, and the Omni-VII is in the same camp. The first thing a CW operator will notice is the smoothest and quietest full break-in (QSK) operation that I've ever experienced! There is absolutely no audible relay clatter, even with the linear amplifier keying loop enabled. I can't say there are no relays involved, but if there are they are the quietest I've (not) heard. The keying is so smooth and transition so transparent that ARRL's test engineer asked if I could confirm that the radio was actually muting during transmit (it was!). Interestingly, the Omni-VII does not have a selection for the usual semi break-in. Instead there is a menu function that allows setting CW QSK DELAY from 0% (full break-in) to 100%, for 1 second TR delay, as semi a break-in as anyone could want.

The front panel KEY jack can be menu selected to be an input to an internal keyer or OFF for no internal keyer. The keyer can be front panel adjusted in speed from 5 to 63 WPM. In addition, it is possible to insert a keyer signal from a computer logging program or external memory keyer via the ACC-1 five pin DIN connector on a line shared with PTT for voice or data modes. Unlike the competition, the internal keyer has no memory functions.

The transmit CW signal can be adjusted in rise and fall time from 3 to 10 ms with a default of 5 ms. With the default value, the keying waveform was as close to perfection as we've seen and the resulting spectrum should be delightful, especially to neighbors on adjacent channels. With this radio, the receiver won't likely tell you they are there, unless they have a clicky transmitter, and you won't bother them either — a nice approach to our flavor of air pollution control! George, W1WO, my usual Thursday night CW schedule for 34 short years, has heard many recent radio sounds from W1ZR and gave the sound of the Omni-VII an A+.

The SIDETONE frequency can be menu adjusted from 0 to 1270 Hz to suit your preference. The CW offset frequency marches in lockstep to the SIDETONE setting, as does the SPOT audio reference that allows you to align your transceiver frequency to another station.

The DSP automatic notch function is disabled in CW mode, but the very effective manual notch filter works in any mode, including CW. The width and frequency are adjustable. If the width is too narrow, it can be very touchy to adjust.

I found the 10 Hz tune encoding selection just right for casual CW (and SSB, for that matter) operation. At the FAST encoding setting (VFO ENC RATE), the resulting tuning rate is about 2 kHz/revolution. The DSP CW filter selections range from 200 to 500 Hz in 50 Hz steps, then to 1000 Hz in 100 Hz steps, and 200 Hz steps above 1000 Hz. The display shows both the DSP and intermediate IF filter bandwidths as you turn the control. We had the optional 500 Hz intermediate IF filter installed, and it automatically dropped in on any bandwidth of 500 Hz or lower (the standard 6000 and 2500 Hz filters did so at the right settings as well). I found the 1 Hz tuning rate perfect for careful tuning at the narrow bandwidth positions.

The same knob that controls bandwidth, the PBT/BW knob, can be used to select the passband tuning function. Just push the button in and it toggles between its two jobs, indicating which is in play with an LED indicator. The display indicates the amount and direction of shift in Hz.

SSB Operation

All the usual SSB bells and whistles are provided, including a smooth VOX system, speech compressor and even a transmit equalizer that can tilt the audio band from flat to up to 20 dB boost or cut of bass response. This can be useful to compensate for different mic or operator voice characteristics. A similar function is provided for receive to allow compensation for shortcomings in received signals or in your speaker system.

Table 1

Ten-Tec Omni-VII, serial number 11C10176

Manufacturer's Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive, 0.1-30, 48-54 MHz; transmit, 1.797-2.01, 3.495-4.005, 5.275-5.407, 6.995-7.305, 10.095-10.155, 13.995-14.352, 18.063-18.17, 20.995-21.452, 24.885-24.995, 27.995-29.702, 49.995-54.0 MHz.	Receive and transmit, as specified. (The receiver tunes to 100 Hz but doesn't receive that low.)
Power requirement: 13.8 V dc; transmit, 25 A (100 W out).	Receive, 2.2 A (max volume, no signal); transmit, 19 A. Tested at 13.8 V.
Modes of operation: SSB, CW, AM, FM, FSK.	As specified.
Receiver	***Receiver Dynamic Testing***
SSB/CW sensitivity, 2.4 kHz bandwidth, 10 dB S/N: preamp off, 0.5 μV; preamp on, 0.18 μV.	Noise Floor (MDS), 500 Hz filter: *Preamp off* / *Preamp on* 1.0 MHz –126 dBm / –137 dBm 3.5 MHz –130 dBm / –139 dBm 14 MHz –130 dBm / –140 dBm 50 MHz –128 dBm / –139 dBm
AM sensitivity, 6 kHz bandwidth, 10 dB S/N: preamp off, 2.5 μV.	10 dB (S+N)/N, 1-kHz tone, 30% mod: *Preamp off* / *Preamp on* 3.8 MHz 2.6 μV / 0.86 μV 50 MHz 3.3 μV / 1.1 μV
FM sensitivity, 12 dB SINAD: 2.5 μV.	For 12 dB SINAD: *Preamp off* / *Preamp on* 29 MHz 1.8 μV / 0.48 μV 52 MHz 1.8 μV / 0.53 μV
Blocking dynamic range: 20 kHz offset, 2.5 kHz IF filter: 135 dB; 2 kHz offset, 500 Hz IF filter: 130 dB.	Blocking dynamic range, 500 Hz filter:* *20 kHz Preamp off/on* / *5/2 kHz Preamp off* 3.5 MHz 137/134 dB / 134/134 dB 14 MHz 137/134 dB / 135/134 dB 50 MHz 138/137 dB / 134/134 dB
Two-tone, third-order IMD dynamic range: 20 kHz offset, 2.5 kHz IF filter, 90 dB; 2 kHz offset, 500 Hz IF filter, 78 dB.	Two-tone, third-order IMD dynamic range, 500 Hz filter: *20 kHz Preamp off/on* / *5/2 kHz Preamp off* 3.5 MHz 92/91 dB / 84/82 dB 14 MHz 91/91 dB / 84/82 dB 50 MHz 88/88 dB / 83/82 dB
Third-order intercept: 20 kHz offset, +13 dBm; 2 kHz offset, 500 Hz IF filter, +8.5 dBm.	*20 kHz Preamp off/on* / *5/2 kHz Preamp off* 3.5 MHz +11/–2.5 dBm / +6.5/+6.5 dBm 14 MHz +11/–0.5 dBm / +6.5/+6.5 dBm 50 MHz +9/0 dBm / +12/+12 dBm
Second-order intercept: Not specified.	Preamp off/on, +73/+75 dBm.
FM adjacent channel rejection: Not specified.	20 kHz offset, preamp on: 29 MHz, 74 dB; 52 MHz, 74 dB.

Manufacturer's Specifications	Measured in the ARRL Lab
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset, preamp on: 29 MHz, 77 dB; 52 MHz, 73 dB. 10 MHz offset: 52 MHz, 103 dB.
S-meter sensitivity: 50 μV at S9.	S9 signal at 14.2 MHz: preamp off, 67 μV; preamp on, 61 μV.
Receiver audio output: 2 W into 4 Ω at 3% THD.	2.0 W at 3% THD into 4 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth):** CW (500 Hz filter): 434-970 Hz (536 Hz); USB: 104-2802 Hz (2698 Hz); LSB: 105-2801 Hz (2696 Hz); AM: 76-2910 Hz (2844 Hz).
Spurious and image rejection: 70 dB.	First IF rejection, 14 MHz, 92 dB; 50 MHz, 85 dB; image rejection, 14 MHz, 116 dB; 50 MHz, 103 dB.
Transmitter	**Transmitter Dynamic Testing**
Power output: 100 W (high), 5 W (low).	CW, SSB, FM, typically 105 W high, <5 W low; AM, typ 19 W high, <2 W low.
Spurious-signal and harmonic suppression: 50 dB.	HF, 52 dB; 50 MHz, 63 dB. Meets FCC requirements.
SSB carrier suppression: 50 dB.	HF, 72 dB; 50 MHz, 70 dB.
Undesired sideband suppression: 60 dB.	HF, 75 dB; 50 MHz, 70 dB.
Third-order intermodulation distortion (IMD) products: Not specified.	3rd/5th/7th/9th order (worst case band,: HF, –27/–53/–51/–55 dB PEP; 50 MHz, –25/–45/–52/–53 dB PEP.
CW keyer speed range: 5-63 WPM.	As specified.
CW keying characteristics: Not specified.	See Figures 2 and 3.
Transmit-receive turnaround time (PTT release to 50% audio output): 20 ms.	S9 signal, 20 ms.
Receive-transmit turnaround time (tx delay): Not specified.	SSB, FM, 18 ms. Unit is suitable for use on digital modes.
Composite transmitted noise: Not specified.	See Figure 4.

Size (height, width, depth): 5 × 12 × 14.8 inches; weight, 15.4 pounds.

Price: Model 588 (Omni VII transceiver), $2550; Model 588AT (with autotuner), $2850; Model 2031 500 Hz filter for 455 kHz IF, $99; Model 302R remote keypad, $139.

Third-order intercept points were determined using S5 reference.

*The AGC OFF setting does not actually disable the AGC, but rather reduces the decay time to zero. The AGC can be effectively disabled by raising the threshold by turning down the RF GAIN control, which actually controls the AGC threshold. For the blocking test, the control was set to approximately 30 percent for preamp off and 20 percent for preamp on.

**Default values; bandwidth and cutoff frequencies are adjustable via DSP.

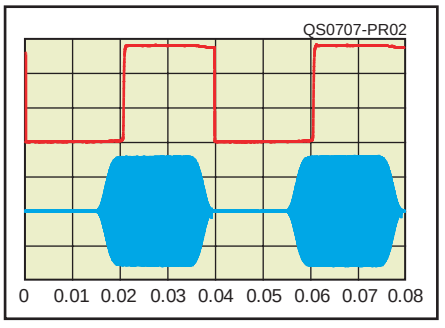


Figure 2 — CW keying waveform for the Ten-Tec Omni-VII showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. (Note that the first key closure starts at the left edge of the figure.) Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output at 14.2 MHz at the default rise time setting.

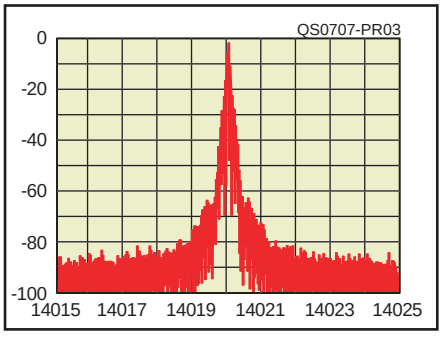


Figure 3 — Worst-case spectral display of the Ten-Tec Omni-VII transmitter during keying sideband testing. Equivalent keying speed is 60 WPM using external keying. Spectrum analyzer resolution bandwidth is 10 Hz, and the sweep time is 30 seconds. The transmitter was being operated at 100 W PEP output at 14.2 MHz at the default rise time setting.

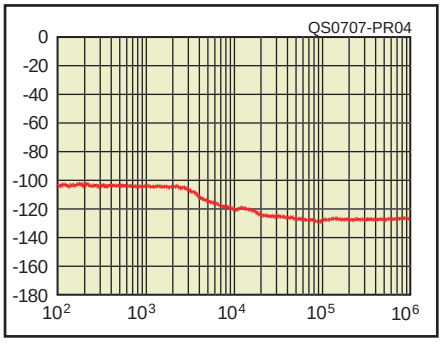


Figure 4 — Worst-case spectral display of the Ten-Tec Omni-VII transmitter output during composite-noise testing. Power output is 100 W at 14.2 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 100 Hz to 1 MHz from the carrier.

Transmit bandwidth can be MENU adjusted between 1000 and 4000 Hz in 200 Hz steps using the SB TX FILTER selection. A separate TX ROLL OFF parameter establishes the low frequency end of the transmit bandwidth. It can be from 70 to 300 Hz in 10 Hz steps. Thus if you were to set TX ROLL OFF to 200 Hz and SB TX FILTER to 2300 Hz, you would have a 2300 Hz bandwidth extending from 200 to 2500 Hz. I received reports of crisp audio using the default settings with a Ten-Tec model 706 mic

The MIC gain and SP compression buttons are on the front panel and either can be adjusted by the MULTI knob if their button is pressed. A MONitor function allows listening to your audio through headphones while you set everything up.

The AN (automatic DSP notch filter) is effective during SSB operation. It can eliminate both "tuner-uppers" and the carriers of those 40 meter shortwave broadcast stations. Nine processing levels are provided, but I found that level 1 eliminated the tone or carrier without noticeable distortion. Higher numbers just made for more distortion and, since the tone was already gone, didn't seem to provide any value.

DSP noise reduction (NR) seems to make a nice reduction in ambient noise level. As with any DSP function, give it a few seconds to "do its thing" before you decide whether or not it's helping. In this case, higher numbers do make a difference. I found mid-range numbers provided the best balance between noise reduction and distortion.

AM Operation

The Omni-VII can transmit and receive on AM. It makes a very good shortwave AM

A Look at the Field

The Omni-VII makes the third radio currently competing in the hotly contested $2500 to $3000 range. This range used to belong to the top tier of amateur transceivers, but has now transmogrified into the medium price category, with each of the manufacturers offering radios costing significantly more. Each of these radios offers 160 through 6 meter operation with a general coverage receiver and IF DSP. While fiercely competitive, these radios offer distinct choices among the models that will make each appeal to hams with particular needs and interests. I have summarized some major features and performance characteristics in Table A to make a comparison easier.

Table A

Key Differences Among the Contenders

Feature	*ICOM IC-756PROIII*	*Ten-Tec Omni-VII*	*Yaesu FT-2000*
Base Price	$2700	$2550	$2700
Power Supply	$299	$169	Internal
Dual Receiver	"Dual Watch"*	None	Yes, same band or range
Spectrum Scope	Real Time	One Shot	$1000 Option**
3.5 MHz BDR (20/5/2 kHz) dB	122/102/98	137/134/134	136/107/91
3.5 MHz 3OIMD (20/5/2 kHz) dB (Higher numbers indicate improved dynamic range)	102/78/70	91/84/82	100/84/63
Antenna Tuner SWR Range	3:1	10:1, $300 Option	3:1
Firmware Downloadable	No	Yes	Yes
Internet Remote Operation	No	Yes	No
Electronic Keyer	Iambic, w/memory	Iambic	Iambic, w/memory
Transmit Audio Equalizer	Yes	Yes	Dual, three band

*"Dual watch" allows combined reception of two frequencies through a common IF and audio channel.
**The DMU option provides a real time spectrum video output (you supply the display), as well as a list of additional features.

broadcast receiver with its range of bandwidths extending to 9 kHz for maximum fidelity, useful while listening to strong stations on clear channels. In the presence of interference, the bandwidth can be tightened up as needed, and the DSP notch and noise filters can be employed as well.

For my usual AM test, I joined in with my friends on the Antique Wireless Association (**www.antiquewireless.org**) AM net on 3837 kHz, Sundays at 4 PM. This Sunday we had horrific conditions with a major nor'easter and accompanying atmospheric noise. I was able to copy everyone that I could hear with my venerable Collins 51J-4, and the Omni's DSP filtering brought many stations comfortably out of the noise. I found by accident that a combination of noise reduction set at about 3 and auto notch at 1 made for really quiet reception, even without a carrier to notch!

On the transmit side, the Omni-VII puts out a carrier level of about 20 W, corresponding to 80 W PEP, close to what its output amplifier can handle. To get through the crummy conditions, I used my linear amplifier at a carrier output of about 120 W, similar to the output of my old Johnson Viking II I usually use. Initial reports indicated that I was not fully modulating the carrier, and I had to increase the MIC gain to 70% to get reports of appropriate modulation. This was a significant increase from the SSB setting, and there really is no way within the radio to set it up. I guess if you're a serious AM operator, you need a modulation scope to set your level — some things never change!

Digital Modes

The Omni-VII supports direct frequency shift keying (FSK) for RTTY operation. In addition, the ACC-1 connector in the rear provided LINE IN and LINE OUT connections for sound card audio, along with PTT. Ten-Tec kindly provides a cable to plug into the ACC-1 socket that terminates in five separate color coded phono connectors, making for easy hook-up to your sound card or RTTY terminal unit.

Firmware Updates

Ten-Tec provides the latest firmware for all its models on its Web site at **www.rfsquared.com**. Keeping your radio up to date couldn't be simpler. The update gets downloaded to your PC from the Internet and then, using the serial cable provided, you can update your radio painlessly in about 4 minutes. If your PC doesn't support serial connectivity, it is also possible to upgrade the software via the Ethernet connection.

In an "unscheduled experiment," I managed to lose an update somewhere in hyperspace between my PC and radio. The radio code had been erased, my PC was in a loop and I could picture sending the radio back to Tennessee for some kind of lobotomy. No problem. I stopped the process, dropped back to the last revision still on my PC, and started over. I then successfully installed the latest upgrade.

The software Web site has a revision history page, so you can determine if you need any particular upgrade. It's worth checking periodically, as the firmware updates have fixed a number of minor problems with early releases. The process doesn't write over earlier code on your PC, so you can try a new version and drop back without a problem if you prefer an earlier one. If earlier Ten-Tec software driven radios are indicative, it seems likely that third party providers might develop their own operating code, perhaps even more to your liking than what comes from Ten-Tec.

One Plug Remote Operation

Perhaps the most dramatic innovation is the ability to operate remotely via a network connection direct to the radio. This requires that you download another piece of software, the *One Plug GUI* from **www.rfsquared.com** and set it up on the PC that you want to operate from. In my case it was easy to check out — the radio was near my firewall/router in the basement and a PC upstairs is on the same network. I also confirmed operation from my ARRL office, 60 miles away, remembering to change the IP addresses as needed.

The Web site offers a manual with setup and operational information. You need to follow the directions carefully to determine IP addresses and enable ports through your firewall, but it's all spelled out clearly in the manual.

The radio can be set to either RADIO STATE or REMOTE STATE by holding down the 1 key or the 2 key on the keypad as you power up. In the RADIO STATE the radio operates from its front panel, while in the REMOTE STATE it operates from some other location via its Internet connection.

Figure 5 shows the *One Plug GUI* main screen. As is evident, on one screen you have essentially all of the options and parameters of the radio, along with all the needed network setup adjustments. It takes a little getting used to to find what you want! My guess is that more user friendly screens will be available as the radio matures, but this does work! Your PC sound card mic

Distributed Roofing Filter Architecture—What's it All About?

The Omni VII achieves very good dynamic receiver performance through a new architecture that is worth a few words of explanation. In the past, the receivers with the best close-in third order intermodulation distortion and maximum blocking dynamic range were amateur-band-only receivers, such as the primary receiver in the Ten-Tec Orion, the Elecraft K2 and earlier Ten-Tec Omni VI. A look at a typical block diagram, as shown in Figure A, makes it easy to see why. The problems resulting from strong unwanted signals near a desired one are minimized if the unwanted signals are kept out of the places in the receiver where they can be amplified even more and cause the nonlinear effects that we try to avoid.

Note that in Figure A, the only place where the desired and undesired signals all coexist is in the first mixer. If the first mixer has sufficient strong signal handling capability, the undesired signals will be eliminated in the filter immediately behind the first mixer. The later amplifier, mixer and DSP circuits only have to deal with the signal we want.[2]

Now look at a typical modern general coverage receiver as shown in Figure B. In this arrangement, a single digital synthesizer, perhaps covering from 70 to 100 MHz, shifts the incoming signal(s) to a VHF IF, often near 70 MHz. A roofing filter at 70 MHz follows the first mixer. This arrangement offers simplified local oscillator (LO) design and the possibility of excellent image rejection. Unfortunately, crystal filter technology has only recently been able to produce narrow filters for 70 MHz, and so far they have much wider skirts than the crystal filters used in the Figure A architecture. Many receivers and transceivers just set this filter bandwidth wider than any operating bandwidth and use DSP filtering much later in the signal chain to set the final operating bandwidth.

For a receiver that will receive FM and AM, as well as SSB and CW, that usually means a roofing filter with a bandwidth of 20 kHz.[3] With this arrangement, all signals in that 20 kHz bandwidth pass all the way through IF amplifiers and mixers and into the A/D converter before we attempt to eliminate them with DSP filters. By that time they have had an opportunity to generate intermodulation products and cause the blocking that we are trying to eliminate.

The Omni VII has effectively combined the two technologies. The first IF has a 20 kHz wide roofing filter at 70 MHz, followed by selectable steep skirted 455 kHz Collins mechanical filters at the second IF and then DSP filters at the third IF. Careful attention to gain in the stages between the filters maintains desired sensitivity, but not so high that the undesired products have a chance to become a serious problem. With bandwidths of 20, 6 and 2.5 kHz supplied, and 500 and 300 Hz as accessories, the undesired near in signals are eliminated before they have an opportunity to cause serious trouble. The result is a very nice, in my opinion — best of both worlds.

[2]For additional discussion of the issues, see J. Hallas, "International Radio Roofing Filters for the Yaesu FT-1000 MP Series Transceivers," Product Review, *QST*, Feb 2005, pp 76-78.

[3]Exceptions we've seen with general coverage receivers and switchable VHF roofing filters include the ICOM IC-7800 and Yaesu FTdx9000 and FT-2000 transceivers.

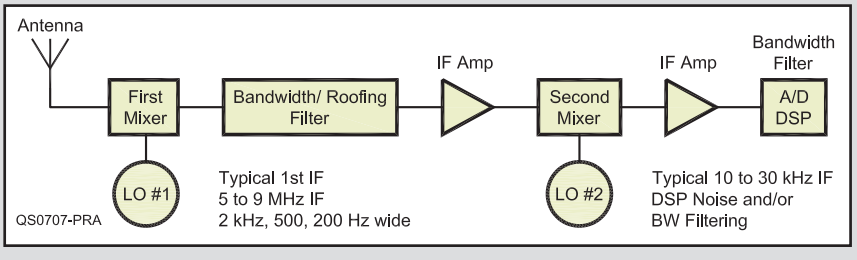


Figure A — Simplified block diagram of a modern amateur-band-only receiver.

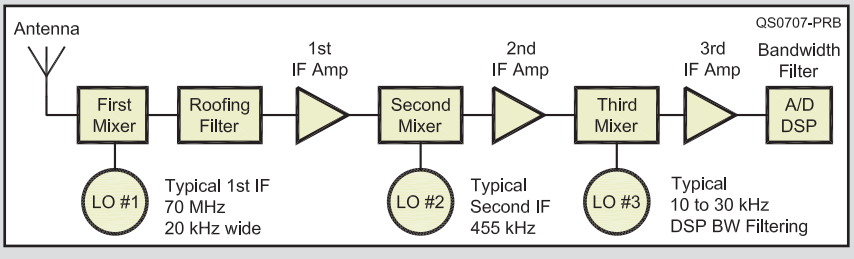


Figure B — Simplified block diagram of a modern general coverage receiver.

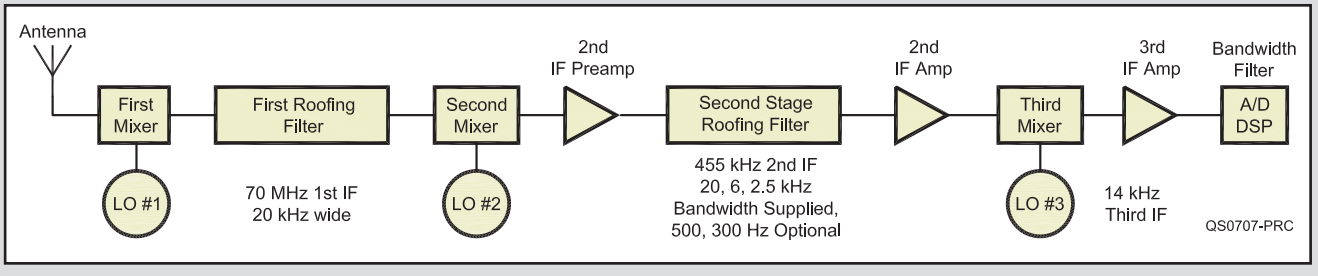


Figure C — Simplified block diagram of the Omni-VII general coverage receiver.

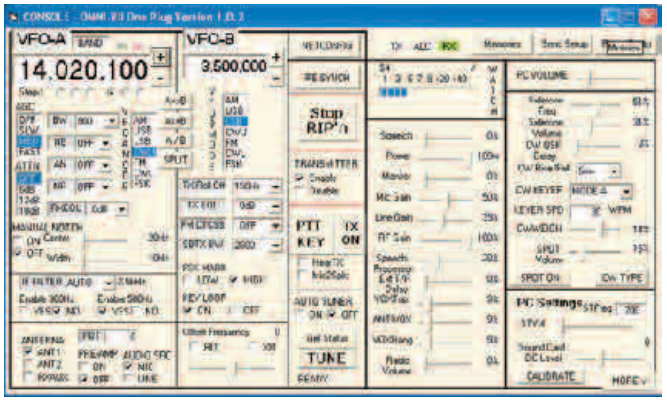


Figure 5 — The main screen from the *One Plug GUI* software. Anything you want to do is in there somewhere!

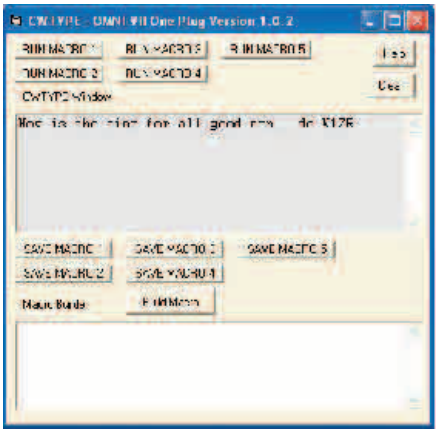


Figure 6 — Dialog box for CW TYPE from the *One Plug GUI*. The macros can speed up the process.

provides the audio, while you listen with your speakers, or a headset could be used for both. Reports on SSB were good, although there were reports of occasional warbles on my transmit audio, apparently the result of IP packet delay.

While many remote systems don't support CW because of delays, it's a Ten-Tec so of course it does more than just voice! For now, the CW transmit function is initiated via the CW TYPE button on the lower right of the screen. The dialog box in Figure 6 pops up and you can use prerecorded macros or just type in real time. Ten-Tec promises a keyer paddle adapter soon. As I noted, it would be even better if combined with a tuning knob! Remote operation with the Omni-VII will just get slicker and slicker as folks in Tennessee and elsewhere take their crack at the open source software.

Documentation

Ten-Tec provided a 39 page *Owner's Manual* with the Omni-VII. Ours is the first release dated February 2007, so revisions may appear over time and they are available on the Ten-Tec Web site. The manual starts with the usual sections about unpacking and connecting the radio, then a description of all the controls, connectors and indicators on the front panel, and then a tour of the back panel. Next, each menu operation is described, along with a discussion of the range of choices provide with each. I found all the material clear and adequate to understand any operation I wanted to undertake.

Further to the rear is a section providing "Operation Notes and Accessory Connection Examples." Included are instructions for using the optional antenna tuner, connecting and tuning a linear amplifier and optional filter installation. A discussion of the theory and use of the cascaded IF and DSP filters is provided, along with details of how to set up a properly sounding SSB transmitter. All are good and to the point. A section on updating the firmware is provided, but it is no longer current and the instructions on the *rfsquared.com* Web site, where the software is found, should be followed instead. The *One Plug* remote operation software is described in its own 42 page manual, available on the rfsquared Web site.

I found the Omni-VII quite intuitive, with few trips to the manual required. On the other hand, you will want to go through it carefully because there are functions provided that wouldn't likely occur to you. An example — if you push the tuning STEP button you get a selection of seven tuning steps to choose from in decade steps from 1 Hz to 100 kHz. That's likely what you would expect. On the other hand, without reading the manual you wouldn't likely guess that if you hold in the STEP button for 2 seconds, the tuning rate will jump to ×10.

The Omni-VII manual is in interesting contrast to another one we reviewed recently that was organized into sections depending on what you want to do ("How to Make a SSB Contact," for example), but made it difficult to find a description of a particular control. The Omni-VII manual is structured the other way around. It lets you know what each control does with the hope that you will know why you would want or need it. Each approach has its merits, depending on the intended audience, but there would be no harm in offering both with any radio. I suspect most Omni-VII purchasers will know what they want to do and just need to find the right control.

Ten-Tec's Omni-VII is a worthy successor to the Omni-VI, and it has what it takes to compete with the other HF/6 meter radios in its price range. Its new receiver architecture offers measurable improvements in close-in receiver dynamic performance, and it couldn't be easier to configure it for remote operation.

Manufacturer: Ten-Tec Inc, 1185 Dolly Parton Parkway, Sevierville, TN 37862, 800-833-7373; **radio.tentec.com**; **sales@tentec.com**. QST

Why General Coverage?

The Omni-VII, IC-756PROIII and FT-2000 transceivers all offer general coverage receivers. This is a new direction for a high performance receiver from Ten-Tec, which has heretofore used amateur-band-only receivers in high performance units for the simple reason that it is much easier to design a high performance amateur-band-only receiver than a general coverage one. One might wonder why they bothered with general coverage, since most serious hams likely have a general coverage receiver around to use if inspired to listen to the BBC or even local news and weather. I can think of two reasons:

The Omni-VII architecture and filtering design will permit transmission anywhere in the range of 1.8 to 30 MHz, with only a firmware change. This means owners of 2007 Omni-VIIs, and likely other firmware upgradeable radios, will be able to quickly refresh their radios to include any new or changed bands. This could happen at any future World Radiocommunication Conference, such as the one scheduled for 2011.

The more markets there are for a product, the lower the unit cost for all end users. Ten-Tec conducts significant government business. A transceiver that can operate anywhere in the HF region could be quickly adapted to serve other market segments. This is good both for the company, as well as the individual buyer, since development costs can be spread among different business units.

ARRL Withdraws "Regulation By Bandwidth" Petition, Plans to Refile

The ARRL has withdrawn its controversial November 2005 *Petition for Rule Making* (RM-11306) calling on the FCC to establish a regulatory regime to segment bands by necessary bandwidth rather than by emission mode. The League cited "widespread misconceptions" surrounding the petition as a primary reason for removing it from FCC consideration. The ARRL left open the option to refile the same — or a similar — petition in the future, however.

"The withdrawal of the petition will permit a full discussion and consideration of options at the July 2007 meeting of the ARRL Board of Directors," said ARRL President Joel Harrison, W5ZN. "The petition then can be recast with a better explanation of its scope and the reasons for the proposed changes."

The ARRL Executive Committee advised withdrawing the petition in April, and the ARRL Board subsequently okayed the EC's recommendation by mail vote.

That action aside, the ARRL Board continues to support the concept of regulation by maximum emission bandwidth as a way to facilitate the eventual transition from analog to digital modes. ARRL CEO David Sumner, K1ZZ, emphasized that the League seeks a regulatory framework that's "fully compatible with both narrowband and wideband analog emission modes now in common use."

Sumner expressed the hope that a refiled regulation-by-bandwidth petition would "address — and hopefully avoid — widespread misconceptions" about RM-11306, either in its original form or as amended earlier this year. Irrespective of the present controversy over the petition's proposals, he pointed out, the League repeatedly sought comment on its regulation-by-bandwidth concepts before filing its petition with the FCC.

The ARRL first sounded out the Amateur Radio community regarding regulation-by-bandwidth three years ago. A September 2004 "It Seems to Us . . ." *QST* editorial "Regulation by Bandwidth" followed, explaining the concept and its rationale. Hundreds of subsequent comments from ARRL members and others "helped to bring the issues on which the amateur community was not in agreement into focus," Sumner said.

That led to a second editorial, "Narrowing the Bandwidth Issues," in April 2005 *QST*, soliciting additional comments on the plan's most contentious points. That drew hundreds more constructive and critical comments, and all input was taken into account in developing a draft petition for the Board's consideration. Following the ARRL Board of Directors' approval of the proposal in July 2005, he ARRL filed the petition in November 2005, and the FCC put it on public notice in January 2006.

The Amateur Radio community has posted upward of 1000 comments on RM-11306. While some comments appropriately reflected concerns about the proposed substantial shift in regulatory philosophy, others tended to reflect a lack of understanding of existing rules, of the ARRL's proposals, or both. Some expressed the view that the League was attempting to promote or legitimize particular data modes, such as *Winlink*.

"The petition, in fact, had nothing specifically to do with *Winlink* or any other particular data mode," Sumner maintained. "It was, rather, a means of facilitating data experimentation, which is somewhat stifled under the current rules" that were written almost exclusively for analog modes.

A major distraction in the public debate related to automatically controlled data stations, and assertions that adopting the League's petition would permit such facilities to run roughshod over CW and other traditional modes. Sumner says automatic control is not even an essential component of the League's regulation-by-bandwidth proposals.

Revisions to RM-11306 the ARRL filed earlier this year to accommodate changes in Part 97 that occurred since November 2005 only seemed to generate additional controversy and lead to further confusion, Sumner conceded. Those revisions would have largely confined regulation by bandwidth to the VHF and UHF bands.

One misunderstanding resulting from an unintentional editorial error in the League's revisions gave rise to concerns that the ARRL's proposed 3 kHz bandwidth limitation for data emissions represented an expansion of the currently permitted maximum bandwidth. Quite the contrary, Sumner explains.

"In fact, 3 kHz bandwidth would have been a new limitation, because the present baud rate limit applies to individual carriers," he said. "Therefore, for emissions such as OFDM [orthogonal frequency-division multiplexing] that use multiple carriers, there is no effective bandwidth limit in the HF bands now." Sumner noted that under current rules, a single OFDM signal could conceivably — and legally — occupy an entire HF band.

Harrison offered assurances that the League intends to offer a "far better explanation" of the consequences of regulation by bandwidth before it files any new petition proposing that regulatory concept,"so that the misunderstandings that occurred with respect to RM-11306 do not happen again."

ARRL Submits Plan to Mitigate Repeater Interference to Military

The ARRL in April submitted an interference mitigation plan to the US Department of Defense (DoD) as part of an effort to resolve reported interference from dozens of 70 cm amateur repeaters to US military radar systems on both coasts. Since Amateur Radio is secondary to government users from 420 to 450 MHz, hams must not interfere with primary users and, under the rules, can be forced to cease operation. Earlier this year, the US Air Force asked the FCC to order dozens of repeater systems to either eliminate interference to its "PAVE PAWS" missile and satellite detection and tracking radars in Massachusetts and California or shut down.

"We are awaiting the response of the DoD representative to the proposal and will continue to provide information as to its status when it becomes available," ARRL Regulatory Information Specialist Dan Henderson, N1ND, commented at press time. The interference mitigation plan has four primary steps.

- All repeaters the DoD has identified as potential interference sources will immediately and temporarily reduce transmitter

Rick Lindquist, N1RL ♦ Senior News Editor ♦ n1rl@arrl.org

FCC News

FCC POISED TO CUT VANITY CALL SIGN FEE BY MORE THAN 40 PERCENT

The FCC has proposed reducing the regulatory fee to obtain or retain an Amateur Radio vanity call sign by more than 40 percent starting later this year. In a *Notice of Proposed Rule Making* (*NPRM*), "Assessment and Collection of Regulatory Fees for Fiscal Year 2007" in MD Docket 07-81 released April 18, the Commission proposed to cut the fee from its current $20.80 to $11.70. If ultimately adopted, that would mark the lowest fee in the history of the current vanity call sign program. The FCC proposed to collect nearly $290.3 million in FY 2007 regulatory fees. If approved the new fee would go into effect in August or September.

The vanity call sign fee has fluctuated over the 11 years of the current vanity call sign program — from a low of $12 to a high of $50. The FCC says it anticipates some 14,700 Amateur Radio vanity call sign "payment units" or applications during the next fiscal year. The vanity call sign regulatory fee is payable not only when applying for a new vanity call sign but upon renewing a vanity call sign for a new term.

Those holding vanity call signs issued prior to 1996 are exempt from having to pay the vanity call sign regulatory fee at renewal, however. That's because Congress did not authorize the FCC to collect regulatory fees until 1993. Such "heritage" vanity call sign holders do not appear as vanity licensees in the FCC Amateur Radio database. Amateur Radio licensees may file for renewal only within 90 days of their license expiration date.

The ARRL VEC processes license renewals for vanity call sign holders for a modest fee. The service is available to ARRL members and nonmembers, although League members pay less. Visit **www.arrl.org/fcc/memberlicenseinstructions.html**.

FCC'S "SMART RADIO" ORDER WELCOME NEWS FOR ARRL

In a *Memorandum Opinion and Order* (*MO&O*) on cognitive or "smart radio" systems, the FCC has affirmed its favorable policy toward the regulation of amateur software defined radios (SDRs). A cognitive radio system is an SDR that can adapt its operating parameters by interacting with its RF environment. The FCC's April 20 *MO&O* was in response to petitions seeking clarification of the Commission's March 2005 *Report and Order* (*R&O*) in ET Docket 03-108. In that proceeding, the FCC declined to adopt any new regulations for cognitive Amateur Radio transceivers or for digital-to-analog (D/A) converters. ARRL Chief Technology Officer Paul Rinaldo, W4RI, says the April *MO&O* indicates that the FCC intends to treat Amateur Radio SDRs the same as any other Amateur Radio equipment.

"This is welcome news from the FCC as it clarifies the matter of certification of amateur equipment," Rinaldo remarked. "It applies not only to terrestrial amateur equipment but also to amateur satellites, which increasingly are using SDR in their designs." AMSAT-NA has announced it's revamped the design of its Project Eagle satellite to take maximum advantage of software defined transponder (SDX) technology.

The "cognitive radio" proceeding epitomizes the FCC's ongoing struggle to address thorny regulatory issues as it attempts to keep pace with cutting-edge technology. In its 2005 *R&O*, the FCC concluded that neither software programmable amateur transceivers nor high-speed D/A converters "present any significantly greater risk of interference to authorized radio services" than conventional hardware radios.

April's *MO&O* was in response to petitions from Marcus Spectrum Solutions (MSS), owned by Mike Marcus, N3JMM, a former FCC staffer and a member of the ARRL Software Defined Radio Technology Working Group, and from Cisco Systems. While the League was satisfied that the FCC's 2005 *R&O* had exempted Amateur Radio SDRs from its certification requirement, MSS felt the *Order* was ambiguous and sought further assurances.

In response, the FCC said it "did not intend to impose any new certification requirements for Amateur Radio equipment" in its 2005 *R&O*, including SDR equipment that may be modified by someone other than the manufacturer. The Commission noted, however, that external RF amplifiers operating below 144 MHz and marketed for amateur use "will continue to require certification before they can be marketed."

MSS also requested a *Further Notice of Proposed Rule Making* with respect to D/A devices. Marcus predicted that if high-power, high-speed D/A converters with antenna-like connectors ever became readily available, it could bypass the entire FCC equipment certification program and open the door to D/A-equipped computers capable of operating on any frequency. The FCC declined to act on Marcus's request, saying MSS did not "demonstrate any current need for regulation of D/A converters."

The FCC reiterated that it "may revisit the issue of the certification of amateur equipment with software modifiable features in the future, if misuse of such devices results in significant interference to authorized spectrum users."

ARRL General Counsel Chris Imlay, W3KD, expressed confidence that it would not prove necessary for the FCC to revisit the issue, however, "as no misuse of amateur SDR technology is anticipated."

Cisco had asked the FCC to revise its rules to better specify those classes of devices that do not require SDR certification.

In response, the FCC revised §2.1(c) its rules to state that only radios with software "designed or expected to be modified by a party other than the manufacturer" — such as downloading from the Internet — and that would affect frequency range, modulation type, maximum power output or the circumstances under which the transmitter operates legally, would have to be certified as SDRs.

Amateur Enforcement

♦ **FCC terminates hearing, denies application in "license hijacking" case:** The FCC has terminated with prejudice a hearing proceeding involving a case of apparent ham radio identity theft. The FCC has said its evidence suggests that Joseph W. Hartmann Jr of Lansing, Michigan, "intentionally submitted fraudulent administrative updates" to obtain the privileges associated with the General class license of a Delaware radio amateur with a very similar name. In a *Memorandum Opinion and Order* (*MO&O*) released March 23, the FCC further ruled to dismiss with prejudice Hartmann's pending new Amateur Radio

power output (TPO) to 5 W.

● The ARRL will conduct Longley-Rice studies on each repeater system to determine what further mitigation techniques might apply to individual repeaters. These could include relocating the system, the use of directional antenna systems to create nulls towards the PAVE PAWS site, permanent power reductions or a combination of these techniques.

● The DoD will review ARRL's studies to determine if the proposals will meet its unspecified field strength requirements to mitigate the potential interference satisfactorily.

license application, which he filed after the FCC questioned his attempts to change the Delaware ham's record in the Universal Licensing System (ULS). After several apparently unsuccessful attempts to deliver a *Hearing Designation Order* (*HDO*) to Hartmann and even affording him more time to file a written appearance, Hartmann sent Presiding Administrative Law Judge Arthur I. Steinberg three identical e-mail messages.

"Mr Steinberg I am writing you in regards to this letter. I do not have the resources to obtain legal counsel for this hearing nor have the resources for driving to hearing in Washington.D.C," the FCC quoted Hartmann, noting that capitalization, punctuation, spelling and spacing were reproduced as they appeared in Hartmann's e-mails. "is there another way we can please have a phone conference in regards to this matter. please write back with your reply."

Several pieces of Certified Mail, Return Receipt Requested to Hartmann came back to the Commission as unclaimed, the FCC recounted in its March *MO&O*. "Interestingly, neither of the regular First Class Mail envelopes sent to Mr Hartmann's Lansing, Michigan, addresses has been returned," the Commission noted.

The FCC had put Hartmann's January 2006 application for an Amateur Radio license on hold while it was looking into why he'd filed a half-dozen administrative updates during 2005 seeking to change the name and address of Joseph V. Hartman Sr, K3GUX, of Oceanview, Delaware, to his own name and address.

In its March *MO&O*, the FCC declined to accept Hartmann's e-mails to Judge Steinberg as a proper written appearance, because he did not file in accordance with FCC rules. Consequently the Commission dismissed the hearing proceeding and Hartmann's pending Amateur Radio application with prejudice "for failure to prosecute."

The FCC scheduled a hearing on Hartmann's January 2006 Amateur Radio license application after deciding that his alleged actions had raised "a substantial and material question of fact as to whether he possesses the requisite character qualifications to be a Commission licensee."

US AIR FORCE

A PAVE PAWS radar site.

● Once the DoD reviews and approves the proposals, the ARRL will provide the recommendations to respective repeater frequency coordinating groups and the FCC.

The situation affects 15 repeaters within less than 100 miles of Otis Air Force Base on Cape Cod, Massachusetts, and more than 100 repeaters within some 140 miles of Beale Air Force Base near Sacramento, California. PAVE PAWS facilities occupy essentially the entire 70 cm band — one factor that makes mitigation difficult.

Henderson said repeater owners and trustees bear the ultimate responsibility for implementing any mitigation proposals or developing alternatives that protect the radar systems to the same extent.

"Although ARRL has no means to compel compliance with the mitigation strategies, each repeater is absolutely obligated not to interfere with these radars," he emphasized. "Failure to implement the mitigation strategy or otherwise eliminate interference attributed to an individual repeater will result in immediate FCC action."

Henderson pointed out that the FCC is aware of and monitoring this situation and will act as necessary to protect the radars from interference. He stressed, however, that the US military is aware of the critical role Amateur Radio repeaters play in disasters and emergencies, and a wholesale shutdown of US 70 cm Amateur Radio activity is not under consideration.

A US Air Force contractor identified the allegedly problematic repeater systems last summer, but the situation didn't become critical until the Air Force contacted the FCC in March. ARRL officials met with Defense Department representatives later that month to discuss alleged interference to the PAVE PAWS radar sites.

Contact Dan Henderson, N1ND, **n1nd@arrl.org**; 860-594-0236, with specific questions or issues associated with this situation.

RED CROSS, ARRL DISCUSS BACKGROUND INVESTIGATIONS

Amateur Radio Emergency Service (ARES) members who volunteer to support communications for American Red Cross disaster relief or recovery operations would only have to submit to a Red Cross background check if their stints extended beyond seven days. That was the word from Red Cross officials, who met this spring with ARRL representatives. The ARRL has expressed concerns about the Red Cross's background check policy since first learning of it last year and posted its most recent position statement on the topic, **www.arrl.org/announce/ARRL-ARC-bg-check.html**, in March.

ARRL General Counsel Chris Imlay, W3KD, and Chief Technology Officer Paul Rinaldo, W4RI, met March 20 at American Red Cross offices in Washington, DC, with two attorneys from the Red Cross General Counsel's office and two management-level staff members from Red Cross Disaster Services. The position of the Red Cross is that ARES volunteers would not be permitted to provide communications at an American Red Cross disaster site for more than seven days without submitting to the Red Cross background check procedure.

Discussion then turned to the Red Cross's announcement that it would not conduct credit or mode-of-living checks. The League's stated concern has been that the ARC background investigation consent form states that a consumer report and/or an investigative consumer report — which includes certain credit checks and mode of living checks — will be obtained on the volunteer signing the form.

The ARRL asked if the Red Cross would be willing to modify its consent form to limit the authority granted by the person signing the form to criminal background checks only. The Red Cross representatives did not appear willing to do that, however. The ARRL also suggested alternatives to the Red Cross investigation firm, MyBackgroundCheck.com (MBC).

The Red Cross also appeared unenthusiastic about accepting background checks conducted by other entities, such as law enforcement organizations. The organization based its reluctance on a requirement to compare the methodologies of MBC with those of

alternative background-check providers.

Following the meeting, the ARRL reiterated its recommendation that members carefully review any consent document permitting a private organization to conduct a background investigation on that individual. The current Red Cross background check consent form includes permission, without further consent from the volunteer, to conduct a consumer report and/or an investigative consumer report. The Federal Trade Commission and federal statutes define "investigative consumer reports" to include a mode-of-living check as well as certain credit checks.

While the Red Cross has expressed assurances that it will not routinely pull credit reports on background check applicants, ARRL President Joel Harrison, W5ZN, has countered that just requiring volunteers to authorize procurement of a credit report "is inconsistent with this assurance."

In the course of the background check application process, prospective volunteers must agree to let MBC obtain a wide range of personal information bearing not just on criminal background and creditworthiness but, MBC says, "character, general reputation [and] personal characteristics." MBC advises, "The nature and scope of this disclosure and authorization is all-encompassing."

The ARRL says it won't suggest which organizations or agencies Amateur Radio volunteers should or should not support, but the League stresses that it does wish to facilitate the provision of volunteer services. The *Statement of Understanding* between ARRL and the Red Cross is up for review this year.

FIRST GOLDFARB SCHOLARSHIP RECIPIENT WINS RESEARCH FELLOWSHIP

ARRL member Ben Schupack, NW7DX, the first-ever recipient of the prestigious ARRL Foundation William R. Goldfarb Memorial Scholarship, has won a $120,000 graduate research fellowship from the National Science Foundation (NSF). The stipend will enable Schupack, a recent graduate of Whitman College in Washington, to undertake three years of research in Iceland and Greenland. Schupack said he plans to take Amateur Radio gear along when he heads into the field.

WHITMAN COLLEGE

Ben Schupack, NW7DX, in the field.

"My graduate studies will not involve radio directly, but I will continue my involvement on the air, and I anticipate bringing along radio equipment to my proposed field sites in Iceland and Greenland," he told ARRL.

A geology and environmental studies major, Schupack, 22, plans to attend the University of Colorado — Boulder in the fall, where he will be working within the Institute of Arctic and Alpine Research (INSTAAR). His research will focus on the interaction between volcanic eruptions and Arctic climate variability, and he expects to undertake ice-core and lake-core field work in Iceland and Greenland.

Schupack says he believes Amateur Radio played a role in his getting the NSF award. In one application essay, he mentioned his interest in Amateur Radio and the infinite questions that stem from studying Earth sciences. "The atmosphere, geomagnetic variations and solar conditions are among just a few of the many threads that help unravel Earth's history and predict future dynamics," he explained.

His background in electronics and ham radio already has come in handy on countless occasions, from installing remote solar panels to measuring battery discharge cycles and interpreting ground-penetrating radar surveys, he said.

The Goldfarb award is the result of a generous endowment from the late William Goldfarb, N2ITP. For more information about ARRL scholarships, visit the ARRL Foundation scholarships Web page, **www.arrlf.org/programs/scholarship**. — *some information from Whitman College*

ARRL SENIOR NEWS EDITOR RICK LINDQUIST, N1RL, RETIRES

ARRL Senior News Editor Rick Lindquist, N1RL, retired from the Headquarters staff June 1. ARRL Assistant Editor Khrystyne Keane, K1SFA, has been named ARRL News Editor. Lindquist, 62, came to the League from *The Roanoke Times* in Southwest Virginia 12 years ago.

ARRL Senior News Editor Rick Lindquist, N1RL, retired June 1.

He began his Headquarters tenure as *QST* "Product Review" editor while juggling ARRL News Bureau duties on the side. A couple of years later, he shifted to covering Amateur Radio news fulltime as part of the League's initiative to feature news and features on its Web site.

"It's been a great ride, but it's time to dial things back several decibels," said Lindquist, who lives with his wife Jean Collier, N1MJC, in Feeding Hills, Massachusetts. "For starters, I hope to get on the air more frequently." A radio amateur for 49 years, he's also is a mobile CW, contesting, vintage radio and boating enthusiast.

During his time at League Headquarters, Lindquist has prepared and edited the "Happenings" news column for *QST* plus most of the news items and announcements appearing on the ARRL Web site. In addition, he compiled and edited *The ARRL Letter* each week. The former radio and TV broadcaster also voiced, edited and produced *ARRL Audio News*, a Web/podcast he launched in 1997, and he has edited several Web site columns. Lindquist will continue his association with the ARRL as a freelance writer/editor. He will also take over from Keane as Managing Editor of *National Contest Journal* (*NCJ*).

ARRL CEO David Sumner, K1ZZ, said, "Rick's newspaper experience, writing talent and longtime Amateur Radio involvement combine to give him a great ability to grasp what's important and communicate it to readers. We're fortunate that we will be able to continue to call on him."

ARRL Chief Operating Officer Harold Kramer, WJ1B, said it's been his privilege to work with Lindquist. "Rick has been our news editor and reporter through many of the major events in Amateur Radio, including 9/11, Katrina, and the elimination of the Morse code requirement," Kramer noted. "He has been the print and audio voice of the ARRL both during these events and he has reported them accurately, incisively and engagingly."

An ARRL Life Member, Keane joined the Headquarters staff in 2006. She and her husband, Michael, K1MK, live in Watertown, Connecticut, and she holds a General class license.

ARRL News Editor Khrystyne Keane, K1SFA.

Keane is a graduate of Stephen F. Austin State University in Texas, which she's honored with her call sign. The mother of two has previously led political campaigns in Connecticut, worked for the Boy Scouts of America and headed up the news department for her local newspaper.

At ARRL Headquarters, Keane has prepared and edited feature articles and columns for the ARRL Web site as well as for *QST* and for *NCJ*. She also has been a contributor to *ARRL Audio News*, which she's taken over as part of her news duties.

PRESIDENT RECOGNIZES RADIO AMATEUR'S DEDICATION

President George W. Bush has honored ARRL member Randy Hatfield, AG6RH, of Victorville, California, with the President's Volunteer Service Award. A volunteer with the City of Victorville Community Emergency Response Team (CERT) and Emergency Communication Service, Hatfield met briefly with the president April 4 to receive the award. President Bush honors local volunteers as he travels throughout the United States. When

WHITE HOUSE

President George W. Bush honored ARRL member Randy Hatfield, AG6RH, with the President's Volunteer Service Award.

a call came from the White House, Hatfield at first thought he was the victim of an April Fool's Day prank by ECS Coordinator Robert Barton, W7OES, who had nominated Hatfield for the award a few days earlier. But it was for real. At the appointed hour on April 4, Hatfield stood on the tarmac to greet the president as he disembarked from Air Force One.

Hatfield has logged more than 500 hours of volunteer service over the past 12 months. The award recognizes his volunteer work with CERT, a Citizen Corps program that trains volunteers in basic response skills such as fire safety, light search and rescue and disaster preparedness. In his volunteer work with ECS, which uses Amateur Radio volunteers to assist city and county personnel in the event of a disaster or emergency, Hatfield has taught ham radio classes to community members. Over the years, Hatfield estimates, he's helped some 350 individuals to get their ham radio tickets.

In his nomination letter, Barton praised Hatfield for inspiring others by example to also volunteer their time and receive CERT and Amateur Radio training. "His classes provide hands on and practical applications to the materials taught," Barton said. "Randy has made service to his community a priority in life by volunteering his time and talents," Barton concluded.

SECTION MANAGER ELECTION RESULTS

In the only contested Section Manager race in the spring election cycle, Sterling Eanes, AK1K, was elected to a second term as ARRL New Hampshire Section Manager. He received 277 votes, while challenger Russell Santos, K1TSV, polled 236 votes. Ballots were counted May 22 at ARRL Headquarters.

A radio amateur since 1962, Eanes has a keen interest in emergency communications and Field Day. He also offers a training program for those who climb towers and provide ground support, so they can put up towers and antennas safely and efficiently.

Elsewhere, John Dyer, AE5B, has returned to the West Texas Section Manager's post he once held, succeeding SM Bill Lawless, W5WRL, who did not run for a new term. Dyer, who ran unopposed, served as West Texas SM from October 2002 through June 2005.

Several incumbent SMs faced no opposition in their bids for new terms and were declared elected. They were: Bob Beaudet, W1YRC, Rhode Island; Jim Cross, WI3N, Maryland-DC; Dick Flanagan, K7VC, Nevada; Charles McConnell, W6DPD, San Joaquin Valley; and Mel Parkes, NM7P, Utah.

Terms for all successful candidates in the current election cycle begin July 1.

In Brief

- **ARRL greets radio amateurs, visitors at broadcasters' convention:** The ARRL had a presence at the National Association of Broadcasters (NAB) Convention, April 14-19 in Las Vegas. The gathering annually attracts more than 100,000 broadcasting and electronic media industry representatives. Las Vegas volunteer Stan Perkins, W7SLP, ARRL Pacific Division Director Bob Vallio, W6RGG, and others from near and far staffed the League's exhibit to inform attendees about Amateur Radio's service to the public. The NAB generously provided space for the League's booth, which attracted hams and non-hams alike. Several visitors expressed an interest in becoming licensed — or re-licensed. Audio guru Bob Heil, K9EID, of Heil Sound Ltd sponsored the popular Wednesday evening ham radio reception.

- **AMSAT 2007 Space Symposium and General Meeting set:** The 2007 AMSAT-NA Space Symposium and General Meeting will take place Friday through Sunday, October 26-28, in Pittsburgh, Pennsylvania. The Wireless Association of South Hills Amateur Radio Club will host for this year's event. The 2007 Space Symposium wants to reach out to middle and high school students. In connection with this initiative, a fully operational satellite station will be available on site. — *AMSAT News Service*

- **ARRL congratulates centenarian member:** The ARRL has extended its congratulations to League member Harvey Baalke, W9HNX, of Sheboygan, Wisconsin, who celebrated his 100th birthday March 23. Wrote ARRL CEO David Sumner, K1ZZ, on the League's behalf: "Please accept belated congratulations on behalf of the Board, staff and your fellow members of the ARRL. I know you have seen many changes since you were first licensed. One thing that has not changed is the unique camaraderie among radio amateurs of different generations and cultures." Baalke first joined the ARRL in 1936.

SECTION MANAGER NOMINATION NOTICE

To all ARRL members in the Alabama, Alaska, Delaware, East Bay, Kansas, Michigan, New Mexico, Santa Barbara, Tennessee and Western Massachusetts sections: You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 16 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. (Petition forms FSD-129) are available on request from ARRL Headquarters but are not required. A sample nomination form is available on the ARRL Web site, **www.arrl.org/FandES/field/org/smterms.html#sample.**

We suggest the following format:
(Place and Date)
Membership and Volunteer Programs Manager, ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL Section of the _____ Division, hereby nominate _____ as candidate for Section Manager of this section for the next two-year term of office.

(Signature___ Call Sign___ City___ ZIP___)

Any candidate for the office of Section Manager must be a resident of the Section, an Amateur Radio licensee of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a nominating petition. Petitions must be received at Headquarters by 4 PM Eastern Time on September 7, 2007. If more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before October 1, 2007, to full members of record as of September 7, 2007, which is the closing date for nominations. Returns will be counted November 20, 2007. Section Managers elected as a result of the above procedure will take office January 1, 2008.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning January 1, 2008. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the January 2008. *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Membership and Volunteer Programs Manager. — *David Patton, NN1N, Membership and Volunteer Programs Manager*

SM Nomination Resolicitation:

Since no nomination petition was received for the Northern New Jersey Section Manager election by the nomination deadline of March 9, 2007, nominations are hereby resolicited. See above for details on how to nominate. QST

Nominees Sought for ARRL Board of Directors

If you're a full ARRL member in one of the following five divisions and are interested in playing a part in the League's democratic organization, here's the opportunity. Nominations are open for the offices of director and vice director for the 2008-2010 term in the Pacific, Rocky Mountain, Southeastern, Southwestern and West Gulf divisions.

ARRL Divisions

The policies of the League are established by 15 directors who are elected to the Board on a geographical basis to represent their divisions and constituents (see page 15 of any recent *QST* for a list of the divisions, directors and vice directors). These 15 directors serve for three-year terms, with five standing for election each year.

Just as in national or state politics, ARRL voters/members have the privilege and responsibility to decide that they like the actions of their incumbent representatives and support them actively for reelection or to decide that other representatives could do a better job, and to work for the election of those persons. Vice directors, who succeed to director in the event of a midterm vacancy and serve as director at any Board meeting the director is unable to attend, are elected at the same time.

Call for Nominations

Nominations are open for director and vice director in the five divisions mentioned above for the three-year term beginning at noon January 1, 2008.

How to Nominate

1. *Obtain official nominating petition forms*. This package consists of a cover letter; a reprint of this election announcement; blank Official Nominating Petition forms and Candidate's Questionnaires for the offices of director and vice director; a copy of the ARRL Articles of Association and Bylaws; and an informational pamphlet for candidates.

Any full member residing in a division where there is an election may request an official nominating petition package. You don't need to be a candidate to request the forms. Your request for forms must be received by the Secretary *no later than noon Eastern Time on Friday, August 10, 2007*. There are separate forms for director and vice director nominations.

2. *Submit petition with statement of eligibility and willingness to serve*. Official forms bearing the *signatures of 10 full members of the division* and naming a full member of the division as a candidate for director or vice director, must be submitted, with a statement *signed by the candidate* attesting to his or her eligibility, willingness to run and willingness to assume the office if elected. These documents must be filed with the secretary *no later than noon Eastern Time on Friday, August 17, 2007*. Only original documents can be accepted; *no facsimiles of any kind are acceptable*. On Monday, August 20, 2007, the secretary will notify each candidate of the names and call signs of each other candidate for the same office. Candidates will then have until Friday, August 31, 2007, to submit 300-word statements and photographs, if they desire these to accompany the ballot, in accordance with instructions that will be supplied.

3. *Ethics and Elections Committee to certify eligibility*. In accordance with the Bylaws, an Ethics and Elections Committee, composed of three directors not subject to election this year, is responsible for the conduct of the election. This year, the Ethics and Elections Committee consists of Tom Frenaye, K1KI (chair); Bruce Frahm, KØBJ, and Henry R. Leggette, WD4Q.

The nominee must be at least 21 years of age and have been licensed and a full member of the League for a continuous term of at least four years immediately preceding nomination. No person is eligible whose business connections are of such nature that his or her influence in the affairs of the League could be used for his or her private benefit or would materially conflict with the activities or affairs of the League. The primary test of eligibility under this portion of the Article shall be full compliance with the Articles, Bylaws and Rules and Regulations of the League relating to ethics, elections and conflicts of interest.

Balloting Will Follow

If there is only one eligible candidate for an office, he or she will be declared elected by the Ethics and Elections Committee. Otherwise, ballots will be sent to all full members of the League in that division who are in good standing as of September 10, 2007. (You must be a licensed radio amateur to be a full member.) The ballots will be mailed not later than October 1, 2007 and, to be valid, must be received at HQ by noon Eastern Time on Friday, November 16, 2007. A group of nominators can name a candidate for director or vice director, or both, but there are no "slates," as such. Each candidate appears on the ballot in alphabetical order. If a person is nominated for both director and vice director, the nomination for director will stand and that for vice director will be void. A person nominated for both offices does have the option, however, of declining the higher nomination and running for vice director if he or she wishes. Because all the powers of the director are transferred to the vice director in the event of the director's death, resignation, recall, removal outside the division or inability to serve, careful selection of candidates for vice director is just as important as for director.

Absentee Ballots

All ARRL members licensed by the FCC, but temporarily residing outside the US, are eligible for full membership. Members overseas who arrange to be listed as full members in an appropriate division prior to September 10, 2007, will be able to vote this year where elections are being held. Members with overseas military addresses should take special note of this provision; in the absence of information received to the contrary, ballots will be sent to them based on their postal addresses. Even within the US, full members temporarily living outside the ARRL division they consider home may have voting privileges by notifying the Secretary prior to September 10, 2007, giving their current *QST* address and the reason that another division is considered home. If your home is in the Pacific, Rocky Mountain, Southeastern. Southwestern and West Gulf divisions but your *QST* goes elsewhere, let the ARRL Secretary know as soon as possible, but no later than September 10, 2007, so you can receive a ballot from your home division.

The Incumbents

These people presently hold the offices of director and vice director, respectively, in the divisions conducting elections this year:

Pacific — Bob Vallio, W6RGG and Andy Oppel, N6AJO

Rocky Mountain — Warren G. "Rev" Morton, WS7W and Brian Mileshosky, N5ZGT

Southeastern — Frank M. Butler Jr, W4RH and Sandy Donahue, W4RU

Southwestern — Richard J. Norton, N6AA and Edward J. "Ned" Stearns, AA7A

West Gulf — Coy C. Day, N5OK and Dr. David Woolweaver, K5RAV

For the Board of Directors:

May 22, 2007

David Sumner, K1ZZ
Secretary

2006 Simulated Emergency Test Results

In the spirit of readiness, and with continued motivation to prepare for emergencies, radio amateurs across the country took part in the 2006 ARRL Simulated Emergency Test in their own Sections, states and communities. The main SET weekend was October 7-8, 2006, but many groups and Sections took advantage of the chance to hold their exercises on another date throughout the autumn season to allow for more participation and better cooperation with served agencies. Thanks to all those who are active in public service and emergency communications! The following articles and SET results really do demonstrate that Amateur Radio is there "when all else fails."

West Virginia's Scenario Sees Success

Tina Clark, K8TAC
West Virginia Section Emergency Coordinator

What a great experience the SET was! I am still in awe! We had 23 of West Virginia's 55 counties participating. A couple of Virginia counties, Ohio counties and even a county in Tennessee checked in to the HF Mountain State Emergency Net that was activated for the purpose of the SET.

An influenza pandemic set the stage for the state-wide scenario. I gave the plans to the ECs, DECs and Assistant EC. The net was activated around 10 AM, and all stations were secured by 1:15 PM. Local VHF nets were up and going. Some operators were at their county EOCs (Emergency Operation Centers), while others gathered at schools, shelters and such. We passed formal written traffic and tactical messages, and all messages sent via the HF net were received appropriately. We used relay stations, since conditions on 75 meters were not very good. We learned a lot and we had fun! We were professional, and we used our resources appropriately. All in all, it was a great experience.

Lee County (Florida) Called to Action

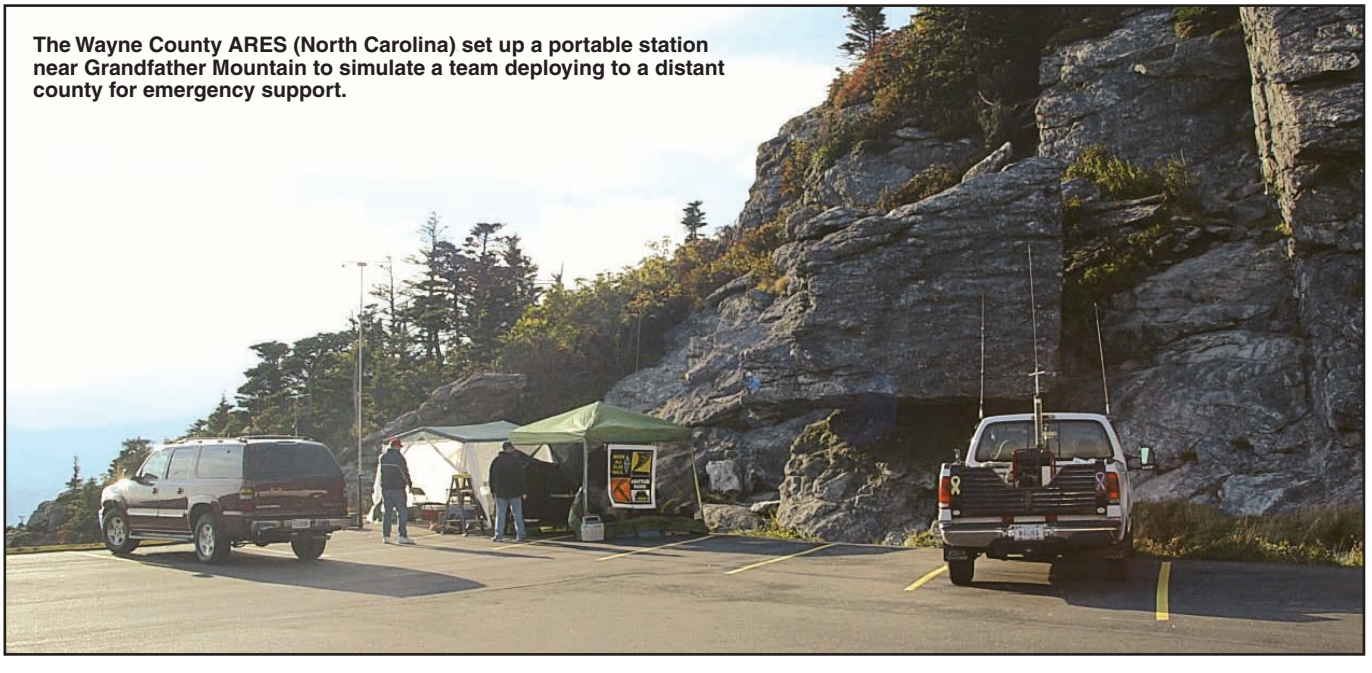
Dave Penezic, WA4GUK
ARRL Emergency Coordinator, Lee County, Florida

On Saturday, September 30, I called CQ for the All Lee Emergency Response Team (ALERT) at 9 AM. For the next three hours, several dedicated members of ALERT took part in an emergency activation. A simulation of a train-versus-semi trailer crash at the Ten Mile canal and Colonial Boulevard intersection provided substance for this group of Amateur Radio operators to practice and show their expertise in providing emergency communications for the general public.

2006 SET Top Ten

Section	*Points*	*Section*	*Points*
ARES Activity		**Section/Local Nets**	
Michigan	5744	Wisconsin	1983
Virginia	4476	North Carolina	1745
Wisconsin	3755	Michigan	1357
North Carolina	3563	Ohio	986
Western Washington	3529	Western New York	836
Ohio	2112	Louisiana	521
Louisiana	1561	North Texas	352
Illinois	1492	Virginia	318
Georgia	1139	Illinois	305
Southern New Jersey	1136	Vermont	279

BILL DUNHAM, KE4UKG



The Wayne County ARES (North Carolina) set up a portable station near Grandfather Mountain to simulate a team deploying to a distant county for emergency support.

Steve Ewald, WV1X ♦ Public Service Specialist ♦ sewald@arrl.org

BOB JONES, W5BJ

Bill Engle, KE5DHY, maintained HF communication with the State of Texas Emergency Operations Center and the State Department of Public Services in eastern and northern Texas during the Garland (Texas) ARES/RACES SET.

BOB JONES, W5BJ

Ralph Brown, KA5KVF, is shown setting up the generator at the Garland Emergency Communications Center. Their ARES/RACES team simulated a severe ice storm that created havoc to communications and the city's electrical power grid.

SET Scorecard

The points for ARES activity were awarded in the following manner:

Category		*Points*
A)	Number of amateurs participating	2 (each)
B)	Number of new amateurs (licensed on or after 1/1/2002)	3 (each)
C)	Number of formal third party messages originated on behalf of served agencies	1 (each)
D)	Tactical communication was conducted on behalf of served agencies: (<0.5 hour, 5 points; 0.5-1 hour, 10 points, >1 hour, 20 points)	
E)	Number of stations on emergency power during test	2 (each)
F)	Number of emergency-powered repeaters used in test	10 (each)
G)	Dual membership in ARES and RACES is encouraged	10
H)	Liaison was maintained with an NTS section/local net	10
I)	Digital modes were used during test	10
J)	Number of different agencies for which communication was provided.	5 (each)
K)	Number of communities in which agencies were contacted	10 (each)
L)	Press release was submitted	10

The points for net activity were awarded in the following manner:

A)	Total number of messages handled.	1 (each)
B)	Number of different stations participating	2 (each)
C)	Number of different stations checking-in on emergency power	2 (each)
D)	Number of new amateurs (licensed on or after 1/1/2002) in test	3 (each)
E)	Number of net control stations	5 (each)
F)	Number of different stations performing NTS liaison	5 (each)

2007 SET on the Schedule

October 6-7 2007, is the main weekend to focus on for this year's SET. Please contact your local ARRL Field Organization leaders to find out specific dates, times and potential plans for the Simulated Emergency Test in your area. Thank you!

Mike Meehan, KI4PTZ, wrote the scenario. It involved a crash between the train and tanker during a violent Southwest Florida thunderstorm. At the time of the crash, a bolt of lightning took out the communications capability of the tower at the EOC on Ortiz Avenue in Fort Meyers. The crash created a hazardous material condition, as the train was to have been carrying fertilizer; the truck had a load of diesel fuel. The simulated rupture of both loads and their mixture created an explosive situation with the nitrates, the fertilizer and the fuel oil.

ALERT members filled communications positions at hospitals, school shelters, the American Red Cross, Lee County EOC, a remote command post and a fire station. An emergency antenna crew put up a tower trailer to support the operation. All of the actual transmission took place from individual operators' homes.

Communication for the scenario included obtaining medical aid to the scene for injured crash victims, coordination of evacuation of people in the affected area, setting up shelters at local schools and obtaining food and water for the sheltered people and workers at the crash site. There were also messages sent outside of the Lee County using the National Traffic System.

Individual stations had scripted events to put into play as the scenario unfolded. Each station was also given a charge to add other events that would simulate a real-life event of this type. All members of the team performed at their respective stations well. Minor problems were corrected, and the drill provided an educational experience for all involved.

We made announcements throughout the exercise that the situation was a simulation and not a real event. This was done so that anyone listening with a scanner or receiver would not panic and/or call 911, creating a problem for emergency operators.

Columbia County (Wisconsin) Activates

Richard Green, KC9FNM

Columbia County (Wisconsin) ARES/RACES had an excellent 2006 Simulated Emergency Test. I activated the calling tree at 8 AM, directing members to come to the county EOC; soon after, we started a resource net on our repeater. At around 8:30, we took roll call at the EOC and explained the full exercise.

We added to the state's scenario of a biological attack. In our scenario, we said that drinking water supplies around the county had been compromised, and people were quickly getting sick. In the scenario, local hospitals would be overrun with sick people and worried residents. At this point, our members were paired up and given instructions on where to go around the county.

We activated our radio room in the county's 911 dispatch center, and several members took turns being Net control from the radio room during the exercise. We also activated our communications truck that had been donated by the county.

ARES Activity

Area	Reporter	Points	Section Points
Atlantic Division			
Eastern Pennsylvania			**193**
Lebanon Co	K3BFD	193	
Maryland-DC			**202**
Anne Arundel Co	N3SEO	152	
Frederick Co	N8AAY	50	
Southern New Jersey			**1136**
Mercer Co	KB2EGI	357	
Cape May Co	N2EWT	187	
Ocean Co	WX2NJ	185	
Salem Co	AA2WN	121	
Cumberland Co	N2MHO	117	
Gloucester Co	N2AYK	99	
Burlington Co	W2RDS	70	
Western New York			**1027**
Chenango Co	K2DAR	288	
Onondaga Co	WA2PUU	247	
Herkimer Co	N2ZWO	137	
Oneida, Madison Co	AB2QZ	117	
Monroe Co	WY7Q	112	
Wyoming Co	KC2MVC	80	
Erie Co	N2WLS	46	
Western Pennsylvania			**117**
Fayette Co	KA3WOI	117	
Central Division			
Illinois			**1492**
Lake Co	K9DRH	412	
Will Co	N9UEB	233	
St Clair Co	WA9TZL	219	
LaSalle Co	KF9NZ	175	
Wabash Co	AJ9H	145	
Ogle Co	W8MQ	109	
Suburban Cook Co	N9NL	82	
Palentine	KB9YQX	82	
Marion Co	W9JDH	21	
Bureau Co	KC9EGB	14	
Indiana			**594**
LaPorte Co	N9RKY	160	
Vanderburgh Co	WB9EFH	154	
Clinton Co	W9PC	139	
Whitley Co	WB9UNL	137	
Jefferson Co	N9UNM	4	
Wisconsin			**3755**
Racine	WB9USI	389	
Columbia Co	KC9FNM	223	
Dane Co	N9TWA	204	
East Central	N9TBM	164	
St Croix Co	N9KMY	159	
Waushara Co	KC9ZET	157	
Brown Co	N8KQS	150	
Fond du Lac Co	W9GPI	147	
Sauk Co	N9ROY	145	
Richland Co	W9MZ	141	
Pepin Co	WB9NTO	140	
Marathon Co	KB9VBR	136	
Walworth Co	N9ZXP	126	
Burnett Co	AA0KU	122	
Green Co	KC9YI	122	
Manitowoc Co	N9NCU	121	
Langlade Co	W9DMS	121	
Winnebago Co	KC9COI	121	
Calumet Co	N9VPZ	114	
Outagamie Co	K9STN	111	
Rock Co	N9GQ	109	
West Central	KB9VLF	109	
Jefferson Co	KC9IKI	85	
Polk Co	KC9GHQ	80	
Price Co	AG9G	78	
Chippewa Co	W9RMA	72	
Door Co	K9KJM	58	
Kewaunee Co	N9JKX	47	
Buffalo, Trempealeau Co	N9UNW	4	
Dakota Division			
South Dakota			**344**
Pennington Co	N0UKO	103	
Meade Co	N0MHJ	79	
Butte Co	KG0GG	66	
Mead Co #2	KA0FAI	60	
Hughes Co	KD0S	36	
Delta Division			
Arkansas			**569**
Washington Co	WC5AR	239	
Pope Co	W5RZ	191	
Eastern Arkansas	W5WPN	139	
Louisiana			**1561**
Section wide	K5GLS	1561	
Mississippi			**112**
Marshall Co	KB0ZTX	112	
Tennessee			**260**
Cocke Co	KI4KBS	210	
Loudon Co	KM4H	50	
Great Lakes Division			
Kentucky			**256**
Pendleton Co	NB4K	256	
Michigan			**5744**
Kalamazoo Co	NK8X	1239	
Oakland Co	W8HIU	674	
Alcona Co	W8SZ	649	
Calhoun Co	KC8COT	639	
Allegan Co	AB8SF	437	
Barry Co	K8LHM	323	
Lenawee Co	K8YZA	289	
Benzie Co	K8BTE	217	
Monroe Co	N8KUF	209	
Mecosta Co	KB8TYJ	180	
Cass Co	KC8OVZ	173	
Region 6	WB8GAO	171	
Menominee Co	KS8O	130	
District 9	W8FHF	125	
Alger Co	W8RDR	121	
Montcalm Co	KC8ZMO	90	
Hillsdale Co	KC8RYF	58	
Presque Isle Co	WB8TQZ	16	
Houghton Co	N8WAV	4	
Ohio			**2112**
Franklin Co	AA8DN	402	
Greene Co	W8LLY	317	
Hamilton Co	N8LMJ	239	
Erie Co	K8HLH	260	
Hancock Co	N8PTJ	220	
Seneca Co	KC8BUJ	194	
Clark Co	N8NSD	152	
Shelby Co	N8KZL	147	
Sandusky Co	K8DLH	118	
Drake Co	N8YD	63	
Hudson Division			
Eastern New York			**111**
Albany Co	KB2YUR	111	
New York City-Long Island			**364**
Nassau Co	W2KFV	241	
Town of Southold	N2QHV	123	
Northern New Jersey			**935**
Bergen Co	K2NUD	204	
Hunterdon Co	WB2AZE	180	
Monmouth Co	N2SMV	179	
Morris Co	WB2VUF	122	
Salvation Army	N3DV	106	
Chatham	W2UH	81	
Englewood	W2CC	63	
Midwest Division			
Iowa			**368**
Humboldt	K0HU	134	
Henry Co		99	
Polk Co	KC0FRL	89	
Linn Co	N0GUD	36	
Wright Co	WA0VTJ	10	
Kansas			**328**
Zone C4	KC0JCQ	328	
Missouri			**264**
Jackson Co	K0UAA	264	
Nebraska			**243**
Lancaster Co	K0GND	167	
Buffalo Co	KA0DBK	76	
New England Division			
Connecticut			**374**
Bethel	KD1YV	166	
Statewide SKYWARN	KB1UIZ	102	
Region 4	KD1LD	52	
Hartford, Tolland Co SKYWARN	K1PAI	31	
SKYWARN	KA1TCH	23	
Maine			**716**
Piscataquis Co	KB1NJO	199	
Penobscot Co	N2LX	137	
Sagadahoc Co	WA1SCS	137	
Oxford Co	N1GZB	86	
Washington Co	K1PAR	83	
Kennebec Co	NT1N	74	
New Hampshire			**168**
W Rockingham Co	KA1UVH	168	
Vermont			**680**
Statewide	W4YFJ	678	
District 2	K3BRJ	2	
Western Massachusetts			**250**
Hampden/Hampshire Co	N1MUV	250	
Northwestern Division			
Alaska			**90**
Delta Junction	N1CKM	90	
Oregon			
Jackson Co	KE7CIJ	Narrative	
Western Washington			**3529**
District M-Medical	N7LSL	668	
Pacific Co	N7CVW	412	
District 3	KA4VVA	303	
King Co	N7UK	260	
Clallam Co	N7BV	224	
Kitsap Co	AB7Y	201	
Island Co	K7ACT	187	
Vashon, Maury Is	N0AX	169	
Mercer Is	N7UK	151	
San Juan Co	WA7ZZT	147	
Lewis Co	AC7SR	131	
Mason Co	AA7JK	130	
Puget Sound	KE7CFM	121	
Region/Section 2	N0WO	119	
Grays Harbor Co	N7UJK	112	
Stanwood, Camano Is	KC7EKA	93	
Sammamish	N9VW	62	
Shoreline	K7UW	39	
Pacific Division			
East Bay			**275**
Alameda	N6RCG	188	
Berkely, Albany	WA6CCF	87	
Nevada			**346**
Clark Co	AA5QJ	232	
South Nye Co	KC6ILH	114	
Pacific			**99**
Maui Co	KH6H	99	
Sacramento Valley			**190**
Sacramento Co	WD6FXR	190	
Santa Clara Valley			**693**
Monterey	W6IIQ	320	
Santa Cruz Co	KE6AFE	237	
City of Cupertino	KN6PE	136	
Roanoke Division			
North Carolina			**3563**
Guilford Co	KE4IAF	691	
Thirteen	WD4PIC	397	
Mecklenburg Co	K4RLD	352	
Union Co	K4RLD	263	
Orange Co	N6LUZ	224	
Eastern Branch	W9EF	203	
Caldwell Co	KD4YTU	198	
Moore Co	N4YYL	195	
Wake Co	N4TAB	189	
Alamance Co	N4MIO	155	
Randolf Co	AG4ZH	146	
Rowan Co	KG4WAD	108	
Henderson Co	W4DK	101	
Stanly Co	K4VET	95	
Catawba Co	W1FAI	81	
Cabarrus Co	KA4ATT	77	
Wayne Co	KG4DBM	50	
Carrituck Co	KD4ATK	38	
South Carolina			**128**
Greenville Co	N4ENX	128	
Virginia			**4476**
Carroll/Grayson Co	W4GHS	867	
Montgomery Co	W4BOT	863	
Roanoke Co	K4WFO	653	
Wythe Co	KB1IXB	362	
Prince William Co	KG4GIY	291	
Franklin Co	W4BOT	236	
Henry, Patrick Co	AE4YK	232	
Virginia Beach	WA4TCJ	223	
Portsmouth	K5SFM	220	
Albemarle Co	AD6JV	157	
Hampton	KC4F	118	
Spotsylvania	KI4AFE	115	
Williamsburg-James City Co	KC4CMR	90	
Norfolk	N2NMH	49	
West Virginia			**972**
Raleigh Co	KE8YB	330	
Randolf Co	KD8BMX	153	
Jefferson Co	KD8CKN	143	
Cabell Co	WD8AGH	131	
Mercer Co	KC8TES	108	
Barbour Co	K8RWW	107	
Rocky Mountain Division			
Colorado			**144**
District 25	KI0KY	144	
Southeastern Division			
Alabama			**625**
Tuscaloosa	KG4AMK	200	
Montgomery Co	WB5NMZ	102	
Morgan Co	W9KOP	95	
Mobile Co	KD4DLJ	88	
Butler Co	WA9LXJ	88	
Ft Deposit	WQ4V	52	
Georgia			**1139**
Gwinnett Co	WB4QDX	301	
Newton Co	AG4LS	222	
Camden Co	WD8LQT	119	
White Co	KB4SNU	111	
Towns Co	W4VFZ	99	
N Fulton Co	KI4HPX	95	
DeKalb Co	W4TGA	70	
Coweta Co	KL0UD	48	
Houston Co	WB4EEL	47	
GEMA	KM4Z	27	
Southern Florida			**255**
Indian River Co	WA4ASJ	135	
Lee Co	WA4GUK	120	
Southwestern Division			
Arizona			**169**
Yavapai Co	WA6ZZJ	169	
Maricopa Co	W7STS	Narrative	
Orange			**362**
Riverside Co	KQ6U	129	
City of Riverside	KE6RYX	106	
Southwest Orange	KG6KYQ	67	
Hemet	W6CCT	60	
West Gulf Division			
North Texas			**945**
Wichita Co	N5DHG	388	
Garland	W5BJ	215	
Smith Co	N9JN	200	
Irving	KA1CWM	142	
Oklahoma			**161**
Tulsa Co	KE5FUD	161	
South Texas			**599**
SW Harris Co	W5QQ	221	
Valverde Co	W5DRW	133	
Orange Co	N5MTX	171	
Brazos Co	KB5N	74	
West Texas			**219**
Midland Co	W5OZX	219	

Section/Local Nets

Area/Net Name	Reporter	Points	Section Points
Atlantic Division			
Maryland-DC			**66**
Anne Arundel Co	W3NI	66	
Western New York			**836**
OCTEN	KA2ZNZ	323	
WDN/Morning, Early, Late	KA2IWK	294	
CNYTN/ORCEN	WA2PUU	146	
CARES	K2DAR	73	
Central Division			
Illinois			**305**
Lake Co	W9FUL	225	
RADIO	WA0JOW	80	
Indiana			**177**
Clinton Co	W9PC	79	
Whitley Co	WB9UNL	68	
Green/Sullivan	W9XTZ	30	
Wisconsin			**1983**
WI WinLink Digital	KB9MMC	260	
WI ARES/RACES	N9VAO	212	
Richland Co	W9PVR	184	
East Central	N9TBM	164	
Racine/Kenosha	WB9USI	153	
Badger Emerg Net	KE9VU	144	
Winnebago Co	KC9COI	108	
Fond Du Lac Co	W9GPI	90	
Marathon Co	KB9UBR	79	
Manitowoc Co	N9NCU	78	
Brown Co	N8KQS	72	
St Croix Co	N9KMY	53	
Langlade Co	W9DMS	51	
Walworth Co	N9ZXP	51	
West Central	KB9VLF	50	
SE WI ARES EC	N9VE	47	
Green Co	KC9YI	45	
Jefferson Co	KC9IKI	41	
Chippewa Co	W9CVA	32	
Price Co	AG9G	28	
Western WI ARES/RACES	N9UNW	28	
Hospital Bioterrorism Net	KB9VXJ	13	
Dakota Division			
South Dakota			**87**
Western SD Em Wx	N0UKO	87	
Delta Division			
Arkansas			**224**
Washington Co	WC5AR	148	
Cass Co	W5WPN	76	
Louisiana			**521**
Louisiana Gulf Coast	K5GLS	378	
RN5 NTS	WB5ZED	143	
Great Lakes Division			
Michigan			**1357**
Alcona Co	W8SZ	289	
Cass Co	KC8OVZ	228	
Upper Peninsula	AA8SN	228	
Saginaw Co	K8CQF	174	
Monroe Co	N8KUF	119	
W MI Traffic	KD8BGQ	110	
Benzie Co	K8BTE	76	
SEMTN	WI8K	74	
Minominee Co	KG8CX	61	
Lenawee Co	K8KIC	59	
Ohio			**986**
OSSBN	N8IO	617	
Sandusky Co	K8DLH	145	
Shelby Co	KC6NLX	121	
FARA	N8FMJ	103	
Hudson Division			
Northern New Jersey			**37**
NJ Phone Net	W2CC	37	
Midwest Division			
Iowa			**51**
Linn Co	KF0VF	51	
Kansas			**151**
Kansas SSB/Phone	N0KFS	151	
Missouri			**197**
Jackson Co	K0UAA	197	
Nebraska			**86**
Eastern Nebraska	KB0MTT	86	
New England Division			
Connecticut			**101**
New London SKYWARN	W1SSN	42	
Hartford, Tolland SKYWARN	K1PAI	32	
Litchfield SKYWARN	KA1TCH	27	
Maine			**180**
Maine Emerg Comm	K1HZU	180	
New Hampshire			**54**
W Rockingham	KA1UVH	54	
Vermont			**279**
Vermont Phone Net	KF1Z	106	
District 1	W1OKH	98	
Bennington Co	N1RRW	73	
District 2 ARES	K3BRJ	2	
Northwestern Division			
Western Washington			**156**
King Co	K7FDF	99	
Auxiliary Emerg Comm	KE7AUV	57	
Pacific Division			
East Bay			**81**
Trilogy	KG6RBN	81	
Santa Clara Valley			**165**
Monterey, Santa Cruz Co	W6IIQ	165	
Roanoke Division			
North Carolina			**1745**
Guilford Co	KI4BMS	471	
THEN	KE4JHJ	266	
Metrolina 2 Mtr	WB2NHQ	230	
Lincoln Co	WD4PIC	204	
Union Co	K4RLD	167	
Cabarrus Co	KA4ATT	99	
Randolf, Guilford Co	AG4ZH	96	
Stanly Co	K4VET	87	
Alamance Co	N4MIO	75	
Rowan Co	N4FCC	50	
Virginia			**318**
ODEN	K3EP	163	
Virginia Beach	WA4TCJ	110	
Williamsburg	KC4CMR	45	
West Virginia			**101**
Jefferson Co	KD8DMI	101	
Southeastern Division			
Georgia			**199**
Newton Co	AG4LS	152	
Houston Co	WB4EEL	47	
West Gulf Division			
North Texas			**352**
DFW Metroplex	KE5HYW	268	
Irving	KA5OZC	84	
West Texas			**155**
Midland	W5ZOX	155	

Field Organization Reports

Public Service Honor Roll
April 2007

This listing is to recognize radio amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 6 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Participating in a public service net, using any mode. —1 point per net session; maximum 40.
2) Handling formal messages (radiograms) via any mode. —1 point for each message handled; maximum 40.
3) Serving in an ARRL-sponsored volunteer position: ARRL Field Organization appointee or Section Manager, NTS Net Manager, TCC Director, TCC member, NTS official or appointee above the Section level. — 10 points for each position; maximum 30.
4) Participation in scheduled short-term public service events such as walk-a-thons, bike-a-thons, parades, simulated emergency tests and related practice events. This includes off-the-air meetings and coordination efforts with related emergency groups and served agencies. — 5 points per hour (or any portion thereof) of time spent in either coordinating and/or operating in the public service event; no limit.
5) Participation in an unplanned emergency response when the Amateur Radio operator is on the scene. This also includes unplanned incident requests by public or served agencies for Amateur Radio participation. — 5 points per hour (or any portion thereof) of time spent directly involved in the emergency operation; no limit.
6) Providing and maintaining a) an automated digital system that handles ARRL radiogram-formatted messages; b) a Web page or e-mail list server oriented toward Amateur Radio public service — 10 points per item.
Amateur Radio stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from Headquarters upon written notification of qualifying months to the Public Service Branch of the Membership and Volunteer Programs Department at ARRL HQ.

874 KD8BGQ
656 KG4TND
505 W2LTB
455 KI4GEM
415 KA2ZNZ
395 K2DYB
390 KB9KEG
350 WA2WMJ
348 W2MTA
340 N1UMJ
310 N2LTC
230 AK2Z
227 N0YR
215 K0IBS
205 KK1X KB2ETO
202 WA2BSS
195 WA0VKC KE5HYW
194 KB3LFG
193 K8MFK
189 K7EAJ
185 WB9JSR WN2IHJ
184 K2ABX
183 WB8RCR
180 KD5TXD KD1SM
176 KB5PGY
170 N7CM KC2MQU
160 W2DWR KG0GG N0UKO
152 K4DND
150 WB5ZED
145 K8RDN
140 N8IO K7BFL KA2GJV
137 AB5WF
135 W3YVQ NI0I KC5OZT
130 W8UL KK3F WB2KNS K9FHI AG9G K9LGU KI6CM
N2QZ
129 KA2BCE
125 KA8ZGY K7BC
124 KB8UIH
120 K6YR KW1U W1GMF N1LKJ KA5KLU W7IG W0LAW K4GK K4FQU KA4FZI
119 WU8H
116 WB8OIF K4BEH
115 NN7H
112 KD7THV W5XX
111 WA4UJC N3RB
110 WX4H N1IQI K1YCQ W5ESE WV8RG N7XG N7YSS N4ABM W0WSP W7GB WE2G
KK5GY
108 AF2K
107 KV4AN
106 N9WS N2VC AB1AV
105 K2TV W3CB NU0F
104 AD4BL
103 N0MEA W9JDH
102 K8AMR K6JT
100 NR2F N9MN K4ZZA WA8SSI W8SB KB2LKH W2DSX N5OUJ K7HQA K2VX WA4EIC W7GHT N8FPN NX1Q W3TWV WB2LEZ K2AN KF6SHU
98 N7IE
97 W7VSE
96 W5GKH WD9FLJ
95 WG8Z N1LKJ N3ZOC KF7GC WB6OTS WA5OUV
93 KB8NDS
92 N2JRS
91 AA3SB NA7G
90 W9XAN W3GQJ W8IM K1JPG KF4WIJ N8DD WD8Q WB8SIQ WD8DHC KA8WNO KD7ZLF K3IN WB4BIK KI4JQB N1JX KC2PFV KC2ANN W0CLS NY4E WA2YL W7EKB KC8WSE KA1RMV KA1GWE KG2D KB2IJH
89 W2CC
88 W8CPG WB4FDT
87 N2LJD
85 W8IVF N7BEC KC2ODN
84 K8ZJU
83 K8GA
82 KK7TN
81 N2VQA
80 K8KV AA4BN AB8SY W8RIT N3SW AL7N
79 WD0GUF
78 K8AE KS3Z
76 N2OMK
75 W4TY
73 N3AO W5CU
72 WB1CHU
70 KA0FUI N0MHJ

The following stations qualified for PSHR in previous months but were not recognized in this column: (March) KD1SM 100. (February) K4RLD 185, W4EAT, W4TTO 170, W4DNA 140, W4FAL 130, K4IWW, W0UCE 120, KE4JHJ, W2EAG, WA2YBM 110, W4LN 108, N7IE 100, KD4FUN, KG4YNM, KI4YV 90, NA7G 84. (January) W4DNA 150, W4TTO 148, K4RLD 140, W4EAT, W4FAL 130, WA2YBM 125, K4IWW, W0UCE 120, KE4JHJ, W2EAG 110, W4NCD 101, KD4FUN, KI4YV 90, W4LN 75.

Section Traffic Manager Reports
April 2007

The following ARRL Section Traffic Managers reported: AK, AL, AR, AZ, CO, CT, EMA, ENY, EPA, EWA, GA, ID, IL, IN, KY, LA, MDC, MI, MN, MO, MS, NC, NFL, NH, NLI, NNJ, NNY, NTX, OH, OK, OR, SB, SC, SD, SFL, SJV, STX, UT, VA, WCF, WI, WMA, WNY, WY.

Section Emergency Coordinator Reports
April 2007

The following ARRL Section Emergency Coordinators reported: AK, AR, AZ, GA, IL, KS, KY, LA, MDC, ME, MI, NC, NTX, NV, OH, OK, RI, SD, SFL, STX, SV, WTX, WV, WWA.

Brass Pounders League
April 2007

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	Orig	Rcvd	Sent	Dlvd	Total
WB5ZED	27	1779	1562	33	3401
N1IQI	0	610	2234	0	2844
W1GMF	0	300	1529	0	1829
KA9EKG	44	688	640	26	1398
KK3F	19	662	642	20	1343
KA5KLU	0	525	431	0	962
W8UL	0	402	415	15	832
KW1U	0	406	407	0	813
N1UMJ	0	359	382	9	782
WX4H	0	338	408	7	753
WB5NKC	57	119	543	57	722
N8IXF	0	391	303	17	711
W4EAT	0	361	345	0	706
KB9KEG	39	296	6	329	670
WB5NKD	23	57	545	0	623
KA4FZI	—	—	—	—	566
N2LTC	0	256	241	53	550
WB9JSR	1	272	257	16	546
KC8WSE	4	260	249	7	520
KK5GY	0	214	72	214	500

W3UR

HOW'S DX?

DXing 101

It's Saturday morning May 5 and there are less than 12 hours before the current BS7H DXpedition on Scarborough Reef goes silent. The last operation from this rarest of the rarest DX entities was exactly 10 years ago. It was the most-wanted DXCC entity for 2007, and many needed it for another notch in their DXCC belt. In fact, for many who did work BS7H in late April or early May, it was their last one. Congratulations to all who managed an all-time new one!

Scarborough Reef, also known as *Huang Yan Dao* (which literally means Yellow Rock Islands), is located in the South China Sea at 15° 07' North and 117° 45' East, approximately 500 miles from mainland China. This past DXpedition in April and May 2007 was the fourth ever to the island.

The first operation from Scarborough Reef took place in late June 1994 and was on the air for about 13 hours. They netted about 2000 contacts, but this operation did not count for DXCC as they were operating from a scaffold. The second operation started on April 12, 1995, running for just under 4 days and managing almost 12,000 contacts. This was the first operation to count for DXCC. This obviously did not meet the worldwide DX community's needs.

Scarborough is a difficult location to operate from physically; however, at the time it was not impossible to get permission to operate from the reef. The infamous late April/early May 1997 operation came to a halt after just 70 some hours of operation and making just over 13,000 contacts. The Philippine Navy showed up and the Chinese ops agreed to leave earlier than originally planned, all because of a territorial dispute.

They don't call it "Scaffold Reef" for nothing! Top left: Martti Laine, OH2BH, and David Chen, BA4RF, operate from Rock 1, while Bob Vallio, W6RGG, gets busy on Rock 4.

Bottom left: Paul Pescitelli, K4UJ, puts BS7H on the books on Rock 2, and Tom Berson, ND2T, makes Amateur Radio history on Rock 1.

Photos courtesy of the BS7H DXpedition.

Support the DXpeditioners

All of the "Most Wanted DXCC Entities" are rare for one reason or another. Some entities

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are rare for more reasons than others. Scarborough Reef is one of them.

The inexperienced DXer might ask, "Why is a DXpedition of this stature taking place at the lowest point of the sunspot cycle?" The group that went earlier this year had been working and planning on this DXpedition for five years. They started planning it near the top of Solar Cycle 23. By the time they received operating permission, landing permits, gathered up the team and equipment, as well as working out the diplomacy, we were almost at the bottom of the sunspot cycle. Should they have waited another year or two? Heck no! Who knows what could have happened in the meantime that could derail the DXpedition.

DXpeditioners go to the rarest of the rare locations when they get everything they need lined up and receive the green light. They can't control the timing or propagation. They go when they can and they do the best possible job they can to give you, the DXer, a new one, whether an all-time new one, a band point or country mode. And we, the DXers, should be thankful and supportive of their efforts. If you think you can do a better job, get out of your armchair and go do it! Otherwise sit back and relax.

Stepping Up on the Soapbox

This month's column is not about Scarborough Reef, although I will refer to their operation. The above was just to get you this far. Now, I know some of you are going to be mad at me for not continuing on about the April/May BS7H operation. I'm sure we will hear more on the 2007 BS7H operation in the coming months. I can't wait to see the video and photos.

No, what I want to talk about is the behavior of the audience. I want to talk about those in the BS7H pileups and on the clusters and the DX reflectors, even those transmitting on top of the DX. I know within 30 minutes, after certain DX subscribers read this, they are going to e-mail their ARRL Director and say, "Bernie shouldn't be wasting precious space in *QST* preaching to the choir." Believe me, I don't like bringing up the subject, but hey, every once in a while you have to do it to remind some of the audience what is and what is not accepted. So here I am, stepping up on my soapbox.

Listening is the Key

The most important thing the BS7H team did was to have two of their four stations dedicated to a band/mode. That is, one station was on 20 meters CW, while the other was on 20 meters SSB, virtually 24/7 during the entire DXpedition. This was the biggest asset they could give to the DX community; so many DXers needed Scarborough Reef.

The majority of DXers around the world have an antenna and equipment for 20 meters. To have one on CW and the other on SSB on this band gave the opportunity to so many during the entire operation. Meanwhile, the other two stations could be used on the other bands for those collecting band points for the DXCC Challenge.

One thing everyone needs to be reminded of is this: The DXpedition operator is in charge of the pileup. The pileup is a reflection of the operator, as Martti Laine, OH2BH, says.

But before we call in the pileup, everyone — whether a new or experienced DXer — needs to first *listen* to the pileup. Don't be in too big a hurry and crash going out of the gate. Listen to the DX station. Know his call sign. Don't depend on the packet cluster! If you have a beam, are you pointed to the correct path? What frequency range is he listening? Is he listening for Europe only? Is he going by call areas? Properly set up your rig to operate split. If you don't know how to do it, then get out the user manual and read it. You don't want to be a lid and call on top of the DX and tick off your fellow DXers.

Once you know where the DX station is listening, take your second (receive) VFO and listen where the DX station is listening. Are there any previous contacts going on in that range? Can you hear the others calling in that range? Can you find any of the stations the DX station is working? Move your VFO around and figure out what is going on. Then, once you feel like you know what is going on and have listened of a few minutes, set up your rig so you can transmit in the set DX listening range. Key your transmitter but don't start calling yet. Make sure you are definitely transmitting where the DX is listening and not on top of the DX station! If everything is correct, then now is time to call, but only when the DX station says so.

If the operator says something like, "Who is the Hotel Bravo station," only someone who has Hotel Bravo in their call sign should be calling. Everyone else must be quiet until the contact is completed. If you're not hearing the DX station, then why are you calling? You are just wasting your time, the DX station's time and all of the DX community who can hear and are also calling. You are slowing down the rate. It won't be long before you get a reputation of having "wooden ears." Once you have that reputation, the alert DXpeditioner will put your call into his mental file as one who can't hear. You do that one too many times and he won't bother replying to you then or possibly even later as he will get frustrated with you and your absence of hearing!

Don't be an alligator. The same can be said on CW. If you are one of these DXers that can only copy your call sign, then you shouldn't be calling in the pileup. Practice with a buddy, with tapes or with W1AW to get your code speed up. If you can't copy what the DX station is sending, then you should not be calling him!

Don't tune up your rig or amp on the DX station. First off, you should be using a dummy load. Second, move 5 to 10 kHz away from the DX stations transmit frequency before you tune up.

"Concentrate on the DX"

So what should you do if someone starts tuning up on the DX station, or if someone starts sending their call (on CW or SSB) on top of the DX station who is not listening to his transmit frequency, but rather listening up or down? Technically, nothing! Everyone — and I mean *everyone* — should just keep quiet and pay no attention to it. Let it go. Eventually, they will figure it out or go away.

The worst thing, and I do mean the worst thing, anyone can do is to tell the person "Up" or some other nasty comment. Why? Well, think about it for a minute. Let's say the DX station is in Southeast Asia. The offending station, who is calling on the DX frequency, is in California. Some of the audience will not hear the California station and some will. If a so-called "do-gooder" tells the offending station "Wrong VFO," or "Don't call on top of the DX," you are now interfering with the DX station; others who can hear you won't be happy with you. Keep your headphones on and use the mental filter in your head to block out the offending stations and just *concentrate on the DX*.

Arrrrgh, Matey

There is now a new concern for DXers here in the US. Actually, it has been going on for several years in certain parts of Europe and has recently cropped up here in the States. I hope I don't make the problem worse by mentioning it here in this month's column, but everyone needs to be made aware of this latest form of pirating. It has been mostly on CW and occasionally on SSB. A "so-called DXer" will send someone else's call sign (not his) on top of the DX station, pirating the call over and over, giving everyone the impression that they are on the wrong VFO. The pirating station will call two or three times on top of the DX and then wait a few seconds as if he were listening. They then begin to call again and again.

I referred earlier in the column to the packet cluster. This subject has been brought up several times and seems to have fallen on deaf ears. There are so many telnet clusters throughout the world. It is so easy to post a DX spot with someone else's call as the

spotter. Don't be fooled by the spots on the cluster. The software developers, packet node sysops and other backbone network support teams need to implement authentication methods and use them. Otherwise, it is only going to get worse.

Near the end of the BS7H DXpedition, at least one group in a certain European country stepped up and implemented a sign-on password to get on to their packet cluster nodes. Good for them. It's not perfect and yes, someone has to maintain a database, but they are taking steps to slow down this growing problem. It will be interesting to see if any others pick up on this and see how it's working.

Going All Out to Work DX

Okay, I'm going to step down off my soapbox and hope I don't need it again anytime soon. During the BS7H DXpedition, there were a number of guys who needed it for their last one on the DXCC list. Various stories went around the reflectors about guys going to some trouble to work, or attempt to work, BS7H, including putting up new antennas just for the purpose. Frank Letton, W6JTI, is one who qualifies as a "true blue DXer."

Before the DXpedition was announced, he had already finalized his own plans for a three week trip to Texas to visit his mother; this just happened to be scheduled at the same time as the expedition. So he shipped his IC-735 and related equipment, as well as a 2 element 20 meter Yagi to her home. He put the Yagi up on a 35 foot RadioShack TV mast (that he purchased locally) and strung up a dipole below that. He got BS7H with that setup on both 40 and 20 CW. Says Frank, "My DXpedition to Texas is a success!" Frank still needs four entities: Palestine, Montenegro, Yemen and North Korea. He's worked 333 current entities, all with 100 W.

DX News from Around the Globe

A2 — Botswana

Charles "Frosty" Frost, K5LBU, has a group of at least six going to Botswana to operate July 6-20. They will have a 72 foot vertical for 160 and 80, and a four-square vertical array for 40 meters. They expect to be far from the highway with a quiet location. Frosty says he knows thunderstorms in North America at that time of year could cause some static "on this side, but we are going to be there," he says. The ops hope to have A25 call signs.

J8 — St Vincent

Six meter DXers should look for Jimmy Treybig, W6JKV, as he heads for Bequia Island, St Vincent (J8). He's looking at June 28-July 11.

OX — Greenland

OX3LX operator Bo Christensen, OZ1DJJ; and OX3OX operator Ole Andersen, OZ7OX, will be on from July 7-25 from grid squares GP47TA and GP36DW. They will be trying to make some contacts on 6 meters.

VP2E — Anguilla

Jim Millner, WB2REM, will be operating the special 4-letter suffix call sign VP2EREM from Anguilla from June 28-July 8. Operation is expected on 10-80 meters, CW and SSB. QSL via WB2REM.

VP6 — Pitcairn Island

By the time you read this, Tom Dixon, ZL2HGR, should be active from Pitcairn Island. He'll be ready to go as VP6TD from May 7 until early September. Tom will be mostly on PSK and hopefully CW. He'll be using a Yaesu FT-857D, longwire, Buddipole and Z11-pro antenna tuner.

Cycle 23

The US Department of Commerce and NOAA, Space Environment Center have released their latest prediction on the cycle minimum. This update is made monthly, and for the second month in a row they are predicting the bottom as July 2007, with a predicted solar flux average of 74.9. The complete chart can be seen at **www.sec.noaa.gov/ftpdir/weekly/Predict.txt**. The predicted values are based on ISES cycle 23 forecast of 13 month running smoothed values.

Wrap Up

That's all for this month. Don't forget to send any DX news to me at **w3ur@arrl.org**. Until next month, see you in the pileups! QST

New Products

ELECRAFT K3 HF/6 METER TRANSCEIVER

◊ Elecraft's K3 transceiver covers 160 through 6 meters, includes general coverage receive, and is available in 100 W and 10 W versions with a wide variety of options and accessories. An optional subreceiver is available, and its features and specifications are identical to the main receiver. Each receiver is said to have its own bus-switching mixer, narrow ham-band front-end filters, 32-bit IF DSP, low-noise synthesizer and up to five crystal roofing filters with bandwidths as narrow as 200 Hz. Other features include receive and transmit EQ and built-in PSK31, CW and RTTY decode/encode. An optional module provides transverter in/out and receive antenna in/out jacks.

The K3 is offered factory-assembled and as a modular, no-soldering kit. Owners can start with a basic version, then add modules later (such as the internal subreceiver or automatic antenna tuner). Modules are 100% assembled and tested at the factory for consistent performance. Size: 4 × 10 × 10 inches (HWD); weight 8 pounds. Price: $1399 for the 10 W version in kit form, $1989 for the 100 W version assembled and tested. Other versions and options available. See **www.elecraft.com** to order or for more information.

SEARS DIEHARD 13.8 V DC POWER PACK

◊ The Sears DieHard Portable Power 950 power pack is intended to be carried in your car as an emergency jump start for your battery, but it can be used as an emergency power source for your 13.8 V dc Amateur Radio transceiver too. It contains an 18 Ah sealed lead-acid battery. Two cigarette lighter jacks provide 15 A total output, protected by a circuit breaker. On the rear are two #4 copper cables, 24 inches long, terminated in heavy battery clamps for higher current applications. There is a built in 120 V ac charger, an emergency light and a digital readout that indicates remaining battery capacity. Price $79.99. For more information, visit your nearest Sears store or **www.sears.com**. — *Tom Webb, W4YOK*

W3ZZ

THE WORLD ABOVE 50 MHz

Propagation Beacons

Suppose you have a nice new radio that covers the VHF+ bands, and have put up antennas to match. How can you tell whether your radio is receiving on any given VHF+ band? Once you have ascertained that the radio and antenna systems work, how can you tell what kind of propagation might be occurring? The answer is to listen for propagation beacons.

Beacons are (usually) unattended transmitters of typically modest power that send a message identifying the beacon transmitter location and call sign over and over on CW or FSK, usually 24 hours a day. Beacons usually have an amateur call sign from the country in which they are located followed by the designator "/B" or "/BCN" to indicate they are a beacon station. For instance, our local beacon repeatedly sends "DE W3VD/BCN JHU/APL FM19NE" followed by an 11 second carrier. Its call is W3VD; it is a beacon /BCN; JHU/APL indicates that it is located at the Applied Physics Laboratory run by The Johns Hopkins University, and its six digit grid square is FM19ne, which puts it somewhat southwest of Baltimore, MD. The carrier is so that stations copying the beacon can adjust their equipment or antennas on a steady signal — or at least as steady as propagation can produce.

Let's now look at some specific characteristics of beacons.

Propagation Beacon Frequencies

The frequency ranges that allow operation of unattended domestic beacons by regulation are given by §97.203 of the FCC Rules and Regulations (see Table 1). Note that FCC regulation of unattended domestic beacons covers only through 70 cm. Above that, unattended beacons can operate on any frequency but the ARRL band plan suggests frequency ranges for such bands except 33 cm and 13 cm. As we discuss VHF beacons, please also note that a few — like KØGUV on 50.008 — are attended, so they can operate outside of the designated beacon band.

HF Beacons

Perhaps the best list of HF propagation beacons is the Worldwide List of HF

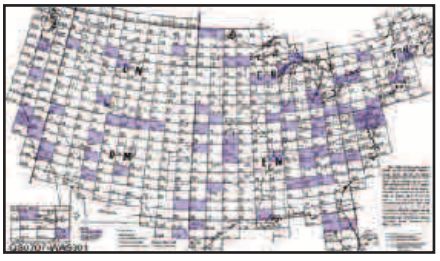

Figure 1 — Location of 6 meter propagation beacons in the US, its possessions and its nearby borders. Grids having beacons are colored blue.

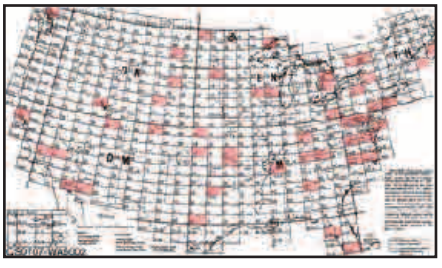

Figure 2 — Location of 2 meter propagation beacons in the US and its nearby borders. Grids having beacons are colored red.

Beacons put out by G3USF, found at **www.keele.ac.uk/depts/por/28.htm**. Rather than discussing these in any detail I just want to highlight two of these systems: the NCDXCF/IARU system and the 28 MHz beacons. The best known HF beacon system is the NCDXF/IARU International Beacon Project operated and funded by the Northern California DX Foundation in cooperation with the IARU. It currently consists of up to 18 beacons scattered throughout the world, operating on 14.100, 18.110, 21.150, 24.930 and 28.200 MHz in a very specific manner in terms of time, frequency and power, such that a complete view of worldwide propagation on five HF bands can be determined from any place in the world at any time. A complete description can be found at **www.ncdxf.org/beacons.html**, including .pdf reprints of three *QST* articles.

This Month

July 8	Good EME conditions*
July 15	Good EME conditions*
July 21-22	2007 CQ Worldwide VHF Contest
July 26-29	Central States VHF Society conference

*Moon data from W5LUU

Table 1
Frequency Plan for Propagation Beacons by FCC Regulation 10 Meters through 70 cm and by ARRL Band Plan on Frequencies Above That

Note that the ARRL band plan does not have suggested frequency ranges for the 33 cm and 13 cm bands.

Band	*Frequency Range*
*10 M	28.200-28.300
*6 M	50.060-50.080
*2 M	144.275-144.300
*135 cm	222.050-222.060
*70 cm	432.300-432.400
†23 cm	1296.070-1296.080
†9 cm	3456.300-3456.400
†5 cm	5760.300-5760.400
†3 cm	10368.300-10368.400

*By FCC regulation for unattended beacons
†By ARRL band plan

Ten meters has many of the characteristics of a VHF band, particularly 6 meters. There is an extensive series of world-wide beacons located mostly between 28.100-28.300 MHz. Unattended domestic US beacons are limited by regulation to 28.200-28.300 MHz. The G3USF site is a good place to look for 10 meter beacons. We will see below how we can use 10 meter beacons to anticipate 6 meter openings.

VHF Beacons

For VHF, propagation beacons are an even more important factor than they are for HF. Fortunately, there are two reasonably reliable lists of VHF+ beacons that can be accessed from the Web. G3USF's Worldwide List of 50 MHz Beacons can be found at **www.keele.ac.uk/depts/por/50.htm**. VHF/UHF BEACONS, by WZ1V, covers all bands from 144 MHz and up at **www.newsvhf.com/beacons2.html**. I say reasonably reliable because beacons are a moving target — they come and they go. If no one notifies the list keeper

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and (s)he does not learn by other means that a new beacon is on the air or an old beacon is temporarily or permanently off the air, the list will not be up-to-date. Both of the list owners mentioned in this paragraph are very good at having the latest information.

If you look at these lists you will be struck immediately by the asymmetry of the listings: There are more beacons on six meters than on any other band. In the US, its possessions and the nearby border areas there are 86 six meter beacons in 79 different grid squares. See Figure 1. A look at the figure indicates that these are spread quite well across the map, including decent density along the coastal areas. Notice also that there is a fair amount of redundancy, however, with seven grid squares having more than one beacon and numerous others with beacons in adjacent squares.

On 2 meters, the beacons tend to be more clustered, reflecting areas of higher VHF activity and the influence of clubs. See Figure 2. The clusters appear in the mid-Atlantic (Pack Rats and the DC area) the Carolinas and in the general vicinity of Rochester as well as a few not far from Chicago and two in the population areas of Texas. Yet there are essentially no beacons listed in New England. We could use one somewhere between Florida and Delaware to check coastal tropo, and one on the Texas coast for transgulf tropo and there are essentially none along the California coast.

As one might expect, beacons on bands above 2 meters are much scarcer and also reflect areas of highest activity on those bands. Thus, the 16 beacons on 222 MHz cluster mostly in the northeast (except New England) and southwest Pacific coast. The twenty-five 432 MHz beacons cluster in the Northwest, Florida, Texas and the northeast except New England. While most of the microwave bands have limited numbers of beacons ([902/3 = 13; 2304 = 12; 3456 = 6; and 5760 = 6], 1296 MHz has 23 and 10 GHz has 20. Where are all those New England beacons? Befitting the high 10 GHz activity, there are five in New England and five in the mid-Atlantic and three in Texas.

Sponsors

Most beacons are the result of the efforts of individuals or clubs. There have been, and are, organized efforts to put beacons on the air. Here I would like to mention two such efforts. SMIRK (the Six Meter International Radio Klub), which promotes worldwide six meter activity, has as one of its strategic goals placing/supporting 6 meter beacons that would help spot 6 meter openings of interest. Among their accomplishments are the VP9DUB beacon and the proposed Easter Island (CEØA) beacon. SMIRK is also a contributor to the Six Meter Beacon Project. Initiated as a collaboration between Al Waller, K3TKJ, Dave Craig, N3DB, and Keith Murray, KB3IWV, the Six Meter Beacon Project (**www.6mbeacon.net/**) was formed to construct and install 6 meter beacons in a few select overseas locations in need of propagation indicators. With the additional help of W3CMP, W3JCT, N3NO and a number of generous donors, the project has emphasized finding non-US locations as beacon hosts, particularly ones at the ends of interesting propagation paths (see Table 2). The project currently uses converted Motorola Maxar Lowband land mobile radios and either KB6KQ or M^2 HO loops for antennas.

Table 2
Beacons Supplied Entirely or in Large Part by the 6 Meter Beacon Project

Beacon	*Locator*	*Host*	*Status*
AL7QY/B	AP74gm	AL7QY	QRV
KH6HI/B	BL01	KH6HI	QRV
V44KAI/B	FK87qh	V44KAI	QRV
C6AFP/B	FL16	C6AFP	QRV
PR8ZIX/B	GI64gl	PR8ZX	QRV
ZD7VC/B	IH74	ZD7VC	QRV
CQ3SIX/B	IM12ip	Madeira RC	QRV
CT1ART/B	IM67ah	EA7KW et al	QRV
V73SIX/B	RJ39rj	V73NS	QRV
AH8A/B	AH45	AH8A	In progress
CE3AA/rpt6	FF46	Radio Club de la Chile	In progress
CU8DUB/B	HM49	DUBUS	In progress
D44DUB/B	HK86	DUBUS	In progress
Z21SIX/b	KH52	Zimbabwe ARS	In progress

How to Use Beacons

You can use beacons both to determine whether and how well a VHF station is working and to detect the appearance of enhanced or suppressed band conditions. You want to start by determining tropospheric propagation under normal conditions. Try to find your local beacons — those within preferably 200 miles (300 km) of your location or less by either asking your local VHF friends their calls and frequencies or by looking at either the G3USF or WZ1V lists. Note their 6 digit grid locators and use your favorite bearing and distance program to get the correct beam headings to each beacon. (Try WinGrid at **www.keplerian.com** if you don't have one.)

Ask your friends if everyone in town can usually hear a particular beacon or whether it takes a particularly good antenna or location to hear it. Assuming you have a beam, point it at beacon, tune to the correct frequency and see if you can hear it. So long as you have a reasonably clear path not occluded by high ground or buildings, you should hear the beacon if your friends tell you almost everybody else does. If you don't, make sure your beam is really pointed where you think it is pointed and tune your receiver — some beacons are not always on the frequency they say they are on. Once you hear it copy down what it says. (Look at the beginning of this column to see a typical message from W3VD/BCN.) Listen for at least 10 minutes to get an average strength reading on your S meter. Listen at three or four different times of day to get a feel for diurnal changes in propagation and listen on different days — ones with different kinds of weather — and at different times of year (temperature) to get a feel for seasonal and meteorological changes in propagation. Discount days when conditions are clearly enhanced.

From a synthesis of all these readings you can determine a normal propagation strength. For example, W3DOG/B is normally S3 on the meter at 101 miles from W3ZZ. The best beacons are those that are barely audible at your QTH under normal conditions. They set the limits for how good your station is performing. Now propagation conditions change even over 100 miles but I should always hear W3DOG/B even if it is –15°C with a strong wind and a weather front between us. If I don't hear it and my friends do hear it, I know I have a problem with either my receiver or my antenna system (antenna, feed line or relays). More difficult to detect by any means are problems involving a slow degradation of one or more parts of your system: a degrading antenna match; a slowly deteriorating feed line; a dirty relay that isn't obviously disconnected when it returns to receive; a minimally bad connector that is only going to give even more problems with time; and/or a developing receiver problem (W3DOG/B is now almost always only S2 or S1 here) it's time to find out what is wrong.

Finally, how can we detect enhanced propagation? Either we will hear a local beacon much stronger than usual or we will hear beacons that we normally don't hear. On tropo from my home station, WA2UMX/B (FN23xc) is normally about 70% copy on 144.289 and WA4PGI (FM07bw) is normally barely above the noise on 432.307 MHz. When there is any enhancement over these paths it is quite obvious by listening to these beacons. If there is a tropo opening to the west I will hear beacons in OH, IN and IL.

On 6 meters, beacons are wonderful indicators of E-skip openings. Some, like NØLL/B, are often audible well before you will hear any normal stations regardless of power. For E-skip you can listen for 10 meter beacons in the spring and summer in the normal skip range out to 2000 km; you will hear these before you hear 6 meter beacons. On 2 meters, the famous KH6HME beacon is essentially always the first indicator that the transpacific duct is open from Hawaii to California. In fact a few people have

144-MHz Standings

Published 144-MHz standings include call-area leaders as of May 1, 2007. For a complete listing, check the Standings Boxes on the World Above 50 MHz Web pages at **www.arrl.org/qst/worldabove/**. There are two requirements for inclusion in this list: US operators located east of the Mississippi River must have worked at least eight states. All operators must have submitted information within the previous two years. (You need not work additional stations to remain in the standings, but please confirm your continued interest.) Submit data by e-mail to **standings@arrl.org** or mail paper submissions to Steve Ford, WB8IMY, ARRL, 225 Main St, Newington, CT 06111.

Listing By States Worked

Call sign	State	States	DXCC	Grids	DX(km)†
1					
K1MS*	MA	50	32	—	2,166
W1AIM*	VT	50	18	222	2,340
K1SIX*	NH	43	14	201	2,501
AA1YN*	NH	39	43	191	2,201
K1TEO	CT	37	5	240	2,420
W1LP	MA	36	5	171	2,280
W1ZC	NH	35	2	87	2,490
2					
W2CNS*	NY	50	22	125	2,367
K1JT*	NJ	43	49	311	2,369
K1NY	NY	38	4	151	2,576
WB2CUT	NJ	37	2	155	—
K2OVS*	NY	36	6	165	2,812
3					
W3CMP*	PA	50	63	408	—
K3VGX*	PA	50	26	166	—
WA2FGK*	PA	45	36	248	—
W3ZZ	MD	38	6	241	2,526
K1RZ	MD	38	2	201	2,408
AE3T	PA	37	3	—	2,338
AK3E	MD	36	4	168	2,293
4					
W8WN*	KY	50	69	482	2,273
W4WA	GA	42	5	167	—
K4RF	GA	40	4	212	2,147
W4WTA	GA	40	4	175	2,413
W4DEX	NC	40	—	—	—
KU4WW	AL	39	3	164	2,968
K2BLA*	FL	38	51	245	13,504
K4QI	NC	38	6	229	—
K4RWP	TN	38	3	172	2,323
AA4H	TN	38	3	165	2,007
K4RTS	VA	36	3	160	2,023
K4MM	FL	34	8	163	2,347
K4MSG	VA	32	2	101	1,656
K3XA	VA	32	2	—	1,953

Call sign	State	States	DXCC	Grids	DX(km)†
5					
W5UWB*	TX	50	46	375	2,197
W5ZN*	AR	50	37	312	2,400
WD5AGO*	OK	50	32	220	2,050
WA5VJB*	TX	50	19	—	—
W5RCI*	MS	50	16	283	2,992
K5CM*	OK	50	—	—	—
W5LUA*	TX	50	—	—	—
N5KDA*	MS	48	51	329	16,069
K5SW	OK	47	4	298	2,377
KM5ES	OK	44	9	229	9,983
K5YPV	MS	41	3	199	2,902
K5LLL	TX	39	3	208	2,089
W5TD	OK	39	3	145	2,171
W5HNK	TX	37	3	—	2,442
WA5UFH	TX	35	6	171	—
W3UUM*	TX	33	10	203	2,132
K5TN	OK	32	1	127	2,025
K5AM	NM	31	9	157	—
AA5AM	TX	31	3	125	2,271
6					
K6AAW*	CA	50	57	401	3,831
WA6PEV*	CA	50	52	—	—
N6CW*	CA	32	20	175	—
K6QXY*	CA	24	8	—	3,794
N6ZE*	CA	22	16	115	2,600
KC6ZWT*	CA	20	5	150	3,934
7					
W7GJ*	MT	50	110	—	—
W7RV*	AZ	50	29	257	2,937
K7XC*	NV	31	21	189	4,056
WA7JTM	AZ	27	1	100	—
8					
W8PAT*	OH	50	50	289	2,207
K8BHZ*	MI	50	45	362	2,278
W8WVM*	WV	50	29	135	1,560
N8OC*	MI	44	29	227	2,140

Call sign	State	States	DXCC	Grids	DX(km)†
WA8RJF*	OH	44	27	227	2,131
K8ROX	OH	41	2	162	1,984
WB8TGY*	MI	40	8	174	2,262
WA8EOJ	OH	39	3	199	2,198
9					
N9LR*	IL	50	50	450	2,274
AA9MY*	IL	49	53	319	1,961
KA9UVY	IL	43	2	161	2,373
KJ9I*	WI	35	102	—	—
WA9PWP	WI	32	2	144	1,940
W9RPM	WI	29	3	116	2,507
W9RM	IL	26	2	54	1,609
Ø					
KØFF*	MO	50	35	267	2,185
KØAWU*	MN	48	38	330	15,316
KØCJ	MN	45	2	—	2,330
KØGU*	CO	42	40	350	2,400
KØUO	KS	41	3	273	2,213
KBØPE	MO	29	1	106	1,702
KØRZ*	CO	26	2	107	2,173
KØCS	CO	26	2	82	2,177
Canada					
VE3KH*	ON	50	63	300	1,985
VA3ST		37	2	129	—
VE3TMG	ON	35	2	172	1,994
VE2PIJ	PQ	14	2	49	1,781
International					
XE2AT*		39	41	198	1,988
SV1DH*		—	45	223	7,230
F5DE*	INT	—	44	241	2,399
GW3HWR*		—	34	177	2,760
PD3UX*		—	33	180	2,593

— Information not supplied
*Includes EME contacts
†Terrestrial

installed extensive antenna systems just to detect KH6HME/B.

Thus we have seen that propagation beacons are among the most useful tools for the VHFer. Use them and you will know your station is working right and you will be among the first to find those elusive band openings.

ON THE BANDS

April was another month with very little enhanced activity until the last week. With the coming of late spring and summer, however, that is about to change.

6 Meters

The E_s season perked up in the last week of April after a slow start. Jon, NØJK (EM17) reports XE1MM (EK09) into EM01, 07 and 26 on the 9th. Dave, N7DB, reports a little sunbelt E_s for a few days preceding the 14th. Several stations noted a significant opening from Mexico (DL82, 90, 91 among others) to TX, OK, AR and as far as KS on the 22nd and 23rd. Gary, KBØHH (EM07) worked 7 XE stations, and Steve, W5KI (EM36) worked 3 XE stations on those days. The last two days of April featured widespread openings to the Caribbean — CO, FM, HI, HP, KP4, VP5 as reported by stations in eastern and southeastern locations such as Bill, K3XA (FM18), Gary, N3JPU (FM19), Russ, K4QI (FM06) and Justin, N5BO (EM60). The opening April 30 lasted over 4 hours. Transequatorial propagation (TEP) continues in Europe into sunspot minimum as NØJK reports ZD7VC to IS0, and 9Q into EA and CT.

2 Meters and Up

Russ, K4QI (FM06) had some decent tropo into south FL on the 23rd and Dan, K3ZXL (EL87) reports a transgulf opening into Texas, EL29, EM10 and 20 on the morning of the 28th. The Spring Sprints, recently rescued by W4SHG and K9ZF, featured flat conditions but reasonable activity at least in the eastern regions based on the top scores from the usual suspects (K1TEO, WZ1V and W3SO). Other regions found the going slow, as usual.

Meteor Scatter

Dave, W6OAL/Ø (DM79) had considerable success on 6 meters on April 22 with the Lyrids — a daytime shower — working stations from CA to KY, including EM84, EN42, CM98 and DM07, all on analog SSB and CW.

EME

The Swains Island N8S DXpedition was able to work 5 contacts on 2 meter EME (including W5UN, K6MYC, W7GJ and KB8RQ) and 2 contacts on 6 meter EME (K6MYC and W7GJ). Justin, N5BO, is now up to 135 initials on 2 meter EME and 36 countries with his 400 W and 2×9 element array. Russ, K4QI, worked KH7X on random 2 m EME for state no. 39. Bob, K6QXY, continues to pile up new European countries with GDØTEP on 6 m EME for no. 140 overall. Next month we will take a detailed look at the KH7X EME DXpedition by Bruce, KØYW and company.

HERE AND THERE

2007 CQ World Wide VHF Contest

This two band contest, 6 and 2 meters, begins at 1800Z July 21 and ends at 2100Z July 22. Details, rules and log sheets can be found in the June issue of *CQ* or at **www.cq-amateurradio.com/VHFContest_Rules200741107.pdf**. Last year conditions in this contest were unbelievably good, and activity was at least as good as the September ARRL VHF contest. Join in and see if the good conditions repeat.

Central States VHF Society 2006 Conference

The annual CSVHFS conference returns to its roots in Texas in San Antonio July 26-29. This year there is likely to be no independent gathering of six meter operators, so many of them will come to this conference. The usual excellent program is planned, with antenna and preamp measuring included. More details can be found at **www.csvhfs.org/CSVHFS2007.html**.

New 2 Meter Beacon

Mike, WA3TTS, writes that he has a new 5 W ERP beacon running on 144.300 MHz in EN90xn at 1200 ft ASL. It uses a pair of Par loops up 40 ft and covers from at least my QTH in FM19jd to EN71. QST

K2TQN

OLD RADIO

Bruce Kelley, W2ICE (SK), and the Antique Wireless Association

This story starts in January 1951, with a letter Bruce Kelley wrote to his friend Ed Raser, W2ZI. In it, he tells Ed about a recent meeting of the Rochester Amateur Radio Association where almost 100 turned out at a meeting about early wireless radio. He said, "The overwhelming success of the meeting demands another one this fall." He also asked when Ed was planning his next "Old Timers Nite," in New Jersey, as he would like to attend.

In November 1951, Kelley writes again that he is planning an "Old Timer's Nite" in early December and asks Ed for some help. He also talks about his collection of radios. "I'm personally interested in collecting old gear but my collection is relatively small compared to yours. I am told that you have one of the largest in the country — if not the largest. I have about 150 tubes of different types prior to 1930 of which 40 are of European origin. Also have a couple Grebe receivers, a Paragon RA-10, an old Navy receiver, odd parts, magazines and catalogs." He also mentioned that he would like to locate some old spark equipment. Continuing he said, "I heard some when a kid but that was a long time ago — hi!"

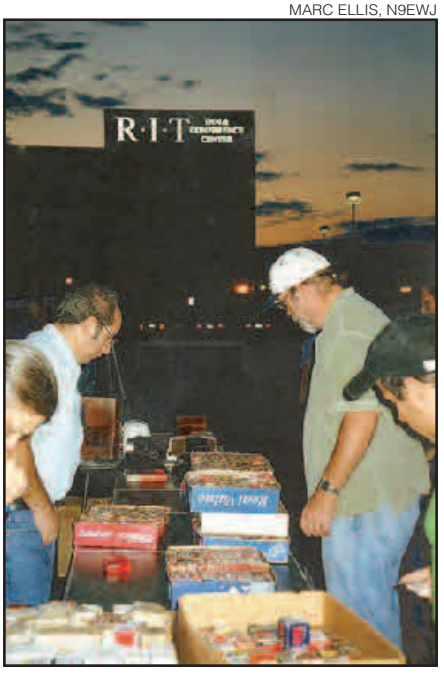
In letters dated November 1952, Kelley writes about his "Old Timer's Nite," recently held on October 9, 1952, saying that 130 hams were present, the majority of whom were active in the 1920s and before. He said that it was very successful and plans to have another one.

Continuing, Kelley said, "I am more or less the permanent custodian for the OT collection and chairman of the OT Nite, however, I have never seen an old time collection of gear other than my own or never have attended an OT Nite. I am looking forward to attending your OT Nite in Trenton sometime…."

The printed OT program was really interesting (and is available to you at **www.k2tqn.com**). Highlights were the illustrated talk on the Transatlantic tests in 1921 called "The Paul Godley Story," a working 1 kW Spark Rig by George Batterson, W2GB, and a display of 48 early and rare wireless parts and accessories.

JOHN WARD, KE2ST

MARC ELLIS, N9EWJ



Buying tubes at the crack of dawn.

MARC ELLIS, N9EWJ

World War II military aircraft radios for sale.

Just how did Bruce Kelley take a few old tubes, receivers and some odd parts and turn them into one of the largest radio collections and collector organizations in the United States, and perhaps the world?

I reviewed more than 100 letters by Bruce Kelley, written between 1951 and the 1970s in preparation for this story. It is very clear to me that Bruce Kelley was an exceptional man, dedicated to his beloved hobby of ham radio, the ARRL and to his friends.

His enthusiasm was infectious, and he was able to recruit friends and strangers alike to work with him. He was a tireless worker and planner, always gathering information and sharing the same with anyone who would listen. If he heard about someone, another old timer or collector who had radios, he would contact them. If he heard about some old radios forgotten in storage, he would try to get them. If he learned about a long forgotten radio station from the past, he would visit it and take photos to preserve the history.

Bruce would make historic slide shows with a tape recorded program, and then share them with just about any club that wanted to borrow them. He contacted the ARRL and had them distribute (loan) the slide shows to even more clubs where they would also be shown at hamfests and conventions. Many times Bruce would accompany the slide shows and bring along some of his collection for show and demonstrations.

The AWA and Amateur Radio

From the beginning of the Antique

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MARC ELLIS, N9EWJ

Collector Larry Babcock wins a blue ribbon for his World War I aircraft radio display.

ROBERT LOZIER, KD4HSH

German World War II Enigma display by Tom Perera, W1TP.

Wireless Association (AWA), Amateur Radio has played a significant role. All the AWA's founders were licensed amateurs; in the beginning, a ham license was a requirement to be an officer. Founders Bruce Kelley, W2ICE; George Batterson, W2GB, and Linc Cundall, W2QY, were active amateurs during the 1930s. Kelley, with an enviable DX operating record during the 1930s, was able to use his association with both the Rochester Amateur Radio Association (where he was a founding member) and the American Radio Relay League to significant advantage in promoting the AWA.

Ed Gable, K2MP, current Curator of The AWA Electronic Communication Museum, adds the following comments: "Amateur Radio was the common meeting ground for those wishing to enter the historic radio field to become introduced to those who were already there. It was the foot in the door. How many of these pioneering AWA supporters do you recognize? Thorn Mayes, W6AX; George Grammer, W1DF; Ed Reddington, W4ZM; Bill Halligan, W9AC; Ed Raser, W2ZI; Bob Merriam, W1NTE; Jack Gray, W8JDV; Joe Pavek, WØOEP; Rex Matlack, W3CFC; R.H.G. Mathews, 9ZN; Bud Hall, K2LP; Bob Morris, W2LV; Ken Conrad, W2IIE; Louise Moreau, W3WRE; Howard Pyle, W7OE; Fred Hammond, VE3HC, and Bill Orr, W6SAI. There are many others.

"The ability to communicate with each other via their own ham sets tied many of these early wireless and radio historians together in this unique way. AWA nets on 75 and 20 meters were widely used in the earlier days."

Kelley mentions in his letters that he wanted to start a four page collecting newsletter once a month. This quickly changed into a quarterly publication of several pages. True to his nature, Kelley recruited friends to edit various sections so that all he had to do was assemble the various pieces into what was to become the *Old Timer's Bulletin*, loaded with wireless history articles. Thus, the Antique Wireless Association was born. It started with a few hams who appreciated old radios. Word spread, and it has grown into a very active organization of thousands of members from around the world.

AWA Annual Conferences Begin

The 1963 summer issue of the *Old Timer's Bulletin* announced the "First National Get Together," to be held on Saturday, August 17, 1963 in Holcomb, New York. The 1964 summer issue brings an announcement of a second National Meet, to be held on October 3 at the New England Wireless Museum in East Greenwich, Rhode Island. Bob and Nancy Merriam were the hosts.

This yearly gathering of collectors has become "the event" to attend. It typically runs several days and has the following activities: a flea market, an auction, seminars, membership meeting, visits to the AWA Museum, a very prestigious old equipment contest and a nice awards banquet. There is too much to do to try and attend for only one day, like a hamfest.

This Year's Conference

The theme of this year's (46th annual) conference will be "100 Years of Electronic Communications," with 2007 being the 100th Anniversary of the patent of the De-Forest Audion. The dates for the conference are August 22-25. Early registration will be on Wednesday evening, and the flea market will open Thursday morning. The many seminars will be on Thursday and Friday. The auction will be all day Saturday, with well known radio Auctioneer Richard Estes at the gavel.

So why not plan something different this summer and take a few days off from work and attend. You'll have a great time meeting and speaking with other collectors, and the opportunity to pick up some new treasures in the flea market or at the auction. You might just be able to find those much needed parts to complete your restoration project from the many vendors attending. And what would a radio event be without a new friend or two? There is also a contest for the best restoration, home brew item and rare radio item, so bring your rig along for the ride and enter it in the contest.

The AWA will waive the members-only rule this year, so you can attend without being an AWA member. Of course you are invited to join if you wish, and if you do you will receive *The AWA Journal* four times a year. It is loaded with history and old equipment information. As collectors, we all owe a lot to the AWA for building this hobby we all enjoy so much.

There are many motels and restaurants in the area, so finding a room should be fairly easy. For more information, please visit **www.antiquewireless.org/otb/2007conf.htm** or you can visit **www.k2tqn.com** for this and additional AWA links.

Next Month

Next month I will continue the Bruce Kelley story and feature the AWA Electronic Communications Museum, both the old one and the present one; we will look into the future to see what it holds. I'll also show many photos of the current exhibits.

I would like to acknowledge the assistance of Bill Fizette, W2DGB, and Ed Gable, K2MP. Some information was taken directly from the publication *50 Years of the AWA*, which is available from the AWA.

W1GHZ

MICROWAVELENGTHS

Getting Started in Microwaves

You've been reading Microwavelengths in *QST* for a while, and now you are wondering what microwaves are really like. How can you get your feet wet (yes, we operate in the rain on occasion) and see for yourself? Summer is a good time for portable operation, so it is the "high season" for microwave activity. You just have to find some!

Microwave Beginners Workshop

This past April in New England, we held a microwave workshop at the Eastern VHF Conference for folks interested in getting started in microwaves; this was patterned after several microwave workshops held recently in the United Kingdom. Facilitators included Dale Clement, AF1T; Matt Reilly, KB1VC; Chip Taylor, W1AIM, and myself. Our audience ranged from old-timers to young Bahnou Upton, KB1OIS, who recently passed her General license (including code) and then wanted to attend the conference, persuading her father David, WB1CMG, to come along.

The workshop emphasized simple and less expensive ways to get on microwaves. For some reason, most beginners want a 6 foot dish (too big to point) and a 10 W TWT amplifier (too power-hungry for portable operation). Most of the experienced 10 GHz operators do well with an 18-24 inch dish and 1 or 2 W. For the beginner, we recommend an easy-to-aim horn antenna and perhaps a bit less power.

Most of the experienced operators have improved their equipment over time, ending up with excess equipment. We try to lend these out for contests and other activity, to give newcomers a chance to try microwave operation. Typically, an experienced operator will invite new operators to accompany them for a day or weekend, so as to learn some of the nuances of microwave operation; they are then encouraged to "fly solo." With a bit of guidance, a new operator with simpler equipment in a 10 GHz contest will make about 90 percent of the contacts that the experienced operator with the fancy equipment makes. Many of the folks who have borrowed a rig and tried microwaves have become enthusiastic microwavers, encouraging others to join them.

Matt, KB1VC, covered simple test equipment. Many microwavers have acquired far too much test equipment — some of it expensive, but rarely used. Matt suggests that the most important item to have is an inexpensive digital multimeter, since many problems are just dc-related, usually 12 V. The capability for detecting output power with some sort of power meter, as discussed in April 2007's "Microwavelengths," is the next priority. A signal source, like the one featured in July 2006's "Microwavelengths," is the final essential item for assurance that the receiver is working and on frequency.

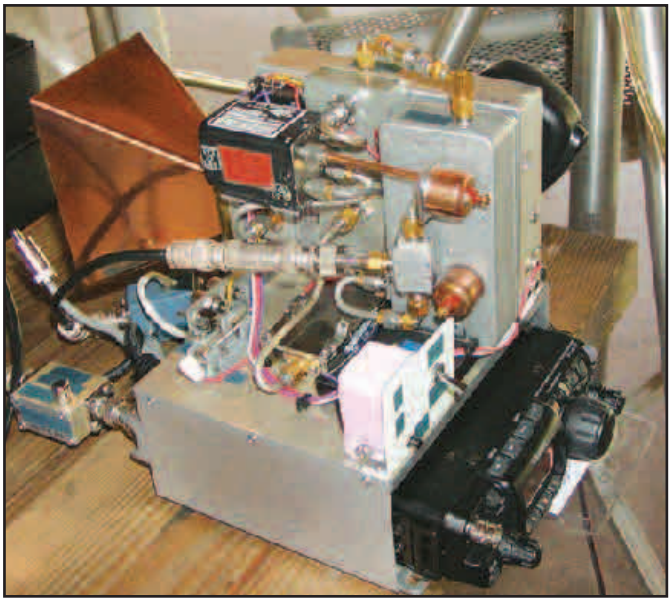
All the presentations from the workshop are available on the conference Proceedings CD, available for $6 postpaid from Bruce

Chip Taylor, W1AIM, demonstrating a simple 10 GHz rig.

Bahnou Upton, KB1OIS, and dad Dave, WB1CMG, admire a microwave transverter.

A 10 GHz transverter with a dish antenna.

Paul Wade, W1GHZ ♦ 161 Center Rd, Shirley, MA 01464 ♦ w1ghz@arrl.org



A simple 10 GHz transverter with a horn antenna.

Microwave operating — good portable locations can be popular.

Wood, N2LIV, 3 Maple Glen Ln, Nesconset, NY 11767.

Outside New England

There are centers of microwave activity in Texas, California, the Pacific Northwest, Minnesota, Colorado, the Midwest, the Southeast, the New Jersey-Philadelphia area and the Rochester-Toronto area. If you are near one of these areas, contact one of the local clubs in the area; this should allow you to make a connection with some experienced microwavers. A partial list of Web sites for these clubs is shown in the table — most of them have interesting newsletters. I know hams in all of these clubs who have assisted newcomers and they would welcome you and your questions.

For those far from any activity center, life is a bit harder. A few determined souls have done it alone, making contacts only during exceptional conditions or via the moon, by EME, but that is a major challenge.

A better choice is to find a buddy and work together — you will need two rigs anyway, and someone to operate the second one, just to make a contact. In northern Vermont, two active VHFers, Larry Filby, K1LPS, and Chip Taylor, W1AIM, decided to try 10 GHz. They worked together and got two simple rigs working, then found some other hams near Montreal doing the same thing. I was hiking on Jay Peak in Vermont when I came across them working the hams in Quebec during a 10 GHz contest. I took their picture and sent it to *QST*, where it appeared on the cover of the March 1990 issue. A year later — with borrowed equipment and help from Larry and Chip — Matt, KB1VC, and I were operating in the 10 GHz contest. After that, we were hooked!

Microwave Information on the World Wide Web

Microwave Update (world)	**www.microwaveupdate.org**
North East Weak Signal Group	**www.newsvhf.com**
North Texas Microwave Society	**www.ntms.org**
Roadrunners Microwave Group (South Texas)	**www.k5rmg.org**
San Bernardino Microwave Society	**www.ham-radio.com/sbms/**
Pacific Northwest VHF Society	**www.pnwvhfs.org**
Northern Lights Radio Society (Minnesota)	**www.nlrs.org**
Midwest VHF-UHF Society	**www.mvus.org**
Central States VHF Society	**www.csvhfs.org**
Southeastern VHF Society	**www.svhfs.org**
Mt Airy VHF Radio Club (Pennsylvania)	**www.packratvhf.com**
Rochester (NY) VHF Group	**www.rvhfg.org**
UK Microwave Group	**www.microwavers.org**
Microwave e-mail reflector	**www.wa1mba.org**

Learn by Doing

So find a buddy or two and pick a manageable project, perhaps one of the lower microwave bands — like 1296 or 2304 MHz — where a range of equipment and surplus is available. More important, all the things you have learned about VHF and UHF still apply on these bands, if applied judiciously. Keep things short and pay attention to good grounding. First get something working, then take it out and make some contacts. Start with short distances and move further apart in stages. When something doesn't work, figure out why and try again.

Of course, microwave DX isn't the only kind of operation. These bands are wide, with room for other modes and experimentation. There are folks operating WBFM, ATV, high-speed data and more. You could even try something like high-definition TV.

Finally, keep reading. There are several good books from the ARRL and RSGB — a few things may be a bit dated, but the basics haven't changed. Proceedings from past Microwave Updates (available from the ARRL) document what some of the serious experimenters are doing. And the Web sites listed have links to a wealth of material (but don't believe everything on the Internet). You also might want to check out "Getting on 24 GHz" by Wayne Yoshida, KH6WZ, on page 28 of this issue.

But hands-on learning is best. In the 1960s, there was a small magazine called the *VHFer* whose motto was "Learn by doing." You can learn something from everything you try, whether successful or not. Give microwaves a try! And don't forget your raincoat.

All photos courtesy of the author. QST

WB8IMY

ECLECTIC TECHNOLOGY

JT65A on the HF Bands

Never underestimate a ham's ability to "repurpose" a device or technique. If curiosity gets the better of us, we won't hesitate to experiment. Our internal dialogue goes something like this: "Yeah, I know you're supposed to use X to do Y, but why not try using X to do Z?"

Take JT65A as an example. This is a digital communications mode designed by Joe Taylor, K1JT, and it is part of his *WSJT* software suite. JT65A is normally used for *moonbounce*, otherwise known as *EME* (Earth-Moon-Earth) communication. This exotic pursuit uses the Moon as a giant mirror. By bouncing radio waves off the Moon, hams enjoy contacts that span thousands of miles here on Earth. JT65A was a revolutionary development in the moonbounce world because its weak-signal detection ability made it possible for hams with modest stations (a single Yagi antenna and about 100 W output) to make EME contacts. Prior to the debut of the *WSJT* suite, you usually needed large antenna arrays and serious RF (1.5 kW) to routinely ricochet signals off the lunar surface.

So far so good, right? Well, some amateurs began to wonder why JT65A couldn't be used for terrestrial communication on the HF bands. They started trying it on 20 and 40 meters and, by golly, it worked. Even with low power levels and poor band conditions, these curious hams made JT65A contacts, and they are still at it.

I should point out that JT65A is not designed for "conversational" contacts. All that is exchanged is the minimal information necessary to consider a contact complete: call signs and signal reports. (Brevity is important when you're trying to decode an exquisitely weak signal that has traveled to the Moon and back!) Text messages, up to 13 characters per transmission, are supported as well.

If you want to give terrestrial JT65A a try, all you need is an SSB transceiver, a computer with a soundcard (or sound chipset) and a sound card interface such as those you commonly see advertised in *QST* and elsewhere. The *WSJT* software is free for downloading at **physics.princeton.edu/pulsar/K1JT/**. Before you attempt to make contacts, read *The Complete Bozo's Guide to HF JT65A* by Andrew O'Brien, K3UK, at **www.obriensweb.com/bozoguidejt65a.htm** and the *WSJT6 User's Guide and Reference Manual* that comes with the program.

W0JAB

JT65A is one of several applications in the *WSJT* software suite. It was originally intended for moonbounce work, but now some amateurs are trying it on HF.

A wide-bandwidth inverted-V "blade" antenna under test at the Long Wavelength Array.

A Little Sugar in Your Battery?

Researchers at St Louis University in Missouri have created a fuel cell battery that runs on virtually any sugar source, including soft drinks. They say it has the potential to operate three to four times longer on a single charge than conventional lithium ion batteries. They made the announcement at 2007 national meeting of the American Chemical Society.

Sugar-fueled power is not new. In fact, our very bodies are powered by sugar in the form of glucose. Some hams have toyed with the idea over the years, but the St Louis University team has made an important breakthrough that allows sugar power generation to be much more efficient. One scientist made her point by using a small prototype of the battery (about the size of a postage stamp) to successfully run a handheld calculator.

These batteries can be instantly recharged by adding any convenient sugar source, including plant sap. The sugar battery contains enzymes that convert sugar into electricity, leaving ordinary water as the main byproduct. Best of all, the materials used to build the sugar battery are biodegradable.

The research team has powered the batteries from glucose, flat sodas, sweetened drink mixes and tree sap. Yes, they've tried carbonated beverages, but carbonation seems to weaken the cell. The best fuel tested so far is ordinary table sugar dissolved in water.

Long Wavelength Telescope

When you think of radio astronomy, you normally think of microwave signals. However, there is a largely unexplored astronomical world at HF and low VHF frequencies. The problem of probing this undiscovered country is the distorting effect of our ionosphere. The ionized region of our atmosphere that gives us the ability to communicate over long distances on HF frequencies also tends to play havoc with signals arriving from outer space on those same frequencies.

Astronomers at the Naval Research Laboratory are testing a prototype of what they call the Long Wavelength Array (LWA) in southwestern New Mexico. Once completed, the full-sized LWA will provide an entirely new view of the sky in the radio frequency range of 20-80 MHz.

The current prototype, referred to as the Long Wavelength Demonstrator Array (LWDA) was built by Applied Research Laboratories at the University of Texas, Austin. The telescope consists of 16 wide-bandwidth inverted-V dipole antennas connected to RF combiners and a suite of digital signal processing receivers.

The full-sized LWA will be much the same, but much larger. Plans call for more than 13,000 individual antennas divided into 50 stations. The stations will be spread over a 250-mile area of New Mexico, and possibly beyond. QST

Steve Ford, WB8IMY ♦ *QST* Editor ♦ sford@arrl.org

AB1FM

EXAM INFO

General Pool Up! — Activity Up! — Enthusiasm Up!

S. KHRYSTYNE KEANE, K1SFA

VEC Manager Maria Somma, AB1FM (left), reviews exam session paperwork with VEC staffer Nancy Hallas, W1NCY.

New General Question Pool to Take Effect July 1

Effective *July 1, 2007* a new Element 3 General class question pool takes effect for examinations. VECs and VEs will have new test designs available for use at exam sessions effective that date.

The newly revised pool released on January 9, 2007 (and updated January 22, 2007) by the Question Pool Committee (QPC) of the National Conference of Volunteer Examiner Coordinators (NCVEC) must be in use starting July 1. There are 485 questions in this pool and there is one schematic drawing graphic file required for this pool. The new pool is presented in a more understandable and friendly fashion, while maintaining appropriate emphasis on safety, rules and operating procedures.

With the General class exam questions changing *July 1*, new test designs must be used effective that day. Previous ARRL VEC supplied General class test booklets versions (2004 series) are only valid until midnight June 30, 2007. At that time VE Team leaders may destroy the old versions of the General exams.

The ARRL VEC *ExamWin* Software will get updated, too. If you are an ARRL VE using our *ExamWin* software package, an *ExamWin* software update will be available for download from the VEC Web site at **www.arrl.org/arrlvec/examwin/**. If you will need any NCVEC Form 605s, CSCEs, other exam summary forms or supplies to go with the new *ExamWin*, please contact us directly.

Next up for review is the Element 4 Amateur Extra class question pool. The NCVEC QPC welcomes public comments and suggestions for new questions or changes to the topic areas for any of the pools. Please send your input to the QPC using the following e-mail address: **qpcinput@ncvec.org**.

You can help shape the next pool!

All current question pools can be found on our Web page, **www.arrl.org/arrlvec/pools.html**.

Question Pool Schedule

- Technician class (Element 2) Pool effective July 1, 2006 is valid until June 30, 2010.
- General class (Element 3) Pool effective July 1, 2007 is valid until June 30, 2011.
- Extra class (Element 4) will be released December 2007 and will become effective July 1, 2008. The current Extra Pool will be valid until June 30, 2008.

We've Been Busy!

The expected avalanche of Amateur Radio license and license upgrade applications prompted by the FCC's elimination of Morse code as a licensing requirement is well under way. ARRL Volunteer Examiner Coordinator staff of seven full-time and three part-time employees handles the "incoming" Amateur Radio exam sessions from across the US and from other sites where US Amateur Radio examinations are administered through ARRL VEC. While the initial surge of applications immediately following February 23, when the new rules went into effect, has subsided somewhat, business remains brisk.

In a typical pre-February 23 week, ARRL VEC would receive paperwork from approximately 115 test sessions. It's on the order of 150 to 200 sessions per week now and it doesn't look like the pace will slacken anytime soon. We have also seen a rise in new Technician licensees and Amateur Extra class upgrades as well as the expected upgrades to General. We estimated that new applications were up by 35 percent while upgrade applications were up 150 percent over last year's volume. Despite the hectic pace, VEC staff has been able to process most test session paperwork promptly. The majority of our VE teams are returning the sessions in good order and with all the needed forms.

Flood of Applications Causes Ripple Effect…

The number of hams who want to be volunteer examiners is also going up. We've seen a spike in the number of applications from General class radio amateurs who want to give back to their community by serving as volunteer examiners.

Twenty years ago, the ARRL VEC averaged about 55 sessions a week and we had about 12,000 VEs in our program. Today, the ARRL VEC normally averages about 115 sessions a week and our Volunteer examiners are now over 30,000 strong.

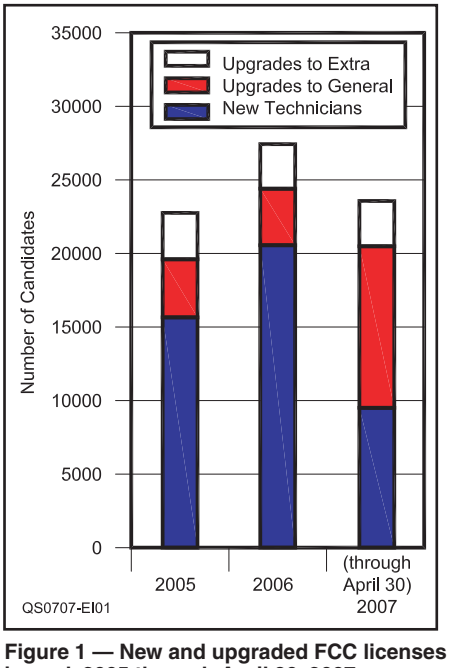


Figure 1 — New and upgraded FCC licenses issued, 2005 through April 30, 2007.

The ARRL VEC's ability to provide examination opportunities in the field could not have been accomplished without the generous contributions of our Volunteer Examiners. We want to express our warmest appreciation to you all. May future years bring continued prosperity and health to Volunteer Examining, Amateur Radio and to all of you who make it happen. QST

Maria Somma, AB1FM ♦ ARRL VEC Manager ♦ msomma@arrl.org

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

KA1ARE **Adams**, Paul R., Biddeford, ME
W1AYX **Caron**, Lawrence W., Old Town, ME
N1BCF **Saunders**, Phyllis E., Augusta, ME
W1EMJ **Bent**, Lincoln T., Naples, ME
WB1FSR **Rowe**, Michael, Milford, CT
K1FUB **Fleury**, William, Nashua, NH
N1GLV **Ridenour**, Richard D., Richmond, ME
KA1HIW **Merritt**, Donald T., Caribou, ME
K1JNR **Hilt**, Roy A., Uncasville, CT
W1PN **Rock**, Charles H., Monticello, ME
WA1UDP **Hunter**, Phillip J., Patten, ME
K1VZX **Dionne**, Nelson L., Salem, MA
N1XLC **Clark**, Daniel F., Mattawamkeag, ME
♦ WA1YRB **Pelletier**, Richard, Groton, CT
WA2LKF **Scibilia**, Salvatore J., Vineland, NJ
W2ODC **Lester**, Howard L., Alplaus, NY
W2RHQ **Sellwood**, Charles R., Constantia, NY
W2WIY **Richardt**, John W. Jr, Hackettstown, NJ
KB2YAU **Devejian**, Haig S., Seaford, NY
N2ZAU **LaGreca**, Vincent, Randolph, NJ
N2ZIW **Radmore**, Glenna M., Olcott, NY
KB3BJX **Rossi**, Dominick Jr, Bradford, PA
W3FQE **Benson**, Lee A. Jr, Lutherville, MD
W3GAM, **Williams**, Edwin M., McKeesport, PA
W3HXL **Hahn**, Oscar A., Danville, PA
KB3MME **Schoch**, Sarah, Potomac, MD
KI4AKZ **Stout**, Charles S., Mountain City, TN
W4BKK **Wells**, James C., Dublin, GA
N4CO **Hutsell**, Vance C., Georgetown, KY
♦ W4DNZ **Poling**, Philip, Bristol, TN
W4DXJ **Edwards**, Isaac J. Jr, Greenville, NC
KD4DYK **Anderson**, Erma J., Louisville, KY
KD4IEE **Larison**, John F., Stateline, NV
N4KMK **Counts**, Dale W., Johnson City, TN
W4LUM **Ostrye**, Norbert B., Millbrook, AL
KD4MIZ **Manley**, Max C., McKenzie, TN
♦ WB4MUS **Craft**, William H., Seminole, AL
♦ KA4NZO **Hopkins**, Ann S., Collinsville, VA
NZ4O **Zimmerman**, Charles R., Old Town, FL
K4PPN **Parker**, Robert L., Memphis, TN
♦ K4PVZ **McFarland**, Wilbur G. Jr, Burlington, NC
KD4SRB **Arnold**, Lemuel C., Kingsport, TN
W4VSE **Weixler**, Herman J., Tulsa, OK
W4WMS **Williams**, Wendel K., Harrison, TN
K4WO **Todd**, Irby L., Barco, NC
♦ K5CVH **Lee**, Richard H., Abilene, TX
W5GSS **Trewitt**, Manning B., Dallas, TX
KC5OJS **Coombs**, Wesley, Meridian, MS
WB5OMY **Boyd**, Earl E., Shamrock, TX
W5UAA **Brower**, William L., Grove, OK
WD6BAI **Bennett**, John, Apple Valley, CA
KA6BUM **Boski**, John, Pine Grove, CA
W6CMO **Iacono**, Tony, San Pedro, CA
♦ K6DS **Gabrielson**, Harley C., La Mesa, CA
K6JTC **Workman**, Harry E., Sunnyvale, CA
K6LSK **Welch**, George K., Madera, CA
KK6NZ **Janer**, Fernando, Castro Valley, CA
KG6OY **Wheaton**, John, South San Francisco, CA
KJ6PZ **Stutsman**, Hugh J., Bakersfield, CA
KA6RHH **McKinney**, Leona G., Baldwin Park, CA
KO6VU **Cobb**, Edwin B., Goleta, CA
W6WLT **Winkle**, Walter M., Fullerton, CA
KB6ZN **Jeffries**, Herb, Washington, DC
KD7BCQ **Grassia**, Carmelo C., Port Townsend, WA
W7CHU, **Matthews**, John, Spokane, WA
K7EFB **Martinek**, William R., Veradale, WA
WA7HTY **Pacheco**, Jon F., Boise, ID
KB7JEZ **Snider**, Stone M., Gold Beach, OR
W7NQA **Runnels**, Arthur L., Burns, OR
WB7WAS **Hansen**, Sue A., Williams, AZ
W7WLA **Adkins**, Walter L., Mesa, AZ
KE7XK **Hooke**, Earl D., Aloha, OR
KD8BCI **McCullough**, William F., Leesburg, FL
WA8DBI **Sever**, Robert G., Leesburg, FL
W8GUL **McEwuen**, James E., Morgantown, WV
WA8ICV **Somero**, Henry M., Laurium, MI
KA8MQV **Smithwick**, John A., Portland, OR
K8ROH **Wood**, Elmer L. Jr, Twin Lake, MI
K8TNE **Riley**, John J., Marysville, OH
N8UJC **Gorby**, Robert J., Mount Pleasant, MI
WA8VQQ **Rosneck**, Paul H., Covington, TN
KB8ZEH **Wenson**, Richard R., Marlette, MI
W9FHW **Fabert**, Herman A. Jr, Bainbridge Island, WA
W9FSW **Brooner**, Claire H., Morton, IL
WD9IAI **Williamson**, Larry T., Peoria, IL
W9IWX **Schumacher**, Norman F., Chicago, IL
N9KYM **Zimmer**, Ralph F., Hickory Hills, IL
N9MBT **Cavallaro**, Elmer J., Des Plaines, IL
W9NVV **Jensen**, Garold K., River Falls, WI
WB9RNJ **McFee**, Paul H., Madison, WI
K9RUN **Hill**, Ron, Bartonville, IL
WA9SGH **Reuterskiold**, Vernon H., Fort Atkinson, WI
KB9WAY **Krukowski**, Paul, Milwaukee, WI
WB9YWL **Davis**, Charles A., Beloit, WI
WØDNS **Stoker**, Raymond F., Guernsey, IA
WAØGWA **Thomas**, Larry P., Olathe, KS
WBØIGI **Miller**, Merrill R., Clarinda, IA
WØITD **Baker**, Clifford A., Greeley, CO
WØMZI **Kruse**, Francis H., Hill City, SD
NØUSE **Zachau**, Jeremy W., Cedar, MN
WAØVNE **Bush**, Dorothy E., Lincoln, NE
WBØVXU **Andersen**, Samuel E., Axtell, NE
WØWRT **Snyder**, John D., Omaha, NE
KAØZXJ **Swallow**, Larry L., Topeka, KS
♦ VE7JCR **Crull**, Roland J., Penticton, BC
HK3BZO **Carosio**, Francisco E., Miami, FL

♦ Life Member, ARRL

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation or to ARRL. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Amy Hurtado, KB1NXO ♦ Silent Keys Administrator ♦ sk@arrl.org

Strays

QST congratulates…

◊ Frederick Van Veen, W1NYL, of Kennebunkport, Maine, who has written a book tracing the history of the General Radio Company from its founding through 2001, when it was acquired. *The General Radio Story* is available for $20 at **www.lulu.com**.

◊ ARRL Technical Advisor Nathan O. (Nat) Sokal, WA1HQC, of Lexington, Massachusetts, and his son Alan D. Sokal, WA1HQB, of New York City and London, England, who jointly were awarded the 2007 Microwave Pioneer Award of the IEEE Microwave Theory and Technical Society. The Award was given for their development of the Class E RF power amplifier.

W8JK MEMORIAL CLUB

◊ The recently formed John D. Kraus Memorial Amateur Radio Club has been issued Dr Kraus' call sign, W8JK. The Web site is **www.naapo.org/W8JK/W8JK.htm**. The station, based at the North American AstroPhyical Observatory in Delaware, Ohio, will be on the air in various contests and special events. QSL via KC8VEB. John Kraus was a well-known pioneer in antennas and radio astronomy. — *Robert S. Dixon, W8ERD, Chief Research Engineer*

KAZAKH CLUB MEETING

◊ Vern Kaspar, W9FAM, of Frankfort, Indiana, operated as UN7W9FAM during a recent trip to Kazakhstan. He and his host, Gennadij Khonin, UN7QF (ex UL7QF) attended an Amateur Radio club meeting in Almaty, the largest city in the former Soviet republic. During the trip, Vern and Gennadij also traveled to Bishkek, Kyrgyzstan, meeting up with old ham friends; Vern operated from there as EX/W9FAM.

GENNADIJ KHONIN, UN7QF

This photo was taken at the radio club meeting in Almaty, Kazakhstan. Vern, W9FAM, is in the middle (wearing a hat and holding his QSL card).

75, 50, AND 25 YEARS AGO

July 1932

• The cover photo shows ongoing work on "building an inexpensive radiophone."
• The editorial lays down some strong words about the "a.c. notes" that "continue to infest our air."
• "On the Beach," a short article by Ed Stevens, W7BB-K6BB, takes a quick look at the interesting variety of stations we might run across on the air.
• George Grammer, W1DF, tells us about "Building a Low-Cost 1750-kc. 'Phone-C.W. Transmitter." Part I gives construction details of the Class B modulator.
• "Eliminating the "'Phone Monologue," by M. F. Chapin, W9CJU, tells how to have a station that transmits only when the op speaks into his microphone — a revolutionary idea that will soon put an end to long-winded 'phone transmissions!
• L. C. Waller, W2BRO, tells how to use "The New 57 as a High Gain Audio Amplifier."
• "How Electron-Coupled Oscillators Make Still Better Frequency Meters" presents construction details on two new models: "W1MK's New Frequency Meter," by R. B. Parmenter, chief op of HQ station W1MK; and "An All-A.C. Operated Model," by Donald Meserve, W1FL.
• S. M. Kinter tells tales from his experiences in "Some Recollections of Early Radio Days."
• Bill Swearingten, W5AQO, describes "A Compact C.W. and 'Phone Transmitter Assembly" that uses 210 tubes in the oscillator and multiplier stages, and 211-D tubes in the r.f. amplifier (one tube) and modulator (a pair).

July 1957

• The cover photo shows the ARRL's slick 6-60-90 mobile transmitter for 'phone and c.w., to be described in next month's issue.
• The editorial discusses the merits of "Do-It-Yourself" equipment building. A small sidebar notes that, effective with the August issue, *QST* will discontinue general newsstand distribution.
• Ted Crosby, W6TC, tells about simplified construction of his high-performance "Ham-Band 14-Tube Double-Conversion Receiver."
• Lew McCoy, W1ICP, discusses "Test Meters and How to Use Them" to perform your own trouble-shooting.
• Laird Campbell, W1CUT, describes "A Saw-Tooth Crystal Calibrator" that will provide 100-Kc. Markers up to the 50 Mc. Band.
• L. A. Morrow, W1VG, tells about "Rule 11 … ," which concerns the altering of DX QSL cards submitted for DXCC credit.
• Fred Reynolds, W2VS, discusses "Simple Gamma-Match Construction" for your HF beam antennas.
• Gerald Banshak tells how to build "Wavemeters Using Butterfly Tank Circuits" to cover 135 to 1000 Mc. with two handy units.
• H. F. Priebe, W2TGP, shows off his neat design work in "Packaging a Portable Two-Meter Station."

July 1982

• The cover photo shows the sun as it sets behind the array of towers and antennas at the Rockwell/Collins Worldwide Communications System, in Cedar Rapids, Iowa.
• The editorial declares, "We Win One on the Hill," reporting that the Communications Technical Amendments Act of 1982 has passed both the House and the Senate, and will soon be ready for the president's signature.
• Bob Heil, K9EID, urges the reader to "Equalize Your Microphone and Be Heard!" and describes a small but effective equalizer for the ham shack.
• Doug DeMaw, W1FB, presents "Antenna Matching, Remotely—Some Thoughts."
• Floyd Carter, K6BSU, describes the "K6BSU Touch Keyer."
• David Jagerman, KC2FR, describes an audio filter for cw, which he calls "The KC2FR QRM Fighter."
• Claude Frantz, F5FC/DJØOT, presents "A New More Versatile Transmatch" that features front-panel jacks to accept jumper wires to change the tuner's circuit.
• Dennis Monticelli, AE6C, wants the reader to "Build a 40-M Cubic Incher," a single-stage crystal-controlled transmitter that occupies less than one cubic inch of volume—until you plug the FT-243 crystal into it!
• Dick Baldwin, W1RU, reports that BY1PK is once again on the air and making contacts with stations around the world, in his report, "China: Active Once Again."

Al Brogdon, W1AB ♦ Contributing Editor

W1AW SCHEDULE

W1AW's schedule is at the same local time throughout the year. From the second Sunday in March to the first Sunday in November, UTC = Eastern US Time + 4 hours. For the rest of the year, UTC = Eastern US Time + 5 hours.

♦ **Morse code transmissions:** Frequencies are 1.8175, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 WPM.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 WPM.

Code bulletins are sent at 18 WPM.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. See "Contest Corral" in this issue. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Fees: $10 for a certificate, $7.50 for endorsements.

♦ **Digital transmissions:** Frequencies are 3.5975, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:** Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Notes:** On Fridays, UTC, a DX bulletin replaces the regular bulletins. W1AW is open to visitors 10 AM to noon and 1 PM to 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy. In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

During 2007, Headquarters and W1AW are closed on New Year's Day (Jan 1), Presidents' Day (Feb 19), Good Friday (Apr 6), Memorial Day (May 28), Independence Day (Jul 4), Labor Day (Sep 3), Thanksgiving and the following Friday (Nov 22-23), and Christmas Eve Day and Christmas Day (Dec 24-25).

For more information, see **www.arrl.org/w1aw.html**.

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM-1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	DIGITAL BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	DIGITAL BULLETIN				
6:45 PM	7:45 PM	8:45 PM	9:45 PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

COMING CONVENTIONS

OKLAHOMA SECTION CONVENTION

July 20-21, Oklahoma City

F D V S

The Oklahoma Section Convention (Ham Holiday 2007), sponsored by the Central Oklahoma Radio Amateurs, will be held at the Oklahoma State Fair Park (Oklahoma Expo Hall), NE of the intersection of I-40 and I-44 (NW 10th St and May Ave). Doors are open Friday 4-9 PM, Saturday 8 AM-3 PM. Features include 33rd Annual Ham Holiday, flea market, vendors (contact **kc5qcv@cox.net** for details), technical and non-technical programs, WAS card checking, VE sessions. Talk-in on 146.82 (151.4 Hz). Admission is $7 in advance, $10 at the door; under 16 free with paying adult. Tables are $15 in advance (pre-registration only), $20 at the door (if available); electrical hookup $10. Send pre-registrations to William Roberson, N5AQ, c/o CORA Ham Holiday 2007, 1629 Rolling Stone Dr, Norman, OK 73071-1430; or contact David Duskin, NE5S, 405-386-6739; **ne5s@arrl.net** or **hamholiday@hotmail.com**; **www.hamholiday.org**.

MONTANA STATE CONVENTION

July 20-22, East Glacier

F D V S

The Montana State Convention (73rd Glacier-Waterton International Peace Park Hamfest), sponsored by the Glacier-Waterton Directors, will be held at the Glacier Meadow RV Park, US Hwy 2 (Mile Post 191.5). Features include flea market; tailgating; vendors; dealer displays; old equipment auction; meetings (QCWA, ARES, annual hamfest); transmitter hunts; contests; seminars and programs; VE sessions; DXCC, VUCC and WAS field card checking; BBQ lunch; supper (Saturday, bring your own meat, plates and utensils, plus a pot luck); camping (for reservations call 406-226-4479 or **www.glaciermeadowrvpark.com/**). Talk-in on 146.52. Admission is $15 in advance, $20 at the door. Tables are $6. Contact Sam Moore, K7SAM, Rte 1, Box 92, Flaxville, MT 59222; 406-779-3534; fax 407-474-2232; **k7sam@arrl.net**; **www.gwhamfest.org**.

CENTRAL STATES VHF CONFERENCE

July 26-29, San Antonio, TX

F D S

The Central States VHF Society Conference (41st Annual Conference), sponsored by the Roadrunners Microwave Group, will be held at the Omni San Antonio Hotel, 9821 Colonnade Blvd. Doors are open Thursday 6-10 PM, Friday and Saturday 8 AM-10 PM, Sunday 8 AM-noon. Features include technical presentations (VHF and UHF propagation, weak signal modes and operation and construction); outdoor antenna range; noise figure measurement; testing of passive devices; pre-amp workshop; VHF/UHF flea market; vendors; dealer area; "Getting Started in VHF/UHF Weak Signal Ham Radio" program; Friday luncheon with special guest speaker ARRL President Joel Harrison, W5ZN; Saturday eve banquet; hospitality suite; fun family program. Talk-in on 147.38, 443.875 (162.2 Hz). See Web site for registration fees. Contact Paul Goble, ND2X, Box 380526, San Antonio, TX 78268; 210-884-9105; **nd2x@arrl.net**; **www.csvhfs.org/conference/**.

June 29-30
Iowa State, South Sioux City, NE*

July 6-8
Arizona State, Williams*

August 10-12
Pacific Northwest DX, Everett, WA

August 18-19
ARRL National, Huntsville, AL

August 19
Kansas State, Salina

August 24-25
Missouri State, Joplin

August 25
West Virginia State, Weston

September 7-8
Arkansas State, Mena

September 7-9
Southwestern Division, Torrance, CA

*See June *QST* for details.

3905 CENTURY CLUB EYEBALL

July 27-29, Guthrie, OK

S

The 3905 Century Club Eyeball, sponsored by the 3905 Century Club, will be held at the American Legion Bldg, 123 N 1st St. Doors are open Friday and Saturday 8 AM-10 PM, Sunday 8-10 AM. Features include 3905 Century Club's 30th Anniversary celebration, Antenna Shootout contest (Saturday morning), forums, guest speakers, awards presentations, special HF nets, annual board meeting, Barbecue Banquet (Saturday eve). Talk-in on 147.135. Admission is $30. Tables are $5. Contact Jim Richardson, N5OHL, 1810 NW 18th St, Oklahoma City, OK 73106; 405-473-8009; fax 405-739-2839; **n5ohl@cox.net**; **www.3905ccn.com**.

TEXAS STATE CONVENTION

August 3-4, Austin

F D V S

The Texas State Convention, Austin Summerfest 2007, co-sponsored by the Austin ARC and the Texas VHF-FM Society, will be held at the Wyndham Garden Hotel and Conference Center, 3401 S I-35. Doors are open Friday 5-9 PM, Saturday 8 AM-5 PM. Features include indoor swapfest, dealers with latest products, exhibits, forums and technical sessions, demonstrations and presentations, Texas VHF-FM Society annual meeting, VE sessions, DX and contest. Talk-in on 146.34/.94. Admission is $8 in advance, $10 at the door. Tables are $10 each (limit of 3 to a customer; first come, first served basis); power is available at an additional $5 charge (through advance registration only). Contact Joe Makeever, W5HS, 8609 Tallwood Dr, Austin, TX 78759; 512-345-0800; **w5hs@arrl.net**; **www.austinsummerfest.org**.

WYOMING SECTION CONVENTION

August 3-5, Jackson Hole

F V S

The Wyoming Section Convention (WIMU 2007 — Four-State Convention), sponsored by the Utah Hamfest Committee, will be held at the Virginian Lodge, 750 W Broadway (for directions visit **www.virginianlodge.com**). Features include BBQ Cookout and Eyeball QSO Party (Friday eve, $10); outdoor swapmeet (free, bring your own tables); seminars and forums; special guest Chris Imlay, W3KD, General Counsel for the ARRL; VE sessions; QSL card checking; contests (CW, QLF, mobile installation, transformer toss, transmitter hunts);Wouff Hong ceremony; women's and children's events; Dutch Oven Dinner (Saturday eve, $15); breakfast banquet (Sunday, $12; under 12, $6). Admission is $10 in advance (by Jul 20), $12 at the door; for youth under 18, $3 in advance (by Jul 20), $5 at the door. WIMU polo shirts are $25. Contact Eugene or Carol McWherter, **n7ovt@arrl.net** or **kc7llw@arrl.net**; **home.comcast.net/~wimuhamfest/**.

ILLINOIS STATE CONVENTION

August 5, Bolingbrook

F D V S

The Illinois State Convention (22nd Annual Event), sponsored by the Bolingbrook ARS, will be held at the Bolingbrook High School, 365 Raider Way. Doors are open for setup at 6 AM; public 8 AM-2 PM. Features include huge outdoor flea market, vendors, AR gear, computer items, electronics, forums, VE sessions (9 AM-noon, walk-ins welcomed), DXCC QSL card checking, free parking on paved lot. Talk in on 147.33, 443.525. Admission is $6 in advance, $8 at the door. Tables are $12 (without power), $15 (with power) in advance; $20 (without power), $25 (with power) at the door. Contact Tom Ballard, N9LJY, 19 W 609 Dystrup Ave, Lemont, IL 60439; 630-739-3740 (before 9 PM); fax 312-499-7602; **tb1301@comcast.net**; **www.k9bar.org**.

F = FLEA MARKET
D = DEALERS / VENDORS
H = HANDICAP ACCESS
V = VE SESSIONS
S = SEMINARS / PRESENTATIONS

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

Gail Iannone ♦ Convention and Hamfest Program Manager ♦ giannone@arrl.org

HAMFEST CALENDAR

Attention: 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 **July 1** to be listed in the **September** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For detailed directions to the event, see the event Web site or contact sponsor. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

Abbreviations: *Spr* = Sponsor, *Tl* = Talk-in frequency, *Adm* = Admission

Alabama (Cullman) — Jul 28 F V
8 AM-4 PM. *Spr:* Cullman ARC. Cullman County Fairgrounds, Sportsmans Lake Rd. First Annual Mid-Summer Swapfest, VE sessions. *Tl:* 145.31. *Adm:* $2. Tables: $10. Dana Byerley, KD4ESC, 1509 Convent Rd NE, Cullman, AL 35055; 256-651-0005; **byerleyd@bellsouth.net**; **www.qsl.net/cullmanarc**.

California (Fresno) — Aug 4 F D V S
8 AM-3 PM. *Spr:* Fresno ARC. Airport Holiday Inn, 5090 E Clinton Way. 65th Annual Fresno Hamfest, swap tables, vendors, forums, VE sessions, luncheon with keynote speaker. *Tl:* 146.94 (starting at 7 AM). *Adm:* advance $8, door $10. Tables: $20. Tom Jarvis, KG6KYU, 359 E Shaw Ave, Fresno, CA 93710; 559-916-2445; fax 559-226-5920; **kg6kyu@comcast.net** or **hamfest@w6to.com**; **www.w6to.com**.

Florida (Milton) — Jul 13-14 F D V
Set up Friday noon, public 5-9 PM; set up Saturday 7 AM, public 8 AM-2 PM. *Spr:* Milton ARC. Santa Rosa County Auditorium, 4530 Jimmy's Way. 12th Annual Hamfest, air-conditioned spaces, vendors, VE sessions (Saturday, 8 AM-noon), refreshments. *Tl:* 145.49. *Adm:* $3. Tables: $8. Walter Yarbrough, WA4TFR, 4301 Bell Ln, Pace, FL 32571; 850-994-7335; **wa4tfr@bellsouth.net**; **www.miltonarc.org**.

Illinois (Bolingbrook) — Aug 5, Illinois State Convention. See "Coming Conventions."

Illinois (Carlinville) — Aug 4 D V S
7 AM-2 PM. *Sprs:* Macoupin and Montgomery County ARCs. Macoupin County Fairgrounds, IL State Rte 4 N. Vendors, tailgating, seminars, displays, VE sessions. *Tl:* 146.82, 444.25 (103.5 Hz). *Adm:* $4. Tables: $5. Jim Pitchford, N9LQF, 18303 Blackhawk Dr, Girard, IL 62640; 217-854-3352; fax 217-854-4474; **james@royell.org**.

Illinois (Fox Lake) — Jul 14 D V S
9 AM-5 PM. *Sprs:* Western Lake County ARS and Boy Scout Venture Crew 743. Fox Lake Community Center, 23 South St. WelCARS TechFEST, technology sales only (not a flea market), vendors, tailgating ($5), technical forums and videos, VE sessions, free parking. *Tl:* 145.29. *Adm:* Free ($5 recommended donation for patrons). Tables: $15 ($10 for table space only). Joe Serocki, N9IFG, 35144 Sheridan Dr, Ingleside, IL 60041; 224-715-7766; **joeserocki@gmail.com**; **welcars.no-ip.org**.

Illinois (Peotone) — Jul 15 F D H V
Set up Saturday 6-8 PM, Sunday 6-8 AM; public 6 AM for flea market, 8 AM for indoor vendors. *Spr:* Kankakee Area Radio Society. Will County Fairgrounds. 24th Annual Hamfest; air-conditioned building; flea market; vendors; electronics; computers; DXCC, WAS and WAZ card checking; ARRL reps and booth, VE sessions; handicapped accessible; overnight RV parking ($10 with electricity); refreshments; free parking. *Tl:* 146.94 (107.2 Hz). *Adm:* advance $6 (double stub), gate $8 (single stub), under 12 free. Tables: $10 (reserve early). Send SASE and check made payable to KARS to Carl Schroeder, K9CS, 1505 N 2000 East Rd, Watseka, IL 60970; 815-473-4263; **kn2qzr@hotmail.com**; **www.w9az.com**.

Indiana (Indianapolis) — Jul 14 F V S
6 AM-3 PM. *Spr:* Indianapolis Hamfest Assn. Camp Sertoma, 2316 S German Church Rd. Indoor and outdoor flea markets, forums, VE sessions. *Tl:* 146.76. *Adm:* advance $6, door $8. Tables: $15. Bob Blake, N9FIM, 11064 Indian Lake Blvd, Indianapolis, IN 46236; 317-261-6658; **bob9fim@aol.com**; **www.indyhamfest.com**.

Iowa (Cedar Rapids) — Aug 5 F H V
8 AM-1 PM. *Spr:* Cedar Valley ARC. Teamsters Hall, 5000 J St SW. Large flea market, VE sessions, handicapped parking. *Tl:* 146.745, 146.52. *Adm:* $5. Tables: $10. Rick Olney, NØXZL, 1574 W Mt Vernon Rd, Mt Vernon, IA 52314-9532; 319-396-8979; **rolney@qwest.net**; **www.cvarc.rf.org/**.

Iowa (Marshalltown) — Jul 7 F V
9 AM. *Sprs:* Central Iowa RAS and Iowa 75 Meter Net. Marshalltown Community College, 3702 S Center St. Flea market, picnic, VE sessions. *Tl:* 444.525 (151.4 Hz), 146.88 (146.2 Hz). *Adm:* $5. Chuck Lynk, WØDYS, 1004 Highland Acres Rd, Marshalltown, IA 50158-6015; 641-753-6925; **c.lynk@mchsi.com**; **www.k0miw.org**.

Louisiana (Slidell) — Jul 21 F D V S
8 AM-2:30 PM. *Spr:* Ozone ARC. Slidell City Auditorium, 2056 Second St. Flea market, commercial dealers, ARRL forum, WAS, VE sessions. *Tl:* 147.27 (114.8 Hz). *Adm:* $5. Tables: $7. Mike King, W5PY, 592 Marina Dr, Slidell, LA 70458; 985-641-0831 or 985-640-7708 (cell); **w5py@arrl.net**; **www.w5sla.net**.

Maine (Union) — Jul 14 F V
Set up 7 AM; public 8 AM-1 PM. *Spr:* Pen-Bay ARC. Thompson Community Center, 51 S Union Rd. Indoor flea market only (no tailgating), VE sessions, refreshments. *Tl:* 145.49 (91.5 Hz). *Adm:* $5, under 12 free with paying adult. Tables: $4. Scott Ewen, KB1DSW, 408 River Rd, Cushing, ME 04563; 207-354-6809.

Maryland (West Friendship) — Jul 22 F V
8 AM-3 PM. *Spr:* Baltimore RA Television Society. Howard County Fairgrounds, Rte 144. Hamfest/Computerfest, free VE sessions (9 AM). *Tl:* 147.03, 224.96, 448.325. *Adm:* $6. Tables: $30. Les McClure, W3GXT, c/o BRATS, Box 5915, Baltimore, MD 21282; 410-461-0086 (phone/fax); **lesmcclure@comcast.net** or **brats@bratsatv.org**; **www.bratsatv.org**.

Massachusetts (Cambridge) — Jul 15. Nick Altenbernd, KA1MQX, 617-253-3776 (9 AM-5 PM); **w1gsl@mit.edu**; **www.swapfest.us**.

Michigan (Escanaba) — Jul 28 F D S
Set up Friday 6-10 PM, Saturday 7-9 AM; public 9 AM-3 PM. *Spr:* Delta County ARS. Bay de Noc Community College, Joseph Heiman University Center (Building 9), 2001 N Lincoln Rd. Swap and Shop, vendors, meetings, forums (APRS; ARRL with Great Lakes Division Director Jim Weaver, K8JE; and more), refreshments. *Tl:* 146.7, 147.24 (107.2 Hz). *Adm:* $5. Tables: $5. Richard Thompson, N8OYR, 9560 Chaison N 5 Rd, Gladstone, MI 49837; 906-428-2528; **rich137@charter.net** or **n8oyr@dcars.org**; **www.dcars.org**.

Michigan (Hale) — Aug 4 F V
8 AM-noon. *Spr:* Iosco County AR Enthusiasts. Plainfield Township Hall, 220 N Washington (M-65). Ham Swap, inside tables, trunk sales, VE sessions. *Tl:* 146.64. *Adm:* advance $4, door $5. Tables: $7. Clifford Dolliver, N8HA, 3636 Glennie Rd (F-30), Glennie, MI 48737; 989-735-3186; **n8ha@centurytel.net**; **www.w8icc.com**.

Michigan (Petoskey) — Jul 14 F V
8 AM-noon. *Spr:* Straits Area ARC. Petoskey High School, 1500 Hill St. Swap and Shop, VE sessions, refreshments. *Tl:* 146.68 (110.9 Hz). *Adm:* $5. Tables: $10. Dirk Esterline, KG8JK, 3106 Greenfield Dr, Petoskey, MI 49770; 231-348-5043; **kg8jk@qsl.net**; **www.w8gqn.org**.

Minnesota (Brainerd) — Jul 14 F
9 AM-2 PM. *Spr:* Brainerd Area ARC. National Guard Armory, 1115 Wright St. 7th Annual Hamfest. *Tl:* 147.225. *Adm:* $5. Tables: $10. Al Doree, WØRC, 33247 E Shamineau Dr, Motley, MN 56466; 218-575-2404; **doreeaj@brainerd.net**; **www.brainerdham.org**.

Minnesota (St Paul) — Jul 28 F
8 AM-noon. *Spr:* Magic Repeater Group. Art's (KAØJLB) QTH, 37 Hatch St. Free swapmeet/yard sale. *Tl:* 145.17. *Adm:* Free. Tables: Free. George Lavallee, NØSBU, 5578 141st St N, Hugo, MN 55038; 651-429-5948; **n0sbu@arrl.net**; **www.magicrepeater.net**.

Missouri (Warrensburg) — Jul 21 V
8 AM-1 PM. *Spr:* Warrensburg Area ARC. Johnson County Fairgrounds, Hwy 50. Air-conditioned, equipment testing station, VE sessions. *Tl:* 146.88 (107.2 Hz). *Adm:* 3 for $7 in advance; door, $4 each. Tables: $10. Keith Raihala, NØVJ, c/o WAARCI, Box 1364, Warrensburg, MO 64093; 660-422-7273; **n0vj@arrl.net**; **www.waarci.org**.

Missouri (Washington) — Jul 15 F V
6 AM-1 PM. *Spr:* Zero Beaters ARC. Hillerman Park, Grand Ave. 45th Annual Hamfest, VE sessions. *Tl:* 147.24. *Adm:* $5. Tables: $5. Jim Glasscock, WØFF, 8300 Whiskey Creek Rd, Union, MO 63084-2715; 636-584-8888; **foxfox@yhti.net**; **www.wa0fya.org**.

Montana (East Glacier) — Jul 20-22, Montana State Convention. See "Coming Conventions."

Nebraska (North Bend) — Jul 21 F H
Set up 7:30 AM; public 9 AM-12:30 PM. *Spr:* Pioneer ARC. St Charles Parish Center, 8th and Locust Sts. 10th Annual Flea Market, air-conditioned building, easy parking, handicapped accessible, breakfast and lunch available. *Tl:* 146.67. *Adm:* $2. Tables: advance $5, door $7 (for each 8-ft space). Rich Mehaffey, KBØARZ, 1525 County Rd 5, North Bend, NE 68649; 402-652-3410; **mehaffey@dtnspeed.net**; **home.alltel.net/jlhoffman/index.htm**.

New Jersey (Oceanport) — Jul 14 F D V
Set up 6 AM; public 8 AM-1 PM. *Spr:* Ocean-

Gail Iannone ♦ Convention and Hamfest Program Manager ♦ giannone@arrl.org

port Volunteer First Aid and Rescue Squad. Oceanport Volunteer First Aid and Rescue Squad, 2 Pemberton Ave. Indoor/outdoor hamfest, vendors, VE sessions, plenty of parking, refreshments. *Tl:* 145.045 (67 Hz). *Adm:* $5. Tables: $15 (outside), $20 (inside). Jonathan Ryan, KC2QVO, 24 Willow Ct, Oceanport, NJ 07757; 732-804-7421; fax 732-542-0689; **kc2qvo@aol.com**; **oceanporthamfest.20m.com**.

New York (Alexander/Batavia) — Jul 21 F V

6 AM-2 PM. *Spr:* Genesee Radio Amateurs. Alexander Firemen's Recreation Center, 10708 Rte 98. 27th Annual Summer Hamfest, flea market, foxhunt, VE sessions (9 AM), breakfast and lunch served. *Tl:* 147.285, 146.52. *Adm:* advance $6, door $7. Tables: inside $10 (outdoor space $5). Rob McLean, KC2MHH, 220 W Main St, Batavia, NY 14020; 585-343-1347; **kc2mhh@verizon.net**; **www.geocities.com/gram_radio_club/index.html**.

New York (Frankfort/Utica) — Jul 21 V

Set up 6 AM; public 8 AM-1 PM. *Spr:* Utica ARC. Herkimer County Fairgrounds, Cemetery St. RadioCom 2007, VE sessions. *Tl:* 146.76. *Adm:* $5. Tables: $6. Bob Decker, AA2CU, 4 Forest Rd, Utica, NY 13501; 315-797-6614; **tbd2626@yahoo.com**.

New York (Ithaca) — Aug 4 V

7 AM-2 PM. *Spr:* Tompkins County ARC. Trumansburg Fairgrounds, 2150 Trumansburg-Ithaca Rd (NYS Rte 96). Free crystal radio build for children, VE sessions. *Tl:* 146.97 (103.5 Hz). *Adm:* advance $4, door $5. Tables: $10. Doug Reid, NE2T, 105 Sheldon Rd, Ithaca, NY 14850-2501; 607-257-6066; **jdreid@lightlink.com**; **tcarc.compcenter.com**.

North Carolina (Cary) — Jul 21 F V

8 AM. *Spr:* Cary ARC. Harold Ritter Park, 301 W Lochmere Dr. 35th Annual Swapfest, VE sessions. *Tl:* 146.88. *Adm:* $3. Tables: $10. Herb Lacey, W3HL, 1022 Medlin Dr, Cary, NC 27511; 919-467-9608; **w3hl@arrl.net**; **www.qsl.net/n4nc**.

North Carolina (Waynesville) — Jul 28 F V S

8 AM-4 PM. *Spr:* Western Carolina ARS. Haywood County Fairgrounds, Hwy 209 (Lake Junaluska). 32nd Annual Western Carolina Hamfest, ARRL Forum, foxhunt, VE sessions. *Tl:* 146.91 (91.5 Hz), 146.76. *Adm:* advance $5, door $6. Tables: $10. Dean Blair, K2JB, 20 Coffey Pl, Asheville, NC 28806; 828-423-3082; fax 828-670-9909; **k2jb@arrl.net**; **www.wcars.org/hamfest/**.

North Dakota (International Peace Garden) — Jul 13-15 F V

Friday 6-9 PM, Saturday all day, Sunday 6 AM to Noon. *Sprs:* Central Dakota ARC and other ND and Manitoba, Canada ARCs. CCC Lodge and Campgrounds, West Loop Rd. 44th International Hamfest, tailgate swapfest, eyeball QSOs, VE sessions, Mobile Judging Contest, 2 Mtr Transmitter Hunt, scavenger hunt, ladies activities, dance (Saturday, 9 PM), camping, breakfast (Sunday 7 AM), annual meeting (Sunday, 10 AM). *Tl:* 146.52. *Adm:* $13 (US or Canadian; upon entering the park gate, inform personnel that you are attending the hamfest to obtain discount). Richard Holder, VE4QK, 204-268-1702; **ve4qk@mts.net**; **www.mts.net/-holderr/ihf.htm**.

Ohio (Columbus) — Aug 4 F V S

8 AM-1 PM. *Spr:* Voice of Aladdin ARC. Aladdin Shrine Center, 3850 Stelzer Rd. Hamfest and Electronics Show, forums, VE sessions. *Tl:* 147.21. *Adm:* $5. Tables: $8. Jim Morton, KB8KPJ, 6070 Northgap Dr, Columbus, OH 43229; 614-846-7790; **kb8kpj@cs.com**.

Ohio (Randolph) — Jul 29 F D V

8 AM-3 PM. *Spr:* Portage ARC. Portage County Fairgrounds, 4215 Fairgrounds Rd. Portage Hamfair, vendors, League and Section Officials, VE sessions. *Tl:* 145.39. *Adm:* advance $5, door $6. Tables: $15. Joanne Solak, KJ3O, 9971 Diagonal Rd, Mantua, OH 44255; 330-274-8240; fax 330-274-8527; **kj3o@arrl.net**; **www.hamfair.com**.

Ohio (Van Wert) — Jul 22 D

8 AM. *Spr:* Van Wert ARC. Van Wert County Fairgrounds, 1055 S Washington St (US Rte 127 S). *Tl:* 146.85. *Adm:* $5. Tables: $10. Louie Thomas, WD8LLO, 208 N Chestnut St, Van Wert, OH 45891; 419-238-2812; or Stephen Kouts, WA8WKF, **skouts@bright.net**; **www.w8fy.org**.

Ohio (Wellington) — Jul 14 F D

8 AM-1 PM. *Spr:* Northern Ohio ARS. Lorain County Fairgrounds, 23000 Fairgrounds Rd (Rte 18). Large flea market, indoor vendors, computer and Amateur Radio sales, ladies events. *Tl:* 146.7. *Adm:* $6. Tables: $15 (8-ft; for reservations contact Al Moriarty, N8CX, 2140 McKinley Ave, Lakewood, OH 44107; 216-221-3682; **n8cx@mindspring.com**). Tom Porter, W8KYZ, 161 Herrmann Dr, Avon Lake, OH 44012; 440-930-9115; **tporter161@oh.rr.com**; **www.noars.net**.

Oklahoma (Guthrie) — Jul 27-29, 3905 Century Club Eyeball. See "Coming Conventions."

Oklahoma (Oklahoma City) — Jul 20-21, Oklahoma Section Convention. See "Coming Conventions."

Oregon (Bandon) — Jul 21 D V

9 AM-3 PM. *Spr:* Coos County RC. The Barn (Bandon Community Center), 1200 SW 11th St (Hwy 101). Vendors, programs, VE sessions, ARRL representatives, refreshments. *Tl:* 146.61, 145.19 (146.2 Hz). *Adm:* $3. Tables: $15 (pre-registration only). Ron Oliver, W7VU, 2041 King Ln, Myrtle Point, OR 97458; 541-572-5546; **w7vu@arrl.net**.

Pennsylvania (Kimberton) — Jul 15 F

7 AM-noon. *Spr:* Mid-Atlantic ARC. Kimberton Fire Company Fairgrounds, Rte 113 and Firehouse Rd. Valley Forge Hamfest and Computer Fair. *Tl:* 145.13, 147.06 (131.8 Hz). *Adm:* $6. Tables: $10. Mike Pilotti, KF3CD, 212 Amanda Ln, Phoenixville, PA 19460; 610-935-4429; **reservations@marc-radio.org** or **kf3cd@arrl.net**; **www.marc-radio.org/hamfest.html**.

Pennsylvania (Somerset) — Jul 15 F D V

6 AM (flea market), 8 AM-noon (inside vendors). *Spr:* Somerset County ARC. Somerset County Technology Center, 281 Technology Dr. Flea market, large tailgating and indoor vendor areas, on-site VE sessions, free parking, free coffee. *Tl:* 147.195, 443.25 (123 Hz). *Adm:* advance $4, door $5. Tables: $10. Scott Zimmerman, N3XCC, 474 Barnett Rd, Boswell, PA 15531; 814-444-9460; **hamfestinfo@k3smt.org**; **www.k3smt.org**.

South Dakota (Clear Lake) — Jul 28 F V

8 AM-6 PM. *Spr:* Deuel County ARC. Clear Lake City Park, Hwy 15. Complete outdoor event, VE sessions, camping. *Tl:* 147.18 (146.2 Hz), 444.95 (146.2 Hz). *Adm:* $5. Tables: Free. Dan Kelly, WAØYIN, Box 742, Clear Lake, SD 57226; 605-874-2701; fax 605-874-2449; **dkelly@itctel.com**; **www.w0gc.org**.

Tennessee (Athens) — Jul 21 F

7 AM-noon. *Spr:* McCinn County ARC. Athens Regional Park. Hwy 30 W. 3rd Annual Hamfest, tailgating, information booths, mobile communications trailer. *Tl:* 145.31 (141.3 Hz). *Adm:* Free. Tables: $5. Scott Duckworth, NA4IT, 522 County Rd 783, Etowah, TN 37331; 423-263-1989; fax 423-263-7393; **na4it@yahoo.com**; **www.mcminnarc.com/fest/fest.html**.

Texas (Austin) — Aug 3-4, Texas State Convention. See "Coming Conventions."

Texas (Dallas) — Jul 6-7. Pete, 214-432-7665; **info@sidewalksale.com**; **www.sidewalksale.com**.

Texas (Dallas) — Jul 21. Pete, 214-432-7665; **info@sidewalksale.com**; **www.sidewalksale.com**.

Texas (San Antonio) — Jul 26-29, Central States VHF Conference. See "Coming Conventions."

Texas (Texas City) — Jul 14 F D V S

8 AM-2 PM. *Spr:* Tidelands ARS. Doyle Convention Center, 2010 5th Ave N at 21st St N. Swap tables, major vendors, exhibits, CW contest, foxhunt, forum, VE sessions, refreshments. *Tl:* 147.14 (167.9 Hz), 442.025 (103.5 Hz). *Adm:* advance $4, door $5. Tables: $7. Joe Wileman, AA5OP, Box 73, Texas City, TX 77592; 409-945-6794; **aa5op@arrl.net**; **www.tidelands.org**.

Virginia (Berryville) — Aug 5 F V

6 AM-5 PM. *Spr:* Shenandoah Valley ARC. Clarke County Ruritan Fairgrounds, Business Rte 7. 57th Annual Winchester Hamfest/Computer Show, VE sessions, Ruritan's Famous Chicken and Beef BBQ. *Tl:* 146.82. *Adm:* $6. Tables: $10. Laura Stewart, N4LLS, HC 61, Box 159T, Capon Bridge, WV 26711; 540-533-2626; fax 540-869-7067; **n4lls@starband.net**; **www.svarc.us/hamfest**.

Virginia (Vinton) — Aug 4 F V S

8 AM-3 PM. *Spr:* Roanoke Valley ARC. William Byrd High School, 2902 E Washington Ave. Flea market, forums, VE sessions. *Tl:* 146.985 (107.2 Hz). *Adm:* $5. Tables: $10. Phil Roark, K4WFO, 405 Yorkshire St, Salem, VA 24153; 540-387-4487; **k4wfo@arrl.net**; **www.w4ca.org**.

Washington (Chehalis) — Jul 28 F D V

9 AM-1 PM. *Spr:* Chehalis Valley ARS. Lewis County Southwest Washington Fairgrounds, 2555 N National Ave. Largest Pacific Northwest covered tailgate electronics swapmeet and consignment auction; commercial vendors ($10 for car and 1 space; $5 for each additional space), auction (10:30 AM), VE sessions (11:30 AM). *Tl:* 147.06 (110.9 Hz), 146.46. *Adm:* $3. Tables: $6. John Ellingson, K7OSK, 18140 Mi-Lane SW, Rochester, WA 98579; 360-791-7934; fax 360-273-5929; **k7osk@boatanchor.com**; **www.cvars.org/swapmeet.htm**.

Wisconsin (Oak Creek) — Jul 7 F V

6 AM-3 PM. *Spr:* South Milwaukee ARC. American Legion Post No 434, 9327 S Shepard Ave. 40th Annual Swapfest, VE sessions. *Tl:* 146.52. *Adm:* $5. Verne Teske, W9RYA, 414-762-3235; **ryatex@aol.com**; **www.qsl.net/wa9txe**.

Wyoming (Jackson Hole) — Aug 3-5, Wyoming Section Convention (WIMU). See "Coming Conventions."

F = FLEA MARKET
D = DEALERS / VENDORS
H = HANDICAP ACCESS
V = VE SESSIONS
S = SEMINARS / PRESENTATIONS

SPECIAL EVENTS

Contact these stations and help commemorate history. Many provide a special QSL card or certificate!

Jun 16, 1800Z-2359Z, Garland, TX. Garland Amateur Radio Club, K5QHD. Celebrating 50 years as a club in Amateur Radio! 28.355 21.385 14.275. QSL. Garland Amateur Radio Club, 1027-B W Austin St, Garland, TX 75042. **www.k5qhd.org**.

Jun 22-Jun 24, 1400Z-1800Z, North Bend, NE. Pioneer Amateur Radio Club, KØJFN. 75th anniversary of the Pioneer Amateur Radio Club. 21.325 14.325 7.225 3.855. Certificate. KØJFN, 2411 CR 15, Colon, NE 68018. **home.net/jlhoffman/index.htm**.

Jun 23-Jun 24, 1800Z-1800Z, Nixa, MO. Nixa Amateur Radio Club, NØA. Annual ARRL Field Day. 28.400. QSL. Nixa Amateur Radio Club, PO Box 467, Nixa, MO 65714-0467. **www.nixahams.net**.

Jun 23-Jun 24, 1800Z-1800Z, San Diego, CA. HAMs on Kalypsys Relay for Life Team - QRP, K6S. *Call for the Cure* American Cancer Society Relay For Life/Field Day. 14.275 14.050 7.275 7.050 PSK-31 14.070 7.070 21.070 QRP. QSL. Daniel Severance, 8439 Torrell Way, San Diego, CA 92126. **www.qrz.com/n6erd**.

Jun 29-Jul 1, 1400Z-0200Z, Evansville, IN. USS LST325 *Memorial* Ship, WW2LST. Evansville Indiana Freedom Festival. CW 7.040 14.040 LSB 7.240 USB 14.240. Certificate. WW2LST Special Event, PO Box 4521, Evansville, IN 47724. **n9xaw@arrl.net**.

Jun 30, 1200Z-1900Z, Ashland, KY. River Cities Amateur Radio Club, K4S. Tri State's premier family fun festival in Central Park. 40 20 m. Certificate. RCARA, PO Box 612, Ashland, KY 41105.

Jul 4, 1300Z-1900Z, Milford, MI. Milford Amateur Radio Club, W8YDK. To commemorate the 175th year of the founding of Milford. CW 14.040 7.040 SSB 14.220 7.220. QSL. Milford Amateur Radio Club, PO Box 573, Highland, MI 48357. **www.qsl.net/w8ydk**.

Jul 4, 1300Z-2300Z, Van Wert, OH. Van Wert Amateur Radio Club, W8FY. Holiday at Home — Van Wert County Museum. 14.304 7.204 7.044 CW. Certificate. Van Wert Amateur Radio Club, PO Box 602, Van Wert, OH 45891. **www.w8fy.org**.

Jul 4, 1600Z-2300Z, Missoula, MT. Hellgate Amateur Radio Club, W7PX. Independence Day at Fort Missoula. 28.360 21.360 14.260 7.260. QSL. HARC, PO Box 3811, Missoula, MT 59806.

Jul 4, 1600Z-2359Z, Klamath Falls, OR. Klamath Basin Amateur Radio Club, W7VW. 4th of July Street Fair. 14.250 7.200. QSL. KBARA, PO Box 8106, Klamath Falls, OR 97602.

Jul 4, 1600Z-2200Z, Wessington Springs, SD. Huron Amateur Radio Association Inc, WØNOZ. 125th Birthday of the founding of city of Wessington Springs. 50.165 14.265 7.265. Certificate. Huron ARA, PO Box 205, Huron, SD 57350.

Jul 4-Jul 5, 1400Z-0200Z, Thompson, OH. Lake County Amateur Radio Association, N8GB. Happy Birthday America! 28.460 7.248. Certificate. George Bair, 386 Cedarbrook Dr, Painesville, OH 44077-2849.

Jul 7, 1330Z-2030Z, Williamsburg, VA. Williamsburg Area Amateur Radio Club, K4RC. Special Event related to Colonial Williamsburg and July 4th. 21.350 18.150 14.250 7.261. Certificate. Russell Chandler, KU4FP, 132 Druid Dr, Williamsburg, VA 23185. *Certificate for working all three special event stations (any year) for WAARC including Jamestown, Colonial Williamsburg and Yorktown Battlefield*. **www.qsl.net/waarc**.

Jul 7, 1400Z-2200Z, Smithville, TN. DeKalb County Amateur Radio Club, K4F. 36th Annual Smithville Fiddlers' Jamboree & Crafts Festival. 28.425 21.335 14.280 7.275. QSL. William Freddy Curtis, KC4GUG, 288 Dogwood Cir, Smithville, TN 37166-2712. **web.infoave.net/~kg4bto/dcarc.html**.

Jul 7, 1500Z-2000Z, Sioux Falls, SD. Sioux Empire Amateur Radio Club, WØFSD. USS *South Dakota* Battleship Crew Reunion. 146.895 28.450 21.365 14.260. Certificate. Sioux Empire Amateur Radio Club, PO Box 91, Sioux Falls, SD 57101. **www.w0zwy.org**.

Jul 7-Jul 8, 1300Z-0100Z, Green River, WY. Sweetwater Amateur Radio Club, WY7U. 100th Anniversary of Robert A. Heinlein's Birthday. IRLP 3831 14.235 7.250. Certificate. Dave Gregory, 1000 South Dakota St, Green River, WY 82935. *Transmitting from Greater Green River Intergalatic Spaceport*. **www.wy7u.org**.

Jul 7-Jul 8, 1600Z-2200Z, DeSmet, SD. Huron Amateur Radio Association, WØNOZ. Annual Little House on the Prairie Pageant. 14.265 7.265. Certificate. Huron ARA, PO Box 205, Huron, SD 57350.

Jul 7-Jul 10, 1300Z-0100Z, Corona, NM. NM SES Group, N5C. 60th Anniversary of "The Crash at Corona." 14.260 7.260 3.860. Certificate. Jay Miller, 4613 Jupiter St NW, Albuquerque, NM 87107. *Extra multiplier for non-terrestrial contacts, excluding ISS*. **wa5whn@arrl.net**.

Jul 8-Jul 9, 1500Z-0000Z, Everett, WA. Boeing Employees Amateur Radio Operators North Society, W7FLY. Celebrating the rollout of the Boeing 787 Dreamliner. 14.240 14.050 7.240 7.050. QSL. Mark McLauchlin, KN7T, 2625 176th St SE, Bothell, WA 98012. **www.w0ma.org**.

Jul 10-Jul 22, 1400Z-2359Z, Steamboat Lake, CO. KØSDW and KØYY Special Event Station, KØSDW. US Island Activation, USI — Bridge Island CO-12L. 21.365 14.265 7.265 3.965. QSL. QSL via bureau or LoTW, or direct to: Stan Whicker, KØSDW, 2539 S Fairplay Wy, Aurora, CO 80014. From Steamboat Lake State Park, rare Routt County and grid square — DN60. Operation on 80-6 meters, SSB, CW and digital. k**0sdw@arrl.net**.

Jul 11-Jul 15, 1800Z-2200Z, Austin, TX. Naturist Amateur Radio Club, NU5DE. Nude Awareness Celebration — Nude Recreation Week. 21.365 14.265 7.265. QSL. Naturist Amateur Radio Club, PO Box 200812, Austin, TX 78720-0812. **www.nu5de.org**.

Jul 13-Jul 14, 0000Z-0200Z, Burley, WA. Burley Amateur Radio Club, W1E. Continuing celebration of traditional bad luck day. 14.313 14.033 7.213 7.033. QSL. Burley Amateur Radio Club, PO Box 639, Burley, WA 98322. **tjsand@wavecable.com**.

Jul 14, 1600Z-2300Z, Grand Rapids, MI. Michigan DX Association, W8DXI. Gerald R. Ford Presidential Museum W8DXI. 14.285 14.110 7.265 7.135. QSL. Michigan DX Association, 1235 Morgan NW, Grand Rapids, MI 49504. **w8vom@sbcglobal.net**.

Jul 14-Jul 15, 1300Z-2300Z, Forest City, IA. Winnebago-Itasca Travelers Hams, WØWIT. 38th Annual Winnebago-Itasca Grand National Rally. 14.263 7.253 3.970 147.27+. QSL. Frank Krizan, 1005 Talley Rd, Garland, TX 75044. **www.orgsites.com/ia/witcars**.

Jul 14-Jul 29, 1100Z-0300Z, Williamsburg, VA. Williamsburg Radio Association, W4J. Celebrating the VA 400th anniversary from Williamsburg area. 14.325 7.230 3.855. Certificate. WRA - W4J, 106 Candlestick Pl, Williamsburg, VA 23185. **www.qsl.net/n4ari**.

Jul 15-Jul 21, 0100Z-2359Z, Newark, OH. Central Ohio Operators Klub Extra - Novice, W8TNX. Carl Howard, 8AGF, appeared in the July 1, 1915 D.O.C. General portion of all bands. Certificate. W8TNX, 1010 Blacks Rd SE, Hebron, OH 43025. **www.cooken.org**.

Jul 20-Jul 22, 1500Z-2359Z, Ashton, IA. Northwest Iowa Amateur Radio Club, WØVHQ. Ashton Iowa "Town & Country Days" & RAGBRAI-Iowa Bike Ride. 50.160 18.140 14.260 7.180. QSL. WØVHQ, 1430 Western Ave, Sheldon, IA 51201. **www.niarc.com**.

Jul 21, 1300Z-1900Z, Paris, TX. Red River Valley Amateur Radio Club, WB5RDD. 23rd Annual Tour De Paris Bike Rally. 28.350 14.260. QSL. Red River Valley ARC, PO Box 6103, Paris, TX 75461-6103. **www.wb5rdd.org**.

Jul 21, 1300Z-2000Z, Roanoke, VA. Roanoke Valley Amateur Radio Club, W4CA. Celebrating 57 years of the Mill Mountain Star. 14.260 7.260. QSL. Ray Crampton, 1670 Catawba Rd, Troutville, VA 24175. **www.w4ca.net**.

Jul 21, 1300Z-1600Z, Wapakoneta, OH. Reservoir Amateur Radio Association, K8QYL. Celebrating the 38th anniversary of Moon Landing. 14.235 7.185. Certificate. Ann Vogel, WB8GPB, 14455 CR 66A, St. Marys, OH 45885.

Jul 21, 1400Z-2200Z, Fulton, NY. Fulton Amateur Radio Club, W2CXV. Celebrating the 50th Anniversary of the Fulton ARC. 21.350 18.150 14.250 7.250. QSL. Tom Cantine, W2TQF, 2807 CR 45, Fulton, NY 13069. **www.fultonhamclub.org**.

Jul 21-Jul 22, 1300Z-2100Z, Warren, OH. Warren Amateur Radio Association, W8P. 18th Annual Car Show from the National Packard Museum. 20 40 m Gen portions. Certificate. Gail Wells, PO Box 809, Warren, OH 44482. **www.w8vtd.org**.

Jul 21-Jul 22, 1400Z-2100Z, Surry, VA. Western Tidewater Radio Association, WT4RA. 400th Anniversary of the First Colony in America. 28.450 21.350 14.250 7.250. Certificate. Bruce Powell, 317 Smithfield Blvd, Smithfield, VA 23430. *From the Chippokes Plantation*. **ke4gfm@arrl.net**.

Jul 21-Jul 23, 1400Z-0100Z, Springfield, OH. Independent Radio Association Inc, K4H. Founding of the 4H movement. 28.440 21.440 14.240 7.240. QSL. Doug Bell, N8HSU, Independent Radio Association, PO Box 523, Springfield, OH 45501-0523. **n8hsu-1@ameritech.net**.

Maty Weinberg, KB1EIB ♦ Special Events ♦ events@arrl.org

Jul 26-Jul 29, 1300Z-2100Z, Oshkosh, WI. Fox Cities Amateur Radio Club, W9ZL. EAA AirVenture Special Event Station from Vette Hangar at Pioneer Airport. 14.270 7.250 146.52 146.76-. Certificate. FCARC — Attn: N9YMC, PO Box 5233, Appleton, WI 54912. *Guest operators welcome!* **www.fcarc.us**.

Jul 27-Jul 28, 1300Z-2200Z, Berne, IN. Adams County Amateur Radio Club, W9A. Annual Swiss Days celebration. 14.28 7.26. QSL. Adams County Amateur Radio Club, c/o 417 Dearborn St, Berne, IN 46711. **wb9kqo.com**.

Jul 27-Jul 28, 1400Z-2100Z, Ashtabula, OH. Finnish American Heritage Association, W8F. Annual celebration of Finnish heritage and ancestry. 28.415 21.320 14.260 7.270. QSL. Richard Madison, 2818 Hedrick Ln, Ashtabula, OH 44004-4816. **www.finnfestusa2007.com**.

Jul 27-Jul 28 1800z-0200Z and **Jul 28-Jul 29 1300Z-0200Z**, St Ignace, MI. Various clubs and organizations, W8M. 50th anniversary of the opening of the Mackinac Straits Bridge. 146.52 14.250 14.070 7.250 7.050 3.850 CW SSB other modes as conditions permit. Certificate and QSL. KD8DKU, 8 Southfork St, Marquette, MI 49855. **www.macbridge50.info**.*

Jul 27-Jul 30, 1500Z-0300Z, Indianapolis, IN. Indianapolis Motor Speedway Amateur Radio Club, W9IMS. Allstate 400 at the Brickyard. 21.340 14.240 7.240 3.840. Certificate and QSL. Indianapolis Motor Speedway Amateur Radio Club, PO Box 18495, Indianapolis, IN 46218-0495. **www.w9ims.com**.

Jul 28-Jul 29, 1200Z-1700Z, Talbot Island, FL. St Augustine Amateur Radio Society, N4AUG. IOTA NA-138 activation. 14.270 14.035 7.230 7.035. QSL. SAARS — N4AUG, PO Box 860084, St Augustine, FL 32086. **www.saarsham.net**. QST

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

***Note:** Some clubs may ask for a nominal fee to cover the cost of the certificate or QSL. Request will be made on air during the event or on the club's Web site.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form, at **www.arrl.org/contests/spevform.html**, or if you prefer, forms are available via Internet (**info@arrl.org**), or for an SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Events Form" in the lower left-hand corner). Off-line completed forms may be mailed, faxed or e-mailed to ARRL, Attn: Special Events. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; that is, a special event listing for **Sept** *QST* would have to be received by **Jul 1**. In addition to being listed in *QST*, your event will be listed on the *ARRLWeb* Special Event page.

CONTEST CORRAL

W1AW Qualifying Runs are 10 PM EDT Wednesday, Jul 11 (0200 UTC Jul 12) (35-10 WPM) and 9 AM EDT Friday, Jul 27 (1300 UTC Jul 27). The K6YR West Coast Qualifying Run will be at 9 PM PDT Wednesday, Jul 11 (0400 UTC Jul 12) (10-40 WPM); K9JM serves as alternate. Unless otherwise indicated, code speeds are from 10-35 WPM. Check the W1AW schedule elsewhere in this issue for more details.

Abbreviations

SO — Single-Op; M2 — Multiop, 2 Transmitters; MO — Multi-Op; MS — Multi-Op, Single Transmitter; MM — Multi-Op, Multiple Transmitters; AB — All Band; SB — Single Band; S/P/C — State/Province/DXCC Entity; HP — High Power (>100 W); LP — Low Power; QRP — 5 W or less; Entity — DXCC Entity.

No contest activity on 30, 17 or 12 meters. Refer to the contest Web sites for information about awards. Unless stated otherwise, regional contests only count QSOs with stations in the region. Publication deadline for Contest Corral listings is the first of the second month prior to publication. For updates and additional contests, see the Contest Corral Web page at **www.arrl.org/contests**.

July 1-5

This contest brings out many Canadian stations in unusual locations and from rare provinces and territories.

Canada Day Contest — CW/Phone, sponsored by the Radio Amateurs of Canada (RAC) from 0000Z-2359Z Jul 1. Frequencies: 160-10, 6 and 2 meters. Categories: SOAB (HP, LP, QRP, PH only and CW only), SOSB, MS (LP and HP) and MM. Exchange: Stations in Canada send RS(T) and province or territory; VEØ and non-VE send RS(T) and serial number. QSO points: VE and VEØ — 10 points, non-VE — 2 points, RAC official stations (suffix of -RAC) — 20 pts. Score: QSO points × Provinces and Territories counted once per band and mode. For more information: **www.rac.ca/service/infocont.htm**. Logs due Jul 31 to **canadaday@rac.ca** or Radio Amateurs of Canada, 720 Belfast Rd, Ste 217, Ottawa, ON K1G 0Z5, Canada.

MI QRP July 4th CW Sprint — 2300Z Jul 4-0300Z Jul 5. See **www.qsl.net/miqrpclub** for more information.

July 7-8

This 24-hour CW/SSB DX contest encourages you to work all stations for points.

IARU HF World Championship — from 1200Z Jul 7-1200Z Jul 8 (see Apr *QST*, p 102, or **www.iaru.org/contest.html**).

Classic DX Contest — sponsored by John Thompson, K3MD. Runs concurrently with the IARU HF World Championship. Categories: IARU categories, except HP (CW 650 W, SSB 1300 W) and LP, MS (HP only). Use of packet, Internet, DVK, add-on audio DSP, computer keying or DVK prohibited. Contest keyers, computer logging OK. All equipment must be at least 20 years old. See Web site for scoring and more information: **www.skyviewradio.net**. Report claimed score, number contacts, number of mults, classic multiplier, rigs and class to **jwt105j@yahoo.com** within two weeks of contest.

DL DX/RTTY Contest — RTTY/PSK, sponsored by the DL DX RTTY Contest Group (DRCG) from 1100Z Jul 7-1059Z Jul 8. Frequencies: 80-10 meters. Categories: SOAB, SOAB-single radio (unlimited, 6 hour, dipole/groundplane), MS, MO. Exchange: RST + serial number. QSO points: own country — 5 points, different country — 10 points, different continent — 15 points, with DL station add 3 points from EU, 5 points elsewhere. Score: QSO points × DXCC entities + VK/VE/JA/W call areas from each band. For more information: **www.drcg.de**. Logs in Cabrillo format due Aug 10 to **logs@drcg.de**.

DARC 10 Meter Digital "Corona" — RTTY/AMTOR/PACTOR/PSK31/Clover, sponsored by Deutscher Amateur Radio Club from 1100Z-1700Z Jul 8 (see Nov 2006 *QST*, p 104, or **www.darc.de/referate/dx**).

Venezuelan Independence Day Contest — CW/SSB, sponsored by the Radio Club Venezolano from 0000Z Jul 7-2400Z Jul 8. Frequencies: 160-10 meters. Categories: SOAB and SOSB (CW, SSB and mixed), MS (mixed mode). Exchange: RS(T) plus serial number. Work any station, not just YV. QSO points: own country — 1 point, different country, same continent — 3 points, different continent — 5 points. Score: QSO points × YV call areas + DXCC entities counted once per band. For more information: **radioclubvenezolano.org/concurso.htm**. Logs due Aug 31 to **contestyv@cantv.net** or Radio Club Venezolano, Concurso Independencia de Venezuela, PO Box 2285, Caracas 1010-A, Venezuela.

QRP ARCI Summer Homebrew Sprint — CW, from 2000Z-2400Z Jul 8. Add the following bonus points for each band on which homebrew gear is used: 2000 points for homebrew transmitter, 3000 points for homebrew receiver, 5000 points for homebrew transceiver. For rules and more information: **www.qrparci.org**. Logs due 30 days after the contest to **contest@qrparci.org** or Jeff Hetherington, VA3JFF, 139 Elizabeth St W, Welland, ON L3C 4M3, Canada.

Original QRP Contest — CW, sponsored by the QRP Contest Community from 1500Z Jul 7-1500Z Jul 8. Frequencies: 80-20 meters. Categories: VLP (<1 W), QRP (<5 W), MP (<20 W), Handmade. Exchange: RST, serial number, category (RST okay for non-participating stations). QSO points: Participants — 4 points, others — 1 point. Total score: calculateded by sponsor, see Web site for more information: **www.qrpcc.de**. Logs due Jul 31 to **oqrpc@qrpcc.de** or Dr Hartmut Weber, DJ7ST, Schlesierweg 13, D-38228 Salzgitter, Germany.

July 13-16

Celebrate the return of the Colorado QSO Party by making a few contacts with stations in the Centennial State.

Colorado QSO Party — Phone/CW/Digital, sponsored by the Pikes Peak Radio Amateur

H. Ward Silver, NØAX ♦ PO Box 927, Vashon, WA 98070 ♦ n0ax@arrl.org

Association from 1200Z Jul 15-0400Z Jul 16. Frequencies (MHz): CW — 1.850, 3.550, 7.050, 14.050, 21.050 and 28.050 MHz; Phone — 1.870, 3.850, 7.250, 14.250, 21.350 and 28.450 MHz; RTTY — 3.575, 7.090, 14.090, 21.090 and 28.065 MHz; PSK — 1.8073, 3.583, 7.073, 14.073, 21.073 and 28.123 MHz; VHF/UHF — per band plan. Categories: SO, MS, MM, Mobile (SO, SO+Driver, MO), School; HP/LP/QRP and CW/Phone/Digital/Mixed each category. Exchange: RST and CO county or S/P/C. QSO points: CW and digital — 2 points, Phone — 1 point. Work stations once per mode per band, mobiles may be worked again as they change counties. Score: QSO points × CO counties (CO stations add S/P/C) × power multiplier. For more information: **www.ppraa.org/coqp**. Logs due by Jul 31 to **coqplogs@ppraa.org** or Colorado QSO Party, PO Box 16521, Colorado Springs, CO 80935.

FISTS Summer Sprint — CW, from 1700Z-2100Z Jul 13 (see Feb *QST*, p 101, or **www.fists.org**).

July 21-22

North American RTTY QSO Party — sponsored by the *National Contest Journal* from 1800Z Jul 21-0600Z Jul 22. Frequencies: 80-10 meters, 100 W max power. Categories SOAB and M2; SO stations operate 10 hours max with off times of at least 30 minutes. Exchange: Name and S/P/C. QSO points: 1 point per QSO. Score is QSO points × S/P/C (NA entities only) counted once per band. DX QSOs count for QSO points, but not as multipliers. For more information: **www.ncjweb.com**. Logs due 14 days after the contest to **www.ncjweb.com/naqplogsubmit.php** or **rttynaqp@ncjweb.com** or Shelby Summerville, K4WW, 6506 Lantana Ct, Louisville, KY 40229-1544.

The summer E_S season is a great time to give that all-mode rig a try. Even a simple horizontal dipole will bag some contacts!

CQ WW VHF Contest — all modes, sponsored by *CQ Magazine* from 1800Z Jul 21-2100Z Jul 22. Frequencies: 50 and 144 MHz bands, except 146.52 MHz (and other national simplex calling frequencies) and repeater frequencies. Please avoid the DX windows and international calling frequencies. Categories: SOAB, SOSB, MM, Rover, Hilltopper, QRP (<10 W). Exchange: Call sign and 4 digit Maidenhead grid. Work Rover stations in each grid. QSO points: 50 MHz — 1 point, 144 MHz — 2 points. Score: QSO points × grids counted once per band (Rovers count grids from each activated grid). For more information: **www.cqww-vhf.com**. Logs in Cabrillo format due Sep 1 to **cqvhf@cqww-vhf.com**, via Web submission form at **www.b4h.net/cabforms/cqwwvhf_cab.php** or CQ VHF Contest, 25 Newbridge Rd, Hicksville, NY 11801.

DMC RTTY Contest — sponsored by the Digital Modes Club from 1200Z Jul 21-1200Z Jul 22. Frequencies: 80-10 meters. Categories: SO (HP/LP), MS. Exchange: RST + serial number. QSO points: 1 point per QSO. Score: QSO points × DXCC entities + W/VE/VK/JA call areas + continents (all counted only once). For more information: **www.digital-modes-club.org/dmccontest.htm**. Logs in Cabrillo format due Aug 22 to **dmcrtty@digital-modes-club.org** or DMC Contest Committee, PO Box 8, 6000 Stara Zagora, Bulgaria.

CQC Great Colorado Gold Rush — CW, sponsored by the Colorado QRP Club from 2000Z-2200Z Jul 22. Frequencies: 20 meters only. Categories: Wire, Vertical, Beam or Portable. Exchange: RST + S/P/C + Category + CQC member number or power output. Work stations up to three times during the contest, with at least 30 minutes between QSOs. QSO points: 1st QSO — 3 points, 2nd QSO — 2 points, 3rd QSO — 1 point. Score: QSO points × S/P/C + CQC members. For more information: **www.cqc.org/contests/gold2007.htm**. Logs due 30 days after the contest to **contest@cqc.org** or Colorado QRP Club, PO Box 17174, Golden, CO 80402-6019.

July 28-29

Flight of the Bumblebees — CW, sponsored by the Adventure Radio Society, 1700Z-2100Z Jul 29. Bumblebees are low power portable stations that walk, bike or boat to their sites and sign /BB after their calls. Frequencies: 7.040, 14.060, 21.060 and 28.060 MHz. Exchange: RST, S/P/C and Bumblebee Number or power (5 W maximum). Score: QSOs × number of different Bumblebees contacted × 3. For more information: **www.arsqrp.com/ars/pages/bumblebees/bb_rules.html**. Logs due Aug 9 via the ARS Web site.

The IOTA contest features operations from unusual and rare island groups — a great way to get started accumulating those island QSOs.

RSGB Islands-On-The-Air Contest — CW/SSB, sponsored by the RSGB from 1200Z Jul 28-1200Z Jul 29. Frequencies: 80-10 meters. Categories: SOAB and SOAB-Assisted (SSB/CW/Mixed, 12 and 24 hour entries, High/Low/QRP Power), MS. All categories Island or World (non-Island). Exchange: RS(T) and serial number, Island stations add IOTA reference number. QSO points: contacts with own IOTA — 3 points, with other IOTA — 15 points, non-island — 3 points. Score: QSO points × IOTA refs, counted once per band and mode. For more information: **www.rsgbhfcc.org**. Logs due Sep 1 to **iota.logs@rsgbhfcc.org** or RSGB IOTA Contest, PO Box 9, Potters Bar, Herts EN6 3RH, England.

Are you interested in finding out more about contesting and "how they do it"? Try the free, biweekly e-mail newsletter *Contester's Rate Sheet* (**www.arrl.org/contests**), or the bi-monthly magazine *NCJ, National Contest Journal* (**www.ncjweb.com**). QST

Strays

ARRL STAFFERS, PRESIDENT EMERITUS HONORED BY AMATEUR RADIO COMMUNITY

♢ Rick Lindquist, N1RL, has been selected as a 2007 inductee to the CQ Amateur Radio Hall of Fame. As ARRL Senior News Editor, Rick has been responsible for the past decade for keeping the amateur community updated on new developments via *The ARRL Letter*, the *ARRL Audio News* and the ARRL Web news pages. He retired from ARRL Headquarters staff on June 1.

Rick Lindquist, N1RL

Upon the announcement, *QST* Editor Steve Ford, WB8IMY, said, "Rick Lindquist started as the ARRL Product Review editor, but he quickly made the transition to news reporting, his true calling. In a remarkably short time, Rick became the most recognized name in Amateur Radio journalism."

ARRL Chief Operating Officer Harold Kramer, WJ1B, said, "Rick has been our news editor and reporter through many of the major events in Amateur Radio, including 911, Katrina and the No-Code Licensing. He has been the print and audio voice of the ARRL during these events and he has reported them accurately, incisively and engagingly.

"He is an active amateur contester and DXer with an encyclopedic knowledge of Amateur Radio. He has been especially effective at writing Product Reviews and both writing and editing articles on all aspects of Amateur Radio."

QST Managing Editor Joel Kleinman, N1BKE, was very pleased to hear that Rick had been selected for this honor. "He's made an outstanding and long-lasting contribution to the Amateur Radio Service and to the ARRL with his dedication to his craft, his thoroughness and perhaps most impressive of all, his ability to get to the crux of a complex story and report it in a way that's of immediate practical value to readers. We'll miss him here at ARRL Headquarters, but we're glad he's agreed to freelance for us on a part-time basis."

Ed Hare, W1RFI, and Jim Haynie, W5JBP

ARRL Laboratory Manager Ed Hare, W1RFI, received the Dayton Hamvention 2007 Special Achievement Award for his extensive work in addressing the Broadband over Powerline (BPL) hazards to radio communication. ARRL President Emeritus Jim Haynie, W5JBP, received the 2007 Amateur of the Year Award for his many contributions to Amateur Radio both before and during his three terms as President of the ARRL from 2000 to 2006. These awards were presented at the awards dinner during this year's Hamvention.

ARRL President Emeritus Jim Haynie, W5JBP, receives the Ham of the Year Award from Dayton ARA President Jim Simpson, WB8QZZ.

2006 ARRL 10 Meter Contest Results

Learning to do more with less.

Ken Harker, WM5R
wm5r@arrl.net

Even at the bottom of the solar cycle, the 10 Meter Contest remains one of the most popular HF operating events sponsored by the ARRL. A total of 1863 logs were received at ARRL headquarters for the 2006 contest, over twice as many entries as the Contest Branch received at the minimum of the previous solar cycle 11 years ago. A total of 1295 (69.5%) of the logs were submitted by stations in the United States and Canada, and 568 (30.5%) were submitted by stations in the rest of the world. To those new to operating on HF, 10 meters may seem like a dead band most of the time at this point in the solar cycle, but major contests like the ARRL 10 Meter Contest bring the band to life!

What gets so many stations excited about operating on 10 meters? For starters, antennas for 10 meters are easier to build, are smaller, and have lower height requirements to work effectively. A dipole antenna requires just 5 meters (16.5 feet) of wire, and the antenna is a full wavelength above ground at just 10 meters (33 feet) up in the air. If you have an HF radio, it is relatively easy to get on 10 meters and enjoy making contacts. There are also more amateurs licensed to operate on the 10 meter band than any other HF band. Countries like Japan, Argentina and the United States extend more privileges to entry-level licensees on the band. Even at the bottom of the solar cycle, you never know when you will be someone's very first HF contact!

No HF band is more affected by the solar cycle than 10 meters. Remarkably, 2006 is the fourth year in a row in which the solar flux index has been between 85 and 90.2. In 2002, the daily solar flux indices for the contest weekend were 180.1 on Saturday and 196.6 on Sunday, and life was great for operators on the 10 meter band. According to the archives at the National Geophysical Data Center, the indices in 2003 were an unusually low 85 on Saturday and 89.5 on the Sunday of the 10 Meter Contest. In 2004, the indices were 87.1 on Saturday and 87.7 on Sunday, and in 2005 they were 88.7 on Saturday and 90.2 on Sunday. 2006 could have been worse than it was. Saturday's solar flux index was 89.6, and Sunday's solar flux index was 87.3, but just two months earlier, on October 18, 2006, the solar flux index dipped as low as 69.0. Next year may be another rough year, as the NOAA Space Environment Center predicts an average solar flux value of just 79.4 for the month of December 2007, with an expected range from 60.0 to 102.4.

The three Single Operator Low Power entry categories remain the most popular in 2006 for both W/VE stations (58% of all W/VE logs) and for DX stations (59% of all DX logs). The most popular mode for W/VE single operators was mixed-mode. 36% of all W/VE log submissions were mixed-mode single operators. Historically, the mixed-mode single operator categories are more popular with W/VE operators in the years around solar minimum. By entering in a mixed-mode category, you can make contact with a station active in the contest on both CW and phone. In the years ahead, expect the phone-only single operator categories to grow in popularity, as they are historically the most popular in years around the solar maximum. The most popular mode for DX single operators was CW Only. 35% of all DX logs were submitted in the three CW Only single operator categories. Since the late 1980s, the CW-only single operator categories have been the most popular with DX stations, whether near solar maximum or near solar minimum.

The contest remains more popular with W/VE stations than DX stations. Not only were there over twice as many W/VE logs as DX logs submitted in 2006, the decline in the number of DX log submissions since the previous solar maximum has been greater than the decline in W/VE log submissions. This year's total of 1295 logs is still 70% as many as the 1843 W/VE logs submitted in 2002. This year's total of 568 DX logs is just 45% as many as the 1276 DX logs submitted in 2002. This is mostly the result of fewer logs coming in from Europe and Japan. One part of the world where interest in the contest remains high is South America. 2006 was the fourth highest log submission total ever for South American stations, and well over ⅔ as many logs were submitted from South America in 2006 as in 2002.

DX Categories

At the bottom of a solar cycle, the most reliable F layer propagation on the 10 meter band will be on north-south paths. Ionization in the F layer will be strongest near the equator, so communications paths that cross the equator are more likely to be successful. This

Ed, K3IXD (in photo) and Mel, W4MEL, operated at W4MEL's QTH using the Low Country Contest Club Call NU4SC.

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Potomac Valley Radio Club	6,664,458	84
Florida Contest Group	3,456,660	55
Medium Category		
Northern California Contest Club	3,859,448	41
Minnesota Wireless Assn	1,881,244	37
Yankee Clipper Contest Club	1,605,382	28
Central Texas DX and Contest Club	1,534,604	12
Society of Midwest Contesters	1,353,440	36
Frankford Radio Club	1,126,516	12
Southern California Contest Club	1,095,914	15
Tennessee Contest Group	961,134	22
South East Contest Club	905,396	15
Contest Club Ontario	893,732	31
Grand Mesa Contesters of Colorado	872,826	12
Western Washington DX Club	707,756	13
Central Arizona DX Assn	580,586	9
North Texas Contest Club	414,916	5
Utah DX Assn	410,490	6
Mad River Radio Club	400,020	10
Alabama Contest Group	348,112	6
Hudson Valley Contesters and DXers	207,506	10
Local Category		
Midland ARC	243,254	3
Willamette Valley DX Club	238,492	6
Texas DX Society	230,292	3
Bay Area Wireless Assn	204,524	3
Florida Contest Group - Panhandle	198,742	5
Western New York DX Assn	183,848	4
Carolina DX Assn	178,960	4
Kentucky Contest Group	167,436	4
Low Country Contest Club	151,202	7
Order of Boiled Owls of New York	98,148	6
West Allis RAC	88,852	5
Spokane DX Association	86,836	3
Sussex County ARC	84,542	3
Metro DX Club	82,060	4
Dominion DX Group	76,318	7
CTRI Contest Group	72,608	5
Mother Lode DX/Contest Club	65,238	4
Hampden County Radio Assn	64,878	7
Murgas ARC	63,428	3
North Coast Contesters	63,204	3
Columbia-Montour ARC	57,776	3
West Park Radiops	41,490	6
Heartland DX Association	24,056	3
Athens County ARA	20,316	4
Bergen ARA	12,882	3
Six Meter Club of Chicago	8,006	3
West Park Radiops	41,490	6
Heartland DX Association	24,056	3
Athens County ARA	20,316	4
Bergen ARA	12,882	3

Top 10, W/VE

Mixed Mode, QRP

WA6FGV	152,872
KA1LMR	74,152
N6WG	69,750
WA8ZBT	52,500
W5GZ	50,820
VA3DF	32,116
K3TW	20,298
NA4BW	18,480
K4CIA	17,184
K1EQA	12,400

Phone Only, High Power

W0SD	273,020
K5TR	201,840
K7RL	188,650
W5PR	156,800
KH6/AF7DX	145,010
N4OX	136,968
KY5R	135,722
K6HNZ	130,288
AK2P	124,468
N8RA	123,880

Mixed Mode, Low Power

K6AM	464,112
K2PS	317,848
NT6K	292,496
WD5K	267,912
W3EP	266,112
AC0W	254,476
N7LOX	247,046
KT0K	206,064
W0ETT	168,912
WO4O	150,360

CW Only, QRP

KG5U	57,888
KR2Q	43,584
N0NI	39,744
W7FG	35,552
K7MM	32,528
N8AP	29,880
K5OI	22,140
N4AU	18,696
K0HW	14,720
K2SM	14,700

Mixed Mode, High Power

KV7DX	606,430
N8II	606,132
WE3C	553,536
K6XX	521,642
W0AIH	512,952
NN3W	494,024
K9WZB	424,592
N2TTA	417,576
W7ZR	386,568
KA6BIM	361,368

CW Only, Low Power

K8IA	229,248
K7HP	178,620
K4OJ	150,360
N7YK	123,228
N4IJ	121,240
WK2G	113,216
KA7T	101,200
KM6Z	96,984
WD4AHZ	95,472
K9QVB	88,880

Phone Only, QRP

W7YA	35,970
W6QU	34,384
WW0WB	10,664
KC8QAE	9,200
KC9AMM	5,340
KE2OI	4,216
NO4FX	2,862
WB0IWG	2,704
WD9FTZ	1,932
WA0QJE	1,116

CW Only, High Power

K1TO	340,032
K5NA	339,648
K4ZA	307,944
W5VX	239,372
N4WW	227,772
NY3A	220,816
N2MM	197,100
K6RB	196,980
N4BP	181,764
N2IC	179,488

Phone Only, Low Power

AC5N	78,256
W3LL	71,208
KE3WM	70,656
WW4LL	59,776
W4GKF	56,160
KE0L	54,484
NJ7I	41,184
VA3YP	35,310
WB9PUB	30,702
K4CGY	29,640

Multioperator

NX5M	739,840
W4MYA	488,922
K4FJ	460,224
AA1JD	411,916
W7RN	393,652
KD0S	306,270
K3DI	284,316
K0LUZ	280,832
K4HR	248,114
K9YC	235,656

Top 10, DX

Mixed Mode, QRP

YT7TY	21,566
RW3AI	4,032
JK2VOC	2,628
DL1ARJ	2,400
JH7RTQ	1,700
JK1TCV	1,232
RA3AOS	1,140
PA0RBO	616
RX3ALL	612
JH8FAJ/7	156

Phone Only, High Power

ZX5J	605,640
L47D	265,176
LU5HM	244,064
LQ5H	224,700
P40K	220,400
8P2K	166,440
PY5DC	121,980
TG0AA	98,696
CE4CT	92,554
PY5YA	70,520

Mixed Mode, Low Power

LT7W	663,264
PP5BZ	141,112
HR2DMR	102,096
HA508IB	102,024
PY2NY	101,640
Z36W	82,678
NP3CW	79,856
LU5FF	61,138
HA5MY	61,100
ER0FEO	50,388

CW Only, QRP

TI3TLS	5,336
LZ1MG	4,312
RU2FM	4,240
YB5AQB	2,128
F5VBT	1,496
PA1B	1,056
YO4AAC	1,012
JR1NKN	968
GW4ALG	880
SP2MHC	720

Mixed Mode, High Power

PS2T	783,804
TI5N	485,394
OA4SS	438,600
ZF2AH	240,840
S57S	132,254
ZS1EL	88,128
9M6XRO	61,600
JH4UTP	41,360
UA3QDX	29,700
F8AOF	28,652

CW Only, Low Power

ZL1BYZ	201,600
LW1E	157,760
VP5D	98,784
9A3VM	61,020
YO4AB	54,288
PY8MGB	47,300
VK4TT	37,440
HP1AC	33,488
PY4CEL	26,400
PY3AU	25,000

Phone Only, QRP

HI3TEJ	96,560
LU1VK	39,900
HP3BS	25,452
I5KAP	5,040
YO9BXC	3,360
IU9A	2,528
EA8AJO	2,360
PY2XC	1,584
EA3FF	696
DF1RK	540

CW Only, High Power

LU7HN	366,016
ZL4BR	229,632
HP1WW	224,840
XE1MM	174,460
ZL1AIH	169,400
LU6UO	149,400
YU2A	139,104
7X0RY	104,416
PY2WC	87,300
LU7DIR	72,224

Phone Only, Low Power

PP5JD	281,320
LU4DX	256,956
HI3C	120,960
LW3DN	118,776
HK3JJH	117,576
CX1AV	112,158
LU8EOT	95,408
PY2DN	61,596
LR1F	56,316
4A7L	51,610

Multioperator

CX5BW	1,529,808
LR2F	1,138,720
AY8A	1,105,720
PJ2T	876,688
ZL6QH	749,294
LU2EE	333,914
EA8AH	237,726
LU1BJW	213,248
EF8A	204,470
XE1KK	200,868

gives an unusual advantage to stations in the southern hemisphere. While South America, New Zealand, or South Africa might be far away from the dense populations of radio amateurs in Europe, North America, and Japan, and at a disadvantage in other years or in other contests, they are at the better end of the best 10 meter DX openings during solar minimum. South America especially is geographically favored at this point in the solar cycle, with north-south propagation paths to both North America and Europe. Even DX stations in the Caribbean found it hard to compete against the best stations in Argentina, Brazil and Uruguay this year.

Europe and North Africa faced perhaps the most challenging propagation conditions the region has seen in this contest in the past 11 years. Isidro Acosta Hernández, EA8NQ, summed it up for many when he remarked, "Very bad propagation!" Cedric Lamouche, F4EGZ, operating in the Single Operator Mixed Mode Low Power category at the F8KHF club station, agreed with Isidro, "Very poor propagation in central France." Cedric found CW a better choice this weekend for making QSOs in the tough conditions. Bosko Milankov, YT7TY, had the best result from Europe with his victory in the Single Operator Mixed Mode QRP category.

Perhaps the least favorable area of the world from which to operate in the ARRL 10 Meter Contest at the bottom of the solar cycle is Japan. Only 62 logs (3.3% of all logs) were received from Japanese stations this year. Only one of these logs was a Multioperator effort. No Japanese station made over 322 QSOs. Yoshi Fukuta, JK2VOC, had the best result from Japan with his third place overall finish in the Single Operator Mixed Mode QRP category.

W/VE Categories

At the bottom of the solar cycle, W/VE stations across the continent face surprisingly similar F layer DX propagation on the 10 meter band. Even stations on the East Coast have difficulty working Europe, and stations on the West Coast have difficulty working Japan. The most reliable DX openings on the band are north-south across the equator to South America, New Zealand and Australia. Stations located farther south and closer to the equator may get better F layer propagation on those DX paths, but what can really set W/VE stations apart during the years around solar minimum is how good propagation is within North America. Stations in the southwest generally had the best intracontinental propagation in 2006, and they took advantage of it.

Nine of the 10 W/VE category winners were stations located west of the Mississippi River. Three winners were from southern California, two were from Arizona, two were from Texas, and one each was from Oklahoma, South Dakota, and Florida. Ed Gray, WØSD's victory in the Single Operator Phone Only High Power category was the only victory by a northern W/VE station. Many operators in southern California and Arizona remarked on Sporadic E propagation that lasted well after local sunset, in some cases until past midnight local time, giving them an extra boost to their scores.

ARRL Affiliated Club Competition

The ARRL Affiliated Club Competition always attracts a lot of attention. A total of 46 ARRL Affiliated Clubs entered the competition in 2006, the same number as last year. Affiliated clubs are organized into three categories: Local Clubs, Medium Clubs, and Unlimited Clubs. Which category your club will be ranked in depends on the number of logs submitted for the club, and how large the territory is from which the club members operate. For a club to be listed in the results, the Contest Branch must receive at least three entries from club members. DXpedition logs cannot be included for a club score, so energizing the stations in your club territory to get on the air and make contacts is a key to success!

In 2006, the most competitive of the three club categories was the Local Club competition, with the Midland Amateur Radio Club taking top honors in the category with 243,254 points. The Willamette Valley DX Club placed second with a score that beat out 24 other local clubs. Congratulations to all!

In the Medium Club competition, the Northern California Contest Club had 42 entries, and secured the top spot by a margin of just under 2 million points! The Minnesota Wireless Association took second place with scores from 41 logs, followed closely by the Yankee Clipper Contest Club, who had 85% of the Minnesota Wireless Association's score with just 31 logs. In fourth place, the Central Texas DX and Contest Club was the only other Medium Club to break 1.5 million points, and they did so with just 12 logs!

Region Leaders

Table lists call sign, score, class (A = Mixed Mode, B = Phone only, C = CW only, D = Multioperator), and power (A = QRP, B = Low Power, C = High Power).

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

KA1LMR	74,152	A	A
K3TW	20,298	A	A
WB2AMU	11,430	A	A
K2TA	8,190	A	A
W3OSS	7,910	A	A
K2PS	317,848	A	B
W3EP	266,112	A	B
NP3D	94,458	A	B
W3KB	91,584	A	B
NS3T	51,216	A	B
WE3C	553,536	A	C
NN3W	494,024	A	C
N2TTA	417,576	A	C
K3ZO	340,032	A	C
K1KI	167,188	A	C
KE2OI	4,216	B	A
WB0IWG	2,704	B	A
AB2IW	748	B	A
NZ1I	100	B	A
W3LL	71,208	B	B
KE3WM	70,656	B	B
K4CGY	29,640	B	B
N2NHN	16,146	B	B
N3FNE	12,144	B	B
AK2P	124,468	B	C
N8RA	123,880	B	C
N2EOC	123,354	B	C
NA3D	121,968	B	C
AC2AA	72,800	B	C
KR2Q	43,584	C	A
K2SM	14,700	C	A
K3SWZ	12,800	C	A
WO2N	8,556	C	A
K5GMX	8,120	C	A
K2UF	73,444	C	B
W3CB	51,700	C	B
K2DFC	49,476	C	B
KA2D	43,632	C	B
W3EQ	41,040	C	B
K4ZA	307,944	C	C
NY3A	220,816	C	C
N2MM	197,100	C	C
K1LZ	147,440	C	C
NB1B	127,512	C	C
AA1JD	411,916	D	
K3DI	284,316	D	
WX3B	165,636	D	
W9GE	137,994	D	
K3OQ	95,520	D	

Southeast Region (Delta, Roanoke and Southeastern Divisions)

NA4BW	18,480	A	A
K4CIA	17,184	A	A
KG4IGC	8,968	A	A
W0PV	1,734	A	A
WB4HUX	130	A	A
WO4O	150,360	A	B
WA4JUK	102,834	A	B
N3JT	94,810	A	B
WQ5L	88,910	A	B
W5MK	65,910	A	B
N8II	606,132	A	C
K4EU	304,512	A	C
K4ZGB	237,104	A	C
K4BAI	169,180	A	C
N4CW	161,824	A	C
NO4FX	2,862	B	A
WW4LL	59,776	B	B
W4GKF	56,160	B	B
K4KZZ	24,288	B	B
WB4JFS	23,632	B	B
K4REB	21,824	B	B
N4OX	136,968	B	C
KY5R	135,722	B	C
NJ2F	55,614	B	C
W4SVO	29,040	B	C
K4ADR	28,842	B	C
N4AU	18,696	C	A
KM4D	13,172	C	A
K4ORD	12,936	C	A
KI4FW	6,528	C	A
N4YQ	4,400	C	A
K4OJ	150,360	C	B
WK2G	113,216	C	B
WD4AHZ	95,472	C	B
WB4TDH	68,544	C	B
KC5R	66,976	C	B
K1TO	340,032	C	C
N4WW	227,772	C	C
N4BP	181,764	C	C
K4EA	160,704	C	C
W9WI	141,180	C	C
W4MYA	488,922	D	
K4FJ	460,224	D	
K0LUZ	280,832	D	
K4HR	248,114	D	
K5KG	228,718	D	

Central Region (Central and Great Lakes Divisions; Ontario Section)

VA3DF	32,116	A	A
W8VE	7,384	A	A
AF9J	3,318	A	A
N8XA	3,024	A	A
VE3DZ	120,736	A	B
K9MU	120,048	A	B
N9AX	101,728	A	B
VE3/W4TAA	85,352	A	B
WB8JUI	65,124	A	B
W0AIH	512,952	A	C
W9IU	260,150	A	C
VE3KZ	222,870	A	C
W9XT	207,126	A	C
W9RE	131,560	A	C
KC8QAE	9,200	B	A
KC9AMM	5,340	B	A
WD9FTZ	1,932	B	A
KE4TZJ	176	B	A
N8PVL	2	B	A
VA3YP	35,310	B	B
WB9PUB	30,702	B	B
K9BTQ	14,872	B	B
KF9US	11,360	B	B
K9IAC	9,576	B	B
W8JUZ	83,640	B	C
KE9S	77,656	B	C
K8CMP	36,240	B	C
W9JA	29,304	B	C
VE3SY	21,528	B	C
N8AP	29,880	C	A
AE8M	6,552	C	A
VA3RJ	4,840	C	A
VA3RKM	2,340	C	A
KT8K	1,104	C	A
K9QVB	88,880	C	B
VE3NE	53,872	C	B
VE3GSI	28,080	C	B
VE3XD	21,824	C	B
W9UM	20,328	C	B
W8AV	127,024	C	C
K8IR	74,340	C	C
KE9I	71,456	C	C
K9BGL	62,328	C	C
W9SE	54,208	C	C
W8MJ	154,400	D	
N2BJ	118,524	D	
VE3MIS	68,796	D	
VE3AD	61,422	D	
K4LT	56,574	D	

Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

WA8ZBT	52,500	A	A
W5GZ	50,820	A	A
K1EQA	12,400	A	A
N0JK	1,440	A	A
KB0SZY	1,440	A	A
WD5K	267,912	A	B
AC0W	254,476	A	B
KT0K	206,064	A	B
W0ETT	168,912	A	B
N0ZA	141,170	A	B
K5NZ	283,392	A	C
N0AT	235,468	A	C
W0BH	213,780	A	C
KO7X	196,812	A	C
NI7T	189,314	A	C
WW0WB	10,664	B	A
WA0QJE	1,116	B	A
WD5FGZ	84	B	A
AC5N	78,256	B	B
KE0L	54,484	B	B
AG0M	23,432	B	B
KC6R	21,120	B	B
WB5R	18,816	B	B
W0SD	273,020	B	C
K5TR	201,840	B	C
W5PR	156,800	B	C
K0RH	92,736	B	C
W7KB	74,100	B	C
KG5U	57,888	C	A
N0NI	39,744	C	A
W7FG	35,552	C	A
K5OI	22,140	C	A
K0HW	14,720	C	A
N4IJ	121,240	C	B
AD5A	71,672	C	B
W5MT	61,400	C	B
KN0V	57,456	C	B
N5CHA	49,920	C	B
K5NA	339,648	C	C
W5VX	239,372	C	C
N2IC	179,488	C	C
NN7ZZ	168,912	C	C
N5NA	162,288	C	C
NX5M	739,840	D	
KD0S	306,270	D	
K0GAS	146,054	D	
K0RC	123,072	D	
WW5R	93,104	D	

West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT Sections)

WA6FGV	152,872	A	A
N6WG	69,750	A	A
K6MI	42	A	A
K6AM	464,112	A	B
NT6K	292,496	A	B
N7LOX	247,046	A	B
KQ6ES	114,380	A	B
N6EM	91,640	A	B
KV7DX	606,430	A	C
K6XX	521,642	A	C
K9WZB	424,592	A	C
W7ZR	386,568	A	C
KA6BIM	361,368	A	C
W7YA	35,970	B	A
W6QU	34,384	B	A
WA9NBU	810	B	A
NJ7I	41,184	B	B
KG6IYN	24,910	B	B
KQ6OB	23,312	B	B
KE6SHL	22,400	B	B
AC7JM	16,926	B	B
K7RL	188,650	B	C
KH6/AF7DX	145,010	B	C
K6HNZ	130,288	B	C
WA7NB	109,880	B	C
KW6N	80,802	B	C
K7MM	32,528	C	A
K7TQ	7,952	C	A
W9CF	2,520	C	A
K6UIZ	1,800	C	A
VE7NI	1,612	C	A
K8IA	229,248	C	B
K7HP	178,620	C	B
N7YK	123,228	C	B
KA7T	101,200	C	B
KM6Z	96,984	C	B
K6RB	196,980	C	C
K7MI	165,564	C	C
W4UAT	154,728	C	C
K7BG	149,008	C	C
N4SL	130,508	C	C
W7RN	393,652	D	
K9YC	235,656	D	
WA7U	184,920	D	
W6YX	160,550	D	
K6RIM	141,170	D	

Africa

EA8/DJ1OJ	25,520	A	B
ZS1EL	88,128	A	C
EA8AJO	2,360	B	A
EA8TX	32,400	B	B
EC8D	14,040	B	B
CN8SG	4,674	B	B
ST2T	120	B	B
EA8DA	12,240	C	B
ZS4JAN	7,392	C	B
EA8CN	3,600	C	B
EA8NQ	2,640	C	B
ZS6C	1,008	C	B
7X0RY	104,416	C	C
EA8MQ	22,348	C	C
EA8AH	237,726	D	
EF8A	204,470	D	
VQ9X	6,052	D	

Asia

JK2VOC	2,628	A	A
JH7RTQ	1,700	A	A
JK1TCV	1,232	A	A
JH8FAJ/7	156	A	A
BD7JLR	31,064	A	B
HS0ZDG	13,756	A	B
RN6DJ	7,878	A	B
JA2PFO	4,416	A	B
4Z5QQ	3,906	A	B
JH4UTP	41,360	A	C
JH7XMO	12,928	A	C
JS1OYN	12,208	A	C
JA7NVF	12,048	A	C
JA1HP	6,750	A	C
JA2MWV	154	B	A
BG7IXG	1,560	B	B
7N2UQC	924	B	B
JG2REJ	660	B	B
JH1UUT	468	B	B
JA1XMT	288	B	B
JA7OWD	11,300	B	C
JA2PAC	4,896	B	C
JH1OCC	3,852	B	C
JH1CML	2,112	B	C
VR2MX	84	B	C
JR1NKN	968	C	A
JK3ZQJ	216	C	A
RN3QP	12,064	C	B
EX2X	7,280	C	B
VU2BGS	6,380	C	B
JA2KVB	4,320	C	B
4K9W	3,968	C	B
RN3BD	21,912	C	C
HS0AC	19,008	C	C
ZC4LI	11,776	C	C
VR2BG	10,656	C	C
4X1VF	6,448	C	C
JE1ZWT	44,462	D	
UA9UZZ	8,216	D	

Europe

YT7TY	21,566	A	A
RW3AI	4,032	A	A
DL1ARJ	2,400	A	A
RA3AOS	1,140	A	A
PA0RBO	616	A	A
HA50BIB	102,024	A	B
Z36W	82,678	A	B
HA5MY	61,100	A	B
ER0FEO	50,388	A	B
S56A	37,680	A	B
S57S	132,254	A	C
UA3QDX	29,700	A	C
F8AOF	28,652	A	C
UY0ZG	24,026	A	C
YL8M	20,240	A	C
I5KAP	5,040	B	A
YO9BXC	3,360	B	A
IU9A	2,528	B	A
EA3FF	696	B	A
DF1RK	540	B	A
LZ2HM	13,014	B	B
9A5KV	12,816	B	B
4N500CC	10,920	B	B
OE1DWC	8,120	B	B
EA7HBP	5,148	B	B
DL2ARD	49,000	B	C
IT9YVO	11,388	B	C
F4BHW	10,758	B	C
G0AEV	9,940	B	C
IK2YCW	7,800	B	C
LZ1MG	4,312	C	A
RU2FM	4,240	C	A
F5VBT	1,496	C	A
PA1B	1,056	C	A
YO4AAC	1,012	C	A
9A3VM	61,020	C	B
YO4AB	54,288	C	B
F8AKC	19,760	C	B
YO4ATW	17,360	C	B
UY5LW	14,508	C	B
YU2A	139,104	C	C
YZ9A	68,688	C	C
DL1IAO	66,528	C	C
UW5U	44,064	C	C
F5IN	34,672	C	C
S51DX	179,928	D	
9H6A	167,142	D	
SZ1A	166,940	D	
UU0JM	142,560	D	
YR1A	68,850	D	

North America

HR2DMR	102,096	A	B
NP3CW	79,856	A	B
XE2AUB	6,864	A	B
TI5N	485,394	A	C
ZF2AH	240,840	A	C
HI3TEJ	96,560	B	A
HP3BS	25,452	B	A
HI3C	120,960	B	B
4A7L	51,610	B	B
KP2CT	16,652	B	B
WP3GW	5,984	B	B
XE1AKM	5,760	B	B
8P2K	166,440	B	C
TG0AA	98,696	B	C
HP2ECP	64,920	B	C
TI2KAC	60,024	B	C
FM5AN	26,404	B	C
TI3TLS	5,336	C	A
VP5D	98,784	C	B
HP1AC	33,488	C	B
XE1CT	15,840	C	B
HP1WW	224,840	C	C
XE1MM	174,460	C	C
8P6SH	112	C	C
XE1KK	200,868	D	
WP4WW	40,356	D	

Oceania

A35RK	19,488	A	B
WH2D	8,466	A	B
9M6XRO	61,600	A	C
KG6DX	21,684	A	C
VK2GWK	19,596	A	C
VK3GK	4,118	A	C
VK2FHN	1,664	A	C
ZL2AWH	14,996	B	B
VK4EJ	9,800	B	B
DV1JM	4,288	B	B
NH7PE	672	B	B
YB2ECG	350	B	B
VK8AA	56,704	B	C
VK3AVV	1,148	B	C
YB5AQB	2,128	C	A
ZL1BYZ	201,600	C	B
VK4TT	37,440	C	B
ZL4BR	229,632	C	C
ZL1AIH	169,400	C	C
ZL6QH	749,294	D	
KH8Q	44,982	D	
ZL1AA	26,414	D	
ZL1ANH	9,416	D	
VK2KDP	180	D	

South America

LT7W	663,264	A	B
PP5BZ	141,112	A	B
PY2NY	101,640	A	B
LU5FF	61,138	A	B
YV7QP	33,124	A	B
PS2T	783,804	A	C
OA4SS	438,600	A	C
PY5ZHP	26,768	A	C
PV8DX	1,536	A	C
LU1VK	39,900	B	A
PY2XC	1,584	B	A
YV5IAL	522	B	A
PP5JD	281,320	B	B
LU4DX	256,956	B	B
LW3DN	118,776	B	B
HK3JJH	117,576	B	B
CX1AV	112,158	B	B
ZX5J	605,640	B	C
L47D	265,176	B	C
LU5HM	244,064	B	C
LQ5H	224,700	B	C
P40K	220,400	B	C
LW1E	157,760	C	B
PY8MGB	47,300	C	B
PY4CEL	26,400	C	B
PY3AU	25,000	C	B
LW2DX	21,808	C	B
LU7HN	366,016	C	C
LU6UO	149,400	C	C
PY2WC	87,300	C	C
LU7DIR	72,224	C	C
CX5BW	1,529,808	D	
LR2F	1,138,720	D	
AY8A	1,105,720	D	
PJ2T	876,688	D	
LU2EE	333,914	D	

Two clubs entered in the Unlimited Club category. The Potomac Valley Radio Club had more log entries (87) than any other club, and ran away with the victory. Over three million points and 28 logs behind, the Florida Contest Group took second place, with 59 logs contributing their score to the club.

Get Ready for Next Year

Expanded coverage of the 2006 ARRL 10 Meter Contest can be found on the ARRLWeb at **www.arrl.org/contests/**. Look for soapbox comments, photographs, all the line scores and additional articles about the 2006 competition experience. ARRL members can use the online Score Database to examine the results in greater detail. You can filter the line scores by class, power, geography, or club membership, and sort on score, QSOs, multipliers and more. If you've never operated the 10 Meter Contest before, find the stations in your section or DXCC entity that have participated, be brave and ask for advice. Most contesters and DXers will be excited to help someone get the most out of their contest experience.

By December 2007, we will probably be at the leading edge of Solar Cycle 24. While the NOAA Space Environment Center predictions are for conditions very similar to December 2006, you never can tell what 10 meters might bring. One thing we can be sure of, though — on December 8 and 9, 2007, thousands of Amateur Radio operators around the world will bring the 10 meter band to life once again. Good luck! QST

2007 ARRL August UHF Contest Announcement

Date: 1800 UTC Saturday, August 4-1800 UTC Sunday, August 5

How to participate: Any amateur station on any band above 222 MHz may be worked. The entry classes for Single Operator are High Power and Low Power. A rover is a 1 or 2 person station that moves and operates from two or more grid squares. There is a Multioperator category. You may re-work a rover station each time they move to a new grid square. Use of a spotting network makes your station a Multioperator entry.

What to say: All stations give their call sign and 4 digit grid-square locator (such as W1AW FN31). Information on how to determine your grid square is found on page 60 of the May 2007 *QST*, or online at **www.arrl.org/locate/gridinfo.html**.

Special interest: During the contest, some tropospheric propagation may occur. It is also a good time to make sure all equipment is in proper order for upcoming contests.

Quirks: It can be a great time of year for "hill-topping," while the lower elevations may present a greater challenge during the summer months.

Rule changes this year: None for 2007

Best reason to participate: This contest is a good way to build up totals for the ARRL UHF operating awards, such as VUCC.

Relative challenge: UHF/Microwave operation presents unique challenges that test the best-equipped operators, but it is also possible for someone to participate in this event with a modest station. The more bands you are able to utilize, the better your results. Rovers are very important during this contest, as they activate as many grid squares as possible.

Scoring: QSOs count 3 points on 222 and 432 MHz, 6 points on 902 and 1296 MHz and 12 points each on 2.3 GHz and higher. On each band, every time you work a different grid square, you receive a multiplier. Your multiplier total is the sum of grids you worked per band. The final score is your QSO point total times your multiplier total.

Rovers only: The final score consists of the total number of QSO points from all bands times the sum of unique multipliers (grids) worked per band (regardless of which grid they were made in), plus one additional multiplier for every grid activated.

COURTESY WØZQ

Looking toward the Twin Cities from EN25.

How to report your score: You must send in your entry by September 6, 2007. E-mail Cabrillo formatted logs to **augustUHF@arrl.org**, or send paper logs and a complete summary sheet to August UHF Contest, ARRL, 225 Main St, Newington, CT 06111. You may also submit the entry by completing the Web submission form at **www.b4h.net/cabforms**.

Complete rules: The complete rules may be found at **www.arrl.org/contests/forms**. You will also find links to the general rules for all ARRL contests, general rules for ARRL contests on bands above 50 MHz (VHF) and other forms and operating aids, as well as log sheets for submitting your entry. If you don't have Web access, you can obtain the complete rules and forms by sending a self-addressed, stamped envelope with two units of postage to August UHF Contest Rules, ARRL, 225 Main St, Newington, CT 06111.

For more information: E-mail **contests@arrl.org**, or phone 860-594-0232. QST

HAMS ASSIST AT SECOND LARGEST SINGLE DAY SPORTING EVENT IN THE WORLD

For more than 25 years, Marathon Amateur Radio Communications has been assisting with the Boston Marathon. This year marked the 111th running of the Marathon on Patriots' Day, April 16, 2007. MARC is a consortium of the Boston Amateur Radio Club, the Framingham Amateur Radio Association and the Minuteman Repeater Association to support the Marathon.

Traditionally run on Patriots' Day (which marks the occasion as the "shot heard 'round the world," otherwise known as the Battle of Lexington and Concord), more than 20,000 runners participated in this year's Marathon. Another 500,000 spectators and 1100 media members line the 26.2 mile route from the starting point in Hopkinton to the finish point in front of the Boston Public Library.

According to Steve Schwarm, W3EVE, of Wrentham, Massachusetts, captain of the Route/First Aid and Water Stations team, there are 26 first aid stations and 26 water stations along the route — each has a ham there to provide communications. "With the number of people involved, we find cell phones are just too overloaded and don't work for communicating. Ham radio is the only thing that works."

To help facilitate communications, MARC has three Net Control Stations — one at the start, one at the finish and one on the course. "We use 10 frequencies simultaneously, so it can get rather busy," Schwarm said. There is a command channel linking the three NCSs.

Because runners have to qualify to be eligible to compete in the Boston Marathon, the participants are in pretty good shape. Even so, Schwarm said, they facilitate communications to escort runners to the first aid stations or hospitals every year. "We had to escort 22 runners from the course this year to go to the hospital. In 2004, we had to escort 189. We escorted another 50 participants from the finish line this year."

More than 200 hams helped out with the 2007 Marathon, but Schwarm says they are always looking for more volunteers. Many ham families lend a hand, with mothers, fathers, brothers and sisters working alongside each other.

If you are interested in helping out at the 2008 Boston Marathon, please visit **mtfort.vh.primushost.com/marc/**, or e-mail Steve Schwarm at **w3eve@amateur-radio.net**. Find out more about the Boston Marathon at **www.boston-marathon.com**. — *S. Khrystyne Keane, K1SFA*

ROBERT PHINNEY, K5TEC

Kevin Paetzold, K1KWP, of Shrewsbury, MA, prepares an antenna for the Boston Marathon in 40 knot/hour winds.

STEVE SCHWARM, W3EVE

The American Red Cross, Massachusetts Department of Public Health, Massachusetts State Police and ambulance dispatchers man a total of nine control sites.

COURTESY STEVE SCHWARM, W3EVE

Tom, K1TH, and Linda Hurley, WB2BYO, take a moment to smile as the driving rain began to let up at the start of the 2007 Boston Marathon in Hopkinton. The couple was assigned to the busy Red Cross tent at the first of a series of hills at the 16.6 mile marker of the nation's oldest marathon.

2007 ARRL RTTY Roundup Results

Topping out after 19 years.

Jay Townsend, WS7I
ws7i@arrl.net

COURTESY ED MUNS, WØYK

Ed Muns, WØYK, operated P49X from Aruba and set another Single Operator world record with 2803 contacts and 372,799 points.

After many years of increased activity, the RTTY Roundup briefly reached its peak in activity. We received a few fewer logs this year than for last year's contest, but as we approach the bottom of the sunspot cycle, this was to be expected. This was the year that the high power operators took full charge of the contest. Available band space shrank with the lack of propagation on 10 and 15 meters. The extra 10 dB in power between the classes really counted on the low bands, and 20 meters was its usual crowded, wall-to-wall, exciting place to operate.

This year, a couple of operators merit special attention since the RTTY Roundup has always been about the "little pistol." Greg Cathcart, WA4HPH, who is an old-time CW guy, entered his first contest in 48 years. He says he had a blast. Mike McShan, N5JKY, is a QRP man who had never tried RTTY before — he had so much fun he just kept going and going. Mike worked 29 states with six DX contacts, all using an attic-mounted dipole.

High Power Single Operator Results

I guess I didn't take the sunspot cycle too seriously when I made last year's predictions. That was an error, and yet in 2007 the 2500 QSO mark was exceeded by over 10 percent. Over a hundred contacts an hour is now the new standard of the RTTY Roundup. Peak rates are far greater than that.

From Aruba, Ed Muns, WØYK, operated P49X and set another Single Operator World Record with 2803 contacts and 372,799 points. His effort set a new high water mark that might take a while to beat. Ed reports that he worked 1558 unique call signs. Sort of reminds me of some of the hits I took when a log checker knocked out a bunch of unique calls from my log when I operated P4ØJT from the exact same spot as Ed. The log checker couldn't understand how rare P4 was in Japan and that JAs were lining up to get in the RTTY log back then. His misunderstanding cost me first place overall that year.

Europe dominated the rest of the DX high power standings with Anton Crv, S54E, capturing second place, just missing the European record. Nick Nikityuk, UW8I, dropped a place this year to third spot. In fourth place DX, EO3Q had a nice score, as well.

Shifting from Multi to Single operator this year was Rick Davenport, KI1G, who beat his old W/VE record Single Operator, setting the New England Division record a notch higher. Mike Sims, K4GMH, moved up another place this year in the standings, beating Charlie Morrison, KI5XP, in a tight race where both set new Roanoke and Delta Division records.

The differences in Mike and Charlie's scores are interesting to examine. Both had the same number of Multipliers. Mike beat Charlie on both 80 and 40 meters by a total of nearly 200 contacts, but Charlie won both of the 15 and 20 meter battles. Mike, however, had 53 more contacts in the log when all was said and done.

Alex Tkatch, KU1CW, from the Midwest Division was the fourth place record-setting finisher. Another in the over-200,000 point group was Dennis Egan, NB1B. Rounding out the Top 10 — also with new records — was Bob Patten, N4BP, from the Southeastern Division and Glenn Wyant, VA3DX (and with a new Canada record to boot!). Steve Moore,

Plaque Winners

Thanks to the generous sponsorship of numerous clubs, individuals and West Mountain Radio-Principal Awards Sponsor for the 2007 ARRL RTTY Roundup — we are pleased to again announce that the Overall and Division winners in each category receive a sponsored Sweepstakes plaque. Many thanks to the sponsors for their commitment to the ARRL Plaque Program.

Overall Winners

Category	*Winner*	*Sponsor*
W/VE		
Single Operator Low Power —	NM7M	Memorial
	AA5AU	Jim Reisert, AD1C
Single Operator High Power —	W7RM	Award
	KI1G	Frank Fallon, N2FF
Multioperator Low Power		
	N5ZM	West Mountain Radio
Multioperator High Power		
	K4QD	John Lockhart, WØDC
DX		
Single Operator Low Power		
	HI3TEJ	West Mountain Radio
Single Operator High Power		
	P49X	Gary Belcher, KH6GMP
Multioperator Low Power		
	KP2D	West Mountain Radio
Multioperator High Power		
	GIØKOW	In Memoriam of WØETC, by the Tennessee Contest Group

ARRL Division Winners

Single Operator Low Power

Atlantic	W3LL	West Mountain Radio
Central	N9CK	West Mountain Radio
Dakota	NØAT	W2JGR Memorial by Don Hill, AA5AU
Delta	AA5AU	West Mountain Radio
Great Lakes	W4LC	West Mountain Radio
Hudson	WA2LXE	West Mountain Radio
Midwest	NTØF	In Memoriam of WØETC, by Peter Rudolph, DL2YCA
New England	W1ECT	CTRI Contest Group
Northwestern	K7ZUM	West Mountain Radio
Pacific	N6OJ	West Mountain Radio
Roanoke	KA4RRU	Mike Sims, K4GMH
Rocky Mountain	KTØDX	West Mountain Radio
Southeastern	KE4KWE	West Mountain Radio
Southwestern	AD6WL	West Mountain Radio
West Gulf	KE5OG	West Mountain Radio
Canada	VE1OP	West Mountain Radio

Single Operator High Power

Atlantic	WA2ETU	West Mountain Radio
Central	AI9T	Don Hill, AA5AU
Dakota	KØSR	West Mountain Radio
Delta	KI5XP	Roland Guidry, NA5Q
Great Lakes	AB8K	Southwest Ohio DX Association
Hudson	NP3D/W2	Frank Fallon, N2FF
Midwest	KU1CW	West Mountain Radio
New England	KI1G	West Mountain Radio
Northwestern	K7MI	Pat Shinners, W7GTO
Pacific	K6IDX	Northern California Contest Club
Roanoke	K4GMH	West Mountain Radio
Rocky Mountain	KØFX	West Mountain Radio
Southeastern	N4BP	West Mountain Radio
Southwestern	K6LL	West Mountain Radio
West Gulf	W5AP	West Mountain Radio
Canada	VA3DX	West Mountain Radio

Multioperator Low Power

Atlantic	N2WK	West Mountain Radio
Central	W9AZ	West Mountain Radio
Dakota	KEØL	West Mountain Radio
Delta	N5ZM	West Mountain Radio
Great Lakes	N8LRG	Shelby Summerville, K4WW
Hudson	K2VK	West Mountain Radio
Midwest	NØNI	West Mountain Radio
New England	KT1I	West Mountain Radio
Northwestern	WA1PMA	West Mountain Radio
Pacific	N6MW	West Mountain Radio
Roanoke	WD4LBR	West Mountain Radio
Rocky Mountain	WØRAA	West Mountain Radio
Southeastern	W4QG	West Mountain Radio
Canada	VE7OGO	West Mountain Radio

Multioperator High Power

Atlantic	AA3B	West Mountain Radio
Central	N2BJ	West Mountain Radio
Dakota	WØSD	West Mountain Radio
Delta	KG5VK	West Mountain Radio
Great Lakes	KE4YVD	West Mountain Radio
Hudson	NA2M	West Mountain Radio
Midwest	AB0RX	West Mountain Radio
New England	KV1J	West Mountain Radio
Northwestern	KE7AJ	West Mountain Radio
Pacific	NN6NN	West Mountain Radio
Roanoke	W4RM	West Mountain Radio
Rocky Mountain	WØLSD	West Mountain Radio
Southeastern	K4QD	West Mountain Radio
Southwestern	W7WW	West Mountain Radio
West Gulf	K5HDU	West Mountain Radio
Canada	VE7UF	West Mountain Radio

AI9T, won the Central Division for the fifth consecutive time.

Six new Division records were set this year and a new overall High Power Record, too. When we get 10 meters back, what then?

Low Power Single Operator Results

Teddy Jimenez, HI3TEJ, notched the win from the Dominican Republic. Making a strong run was Jerry Rosalius, PJ2T, finishing a bit off the pace in second place. Patrik Hrvatin, 9A5CW, secured third place. Out of Morocco Mohamed Kharbouche, CN8KD, claimed a new African record to finish out the top four.

Don Hill, AA5AU, rose like an old alligator to the surface, notching yet another win. Did you know that Don won his first Roundup with a ground-mounted 5-band vertical? I think that next year Don should try that again to give others a chance (or to see if he still has the magic).

There was a tight race for second place. Mike Trowbridge, KA4RRU, who missed last year's contest, moved by Steve Franzen, N9CK, last year's second place guy. From the East Coast, Michael McAmis, W1ECT, claimed fourth place.

A new Canadian all-time Low Power record was set by Scott Nichols,VE1OP, after he received a bit of a push from VE9DX to stay in the chair and go for the gusto.

Two new division records were all that were set this year in this class. Jim Seifert, AD6WL, set a new Southwestern Division record after he entered in Low Power this year. Bill Brooks, KE5OG, had a nice showing and a sixth place finish. Steve Sawyer, KTØDX, took a new Rocky Mountain Division record.

That goes to show you that low power rules. More than 700 logs were from the Single Operator Low Power classification this year. Some were even trying QRP.

High Power Multi Single Results

On the DX side, it was R. W. C. Cummings, GIØKOW, in a very tight race with Wanderley Gomes, ZX2B, down less than 1000 points. The crew of the East Cork Radio Group, EI7M, was third, with old friend Marijan Miletic, S56A, in fourth place overall. The *Associazione Radioamatori Italiani-Sezione di Udine*, IQ3UD, was fifth.

In the US, it was Jan Heise, K4QD, with the overall victory. They also set a new all-time Southeastern Division record. Ed Gray, WØSD, was back in action this year, about 10,000 off the pace, but making everyone happy that South Dakota was easy. Ken Eigsti, WØLSD, placed third, also setting a new Rocky Mountain Division record. George Mackus, ABØRX, with partner Joe Duerbusch, KØBX, finished up in fourth. Bill O'Mara, W4RM, hadn't operated in a couple of years, but secured fifth place.

The West Coast groups and their lack of good propagation this year took most of the last five spots. NN6NN with Chet Jensen, W6XK, and Ron Lodewyck, N6EE, operating was sixth. Dave Montgomery, W7WW; Tom Berson, ND2T, and Ralph Fedor, KØIR, were bunched together next. Finishing out the Top 10 was Barb Elliott, KE7AJ, and Gary Elliott, K7OX.

Top Ten Scores

Single Operator W/VE — Low Power		Multioperator W/VE — Low Power	
AA5AU	219,240	N5ZM	135,160
KA4RRU	146,392	N2WK	107,970
N9CK	142,500	W5VZF	106,384
VE1OP	130,268	NØNI	105,350
W1ECT	121,878	KE3WM	82,368
AD6WL	112,761	W2RTY	81,952
KE5OG	101,463	W4QG	77,280
KTØDX	101,080	N3XLS	72,400
NØAT	92,655	N8LRG	65,766
WØAW	92,597	K5BAT	65,145
W/VE — High Power		**W/VE — High Power**	
KI1G	251,636	K4QD	169,476
K4GMH	234,484	WØSD	159,330
KI5XP	227,912	WØLSD	136,141
KU1CW	218,484	ABØRX	134,040
NB1B	212,135	W4RM	132,225
K4RO	180,960	NN6NN	126,324
W4GKM	170,085	W7WW	112,056
AI9T	167,195	ND2T	108,240
N4BP	162,030	KØIR	106,954
VA3DX	155,736	KE7AJ	101,555
DX — Low Power		**DX — Low Power**	
HI3TEJ	155,533	KP2D	171,454
PJ2T	140,250	LZ9R	68,400
9A5CW	126,762	UT3HWW	67,770
CN8KD	113,300	GØMTN	63,700
8P2K	83,284	F6FJE	54,405
LV5V	78,846	RZ4HZW	13,624
YZ1SM	71,552	9A3ASF	5,564
Z36W	62,510	RU3AT	5,050
UT2UZ	62,160	DF4WC	4,429
UT1IA	61,789	LZ2007EU	4,095
DX — High Power		**DX — High Power**	
P49X	372,799	GIØKOW	141,172
S54E	163,226	ZX2B	140,400
UW8I	143,526	EI7M	122,952
EO3Q	129,636	S56A	81,408
SP4MPG	125,840	IQ3UD	70,854
EF8A	124,656	UX4E	41,975
LB8IB	119,900	F5BEG	26,487
EA1AKS	113,300	JA6ZPR	15,000
UT2II	106,512	BY1RX	12,852
IK2RZP	105,872	OE8YDQ	10,864

Affiliated Club Competition

Club	*Participants*	*Score*
Medium Category		
Potomac Valley Radio Club	37	1,966,378
Northern California Contest Club	29	1,291,583
Minnesota Wireless Assn	28	1,273,156
Tennessee Contest Group	20	1,031,637
Yankee Clipper Contest Club	14	831,999
Contest Club Ontario	16	690,195
Florida Contest Group	15	579,552
Society of Midwest Contesters	14	569,818
Local Category		
Alabama Contest Group	7	453,854
Grand Mesa Contesters of Colorado	6	347,954
CTRI Contest Group	4	331,539
Western Washington DX Club	9	269,547
Maritime Contest Club	3	236,316
Frankford Radio Club	3	231,525
Rochester (NY) DX Assn	5	226,423
South East Contest Club	7	192,286
Southern California Contest Club	5	166,713
Central Texas DX and Contest Club	5	143,063
Wireless Association of South Hills	3	137,200
Spokane DX Association	4	136,056
Mad River Radio Club	7	132,976
Willamette Valley DX Club	3	101,233
East Coast DX Assn	3	73,144
Order of Boiled Owls of New York	3	70,889
Metro DX Club	3	54,666
South Texas DX and Contest Club	3	31,560
Murgas ARC	3	25,276
Boeing Employees ARS	3	23,103

Low Power Multi Single Results

Setting a new record for Low Power Multi was the crew from the Virgin Islands ARC, KP2D, who set that as their goal this year and they achieved it — ah, the power of positive thinking. Ron reports that 15 meters was very good into Europe on both days, but that the real action was on 40 meters where they had solid runs. Positive thinking plus dynamite operating!

Europe dominated the remainder of the DX category. LZ9R with Atanas Koitchev, LZ3YY, operating took second place. UT3HWW's crew was third place. Lee Volante, GØMTN, with partner M3SSP were fourth, and Pierre-Jean Merceret F6FJE, rounded out the top five.

Stateside, with another record breaking effort, was Earl Smith, N5ZM, and his partner Glenn Wolf, N5RN. This is another Delta Division record for the duo. They repeated for the fourth time as the Low Power Multi-Single winners — not bad for a couple of good ole country boys.

Wayne King, N2WK, using packet from the Atlantic Division, was in second place. Jimmy Akers, W5VZF, and crew were third, and Toni Radebough, NØNI, and crew from Iowa were fourth. They also set a new Midwest Division Record. Bob Phillips, KE3WM; the WNY Digital Contest Club, W2RTY; Paul Ash, W4QG, and Joe Raymer, N3XLS, were bunched up. Phil Humphries, N8LRG, and the Colony Mountain Contest Club, K5BAT, rounded out the rest of the stateside guys and gals.

Affiliated Club Competition Results

As expected during the low end of the solar cycle, the East Coast has the edge. Setting a new Medium Club record, and beating the second place finisher by nearly half a million points, was the Potomac Valley Radio Club. The Northern California Contest Club was again second this year. Out of the Black Hole finishing third was the Minnesota Wireless Association with a strong showing in the Medium Club category. They had nearly as many participants as the NCCC. The Tennessee Contest Group rounded out the top four in the medium size group.

On the Local Club level there were some new entries and no repeats from last year in the top three. The Alabama Contest Group won the category. Grand Mesa Contesters of Colorado captured second place. These groups were followed in third place by the CTRI Contest Group. This is my type of contest and DX group — they support kids, as well as contest.

This year, I look for Field Day to have a big increase in the number of RTTY stations taking part as clubs build more activity and experience; this should lead to another upswing in Roundup, perhaps as early as in the next running of the RTTY Roundup, January 5-6, 2008. QST

2007 ARRL January VHF Sweepstakes Results

Generally poor conditions; an unexpected E_S opening; lots of cold weather.

Jan Carman, K5MA
jcarman@capecod.net

Weather conditions for the 2007 running of the January VHF Sweepstakes competition were typical for the winter season. Temperatures in the northern states and Canada were generally very cold, although snowfall was less than normal with a few exceptions; most of the heavy snowfall was found in the central and western regions. Unrelated to weather events, but causing serious distraction to many contest participants, were the NFL football playoffs that invaded our contest weekend space!

Scores were generally lower than those reported in the 2006 January VHF Sweepstakes event. In every Top 10 category but one, the 2006 results surpassed this year's scores. For example, the 2007 top Single Operator, Low Power score was 151,900 points from Roger Rehr, W3SZ, while the 2006 top Single Operator, Low Power score was 174,894 points from Bob Striegl, K2DRH. The only exception was in the Single Operator, High Power category, where the K3EAR 2007 score of 541,918 points beat K1TEO's 2006 score of 429,840 points.

There were 684 logs submitted for this year's event, representing 86,910 contacts. This is down substantially from both 2006 with 793 logs, and 718 in 2005. Weather certainly played a role in the 2005 event, and while there was some significant snow in Ontario last year, weather conditions for the 2006 event were generally tame. Most regions of the US and Canada enjoyed decent weather conditions. How do we reverse this disturbing downward trend in January VHF SS participation? Your comments on this issue are welcome; e-mail them to me at the address at the top of the article.

Propagation

Most of the Soapbox comments indicated that propagation was generally unenhanced, with normal tropo ranges out to about 300 miles being typical on both the VHF and UHF bands. Some stations noted a fairly brief 6 meter E_S opening in the mid-Southern states from the Midwest to the Southeast that occurred late Saturday evening. Also, some operators in the southern states noted enhanced tropo conditions, as well.

Jon Jones, NØJK, in Kansas said, "There was a surprise 6 meter E_S opening starting around 2300 UTC to the southeastern states. Most of the signals were weak and skipping over my location. Finally, at 2345 UTC, a loud K5IX popped up on 50.125 MHz and we easily exchanged grids." Jon's map of the 6 meter opening shows that the event was centered near southeastern Missouri, and included stations in a region bounded by Texas, Nebraska, western Pennsylvania and northern Florida.

Apparently many of the EME operators had better success than those totally dependent on terrestrial propagation. Tim Marek, K7XC, from Fallon, Nevada had lots of *WSJT* contacts and worked Ohio and Europe on EME. He also said, "The last hour of the contest was spent trying to work JA on 50 MHz JT65A EME. While we did not complete, I was able to easily copy several complete sequences, something I would

Top Ten

Single Operator, Low Power

W3SZ	151,920
N1DPM	98,400
WA3GFZ	91,698
K8GUN	88,128
WA3NUF	84,660
K1TR	82,600
AF1T	80,370
W4ZRZ	63,196
WB2SIH	63,080
WØAH	58,359

Single Operator, High Power

K3EAR	541,918
K1TEO	396,393
K1RZ	235,814
K3TUF	223,256
KA1ZE	160,716
W1RJA	115,218
WA3DRC	110,979
K1JT	100,776
W2SJ	79,310
K2AXX	75,717

QRP Portable

N6MU	15,807
KA1LMR	9,504
W6DWI	3,840
W9SZ	3,366
KG4LEV	1,404
WB2AMU	1,309
K6ME	1,281
KG6TGI	448
KØNR	310
N8XA	300

Limited Multioperator

W3SO	247,190
WA2FGK	102,108
W2MMD	66,483
W3HZU	54,288
N8ZM	51,689
K4LTX	49,575
W1QK	45,225
KA2LIM	40,400
KB1DFB	32,804
WN8R	25,840

Multioperator

N3NGE	554,268
K5QE	327,096
N2PA	277,720
W4RX	131,553
K3EOD	118,088
K8EB	74,620
KW1AM	64,855
KBØHH	34,810
WØEEA	32,300
W1XM	29,127

Rover

N6NB/R	952,409
W6YLZ	906,769
W6TE/R	832,986
KG6TOA	792,792
N6TEB/R	364,507
N6DN/R	363,094
K2TER/R	183,480
K2QO/R	130,065
N5AC/R	63,990
VE3OIL/R	61,910

COURTESY ANDY STEPHENS, W6AWS

Andy Stephens, W6AWS; Glenn Gleason, KG6LRX, and Gary Hayes, KG6SMX, operate from CM98 (Northern California), representing the River City Amateur Radio Communications Society, N6NA, while they chase contacts under the watchful eye of Charles Freas, W6FT.

Affiliated Club Competition

Club Name	Score	Entries
Unlimited		
Mt Airy VHF Radio Club	1,968,935	61
Medium		
Rochester VHF Group	894,620	22
North East Weak Signal Group	881,325	16
Potomac Valley Radio Club	804,323	37
South Mountain Contest Club	591,564	7
North Texas Microwave Society	496,764	13
Downey ARC	365,152	3
Northern Lights Radio Society	275,158	23
Contest Club Ontario	237,332	22
Yankee Clipper Contest Club	175,025	14
Society of Midwest Contesters	149,689	13
Badger Contesters	147,959	16
Pacific Northwest VHF Society	60,753	17
Six Meter Club of Chicago	28,147	11
Northern California Contest Club	21,874	7
Raritan Bay Radio Amateurs	19,953	15
Local		
Murgas ARC	129,595	5
Roadrunners Microwave Group	125,419	6
Eastern Panhandle ARC	101,917	7
Eastern Connecticut ARA	101,167	5
Carolina DX Assn	80,423	5
Florida Weak Signal Society	79,364	7
Chippewa Valley VHF	60,991	5
Florida Contest Group	39,940	5
Grand Mesa Contesters of	39,810	4
Bergen ARA	29,562	5
Western States Weak Signal	14,906	4
10-70 Repeater Assn	10,695	4
Dauberville DX Assn	6,521	6
West Park Radiops	5,846	3
Bears of Manchester	3,289	3
Hudson Valley Contesters and	2,744	3
Mobile Sixers Radio Club	1,246	4
Alexandria Radio Club	1,086	3
Tennessee Contest Group	1,086	3

not have thought possible just a few years ago." Finally, Tim said, "Many thanks to Joe Taylor, K1JT, for putting so much fun back into VHF operating."

Mark McMillan, W7MEM, indicated that if he had just worked only 2 meter EME, he would have worked more stations than he did, shifting between EME and terrestrial work. Brad Fuller, WQ5S, said that activity was great, conditions were poor and that both meteor scatter and EME added several multipliers.

The National Scene

Overall, scores were slightly lower than last year in all categories, but there were some exceptions. Rover scores were generally higher than last year, except for the top spots.

Single Operator

Roger Rehr, W3SZ, Reading, Pennsylvania, took the top spot in the Single Operator, Low Power competition with 151,900 points; this score is down 13 percent from the winning SOLP score last year. Fred Stefanik, N1DPM, moved up from third spot last year to the second spot with 98,400 points. Paul Sokoloff, WA3GFZ, moved down from second spot last year to third this year with 91,700 points, while Dan LeFevre, K8GUN, moved from sixth place last year to fourth place. Phil Miguelez, WA3NUF, moved down from the High Power category last year to the Low Power category this year to take the fifth place spot with 84,700 points.

ROD WOLFE, N3XG

Here is Matt Small, KB3NMQ, in his first contest as he activates FM19 (Maryland), FN10 and FN20 (Pennsylvania) with Rod Wolfe, N3XG, as KB3NMQ/R.

Expanded Reports Available

For complete results, participant soapbox and the complete scores in a user-searchable database, please visit **www.arrl.org/contests/results**. ARRL members without Internet access may obtain a printout of the complete line scores by sending a self-addressed, stamped envelope to ARRL Contest Results, 225 Main St, Newington, CT 06111. Please be sure to include the contest name and year.

The Single Operator, High Power category is the only class with a higher score than last year in the top spot. The South Mountain Contest Group, operating K3EAR, took top honors with a 541,918 point effort. Jeff Klein, K1TEO, claimed the second SOHP spot with 396,400 points operating from Connecticut. Dave Petke, K1RZ, from Maryland took the third spot with 235,800 points, while Phil Theis, K3TUF, was close behind at 223,400 points. Stan Hilinski, KA1ZE, took fifth place with 160,700 points.

The scores in the QRP portable category were substantially lower in the top two positions than those produced last year. John Desloge, N6MU, claimed the top spot with 15,800 points, followed by Chris Merchant, KA1LMR, at 9500; Robin Whiting, W6DWI, with 3800; Zack Widup, W9SZ, at 3400, and John Coley, KG4LEV, with 1400.

Multioperator

The multioperator scores were generally lower this year than during 2006. The top spot goes to Packrats station N3NGE, led by Len Martin, with 554,200 points. Len's group had difficulty with wind-induced power-line noise on the 6 and 2 meter bands during the first half of the contest. He indi-

Division Leaders

Single Operator Low Power

Atlantic	W3SZ	151,920
Central	K2DRH	50,038
Dakota	N0KP	40,194
Delta	N4QWZ	32,076
Great Lakes	K2YAZ	18,785
Hudson	WB2SIH	63,080
Midwest	N0LL	16,647
New England	N1DPM	98,400
Northwestern	KI7JA	7,917
Pacific	W6GMT	1,716
Roanoke	K8GUN	88,128
Rocky Mountain	N0POH	7,068
Southeastern	W4ZRZ	63,196
Southwestern	K6TSK	5,724
West Gulf	K5LLL	25,340
Canada	VA3KA	31,278

Single Operator High Power

Atlantic	K3EAR	541,918
Central	N2BJ	56,100
Dakota	W0GHZ	60,352
Delta	W5MRB	10,656
Great Lakes	K8ROX	40,553
Hudson	N2GHR	72,716
Midwest	KM0T	26,488
New England	K1TEO	396,393
Northwestern	N7EPD	18,900
Pacific	KC6ZWT	22,444
Roanoke	KE2N	61,380
Rocky Mountain	KC0MEA	1,840
Southeastern	W4WA	75,175
Southwestern	AF6O	49,220
West Gulf	K9MK	47,960
Canada	VE3OJN	2,360

Limited Multioperator

Atlantic	W3SO	247,190
Dakota	W0VB	19,076
Delta	N5KDA	7,434
Great Lakes	N8ZM	51,689
Hudson	K2BAR	20,142
Midwest	N0UNL	1,040
New England	W1QK	45,225
Pacific	K7XC	5,635
Roanoke	K4LTX	49,575
Rocky Mountain	K0GIE	1,350
Southeastern	N4DXY	1,265
Southwestern	KE6GFF	60
West Gulf	WA5TKU	8,050

Multi-multi

Atlantic	N3NGE	554,268
Central	W9XA	16,060
Delta	AG4V	20,252
Great Lakes	K8EB	74,620
New England	KW1AM	64,855
Pacific	W6YX	10,434
Roanoke	W4RX	131,553
Rocky Mountain	W0EEA	32,300
Southeastern	K4NGA	8,874
West Gulf	K5QE	327,096
Canada	VE3LCA	3,990

Single Operator Portable

Atlantic	KB3LNM	60
Central	W9SZ	3,366
Great Lakes	N8XA	300
Hudson	WB2AMU	1,309
New England	KA1LMR	9,504
Pacific	W6DWI	3,840
Roanoke	KG4LEV	1,404
Rocky Mountain	K0NR	310
Southeastern	KI4OQH	4
Southwestern	N6MU	15,807
West Gulf	N5TEN	24

Rover

Atlantic	K2TER/R	183,480
Central	WB8BZK/R	18,676
Dakota	KC0IYT/R	20,724
Delta	N4FLM/R	17,280
Great Lakes	KC8QAE/R	11,520
Hudson	KJ1K/R	12,348
New England	KB1EKZ/R	11,221
Pacific	N6NB/R	952,409
Roanoke	KC3WD	29,749
Rocky Mountain	WJ7L/R	270
Southeastern	AH8M/R	15,162
Southwestern	N6TEB/R	364,507
West Gulf	N5AC/R	63,990
Canada	VE3OIL/R	61,910

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)		
W3SZ	151,920	A	K8GUN	88,128	A	K2DRH	50,038	A	NØKP	40,194	A	KI7JA	7,917	A
N1DPM	98,400	A	W4ZRZ	63,196	A	VA3KA	31,278	A	NØVZJ	29,172	A	K6TSK	5,724	A
WA3GFZ	91,698	A	WØAH	58,359	A	N9DG	25,947	A	K5LLL	25,340	A	KN6VR	3,948	A
WA3NUF	84,660	A	W4SHG	57,459	A	KB9TLV	25,908	A	WB5ZDP	18,605	A	N6KW	3,700	A
K1TR	82,600	A	N4QWZ	32,076	A	VO1NO/VE3	25,840	A	NØLL	16,647	A	W6GMT	1,716	A
K3EAR	541,918	B	W4WA	75,175	B	N2BJ	56,100	B	WØGHZ	60,352	B	AF6O	49,220	B
K1TEO	396,393	B	KE2N	61,380	B	K8ROX	40,553	B	WØZQ	56,212	B	KC6ZWT	22,444	B
K1RZ	235,814	B	K4QI	53,439	B	W9GA	40,400	B	K9MK	47,960	B	N7EPD	18,900	B
K3TUF	223,256	B	K4XR	37,875	B	K8TQK	38,481	B	W3XO/5	27,888	B	NU6S	12,096	B
KA1ZE	160,716	B	KC4PX	25,256	B	WA8RJF	30,900	B	KMØT	26,488	B	KD6VNQ	10,094	B
KA1LMR	9,504	Q	KG4LEV	1,404	Q	W9SZ	3,366	Q	KØNR	310	Q	N6MU	15,807	Q
WB2AMU	1,309	Q	KI4OQH	4	Q	N8XA	300	Q	N5TEN	24	Q	W6DWI	3,840	Q
W3EP/1	221	Q							KØJJW	6	Q	KG6TGI	448	Q
KC2JRQ	75	Q												
KB3LNM	60	Q												
W3SO	247,190	L	K4LTX	49,575	L	N8ZM	51,689	L	WØVB	19,076	L	K7XC	5,635	L
WA2FGK	102,108	L	WC4J	14,796	L	WN8R	25,840	L	WA5TKU	8,050	L	K6CHA	3,850	L
W2MMD	66,483	L	N4ARR	12,452	L	WC8VOA	1,386	L	KE5BAV	3,630	L	W6HF	646	L
W3HZU	54,288	L	KI4SNY	9,588	L				WØMR	1,444	L	N6NA	80	L
W1QK	45,225	L	N5KDA	7,434	L				KØGIE	1,350	L	KE6GFF	60	L
N3NGE	554,268	M	W4RX	131,553	M	K8EB	74,620	M	K5QE	327,096	M	W6YX	10,434	M
N2PA	277,720	M	AG4V	20,252	M	W9XA	16,060	M	KBØHH	34,810	M	KI6BEW	7,410	M
K3EOD	118,088	M	K4NGA	8,874	M	W9CDL	6,762	M	WØEEA	32,300	M			
KW1AM	64,855	M				N9UHF	6,288	M	W5LCC	3,330	M			
W1XM	29,127	M				VE3LCA	3,990	M	K5CCC	1,140	M			
K2TER/R	183,480	R	KC3WD	29,749	R	VE3OIL/R	61,910	R	N5AC/R	63,990	R	N6NB/R	952,409	R
K2QO/R	130,065	R	N4FLM/R	17,280	R	WB8BZK/R	18,676	R	WDØACD	55,616	R	W6YLZ	906,769	R
N3EMF/R	25,530	R	AH8M/R	15,162	R	VA3CDD	16,770	R	KCØIYT/R	20,724	R	W6TE/R	832,986	R
K1DS/R	24,434	R	N4T	3,220	R	VE3RKS/R	16,506	R	AE5P/R	3,190	R	KG6TOA	792,792	R
WA1HHN/R	16,887	R	N2MH	2,639	R	KI9R/R	15,974	R	WAØVPJ/R	1,818	R	N6TEB/R	364,507	R

cated that there were improved propagation conditions on Sunday, and not as much static. The K5QE group, led by Marshall Williams, claimed the second spot with 327,000 points. He indicated that the bands were terrible on Saturday but improved to well above average on Sunday. The Mountain Group in upstate New York operated N2PA to the third spot with 277,700 points, with W4RX in fourth position at 131,500 points and K3EOD with 118,000 points in fifth place.

The top Limited Multioperator spot goes to the Wopsononock Mountain Operators, W3SO, in western Pennsylvania with 247,200 points. This score is down almost 30,000 points from their winning effort last year. WA2FGK took the second place spot with a 102,100 point effort, followed by W2MMD (66,400), W3HZU (54,300), and N8ZM (51,700).

MARK ADAMS, K2QO

Paul Schwabel, W2TAU, tweaks a few extra dB out of 10 GHz.

Rover

The top rover category scores were slightly lower this year than last. Wayne Overbeck, N6NB, took the top spot this year as a Single Operator effort with 952,400 points, down somewhat from his joint rover effort last year with Art Goddard, W6XD. Second place went to Mike Ramirez, W6YLZ, with 906,800 points, followed by Dave Smith, W6TE, at 833,000; Rob Hughes, KG6TOA at 792,700, and Dave Glenn, N6TEB, at 364,500.

It appears that the highly successful grid-circling techniques developed in California and elsewhere in the Southwest to produce record high scores are now standard operating procedure. These techniques and the impressive results produced were a very big deal two years ago!

Affiliated Club Competition

The Mt Airy VHF Radio Club is the largest group of VHF/UHF/Microwave enthusiasts in North America, regularly fielding more than 50 entries in the January VHF Sweeps event; they placed 61 entries in this year's competition. The total club score comes to 1,968,935 points, down from 2.5 million in 2006 and 2.8 million in 2004, with only 56 members reporting scores. This large Philadelphia area club is clearly in a class of its own!

In the Medium Club category, the Rochester VHF Group regained the top position with a total of 894,620 points from 22 mem-

COURTESY BOB WITTE, KØNR

With his backpack portable station in tow, Bob Witte, KØNR, is on his way to operate at the top of Mt Herman DM79 (Colorado).

bers. The North East Weak Signal Group (NEWS Group) came in a very close second with 881,325 points from 16 members. The Potomac Valley Radio Club (PVRC) made third place with 804,323 points from 37 members, down from their first place finish in this category last year. Fourth place in the Medium category went to the South Mountain Contest Club with 592,564 points. The North Texas Microwave Society, with 13 entries and 496,764 points, placed fifth.

The Murgas Amateur Radio Club, with 129,595 points from five members, placed first in the Local Club category. Second place goes to the Roadrunners Microwave Group with 125,419 points from six members. The Eastern Panhandle and Eastern Connecticut clubs enjoyed a close battle for third and fourth place.

Clubs are Critical to Growth

A total of 35 clubs reported scores this year, compared to 40 in 2006 and 30 in 2005. In looking through the names of these 35 clubs, I have discovered that a surprising number are not specifically devoted to VHF/UHF/Microwave — only 13 clubs were listed that specifically focus on VHF/UHF/Microwave activities. Many of the leading HF contest clubs are on the list, such as the Potomac Valley Radio Club (PVRC), Contest Club Ontario, Yankee Clipper Contest Club (YCCC), Society of Midwest Contesters, Northern California Contest Club (NCCC) and the Florida Contest Group (FCG) to name a few. PVRC alone fielded 37 member entries, second only to the Mt Airy VHF Radio Club's 61 entries.

The point to be made here is that there is a great interest in VHF/UHF contesting by many amateurs who are not specifically focused on the VHF/UHF/Microwave world. I believe this is a very good trend, and those of us whose interests lie in both areas should hit the campaign trail to our local radio clubs and make presentations on the great enjoyment to be gained from participation in Amateur Radio contesting, regardless of the frequency range and operating mode.

The next ARRL VHF Sweepstakes is January 19-21, 2008. For more information, please see **www.arrl.org/contests/**. QST

Strays

ED WILLERS, ZS6UT

Can you see the light? **Ed Willers, ZS6UT, of Lynnwood Ridge, South Africa, demonstrates the high voltages and current generated when transmitting with a magnetic loop. He placed a 4 foot long neon tube across the housing on the center of the capacitor housing. It had no physical electrical connection to the tube. He was using CW and calling CQ on 80 meters, running 200 W PEP. The tube acted as a light semaphore, enabling the code to be read as it was being sent.**

QUICK-DISCONNECT ANTENNA GOOD FOR DX

◊ Pierre Bordeleau, VE2OPB, of Montreal, Quebec, lives in a condominium and faces the all-too-common restrictions on putting up an antenna structure. He found a good way to put one up legally and get on the air: a pair of Outbacker antennas, a 1:1 balun and quick-disconnect system do the job. The antenna works well, he says, on 80-10 meters.

PIERRE BORDELEAU, VE2OPB

Stealthy: **VE2OPB's balcony sports a quick-disconnect antenna that's netted him some good DX over a span of 7 years.**

TOM BROWNLEE, AF2D

Old hams never die… **Tom Brownlee, AF2D, of Middletown, Virginia, snapped this photo while visiting the Marie Selby Botanical Gardens in Sarasota, Florida.**

COURTESY JERRY SOBEL, KØMBB

Can you hear me now? **Jerry Sobel, KØMBB, of St Louis, Missouri was on vacation in Palm Springs, California when he ran across what he termed a "very unusual antenna design."**

HAMSPEAK

Getting on 24 GHz

Gunnplexer — Trade name of a compact microwave transceiver based on Gunn diode technology. They generally operate in the region of 10 GHz and above. See **www.arrl.org/members-only/tis/info/pdf/0203096.pdf**.

ADVANCED RECEIVER RESEARCH

Microwave bands — The amateur ultra (UHF) and super (SHF) high frequency (and above) bands starting at 1000 MHz. More at **www.arrl.org/tis/info/microwave.html**.

Noise figure — Figure of merit of receiver performance. It is a measure of how much noise is produced in the receiver itself as compared to a perfect receiver. It is most important at VHF and above since lower frequencies are more likely to have sensitivity limited by noise from other sources. See **www.arrl.org/qex/2007/05/koehler.pdf**.

SMA — Subminiature screw-on coaxial cable connector rated to 18 GHz. These are smaller than the BNC type and as a result are often used in compact equipment, especially between subassemblies. They are also seen as antenna connectors on a number of popular models of handheld VHF and UHF transceivers. For more information, search for SMA at **www.amphenolrf.com**.

A Resonance Probe for the Ham Shack

Homebrewing — Art and craft of constructing Amateur Radio equipment, usually from a bunch of separate parts.

Integrated circuit voltmeter — Voltmeter that has its input processed by an amplifier. The amplifier provides reduced loading to the measured circuit allowing a reading that is more representative of the actual voltage present.

Signal generator — Test instrument that generates a signal used for measuring radio or audio system performance. Generally offers adjustable frequency and amplitude.

Toroid — Metallic core in shape of a donut. Often used as the core of an inductor. Such inductors have the property that the magnetic field primarily exists within the core, and thus avoids coupling to other circuits and acts as if self shielding. See **www.arrl.org/members-only/tis/info/pdf/0612053.pdf**.

A Simple Headset Adapter for the IC-706 Series Radios

Altoids tin — Small metallic candy container with snap-on lid that has often been used as an enclosure for miniaturized Amateur Radio gear.

CAT-5 — Category-5. A local area network (Ethernet) signaling and cable specification designed to carry data communication at signaling rates up to 100 Mbps. The connector type (modular RJ-45) is commonly used as a mic connector in mobile radio equipment. For more, check out **www.lanshack.com/cat5e-tutorial.aspx**.

Electret microphone — A kind of microphone element that is composed of an integrated condenser type microphone and integrated circuit amplifier in a single module. See **www.kingstate.com.tw/9-5.htm**.

Simplex frequency — Typically a VHF or UHF FM operating frequency in which transmission and reception take place on the same frequency. This is in contrast to repeater operation in which there is a difference between transmit and receive frequencies (typically 600 kHz at 146 MHz and 5 MHz at 440 MHz, for example). In repeater operation, both stations transmit toward the repeater and both listen to the signal from the repeater. The repeater location is typically high and in the clear so much longer range is possible than with simplex operation.

The Smart Keyboard

ARRL Field Day — An ARRL operating event in June of each year in which hams typically operate for 24 hours from temporary locations using emergency power and portable equipment to simulate emergency conditions and have fun. See **www.arrl.org/contests/rules/2006/rules-fd-2006.html**.

CW keyboards — A device that sends Morse CW characters through the use of a computer type keyboard.

Firmware — Instruction sets for programmable devices. A kind of software generally used to specify the operating characteristics of a device. It acts between software and hardware. For more, see **en.wikipedia.org/wiki/Firmware**.

Graphical user interface (GUI) — A part of computer operating environment software, such as Microsoft *Windows* or *MAC-OS*, that allows the use of icons and a pointing device to control a computer.

Keyer speed, weight — Define the characteristics of a Morse keying system. The speed is usually expressed in terms of transmitted words per minute (WPM), while the weight refers to the ratio between dot (and space) duration to dash duration — nominally 1:3.

Phase locked loop — A kind of variable oscillator system in which the phase of the signal (or a multiple or fraction of the signal frequency) is locked to the phase of a stable reference (or a multiple or fraction of the reference frequency). The result, if properly implemented, is a variable frequency signal with a stability that approaches that of the stable reference. See **www.uoguelph.ca/~antoon/gadgets/pll/pll.html**.

Sidetone — For voice, the sidetone is the copy of your speech that you hear in your ear while talking on a telephone, for example. For CW, it is generally a locally generated tone that lets you hear your keying so you can be sure you are sending properly.

Hands-On Radio

Half-wave rectifier — Circuit element that converts ac to dc by conducting only when the anode is positive with respect to the cathode. A half-wave rectifier provides output only on the half of the ac signal in which (typically) input is positive. For more information, see **www.visionics.ee/curriculum/Experiments/HW%20Rectifier/Half%20Wave%20Rectifier1.html**.

Op-amp — Originally the heart of the almost forgotten analog computer, an ideal operational amplifier has infinite gain and infinitely high input impedance. In real life, op-amps have high enough gain and impedance that their actual circuit gain, input and output impedance and frequency response are determined by the feedback components that surround the operational amplifier. See **www.williamson-labs.com/480_opam.htm**.

Semiconductor diode — Two-element solid state device that acts as a rectifier.

PN junction — Basis of a large class of semiconductor devices. Semiconductor material with an excess of electrons (N type) is bonded to other semiconductor material with "holes" or reduced electrons (P type). If a positive voltage is applied to the P side, and a negative one to the N side, the holes and electrons are both pushed to the junction and current flows across the junction. If the connections are reversed, the holes and electrons are drawn away from the junction and thus no current flows. This acts like a diode. Multiple junctions are combined to make other types of devices such as transistors and integrated circuits. See **britneyspears.ac/physics/pn/pnjunct.htm**.

Potentiometer — Variable resistance device in which both ends of the total resistance as well as the variable tap point are accessible. For more information, see **physics.kenyon.edu/EarlyApparatus/Electrical_Measurements/Potentiometer/Potentiometer.html**.

Saturation — the state of an amplifier at which the output voltage reaches the supply voltage. Any further increase in input will not result in additional output. An amplifier in this condition produced considerable distortion.

Full-wave rectifier — Circuit containing two or more individual diodes that provides dc output during the whole ac input cycle.

Noninverting input — Operational amplifiers generally have two inputs. If a signal is applied to the non-inverting input, the output goes positive with a positive input. In contrast, were the signal applied to an inverting input, the output goes negative with a positive input.

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sunnyvale@hamradio.com

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Connector: **N, PL259, TNC & 7/16,** Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 87%,** Attenuation 3.9dB @ 2 GHz at 100ft.
Usage 450 MHz and Higher.

PL259 CONNECTORS EACH END

Part #	Footage	Price
600C125	125 ft	$235.95
600C100	100 ft	$205.95
600C75	75 ft	$175.95
600C50	50 ft	$145.95
600C25	25 ft	$115.95
600C3	3 ft	$ 88.95

PL259(UHF) TO "N" MALE CONNECTOR

Part #	Footage	Price
600CN100	100 ft	$187.95

"N" MALE CONNECTORS EACH END

Part #	Footage	Price
600N100	100 ft	$168.95
600N75	75 ft	$139.95
600N50	50 ft	$108.95
600N25	25 ft	$ 77.95
600N15	15 ft	$ 66.49
600N6	6 ft	$ 55.49

Or CREATE YOUR OWN CUSTOM LENGTH ON-LINE.

ANDREW® Cinta CNT-400

RG8U SIZE SHOWN

Connector: **N, PL259, TNC, SMA, BNC & QMA,** Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 85%,** Attenuation 6.0dB @ 2 GHz at 100ft.
Usage 450 MHz and Higher.

PL259 CONNECTORS EACH END

Part #	Footage	Price
400C100	100 ft	$ 82.49
400C75	75 ft	$ 63.95
400C50	50 ft	$ 45.49
400C25	25 ft	$ 27.49
400C6	6 ft	$ 14.95
400C3	3 ft	$ 11.95

"N" MALE CONNECTORS EACH END

Part #	Footage	Price
400N50	50 ft	$ 54.95
400N6	6 ft	$ 22.95
400N3	3 ft	$ 20.95

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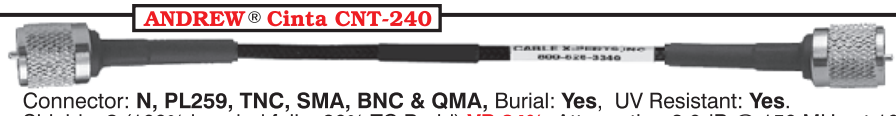

RG8X SIZE SHOWN

Connector: **N, PL259, TNC, SMA, BNC & QMA,** Burial: **Yes**, UV Resistant: **Yes**.
Shields: **2** (100% bonded foil +90% TC Braid) **VP 84%,** Attenuation 3.0dB @ 150 MHz at 100ft.
Usage 1 MHz and Higher.

PL259 CONNECTORS EACH END

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Frequency coverage: All amateur frequencies from 1.8-29.7 MHz
Power output: 1500 watts minimum
Harmonic Output: Better than 50 dB below rated output.
3rd Order IM: <-30 dBc
SWR tolerance: 3:1
Drive power: 65 watts nominal
Tube: Eimac 8877
Antenna outputs: 4xSO-239 connectors
Antenna selection: 1 or 2 outputs per band/segment
Input: SO-239 connector
Tuning/Band switching: Automatic. Manual override possible
Power: 100, 120, 200, 220, 240 V ac, 50/60 Hz
Power tap selection: Automatic
Interface: USB. Full remote control capability
Protection: Protected against all common faults
Display: **LED** bar graphs as well as digital panel meter
T/R switching: Vacuum relays; QSK (full break-in)
Bypass capability: 1500 Watts

ALPHA 8100

Frequency coverage: All amateur frequencies from 1.8-29.7 MHz
Power output: 1500 watts minimum
Harmonic Output: Better than 50 dB below rated output.
3rd Order IM: <-30 dBc
SWR tolerance: 2.5:1
Drive power: 50 to 55 watts nominal
Tube: 2x 4CX800 Svetlana Tetrodes
Cooling: Forced air
Antenna output: SO-239 connector
Input: SO-239 connector
Tuning/Band switching: Manual band switching & tuning
Power: 100, 120, 200, 220, 240 V ac, 50/60 Hz
Power tap selection: Manual
Interface: USB port for remote monitoring and performance data logging
Protection: Protected against all common faults
Display: **LED** bar graphs
T/R switching: Vacuum relays; QSK (full break-in)
Bypass capability: 150 watts

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- Peak weak signals hidden under a strong signal on the same frequency
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Antenna Phasing Controller

- 2 antenna alternative to DX Engineering's Receive Four-Square antenna
- Combine two antennas to create a directional pattern
- The NCC-1 enables you to adjust the antenna array pattern as if you were moving the antennas
- Use for direction finding

Special Features

- Exceptional dynamic range, nearly 1000 times better than nearest competitor
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- Separate controls for reversing channel and phase
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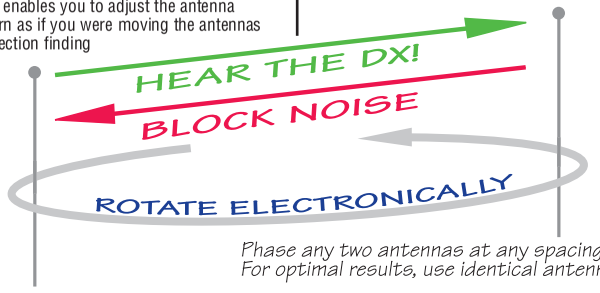
DXE-NCC-1 Noise Canceling/Phasing Controller **$495.00**



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HUSTLER

Easiest assembly and tuning of any multi-band vertical!

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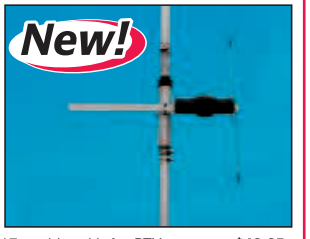
DXE-8X19-RT	Coax Jumper Cable – interface cable for easy connection to Hustler BTV	**$16.95**

See DXEngineering.com for details!

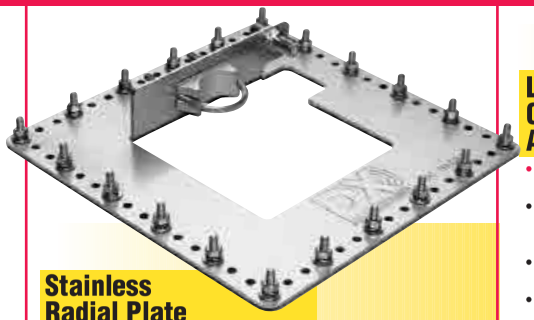
17m Add-On Kit

- Full band under 1.5:1 SWR
- Minor adjustments for other bands
- Simple installation
- 500W SSB/CW Power rating

Patent Pending



DXE-AOK-17M 17m add-on kit for BTV.....**$49.95**



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Makes radial attachment a snap!

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- Accommodates up to 120 radials
- Patented high current coax connection to radials

DXE-RADP-1P	Complete with 20 stainless bolt sets	**$49.95**
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DXE-RADW-500K	Radial Wire Kit, 500 feet of wire, 20 lugs, 100 anchor pins	**$59.90**
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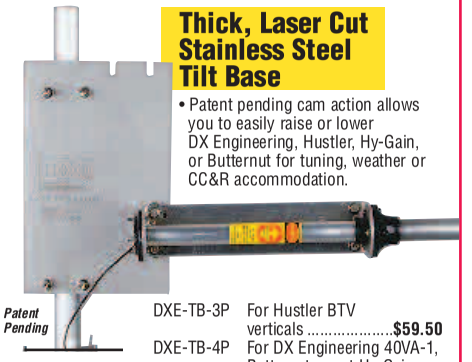
DXE-STPL-100P	Radial Wire Anchor Pins, 100-pack	**$14.00**



Thick, Laser Cut Stainless Steel Tilt Base

- Patent pending cam action allows you to easily raise or lower DX Engineering, Hustler, Hy-Gain, or Butternut for tuning, weather or CC&R accommodation.

Patent Pending

DXE-TB-3P	For Hustler BTV verticals	**$59.50**
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- Protect receiver front end, preamplifiers, linear amplifiers, or other sensitive equipment from damage due to improper switching during the receive/transmit transition
- Five outputs tied to the CW keying or push-to-talk (PTT) lines each have adjustable delay from 0-30 ms in 2 ms increments
- Side-tone generator follows input of keyer, not transmitter
- Supports full CW break-in
- Ideal for protecting DXE ARAV-2 or ARAH-2 Active Antennas from RF damage

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- All cable assemblies are high voltage tested to handle full-rated power
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Belden

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DXE-CBC-8XUN3	RG-8X, PL259 one end, Type N other, 3 feet	**$24.50**
DXE-CBC-8XN3	RG-8X, Type N each end, 3 feet	**$29.50**
DXE-CBC-8XU6	RG-8X, PL259 each end, 6 feet	**$21.99**
DXE-CBC-8XU12	RG-8X, PL259 each end, 12 feet	**$25.99**
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- 8-position switch, controller included
- Better than 1.1:1 SWR below 30 MHz

5 KW Key-Down RF Switch

- Better than 70 dB of port-to-port isolation

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At LDG Electronics we have always been the innovators in the automatic tuner industry. We built the first desktop switched-L tuner, the first automatic tuner for QRP radios, the first automatic tuner with a remote control head, and the first automatic tuner with 3-D memories. We were also the first manufacturer with a two-year warranty on all of our products and the first autotuner company to include all of the cables you need in your box.

Now we can say LDG autotuners have the highest resale value of any company's autotuners.*

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Over time, LDG' s well-built, over-engineered, long-lasting autotuners retain more of their value.

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Z-11Pro

Everything you always wanted in a small, portable tuner

The original portable Z-11 was one of LDG's most popular tuners, accompanying adventurous hams to their backyards, or to the ends of the earth. Now meet the Z-11Pro, everything you always wanted in a small, portable tuner designed from the ground up for battery operation.

Only 5" x 7.7" x 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 - 6 meters.

The Z-11Pro 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.

Two Year Warranty. Cables Included.

List Price $179

* Based on the average retail price of the product subtracted from the average resale value of used equipment sold on e-Bay. The data was compiled for a one year period in 2005-2006.

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AT-7000

The Hottest Radio in the Industry! Now with It's Own Autotuner!

The AT-7000 is the ideal tuner for IC-7000 & other ICOM Radios: Covers all frequencies from 1.8–54 MHz **(including 6 meters),** and will automatically match your antenna in a flash. Requires just 0.1 W for operation, but will handle up to 125 W (100 W on 6 m), making it suitable for everything from QRP (IC- 703Plus) to a typical 100 W ICOM transceiver.

Ready to go right out of the box! No extra cable to buy. Two-Year Warranty.

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The first auto tuner specifically designed for today's high-powered transceivers.

The AT-200 features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MHz **(including 6 meters)**.

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List Price $249

Z-100

The definitive low cost automatic antenna tuner!

The Z-100 is the definitive low cost automatic antenna tuner!

It has been designed from the ground up to provide the 100 watt power handling you asked for, in a small, light-weight package, perfect for portable as well as sitting on your desk in your shack!

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VHF/UHF HANDHELDS

VX-170/177

VX-170 *2 meter FM Sub-mersible handheld* RX coverage: 136-174 MHz and 200 memories. Power: 5W. © **$119.99**

VX-177 *440 MHz FM Submersible handheld* RX coverage: 420-470 MHz and 200 memories. Power: 5W. **$149.99**

FBA-25 *Battery Case* 6AA battery case for VX-170/177. **$20.99**

VX-7R

VX-6R *Dualband Sub-mersible HT* – 5W output on 144 and 440 MHz FM. Also 1.5W output on 220 MHz. 504 kHz to 998.9 MHz continuous RX (cellular blocked); 900 memories. **$249.99**

VHF/UHF MOBILES

FT-1802M *50W 2M FM Mobile* Covers: 136–174 MHz RX (includes a 10 channel NOAA weather bank); 144–148 MHz 50W TX; 221 memories with eight banks and Alphanumeric labeling. © **$129.99**

FT-7800R *2M/440 MHz FM Mobile* Covers: 144-148 & 430-450 MHz TX with 108-520 & 700-999 MHz RX (cell blocked); Power: 50W (2M), 40W (430 MHz); Over 1,000 Memories; WX alert; WIRES™ capability. © **$249.99**

(FT-8900R shown)

FT-8800R *2M/440 MHz FM Mobile* – Covers 144-148 & 430-450 MHz TX with 108-520 & 700-999 MHz RX (cell blkd); Power: 50W on 144 MHz, 35W on 430 MHz; Crossband repeat. Free YSK-8900 **$374.99**

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HF RADIOS

FT-817ND *HF/VHF/UHF Backpack Transceiver* Covers 160-10M, 6M, 2M, 70CM; RX: 100 kHz - 56 MHz, 76-154 MHz, 420-470 MHz. Power: 5W SSB/CW/FM (13.8V ext. DC), 1.5W AM, 2.5W SSB/CW/FM (9.6V NiMH pack or 8 AA's), 0.7W AM, up to 5W SSB/CW/FM. 1400mAh NiMH battery & charger. **$599.99**

FT-2000 *100W HF/6M Transceiver* – Covers 160–6M (TX) and 30 kHz – 60 MHz (RX), all modes. Power output: 100W. Features: Built-in automatic antenna tuner; 32-bit Floating Point DSP-based variable IF Bandwidth, IF shift and Contour Tuning; First IF Roofing Filters (3 kHz/6 kHz/15 kHz included); Dual In-band Receive; External display port with optional DMU-2000 unit for viewing of RF scope, Audio scope and Oscilloscope displays.
Dim: 16"w x 5.3"h x 14"d; Weight: 33 lbs. **$2669.99**

FT-2000D *200 Watt version of the FT-2000 series* – Same as the FT-2000 except RF output is 200W and the power supply is external instead of internal. FP-2000 power supply is included. **$3399.99**

VL-1000/VP-1000 QUADRA SYSTEM *HF/50 MHz Linear Amplifier with Automatic Antenna Tuner and Switching Power Supply* – Solid-state design uses MRF-150 MOSFET devices in a four unit push-pull configuration to produce 1000W SSB/CW output (500W SSB/CW/FM on 6 meters) with 80W of drive. Frequency range: 160-15M, 6M amateur bands. Automatic bandswitching with Yaesu FT-1000, FT-1000MP, FT-1000MP MK-V, MK-V FIELD, FT-920, FT-2000 series and FT-9000 series. 16-bit Control CPU provides high speed antenna tuning with memory. The huge dot-matrix LCD provides amplifier-status information, including peak and average power output, voltage, current, and a panoramic SWR monitor, displaying "before tuning" and "after tuning" SWR information. Two input and four output antenna jacks output jacks for versatile equipment and antenna configurations. Dim: (Amp) 16.25"w x 5.9"w x 17.7"d, 46.3 lbs. (PS) 16"w x 5.9"h x 15"d, 32.2 lbs **$3899.99**

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IC-T7H SPORT

VHF/UHF MOBILES

IC-V8000 *2M FM Mobile*
75W output; Covers 144-148 TX with 136-174 MHz RX; 207 alpha memories; WX Alert. Ⓡ **$179.99**

IC-208H *2M/440 FM Mobile*
Covers: 144-148 and 430-450 TX; 118-173, 230-549, 810-999 MHz (cell blocked) wideband RX; 55/50W output (2M/440); WX Alert; Comes with separation cable and mounting hardware! © Ⓡ **$254.99**

IC-2720H
2M/440 FM Mobile
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HF RADIOS

IC-703 PLUS IC-706 MK II-G

IC-703 PLUS *HF QRP Transceiver* – Covers 160-10M + 6M in SSB/CW/RTTY/AM/FM modes; Power: 10W @ 13.8VDC and 5W @ 9.6VDC; 105 memories; Built-in relay-type HF automatic antenna tuner; Memory keyer; Optional large capacity external battery pack (BP-228) and antenna (AH-703) makes this radio perfect for field operation. Ⓡ **$679.99**

IC-706 MK II-G *Multi band Multimode Mobile Transceiver*
Covers HF/6M/2M/440 MHz with wideband 0.03-200, 400-470 MHz RX. 107 alpha memories; Power: 100W (40W AM) on 160-6M, 50W (40W AM) on 2M, 20W (8W AM) on 70cm; AF-DSP; IF shift; Preamp/attenuator; 2 filter slots. Free RMK-706 Ⓡ **$899.99**

IC-746PRO *HF/VHF All Mode Transceiver* – Covers HF/6M/2M with 0.03-60 MHz, and 108-174 MHz RX; 100W output all bands; 100 memories; Built-in HF/6M automatic antenna tuner; 32-bit floating DSP and 24-bit AD/DA converter. Free PS-125 © Ⓡ **$1499.99**

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ID-800 *2M/440 Analog/Digital Dual Bander* – D-STAR Digital Ready. Detachable control head; wideband RX; Three power settings: 55/15/5W (2M), 50/15/5W (440 MHz); Built-in CTCSS decode/encode with tone scan; PC compatible; 500 alphanumeric memories; Includes remote hand mic., seperation cable, & more. Ⓡ **$609.99**

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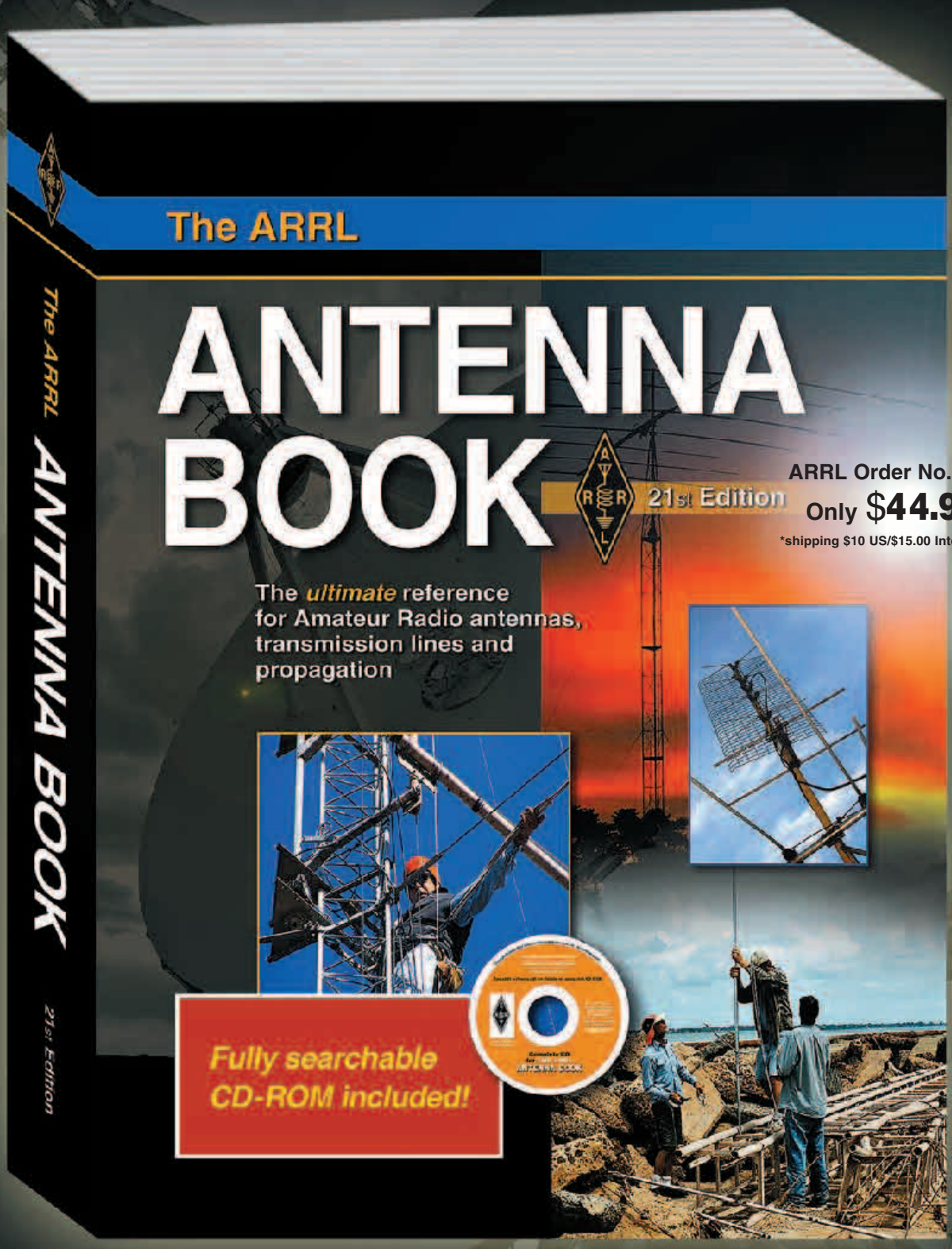

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Deluxe low loss cable assembly included for easy entry thru the weather seal without causing water leaks, wind noise and/or coax cable damage.

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Max Power: *HF 130W*
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Universal lip mount with coax, NMO and PL-259 connectors.

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Universal lip mount with coax, SO-239 andPL-259 connectors.

Combine the coax style and length you need with a bracket from below.
(assemblies also available with N-connectors)

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Standard low loss cable assy.
Gold plated SO-239 / PL-259 connectors.
3D5M length 16' 6"
3D4M length 13'

COMET
CK-3M5 / CK-3M
Deluxe low loss cable assy.
Includes 18" of mini RG-188A/U type coax for easy entry from a lip mount without causing water leaks, wind noise or coax damage.
CK-3M5 length: 16'6"
CK-3M length: 9'9"

Choose the bracket that best fits your antenna and vehicle. All have multiple adjustments and fit virtually any lip 1/4" thick or less. Soft rubber protects vehicle finish.

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RS-730
Heavy-duty, 4 adjustment planes, up to 70" antenna.

COMET
RS-720 / RS-720NMO
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RS-720: Accepts SO-239 conn
RS-720NMO: Accepts NMO conn

COMET
RS-520
Light-duty, 3 adjustment planes, up to 45" antenna.

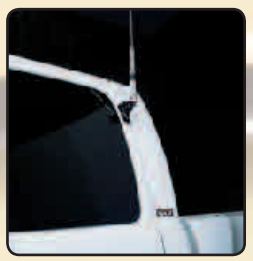
Maldol
PRM-T
Heavy-duty, 3 adjustment planes, up to 80" antenna.

Maldol
MK-30H
12VDC motorized mount. Mounts to vertical or horizontal door lip. Up to 70"/19 oz. antenna.

Maldol
EM-B80
Light-duty, 2 adjustment planes, up to 40" antenna.

COMET
GRB-5M
Trunk lip mount, low-profile,black anodized stainless steel.Offset washers provide up to 17 deg. vertical adjustment of antenna.16'9" of deluxe cable included, 18" of mini RG-188A/U style coax for easy entry thru the weatherseal. Gold-plated SO-239/PL-259 connectors.

The rear doors on newer trucks are the perfect place to mount antennas • No holes to drill • Above roof line • Easy access • When mounting to a van, SUV, truck, etc., use the CP-5M or build your own system with components shown above. There are several mount sizes, coax diameters and coax lengths from which to choose.



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EZHANGKIT The EZ Hang Kit includes, THE NEW AND IMPROVED EZ HANG WITH FOLDABLE WRIST SUPPORT FOR EASY STOARGE AND PACKING, six weights and clips, a set of replacement bands, EZ Winder (intermediate line dispenser) has 500 feet of orange braided line with a stackable handle to hold the dispenser upright, and the top pulls off for easy line dispensing. EZ HANG's basic construction is a welded steel 1/2" attached to a reel that is corrosion resistant plastic and stainless steel. The reel comes with 300 feet of 10-pound-test monofilament line installed, a quick disconnect clip to release the weight and an easy-to-see "bright yellow" one-ounce lead weight. This Kit is a MUST HAVE for the one doing any type of antenna work without spending a lot of time and effort putting up your antennas. It truly makes it a one person job.

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Yaesu FT7800R

The FT-7800R is a ruggedly-built, high quality Dual Band FM transceiver providing 50 Watts of power output on the 144 MHz Amateur band and 40 Watts on the 430 MHz Amateur band. Featuring 1055 memory channels which enable the storage of Independent Transmit Frequencies ("Odd Split "),and built-in CTCSS and DCS encoder/decoder circuits, the FT-7800R includes also provision for remote-head mounting, utilizing the optional YSK-7800 Separation Kit, which allows installation even in the most compact of cars. Additional features include a convenient access key for Vertex Standard 's WIRES (Wide-Coverage Internet Repeater Enhancement System), a transmit Time-Out Timer (TOT), Automatic Power-Off (APO), Automatic Repeater Shift (ARS), plus Yaesu 's exclusive ARTS (Auto-Range Transponder System) which "beeps " the user when you move out of communications range with another ARTS equipped station.

Accessories for the FT7800R

MEK2 *Microphone Extension Kit* **42.95**
MLS100 *High power ext speaker* **46.95**
MMB60 *Quick Release Mobile Bracket* **29.95**
YSK7800 *Separation Kit* **54.95**

Yaesu FT8800R

The FT-8800R is a ruggedly-built, high quality Dual Band FM transceiver providing 50 Watts of power output on the 144 MHz Amateur band and 35 Watts on the 430 MHz band. Featuring 1054 memory channels (527 channels each for "Main " and "Sub " band)), full duplex operation with independent Volume and Squelch controls, and built-in CTCSS and DCS encoder/decoder circuits, the FT-8800R includes provision for remote-head mounting, utilizing the optional YSK-8900 Separation Kit, which allows installation evening the most compact of cars.

Accessories for the FT8800R

ADMS2I *Software and cable* **38.95**
CT39 *Packet Interface Cable* **9.95**
MEK2 *Microphone Extension Kit* **42.95**
MLS100 *High power ext speaker* **46.95**
MMB60 *Quick Release Mobile Bracket* **29.95**
YSK8900 *Separation Kit* **41.95**

Yaesu FT8900R

The FT-8900R is a ruggedly-built, high quality Quad Band FM transceiver providing 50 Watts of power output on the 29/50/144 MHz Amateur bands and 35 Watts on the 430 MHz band. Featuring 809 memory channels, full duplex operation with independent Volume and Squelch controls, and built-in CTCSS and DCS encoder/decoder circuits, the FT-8900R includes provision for remote-head mounting, utilizing the optional YSK-8900 Separation Kit, which allows installation evening the most compact of cars.

Accessories for the FT8900R

ADMS2H *Software and cable* **38.95**
CT39 *Packet Interface Cable* **9.95**
MEK2 *Microphone Extension Kit* **42.95**
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Dual Band Transceiver with Full Duplex Capability

Alinco's new DR-635T is an easy-to-use, high-quality transceiver for simplex and repeater operations on the VHF and UHF bands. With cross-band repeat, full duplex capability and a remote mountable control head, the DR-635T features newly designed RF circuitry that delivers increased resistance to interference from adjacent signals. Plus, a new protection circuit automatically lowers the power setting whenever the internal temperature rises. This protects the radio when used as a cross-band repeater. But, that's just the beginning:

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- Narrow FM mode
- Power supply voltage display
- Ignition key on/off feature & theft alarm feature
- CTCSS, DCS encode/decode and DTMF encode functions plus European Tone Bursts
- Multiple scan modes and extended receive capabilities including broadcast FM
- Backlit DTMF microphone allows direct frequency entry and more
- VHF: 50/20/5, UHF: 35/20/5 watt power output settings
- 200 Memory channels that can operate in splits of 80ch/VHF, 80ch/UHF and 40ch freely programmable with 1 call channel each for VHF and UHF operation
- Extended receive from 108.000 ~173.995MHz / 335.000 ~ 479.995MHz / 87.5 ~ 107.995MHz, transmits from 144.000 ~ 147.995MHz / 430.000 ~ 449.995MHz, plus reception on AM aircraft band and the ability to operate on MARS frequencies
- Can also operate with Alinco's optional EJ-50U digital data packet board that fits inside or the EJ-47U digital voice board

Thanks to Alinco, you can have a dual band dynamo in your pocket AND in your car!

DJ-C7T 2M/440MHZ "Pocket-size" HT

Hams are packing some serious radio power in their pockets with the DJ-C7T, the new dual band mini HT. Alinco led the way in breakthrough miniature electronics technology with its revolutionary "credit card" size transceivers. Now, the DJ-C7T offers a "pocket size" HT that's small in size but BIG in added memories and modes.

Check out the features of this "new generation" DJ-C7T

- Internal speaker with great audio!
- 200 Memories
- VFO, Memory and Scan modes
- 39 CTCSS tone squelch (encode+decode) settings
- Split function
- SMA antenna port
- As thin as 0.57in. and just 3.59 oz. total weight with antenna and battery
- Cloning feature
- Lithium-ion battery
- Wide-band receive; includes FM broadcast and AM aircraft bands
- Auto repeater setting

The DJ-C7T can fit in a pocket or purse, but it's a versatile dual band HT with an enhanced receiver. So, you can enjoy twice the operating fun in half the size.

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The **FCC ignored technical information** provided by ARRL and others.

The FCC rules for BPL in 2004 were bad, but the rules adopted in 2006 are **intolerable**.

We must fight to challenge bad rules which will lead to even worse rules later.

ARRL has only one course of action: Appeal in federal court!

The Amateur Radio is a priceless asset —and it must be protected!

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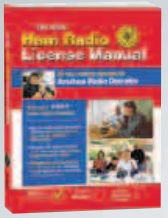

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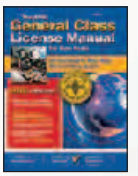

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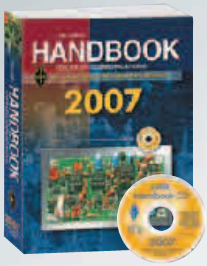

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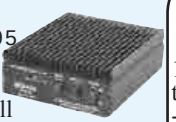
B-2518-G	5	7	40	60	80	100	125	160	160	160
B-5018-G	--	2	15	25	40	50	70	100	130	160
Watts In	.25	.5	3	5	8	10	15	25	35	50

35 Watts for 2 Meter HT



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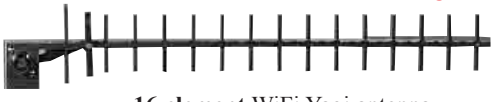

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MFJ's exclusive *IntelliTune*™, *Adaptive Search*™ and *InstantRecall*™ algorithms give you ultra-fast automatic tuning with over 20,000 *VirtualAntenna*™ Memories.

MFJ VirtualAntenna™ Memory

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4 Times the Solutions!

MFJ-929 gives you 256 values each of capacitance and inductances for 131,072 matching solutions. That's *4 times* the 32,768 matching solutions of competing products with only 128 L/C values each!

Highly intelligent, ultra-fast tuning!

Don't be fooled by competing products claiming fast search times -- if you have a *quarter* of the matching solutions, of course, it takes less time to search but it's *not* faster.

MFJ's much faster speed comes from advanced technology and software algorithms *not* from fewer matching solutions.

MFJ's *IntelliTuner-Compact*™ actually *measures* complex impedance -- *R* and *X* -- of your antenna, computes the L-network values needed and snaps in those components to give you an *instant* match.

If the load is out of measurement range, *AdaptiveSearch*™ determines the *smaller* subset from all solutions that can match a safe load -- and then searches *only* that subset -- others search through far more solutions.

Digital LCD SWR/Wattmeter

An easy-to-read, two-line, 16-character backlit LCD displays SWR, peak or average forward/reflected power, frequency, antenna 1 or 2, L/C tuner values, on/off indicators and other info. They are selected from easy-to-understand menus -- *not* complex combinations of buttons you can't remember.

A fast-response, high-resolution bargraph gives you an auto-ranging 20/200 Watt power meter. You get 60 segments each for forward and reflected power and 36 segments for SWR -- *try that with an 8 segment bargraph that makes you change power ranges and doesn't even give you reflected power!*

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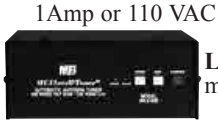
Its built-in radio interface lets you use a simple wire cable to compatible rigs. Others require a cable with expensive electronics.

Binding post for random wire. Self-test.

Highly efficient L-network. 10 Amp/1000V relays, RF duty silver mica capacitors. 6½ Wx2¾Hx7½D in. 2.4 lbs. 12-15 VDC/1Amp or 110 VAC with MFJ-1316, $21.95.



MFJ-928, $199.95. **Like** MFJ-929, less LCD, manual tune buttons.

MFJ-927, $259.95. **Weather** protected *remote* auto tuner for coax/wire ant., includes MFJ-4116 Power Injector. Most MFJ-929 features, no LCD/buttons.

MFJ-5114 K/Y/I/A, $19.95. Prewired Radio Interface cable for MFJ-929/928.

MFJ-4116, $24.95. Power Injector for remote MFJ-929/928 use. Sends DC/RF down coax.

Desktop/Remote Antenna and Antenna/Transceiver Switches

MFJ-4716
$89.95
6-position *Antenna* Switch

New!

MFJ-4726
$159.95
6-position *Antenna/Transceiver* Switch

Place these MFJ antenna or antenna/transceiver switches on your *desk* or use them *remotely*. You can place them out-of-the-way under your desk, in your garage or closet -- saves cable, eliminates cable mess.

Super easy-to-use rotary switches -- no complicated computer buttons to learn or microprocessors to fail or generate RFI that covers up rare DX.

Select 1 of 6 antennas and/or 1 of 6 transceivers in any combination. All unused inputs are grounded. Automatically grounds all inputs when you turn off your transceiver -- simply connect a sense line to your transceiver. When rotary switches are in OFF position, all inputs are grounded or control is transferred to the optional remote control.

Ultra-fast gas discharge tube *lightning surge protector* protects transceiver and safely shunts static electricity and lightning induced surges safely to ground. Does not protect against direct lightning hit.

SO-239 connectors. 1500 Watts/50-75 Ohm load, 1-60 MHz. Useable to 150 MHz. Connects to remote control with common CAT 5 cable, not included (available from WalMart, etc.). Use 12 VDC or 110 VAC with MFJ-1312D, $14.95. For indoor use, not weather protected.

Antenna Switches - - 6 and 4 positions

• MFJ-4716, $89.95, *6-positions*; **• MFJ-4714, $79.95,** *4-positions*. 8Wx2¾Hx4¼D in.

Remote Controls:

• MFJ-4716RC, $39.95, *6-positions*; **• MFJ-4714RC, $39.95,** *4-positions*. 2¾Wx3¾Hx1D inches.

Antenna/Transceiver Switches - - 6 and 4 positions

Select one of 6 antennas *and* one of 6 transceivers in any combination with just two easy-to-use rotary switches.

Plug in antenna tuner, SWR/Wattmeter or other into its common ports, so it's always connected to the antenna and radio selected.

• MFJ-4726, $159.95, *6-positions*; **• MFJ-4724, $139.95,** *4-positions*. 8Wx5Hx4¼D"

Remote Controls: • MFJ-4726RC, $59.95, *6-positions*; **• MFJ-4724RC, $59.95,** *4-positions*. 2¾Wx3¾Hx1D"

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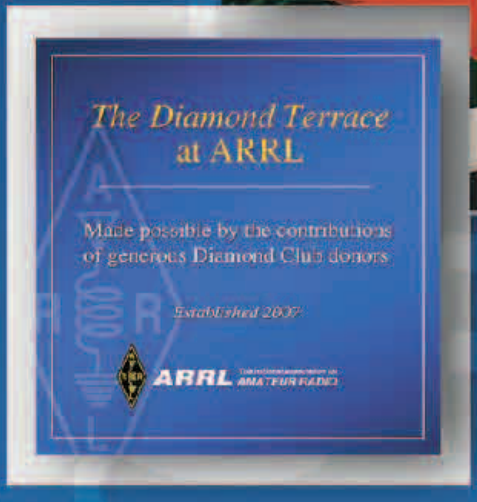
New in 2007!
The Diamond Terrace at ARRL



For more information, contact:

Mary M. Hobart, K1MMH
Chief Development Officer
ARRL
225 Main Street
Newington CT 06111-1494
Telephone: **860-594-0397**
Email: **mhobart@arrl.org**

The Diamond Terrace at ARRL is the newest and most exciting benefit for annual donors to the ARRL Diamond Club. The Terrace will honor the call signs of Diamond Club donors and others. Here's how it works:

- Join or renew your Diamond Club support with your **annual** contribution of $250 or more.
- ARRL will recognize your call sign on a 4" x 8" brick to be placed in the Terrace.
- You will receive a 2"x 4" Lucite replica with a copper plate bearing the call sign.
- You may elect to honor an additional call sign —a Silent Key, family member, Elmer or friend—with each $250 in contributions.
- The Diamond Terrace will begin construction in late spring 2007.

Join the Diamond Club and honor your call sign at The ARRL Diamond Terrace!

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's new 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 in the palm of your 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.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low Ripple . . . Highly Regulated

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.

Fully Protected

You won't burn up our power supplies!

No RF Hash!

They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

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.

MightyLites™ . . . Mighty Features

Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV
25 Amp
$149.95 plus s&h

MFJ-4245MV
45 Amp
$199.95 plus s&h

No RF Hash!

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

New! **MFJ-4175, $359.95.** 75 Amps *continuous*. 13.8-14.2 VDC. 7.8 pounds. 6½Wx3½Hx10D inches.108-132 VAC. *No RF hash!*

NEW! 25 Amp *MightyLite*™

MFJ-4125
25 Amp
$109.95 plus s&h

Super light, super compact switching power supply delivers 25 Amps maximum/22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. ***No RF Hash!*** Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 2.86 lbs. 5¾Wx3Hx5¾D inches.

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

MFJ-4035MV
$149.95

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118
$79.95 plus s&h

MFJ-1116
$54.95 plus s&h

MFJ-1112
$39.95 plus s&h

MFJ-1117
$59.95 plus s&h

MFJ-1118, $79.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

MFJ-1116, $54.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $39.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

MFJ-1117, $59.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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All are protected by MFJ's famous No Matter What™ one year limited warranty.

MFJ TUNERS

New, Improved MFJ-989D 1500 Watt *legal limit* Antenna Tuner

World's most popular 1500 Watt Legal Limit Tuner just got better -- much better -- gives you more for your money!

New, improved MFJ-989D *legal limit* antenna tuner gives you better efficiency, lower losses and a new *true* peak reading meter. It easily handles *full* 1500 Watts SSB/CW, 1.8 to 30 MHz, including MARS/WARC bands.

New dual 500 pF *air variable capacitors* give you twice the capacitance for more efficient operation on 160 and 80 Meters.

New, improved *AirCore*™ *Roller Inductor* gives you lower losses, higher Q and handles more power more efficiently.

New *TrueActive*™ peak reading Cross-Needle *SWR/Wattmeter* lets you read *true* peak power on all modes.

MFJ-989D $369.95

New high voltage *current balun* lets you tune balanced lines at high power with no worries.

New *crank knob* lets you reset your roller inductor quickly, smoothly and accurately.

New larger 2-inch diameter *capacitor knobs* with easy-to-see dials make tuning much easier.

New cabinet maintains components' high-Q. Generous air vents keep components cool. $12^{7}/_{8}$Wx6Hx$11^{5}/_{8}$D inches.

Includes six position ceramic antenna switch, 50 Ohm dummy load, indestructible multi-color Lexan front panel with detailed logging scales and legends.

The MFJ-989D uses the superb time-tested T-Network. It has the widest matching range and is the easiest to use of all matching networks. Now with MFJ's new 500 pF air variable capacitors and new low loss roller inductor, it easily handles higher power much more efficiently.

***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-986 Two knob *Differential-T*™

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-986 $339.95

MFJ-962D *compact* kW Tuner

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-962D $279.95

MFJ-969 300W *Roller Inductor* Tuner

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. $3^{1}/_{2}$Hx$10^{1}/_{2}$Wx$9^{1}/_{2}$D inches.

MFJ-969 $199.95

MFJ-949E *deluxe* 300 Watt Tuner

More *hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, custom inductor switch, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. $3^{1}/_{2}$Hx$10^{5}/_{8}$Wx7D inches. **MFJ-948, $139.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-949E $169.95

MFJ-941E *super value* Tuner

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-941E $129.95

MFJ-945E HF/6M *mobile* Tuner

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-945E $119.95

MFJ-971 *portable/QRP* Tuner

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-971 $109.95

MFJ-901B *smallest* Versa Tuner

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-901B $89.95

MFJ-902 *Tiny Travel* Tuner

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-902 $89.95

MFJ-904H, $139.95. 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

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-16010 $59.95

MFJ-906/903 *6 Meter* Tuners

MFJ-906 has lighted Cross-Needle SWR/Wattmeter, bypass switch. Handles 100 W FM, 200W SSB.

MFJ-906 $89.95

MFJ-903, $59.95, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x$2^{1}/_{2}$x3 in.

MFJ-921/924 $79.95

MFJ-931 *artificial* RF Ground

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-931 $99.95

MFJ-934, $199.95, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

Dealer/Catalog/Manuals

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MFJ 2500 Watts *ContinuousCarrier*™ Tuner

Silver plated Edge-Wound Roller Inductor . . .1000/500 pF Variable Capacitors . . . Antenna Switch . . . 4-Core Balun . . . true Peak Cross-Needle SWR/Wattmeter . . . Dummy Load . . . Extremely Wide Matching Range . . . Patent Pending . . .

New!

MFJ-9982

$699.95

The MFJ-9982 ContinuousCarrier™ antenna tuner handles 2500 Watts continuous carrier output on all modes and all HF bands into most unbalanced antennas -- even on 160 Meters where even the best antenna tuners fail!

The MFJ-9982 gives you every feature you'll ever want in a high power tuner -- wide matching range, 1.8 to 30 MHz coverage, 6-position antenna switch, 4-core balun, dummy load, true peak/average lighted SWR/Wattmeter, 6:1 reduction drives with detailed logging scales, 3-digit turns counter, extra large knobs.

New Components, New Technologies

The *Heart and Soul* of the MFJ-9982 is its roller inductor and variable capacitors.

MFJ's high power, high-Q *continuous current AirCore*™ roller inductor is no ordinary roller inductor! It's edge wound from thick .06-inch *silver-plated* solid copper strap.

It can carry huge circulating RF currents and withstand tremendous heat that'll melt or burn up ordinary roller inductors.

Self-insulating construction reduces stray capacitance -- keeps self-resonant frequencies high and out-of-the-way. Dual, *silver-plated* compression wheels give ultra low-resistance contacts. New fast-tune crank knob.

High-current, *high-capacitance* 1000 pF and 500 pF air variable capacitors have low minimum capacitance and are self-insulating.

These newly developed air variable capacitors give you *very high efficiency* on 160/80 Meters *and* MFJ's patent pending innovation gives you *extremely wide matching range* on 10/12/15 Meters at 2500 Watts -- a feat *only* the MFJ-9982 has achieved.

Hi-Voltage/Current Antenna Switch

The antenna switch is completely isolated to handle high-voltage, high impedance antennas. High-current, low impedance antennas are handled by parallel sets of high-current contacts of *two* ceramic switches.

New 4-Core Balun

Powerful balun -- Four 2½ inch cores, 12-gauge *Teflon*™ wire. Run balanced lines at full 2500 Watts SSB/CW continuous, 24/7.

New Balanced Line Feed-Thru Insulator

Allows massive transmitter currents to flow directly to the antenna without passing through lossy screws or bolts.

TrueActive™ Peak Reading Circuit

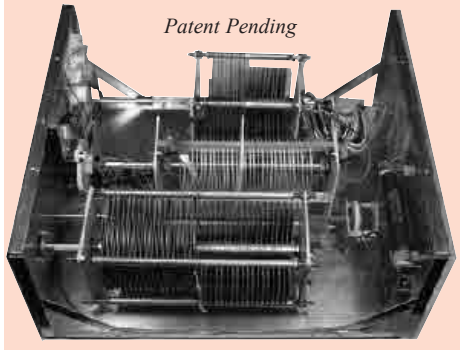
New *TrueActive*™ circuit reads *true* peak or average power on all modes. *Cross-Needle* meter reads SWR/forward/reflected power.

1500 Watt Dummy Load

1500 Watt air-cooled non-inductive 50 Ohm resistor. 100W/10 min., 1.5kW/10 sec.

New Cabinet maintains high Q

New roomy cabinet maintains high Q. Vent holes. Heavy gauge, .08 inch aluminum braced chassis. Vinyl cover, non-stripping PEM nuts, heavy 10-gauge and copper strap wiring throughout. 13¾Wx7Dx16¼D inches. 15 pounds.



MFJ 1500 Watt *Fully Balanced* Antenna Tuner

Fully balanced MFJ-976 handles 1500 Watts legal limit . . . Extra-wide 12-2000 Ohms matching range . . . continuous 1.8 to 30 MHz coverage including all WARC bands . . . Four separate 500 pF in two gangs gives you a total of 2000 pF capacitance . . . Heavy duty 1:1 current balun . . . more!

New!

MFJ-976

$499.95

The MFJ-976 is a 1500Watt full Legal Limit *fully balanced* antenna tuner.

You get *superb* current balance, very wide matching range (12-2000 Ohms) and *continuous* 1.8-30 MHz coverage including all WARC bands. Handles *full* 1500 Watts SSB *and* CW.

You can tune *any* balanced lines including 600 Ohm open wire line, 450/ 300 Ohm ladder lines, 300/72 Ohm twin lead -- shielded or unshielded. Also tunes random wires and coax fed antennas.

MFJ's *fully balanced* extremely wide-range T-network gives you simple, fast three knob tuning. No complicated switching between high and low impedance and switching in additional capacitance of L-networks.

Four separate 500 pF in two gangs gives you a total of 2000 pF for highly efficient low loss operation on 160 Meters.

You get excellent 10 Meter performance because of MFJ's low minimum capacitance and exclusive *Self-Resonance Killer*™ high-Q *AirCore*™ roller inductor with silver plated contacts.

Heavy duty 1:1 current balun gives you *superb balance* and stays cool even at 1.5kW.

True *active* peak reading lighted Cross-Needle SWR/Wattmeter lets you read SWR, *true peak* or average forward and reflected power all at a glance on 300/ 3000 Watt ranges. 12Wx6Hx15¾D inches.

Dealer/Catalog/Manuals

Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

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TELEGRAPH KEYS wanted by collector. Bugs and unusual or unique straight keys or sounders, and tube electronic keyers. Also pre-1950 callbooks. Vince Thompson, K5VT, 3410 N. 4th Ave., Phoenix, AZ 85013. 602-840-2653.

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WANTED: pre-1925 battery radios, crystal sets, and vacuum tubes. Also early telegraph keys and pre-1900 electrical apparatus. Jim Kreuzer, N2GHD, 1541 Bronson Road, Grand Island, NY 14072. 716-773-4999. wireless@pce.net

MFJ-259B *1.8-170 MHz* SWR Analyzer

World's most popular SWR analyzer is super easy-to-use

Reads SWR . . . Complex RF Impedance: Resistance(R) and Reactance(X) or Magnitude(Z) and Phase(degrees) . . . Coax cable loss(dB) . . . Coax cable length and Distance to fault . . . Return Loss . . . Reflection Coefficient . . . Inductance . . . Capacitance . . . Battery Voltage. LCD digital readout . . . frequency counter . . . side-by-side meters . . . Battery charger . . . battery saver . . . low battery warning . . . smooth reduction drive tuning . . .

World's most popular SWR analyzer! ***The famous MFJ-259B gives you a complete picture of your antenna's performance. You can read your antenna's SWR and Complex Impedance from 1.8 to 170 MHz.***

You can read Complex Impedance as series resistance and reactance (R+jX) or as magnitude (Z) and phase (degrees).

You can determine velocity factor, coax cable loss in dB, length of coax and distance to a short or open.

You can read SWR, return loss and reflection coefficient at any frequency simultaneously.

You can read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-MH/Ni-CD charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance from HF to VHF -- 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Call your favorite dealer for your best price!

MFJ-259B $279.95

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and more!

Free Manual: call, write or download

MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

Take it anywhere

Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1312D, $15.95. Its rugged all metal cabinet is a compact 4x2x6¾ in.

How good is the MFJ-259B?

MFJ *SWR Analyzers*™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Used worldwide by professionals everywhere.

More MFJ SWR Analyzers™

MFJ-249B, $259.95. Like MFJ-259B, but reads SWR, true impedance magnitude and frequency only on LCD. No meters.

MFJ-209, $149.95. Like MFJ-249B but SWR meter only. No LCD/frequency counter.

MFJ-219B, $119.95. UHF *SWR Analyzer* covers 420-450 MHz. External frequency counter jack. 7½x2½x2¼ in. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter

MFJ-66, $24.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Takes guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*.

Genuine MFJ Carrying Case

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories. Made of special foam-filled fabric -- cushions blows, deflects scrapes, and protects knobs, meters and displays from harm. Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends. Has clear protective window for frequency display and cutouts for knobs and connectors so you can use your MFJ *SWR Analyzer*™ without taking it out of your case.

MFJ-99, $60.85. Accessory Package for MFJ-259/B/249/B/209. Includes MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1312D 110VAC adapter. ***Save $5!***

Tunable Measurement Filter

MFJ-731, $89.95. *Exclusive* MFJ tunable RF filter allows accurate SWR and impedance measurements 1.8-30 MHz in presence of strong RF fields. Virtually no effect on measurements. Works with *all* SWR Analyzers.

MFJ *No Matter What*™ warranty

MFJ will repair or replace (at our option) your MFJ *SWR Analyzer*™ for one full year.

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MFJ-269 $379.95

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More hams use MFJ SWR Analyzers™ than any others in the world!

10 Bands -- 1 MFJ Antenna!

Full size performance . . . No ground or radials

Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.

MFJ-1798
$289.95
Ship Code F

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

Separate Full Size Radiators

Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

This forms a very large equivalent radiator and gives you incredible bandwidths.

Radiator stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

MFJ's Super High-Q Loop™ Antennas

MFJ-1786
$399.95

MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency*.

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

MFJ-1788, $449.95. Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

MFJ-1782, $359.95. Like MFJ-1786 but control has only fast/slow tune buttons.

MFJ-1780, $259.95. *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

MFJ Apartment Antenna

MFJ-1622 $99.95

Covers 40 thru 2 Meters. Mounts outdoor to windows, balconies, railings. Works great indoors mounted to desks, tables, bookshelves. Highly efficient air wound *bug catcher* loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage/carrying. Includes coax RF choke balun, coax feed line, counterpoise wire, safety rope. 200 Watts PEP.

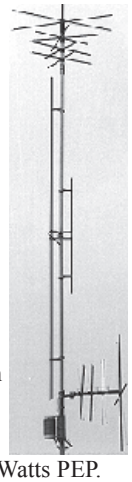
MFJ's G5RV Antenna

MFJ-1778
$39.95

Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



MFJ-1796
$219.95

Only 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments,small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

Efficient end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

MFJ-1792, $179.95. Full size 1/4 wave radiator for 40 Meters. 33 feet, handles 1500 Watts PEP. Requires guying and radials.

MFJ-1793, $199.95. Like MFJ-1792 but has full size 20 Meter ¼ wave also.

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MFJ . . . the world leader in ham radio accessories!

MFJ Dummy Load/Wattmeter

1.5 kW Dry Dummy Load has built-in precision, true peak-reading SWR/Wattmeter switchable to external antenna!

MFJ-267
$159.95

World's most versatile 1.5 kW dummy load has a *built-in* true peak reading SWR/Wattmeter that you can switch and use independently!

You'll find tons of uses!

Tune up your transceiver, linear amplifier or antenna tuner into a safe 50 Ohm dummy load at *full power*. Then instantly switch to your antenna and monitor SWR, forward and reflected power.

Use for testing/tuning transmitters, transceivers, amplifiers, antenna tuners, baluns, transformers, filters, matching networks, coax, stubs, transmission lines and antennas.

The 50-Ohm dry dummy load works DC to 60 MHz. SWR is below 1.3:1 at 30 MHz. Can handle 100 Watts for ten minutes or 1500 Watts for ten seconds. Comes with power derating curve.

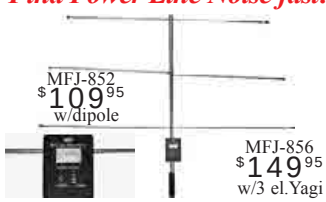
Extra-large three-inch lighted Cross-Needle meter reads SWR (1:1 to 8:1), forward and reflected power *simultaneously*.

Reads *true peak* PEP or average power on 300/3000 Watts forward and 60/600 Watts reflected power ranges 1.8-54 MHz.

High accuracy comes from a carefully designed directional coupler, an accurate active-peak reading circuit and a precision d'Arsonval meter movement.

RF tight perforated aluminum cabinet. 4½Wx3½Hx10½D inches. Uses 12 VDC or 120 VAC with MFJ-1312D, $15.95.

Find Power Line Noise fast!



MFJ-852
$109.95
w/dipole

MFJ-856
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Choose 3 element Yagi or compact telescoping dipole to quickly pinpoint noise. Walk or drive with these handheld, directional noise finders to search out leaky insulators, loose hardware and corroded ground lines quickly. Track noise directly to pole, transformer, insulator or others. Has field-strength meter, headphone jack to listen or record. Operates in optimum 135 MHz region. Sensitive .3uV receiver, 70 dB AGC.

Field Strength Meters

MFJ-802
$44.95

Shows radiated antenna relative field strength. Determine radiation pattern. **MFJ-802** has huge 3 inch meter. Telescoping dipole reduces influence of surrounding objects and is more reliable, repeatable than monopole. Sensitivity control. Jack for remote sensor, MFJ-802R, $24.95. **MFJ-801** has 1¾ inch meter, sensitivity control, 20 inch extended telescoping monopole antenna.

MFJ-801
$24.95

81 dB Step Attenuator

MFJ-762
$79.95

81 dB Attenuator in 1 dB steps. 50 Ohms. Usable to 500 MHz. 250 milliwatt maximum input. BNC connectors. Shielded stages. Connect between receiver and antenna and use S-meter as a precision calibrated field strength meter. Prevent receiver blocking, cross-modulation. Determine gain/loss, ideal for fox hunting. Evaluate linearity. Isolate circuits. Extend range of sensitive equipment. Measure input/output level differences.

MFJ Frequency Counters

MFJ-886
$119.95

MFJ-886 covers 1 MHz to 3 GHz with 300 MHz direct count, 0.1 Hz resolution. 4 gate times. 10-digit high-contrast 3/4 inch LCD display. Lock display button. Bargraph shows RF field strength. Includes rechargeable Ni-Cad batteries, charger, telescopic antenna. Black anodized aluminum. 2¾x2¼x1¼ in. **MFJ-888**, like MFJ-886, but covers *10 Hz*-3 GHz. Measures frequency/period, has 50/1M Ohm input, auto hold, LED backlight, beeper. 2¾x4¼x1¼ in.

MFJ-888
$189.95

MFJ HF/VHF/UHF Dummy Loads

Oil-Cooled 1 KW CW 2 KW SSB VersaLoad™

MFJ-250X
$49.95

Run 1KW CW or 2 KW PEP for 10 minutes. Run *continuous duty* with 200 Watts CW or 400 watts PEP. Transformer oil not included. Low VSWR to 400 MHz. Under 1.2:1 to 30 MHz. SO-239 connector. Safety vent with cap, carrying handle. 7½Hx6⅝D in. **MFJ-250, $69.95.** Includes transformer oil (no PCB).

Dry 1.5 kW HF/VHF/UHF Load

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$74.95

Ham radio's most versatile 50 ohm *dry* dummy load. Works with all radios from 160 Meters through 650 MHz. SWR below 1.3 to 650 MHz and below 1.1 at 30 MHz. Handles 100 watts for 10 minutes, 1500 Watts for 10 seconds. 3Wx3H x9D in. SO-239 connector. **MFJ-264N, $84.95.** With type "N" connector.

Dry 300 Watt HF/VHF Dummy Load

MFJ-260C
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Air-cooled, non-inductive resistor in a perforated metal housing; SO-239 connector. Full load for 30 seconds. Silk-screened derating curve to 5 minutes. Handles 300 Watts. SWR below 1.1:1 to 30 MHz, 1.5:1 from 30 to 650 MHz. 2¼x2¼x7 inches. **MFJ-260CN, $49.95.** With type "N" connector.

MFJ CW Reader/Keyer

MFJ-464
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(Keyboard, paddle not included.)

Plug MFJ's CW Reader with *built-in* Keyer into your transceiver's phone jack and key jack. Now you're ready to compete with the world's best hi-speed CW operators -- and *they won't even know you just passed the code test!* Sends and reads 5-99 WPM. Automatic speed tracking. Large 2-line LCD shows send/receive messages. Use paddle or computer keyboard. Easy menu operation. Front panel speed, volume controls. 4 message memories, type ahead buffer, read again buffer, adjustable weight/sidetone, speaker. RFI proof.

MFJ Atomic Wrist Watch

MFJ-186RC
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Receives atomic time signal WWVB and sets your watch automatically -- always accurate to milliseconds. Select 12/24 hour format and pacific, mountain, central, eastern time zones. Displays hour, minutes, seconds, day and date. Displays year, month and day in calendar mode. Alarm, stopwatch functions. Brilliant blue backlight. Water-resistant.

25-1300 MHz Discone Antenna

MFJ-1868
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Ultra wide-band antenna receives 25-1300 MHz. Perfect for scanners. Transmit 50-1300 MHz. Handles 200 Watts. Ideal for 6/2/1¼ Meters, 70/33/23 CM ham bands. Excellent for testing various transmitters on single coax. SO-239, 50 feet coax, stainless steel elements.

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5 W Heavy Duty Submersible
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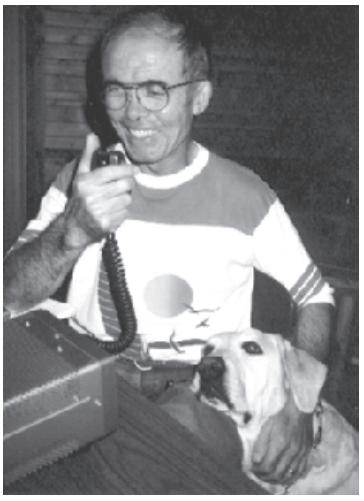

Jerry and guide dog, Kerwin.

"I was hooked the moment I first saw ham radio. Since I am visually impaired and have great difficulty reading, passing the FCC exam seemed like an insurmountable obstacle. A friend suggested the **Courage HANDI-HAM System**. In a matter of a few days I was listening to the voice of Tony Tretter, WØKVO, as he read ARRL's "Now You're Talking." I attended Radio Camp, learned code, and worked on upgrades using taped study materials."

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- **ARRL EXPO 2007** – This special exhibit area will feature ARRL program representatives, activities, presentations and the huge ARRL bookstore.
- **Huntsville Hamfest** – Featuring equipment dealers, manufacturers, forums and more!
- **GAREC-2007** – The third Global Amateur Radio Emergency Communications Conference will be held at the Embassy Suites Hotel in Huntsville, August 16-17.
- **DX Banquet** (sponsored by the North Alabama DX Club) featuring K4UEE – Lakshadweep DXpedition
- **DXCC Card Checking**
- **Contest Forums** – Alabama Contest Group
- **ARRL Youth Activities and Youth Lounge**
- **ARRL Wouff Hong Ceremony** – Steeped in ritual and mystery, this ceremony also promises to be great fun.
- **W1AW/4 Special Event Station** – Bring a copy of your license to operate.

…and much more!

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Embassy Suites Hotel.
Group/Convention code: HAM.Reservations: 1-800-362-2779 or **www.embassysuiteshuntsville.com**

Holiday Inn.
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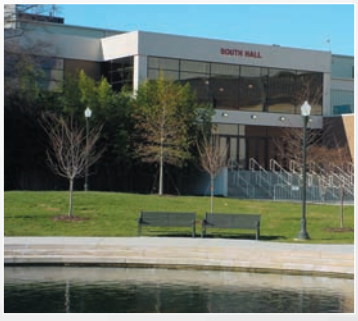
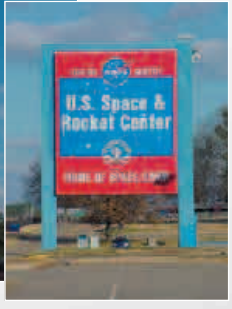
See www.arrl.org/expo for additional lodging options and links to travel information.





Nearby Points of Interest

- ✓ U.S. Space & Rocket Center and U.S. Space Camp
- ✓ NASA Marshall Space Flight Center Tour
- ✓ Huntsville Botanical Garden
- ✓ Huntsville Museum of Art
- ✓ Cathedral Caverns State Park
- ✓ Historic Huntsville Depot Museum and Alabama's Constitution Village

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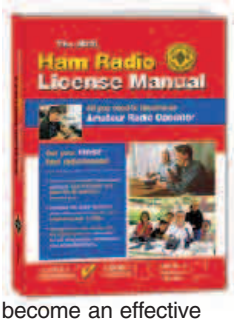
Licensing

LEVEL 1 – TECHNICIAN

- 35-question Technician test (Element 2)



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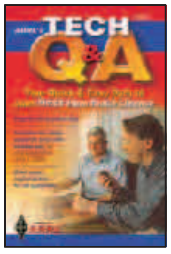

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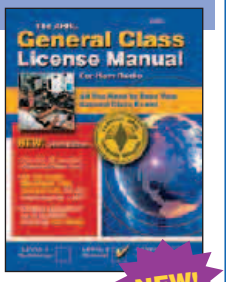

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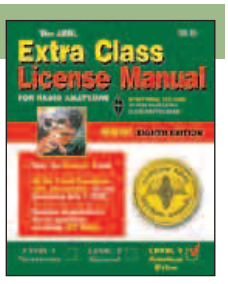

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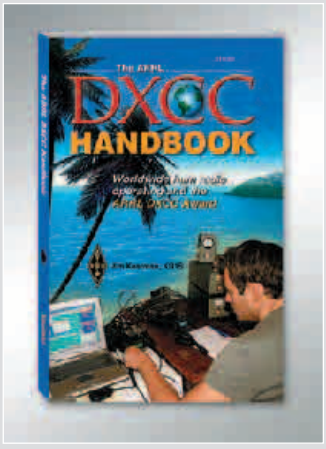

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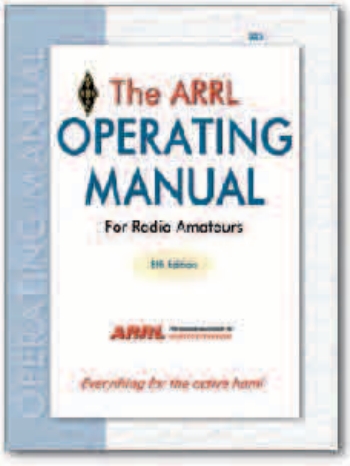

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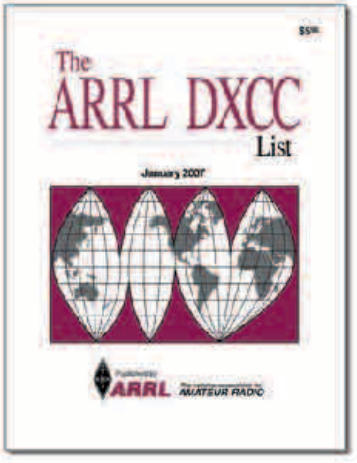

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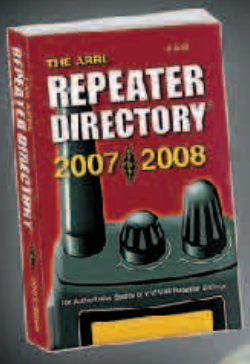

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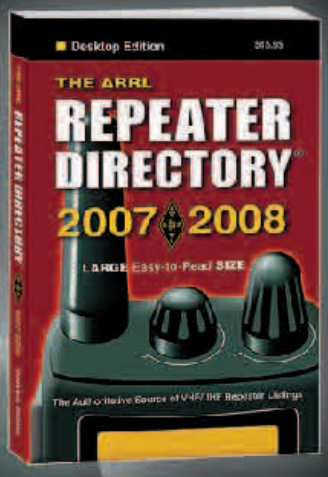

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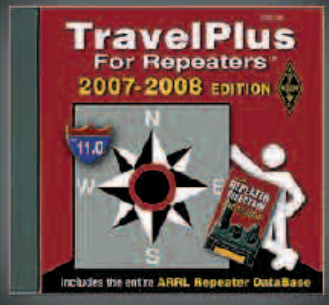

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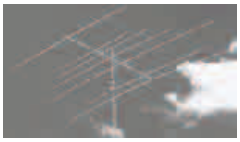

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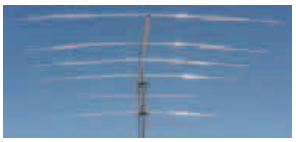

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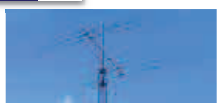

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