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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

JANUARY 2009

CQ

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On the Cover: Broadcaster, Contester, Cancer Fighter John Kanzius, K3TUP, at his winter home in Sanibel, Florida. See interview, p.13.

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RC-D710

The RC-D710 is a standalone 1200/9600 bps TNC with APRS firmware and now including SmartBeaconing™ Technology

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TM-G707A

TM-V7A

TM-D700A

With the supplied accessories the RC-D710 is a full upgrade to the TM-V71A. The TM-V71A will have full functionality of the TM-D710A by exchanging the TM-V71A panel with the RC-D710.

This is where it gets interesting!

PG-5J connection kit makes the RC-D710 a complete standalone APRS/TNC for your current radio. This option allows connectivity with previous and current Kenwood models* as an external modem.

**Compatible models include: TM-D710A / TM-V71A / TM-D700A / TM-G707A / TM-V7A / TM-733A / TM-255A / TM-455A*
SmartBeaconing™ from HamHUD Nichetronix

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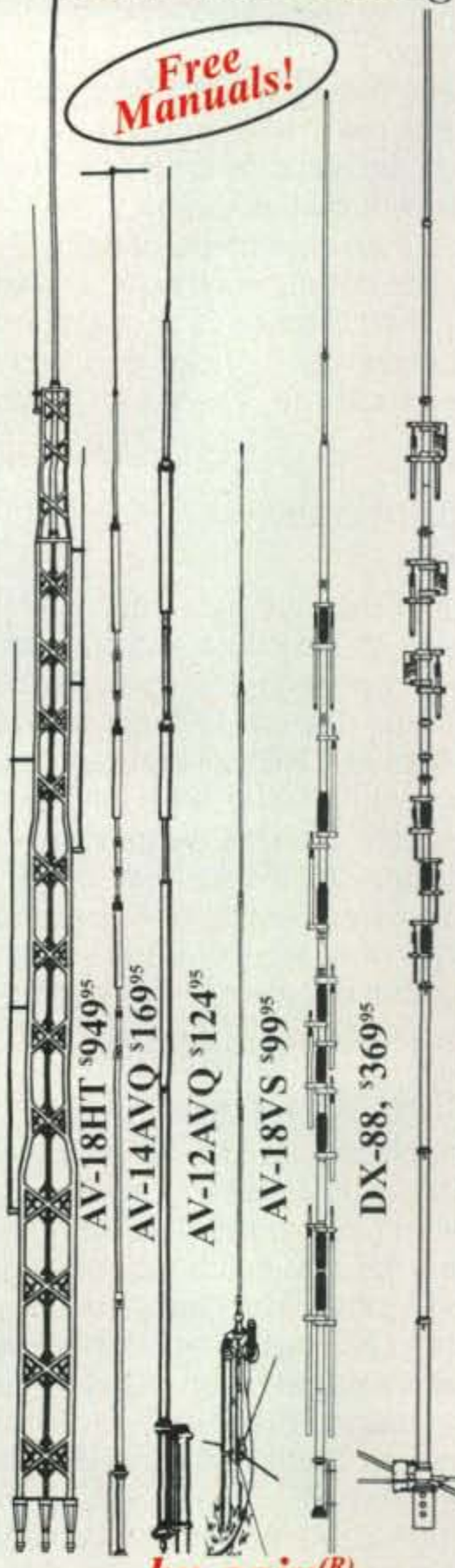

hy-gain(R) Classics

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, $949.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

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

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

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

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, $199.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs.

No ground radials required! Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$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 160-6 Meters Self-Supporting Vertical

Full 1500 Watts, 43 feet, includes base mount

New! AV-6160

$399.95 UPS SHIPPABLE

Operate all bands 160-6 Meters at full 1500 Watt with this self-supporting, 43 feet high performance vertical! It assembles in less than an hour and its low profile blends in with the sky and trees -- you can barely see it . . .

Exceptional Performance

The entire length radiates to provide exceptional low angle radiation 160-17 Meters and very good performance on 15-6 Meters. You can shorten it by telescoping it down for more effective low angle radiation on higher bands.

Just talk with automatic tuner!

An automatic or manual antenna tuner at your rig or your rig's internal auto-tuner easily matches this antenna for all band 160-6 Meters operation. There's no physical tuning adjustments on the antenna -- you simply put it up!

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than 1/2 dB with good quality, low-loss coax).

Extremely low wind loading

With just 2 square feet wind load, the AV-6160 has the lowest wind-loading and lowest visibility of any vertical antenna! The key is a nine foot section of 1/8" diameter *stainless steel* whip that flexes in strong wind instead of stressing the bottom sections. Its 2-inch O.D.and .120 inch thick walled tubing bottom section makes it incredibly strong.

Just 20 lbs., uses super-strong *6063 aircraft aluminum tubing.* Stainless steel hardware.

Assembles in an hour

Ground mounting lets you hide antenna base in shrubbery. Requires ground system -- at least one radial. More extensive ground work better.

Stealth Operation

Low profile. Use as flagpole, hide behind trees, fences, buildings, bushes. Easily telescopes down during the day.

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Prices and specifications subject to change without notice or obligation. ® Hy-Gain®, 2009.

CQ Buys WorldRadio Magazine

CQ Publisher Dick Ross, K2MGA, and *WorldRadio* publisher Armond Noble, N6WR, jointly announced in November that CQ Communications, Inc. had purchased *WorldRadio* and would be converting it to an online magazine. Noble said that, at age 74, the time had come to retire and he offered the magazine to CQ because "I wanted to be sure that *WorldRadio* found a good home and that our readers would continue to be served by an independent voice in amateur radio." Ross said that *WorldRadio* Editor Nancy Kott, WZ8C, would continue to edit the online edition, and that *WorldRadio* print subscriptions would be converted to *CQ* subscriptions. Details on subscription conversions are in the January issue of *WorldRadio* (still in print form) and on the CQ website at <http://www.cq-amateur-radio.com>.

IBM Gets Into BPL

Broadband over Power Lines, or BPL, got a big boost in November with IBM's announcement that it had set up a partnership with a small BPL provider to try to bring high-speed internet access to rural America over power lines, according to various news reports. Early BPL systems generated RF hash across the high-frequency (HF) spectrum, causing interference with hams and other shortwave radio users. ARRL Laboratory Manager Ed Hare, W1RFI, the League's resident expert on BPL, told the *ARRL Letter* that the system used by IBM's partner, International Broadband Electric Communications (IBEC), does not operate in the ham bands, so interference to amateurs is unlikely. In addition, said Hare, an IBEC staff member who is also a ham is a member of the ARRL's Electromagnetic Compatibility Committee. The IBM/IBEC plan is initially to sign up rural electric cooperatives in seven states for the service, rather than trying to compete with established broadband providers in urban and suburban areas. It is reported that 86% of the customers served by the cooperatives in the first part of the plan currently do not have the option of purchasing broadband connections from cable or phone companies.

PAVE PAWS Mitigation Enters Third Round

The FCC is making contact with the licensees of some 40 repeaters on the 70-centimeter band that have been identified as causing interference to an Air Force "PAVE PAWS" radar system in California. PAVE PAWS helps detect water-launched missiles and is in constant use on the 440-MHz band. According to the *ARRL Letter*, repeater owners will be provided with operating parameters that Air Force engineers have determined will eliminate or significantly reduce the interference from their systems, and will be expected to implement the changes as quickly as possible. The military is the primary occupant of the 70-centimeter band. Amateur radio's allocation there is secondary, and amateur stations may not cause interference to the primary occupants.

Aurora Rocket Research Planned

A professor at Oslo's Institute of Physics was planning to launch a sensor-filled rocket into the northern lights in late November or early December, trying to determine why airplanes flying through the auroral zone sometimes lose HF radio communications for several hours at a time. According to *Science Daily*, Professor Jóran Moen hoped to measure the electric fields and waves of the northern lights, as well as particles of low and high energy and fine structures in the electronic clouds of the aurora. As many hams already know, intense auroras can shut down HF communications while enhancing VHF communications. Professor Moen wants to find out *why*.

Garriott Says Thanks to Hams

Space tourist and video-game developer Richard Garriott, W5KWQ, said it was "an unexpected joy" to contact so many enthusiastic hams during his recent flight aboard the International Space Station. In a message delivered to AMSAT by his father, former astronaut and first ham-in-space Owen Garriott, W5LFL, Richard said, in part:

"On my recent flight I had the great opportunity to speak directly with and trade callsigns with hundreds of hams around the globe. For me it was an unexpected joy to find so many enthusiastic hams, who were so well informed and interested in my activities in orbit… By late in my flight I had contacted many hundreds of hams by voice and I have good records of these contacts… I also contacted many hams who had listened to or contacted my father from space 25 years ago… I can only hope that you enjoyed it as much as I did. Thanks so much and 73, Richard, W5KWQ."

NASA Finds "Magnetic Portals" Between Sun and Earth

Approximately every eight minutes a "portal" opens between the magnetic fields of the sun and the Earth, allowing the transfer of tons of high-energy particles before it closes again. Those are the findings of two groups of satellites, NASA's five THEMIS craft and the European Space Agency's four Cluster satellites, presented recently at the 2008 Plasma Workshop in Huntsville, Alabama. According to NASA, these energy transfers are called Flux Transfer Events, or FTEs, and represent important conduits of energy for Earth's magnetosphere. The impact of these transfers was not discussed in the NASA news story.

NASA Searching for New Meteor Showers

A new computer-controlled camera at NASA's Marshall Space Flight Center is detecting previously unknown meteor showers and automatically sending e-mails to researchers, telling them to come look at what it saw! The all-sky Sentinel camera was designed at the University of Western Ontario and has been modified by NASA for its studies. What the camera has found so far is that the so-called "September Perseids"—a minor shower appearing to originate from the constellation Perseus—isn't so minor after all. In the skies over Huntsville, Alabama this past September 9, the camera recorded more than two dozen fireballs brighter than Jupiter and Venus, some even casting shadows, according to NASA. A second camera has been added to try to determine the actual points of origin of the meteors that are detected. For more on this, see this month's "VHF Plus" column elsewhere in this issue.

Spanish Hams Get Brief Band Expansions on 160

Spain's national ham radio organization reports via the *ARRL Letter* that the country's regulatory authority is giving hams there temporarily expanded access to 160 meters during certain events. According to the report, Spanish hams were permitted to operate on 1810–1830 kHz and 1850–2000 kHz during the 2008 CQ World-Wide DX Contest, and will be allowed to do so again during the 2009 ARRL and CQ 160-meter contests as well as the 2009 King of Spain Contest. Hams in Spain were also granted temporary access, until April 25, 2009, to experimental areas on the 4-meter band, between 70.150 and 70.200 MHz.

(Continued on page 8)

FlexRadio Transceivers

Fully Software Defined Radios (SDR)

Made In the USA

Introducing the FLEX-3000... Superb Performance Priced for the Budget Minded

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FLEX-3000™

100 Watts 160-6m - Great for home or travel - General coverage receiver - High resolution, real time 96 KHz panadapter - Single Firewire connection - Computer required - ATU standard - High-end performance - Weighs only 7 lbs

Introductory price

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FLEX-5000A™

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The Ultimate SDR.

HF/6M 100W transceiver - Unmatched flexibility - Fully software defined using the incomparable *FlexRadio* PowerSDR™ Software - Full performance 2nd receiver option - 192 kHz real time, high resolution display - Computer required - The only radio with dual receiver displays - Optional transverter - Optional antenna tuning unit

FLEX-5000C™

Integrated Computer.

All in one SDR Solution - Same amazing radio as the FLEX-5000A - Just requires a monitor - Intel Core 2 Duo - Windows XP Pro installed - DVI interface - 1 Gigabyte of RAM - 160 Gigabyte hard drive - Wireless keyboard and mouse - Requires 13.8V DC - Internal speaker 7 watt audio amplifier - Optional transverter - Optional antenna tuning unit

More features and performance than any other amateur radio at any price

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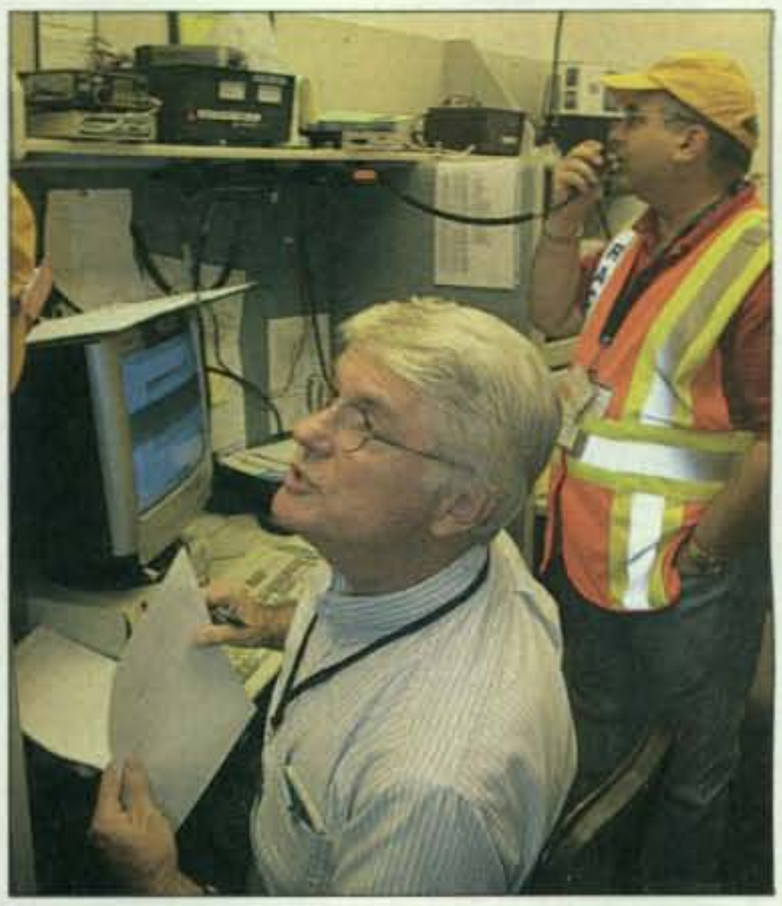
features

Vol. 65 No. 1



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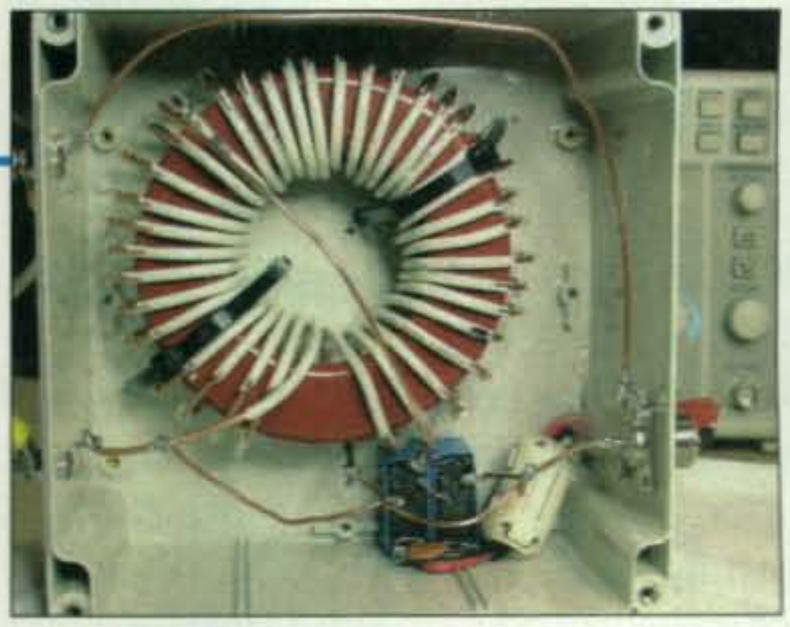

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departments

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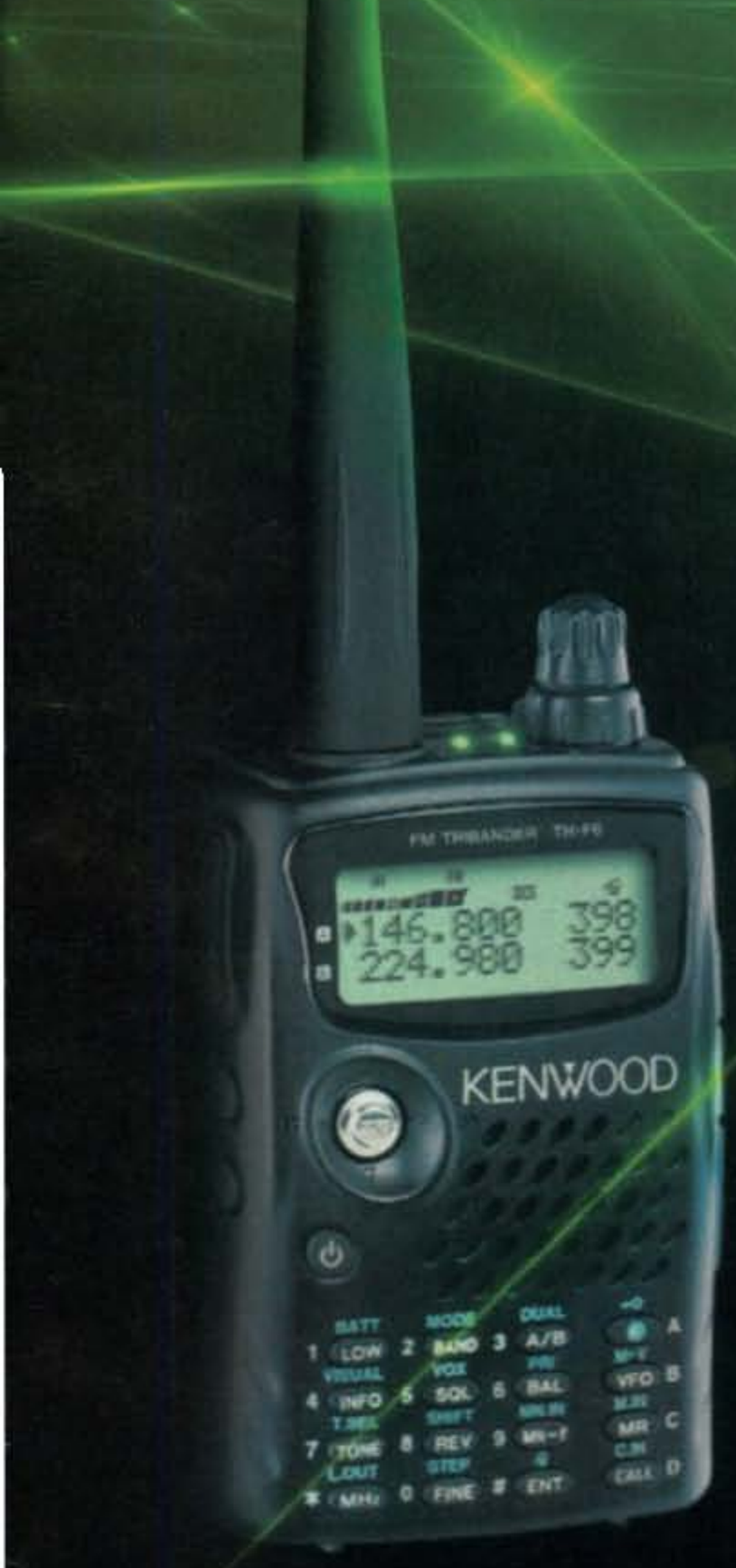
Listen to the Future

AIRWAVE SUPERIORITY

Never before has a compact HT offered as many features, and such high powered performance as the TH-F6A. Arm yourself with one today and gain your own airwave superiority.

- Triband (144/220/440 MHz)
- Receives 2 frequencies simultaneously even on the same band
- 0.1~1300MHz high-frequency range RX (B band)[1]
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

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



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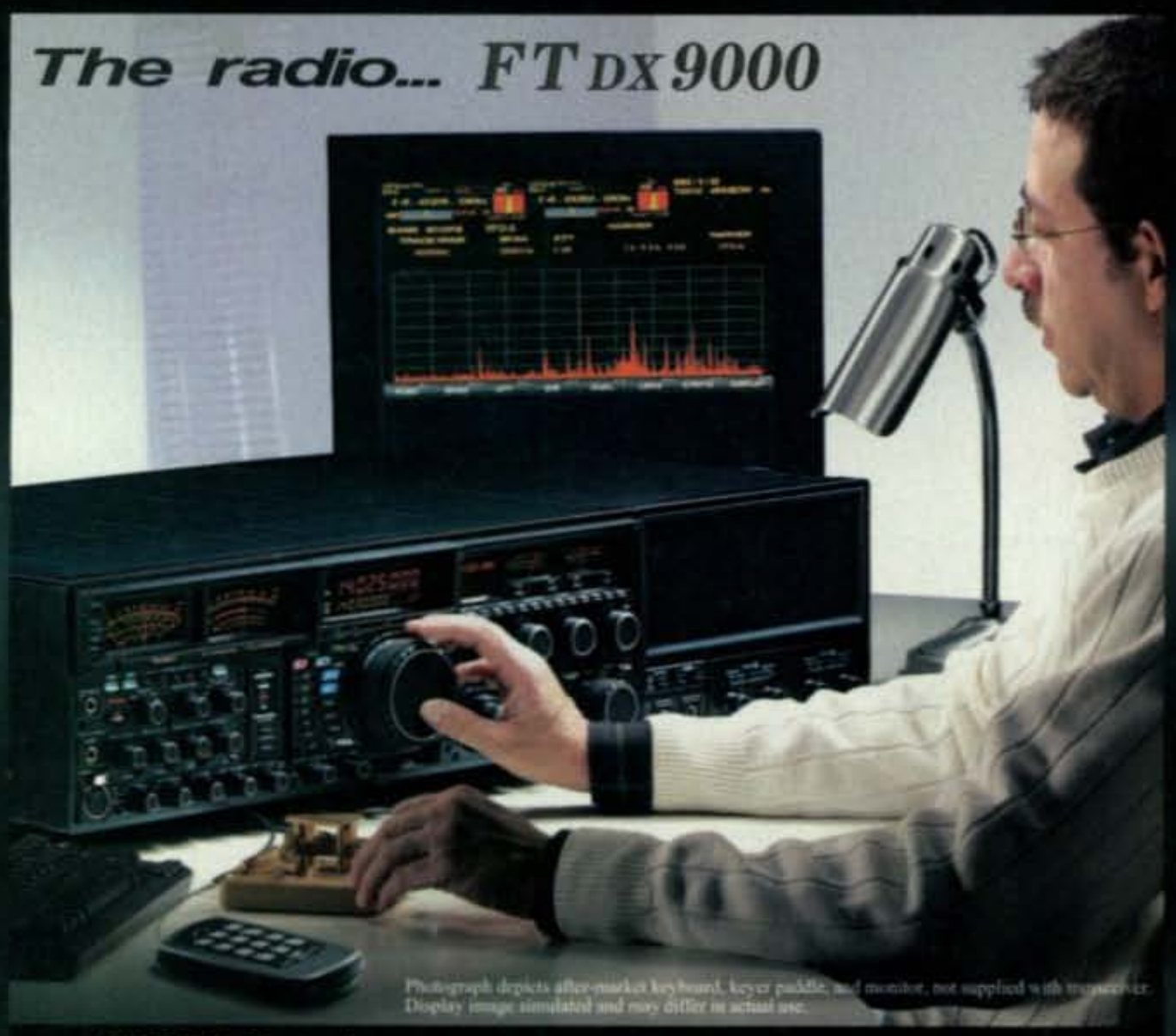

Photo-graph depicts after-market keyboard, keyer paddle, and monitor, not supplied with transceiver. Display image simulated and may differ in actual use.

HF/50 MHz Transceiver
FT DX 9000MP
Two Pairs of Meters, plus LCD Window; Data Management Unit and Flash Memory Slot Built In. Main/Sub Receiver VRF, plus Full Dual Receive Capability. External 50 V/24 A Switching Regulator Power Supply and Speaker with Audio Filters

Display color (Umber or Light Blue) may be selected at the time of purchase. Modification from 400 to 200 W not possible.

HF/50 MHz Transceiver
FT DX 9000D 200 W Version
Large TFT, Data Management Unit and Flash Memory Slot Built In. Main/Sub Receiver VRF, plus Full Dual Receive Capability. Three μ-Tuning Modules for 160 - 20 M. 50 V/12 A Internal Switching Regulator Power Supply

HF/50 MHz Transceiver
FT DX 9000 Contest
Custom-Configurable Version
Two Pairs of Meters, plus LCD Window, VRF Input Preselector Filter, Three Key Jacks, and Dual Headphone Jacks. 50 V/12 A Internal Switching Regulator Power Supply

Display color (Umber or Light Blue) may be selected at the time of purchase. Modification from 200- to 400-Watt version not available.

Loaded with Leading-edge Performance Capabilities. . .
The First Triumph in the 2nd Generation of the FT DX 9000 Lineage:
The Powerful FT-2000!

Shown with after-market keyboard, and monitor (not supplied).
Optional Data Management Unit (DMU-2000)

HF/50 MHz Transceiver
FT-2000D
200 W Version (External Power Supply)

HF/50 MHz Transceiver
FT-2000
100 W Version (Internal Power Supply)

"The Best of the Best Just Got Better"

Introducing the new FT DX 9000 Series with PEP-9000 and FT-2000 Series with PEP-2000 (Performance Enhancement Program)
Contact Dennis Motschenbacher K7BV at k7bv@vxstdusa.com for details

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

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

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Introducing the Yaesu FT-950 transceiver for DX enthusiasts
Superb receiver performance
Direct lineage from the legendary FT DX 9000 and FT-2000

HF/50 MHz 100 W Transceiver

FT-950

- Triple-conversion super-heterodyne receiver architecture, using 69.450 MHz 1st IF
- Eight narrow, band-pass filters in the RF stage eliminate out of band interference and protect the powerful 1st IF
- 1st IF 3 kHz Roofing filter included
- High-speed Direct Digital Synthesizer (DDS) and high-spec Digital PLL for outstanding Local Oscillator performance
- Original YAESU IF DSP advanced design, provides comfortable and effective reception. IF SHIFT / IF WIDTH / CONTOUR / NOTCH / DNR
- DSP enhancement of Transmit SSB/AM signal quality with Parametric Microphone Equalizer and Speech Processor
- Built-in high stability TCXO (±0.5 ppm after 1 minute@77 ° F)
- Built-in automatic antenna tuner ATU, with 100 memories
- Powerful CW operating capabilities for CW enthusiasts
- Five Voice Message memories, with the optional DVS-6 unit
- Large Multi-color VFD (Vacuum Fluorescent Display)
- Optional Data Management Unit (DMU-2000) permits display of various operating conditions, transceiver status and station logging.
- Optional RF μ -Tune Units for 160 m, 80/40 m and 30/20 m Bands

Optional External Data Management Unit (DMU-2000) Provides Many Display Capabilities

Shown with after-market keyer paddle, keyboard, and monitor (not supplied).

COMPACT HF/50 MHz TRANSCEIVER WITH IF DSP

A superb, compact HF/50 MHz radio with state-of-the-art IF DSP technology configured to provide YAESU World-Class Performance in an easy to operate package.

New licensees, casual operators, DX chasers, contesters, portable/field enthusiasts, and emergency service providers - *YAESU FT-450...This Radio is for YOU!*

HF/50 MHz 100 W All Mode Transceiver

FT-450 Automatic Antenna Tuner ATU-450 optional

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

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

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

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

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announcements

2009 Nominations 2009 Dayton Hamvention® Awards: Deadline for nominations for the 2009 Amateur of the Year, Special Achievement, and Technical Excellence Awards is February 18. All amateur radio operators are eligible and the winners will be announced at the Hamvention®, May 15–17. Documentation that informs the Awards Committee of a candidate's accomplishments may include magazine articles, newsletters, newspaper clippings, and videos. Additional details on the awards and a nomination form are available on the Hamvention® website. Nominations also will be accepted via mail to Dayton Hamvention® Awards, PO Box 964, Dayton, OH 45401.

Straight Key Century Club Third Anniversary Special Event Station K3Y: 0000Z January 1 to 2359Z January 31 on 1.820, 3.550, 7.055, 10.120, 14.050, 18.080, 21.050, 24.910, 28.050, 50.090, and 144.070 MHz. All K3Y ops will be using straight keys, cootie keys, or bugs. For QSL mail QSL and SASE to Dan Rhodes, KA3CTQ, 5408 Chillingham Place, Frederick, MD 21703. Working all ten call areas will earn the operator a certificate with SASE. For details: <www.skccgroup.com>.

The following hamfests, etc., are scheduled for January and early February:

Jan. 3, **18th Annual Morristown Hamfest**, Smoky Mountain Expo Center, White Pine, Tennessee. Contact June McClary, AI4SO, e-mail <ai4so@hughes.net>. (Talk-in 147.030+; exams 11 AM)

Jan. 3, **West Allis RAC Midwinter Hamfest/Swapfest**, Waukesha Co. Expo Center Forum, Waukesha, Wisconsin. Contact Phil Gural, W9NAW, phone 414-425-3649, or visit <www.warac.org>. (Exams 9–11:15 AM at AMF Waukesha Lanes across from Expo)

Jan. 17, **NCARC Winter Superfest**, Lincoln Center, Fort Collins, Colorado. Contact Matt Kassawara, KGØW, e-mail: <kg0w@arrl.net>, phone: 970-433-2123. (Talk-in 145.115 –/100 Hz; exams)

Jan. 17, **Southeast Louisiana ARC Hammond Hamfest**, University Center of SLU campus, Hammond, Lousiana. Contact Tyrone Burns, N5XES, e-mail: <n5xes@arrl.net>; phone: 985-351-8315; <www.selarc.org/selarchamfest>. (Exams 9:15 AM)

Jan. 18, **Hazel Park ARC Hamfest**, Hazel Park High School, Hazel Park, Michigan. Contact WD8S at e-mail: <WD8S@comcast.net>; phone: 248-399-7970; <www.hparc.org>. (Talk-in 146.640 [100 Hz PL])

Jan. 31, **Lockport ARA Hamfest**, South Lockport Firehall, Lockport, New York. Contact Dan Caswell, N2OBX, e-mail: <caswelld@verizon.net>; <http://lara.hamgate.net>. (Talk-in 146.820 [107.2 PL])

Feb. 1, **Northern Ohio ARS Winter*Ham*Fest**, Gargus Hall, Sheffield, Ohio. Contact Darlene Ohman, KA8VTS, e-mail: <dfohman@att.net>; phone: 216-398-8858; <http://www.noars.net/>. (Talk-in 146.70/10)

ham radio news *(from page 2)*

FCC Responds Quickly to ARRL Objection

An experimental license trying to determine the feasibility of using various HF frequencies to deliver digital radio broadcasting to Alaska was modified by the FCC the day after the ARRL complained it would cause significant interference in the 40-meter amateur band. The experimental license to Digital Aurora Radio Technologies (DART) originally authorized digital transmissions over a 500-kHz segment from 7.1–7.6 MHz, including the top 200 kHz of the 40-meter ham band. The ARRL filed objections and the following day, the FCC revised the license to permit transmissions only from 7.3–7.6 MHz.

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.

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Specifications

Frequency:
1.8 ~ 28MHz all amateur bands including WARC bands
Mode:
SSB, CW, RTTY
RF Drive:
75 ~ 90W
Output Power:
SSB 600W PEP max.
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Final Transistor:
SD 2933 x 4
(MOS FET by ST micro)
Circuit:
Class AB parallel push-pull
Cooling Method:
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Multi-Meter:
Output Pf 1kW, Reflected Power 100W, Drain Voltage Vd 60V, Drain Current Id 50A
Input/Output Connectors:
Type M-J (UHF SO-239)
AC Power:
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Weight:
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Specifications

Frequency:
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Mode: SSB(A3E), CW(A1A), FM(F3E)
RF Output Power:
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RF Drive Power: 5W max.
DC Power: DC 13.8V, 8.5A max.
In/Out Impedance: 50Ω
In/Out Connectors: SO-239
Major Circuits and Functions:
1. Class AB wide band linear power amp
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4. LED meter for indicating transmitting power level
5. Send-receive switching remote terminal
6. ALC
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Spare fuse 10A x 2
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– a CQ editorial

zero bias

BY RICH MOSESON,* W2VU

Endings and Beginnings

January, as you probably know, is named for the Roman god Janus. As the patron of beginnings and endings, he is often depicted as looking backwards and forwards at the same time. This is an appropriate theme for this month, since we are not only starting a new year but a new chapter for *CQ* and for amateur radio magazines. Plus, of course, as Janus reminds us, every new beginning also represents an ending of something else.

WorldRadio

As you may have read on our website or elsewhere, we announced in November that our parent company, CQ Communications, Inc., has purchased *WorldRadio* magazine from its former publisher, Armond Noble, N6WR, who has decided to retire. Within the next couple of months, we will be converting *WorldRadio* from a print publication to an online publication. Editor Nancy Kott, WZ8C, will continue at its helm. So, while the print magazine that has been familiar to its readers for more than 38 years will be ending, we are looking forward to its new beginning as a fully-online magazine, right at the leading edge of the magazine publishing industry.

Our plan is to make the online version of *WorldRadio* freely available, with its subscribers receiving *CQ* magazine as well (details of *WR*-to-*CQ* conversions are on our website at <http://www.cq-amateur-radio.com/WorldRadioConver.html>). Our current plan is to produce the magazine in .PDF format, making articles readily available for either reading online or for downloading and printing, whatever your preference. We will also set up an e-mail list (similar to the CQ e-news list) that will alert readers when the next issue is available and provide highlights of each issue's contents. This is an exciting time for us, and while there will most certainly be some technical glitches along the way—since we'll be learning the process as we go along—we are looking forward to both the challenges and opportunities that this new beginning for *WorldRadio* represents.

Of course, this month also marks the beginning of a new administration in Washington. It remains to be seen how ham-aware and ham-friendly the new President will be, or how his administration's policies play out at the FCC. Generally speaking, though, amateur radio is far enough down the priority list that it rarely even appears on the presidential radar. It only appears on the FCC commissioners' radar when we start making noise about something … such as the Commission's apparent abandonment of amateur radio enforcement efforts after the retirement of Riley Hollingsworth, K4ZDH, last July. It is something we need to keep making noise about until there is action.

Enforcement Follow-up

The early feedback from last month's editorial calling on the FCC to get back into the amateur radio enforcement business and to quickly name a successor to Hollingsworth has been quite interesting, and mostly positive. Some readers have pointed out that Riley's efforts resulted in very few actual license revocations, massive fines, etc., as opposed to "negotiated settlements" in which people agreed to change their behavior or stay off certain bands for a set period of time rather than facing long and drawn-out proceedings that accompany formal enforcement actions. They saw this as evidence of ineffectiveness. We disagree. The goal here was not so much to punish people for breaking the rules as to get them to change their behavior and to once again become respectable, law-abiding members of the amateur community. In that regard, Riley was incredibly effective, since behaviors did change and the instances of "things I wouldn't want my kids to hear" on the ham bands dropped off dramatically. Unfortunately, much of that has returned in the face of the Commission's failure so far to name a successor. We remain concerned that without a public face to connect with amateur enforcement, and particularly with the complete absence of amateur enforcement actions, or even "call me to talk" letters, all the improvements we have seen in the past ten years will quickly be lost.

Back to Janus

Before we leave Janus behind for another year, I want to mention a couple of additional endings and beginnings in the *CQ* "family." CQ RTTY Contest Director Glenn Vinson, W6OTC, has turned the reins of our two radioteletype competitions over to Ed Muns, WØYK. In his eight years at the helm, Glenn has guided the growth of the CQ WW RTTY DX Contest and the CQ WW WPX RTTY Contest into the world's most popular RTTY events. We thank Glenn for his service and his dedication to RTTY contesting. Ed is a championship RTTY contester himself. He's a retired computer engineer and now works full-time running the California vineyard he started in 1998. We look forward to working closely with Ed. It should be noted that Glenn's original plan was to turn the contests over to Paolo Cortese, I2UIY, who had been his co-director for the past several years, a plan that was short-circuited by Paolo's untimely passing last October. We also thank Ed for stepping in to fill the resulting void.

Finally, "Weekender" editor Phil Salas, AD5X, has decided he would like to devote more time to operating than to tinkering, especially as the new sunspot cycle starts showing some signs of life, so this month's column is his last. We would like to continue the "Weekender" column, as homebrewing is not only a ham radio tradition but an activity that takes on greater importance in a bad economy. If you, or someone you know, is an inveterate tinkerer who not only can come up with simple, useful weekend projects, but can also write about them clearly and succinctly, we'd like to hear from you.

All the best to you and yours for a happy and healthy new year from all of us here at *CQ*. 73, Rich, W2VU

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

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Control Cable Conductors	**8**
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Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
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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**
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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**
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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.**

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You may have already heard of John Kanzius and the potential cancer cure he developed at 3 o'clock one morning using his ham radio equipment and his wife's pie plates. However, you may not be familiar with the John Kanzius who saved RCA from a slew of lawsuits in the 1950s or K3TUP the big-gun contester. We have all that and more in this month's CQ Interview...

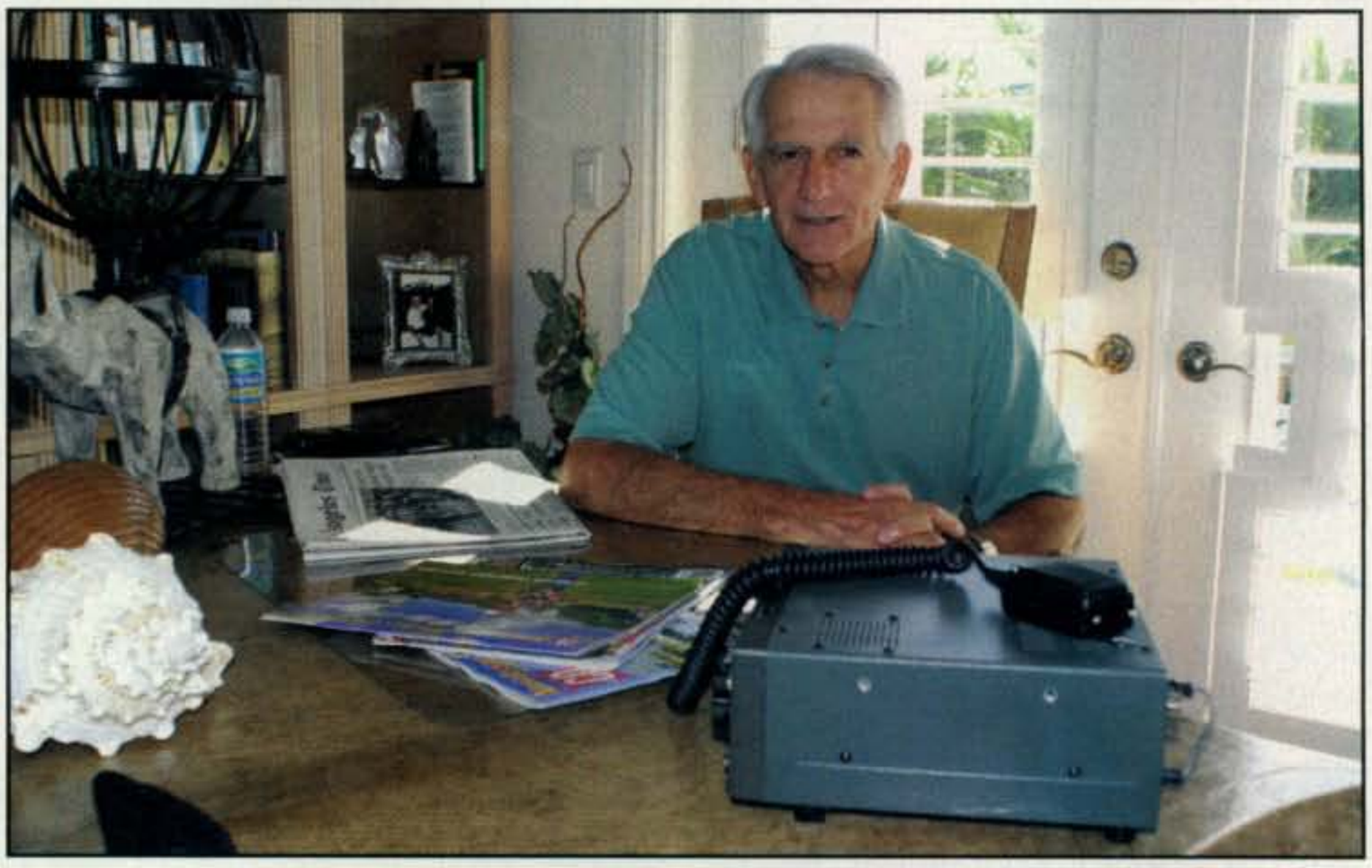
CQ Interviews:

John Kanzius, K3TUP "Always Pushing the Envelope"

BY RICH MOSESON,* W2VU

When I spoke with John Kanzius this past January, he was waiting for a *60 Minutes* crew to come talk with him for a piece that aired nationwide in April. He'd already been in newspapers all over the country. In fact, he first came to our attention about two years ago, when *Reader's Digest* listed him among "America's 100 Best" for 2006, under the category of "best brainstorm"—a totally new approach to fighting cancer.

In case you've missed all of this, here's the main story: John, a retired broadcast executive and K3TUP, was diagnosed with a rare form of leukemia soon after his retirement in 2002. After suffering through multiple rounds of chemotherapy, and watching kids with cancer do the same, he had a brainstorm at 3 o'clock one morning—figure out a way to "tag" cancer cells with metallic particles that would heat up in the presence of a strong RF (radio frequency) field and kill the cancer cells while leaving nearby healthy cells unaffected. The metal particles, he explained, essentially act as receiving antennas for the RF energy. He cut up some of his wife's pie plates to use as chassis, raided the freezer for some hot dogs, and headed to the ham shack, where he tried a crude experiment ... that worked. His method, now refined, has been published in the journal *Cancer*[1], and is undergoing tests at two major medical centers with promising results. Oh, and in the process, he may have discovered a way to use the same method to get energy out of salt water, one of the most abundant resources on the planet.



John Kanzius, K3TUP, at his winter home in Florida. John's 100-watt transceiver and 33-foot vertical there keep him on the air, but with a different perspective from when he had a contest superstation at his Erie, Pennsylvania QTH. (Photo by Larry Mulvehill, WB2ZPI)

But there's more to John's story, especially from a ham radio perspective. So, to steal a line from *The Sound of Music,* we'll "start at the very beginning (it's a very fine place to start...)." And as is so often the case, it started with ham radio...

Field of the Future

"I got my ham license back in 1959, I believe," John told us, "and my dad (Sil Kanzius, W3NRE, licensed in 1933) thought at that time that electronics would be the field of the future to get involved with, and I liked building transmitters and receivers and so forth. I

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

John in his contest station back in 1990 when he was profiled in CQ by Contest Editor John Dorr, K1AR.

always liked transmitters. I went to two years of a technical school for electronics, got a job at RCA, and was the first person at RCA who actually got accepted into their engineering department for AM and FM, TV—their whole band of television transmitters—without a degree."

There's a story there, of course, and it has to do with his ham skills, of course…

"I was assigned to work with Ralph Harmon, who RCA hired (away from) Westinghouse broadcasting, on a differential phase problem," John explained. "A differential phase was occurring on the high channels of the new RCA transmitter lines, and what happens with differential phase is the color shifts from red, or from black to white, and instead of having a true color red for instance, that would be red with a light color red for the bright colors … instead of that staying a true red, it would start to turn a different color. And RCA had (a couple of lawsuits) because their transmitters would not meet the differential phase regulations of the FCC, which at that time was 1–10% and most of these transmitters had a differential phase of 15–17%. Anyway, Ralph Harmon asked me to get a transmitter ready for him, a brand new one, up in the test area. He said, 'You and I are going to be working on this together probably for a long time,' because they had been working on it for a couple of years with PhDs over in Camden (RCA's technical headquarters). So I cleaned it up and got the vector scope and looked at the differential phase and sure as heck, it was like 14, 15 degrees, and well, I had the rest of the afternoon, so I thought I may as well screw around and see what I could see. Probably in about 15 minutes I figured out it was occurring in the cathode of the driver of the transmitter. It was a driver tube that put out 5000 watts; it drove the final amplifier, and it looked like it was in the cathode. Knowing that the cathode was inductive, I got a small capacitor and … put it on the cathode ring and tuned it to ground and tuned out the reactance and the differential phase went from 14, 17 degrees down to 2 degrees. I went down and got Ralph Harmon, who was still working in his office putting pictures on his wall, and said, 'You know, Mr. Harmon, I think I got this fixed already.' And he said, 'What!?' and so he came up and looked at it and said, 'Holy smokes, that is amazing.' So to make a long story short, they had a big meeting and sent their top engineers from RCA up to make the modification that I had developed that afternoon, on a Friday afternoon, and on Monday morning, the lawsuits were dropped."

John also found himself with a new job, as Special Assistant to the Executive Vice President of RCA's communications division, traveling the country as a high-powered troubleshooter. Even as a young man, though, the travel quickly lost its glamour.

"I had a chance to meet engineering directors, television managers, chief engineers, and so forth," he recalled, "and after about eight months of traveling, I thought, 'these guys at the broadcast stations have a better life than I do, going to lunch and having a crew there, and they don't have to worry about traveling and going out in the middle of the night looking for problems, where there are rattlesnakes and every darn thing.' Now at the same time, RCA told me they were going to pay for me to get an engineering degree, and I had signed up at the University of Pittsburgh. One of the things I picked up at the broadcast stations was that there was a trade magazine called *Broadcasting*. I subscribed to *Broadcasting* and saw that there was a new UHF station being built in Erie, Pennsylvania, which was about 125 miles north of Pittsburgh, or from Washington, Pennsylvania, where I was living, and where RCA had their big plant and metal labs. And I called up there and it just happened that the owner at that time was going to be in Pittsburgh the night that I was going to have some classes. So I skipped the classes, had dinner with him, and the rest is sort of history. I became his Chief Engineer, Director of Engineering, Executive Vice President, and eventually owned part of the broadcast company, that was in 1980, and became President in 1982. So that's my career pretty much for you."

Always Pushing the Envelope

Throughout his career, John said, he was always trying to make things better. "I had my radio stations and television stations, but was always trying to find ways to improve those stations, and I'd buy an AM station that was a 500-watt daytimer and figure out how to re-engineer it to get it up to 5000 watts fulltime, if possible. So always, even with the broadcast properties, I did everything I could to optimize those, whether it be the first color station; we had the second live broadcast out of China for a local television station and that was unheard of in the '80s for a small market TV station to do a live shot out of China. When Tom Ridge, the Homeland Security Director, who was still a (Pennsylvania) Congressman, went back to Vietnam, I sent a camera crew with him in the '80s, did a live shot to open up our 11 o'clock news from Bangkok, Thailand. … When Pope John Paul became the new Pope, Erie had a high population of Polish and Italian immigrants, so I sent a camera crew to his hometown in Poland and then on to Rome. … On the anniversary of Pearl Harbor, we had a camera crew at Pearl Harbor. Always pushing the envelope, and for television news and news ratings, our television station in Erie had more people watching it at 6 o'clock than all the other stations com-

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bined. We took it from a poor number three to the news leader in that market. I think it still ranks number one, even though we sold it a number of years ago."

It was also through his TV stations that John had his initial first-hand exposure to kids suffering through debilitating diseases. "We did a lot of work with muscular dystrophy with one of our TV stations, and carried the muscular dystrophy telethon from the '70s," John said, "and I got a chance every year to meet all the young MDA kids at the national level by going to the Jerry Lewis Telethon. Knowing that those kids with muscular dystrophy would never walk and probably would never get well, I had a taste of young kids suffering from a long time back, before I got diagnosed with cancer. And then, seeing young kids again, with different types of blood disorders and cancers and so forth while I was getting my own treatments, I'd watch them prepare for chemo or stem-cell transplants or whatever they were getting treated for. I thought, man, these young people have more than one disease to worry about. They've got cancer to worry about, which I'd never thought much about. But ... I looked at myself, and said you've had a full life, you've been in the broadcast business, you've met a lot of people, you've done a lot of interesting things, and there's a lot of people who died younger than you, but these young kids, they don't have a chance—six, eight years old—they've never looked at life, they've never had a chance to live, and it was through that whole process that I got a chance to revisit young kids being sick and that's not a great experience."

The Brainstorm

It was that experience, though, and his desire to help ease children's suffering, that spurred John to his now-famous 3 AM brainstorm. We noted that most of the media reports on his breakthrough were non-technical, for obvious reasons, and asked if he could give us a slightly more technical explanation for a ham audience without giving away any trade secrets.

"I can tell you how it works," he assured us. "The idea was to try to establish a high energy field that didn't have a lot of current in it, that perhaps would cause an instability of microparticles or nanoparticles ... and my thought was to find a frequency that, with a few hundred watts, up to a thousand watts, could pass through a human and you wouldn't feel anything. The 13.56 (MHz) that I ended up using was one of those frequencies ... (M)y thought was to create a very high energy field that perhaps the atoms, in particular, the electrons of an atom, would become unstable and produce heat, either by friction—within dipolar action within water—just plain friction, or whether or not it might be a shifting of the electrons from the 'I' ring to another ring, and actually having a shift within electrons within an atom or a molecule."

"The first substance that I used was copper sulfate," John explained, "and I was able to inject that into some hot dogs and different types of organs from fresh-cut animals that I could get at the supermarket. You know, being on chemo and being deathly sick at the time, it was really difficult to inject that stuff and even smell the odors of the stuff when you're nauseous and not feeling well, but I built the thing and developed a tremendous voltage field and, in fact, the people at Rice University have looked at this device and the voltage field that's created, and they've never seen anything quite like it, that much voltage within an open-air circuit. But I did that by having a very, very high-Q circuit, and that was the thought behind it, to achieve the highest Q possible. I injected the copper sulfate into the (hot dog and) lo and behold, the areas of injection would actually heat and start to give off steam, and the rest of the meat would remain at room temperature. It was at that point that I knew I had something that might work."

Kanzius filed a patent on the process in 2004 and the local newspaper ran a story on it that caught the attention of Dr. David Geller, the co-director of the liver transplant division at the University of Pittsburgh. "People with cancer from Erie were bringing the newspaper stories down to him and saying, 'what is this new device?' I had dinner with him and (he) read the patent. He said, 'this is one of the most amazing things I've ever read,' and wanted to know whether they could get a device built and that they would like to be part of testing this on animals. That's how the thing got started."

Enter the Nanoparticle

What John didn't know at the time was that researchers in various places were looking into the use of something known as "nanoparticles" as agents to deliver treatments directly to cancer cells. These are metallic particles so small that according to John, you can fit 75,000 to 100,000 of them across a tip of hair. "A cell can hold 10, 15, 20,000 nanoparticles," he said. "One of the things we're trying to find out is, do we really need that many nanoparticles within a cell? What's the minimum amount that you need? Is it 300 per cell? Is it 1000?"

"There are a lot of research centers trying to use nanoparticles ... to deliver to the cancer sites radioisotopes, chemotherapy and so forth," John explained, including those at Rice University and the M. D. Anderson Cancer Center of The University of Texas. The next step came when John's doctor brought them all together. "My personal doctor down there knew Rick Smalley, the fellow who created nanoparticles (and who was, ironically, a cancer patient himself) and got a friend of his, Steve Curley, who actually developed the current invasive treatment, to get a hold of me."

There's a difference, though, says John, between what they've been doing and what he is doing. "They're trying to use the nanoparticles as the delivery system for standard chemotherapy or standard radioisotope treatment. In my case, I am trying to deliver the nanoparticles because they *are* the silver bullet, and they're what I've built that kills the cells, and that is a little cleaner because there's no chemotherapy being applied to someone's body and there's no radiation being applied to somebody's body, so if the nanoparticles can get in there and literally be heated externally from the body... then there's no toxicity."

Dr. Steve Curley from M. D. Anderson came up to the University of Pittsburgh carrying some vials of carbon nanoparticles from the Smalley Lab. He told John that "Smalley told him, 'Steve, there's zero chance of these working, but to humor you, go ahead and take as many as you want; it's never going to work.' And when we put 'em in the device in the field up at the University of Pittsburgh, not only did they heat, they literally came out of solution and looked like carbon again. I mean they just turned into solid pieces. And at that point, Rick Smalley became a huge proponent of this and said, 'My God, this will change the treatment of cancer and other diseases forever.' On his deathbed, he told everybody that they need to work on this thing to take it further."

Indeed, it has been taken further. In an article published in the December 2007 issue of *Cancer*, a team of researchers from M. D. Anderson and Rice University (John is also listed as a co-author) explained in great technical detail an experiment in which nanoparticles were injected into a rabbit with cancer. The nanoparticles attached themselves to the cancer cells, and as John explained it, "within two minutes—in this particular case, we used carbon

nanoparticles—within two minutes, the tumors were totally necrosed, totally eradicated, there was no sign of any tumor cells after they euthanized the rabbits. It took two minutes and there were no side-effects. And that's about as good as you can get, in any treatment, to kill the cancer 100%, not have any side-effects to the animals, and the brevity of time was just amazing. Now they have switched to gold nanoparticles—gold is already FDA-approved—and the gold nanoparticles heat just as well as the carbon nanoparticles."

"(There is) very little attached to these gold nanoparticles," John added. "Twenty to 30 pieces of information so that you attach two or three different 'targeting molecules.' Targeting molecules are the antibodies that … would deliver the gold nanoparticles after injection in your arm. They would take the nanoparticles to the particular cancer site, attach to the cancer cells at their nuclei, and once put in the field, the nanoparticles begin to heat rapidly. They release a lot of heat. The phrase is actually 'releasing heat.' They don't heat; they *release* heat, and that is the real operative term. They release heat and they release heat up to three or four hundred degrees centigrade, and stick within themselves. It takes only 60 degrees to kill a cancer cell so it can never divide again. Once exposed to 60 degrees centigrade, a cancer cell is dead forever. So we have plenty of headroom here, with these things being able to heat up to three, five hundred degrees centigrade."

John also notes that while most of the work so far has been done at 13.56 MHz, there is nothing magical about that frequency. "It'll work at 2 MHz, it'll work at 13, it'll work at 27, it'll work at 54," he explained. "In a lot of the applications that we envision, it might be preferable to have two frequencies, transmitted at the same time, perhaps even pulsed, based upon where the cancer is, because some cancers are very deep into the visceral area, and the outside of the cancer might be 3 cm below the surface. The other one might be 10 cm below the surface. You may want to shoot that at two different frequencies from two different angles to make sure you get uniform heating throughout the tissue." Amazingly, he adds, the process does not require a lot of power. "The nanoparticles will heat fine at 30 to 40 watts, which is unique. The voltage that's developed is in the thousands of volts (but the current is very low). To heat the nanoparticles is a voltage phenomenon."

John notes that M. D. Anderson is "the

only place in the world where an infrared microscope is being used to look at nanoparticles within a cell, and you can actually see one nanoparticle within a cell. It's pretty interesting. It's sure far from a hot dog to an infrared microscope in a lab down there." Work there continues and Dr. Curley says he hopes to be able to begin human trials within two to three years.

Parting the Sea (Water)

A not-yet-understood offshoot of Kanzius's process was discovered by accident as a result of a visit to the University of Pittsburgh by Gary Mar, who was then Canada's Minister of National and International Provincial Affairs. John explained that Canada has universal health care as well as a big nanoscience center in Alberta, and was interested in getting involved with the research. He says Mar watched a demonstration and "he saw the instantaneous heat, and the heat gave off so much steam that he saw the steam coming down the side of the test tube walls, and he said, 'Man, have you guys ever thought about desalinization? You could make some steam from salt water quickly with this thing.'"

Well, initial efforts at desalinization did not work, but when test tubes of salt water were put into the RF field, *the water caught fire and burned!*

"Where that's going to go, I have no idea," says John. "That is not something that I had planned on." This new aspect of John's invention caught the attention of Dr. Rustum Roy of Penn State University, who is founder of both the school's Materials Research Laboratory and its Science, Technology, and Society program. John says Roy is considered the world's foremost authority on water, and that he (Roy) "claims this is going to be the biggest find, ever, in the use of water, for not only perhaps energy but for other things."

After observing the process both in Kanzius's lab and in his own, Dr. Roy released a statement saying that "(i)t is clear that Mr. Kanzius has demonstrated the ability to dissociate aqueous solutions of sodium chloride at normal sea water concentrations into hydrogen and oxygen," and noted that "it is the hydrogen and oxygen (emerging from the water) which are being burned" in videos that have been shown on TV and on YouTube, "not the water or NaCl (salt)."

Kanzius says he has signed a collaboration agreement with Penn State to work together on exploring the process, in which he says the molecular bond between the hydrogen and oxygen in the water is broken, releasing huge amounts of energy. "I've been privileged to see some of the earlier work that's been done there," says John, "and they're already generating new intellectual property with this device and with salt water, trying to get a jump on the rest of the world, so that the Russians and the Chinese and the Japanese don't beat 'em to it."

Basement Inventors

I pointed out to John that his experience seemed to fly in the face of the common wisdom in recent years that the day of the solitary inventor working in his basement or garage is over and that invention today is the province of highly-paid researchers in big companies. His response was that the perception itself is false.

"You know," he said, "in talking to a Steve Curley at M. D. Anderson, who has been in research for 20 years, or Rustum Roy, who has been in research for probably 50 years, they tell me that more inventions—particularly the large inventions—still come out of somebody like myself, and they see it all the time. It's one or two guys in their garage or in their basement who come up with these ideas that will work. And I guess if I was educated to 'know' that nanoparticles would not heat in a radio frequency field, then I never would have tried it. Not just nanoparticles, but microparticles—copper sulfate. It was taught in a formal setting such as Rice University by a guy like Rick Smalley that you never could heat these things, so why would you ever try it? So sometimes not having that knowledge is a little more useful than having it."

You didn't know it was impossible, I asked, so you went ahead and did it anyway?

"Yeah," John replied, "and then, of course, after I did it (the experts were) able to put the science and the math to it and say, 'Hm, here's why it happens, and why the heck didn't we think of it?'"

I also asked John if he had thought of himself as an inventor before all this started. He responded that he still doesn't. "I'd never considered myself an inventor. I considered myself an experimenter, a guy who liked to experiment with antennas, built stacked antennas over in Erie, Pennsylvania, and was always playing around with antennas, trying to get more signal and better performance out of a ham radio station. So I would consider myself an experimenter but not truly an inventor."

About Those Stacked Antennas...

That, of course, brings us back around to ham radio. "I was very big into contesting in the '80s and '90s," John recalls. "In fact, I had quite an antenna farm in Erie, Pennsylvania and had people like (Tim Duffy) K3LR and (Randy Thompson) K5ZD, different people, come out to Erie and operate as guest operators and win some contests from both CQ and the ARRL from (my station). And then I had a big ham bash golf tournament every year that I put on for hams around the country, and Bob Cox (K3EST) would come to some of these. I would have a special guest speak, people from ARRL and so forth. And I did those until I retired, so I did those for seven or eight years, nine years ... Even though I was in radio and television, ham radio was a time that I could come and do what I really wanted to do, and that was experiment and try to achieve a better signal and so forth. It was just something that I enjoyed ... didn't have the time for it but I sure enjoyed it."

I noted that *CQ* Contesting Editor John Dorr, K1AR, profiled K3TUP back in 1990 and described the 140-foot rotating tower that John had at the time. I asked him if he still had that.

"No, actually that's over at K8AZ's right now," he replied. "We decided to build a house in around 1992 or so, different QTH, and there was no room for rotating towers but I put up three 300-foot self-supporters at the new location and really set up a nice contest station there, except 5 1/2, 6 years later, the leukemia came and that was the end of my contesting."

John continued, "I still get on and make a few contacts during the contests down here in Florida, where I have a winter home ... I really get a chance to operate with a 33-foot vertical and can load that up on different bands by screwing around with some top-loading and so forth, but it sure gives me an idea of what a regular ham station operates like. You know, you don't go into a pile-up and call and become the second or the first guy somebody answers, but I still enjoy operating. In fact, I've been on most of the weekend, even though conditions aren't good, trying to eke out a few contacts here and there."

Kanzius added that his work in broadcasting gave him the opportunity to give something back to the hobby. "Being in the broadcast business, you know, we're talking about communication and so ham radio just seemed to be a natural extension to come home to and make a few

contacts and get to know people around the country and around the world. I was able to use the TV station facilities to provide some services to ham radio, too, to tape for hams, programs that I did for nothing, and that was a value, to be a licensee of a broadcast station, to actually highlight the main hobby that I had, and I enjoyed doing that."

John credits his early and ongoing involvement with ham radio as being the foundation of his career and even for his latest accomplishments involving the possible cancer treatment. "If I wasn't in ham radio as a teenager … and I think I've been in ham radio for 50 years now, I wouldn't have gotten into electronics … If I didn't have the electronic knowledge, I wouldn't have gone to RCA, I would not have gone to the broadcast business, and who knows what (path) my career would have taken. ... So it influenced my whole career, and as I've told some of the major networks and newspapers, even if I had this idea about sending a signal to superheat cancer cells … with some kind of an antenna or whatever you want to call it, inside the cells, if I wasn't in ham radio, I wouldn't have had the equipment inside my house to even experiment with that. Having the equipment, the oscilloscopes, the wattmeters and so forth, and all the parts necessary to try to build an in-house coupling system, it was doable. So that's the story of the pie pans at 3 o'clock in the morning when I was looking for a chassis to build some circuits, I had everything I needed except some specific hardware, which my wife had! But I had the coils and … I had bolts, nuts, coil forms, and so forth, and without ham radio in my house, my project never would have been developed."

Read More Online

For additional details from John about the salt water experiments and his views on ham radio's continuing role in science and technology today, see "Digging Deeper with John Kanzuis, K3TUP," on the CQ website. Go to our home page at <www.cq-amateur-radio.com>, click on the cover for this issue, and then click on the "Digging Deeper" link.

Notes

1. The abstract of the *Cancer* journal article is available online at <http://www3.interscience.wiley.com/journal/116834125/abstract>. The full text is also online but must be purchased. Information on purchasing access to the article is available from the abstract page by clicking on "full text."

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Of course, the Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the tune button on the tuner. The Z-817 is powered by four AA internal Alkaline batteries (not included), so there are no additional cables required to use the Z-817. A coax jumper cable is also induced for fast hook up. Latching relays are used so that power consumption is Zero when not tuning allowing a set of batteries to last about one year. ***Suggest Price $129.99.***

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Designed from the ground up to provide 100 watt power handling 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 it's not tuning, it draws nearly zero amps. ***Suggested Price $149***

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See AT-1000Pro Review in Nov. '08 CQ

AT-1000Pro

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radio not included

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radio not included

AT-7000

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. Requires just 0.1W for operation, but will handle up to 125W (100 W on 6 m), making it suitable for everything from QRP (IC- 703 Plus) to a typical 100 W Icom transceiver. All cables included.
Suggested Price $169

AT-200Pro

The AT-200 features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MHz (including 6 meters). Rugged and easy-to-read LED bar graphs show power and SWR, and a function key on the front panel allows you to access data such as mode and status. All cables included. ***Suggested Price $249***

AT-100Pro

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. All cables included. ***Suggested Price $219***

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The new KT-100 Autotuner fills a need for Kenwood transceiver owners after Kenwood discontinued the Kenwood AT-300 antenna tuner. The KT-100 is a flexible, low cost, easy to use unit just right for an AT-300 compatible Kenwood transceiver. Of course, most any LDG tuner will work just fine with a Kenwood transceiver, but wouldn't it be great if you could use that Tune button on the radio. The KT-100 allows you to do just that as LDG's first dedicated autotuner for Kenwood Amateur transceivers.

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LDG

Results of the 2008 CQ WW WPX SSB Contest

BY RANDY THOMPSON,* K5ZD

On the weekend of March 29 and 30, 2008, over 41,000 amateur radio callsigns were active in the 50th running of the CQ World-Wide WPX SSB Contest. Conditions weren't the best, but that didn't prevent participants from breaking score records or having lots of fun.

The sun tried to do its part to help, with the solar flux approaching the 80s, but conditions got ugly as the contest began. The north-south paths were there, but working east and west between the population centers was difficult. At times, the contest divided into regional affairs with contacts only possible between local stations. With one point for contacts between stations in the same country, top scorers could continue to make points even as DX rates slowed.

It's prefixes that make the WPX Contest so much fun. You never know what the next station on the dial will be. Some of the more interesting calls included 9UXEV, 4D75T, 5D5A, 9A5ØKDE, A73A, HB1ØDX, HG1848I, LZØ5ANT, LZØ8IPY, R35NP on a floating ice station near the North Pole, S566D, TB37F, V48M, VQ59W, XR6T, and ZV5K, to name just a few. While it's fun to chase exotic prefixes, working that first W5 or JA7 can bring just as much boost to the score. This means everyone gets to experience being both the hunter and the hunted! The top two hunters this year were multi-multi stations DR1A with 1389 prefixes and AO8A with 1387.

Claudio, LU7DW, takes a walk in the snow at VE3RM.

Single-Operator All-Band

Tom, W2SC, working from Barbados as 8P1A, made it three in a row for world high score in the Single-Operator All-Band category. With almost 5600 contacts and over 1200 prefixes, Tom missed breaking his own North American record by less than 27,000 points (that's about one tenth of one percent!). Just a few islands away, a strong second place world score was turned in by Ivan, OM3LA, operating from Guadeloupe as FG/OM3LA. Less than 200k points behind in third was CT9L operated by Helmut, DF7ZS. How bad were conditions? None of the top three made any contacts on 10 meters! Fourth place went to Hrane, YT1AD, operating once again from 3V8BB in Tunisia. AE6Y also returned to P49Y to take fifth overall. Two close races filled out the world top ten. PY2NY took the wheel at PS2T to finish just ahead of PY2YU for sixth, while in Canada, the battle between John, VE3EJ, and Ron, VE3AT, operating as VB3E, came down to log checking and QSO points, with EJ taking the win.

In the world low power classification, Andy, KK9A, piloted P4ØA to a wide margin of victory and a score that would have placed him fourth in the high power category! His 15-million point score also raises the low power world record by almost a million points. Second place was earned by Didier, FY5FY. Ted, HI3TEJ, used his contest call HI3T to finish a close third.

Competition for tops in the USA was intensified by a number of operators seeking to earn qualifying points for the 2010 World Radiosport Team Championship. When all the yelling was over, Jeff, K1ZM, took top honors operating from his Cape Cod location. A little over a million points back was a close race for second place between Ken, K4ZW, operating from NR4M using the call KN1DX, and Alex, LZ4AX, operating from K3CR using the call KC3R (got all that?). Both submitted extremely accurate logs (less than 3.7% score reductions), leaving the margin of victory based on Ken finding a few extra multipliers. Krassy, K1LZ, finished off the pack of top scores in fourth. George, K5TR, in Texas had the top score away from the Eastern Seaboard.

With perennial winner N1UR traveling, the chase for top low power USA score was between four stations in different parts of the country. Bud, W3LL, operating from Maryland used 40 meters very effectively to take the win. Ed, NX7TT, made a great effort from KØUK in Colorado to grab second. Less than 100k points behind was Terry, KS9K, operating from the station of N4TZ in Indiana. Finishing out the top pack was Thomas, WD5K, located in Texas.

Andy, G4PIQ, operated M6T to the top Single-Operator score for Europe. He used some of his 12 hours of off-time to repair antennas and amplifiers, so it was not an easy weekend. Second place went to OK5R, operated by Jiri, OK1RI, who struggled with difficult conditions to the USA on the first day. Close behind was Felipe, CT1ILT, using the call CS2T. Felipe took advantage of his location in the south and west of Europe to find 15 meters open the USA, but not with enough activity to move him up in the standings. Anti, HA3OV, worked single op from the big station of HG6N in order to earn qualifying points for WRTC, and finished fourth. The center of Europe was well represented, with impressive scores from S5ØA, OM3BH, and HG8R. OG8X and OG6A turned in very nice scores from the top of Europe.

The low power competition in Europe was dominated by stations from the south.

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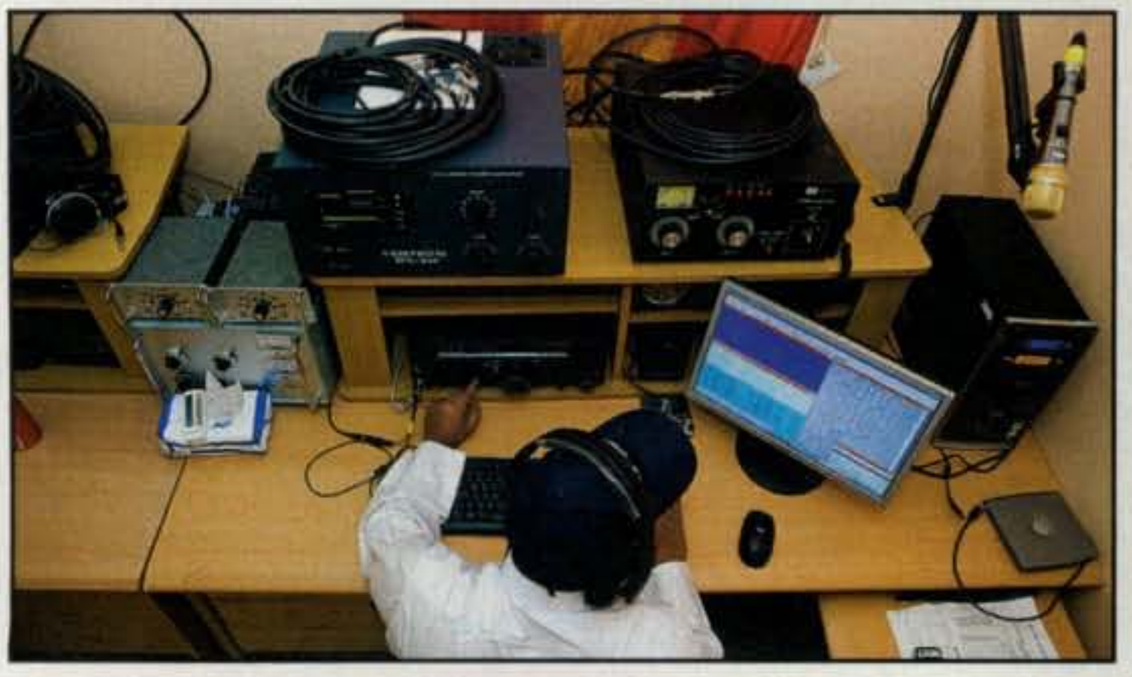

Looking down at the operating position at A73A.

Manuel, EC7ANC, operates single band 40 meters as AM7M.

Lorenzo, IZ2FOS, broke 2-million points to take the top spot. Valentin, S53EA, used the station of S59AA to finish in second. Zik, YT1HA, led a close race between F4FLQ and OK1WCF.

In the Single-Operator Assisted category, Wanderly, PY2MNL, operated as ZX2B to earn 9.5-million points and garner the top score. Close behind was Braco, E77DX, who took first place in Europe. Third place went to Ramon, LU5HM, operating at LP1H. Kamal, N3KS, returned to WY3P to repeat as USA winner and finish fourth in the world. Yuri, UA9AM, activated the call RG9A to finish fifth overall. Among the single band assisted entries, Claudio, IW2HAJ, operated IR2C to a new world record on 80 meters.

Single-Operator Single-Band

Ten meters can be a lonely place in this part of the sunspot cycle, but contests seem to bring the band to life. John, LU1HF, won world high on 10 meters for the fourth year in a row! He had some competition

WORLD TOP SCORES

SINGLE OPERATOR ALL BAND

8P1A (W2SC)	20,533,584
FG/OM3LA	16,105,188
CT9L (DF7ZS)	15,981,472
3V8BB (YT1AD)	13,999,022
P49Y (AE6Y)	13,539,890
PS2T (PY2NY)	11,390,195
PY2YU	10,978,420
VE3EJ	10,756,686
VB3E (VE3AT)	10,310,760
4LØA (4L4WW)	10,017,060

28 MHz

LU1HF	1,665,198
PP5EG (PY5EG)	1,383,694
KG6DX	247,217
PP5WG	197,568
CX4DX	177,540
KJ5W (W5PR)	100,110
VK8AA	66,462
S57S	48,444
JH6AUS	33,803
NA4W	21,021

21 MHz

ZX5J (PP5JR)	14,740,056
PY1KN	3,642,254
PX2T (PY2DN)	2,370,700
9A5Y (9A3LG)	1,248,650
9A4W	991,800
VR1ØXMT	816,540
JA3YBK (JS1PWV)	800,384
IU3X (IV3SKB)	796,060
YT7Z (YT7EI)	526,095
EA5DFV	514,206

14 MHz

CN2R (W7EJ)	15,778,840
PT5A (W6NV)	6,424,096
TM1W	4,473,924
S5ØK	4,442,844
W7WA	4,054,754
4Z4OQ	3,983,984
R3K	3,882,440
LY8O (LY1PM)	3,454,052
S57AL	3,120,816
UZ8M (USØMR)	3,064,094

7 MHz

ZL3A (ZL3WW)	8,200,800
YT8A	5,197,840
LN9Z (LA5KO)	2,089,542
NY6N (W6YI)	2,038,192
SP4TKR	1,822,266
S56X	1,813,089
YU3AA	1,561,824
IZ1GAR	1,164,096
EA3ATM	1,030,806
AH6JR	989,682

3.7 MHz

SN7Q (SP7GIQ)	2,969,645
H22H (5B4MF)	2,432,692
ZF1A (ZF2AH)	2,269,344
S52AW (S52RU)	2,107,380
OK2BYW	1,788,534
9A6A	1,684,256
9A3B (9A2VR)	1,244,740
SP7HKK	1,126,428
ND8DX	1,026,836
9A5D (9A3ID)	956,823

1.8 MHz

LY2IJ	669,108
YT6T (YU7CM)	359,822
DL1SWB	204,614
CM6RCR	186,399
SP1GZF	177,480
OM7RU	165,436
K9NW	108,129
W2MF	99,006
AA4MM	93,019
RA6DB	84,597

LOW POWER SINGLE OPERATOR ALL BAND

*P4ØA (KK9A)	15,484,383
*FY5FY	8,500,401
*HI3T (HI3TEJ)	6,928,198
*TC3D (TA3D)	6,757,972
*VQ58V (W5CW)	5,951,071
*CN2BC (DL7BC)	4,698,149
*7Z1SJ	3,767,244
*IZ2FOS	2,706,688
*LU1HLH	2,537,808
*S53EA	2,296,193

28 MHz

*PY2CX	305,487
*LU6FOV	255,840
*PY2SRB	109,650
*LW1HR	71,136
*PU2MTS	48,250
*IWØHBY	32,508
*BG7NWF	28,014
*YY1JGT	27,642
*PY2ZY	20,169
*EC7AKV	17,821

21 MHz

*YE1AA	2,673,376
*LQ5H	2,277,347
*LU7KAT	2,116,752
*6V7E (RW3TN)	1,353,905
*YB3KM	1,002,375
*YV1CTE	917,350
*CX8AT	699,205
*YC5OUB	597,012
*JA6WFM/HC5	528,048
*HP1BYS	361,665

14 MHz

*WP3C	2,372,700
*EB7DX	2,178,000
*PD1DX	1,539,163
*9A5ØKDE (9A1AA)	1,513,400
*YU5RA	1,183,507
*ED8D (EA8BHD)	1,069,076
*HG3DX (HG3M)	847,476
*4L2M	843,480
*S57RTH	723,008
*YT3MA	658,815

7 MHz

*XE1CQ	1,607,522
*LZ5W	1,057,707
*E77DO	780,858
*SN3X	690,135
*EC5CSW	409,370
*IZ5DKJ	355,946
*PP5KR	348,936
*EA1JJ	310,534
*G7TWC	294,465
*S5ØB	293,715

3.7 MHz

*YU3A (YT2RX)	641,346
*OL5J (OK1RZ)	558,298
*3Z1ØUM (SQ9UM)	541,320
*YU5B	528,200
*RV3WT	492,156
*F5BEG	468,096
*YUØU	431,395
*OM7AB	409,968
*S57O	407,640
*UU2JM	374,958

1.8 MHz

*HA8BE	229,457
*LY2OU	180,648
*S52OT	180,389
*VE3MGY	109,361
*SQ9HZM	95,445
*YMØT (TA2RC)	94,518
*YO5PBF	93,930
*US8ICM	59,356
*OL6P (OK2WTM)	41,396
*ER3HW	36,816

QRP/p

OK7CM	A	489,342
S59D	A	402,500
S57SU	A	333,086
IZ1ANK	A	213,850
US2IZ	A	178,176
YP8A	A	171,105
HR2DX	A	157,755
RZ6MP	A	140,896
NAØCW/6	A	138,402
DJØMY	A	131,054
I5KAP	28	11,907
JH7RTQ	21	54,400
HR2DX	14	157,755
S57SU	7	333,086
US2IZ	3.7	178,176
RN3ZJJ	1.8	21,952

SINGLE OPERATOR ASSISTED

ZX2B (PY2MNL)	A	9,533,793
E77DX	A	8,715,798
LP1H (LU5HM)	A	7,091,045
WY3P (N3KS)	A	6,660,726
RG9A (UA9AM)	A	6,656,136
YT2T	A	4,979,676
RK4FD	A	4,753,098
YR9P (YO9HP)	A	4,495,568
UP4L (UN7LZ)	A	4,284,714
IQ2CJ (IK2NCJ)	A	3,701,335
*PU1KGG	28	70,880
ZS6DXB	21	2,397,668
IQ2CJ (IK2NCJ)	14	3,701,335
ES5RW	14	2,257,717
UW8I (UT2IZ)	14	2,136,888
UZ7M (UT9MZ)	7	2,390,166
IZ8FWN	7	1,703,592
IR2C (IW2HAJ)	3.7	2,380,644
IC8TEM	1.8	162,675

TRIBANDER/SINGLE ELEMENT

CT9L (DF7ZS)	A	15,981,472
HG8R (HA8JV)	A	6,211,205
FY1FL	A	4,784,856
*CN2BC (DL7BC)	A	4,698,149
EA6SX	A	4,284,054
CT1DIZ	A	3,875,040
CE4CT	A	3,690,225
AY8A (LU8ADX)	A	3,120,834
YJ8TZ (VK3TZ)	A	2,776,869
KJ4VO (N4PN)	A	2,451,417
S56M	A	2,388,100
KG6DX	28	247,217
*JA6WFM/HC5	21	528,048
Z35X	21	477,356
4Z4OQ	14	3,983,984
EA5KV	14	2,273,810
*LY2MM	7	229,457
VA6XDX	7	119,980
SP7HKK	3.7	1,126,428
*3Z1ØUM	3.7	541,320
*VE3MGY	1.8	109,361

ROOKIE

NHØDX	A	2,411,046
OT2A	A	2,220,288
IZ1LBG	A	2,115,280
RN3ZC	A	1,524,772
W1GUS	A	1,374,080
UA6YIU	A	1,361,835
*EA8CDI	A	996,710
*IZ3KKE	A	702,093
IW3SSA	A	652,080
*RK9AJZ	A	502,920
*HI8PJP	28	3,379
*YY5LI	21	233,160
OM7ANB	14	569,296
*UA1AQA	14	377,235
*EC5CSW	7	409,370
PV2P (PY2DY)	7	188,188
IW3SSA	3.7	652,080
*RK2FXG (RA2FIR)	1.8	11,520

MULTI-OPERATOR SINGLE TRANSMITTER

5D5A	33,066,880
P33W	26,089,327
CQ95F	23,507,296
ZY7C	20,940,736
CQ3T	18,009,992
C4N	17,440,784
9K2HN	15,858,564
PJ2T	14,485,378
KP2TM	14,190,228
TM6M	14,075,078

MULTI-OPERATOR TWO TRANSMITTER

6Y1V	29,018,014
9A6ØA	16,471,710
ES9ØC	13,724,640
C4I	13,615,875
WE3C	12,916,452
HG8ØHQ	12,871,896
UU7J	11,789,823
KD4D/3	10,680,336
OL7R	9,949,407
YT9X	9,917,964

MULTI-OPERATOR MULTI-TRANSMITTER

AO8A	43,180,084
DR1A	22,340,676
LT1F	21,812,848
OT5A	16,285,416
YW4M	15,813,406
LZ9W	14,928,360
NQ4I	12,051,526
LY7A	8,371,200
EB1WW	7,711,155
NR6O	7,176,202

**Low Power*

from Oms, PY5EG, operating as PP5EG. Both managed to find more than 1000 contacts on what seemed like a dead band. Joel, KG6DX, took advantage of being south of Japan to earn third place. W5PR used the call KJ5W to make 308 contacts and win the USA.

Sergio, PP5JR, delivered a dominating performance on 15 meters from ZX5J. His 4255 contacts and 1242 prefixes raise the South American record by over 1-million points. Second- and third-place finishers Marcelo, PY1KN, and Roberto, PX2T, gave Brazil all three places on the podium. In Europe, 9A5Y (op Zvonko, 9A3LG) and Tom, 9A4W, had almost identical QSO totals, but it was the extra multipliers that gave 9A5Y the win. Charlie, VR1ØXMT, beat JA3YBK (op Hiro, JS1PWV) for tops in Asia. George, NR5M, got past Bob, WN1GIV, for the top USA score.

When conditions are poor, everyone seems to end up on 20 meters. Stations are stacked two or three deep across the band from sunrise until midnight. Into this maelstrom stepped Jim, W7EJ, operating as CN2R from his well-equipped station in Morocco. After 4429 contacts and 1199 multipliers, Jim captured his fourth single-band world record. Oliver, W6NV, did a great job from PT5A in Brazil, but had to settle for second. Marc, TM1W, and Marko, S5ØK, ended in a photo finish for top score in Europe. After log checking, TM1W earned the win by less than 30k points. Dan, W7WA, finished fifth overall for another convincing victory among USA entrants. 4Z4OQ was close behind and represented the fifth continent among the top six scores!

As we checked logs from around the world, there was one call that seemed to show up in almost all of them. That call was ZL3A, operated by Dule, ZL3WW. Operating single band 40 meters from Auckland, New Zealand, Dule worked almost 1800 contacts for a new Oceania record. Dusan, YT8A, worked over 2000 contacts to win Europe over LN9Z, operated by Roy, LA5KO. In the USA, NY6N, operated by Jim, W6YI, broke one of the oldest records in the books—USA single-band 40 meters held by KC7EM from 1995. What's really amazing is that Jim only worked three European stations all weekend!

Eighty meters saw an interesting competition between stations on three continents. With 1696 contacts and 713 prefixes, Chris, SN7Q, took the trophy. Spyros, 5B4MF, operating H22H from Cyprus, made half as many contacts, but took advantage of the higher points per contact to take second place. ZF1A finished third overall, but enjoyed setting a new North American record.

Log Checking Honor Roll

A major goal of log checking in any contest should be to confirm that the winners are truly the winners. This year the CQ WPX Contest used new log-checking software developed by Ken, K1EA. Of the 1,791,048 QSOs reported in the 3728 logs received, over 93% were cross checked against other logs. Callsign errors resulted in a loss of the contact plus a penalty of one additional contact. Errors in copying numbers, band-change violations, or operating beyond the permitted time resulted in a loss of the contact. Any lost QSO could hurt even more if it causes the loss of a multiplier.

Looking at the score reductions, it should be no surprise that the operators near the top had some of the most accurate logs. The top 20 Single-Operator All-Band entries had an average score reduction of only 4.6% after penalties. The average for *all* Single-Operator entrants was 11.2%. We urge every competitor to use these results as a benchmark for measuring their personal progress toward operating perfection. Detailed log-checking reports can be requested by sending an e-mail to <k5zd @cqwpx.com>.

Speaking of perfection, there were 289 golden logs—i.e., perfect with no score reductions. The top five golden log scorers (with number of contacts) were K9JE (346), VE3BVA (254), OE3DMA (241), PE1FTV (232), and BG4DVK (223).

It takes two to tango and two stations to make a QSO. There were 134 entries that caused no errors in other logs. The top scores among these golden transmitters were K6GEP (191), UA9CIR (103), OL4W (95), K6VFF (77), and K3ISH (71).

Will we see your call in this list next year?

TROPHY WINNERS AND DONORS

SINGLE OPERATOR ALL BAND

WORLD: Stanley Cohen, W8QDQ Trophy. Won by: **8P1A operated by Tom Georgens, W2SC**
WORLD Low Power: Caribbean Contesting Consortium Trophy. Won by: **P40A operated by John Bayne, KK9A**
WORLD QRP/p: Phil Krichbaum, NØKE Trophy. Won by: **Antonin Bechyna, OK7CM**
WORLD Tribander/Single Element: Helmut Mueller, DF7ZS Trophy. Won by: **CT9L operated by Helmut Mueller, DF7ZS**
USA: Atilano de Oms, PY5EG Trophy. Won by: **Jeffrey T. Briggs, K1ZM**
USA Low Power: Terry Zivney, N4TZ Trophy. Won by: **Bud Governale, W3LL**
USA QRP/p: Doug Zwiebel, KR2Q Trophy. Won by: **NAØCW/6 operated by Bill Parker, W8QZA**
USA Zone 4 High Power: Society of Midwest Contesters Trophy. Won by: **George Fremin III, K5TR**
USA Zone 4 Low Power: Society of Midwest Contesters Trophy. Won by: **Ed Campbell, NX7TT/Ø**
USA Tribander/ Single Element: Paul Newberry, N4PN Trophy. Won by: **KJ4VO operated by Paul H. Newberry, Jr., N4PN**
CANADA Low Power: Contest Club Ontario Trophy. Won by: **Ken Tucker, VO1KVT**
AFRICA: Peter Sprengel, PY5CC Trophy. Won by: **3V8BB operated by Hranislav Milosevic, YT1AD**
EUROPE: Jim Hoffman, N5FA Trophy. Won by: **M6T operated by Andy Cook, G4PIQ**
NORTH AMERICA: Albert Crespo, F5VHJ Trophy. Won by: **FG/OM3LA operated by Dr. Ivan Dobrocky, OM3LA**
SOUTH AMERICA: Andrew Faber, AE6Y Trophy. Won by: **P49Y operated by Andy Faber, AE6Y**
OCEANIA: Phillip Frazier, K6ZM Memorial Trophy. Won by: **9M8Z operated by Steve Telenius-Lowe, 9M6DXX**
JAPAN: Hamad Alnusif, 9K2HN Trophy. Won by: **Masaki Okano, JH4UYB**
NORTH AMERICA QRP/p: Phil Krichbaum, NØKE Trophy. Won by: **Antonio Handal, HR2DX**

SINGLE OPERATOR, SINGLE BAND

WORLD: Steve Merchant, K6AW Trophy. Won by: **CN2R operated by James P Sullivan, W7EJ**
WORLD 14 MHz: Jorge Taboada, EA9LZ Trophy. Won by: **PT5A operated by Oliver Sweningsen, W6NV**
WORLD 7 MHz: Jorge Taboada, EA9LZ Trophy. Won by: **ZL3A operated by Dusko Dumanovic, ZL3WW**
WORLD 3.7 MHz: Tom Haavisto, VE3CX Trophy. Won by: **SN7Q operated by Krzysztof Sobon, SP7GIQ**
EUROPE 28 MHz High Power: SKY Contest Club Trophy. Won by: **Aleksander Zagar, S57S**
EUROPE 21 MHz High Power: SKY Contest Club Trophy. Won by: **9A5Y operated by Zvonimir Karnik, 9A3LG**
EUROPE 14 MHz High Power: SKY Contest Club Trophy. Won by: **Sentuc Marc, TM1W**
EUROPE 7 MHz High Power: SKY Contest Club Trophy. Won by: **Dusan Ceha, YT8A**
EUROPE 3.7 MHz High Power: SKY Contest Club Trophy. Won by: **S52AW operated by Karl D. Bucar, S52RU**
EUROPE 1.8 MHz High Power: SKY Contest Club Trophy. Won by: **Arunas Vaglys, LY2IJ**

SINGLE OPERATOR ASSISTED

EUROPE: Martin Huml, OL5Y Trophy. Won by: **E77DX operated by Emir Braco Memic, OE1EMS**

MULTI-OPERATOR, SINGLE TRANSMITTER

USA: Steve Bolia, N8BJQ Trophy. Won by: **K3EST/4 operated by K3EST & KT3Y**
ASIA: W2MIG Memorial (NX7TT Sponsor) Trophy. Won by: **P33W operated by RW4WR, RX3DCX, RA3AUU**
USA Zone 4: Mike Fatchett, WØMU Trophy. Won by: **NX5M operated by NX5M, KU5B, AB5K, K5GA, N5XJ**

MULTI-OPERATOR, TWO TRANSMITTER

WORLD: Ken Adams, K5KA Trophy. Won by: **6Y1V operated by KY1V, K6AM, W4PA, WE9V**
USA: FCG, Florida Contest Group Trophy. Won by: **WE3C operated by K3CT, KQ3V, N3FTI, NM3E, NN3Q, W2GD, W3FV, W3PA, WB3FIZ, WE3C**

MULTI-OPERATOR, MULTI-TRANSMITTER

WORLD: Gail Sheehan, K2RED Trophy. Won by: **AO8A operated by EA8AH, EA8CAC, EA8ZS, N5ZO, TF3CW, ES2RR, OH2MM, OH2KI, OH2ZZ**
USA: Rick Dougherty, NQ4I Trophy. Won by: **NQ4I operated by NQ4I, WI4R, K4PK, K4NV, VE7ZO, WB4A, W5LE, K4BAI, K5KG, KF4GTA, KØEJ, KU1CW**

Braco, OE1EMS, was the top European scorer in the SOAB Assisted category from E77DX.

The top USA score was submitted by Karl, ND8DX, who outpaced WI4R, operated by Mark, W4SVO.

Arunas, LY2IJ, spent his weekend calling CQ and listening to noise on 160 meters to earn the top score in the world. It was a close three-station race in the USA with Mike, K9NW, finishing ahead of Manny, W2MF, and Leo, AA4MM.

QRP

What kind of person steps into the poor conditions and SSB splatter while running only 5 watts? Well, there were at least 128 of them who submitted logs in the QRP category. The top all-band score was by Antonin, OK7CM, who finished just ahead of Janko, S59D. Both made more than 500 contacts and 300 multipliers—quite an accomplishment! Bill, W8QZA, operated NA0CW/6 to just squeak by Eric, N2RRA, and Chas, K3WW, for the top USA score.

Tribander/Single Element

The tribander/single-element classification is designed to compare scores from similarly equipped stations. Helmut, CT9L, took advantage of his island location to easily win the category and set a new world record! Pali, HA8JV, worked as HG8R to finish tops in Europe and second overall. It was a close three-way race among FY1FL, CN2BC, and EA6SX for spots three through five. In the USA, Paul, N4PN, repeated as the champion, this time operating with the call KJ4VO. Close behind were K4PV and NF4A.

Rookie

The Rookie category is for operators who have been a licensed amateur radio operator for less than three years. Newcomer Koji, NH0DX, scored an impressive 2.4-million points to take the lead. Just behind in second was last year's winner, Patrick, OT2A, in his last year to be eligible for the category. IZ1LBG was only 100k points behind for third place.

Multi-Operator Single-Transmitter

Last year, the two-person team of IK2QEI and IK2SGC operated as 5D5A in Morocco and made over 6000 contacts to finish just short of the world record in the Multi-Single category. This year, they returned to try again—working over 6300 QSOs and 1342 multipliers—only to miss the record by less than 400k points. Even so, this is a great score given the conditions. Second place went to the Russian team of RW4WR, RX3DCX, and RA3AUU operating as P33W. Third place was an all CT3 team operating with the special contest call CQ95F from Madeira. ZY7C finished a strong fourth from northeastern Brazil. Multi-Single is probably the most competitive category in the contest with 21 stations making more than 3000 contacts! In the USA, K3EST/4 led a virtual three way tie among WU3A/1, WR3Z, and NX5M.

Multi-Operator Two-Transmitter

In the Multi-Operator Two-Transmitter category, the four-man team of KY1V, K6AM, W4PA, and WE9V operating at 6Y1V exceeded their goals and broke the North American record on the way to making the world high score. The next places were held by two of the most miscopied calls in the contest: 9A60A (operating from 9A7A) beat ES90C (operating from ES5TV) for high score in Europe. The group at C4I took fourth.

Vlad, UU5MAF, operating Multi-Operator Two Transmitters at UU7J.

A group of ten operators at WE3C finished off a three-year progression where they moved from third, to second, and now to first place in the USA. Last year's winner KD4D (operating from N3HBX) fell back to second.

Multi-Operator Multi-Transmitter

AO8A set the standard for the Multi-Multi category this year. An experienced group of locals and Scandinavian visitors made over 8000 contacts on their way to the win. Second place was the well-known German call DR1A. LT1F was a new entrant in the Multi-Multi category of WPX SSB, and they did a very nice job to finish in third place. The top USA score went to the very enthusiastic group at NQ4I.

New Records

Even with the challenging conditions, new world records are available for the right operator in the right location. W7EJ at CN2R was one such combination. Jim continued his growing collection of records by capturing another band—this time 20 meters. He now holds the single-band world records for 160, 80, 40, and 20 meters. Hmm . . . I wonder what band he will work next year? P4ØA (KK9A) set a new world record for low power in the Single-Operator All-Band category. CT9L (DF7ZS) increased the world record for the Tribander/Single Element category by 100k points.

Congratulations also to these new Continental Record holders:

Asia, 3.7 MHz, H22H – 2,432,692 points

Europe, 3.7 MHz, SN7Q – 2,969,645 points

Europe, 7 MHz, YT8A – 5,197,840 points

North America, 3.7 MHz, ZF1A – 2,269,344 points

Oceania, 7 MHz, ZL3A – 8,200,800 points

South America, 21 MHz, ZX5J – 14,740,056 points

North America, Multi-Operator Two-Transmitter, 6Y1V – 29,018,014 points

Rule Changes

There are a number of rule changes for the 2009 contest. Our goal was to make the rules more specific, more aligned with other CQ contests, and in accordance with current contesting practices. The new terms of competition address the use of remote stations and self-spotting. Pay special attention to the new definitions for the Multi-Single category. We are now asking single-band entrants to submit *all* contacts made on any band during the contest period in order to help us with the log checking. The club competition rules have been modified to match those of the CQ WW DX Contest. Please read the new rules (in the February issue) carefully! Check the <cqwpx.com> website for explanations of the most frequently asked questions.

Final Thoughts

This is a year of change for the CQ WPX Contest, as administration of the contest has been handed off from Steve, K6AW, and Steve, N8BJQ. Both of these gentlemen have done a fantastic job over the years to check logs and help the WPX Contest become one of the major events on the contesting calendar. They have been a very big help during the transition and will continue to work as members of the WPX Contest Committee.

Special thanks go to Ken, K1EA, for developing completely new log-checking software that enables an unprecedented level of log checking. Any errors that appear in the results are due to me and not the software. Kudos to the following for giving up their time (and in some cases their eyesight) to type in the paper logs and convert them to Cabrillo format: W4AU, K1ZE, WA1Z, K2BB, NJ1F, W1UE, WO1N, WC2L, N8RA, WB1DX,

USA TOP SCORES

SINGLE OPERATOR ALL BAND

K1ZM	8,316,563
KN1DX/4 (K4ZW)	7,147,845
KC3R (LZ4AX)	6,829,005
K1LZ	6,468,150
NC1I (K9PW)	4,774,728
W1UE	4,478,656
NJ4M (K1TO)	4,130,420
K5TR	3,938,420
K3ZO	3,898,310
NN5J	3,329,405

28 MHz

KJ5W (W5PR)	100,110
NA4W	21,021
WZ7ZR	6,116

21 MHz

NR5M	388,440
WN1GIV/4 (N4BP)	259,402
NJ4U	202,032
KØRH	68,600
WW6OR (K6JAT)	46,443
KC7V	26,414
KØPK	17,177
AA2NA	17,017
W2RR	14,784
W6RKC	6,486

14 MHz

W7WA	4,054,754
K6HNZ	959,310
W6AFA	656,812
N2RJ	464,457
K4EU	406,747
WX6V	401,128
NQ5K (W5ASP)	370,300
W9DX/5	299,398
W6AEA/7	291,248
KG9N	213,750

7 MHz

NY6N (W6YI)	2,038,192
N4QV	511,144
WØICT	65,600
N2NS/6	24,612
W6XI/7	20,592
WA2JQK	5,832
N3TXH	4,161

3.7 MHz

ND8DX	1,026,836
WI4R (W4SVO)	850,212
W3/T98T	362,148
W3BGN	335,240
WN2O (N2GC)	241,528
KK9V	168,480
N4NX	163,530
K4KZZ	161,006
K4RDU	81,965

1.8 MHz

K9NW	108,129
W2MF	99,006
AA4MM	93,019
K1HAP	26,598
WA2AOG	1,716

LOW POWER ALL BAND

*W3LL	1,234,480
*NX7TT/Ø	1,167,720
*KS9K	1,091,748
*WD5K	1,042,056
*ACØW	909,580
*N5DO	819,680
*N4XL	719,922
*WZ8T	607,986
*W4TMN	521,389
*WB8TLI	516,880

28 MHz

*WA1FCN/4	2,688
*ND6S	1,482
*W6GMT/Ø	75

21 MHz

*ND4X	139,105
*W7UPF	39,558
*K9WZB/7	24,390
*K7MY	13,002
*W9ILY	7,748
*N5DTT	1,512
*NQ4K	1,196
*W1OHM	987
*WØIE	176

14 MHz

*KG2RG	546,939
*AD7J	252,800
*W2AW	185,724
*KZ5OH/4	163,250
*KI6LZ	148,176
*NN5Z	78,120
*WB1HBB/4	42,775
*K7ACZ	37,375
*KB5UOK	35,250
*KG1V	33,154

7 MHz

*NR8U	55,245
*N9ADG/7	12,859
*N9HDE/Ø	7,502
*KU6T	6,960
*WB8TLH	3,360
*AI3G	3,192
*N5DGK	1,768
*NT5HS	130

3.7 MHz

*KU4BP	60,941
*N7MAL	1,764
*KE7BWN	1,175
*KCØRQH	576

1.8 MHz

*K3BU/2	3,060

QRP/p

NAØCW/6 (W8QZA)	A	138,402
N2RRA	A	130,585
K3WW	A	129,789
K3TW	A	55,272
WA8WV	A	52,992
N3HU	A	42,640
N6WG	A	40,430
ADØNW/4	A	29,904
KE6K	A	22,145
KT8K	A	19,392
WA6FGV	21	8,236
K3TW	14	55,272
WB7OCV/2	7	14,308

SINGLE OPERATOR ASSISTED

WY3P (N3KS)	A	6,660,726
W5WMU	A	2,646,798
W8MJ	A	2,282,167
NF4A	A	2,168,280
N3MX	A	1,958,535
WB4MSG	A	1,940,643
AA3B	A	1,921,362
N2BJ/9	A	1,759,984
WN9O	A	1,634,556
W1GUS	A	1,374,080
KE3WM	21	9,800
K5ZO	14	487,552
W2IRT	7	178,688
N3YD	3.7	480,585

TRIBANDER/SINGLE ELEMENT

KJ4VO (N4PN)	A	2,451,417
K4PV	A	2,315,936
N2QT/4	A	1,683,856
WZ4F	A	1,585,980
KG4W	A	1,561,230
W6TK	A	1,391,698
AA5B	A	1,235,500
WAØMHJ	A	1,203,288
*WD5K	A	1,042,056
KJ3X	A	1,007,820
*WA1FCN/4	28	2,688
WW6OR (K6JAT)	21	46,443
K4EU	14	406,747
W2IRT	7	178,688
WN2O (N2GC)	3.7	241,528
*K3BU/2	1.8	3,060

ROOKIE

W1GUS	A	1,374,080
*KI4PKW	A	146,076
KB1MIC	A	140,399
*K4CX	A	126,484
KB1OWT	A	109,890
KB1ODO	A	109,610
*KBØARZ	A	93,810
KE7FBY	A	76,314
W5YAA	A	73,538
*K6DEX	A	70,144
*KS6M	14	7,381
*WB8TLH	7	3,360

MULTI-OPERATOR SINGLE TRANSMITTER

K3EST/4	6,347,900
WU3A/1	6,081,120
WR3Z	6,025,790
NX5M	5,893,424
NQ2F	3,981,516
WC6H	3,751,875
WA7XX	3,098,771
AJ9C	2,412,072
WX5S/6	1,708,643
KT4PD	1,646,970

MULTI-OPERATOR TWO TRANSMITTER

WE3C	12,916,452
KD4D/3	10,680,336
KI1G	6,970,000
W1CU/6	6,854,546
NG3U	1,801,534
N2CW	497,280
W7RN	191,800
WØEBE	35,505

MULTI-OPERATOR MULTI-TRANSMITTER

NQ4I	12,051,526
NR6O	7,176,202
WX3B	4,907,747
NE1C	4,726,400
WC8VOA	211,728
W9VT	163,800

**Low Power*

EUROPE TOP SCORES

SINGLE OPERATOR ALL BAND

M6T (G4PIQ)		9,975,816
OK5R (OK1RI)		9,315,900
CS2T (CT1ILT)		8,916,812
HA3OV		7,968,296
S5ØA		6,722,650
OM3BH		6,628,692
HG8R (HA8JV)		6,211,205
OG8X (OH6UM)		5,841,780
UW2M		5,816,635
OG6A (OH6KZP)		5,266,170

28 MHz

S57S		48,444
UU5WW		2,760
UA6AK		5

21 MHz

9A5Y (9A3LG)		1,248,650
9A4W		991,800
IU3X (IV3SKB)		796,060
YT7Z (YT7EI)		526,095
EA5DFV		514,206
TM4W (F5HRY)		491,928
UZ4E (UV5EOZ)		234,855
RL3BM		103,179
YO5BBO		68,388
UR5FAV		65,037

14 MHz

TM1W		4,473,924
S5ØK		4,442,844
R3K		3,882,440
LY8O (LY1PM)		3,454,052
S57AL		3,120,816
UZ8M (USØMR)		3,064,094
YT1BB		2,824,326
IT9STX		2,415,420
EA5KV		2,273,810
DL1Z		2,249,468

7 MHz

YT8A		5,197,840
LN9Z (LA5KO)		2,089,542
SP4TKR		1,822,266
S56X		1,813,089
YU3AA		1,561,824
IZ1GAR		1,164,096
EA3ATM		1,030,806
DJØUD		820,988
AM7M		760,914
UT7U		444,882

3.7 MHz

SN7Q (SP7GIQ)		2,969,645
S52AW (S52RU)		2,107,380
OK2BYW		1,788,534
9A6A		1,684,256
9A3B (9A2VR)		1,244,740
SP7HKK		1,126,428
9A5D		956,823
IT9RBW		950,137
SN3A		937,480
OK1W (OK2WM)		817,180

1.8 MHz

LY2IJ		669,108
YT6T (YU7CM)		359,822
DL1SWB		204,614
SP1GZF		177,480
OM7RU		165,436
RA6DB		84,597
DF2UU		77,437
OZ1AXG		42,444
YR8D (YO8DAR)		35,040
IK2DZN		31,088

LOW POWER SINGLE OPERATOR ALL BAND

*IZ2FOS		2,706,688
*S53EA		2,296,193
*YT1HA		1,873,470
*F4FLQ		1,561,716
*OK1WCF		1,534,468
*RV6LFE		1,316,714
*S59KW		1,316,641
*S51F		1,305,678
*IU9A		1,262,602
*UA4FRL		1,215,504

28 MHz

*IWØHBY		32,508
*EC7AKV		17,821
*IZ8CCW		5,500
*F5TMJ		1,863
*EC6UD		1,140
*UT1IA		644
*RW6CW		472
*UZ7HO		220
*SQ9CNN		198
*YO2LEE		192

21 MHz

*SV1UT		94,966
*IK2YGZ		94,668
*EA5EOR		83,172
*SP9DSD		71,645
*LZ2PEP		68,040
*YT1YV		62,918
*YO6CFB		59,136
*HA8TP		58,176
*UR6IJ		56,628
*SP2EXN		48,608

14 MHz

*EB7DX		2,178,000
*PD1DX		1,539,163
*9A5ØKDE (9A1AA)		1,513,400
*YU5RA		1,183,507
*HG3DX (HG3M)		847,476
*S57RTH		723,008
*YT3MA		658,815
*YT5C		601,224
*YR8B		592,740
*IW1QN		515,394

7 MHz

*LZ5W		1,057,707
*E77DO		780,858
*SN3X		690,135
*EC5CSW		409,370
*IZ5DKJ		355,946
*EA1JJ		310,534
*G7TWC		294,465
*S5ØB		293,715
*USØHZ		267,534
*LY2MM		229,457

3.7 MHz

*YU3A (YT2RX)		641,346
*OL5J (OK1RZ)		558,298
*3Z1ØUM (SQ9UM)		541,320
*YU5B		528,200
*RV3WT		492,156
*F5BEG		468,096
*YUØU		431,395
*OM7AB		409,968
*S57O		407,640
*UU2JM		374,958

1.8 MHz

*HA8BE		229,457
*LY2OU		180,648
*S52OT		180,389
*SQ9HZM		95,445
*YO5PBF		93,930
*US8ICM		59,356
*OL6P (OK2WTM)		41,396
*ER3HW		36,816
*OK1JOK		32,096
*RA6MT		13,604

QRP/p

OK7CM	A	489,342
S59D	A	402,500
S57SU	A	333,086
IZ1ANK	A	213,850
US2IZ	A	178,176
YP8A	A	171,105
RZ6MP	A	140,896
DJØMY	A	131,054
RW6HJV/6	A	123,190
IC8FAX	A	106,672
I5KAP	28	11,907
SQ4HRN	21	26,826
DJØMY	14	131,054
S57SU	7	333,086
US2IZ	3.7	178,176
RN3ZJJ	1.8	21,952

SINGLE OPERATOR ASSISTED

E77DX (OE1EMS)	A	8,715,798
YT2T	A	4,979,676
RK4FD	A	4,753,098
YR9P (YO9HP)	A	4,495,568
IQ2CJ	A	3,701,335
OG5B	A	3,574,928
YT5A	A	2,915,704
SV9GPV	A	2,750,334
YT3M	A	2,539,176
DLØWW	A	2,455,164
9A2U (9A3ZA)	28	15,795
Z35X	21	477,356
IQ2CJ (IK2NCJ)	14	3,701,335
UZ7M (UT9MZ)	7	2,390,166
IR2C (IW2HAJ)	3.7	2,380,644
IC8TEM	1.8	162,675

TRIBANDER/SINGLE ELEMENT

HG8R	A	6,211,205
EA6SX	A	4,284,054
CT1DIZ	A	3,875,040
S56M	A	2,388,100
*OK1WCF	A	1,534,468
UA6UDV	A	1,534,280
MDØCCE	A	1,471,927
OH1RX	A	1,381,788
*S59KW	A	1,316,641
*IU9A	A	1,262,602
*EC7AKV	28	17,821
Z35X	21	477,356
EA5KV	14	2,273,810
SP7HKK	3.7	1,126,428
RA6DB	1.8	84,597

ROOKIE

OT2A	A	2,220,288
IZ1LBG	A	2,115,280
RN3ZC	A	1,524,772
UA6YIU	A	1,361,835
*IZ3KKE	A	702,093
IW3SSA	A	652,080
UT6EE	A	495,670
*F4FDA	A	416,780
LA9LMA	A	381,628
*EA2COD	A	274,205
*EC7DZL	21	8,151
OM7ANB	14	569,296
*EC5CSW	7	409,370
IW3SSA	3.7	652,080
*RK2FXG (RA2FIR)	1.8	11,520

MULTI-OPERATOR SINGLE TRANSMITTER

TM6M		14,075,078
OM7M		9,746,737
S53M		9,351,920
EE2W		8,702,568
OE2S		8,467,888
YO22NATO		7,973,688
IO5O		7,911,360
LY9Y		6,662,782
TM7F		6,630,633
EA1EEY		6,234,162

MULTI-OPERATOR TWO TRANSMITTER

9A6ØA		16,471,710
ES9ØC		13,724,640
HG8ØHQ		12,871,896
UU7J		11,789,823
OL7R		9,949,407
YT9X		9,917,964
AM3SSB		9,126,700
DAØBCC		8,929,620
OL1X		6,270,660
PI4COM		3,501,924

MULTI-OPERATOR MULTI-TRANSMITTER

DR1A		22,340,676
OT5A		16,285,416
LZ9W		14,928,360
LY7A		8,371,200
EB1WW		7,711,155
SX5P		6,530,185
SN6O		4,582,080
SN75T		1,650,873
SP75S		684,648
SF6DX		523,083

*Low Power

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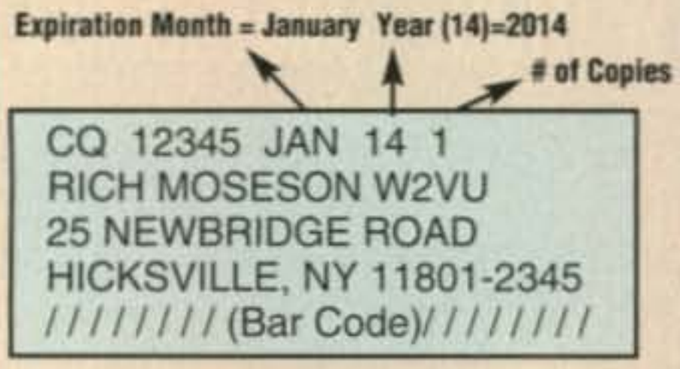

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W1TO, N1NK, W2JU, W1KQ, KM1P, W1KM, and W1ZT. Their work enabled every QSO from every paper log to be incorporated into the log-checking process! Two key helpers in the back office are K1DG, who manages the plaque program, and W5GN, who coordinates all of the certificate printing and distribution.

For expanded QRM of the 2008 contest and operator lists for mult-op stations, go to <www.cq-amateur-radio.com> to the contests section.

The 2009 WPX SSB Contest will be held on March 28 and 29. Conditions are sure to be better by then, so please plan to join in the fun. Rules can be found in the February issue of *CQ*, on the CQ website (www.cq-amateur-radio.com>, and on the CQ WPX Contest website (www.cqwpx.com). Logs are requested to be submitted by e-mail in Cabrillo format. Send WPX SSB logs to **<ssb@ cqwpx.com>**. Hope to see you in the 2009 contest!

73, Randy, K5ZD

QRM

My first attempt as SOAB and I am spoiled. Great competition; will come back next year. Thank you! ... **4LØA**. Another incredibile contest from Morocco! 5D5A@CN3A ... **5D5A**. Sigs from W/VE disappointing. Little heard from western EU too. Quote from K7RI: "Is my frequency clear? I'm not getting many responses." Yes, the frequency was clear. But even K7RI was only S7 ... **7J1AQH**. Very hard conditions especially during the first part of the contest. We worked multi/one with low power and a 2-el 3-band quad on 10 (no QSOs), 15, and 20m. On 40, 80, and 160m we used a multiband dipole. It was fun but we hope that conditions will improve next year. We operated from Skinnskatteberg, JO89UT ... **8SØC**. First time worked in QRP mode contest with Yaesu FT-817 and homebrew 14-element Spider Beam. Mainly worked Asia Pacific region. Surprisingly worked abt 20 contacts with EU on 14 MHz, and one from AF. I am very enjoyable to work in QRP mode. Many thanks for those good-ear stations for my weak signal ... **9M6YBG**. Operated first day from home, then flew to Austria and was able to operate a few hours from OE6MBG. Great fun to work the contest from two continents and hear how different the contest sounds from each place ... **AK1W**. I'm a volunteer paramedic here. Had to respond to some calls during the contest. The dispatchers now know what QRZ, QSL, and QRX mean! ... **AK9I**. This was four stations M/M from EA8AH QTH. Poor conditions and many problems with generators, but we still managed to keep four stations on the air for entire contest ... **AO8A**. I am glad of contacting hams around the world. See everyone next contest ... **BV4VR**. Second day was much better. In memory of Charki ... **CN2R**. SSB contests keep getting tougher. Even with HP it becomes increas-

(Continued on page 102)

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	CN2R('07)	1,613,955	399
3.5	CN2R('06)	11,849,076	894
7.0	CN2R('05)	14,724,696	931
14	CN2R('08)	15,778,840	1199
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
Assisted	P40W ('07)	15,837,235	1069

Multi-Operator Single Transmitter

D44TD('02)		33,443,856	1332

Multi-Operator Two Transmitter

AN8A('07)		47,019,528	1444

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	NY6N('08)	2,038,192	533
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
Assisted	NB1B('01)	7,463,666	1022

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	CN2R('07)	1,613,955	399
3.5	CN2R('06)	11,849,076	894
7.0	CN2R('05)	14,724,696	931
14	CN2R('08)	15,778,840	1199
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	H22H('08)	2,432,692	502
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	SN3R('07)	835,884	434
3.5	SN7Q('08)	2,969,645	713
7.0	YT8A('08)	5,197,840	860
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	ZF1A('08)	2,269,344	462
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	KH6ND('07)	26,432	59
3.5	WH7Z('03)	1,208,900	308
7.0	ZL3A('08)	8,200,800	816
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	ZX5J('08)	14,740,056	1242
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	AN8A('07)	47,019,528	1444
AS	A61AJ('04)	30,157,650	1255
EU	OE4A('07)	18,533,494	1337
NA	6Y1V('08)	29,018,014	1306
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

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Announcing:

The 2009 CQ World-Wide WPX RTTY Contest

February 14–15, 2009

Starts: 0000 GMT Saturday Ends: 2359 GMT Sunday

I. Objective: For amateurs worldwide to contact as many amateurs and licensed prefixes as possible during the contest period.

II. Period of Operation: 48 hours. Single Operator stations may operate 30 of the 48 hours; **off times must be a minimum of 60 minutes**. Multi-Operator stations may operate the full 48 hours.

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

IV. Terms of Competition for All Categories:

(a) 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.

(b) A different callsign must be used for each entry.

(c) All entrants must not exceed 1500 watts total output power, or the maximum output power of their country, or the power limit of their entry category, whichever is less, on any band.

(d) Any form of QSO alerting assistance may be used in *all* categories. However, self-spotting or asking other stations to spot you is not allowed.

(e) All operation must take place from one operating site. 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.

(f) The entry location of a remote station is determined by the physical location of the transmitters, receivers, and antennas. A remote station must obey all station and category limitations.

V. Entry Categories

A. Single Operator Categories: Only one person (the operator) may contribute to the final score during the official contest period.

(a) Single Operator High (All Band or Single Band): One person performs all of the operating and logging functions. Only one transmitted signal is permitted at any time. **Total output power must not exceed 1500 watts**.

(b) Single Operator Low (All Band or Single Band): One person performs all of the operating and logging functions. Only one transmitted signal is permitted at any time. **Total output power must not exceed 100 watts.**

B. Multi-Operator Categories (all band operation only, high power only):

(a) Single-Transmitter (MULTI-ONE): Only one transmitted signal at a time. A maximum of 8 band changes may be made in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Violation of the 8-band change rule will result in reclassification to the Multi-Multi category. Maximum power allowed is 1500 watts total output.

(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 only be worked once per band regardless of which transmitter is used. The log must indicate which transmitter made each QSO (see rule XIII(b)). Each transmitter 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 counts as two band changes. Use a separate serial number sequence for each band. Violation of the 8-band change rule will result in reclassification to the Multi-Multi category. Maximum power allowed is 1500 watts total output.

(c) Multi-Transmitter (MULTI-MULTI): No limit to transmitters, but only one transmitted signal (and running station) allowed per band at any time. Use a separate serial number sequence for each band. Maximum power allowed is 1500 watts total output.

VI. Exchange: RS(T) report plus a progressive contact serial number starting with 001 for the first contact. Multi-Single and Multi-Two use a single serial number sequence for the complete log and Multi-Multi entrants use separate serial number sequences starting with serial number 001 on each band.

VII. 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 and 3.5 MHz.

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

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

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

(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 count as 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, /AD8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. Example: PA/N8BJQ would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

(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.

IX. Scoring (QSO Points):

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

(b) Multi Operator: Scoring is the same as Single Operator, All Band.

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

X. Awards: Certificates will be awarded to the highest scoring station in each category listed under Section V—

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(a) In every participating country.

(b) In each call area of the United States, Canada, Australia, Asiatic Russia, Spain, and Japan.

(c) In countries or call areas where entries justify, second- and third-place awards may be made.

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, only contacts made on the band specified in the Cabrillo header or summary sheet will be considered for scoring purposes.

XI. Plaques and Donors:

Plaques are awarded to recognize top performance in a number of categories. For a current list of plaques and sponsors, or to learn how to become a sponsor, see the CQ WPX RTTY Contest website: <http://www.cqwpxrtty.com/plaques.htm>.

A station winning a World plaque will not be considered for a sub-area award. That award will be given to the runner-up for that area if the number of entries justifies the award. Contestants who win a category for which no plaque is sponsored may contact <plaques@ cqwpxrtty.com> to arrange to order one.

XII. Club Competition: A plaque will be awarded each year to the club that has the highest aggregate score from logs submitted by members. The club must be a local group and not a national organization (e.g., ARRL or DARC). Participation is limited to members operating from a local geographic area defined as within a 275 km radius from center of club area (except for DXpeditions specially organized for operation in the contest). Single operators can only contribute to one club. Multi-operator and DXpedition scores are allocated as indicated with the entry. Please spell out the full club name in the Cabrillo file. To be listed in the results, a minimum of three logs must be received from a club.

XIII. Instructions for Submission of Logs:

(a) All times must be in GMT.

(b) All logs must be submitted in chronological order. Entries from Multi-Two stations must clearly indicate which transmitter made each QSO (column 81 of Cabrillo QSO template for CQ contests.)

(c) The log **must** show the correct serial number sent and received for each contact. Logs without sent and received serial numbers may be reclassified as checklogs.

(d) We would appreciate receiving all logs in electronic format. Electronic submission of logs is **required** for anyone competing for an award and for all who use a computer to log the contest or prepare contest logs.

(e) Single band entrants are requested to include *all* contacts made during the contest period, even if on other bands. Indicate the single band information in the Cabrillo header and only those contacts made on the single band will be included in the scoring.

(f) The Cabrillo file format is the standard. Please make sure all of the Cabrillo header information is included. For detailed instructions on filling out the Cabrillo file header, see the CQ WPX RTTY Contest website <www.cqwpxrtty.com>. Failure to fill out the header correctly can result in your entry being placed in the wrong category or reclassified as a checklog. **U.S. stations must indicate the ARRL Section or state of operation in the Cabrillo header (e.g., ARRL-SECTION: OH**).

(g) E-mail is the expected method of log submission. Logs in Cabrillo format should be sent to <rtty@cqwpx.com>. In the "Subject:" line of your e-mail message, please include only your callsign and nothing else. All logs received via e-mail will be confirmed via e-mail. A listing of logs received can be found on the CQ WPX RTTY website.

(h) Instructions for NON-CABRILLO electronic logs: If you are not able to submit a Cabrillo log, please contact the Contest Director for permission to submit another format.

(i) Instructions for paper logs: Official log and summary sheets are available from CQ Communications, Inc., 25 Newbridge Road, Hicksville, NY 11801 USA; fax (+1) 516-681-2926); or e-mail your request to CQ at <cq@cq-amateur-radio.com>. You may make your own forms as long as all required information is present. Each paper log entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS. Indicate CQ WPX RTTY Contest on your envelope.

XIV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive unverifiable QSOs or unverifiable multipliers will be deemed sufficient cause for disqualification. Incorrectly logged calls will be counted as unverifiable contacts.

Any use by an entrant of any non-amateur means including, but not limited to, telephones, e-mail, Internet, Instant Messenger, chat rooms, VoIP, or the use of packet to *solicit, arrange, or confirm* any contacts during the contest is unsportsmanlike and the entry is subject to disqualification.

An entrant whose log is deemed by the Contest Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within five years, he/she will be ineligible for any CQ contest awards for three years.

XV. Declaration: By submitting an entry in the CQ WPX RTTY Contest you agree that: (1) 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; (2) your log entry may be made open to the public; and (3) all actions and decisions of the CQ WPX RTTY Contest Committee are official and final.

XVI. Deadline: All entries must be postmarked NO LATER than March 11, 2009. All logs, including e-mail entries, are subject to these deadlines. Logs postmarked after the deadline may be listed in the results, but will be ineligible for any awards.

Any questions pertaining to the contest may be e-mailed to the CQ WPX RTTY Contest Director, Ed Muns, WØYK at <w0yk@cqwpxrtty.com>.

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Announcing:

2009 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 2009 "class" are now open. Members of the 2008 "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, 2009, we will be accepting nominations for the 2009 "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 2009. Please help us recognize these "ham radio heroes" whose contributions have helped shape our hobby, our nation, or our world.

(The official nomination form is on the CQ website.)

CQ DX and Contest Halls of Fame
Deadline March 1st

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>.

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math's notes

BY IRWIN MATH,* WA2NDM

Potpourri

First and foremost, 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!

Although my professional career is continuously involved with lasers, fiber optics, and multi-gigabit transmission systems, I am not a technological "freak." I grew up during the age of the maturing of semiconductors and am well aware of the amazing accomplishments our current technology is capable of, but *my* cell phone only rings (like the old-fashioned telephone). It does not have a multitude of "ringtones" or pictures of the people I talk to or any of the many so-called "desirable features" available. Don't get me wrong. This is my personal choice. I love technology. I just don't like so-called "technology for technology's sake."

My amateur radio station consists of a Kenwood hybrid (solid-state front end, vacuum-tube final), as I feel that the lower noise capabilities of transistors are "worth it," while the forgiveness of vacuum tubes driving mismatched loads is hard to equate with solid-state devices (unless one provides an elaborate feedback network). My well-equipped lab has a 200-MHz digital Tektronix scope as well as a 1000-MHz analog Tektronix scope. I also have a digital pulse generator and an analog function generator. I mention all of this to indicate that the reason for such a mix is that each has its own specific advantages as well as inherent disadvantages (which we will look at in a future column). In short, I feel that technology should certainly be used wherever and whenever appropriate, but *never* just to demonstrate how clever a designer can be.

In the "old days" a radio's controls were simple and to the point. One knob had one function (volume, tone, bandswitch, RF gain, etc.). Sometimes a switch was coupled to a potentiometer to produce a volume-control/power on-off combination, but that was pretty much the limit. Every control was self-explanatory, and even the least technically adept person had no real problem understanding each function. Instruction manuals were not really necessary, and most people never read them but filed them away "just in case." Today, however, you must push button #1 twice quickly to get one function, three times to get another function, and in conjunction with another button or two to get additional functions and so on. This has been taken to such an extreme that the average consumer has real problems programming a DVD player, a simple TV remote control, or even the features on a cell phone. Even the instruction manuals that are provided are fairly complex and often hard to follow. I often wonder if the real reason all of this has come to pass is to impress someone with how clever the designer (or the designer's company) can be.

I can already hear the shouts of "but this is progress!" or "how can your generation possibly understand?" or even "because it's really *cool*." Well, I am not so sure it really is so cool. Our youngsters are no longer captivated by the "magic" of technology, but by how quickly they can "text-message" a friend. Our RF spectrum is being auctioned off to the highest bidder for even more of the same, while it seems that the major effort of industry is to create even more uses for the cell phone. Live video (who wants to watch a movie on a cell phone?), voice recognition (eliminating the human component altogether), and a host of games (are we so bored all of the time?) all are in the offerings to come or are available "at a small additional cost."

Even the amazing computer, which has proven to be so useful in providing research and simulation tools, has had its real growth in internet chat rooms, MySpace, and similar features, not to mention spawning a group of people who get their kicks by creating viruses to interfere with legitimate users. Even search engines are becoming so clogged with erroneous data that trying to find something is getting harder and harder.

Other than a source of revenue for the various manufacturers involved, has any of this really improved the quality of life for the human beings on this planet? I am not so sure. In the old days (there he goes again!) one who was so inclined learned electronics by building circuits, experimenting, blowing out components, and getting burned by soldering irons, but also by truly creating something that one could often be proud of, not by mastering level 10 on some mindless video game. Occasionally such "amateurs" even actually created something that did indeed revolutionize our lives.

The excitement of my first radio contact (New York to London) on homebrew equipment I built with my two hands (from salvaged radio and TV components) still has not been equaled, but as my 15-year-old says, "So what?! I can easily dial anyone in the world I want to with my transceiver (aka cell phone)." "Yes," I answer, "but do you even have any appreciation of what is going on in that little piece of equipment in your hand?" "Why should I care?" is the curt answer. This, in a nutshell, is part of the problem. Not too many do care anymore (at least in this country).

I am deeply disturbed by a recent article that stated that over the next 50 years more than 90 percent of all of the engineers in the world will not be in the U.S. If this is true, does it mean that the technological age that started here is over (as far as the U.S. is concerned)? Will we all simply become mindless users of some other country's technology, possibly even one with radically different views than ours? I for one certainly hope not.

One possible solution to this scenario (as far as I am concerned) is to try to awaken an interest in

*c/o CQ magazine

technological endeavors such as amateur radio. If we take a little of our time and try to show technically oriented youngsters the fun side of technology perhaps we can guide such people toward a career in technology.

My entry into this "world" occurred when I was only 10 years old. My father brought home a simple crystal radio kit. Together we wound the slider equipped "tuning coil" and put up an antenna between a couple of vents on the roof of the apartment house we lived in. A convenient water pipe served as a ground. I remember spending hours sharpening the "cat's whisker" and searching for the most sensitive spot on the galena crystal. The fact that I could only receive three stations did not matter. It was "magic" to my 10-year-old mind. Not only did this create a close relationship with my father, it literally gave my life direction! I don't think MySpace, Facebook, text messaging, and/or video games are really capable of doing the same.

Ladies and gentlemen, the handwriting is on the wall! What we as responsible adults (at least most of us) do from this point on may well shape the world our children will inherit. Let us hope that the spirit that has been "America" for so long *is still there!* 73, Irwin, WA2NDM

BY FREDERICK O. MAIA,* W5YI

Controversy at the Radio Club of America, W2RCA

"Unauthorized" club trustee change reveals schism in century-old club

The Radio Club of America, Inc., is the oldest and most prestigious radio club in the world with membership by invitation only. Nearly as old as the radio art itself, the club has roots dating back to 1907 and was founded as the Junior Wireless Club Limited. Its first meeting was called to order 100 years ago this month, in January 1909.

An amateur station built and operated by The Radio Club of America was the first to send a message across the Atlantic on the shortwaves. It was sent from Old Greenwich, Connecticut, to Ardrossan, Scotland by amateur station 1BCG on December 11, 1921.

The Radio Club of America counts among its current and past membership the best in the radio communications industry, including radio pioneers such as Edwin H. Armstrong and David Sarnoff.

Club Election Brings Disputes to Light

One of this year's candidates for RCA Vice President is Don Bishop, WØWO, of Overland Park, KS. Don is a lifetime Fellow of the Radio Club of America, an ARRL and QCWA life member, and a member of IEEE, the Institute of Electrical and Electronics Engineers.

Bishop was also a member of the RCA Board of Directors and Editor of its magazine, *Proceedings,* for many years. He was elected once again to the board in 2007 for a two-year term beginning in 2008. For three years beginning in September 2005, he had been writing and distributing a separate RCA newsletter (he called it "Personal Correspondence") which apparently was not the "official" club publication. Another newsletter claimed to be the "official" one. We were never able to figure out why there were two, but suspected there was some sort of problem.

It came to a head on September 12, 2008, when we received another official RCA newsletter that carried an item entitled: "Club Call Sign To Be Restored."

The newsletter went on to say: "Without the knowledge or the authority of the Radio Club Board, the Radio Club's amateur call sign, W2RCA, was secretly assigned to Don Bishop, who alleged on the application to the FCC that he was the new trustee of the station. 'The original trustee, Eric Stoll [K2TO], was not informed of and did not participate in this activity,' says President Phil Casciano [who is not a licensed radio amateur.] 'The Radio Club's Board was shocked to find that this asset was improperly spirited into Bishop's control without warning or authority.'"

"The Executive Committee voted to restore the license to the rightful trustee," the article continued. "Meanwhile, the matter has been referred to Radio Club legal counsel to determine what, if any, federal laws have been violated by Bishop's unauthorized actions. 'We are providing Mr. Bishop an opportunity to explain his bizarre actions,' comments Robert Schwaninger, co-counsel, 'prior to making further recommendations to the Board.'"

Dr. Eric Stoll, trustee of W2RCA, said he "...found this a curious situation considering that W2RCA has been active in all the recent Radio Club of America QSO Parties...."

Club Station Call Sign Administrator (CSCSA)

We decided to look into this, since FCC rules, Section 97.5(b)(2), clearly require that club trustee changes must be authorized by an officer of the club and submitted through an FCC-appointed Club Station Call Sign Administrator. It takes two signatures on the trustee-change application: appointment by a club officer and the agreement of the new trustee.

The FCC privatized the club call sign assignment system several years ago. All club licenses must go through a CSCSA and there are three. Two are the ARRL-VEC and W5YI-VEC. (ARRL CEO Dave Sumner, K1ZZ, and the retired founder of the W5YI-VEC, Fred Maia, W5YI, are both longtime members and Fellows in the Radio Club of America.) The RCA trustee change application was submitted through the ARRL-VEC.

W5YI contacted Don Bishop to get more details. In a September 13 e-mail, Bishop said he was asked to be the trustee by Ray Minichiello, W1BC. Minichiello, 91, is RCA Secretary and therefore an officer of the club. He also believes Ray was authorized since "It was Ray's idea for RCA to apply for the license in the first place, ten years ago. He prepared the original application back then, and he asked Frank Gunther, W2ALS (SK), to be the first trustee for the license." The W2RCA trustee change was made in May 2008.

Bishop said that he did not initiate the trustee change, but "agreed to serve," adding, "No one from RCA contacted me about this W2RCA matter before sending the RCA e-mail newsletter, so that was my notice that there was a problem." He said, "I hear complaints from some club leaders

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who are not radio amateurs that 'Bishop is trying to turn RCA into a ham club.'

"What I actually am doing is looking to restore a proportion of technical understanding and engineering background to the club, and especially within its complement of elected officials," Bishop continued. "The club leadership has shifted toward the non-technical during the past decade or two. Also, the club is taking on more of the attributes of a trade association and losing its identity as a fraternal organization of individuals interested in the radio art."

Bishop added, "In 2007, of the 21 board members, only four were radio amateurs. Through a grassroots effort using e-mail and telephone communication to identify potential candidates and then using petitions to nominate them, nine candidates with RF-oriented backgrounds and radio amateur licenses were placed on the ballot for director for the 2007 election to take office in 2008. ...This change in the makeup of the board of directors shocked an influential part of the incumbent leadership. They saw it as a step that was not in the best interest of the club. Many others among the rank-and-file members saw it as a welcome step forward.

"This year, the same grassroots effort used e-mail and telephone communication to identify some more potential candidates. Then, once again using petitions, seven candidates with technical backgrounds and radio amateur licenses—and many with executive, managerial and entrepreneurial experience, I might add—were placed on the ballot.

"The incumbent leadership has sometimes described this development as 'hijacking the election' or 'taking over the club' or worse." "What it is," Bishop said," is good old-fashioned activism intended to improve the club and move it forward.

"If these seven candidates are elected as directors, along with Ray Minichiello as secretary, and myself as vice president, then the Radio Club would have about 15 radio amateurs on its 21-member board of directors. The exact number depends on who is appointed to fill vacancies."

Bishop continued, "But the candidate field is large. Ray and I both share the ballot for officer positions with candidates who are not radio amateurs, and the list of director candidates includes the names of eight nominees who are not radio amateurs. It therefore is possible that no one with a radio amateur license will be added to the board in this election, and next year's board would have six members with licenses. The actual number could be somewhere between six and 15.

"A focus on radio amateur licenses is not so important, but the candidates with licenses generally have technical or engineering backgrounds, and those without often do not. That's just the way it tends to work. People who are interested in radio for career purposes often obtain radio amateur licenses, and youngsters with radio amateur licenses may grow up to become adults with technical careers."

Bishop went on to say, "Last year's election results were not lost upon the incumbent, influential leadership. This year, some of them are going to great lengths to obtain a different outcome that does not include radio amateurs. Whether what you have just seen in the newsletter and in a previous postal letter sent by the club president is a reflection of that effort, I would leave to you to decide. Whether you also are seeing RCA officials with a desire to sway the election outcome using the club's media and its postal permit, in effect spending club money on electioneering, is also something I would leave for you to decide.

"I have never seen the club give so much attention to its amateur radio club station license. You won't find the call sign printed on the *Proceedings* masthead. You won't see it displayed in the "Aerogram" printed newsletter. You won't see it identified in the e-mail newsletter heading. You won't see it mentioned anywhere on the club's website. I've urged the club to do any one or all of those things, but the incumbent leaders won't do it because *it would* 'make RCA look like a ham club.' It's as though the club station license and the call sign W2RCA were an insignificant part of the Radio Club until that e-mail newsletter from the club came out on Sept. 12."

Response by Radio Club of America

On September 16, W5YI sent an e-mail to RCA President Phil Casciano, pointing out that it is not possible for a club trustee to assign himself as the new trustee and that the trustee change was authorized by the signature of Raymond Minichiello, a current RCA officer. The trustee rules do not require that the RCA Board nor the outgoing trustee be involved.

Casciano forwarded our e-mail to Robert Schwaninger, legal counsel for the Radio Club of America. He said, in part, "You are correct when you state that the trustee of a club license cannot be assigned without participation by an officer of the club. The applicable FCC Form requires execution by both the new trustee and an officer. What the completion of the form does not reach, however, is whether the proposed trustee or the officer has the necessary corporate authority to take those actions to assign the trusteeship. In the subject case, neither Mr. Bishop nor Mr. Minichiello possessed such authority.

"Just because a person serves as an officer of a club, that person is not imbued with the authority to transfer the control of club assets without consent of the board. Nothing in the RCA by-laws provides such authority to Mr. Minichiello by virtue of his status as club secretary. To the contrary, such authority resides solely in the board. Similarly, nothing in the by-laws would allow Mr. Minichiello to unilaterally name Don Bishop trustee of the radio license.

"As for what the FCC rules require, the following statement is more accurate: The FCC rules require that an officer, who is also empowered by the licensee, approve such an assignment. When a club officer executes a Form 605 they are not just 'approving' the assignment, they are also warranting that they have been provided all corporate authority to take such actions. Mr. Minichiello made that warranty to the FCC, but that warranty was incorrect as he had never requested such authority from the club, was never granted such authority from the club, and never even informed the club that he intended to so act. Therefore, your assertion that 'The trustee rules do not require that the RCA Board nor the outgoing trustee be involved' is inaccurate. FCC rules, in combination with corporate law and, frankly, polite participation in a non-profit organization, require that, at least, the RCA Board be involved."

Schwaninger continued, "Both Mr. Bishop and Mr. Minichiello knew or should have known that their actions required board approval. They did not seek such approval and, instead, acted outside of their respective authority. This situation raises legal issues which are being explored by legal counsel, pending a fuller explanation from Mr. Bishop and Mr. Minichiello."

The fact is that the trustee change was indeed properly handled by the American Radio Relay League. As of press time,

Don Bishop is still listed as the trustee for the Radio Club of America's ham station call sign, W2RCA.

More Don Bishop "Personal Correspondence"

On September 27, Bishop distributed another of his "Personal Correspondence" newsletters. He said that it was puzzling to him "...why I am being made the subject of all this controversy involving the trustee for RCA's amateur radio club station license, W2RCA. Someone seems to be instigating this when it is entirely unnecessary. It was not my idea to become the trustee. I was honoring a request from Ray Minichiello, W1BC, the Radio Club's elected secretary. The core of the question seems to be, 'Did Ray have the authority to ask me?' That is simply a matter for the board to decide, and it should not have resulted in the personal attack upon me. ...As a result, I feel obliged to send out my correspondence describing the situation."

Bishop retained an attorney to protect his interests.

We also contacted Ray Minichello, W1BC, the club's secretary. He confirmed that he did indeed ask Don Bishop to be the trustee of W2RCA and that—after thinking it over—Bishop accepted. Ray added that he and Don had been discussing possible amateur radio activities to celebrate the upcoming 100th anniversary of the club in 2009 and that he had arranged a donation of a state-of-the-art transceiver to be used during the event.

In a letter to RCA, Bishop's attorney (Michael L. Higgs, who is also a member of the club) said the club had "libeled and defamed our client," and that its accusations were "reckless" and "wholly *unsupported by fact*." He pointed out that the club's constitution and by-laws do not address handling of the club's call sign. Higgs said they were offering "...one opportunity for the club to remedy this dreadful error." The club was asked to publish a retraction of the September 12 accusations and issue "...a sincere apology to Mr. Bishop for publishing such scandalous claims without providing Mr. Bishop the opportunity to explain himself."

A deadline of September 30 was set but RCA did not issue a retraction or issue the apology. Don Bishop eventually decided to deal directly with the club and discharged his attorney.

In a follow-up email, I asked Don Bishop for his views on the upcoming election:

"The election appears to have cast light on some differences of opinion regarding what the Radio Club of America is and what its future holds," he replied. "Some members see the Radio Club's future as a trade association or industry association, and they believe that it already is an organization of that nature, regardless of what it might once have been. Others see its future as a fraternal organization devoted to the investigation and advancement of the radio art that welcomes technically minded members, including radio amateurs, and that its shift toward being an industry association is more a reflection of its complement of elected officials than the makeup of its membership.

"An effort by several members, including me, identified a large number of members with technical backgrounds and radio amateur licenses who said they would be interested in serving as officers or directors. I circulated petitions on their behalf to nominate them as candidates.

"Seeing 10 candidates nominated who, if elected, would represent the technical and radio amateur segment of the membership on the 21-member board, the industry association segment responded by nominating additional candidates of its own," Bishop continued. "Both groups then conducted election campaigns for their slates of candidates using postal mail and e-mail."

I asked Bishop his view on where Ray Minichiello now stands:

"Ray has been placed in a most unfortunate position because he believes, as I believe, he has or had the authority to transfer the trustee and sufficient reason to do so. Yet, it could have been handled better, and circumstances involving the board and other officers made it difficult if not close to impossible for Ray to handle it better. But I can't say exactly why because it would violate a confidence."

Bishop continued, "Ray also is a candidate for office, and he is one of several of us members who conducted election campaigns. I believe it would be safe to say that objections have been raised to the way everyone campaigned, and that objecting to the way the other guy campaigns is fairly common."

Finally, I asked Don where he currently stands with the club:

"As of today, October 24," he replied, "I am a life member and Fellow of the club, a member of the board of directors, and a candidate for vice president.

Response to This Column from The Radio Club of America

I shared much of what I would be writing for this month's column with the people involved. On October 30, I received the following from Martin Cooper, a Radio Club of America Vice President (and inventor of the first portable cellular telephone in 1973). According to Mr. Cooper, this statement represents the views of the Board of Directors and is the official club position on the matter:

I am grateful to Fred Maia for sharing parts of this story before its publication and for allowing me to present my views. I fear that, while Fred's reportage is largely accurate, the story leaves some misleading impressions. Here are my views on some issues covered in this article.

It would be difficult to find an organization of intelligent, opinionated, and enthusiastic people in which there are not disagreements and controversies; the Radio Club of America is no exception. These controversies are healthy. They ensure that the views of all members are represented and when they are resolved, that the organization serves all constituents. But resolution involves processes and procedures that must be observed. I know all of the RCA people mentioned in Fred's article, some better than others. All of them are acting, in their own way, in the interest of the Radio Club of America. But reasonable people differ and, not surprisingly, there have been mistakes, perhaps errors in judgment, made by parties on every side of the controversies described by Fred. The reactions to these differences and mistakes have most often been overblown. I point out that there is not one shred of evidence of dishonesty, not one fact of breaking of trust, mentioned in the article. Fred believes that there may be value in reporting of rumors, opinions, and allegations so long as they are identified as such. I don't agree! What purpose is there except to dishonor club members and spark continued unhealthy controversy? Fortunately, the readers of the article are smart enough to recognize the facts, as such.

The characterization of two factions in the RCA, one representing marketing-oriented people (CMA, etc.), and the other technical people (hams, engineers, etc.), is simply wrong. Yes, we are a diverse group. The collegial element of the RCA embraces not only marketing and technical people, but regulators, lawyers, and others, all of whom have contributed to make the radio industry great. A more careful look at our officers would disclose that the "CMA" group includes amateurs and engineers and the "techies" group includes many who make their living out of marketing and journalism and law. The club has made all welcome. There are processes and procedures available to those who wish to change this inclusive policy and they are within their right to do so.

The Board of Directors of the RCA is addressing the potentially damaging aspects of the controversies. My dream is to see everyone working together in the interest of the club. I have urged Don Bishop to publish his newsletter as an official publication of the Club, with appropriate oversight by the RCA Board, and he has indicated a willingness to do so. I have urged Ray Minichiello to apply his considerable talents to create a magnificent 100th Anniversary Memorial book and he, also, has volunteered.

The RCA Board is working hard to move forward and to put the negative aspects of the controversies discussed in this article behind us. By the time this article is published, I believe (but don't guarantee) that we will be successful. Meanwhile, I urge the readers of this article to focus on the facts, dismiss the rumors, and enjoy the benefits of club membership. And those of you who don't yet belong to the Radio Club of America, NOW IS THE TIME TO JOIN.

I am a devoted member of the club and hope to remain a member and also an active contributor to club projects.

"I used to send 'personal correspondence' e-mail messages to some RCA members that contained information about other members' activities, stories about new members, historical information about the club, photos I took at club events and original artwork. I started the [personal correspondence] e-mails as an offshoot of travel e-mails I sent to relatives and friends. The first one I wrote had to do with an RCA breakfast meeting I attended in August 2005. My first e-mail was sent on Sept. 28, 2005, and the last one on Sept. 27, 2008. During the three years, I wrote about 100 of them. Although many members liked my RCA-related e-mails, some did not, and enough members of the board objected to them that I decided to discontinue them indefinitely. RCA started its own e-mails in April 2007, and some board members saw mine as confusing RCA's official message, competing with the club's own effort to disseminate information and otherwise unnecessary or unwanted.

"Some members of the board also objected to my accepting an invitation from the club secretary, Ray Minichiello, P.E., W1BC, to be the trustee for the amateur radio club station license W2RCA, and the way the transfer of trustee was handled. Although it was entirely consistent with the way I became the trustee of another club station license 30 years ago, it did not meet the expectations of the Radio Club's board. I could have handled the matter better, and I'm sorry I didn't. I have apologized to the board for the mistake.

"Along the way, though, the matter of the trustee escalated to the point where club officers made some accusations about me in public and had an attorney send me a letter about it before asking me what happened. I responded via an attorney, which is what I always have been advised to do: When contacted via an attorney, respond via an attorney. I have since discharged my attorney in an effort to bring the matter back down to something to be fixed among club members. Some officers said they couldn't talk to me as long as I was represented by an attorney, so I ended that representation. I also asked that the club discontinue using an attorney, and maybe that was done.

"One of my friends in the club told me that what upset some board members never was so much about the license trustee matter, it was mostly about the e-mails, even though no one wanted to say it because who can challenge one person's right to send e-mail correspondence to another? But in the interest of harmony, I have discontinued the e-mails and would like to see the other matters resolved quietly and amicably.

"I was surprised by the highly adverse reaction by a fairly large number of board members who tend to represent the 'industry association' part of the club when I helped to nominate technically minded members with radio amateur licenses to run for office. I would have hoped that the new candidates would have been welcomed as coming forward to possibly represent a segment of the club that has been under-represented for a number of years. The idea never was to push out or diminish the size of the industry association segment, but instead to increase the proportion, just the proportion, of technically minded club leaders. I would also like to see the proportion of technically minded club members increase, whether or not they have radio amateur licenses. I believe that would be in the best interest of the club and good for its future."

73, Fred, W5YI

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- Stays in mode you select (voice/packet) through power off cycles
- Ten autodial memories

Work simplex and the VHF and UHF Repeaters

- 144 MHz DR-135TMkIII
  50 watts, H/M/L power settings
- 220 MHZ DR-235TMkIII
  (pictured) 25 watts, H/M/L power settings
- 440 MHZ DR-435TMKIII
  35 watts, H/M/L power settings

- EJ-41U internal TNC board is available as an option for 1200/9600bps packet
- 100 memory channels
- Front panel data port
- Rear panel DSUB9 computer connection
- No need to remove mic for packet operation
- Ignition key on/off feature
- CTCSS, DCS encode+decode, DTMF encode and Tone-burst are all standards
- Clean, clear Alinco audio
- Super-wide 7 character alphanumeric display
- Wide and narrow FM modes (16K0 & 8K50F3E)
- Theft alarm feature
- A large, palm-fitting commercial-grade backlit microphone with an 8 pin metal connector (not a modular plug) as well as direct frequency input and direct multi-function access such as monitor, call channel, power setting, memory to VFO plus more!
- Stays in mode you select (voice/packet) through power off cycles
- Ten autodial memories

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- DR-635T 144 MHz/440MHz

- VHF/UHF full duplex operation includes V/U and U/V modes.
- Cross-band repeater function (where permitted: standard on DR-635T)
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- H/M/L power output settings- VHF: 50/25/5W UHF: 35/20/5W
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- Selectable display color illumination (Blue, Violet or amber)
- Internal duplexer - single antenna connector
- Removable control head can be remotely mounted (requires optional EDS-9 separation kit) or allow transceiver to be inverted for optimal speaker placement.
- Expanded receive range includes FM broadcast band (WFM)
- Power supply voltage display
- Theft alarm feature
- Optional 1200 and 9600 bps packet operation with optional EJ-50U
- Digital voice communications with optional EJ-47U
- Illuminated DTMF EMS-57 microphone allows direct VFO frequency entry and remote control of transceiver
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- CTCSS Tone and DCS scan
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In a follow-up to his November article co-authored with K9LA, NM7M says some of the data used to develop their theory of galactic cosmic rays and enhanced propagation on 160 meters can also be used to predict future long-distance openings.

Predicting Ducting-Assisted Propagation on 160 Meters

BY ROBERT R. BROWN,* NM7M

Recently, an article was published in *CQ* (Brown and Luetzelschwab, November 2008) which dealt with the role that galactic cosmic ray intensity plays in 160-meter propagation and DXing. For us, galactic cosmic rays are a weak flux of particles, largely protons in the 10–20 GeV range, that have entered our atmosphere after first getting through the *heliosphere* (the sun's magnetic field, which contains the entire solar system) as well as the Earth's magnetic field and ionosphere.

In the article, use was made of records of ground-based *neutron monitors*, devices that detect secondary neutrons generated in the atmosphere by primary galactic cosmic rays (GCR). It is now apparent that these measurements may also be used to predict the formation of ducts capable of supporting very long-distance DX (over 10,000 kilometers) on the band.

Turning to the ionosphere, it was found (Brown, 2008) that the GCR flux can support the ionization at the bottom of the electron density valley above the *E*-layer after sunset. That valley has long been considered a potential site for ducting, with signals propagating for great distances by reflections with the walls of the valley without ground reflections. This ducting mode is realized when the flux of GCR decreases (Brown and Luetzelschwab, 2008) or falls below the normal background level.

Neutron monitors such as those at Moscow, Kiel (Germany), or Calgary report decreases in GCR on a routine basis and electromagnetic theory can be used to relate the ducted distance,

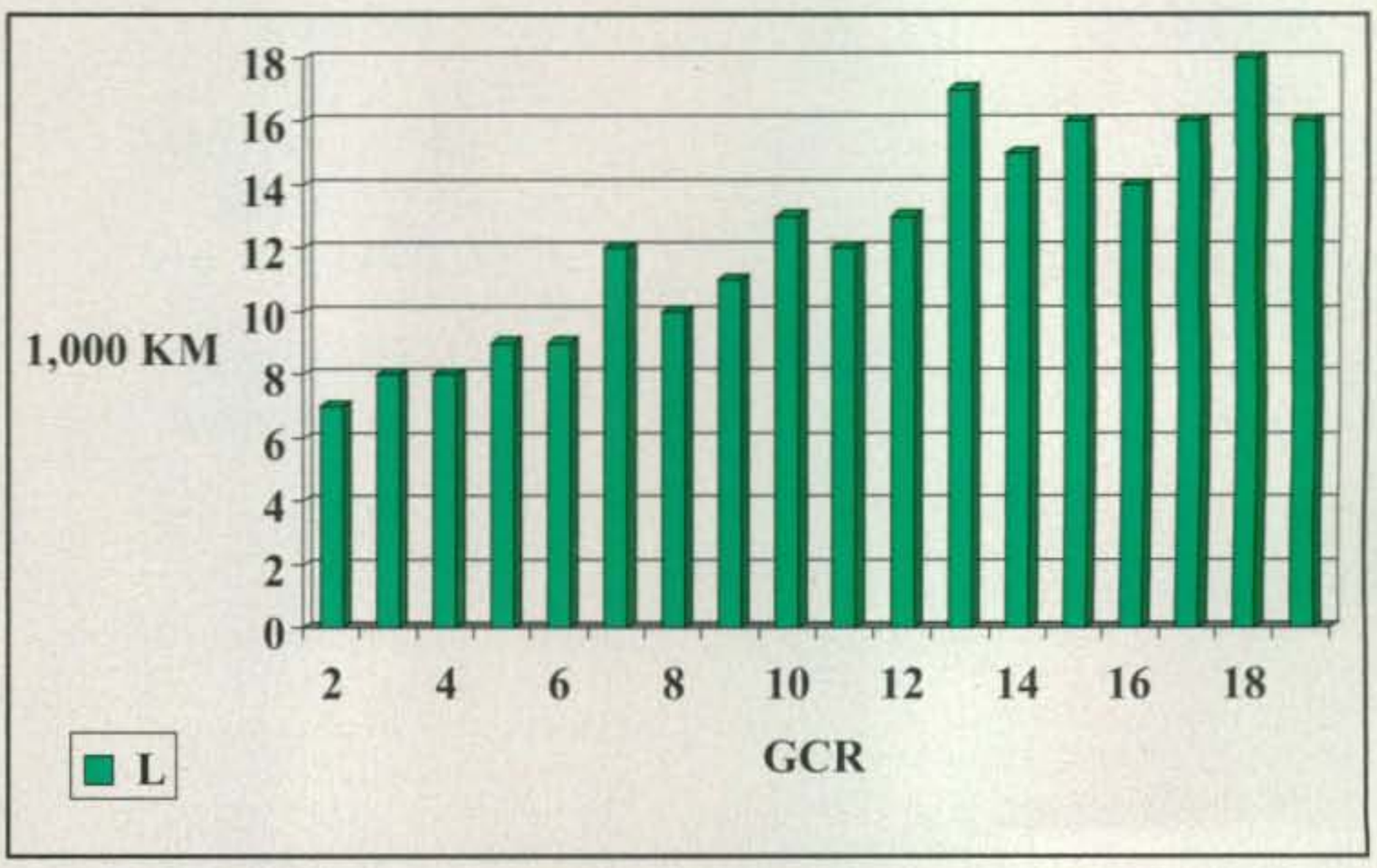

Fig. 1– The greatest distances reached on 160 meters by W7LR compared with the flux of galactic cosmic ray decreases (GCRd) in the ionosphere. Note that with GCRd values of 2–9, most contacts were at distances of less than 9000 km, while most contacts of 10,000 km or more were during times of GCRd values of 10 or higher.

L, to which signals may be propagated on 160 meters for a given decrease in GCR intensity. The first result was

$$L = 3.5.* \sqrt{GCRd}$$

where units for L are 1,000 kilometers with a maximum (Lmax) of 20,000 km, and GCRd in percent decrease.

As a first test of this result, more than 100 contacts with the USA were analyzed from the logs of VK3ZL and VK6VZ using GCR data from the Calgary neutron monitor from 2004–2005.

This test was encouraging, as the contacts across the Pacific Ocean (11,000–14,000 km) were for GCR values consistent with the theoretical result. However, a larger, broader test was needed, so more than 900 contacts from the DX logs of W7LR (2003–2007) were used next.

The theoretical methods were also improved. Using GCR in unit steps, the L-GCR algorithm changed to

$$L = 1 + 3.4.* \sqrt{GCRd} \text{ (for GCRd <9\%)}$$

or

$$L = 2 + GCRd \text{ (for GCRd >9\%)}$$

Results with the W7LR database in fig. 1 show that for GCRd = 2 to 9, there is a large block of data points for contacts with Japan and western Europe,

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e-mail: <nm7m@aol.com>

but nearly all to distances of less than 9,000 km. Fewer than 5% of the contacts in that group reached beyond 9,000 km. These included prefixes such as TZ, VP6, VR, and ZL8. On the other hand, for the smaller group of DX contacts above L = 10, 50% were beyond 10,000 km, with prefixes such as FT5, TR, ZD8, and 9V.

The distribution of Lmax values for each GCRd bin is shown in fig.1. As a summary figure for the five years of operation (2003–2007) of W7LR, the L-GCR diagram has 20 GCR bins which contain data entries for each of the QSOs, but the L-value shown for each bin is the most distant entry. About 50 DX entries are in the last 10 bins, but none of the longest entries reached the Lmax for its GCR value. The increasing trend in the figure suggests that ducting does support DXing beyond 10,000 km. Without ducting assistance, one could expect to find the DX contacts beyond 10,000 km spread more evenly in the figure instead of being concentrated at the high GCR end.

GCRs and Sunspots

Now a few words about sunspot numbers. They are counted and tallied by solar astronomers, just numbers on paper, but we find their trend is followed to a high degree by the state of ionization in the terrestrial ionosphere. Physics tells us the ionosphere requires a strong flux of UV and X-rays to maintain it, so sunspot counts serve as surrogates for energetic solar UV and X-rays. We will find a new application from that idea with the study of another database, the SÉANCE NET, a trans-Pacific operation between British Columbia and Australia during the summers of Cycle 22. Such an operation in the face of heavy ionospheric absorption points to the efficiency of ducting-assisted propagation.

In fig. 2, GCRd (heavy trace; values doubled for clarity) and increasing sunspot (SSN) counts (light trace) are shown for Cycle 22. The SSN count may be interpreted as representing the flux of solar UV and X-rays, pointing to heating or temperature increase by absorption as the mechanism affecting the solar wind in producing GCR decreases by its modulation of the interplanetary field (IMF).

As noted above, UV and X-ray activity associated with SSN are features that interact with the solar wind and affect how it modulates GCR. The degree of connection is seen in the correlation between SSN and 2*GCR, say on the rising portion of Cycle 22, January 1988 to Jananuary 1990, in fig. 2. For that period, the correlation coefficient was $R^2 = 0.89$.

Across the peak at solar maximum, the SSN began to decline a bit while going through large fluctuations, giving $R^2 = 0.11$. After that, the two decreased with $R^2 = 0.6$ in the declining phase of the cycle. In any event, GCRd and SSN are related in time, and the signal gain due to ducting serves to counteract ionospheric absorption from increased solar activity.

Neutron Monitors and Top-Band DX

Finally, cosmic ray neutron monitor observations have been available since the 1950s, but until recently 160-meter propagation predictions have tried to use other variables, say the geomagnetic *K*- and *A*-indices as well as SSN, to no avail. Now, however, we see that ducting occurs when the GCR flux decreases, and that decreases in excess of 10% are quite promising for DXing. However, for GCR decreases less than 10%—i.e., L = 10,000 km—path predictions are less reliable, as *E*- and *F*-hops have signal strengths competitive with ducted signals.

With neutron monitor records dating back to the '50s, the cyclical nature of GCR decreases, shown in fig. 3 from Alberta, Canada, available for study.

This record involves solar activity in two ways: GCR intensity changes as the heliospheric volume changes with solar activity and temperature changes of the solar wind with SSN, as inferred from fig. 2. A cyclical variation of GCR decreases seen in comparison with solar activity shows a few months' lag behind SSN counts.

At the present time (Fall, 2008) GCR decreases are running low, about 1–2%, according to the Moscow monitor. Thus, 160-meter DXing for now will be by *E*- and *F*-hops, and assistance on long-haul DX by ducting probably will not become frequent again until GCRd reaches 10%. After that, ducting will help put more contacts beyond 10,000 km in your log.

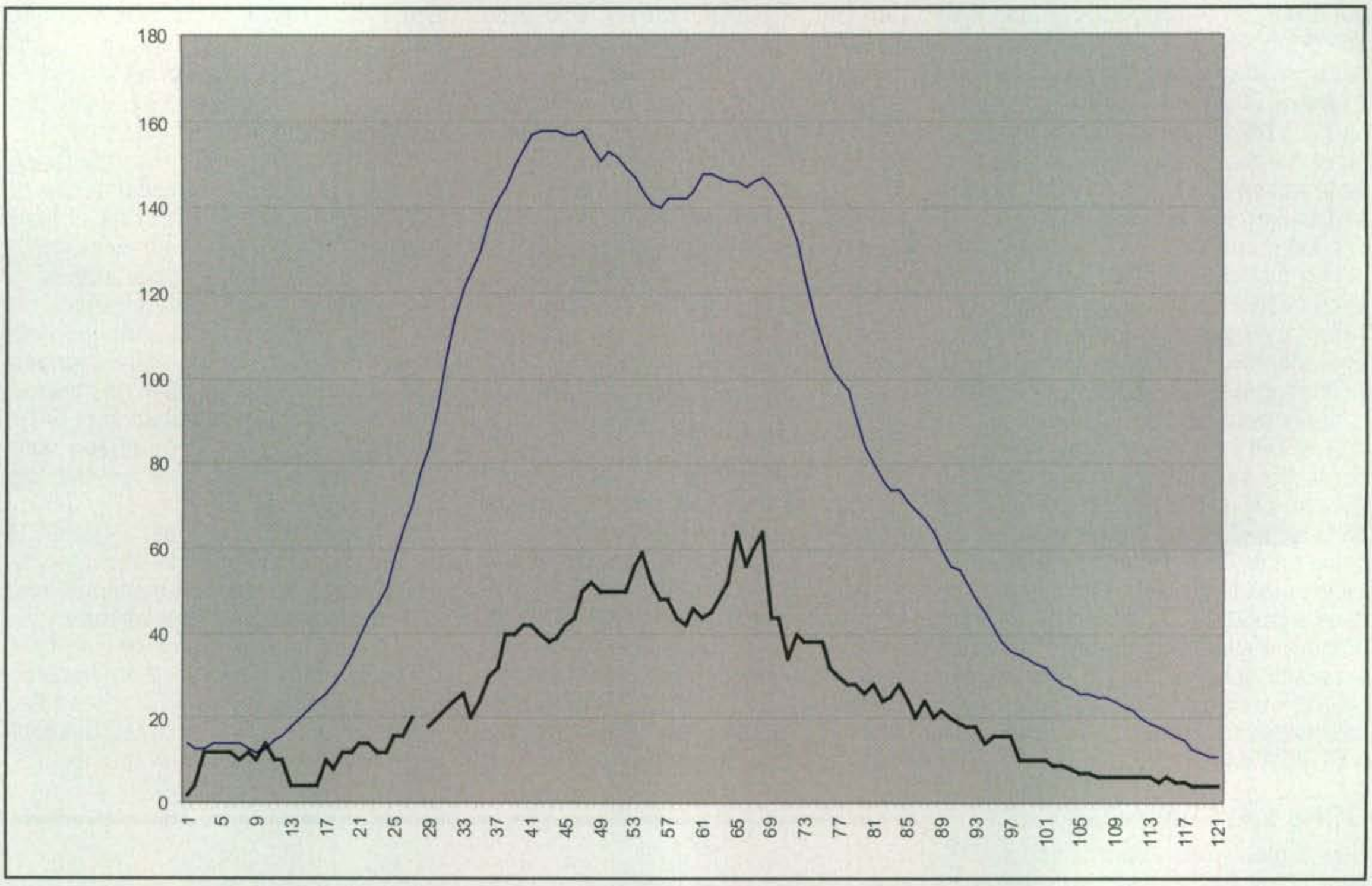

Fig. 2– Comparison of GCRd levels (lower, heavy line, multiplied by 2 for clarity) and sunspot numbers (higher, lighter line) during Cycle 22. Note that the GCRd levels generally track with the SSNs but lag slightly.

One cannot leave this subject without noting the good fortune that the first work on 160-meter propagation and GCR was carried out using log data from 2004. It also rested on a senior research project on cosmic ray physics taken in college more than 50 years ago. All in all, this is called "serendipity."

References

Brown, R. R., "On Solar and Galactic Cosmic Rays," *Low Band Monitor,* Fall, 2008.

Brown, R. R. and R. C. Luetzelschwab, "A Theory on the Role of Galactic Cosmic Rays in 160-meter Propagation," *CQ* magazine, November 2008.

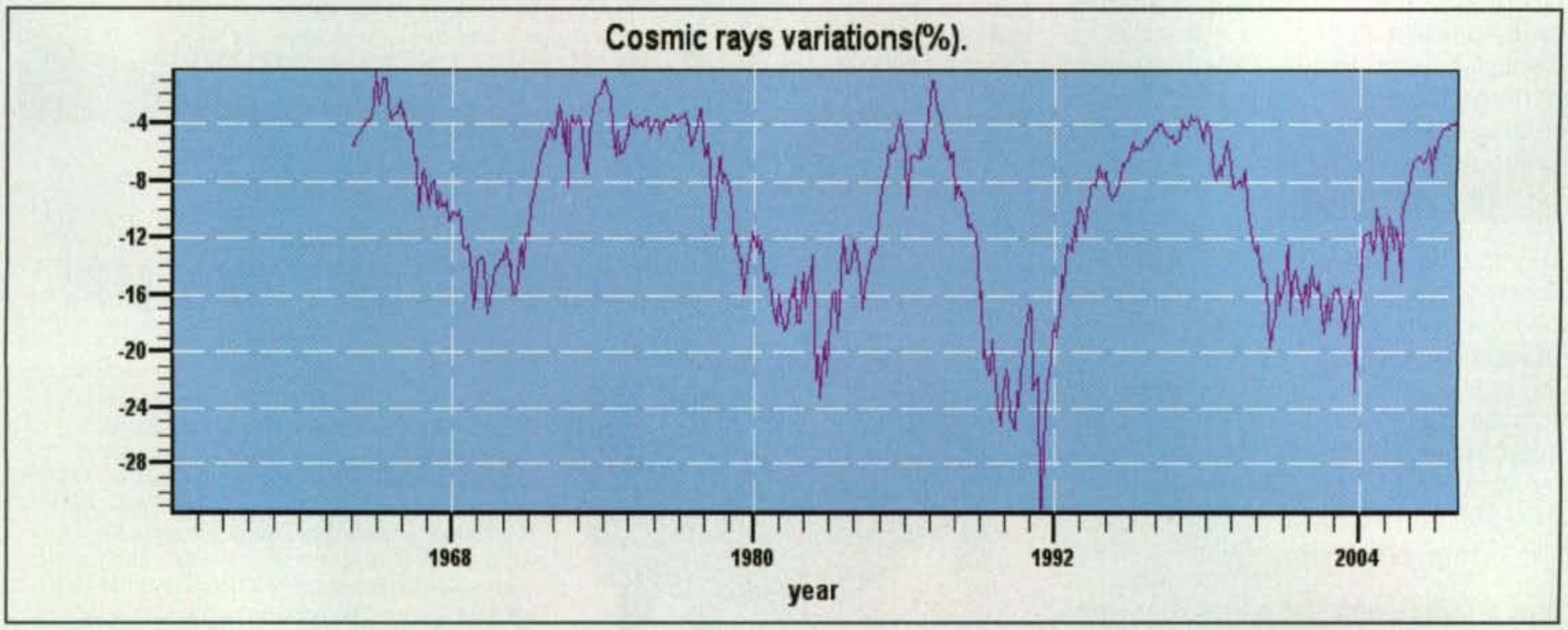

Fig. 3– GCR levels from 1964–2008 as recorded by the neutron monitor in Calgary, Alberta, Canada. These levels are roughly inverse of the sunspot cycle, as it is the measure of the decrease in GCR levels that tracks with the sunspot numbers (note the negative numbers on the Y-axis).

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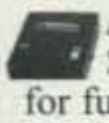
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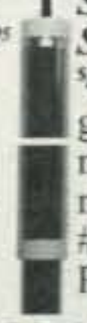
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BY BOB JOSUWEIT,* WA3PZO

The Future is Now

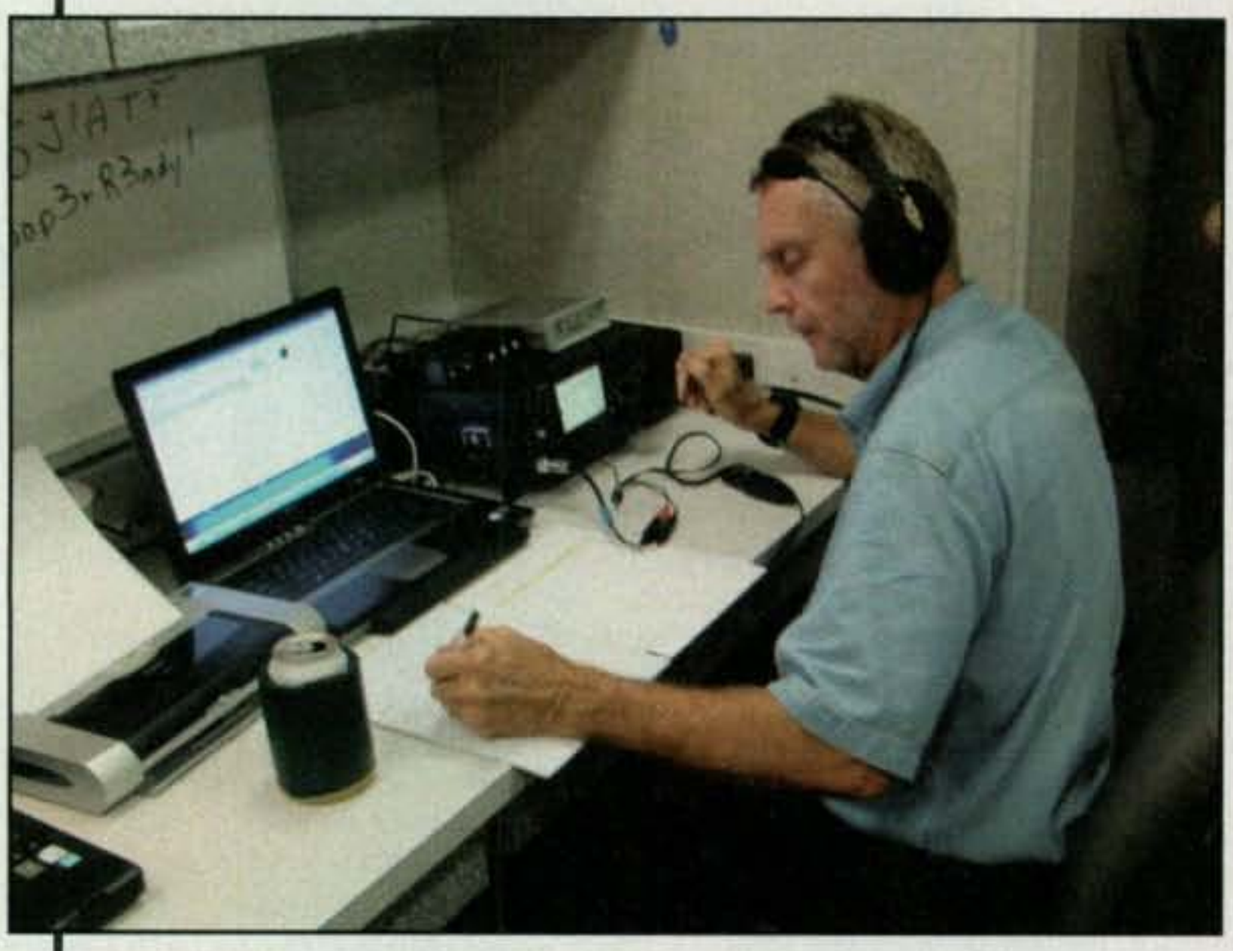
As I began writing this article I had just returned from a World Series Championship parade for the Philadelphia Phillies. Millions of people lined the parade route. As the festivities ended and fans made their way back to the train station, the building was packed with excited fans. They were also in for a substantial wait until they could get on a train to go back home. SEPTA, the local transit agency, reported that it handled over 215,000 more people than the 135,000 commuters who ride the rails on any given Friday. SEPTA admitted there was no way it could handle the crowd, but the agency kept all of the equipment working and everyone got home with no injuries reported.

What does this transportation issue have to do with emergency communications? Probably everything. Take a look at what happened during Hurricanes Gustav and Ike. The storms were powerful enough to test both the amateur radio and MARS response. It was certainly better than any exercise could have. Yet for as bad as the storms were, the emergency response wasn't overwhelmed. Just like the parade, SEPTA was able to handle the crowds.

However, incidents like these don't mean there is no use for amateur radio emergency communications. However, as technology changes we must be able to offer value to the emergency management community. Army MARS Chief Stuart Carter recently explained how Winlink is now "firmly in place interconnecting the three MARS services with the full range of supporting agencies." More and more amateur radio groups are adding digital communication to their list of available resources that can be deployed in an emergency.

This time we'll report on several activities and events involving amateur radio emergency communication.

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



Army MARS member Lewis Thompson, W5IFQ/AAR6UK, operates on the MARS WinLink net from Galveston, TX. He's aboard "Big Blue," the mobile command post of the Texas Military Forces' Standing Joint Interagency Task Force, the first unit to reach Galveston Island after Hurricane Ike's landfall. (Photo courtesy of Army MARS)

Traffic Changes

This month word comes that formal message routing will change in North America and come to a halt overseas. In order to keep amateur radio message traffic flowing across the country the ARRL National Traffic System (NTS) has expanded its reach to include eastern Canada. In a joint announcement NTS Eastern Area Chair Marcia Forde, KW1U, and Bill Thompson, W2MTA, NTS Second Region Net (2RN) Manager for Cycles 2 and 3, invited Canadian radio amateurs who handle traffic to participate in Second Region Net operations, as the Eastern Canada Net (ECN) is no longer active. The ARRL reported that the ECN, a CW net, handled traffic for Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland into the U.S. for transcontinental transmission.

"This expansion of 2RN operations is intended to allow Section Nets in the eastern provinces of Canada to have outlet to Eastern Area Net operations and to allow inbound traffic to flow to those provinces of Ontario, Quebec, and the Maritimes," Thompson said. "This is much the same way as the more-western provinces in Canada currently interface with the NTS RN7 (Seventh Region Net) and TEN (Tenth Region Net) nets."

Meanwhile, we may have seen the end of the MARSgram to soldiers overseas. Carter told Army MARS members that MARSgrams served very few soldiers who are not within reach of e-mail or phone service. He said, "We can handle MARSgrams still, but final delivery will have to be by mail. We won't be promoting the service." Carter continued that the message he gets from Europe on the MARSgram is that the "Army's warfighters don't think they need us given the systems they now have. Our work is here at home, supporting the Army's commitment to civil support." He labels this "the new reality."

Exactly how Army MARS will fit into the national emcomm picture is still evolving, according to Carter. There has been a thriving partnership with the Transportation Security Administration (TSA). He says it's proven to be a "natural fit." He sees another growth opportunity with the National Guard and domestic civil support to U.S. North-

com. This might take the form of a tie between the MARS regional commands and Army Northern Command, 5th Army's newly established Defense Coordinating Officer teams attached to each FEMA region. He said this new mission will continue to support the military, federal agencies, and their state and local partners.

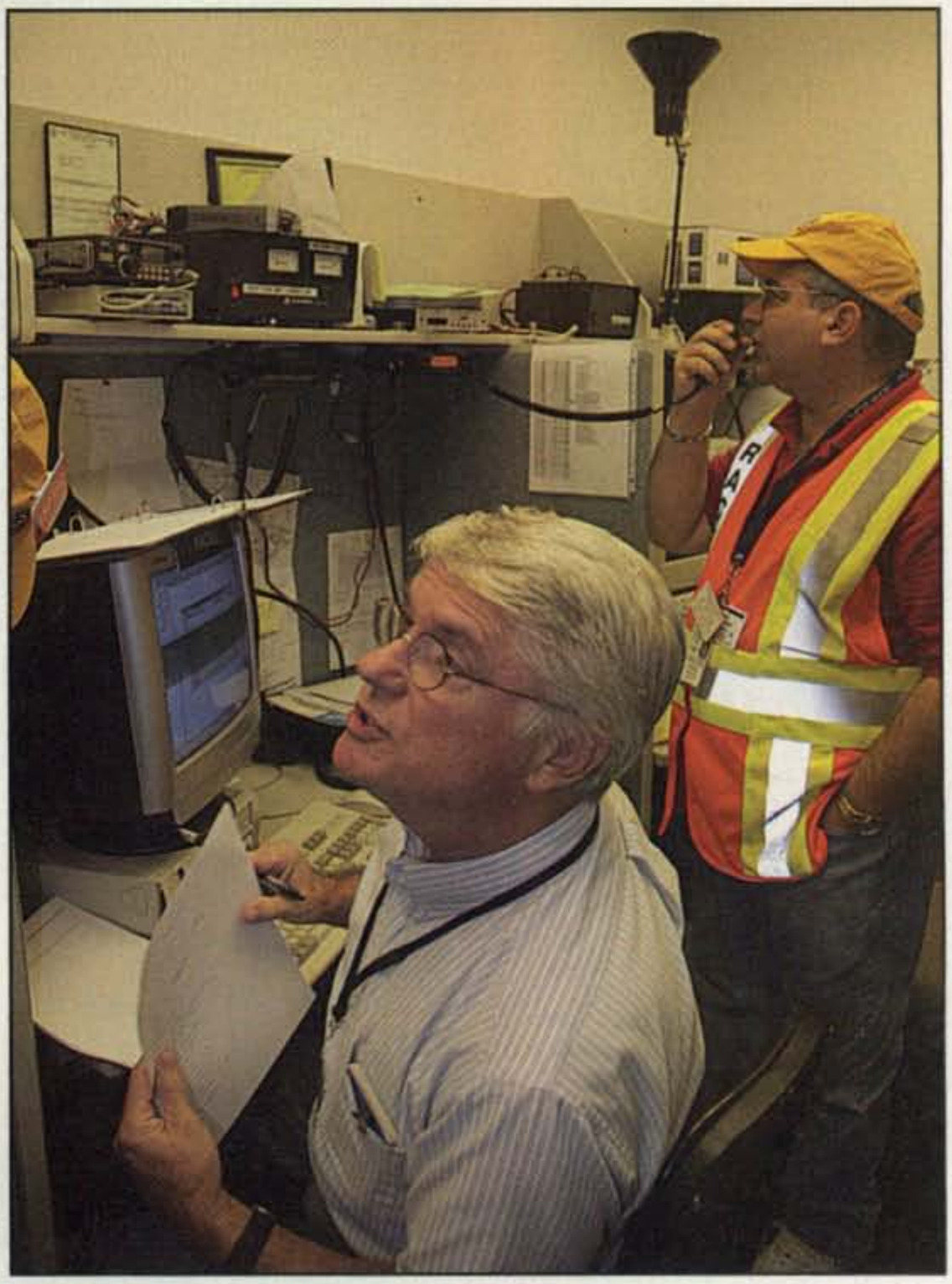
Flu Season

The Bucks County, PA Health Department and Emergency Management Agency recently held their third Pandemic Flu drill. The drill had a dual purpose—immunize citizens from the winter season's flu, and prepare county officials and citizens for a Pandemic Flu mass-vaccination scenario. Local ARES and RACES organizations were activated to support the drill.

Over the course of four hours, more than 4500 vaccines were administered in five locations (PODs) around the county. Amateur radio operators staffed each of the locations. Each station had voice and digital communications available to pass information between the distribution sites as well as the County Emergency Operations Center.

"We are grateful to the public, our volunteers, and the Major Incident Response Team (MIRT) team for a successful drill," noted Exercise Director and Health Department epidemiologist Meredith Allen.

In addition to the vaccine distribution sites, an amateur radio resource staging area was set up at a shopping mall in the



Ron Wenig, NY3J, and other members of Bucks County (PA) ARES kept track of activity at various flu vaccination distribution sites at the county emergency operations center. (Photo courtesy of Steve Pearl, N3LJZ) ⟶

neighboring county. From that point, amateurs had access to major roads in Bucks County for quick deployment to possible additional deployment points.

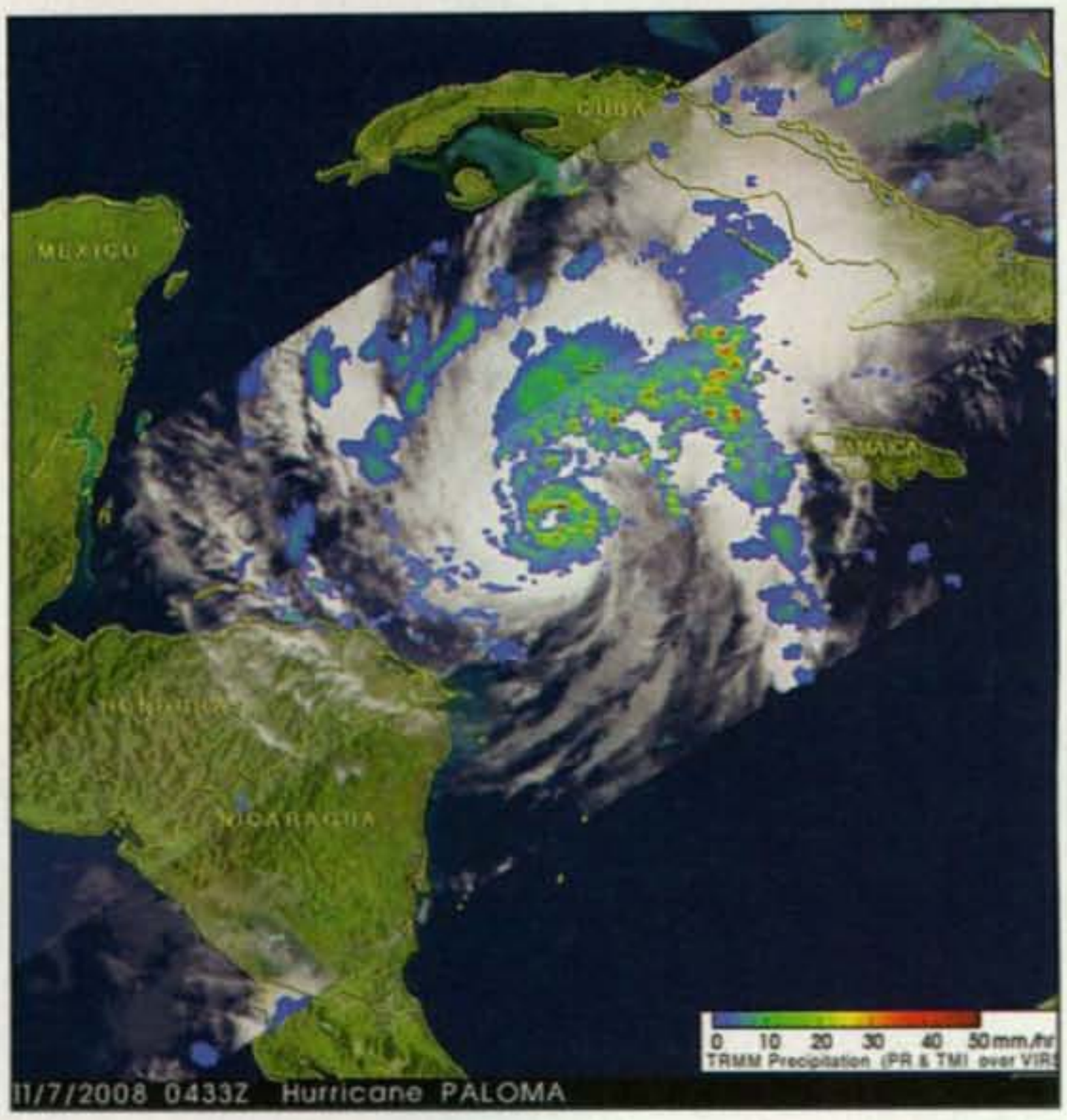
In addition to the approximately 55 members of Health Department staff at the PODs, personnel from the county's Emergency Management Agency were called to staff the county's Emergency Operations Center (EOC) in Ivyland. The EOC serves as a communication and coordination hub during emergencies and exercises. John Dougherty oversees operations there. "At this level, we're able to troubleshoot. For example, we can determine whether a POD might need additional vaccines and facilitate the escort of those doses using the MIRT officers for security."

No Power, No Phones

In mid-November the lights at the San Bernardino County's Emergency Operations Center went out. The phones stopped working. The staff on hand huddled under their desks, holding on through a minute-long imaginary earthquake of magnitude 7.8 rippling along the San Andreas Fault. The drill was part of the Great Southern California ShakeOut, which is part of the largest earthquake drill in U.S. history. Emergency responders from San Bernardino's central command spent two hours without computers, lights, or land-line communication to get a better sense of what things would be like after such a powerful quake. The drill scenario indicated that the phone system and the internet would fail in the first 10 minutes after the earthquake.

The drill was "as similar to a real activation as we could make it," said Megan Blaney, a spokeswoman for the county's Office of Emergency Services, in advance of the event. She said that about 70 representatives of various emergency agencies, utilities, water districts, and schools would be on hand in what would essentially be a war-room type exercise. "We fall back on our backup or redundant communication, which is ham radio operators and emergency radio." The drill indicates that ham radio operators would still be assisting local officials 72 hours after the earthquake, but that the internet would be available where there was electricity. At this point, friends and family from outside of the region would begin to reach people in the disaster area. It is thought that within one week response organizations would be able to use the telephone and the internet.

Todd Hevener, KB3LCT, served as net control for the Bucks County Operations Net during the flu vaccination drill. (Photo courtesy of Steve Pearl, N3LJZ)



Hurricane Paloma takes aim at the southern coast of Cuba. This would be the third major hurricane to hit Cuba in 2008. (Photo by Hail Pierce, courtesy of NASA/SSAI)

While California residents have seen their share of large scale disasters such as the destructive wildfires that have taxed resources and provided experience in dealing with sheltering displaced residents, gaining access to damage-affected areas and post-event cleanup, the scope of destruction from a magnitude 7.8 earthquake would dwarf those operations seen during the wildfires. "In an earthquake, some of that would be the same," she said. "Some wouldn't. We'd have terrible, terrible amounts of debris. That's a problem with fires was well, but it's nothing compared to this."

Find the Gaps

The idea of the ShakeOut was to "find where the gaps are and take corrective action to fix them. It takes continuous planning and exercising to find out where you need improvement." Similar activity was also planned at the Riverside County Emergency Operation Center in Riverside, where 120 people would be reacting to the fictional quake. Spokeswoman Zuzzette Bricker, KI6PPO, said the county hosted two large Field Day activities for trained community emergency response teams. "We'll bring out all the people who have taken the CERT training and do some hands-on triage and (search and rescue) and fire suppression," Bricker said.

International News

At deadline, extremely dangerous Hurricane Paloma was bearing down on the Cuban coast. Amateur radio operators were supplying information to the National Hurricane Center in Miami via the Hurricane Watch Net and the VoIP Weather Net. In addition, the Salvation Army's SATERN net activated to help with the possible hurricane-related information. Amateur radio operators were also assisting local emergency management officials in various Caribbean countries. Hurricane Paloma had become a Category 4 storm prior to

making landfall with 145-mph winds. It was the second strongest hurricane recorded in November.

The International Amateur Radio Union (IARU) and the International Federation of Red Cross and Red Crescent Societies (IFRC) recently signed a Memorandum of Understanding. The MOU says they will promote each other's activities related to disaster relief/response. The will promote joint events for disaster preparedness, coordinate disaster relief activities, and cooperate on training activities and exercises relating to the use of emergency telecommunications in the service of humanitarian assistance.

According to the MOU, the IFRC will "collaborate with IARU (either directly or in co-operation with its member National Societies) in its work with national telecommunications regulatory entities on matters related to use of amateur radio resources for disaster management and in particular in promoting the Tampere Convention."

Global SET

In early November a Global Simulated Emergency Test was held for the headquarters stations of IARU member societies and stations of emergency communications groups. According to Greg Mossop, GØDUB, the objectives of the test were to "increase the common interest in emergency communications, test how usable the IARU Emergency Center of Activity frequencies are across ITU regions, create practices for international emergency communication, and to practice the relaying of messages using all modes." Recommendations included suggestions that all stations limit their power during the exercise to 100 watts.

One major objective to overcome during the test is the message format used among various countries. During the May 2008 GlobalSET gathered information on emergency power available or in use at participating stations. One of the designators used during the drill was placing a "/D" after the callsign. However, it was noted that some data-mode software would not accept the "/D" as a callsign suffix for transmission or identification. This led to messages that were sent to different stations.

The GlobalSET report for the May exercise said, "Having messages that change their content depending upon which mode is used to transmit them is not good for message accuracy and having variation in the message structure passed during each exercise is not good for getting a common message-handing procedure."

Exciting Year

As you can see, there are many activities and events involving amateur radio emergency communications. We'll be covering the new mission of Army MARS, the expansion of amateur radio usage in international disasters, and the disasters here in the United States where amateur radio operators will be ready to assist their local communities when normal communications fail.

Let us know how you are getting ready to be prepared to provide emergency communications in your community. As a reminder, each emergency group should have a public information officer. News today is almost instantaneous. There isn't time to wait several weeks or months for an after-action report. Drop us a note. Add us to your mailing list.

73, Bob, WA3PZO

BY DAVE INGRAM,* K4TWJ

The Joys of New Gear

How long has it been since you sat down to a nice new transceiver complemented with a new mic, new CW paddle, and possibly a new antenna? It is a most exhilarating experience for sure (akin to reliving those exciting first days in amateur radio), and the good news is the endeavor need not be overly expensive. There are good transceivers and accessories—really good transceivers and dazzling accessories—to fit every budget. If your funds preclude going with all new gear, however, adding only a single item such as a new key or even a new wire antenna can open a world of enjoyment for you. The previous statement obviously requires further explanation, and that is the subject of this month's column.

A New Transceiver!

I sense you bouncing around like those parrots atop the Texaco sign in old TV ads and singing the Trump theme song "Money, Money, Money," but look behind that intro humor. Both $10,000 super transceivers and $900 economy transceivers are equipped with high-grade receivers and 100-watt transmitters, and both types are quite capable of global communications. The special benefits of a new rig, however, are numerous. First there is the sheer pleasure of using new gear—the feeling that you can take on anything that comes your way and work out three times better than ever before. The feeling is well-justified, as even fundamental circuitry in modern gear is noticeably superior to that of older gear. It's heartbreaking, true, but you can really hear a difference in performance between "tube rigs" and recently introduced "solid-state rigs" (sigh).

There is also an "hours of operation" factor worthy of consideration. Simply explained, with age any piece of equipment becomes more susceptible to some type of failure or malfunction. Even with limited use, dust and humidity can creep into connectors, switches, etc., and cause malfunctions. Additionally, world economic situations are requiring many manufacturers to discontinue producing circuit boards and special components required to repair older gear. Conversely, the "all new components backed with a full-year warranty and supported by a proven reliable service center" is the best assurance that you can enjoy amateur radio to the max without long-term breakdown and repairs.

Should old pro amateurs—those of us who built and/or repaired our (tube-type) gear of eras past—feel guilty about sending our new-style gear off for repair? Absolutely not! Most new rigs are sold with little, if any, service data or even a usable circuit diagram. Half the components are only available from the equipments' manufacturer, and working with tiny surface-mount components while wrestling with unsteady hands and high-magnification glasses is a major challenge. We have spent our time in the trenches; now we deserve time to enjoy life hamming to the max!

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e-mail: <k4twj@cq-amateur-radio.com>

Photo 1– There is no better way to rekindle your interest in amateur radio than with a new rig, a new antenna, and/or new mic and key. As shown by the Kenwood TS-480, Bencher Hex key, and Heil FIN microphone shown here, the endeavor can also be quite affordable—and reward you with many years of enjoyable operation.

A New Antenna

Have you noticed how antennas of all types seem to work out really great when new, but settle into a more ho-hum category after a few years? Why does that happen? Aluminum tubing in beams and verticals tends to corrode at joining points, individual strands in wire antennas break over a period of time, feedpoint connections weather, and losses in feedlines/coax cables increase with age. The changes are gradual and often go unnoticed until we refurbish or replace a beam or vertical or replace an old favorite wire antenna with a new version and discover a whole new world of amateur radio communications. In light of these facts, I say, "Why wait? Do it now!"

Are you thinking of replacing a dipole antenna? Consider moving up a couple of steps in the process. Among multiband wires, the Carolina Windom (available preassembled and in several sizes from <www.theradioworks.com>) is a very good choice. If big-time results on one particular band are your goal, the Extended Double Zepp (available from <www.mfjenterprises.com>) is a romper. With either choice, your investment is small and your returns are large.

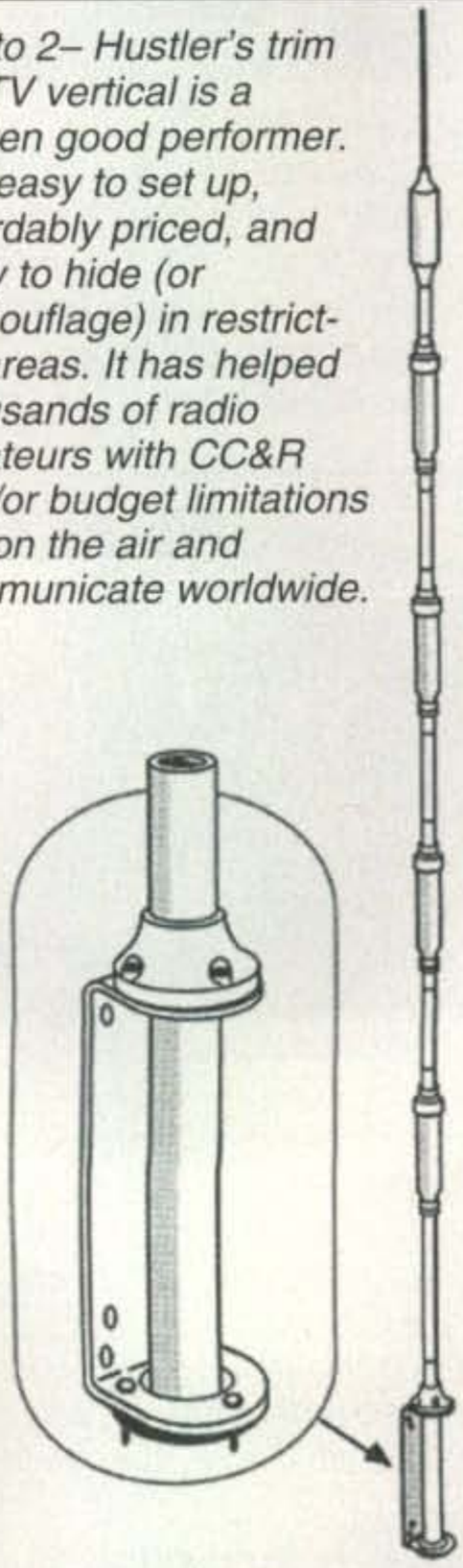
Thinking of a vertical? Good idea. There is something special about seeing a tall length of aluminum tubing in your backyard that inspires feelings of grandeur. A large number of Europeans favor Hustler's 6-BTV vertical (photo 2;

<www.new-tronics.com>), possibly because it is trim, slim, and can be hidden in plastic rain-gutter material and disguised as a lamp post. Personally, I have used every type of vertical imaginable and find Hy-Gain's AV-620 and AV-640 (photo 3; <www.hy-gain.com>) beat all others by a noticeable margin—probably because they are 3/8-wave rather than conventional trap-type 1/4-wave verticals. I spent over two years with in-QSO A-B checks/comparisons between a regular 1/4-wavelength vertical, a popular triband beam, and an AV-640, and the AV-640 consistently stood tall as the best buy for the (overall) money.

Mics and Keys

Whether your transceiver is new or old, large or small, simple or super-elaborate, complementing it with a new key and/or mic always makes on-the-air operation delightful. They are truly affordable accessories with glitz and glamour galore. In microphones, Heil Sound is the unquestioned leader. Heil mics enhance your voice and give your signal more "punch" than any other type

Photo 2– Hustler's trim 6-BTV vertical is a proven good performer. It is easy to set up, affordably priced, and easy to hide (or camouflage) in restricted areas. It has helped thousands of radio amateurs with CC&R and/or budget limitations get on the air and communicate worldwide.



of microphone. In fact, Bob (Heil) demonstrated his mics at the Huntsville (Alabama) Hamfest in August 2008, and you could actually hear how they boost one's voice like switching on a linear amplifier.

Heil's new FIN mic (photo 4) includes a unique finishing touch: Blue cool LEDs behind its blue windscreen can be illuminated by phantom voltage from an external audio mixer or equalizer such as the low-cost Berringer Model UB-802. Numerous other Heil mics are available to fit every need and voice, and they are surprisingly affordable. Check <www.heilsound.com> for more details.

Many radio amateurs recognize the benefits of CW for reaching out long distances, and from that standpoint I can say nothing beats a new key or paddle in the shack. Indeed, getting behind a great-looking and smooth-handling paddle is akin to getting behind the wheel of a new car or sitting down to a new transceiver—but it is much less (!) expensive. A new paddle also inspires you to enjoy more on-the-air time each day. Dinking with a new paddle is just plain fun! Expensive? It can be (some keys are akin to jewelry!), but we have also noted several really impressive paddles in the "under $200" category. Check out, for example, Bencher's neat Hex key (photo 5; <www.bencher.com>).

Photo 3– Hy-Gain's AV-640 vertical may be somewhat "high profile," but its 3/8-wavelength design helps it to perform almost equal to several "triband" beams. If you want top results with a multiband vertical, this will provide them.

Investigating New Areas

Thinking about something more than new gear and/or accessories, something

Photo 4– Like to add a touch of big-time glitz and glamour to your setup and enhance your on-the-air sound quality at the same time? Heil Sound's new blue cool FIN mic fills the bill in high style and it is priced right to boot. Details at <www.heilsound.com>.

Photo 5– Bencher's reasonably priced Hex key is fashioned similar to the world-famous N2DAN "Mercury" iambic paddle with magnetic tensioning and positive action. It is an impressive CW instrument that is, well, fun to use! Details at <www.bencher.com>; paddles available from <www.morseX.com>.

Photo 6– All new areas of pursuit need not be massive, complex, or expensive to join, and the world of QRP is a prime example. This (10-watt version) Elecraft K3 is a QRPer's dream rig with features galore, and it fits in the smallest "shack" imaginable. Details at <www.elecraft.com>.

that may require a few years' investigation and study to join but something with real horizon-expanding flair? Expanding horizons is commendable from any viewpoint, and some areas of interest can prove captivating for a lifetime.

Moonbounce is a good example of a horizon-expanding pursuit. The Earth-Moon-Earth (EME) signal path is one of 260 dB loss. Do the math on that, and you can actually feel how you must start with high effective radiated power (ERP) to even produce weak echoes that must be amplified low-noise style. Look further and you will discover how the Earth's atmosphere can twist transmitted signals right-hand circular and reflected/received signals left-hand circular, and improper antenna polarization can cause signals to drop below noise levels. Then too, galactic noises from the sun, stars, and the Milky Way can mask signals in the noise. Once you beat the odds and make an EME contact, you realize the efforts were worth the reward. It is a wonderful memory.

Another area of significance is radio astronomy and its "spin-off interest" of SETI—the Search for Extra Terrestrial Intelligence. These areas are sure to become major frontiers of interest during coming years as we move closer and closer to colonizing the Moon, mining its ice deposits, and exploring Mars. There is an endless amount of information right beyond our telescope's view in space, information that may define our future. The study is captivating!

All "new" areas need not be complex or expensive to pursue, incidentally, and they need only be "new" to you to hold creditable appeal. QRP (see, for example, the Elecraft K3 in photo 6) is a prime example of that fact. It is a low-cost and easily affordable pursuit, one you can enjoy from the most confined locations imaginable, and working the world with low power is incredibly exciting. Give it, or any other special area of interest, a go! Investigate new frontiers. Gear up with new goodies. Enjoy life!

Conclusion

If we look back a hundred years from today, we can see stout-hearted amateurs having a ball dinking with primitive but new gear, new antennas, and new ideas. If we then use that same mindset to look at the present, we see that same form of excitement and golden-age thrills live on in high style today. These are indeed good times—times that people of tomorrow will look back on with envy, and each one of us has the privilege of enjoying these times to the max right now! May the force of good signals always be with us—one and all!

73, Dave, K4TWJ

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1.250"	.058"	$1.85
1.375"	.058"	$2.05
1.500"	.058"	$2.25
1.625"	.058"	$2.55
1.750"	.058"	$2.80
1.875"	.058"	$3.05
2.000"	.058"	$3.30
2.125"	.058"	$3.80

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Yaesu G-550	$299
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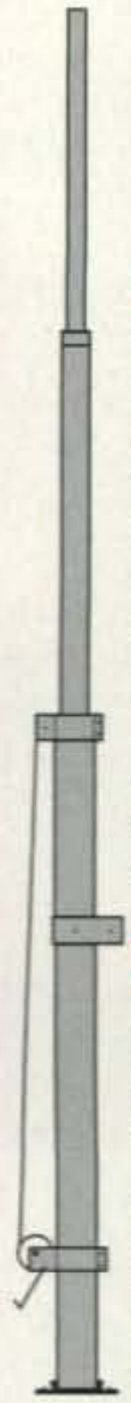

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the weekender

BY PHIL SALAS,* AD5X

Inexpensive 60–10 Meter Vertical Antenna plus 80 and 160 Meters!

Last month I described an inexpensive 40/15-meter vertical antenna made from surplus 4-foot aluminum tubing. I've done a little more work on this antenna, making it easy to put on 60–10 meters by increasing the length and using a wide-range antenna tuner (i.e., something better than the typical 3:1 internal antenna tuners provided in some radios).

First I added another 4-foot section of aluminum tubing to last month's vertical, making the antenna about 36 feet long. The reason I did this was to keep the antenna from becoming a half-wave long on 20 meters, which would make it extremely hard to match.

With the 36-foot length, I found that the worst-case SWR from 60–10 meters was about 10:1 on 20 meters. The SWR was lower on all other bands. I know; this sounds bad. However, it turns out that if you feed the antenna with low-loss coax such as LMR-400 or 9913, your coax losses due to SWR are pretty much negligible when you tune the antenna system from your shack. As an example, I'm using about 60 feet of LMR-400 with an antenna tuner in my shack. On 20 meters, I lose less than 1 dB due to the high SWR. Detailed information on the impact of SWR on coax losses can be found in the *ARRL Handbook* and *ARRL Antenna Book*. Take a look at this information, as I think you'll be surprised at just how little power you will lose under high SWR conditions *if* you use low-loss cable.

Photo B– Matchbox installed at the 36-foot vertical antenna base.

OK, this is great. One antenna covering 60–10 meters, and all you need is low-loss coax and a good antenna tuner in your shack. However, is there any chance we can make this antenna work on 80 and 160 meters as well? Sure there is!

A 36-foot long vertical antenna is very short (electrically) on 80 and 160 meters. Like any short antenna, though, this vertical can be matched on these bands as well. A short antenna has a high capacitive reactance, requiring a series inductor in order to resonate the antenna in your band of interest. There are detailed equations available to determine exactly what the capacitance is, but I've found that if you assume the antenna capacitance of a short vertical is about 4 pF/foot, you will be pretty close. So, let's see what it takes to resonate this antenna on 80 and 160 meters.

For this 36-foot antenna, the effective series capacitance is about 144 pF (36 ft × 4 pF/ft). To resonate this, we need:

160 Meters:

$L = 1/[(2 \times \pi \times 1.9)^2 \times 144] = 49\ \mu Hy$

80 Meters:

$L = 1/[(2 \times \pi \times 3.7)^2 \times 144] = 12\ \mu Hy$

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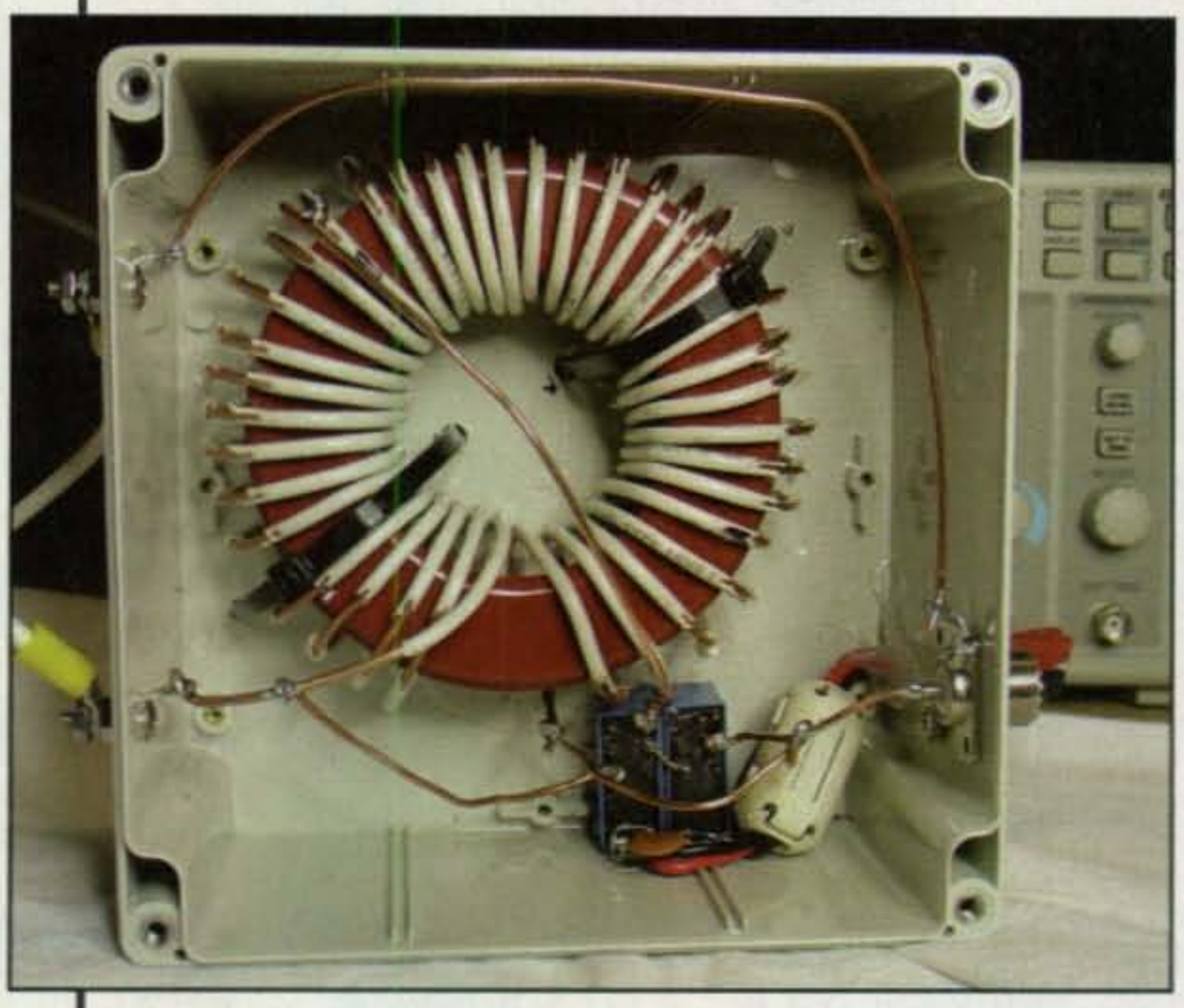


Photo A– Internal wiring of the 160/80-meter matchbox.

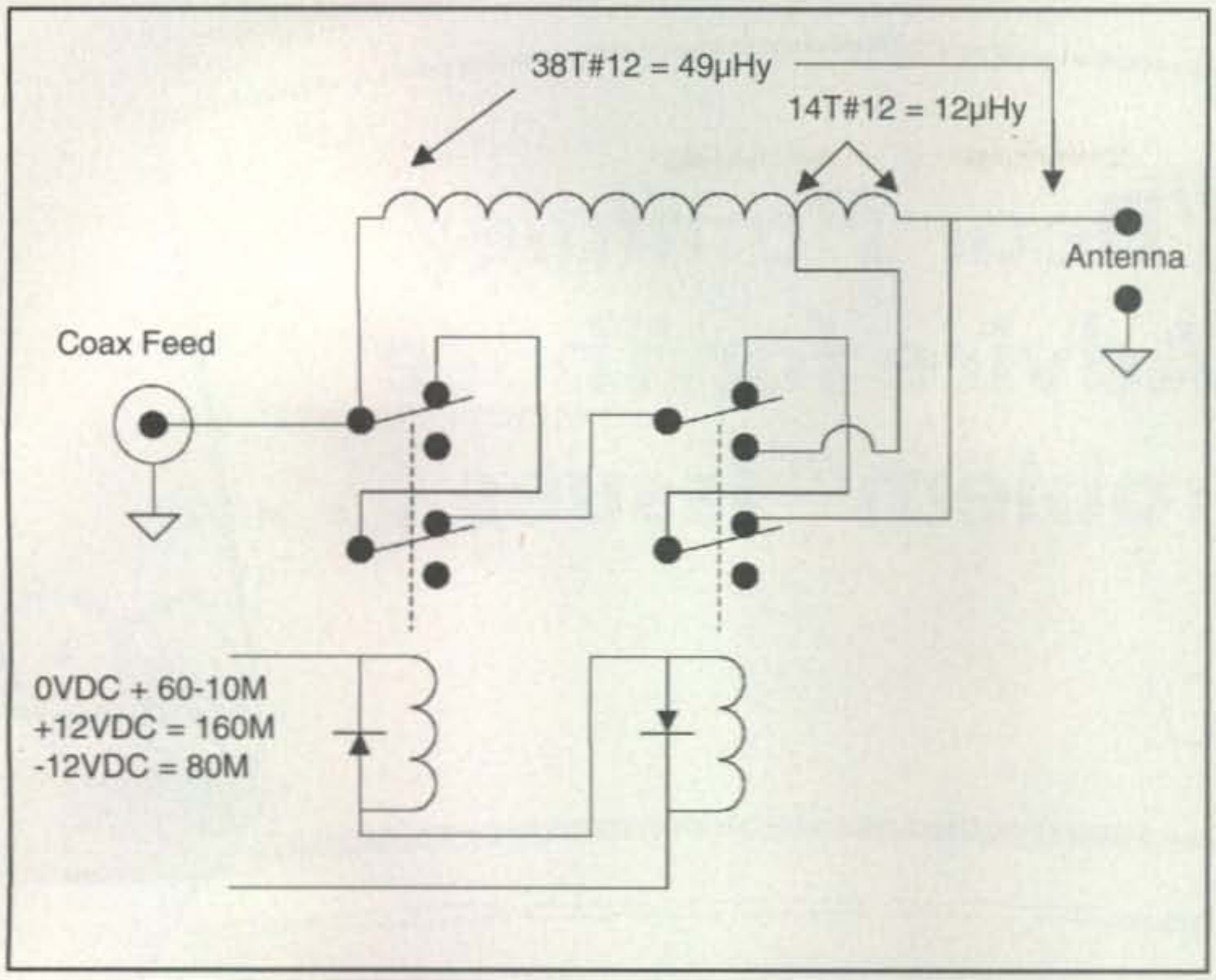


Fig. 1– The 160- and 80-meter base matching circuit.

Fig. 1 shows my final creation. The relays are power relays with 1000 VAC RMS minimum breakdown between contacts, and 5000 VAC RMS breakdown between contacts and coil. I wired the relays so as to double the breakdown voltage by putting contacts in *series*. The relays are powered such that the coil is shorted out on 60–10 meters. A negative 12 VDC causes 12 µHy to be in series with the antenna feedpoint, and positive 12 VDC causes the full 49 µHy coil to be placed in series with the antenna feedpoint.

In order to handle high power, I wound the inductor with 14-gauge insulated house wiring on a T400A-2 toroid core. Everything was built into a plastic NEMA outdoor box. The critical parts are given in Table I. I drilled holes in the NEMA box for tie-wraps that hold the toroid in place, as well as to provide water drainage holes. I used a pendant DC cable terminated in an Anderson PowerPole™ connector for the DC input. I gooped hot glue around the DC cable hole for waterproofing. Photo A shows the internal wiring, and photo B shows the matching unit placed at the base of my 36-foot vertical antenna.

How does this work? In a word: Great! The SWR on 160 and 80 meters drops to less than 3:1 from the >15:1 it was before the matching coil was put in place. This SWR value keeps line losses very low and makes matching with your indoor antenna tuner very easy on these bands.

Until We Meet Again...

And now it is time to retire! I have enjoyed writing the "Weekender" column for almost two years now, but I'm starting to spend more time operating and less time tinkering, although hopefully you'll still continue to see some articles of mine on occasion. Finally, I want to thank the many of you who have e-mailed me with ideas and comments. I have appreciated and valued your input.

73, and I hope to run into you on the air.

Phil, AD5X

Qty	Description	Source/Part Number	Price each
1	6" × 6" × 4" NEMA Enclosure	Lowes/Home Depot	$12.00
1	T400A-2 Powdered Iron Toroid	Amidon T400A-2	$30.00
2	DPDT Power Relays	Mouser 653-G2RL-24-DC12	$3.85

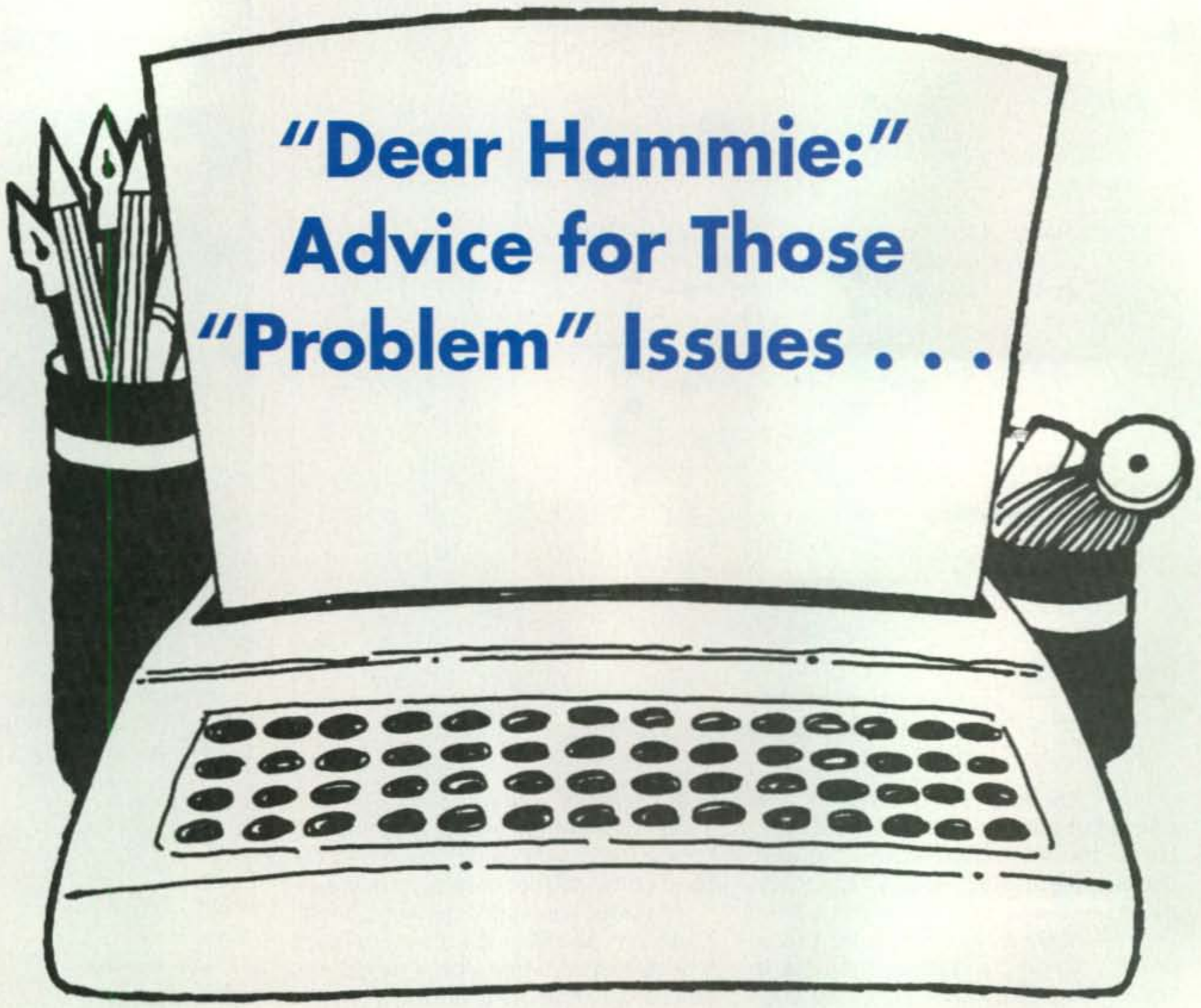
Misc: 14-gauge house wiring, stainless-steel hardware, UHF connector, tie-wraps, DC power wire and connector.

Table I– 160/80-meter base matching unit.

magic in the sky

BY JEFF REINHARDT,* AA6JR

"Dear Hammie:" Advice for Those "Problem" Issues . . .



In an effort to once again fill a gap left unaddressed by other ham radio publications, "Magic in the Sky" dares to go beyond the technical. Sure, there are columns that deal with technical Q&A; a column in another publication purports to have expertise at the doctoral level. What's missing has been a true advice column that places focus on the operator in this unique pursuit we share.

Ann Landers and her twin sister, Abigail Van Buren, provided guidance in the nation's newspapers for decades. With apologies to them and those who have followed, let's dip into the mailbag!

Dear Hammie:

I'm in love with a wonderful girl. We dance. We laugh. She's smart, beautiful, with radiant red hair, a great smile, and a perfect figure. She loves to cook gourmet meals, she has a professional job with a six-figure income, and she collects exotic cars. She's proposed to me and wants to take an around-the-world cruise for our honeymoon. The problem is, we'd be gone for months and I'd miss Field Day. What should I do?

Confused in Colorado

Dear Confused: I thought you said she was smart? Dump her. There are more like her out there. You just haven't looked hard enough.

Dear Hammie:

I was among the many "undecided" voters in the last election. In fact, I was so pressed to make a choice, I decided to stay home and leave the decision to others. How can I avoid such a quandary in the future? *Undecided in Utah*

Dear Undecided: It's easy. Vote for the ham. After that, nothing else matters.

Dear Hammie:

I hope you don't mind my seeking your advice; my dad is a ham radio operator but I am not. I am gearing up for that all-important meeting with my fiancée's parents. I'm nervous about it but I think it will go well. I have a medical degree and am ready to get my life going in high gear. My older brother runs a bookie operation in a distant city. My younger brother is a convicted drug dealer but

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is now in a halfway house. My sister runs guns to third-world revolutionaries, and my mom helps her with back office bookkeeping. The question is, how do I explain to my girlfriend's parents that dad is a ham?

Fidgety in Florida

Dear Fidgety: Tell the girl's parents that Dad abandoned the family. That way there's no expectation he'll be at the wedding if it falls during Dayton or a contest weekend.

Dear Hammie:

I find I'm torn between my favorite two hobbies, ham radio and golf. I'm retiring soon, and my budget will only allow me to sustain one. What guidance can you offer?

Tee or Key in Tennessee

Dear T or K: This required some analysis, but here it is. Golf only allows you to be frustrated and curse at missing balls during the summer. DXing allows you to be frustrated and curse at missing calls the entire year. By that calculation, ham radio is the far better value.

Dear Hammie:

I made a deal with my wife that she could pick out our new car, as long as I got to install a mobile radio in it; she agreed, provided I was careful not to mess up the new purchase. She picked out a nice sedan with all the options, and I just completed installing the radio. So far, so good. Just like the manuals say, I took precautions to center-mount the rooftop antenna in a carefully drilled hole. Only when I was done did I come to realize the sunroof now won't open. How can I explain this to her?

Hiding in Huntsville

Dear Hiding: Try telling her that soft light in darkened rooms makes her skin look like she's 17, but strong sunlight shows some creases. That sliding cloth panel under the sunroof should remain closed tighter than a bank's vault at midnight.

Dear Hammie:

I realize this is a somewhat technical question, but it really falls under the category of advice. I'm a new ham in a quandary as to which radio to buy. Any recommendations?

Newbie in Norfolk

Dear Newbie: All of them. (Rookies ... sheesh!)

Dear Hammie:

I understand that radio waves go into space and continue across the universe forever. Isn't it possible that some alien species on another planet could DF those signals back to the source and find our planet?

Frightened in Fresno

Dear Fresno: Your theory could be true. On the other hand, put yourself in the shoes of the alien species. Listen in on some 40- and 80-meter nets for a while and ask yourself if you'd want to risk a 40-light-year trip to meet these life forms? Some of these rag chews could be the best defense against alien invaders our planet could ever hope for. And so far, it's worked. (I think).

Dear Hammie:

My spouse wants more "togetherness" but I enjoy ham radio in all its forms, which doesn't leave a lot of spare time. She's taken up needlepoint, which bores me. How can we mutually enjoy our respective hobbies?

Partnered in Pottstown

Dear Pottstown: Have her needlepoint the schematic to your HF transceiver.

Dear Hammie appreciates your questions, so send them in, but no need to hurry. Editor Rich, W2VU, says the next time he expects room for Hammie's column may be sometime in 2019, but twice in a given decade may be too often.

"Hidden Morse" Postscript

The mailbag (and okay, the e-mail inbox) had some nice responses to our "Hidden Morse" vignette. Among them, Geoffrey Sutton of Texas and Gary Bartlett, VE1RGB, of Canada both identified a feature carried for years in *Mad* magazine, "Spy vs. Spy." The author, Antonio Prohias, embedded Morse symbols between the panels of his creative cartoons, which spelled "By Prohias." How many "closet" *Mad* readers were also hams? I'm willing to bet more than a few of us!

Happy 2009

Here's to a 2009 that's full of great contacts, compliant and cooperative equipment, superb sunspots, awesome antennas, and fantastic friends all brought together through your participation in the world's greatest hobby. This year, make a resolution to add even more to the "Magic in the Sky."

73, Jeff, AA6JR

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Wires and Cables

Over the years, I have had many conversations with hams (and their non-ham spouses) about "all those wires." While non-hams may think a wire is a wire is a wire, most hams know that this is not the case at all.

In its simplest sense, wires and cables transport electrical signals from a source to a destination. In ham radio stations and equipment, wires are used to route operating power from a source such as an electrical AC mains outlet or a battery to the radio gear. Wires are also used to transport radio signals from the radio to the antenna during transmit, and from the antenna to the radio during receive. Inside the radio, other signals are moved from place to place and can include data signals from a microprocessor. However, it all boils down to electrical signals moving from one place to another.

Wires for Antennas

When making antennas with insulated wire, you do not have to remove the insulation. I do not recall any antenna article that addressed this bare-wire versus insulated-wire question, so let's make a clarification here: When making antennas with wire, such as a dipole or inverted-Vee, you do not have to remove the insulation. If the antenna wire you are using is not insulated, you do not have to add any insulation. You can use No. 12 or smaller wire, in either stranded or solid copper. (You can use heavier, thicker gauge wire, but the weight may make the antenna difficult to support.)

Hardware and home-center-type stores carry insulated bell wire (usually in small gauges, from 18 to 26) as well as insulated house wire (usually with a designation called THHN and in larger, heavier 10- or 12-gauge sizes) both of which are suitable for wire antennas.

I use plastic-coated, No. 12 gauge solid-copper wire for just about all of my dipoles and inverted-Vees, mostly because I have hundreds of feet of this type of wire stored in my garage. (I found a "good deal" several years ago when a local electrician friend decided to clean out his workshop.) No. 14 can also be used, and the antenna would also be a little lighter in weight. Take a look at the wire antenna books sold in the CQ Bookstore for more details.

Coax is a two-syllable word in the ham radio world. It is short for "coaxial cable." Coax consists of a center conductor with a layer of insulation, followed by a woven braid or a solid shield (the shield forms the second conductor of the cable), and finally an outer insulating jacket.

There are many types of coax suitable for ham radio antenna installations, including many types with specialized jackets or construction and materials. The impedance for radio transmitting and receiving is 50 ohms. Since there are so many cable types from which to choose, *your* best source for help would be your favorite ham radio equipment dealer. If such a dealership is not conveniently located, you may want to ask your fellow ham club members for coax-cable advice.

The most common cable types for two-way radio applications are RG-58, RG-8X, RG-213 and RG-8. Generally speaking, the larger the diameter, the better the cable, with some exceptions, such as UT-141, a small-diameter, solid-copper-jacket coax used in the microwave frequency ranges.

A very low-loss cable type is "hardline," in which the outer shield is not a braid, but solid (or corrugated) aluminum tubing. Thus the cable is "hard," as opposed to a traditional cable with a soft and flexible braided wire shield. Hardline cable is usually used in VHF-and-above applications, such as a repeater installation (see photo 1).

Several types of outer jacket materials are available for most coax types, depending on where the cable is to be used. If the coax is to be buried, a jacket made of polyethylene (PE) should be used, and if the cable will run mostly outdoors, a UV-resistant jacket should be used, such as polyvinyl chloride (PVC).

According to Belden Technical Bulletin T/8-6

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

Photo 1– A very low-loss coax-cable type is called hardline. In this cable, the outer shield is made of solid copper, rather than woven wire braid. This type of cable is used on VHF-and-above frequencies and is particularly useful when long runs are needed.

Connector	Upper Frequency Limit
PL-259	144 MHz
BNC	4 GHz
SMA	25 GHz
N	11 GHz normal, 18 GHz precision

Table I– Various coax-connector types and applications.

Photo 2– From bottom right to upper left, typical cables and connectors found on ham radio gear: PL-259 on RG-213, BNC on RG-58, SMA on some sort of very flexible cable, and Type N on 1/2-inch hardline.

Issue 5, "Underground Burial of Belden Cable," a high-density polyethylene jacket is particularly well-equipped for direct burial because it can stand up well to compressive forces, it is both non-porous and non-contaminating, and it provides complete protection against normal moisture and alkaline conditions.

It would be a good idea to spend a little extra and install an underground coax run inside a length of polyethylene water pipe or other suitable conduit to further protect the cable and to simplify replacement of the cable in the future. Use a large-diameter pipe so that if you decide to add another antenna, the new coax can be run inside the existing conduit.

References
Wire and Cable Information and Facts

Belden, Inc.: <http://www.belden.com/index.cfm>

Hardline coaxial cable—Andrew®, a CommScope Company, makes HELIAX® hardline cables:
<http://www.commscope.com/andrew/eng/index.html>

An online calculator for determining the voltage drop (loss) using power-supply voltage, wire size, and distance, from Current Solutions, Inc.:
<http://www.currentsolutions.com/knowledge/vdrop.htm>

A nice chart comparing wire sizes and voltage drop from Affordable Solar:
<http://www.affordable-solar.com/wire.charts.htm>

Connector, cable, and other useful information can be found at the Microwaves 101 website. Although this site is dedicated to the microwave-frequency ranges, it has some very useful information and interesting images on radio technology:
<http://www.microwaves101.com>

Photo 3– In this not-so-typical radio setup the rig is located far away from the power source (car battery). The voltage drop at the radio end of the long cable can be enough to cause the radio system to malfunction. Minimize this loss and maximize performance by using a cable made with thick wires.

Photo 4– A good source for flexible, large-gauge wire is your local electronics store that caters to car audio buffs. Other items, such as fuses and fuse holders, cable clamps, and other car audio supplies may also be available from shops like this.

The Belden information mentions one more important thing: In cold-weather areas, the conduit and cables should be run below the frost line to avoid damage from the expansion and contraction of the earth during freezing and thawing.

There may also be local laws or regulations regarding the use of buried wires, so you may want to check with the local building inspectors or do some research for any electrical codes for your area before considering burying any cables.

Loss is Bad; Gain is Good

In the financial world, losses are bad and gains are good. The same is true in the electronics world. For wire and cable, losses and gains are affected by voltages and current and resistance, the factors you learned about when studying Ohm's Law and Watt's Law. Note that wires really do not have gain, but let's think about maximizing performance by reducing loss as much as possible. Of course, if one thinks in terms of wire antennas, it is possible that wires contribute to antenna system gain, since wire is used for the antenna elements, and the antenna elements can improve or increase antenna gain when compared to a simple one-element antenna (dipole).

In practical terms, we should minimize loss as much as possible when dealing with wires and cables. For antenna work, there are two major contributors to losses in the feedline.

The first is cable construction, and suitability of the cable to the frequency for which it will be used. This translates into a simple rule: You get what you pay for when buying feedline cable. Perhaps a better way to think about this is the fact that cable price increases as the frequency for which it is designed increases. The second factor is cable length. All coax-cable specifications include loss information per length, usually per 100 feet.

Related to antenna cable loss is the connector type and its suitability for the operating frequency. The most common connector for many ham stations is the PL-259. This connector can be used from about 2 MHz to 144 MHz, and is sometimes used at 450 MHz. One main reason the PL-259 is so ubiquitous is that it is fairly easy to install and use. Other connector types and their typical frequency ratings are shown in Table I and also in photo 2.

Most ham equipment dealers have varying lengths and types of coax cable as well as a selection of connectors. Almost all of these dealers also carry

pre-made coax-cable assemblies with the connectors already installed, a great time saver.

Wires for Power

In power-supply situations, losses can be avoided by increasing cable diameter, or gauge. The fatter the wire, the smaller the loss. By the same token, cable losses are minimized when the cables are kept as short as possible. Now for most home and mobile station installations, the power cord supplied with the radio is usually adequate for almost all installations. The loss for such short lengths should not be an issue.

However, what if you are not doing a "typical installation," like we sometimes do in an emergency situation when we must remove the radio from its normal position and use it in the field? Or perhaps the installation is going to be in a boat, on the bridge, and the battery and electrical system are located many feet away?

In photo 3 the radio equipment is not mounted within the vehicle, but instead is connected to the power source (vehicle battery) via a cord about 20 or 30 feet long. The power cable is very long because the power must move from the car battery under the hood to the radio system located away from the vehicle.

Let's see what happens when we power 12-VDC radios with a long and lossy cord, and see what we can do to optimize performance, or at least minimize power loss and voltage drop at the radio end of the wires.

Most ham equipment operates at 12 VDC, which is actually 13.8 V to accommodate an automotive electrical system with the alternator running at highway speeds. High-transmit-power radios draw from 15 to 20 amps or more, and this is where the losses come into play. If the power-supply wires are "thin," the voltage drop caused by the cable length may be enough to cause improper operation of the radio.

Using the online voltage-drop calculator mentioned in the "References" section, a run of No. 14 wire, 30 feet long, connected to the car battery (assuming 13 V), powering a rig that pulls 14 amps will have a voltage drop of 1.05 V. This means that the cable will have 11.95 V at the "radio end."

Although this seems to be a very tiny amount of voltage drop, it may be enough to cause a radio to malfunction. As the battery begins to discharge—say to 10 V—the voltage drop is the same, but the voltage going to the radio drops to 8.95 V. This may explain why many battery-operated stations seem to lose performance after a long weekend of operating. The combination of cable loss and battery state of charge (or in this case "discharge") will likely cause a radio setup to malfunction.

Now keeping everything the same, but changing the wire gauge to No. 8 wire, we see that the voltage drop becomes much less than 1 volt, 0.260 V, so the radio will get 12.74 V to operate.

A good source for large-diameter power wires is your neighborhood electronics parts store or a stereo shop that caters to the car audio crowd (see photo 4). A wide range of colors and sizes of wire is available. I like the No. 8 or No. 4 wire for long DC cable runs. The car audio power wire is also very flexible, so it can be routed and handled easily.

Of course, using very heavy power wires is not going to totally prevent this from happening, nor will it magically increase operating time of a battery operated system. However, if losses are kept to a minimum, operating time can be maximized per outing.

In summary, wires and cables can be a way to improve station performance by minimizing loss, from top to bottom, or from the antenna system to the power supply.

73, Wayne, KH6WZ

how it works

BY DAVE INGRAM,* K4TWJ

dBs, S-units, and You

I'm sure you have heard fellow radio amateurs comparing transceiver and linear-amplifier power levels, antenna-gain figures and S-meter readings, but unless you have studied electronics technology, you may have been rather confused over the relationship among various figures. You also may have pondered if a linear amplifier producing less than 800 watts output would be a worthy addition to your station, or if a small beam antenna might give better results for the money. Hopefully, I can help answer those questions plus add a few more points of interest in this month's "How It Works" column. Along the way, I will also bring in some notes that may not fall in specific categories, but ones I have found useful for visualizing how electronics works. Let's begin with some proven beneficial and easy-to-remember facts.

dBs Plain and Simple

The term *decibel* is often used in electronic discussions, but what exactly is a decibel? Basically, decibel, or dB, describes a measure of one power level as compared to another. Also, 1 dB is the smallest increase or decrease in level detectable by ear. Technically and/or mathematically, dB(s) can be calculated as: dB = 10 × log power1/power2. As an example, consider a linear amplifier produces 600 watts output for 50 watts input. Grab your calculator with scientific notations (log, sin, cosine, tangent, etc.) and divide 600 by 50. When the answer (12) appears, press "LOG" and read 1.079. Then press "×", enter "1, Ø", then "=" and read 10.79 dB. Try it again using 1500 watts output divided by 75 watts input. 1500/75 = 20, press "LOG", read 1.30, press "×" and "1, Ø", and the answer is 13 dB. Now substitute your own station's numbers (or planned numbers) into the keystrokes you have performed twice and checked against our figures for accuracy, and you have mastered the formula.

Is there an easier way to estimate power levels and/or antenna gain? Yes, indeed. Just remember *every 3 dB is approximately equivalent to doubling or halving a previous power level* (fig. 1). Using the previous example, let's return to our "600 watts output with 50 watts input" calculations. Doubling 50 watts to 100 watts equals 3 dB. Doubling 100 watts to 200 watts equals another 3 dB. Doubling 200 watts to 400 watts equals a third 3 dB. Doubling 400 watts to 800 watts equals three more dB, but we only wish to go halfway between 400 and 800 watts (to 600 watts) and that's half of 3 dB, or 1.5 dB. Now add up the dBs (using your fingers is acceptable; each finger will equal 3 dB): 3 + 3 + 3 + 1.5 = 10.5 dB. Look back *and notice* the exact answer was 10.79 dB, while our quickly estimated answer was 10.5 dB. How much difference does 0.29 dB make? Again look back. One full dB is the smallest increase or decrease discernable by ear.

But wait, you say: I am interested in how strong (or weak) my signal will be at a distant receiver—how high or low it will read on that distant receiver's S-meter. A large number of estimable/estimated variables are connected with that answer, but again let's stay in the "keep it simple" category (refer to fig. 2).

S-meter Levels

First let's "reference," or "calibrate," your transceiver's S-meter. Tune in WWV, W1AW code practice, or another relatively strong signal in the 3- to 15-MHz range. Pick a station/band/frequency so the received station is 20 or 30 dB over S9, and then check your rig's manual to determine if its front-panel attenuator is 10 or 20 dB and switch on/in the attenuator. Confirm the received signal drops 10 or 20 dB as expected. (Remember that QSB fades. Perform the check several times for accuracy).

Next, tune in a steady signal registering S8 or S9 and again switch on/in your rig's attenuator and note the amount of signal drop. Some people say each S-unit is equal to 3 dB, some say each S-unit is equal to 6 dB, and some have even different opinions, but they are all exactly that—opinions. I have also noted S-meters on some transceivers respond differently than others. By using this test,

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Decibels	Hypothetical Example	
Ø dB (reference) unity	50 watts	—
3 dB (double the previous/reference level)	100 watts (estimation)	1 or 2 S- units on distant transceiver. (Discussion in text)
6 dB (double the previous level of 3 dB)	200 watts (estimation)	—
9 dB (double the previous level of 6 dB)	400 watts (estimation)	—
10 dB (10 times the reference level of 50w)	500 watts (exact calculation)	—
*10.5 dB (estimate)	*600w (see text)	—
12 dB (double the previous level of 9 dB)	(800 watts estimation)	—
15 dB (double the previous level of 12 dB)	1600 watts	Note: This level (+15 dB) could also be attained using 9-dB gain amplifier plus a 6-dB gain antenna.

Fig. 1– General relation of power levels, dBs, and S-units as discussed in text. Figures shown here apply equally to transceivers, linear amplifiers, and antennas.

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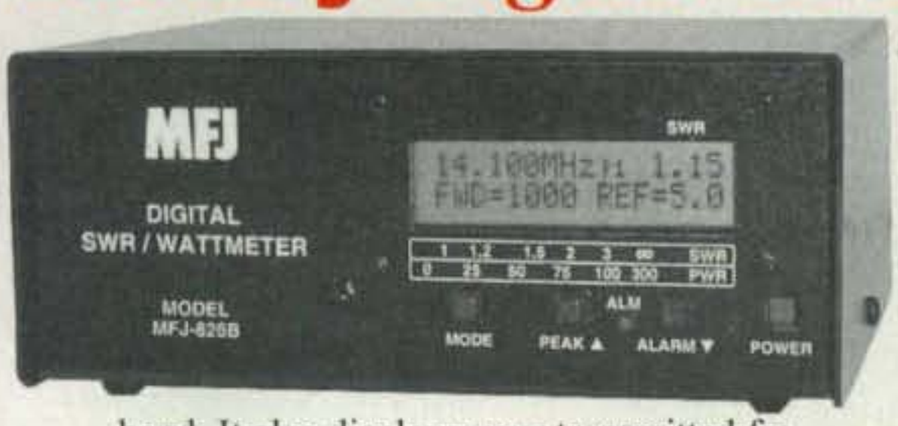

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Strong signal	S9 – 10 dB over S9 = 10 dB
Strong signal	S8 – S9 = 3 dB
Good signal	S7 – S8 = 3 dB
Good signal	S6 – S7 = 3 dB
Fair signal	S5 – S6 = 3 dB
Fair signal	S4 – S5 = 3 dB
Weak signal	S3 – S4 = 3 dB
Weak signal	S2 – S3 = 3 dB
Quite weak signal	S1 – S2 = 3 dB
Very weak but occasionally readable signal	SØ – S1 = 3 dB

Fig. 2– "Keep it Simple" chart for estimating approximately how much difference a linear amplifier or beam antenna may make in your transmitted HF signal strength. Example of use: If you typically run 90 watts and receive signal reports of S4–S5, a small beam antenna or 400-watt linear amplifier should raise your signal to approximately S7 and a 1-kw amplifier should increase it to almost S9. (More details in text.)

however, you confirm for yourself on your own rig in your own shack exactly how many dBs equal each S-unit. If your transceiver has a 10-dB attenuator, for example, and an S8 signal drops to S5 (or a tad lower) with attenuation, each S-unit equals 3 dB. If the S8 signal drops to slightly above S6, each S-unit equals 6 dB. Again, perform these checks several times to minimize errors due to fades. You may also wish to check levels at various "S counts" to ensure full-scale accuracy/linearity of your rig's S-meter. Let's now progress to applying your acquired information/knowledge to real radio world situations.

Beams, Verticals, and Decibels

Do you occasionally feel like an underdog because you use a wire antenna or a vertical rather than a beam on a big tower? Don't fret. Your on-the-air signal may be stronger than assumed—and with CC&Rs becoming rampant, you may be slightly ahead of the changing times. Locating precise signal gain figures on modern Yagi or triband beams has become rather difficult today, probably because some years ago manufacturers and advertisers became engrossed in a free-for-all stretching actual gain figures. The full story is quite lengthy, so I will just focus on the main facts.

The typical forward gain of a full-size 2-element Yagi is approximately 5 dB, and its typical front-to-back ratio is approximately 20 to 23 dB. The typical forward gain of a full-size 3-element Yagi is 8 dB—maybe 8.5 dB if it is a real romper—and its typical front-to-back ratio is around 25 dB. Classic triband beams with traps are full size on only one band, usually 10 meters, and reduced-size "mini beams" on other bands such as 15 and 20 (and maybe 40 or 30) meters. Further, traps are slightly "lossy,"and the more traps (required for operation on lower frequency bands), the greater the losses. A 3-element triband beam with traps and shorter-than-full-size elements is doing well if it exhibits 5 or 5.5 dB gain on 20 meters, and it probably functions as a reduced-size dipole on 40 and/or 30 meters. Also, I should mention all Yagi and beam antennas acquire or produce their signal gain by reflecting energy from their "back" side and directing it "forward."

Two more triband or multiband antenna types warrant mention here: the linear loaded-type, such as KLMs, and the full-size-element types, such SteppIRs. Linear loading is more efficient than traps, because element sections are folded back on themselves (and still efficiently radiate signals) rather than being coiled up in shielded traps. Full-size elements are obviously best for gain, but they are also very big, very heavy, and very expensive. If you are not familiar with the SteppIR concept, incidentally, its working technique is based on lengths of .75-inch wide spring copper strips with sprocket holes placed within high-strength PVC tubes being adjust-

	Signal Gain	Approx. S-meter Gain
Full-size 2-element Yagi Reduced-size 3-element triband beam (20m)	5.5 dB	1 or 2 S-units
Full-size 3-element Yagi	8–8.5 dB	2 or 3 S-units

Fig. 3– General comparison of popular beam antennas as discussed in text.

A Note of Encouragement

This month's column may not contain "glitz and glamour" pictures to capture your attention, but it is filled with scarce and useful information I am sure you will find beneficial for many years to come. Read it at least twice for best understanding and watch for further expansions of presented information in our next/March "How It Works" column. —*K4TWJ*

ed to band-related lengths by a stepper motor. That numerical control, in turn, is operated by an indoor control box. The SteppIR's non-metallic tubes may be 36 feet long to accommodate full-size 20-meter operation, even when internal copper straps (the actual elements) are only 17 feet long. Operation on 30 and 40 meters also involves folding back elements "linear loading style." Overall, SteppIRs exhibit full-size Yagi gain on 20 meters and up, and also reasonably good performance on 30 and 40 meters.

While discussing Yagis and beams, I should mention the same full-size/linear-loaded/trapped/radiator factors apply to verticals. Also, all verticals are not equal. A 1/4-wave vertical mounted on a single metal stake for a ground rod and lacking at least 3 1/4-wave radials per band typically performs 3 to 7 dB below the same vertical with a good radial ground system. A 1/4-wave vertical with a good ground system also performs generally close to par with a dipole or G5RV. Although a personal opinion derived from two full years of direct on-the-air A-B comparisons, I have found newer design 3/8-wave verticals (such as Hy-Gain's AV-620 and AV-640) with their full-size or linear-loaded elements deliver very good performance. They typically "outwork" 1/4-wave verticals by 3 to 6 dB and are within 3 or 4 dB of a 3-element trapped triband (20, 15, 10 meter) beam. Also, 3/8-wave verticals do not require multiple ground radials; their half-dozen 5- or 6-foot "spokes" are quite sufficient. Obtaining 3 or 4 dB gain with wire antennas is also easy; the Extended Double Zepp and the Carolina Windom are two good examples of that fact.

Briefly recapping, a full-size Yagi (or vertical, or wire dipole) radiates (and receives) signals better than a Yagi (or vertical or wire antenna) with linear-loaded elements, and the same antenna with linear loading outperforms one with traps. Also, a "larger than 1/4-wave" vertical often performs almost comparable to a triband beam on bands below 10 and 12 meters—and that's assuming the beam is pointed directly at the distant station one wishes to contact. If that station is "off the back" of the beam, the vertical has an advantage.

Wrap Up

We have covered a vast amount of ground in this month's column, ground that was vital before we could progress to the main points of interest. However, we have now also run out of space (right at the "highpoint"!). I can only say (encourage you!) to read our next "How It Works" column in two months, when I will discuss which will be the best addition to your station—a linear amplifier or a beam antenna (or both!)—and how much gain (in dBs and S-units) may best fit/parallel your needs, budget, and lifestyle. I will also discuss how signals both transmitted and received are influenced by propagation, polarity, and operator expertise, plus look at the "magic dB equalizer," a receiver's AGC system. The combination of these two columns is a learning experience you probably will not find anywhere else, so stay with me, and drop me a short note or e-mail if you found this month's column informative. I aim to please!

73, Dave, K4TWJ

antennas

BY KENT BRITAIN,* WA5VJB

Antenna Help for (and hopefully from) Readers

This month the column is going to cover a variety of topics rather than one project. We start off with reader feedback regarding the last column on using loop antennas for transmitting. Oleh, KD7WPJ, reminds us that the RF currents are very high in a loop antenna and that any resistance in the loop very quickly reduces its efficiency. Connections between segments can be particularly troublesome. When practical, the loop needs to be one piece of metal. Segments as used in the G4TPH antenna can be problematic. G4TPH used wide antenna segments with lots of contact area as you can see in photo A. Thus, make sure the sections are clean where the elements come together and the connections are tight. Also, with any loop antenna used for transmitting, you need to have good low-resistance connections between sections.

From Gordon we get the question: "If I improve my antenna from its 1.9 SWR to 1.1, how much more gain will the antenna have?"

There are several ways to define gain, but the most common way is how the antenna takes energy from one part of its pattern and focuses that energy in a preferred direction. In short, there is no relationship between the SWR of an antenna and its gain. Now there *may* be a slight improvement in the efficiency of the antenna.

An SWR of 1.9:1 means about 8% of the power is reflected, while a 1.1:1 SWR is about 1% reflected power. Therefore, there is a potential for a 7% improvement in radiated power, but the pattern and gain of the antenna are unchanged.

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Photo A– Low-resistance contact points.

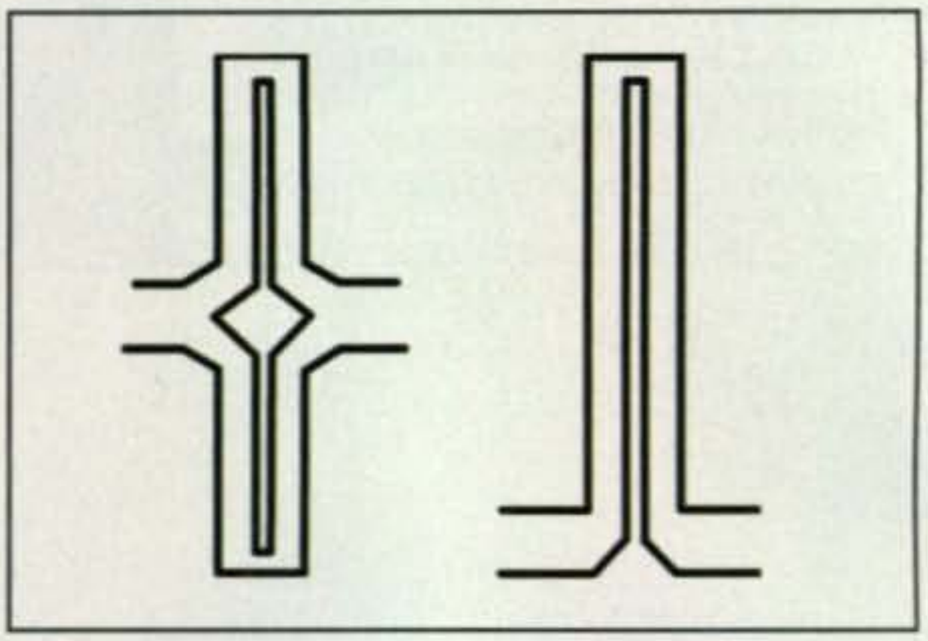

Fig. 1– Schiffman Phase Shifters.

Again I say the *potential* for a 7% improvement. If you have a very low-loss transmission line and the transmitter is quite happy working into a 1.9:1 SWR, then there is *no loss* in the efficiency of the antenna. The transmitter simply returns the reflected power to the antenna.

If you have a long, lossy feedline, then the reflected power shows up as heat in the coax. This is why many HF antennas fed with ladder line and an antenna tuner may have SWRs near 100 but still work fine. The reflected power is simply bounced back to the antenna again and again. Since ladder line has virtually no loss at HF, the signal is eventually radiated. This is also true when the transmitter is mounted at the antenna. In short, SWR and gain are not related.

Now for Your Help

I am looking for someone who has designed a Schiffman Phase Shifter (see fig. 1). When you have 1/4 wavelength of coax, there is a 90-degree phase shift as the wave travels though the coax. If you change frequency, the coax is no longer 90 degrees long.

The Schiffman Phase Shifter is both a phase delay and a coupler that bypasses its own part of the phase delay. As frequency goes up, the phase shifter is bypassed. The result is a 90-degree phase shift that stays a 90-degree phase shift over a broad range of frequencies. For the next family of AMSAT transponders, we are looking at using two crossed Vivaldi antennaslike the one shown in photo B. We end up with an antenna much like the ridged horn on the left side of photo B, but without the horn. When one of the Vivaldis is driven 90 degrees out of phase, we get circular polarization, but that would only be on one frequency. Use a Schiffman Phase Shifter and we can have a 2–6

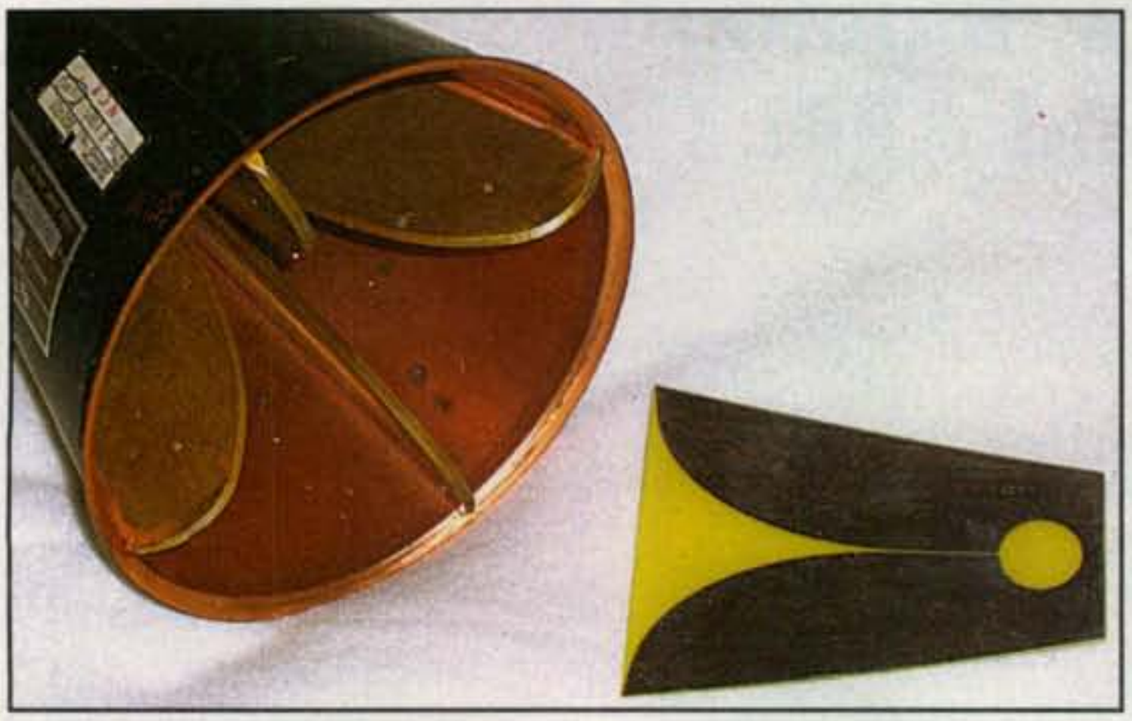

Photo B– Tapered slot or Vivaldi antenna.

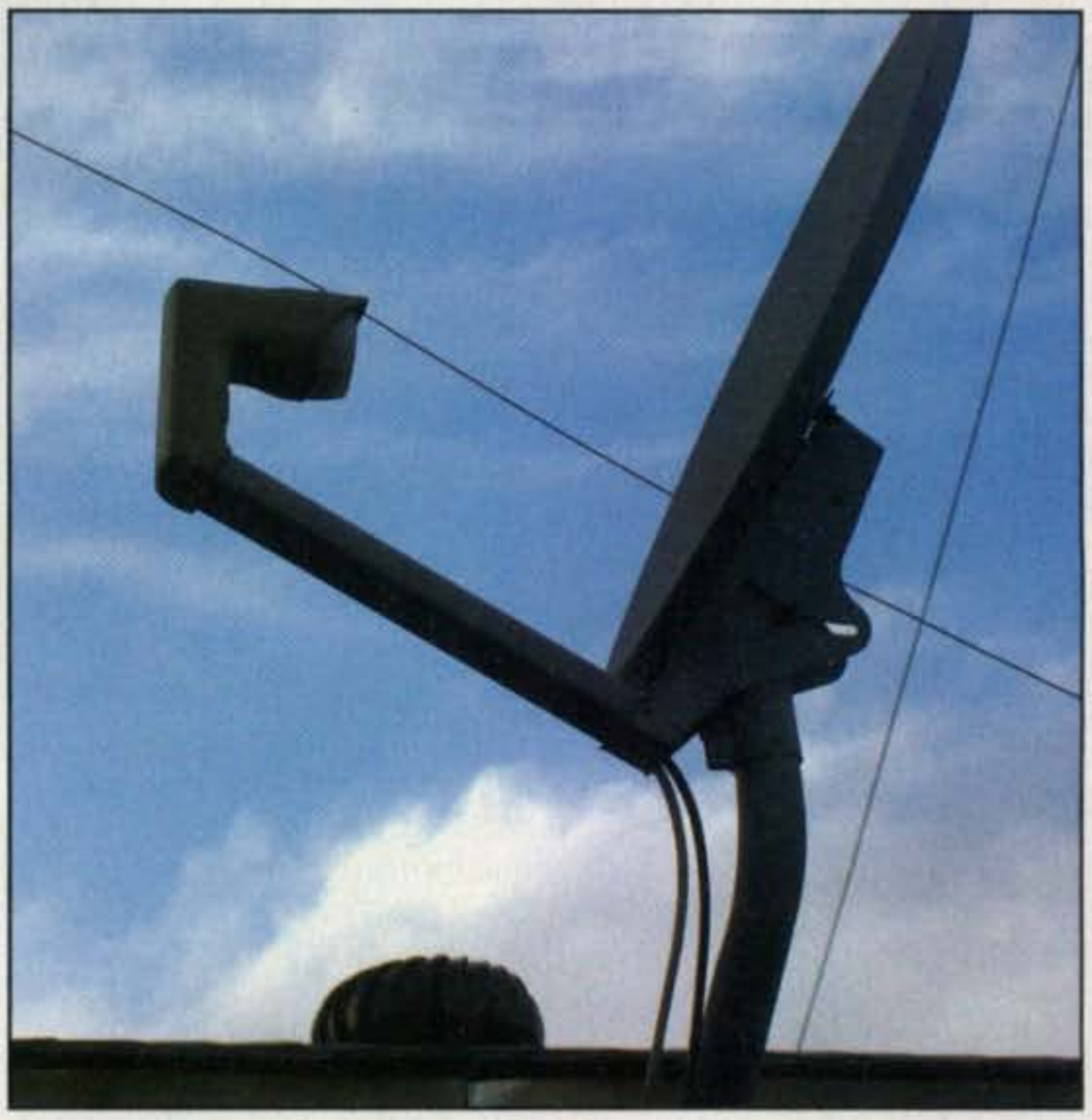

Photo C– Plain-sight hidden AMSAT antenna.

GHz circularly polarized dish feed than maintains CP over the 2400, 3400, and 5700 MHz ham bands. So I am looking for help designing 100-ohm and 50-ohm 2- to 6-GHz, 90-degree Schiffman Phase Shifters.

"Well, why don't you just look it up on the internet?" Step up close ... a little closer. ... I want to whack ya upside the head! I have Schiffman's original paper, several newer papers, and have reviewed the first 300 of the 8000 Google hits. They all talk about the Schiffman designs in broad terms and never get into line impedances and their separation. That's why I am hoping one of you, our readers, has actually worked with these.

You are welcome to contact me at my *CQ* e-mail address, <wa5vjb@cq-amateur-radio.com>.

Now for where I am going with these. These new AMSAT birds will be in geostationary orbit this time, so no tracking motors will be necessary. Many hams would like to put up an antenna to use these transponders, but local antenna restrictions and neighborhood covenants forbid outside antennas. Ahhh ... but not the satellite TV antennas. Those *neighborhood* busy-bodies can't keep you from getting your news. That's protected by the US Constitution (as well as the FCC's "OTARD" ruling). If we can come up with a multiband dish feed that sort of looks like a satellite LNB, then you would be able to bolt that deception 2–6 GHz circularly polarized feed on a surplus dish and mount on a spot with a good southern exposure such as the one shown in photo C. How about that for a plain sight-hidden antenna? 2400 MHz, 3400 MHz, and 5800 MHz all are covered at the same time in the same antenna.

As always, we welcome your questions and topic suggestions. Just drop a snail mail to my QRZ.com address or an e-mail to <wa5vjb@cq-amateur-radio.com>. Oh . . . as for that construction project suggested from Washington State, it looks like we will need to wait until room-temperature superconducting wire is available for that one! For other antenna articles and projects, you are welcome to visit <www.wa5vjb.com>. Go put up some antennas before the snow gets too deep!

73, Kent, WA5VJB

what's new

BY ANTHONY A. LUSCRE,* K8ZT

Tuning Controllers, Bluetooth® Adapters, Antenna Book, and ARRL Handbook

This month we start with products to allow some popular portable HF rigs to control your antenna tuning. Next up are two Bluetooth® adapters to get your hands off the radio and back on the steering wheel. We then have some reading material for the cold winter nights. Finally, we visit The Amateur Radio Website of the Month.

Four Antenna Tuning Accessories

The BetterRF 7000 Screwdriver Control works in conjunction with an ICOM IC-7000 radio and any screwdriver antenna. It finds resonance settings with the push of the Tune button. All operations are done from IC-7000 controls and no extra buttons or speakers are necessary. No RF connections to the 7000 Controller and no modification of your screwdriver antenna or radio are necessary. Your SWR reading is visible on the IC-7000 during the tuning process. Pricing is $84.95 plus shipping.

The BetterRF ICOM 7000 Tune Control makes the Tune/Call button functional on the ICOM 7000! The SWR is displayed on the radio as you tune an antenna or an external tuner. There are two available modes: constant 30 watts out or pulsed (50% duty cycle) output at user-selectable power (good for tuning an amp). No radio modification is required, simply plug-and-play installation. Pricing is $54.95 plus shipping. Also available is a similar unit that can work with the IC-706 or IC-718.

The BetterRF I-Mate (photo A) implements the external selection of pre-recorded voice and keyed messages for the IC-7800, IC-756 PROII/III, and keyed CW messages for the IC-746 PRO. It eliminates the necessity of shifting the display from an operating mode to a memory-select mode simply to transmit the pre-recorded message. In addition, the I-Mate provides a pulsed sine-wave oscillator for the tuning of high-powered amplifiers and antenna tuners. Pricing is $74.95 plus shipping.

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Photo A– BetterRF's I-Mate implements the external selection of pre-recorded voice and keyed messages for many of the recent ICOM rigs.

Photo B– Timewave's new HamLinkBT-RC Wireless Rig Controller is a Bluetooth® device that features Receive/Transmit audio, rig control, and PTT connectivity for remote operation of RS-232, CAT, and CIV enabled transceivers.

The BetterRF Yaesu Tune Control for the FT-100, FT-857, and FT-897 (will also work with FT-450 and FT-950 with an easy modification) makes the Tune button function to provide a low-power output for tuning, adjusting an antenna, checking SWR, etc., no matter what mode you are using. An interface cable is included. No radio modification is necessary. It can also provide an interface between your Yaesu transceiver and ICOM-type accessories such as ICOM antenna tuners, tuners from other manufacturers, and screwdriver antenna controllers. Price is $44.95 plus shipping.

For details or to order BetterRF products, visit <www.betterrf.com> or phone 800-653-9910.

Two Bluetooth® Adapters

Timewave's new HamLinkBT-BTH™ Wireless Headset Adapter is a Bluetooth® device linking a Bluetooth® wireless cell-phone earpiece to a transceiver for untethered remote operating. The HLBT-BTH features Receive/Transmit audio and PTT connectivity. The design eliminates most wires for safer mobile operation.

The HamLinkBT-BTH connects directly to your transceiver. You can operate virtually hands-free with VOX. If your radio does not have VOX, PTT (push-to-talk) is just a quick tap of the switch on your earpiece. Supported radios include Kenwood, ICOM, Yaesu, Ten-Tec, Elecraft, Alinco, and other models.

In addition to PTT with the standard built-in push-button switch on your Bluetooth® earpiece, the HamLinkBT-BTH™ has a FastPTT output and input for wired local PTT control. Optionally, the HamLinkBT-PTT has a built-in FastPTT™ push-button switch that connects via a separate

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Bluetooth® link to your HLBT-BTH PTT output. You can hold the HamLinkBT-PTT in your hand, clip it on your belt, or plug in a footswitch or other PTT line. Just as with Timewave data controllers, a safety transmit timeout disables the PTT line after an adjustable period of inactivity.

Most radios and Bluetooth® earpieces require no special configuration to operate with the HLBT-BTH. For special configurations, the included RadioSwitch™ software program features easy setup and pairing of any one of multiple earpieces connected to a radio with HLBT-BTHs.

Timewave's new HamLinkBT-RC™ Wireless Rig Controller (photo B) is a Bluetooth® device that not only has Receive/Transmit audio and PTT, but it also adds remote operation of RS-232, CAT, and CIV enabled transceivers. The HLBT-RC Controller connects directly to transceivers with RS-232, CAT, CIV inputs. Supported radios include Kenwood, ICOM, Yaesu, Ten-Tec, Elecraft, Alinco, and other models.

In addition to the standard rig control interface, the Wireless Rig Controller has a PTT output that operates from your rig control program. Optionally, the HamLinkUSB plugs into your operating PC and routes a footswitch or other PTT line via the Bluetooth® link to your HLBT-RC PTT output. The controller also establishes a Bluetooth® audio link between your remote operating PC and your radio. You may use a computer headset/microphone, a sound-card program, or an external TNC to operate over this link.

Timewave supplies a variety of cable choices for the HamLinkBT-RC Wireless Rig Control, ranging from standard pre-molded cables for the most common radios to custom cables for special requirements. Suggested retail pricing for either the HamLinkBT-BTH or HamLinkBT-RC is $299, and for the HamLinkUSB $59. For more details or to order visit <www.timewave.com>.

Cebic Antenna e-Book

A new book by L.B. Cebik, W4RNL (SK) entitled *Some Basics of Multi-Band Beam Design* is being publish posthumously by antenneX. In addition to the text, the book also contains 52 examples of working antenna-modeling files.

Starting from the premise "What is a Multi-band Beam?" the author wrote that a "beam is any directional antenna. In the broadest terms, then, a multi-band beam is any antenna that is directional on more than one amateur band. (Of course, we can make multi-band beams for other than amateur radio use—for example, for the old lower- and higher-frequency television broadcast channels.) We shall pare down our subject by first limiting ourselves to horizontal antennas, the type used in the upper HF and the VHF regions of the spectrum."

L.B. Cebik describes how "the process of designing multi-band beams has largely hidden beneath a veil of silence. Those who pursue this work very often have a proprietary interest in the designs. Some with a virtually intuitive knack for the process very often cannot clearly articulate what they do so well. Therefore, most amateur literature simply passes over the subject or presents a design without much theoretical commentary. We, the outsiders who look in on multi-band beam design, view it as a mystery, as a function of secret optimizing software, as esoteric knowledge to which the average amateur is denied access."

This 247-page volume presents what L.B. managed to learn about the designing process over the years. As usual L.B. Cebik's books are always full of helpful information and even some myth debunking of antenna lore. The book is available as an e-Book either on CD ($24.95) or as a download

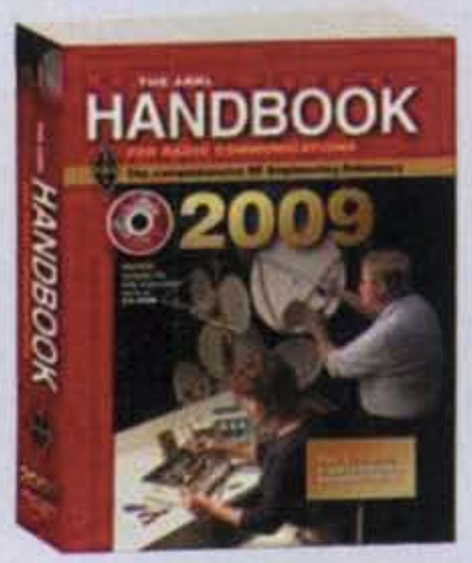


Photo C– The 86th edition of The ARRL Handbook for Radio Communications *continues the tradition of providing information in applied electronics and communications.*

($22.95). For additional information visit: <www.antennex.com/news/index.html>.

ARRL Handbook

Many hams have heard of *The ARRL Handbook*, or they may even own a few versions. However, some do not realize that *The ARRL Handbook for Radio Communications* uniquely serves both amateur experimenters and industry practitioners, emphasizing connections between basic theory and application. *The ARRL Handbook* is simply the standard in applied electronics and communications. The 86th edition (photo C) is both a useful introduction to radio communication and features the most current material on electronics and amateur radio. If you do not have a copy you need one, and if you have older versions you may still want the new edition. Topics in the 2009 edition include, among others:

• Principles of Electronics—including basic theory, components, analog and digital circuit construction.

• Radio Communications Fundamentals and Design—including modes and systems, filters, EMI, digital signal processing and software radio design, and RF power amplifiers.

• Real-World Applications and Operating—including practical projects, station setup, antennas, transmission lines, and methods for testing and troubleshooting.

• References—hundreds of detailed tables, illustrations, and photos.

The CD-ROM at the back of the book includes all of the fully searchable text and illustrations in the printed book, as well as companion software, PC-board templates, and other support files.

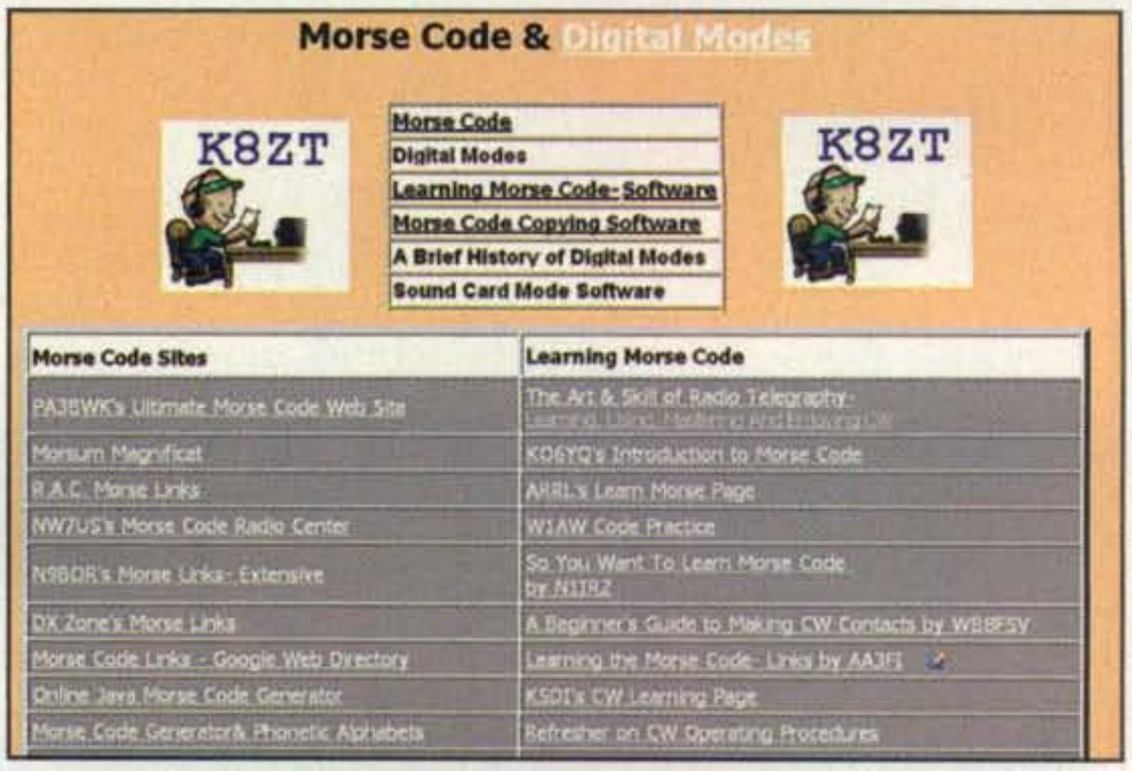


Fig. 1– Screenshot of Amateur Radio Website of the Month,"K8ZT's CW & Digital Mode Links."

Revisions to the 2009 *Handbook* include updated material on amateur satellites, with details for today's fleet of operational satellites, as well as updated versions of accessory software on the CD-ROM included with the book.

New projects in the 86th edition include:

• The RockMite QRP CW transceiver—now expanded to cover 80, 40, 30, or 20 meters.

• Audio Interface for Field Day or Contesting—audio and mic connections for two operators sharing a radio.

• Remote Power Controller—turn high-current devices off and on.

• Audible Antenna Bridge—tune for the lowest SWR by ear.

The soft cover edition of the *Handbook* sells for $44.95 and the hardcover sells for $59.95. Visit <www.arrl.org/catalog> to order or for further details.

The Amateur Radio Website of the Month

This month's Amateur Radio Website's name may sound familiar: K8ZT's Morse Code & Digital Modes Links (fig. 1). The page at <www.k8zt.com morse.html> is, in fact, one of the pages from my personal website. You will find sets of links that include: Morse Code Sites, Learning Morse Code, Morse Code Copying Software, Learning Morse Code Software, Morse Code Copying Hardware, Macintosh Morse Code Software, Morse Code Sending Hardware —Keys and Keyers, and Digital Modes.

By the way, a few alert readers noticed that I forgot to give the web address for November's Amateur Radio Website from K3WWP, John Shannon. The website's address is <http://home.alltel.net/johnshan>.

Wrap-up

That is all for this month's column. Remember, I welcome your feedback, questions, and/or comments. If you are a producer of a new product for amateur radio, please feel free to e-mail me or use the address on the first page of this column.

Until next month . . . 73, Anthony K8ZT

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.*

BY JOE LYNCH,* N6CL

Father, Son Link 25 Years of Amateur Radio in Space History

As reported in last month's column, Richard Garriott, W5KWQ, the son of Owen Garriott, W5LFL, followed his father into space onboard the *Soyuz TMA-13* on October 13, 2008. Richard, who holds his grandfather's original call-sign, flew to the International Space Station (ISS) as a paying passenger, along with Commander *Edward* Michael "Mike" Fincke, KE5AIT, and Flight Engineer Yury Valentinovich Lonchakov of the 18th International Space Station crew.

Richard is the first son of a U.S. astronaut to fly in space. His father, Owen, W5LFL, was the first amateur radio operator to make contacts from space while onboard the Space Shuttle *Columbia* mission STS-9. After ten days in space, Richard, along with Expedition 17 crew members Russian cosmonauts Sergei Volkov and Oleg Kononeko, returned to Earth onboard the *Soyuz TMA-12*.

During Richard's ten-day stay onboard the ISS, he made dozens of QSOs. Commenting on his stay, he stated, "This mission to the ISS fulfilled a lifelong dream to experience spaceflight, just as my father first did 25 years ago. It's an honor to be the first American to follow a parent into space."

Through the Amateur Radio on the International Space Station (ARISS) program Richard made many contacts with school children. Additionally, he sent numerous SSTV images back to Earth. Commenting in the *ARRL Letter,* "ARISS International Chairman Frank Bauer, KA3HDO, had nothing but praise for Richard and his trip to the ISS," stating:

> We have all made history, starting with Richard, W5KWQ, and his father Owen, W5LFL, and continuing with all [who have] participated and/or volunteered in his ISS journey. Along the way, we have sparked the imaginations of thousands of students, and I understand [that Richard's journey has] excited some youths to the point where they are now licensed.

Along with Richard's amateur radio activities were his NASA experiments. These experiments examined the physical impact of spaceflight on astronauts. In particular, he observed the eyes' reaction to low and high pressure in a microgravity environment, the effects of spaceflight on the human immune system, and the astronauts' sleep/wake patterns and sleep characteristics.

In another linking with his father, Owen's previous flight, Richard photographed ecologically significant places on Earth for the Nature Conservancy (http://www.nature.org/). These photos will be compared with photos that Owen took 25 years earlier as a way of documenting how the Earth has changed over a single generation.

e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

Jan. 3	Moon Apogee.
Jan. 4	*Quadrantids* Meteor Shower Peak and First Quarter Moon. Moderate EME conditions.
Jan. 10	Moon Perigee.
Jan. 11	Full Moon. Good EME conditions.
Jan. 17–19	ARRL VHF Sweepstakes Contest. See text for details.
Jan. 18	Last Quarter Moon. Moderate EME conditions.
Jan. 23	Moon Apogee.
Jan. 25	Very poor EME conditions.
Jan. 26	New Moon.

—EME conditions courtesy W5LUU.

Finally,Richard also worked with the European Space Agency in performing experiments related to the early detection of osteoporosis (vestibular (inner ear), adaptation to G-force transitions, and the occurrence of lower back pain. Truly, Richard contributed immensely to a variety of disciplines during his all-too-short stay onboard the ISS.

For more information on his spaceflight, please see the following websites: <http://www.arrl.org/news/stories/2008/11/06/10437/?nc=>, <http://www.rac.ca/ariss/oindex.htm>, and <http://www.richardinspace.com>. To read an accompanying story of the LBJ High School Amateur Radio Club's participation in Richard's ARISS QSOs, see its story "ARRL ETP School Gets 'Up Close and

Expedition 17/18 Flight Engineer Greg Chamitoff, KD5PKZ (left), and Richard Garriott, W5KWQ, pose for a photo in the Zvezda Service Module of the International Space Station. (Photo courtesy of NASA and the ARRL Letter*)*

Personal' With Space" in the November 7, 2008 issue of the *ARRL Letter* (http://www.arrl.org/arrlletter/08/1107/). Portions of this piece courtesy the *ARRL Letter*.

NASA Discovers a Meteor Shower?

On May 21, 2008 Science@NASA reported on a lunar observation program at the Marshall Space Flight Center in Huntsville, Alabama in which observed impacts on the Moon's surface are categorized and compared with known meteor showers (see: <http://science.nasa.gov/headlines/y2008/21may_100explosions.htm?list209719> for the full report). Since 2005, they've recorded more than 100 lunar impacts.

Commenting on the observations thus far, researchers have concluded that not all impacts are meteorites. Some may be sporadic meteorites; some may be space junk. Researchers have observed that the ratio of sporadic hits and other debris of known meteor showers is 2:1 in favor of the sporadic hits. Commenting on this research, Dr. Rob Suggs, KB5EZ, of the Marshall Space Flight Center stated: "That's an important finding [because] it means there's no time of year when the Moon is impact-free."

As part of this ongoing correlative research, other observers have been observing Earth. As a result of these observations, on November 10, 2008 Science@NASA reported on a possible discovery of a previously unknown meteor shower on September 9, 2008 (see: <http://science.nasa.gov/headlines/y2008/10nov_sentinel.htm?list773018> for the full report). When NASA astronomer and meteor expert Bill Cooke checked his e-mail that morning, he discovered that he had received an automatically generated e-mail from his all-sky Sentinel camera. It turns out that during the early morning hours the camera detected "a surprising flurry of meteors had showered the skies above Huntsville, Alabama. More than two dozen of them were fireballs brighter than Jupiter or Venus; a few even cast shadows."

As it turns out, dedicated meteor-shower observers on occasion have noticed meteor streams originating in the Perseus constellation on September 9. Not knowing the comet that might be responsible for these outbursts, the shower became known as the September *Perseids*.

Thanks to the Sentinel camera's observation, NASA now has documentation of a possible annual meteor shower. Future observations will confirm just how prolific this shower might be.

Getting back to the explosions on the Moon's surface, Cooke is especially interested in centimeter-class meteoroids because he and his colleagues at the NASA Meteoroid Environment Office are working on correlating their joint research. Concerning this research, the November 10, 2008 Science@NASA article states:

> With NASA planning to send people back to the Moon, the frequency and power of lunar impacts has become a matter of considerable interest. By studying the meteoroids at close range in the skies over Alabama, Cooke hopes to learn more about their properties, especially their speeds, which is an important factor in luminous efficiency—i.e., how much of a meteoroid's kinetic energy is converted to light when it disintegrates upon impact. This will help researchers understand the distant flashes they see on the Moon.

What does not seem to be explored in the research is whether or not such distant flashes may, in fact, be moondust that has been excited by the Earth's magnetotail, and thus caused to crash to the surface after such excitation. Perhaps those NASA researchers at the Marshall Space Flight Center need to be talking to Dr. Tim Stubbs, a University of Maryland scientist working at the Goddard Space Flight Center, about the Earth's magnetotail. If they talk to him, they may find additional correlation between the Earth's magnetotail and those lunar flashes. For more information on my hypotheses concerning the Moon and the Earth's magnetotail, please see my July, August, and September 2008 "VHF Plus" columns in *CQ*.

Fred Fish Memorial Award No. 1 Presented to Lee Fish, K5FF

For decades Fred, W5FF, and Lee, K5FF, Fish were icons on the VHF+ ham bands. Fred and Lee both worked WAS and DXCC on 6 meters (Lee being the first to achieve that award and Fred being the second). Lee and Fred also worked WAS on 2 meters, 1.25 meters, and 70 cm. Fred went on to

Lee Fish, K5FF, receives the Fred Fish Memorial Award No. 1 on behalf of her husband, Fred Fish, W5FF (SK), at the Texoma Hamorama in Ardmore, Oklahoma on October 25. Front row, left to right: West Gulf Division Director Coy Day, N5OK; Lee Fish, K5FF; and West Gulf Division Vice Director David Woolweaver, K5RAV. Back row, left to right: Richard Allen, W5SXD; Oklahoma Section Manager John Thomason, WB5SYT; and Marshall Williams, K5QE. (Photo courtesy of David Woolweaver, K5RAV, and the ARRL Letter*)*

Lee Fish, K5FF, receives the Fred Fish Memorial Award No. 1 on behalf of her husband, Fred Fish, W5FF (SK), from ARRL West Gulf Division Director Coy Day, N5OK. (Photo courtesy of W5SXD)

achieve a goal that no one else to date has achieved—working and confirming all 488 Maidenhead grid squares in the 48 contiguous U.S. states on 6 meters.

Earlier this year the ARRL established the Fred Fish Memorial Award (FFMA) to honor Fred's unique achievement and to encourage others to also attain such a goal, as well as to encourage 6-meter operations from rare grids. According to ARRL Contest Branch Manager Sean Kutzko, KX9X, "Plaques bearing Fred Fish's *likeness* will be awarded to any amateur who can repeat Fred's accomplishment." More about this award and Fred's history can be found in Bill Van Alstyne, W5WVO's article "In Search of the Legendary Fred Fish," which begins on page 44 of the Spring 2008 issue of *CQ VHF* magazine.

To honor Fred's accomplishment, the first Fred Fish Memorial Award plaque was awarded posthumously to his widow, Lee, during the ARRL Forum at the Texoma Hamorama in Ardmore, Oklahoma on October 25. Several members of the Central States VHF Society (CSVHFS) were present for the ceremony. Fred and Lee were members of CSVHFS for many years.

Commenting on the presentation, Kutzko stated, "Lee was visibly moved when she saw the photo of her late husband on the plaque bearing his name and her voice broke as she spoke out loud, realizing that 'when award number 2099 is presented, Fred's picture will still be on the plaque.'" Lee went on to thank the ARRL and the amateur radio community for recognizing her husband's contributions to amateur radio.

More information on the Fred Fish Memorial Award, as well as other ARRL operating awards, can be found on the ARRL Awards Program portion of the ARRL website: <http://www.arrl.org>. Portions of this piece courtesy the *ARRL Letter*.

More on Tropospheric Ducting

In reporting on the first FR-ZS 2-meter QSO in last November's column, I relied on Dave Pedersen, N7BHC, to supply me with much of the information. This month Dave presents an update of what happened on Reunion Island in November, as well as an announcement for this month. First the report from John Turner, FR5DN, forwarded to me by Dave, N7BHC:

On the evening of November 3, 2008, the station I was listening to on 92.8 MHz was still there but much fainter and nearly swamped by another on 92.7 MHz. And when I got up onto the ridge that runs along the centre of the island there was also a strong South African on 92.8 MHz, so I'm still not able to confirm. I think I could hear French language through the interference, but sometimes you hear what you want/expect to hear. But the 92.7 MHz station was definitely in Portuguese and very strong. FMSCAN lists hoards of Brazilian stations on 92.7 and I wouldn't begin to guess which one I was hearing (if anyone wants to have a go, all I can say is that at 2200 UTC they seemed to be having a discussion about economics). My wife Catherine confirms that it was Portuguese (she doesn't speak it but has visited Portugal many times and recognized it). I think we can safely say that last night there were simultaneous clear paths from here to both sides of the Atlantic.

Now the announcement:

A number of ZS hams are hosting a VHF and EME expedition to Luderitz Bay in Namibia January 7–17. I will be going out to lead the tropo DX effort. We're intending to gather scientific data as much as we are able as well as work the DX.

The Expedition to Luderitz is really good news because the planned dates in January

will also be optimum for tropo ducting across the Atlantic to St. Helena, Ascension, and Brazil. Hopefully the hams in ZD7, ZD8, and PY will be able to get on the air and be ready to work Namibia. It would be ideal for someone to do an expedition to Salvador and Recife in Brazil at the same time. The odds of successfully completing a QSO to ZD7 are probably 100 percent during that time, ZD8 probably over 80 percent, and PY more than 50 percent.

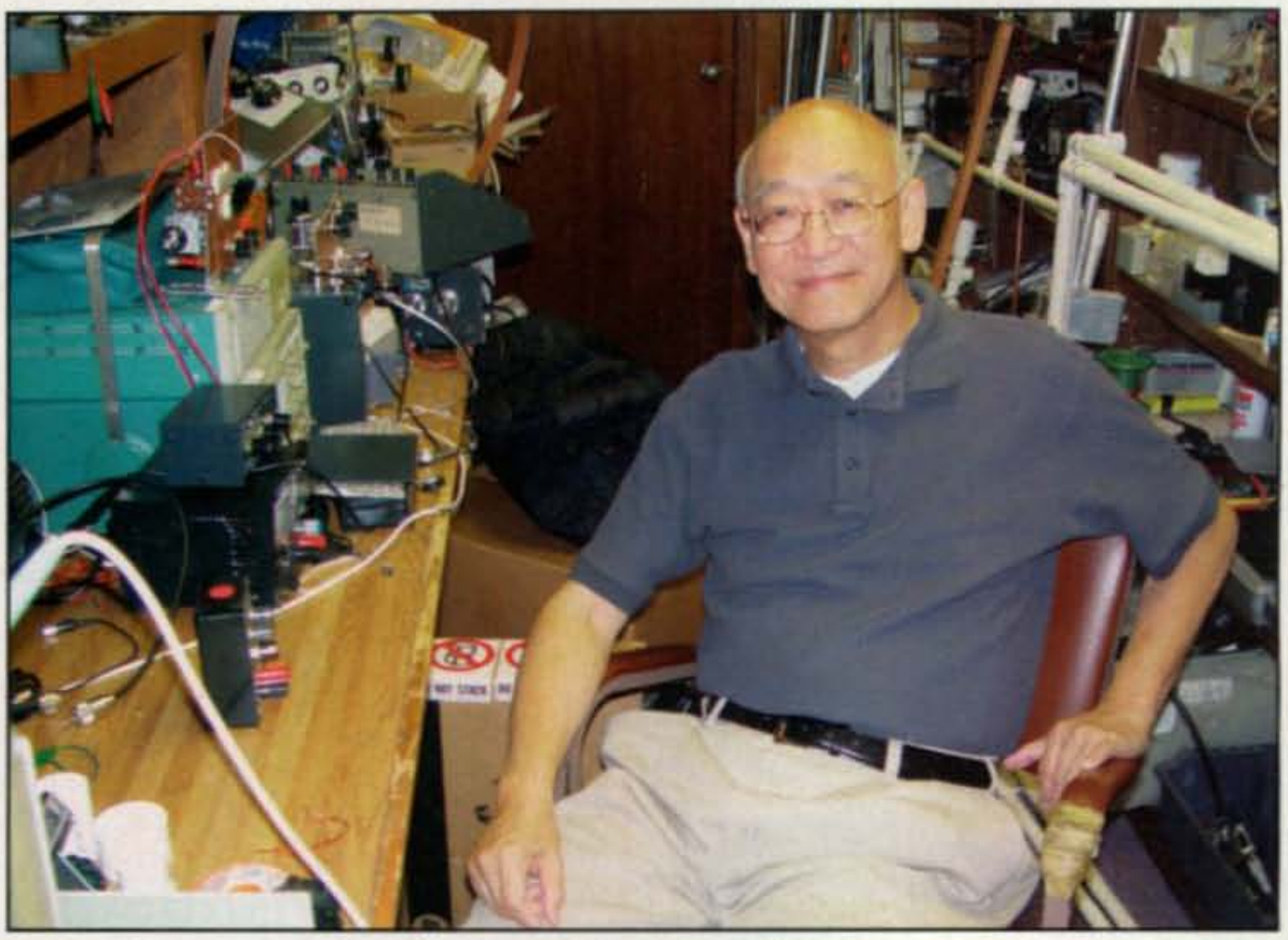
Our Tour of MFJ Enterprises

This past October my wife, Carol, W6CL, and I had the pleasure of touring MFJ Enterprises. It all began with her desire to have another way to send CW while we mobile around the country. Presently, she uses an old Heathkit HD-8999, which she carries in her lap in order to make CW contacts. Knowing that MFJ Enterprises once had a product that used a standard computer keyboard to send Morse code, we looked into their product line at their booth at the Huntsville Hamfest this past August.

While we were checking out MFJ's products, we had the opportunity to meet its owner, Martin Jue, K5FLU. Martin introduced us to Richard Stubbs, who told us about the two MFJ products currently available. Later that day we were invited to join Martin for lunch in the dealers' area of the convention hall. During the course of that conversation, Martin invited us to come through Starkville on our way back to Tulsa for a tour of his company. We agreed to do so the following Tuesday. Unfortunately, my secretary called me to advise me that one of my parishioners was hospitalized and it seemed rather serious. We made the decision to return to Tulsa immediately and postpone our trip to Starkville for a future date.

As it turns out that future date came by way of our travel to Atlanta for the AMSAT Symposium, where I presented my paper on the Earth's magnetotail. On the way to Atlanta, we stopped in Starkville for the promised tour. We were totally thrilled with the hospitality we received. Meeting us was Randy Romero, Martin's chief financial officer. He brought us into Martin's office for our time with him.

Martin has an incredible history. His youth was spent in Hollandale, Mississippi, living on the premises of his parents' grocery store. He inherited the management of that grocery store when his brother wanted to travel for awhile. At that grocery store he learned his business skills that would serve him well during his more than 30 years of ownership of MFJ Enterprises. Martin has a very fine pencil drawing of that grocery store hanging in his office to remind him of his humble beginnings.



Martin Jue, K5FLU, likes to work in the privacy of this cubby hole area in his office at MFJ Enterprises. If you ever contact him during his work hours at MFJ, chances are that he is at his station that he has set up in this cubby hole. (N6CL photo)

During our time with Martin, he showed me his not-so-secret cubby hole that is positioned behind one of the many bookshelves that surround his office. In that cubby hole he takes time to operate and to experiment with various products that he is considering adding to his product line.

After our interview and lunch with Martin, Richard gave us an extensive tour of the company's various locations. Richard displayed wonderful sensitivity toward Carol's blindness by having her feel various circuit boards, cabinets, transmitting tubes, and components associated with the various products that MFJ produces and sells. Carol was quite impressed with the oil, solder, and fiberglass that she got on her hands (albeit a bit negatively impressed by the slivers of fiberglass that she got into one of her fingers!).

We concluded our stay with Martin by having dinner with him, along with Randy. Ever the promoter that I am, I told him that I would look over his catalog and identify products that would be of interest to those of us in the VHF-plus community.

The following week we came through Starkville, this time on our way back to Tulsa. We stopped in and visited with Martin, Randy, and Richard, and I discussed my findings with him. During the course of my conversation with Martin, I added that I was really impressed with his loyal workforce. Martin responded that he employs around 150 people and that some of the employees are second generation, their parents being prior employees of MFJ Enterprises.

In conclusion concerning my visits with Martin, I would like to urge you to continue to look into MFJ's product line when you are seeking those aftermarket products to complement your amateur radio station. It is a great product line and Martin continues to expand it to meet the market needs. For more information, please see MFJ's website: <http://www.mfjenterprises.com>.

Silent Keys

I regret to report the following weak-signal operators became silent keys late last year: Tom Baker, K8MMM, and Art Moe, KB7WW. Both Tom and Art will be sorely missed.

Current Contests

The ARRL VHF Sweepstakes is scheduled for the weekend of January 17–19. For ARRL contest rules, see the issue of *QST* prior to the month of the contest or its URL: <http://www.arrl.org>.

Current Meteor Showers

The *Quandrantids*, or *Quads*, is a brief, but very active meteor shower. The expected peak is on 3–4 January, with

the expected average to be 120 meteors per hour at its peak. 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 predictions, see Tomas Hood, NW7US's "Propagation" column elsewhere in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net>.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., please contact the person listed with the announcement. The following conference organizer has announced a call for papers for its forthcoming conferences:

Southeastern VHF Society Conference: Technical papers are solicited for the 13th annual Southeastern VHF Society Conference to be held in Charlotte, North Carolina on April 24–25, 2009. Papers and presentations are solicited on both the technical and operational aspects of VHF, UHF, and microwave weak-signal amateur radio. In general, papers and presentations on non-weak-signal related topics such as FM repeaters and packet will not be accepted, but exceptions may be made if the topic is related to weak signal.

The deadline for the submission of papers and presentations is March 2, 2009. All submissions should be in Microsoft Word (.doc) or alternatively Adobe Acrobat (.pdf) files. Please indicate when you submit your paper or presentation if you plan to attend the conference and present there or if you are submitting just for publication. Papers and presentations will be published in the conference *Proceedings*. Send all questions about topics and format, comments, and submissions to the program chair, Steve Kostro, N2CEI, at <svhfs2009@downeastmicrowave.com>. For further information about the conference please see the society's website: <http://www.svhfs.org>.

And Finally . . .

The beginning of the new year also begins the term of the new U.S. President, Barack Obama. A new administration brings with it the potential for changes in laws and regulations enacted under the previous administration.

Of ongoing concern to experimenters in our hobby is the International Traffic in Arms Regulations (ITAR). Within the amateur radio experimenting community is a growing "ITAR paranoia" as Bill Ress, N6GHZ, comments in his paper "ITAR and AMSAT," which was published in the *Proceedings* of the 2008 AMSAT Symposium. More than one experimenter has walked away from the research and development tables at AMSAT-NA as a result of ITAR paranoia. In particular, cooperation between AMSAT-NA and AMSAT-DL has all but stopped because the Americans do not want to inadvertently break the law that prohibits the exportation of what might be deemed as sensitive research and technology.

The sanctions for violating the regulations can run into the millions of dollars, as Boeing found out when it was fined $32 million for its role as successor to the Hughes Corporation, which had (according to the U.S. government) illegally transferred technology to China concerning the January 1995 failed launch of the Long March 2E rocket that was carrying the Hughes-built Apstar 2 spacecraft.

From Wikipedia (go to: <http://en.wikipedia.org/wiki/International_Traffic_in_Arms_Regulations>) is the following concerning the controversy:

> There is an open debate between the Department of State and the industries and academia regulated by ITAR concerning how harmful the regulatory restrictions are for U.S. businesses and higher education institutions. The Department of State insists that ITAR has limited effect and provides a security benefit to the nation that outweighs any impact that these sectors must bear. Every year, the Department of State can cite multiple arrests of ITAR violators by U.S. Immigration and Customs Enforcement agents. However, many companies and institutions within the affected areas argue that ITAR is stifling U.S. trade and science. Companies argue that ITAR is a significant trade barrier that acts as a substantial negative subsidy, weakening U.S. industries' ability to compete.

It is your editor's hope that under the new administration a new, healthier look at ITAR may emerge that will positively deal with the concerns within our hobby. Should I learn of any such changes, I will keep you informed via this, your column.

Until next month...

73 de Joe, N6CL

awards

BY TED MELINOSKY,* K1BV

World Flora Fauna Award Series

We saw the awards trend start with countries—about 350 of them ranging from uninhabited sand spits, to major industrial powers, to "entities" of various legal and political descriptions. That kept the kilowatt gang happy, fighting to be on top of the pile earned by working them all. Then along came IOTA (Islands On The Air), counting islands, hundreds and maybe thousands of them. Lighthouses and lightships, thousands of them, also became popular. In short order came awards for contacting stations in the vicinity (on the premises, or within the sight of the operator) of castles, crumbling fortresses, or volcanoes. Then the possible subdivisions incorporated islands on inland lakes , tens of thousands of them. Even contacts for covered bridges were chased in the USA, but that one is now obsolete (and I never got the chance to activate them even when I lived in New Hampshire, which is loaded with them).

World Fauna Flora Award Series

The latest trend is making contacts with national parks or nature reserves as documented in the sponsor's official listing. The World Fauna Flora Award Series is connected to the Russian Robinson Award Series, a successful awards program. The rules are summarized below, although I strongly suggest that you read the complete text on the website <http://wff44.com/en/>. An excellent English language number of pages is found on the site. The official list of valid parks and nature preserves is available as a XLS worksheet, downloadable upon request in the popular EXCEL spreadsheet format.

Contacts must date from July 1, 2008, so everyone is on the same level. One of the best features of an award series like this is that it gives every amateur the opportunity to activate "a new one."

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

William R. Claypool, NUØQ
USA-CA All Counties #1171
September 26, 2008

Jerry Davis, KE4TTS
USA-CA All Counties #1172
October 7, 2008

USA-CA Honor Roll

500
NUØQ 3444
KE4TTS.....3445

1000
NUØQ 1758
LYR-794 1759
KE4TTS.....1760

1500
NUØQ 1474
KE4TTS.....1475
K9AAA.....1476

2000
NUØQ 1366
KE4TTS.....1367

2500
NUØQ 1285
KE4TTS - 1286

3000
NUØQ 1196
KE4TTS.....1197

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.

Once propagation conditions resume at something like "normal intensity," whatever that is, I suspect that the summer months will see many activations of national parks by amateurs on vacation to a qualifying park who will toss a wire *into* the trees, pop a cold one, and proceed to make a few dozen contacts from a camping location. Every program has suggested frequencies, and the ones most likely to be productive for all of us in the near future include 7.044 (not USA), 14.244, 18.144 MHz SSB, and 7.024, 10.124, 14.044, 18.084 MHz CW. The web-

Samples of Russia's World Fauna Flora Award series certificates.

More of Russia's World Fauna Flora Award series.

site also contains a list of planned trips and expeditions, not too busy during the winter months, but it should be hopping with activity during the summer, especially since the sponsor plans to publicize a week of special activity during the first week of July each year. Look for expedition or trip activity to be publicized by the "425 DX Letter," "ARRL DX News," and "Ohio/Penn DX Bulletin," all on the internet.

Other countries that have adopted their own version of the WFF rules by starting similar awards are Moldova (5 parks) and Portugal (46 parks). This would be a great project for radio clubs. (How about operating Field Day in a new entity park?)

General Requirements: This is a program requiring contacts (SWL OK) with stations operating from national parks and nature reserves worldwide that are on the official listing of recognized locations (see website) at the time your QSO was made. Each contact must be with a different park or reserve regardless of whether the contact is made by different modes or on different bands. All contacts must have been made from the same DXCC country. All bands okay. You may apply by e-mail or by regular mail. Send a list containing all QSO data plus the name and official WFF check number (two-letter country code and two or three digits representing the sequence number of the park, such as FF-01). The actual card, or a photo copy showing the front and back of the card (the sponsor reserves the right to examine any card), must be submitted unless the contact is made with a station or expedition that has provided the sponsor with a copy of its electronic logs, in which case you should note this in your application.

A separate set of rules applies to the activators of parks and reserves. See the website for details. Look for expedition activity on 14.244 and 14.044.

It is recommended that you visit the sponsor's website due to the length and complexity of the program. This is a developing program, and the sponsor is still looking for data from many countries regarding parks and preserves that will qualify under the rules. The fee for each award listed below is 12 IRCs. In the case of multiple awards being applied for, the fee for each is reduced to 10 IRCs. The WFF Globus Glass Trophy cost is 100 IRCs. Apply to: WFF Award Manager, Valery Sushkov, RW3GW, P.O. Box 88, Moscow, 101000 Russia. E-mail: <rw3gw@yandex.ru>; internet: <http://wff44.com/en/>.

Awards Available:

1. WFF – basic award requires 100 different FF, from a minimum of 3 continents.
2. WFF 200 – 200 different FF.
3. WFF 300 – 300 different FF.
4. WFF 400 – 400 different FF.
5. WFF 500 – 500 different FF.
6. WFF Africa – 5, 10, or 20 QSOs with different FF located in Africa.
7. WFF Antarctica – 5, 10, or 20 QSOs with different FF located in Antarctica. (Stations operating in the Antarctica territory and representing different countries as scientific, seasonal, or permanent bases are considered as different national parks or nature preserves.)
8. WFF Arctic – 5, 10, or 20 QSOs with different FF of the Arctic (north of latitude 66°).
9. WFF Asia – 5, 10, or 20 QSOs with different FF of Asia.
10. WFF Europe – 5, 10, or 20 QSOs with different FF of Europe.
11. WFF North America – 5, 10, or 20 QSOs with different FF of North America.
12. WFF South America – 5, 10, or 20 QSOs with different FF of South America.
13. WFF Oceania – 5, 10, or 20 QSOs with different FF of Oceania.
14. WFF Globus – a specially laser-engraved glass trophy (80 mm diameter) for proof of having made QSOs with over 500 different FF of the world.

Germany's Royal Wedding of Landshut Award

A beautiful princess married a young German nobleman in the splendor of a Middle Ages royal wedding, truly the story of fairy tales which date from this era. In 1475, Duke George the Rich of Landshut married Polish Princess Jadwiga (Hedwiga). The citizens of Landshut commemorate this royal wedding event with a festival that takes place every four years. With about 2000 participants dressed in historical costumes and around 800,000 visitors from all over the world, the re-enactment of the "Royal Wedding of Landshut" is one of the largest events of its kind.

The next re-enactment of the "Royal Wedding of Landshut" is taking place from June 27 to July 19, 2009. The German Amateur Radio Club e.V. (DARC, section Landshut, DOK U-8) and the Union of Radio Amateurs of the German Federal Post (VFDB, section Landshut, DOK Z-76) sponsor a special award that can be obtained by all radio amateurs and SWLs during the year of this performance. Note that contacts valid for this award may be made during the entire calendar year of 2009.

Earn a total of at least 1475 points. The point values are as follows (listed as German station, followed by points for HF DX stations, then points for all others):

DLØLA/DQØL (U8); first = 475; first = 475.

DLØLAT/DL1E (Z76); second or later = 125 points each; second or later = 125 points each.

All other stations of Landshut (DOK U8 und Z76); 250 points; 125 points.

All applicants must work at least one of the listed club stations: DLØLA, DQØL, DLØLAT, DL1E. Only the first contact with one of these club stations counts for 475 points. All further contacts with club stations and all other stations located in Landshut count 125 points, and 25 points in the case of HF DX contacts (i.e., for stations outside of Europe). QSOs via Echolink or packet are excluded; however, there is no fur-

ther restriction with respect to any bands or modes. For this award each station can only worked once.

Send the application for an award together with the relevant extract from the logbook and 8 Euros or $13US to: Andreas Lehner, DF5LR, Wernstorferstr.11,D- 84 36 Landshut, Germany. E-mail: <df5lr@u08.de>.

The Royal Wedding of Landshut Award certificate.

For further information about the "Royal Wedding of Landshut" visit the website: <www.landshuter-hochzeit.de/welcome.htm>. The rules are located at: <http://www.u08.de/pages/diplomen.shtml>.

County Hunting Q&A

Q: What kind of endorsements are available for USA-CA?

A: Achieving USA-CA is a massive job, sometimes taking 10 or 20 years to finish. Most of the applications I see are "Mixed Bands and Modes." The next major subdivisions are ALL SSB, ALL 20 SSB, and ALL CW. Only a few of the hardiest county chasers even try for the next level, such as ALL 20 SSB mentioned above. However, recognizing the tremendous effort it takes to earn even the mixed band/mode award, we are pleased to endorse your certificate with the appropriate wording that reflects your dedication and perseverance. You should know that we do not maintain official records that show any of these special endorsements, but if you've earned one of these, you have permanent bragging rights on your wall.

Q: Do you require use of the official record book?

A: The USA-CA Award dates back to the time when PCs were not even available to the general public. Oh yes, there were probably about 500 mainframes in action using maybe 20K of ferrite-core memory and processing all those punched cards. (Old timers, get ready to answer the youngsters about these *old* terms.)

Enough history, though. I will accept any printed output from a database or spreadsheet program that contains at least the same data as found in the little booklets printed by CQ. The listing should show contacts by state and county in alphabetical order. Display the callsign, city/town/"mobile" location data, band, and mode. Your certification as well as those from your witnesses may be a photocopy of the form found in the booklet.

We're always interested in hearing from clubs, special interest groups, or individuals who sponsor awards. Please contact me at the e-mail or snial mail address shown on the first page of this column. 73, Ted, K1BV

dx

BY CARL SMITH,* N4AA

DX News and more

Another year gone and a new one to look forward to. I guess we're looking forward to it, aren't we? After a very long political "season," which finally ended in early November, perhaps we can get our attention back to things that are a bit closer to our ham hearts and minds . . . like DXing.

DXpedition News

As of early November we still don't know when the operation from **Desecheo, KP5** will take place. All we do know is that it should happen sometime in the January-March time frame. Keep listening/watching. The team does have a website and it is being "refined" as details become available. You might want to make a note of it so you can keep track of what's happening: <http://www. kp5.us/>.

Glorioso, FR/G is still a question mark. We hoped this would happen in September, then October, but no further information has been seen/heard. Last word we had was that the team still had their mind set on going and it was just a matter of time to arrange transportation. As with Desecheo, keep listening/watching.

Marion Island, ZS8... Where, oh where is Petrus, ZS6GCM/ZS8T? We don't know. We believe he is still on the island but with absolutely no word for months, we can't be sure of anything. It's a real disappointment, to say the least.

A week-long operation from both **VU4** and **VU7** the end of October and early November provided some folks with another opportunity to put these formerly Most Wanted islands on their "worked" list. For the most part the U.S. had little or no opportunity to work the VU4, although the VU7 group was workable.

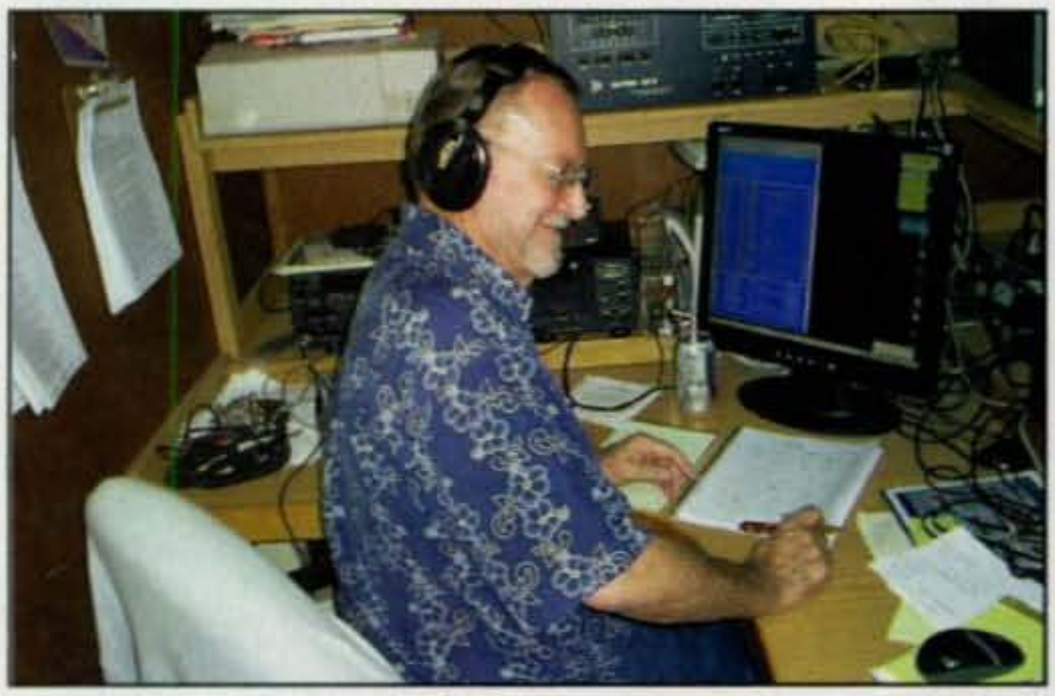
We're starting to see a lot of operations from **Cambodia, XU** and **Vietnam, XV**. I'm not sure of the reason for all the recent activity, but there has been enough to cause me to notice it.

Crozet (FT5WO) is expected to have a year-long resident. Florentin, F4DWY, is a Volunteer Civilian Technical Assistant and is expected to be on the island from December 2008 to November 2009. He is reported to be taking an FT-757GX and will use dipole antennas. This could be a real opportunity for DXers, as Crozet was ranked #9 on the last Most Wanted Survey.

Speaking of the Most Wanted Survey, *The DX Magazine* Most Wanted Survey is conducted annually between early September and mid-October. The results for 2008 are being compiled now, but they won't be available in time for any reports for this issue of *CQ*. You might want to check the website <http://www.dxpub.com> around mid-January to see the overall Top 100.

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

At a Chinese restaurant in Hawaii we find (left to right) Lee, KH6BZF; Yasuko-Chan, JL1BWO; Uti, KS6FO; and Tets, AH7C. Lee says, "The picture was taken by our waitress, Kitty." (Photo courtesy of Lee, KH6BZF)



If you recognize this gentleman, you are probably an Old Timer. It is Bob Winn, W5KNE, the former editor of "QRZ DX," operating from the shack of Larry, AH8LG, on American Samoa. Bob and his wife were on a cruise ship that stopped there, and he took the opportunity to spend a few hours with Larry. (Photo courtesy of Larry, AH8LG)

Lee, HL1WD/T88YB, on the left and Harry, WX8C/T88OO, in the shack of George, T88GN, at the VIP hotel on Palau last October. They were there for the CQ WW DX SSB Contest. (Photo courtesy of Lee, HL1WD)

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- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

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INPUT VOLTAGE: 115 VAC 50/60HZ OR 220 VAC 50/60HZ SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

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MODEL SS-18

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅝ x 6 x 9	3.4
SS-18	15	18	1⅝ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9¾	4.2
SS-30	25	30	3¼ x 7 x 9¾	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	2⅞ x 7 x 9¾	4.2
SS-30M*	25	30	3¼ x 7 x 9¾	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 9¾	6.5
SRM-30	25	30	3½ x 19 x 9¾	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9¾	6.5
SRM-30M	25	30	3½ x 19 x 9¾	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 9¾	10.5
SRM-30-2	25	30	3½ x 19 x 9¾	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9¾	10.5
SRM-30M-2	25	30	3½ x 19 x 9¾	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
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

I'll be able to give you a short summary in the next issue of *CQ*.

VK9DWX from **Willis Island** wrapped up their operation a few days earlier than expected due to a weather front coming at them. The team reported they had over 95,000 QSOs and a great adventure full of unforgettable moments and sweet memories behind them. Quoting from the report: "We enjoyed nice and trusty fellowship within our team. Our two rookies, Josh, W4WJF, and Rhy, ZS6DXB, turned out to be a real surprise for us. They not only slipped into the team very easily but they also shouldered the operating burden in amazingly good performance. They became a valuable support for the DXpedition. We are very sorry that in the last days of operation the online log was not available. Due to a crash of the database on our server we were not able to fix it from the island (not at a rate of 6 EUR/MByte...). But now the online log is available again and also the QSO statistics."

Still Room for Improvement

A friend of mine (I'll call him "Doug the DXer") and some friends went on a short trip to an island not too far away but still

CQ DX Awards Program

RTTY

42 .....9A6ZT

SSB Endorsements

330 .....K6YRA/339
330 .....WB4UBD/339
330 .....4Z4DX/339
330 .....N7BK/339
330 .....DJ9ZB/339
330 .....AB4IQ/337
300 .....K5UO/335

CW Endorsements

330 .....EA2IA/338
330 .....K9MM/338
330 .....K7LAY/336
330 .....K5UO/336
330 .....K3JGJ/335
320 .....IKØADY/328
275 .....KØKG/298

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 338 active countries. Please make all checks payable to the award manager.

The WAZ Program

15 Meter SSB

641 .....OZ1ADL

20 Meter SSB

1176 .....WA3RHW

All Band WAZ

Mixed

8526 .....YO7APA
8527 .....YO7LCB
8528 .....DL4CW
8529 .....JH1EPS
8530 .....EA2BCJ
8531 .....WA3FRP
8532 .....BA7IO

RTTY

191 .....WA3FRP

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>.

The WPX Program

SSB

3022 .....LU4DLL
3023 .....IZ8FFA

Mixed

2017 .....JA7OXR
2018 .....OK7RJ

CW: 2250 VE6BF.
SSB: 700 IZ8FFA. 900 VE6BF. 1350 AE9DX. 2400 WA5VGI.
Mixed: 2400 VE6BF.

80 Meters: K8ZEE

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, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI.

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, K9LJN, 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, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI.

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 bars for the Award of Excellence are $6.50 each.

much sought after. After the operation Doug had a few comments, "We had the same old problem with some of the European operators in pile-ups. They just keep calling and it takes forever to work somebody. We worked 23,000 and should have doubled that count."

He asks the question, "Why do they call over each other all the time?" I wish I had an answer for Doug, but I don't. How about you? This is one of those things that I have been talking about for the past few years now, and I had hoped we had made some progress. I believe we have, but obviously there is still plenty of room for improvement, especially from some of our European friends.

5 Band WAZ

As of November 1, 2008, 757 stations have attained the 200 zone level and 1613 stations have attained the 150 zone level.

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

None

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

S51U, 199 (27)
N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
WØCP, 199 (18)
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)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
VE3XN, 199 (26)
YU7GMN, 199 (10)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
WB9EEE, 199 (17)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
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)
W7VJ, 198 (34, 37)
K9MIE, 198 (18, 21)
W9RN, 198 (26, 19on40)
W5CWQ,198 (17, 18)
K9OW,198 (34on10, 2on15)
I5KKW, 198 (31&23 on 20)
JT1BV, 198 (4, 11)

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

NKØS (157 zones)

5 Band WAZ updates:

JH1EEB (193 zones)

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 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>.

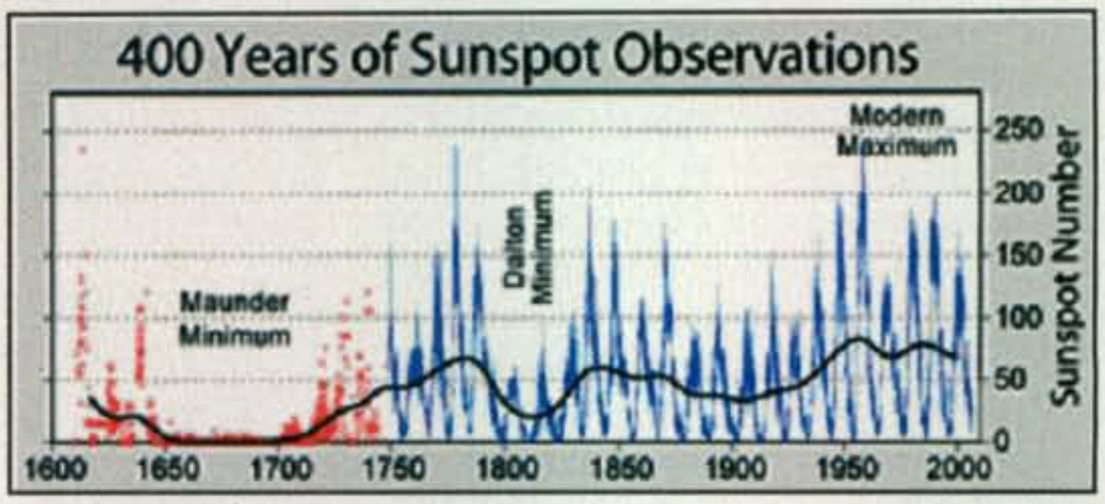

Fig. 1– A graphical display sunspots for the period 1600–2000.

Sunspots and Some History

Every once in awhile there has been a sunspot reported, causing folks to get their hopes up that Cycle 24 is getting started. That start has been very slow and still there are no definitive facts to show it is starting. In spite of the less than ideal propagation DXers are a dedicated group and lots of good DX is still being logged. The low bands (especially 160) have been surprisingly good in early November. We should be grateful for what we can work on those bands while waiting for the upper frequencies to improve.

I can't take credit for the following, as it was sent to me by a friend, but I thought it was interesting enough to pass along. Here is what the article said: "The Maunder Minimum is a 400-year history of sunspot numbers. The 'Maunder Minimum' is the name given to the period from roughly 1645 to 1715, when sunspots became exceedingly rare, as noted by solar observers of the time. It is named after the solar astronomer Edward W. Maunder (1851–1928), who discovered the dearth of sunspots during that period by studying records from those years. During one 30-year period within the Maunder Minimum, for example, astronomers observed only about 50 sunspots, as opposed to a more typical 40,000–50,000 spots." Fig. 1 is a graphical display of the period from 1600–2000. *(For more information on the Maunder Minimum, see the "VHF Plus" column by N6CL in the April 2008 issue of* CQ*—ed.)*

Here is more on the progress of Cycle 24 (or lack thereof). According to an article by David Archibald on the website

QSL Information

JU4Y via IØSNY
JWØP via JWØP
K4J via KS4RX
KHØ/JA1XGI via JA1XGI
KHØ/K3UY via RA3AUU
KH2/K3UY via RA3AUU
KL7J via N3SL
KP2/KC4YHL via JA1ELY
KP4ED via EB7DX
KR6IG via K5YG
KX6ND via JA1ELY
LA1IARU via 3A2LF
LY999X via LY3X
M/F5KEE/P via F8ATS
MØNRC via G1HIP
M7A via MØNRC
MJØDOL via MØDOL
MM/DH5JBR/P via DH5JBR
MM/DL5AUA/P via DL5AUA
MMØBNN/P via MØBNN
MXØNRC via G1HIP
NN7A/NL7 via NN7A
OA4BHY/3 via DL2JRM
OA4WW via HP1WW
OD5QB via YO3FRI
OD5QT via YO3FRI
OD5UJ via YO3FRI
OE2008BZL via DK5AD
OE2008L via OE5FSL
OE8/R3RRC via RW3GW/3
OG8X via OH2BN
OH2EURO via OH2HSJ
OK8AEP via DL5KUA
OL1908D via OK1KT
OM3KAP via 9M6TW
OM9AQA via SP8AQA
OX3PG via WAØSMQ
OZ1RDP via DL9BCP
P33W via RA3AUU
P40GY via K9GY
PG1ITU via PAØABM
PJ2/KC4YHL via JA1ELY
PJ7/KJ9I via KJ9I
PJ7/LA3ZH via LA3ZH
PT5T via N3SL
PYØFT via JA1ELY
PY2KC via N3SL
ROL via IK2DUW
R100R via RW3GW/3
R1ANT via RW3GW/3
R1FJV via RW3GW/3
R3AA/9 via RW3GW/3
R3IOTA via RW3GW/3
R3IOTA/MM via RW3GW/3

(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>; <http://golist.net/>.)

<http://www.warwickhughes.com/blog/?p=181#comment-20552>, "A large number of spotless days means that the following cycle is going to be late, and the later a cycle is, the weaker it will be." There are a number of graphs to justify the author's opinion.If you are interested in the whole story, please visit the cited website.

Until next month, enjoy the chase and please Have Fun!

73, Carl, N4AA

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5770 9A2AA	4313 YU1AB	3799 KØDEQ	3332 ON4CAS	2873 W2ME	2358 I2EAY	1858 W7CB	1556 W2OO	976 KM6HB
5492 K2VV	4151 VE3XN	3637 KF2O	3294 W9OP	2704 K2XF	2343 VE6BF	1847 W2FKF	1511 KC9ARR	964 K8ZEE
5141 W1CU	4112 N6JV	3624 WB2YQH	3227 K9BG	2673 JN3SAC	2162 W3LL	1741 AB5C	1446 DF3JO	815 KL7FAP
5027 W2FXA	4084 I2PJA	3572 WA5VGI	3091 9A4W	2503 K1BV	2116 AE5B	1739 KX1A	1330 K6UXO	726 K5IC
4566 EA2IA	3947 I2MQP	3485 IK2ILH	3007 W2WC	2486 N8BJQ	2192 N2SS	1705 W2EZ	1322 AA4FU	682 AI8P
4500 N4NO	3916 N9AF	3483 YU7BCD	2965 OZ1ACB	2475 W6OUL	1951 KØKG	1662 SV1DPI	1269 K5WAF	644 KWØH
4466 9A2NA	3807 S53EO	3325 SM6DHU	2946 W9IL	2410 K5UR	1891 VE9FX	1643 N1KC	1016 RA1AOB	636 ZS2DL

SSB

4954 IØZV	3457 9A2NA	2726 IN3QCI	2326 CX6BZ	2076 K2XF	1849 K3IXD	1591 JN3SAC	1258 N1KC	895 VE6BF
4310 VE1YX	3198 CT1AHU	2711 LU8ESU	2300 SM6DHU	2071 N6FX	1821 W2FKF	1525 N8BJQ	1232 AG4W	806 K7SAM
4000 I2PJA	3155 I2UIY	2709 KF7RU	2250 I3ZSX	2051 SV3AQR	1765 KQ8D	1480 AB5C	1145 EA3EQT	637 K5WAF
3929 OZ5EV	3133 OE2EGL	2595 EA1JG	2209 IK2QPR	2046 K5UR	1729 W6OUL	1464 VE7SMP	1045 KX1A	
3900 F6DZU	3108 I4CSP	2552 YU7BCD	2178 NQ3A	1946 W3LL	1714 IK2DZN	1463 I2EAY	1042 IZØBNR	
3720 I2MQP	2970 KF2O	2451 EA3GHZ	2135 W9IL	1935 SV1EOS	1688 KI7AO	1386 IK4HPU	1031 IK8OZP	
3473 EA2IA	2857 4X6DK	2431 G4UOL	2094 I8LEL	1927 AE5B	1623 VE9FX	1385 AE9DX	978 EA7HY	
3458 N4NO	2726 KØDEQ	2398 WA5VGI	2093 W2WC	1877 DL8AAV	1611 W2ME	1377 EA3NP	951 KU4BP	

CW

5048 WA2HZR	3412 EA2IA	2632 W2ME	2415 W2WC	2175 W9IL	1848 I2EAY	1334 RUØLL	1053 K5WAF	608 IK2SGV
4953 K9QVB	3096 WA5VGI	2623 SM6DHU	2324 OZ5UR	2089 K2XF	1804 EA7AAW	1310 K6UXO	1030 AA5JG	
4114 N6JV	3046 9A2NA	2606 YU7BCD	2309 JN3SAC	2040 I2MQP	1465 AC5K	1269 WA2VQV	915 N1KC	
4042 N4NO	2927 KØDEQ	2587 KA7T	2308 N6FX	1953 N8BJQ	1445 EA2CIN	1220 AA4FU	824 VE9FX	
3685 VE7DP	2688 I2UIY	2586 EA7AZA	2244 IK3GER	1945 K5UR	1395 W9HR	1147 KX1A	749 AE5B	
3557 LZ1XL	2636 KF2O	2582 I7PXV	2177 VE6BF	1927 W6OUL	1364 WO3Z	1086 VE1YX	740 F5PBL	

DIGITAL

1107 W3LL	1009 GUØSUP	744 N8BJQ

BY JOHN DORR,* K1AR

Contests – Your Favorite and Mine!

January's Contest Tip

In recent weeks there has been a lot of internet discussion about ways to improve CW skills. The two tactics that seem to be most recommended are: (1) practice, practice, practice (hard for many of us who live in the world of "instant gratification"), and (2) utilization of freeware training/practice software such as what is offered by Fabian Kurz, DJ1YFK (<http://lcwo.net/>). There are real hurdles in developing advanced CW skills. However, without them you are missing out on one of the greatest aspects of radio contesting!

Calendar of Events

All year	**CQ DX Marathon**
Dec. 27	RAC Canada Winter Contest
Dec. 27–28	Stew Perry Topband Distance Challenge
Dec. 28	RAEM Contest
Jan. 1	ARRL Straight Key Night
Jan. 3–4	ARRL RTTY Roundup
Jan. 4	Kid's Day
Jan. 10–11	North American CW QSO Party
Jan. 17	LZ Open Contest
Jan. 17	CQ UT Contest
Jan. 17–18	Hungarian DX Contest
Jan. 17–18	North American SSB QSO Party
Jan. 23–25	**CQ WW 160M CW Contest**
Jan. 24-25	REF CW Contest
Jan. 24-25	UBA SSB Contest
Feb. 2	Minnesota QSO Party
Feb. 2-3	Vermont QSO Party
Feb. 2-3	Mexico Int'l RTTY Contest
Feb. 3	North American CW Sprint
Feb. 2-4	Delaware QSO Party
Feb. 14-15	**CQ WW WPX RTTY Contest**
Feb. 27 – Mar. 1	**CQ WW 160M SSB Contest**

As contest operators, we often are asked what we consider to be our favorite contests. As you might expect, the answers cover an incredibly wide range. In part, I think it's because we operate contests for so many reasons. I suspect it's also due to the large number of operating events that are sponsored throughout the year (more on that later).

When it comes right down to it, most of us have one or two favorite contests that stand out above all the others. It could be based on our station's limitations or strengths, or simply a nostalgic feeling about the first one we ever operated.

Without a doubt, and having nothing to do with the source of this column, my favorite events are the CQ World-Wide DX Contests. In fact, I suppose I have to concede that DX contests in general are where my interests lie. This is, for the most part, a very widely held feeling on the East Coast of the U.S. As with any geographical area, the contests that afford the best results are usually the most popular. If you pose the same question to someone in Texas or Nevada, they would probably tell you about the benefits that come from operating domestic contests such as the ARRL Sweepstakes.

I started my ham radio experience by focusing on DXing. To this day, I still enjoy the chase of working a DXpedition on several bands and the thrill of breaking a pile-up with marginal antennas. It only seems natural that these interests would extend into contest operating as well. I suspect that I'm not alone either.

As mentioned earlier, there is a nostalgic part of this equation, too. Like many of you, my first "contest" was ARRL Field Day. It was my first exposure to ham radio as well. For that reason, Field Day has always held a special spot in my contesting interest curve—so much so that I've never missed operating one (albeit from home many times) in nearly 40 years of hamming. I'm sure many of you that can relate a similar story from other events, such as the defunct ARRL Novice Roundup. When I look back at the 20+ hours of operating I endured to make only 230 QSOs in the 1969 NR, it's amazing that I ever operated in another contest. However, to tell the truth, it was one of the best times I ever had in a contest! The excitement of putting one QSO after another into my log was rooted in my earliest days of contesting, where 200 QSOs is now measured as an hour of operating as a large multi-multi or 30 minutes when cranking away from the Caribbean.

From an international perspective, DX contests are hugely popular, and not just the CQ WW and ARRL DX, where activity levels are at all-time highs when measured by the number of logs submitted. There are literally dozens of national contests, some permitting international participation and others limited to domestic QSOs. Maybe some of you can recall an experience such as listening to a buzzsaw of weak JA stations on 80 meters working each other at high QSO rates, wondering what it would be like to work them yourself.

Another favorite is contests that focus on special operating skills. The North American Sprint is a good example. Since its inception, this contest with its special QSY rule has driven a more even-handed result to large station advantages—well, to a degree. With operators being required to QSY after every QSO, operating skill uniquely comes into play, as you can no longer sit and call endless CQs from a loud run station. If you've never given it a try, I suggest you check out this year's winter event in February. However, put your seatbelt on; there's nothing like it.

Finally, there are those good-old organizational contests. You know the ones: QCWA QSO Party, YLRL events, Classic Radio, FOC, etc. They're great in that they increase HF activity while advancing the fraternal aspect of our hobby. Who can question those motives?

Our Contest Activity Comes at a Price

The preceding discussion cannot be concluded without some comments on the number of contests currently being sponsored throughout the year. I think about this topic in months such as January

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As we reported last month, well-known contester Paolo Cortese, I2UIY, passed away last October. This photo showing Paolo (left) and Carl Cook, AI6V, and was sent by Carl with the sentiment "Paolo, you will be remembered always."

or February, where the contest calendar is particularly filled with many events. One of the most common complaints I receive from non-contesting hams is that there are too many darn contests. When you look at the contest calendar, it's easy to see that point of view. There are some weekends in which four or five simultaneous operating events are under way at various times.

Hopefully, most contests have some goal in mind. Some are trying to stir up activity from rare states. Others are attempting to increase activity on certain modes or bands. Still others are designed to encourage newcomers or those with small stations to join in the fun. My question for the contest community to consider is: If there is no significant goal you're trying to achieve by sponsoring a contest, or the organizational support for the event is minimal at best, then why conduct the contest in the first place? The concept is something like building another drug store in your town. Do we really need four drug stores on the corner of a busy intersection?

We've all heard the arguments, however. Given that some of these contests have little or no activity, what's the big deal? Well, my view is that this is precisely the point. If a contest has little or no activity, then why sponsor the contest at all? It sure seems like common sense to me.

The contest and non-contest communities will never completely see eye-to-eye on the virtues of contest operating. It's no different from the conflicts SSTVers and non-SSTVers put up with on 20 meters SSB, or the long-standing challenges of net operators and non-net operators. The list just goes on and on. Fortunately for the hobby, our self-policing approach works very well—for the most part. So what's your favorite contest?

Final Comments

With 2009 upon us, it's always useful to take advantage of the passing into a new calendar as a reason to evaluate our contesting strategy. Will this be the year of station building for some? Or, perhaps, these are the 12 months that will go down as a breakthrough in CW skills for others. Whatever the goal, I challenge you to have one. And as I've said many times, above all – have fun! That's what contesting is all about.

73, John, K1AR

BY TOMAS HOOD,* NW7US

Good Conditions Predicted for 2009

Moderate 2008 CQ WW DX SSB Contest Conditions

The 2008 CQ World-Wide DX SSB Contest weekend of October 25–26 started off with great geomagnetic activity. Geomagnetic activity was very quiet (with single-digit planetary *A*-index (*Ap*) readings, less than 4 over the poles, and less than 2 everywhere else), making for a very stable ionosphere. Sunspot counts were zero for both contest days. The 10.7-cm solar flux index was 68 and 67. Most of the HF contest bands were usable, although not spectacular.

A Quick Look at Current Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, October 2008: 3
Twelve-month smoothed, April 2008: 3

10.7 cm Flux
Observed Monthly, October 2008: 68
Twelve-month smoothed, April 2008: 70

***Ap* Index**
Observed Monthly, October 2008: 6
Twelve-month smoothed, April 2008: 7

The new solar cycle is picking up some steam. Flux readings during November already have risen above the 70 mark, and more often than not there are sunspots to be counted. Further proof that the new cycle is here to stay is that most of the recent sunspots are now "new cycle spots." New cycle spots are those which are magnetically arranged reversed from those orientations typical of the previous cycles.

Here is an overview of expected propagation conditions on each amateur band between 6 and 160 meters for 2009.

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 peak 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 on 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 during the first part of the year, with occasional worldwide openings during the daylight hours of all seasons. Most openings, though, will be short, except for the strong and frequent north/south path openings. By the end of 2009, we should be in a more rapid climb in solar cycle activity, so this band will be open for worldwide DX more often.

17 Meters: This band should behave much like 15, 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 again is going to be a main player during this period 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 24 begins to offer more sunspot activity, conditions on this band will offer moderate openings, especially a few hours before sunset until a few hours after sunrise. In 2009, 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 on 60 meters. DX openings on 80 and 160 should peak during the early spring, late fall, and winter months. Expect

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LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for January 2009

Propagation Index.....	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 1, 4-18, 21-25, 27-28, 31	A	A	B	C
High Normal:2-3, 19-20, 29-30	A	B	C	C-D
Low Normal: 26	B	C-B	C-D	D-E
Below Normal: N/A	C	C-D	D-E	E
Disturbed: N/A	C-D	D	E	E

Where expected signal quality is:
A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be good (B) on Jan. 1st, fair (C) on the 2nd and 3rd, good (B) on the 4th through the 18th, etc.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

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 both becoming optimum DX bands during the late afternoon hours. Short-skip openings between distances of about 1200 and 2300 miles should be great 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, and 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 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

Sporadic-*E* can occur during January, so be on the lookout. This has happened right around New Year's Day and that week. After that, it is rare.

The *Quadrantids* meteor shower is the major meteor shower for January

our readers say

Is it Ham Radio?

Editor, *CQ:*

Here's my reply to the Weisman, W1VIV, letter to you (October 2008, page 111, regarding Echolink and IRLP): "YES, IT IS HAM RADIO."

Mr. Weisman would be well advised to consider what it's like to be a life-long ham, then suddenly become faced with being confined to a retirement home, assisted facility, or other living quarters that prohibit the installation of antennas, and any form of radio transmission that might interfere with radio and TV reception.

Who cares how Merriam-Webster defines radio? That definition has nothing to do with ham radio. Weisman should read Al Goldberg's story in the in the October 2003 *QST*; Anthony Manser's story in the January 2004 *QST*; Guy Duke's story May 2005 *QST*; and Hugh Tingley's compelling story in the April 2006 *QST*.

According to the FCC engineer who discussed Echolink with Tingley, "Hams need to realize that they are communicators FIRST and radio amateurs SECOND. When it comes to serving the public, hams should understand and accept that their communication skills might include tools other than radios."

Weisman, licensed since 1952, should get back to the real world!

Nunzio Addabbo, W4VYD (licensed since 1950)

But is it SDR?

Editor, *CQ:*

I applaud your editorial in the October issue of *CQ*, and your perception that the next few years will see SDR (software defined radio) technology really come into its rightful place in amateur radio products and usefulness to amateur radio operators.

However, I must take exception to your characterization of the current offerings on the amateur market, such as the FLEX-5000A, that have a computer interface, as a SDR. I would prefer calling this kind of equipment software-controlled radios, or perhaps a digital radio, since they really do not fit the FCC definition of a real SDR. The FCC's Forum defines an SDR device as one that functions independently of carrier frequencies and can operate within a range of transmission protocol environments. They further define the ideal SDR as one that has transceivers that perform up-conversion and down-conversion between baseband and the RF carrier itself exclusively in the digital domain, reducing the hardware interface to a power amplifier in the transmit path, a low-noise amplifier in the receive path, and little or no analog filtering. It is possible to completely change the features by simply uploading new software to the device. So for instance, if I wanted to use my amateur radio configured SDR for a marine radar set on my boat, I could just upload another software program, connect my radar antenna instead of my 20 meter beam, and away I go. The FLEX-5000A can't quite do this yet, but it is getting closer, so I would submit that it is a digital radio and not a real SDR.

Pete Hansen, W8TWA

W2VU replies: First of all, I'm sorry we didn't have space to print the rest of your letter regarding the potential pitfalls of SDR. Secondly, the definition of SDR is definitely a hot-button issue. I'm not sure how old the FCC definition you cite is, but the current definition agreed to by both the SDR Forum and the IEEE simply says that a software defined radio is "Radio in which some or all of the physical layer functions are software defined." The "What is SDR?" page on the SDR Forum's website (www.sdrforum.org) further clarifies that "physical layer functions" refer to the radio's operating functions. Under this definition, not only is the FLEX-5000A an SDR but so is any other radio on the amateur market today with at least some functions defined in software rather than hardware.

Thank you, Fred

Editor, *CQ:*

Thank you for the splendid article in your October 2008 issue by Frederick O. Maia, W5YI, in Washington Readout, etitled "Amateur Radio Licensing and Callsign Systems." There have been so many changes over the past 60 years in amateur radio by the FCC that Fred's outstanding summary of the most current information brings us old-timers up to date and is most welcomed reading.

Please continue your fine work in producing such an interesting, quality magazine with so many superb articles.

Meyer A. Minchen, AG5G

and appears from January 1 to January 5. The maximum should occur at 1250 UTC on January 3. This shower can sometimes be quite intense, so it may be a good idea for setting 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 600 this year, although the expected average is about 120. View <http://www.imo.net/calendar/2009> for a complete calendar of meteor showers in 2009.

Check out the *CQ VHF* magazine propagation column for an in-depth look at propagation on VHF and above.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 68.3 for October 2008, continuing a slow but steady monthly rise since July. The 12-month smoothed 10.7-cm flux centered on April 2008 is 69.6. The predicted smoothed 10.7-cm solar flux for January 2009 is about 72, give or take about 7 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for October 2008 is 2.9, showing a slow rise since July's and August's 0.5. The lowest daily sunspot value during October 2008 was zero, occurring on October 1–3, 5–9, and 18–30. The highest daily sunspot count for October was 16 on the 12th. The 12-month running smoothed sunspot number centered on April 2008 is 3.3. A smoothed sunspot count of 15 is expected for January 2009, give or take about 5 points.

The observed monthly mean planetary *A*-index (*Ap*) for October 2008 is 6. The 12-month smoothed *Ap* index centered on April 2008 is 7.1. Expect the overall geomagnetic activity to be quiet during most days in January. At the time of this writing in mid-November, the forecast holds that January will be a very quiet month with little to no geomagnetic storminess. Refer to the Last-Minute Forecast on the first page of this column for the outlook on what days this might occur.

I welcome your thoughts, questions, and experiences regarding the fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. See you on the air!

73, Tomas, NW7US

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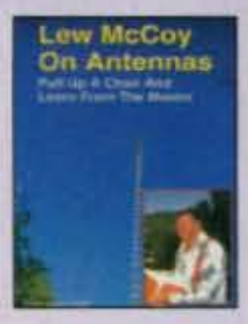

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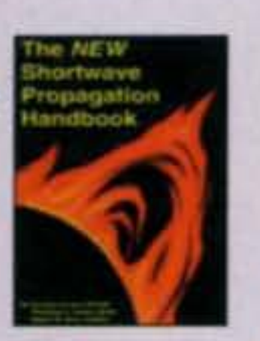

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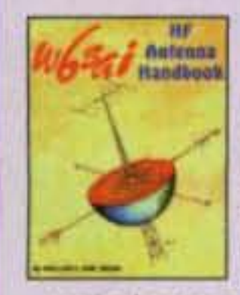

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Results of the 2008 CQ WW WPX SSB Contest

(from page 28)

ingly difficult to keep a frequency to reach a rare stn. I guess it has to do with the fact that for long periods of time one can only use a single band, which then, of course, is completely overcrowded. Still, it's been lots of fun. I thoroughly enjoyed my participation ... **DJ3WE**. Great first experience in the new farm contest QTH. Only time to put a fun dipole on the top of a high mountain ... **EA3ATM**. My goal was to go over my 2007 score. I decided to try the Tribander/Single Element class and I had a lot of fun too! ... **FY1FL**. My first venture with CQ WPX SSB, and it didn't take me long to realize that a 9 foot vertical antenna is not conducive to attaining a high score. In fact I finished early, having worked all I could. Otherwise it was great fun and will have another attempt with better antennas ... **G1FON**. Fantastic DX conditions on 80m on Sunday sunrise! ... **H22H**. The Swiss DX Foundation (SDXF) used this special call to celebrate its 10th birthday. The team operated from HB9CA (Letzi-DX-Group) station ... **HB1ØDX**. Conditions were good but AC power at the mission where we operated was not available for 8 to10 hours each night. We used an IC-7000 and the antennas were a beam for 10, 15, and 20 meters and a SuperLoop for 40 and 80 meters. Jan and I want to thank all the stations that worked us during the contest ... **HH4/AF4Z**. No USA except KH6 but a lot of good DX worked. Not bad for a 33 ft. piece of wire taped to a telescoping fiberglass pole. being on the roof at 150 ft helps I guess, hi! ... **HSØZDR**. First WPX for us, testing equipment and sharing happy time together. We chose Multi-2 for testing interference ... **IQ5AE**. I entered in single-op 80m low power. The condition between the USA and JA was not so good. Especially on 75m DX band, we east Asian stations have very heavy QRM of the OTH radar from China. its signal strength was over S9++. When it transmits, we can hear no amateure radio signals. Hams all over the world must to say to Chinease government about it! I used Micro Vert Antenna by DL7PE. It is only 2m long and I set it on my small balcony of my condominium ... **JE1SPY**. Very few EU, AS, or OC stations were heard. Miss the good old days of EU stations coming in over the pole early in the mornings of the contest. I certify that, other than caffeine, no performance enhancing drugs or steroids were used during this contest. Also, no small animals or children were harmed ... **K7ACZ**. Difficult conditions, especially for QRP. But the best moment came when KF4GDX commented, upon my calling, "At last, a signal above the noise" ... **KA6SGT**. Wow, I went over 100,000 points for the first time! ... **KBØARZ**. Two new operators this time with their first contest operation. Was quite a bit of fun hearing all the great signals with lots of band activity. Thanks to everyone for their patience with those learning to operate in the contests ... **KDØS**. I have done some QSO Parties. This was my first BIG Contest with CQ. It was a hoot! Beats Field Day. With all the overseas stations active, picked up almost enough for my first 100 countries worked. Managed a couple of rarer ones to boot! I'll Be Back, eh ... **KD7DCR**. Sometimes very bad conditions, only local QSOs ... **LY4DX**. Yaesu FT-747GX to base-loaded inverted-L, Datong RF Clipper. Awful results. Think my aerial has turned into a dummy load! ... **MØEZP**. Maybe QRP was BAD idea but it was fun ... **MUØFAL**. We did a contest training seminar and open house for this contest. Hoping to get more contesters active! ... **N2CW**. Come on sunspots, please! ... **N4DXI**. New antenna and amp made for even more fun this year ... **N8AJN**. Where did all the sunspots go? CU next year ... snorezzzzzz ... **ND6S**. Good food, good beer, great contest! Third time out for us and all had a blast. Too bad still another 60 months 'til the peak of cycle 24. (Hope we make it, hi)) 73's from John, Paul & Scott ... **NQ2F**. Operated first day from home, then flew to Austria and was able to operate a few hours from OE6MBG. Great fun to work the contest from two continents and hear how different the contest sounds from each place. Logged using pencil and paper! ... **OE/K5ZD**. People should listen more. I could hear many but they did not listen or could not hear. If you can't hear does not matter how much power! ... **OX3UR**. I had my best score ever in this contest and I finally broke ZD88V's world record. This was fun! ... **P4ØA**. Like every year I try to enter the 80m single band but the DX lures me so I do some operating on the other bands ... **PAØMIR**. A very good time I had in this contest. With a better result than last year. Worked some new DXCC too. And again with two pizzas, lot of cola, and an XYL to serve it to me. See you next year ... **PE2KP**. Thanks to Sergio, PP5JR, for allowing me to operate his nice 10m station. 73, PP5EG/PY5EG ... **PP5EG**. First contest with PV2 prefix ... **PV2P**. Great contest, as usual! Sounds like a big party where everyone is invited. Unfortunately, didn't have more time to be on the air due to homework, just 24h on duty. Was fascinating to meet some friends and being recognized by some others ... **PY3DX**. Thanks for perfect competitions! Our school club "Contact" acted in structure four school boys. Their age 12 years. PWR 100 W; ant. delta . The trainer, UA3DAF, Chaplygin Vladimir. 73! ... **RK3DZH**. First full effort since 1999 with low power! Hope to appear in CW! ... **RV6LFE**.

Patrick, OT2A, second world high in the Rookie category.

Where were all USA stns? Only few called CQ. Closed down 3h before end. There was a moral dilemma: scanning band ten times in a row for new QSO? Maybe score would be bigger by 10 QSO and few mults. Guess will never know ... **S57SU**. OK, this was fun! Many new DXCC for me and nice to get an idea of what's waiting when conditions getting better in cycle 24. Contest site was club house with a 20m mast with 3-el 3-band beam and 100W. Worked quite well! Thanks for all QSOs! I'll be back! ... **SE5S**. Wkd for fun. All ops out there please think about this: a brand new radio transceiver is not equal to a clean TX signal! You do need to use the buttons too. Nevertheless the WPX is a fun thing. CU next time! ... **SF6DX**. Our first attempt for participating in the M/M category and we are more than pleased with our score. Thanks everybody and hope to see you next year ... **SX5P**. 21 MHz band quite nice to work ... **TA1HZ**. What a great contest. This time, I had access to real broadband dipole on 20m poles. What a difference. My 300W and the outstanding dipole made it possible to keep the frequency for a while and score up to 100 Qs/h. The conditions were strange with almost no USA stations. Thanks for organizing this great contest ... **TF3AM**. Had a great time working DX from a relatively new entity, FJ! The pile-ups were huge, in spite of the poor band conditions. We hope that we were able to give out a "new one" to our friends around the world ... **TO5RZ**. Thanks to UA9CLB for letting me use his excellent SO2R setup ... **UA9CDC**. Tnx for contest. Tnx for good program SD ... **UA9MR**. Hard work taking your station 4100 miles, but made it worth it to give some people a new one ... **V25V**. V48M was a new prefix never used before ... **V48M**. I managed to work a new one to add to my 160-meter DXCC total! That alone was worth the price of admission to me, hi ... **VE3CUI**. As usual, at low sunspot numbers, VE5 is the black hole for sure. First day, we could hear them, they couldn't hear us. Second day, much better, now the fun begins. No great score but fun anyway ... **VE5RI**. The VK6 DX Chasers Club operated from Faure Island IOTA OC-206. We were hit by the tail end of Cyclone Pancho and were lucky that the antennas were not blown down. Conditions were not very good but 15 metres was the best ... **VK6FAU**. Great fun giving out the first ever VQ58 prefix! See everyone next year ... **VQ58V**. 81 yrs old and still going strong. Well, maybe just staggering along! ... **W3MGL**. Whilst other contesters usually mention the DX they work, I am wondering if I can claim the prize for the closest unscheduled QSO? During a run near the end of the contest on Sunday, I was called by WD4BEE who said I was 60 dB over S9. I asked where he was located and he said Sebring. It turns out he is in the next block to me. We had seen his tri-band beam but didn't think he was on the air! ... **W4/MØBUE**. Spending the weekend with my best friends from all over the world was priceless! ... **WB8LCD**. Fun time! Had about the same number of Q's as last year but scored a lot higher due to better use of 40m. 10m still a big disappointment. Radio Reef is a GREAT place from which to operate. Stan, K8MJZ ... **WP2Z**. Fun contest. 28 was open only to SA and no USA heard this time ... **XE1EX**. Great contest! It was my first Cabrillo log submitted. Hope next time I have better ham shack. Now only old TS-430S barefoot with homebrew 3-el Yagi 12m high. All the best ... **YB1VA**. From Menjangan Island OC-022, the small island on the north of Bali Is, with a very wonderfull sea garden ... **YB3MM**. Several long power outages put me almost out. I will try again next year ... **YV6BXN**. Our result better than last year with most operating by two oldies. 10 metres surprised us in this low sunspot period ... **ZM2M**. My QTH was on Magaliesberg Mountain (Montana Lodge) 1550m ASL. Condx were nice on Saturday but weather, lightning, thunderstorms, power shading, terrible. But I enjoyed the time which I spent with radio ... **ZS6CCW**.

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.)

2008 WPX SSB RESULTS
SINGLE OPERATOR
NORTH AMERICA
United States

K1ZM	**A**	**8,316,563**	**3060**	**1051**
K1LZ	*	6,468,150	2507	930
NC1I	*	4,774,728	2303	879
			(OP: K9PW)	
W1UE	*	4,478,656	2050	832
NN1N	*	2,047,815	1302	693
NA1L	*	1,049,256	1264	494
			(OP: W1XX)	
WB1DX	*	671,772	798	444
KQ2M/1	*	583,376	629	404
W1BYH	*	500,480	546	340
N1BCL	*	463,592	530	347
AE1P	*	406,086	649	318
K2TE/1	*	381,174	413	303
AK1W	*	293,328	376	291
			(OP: K5ZD)	
ND1X	*	209,013	390	269
K1SND	*	173,732	405	257
W1TO	*	151,980	264	204
WC1M	*	137,904	239	204
AA1O	*	123,615	268	201
KB1ODO	*	109,610	308	194
AB1BW	*	52,345	168	145
W1KQ	*	48,772	150	137
KB1OGZ	*	782	24	23
KB1PLN	**14**	**6,027**	**51**	**49**
K1HAP	**1.8**	**26,598**	**169**	**93**
***K1XM**	**A**	**236,385**	**329**	**255**
*N1GKX	*	230,187	385	277
*NJ1H	*	203,442	371	246
*K1SLB	*	144,627	290	213
*NA1QP	*	129,116	273	191
			(OP: W1CTN)	
*KA1C	*	108,864	257	189
*K1TR	*	82,446	178	151
*W1CRK	*	71,442	217	162
*K1PU	*	70,215	213	151
*K5MA/1	*	56,364	142	122
*AG1C	*	50,673	181	133
			(OP: KB1JFG)	
*KB1FRK	*	48,564	165	142
*KA1G	*	30,316	122	106
*KA1VMG	*	22,989	105	97
*NJ1Q	*	18,900	107	84
*K1VU	*	13,359	82	73
*KB1JUF	*	8,680	73	62
*K1YSY	*	7,844	60	53
*KB1NRI	*	5,076	53	47
*K1YM	*	4,050	50	45
*K1PAR	*	4,002	57	46
*N1ORK	*	988	31	26
*WK1H	*	684	21	19
*AB1EP	*	204	12	12
*KB1KRS	*	1	1	1
***W1OHM**	**21**	**987**	**21**	**21**
***KG1V**	**14**	**33,154**	**134**	**121**
*K3IU/1	*	1,122	23	22
AB3CX/2	**A**	**765,798**	**792**	**451**
N2DWS	*	217,872	327	272
W2OSR	*	98,552	201	194
K2NV	*	48,552	129	119
K2XA	*	36,259	123	101
W2FUI	*	35,256	122	104
N2WLS	*	33,354	130	109
KB2DE	*	23,400	101	90
AA2NA	**21**	**17,017**	**36**	**187**
W2RR	*	14,784	77	77
			(OP: WA2AOG)	
N2RJ	**14**	**464,457**	**502**	**357**
K2RET	*	31,428	115	108
WA2JQK	**7**	**5,832**	**59**	**54**
WN2O	**3.7**	**241,528**	**423**	**266**
			(OP: N2GC)	
W2MF	**1.8**	**99,006**	**293**	**174**
WA2AOG	*	1,716	29	26
***AB2TC**	**A**	**139,776**	**269**	**224**
*KV2M	*	117,537	290	193
*WA2MCR	*	101,638	220	178
*K2RNY	*	71,394	214	163
*N2MTG	*	59,631	197	139
*WA2LXE	*	53,055	197	135
*AA2DS	*	48,112	157	124
*K2BBQ	*	47,580	153	122
*K9CHP/2	*	30,067	140	107
*K2YLH	*	26,300	120	100
*K2SI	*	23,835	133	105
*KM2O	*	22,989	112	97
*WN2Y	*	21,854	122	98
*WA2JTX	*	16,660	79	70
*WB2OOQ	*	14,673	80	73
*W2LP	*	14,555	91	71
*KA2FHN	*	13,172	96	74
*W2SR	*	8,062	62	58
*WB2SXY	*	7,540	70	65
*KC2OGR	*	5,828	49	47
*K3QE/2	*	3,600	44	40
*KC2KZJ	*	3,366	35	33
*KC2QJB	*	2,310	36	33
*N2TEW	*	1,770	33	30
*W2JAT	*	1,410	31	30
*KC2JRQ	*	276	12	12
***KG2RG**	**14**	**546,939**	**718**	**431**
*W2AW	*	185,724	293	252
*K2HVE	*	9,728	86	76
*KC2LYQ	*	8,178	61	58
*NP3JG/W2	*	7,205	59	55
*KD2MU	*	1,608	24	24
***NA2H**	**7**	**130**	**10**	**10**
***K3BU/2**	**1.8**	**3,060**	**53**	**36**
KC3R	**A**	**6,829,005**	**2646**	**985**
			(OP: LZ4AX)	
K3ZO	*	3,898,310	1860	785
KJ3X	*	1,007,820	1078	495
			(OP: K1DQV)	
K3WI	*	989,920	957	460
N3UM	*	603,648	618	384
W3BW	*	349,563	421	327
N3YW	*	214,250	329	250
W2BZR/3	*	116,228	263	196
N1WR/3	*	107,568	242	162
WI3K	*	69,496	189	146
K8OZ/3	*	66,138	198	151
K3YG	*	20,315	87	85
WØBR/3	*	16,068	96	78
K3ISH	*	12,998	71	67
NA3F	*	10,728	72	72
WR3H	**14**	**74,094**	**171**	**159**
AI3Q	*	21,948	98	93
K3OO	*	20,394	142	99
N3TXH	**7**	**4,161**	**64**	**57**
W3/T98T	**3.7**	**362,148**	**557**	**309**
W3BGN	*	335,240	555	290
***W3LL**	**A**	**1,234,480**	**1013**	**520**
*KB3LIX	*	191,293	339	233
*N3ALN	*	189,750	445	253
*KB3EXB	*	113,373	219	171
*KD3HN	*	92,340	216	171
*NX3Y	*	51,569	200	139
			(OP: KA3QLF)	
*N8NA/3	*	27,000	108	100
*K3VED	*	22,272	104	96
*KN3A	*	21,805	117	89
*N3KUN	*	18,060	104	86
*N3VMD	*	16,044	92	84
*N3CHX	*	10,192	70	56
*NB3T	*	9,620	91	65
*N3JNX	*	5,782	51	49
*WO3Z	*	3,040	47	40
*NØMSB/3	*	2,244	36	34
*W3NWS	*	2,204	47	38
*N3KGC	*	1,350	32	30
*W3LDG	*	1,040	20	20
*KB3OUK	*	88	8	8
***K3LAB**	**14**	**1,836**	**38**	**34**
***AI3G**	**7**	**3,192**	**49**	**42**
KN1DX/4	**A**	**7,147,845**	**2692**	**999**
			(OP: K4ZW)	
NJ4M	*	4,130,420	2276	815
			(OP: K1TO)	
KJ4VO	*	2,451,417	1925	677
			(OP: N4PN)	
N4WW	*	2,368,800	1659	705
K4PV	*	2,315,936	1828	686
N2QT/4	*	1,683,856	1203	551
WZ4F	*	1,585,980	1546	540
			(OP: K4AB)	
KG4W	*	1,561,230	1327	570
W4KW	*	500,556	572	354
N4IG	*	322,234	438	302
NE4M	*	237,640	418	260
N6AR/4	*	184,275	302	225
N4ZZ	*	158,625	446	235
N2XD/4	*	143,808	437	224
KY4P	*	141,470	301	215
K3IE/4	*	141,372	298	204
W4NTI	*	139,582	293	202
NJ4F	*	131,453	268	211
NC4KW	*	129,168	242	208
			(OP: N1LN)	
K4PHE	*	126,060	256	191
K4BP	*	100,672	250	176
N3FP/4	*	82,280	240	170
NC4MI	*	68,370	200	159
NE8J/4	*	65,120	292	176
AI4WW	*	44,861	136	113
KO4Y	*	33,150	115	102
N4RVM	*	30,192	131	111
N3BM/4	*	30,098	127	101
KI4MF	*	28,710	101	87
N4DXI	*	21,432	93	76
K2EUH/4	*	19,440	76	60
K4CRM	*	18,576	97	86
W2OO/4	*	9,424	64	62
WB3E/4	*	8,253	82	63
K4DXV	*	3,663	34	33
W4OGG	*	2,460	33	30
K4SV	*	2,187	29	27
NA4W	**28**	**21,021**	**117**	**77**
			(OP: K4WI)	
WN1GIV/4	**21**	**259,402**	**451**	**286**
			(OP: N4BP)	
NJ4U	*	202,032	367	244
K4EU	**14**	**406,747**	**528**	**359**
K4SQR	*	89,712	192	178
VE3XD/W4	*	4,800	50	48
			(OP: VE3XD)	
KI4ZGF	*	270	10	10
N4QV	**7**	**511,144**	**646**	**362**
WI4R	**3.7**	**850,212**	**934**	**452**
			(OP: W4SVO)	
N4NX	*	163,530	361	237
K4KZZ	*	161,006	302	223
K4RDU	*	81,965	233	169
AA4MM	**1.8**	**93,019**	**335**	**167**
***N4XL**	**A**	**719,922**	**861**	**427**
*W4TMN	*	521,389	590	341
*K7SV/4	*	342,855	383	285
*KI3O/4	*	340,130	481	301
*WB4JFS	*	335,808	491	288
*W4EEH	*	321,816	440	276
*K4DET	*	303,325	465	275
*AB4GG	*	265,265	414	265
*W4LT	*	248,040	431	265
*NE4S	*	237,440	454	265
*KA8Q/4	*	229,416	394	242
*KI4PKW	*	146,076	346	222
*N2ESP/4	*	140,855	310	197
*K4CX	*	126,484	348	206
*NA4O	*	122,100	274	185
*W4YE	*	110,774	235	194
*WA4JA	*	98,271	260	183
*N3UC/4	*	97,121	233	197
*W4KAZ	*	85,008	235	168
*W4WNT	*	80,454	211	159
*N4MM	*	80,162	180	149
*AA4LR	*	78,971	204	157
*N4QWB	*	73,752	243	168
*K4WES	*	72,265	199	149
*KN4DS	*	67,360	230	160
*W4PFM	*	66,289	193	151
*NA4BW	*	63,550	234	155
*N4JED	*	62,000	203	155
*KF7CG/4	*	54,954	193	142
*NV4B	*	54,008	174	157
*AI4DB	*	48,465	187	135
*KF4DVG	*	42,939	160	117
*KA5VZG/4	*	36,992	171	128
*N3UA/4	*	36,225	122	105
*K4ML	*	35,148	148	116
*N4IL	*	33,759	174	121
*NX4Y	*	32,996	149	113
*N3CZ/4	*	32,015	121	95
*K4UVA	*	31,740	122	115
*K4YT	*	30,458	115	97
*AI4GR	*	30,090	140	102
*W3MGL/4	*	23,808	116	96
*N4RTD	*	23,474	114	97
*KR1ST/4	*	22,568	132	104
*WA4AEJ	*	20,916	91	83
*KI4FIA	*	20,520	121	95
*N4WO	*	20,020	120	91
*AG4ZM	*	19,872	108	92
*KI4VQQ	*	18,509	103	83
*KO4OL	*	17,139	110	87
*KU4MT	*	14,136	101	76
*KZ2I/4	*	12,851	72	71
*W4GHD	*	12,530	74	70
*K4GOP	*	12,150	93	75
*AB3S/4	*	10,950	83	73
*KC4EZN	*	10,432	75	64
*NZ1D/4	*	9,555	86	65
*N1NP/4	*	6,888	65	56
*KC4RSL	*	6,649	67	61
*WA4FXX	*	6,439	54	47
*WC4MBC	*	5,457	58	51
*NR4C	*	5,203	46	43
*AJ4RK	*	4,860	46	45
*K3MZ/4	*	4,140	41	36
*W4HRC	*	3,612	45	42
*W6GBG/4	*	2,812	46	37
*AE4CW	*	2,590	37	35
*K4MSH	*	2,052	42	38
*WA3GNW/4	*	1,872	27	26
*KC1SS/4	*	1,827	29	29
*WA4OSD	*	1,512	30	28
*AI4QR	*	860	22	20
*K4PBC	*	817	19	19
			(OP: K4PG)	
*WC4V	*	756	21	21
*W4NX	*	187	11	11
			(OP: W4BCG)	
*AE4EC	*	144	12	12
*W4BCG	*	36	6	6
***WA1FCN/4**	**28**	**2,688**	**36**	**32**
***ND4X**	**21**	**139,105**	**279**	**215**
*NQ4K	*	1,196	25	23
***KZ5OH/4**	**14**	**163,250**	**291**	**250**
*WB1HBB/4	*	42,775	190	145
			(OP: W4WR)	
*K4YYD	*	5,200	56	50
*WA2BKN/4	*	2,379	40	39
*W8KHP/4	*	90	6	6
***KU4BP**	**3.7**	**60,941**	**266**	**149**
K5TR	**A**	**3,938,420**	**3064**	**764**
NN5J	*	3,329,405	2163	745
KT5J	*	2,607,303	2370	667
			(OP: N3BB)	
AA5B	*	1,235,500	1617	500
			(OP: @K5HAB)	
K5ER	*	1,162,830	1235	498
AD5XD	*	694,800	1095	400
WA5ZUP	*	141,680	425	220
W5GN	*	119,152	245	176
NQ5D	*	92,950	247	169
N5RMS	*	80,842	227	166
KI5XP	*	78,292	195	148
NX5O	*	73,593	226	153
W5YAA	*	73,538	204	166
KD5JAA	*	61,628	194	142
W5BKT	*	14,350	102	82
KE5FUE	*	9,864	85	72
KD5RXN	*	4,465	48	47
W5JDX	*	1,870	22	22
KD2KW/5	*	1,248	28	26
KJ5W	**28**	**100,110**	**308**	**142**
			(OP: W5PR)	
NR5M	**21**	**388,440**	**562**	**312**
NQ5K	**14**	**370,300**	**742**	**350**
			(OP: W5ASP)	
W9DX/5	*	299,398	462	341
W5FO	*	45,698	167	146
***WD5K**	**A**	**1,042,056**	**1112**	**492**
*N5DO	*	819,680	1046	436
*NE5D	*	258,093	413	237
			(OP: K5RX)	
*N5AW	*	154,000	286	175
*K3TD/5	*	128,270	340	202
*KD5J	*	101,915	421	187
*KC5R	*	71,568	208	144
*W5TMC	*	63,600	234	150
*AB5C	*	61,754	207	154
*WBDM/5	*	56,420	194	140
*KE5LQ	*	41,080	175	130
*AE5MM	*	39,375	207	125
*K5DHY	*	34,336	161	116
*KB5DRJ	*	30,397	162	113
*NN5T	*	25,380	112	94
*WV5L	*	23,124	128	94
*KB5HPL	*	18,040	132	88
*WA5O	*	12,636	107	78
			(OP: K5KA)	
*K5LAD	*	11,780	76	62
*W5CSM	*	10,082	81	71
*KX5RW	*	10,034	66	58
*AA5SH	*	8,909	62	59
*WD5DCZ	*	8,700	77	58
*KBØLZQ/5	*	8,085	60	55
*AA5JG	*	6,200	74	62
*N5HMH	*	5,964	90	71
*W5RAW	*	3,869	64	53
*N5PU	*	2,418	41	39
*ADØK/5	*	2,320	45	40
*KCØLFQ/5	*	1,200	29	25
*N5VP	*	680	19	17
*N5KEV	*	231	12	11
*KD5UBC	*	198	11	11
***N5DTT**	**21**	**1,512**	**24**	**24**
***NN5Z**	**14**	**78,120**	**321**	**180**
			(OP: K5PX)	
*KB5UOK	*	35,250	241	125
*WW6O/5	*	14,130	114	90
*AE5FT	*	3,264	62	48
*KE5LHC	*	100	10	10
*KE5LFO	*	10	2	2
***N5DGK**	**7**	**1,768**	**26**	**26**
*NT5HS	*	130	10	10
			(OP: NØRQ)	
W6TK	**A**	**1,391,698**	**1495**	**539**
NF6A	*	1,151,298	1042	501
			(OP: K6XX)	
N6AA	*	993,672	1129	444
N6XT	*	943,274	1441	482
K6NA	*	698,640	864	410
AC6DX	*	695,934	1132	414
AF6T	*	563,010	1065	383
			(OP: K6TD)	
KI6VC	*	269,094	667	298
AK6M	*	264,330	531	297
			(OP: K6MM)	
K6LRN	*	183,974	356	238
NK6A	*	182,710	402	242
N6OU	*	132,309	302	183
NW6P	*	132,090	303	222
KB6A	*	129,248	295	224
NI7T/6	*	120,120	309	195
AE6RF	*	92,224	284	176
WB6JJJ	*	84,450	206	150
W6EB	*	63,176	208	149
AG6JC	*	18,334	108	89
NO6T	*	15,130	103	85
			(OP: N6NC)	
WB6TFD	*	12,948	102	78
N6ER	*	12,371	124	89
WM6DX	*	9,164	70	58
			(OP: W6DPD)	
KG6ZHC	*	4,560	58	48
WW6OR	**21**	**46,443**	**177**	**113**
			(OP: K6JAT)	
W6RKC	*	6,486	50	47
K6HNZ	**14**	**959,310**	**1200**	**495**
W6AFA	*	656,812	1011	442
WX6V	*	401,128	631	364
NY6N	**7**	**2,038,192**	**1753**	**533**
			(OP: W6YI)	
N2NS/6	*	24,612	102	84
***AA6K**	**A**	**149,586**	**304**	**214**
*AA6YX	*	143,664	334	219

*KE6SHL	*	123,190	324	194	**ND8DX**	**3.7**	**1,026,836**	**1304**	**458**	*WØIS	*	33,558	190	119	**VA7AAA**	**3.7**	**74,690**	**188**	**110**
*WA6ST	*	122,388	296	188	***WZ8T**	**A**	**607,986**	**740**	**417**	*WAØVPJ	*	30,464	182	119				(OP: VE7SZ)	
*KF6IHL	*	94,656	272	174	*WB8TLI	*	516,880	582	355	*KCØJFY	*	28,782	154	123	***VE7UQ**	**A**	**270,161**	**402**	**241**
*K6AAB	*	74,898	238	146	*N8CN	*	202,104	374	252	*WØRAA	*	26,322	125	107	*VA7BEC	*	213,075	344	225
*K6DEX	*	70,144	200	137	*WB8JUI	*	174,517	370	233	*NØSMA	*	25,038	151	107	*VE7FCO	*	49,256	147	131
*KI6JJW	*	69,280	233	160	*ND8L	*	125,665	251	205	*WØKC	*	19,208	113	98	*VA7MJR	*	42,552	146	108
*WA6NHO	*	58,225	199	137	*AF8C	*	80,580	237	170	*KCØOYT	*	16,704	122	96	*VE7BGP	*	10,384	68	59
*W6TKV	*	53,460	186	135	*KE8PX	*	68,586	202	142	*KØHW	*	15,886	94	94	*VA7ZOO	*	1,575	27	21
*AF6EV	*	46,138	166	118	*N8MRC	*	64,325	288	155	*KDØBRD	*	14,448	107	86	***VA7ALK**	**14**	**24,892**	**121**	**98**
*WT6K	*	45,625	189	125	*KC8PD	*	54,458	194	146	*NØSCK	*	12,960	100	72					
*AE6YB	*	37,638	203	123	*KB8O	*	53,568	228	144	*KCØSZU	*	12,191	97	73	**VY1EI**	**14**	**14,615**	**89**	**79**
*WA6WPG	*	29,120	129	104	*N8HP	*	43,335	158	135	*WAØRXR	*	9,130	86	83					
*N6MUF	*	28,784	139	112	*N8BV	*	36,725	158	113	*KØKU	*	6,985	62	55			**Cayman Islands**		
*KQ6ES	*	27,903	131	131	*WY8DX	*	35,211	140	121				(OP: KCØIDI)		**ZF1A**	**3.7**	**2,269,344**	**1201**	**462**
*K6KWB	*	27,621	139	99				(OP: K8GT)		*KKØSD	*	6,318	74	54				(OP: ZF2AH)	
*N6RV	*	17,513	99	83	*WB8LCD	*	28,620	139	106	*KCØTDJ	*	5,904	49	48					
*K6VFF	*	13,054	77	61	*W8KNO	*	27,378	153	117	*NØBK	*	3,195	54	45			**Cuba**		
*K6CSL	*	10,492	83	61	*KD8ELX	*	24,274	130	106	*NNØQ	*	2,880	53	45	**CM6RCR**	**1.8**	**186,399**	**317**	**149**
*K6LE	*	9,452	79	68	*W8AKS	*	23,763	99	89	*N1SWK/Ø	*	1,624	30	29	***CM6CAC**	**3.7**	**226,077**	**321**	**179**
*AK6X	*	6,572	82	62	*W8IDM	*	23,364	115	99	*ACØHK	*	1,363	31	29					
*N1KR/6	*	4,094	51	46	*K8DXR	*	21,109	126	101	*KCØUUT	*	1,131	32	29			**Dominican Republic**		
*KA6GDT	*	3,738	48	42	*KB8DDZ	*	20,332	124	92	*KAØEIC	*	360	15	15	***HI3T**	**A**	**6,928,198**	**2774**	**874**
*KK6TV	*	3,654	54	42	*W8TM	*	18,216	86	69	*WØESF	*	288	12	12				(OP: HI3TEJ)	
*KG6RCW	*	3,420	55	45	*N8AE	*	16,281	102	81	*KCØWCF	*	195	14	13	***HI8PJP**	**28**	**3,379**	**39**	**31**
*KJ6NO	*	3,276	51	42	*WA8SDF	*	14,580	104	81	*KCØFUE	*	8	4	4					
*KG6YHH	*	2,340	45	39	*N8HC	*	12,750	103	85	***W6GMT/Ø**	**28**	**75**	**5**	**5**			**Greenland**		
*K6JRA	*	2,310	40	35	*K8ME	*	10,920	70	65	***WØIE**	**21**	**176**	**8**	**8**	*OX3UR	14	128	8	8
*K6VUG	*	1,624	32	28	*KD8CDC	*	10,010	83	65	***NØGOS**	**14**	**11,438**	**98**	**86**					
*N6EF	*	1,612	33	31	*NT8K	*	8,580	64	62	*WA5SWN/Ø	*	9,825	92	75			**Guadeloupe**		
*NC6P	*	946	24	22	*KB8FZY	*	6,111	69	63	*KØANS	*	100	10	10	**FG/OM3LA**	**A**	**16,105,188**	**4782**	**1122**
*N6QZS	*	924	21	21	*KX8C	*	3,526	51	43	***N9HDE/Ø**	**7**	**7,502**	**72**	**62**	FG1PP	*	910	17	13
*NT6ET	*	336	12	12	*AF8T	*	2,622	51	38	***KCØRQH**	**3.7**	**576**	**16**	**16**					
*W1BUD/6	*	1	1	1	*KA9IVY/8	*	2,482	37	34								**Guatemala**		
***ND6S**	**28**	**1,482**	**27**	**26**	*N8QL	*	680	17	17			**Alaska**			***TGØWPX**	**21**	**40,250**	**150**	**115**
***KI6LZ**	**14**	**148,176**	**345**	**252**	*WB9LBI/8	*	638	22	22	**KL7OU**	**14**	**282,975**	**480**	**245**				(OP: TG9AJR)	
*KS6M	*	7,381	77	61	*AB8XE	*	560	20	20						***TG9ANF**	**14**	**260,322**	**487**	**258**
*KA6YLA	*	6,667	66	59	*WB8SDA	*	195	16	15			**Anguilla**							
*KE6GFF	*	364	16	14	*KD8GKL	*	169	14	13	**VP2EFB**	**21**	**51,045**	**192**	**123**			**Honduras**		
*KG6HUM	*	273	13	13	*KC8NHP	*	56	7	7						***HR1RTF**	**A**	**177,183**	**296**	**197**
***KU6T**	**7**	**6,960**	**37**	**120**	***KE8FO**	**14**	**2,394**	**42**	**38**			**Antigua & Barbuda**							
					***NR8U**	**7**	**55,245**	**221**	**145**	**V2SV**	**14**	**3,006,869**	**1781**	**709**			**Martinique**		
K7ZS	**A**	**1,014,783**	**1254**	**483**	*WB8TLH	*	3,360	56	48						**TO5A**	**A**	**6,162,681**	**2727**	**791**
N7RO	*	914,024	1143	488								**Barbados**							
K7WP	*	864,160	1157	440	**W9JA**	**A**	**369,520**	**521**	**310**	**8P1A**	**A**	**20,533,584**	**5590**	**1208**			**Mexico**		
WA7NB	*	685,692	1073	378	AG9/NP2I	*	290,766	693	301				(OP: W2SC)		**XE2S**	**A**	**753,912**	**853**	**333**
K7ZZ	*	557,256	885	372	WW9R	*	235,796	651	253						**XE1KK**	**21**	**97,774**	**243**	**166**
WZ7M	*	356,952	744	321	AC9S	*	114,706	227	166			**Belize**			***XE2YBG**	**A**	**668,169**	**785**	**339**
			(OP: K7MO)		N9FC	*	74,034	192	162	***V31MR**	**A**	**1,109,808**	**1179**	**378**	*XE2JA	*	57,900	232	100
WG7X	*	331,154	739	313	W9RE	*	59,400	186	135						*XE2MX	*	46,827	154	129
NB7V	*	320,382	737	306	WA9IVH	*	33,165	136	99			**Canada**			*XE2HUM	*	26,796	123	87
W7JY	*	297,348	477	284	AF9J	*	12,874	115	82	**VO1MP**	**A**	**3,432,737**	**1746**	**763**	*XE3WAO	*	3,626	41	37
KI7AO	*	190,250	330	250	AI9L	*	3,570	50	42	VA1MM	*	622,518	688	299	***XE1CT**	**14**	**626,952**	**877**	**346**
NR7DX	*	173,305	395	253	AF9H	*	595	23	17	VE1MC	*	580,013	530	343	***XE1CQ**	**7**	**1,607,522**	**973**	**398**
			(OP: K7A8V)		**KG9N**	**14**	**213,750**	**504**	**285**	VO1TX	*	162,060	262	185					
K7EG	*	151,986	287	219	**KK9V**	**3.7**	**168,480**	**404**	**240**	VE9MY	*	106,641	173	153			**Montserrat**		
K7LV	*	127,806	284	179	**K9NW**	**1.8**	**108,129**	**267**	**271**	***VO1KVT**	**A**	**774,297**	**683**	**379**	**VP2MAH**	**A**	**2,912,562**	**1641**	**639**
NQ7R	*	126,324	297	198	***KS9K**	**A**	**1,091,748**	**984**	**492**	*VE9CEH	*	346,884	412	274				(OP: N3OXX)	
WR5G/7	*	117,990	280	190				(OP: N4TZ)		*VO1DJT	*	154,316	261	223					
N6TW/7	*	116,056	264	178	*WE4YL/9	*	468,480	806	366	*VE1JS	*	44,908	115	109			**Panama**		
N7VS	*	112,013	308	187	*K9QVB	*	188,190	327	246	***VE9DXR**	**14**	**1,863**	**30**	**27**	***HP3FTD**	**A**	**102,600**	**220**	**152**
N7BF	*	59,067	210	161	*K9JE	*	155,495	344	227						***HP1RIS**	**28**	**6,109**	**53**	**41**
KG7P	*	53,339	198	143	*K9SQL	*	151,946	329	218	**VA2WDQ**	**A**	**356,320**	**393**	**262**	***HP1BYS**	**21**	**361,665**	**592**	**285**
KB7N	*	43,276	174	124	*W9QL	*	117,585	328	195	VE2GK	*	72,600	162	121	***HP1ALX**	**14**	**504**	**14**	**14**
AD7SI	*	37,440	173	120	*KB9RDS	*	112,464	275	198	VE2DC	*	8,602	52	46					
KS7T	*	32,409	153	117	*N9LYE	*	107,365	345	197	**VE2DWA**	**3.7**	**10,575**	**58**	**47**			**Puerto Rico**		
K7HP	*	20,900	111	76	*AK9I	*	96,534	340	186	***VE2XAA**	**A**	**425,425**	**454**	**325**	***NP3CW**	**A**	**308,052**	**524**	**258**
W6NF/7	*	6,624	53	48	*N9TF	*	43,989	151	129	*VA2SG	*	186,507	334	207	*WP3GW	*	183,799	290	217
KE7HTL	*	6,084	61	52	*WR9Y	*	43,384	199	136	*VE2AWR	*	109,480	228	170	*NP3HM	*	33,561	135	99
KR7P	*	5,610	61	51	*K9PY	*	41,472	154	128	*VA2RIO	*	49,664	144	128	***WP3C**	**14**	**2,372,700**	**1576**	**660**
K7XC	*	4,992	57	52	*W9VQ	*	24,735	110	97	*VA2PZ	*	24,708	96	87					
W7JAM	*	920	23	23	*KC9HGW	*	24,062	125	106	*VE2HAY	*	13,398	69	58			**St. Kitts & Nevis**		
KB7UJI	*	782	29	23	*KC9KIO	*	21,412	132	101	*VE2GLA	*	7,182	57	54	**V48M**	**A**	**7,966,329**	**3179**	**889**
KK7CG	*	750	26	25	*K9GY	*	14,320	94	80	*VE2LX	*	5,136	51	48				(OP: W2OX)	
WZ7ZR	**28**	**6,116**	**58**	**44**	*KC9ECI	*	13,200	102	80	*VA2LGQ	*	1,694	25	22					
KC7V	**21**	**26,414**	**112**	**94**	*N9BT	*	9,798	87	69				(OP: VE3AV)				**Turks & Caicos**		
W7WA	**14**	**4,054,754**	**2585**	**869**	*K9AIH	*	4,850	62	50	*VE2FFE	*	1,400	26	25	***VQ5BV**	**A**	**5,951,071**	**3065**	**731**
W6AEA/7	*	291,248	393	334	*WB9LRK	*	3,124	51	44									(OP: W5CW)	
KC7UP	*	22,372	100	94	*KK9U	*	600	25	20	**VE3EJ**	**A**	**10,756,686**	**3076**	**1058**					
KD7DCR	*	16,274	85	79	*K9TCD	*	240	10	10	VB3E	*	10,310,760	3099	1080			**Virgin Islands**		
W6XI/7	**7**	**20,592**	**108**	**99**	***W9ILY**	**21**	**7,748**	**56**	**52**				(OP: VE3AT)		**WP2Z**	**A**	**7,984,295**	**3174**	**895**
***K7JE**	**A**	**176,148**	**326**	**233**	***NØICV/9**	**14**	**2,340**	**38**	**36**	VE3DZ	*	7,859,126	2477	902				(OP: K8MJZ)	
*N4LS/7	*	155,283	320	191	*KC9GRD	*	234	15	13	VE3CX	*	3,302,800	1875	575	***KP2BH**	**A**	**400,608**	**517**	**288**
*KD7MSC	*	124,800	323	200						VE3GR	*	1,269,816	802	471					
*N7IR	*	113,399	264	169	**WØEWD**	**A**	**1,234,788**	**1510**	**516**	VA3CCO	*	131,904	192	192					
*W7QN	*	95,580	287	180	WAØMHJ	*	1,203,288	1123	554				(OP: VE3KZ)				**AFRICA**		
*W3CP/7	*	93,740	218	172	WØBH	*	1,173,907	1860	469	**VA3FP**	**21**	**13,056**	**75**	**64**					
*W7RV	*	72,224	205	148	KDØU	*	580,628	877	379	**VE3SS**	**14**	**20,740**	**90**	**85**			**Angola**		
*NF7T	*	72,200	243	152				(OP: KDØU)		**VA3XH**	**7**	**588,924**	**544**	**266**	***D2NX**	**A**	**124,872**	**255**	**172**
*AD7KG	*	52,416	209	144	WKØP	*	437,668	865	343	**VE3CUI**	**1.8**	**6,825**	**50**	**39**				(OP: JM1CAX)	
*W4LSC/7	*	48,585	158	123	KØDEQ	*	383,782	609	347	***VA3SWG**	**A**	**674,050**	**619**	**325**					
*K7PRW	*	40,098	187	123	WØATC	*	300,310	567	295	*VE3KPP	*	435,214	524	247			**Burundi**		
*N7QS	*	37,468	172	116				(OP: WAØHLJ)		*VE3FZ	*	269,824	341	256	***9UXEV**	**A**	**29,536**	**113**	**104**
*KD5D/7	*	34,485	160	121	K5VYT/Ø	*	282,504	588	298	*VE3AD	*	190,115	272	235					
*W7KAM	*	34,272	152	119	NCØB	*	246,339	430	271	*VE3BVA	*	152,800	254	191			**Canary Islands**		
*K7PWL	*	33,120	153	120	WØJPL	*	210,958	353	223	*VE3NB	*	130,680	216	180	**EA8MQ**	**A**	**310,528**	**389**	**256**
*WAØKDS/7	*	24,682	114	82	KØGAS	*	205,128	463	264	*VE3NCQ	*	110,880	225	154	**EA8LS**	**14**	**1,469,362**	**921**	**542**
*WA7MR	*	22,525	135	85	KØFX	*	177,650	287	209	*VE3MPT	*	101,067	224	177	***EA8BTM**	**A**	**1,382,528**	**1061**	**448**
*NX7F	*	19,596	119	92	KØXTR	*	111,530	302	190	*VE3TW	*	64,090	166	130	*EA8CDI	*	996,710	703	410
*W7SUR	*	10,792	100	71	WØHBH	*	96,800	217	176	*VE3JI	*	26,960	101	80	*EC8AFM	*	733,866	555	346
*N7SCL	*	6,273	73	51	ABØRX	*	89,670	197	147	*VE3RCN	*	21,910	90	70	*EA8BUR	*	286,391	356	251
*NG7Z	*	4,992	63	48	WØNO	*	73,738	228	161	*VE3KCO	*	13,440	94	70	***EC8AQQ**	**21**	**143,370**	**274**	**177**
*W7GMC	*	4,788	65	57	WWØAL	*	55,860	221	140	*VE3AJ	*	13,167	74	63	***ED8D**	**14**	**1,069,076**	**759**	**482**
*N7CN	*	3,840	50	40	WBØN	*	46,812	221	141	*VE3OIL	*	5,808	49	44				(OP: EA8BHD)	
*KD7RHI	*	2,904	55	44	KV6O/Ø	*	45,780	195	140	*VE3LXL	*	1,122	23	22	*EA8BGO	*	26,928	109	99
*KFØX/7	*	2,600	43	40	KØTG	*	38,958	177	129	*VA3PL	*	260	10	10					
*W7YKN	*	2,457	39	39	AIØQ	*	33,428	142	122	***VE3IAE**	**14**	**14,212**	**71**	**76**			**Ghana**		
*KW7I	*	1,056	25	22	NØRN	*	32,769	122	99	*VA3HUN	*	91	7	7					
*KD7GIM	*	880	27	22	WA2MNO/Ø	*	21,203	110	91	***VE3MGY**	**1.8**	**109,361**	**252**	**119**	***9G5ZS**	**A**	**14,342**	**76**	**71**
*K7TR	*	264	8	8	NAØBR	*	9,975	93	75										
*AD7BN	*	161	7	7	KCØNXB	*	2,574	42	39	**VE4EAR**	**A**	**700,441**	**724**	**329**			**Madeira Islands**		
*N7RSE	*	104	8	8	**KØRH**	**21**	**68,600**	**198**	**140**	***VE4YU**	**A**	**97,244**	**236**	**161**	**CT9L**	**A**	**15,981,472**	**4198**	**1066**
***W7UPF**	**21**	**39,558**	**132**	**114**	KØPK	*	17,177	71	89	*VE4DET	*	1,728	24	24				(OP: DF7ZS)	
*K9WZB/7	*	24,390	100	90	**WØCEM**	**14**	**92,365**	**282**	**203**						***CT3HF**	**A**	**226,240**	**342**	**224**
*K7MY	*	13,002	74	66	WØPPF	*	39,274	152	146	**VE5ZX**	**14**	**362,368**	**592**	**298**	*CS9UW	*	6,837	55	53
***AD7J**	**14**	**252,800**	**412**	**316**	KAØLL	*	11,172	98	84	VE5CPU	*	6,936	69	51					
*K7ACZ	*	37,375	122	115	**WØICT**	**7**	**65,600**	**385**	**164**	VE5ZC	*	325	13	13			**Morocco**		
*WA7NWL	*	16,926	108	93	***NX7TT/Ø**	**A**	**1,167,720**	**1486**	**526**						**CN2R**	**14**	**15,778,840**	**4429**	**1199**
*NE7D	*	14,196	94	78	*ACØW	*	909,580	1209	445	**VE6EX**	**A**	**686,504**	**775**	**296**				(OP: W7EJ)	
***N9ADG/7**	**7**	**12,859**	**114**	**77**	*NTØF	*	304,028	483	289	VA6MA	*	388,352	601	256	***CN2BC**	**A**	**4,698,149**	**1998**	**779**
***N7MAL**	**3.7**	**1,764**	**29**	**28**	*NØYO	*	292,134	516	269	VA6APB	*	110,600	247	175				(OP: DL7BC)	
*KE7BWN	*	1,175	29	25	*AAØNK	*	193,356	376	262	VA6SZ	*	74,256	199	136	*5C5W	*	2,183,780	1156	548
					*WBØTSR	*	159,139	359	233	VE6TR	*	36,406	123	109				(OP: CN8KD)	
WN8R	**A**	**132,916**	**268**	**202**	*NØBUI	*	113,400	336	210	**VA6XDX**	**7**	**119,980**	**222**	**140**	*CN4P	*	112,047	230	169
K8GL	*	132,225	259	205	*KBØARZ	*	93,810	274	177				(OP: VE6LB)					(OP: CN8NK)	
K8DD	*	127,058	300	202	*KØCN	*	75,604	269	164	***VE6LE**	**A**	**15,128**	**87**	**62**	***CN8YE**	**14**	**140,910**	**235**	**210**
NO8R	*	121,806	300	201	*K4JNB/Ø	*	71,906	249	157	*VE6MRX	*	3,922	45	37					
KY4Q/8	*	103,462	226	179	*KØVM	*	67,200	239	160	***VE6CNU**	**14**	**10,787**	**77**	**67**			**Mozambique**		
W8JMF	*	74,382	186	147	*KØJJM	*	39,693	176	131						**C91R**	**A**	**646,548**	**617**	**358**
W8OHT	*	67,425	194	155	*ADØH	*	37,422	152	126	**VA7ST**	**A**	**1,050,621**	**933**	**403**					
K8AO	*	28,016	106	103	*WGØM	*	37,395	185	135	VE7NS	*	110,500	229	170			**Namibia**		
W8MET	*	5,808	53	48	*NYØT	*	36,000	148	144	VA7DM	*	92,960	217	140	***V51YJ**	**21**	**31,815**	**109**	**105**

		Senegal		
***6V7E**	**21**	**1,353,905**	**908**	**505**
			(OP: RW3TN)	
		South Africa		
ZS9Z	**A**	**1,515,036**	**1031**	**503**
ZS2DL	*	449,920	522	296
***ZS4JAN**	**A**	**8,848**	**85**	**56**
***ZS6CCW**	**21**	**104,475**	**211**	**175**
*ZS6MHH	*	8,624	57	56
		Sudan		
***ST2KSS**	**A**	**1,242,096**	**915**	**458**
			(OP: ST2M)	
		Tunisia		
3V8BB	**A**	**13,999,022**	**3719**	**1019**
			(OP: YT1AD)	
		ASIA		
		Armenia		
EK3SA	**14**	**1,618,758**	**1072**	**558**
		Asiatic Russia		
UA9CDC	**A**	**8,574,630**	**2643**	**867**
UA9PC	*	**8,520,930**	**2775**	**855**
RW9USA	*	7,102,942	2453	847
RD9O	*	5,061,378	2128	777
			(OP: RZ9OO)	
RV9SV	*	3,066,255	1440	603
RU9AC	*	3,008,544	1342	592
RK9CWW	*	2,606,620	1285	590
			(OP: RA9CMO)	
UA9JDP	*	2,345,536	1226	536
RT9S	*	1,532,102	943	487
			(OP: UA9SP)	
RX9JP	*	427,610	468	305
RK9CR	*	418,600	481	280
UA9FGJ	*	311,736	362	248
RV9XO	*	302,207	373	277
RV9AZ	*	97,836	213	186
RW9WA	*	88,960	196	160
UA9CIR	*	24,297	103	91
UA9SAW	*	21,080	96	85
UA9QGS	*	20,970	97	90
UA9CGL	*	9,408	54	49
RX9FW	*	5,490	49	45
UA9SCX	**21**	**193,170**	**310**	**235**
RZ9YF	*	8,052	64	61
RZ9OJ	**14**	**51,610**	**149**	**130**
RK9KWI	*	46,305	146	135
RV9JE	*	6,477	53	51
RZ9CQ	*	4,173	41	39
RX9UKF	**3.7**	**12,648**	**69**	**51**
***RX9AM**	**A**	**1,826,478**	**1098**	**522**
*UA9ACJ	*	869,778	643	354
*RL9AA	*	583,780	538	340
*RK9AJZ	*	502,920	507	330
*RA9AAA	*	495,608	509	328
*UA9MR	*	453,000	495	302
*RX9FR	*	420,348	449	276
*RX9WN	*	416,292	431	339
*RU9CD	*	247,696	326	226
*RV9CBW	*	244,902	324	238
*RZ9UGN	*	174,231	312	239
*RZ9OO	*	138,960	254	193
*RX9CCJ	*	136,682	234	182
*RA9AP	*	100,196	190	148
*RA9MC	*	87,711	212	169
*RX9DJ	*	79,424	198	146
*UA9MD	*	64,532	170	146
*RA9SAS	*	43,008	147	112
*RV9UP	*	28,120	100	95
*RV9MN	*	25,662	110	94
*RA9AMO	*	8,960	68	64
*RU9YF	*	6,392	52	47
*RX9FO	*	4,514	40	37
*UA9TF	*	3,510	44	39
*R35NP	*	1,020	20	17
			(OP: RW1AI)	
*RV9UB	*	726	23	22
*RA9UCD	*	672	18	14
***UA9AX**	**21**	**133,956**	**205**	**244**
*RW9RA	*	70,356	186	143
*RA9MX	*	25,970	112	106
*RA9JP	*	13,908	88	76
*RA9FEL	*	12,870	74	65
*UA9QQ	*	7,920	58	55
*RV9YK	*	1,984	36	32
***RA9XU**	**14**	**289,192**	**384**	**296**
*RK9UN	*	231,804	397	282
*RX9FG	*	177,144	283	244
*RA9XF	*	167,544	288	234
*RW9TP	*	70,416	179	163
*RU9WZ	*	36,533	134	119
*RA9JBA	*	23,876	108	94
*RA9JM	*	23,128	100	98
*RK9UAC	*	22,533	94	87
*UA9AL	*	8,614	63	59
*UA9ODE	*	5,684	49	49
*RN9AS	*	3,293	40	37
*UA9JMB	*	288	18	16
*RA9DR	*	28	4	4
***RA9UAD**	**7**	**40**	**5**	**4**
***UA9WIK**	**3.7**	**82,992**	**157**	**112**
UAØANW	**A**	**562,130**	**604**	**335**
UAØDC	*	455,040	578	320
RKØAB	*	286,366	427	262
UAØACG	*	247,396	478	254
UAØSR	*	140,400	278	216
RAØAA	*	102,660	233	174
RKØUT	*	76,140	227	162
UAØFDX	*	58,674	213	127
UAØDAM	*	55,594	201	133
RUØLL	*	27,438	123	102
UAØUV	*	17,430	96	83
RZ8SR	**14**	**1,343,570**	**1054**	**565**
UAØCA	*	1,064,370	1018	510
RAØQD	*	710,120	832	433
UAØIBX	*	98,888	288	188
RXØQA	*	42,084	179	126
RKØAWQ	*	3,441	40	37
RUØAW	**7**	**3,910**	**38**	**34**
RWØCF	**3.7**	**5,560**	**40**	**40**
***UAØCNX**	**A**	**209,466**	**434**	**243**
*UAØIT	*	162,892	332	211
*RZØAO	*	142,628	283	197
*UAØAPV	*	104,576	208	172
*UAØYAY	*	35,280	145	120

*RAØSMS	*	20,116	150	94
*RAØLE	*	17,876	105	82
*RAØCAH	*	14,421	97	69
*RAØAY	*	5,226	48	39
*RZØAK	*	3,078	45	38
***RAØSCA**	**21**	**40,920**	**283**	**120**
*UAØSAD	*	7,493	80	59
***UAØIDZ**	**14**	**544,211**	**609**	**389**
*UAØSJ	*	442,586	582	361
*RVØAL	*	143,100	262	212
*RWØUM	*	124,848	332	216
*RXØAW	*	101,928	217	186
*RWØAA	*	99,792	234	189
*RWØCV	*	73,610	250	170
*UCØLAF	*	49,880	173	145
*RAØACM	*	43,798	163	122
*RUØAT	*	16,800	93	84
*RWØUB	*	2,660	44	38

Azerbaijan

***4J7WMF**	**A**	**368,621**	**410**	**253**
*4K9W	*	73,728	164	144
***4K8M**	**7**	**16,461**	**60**	**59**

Bahrain

A92GR	**A**	**436,248**	**537**	**332**

Bangladesh

***S21YV**	**A**	**19,866**	**123**	**86**

Bhutan

***A52K**	**A**	**3,192**	**63**	**42**

China

BA7IO	**A**	**251,680**	**613**	**260**
BA5DX	*	121,626	376	174
BG5HST	*	18,532	128	82
BG5HSC	*	1,674	31	27
BG5HRE	*	1,242	26	23
***BL7IN**	**A**	**100,230**	**292**	**195**
*BD4RET	*	25,774	151	98
*BD4AGK	*	19,096	109	88
*BY8AC	*	12,986	141	86
			(OP: BD8ATI)	
*BG4TBJ	*	10,143	84	63
*BD4AHS	*	7,375	73	59
*BD4SX	*	5,336	48	46
*BG4XNG	*	4,343	55	43
*BG4JWU	*	3,311	53	43
*BG4DGJ	*	3,204	40	36
*BD4RCS	*	2,730	31	30
*BG3EO	*	2,262	47	39
*BD3MZX	*	1,450	35	29
*BG6AIF	*	1,344	35	28
***BG7NWF**	**28**	**28,014**	**197**	**87**
***BD5HIS**	**21**	**21,168**	**132**	**98**
*BD7IBN	*	15,480	108	90
*BG7IEU	*	1,458	34	27
***BG4DVK**	**14**	**68,445**	**223**	**169**
*BG7LDM	*	22,927	132	101
*BG4KUU	*	21,582	164	99
*BG6AGB	*	13,035	100	79
*BG4JUU	*	9,882	96	81
*BY7KP	*	9,246	91	69
*BG4IGL	*	2,860	47	44
***BG4TYQ**	**7**	**64**	**6**	**4**

Cyprus

H22H	**3.7**	**2,432,692**	**854**	**502**
			(OP: 5B4MF)	

Georgia

4LØA	**A**	**10,017,060**	**3110**	**876**
			(OP: 4L4WW)	
***4L2M**	**14**	**843,480**	**717**	**440**

Hong Kong

VR1ØXMT	**21**	**816,540**	**1164**	**439**
***VR2YKP**	**A**	**35**	**5**	**5**
***VR2YYW**	**14**	**235,535**	**517**	**289**
*VR2PW	*	36,530	143	130
***VR2PX**	**7**	**19,600**	**71**	**70**

India

VU2PTT	**A**	**802,426**	**784**	**421**
VU2SWS	*	530,309	572	361
***VU3USJ**	**14**	**1,200**	**24**	**24**

Iraq

YI9PT	**A**	**816,957**	**761**	**387**

Israel

4Z5ML	**A**	**626,808**	**504**	**312**
4Z4OO	**14**	**3,983,984**	**1925**	**776**
***4Z5MV**	**A**	**81,396**	**208**	**171**
*4Z5PJ	*	22,250	92	89
***4Z5MY**	**14**	**27,400**	**111**	**100**

Japan

JE1LFX	**A**	**1,454,904**	**1095**	**484**
JR1LZK	*	166,530	324	195
JO1SIM	*	40,710	177	115
JI1ALP	*	21,329	95	77
7J1ABD	*	12,400	75	62
JF1AZQ	*	5,382	59	46
JH1APK	*	4,800	31	30
JH1ACA	**14**	**509,007**	**571**	**383**
***JP1JFG**	**A**	**395,514**	**530**	**301**
*7J1AQH	*	184,416	369	204
			(OP: VE7HA)	
*JA1GLE	*	117,335	273	155
*JE4AEJ/1	*	78,804	247	132
*JA1FRQ	*	52,095	171	115
*JA1XUY	*	47,632	194	104
*JA1XPU	*	46,759	186	107
*JA1VGV	*	17,080	89	70
*JA1ALE	*	12,931	93	67
*JH1OLB	*	9,912	77	59
*JK1NSR	*	8,851	77	53
*JF1HJX	*	7,802	74	47
*JA1AAT	*	6,909	59	47
*JH1HYC	*	4,875	54	39
*JA1BPN	*	4,816	58	43
*JA1BJI	*	3,192	29	28
*JA1LBZ	*	2,604	43	28
*JA1FO	*	2,560	40	32
*JE1JAC	*	2,380	40	28
*JI1UDD	*	1,971	34	27
*JG1FGL	*	1,128	27	24
*JF1RYU	*	1,122	23	22
*JN1DNV	*	264	12	12
***JA1RYC**	**21**	**11,466**	**87**	**63**
*JA1JLP	*	7,008	64	48
*JA1DBG	*	4,100	50	41
*JA1LPQ	*	1,007	23	19
*JE1QCL	*	1,000	22	20
*JA1SMD	*	216	10	9
*JI1LAI	*	48	4	4
***JF1TEU**	**14**	**72,980**	**204**	**164**
*JH1UUT	*	59,888	197	152
*JH1FNU	*	16,896	98	88
*JE1GZB	*	10,640	87	70
*JA1BFN	*	1,050	22	21
*JG1GCO	*	756	22	18
***JH1RDU**	**7**	**1,408**	**16**	**16**
*JK1BII	*	308	11	11
***JE1SPY**	**3.7**	**3,885**	**43**	**35**
JA2PAC	**A**	**2,040,996**	**1248**	**601**
JA2BNN	*	324,816	488	268
JH2FXK	*	202,653	327	253
JJ2CJB	*	147,278	297	211
JF2FIU	*	68,949	211	141
JG2REJ	*	62,061	215	137
JJ2PUG	**21**	**2,040**	**27**	**30**
JA2XCR	**14**	**196,560**	**319**	**260**
***JA2GHP**	**A**	**36,192**	**175**	**96**
*JA2VZL	*	23,940	122	84
*7L2PDJ	*	22,078	111	83
*JA2PFO	*	10,500	70	50
*JA2TTH	*	6,063	59	43
*JQ2OUL	*	2,632	36	28
*JA2DLM	*	960	21	20
***7N2UQC**	**28**	**4,480**	**61**	**40**
***JG2KKG**	**14**	**412,657**	**494**	**353**
JS3CTQ	**A**	**1,420,660**	**1075**	**502**
JA3AOP	*	896,325	797	425
JH3PRR	*	627,057	613	361
JO3DDD	*	201,080	378	220
JA3LEZ	*	90,628	207	163
JA3YBK	**21**	**800,384**	**839**	**416**
			(OP: JS1PWV)	
JH3GCN	**7**	**45,504**	**104**	**96**
***JA3UWB**	**A**	**97,376**	**248**	**179**
*JR3RIY	*	66,640	180	119
*JA3PYC	*	38,304	138	112
*JH3PTC	*	30,874	146	86
*JA3JM	*	21,440	133	80
*JF3SAD	*	9,500	65	50
*JA3KDJ	*	4,551	57	37
*JO3EVM	*	3,312	39	36
*JR3SZZ	*	1,764	37	28
*JA3EOE	*	341	13	11
***JL3MCM**	**28**	**6,864**	**48**	**66**
***JF3BFS**	**21**	**24,395**	**126**	**85**
*JR3KAH	*	2,760	40	30
*JA2VSU/3	*	765	19	17
***JA3COA**	**14**	**192**	**8**	**8**
***JF3IYW**	**7**	**7,396**	**46**	**43**
*JI3MCM	*	104	8	8
JH4UYB	**A**	**5,407,080**	**2093**	**840**
JA4NQD	*	5,670	59	45
JH4UTP	**28**	**15,276**	**109**	**57**
JM4WUZ	**14**	**7,560**	**64**	**54**
***JA4BDY**	**A**	**7,904**	**68**	**52**
***JF4GWA**	**28**	**153**	**9**	**9**
***JR4LRY**	**21**	**6,721**	**68**	**47**
*JA4CBX	*	585	15	15
***JR4FLW**	**14**	**25,100**	**114**	**100**
*JA4AQR	*	18,445	92	85
***JR4URW**	**7**	**14,328**	**88**	**72**
JA5FBZ	**21**	**35,534**	**148**	**109**
***JA5ND**	**A**	**198**	**12**	**11**
JA6BZI	**A**	**91,035**	**187**	**153**
JE6DND	*	35,898	138	93
JH6AUS	**28**	**33,803**	**189**	**77**
***JA6DIJ**	**A**	**102,672**	**274**	**186**
*JQ1AHZ/6	*	8,670	84	51
*JA6AVT	*	6,700	63	50
***JH6WXF**	**21**	**7,140**	**69**	**51**
***JH6QFJ**	**14**	**14,592**	**86**	**76**
JA7COI	**A**	**427,040**	**605**	**272**
JE7YSS	*	100,308	247	156
			(OP: 7N4TEN)	
JA7ZP	*	47,151	155	117
JH7DUM	*	2,816	39	32
JA7JH	**28**	**2,604**	**37**	**31**
JH7XMO	**21**	**149,768**	**341**	**193**
JA7AKH	**14**	**290,019**	**435**	**277**
JH7QXJ	*	171,082	315	226
***JA7LMZ**	**A**	**395,416**	**517**	**307**
*JL7XBN	*	24,388	131	91
***JA7HYS**	**14**	**1,122**	**23**	**22**
*JF7GDF	*	578	18	17
JH8FIH	**A**	**121,813**	**262**	**181**
***JL8MBF**	**A**	**22,386**	**124**	**82**
***JA8IJI**	**14**	**19,350**	**108**	**86**
JA9CCG	**A**	**24,297**	**124**	**91**
***JF9KVT**	**A**	**39,882**	**184**	**102**
*JA9TQY	*	19,053	118	87
***JH9URT**	**7**	**54,992**	**159**	**112**
***JHØNEC**	**A**	**232,971**	**377**	**237**
*JHØCCK	*	13,752	78	72
*JAØGEY	*	9,240	73	56
***JHØEPI**	**14**	**175,788**	**321**	**228**

Kampuchea

***XU7ACY**	**A**	**1,124,840**	**1412**	**461**

Kazakhstan

UPØL	**A**	**7,618,760**	**2593**	**790**
			(OP: UN9LW)	
UN7PL	*	606,209	571	347
UN6G	*	44,034	156	123
UN5J	*	242	12	11
UN7MMM	**14**	**2,195,856**	**1273**	**621**
UN9L	*	1,098,720	814	504
UN7QF	*	187,036	360	214
***UP6P**	**A**	**972,089**	**781**	**421**
			(OP: UN6P)	
***UP8A**	**21**	**4,641**	**44**	**39**
***UN7JX**	**14**	**599,073**	**620**	**397**
*UN6LN	*	573,806	566	379
*UO6P	*	530,216	570	347
			(OP: UN7PBY)	
*UN4PG	*	222,360	336	255
*UO7ØF	*	126,684	240	204
*UN7EX	*	24,840	100	90
***UN5C**	**3.7**	**4,002**	**34**	**29**

Kyrgyzstan

EX2T	**A**	**357,272**	**518**	**284**
EX8MAT	*	160,392	221	163
***EX7ML**	**21**	**125,296**	**302**	**191**

Laos

XW1A	**14**	**8,784**	**66**	**61**

Macau

***XX9AU**	**21**	**3,995**	**60**	**47**

Mongolia

***JT1BV**	**A**	**773,568**	**974**	**408**

Ogasawara

***JD1BIA**	**21**	**3,420**	**42**	**36**

Oman

***A41MX**	**A**	**807,222**	**765**	**393**

Saudi Arabia

***7Z1SJ**	**A**	**3,767,244**	**1946**	**741**
*HZ1PS	*	189,840	297	226

Singapore

9V1YC	**A**	**3,856,128**	**2215**	**768**
9V1UV	*	35,046	166	118

South Korea

HL2FDW	**A**	**625,666**	**1026**	**307**
HL5JCB	*	30,260	139	89
DS5DNO	*	15,774	95	66
***DS5KJR**	**A**	**52,614**	**214**	**111**
*HL5YI	*	4,268	55	44

Taiwan

BX5AA	**A**	**1,138,212**	**1429**	**486**
***BV4VR**	**A**	**56,440**	**244**	**136**
*BU2AE	*	51,328	227	128
*BX4AQ	*	50,908	240	143

Tajikistan

EY2Q	**21**	**33,592**	**137**	**104**
			(OP: EY8CQ)	
***EY8DQ**	**21**	**47,838**	**165**	**134**

Thailand

HSØZDR	**21**	**17,220**	**100**	**84**
***HSØZCW**	**A**	**2,025,368**	**1513**	**619**
*HS1CKC	*	938,546	1111	427
***E2ØYLM**	**21**	**1,034**	**28**	**22**
***E21YDP**	**14**	**182,000**	**325**	**250**
***E21EIC**	**7**	**136,594**	**230**	**163**

Turkey

TA3YJ	**7**	**2,400**	**20**	**20**
***TC3D**	**A**	**6,757,972**	**2384**	**769**
			(OP: TA3D)	
*TA1CM	*	161,777	245	191
***TA2IB**	**21**	**4,400**	**45**	**40**
*TA1HZ	*	3,838	44	38
***TA3J**	**7**	**7,770**	**37**	**37**
***YMØT**	**1.8**	**94,518**	**143**	**118**
			(OP: TA2RC)	

UK Bases on Cyprus

ZC4LI	**7**	**18,126**	**57**	**57**

Uzbekistan

***UK7F**	**21**	**165,375**	**316**	**245**

Vietnam

XV1X	**A**	**377,848**	**730**	**292**

West Malaysia

9M2MT	**A**	**435,404**	**704**	**337**
***9M2TO**	**A**	**345,072**	**622**	**312**
***9W2DRL**	**28**	**9,782**	**119**	**67**

EUROPE

Austria

OE6MDF	**A**	**539,708**	**607**	**388**
OE1C	*	227,106	421	279
			(OP: OE1MHL)	
OE/K5ZD	*	181,655	306	235
OE6V	**14**	**1,422,596**	**1241**	**658**
***OE3BCA**	**A**	**396,306**	**519**	**358**
*OE3DMA	*	91,956	241	194
*OE5CWO/2	*	88,464	250	194
*OE7AJT	*	68,288	205	176
*OE5UAL	*	38,440	134	124

Azores

CU3FV	**A**	**1,106,448**	**1005**	**534**

Balearic Islands

EA6SX	**A**	**4,284,054**	**1919**	**841**
***EA6XQ**	**A**	**187,372**	**358**	**278**
*EA6AFM	*	1,495	25	23
***EC6UD**	**28**	**1,140**	**21**	**20**

Belarus

EV1R	**A**	**1,841,840**	**1389**	**644**
			(OP: EU1PA)	
EW2EO	*	7,392	63	56
EW4MM	**21**	**64,419**	**83**	**327**
EW8DX	**14**	**252,015**	**488**	**317**
EW6GF	*	149,725	383	265
EV1Z	**3.7**	**122,400**	**260**	**200**
			(OP: EU1UN)	
***EW7LE**	**A**	**8,107**	**70**	**67**
*EW8DA	*	7,239	61	57
*EW6GL	*	3,145	42	37
***EW6DX**	**14**	**53,720**	**203**	**170**
***EU1DZ**	**3.7**	**104,139**	**238**	**189**
*EV6M	*	63,900	176	142

Belgium

OT2A	**A**	**2,220,288**	**1534**	**708**
ON7ON	*	17,298	100	93
***ON4CT**	**A**	**343,416**	**481**	**349**
*OO5D	*	200,256	339	298
			(OP: ON5SD)	
*OO4A	*	160,146	350	246
			(OP: ON6ML)	
*ON4CAS	*	112,350	262	210
*ON3AR	*	83,727	256	189
*ON4AAA	*	11,484	71	66
***OT2C**	**14**	**156,429**	**342**	**273**
*ON7BBR	*	34,450	149	130
***OO6U**	**3.7**	**145,197**	**339**	**219**
			(OP: ON6UU)	
*ON8PH	*	107,759	277	197

Bosnia-Herzegovina

E77EZ	**3.7**	**354,662**	**497**	**329**
***E74AA**	**A**	**1,064,469**	**1082**	**519**
*E72WG	*	68,480	206	160
***E73ACL**	**14**	**35,775**	**160**	**135**
*T97J	*	2,226	45	42
			(OP: YU2EA)	
***E77DO**	**7**	**780,858**	**765**	**426**
***E77AR**	**3.7**	**1,404**	**28**	**27**

Bulgaria

LZ2SX	**A**	**976,752**	**1095**	**532**
LZ1ND	*	226,947	507	303
LZ1BJ	*	76,110	221	177
LZ1AQ	*	54,931	187	163
LZ2JR	*	1,372	29	28
LZ3GA	*	630	15	15
LZØ8IPY	*	297	16	11
LZØ5ANT	*	220	10	10
LZ2PG	**21**	**22,968**	**92**	**99**
***LZ4UU**	**A**	**636,141**	**771**	**407**
*LZ2HA	*	207,360	398	288
*LZ1IKY	*	198,220	397	265
*LZ1ONK	*	69,324	217	159
*LZ5XQ	*	42,059	174	137
*LZ2DF	*	12,744	82	72
*LZ1WJ	*	6,200	50	50
*LZ2HN	*	2,838	33	33
***LZ2PEP**	**21**	**68,040**	**209**	**162**
***LZ13ØJA**	**14**	**401,821**	**742**	**419**
*LZ1CAR	*	37,240	158	140
***LZ5W**	**7**	**1,057,707**	**859**	**489**
*LZ2FM	*	32,591	119	109

Crete

SV9COL	**A**	**225,261**	**466**	**309**

Croatia

9A3KS	**A**	**23,458**	**86**	**74**
9A5Y	**21**	**1,248,650**	**1073**	**650**
			(OP: 9A3LG)	
9A4W	*	991,800	1068	570
9A6A	**3.7**	**1,684,256**	**1272**	**584**
9A3B	*	1,244,740	1044	523
			(OP: 9A2VR)	
9A5D	*	956,823	891	483
			(OP: 9A3ID)	
***9A4VM**	**A**	**115,786**	**254**	**209**
*9A6KTB	*	111,588	288	204
*9A3QB	*	75,330	209	162
*9A3TU	*	39,324	137	113
*9A8A	*	17,138	89	82
*9A2GA	*	17,098	93	83
*9A1MM	*	10,758	75	66
*9A1DL	*	2,926	40	38
***9A5ØKDE**	**14**	**1,513,400**	**1347**	**644**
			(OP: 9A1AA)	
*9A6AJ	*	53,424	206	168

Czech Republic

OK5R	**A**	**9,315,900**	**3127**	**1100**
OK6TW	*	413,345	574	361
OK1FRO	*	26,910	133	117
OK1MJA	*	5,264	62	56
OK2BND	*	2,275	38	35
OK1DX	**21**	**51,072**	**166**	**133**
OK2ABU	*	10,850	78	62
OK2BYW	**3.7**	**1,788,534**	**1314**	**594**
OK1W	*	817,180	779	455
			(OP: OK2WM)	
***OK1WCF**	**A**	**1,534,468**	**1162**	**598**
*OK6Y	*	782,292	779	469
			(OP: OK2PTZ)	
*OK2MBP	*	530,600	699	379
*OK2BEN	*	351,624	502	312
*OK1DKR	*	232,290	403	290
*OK6AY	*	225,736	381	278
*OK1MKU	*	210,386	345	262
*OK2BRX	*	183,954	365	258
*OK1HEH	*	176,736	376	263
*OK1BA	*	167,232	360	268
*OL2T	*	161,750	357	250
			(OP: OK2TC)	
*OK1TC	*	155,363	312	247
*OK4AS	*	146,370	322	238
*OK2KFK	*	98,697	273	197
			(OP: OK2ABU)	
*OK4DZ	*	88,451	230	187
*OK7N	*	63,176	180	149
*OK1UDJ	*	62,976	204	164
*OK1LO	*	59,408	196	158
*OK2PBG	*	58,720	201	160
*OK2SAR	*	43,722	161	126
*OK2PHI	*	39,168	159	136
*OK1TRA	*	37,000	145	125
*OK1SI	*	31,707	134	117
*OK4AZ	*	12,859	80	77
*OK2BJ	*	5,628	46	42
*OK1VHV	*	3,690	50	45
*OK1URO	*	1,792	34	32
*OL1ATB	*	675	15	15
***OK1DKA**	**21**	**46,550**	**155**	**133**
*OK1ULE	*	27	3	3
***OK1MMN**	**14**	**36,300**	**153**	**132**
*OK1DI	*	22,148	112	98
*OK2SWD	*	888	25	24
***OK2BUT**	**7**	**123,200**	**236**	**200**
*OK1UG	*	95,744	206	187
*OK2XKA	*	50,518	143	134
***OL5J**	**3.7**	**558,298**	**712**	**394**
			(OP: OK1RZ)	
*OK2WYK	*	41,796	151	129
***OL6P**	**1.8**	**41,396**	**172**	**131**
			(OP: OK2WTM)	
*OK1JOK	*	32,096	141	118
*OK1KZ	*	2,176	36	34

Denmark

OZ5EV	**A**	**377,856**	**443**	**384**
OZ/DL1TM	*	276,640	458	304
OZ/DJ4MG	*	152,514	344	229
OZ8PI	*	5,005	58	55
OZ2PBS	*	3,268	45	38
OZ1ADL	**3.7**	**584,350**	**651**	**403**
OZ1AXG	**1.8**	**42,444**	**130**	**162**
***OZ1AC8**	**A**	**228,636**	**402**	**292**
*OZ2DAN	*	96,248	261	212
*OZ4RT	*	39,390	139	130
*OZ1XV	*	16,781	108	97
*OZ6TL	*	6,840	59	57
*OZ1DGQ	*	1,134	30	27
*5P4RT	*	476	14	14
***OZ6OQ**	**7**	**15,792**	**90**	**84**

England

M6T	**A**	**9,975,816**	**3476**	**1047**
			(OP: G4PIQ)	
M8C	*	928,574	974	527
GØMTN	*	377,104	547	364
MØWLF	*	367,734	510	334
G3TXF	*	137,532	267	219
G4OWT	*	121,695	236	183
G4MKP	*	93,933	256	189
G4FAL	*	53,818	179	142
GØGFQ	*	51,972	174	142
G8DYT	**3.7**	**434,190**	**497**	**353**
***G4DFI**	**A**	**306,525**	**469**	**335**
*GB9ØRAF	*	292,400	488	344
			(OP: G3VAO)	
*G2C	*	265,124	457	316
			(OP: FBCKH)	
*G4DBW	*	195,021	396	279
*G8MIA	*	146,993	334	253
*G4WGE	*	116,256	299	224
*2EØPLA	*	91,739	259	199
*G1FON	*	89,621	281	217
*GØCER	*	81,965	208	169
*G8ZRE	*	81,755	266	197
*MØMCX	*	81,328	240	184
*2E1FVS	*	59,532	194	164
*MØSDY	*	47,762	157	143
*2EØSJC	*	41,273	176	149
*M5KJM	*	33,411	142	129
*GØKDS	*	33,033	128	121
*G4NXG	*	26,304	110	96
*M3ENF	*	25,538	120	113
*G6UBM	*	22,422	118	101
*G6CSY	*	22,295	103	91
*MØTLN	*	20,790	121	110
*GØMLY	*	19,251	111	93
*2EØPSK	*	17,266	102	97
*MØJPF	*	16,660	101	98
*M3OHI	*	15,288	110	98
*MØYOY	*	12,480	83	78
*M3PZT	*	10,611	92	81
*G8YTC	*	3,408	51	48
*G4SGI	*	2,914	49	47
*MØBGR	*	234	13	13
*G4LMW	*	24	2	2
***G3WW**	**14**	**468**	**18**	**18**
***G7TWC**	**7**	**294,465**	**406**	**293**
*M3RCV	*	22,860	94	90
***MØEZP**	**1.8**	**98**	**7**	**7**

Estonia

ES5GI	**A**	**270,475**	**546**	**349**
ES8DH	*	52,298	180	158
ES1A	**7**	**329,058**	**405**	**303**
			(OP: ES1GE)	
***ES6RMR**	**A**	**19,136**	**111**	**104**
*ES2BH	*	5,642	64	62
***ES4RD**	**14**	**116,550**	**263**	**225**
***ES1LS**	**7**	**120,768**	**249**	**204**

European Russia

RM3F	**A**	**4,366,560**	**2423**	**880**
			(OP: UA3DPX)	
RG3K	*	3,311,529	2350	779
			(OP: UA3QDX)	
RS3A	*	2,966,340	1875	780
			(OP: RA3CW)	
UA4WKW	*	2,681,206	1857	737
RW1ZA	*	2,592,910	1966	766
UA4FER	*	2,411,805	1788	705
RV4HC	*	2,155,365	1762	681
UA6GP	*	1,949,220	1468	663
RD4WA	*	1,909,173	1556	687
UA6UDV	*	1,534,280	1334	605
RN3ZC	*	1,524,772	1361	586
UA6YIU	*	1,361,835	1256	571
RA3AUM	*	1,282,500	1099	540
RY4I	*	1,219,738	1283	559
UA4SKW	*	960,000	780	480
UA3VFS	*	896,852	994	484
RA3RK	*	580,723	752	403
RW4PL	*	572,468	669	404
RA3NC	*	402,335	578	335
RX3AGD	*	330,484	411	319
RA1AGL	*	256,734	498	306
RD3A	*	244,904	378	242
			(OP: RD3AF)	
RU6YZ	*	226,200	455	325
RL3AW	*	203,872	289	277
RK3FQ	*	191,690	409	290
RK3QS	*	188,832	401	281
RU6YK	*	180,804	343	244
RX4WX	*	163,056	372	237
UA4NC	*	106,368	267	192
RU3UR	*	80,194	281	202
RZ3DA	*	77,525	209	175
RU6YJ	*	64,680	191	147
UA3DUJ	*	59,607	220	179
RL3AO	*	57,512	205	158
RA6AR	*	41,602	139	122
UA3DAM	*	33,410	153	130
RN3REY	*	27,027	114	99
UA3QFU	*	26,945	112	85
UA3AGW	*	23,994	99	86
RX3VF	*	20,172	129	123
RN1ON	*	10,205	72	65
RA4UVK	*	9,700	62	50
UA6LPY	*	8,008	55	44
U1BB	*	7,931	82	77
RX6CC	*	5,978	52	49
RA3FD	*	276	12	12
UA6AK	**28**	**5**	**5**	**5**
RL3BM	**21**	**103,179**	**258**	**211**
RW6ATJ	*	55,068	187	156

R3K	14	3,882,440	2462	961
RZ1ZZ	"	760,200	1087	543
RA1AW	"	386,630	668	410
RA4LBS	"	26,201	144	133
RA4HTX	"	19,800	123	110
RN1NU	"	13,884	83	78
RK3GWW	"	12,015	99	89
			(OP: RN3GA)	
RW6BN	7	89,178	202	167
UA6AKD	3.7	29,715	123	105
RA6DB	1.8	84,597	226	173
*RV6LFE	A	1,316,714	1223	577
*UA4FRL	"	1,215,504	1178	552
*UA3BL	"	809,977	896	461
*RK3MWI	"	654,885	742	405
			(OP: UA3MSA)	
*UA1CEI	"	494,424	667	378
*RK6CK	"	458,631	670	389
*RA6GW	"	366,912	555	364
*RA3MR	"	366,748	542	331
*RZ3TZZ	"	366,114	596	379
*RW3XZ	"	362,140	578	380
*RV3LO	"	340,392	512	312
*RK4CB	"	327,187	496	301
*UA1CUR	"	317,988	530	292
*UA4PAN	"	290,472	482	273
*RU6HJ	"	289,380	493	318
*RN3AHL	"	282,653	404	271
*UA3QOS	"	276,520	454	310
*RK4PB	"	264,578	417	263
*UA3UNP	"	246,448	430	292
*RA1AFR	"	216,050	385	298
*UA1AFZ	"	193,949	388	269
*RA4ACX	"	181,306	366	269
*RD3WF	"	180,544	388	217
*UA3DQ	"	169,520	356	260
*RN3ZR	"	151,526	347	239
*U1BA	"	137,340	329	252
*RX3QDF	"	133,515	301	207
*RV1CB	"	124,542	323	222
*RU3XY	"	124,460	281	196
*RA3MB	"	117,055	267	205
*UA4AAC	"	115,404	259	177
*RL3FO	"	81,408	241	192
*RV4LC	"	71,740	215	170
*RN4NF	"	71,604	180	156
*RA6HSM	"	68,040	207	140
*RL3WX	"	66,062	182	134
*UA3AIU	"	65,472	221	176
*RW3WX	"	64,558	203	169
*UA3ACL	"	61,462	209	158
*RN4CA	"	57,812	191	149
*RA1AGU	"	51,520	156	140
*UA3ABJ	"	47,422	169	131
*RN3ZIN	"	46,368	169	144
*UA3FDX	"	44,144	158	124
*RW3VZ	"	41,984	147	128
*RW6HPD	"	41,860	210	161
*RV4HL	"	39,128	153	134
*RA4PX	"	36,300	142	121
*UA3AKI	"	35,143	142	113
*RA6FUZ	"	34,944	132	112
*RV3ZL	"	34,720	150	124
*RA3TLA	"	34,224	154	124
*RA3VE	"	33,787	138	113
*UA3DFR	"	32,258	148	127
*UA3RW	"	31,065	132	109
*RU3XB	"	29,890	143	122
*RV3MI	"	27,480	140	120
*RZ3DC	"	25,317	124	87
*RA6XB	"	23,585	103	89
*RA4FUN	"	23,474	120	97
*RU4FA	"	21,912	103	88
*RV6BK	"	19,594	102	97
*RA3VR	"	19,320	99	84
*RA3TUT	"	17,512	95	88
*RU3VD	"	17,228	73	73
*RL3AJ	"	14,996	103	92
*RA4NCC	"	14,705	98	85
*RU3UW	"	13,197	87	83
*RU4WD	"	11,285	74	61
*RA1QDP	"	10,626	74	66
*RX3MM	"	8,260	66	59
*RA3RBL	"	5,600	46	40
*UA6YI	"	4,182	43	34
*RW4LQ	"	3,441	37	31
*RV3DHC	"	3,139	45	43
*RA3RGQ	"	2,835	32	27
*UA3MEJ	"	2,821	35	31
*RU4CS	"	2,813	35	29
*UA4FUW	"	2,484	41	36
*RN4AM	"	2,345	39	35
*UA3DSS	"	1,827	30	29
*RZ3VA	"	1,647	29	27
*RZ3ATG	"	1,288	24	23
*UA6AN	"	874	20	19
*UA3GHM	"	611	14	13
*UA4WAG	"	140	7	7
*RN6DR	"	15	3	3
*RW6CW	28	472	4	59
*UA4LW	21	7,296	60	57
*RD6LP	"	5,760	52	48
*RK6CM	"	5,454	47	54
*UA1AQA	14	377,235	609	415
*RW1CW	"	373,324	536	398
*RU3SE	"	161,912	378	296
*RU3FN	"	108,092	289	244
*UA6ARR	"	90,252	252	207
*RX3DBG	"	46,956	195	172
*RW6AH	"	46,508	183	154
*RL3AB	"	38,905	182	155
*RA3DGH	"	38,212	186	164
*RV6AMI	"	17,649	113	111
*UA4ACP	"	7,688	75	62
*RZ3ATE	"	5,529	58	57
*RW3XL	"	3	1	1
*UA3FX	7	115,900	234	190
*UA1ANA	"	21,526	101	94
*RV3WT	3.7	492,156	597	378
*RA3QH	"	104,517	244	189
*UA2FFX/1	"	101,994	251	191
*RA3QG	"	14,688	82	68
*RA6MT	1.8	13,604	90	76
*UA3QDF	"	7,326	57	74
Faroe Islands				
*OY9R	A	104,085	344	257
Finland				
OG8X	A	5,841,780	2858	980
			(OP: OH6UM)	
OG6A	"	5,266,170	2454	910
			(OP: OH6KZP)	
OH1RX	"	1,381,788	1105	586
OH6RE	"	610,985	778	445
OH1BV	"	110,656	272	208
OH2NRG	"	893	20	19
			(OP: OH2LRE)	
OG5M	14	1,549,560	1522	698
			(OP: OH5KS)	
OH8L	"	1,455,006	1362	707
			(OP: OH8LQ)	
OH2K	"	980,685	992	589
			(OP: OH2LZC)	
*OH3DP	A	67,423	212	191
*OH8GZQ	"	17,304	114	103
*OH7JHA	"	16,400	106	100
*OH6GFI	"	104	9	8
*OH6RC	14	33,572	160	154
*OH8GZN	"	13,585	106	95
*OG8A	7	113,094	230	183
			(OP: OH8VJ)	
*OH6JYH	"	2,240	31	28
*OH6AC	1.8	4,876	54	46
France				
F6DZU	A	2,037,516	1401	706
F5BBD	"	867,510	887	486
F4DSK	"	194,790	383	258
F5VHY	"	84,466	206	157
F4CPF	"	43,692	161	132
F8DVD	"	19,080	82	72
F8CRS	"	14,300	75	65
TM4W	21	491,928	646	412
			(OP: F5HRY)	
TM1W	14	4,473,924	2337	884
F1UVN	3.7	33,396	125	121
*F4FLQ	A	1,561,716	1163	639
*TM7C	"	855,337	840	497
			(OP: F8AKS)	
*F5LIW	"	430,124	545	367
*F4FDA	"	416,780	544	364
*F4FFH	"	268,736	438	304
*F5ODA	"	208,936	390	287
*F6DRP	"	200,020	390	292
*F4DLL	"	164,700	358	244
*F4FEP	"	126,792	281	216
*F1RUK	"	118,456	283	221
*F5LCU	"	115,316	261	227
*F5AQB	"	98,784	286	224
*F1ADG	"	91,575	237	185
*F5KKD	"	67,200	209	175
			(OP: F4EYQ)	
*F1RHS	"	49,305	209	173
*F4CUI	"	36,288	143	126
*F5GGL	"	28,160	124	110
*F4BDG	"	21,690	98	90
*F1ICS	"	14,022	92	82
*F5RDS	"	13,622	111	98
*F4CGJ	"	8,908	79	68
*F2RO	"	6,360	54	53
*F5IYJ	"	5,368	64	61
*F1SMV	"	2,774	39	38
*F6CZV	"	2,139	34	31
*F1IWH	"	770	22	22
*F1RIQ	"	2	2	2
*F5TMJ	28	1,863	29	23
*F5SDD	21	10,140	64	60
*F5OTZ	14	108,204	304	254
*F5BEG	3.7	468,096	589	368
Germany				
DL3TD	A	5,084,642	2371	907
DH2WQ	"	2,338,032	1525	727
DL2AA	"	1,321,008	1114	584
DK1KC	"	926,224	908	488
DF9OO	"	495,966	595	393
DL9GWD	"	472,004	597	377
DL1NEO	"	464,128	626	392
DK8EY	"	449,811	563	369
DJ6OZ	"	447,064	515	376
DJ9HX	"	408,800	500	350
DL5MEV	"	392,116	501	334
DL1QQ	"	389,918	622	331
DJ7EC	"	380,702	572	383
DG1EA	"	370,180	519	332
DJ2YE	"	306,504	505	324
DL9DYL	"	174,960	304	243
DL1RYD	"	151,632	334	243
DL8YR	"	148,108	346	244
DL8EAQ	"	144,960	319	240
DL8SCG	"	141,382	278	223
DL4YBP	"	134,780	287	230
DL1PT	"	134,754	296	222
DL5AN	"	126,400	256	200
DL2RTL	"	88,270	256	194
DH1JY	"	84,390	238	194
DM3ML	"	70,684	196	164
DL2MDU	"	66,300	192	150
DJ4QO	"	65,493	203	171
DL1YFF	"	62,125	199	175
DK7AN	"	53,482	177	143
DF7YT	"	49,220	143	115
DL6AG	"	32,700	128	109
DJ6TB	"	27,820	125	107
DL1DTC	"	22,784	99	89
DJ2IA	"	18,090	95	90
DJ8ES	"	17,952	93	88
DL9GTI	"	9,686	60	58
DG2EBW	"	3,268	47	43
DM3VL	"	2,720	33	32
DL7BA	"	2,370	33	30
DL1JGG	21	774	18	18
DL1Z	14	2,249,468	1408	724
DF1IAQ	"	262,070	422	365
DK1QH	"	33,020	144	127
DH0GDS	"	32,428	160	134
DR8M	"	27,492	134	116
			(OP: DL2OT)	
DJ0UD	7	820,988	866	436
			(OP: DK5JM)	
DL3QQ	"	394,416	477	332
DL3KZA	"	261,609	401	291
DL1HUH	"	37,170	130	118
DL1MJF	"	2,262	31	29
DJ1TW	3.7	27,348	114	106
DL1SWB	1.8	204,614	444	263
DF2UU	"	77,437	199	211
*DD5M	A	996,870	936	505
			(OP: DJ8ZY)	
*DR4G	"	692,172	732	442
			(OP: DJ0GM)	
*DB7TF	"	513,420	629	398
*DC7NF	"	485,608	615	404
*DO2ML	"	417,925	595	365
*DF8XC	"	339,606	531	342
*DJ8UV	"	326,772	539	348
*DL2VB	"	275,114	472	301
*DF7EF	"	267,520	419	320
*DK5DQ	"	233,480	374	260
*DK7CH	"	210,188	403	281
*DF1LON	"	196,746	387	271
*DG0CC	"	195,624	407	264
*DK1ROB	"	187,726	317	253
*DK7MCX	"	176,210	356	263
*DL9ABF	"	172,190	349	257
*DL5AYI	"	159,000	348	250
*DL6DCD	"	158,000	331	250
*DG6OAG	"	156,488	319	248
*DM5LK	"	149,568	351	246
*DL7VX	"	146,168	340	242
*DL0IH	"	145,116	351	261
			(OP: DF6QC)	
*DQ5A	"	140,530	286	230
			(OP: DL4SDW)	
*DM2BPG	"	131,660	295	227
*DL6RBH	"	126,854	294	221
*DF2PH	"	125,952	305	246
*DK7TM	"	125,610	327	237
*DG3DAT	"	122,080	311	224
*DM5Z	"	110,376	298	216
			(OP: DM5JBN)	
*DO9PL	"	106,708	287	206
*DO9RE	"	102,400	269	200
*DL7FA	"	100,395	277	207
*DL6NAL	"	98,000	243	196
*DH7LF	"	84,000	278	175
*DO1HGS	"	70,269	188	177
*DJ5KW	"	67,513	227	181
*DL1TS	"	65,600	196	164
*DL4DBM	"	60,756	199	166
*DL4EBA	"	59,148	203	159
*DL2YED	"	58,880	205	160
*DH2PL	"	54,385	173	149
*DL1ARJ	"	54,352	191	158
*DL1TPY	"	54,132	206	156
*DG1LS	"	52,332	170	147
*DG6TOM	"	48,018	191	151
*DQ8T	"	46,158	180	147
			(OP: DL8NCG)	
*DJ9VA	"	45,426	154	134
*DB2MQ	"	41,004	171	134
*DL6DVU	"	40,320	168	144
*DO3ME	"	36,418	151	131
*DJ7TW	"	31,581	150	121
*DJ6TK	"	29,750	126	119
*DL3KDC	"	29,397	138	123
*DL7VRG	"	21,922	128	113
*DL9SEV	"	21,424	113	104
*DO6SR	"	19,872	117	96
*DG8AM	"	19,623	110	93
*DC4PAS	"	18,414	114	99
*DP5X	"	17,480	110	92
*DL4EBW	"	15,379	104	91
*DM2AWM	"	14,628	99	92
*DK3UO	"	14,442	102	83
*DL2IH	"	13,741	98	91
*DF8JK	"	13,188	98	84
*DH5MM	"	12,702	78	73
*DO1GVT	"	12,640	83	80
*DL8AWJ	"	10,823	86	79
*DL9LF	"	10,780	73	70
*DL3SCN	"	9,940	79	71
*DO8TB	"	9,424	81	76
*DK1TS	"	6,834	69	67
*DK1AX	"	6,832	72	61
*DD8EI	"	6,816	51	48
*DH5WB	"	6,696	65	62
*DN0EMH	"	6,664	55	49
			(OP: DO1DJJ)	
*DM3KZN	"	6,325	62	55
*DG6DAF	"	6,148	54	53
*DF2FM	"	5,994	55	54
*DL6JV	"	5,022	66	62
*DG1ROL	"	4,950	52	50
*DL8UGF	"	4,940	56	52
*DO1KUB	"	4,876	55	53
*DK8RE	"	4,608	55	48
*DF6YC	"	4,324	50	47
*DL7CU	"	3,784	48	43
*DJ6UP	"	3,700	51	50
*DL8DXL	"	3,280	42	40
*DK1LRS	"	3,195	48	45
*DO2CT	"	1,885	29	29
*DL4RCK	"	1,380	24	23
*DL9KWW	"	1,316	28	28
*DL9FB	"	667	24	23
*DL7LZ	"	540	19	18
*DG1RZD	"	512	16	16
*DL4NTC	"	496	16	16
*DF7GG	"	230	10	10
*DL1LQL	21	5,616	55	52
*DL8ZAJ	"	4,360	42	40
*DO1AYJ	"	2,706	35	33
*DH2UHF	14	239,292	399	306
*DG1YBO	"	123,998	303	238
*DL3BRA	"	104,412	289	226
*DL9LR	"	37,125	159	135
*DL1GHJ	"	24,846	133	123
*DL4YR	"	20,482	108	98
*DF5BM	"	9,150	86	75
*DC2TOM	"	2,015	31	31
*DL1SBF	"	364	14	14
*DL9ECA	7	69,391	177	161
*DL5RU	"	28,620	114	106
*DB4SP	"	10,584	72	72
*DL1MDU	3.7	62,805	177	159
*DO1MGN	"	23,650	126	110
*DG2BTE	"	3,360	43	42
*DL1HSI	1.8	2,747	42	41
*DL2VSF	"	1,792	32	32
Greece				
SX1L	14	1,415,544	1793	676
			(OP: SV1JCZ)	
SV2GWY	3.7	156,660	184	420
*SV1HEM	A	3,597	37	33
*SV1UT	21	94,966	260	206
*SV2FLQ	1.8	494	14	13
Guernsey				
*MU0GSY	A	360,828	519	351
Hungary				
HA3OV	A	7,968,296	3130	1064
HG8R	"	6,211,205	2866	1001
			(OP: HA8JV)	
HA1TNX	"	557,032	593	392
HA8TI	"	23,000	96	92
*HA6NL	A	1,195,315	1060	515
*HA1BC	"	551,705	593	385
			(OP: DL1MAJ)	
*HA8LMZ	"	79,173	217	171
*HG3FMZ	"	64,295	201	167
*HA2MN	"	21,600	109	90
*HA7MI	"	2,584	35	34
*HA8TP	21	58,176	165	144
*HG3DX	14	847,476	852	513
			(OP: HG3M)	
*HA6IAM	7	105,432	230	184
*HA6IGM	3.7	56,985	178	145
*HA8BE	1.8	229,457	404	269
Iceland				
TF3AM	A	312,676	685	364
TF3SG	"	925	25	25
*TF3DC	A	5,580	67	60
Ireland				
EI6JK	A	1,955,232	1328	657
EI2JD	"	544,070	679	410
EI8JR	"	93,732	266	214
EI9HX	14	1,668,303	1407	679
*EI4CF	A	218,484	354	289
*EI7CC	"	124,372	296	236
*EI4GXB	"	61,537	180	149
*EI4GNB	"	35,868	137	122
Isle of Man				
MD0CCE	A	1,471,927	1084	577
Italy				
I2WIJ	A	2,265,900	1485	700
IZ1LBG	"	2,115,280	1419	685
IK2SND	"	797,685	862	497
IK8UND	"	539,253	752	419
IZ6CLN	"	484,034	630	422
IV3UHL	"	467,060	604	386
IO2A	"	172,672	339	284
			(OP: IK2RZP)	
IW0HLZ	"	115,385	298	235
IW0BCF	"	102,486	254	186
IZ4EFP	"	95,496	233	184
IZ5IJY	"	78,854	247	178
IZ0BVU	"	66,836	176	154
IK2IKW	"	37,180	156	130
I1YGQ	"	32,760	147	120
IZ8GNH	"	8,308	64	62
IK8JDH	"	3,906	43	42
IK2GZU	"	2,656	33	32
IK8NBL	"	1,357	25	23
IC8SCI	"	260	10	10
IU3X	21	796,060	821	530
			(OP: IV3SKB)	
IT9STX	14	2,415,420	1760	810
IR2M	"	2,054,396	1440	764
			(OP: IZ2FDU)	
IR2A	"	268,035	498	321
			(OP: I2UIY)	
IW2MWZ	"	107,865	333	235
IZ4AKS	"	91,530	307	226
IZ1GAR	7	1,164,096	960	516
IT9RBW	3.7	950,137	813	487
IO3X	"	208,458	294	333
IK2DZN	1.8	31,088	132	116
*IZ2FOS	A	2,706,688	1781	776
*IU9A	"	1,262,602	1526	638
*IV3BTY	"	862,815	874	485
*I1EIS	"	766,055	795	439
*IZ3KKE	"	702,093	726	469
*IT9ESW	"	415,140	601	370
*IO1T	"	211,950	360	270
*IZ5ICH	"	170,496	344	256
*IK7NXU	"	165,205	295	235
*IW4EOI	"	158,880	312	240
*IK1LJO	"	143,871	286	217
*IZ0FWD	"	140,958	313	246
*IR9Z	"	140,556	296	212
			(OP: IT9VCE)	
*IZ2JPN	"	112,612	235	188
*IK4QJF	"	112,200	253	200
*IK7SBU	"	109,649	264	199
*IK3UNA	"	99,348	289	204
*IW9FI	"	97,500	257	195
*IZ8JFL	"	87,870	224	174
*IW5ECP	"	84,422	246	191
*IK2YSJ	"	82,320	256	196
*IZ8FTW	"	76,400	244	191
*IT9JDH	"	68,820	216	155
*IZ1KGY	"	65,221	210	173
*IT9LED	"	60,684	196	156
*IK3SSW	"	58,608	186	176
*IZ1GLX	"	56,950	200	170
*IK5FKF	"	51,450	190	150
*IZ0FVL	"	50,718	163	158
*IW4EGX	"	48,356	169	154
*IK2UCK	"	45,298	152	142
*IZ4DIG	"	45,014	158	142
*IW0GYC	"	43,030	162	130
*IZ5IMD	"	41,623	136	107
*IZ2JCD	"	36,176	142	133
*IZ0CEZ	"	34,188	148	132
*IZ7EUB	"	27,391	106	91
*IK2WFN	"	26,664	116	101
*IN3FHE	"	19,278	103	102
*IT9JOB	"	17,094	77	74
*IZ1NBX	"	15,738	97	86
*IW7ECA	"	15,089	96	79
*IZ8MBW	"	12,975	83	75
*IW4EQI	"	12,118	79	73
*IK6GPZ	"	11,189	79	67
*IK5YJK	"	11,097	86	81
*IZ3MSK	"	10,521	69	63
*IN3SJG	"	8,500	74	68
*IZ1GJK	"	8,308	69	62
*IW0HPL	"	7,384	61	52
*IK6ZDE	"	6,710	60	55
*IZ2ABN	"	6,432	55	48
*IK3MLF	"	6,375	54	51
*IW9HQP	"	5,967	53	51
*I6FDJ	"	5,510	61	58
*IZ2KRZ	"	4,960	41	40
*IZ5HQB	"	4,628	59	52
*IZ8FSL	"	4,560	63	57
*IZ3EOU	"	4,410	47	45
*IK4XQT/4	"	4,389	63	57
*IZ1DLY	"	3,840	54	48
*IZ2LSC	"	3,366	38	34
*IZ8BGA	"	3,080	42	40
*IZ3ALW	"	2,052	38	36
*IK2ULV	"	2,014	39	38
*IZ5NFD	"	1,891	34	31
*IZ0FVD	"	1,855	35	35
*IZ6INR	"	1,269	27	27
*IV3SGJ	"	880	26	22
*IW0HBY	28	32,508	153	108
*IZ8CCW	"	5,500	68	55
*IK2YGZ	21	94,668	231	196
*IZ7CDB	"	22,841	107	91
*IT9IMJ	"	5,952	50	48
*IK7FMQ	"	2,201	33	31
*IZ0GXM	"	1,728	24	24
*IW1QN	14	515,394	733	418
*IC8DAK	"	244,216	571	343
*IQ8EB	"	212,223	518	327
			(OP: IZ8GNR)	
*IK3PQG	"	34,500	154	138
*IN3XUG	"	16,224	113	104
*IZ5MMQ	"	5,893	73	71
*IK8IFW	"	2,200	44	44
*IZ5DKJ	7	355,946	412	323
*IT9ZIV	"	115,668	247	204
*IR9P	"	70,308	186	162
			(OP: IW9HMQ)	
*IT9RZU	"	3,360	46	42
Kaliningrad				
UA2CZ	A	71,487	192	169
*RU2FL	A	6,384	58	56
*RN2FA	"	6,344	58	52
*RA2FB	"	6,156	63	54
*UA2FT	7	164,120	293	220
*RK2FXG	1.8	11,520	80	72
			(OP: RA2FIR)	
Latvia				
YL6W	A	3,843,905	2061	845
			(OP: YL2GD)	
YL7A	"	507,763	663	397
YL9T	"	154,940	328	254
YL7X	21	5,850	51	50
			(OP: YL2LY)	
*YL3FT	A	728,640	775	440
*YL2CR	"	232,323	443	273
*YL3AD	"	46,512	151	136
*YL2IP	"	29,070	127	114
*YL2PJ	21	7,260	60	55
*YL3BZ	"	6,195	66	59
*YL5W	14	386,628	586	404
*YL2IS	"	1,584	34	33
*YL2II	"	1,032	25	24
*YL2PP	3.7	22,032	49	204
Liechtenstein				
*HB0/LX9EG	7	5,200	52	50
Lithuania				
LY4CW	A	827,170	862	457
LY4DX	"	484,440	648	367
LY2TS	"	288,508	451	316
LY2AE	"	249,050	445	293
LY3CY	"	140,399	300	217
LY8O	14	3,454,052	1994	878
			(OP: LY1PM)	
LY2IJ	1.8	669,108	753	411
*LY2OM	A	167,050	346	257
*LY3X	"	166,830	338	249
*LY3ID	"	9,860	75	68
*LY2BBF	21	264	12	12
*LY1GP	"	84	6	6
*LY2MM	7	229,457	361	269
*LY4Q	3.7	149,850	297	222
*LY2CO	"	18,423	99	89
*LY3BA	"	6,944	61	56
*LY2OU	1.8	180,648	368	234
Luxembourg				
*LX1ER	A	98,875	226	175
Macedonia				
Z35T	14	1,408,972	1380	652
*Z35G	A	29,998	132	106
*Z36W	"	24,698	115	106
Moldova				
ER3DW	A	4,968	60	54
*ER2RM	A	620,928	728	384
*ER4LX	"	494,200	593	350
*ER3CT	"	99,267	243	203
*ER1RR	3.7	100,998	240	181
*ER3HW	1.8	36,816	146	118
Montenegro				
4O8A	3.7	18,109	97	91
*4O3TT	A	118,656	254	192
*4O7AMD	7	18,732	97	84
*4O3Z	"	17,479	88	77
Netherlands				
PA0JNH	A	204,484	345	268
PA0LOU	"	142,545	287	221
PA3AAV	"	99,216	259	208
PA1TX	"	66,006	196	171
PA0LSK	"	17,640	110	98
PA2ALF	"	2,508	39	38
PA0M	21	9,006	61	57
PA0IJM	3.7	366,240	508	336
*PA1CM	A	421,400	576	350
*PA0AGA	"	325,381	549	329
*PH2A	"	123,816	296	231
*PA8KW	"	120,481	284	211
*PD7BZ	"	102,820	259	212
*PE1LTY	"	92,442	252	213
*PA7RA	"	91,000	243	200
*PA0GJV	"	72,496	220	184
*PF9A	"	60,225	198	165
*PA3DBS	"	57,768	206	174
*PH0AS	"	56,472	175	156
*PG6W	"	54,479	195	157
			(OP: PE1MPA)	
*PA3ARM	"	52,895	189	149
*PA3FMC	"	51,867	191	153
*PA5VK	"	50,550	172	150
*PA1WLB	"	47,414	197	157
*PE2JMR	"	41,648	186	137

*PG1R	*	35,937	148	121
*PI4YSM	*	32,696	144	122
*PAØEMO	*	26,418	133	119
*PAØCGB	*	20,580	119	105
*PA3EWG	*	19,488	124	112
*PD2LLS	*	16,284	96	92
*PA7PYR	*	15,531	102	93
*PG2D	*	15,210	101	90
*PA1PAT	*	12,441	102	87
*PAØFEI	*	5,880	55	49
*PAØB	*	3,840	49	48
*PA3HGF	*	3,311	47	43
*PA8TWN	*	2,592	37	36
***PD1DX**	**14**	**1,539,163**	**1198**	**629**
*PI4AML	*	59,340	211	172
			(OP: PG2AA)	
*PI4WLD	*	18,972	92	93
			(OP: PAØMIR)	
*PA2C	*	6,612	61	57
*PA2CHM	*	6,417	75	69
***PAØMIR**	**3.7**	**99,180**	**169**	**261**
Northern Ireland				
***GI4AAM**	**A**	**106,572**	**293**	**214**
Norway				
LA9LMA	**A**	**381,628**	**604**	**358**
LA1PHA	*	120,927	304	233
LA9TJA	*	67,500	228	180
LA1BFA	*	5,952	64	64
LA2OKA	*	1,144	22	22
LN9Z	**7**	**2,089,542**	**1535**	**602**
			(OP: LA5KO)	
***LA7GNA**	**A**	**41,055**	**181**	**161**
*LA7TN	*	39,618	171	142
*LA2GN	*	20,090	121	98
*LA6CF	*	11,220	70	66
*LA6BNA	*	2,331	42	37
***LA9Z**	**14**	**24,940**	**125**	**116**
			(OP: LA9HW)	
*LA2LI	*	1,584	34	33
Poland				
SPØDXC	**A**	**875,488**	**777**	**436**
			(OP: SP4Z)	
SO6I	*	359,120	514	335
			(OP: SP6JIU)	
SP3GTS	*	318,240	491	306
SP1MVG	*	184,758	318	249
SQ7B	*	135,125	326	235
SP4ICP	*	131,488	324	224
SP2FTL	*	82,810	237	182
SP9JZT	*	59,305	173	145
SP1O	*	47,824	148	122
SQ5MX	*	21,582	119	99
SPØPGA	*	2,496	33	32
			(OP: SP2LNW)	
SP8DHJ	*	1,650	26	25
SP2FAP	*	144	8	8
SQ6R	**21**	**16,440**	**54**	**120**
SP2AVE	*	2,730	36	35
SP4JTJ	**14**	**69,561**	**189**	**177**
SP4TKR	**7**	**1,822,266**	**1206**	**603**
SP3LPG	*	349,752	393	312
SN7Q	**3.7**	**2,969,645**	**1696**	**713**
SP7HKK	*	1,126,428	996	516
SN3A	*	937,480	722	460
SP1GZF	**1.8**	**177,480**	**348**	**255**
***SP9NWN**	**A**	**353,628**	**502**	**342**
*SP2AYC	*	293,480	495	290
*SP8EDD	*	279,668	480	278
*SP2GJI	*	171,990	343	245
*SP6MLX	*	130,086	310	219
*SP4AAZ	*	122,960	293	212
*SQ8LSC	*	116,790	264	229
*SQ6NES	*	92,544	261	192
*SP9RTL	*	77,464	228	184
*SP6OPZ	*	66,185	198	155
*SP8LNE	*	65,852	198	163
*SP8LXE	*	60,800	203	160
*SPØDKI	*	59,752	199	154
*SQ9DXT	*	57,213	200	163
*SN1A	*	48,928	165	139
			(OP: SP1EG)	
*SP2GMA	*	48,222	189	141
*SP6NVK	*	35,644	168	133
*SN7F	*	35,532	155	126
			(OP: SP7LFT)	
*SQ9ANS	*	33,396	141	121
*SP9CLU	*	23,634	111	101
*SP5UAR	*	17,640	103	90
*SP6EWB	*	17,190	104	90
*SP5NHK	*	14,268	95	82
*SP6AXW	*	14,027	93	83
*SP7TEX	*	14,007	94	87
*SP9CLO	*	11,736	78	72
*SP9BMH	*	9,324	66	63
*SP3NYR	*	6,380	64	58
*SQ7MRP	*	5,247	57	53
*SP2IKP	*	5,243	53	49
*SQ2RH	*	4,400	50	50
*SP9IHP	*	4,032	43	36
*SP6PLH	*	3,984	51	48
*SN9K	*	3,740	46	44
*SP5GDY	*	2,912	28	26
*SQ8T	*	2,262	31	29
*SP6OWA	*	704	22	22
*SP7FBQ	*	592	16	16
*SP7IIT	*	60	4	4
***SQ9CNN**	**28**	**198**	**12**	**11**
*SP6EF	*	180	10	10
*SP3LWP	*	150	11	10
***SP9DSD**	**21**	**71,645**	**186**	**161**
*SP2EXN	*	48,608	98	224
*SP9W	*	5,969	48	47
*SN9U	*	4,464	31	48
			(OP: SP9UMU)	
*SP9EWM	*	4,071	23	69
***SP4LVK**	**14**	**90,944**	**263**	**203**
*SP9DNO	*	74,210	211	181
*SP5DRE	*	25,200	131	112
*SP6GTN	*	22,365	125	105
*SN3C	*	14,105	99	91
			(OP: SP3ASN)	
*SP9IKN	*	4,048	49	46
*SP4AVG	*	1,488	32	31
*SQ3WW	*	1,485	33	33
*SP6BEN	*	240	10	10
***SN3X**	**7**	**690,135**	**684**	**417**
*SQ8JX	*	67,196	182	157
*SN9I	*	49,780	147	131
*SP9EML	*	23,343	99	93
*SP8OOB	*	15,744	92	82
*SP8LZC	*	15,075	81	75
*SP5EWX	*	13,432	75	73
***3Z1ØUM**	**3.7**	**541,320**	**668**	**390**
			(OP: SQ9UM)	
*SP9DTE	*	287,310	455	314
*SN9P	*	286,738	416	307
			(OP: SQ9GAI)	
*SP4SHD	*	225,924	368	281
*SO9CWO	*	158,080	306	247
*SO5NAE	*	106,656	248	202
*SP8KEA	*	94,956	238	193
*SO9L	*	66,912	190	164
			(OP: SP9UML)	
*SQ9HQ	*	58,110	189	149
*SQ3JPV	*	44,685	169	135
*SP3SXX	*	15,810	89	85
*SO9JXJ	*	12,450	80	75
*SN2U	*	6,426	64	54
			(OP: SQ2GXO)	
*SP3FYX	*	3,995	47	47
*SQ9JKS	*	3,320	41	40
*SQ9LOJ	*	612	19	18
***SQ9HZM**	**1.8**	**95,445**	**255**	**189**
Portugal				
CS2T	**A**	**8,916,812**	**3404**	**1076**
			(OP: CT1ILT)	
CT1DIZ	*	3,875,040	2480	897
CT1BOL	*	231,948	449	306
CT1EAT	*	124,434	275	223
***CT1FMS**	**A**	**645,275**	**872**	**487**
*CT1AVR	*	54,416	179	152
*CT4DK	*	15	3	3
***CT2FUO**	**28**	**3**	**1**	**1**
***CT1EGW**	**14**	**102,752**	**248**	**247**
*CT1FNV	*	221	18	17
Romania				
YO6A	**A**	**823,168**	**967**	**472**
			(OP: YO6BHN)	
YO3RU	*	337,280	528	320
YO4KCC	*	56,580	193	138
YO6QT	*	50,784	180	138
YO9HG	*	17,407	112	103
YO5BBO	**21**	**68,388**	**191**	**154**
YO2R	*	62,472	190	152
			(OP: YO2RR)	
YO5CBX	**14**	**180,625**	**386**	**289**
YO2BPZ	*	247	14	13
YO7LGI	**7**	**89,250**	**208**	**175**
YR8D	**1.8**	**35,040**	**136**	**120**
			(OP: YO8DAR)	
***YO3CZW**	**A**	**1,122,680**	**1142**	**508**
*YO3APJ	*	819,553	793	497
*YO7LFV	*	710,129	791	443
*YO5DDD	*	293,844	485	282
*YO5FMT	*	250,260	447	291
*YO8MI	*	249,977	454	287
*YO3CVG	*	223,780	380	268
*YO5OHY	*	214,760	379	260
*YO5AIR	*	207,276	408	276
*YO6HSU	*	145,619	327	223
*YO8KVS	*	143,750	296	230
			(OP: YO8CT)	
*YO2MAX	*	141,086	337	242
*YO2LXW	*	70,520	210	164
*YO7NW	*	64,476	204	162
*YO5QCD	*	61,466	194	146
*YO4US	*	42,037	150	127
*YO5CCX	*	41,265	164	131
*YO5CUQ	*	38,688	160	124
*YO8GF	*	32,760	143	117
*YO2MHD	*	13,124	79	68
*YO6DBL	*	11,718	66	62
*YO9IKW	*	7,920	54	48
*YO7LTQ	*	7,236	72	67
*YO7LYM	*	6,468	70	66
*YO4BTB	*	5,088	55	48
***YO2LEE**	**28**	**192**	**10**	**8**
***YO6CFB**	**21**	**59,136**	**179**	**154**
*YO9BXC	*	35,530	131	110
*YO3DLK	*	9,750	72	65
*YO2CJX	*	7,192	60	58
*YO5BTZ	*	4,410	45	42
*YO5AYT	*	3,780	46	42
*YO9AGI	*	850	36	34
***YR8B**	**14**	**592,740**	**818**	**445**
			(OP: YO8SSX)	
*YO7BGB	*	30,191	148	133
*YO6KSU	*	27,448	168	146
*YO9GVN	*	16,740	110	108
*YO8COK	*	13,083	100	89
*YO8AXP	*	4,664	56	53
***YO7LBX**	**7**	**65,712**	**182**	**148**
***YO5PEZ**	**3.7**	**24,846**	**111**	**101**
***YO5PBF**	**1.8**	**93,930**	**248**	**186**
*YO6BZL	*	8,494	63	62
Sardinia				
IMØ/IKØFMB	**A**	**1,802,240**	**1510**	**704**
***ISØLLJ**	**A**	**2,912**	**32**	**32**
***ISØDFC**	**14**	**9,996**	**90**	**84**
Scotland				
GM7V	**A**	**3,416,106**	**2111**	**862**
			(OP: GM3WOJ)	
MMØXDG	*	248,248	429	308
GMØTQJ	*	79,647	230	191
MM3T	**7**	**35,910**	**133**	**114**
			(OP: GMØELP)	
***GM7TUD**	**A**	**298,350**	**424**	**325**
*GMØNBM	*	61,054	214	178
*MMØYEC	*	900	20	20
***MMØCWJ**	**3.7**	**53,340**	**142**	**140**
Serbia				
YT9A	**A**	**4,599,288**	**2493**	**856**
YT1T	*	901,336	870	488
YT2AA	*	36,410	135	110
YT7Z	**21**	**526,095**	**677**	**433**
			(OP: YT7EI)	
YU2A	*	16,940	98	77
YT1BB	**14**	**2,824,326**	**1933**	**801**
YU1EL	*	300,240	601	360
YT8A	**7**	**5,197,840**	**2057**	**860**
YU3AA	*	1,561,824	1057	561
YT6T	**1.8**	**359,822**	**528**	**323**
			(OP: YU7CM)	
***YT1HA**	**A**	**1,873,470**	**1480**	**634**
*YT1BX	*	237,104	421	292
*YT3AA	*	75,240	217	180
*YU7ONE	*	24,544	119	104
*YU1IV	*	1,650	25	25
***YT1YV**	**21**	**62,918**	**189**	**163**
***YU5RA**	**14**	**1,183,507**	**1159**	**611**
*YT3MA	*	658,815	930	501
*YT5C	*	601,224	796	492
			(OP: YU7WW)	
*YT2AAA	*	126,492	329	254
*YU7KM	*	29,232	146	126
***YU3A**	**3.7**	**641,346**	**698**	**417**
			(OP: YT2RX)	
*YU5B	*	528,200	633	380
*YUØU	*	431,395	545	361
*YU7YZ	*	140,800	264	220
*YT8WW	*	101,706	258	188
Slovakia				
OM3BH	**A**	**6,628,592**	**2796**	**987**
OM6AL	*	191,574	378	261
OM3DX	**21**	**17,415**	**89**	**81**
OM7ANB	**14**	**569,296**	**700**	**442**
OM7RX	**7**	**57,300**	**186**	**150**
OM7RU	**1.8**	**165,436**	**329**	**236**
***OM4DN**	**A**	**412,778**	**601**	**346**
*OM5UM	*	69,650	220	175
*OM4DA	*	39,072	164	132
*OM7AG	*	19,000	104	95
*OM4ADR	*	4,444	50	44
***OM4TC**	**14**	**16,814**	**119**	**102**
*OM3TB	*	12,467	101	91
***OM4PD**	**7**	**4,136**	**45**	**44**
***OM7AB**	**3.7**	**409,968**	**564**	**351**
*OM7AAS	*	127,161	286	213
Slovenia				
S58A	**A**	**6,722,650**	**2508**	**935**
S566D	*	4,845,816	2377	888
			(OP: S57DX)	
S56M	*	2,388,100	1594	715
S58L	*	239,166	416	309
S51DX	*	107,334	291	201
S57S	**28**	**48,444**	**211**	**132**
S58K	**14**	**4,442,844**	**2288**	**908**
S57AL	*	3,120,816	1846	823
S56X	**7**	**1,813,089**	**1105**	**597**
S52AW	**3.7**	**2,107,380**	**1339**	**628**
			(OP: S52RU)	
***S53EA**	**A**	**2,296,193**	**1513**	**691**
*S59KW	*	1,316,641	1107	567
*S51F	*	1,305,678	1053	542
*S59MA	*	182,286	364	246
*S56B	*	75,294	222	178
*S58MU	*	38,400	149	128
*S56DX	*	330	12	11
*S59T	*	270	15	10
*S53DIJ	*	250	14	10
*S59EIJ	*	225	14	9
***S57RTH**	**14**	**723,008**	**906**	**416**
*S58P	*	1,664	27	26
***S5ØB**	**7**	**293,715**	**400**	**305**
***S57Ø**	**3.7**	**407,640**	**553**	**344**
***S52OT**	**1.8**	**180,389**	**349**	**253**
Spain				
EA1JO	**A**	**364,320**	**504**	**368**
AN1A	*	333,792	534	342
			(OP: EA1AST)	
EA1DVY	**7**	**22,550**	**85**	**82**
***EA1AJV**	**A**	**416,912**	**582**	**367**
*EC1AIJ	*	205,065	343	279
*EB1EVX	*	73,138	228	194
*EA1BTK	*	53,505	158	123
*EC1AE	*	39,680	151	124
*EA1AY	*	29,568	150	128
*EC1AQT	*	3,256	45	44
*EA1GPL	*	1,000	22	20
*EB1BD	*	888	25	24
***AO1B**	**14**	**317,824**	**598**	**382**
*EA1ASG	*	115,808	251	224
***EA1JJ**	**7**	**310,534**	**440**	**287**
EA2CNU	**21**	**10,230**	**72**	**66**
***AN2R**	**A**	**396,304**	**526**	**376**
			(OP: EA2TO)	
*EA2COD	*	274,205	462	317
*EB2CYQ	*	238,854	368	282
*EC2AWD	*	159,576	331	244
*EA2AOO	*	94,615	191	149
*EA2CE	*	57,442	198	154
*EA2AP	*	5,324	45	44
*EA2AVM	*	816	17	17
*EA2CHL	*	775	26	25
*EA2MA	*	682	23	22
*EA2AOS	*	540	18	18
***EA2VE**	**14**	**110,440**	**384**	**251**
EE3E	**A**	**2,679,927**	**1700**	**753**
			(OP: EA3ELZ)	
EE3R	*	749,360	739	464
EA3CEC	*	5,576	44	41
EA3ATM	**7**	**1,030,806**	**882**	**486**
***EA3FF**	**A**	**252,747**	**413**	**297**
*EA3NA	*	98,810	250	205
*AO3K	*	60,896	232	173
			(OP: EA3GHZ)	
*EB3FLY	*	43,820	161	140
*EA3BIP	*	11,523	77	69
*EC3ADB	*	9,638	68	61
*EA3GOD	*	8,580	63	60
***AM3CS**	**14**	**73,485**	**246**	**213**
			(OP: EA3CS)	
*AM3A	*	11,648	100	91
			(OP: EA3FHP)	
***EA3ALV**	**7**	**51,198**	**139**	**138**
*EA3DUM	*	36,900	106	100
***EA3AKA**	**1.8**	**12,483**	**81**	**73**
EA4EER	**A**	**791,375**	**787**	**487**
EA4TG	*	202,266	496	306
EA4AFA	*	19,620	127	109
EA4ETW	*	1,056	24	24
***EA4TV**	**A**	**518,154**	**765**	**438**
*AM4L	*	131,150	286	215
*EA4EQF	*	273	15	13
***EA4YK**	**14**	**91,840**	**250**	**224**
EF5K	**A**	**1,853,674**	**1670**	**694**
EH5J	*	207,564	429	294
			(OP: EA5DM)	
EA5OL	*	125,760	320	262
EC5AAB	*	95,120	281	232
EA5DFV	**21**	**514,206**	**731**	**441**
EA5KV	**14**	**2,273,810**	**1992**	**770**
EC5ANF	*	7,957	79	73
***EA5TT**	**A**	**110,644**	**268**	**199**
*EB5GGC	*	85,540	226	182
*EB5WC	*	74,860	224	190
*EA5BAH	*	42,340	159	145
*EB5CNK	*	39,688	144	121
*EA5GVZ	*	31,280	140	115
*EA5FWW	*	24,480	107	96
*EA5HDU	*	18,150	121	110
*EA5TN	*	17,199	101	91
*EA5AVW	*	14,994	108	102
*EA5JC	*	11,448	83	72
*EA5GZO	*	1,980	37	36
*EA5PS	*	682	22	22
*EA5CZM	*	156	12	12
***EA5EOR**	**21**	**83,172**	**207**	**174**
***EA5ET**	**14**	**50,530**	**189**	**163**
***EC5CSW**	**7**	**409,370**	**444**	**335**
***EA5GTQ**	**3.7**	**97,560**	**208**	**180**
*EC5WW	*	88,872	209	184
EA7HW	**A**	**8,789**	**50**	**47**
AM7M	**7**	**760,914**	**555**	**366**
			(OP: EC7ANC)	
***EE7E**	**A**	**337,500**	**617**	**375**
			(OP: EC7ABV)	
*EA7AA	*	305,100	436	300
*EC7DNX	*	168,392	325	248
*EA7CWA	*	19,837	93	83
*EA7HE	*	13,072	95	76
*EC7DDZ	*	9,715	68	67
*EA7EYQ	*	5,664	49	48
*EC7DTQ	*	625	26	25
***EC7AKV**	**28**	**17,821**	**102**	**71**
***EC7DZL**	**21**	**8,151**	**60**	**57**
***EB7DX**	**14**	**2,178,000**	**1988**	**792**
*AO7T	*	343,990	731	410
*EA7HEG	*	50,592	228	204
Sweden				
7SØX	**A**	**565,554**	**640**	**418**
			(OP: SMØMDG)	
SM6BGG	*	312,399	446	309
SI3A	*	122,622	311	214
			(OP: SM3LIV)	
SM6FJY	*	110,898	276	202
SD3A	*	74,272	244	176
			(OP: SM3FJF)	
SM7BZV	*	64,428	193	156
SB6A	*	48,048	182	143
SM7BJW	*	33,275	144	121
SA2D	*	20,538	139	126
SM2MZC	*	7,854	72	66
SM6XVI	*	6,900	60	60
SM5Y	*	165	11	11
			(OP: SM5AAY)	
SM7ATL	**21**	**4,212**	**43**	**39**
SM5U	**14**	**117,265**	**293**	**235**
SM6V	*	53,019	176	129
SM6AHU	*	16,284	101	92
SM6IQD	**3.7**	**36,300**	**138**	**121**
***SE5S**	**A**	**105,565**	**262**	**215**
*SAØAQT	*	90,624	241	192
*SE6C	*	30,125	146	125
			(OP: SM6CDN)	
*SM5LSM	*	30,012	145	122
*SM7RPU	*	15,138	98	87
*SMØFM	*	15,089	87	79
*SM7YGZ	*	14,800	92	80
*SM5OSZ	*	9,864	80	72
*SMØBDS	*	3,901	47	47
*SM7GUY	*	2,665	42	41
***SG3O**	**21**	**300**	**10**	**10**
			(OP: SM3AGO)	
***SM6CRM**	**14**	**59,400**	**198**	**180**
*SF3E	*	37,410	156	145
			(OP: SM3EAE)	
*SM5DQE	*	36,348	162	156
*SM7HSP	*	3,927	53	51
*SM6TOL	*	825	25	25
*SH3O	*	200	10	10
			(OP: SM3TLG)	
*7S7V	*	63	7	7
***SE2T**	**7**	**24,057**	**111**	**99**
Switzerland				
HB9TMW	**A**	**164,410**	**292**	**205**
HB9MH	**14**	**183,376**	**414**	**292**
***HB9ODP**	**A**	**224,128**	**383**	**272**
*HB9ODK	*	150,768	308	216
*HB9TSA	*	91,326	229	186
*HB9OK	*	45,903	158	143
*HB9SVT	*	38,352	174	141
*HB9OA	*	3,984	51	48
*HB9JAQ	*	2,010	37	30
*HB9BGF	*	918	21	18
Ukraine				
UW2M	**A**	**5,816,635**	**2791**	**935**
			(OP: URØMC)	
US5D	*	2,896,317	1774	783
			(OP: UT7DX)	
UW1M	*	1,874,790	1381	666
			(OP: UR5MW)	
UZ1G	*	1,611,210	1421	645
			(OP: UY5HF)	
UW5U	*	1,027,256	1106	584
UR5AS	*	966,690	973	467
UX2X	*	955,450	957	485
			(OP: UT2XQ)	
UT6EE	*	495,670	596	365
UT6IS	*	425,241	608	333
UR8QR	*	248,589	402	279
UT5SA	*	223,686	395	258
UR4XM	*	216,315	407	285
			(OP: US6IPD)	
UT7NW	*	121,197	258	213
UT4EK	*	92,640	237	160
US5UO	*	72,581	206	181
USØQG	*	48,840	154	132
UY3QW	*	43,884	165	138
UT4XU	*	20,111	101	91
UU5WW	**28**	**2,760**	**44**	**40**
UZ4E	**21**	**234,855**	**431**	**307**
			(OP: UV5EOZ)	
UR5FAV	*	65,037	203	163
UW1I	*	34,524	149	126
			(OP: US6IMA)	
UZ8M	**14**	**3,064,094**	**2348**	**902**
			(OP: USØMR)	
UT5ID	*	474,804	792	436
US7IID	*	52,965	210	165
UT7U	**7**	**444,882**	**442**	**318**
			(OP: UT7UV)	
UT5ECZ	*	99,790	208	170
UTØEA	*	65,394	147	173
UR5KAT	*	60,000	195	160
UX4LA	*	37,518	131	111
UX3MZ	*	10,659	60	51
UT7QL	**3.7**	**262,984**	**384**	**284**
UT2II	*	170,375	332	235
UV5QQ	*	91,863	217	173
***UR4U**	**A**	**912,740**	**891**	**470**
			(OP: UR4UDI)	
***UW8SM**	*****	**901,810**	**932**	**455**
*UR6QS	*	496,856	656	359
*URØIQ	*	205,320	344	290
*URØQX	*	156,545	335	239
*UY5TE	*	134,624	311	224
*US5ISV	*	123,417	299	189
*US7LM	*	99,715	253	185
*UR7EQ	*	90,882	244	198
*UR5WDQ	*	60,225	195	165
*UR5XMM	*	43,136	163	128
*UV5EEO	*	31,644	135	108
*UYØIX	*	21,758	102	86
*UU4JC	*	19,040	90	80
			(OP: UU2JUA)	
*UU2JA	*	17,856	105	93
*UT5ZB	*	15,540	100	84
*UR5EPG	*	14,847	106	101
*UT7HM	*	14,696	99	88
*UT8EL	*	7,749	71	63
*US6IVC	*	5,047	55	49
*UU5TN	*	966	24	23
*UT4UB	*	209	11	11
***UT1IA**	**28**	**644**	**26**	**23**
*UZ7HO	*	220	12	11
***UR6IJ**	**21**	**56,628**	**185**	**156**
*UY7C	*	28,896	138	129
*UY8LM	*	20,304	108	94
*UX7UN	*	5,100	54	51
*UY5QZ	*	190	8	10
***UZ5UA**	**14**	**224,753**	**412**	**317**
*UR5AW	*	15,288	96	84
*UR5IKN	*	2,280	38	38
*UR3PGX	*	2,135	36	35
*UR5WHT	*	936	25	24
***USØHZ**	**7**	**267,534**	**378**	**267**
*UT8AS	*	172,575	305	225
***UU2JM**	**3.7**	**374,958**	**501**	**333**
*UT3L	*	210,266	297	322
			(OP: UR5LO)	
*UY4F	*	186,960	331	246
			(OP: UR5FEL)	
*UY3AW	*	64,050	185	150
***US8ICM**	**1.8**	**59,356**	**182**	**142**
Wales				
GW4BLE	**A**	**12,096**	**75**	**72**
***GW8NBI**	**A**	**111,725**	**292**	**205**
***MWØCRI**	**14**	**205,746**	**474**	**318**
*MWØFDG	*	30,736	149	136

OCEANIA

Australia				
VK1MJ	**A**	**19,803**	**77**	**69**
VK2APG	**A**	**1,890,910**	**1482**	**454**
VK2XN	*	1,013,274	963	369
VK2CA	*	461,829	631	257
VK2BCQ	*	99,814	255	143
VK2FHN	*	53,212	187	106
VK2GR	*	2,324	34	28
VK3FM	**A**	**93,155**	**201**	**155**
VK3YXC	*	17,877	100	59
***VK3TDX**	**A**	**4,040**	**47**	**40**
***VK4FRAJ**	**A**	**114,708**	**309**	**158**
*VK4FJ	*	80,640	234	128
*VK4AMC	*	41,921	153	103
*VK4VDX	*	10,602	73	62
*VK4XES	*	1,809	27	27
***VK4HAM**	**14**	**304,965**	**474**	**251**
***VK4BAA**	**7**	**196,093**	**257**	**157**
***VK6FOX**	**A**	**8,580**	**69**	**52**
VK7GN	**A**	**1,220,865**	**948**	**409**
VK7WPX	*	198,162	359	218
VK8AA	**28**	**66,462**	**215**	**114**
Brunei				
***V8AQM**	**14**	**71,214**	**186**	**143**
East Malaysia				
9M8Z	**A**	**8,234,406**	**3107**	**837**
			(OP: 9M6DXX)	
9M6XRO	*	52,785	164	115
Guam				
KG6DX	**28**	**247,217**	**514**	**173**
***KB7DBU/KH2**	**A**	**199,880**	**453**	**152**
*WH2D	*	70,452	244	103
			(OP: K3UOC)	
*AH2DT	*	8,364	61	51
Hawaii				
KH6FI	**A**	**2,788,808**	**1829**	**473**
KH6GMP	*	427,453	608	251
AH6JR	**7**	**989,682**	**645**	**281**
KH6FKG	*	446,706	388	207
***NH6WZ**	**A**	**8,554**	**62**	**47**
*KH7/KO7X	*	7,440	48	40
***KH6TS**	**7**	**605**	**11**	**11**
Indonesia				
YB1AR	**A**	**685,038**	**585**	**381**
YBØNFL	*	354,197	453	271
YBØBCU	*	14,784	103	64
YB1TC	*	12,408	93	66
YC1RW	**21**	**114**	**7**	**5**
YB1RS	*	72	6	6
YB4IR	**14**	**951,584**	**734**	**454**

*YB1TJ	A	511,920	549	316
*YBØMJY	*	499,285	587	305
*YB2ECG	*	368,350	492	265
*YC1UGK	*	28,574	120	91
*YB9BZ	*	20,664	102	84
*YBØCOU	*	390	15	13
*YB1UUN	28	8,304	64	48
*YE1AA	21	2,673,376	1536	608
*YB3KM	*	1,002,375	951	375
*YC5OUB	*	597,012	594	356
*YC1LA	*	341,900	474	260
*YC1FT	*	265,200	382	260
*YC6LAY	*	167,272	310	203
*YB2UTX	*	162,200	323	200
*YB1VA	*	111,584	235	176
*YC1URC	*	22,295	101	91
*YC1BNY	*	12,852	78	68
*YBØEIN	14	2,002	27	26
*YB7KNV	7	19,320	73	56
*YB2VTO	*	6,156	39	38

Mariana Islands

NHØDX	A	2,411,046	2087	369
*WHØS	A	176,328	416	158

New Zealand

ZM2A	28	3,000	39	30
ZL3A	7	8,200,800	1767	816
			(OP: ZM3A)	
ZM1K	3.7	7,760	41	40
			(OP: ZL1AIH)	
*ZL2MM	A	20,304	103	72
*ZL3DW	*	8,326	50	46
*ZL4JB	7	3,564	29	27

Norfolk Island

*VK9ANU	A	527,472	726	222

Philippines

4D75T	A	1,822,821	1292	429
			(OP: DU1IVT)	
DU1AV	21	131,454	380	134
*DV1JM	A	1,149,611	1048	347
*4D75B	*	669,340	949	245
			(OP: DU1BP)	
*DU1EG	*	273,916	511	188
*DV1JD	*	33,840	144	90
*DW1UBY	21	61,696	197	128

Tonga

*A35RK	A	251,680	493	208

Vanuatu

YJ8TZ	A	2,776,869	1921	513
			(OP: VK3TZ)	

SOUTH AMERICA

Argentina

AY8A	A	3,120,834	1619	578
			(OP: LU8ADX)	
LT5Y	*	180,170	326	215
			(OP: LU1YU)	
LTØD	*	103,281	239	173
LU6QI	*	1,936	24	22
LU1HF	28	1,665,198	1172	513
LU1FDU	3.7	100,320	164	132
*LU1HLH	A	2,537,808	1404	624
*LU7HW	*	1,389,687	986	507
*AYØDX	*	225,511	363	247
*LU3MAM	*	188,340	312	215
*LU5EVK	*	99,828	241	177
*LR1A	*	74,245	200	155
*LU4KC	*	57,915	225	135
			(OP: LU6KA)	
*LU2EQF	*	35,960	149	116
*LU7DUE	*	416	13	13
*LU6FEH	*	220	11	11
*LU6FOV	28	255,840	405	240
*LW1HR	*	71,136	194	144
*LO7D	*	10,899	72	63
			(OP: LW1DRH)	
*LU2BPM	*	980	21	20
*LQ5H	21	2,277,347	1317	617
*LU7KAT	*	2,116,752	1195	627
*LW6DW	*	28,184	115	104
*LU1ELY	*	735	21	21
*LR1H	14	97,614	230	174
*LU5CAB	*	16,200	92	81

Aruba

P49Y	A	13,539,890	4068	910
			(OP: AE6Y)	
*P4BA	A	15,484,383	4119	1051
			(OP: KK9A)	

Brazil

PS2T	A	11,390,195	3443	1069
			(OP: PY2NY)	
PY2YU	*	10,978,420	3363	1060
PP5JY	*	392,730	459	318
PT7VB	*	376,419	372	271
PY5ZD	*	288,360	385	270
PV2M	*	200,811	359	247
			(OP: PT2ADM)	
PY7MV	*	85,920	194	160
PY2KP	*	65,424	184	141
PP5MS	*	608	19	16
PP5EG	28	1,383,694	1027	494
PP5WG	*	197,568	341	224
PU2SHF	*	1	1	1
ZX5J	21	14,740,056	4078	1242
			(OP: PP5JR)	
PY1KN	*	3,642,254	1696	737
PX2T	*	2,370,700	1304	628
			(OP: PY2DN)	
PT5A	14	6,424,096	2373	952
			(OP: W6NV)	
PP1CZ	*	85,888	193	176
PV8DX	3.7	593,920	406	256
ZV5K	*	36,168	98	88
PU5OGE	1.8	144	11	9
*PY3DX	A	1,559,648	968	544
*PY2HL	*	1,332,432	969	487
*ZX7U	*	1,039,680	822	456
			(OP: PT7ZT)	
*PS5S	*	864,024	665	444
*PY7VI	*	458,850	490	322
*PY2DU	*	269,352	390	258
*PY2MR	*	109,604	241	188
*PX2E	*	102,834	219	174
			(OP: PY2EJ)	
*PY2GD	*	58,212	175	132
*PY2NA	*	32,536	119	98
*PY1SX	*	27,455	107	95
*PV8DR	*	6,426	59	54
*PY2SRL	*	3,864	50	46
*PP8EB	*	8	2	2
*PY2CX	28	305,487	425	273
*PY2SRB	*	109,650	259	170
*PU2MTS	*	48,250	170	125
*PY2ZY	*	20,169	105	81
*PY3FOX	*	17,043	90	69
*PU2TES	*	6,136	57	52
*PT9PA	*	4,182	47	41
*PU2VIR	*	3,822	54	42
*PY1PDF	*	2,840	43	40
*PU2VYT	*	117	9	9
*PY7DI	21	56,260	156	145
*PP5JAK	*	46,332	150	132
*PP5JIN	*	35,400	128	118
*PY3BIL	*	4,182	42	41
*ZV5E	14	149,644	305	179
			(OP: PP5KE)	
*PP2RON	*	40,825	150	115
*PY5KW	*	16,236	89	82
*PY5JO	*	7,436	55	52
*PP5KR	7	348,936	316	217
*PY6KY	*	52,528	106	98
*PT8CWA	*	1,296	18	18

Chile

CE4CT	A	3,690,225	1735	693
CE1TT	*	1,202,448	934	492
XQ1KY	*	1,130,823	1032	389
CE3BFZ	*	443,520	561	240
*3G1C	A	1,252,904	1009	398
*CE2WWF	*	106,470	236	182
*XQ4EM	*	30,952	121	106
*XQ4CW	*	8,932	71	58
*CE4UJU	*	240	15	12
*XR3A	21	295,900	398	269
			(OP: CE3DNP)	

Colombia

HK3Q	A	221,096	321	232
HK3W	7	12,773	49	53
*HK6P	A	1,093,842	668	402
*HK3JJH	*	498,648	648	263
*HK3/IZØGYP	*	31,654	131	98

Ecuador

*JA6WFM/HC5	21	528,048	575	342
*HC1JQ	14	41,580	129	126

French Guiana

FY1FL	A	4,784,856	1934	772
*FY5FY	A	8,500,401	2627	873

Guyana

8R1K	A	9,873,182	3103	913

Trinidad & Tobago

9Y4D	1.8	11,214	51	42

Uruguay

CX9AU	A	182,820	292	220
CX4DX	28	177,540	312	220
*CX8AT	21	699,205	632	403
*CX1AV	*	176,440	286	220
*CX2CC	7	22,995	85	73

Venezuela

*YW5T	A	667,320	542	332
			(OP: YV5JBI)	
*4M5E	*	46,434	157	109
			(OP: YV5NWG)	
*YY1JGT	28	27,642	147	102
*YV1CTE	21	917,350	907	350

QRP

OK7CM	A	489,342	583	382
S59D	*	402,500	552	322
IZ1ANK	*	213,850	468	325
YP8A	*	171,105	337	255
RZ6MP	*	140,896	340	224
NAØCW/6	*	138,402	323	198
			(OP: W8QZA)	
N2RRA	*	130,585	386	205
K3WW	*	129,789	253	207
RW6HJV/6	*	123,190	330	254
IC8FAX	*	106,672	288	236
RA3DBK	*	100,323	273	213
I1BAY	*	94,128	292	212
9M6YBG	*	92,736	249	138
UX8ZA	*	87,966	245	181
PE2KP	*	85,848	265	196
RW6FO	*	81,780	235	188
JE2LPC	*	76,504	254	131
SP9RQH	*	75,632	211	163
UA3LMR	*	74,305	216	193
9A2EY	*	73,917	249	191
VA3YT	*	73,568	192	121
UT5UUV	*	72,800	230	175
RW3AI	*	72,128	220	161
YO4AAC	*	59,840	209	160
RD4HD	*	53,664	190	156
WA8WV	*	52,992	168	144
IZ1JLF	*	50,895	154	117
SP5AKG	*	49,932	175	146
IZ3IBL	*	48,650	175	139
N3HU	*	42,640	175	130
HA5BA	*	41,860	178	140
N6WG	*	40,430	203	130
ADØNW/4	*	29,904	139	112
IKØXBX	*	28,712	104	97
VK4ATH	*	28,116	118	99
YO6ADW	*	24,102	114	103
KE6K	*	22,145	141	103
PY2BN	*	20,700	108	92
M5AEF	*	19,397	130	119
KT8K	*	19,392	109	96
WD9FTZ/8	*	19,082	123	94
RA9AE	*	16,128	81	64
OM3TLE	*	14,525	97	83
7K1CPT	*	14,388	104	66
N1TM	*	12,896	72	62
US5IND	*	12,337	87	73
ON8NT	*	12,201	91	83
S57AJ	*	12,166	83	77
K6TV	*	11,753	95	73
K6RM	*	11,169	99	73
IZ5ILK	*	10,206	69	63
VA3RKM	*	9,964	68	53
IN3UFW	*	8,848	101	79
KA6SGT/9	*	8,568	75	63
UT2AB	*	8,437	63	59
MØBPQ	*	7,946	59	58
W2JEK	*	7,392	74	56
RK9DO	*	6,720	52	48
N4ZAK	*	4,320	49	45
IN3PEE	*	4,000	56	50
PAØRBO	*	3,936	48	48
ES6KW	*	3,827	46	43
KD4OFG	*	3,825	55	51
JA1KEB	*	3,564	49	33
W8BS	*	2,850	40	38
W6ISO	*	2,240	31	28
KA1LMR	*	2,128	28	28
IK3XTY	*	2,065	43	35
UA3YFR	*	1,769	30	29
F1UIH	*	1,134	27	27
DHØJAE	*	580	20	20
KA7PLE	*	560	23	20
AF4KL	*	180	9	9
N8QE	*	60	6	6
N3TEE	*	55	5	5
MM3ZYS	*	45	5	5
I5KAP	28	11,907	79	63
PU1KYC	*	8,220	70	60
JA2MWV	*	1,608	28	24
VU2UR	*	1,058	28	23
JH7RTQ	21	54,400	183	136
SQ4HRN	*	26,826	119	102
YT2B	*	16,968	98	84
YB2OK	*	12,880	93	70
WA6FGV	*	8,236	67	58
JR1NKN	*	5,208	55	42
JK1TCV	*	4,719	49	39
9V1OE	*	242	11	11
			(OP: OE1WWL)	
JA1KPF/6	*	1	1	1
HR2DX	14	157,755	397	195
DJØMY	*	131,054	317	253
YO2LYN	*	61,952	222	176
K3TW	*	55,272	162	147
UX1UX	*	38,780	168	140
UA1CEC	*	34,892	161	143
RK4FB	*	32,656	151	157
3Z4ACC	*	30,132	149	124
DJ5GK	*	8,618	70	62
SO4ZS	*	8,393	77	77
MUØFAL	*	5,478	70	66
YO4AYE	*	3,476	48	44
YO4BII	*	3,128	47	46
YO8DHD	*	2,772	43	42
NU4I	*	1,056	22	22
W9BNO/8	*	980	29	28
VK2CCC	*	4	2	2
JK3AHS	*	3	1	1
S57SU	7	333,086	393	299
SP4GFG	*	89,936	214	176
RW9LL	*	51,680	108	95
PY2ZX	*	44,640	101	93
WB7OCV/2	*	14,308	80	73
DM4DX	*	9,984	72	64
YB3MM/9	*	4,898	31	31
DL2SAX	*	4,134	41	39
KW9L	*	288	16	16
US2IZ	3.7	178,176	324	232
SQ2DYF	*	40,788	152	132
S54AA	*	33,345	123	117
DL1A	*	30,371	140	121
			(OP: DO4DXA)	
OL4W	*	14,160	95	80
			(OP: OK1IF)	
SQ9MEI	*	5,050	58	50
RW4YD	*	1,218	25	21
JF2MBF	*	697	17	17
RN3ZJJ	1.8	21,952	113	98
SP2OG	*	3,003	39	39
DJ3GE	*	459	17	17

ASSISTED

NORTH AMERICA

United States

WY3P	A	6,660,726	2732	1006
			(OP: N3KS)	
W5WMU	*	2,646,798	2422	674
W8MJ	*	2,282,167	1881	677
NF4A	*	2,168,280	1685	634
N3MX	*	1,958,535	1160	613
WB4MSG	*	1,940,643	1521	639
AA3B	*	1,921,362	1095	618
N2BJ/9	*	1,759,984	1538	634
WN9O	*	1,634,556	1503	609
			(OP: W9IU)	
W1GUS	*	1,374,080	1225	565
KE2DX	*	1,085,936	1046	536
N5QQ	*	843,650	821	470
K4FX	*	761,583	704	411
N1RK/2	*	604,877	578	391
KØRI	*	569,562	631	382
K9CT	*	545,010	582	370
K1FWE	*	538,016	548	391
K5EK/4	*	503,334	633	351
N2SQW	*	443,980	527	316
NM4K	*	437,920	621	340
KC1F	*	432,630	491	345
W4NZ	*	430,824	457	348
WB2ZAB/3	*	430,107	451	307
KV7DX	*	429,005	566	359
			(OP: KN5H)	
KR4F	*	417,094	512	347
WA3C/8	*	380,875	402	275
NX6T	*	363,222	604	306
			(OP: N6KI)	
NN4GG	*	360,725	617	307
			(OP: N4GG)	
NJ1F/2	*	324,324	505	297
KØAD	*	322,422	623	327
NA3M	*	306,375	448	285
WA4ASJ	*	299,376	446	297
N8BJQ	*	274,896	392	276
W8RJL/4	*	260,739	401	261
KØRC	*	251,488	428	271
K7VI	*	250,250	417	275
AE1T	*	249,242	356	266
WØTT	*	210,137	422	263
AK4I	*	208,376	342	244
N4KG	*	193,914	315	171
KI9A	*	192,975	543	249
K2SX/4	*	190,476	341	234
W6SA/7	*	187,488	386	217
K6TA	*	177,289	295	217
N2VW	*	150,046	253	199
N4DWK	*	146,412	224	196
KZ5OM/6	*	144,474	320	199
			(OP: K6III)	
N6AJR	*	138,000	326	200
NE1B	*	123,577	236	191
N4TL	*	110,528	242	176
W4JAM	*	109,956	218	167
WA3AFS/2	*	109,632	192	192
K1JB	*	109,417	243	203
K7VIT	*	102,567	248	179
KW2O	*	91,344	217	176
			(OP: N2MUN)	
K5VIP/4	*	90,072	199	139
K1ZW/4	*	76,653	175	167
KE7FBY	*	76,314	259	161
KE8UM	*	73,050	175	150
KM9M	*	60,514	288	158
K6GT	*	54,120	157	123
W7SW	*	52,984	205	148
KD6X	*	49,980	147	119
W4CU	*	46,624	165	124
W3GNQ	*	45,804	141	132
KA2D	*	45,184	139	128
K3IRV/4	*	38,375	154	125
N4VV	*	36,701	123	107
K4IU/Ø	*	33,517	141	121
W3YY/4	*	30,912	105	92
W5GA	*	29,748	166	111
KT6LA	*	27,900	124	93
NS1S/4	*	27,832	99	98
			(OP: K1ZZI)	
AD4YQ	*	24,934	120	91
K2YR	*	19,575	94	87
N2YO/4	*	19,135	113	89
WF2B	*	18,832	97	88
WA3OFC/4	*	18,509	85	83
NW1E	*	18,450	86	75
			(OP: K1JN)	
K8MR	*	17,556	90	77
N2YBB	*	14,697	73	71
K5NA	*	14,688	88	72
WB5MFI/Ø	*	12,545	69	65
K7MZ	*	12,537	86	63
NFØN	*	10,212	76	69
WA3G	*	9,744	65	58
K3KO/4	*	6,321	49	49
WA1Z	*	6,254	64	53
K8YC/4	*	450	15	15
AB3FL	*	200	8	8
AE5FD	*	121	11	11
K5ZO	14	487,552	819	416
N1SW	*	292,698	537	322
W2IRT	7	178,688	248	349
WA1PMA/7	*	2,025	29	27
N3YD	3.7	480,585	670	345
N8KOJ	*	4,752	53	48
*NR1I	A	554,372	642	364
			(OP: W1NT)	
*NN4F	*	467,756	612	347
*KR7RK	*	363,940	642	310
*W3TZ/5	*	355,992	584	312
*AC9X	*	337,552	478	292
*KS1Y	*	213,792	354	272
			(OP: N1BAA)	
*KS2G	*	197,866	349	254
*KB1MIC	*	140,399	299	217
*KB1OWT	*	109,890	236	185
*KCØDEB	*	74,898	210	171
*K4NAU	*	63,492	180	148
*KA9O	*	58,797	203	139
*K6GEP	*	57,540	191	137
*K9DUR	*	53,055	196	135
*W7SO	*	43,746	165	138
*WA1ZYX	*	41,535	164	117
*KK3Q/4	*	41,503	143	121
*KØKX	*	39,693	135	131
*AI4ME	*	36,015	138	105
*W6JYT/7	*	34,804	171	113
*K7AWB	*	31,824	144	117
*AB5XZ	*	28,944	153	108
*K5WW	*	27,324	125	92
*W4AMS	*	24,920	100	89
*N2FF	*	24,130	102	95
*KA4OTB	*	22,135	117	95
*N7FLT	*	21,828	120	102
*KF7P	*	20,832	115	93
*K4MIL	*	15,810	106	85
*N4VA	*	15,405	88	79
*AAØAW	*	14,448	99	84
*WB1EDI	*	8,550	61	57
*KM5Z	*	7,770	79	70
*N9PVQ	*	6,496	75	58
*KJ4IC	*	4,784	55	52
*KØBJ	*	3,071	40	37
*AF6AV	*	2,800	38	35
*NE1F	*	1,675	25	25
*W8EH	*	1,350	31	30
*N6RNO	*	190	11	10
*KE3WM	21	9,800	63	56
*W4/MØBUE	14	310,155	607	345
*KJ9A	*	2,800	44	40

Alaska

AL9A	A	458,752	657	256

Canada

VE3UTT	A	2,824,255	1234	665
			(OP: W1AJT)	
VA3DX	*	1,466,192	883	494
VE7KS	*	511,980	520	318
VE3ZZ	*	283,026	365	258
*VE1DHD	A	388,515	503	295
*VE3XAT	*	19,024	86	82
*VE1RAR	*	18,252	85	78
*VE1TRI	*	9,945	63	51
*VE8DW	14	3,648	44	38

Honduras

HQ2W	A	1,173,421	1209	409
			(OP: HR2DMR)	

Mexico

XE1EX	A	18,070	82	65

Puerto Rico

WP4SK	A	139,425	264	195

Saint Maarten

*PJ7/KBYR	A	6,960	41	40

AFRICA

Canary Islands

EB8AH	A	1,260	21	20
*EA8OM	A	740,566	651	379
			(OP: DJ1OJ)	
*EA8BQM	*	238,804	339	227

South Africa

ZS6DXB	21	2,397,668	1307	637

ASIA

Asiatic Russia

RG9A	A	6,656,136	2255	807
			(OP: UA9AM)	
RZ9HG	*	3,629,655	1687	711
RX9FM	*	3,190,922	1403	634
UA9QA	*	1,667,466	974	486
RXØAE	*	1,104,928	913	473
RM9RZ	*	501,396	499	329
RW9TA	*	63,597	159	129
UA9OC	*	1,323	21	21
UA9HR	21	6,325	62	55
RV9CP	14	279,360	356	288
RA9KM	*	736	17	16
UA9TT	7	279,006	259	219
*RA9DZ	A	953,225	721	419
*UAØSE	*	379,647	548	327
*RV9UF	*	38,556	134	119
*UAØQBR	*	19,565	101	91
*RK9JWR	21	2,088	31	29
			(OP: RA9JR)	
*RA9JR	14	630,678	581	409
*RKØSV	*	9,610	69	62
*RAØANO	*	364	14	14

China

B4TB	A	72,960	288	160
			(OP: BA4TB)	
*BG4TQX	A	46,128	215	124

Hong Kong

*VR1ØXLN	A	286,893	647	251

India

*VU2NKS	A	293,764	399	271

Japan

JQ1BVI	A	1,165,364	1009	478
JR2PMT	*	248,300	367	260
JF9JTS	*	83,844	216	153
*JO1WKO	A	425,915	460	301
*JR5XPG	*	199,728	328	219
*JK2VOC	*	69,120	245	120
*JA2KPW	*	11,280	83	60
*JA1MZM	*	3,636	39	36
*JH1GUO	*	341	11	11
*JA1IZZ	21	5,535	53	45

Kazakhstan

UP4L	A	4,284,714	759	714
			(OP: UN7LZ)	
*UQ7BF	14	11,098	67	62
			(OP: UN8FM)	

South Korea

*HL1VAU	A	46,726	198	122

West Malaysia

9M2CCO	A	482,496	577	359

EUROPE

Balearic Islands

*EB6AOK	A	76,433	233	179

Belarus

EU6AA	A	49,224	194	168

Belgium

OQ4B	A	480,216	594	374
			(OP: ON4BHQ)	
OO5S	*	123,676	266	196
			(OP: ON5SY)	
OQ5M	14	29,729	148	137
			(OP: ON5ZO)	
*ON6LR	A	335,896	418	347
*ON6FC	*	236,412	415	297

Bosnia-Herzegovina

E77DX	A	8,715,798	3417	1071
			(OP: DE1EMS)	

Bulgaria

LZ8A	A	251,412	388	292
			(OP: LZ2BE)	
LZ5Z	14	507,474	716	466

Crete

SV9GPV	A	2,750,334	2653	773

Croatia

9A2U	28	15,795	105	81
			(OP: 9A3ZA)	

Czech Republic

OL5T	A	1,459,200	1109	608
			(OP: OK1BQA)	
OK7Y	*	655,700	660	415
			(OP: OK1FDY)	
OK1DTC	*	288,358	610	422
OL6W	*	157,760	319	232
OK7MT	*	100,672	208	176
OK7M	7	1,686,627	1079	579
			(OP: OK1DIG)	
*OK2HZ	3.7	128,077	249	211

England

MØRNR	A	98,648	259	209
G7VRK	*	26,125	113	95
G3YBY	21	32,190	118	111
*GØHVQ	A	323,076	467	327
*G3ZQH	*	282,100	489	325
*MØDXR	*	143,612	295	223

Estonia

ES5QX	**21**	**9,348**	**64**	**57**
ES5RW	**14**	**2,257,717**	**1669**	**763**
ES5MG	**3.7**	**171,186**	**251**	**277**

European Russia

RK4FD	**A**	**4,753,098**	**2595**	**882**
UA3SAQ	*	1,931,942	1412	647
UA4RZ	*	1,389,816	1196	597
			(OP: UT5UDX)	
RU6FA	*	658,611	691	423
RU3VT	*	61,851	211	159
RA3DNC	*	37,260	154	138
RZ6HF	*	27,776	126	112
UA6YW	*	17,222	84	79
RA6YY	*	13,200	70	66
RK6ASY	*	11,100	86	74
RN3QO	**14**	**1,620,984**	**1513**	**696**
RK3DZB	*	1,568,908	1487	724
			(OP: RU3DNN)	
RV3FF	*	1,244,358	1315	657
***RA4FWA**	**A**	**249,912**	**452**	**234**
*RA6YDX	*	150,423	315	247
*RV6LA	*	83,512	231	143
*UA3RAW	*	37,740	163	148
*UA4CCC	*	36,448	164	134
*RX3MA	*	16,524	116	102
*UA1OMS	*	3,784	47	43
*RK3DMN	*	132	11	11
***RA3XEV**	**14**	**14,850**	**101**	**110**
*RA3WCG	*	3,713	49	47

Finland

OG5B	**A**	**3,574,928**	**2268**	**826**
			(OP: OH5BM)	
OG6N	*	1,456,380	1351	620
OG7X	*	100,854	330	234
OH6MW	*	49,056	164	146
***OH2FS**	**14**	**4,080**	**42**	**40**

France

F5VJK	**A**	**509,220**	**631**	**410**
F6GCI	*	117,949	264	211
F5CQ	*	24,444	92	84
***F8AKC**	**28**	**2,136**	**32**	**24**

Germany

DLØWW	**A**	**2,455,164**	**1462**	**716**
DL1ELY	*	1,651,422	1212	613
DJ3WE	*	1,189,439	1025	527
DL5KUT	*	1,175,760	1021	568
DL8DAZ	*	931,950	872	475
DHØGHU	*	909,816	861	501
DB2B	*	898,039	945	491
			(OP: DL8OBF)	
DL4GBA	*	866,320	777	476
DK6CQ	*	669,725	701	445
DL3LAB	*	529,995	594	397
DJ9MH	*	399,483	529	357
DL6EZ	*	393,084	545	366
DL7ON	*	326,039	443	329
DG4R	*	198,882	359	261
			(OP: DL1RG)	
DL1ECG	*	187,592	336	262
DRØV	*	124,372	294	236
			(OP: DL5GAC)	
DL1EJA	*	123,825	251	195
DF9IU	*	121,832	237	194
DL9NCR	*	108,350	253	197
DB9EX	*	64,306	179	158
DO1SAJ	*	33,768	143	126
DL4YAO	*	33,504	126	96
DL2SWN	*	28,496	118	104
DL2KUF	*	20,140	111	95
DD1JN	*	18,786	116	101
DO5AWE	*	15,390	102	81
DJ2QV	*	7,150	61	55
DLØTGM	*	6,111	72	63
			(OP: DK1OR)	
DKØTZ	*	364	14	14
			(OP: DL1SBF)	
DP9Z	**21**	**439,140**	**539**	**390**
			(OP: DF9ZP)	
DJ1AA	*	160,000	311	250
DL8QS	**14**	**517,082**	**587**	**458**
DM5X	*	501,676	635	437
			(OP: DL3NED)	
DL5JS	*	291,920	450	356
DK5OS	*	216,216	410	308
DC2YY	*	128,790	276	243
DK8JB	*	101,588	290	233
DL4SVA	**7**	**605,268**	**580**	**387**
***DABCA**	**A**	**843,998**	**962**	**479**
			(OP: DL1REM)	
*DJ3HW	*	657,090	709	447
*DL9YAJ	*	614,040	689	420
*DJ2YA	*	200,816	323	308
*DL1EHR	*	200,081	389	283
*DK4WF	*	97,218	264	198
*DL1JGO	*	91,350	265	210
*DO9ST	*	85,008	211	184
*DK5MB	*	53,534	157	142
*DM3PKK	*	52,852	166	146
*DJ9AO	*	52,140	208	165
*DLØSP	*	31,110	154	122
			(OP: DL2JKE)	
*DF1HF	*	20,099	109	101
*DK7ZH	*	19,488	111	96
*DG5LAC	*	18,473	104	91
*DL1SVA	*	17,640	106	90
*DK6AH	*	10,200	80	68
*DL4EAX	*	3,627	42	39
*DF1HE	*	1,953	31	31
*DL1AZA	*	1,036	31	28
*DG5LM	*	950	19	19
***DL6EAQ**	**14**	**36,378**	**145**	**141**

Greece

SV2GJV	**A**	**28,749**	**119**	**111**
***SV1NK**	**A**	**185,130**	**346**	**242**

Hungary

HG3W	**A**	**360,100**	**517**	**325**
			(OP: HA3AUI)	
HAØHW	*	142,790	292	218
HA6PX	**21**	**248,489**	**420**	**311**
HA1YI	**3.7**	**1,246,232**	**1099**	**521**
HGØA	*	302,395	421	307

Iceland

TF3AO	**14**	**28,495**	**159**	**139**

Ireland

EI2CN	**A**	**939,875**	**899**	**515**

Italy

IZ8EPX	**A**	**896,660**	**1125**	**535**
I2SVA	*	346,408	449	344
IZ1MHS	*	152	8	8
IWØHOU	**28**	**13,872**	**88**	**68**
IZ5ASZ	**21**	**114,063**	**245**	**197**
IK2XYI	*	7,242	50	51
IQ2CJ	**14**	**3,701,335**	**2018**	**865**
			(OP: IK2NCJ)	
IZ5CML	*	919,204	898	572
IR5A	*	808,466	907	547
I1NVU	*	259,651	460	343
IZ8FWN	**7**	**1,703,592**	**1120**	**594**
IR2C	**3.7**	**2,380,644**	**1465**	**658**
			(OP: IW2HAJ)	
IW3SSA	*	652,080	730	418
IC8TEM	**1.8**	**162,675**	**331**	**241**
***IZ8APP**	**A**	**95,160**	**223**	**183**
*IQ8PQ	*	18,426	125	111
*IW3SAR	*	1,426	31	31
***IKØEIE**	**21**	**145,656**	**288**	**238**
*IP8IPY	*	10,758	68	66
***IW9HIK**	**14**	**4,081**	**53**	**53**

Kaliningrad

***RA2FIA**	**A**	**36**	**3**	**3**

Latvia

YL1S	**A**	**1,868,862**	**1396**	**642**
			(OP: YL1ZF)	

Lithuania

***LY1C**	**7**	**156,352**	**300**	**224**
***LY3S**	**3.7**	**163,560**	**312**	**235**

Luxembourg

LX7I	**A**	**1,401,264**	**1002**	**592**
			(OP: LX2A)	

Macedonia

Z37M	**A**	**3,783**	**41**	**39**
Z31MM	*	1,404	27	26
Z32MC	*	1,350	29	27
Z35X	**21**	**477,356**	**736**	**418**

Netherlands

PE1MMZ	**A**	**294,576**	**449**	**323**
PA5TT	*	101,291	249	199
PA1T	*	52,812	204	162
PA2CVD	*	23,919	133	119
PA5O	*	5,300	51	50
***PG7V**	**A**	**133,350**	**256**	**254**
*PE1FTV	*	79,278	232	181
*PB2JJ	*	46,041	179	149
*PE4BAS	*	38,610	149	130
*PA2MI	*	8,228	75	68
*PE1RIK	*	1,209	32	31

Poland

SN5G	**A**	**1,355,871**	**1145**	**543**
			(OP: SP5JTF)	
SP3GXH	*	705,760	739	440
SO8B	*	103,224	265	184
			(OP: SP8UFB)	
SP9HZW	*	29,835	143	117
SN9Y	*	5,618	55	53
			(OP: SP9UOP)	
SP9TTT	*	2,409	35	33
SP9LAS	*	1,071	21	21
SP8HXN	*	264	12	12
SP1RKT	**21**	**42,294**	**156**	**133**
SO7O	**14**	**33,728**	**130**	**136**
			(OP: SP7DQR)	
***SQ1EIC**	**A**	**55,107**	**194**	**157**
*SP2LQP	*	12,284	85	74
*SQ3RX	*	21	3	3
***SP1MWN**	**28**	**9**	**3**	**3**
***SP7FDV**	**7**	**23,265**	**105**	**99**
***SN9Q**	**3.7**	**106,434**	**294**	**219**
			(OP: SQ9NFI)	
*SQ9ITA	*	1,056	24	24

Romania

YR9P	**A**	**4,495,568**	**2487**	**902**
			(OP: YO9HP)	
YO3HKW	*	339,950	516	325
YO8BFB	*	126,474	283	214
YP3A	**21**	**451,485**	**660**	**395**
			(OP: YO3XX)	
YR1C	**14**	**1,658,394**	**1645**	**706**
			(OP: YO4NA)	
***YO3FRI**	**A**	**1,027,356**	**978**	**543**
*YO4RST	*	88,464	226	194
***YO5Q**	**14**	**179,580**	**399**	**292**
			(OP: YO5OHO)	
*YO5OAG	*	65,637	234	187
*YO9CWY	*	56,160	214	156

Sardinia

***ISØ/IT9VDQ**	**A**	**19,256**	**127**	**116**

Scotland

GMØDBW	**A**	**160,684**	**358**	**278**
GM7M	*	29,832	123	113
			(OP: MMØERK)	
***GM4UYZ**	**A**	**13,328**	**117**	**98**

Serbia

YT2T	**A**	**4,979,676**	**2639**	**932**
YT5A	*	2,915,704	1698	748
YT3M	*	2,539,176	1756	723
YU9VK	*	674,960	695	472
***YT7TA**	**A**	**113,677**	**243**	**193**

Slovakia

OM8DD	**14**	**1,070,388**	**1024**	**561**

Slovenia

S56A	**A**	**1,755,304**	**1200**	**626**
S53S	**7**	**2,340,060**	**1242**	**645**
			(OP: S5ØXX)	
S51CK	**3.7**	**1,483,845**	**1210**	**561**
S53O	*	311,000	463	311
***S53F**	**A**	**129,645**	**282**	**215**
*S52W	*	80,105	237	185

Spain

AO5W	**A**	**294,120**	**536**	**360**
			(OP: EA5DWS)	
EF5J	*	270,732	386	293
			(OP: EA5YJ)	
EH7H	**"**	**207,080**	**419**	**310**
EA3EJI	**"**	**96,195**	**214**	**165**
EF1A	**"**	**14,535**	**105**	**95**
			(OP: EA1BLX)	
EA5EH	**21**	**338,793**	**515**	**357**
EA7ZY	**"**	**327,374**	**550**	**382**
AO4M	**"**	**267,580**	**492**	**340**
			(OP: EA4DEC)	
***EF1W**	**A**	**1,458,275**	**1281**	**641**
			(OP: EA1WS)	
*AM1W	*	594,150	659	425
			(OP: EA1OS)	
***EE7R**	**"**	**277,704**	**484**	**342**
*EA7HMB	*	53,584	172	136
***EC2AUD**	**"**	**35,154**	**167**	**126**
***EA5ASM**	**"**	**12,600**	**79**	**72**
***EA4ZK**	**28**	**11,940**	**81**	**60**
***EC3ADC**	**21**	**20,304**	**97**	**94**

Sweden

SMØGYX	**A**	**195,088**	**381**	**274**
SM6WET	*	5,670	49	45
***SIØE**	**A**	**6,171**	**61**	**51**
***SJØWPX**	**14**	**60,610**	**225**	**190**
			(OP: SMØOGQ)	

Switzerland

HB9CIC	**A**	**267,036**	**444**	**308**

Ukraine

UU2JQ	**A**	**159,870**	**278**	**219**
UR7HCX	*	131,224	288	188
UR5ZVJ	*	120,267	280	207
UX1RX	*	72,180	238	180
UR7EM	*	65,676	208	156
UT4MW	*	36,432	167	144
UR6MX	*	5,016	44	44
UW8I	**14**	**2,136,888**	**2036**	**761**
			(OP: UT2IZ)	
UV8M	*	1,796,292	1838	738
			(OP: UX3MR)	
UZ7M	**7**	**2,390,166**	**1236**	**657**
			(OP: UT9MZ)	
EO3Q	*	1,240,977	882	501
***UR5ETN**	**A**	**458,356**	**651**	**326**
*US0GH	*	153,888	320	229
*UU7JM	*	5,940	50	45
***UT1ML**	**14**	**31,824**	**163**	**144**

Wales

MW9W	**3.7**	**137,760**	**262**	**210**
			(OP: MWØJZE)	

OCEANIA

Australia

***VK2KDP**	**A**	**39,346**	**148**	**103**

Hawaii

***AH7G**	**28**	**2,376**	**36**	**33**

Indonesia

YBØIR	**A**	**266,364**	**383**	**252**
YB3IZK	*	194,812	313	226

New Zealand

ZL2IFB	**A**	**1,123,864**	**948**	**376**
***ZL1BYZ**	**A**	**361,616**	**578**	**233**
*ZL4PW	*	305,463	388	233

Philippines

DU1UGZ	**A**	**344,984**	**534**	**232**

SOUTH AMERICA

Argentina

LP1H	**A**	**7,091,045**	**2694**	**859**
			(OP: LU5HM)	
LTØH	**21**	**1,430,278**	**964**	**527**
***LU7YZ**	**A**	**685,201**	**702**	**373**
***LU3JVO**	**28**	**608**	**16**	**16**

Brazil

ZX2B	**A**	**9,533,793**	**3028**	**993**
			(OP: PY2MNL)	
PY5QW	*	2,230,000	1236	625
PY4OG	*	1,527,760	1000	520
PY2RDS	*	137,310	265	199
PY2IQ	*	96,330	229	169
PY5KA	*	62,335	171	137
PY3PA	*	54,502	156	119
PY6HD	*	27,000	131	90
PY6PRS	*	15,768	113	72
PV2P	**7**	**188,188**	**216**	**188**
			(OP: PY2DY)	
***ZX7A**	**A**	**3,620,149**	**1674**	**691**
			(OP: PS7TKS)	
*PY3MHZ	*	205,556	350	236
			(OP: PY3XX)	
*PY2EL	*	18,018	91	77
*PY2GMR	*	2,263	37	31
			(OP: PY2OMT)	
***PU1KGG**	**28**	**70,880**	**194**	**160**
*PY2XC	*	8,970	80	65
***PY2BRZ**	**14**	**595**	**17**	**17**
***PT7ZZ**	**7**	**116,620**	**154**	**140**
***PU1PRF**	**3.7**	**154**	**14**	**11**

Chile

XR3P	**A**	**525,262**	**535**	**362**
			(OP: CE3PG)	

Uruguay

***CX7TT**	**A**	**35,682**	**142**	**114**
			(OP: K6CT)	

Venezuela

YV6BXN	**A**	**11,501**	**59**	**53**
***YY5LI**	**21**	**233,160**	**361**	**268**

TRIBANDER/SINGLE ELEMENT

United States

KJ4VO	**A**	**2,451,417**	**1925**	**677**
			(OP: N4PN)	
K4PV	*	2,315,936	1828	686
NF4A	*	2,168,280	1686	634
N3MX	**A**	**1,958,535**	**1160**	**613**
N2QT/4	*	1,683,856	1203	551
WZ4F	*	1,585,980	1546	540
			(OP: K4AB)	
KG4W	*	1,561,230	1327	570
W6TK	**A**	**1,391,698**	**1495**	**539**
AA5B	**A**	**1,235,500**	**1617**	**500**
WAØMHJ	**A**	**1,203,288**	**1123**	**554**
KJ3X	*	1,007,820	1078	495
			(OP: K1DQV)	
AB3CX/2	**A**	**765,798**	**792**	**451**
K4FX	*	761,583	704	411
N3UM	*	603,648	618	384
KØRI	*	569,562	631	382
W1BYH	**A**	**500,480**	**546**	**340**
N1BCL	*	463,592	530	347
KV7DX	**A**	**429,005**	**566**	**359**
			(OP: KN5H)	
KR4F	*	417,094	512	347
AE1P	*	406,086	649	318
WZ7M	*	356,952	744	321
			(OP: K7MO)	
WG7X	*	331,154	739	313
NJ1F/2	*	324,324	505	297
WØATC	*	300,310	567	295
			(OP: WAØHLJ)	
WA4ASJ	*	299,376	446	297
W8RJL/4	*	260,739	401	261
AE1T	*	249,242	356	266
N2DWS	*	217,872	327	272
ND1X	*	209,013	390	269
K2SX/4	*	190,476	341	234
N2VW	*	150,046	253	199
WA5ZUP	*	141,680	425	220
KY4P	*	141,470	301	215
K3IE/4	*	141,372	298	204
W4NTI	*	139,582	293	202
NJ4F	*	131,453	268	211
KB6A	*	129,248	295	224
NQ7R	*	126,324	297	198
NI7T/6	*	120,120	309	195
WR5G/7	*	117,990	280	190
KY4Q/8	**A**	**103,462**	**226**	**179**
K5VIP/4	*	90,072	199	139
N5RMS	*	80,842	227	166
W8JMF	*	74,382	186	147
KE8UM	*	73,050	175	150
NC4MI	*	68,370	200	159
W8OHT	*	67,425	194	155
K8OZ/3	*	66,138	198	151
W6EB	*	63,176	208	149
KM9M	**A**	**60,514**	**288**	**158**
WWØAL	*	55,860	221	140
W7SW	*	52,984	205	148
AB1BW	*	52,345	168	145
W4CU	*	46,624	165	124
AIØQ	*	33,428	142	122
WA9IVH	*	33,165	136	99
WA3OFC/4	*	18,509	85	83
NW1E	*	18,450	86	75
			(OP: K1JN)	
KR7P	*	5,610	61	51
WW6OR	**21**	**46,443**	**177**	**113**
			(OP: K6JAT)	
W6RKC	*	6,486	50	47
K4EU	**14**	**406,747**	**528**	**359**
WX6V	*	401,128	631	364
W9DX/5	*	299,398	462	341
KD7DCR	*	16,274	85	79
W2IRT	**7**	**178,688**	**248**	**349**
WN2O	**3.7**	**241,528**	**423**	**266**
			(OP: N2GC)	
KK9V	**"**	**168,480**	**404**	**240**
N4NX	*	163,530	361	237
***WD5K**	**A**	**1,042,056**	**1112**	**492**
***WZ8T**	**"**	**607,986**	**740**	**417**
*WB8TLI	*	516,880	582	355
***WE4YL/9**	**A**	**468,480**	**806**	**366**
***KR7RK**	**A**	**363,940**	**642**	**310**
*W3TZ/5	*	355,992	584	312
***WB4JFS**	**A**	**335,808**	**491**	**288**
***NØYO**	**A**	**292,134**	**516**	**269**
*NE4S	*	237,440	454	265
***KS2G**	**A**	**197,866**	**349**	**254**
*AAØNK	*	193,356	376	262
***KB3LIX**	**A**	**191,293**	**339**	**233**
*N3ALN	*	189,750	445	253
*WB8JUI	*	174,517	370	233
*WBØTSR	*	159,139	359	233
*K9JE	*	155,495	344	227
*AA6YX	*	143,664	334	219
***NA1QP**	**A**	**129,116**	**273**	**191**
			(OP: W1CTN)	
*NØBUI	*	113,400	336	210
*AK9I	*	96,534	340	186
***KF6IHL**	**A**	**94,656**	**272**	**174**
*W4KAZ	*	85,008	235	168
*AA4LR	*	78,971	204	157
*KØCN	*	75,604	269	164
*KCØDEB	*	74,898	210	171
*N4QWB	*	73,752	243	168
*W7RV	*	72,224	205	148
*KC5R	*	71,568	208	144
*W1CRK	*	71,442	217	162
*K4NAU	*	63,492	180	148
*WA6NHO	*	58,225	199	137
*N9TF	*	43,989	151	129
*N8HP	*	43,335	158	135
*WA1ZYX	*	41,535	164	117
*AE6YB	*	37,638	203	123
*ADØH	*	37,422	152	126
*N3UA/4	*	36,225	122	105
*W6JYT/7	*	34,804	171	113
*WØIS	*	33,558	190	119
*N3CZ/4	*	32,015	121	95
*K4UVA	*	31,740	122	115
*K5WW	*	27,324	125	92
*N8NA/3	*	27,000	108	100
*NN5T	*	25,380	112	94
*NØSMA	*	25,038	151	107
*WAØKDS/7	*	24,682	114	82
*W3MGL/4	*	23,808	116	96
*WA7MR	*	22,525	135	85
*KA4OTB	*	22,135	117	95
*N7FLT	*	21,828	120	102
*KI4FIA	*	20,520	121	95
*WØKC	*	19,208	113	98
*N8AE	*	16,281	102	81
*N4VA	*	15,405	88	79
*WA8SDF	*	14,580	104	81
*KZ2I/4	*	12,851	72	71
*AB3S/4	*	10,950	83	73
*K6CSL	*	10,492	83	61
*AA5SH	*	8,909	62	59
*W2SR	*	8,062	62	58
*KØKU	*	6,985	62	55
			(OP: KCØIDI)	
*KKØSD	*	6,318	74	54
*KB8FZY	*	6,111	69	63
*W4HRC	*	3,612	45	42
*N5PU	*	2,418	41	39
*KG6YHH	*	2,340	45	39
*W8EH	*	1,350	31	30
*K7TR	*	264	8	8
*AE4EC	*	144	12	12
*N7RSE	*	104	8	8
*KB1KRS	*	1	1	1
***WA1FCN/4**	**28**	**2,688**	**36**	**32**
***W7UPF**	**21**	**39,558**	**132**	**114**
*K7MY	*	13,002	74	66
***W4/MØBUE**	**14**	**310,155**	**607**	**345**
*NN5Z	14	78,120	321	180
			(OP: K5PX)	
*K7ACZ	*	37,375	122	115
***N5DGK**	**7**	**1,768**	**26**	**26**
***KCØRQH**	**3.7**	**576**	**16**	**16**
***K3BU/2**	**1.8**	**3,060**	**53**	**36**

DX

CT9L	**A**	**15,981,472**	**4198**	**1066**
			(OP: DF7ZS)	
HG8R	**A**	**6,211,205**	**2866**	**1001**
			(OP: HA8JV)	
FY1FL	**A**	**4,784,856**	**1934**	**772**
UP4L	**A**	**4,284,714**	**1759**	**714**
			(OP: UN7LZ)	
EA6SX	**A**	**4,284,054**	**1919**	**841**
CT1DIZ	**A**	**3,875,040**	**2480**	**897**
CE4CT	**A**	**3,690,225**	**1735**	**693**
AY8A	**A**	**3,120,834**	**1619**	**678**
			(OP: LU8ADX)	
YJ8TZ	**A**	**2,776,869**	**1921**	**513**
			(OP: VK3TZ)	
S56M	**A**	**2,388,100**	**1594**	**715**
VK2APG	**A**	**1,890,910**	**1482**	**454**
YL1S	**A**	**1,868,862**	**1396**	**642**
			(OP: YL1ZF)	
UA6UDV	**A**	**1,534,280**	**1334**	**605**
MDØCCE	**A**	**1,471,927**	**1084**	**577**
JE1LFX	**A**	**1,454,904**	**1095**	**484**
OH1RX	**A**	**1,381,788**	**1105**	**586**
SN5G	**A**	**1,355,871**	**1145**	**543**
			(OP: SP5JTF)	
VE3CR	**A**	**1,269,816**	**802**	**471**
LZ2SX	**A**	**976,752**	**1095**	**532**
DK1KC	**A**	**926,224**	**908**	**488**
DB2B	*	898,039	945	491
			(OP: DL8OBF)	
VU2PTT	**A**	**802,426**	**784**	**421**
IK2SND	**A**	**797,685**	**862**	**497**
VE4EAR	**A**	**700,441**	**724**	**329**
YB1AR	**A**	**685,038**	**685**	**381**
4Z5ML	**A**	**626,808**	**504**	**312**
VE1MC	**A**	**580,013**	**530**	**343**
HA1TNX	*	557,032	593	392
XR3P	*	525,262	535	362
			(OP: CE3PG)	
9M2CCO	**A**	**482,496**	**577**	**359**
DL9GWD	*	472,004	597	377
DL1NEO	*	464,128	626	392
VK2CA	*	461,829	631	257
DK8EY	*	449,811	563	369
CE3BFZ	*	443,520	561	240
JA7COI	**A**	**427,040**	**605**	**272**
DL1QQ	*	389,918	622	331
MØWLF	*	367,734	510	334
HG3W	**A**	**360,100**	**517**	**325**
			(OP: HA3AUI)	
VA2WDQ	**A**	**356,320**	**393**	**262**
I2SVA	*	346,408	449	344
YO3RU	*	337,280	528	320
SP3GTS	*	318,240	491	306
PE1MMZ	**A**	**294,576**	**449**	**323**
PY5ZD	*	288,360	385	270
VE3ZZ	*	283,026	365	258
LZ8A	**A**	**251,412**	**388**	**292**
			(OP: LZ2BE)	
S58L	*	239,166	416	309
SV9COL	**A**	**225,261**	**466**	**309**
PAØJNH	**A**	**204,484**	**345**	**268**
EA4TG	**A**	**202,266**	**496**	**306**
F4DSK	**A**	**194,790**	**383**	**258**
YL9T	*	154,940	328	254
PY2RDS	*	137,310	265	199
DF9IU	*	121,832	237	194
JH8FIH	**A**	**121,813**	**262**	**181**
G4OWT	*	121,695	236	183
BA5DX	**A**	**121,626**	**376**	**174**
VE7NS	**A**	**110,500**	**229**	**170**
S51DX	*	107,334	291	201
IWØBCF	*	102,486	254	186
MØRNR	*	98,648	259	209
EA3EJI	**A**	**96,195**	**214**	**165**
EC5AAB	*	95,120	281	232
PY7MV	*	85,920	194	160
B4TB	*	72,960	288	160
			(OP: BA4TB)	
PY5KA	*	62,335	171	137
UAØDAM	**A**	**55,594**	**201**	**133**
DF7YT	*	49,220	143	115
OH6MW	*	49,056	164	146
RA6AR	*	41,602	139	122
JO1SIM	*	40,710	177	115
YT2AA	**A**	**36,410**	**135**	**110**
VE6TR	*	36,406	123	109
G7VRK	*	26,125	113	95
RX3VF	*	20,172	129	123
XE1EX	**A**	**18,070**	**82**	**65**
YV6BXN	**A**	**11,501**	**59**	**53**
SM6WET	*	5,670	49	45
JF1AZQ	*	5,382	59	46
IK8JDH	*	3,906	43	42
VK2GR	*	2,324	34	28
EA4ETW	*	1,056	24	24
UN5J	*	242	12	11
KG6DX	**28**	**247,217**	**514**	**173**
Z35X	**21**	**477,356**	**736**	**418**
AO4M	*	267,580	492	340
			(OP: EA4DEC)	
JH7XMO	*	149,768	341	193

PAØM	*	9,006	61	57
4Z4OQ	**14**	**3,983,984**	**1925**	**776**
EA5KV	*	2,273,810	1992	770
YB4IR	*	951,584	734	454
OQ5M	*	29,729	148	137
			(OP: ON5ZO)	
VY1EI	*	14,615	89	79
VA6XDX	**7**	**119,980**	**222**	**140**
			(OP: VE6LB)	
SP7HKK	**3.7**	**1,126,428**	**996**	**516**
G8DYT	*	434,190	497	353
IO3X	*	208,458	294	333
MW9W	*	137,760	262	210
			(OP: MWØJZE)	
RA6DB	**1.8**	**84,597**	**226**	**173**
***CN2BC**	**A**	**4,698,149**	**1998**	**779**
			(OP: DL7BC)	
***RX9AM**	**A**	**1,826,478**	**1098**	**522**
***OK1WCF**	**A**	**1,534,468**	**1162**	**598**
***S59KW**	**A**	**1,316,641**	**1107**	**587**
***IU9A**	**A**	**1,262,602**	**1526**	**638**
***YO3APJ**	**A**	**819,553**	**793**	**497**
*I1EIS	*	766,055	795	439
***EA8OM**	**A**	**740,566**	**651**	**379**
			(OP: DJ1OJ)	
***DR4G**	**A**	**692,172**	**732**	**442**
			(OP: DJØGM)	
***LU7YZ**	**A**	**685,201**	**702**	**373**
***4D75B**	**A**	**669,340**	**949**	**245**
			(OP: DU1BP)	
***XE2YBG**	*	**668,169**	**785**	**339**
*DJ3HW	*	657,090	709	447
***RK3MWI**	**A**	**654,885**	**742**	**405**
			(OP: UA3MSA)	
*DL9YAJ	*	614,040	689	420
***AM1W**	*	**594,150**	**659**	**425**
			(OP: EA1OS)	
***HA1BC**	**A**	**551,705**	**593**	**385**
			(OP: DL1MAJ)	
***VK9ANU**	**A**	**527,472**	**726**	**222**
*EA4TV	*	518,154	765	438
*DB7TF	*	513,420	629	398
***YB1TJ**	**A**	**511,920**	**549**	**316**
*DC7NF	*	485,608	615	404
***VE3KPP**	**A**	**435,214**	**524**	**247**
***F5LIW**	**A**	**430,124**	**545**	**367**
***VE2XAA**	**A**	**425,425**	**454**	**325**
*YB2ECG	*	368,350	492	265
***ON4CT**	**A**	**343,416**	**481**	**349**
*EE7E	*	337,500	617	375
			(OP: EC7ABV)	
***G4DFI**	**A**	**306,525**	**469**	**335**
***VU2NKS**	**A**	**293,764**	**399**	**271**
*GB9ØRAF	*	292,400	488	344
			(OP: G3VAO)	
*G3ZQH	*	282,100	489	325
*EE7R	*	277,704	484	342
***PY2DU**	**A**	**269,352**	**390**	**258**
*DF7EF	*	267,520	419	320
*EA3FF	*	252,747	413	297
***A35RK**	**A**	**251,680**	**493**	**208**
*RV9CBW	*	244,902	324	238
*EB2CYQ	*	238,854	368	282
*DK5DQ	*	233,480	374	260
***JHØNEC**	**A**	**232,971**	**377**	**237**
***OZ1ACB**	**A**	**228,636**	**402**	**292**
***CT3HF**	**A**	**226,240**	**342**	**224**
*YO5OHY	*	214,760	379	260
*DL1EHR	*	200,081	389	283
*DF1LON	*	196,746	387	271
*G4DBW	*	195,021	396	279
***HZ1PS**	**A**	**189,840**	**297**	**226**
***EA6XQ**	**A**	**187,372**	**358**	**278**
*7J1AQH	*	184,416	369	204
			(OP: VE7HA)	
***HB9ODK**	**A**	**150,768**	**308**	**216**
*IR9Z	*	140,556	296	212
			(OP: IT9VCE)	
*U1BA	*	137,340	329	252
*DK7TM	*	125,610	327	237
***D2NX**	**A**	**124,872**	**255**	**172**
			(OP: JM1CAX)	
***EI7CC**	**A**	**124,372**	**296**	**236**
*EA5TT	*	110,644	268	199
*DO9PL	*	106,708	287	206
***CE2WWF**	**A**	**106,470**	**236**	**182**
***SE5S**	**A**	**105,565**	**262**	**215**
*VE3MPT	*	101,067	224	177
*IW9FI	*	97,500	257	195
*DK4WF	*	97,218	264	198
*PE1LTY	*	92,442	252	213
*IW5ECP	*	84,422	246	191
*IK2YSJ	*	82,320	256	196
*RX9DJ	*	79,424	198	146
*JE4AEJ/1	*	78,804	247	132
*YT3AA	*	75,240	217	180
*EB5WC	*	74,860	224	190
*EB1EVX	*	73,138	228	194
***OH3DP**	**A**	**67,423**	**212**	**191**
*JR3RIY	*	66,640	180	119
*RL3WX	*	66,062	182	134
*VE3TW	*	64,090	166	130
*OK7N	*	63,176	180	149
*IT9LED	*	60,684	196	156
*2E1FVS	*	59,532	194	164
*LU4KC	*	57,915	225	135
			(OP: LU6KA)	
*PA3DBS	*	57,768	206	174
*JA1FRQ	*	52,095	171	115
*PA3FMC	*	51,867	191	153
*F1RHS	*	49,305	209	173
*IW4EGX	*	48,356	169	154
*JA1XUY	*	47,632	194	104
*IZ4DIG	*	45,014	158	142
*VE1JS	*	44,908	115	109
*IWØGYC	*	43,030	162	130
*RW3VZ	*	41,984	147	128
***VK4AMC**	**A**	**41,921**	**153**	**103**
*PE2JMR	*	41,648	166	137
***LA7GNA**	**A**	**41,055**	**181**	**161**
*DO3ME	*	36,418	151	131
*F4CUI	*	36,288	143	126
***SP6NVK**	**A**	**35,644**	**168**	**133**
*DV1JD	*	33,840	144	90
*RA3VE	*	33,787	138	113
*PY2NA	*	32,536	119	98
*SE6C	*	30,125	146	125
			(OP: SM6CDN)	
*YC1UGK	*	28,574	120	91
*RV9UP	*	28,120	100	95
*VE3JI	*	26,960	101	80
*G4NXG	*	26,304	110	96
*JL7XBN	*	24,388	131	91
*JA2VZL	*	23,940	122	84
*G6UBM	*	22,422	118	101
*JL8MBF	*	22,386	124	82
*G6CSY	*	22,295	103	91
*JA3JM	*	21,440	133	80
*MØTLN	*	20,790	121	110
*UAØQBR	*	19,565	101	91
*IN3FHE	*	19,278	103	102
*RU3VD	*	17,228	73	73
*EA5TN	*	17,199	101	91
*IT9JOB	*	17,094	77	74
*MØJPF	*	16,660	101	98
*IZ1NBX	*	15,738	97	86
*PG2D	*	15,210	101	90
*SM7RPU	*	15,138	98	87
***9G5ZS**	**A**	**14,342**	**76**	**71**
*DF8JK	*	13,188	98	84
*DH5MM	*	12,702	78	73
*MØYOY	*	12,480	83	78
*JA2PFO	*	10,500	70	50
*VE7BGP	*	10,384	68	59
*SM5OSZ	*	9,864	80	72
*EC3ADB	*	9,638	68	61
*SP9BMH	*	9,324	66	63
*ZS4JAN	*	8,848	85	56
*VK6FDX	*	8,580	69	52
*EW7LE	*	8,107	70	67
*JA4BDY	*	7,904	68	52
*KH7/KO7X	*	7,440	48	40
*IWØHPL	*	7,384	61	52
*F2RO	*	6,360	54	53
*DG6DAF	*	6,148	54	53
*DF6YC	*	4,324	50	47
*HL5YI	*	4,268	55	44
*RW4LQ	*	3,441	37	31
*EC1AQT	*	3,256	45	44
*PY2GMR	*	2,263	37	31
			(OP: PY2OMT)	
*EA5GZO	*	1,980	37	36
*JI1UDD	*	1,971	34	27
*VK4XES	*	1,809	27	27
*JR3SZZ	*	1,764	37	28
*YU1IV	*	1,650	25	25
*JF1RYU	*	1,122	23	22
*EA1GPL	*	1,000	22	20
*JA2DLM	*	960	21	20
***EC7AKV**	**28**	**17,821**	**102**	**71**
*JL3MCM	*	6,864	48	66
*IZ8CCW	*	5,500	68	55
*7N2UQC	*	4,480	61	40
*PT9PA	*	4,182	47	41
*JF4GWA	*	153	9	9
***JA6WFM/HC5**	**21**	**528,048**	**575**	**342**
*YC6LAY	*	167,272	310	203
*IKØEIE	*	145,656	288	238
*SV1UT	*	94,966	260	206
*JA2VSU/3	*	765	19	17
*SG3O	*	300	10	10
			(OP: SM3AGO)	
***AO1B**	**14**	**317,824**	**598**	**382**
*AM3CS	*	73,485	246	213
			(OP: EA3CS)	
*PI4AML	*	59,340	211	172
			(OP: PG2AA)	
*DL9LR	*	37,125	159	135
*DL6EAQ	*	36,378	145	141
*JA8IJI	*	19,350	108	86
*PI4WLD	*	18,972	92	93
			(OP: PAØMIR)	
*JA4AQR	*	18,445	92	85
*PY5KW	*	16,236	89	82
*VE3IAE	*	14,212	71	76
*UQ7ØF	*	11,098	67	62
			(OP: UN8FM)	
*UR5IKN	*	2,280	38	38
*S58P	*	1,664	27	26
*UA9JMB	*	288	18	16
*SH3O	*	200	10	10
			(OP: SM3TLG)	
***LY2MM**	**7**	**229,457**	**361**	**269**
*HA6IAM	*	105,432	230	184
*UA1ANA	*	21,526	101	94
*JR4URW	*	14,328	88	72
*JF3IYW	*	7,396	46	43
*OH6JYH	*	2,240	31	28
***3Z1ØUM**	**3.7**	**541,320**	**668**	**390**
			(OP: SQ9UM)	
*PAØMIR	*	99,180	169	261
*OK2WYK	*	41,796	151	129
***VE3MGY**	**1.8**	**109,361**	**252**	**119**
*EA3AKA	*	12,483	81	73

ROOKIE

United States

W1GUS	**A**	**1,374,080**	**1225**	**565**
KB1ODO	*	109,610	308	194
KE7FBY	**A**	**76,314**	**259**	**161**
W5YAA	**A**	**73,538**	**204**	**166**
AD7SI	*	37,440	173	120
N4RVM	**A**	**30,192**	**131**	**111**
W5BKT	*	14,350	102	82
KE5FUE	*	9,864	85	72
KE7HTL	*	6,084	61	52
KG6ZHC	**A**	**4,560**	**58**	**48**
KCØNXB	**A**	**2,574**	**42**	**39**
KB1OGZ	*	782	24	23
AE5FD	*	121	11	11
KB1PLN	**14**	**6,027**	**51**	**49**
KI4ZGF	*	270	10	10
***KI4PKW**	**A**	**146,076**	**346**	**222**
***KB1MIC**	**A**	**140,399**	**299**	**217**
*K4CX	*	126,484	348	206
*KB1OWT	*	109,890	236	185
***KBØARZ**	**A**	**93,810**	**274**	**177**
***K6DEX**	**A**	**70,144**	**200**	**137**
*KI6JJW	*	69,280	233	160
***AD7KG**	**A**	**52,416**	**209**	**144**
***AA2DS**	**A**	**48,112**	**157**	**124**
*K2BBQ	*	47,580	153	122
*AF6EV	*	46,138	166	118
*KO5D/7	*	34,485	160	121
*KA1G	*	30,316	122	106
*K6KWB	*	27,621	139	99
***KD8ELX**	**A**	**24,274**	**130**	**106**
*K2SI	*	23,835	133	105
***KC9KIO**	**A**	**21,412**	**132**	**101**
*KF7P	*	20,832	115	93
*KI4VQQ	*	18,509	103	83
*KD0BRD	*	14,448	107	86
*KU4MT	*	14,136	101	76
*KD8CDC	*	10,010	83	65
*NT8K	*	8,680	64	62
*KM5Z	*	7,770	79	70
*N9PVQ	*	6,496	75	58
*N5HMH	*	5,964	90	71
*KG6RCW	*	3,420	55	45
*AF6AV	*	2,800	38	35
*AE4CW	*	2,590	37	35
*K6VUG	*	1,624	32	28
*N6EF	*	1,612	33	31
*KCØUUT	*	1,131	32	29
*AI4QR	*	860	22	20
*AB8XE	*	560	20	20
*NT6ET	*	336	12	12
*KD5UBC	*	198	11	11
*KD8GKL	*	169	14	13
*KB3OUK	*	88	8	8
***KS6M**	**14**	**7,381**	**77**	**61**
*KA6YLA	*	6,667	66	59
*K4YYD	*	5,200	56	50
*KE5LHC	*	100	10	10
*KE5LFO	*	10	2	2
***WB8TLH**	**7**	**3,360**	**56**	**48**

DX

NHØDX	**A**	**2,411,046**	**2087**	**369**
OT2A	**A**	**2,220,288**	**1534**	**708**
IZ1LBG	**A**	**2,115,280**	**1419**	**685**
RN3ZC	**A**	**1,524,772**	**1361**	**586**
UA6YIU	*	1,361,835	1256	571
UT6EE	**A**	**495,670**	**596**	**365**
LA9LMA	**A**	**381,628**	**604**	**358**
DJ6TB	**A**	**27,820**	**125**	**107**
UA9SAW	*	21,080	96	85
BG5HSC	*	1,674	31	27
BG5HRE	*	1,242	26	23
YC1RW	21	114	7	6
OM7AN8	**14**	**569,296**	**700**	**442**
EC5ANF	*	7,957	79	73
PV2P	**7**	**188,188**	**216**	**188**
			(OP: PY2DY)	
OM7RX	*	57,300	186	150
IW3SSA	**3.7**	**652,080**	**730**	**418**
***EA8CDI**	**A**	**996,710**	**703**	**410**
***IZ3KKE**	**A**	**702,093**	**726**	**469**
***RK9AJZ**	**A**	**502,920**	**507**	**330**
***PY7VI**	**A**	**458,850**	**490**	**322**
*UA9MR	*	453,000	495	302
***F4FDA**	**A**	**416,780**	**544**	**364**
***EA2COD**	**A**	**274,205**	**462**	**317**
*F4FFH	*	268,736	438	304
*RU9CD	*	247,696	326	226
***DK1ROB**	**A**	**187,726**	**317**	**253**
***RD3WF**	**A**	**180,544**	**388**	**217**
***OL2T**	**A**	**161,750**	**357**	**250**
			(OP: OK2TC)	
***VO1DJT**	**A**	**154,316**	**261**	**223**
*USØGH	*	153,888	320	229
*DM5LK	*	149,568	351	246
*F4FEP	*	126,792	281	216
***VK4FRAJ**	**A**	**114,708**	**309**	**158**
*VE3NCQ	*	110,880	225	154
***PD7BZ**	**A**	**102,820**	**259**	**212**
*DO9RE	*	102,400	269	200
*EA2AOO	*	94,615	191	149
***SAØAQT**	**A**	**90,624**	**241**	**192**
***OE5CWO/2**	**A**	**88,464**	**250**	**194**
*IZ8JFL	*	87,870	224	174
***ON3AR**	**A**	**83,727**	**256**	**189**
*IT9JDH	*	68,820	216	155
*IZ1KGY	*	65,221	210	173
*EI4GXB	*	61,537	180	149
*XE2JA	*	57,900	232	100
*BV4VR	*	56,440	244	136
*EA7HMB	*	53,584	172	136
*YO5CCX	*	41,265	164	131
*PG1R	*	35,937	148	121
*EI4GNB	*	35,868	137	122
*XE2HUM	*	26,796	123	87
*M3ENF	*	25,538	120	113
*VA2PZ	*	24,708	96	87
*UU4JC	*	19,040	90	80
			(OP: UU2JUA)	
*DC4PAS	*	18,414	114	99
*VE1RAR	*	18,252	85	78
*OH8GZQ	*	17,304	114	103
*M3OHI	*	15,288	110	98
*DL2IH	*	13,741	98	91
*BY8AC	*	12,986	141	86
			(OP: BD8ATI)	
*BG4TBJ	*	10,143	84	63
*DO8TB	*	9,424	81	76
*EA3GOD	*	8,580	63	60
*IN3SJG	*	8,500	74	68
*IK3MLF	*	6,375	54	51
*EA7EYQ	*	5,664	49	48
*SQ7MRP	*	5,247	57	53
*VE2LX	*	5,136	51	48
*DL6JV	*	5,022	66	62
*IZ5HQB	*	4,628	59	52
*IZ2LSC	*	3,366	38	34
*BG4JWU	*	3,311	53	43
*BG3EO	*	2,262	47	39
*IZ5NFD	*	1,891	34	31
*DO2CT	*	1,885	29	29
*EA6AFM	*	1,495	25	23
*BD3MZX	*	1,450	35	29
*IZ6INR	*	1,269	27	27
*SP7IIT	*	60	4	4
***HI8PJP**	**28**	**3,379**	**39**	**31**
***YY5LI**	**21**	**233,160**	**361**	**268**
*DW1UBY	*	61,696	197	128
*V51YJ	*	31,815	109	105
*EC7DZL	*	8,151	60	57
*IZØGXM	*	1,728	24	24
***UA1AQA**	**14**	**377,235**	**609**	**415**
***VK4HAM**	**14**	**304,965**	**474**	**251**
*IC8DAK	*	244,216	571	343
*OT2C	*	156,429	342	273
*YT2AAA	*	126,492	329	254
*RWØUM	*	124,848	332	216
*V8AQM	*	71,214	186	143
*EA7HEG	*	50,592	228	204
*4Z5MY	*	27,400	111	100
*VA7ALK	*	24,892	121	98
*RK9UAC	*	22,533	94	87
*OH8GZN	*	13,585	106	95
*BG4JUU	*	9,882	96	81
*BY7KP	*	9,246	91	69
*IZ5MMQ	*	5,893	73	71
*VE8DW	*	3,648	44	38
*LA2LI	*	1,584	34	33
***EC5CSW**	**7**	**409,370**	**444**	**335**
*IT9ZIV	*	115,668	247	204
*KH6TS	*	605	11	11
*RA9UAD	*	40	5	4
***OM7AAS**	**3.7**	**127,161**	**286**	**213**
*SQ5NAE	*	106,656	248	202
*PU1PRF	*	154	14	11
***RK2FXG**	**1.8**	**11,520**	**80**	**72**
			(OP: RA2FIR)	

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

K3EST/4	**6,347,900**	**2774**	**988**
WU3A/1	**6,081,120**	**2452**	**984**
WR3Z	**6,025,790**	**2679**	**983**
NX5M	**5,893,424**	**3818**	**922**
NQ2F	**3,981,516**	**2126**	**868**
WC6H	**3,751,875**	**2935**	**725**
WA7XX	**3,098,771**	**2243**	**683**
AJ9C	**2,412,072**	**1618**	**702**
WX5S/6	1,708,643	1613	601
KT4PD	1,646,970	1402	618
W7EB	1,300,455	1653	513
K2DB	950,950	955	494
WX7P	870,849	1234	483
NQ4U	779,225	908	439
AB2DE	671,888	677	392
NØMA	**570,375**	**686**	**375**
W4EE	482,657	580	361
N2BZP	466,452	574	378
WQ1Z	426,378	556	358
KG7C	403,340	796	335
KI4GUO	402,067	680	353
WT4Q/2	309,300	547	300
WQ2N	309,000	514	309
KDØS	302,376	522	293
W6SAI/4	286,901	486	281
KB1OGL	204,006	338	242
N4CW	190,026	287	243
WU4N	157,707	278	243
N8AJN/Ø	132,692	352	196
K4YHB	124,992	283	192
N4DXY	79,659	272	159
W5LCC	74,221	203	161
WØEF	68,886	201	178
N2NGW	16,104	105	88
KC9LQS	10,187	75	61
AI9I	4,429	48	43

Alaska

KL7AIR	**43,656**	**178**	**107**

Canada

VE6SV	**2,855,776**	**1721**	**616**
VA2TG	**1,035,336**	**812**	**482**
VE7HL	**74,592**	**217**	**144**
VA3ARG	**46,904**	**146**	**104**

Costa Rica

TI5N	**6,395,825**	**3210**	**745**
TI8M	1,066,185	983	387

Dominican Republic

HI3C	**7,871,062**	**3007**	**883**

Guadeloupe

TO6T	**10,047,402**	**3354**	**981**

Haiti

HH4/AF4Z	**2,978,820**	**1965**	**603**

Martinique

TO1C	**4,283,078**	**1963**	**797**

Mexico

XE1CXC	**2,660,367**	**2145**	**503**

Turks & Caicos

VQ59W	**5,353,638**	**2243**	**807**

Virgin Islands

KP2TM	**14,190,228**	**4646**	**1053**

AFRICA

Canary Islands

EH8A	**3,088,640**	**1588**	**640**

Madeira Islands

CQ95F	**23,507,296**	**4908**	**1256**
CQ3T	18,009,992	4297	1144

Mauritania

5T5DC	**2,004,912**	**1041**	**468**

Morocco

5D5A	**33,066,880**	**6372**	**1342**

ASIA

Armenia

EKØB	**7,641,211**	**2574**	**779**

Asiatic Russia

RT9W	**10,009,908**	**2940**	**909**
UA9UZZ	5,678,624	2132	808
RWØLT	**1,543,213**	**1311**	**491**
RK9CZO	831,082	679	406
RZ9WXK	385,029	422	239
RK9CYA	183,664	301	208
RXØLYP	24,628	126	94

China

B7M	**2,286,113**	**1754**	**631**
BY1QH	163,020	435	228
B1P	113,486	465	179
BY6AH	76,415	279	145
BY1TTY	35,620	211	137

Cyprus

P33W	**26,089,327**	**5621**	**1243**
C4N	17,440,784	4313	1114

Japan

JI2ZJS	**2,492,608**	**1436**	**632**
JA8RWU	**1,868,720**	**1200**	**568**
JA2ZJW	1,625,520	1181	521
JI2ZEY	1,426,425	1048	475
JF2QNM	1,068,408	1002	418
JA3YKC	**130,880**	**337**	**160**
JA7YCQ	**20,124**	**107**	**86**

Kazakhstan

UP9L	**1,609,872**	**1001**	**528**
UN4L	101,592	198	153

Kuwait

9K2HN	**15,858,564**	**4256**	**1038**

Qatar

A73A	**8,231,928**	**2960**	**908**

South Korea

D73D	**541,554**	**990**	**262**

Turkey

TB37F	**8,215,430**	**2650**	**811**
TC7KA	5,886,000	2370	720
TC3EC	3,325,756	1542	574

United Arab Emirates

A62ER	**3,822,420**	**1923**	**665**

EUROPE

Austria

OE2S	**8,467,888**	**3147**	**1144**
OE9R	2,707,614	1665	754

Balearic Islands

EH6R	**2,144,514**	**1802**	**678**

Belarus

EW8WW	**18,300**	**112**	**100**
EW6WA	5,502	47	42
EW8ZO	1,140	20	19

Belgium

OP4K	**3,295,866**	**1790**	**809**
OR5N	2,589,818	1652	737
OT5P	431,068	564	388

Croatia

9A8M	**4,527,141**	**2425**	**883**

Czech Republic

OL3Z	**5,415,511**	**2307**	**977**
OL1C	2,515,798	1549	743
OL7T	1,752,660	1346	630
OK2KOJ	617,716	704	404
OL2U	139,308	318	228

Denmark

OZ2AR	**956,709**	**978**	**507**
5Q2J	837,039	877	483

England

G6PZ	**6,216,336**	**2449**	**1008**
M4U	2,011,734	1515	657
G1T	458,451	603	399
G3YNN	89,976	227	184
M4A	7,840	81	70

European Russia

RK3QWW	**2,074,664**	**1554**	**652**
RT4D	1,903,250	1453	662
RZ4HZW	1,798,924	1616	668
RK3QWM	1,410,768	1259	582
RZ6HWA	1,104,520	984	530
RK3DXS	1,027,092	1016	502
RK3DZH	306,072	505	312
RK3AWK	184,698	389	279
R3TWA	144,040	315	260
RL3QWA	51,072	194	152
RK3PWJ	23,092	111	92

France

TM6M	**14,075,078**	**4109**	**1282**
TM7F	6,630,633	2802	1019
TMØR	3,604,768	2254	887

Germany

DP4A	**6,182,262**	**2627**	**981**
DJ8OG	5,137,384	2586	922
DQ8N	4,912,848	2395	939
DJØA	1,334,580	1060	580
DLØER	782,692	794	467
DK1F	674,660	779	427
DLØBRI	644,003	727	419
DM5A	401,940	564	348
DP5M	376,084	476	334
DLØTUM	228,158	389	301

Greece

SX3Z	**3,040,254**	**2344**	**766**
J43P	2,564,196	2222	732
SY8A	1,537,848	1527	636
J42WT	735,570	982	495

Ireland

EI9E	**2,917,816**	**1672**	**781**

Italy

IO5O	**7,911,360**	**3150**	**1072**
IR6T	1,374,600	1078	580
II1W	1,168,720	1033	560
IO2L	1,026,260	917	529
IW3IFJ	940,329	851	513

Lithuania

LY9Y	**6,662,782**	**2888**	**994**
LY3V	883,280	962	488

Norway

LN3Z	**3,885,819**	**2015**	**889**
LA3S	970,812	933	534
LN8W	97,600	233	200

Poland

SO9Q	**6,220,995**	**2726**	**1019**
SP75C	5,661,354	2648	937
SN2K	1,500,720	1133	592
SP1KZE	11,475	76	75
SP3KPN	2,652	43	39

Looking down the tower at LU1HF. (Inset: John, LU1HF, champion on single band 10 meters for the fourth consecutive year.)

Portugal			
CT6P	**2,434,534**	**1580**	**719**
CT7X	1,547,000	1370	680
Romania			
YO22NATO	**7,973,688**	**3608**	**1068**
YR2X	430,160	560	380
San Marino			
T77NM	**3,273,172**	**2045**	**812**
Slovakia			
OM7M	**9,746,737**	**3422**	**1183**
OM3RRC	506,709	665	383
OM3RKP	238,840	410	280
Slovenia			
S53M	**9,351,920**	**3241**	**1112**
S56P	4,282,913	2254	853
S51A	2,206,458	1605	666
Spain			
EE2W	**8,702,568**	**3268**	**1116**
EA1EEY	**6,234,162**	**2672**	**1023**
AO3A	**3,949,200**	**2260**	**900**
EA5JK	**1,520,163**	**1260**	**603**
AM5A	865,809	1225	567
AN7B	**784,168**	**799**	**469**
EB1IZD	608,650	825	470
EA4RCT	**520,344**	**879**	**438**
AO2W	389,610	573	390
EA4TX	42,939	157	117
Sweden			
SK7OA	**898,128**	**932**	**486**
8SØC/5	379,235	482	365
SI9AM	322,350	523	350
Ukraine			
UT7L	**4,171,545**	**2396**	**855**
UR4Z	3,447,720	2238	785
UZ1I	1,437,843	1341	561
US4IYM	201,168	405	264
UT7AXA	432	20	18

OCEANIA

Australia			
VK6FAU	**772,455**	**805**	**345**
VK4VSP	**14,416**	**88**	**68**
VK6AHR	4,680	50	45
Guam			
WH2DX	**2,769,340**	**1747**	**524**
Hawaii			
NH6P	**6,552,855**	**2959**	**653**
Indonesia			
YE1ZAT	**2,550,396**	**1485**	**566**
Marshall Islands			
V73PX	**4,877,190**	**2359**	**705**
New Zealand			
ZM4A	**1,784,160**	**1208**	**472**
ZL1AA	28,952	139	88

SOUTH AMERICA

Argentina			
LR2F	**12,745,026**	**3595**	**1134**
LU7FJ	1,298,746	953	503
LV6D	560,994	576	361
LU4DQ	167,754	290	219
LS4DX	89,159	74	329
Brazil			
ZY7C	**20,940,736**	**4738**	**1292**
PW2D	12,714,732	3603	1143
ZW5B	11,367,681	3363	1131
PP5JD	11,026,150	3318	1030
PR1T	8,684,340	2745	966
PR7AA	5,209,794	1802	762
PR5Z	2,554,400	1433	620
ZW5F	1,866,492	1063	556
Chile			
CC2A	**681,488**	**642**	**382**
Ecuador			
HD2A	**6,026,477**	**2396**	**757**
Netherlands Antilles			
PJ2T	**14,485,378**	**4085**	**971**
Peru			
OA4O	**3,059,208**	**1518**	**648**

MULTI-OPERATOR TWO TRANSMITTER

NORTH AMERICA

6Y1V	**29,018,014**	**6974**	**1306**
WE3C	**12,916,452**	**4059**	**1244**
KD4D/3	10,680,336	4175	1107
VE7SV	**8,564,446**	**3206**	**781**
VE3RM	**7,853,120**	**2517**	**880**
KI1G	**6,970,000**	**3056**	**1000**
W1CU/6	**6,854,546**	**3685**	**878**
VE6FI	**2,000,700**	**1478**	**494**
NG3U	1,801,534	1152	593
TO5RZ	**1,222,176**	**919**	**439**
KL5O	**558,030**	**814**	**285**
N2CW	**497,280**	**505**	**384**
W7RN	**191,800**	**429**	**280**
WØEBE	**35,505**	**211**	**135**

ASIA

C4I	**13,615,875**	**3781**	**975**
VR2C	**5,148,750**	**3369**	**750**
B7P	**3,226,608**	**2361**	**679**
BVØJ	**648,768**	**942**	**372**
B3C	646,500	1013	375
JA1ZGP	**225,365**	**451**	**235**

EUROPE

9A6BA	**16,471,710**	**5367**	**1305**
ES9DC	**13,724,640**	**5291**	**1215**
HG8BHQ	**12,871,896**	**4418**	**1228**
UU7J	**11,789,823**	**4849**	**1173**
OL7R	**9,949,407**	**3761**	**1131**
YT9X	**9,917,964**	**4214**	**1134**
AM3SSB	**9,126,700**	**3680**	**1100**
DABBCC	**8,929,620**	**3750**	**1119**
OL1X	6,270,660	2899	990
PI4COM	**3,501,924**	**1926**	**841**
AM1A	**2,179,681**	**1601**	**707**
AO1O	2,123,749	1474	677
CT8ARL	**1,391,648**	**1127**	**554**
PI4WNO	1,351,296	1151	544
G4IIY	**1,208,350**	**1049**	**550**
SP7SN	**1,066,240**	**862**	**490**
HB10DX	**1,032,512**	**967**	**544**
IQ5AE	**855,360**	**844**	**480**
LN1K	**230,681**	**487**	**313**
YP2Y	**161,670**	**359**	**255**
OK6A	152,375	342	265

OCEANIA

AH8BT	**6,054,723**	**2908**	**603**
ZM2M	**4,376,460**	**2112**	**660**
VK2ATZ	**2,794,902**	**1533**	**517**
VK4WIL	**668,168**	**775**	**289**

SOUTH AMERICA

LS2D	**8,904,135**	**2966**	**991**
XR6T	**6,473,724**	**2697**	**839**
ZV2K	**942,144**	**738**	**448**

MULTI-OPERATOR MULTI-TRANSMITTER

NORTH AMERICA

NQ4I	**12,051,526**	**5648**	**1142**
NR6O	**7,176,202**	**4309**	**869**
WX3B	**4,907,747**	**2392**	**901**
NE1C	**4,726,400**	**2715**	**896**
VE5RI	**1,242,605**	**975**	**455**
WC8VOA	**211,728**	**440**	**264**
W9VT	**163,800**	**388**	**225**

AFRICA

AO8A	**43,180,084**	**7914**	**1387**

ASIA

RK9AWN	**2,883,000**	**1390**	**600**
BPØP	**1,857,612**	**1774**	**547**
B1Z	**1,492,320**	**1592**	**480**

EUROPE

DR1A	**22,340,676**	**6907**	**1389**
OT5A	**16,285,416**	**5607**	**1302**
LZ9W	**14,928,360**	**5814**	**1240**
LY7A	**8,371,200**	**3881**	**1024**
EB1WW	**7,711,155**	**3551**	**1047**
SX5P	**6,530,185**	**3635**	**995**
SN6O	**4,582,080**	**2508**	**860**
SN75T	1,650,873	1236	619
SP75S	684,648	728	444
SF6DX	**523,083**	**652**	**393**
DKØGYB	129,055	346	265
DR2P	122,765	316	215
DLØERP	16,102	94	83

OCEANIA

DX1DBT	**1,060,199**	**1149**	**311**

SOUTH AMERICA

LT1F	**21,812,848**	**5335**	**1264**
YW4M	**15,813,406**	**4457**	**1022**

CHECKLOGS

The following logs were used as checklogs. Checklogs are always appreciated. 2E1EVJ, 403A, 4Z5FL, 4Z5OZ, AD5VJ, AO4K, C31CT, CU2JT, D44AC, D4C, DG1BQC, DG5YHZ, DK7GH, DL1DXF, DL2AL, DL2DXA, DL3KVR, DL7DZ, DL8UFO, DL8UVG, DM1LM, DM5JL, DM7DX, EA3BJM, EA7HY, EA7RU, EA9IE, EC5APA, EE2K, ER5GB, ES5EP, EW1KV, F4EMN, F4FHI, GØRPM, G3NXT, G3RWL, G3TQZ, HA1SN, HB9EGA, HG1848I, IK2HLM, IZ5MOQ, J39BS, JI3BFC, JJ3TBB, KØADE, K6FM/7, KL8DX, KN6Y, LA4RT, LA8HGA, LA8OM, LA9NM, LU1BJW, LX1EA, MØKNG, N1WQ/Ø, NM1JY, OGØR, OK2OP, OK2QX, OM4F, ON3OS, ON70REDSTAR, ON7SS, ON8AKU, OO9O, OZ3EN, PAØCOR, PD2EDR, PF5X, PY3ATR, PY3EAM, PY3OPP, RA3AD, RA3OE, RA3XDX, RA9AC, RK4PA, RK9JYY, RN6BY, RN6FK, RN9AA, RU3EJ, RU6LG, RV3DUT, RW3VA, RZ1OM, RZ6BU, RZ9UO, SM4YPH, SM7N, SN5M, SN5Z, SN6Z, SP1DMD, SP1MWF, SP2QCU, SP5AAJ, SP5ANY, SP5ELW, SP5XSD, SP7AWG, SP7HOV, SP7QHR, SP9MDY, SQ5M, SQ5WAA, SQ6MS, SQ7IL, SQ9IAU, TF4M, UA3RAB, UA4UT, UA6GU, UA6HCA, UA9CMQ, UA9JLL, UA9LGD, UR4UGL, US0LW, US5XD, US7MM, UUØJC, UU2JG, UXØFY, VE3FDT, VE3LR, VP2E, W7VS, WA9OUE, WD5EAE, YL5T, YO4BEX, YO5OEF, YO6OAF, YO6OHS, YO7DAA, YO9FWX, YR9F, ZL4CR

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Looking Ahead in CQ

Here are some of the articles we're working on for upcoming issues of *CQ*:

- 2009 CQ Market Survey, by Gordon West, WB6NOA
- Ham Radio Groundhog Day, by Henry Hill, WA3CVC
- Creating a Ham Radio Legacy, by Emily Stewart, KCØPTL

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/guide.html>.

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- Wideband RX - 900 Memories
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50/144/222/440 Handheld

- 5w (1W 222)
- Bluetooth optional
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Ultra compact HF, VHF, UHF

- 100w HF/6M, 50w 2M, 20w UHF
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- 1000+ Mems
- WIRES Capability
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The optional GPS Antenna Unit FGPS-2 can be either directly attached to the radio using the microphone input jack or to the optional external microphone MH-74A7A.

•Shown with the optional FGPS-2 GPS Antenna and the optional CT-136 Adapter.

•The optional GPS Antenna Unit FGPS-2 attached to the optional Speaker/Microphone MH-74A7A

Actual size

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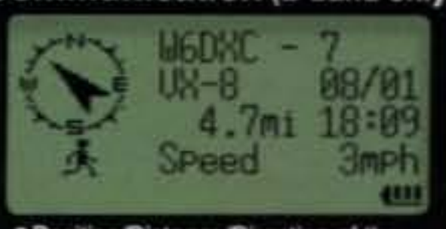
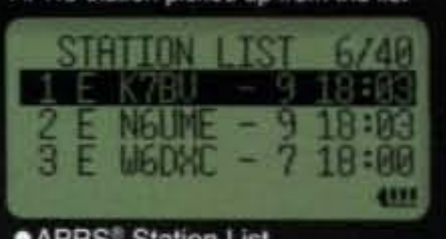
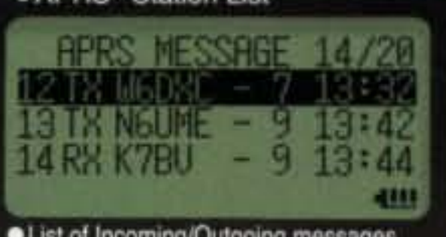
APRS® 1200/9600 bps Data Communication (B band only)



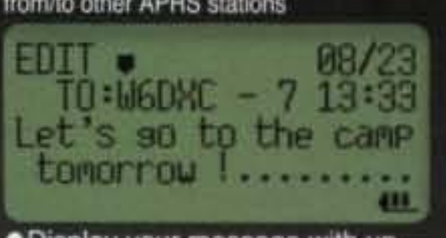
•Position/Distance/Direction of the APRS station picked up from the list



•APRS® Station List



•List of Incoming/Outgoing messages from/to other APRS stations



•Display your message with up to 67 characters

50/144/(222)*/430 MHz
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VX-8R NEW

***222 MHz: 1.5 W** (USA version)

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- **Bluetooth® for Hands-free Operation *1**
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- **A large LCD backlit display in a compact case!**
- **Up to 9 hours *3 of Amateur Band operation with the optional FNB-102LI, high capacity Lithium-ion Battery.**

*1 With optional accessories
*2 Cellular Blocked per FCC rule Part 15.121, may not receive 900 MHz Amateur band
*3 Assuming a duty cycle of 6-second transmit, 6-second receive, and 48-second standby (50 MHz 5 W)

* APRS® is a registered trademark of Bob Bruninga WB4APR.

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