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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

JANUARY 2007

CQ

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On the Cover: Scott Johnson, WDØDAN, of Bloomington, Minnesota. Details on page 102.

KENWOOD

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KENWOOD SKYCOMMAND TURN IT ON!

Kenwood SkyCommand has FCC approval.

Allows Global communication through remote operation on HF frequencies at home or in the field utilizing Kenwood's TS-2000 series transceivers.

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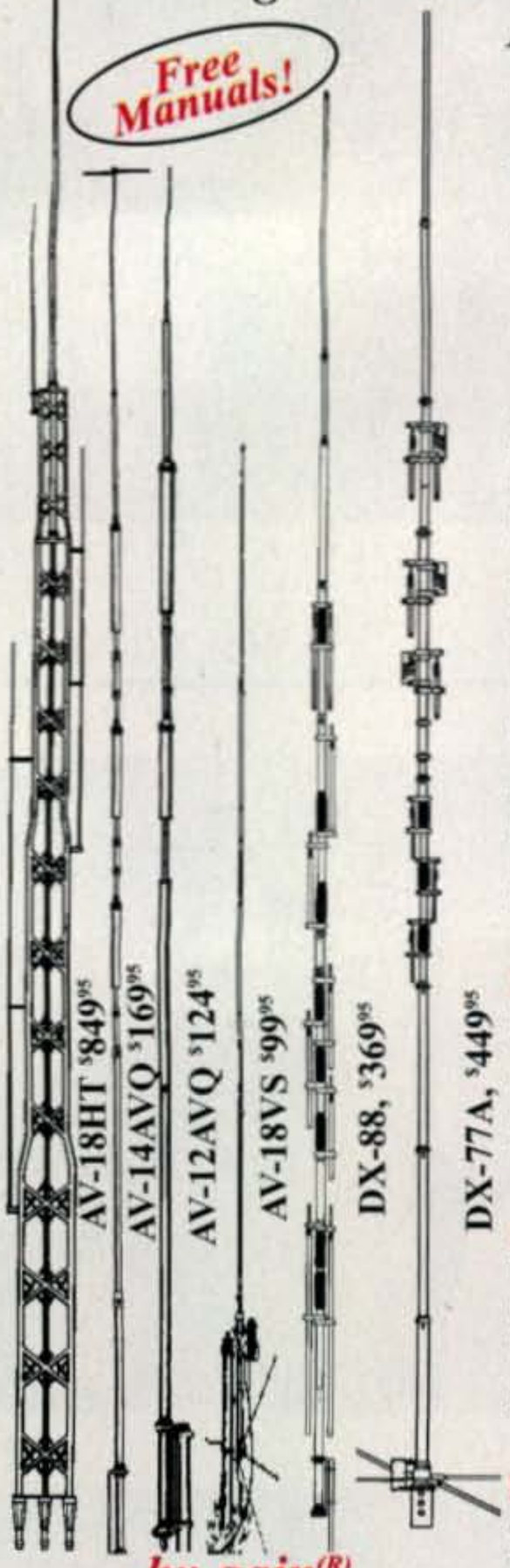
Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited Warranty . . .



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Classics

***All** hy-gain multi-band vertical antennas are entirely self supporting -- no guys required.*

They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

All handle 1500 Watts PEP SSB, have low SWR, automatic band-switching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators. Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage. Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low. Two year limited warranty.

AV-18HT, $849.95. (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.

AV-18VS, $99.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

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, $189.95. 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.

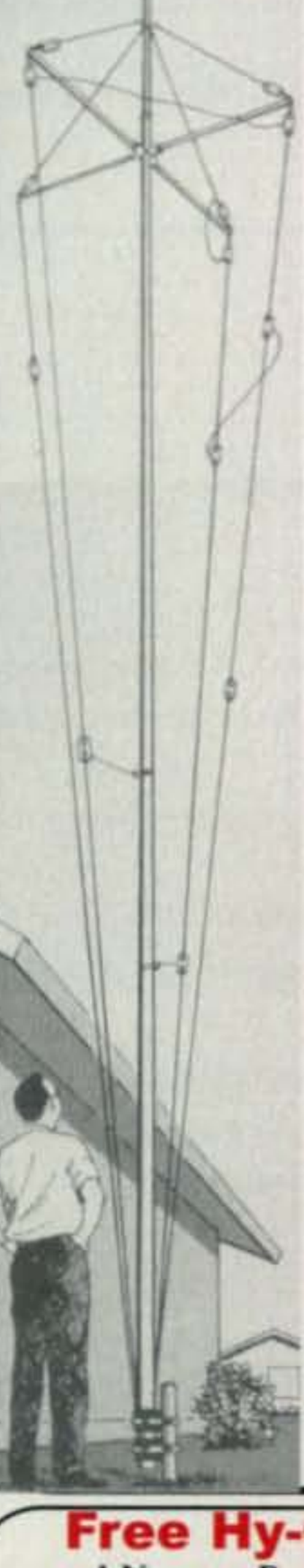
Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$849.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$124.95	10,15,20 M	1500 W PEP	13 feet	9 pounds	80 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"**

Hy-Gain HyTower-Jr™

Stands 39 feet tall . . . Full 1/4 Wave on 40, 20, 15, 10 Meters . . . Cage loading on 80 Meters

New!

AV-18HT-Jr. **$349.95**



Standing a tall 39 feet with *full-size* elements and rated at 5 KW, the AV-18JR *Hy-gain HyTower-Jr.*™ is the world's *second best** performing vertical!

Stub-decoupling is used to give *full-size* quarter wave radiators on 40, 20, 15, 10 Meters with super efficient cage loading on 80 Meters.

The *HyTower-Jr*™ has almost no losses -- your ground system determines your efficiency.

It is automatic bandswitching, fed with 50 Ohm coax and has low SWR over an exceptionally wide bandwidth. SWR is less than 1.2 at resonance on all bands.

The main radiator is aircraft high-strength, heavy walled, 2-inch aluminum tubing swedged at the top. Self-supporting in winds up to 40 MPH (use guy wires for higher winds). Mounts on 1¼ inch plumber's pipe. Heavy duty components will give you years of trouble-free operating pleasure. UPS Shippable.

Requires good ground system for optimum performance.

***The** famous 53 foot *Hy-gain HyTower*™ is legendary. It's the premier, best performing vertical in the world -- bar none! At less than half the price with nearly the *same* performance and based on the *same* principles, the *HyTower-Jr*™ is the poor man's version of its father *HyTower*. Of course, *Junior*™ doesn't have its father's rugged hot-dipped galvanized steel tower and construction!

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KENWOOD

Listen to the Future

On or off the road, Kenwood's new TM-271A delivers powerful mobile performance with 60W maximum output and other welcome features such as multiple scan functions and memory names. Yet this tough, MIL-STD compliant transceiver goes easy on you, providing high-quality audio, illuminated keys and a large LCD with adjustable green backlighting for simple operation, day or night.

144MHz FM TRANSCEIVER

TM-271A

▌200 memory channels (100 when used with memory names) ▌Frequency stability better than ±2.5ppm (-20~+60°C) ▌Wide/Narrow deviation with switchable receive filters ▌DTMF microphone supplied ▌NOAA Weather Band reception with warning alert tone ▌CTCSS (42 subtone frequencies), DCS (104 codes) ▌1750Hz tone burst ▌VFO scan, MHz scan, Program scan, Memory scan, Group scan, Call scan, Priority scan, Tone scan, CTCSS scan, DCS scan ▌Memory channel lockout ▌Scan resume (time-operated, carrier-operated, seek scan) ▌Automatic repeater offset ▌Automatic simplex checker ▌Power-on message ▌Key lock & key beep ▌Automatic power off ▌Compliant with MIL-STD 810 C/D/E/F standards for resistance to vibration and shock ▌Memory Control Program (available free for downloading from the Kenwood Website: ***www.kenwoodusa.com***)

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BY RICH MOSESON,* W2VU

A Lapful of Technology

"Do you have a light of some sort on?" I asked my daughter as I drove her home from work the other night and saw a light out of the corner of my eye. "Sort of," she said. "It's my iPod and my cellphone." In the typical multitasking world of today's kids, she was selecting the next song for the iPod (which, by the way, was playing through the car radio thanks to a little FM transmitter she was using) while simultaneously typing a text message to a friend.

"Last week, I had even more," she added. "Sitting on the bus on our field trip, I had my iPod, my cellphone and my digital camera. I looked at it all and said to my friend, 'Look at this, I've got a lapful of technology.' "

Indeed. And most of it seems foreign to ham radio, but if you look a little deeper, you'll realize that's not the case at all. While music transmission is clearly not a part of ham radio, using a low-powered transmitter certainly is. Here, she was operating QRPp and didn't even realize it! The cellphone, of course, is a two-way radio, and sending text messages is really no different from having a QSO in RTTY or PSK 31, except that the screen is much smaller and the "radio" is much more portable and has the messaging software built in. Her cellphone also has a camera built in, enabling her not only to take pictures wherever she is but to send them over the air to her friends as well (at a price, of course). This is nothing more than slow-scan TV, which hams have now been using for the past 50 years. Digital cameras and computers have breathed new life into SSTV in recent years, and we'll have a couple of articles about that in upcoming issues. But the point here is that my daughter's "lapful of technology" has many of its roots in ham radio, yet it seems completely disconnected from what we do. Why can't we have cellphone-sized portable messaging terminals that also shoot pictures and transmit them via SSTV? Imagine the uses in public service and emergency communications, or for just plain fun. Kenwood has made some commendable efforts in that direction, with its VH-1 camera and some VHF rigs that offer built-in messaging capability. But they've never really been big sellers, even though they do everything today's kids are doing, without the monthly fees for texting and sending/receiving photos. Of course, it's not all in one tiny unit, and for many (if not most) of us, ham radio remains something that we do while sitting in one place. We might find it easier to appeal to young people if we can offer the familiar, with added benefits that you can't get from your "wireless" provider. But we first have to be willing to adopt these sorts of things ourselves. Getting out from behind our shack tables and steering wheels might be a good start.

Hitting Bottom

I was reminded during the SSB weekend of the CQ World-Wide DX Contest last fall why I don't like the bottom of the sunspot cycle. This year, I was able to make a stunning 106 QSOs in 32 zones and 69 countries for an astounding total of just over 26,000 points. By contrast, at the peak of the cycle in 2001, using the same station (100 watts and a vertical), I worked 324 stations in 52 zones and 159 countries for a point total of more than 188,000. Even compared with just last year, my point total was cut in half. There was only a difference of about 40 QSOs, but I had 12 fewer zones and 30 fewer countries and that makes a really big difference when you start calculating your score. Now those of us who are "little pistols" in the big contests compete primarily against ourselves, but I was clearly losing to my earlier self. The biggest difference, though, had little to do with me (although I probably operated for less time, since there were fewer stations I could contact), and almost everything to do with the sun and the ionosphere.

Don't get me wrong—there was plenty of DX on the bands. I just couldn't work too much of it. If I was an SWL, I'd have been very happy … I heard lots of African stations on 15 and 20, but managed only to work Senegal on 15 and Tunisia on 40. My 100 watts and vertical antenna didn't have the "oomph" required to break through the pileups on all those juicy DX stations I heard but couldn't work. Sometimes, I couldn't even beat the band noise. I lost track of how many times I heard a station calling "CQ contest," called him, and heard him call "CQ contest" again … repeatedly. At the top of the cycle, with a bit of patience, I could generally work any of them. But not now. There's an old saying, "You can't work 'em if you can't hear 'em." The opposite is true as well … you can't work 'em if *they* can't hear *you.* Cycle 24, we're ready for you, anytime now…

On the other hand, looking at my logs is a real-life lesson in propagation. While I was able to work all over the world at the peak of the cycle, the vast majority of my contacts this year were in Central and South America and the Caribbean. I think I managed about a dozen contacts in Europe. If you look at NW7US's Propagation column this month, you'll see that he's talking about having primarily north-south paths on the upper HF bands at this point in the solar cycle. Working contests like the CQWW provides the opportunity to see that "textbook" propagation theory translated into reality. That's one of the reasons ham radio is such a great educational tool.

Charting a New Course

Speaking of our Propagation column, you'll notice something different about it this month—the propagation charts, a fixture of the column for decades, aren't there. Over the past several months, we've been talking about whether those charts are still relevant in today's instant-access internet-connected world. Computer programs utilizing constantly updated data make predictions timelier and more accurate than what we can produce, months ahead of time, to print in the magazine. In addition, a variety of websites, including NW7US's <hfradio.org> site, offer near-real-time snapshots of current conditions. On the other hand, we don't want to take away the charts if a significant number of you find them useful. Please drop Tomas (or me) a note if you regularly use the propagation and short-skip charts and feel that you'll be at a disadvantage without them. If most of you don't use them, however, removing them frees up a good deal of space in each issue to let us provide you with more information about our favorite hobby.

Content Note: Due to commitments at his "day job," WA5VJB was unable to finish his Antennas column in time for this issue. The column will return in March.

Happy New Year to all, and may 2007 bring us the upturn in propagation that we've all been waiting for!

73, W2VU

New Phone Bands Effective Dec. 15

The FCC's Report and Order expanding the phone bands on 75, 40, and 15 meters took effect on December 15, 2006. For more details, see "Ham Radio News" on page 4, "Washington Readout" on page 56, both in this issue; and our summary and band chart on page 2 of last month's *CQ*.

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

hy-gain® ROTATORS

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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

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.

T-2X
$649.95

T-2XD
$1029.95
with DCU-1

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
$949.95
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
$649.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1 degree 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
$69.95

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

NEW! Automatic Rotator Brake Delay

RBD-5
$34.95

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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60 m Band

Automatic Matching for FT-897/857 Series Transceivers

FC-40
Automatic-Matching
200-Memory
Antenna Tuner

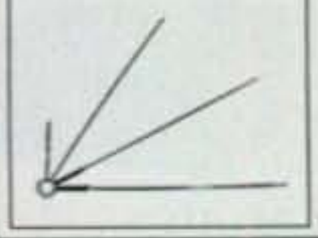
WATERPROOF

- Operational on 1.8 ~ 54 MHz when used with 66' (or longer) wire, or 7~ 54 MHz with standard 8.2' whip antenna (wire/whip antenna not supplied).
- Required Drive Power: 4 ~ 60 Watts. Maximum TX Power: 100 Watts.

Mobile Auto-Resonating 7~430 MHz for FT-897/857 Series Transceivers

ATAS-120A
Active Tuning
Antenna System
(no separate tuner required)

VHF/UHF Base RadialKit
ATBK-100 for ATAS-120A.



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announcements

Ham Radio University & ARRL New York City/Long Island Section Convention – This eighth annual event will take place on January 7 at Briarcliffe College, Bethpage, Long Island, New York. Included will be forums on satellite communications, low-power operating, emergency communications, antennas, HF digital communications, plus there will be booths set up about organizations and clubs, including the Red Cross, Salvation Army, National Weather Service, etc. Special event station W2V will also be on the air and VE exams are scheduled. For details, go to: <www.HamRadioUniversity.org>.

The following hamfests, etc., are scheduled for January:

Jan. 6, **West Allis RAC Hamfest/Swapfest**, Waukesha Co. Expo Center Forum, Waukesha, WI. Contact Phil Gural, W9NAW, 414-425-3649, or go to <www.warac.org>. (Exams 9–11:15 AM)

Jan. 13, **San Antonio Radio Club Swapfest**, Little Joe's Country Gold, San Antonio, TX. Contact JC Smith, N5RXS, e-mail: <n5rxs@satx.rr.com>; <http://w5sc.org/>.

Jan. 20, **Northern Colorado ARC Winter Hamfest**, Lincoln Center, Fort Collins, CO. Contact Willis Whatley, WA5VRL, 970-407-6599, e-mail: <willis.whatley@AEI.com>. (Talk-in 145.115 [–100 Hz CTCSS]; exams 9 AM)

Jan. 27, **LARA Hamfest**, South Lockport Firehall, Lockport, NY. Contact Dan Caswell, N2OBX, e-mail: <caswelld@verizon.net>; <http://lara.hamgate.net>. (Talk-in 146.820 [107.2 PL])

Jan. 28, **Tusco ARC Hamfest**, 965 N. Wooster Ave., Strasburg, Ohio. Contact gary Green, K8WFN, 740-922-4454, e-mail: <tuscofest07@hotmail.com>. (Talk-in 146.730–)

our readers say

Too Much Technology?

The following letter is to CQ Beginners' Editor Wayne Yoshida, KH6WZ, whose September column was entitled, "Too Much Technology?"

Dear Wayne,

The answer is *yes*. My Yaesu FM Transceiver FT-1500M was working fine *until* the local repeater decided to go DTMF. Now I can only access this repeater (147,135 67.0 CTCSS) and the ten weather channels. I have tried the Master Reset per instructions, but I can't seem to get the rig out of its present configuration. I have written to Yaesu at the Cerritos, CA address that is on my instruction manual, but mail comes back—not at this address. Can you help me? I like your feature in *CQ* magazine.

Ted Figlock, W1HGY

KH6WZ responds:

Dear Ted,

I am glad you liked the article on too much technology. You know, sometimes we just want something that works. Cell phones are a great example of too much —I do not need a camera, or games, or color displays.

I think you meant the repeater went to "CTCSS" or "PL" rather than "DTMF," which is TouchTone®. CTCSS and PL are used to limit access to certain repeater or radio systems, either to exclude non-members of the sponsoring group (a "private" repeater) or to prevent interference from other nearby (both in frequency as well as proximity) radio systems.

The FT-1500M has built-in CTCSS "encode" as well as "decode." I think it may be possible that your rig is in the "encode-decode" mode. Check to make sure your radio is in the "encode-only" mode, because if your radio is set to decode as well, it will make your receiver silent, even though it really is working.

With regard to Yaesu, their offices have moved since your radio was packaged. Try this address: Vertex Standard USA, Attn: Amateur Radio Dept., 10900 Walker St., Cypress, CA 90630.

"Misguided Guide" Editorial

Editor, *CQ:*

I enjoyed your article on "A Misguided Guide for New Hams" (Zero Bias, November 2006 *CQ*). What you say is true. Some

(Continued on p. 99)

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New HF Phone Frequencies Effective Dec. 15

The expanded voice frequencies on 75, 40, and (for Generals) 15 meters became available to U.S. hams on December 15, 2006. The new lower limit of the 75-meter phone band is 3,600 kHz for Extras (the Advanced band begins at 3,700 and the General band at 3,800); on 40 meters, Advanced and Extra Class hams may start talking at 7,125 kHz, with the General phone band beginning at 7,175; and on 15 meters, the General phone band now begins at 21,275 kHz (there is no change to the Advanced or Extra Class phone boundaries on 15 meters). There were also changes in the CW subbands, including new code privileges for Novices and Technicians with code credit, as well as rule changes on a variety of other topics. For complete information, see this month's "Washington Readout" column on page 56. A chart of the new subbands appeared on page 2 of *last month's CQ*.

Broadcasters Join ARRL in BPL Appeal

Two major broadcasters' groups have lined up with the ARRL in its appeal to federal court of parts of the FCC's decision on Broadband over Power Lines, or BPL. The National Association of Broadcasters and the Association for Maximum Service Television (a major digital TV group) filed a joint motion with the U.S. Court of Appeals for the District of Columbia, seeking permission to "intervene" in support of the ARRL's position. Since both organizations filed comments in the original FCC proceedings, they are entitled by right to intervene, according to the *ARRL Letter*, so court approval was expected. Several BPL proponents were seeking to intervene on the FCC's side.

ARRL Seeks FCC, ITU Action on 60 Meters

The ARRL is working on two fronts to get hams greater access to, and more flexibility on, the 60-meter band. Currently, FCC rules stipulate five distinct channels and permit SSB only, at a maximum power of 50 watts effective radiated power (ERP). In addition, there is no international allocation for amateur radio at 5 MHz. The *ARRL Letter* reports that the League has filed a petition for rulemaking with the FCC, seeking higher power (100 w. ERP), the ability to operate CW and other digital modes in addition to SSB, and a replacement channel at 5358.5 kHz instead of the current one at 5368.0, which is often busy with government traffic (amateur radio is secondary on the band).

In addition, the ARRL is asking the FCC to support a proposal before the International Telecommunications Union (ITU) to create a worldwide secondary amateur allocation at 5260–5410 kHz. The proposal could be considered at the next World Radiocommunication Conference (WRC), which will be held later this year.

ITU Elects "Ham Friendly" Secretary-General

Hamadoun I. Touré of Mali has been elected the new Secretary-General of the International Telecommunications Union (ITU). Delegates to the ITU's 17th Plenipotentiary Conference in Antalya, Turkey, also elected Houlin Zhou of China as Deputy Secretary-General. Both will serve four-year terms.

Leaders of the International Amateur Radio Union say Touré is a friend of amateur radio. IARU President Larry Price, W4RA, told the *ARRL Letter* that hams have worked with Touré for the past eight years in his role as Director of the ITU's Telecommunications Development Bureau, and IARU Vice President Tim Ellam, VR6SH, said Touré told him the IARU "has an important role to play in the future" and encouraged the group to "continue its good work in the ITU."

In addition, delegates elected Robert Jones, VE7RWJ, to another term on the 11-member Radio Regulations Board.

500 kHz a "Heritage Frequency"?

The first international radio conference was held 100 years ago this past November. The International Radiotelegraph Conference held in Berlin in 1906 established "SOS" as the international distress signal and designated 500 kc (kilocycles) as the international distress and calling frequency. At least two special operations were planned for the centennial on November 3 and 4, including former coast station KPH in the U.S. and a special ham station, GB500KCS, in the UK.

In addition, Britain's Radio Officers' Association is using the occasion of the centennial to kick off a campaign to have 500 kHz designated worldwide as the "radiotelegraphy heritage frequency" at the center of a "radiotelegraphy heritage band" between 495 and 505 kHz or from 495–513 kHz. According to the group's website, "500 kHz is the only spot frequency in the whole spectrum that can be identified as having life saving historical significance. It can be retained and continue to be used to demonstrate its past role for the benefit of future generations."

Hams on 500 kHz Band Heard Widely

A group of U.S. hams operating in the vicinity of 500 kHz under a special experimental license have been heard in Europe and in Hawaii, and are making contacts with each other, generally at distances of a few hundred miles. The *ARRL Letter* reports that the group, operating as WD2XSH, has been authorized to operate for two years between 505 and 510 kHz. Project manager Fritz Raab, W1FR, envisions a secondary amateur radio allocation in the "600-meter band" that could support amateur radio emergency communications via groundwave.

NASA Calls on Hams for ISS Backup

A group of hams that normally helps provide communications for the Amateur Radio on the International Space Station (ARISS) program was called on recently by NASA to stand by to provide backup communications with the station itself during a docking operation. The *ARRL Letter* reports that the ISS Ham Contingency Network was activated on October 26, when Russian flight controllers were unable to confirm whether an automated antenna on a Progress supply rocket had retracted as commanded, possibly posing a problem for final latching to the ISS. The space station was in "free-drift mode" during the docking, which opened up the possibility that it would lose contact with the ground through TDRSS, the Tracking and Data Relay Satellite System. It was the first time in the six years that the ISS has been occupied that NASA has requested ham backup for its primary communications. As it turned out, the ham link did not need to be used, but it provided "an additional layer of security" for Mission Control. ARISS team member Rosalie White, K1STO, said NASA officials were impressed with how quickly the system was brought up— with stations around the world on the air within 15 minutes.

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

Results of the 2006 CQ WW WPX SSB Contest

BY STEVE MERCHANT,* K6AW

The 2006 CQ WPX SSB was the 48th running of the contest. The relatively poor solar conditions did not seem to dampen contesters' enthusiasm, as we again saw an increase in the number of logs received. This time world Single Op All Band top honors went to Tom, W2SC, operating as 8P5A from his fine station in Barbados.

DX

8P5A took the top SOAB spot followed by another frequent top finisher, Jim, N6TJ, operating from ZD8Z. In third place was P40L (John, W6LD) followed by 6W1RW, operated by Jacques, F6BEE, and PJ2T (Marty, W1MD) in fifth. Sixth place went to VC3J (Elton, VE3EJ) and seventh again went to Olli, OH0XX/EA4BQ operating OA4WW from his new QTH in Peru. In eighth place was Ron, VE3AT, operating VC3L. ZX2B (Wanderly, PY2MNL) was number nine, and Jiri, OK1RI, finished up the top ten.

The 10-meter category was won again this time by Juan, LU1HF, by a wide margin over number two, Marcos, ZV5K. Third place was won with a low power entry by Alejandro, LW7HT, while Walter, PP5WG, and Ralph, AH6RF, took fourth and fifth place, respectively. The 15-meter single band scores again showed a clear winner in Sergio, PX5E, with an almost 10-million point margin over number two, Diego, LU8ADX, operating AY8A. Third went to Maurizio, IV3IYH, as TO3W. In fourth place was Joe, W6VNR, operating ZF1A, and fifth was Eduardo, LU1NDC. On 20 meters the winner was CN2SD, operated by Brad, K7ZSD. Again in 2006 there was a close battle for second place, with 9A15DX (Emil, 9A9A) narrowly edging out Juan, EA8CAC. The race for fourth and fifth was just as close, with Kaz, SP2FAX, as SN2B just beating out Vaho, 4L8A. The 40-meter competition was decisively won by Pekka, OH1RY. operating AN8AH. with a big lead over second place 4N8A (Ceha, YU1EA). Third place was won by Robert, 9A5E, and the fourth spot again went to Alexis, YV5SSB, this time operating as YW5CQ. Fifth went to YT7A, operated by YU7GMN. The 80-meter competition was totally dominated by Jim, W7EJ, operating from CN2R with a 10-million point lead over number two, YT15ØT operated by Zoran, YZ1ZV. RK2FWA (UA2FB op.) was third; Vojislav, YU7AV, fourth; and Frdi, S52ZW, was fifth. The 160-meter honors went to Krzysztof, SN7Q; with SP3KEY (Przomek, SP7VC) second; Petar, 9A6A, third; Arunas, LY2IJ, fourth; and Bela, HA8BE, fifth with his low power entry.

The world low power SOAB winner was John, VE3TG, operating VP5TG. Second place went to Javier, LU5FF, and third was Yuri, UA4LCQ/9. Fourth was Gedas, LY9A, and Ed, N1UR, took fifth place as NV1N. Igor, UA4FER, was in sixth; Beresford, 8P6EX, seventh; Stig, LA7JO, operating from 9N7JO eighth; Laszlo, HA3NU, ninth; and Carlos, TI2KAC, operating TE2M tenth.

The low power 10-meter category was won by Alejandro, LW7HT, followed by LU9DAG in second place and LR2D operated by Alex, LW7DUC, was third. Mariano, LU8EOT, was fourth and Mau, PY2CX, was fifth. The 15-meter low power race was extremely tight, with Juan, LU4DX, just edging out Luis, 4A7L. Fred, KH6RZ, was third; Thomas, YC3BGJ, fourth; and L44DX operated by Esteban, LW1DTZ, was fifth. The 20-meter low power competition was very close as well, with M'hamed, CN8NK, prevailing over his second-place rival Francisco, EA7FTR, operating AN7FTR. Third place went to Hugo, XE1CQ, and fourth was Igor, Z32ID, operating Z37M. John, OM5XX, was in fifth place. The 40-meter low power winner was Dal, T99D, with CT6A (Felipe, CT1ILT) second and IR8E (Oreste, IZ8EDJ) third. Andrzej, SP4TKR, took fourth place and SP3FYX was fifth. Eighty meters was won by Al, WP3C, with Gus, HA1YI, in second and John, UU4JKY, third. Zolo, OM7AB, took fourth place and Stan, SP9XCN, was fifth. The 160-meter low power category was won by Bela, HA8BE, with YMØT (Ozer, TA2RC) in second place. Brian, VE3MGY, was third; Jonas, LY5A, fourth; and fifth was LN9Z (Jan, LA9HW op.)

The Tribander-Single Element category continues to be very popular. ZX2B, operated by Wanderly, PY2MNL, was first; Dimitry, UT5UGR, was second; and Richard, 9M2CNC, was third. C4M (Val,

The world-winning Multi-Two HC8N team (left to right): LU6ETB, N5KO, HC8GR, LU4FPZ, LU2FA, and K6AW.

*e-mail: <k6aw@cqwpx.com>

Jan, HH4/K4QD (left), and Bill, HH4/W4WX (right), operated from the Northwest Haiti Christian Mission. Jan submitted a single-band 20-meter entry and Bill entered as single-band 15 meters. Their operating time was limited, however, because of the power limirtations of the mission and church functions on the Sunday of the contest weekend.

5B4AGM op) took fourth place and Javi, LU5FF, was fifth with his low power entry. Paul, N4PN, was sixth operating NF4A. Jim, K4PV, took seventh place; Bill, VY2LI, was eighth; Jon, W1CU, was ninth; and Martin, ZL1ANJ, was number ten. The 10-meter winner in the TS category was Taka, 7N2UQC (low power). The 15-meter winner was a low power entry by Icko, JA1BPA, followed by Bob, K8IA, in second and Felipe, PY1NB, with a low power third place win. Twenty meters was won by Darryl, 9Y4LDK, with Ryan, NV8N, in second and Victor, RV9LV, third, all three finishers running low power. On 40 meters EA1RCM was first and George, KI6LZ, second. On 80 meters Nico, PAØMIR won. Robert, F5VHN, won the 160-meter top spot.

The Rookie category winner this time was Rhy, ZS6DXB, with 3.7 million points, followed by Sergey, UA9JDP, and Dimitri, F4DSK, in third place. Adriano, PY2ADR, took fourth and Salvatore, IV3YIM, was fifth.

Single Op Assisted was easily won by Jorge, EA9LZ, followed by Vlad, UN9LW, operating UPØL; RG9A operated by Yuri, UA9AM; IO3P operated by Matteo, IZ3EYZ; and Tomas, ZP5AZL, operating ZPØR. The 10-meter Assisted winner was Rib, PY5TJ. On 15 meters Gennady, UA9UR, came in first. On 20 meters Rob, UA3AS,Z turned in a very nice score to win, followed by Serge, UT2IO, operating UT7I. The 40-meter top spot in SO(A) went to Ed, S56X. UU5A (Vlad, UU8JY op) won on 80 meters, and Vajda, HA3MY, operating HG3M was the 160-meter winner.

The top QRP spot was won by Phil, NØKE, operating TI5N, followed by Christian, F5BEG, in second place. Chermen,

WORLD TOP SCORES

SINGLE OPERATOR ALL BAND

8P5A (W2SC)	20,560,452
ZD8Z (N6TJ)	18,616,320
P4ØL (W6LD)	15,400,304
6W1RW (F68EE)	13,889,408
PJ2T (W1MD)	13,378,668
VC3J (VE3EJ)	11,975,880
OA4WW	11,379,312
VC3L (VE3AT)	10,404,000
ZX2B (PY2MNL)	10,203,949
OK1RI	9,422,700
VC3T	9,264,124
S58A (S55OO)	8,748,058
ES5TV	7,719,591
OH8X (OH6UM)	7,698,075
UA9CLB	6,638,720
R3R (UA3DPX)	6,062,336
K3ZO	5,929,630
LY7Z (LY2TA)	5,682,905
ED4KR (EA4KR)	5,240,704
SO6X (SP6IXF)	4,564,999

28 MHz

LU1HF	2,089,388
ZV5K	883,125
*LW7HT	667,734
PP5WG	599,976
AH6RF	568,260
*LU9DAG	495,320
*LR2D (LW7DUC)	491,634
*LU8EOT	428,398
*PY2CX	346,494
*PY2SBY	291,017

21 MHz

PX5E	14,179,990
AY8A (LU8ADX)	6,176,691
TO3W (IV3IYH)	4,791,506
ZF1A (W6VNR)	4,680,289
LU1NDC	4,088,512
ZS4U	3,335,364
TZ9A	3,004,600
PY1KN	2,421,900
*LU4DX	2,358,850
*4A7L	2,312,510

14 MHz

CN2SD (K7ZSD)	7,776,665
9A15DX (9A9A)	5,557,191
EA8CAC	5,405,310
SN2B (SP2FAX)	5,299,866
4L8A	5,107,104
JAØJHA	4,929,804
YT65WRTC (YT6A)	4,829,330
W7WA	4,766,850
S5ØK	4,507,449
IR4X (IK2NCJ)	4,286,082

7 MHz

AN8AH (OH1RY)	9,447,000
4N8A (YU1EA)	4,337,646
9A5E	4,154,898
YW5CQ (YV5SSB)	4,021,444
YT7A (YU7GMN)	3,526,566
EO6F (UXØFF)	2,881,752
IO3Z (IV3ZXQ)	1,931,653
LX6T	1,771,077
Z32XA	1,668,700
EA3BOX	1,523,570

3.7 MHz

CN2R (W7EJ)	11,849,076
YT15ØT (YZ1ZV)	1,700,850
RK2FWA (UA2FB)	1,558,150
YU7AV	1,369,887
S52ZW	1,364,370
EN5D (UT7DK)	1,238,020
S57AW	1,129,284
YT8T (YZ1KA)	1,118,508
W3BGN	1,032,430
YT2T (4N1JA)	979,424

1.8 MHz

SN7Q	541,680
SP3KEY (SP7VC)	494,130
9A6A	493,682
LY2IJ	438,240
*HA8BE	257,400
*YMØT (TA2RC)	221,400
*VE3MGY	220,946
ES1LBK	212,872
IV3OWC	212,000
DF2UU	178,416

LOW POWER SINGLE OPERATOR ALL BAND

VP5TG (VE3TG)	3,825,975
LU5FF	3,779,370
UA4LCQ/9	2,443,518
LY9A	2,097,431
NV1N (N1UR)	2,063,370
UA4FER	1,970,343
8P6EX	1,960,168
9N7JO (LA7JO)	1,868,390
HA3NU	1,754,256
TE2M (TI2KAC)	1,690,468
LU2NI	1,626,675
UZ7M	1,559,620
YB4IR	1,550,640
WD5K	1,512,466
RX3FS	1,506,828
VE6EX	1,392,747
ER3DW	1,313,995
PY2DN	1,313,688
N5DO	1,263,990
VE1OP	1,259,415

28 MHz

LW7HT	667,734
LU9DAG	495,320
LR2D (LW7DUC)	491,634
LU8EOT	428,398
PY2CX	346,494
PY2SBY	291,017
PY2DY	249,502
CX4DX	159,400
CX2TG	153,628

21 MHz

LU4DX	2,358,850
4A7L	2,312,510
KH6RZ	1,903,648
YC3BDJ	1,831,104
L44DX (LW1DTZ)	1,754,298
YB2OBL	1,728,564
AM8BHD	1,702,914
HP1BYS	621,230
HH4/W4WX	512,505

14 MHz

CN8NK	3,346,212
AN7FTR (EA7FTR)	3,036,873
XE1CQ	2,465,814
Z37M (Z32ID)	2,363,774
OM5XX	1,966,116
HH4/K4QD	1,592,205
LQ5H (LU3HS)	1,286,194
SP4XQN	1,088,648
UA9JMB	992,290
DF7YU	863,272

7 MHz

T99D	1,227,450
CT6A (CT1ILT)	1,091,872
IR8C (IZ8EDJ)	639,424
SP4TKR	629,486
SP3FYX	478,185
TG7M (EA1APV)	400,500
USØYW	383,508
II3L	307,377
ZX7A	199,150
TA3J	198,832

3.7 MHz

WP3C	674,250
HA1YI	523,296
UU4JKY	361,608
OM7AB	355,840
SP9XCN	347,750
LA5KO	265,768
UW8SM	253,935
OL7P (OK1CRM)	238,751
SP4SHD	227,911
CO6LPB	224,390

1.8 MHz

HA8BE	257,400
YMØT (TA2RC)	221,400
VE3MGY	220,946
LY5A	103,411
LN9Z (LA9HW)	90,998

TRIBANDER/SINGLE ELEMENT

ZX2B (PY2MNL)	A	10,203,949
UT5UGR	A	4,149,441
9M2CNC	A	3,933,748
C4M (5B4AGM)	A	3,909,000
VY2LI	A	2,977,612
ZL1ANJ	A	2,642,600
KG6DX	A	2,335,392
VE3CR	A	2,060,247
CX6VM	A	2,034,803
VB3O (W1AJT)	A	1,932,987

ROOKIE

ZS6DXB	A	3,717,896
UA9JDP	A	3,190,917
F4DSK	A	2,142,409
PY2ADR	A	1,284,290
IV3YIM	A	1,242,125
AB3CX	A	1,037,658
IW7EFC	A	953,862
MMØDXH	A	438,014
SM6U	A	370,220
XE2WWW	A	300,846

QRP/p

TI5N (NØKE)	A	1,368,310
F5BEG	A	716,256
UA3BL	A	627,532
YT7TY	A	531,330
KA1LMR	A	455,287
LW3DN	28	18,144
LU3JVO	28	9,256
JH7RTQ	21	33,915
SQ4HRN	21	24,768
KP4FP (KP3T)	14	377,806
YT15ØCS	14	190,218
OK2BYW	7	118,862
SP4GFG	7	86,064
SQ2DYF	3.7	50,315
LY5A	1.8	103,411

SINGLE OPERATOR ASSISTED

EA9LZ	A	12,295,470
UPØL (UN9LW)	A	7,496,412
RG9A (UA9AM)	A	7,470,528
IO3P (IZ3EYZ)	A	5,985,672
ZPØR (ZP5AZL)	A	5,811,484
S57DX	A	5,313,960
OH4R	A	5,265,660
RK4FD	A	4,570,128
VA3DX	A	4,226,491
YR9P (YO9HP)	A	3,885,310
PY5TJ	28	6,519
UA9UR	21	398,454
RL3A (UA3ASZ)	14	4,542,820
UT7I (UT2IO)	14	4,170,270
S56X	7	1,950,837
UU5A (UU8JY)	3.7	937,674
HG3M (HA3MY)	1.8	513,360

MULTI-OP SINGLE TRANSMITTER

CQ9K	24,878,978
PS2T	21,047,250
5B/AJ2O	19,708,493
KH7X	17,357,548
KP2TM	16,562,210
OE4A	14,967,480
LR2F	14,086,400
OM7M	13,614,132
V31RV	13,335,276
HI3CCP	12,235,885

MULTI-OP TWO TRANSMITTER

HC8N	46,791,472
KD4D	14,535,521
KI1G	13,541,275
WE3C	13,117,104
V47KP	10,941,464
EM7J	10,471,188
NX6T	10,225,743
EKØB	9,928,604
OF6AA	9,362,465
VE7SV	9,315,492
DD5FZ	8,204,796

MULTI-OP MULTI-TRANSMITTER

YW4M	27,076,209
DR1A	25,586,050
J6DX	21,416,646
OT6A	21,416,636
LZ9W	18,253,774
NQ4I	16,512,034
UP5G	10,689,840
NR6O	9,929,400
NX5M	9,692,375
LY7A	8,923,080

**Denotes low power.*

UA3BL, was third, with Bosko at YT7TY fourth and Chris, KA1LMR, fifth. Nico, LW3DN, was the top 10-meter op; Yoshi, JH7RTQ, was the winner on 15 meters; KP4FP (Jose, KP3T op) was tops on 20 meters; and Milan, OK2BYW, was the 40-meter champion. Leszek, SQ2DYF, was the winner on 80 meters, and Jonas, LY5A, on 160 meters.

USA

Long-time WPX contest participant Fred, K3ZO, easily won the top SOAB USA spot. He was followed by Jerry, WB9Z, in second place and Terry, N6CW (@K6NA), in third place. Paul, N4PN, was fourth operating NF4A; Bob, KQ2M, was fifth; Jim, K4PV, was sixth; and Jon, W1CU, was seventh. Martin, AD4TR, was eighth and Dave, K5RQ, took ninth place. The number ten spot went to Randy, K5ZD, operating as AK1W.

Cort, NA4W, was the 10-meter champ, followed by Chuck, W5PR. Bill, W6QU, was in third place; Bill, WWØWB, fourth; and Jim, WBØIWG was fifth. On 15 meters Ken, WM5R, operating at K5TR won nicely. Second place went to Bob, N4BP, operating as WN1GIV, followed by Bob, K8IA, and Carol, N2MM. Joe, W5ASP, was once again fifth, operating as NQ5K. Twenty meters was won by Dan, W7WA, with Bill, KG44WW, in second place. Lynn, W5FO, was third; Ryan, NV8N, fourth; and Bob, KF4GTA, fifth, the last two winners both using low power. On 40 meters all top five winners entered low power. George, KI6LZ, was the winner, with Bill, W9LYN, in second and Bob, NR8U, third. Paul, KU6T, was fourth and Steve, K7AWB, fifth. The 80-meter winner was Steve, W3BGN. Lew, W7EW, was second operating W7AT and Jeff, KU8E, was third. The low power entry from Dave, W9LYA, was fourth. On 160 meters Alex, KU1CW, was the winner, with Leo, AA4MM, again in second place. Yuri, K3BU, took third with a low power entry from NT1E, Mike, K9NW, was fourth and Mike, NE4S, took fifth place with low power.

Sebastian, LU4FPZ, part of the top-scoring Multi-Two HC8N team.

Ed, N1UR, captured the U.S. SOAB low power title as NV1N, followed by Tom, WD5F, in second. Dave, N5DO, was third; Bill, ACØW fourth; and fifth place went to Ed, NT4TT. Bill, W6QU, was the 10-meter U.S. winner, with Bill, WWØWB second and Jim, WBØIWG third. Fifteen meters was won by Don, W7UPF, with Steve, K4EU, second, and John, W9ILY, third. Ryan, NV8N, had the top 20-meter low power entry, followed by Bob, KF4GTA, and AD7J (Chuck, W7FP op). Forty meters was won by George, KI6LZ, with Bill, W9LYN, second. Dave, W9LYA, was the winner of the 80-meter category, and Yuri, K3BU, won 160 meters operating as NT1E.

NF4A (Paul, N4PN op) was tops in the U.S. T/S category, followed by Jim, K4PV, in second; Jon, W1CU, third; Dave, K5RQ, fourth; and Dick, W6TK, fifth. WD5K was the top low power winner in the T/S category. Mike, AB3CX, won the Rookie top spot, with John, WE9N, in second place and Bill, K4JET, in third.

Single Op Assisted top honors went to John, NY6DX, with second place going to Kamal, N3KS. Austin, N4WW, took third this time out, followed by NA7XX (Ken, WØMU op) and WM4RM (John, W4NF op). Tom, K7RI, had the top 20-meter score; as did Dick, AA2MF, on 40 meters; Jim, KEØL, on 80; and Manny, W2MF, on 160 meters.

The USA QRP winners were Chris, KA1LMR, in first place; with Randy, NDØC, second; followed by Chas, K3WW; Tom, N1TM; and Mark, N8ME. Single band winners were Bill, W6QU, on 10 meters; John, K7UP on 15 meters; and George, W4BQK, on 20 meters.

Multi-Ops

The Multi-Single category was won this time by CQ9K. PS2T came in second, 5B/AJ2O was third, and KH7X was fourth. KP2TM scored fifth, with OE4A in sixth place and LR2F seventh. OM7M was eighth, V31RV ninth, and HI3CCP took the tenth spot.

The KM9P crew won the top USA Multi-Single honor. Second place went to WU3A. Third place was claimed by WT4M. Fourth went to WC6H and in fifth place was AJ9C.

In the Multi-Two category HC8N set a new world record and contest high score with just under 47-million points. The next three places were won by U.S. stations: KD4D was second, KI1G was third, and WE3C was fourth. V47KP took fifth place.

The U.S. Multi-Two winner was KD4D, with KI1G second, WE3C third, NX6T fourth, and WR3Z fifth.

YW4M was this year's winner of the Multi-Multi category. Second place went to DR1A, the third spot to J6DX, OT6A fourth, and LZ9W fifth.

In the U.S. NQ4I took first place in the always contentious U.S. Multi-Multi competition. Second place went to NR6O, followed by NX5M in third, WX3B fourth, and NK7U in fifth place.

The Rest of the Story

Log submissions were up over 10 percent in the 2006 contest. Most logs were sent in Cabrillo format, which is the default requirement. We continue to refine our log preparation instructions on the website (http://www.cqwpx.com) so contestants will not have difficulties submitting their logs. Please do not rely on your logging program to get the Cabrillo header filled out correctly, especially if you are entering one of the two categories that require a Category Overlay line in the header. If you make any changes to your Cabrillo file, please use a simple text editor, not a word processor. Refer to the current rules in this issue or the website for more information.

We check the entire contest exchange, including serial numbers. If we receive a log without sent or received serial numbers it will be reclassified as a check log. If you encounter problems with serial numbers in your log, please take the matter up with your logging program author. With close to 5,000 logs to process each year it's not possible for us to fix everyone's log.

Special thanks go to the many operators who travel to remote locations all over the world so the rest of us have interesting and exciting prefixes to work. Also thanks to the many operators who arrange for special prefixes solely for use in this contest.

Thanks to WT4I for his log-checking software, and to EA3DU and OH5DX for help handling logs from their respective

USA TOP SCORES

SINGLE OPERATOR ALL BAND

K3ZO	5,929,630
WB9Z	4,010,560
N6CW (@ K6NA)	3,917,216
NF4A (N4PN)	3,601,224
KQ2M	3,419,570
K4PV	3,193,454
W1CU	2,873,502
AD4TR	2,637,405
K5RQ	2,604,105
AK1W (K5ZD)	2,334,584
*NV1N (N1UR)	2,063,370
AA6PW	1,779,232
K7ZS	1,720,500
WS4NC	1,674,270
KW7Y (K7RL)	1,664,775
K7ZZ	1,573,929
*WD5K	1,512,466
KI6CG	1,433,112
KTØR	1,315,085
NI7T	1,305,076
W2OO	447,355
K4ADR	446,590
KJ4TS (K9VV)	443,520
KE7RT	433,198
*KI3O	432,948
W8TE	412,720

28 MHz

NA4W	144,664
W5PR	58,919
*W6QU	8,750
*WWØWB	2,225
*WBØIWG	1,876

21 MHz

WM5R (@K5TR)	1,571,168
WN1GIV (N4BP)	1,249,365
K8IA	460,435
N2MM	383,768
NQ5K (W5ASP)	265,264
KC7V	200,943
KØRH	169,360
W4PV	138,844
WO8CC (N8BJQ)	125,528
*W7UPF	100,694

14 MHz

W7WA	4,766,850
KG44WW	3,268,210
W5FO	1,247,148
*NV8N	476,007
*KF4GTA	425,870
*AD7J (W7FP)	396,924
K6HNZ	342,324
WR6WR (N6WR)	313,225
W6AEA	311,049
*W4LC	250,828

7 MHz

*KI6LZ	118,420
*W9LYN	28,500
*NR8U	17,112
*KU6T	13,568
*K7AWB	12,460

3.7 MHz

W38GN	1,032,430
W7AT (W7EW)	418,931
KU8E	16,800
*W9LYA	275

1.8 MHz

KU1CW	167,299
AA4MM	92,232
*NT1E (K3BU)	78,720
K9NW	60,000
*NE4S	21,112

LOW POWER SINGLE OPERATOR ALL BAND

NV1N (N1UR)	2,063,370
WD5K	1,512,466
N5DO	1,263,990
ACØW	1,195,262
NT4TT	929,704
WB8TLI	767,110
K9QVB	716,968
NS4T	679,980
WW9R	672,364
KA8Q/4	578,985

28 MHz

W6QU	8,750
WWØWB	2,225
WBØIWG	1,876
KG4KVZ	1,260
N3TXH	468

21 MHz

W7UPF	100,694
K4EU	23,700
W9ILY	6,750
NA4M	5,880
WA4FXX	5,566

14 MHz

NV8N	476,007
KF4GTA	425,870
AD7J (W7FP)	396,924
W4LC	250,828
N4MO	231,275
AKØA	215,250
KM6Z	203,490
KZ5OH	172,620
NN5Z (K5PX)	125,325
AD6G	68,297

7 MHz

KI6LZ	118,420
W9LYN	28,500
NR8U	17,112
KU6T	13,568
K7AWB	12,460

3.7 MHz

W9LYA	275

1.8 MHz

NT1E (K3BU)	78,720
NE4S	21,112

TRIBANDER/SINGLE ELEMENT

NF4A (N4PN)	A	3,601,224
K4PV	A	3,193,454
W1CU	A	2,873,502
K5RQ	A	2,604,105
W6TK	A	1,495,492
KI6CG	A	1,433,112
N6QQ	A	1,300,728
KV7DX (KN5H)	A	1,206,480
N3UM	A	1,022,625
NJ2F	A	981,396
K2NNY (K2DB)	A	581,357
W2YE	A	527,012
W3TZ	A	505,530
K3BZ	A	335,720
K3MD	A	319,227
NX3Y (KA3QLF)	A	302,400
W1EQ	A	265,816
WM2Z	A	243,310
W4NTI	A	239,598
WG7X	A	225,834

ROOKIE

AB3CX	A	1,037,658
WE9N	A	353,298
K4JET	A	281,184
W7UG	A	144,534
ADØNW	A	38,306

QRP/p

KA1LMR	A	455,287
NDØC	A	299,008
K3WW	A	229,758
N1TM	A	85,221
N8ME	A	74,980

SINGLE OPERATOR ASSISTED

NY6DX	A	4,778,115
N3KS	A	4,620,264
N4WW	A	3,115,020
NA7XX (WØMU)	A	2,893,891
WM4RM (W4NF)	A	2,401,225
WN9O (W9IU)	A	2,195,544
N2BJ	A	2,158,468
W8MJ	A	2,112,534
KØLUZ	A	1,876,380
W6TK	A	1,495,492
KW5DX (K5UN)	A	1,346,430
N6QQ	A	1,300,728
KOØU	A	955,450
K1UQ	A	939,930
WW5X (@ WØLSD)	A	939,418
NF6A (K6XX @ K6XX)	A	823,732
NO2R	A	771,284
W6FRH	A	718,658
KW3W	A	645,120
K2NNY (K2DB)	A	581,357
K7RI	14	2,811,214
K7VIT	14	90,346
AA2MF	7	52,680
KEØL	3.7	241,680
W2MF	1.8	66,682
K4WW	1.8	10,952
WA1PMA	1.8	7,257

MULTI-OP SINGLE TRANSMITTER

KM9P	7,292,880
WU3A	5,579,466
WT4M	4,528,080
WC6H	4,183,700
AJ9C	3,018,720
K9SD	2,954,310
KD2HE	2,822,910
WX5S	2,683,004
AJ5DX	2,389,500
NU5F	2,381,886

MULTI-OP TWO TRANSMITTER

KD4D	14,535,521
KI1G	13,541,275
WE3C	13,117,104
NX6T	10,225,743
WR3Z	7,855,523
AA5NT	4,101,408
W5WMU	2,882,418
NG3U	1,690,134
NM1JY	1,169,595
NC7M	1,139,514

MULTI-OP MULTI-TRANSMITTER

NQ4I	16,512,034
NR6O	9,929,400
NX5M	9,692,375
WX3B	7,975,101
NK7U	7,520,352
NE1C	6,409,578

*Denotes low power.

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countries. Many thanks also to members of the CQWW Contest Committee for helping with various log-handling issues in local languages. Thanks as well to N5KO and his robots; they are a huge help in the log checking process.

The biggest thanks go to Steve Bolia, N8BJQ, for his help and endless energy and enthusiasm.

The 2007 WPX SSB Contest will be held on March 24 and 25. Please plan to participate. Rules can be found elsewhere in this issue of *CQ* and on both the CQ website (www.cq-amateur-radio.com) and the WPX website (http://www.cqwpx.com). Logs are requested to be submitted by e-mail in Cabrillo format. Send WPX SSB logs to <ssb@cqwpx.com>.

See you in the 2007 contest!

73, Steve, K6AW

QRM

Conditions were favourable on 15m for most of the contest period. There was a brief opening on 10m from New Zealand to southern United States, and I look forward to next year with higher solar flux levels . . . **ZL1ANJ**. 400w into G5RV @ 30m was more than enough for fun . . . **ZA/Z35M**. Where was the JA's? I worked only one . . . **YW5NN**. Fun from 0Z to 23:59Z . . . **XE2K**. I had a lot of fun with this contest. Next year I'll free up more time to play . . . **WA4ASJ**. First time operating this contest. Tons of fun! . . . **W8DCQ**. One Euro—TNX Jimmy! 80m on SSB not a lot of fun . . . **W7AT**. Band more active on Sunday afternoon . . . **W4PV**. My first WPX. Had a ball. Family commitments limited me to only 2 hrs. Wait till next year!! . . . **W1WIU**. The contest weekend marked exactly the 50th anniversary of my first amateur radio license as KN2TBU. It was a perfect way to celebrate 50 years in this wonderful hobby . . . **W1CU**.

Well that was a lot of fun! Wish I'd had more time to operate. Sneaked in some low band activity on Friday night before going to bed, but nothing at all on Saturday night between visits with my son and grandson. Managed several good runs on 20 . . . **VY2LI**. Great condx considering the progress of the solar cycle. 15m once again proved to be the

TROPHY WINNERS AND DONORS

WORLD: Stanley Cohen, W8QDQ Trophy. Won by: **8P5A operated by Tom Goergens, W2SC.**
World Low Power: Caribbean Contesting Consortium Trophy. Won by: **VP5TG operated by John Connor, VE3TG.**
World QRP/p: Phil Krichbaum, NØKE Trophy. Won by: **TI5N operated by Phil Krichbaum, NØKE.**
USA: Atilano de Oms, PY5EG Trophy. Won by: **Fred Laun, K3ZO.**
USA Zone 4: Society of Midwest Contesters Trophy. Won by: **Jerry Rosalius, WB9Z.**
USA Low Power: Terry Zivney, N4TZ Trophy. Won by: **NV1N operated by Edward Sawyer, N1UR.**
USA Zone 4 Low Power: Society of Midwest Contesters Trophy. Won by: **Thomas Johnson, WD5K.**
CANADA Low Power: Contest Club Ontario Trophy. Won by: **Dan Lazar, VE6EX.**
AFRICA: Peter Sprengel, PY5CC Trophy. Won by: **6W1RW operated by Jacques Saget, F6BEE.**
EUROPE: Jim Hoffman, NF5A Trophy. Won by: **Jiri Sanda, OK1RI.**
SOUTH AMERICA: Ron Moorefield, W8ILC Trophy. Won by: **P40L operated by John Fore, W6LD.**
OCEANIA: Philip Frazier, K6ZM Memorial. Won by: **Joel Chalmers, KG6DX.**
JAPAN: The DX Family Foundation Trophy. Won by: **Masaki Okano, JH4UYB.**
NORTH AMERICA QRP/p: Phil Krichbaum, NØKE Trophy. Won by: **Christopher Merchant, KA1LMR.**
USA QRP/p: Doug Zwiebel, KR2Q Trophy. Won by: **Randy Shirbroun, NDØC.**

SINGLE OPERATOR, SINGLE BAND

WORLD: Steve Merchant, K6AW Trophy. Won by: **Sergio Lima de Almeida PX5E (21 MHz).**
WORLD 28 MHz: Alan Dorhoffer, K2EEK Memorial Trophy. Won by: **John Morandi, LU1HF.**
WORLD 7 MHz: William D. Johnson, KVØQ Trophy. Won by: **AN8AH operated by Pekka Kolehmainen, OH1RY.**
USA 3.7 MHz: Lance Johnson Engineering Trophy. Won by: **Steven Sussman, W3BGN.**
USA 14 MHz Low Power: Boomer Contest Club Trophy. Won by: **Ryan Fountain, NV8N.**
USA 21 MHz: Bernie Welch, W8IMZ Memorial. Won by: **Kenneth Harker, WM5R @ K5TR.**

MULTI-OPERATOR, SINGLE TRANSMITTER

USA: Steve Bolia, N8BJQ Trophy. Won by: **KM9P operated by K4JNY, K4RO, KØEJ, KD4HIK, NA4K, W4PA, W4NZ.**
USA Zone 4: Society of Midwest Contesters Trophy. Won by: **AJ9C operated by AJ9C & KE9I.**
ASIA: W2MIG Memorial Trophy sponsored by Ed Campbell, NT4TT. Won by: **5B/AJ2O operated by N2OW, RW3QC, RW4WR, UA9CDV, RA3AUU.**

MULTI-OPERATOR, TWO TRANSMITTER

WORLD: Doris Wong, AG1RL Trophy. Won by: **HC8N operated by N5KO, K6AW, LU6ETB, LU4FPZ, LU2FA.**

MULTI-OPERATOR, MULTI-TRANSMITTER

WORLD: Gail Schieber, K2RED Trophy. Won by: **YW4M operated by YV2IF, YV3AZC, YV5AMH, YV5ANT, YV5EED, YV5IVB, YV5KG, YV5LMW, YV5ZV.**

USA: Rick Dougherty, NQ4I Trophy. Won by: **NQ4I operated by NQ4I, K4PK, KE4UW, K2UFT, VE7ZO, K4TD, KT4ZB, NF4A, N4OX, K5ZM K4BAI, KN6RO, W4DD, WI4R, K9JS.**

CONTEST EXPEDITION

WORLD: Kansas City DX Club Trophy. Won by: **CN2R operated by Jim Sullivan, CN2R.**

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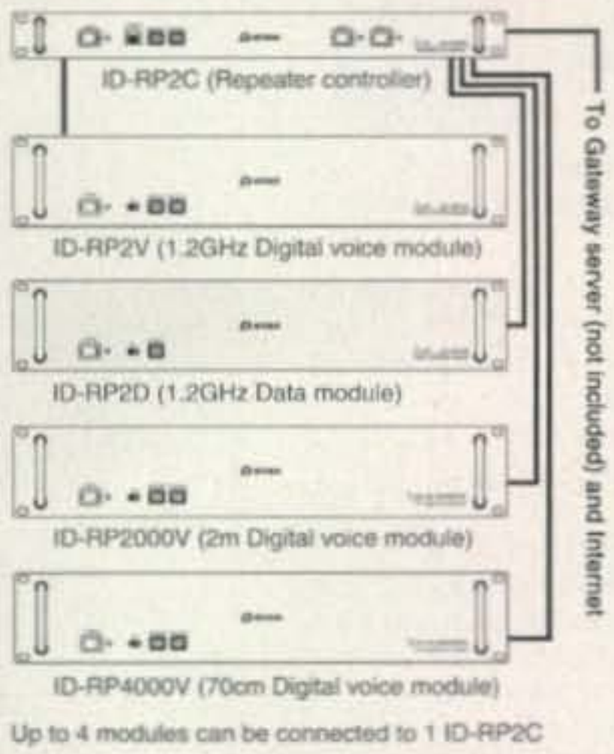

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WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
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(703) 643-1063
(800) 444-4799
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virginia@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
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28 mi. No. of Boston
salem@hamradio.com

"money band" with great condx all weekend. 10m was available with some good signals but it seemed no one bothered about running there—shame . . . **VK4CZ**. Too much work time and not enough contest time. Thanks once again for the continued efforts of the contest sponsors and managers . . . **VE5CPU**. Limit time to operate. Thanks to all I managed to work . . . **VA3PC**. Good contest! 73! . . . **UX7MM**. Tnx fer contest! . . . **UR7GX**. My best CQ WPX contest so far, and running once more on car batteries. I managed to run 300w with my solid-state amplifier. Surprises included Australia, New Zealand, Japan, and my neighbour Jan Mayen . . . **TF3AM**. I did QRV in Koror, Palau . . . **T88CW**.

73s from Greece. It is the first time that I participated in this contest. I hope everything is okay. QRX in the next contest . . . **SV2GWY**. Not a serious effort. Very fun though . . . **SM6U**. Ten meters at this year was close . . . **PP5WG**. I hope to find more time for the contest next year. Have fun with the control of the incoming logs, best 73 Jan . . . **PAØIJM**. Great contest! I enjoyed the

CQ WW WPX SSB CONTEST ALL-TIME RECORDS

The contest is held each year on the last full weekend of March. The All-Time Records will be updated and published annually. Data following the calls: year of operation, total score, and number of prefix multipliers.

WORLD RECORD HOLDERS

Single Operator

1.8	IV3OWC('05)	758,912	392
3.5	CN2R('06)	11,849,076	894
7.0	CN2R('05)	14,724,696	931
14	EA8AH('97)	11,142,198	981
21	ZD8Z('05)	17,129,112	1196
28	D44AC('02)	15,707,401	1123
AB	D4B('05)	26,871,482	1271
QRP/p	HC8A('94)	7,520,562	714

Multi-Operator Single Transmitter

D44TD('02)		33,443,856	1332

Multi-Operator Two Transmitter

HC8N('06)		46,791,472	1456

Multi-Operator Multi-Transmitter

HC8N ('03)		60,703,452	1476

U.S.A. RECORD HOLDERS

Single Operator

1.8	K1ZM('95)	327,712	308
3.5	WE3C('95)	1,519,300	475
7.0	KC7EM('95)	1,950,228	495
14	KK9A('00)	6,621,446	962
21	KX8R('00)	7,556,250	930
28	NY4A('00)	6,006,573	877
AB	KQ2M('00)	11,875,240	1066
QRPp	KR2Q('00)	2,688,158	649

Multi-Operator Single Transmitter

KM3T('99)		14,091,468	1077

Multi-Operator Two Transmitter

KD4D('06)		14,535,521	1183

Multi-Operator Multi-Transmitter

KM3T('00)		29,338,460	1355

CLUB RECORD
Contest Club Finland ('00) 250,320,141

QRPp RECORD
HC8A('94) 7,520,562

WPX (Prefix) RECORD
OTØA('00) 1528

CONTINENTAL RECORD HOLDERS

AFRICA

1.8	EA8/OH1MA('99)	404,976	208
3.5	CN2R('06)	11,849,076	894
7.0	CN2R('05)	14,724,696	931
14	EA8AH('97)	11,142,198	981
21	ZD8Z('05)	17,129,112	1196
28	D44AC('02)	15,707,401	1123
AB	D4B('05)	26,871,482	1271

ASIA

1.8	*YMØT('05)	486,846	222
3.5	UA9CSS('94)	1,074,780	315
7.0	H24LP('87)	5,348,975	503
14	H2A('91)	6,297,464	758
21	7L1GVE('92)	6,848,136	838
28	H22H('00)	9,092,146	931
AB	JY9NX('01)	15,463,485	1017

EUROPE

1.8	SO2R('05)	756,105	399
3.5	SO2R('04)	2,543,708	643
7.0	9A9A('99)	4,624,188	724
14	DJ7AA('00)	7,955,224	1052
21	CQ1BOP('00)	6,989,997	1029
28	GM7V('00)	8,305,756	982
AB	OK1RI('01)	10,844,592	1034

NORTH AMERICA

1.8	VA1A('99)	535,225	271
3.5	VE1BY('00)	2,226,300	492
7.0	TI4CF('05)	8,057,479	751
14	KP2A('95)	7,088,976	912
21	WP3R('98)	10,167,632	986
28	KP2A('00)	11,385,710	1046
AB	8P5A('06)	20,560,452	1199

OCEANIA

1.8	AH6PR('99)	18,963	49
3.5	WH7Z('03)	1,208,900	308
7.0	WH7Z('99)	4,582,773	507
14	KH6ND('03)	6,493,727	887
21	AH7DX('00)	7,645,990	890
28	TXØDX('00)	12,049,422	847
AB	KH6ND('01)	15,498,798	1029

SOUTH AMERICA

1.8	YV5JEA('84)	40,320	63
3.5	P4ØA('96)	1,715,076	426
7.0	ZX9A('97)	10,787,128	814
14	PYØFM('95)	9,660,432	939
21	PX5E('06)	14,179,990	1210
28	ZX5J('99)	14,405,820	1095
AB	HC8A('01)	25,180,199	1199

MULTI-OPERATOR SINGLE TRANSMITTER

AF	D44TD('02)	33,443,856	1332
AS	5B/AJ2O('05)	28,966,272	1252
EU	9A7A('02)	19,034,950	1306
NA	VP2EC('92)	24,409,580	1115
OC	T33RD('99)	17,778,372	998
SA	HC8A('93)	32,502,677	1107

MULTI-OPERATOR TWO TRANSMITTER

AF	TS3A('05)	30,460,277	1139
AS	A61AJ('04)	30,157,650	1255
EU	RU1A('04)	16,054,404	1257
NA	V47KP('03)	15,958,488	1092
OC	KH7X('05)	20,910,656	1066
SA	HC8N('06)	46,791,472	1456

MULTI-OPERATOR MULTI-TRANSMITTER

AF	CN8WW('99)	55,151,562	1334
AS	P3A('00)	53,554,592	1456
EU	9AY2K('00)	42,477,343	1493
NA	WL7E('00)	42,013,215	1395
OC	KH7R('02)	32,806,032	1304
SA	HC8N('03)	60,703,452	1476

benefits of an HF2V vertical for 40 and 80 over just having a wire dipole. Ten meters performed poorly due to propagation . . . **P29NB**. After last year bad experience I decided this year to go not for QSOs but pts; if it worked out we will see. Propagation as expected this time of the cycle. When to pause is always a challenge. Had fun as always. WPX SSB is my favorite one . . . **OK1RI**. Fun contest. Getting ready for next year with new tower and 4-el. Stepplr beam . . . **NL7V**. Tks Charlie for the use of your call. Didn't work another NF4. 15 and 10 poor on Saturday but opened up great on Sunday. Low bands were great all weekend with little QRN. Beat my all-time high, which was last year using NK4A, by half-million points! . . . **NF4A**. Not much time to operate, so just played around mostly on 80 meters, which did not seem too good. Sure wish more Europeans would have listened up in the U.S. band . . . **NE5D**.

Lots of fun as always . . . **NE4M**. First entry in CQ WPX. Hope this works . . . **N5TEY**. Started slow, went to a concert during first 4 hr. of contest. Still put in 1.7 hr. more than previous max., in 2005, but got 187 fewer QSOs. Continuing trend of recent years, 15m was thin and weak, with very few EU's as a result. 20m was extremely crowded . . . **N3UM**. Great contest. Higher frequency bands hardly open. Some new DXCCs for me too. See you next year . . . **MMØDXH**. Wherever the propagation is, it ain't here but still had fun working a lot of stations off the coax feedline of my tribander on 75! 40 was better for DX but hardly any stns there . . . **KS7T**. Had fun during this contest. See you next one . . . **KP4JRS**. Limited time, limited effort, and very limited propagation . . . **KL8DX**. Ten is still open . . . **KD5JAA**. Cnds were horrible . . . **KC7UP**. I enjoyed the contest and had fun doing it . . . **K9HUY**. No 10 meters at all. 20 good, as was 15 and 40. Fun as usual . . . **K7ABV**. Only on the first night before going to the club station . . . **K5ZD**. Great conditions for the bottom of the sunspot cycle . . . **K4PV**. Great openings on 15! . . . **K4IRS**. Lots of fun . . . **K2MFW**. Sorry I couldn't have operated more hours . . . **KØGAS**. Was able for once to work all bands . . . **KØDAT**.

Thanks for create this contest. Very fine good score for me. My antenna Force 12 QRT, only dipole . . . **IZ8EDL**. Good conditions 20m . . . **IK8SEU**. Only QRV for a few hours; should be a checklog really. Hi. Spent some time at local club station (GW6GW). Good to see that call on in WPX after a break of over 20 years . . . **GW4BLE**. My third entry into the contest. Shame about the poorer conditions . . . **G4DFI**. First time in WPX contest. Enjoyed the chase and worked some new ones. Looking forward to CQWW DX at end of year . . . **G1VDP**. Great contest; many noises on 20m. Many NA stations missed the 15m opening . . . **F4DSK**. Good contest. I enjoyed it very much . . . **EI9HX**. Many thanks to my dear friend Manolo, EA8ZS, for to be my contest teacher and many tnx to all stations for QSO . . . **EA8CAC**.

Condx on 15m were from excellent to boring. Unexpected signals coming and going. Not bad the sunspot cycle period we have now . . . **DL2OBO**. Could only spend some three hours. Will do better in the CW section . . . **DJ3WE**. My first 80m monoband contest in WPX. Last WPX in 2005 I made 40m monoband, I think successful. Thanks for the nice surprise award for first place in DL in year 2004. I got the award last weekend . . . **DJ1AA**. I am amazed that I managed to pull through 100 QSOs (some in a checklog for 40 and 15m) in this incredible bedlam. So much splatter, cracked audios, and shouting . . . **CU2JT**. Great condx! The 80m band had zero QRN . . . **CN2R**. Good conditions. Made my best ever 40m single effort . . . **AN8AH**. Started just to give out the prefix, but then had so much fun I couldn't stop! . . . **AK1W**. Fun contest as usual. One of the few where average stateside station can be on the receiving side of a pileup . . . **AC9S**. Highlights were being called by B5TT in the last hour of the contest and 9V1YC's busting a big pileup to call me. Thanks for another great contest . . . **8P2K**. Great conditions on low bands but very few came down to 75m . . . **6W1RW**. Very limited time . . . **4X6FR.**

CONTINENTAL LEADERS

AFRICA

1.8	No Entry	
3.5	CN2R	11,849,076
7	AN8AH	9,447,000
14	CN2SD	7,776,665
21	ZS4U	3,335,364
28	*EA8TX	8,964
AB	ZD8Z	18,616,320

ASIA

1.8	*YMØT	221,400
3.5	*UA9LAU	75,460
7	EY8CQ	221,288
14	4L8A	5,107,104
21	VR2XMT	532,890
28	JA6WJL	8,772
AB	UA9CLB	6,638,720

EUROPE

1.8	SN7Q	541,680
3.5	YT15ØT	1,700,850
7	4N8A	4,337,646
14	9A15DX	5,557,191
21	T96Q	1,464,708
28	*S57S	5,588
AB	OK1RI	9,422,700

NORTH AMERICA

1.8	*VE3MGY	220,946
3.5	W3BGN	1,032,430
7	TG7M	400,500
14	W7WA	4,766,850
21	TO3W	4,791,506
28	NA4W	144,664
AB	8P5A	21,011,456

OCEANIA

1.8	No Entry	
3.5	*YBØA	3,250
7	*ZL4JB	30,295
14	YB1YG	118,620
21	*KH6RZ	1,903,648
28	AH6RF	568,260
AB	KG6DX	3,754,025

SOUTH AMERICA

1.8	No Entry	
3.5	*YY5RED	191,580
7	YW5CQ	4,021,444
14	4M5R	2,843,964
21	PX5E	14,179,990
28	LU1HF	2,089,388
AB	P4ØL	15,400,304

MULTI-OPERATOR SINGLE TRANSMITTER

AF	CQ9K	24,878,978
AS	5B/AJ2O	19,708,493
EU	OE4A	14,967,480
NA	KP2TM	16,562,210
OC	KH7X	17,357,548
SA	PS2T	21,047,250

MULTI-OPERATOR TWO TRANSMITTER

AF	No Entry	
AS	EKØB	9,928,604
EU	EM7J	10,471,188
NA	KD4D	14,535,521
OC	4H5ØO	1,450,885
SA	HC8N	46,791,472

MULTI-OPERATOR MULTI-TRANSMITTER

AF	No Entry	
AS	UP5G	10,689,840
EU	DR1A	25,586,050
NA	J6DX	21,416,646
OC	YE2O	2,444,532
SA	YW4M	27,076,209

**Denotes Low Power*

(Continued on page 106)

Despite some "opening night" glitches, the CQ DX Marathon will be run again in 2007, with a few minor rule changes.

Announcing:

The 2007 CQ DX Marathon

The second running of the new CQ DX Marathon begins at 0000 UTC on January 1, 2007, and runs through 2359 UTC on December 31, 2007. The goal is to work as many countries and CQ zones as possible at least once during the calendar year.

There are a couple of changes from the 2006 rules: First, the restriction on counting contacts made on 60, 30, 17, and 12 meters has been lifted (see sidebar, "2006 CQ DX Marathon," for explanation). Second, there will be no scoring matrix, but rather a downloadable Microsoft Excel® template which may be filled in and e-mailed to a special address as your log entry. Here are the 2007 rules for the CQ DX Marathon:

Rules, 2007 CQ DX Marathon

1. Activity period: The CQ DX Marathon is a year-long activity, beginning at 0000 UTC January 1 and ending at 2359 UTC December 31. Each year's event is separate.

2. Frequencies: Any authorized amateur frequency may be used. Contacts through repeaters or satellites are not allowed for credit. All contacts must be made entirely over amateur radio frequencies; i.e., Echolink-type contacts do not count.

3. Categories: All awards are for single operator only. There are two entry classes, "Formula" and "Unlimited."

a. Formula: An entrant may choose one of two options in this class: (1) All contacts must be made with a maximum output power of 10 watts, regardless of band or mode; or, (2) the operator may run a maximum of 100 watts output to a simple antenna, such as a vertical or dipole (see the appendix for further rules on antennas used in this class). An operator in Formula Class must select either QRP or 100 watts and limited antennas at the beginning of the year's DX Marathon, and may not switch between entry modes during the year. All contacts must be made without assistance of any sort, including but not limited to lists, passes or use of higher power or prohibited antennas to initially secure the contact. Use of spotting nets such as a DX Cluster® is allowed.

b. Unlimited: Any antenna may be used, along with any power level for which the operator is licensed. As in the Formula class, all contacts must be made without assistance of any sort, including but not limited to lists and passes. Use of spotting nets such as a DX Cluster® is allowed.

4. Scoring: Each country worked is worth one point. Each CQ zone worked is worth one point. The total score is the sum of zones and countries worked, on any mode and any authorized band. There are no multipliers of any kind. Each country and zone count only once. If in the course of the year you work 238 countries and 37 zones, your score is 275. If you work all 40 zones and 150 countries, your score is 190. The CQ DX Countries List and the CQ Zone List constitute the official lists. In the case of ties, the operator whose last scoring contact was earlier chronologically will be judged the winner. Decisions of the Marathon Manager are final.

5. Submissions: Submissions must be made electronically, via e-mail to <scores@dxmarathon.com>. A Microsoft Excel® template into which contacts may be entered is available for download from the CQ DX Marathon website at <http://www.dxmarathon.com>.All scores must be received by

The 2006 CQ DX Marathon

The new CQ DX Marathon was run in 2006 for the first time since 1948, and with that long a layover, some startup glitches were inevitable. When we announced the revival of the Marathon in 2005, we anticipated having an interactive matrix into which entrants could enter and submit their contacts. It never happened. Instead, what we have (also quite belatedly) is a Microsoft Excel® template which contestants may download from the official DX Marathon website at <http:// www.dxmarathon.com>. Scores should then be submitted by e-mail to <scores@ dxmarathon.com>. The scores box on the website will be updated as new logs are submitted. Comments and stories may be sent to <comments@dxmarathon.com>, and questions may be directed to CQ DX Marathon Manager John Sweeney, K9EL, at <info@dxmarathon.com>. Logs for 2006 must be submitted by February 28, 2007.

WARC Bands

The only real complaint we received from participants during the first year about the rules of the DX Marathon related to the exclusion of credit for contacts made on the so-called "WARC bands" (30, 17, and 12 meters) and 60 meters. When we first planned the Marathon, we didn't know whether activity would be spread across the year or would come in contest-like "clumps" at the beginning and end of the year. Preferring to err on the side of caution, the 2006 rules did not permit contacts made on 60, 30, 17, or 12 meters to count toward an entrant's score, in keeping with the gentlemen's agreement to keep contests off of the "WARC bands."

However, as the year played out, it became obvious that activity has been spread out in terms of both time and frequencies—more like what you'd see in going after a time-limited award than in a typical 48-hour contest. It turned out that we were denying credit for activity and contacts that were going to happen anyway, because some of the best DX of 2006 was on bands that didn't count for Marathon credit. Since the goal of this event is to encourage more activity, not to discourage it, we have decided to lift the band restrictions for 2007. All contacts on all bands (subject to limitations in Rule 2) will count toward your Marathon score in 2007.

Get Your Scores In!

Remember, you only have until February 28 to submit your logs/scores, and everybody starts over again from zero on January 1. We hope you had fun in the 2006 CQ DX Marathon and that you'll have even more fun in 2007 (now that we're a little better organized!). If you didn't participate last year, we look forward to your joining us in '07.

73 and Happy New Year—The CQ DX Marathon Committee

January 31 following the close of each DX Marathon.

6. Verification: QSLs are not required. The operator is expected to claim contacts only from stations the operator has every reason to believe are legitimate, and only to claim contacts in which an accurate two-way exchange was clearly accomplished (see Appendix for further explanation). Scores will be adjusted by the DX Marathon committee for claimed contacts with pirates or any station not considered legitimate. Submissions may be penalized or voided in cases of fraud or poor sportsmanship.

7. Clubs: Clubs are strongly encouraged to use the framework of this contest for intramural and regional competitions.

8. Claimed Scores: Competitors will be encouraged to post claimed scores to the DX Marathon Web page. These claims will be updated regularly, and may be published periodically in *CQ* magazine.

9. Results: The final listing of scores will be posted each year on the CQ website. In addition, *CQ* magazine will publish an annual summary of the winning scores and details.

10. Awards:

a. Certificates: Certificates will be issued to the winners from each CQ zone and each CQ country. Where there is sufficient activity, additional certificates will be issued for other high scorers. In addition, downloadable certificates of participation will be made available to each participant. Other awards may be offered at the discretion of the DX Marathon committee.

b. Plaques: The CQ DX Marathon Committee anticipates that plaques will be given to major winners. Sponsors are solicited.

c. Special recognition: The CQ DX Marathon Committee is also examining the possibility of special prizes for DX stations that appear in the greatest number of submitted logs.

11. In all cases, the rulings of the CQ DX Marathon Committee and the CQ DX Marathon Manager are final.

Appendix:

a. Formula Class antennas: Antennas used in this category for operators choosing the 100-watt option must be either simple verticals or wire antennas lacking significant gain. No arrays are allowed, whether vertical or horizontal, nor are long wires exceeding 100 feet in length, except on 80 and 160 meters. Vertical antennas used must not be more than 33 feet higher than the station floor at their base, while dipoles or other wire antennas must not be more than 60 feet above ground. Yagis, quads, or tower-mounted antennas (except wire antennas meeting the height limits above) may not be used in this category.

b. Operators selecting the 10-watt option are limited to antennas on a single tower whose height does not exceed 65 feet above ground elevation within 330 feet or 100 meters of the tower base. Wire antennas may also be used but must meet the criteria of the 100-watt option, and may be tower-supported at only one point.

c. Contacts: The DX Marathon Committee believes that each contact for a claimed country or zone must be a solid contact. The station claiming a contact with another station is expected to have had his or her callsign fully and accurately received and transmitted by the other station, and to have copied his/her own call being correctly sent by the other station. For example, K2MGA may not claim credit for a QSO with a DX station who had his call as K3MGA, even though in many cases the DX station would QSL the contact with the correction made (after receiving a card from K2MGA, realizing the error and correcting his/her log). For a contact to count, both stations must correctly copy all of both callsigns.

The biggest winners in the FCC's recent "HF Phone Band Expansion" ruling are actually some CW operators! Technicians with code credit and Novices will now have access to the full General Class CW bands on 80, 40, 15, and 10 meters. W6BNB offers tips for fun and success on CW to help new and experienced code operators alike get the most fun from their privileges.

CW Can Be Fun!

BY BOB SHRADER,* W6BNB

You may find this hard to believe if you're not a Morse code aficionado, but CW operating can actually be a lot of fun! Radio amateurs who know the finer points of operating CW get a lot more fun out of contacts than those whose CW training may have been insufficient. Let me tell you some of the secrets of good sending and copying code.

Four Types of QSOs

First, however, hams have four types of QSOs on the air. Each type may be by radiotelegraph (CW), radiotelephone (SSB, AM, FM), or with various digital keyboard forms of communication. While each form may be very different, they do have similar basics. The emphasis here will be on explaining CW operating, since talking into a microphone is not much of a challenge, nor is typing on a keyboard. However, proper CW operating *is* a challenge, and beating challenges is what makes life enjoyable! Our four different types of QSOs are:

(1) DXing. This is contacting stations in states or countries other than your own. It involves sending and receiving RST reports, QTHs, operator names, maybe grid numbers, county names, FISTS numbers, etc., and possibly exchanging QSL cards. Answering DX CQs should be made about 50 Hz above or below the frequency used by the CQing station. If two or three stations are both zero-beat with the station sending the CQ, their calls may be unreadable. Your signal, 50 Hz away, may be the only one the DX station can read. DX contacts may last perhaps two to ten minutes or more. If the DX station is involved in a pile-up, probably only callsigns, names, and RST reports should be exchanged. Often only minimal time is taken for these contacts to give other amateurs a chance to latch on to a desirable DX contact. It is smart to call a DX station zero-beat on the frequency of any station signing clear of that DX station. The DX station will already be tuned to that frequency. (Tune your VFO to the frequency of the other station and use your RIT [Receive Incremental Tuning] to comfortably tune in the DX station on your receiver.)

(2) Contesting. In these QSOs only the other station's call and any special contest information will be exchanged. Contacts are usually made on the other station's frequency and should last as short a time as possible, normally without requests for QSL cards. If a station calls CQ and says "Up," it means he will be listening for answers higher in frequency than the frequency he is using. In this way he is probably lowering the possibility of answering stations being zero-beat with one another. An exchange of QSLs may result in some cases. (Contest DXpeditions often have QSL information posted on the internet; QSL managers for selected DX stations are listed monthly here in *CQ*. See the DX column.)

(3) Rag-chewing. This includes not only social conversations, but also may involve discussions on technical radio or other subjects. Operating with CW, or any other mode, the first thing is the exchange of RST, QTH, and operator name. QSOs usually continue with an exchange of information about equipment used, RF power output, and antennas. These are of interest to enable comparisons of received signals. After covering basic items, there is always the weather to get things started. From that point on, subjects discussed will go in diverse directions. Good rag-chew QSOs are usually a lot of fun and may last from perhaps 15 minutes to well over an hour if enough subjects of common interest are found to talk about. Perhaps QSLs will be exchanged. Many such QSOs are very interesting and worthwhile. A few may even develop into long-time friendships. Rag-chewing stations should always operate zero-beat or exactly on the same frequency.

(4) Net operating. Nets allow many stations to intercommunicate and also free many frequencies on the band during net times. Nets are set up at specific times, days, and frequencies. All members should be exactly on the Net Control Station's frequency, even if it is not the assigned one. Some nets use an existing list of stations that are called in order to transmit, or the NCS may open up a net to establish a calling list of stations for that day, after which the list is announced. After a member has had his say, he may return operations to the NCS, or may sign over to the next member on the announced list. Operating speed should be one that can be copied by all members.

While the suggestions that follow are mostly for ragchewing, DXers, contesters, and net participants may find many of the communicating basics useful to them.

Why Some QSOs Fail

When trying to start up a rag-chew QSO with another station on CW, if the other

e-mail: <w6bnb@aol.com>

operator signs off almost immediately with some unlikely excuse, it might be because of something you are doing. Could it be that your sending is not being copied because it is too fast? Could you be sending too slowly for the other operator? Are you making too many mistakes? Are your abbreviations not being understood? While these all are possibilities, there is also the chance that there may be a lot of interference at the receiving operator's end and the sending operator is not aware of it. In a few cases some operators are just not interested in sending and receiving anything other than the RST, QTH, name, and 73 and will not get involved in a rag-chew.

Sending Speed

If you happen to be the faster sending operator in a QSO, try to determine the highest speed at which the other operator can copy well. The first call should be a speed clue. Usually new operators are not able to copy well at a speed any faster than they can send. The opposite may be true of older, experienced operators. If the other operator's sending is poor, respond at a slower speed. If you ask questions that are not answered, your sending is probably too fast. Keep slowing down and asking questions until answers are received. Continue operating at that speed. It is only human nature for operators not to admit they can't copy as fast as the other operator is sending. Except in contests, speed in amateur contacts usually is not too important. A few minutes more or less is not going to make much difference in a rag-chew QSO.

Trying to send faster than you can copy solidly can get you into trouble. Better operators will usually send at the speed of the code being received. If slower receiving operators try to send faster than they can receive well, the other operator may come back at that higher speed and trouble results! When operators try to send with any kind of a key at speeds faster than they can copy, it usually will result in poor sending. Letters are broken or badly made, letters are run together, words are run together, or words are broken up by improper spacing of the letters. These all are things most poor operators do. Many fast senders are not good operators!

What can you do if the other person is not a good operator? Slow your sending in hopes the other operator will do the same and it will thereby produce better sending. If an operator does not

slow down without being told to, tell him "QRS" (send slower). With slowed sending, you may suddenly find that you are in an interesting QSO.

Machine sending, using a key board, should not be at higher speeds than a hand-sending operator is using, unless it is known that the other operator can copy at high speeds. Most operators using keys to respond to fast machine sending may try to send too fast and produce copy that is unreadable for the machine. Many better operators can copy machine sending very well at 40, 50, or more wpm but can only send well with a bug or keyer at perhaps 15 to 35 wpm. It is interesting that some good keyboard operators can copy in their heads what is being sent to them by poor senders who are producing unreadable code on their monitor screens.

There are many old-time operators who are used to sending at 30 wpm or more, but become careless and run their letters and words together. Even if they are requested to space better, or to QRS, in no time at all they will be back up at a higher speed and will be running things together again. Be patient with some of the true old timers up in their 80s and 90s. They usually have a lot of interesting information they can pass along if you can slow them down to a speed that is readable!

When an operator cannot copy what is being sent, it is hard to make sensible answering comments and the desire to end the QSO (to "QRT") will be strong. If an operator is sending too fast, or the sending is poor, the QRS signal should be used. If told to QRS by an obviously good operator, it indicates that your sending is not good. Hopefully at a reduced speed the readability of your sending will improve!

If someone calls CQ at a high speed, don't answer at a low speed unless it is a DX station. Operators normally call at a speed at which they would like to operate. However, many better operators are willing to give slower operators practice and will rag-chew at a reduced speed if asked to QRS. They should be able to remember when they too were slower at receiving once and how they appreciated others slowing down for them. In this case, the better operators should concentrate on using the best operating procedures, making letters perfectly and spacing well as teaching examples. If operators who have had little proper training pay attention, good operating procedures will rub off on them. All amateurs should try to pick up good communicating ideas whenever listening to better operators. It is too bad that many of our Elmers, bless them all, may never have learned to communicate properly on CW. In many cases, new amateurs must learn good operating by what they hear on the air.

When a CQ is heard, answer at that speed if you can. Many faster operators call CQ at a slower speed than they are capable of using. If you are capable of sending good fast code, never send slower than you know the other operator can copy easily. When answering a CQ, unless you know the other operator, send the calling station's callsign followed by your callsign at least twice and space adequately between them. This confirms that the receiving operator has the proper sender's callsign. Always sign twice, because QRM from other stations or QRN radio noises can break up one or more characters of a call, even with strong signals.

Signing Calls Needlessly!

Something that will help a QSO is not wasting time sending your callsign needlessly. Once a QSO is under way, it is only required to transmit your callsign once every 10 minutes and at the end of the contact. Don't send the other station's callsign after the first contact, unless the signals are very weak or transmitters are drifting in frequency. Many beginners send multiple callsigns of both stations at every sign-on and sign-over. That is just a waste of time! If transmissions in a QSO last only a couple of minutes, it will not be necessary to send calls at all when signing over. Ask a question or make a statement and send "K" ("Over" on 'phone), meaning "I am turning it over to you." When transmissions are 5 to 10 minutes long, sign your call at every sign-over. If a transmission is going to exceed 10 minutes, stop at 10 minutes, send "DE" and your callsign, and resume your transmission. Operators appreciate your using their name instead of their callsign when you come back to them. It is always the courteous thing to add the other station's callsign when signing off. It is required when handling international third-party traffic.

It is handy to have some sort of timing device to indicate when you have been sending for 10 minutes. If a wind-up or electronic timer is used, set it to 10 minutes every time you start transmitting. When it "dings" send "BK" (break), "DE" and your callsign, and then continue on.

Zero-Beating and Using "QRL?"

Few operators seem to know how to adjust their transmitters to the frequency of the station they are working, which is known as "zero-beating." If a separate receiver and transmitter are used, tune the received signal to a zero-beat (whistle tone goes down to zero). Then key and tune your transmitter to a similar zero-tone. The two signals are now zero-beat. There are other ways to zero-beat signals, but one method should be mastered. With some transceivers if the beat tone of the received signal is tuned to the tone of the CW monitor oscillator, the two transmitters will be on the same frequency. Some transceivers have a special switch position that allows you to zero-beat without transmitting. When learning how to zero-beat, check with other stations to see if you are actually doing it properly. If two stations use digital readouts, ask the other station his frequency and adjust your frequency to that one. If two CW stations are within perhaps 20 Hz of one another this is probably okay. If they are over 150 Hz apart, they will be taking up two usable places on the band. This may result in QRM developing on one or both of the frequencies as the two stations continue communicating. Other stations using narrow-band CW filters may be looking for a free frequency, and hearing the frequency of your transmitter is not being used, may send "QRL?" (Is this frequency in use?). (Incidentally, never send "QRL" when you mean "QRL?". QRL without the question mark says, "This frequency is in use; do not transmit on it," which is not what you wanted to ask!) If no answer is heard within about five seconds after a "QRL?" is sent, it should be assumed the frequency *is free to use.*

Break-In Operation

All CW operators should use "break-in" operating whenever communicating by CW, if their equipment is capable of it. When you send "QSK," it means "I can hear signals between my dots and dashes." If receiving operators miss one or two important words, they should send a one-second dash to break the sending operator. If sending operators are using QSK and a breaking tone is heard, they should stop their sentence and send "BK K." This tells the receiving operator that the break signal was heard and to advise why the break signal was sent. The receiving operator then sends the last word received correctly followed by either "K" or "AA," meaning "All After." Once operators learn to use QSK correctly, they usually never want to go back to non-break-

in operation. However, when using QSK with weak signals, the background noise can be quite high. If the RF gain is reduced it will help, but if it is reduced too much it requires very careful listening to hear a weak breaking signal.

With some transceivers there may be a control perhaps labeled "Full/Semi" and another "VOX." If both VOX and Full are energized, it may provide excellent CW QSK operation. If set to "Semi," it may only provide good radiotelephone break in. If VOX is operating correctly with 'phone, when the operator pauses to take a breath or hesitates between words or sentences, his transmitter switches off and his receiver switches on. If the VOX hangs on too long, an adjustment of the "VOX delay" control can be made. If someone starts transmitting on the frequency being used, the operator will hear it between the switching of the transmit/receive relay and can stop to find out what that station wants. Different manufacturers may use different terms than those given here.

"Light" Dots

CW may sound poor and may be more difficult to copy if the dots are too "light" (short). Light dots are difficult to hear in heavy noise. It will help to adjust a keyer, if it has a "weight" control for its dots, or screw in the dot contact adjustment on a bug a little to produce heavier dots. So-called perfect code letters have the duration of dots, in multiple-dot letters, exactly equal to the spaces between the dots and dashes. This can be checked with an oscilloscope set to show transmitted signals. The length of *most* of a dot should be equal to the distance between the off-time between dots. Another method is to connect a keyer or bug across an analog ohmmeter while sending a series of five dots or more. The needle of the ohmmeter should rise and jitter back and forth at center scale. Under noisy receiving conditions, dots that drive the needle up to less than half-scale may be harder to hear. If the needle reads somewhat past mid-scale, it indicates that heavier and easier-to-read dots are being made.

Some transmitters may have built-in keying filters that round off the tops of dots and dashes so the transmitted signal does not put out "key clicks." At higher speeds it shortens the dots, and even perfectly set dots from keyers, bugs, or keyboards will transmit lighter than desirable dots at high speeds. To overcome this, it will be necessary to readjust dot contacts to produce longer dots than normal.

Correcting Errors

Few CW operators properly correct their sending errors. Whenever a mistake is made in sending a letter or word, they should stop sending. If the mistake is in the middle of a word, stop, send an error sign (8 dots, or a question mark or two, or three double-spaced dots, or anything that is not a readable character), and then return to the beginning of the word and resend that whole word correctly. (On computer monitor screens the three slow dots register as "e e e" for "error error error.") There is no other proper way of correcting such errors. Adding a dot a little late to an "R" to make it an "L" doesn't do it. Resending a broken letter doesn't do it. If the last two letters of a word are butchered, never just repeat sending the two last letters correctly. You may hear all of these on the air!

Whenever a mistake is made on the first letter of a word, stop, make an error sign, then resend the whole last correctly sent word and continue on. These are the only ways to correct errors in sending so that the other operator is assured of receiving information in its correct form. Correcting errors is most important when handling CW messages and important information. Practice correcting errors properly. So it takes a little longer to send an error sign and make a proper correction. . . . Is the additional time really going to matter, particularly if it means the other operator will more assuredly understand what you are saying?

Abbreviations

Abbreviations or contractions should be used with caution. There are probably only a relatively few abbreviations that will be recognizable to beginning operators. On the other hand, hundreds or maybe thousands may be known and used by old-time operators. Experienced operators should be careful about abbreviating words when sending to anyone who is obviously untrained or relatively new to CW.

It is generally accepted that hams will abbreviate by dropping out most of the vowels of common words, sending only the consonants. Thus, "wrld" would be "world," "nw yrk" would be "New York," "hpe" would be "hope," "tks" or "tnx" would be "thanks" ("x" can also mean "trans," as in xmtr). However, "Wd" might be "wood" or "would." Which is it? It may take time for a slower receiving operator to decide what was meant. Do not overwhelm less-experienced operators with a lot of abbreviations. They may become confused. When this happens, you may be told all of a sudden that the other operator's XYL wants him to do something for her and that he has to QRT. More often than they know, XYLs are used as excuses in ham radio when the OM wants to get out of a QSO. Of course, it works with the opposite gender, too!

Abbreviations can be very confusing if the transmitting operator is sending poorly. Anyone who knows he is stumbling along and sending poorly should not use abbreviations. Also, be careful abbreviating words common to your work or hobby. Operators who know a lot about aircraft can easily floor most of us due to our lack of knowledge of what is common aircraft terminology, particularly if they abbreviate such words. Computer experts can lose the untrained among us when they not only send computerese terms, but then abbreviate them! It would be wise to find out something about the other operator's background before using anything other than common abbreviations. If there is any question in your mind about the use of abbreviations, spell out the whole words; it doesn't take much longer. Use few if any abbreviations with foreign amateurs unless *they* are using them. In many cases, if all English words are spelled out in a QSO, it can provide very helpful spelling practice for foreign CW amateurs trying to learn English.

The Phillips Code

An old time list of abbreviations used by land-line telegraph operators called the "Phillips Code" was used by news and other telegraphers in the late 1800s and up into the 1900s. It had recognized abbreviations for over 5,000 English words which could be really handy if the operators at both ends of a circuit were familiar with them. Telegraphers sending at 30 wpm using Phillips Code could produce 70 to 100 wpm of typed copy, if the receiving operators could type that fast! In the past, when hams hooked up with some of the old time telegraphers who liked to use a lot of Phillips code abbreviations to any extent, they were in trouble.

Examples of a few simple single-letter Phillips Code words are: B = be, C = see, H = has, M = more, N = not, R = are, U = you, W = with, Y = year.

Besides 1-letter abbreviations there are 5 pages of 2-column listings of 2-letter Phillips Code words. A few of these are: BK = break, CQ = correct, DB = debate, GF = gulf, HV = have, MO = month, MR = mister, MS = most, SG = signify, SA = senate, TK = take, XB = exorbitant, XL = excel, ZD = said, ZM = seem.

CW operators may recognize that they use some of the Phillips Code words. Many of those abbreviations do not make sense to us. However, most of the abbreviations are not likely to be guessed in the 50+ pages of small-font 3- and 4-letter Phillips Code words!

Types of Interference

"QRM" means interference by things such as radio stations, or by unwanted TV-receiver and computer-generated radio signals.

"QRN" means static from lightning, local power line "leaks" (sparking), electric fences, automobile ignition, or any other electrically generated pulsing noises at a receiving location. QRN may make weaker signals hard to read, even if the sending is good and the receiving operator is quite capable. Digital signal processing (DSP) circuits can often help to clear up some QRM and QRN noises. Receiving conditions at the transmitting end may vary greatly from those at the receiving end. A distant receiving operator may be experiencing crashes of static and other noises that are blocking out letters, or even whole short words at higher code speeds. These noises may not be heard at all by a transmitting operator if he is 500 or miles away. When there are many strong static crashes, receiving operators should send "QRS QRN" so that the crashes of static will take out only parts of slower speed letters rather than one or more letters. It is fairly easy to guess a garbled received word if only one or two letters are obliterated. It may be impossible if there are any more missing, particularly if abbreviated words are being broken up. When the best speed is determined under strong QRM and QRN conditions, don't exceed that speed and use few if any abbreviations! This is where QSK (or VOX on 'phone) operation can be very useful.

Keyboarding CW

If a keyboard is used to transmit CW, amateurs copying by ear know it is perfect code. But if the sender's typing is poor, there may be many incorrectly typed letters, incorrectly spelled words, or the improper spacing of letters may make two or three meaningless words out of one long word. Knowing how to handle a keyboard at speeds of 25 wpm and higher requires good typing ability. It is very disconcerting for an operator

to hear what should be a perfect keyboard transmission turn out to be one that is shot through with misspelled words, unwanted extra letters, missing letters, incorrectly struck letters, perhaps interspersed with some incorrectly typed abbreviations, plus long spaces between letters in words! On the other hand, with some practice, keyboarding can produce perfect code transmissions. To do this, "touch typing" usually must be learned. To use a keyboard properly, an operator should be able to touch type well at perhaps 50 wpm to be able to transmit at 25 wpm without errors. This speed allows the sender to observe any errors he makes as they show up on his monitor screen, allowing him time to back space and correct the mistake before it is actually transmitted. If no time is available, use either EEE or XXX as an error indicator and resend the word correctly and continue.

Copying in Your Head

This is what makes copying CW fun. Believe it or not, learning to "copy code in your head" is one of the best ways to increase your receiving speed! Copying code letters onto paper with a pencil or pen is a necessity for all beginners. However, as soon as possible you should learn to "copy behind." Instead of writing down each letter as soon as it is heard, concentrate on waiting until the next letter is recognized before printing the letter before. With self-discipline it becomes fairly easy to copy one letter behind. To learn to copy two letters behind requires a lot more self-discipline and is much harder, as is copying three or four letters behind. By the time two or three letters can be copied behind, whole short words are being held in memory and do not have to be written at all. With time, longer words are held in memory. When whole sentences can be held in memory without writing anything, except jotting down some short notes, the person has learned to copy in his head and is well on the way to becoming a good CW operator!

Copying in your head makes CW very enjoyable. An operator should be able to get up and walk around the room while listening to CW on the loudspeaker. (Get rid of earphones as soon as possible.) It should be the goal of every CW operator to never have to use pens or pencils when in a QSO! As a guess, perhaps half of the amateurs who can copy at 18 wpm have learned to copy behind by at least one letter. Of course, to copy messages to be delivered to someone, it is necessary to print each word of the message by hand, on a typewriter, or with a word processor. When you learn to copy one or two *words* behind before printing or typing them—and that ain't easy—then you will have joined the ranks of the really good CW operators! You also will be surprised at how fast you can now send and receive!

Improving Your Fist

If you have not been sending for a few days, weeks, months, or years, warm up your sending fist before getting on the air. Keep a copy of the following pasted up in front of you somewhere. Practice sending these off the air until you can send them without error:

PACK MY BOX WITH FIVE DOZEN LIQUOR JUGS – 1234567890
THE QUICK BROWN FOX JUMPS OVER A LAZY DOG – 0987654321

Both sentences contain all of the letters and numbers plus the dah-di-di-di-dah "dash" that is used as almost the only punctuation needed, except question marks, in ham CW rag-chews. It takes the place of periods and para-

graph breaks, and is used as a time killer while an operator is thinking of what to say next. This is good warm-up practice, regardless of what kind of key you use. Be sure to space between letters and use twice as much spacing between words!

If a straight key is used, check the movements of your hand and wrist. If the wrist goes down as the key is closed, the sending is with the whole forearm. If the wrist goes up when the key is closed, the sending is with only the fingers, hand, and wrist and is much less tiring. If the arm tires in 5 to 10 minutes of sending, the sending is probably with the forearm. If sending with fingers, hand, and wrist, it is no problem to send for an hour or more without tiring. This is accomplished by resting the forearm on the operating table, placing the tip of the index finger on the far edge of the flat knob (just a little past the 12-o'clock position), and swinging the other three fingers up and down as a pendulum to make the dots and dashes. It is very easy when you learn to do it properly.

When using any of the paddle-type keys, such as an electronic keyer, a bug, or a "sideswiper" ("double-speed" or "cootie" key), send not only by moving the thumb and first finger, but roll the hand and wrist while making the dots and dashes. Rest the end joint of the little finger on the table top while sending. This produces more solid contacts and makes sending easier over a longer period of time. Take the advice of someone who has been practicing and teaching how to send CW properly for many decades!

Interesting Subjects

What are some of the ways of producing interesting rag-chews? First, keep asking questions of the other operator. The more other operators can be kept talking about things they know, the more likely both of you are to enjoy the QSO. Some of the common beginning subjects mentioned before were weather, transmitters, receivers, power, and antennas. Then there are keys used, radio gear being worked on, clubs you belong to, age (well, maybe not with YLs!), work, family, home, vacations, hunting, fishing, other sports, cars, trailers, motor homes, airplanes, trips made, trips planned, past and up-coming holidays, and so on. Short, funny stories can add a lot to a QSO, but if they are about politics, religion, or sex, they might not be appreciated by some receiving operators!

Summing up, use common sense when sending, send at the proper speed for yourself and the other operator, send at a constant speed, don't break up letters or words, correct your errors properly, learn to zero beat, use "QRL?" correctly, use QSK, use slightly heavy dots, be careful about abbreviations, use keyboards properly, improve your fist, choose interesting subjects when rag-chewing—and above all, learn to copy in your head! If you can learn to do most of these things, you will be rewarded with many pleasurable and interesting CW rag-chews and contacts!

Announcing:

2007 Nominations Open for the *CQ* Amateur Radio Hall of Fame

Amateur radio operators have been responsible for many advances in communications technology, and entire industries have been built on the foundation of amateur radio experimentation and activity. In an effort to recognize outstanding amateurs and their achievements, and help the public appreciate the far-reaching and long-standing value of amateur radio in our society, we have established the *CQ* Amateur Radio Hall of Fame. Nominations for the 2007 "class" are now open. Members of the 2006 "class" were announced last May and appeared in the July issue of *CQ*.

The *CQ* Amateur Radio Hall of Fame honors those whose technical or other accomplishments have helped propel amateur radio forward, or whose achievements in other areas of life have helped improve ham radio's reputation simply through association. Nominees for the *CQ* Amateur Radio Hall of Fame will be judged on the basis of qualifying in one of two broad areas: those individuals—whether licensed amateurs or not—who have made significant contributions to the amateur radio hobby; and those radio amateurs who have made significant contributions to society in general. Nominees must have made *significant* contributions of nationwide or worldwide impact.

Nomination Period Closes March 31

Between now and March 31, 2007, we will be accepting nominations for the 2007 "class" of the Amateur Radio Hall of Fame. Nominations received after that date will be considered for future selection. You may either use the form on the following page or on our website, or simply write us a letter stating your candidate's name, where to contact him/her if still living, for which category you are nominating him/her, and a brief one- to two-paragraph description of this person's accomplishments. Please include your name and contact information as well. E-mail to <hall-of-fame@cq-amateur-radio.com> or mail to *CQ* Amateur Radio Hall of Fame, 25 Newbridge Rd., Hicksville, NY 11801. If you feel someone has earned this recognition, please submit a nomination. Please *don't* assume that someone else will nominate the person you may have in mind.

We'll be making up our own candidate list at the same time, and will announce this year's selections at the Dayton Hamvention in May 2007. Please help us recognize these "ham radio heroes" whose contributions have helped shape our hobby, our nation, or our world.

(Official nomination form is on the next page.)

CQ DX and Contest Halls of Fame

Nominations are also open for the **CQ DX Hall of Fame** and the **CQ Contest Hall of Fame**, which recognize those amateurs who have made major contributions to DXing and contesting, respectively. The activities and accomplishments that qualify one for membership in these elite groups involve considerable personal sacrifice and can usually be described by the phrase "above and beyond the call of duty."

Nominations for the Contest and DX Halls of Fame are made by **contesting or DX clubs or national organizations,** and must be submitted by **March 1** of each year to be considered. A maximum of two (2) people may be inducted into each hall of fame each year. Nominations for the CQ Contest and DX Halls of Fame should be directed to Bob Cox, K3EST, c/o CQ Communications Inc., 25 Newbridge Rd., Hicksville, NY 11801; or via e-mail to <k3est@cqww.com>.

CQ Amateur Radio Hall of Fame Nomination Form

The purpose of the CQ Amateur Radio Hall of Fame is to recognize individuals who have made significant contributions to the amateur radio hobby, and/or radio amateurs who have made significant contributions to society at large.

Name of Person Nominated:_____

Callsign (if licensed amateur/if multiple callsigns, list most recent): _____

If your nominee is still living and you know how to contact him/her, please supply the following contact information:

Mailing address: _____

City: _____ State/Prov. _____ Zip/Postal Code:_____

Country: _____

Phone: _____ Fax: _____

E-mail address:_____ @ _____

Please write a brief (one to two paragraph) description of this person's accomplishments/achievements and why you feel he/she should be elected to the CQ Amateur Radio Hall of Fame (if you need more room please attach a separate piece of paper):

Nominator Information

(This is only for the purpose of contacting you in case of questions, and will not be published.):

Your name: _____ Callsign: _____

Mailing address: _____

City: _____ State/Prov. _____ Zip/Postal Code:_____

Country: _____Phone: _____Fax: _____

E-mail address:_____ @ _____

AMERITRON mobile *no tune* Solid State Amp

500 Watts, Instant bandswitching, no tuning, no warm-up, SWR protected, 1.5-22 MHz . . . NEW! ARI-500 Amplifier Radio Interface reads transceiver band data -- automatically bandswitches ALS-500M amp . . . NEW! ALS-500RC Remote Head gives total remote control!

ALS-500M
$849
Suggested Retail

Just turn on and operate -- no warm-up, no tuning, instant bandswitching. Compact.

Ameritron's ALS-500M solid state *mobile* amp gives you 500 Watts PEP SSB or 400 Watts CW output! Covers 1.5-22 MHz, (10/12 Meters with MOD-10M, $29.95 kit, requires FCC license).

Virtually indestructible! *Load Fault Protection* eliminates amplifier damage due to operator error, antenna hitting tree branches, 18-wheeler passing by. *Thermal Overload Protection* disables/bypasses amp if temperature is excessively high. Auto resets.

Typically 60-70 watts in gives full output. ON/OFF switch bypasses amplifier for "barefoot" operation. Extremely quiet fan comes on as needed. Excellent harmonic suppression, push-pull output, DC current meter. 13.8 VDC/80 Amps. 3½x9x15 inches. 7 lbs.

Choose ARI-500 for fully *automatic bandswitching* or ALS-500RC for *manual* remote control.

***New* ARI-500, $119.95**, *Amplifier Radio Interface* reads band data from your transceiver so you can *automatically bandswitch* your ALS-500M amplifier. *See right inset.*

***New* ALS-500RC, $49.95**, *Remote Head* lets you mount ALS-500M amplifier *anywhere* and gives you full *manual remote control*. Select desired band, turn On/Off and monitor current draw on its DC Current Meter. Power, transmit and overload LEDs. RJ-45 cables plug into Amplifier/ Remote Head. Works with serial numbers above 13049 (below 13049 requires the ARF-500K, *see below*).

ALS-500M, $849, 500 Watt mobile amp.

ALS-500MR, $879, ALS-500M mobile amp *plus* ALS-500RC *Remote Head*.

ARF-500K, $179.95, Remote kit for older ALS- 500M mobile amps with serial # below 13049. Includes filter/relay board for ALS-500M, AL-500RC Remote Head, cables, hardware, instructions.

ARF-500K2, $289.95. Includes ARF-500K Remote kit for older ALS-500Ms ***plus*** ARI-500 *Amplifier Radio Interface* below.

Let your rig *auto bandswitch* your ALS-500M Amplifier

ARI-500
$119.95
Ship Code A

The Ameritron ARI-500 *Amplifier Radio Interface* reads band data from your Icom, Yaesu, Kenwood or Alinco transceiver so they can remotely and automatically bandswitch your ALS-500M amp. Lets you mount your ALS-500M out-of-the-way in your trunk. Works with serial numbers above 13049 (below 13049 requires the ARF-500K, *see above*). You can add the ALS-500RC for manual bandswitching and data monitoring, etc, *see left description*.

Programmable Screwdriver Antenna Controller

10 Memories . . . Super Accurate . . . AutoPark™ . . . StallProtector™ . . . Super bright LEDs

Tuning your mobile screwdriver antenna couldn't be easier or more reliable!

The SDC-102 lets you save *10* of your favorite screwdriver antenna positions in memory -- that's more than enough for all HF bands. Then, with a push of a button, you can quickly return to any saved position.

Up/Down buttons let you manually move the antenna to any desired position. A 4-digit turns counter gives you precise antenna position -- you can see its *super bright LEDs* even in direct sunlight!

Returning to a position from memory is extremely accurate for three reasons . . .

A. The antenna always moves to its desired position from the bottom, insuring that the motor is always loaded the same.

B. Ameritron's exclusive *AutoPark™* feature automatically bottoms your antenna for parking in your garage and *resets and calibrates* your counter each time to eliminate antenna slippage and turns count errors.

New!
SDC-102
$119.95
Suggested Retail

C. The momentum of the moving antenna causes it to overshoot its stop point. Ameritron's exclusive *Dead-OnSTOP™* feature automatically reverses the motor briefly just before it stops to eliminate overshoot and come to a precise stop.

Ameritron's exclusive *StallProtector™* feature prevents your expensive motor from burning out. Automatically detects motor stall and completely shuts off power to motor.

Monitor motor current on LEDs for signs of trouble and to determine stall current.

If you wire the motor backwards, you can reverse its direction from the SDC-102 front panel so the UP button is always up and the DOWN button is always down.

Compatible with single and dual magnetic turns sensors. Requires 12 VDC.

3½Wx3¼Hx1¼D inches.

SRS-100, $29.95. Magnetic sensor kit for High Sierra antennas to use SDC-102.

SRS-1001, $9.95. Magnetic sensor kit for Hi-Q Antennas to use SDC-102.

1.2 kW Screwdriver Antenna

SDA-100
$379
Suggested Retail

SDA-100 lets you operate 3.5 to 30 MHz continuous with six foot whip at full 1200 Watts PEP.

World's most rugged screwdriver antenna features . . . super heavy-duty commercial Pittman 12 Volt gear motor . . . stainless steel/ aircraft aluminum CNC machined components . . . 2-inch machine groove fiberglass coil form with 14-gauge wire wound at 8 turns per inch . . . built-in magnetic sensors . . . super durable Lexan cover . . .

SWP-100, $24.95. 6-ft stainless whip.
SDM-100, $99. Stainless steel mount.
Saves $16.85! **SDA-110, $478.** Includes SDA-100, SDC-100, SWP-100.

Flat Mobile Wattmeter

AWM-35
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Announcing:

The 2007 CQ World-Wide WPX Contest

SSB: March 24–25, 2007 CW: May 26–27, 2007
Starts: 0000 GMT Saturday Ends: 2359 GMT Sunday

I. Period of Operation: 48 hours. Single Operator stations may operate 36 of the 48 hours. **Off times must be a minimum of 60 minutes in length.** Multi-Operator stations may operate the full 48 hours.

II. Objective: The object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. No WARC bands allowed. **Observance of established band plans is strongly encouraged.**

IV. Terms of Competition (for all categories): All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score. Only the entrant's callsign may be used to aid the entrant's score. **A different callsign must be used for each entry**. Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant. All high power categories must not exceed 1500 watts total output power on any band. No self-spotting of any form on DX spotting nets is permitted for any category. Self-spotting is defined as generating packet spots for your contest callsign by: (a) using your own callsign; (b) spotting your call while using another callsign; or (c) the spotting of your callsign by other stations as a result of prearranged solicitation.

Categories: *Note*—CATEGORY and CATEGORY-OVERLAY** names for use in the CABRILLO file header are shown in (italics).

1. Single Operator (Single Band and All Band) *(SINGLE-OP ALL HIGH or SINGLE-OP [BAND] HIGH)*

(a) One person performs all of the operating, logging, and, for the Assisted category only, spotting functions. Only one transmitted signal is allowed at any time. **Maximum power allowed is 1500 watts total output.**

(b) Low Power: *(SINGLE-OP LOW or SINGLE-OP [BAND] LOW):* Same as 1(a) except that output power shall not exceed 100 watts. Stations in this category will compete only with other low power stations.

(c) QRP *(SINGLE-OP ALL QRP or SINGLE-OP [BAND] QRP):* Same as 1(a) except that output power shall not exceed 5 watts. Stations in this category will compete only with other QRP stations.

(d) Assisted/with Packet *(SINGLE-OP-ASSISTED ALL HIGH or SINGLE-OP-ASSISTED ALL LOW):* Same as 1(a) except the passive use (no self-spotting) of DX spotting nets or other forms of DX alerting is permitted. Stations in this category will compete only with other Assisted stations.

****The next two categories shown below require an additional line in your Cabrillo logfile header called CATEGORY-OVERLAY. See paragraph XIV(d).**

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

(f) Rookie *(ROOKIE)***: To enter this category you must have been licensed as a radio amateur three (3) years or less on the date of the contest.

2. Multi-Operator (All band operation only, high power only)

(a) Single-Transmitter *(MULTI-ONE)*: Only one transmitter and one band permitted during the same time period (defined as 10 minutes). **Exception: One other band may be used during any 10-minute period if the station worked is a new multiplier. Use a separate serial number sequence for each band. Logs found in violation of the 10-minute rule will be automatically reclassified as multi-multi. Maximum power allowed is 1500 watts total output. Your log MUST show the correct serial number sent and received for each contact.**

(b) Multi-Two *(MULTI-TWO)*: A maximum of two transmitted signals at any time on different bands. Both transmitters may work any and all stations. A station may be worked only once per band regardless of which transmitter is used. Use a separate serial number sequence for each band and include a unique identifier for each transmitter. Each of the two stations may make a maximum of 8 band changes in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. **Maximum power allowed is 1500 watts total output.**

(c) Multi-Transmitter *(MULTI-MULTI)*: No limit to transmitters, but only one signal (and running station) allowed per band at any time. Use a separate serial number sequence for each band. *Note:* All transmitters and receivers must be located within a 500-meter diameter area or within property limits of the station licensee, whichever is greater. All operation must take place from the same operating site. **Maximum power allowed is 1500 watts total output.**

V. Exchange: RS(T) report plus a progressive contact three-digit serial number starting with 001 for the first contact. (Continue to four digits if past 999 and five if past 9999.) **Your log MUST show the correct serial number sent and received for each contact.**

VI. Contact Points:

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

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

(c) Contacts between stations in the same country are worth one (1) point regardless of band.

VII. Prefix Multipliers: The prefix multiplier is the number of valid prefixes worked. A PREFIX is counted only once regardless of the number of times the same prefix is worked.

(a) A PREFIX is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. Example: N8BJQ operating from Wake Island would sign N8BJQ/KH9 or N8BJQ/NH9. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (W8, K8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. Example: PA/N8BJQ would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes. **You may not make up your own prefix.**

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

VIII. Scoring (QSO Points):

1. Single Operator: (a) All Band score = total contact points from all bands multiplied by the number of different prefixes worked (prefix multiplier; prefixes are counted only once). (b) Single Band score = total contact points on the band entered multiplied by the number of different prefixes worked (prefix multiplier).

2. Multi Operator: Scoring is the same as Single Operator, All Band.

3. A station may be worked once on each band for QSO point credit. Prefix credit may be taken only once.

IX. QRP Section: Single Operator only. **Output power must not exceed 5 watts. You must note QRP in the header of your Cabrillo file**, or in the case of non-Cabrillo logs, on the summary sheet and state the actual maximum output power used for all claimed contacts. Results will be listed in a separate QRP section and certificates will be awarded to each top-scoring QRP station in the order indicated in Section XI.

X. Low Power Section: Single Operator only. **Output power must not exceed 100 watts.** You must indicate low power in the header of your Cabrillo file, or in the case of non-Cabrillo logs, on the summary sheet and state the actual maximum output power used for all claimed contacts. Results will be listed in a separate low power section and certificates will be awarded to each top-scoring low power station in the order indicated in Section XI.

XI Awards: Certificates will be awarded to the highest scoring station in each category listed under Section IV . . .

1. In every participating country.

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

All scores will be published. To be eligible for an award, a single operator station must show a minimum of 12 hours of operation and multi-operator stations must show a minimum of 24 hours of operation.

A single-band log will be eligible for a single-band award only. If a log contains more than one band, it will be judged as an all-band entry unless specified otherwise.

In countries or sections where entries justify, second- and third-place awards will be made.

XII. Trophies, Plaques, and Donors:

SSB

Single Operator, All Band

WORLD – Stanley Cohen, W8QDQ
USA – Atilano de Oms, PY5EG
EUROPE – Jim Hoffman, N5FA
SOUTH AMERICA – Ron Moorefield, W8ILC
OCEANIA – Phillip Fraizer, K6ZM Memorial
AFRICA – Peter Sprengel, PY5CC
JAPAN – The DX Family Foundation
WORLD Low Power – Caribbean Contesting Consortium
CANADA Low Power – Contest Club Ontario
USA Low Power – Terry Zivney, N4TZ
WORLD QRP/p – Phil Krichbaum, NØKE
NORTH AMERICA QRP/p – Phil Krichbaum, NØKE
USA QRP/p – Doug Zwiebel, KR2Q
USA ZONE 4 HIGH POWER - Society of Midwest Contesters
USA ZONE 4 LOW POWER - Society of Midwest Contesters

Single Operator, Single Band

WORLD – Steve Merchant, K6AW
WORLD 28 MHz – Alan Dorhoffer, K2EEK Memorial
WORLD 7 MHz – William D. Johnson, KVØQ
USA 21 MHz – Bernie Welch, W8IMZ Memorial
USA 3.7 MHz – Lance Johnson Digital Graphics
USA 14 MHz Low Power – Boomer Contest Club

Multi-Operator, Single Transmitter

USA – Steve Bolia, N8BJQ
USA ZONE 4 – Society of Midwest Contesters
ASIA – W2MIG Memorial (NT4TT Sponsor)

Multi-Operator, Two Transmitter

WORLD – Doris Wong, AG1RL

Multi-Operator, Multi-Transmitter

WORLD – Gail Schieber, K2RED
USA – Rick Dougherty, NQ4I

Contest Expedition

WORLD – Kansas City DX Club

CW

Single Operator, All Band

WORLD – Steve Bolia, N8BJQ
USA – Dennis Motschenbacher, K7BV
EUROPE – Ivo Pezer, 5B4ADA/9A3A
OCEANIA – Tom Morton, K6CT
CANADA – Radio Amateurs of Canada (RAC)
JAPAN – The DX Family Foundation
WORLD LOW POWER – Caribbean Contesting Consortium
CANADA LOW POWER – Contest Club Ontario
USA LOW POWER – Terry Zivney, N4TZ
WORLD QRP/p – Phil Krichbaum, NØKE
NORTH AMERICA QRP/p – Phil Krichbaum, NØKE
USA ZONE 3 HIGH POWER – Jim Pratt, N6IG
USA ZONE 4 HIGH POWER – Society of Midwest Contesters
USA ZONE 4 LOW POWER – Society of Midwest Contesters

Single Operator, Single Band

WORLD 7 MHz – William D. Johnson, KVØQ
WORLD 3.5 MHz – Lance Johnson Digital Graphics
USA – Kansas City DX Club
USA 28 MHz – Bernie Welch, W8IMZ Memorial
USA 21 MHz – Wayne Carroll, W4MPY

Multi-Operator, Single Transmitter

WORLD – Ron Blake, N4KE
ASIA – W2MIG Memorial (NT4TT Sponsor)
USA ZONE 4 – Society of Midwest Contesters

Multi-Operator, Multi-Transmitter

WORLD, Steve Merchant, K6AW

Contest Expedition

WORLD – Steve Bolia, N8BJQ

Combined SSB/CW

Single Operator, All Band

WORLD – Al Slater, G3FXB Memorial

Club (SSB & CW)

WORLD – *CQ* Magazine

A station winning a World trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up for that area if the returns justify the award. Contestants who win a category for which no trophy is sponsored may contact <k6aw@cqwpx.com> to arrange to order one.

XIII. Club Competition: A trophy will be awarded each year to the club that has the highest aggregate scores from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area (exception: DXpeditions specially organized for operation in the contest and manned by members). Indicate your club affiliation on the summary sheet or in the CABRILLO file. To be eligible for an award, a minimum of three logs must be received from a club.

XIV. Instructions for Submission of Logs:

(a) All times must be in GMT. All breaks must be clearly marked (not required for CABRILLO logs). Single operator and multi-single logs must be submitted in chronological order. Multi-Two logs must be submitted chronologically by band. Multi-multi logs must be submitted chronologically by band.

(b) All sent and received exchanges are to be logged. **Logs without sent and received serial numbers will be reclassified as checklogs.**

(c) Electronic submission of logs is the expected method for all participants. It is required for all top-scoring entrants, for anyone wishing to compete for an award, and for all who use a computer to log the contest or prepare contest logs.

(d) Instructions for CABRILLO logs—IMPORTANT: Please put only your callsign in the Subject: field of the e-mail used to send your CABRILLO log. For U.S. stations, please also indicate your ARRL Section in the CABRILLO header. The CABRILLO file format is the standard. Do not rely on your logging program; use a text editor (Wordpad, Notepad, DOS Edit—no word processors) to make sure all of the CABRILLO header information is there, including the extra line in the header for CATEGORY-OVERLAY if you are entering the TB-WIRES or ROOKIE categories. Also be sure to indicate your club affiliation. For detailed instructions on filling out the CABRILLO file header, see the WPX Contest website (www.cqwpx.com). Failure to fill out the header correctly can result in your entry being placed in the wrong category or reclassified as a checklog. Please do not mail printed copies of CABRILLO logs, as these are of no use to anyone.

(e) E-mail is the expected method of log submission. SSB CABRILLO logs should be sent to **<ssb@cqwpx.com>** and CW CABRILLO logs should be sent to **<cw@cqwpx.com>**. All logs received via e-mail will be confirmed via e-mail. A listing of logs received can be found on the CQ WPX website at <http://www.cqwpx.com> and will be updated frequently.

(f) Instructions for NON-CABRILLO logs: If you are not able to submit a CABRILLO log, you may submit the ASCII output from most of the popular logging programs such as TR, CT, NA, Writelog, and SuperDuper. You may also submit the *.BIN, *.DAT, *.QDF files from CT, TR, or NA. If your log is not in CABRILLO format, a separate summary sheet is required. Please name your files with your call and the file type. Example: N8BJQ submits a CABRILLO file. It should be named N8BJQ.LOG. If N8BJQ chose to submit a non-CABRILLO file such as TR's .Dat file, he should name the log file N8BJQ.DAT and the summary file should be N8BJQ.SUM. See <www.cqwpx.com> for more information on e-mail log formats. Any logs sent on floppy disk should be on 3.5-inch diskettes and sent in a proper mailer to prevent damage. Non-CABRILLO Logs must be checked for duplicate contacts, correct QSO points, and prefix multipliers. Duplicate contacts must be clearly marked. An alpha/numeric check list of claimed PREFIX multipliers must be submitted with your log. Each non-CABRILLO entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS. Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

(g) Official log and summary sheets are available from CQ Communications, Inc., 25 Newbridge Road, Hicksville, NY 11801 USA; fax (+1) 516-681-2926); or are available on the CQ website: <www.cq-amateur-radio.com>. You may make your own forms as long as all required information is present.

XV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSOs or multipliers will be deemed sufficient cause for disqualification. An entrant whose log is judged by the WPX Contest Committee to contain an excessive number of discrepancies may be disqualified as a participant operator or station for a period of one year. If within a five-year period the operator is disqualified a second time, he or she will be ineligible for any CQ contest awards for three years.

Declaration: By submitting an entry in the CQ WPX Contest you agree that you have read and understood the rules of the contest and agree to be bound by them, as well as all rules and regulations of your country which pertain to amateur radio. All actions and decisions of the WPX Contest Committee are official and final.

XIII. Deadline: All entries must be postmarked NO LATER than May 1, 2007 for the SSB section and NO LATER than July 1, 2007 for the CW section. All logs, including e-mail entries, are subject to these deadlines. Indicate SSB or CW on your envelope. Logs postmarked after the deadline may be listed in the results, but will be ineligible for any awards.

Check the WPX website <http://www.cqwpx.com> for instructions on mailing WPX logs. Questions pertaining to the WPX Contest may be e-mailed to the WPX Contest Director, Steve Merchant, K6AW, <k6aw@cqwpx.com>.

Every LDG Electronics Product has a Two-Year , "No Questions Asked" Warranty

Your Power Problems— Solved!

New! The Multi-DC, a 12 Volt DC Distribution Box

The provided cables have the right coaxial DC power plug to connect to all your LDG products. The Multi-DC can source up to three amps; each of the six outputs can provide up to .5 amps to your LDG accessories. The Multi-DC comes with an input cable, and six output cables, each 3 feet long.

The six outputs are organized in three groups of two. Each pair is internally regulated to 12 vdc, thermal protected and short-limited; a short circuit just shuts down the regulator and turns off that output. So, with the Multi-DC, you can easily and safely power your LDG tuners and accessories (with more coming, by the way!).

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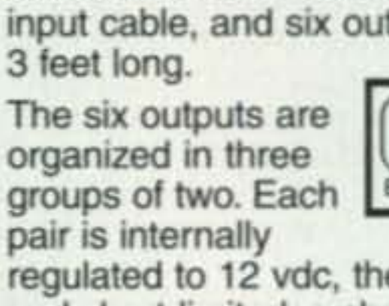
List Price $49



"The Forward Power is 112 Watts"

The "Talking" Watt Meter

The TW-1 Talking Wattmeter provides an aural spoken indication of power and SWR using a digitally recorded voice. It is ideal for the vision-impaired, for those of us in the "bi-focal set", or just for those times when you need to be looking somewhere else. At the press of a button, the TW-1 speaks the forward power, reverse power or SWR. Three languages are available: English, Spanish and German. It includes its own internal speaker; no external audio hookups are needed. Also available the TW-2 for UHF/VHF.

List Price $149

Your Eye Strain Problems — Solved!

Yaesu's popular FT-857 and FT-897 transceivers are wonders of compact efficiency. These do-anything, go-anywhere transceivers were science fiction just a few years ago, but ham's today are using them in shacks, mobiles and on expeditions from the back yard to the top of the world.

The FT-Meter presents a lush, highly readable 2.5" meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit.

LDG ELECTRONICS 2 YEAR WARRANTY

Each function is selectable from the radio's menu.

Easily visible from anywhere on your desk or dash, the FT-Meter is illuminated by any external 12 vdc source.

The FT-Meter comes fully assembled and ready to go; just plug it into the radio and you're in the picture like never before.

List Price $49

Your Cable Problems— Solved!

RCA-14 is a breakout box for the accessory jacks on most popular transceivers. It comes with cables with the right DIN plugs, and all the outputs are blessedly simple RCA jacks. You simply plug the RCA-14 into your radio's accessory jacks, and all your ports are right there at your fingertips; just plug and play, one function or all of them, makes no difference. And, you can changes things around as often as you like; it's as simple as swapping out an RCA plug.

The RCA-14 comes with a DIN 13 cable, a mini DIN 6 and a mini Din 8. The DIN 13 cable breaks out the functions to RCA jacks 1 - 13, while the mini DIN 6 goes to RCA 1 - 6, and the mini DIN 8 goes to RCA 7 - 14.

You can use the DIN 13 or the mini DIN 6 and/or 8, depending on your radio.

The RCA-14 is compatible with: Icom 703, 706, 718, 746, 756, 7000 and 7800, Yaesu 817, 857, 897 and 840, Kenwood 480, 570, 2000 Ten Tec Orion and many more radios.

List price $59

The DTS Series

Antenna Switches

Tired of that tangled mess of coax and pigtails in your shack? Always worrying about whether you set the ground switch on your antenna before you left your snack? LDG's new DTS Series antenna switches are for you. Instantly switch your rig between 4 or 6 antennas with the press of a button. Auto-grounding when you shut your rig down. Purchase the additional remote control and put the DTS Series switch anywhere indoors and operate it from your desk. They handle up to 1500 watts of RF power on HF (250W on 6M), and can be used with any coax-fed antenna.

List Price DTS-4 $79, remote $39
DTS-6 $99, remote $49

AT-897 for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897 Autotuner mounts on the side of your FT-897 just like the original equipment. We even added the ability to mount the "feet" on the side of the tuner so when you are transporting your rig by the handle, you can safely set it down and not worry about scratching the case. The AT-897 takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so if you are using another CAT device, hooking it up couldn't be easier.

List Price $199

No Questions Asked! Every LDG Product comes with our industry leading 2-Year warranty on the performance of your product. Just contact us to let us know your problem and we will repair or replace your product—**NO QUESTIONS ASKED!**

LDG ELECTRONICS 2 YEAR WARRANTY

Now! With All of the Cables Included - Nothing More to Buy
The First Autotuners with True Plug and Play Simplicity.

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 and 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. **Now we are including all of the necessary interface cables with every tuner we sell.** No more getting your new tuner home and not having the right interface cable—**everything you need is included in the box!**

Sign Up For Our New Electronic Newsletter

Visit: www.ldgelectronics.com

Z-11Pro

The Return of a Legend.

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.

With 8,000 memories in LDG's exclusive "3-D Memory" array, 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. ***Ready to go right out of the box! No extra cable to buy.***

List Price $179

AT-200Pro

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 MH **(including 6 meters)**.

Ready to go right out of the box! No extra cable to buy.

List Price $249

LDG ELECTRONICS **2 YEAR WARRANTY**

AT-100Pro

Automatic Antenna Tuner

This desktop tuner covers all frequencies from 1.8 – 54 MHz **(including 6 meters)**, and will automatically match your antenna in no time. It features a two-position antenna switch, allowing you to switch instantly between two antennas. The AT-100Pro requires just 1 watt for operation, but will handle up to 125 watts. The AT-100Pro includes over 2,000 memories for each antenna, automatically storing tuning configurations for each frequency and band as you use them.

List Price $219

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.

Tune with the AT-7000 or use your radio. Includes over 2,000 memories, uses latching relays, tuning range is 4-800 ohms, powered by your radio. Includes ICOM interface cable.

List Price $169

AT-200PC

The First Automatic Tuner Designed Specifically for PC Rig Control

Now you can have a state-of-the-art, high performance automatic tuner and still run your whole station right from your keyboard and mouse. LDG's AT-200PC is a special version of the popular AT-200Pro, designed for PC control. All of its functions are controlled entirely by a program running on your PC. The tuner itself can be installed out of the way, on the floor or even in another room, interfacing to your PC via a serial or USB cable.

List Price $259

AT-1000

An Autotuner for use with your amplifier!

No more knob spinning or inductor rolling. Tunes your antenna in 1 to 8 seconds when you QSY either in the same band or to a different band! Easy installation and use makes this the choice for any Amateur Radio Operator with an amplifier.

Power rating HF (1.8 to 30 MHz): 1000 Watts Single Side Band, 750 Watts CW, 500 Watts Digital (RTTY, Packet, etc.) **including 6 meters**. ***Ready to go right out of the box! No extra cable to buy.***

List Price $599

Z-100

The definitive low cost automatic antenna tuner!

Designed from the ground up to provide the 100 watt power handling you asked for, in a small, lightweight package, perfect for portable as well as sitting on your desk in your shack!

The Z-100 will tune with 0.1 to 125 watts (50 watts on 6 meters), making it an excellent choice for almost any radio or operating style. Backpackers and QRP operators will appreciate the latching relays. Power can be removed from the tuner once you have tuned. Additionally, when the tuner is not tuning, it draws nearly zero amps. ***Ready to go right out of the box! No extra cable to buy.***

List Price $149

Contact Your Favorite Dealer to Purchase

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math's notes

BY IRWIN MATH,* WA2NDM

Temperature Measurements

First, I would like to wish a very happy and healthy New Year to all of my loyal readers. I sincerely hope that this is the year when all of those dreams and wishes you have had for so long really do come true. Always remember, you never know what a new year (or tomorrow, for that matter) will bring!

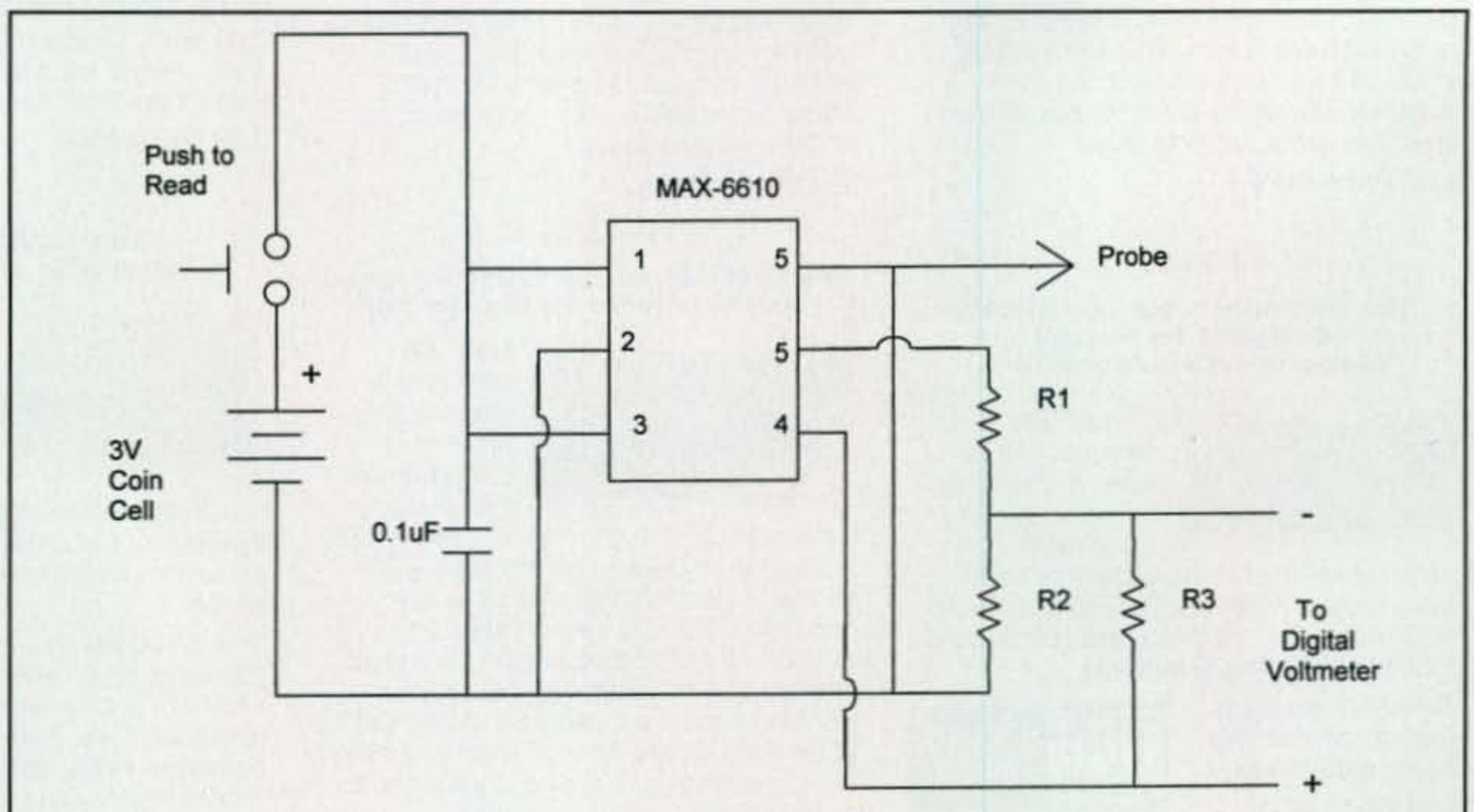
A short while ago we described a couple of chips that could be used to implement simple temperature sensors. This month we would like to elaborate on this subject by describing an interesting temperature measuring device that can be used to check the temperature of various components in homebrew equipment during the bread-boarding stage to help avoid situations that could cause premature failure. The device is based on a chip manufactured by Maxim Integrated Circuits and described in a design note published in the September issue of *ECN Magazine* and authored by two engineers from Maxim, A. Saab and B. Pham.

The chip is the MAX6610, and it can be used to implement a complete temperature sensing probe with either a Fahrenheit or Centigrade scale by the choice of three resistors and a capacitor. For a readout, the device utilizes a common digital voltmeter, and for a power supply a 3-volt lithium "coin" cell. The overall range of the temperature probe is in the neighborhood of –40 to +125°C and the battery life is extremely long.

Fig. 1 is a schematic of the temperature probe. As you can see, the circuit is quite simple and straightforward, so you should not hesitate to try to build one. The chip comes in a tiny SOT-23 package, and as a result, you can build the entire probe in a very small package. The resistor values will have to be chosen for the range you wish, and you will notice that they are not standard values. To maintain the accuracy of the basic design, though, you should really try to get as close as possible to the values shown. The 68.1K resistor can be selected from a handful of 68K devices, the 2.8K from two 5.6K resistors in parallel, the 2.21K from a handful of 2.2K devices, the 3.32K resistor from a handful of 3.3K devices, and the 19.6K from a 20K resistor in parallel with a 1-megohm resistor.

Be sure to use either carbon film resistors or 1206 surface-mount devices and your ohmmeter for final trimming. The 1206 devices are not as tiny

*c/o CQ magazine



Range	R1	R2	R3
1 mv/C	68.1K	2.8K	2.21K
1 mv/F	68.1K	19.6K	3.32K

Fig. 1– Schematic diagram of the temperature probe.

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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.

Features

- Lightest and most compact 1kW HF amplifier in the industry.
- The amplifier's decoder changes bands automatically with most ICOM, Kenwood, Yaesu.
- The amp utilizes an advanced 16 bit MPU (microprocessor) to run the various high speed protection circuits such as overdrive, high antenna SWR, DC overvoltage, band miss-set etc.
- Built in power supply.
- AC 230V (200/220/240V) default and AC 115V, (100/110/120V) (selectable).
- Equipped with a control cable connection socket, for the HC-1.5KAT, auto antenna tuner by Tokyo Hy-Power Labs.
- Two antenna ports selectable from front panel.
- Great for desktop or DXpedition!

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Specifications

Frequency:
1.8 ~ 28MHz all amateur bands including WARC bands and 50MHz

Mode:
SSB, CW, RTTY

RF Drive:
85W typ. (100W max.)

Output Power:
HF 1kW PEP max., 930W CW (typ.)
50MHz 650W PEP max.

Matching Transceivers for Auto Band Decoder:
Most modern ICOM, Yaesu, Kenwood

Drain Voltage:
53V (when no RF drive)

Drain Current:
40A max.

Input Impedance:
50 OHM (unbalanced)

Output Impedance:
50 OHM (unbalanced)

Final Transistor:
SD2933 x 4 (MOS FET by ST micro)

Circuit:
Class AB parallel push-pull

Cooling Method:
Forced Air Cooling

MPU:
PIC 18F452 x 2

Multi-Meter:
Output Power – Pf 1Kw
Drain Voltage – Vd 60V
Drain Current – Id 50A

Input/Output Connectors:
UHF SO-239

AC Power:
AC 230V (200/220/240V) – 10A max. (default)
AC 115V (100/110/124V) – 20A max.

AC Consumption:
1.9kVA max. when TX

Dimension:
10.7 x 5.6 x 14.3 inches (WxHxD)/272 x 142 x 363 mm

Weight:
Approx. 20kgs. or 45.5lbs.

Accessories Included:
AC Power Cord
Band Decoder Cables included for Kenwood, ICOM and Yaesu
Spare Fuses and Plugs
User Manual

Optional Items:
Auto Antenna Tuner (HC-1.5KAT)
External Cooling Fan (HXT-1.5KF for high duty cycle RTTY)

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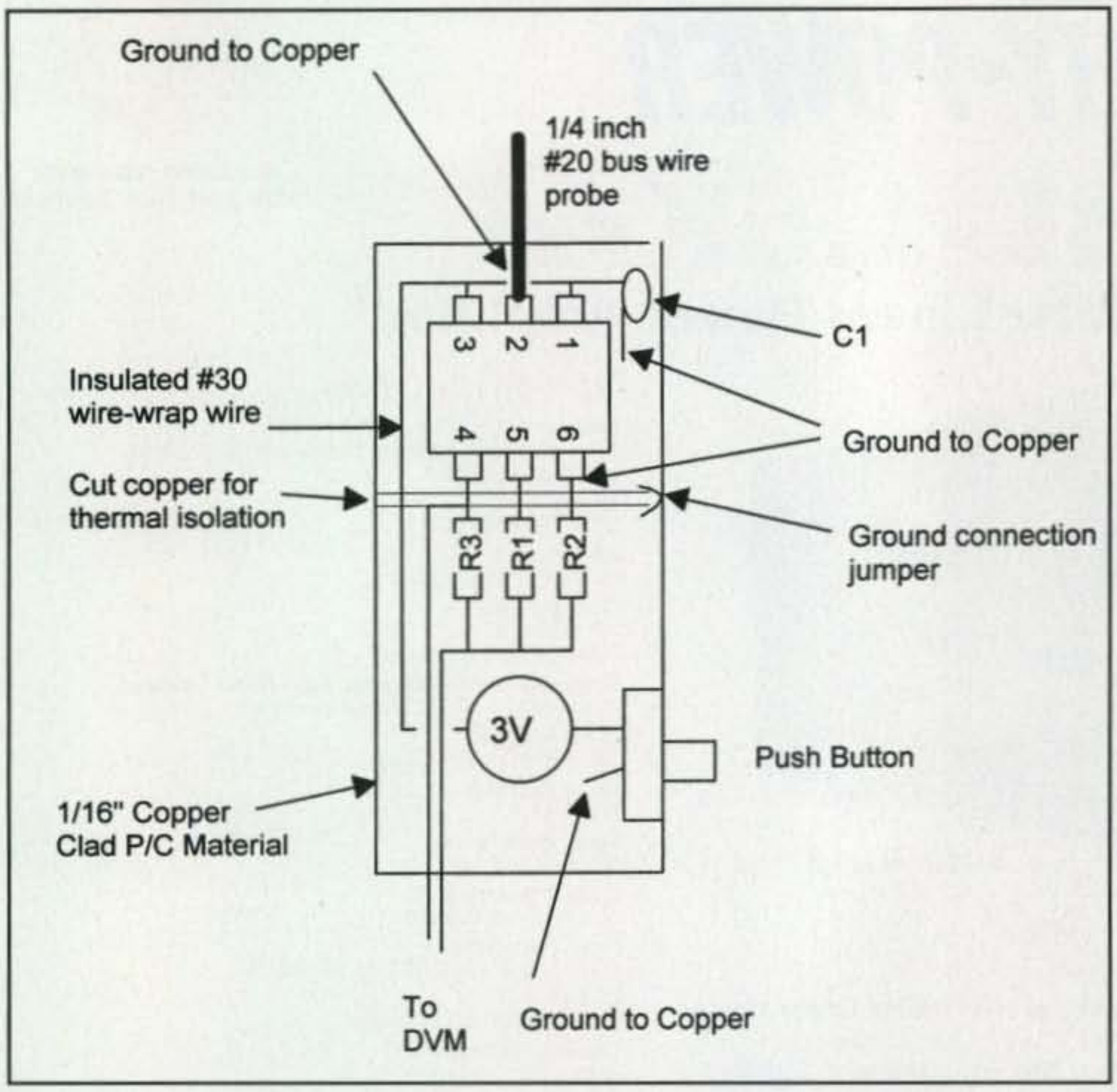
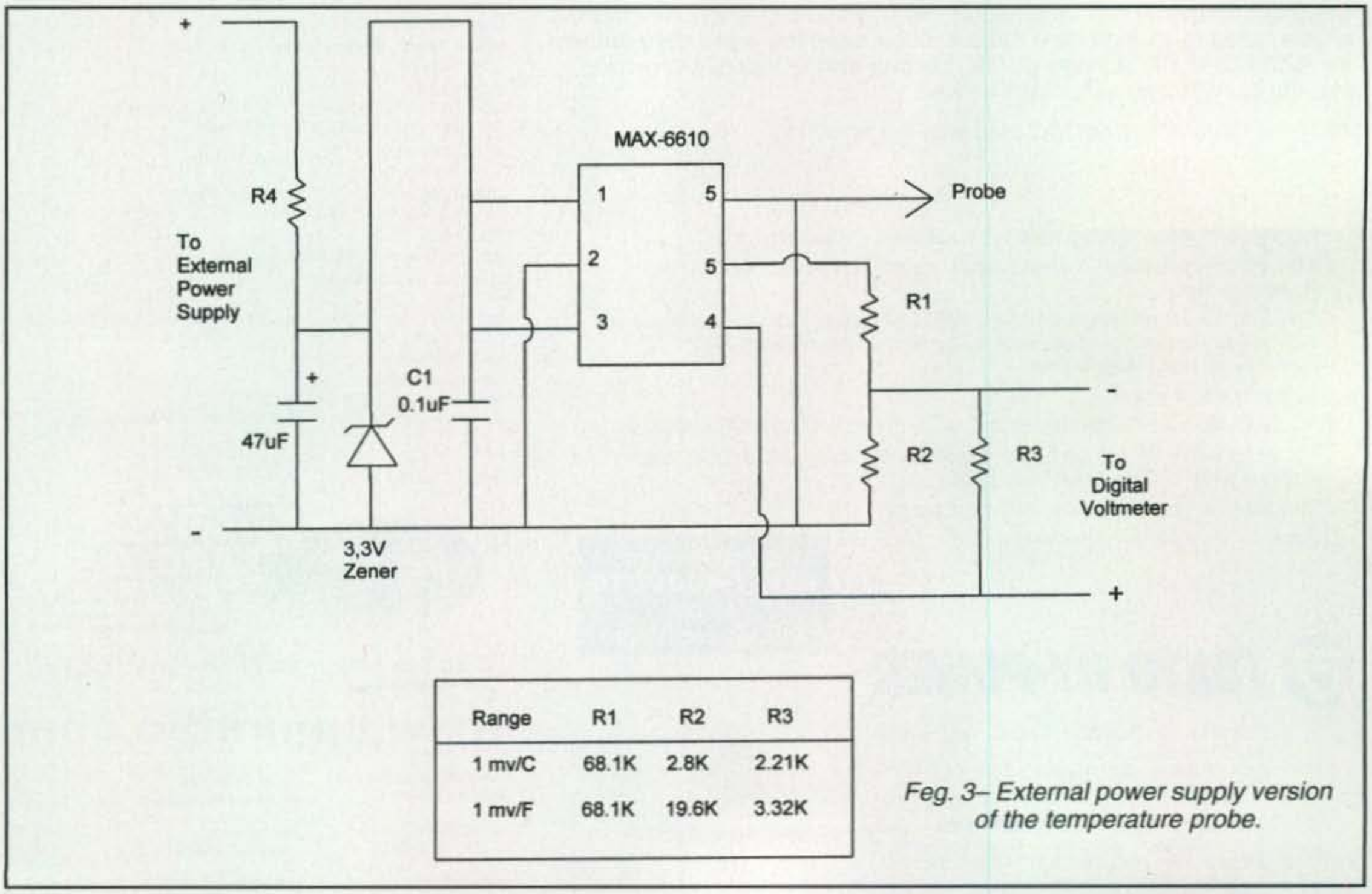


Fig. 2– Suggested layout of components.

as you might suspect and are easy to work with. Since there are so few parts in the entire design, none of this should be a real effort, and as a bonus you will learn about surface-mount parts as well.

The 0.1-µF capacitor should be a ceramic type (1206 surface-mount devices for this also exist, by the way), and the battery should be a common 3-volt lithium coin cell such as the CR2330 or its many cousins. You will also need a small push-button switch and a holder for the battery. Since current drain is extremely low (only 150 to 200 microamperes), battery life will be quite long, since current will only be drawn from the battery when the switch is pushed.

Fig. 2 is a suggestion for a layout. We used a small piece of one-sided copper-clad printed circuit board material, but you can use whatever you might have on hand. Don't be afraid to improvise. The MAX6610 is very tiny, but if you are very careful, you can solder to it using a small, low-wattage soldering iron and a 1/32-inch pointed tip of the type used for surface-mount components. We do it all the time, and it really doesn't take too long to learn the technique. If you wish to use connecting wires, use the #30 insulated material designed for



Range	R1	R2	R3
1 mv/C	68.1K	2.8K	2.21K
1 mv/F	68.1K	19.6K	3.32K

Feg. 3– External power supply version of the temperature probe.

wire-wrap applications. A desk-lamp magnifier will also come in handy here if your eyesight is anything like mine!

The temperature-sensing portion of the probe is a short length of #20 bare "bus wire" and is soldered to one of the ground pins of the chip or to the copper area to which the chip is soldered. This "probe" is used to conduct heat from the component you are measuring directly to the MAX6610. The chip is the sensor as well as the conversion part (temperature to voltage) of the circuitry.

Remember, fig. 2 is only a suggestion. Use your imagination here. Try to keep the mass of the probe/chip/copper as small as possible so that there is not too much thermal lag while making a measurement. You want the whole chip to reach the temperature you are measuring as quickly as possible.

When you have built the circuit to your satisfaction, you only have to connect your DVM (digital voltmeter), press the button, and read the temperature. If you have selected the Centigrade version, each millivolt read on the meter will be equal to one degree Centigrade. Room temperature at 25°C will read 25 millivolts. The Fahrenheit version works in a similar manner. In this instance, room temperature at 75°F results in a reading of 75 millivolts. Since most DVMs have a 200-millivolt as well as a 2-volt range, you can select the resolution you wish simply by changing the range switch on the meter. Temperatures below zero, by the way, will be read as negative numbers. Ten below zero, for example, will be indicated as –10 millivolts. It couldn't be easier, could it?

The exact same circuit can also be used as a thermometer. Just mount the circuit (less the #20 bus wire probe extension) where you wish to sense the temperature and connect the DVM. For those who want a more permanent, battery-less circuit, replace the 3-volt coin cell with a simple power supply as shown in fig. 3. The external power supply can be whatever voltage you have available, and the value of R4 can be calculated from the following formula:

R4 = (Voltage available – 3.3)/0.01

Use the closest standard value.

That's about it. Have fun, and since it is still January, those in the Northeast can simply move the circuit from the oven to outdoors to check on its operation. Those in more temperate climates will have to rely on the refrigerator!

73, Irwin, WA2NDM

What You've Told Us...

Our October survey asked about your logging and award-tracking practices. Despite the fact that the FCC has not required hams to log their contacts for 30 years, 94% of you said you still keep a log, and 72% of you log all contacts. In addition, 14% log all contacts made from your home station, 5% log contacts of interest, 4% those that may result in a QSL card, and 2% each log only DX contacts or those contacts that may be useful for awards.

In answer to our question of why you keep a log, 84% of you responded, "to keep track of stations I've contacted," while 55% use their logs to keep records of QSL cards sent and received, 38% use them to keep records of progress toward operating awards, 35% keep a log in case of complaints or questions about station operation and 30% log contest contacts. Finally, 10% have some other reason for keeping a log.

We were frankly surprised by the number of you who use only paper logs—47%—while 30% use a combination of paper and computer logging and only 18% of you log by computer only. Among those of you who do use computer logging, 70% use commercial logging software, while 13% use a shareware program, 11% use a program you've written yourself, and 9% use a combination of program types. In addition 49% do all logging on one program while 41% use a separate contest logging program, 3% use a separate VHF/UHF program and 7% use another specialized logging program.

Finally, we asked how you track qualified contacts for operating awards. The largest group of respondents—34%—said you don't chase operating awards, while 32% rely on paper record-keeping, 30% use your general logging program and only 6% use specialized award-tracking software.

This month's free subscription winner is David Benton, WB4JGG, of Cleveland, Tennessee.

Reader Survey January 2007

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month's Public Service column highlights a major policy change by the American Red Cross, which is now requiring all volunteers—including hams in many cases—to authorize a background check as a condition of working with the organization. This follows well-publicized problems with in the group's response to Hurricane Katrina in 2005. We'd like to get your feelings on the matter.

Please answer by circling the appropriate numbers on the reply card.

1. Have you ever provided amateur radio communications services to the Red Cross at a disaster or other event?
Yes....1
No....2

2. Have you ever been registered as a Red Cross volunteer?
Yes, in connection with ARES deployment....3
Yes, as general volunteer....4
No....5

3. Are you a member of/volunteer with any of the following emergency communications groups (circle all that apply)?
Amateur Radio Emergency Service (ARES)....6
Local emergency management agency (including RACES)....7
Skywarn (National Weather Service)....8
Salvation Army Team Emergency Radio Network (SATERN)....9
Other emergency communications group....10
None....11

4. Should ARES members be required to register as Red Cross volunteers when ARES is working with the Red Cross as a served agency?
Yes....12
Depends on the situation....13
No....14
No opinion....15

5. The American Red Cross now requires all prospective employees and volunteers to undergo a criminal background check and to authorize additional background checks, including a credit check (which it says would only be conducted on people dealing with money or suspected of wrongdoing). How do you feel about this policy?
Agree that it is needed....16
Agree that it is needed for employees, but not for volunteers....17
Criminal history check is OK but credit check goes too far....18
Criminal history check is OK for all, but only employees should be subject to credit check....19
The whole thing is unnecessary....20
No opinion....21

6. How will this new policy affect your willingness to register as a Red Cross volunteer, either generally or in conjunction with communication services provided through ARES?
I would not agree to these conditions, even if it means not helping....22
I would want assurances about what checks would be conducted before agreeing....23
No problem; I have nothing to hide....24
I wouldn't be volunteering with the Red Cross regardless....25
Don't know....26

7. How do you think this policy will affect the ability of the Red Cross to get the volunteers it needs, both generally and through ARES?
It will shrink the pool of willing volunteers....27
It should have no impact on the number of people volunteering....28
It will encourage more people to volunteer, since they'll have some assurances about the integrity of the people they're working with....29
No opinion....30

8. As an amateur radio volunteer have you submitted to a background check for another organization? If so which one?
No....31
Emergency Management (including RACES)....32
Scouting....33
Salvation Army....34
Other....35

Thank you for your responses. We'll be back with more questions next month.

Tell "Santa" you want a Holiday Gift that Keeps Giving, Receiving and Transmitting!

The ARD9000 Mk2 and ARD9800 are both great gifts because there's "no assembly required" to start having fun. No radio modifications are necessary and it works with any brand of transceiver.

Clip this ad and leave it for your favorite "elf" to find.

It's like adding a whole new mode to your HF operation without needing a new radio!

With a few quick connections, you can be part of the digital voice excitement that's sweeping the SSB bands. Once you hear the audio quality, you'll be a believer! Whenever these digital voice modems are demonstrated, looks of amazement pass through the crowds.

Using the open G4GUO protocol, the ARD9000 Mk2 or ARD9800 allows any ham to convert an existing HF analog transceiver to work digital voice in one easy step! The unit automatically detects digital signals and decodes them, but you also maintain full analog capabilities. Whether a contact comes in as digital or analog, the ARD9000 Mk2 and ARD9800 can handle it.

It's a real breakthrough in communications technology that uses the same audio frequencies (300 Hz ~ 2500 Hz) as microphone audio to transmit digital SSB voice signals.

'Tis the season to help your favorite ham (even if that's yourself) enjoy the clean, clear audio that makes HF digital so much fun!

- NO transceiver modifications necessary
- Digital voice communications using existing analog transceivers
- Works on Single Side Band (SSB) mode.
- Automatic digital receive
- Optional interface cables for most popular transceivers
- Built-in high grade Vocoder (AMBE)
- Built-in FEC protocol
- Compact unit. Easy to operate.
- Utilizes a uniquely designed high performance DSP engine
- Uses the established G4GUO open protocol
- ARD9800 can also be used for digital slow scan TV and data transmissions (images require optional memory board)

Be sure to check the website at www.aorusa.com for FAQs, links to user groups and more!

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Announcing:

The 2007 CQ World-Wide RTTY WPX Contest

February 10–11, 2007

Starts: 0000 GMT Saturday Ends: 2400 GMT Sunday

Logs are due no later than March 9, 2007

I. Period of Operation: Single Operator stations may operate only 30 hours of the 48-hour contest period. Off time periods must be a minimum of 60 minutes in length and must be clearly marked on the Summary Sheet. Multi-Operator stations may operate the entire 48-hour contest period.

II. Objective: The object of the contest is for amateurs around the world using RTTY to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 3.5, 7, 14, 21, and 28 MHz bands may be used. No 1.8 MHz or WARC bands. **Observance of established band plans is strongly encouraged.**

IV. Terms of Competition (for all categories): All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score. Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant. All high power categories must not exceed 1500 watts total output power on any band. Only the entrant's callsign may be used to aid the entrant's score. RTTY (Baudot) mode only. No unattended operation or contacts through gateways or digipeaters are permitted.

Any form of DX alerting assistance is permitted in ALL categories.

V. Categories:

1. Single Operator (Single Band and All Band)

(a) Single Operator stations are those at which one person performs all of the operating, logging, and spotting functions. Only one transmitted signal is allowed at any time.

(b) Low Power: Same as 1(a) except that (i) output power is 150 watts or less and (ii) only All Band entrants may enter the Low Power category. Stations in this category compete with other Low Power stations only.

(c) Rookie: An entrant in this category shall, at the time of the contest, have been licensed as a radio amateur for three years or less. If you are entering this category, please indicate on your Summary Sheet.

2. Multi-Operator (All Band operation only)

(a) Single-Transmitter: Only one transmitted signal at any time. Limited to 6 band changes in any clock hour (0 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. Violation of the 6-band change rule will result in reclassification to the Multi-Multi category.

(b) Multi-Two: A maximum of two transmitted signals are allowed as long as each transmitter is on a different band. Each of the two transmitters is limited to 6 band changes in any clock hour (0 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. Violation of the 6-band change rule will result in reclassification of the entry to the Multi-Multi category. Each transmitter must keep a chronological log containing its own serial numbers and unique transmitter identifier (0 or 1 in the Cabrillo format).

(c) Multi-Transmitter: No limit to transmitters, but only one signal and running station allowed per band.

3. SWL: SWLs are required to log the callsigns of both the heard and correspondent station. Scores are based only upon the heard station, using the same rules as transmitting stations. Correspondent callsigns may not appear more than three times per band in your log.

VI. Modes: Baudot only. No unattended operation or contacts through gateways or digipeaters permitted.

VII. Exchange: RS(T) report plus a progressive contact three-digit serial number starting with 001 for the first contact. (Continue to four digits if past 999.) Your log MUST show the correct serial number sent and received for each contact.

VIII. Serial Numbers and Identification of Transmitters: Single Operator log entries must contain a progressive three (or four) digit serial number sequence starting with 001 for the first contact. Multi-Two log entries must follow the same serial number scheme for each transmitter separately, and identify the transmitter (0 or 1) that makes each QSO. Multi-Transmitter (Multi-Multi) log entries must follow the same serial scheme as Single Operator log entries, but use separate serial numbers for each band.

IX. QSO Points:

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

2. Contacts between stations on the same continent but in different countries, and contacts with maritime mobile stations, are worth two (2) points on 28, 21, and 14 MHz and four (4) points on 7 and 3.5 MHz.

3. Contacts between stations in the same country are worth one (1) point on 28, 21, and 14 MHz, and two (2) points on 7 and 3.5 MHz.

X. Multiplier: The multiplier is the number of "valid" prefixes worked. A prefix is counted only once regardless of the number of times the same prefix is worked.

1. A prefix is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, AB8, DL5, DJ2, HG1, WD200, WF96, 3DAØ, GB75, ZS66, U3, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation the portable designator will then become the prefix. Example: AB5KD operating from Wake Island would sign AB5KD/KH9 or AB5KD/NH9. American DX (KL7, KH6, KP2, KH3, etc.) operating within the 48 states must sign with a full designator of their choice. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (W8, K8, etc.). United States portable stations are not permitted to select a portable prefix designation. For example, WS7I/2 is permitted, but WS7I/WY2 or WS7I/KZ2 is not. Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form a prefix. Example: N8BJQ/PA would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

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

XI. Scoring:

1. Single Operator: (a) **All Band** score = total QSO points from all bands multiplied by the number of different prefixes worked (prefixes are counted only once). (b) **Single Band** score = total QSO points on the band multiplied by the number of different prefixes worked.

2. Multi Operator: Scoring is the same as Single Operator, All Band.

3. A station may be worked once on each band for QSO point credit.

XII. Awards: First place certificates will be awarded in each category listed under Section V in every participating country and in each call area of the United States, Canada, Australia, and Japan. All scores will be published. To be eligible for an award a Single Operator station must operate at least 12 hours. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award only. (Single band entrants who also operate on other bands are encour-

aged to submit their logs to aid in the log checking process. *Note:* Logs containing more than one band will be judged as all-band entries unless they are submitted in Cabrillo format and the single band entry is specified in the Cabrillo header.) All certificates and plaques will be issued to the licensee of the station used. To the extent sponsors or winners purchase plaques through the Contest Director, plaques will be awarded in the following geographical areas for each of the categories listed in Rule V: World, North America, USA, Canada, South America, Africa, Europe, Asia, and Oceania.

XIII. Club Competition. A plaque will be awarded each year to the club that has the highest aggregate scores from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area defined as within a 275-km radius from center of club area (exception: DXpeditions specially organized for operation in the contest and manned by club members; club contributions of DXpedition scores are proportioned to the number of club members on the DXpedition). Indicate your club affiliation in the Cabrillo file. To be eligible for an award, a minimum of three logs must be received from a club, and if requested by the Contest Director a club officer must verify a list of participating club members.

XIV. Instructions for Preparation of Logs:

1. We want your electronic log. It should be submitted in Cabrillo format via e-mail to <wpxrtty@kkn.net>. Logs must be submitted no later than March 9, 2007. **In the "Subject:" line of your e-mail message please include your callsign**. Logs should be sent as an e-mail attachment, not in the text of the e-mail, and the filename for the log should be *yourcall.log*. Receipt of all e-mailed logs will be confirmed via return e-mail. To view a sample Cabrillo QSO template for this contest, go to <www.kkn.net/~trey/cabrillo/wpx-rtty.txt>.

2. Entries from Multi-Two and Multi-Multi stations must be merged into a single chorono-logical log. In the case of Multi-Two stations, the log must also indicate clearly which station (shown as 0 or 1 in column 81 of the Cabrillo *log) made* each contact.

3. If the Cabrillo format is unavailable, contact the Log Checker, Paolo Cortese, I2UIY, at <I2UIY@cqww.com>.

Other questions pertaining to the CQ WPX RTTY Contest may be sent to the WPX RTTY Contest Director, Glenn Vinson, W6OTC, 488 Locust Street, #401, San Francisco, CA 94118 USA, e-mail: <w6otc@garlic.com>.

XV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSOs or multipliers will be deemed sufficient cause for disqualification. An entrant whose log is deemed by the WPX RTTY Contest Committee to contain a large number of discrepancies may be disqualified as a participant operator or station for a period of one year. If within a five-year period the operator is disqualified a second time, he will be ineligible for any CQ contest awards for three years.

XVI. Deadline: All entries must be received NO LATER than **March 9, 2007.** E-mail logs are subject to the same deadline. Logs postmarked after the deadline may be listed in the results but will be ineligible for any awards.

public service

BY BOB JOSUWEIT,* WA3PZO

Are the Red Cross's Signals Crossed?

Plus: Earthquake in Hawaii and JOTA 2006

As many public-service-minded amateur radio operators were getting ready to participate in last year's ARRL Simulated Emergency Test, word came that the American Red Cross would require background checks of all volunteers, including ham radio operators. Alarms were sounded by many amateurs, including ARRL President Joel Harrison, W5ZN. This month we take a look at the Red Cross background-check requirement and how the language of the consent form allows the organization to investigate more than your criminal history.

The American Red Cross has required background checks since July 2006 for all volunteers and staff. (Photo courtesy of the American Red Cross)

Post Katrina

In March 2006 Red Cross volunteer and attorney Jerome Nickerson wrote a blistering investigative report that said he found widespread evidence of theft and fraud in the wake of Hurricane Katrina, including a black market of disaster relief goods operating out of New Orleans with the knowledge of some Red Cross supervisors. The report was turned over to the FBI for further investigation.

Jack McGuire, Interim President and CEO, and Kate Forbes, National Chair of Volunteers of the American Red Cross, said in a joint statement last summer that "background checks have been an area of focus for many years, but it was not until last year's (2005) hurricanes that our weakness in this area was exposed, as evidenced by publicized examples of fraud and waste. In some instances, our excellent work and service to those in need were overshadowed by negative stories of individuals abusing our internal systems." They continued, "We believe that in order to maintain the trust of the American people and provide them with the best quality service, all Red Cross employees and volunteers must be background-checked according to standards being implemented across the entire organization."

Like hundreds of other amateur radio operators around the U.S., Jacob Kinser, KB3LCB, of Philadelphia, Pennsylvania, routinely supplied communications for the Red Cross. ARES groups as well as individuals are evaluating whether or not they will agree to the new Red Cross background-check requirement. (Photo courtesy of Al Konschak, WI3Z)

Minimum Background Check

"Beginning in July 2006," they continued, "Red Cross employees and volunteers must complete a background check prior to employment or registered volunteer service with the Red Cross. Minimum background checking standards are being implemented across the entire organization so that all future background-check results will transfer between Red Cross units." According to the statement, the background check initiative will require Red Cross units to use an identified vendor, MyBackgroundCheck.com, to ensure easy transfer of background checks between units and broad reporting on background checks, as well as other measures of Red Cross progress. The vendor will conduct a background check that verifies an individual's social security number and searches the National Criminal Registry. Under federal law, the Red Cross may only review employee criminal records over the past seven years, unless otherwise restricted by state law, and this provision is being applied to volunteers as well. In many

*c/o CQ magazine
e-mail: <wa3pzo@cq-amateur-radio.com>

cases, hams working with the Red Cross under the auspices of the ARRL's Amateur Radio Emergency Service (ARES) are required to register as American Red Cross volunteers as well.

Red Cross Crossed?

"The Red Cross is requiring volunteers to grant permission for more than just a criminal background check," Harrison asserted. "They are also requiring permission to draw a consumer and/or investigative consumer report on the volunteer." Harrison said that could also include a credit check and a mode-of-living check.

Many hams are concerned about the requirement of MyBackgroundCheck.com that you give them your name, Social Security number, date of birth, telephone number, driver's license number, e-mail address, and other personal data. Then you must grant the company permission to run a credit report, education history, and, quoting from the website's privacy policy, "other types of background screening."

"The Red Cross has stated that they will not use credit reports," Harrison noted. "Requiring that volunteers authorize the procurement of a credit report is inconsistent with this assurance." The on-line application allows applicants to request a copy of any consumer report resulting from its background investigation.

According to information obtained by *CQ*, Red Cross chapters are provided some flexibility on background-checking standards. The website of the Delmarva Chapter of the American Red Cross says Red Cross units must follow the minimum Background Check Standard but may add additional standards that are job-related and appropriate to meet business needs. By signing the required consent form that allows the Red Cross to conduct the background check, the employee, volunteer, or applicant also *"authorizes the Red Cross to perform any number of background reviews, including credit checks and motor vehicle checks."* However, in most states the minimum Background Check Standard is limited to verification of the individual's Social Security number and a clear review of his or her criminal record for the prior seven years. It is not clear whether the amateur radio operator, who potentially could be asked to pass supply orders or disaster victim information, would be required to have more than the minimum background check. The ARRL has identified other Red Cross Chapter statements that only require minimum information.

Therefore, while many Red Cross statements say only a minimum background check is required, there is reason to believe that the organization has not been totally forthcoming. Many volunteers are concerned about the background checks. ARRL Field and Educational Services Manager Dave Patton, NN1N, whose department oversees the ARRL Field Organization, including ARES, is among those who believe the American Red Cross (ARC) stands to lose a fair number of volunteers because of the requirement.

Several ARES leaders have told both the ARRL and *CQ* that they and their volunteers represent ARES, not the Red Cross, even when supporting communication for ARC as a served agency. The ARRL's Patton disagrees, saying, "ARES members who are providing communications for ARC are working for ARC, and, as such, will follow their guidelines." He added that whatever position the ARRL might adopt, the decision to go along with the new Red Cross policy is up to individual volunteers.

Earthquake!

In mid-October a magnitude 6.7 earthquake struck off of Hawaii's Kona coast shortly after 7 AM. The shaking lasted about 15 seconds. In less than 40 seconds the quake had traveled to Honolulu on the island of Oahu, a distance of about 155 miles. In Honolulu, Ron Hashiro, AH6RH, was working at his computer when off in the distance he heard "a broad, widespread rumble similar to the sound of surf or a jet about to take off. The sound lasted for about four seconds before the building began shaking violently," said Hashiro. "After a couple of seconds, I realized this event was a strong local earthquake, substantially more shaking than the 1975 7.2 magnitude Kalapana quake."

Hashiro quickly put out a call on the local repeater. "Did anyone feel that? AH6RH." He quickly told the other amateurs on frequency to start a net on the repeater, then switched to the 147.06 inter-island linked repeater system. He put out the same call, "AH6RH. Did anyone feel that?" A station responded yes, and seconds later Honolulu had lost power. Power also began failing on the island on Oahu. Hashiro got dressed and reported to his assigned location at the State Civil Defense Emergency Operations Center within 25 minutes of the quake. As other operators grabbed their go-bags and mobilized to their assigned operating locations, a second quake with magnitude 6.0 struck at 7:14:12. Within the first hour, HF operations were started and RACES communications were in place. Stations on the Big Island (Hawaii) and on Maui began passing reports of boulders, landslides, and damage. Some of the key operators made it to the hospitals and reported on the damage and the evacuation of the patients out of buildings to tents set up in parking lots or to shelters that were being set up.

Other operators began to report to other hospitals around Honolulu, near Pearl Harbor and in Oahu. All were part of the HealthComm VHF/UHF radio network. They used go kits that were made about a year ago (see February 2006 *CQ*). They had practiced setting up the kits just a week earlier as part of the SET exercise for the hospitals.

Staff at St. Francis Hospital-West realized that the building transformer was damaged by the power surge. They requested amateur radio operators working with the HealthCare Association of Hawaii (HAH) to locate a replacement transformer. Amateur radio operators remained at the hospital until power was restored at 11:00 PM.

Steve Putnoki, N1CFD, Division 1 Coast Guard Auxiliary Communications Officer with D14 Hawaii, responded to the Coast Guard Communications Headquarters at Sand Island. After he felt the second quake, his wife Bonnie turned on the portable broadcast radio and found nothing on. He monitored the 2-meter Diamond Head repeater and Marine VHF channel 16 for information. His immediate concern was for the possibility of a tsunami. A tsunami generated off of Kona would travel through open ocean and strike the island of Maui within about ten minutes and reach Oahu in about thirty minutes. With the loss of phone service, he could not call out other team members. Fortunately, several minutes later the Coast Guard announced that there was no threat of a tsunami.

Problems Encountered

Ron Hashiro provided this description of some of the problems Putnoki and others faced following the earthquake.

With the lack of traffic signals due to the loss of power island-wide, Steve encountered problems driving through the intersections. Some of the drivers did not follow procedures and treat each intersection as an all-way stop. A number of drivers sailed through intersections without slowing down or stopping.

At the Coast Guard comms center, Putnoki was briefed on the available operational base and portable stations. He could not verify the status of team members due to the phones being jammed by the huge volume of calls. A C-130 aircraft was dispatched to send back imagery of the Big Island. The crew was requested to check the Kona Airport, the hospital, and the civic center. They also checked the volcanoes, the shore line for pollution, and did a perimeter check of the island. A second C-130 was put on standby for a possible medical evacuation of patients from Kona Community Hospital to Hilo. Putnoki said, "We were lucky. It could have been much worse."

The Kona Community Hospital Operating Room was damaged by the early morning earthquake that struck Hawaii in mid-October. (Photo courtesy of HAH)

One of several HF radio go-kits shipped out to hospitals in Hawaii. (Photo courtesy of Toby Clairmont, KH7FR)

The telephone system jammed with the flood of phone calls. That hampered the response from emergency responders. They were unable to coordinate within the teams and between agencies during the early hours and that slowed the overall response. On the island of Oahu, the power grid came down in sections as the first generators shut down because of the excessive vibration caused by the quake. The shutdowns increased the load on the remaining generators, causing them to shed electrical load and cascade further shutdowns to prevent permanent damage to the remaining generators. Within 20 minutes the entire island experienced a blackout. Power was restored starting at 12:05 PM, but it wasn't until nearly 2:00 the next morning before power was restored to the majority of the island.

The general public continued to use cellular phones for non-essential calls, exhausting the batteries at the cellular telephone sites. Only those sites with generators continued to operate. At numerous locations, operations staff of several agencies kept watch over the fuel supply of the backup generators. Those with sites fueled by gasoline had limited access to fuel as lines formed at the few gas stations still pumping gas with the use of backup generators. These lines for gas further slowed the response of emergency responders.

The Statement of Understanding (SoU) between the ARRL and the ARC isn't clear. It says, "each organization retains its own identity in providing service." It further stipulates that ARES volunteers "in such cases when the operators are required to carry American Red Cross identification" must register as American Red Cross volunteers. According to the ARRL, radio amateurs who volunteered in the wake of Hurricane Katrina last year were "badged in via the Montgomery, Alabama staging area as ARC volunteers." The same applied to those who turned out to assist following the attacks on the World Trade Center in 2001, and that practice upset some ARES volunteers.

The agreement goes on to say that volunteers assisting the ARC with disaster relief communication support "shall be at all times considered ARRL volunteers," but then goes on to say that ARRL and ARES volunteers "may, under conditions and terms established by American Red Cross from time to time, also serve as American Red Cross volunteers for a mutually agreed upon task or function." The agreement comes up for review this year.

More Than Background Info

By signing up as a Red Cross volunteer, additional insurance coverage is offered that is not available from ARES. According to the Claremont (CA) Chapter Volunteer Handbook, the "American Red Cross insurance covers volunteers while they are acting as agents for the Red Cross (for):

- Liabilities they might incur while performing Red Cross duties
- Liabilities incurred as a result of accidents while driving a Red Cross motor vehicle
- Medical expenses incurred in conjunction with their Red Cross volunteer activities (this insurance is limited to a maximum of $10,000 and injured volunteers should first turn to their personal health and medical insurance), and
- Wrongful acts such as any breach of duty, error, misstatement, or misleading statement by any volunteer that is committed while performing official duties on behalf of the Red Cross.

These statements seem to be consistent with several other Red Cross volunteer handbooks, but it is always best to check with your local Red Cross office.

ARRL Public Service Team Leader Steve Ewald, WV1X, says ARES leaders can assign volunteers who don't want to submit to the ARC criminal background check to ARES duties "away from the action" that don't involve direct interaction with the ARC. "We certainly understand the risks that are involved in having background checks done—such as potential identity theft," Ewald said. "Those volunteers who do go through the background check will, indeed, enter at their own risk in this regard."

What's Next?

Many ARES groups are looking at other possible ways they can provide the same communication service to the Red Cross without being activated by the ARC. Some groups are only deployed by their county emergency management agency and would be deployed by the county to provide communications for the Red Cross. Other clubs that meet in a Red Cross chapter are concerned over their meeting location status with the Red Cross if they do not submit to the background check.

Jamboree On The Air

Each October more than 400,000 Scouts and Guides hook up by radio for the annual Jamboree On The Air (JOTA). Amateur radio and the internet offer boys and girls the exciting opportunity to make friends in other countries without leaving home.

According to the ARRL, millions of Scouts have met each other via ham radio since the first Jamboree On The Air was held in 1958.

Cub Scouts on the Air

"One of the most common questions I get from parents is 'Does ham radio still exist?' and my answer is always an emphatic 'Yes!'" says Nick Roscoe, N3NR, Cubmaster of Pack 260 in suburban Philadelphia. "Many people believe that the rise in the popularity of the internet and the ease with which we now are able to communicate across the globe via the internet have pretty much rendered ham radio obsolete. Quite to the contrary, the Amateur Radio Service has adapted itself to embrace the internet, and hams have found ways to make the internet part of our radio operations."

In addition to actually talking on the radio with other Scout stations, members of Pack 260 were treated to a presentation about ham radio emergency communications by Fred Field, N3OFR, Fire Marshal and Emergency Management Official from Concord Township. Roscoe said part of the program for the Cub Scouts was to illustrate "how many of the community-oriented principles that are at the core of Scouting are shared by other organizations like the Amateur Radio Service." Some of those principles include being helpful and friendly.

Fred Field, N3OFR, a Fire Marshal and emergency management official from Concord Township, PA gave a presentation about ham radio emergency communications. (Photo courtesy of N3NR)

Cub Scouts from Pack 260 in Concord, PA visited with Cubmaster Nick Roscoe, N3NR, to participate in the 2006 Jamboree On The Air (JOTA). (Photo courtesy of Anita Field)

Members of Brownie Troop 237, based in Concord Township, PA, also participated in JOTA. (Photo courtesy of Anita Field)

As we approached press time, the American Red Cross issued a statement to the ARRL in an attempt to clarify the issue. Red Cross Director of Response Communication and Marketing Laura Howe wrote, "it is true that the person does agree that the Red Cross *has the right to* conduct a credit check or other investigation into an individual's background; however, it is only in a *rare applicable circumstance* that the Red Cross will actually run a credit check."

Howe added that while the agency will never run a credit check on the vast majority of its employees and volunteers, it is important that it have the right to do so in certain circumstances in order to protect its clients, employees, and volunteers.

"Instances when a credit check may be warranted," Howe explained, "include, but are not limited to, when a unit is hiring someone to work with finances or fundraising or when an individual is suspected of a theft, fraud, or other crime related to his or her activities with the Red Cross."

This story isn't over yet. Stay tuned for further information.

73, Bob, WA3PZO

What a Start...

It's only January and there is already one story that looks like it will be part of a future column, as we keep you updated on the issue of Red Cross background checks. The story from Hawaii talks about preparedness and how recent drills and practice paid off when it was the real thing.

This month we want to thank Ron Hashiro, AH6RH, Nick Roscoe, N3NR, and the ARRL for providing some of the information in this column.

how it works

BY DAVE INGRAM,* K4TWJ

Cooling Hot Gear

Heat and dust have a direct bearing on the overall performance and lifespan of all electronic equipment. Indeed, a buildup of dust can cause intermittent operation of switches, plugs, and sockets, plus arcing in high-voltage power supplies, while insufficient cooling can result in premature component failures—in transceivers, power supplies, and high-power linear amplifiers. Conversely, equipment kept clean and cool looks great and delivers top-notch performance for many years. This month's column thus looks at the how and why of equipment cooling. Let's begin with a review of some "ground floor" basics.

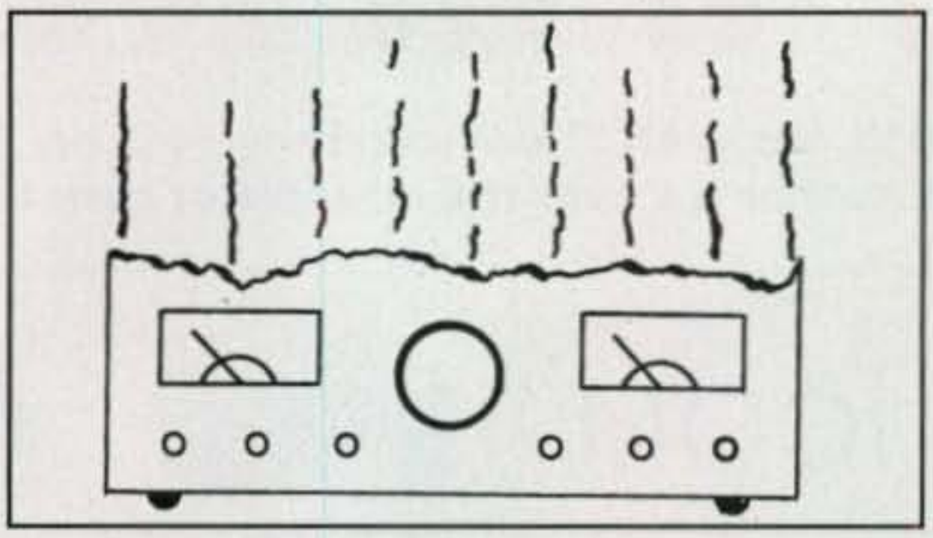

Fig. 1– What a rig! It smoked the band until it smoked and melted down!

Cool Is . . .

Simply described, electronic equipment generates heat during operation, and cooling is the process of removing that heat. Two common means of accomplishing this task are reducing the ambient temperature (the temperature in which the equipment is operating) and helping the heat transfer process (usually with one or more fans). Moving air also brings dust into equipment, however, so the more we keep it clean and free of dust, the hotter it runs. Without adequate cooling, major components in solid-state gear can fail and tubes in high-power gear can implode. What to do? Cool it! How? Read on!

Cool What?

Since most transceivers rated at 10 watts or more usually have their own heat sink and/or cooling fan, you understandably may ask if additional cooling measures are really necessary. That all depends on the transceiver's design, the room's ambient temperature, and how the rig is operated. If a 100-watt transceiver and its power supply are set up so air can flow freely around them, and assuming casual operation (one or two hours a day) with much of that time spent receiving rather than transmitting, the rig's cooling system is probably adequate. If several hours of receive-only operation per day are common, however, the average temperature of the transceiver and its power supply can rise enough so that one or two lengthy transmissions can cause the rig to border on overheating. Similarly, continuous transmit/receive operation such as contesting often pushes a transceiver's cooling abilities to the maximum. In other words, nearly every 100-watt transceiver (and its power supply) can benefit from a little extra help during times of heavy use.

Factor in room temperature, too. The ambient temperature in a cool room is quite "rig friendly," whereas equipment in a toasty-warm room has a head start on overheating (plus making you half sleepy). Yes, and that fact applies double to high-power linear amplifiers. Just think "the cooler the better" and you can't go wrong.

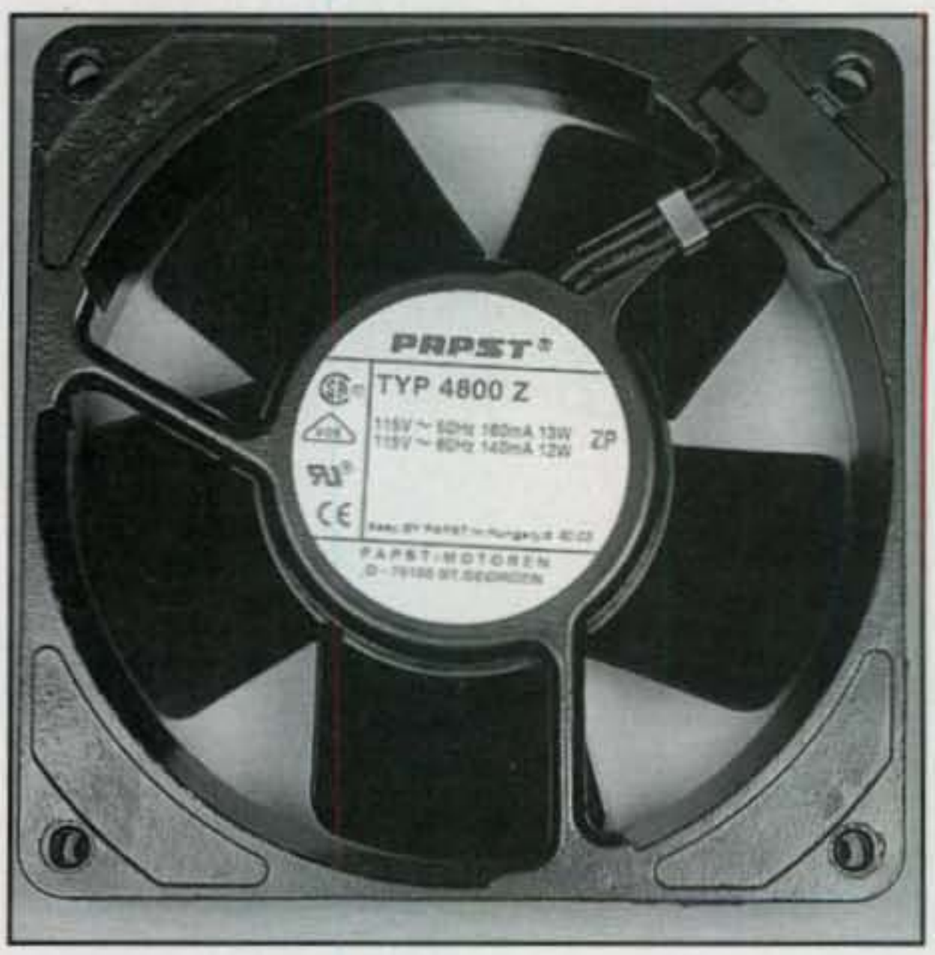

Photo A– Square-frame fans are exceptionally quiet, efficient, and popular for cooling everything from power supplies to linear amplifiers. This particular fan is used in an Ameritron AL-80A linear amplifier. It is positioned in the unit's mid section so it draws air across power-supply filter capacitors and blows it across the 3-500Z tube. (Photo courtesy of MFJ Enterprises)

An easy and effective means of checking your rig's temperature is by feeling its case and rear heat sink after it has been on only a few minutes and again after it has been in operation an hour or two. Notice if there are many (any?) vent air holes or slots in the case. Are they effective in helping the rig's internal fan draw in fresh air through the holes or slots and blow it across the rear heat sink,

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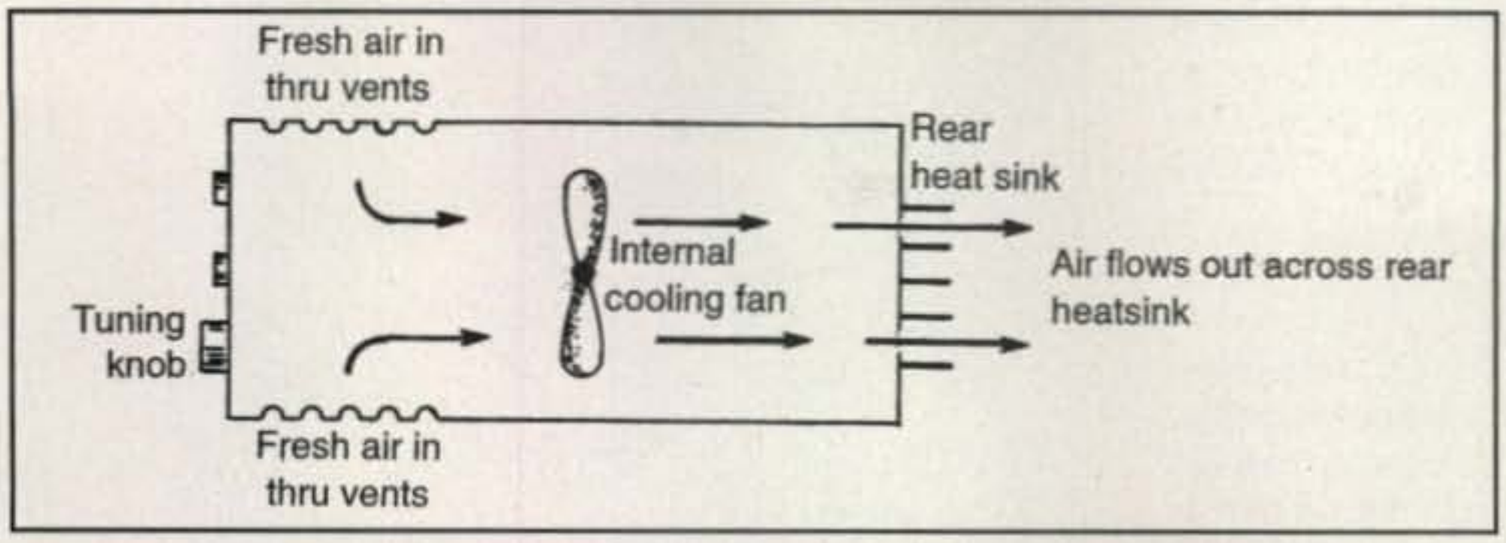

Fig. 2A– Example of an internal fan drawing fresh air in the front of a rig and blowing it out across the rear heat sink. (Details in text.)

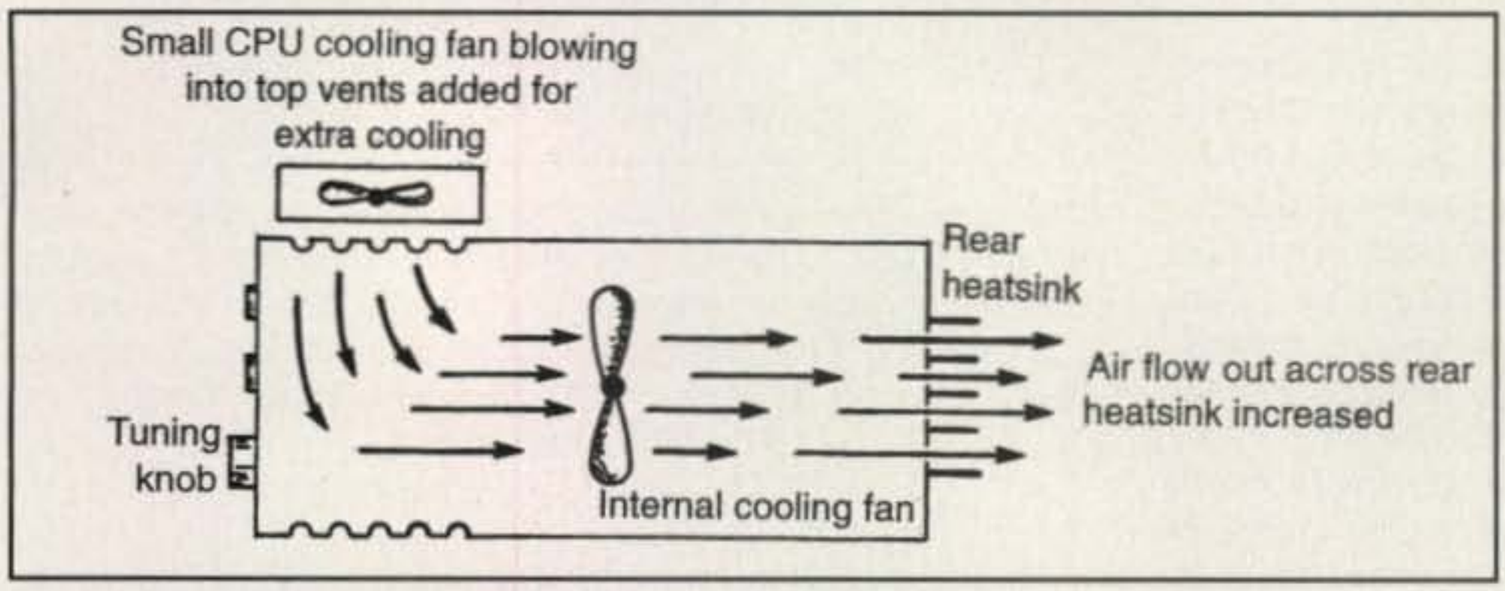

Fig. 2B– An additional fan has been added to assist the internal fan in fig. 2A.

or does the fan only blow across the heat sink? Check the power supply, too. It may run hotter than the transceiver and its cooling system may be totally inefficient. You can also judge your rig's cooling efficiency according to how often its built-in fan operates and how long the fan runs to reduce the rig/heat-sink temperature. A heat sink that is mildly warm to the touch is generally considered acceptable. If you cannot leave a sensitive finger on the sink for more than four or five seconds without an "ouch!" it probably needs additional cooling—and that cooling should aid rather than oppose operation of an existing fan.

Helping Out

Two examples of effective cooling are illustrated in figs. 2A and B. The transceiver in fig. 2A has an internal fan drawing fresh air in and moving it across a rear heat sink. In some transceivers, the fan runs at normal speed with casual operation and shifts to high speed during heavy use. The natural tendency in helping out here involves placing an extra fan blowing toward the rear/heat sink, but the two air masses can "buck" each other and the rig's temperature will remain unchanged. Conversely, a small whisper fan or computer CPU fan positioned to blow additional fresh air into intake holes or vents, or draw more air out of rear openings, increases air flow (possibly even creating a mild draft across the power transistors and heat sink) and noticeably improves cooling (fig. 2B). I would like to be more specific on fan size and placement here, but every situation is different. That is why I am explaining the basics—hopefully in enough detail so you can evaluate and implement your specific cooling needs.

High-Power Amps

Heat increases with power, so a linear amplifier is obviously a station's hottest running piece of equipment. Indeed, many high-power amplifiers produce enough heat during operation to warm a chilly room—and some sizable fans or blowers are necessary to remove the heat. Some amplifiers utilize square-cased "boxer" or "whisper" fans as shown in photo A. Others use a squirrel-cage blower. A what? A squirrel-cage blower uses a small motor to turn a wide, slotted wheel that looks similar to a miniature paddle wheel on a riverboat or a "mouse run" exercise wheel for a hamster (photo B). The slots are akin to a multi-blade fan, with resultant airflow usually ducted to precisely where it is needed. Squirrel-cage blowers move a large amount of air and can thus be somewhat noisy. Therefore, some models include owner-selectable taps for fast-, medium-, and slow-speed operation. High speed usually delivers excellent cooling, but resultant noise

may drown out weak audio from a transceiver. Many people prefer to set their amplifier's fan at a slow speed and add an external whisper fan (either placed atop or directly beside the amplifier according to airflow) for additional cooling. The idea holds good merit, especially when contesting.

Smoking Mobiles

Surely the most challenging environment for any transceiver is mobiling, especially during the hot summer months. When left parked, an auto's temperature can easily exceed 130 degrees. Then you hop in the car, flip on the air conditioner and rig, and immediately hear a "must contact" station. Forget the SWR. Just crank up the power and call, call, call! Check the rear heat sink's temperature? It's buried up where? What's that electrical smell? Duh!

That's what I call the ostrich effect: The air conditioning keeps you cool and grinning while the transceiver smokes and smolders. Typically, air circulation is half blocked by seats, console panels, or shrouds, and the heat sink is probably sitting on carpet. If the transceiver's main body is remotely mounted in the trunk or under a seat, you probably do not realize it is overheating. Check it during heavy use, regardless of the inconvenience (remember the ostrich effect!). Moving it to a more airy location where it can breathe freely and possibly adding an external fan to help airflow could prove quite beneficial and avoid costly repair bills. Some of the most efficient mobile installations I have seen are ones in which a small amount of cool air from an air-conditioning vent is diverted toward a transceiver's case for extra cooling.

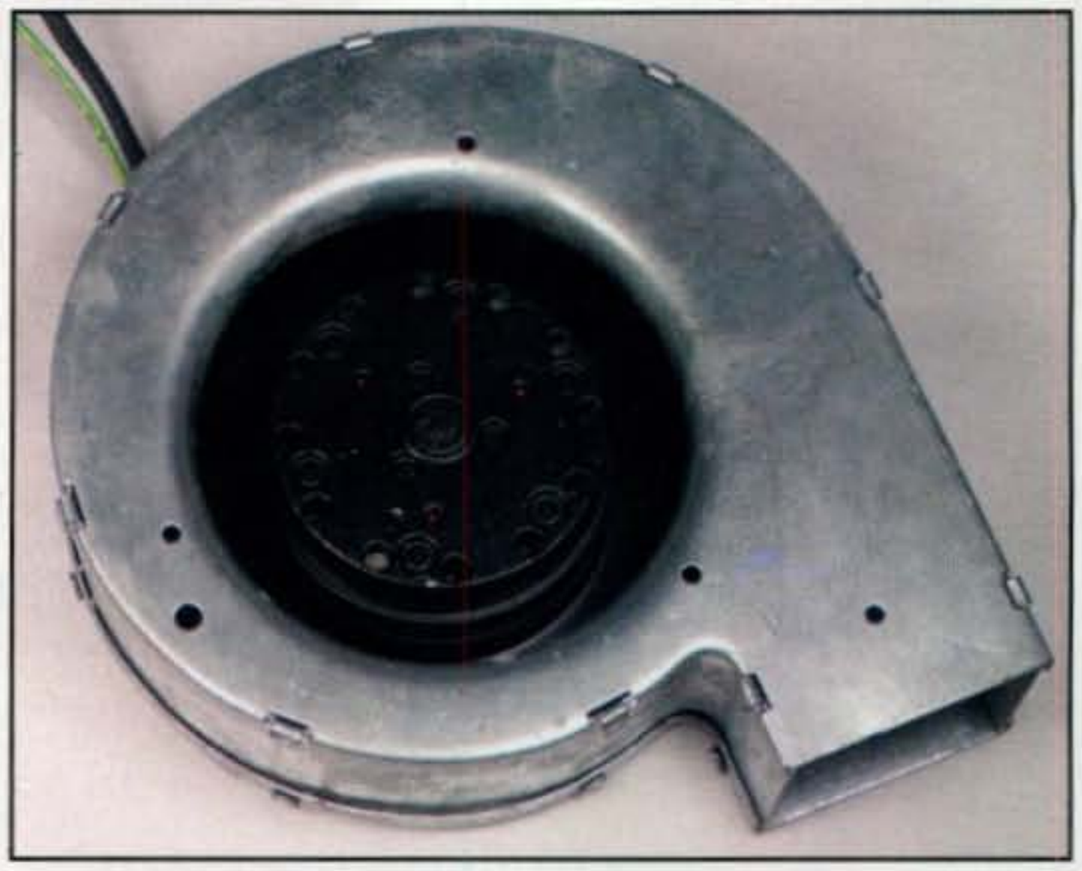

Photo B– This highly efficient fan is called a squirrel-cage blower. It has a number of blades arranged on a paddle wheel in a riverboat manner and moves a high volume of air for its size. This particular blower is used in an Ameritron AL-82, cooling its dual 3-500Z tubes. (Photo courtesy of MFJ Enterprises)

Considering cooling first and appearance second has a big reward in mobile installations.

Buying and Mounting Fans

Two often-asked questions are where to purchase small cooling fans and what are typical prices. Most major electronic suppliers such as Mouser Electronics (1-800-346-6873) and MFJ Enterprises (1-800-647-1800) sell various size fans, and they are top notch. Alternately, the square fan removed from a used computer power supply or a tiny CPU-cooling fan salvaged from an outdated computer is good—if you can find one. Hamfest flea markets are usually a good source of fans. Buy several, as over-cooling radio gear is seldom a problem.

When installing or mounting fans, add a small grommet to make a tiny standoff bushing and prevent noise or vibration. If you stand a fan on end or lay it on a power supply or amplifier, a small piece of non-skid shelf liner can serve as a bushing. Occasionally, self-tapping screws with expandable plastic tips for holding in thin wallboard can be used to secure a small fan to (actually between) fins on a heat sink. I attached a fan to my transceiver's power supply using such screws a couple of years ago and it is still holding strong today.

Conclusion

Some readers may ponder if all radio equipment needs additional cooling, and the answer is . . . not necessarily. If you normally switch on your rig for 30 minutes or an hour and make one or two contacts a day, the rig's internal fan is probably sufficient, especially if you use a large-size rig and operate SSB. Operating CW with a small rig running full power, however, warrants closer study for worry-free hamming. Companies with large computer systems are the same, as their mainframes are typically housed in a room almost cold enough to store meat, and the results are long and reliable life.

What else might I say except for maximum life of your equipment, keep it cool and comfortable!

73, Dave, K4TWJ

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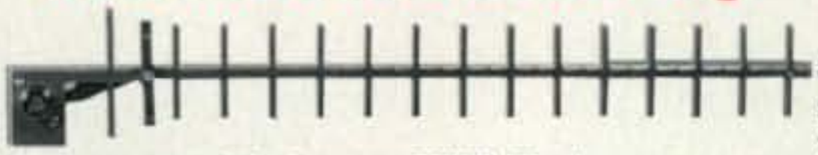

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BY FREDERICK O. MAIA,* W5YI

FCC Releases Omnibus Rulemaking
New Rules Effective December 15

"We believe that authorizing additional spectrum for voice communications is warranted. We agree with the majority of commenters that such an authorization will address a current need for more spectrum to accommodate phone communications, and that benefits will accrue and efficiencies will be gained by this action."

Federal Communications Commission in R&O, WT 04-140

In the spring of 2004, the FCC issued a lengthy document addressing 19 Petitions for Rulemaking that proposed various changes to the Part 97 Rules. Some had been collecting dust at the Commission for more than five years. The proposals were wide ranging. Some wanted revised on-the-the air operating privileges. Others suggested changes to the types of communications an amateur station may transmit, amended vanity callsign rules, amateur equipment regulations, and license examination system procedures.

Major Amateur Service changes were last made in 1999 when the Commission simplified the license structure and examination system. The FCC declined at that time, however, to consider a comprehensive restructuring of frequency operating privileges. They concluded that "...simplifying the license structure was independent of restructuring operating privileges" and that radio amateurs should have an opportunity to weigh in on those proposals.

"Some of these petitions represent efforts within the Amateur Service community to restructure operating privileges," the FCC said. "On the basis of the petitions before us, we conclude that a comprehensive restructuring of operating privileges is now ripe for consideration." The 71-page Notice of Proposed Rulemaking (NPRM, WT Docket 04-140) denied several of the petitions but agreed to go forward with 12 of them.

The complete NPRM for WT Docket No. 04-140 can be found on the FCC website at: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-79A1.pdf>.

The Petitions that were Denied

Dale Reich, K8AD (Seville, OH), submitted three proposals. First, he wanted color-coded license documents: blue for Advanced and Extra Class licensees, gold for General Class, and red for Technician. The FCC said possession of a license document is not necessary and that color-coded licenses would increase their costs and adversely impact their license printing system.

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Reich also requested that VEs be authorized to issue "instant temporary licenses" to first-time examinees "to gain rapid access to amateur radio." The FCC said it "...does not permit private organizations to issue licenses," adding that electronic filing by VECs causes only a minimal wait for a first license.

In addition, Reich wanted VEs to allow examination credit for length of time licensed and operating without a serious violation. This would allow some Novice and Advanced Class operators to advance without taking an examination, Reich added. The FCC said this was considered and rejected when the Commission simplified the license structure in 1999. Upgrading is not difficult, the FCC said. Also, length of service is "unrelated to whether a person qualifies for a higher class."

Jeffrey T. Briggs, K1ZM (Hopewell Junction, NY), and William R. Tippett, W4ZV (New London, NC), wanted the voluntary 160-meter 1800–1843 kHz narrowband and 1843–2000 kHz wideband band plan made mandatory. The FCC said the issue of voluntary vs. mandatory band plans was previously considered and that "...cooperation between licensees, education, and compliance with our Rules is sufficient to minimize interference."

John S. Rippey, W3ULS (Montrose, VA), asked for additional CW and phone privileges in the 80-, 40-, 30-, 17-, 15-, 12-, and 10-meter ham bands for Novice and Technician Plus Class operators to increase the total number of licensees and those proficient in Morse code. The FCC denied the petition, noting that these amateurs "...can easily upgrade, thereby obtaining access to significantly more spectrum."

Nickolaus E. Leggett, N3NL (Reston, VA), requested that the rules require all commercially manufactured amateur radio equipment to be field-repairable since "...most commercially-built amateur radio systems are difficult to repair in the field." The FCC said such a regulation would be an "unnecessary requirement on manufacturers" and that the amateur community was against this proposal.

Robert H. Birdsey, WI4J (Royal Palm Beach, FL), wanted amateur stations to be able to broadcast and transmit music. He believes that the current FCC Rules violate the First Amendment. The FCC said this "...would be inconsistent with the definition and purpose of the Amateur Service" and that other frequencies are available for these services.

Dr. Michael C. Trahos, KB4PGC (Falls Church, VA), wanted to establish an unlicensed communications service similar to the Family Radio Service (FRS) in the 420–450 MHz ham band. The FCC said that such a service "...is contrary to the fundamental regulatory structure of the Amateur Service and would cause interference to repeaters and other stations."

Several petitioners wanted changes to the amateur information bulletin regulations. John J. Elengo, W1DQ (Cheshire, CT), wanted three conditions imposed on bulletin stations: (a) limit stations to a single transmission not exceeding 15 minutes; (b) require a minimum two-hour time period between successive transmissions; and (c) limit bulletins in any band to four per day. Jonathan S. Gunn, W9WHE (Champaign, IL), asked for a new definition of "one-way voice broadcast" transmissions and that information bulletins be time limited with a specified period required in between transmissions. Bob Sherin, W4ASX (Miami, FL), wanted restrictions on the types of information bulletins that can be transmitted on the ham bands. And Phillip E. Galasso, K2PG (Shickshinny, PA), wanted a prohibition against all information bulletins transmitted on the HF bands. The FCC denied all petitions, stating that they previously had considered and denied a request in 1988 to limit bulletins to ten minutes per day and that there was no showing that bulletins were of lesser importance than other communications.

The Petitions that were Granted

On October 10th, the FCC released a Report and Order addressing the remaining 12 Petitions for Rulemaking. Following are the major changes that are being made.

Operating Privileges Revised in Four HF Bands

Amateur stations may transmit communications in nine HF bands. Seven of them have segments that permit narrow bandwidth emissions (such as telegraphy, data, or radioteletype), and segments where wider bandwidth emissions (such as voice or image) are allowed.

On March 22, 2002, the American Radio Relay League (ARRL) petitioned the Commission to eliminate the telegraphy frequency segments currently authorized to Novice and Technician Plus Class licensees. This action would free up spectrum to be used to expand the voice segments of the 80-, 40-, and 15-meter bands, the ARRL said. The League believed that this "refarming" plan was important because the segments presently authorized for phone and digital communications are severely overcrowded.

The Commission agreed with the ARRL "...that authorizing more spectrum for voice communications will more closely reflect licensees' operating preferences, thereby resulting in more efficient use of Amateur Service spectrum."

"Because the ARRL Petition addresses the operating privileges of all classes of licensees, we believe that the ARRL Petition provides a basis for a comprehensive restructuring of operating privileges," the FCC said. The Commission basically adopted the ARRL's "Novice refarming" plan as proposed.

The Commission noted that the rule revisions would result in no licensee losing any spectrum privileges, and that General, Advanced, and Amateur Extra Class operators would gain access to additional spectrum for phone communications, one of the most popular operating activities on the HF bands.

The new Part §97.301 and §97.305 rules allow most amateur radio operators additional voice spectrum in the 80-, 40-, and 15-meter bands. Novice and Technician Class operators who have passed a code exam will also be allowed to operate CW in the General class CW subbands on 80, 40, 15 and 10 meters. Here is a recap by band and by license class of the new frequency privileges.

75/80-meter Amateur Band (3500–4000 kHz):

An *Amateur Extra Class* licensee currently may transmit CW, RTTY, and data (narrowband) on the entire band, and CW, phone, and image (wideband) between 3750 and 4000 kHz. Effective with the new rules, the voice portion is being lowered to 3600 kHz—a gain of 150 kHz in voice spectrum.

An *Advanced Class* licensee currently may transmit narrowband between 3525–3750 kHz and voice between 3775–4000 kHz. Effective with the new rules, the narrowband only segment is changed to 3525–3600 and the voice portion is being lowered to 3700 kHz—a gain of 75 kHz in voice spectrum.

A *General Class* licensee may currently transmit narrowband between 3525–3750 kHz and voice between 3850–4000 kHz. Effective with the new rules, the narrowband only segment is changed to 3525–3600 and the voice portion is being lowered to 3800 kHz—a gain of 50 kHz in voice spectrum.

There are no frequency changes on the 60-meter ham band for any license class.

40-meter Amateur Band (7000–7300 kHz):

An *Amateur Extra Class* licensee may currently transmit CW, RTTY, and data (narrowband) between 7000–7150 kHz, and CW, phone, and image (wide-

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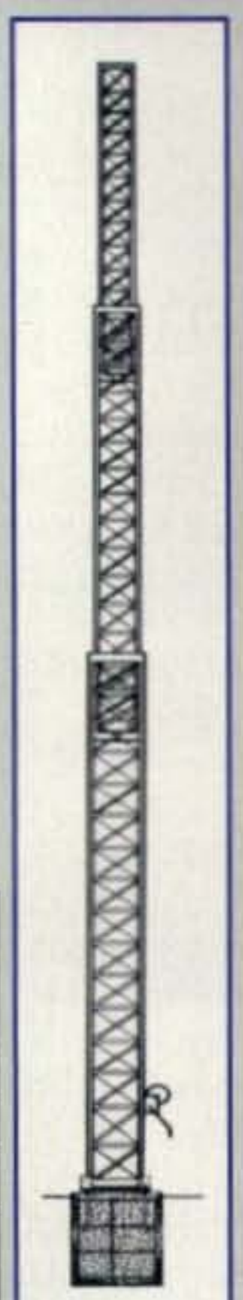

- Handles 35 square feet of antenna load at 50 MPH, 14.75 square feet at 70 MPH.
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TX-455	55'	22'	670	$2,727	$2,229
TX-472	72'	22'8"	1040	$4,481	$3,689
TX-472MDP	72'	22'8"	1210	$7,211	$5,929
TX-489MDPL	89'	23'4"	1800	$11,692	$9,599

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- Heavy duty, handles 44.7 square feet of antenna load at 50 MPH, 35 square feet at 70 MPH.
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- Options include coax arms, raising fixtures, masts, motor drives, and more!

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HDX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
HDX-538	38'	21'6"	600	$2,339	$1,919
HDX-555	55'	22'	870	$4,093	$3,379
HDX-572MDPL	72'	22'8"	1600	$10,719	$8,769
HDX-589MDPL	89'	23'8"	2440	$14,031	$11,499
HDX-689MDPL	89'	23'8"	3450	$27,104	$22,199
HDX-5106MDPL	106'	24'8"	3700	$29,495	$23,799

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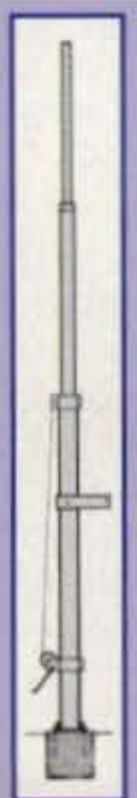

- Handles up to 22 square feet of antenna load. (See chart below)
- MDP models include motor drive.
- All models supllied with anchor bolts, load-actuated hand winch, and house bracket.
- Options include coax arms, raising fixtures, motor drives, self-supporting and rotator bases, remote control panel, and more!

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MA SERIES CRANK-UP MASTS							
MAST MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	50 MPH (sq. ft.)	70 MPH (sq. ft.)	LIST PRICE	SALE PRICE
MA-40	40'	21'6"	242	16.5	6.8	$1,569	$1,289
MA-550	55'	22'1"	435	22	9	$2,427	$1,999
MA-550MDP	55'	22'1"	620	22	9	$4,639	$3,799
MA-770	71'	22'10"	645	15.5	5.5	$4,001	$3,279
MA-770MDP	71'	22'10"	830	15.5	5.5	$6,329	$5,149
MA-850MDP	85'	23'6"	1128	15.3	6.3	$8,531	$5,949

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TMM SERIES COMPACT CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TMM-433SS	33'	11'4"	315	$2,105	$1,719
TMM-433HD	33'	11'4"	400	$2,550	$2,089
TMM-541SS	41'	12'	430	$2,764	$2,259

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band) between 7150–7300 kHz. Effective with the new rules, the narrowband only segment is changed to 7000–7125 kHz and the voice portion is being lowered to 7125 kHz—a gain of 25 kHz in voice spectrum.

An *Advanced Class* licensee may transmit narrowband between 7025–7150 kHz and voice between 7150–7300 kHz. Effective with the new rules, the narrowband only segment is changed to 7025–7125 kHz and voice portion is being lowered to 7125 kHz—a gain of 25 kHz in voice spectrum.

A *General Class* licensee currently may transmit narrowband between 7025–7150 kHz and voice between 7225–7300 kHz. Effective with the new rules, the narrowband only segment is remains at 7025–7125, but the voice portion is being lowered to 7175 kHz—a gain of 50 kHz in voice spectrum.

There are no frequency changes on the 30-, 20-, or 17-meter ham bands for any license class.

15-meter Amateur Band (21000–21450 kHz):

An *Amateur Extra Class* licensee currently may transmit CW, RTTY, and data (narrowband) between 21000–21450 kHz and CW, phone, and image (wideband) between 21200–21450 kHz. *There is no change; both the CW and voice segment remain the same.*

An *Advanced Class* licensee currently may transmit narrowband between 21025–21200 kHz and voice between 21225–21450 kHz. *There is no change, both the CW and voice segment remain the same.*

A *General Class* licensee currently may transmit narrowband between 21025–21200 kHz and voice between 21300–21450 kHz. Effective with the new rules, the narrowband only segment remains at 21025–21200 kHz, but the voice segment is being lowered to 21275 kHz—a gain of 25 kHz in voice spectrum.

There are no changes on the 12- or 10-meter ham bands for any license class in terms of voice privileges. However, as noted below, there is a change in the 10-meter CW privileges granted to Novices and Technicians with code credit.

Novice and Technician Class with Code Credit (CW only):

80-meter Amateur Band: Previously 3675–3725 kHz. Effective with the new rules: 3525–3600 kHz—a gain of 25 kHz in CW spectrum.

40-meter Amateur Band: Previously 7100–7150 kHz. Effective with the new rules: 7025–7125 kHz—a gain of 50 kHz in CW spectrum.

15-meter Amateur Band: Previously 21100–21200 kHz. Effective with the new rules: 21025–21200 kHz—a gain of 75 kHz CW spectrum.

10 Meter Amateur Band: Previously 28100–28500 kHz. Effective with the new rules: 28000–28500 kHz—a gain of 100 kHz CW spectrum.

(Novice/Tech Plus licensees still may only transmit no more than 200 W PEP on the above HF CW segments.)

Novice and Technician Class with Code Credit (CW or SSB):

Previously 28300–28500 kHz. Effective with the new rules: 28300–28500 kHz (no change).

The ARRL has an excellent downloadable chart showing the band changes online at: <http://www.arrl.org/announce/regulatory/wt04-140/Hambands3_color.pdf>.

Permit Auxiliary Stations to Transmit on the 2-meter Band

The rules currently define an auxiliary station as an amateur station, other than a station in a message forwarding system, that is transmitting point-to-point communications within a system of cooperating amateur stations. In plain English, this generally applies to stations using some sort of remote control.

Generally, under the current Part 97 rules, an auxiliary station is restricted to transmitting only on the 1.25-meter (222.15–225.00 MHz) and shorter wavelength (that is, higher frequency) ham bands. The underlying purpose of limiting bands has been to minimize the possibility of harmful interference to other amateur operations, particularly "weak signal" activity in the 2-meter (144–148 MHz) band.

Kenwood's "Sky Command system" permits radio amateurs who do not have sufficient space for HF antennas, or who live in areas with restrictive covenants, to operate their HF equipment at remote locations through the use of VHF and UHF channels. However, the FCC ruled that this constitutes auxiliary operation and that the current rules do not permit auxiliary operation on 2 meters.

The new Part 97.201(b) rule will permit a user to remotely operate certain Kenwood equipment (and others, should other manufacturers introduce similar systems) via a VHF/UHF handheld transceiver on the 2-meter band. Section 97.201(b) has been amended to read: "An auxiliary station may transmit only on the 2 m and shorter wavelength bands, except the 144.0–144.5 MHz, 145.8–146.0 MHz, 219–220 MHz, 222.00–222.15 MHz, 431–433 MHz, and 435–438 MHz segments."

Permit Spread Spectrum Communications on the 1.25-meter Band

Currently, spread spectrum (SS) emission may only be transmitted above 420 MHz (the 70-cm band).

Noting that there is no VHF band in which amateur stations may transmit SS emissions, the ARRL requested that spread spectrum be authorized on an additional 3 MHz of amateur spectrum. New Part 97.305(c) allows SS in the 222-225 MHz (1.25 cm) band.

In approving the change, the FCC noted that "...there has been no showing that SS transmissions have caused—or would cause—harmful interference to other stations." It declined, however, to authorize SS emissions to the 6 and 2 meter band "...at this time."

Retransmission of Space Station Communications

The FCC rules generally prohibit amateur stations from retransmitting signals from other types of radio stations. One exception allows amateur to retransmit communications originating U.S. Government frequencies between a space shuttle spacecraft and Earth.

New Section 97.113(e) rules allow amateurs to retransmit communications from additional types of manned spacecraft, including the International Space Station.

Designating a Club to Receive a Callsign upon Death

Current vanity callsign rules do not permit a radio amateur, while living, to designate a club that may apply for his or her callsign upon their death. John B. Johnston, W3BE (Derwood, MD), asked the FCC to allow currently licensed amateur radio operators to be able to name a specific ham club to acquire their callsigns "in memoriam."

The FCC has approved his request, and new Section 97(c)(3) rules permit a licensee to express a preference as to which club may receive his/her callsign. If the club desires the callsign, the club may claim the callsign with a vanity callsign application. If it is unclaimed by the club during the two-year waiting period, then the call becomes available to all other applicants.

Filing Multiple Applications for a Specific Vanity Callsign

Previously assigned station callsigns generally become available for reassignment as a vanity callsign two years after termination of the previous license.

Under existing FCC rules, an applicant seeking a vanity callsign is not precluded from filing multiple applications seeking the same vanity callsign provided that the filing fee is paid for each application filed. Applicants who file applications that do not receive a requested callsign are eligible to request a refund of the filing fee.

Multiple applications give an applicant an unfair advantage in obtaining that callsign, since it is awarded by lottery. New Section 97.19(d) rule limits applicants to filing one application on any one day for a specific vanity callsign.

Marketing of Power Amplifiers that Transmit on the CB Band

Commercial companies are currently prohibited from manufacturing, marketing, and selling external RF power amplifiers capable of transmitting on the 12- and 10-meter ham bands as a way to prevent their use by Citizens Band operators.

New Section 97.315 and 97.317 rules now specify that RF amplifiers must exhibit no amplification between 26 and 28 MHz—nor easily be modifiable to operate between 26 and 28 MHz—prior to being FCC certified for sale.

RF amplifiers that operate on the 12- and 10-meter bands may otherwise be commercially manufactured. The FCC also concluded that the definition of an external RF power amplifier kit is no longer needed in Part 97.

Emergency Communications Drills in Alaska

Currently, Section 97.401(d) authorizes an amateur station in Alaska to transmit communications during emergencies on 5.1675 MHz (the Alaska Emergency Frequency), but not communications for training drills and tests.

This rule is being changed to authorize amateur stations in or near Alaska to transmit communications during tests and drills on 5.1675 MHz.

Amateur License Examination System Simplification

The FCC has decided to eliminate Section 97.509(a) of the rules, which requires a public announcement of an upcoming license examination session. It believes that "...test locations and times are given adequate coverage on club and Volunteer-Examiner Coordinator (VEC) websites, in newsletters, and in other media." Public announcements could still be made; they just would not be required.

Section 97.505(a)(9, Examination Credit, is being amended to provide Element 1 (5 wpm Morse) credit to any applicant who has passed a code examination in the past even though their license may now be expired. Current rules limited this credit to certain license classes only. The new rules would permit any former license holder whose license class required a code test to get credit when applying for a new license.

Currently, Sections 97.509(m) and 97.519(b) require that license applications must be submitted within ten days of the examination to the VEC or to the Commission. The FCC has concluded that there is no need for the ten-day filing time rule in Part 97. "VECs may require VE teams to submit applications to them within a specified time period as a condition of coordinating an examination session."

Radio Amateur Civil Emergency Service (RACES)

Established in 1952, RACES operators provide essential communications to assist state and local governments during emergencies. It is sponsored by FEMA, the Federal Emergency Management Agency.

RACES authorizes specific frequency bands for amateur stations to use for providing civil defense communications in the event that Amateur Service use of the radio spectrum is suspended due to war or other national emergency.

New Part 97.407(b) deletes the frequency bands and segments and clarifies that during certain emergencies the frequency segments available to Radio Amateur Civil Emergency Service (RACES) stations and amateur stations participating in RACES would be authorized pursuant to Part 214 of the Code of Federal Regulations, "Procedures for Use and Coordination of the Radio Spectrum During a Wartime Emergency."

What WT 04-140 Does Not Do

The Report & Order does not address Morse code testing in the Amateur Service nor petitions that suggest a new entry-level license that allows HF operation. Those matters will be covered in the next major Amateur Service rulemaking, WT Docket 05-235, which is still pending at the FCC. The 5 words-per-minute code exam is still required for the General and Extra class.

The new WT 04-140 rules were publishing in the Federal Register on November 15 and take effect on December 15, 2006. A copy of the R&O appears on the FCC website: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-149A1.pdf>.

73, Fred, W5YI

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

A New Ham's Greatest Resource: Other Hams

During the Field Day (FD) event last summer there were a number of newly licensed hams among the Huntington Beach Radio Amateur Emergency Service (RACES) group. As usual, some of the members were content to participate in Field Day by sitting in the shade and drinking soft drinks and having lunch. Others went full bore and set up radios and antennas and accessories needed to make the stations run.

I always like to think that Field Day serves multiple purposes, beyond a demonstration of public-service and emergency communications. FD can also be a great opportunity for "learners" and "teachers" and "followers" and "leaders" to get together, help one another out, and have fun in the process.

Opportunities for Newcomers

At least one brand-new ham stepped up to learn something new while at Field Day. It was Rami Shunmugavel, KG6CCB (who, by the way, has her Amateur Extra Class license). She recently had purchased a used handie-talkie and was having some sort of trouble with her rig. While none of us had the same model of radio she did, Rami did bring the operating manual with her to the Field Day site.

A few of us tried to determine if the unit was actually a radio meant for a different (non-USA) region of the world. (This is sometimes important when looking at a used VHF or UHF radio, since frequency allocations are often different in other parts of the world. Thus, a radio destined to be sold in Europe quite often will have differences from the U.S. model in frequency capability, operating features, and sometimes accessories. One example of a difference in features is continuous tone squelch (CTCSS), which is used in the U.S. to access repeaters. In Europe, though, the convention is to use a "tone burst," so a European version of a radio—often with an "E" at the end rather than an "A" for America—may not include CTCSS as a standard feature.) Fortunately, Rami's radio was a "valid unit" for the USA.

Meanwhile, after a few minutes of looking at the operating manual and using the radio step-by-step, the group figured out that it was functional, and that the culprit was the speaker/microphone headset accessory, which turned out to be defective. The good news was that the accessory was purchased less than a week earlier and could be exchanged under warranty. We suggested that she take both the radio and the defective headset to the local ham radio store where she bought her items, so that the broken unit could be verified to be "bad" and a working replacement could be received (see photo A).

Once Rami found out that her problem really was not a "pilot error" in operating the radio, I could tell that her confidence and enjoyment of operating the radio began to improve. In fact, she also got a chance to give the "low bands" a try, and made a large number of contacts beyond the local repeater (photo B).

Recruiting Opportunities

Field Day also provides a great opportunity for recruiting spouses and family members into ham radio. Other events have that potential as well. A few years ago, another radio club to which I belong—the San Bernardino Microwave Society, SBMS—sponsored a national technical conference called Microwave Update (MUD). The tasks for the organizers included arranging activities for the wives (XYLs), coordinating the banquet and decorations, and a million other details of putting on a successful conference.

Luckily for us, a team of ladies came together and did an outstanding job of getting all the details done. With all this activity centered on a ham radio event, I was hoping that some of the "radio aspects" of the event would rub off on the women in the group, and maybe even inspire one or more of them to get her own ham license. Sure enough, we got at least one more enthused ham in our club. Tisza

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e-mail: <kh6wz@cq-amateur-radio.com>

Photo A– Operating events such as Field Day are a great opportunity for radio beginners and teachers to get together. A new ham and an Extra Class operator, Rami, KG6CCB, learned that her radio difficulties were not caused by improper operation; it was a defective accessory item. Once she had confirmation that her confusion had nothing to do with the way she operated the radio, her confidence improved, and so did her enjoyment.

Photo B– On the left, Dr. Steve Graboff, W6GOS, past Chief Radio Officer of Huntington Beach RACES, mentors Rami on how to handle HF operations for the first time.

Swanberg, now KI6DBR, the wife of the club's Recording Secretary, Mel, WA6JBD, caught the ham radio bug and passed the Technician Class exam with flying colors. She has even participated in at least one microwave contest. In fact, her first contacts were on the 10-GHz band, at several hundred kilometers away! This is a pretty amazing feat for a brand-new licensee. Of course, Mel was able to help her along the way to success. For the rest of the club members, this also means a new station to contact for points in the contests. This has to be even better for Mel, because now more of the family budget can be allocated for new radio equipment!

Opportunities for Teachers and Instructors

Actually, the sub-head used here should say "Opportunities for Teachers and Instructors and Everyone Else." That's because any licensed ham should be qualified to teach a thing or two to newcomers in our hobby. In other words, in a world where volunteerism is a main ingredient, a lot can be done simply by being there to *lend a helping* hand to someone who is "stuck." Since you have earned your license by studying for—and passing—exam, you know enough to help someone else to do the same. Sure, there are limits to anyone's knowledge, but when your student reaches your maximum amount of knowledge, it is time for him or her to seek another resource. This also means that you have an opportunity to become a student again and increase your own knowledge. This is an ongoing process throughout life.

Whenever anyone asks me for help, I try to assist as best I can. If I am not able to render help, I try to provide an alternate contact person or recommend good references. The person seeking assistance also creates an opportunity for you to recruit him or her into whatever part of ham radio you enjoy, perhaps as a communications volunteer, operating a ham radio specialty mode, or just joining your radio club.

People seeking help are showing an interest in learning something new and have the motivation and drive to make the first move. This personality trait is something we need to strive to capture, since their enthusiasm can help sustain or breathe new life into many clubs or groups. Your goal as an experienced and helpful person is to keep them motivated and excited about what we are doing.

Remember, too, while we are "giving and taking," there is no such thing as a dumb question, especially since the person asking the question is trying to learn something new, and there is nothing wrong with that.

Is there something related to ham radio you want to know more about? Do you have an interesting story to share about how you got started? Drop me an e-mail message and we can get something going.

73, Wayne, KH6WZ

world of ideas

BY DAVE INGRAM,* K4TWJ

More Glowbug Glamour—Part II

As you may recall, our November 2006 column featured "More Glowbug Glamour" with views and details of the ever-popular 50C5 and 117N7 transmitters. It also hinted that another "golden oldies special" was scheduled for early 2007. That is the topic of this month's column, and the focus this time is on mods for the classic 6L6 transmitter (plus other famed one-tubers such as the 50C5 and 117N7). We will also revisit the unique "Twinplex" one-tube receiver and a delightful little push-pull transmitter from the mid 1930s for extra pizzazz. Do you like easy homebrew fun projects with nostalgic flare? If so, read on!

Incidentally, if you become hooked on heart-warming tube-type gear from eras past, take a look at <www.antiquewireless.org>. This group has a great time exchanging views and tales from the days of real glow-in-the-dark radio, and they also hold some fascinating on-the-air contests using genuine "oldie" gear.

Here's Looking at You, Kid!

When Bob Russell, WD4PAQ, built our sweet little 6L6 transmitter featured in October 2004 *CQ*, he did it in high style (photo A and fig. 1). First, he mounted the parts on a beautifully crafted wood base with all wiring recessed into the bottom for great eye appeal and an extra margin of safety. Getting shocked is still possible, but you must work at not doing so! Bob also added an electron-ray tube (we affectionately called them "magic-eye tubes" during the fabulous '50s) as an output tuning indicator. The mod was originally featured in a March 1994 *CQ* article by David Ishmael, WA6VVL, the man credited with keeping Knight Kits famed Ocean Hopper receivers alive and thriving. David used a 6E5 magic-eye tube, but Bob only had its equivalent 12-volt filament tube on hand (a 1629), so in it went.

As Bob points out, either tube works fine. The 1629 just requires an 8-pin octal socket (rather than a 6-pin socket), 12 volts rather than 6 for the filament, and slightly more grid voltage to close its tuning eye. That's why an additional 10K-ohm resistor is included between the 1N4148 (or equivalent "glass" diode) and the 10K potentiometer in the 6E5 inset circuit of fig. 1. It drops the sensed/input voltage.

Adjusting the magic tuning indicator circuit is also a snap: just set R7 for eye closure when the transmitter is fully tuned. Once set, any other form of RF output indicator is not necessary. Nice! It has real radio class and flash (especially when operated in a dimly lit room), and the magic-eye mod is easily added to other transmitters such as the 50C5, 117N7, or even the push-pull 6A6 transmitter highlighted later in this column. Just remember to include a filament transformer/connection for the magic-eye tube. Bob addressed that requirement by using a center-tapped 12-volt transformer to "feed" both tubes' filaments. That also brings another mod into focus.

Although our highlighted transmitters have been built on wood frames with hidden wires and link coupled output and are used with plastic-cased keys, some folks still frown on our inclusion of an AC/DC-type high-voltage power supply. As an alternate power supply idea, we suggest using two 120-volt to 12-volt transformers connected back to back to produce a 120-volt to 120-volt isolation transformer. Filament voltage can then be tapped off the transformer's parallel-wired low-voltage windings.

Sharp-eyed readers may notice Bob also used a different plate coil in his transmitter. It consists of 13 turns of No. 18 enamel wire on a 1.25-inch form for 40 meters, with a 4-turn antenna pickup coil. For 80 meters, he swaps to a 29-turn coil and a 5-turn antenna pickup coil on a similar 1.25-inch diameter form. The mating tuning capacitor is 140 pF. The same coils also work in the following "Twinplex" receiver, with the tickler windings substituted for the antenna pickup coils and a 100-pF tuning capacitor used in lieu of a 140-pF capacitor.

The Amazing Twinplex

In talking with Bob Russell, WD4PAQ, about his 6L6 transmitter, we learned he also homebrewed a neat little one-tube "Twinplex" receiver worthy of recognition (photos B and C, and fig. 2). This little beauty debuted in a 1934 edition of Hugo Gernsback's celebrated *Shortwave Craft* magazine and

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Photo A– Using as a basis one of our 6L6 parts packs featured in the October 2004 "World of Ideas" column, Bob Russell, WD4PAQ, built this smart-looking transmitter with all the wiring hidden below the base and a "magic-eye" tuning indicator for extra glamour. It is a genuine showpiece guaranteed to live on in the annals of time, and it works well, too! (Photo courtesy of WD4PAQ)

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1.5 kW Dry Dummy Load has built-in precision, true peak-reading SWR/Wattmeter switchable to external antenna!

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.

MFJ-267 **$159.95**

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.

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MFJ-856 **$149.95** w/3 el.Yagi

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.

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MFJ-801 has 1¾ inch meter, sensitivity control, 20 inch extended telescoping monopole antenna.

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 **$189.95**

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 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. 7½Hx6¾D in. **MFJ-250, $69.95.** Includes transformer oil (no PCB).

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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 **$39.95**

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

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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.

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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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acquired immediate popularity because of its clever "two tubes in one envelope" design.

Looking closer at the Twinplex circuit, we see its use of RC coupling between detector and amplifier sections rather than a big (and rare!) audio choke makes it easy to home-reproduce today. That is assuming you can locate a nice NOS (*new old stock*) No. 19 tube.

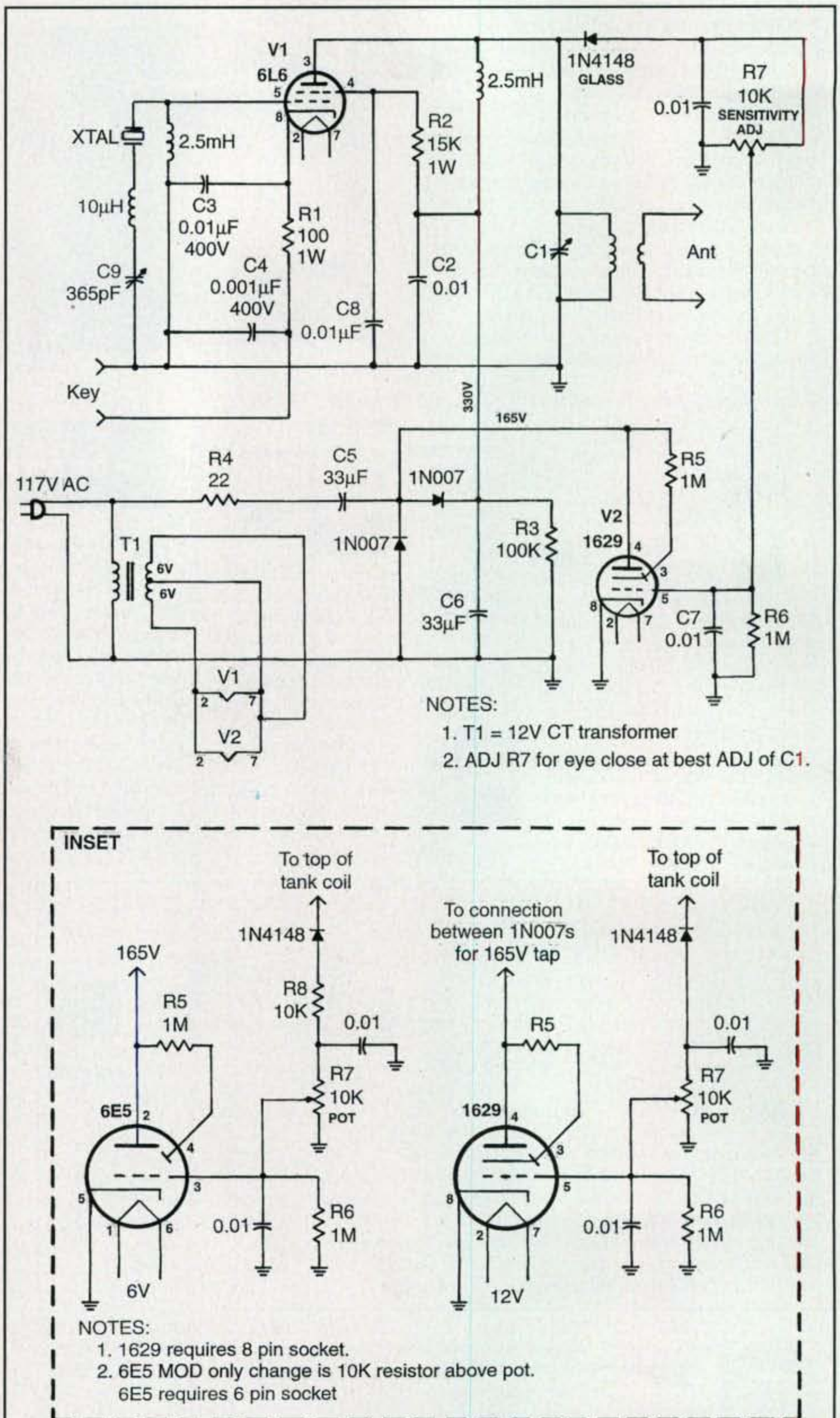

Fig. 1– Circuit diagram of the 6L6 transmitter with magic-eye tuning indicator built by Bob, WD4PAQ. Insert shows how a 6-volt 6E5 or a 12-volt 1629 may be used in the magic-eye circuit. (Info courtesy of WD4PAQ)

I understand some are available from Stan Winston at ESRC Corp., <www.esrcvacuumtubes.com>, or by e-mailing Stan at <esrc1@aol.com>.

Simple one- and two-tube regenerative receivers were hot attractions during the mid-1930s, so the Radio Trading Company of New York City began producing easy-to-assemble kits of the Twinplex—with an interesting twist. Rather than mounting the tube, coil, and several other parts vertically on the frame's baseboard as normally done, they positioned them to extend horizontally, facing the rear from the front panel. Supporting advertisements for the Twinplex explained short interconnecting wires were very important for top performance, and horizontally mounted components with short wire runs had a decided advantage. Fact or fiction? It really didn't matter. Appearance was (and often still is!) everything. The Twinplex thus became an all-time classic in one-tube receivers, with homebrewed-from-scratch versions built traditional style and Radio Trading Company versions built horizontal style. The Radio Trading Company went on to produce several other receivers with attention-grabbing names such as the Oscillodyne, the One Tube Wonder, and the Argonaut.

What is it like using a regenerative receiver today? It's fun yet somewhat challenging, I would say. A regenerative receiver is quite sensitive, but like a basic direct-conversion receiver, it tunes both sidebands and lacks any form of selectivity to eliminate QRM. A drawback? That depends on your ability to copy one signal while ignoring other on-frequency signals—mental filtering, so-to-speak. That is what I refer to as the operator rather than the rig making the difference.

Our sincere thanks to Bob, WD4PAQ, for sharing views and circuit diagrams of his mini rigs. If you have questions, you can e-mail Bob at <wd4paq@bellsouth.net>.

A Push-Pull Transmitter

Views and details of yet another captivating little one-tube transmitter from the mid-1930s, compliments of Mac Neill, W8ZNX, are included in photo D and fig. 4. Mac homebrewed this little treat from descriptions in the famous Frank Jones *Radio Handbook* of 1935, and it utilizes a shapely little 6A6 tube in an almost-forgotten push-pull oscillator configuration. If you have never dinked with a push-pull oscillator, you have missed a fascinating experience.

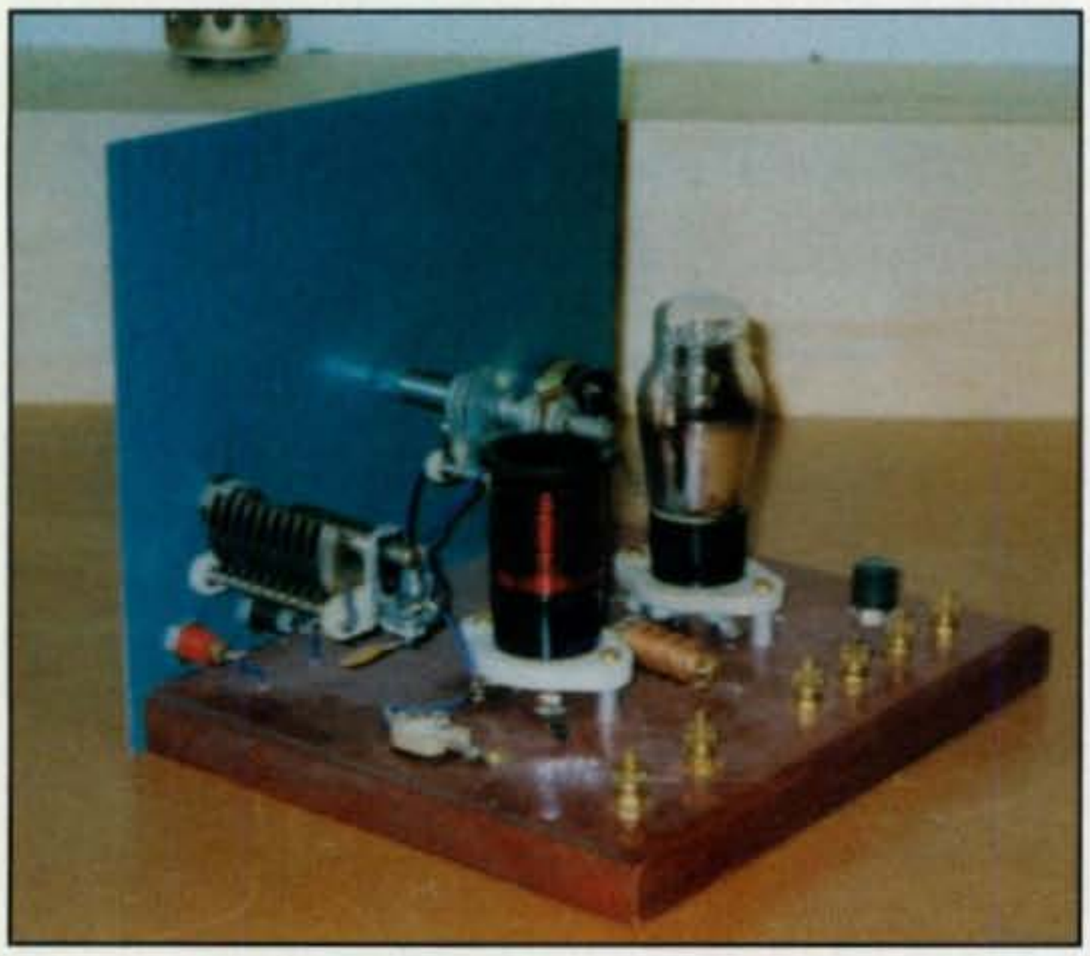

Photo B– Another WD4PAQ homebrew beauty with true old-time pizzazz is this 1934 Twinplex receiver utilizing a No. 19 dual section tube. Check out those snow-white isolanite sockets and the classic Jackson vernier drive. Nice! (Photo courtesy of WD4PAQ)

Photo C– Front view of the 1934 Twinplex receiver built by WD4PAQ. It is a classic example of elegant simplicity. (Photo courtesy of WD4PAQ)

It employs a balanced circuit, so its plate coil is center tapped and it can also be a mite finicky on crystals. That is, sluggish or slow to oscillate crystals tend to introduce chirps and some even refuse to oscillate above 40 meters. Personally, I see this push-pull oscillator/transmitter as an ideal candidate for a frequency-warping crystal as discussed in our previous glowbugs column. Simply explained, that is an old-style FT-243 cased crystal with its front/metal cover unscrewed slightly and a center adjustment screw added to vary holder pressure on the quartz slab inside. By varying the pressure, you control oscillation ever so slightly and thus shift the crystal's frequency five or six kilohertz. It's wild, but it works!

Look closely at Mac's 6A6 beauty and you will notice it is set for 80-meter operation with a 3547-kHz crystal. The accompanying plate coil (on a 1.5-inch diameter plug-in form) is 51 turns of No. 22 enamel-coated wire, close wound and tapped at its 26th turn. The tap connects to one of the form's four pins, so the four-turn antenna pickup coil (of insulated hookup wire wound over the plate coil's mid section) connects to two binding posts beside the coil form. Pickup coil position can be varied slightly to tweak output.

If 40-meter operation is preferred, the plate coil is 25 turns of No. 16 enamel-coated wire wound with a wire's width spacing between turns and tapped at its 13th turn. A 70-pF variable capacitor is used for 80-meter operation, and a 35-pFd variable capacitor is used for 40-meter operation. Jones pulled a "trick" in his transmitter by parallel connecting a fixed capacitor of approximately 35 pFd with a variable capacitor of 35 pFd to produce a 70-pF capacitor for 80 meters. Then disconnecting one fixed capacitor wire yields a 35 pF capacitor for 40 meters.

Reviewing Jones' description of a "no meter required" tune-up for this push-pull transmitter is a hoot. One method he suggests is touching the lead point of a wood pencil to one of the variable capacitor's plates while the key is closed/down. Do not hold the point of the pencil continuously against the capacitor's plate. Instead make a series of rapid contacts with the point while turning the capacitor through its range. When the capacitor hits resonant, small sparks will be drawn to the pencil's lead. Now that's what we call class!

Typical power of this little gem, incidentally, is around 10 to 12 watts output on 80 meters with 350 to 400 volts on the tube's plates. You could opt for the standard procedure of inserting a

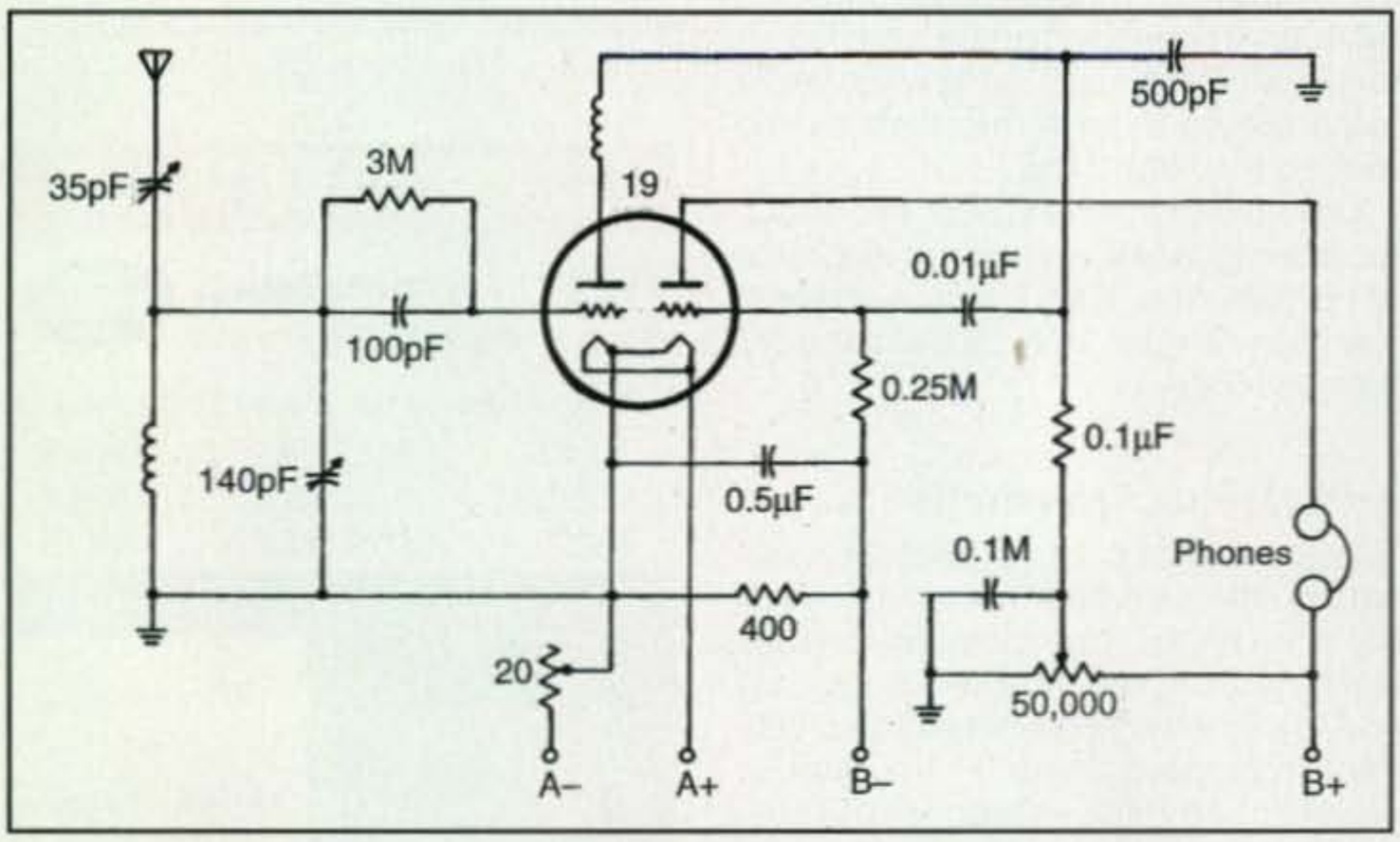

Fig. 2– Circuit diagram of the Twinplex receiver as introduced in a 1934 edition of Shortwave Craft *magazine. Thanks to its use of conventional parts, home-brewing a copy in 2007 still holds great appeal.*

Fig. 3– Original sketch of the Twinplex receiver sold as a kit by the Radio Trading Company of New York City. The horizontally positioned tube and coil place this kit in a class of its own. The receiver featured authentic "velvet vernier" tuning knob with rim drive fine-tuning control, and it sold for $4.91 in 1934.

Photo D– Roaring back from the pages of Frank Jones's 1935 Radio Handbook *is this unique 6A6 push-pull transmitter built today by Mac Neill, W8ZNX. (Photo courtesy of W8ZNX)*

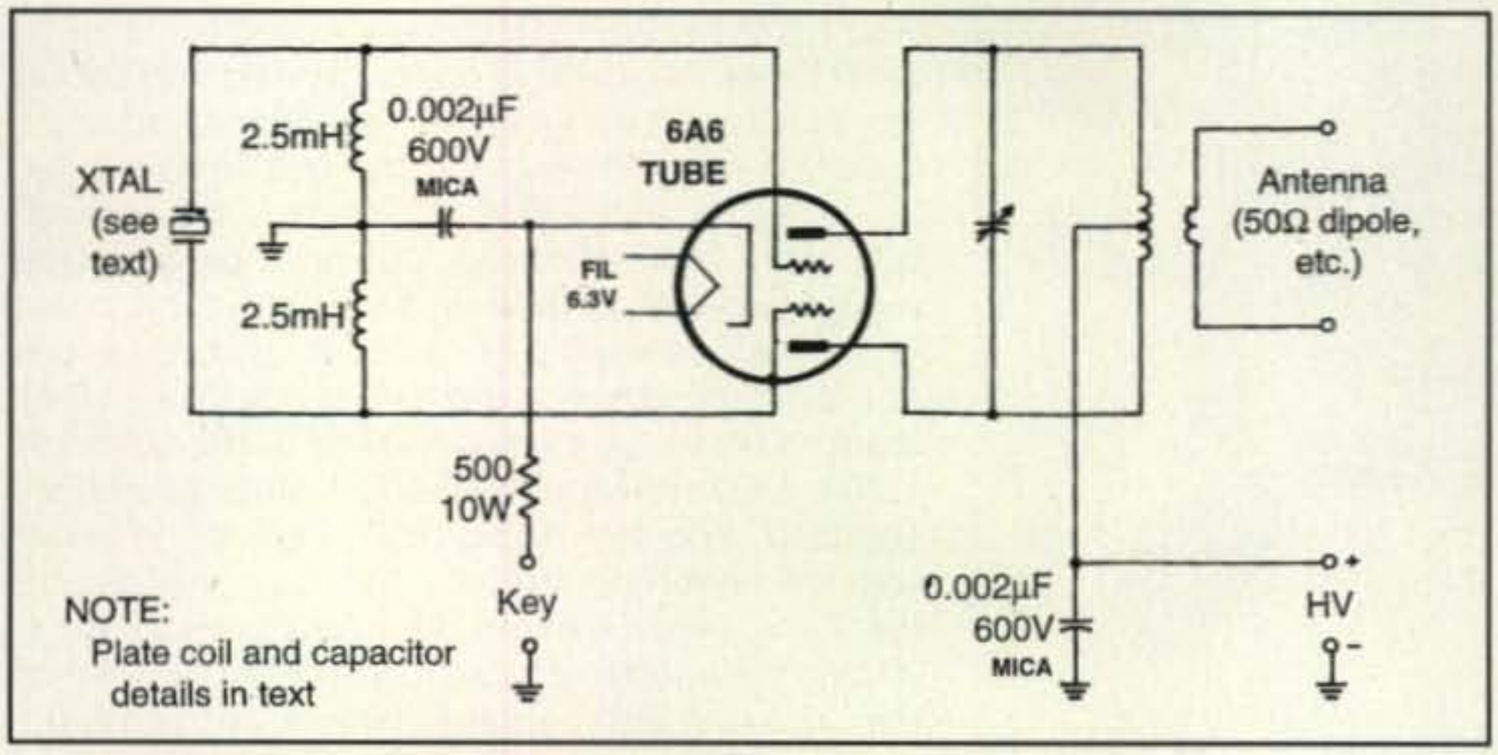

Fig. 4– Circuit diagram of the 6A6 push-pull transmitter courtesy of W8ZNX. (Discussion in text.)

milliamp meter across the key or monitoring RF output on a wattmeter, true, but somehow it seems too prim and proper compared to using a wooden pencil. One word of warning, however: ***Do not try this method of tuning with a kilowatt amplifier.*** The pen will be cremated and you will be fried ham!

Our thanks to Mac Neill, W8ZNX, for sharing views and details of this neat 6A6 push-pull transmitter.

Conclusion

That wraps up the old-time views for this month, gang, but stay tuned for more glow-in-the-dark radio fun coming in future columns. We even have a tube-type mobile rig lurking in the wings. Who could ask for more?

73, Dave, K4TWJ

the weekender

BY PHIL SALAS,* AD5X

Separate Transmit/Receive Antenna Switching

There are times when it can be beneficial to use separate antennas for transmitting and receiving. As an example, a vertical antenna can be a great radiator on 160 and 80 meters, but it may also be a very noisy receiving antenna. Thus, sometimes the low-noise characteristics of a magnetic loop antenna or a Beverage antenna may be desired for receiving. Now many higher-end transceivers have a separate antenna connector for a receive-only antenna, but my IC-706MKIIG, like most low-to-moderate priced transceivers, does not. However, it is not difficult to provide separate T/R antenna switching externally to most radios.

Photo B– External view. Labeling was done with a Casio labeler and "black-on-clear" labeling tape.

Design Consideration

The T/R antenna switch uses a relay for antenna switching, under control of the amplifier interface available on most transceivers. Since lead lengths and their associated inductances are very forgiving at frequencies below 30 MHz, the important thing becomes the current rating of the relay contacts and the relay switching time, as it is important for the relay to fully energize before your transmitter puts out power. The heart of this unit is the Fujitsu 10-amp SPDT relay called out in the parts list (Table I). This relay has a specified maximum switching time of 10 milliseconds. I measured the HSEND-to-RF Output on my IC-706MKIIG as 12–15 milliseconds from start of the output RF to full RF power, so the 10 millisecond switching time of this relay is perfect for this transceiver.

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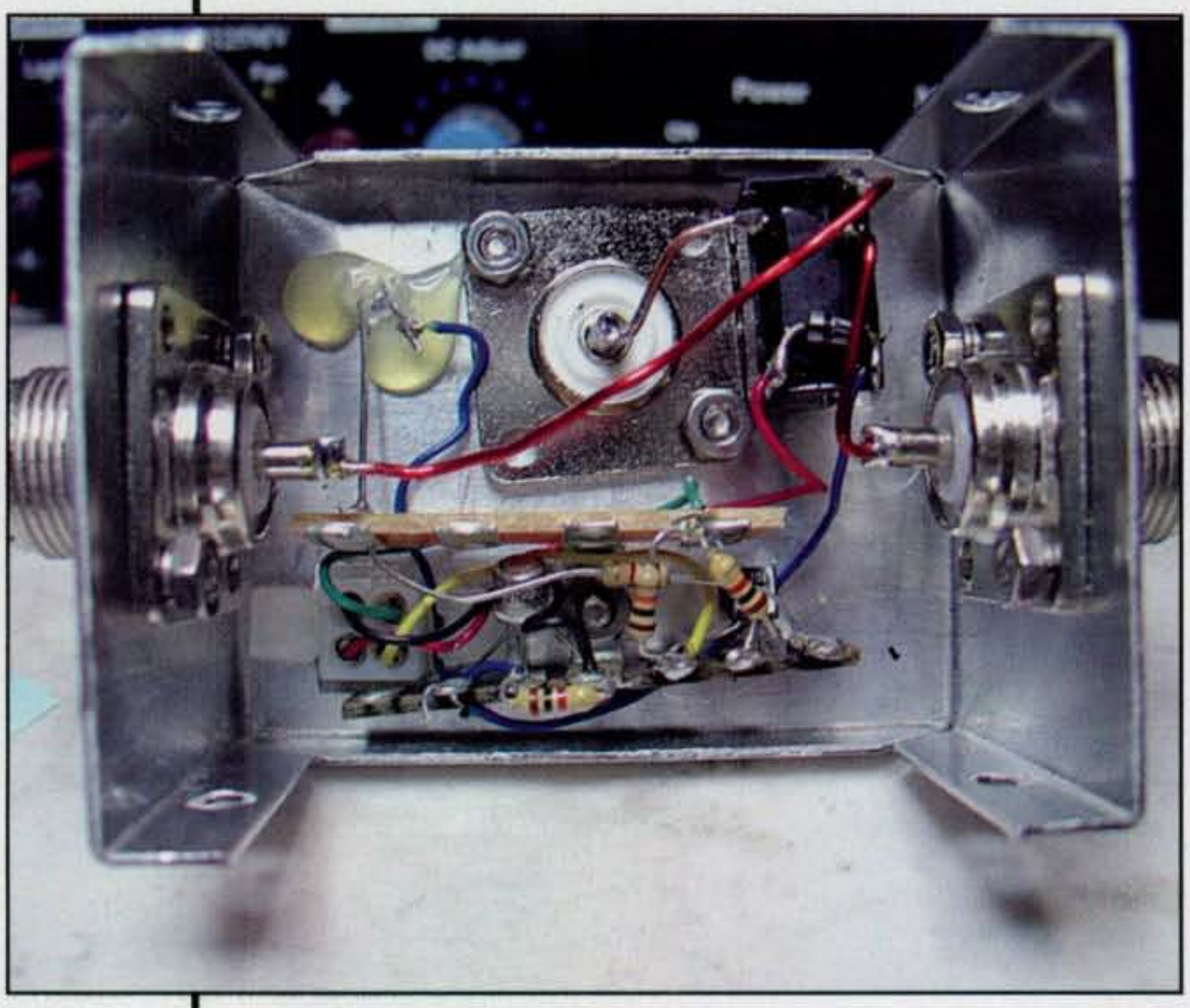

Photo A– Inside wiring. All are point-to-point, as lead lengths are not critical at HF.

The Circuit

Fig. 1 is the schematic of the antenna switch. The relay driver interface is pretty generic and should work with most transceivers that provide an open-collector transistor to ground for enabling an external amplifier. On the IC-706MKIIG, the HSEND output is a bi-directional output that must only drive a high-impedance load and should not be pulled up higher than 8 volts. For most other transceivers, you can just connect the +8V point to a +13.8V input as shown by the dashed line on the schematic. The LED shows when the TX antenna has been selected. You can add an SPST switch in series with the either the +8V or +13.8V input to disable the switch when desired. I found it just as easy to unplug the interface cable to the transceiver when the separate antenna switching is not needed. I used SO-239 connectors for the RF interfaces, and a Molex 4-pin miniature connector for the control signals. All circuitry is wired on two terminal strips.

Qty	Description	Source	Price ea.
1	2.7x2.2x1.6" AL box	Mouser 546-1411BU	$3.30
1	SPDT 10-amp relay	Mouser 817-FTR-H1CA012V	$1.88
1	4-pin Molex plug	Mouser 538-030-06-2043	$0.77
1	4-pin Molex socket	Mouser 538-03-06-1044	$0.77
4	0.062 F contacts	Mouser 538-02-06-1103	$0.19
4	0.062 M contacts	Mouser 538-02-06-2103	$0.19
3	SO-239 connectors	All Electronics SO-239	$1.00
1	2N2222A transistor	All Electronics 2N2222A	2/$1.00
1	2N3906 transistor	All Electronics 2N3906	5/$0.75
1	Ultrabright red LED	All Electronics LED-94	$0.75
1	10K resistor	All Electronics 10K-1/4	5/$0.50
3	1K resistor	All Electronics 1K-1/4	5/$0.50
1	1N4001 diode	All Electronics 1N4001	15/$1.00
2	7-lug terminal strip	All Electronics TP-70	10/$1.00

Table I– Parts list.

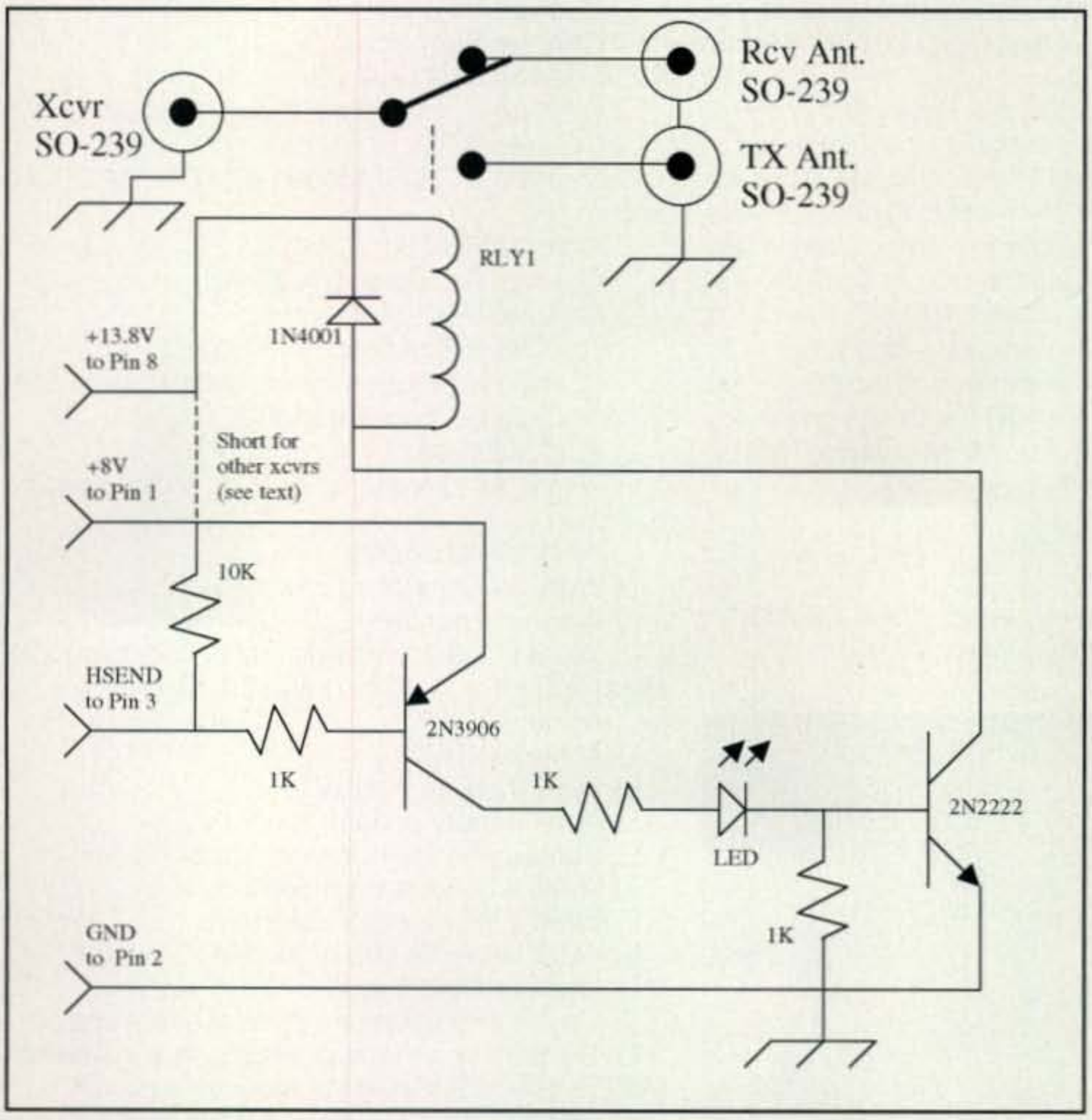

Fig. 1– Schematic of the separate transmit/receive antenna switch.

The relay and LED are mounted by hot-gluing them to the bottom of the aluminum box. Photos A and B show the inside and outside of the transmit/receive antenna switch.

Conclusion

I've described a simple external antenna switch for separate transmit/receive antenna switching. If your transceiver doesn't have a separate receive-only antenna connector, this switch will inexpensively solve this problem.

Don't forget to send your ideas, questions, or suggestions to me at <ad5x@cq-amateur-radio.com>. Until next time . . .

73, Phil, AD5X

magic in the sky

BY JEFF REINHARDT,* AA6JR

The Things We Do . . .

Recently, I was in a conversation with some fellow hams. Each was recounting some activity related to ham radio. I then began to "zone out" of the discussion, wondering, "How many different things are there to do in ham radio?"

I then flashed back to my primary school days, recalling yet another way I sent my mother climbing the walls. After months of anticipation of summer vacation, on the first afternoon of that wondrous break away from the classroom I said to her, "I don't have anything to do." Her eyes just rolled.

The connection here is this: If you're starting 2007 thinking, "I don't have anything to do in ham radio," you're probably like a kid on the first day of summer vacation. . . . Maybe you just don't know what your options are.

Thinking about this further, I compiled a list of many different activities associated with ham radio. I'm sure there are a few I have missed, but spare me the "Worked All Left-handed Corvair Drivers Award" and their ilk. Some are easy, while a few others can take considerable time to achieve. Are you up for a challenge or two?

Your assignment (it's January, not June!): Go down the following list and check off the things you have done, and then identify the things you'd *like* to do. No complaining about lack of funds, either! If there's a will, you'll find the means.

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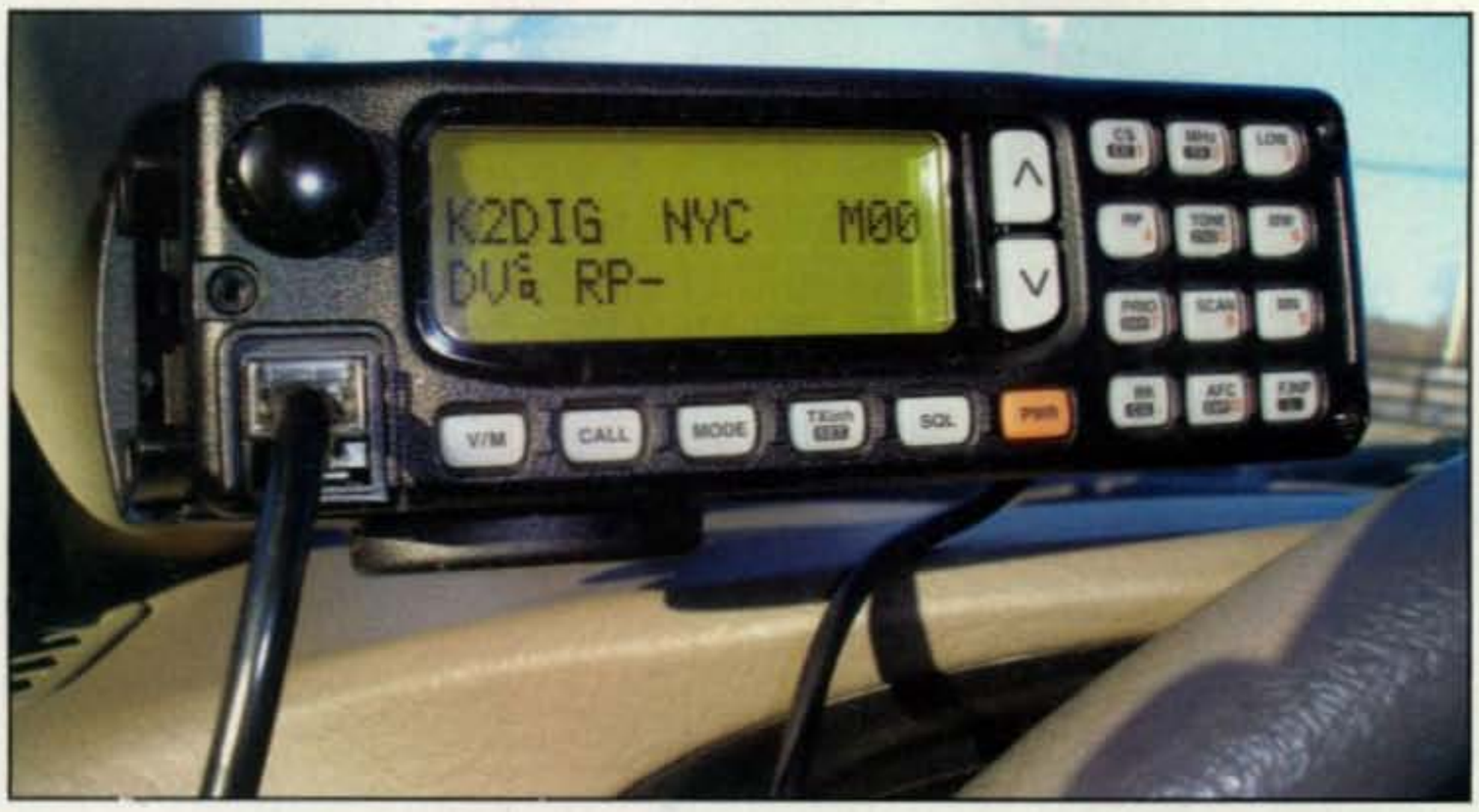
Build something! It can be a relatively simple kit such as this "Tuna Tin" QRP transmitter or whaever your skill level will permit.

☐ Build a receiver (crystal set, transistor or tube)
☐ Build a transmitter, anything from QRP to linear
☐ Build a dipole (maybe for a band you're not currently on)
☐ Build an exotic wire antenna (something other than a dipole)
☐ Build a Yagi (VHF or UHF)
☐ Operate AM
☐ Operate FM
☐ Operate CW
☐ Operate SSB
☐ Operate SSB on VHF
☐ Operate SSB on UHF
☐ Operate Slow Scan TV
☐ Operate Fast Scan TV
☐ Operate through a 10-meter repeater
☐ Operate RTTY
☐ Operate a "TOR" mode (AMTOR, PACTOR, and so on)
☐ Operate PSK 31
☐ Operate Packet and/or APRS
☐ Operate IRLP or Echolink
☐ Operate a digital voice mode
☐ Operate a remote-control device using a ham frequency (e.g., model aircraft)
☐ Work all states
☐ Work all states on one or more specific band(s)
☐ Work all continents
☐ Work all Canadian provinces
☐ Work all counties (USA-CA)
☐ Work a QSO on every band (including 222 MHz, 902 MHz, 1.2 MHz, and 2.4 MHz)
☐ Achieve DXCC
☐ Achieve VUCC
☐ Work through a satellite
☐ Work meteor scatter
☐ Contact the International Space Station
☐ Make a contact via moon bounce
☐ Work a YL on each continent
☐ Work HF while you're mobile
☐ Operate Field Day
☐ Create and operate a special event station
☐ Be part of an actual emergency response (ARES, RACES, Skywarn, etc.)
☐ Operate as a DX station (from outside your home country)
☐ Build a repeater, digipeater, or IRLP port
☐ Build (or help someone erect) a tower
☐ Attend the Dayton Hamvention®
☐ Attend a regional hamfest
☐ Send a Radiogram
☐ Participate in a net
☐ Make a presentation to a club
☐ Write a story for a ham magazine
☐ Recruit at least one person get an amateur radio license
☐ Help a newly licensed ham get on the air



Try operating a new mode! This ICOM ID-1 transceiver is set up for digital voice using D-Star, but you may be able to try a new mode, such as AM, RTTY, or slow-scan TV, with equipment already in your ham shack.

☐ Participate with a Scout troop in Jamboree On The Air

☐ Operate marine mobile

☐ Operate from a private airplane (legally, of course)

☐ Operate from a campsite

☐ Operate from an island

☐ Operate W1AW at ARRL HQ or at a divisional convention

☐ Operate the ham station at the Smithsonian in Washington, D.C.

So there are more than 50 ideas (better than one pursuit for each week) for 2007. Are you *sure* you don't have anything to do?

A Ham Radio Fantasy

What's your ham fantasy? Going on a DXpedition? Operating from space? Being the first to work some rare DX? Upgrading your license? Working every entity on the planet?

My *ultimate* ham fantasy was inspired by the recent elections. Imagine being the President of the U.S. and also being a ham. It nearly happened when Barry Goldwater (K7UGA, SK) ran for the office in 1964. Just think of the fun it would be to put out a CQ from your multi-element beam atop the White House, or from your 100-foot tower at Camp David, or from Air Force One. Do you think maybe there would be a pile-up? Then think of how happy others would be to receive your signed QSL card.

Many hams were fortunate to have worked K7UGA or the late King Hussein of Jordan (JY1). It indeed would be nice to see more world leaders take up our most enjoyable pursuit.

Drop me a note about your ham radio fantasy, and if we get enough responses, we'll publish the best.

Happy 2007

The new year awaits with many opportunities to make new friends, sharpen your skills, and brighten someone's day through this marvelous pursuit we call amateur radio. May every day of 2007 bring you the enjoyment that can only be found when you take to the airwaves and put some Magic In The Sky.

73, Jeff, AA6JR

Go to a hamfest! If you've only been to local shows lately, try a larger regional show or even the Mecca of ham radio, the Dayton Hamvention®. This photo is of the indoor flea market at last summer's HamCom outside Dallas, Texas.

what's new

BY KARL T. THURBER, JR.,* W8FX

New Products for the New Year!

A very happy, prosperous, and healthy New Year to all our readers! That having been said, let's dig right in. This month, we will focus on radio gear, accessories for the shack, antennas and antenna accessories, and the bookshelf, taking a close look at "what's new" in our radio hobby.

Photo A– Yaesu's new FT-2000 transceiver, shown here at the 2006 Huntsville Hamfest, is the second generation in the proud lineage of the FTdx9000 series. Is a state-of-the-art FT-2000 destined to be the centerpiece of your HF/50-MHz station? (Photo by W8FX at the Huntsville Hamfest)

Radio Gear

Yaesu FT-2000 HF/50-MHz Transceiver. A subject of great interest at last year's Dayton Hamvention® and subsequent hamfests was the state-of-the-art Yaesu FT-2000 HF/50-MHz transceiver photo A), dubbed by Yaesu as the second generation in the proud FTdx9000 lineage. The new radio looks to become a top-notch favorite in Yaesu's product line. In fact, Yaesu bills it as "Your DXing Dream Come True!"

The FT-2000 comes in two distinct versions: the FT-2000, a 100-watt radio with an internal power supply, and the FT-2000D, a 200-watt radio with an external supply. Major rig highlights are strong receiver design with wide dynamic range; dual in-band receive; powerful 32-bit DSP, providing IF shift, variable bandwidth, notch, and passband contour tuning; use of up to three optional high-Q preselector modules for the low bands; unique "block diagram" display layout; graphical display of IF filter passband; included precision analog meters; and more.

Particularly interesting is the ability to connect your computer monitor to the radio that is equipped with the DMU-2000 Data Management Unit. With it, you can enjoy a host of exciting, useful, and fun display possibilities. These include the Band Scope page, Audio Scope/Oscilloscope page, World Clock page, Rotator Control (with great circle map) page, Swept-Frequency SWR page, Logging page, and Memory Channel listings.

For more information, contact Vertex Standard USA, 10900 Walker Street, Cypress, CA 90630 (phone 714-827-7600; e-mail: <amateursales@vxstdusa.com> or <customerservice@vxstdusa.com>; on the web: <http://www.vertexstandard.com> or <http://www.yaesu.com>).

New Elecraft XV432 Transverter. Four high-performance transverters are included in Elecraft's new XV Series: the XV50 (6 meters), XV144 (2 meters), XV222 (222 MHz), and the very newest of them all, the XV432 (432 MHz). (See photo B.) The transverters can be used with nearly any transceiver that covers the 28- to 30-MHz frequency range (28–32 MHz on the XV432), including Elecraft's popular K2 and K2/100 radios.

The XV Series provides important benefits in both receive and transmit. On receive, the transverters combine a low receive noise figure with a high-dynamic-range front end, ensuring top weak-signal performance even in large-signal environments. Reliable overload detection is included at the IF port to protect the mixer. On transmit, the XV's 20–25 watts output will drive most high-power linear amplifiers. A sequenced keying output is provided for external amplifiers, and a built-in wattmeter using a 10-segment LED bargraph provides fast power output monitoring. Single-port and dual-port IF connections allow use with almost any transceiver. You also can easily chain multiple transverters to a single IF transceiver, providing multi-band operation without cable rearrangement.

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e-mail: <w8fx@cq-amateur-radio.com>

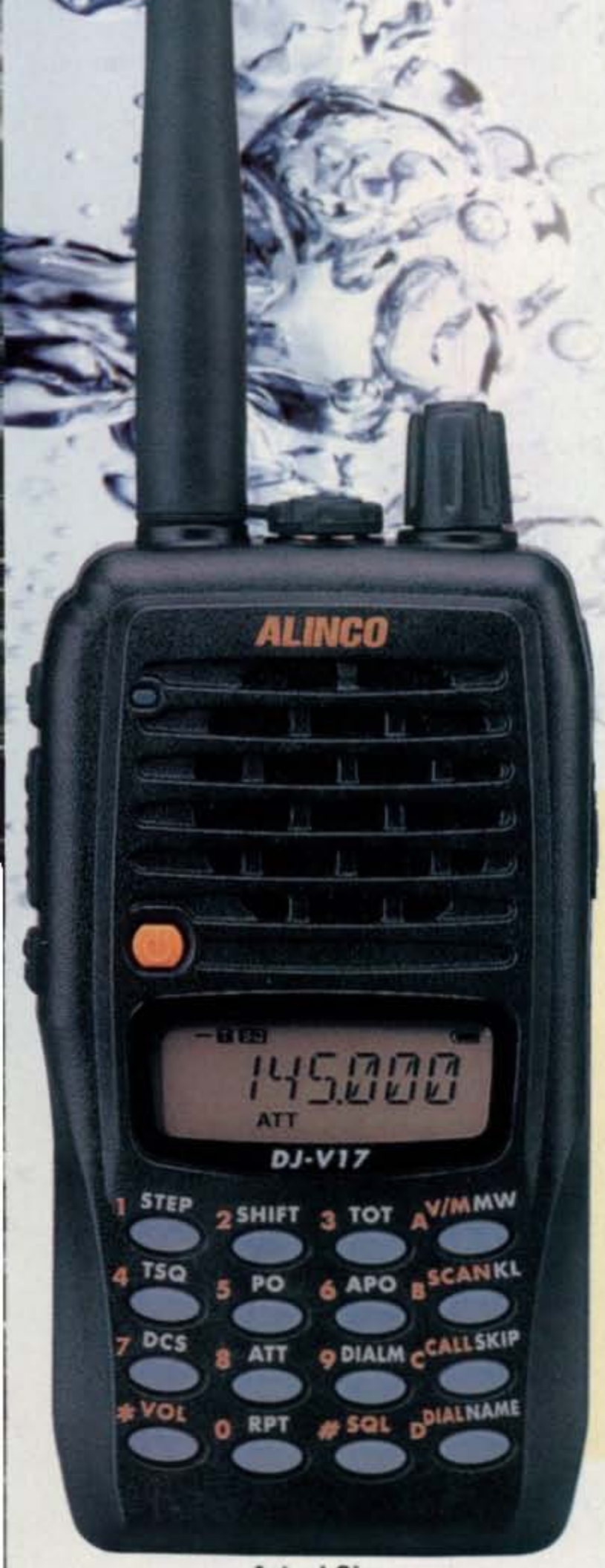
Photo B– The four Elecraft transverters in the XV432 series are shown on the right, along with the Elecraft K2 transceiver on the left. The new XV432 transverter sits atop the stack. (Photo from the Elecraft website) ←

New DJ-V17 makes a SPLASH

with great audio and high grade waterproof design!

Alinco is proud to introduce a new 5-watt full power 2M HT that makes a perfect companion for outdoor activities like fishing, camping or snow-sports.

The rugged polycarbonate materials are compatible to IPX7* so it's submersible 1m/3ft. for 30 minutes! And unlike water-resistant radios you may have looked at before, the DJ-V17 has a large 40mm internal speaker so its audio is clean and crisp, not muffled. You can enjoy 500mW max audio-output, new two-touch repeater access, and over 200 memories. A special battery-drain function helps avoid battery memory-effect. Other features include an ergonomic design, ultra-flexible antenna with SMA connector, 39 CTCSS settings, split function, two-level attenuator and more. Whatever your idea of outdoor fun, Alinco's DJ-V17 is ready to take on the challenges of rain, dirt and dust and come back for more.



Actual Size

- New, two-touch repeater access
- High grade waterproof materials compatible to IPX7* (submersible 1m/3ft. for 30 min.)
- Rugged polycarbonate body resists dirt, dust and moisture
- Large 40mm internal speaker for great audio!
- Highly visible backlit alphanumeric display
- Direct frequency input through illuminated keypad
- 200 Memories, plus one call channel and one repeater access parameter memory
- VFO, Memory and Scan modes
- Ultra-flexible antenna with SMA connector avoids breakage
- 39 CTCSS tone squelch (encode+decode) settings
- Tone burst function (1,000, 1450, 1750 and 2100Hz)
- Battery-drain function avoids memory-effect
- Cloning feature
- Ni-MH standard also uses optional Lithium-ion and NiMH battery packs or AA dry cell case
- SMA antenna port
- 2-level attenuator
- Waterproof single mic/speaker jack

Alinco guarantees this feature for 1 year provided all jack covers are properly and securely closed.

www.ALINCO.com

Distributed in North America by Ham Distributors, 1775 North Loop 336 East, Conroe, Texas 77301 • Phone: 866-396-9132 • Fax: 936-649-1303 • email: USRep@Alinco.com

Photo C– The new Novatech Model 1940A 400-MHz Signal Generator fits four frequencies in a rack-mountable case. See the text of this month's column for the details. (Photo courtesy of Novatech)

The XV Series transverters are packaged in attractive, low-profile enclosures with styling that matches the Elecraft K2. The transverters are also electrically well-integrated with the K2. Like Elecraft's transceivers, the XV transverters are completely modular, simplifying construction and alignment. The easy-to-assemble kits feature "no-wires" construction, and all surface-mount parts used in the kit are preinstalled at the factory.

For more details, contact Elecraft, P.O. Box 69, Aptos, CA 95001-0069 (813-662-8345; e-mail: <sales@elecraft.com>; on the web: <http://www.elecraft.com>).

Accessories for the Shack

Novatech Model 1940A 400 MHz Signal Generator. Definitely for upscale and lab users where only the very best instruments will do, the new Novatech Model 1940A 400-MHz Signal Generator (photos C and D) fits four frequencies in a rack-mountable case. The four 1940A frequency low-noise sine-wave outputs are independent and can be individually set to any value between 200 kHz and 400 MHz. Each of the output frequencies is provided on two buffered output connectors, for a total of eight outputs.

The Model 1940A contains an internal temperature-compensated crystal timebase that is stable to ±2 ppm per year. External reference inputs are provided so each section of the 1940A can be linked to an external frequency standard, thus allowing the same accuracy and stability as the standard.

There are two front-panel LCDs on each 1940A. Each two-line display has an associated rotary encoder and control buttons for setting the desired frequency on each of two channels per section. The output frequency also can be controlled remotely using an RS232 computer interface and simple text commands.

For more information and product pricing, contact Novatech Instruments, Inc., P.O. Box 55997, Seattle, WA 98155-0997 (206-301-8986; e-mail: <sales@novatech-instr.com>; on the web: <http://www.novatech-instr.com>).

Leviton SmartLockPro™ GFCI. How safe is your radio shack? Leviton's new SmartLockPRO™ GFCI (Ground Fault Circuit Interrupter) raises the bar for electrical safety and complies with Underwriters Laboratories' (UL's) latest GFCI requirements. Based on the patented lock-out feature of Leviton's original SmartLock® GFCI, the SmartLockPRO (photo E) offers two-stage protection against ground fault shock hazard, adding enhanced electrical safety features.

The SmartLockPRO can't be reset when its line and load terminals are miswired. In instances of an improperly wired line-load reversal, the green diagnostic LED indicator will turn ON to signal the wiring error. Once the device is properly rewired, it can be reset and its LED will function as a power indicator light, signaling that the receptacle has power.

A second stage of protection is afforded during the GFCI's service life. If the device fails to work properly (i.e., stops providing ground fault protection) at any time after it is installed, it can't be reset. This feature provides a clear indication to users that the device must be replaced.

According to Bill Grande, Director of Safety Products for Leviton, "Our extensive research showed that with earlier GFCI designs, users would unknowingly continue to use a GFCI even though it failed to provide protection against ground faults. It was also easy to put an improperly wired GFCI into service and have it appear as though it was working correctly. SmartLockPRO offers several advances that help ensure error-free installation. Once installed, the device stands up to rigorous use through the improvements we've made in its electronics and material construction. As a final measure of safety, the reset lock-out feature visibly communicates the need to replace the device should it fail its internal test function."

Earlier generations of GFCIs can be reset even though they are not providing ground fault circuit protection. With SmartLockPRO's unique, patented end-of-life lock-out action, users cannot reset the device when it fails to pass its internal test function, adding an extra measure of critical protection.

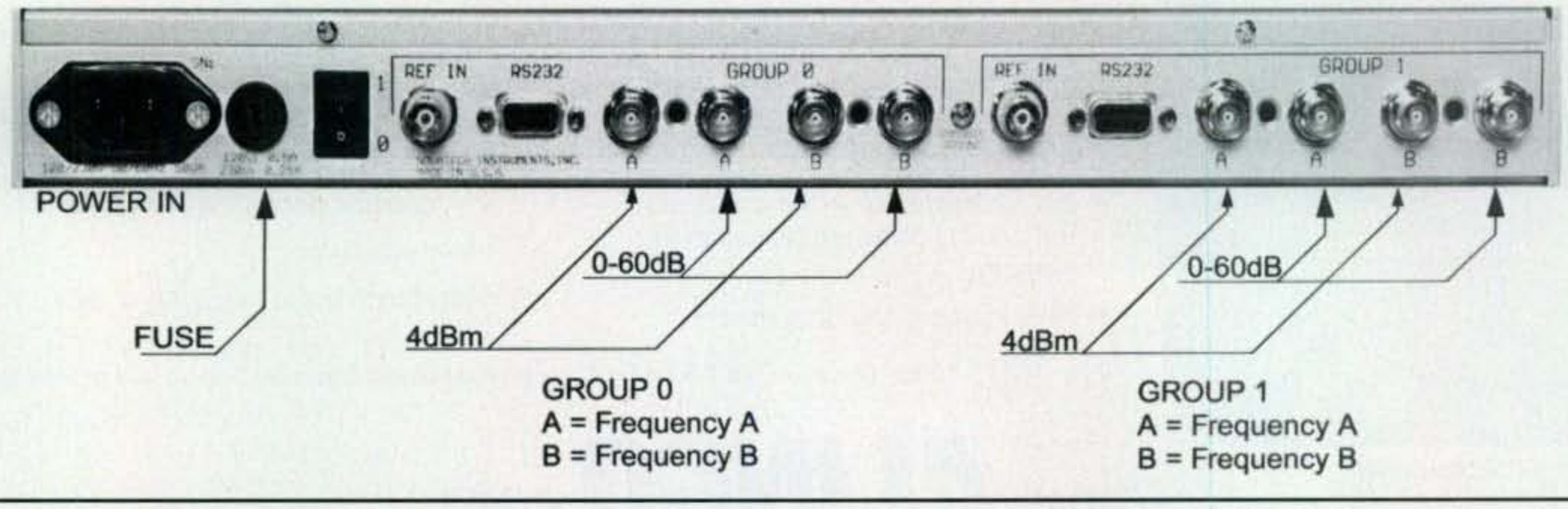


Photo D– Here's the well-appointed and nicely arranged rear panel of the Novatech 1940A 400-MHz Signal Generator. (Photo courtesy of Novatech)

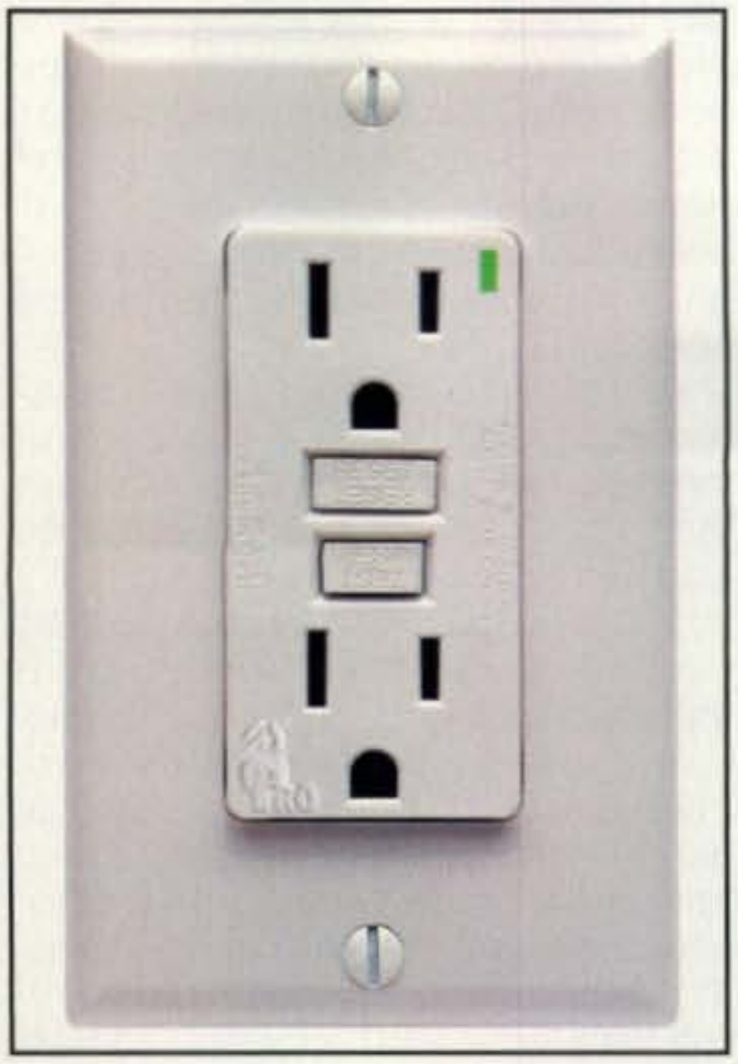


Photo E– Definitely not your father's Ground Fault Circuit Interrupter, Leviton's SmartLockPRO™ GFCI raises the bar for electrical safety and complies with UL's latest GFCI requirements. The SmartLockPRO offers two-stage protection against ground fault shock hazard. (Image courtesy of Leviton)

Contact Leviton Manufacturing Co., Inc., 59-25 Little Neck Parkway, Little Neck, NY 11362-2591 (phone 1-800-323-8900; on the web: <http://www.leviton.com>).

DD-103 Universal Digital Dial from ESP. The Model DD-103 Universal Digital Dial, offered by Electronic Specialty Products, LLC, provides digital accuracy for vintage receivers (photo F). It works by counting only the VFO (local oscillator) signal. All of the VFO offset and band information for many receivers is stored in the display's memory, allowing the operating frequency to be displayed by counting only the VFO signal.

The complete instruction manual and receiver list can be viewed on the firm's website, and there also is a manual program mode that lets you program the dial for any receiver (up to 32 bands) that is not preprogrammed. You can even use the 32 bands to manually program the unit for multiple receivers.

Each band can be individually calibrated to allow for crystals that have aged, or for any other misalignment or error, to an accuracy of 10 Hz. The calibration also is stored in memory so that any time you return to that band, the dial is automatically recalibrated; you only calibrate each band one time. The DD-103 has a band that is always available for use as a bench counter up to 40 MHz. The compact unit uses a backlighted LCD and is 2"H × 6"W × 4"D. Power is from the receiver, and the power and signal cables are supplied.

For details, contact Electronic Specialty Products, LLC, 3054 Moore Dr., Oviedo, FL 32765 (407-366-4859; e-mail: <cs@electronicspecialtyproducts.com>; or on the web: <http://electronicspecialtyproducts.com>).

Photo F– The Model DD-103 Universal Digital Dial from Electronic Specialty Products, LLC, provides digital accuracy for vintage receivers. It works by counting only the VFO (local oscillator) signal. All VFO offset and band information is stored in the display's memory. (Image courtesy of ESP)

Antennas and Antenna Accessories

Alpha 2100 Legal Limit HF Dummy Load. Do you know what goes nicely with a full-legal-limit amplifier? According to the folks at Alpha Radio, the answer is a dummy load capable of dissipating four times the legal limit (6 KW) for 2 to 3 minutes and the legal limit (1500 watts) "till the cows come home."

That being said, the new Alpha 2100 Legal Limit HF Dummy Load (see fig. 1) is an impressive piece of hamshack equipment. With its forced-air dry heatsink cooling system, temperature-con-

Fig. 1– With its forced-air dry heat-sink cooling system, temperature-controlled fans, multiple metering capabilities, and full bypass shunt, the Alpha 2100 Dummy Load is said to be one of the most clever dummies you'll ever meet! (Image from the Alpha website)

trolled fans, multiple metering capabilities, and full bypass shunt, the folks at Alpha Radio Products believe this thing is indeed pretty clever for a dummy (pun intended)!

Some of the unit's key specs include a dissipation capacity of 6000 watts burst and 1500 watts continuously; SWR flat across all HF amateur bands; metering that monitors wattage, heat-sink temperature, and reflected power; a temperature-controlled forced-air cooling system; full bypass shunt that can be kept in line with the amplifier and antenna; and a handy serial-port interface for PC monitoring and control. Power requirements are 100, 120, 200, 220, or 240 VAC, 50/60 Hz. The power tap selection is automatic.

For more details, contact Alpha Radio Products, 6185 Arapahoe Ave., Boulder, CO 80303 (303-473-9232; web: <http://alpharadioproducts.com>).

Photo G– The new MFJ-269 PRO HF/VHF/UHF SWR Analyzer features extended UHF frequency coverage and a commercial lab-type metal cabinet. Details in this month's column. (Photo courtesy of MFJ)

Two from MFJ. First up from MFJ is the new PRO Version of the popular MFJ-269 HF/VHF/UHF SWR Analyzer that features extended UHF frequency coverage and a commercial lab-type metal cabinet. The MFJ-269PRO™ (photo G) is priced at $409.95.

You can instantly check and tune any antenna from 1.8 to 170 MHz and 430 to 520 MHz with this easy-to-use and complete handheld antenna test lab. The rugged, handheld unit is said by MFJ to replace a workbench full of expensive test equipment.

The MFJ-269PRO measures essentially every antenna parameter: SWR, return loss, reflection coefficient, match efficiency, RF resistance, reactance, impedance, and phase angle of antennas—as well as antenna resonant frequency, bandwidth, and "Q." You also can determine coax cable loss in dB, its velocity factor, and its length in feet and electrical degrees.

The new MFJ Analyzer also lets you find out how many feet it is to an open or short in faulty coax. You can measure inductors in µH and capacitors in pF at any frequency, as well as SWR, return loss, reflection coefficient, match efficiency, coax loss in dB, and coax length in feet and electrical degrees on UHF.

A ruggedized, extended, commercial lab-type all-metal case protects the front-panel controls and connectors from damage if bumped, knocked around, or dropped. You can take it anywhere—to remote sites, up towers, in cramped places. It's fully portable, battery operated, compact in size, and weighs in at just 2 lbs. Also included are a battery saver, low-battery warning, built-in charging circuit for rechargeables, and "N" to SO-239 adapter.

Next up from MFJ is what is reportedly the world's largest HF SWR/wattmeter, the MFJ-868 Giant SWR/Wattmeter (photo H), priced at $139.95. The new MFJ-868 measures a full 6 1/2 inches diagonally across the meter scale. This meter is indeed one you can see! Its huge scale gives you ultra-fine resolution and its big, high-contrast numbers make reading a breeze—even across your radio shack. Also, the meter needle position and motion give you an accurate indication of what's going on quickly without actually reading the scale.

MFJ's exclusive TrueActive™ peak-reading circuit captures true peak or average forward and reflected power readings. The unit has 20/200/2000 watt ranges, which make it valuable for both QRP and QRO operation, and the full SWR scale makes reading SWR much more accurate and easier to read.

An exclusive MFJ Wattmeter PowerSaver™ circuit turns the meter on only when RF power is being measured. The new MFJ-868 covers 1.8–30 MHz, and its dimensions are 7" W × 5 1/2" H × 5" D. You can power the unit with a 9-volt battery, 12 VDC, or even 110 VAC (with the MFJ-1312D, $15.95).

All these products are protected by MFJ's famous No Matter What™ one-year limited warranty. Under it, MFJ will repair or replace (at its option) your MFJ products no matter what for one complete year.

For more information, to place an order, to get a free catalog, or to find your nearest dealer, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; <http://www.mfjenterprises.com>).

Turbo Tuner from N2VZ Enterprises. Bill Kantz, N2VZ, has introduced the Turbo Tuner™ (photo I). The Turbo Tuner is an automated screwdriver antenna controller, one that allows one-button tuning for screwdriver antennas using your radio's tune button. The controller, which works with most screwdriver antennas, tunes the screwdriver antenna by SWR, requires no calibration, and automatically finds the lowest SWR for you. Versions are available for ICOM, Yaesu, and Kenwood radios, and the Turbo Tuner's firmware is upgradeable via a PC.

Major Turbo Tuner features include "plug and play" capability with your Kenwood, ICOM, or Yaesu radio; the controller will find the lowest SWR for a given frequency. Also, there's fully automatic adjustment of the screwdriver antenna to the current operating frequency; no calibration is required—just plug it in and tune. Tuning is initiated with the tune control on the radio, and all tuning is performed using 10 watts or less.

The unit is fully "plug-and-play" with Tarheel, High Sierra, and Hi-Q antennas. The controller also has a Park func-

Photo H– The MFJ-868 Giant SWR/Wattmeter is said to be the world's largest such instrument. It's manufactured by MFJ and measures all of 6 1/2 inches diagonally across the meter scale. (Photo courtesy of MFJ)

Photo I– The Turbo Tuner from N2VZ Enterprises is an automated screwdriver controller that affords one-button tuning for screwdriver antennas, using your radio's tune button. (Photo courtesy of N2VZ Enterprises)

Fig. 2– Nifty! Ham Accessories adds the ICOM IC-R20 Quick Reference Card and Mini-manual to its series of quick reference guides. The Mini-manual fully describes all control functions, providing simplified explanations and operating instructions. (Image courtesy of Nifty! Ham Accessories)

tion that automatically lowers the antenna to its shortest position.

The controller is RFI-filtered and RF-bulletproof to the full legal limit, and it handles up to 1 amp for driving large screwdriver antennas. It works with most ICOM (ham) HF radios with a tune button; the Kenwood TS-480 and TS-2000; and the Yaesu FT-897 and 857. You can download the Turbo Tuner manuals for the ICOM IC-706 and IC-7000; Kenwood TS-480 and TS-2000; and the Yaesu FT-857/897.

The Turbo Tuner controller is $239 plus $14 s/h for each radio controller.

Contact N2VZ Enterprises, 1111 Leilani Dr., Forked River, NJ 08731 (609-249-3875; e-mail: <bill@n2vz.com>; on the web: <http://www.n2vz.com>).

From the Bookshelf

IC-R20 Quick Reference Card & Mini-manual. Nifty! Ham Accessories has added the ICOM IC-R20 Quick Reference Card and Mini-manual (fig. 2) to its series of quick reference guides. While the company is well-known for its amateur radio transceiver quick reference guides, this is the first of a series of guides targeting scanners. For maximum convenience, the company is providing both a spiral-bound Mini-manual and a wallet-sized Quick Reference Card as a complete package.

The spiral bound Mini-manual fully describes all control functions, providing explanations and operating instructions for the IC-R20's advanced features in a compact 12-page, 4.5" 8" format. An accompanying tri-folded wallet-size card

is ideal for situations when you need a quick reminder on how to program a frequency, perform scanning, or carry out other basic operations.

Faster and easier to use than most factory manuals, the color guides are organized and color-coded for quick access to condensed, step-by-step instructions for programming and operating the IC-R20. These short-form guides are convenient memory joggers for instantly recalling how to set up and operate your radio.

The combination of the IC-R20 Quick Reference Card and spiral bound Mini-manual is $19.95. For more information, contact Nifty! Ham Accessories, 1601 Donalor Drive, Escondido, CA 92027; (760-781-5522; e-mail: <bernie-n6fn@niftyaccessories.com>; on the web: <http://www.niftyaccessories.com>).

Wrap-Up

That's all for this time, gang. Next time, more "What's New." See you then.

Overheard: Much to my frustration, I have found that experience is something we don't get until after we need it!

73, Karl, W8FX

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

More DX in the New Year

BY CARL SMITH,* N4AA

My goodness ... 2007! It seems as if I just got used to 2006. Well, it has been a busy year. As I write this in mid-November, there is still about a month and a *half of the* year left to go and lots of DXing to be done in that time and in the year ahead.

The big news in mid-November was the FCC's release of the Report & Order allowing expanded phone privileges on 75/80, 40, and 15 meters. Most notable among these is the *huge* allocation on 75/80 meters allowing phone operation all the way down to 3600. Although this may cause problems for many of the National Traffic system nets that are using frequencies in the 3500–3700 area, it does give the phone gang a lot more spectrum to "play" in. Time will tell how this works out.

Hmmm . . . Antennas will have to be adjusted, trimmed, etc., to cover that 400-kHz spread. Antenna tuners will get a workout for sure. Broadband antennas surely will abound to allow you to run up and down the band without retuning your amp. The increase on 40 meters will allow U.S. hams to go all the way down to 7125, eliminating those frustrating wide split operations when working DX on that band. Broadcast stations may still be a problem, but those stations are slowly migrating to other frequencies, so the QRM from them should diminish over a period of time.

Jim, NW6S, gets help from members of the NCDXCC in getting his new tower raised. Dave, K4SV, just happens to own a small bucket truck, which made the job much easier than trying to physically lift all that steel into a vertical position. (Photo courtesy of Andy, K4YKZ)

Howard, WB5DNT, needed a little help getting his antenna system up and running. Tom, N4XP, Alan, K5AB, and Keith (not a ham right now) gave Howard a hand and he is now on the air in a big way. (Photo courtesy of Tom, N4XP)

DX News

VU7 – Lakshadweep. No less than two major operations from this very rare location were scheduled for December and January (this is a change to the originally announced plans). Here's what was known prior to the operations:

ARSI <http://www.arsi.info/>: The Amateur Radio Society of India website gives details on its DXpedition to Lakshadweep in the month of December 2006. The website says the group has permission to operate and has been assigned the call VU7LD to operate for the entire month of December. According to the website, W3HNK will handle QSLing for VU7LD.

NIAR <www.vu7.in>: The National Institute of Amateur Radio website gives details of its DXpedition to Lakshadweep, originally scheduled for December 1–10, 2006, but now listed as beginning on January 15, 2007. The call VU7RG will be used by three teams operating from three different islands. There will be *three* QSL routes depending upon your IARU Region. Region 1 will QSL via the German DX Foundation (address to be furnished later). IARU Region 2 will QSL via Bob, N2OO, and Region 3 will be handled by the I-House Radio Club, JA3UB. For the latter, I note the address shown on QRZ.com is *not* the address shown on the NIAR website. The address in the *Flying Horse Callbook* is the same: P.O. Box 73, Amagasaki, 6608799, Japan.

5A7A – Libya. This operation was due to begin November 15/16, 2006 and run for two weeks. Last word was the team had departed Germany for Libya, so time will tell how this works out. The

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

CW

None

SSB

None

MIXED

None

CW: 400 DS4DRE. 700 7N2JZT.
SSB: 650 DS4DRE, KT2C. 1300 IK2DZN.
Mixed: 500 AA8P. 3050 N4UH.
Europe: 7N2JZT

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, DKØPM, SV1EOS, UAØFAI, N4GG.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.

**Please Note: The price of the 160 meter bar for the Award of Excellence is $6.50.*

5 Band WAZ

As of November 1, 2006, 709 stations have attained the 200 zone level and 1522 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
UA3BS UA6LV

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
N3UN, 199 (18)
OH2VZ, 199 (31)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
SP5DVP, 199 (31 on 40)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
CT3DL, 199 (26)
NØIJ, 199 (21)
RU3DX, 199 (6)
N4XR, 199 (27)
WØPGI, 199 (26)
HA5AGS, 199 (1)
EA8AYV, 199 (27)
VE3XN, 199 (26)
K7BG, 199 (22)
W6XK, 198 (17, 34)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
HA1RW, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
WA5VGI, 198 (34)
W7VJ, 198 (34, 37)
WØCP, 198 (18, 40)
K9MIE (18, 21)

The following have qualified for the basic 5 Band WAZ Award:

W2LK (177 zones)
UT4EK (170 zones)
UA6LTI (170 zones)
UA6LAH (170 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $100 ($120 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

Left to right, Rick, NE8Z; Maria, HC1MM; Laura, 3A2MD; Gary, HH6VG/WD7DZI; and Mitzy, N4NMJ. Rick, NE8Z, is touring several countries in Europe and says it really is a small world. On a walking tour with Laura in Monaco, Rick was wearing his callsign hat when a couple stopped them. It was Garry, WD7DZI, and Mitzy, N4NMJ. Rick and Garry worked each other in the 1970s, Garry as HH6VG and Rick as HC5EE. (Photo courtesy of Laura, 3A2MD, and Rick, NE8Z)

QSL Manager is DL9USA. More on this one next month.

XT – Burkina Faso. This one will see action January 6–20, 2007 when a team of U.S., French, and Austrian DXers plans to be very active on 160–2 meters on CW, SSB, RTTY, PSK31-62, SSTV, and perhaps even WSJT on 6 meters.

3B6 – Agalega. Members of PZK and the SP-DX-Club announced they have received permission to visit the island and get a license to operate. It took a year, but they finally got the permission. Witek, SP9MRO, Wojtek, SP9PT, along with SP9BQJ, SP3IQ, SP5BFX, and SP9-31029 will be on the air for 12 to14 days in March 2007. They plan to operate 160–6 meters CW/SSB/RTTY/PSK31 and 6 meters JT6M. They may also operate from Seychelles, Mauritius, and /MM from the Indian Ocean. Due to the "huge expenses" involved, they are asking for sponsors. Contact Witek by e-mail at <woncz@box.zag.pl>.

3B7C – St. Brandon. The Five Star DXers Association (FSDXA) announced that members will be conducting a DXpedition to St. Brandon in September 2007. The callsign 3B7C has been requested, but not yet assigned. Yaesu will be the principal sponsor, providing twelve FT-2000s and six Quadra VL-1000 amplifiers.

As with their previous operations as 9MØC from Spratly in 1998, D68C from Comoros in 2001, and 3B9C from Rodriguez in 2004, the team is looking to make 100,000 QSOs. The operation will run 24/7 for almost three weeks, including three weekends, around the autumn equinox when DX propagation is typically at its best. Emphasis will be on the LF bands.

The FSDXA is seeking contributions from sponsors to help defray the very significant costs of this DXpedition. A website is being constructed accessible

CQ DX Awards Program

SSB

2489 ..... NJ4F
2490 ..... YB2VTO

SSB Endorsements

330 ..... IK1GPG/337
330 ..... K4MZU/337
330 ..... NØFW/337
330 ..... KZ2P/337
330 ..... W4WX/337
330 ..... N4JF/337
330 ..... DJ9ZB/336
330 ..... W6BCQ/336
330 ..... K9BWQ/336
330 ..... K9IW/334
320 ..... KD2GC/321
310 ..... WØROB/313
275 ..... HSØ/EA4BKA/276
200 ..... YB2VTO/202

CW Endorsements

330 ..... K4IQJ/336
330 ..... K9BWQ/336
330 ..... N4JF/336
330 ..... N7FU/336
330 ..... WB4UBD/335
330 ..... N7RO/335
330 ..... W8XD/335
330 ..... K9IW/334
320 ..... W7IIT/328

RTTY Endorsements

320 ..... WB4UBD/334

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 337 active countries. Please make all checks payable to the award manager.

via <http://www.3b7c.com> or <http://www.fsdxa.com/3b7c>, where information will be posted as it becomes available. For further information contact Don, G3XTT, by e-mail at: <g3xtt@lineone.net>.

N8S – Swains Island. Hrane, YT1AD, will lead a team of 12 to Swains Island April 3–16, 2007. Please note the special callsign N8S. This is an unusual call for Swains Island, but not unprecedented, considering K7C for Kure, etc.

Sunspots?

Don, W7GB, calls our attention to an article in the November 2006 issue of *Sky and Telescope Magazine* entitled "New Solar Cycle Under Way." Here's an excerpt: "A telescope at the National Solar Observatory on Arizona's Kitt

QSL Information

3CØM via EA5BYP
3DAØWW via ZS6DXB
3W3A via JA6UHG
4L8A via DJ1CW
4N6FZ via DD5FZ
4X7ØR via 4Z4TL
4Z7ØR via 4Z4TL
5B/AJ2O via RA3AUU
5B4/DL7DF via DL7DF
5H3AA via K6EID
5R8RJ via DJ7RJ
5WØAX via ON5AX
5Z4LS via G3RWF
6W1RY via F5VHJ
7Q7HB via GØIAS
7S2S via SM2OAN
8J3YAGI via JA3YKC
8J7YAGI via JA7YAA
8P9NX via WØSA
9A1P via 9A1UN
9H/DL5AUA via DL5AUA
9HØVRZ via PB9ZR
9H3AB via PA1SL
9H3HS via PE2HSB
9H3IE via PAØBEA
9H3JC via DL5AUA
9H3ON via PG9W
9H3QH via PH2M
9H3X via PE1NGF
9H3YL via PAØXYL
9H3YM via PE1OFJ
9H3YN via PA3CUZ
9H3ZR via PB9ZR
9H9PA via PH2M
9L1YT via K4YT
9N1AA via N4AA
9N7MV via JAØUMV
9Q1EK via 9Q1EK
9Q1NT via ON5NT
9Q1TB via F5LTB
A35AX via ON5AX
AH2J via JR1VAY
AH2R via JH7QXJ
AT6MYL via VU2SWS

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 337 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

K9BWQ 336	K2JLA 334	K2ENT 334	N5FG 333	HB9DDZ 332	G3KMQ 329	YV5ANT 324	YT1AT 317	K4IE 291
N7FU 336	K2OWE 334	OK1MP 334	K4CN 333	K7LAY 332	N5HB 329	KE3A 323	W6YQ 314	G3DPX 284
N4JF 336	N4MM 334	NC9T 334	W4MPY 333	VE3XN 331	K1HDO 329	N7WO 323	UA9SG 310	DJ1YH 281
K4IQJ 336	F3TH 334	W2VJN 334	N4CH 333	K2JF 331	K7JS 329	KF8UN 323	W9IL 309	XE1MD 280
N7RO 335	F3AT 334	G4BWP 334	K5UO 333	K3JGJ 331	W6OUL 329	IKØTUG 321	EA3ALV 309	WD9DZV 277
W8XD 335	WA4IUM 334	W1JR 334	WØJLC 333	WA8DXA 331	W7IIT 328	IKØADY 320	YU7FW 306	W2JLK 277
NØFW 335	W4OEL 334	I4LCK 334	KA7T 333	K4JLD 331	KA3S 328	WG5G/QRPp 320	LU3DSI 302	
WB4UBD 335	K4MQG 334	PY2YP 334	K8LJG 332	K9OW 331	SM5HV/HK7 327	W3II 320	N1KC 302	
K2TQC 334	EA2IA 334	W7CNL 334	YU1AB 332	N6AW 331	K6CU 326	F5OIU 320	RA1AOB 300	
K2FL 334	PA5PQ 334	K9IW 334	K5RT 332	W2UE 330	W4LI 325	PY4WS 320	VE7KDU 300	
K9MM 334	K3UA 334	K4CEB 333	YU1AB 332	W4UW 330	N4OT 325	F6HMJ 319	KT2C 300	
W7OM 334	DL3DXX 334	WØHZ 333	N4AH 332	N5ZM 330	K1FK 324	OZ5UR 319	WA4DOU 299	

SSB

K6YRA 337	VE3MR 335	IK6GPZ 335	W5RUK 334	W2CC 333	EA3JL 331	K7TCL 326	XE2NLD 315	W4EJG 295
IK1GPG 337	VE3MRS 335	NC9T 335	K4CN 334	DL3DXX 333	K1HDO 331	HB9DDZ 326	VE7SMP 315	K7ZM 292
K5TVC 337	N7BK 335	K1UO 335	EA3KB 334	EA3BMT 333	N7WR 331	F6HMJ 326	IZ6CST 314	K1RB 292
NØFW 337	K7LAY 335	I8KCI 335	K3UA 334	EA3EQT 333	AB4IQ 330	YV4VN 326	W6NW 314	K7SAM 292
KZ2P 337	ZL3NS 335	I8LEL 335	K4JLD 334	YV1KZ 333	AE5DX 330	WR5Y 325	WØROB 313	W9ACE 291
K4MZU 337	N4MM 335	DU9RG 335	N5ZM 334	KE3A 333	KB2MY 330	KC4MJ 325	W7GAX 312	N2LM 291
N4JF 337	OZ3SK 335	DU1KT 335	AA4S 334	W7BJN 333	K3PT 330	PY2DBU 325	WA5MLT 310	KU4BP 291
W4WX 337	K7JS 335	CT1EEB 335	CT3DL 334	K3JGJ 333	ZL1BOQ 330	YT1AT 325	RW9SG 310	XE1MW 287
K2TQC 336	XE1L 335	W1JR 335	W9SS 334	W2FKF 333	WS9V 329	KE4SCY 325	KK4TR 306	W5PVE 286
K5OVC 336	YU1AB 335	N4CH 335	VE7WJ 334	N2VW 332	W9OKL 329	K6GFJ 324	WB2AQC 305	KKØDX 285
W6BCQ 336	OE3WWB 335	I4LCK 335	VE2PJ 334	YV1AJ 332	W2FGY 329	W6WI 323	XE1RBV 304	VE7HAM 285
OZ5EV 336	N5FG 335	PY2YP 335	W3AZD 334	KSØZ 332	CT1CFH 329	EA3CYM 323	K3BYV 303	N8LIQ 284
DJ9ZB 336	PY4OY 335	ZL1HY 335	YZ7AA 334	LU4DXU 332	EA1JG 329	WA4ZZ 322	JR4NUN 303	WØIKD 283
N7RO 336	VE3XN 335	WDØBNC 334	CT3BM 334	VE4ROY 332	W9IL 329	WN9NBT 322	VE7KDU 302	KBØRNC 282
K9BWQ 336	4Z4DX 335	K2FL 334	N6AW 334	W7FP 332	KF8UN 328	W6OUL 322	W5GZI 302	IK8TMI 281
WB4UBD 336	IØZV 335	WØYDB 334	WS9V 334	K9HQM 332	WØULU 328	KD5ZD 322	W4PGC 302	F5INJ 279
W6EUF 335	EA2IA 335	W4UW 334	4N7ZZ 333	N2VW 332	K1EY 328	CT1ESO 321	EA8AYV 302	WD9DZV 278
K2JLA 335	IN3DEI 335	W4NKI 334	VE1YX 333	CT1EEN 332	K3LC 328	KD2GC 321	YV2FEQ 301	W5GT 276
K4MQG 335	EA4DO 335	W4UNP 334	W2JZK 333	K9IW 332	K4DXA 328	N1KC 320	AC6WO 301	HSØ/EA4BKA 276
K9MM 335	PA5PQ 335	W8AXI 334	K8LJG 333	DL9OH 331	LU5DV 328	W5GZI 320	4X6DK 301	K9DXR 275
XE1AE 335	K9OW 335	VE2GHZ 334	VE4ACY 333	YV1JV 331	XE1MD 327	SV3AQR 320	N5WYR 300	XE1MEX 275
W7OM 335	W6DPD 335	OE2EGL 334	KØKG 333	WA4WTG 331	DK5WQ 327	KD2GC 320	K4IE 300	
IK8CNT 335	XE1VIC 335	WA4IUM 334	VE2WY 333	K3JGJ 331	KE5K 327	LU3HBO 317	RA1AOB 300	
VK4LC 335	K2ENT 335	K5RT 334	WB3DNA 333	N5ORT 331	CP2DL 327	WB4GMR 317	WA1ECF 295	
OE7SEL 335	OK1MP 335	W6SHY 334	K9PP 333	CT1AHU 331	NI5D 327	N8SHZ 316	KW1DX 295	

RTTY

WB4UBD 334	K3UA 328	N5FG 325	G4BWP 325	OK1MP 322	N5ZM 321	EA5FKI 320	PA5PQ 311	W4EEU 297
K2ENT 333	NI4H 325							

The WAZ Program

15 Meter SSB

631 ..... SV1CNS 632 ..... WC6DX

20 Meter SSB

1152 ..... SV1CNS 1153 ..... JA1AJK

40 Meter SSB

105 ..... EA5GPQ

20 Meter CW

568 ..... W2LK

20 Meter RTTY

59 ..... RA9SC

All Band WAZ

Mixed

8433 ..... NF8J

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

Peak has picked up signs that solar cycle 24 has just started. In June the Synoptic Optical Long-term Investigations of the Sun (SOLIS) facility, which began operation in 2003, picked up small magnetic eruptions near the (solar) poles that have reversed polarity from those of the previous cycle—a telling signature that a new cycle is under way. While cycle 24 is starting at high latitudes, cycle 23 activity is winding down near the equator and is expected to reach minimum around February 2007."

For more information on Cycles 23 and 24, see NW7US's "Propagation" column elsewhere in this issue.

Most Wanted Survey

A sneak preview at *The DX Magazine*'s Most Wanted Survey for 2006 shows the top five overal most wanted in the world are Scarborough (BS7), Lakshadweep (VU7), North Korea (P5), Yemen (7O), and Navassa (KP1). The full list of 100, with continental breakdowns, will be published in the January/February 2007 issue of *The DX Magazine*. Further breakdowns by mode will be published in the March/ April issue. The top 100 overall will be posted to the DX Publishing website (www.dxpub.com) in mid-January 2007.

Swains Island was not included in the survey, unfortunately, but it is estimated that it would rank at least in the top ten in all categories. With DXpeditions already announced for Lakshadweep in 2006 and Swains Island in 2007, it is expected that both of these will drop substantially in the survey for 2007. Unfortunately, others in the top five are not expecting any activity any time soon, at least none that I am aware of, so they will no doubt stay at or near the top of the list for 2007.

Let me wish all of you health, happiness, and good DX in the New Year. Until next time, enjoy the chase and Have Fun!

73, Carl, N4AA

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OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

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DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅛ x 6 x 9	3.4
SS-18	15	18	1⅛ x 6 x 9	3.6
SS-25	20	25	2⅛ x 7 x 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅛ x 7 x 9⅝	4.2
SS-30M*	25	30	3¼ x 7 x 9⅝	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

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EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

CIRCLE 134 ON READER SERVICE CARD

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

awards

BY TED MELINOSKY,* K1BV

Royal Naval ARS Award Series

This month we are pleased to feature the awards series sponsored by the Royal Naval Amateur Radio Society (RNARS). Britain was long known as a powerful maritime power, and much of that reputation was derived from the strength and professionalism of the Royal Navy. Its heritage is celebrated by the RNARS. The society has over 1000 members worldwide, and they use distinctive QSLs that feature naval ships, past and present, which were a proud part of that service. If you have even a small QSL collection, you probably will be able to qualify for the group's Mercury Award, which requires contacts with only five members of the society. Endorsement stickers are provided for contacts up to 1000 members! (I have 50, I think.)

You don't have to be a member of the RNARS to apply for any of the awards, but membership is available to all of those who have served at sea or who have nautical connections, seagoing or otherwise. The membership secretary is S. Will, GM4SID (53 Bishop Forbes Crescent, Blackburn, Aberdeen, AB2 0TW, UK).

General requirements for the awards are as follows: GCR list accepted. Fee for each of the awards is: UK £2.00, EU £2.50/$US4.00 or 5 IRCs; and all others £3.50, $US7.00, or 10 IRCs. When sending IRCs, only the new-style IRC is accepted for RNARS awards (old-style IRCs will be returned). Apply to: RNARS Award Manager, Glynn Burhouse, G4MVA, 40 High Park, Hawarden, Flintshire, Wales, UK CH5 3EF (internet: <http://www.rnars.org.uk>).

Hampshire County Award. Available for contacting/hearing any amateur stations in the county of Hampshire (note that Isle of Wight is a separate county and cannot be used) on or after 1 October 1960. Each Hampshire station counts one point and each RNARS special station operated within the county counts two points. The award is ssued in three classes:

	UK	EU	DX
Class One	50 points	20 points	15 points
Class Two	30 points	15 points	10 points
Class Three	20 points	10 points	5 points

International Navy Award. Work or hear RNARS members plus specified numbers of other amateur radio naval organizations of other countries as shown below. Contacts must be on or after 1 January 2004.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Alan Homer, KI7WO
USA-CA All Counties #1145
October 10, 2006

USA-CA Honor Roll

500

JA1CPZ	3389
KI7WO	3390
YB1A	3391

1000

JA1CPZ	1722
KI7WO	1723

1500

KI7WO	1445

2000

KI7WO	1339

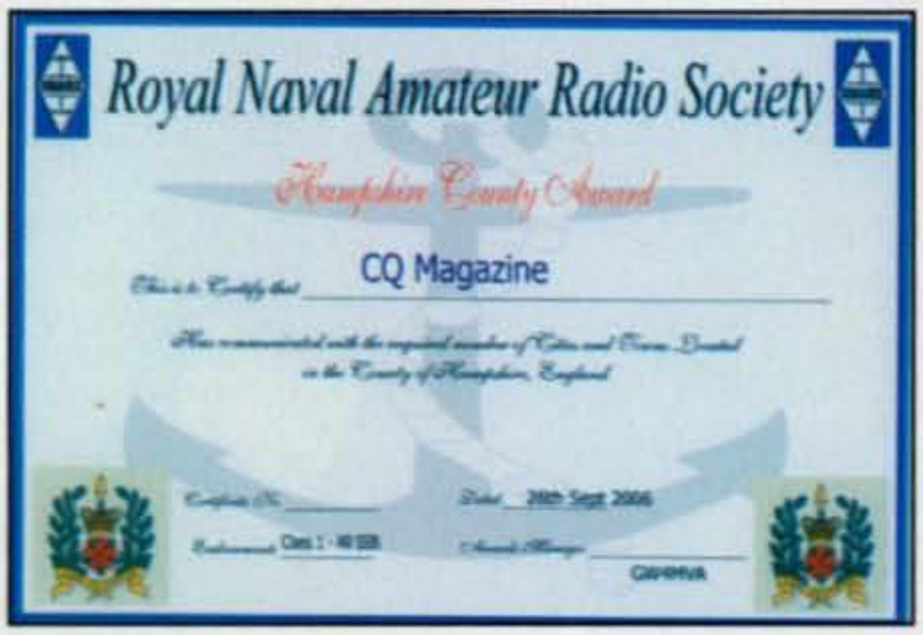
2500

KI7WO	1257

3000

KI7WO	1168

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.



The Hampshire County Award, sponsored by the Royal Naval Amateur Radio Society, is available for contacting/hearing any amateur stations in the county of Hampshire, England.

Work or hear RNARS members plus specified numbers of other amateur radio naval organizations of other countries to earn the International Navy Award sponsored by the RNARS.

Spell the words ROYAL NAVAL AMATEUR RADIO SOCIETY using the last letter of the RNARS members' callsigns, for a total of 29 contacts, for the Kaleidoscope Award.

Contact/hear members of RNARS on or after 1 October 1960 to earn the Mercury Award, which is available in three classes for different numbers of contacts.

Class One: Work or hear ten RNARS members, ten MF Runde members, three INORC members, one MARAC member, plus one member from ANARS, BMARS, FNARS, YO-MARC, or MFCA.

Class Two: Work or hear five RNARS members, five MF Runde members, one INORC member, one MARAC member, plus one member from ANARS, BMARS, FNARS, YO-MARC, or MFCA.

Class Three (for DX stations outside of Europe only): Work or hear three RNARS members, three MF Runde members, plus one member from ANARS, BMARS, FNARS, INORC, MARAC, YO-MARC, or MFCA.

Amateur radio naval organizations:
RNARS = Royal Naval Amateur Radio Society
MF Runde = German Naval Marine Funker Club
BMARS = Belgian Marine ARS
ANARS = Australian Naval ARS
FNARS = Finnish Naval ARS
MARAC = Marine Amateur Radio Club, The Netherlands
YO-MARC = Romanian Marine ARC

To achieve the HMS Plymouth Award, contact members of the HMS Plymouth Group after 1 January 2001.

The World Wide Award is earned by contacting/hearing RNARS members in ten DXCC countries and on two continents on or after 1 October 1960.

MFCA = Marine Funk Club Austria
OZ1RDN = Danish Ship Peder Skram
MARCOM = DLØMCM

Kaleidoscope Award. Spell the words ROYAL NAVAL AMATEUR RADIO SOCIETY using the last letter of the RNARS members' callsigns, for a total of 29 contacts (e.g., G4JBR = R, G4SFO = O, G3ZAY = Y, G4MVA = A, G3VLLL = L, etc.). No more than one member may count for any single letter. All contacts after 1 January 1986 are valid.

Mercury Award. Contact/hear members of RNARS on or after 1 October 1960. One point per member per band worked/heard, two points per band for RNARS special stations (e.g., GB2RN, GB3RN, GB2PLY, etc.), and double these points for stations contacted on frequencies above 30 MHz.

Available in three classes:

Class One: 20 points required (basic minimum for UK stations).

Class Two: 10 points required (basic minimum for EU stations).

Class Three: 5 points required (only available for outside EU).

Endorsement stickers are available in increments of 10 points up to 100 points, and thereafter for 150, 200, 250, 500, 750, and 1000 points. Charge for stickers is a reply postage-paid envelope for UK stations, and 1 IRC for overseas stations together with a return envelope. Supply membership numbers.

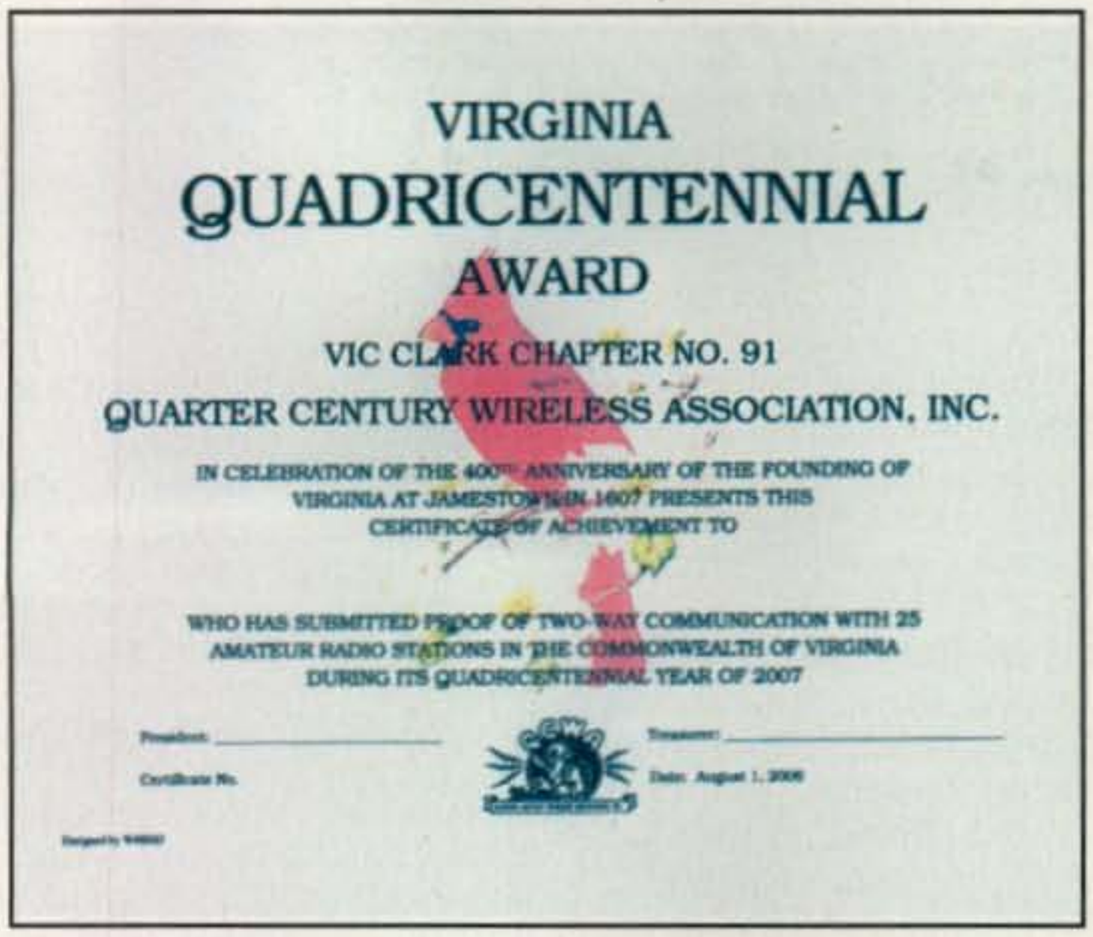
HMS Plymouth Award. Contact members of the HMS Plymouth Group after 1 January 2001. UK applicants need to earn 25 points, Europeans need 10, and all others 5. One point per member per band worked or heard. SWL okay. Contacts on VHF/UHF count for double their usual value. The list of members is found on the group's website (http://www.mars.org.uk/awards.html). Applications may be sent to the RNARS address

World Wide Award. Contact/hear RNARS members in ten DXCC countries and on two continents on or after 1 October 1960. A member signing /MM may be claimed if close to the shores of a missing continent, but does not count for a missing country. Stickers are available for 25, 50, 75, and 100 countries and 3, 4, 5, and 6 continents and require a reply postage-paid envelope for UK applicants, or 1 IRC plus return envelope for overseas applicants. Contact members of RNARS and other naval radio clubs after 1 January 2004. SWL okay. Endorsements are available for mode or band upon request.

The Virginia Quadricentennial Commemorative Award

This short-term award is sponsored by Quarter Century Wireless Association (QCWA) Vic Clark Chapter 91, Washington, DC area.

The Virginia Quadricentennial Commemorative Award is a short-term award sponsored by Quarter Century Wireless Association (QCWA) Vic Clark Chapter 91, Washington, DC area. Complete 25 two-way contacts in 2007 with stations located in Virginia.



In 1607 the first permanent English settlement in the New World was founded on the banks of a river on a spit of land 40 miles upstream from where the river empties into the Atlantic Ocean. Its founders, some 100 in number, sailed from England on three vessels: the *Susan Constant,* the *Godspeed,* and the *Discovery.* They landed first at Cape Henry, near what is now known as Virginia Beach. Seeking a more secure location, they ventured upstream into what is now known as the James River, and they named their new settlement Jamestown. Both were named in honor of their king, James I.

The Commonwealth of Virginia will be celebrating the 400th anniversary of the founding of Jamestown during 2007. The Vic Clark Chapter 91 of the QCWA is joining in the celebration by offering an award to licensed radio amateurs for completing 25 two-way contacts in 2007 with stations located in Virginia. The requirements for earning the award are as follows:

1. Contact 25 different stations in Virginia between 0000 UTC 1 January 2007 and 2400 UTC 31 December 2007.

2. Contacts may be made on any frequency authorized for amateur use. Contacts through repeaters will not count for the award.

3. Any mode that is legal on the frequency used will be acceptable.

Applicants must submit a list of contacts claimed, including callsign of each Virginia station worked, date and time (UTC), band/frequency, mode, QTH, and name of operator. Applications must be sent by mail, and not electronically (do not submit logs via e-mail). Do not send QSL cards. Each application must include a signed log certifying the list to be accurate, and include your name, call, and return mailing address.

The Virginia QSO Party, to be held March 17–18, 2007, is an excellent event for contacting stations in Virginia. It is sponsored by the Sterling Park Amateur Radio Club (SPARC), and contacts made in the VQP may be used for the Virginia Quadricentennial Award. Certificates for the award and the Virginia QSO Party must be applied for separately. See the SPARC website at <www.qsl.net/sterling/ uf1.htm> for details on the Virginia QSO Party.

There is a fee of $2.00 for applicants in North America to cover printing and mailing of the Quadricentennial Award (check, cash, or money order only; no credit cards or stamps accepted). Certificates will be sent free of charge to stations outside North America, but donations will be accepted. Mail your application to the following address before 1 July 2008: QCWA Vic Clark Chapter 91, P.O. Box 4112, Merrifield, VA 22116-4112 (<http://homepage.mac.com/rrucker/qcwa/chapter91.html>; e-mail: <k6zr@arrl.net).

Looking for some help in publicizing your group or club's award? *CQ* magazine can help. Please send all details and samples to me for review.

73, Ted, K1BV

vhf plus

BY JOE LYNCH,* N6CL

Thunderstorm/Sporadic-*E* Connection Solved?

Do thunderstorms cause sporadic-*E* propagation? It has been a point of disagreement for decades. Voices on both sides of the debate have been strong and consistent, with defenders on both sides giving strong arguments for their position.

Adding to the debate is an article that was published in the 4/2006 issue of *DUBUS* magazine entitled "Thunderstorm effects on sporadic E propagation in 144 MHz." Its authors include Volker Grassmann, DF5AI; Sabine Cremer, DL1DBC; Udo Langenohl, DK5YA; Munters, PE1NWL; Gabriel Sampol, EA6VQ; and Joachim Kraft, DL8HCZ. This article is also posted as a pdf file on Volker's website at: <http://www.df5ai.net/ArticlesDL/Thunderstorm/ThunderstormEffectsDUBUS.pdf>.

e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

January 3	Full Moon
January 4	*Quadrantids* meteor shower peak
January 7	Moderate EME conditions
January 10	Moon Apogee
January 11	Last Quarter Moon
January 14	Poor EME conditions
January 19	New Moon
January 20–22	ARRL VHF Sweepstakes (see text for details)
January 21	Good EME conditions
January 22	Moon Perigee
January 25	First Quarter Moon
January 28	Moderate EME conditions

—EME conditions courtesy W5LUU

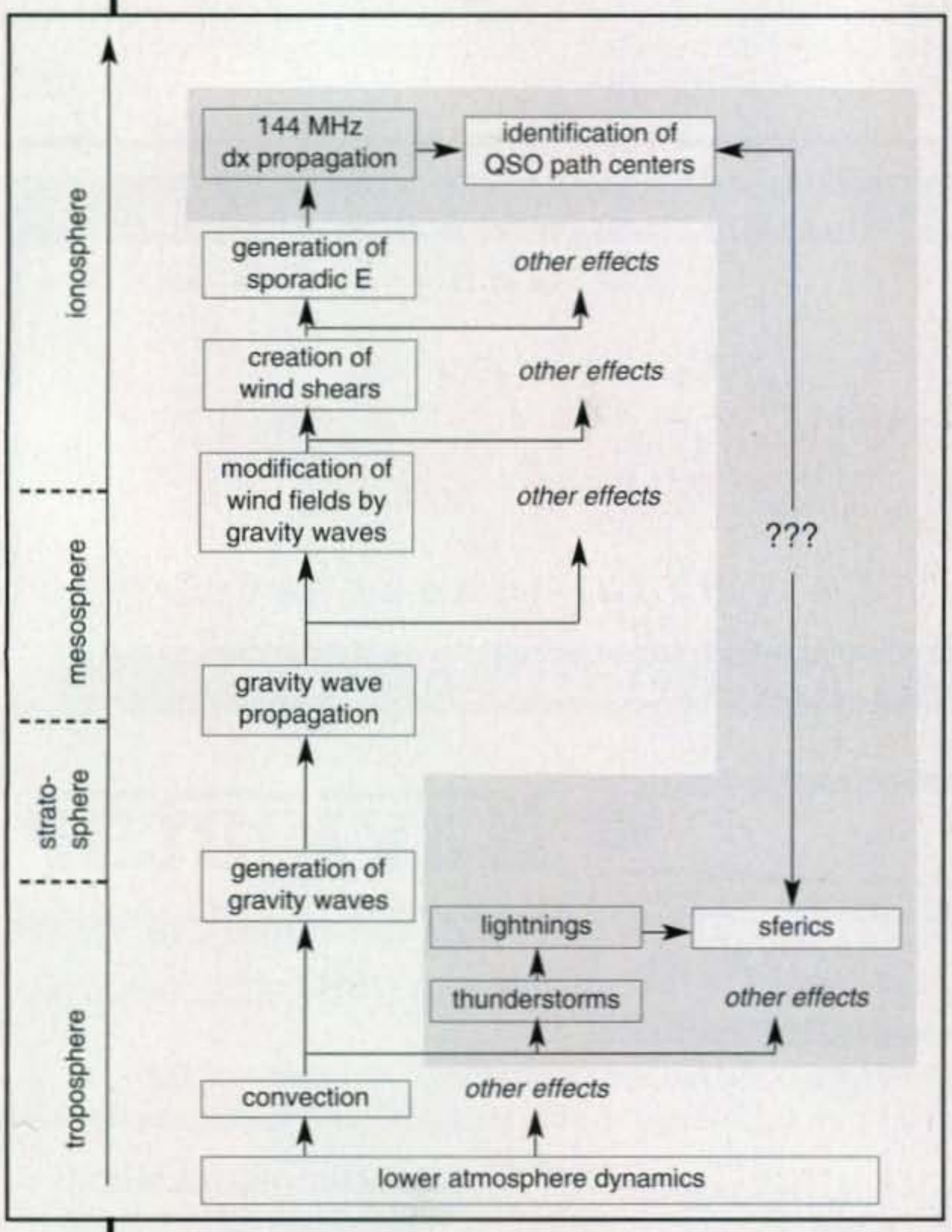


Fig. 1– Flow chart visualizing the radio amateur's approach to thunderstorm effects on ionospheric sporadic-E. The white area denotes the scientific model; the gray area denotes additional elements discussed by radio amateurs. (Figure courtesy of DF5AI)

In this extensive article the authors examine wind sheer, gravity waves (energy transferring media), and sferics (RF signals emanating from nearby lightning strikes that are picked up on VLF receivers). Regarding gravity waves, the authors are particularly interested in convectively generated gravity waves that are associated with thunderstorms. In the article they postulate that there seems to be some sort of relationship between thunderstorms and some sporadic-*E* events, in particular on 144 MHz. In establishing correlation for their theory, they first try to assemble a rather complicated puzzle which has several pieces missing, as the following quote illustrates:

> The above details [pertaining to wind sheer, gravity waves, and sferics] represent pieces of a puzzle which may be assembled to a quite complicated model of thunderstorm effects on the ionosphere. The model has been discussed in scientific literature (unfortunately, we couldn't identify the original source) and even in ham radio (see, Grayer G., G3NAQ, *The VHF/UHF DX Book*, White I., G3SEK, editor, pp. 2.45–2.46, RSGB, 1995)...
>
> Intense atmospheric convection breaking the tropopause (which separates the troposphere from the stratosphere) is considered the driving element in the generation of those types of gravity waves which in particular attract our interest, i.e., convectively generated gravity waves. These gravity waves may propagate from the lower stratosphere into the mesosphere ... and may even arrive at E region level around 100 kilometers height.... Representing an oscillatory perturbation of the neutral wind field, the gravity waves may support the generation of wind shears which are considered a possible cause of sporadic E. Thus, in this model sporadic E layers are associated with gravity waves originating in the lower atmosphere and propagating into the ionosphere.

In their article the authors freely acknowledge that there are gaps in their understanding of the relationship between thunderstorms and some spo-

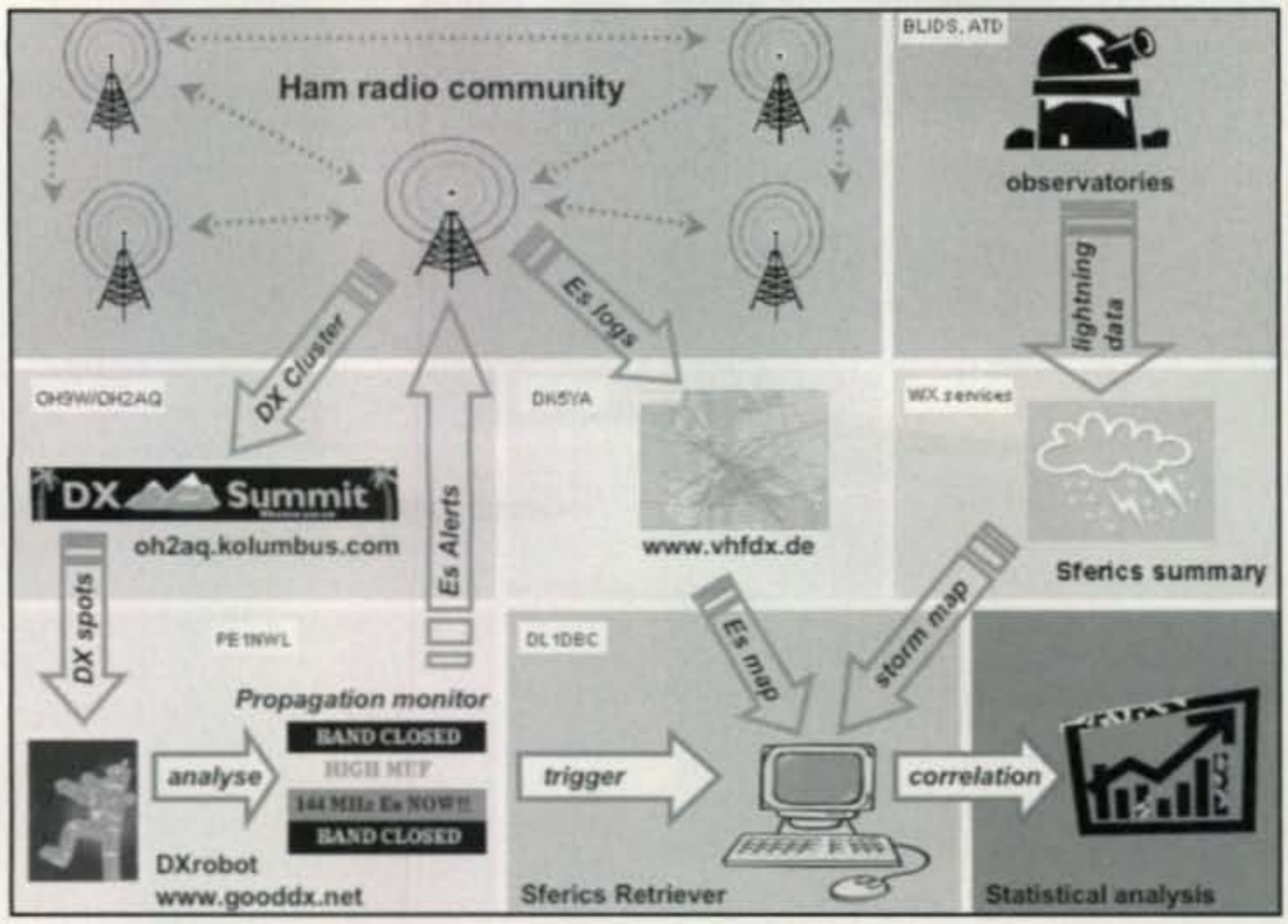


Fig. 2– Schematic diagram of the data flow in the thunderstorm analysis project. (Figure courtesy of DF5AI)

radic-*E* propagation. Fig. 1 illustrates these gaps.

Even so, in order to support their hypothesis, the authors cite a particularly strong and widespread 144-MHz sporadic-*E* event that occurred between 0800 and 1700 UTC on June 27, 2004. Referring to sferic data available to them, they point out that between 0800 and 1200 UTC there was no sferic data due to an absence of thunderstorms. Hence, they conclude: "these sporadic E openings are definitely associated with no thunderstorm triggered effects."

However, beginning at around 1230 UTC there is a marked increase in sferic events. In fact, their data shows that these sferic events are so well aligned with the sporadic-*E* propagation line that they seem to want to conclude causation. Even so, they back away from such a bold statement by commenting:

> We are reluctant to cite this feature as evidence for 144 MHz sporadic E propagation

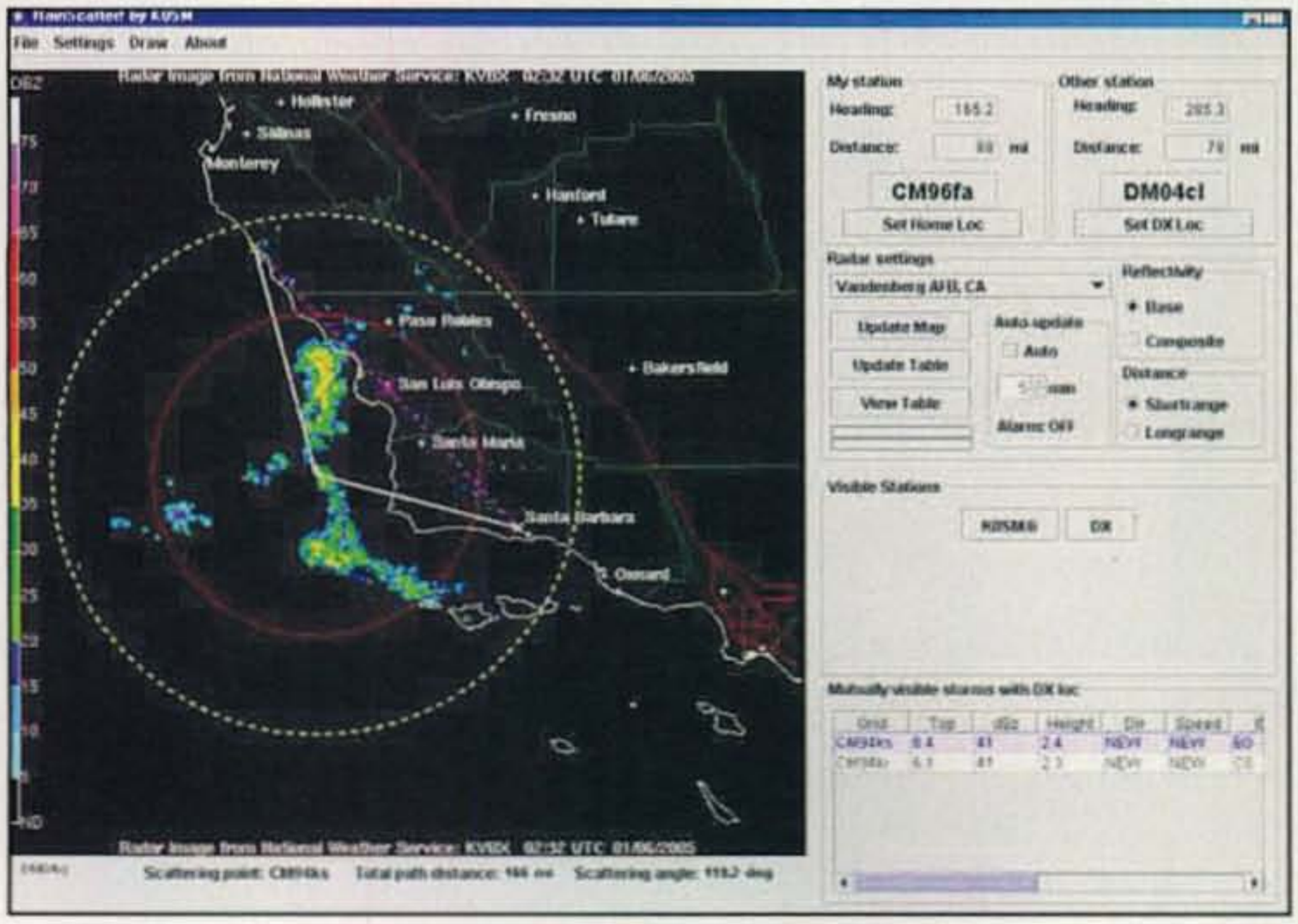


Fig. 3– Screenshot of KØSM's RainScatter software. (Image from <http://frontiernet.net/~aflowers/rainscatter/>)

Photo A– WC8VOA's EME dish, Model KXK 7.2M (24') Ku-band satellite antenna by Vertex/RSI, 54 dB gain in 0.28-degree beamwidth. It had been abandoned in November 1995 at the Bethany VOA. (Photo courtesy of the WC8VOA website: <www.wc8voa.com>)

triggered by thunderstorms because we cannot exclude an accidental occurrence of sferics and sporadic E activity in this example (in fact, central European thunderstorms indeed appear to be aligned from south-west to north-east quite often in summertime). Nevertheless, we consider this a striking feature which motivates further analyses in this subject.

The short summary of their long article is the following drawn from their conclusions:

The existence of thunderstorm effects on the ionosphere appears generally accepted in atmospheric sciences for three reasons:

- Various ionospheric effects are clearly associated with atmospheric gravity waves traveling in the E and F region of the ionosphere. Gravity waves are in particular considered one cause of wind shears around 100 km height which may stimulate the generation of sporadic E layers.
- Gravity waves originating in the troposphere and in the stratosphere may propagate upwards into the mesosphere (80 km) and, very likely, may also arrive at D and E region heights around 90 to 110 km.
- It is a well known fact that thunderstorms may create convectively generated gravity waves in the upper troposphere and in the lower stratosphere.

Scientists believe that these three individual effects may also occur in combination, at least partially. Hence, thunderstorms are interpreted as the origin of gravity waves propagating from the lower into the upper atmosphere where they may create wind shears in the E region of the ionosphere which, finally, stimulate or support the generation of sporadic E. This model appears plausible to many scientists but, as far as we can see, it isn't yet verified in all aspects and details. However, scientific measurements provide strong indications leading in this direction.

Finally, in encouraging further research, they conclude the following:

Thus, thunderstorm effects on VHF sporadic E propagation remain an open issue in amateur radio propagation studies worth being investigated in more detail. The authors hope that this paper may provide some new aspects and considerations and may stimulate ham cooperation in this fascinating subject which combines elements from meteorology (thunderstorms), ionospheric physics (sporadic E), VLF radio techniques (sferic detection), VHF radio operation (144 MHz DX QSOs), internet applications (weather services and DX alerting systems), software engineering (data acquisition and data processing), and data analysis methods.

Indeed, despite their limitations of available resources, the authors have gone to considerable effort to investigate their hypothesis in order to continue their research. Fig. 2 indicates to what extent they have established a research program. For more information on other propagation studies that Volker has undertaken, see his website: <http://www.df5ai.net>.

Something else to consider: In the Summer 2006 issue of *CQ VHF* magazine we published the article "Using Radar Data to Predict Rain-Scatter Paths" by Andy Flowers, KØSM. In his article Andy describes how he has developed a software program called *RainScatter* (fig. 3), which downloads the Storm Attribute Tables and quickly calculates the footprint for each storm in order to aid the user in predicting rainscatter propagation paths between two stations. Even though it is designed for the relatively short 10-GHz rainscatter

Photo B– Student members of the Wagoner Windtalkers High School ARC, WI5ND. (Photo courtesy of AF4CM)

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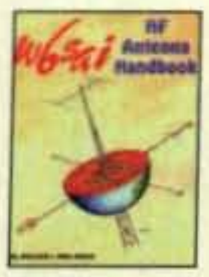

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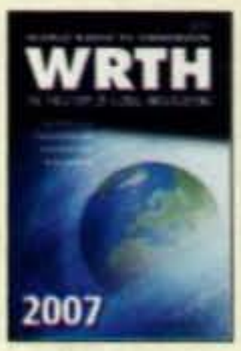

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propagation path, it could also be used as a tool for viewing locations of thunderstorms. *RainScatter* is freely available under the GNU Public License at <http://frontiernet.net/~aflowers/rainscatter>. It requires a Java Runtime Environment (JRE) 1.4.2 or later.

First 10-GHz EME Signal Received at WC8VOA

Speaking of 10 GHz, the following is from Dave Powis, ND8P/G4HUP, via the Moon-net reflector:

On Monday, November 13, 2006, at 1430 UTC Mike Murphy, KA8ABR, and I received the first 10-GHz EME [Earth-Moon-Earth] signals on the 7.2-meter dish at the VOA Park, Bethany, north of Cincinnati (photo A). Al Ward, W5LUA, kindly provided the test source, and signals were received solidly, peaking at 15 dB above noise, with a dispersion of approx 200 Hz, until 1442 UTC. The moon left our tracking limits at 1445 UTC.

For me personally, this was a wonderful climax to the work with Mike and Jim Miller, N8ECI, over the seven weeks that I was there, and could not have been better timed. The same night I flew out to return to the UK! I'm also grateful for the experience. Although I have operated on 10 GHz terrestrially, this was my first foray into 10-GHz EME, and I learned a lot from it!

I look forward to the news that WC8VOA is ready to transmit on 10 GHz. The PA and driver have been tested (thanks Jeff Kruth, WA3ZKR) and now just require integrating into the system, with the sequencing logic. In due course details of the station upgrades and an edited version of the WAV file of Al's signals will be placed on the West Chester ARA VOA site at <http://www.wc8voa.com>. Navigate to the Photo Album section to find the dish project.

My thanks to WCARA for their welcome and hospitality, to Mike and Jim for all the work they had put in previously to refurbish the dish and its drive systems, and for being such fun to work with. Thanks also to Al, W5LUA, for being there when we needed a signal, and to Dave Sublette, K4TO, and Jeff, WA3ZKR, for their help in getting there!

Wagoner Windtalkers: Amateur Radio in the Classroom with a Historical Twist

In recent columns I written about developing school programs about our hobby in order to reach young people. The following is an example of a program in Wagoner, Oklahoma that is in its infancy. The story is told by the faculty advisor, Jeff Sharrock, AF4CM:

Some background on the Wagoner Windtalkers: When I was in the U.S. Marines I came to appreciate the importance of portable and reliable low-power communications. The transceivers that reconnaissance teams carry are essential to mission accomplishment. It is their means of reporting information (the eyes and ears of their units), of calling in for assistance such as medivacs or emergency extracts, and it is the means they use to call supporting arms such as air strikes and artillery.

As a reconnaissance officer I was particularly impressed with the science that was involved in high-frequency communications, as it always seemed to be harder to maintain than the UHF and VHF links. Despite our use of VHF, UHF, and SHF radios, it was my desire to master HF that took me into the realm of amateur radio, and once exposed to that as a hobby, I was hooked.

I got my first ham radio license while stationed on the Army base at Ft. Knox, Kentucky in 1996, and worked through the then six classes of licensing in a couple of months. When I retired from the Marines in June 2004, I transitioned to teaching through the military's Troops to Teachers program. Shortly after starting my first year as a U.S. History teacher we formed a school club and crafted a constitution that empowered the students to control all aspects of the club except issues involving safety and proper operating procedures (which I retain, as the sponsor). I was very pleased to find out that we were the first licensed high school club in the state (photo B) and that the WI5ND call was available.

The club was named to honor the American Indian Codetalkers, particularly from the Choctaw and Comanche nations, who hail from Oklahoma. When most people hear the name Windtalkers, they only think of the Navajo, because they played such a vital role in the Pacific theatre with the Marines. What we want to bring attention to is the fact that the Choctaw were the first to employ their native language when wireless radio was introduced onto the battlefields in Europe during WW I, and the Comanche played a significant role in the success of the Normandy D-Day landings and subsequent liberation of Europe by reporting the progress of the landings on the beaches to Allied commanders across the English Channel and on all the way to the fall of Hitler's bunker.

In the spring of 2005, Mr. Charles Chibbity, the last living Comanche codetalker, met with the students in our club and captivated them with stories of his life and service in WW II. When he passed away the following July, the significance of their precious opportunity to meet the last living codetalker from the Comanche nation was not lost on them.

Since its inception, the club has been oriented towards developing portable, low-power operating capability. First with HF, because of my own passion for it, we found ways to reach out and make QSOs with hams as far a way as possible, with as little power as possible. In addition to demonstrating the capability of ham radio "when all else fails," the kids have steered towards contesting, using our modest base-station setup to develop operator skills by participating in School Club Roundups and other organized operator activities. Using homebrew wire antennas, and an HF rig, and often a battery, solar panel, and charge controller, the kids have managed to work all 50 states (unconfirmed, as we lack a few QSL replies at the moment) and all the continents. Last spring, the club managed its greatest achievement, a second-place finish in the High School category for School Club Roundup, and without even working all 24 hours. We were most pleased that. While others apparently found conditions at the bottom of the sunspot cycle a bit tough, our QSOs doubled and our score tripled from the year before.

With the help of a couple of local donors who saw the club's activities featured in the *Tulsa World* daily newspaper and on OETA (Oklahoma Education Television Authority, the Oklahoma statewide public television network) and provided a used Radio Shack 2-meter HTX-420 and a Kenwood TR-7500, we now have the means to develop our portability theme in the VHF realm. Eight of the 21 members currently on club roles are actively working on getting at least a Technician license, and the VHF gear lowers the point by one license class whereby I can let them function on their own without my direct control. In addition, the kids will soon have

the means to do local CW QSOs and train operators for license upgrades using MCW over their FM VHF radios.

We are in the parts-collection mode now and will begin construction of MCW audio oscillators at our next weekly meeting. I also intend to use the VHF gear to teach them about other things I have not yet given them much exposure to, like using repeater networks. Finally, I am sure club members will be using our new VHF capability during next School Club Roundup in an attempt to reach local hams on the designated simplex calling frequencies.

Jeff is a great example of a K-12 educator who has taken the initiative to bring amateur radio into the classroom. His efforts are beginning to pay off for the students. One recent Wagoner High School graduate and Wagoner Windtalkers ARC alum is Brett Greer, KE5EHN, who is in the U.S. Air Force working in electronics technology.

Mark Spencer, WA8SME, the ARRL Education and Technology Program Coordinator, encourages those of us who are interested in promoting amateur radio in the classroom to find a really bright teacher to work with, preferably a science teacher—although as Jeff clearly illustrates, it really does not matter what the teacher's teaching specialty is as long as the teacher is willing to promote the hobby.

Mark also makes it clear that the school's administration and also the school board and/or district's leadership need to be supportive as well. One way of bringing these leaders on board is by way of a demonstration of the hobby. Mark comments: "A small group of 6th or 7th graders, demonstrating an HF QSO or satellite contact can have a profound effect on educators. Allowing students to demonstrate the depth of their knowledge through several layers of questions will leave a lasting impression."

Mark also makes the point that in order to communicate with educators, one needs to speak their language. He adds: "While you should not attempt to come across as a professional educator, unless you are one, you should attempt to articulate the value of amateur radio in the classroom with a vocabulary that the professional educators can understand. Try to convey that amateur radio will improve student learning and achievement via a variety of ways." To learn more about these ways and how you might bring amateur radio into your local school, please see Mark's article "Getting Ham Radio into Local Schools," which will be in the Winter 2007 issue of *CQ VHF* magazine.

JT65, the Pro Side of the Debate

In the October 2006 issue of *CQ*, in this column I published a letter from Wolfgang Schlaffer, DL5MAE, who is one of the opponents of the use of the JT65 software program. In presenting a pro view, this month we have statements from Gary Crabtree, KB8RQ, who posted his comments to the Moon-net reflector:

This will be my first posting ever about a contest [ARRL EME contest] and maybe my last. I decided to run 100 percent JT unassisted in 2006. My reason was to just see how many stations I could work on JT mode.

The bad thing was on the first weekend my amplifier blew up as I was getting on the second night. It did not get repaired until Tuesday. I had to order parts for it. I had a second amplifier but it did not have a tube in it nor had it ever been wired up to be able to run. With only 3-1/2 hours sleep, I was not going to try that and kill myself. Now I have both amplifiers up and running so that will never happen again. I decided to stick to my plan anyway, even with a day lost.

My station setup is not a normal station for EME. I run four computers and three different radios, all going to the same antenna. I transmit with the same radio all the time. The other two are use to scan the band to find new stations if nobody is answering my CQ. I use a four-port power divider with a 50-ohm load on one port to feed the radios. Each radio has a dedicated computer. The fourth computer is for my auto-tracking.

For the JA stations I listened 40 kHz below my TX frequency as K1JT recommended on Moon-net. I managed to work a lot of the JA stations. There were stations that called me on CW while I was running JT. I could see their signal, but I do not have speakers set up to hear them. I need to change that so I can answer any mode. I am sure there are stations that did not like it because I only ran JT this year.

The way I feel about contesting is I think a station does what he or she wants to do to have fun. This is only a hobby. I have been doing EME for over 25 years. The thing I like most about EME is being a station's first contact. I worked a new station last week for his first. It was Adrian Sinclair, LU1CGB. He also called me in the contest, and Dave, W5UN, told me he also worked him. I got an e-mail from Adrian saying he was very happy and that he was going to upgrade his station so he could run CW also.

This is where the new CW stations come from. First we have to get them on the band, and then they get excited and build better antennas.

I am against splitting up this contest by modes. I agree with Leif Asbrink, SM5BSZ. Splitting may help CW at first, but it will kill CW in the long run. I think every operator has the right to do what they want with their station. This is a hobby. We are supposed to have fun. I know I am having fun on all modes. In the contest in three days I worked 164 stations and 68 multipliers. If I had changed to CW, I could have made a bigger score, but that was not what I wanted to do this year.

I hope this letter does not make anybody mad at me for what I think. This is just my own opinion. I am now getting close to 200 DXCC countries on 2 meters. I hope to do that in the next two years. Thank you very much for a great contest. I will be glad to work anybody on any mode.

New Product: The SDR-IQ™

On the heels of its success with the SDR-14, RFSPACE has released its little brother, the SDR-IQ™ Software Defined Receiver and Panoramic Adapter. This receiver covers the frequency range of 500 Hz to 30 MHz in 1-Hz steps. It can also be used as an excellent IF for VHF and above work using Down East Microwave (or other) down-converters. The maximum realtime bandwidth of this unit will be 190 kHz.

In order to make the unit affordable to the experimenter, RFSPACE will offer the unit as a board-level assembly ready to plug and play. The powering is by the USB port, so no power supply is required. The unit measures 3.75×3.75 inches. You can read more about this unit at the following URL: <http://www.rfspace.com/sdriq.html>.

As of this writing there was a promotional price of $375 for the first 200 board-level units. You might want to check the website to see if any of these units are still available. Due to the high popularity of SDR radios for VHF-plus work, the first 100 of these units were reserved within a week of the product announcement this past November.

Current Contest

The ARRL VHF Sweepstakes is scheduled for the weekend of January 20–22, 2007. Here is a contest that will get you out of the house in the dead of winter to have some great fun. Don't let the word "sweepstakes" fool you either. Unlike its HF counterpart with its preamble message-style exchange, the exchange is the same as any other VHF contest— your callsign and grid locator. For the complete contest rules, see the December 2006 issue of *QST* or the ARRL's URL: <http://www.arrl.org>.

Current Meteor Shower

The *Quandrantids*, or *Quads*, is a brief but very active meteor shower. The expected peak is at around 0030 UTC on 4 January. The actual peak can occur three hours before or after the predicted peak. The best paths are north-south. Long-duration meteors can be expected about one hour after the predicted peak.

For more information on the above meteor shower prediction, see Tomas Hood, NW7US's Propagation column elsewhere in this issue. Also visit the International Meteor Organization's website, <http://www.imo.net>, for information on this shower as well as an outline for the whole year.

And Finally . . .

With this issue, we begin another new year with a column full of information for the VHF-plus operator. For those of you who are longtime readers of this column, you probably have noticed the evolution of coverage over the past five years. Ever since I became the editor of *CQ VHF* magazine I have felt the need to expand the coverage in this column from weak-signal communications to including almost every possible VHF-oriented communication.

This expansion of coverage is due in large part to your interests and technological advancements. As more of you experiment with more ways in which to use the VHF-plus spectrum, your developments and enthusiasm are being appreciated by readers of this column and *CQ VHF* magazine. Therefore, I strongly encourage you to keep up your great work.

When you have a new idea, please contact me. I will endeavor to work it into this column. When you have an article proposal, also please contact me. I will try to publish your article in *CQ VHF*. It is by way of this ongoing coverage that we will continue to keep the flame of our hobby alive—not only for the present, but also for future generations.

Thanks again for your continued support for this, your VHF Plus column. Until next month…

73 de Joe, N6CL

Oops…

We had two errors creep into last February's article "Sounders: A New Challenge From Telegraphy's Past," by *Heikki Lempola*, OH2BGX. The schematic diagram in figure 2 had an extra connection that unfortunately connects the output of the chip directly to the power supply, resulting in a burned out chip (see corrected schematic for connection *not* to make).

In addition, we extended the square *root line too* far in the formula on page 29. The corrected formula is shown here as well. We regret the errors.

$$R_{serial} = E \times \sqrt{(R_{sounder}/P)} - R_{sounder}$$

our readers say

(Continued from p. 8)

Amateur Extras do look down their noses at Techs, because Techs came into the hobby without learning the code ...The book talks about HF, and Techs have access to HF via Echolink, E-QSO, WIRES 2, etc. I live in an apartment and cannot have an outside antenna. I have Echolink and E-QSO; they are a life saver because of the antenna restrictions. I say to all the Extras and Generals, maybe I did not learn the code to get into ham radio, but I still operate with responsibility and volunteer to help the community. Thanks again for the great article.

Rich Polukort, KE7ELT

W2VU replies:

Hi Rich,

I'm glad you're able to get on the air despite your antenna restrictions. I just want to point out one small item: Echolink, etc., do not operate on HF. They link repeaters and individual hams via the internet and—at either end—on VHF or UHF. Technicians using these systems have the ability to talk with other hams in far-away places, but they do not have access to HF. Thanks for writing.

Editor, *CQ:*

Regarding the stats on declining General numbers (mentioned in November Zero Bias), I suspect there is a pending flood of new Generals just awaiting the dropping of the Morse requirement. The Extra Class has healthy numbers because there were upgrades from General and Advanced as soon as fast code was dropped.

Once the code requirement is removed (at least for General), as the ARRL and most of the rest of us anticipate that it will be, I think the ranks of the General Class will quickly fill and begin to look much healthier. That, of course, will be at the expense of some of those big Technician Class numbers, but without the code requirement it will be more attractive to get started in hamming in the first place. Perhaps the structure of the ARRL beginner book was designed with this in mind—making the transition to General will be easier with that background knowledge from one's Tech studies.

But this is all speculation on my part! I'm not exactly holding my breath in anticipation of quick FCC action on the code, Hi.

Pat Tice, WAØTDA

Editor, *CQ:*

I just read your "review" of the new edition of ARRL's *Getting Started with Ham Radio*. You provide some interesting insight into deficiencies of today's amateur radio licensing training procedures. Perhaps the HF emphasis was provided in anticipation of yet unannounced code-free HF privileges! I know some local Techs who are not pleased with the FCC's latest changes, which do not include code-free HF privileges.

Of greater importance is that amateur radio's continued existence is paramount in your mind as well as the ARRL HQ bunch you mentioned.

I don't pretend to know "how to fix" amateur radio! Between $10 watches that far exceed Dick Tracy's, cellphones which can do everything except be a kitchen sink, today's media fascination with perps preying on every youngster, people working multiple jobs, time demands of catering to youngsters' sports, and CCRs—ham radio seems to be doomed.

In the past couple of years, repeater use in my area has dropped significantly (down 60–70%); 2 meters and up "weak signal activity" is down 80% in many cases, and HF bands are almost unused. Requests for certification in the ARRL's VUCC program have dropped to almost zero.

However, one local club here in southern California continually cranks out new licensees in their licensing classes. Most new hams will buy a 2-meter handheld for RACES/ ARES activities, but have no further interest in the hobby.

On the basis of your editorial, I decided to do an ad hoc survey to determine which publications the members of my two local clubs have access to. Will your editorial be available on-line?

Pete Heins, N6ZE

W2VU replies:

Hi Pete,

Yes, my editorial is available online at <http://www.cq-amateur-radio.com/Zero_Bias_Nov06.pdf>. I agree that the ARRL may have published the book in anticipation of an FCC decision to drop the code requirement for General, *but* the entry-level license will still be the Technician, and nothing in the FCC's proposal suggested the Commission was planning to make HF privileges available to Technicians.

I don't believe ham radio is doomed. We have challenges, to be sure, but we always have. We will find ways to meet today's challenges as we have with yesterday's. But we have the collective responsibility to make sure that newcomers to our hobby are introduced to the wide variety of activities they may pursue *with the license they already have*. It's a responsibility we take very seriously at CQ, and it is the guiding philosophy behind our "Getting Started" videos, the launch a decade ago of *CQ VHF* magazine, and the fact that *CQ* today is the only general-interest ham magazine with not one, but two, regular columns aimed at the new ham ("Beginner's Corner" and "How it Works"). *Our* challenge is to make sure those new hams know we're out there!

Dear Rich,

You couldn't be more wrong about the new *Getting Started with Ham Radio* publication. A few years ago, I decided to try weak signal VHF/UHF after over 30 years of mostly HF ham activity. I joined the Northeast Weak Signal Group, puchased equipment and substantial antennas. After five years of attempts at activity, I have concluded that VHF is a wasteland. There is nobody on here in the Boston area anyway. I've had very few 432 and 1296 MHz contacts, and 144 MHz is pretty empty too. Why write a book emphasizing that segment of the hobby for a newcomer where there is so little activity? To maintain interest, you need contacts. Covering HF and VHF in an entry level publication is the way to go.

Dick Bean, K1HC

Rich, & Don (N2IRZ),

I like the new ARRL book. In fact, I have purchased two as gifts, both for Technicians looking to upgrade. But it was not until your excellent editorial that I realized how horribly lop-sided it is! With all the wonderful things to do on VHF-UHF from EME, to satellites, to ATV, and yes, certainly HSMM, it doesn't spend much time with any of these. What a tremendous mis-focus! Also, I agree with Don's reply regarding encryption.Thank you both for another excellent edition.

John Champa, K8OCL

BY JOHN DORR,* K1AR

How Has Contesting Changed?

January's Contest Tip

The 40-meter band has become a new adventure for DX contest aficionados. Most of the U.S. multi-op stations reported that they worked more DX while operating transceive than via split operation in last year's CQ WW contest. Therefore, be aware that you may be missing the greatest opportunity of all in the next DX contest by only listening split, when you can be working guys on your own 40-meter transmit frequency!

Has contesting changed over the past month, year, or many decades? You bet it has—and, mostly for the good. Clearly, the conclusions drawn from this month's topic could have a broad range of outcomes depending on the timeframe being used. So, with that in mind I'm going to pick a few timelines and have some fun with it. I hope you enjoy it, too!

Calendar of Events

All year	**CQ DX Marathon**
Dec. 30	RAC Winter Contest
Dec. 3031	Stew Perry Topband Challenge
Jan. 1	ARRL Straight Key Night
Jan. 6–7	ARRL RTTY Roundup
Jan. 7	Kid's Day
Jan. 13–14	North American CW QSO Party
Jan. 20–21	HA DX Contest
Jan. 20–21	North American SSB QSO Party
Jan. 20–22	ARRL January VHF Sweepstakes
Jan. 27–28	**CQ 160M CW Contest**
Jan. 27–28	REF CW Contest
Jan. 27–28	BARTG RTTY Sprint Contest
Jan. 27–28	UBA SSB DX Contest
Feb. 3–4	Vermont QSO Party
Feb. 3–4	Delaware QSO Party
Feb. 10–11	PACC DX Contest
Feb. 10–11	CQ WW WPX RTTY Contest
Feb. 11	North American CW Sprint
Feb. 24–25	**CQ 160M SSB Contest**

Contesting 50+ Years Ago

Let me first make the claim that I'm not really qualified to comment on this time period, as I was a substantially younger fellow 50 years ago. At that point, to me contesting was putting five or six consecutive steps together (a different form of running, I guess!).

For those of you who were contesting in the 1950s, allow me to take some liberties with my assumptions. I do have the advantage of having spoken with many of you, so our readers will benefit from anecdotal experience.

When looking back 50 years, contesting was a very different animal. Now one can hardly imagine a contest without computers and DX spotting (yes, "contest men" as they were called in the 1950s actually tuned for new stations and found them on their own). The winning world-high score in the 1955 CQ WW DX CW Contest was 517,030 (W2HJR) and there were about 500 logs submitted (this is in sharp contrast to the nearly 4000 logs received per mode in today's WW). There was no instant gratification from 3830 internet score reporting. Also, perhaps of greatest distinction was the fact that rates were incredibly slow by today's standards. The notion of working 100 QSOs in a single hour was only a dream. However, when you consider the equipment being used (imagine a radio that needed to be "warmed up" before use) and dramatically simpler antennas, contesters of this era did pretty well for themselves. I often like to compare this to the old debate of which baseball players are the best—today's superstars or our heroes of the past.

As part of the information-gathering exercise for this month's topic, I was able obtain a perspective from Chas Weir, W6UM. Chas has the distinction of having operated in every CQ WW contest—not just 10 or 15 consecutive contests, but *all* of them! Who better to tell us about contesting's past than the man himself?!

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Some CQ WW Memories
By Chas Weir, W6UM

"When I admitted to K1AR that I had participated in every CQ WW Contest, including the very first, he asked me to write a bit about the early days. The contest has come a long way since the time when WAZ (Worked All Zones) was a goal likely to be achieved only after many years on the air.

In the first WWs, most DXers used commercial receivers, but nearly all built their own transmitters, especially the final amplifiers. The legal power limit for U.S. stations was 1 KW input, much greater than in other countries. Some countries still had regulations dating from before WW II, and hams were allowed only 100 watts or even less. Most competitors' antennas were dipoles and long wires. Any rotary beam had to be self-constructed, but the incentive to do so was very strong, given the immediate advantage to be gained over most of the competition. Yagi designs, for those able to build them, were entirely empirical.

The first WW did not include 80 meters. Phone was not allowed in the U.S. on 40, and 15 meters was not yet an amateur band. All phone contacts used AM. On 20 phone, U.S. stations crowded the band edge of 14200 to call all the DX stations who transmitted lower in the band. When 10 was not open, 20 meters got *very* crowded during the day! Understandably, in the pre-SSB days activity on phone was much less than on CW.

Contest participants sent their paper logs to CQ by surface mail, whereupon a group of volunteers from the principal U.S. DX and contest clubs undertook the task of log checking. Before the contest rules were completely translated and distributed around the world, some stations weren't sure of their correct zone, and also some miscalculated their scores in terms of points per QSO. All contesters seem to have terrible penmanship, so reading the logs and understanding the attached questions and comments in various languages was a challenge, but well worth the effort!

As primitive as all this may sound by today's standards, the participants in the first CQ WW contests kept coming back because the unique nature of a competition where everybody worked DX was more enjoyable than any alternative. It took a few years for the CQ WW to really explode in terms of popularity, which happened when ever more stations came on the air as rebuilding

January 27–28	CQ WW 160M CW Contest
February 10–11	CQ WW WPX RTTY Contest
February 24–25	CQ WW 160M SSB Contest
March 24–25	CQ WW WPX SSB Contest
May 26–27	CQ WW WPX CW Contest
July 21-22	CQ WW VHF Contest
September 22–23	CQ WW RTTY Contest
October 27–28	CQ WW DX SSB Contest
November 24–25	CQ WW DX CW Contest

Table I– The 2007 CQ WW contest schedule.

after WW II progressed worldwide. A contributing factor to the increased number of amateurs may have been the great expansion of technical education at institutes and universities around the world. Some of today's most dedicated contesters started by operating at a university club station and went on to build their own contest-oriented stations after graduation.

The CQ WW gained its initial popularity well before some features—such as contest expeditions, SSB, expanded multi-multi operation, computer logging, readily available commercial equipment, and other benefits routinely available today—appeared on the scene. Many developments have made the CQ WW even more enjoyable and more accessible for all participants. It is now possible to achieve WAZ in a single weekend. It is even possible for strongly motivated individuals to visit and operate from all 40 zones during sequential CQ WW contests.

Each CQ WW contest has provided unique and unforgettable experiences for me, whether single- or multi-operating from either a common or a rare DX location. The special bonds established with some of the fellow operators at multi-multi efforts remain after more than forty years. QSOs with the DX operators I have met personally at conventions or at WRTC (World Radiosport Team Championship) are worth much more to me than the three points per QSO they add to my score. But as I participate in each contest, I think back on the volunteers who supported and kept the CQ WW alive back in its formative years and helped it develop into what it is today. We all owe a great deal to them and to their present-day counterparts.

Contesting – 25 Years Ago

Hitting the fast-forward button 25 years reveals a world of contesting that was vastly different from its earliest days. Even though we still didn't have computers and today's other commonly available technology, advances in contesting were widespread. Commercial gear was the norm at this point. Leaders in the sport—such as Jim Lawson, W2PV, and others—were just introducing the world to stacked Yagis. The envelope was being pushed, both inside the shack and outside as well.

The large multi-op stations now sported two operating positions per band. Single operators were beginning to use two radios as a way to maximize their ability to work more stations. Also, in what had been a dream for just a few, more and more stations started to use 40-meter Yagis. Contesting's eye was now on bigger and better antenna farms, with a few brave souls erecting 80-meter beams.

Unlike the early days of contesting, the 1980s introduced the beginning of significant QSO rates. As the popularity of contesting grew, so did the number of stations worked in a particular event. In sharp contrast to the 1950s, the 1981 contest was won in the U.S. with a score of 3,554,880. In that year, 2600 logs were received for the SSB contest alone. With increased activity came higher rates, and for the first time the subject of logging accuracy took a front seat in the adjudication process.

On the Cover

Scott Johnson, WDØDAN, poses in front of his house and 50-foot tower in Bloomington, Minnesota. The tower sports a Force-12 XR-5 multiband Yagi with two elements each on 10, 12, 15, 17, and 20 meters, as well as various wire antennas for 80, 40, and 30 meters. The antennas are connected to a Yaesu FT-1000MP transceiver and an Alpha 87A linear amplifier in Scott's neatly appointed shack, which he shares with daughter Katelyn, KCØGKA, who was 15 when this photo was taken (she's now 18).

"The excitement of being able to talk a long distance" is ham radio's main draw for Scott, whose DXing accomplishments include 333 countries confirmed and single-band DXCC on 10 through 40 meters (except for 30 meters, on which he has 99 countries confirmed).

"The fun for me is in the competition of DXing," says Scott, explaining that "(w)hat really gets me going is the competition in the pileups on rare stations." He enjoys working both CW and phone, although "in recent years, I've been leaning more toward CW."

Scott holds an Extra Class license and has been a ham since 1977, but says he wasn't always a DXer. "For the first seven or eight years, I didn't really know what DXing was. I just got on the air and worked CW." Scott was inactive while in college but got back on the air after he got married and moved into his current house, with room for antennas. "Then I discovered DXing," he says, "and I haven't looked back." *(Cover photo by Larry Mulvehill, WB2ZPI)*

Contesting – 10 Years Ago

We now enter the 1990s. Technology's command over contest strategy was firmly in place as computers dotted the operating-desk landscape of many competitors. It was during this timeframe that a significant change took place. It seemed that we were beginning to spend more time working on our computers than on our actual stations. All of us were forced to learn more than we wanted to know about comm ports and multi-pin connectors. In addition, what seemed like a good idea in the 1980s was now becoming a problem—packet radio spotting. A dangerous habit was emerging, with many operators relying on the computer screen to dictate their next tactical move. Many of us were asking, "Has contest technology gone too far?" Fortunately, cooler heads prevailed and the answer has been a resounding "no."

The decade of the '90s was also the era in which high-rate contest operating really took off. A combination of activity, technology, and improving skills resulted in 300-hour rates being commonplace for DX operations and 400-hour rates being the gold standard of achievement. In the U.S., the larger stations were now routinely breaking the 200-hour barrier on SSB.

One of the benefits of the technology revolution was its impact on log checking. In what used to be a tedious and manual process, computers provided a significant leap in what had only been a dream just a few years before. The result was a community of contesters that truly stepped it up in terms of logging accuracy.

Speaking of single operating, the era of SO2R (Single Op/2 Radios) came into being during the 1990s. While some contesters had dabbled with the concept much earlier, the advent of new SO2R products made the task much easier for the average semi-technical ham. In addition, we began to see automatic antenna switching and other gadgetry that maximized the potential of virtually any station.

Computer automation, whether it took the form of logging or on-the-air operation, gave contest operating a new face around the world. Indeed, the era of the 1990s demonstrated some of the most exciting changes that contesting had ever seen.

Contesting – One Year Ago

Over the past year, contesting has thrived. We've suffered through a long and dreadful lull in solar activity only to emerge with more activity than ever from all parts of the world. In 2005, over 200 contests were sponsored by organizations around the globe on virtually every weekend of the year. Despite the lack of sunspots, stations were still reporting record contest scores and new highs in hourly rates, and an unprecedented number of stations submitted competitive logs. We even saw 10 meters open up between the U.S. and Europe during the 2006 CQ WW SSB contest.

That being said, contesting has also experienced some challenges in recent times. The cost of entry is sometimes prohibitive for aspiring competitors. Zoning restrictions seem to be the norm for hams wanting to place that tower in their back yard. Sadly, too, with each passing year the average age of a contester is keeping pace, now in excess of 50 years old.

Expectations for the Future

At the end of the day, the future of contesting is defined by whether or not your attitude is based on a half-full or half-empty point of view. I choose to be optimistic, as do most of the successful contesters I know. The future success of contesting is directly related to how many of us get involved in our own destiny; it has little to do with sunspots, the reliability of our laptops, or declining participation in certain parts of the world. It now seems that with great regularity I discover another pocket of meaningful contribution by a fellow contester. There are so many who choose to be quietly involved in aspects of the sport that are never reported in the final results.

The combination of your support for our beloved sport and unprecedented interest by the ham community in general bodes well for the future of contesting. Indeed, we do have our destiny in the palm of our hands. I'm excited to think about what contesting will be like in the years ahead. If the dramatic changes of the past are any indicator, we're in for a long and fantastic ride!

Final Comments

Contesting is rich in tradition. Those of us who are fortunate enough to enjoy contesting today are beneficiaries of the past, and for that we are thankful. Even though technology will continue to influence contesting in the future, let's never lose sight of the fact that the ultimate success of our sport is based on honesty and good old-fashioned competition.

As I've become known to say, above all make sure you're having fun. For me, my first contest, the 1969 ARRL Novice Roundup, was fun, and the sport still is today. See you in the next one!

73, John, K1AR

It's a New Year and a New Solar Cycle!

BY TOMAS HOOD,* NW7US

A Quick Look at Current Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, October 2006: 10
Twelve-month smoothed, April 2006: 17

10.7 cm Flux
Observed Monthly, October 2006: 74
Twelve-month smoothed, April 2006: 81

***Ap* Index**
Observed Monthly, October 2006: 7
Twelve-month smoothed, April 2006: 8

As we start out the new year of 2007, some of us continue the yearly ritual of setting resolutions for ourselves. We hope that the new year affords us an opportunity to accomplish the goals that we've hoped to achieve for years. Some of us actually accomplish our lofty goals during the course of a year. Year after year, this cycle repeats itself. We resolve, we try, we look back (with pride or with regret), and then we do it again with the dawning of another year.

The sun has its cycles, too. One of the most known of these cycles is the approximately 11-year cycle during which the sun changes in its level of "activity." This solar cycle is based on the monthly average of a daily sunspot count. At the start of a typical sunspot cycle, there are very few sunspots observed. This is known as the *solar minimum.* The *solar maximum* is the period of months when the number of sunspots reaches the peak of the cycle.

This year, 2007, marks the transition between the last solar cycle, Cycle 23, and the new cycle that might have already begun, Cycle 24. This is a period marked by very few sunspots, and the result is the continuing lack of propagation of radio signals on the higher amateur radio bands. Looking forward to what is coming this year, we're expecting a moderate rise in solar activity, but not significant enough by the end of 2007 to really see much change in conditions compared with those of 2006.

Another change this year is found in this column. For many decades this column has featured a set of charts that, when decoded, could be used to plan activity based on an estimate of propagation conditions between different areas of the world. These charts relied on a massive HF propagation modeling that examined "average" simulations to various world areas, but made a number of compromises. Imagine the computing power that was available 30, 20, and even 10 years ago. The sheer amount of data and variations that were used to create these tables resulted in very lengthy computer "runs."

Even today, some investigators attempt to load modern computers with "typical" runs that they can then draw on forever to predict specific radio-signal propagation cases. Such methods always fail (with as much as 10- and 20-dB errors), because they do not accurately define all the system variables.

Nevertheless, if one were to devise a methodology that gives a "handbook" of propagation predictions—one that can be referred to for years—then such compromises are necessary. The charts that have appeared in this column for so many years are to be admired, for they accomplished the goal of providing a general guidance for amateur radio operations during a typical month.

Through the years, as computers increased in power, and as scientists discovered more about space weather and radio-signal propagation, the models have changed. One of the most well-tested and up-to-date models has been embedded in the VOACAP software. VOACAP has continued as a living model and continues to be corrected.

Because of these advances in computers, software, and models, it is much more effective for the reader to begin using the affordable and powerful tools easily obtained. The current available software uses methods that can take into account the specific radio-circuit parameters (power level, antenna modeling, reliability factors, bandwidth, signal-to-noise factors, and so forth). I've reviewed some of these software programs in past issues of this column. My top recommendation is ACE-HF Pro <http://home.att.net/~acehf/>, due to the very close

CQ WW DX SSB Contest Review of Conditions

Where were you during the 2006 CQ WW DX SSB Contest weekend of October 28–29? How did you fare in the contest and how was propagation from your location to the many areas of the world where contesters hunted for points?

I forecast poor to good conditions for the weekend with an expected 10.7-cm flux level of about 75 during the contest. On October 28, the 10.7-cm flux peaked at 75, but fell to 73 on October 29. The daily sunspot count was 28 on October 28, but zero on October 29. No flares were observed, and the background x-ray radiation was very low, measured at the A1.5 to A1.6 level (barely energized).

I predicted the planetary *A*-index (*Ap*) to be about 10 during the SSB contest. On October 28, the *Ap* was 14, although the middle latitude *A*-index was 12. The *Ap* was 21 on October 29, with the middle latitude A-index recorded at 13. At higher latitudes, the *A*-index was 28 on October 28 and 36 on October 29. This all translates to fair conditions for propagation paths that did not cross high latitude regions and the polar caps. Paths over the higher regions suffered from loss, making signals weak and closing many paths. The prediction seemes to have been accurate.

Overall, the contest weekend was typical of any past contest during the very end of a solar cycle, except that there are so many participants using advanced equipment (DSP filtering, well-engineered receivers, and so forth). The majority of activity was on the lower bands, as expected.

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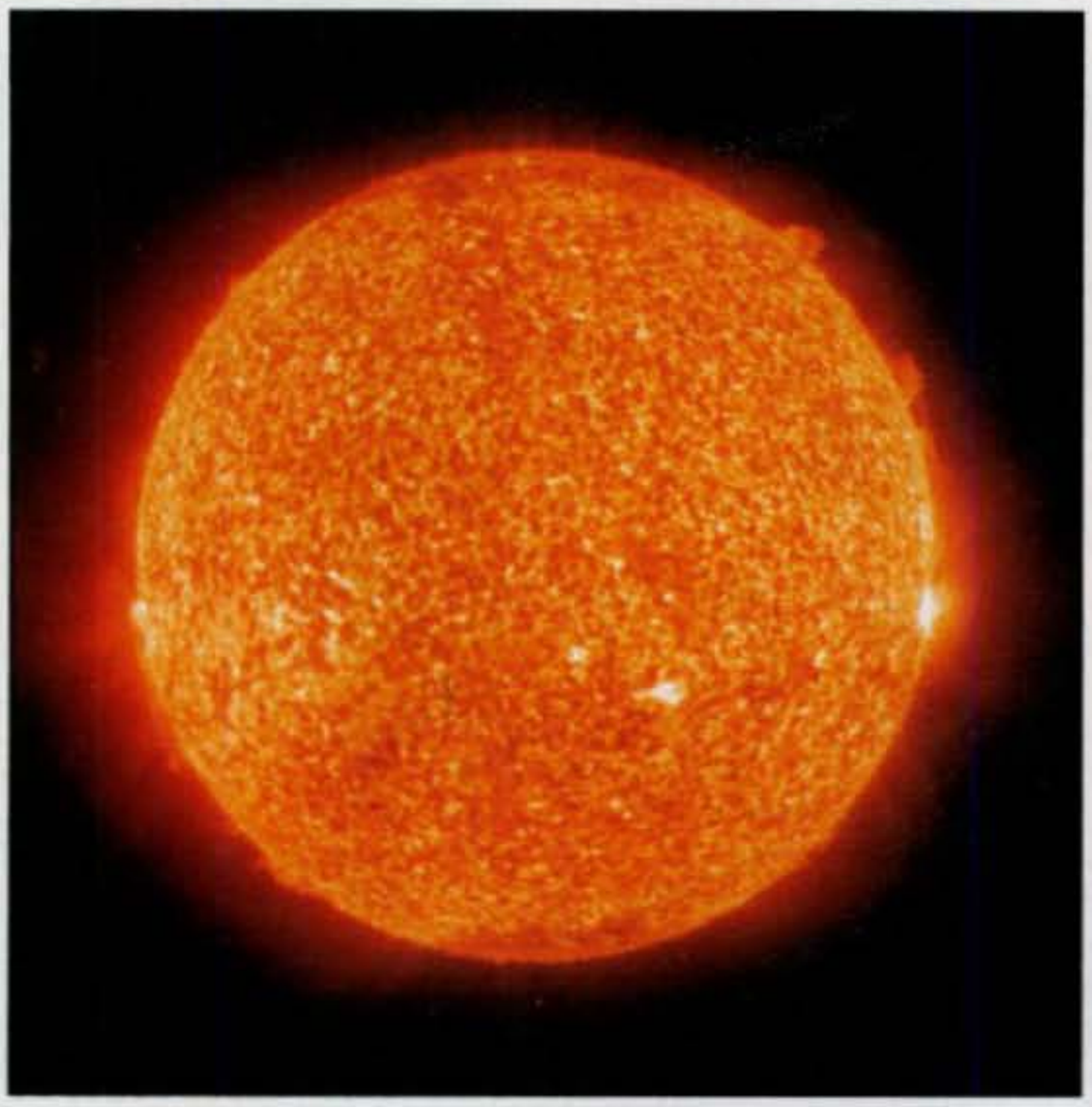
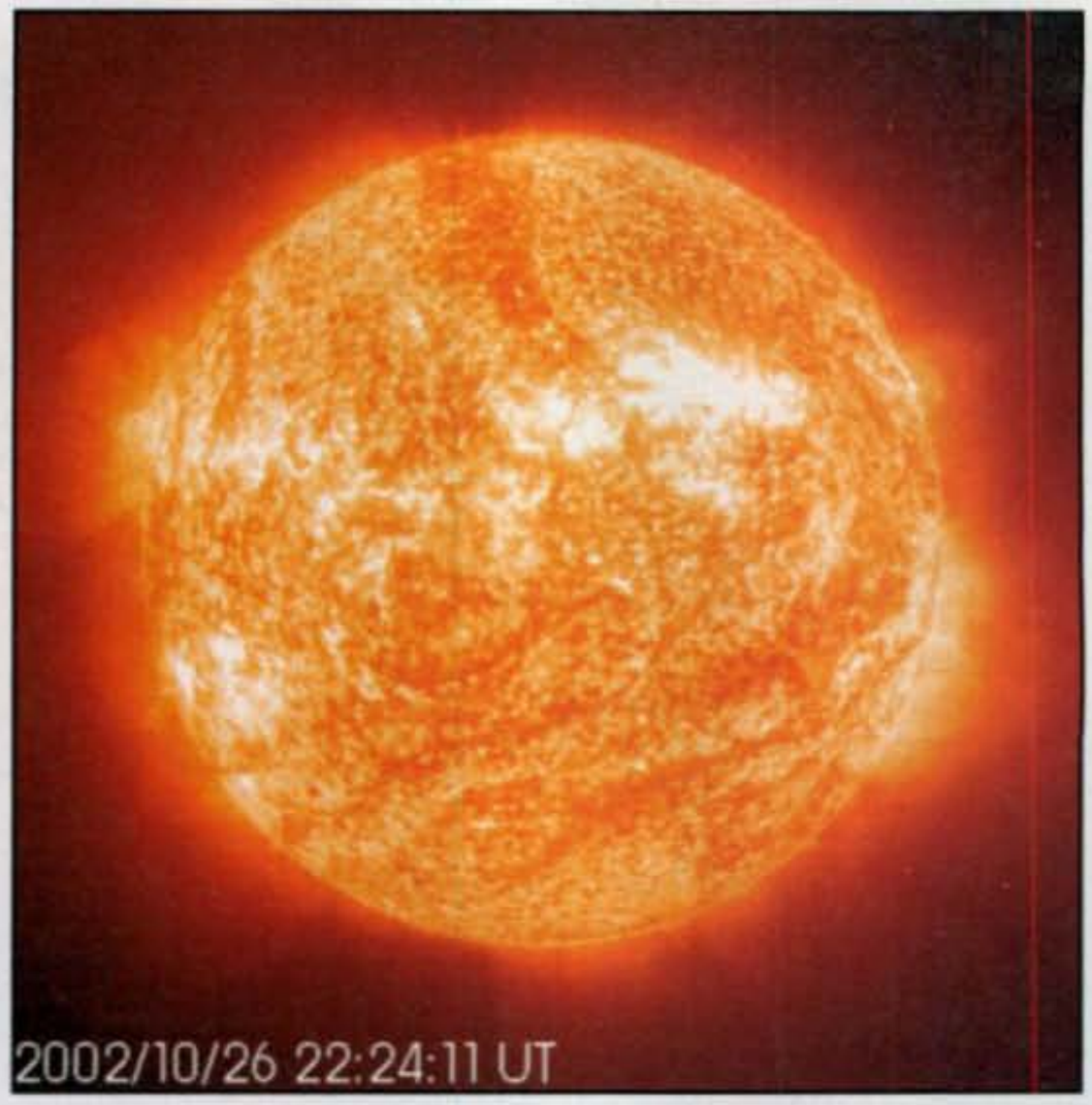


The sun during the second day (October 29) of the 2006 CQ WW DX SSB Contest, showing very low activity. (Source: NASA/SOHO)



The sun during the first day (October 26) of the 2002 CQ WW DX SSB Contest. Notice how much more active the sun was during the peak of solar Cycle 23. (Source: NASA/SOHO)

integration and active participation with the engineering of VOACAP that is found in this software. Other software programs that use the VOACAP engine with varying degrees of complexity and results include WinCAP Wizard <http://www.taborsoft.com/>, the DX Atlas Ham CAP program <http://www. dxatlas.com/hamcap/>, and of course, the actual VOACAP program <http://elbert.its.bldrdoc.gov/pc_hf/hfwin32.html>. Based on the older and now obsolete model, the IONCAP engine, the DX Labs PropView program <http://www.dxlabsuite.com/propview/> is also available.

All of these modern computer software tools provide levels of accuracy that just cannot be found in any tabulation that can be printed here each month. For this reason, the charts are no longer included here in the column, but can be referred to in the CQ publication *The New Shortwave Propagation Handbook*, by George Jacobs, W3ASK, Theodore J. Cohen, N4XX, and R. B. Rose, K6GKU (see the CQ Books ad elsewhere in this issue).

Will charts of any kind be published with this column in the future? I am exploring the options and weighing the benefits and drawbacks of various ideas. Since we are at the very start of a new cycle, it does not seem to me to be a critical matter. Please write to me with your thoughts about this change. Did you rely on these charts in your daily operations, or even for occasional planning? Have you used software tools to compare or replace these monthly charts in your situation? Or do you agree that the charts are no longer as effective as the modern computer tools so widely available?

Good Conditions for 2007

Here is an overview of expected propagation conditions on each amateur band between 6 and 160 meters for 2007.

6 Meters: About the only real action on 6 meters will be during the summer season's troposcatter and sporadic-*E* activity. Aurora will play a minor role during spring and fall. Meteor-scatter propagation might offer an occasional spike in activity, as well.

10 and 12 Meters: These bands will be fair to poor, except during times of sporadic-*E* activity. Expect most DX openings to be generally on north and south paths. Most of the time, the solar activity will not support propagation at higher bands, except for possible openings on paths between lower latitudes and locations on the other side of the equator (north/south paths).

15 Meters: This band will be fair to poor during the first part of the year, with occasional worldwide openings during the daylight hours of all seasons. Most openings, if present, will be short, except for the strong and frequent north/ south path openings. By the end of 2007, we might see a slight increase in solar activity as the new cycle, solar Cycle 24, is expected to begin sometime between now and the end of 2007.

17 Meters: This band should behave much like 15 meters, but you will find it open more often, with it remaining open for DX an hour or two longer than 15 meters.

20 Meters: This band is going to be the main player during this year of low solar activity. Expect fair conditions during the daylight hours, with DX openings possible to limited areas throughout the year. DX conditions on this band tend to peak for a few hours after local sunrise and again during the sunset period.

30 Meters: As Cycle 23 sees its completion at the end of 2006, activity on this band will offer moderate openings, especially a few hours before sunset until a few hours after sunrise. In 2007, 30 meters will be an exciting band for those low-power digital signals. Winter brings longer nights, providing the right mix for exceptional worldwide DX.

40, 60, 80, and 160 Meters: These are nighttime DX bands. Great worldwide DX should continue on 40 meters from about two hours before sunset to approximately two hours after sunrise during all seasons. Expect coast-to-coast DX in 60 meters. DX openings on 80 and 160 should peak during the

early spring, late fall, and winter months. Expect somewhat stronger signals than those of last year.

January Propagation

It should be a *toss*-up between 17 and 20 meters for some great DX propagation openings during the daylight hours. These bands should open to most areas of the world, often with very strong signals. Seventeen meters may have a slight edge before noon, with 20 meters taking the lead after noon and becoming the optimum DX band during the late afternoon hours. Short-skip openings between distances of about 1200 and 2300 miles should be excellent during the daylight hours. Excellent short-skip openings are expected on 15 and 17 meters from shortly after sunrise through the early evening hours for distances between 1000 and 2300 miles. Twenty meters is expected to be a solid band with openings for both DX and short-skip. DX conditions should peak during a window of an hour or so right after sunrise and again during the late afternoon and early evening hours. Short-skip openings between approximately 1300 and 2300 miles should be possible from just after sunrise to as late as midnight. Shorter distance openings should also be possible from mid-morning to mid-afternoon.

The optimum band for DX conditions during the *hours of darkness* should be 40 meters. Expect openings to most areas of the world from shortly before sundown, through the hours of darkness, until shortly after sunrise. Signal levels may be exceptionally strong at times. During the daylight hours, short-skip conditions should be optimal for openings between approximately 100 and 600 miles. Skip will lengthen during the late afternoon, and by nightfall short-skip conditions should be optimal for openings between 800 and 2300 miles.

Expect 60 meters to play a significant role in nightly DX across the United States. With very low noise levels this month, the weaker signals of 60 meters will be easy to copy.

Because atmospheric noise levels will be at seasonally minimum levels in the Northern Hemisphere during January, the 80- and 160-meter bands should also be hot. Expect some good openings to many parts of the world on 80 meters during the hours of darkness and the sunrise period. Short-skip openings between distances of 50 and 250 miles should be optimal on 80 meters during the daylight hours. During the later afternoon and early evening hours, short-skip openings should increase to between 250 and 1500 miles, and by nightfall openings up to and beyond 2300 miles should be possible.

Expect some DX openings on the 160-meter band during the hours of darkness. Openings towards Europe and the east should peak at about midnight. Openings towards the South Pacific and in a generally southerly direction may be possible just before daybreak, as well as openings into Asia and the North Pacific. Short-skip openings up to 1300 miles should be possible during the hours of darkness, and frequently the skip will extend out as far as 2300 miles. During the daylight hours intense ionospheric absorption will severely limit openings, although at times some may be possible up to 150 miles or so.

VHF Conditions

Look for the *Quadrantids* meteor shower, the major meteor shower for January. It typically starts sometime between January 1 and lasts through January 5. The maximum should occur at 0030 UTC on January 4. This shower can sometimes be quite intense, so it may be a good idea to set up some 2- and 6-meter schedules. Morning meteor openings may be the best bet during this month. The hourly rate can be as high as 120 this year.

Check out <http://www.imo.net/calendar/> for a complete calendar of meteor showers in 2007. Have you worked any of these meteors? Please drop me a note and let me know. I'll construct a summary from your reports for this column's readers to enjoy.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for October 2006 is 10.4, down from September's 14.5 and 12.9 for August. However, this is not the lowest monthly figure during the decline of this solar cycle. We observed a monthly mean sunspot number of 5.3 for February 2006. The lowest daily sunspot value recorded was zero (0) on October 11–18, October 26, and October 29. Clearly, activity is quickly diminishing the closer we get to the end of Cycle 23. The highest daily sunspot count was 27 on October 23. The 12-month running smoothed sunspot number centered on April 2006 is 17.1, not even a full point less than the 17.1 figure from March. A smoothed sunspot count of 7, give or take about 7 points lower to 12 points higher, is expected for January 2007.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 74.3 for October 2006, down from 77.8 from September 2006. The 12-month smoothed 10.7-cm flux centered on April 2006 is 80.9. The predicted smoothed 10.7-cm solar flux for January 2007 is 72, give or take about 14 points.

The observed monthly mean planetary *A*-index (*Ap*) for October 2006 is 7. The 12-month smoothed *Ap*-index centered on April 2006 is 7.9. Expect the overall geomagnetic activity to vary greatly between quiet to active during most days in January.

I invite you to visit my online propagation resource at <http://propagation.hfradio.org/>, where you can get the latest space data, forecasts, and more, all in an organized manner. If you have a cell phone with internet capabilities, try <http://wap.hfradio.org/>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. I'd also love to hear any feedback you might have on what I have written. Until next month . . .

73, Tomas, NW7US

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, and Prefixes. An asterisk (*) before a call indicates low power. Certificate winners are listed in boldface. (Note that the country names and groupings reflect the DXCC list at the time of the contest.)

2006 WPX SSB RESULTS
QRP/p

TI5N	A	1,368,310	1,205	467
			(Op: N0KE)	
F5BEG	A	716,256	734	432
UA3BL	A	627,532	751	437
YT7TY	A	531,330	590	398
KA1LMR	A	455,287	596	337
IO5PO	A	361,722	449	334
ND0C	A	299,008	485	292
OK7CM	A	254,624	381	292
HG5Y	A	248,211	432	261
LU1VK	A	245,016	378	246
RW3AI	*	242,416	460	278
K3WW	A	229,758	355	257
IZ1ANK	*	194,016	367	282
PG2AA	A	191,326	381	271
RX1CQ	*	166,515	372	255
MM3AWD	A	162,096	344	264
ES5KJ	A	145,530	301	245
SP2DNI	A	140,335	310	221
OK1JOC	*	126,522	309	213
SP7L	*	110,148	256	201
AN1TI	A	107,326	252	206
UX8ZA	A	99,072	269	192
RV9AZ	A	89,040	197	159
VK2BAA	A	88,638	201	158
N1TM	*	85,221	193	153
RA6GW	*	80,910	240	186
N8ME	A	74,980	217	163
US0YA	*	72,504	197	171
K3TW	*	65,044	205	161
SP9RQH/9	*	37,352	139	116
EA8BTM	*	35,616	105	84
PE2KP	*	35,112	158	133
ED8BTM	A	33,210	100	81
NF2L	A	31,050	152	115
YO4AAC	A	30,968	155	98
RL3DZ	*	28,231	133	109
KC9ECI	A	26,924	151	106
EA2CHT	*	26,730	127	110
AX8AA	A	21,827	109	73
UA8SBQ	A	21,060	105	81
K6TV	A	20,808	114	102
N8XA	*	18,785	100	85
SP1RFC	*	18,616	118	104
DL2EF	A	17,776	110	101
N7IR	A	15,200	90	76
WD9FTZ	*	15,123	98	71
SP4DZT	*	13,870	75	73
IC8FAX	*	13,689	92	81
VA3RKM	A	13,464	79	68
OM7DX	A	11,529	68	61
AM1BP	*	10,553	64	61
			(Op: EA1BP)	
K6EY	*	7,552	70	64
WD5FGZ	A	7,366	70	58
W2JEK	*	7,260	66	60
IW0RLC	*	6,498	58	57
SP3BLT	*	4,968	48	46
			(Op: SP3BLT)	
YB5AQB	A	4,636	50	38
RN3QIS	*	3,978	44	39
VK3JS	A	3,060	52	30
AF9J	*	2,680	43	40
RK3DUJ	*	2,664	38	37
RK9DO	*	2,139	24	23
			(Op: RV9CLF)	
VK2NU	*	1,679	23	23
UA1CAK	*	570	20	15
AF4KL	A	464	16	16
DL1JB	*	384	17	16
RW3VZ	*	135	9	9
PA0FAW	*	90	10	9
K3KOA/KH6	*	21	3	3
AI4G	*	16	4	4
LW3DN	28	18,144	96	84
LU3JVO	*	9,256	62	52
W6QU	28	8,750	66	50
LW3DC	*	3,502	39	34
I5KAP	28	3,120	38	30
WW0WB	28	2,225	33	25
WB0IWG	*	1,876	28	28
PY1CMT	*	48	4	4
JH7RTQ	21	33,915	129	105
SQ4HRN	21	24,768	102	96
JR1NKN	*	18,330	95	78
YO4ATW	21	10,540	66	62
EY8BW	21	4,635	73	45
K7UP	21	1,608	25	24
SP3PL	*	1,197	21	19
DF1RK	21	561	17	17
JK1TCV	*	8	2	2
JO6PAQ	*	1	1	1
KP4FP	14	377,806	618	286
			(Op: KP3T)	
YT150CS	14	190,218	413	294
YO2LYN	14	78,435	247	189
RZ9IB	14	77,872	184	157
VA3VF	14	60,532	170	148
HA1ZV	14	37,639	163	133
F4AGR	14	25,155	131	117
SQ6ELV	14	22,330	129	110
SQ4LP	*	20,235	103	95
SO9L	*	12,765	85	69
			(Op: SP9UML)	
JA4DQX	14	12,444	81	68
WB7OCV	14	10,290	72	70
RV6MD/9	*	9,877	89	83
LY5G	14	9,720	81	72
			(Op: LY2FE)	
SE5S	14	8,928	80	72
I1BAY	14	8,240	126	120
W4BQK	14	7,308	61	58
DH8BQA	14	6,800	78	68
KT8K	14	2,508	41	38
AN2SN	14	2,451	47	43
			(Op: EA2SN)	
WA6NOL	14	960	20	20
EA4EOZ	*	682	23	22
DC6CO	*	378	19	18
EW6DX	*	24	4	4
OK2BYW	7	118,862	239	206
SP4GFG	7	86,064	200	176
YO4US	7	2,146	32	29
SM5ARO	7	200	10	10
SQ2DYF	3.7	50,315	175	145
UT5UPN	3.7	9,982	70	62
LY5A	1.8	103,411	260	187
RA3WUD	1.8	3,440	47	40
OL4W	1.8	3,315	48	39
			(Op: OK1IF)	
AM3FF	1.8	2,176	32	32
UR4MLU	1.8	216	12	12
DJ3GE	1.8	170	10	10

SINGLE OPERATOR
UNITED STATES

KQ2M	A	3,419,570	1736	770
W1CU	A	2,873,502	1630	762
AK1W	A	2,334,584	1287	658
			(Op: K5ZD)	
W6ZF	*	457,353	579	351
NN1N	*	368,636	436	314
W1EQ	*	265,816	400	298
K1SND	*	135,339	320	229
NW1E	*	99,828	212	177
			(Op: N3KCJ)	
K5ZD	*	64,260	163	140
AB1BW	*	57,505	189	155
NF1A	*	29,648	129	109
W1YRC	*	27,170	110	95
KV1J	*	19,580	100	89
KB1IWX	*	1,575	27	25
W1WIU	*	1,296	25	24
N1GKI	14	179,907	324	273
N1IW	*	3,750	62	50
K3FN	7	91,020	204	164
K1HAP	1.8	40,590	190	123
***NV1N**	A	2,063,370	1370	654
			(Op: N1UR)	
***KA1EKR**	A	175,602	277	226
***KA1C**	A	120,972	286	204
*KB1FRK	*	86,304	219	186
*K1VU	*	45,758	162	137
*W1CRK	*	43,282	162	134
*KK1X	*	38,400	167	128
*WB1EDI	*	27,371	119	101
*N1YKH	*	18,792	91	87
*K1QK	*	14,904	101	81
*W1XW	*	840	22	21
***WB2VVV**	14	61,380	167	155
*W1OHM	*	7,668	54	54
*KZ1O	*	3,116	39	38
***AB1FY**	7	798	14	14
WA2JQK	A	797,001	727	447
W2LK	A	364,554	420	314
N2MUN	A	318,200	430	296
WM2Z	*	243,310	501	290
KB2DE	*	161,550	299	225
WF2B	*	150,768	302	216
N2SQW	*	103,212	222	183
W2FUI	*	85,444	175	136
WB2KLD	*	68,136	164	136
K2MFW	*	57,771	192	147
WA2BKN	*	50,710	151	110
NA2M	*	29,154	132	113
KD2NE	*	20,293	106	91
W2KXD	*	18,018	80	77
N2SY	*	10,230	70	66
K2NV	*	7,176	50	46
AF2K	*	3,811	44	37
NA2P	*	1,920	26	24
N2MM	21	383,768	600	356
***W2CCC**	A	465,885	593	357
			(Op: K2CS)	
***WR2G**	A	379,620	478	333
***WA2MCR**	A	280,576	410	274
*KM2O	*	226,416	377	267
*AB2TC	*	188,972	342	238
*WA2LXE	*	88,935	223	165
*K2YLH	*	67,353	242	157
*AB2IO	*	51,910	171	145
*WA2ALY	*	50,193	127	117
*KG2NI	*	49,178	165	134
*W2PWE	*	44,744	158	136
*W2GLE	*	36,058	137	121
*KG2AF	*	30,916	152	118
*N2TTA	*	21,120	106	96
*WB2DZH	*	15,400	99	77
*WB1ERE	*	8,946	73	63
*K2PH	*	6,800	52	50
*AB0OX	*	3,648	41	38
*AK2K	*	3	1	1
*N2ZN	21	360	13	12
***K2HVE**	14	31,414	129	113
*N2USM	*	29,318	113	107
***NT1E**	1.8	78,720	335	164
			(Op: K3BU)	
K3ZO	A	5,929,630	2363	889
AB3CX	A	1,037,658	934	489
N3UM	A	1,022,625	842	505
KB3TS	*	350,594	418	307
AD8J	*	348,084	425	293
N3KR	*	308,538	430	281
NX3Y	*	302,400	449	300
			(Op: KA3QLF)	
N3ST	*	210,366	390	261
K3RH	*	63,384	172	139
K3ISH	*	48,000	141	128
KD3TB	*	43,911	133	119
W4ZE	*	10,089	68	57
W3BGN	3.7	1,032,430	922	430
***K4CGY**	A	244,584	384	258
***W2BZR**	A	85,808	228	173
***WY3X**	A	76,152	268	167
*WA1LWS	*	64,370	235	157
*W3MIV	*	62,726	217	158
*K3VED	*	54,683	184	149
*W3DQN	*	53,491	188	149
*NS3T	*	50,887	215	151
*N3FNE	*	43,896	169	124
*KB3EXB	*	42,007	131	119
*N3CHX	*	38,868	150	123
*KZ3M	*	34,320	141	120
*WA3ELQ	*	23,100	105	100
*K3ZT	*	12,240	96	80
*KB3KGP	*	11,005	80	71
*W3LF	*	7,869	68	61
*WB3LKO	*	1,127	23	23
***N3TXH**	28	468	15	13
***W6AAN**	14	9,120	58	57
*KE3QX	*	4,922	51	46
*N3GL	*	4,326	43	42
NF4A	A	3,601,224	1941	792
			(Op: N4PN)	
K4PV	A	3,193,454	2111	766
AD4TR	A	2,637,405	1869	705
K5RQ	*	2,604,105	1837	735
WS4NC	*	1,674,270	1226	585
KX4X	*	1,102,494	1073	509
			(Op: K4ZGB)	
NJ2F	*	981,396	963	468
N4ZZ	*	702,961	892	431
W2YE	*	527,012	567	359
WB2QLP	*	462,645	626	345
W2OO	*	447,355	513	323
K4ADR	*	446,590	606	370
KJ4TS	*	443,520	700	360
			(Op: K9VV)	
K4JET	*	281,184	401	303
W7QF	*	280,233	418	291
W4YE	*	271,165	392	281
K4OH	*	269,876	359	268
KU5S	*	259,644	458	281
K9HUY	*	242,252	405	284
W4NTI	*	239,598	387	261
NE8J	*	194,666	399	262
K4LQ	*	189,912	304	246
NJ4I	*	160,244	309	236
			(Op: K4LTA)	
AJ2U	*	146,046	313	241
W3MGL	*	116,372	262	188
AD4IE	*	111,296	240	188
K4IRS	*	110,644	223	199
K1ZW	*	110,589	225	193
NE4M	*	88,644	253	166
K4WQ	*	77,952	233	174
N4MM	*	77,679	152	137
W4SUL	*	64,752	167	152
NX9T	*	64,629	247	167
WA4ASJ	*	63,000	197	150
NJ4F	*	23,600	113	100
N4EKG	*	23,577	97	87
WF1L	*	21,090	106	95
W1MO	*	20,210	104	86
NS4SC	*	18,468	83	76
WA4GLH	*	10,650	88	71
K4APG	*	9,976	67	58
K4ZTL	*	4,788	45	42
N4CU	*	4,680	41	39
N4ES	*	3,658	40	31
NA4W	28	144,664	364	214
WN1GIV	21	1,249,365	1041	559
			(Op: N4BP)	
W4PV	*	138,844	322	206
K4RDU	14	156,545	284	239
K4SQR	*	38,812	130	124
K4KZZ	7	48,311	91	91
AA4VV	*	6,370	35	35
KU8E	3.7	16,800	106	80
AA4MM	1.8	92,232	374	183
***N5DO**	A	1,263,990	1203	546
***NS4T**	A	679,980	712	420
***KA8Q/4**	A	578,985	602	363
*N4NX	*	511,598	617	367
*KI3O	*	432,948	541	331
*K4JE	*	398,431	456	319
*W4TMN	*	330,624	438	287
*WB2RHM	*	292,006	430	286
*W4TMO	*	186,303	312	221
*AI4MT	*	178,157	306	217
*NA4BW	*	164,680	415	230
*N4LS	*	150,722	364	221
*AA4FU	*	134,723	295	199
*NU4SC	*	124,236	277	204
			(Op: K3IXD)	
*K4MIL	*	123,828	287	204
*KD4CC	*	122,930	269	190
*N2IXX	*	122,718	255	181
*N4UH	*	108,064	231	176
*NE4AA	*	106,275	257	195
			(Op: K1TO)	
*WA4BKW	*	103,668	206	159
*WB4SQ	*	101,104	248	178
*KG4IGC	*	87,360	238	182
*K4JAF	*	86,416	220	176
*WA4OSD	*	86,278	253	179
*WO4O	*	81,344	215	164
*N4JED	*	80,828	226	167
*K2DAR	*	71,456	195	176
*K3MZ	*	69,006	190	159
*W4WNT	*	68,252	194	151
*N4DXI	*	67,248	194	144
*AC5ZS	*	66,144	188	156
*KM4RK	*	61,045	213	145
*AC4JI	*	50,304	168	131
*N4WO	*	42,372	171	132
*WA2KHO	*	41,922	125	102
*W4/AL2F	*	36,624	155	112
*AD4YQ	*	34,505	122	103
*K4FTO	*	32,568	151	118
*NJ8J	*	23,765	125	97
*W4GHD	*	21,018	111	93
*W4KAZ	*	19,053	101	87
*NA4CW	*	17,544	97	86
*AE4EC	*	17,085	102	85
*WN4DX	*	17,025	87	75
*KE4JUH	*	16,200	107	81
*KE5OG	*	15,840	118	96
*WA3OFC	*	13,869	75	67
*K8OSF	*	13,140	83	73
*KV1P	*	12,996	88	76
*KR1ST	*	12,960	122	81
*AF4UU	*	11,385	79	69
*AF4PP	*	11,084	76	68
*N9XY	*	10,380	69	60
*K4GOP	*	10,184	77	67
*W4TME	*	9,548	74	62
*KA4OTB	*	9,165	65	65
*AI4CB	*	8,505	76	63
*W4GAC	*	8,262	55	54
			(Op: W4/KP2N)	
*W4STB	*	4,794	48	47
*W4OGG	*	4,160	40	40
*WA4PGM	*	3,800	40	40
*KD0XX	*	3,182	43	37
*K4YJ	*	2,278	34	34
*KI4KNS	*	2,244	40	34
*K2VX	*	1,360	20	20
*W2DZO	*	1,008	25	21
***KG4KVZ**	28	1,260	22	21
***K4EU**	21	23,700	100	100
*WA4FXX	*	5,566	50	46
*W4JIK	*	3,760	40	40
*NQ4K	*	162	9	9
*KI4MPQ	*	32	4	4
***KF4GTA**	14	425,870	752	370
***W4LC**	14	250,828	339	292
*N4MO	*	231,275	330	275
*KZ5OH	*	172,620	310	252
*N4EXA	*	67,252	201	172
			(Op: T93M)	
*WA4VJC	*	29,618	135	118
*KX2J	*	9,027	64	59
*K1HG	*	7,597	73	71
*KG4ICS	*	3,145	40	37
*KT4KW	*	1,643	31	31
*K5FYI	*	6	2	2
***NE4S**	1.8	21,112	151	104
NE5D	A	182,608	349	226
			(Op: K5RX)	
KD5JAA	A	75,088	199	152
N6ZZ	A	61,932	225	156
W5JLR	*	49,245	162	147
WA6POZ	*	47,144	152	142
KC5TA	*	23,871	112	109
W5PR	28	58,919	225	133
WM5R	21	1,571,168	1193	592
			(@K5TR)	
NO5K	*	265,264	457	281
			(Op: W5ASP)	
N5TEY	*	3	1	1
W5FO	14	1,247,148	1249	588
N5VYS	*	128,226	510	213
NT5HS	7	7,500	50	50
			(Op: N0RQ)	
***WD5K**	A	1,512,466	1299	586
***K5ER**	A	402,897	610	319
***WA5ZUP**	A	124,630	347	206
*AD5WI	*	88,206	293	183
*AF5Q	*	70,253	251	163
*NY5J	*	54,663	186	133
*K0CIE	*	53,475	195	155
*W5WAF	*	52,820	220	139
*KD5OWO	*	50,274	237	147
*W5GCX	*	35,844	132	103
*NQ5Z	*	32,760	147	126
*NE0P	*	30,580	150	110
*KE5DHY	*	30,210	141	114
*KZ5J	*	28,982	116	86
*KD5ZEZ	*	22,616	110	88
*K5KA	*	16,875	99	75
*K5VGI	*	9,438	78	66
*K5SF	*	6,120	62	51
*N5DTT	*	4,002	46	46
*K5LAD	*	3,663	40	37
*KE5CWC	*	900	18	18
*KC5RET	*	208	9	8
***NA4M**	21	5,880	53	49
***NN5Z**	14	125,325	301	225
			(Op: K5PX)	
*AD6G	*	68,297	190	163
N6CW	A	3,917,216	2331	751
			(@ K6NA)	
AA6PW	A	1,779,232	1796	611
KI6CG	A	1,433,112	1377	566
N6AA	*	1,091,556	1163	486
K6NR	*	626,316	793	402
N6NF	*	251,488	444	271
KO6LU	*	205,975	493	275
KY6LA	*	179,414	391	218
N6WK	*	168,975	311	225
K6QK	*	157,176	405	236
WA6ST	*	153,360	347	213
K6JAT	*	115,753	304	187
AD6ZJ	*	104,346	256	187
NO6X	*	63,600	233	150
KI6T	*	52,500	192	150
KI6CK	*	42,918	208	138
KE6QR	*	37,076	192	124
KG6ZHC	*	36,120	173	120
AE6RR	*	25,146	117	99
AK6DV	*	21,672	111	84
WA5VGI	*	19,118	91	79
NF6V	*	17,082	102	78
W6ISO	*	10,912	67	62
W6OAT	*	2,310	30	30
K6KO	*	2,072	31	28
W6RKC	21	6,400	53	50
K6HNZ	14	342,324	669	333
WR6WR	14	313,225	569	335
			(Op: N6WR)	
NT6K	*	25,724	165	118
K6III	*	20,079	97	97
***WN6K**	A	517,680	782	360
***K6XV**	A	302,045	612	313
***N6EM**	A	132,335	317	199
*K1USC	*	99,680	288	178
*KD6PQF	*	63,568	235	137
*K6VFF/M	*	57,816	196	146
*AA6EE	*	53,949	210	147
*KQ6ES	*	52,126	217	134
*W6HYK	*	37,648	108	104
*NZ6L	*	37,281	159	129
*NA6G	*	21,945	118	95
*KI6CDF	*	20,274	110	93
*NK6A	*	14,691	96	83
*WB6KDH	*	12,090	76	65
*N6SPB	*	11,899	97	73
*NV6V	*	11,375	106	65
*K6CSL	*	7,236	63	54
*K6BIR	*	6,572	62	53
*WB6NFO	*	6,570	108	96
*NJ6N	*	6,136	57	52
*KK6MM	*	2,964	46	39
*N6QZS	*	2,858	51	44
*W6PAP	*	2,583	44	41
*AD6FR	*	1,525	26	25
*NC6P	*	925	28	25
***W6AFA**	21	354,316	562	313
*NP4IW/KO6	*	100,980	298	187
***KM6Z**	14	203,490	482	285
*NE6I	*	6,120	69	60
***KI6LZ**	7	118,420	235	191
*KU6T	*	13,568	70	64
*AA6DX	*	8,154	55	54
K7ZS	A	1,720,500	1553	620
KW7Y	A	1,664,775	1271	525
			(Op: K7RL)	
K7ZZ	A	1,573,929	1485	581
NI7T	*	1,305,076	1156	509
KV7DX	*	1,206,480	1425	528
			(Op: KN5H)	
KE7RT	*	433,198	577	334
AA7PM	*	349,576	441	296
NB7V	*	344,640	613	320
WZ7M	*	310,930	516	310
			(Op: K7MO)	
WG7X	*	225,834	496	283
K7ABV	*	220,506	337	257
KI7Y	*	215,634	396	249
W7QN	*	164,500	357	235
W7UG	*	144,534	315	218
KS7T	*	131,840	301	206
K7WP	*	123,025	300	185
NN7ZZ	*	99,736	296	182
			(Op: N5LZ)	
KG7P	*	86,099	252	179
N7BF	*	70,550	195	170
K7LV	*	40,479	148	103
WG7Y	*	22,601	104	97
K8IA	21	460,435	763	355
KC7V	*	200,943	386	269
W7WA	14	4,766,850	2573	963
W6AEA	*	311,049	382	323
KC7UP	*	4,730	43	43
KD7YVV	*	154	12	11
K7NWS	*	72	6	6
W7AT	3.7	418,931	739	323
			(Op: W7EW)	
***N7VR**	A	334,796	492	308
***N7LOX**	A	165,920	379	244
***K7ACZ**	A	143,655	256	183
*W7ASF	*	142,766	320	221
*W3CP	*	120,900	252	195
*W7YVK	*	116,083	240	173
*AE7DX	*	91,368	247	162
*N7NJO	*	50,370	158	138
*W7SYJ	*	36,414	138	119
*AD7BK	*	30,495	158	107
*K7ACS	*	28,890	144	107
*K7TR	*	28,847	112	91
*N7CN	*	26,622	140	102
*KT7G	*	24,035	135	95
*AC7GP	*	21,632	136	104
*K7AEK	*	16,548	97	84
*KC5YED	*	15,054	109	78
*W7JU	*	12,670	78	70
*N9ADG	*	10,082	85	71
*NI0S	*	7,280	76	65
*KG7WZ	*	6,032	60	52
*K7AT	*	2,584	43	34
*NG7Z	*	1,710	31	30
*K7ABL	*	1,431	27	27
*K9TTE	*	1,140	20	20
***W7UPF**	21	100,694	232	199
***AD7J**	14	396,924	462	372
			(Op: W7FP)	
*N7IZ	*	11,880	102	88
*W7TAX	*	805	25	23
***K7AWB**	7	12,460	75	70
W8TE	A	412,720	543	335
W8DCQ	A	172,788	330	242
N4SEA	A	135,340	256	202
K8VUS	*	119,748	249	204
K9TTT	*	6,248	45	44
WO8CC	21	125,528	282	221
			(Op: N8BJQ)	
K8OQL	1.8	6,254	79	59
***WB8TLI**	A	767,110	716	410
***KD5LNO**	A	330,632	525	296
***NR8I**	A	274,572	449	263
*WB8JUI	*	209,969	378	257
*WA8WV	*	195,980	322	239
*N8XD	*	122,208	256	201
*K8ME	*	67,195	205	151
*N8IE	*	56,126	191	133
*AF8C	*	49,640	175	146
*N8WK	*	47,950	155	137
*KQ8RP	*	29,425	136	107
*AB8VE	*	13,612	98	82
*AB8OJ	*	13,172	83	74
*N8HC	*	13,090	98	77
*W8IDM	*	10,368	69	64
*W8KNO	*	7,840	61	56
*KZ8E	*	1,575	27	25
***NV8N**	14	476,007	612	399
*W8GOC	*	3,952	39	38
***NR8U**	7	17,112	120	92
WB9Z	A	4,010,560	2173	830
AC9S	A	383,648	509	304
WE9N	A	353,298	453	318
K9JIG	*	115,374	269	201
KY9IN	*	75,006	246	162
			(Op: K9GX)	
WT9U	*	47,060	171	130
K9VS	*	35,968	160	128
AI9L	*	9,000	83	60
N9JZN	*	5,043	48	41
K9FH	*	6	1	1
W9VA	21	7,182	60	57
KG9N	14	21,922	127	97
K9NW	1.8	60,000	273	160
***K9QVB**	A	716,968	784	434
***WW9R**	A	672,364	1040	407
***AA6DY**	A	228,780	409	279
*N9LYE	*	82,368	280	176
*N9AVY	*	27,405	137	105
*WB8RFB	*	25,900	120	100
*W9VQ	*	25,048	107	101
*N9MTT	*	23,871	113	109
*KC9HAV	*	18,834	112	86
*N9LJX	*	14,560	72	65
*W9THD	*	8,216	58	52
*K9PY	*	6,566	55	49
*K9OSH	*	6,136	58	52
*KD4ULW	*	3,367	39	37
*W9WY	*	495	17	15
*WI9TOM	*	390	16	15
***W9ILY**	21	6,750	54	50
***K9DN**	14	26,448	136	116
*W9IL	*	17,835	89	87

*WD9DJD	*	8,316	70	66
*W9LYN	7	28,500	111	100
*W9LYA	3.7	275	11	11
KTØR	A	1,315,085	1423	545
WØBH	A	645,402	1061	409
WBØN	A	133,280	273	224
WBØHCH	*	132,762	279	203
KØDAT	*	132,444	264	234
KØJJR	*	110,494	294	202
WA2MNO	*	93,896	287	194
KØGAS	*	80,608	265	176
ADØNW	*	38,306	119	107
K2HT	*	36,530	135	130
WØCBH	*	31,878	156	126
WGØM	*	20,604	115	101
ABØVM	*	540	22	20
WØR :R	*	21	3	3
KØRH	21	169,360	320	232
NØUU	14	215,460	345	285
KBØENE	*	84,816	218	186
WØPPF	*	65,741	197	169
KU1CW	1.8	167,299	539	227
*ACØW	A	1,195,262	1281	502
*NT4TT	A	929,704	1057	502
*NTØF	A	410,868	579	339
*WØETT	*	213,328	378	268
*AAØNK	*	208,604	381	242
*WBØTSR	*	199,382	385	262
*NØBUI	*	100,596	304	202
*WØLSD	*	95,744	232	187
*KBØARZ	*	86,005	239	167
*NØKQ	*	66,682	227	154
*NNØQ	*	59,328	211	144
*AAØBB	*	55,272	183	147
*NØCQI	*	40,905	175	135
*KAØVXK	*	27,772	135	106
*ACØE	*	25,700	125	100
*NØWY	*	24,696	130	98
*NØPVZ	*	19,900	123	100
*KØVM	*	17,388	101	84
*KCØRQH	*	15,824	101	86
*KCØCQD	*	14,168	108	88
*KAØEIC	*	10,080	78	72
*KØMLA	*	7,936	82	64
*KØJV	*	5,781	49	47
*KØUO	*	1,736	34	28
*AKØA	14	215,250	349	287
*WASSWN	*	28,175	138	115
*NØZK	*	3,555	52	45

NORTH AMERICA

BARBADOS

8P5A	A	20,560,452	5848	1199
			(Op: W2SC)	
8P2X	14	3,556,386	1874	783
			(Op: 8P6SH)	
*8P6EX	A	1,960,168	1336	568

CUBA

*CO6LPB	3.7	224,390	279	190
*CM6CAC	*	112,917	204	133

MARTINIQUE

FM5AN	A	169,152	286	192
TO3W	21	4,791,506	2423	823
			(Op: IV3IYH)	
TO5BG	14	3,253,306	1699	746
			(Op: F6ASS)	

HAITI

*HH4/W4WX	21	512,505	775	315
*HH4/K4QD	14	1,592,205	1226	537

DOMINICAN REPUBLIC

*HI3TEJ	A	826,440	695	388
*HI8ROX	14	11,830	79	65

PANAMA

HP3BS	A	36,288	126	112
*HP1BYS	21	621,230	767	370
*HP1ALX	14	748	17	17

GRENADA

*J37T	A	172,422	357	206
			(Op: VE3EBN)	

DOMINICA

*J79WP	A	563,959	879	307
			(Op: DL5JMN)	

GUANTANAMO BAY

KG44WW	14	3,268,210	2232	803

ALASKA

KL8DX	A	27,784	133	92
NL7V	14	324,016	393	308
*KL1SF	A	84,966	241	147

PUERTO RICO

KP4JRS	A	664,680	786	348
*WP4BH	A	302,430	478	255
*WP3GW	*	275,187	364	269
*KP3O	14	12,240	78	68
*WP3C	3.7	674,250	557	290

GUATEMALA

*TG7E	14	91,632	253	166
			(Op: TG9ANF)	
*TG7M	7	400,500	400	225
			(Op: EA1APV)	

COSTA RICA

*TE2M	A	1,690,468	1410	494
			(Op: TI2KAC)	

CANADA

VC3J	A	11,975,880	3555	1060
			(Op: VE3EJ)	
VC3L	*	10,404,000	3164	1020
			(Op: VE3AT)	
VC3T	*	9,264,124	2869	997
VY2LJ	A	2,977,612	1447	682
VE3KZ	*	2,430,145	1218	635
VE3CR	*	2,060,247	1120	609
VA1CHP	A	1,776,438	1083	491
VO1TA	A	1,687,124	1074	562
VE3KN	*	1,510,773	954	561
VE3CX	*	565,506	570	353
VE1MC	*	545,266	520	337
VE9MY	A	245,494	293	262
VE2QIP	A	209,880	295	212
VY1CQ	A	155,015	295	215
VE6TR	*	151,424	266	208
VE7NS	A	131,688	248	177
VA2BMG	*	89,075	193	175
VA3XH	*	85,090	174	134
VE5CPU	A	83,050	257	151
VA3PC	*	23,040	100	90
VE6JY	14	3,709,648	1879	824
VE7ON	14	864,644	816	457
VA3EC	14	2,262	31	29
*VE6EX	A	1,392,747	1169	471
*VE1OP	A	1,259,415	905	513
*VC3U	A	884,205	707	401
			(Op: VE3JAQ)	
*VE3ESH	*	516,844	535	314
*VE3KPP	*	447,740	467	305
*VA3SWG	*	413,568	440	288
*VE7IN	A	397,540	488	286
*VE5ZX	A	395,632	543	316
*VE1JS	*	336,644	395	308
*VO1KV7	A	326,250	385	261
*VE3SHL	*	320,860	415	244
*VE4YU	A	289,926	402	273
*VA3OX	*	202,011	297	233
*VE3GLO	*	193,070	298	215
*VO1ONE	*	163,822	276	202

*VE3FH	*	154,649	284	187
*VA3GD	*	150,176	263	208
*VE4EAR	*	99,954	240	162
*VA3QP	*	89,677	215	161
*VA2SG	A	86,352	191	168
*VE7FCO	*	80,600	198	155
*VE3AD	*	79,800	173	150
*VE3/W4TAA	*	78,971	193	157
*VE9XY	A	64,604	155	124
*VE4HAZ	*	24,885	105	79
*VE3ZIN	*	24,864	114	96
*VA7MJR	*	23,370	104	95
*VA3IX	*	21,230	138	110
*VE2AWR	*	17,459	85	79
*VE3RER	*	12,716	76	68
*VA7KOJ	*	8,250	59	55
*VA1MM	*	5,320	43	35
*VA2RIO	*	3,922	37	37
*VE3TTN	*	2,730	38	35
*VE5SF	*	2,656	33	32
*VY1EI	*	980	23	20
*VA3VP	21	31,300	313	100
*VY2DM	21	8,100	61	54
*VA7ST	*	105	7	5
*VE6CNU	14	157,542	294	231
*VE3RCN	14	38,610	124	117
*VE9DXR	14	25,996	113	97
*VE3QEE	*	78	6	6
*VE5AAD	7	2,727	28	27
*VE3JEB	7	1,512	18	18
*VE3MGY	1.8	220,946	353	166

TURKS AND CAICOS

*VP5TG	A	3,825,975	2077	695
			(Op: VE3TG)	

BERMUDA

VP9/KBARY	14	87,285	215	165

MEXICO

XE2K	A	4,070,544	1868	619
XE2WWW	*	300,846	474	273
*XE2AUB	A	377,723	535	289
*XE2MX	*	76,797	196	159
*XE1ZVO	*	29,973	118	97
*4A7L	21	2,312,510	1756	610
*XE1CQ	14	2,465,814	1826	626
*XE1CT	*	142,627	355	193

CAYMAN IS.

ZF1A	21	4,680,289	2645	787
			(Op: W6VNR)	

AFRICA

SENEGAL

6W1RW	A	13,889,408	3761	982
			(Op: F6BEE)	
*6W1EA	A	1,110,321	823	459
*6W/HB9DTE	A	832,905	675	415

*CN2SD	14	7,776,665	2871	905
			(Op: K7ZSD)	
CN2R	3.7	11,849,076	2224	894
			(Op: W7EJ)	
*CN8NK	14	3,346,212	1604	698

CANARY IS.

AN8KV	A	565,136	534	338
EA8LS	21	174,669	293	201
EA8CAC	14	5,405,310	2118	855
AN8AH	7	9,447,000	1967	804
			(Op: OH1RY)	
*EA8/DJ1OJ	A	93,280	192	160
*EA8TX	28	8,964	58	54
*AM8HD	21	1,702,914	1242	463
*EA8MQ	*	163,856	280	196
*EC8BBZ	*	1,120	20	20
*EA8BSR	14	4,961	43	41
*AN8AD	*	2,349	29	27

REUNION IS.

FR1HZ	A	294,488	379	282

SAO TOME & PRINCIPE

S9YL	14	1,679	25	23

SUDAN

*ST2M	14	307,976	376	274

BENIN

TY5MR	A	952	20	17
			(Op: IK1PMR)	

MALI

TZ9A	21	3,004,600	1531	664

ASCENSION IS.

ZD8Z	A	18,616,320	5031	1212
			(Op: N6TJ)	

REPUBLIC OF SOUTH AFRICA

ZS6DXB	A	3,717,896	1641	728
ZS5ZZ	*	11,940	67	60
ZS4U	21	3,335,364	1622	694
*ZS4JAN	A	5,612	60	46
*ZS9Z	21	101,108	210	161

ASIA

AZERBAIJAN

*4J7WMF	A	516,525	513	291
*4K9W	*	217,944	305	216

GEORGIA

4L8A	14	5,107,104	2200	828
*4L1DA	14	152,724	320	178

SRI LANKA

4S7AB	A	649,880	663	385

ISRAEL

4X6FR	A	1,473,925	974	475
*4Z5FI	*	71,898	160	138
*4Z5MV	A	102,860	230	185

CYPRUS

C4M	A	3,909,000	1736	600
			(Op: 5B4AGM)	

EAST MALAYSIA

9M2CNC	A	3,933,748	2053	749
*9M2TO	A	524,032	607	356

NEPAL

*9N7JO	A	1,868,390	1248	514
			(Op: LA7JO)	

SINGAPORE

9V1UV	A	29,896	122	101
9V1YC	14	1,086,210	877	486
9V1AL	*	504	14	14

DUBAI

A61M	A	20,280	99	78

BAHRAIN

*A92GR	A	32,865	111	105

PAKISTAN

*AP2IA	14	585,438	616	371
			(Op: S57CQ)	

TAIWAN

*BU2AI	A	122,657	405	173

PEOPLE'S REPUBLIC OF CHINA

*BD7KLO	A	638,673	897	357
*BG1DRJ	A	342,087	505	303
*BD4ALC	A	100,016	295	152
*BG7MVZ	*	61,045	233	145
*BG4SOF	*	48,994	172	131
*BG7IUN	*	28,770	176	105
*BD7OH	*	12,283	81	71
*BG6AHP	*	5,445	55	45
*BG3AKS	*	3,645	52	45
*BG7KQT	*	880	27	22
*BD3AF	*	276	14	12
*BG3AEK	*	16	4	4
*BG3APX	14	1,947	35	33
*BD1FBV	*	420	14	14

ARMENIA

EK3SA	14	1,157,034	893	474

KYRGYZSTAN

EX2X	A	1,280,100	1000	510
*EX8AA	A	218,554	340	233
*EX2T	14	269,860	398	262
*EX8MAT	7	69,264	136	111

TAJIKISTAN

EY8CQ	7	221,288	260	199
*EY2Q	14	11,088	72	63

SOUTH KOREA

HL5UOG	A	73,414	220	142
*DS1OFE	A	25,415	115	85
*6K2ABX	*	6,862	50	47

THAILAND

*HSØZGL	A	586,560	677	390
*HS6MYW	*	15,566	123	86
*HS1OVH	*	2,838	40	33
*E21YDP	21	145,854	310	219
*E21EIC	14	681,700	636	425
*E2ØNMK	*	300	13	12

JAPAN

JH4UYB	A	4,272,792	1838	744
JA2BNN	A	346,256	470	272
JA7ZP	A	54,970	147	115
JG2REJ	*	48,360	142	124
JF2FIU	*	40,392	148	108
JR3NZC	*	40,040	127	104
JA1ISJ	*	4,536	44	42
JA6WJL	28	8,772	76	51
JA7JH	*	952	21	17
JA7NVF	21	283,611	421	249
JH7XMO	21	239,935	401	235
JH2BTM	*	4,070	40	37
JA1HOI	*	576	18	16
JAØJHA	14	4,929,804	2133	844
JH1ACA	14	213,310	320	257
JA5APU	*	178,296	312	228
JM4WUZ	*	23,276	107	92
JA5GSG	*	4,326	51	42
JA1KVT	7	48,791	114	97
JJ2PUG	*	9,870	49	47
JAØGZ	*	588	13	12
*JA1MZM	A	278,166	404	259
*JA7LMZ	A	245,016	390	246
*JA2AXB	A	150,060	285	205
*JA1GLE	*	104,112	241	144
*JA1XRH	*	85,077	202	137
*JA1XPU	*	57,165	196	111
*JA2GHP	*	54,720	186	120
*JA1HFY	*	41,400	154	100
*JA1BPN	*	40,392	143	108
*JN7UKK	*	39,165	131	105
*JL7XBN	*	32,301	128	97
*JF9KVT	*	31,020	134	94
*JA1KK	*	22,464	108	78
*JA4DWG	*	21,040	93	80
*JQ1AHZ/6	*	19,236	109	84
*JA2KPW	*	18,496	95	68
*JAØBMS	*	10,725	77	55
*JK1NSR	*	10,696	73	56
*JA1IWP	*	9,735	72	59
*JR1MRG	*	8,786	68	46
*JO3FEU	*	7,693	57	49
*JL3RDC	*	7,636	61	46
*JA1HNW	*	7,296	60	48
*JA4AQR	*	4,970	44	35
*JAØAVS	*	3,570	37	34
*JA1HG	*	2,175	32	29
*JE6UWU	*	1,870	26	22
*JH9VJW	*	1,825	27	25
*JA1PTO	*	1,675	28	25
*JO1SIM	*	1,122	29	22
*JN7OJA	*	279	10	9
*JO3CQF	*	112	7	7
*7N2UQC	28	900	24	18
*JE1ALA	*	152	9	8
*JA1BPA	21	464,202	558	333
*JF3BFS	21	156,800	314	200
*JH6QFJ	21	66,899	195	133
*JP1QDH	*	42,360	149	120
*JL3TEM	*	23,940	105	84
*JA1JLP	*	7,203	49	49
*JE1JAC	*	6,204	54	47
*JA1AAT	*	5,451	49	43
*JH1RMH	*	5,376	46	42
*JA3BBG	*	5,332	48	43
*JS1NDM	*	3,740	38	34
			(Op: JA6-9330)	
*JA1DBG	*	3,276	37	36
*JR3KAH	*	2,376	36	27
*JK1BII	*	2,028	30	26
*JH1DJD	*	1,898	29	26
*JA7ADV	*	1,475	27	25
*JH9BWC	*	900	20	18
*JF7GDF	*	504	14	14
*JI8BUR	*	160	8	8
*7K1EQG	*	136	9	8
*JG2KKG	14	381,892	444	322
*JA6WFM	14	261,978	369	282
*JF6ZXC	14	260,425	361	275
*JA1MVK	*	150,500	254	215
*JJ8KRD	*	104,493	219	183

*JHØEPI	*	39,128	124	108
*JH1UUT	*	33,592	141	104
*7K2GMJ	*	15,900	96	75
*JA2DLM	*	15,695	75	73
*JJ1WWL/1	*	840	20	20
*JG1GCO	*	220	10	10
*JA1BUS	*	52	5	4
*JR4URW	7	25,665	116	87
*JR3RIY	7	12,600	50	50
*JF3IYW/3	*	12,393	54	51
*JA2PFO	*	11,891	50	47
*JH1RDU	*	2,541	21	21
*JL2LFK	*	462	11	11
*JH9URT	3.7	11,178	65	54
*JE1SPY	3.7	6,862	57	47

OGASAWARA

*JD1BIA	A	2,500	32	25

MONGOLIA

JV8ØØDA	A	674,140	1042	370

TURKEY

TA3YJ	A	41,184	130	104
*TC2T	A	183,495	271	195
				(Op: TA2MW)
*TA4CS	*	7,400	56	50
*TA3J	7	198,832	200	172
*YMØT	1.8	221,400	233	164
				(Op: TA2RC)

ASIATIC RUSSIA

UA9CLB	A	6,638,720	2210	820
UA9JDP	A	3,190,917	1471	629
UA9MA	A	1,682,326	969	538
UA9BS	*	686,736	562	342
RK9UE	*	649,770	576	363
UA9CDC	*	453,300	437	300
RX9FW	*	197,302	288	238
UA9HN	*	195,075	311	225
UA9YAB	*	162,946	291	206
RK9CWW	*	160,770	279	230
				(Op: UA9CIR)
RX9JP	*	146,200	264	200
RK9KWI	*	108,675	222	175
UA9WIK	*	103,304	187	148
RV9XE	*	80,068	179	148
RX9TL	*	65,688	172	138
RA9SAS	*	64,240	133	110
UA9FM	*	52,745	143	137
RA9SK	*	42,780	124	115
RV9JE	*	23,670	98	90
UA9CGL	*	18,070	79	65
RU9UC	*	4,680	46	45
RU9TO	14	1,015,045	805	445
RW9RA	14	584,790	553	386
UA9XBI	*	365,584	428	313
RX9LW	*	19,210	88	85
UA9KM	7	148,230	268	162
*UA4LCQ/9	A	2,443,518	1241	602
*UA9ACJ	A	832,086	613	342
*RW9MD	A	460,768	464	374
*UA9QA	*	416,160	439	289
*RA9CB	*	362,255	391	265
*RX9WN	*	314,286	375	294
*RK9CR	*	305,312	384	232
*RX9FR	*	252,155	334	235
*UA9QFF	*	202,584	302	184
*RU9CC	*	198,220	286	220
*RV9UF	*	189,882	306	231
*UA9SAW	*	171,488	294	233
*RK9AJZ	*	153,397	265	211
*RX9DJ	*	117,813	226	173
*RU9CD	*	110,670	230	170
*UA9XF	*	121,512	228	183
*RA9UAD	*	70,200	195	135
*UA9XOM	*	65,520	153	130
*RV9UP	*	56,448	165	128
*RZØAK	*	55,314	177	126
*UA9XZ	*	46,276	119	92
*RX9AOG	*	29,189	110	101
*UA9QF	*	24,095	92	79
*RN9AA/9	*	10,846	66	58
*UA9UX	*	3,636	41	36
*RA9QBR	*	3,290	37	35
*RU9LA	21	31,692	128	114
*UA9FGJ	*	4,410	46	45
*RA9FEL	*	3,690	42	41
*UA9JMB	14	992,290	776	449
*RN9HM	14	484,029	539	351
*RV9LV	14	465,864	478	354
*RA9AU	*	406,230	443	330
*RA9XU	*	279,069	365	291
*UA9OMT	*	258,529	381	263
*RX9CCJ	*	164,934	266	231
*UA9MQR	*	117,800	228	190
*RZ9OW	*	52,374	152	129
*RA9CNF	*	24,459	103	93
*RZ9UGN	*	9,699	69	61
*UA9LAU	3.7	75,460	131	110
*UA9QCZ	1.8	14	2	2
RMØA	A	995,744	762	464
				(Op: UAØANW)
RVØAX	A	722,937	637	397
UAØDC	A	628,176	725	368
UAØACG	*	545,584	599	344
RAØAM	*	488,166	516	354
RWØBG	*	324,023	435	287
RAØAKL	*	51,221	148	131
RAØASL	*	11,832	72	68
RUØLL	*	9,338	65	58
UAØSR	21	37,908	190	117
RUØAJD	14	990,186	785	474
RWØUU	14	340,458	494	317
RUØSN	*	56,760	174	129
RAØBA	7	104,942	186	137
UAØFDX	3.7	20,064	86	66
*RVØAL	A	655,320	622	381
*RWØCDA	A	268,233	479	241
*RWØCV	A	220,626	395	238
*UAØLGY	*	27,600	132	92
*RAØACM	*	71,205	177	141
*RNØSA	*	9,720	66	60
*RAØAY	*	6,660	56	45
*UAØCW	*	3,416	28	28
*UAØAPV	*	768	18	16
*UAØSAV	*	364	14	14
*RAØCDF	21	162	10	9
*RWØUM	14	66,254	220	157
*RUØAT	14	14,504	76	74

*RAØCL	*	13,806	103	78
*RAØCAH	*	11,644	88	71
*RWØCF	7	85,272	192	136

KAZAKHSTAN

UN5J	A	39,444	134	114
*UN4L	*	47,674	135	121
*UN6LN	14	838,565	685	455
UN7QF	A	314,704	422	272
*UN8FR	*	169,041	275	201
*UN4PG	21	20,271	95	87
*UP7E	14	46,920	147	120

HONG KONG

VR2XMT	21	532,890	785	382
VR2BG	14	248,703	485	273
*VR2XLN	A	550,766	836	334
*VR2YKP	*	1	3	1

MACAU

*XX9AU	21	5,250	63	50

AFGHANISTAN

T6BG	A	90,644	233	172
				(Op: LA5IIA)

EUROPE

SICILY

IT9ESW	A	1,730,352	1385	611
IU9A	A	898,452	1149	531
IT9STX	14	2,171,793	1693	717
*IT9ORA	A	72,180	202	180
*IR9Z	14	193,116	469	308
				(Op: IT9VCE)
*IT9RJE	*	87,885	247	217
*IT9YSW	*	29,480	174	134
*IT9DFA	*	621	25	23

TURKEY (EUROPEAN)

*TA1CM	A	24,564	108	89
*TA1FA	14	234,990	632	315

CROATIA

9A3KS	A	252,153	367	283
9A35Y	21	1,289,808	993	624
				(Op: 9A3LG)
9A8A	21	1,180,116	941	588
9A15DX	14	5,557,191	2563	989
				(Op: 9A9A)
9A7D	14	1,900,283	1395	667
				(Op: 9A3SC)
9A5E	7	4,154,898	1686	726
9A6A	1.8	493,582	608	358
*9A3GI	A	217,080	420	268
*9A5YY	A	22,470	119	107
*9A1DL	*	21,049	105	97
*9A5ADM	*	260	10	10
*9A3VM	*	225	9	9
*9A4NC	*	40	4	4
*9A5KV	28	703	19	19
*9A2TE	21	54,040	152	140
*9A/VE3ZIK	14	137,344	350	232
*9A5CW	*	9,727	85	71

PORTUGAL

CT1AGS	A	27,720	123	110
CT1EGA	*	13,468	76	74
*CT1FMS	A	674,943	876	471
*CT2GSN	*	15,576	70	66
*CT1CDZ	*	1,863	29	27
*CT1IUA	14	273,884	428	299
*CT1BNW	*	116,000	272	232
*CT6A	7	1,091,872	760	458
				(Op: CT1ILT)

AZORES

CU2CR	14	643,871	773	433
CU2JT	*	14,697	77	71
CU2AF	1.8	42,770	112	94
*CU3URA	A	209,064	357	248

GERMANY

DL8OBF	A	842,231	843	481
DL2OBO	A	707,570	656	409
DK6CQ	A	419,040	520	360
DJ9HX	*	295,240	401	305
DL1PT	*	246,586	403	278
DL9GWD	*	182,520	327	270
DL5MEV	*	174,460	291	220
DF3IS	*	169,195	319	247
DP5X	*	162,192	312	248
				(Op: DL3EBX)
DF5BX	*	120,400	295	215
DJ1CW	*	108,402	243	174
DH2RTW	*	107,920	244	190
DL6RBO	*	86,996	243	182
DH1DA	*	80,626	242	182
DL1YFF	*	71,878	196	166
DKØGYB	*	66,420	209	180
DL4YBP	*	63,855	201	165
DL5RMH	*	59,360	172	140
DL6DVU	*	58,035	193	159
DL6NAL	*	47,940	180	141
DK8NI	*	31,900	119	110
DJ3WE	*	29,500	137	125
DL6AG	*	28,944	120	108
DL9SEV	*	18,564	115	102
DB9EX	*	4,600	51	50
DP3D	21	24,288	106	92
DJ6QT	7	967,732	797	452
DJ4PI	*	57,392	149	136
DL8EAQ	*	18,868	94	89
DF8AA	*	2	1	1
DJ1AA	3.7	792,036	889	441
DN2RMC	3.7	535,653	636	389
DL3KZA	*	473,371	630	379
DF2UU	1.8	178,416	385	252
*DK5DQ	A	1,189,056	1005	528
*DJ8UV	A	696,141	802	437
*DO5M	A	646,506	690	441
				(Op: DJ8ZY)
*DR4G	*	480,675	594	377
				(Op: DJØGM)
*DQØT	*	387,353	545	361
				(Op: DC7NF)
*DF6QV	*	341,874	489	351
*DL3BRA	*	228,035	404	295
*DK8EY	*	184,080	311	240
*DL6RBH	*	180,136	360	253
*DF1LON	*	176,120	317	259
*DH5AO	*	159,894	344	243
*DF6WE	*	128,475	326	225
*DF2FM	*	122,388	267	217
*DH2PL	*	115,368	262	209
*DR5A	*	111,585	257	215
				(Op: DF1LON)
*DL5FU	*	103,402	246	194
*DK1KC	*	102,044	239	194
*DL8UVG	*	100,192	258	202
*DL1JGO	*	95,220	269	207
*DA3T	*	92,040	252	195
*DM2AWM	*	75,001	207	179
*DM2BPG	*	72,928	220	172
*DJ6OL	*	72,219	221	181
*DL8NBJ	*	65,410	196	155
*DL7BC	*	63,271	202	157
*DL4NEI	*	61,506	192	153
*DJ6UP	*	59,466	194	159
*DH2PG	*	57,081	195	159
*DB7TF	*	47,382	176	149
*DM9JM	*	44,220	146	132
*DH5JG	*	42,028	153	133
*DK8AX	*	35,175	125	105
*DL9GMN	*	33,462	140	117
*DF2PH	*	33,147	144	127
*DF2AP	*	31,863	146	129
*DF1HF	*	31,350	132	114
*DL5SL	*	28,800	131	120
*DJ7LH	*	27,636	110	98
*DG8AM	*	27,608	138	119
*DL2VB	*	27,120	134	113
*DJ4TS	*	26,912	131	116
*DL3SCN	*	22,800	127	100
*DC2LF	*	21,412	106	106
*DK7MCX	*	21,293	118	107
*DG7RO	*	17,934	124	98
*DL7BA	*	17,710	86	70
*DG4CHS	*	15,566	95	86
*DG8FAY	*	14,457	90	79
*DK2BJ	*	14,141	97	79
*DG1RKP	*	13,398	94	87
*DL6ATI	*	12,298	94	86
*DK7AN	*	12,160	86	80
*DL1NEO	*	9,360	67	65
*DL7VRG	*	7,688	69	62
*DL3DRN	*	6,681	55	51
*DR5T	*	6,157	49	47
				(Op: DJ3IW)
*DL2LAR	*	5,995	61	55
*DL8DWW	*	4,067	52	49
*DB1SDJ	*	3,108	40	37
*DJ5LY	*	2,310	35	33
*DL2DYL	*	2,310	31	30
*DL7CU	*	1,682	32	29
*DM2DME	*	1,440	24	24
*DL7LZ	*	286	16	11
*DL3ZAI	21	17,404	85	76
*DF7YU	14	863,272	801	488
*DL4GBA	14	96,350	252	205
*DL4JYT	*	26,325	133	117
*DG6OAG	*	1,584	24	22
*DL1TS	7	24,384	102	96
*DL9NEI	7	24,300	109	100
*DL2RZG	*	15,876	83	81
*DJ9VA	1.8	24,442	129	101

SPAIN

ED4KR	A	5,240,704	2488	896
				(Op: EA4KR)
ED5OL	*	75,970	277	214
				(Op: EA5OL)
EA2ADJ	*	1,025	26	25
EA1DLU	21	276,830	433	310
EC1KV	*	170,687	375	263
AN1DGZ	14	452,193	743	427
EA1AAW	*	106,338	305	222
EA3EYD	*	43,865	187	155
EA3BOX	7	1,523,570	909	502
EA3CI	*	352,836	418	297
EA1RCM	*	159,940	282	220
EA7ATX	3.7	203,008	311	256
EA4KD	*	167,993	298	233
*ED1WS	A	845,988	840	493
				(Op: EA1WS)
*EA7AA	A	549,252	642	396
*AM7IA	A	472,428	594	396
*EA1AJV	*	350,865	515	345
*EA1MR	*	324,288	457	288
*EA1ASG	*	199,430	321	245
*EA3NA	*	172,380	321	255
*AM1OT	*	167,585	433	277
*EA3NP	*	137,562	298	227
*EA1AHO	*	122,080	282	224
*EA1EWC	*	116,790	255	229
*EA1GAR	*	109,088	316	224
*AM7EWX	*	102,284	240	182
*EA3AGB	*	86,697	193	169
*EA5BAH	*	69,774	207	174
*EA3EIQ	*	62,205	190	165
*EA3SD	*	57,354	198	158
*EC7ANC	*	44,416	144	128
*EA1BZP	*	39,300	149	131
*AN1CBX	*	36,047	127	113
				(Op: EA1CBX)
*AN7HE	*	35,306	149	139
				(Op: EA7HE)
*EC7AMT	*	23,100	124	105
*EA5FWW	*	20,570	90	85
*EA7GV	*	20,544	106	96
*EA5FST	*	19,140	104	87
*EA2CE	*	16,643	99	89
*AM5AAJ	*	16,560	99	92
*EA1TCR	*	13,870	76	73
*EA5ACO	*	13,246	79	74
*EA3ZQ	*	9,246	70	67
*EC3AKY	*	8,680	63	62
*EA2CHL	*	5,882	152	55
*EC2AWD	*	5,808	53	48
*EA4AFP	*	5,633	45	43
*EA5AFF	*	4,284	37	36
*EA5XP	*	2,856	36	34
*EA7RQ	*	2,280	30	30
*EA2CNU	*	828	18	18
*EA7EYQ	*	374	12	11
*EA7CWA	*	189	9	9
*AM7HBP	21	100,170	269	210
				(Op: EA7HBP)
*EA5EOR	21	89,858	200	179
*EA7FRX	*	39,872	132	112
*EC7DDZ	*	16,192	98	88
*EC5AAJ	*	8,418	72	69
*EA5DIT	*	1,988	29	28
*EC5BBZ	*	1,080	20	20
*AN7FTR	14	3,036,873	2289	849
				(Op: EA7FTR)
*AM7KJ	14	329,778	651	394
*AM3CS	*	28,659	133	123
				(Op: EA3CS)
*EA3EJI	*	11,060	78	70
*AN5TN	*	8,008	80	77
				(Op: EA5TN)
*EA5GFK	*	5,586	58	57
*EA3FHP	*	2,584	40	38
*EA1CFA	*	2,520	44	42
*EA1QA	3.7	199,836	304	234
*EA5BJI	*	8,528	57	52
*EA3DUM	*	6,396	55	52
*EA1EY	1.8	19,096	97	88
*EA3AKA	*	2,926	39	38

BALEARIC IS.

AM6AZ	A	46,488	180	149
				(Op: EA6AZ)
EA6AZ	*	8,775	80	75

IRELAND

EI2JD	A	683,272	726	445
EI4DW	A	521,885	622	403
EI9HX	14	719,320	678	490
*EI/W5GN	A	332,024	491	308
*EI9FVB	A	170,000	332	250
*EI4CF	*	105,600	223	192
*EI7CC	*	84,534	238	193
*EI7JQ	*	33,480	147	124
*EI7JR	*	12,150	100	90
*EI9ES	14	8,330	75	70

MOLDOVA

*ER3DW	A	1,313,995	1247	545
*ER5DX	A	657,965	760	385
*ER3CT	*	151,575	307	235
*ER3GS	*	648	20	18

ESTONIA

ES5TV	A	7,719,591	3316	1049
ES2DJ	*	784	19	16
ES5MG	3.7	71,840	189	160
ES1LBK	1.8	212,872	392	236
*ES7FU	A	58,302	199	158
*ES5RIM	*	16,986	130	118
*ES6RMR	*	14,534	97	86
*ES8DH	*	7,581	63	57
*ES4RC	14	74,942	217	202
*ES1LH	*	2,990	48	46
*ES1LS	3.7	70,035	199	161

BELARUS

EU4LY	A	69,174	213	162
EW2EO	*	32,725	145	119
EU6NN	3.7	3,936	44	41
*EW4AB	A	35,343	145	119
*EV6Z	*	11,136	73	64
*EW6GL	*	7,076	63	58
*EW8FF	*	3	1	1
*EU1AI	21	48,258	153	126
*EW8DA	*	1,701	29	27
*EU6FF	14	63,000	212	175
*EU2MM	*	30,258	140	123

FRANCE

TMØX	A	4,109,112	2175	868
F4DSK	A	2,142,409	1419	659
TM5A	A	1,637,104	1237	622
				(Op: F5VHJ)
TM5Y	*	1,224,210	993	559
				(Op: F8DBF)
F5CQ	*	229,906	361	278
F5AHO	*	19,740	107	105
F4DNW	7	451,647	418	321
*F6BAT	A	198,528	343	264
*F4DLL	A	190,183	362	269
*F4EUN	A	139,567	296	233
*F5LIW	*	83,772	218	179
*F5LCU	*	69,660	198	180
*F4CUI	*	58,718	177	157
*F6DRP	*	53,055	171	135
*F8DYD	*	31,784	124	116
*F4CPF	*	30,583	129	119
*F6FTB	*	28,215	111	99
*F5MLJ	*	19,505	93	83
*F5BTH	*	17,372	103	86
*F4DZF	*	16,647	100	93
*F5QF	*	15,810	74	62
*F6CZV	*	10,736	66	61
*F5SDD	*	5,850	46	45
*F4CGJ	*	3,828	46	44
*F8CPA	*	3,496	47	46
*F1BCT	*	900	20	20
*F5JY	21	100,275	209	191
*F1ORL	*	26,602	105	94
*F4EZC	14	7,616	71	64
*F5CWU	*	1,400	28	28
*F6FJE	3.7	19,360	107	88
*F5VHN	1.8	27,090	132	105

ENGLAND

M6Q	A	224,425	361	235
G4DFI	A	222,088	402	284
MØTDG	*	2,937	37	33
MØWLF	14	1,403,784	1139	536
G1VDP	14	115,921	301	241
GØMTN	*	57,409	243	187
MXØCYB/P	*	10,488	80	76
				(Op: GØVQR)
GØJTN	*	1,485	27	27
MØBBB	*	234	9	9
*G4WGE/P	A	100,098	249	201
*G3RWF	A	89,936	216	176
*M5KJM	*	82,187	209	199
*M3RCV	*	77,784	216	168
*G6CSY	*	71,214	199	166
*2EØPLA	*	69,373	201	173
*G4NXG/M	*	57,814	164	137
*G8ZRE	*	34,560	159	135
*MØVPE	*	33,401	139	127
*GØMRH	*	27,258	135	118
*MØAQM	14	78,967	239	203
*MØEZP	1.8	1,012	23	23

NORTHERN IRELAND

*GI4AAM	A	131,570	305	223
*MI3OZX	*	48,356	159	157

SCOTLAND

MMØDXH	A	438,014	642	389
GMØDBW	A	75,656	239	193
*GM7TUD	*	93,177	210	189
*MMØTOB	*	78,772	239	188
*2MØBEC	*	1,560	31	30

GUERNSEY

*MUØFAL	A	213,435	383	279
*2UØGSY	*	71,208	209	172

WALES

GW4BLE	A	111,470	243	157
*GW3YVC	A	10,764	84	78
*2WØJNI	*	128	8	8

HUNGARY

*HA3NU	A	1,754,256	1244	644
*HA1ZN	A	552,559	665	409
*HA7VK	*	190,995	364	255
*HA8CQ	*	53,144	177	146
*HA8TP	*	23,392	100	86
*HA6D	14	93,526	251	202
				(Op: HA6-345)
*HA6ZQ	7	22,895	95	95
*HA1YI	3.7	523,296	677	368
*HA8BE	1.8	257,400	432	275

SWITZERLAND

*HB9TQG	A	809,680	729	464

ITALY

IV3YIM	A	1,242,125	845	475
IW7EFC	A	953,862	950	546
IZ8EDL	A	351,648	495	352
IZØBVU	*	305,727	479	303
IQ2LS	*	188,160	384	280
				(Op: IZ2FFK)
IO4T	*	116,365	271	185
				(Op: IK4VET)
IK8SEU	*	49,704	182	152
IK3OII	*	40,356	131	118
IZ8EEL	*	27,456	112	104
IZ1CQZ	*	23,520	106	98
IWØHOU	*	12,750	75	75
IKØZIO	*	4,914	57	54
IZ3GYS	*	3,968	36	32
IR4X	14	4,286,082	2112	883
				(Op: IK2NCJ)
IW2HAJ	14	2,775,773	1623	767
IU3X	14	2,730,719	1587	769
				(Op: IV3NDC)
IR2M	*	1,651,056	1226	649
				(Op: IZ2FDU)
IZ8EPX	*	386,254	613	362
IK2SND	*	98,747	287	191
I2SVA	*	192	8	8
IO3Z	7	1,931,653	1085	563
				(Op: IV3ZXQ)
IQ4RA	3.7	891,000	755	450
IV3OWC	1.8	212,000	388	250
*IK2DZN	A	998,025	899	525
*IR4R	A	885,108	826	492
*IZ8APP	A	218,120	395	266
*IZ3GNG	*	144,727	265	223
*IK7RVY	*	125,892	296	234
*IZ8GBH	*	112,528	258	208
*IK2YSJ	*	84,266	233	182
*IZØGYP	*	59,092	185	158
*IV3JCC	*	57,856	149	128
*I8TWB	*	57,760	200	160
*IZ3KKE	*	56,118	177	141
*IZ1AOD	*	50,083	189	157
*IK8NBE	*	41,762	148	133
*IW1RHG	*	38,841	122	107
*I1YGQ	*	36,636	158	129
*IK3SSJ	*	36,112	136	122
*IK7TOE	*	35,343	137	119
*IW1QN	*	35,334	136	117
*IW5EDV	*	32,500	144	125
*IK1SPR	*	27,984	114	106
				(Op: IU1A)
*IZ7EUB	*	27,648	112	96
*IWØGYC	*	23,092	105	92
*IK2MPR	*	22,968	115	99
*IK1DFH	*	20,586	107	94
*IZ5HQB	*	19,320	107	92
*IK2WFN	*	18,568	93	88
*IZØBNR	*	16,016	98	88
*IW7EGQ	*	11,109	74	69
*IK8IFW	*	10,320	90	80
*IW2NNQ	*	9,891	71	63
*IZ8DDP	*	9,042	77	66
*IYØTC	*	5,904	50	48
				(Op: IØKHP)
*IZ8GNH	*	3,094	35	34
*IK2SAE	*	2,964	46	38
*IW5EIJ	*	2,574	34	33
*IK5WQO	*	2,414	35	34
*IK2HLM	*	1,947	33	33
*IV3KSE	*	1,742	26	26
*I8ZBU	*	1,083	19	19
*IKØVAQ	*	736	16	16
*IZ1DLY	*	609	23	21
*IZ2GNQ	*	561	17	17
*IW2NSE	*	72	6	6
*IZ7EDQ	21	147,200	282	230
*IW9HDD	*	110,760	228	195
*IKØEIE	*	106,080	218	195
*IZ4AFW	*	4,144	38	37
*IZ7DOK	*	1,536	26	24
*IQ8DO	14	486,200	747	440
				(Op: IK8UND)
*IW1ARB	14	274,725	479	333
*IZ5DKF	*	51,680	199	160
*I1NHR	*	12,384	90	86
*IK8DNJ	*	7,540	60	58
*IW4EQI	*	5,605	61	59
*IZ2HAN	*	945	29	27
*IW5EEP	*	651	21	21
*IR8C	7	639,424	567	388
				(Op: IZ8EDJ)
*II3L	7	307,377	520	287
*IW3SSA	*	122,158	260	206
*IW2MYH	*	2,937	33	33
*IZ5CFS	*	2,625	36	35
*IZ1GJH	*	1,325	25	25
*IZ1DGG	3.7	1,566	28	27
*IK1YDB	1.8	10,184	81	67

SARDINIA

ISØDFC	14	336	17	16

SVALBARD

JW/F8DVD	14	719,646	800	433

NORWAY

LA6MV	14	762,200	910	515
LN7AZ	"	360	10	9
(Op: LA6FJA)				
LN3Z	1.8	110,955	265	195
(Op: LA6YEA)				
*LA3S	A	669,305	743	455
(Op: LA3BO)				
*LA4ZNA	A	22,572	107	99
*LA6ZFA	A	13,824	101	96
*LA6CF	"	7,205	62	55
*LA7TN	"	7,137	70	61
*LA7GNA	"	5,525	66	65
*LB9LE	"	3,927	53	51
*LA1PHA	"	3,120	42	39
*LA6NNA	"	392	14	14
*LA3RNA	14	945	29	27
*LA9QNA	7	2,088	30	29
*LA5KO	3.7	265,768	427	278
*LN9Z	1.8	90,998	255	173
(Op: LA9HW)				

LUXEMBOURG

LX6T	7	1,771,077	1154	561
*LX1ET	A	405	15	15

LITHUANIA

LY7Z	A	5,682,905	2559	937
(Op: LY2TA)				
LY2MM	A	982,000	936	491
LY2AE	"	220,740	386	260
LY3CY	"	100,860	260	205
LY1CM	"	43,400	162	124
LY2OO	"	16,605	96	81
LY9Y	14	1,132,323	1015	587
(Op: LY2CY)				
LY2IC	"	200,811	389	271
LY2K	3.7	208,620	397	244
LY2IJ	1.8	438,240	614	332
*LY9A	A	2,097,431	1484	679
*LY2HM	A	330,528	507	313
*LY1DJ	A	165,968	362	253
*LY4DX	"	151,385	331	221
*LY4Q	"	147,705	322	229
*LY2LU	"	114,400	269	220
*LY3SL	"	69,324	216	159
*LY2OM	"	57,105	182	141
*LY2AT	"	52,572	195	156
*LY2BOS	"	23,896	117	103
*LY6M	"	21,510	113	90
(Op: LY1DS)				
*LY2BBF	"	6,786	63	58
*LY2Y	14	3,569	49	43
*LY2O	3.7	42,380	146	130

BULGARIA

LZ1BJ	A	586,089	726	443
LZ3YY	"	4,551	41	41
LZ2ZG	21	6,864	49	48
LZ1JZ	14	97,902	395	222
LZ1RGT	"	2,058	49	42
LZ7J	3.7	387,504	504	324
(Op: LZ1YQ)				
*LZ2JR	"	49,226	175	151
*LZ3SM	"	11,323	76	67
*LZ1MC	"	615	15	15
*LZ8W	28	690	16	15
*LZ1DNY	21	1,495	23	23

AUSTRIA

OE1WWL	A	5,074	46	43
OE3I	14	650,760	729	440
(Op: OE1JNB)				
OE2S	"	208,164	392	249
*OE3JTB	A	66,682	188	154
*OE2IJL	"	4,386	54	51

FINLAND

OH8X	A	7,698,075	3205	1023
(Op: OH6UM)				
OH6PX	"	108,474	226	202
OH5NS	"	20,710	102	95
OH9UFO	"	312	12	12
OH8A	14	3,313,163	2023	859
(Op: OH8LQ)				
OH7M	7	1,412,718	972	519
(Op: OH7WV)				
OH5UX	3.7	216	10	9
*OH2FS	A	185,249	329	289
*OH8GZN	"	11,475	98	85
*OH6GFI	"	672	21	21
*OH1JT	"	496	17	16
*OH5BM	14	714,660	851	516
*OH6RC	"	45,870	171	165

ALAND IS.

OHØR	14	3,956,920	2135	920
(Op: OH2PM)				

CZECH REPUBLIC

OK1RI	A	9,422,700	3022	1050
OK1EP	A	1,154,478	989	533
OL1X	"	1,137,213	971	547
(Op: OK4PA)				
OK1AXB	"	541,310	681	407
OK3Z	21	306,240	413	320
OK2ABU	"	28,704	112	104
OK5DX	14	1,475,187	1061	597
OL9Z	"	738,072	764	459
(Op: OK2PVF)				
OK1ES	1.8	137,592	311	216
*OK1FNJ	A	673,854	746	437
*OK6Y	A	654,336	742	426
*OK2BEN	A	451,500	576	350
*OK1CID	"	302,302	490	302
*OK2BRA	"	214,393	399	269
*OK1BA	"	197,262	348	281
*OK1TC	"	186,018	347	258
*OK7MT	"	182,595	320	259
*OK1MKU	"	141,792	267	211
*OK2BRX	"	139,004	322	236
*OK1CLD	"	126,312	288	228
*OK2WYK	"	95,186	246	182
*OK2SAR	"	86,765	250	185
*OK2TSG	"	85,655	243	185
*OK1BOA	"	84,728	211	178
*OK1CJN	"	62,496	170	144
*OK2SWD	"	44,020	163	142
*OK2MIG	"	40,296	155	138
*OK1UDJ	"	19,190	111	101
*OK2VX	"	18,432	103	96
*OK2PBG	"	17,892	104	84
*OK1FCA	"	5,586	58	57
*OL6P	14	207,028	411	292
(Op: OK2WTM)				
*OK2HZ	14	84,774	250	199
*OK2DU	"	29,952	132	117
*OK1KMG	"	28,614	129	114
*OK2PMS	"	22,454	118	103
*OK4AZ	"	20,844	119	108
*OK2ZIL	"	19,982	118	103
*OL7P	3.7	238,751	436	271
(Op: OK1CRM)				
*OK1WCF	3.7	217,035	399	265
*OK1JOK	1.8	10,640	81	70
*OK1KZ	"	2,112	36	32

SLOVAKIA

OM7JG	14	2,729,824	1671	736
*OM6TX	A	213,556	395	263
*OM5UM	A	130,020	307	220
*OM7YC	"	92,635	230	191
*OM4DA	"	37,044	160	126
*OM4KK	"	15,200	91	80
*OM7PY	21	1,474	23	22
*OM5XX	14	1,966,116	1337	708
*OM2TB	"	2,378	44	41
*OM7AB	3.7	355,840	515	320
*OM4WW	3.7	209,496	390	258
*OM7RU	"	104,742	238	198

BELGIUM

ON4ACA	14	367,392	542	356
ON4BR	1.8	2,145	33	33
*ON7BS	A	171,745	330	245
*ON6AT	"	16,280	96	88
*ON7MIC	"	15,180	103	92
*ON9CTZ	14	353,816	545	376
*ON4LWX	"	12,584	93	88
*ON6LY	"	7,350	77	70
*ON6UU	3.7	23,275	127	95

DENMARK

OZ5EV	A	802,893	684	519
OZ4RT	"	70,452	198	171
OZ4EL	"	47,922	162	147
OZ8PI	"	16,200	96	90
OZØJ	21	27	3	3
*OZ1ACB	A	307,518	455	321
*OZ5DSB	"	17,088	96	89
(Op: OZ4EL/OZ6AGX)				
*OZ7AEI	"	11,627	82	77
*OZ1DGQ	"	2,080	34	32
*OZ1JVX	14	163,773	333	279

THE NETHERLANDS

PAØABM	A	415,370	530	365
PAØJNH	A	368,962	500	341
PA4A	"	237,096	388	296
PA9DD	"	218,500	344	250
PA3AAV	"	128,205	346	231
PAØLOU	"	115,260	239	204
PAØLSK	"	41,363	154	133
PAØIJM	3.7	332,332	505	308
*PF9A	A	325,316	501	334
*PH4U	A	196,840	371	280
*PA8KW	A	89,233	217	181
*PE1DTU	"	71,449	210	173
*PAØKDM	"	62,465	188	155
*PA2W	"	37,264	157	137
*PA2C	"	36,704	145	124
*PA3AM	"	33,408	144	128
*PG2D	"	32,736	156	132
*PH3BDJ	"	29,367	144	117
*PA1PAT	"	25,823	142	119
*PE2SVN	"	22,575	126	105
*PG7V	"	20,988	99	99
*PA2RPJ	"	16,182	109	93
*PA3EBP	"	10,906	91	82
*PA3HGF	"	7,872	72	64
*PA1TX	"	7,314	76	69
*PA3GBI	"	5,202	60	51
*PAØADP	"	2,360	43	40
*PA3CEB	"	276	12	12
*PAØMIR	3.7	91,800	219	180

SLOVENIA

S58A	A	8,748,058	3136	977
(Op: S55OO)				
S53XX	21	191,979	329	257
S5ØK	14	4,507,449	2251	863
S5ØC	14	2,926,836	1744	778
(Op: S53MM)				
S53O	"	2,457,180	1532	730
S52ZW	3.7	1,364,370	1100	534
S57AW	3.7	1,129,284	882	494
S57J	"	576,954	669	399
*S51F	A	1,066,527	876	513
*S57TA	A	419,601	490	371
*S58P	A	261,048	410	292
*S58RU	"	206,416	371	266
*S58MU	"	136,479	342	201
*S51DX	"	105,472	276	206
*S58L	"	96,030	248	198
*S57S	28	5,588	63	44
*S55O	3.7	177,388	344	244
*S56ZZZ	"	52,052	173	143

SWEDEN

SM5Q	A	1,151,802	959	549
(Op: SM5AOE)				
SM6U	A	370,220	500	346
SM6FJY	"	138,880	291	220
SM7BJW	"	106,465	238	199
8S4Z	"	88,328	216	181
SA2T	"	23,183	117	97
(Op: SM2YIZ)				
SA2C	"	19,364	115	103
SJ6A	21	32,046	124	109
(Op: SM6JSM)				
SFØF	14	1,896,120	1428	687
(Op: SMØPSO)				
SM5U	14	153,012	320	246
(Op: SM5UGC)				
SA6A	"	61,060	195	172
(Op: SM6JSM)				
SI3A	"	5,220	64	58
(Op: SM3LIV)				
SG3A	"	3,634	49	46
(Op: SM3FJF)				
*SM5AOG	A	54,568	190	152
*SM5DQE	A	34,704	163	144
*SE6C	"	13,020	96	84
(Op: SM6CDN)				
*SA7J	"	11,242	88	77
(Op: SM7XGG)				
*SMØBDS	"	9,114	66	62
*SMØFM	"	8,832	67	64
*SM6AHU	"	5,200	56	52
*SM5OSZ	"	1,683	37	33
*SLØW	14	482,313	637	447
(Op: SMØAJU)				
*SM6CRM	"	96,140	257	220
*SM7HSP	"	3,723	55	51
*SE6D	"	336	17	16
*SM4FYX	3.7	242	11	11

POLAND

SO6X	A	4,564,999	2164	839
(Op: SP6IXF)				
SP9QMP	A	2,722,134	1595	719
SP9LJD	A	1,946,351	1322	649
SP6RLK	"	152,615	276	233
SQ7B	"	105,545	262	209
SN2B	14	5,299,866	2384	923
(Op: SP2FAX)				
SP3LPG	7	572,262	583	381
SP1QY	"	199,650	329	242
SP9TCC	"	56,536	158	148
SN2M	3.7	88,880	248	176
(Op: SN2M)				
SN7Q	1.8	541,680	673	370
SP3KEY	1.8	494,130	638	362
(Op: SP7VC)				
SP6EUA	"	35,520	155	120
SP7JQQ	"	19,888	111	88
*SP2JSS	A	506,150	610	382
*SP8TJU	A	412,452	550	342
*SP9NWN	A	325,376	491	328
*SP3GHK	"	214,376	346	254
*SP2GJI	"	152,460	303	252
*SQ9HZM	"	147,096	296	227
*SP6LUV	"	134,316	249	246
*SQ9ANS	"	125,190	291	214
*SQ8LSC	"	101,592	242	204
*SP5XSD	"	99,990	245	198
*SP8ONB	"	97,722	252	183
*3Z8Z	"	82,720	200	188
*SP9FT	"	71,632	214	176
*SP9KJU	"	64,320	185	160
(Op: SP9MDY)				
*SP2OVQ	"	63,585	189	157
*SP6NVK	"	56,925	199	165
*SP9LAS	"	54,978	183	154
*SP1MVG	"	54,400	197	160
*SP4ICD	"	53,808	189	152
*SP0PZK	"	51,561	161	153
(Op: SP2UKB)				
*SP9BGS	"	43,974	151	126
*SQ9FCH	"	36,531	150	123
*SP6GNJ	"	32,760	117	105
*SP4AQD	"	31,680	126	110
*SP5BUJ	"	28,050	120	110
*SP9RTL	"	24,500	117	100
*SP2DKI	"	21,432	106	94
*SP1GZT	"	19,594	106	97
*SP5IT	"	17,238	88	78
*SP4MPA	"	13,800	77	69
*SP5BB	"	13,348	100	71
*SP9TPB	"	12,600	68	63
*SP8KPK	"	7,826	96	43
*SP5XO	"	6,670	58	58
*SP8SW	"	4,182	41	41
*SP6PLH	"	4,060	80	29
*SP7FBQ	"	3,431	49	47
*SP8MFW	"	2,025	35	25
*SQ5NF	"	1,904	31	28
*SP9MCU	"	1,600	32	32
*SP6EWB	"	774	43	18
*SP2EXN	21	16,748	82	79
*SP2PI	"	3,348	37	36
*SP4XQN	14	1,088,648	952	556
*SP9EWO	14	226,134	389	306
*3Z6V	14	187,176	350	264
*SP2FTL	"	75,665	225	185
*SP1DMD	"	56,606	207	166
*SP4LVK	"	55,380	177	156
*SP3BVI	"	29,036	146	122
*SP9BMH	"	24,038	126	101
*SQ2EAN	"	18,685	119	101
*SP1KZE	"	16,830	111	90
(Op: SP1MWN)				
*SP9MAX	"	13,104	82	78
*SP6DHH	"	5,336	66	58
*SP5BYC	"	4,815	49	45
*SP2AVE	"	2,904	34	33
*SN9U	"	988	20	19
(Op: SP9UMJ)				
*SP5NN	"	345	15	15
*SP4TKR	7	629,486	618	403
*SP3FYX	7	478,185	536	355
*SP8NR	"	154,224	252	216
*SP4AAZ	"	66,780	171	159
*SP9XCN	3.7	347,750	511	325
*SP4SHD	3.7	227,911	391	271
*SQ9CWO	3.7	145,186	302	229
*SP9UOP	"	121,220	269	209
*SQ9GAI	"	97,614	236	187
*SN190ZS	"	28,885	132	109
(Op: SP9GFI)				
*SP8OOB	"	22,944	114	96
*SQ9CNN	"	18,601	103	89
*SP9WLC	"	4,922	58	46
*SP4JON	"	2,332	55	22

GREECE

SV2GWY	A	125,580	338	230
SV1DPI	"	29,505	117	105
SV1CER	14	705,705	947	517
*SV1JCV	A	68,376	233	168
*SV1BFW	"	4,407	39	39
*SV3AWG	"	3,686	39	38
*SV1XV	"	2,835	36	35

BOSNIA-HERZEGOVINA

T96Q	21	1,464,708	1073	636
(Op: T93O)				
*T92M	14	35,378	154	133
*T99D	7	1,227,450	993	490

ICELAND

TF3AM	A	401,638	657	409
TF3MA	"	76,242	220	194
TF3CW	14	183,180	350	213
TF4M	"	124,659	327	243
*TFØGX	"	4,576	54	52
(Op: TF8GX)				
TF3YH	7	7,900	51	50

EUROPEAN RUSSIA

R3R	A	6,062,336	2952	952
(Op: UA3DPX)				
RW1ZA	A	3,314,935	2031	845
UA3QDX	A	2,888,448	2001	768
RK3QWW	"	1,537,000	1179	580
RM4HZ	"	1,178,234	1203	577
RK3DK	"	941,976	950	441
RD4WA	"	906,309	942	501
RV4HC	"	653,425	784	443
RA4UF	"	540,120	572	420
UA4RZ	"	474,296	576	404
RA6AFB	"	418,248	584	333
RW6BZ	"	416,250	581	370
UA4SU	"	287,040	467	320
RA3UT	"	284,616	450	354
RV1CC	"	222,495	391	273
RA3CQ	"	208,495	333	259
RA3NC	"	150,568	310	232
RK3QS	"	136,184	304	232
UA3VJV	"	116,958	296	193
UA3AKO	"	97,948	247	188
RA4YW	"	96,288	276	236
U1BB	"	58,136	205	169
RA3VE	"	44,744	177	136
R3AA	"	34,443	149	129
RZ3ARO	"	31,350	143	114
UA3DUJ	"	15,088	102	92
RU6DX	"	10,875	81	75
RA6AR	"	10,540	75	68
UA3DEE	"	3,588	40	39
RA4UVK	"	176	8	8
RC4Q	21	211,600	372	230
(Op: UA4RC)				
RD3A	14	2,567,952	1813	816
(Op: RD3AF)				
RN3QO	14	2,161,863	1737	783
UA4LCH	14	1,980,792	1549	792
RZ1ZZ	"	1,654,100	1546	695
RK3DZB	"	1,526,672	1433	688
(Op: RU3DNN)				
RN3ZC	"	1,091,430	1262	603
RV1AW/0	"	388,494	524	339
RW3FY	"	341,376	542	381
RA4SD	"	15,484	104	98
RV3BQ	"	14,915	105	95
RX3AP	"	4,732	55	52
UA4LU/3	3.7	718,256	715	424
RN3RQ	3.7	227,205	395	255
UA3MIF	"	108,100	255	188
UA6AKD	"	13,056	87	68
*UA4FER	A	1,970,343	1462	657
*RX3FS	A	1,506,828	1300	597
*UA3ABJ	A	1,014,784	994	512
*RX3ZX	"	695,760	751	446
*RW4PL	"	576,352	684	434
*UA3LHL	"	333,250	512	310
*UA4PJM	"	232,448	410	256
*UA4CCC	"	231,695	445	311
*RW3WX	"	197,652	384	273
*RN6AH	"	171,648	386	288
*RA4PKO	"	164,032	342	233
*RX3QDF	"	153,560	332	220
*UA3RN	"	142,835	314	245
*RZ6BU	"	140,296	281	247
*RA3WIQ	"	136,107	324	213
*U1BA	"	119,340	314	234
*RV4LC	"	114,063	295	193
*RV3BZ	"	113,760	296	240
*UA1CUR	"	103,515	277	201
*RW3DL	"	103,402	257	194
*UA1AFZ	"	98,691	265	201
*RA4NCC	"	91,932	252	188
*UA1CEC	"	87,756	272	206
*RN4AM	"	75,222	238	199
*RN6DR	"	70,692	214	172
*UA3GBC	"	68,370	209	159
*RV3IC	"	61,752	197	166
*UA4AAC	"	56,916	190	153
*UA3WHF	"	53,439	157	141
*RX3MX	"	50,995	167	155
*RU1AB	"	46,472	164	148
*RA4LE	"	43,168	169	152
*RA1OD	"	42,441	139	129
*UA3RW	"	36,314	146	134
*RD3DD	"	33,638	141	121
*RU3DM	"	25,872	113	98
*UA3AAP	"	24,531	129	111
*RZ3FR	"	22,515	121	95
*RU6YJ	"	20,600	107	100
*UA3MEJ	"	19,844	93	82
*RV3MI	"	16,268	104	98
*RW4LQ	"	13,065	75	67
*RZ3VA	"	7,434	70	63
*UA3QIX	"	6,528	58	51
*UA1WBV	"	5,811	46	39
*RX3VF	"	4,218	62	57
*RU3LA	"	3,503	35	31
*RW3LX	"	2,528	33	32
*RV1AT	"	2,210	39	34
*UA4LL	"	2,166	39	38
*RX3DVF	"	192	8	8
*RA6DB	21	70,880	201	160
*RU3SD	21	55,760	164	136
*RA3XEV	"	23,690	140	103
*UA4LW	"	2,449	33	31
*RA3DGH	"	2,448	40	36
*RA4LK	"	240	10	10
*RK3XWO	14	276,968	486	356
(Op: R3X-548)				
*RK6CK	14	95,056	289	208
*RA3NK	14	88,102	246	217
*RL3AB	"	47,107	189	163
*RW3XB	"	45,633	185	159
*RW6ATJ	"	35,777	171	133
*RW6AH	"	32,370	159	130
*RU3XB	"	29,260	146	133
*RV6AMI	"	28,080	180	104
*RA3XO	"	16,032	105	96
*RX3MM	"	11,200	72	70
*UA4HQS	"	10,686	87	78
*RA1TV	"	8,520	78	71
*RV3YR	"	7,812	68	62
*RX3AGD	"	7,620	63	60
*RZ3DW	"	7,599	55	51
*RU4WG	"	1,749	33	33
*UA3AKI	"	1,271	31	31
*UA4WEV	"	648	18	18
*RW3MB	"	459	17	17
*RK3DSW	"	112	8	8
*RW3XZ	7	98,280	206	168
*RA1ZZ/3	1.8	25,555	121	95
*RA3WUV	1.8	24,910	127	94
*UA6BQD	"	20,382	111	86
*RZ3AUL	"	10,017	73	63
*RW6FO	"	774	18	18

KALININGRADSK

RK2FWA	3.7	1,558,150	1164	550
(Op: UA2FB)				
*UA2FZ	A	1,012	22	22
*RU2FL	14	108,000	260	200
*RK2FZV/M	"	25,764	130	113
(Op: UA2FT)				

UKRAINE

UT5UGR	A	4,149,441	2155	939
UW5U	A	867,654	978	531
EO3Q	A	628,000	734	400
(Op: UW5Q)				
UY5ZZ	"	572,736	716	456
UT5UML	"	377,024	495	344
UT6IS	"	366,667	533	343
UT5ECZ	"	313,326	504	309
UX7MM	"	126,945	263	195
UR5WDQ	"	124,300	298	226
UR4EI	"	85,120	251	190
UR7GX	"	41,706	148	126
UR7EQ	"	19,350	100	86
UXØKN	"	5,590	46	43
UT7LA	21	12,880	78	70
UT1IA	"	8,178	61	58
UTØU	14	2,870,350	1883	826
(Op: UT5UDX)				
EM3H	14	1,309,689	1323	621
UR5WCQ	"	340,800	482	355
UT7MD	"	19,260	112	107
UU5WW	"	15,300	92	90
UR5ZMK	"	12,810	83	70
EO6F	7	2,881,752	1478	668
(Op: UXØFF)				
EN5D	3.7	1,238,020	1060	518
(Op: UT7DK)				
UT2II	3.7	434,156	554	349
UU1DX	"	153,679	299	227
UT7QL	"	129,710	273	218
UT3SA	1.8	124,640	289	205
US6IQE	1.8	27,664	137	112
UYØZG	"	4,680	50	45
*UZ7M	"	1,559,620	1285	580
*UY4F	A	990,771	945	519
(Op: UT9FJ)				
*UR6QS	A	409,020	550	340
*US4MIE	A	250,821	402	279
*US2YW	"	180,084	338	258
*UY5TE	"	119,392	309	208
*UX8IR	"	119,136	286	219
*EMØU	"	114,332	272	202
(Op: UT3UZ)				
*UZØM	"	98,691	256	201
(Op: UT1ML)				
*UY3AW	"	86,010	228	183
*UU2JG	"	74,390	225	173
*UR6MX	"	65,175	166	165
*UT4MW	"	59,285	202	167
*UT4UQ	"	46,843	179	139
*US8MX	"	37,044	164	126
*UR7HEC	"	11,026	84	74
*UT9FJ	"	8,480	57	53
*UY2RZ	"	4,554	46	46
*UT3QT	"	3,510	46	45
*UR7M	21	248,542	400	287
*UT3FM	"	13,419	79	71
*UX3IO	"	176	8	8
*UR5ZLK	"	147	7	7
*UR6IJ	14	274,275	493	345
*US5QSF	14	170,346	384	267
*UR5KAT	"	37,875	157	125
*US5ESP	"	1,872	26	24
*USØYW	7	383,508	516	318
*UR8QR	7	131,580	243	204
*USØHZ	"	69,020	168	145
*UU4JKY	3.7	361,608	512	312
*UW8SM	3.7	253,935	411	285
*UT7XX	"	181,724	359	251
*UR7GO	"	110,192	255	194
*UT5PY	"	24,552	128	99
*UV5EEO	"	21,056	111	94
*UR7HCX	"	7,480	62	55
*US5ZCW	1.8	27,352	125	104
*US9PA	1.8	12,654	84	74

LATVIA

YL2KO	A	2,045,274	1465	699
YL2CI	A	1,020,954	1008	499
YL9T	"	479,892	666	406
(Op: YL2TW)				
YL2TQ	"	1,536	34	32
YL6W	7	1,023,881	850	461
(Op: YL2GD)				
*YL2BJ	A	170,624	341	248
*YL2CR	A	119,808	297	208
*YL3DX	"	22,176	104	88
*YL2UH	"	128	10	8
*YL3BZ	21	10,404	75	68
*YL2PJ	"	7,632	58	53
*YL5W	14	666,216	886	487
*YL2NK	"	364	14	14
*YL2II	7	8,732	66	59

ROMANIA

YO5OEF	A	1,120,560	1023	483
YO2RR	21	24,831	103	93
YO6BHN	"	4,218	39	38
*YO3CZW	A	749,023	827	457
*YO7LFV	A	366,792	551	348
*YO4AUP	A	199,698	384	249
*YO3XL	"	147,900	274	255
*YO8BPY	"	144,976	290	208
*YO6QT	"	124,611	271	219

*YO7ARY	*	124,444	297	212
*YO6GCW	*	64,944	211	164
*YO7HHI	*	61,446	184	147
*YO5BWI	*	35,332	150	121
*YO2BPZ	*	30,128	133	112
*YO8RKP	*	2,432	38	32
*YO9BXC	*	1,944	29	27
*YO3AIL	21	18,095	87	77
*YO7BGB	*	40	4	4
*YO9JIM	14	43,555	173	155
*YO9KPI	*	27,028	141	116
*YO8COK	*	15,222	101	86
*YO9CXE	*	5,005	57	55
*YO2LGW	7	25,872	110	98
*YO3CDN	*	11,560	69	68
*YO3CVG	*	9,728	67	64
*YO9IKW	*	7,290	45	45
*YO2MET	*	4,800	40	40
*YO6ADW	3.7	195,426	252	198
*YO8MI	*	31,339	132	121

SERBIA & MONTENEGRO

YZ9A	A	3,483,480	1899	780
			(Op: YU1AU)	
YU1LA	*	4	2	2
YT7Z	21	314,580	442	321
			(Op: YU7EE)	
YT65WRTC	14	4,829,330	2609	946
			(Op: YT6A)	
YT5A	14	3,398,976	2084	843
			(Op: YU1DX)	
YZ1AU	14	3,020,537	2009	793
YT1XN	*	265,727	485	319
4N8A	7	4,337,646	1771	771
			(Op: YU1EA)	
YT7A	7	3,526,566	1556	709
			(Op: YU7GMN)	
YT15ØT	3.7	1,700,850	1219	575
			(Op: YZ1ZV)	
YU7AV	3.7	1,369,887	1028	537
YT8T	3.7	1,118,508	989	498
			(Op: YZ1KA)	
YT2T	*	979,424	871	482
			(Op: 4N1JA)	
*YU1EQ	A	130,123	293	203
*YZ8A	A	82,720	236	176
*YZ6AMD	*	41,625	153	125
*4N1N	14	740,950	918	511
			(Op: 4N1LB)	
*YZ1ZX	*	97,584	254	214
*YU7KM	*	57,148	194	157
*YU7YZ	7	161,109	285	221
*YU1RA	1.8	2,304	33	32

MACEDONIA

Z32XA	7	1,668,700	1044	550
Z36W	3.7	526,608	617	368
*Z37M	14	2,363,774	1874	763
			(Op: Z32ID)	
*Z32PT	1.8	69,920	208	160

ALBANIA

ZA/Z35M	A	813,256	988	472

OCEANIA

EAST MALAYSIA

9M6AAC	A	507,756	542	323
			(Op: DL2QT)	

TONGA

*A35RK	A	457,548	606	273

PHILIPPINES

*DZ5ØI	A	608,350	748	230
*DV1JM	A	542,892	605	276
*DU9SS	*	172,598	287	211
*DV1VGN	*	133,099	292	167
*4F1MEU	21	166,880	365	160
*DZ5ØALI	*	30,926	131	94

GUAM

KG6DX	A	2,335,392	1498	477

HAWAII

KH6FI	A	576,012	715	276
KH6GMP	A	297,900	464	225
AH6RF	28	568,260	680	287
*KH6/WØCN	A	142,428	277	156
*KH6/NØCO	A	75,482	192	146
*NH6YK	*	71,110	187	130
*AH6KW	*	160	8	8
*AH6RR	*	154	8	7
*KH6RZ	21	1,903,648	1330	496

PAPUA NEW GUINEA

P29NB	A	1,730,702	1140	467

PALAU

T88CW	A	214,164	448	162

AUSTRALIA

VK4CZ	A	3,585,504	1758	663
AX7GN	A	523,642	527	331
			(Op: VK7GN)	
VK3IO	A	334,825	369	227
VK3KE	*	75,000	179	150
VK3AVV	*	42,420	137	105
AX2GR	A	18,060	82	70
			(Op: VK2GR)	
VK6HZ	A	17,484	79	62
VK2BCQ	*	5,928	45	38
VK2KPP	21	1,677,312	1152	504
*AX4EJ	A	379,950	497	255
			(Op: VK4EJ)	
*VK2ICQ	A	47,841	149	111
*VK2KDP	*	34,584	121	88
*VK3BGH	A	9,240	67	55
*VK2WL	*	3,102	34	33
*VK4VCC	14	1,323	23	21

INDONESIA

YC2RGK	21	2,106	27	26
YB1YG	14	118,620	225	180
*YB4IR	A	1,550,640	982	497
*YC5JAU	A	265,307	361	251
*YB1UUN	A	229,724	349	227
*YB1TC	*	106,080	239	160
*YB5BO	*	67,056	160	127
*YCØMJY	*	25,207	100	91
*YBØCOU	*	17,936	85	76
*YBØIR	*	16,940	82	70
*YC3BDJ	21	1,831,104	1134	561
*YB2OBL	21	1,728,564	1054	566
*YB1BAD	21	348,480	418	288
*YCØKYM	*	123,442	238	181
*YC6LAY	*	85,626	219	142
*YC5OUB	*	37,180	124	110
*YCØNFL	*	20,812	96	86
*YC1UGK	*	7,052	58	43
*YC2VEJ	*	5,888	48	46
*YC5OVZ	*	168	9	8
*YBØEIN	14	63,756	164	138
*YB2ECG	*	9,744	62	58
*YB2VTO	7	12,050	51	50
*YC2EMV/1	*	1,292	17	17
*YBØA	3.7	3,250	27	25

NEW ZEALAND

ZL1ANJ	A	2,642,600	1513	584
ZL1ANH	A	186,861	298	199
ZL2UO	*	99,684	173	142
*ZL1KMN	A	23,328	88	72
*ZL3DW	*	4,020	31	30
*ZL2IFB	21	2,010	33	30
*ZL2DZ	14	7,154	52	49
*ZL4JB	7	30,295	80	73

SOUTH AMERICA

TRINIDAD & TOBAGO

*9Y4LDK	14	494,844	556	301

CHILE

3G1K	A	2,875,184	1643	598
			(Op: XQ1KY)	
CE4CT	21	515,610	585	306
*XQ4CW	28	6,630	62	51

BOLIVIA

*CP1FF	21	6,477	51	51

URUGUAY

CX6VM	A	2,034,803	1196	599
CX4VA	*	9,350	65	50
*CX4DX	28	159,400	297	200
*CX2TG	28	153,628	298	193
*CX5TR	*	13,184	78	64

COLOMBIA

HK6PSG	A	476,141	485	311
HK3AXY	*	258,240	384	240
*HK3JJH	A	1,137,258	880	402
*HK3SGP	14	66,728	155	152
*5K3W	3.7	24,882	67	66
			(Op: HK3SGP)	

ARGENTINA

L2ØH	A	1,848,860	1172	547
			(Op: LU9HS)	
LU1HF	28	2,089,388	1476	497
AY8A	21	6,176,691	2387	881
			(Op: LU8ADX)	
LU1NDC	21	4,088,512	1812	772
LW9ETQ	*	326,606	398	287
*LU5FF	A	3,779,370	1780	735
*LU2NI	A	1,626,675	1089	529
*LU9FFZ	A	150,380	266	206
*LU1ARV	*	49,236	165	132
*LR1A	*	39,131	137	109
*LW1DB	*	28,400	110	100
*LU5EVK	*	7,952	58	56
*LU2FDN	*	2,436	29	28
*LU7DUE	*	1,566	28	27
*LW7HT	28	667,734	730	327
*LU9DAG	28	495,320	590	305
*LR2D	28	491,634	615	286
			(Op: LW7DUC)	
*LU8EOT	*	428,398	553	278
*LU2HHH	*	35,433	135	93
*LW1DRH	*	12,141	81	71
*LU6XAH	*	1,056	26	22
*LU4DX	21	2,358,850	1257	650
*L44DX	21	1,754,298	1074	567
			(Op: LW1DTZ)	
*LQ5H	14	1,286,194	930	481
			(Op: LU3HS)	
*L4ØK	*	101,382	216	183
			(Op: LU6KA)	
*LU5CAB	*	32,560	122	110

PERU

OA4WW	A	11,379,312	3406	954

ARUBA

P4ØL	A	15,400,304	4269	1018
			(Op: W6LD)	

NETHERLANDS ANTILLES

PJ2T	A	13,378,668	4259	951
			(Op: W1MD)	

BRAZIL

ZX2B	A	10,203,949	3278	1013
			(Op: PY2MNL)	
PV8DX	A	4,462,446	1899	709
PY2ADR	A	1,284,290	924	490
PY2GA	*	344,470	447	266
PY3PA	*	236,042	376	214
PT7VB	*	186,162	292	213
PY5ZD	*	161,734	276	193
PY3MSS	*	48,564	151	114
ZV5K	28	883,125	835	375
PP5WG	28	599,976	681	312
PX5E	21	14,179,990	3963	1210
PY1KN	21	2,421,900	1368	598
PY2GH	*	6,157	51	47
PP5KE	14	2,300,207	1241	637
PY2WC	7	168,606	191	171
PP5TR	3.7	9,324	45	42
*PY2DN	A	1,313,688	900	508
*PY1ZV	A	322,940	436	268
*PY2BF	A	84,906	195	159
*PY2ZR	*	61,965	177	135
*PY7EG	*	38,512	134	116
*PY2UZ	*	29,106	113	98
*PY7ZY	*	19,712	90	77
*PS8ET	*	11,077	56	53
*PY2IQ	*	6,250	56	50
*PR7AP	*	944	17	16
*PY2VZ	*	275	11	11
*PY2CX	28	346,494	491	258
*PY2SBY	28	291,017	449	233
*PY2DY	*	249,502	383	242
*PY2ZK	*	41,174	152	119
*PU1KGG	*	14,025	81	75
*PY4PW	*	351	13	13
*PY2HL	21	347,541	401	303
*PY1NB	21	206,568	316	228
*PY2APQ	*	27,295	112	103
*PY5HSD	14	523,378	545	334
*PY2NY	14	400,635	455	307
*PP2RON	*	160,800	292	200
*PY2DJ	*	158,118	262	219
*PY4RDS	*	6,250	53	50
*PY2ZA	*	5,244	48	46
*ZX7A	7	199,150	200	175
*PS8NF	3.7	2,398	23	22

ANTARCTICA

R1ANF	A	683,584	662	352
			(Op: UA1PBA)	

VENEZUELA

YW5NN	21	743,376	638	408
			(Op: YV5NWG)	
4M5R	14	2,843,964	1589	612
			(Op: YV5TX)	
YW5CQ	7	4,021,444	1202	574
			(Op: YV5SSB)	
*YW5T	A	653,920	511	305
			(Op: YV5JBI)	
*YV5IAL	*	40,656	135	112
*YY5AGE	*	15,695	83	73
*YV7QP	21	116,698	241	166
*YY5RED	3.7	191,580	215	155

TRIBANDER/SINGLE ELEMENT

UNITED STATES

NF4A	A	3,601,224	1941	792
			(Op: N4PN)	
K4PV	*	3,193,454	2111	766
W1CU	A	2,873,502	1630	762
K5RQ	A	2,604,105	1837	735
KI6CG	A	1,433,112	1377	566
KV7DX	A	1,206,480	1425	528
			(Op: KN5H)	
N3UM	A	1,022,625	842	505
NJ2F	*	981,396	963	468
W2YE	*	527,012	567	359
NN1N	*	368,636	436	314
NX3Y	*	302,400	449	300
			(Op: KA3QLF)	
W1EQ	*	265,816	400	298
WM2Z	A	243,310	501	290
W4NTI	*	239,598	387	261
WG7X	*	225,834	496	283
KI7Y	*	215,634	396	249
W8DCQ	A	172,788	330	242
W7QN	*	164,500	357	235
KB2DE	*	161,550	299	225
AJ2U	*	146,046	313	241
KØDAT	A	132,444	264	234
K7WP	*	123,025	300	185
K6JAT	*	115,753	304	187
KG7P	*	86,099	252	179
WB2KLD	*	68,136	164	136
NX9T	*	64,629	247	167
WA4ASJ	*	63,000	197	150
AB1BW	*	57,505	189	155
K3ISH	*	48,000	141	128
WA6POZ	*	47,144	152	142
AE6RR	*	25,146	117	99
WG7Y	*	22,601	104	97
KV1J	*	19,580	100	89
NA2P	*	1,920	26	24
K8IA	21	460,435	763	355
W6RKC	21	6,400	53	50
N5VYS	14	128,226	510	213
KBØENE	14	84,816	218	186
WØPPF	*	65,741	197	169
NT6K	14	25,724	165	118
NT5HS	7	7,500	50	50
			(Op: NØRQ)	
*WD5K	A	1,512,466	1299	586
*WB8TLI	A	767,110	716	410
*WN6K	A	517,680	782	360
*N4NX	A	511,598	617	367
*W4TMN	A	330,624	438	287
*WB2RHM	*	292,006	430	286
*AAØNK	A	208,604	381	242
*WBØTSR	*	199,382	385	262
*KA1EKR	A	175,602	277	226
*NU4SC	*	124,236	277	204
			(Op: K3IXD)	
*NØBUI	*	100,596	304	202
*AD5WI	*	88,206	293	183
*KBØARZ	*	86,005	239	167
*KD6PQF	*	63,568	235	137
*KØCIE	*	53,475	195	155
*AB2IO	A	51,910	171	145
*AF8C	*	49,640	175	146
*KG2NI	*	49,178	165	134
*W1CRK	*	43,282	162	134
*KZ3M	A	34,320	141	120
*NQ5Z	*	32,760	147	126
*NEØP	*	30,580	150	110
*K7TR	A	28,847	112	91
*NJ8J	*	23,765	125	97
*WA3ELQ	*	23,100	105	100
*KE4JUH	*	16,200	107	81
*KCØRQH	*	15,824	101	86
*WB2DZH	*	15,400	99	77
*KC5YED	*	15,054	109	78
*N9LJX	A	14,560	72	65
*WA3OFC	*	13,869	75	67
*N9ADG	*	10,082	85	71
*K5VGI	*	9,438	78	66
*WB1ERE	*	8,946	73	63
*ABØOX	*	3,648	41	38
*KK6MM	*	2,964	46	39
*W6PAP	*	2,583	44	41
*KØUD	*	1,736	34	28
*W1XW	*	840	22	21
*W7UPF	21	100,694	232	199
*K4EU	21	23,700	100	100
*NA4M	21	5,880	53	49
*N2ZN	21	360	13	12
*NV8N	14	476,007	612	399
*W4LC	14	250,828	339	292
*NN5Z	14	125,325	301	225
			(Op: K5PX)	
*AD6G	*	68,297	190	163
*WB2VVV	14	61,380	167	155
*WA4VJC	*	29,618	135	118
*W9IL	*	17,835	89	87
*KI6LZ	7	118,420	235	191
*W9LYA	3.7	275	11	11

DX

ZX2B	A	10,203,949	3278	1013
			(Op: PY2MNL)	
UT5UGR	A	4,149,441	2155	939
9M2CNC	A	3,933,748	2053	749
C4M	A	3,909,000	1736	600
			(Op: 5B4AGM)	
VY2LI	A	2,977,612	1447	682
ZL1ANJ	A	2,642,600	1513	584
KG6DX	A	2,335,392	1498	477
VE3CR	A	2,060,247	1120	609
CX6VM	A	2,034,803	1196	599
L2ØH	A	1,848,860	1172	547
			(Op: LU9HS)	
VO1TA	A	1,687,124	1074	562
EX2X	A	1,280,100	1000	510
OK1EP	A	1,154,478	989	533
RD4WA	A	906,309	942	501
OZ5EV	A	802,893	684	519
4S7AB	A	649,880	663	385
UY5ZZ	*	572,736	716	456
VE1MC	A	545,266	520	337
EI4DW	A	521,885	622	403
YL9T	A	479,892	666	406
			(Op: YL2TW)	
UA9CDC	A	453,300	437	300
MMØDXH	A	438,014	642	389
PAØJNH	A	368,962	500	341
IZ8EDL	A	351,648	495	352
G4DFI	A	222,088	402	284
PT7VB	*	186,162	292	213
DP5X	A	162,192	312	248
			(Op: DL3EBX)	
SP6RLK	A	152,615	276	233
SM6FJY	A	138,880	291	220
VE7NS	A	131,688	248	177
SV2GWY	A	125,580	338	230
RK9KWI	*	108,675	222	175
DH1DA	*	80,626	242	182
ED5OL	A	75,970	277	214
			(Op: EA5OL)	
VK3KE	A	75,000	179	150
IK8SEU	*	49,704	182	152
OZ4EL	A	47,922	162	147
RA3VE	*	44,744	177	136
UN5J	A	39,444	134	114
VA3PC	*	23,040	100	90
AX2GR	A	18,060	82	70
			(Op: VK2GR)	
RA6AR	*	10,540	75	68
OE1WWL	A	5,074	46	43
JA1ISJ	A	4,536	44	42
UT1IA	21	8,178	61	58
KG44WW	14	3,268,210	2232	803
EA1AAW	14	106,338	305	222
GØMTN	14	57,409	243	187
EA1RCM	7	159,940	282	220
*LU5FF	A	3,779,370	1780	735
*UA4LCQ/9	A	2,443,518	1241	602
*TE2M	A	1,690,468	1410	494
			(Op: TI2KAC)	
*VE1OP	A	1,259,415	905	513
*DK5DQ	A	1,189,056	1005	528
*S51F	A	1,066,527	876	513
*UA3ABJ	A	1,014,784	994	512
*IK2DZN	A	998,025	899	525
*IR4R	*	885,108	826	492
*OK1FNJ	A	673,854	746	437
*VE3ESH	A	516,844	535	314
*VE3KPP	*	447,740	467	305
*SP8TJU	A	412,452	550	342
*DF6QV	*	341,874	489	351
*VE1JS	*	336,644	395	308
*UA3LHL	A	333,250	512	310
*OZ1ACB	A	307,518	455	321
*S58P	A	261,048	410	292
*IZ8APP	*	218,120	395	266
*YO4AUP	A	199,698	384	249
*RW3WX	*	197,652	384	273
*US2YW	A	180,084	338	258
*DF1LON	*	176,120	317	259
*EI9FVB	A	170,000	332	250
*VO1ONE	A	163,822	276	202
*LY4Q	A	147,705	322	229
*YU1EQ	A	130,123	293	203
*UA9XF	*	121,512	228	183
*UX8IR	*	119,136	286	219
*LY2LU	*	114,400	269	220
*DR5A	*	111,585	257	215
			(Op: DF1LON)	
*BD4ALC	A	100,016	295	152
*SP5XSD	*	99,990	245	198
*VE4EAR	A	99,954	240	162
*DL1JGO	*	95,220	269	207
*VA3QP	*	89,677	215	161
*JA1XRH	A	85,077	202	137
*OK1BOA	A	84,728	211	178
*F5LIW	A	83,772	218	179
*YZ8A	*	82,720	236	176
*YB5BO	A	67,056	160	127
*OK1CJN	*	62,496	170	144
*EA3EIQ	A	62,205	190	165
*PY2ZR	A	61,965	177	135
*F4CUI	*	58,718	177	157
*G4NXG/M	A	57,814	164	137
*SP6NVK	*	56,925	199	165
*RV9UP	*	56,448	165	128
*UA3WHF	*	53,439	157	141
*F6DRP	*	53,055	171	135
*MI3OZX	A	48,356	159	157
*RA4LE	*	43,168	169	152
*IK8NBE	*	41,762	148	133
*EW4AB	A	35,343	145	119
*AN7HE	*	35,306	149	139
			(Op: EA7HE)	
*IK1SPR	*	27,984	114	106
			(Op: IU1A)	
*HA8TP	A	23,392	100	86
*PE2SVN	A	22,575	126	105
*LY6M	*	21,510	113	90
			(Op: LY1DS)	
*JA4DWG	*	21,040	93	80
*EA7GV	*	20,544	106	96
*PY7ZY	*	19,712	90	77
*DG7RO	*	17,934	124	98
*OZ5DSB	*	17,088	96	89
			(Op: OZ4EL/OZ6AGX)	
*EA2CE	*	16,643	99	89
*HS6MYW	A	15,566	123	86
*LA6ZFA	A	13,824	101	96
*RW4LQ	*	13,065	75	67
*SE6C	A	13,020	96	84
			(Op: SM6CDN)	
*LZ3SM	A	11,323	76	67
*IW7EGQ	*	11,109	74	69
*PS8ET	*	11,077	56	53
*JR1MRG	*	8,786	68	46
*PY2IQ	*	6,250	56	50
*EA2CHL	*	5,882	152	55
*EC2AWD	*	5,808	53	48
*BG6AHP	*	5,445	55	45
*JA4AQR	*	4,970	44	35
*HS1OVH	*	2,838	40	33
*IK2HLM	*	1,947	33	33
*SM5OSZ	*	1,683	37	33
*DL7LZ	*	286	16	11
*7N2UOC	28	900	24	18
*JA1BPA	21	464,202	558	333
			(Op: JA6-9330)	
*PY1NB	21	206,568	316	228
*IK8EIE	21	106,080	218	195
*IZ4AFW	*	4,144	38	37
*9Y4LDK	14	494,844	556	301
*RV9LV	14	465,864	478	354
*9A/VE3ZIK	14	137,344	350	232
*MØAQM	14	78,967	239	203
*VE3RCN	14	38,610	124	117
*DL4JYT	14	26,325	133	117
*YB2ECG	14	9,744	62	58
*9A5CW	*	9,727	85	71
*IK8DNJ	14	7,540	60	58
*ON6LY	14	7,350	77	70
*LA3RNA	14	945	29	27
*JR4URW	7	25,665	116	87
*JF3IYW/3	*	12,393	54	51
*LA9QNA	7	2,088	30	29
*YC2EMV/1	*	1,292	17	17
*PAØMIR	3.7	91,800	219	180
*F5VHN	1.8	27,090	132	105
*EA3AKA	1.8	2,926	39	38
*YU1RA	1.8	2,304	33	32

ROOKIE

UNITED STATES

AB3CX	A	1,037,658	934	489
WE9N	A	353,298	453	318
K4JET	A	281,184	401	303
W7UG	A	144,534	315	218
ADØNW	A	38,306	119	107
KG6ZHC	*	36,120	173	120
N4EKG	*	23,577	97	87
KD7YVV	14	154	12	11
*K1USC	A	99,680	288	178
*KE5DHY	A	30,210	141	114
*KD5ZEZ	*	22,616	110	88
*KI6CDF	*	20,274	110	93
*KV1P	A	12,996	88	76
*KB3KGP	A	11,005	80	71
*KAØEIC	A	10,080	78	72
*KI4KNS	*	2,244	40	34
*KE5CWC	*	900	18	18
*KI4MPQ	21	32	4	4
*N2USM	14	29,318	113	107
*W8GOC	14	3,952	39	38
*NØZK	14	3,555	52	45
*W7TAX	14	805	25	23
*K5FYI	14	6	2	2

DX

ZS6DXB	A	3,717,896	1641	728
UA9JDP	A	3,190,917	1471	629
F4DSK	A	2,142,409	1419	659
PY2ADR	A	1,284,290	924	490
IV3YIM	A	1,242,125	845	475
IW7EFC	*	953,862	950	546
MMØDXH	A	438,014	642	389
SM6U	A	370,220	500	346
XE2WWW	A	300,846	474	273
RV9XE	*	80,068	179	148
LY1CM	A	43,400	162	124
IWØHOU	*	12,750	75	75
UA9XBI	14	365,584	428	313
*HB9TQG	A	809,680	729	464
*BD7KLO	A	638,673	897	357
*DQØT	A	387,353	545	361
			(Op: DC7NF)	
*VO1KVT	A	326,250	385	261
*WP4BH	A	302,430	478	255
*OK1CID	A	302,302	490	302
*YC5JAU	A	265,307	361	251
*UA9SAW	A	171,488	294	233
*F4EUN	A	139,567	296	233
*DV1VGN	*	133,099	292	167
*OK1CLD	*	126,312	288	228
*EA1AHO	A	122,080	282	224
*EA1EWC	*	116,790	255	229
*IZ8GBH	A	112,528	258	208
*RU9CD	*	110,670	230	170
*SQ8LSC	A	101,592	242	204
*OK2TSG	*	85,655	243	185
*VE3/W4TAA	A	78,971	193	157
*MMØTOB	A	78,772	239	188
*2UØGSY	A	71,208	209	172
*2EØPLA	A	69,373	201	173
*VE9XY	A	64,604	155	124
*IV3JCC	*	57,856	149	128
*IZ3KKE	*	56,118	177	141
*DB7TF	*	47,382	176	149
*EC7ANC	*	44,416	144	128
*DM9JM	*	44,220	146	132
*YZ6AMD	A	41,625	153	125
*EI7JQ	A	33,480	147	124
*MØVPE	*	33,401	139	127
*PY2UZ	A	29,106	113	98
*UAØLGY	A	27,600	132	92
*YCØMJY	*	25,207	100	91
*ZL1KMN	A	23,328	88	72
*EC7AMT	*	23,100	124	105
*PE2SVN	A	22,575	126	105
*ON7MIC	A	15,180	103	92
*OH8GZN	A	11,475	98	85
*EC3AKY	*	8,680	63	62
*SP8KPK	*	7,826	96	43
*JO3FEU	*	7,693	57	49

*SP5XO	*	6,670	58	58
***LA7GNA**	**A**	**5,525**	**66**	**65**
*RX3VF	*	4,218	62	57
*DB1SDJ	*	3,108	40	37
*IZ8GNH	*	3,094	35	34
*IW5EIJ	*	2,574	34	33
***VY1EI**	**A**	**980**	**23**	**20**
***BG7KQT**	**A**	**880**	**27**	**22**
*LA6NNA	*	392	14	14
*EA7EYQ	*	374	12	11
*2WØJNI	*	128	8	8
*IW2NSE	*	72	6	6
***PY2ZK**	**28**	**41,174**	**152**	**119**
***LU2HHH**	**28**	**35,433**	**135**	**93**
***AM8BHD**	**21**	**1,702,914**	**1242**	**463**
***YCØNFL**	**21**	**20,812**	**96**	**86**
***EC5AAJ**	**21**	**8,418**	**72**	**69**
*YC1UGK	*	7,052	58	43
***SP2PI**	**21**	**3,348**	**37**	**36**
***CT1IUA**	**14**	**273,884**	**428**	**299**
***HK3SGP**	**14**	**66,728**	**155**	**152**
***KP3O**	**14**	**12,240**	**70**	**68**
***RX3AGD**	**14**	**7,620**	**63**	**60**
***IZ2HAN**	**14**	**945**	**29**	**27**
***LA3RNA**	**14**	**945**	**29**	**27**
***HP1ALX**	**14**	**748**	**17**	**17**
***E2ØNMK**	**14**	**300**	**13**	**12**
***IW3SSA**	**7**	**122,158**	**260**	**206**
***VE3JEB**	**7**	**1,512**	**18**	**18**
***YY5RED**	**3.7**	**191,580**	**215**	**155**
***UT7XX**	**3.7**	**181,724**	**359**	**251**
***S55O**	**3.7**	**177,388**	**344**	**244**
***UA9LAU**	**3.7**	**75,460**	**131**	**110**
***5K3W**	**3.7**	**24,882**	**67**	**66**
			(Op: HK3SGP)	
***UA6BQD**	**1.8**	**20,382**	**111**	**86**
*UA9QCZ	*	14	2	2

SINGLE OP ASSISTED

UNITED STATES

NY6DX	**A**	**4,778,115**	**2079**	**885**
N3KS	**A**	**4,620,264**	**2286**	**888**
N4WW	**A**	**3,115,020**	**1848**	**772**
NA7XX	**A**	**2,893,891**	**2051**	**767**
			(Op: W8MU)	
WM4RM	*	2,401,225	1509	695
			(Op: W4NF)	
WN9O	**A**	**2,195,544**	**1664**	**681**
			(Op: W9IU)	
N2BJ	*	2,158,468	1658	676
W8MJ	**A**	**2,112,534**	**1859**	**639**
KØLUZ	*	1,876,380	1413	660
W6TK	**A**	**1,495,492**	**1507**	**548**
KW5DX	**A**	**1,346,430**	**1224**	**555**
			(Op: K5UN)	
KØBU	**A**	**955,450**	**1074**	**485**
K1UQ	**A**	**939,930**	**712**	**485**
WW5X	*	939,418	1105	482
			(Op: @ WØLSD)	
NF6A	**A**	**823,732**	**724**	**434**
			(Op: K6XX @ K6XX)	
NO2R	*	771,284	707	436
W6FRH	*	718,658	801	391
KW3W	*	645,120	646	384
K2NNY	*	581,357	574	371
			(Op: K2DB)	
W3TZ	*	505,530	593	369
KT3W	*	489,611	488	353
			(Op: W3PP)	
N9ZM	*	474,240	641	384
W7RN	*	467,190	544	358
			(Op: K5RC)	
K6RIM	*	432,032	601	368
K3KO	*	377,303	426	307
K7EG	*	360,972	488	333
K3BZ	*	335,720	489	308
K3MD	*	319,227	412	291
N3KV	*	290,444	366	253
N5KDV	*	287,005	484	305
K9UQN	*	222,040	376	280
W2CDO	*	209,000	382	250
W1EBI	*	183,375	321	225
AA3B	*	181,742	302	242
N6AJR	*	158,457	342	221
KC1F	*	130,410	245	210
W6SA	*	117,475	294	185
W6EB	*	114,560	286	179
W4FDA	*	110,784	246	192
W4UNP	*	108,096	247	192
NØYY	*	107,712	206	176
K3QX	*	107,160	276	190
K6TA	*	104,430	234	177
N8KOJ	*	97,696	220	172
AJ1M	*	89,775	301	171
N3YIM	*	71,645	170	161
KI4JKY	*	67,693	173	139
			(Op: N4GG)	
AD1C	*	56,712	150	136
K8BB	*	37,620	154	110
KØAD	*	30,720	165	120
N5DD	*	28,137	88	83
W2GDJ	*	24,905	106	85
N4TL	*	23,400	98	90
K4IU	*	22,927	116	101
WA3G	*	8,723	62	61
N6NC	*	8,256	72	64
K8YC	*	8,058	55	51
KG6TT	*	7,448	62	56
NF3R	*	5,600	64	56
			(Op: K3ASK)	
W1MAT	*	3,936	43	41
N3HS	*	2,160	32	30
KCØRET	*	2,100	37	35
K7RI	**14**	**2,811,214**	**2045**	**791**
K7VIT	*	90,346	222	199
AA2MF	**7**	**52,680**	**125**	**120**
KEØL	**3.7**	**241,680**	**591**	**265**
W2MF	**1.8**	**66,682**	**281**	**154**
K4WW	**1.8**	**10,952**	**99**	**74**
WA1PMA	**1.8**	**7,257**	**81**	**59**
***W4WTB**	**A**	**681,984**	**642**	**384**
*AB4GG	*	620,908	708	391
***NJ7I**	**A**	**426,880**	**740**	**368**
*K4CZ	*	343,279	474	283
*WE4OJ	*	278,910	504	270
			(Op: K4EJ)	
***KØRC**	**A**	**204,724**	**360**	**254**
***NJ1H**	**A**	**186,714**	**323**	**253**
*W1MX	*	181,662	330	221
			(Op: WG1Z)	

*W4XO	*	172,960	327	235
***KS2G**	**A**	**158,207**	**290**	**233**
*WA1ZYX	*	144,474	253	199
***WR3L**	**A**	**144,372**	**268**	**212**
*N4AWU	*	139,092	290	201
*AK7AT	*	123,624	324	202
***W9QL**	**A**	**112,326**	**280**	**193**
*N4VA	*	108,225	282	185
***K5NZ**	**A**	**100,167**	**240**	**193**
*N1API	*	99,324	227	186
*K2QMF	*	87,007	182	167
*K5WW	*	79,840	253	160
*NE1B	*	76,330	173	170
*WA3KYY	*	76,266	239	171
*NU6T	*	60,192	205	144
*N2OPW	*	51,408	156	144
*WK8A	*	38,236	147	121
*NRØL	*	34,200	192	120
*N9LF	*	32,482	152	109
*W4EE	*	23,571	119	97
*KN4Q	*	23,520	123	96
*W3AG	*	22,386	101	82
*N1HTS	*	20,713	90	77
*KSØT	*	19,313	110	89
*K8NZ	*	16,942	105	86
*WA7RR	*	12,024	79	72
*WW4E	*	6,517	53	49
*WV1M	*	2,720	37	34
*NØBK	*	705	17	15
*KCØMNU	*	414	19	18
***WE1L**	**1.8**	**33,228**	**197**	**117**

DX

EA9LZ	**A**	**12,295,470**	**3344**	**1007**
UPØL	**A**	**7,496,412**	**2365**	**798**
			(Op: UN9LW)	
RG9A	**A**	**7,470,528**	**2265**	**876**
			(Op: UA9AM)	
IO3P	**A**	**5,985,672**	**2301**	**902**
			(Op: IZ3EYZ)	
ZPØR	**A**	**5,811,484**	**2304**	**842**
			(Op: ZP5AZL)	
S57DX	**A**	**5,313,960**	**2254**	**870**
OH4R	**A**	**5,265,660**	**2710**	**930**
RK4FD	**A**	**4,570,128**	**2246**	**852**
VA3DX	**A**	**4,226,491**	**1632**	**797**
DLØWW	**A**	**3,769,920**	**1937**	**816**
PX8C	**A**	**3,648,099**	**1498**	**637**
			(Op: PY8AZT)	
RA4LW	*	3,356,366	1857	773
AM7RU	**A**	**2,957,436**	**1610**	**727**
			(Op: AM7RU)	
SN8F	**A**	**2,688,590**	**1672**	**730**
			(Op: SP8FHK)	
OHØZ	**A**	**1,943,034**	**1382**	**654**
			(Op: OH9MM)	
VB3O	*	1,932,987	1100	581
			(Op: W1AJT)	
SJ3A	**A**	**1,764,730**	**1528**	**671**
			(Op: SM3WMV)	
PV2M	*	1,483,845	970	529
			(Op: PT2ADM)	
PY5DC	*	1,481,872	981	524
G5X	**A**	**1,219,575**	**1085**	**575**
			(Op: MØOXO)	
OK1KT	**A**	**1,078,398**	**863**	**543**
RM9RZ	*	950,912	671	437
HB9FBS	**A**	**852,978**	**843**	**483**
DR1ØØNAU	*	706,860	700	476
			(Op: DL1RG)	
G3YYD	*	698,856	673	444
IK2TDM	*	677,505	693	465
PR2F	*	592,383	636	319
			(Op: PY2NDX)	
AL9A	**A**	**572,286**	**648**	**286**
VE7KET	**A**	**509,016**	**509**	**334**
F1RHS	**A**	**505,530**	**598**	**411**
PA1T	**A**	**482,724**	**550**	**396**
DK9TN	*	461,244	581	357
SI6R	*	372,855	547	335
			(Op: SMØRUX)	
IK3SCB	*	333,336	490	323
UA3AGW	*	320,724	467	302
VE3HG	*	255,360	320	304
VA6XDX	**A**	**235,934**	**339**	**223**
DJ5MW	*	227,188	353	257
ON5ZO	**A**	**215,800**	**366**	**260**
HB9CIC	*	203,490	337	255
F5JFU	*	113,400	244	200
EA1WX	*	107,415	303	217
EA5FID	*	105,930	205	165
DL2RTL	*	86,523	234	191
HB9IQB	*	74,448	198	176
LY1R	**A**	**58,408**	**168**	**149**
EA1EVS	*	53,400	189	150
DL4YAO	*	53,064	156	134
TF3AO	**A**	**51,156**	**216**	**174**
EA4DEC	*	29,648	110	109
JH4UTP	**28**	**455**	**15**	**13**
DP9Z	**21**	**891,552**	**792**	**502**
			(Op: DF9ZP)	
UA9UR	**21**	**398,454**	**481**	**318**
OI6X	**21**	**64,740**	**236**	**166**
			(Op: OH6NJ)	
LY8O	**21**	**58,400**	**185**	**160**
OM3DX	**21**	**54,384**	**150**	**132**
9A4VV	**21**	**13,260**	**69**	**68**
RL3A	**14**	**4,542,820**	**2646**	**985**
			(Op: UA3ASZ)	
UT7I	**14**	**4,170,270**	**2649**	**962**
			(Op: UT2IO)	
IU9S	**14**	**3,387,816**	**2222**	**844**
			(Op: IT9BLB)	
OK7M	**14**	**2,449,170**	**1444**	**705**
			(Op: OK1DIG)	
YU1JW	**14**	**2,360,904**	**1677**	**728**
S57AL	**14**	**2,053,220**	**1370**	**689**
ES5RW	**14**	**1,978,688**	**1602**	**719**
RU6FA	*	1,879,344	1674	744
DP4A	**14**	**1,078,959**	**899**	**573**
			(Op: DL2MWB)	
B5TT	**14**	**767,052**	**916**	**429**
			(Op: BA5TT)	
EA1CUB	**14**	**545,412**	**728**	**453**
EA5KV	*	232,237	589	323
AM5YJ	*	206,918	486	307
			(Op: EA5YJ)	
IZ5ASZ	**14**	**68,880**	**192**	**168**
DL9HD	*	48,169	163	151
JO7KMB	**14**	**28,227**	**115**	**97**
UU2JQ	**14**	**19,030**	**121**	**110**

OK1FIA	*	10,200	60	60
S56X	**7**	**1,950,837**	**1100**	**577**
UU5A	**3.7**	**937,674**	**830**	**461**
			(Op: UU8JY)	
OZ1ADL	**3.7**	**115,830**	**265**	**195**
RAØALM	**3.7**	**46,060**	**110**	**94**
EA7OT	**3.7**	**33,696**	**119**	**108**
HG3M	**1.8**	**513,360**	**636**	**360**
			(Op: HA3MY)	
***S58M**	**A**	**1,464,291**	**1124**	**579**
***PR7AF**	**A**	**1,105,856**	**774**	**467**
***VE1DHD**	**A**	**733,920**	**635**	**417**
*S53F	*	702,630	758	422
***VE9NC**	**A**	**519,354**	**492**	**387**
***VE3ZZ**	**A**	**398,088**	**437**	**291**
***UAØSE**	**A**	**366,317**	**488**	**301**
*VE3XD	*	344,160	406	288
***DL4CW**	**A**	**226,800**	**396**	**280**
***OK1UU**	**A**	**220,860**	**396**	**270**
***ON6LR**	**A**	**217,857**	**310**	**303**
***RA6YDX**	**A**	**211,936**	**412**	**296**
***EA8BZH**	**A**	**211,788**	**300**	**222**
***PAØKHS**	**A**	**194,578**	**357**	**271**
***EY8MM**	**A**	**162,110**	**300**	**215**
*OK1FJD	*	161,500	328	250
***VE7OGO**	**A**	**152,460**	**283**	**198**
*VE3XAT	*	140,070	268	174
***SM2M**	**A**	**138,859**	**297**	**239**
			(Op: SM2LIY)	
***PE1FTV**	**A**	**101,656**	**267**	**194**
***YO4RST**	**A**	**97,988**	**229**	**187**
*VE3EY	*	84,328	199	166
***JA3PYC**	**A**	**70,739**	**184**	**127**
***EA1DBC**	**A**	**67,203**	**200**	**171**
*OK4DZ	*	50,908	173	143
*JK2VOC	*	48,720	188	105
*EA7TN	*	47,385	156	135
*PY2BRZ	*	36,512	134	112
*EA1CDK	*	18,518	99	94
***SP7TES**	**A**	**15,471**	**89**	**81**
*RA9KM	*	13,124	71	68
*DL8UAT	*	12,240	72	72
***G3UEG**	**A**	**11,972**	**76**	**73**
*MØRUN	*	11,060	75	70
*VE1RAR	*	9,288	57	54
*JF3SAD	*	7,439	47	43
*DK5A	*	6,944	56	56
			(Op: DK5KMA)	
*IW7ECJ	*	4,256	45	32
*DFØNF	*	4,183	50	47
*SP5WLO	*	2,555	36	35
*SM6MVE	*	2,240	35	35
*AM1FBJ	*	1,700	36	34
*SM4XIH	*	480	15	15
*DP4N	*	364	14	13
			(Op: DL4NER)	
*DN4NER	*	336	14	14
			(Op: DL4NER)	
***PY2XC**	**28**	**76,976**	**216**	**136**
***UR5FAV**	**28**	**9,870**	**119**	**70**
*DL1EFD	*	4	2	2
***NH7FY**	**21**	**470,658**	**591**	**282**
***LU1BJW**	**21**	**197,964**	**306**	**234**
***IZ5EBL**	**21**	**68,400**	**170**	**150**
***OE5UAL**	**21**	**31,926**	**105**	**102**
***9A4RV**	**21**	**19,344**	**88**	**78**
***PY1LUI**	**21**	**12,213**	**77**	**69**
***YR8DD**	**21**	**3,366**	**36**	**33**
			(Op: YO8TU)	
*SM6OUB	*	75	5	5
***FM5FJ**	**14**	**1,956,876**	**1238**	**626**
***VO1BC**	**14**	**444,276**	**510**	**301**
***SJØWPX**	**14**	**111,750**	**315**	**250**
			(Op: SMØOGQ)	
***OK2BPU**	**14**	**106,424**	**260**	**212**
***RNØCT**	**14**	**83,304**	**218**	**178**
***EA1CS**	**14**	**39,578**	**191**	**154**
			(Op: EA1CS)	
***UT7GX**	**14**	**34,060**	**162**	**130**
***SQ3RX**	**7**	**11,808**	**76**	**72**
*SP5COR	*	384	12	12
***UXØLL**	**3.7**	**126,690**	**279**	**205**
***SA1A**	**3.7**	**420**	**15**	**14**
			(Op: SM1TDE)	
***SP5COF**	**1.8**	**6,095**	**59**	**53**

MULTI-OPERATOR SINGLE TRANSMITTER

UNITED STATES

WU3A	**5,579,466**	**2282**	**942**
WC6H	**4,183,700**	**2908**	**782**
AJ9C	**3,018,720**	**1878**	**760**
K9SD	2,954,310	1967	730
WX5S	2,683,004	1801	694
AJ5DX	**2,389,500**	**1704**	**675**
NU5F	2,381,886	1714	702
KD9ST	2,272,264	1713	647
WD4DDU	**1,480,820**	**1159**	**583**
WT4Q	**985,536**	**1153**	**464**
WX7P	**957,789**	**1202**	**483**
AB2DE	645,960	678	420
N7YX	598,689	682	387
NZ1U	372,654	398	309
KS2O	310,620	454	334
N2BZP	252,057	399	281
N2IC	227,417	507	277
W5LCC	188,325	394	243
WC8VOA	**179,967**	**382**	**239**
KK5I	111,930	264	195
N2NGW	91,290	227	170
KE3OM	**85,251**	**225**	**181**
4U1WB	52,920	157	126
N7VS	52,635	202	145
K8BSG	31,284	133	99
NJ4M	26,260	114	101
K8GC	3,698	48	43

NORTH AMERICA

KP2TM	**16,562,210**	**5555**	**1115**
V31RV	**13,335,276**	**4682**	**998**
HI3CCP	**12,235,885**	**4001**	**1033**
VE3RM	**11,072,760**	**3176**	**1060**
VO1MX	**11,053,064**	**3527**	**1012**
VA7OO	**5,716,746**	**2126**	**826**
VA3YP	3,141,912	1540	618
XE1CXC	**2,774,400**	**2143**	**578**
HR2RCH	**2,636,445**	**1998**	**595**
VA2TG	**707,256**	**586**	**423**
VE3CJ	519,840	570	360
TG7I	**183,111**	**432**	**201**

	AFRICA		
CQ9K	**24,878,978**	**5221**	**1319**
	ASIA		
5B/AJ2O	**19,708,493**	**4600**	**1141**
9K2HN	**11,201,996**	**3404**	**949**
RN9SXX	**5,025,514**	**1843**	**683**
RK9WZZ	4,535,968	1667	736
JI2ZEY	**1,918,329**	**1201**	**501**
UP9L	**1,598,454**	**920**	**486**
JU1DX	**1,045,512**	**1082**	**468**
BY4SZ	**421,473**	**627**	**303**
RK9CYA	94,164	195	133
BY1QH	86,516	261	172
BY8MA	23,736	122	86
	EUROPE		
OE4A	**14,967,480**	**4279**	**1265**
OM7M	**13,614,132**	**3818**	**1239**
TM6M	**12,075,456**	**3638**	**1154**
EI7M	**11,877,888**	**4114**	**1216**
HG1S	**9,886,044**	**3155**	**1127**
TM7F	7,991,704	2936	1036
DL2ARD	**6,581,565**	**2580**	**1035**
OH6ØBH	**6,437,960**	**3130**	**985**
RU1A	**6,146,724**	**2932**	**986**
LY4A	**5,953,092**	**2602**	**996**
UW9I	**5,480,783**	**2917**	**901**
ED3SSB	**5,452,165**	**2530**	**971**
TM8D	5,263,080	2297	915
OE9R	**4,998,456**	**2264**	**951**
9A3B	**4,182,123**	**2200**	**843**
M8C	**4,131,056**	**2241**	**856**
9A2W	3,203,662	1782	781
OH1ØA	3,181,054	1961	787
DA3X	2,735,330	1582	794
OL1C	**2,698,836**	**1566**	**722**
RK3DXW	2,511,852	1688	714
TM2B	2,504,150	1516	725
IQ5GR	**2,495,493**	**1508**	**693**
RO6F	2,356,965	1691	711
OL3Z	2,248,802	1388	713
SY9A	**2,232,895**	**2066**	**655**
OZ5ESB	**2,048,640**	**1448**	**660**
YZ5ØØA	**2,026,845**	**1513**	**617**
II3P	1,990,271	1414	661
AN1COZ	1,944,624	1194	638
ED2PFX	1,877,932	1378	658
4NØW	1,425,900	1145	582
SP9KDA	**1,201,560**	**1040**	**527**
S54K	**1,002,930**	**982**	**505**
OL7T	956,084	851	499
RW3WWW	885,725	962	499
F5KEE	790,704	841	456
AM2WW	759,857	996	511
MXØSSW	640,407	868	433
OE6XRK	599,340	668	420
ES1XQ	487,176	628	383
LY3V	378,780	564	354
SP3KCL	335,909	498	329
LA1B	**328,491**	**483**	**323**
YO8KGA	**306,830**	**474**	**305**
DLØKB	264,600	400	315
OL9S	254,916	428	291
M9Z	253,722	371	294
PA5W	**233,036**	**361**	**298**
RZ4CWW	231,176	391	296
DM3K	230,748	383	287
F1AMA	218,328	371	264
UR4PWC	**204,600**	**387**	**264**
MMØDQP	192,348	375	274
OZ7RJ	178,750	354	250
OM3RRC	145,770	303	215
OZ3RIN	72,446	217	178
YR1Z	63,019	239	187
GW6GW	**44,247**	**175**	**147**
EW2WW	**35,462**	**145**	**119**
CT7Z	**24,840**	**108**	**90**
TF6ØIRA	**7,906**	**80**	**67**
EW8ZZ	377	13	13
	OCEANIA		
KH7X	**17,357,548**	**4490**	**1058**
9M6DXX	**7,179,140**	**2789**	**829**
VK4WR	**1,735,120**	**1118**	**529**
YBØZC8/1	**1,601,882**	**1015**	**502**
DX1L	**1,412,887**	**1027**	**383**
ZL1AA	**1,340,961**	**1071**	**443**
AX6ANC	**1,330,950**	**1003**	**467**
DX1DBT	298,480	495	208
	SOUTH AMERICA		
PS2T	**21,047,250**	**4989**	**1330**
LR2F	**14,086,400**	**3783**	**1136**
ZY7C	13,891,896	3763	1098
ZX3S	5,842,989	2178	873
PQ7Q	1,738,930	1008	530
LU8XW	1,247,208	797	471
LU7YZ	1,228,752	858	504
XR45TA	**448,290**	**513**	**306**
CE2LS	396,738	511	279
LU4DQ	246,985	370	235

MULTI-OPERATOR TWO TRANSMITTER

UNITED STATES

KD4D	**14,535,521**	**4618**	**1183**
KI1G	**13,541,275**	**4233**	**1201**
WE3C	13,117,104	3911	1183
NX6T	**10,225,743**	**4642**	**1041**
WR3Z	7,855,523	3272	1027
AA5NT	**4,101,408**	**2740**	**808**
W5WMU	2,882,418	2088	714
NG3U	1,690,134	1251	606
NM1JY	1,169,595	1013	553
NC7M	**1,139,514**	**1085**	**537**
NE3MD	366,398	587	334
K2VK	**157,842**	**301**	**237**
WØEF	**73,809**	**209**	**177**

NORTH AMERICA

V47KP	**10,941,464**	**3899**	**1018**
VE6FI	**3,999,522**	**2015**	**694**
J75RZ	**1,822,400**	**1544**	**536**

ASIA

B7P	**3,879,876.00**	**2463**	**714**

EUROPE

OF6AA	**9,362,465**	**4046**	**1085**
DD5FZ	**8,204,796**	**3040**	**1044**
LX8M	**7,081,911**	**2990**	**999**
EA5DFV	**6,219,072**	**2865**	**944**
SX5P	**3,686,100**	**2465**	**825**
G4UJS	**3,430,202**	**1798**	**778**
ED4URH	1,876,408	1576	632
IR6T	**1,618,504**	**1183**	**614**
SZ1A	**1,492,006**	**1453**	**607**
9A7P	**570,852**	**669**	**404**

OCEANIA

4H5ØO	**1,450,885**	**1065**	**355**

SOUTH AMERICA

HC8N	**46,791,472**	**9063**	**1456**

MULTI-OPERATOR MULTI-TRANSMITTER

UNITED STATES

NQ4I	**16,512,034**	**6062**	**1253**
NR6O	**9,929,400**	**4852**	**1005**
NX5M	**9,692,375**	**5282**	**1045**
WX3B	**7,975,101**	**3846**	**1041**
NK7U	**7,520,352**	**3874**	**992**
NE1C	**6,409,578**	**3022**	**987**
KC2NMZ	**628,326**	**780**	**402**
W9VT	**164,502**	**326**	**222**

NORTH AMERICA

J6DX	**21,416,646**	**6572**	**1198**
VE5RI	**2,770,416**	**1648**	**594**

ASIA

UP5G	**10,689,840.00**	**3416**	**945**
JE1ZWT	**6,177,387.00**	**2389**	**811**
BPØP	**914,064.00**	**1128**	**411**
RKØAZC	**29,200.00**	**86**	**73**

EUROPE

DR1A	**25,586,050.00**	**7538**	**1435**
OT6A	**21,416,636.00**	**6202**	**1369**
LZ9W	**18,253,774.00**	**5695**	**1298**
LY7A	**8,923,080.00**	**3867**	**1060**
OL7R	**8,170,499.00**	**2903**	**1091**
DL1QQ	8,125,689.00	3658	1023
DP9I	5,148,430.00	2773	931
G6M	**3,825,924.00**	**1983**	**831**
SF6D	**1,536,598.00**	**1219**	**574**

SOUTH AMERICA

PY5JO	**78,029.00**	**181**	**157**

CHECKLOGS

The following logs were used for cross-checking. Checklogs and SWL logs are always appreciated: 4X4REM, 4Z5MU, 9A3GX, AB8WC, AN5GMA, BG4BTB, CT1DOL, DEØWAF, DK4WF, DL1ARD, DL1DTC, DL2AL, DL5DWW, DL5MG, DL8UNF, EA3BJM, EA3CHZ, EA5BK, EA5QB, F5IN, G3NXT, G3VQO, GM3YOJ, HA1SN, HSØZDR, IKØOTJ, ISØLLJ, IV3BKH, IZ4DZD, IZ8EYQ, JJØAEB, KB9WQJ, KD8AX, KE3D, KM2E, LA2OKA, LA9TJA, LU3MAM, N88JQ, OH6XX, OH8JT, OK1FHI, OK1GS, OK2EQ, OK2YN, OK2ZW, OK7RJ, OL5Q, OM2FY, ON5ZYZ, OZ1FAO, PAØJED, PJ4/KG9QX, PR7AYE, RA1ACY, RA1ZI, RA1ZM, RA3AMG, RA3DNC, RA3EG, RA3WNS, RA6YY, RA9DZ, RA9UN, RD4HF, RKØUT, RK9JYY, RL3AF, RL3FA, RN3FT, RN4AK, RN6LG, RU3EJ, RU4WE, RVØST, RV1CB, RV3DUT, RV9MF, RW3DY, RW4FX, RW9CB, RW9UNT, RX3MA, RZ6HF, SA2Z, SN5Z, SP3BLT, SP3BVA, SP3CGK, SP3E, SP4KDX, SP5ECC, SP5GDY, SP5VYI, SP6CZ, SP6M, SP7TEX, SP7XK, SP9AUV, SP9CVY, SP9ODY, SV8CS, TM9R, UAØCA, UA1AKE, UA3AAJ, UA3SFP, UA4HUR, UA9CSA, UA9JLL, UA9YF, URØUL, UR3IJI, UR4UGL, US6IKV, UT4EK, UUØJC, UX1IL, VE3IQ, W1BJ, W6RK, WDØK, YC3BMW, YO2MAX, YO4BEX, YO4CSL, YO6EZ, YO7BA/P, YO8DHD, YO8GF, YO9BHI, YU7AJM,

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Here's a look at articles we're working on for upcoming issues of *CQ:*

- *CQ* Market Survey: VHF/UHF FM Mobile Rigs, by Gordon West, WB6NOA
- "The 'Killer Watt' Bags QRP's Ultimate Certificate," by Dennis Lazar, K4KLQ
- "160 Meters: A Great Place to be for the Next Couple of Years, Part 2," by Carl Luetzelschwab, K9LA

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