Amateur Radio

http://www.cq-amateur-radio.com

COMMUNICATIONS & TECHNOLOGY

AUGUST 2009

CQ

- 1A3A: Contesting from "SMOM," p. 13
- SSB Results, 2008 CQ World-Wide DX Contest, p. 20
- End of the Line for Navy MARS? p. 46

On the Cover: Well-known DXers Lynn (W4NL) and Rosie (KA4S) Lamb at their station in Maryville, Tennessee. Details on page 60.

KENWOOD

Listen to the Future

TS-480

The Perfect Remote Base Transceiver

Straight Out of the Box!

- The perfect internet base transceiver - straight out of the box!
- Easy to operate.
- The size makes it great for base, mobile or portable operation.
- Free VoIP/Control software downloads at Kenwoodusa.com.
- Incredible RX specifications.
- No expensive sound card interface needed.

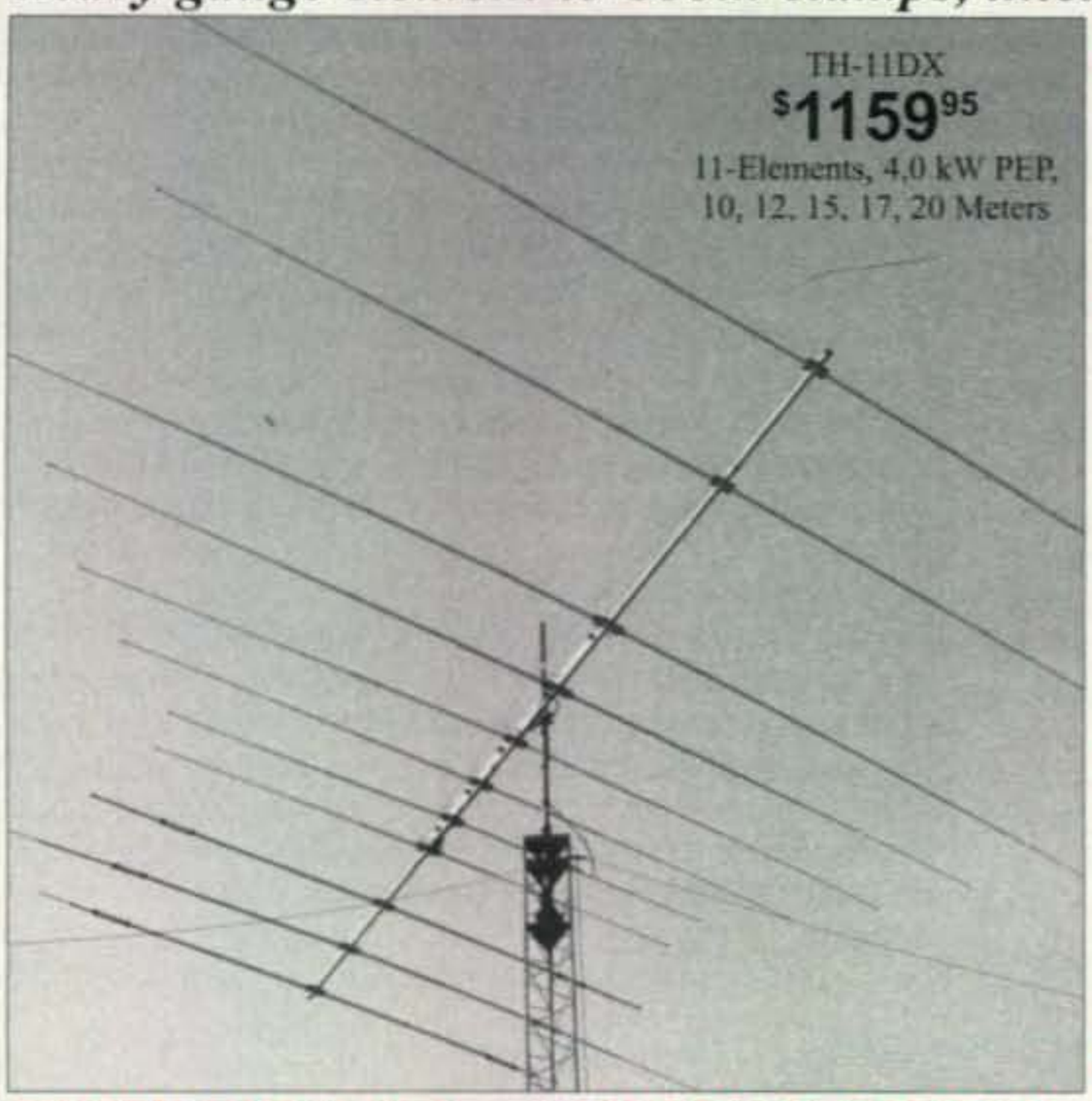
KENWOOD U.S.A. CORPORATION
Communications Sector Headquarters
3970 Johns Creek Court, Suite 100, Suwanee, GA 30024
Customer Support/Distribution
P.O. Box 22745, 2201 East Dominguez St., Long Beach, CA 90801-5745
Customer Support: (310) 639-4200 Fax: (310) 537-8235

www.kenwoodusa.com
ADS#31508

ISO9001 Registered

hy-gain® HF BEAMS...

. . . are stronger, lighter, have less wind surface and last years longer.
Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!



TH-11DX, $1159.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

The choice of top DXers.

With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

Features a low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

Stainless steel hardware and clamps are used on all electrical connections.

TH-7DX, $869.95. 7-element, 1.5 kW PEP, 10,15,20 Meters

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $759.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH™*, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $469.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

Features *Hy-Gain BetaMatch™* for DC ground, full power *Hy-Q™* traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $369.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $599.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

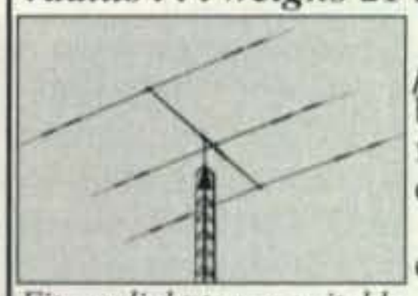
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

***Truly** competitive against giant tri-banders at half the cost!*

QK-710, $179.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



Fits on light tower, suitable guyed TV pole, roof tri-pod

TH-3JRS, $359.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

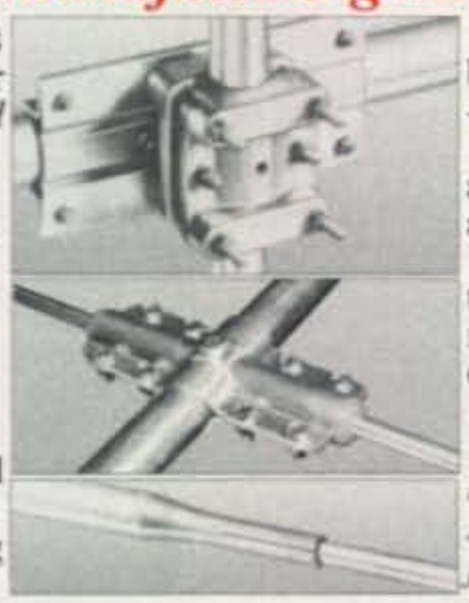
Model No.	No. of elements	avg gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	boom feet	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Sugg. Retail
TH-11DX	11	*For Gain and F/B ratio--See...* • www.hy-gain.com • Hy-Gain catalog • Call toll-free 800-973-6572		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1159.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$869.95**
TH-5MK2	5			1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$759.95
TH-3MK4	**3**			**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$469.95**
TH-3JRS	3			600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$359.95
TH-2MK3	**2**			**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$369.95**
EXP-14	4			1500	10,15,20	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$599.95

Tooled Manufacturing . . . Highest Quality Materials

1. **Hy-Gain's** famous super strong *tooled* die cast *Boom-to-Mast Clamp*

2. ***Tooled*** *Boom-to-Element Clamp*

3. **Thick-wall** *swaged* aluminum tubing



***Tooled** manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

***Hy-Gain** antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

Free Hy-Gain Catalog

and Nearest Dealer . . . 800-973-6572
Call your dealer for your best price!

hy-gain®

Antennas, Rotators & Towers

308 Industrial Park Road, Starkville, MS 39759 USA
Toll-free Customer Sales Hotline: 800-973-6572
• **TECH:** 662-323-9538 • **FAX:** 662-323-6551
http://www.hy-gain.com

NASA: The Sunspot Cycle is not "Broken"

A pair of jet streams some 4000 miles below the surface of the sun may be responsible for the slow beginning of solar Cycle 24, according to two researchers from the National Solar Observatory in Tucson, Arizona, whose remarks were reported by NASA.

Speaking to reporters at a meeting of the American Astronomical Society in Boulder, Colorado, in mid-June, researchers Rachel Howe and Frank Hill reported that the jet streams start near the sun's poles every 11 years and slowly migrate toward the equator. When those jet streams approach 22 degrees latitude, they said, new-cycle sunspots begin to appear. Using a technique called *helioseismology,* Howe and Hill have been able to track the progress of these jet streams and said they're currently moving more slowly than usual, taking three years to cover a 10-degree range that is typically covered in two.

The good news: Howe and Hill report that the jet streams are finally reaching the critical 22-degree latitude and that new groups of sunspots are beginning to emerge. NASA's Dr. Tony Phillips wrote that the research dispels concerns of a prolonged solar minimum, adding, "The sun's internal magnetic dynamo is still operating and the sunspot cycle is not 'broken'."

CQ Propagation Editor Tomas Hood, NW7US, in an online commentary on the CQ website, had challenged May's report from solar "experts," suggesting that we were heading into a short, weak cycle. "No one can postulate with any credibility just how intense the new cycle will be, because there's no direct correlation between this solar minimum and any regular pattern of past minimums," Hood wrote. His complete commentary may be read online by going to <http://www.cq-amateur-radio.com> and clicking on "Online Commentary."

McDowell Renominated to FCC

President Obama announced in early June that he would nominate FCC Commissioner Robert McDowell to a full five-year term on the Commission. McDowell, a Republican, was originally appointed by President George W. Bush to complete the unexpired term of Commissioner Kathleen Abernathy, which ran through June 30th of this year. McDowell was sworn in on June 1, 2006. A communications attorney, McDowell served as a senior executive in a telecommunications trade group and a legislative aide to a Virginia state legislator before being named to the FCC. The White House statement highlighted McDowell's experience in creating rules governing wireless auctions, establishing a framework for unlicensed use of TV "white spaces," and developing incentives to encourage new broadband technologies. McDowell's nomination is subject to Senate confirmation.

Three New Ham-Band Cubesats Launched

Three small "CubeSats" carrying amateur radio transmitters were among five satellites launched successfully in late May from NASA's mid-Atlantic spaceport on Wallops Island, Virginia. An Air Force satellite was the primary payload, and a fourth CubeSat did not carry a transmitter on amateur frequencies.

According to the AMSAT News Service, the three satellites carrying ham-band transmitters, all operating on 437 MHz, are PharmaSat-1, launched by NASA and Stanford University; CP-6 from California Polytechnic State University (CalPoly), and HawkSat-1 from the Hawk Institute for Space Sciences. At press time, none of the sponsors had requested or received OSCAR numbers for the satellites.

Weather Service Predicts "Near Normal" Hurricane Season

The National Weather Service's Climate Prediction Center's initial outlook for the 2009 hurricane season, which began June 1, is that it will more than likely be "near normal" ... or not. According to the CPC, there is a 50% chance of a near-normal season—meaning 9 to 14 named storms, of which four to seven could become hurricanes and one to three might become major hurricanes. But there's also a 50% chance, evenly split, that there will be a below normal or above normal season.

"Regardless of the seasonal outlook," said lead forecaster Gerry Bell, people in areas often threatened by hurricanes should prepare for the worst. "It takes only one landfalling storm to make it a bad season," he noted. According to Commerce Secretary Gary Locke, whose department includes the National Weather Service and the National Hurricane Center, more than 35-million Americans live in regions most threatened by Atlantic hurricanes.

FCC Getting Tough With Power Company

Nearly three years after first contacting Duke Energy about interference complaints from a ham in Cincinnati, the FCC is starting to lose patience with the utility. In a May 4 letter to the company, Special Counsel Laura Smith recounted the exchanges of correspondence and promises of action but pointed out that the problems persist. She even noted that the complainant had gone out on his own and noted the specific locations of several possible noise sources.

"Given the fact that this case has been ongoing for quite some time without resolution," Smith wrote, "you are directed to respond to the undersigned within 30 days ... detailing what steps you have taken to resolve (the interference)." In addition, she told the company that if the problems persist for more than 60 days, "Duke Energy will be required to provide (the FCC) with a status update every two (2) weeks going forward as to what progress, if any, has been made to resolve the matter."

WB4APR Proposes New HF-HF Satellite Transponder

The "father" of APRS, Bob Bruninga, WB4APR, is proposing a new combination of ham bands for satellite transponders. According to Newsline, Bruninga is looking for design help in developing a transponder that would operate on single sideband with an uplink on 29 MHz and a downlink on 24 MHz. He is interested in integrating that into a satellite design that would also include APRS (Automatic Packet Reporting System) on 2 meters as well as a 2-meter FM downlink for the SSB voice signals transmitted up to the bird on 29 MHz.

Belgian Ham Slated to be Space Station Commander

Frank DeWinne, ON1DWN, reportedly has been named commander of the International Space Station's Expedition 21 crew, the first European Space Agency astronaut to be given the status. All commanders so far have been either Americans or Russians. According to the AMSAT News Service, De Winne was scheduled to be launched from Kazakhstan in late May to become part of the Expedition 20 crew, and would become commander with the next crew rotation, before heading home to Earth in November.

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.

TOKYO HY-POWER

The Biggest and Smallest Amps in the Industry!

HL-1.5KFX

HF/50MHz Linear Power

Outstanding for Desktop or DX-peditions!

Lightest and Most Compact 1kW HF Amplifier

Features

- The amplifier's decoder changes bands automatically with most ICOM, Kenwood, Yaesu.
- Solid State.
- The amp utilizes an advanced 16 bit MPU (microprocessor) to run the various high speed protection circuits such as overdrive, high antenna SWR, DC overvoltage, band miss-set etc.
- Built in power supply.
- AC (200/220/235/240V) and (100/110/115/120V) selectable.
- Equipped with a control cable connection socket, for the HC-1.5KAT, auto antenna tuner by Tokyo Hy-Power Labs.

Specifications

Frequency:
1.8 ~ 28MHz all amateur bands including WARC bands and 50MHz
Mode:
SSB, CW, RTTY
RF Drive:
85W typ. (100W max.)

Output Power:
HF 1kW PEP max.
50MHz 650W PEP max.
Circuit:
Class AB parallel push-pull
Cooling Method:
Forced Air Cooling

AC Power:
AC 240V default (200/220/235) – 10 A max.
AC 120V (100/110/115) – 20 A max.
Dimensions:
10.7 x 5.6 x 14.3 inches (WxHxD)/272 x 142 x 363 mm
Weight:
Approx. 20kgs. or 45.5lbs.

Optional Items:
Auto Antenna Tuner (HC-1.5KAT)
External Cooling Fan (HXT-1.5KF for high duty cycle RTTY)
Accessories Included:
Band Decoder Cables included for Kenwood, ICOM and some Yaesu

HL-1.1KFX

Lightweight HF Linear

NEW!

Features

- The amplifier allows operation in full break-in CW mode due to the use of the amplifier's high speed antenna relays.
- The amp utilizes a sophisticated circuit to run the various high speed protection circuits such as overdrive, high antenna SWR, DC overvoltage, band mis-set etc.
- An analog multimeter allows the operator to monitor Pf (Forward output power), Pr (Reflected power), Vd (Drain voltage of power FET), Id (Drain current) etc.

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.
CW 600W.
RTTY 500W (5 minutes)
Final Transistor:
SD 2933 x 4
(MOS FET by ST micro)
Circuit:
Class AB parallel push-pull

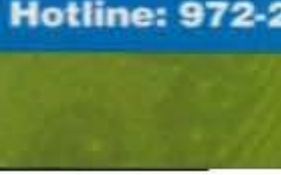
Cooling Method:
Forced Air Cooling
Multi-Meter:
Output Pf 1kW, Reflected Power 100W, Drain Voltage Vd 60V, Drain Current Id 50A
Input/Output Connectors:
Type M-J (UHF SO-239)
AC Power:
1.4kVA max. when TX
AC 100 ~ 250V (Auto Select)
Dimensions:
9.1 x 5.6 x 14.3 inches (WxHxD)
Weight:
Approx. 22.5 lbs.

More Fine Products from TOKYO HY-POWER

HC-1.5KAT
HF 1.5KW Auto Tuner

HL-2.5KFX
Legal Limit 1.5kW HF Amplifier

HL-45B
HF/50MHz 45W Linear Power Amplifier



HL-1.2KFX
750W PEP HF Desktop Linear

TOKYO HY-POWER

Visit Our NEW Website:
www.tokyohypower.com

TOKYO HY-POWER LABS., INC. – USA
6046 FM2920 Rd. Suite 133
Spring, Texas 77379-2542
USA Factory Support Tel: 713-818-4544
USA Factory Email: thpsupport@airmail.net

TOKYO HY-POWER LABS., INC. – JAPAN
1-1 Hatanaka 3chome,
Niiza Saitama 352-0012
Phone: +81 (48) 481-1211
FAX: +81 (48) 479-6949
e-mail: info@thp.co.jp

— Visit Our Tokyo Hy-Power Dealers —

HAM RADIO OUTLET
WORLDWIDE DISTRIBUTION

www.hamradio.com

Western US/Canada 1-800-854-6046	Mid-Atlantic 1-800-444-4799
Mountain/Central 1-800-444-9476	Northeast 1-800-644-4476
Southeast 1-800-444-7927	New England/Eastern Canada 1-800-444-0047

Array Solutions
WE'VE GOT YOUR STUFF

Now Available from Array Solutions
www.arraysolutions.com

Phone: 972-203-2008
sales@arraysolutions.com
Fax: 972-203-8811

THP Hotline: 972-203-2008

CQ contents

AUGUST 2009

p. 13

p. 62

Vol. 65 No. 8

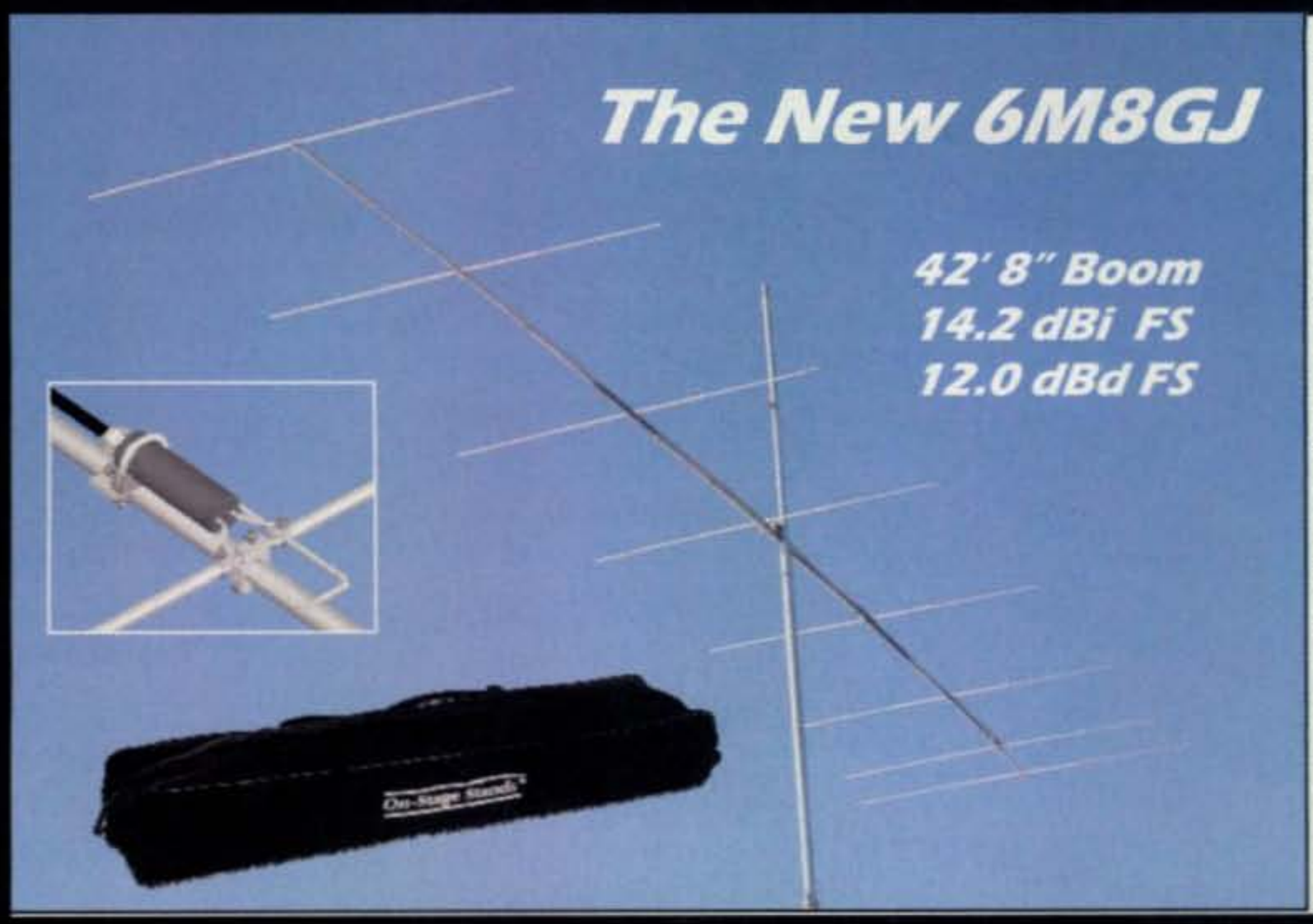
features

p. 77

departments

p. 20

Get ready for your next 6M DXpedition...



The 6M8GJ yagi is the culmination of many years & countless versions of the "40 Foot Trip Yagi." Inspired by W7GJ who, for years tirelessly promoted 6M EME & DXpedition activity. Computer optimized for the exact conditions we find in most DXpedition locations, a height of 20 to 30 feet. Boom sections are 2 1/2" diameter and the rest of the sections all telescope in 1/2" or 1/4" increments. The entire boom breaks down to a 2 1/2" x 5" x 45" bundle. Rugged 1/2" x 40" element center sections and 3/8" diameter tips mount to boom sections with commercial grade clamps. A new Fairite 1:1 Balun for extended service. Optional items include: Nylon carry bag & portable 20+ foot mast that telescopes as well and fits in the same carry bag with the antenna. The mast comes with Dacron guys, slip ring & anchors.

The start of our new HF Light Duty Yagi's

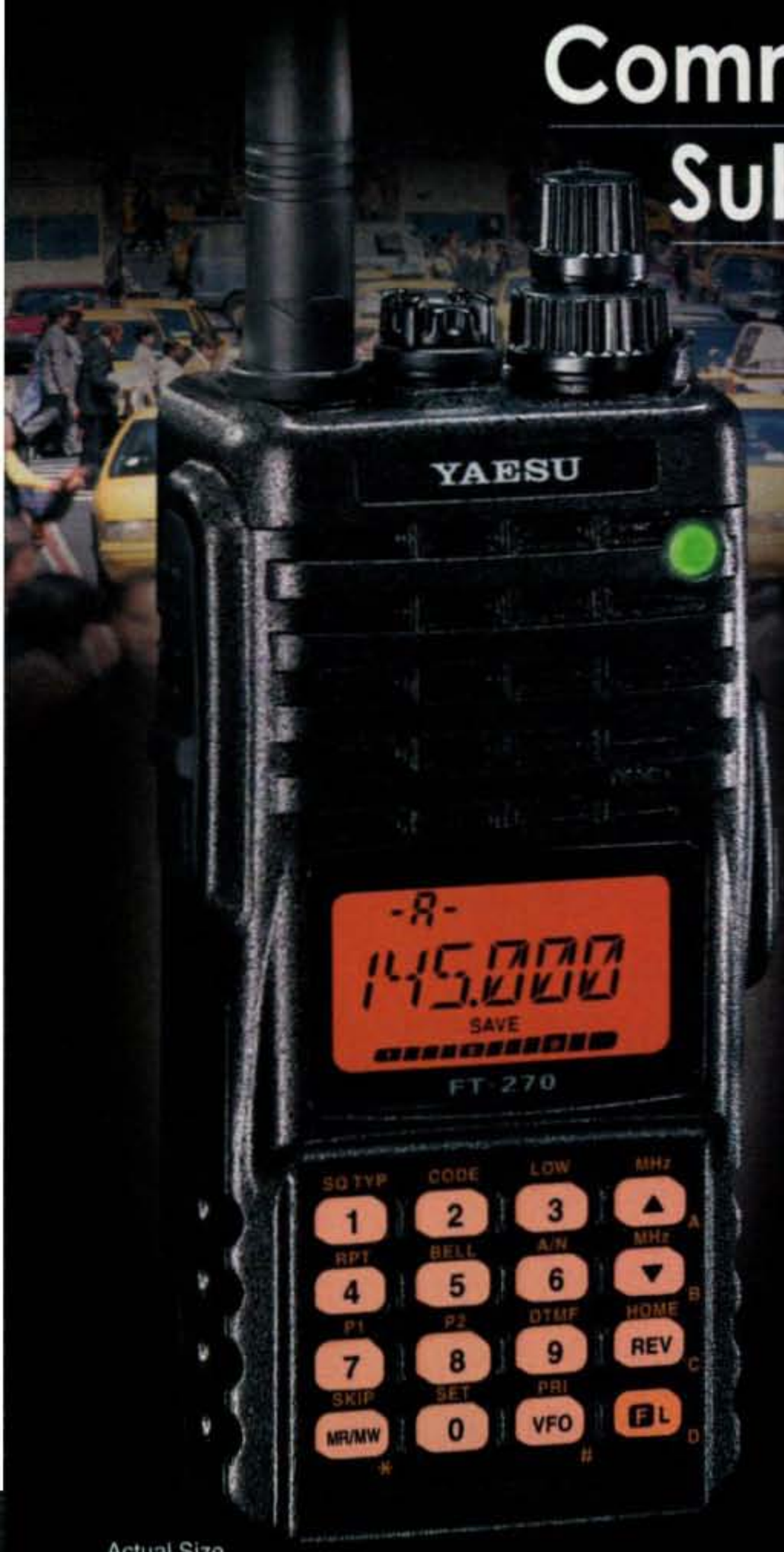
The 20M5LD features the same on air performance as it's very popular, heavy weight brother the 20M5, but it is much lighter. We listened to our customers and have carefully reduced it's weight significantly while reducing the wind survival rating by only 10 MPH. The 20M5LD has the same clean pattern and great gain across the band. We have also made it a "Direct Feed" yagi requiring no matching, only a 1:1 balun. It is easier and quicker to assemble as well as easier to install. Stacking a pair will cost less and put less stress on your tower ! Mechanically, a pair of machined, 3/8" x 4" aluminum boom to element plates and saddles ground each parasitic element and keep elements aligned perfectly for years to come. Elements taper in 1/4" steps from 1-1/4" to the adjustable 1/2" tips. The re-designed 44 foot x 3" boom is a full 1/8" wall in the center section but the tips are half the weight at 1/16". All critical hardware is stainless steel. The 20M5LD is available through our fine distributors worldwide.

Coming Soon →

- New Line of Baluns for our HF Antennas
- New Line of Build Your Own Antenna Parts

M2 Antenna Systems, Inc.
4402 N. Selland Ave.
Fresno, CA 93722
Tel: 559-432-8873
Fax: 559-432-3059

M2 Offers many HF Logs, Monobanders and Multiband products.
Not to mention our full line of VHF, UHF and Microwave antennas.
Were your one stop shop for all of your
High Quality Antenna needs.
Check us out on the web at www.m2inc.com



Actual Size

VHF FM 5 W COMPACT HANDHELD TRANSCEIVER

FT-270R

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

NEW 2 m MONO BAND

Commercial Grade Field Radio
Submersible Construction

- Large Backlit LCD Display for easy operation
- 5 Watts of Stable RF Power with Minimum Components for Reliability
- 800 mW of Loud Audio for noisy field operations
- 200 Memory Channels for Serious users
- Commercial Grade Receivers Performance
- Submersible Construction (3 ft. for 30 min)
- Yaesu Exclusive Power Saving Circuit Design Guarantees Longer Operating time
- Hands Free Operation with Optional VC-24 VOX Headset

Wide Range of available Options includes:
- CD-26 Charger Cradle
- VAC-370B 1.5 Hour Desktop Rapid Charger
- External DC Jack for Cigarette-Lighter adapter E-DC-5B or DC Cable E-DC-6
- FBA-25A Alkaline Battery Case (for 6 X AA cells)
- FTD-7 DTMF Paging Unit

ULTRA-COMPACT 5 W 2 m FM HANDHELD TRANSCEIVER

FT-250R

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

NEW 2 m MONO BAND

Compact Field Radio with
Top Mounted LCD and Loud Audio

- Compact Design with Top mounted LCD Display
- 5 Watts of Stable RF Power with Minimum Components for Reliability
- 700 mW of Loud Audio for outside field environments
- 200 Memory Channels for serious users
- Yaesu Exclusive Power Saving Circuit Design Guarantees Longer Operating time
- Hands Free Operation with Optional VC-25 VOX Headset

Wide Range of available Options includes:
- External DC jack for Cigarette-Lighter adapter E-DC-5B or DC cable E-DC-6
- 6 X AA size Alkaline Battery Case FBA-25A

YAESU
Choice of the World's top DX'ers

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

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

The King of Mobile

- Massive Heatsink guarantees 75 Watts of Solid RF Power with No Cooling Fan Needed
- Loud 3 Watts of Audio Output for noisy environments
- Large 6 Digit Backlit LCD for excellent visibility
- 200 Memory Channels for serious users

75 WATTS

HEAVY-DUTY 75 W 2 m FM TRANSCEIVER

FT-2900R

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

NEW

2 m MONO BAND

55 WATTS

Best Selling, Reliable Mobile

- 55 Watts of Solid RF Power within a compact footprint
- Loud 3 Watts of Audio Output Power for noisy enviroments
- Large 6 Digit Backlit LCD for excellent visibility
- 200 Memory Channels for serious users

NEW

ULTRA RUGGED 55 W 2 m FM TRANSCEIVER

FT-1900R

2 m MONO BAND

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

YAESU

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

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

zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

National Hamfest Vendor Appreciation Month

My predecessor in this seat, the late Alan Dorhoffer, K2EEK, used to love telling stories about "Travels With CQ," regaling readers with the adventures and misadventures—and mostly the food—encountered on trips to various hamfests around the country. As we mark the tenth anniversary of Alan's passing in the summer of 1999, I thought it would be an appropriate tribute to return to his favorite topic, particularly since circumstances have conspired/cooperated to give me some great stories to pass along (great, that is, as long as you weren't in the middle of them).

If you're like most hams, you go to one or two local hamfests each year, and if you're lucky, perhaps one of the bigger regional shows and/or the Dayton Hamvention®. At the bigger shows, you'll get to meet manufacturers' representatives and other vendors—including us—who may travel a thousand miles or more to be there to greet you. Chances are, you don't think too often about what's involved in getting there for those of us who devote multiple weekends each year to displaying and/or selling stuff at hamfests, including dicey travel connections, delayed or missing freight shipments, and other encounters with Murphy. Therefore, I wanted to give you an opportunity this month to get a glimpse from "the other side of the booth."

The hamfest circuit in mid-June brings us to Plano, Texas, about 45 minutes north of Dallas, for Ham-Com. Traveling in the central U.S. in June carries with it the great likelihood of encountering delays due to the big late-spring thunderstorms that regularly pop up, sometimes spawning tornadoes as well. Ham-Com is a Friday/Saturday show, which means that the vendors roll in Wednesday or Thursday in order to have their booths set up by the time the doors open on Friday morning. This year, the Dallas area—and particularly the Dallas-Fort Worth Airport (DFW)—got hit with massive thunderstorms both on Wednesday night and Thursday morning, forcing the airport to shut down for several hours on both days. Here are a few stories of what some of us had to go through to get there … and it's worth noting, by the way, that several vendors had been at the Seapac show in the Pacific Northwest the previous weekend, so they barely had time to get back home before packing up and hitting the road again.

Eric Swartz, WA6HHQ, of Elecraft, was one of those folks. He left Monterey, California at 3:30 Wednesday afternoon to fly to Los Angeles and get a connecting flight to Dallas. When he arrived in LA, he found that his scheduled flight had been cancelled, and he was put on the next flight, which was delayed. He arrived in Dallas just as the Wednesday night storm was beginning, and was informed that the airport was closed and that the bags couldn't be removed from the plane until the rain ended. He was advised to come back for them in the morning. When he got there on Thursday, the morning storms had already begun! Fortunately, his bags were already inside, but he had to load them up and drive back to Plano in a massive storm that dumped six inches of rain on the airport in just a few hours' time!

Phil Parton, N4DRO, Kenwood's national sales manager for amateur radio products, was flying out of Atlanta. His flight Thursday morning took off an hour and a half late. During the flight, the pilot told them DFW was closed and that they would need to circle, which they did for an hour and half before landing. Phil's luggage didn't make the trip with him, arriving on the following flight.

CQ Advertising Manager, Don Allen, W9CW, flying in Thursday morning on a commuter jet from Illinois, took off on time and landed on time … right after DFW was shut down. Since no planes were taking off, there were no gates open for arriving flights, and he sat on the tarmac in that little regional jet for more than three hours!

Julius Jones, W2IHY, of W2IHY Technologies, was flying to Dallas from White Plains, NY by way of Atlanta. He was due in at DFW at 11:40 AM. His first flight left nearly an hour late and he had to run through the airport in Atlanta to make his connection, which took off right on time. About an hour in, though, the pilot reported that DFW was closed and that they were returning to Atlanta. He got back there about the time he was supposed to arrive in Dallas, got rebooked on a 5 PM flight, and got in around 7 PM, too late to start setting up for the show. Fortunately, the Ham-Com folks were very accommodating and opened the hall an hour early (6 AM) on Friday morning for vendors who hadn't been able to set up the night before. *(A collective "thank you" to the Ham-Com folks from all of us.)*

Heil Sound's Chip Margelli, K7JA, found that his 9:45 AM Thursday flight out of Orange County Airport in California was cancelled and was told there were no seats available until Friday morning on any flight out of Orange County, Ontario, or LAX (Los Angeles International). Chip found a 3:30 PM departure out of San Diego and drove down there. The flight was about to push back from the gate when the pilot announced there was an electrical problem. Everybody off the plane. … Luckily, according to Chip, "another MD80, which had escaped from DFW," was on the ground in San Diego. It was pressed into service as a replacement and he arrived in Dallas at 12:30 AM Friday.

Dave Rosenbaum from Battery Tech had an 11:30 AM Thursday flight out of La Guardia Airport in New York City, which was delayed to 2:00 PM and then cancelled. He was rebooked on a 3 o'clock flight out of JFK Airport, which was also delayed and then cancelled. He was offered a seat the next morning on a flight to Dallas via Boston, but declined. He found a

(Continued on page 111)

Oops…

We misidentified the prime sponsor of House bill H.R. 2160 in last month's "Zero Bias" editorial. Her correct name is Rep. Sheila Jackson-Lee, not Shirley. Our apologies to the Congresswoman. Also, in the first sentence of that editorial, we listed the bill number as H.R. 12160. The correct number is 2160, shown correctly in all other references. We regret any confusion.

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

FLEX-3000
HF-6M Transceiver

- High resolution, real time panadapter
- See the weak ones before you hear them
- Point click tuning (faster than tuning with a knob)
- Find that clear frequency during split-operation
- Hop on the frequency of the last station heard in a flash
- See who is splattering and who is not

See it, work it, log it...
On your FlexRadio.

Tune in Excitement.™

Order Yours Today!

www.flex-radio.com
sales@flex-radio.com 512-535-5266

FlexRadio Systems®
Software Defined Radios

announcements

2009 Kansas QSO Party – Sponsored by the Boeing Employee ARS of Wichita, KS, and the Santa Fe Trail ARC of Olathe, KS. Times and bands: 1400Z August 29 to 0200Z August 30, and 1400–2000Z August 30, on 160, 80, 40, 20, 15, 10, 6, and 2 meters. For the complete rules go to: <http://www.ksqsoparty.org/>.

• The following Special Event stations are scheduled for August:

N2Y, from CanalFest 2009, Collins Park/Freedom Park in Scotia, Glenville, NY; 1600–200Z August 8 & 9 on 14.245, 7.245, PSK 14.070, CW 14.060 MHz. For QSL send QSL and SASE to L. W. Eaton, KC2BLC, 7 Wagon Wheel Lane, Scotia, NY 12302-3708.

WA3KEY/2, from 16th annual reunion of Aicraft Carrier U.S.S. Intrepid Association of Former Crewmembers, from flight deck of the Intrepid (CVS-11), Hudson River, NY; 1600Z August 14 to 0100Z August 15 on 3.875, 7.240, 14.275, 21.375, 28.575 MHz. For QSL certificate send business-size SASE with contact number to WA3KEY, PO Box 498, Quakertown, PA 18951. (www.wa3key.com/events.html)

W3O, from commemoration of the Sesquicentennial of Oil, Drake Well, near Titusville, PA; Fort Venango Mike and Key ARC; 1600Z August 28 for 12 hours and again at 1200Z August 29 for 16 more hours on 20, 40, 80, 160 meters CW and SSB. QSL with SASE to Fort Venango Mike and Key Club, W3ZIC, PO Box 99, Cranberry, PA 16319.

K4AI, from 75th Annual APCO Conference & Exposition, Las Vegas, NV; APCO International Amateurs; 1700–2300Z August 16–19 on SSB 3.860, 7.280, 14.310, and 146.580 FM MHz. For certificate send QSO info and 9x12 SASE to K4AI Special Event Station, c/o Conference & Meeting Services Dept. APCO Headquarters, 351 N. Williamson Blvd., Daytona Beach, FL 32114-1112, (http://tinyurl.com/APCO-K4AI)

K5R, from commemoration of anniversaries of Hurricanes Katrina and Rita, Hammond, LA; Southeast Louisiana ARC; 1400–2000Z August 29 on 14.250 and 7.250 MHz. For QSL send QSL and SASE to SELARC (K5R), PO Box 1324, Hammond, LA 70404.

W8AL, from Pro Football Hall of Fame Festival, Canton, OH; Canton ARC; 1200–2400 each day August 7–10 on 7.265, 14.365, 21.365, 28.365 MHz. For certificate send QSL and 9x12 SASE to Donald E. Perry, WQ8J, 968 Culverne Ave. NW, Massillon, OH 44647.

W8CYE, from celebration of 66 years of R.L. Drake communications excellence, Miamisburg, OH; R.L. Drake ARC; 1400–2100Z August 22 on 7.260, 14.260, 18.160, 28.360 MHz. For certificate send QSL and SASE to Drake ARC, c/o Gary Hardwick, 498 Lake Front Drive, Lebanon, OH 45036.

W8LKY, from commemoration of Alliance, OH as the home of the state flower, the scarlet carnation; Alliance ARC; 10 AM to 6 PM local time August 15 on 40, 20, 15, and maybe 6 meters SSB/CW. For certificate send QSL and SASE to Alliance ARC, PO Box 3344, Alliance, OH 44601.

W9PVR, from Muskets & Memories Civil War Era Commemoration, Boscobel, WI; Pine Valley Repeater ARC of Richland, WI; 1400–2300Z August 1 and 1400–2100Z August 2 on CW 3.820, 7.055, 14.060 MHz; SSB 3.850, 7.250, 14.320; PSK 14.070. QSL to Ralph Gray, W9RIG, 906 Justin Circle, Reedsburg, WI 53959.

GB5ØATG, from the British Amateur Radio Teledata Group's Golden Jubilee 2009, one the air for one year beginning July 1, 2009 and ending on July 30, 2010, all HF bands. Operators on a rotating basis will be G3LDI, GW4SKA, G1XKZ, G8GNI, M5AEX. QSL Manager is Andrew, M5AEX, QSL via QSL.com.

• The following hamfests, etc., are slated for August:

August 1, **Columbus Hamfest**, Aladdin Shrine Center, Columbus, OH. Info at: <www.aladdinshrine.org/hamfest.htm>. (Exams)

August 7–8, **2009 Maritime DX Forum**, Rosaria Centre, Mount St. Vincent University, Halifax, Nova Scotia. Speakers: OH2BH, K1JT, N4GRN, KR2Q, VE7HA/7J1AQH. Contact Scott Wood, VE1QD, e-mail: <ve1qd@rac.ca>, phone 902-823-2761; <www.halifax-arc.org>.

August 7–9, **Pacific Northwest DX Convention**, Mirabeau Park Hotel & Convention Center, Spokane, WA. Information: <www.sdxa.org>.

August 16, **Denver Radio Club Hamfest**, Jefferson County Fairgrounds, Golden, CO. Contact Bryan Steinberg, KBØA, at <drcfest@comcast.net>; <www.w0tx.org>. (Talk-in 145.490 or 448.625 [both 100 Hz]; exams 10 AM)

August 21–23, **Porter County ARC Swapmeet & Camp-out**, Allstate Radio Club W9SAL complex, LaPorte, IN. Contact <pcarc@pcarc.net>; <www.pcarc.net>.

August 22, **Owen-Monroe Hamfest**, Owen County Fairgrounds, Spencer, IN. Contact Katie Smith, K9INU, e-mail: <k9inu@arrl.net>; phone 812-829-2140. (Talk-in 146.985 [136.5 PL]; exams 1 PM)

August 23, **East Central Illinois Hamfest**, Vermilion County Fairgrounds, Danville, IL. Contact Josh Kittle, N9WEW, e-mail: <josh@kittle.com>, phone 217-442-0578; <http://www.vcara-hamfest.info/>. (Talk-in 146.820, PL 88.5 Hz; exams)

A publication of

CQ Communications, Inc.
25 Newbridge Road
Hicksville, NY 11801 USA.

CQ Amateur Radio (ISSN 0007-893X) Volume 65, No. 08. Published monthly by CQ Communications, Inc., 25 Newbridge Road., Hicksville, NY 11801, Telephone 516-681-2922. E-mail: cq@cq-amateur-radio.com. Fax 516-681-2926. Web site: www.cq-amateur-radio.com. Periodicals Postage Paid at Hicksville, NY 11801 and at additional mailing offices. Subscription prices (all in U.S. dollars): Domestic-one year $36.95, two years $66.95, three years $96.95; Canada/Mexico-one year $49.95, two years $92.95, three years $135.95: Foreign Air Post-one year $61.95, two years $116.95, three years $171.95. U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government including military services, only on a cash with order basis. Requests for quotations, bids, contracts., etc. will be refused and will not be returned or processed. Entire contents copyrighted 2009 by CQ Communications, Inc. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the U.S.A.
POSTMASTER: Send address changes to:
CQ Amateur Radio, 25 Newbridge Rd., Hicksville, NY 11801

hy-gain® ROTATORS

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

HAM-IV

HAM-IV
$649.95

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

HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
Effective Moment (in tower)	**2800 ft.-lbs.**

TAILTWISTER SERIES II

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

T-2X
$799.95

T-2XD
$1229.95
with DCU-1

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

CD-45II

CD-45II
$449.95

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to 2 1/16 inches. MSLD light duty lower mast support included.

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

HAM-V

HAM-V
$1099.95
with DCU-1

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

ROTATOR OPTIONS

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

AR-40

AR-40
$349.95

For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. 2 1/16 inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power	350 in.-lbs.
Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight	14 lbs.
Effective Moment (in tower)	**300 ft.-lbs.**

HDR-300A

HDR-300A
$1499.95

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

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

Digital Automatic Controller

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

DCU-1
$749.95

AR-35 Rotator/Controller

AR-35
$89.95

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

NEW! Automatic Rotator Brake Delay

RBD-5
$29.95

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

http://www.hy-gain.com
Nearest Dealer, Free catalog, To Order . . .
800-973-6572
Voice: 662-323-9538 **Fax:** 662-323-6551

hy-gain®

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

ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, KL7MF, Mgr.
anaheim@hamradio.com

BURBANK, CA
1525 W. Magnolia Bl., 91506
(818) 842-1786
(800) 854-6046
Eric, K6EJC, Mgr.
Magnolia between
S. Victory & Buena Vista
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102
94085
(408) 736-9496
(800) 854-6046
Jon, K6WV, Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Jim, KJ3N, Mgr.
RT.13 1/4 mi., So. I-295
delaware@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Leon, W7AD, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
John WØIG, Mgr.
denver@hamradio.com

PHOENIX, AZ
10613 N. 43rd Ave., 85029
(602) 242-3515
(800) 444-9476
NEW Phoenix location
Gary, N7GJ, Mgr.
Corner of 43rd Ave. & Peoria
phoenix@hamradio.com

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi. no. of I-285
atlanta@hamradio.com

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
22191
(703) 643-1063
(800) 444-4799
Steve, W4SHG, Mgr.
Exit 161, I-95, So. to US 1
virginia@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, N1UC, Mgr.
Exit 1, I-93;
28 mi. No. of Boston
salem@hamradio.com

12 STORE BUYING POWER

HAM RADIO OUTLET®
WORLDWIDE DISTRIBUTION

World's LARGEST HAM RADIO INVENTORY in stock for quick delivery

D-STAR EXPERTS!

DISCOVER THE POWER OF DSP WITH ICOM!

IC-706MKIIG All Mode Transceiver

• Proven performance • 160-10M*/6M/2M/70CM • All mode w/DSP • HF/6M @ 100W, 2M @ 50W, 440 MHz @ 20W • CTCSS encode/decode w/tone scan • Auto repeater • 107 alphanumeric memories

IC-7800 All Mode Transceiver

• 160-6M @ 200W • Four 32 bit IF-DSPs+ 24 bit AD/DA converters • Two completely independent receivers • +40dBm 3rd order intercept point

IC-746PRO All Mode 160M-2M

• 160-2M* @ 100W • 32 bit IF-DSP+ 24 bit AD/DA converter • Selectable IF filter shapes for SSB & CW • Enhanced Rx performance

IC-7000

• 160-10M/6M/2M/70CM • 2x DSP • Digital IF filters • Digital voice recorder • 2.5" color TFT display

IC-7600 All Mode Transceiver New!

• 100W HF/6m Transceiver, gen cov. receiver • Dual DSP 32 bit • Three roofing filters- 3, 6, 15khz • 5.8 in WQVGA TFT display • Hi-res real time spectrum scope

IC-7200 HF Transceiver New!

• 160-10M • 100W • Simple & tough with IF DSP • AGC Loop Management • Digital IF Filter • Digital Twin PBT • Digital Noise Reduction • Digital Noise Blanker • USB Port for PC Control

IC-718 HF Transceiver

• 160-10M* @ 100W • 12V operation • Simple to use • CW Keyer Built-in • One touch band switching • Direct frequency input • VOX Built-in • Band stacking register • IF shift • 101 memories

IC-7700 Transceiver. The Contester's Rig

• HF + 6m operation • +40dBm ultra high intercept point • IF DSP, user defined filters • 200W output power full duty cycle • Digital voice recorder

New! 3rd Generation D-STAR Dual Bander

IC-880H

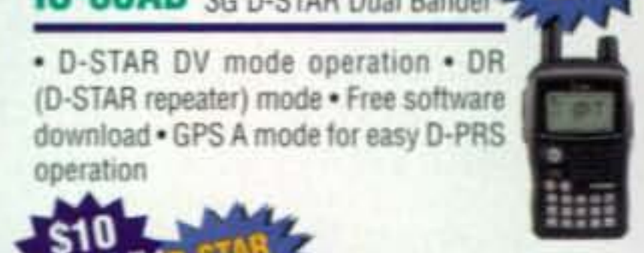
• D-STAR DV mode operation • DR (D-STAR repeator) mode • Free software download • GPS A mode for easy D-PRS operation • One touch reply button (DV mode) • Wideband receiver

IC-V8000 2M Mobile Transceiver

• 75 watts • Dynamic Memory Scan (DMS) • CTCSS/DCS encode/decode w/tone scan • Weather alert • Weather channel scan • 200 alphanumeric memories

IC-2200H 2M Mobile Transceiver

• 65W Output • Optional D-STAR format digital operation & NEMA compatible GPS interface • CTCSS/DTCS encode/decode w/tone scan • 207 alphanumeric memories • Weather alert



IC-T90A Triple Band Transceiver

• 6M/2M/70CM @ 5W • Wide-band RX 495 kHz - 999.999 MHz**

New! D-STAR READY

IC-80AD 3G D-STAR Dual Bander

• D-STAR DV mode operation • DR (D-STAR repeater) mode • Free software download • GPS A mode for easy D-PRS operation

IC-2820H Dual Band FM Transceiver

• D-STAR & GPS upgradeable 2M/70CM • 50/15/5W RF output levels • RX: 118-173.995, 375-549.995, 810-999.99 MHz** • Analog/digital voice with GPS (optional UT-123) • 500 alphanumeric memories

IC-92AD Analog + Digital Dual Bander

• 2M/70CM @ 5W • Wide-band RX 495 kHz - 999.9 MHz** • 1304 alphanumeric memories • Dualwatch capability • IPX7 Submersible*** • Optional GPS speaker Mic HM-175GPS

IC-V82 2M Transceiver

2M @ 7W • CTCSS/DTCS encode/decode w/tone scan • Also available in a sport version and a 70CM version (IC-U82)

*Except 60M Band. **Frequency coverage may vary. Refer to owner's manual for exact specs. ***Tested to survive after being under 1m of water for 30 minutes. ^ AA Alkaline batteries not included, radio comes with a AA alkaline battery tray. ^^For shock and vibration. ✦ Instant summer savings are applied to purchases made between June 12 and July 31, 2009. Rebate coupons are valid for purchases made between July 1 and September 30. Contact HRO for details. CQ AUG 09. The Icom logo is a registered trademark of Icom Inc. 50120

ICOM®

CALL TOLL FREE

Phone Hours: 9:30 AM – 5:30 PM
Store Hours: 10:00 AM – 5:30 PM Closed Sun

Toll free, incl. Hawaii, Alaska, Canada; call nearest to nearest store. All HRO 800-lines can assist you. If the first line you call is busy, you may call another.

West	800-854-6046
Mountain	800-444-9476
Southeast	800-444-7927
Mid-Atlantic	800-444-4799
Northeast	800-644-4476
New England	800-444-0047

Look for the HRO Home Page on the World Wide Web
http://www.hamradio.com

#1 in Customer Service

AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications, descriptions, subject to change without notice.

The Gardens of Santa Maria del Priorato at the headquarters of the Sovereign Military Order of Malta on Aventino Hill in Rome. The order has extra-territorial status, meaning it is an independent entity within the city. (All photos courtesy of the author

1A3A: The First Contest from the Sovereign Military Order of Malta

BY GIORGIO MINGUZZI,* IZ4AKS, and FABIO SCHETTINO, I4UFH
English Translation by Alex Novelli, I6NOA

What's it like to activate a rare DX entity in a major contest for the first time? IZ4AKS and I4UFH take us to the "other side" of the 2007 CQ World-Wide DX Contest from a "country" comprised of just a few buildings in Rome, Italy—the Sovereign Military Order of Malta—and an operation that scored #1 worldwide for multi-multi contest DXpeditions: 1A3A.

It has been nearly 30 years since the ARRL Awards Committee added the Sovereign Military Order of Malta (S.M.O.M., prefix 1A) to the DXCC List, and although many ham radio operations have taken place from this rare DXCC country, no one had ever seriously participated in an international DX contest from the Gardens of Santa Maria del Priorato, the order's home on Aventino Hill in Rome (see sidebar "What is the S.M.O.M.?"). This is the story of the first such operation, as 1A3A, during the SSB weekend of the 2007 CQ World-Wide DX Contest.

Cortesi Massimo, IZ4DPV, clearly was determined to run a contest from Aventino Hill, and when he tried to convince me to do it with him, he didn't have to work very hard to have me start analyzing the opportunity and getting all the necessary permissions.

After a few meetings, we initially concluded that we could do it best with two stations—two single operators, single band, high power. An easy setup would be important with small, unobtrusive rigs and accessories, almost all of which was in our hands. We were already familiar with the operating location, so we knew that setting up for the operation wouldn't be difficult for us, and we could look forward to a weekend of pile-ups and fun. Looking at the previous year's results, we had the feeling that we could achieve a pretty good score, at least in Europe, despite being at the solar cycle minimum.

In the middle of the summer we heard from the Order of Malta announcing that we would soon be granted permission

*Via Savio 2, 4801 Bagnacavallo (RA), Italy
e-mail: <iz4aks@gmail.com>
web: <http://www.iz4aks.com>

to enter the villa and a license to operate there. The license was granted as part of a fundraising program to support the Order of Malta's worldwide relief activities. Specifically, the contest activity would help collect funds for building a girls' school in southern Sudan (see sidebar "The Rumbek School").

A Change of Plans

Soon afterward, some other friends called to ask us about our plans for the 2007 CQ WW DX SSB Contest, along with an invitation to join them in a common project. IZ4DPV and I discussed it over dinner and found ourselves in doubt about whether to carry on our original plan or get other people involved and make it completely different.

At the end of the discussion, we concluded that although a change in operating class and strategy would probably make it harder to achieve a high score in the competition, given the operating environment and geographical location, we nevertheless would give a serious try to activate the country in such a way as to give the contest community the opportunity to work a rare prefix as never before in a WW contest. It now all was up to us to make a small contribution to the history of our hobby. We then started to enroll other friends in this adventure, and the initial two operators soon became 21!

The natural evolution of our original idea would have been that of a M/S (Multi-operator, Single-transmitter) setup, but after careful evaluation of available space and a study of the possible placement of the various stations, we started to dream of competing in the M/M (Multi-operator, Multi-transmitter) category.

With all the stations located close to one another, the only real problems we anticipated would come from reciprocal interference. Once in Rome, we would run tests in the field and make the final

What is S.M.O.M.?

The Sovereign Military Order of Malta is a Roman Catholic religious order that dates back more than 950 years. From its earliest days, it has been recognized as a sovereign entity, answerable only to the Pope. Originally a monastic community known as the Order of St. John of Jerusalem, the group was founded to operate a hospital for Christian pilgrims to the Holy Land. It added a military aspect during the crusades, protecting not only the pilgrims under its care but also the territory conquered in the course of the crusades.

After the crusaders were forced from the Holy Land in the late 1200s, the order moved to Cyprus and then to Rhodes. It minted its own money and maintained diplomatic relations with a variety of nations. The order also took on the defense of the broader Christian world by building a powerful navy that fought many battles. It was a key player in the defeat of Ottoman naval forces in the Mediterranean Sea in the 16th century.

However, in 1523 the knights of the Order of St. John were defeated by Sultan Suleiman the Magnificent and were forced out of Rhodes. Several years later, the order was given possession of the island of Malta, from which its current name originates. Since it was aligned only with the church, one of the order's rules was that it would not take sides in wars between Christian nations or do battle against fellow Christians. Thus, when Napoleon occupied Malta as part of his Egyptian campaign in 1798, the knights were again forced to leave. In 1835, the group settled permanently in Rome, where it continues to occupy two sets of buildings and retains it historic independence. Its extraterritorial

status is the basis for its recognition by the ARRL as a distinct DXCC entity.

The S.M.O.M. today is primarily a charitable organization, organizing medical and humanitarian activities around the world. It currently has about 12,500 full members (knights and dames), as well as many additional volunteers. For more information, see the Order of Malta website at <www.orderofmalta.org>.—*Information courtesy Order of Malta website*

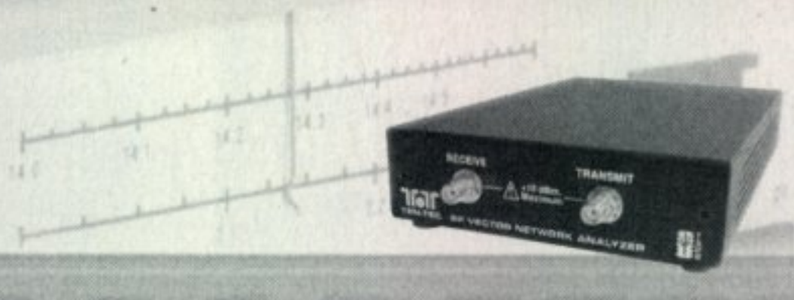
The next best thing to a Ten-Tec transceiver...

HIGH POWER TUNER

Superior matching capability with an L-network tuner assures correct match every time. 2000 watts CW or SSB PEP power rating. ARRL rated as the lowest insertion loss tuner available, QST February 2003. 3 year parts/labor warranty. **$649**

CENTURION LINEAR AMPLIFIER

In its 20th year, this proven dual 3-500ZG design busts the pileups but won't bust your wallet. Peak reading wattmeter and QSK standard. Easy to use and tune up. **$3195**



TAPR VECTOR NETWORK ANALYZER

Use it to test low power amplifiers, characteristics of coax cables, measure and adjust filters, check antenna impedance vs. frequency, antenna SWR, even measure the length of transmission lines using TDR feature. **$655**

715 RF SPEECH PROCESSOR

High performance true RF-type speech processor. RF speech processing is a superior system to the processor found in a typical HF transceiver for achieving the highest ratio of average-to-peak power from SSB transmitters. **$249**

963 POWER SUPPLY

Hash-free switching design. 13.8 Vdc at 25 amps continuous, 30 amps peak. Small, lightweight (4 lbs!), 90-264 VAC, 50/60 Hz input make 963 usable from just about anywhere. **$169**

307B SPEAKER

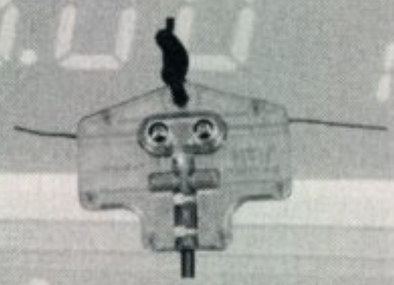
External front-firing communication speaker, black cosmetics match current Ten-Tec HF transceivers. Cabinet and large 4-inch speaker designed specifically for Amateur Radio use. **$98**

302R REMOTE ENCODER/KEYPAD

Armchair tuning and direct frequency entry for your Omni-VII, Orion/Orion II, and Jupiter HF transceiver. Function buttons allow control of some radio features. **$139**

310 FAN KIT

Hole-free allen screw attachment to transceiver heart sink. 13.8 Vdc powered. Use with Orion/Orion II, all Omni, Paragon, Jupiter, Pegasus, Corsairs, Tritons. **$39.95**



3003 ACRO-BAT ANTENNA HANGER

Unbreakable polycarbonate. Not affected by UV. Ladder line or RG58/RG8X coax fed antennas. **$9.95**. Save with a discount 4 pack for only **$32!**

...is a Ten-Tec accessory!

709/709A MICROPHONE, 711 STAND

Omni-directional dynamic microphone for Amateur Radio and other transmitting applications. Die-cast zinc shell, slider PTT switch, cable. 30 Hz to 12 kHz frequency response. **$69**. 711 stand for 709/709A, **$15**

708/708A DELUXE DESK MIC

Omni-directional dynamic microphone for Amateur Radio and other transmitting applications. 3 position PTT switch with TX, OFF, and LOCK, flexible metal gooseneck, ball-type element housing. 30 Hz to 12 kHz frequency response. **$99**

316 USB/SERIAL CONVERTER

For communicating with serial-equipped devices like Ten-Tec HF transceivers from PC's that have only USB ports. Converter and drivers included. **$19.95**

www.tentec.com

TEN-TEC

The SSB Company

1185 Dolly Parton Pkwy., Sevierville, TN 37862. Sales: 800-833-7373 M-F 8:00-5:30 (Eastern Time) sales@tentec.com. Office: (865) 453-7172. FAX: (865) 428-4483.
Service: (865) 428-0364 M-F 8:00-5:00 (Eastern Time), service@tentec.com. We accept Visa, MC, American Express and Discover.

Part of the 1A3A team for the 2007 CQ World-Wide DX Contest SSB competition. There were 21 members of the group overall, of whom a dozen operated in the contest.

decision whether to operate as M/M or, in case of excessive interference, as M2 (Multi-operator, Two-transmitters).

With these ideas in mind, we started to prepare and assemble what we planned to be the best ham radio setup ever installed in 1A-land since it became a DXCC entity. Our biggest challenge was to install all the antennas and set up the shack in four days while avoiding causing any problems in the old 8th century castle or in the garden, which includes Lebanon cedars that—according to legend—were brought there from the Holy Land.

Antennas in the Garden

On 10 meters we chose a 4-element Yagi used in many contests at IR4T to be installed right above a 40-meter 2-element Yagi from Hy-Gain. To pull up these antennas properly at least 20 meters (65 feet) from the ground, we rented a truck with a long extensible arm and a platform on top of it *(what we in America call a cherry-picker—ed.)*, where we bolted the mast for the 10- and 40-meter Yagis. The two beams were mounted 180 degrees out of phase with each other to allow us to work Europe on 10 meters during the day (when 40 was quiet) and then swing the 10-meter beam to South America at night, while simultaneously working Europe on 40. Also installed on the truck were a dipole for 160 meters and a loop for 40, both hanging from the truck's platform at the 20-meter level.

The 3-element 15-meter antenna was put on top of a mast about 9 meters (29 feet) above one of the villa's terrace roofs, while the 20-meter Yagi was installed on a 14-meter (45-foot) high mast, above a large terrace overlooking the Tevere (Tiber) River. This location offered us a good "view" to Japan via long path on 20 and 15.

On 80 meters, we used a Spiderbeam fiberglass vertical antenna with 16 radials. The 80-meter antenna was installed on the opposite side of the church from the other antennas, 100 meters (325 feet) from the shack, in order to avoid interference to the 40-meter station. To help with the reception on the low

bands, we installed a K9AY antenna and a Beverage exactly 100 meters (325 feet) long, low above the ground.

Since our stay at the villa was going to be longer than just the CQ WW weekend, we also wanted to give a new one to WARC band operators (30, 17, and 12 meters), so we also installed a trusty Cushcraft R7 vertical and an ICOM 7400 (the European version of the ICOM 746-Pro). In addition, thanks to Giovanni Zangara, IWØBET, Michele Minguzzi, IZ4GWE, and Luigi Minguzzi, IZ4FTE, we also made QSOs on 2 meters, 4 meters, and 6 meters.

We spent eight weekends and countless nights preparing and testing all the equipment for the contest. Then every

The Rumbek School

One of the Order of Malta's current projects is raising funds to build and equip a middle school for girls in Rumbek, South Sudan. Its goal is to raise 1 million Euros to build and operate the school, hoping to break the cycle of poverty and illness in the area by providing hundreds of young girls with education and assistance in building family-based small businesses. The hams who operated 1A3A are part of this effort, which is sponsored jointly by S.M.O.M. and the Italian government. For information on how to support this program, see the group's website at <www.1a4a.org>.

Construction work in progress on the middle school for girls in Rumbek, South Sudan. The Order of Malta and the 1A3A team are supporting this ongoing project. (Photo from the 1A4A website)

The 10- and 40-meter beams were installed on the platform of a rented cherry-picker and faced in opposite directions. See text for explanation.

The 20-meter Yagi (shown here) and the 15-meter beam both had good views from the top of Aventino Hill for working long path to Japan.

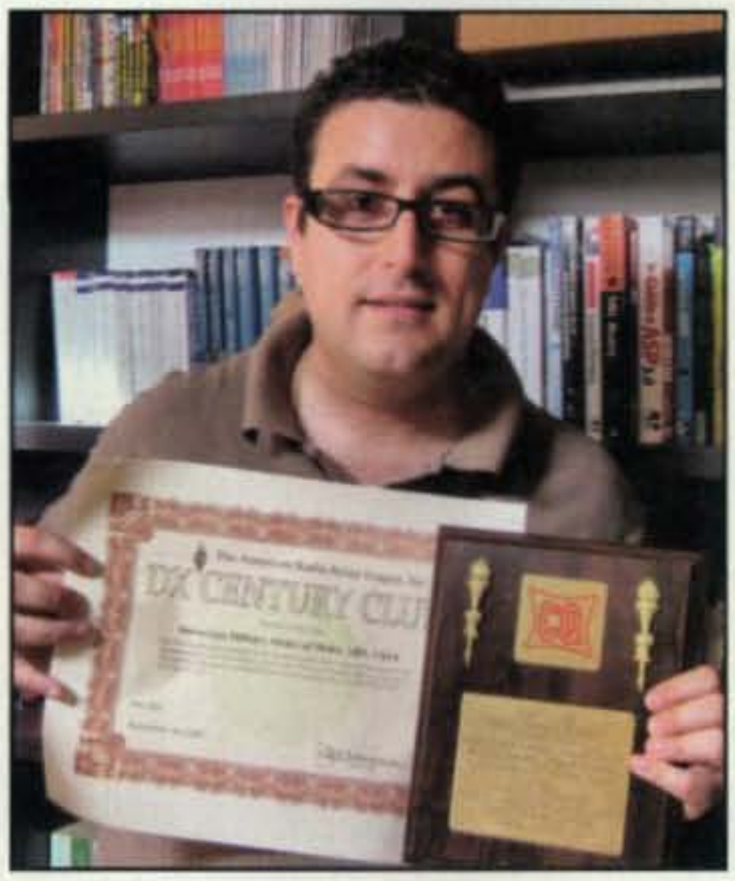
single component was pre-assembled, tuned, and packed for transport, totalling 700 kg (1,540 lbs.) of goods!

Putting it All Together

Once in Rome, we installed everything properly and spent three days before the contest thoroughly testing the setup. The shack was erected around four wooden tables used in the 2007 1A4A activity, in which six stations were built and wired, including computers, monitors, filters, and all the needed stuff for interfacing the computers to both the radios and the internet for monitoring spots. Based on our previous experience of M/M, M2, and M/S contests from other locations in earlier sunspot cycles, the interference issues are the always the ones to fix, and we expected to do that as well in this limited space M/M. Fortunately, we had great help from the filters built by Ranko, 4O3A, that were kindly donated to the group for this contest; accurate wiring of cables; and properly installed connectors. All of this reduced our interference to a minimum, and we really didn't have to worry about it during the contest.

IV3SKB, IZ8CCW, and I4UFH work on connecting the radios to the computers and networking the computers at what will be the main operating position.

Before the contest began, Salvador, C31CT, operating as 1A4A, gave out contacts on the WARC bands (12, 17, and 30 meters).



Fruits of a weekend's labor … author IZ4AKS holding both the ARRL DXCC certificate and the CQ WW DX Contest plaque earned during the 2007 contest weekend.

The strategy of an M/M station in a contest is quite simple: Stay on all the bands all the time, even the lower frequency bands during the day. We didn't stop calling CQ on 80 meters during the day, and we had a slow but good run even during midday. Most of the operators had several years of contesting experience, so everyone knew exactly what to do, how to run, and how to move multipliers to other bands. There were no glitches during the contest. The Cluster spotting was networked with UMTS cellular connection data, and was very reliable for all 48 hours of the event. The software used for logging was WinTest, rock-solid software from the good French guys of FY5KE. In fact, our only problem during the contest was that some apparently organized stations deliberately jammed us for over 20 hours. Nonetheless, we finished the contest with nearly 12,000 QSOs in the log and roughly 12.2 million points—enough to rank fourth in the world for Multi-Multi and first Multi-Multi for contest expeditions.

Describing such an experience is not an easy task, as any ham radio activity, especially a contest, is unique and hard to compare with another, even of the same kind. However, we can easily say that we were enthusiastic about the results.

Those involved in this adventure, who spent energy and resources to reach the goal, will be greatly rewarded not only by the score and by the fun running so many contacts from a DXCC entity which had never been on the air competing in a major contest before, but also by the smiles of the girls from Rumbek (South Sudan), who will be helped by the generosity of hams worldwide who sent donations to the cause we highlighted during our operation. We have, in fact, decided again to start a fund-raising campaign to complete the Order of Malta School in Africa. Thanks to the campaign run last January, in March we could buy the computers for the multimedia class of the African school.

With the pride of having achieved such a good result, and full of gratitude to all of those who made this activity possible, we are already working on the next project.

Not all the operators at 1A3A were men. Here Erica Sanna, IZØEIK, works the pile-ups.

The main station up and running. During the 2007 CQ WW, 1A3A made some 12,000 QSOs and scored more points than any other Multi-Multi contest expedition station.

Chris, 9Y4D, placed third in the world on 14 MHz.

Stig, HSØZGD, placed second in the world low power 14 MHz.

Joe, AA3B, took fifth place Assisted in the U.S.

Results of the 2008 CQ WW DX SSB Contest

BY BOB COX,* K3EST

The 2008 CQ WW DX SSB Contest occurred with the solar flux about as low as it can get. Conditions were predicted to be a challenge. To alleviate months of flat solar flux, the suggested solution was "Enter the CQ WW SSB Contest and help cure band conditions." Once again, the CQ WW made its own propagation. As KØIP said, "Wow! Zero sunspots, what a contest." As has been mentioned before, the CQ WW is a fantastic competition which brings out the best in amateur radio: team work, station construction, antenna design, propagation knowledge, and operating skills. Just turn on your radio and you can join in the fun. Once you listen to the bands during the CQ WW, you will be hooked. You can be guaranteed to have a good time.

With solar conditions on the decline, contesters of all ages from every corner of the world turned on their radios and were surprised when the bands sprung to life. The CQ WW is a celebration of ham radio skill and effort. Thousands of hams throughout the world received their first ham radio thrill in the CQ WW. New hams and old who try the CQ WW become addicted. GM2T's comments sum up the wonderful challenge the CQ WW brings to new and experienced operators: "We had three new license holders who had never ever taken part in any contest in their lives before. One of the Foundation license holders, MM3ZTP, age 14 years, took to it like a duck to water and was soon running pile-ups like a seasoned professional. This is what it is all about, seeing the young ones really enjoying the fun. The other two new hams after being initially over-awed soon got themselves into the swing of operating, great to see."

*e-mail: <k3est@cqww.com>

After all the logs were counted, an amazing number emerged: 5021 received entries. Below are presented the results of the efforts of the entrants. If you want to know how long it is until the 2009 CQ WW SSB test check out the website of OT5A: <http://www.on7lr.org>. Read on to see how you and your friends ended up. Everyone who operated the 2008 CQ WW was a winner.

High Power

The top spot in this difficult category went to an operator familiar with winning the CQ WW. Rich, N6KT, put his considerable skill to work talking HC8A to the world high score. HC8A sits on the side of a dormant volcano on San Cristobal Island, and Rich took full advantage of the location and propagation to find the path to top honors. Second place world and the top European score for several years running was Toni, OH2UA, operating from CU2X. Third place went to several-time world winner Tom, W2SC, operating 8P5A from beautiful Barbados. Taking second place in Europe and sixth in the world was Tonno operating from his super station, ES5TV. From Crete, Ben, DL6FBL, took his host's station, SV9CVY, to third place in Europe and seventh in the world. In the U.S., the competition from the northeast was fierce. Randy, K5ZD, did his usual fabulous job and took top honors! What a great operator and score. Krassy, K1LZ, put his considerable skills to work and took U.S. second place. Doug, K1DG, took third place from his Maine island QTH. Other worthy efforts from propagationally challenged areas which should be mentioned were those of DU9DG, VK4CZ, K7RL, N6TJ, KH6LC (N6GQ), and BA4RF.

The continental winners were: North America: 8P5A (W2SC); Africa: 6W1RY (F5VHJ); Asia: 5B4AII (RW3QC); Europe: CU2X (OH2UA); Oceania: 9M8Z (9M6DXX); South America: HC8A (N6KT); Japan: JH4UYB; U.S.: K5ZD/1.

Special event station EE9E.

Low Power

The low power category means a transceiver and an antenna. Many people have a transceiver running 100 watts, and anyone can enter the low power category. This means that this category has the most entrants of any CQ WW category. It is a challenge to end up on the top scores list.

John, KK9A, operating as P40A, continues to take home the world high trophy. Operating from beautiful Aruba, John again took away top world low power trophy. Four years in a row is quite an achievement, John! Second place went to Ted, HI3TEJ, using his contest call, HI3T. Third place in the world was KP4KE operated by Barney, DK8ZB. CT8K operated by José, CT1CJJ took first place in Europe. This is the fourth year in a row that José took the plaque. Congratulations, José! Second place Europe went to low power champion Zlatko, 9A2EU. Taking Europe third place was Lorenzo, IZ2FOS, operating from northern

Italy. In the U.S., we had a repeat winner from 2007, Art, K1BX. Great operating, Art! Second place went to Ed, N1UR, who finishes on or near the top almost every time. Third place U.S. went to Terry, N4TZ/9, from Indiana. SU1KM (N5ZO), 5Z4/RW1AU, V51YJ, ST2NH, BD1ND, AU2RSB, OD5NJ, 7Z1SJ, HSØZHC, UK8AKK, YB1TJ, and DV1JM all had excellent scores from interesting locations.

The continental winners were: North America: HI3T (HI3TEJ); Africa: SU1KM (N5ZO); Asia: HSØZHC; Europe: CT8K (CT1CJJ); Oceania: DV1JM; South America: P40A (KK9A); Japan: JA7LMZ; U.S.: K1BX.

QRP

The CQ WW offers a contester a very good opportunity to work rare DX which would otherwise prove elusive. The QRP category sharpens you searching skills and the rewards are very satisfying. You can work a lot of stations with 5 watts or less.

Our world winner was Remi, LY8O. He traveled 100 km to his contest station to get away from line noise. Looks like it paid off, Remi. Long-time QRPer, Doug, KR2Q, took second place world and first place U.S. from northern New Jersey. Third place world and number two Europe was Gerard, F5BEG. Second in the U.S., and repeating as the top score west of New Jersey, was Philip, NØKE. He also finished #9 in the world. Another dedicated QRPer took third place in the U.S., Randy, NDØC. Third place in Europe went to Milan, OK2BYW. Special mention must be made of the fine score of Izuno-san, JR4DAH, #7 in the world and #1 in Asia. The top zone 3 score was submitted by NN7SS (K6UFO), followed closely by Bill, W8QZA, operating W6QU. JA2DLM, JA2MWV, YB2OK, VK4ATH, and PY2BN are to be congratulated for their outstanding efforts.

The continental winners were: North America: KR2Q; Africa: no entry; Asia: JR4DAH; Europe: LY8O; Oceania: YB2OK; South America: PY2BN; Japan: JR4DAH; U.S.: KR2Q.

Assisted

Use of a QSO spotting tool places you in the assisted category. The top assisted score in the world went to Philippe, LX7I. Philippe said: "Thanks for all who called me. Before the contest I never had imagined to make this great score." Dreams do come true! Second place world and number one in the U.S. was Dick, NN3W, who asks the questions on all our minds: "Good opening for me on 15 meters. 10 meters, where art thou?" Third place world went to ZX2B, the contest call of PY2MNL. Second place in Europe went to Salvatore, IK8UND, who put TK9R in a lot of logs. Third place in Europe went to Alex, YO9HP, operating his contest call, YR9P. Second place in the U.S. was taken by assisted category aficionado Charles, K3WW. Third place in the U.S. went to Jerry, WB9Z, in Illinois. The efforts of BA7NQ, UP2L, KG6DX, ZM1K (VK2IA), and T8IC (JK2VOC) made everyone happy.

The continental winners were: North America: NN3W; Africa: EC8AFM; Asia: RO9O (RZ9OO); Europe: LX7I; Oceania: KG6DX; South America: ZX2B (PY2MNL); Japan: JQ1BVI; U.S.: NN3W.

Multi-Single

The multi-single category is very competitive. The category attracts the second largest number of participants in the contest. Getting together with new and old friends for a weekend of never-ending QSOs is what multi-single is all about.

The top three winners from 2007 juggled places in the 2008 competition. Taking first place for two years in a row was the multinational team of CN3A. What a great job they did. Moving up to second place in the world was P33W. A team from the Radio Amateur Club of Kourou, operating as FY5YE on the French Guyana coast, came in third. Multi-single is very competitive within Europe. Doing a fine job and taking the top position was radio club F6KHM using their club call, TM6M. Second place went to the Romagna Contest Team, IR4M. Third place in Europe went to the Salgotarjani Varosi Radio Klub, HG6N. Not enough can be said about the great effort and win in the U.S. by NØNI. The team from Iowa took advantage of the rare propagational opportunity to beat all the East Coast stations and lead the pack from the Midwest. Ray's team at K9RS/3 took second place from eastern Pennsylvania. Third place went to Tom, K8AZ, located in the countryside of northeastern Ohio. W7VJ took top honors from the U.S. West Coast. Outstanding performances were turned in by many teams. Some of the rarer ones appearing in many logs were: 3DAØDJ, XU7MDY, AH2R, VU4MY, VU7SJ, T32CXX, 9V1YC, A73A, B7P, 9K2HN, HSØAC, and VU2PAI.

The continental winners were: North America: VP5DX; Africa: CN3A; Asia: P33W; Europe: TM6M; Oceania: AH2R; South America: FY5KE; Japan: JA6ZPR; U.S.: NØNI.

Multi-Two

The multi-two category needs two stations manned nearly all the time and stations have to move skillfully as the propagation changes. Doing this smoothly takes a skilled crew. Reprising their win from 2007 was AO8A. The international group finished #1 in the world from the western Canary Islands. Taking second place in the world was 6Y1V. KY1V was joined by "Young Ham Contest Program Winner IZ7KHR, last year's winner LU9ESD, and three English hams, G3NKC, G4BUO, and G4XUM. This proved to be a great combination; everyone really enjoyed the experience." Third place went to the big DXpedition from the Rhein-Ruhr DX Association, CT9L. First place in Europe went to long-time top finisher, IR4X. The team has been having a good time on a mountaintop in central Italy for a very long time. Second place in Europe went to AM3SSB. Their signal sure was booming into the U.S. Third place in Europe went to the MTTOSZ Gyor Varosi Radio Klub, HG1S. The top two places in the U.S. went to stations from the Frankford Radio Club. Repeating from 2007, WE3C's station in eastern Pennsylvania took the top honors in this popular category. Second place went to Sig's team at N3RS overlooking the Pennsylvania Turnpike. Third place in the U.S. went to Mark's team at K1RX. There were several stations that put rare multipli-

TROPHY WINNERS AND DONORS

SINGLE OPERATOR
ALL BAND
World
HC8A (Opr.: Richard Smith, N6KT)
Donor: Southern California DX Club

World Low Power
P40A (Opr:. John Bayne, KK9A)
Donor: Slovenian Contest Club

World QRP
Remigijus Vaicius, LY8O
Donor: Jeff Steinman, N5TJ

World Assisted
Philippe Lutty, LX7I
Donor: Glenn Johnson, WØGJ

U.S.A.
Randall Thompson, K5ZD
Donor: Potomac Valley R.C. – KC8C Memorial

U.S.A. Low Power
Arthur Hambleton, K1BX
Donor: North Coast Contesters

U.S.A. QRP
Doug Zwiebel, KR2Q
Donor: Pat Collins, N8VW

U.S.A. Assisted
Richard Di Donna, NN3W
Donor: John Rodgers, WE3C

U.S.A. Zone 3
Mitch Mason, K7RL
Donor: Dave Pruett, K8CC & Greg Surma, K8GL

U.S.A. Zone 4
Mike Wetzel, W9RE
Donor: Dave Pruett, K8CC & Greg Surma, K8GL

Canada
VY2ZM (Opr.: Jeffrey Briggs, K1ZM)
Donor: Contest Club Ontario
VE3WT Memorial

Caribbean/C.A.
8P5A (Opr.: Thomas Georgens, W2SC
Donor: Alex M. Kasevich, VP2MM

Europe
CU2X (Opr.: Toni Linden, OH2UA)
Donor: Potomac Valley R.C. – W4BVV Memorial

Europe Low Power
CT8K (Opr.: Jose Manuel Farto Lopes, CT1CJJ)
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Russia
RK3AXX (Opr.: Willy Umanets, UA9BA)
Donor: Roman Thomas, RZ3AA

Africa
6W1RY (Opr.: Albert Crespo, F5VHJ)
Donor: Gordon Marshall, W6RR

Asia
5B4AII (Opr.: Jack Danielyan, RW3QC)
Donor: *CQ* magazine

Japan
Masaki Masa Okano, JH4UYB
Donor: Tack Kumagai, JE1CKA

Japan Low Power
Fumi Konno, JA7LMZ
Donor: Western Washington DX Club

Oceania
9M8Z (Opr.: Steve Telenius-Lowe, 9M6DXX)
Donor: Northern California DX Club

South America
Tom Oliveira Martins, PY2YU
Donor: Yankee Clipper Contest Club

SINGLE OPERATOR, SINGLE BAND
World – 28 MHz
Juan Manuel Morandi, LU1HF
Donor: Joel Chalmers, KG6DX

World – 21 MHz
ZX5J (Opr.: Sergio Almeida, PP5JR)
Donor: Robert Naumann, W5OV

World – 14 MHz
VP2E (Opr.: Jeffrey Steinman, N5TJ)
Donor: North Jersey DX Assn. – K2HLB Memorial

World – 7 MHz
Dusko, Dumanovic, ZL3A
Donor: Fred Laun, K3ZO – K7ZZ Memorial

World – 3.7 MHz
EA8CMX (Opr.: Mauri Leppala, OH2BYS)
Donor: Fred Capossela, K6SSS

World – 1.8 MHz
CN2R (Opr.: James Sullivan, W7EJ)
Donor: Robert Wruble, W7GG

USA – 28 MHz
Courtney Judd, K4WI
Donor: Donald Thomas, N6DT

USA – 21 MHz
Victor Walz, N2PP
Donor: 11 PM Dayton Pizza Gang

USA – 14 MHz
Robert Shohet, KQ2M
Donor: Yankee Clipper Contest Club
KC1F Memorial

USA – 7 MHz
Paul H Newberry, Jr, N4PN
Donor: Stanley Cohen, W8QDQ

USA – 3.7 MHz
Joseph Gagliardi, Jr, AA1BU
Donor: *CQ* magazine

USA – 1.8 MHz
Manuel Fonseca, Jr., W2MF
Donor: Glenn Johnson, WØGJ

Carib./C.A. (14 MHz)
Christopher Ellis, 9Y4D
Donor: Nate Moreschi, N4YDU

Europe – 28 MHz
Slaven Galic, E77A
Donor: Charles Dietz, W5PR

Europe – 21 MHz
Nikola Percin, 9A5W
Donor: Tine Brajnik, S50A

Europe – 14 MHz
GI5K (Opr.: Chris Smith, MIØLLL)
Donor: Charles Wooten, NF4A

Europe – 7 MHz
YT8A (Opr.: Ceha Dusan-Dule, YU1EA)
Donor: John Warren, NT5C

Europe – 3.7 MHz
Robert Cummings, GIØKOW
Donor: Ted Demopoulos, KT1V

Europe – 1.8 MHz
Joseph Cornee, F6CTT
Donor: Robert Kasca, S53R

Oceania (7 MHz)
KH7B (Opr: Wilbert Kollenbaum, K4XS)*
Donor: Bruce D. Lee, KD6WW

Asia –14 MHz
9K2K (Opr.: Abdallah Hamad AL-Muzayan, 9K2GS)
Donor: Charles Shinn, W7MAP

Japan – 14 MHz
Hasebe Tatsumi, JA2PAC
Donor: Take Yokoyama, JL1BLW

MULTI-OPERATOR, SINGLE TRANSMITTER
World
CN3A (Oprs,: IK2SGC, I2WIJ, YO3JR, S50A, S50XX, CN8WW)
Donor: So. Calif. DX Club – W6AM Memorial

U.S.A.
NØNI (Oprs.: KØKD, KU1CW, NØAC, NØNI, NØXR, N7AZ, WØFLS, KØWHV)
Donor: Carolina DX Association

Carib./C.A.
VP5DX (Oprs.: N4KE, AB4UF, NU4Y)
Donor: Bob Raymond, WA1Z

Africa
CQ9K (Oprs.: CT3BD, CT3DL, CT3DZ, CT3EE, CT3EN, CT3IA, CT3KU, CT3KY, CT3NT)*
Donor: Doc Sayre, W7EW

Asia
P33W (Oprs.: 5B8AD, 5B4AIA, RW4WR, RW3RN, RA3AUU, RX3DCX)
Donor: Edward L. Campbell, NT4TT
AA6BB and KA6V Memorial

Japan
JI2ZJS (Oprs.: JA2AXB, JA2JSF, JH2UVL, JG2TSL, JL2TAW, JM2RUV)
Donor: Bob Epstein, K8IA

Europe
TM6M (Oprs.: F1AKK, F4DXW, F5MUX, F5TTU, F8DBF)
Donor: Bob Cox, K3EST

Oceania
AH2R (Oprs.: JI3ERV, NH2C, JR7OMD, JR8VSE, NH2N, JH7QXJ, AH2Q)
Donor: Junichi Tanaka, JH4RHF

South America
FY5YE (Oprs.: F1HAR, F5HRY, F6FGZ, F6FVY, FY5FY)
Donor: Victor Burns, KI6IM –
The Cuba Libra Contest Club

MULTI-OPERATOR, TWO TRANSMITTERS
World
AO8A (Oprs.: EA8AH, EA8CAC, EA8ZS, ES2RR, ES5RW, OH1MA, OH2JA, OH3RB, OH5XT)
Donor: Array Solutions

U.S.A.
WE3C (Oprs.: WE3C, KQ3V, NN3Q, K3CT, KQ3F, W2GD)
Donor: Kimo Chun, KH7U & Mike Gibson, KH6ND
Dan Robbins, KL7Y Memorial

Europe
IR4X (Oprs.: I4EAT, I4AVG, I4EWH, I4VEQ, I4TJE, I4IND, I4IKW, IK4DCT, IK4EWK, IZ4BOY, IK2NCJ, IZ3EYZ)
Donor: Aki Nagi, JA5DQH

Oceania
AHØBT (Oprs.: W1FPU, AHØBR, AHØBM)
Donor: Japan CQ Ham Radio

MULTI-OPERATOR, MULTI-TRANSMITTER
World
K3LR (Oprs.: K3LR, N2NC, N2NL, W3TX, K8GL, W2RQ, KI4MTU, K1AR, N6MJ, N3SD, K3UA, DL6LAU, N3GJ, LU7DW, WM2H)
Donor: Dave Leeson, W6NL, and Barb Leeson, K6BL

U.S.A.
W3LPL (Oprs.: W3LPL, K1DQV, NI1N, ND3A, WX3B, W3IDT, N3KS, K3MIM, K3MM, K3RA, WR3Z, W3ZZ, KD4D, K4ZA, AC6WI)*
Donor: Jim Lawson, W2PV Memorial

Europe
DFØHQ (Oprs.: DG1ATN, DJ9AO, DL1AUZ, DL2OBF, DL2OE, DL2SAX, DL3TD, DL5AOJ, DL5AXX, DL5GA, DL5MLO, DL7FER)
Donor: Finnish Amateur Radio League

Japan
JR5VHU (Oprs.: JR5VHU, JM1UWB, JA5FDJ, JA5JCC, JH5FIS, JH5RXS, JR5JAQ, JR5PWV, JJ6WYS, JK6RIP)
Donor: Ryozo Goto, JH3JYS

CONTEST EXPEDITIONS
World Single Operator
VU4RG (Opr: Norbert Meyer, DJ7JC)
Donor: National Capitol DX Assn.
Stuart Meyer, W2GHK Memorial

World Multi-Single
VU7SJ (Oprs.: DL9GFB, VU2JOS)
Donor: Gail Sheehan, K2RED

World Multi-Multi
VK9DWX (Oprs.: DJ5IW, DJ7EO, DJ9RR, DL1MGB, DL3DXX, DL5LYM, DL8OH, DL8WPX, SP5XVY, ZS6DXB)
Donor: *CQ* magazine

**Second place*

Array Solutions

Your Source for Outstanding Radio Products

Count on us for sound, reliable, efficient and effective equipment. It's been our passion for over 18 years.
Make sure to visit our website to see all that we have to offer.

Array Solutions is pleased to announce that we now carry all of the products from:

TOKYO HY-POWER

and there's MORE Good News from:

WX9B ARRAY SOLUTIONS

Sales and service from one location. Array Solutions is the factory authorized center for all Tokyo Hy-Power Amplifiers. No matter where you purchased your Tokyo Hy-Power Amplifier, contact us for your service needs.

Re-introductory pricing. Contact us for details or see the web site.

No cable? No Problem. We have RADIO cables for all Tokyo Hy-Power products.

Our pledge to you. At no additional charge, each Tokyo Hy-Power amplifier purchased from Array Solutions will be configured with the proper AC mains plug, set up for 230V or 115V and TESTED BEFORE IT'S SHIPPED TO YOU.

HL-1.1KFX
Lightweight HF Linear

This world-class compact HF amplifier has built-in switch mode power supply to save the weight. It is compatible with wide AC line of 100 to 250V, and is best suited for DX-peditioners.

HL-1.5KFX
HF/50MHz Linear

The amp utilizes an advanced 16 bit MPU (microprocessor) to run the various high speed protection circuits such as overdrive, high antenna SWR, DC overvoltage, band miss-set etc.

HL-2.5KFX
HF Linear Amplifier

The HL-2.5KFX is the lightest and most compact self-contained 1.5kW output HF LINEAR amplifier in its class. The amplifier's decoder changes bands automatically with most modern HF transceivers.

HL-1.2KFX
750W PEP HF Desktop Linear

This Solid State, world-class compact 750W HF amplifier is the easiest to handle and operate. The amplifier's broadband characteristics require no further tuning once the operating band is selected.

Tuners from TOKYO HY-POWER

HC-1.5KAT
HF 1.5KW Auto Tuner

HC-200AT
HF/6m 200W Auto Tuner

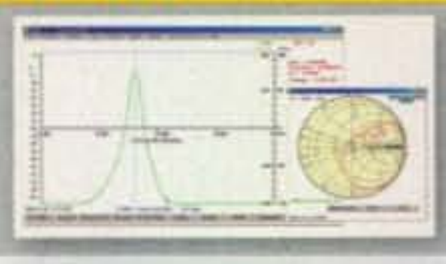
More quality products from Array Solutions...

AA-200/AA-500 & AIM 4170

AA-200/AA-500 – A Powerful Handheld Antenna Analyzer designed for testing, checking, tuning or repairing antennas and antenna-feeder paths in 0.1 to 200 MHz range.

AIM 4170
Laboratory quality impedance analyzer for antennas and networks using our patent pending technology 5 kHz to 180 MHz.

NEW! **2 port VNA-2180** – vector network analyzer



PowerMaster
VSWR/Watt Meter and Station monitor can save your amp, fast bright display and laboratory accuracy. 3kW, 10kW, and 20kW

StackMatch Series
2, 3, and more antenna switching and phasing. New StackMatch Plus with built-in broadband BIP BOP.

QSK Master
Add QSK to any amplifier quickly and without heavy technical modification. Quiet down that clunky relay with our whisper quiet QSK machine.

BandMaster
Universal band decoder, with more features than any decoder made.

FilterMax Series
Bandpass filters that set the benchmark for performance, mono band or auto switching.

Array Solutions Sales and Service for ACOM Amplifiers and Accessories

NEW!

RatPak
The leading remote coax switch. High isolation, high power, and reliable.

SixPak Series
2, 6, and 10 antenna switches. Use them to do SO2R or Multi-Op.

Low Band RX Antennas
AS-AYL-4 is used in backyards and on DX-peditions all over the world.

Prosistel Rotators
Strongest Rotators on the Market

OptiBeam Antennas
German Engineering means High Performance

www.arraysolutions.com

WE'VE GOT YOUR STUFF
We have broadband wire antennas, portable, fixed antenna masts and MORE!

Phone 214-954-7140
sales@arraysolutions.com
Fax 214-954-7142

WX9B ARRAY SOLUTIONS

ers on the air and made big scores: PZ5Z, ZS9X, B1Z, VR2C, JU1DX, BVØJ, and WH2DX. FB job.

The continental winners were: North America: 6Y1V; Africa: AO8A; Asia: 4XØV; Europe: IR4X; Oceania: AHØBT; South America: PJ4E; Japan: JA1YPA, U.S.: WE3C.

Multi-Multi

Entering the multi-multi category is a real challenge. Months of planning the station site, gathering together operators, and waiting to see what nature deals you makes for a combination of satisfaction and excitement.

It has been many years since the world's top scores came from the U.S. For the 2008 contest, we could say that the MM competition in the U.S. was really world-class. The number one score in the world and the U.S. was K3LR. Tim's crew broke into first place over friendly rival W3LPL. Frank's team took world and U.S. second-place honors. Third place in the world went to the multi-national team from HQ3Z. In the U.S., after K3LR and W3LPL, third place went to KC1XX. Matt's station was severely damaged in an ice storm in late 2008. We hope to hear his fine signals again this fall. The German station of DFØHQ once again returned to the first-place position in Europe. Second place went to OT5A and third place went to LZ9W. The Chinese team B4TB made a big effort which allowed many contesters to log a new one. The wonderful effort by VK9DWX from Willis Island was a CQ WW first. The mountaintop

TOP SCORES

WORLD

All Band

HC8A	14,140,854
CU2X	11,043,872
8P5A	10,347,090
VY2ZM	9,160,112
5B4AII	8,770,736
ES5TV	6,860,712
SV9CVY	6,784,912
VE3EJ	6,472,174
K5ZD/1	6,121,516
M6T	5,864,868

28 MHz

LU1HF	174,960
PT5T	162,519
CX4DX	83,187
E77A	64,390
YM2W	29,068
9A5D	17,136

21 MHz

ZX5J	1,944,696
LU2QC	1,132,812
9A5W	647,640
KH7U	620,496
NH6P	482,469
JS3CTQ	396,706

14 MHz

VP2E	2,598,938
CN2B	1,952,482
9Y4D	1,263,536
KQ2M/1	1,242,150
9K2K	1,126,626
ZF2AH	1,085,616

7 MHz

ZL3A	1,090,098
YT8A	1,030,032
KH7B	978,540
S57AL	912,630
RW9USA	805,695
JAØJHA	512,696

3.7 MHz

EA8CMX	476,652
GIØKOW	414,392
OK1BN	272,060
AA1BU	216,982
YL3FT	204,476
KH7X	196,840

1.8 MHz

CN2R	397,103
F6CTT	153,510
SN3R	143,208
LY2IJ	139,944
OE6Z	109,822
LA9Z	103,700

Low Power
All Band

P4ØA	7,318,165
HI3T	3,924,255
KP4KE	3,786,911
CT8K	2,405,340
J88DR	2,244,165
VE3DZ	2,109,028
SU1KM	1,905,106
K1BX	1,655,738
VE3NE	1,639,760
9A2EU	1,621,550

28 MHz

LU2UE	53,576
ZV2C	43,190
PU5OGE	36,960
PU2MTS	26,820
LTØD	24,232
VR2ZQZ	20,070

21 MHz

HI3K	475,904
PX2T	305,448
9A3B	252,408
YY1MTX	165,990
HP1BYS	141,024
HP1AVS	131,400

14 MHz

CN4P	893,607
HSØZGD	529,936
HC1JQ	387,468
VE3XD	386,400
YU7ZZ	331,100
HI3CCP	313,560

7 MHz

UK9AA	309,894
XE1CQ	244,200
YT2T	178,750
SO6V	147,576
RK9AX	141,168
IH9N	115,128

3.7 MHz

OK1WCF	130,530
IV3KFB	126,336
4O4A	118,146
OM3RDX	95,190
7S7V	75,768
EW8DD	70,799

1.8 MHz

SP4XQN	52,591
S58P	29,673
ER2RM	22,400
SP5CJY	12,960
TA2RC	11,427
YO6BZL	11,387

QRP
All Band

LY8O	548,280
KR2Q	468,440
F5BEG	462,561
OK2BYW	363,216
OM7DX	320,390
UA6LPY	306,636
JR4DAH	256,510
YO8WW	249,980
NØKE	237,120
EA3FF	202,275

Assisted
All Band

LX7I	7,300,332
RG9A	5,578,665
NN3W	5,076,422
ZX2B	4,722,760
TK9R	4,426,830
YR9P	4,241,682
DJ4AX	3,596,224
AY4D	3,517,792
DJ5MW	3,402,688
S53MM	3,166,112

Multi-Operator
Single Transmitter

CN3A	16,138,616
FY5KE	15,724,980
P33W	15,578,394
CQ9K	14,025,696
3V8BB	13,693,218
TM6M	10,858,952

Multi-Operator
Two Transmitters

AO8A	23,448,291
6Y1V	14,094,054
CT9L	13,798,850
PJ4E	13,127,680
IR4X	12,751,285
PZ5Z	12,076,368

Multi-Operator
Multi-Transmitter

K3LR	16,096,850
W3LPL	14,155,764
HQ3Z	12,666,672
DFØHQ	12,510,120
KC1XX	12,279,496
YV4A	11,824,268

UNITED STATES

All Band

K5ZD/1	6,121,516
K1LZ	4,915,323
K1DG	4,620,600
K4ZW	4,601,575
N2NT/1	4,584,160
K3CR	4,051,088
W9RE	4,020,992
N5DX	3,199,983
N2IC/5	3,141,460
AA1K/3	3,005,836

28 MHz

K4WI	3,381

21 MHz

N2PP	227,408
N4BP	161,000
NN1N	146,433
N5ZK	63,852
W2RR	46,750
K6JAT	20,650

14 MHz

KQ2M/1	1,242,150
W7WA	816,452
W3UA/1	693,211
K8PO/1	683,612
N7DD	681,948
KA1NCN/3	667,322

7 MHz

N4PN	493,041
K6NA	183,147
W8/T98T	135,330
W1XX	118,560
AG9S	94,875
W8JGU	61,854

3.7 MHz

AA1BU	216,982
W5WMU/1	168,498
K7ZV	117,564
W8JI/4	114,950
W3NO	85,910
W4QNW	28,137

1.8 MHz

W2MF	25,912
K5RX	15,470
W3GH	12,420
K1HAP	8,832
AA4MM	3,822
KØCS	2,059

Low Power
All Band

K1BX	1,655,738
N1UR	1,591,320
N4TZ/9	1,065,220
N1PGA	684,070
K2CS	510,190
N5DO	508,625
WD5K	503,132
K9OM/4	499,565
NA4CW	462,186
W4LT	454,896

28 MHz

KE5TQA	18

21 MHz

N4IJ/5	71,172
N1NK	45,838
K1VSJ	36,465
W7UPF	36,456
K8IR	31,800
W9ILY	30,877
ERØWW	5,517,720
RZ3AXX	5,453,470
OH8X	4,775,945
GW4BLE	4,405,968
HA8JV	4,356,936
GM6V	4,089,600

28 MHz

E77A	64,390
9A5D	17,136
S57S	15,281
EC7AKV	14,688
YU2A	8,772
IQ8OM	7,488

21 MHz

9A5W	647,640
YT7Z	368,125
EI2CN	309,504
9A5MT	290,450
EW8MW	240,210
YL2KO	203,489

14 MHz

GI5K	1,050,120
YU1EL	1,012,044
CT1JLZ	981,050
E71A	842,724
UX2IO	765,762
E77XZ	764,596

7 MHz

YT8A	1,030,032
S57AL	912,630
SO6X	480,600
S53M	448,415
UZ7M	410,870
OZ7X	355,069

3.7 MHz

GIØKOW	414,392
OK1BN	272,060
YL3FT	204,476
OH1TX	188,355
S58M	181,472
UW5U	172,909

1.8 MHz

F6CTT	153,510
SN3R	143,208
LY2IJ	139,944
OE6Z	109,822
LA9Z	103,700
9A2DQ	91,308

Low Power
All Band

CT8K	2,405,340
9A2EU	1,621,550
IZ2FOS	1,338,988
S51F	991,440
YT1HA	963,553
LY6A	955,682
EE7X	942,400
E74AA	873,445
UR4U	812,019
RV4HC	754,062

28 MHz

TA1CM	7,038
IZ8IYX	6,760
OM5FA	6,372
AO1B	5,904
EB3EPR	4,953
YO2AOB	3,915

21 MHz

9A3B	252,408
OK1FHI	123,956
AO1J	120,960
S54W	119,210
EI4CF	111,666
F5JY	109,434

14 MHz

YU7ZZ	331,100
LZ9X	299,452
EA7RM	276,276
AO3K	215,859
HG4F	214,953
UA1AQA	186,864

7 MHz

YT2T	178,750
SO6V	147,576
DH8BQA	106,112
E79D	74,130
G3WW	48,546
SP1I	44,574

3.7 MHz

OK1WCF	130,530
IV3KFB	126,336
4O4A	118,146
OM3RDX	95,190
7S7V	75,768
EW8DD	70,799

1.8 MHz

SP4XQN	52,591
S58P	29,673
ER2RM	22,400
SP5CJY	12,960
YO6BZL	11,387
F5VLV	8,772

QRP
All Band

LY8O	548,280
F5BEG	462,561
OK2BYW	363,216
OM7DX	320,390
UA6LPY	306,636
YO8WW	249,980
EA3FF	202,275
DF1DX	133,574
RW3AI	123,000
F5CYS	115,464

Assisted
All Band

LX7I	7,300,332
TK9R	4,426,830
YR9P	4,241,682
DJ4AX	3,596,224
DJ5MW	3,402,688
S53MM	3,166,112
YL6W	3,121,266
TM7F	3,064,505
IT9GSF	2,949,960
YT9A	2,904,450

Multi-Operator
Single Transmitter

TM6M	10,858,952
IR4M	8,569,156
HG6N	8,275,190
OM7M	7,882,633
OK5W	7,423,416
EI7M	7,237,860

Multi-Operator
Two Transmitters

IR4X	12,751,285
AM3SSB	6,752,412
HG1S	6,572,328
DQ4W	6,569,300
DL1QQ	5,993,469
DR5Z	5,019,912

Multi-Operator
Multi-Transmitter

DFØHQ	12,510,120
OT5A	10,231,340
LZ9W	9,541,920
DR1A	8,084,048
OH5Z	7,117,330
LY7A	6,116,412
WE3C	11,075,915
N3RS	7,072,868
K1RX	5,489,676
W4RM	4,825,515
N4T	4,597,644
KB1H	3,695,052

Multi-Operator
Multi-Transmitter

K3LR	16,096,850
W3LPL	14,155,764
KC1XX	12,279,496
NO4I	7,229,820
K3NA/1	7,145,644
K1TTT	6,618,708

EUROPE

All Band

CU2X	11,043,872
ES5TV	6,860,712
SV9CVY	6,784,912
M6T	5,864,868

QTH of JR5VHU showed its muscle by taking first in Japan, edging out the green tea plantation QTH of JA3YBK.

The continental winners were: North America: K3LR; Africa: no entry; Asia: JR5VHU; Europe: DFØHQ; Oceania: VK9DWX; South America: YV4A; Japan: JR5VHU; U.S.: K3LR.

Team Contesting

Five contesters from anywhere can form a team. Register your team before the contest and you have the ticket to enter the team contesting category. A lot of planning goes into the top teams to make potential top scores. Many of the teams band together just to have fun. As you can see below, the teams can be formed with members from anywhere in the world. Besides sending a FAX or mail to CQ, you can submit your team list to <teams@cqww.com>. You will receive an acknowledgement from that site. You probably noticed the three XE teams entered into the team competition category. What a great way to increase activity in a rare zone. Good job! This year the World-Wide Young Contesters Ultimate Lids team took top honors. The results of team contesting are as follows:

1. WWYC Team Ultimate Lids: CU2X (OH2UA), ES5TV, LX7I (LX2A), NN3W, OH8X (OH4JFN): 35,057,283.

2. Contest *Club* Finland –Team Mannerheim: OA4WW (HP1WW), OG5B (OH5BM), OG6N, TC4X (OH2PM): 6,898,638.

3. Carolina DX Association: AA4S, KI4TZ, KZ2I, N4ZC, N4PQX: 5,966,359.

4. KTU RC: LY1R, LY4T, LY5R, LY6A, LY2OU: 3,319,606

5. WWYC Team AYBABTU: OG5ØF (OH1NOA), M3PHP, SM6U, EA7OT, G1ZQN (MØTZO): 3,092,157.

6. VKCC - 30s: VK3TZ, VK4CZ, VK4HAM, VK4KW, VK4TI: 1,654,595.

7. Grupo DXXE – Full Calories: XE1BY, XE1NW, XE2S, XE1CQ, XE1CWJ: 1,612,527.

8. Mediterraneo Team: IZ8CCW, IZ8BGY, IZ8IYX, IK8LTB, IZ8FWN: 1,531,844.

9. MCC#1: VA1CHP, VA1MM, VE1DT, VE1OP, VY2LI: 1,529,135.

10. The Quebec Baritones: VE2XAA, VA2WDQ, VA2SG: 941,727.

11. WWYC Team IRC: E21EIC, OQ5M (ON5ZO), LZ4UU: 878,474.

12. Reus Radio Contest Group: EE3Y (EA3EYD), EA3KN, EE3R (EA3OR), EA3NA, EB3EPR: 675,089.

13. Grupo DXXE – Low Calories 1: XE1AY, XE1CT, XE1GRR, XE1MM, XE1YJS: 613,767.

14. Louisiana Contest Club Team #1: K5ER, KA5M, N5HMH: 565,583

15. Grupo DXXE – Low Calories 2: XE1YYD, XE1ZVO, XE2AUB, XE3N, N6AN: 158,347.

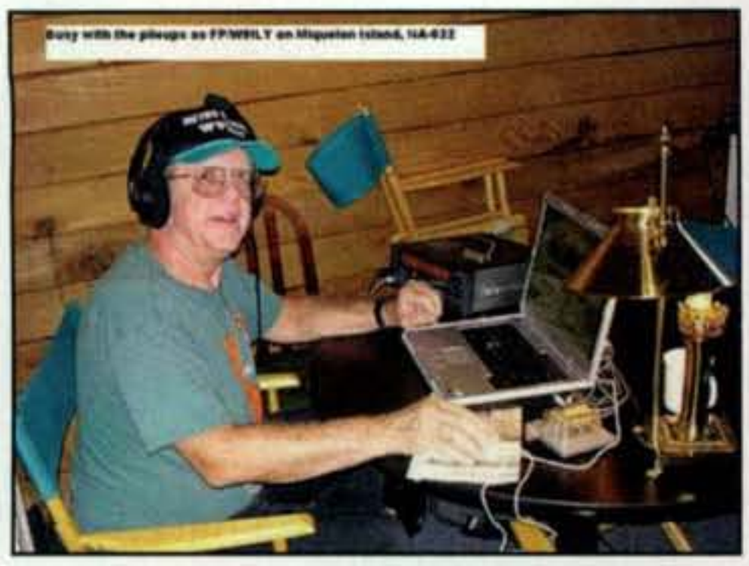
Records

Beating an existing record is a real accomplishment. Take a look at the record list at CQWW.com. You might find that you have a chance to take on the personal challenge of going for a new record. If you discover an error in the record list, please document it and let us know at <questions@cqww.com>. Below are the outstanding efforts of super operators which resulted in setting new world or continental SSB records during the 2008 contest. Congratulations!

World: A7 9Y4W; A3.7 OM2VL. **U.S.:**14 KQ2M/1; A7 N2ZK. **North America:** 14 VP2E (N5TJ). **Africa:** A7 IG9R (IK8HCG). **Asia:** Q7 4X/UU2JM; A1.8 VR2DS. **Japan:** Q3.7 JF2MBF. **Europe:** A CU2X (OH2UA); 7 YT8A, 1.8 F6CTT; A7 TM7R (F5FLN); A3.7 OM2VL. **Oceania:** None. **South America:** A7 9Y4W.

Special Mention

With the small rigs available today, you can place a transceiver in a carry-on, put some aluminum tubing in a golf bag, jump on a plane, and within a few hours be operating from a DX location. The CQ WW is famous for hams going on DXpeditions. If you travel to an island, you will be surprised how the "island effect" will enhance your signal strength. Once your antenna sees salt water, you suddenly have a natural amplifier. Some of the exotic callsigns appearing in entrant's logs making the contest more interesting for all of us were: 3DAØDJ, 3V8BB, 4XØC, 4XØV, 5B4AII, 5Z4/RW1AU, 6V7M, 6W1RY, 6Y1V, 8P5A, 9K2HN, 9M8YY, 9M8Z, A73A, AHØBT, AH2R, AO8A, 78 Chinese contesters(!!), C6APR, CN2B, CN2R, CN3A, CN4P, CQ9K, CT/LZ3ND, CT1JLZ, CT9L, CU2X, D8ØY, DL/NØHJZ,



John, W9ILY, on 21 MHz low power.

Gabi, YO8WW, #1 QRP Zone 20.

David, WA8WV, QRP from West Virginia.

E77J, E77XZ, EA6/AA5UK, EA6/DK5IR, EA8/EA4SV, EA8CMX, ED8D, EI/ON4EI, FG5KC, FY5KE, G/SP4BHD, G5W, GZØF, HBØ/HB9AON, HC8A, HQ2W, HQ3Z, HQ9R, HSØAC, HT2N, IG9R, IG9S, IH9N, IK/DJ1AA, IMØ/IKØFMB, ISØ/K7QB, IS$$A, ISØC, ISØT, J37T, J42T, J43J, J88DR, KH6LC, KP2M, LA2AB, M7A, MWØX, MW9W, NHØDX, OA4WW, OE/DJ1AA, OHØE, OX2A, P33W, P40A, PJ2/OH2YY, PJ2T, PJ4/NØVD, PJ4E, PZ5Z, SU1KM, SU9HP, SV9CVY, SX5P, T32CXX, T88AC, T88YB, T8IC, TA2/DL7BC, TC4X, TC7KA, TI1R, TI5N, TK9R, TO4X, TO5DX, TO8Z, V26B, V31MX, V47JA, V48M, V6B, VK9DWX, VP2E, VP2EC, VP2V/K9NW, VP2V/SP7VC, VP5DX, VP5T, VP9/K3IRV, VR2EH, VU4MY, VU4RG, VU7SJ, WH2D, WH2DX, XU7ADU, YM2W, YV4A, ZAØ/IK7JWX, ZK2DF, and ZM1K.

Comments

We received 5021 2008 CQ WW SSB contest logs of which 4881 were electronic! Thanks to all the contesters around the world who sent in a log. *Please send in your log no matter how small.* Your effort to submit an electronic log allows for a fairer adjudication process. Submitting an electronic log is easy. Send your SSB log to <ssb@cqww. com> (CW to <cw@cqww.com>). Please send your log in Cabrillo format. If you have the capability with your logging program please submit a log with exact frequencies. Exact frequencies help in the log-checking process and help with statistical analysis of band openings.

Before you submit your log, you can help us a great deal by double-checking your Cabrillo submission. Please make sure the category you have chosen is correctly indicated. If you are submitting a single-band entry, please check to see your chosen entry matches what is in your log. If you did everything OK, you will get back an acknowledgment from the robot. If there was something wrong, you will get a message telling you what to do to correct the error. You can then resubmit your log to the same above addresses. If you are having submission problems, we can help you at <questions@cqww.com>. It bears repeating that if you make a mistake on your first submission, you can resubmit your log. It will replace the first submission. We archive all your submissions.

BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

Number groups indicate: QSOs/Zones/Countries on each band

WORLD TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
HC8A	278/17/44	741/27/93	1412/34/113	2477/35/127	1995/29/98	539/15/47
CU2X	262/16/60	748/24/95	1333/28/102	2454/32/117	2932/33/124	39/8/19
8P5A	362/13/49	834/24/90	1160/31/104	2778/32/116	1736/26/92	177/12/28
VY2ZM	675/21/83	668/20/87	854/27/96	3274/34/129	473/25/87	1/1/1
5B4AII	173/10/56	342/19/85	1000/23/98	1546/32/108	2314/28/105	61/8/24
ES5TV	592/20/77	1014/31/109	990/32/111	2395/38/137	400/34/93	92/6/28
SV9CVY	279/9/55	617/17/76	1841/29/107	2217/34/123	1425/26/102	270/9/41
VE3EJ	333/17/53	702/22/91	498/28/92	1738/38/129	931/28/100	28/6/10
K5ZD/1	112/14/55	410/21/86	765/27/100	1891/36/127	458/23/89	44/6/12
M6T	271/14/59	920/23/87	821/29/94	1833/37/112	849/31/98	24/3/19

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
K5ZD/1	112/14/55	410/21/86	765/27/100	1891/36/127	458/23/89	44/6/12
K1LZ	97/12/46	573/20/88	395/25/87	1705/33/122	474/25/90	63/6/13
K1DG	116/16/70	376/24/90	244/24/92	1677/33/123	374/23/92	52/6/19
K4ZW	67/15/46	404/20/85	649/28/95	1285/37/121	518/25/90	14/5/10
N2NT/1	93/12/45	377/22/85	416/24/86	1687/32/118	343/23/91	73/6/16
K3CR	65/11/43	330/19/75	338/22/86	1316/33/123	673/23/92	16/4/5
W9RE	51/10/26	226/26/81	566/28/102	1038/37/124	800/24/90	15/4/4
N5DX	55/13/32	162/24/74	496/29/88	814/36/111	743/28/90	16/5/7
N2IC/5	34/12/25	185/22/69	487/31/89	904/34/110	583/32/94	51/6/8
AA1K/3	67/13/45	175/20/63	408/24/81	1089/32/115	536/24/88	2/1/2

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

CN3A	64/14/63	757/23/96	1733/33/119	2102/38/142	2817/35/141	78/15/35
FY5KE	288/15/67	588/28/100	847/31/117	2148/38/146	2931/35/139	120/21/59
P33W	256/12/66	671/24/96	1429/33/123	2605/37/145	2472/35/132	158/12/39
CQ9K	203/13/63	529/23/102	1276/37/122	2384/39/150	2016/36/143	30/14/30
3V8BB	372/10/62	913/23/90	1293/30/121	2186/38/144	1396/37/131	319/14/48
TM6M	241/17/78	1101/23/105	1318/35/131	2226/39/152	1352/35/129	21/7/21

USA MULTI-OPERATOR SINGLE TRANSMITTER

NØNI	98/16/52	346/27/99	216/27/98	1336/36/141	605/31/106	7/6/6
K9RS/3	91/16/58	380/25/97	383/28/106	1063/37/130	394/29/103	30/8/16
K8AZ	51/15/50	266/26/98	322/28/113	1155/37/141	341/30/105	35/7/12
K5TR	43/14/42	139/25/85	540/31/117	851/37/138	567/33/113	71/10/16
N1MM	41/10/33	219/22/85	547/26/102	695/34/119	513/28/106	84/7/13
K5NA	76/15/48	233/27/94	352/32/113	549/35/131	603/33/107	58/8/11

WORLD MULTI-OPERATOR TWO TRANSMITTER

AO8A	309/16/67	1628/26/106	1837/31/115	3280/40/146	3281/38/149	71/14/41
6Y1V	470/15/65	1003/22/93	2374/29/116	2779/36/131	2129/34/123	85/11/27
CT9L	210/12/61	943/19/86	1724/32/120	2008/34/120	2622/31/108	27/9/18
PJ4E	262/13/45	801/21/88	691/26/94	3349/34/131	2295/31/115	133/13/30
IR4X	201/14/66	1187/30/113	1720/35/133	2295/39/159	1665/38/149	73/11/48
PZ5Z	109/13/27	752/26/90	1107/29/109	3308/38/132	1769/27/106	62/15/24

USA MULTI-OPERATOR TWO TRANSMITTER

WE3C	115/18/72	745/27/105	1175/28/120	2223/38/152	1224/32/122	49/10/21
N3RS	58/11/38	591/24/98	958/30/116	1586/37/142	897/31/119	47/7/14
K1RX	139/14/61	543/25/101	460/28/110	1502/34/127	490/28/107	65/6/13
W4RM	69/15/43	431/23/85	710/28/103	1364/35/131	596/26/97	3/2/3
N4T	66/12/48	321/20/86	640/28/107	1633/38/137	557/30/100	59/8/22
KB1H	48/12/34	321/21/92	315/24/98	858/36/129	593/29/113	91/7/19

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

K3LR	350/21/75	1279/29/115	1475/32/128	3177/39/165	1666/31/130	105/9/17
W3LPL	429/21/82	1002/28/111	1377/31/127	2813/39/157	1377/32/129	72/9/16
HQ3Z	506/15/52	1303/23/90	2044/29/100	2587/33/119	2302/33/116	163/15/29
DFØHQ	990/16/82	2040/26/105	2844/39/148	2170/40/156	937/35/131	236/10/52
KC1XX	279/18/71	1024/27/112	1066/30/120	2517/38/153	1266/30/132	149/8/22
YV4A	225/12/51	445/21/77	1443/33/129	2358/35/123	2061/34/112	207/12/29

USA MULTI-OPERATOR MULTI-TRANSMITTER

K3LR	350/21/75	1279/29/115	1475/32/128	3177/39/165	1666/31/130	105/9/17
W3LPL	429/21/82	1002/28/111	1377/31/127	2813/39/157	1377/32/129	72/9/16
KC1XX	279/18/71	1024/27/112	1066/30/120	2517/38/153	1266/30/132	149/8/22
NQ4I	214/16/58	572/27/108	741/30/116	1701/38/147	1045/33/120	87/8/12
K3NA/1	200/16/74	586/25/99	761/29/117	1633/37/141	642/27/106	102/6/20
K1TTT	278/15/57	642/24/99	855/27/112	1625/37/132	559/29/109	127/8/17

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
CU2X	262/16/60	748/24/95	1333/28/102	2454/32/117	2932/33/124	39/8/19
ES5TV	592/20/77	1014/31/109	990/32/111	2395/38/137	400/34/93	92/6/28
SV9CVY	279/9/55	617/17/76	1841/29/107	2217/34/123	1425/26/102	270/9/41
M6T	271/14/59	920/23/87	821/29/94	1833/37/112	849/31/98	24/3/19
ERØWW	467/13/60	763/18/80	1558/33/112	1746/34/102	809/28/77	44/5/23
RZ3AXX	118/11/45	617/29/91	1282/36/120	2040/38/124	624/23/72	22/6/10
RW1AC	204/13/58	790/27/96	912/30/115	1743/36/115	652/31/84	30/9/21
OH8X	247/11/54	331/21/71	412/28/89	2897/38/114	573/32/89	15/6/12
GW4BLE	104/8/45	800/19/78	745/24/82	1540/30/99	794/27/76	8/2/6
HA8JV	390/11/63	988/22/90	579/25/96	1486/35/124	477/32/98	22/6/19

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

TM6M	241/17/78	1101/23/105	1318/35/131	2226/39/152	1352/35/129	21/7/21
IR4M	193/14/65	477/24/97	1008/35/127	1718/39/147	1450/38/136	94/10/50
HG6N	346/12/63	1235/22/102	1026/34/131	2183/40/155	904/36/136	30/9/30
OM7M	306/15/72	524/21/96	1361/36/134	1699/38/147	944/36/137	44/8/41
OK5W	140/15/71	1013/26/111	1207/37/134	1328/37/143	884/37/133	37/11/37
EI7M	330/16/72	863/19/92	1226/33/115	1839/36/135	898/29/100	13/5/13

EUROPE MULTI-OPERATOR TWO TRANSMITTER

IR4X	201/14/66	1187/30/113	1720/35/133	2295/39/159	1665/38/149	73/11/48
AM3SSB	119/7/46	814/18/82	1483/28/102	2171/39/140	1151/36/115	72/4/19
HG1S	228/9/57	1282/21/91	1300/34/125	1855/37/141	684/35/110	31/8/28
DQ4W	362/11/59	1210/19/101	892/33/124	1553/36/146	862/37/138	39/7/23
DL1QQ	492/14/68	1184/26/107	1009/34/129	1365/37/136	510/35/111	29/7/27
DR5Z	359/8/55	626/19/79	582/30/111	1366/38/137	848/36/130	44/7/28

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

DFØHQ	990/16/82	2040/26/105	2844/39/148	2170/40/156	937/35/131	236/10/52
OT5A	875/12/62	2090/19/94	2314/38/131	2188/40/143	841/33/118	320/10/49
LZ9W	637/10/66	1413/25/98	2531/34/127	1926/38/149	1065/38/132	111/11/44
DR1A	484/15/65	1246/20/81	1623/34/123	2293/36/141	791/36/120	95/9/32
OH5Z	627/12/68	824/25/91	1839/37/135	2067/38/145	623/36/115	63/5/20
LY7A	688/10/59	1244/14/71	1996/28/119	1904/37/132	576/34/102	96/8/38

The CQ WW Contest Committee provides several ways for an entrant to check his/her log for category, club, and operator. Soon after you submit your log and long before the final results are published in *CQ* magazine, a *log received list* with your category is posted on the CQ WW site (cqww.com). Look over this list to find if your data is accurate. If it is not OK, please let us know at <questions@cqww.com>.

About one month before the results are finalized in *CQ*, you will receive via e-mail a password that will allow you access to your log analysis. This is called your *report* (rpt). You can look over the report to again verify your category and other information.

Thanks to the input from numerous entrants, a few systemic errors were found and corrected. All these efforts help to make the results as accurate as possible. Everyone enters the contest to have fun, meet friends, perhaps work some new ones, and fairly compete. You can see information concerning the CQ WW on the web page at: <http://www.cqww.com>.

Top Scores: If you plan to try to make the Top Score Box, you can count on your log being scrutinized. In a perfect world we would not have to spend a great deal of extra effort to check potential problem logs. Unfortunately, some entrants feel they must win at any cost, even if it means cheating by not following the rules. Just as in other aspects of life, cheating in the CQ WW will not be tolerated. The use of undeclared packet; the use of additional operators for a single operator entry; two signals simultaneously on the same band, or on separate bands at the same time, if you are single operator; all are in violation of the CQ WW rules. If you are multi-single, do not alter the times in the log to conform to the 10-minute rule. The CQ WW has at its disposal many methods to verify the score of an entrant. A few of these methods are: category averages for packet and non-packet scores, statistical aids to verify winners, URL tracing, packet clusters, reverse log time/band checking (which provides times and frequencies of more than 80% of the QSOs in any log).

If you are a single operator in *any* single operator category, you cannot receive help which could impact your score in *any* way from *another person or any DX spotting network*. Every year we receive reports of someone allegedly having another operator spot or work

QSOs for him or the unclaimed use of packet. This is not following the rules and could result in disqualification. We will crack down on such cases. The use of packet to self-spot is against the rules. There is nothing wrong with coming across a station and spotting it, but self-spotting is against the rules. There is no problem with using any DX spotting network: *just claim to be assisted.* The CQ WW has few requirements: write down the callsign of the station you are talking to, claim the correct category, and do not self-spot. Not so hard.

We enter the contest to fairly compete and have fun. A fair competition means that everyone is following the same written rules.

Thanks

Creating the results you see in *CQ* magazine is just the final product of a lot of work. Entrant log submission problems, incomplete logs, forgotten band changes not in log, incorrect call indicated as used in the contest, and a myriad of other subtle problems are sorted out behind the scenes. Using an armamentarium of log-checking tools and data sources, the CQ WW Contest Committee has done its best to certify the winners. The members of the committee who provided insight into many contesting topics are: K1DG, K3WW, K3ZO, KR2Q, K3LR, N2AA, N2NC, N3ED, N9RV, W3ZZ, K1AR, KM3T, KT3Y, W5OV, K5ZD, N2NC, WØYK, N5KO, K6AW, N6AA, N6TW, N6TR, K5TR, W6OAT, and N8BJQ. The DX advisors who offered advice and sorted out potential problems are: CT1BOH, EA3DU, F6BEE, G3SXW, I2UIY, JE1CKA, OH2KI, OH2MM, PY5EG, S50A, UA9BA, VA7RR, VE3EJ, and E21EIC. A special thank you to Ken, K1EA, who spent countless hours making the CQ WW database the best in contesting. Thanks as always to John, K1AR, and Tim, K3LR, for their advice. We also want to thank Barry, W5GN. Barry has provided the machinery to send certificates to you in a timely manner. Over many years, Larry, N6TW, has been a solid rock in contributing to the results of the CQ WW. Larry, all of us owe you a debt of gratitude. The CQ WW records are maintained by John, N2NC, and K3EST.

Finally, last year we lost one of our important members, Paolo, I2UIY. His insights and focus on honest contesting always made us alert. Paolo, a friend, with his great wit and his distinctive laughter, will be truly missed.

Congratulations to all the winners and entrants!

73, and CU in the '09 contests! Bob, K3EST

DX QRM

Another fun contest was had by all at 6Y1V. This year KY1V was joined by Young Ham Contest Program Winner IZ7KHR, last year's winner LU9ESD, and three Brits, G3NKC, G4BUO, and G4XUM. This proved to be a great combination; everyone really enjoyed the experience. A few problems were encountered with the antennae following hurricanes involving a significant amount of effort. HF conditions were not good, but LF seemed to be really buzzing ... **6Y1V**. My best single-op contest entry ever. Once again, CQ WW makes its own propagation: terrific conditions, especially on 15m, completely unexpected at this stage of the solar cycle ... **9M8Z**. Great fun in a great contest with several newly minted hams! ... **A73A**. Our first M/2 effort. Everybody was on 20m, 40m, and 80m absolutely crowded. 10m was open only 1 hour on Saturday. Thanks to everybody who contacted us ... **AM3SSB**. Once again, CE1W on the air, step by step to the top, new Chile all time record ... **CE1W**. CQ WW forever! ... **DL4EAX**. Had lots of fun despite rig issues putting out 30W PEP on SSB! Will try again next year to do better. Too bad 10 meters did not open more from Europe ... **EA6/AA5UK**. 15m open on Saturday was nice. 20m operating spread over Saturday and Sunday. 40m and 80m early Sunday was enjoyable ... **EI4DJB**. Licensed for two weeks and two bits of wires for antennas. In CQ WW SSB Contest! Crazy? No, why not? Two new ones on three on these bands, good score ... **F4FWN**. First time entry and pleasantly surprised at what could be achieved with 50 watts and bent wire dipoles ... **GØCPA**. This was our first time on CQ WW during which it was used as training and experience for our new and younger members. We enjoyed it very much ... **G4ARN**. Hard work with 100W as my linear was at GMØB this year. Best moment was working HC8A on 40 metres 80 watts to homemade vertical antenna. Next year high power ... **GMØEGI**. A struggle from start to finish, but great fun nevertheless! Lost electric power for 10 hours on the Saturday and 93 mph winds recorded on the island ... **GZØF**. My first CQ WW contest as single operator from Thailand. Quite a few staions/multipliers heard but not worked. Hard to break US/EU pileups from South East Asia with a small signal. Great fun as always. A lot of activity from Thailand now ... **HSØZGD**. More than 500 QSOs and 90 countries with an inverted V wire dipole. Big fun ... **IK2DZN**. First time together for some members of the local ARI's radio club, a very big fun! Also first try in a CQ WW Contest for a lot of the team members. ... **IR9Y**. I have just come back to the contest after 38 years absence. The propagation was not favorable for low power and small antenna, but really enjoyed the contest ... **JA7HYS**. This year a lot of changes were made on antennas, but surely system is not yet finished and I have some more plans for the next year. More information on my system could be found on www.lx2a.com. Thanks for all who called me. Before the contest I never had imagined to make this great score,... **LX7I**. A very successful contest for a large team of operators of various experience levels from the Cambridge University Wireless Society. For once this year we had no major problems and even the weather was kinder than in previous years. A pity that 15m wasn't anywhere near as good as last year. Thanks for all the QSOs ... **M4A**. Low power needs more propagation! ... **NH7FY**. With no antennas for 40/80m and 10/15m nearly closed I had to agonize about the decision between crowded 20m or working 160m EU. Still had fun. It's CQ WW! ... **OE5T**. My third CQ WW. The goals this year were to be on 40 and have some experience with the crowed band, and I did! Enjoyed the contest and see you back next year! ... **ON3TO**. First CQ WW DX on SSB ever. What a zoo on 40m! :) ... **PA4N**. New for me was to work VE and K stations on 40 meters in the BC station band 7100–7200 for the first time. P4 was a new one, too. New on 20 meters was VP2. Great DX. So a great contest for me with QRP See you all next year again ... **PE2KP**. Haven't antennas for low bands. Just collected DXCC and zones. Especially thanks to LZ7J who show "ham spirit" on my frequency during half hour ... **RV2FW**. Just one week before moving to new QTH. All roof antennas already disassembled. Used car antenna attached to the balcony on the second floor. QRP is powerful as I managed to work zones 25, 34, and 18. Had great fun and every QSO was a joy. ... **SP5DDJ**. I did only operate for 10 hours on Sunday, but average score was over 40 Qs per hour. That was my highest ever. The extra power did help. My only antenna was for 20m so I was limited to daylight. Conditions started in the morning and disappeared in the afternoon. Highlights included A73A in Qatar, 9K2K in Kuwait, and PZ5Z in Surinam. Great fun as always. Thanks for organizing this great event ... **TF3AM**. The epoch of high power is over for me! For the first time in 10 years I worked in CQ WW low power. During those years in category HP I have established new country records 10, 15, 20, 40, 80, 160m and all bands. Now it is the time to get rid of power amplifier and be in CQWW Contest in category low power next 7 or more years. Thanks to all contesters and organizers CQ WW for a nice contest! CQ WW is the event which is awaited 363 days in a year! ... **UK9AA**. Unbelievable courtesy from operators who unknowingly started operating +/–0.5 kc from us to move up/down the band, from stateside and European stations. Thank you all! ... **V48M**. Any excuse to get on 160 meters and make some noise, I always like to say! (Even if my favourite mode just happens to be CW, and NOT SSB! Hi Hi). Still, it was great hearing a few otherwise stalwart CW afficiandos switch to their microphones for a change, even me! ... **VE3CUI**. My QSO with 8P5A on Oct. 26 made me think of R. A. Fessenden, radio pioneer, whose first radio broadcast in voice was made on Christmas

TOP SCORES IN MOST ACTIVE ZONES

Zone 3

K7RL	2,394,040
N6TJ	2,125,669
WC6H	1,544,018
W7AT	1,030,080
K6XX	1,014,300
**W7WA	816,452
**N7DD	681,948
VA7ST	541,270
NN7ZZ	523,008
K7VIC	496,920

Zone 4

VE3EJ	6,472,174
CK3AT	5,577,291
W9RE	4,020,992
N5DX	3,199,983
N2IC/5	3,141,460
VE3CX	2,149,941
*VE3DZ	2,109,028
KØRF	1,883,056
*VE3NE	1,639,760
K4AB	1,478,880

Zone 5

VY2ZM	9,160,112
K5ZD/1	6,121,516
K1LZ	4,915,323
K1DG	4,620,600
K4ZW	4,601,575
N2NT/1	4,584,160
K3CR	4,051,088
AA1K/3	3,005,836
W3BGN	2,729,251
K3ZO	2,687,024

Zone 14

CU2X	11,043,872
M6T	5,864,868
GW4BLE	4,405,968
GM7V	4,089,600
G5W	4,025,875
EA4KR	3,829,224
DJ8OG	3,488,496
LN8W	3,038,616
DJ4PT	2,747,430
*CT8K	2,405,340

Zone 15

ES5TV	6,860,712
OH8X	4,775,945
HA8JV	4,356,936
OE4A	3,856,069
E73M	3,220,000
II4A	2,098,174
OHØE	2,060,300
OG5ØF	1,907,145
*9A2EU	1,621,550
LY5R	1,552,056

Zone 16

ERØWW	5,517,720
RZ3AXX	5,453,470
US5D	2,923,250
RM3F	2,824,345
RW1ZA	2,377,771
RD4WA	1,811,340
EV1R	1,252,878
RA3CM	1,243,984
RN3ZC	1,015,872
*UR4U	812,019

Zone 20

5B4AII	8,770,736
SV9CVY	6,784,912
**TC4X	891,310
*OD5NJ	686,336
*TA2/DL7BC	684,216
*YO3CZW	643,648
*YO3FRI	580,992
LZ3FN	552,330
YO3RU	445,544
LZ1BJ	423,330

Zone 25

JH4UYB	4,577,027
JA7NVF	1,624,120
JF2QNM	1,163,081
JA3AOP	801,810
**JA2PAC	700,942
JA3USA	649,704
JR7WAB	616,050
JA7YAA	572,055
JA7COI	566,564
JHØJHA	512,696

**Low Power*
***Single Band*

Eve, 1906. He is buried on the island of Bermuda. Epitaph Inscription "I am Yesterday and I Know Tomrrow" ... **VE3EDY**. Surprisingly good condx considering low sunspot numbers. Lots of fun. 80 and 40 open to all areas of the world. A real treat for our "black hole" in VE5 land ... **VE5RI**. This contest was a great oportunity for many of the over 12 new hams who passed their Basic Exams in our club in 2008. For many of these operators this was their first great experience in working DX ... **VE7NA**. My first time in this great contest and will be back next year Thanks to all who listened for me ... **VK4BL**. It was a pleasure to take part in the CQ WW as an DXpedition for the first time. We enjoyed the interest of the participants to work with us very much and we hope all had the same fun as we had. Best wishes to everyone!!! DL9GFB/VU2JOS ... **VU7SJ**. 15m was pretty marginal here in VY2 and 10m nonexistent! Tks to all the old friends who called in this time ... **VY2ZM**. It was fun. First time ever. I am just nine years old ... **WP4NVK**. I am happy to follow WW DX contest for first time because I am newcomer in ham radio. All the best to you ... **YC6BRS**. Pretty bad propagation in YO, with little-to-no real runs towards NA. Good participation from all continents. Didn't put up much effort after first day, just enjoyed the rest of the contest and gave out some points. 73, Mircea, YO3XX ... **YP3A**. Good fun! Good polite operating observed. Some interesting phonetics utilized in efforts to get callsigns through the noise! Wish I could have logged more ... **ZL1AAO**.

USA QRM

It was wonderful to see 15 open again. Now let's see what 10 can bring! Great contest as usual ... **AC9S**. 20 meters much better this year into Colorado. At least one signal every 1 kHz! Running was difficult, mostly had to do S&P ... **KØIZ**. Golf date on contest Friday cut into start. Nice western EU openings on 15 both days. Special thanks to JA1NUT for a rare SSB QSO! ... **KØRF**. Lots of fun with only a 160 mtr Windom and a dipole at 25 ft for 20m! ... **K1HTJ**. Can't believe the QRM on 20 meters. How can you pack so many stations in a 200 kHz bandwidth? There must have been ten stations deep per every kHz. When will the higher bands open up to spread out the contesters? ... **K2MFY**. Where did 10 meters go? Best conditions ever on 160m, worked plenty of stations with a shorted G5RV.... **K2CS**. Not much to show for an 8 hour effort but this was my first CQ WW and I had a lot of fun. What I need now is a better antenna system. I am psyched for the contests to come! ... **K4EET**. Good conditions or bad, this contest always offers a few nice suprises. 40 was as amazing as 10 was bad ... **K5ZD**. Another CQ WW with no sunspots. Never heard a signal on 10m! I tuned up there several times too and called CQ. 15m had a surprise early Sunday morning opening to CT, I, F, EA, etc. On 20m, there were times when it was S9+ sigs solid from 14150-350. Strong EU/SA openings there. On 40m, the usual deaf EU and EU/Far East stations booming in and not listening up. On 80m, my R7 seemed like a wet noodle. Hopefully, there will be better condx for the CW part ... **KC6X**. More 15m activity in CQ WW SSB than the whole rest of the year! Maybe the new sunspot cycle didn't stall out after all! ... **KE7DX**. My first CQ WW. I had a great time, and worked several new DXCC entities. Best was Spain and Italy on 40m Sunday AM, and HI on 15m Sunday afternoon ... **KG4ZDM**. I am 9 years old and this is my second contest. Great fun! ... **KJ4BIW**. Way to go Africa! Even with a sunspot count of 0 worked more Africans in this contest than ever before in 52 yrs of contesting! ... **KS7T**. This was my first CQ WW as a high power entry. Lots of fun with many new ones on the low bands. Even some propagation on 15m ... **NØYO**. I hope everyone had a good time. Conditions were not great but good enough to provide some great Q's ... **N1BCL**. Great "cherry pickin." 11 hours of fun. Wanted to play in the sandbox some more, but grass mowing, "honey-do," Eagles game, and the Phillies in the World Series. Too much to do, and never enuough time. Lotsa new ones on 40m and 75m for 5BDXCC. 18 new countries on 40; 7 on 75m. Seeing the light at the end of the 5-band tunnel. Hi! ... **N3TR**. Mobile with minimum time; however, good to participate some to keep the hobby alive ... **N4LS**. What a great experience operating from W8JI's super station. If log checking holds up, will have set a new US record for 40m in this one. Conditions were good and no problem with equipment or QRN. Just terrible broadcast QRM all over the band ... **N4PN**. Another bad year on the third rock. Someday 10/15 will really open, hopefully in my lifetime ... **W3TZ**. JH1OGC gets my vote for best "ears." TM6M was the only European who could hear me. Rig here was "Original" IC-706, CtWin, and HF-2V ... **W6HH**. Wow, my first CQ WW! People were very nice. Had a very fun time! ... **W7JAZ**. The great activity opens up the bands every year. Spent months getting new tower ... W**9RE**. Had a great time even though conditions were pretty poor. Nice to see 15m open for a run from U.S. East Coast to Japan and New Zealand. Look forward to next year. Thanks for putting on the contest ... **WB4ROA**. Hey, conditions are finally looking better! ... **WB8JUI**. Conditions much better this year! 20 and 15 meters were excellent. Next year maybe 10 meters will be alive again? See you then! ... **WKØP**. Always challenging from AZ but did OK considering. Need to upgrade here to be more competitive but I sure have fun with what I have! ... **WU9B**.

(Continued on page 101)

Photo A– In spite of ICOM's best efforts, it was impossible to confuse Hara Arena with a tropical island! Despite that, the Dayton Hamvention® was, as always, a ham's paradise of radio goodies. (Photos by staff and/or courtesy respective manufacturers)

Once again this year, the Dayton Hamvention® provided a launchpad for a variety of new products in the ham radio marketplace. As usual, this month and next we'll be taking a look at what we found in our annual search of the exhibit halls.

The 2009 Dayton Hamvention® Sunday Safari – Part I

BY ANTHONY A. LUSCRE,* K8ZT
NEW PRODUCTS EDITOR

This time we present Part I of the tour of new products at this year's Dayton Hamvention®. As both Part I and next month's Part II were written by Anthony, K8ZT, they appear in these issues in lieu of his regular "What's New" column.
—W2VU

Each year, *CQ* Editor Rich Moseson, W2VU, and Advertising Manager Don Allen, W9CW, set out on a Sunday Safari to hunt the Dayton Hamvention® for new items. This year I am pinch-hitting for Rich, as he needed to leave early to attend his son's college graduation. However, before we start our safari for new products, if you have never made it to Dayton for the Hamvention®, it is not too early to start planning a trip for 2010. For more information on the Hamvention®, read "The Amateur Radio Website of the Month" at the end of this article.

**5441 Park Vista Court, Stow, OH 44224-1663*
e-mail: <k8zt@cq-amateur-radio.com>

Radios & Amplifiers

VHF/UHF

This year there were a lot of new rigs covering the VHF and UHF bands. In addition to the ham-band transceiver capabilities, most units now also include wideband receiving with continuous tuning from 0.530 to 999 MHz with a few even going up to 1299.995 MHz. The usual disclaimer applies for all of these: "cellular frequencies blocked in U.S." Many manufacturers have also added specific weather-band channels with weather alert.

The Alinco **DJ-G7** tri-band FM handheld transceiver provides 2-meter, 430-MHz, and 1200-MHz band coverage. First time 1200-MHz users may find it challenging to find activity on this band, so this is where Alinco's patented Channel-Scope® shines by allowing you to visualize the presence of radio signals on the display. There are also two modes of bug-detector functions for those paranoid among us. MSRP is

Photo B– The Alinco DJ-G7 tri-band (144/430/1200 MHz) FM HT.

Photo C– ICOM ID-880H D-STAR digital dual band mobile.

$350. Visit <www.alinco.com> for more information.

ICOM's new offerings both feature the D-STAR digital system. The **ID-880H** mobile is a 2m/70cm high-power digital transceiver. In addition to standard analog FM mode, the ID-800H can transmit and receive D-STAR format digital voice and 950-bps data communication, simultaneously. When an external GPS receiver is connected to the ID-800H, position information for both your station and the station you're talking to can be exchanged and shown on the display. When the receiving side is connected to a computer with mapping software, map plotting is possible. In the digital voice mode, your callsign and the calling station's callsign (or CQ message) are included in each transmission. The callsign squelch allows you to choose an incoming call selected by the callsign. Also, received callsigns are automatically stored in the memory. Price is approximately $499 at authorized dealers.

ICOM's **IC-80AD** is the "matching HT" to the ID-800H mobile, and the two rigs share many functions and settings. To manage many of these features, ICOM's free-download CS-80/880 cloning software is available from the company's website. Used with this software, various settings can be made from a PC, and the memory channels and other settings can be shared between the two radio models. Approximate price is $450, and the optional HM-189GPS GPS speaker is $200. For more information visit <www.icomamerica.com/en/amateur/default.aspx>.

The first thing most visitors saw at the Yaesu booth was this year's traditional free Yaesu baseball cap. This is yet one more good reason to visit the Hamvention®, and in my opinion, this year's edition was one of the best designs in years. However, do not let the hats grab all your attention, because there were new radios to see: the VX-8R, FT-250 (replacing the VX-150), and FT-270

Photo D– The ICOM IC-80AD digital dual-band HT with the HM-189GPS optional GPS speaker/mic.

(replacing the VX-170) handhelds; and the FT-1900, FT-2900, and FT-7900 mobiles.

The **VX-8R** is Yaesu's most full-featured handheld. Introduced last year at Dayton as a prototype, the production model includes even more than was originally promised. Billed as a "Triple Band Handheld" covering 50/144/430 MHz, the U.S. version is actually a quad-band HT with its addition of low-power 222-MHz band coverage. Yaesu has packed all of that into a compact 2.4" W × 3.7" H × 0.9" D case. Designed for rugged outdoor use with a polycarbonate resin front panel and aluminum die-cast chassis, it is submersible to 3 feet for 30 minutes (IP7X equivalent) and "shockproof." Real dual ham-band operation is featured: With two independent amateur-band receivers you can listen to any two frequencies in the same or different bands (V+V, V+U, U+U). An optional BU-1 Bluetooth® unit provides a variety of Bluetooth® capabilities, including hands-free operation with built-in VOX function. The radio

Photo E– The Yaesu VX-8R 50/144/222/430-MHz HT.

also has integrated APRS (Automatic Packet Reporting System) operation. Addition of the optional FGPS-2 unit provides GPS data. Built-in sensors allow the radio to display barometric pressure, altitude, and/or temperature. Approximate street prices: VX-8R $400, FGPS-2 $80, and BU-1 $70.

If you are looking for a low-price and high-power 2-meter mobile, the new **FT-2900R** provides 75 watts at under $170. Yaesu is calling it "The King of Mobile." The massive heatsink handling 75 watts with no cooling fan, 3 watts of audio output for noisy environments ,and large easy-to-read display help explain this name. The **FT-1900** is sort of the little brother of the FT-2900, but still provides 55 watts (with fan cooling) and an under $150 price tag. The **FT-7900R** is a back-to-basics, heavy-duty 2m/70cm FM mobile with 50 watts VHF and 45 watts UHF. The Smart Search feature automatically sweeps a band and loads active frequencies into dedicated memory banks, making it easy to

Photo F– The new Yaesu FT-2900R 75-watt 2-meter mobile.

Photo G– JetStream's JT220M 50-watt 222-MHz mobile.

Photo H– Elecraft's K144XV internal 2-meter module mounted inside the K3 transceiver.

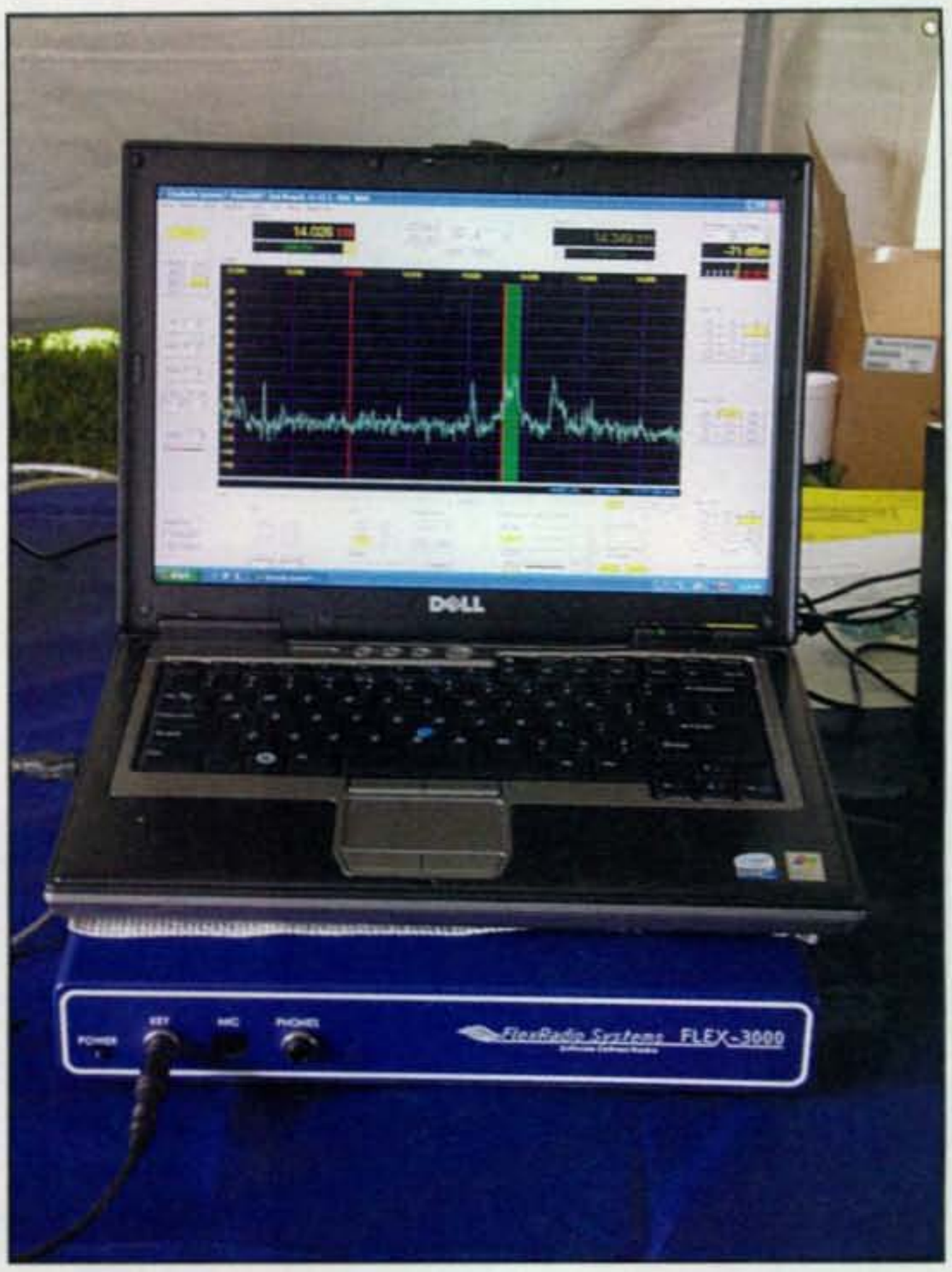


Photo I– The simple, small case of FLEX-3000™ SDR from Flex Radio Products (bottom) gives you little indication of its performance-packed transceiver capabilities.

find repeaters when visiting a new location. Price is $275. For more information visit <www.yaesu.com>.

Stopping by the Jetstream booth revealed a surprise, the **JT220M**, a new 220-MHz 50-watt FM mobile radio. New 220-MHz radios have been few and far between lately, and most have been lower wattage HTs. Frequency range is 222.000–224.995 MHz, and it is computer programmable with the optional JTPRG1 cable and free downloadable software. Price is $239. For more information call 800-524-4889 or visit <www.jetstream-usa.com>.

Finally, we finish our VHF tour with the Elecraft **K144XV,** an internal 2-meter module for the K3 transceiver. The Elecraft K3 has been flying off the shelf as a high-performance HF/50-MHz transceiver, so the user-installable K144XV module will be a welcome addition for many VHF weak-signal enthusiasts and contesters. Features include full coverage of the 2-meter band (144–148 MHz), CW/SSB and FM, 10 watts output, and <2 dB noise figure. Price is $349.95. For more information visit <www.elecraft.com>.

HF Transceivers

Sometimes appearances can be deceiving, and that was certainly the case when we visited the FlexRadio booth at Dayton. The simple, small case of **FLEX-3000™** software-defined radio (SDR) gave little indication of its features and performance-packed transceiver capabilities. The sleek blue face of the FLEX-3000 has only four controls/connectors—power switch and key, mic and headphone jacks. The compact case measures 12.25" × 12.25" × 1.75".

With its mid-range price, the FLEX-3000 provides hams with a transceiver with a good starting point of features and the ability of SDR to continue to provide new performance and operating features. As they are developed, these new features can be had with just a simple free update of FlexRadio PowerSDR™ software, downloaded from the internet.

The FLEX-3000 delivers a full 100 watts PEP CW, phone, or digital mode transmit signal on 160–6 meters. "The FLEX-3000 utilizes high-performance 24-bit A/D and D/A converters that enable its great close-in receiver performance in the sub-$1600 price class of mid-range transceivers. It is able to achieve this level of performance without the use of additional expensive narrow-bandwidth roofing filters. As a matter of fact, there are no additional filters to buy—ever."

With SDR transceivers, a very important part is the operating software, and the FLEX-3000 works with FlexRadio's high-performance PowerSDR software. Price is $1,599. To order or for more details visit <www.flex-radio.com>.

ICOM's **IC-7600** is a high-performance HF/50-MHz all-mode transceiver. In the limited format of our Dayton tour, it is not possible to do justice in describing this extremely full-featured, state-of-the-art transceiver, but here are a few teasers: dual separate DSP units for transmitter/receiver and spectrum scope; three built-in 1st IF (roofing) filters at 3, 6, and 15 kHz; double-conversion superheterodyne receiver system; and an image rejection mixer that improves in-band IMD (intermodulation distortion). There is a large colorful display—5.8-inch WQVGA (400 × 240 pixels) ultra-wide viewing angle TFT LCD with long-life LED backlighting and high-

resolution real-time spectrum scope using a dedicated DSP unit. USB connectors allow easy connection of keyboards, flash memory drives, and PCs. Built-in PSK and RTTY operation are possible with just a USB keyboard (PC not required). Approximate price is $4000.

Amplifiers

Alpha Radio Products was displaying its model **8410**, a full-legal-limit, manual-tune, rugged HF linear amplifier utilizing an enhanced version of the RF deck found in the Alpha 99. Frequency coverage is 1.8–29.7 MHz with 1500 watts output (when excited with a drive power of 50 to 55 watts). The staff at Alpha pointed out their newly designed custom sockets, which provide enhanced performance and reliability, and hold two 4CX1000 tetrode tubes. Vacuum relays provide T/R switching and full break-in keying (QSK). The amplifier can be operated at a variety of voltages from 100 to 240V, 50/60 Hz AC. Size is 17.3" W × 7" H × 17.5" deep, and weight is 70 lbs. Designed and built in Boulder, Colorado, the unit comes with a 4-year warranty and MRSP of $5895. For more details visit: <http://www.alpharadioproducts.com>.

If you need more power on 50 MHz, the **Commander VHF-2000** 6-meter RF amplifier from Palstar can give you the full

Photo J– ICOM's new IC-7600 high-performance HF/50-MHz all-mode transceiver.

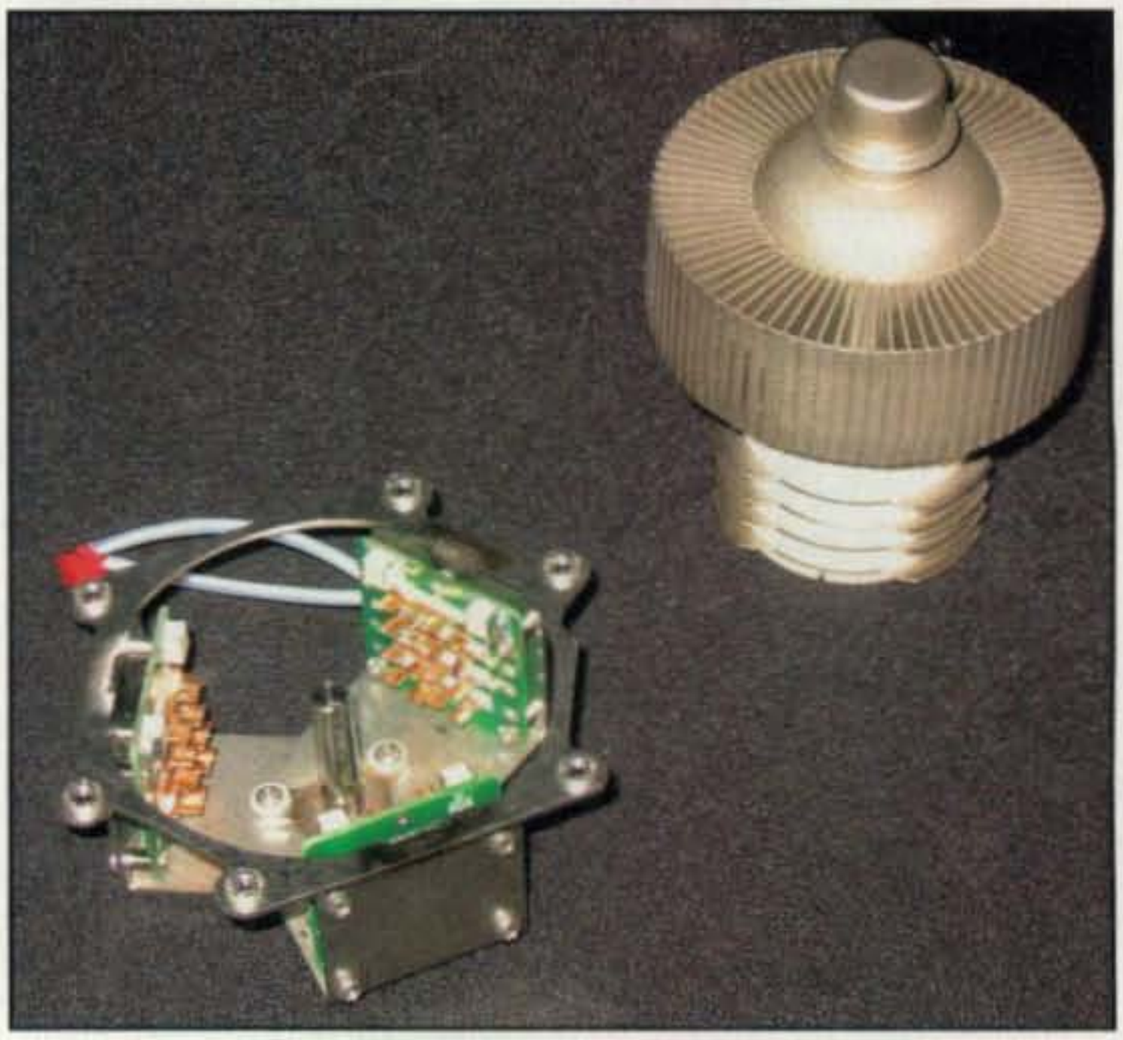


Photo K– Alpha's newly developed socket is just one of the details that contribute to the solid performance of the Model 8410 HF linear amplifier.

Photo L– Tokyo Hy-Power's new HL-45B amplifier is designed as a companion amplifier to the Yaesu FT-817 transceiver, but will also work with other low-power rigs. It will produce 45 watts output with 5 watts of drive.

Photo N– Ten-Tec Model 238C antenna tuner.

Photo M– The Palstar AT5Kplus is a 4500-watt antenna tuner.

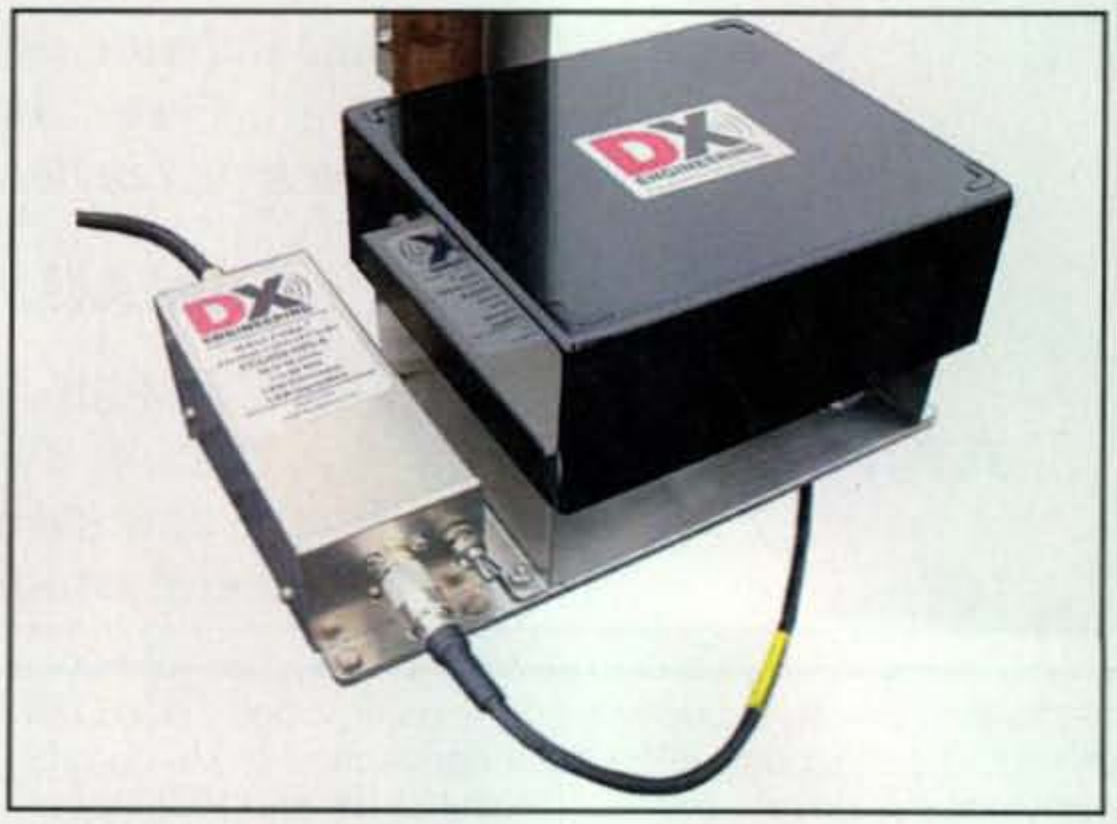


Photo O– DX Engineering/MFJ-927 Remote IntelliTuner® Vertical Antenna Combo.

legal limit. Using two genuine Eimac 3CPX800A7 pulse-rated external anode triodes produces 1500-watt PEP SSB and 1200-watt FM or RTTY. Based on the Commander VHF-1200, Palstar's engineers have added not just more power output, but a number of new features and other improvements. A microprocessor-based controller provides more precise T/R and electronic bias sequencing and true step-start, limiting in-rush current to the HV power supply and to the tube filaments. This translates into greater reliability and tube life, since the HV rectifier, filter stack, tube filaments, and even the fuses are not stressed on startup. A 6:1 vernier reduction drive on each tuning control allows smooth and easy tune-up. The new keying interface is now opto-isolated and fully compatible with solid-state transceivers. Price is $3695. To order online or for more information visit <www.palstar.com/vhf_2000.php>.

The Tokyo Hy-Power Labs **HL-45B** is a compact solid-state linear amplifier that provides up to 45W output with 5 watts input. When paired with Yaesu's FT-817, the HL-45B provides built-in auto band-select function. For more information visit <www.thp.co.jp/english/hl_45b_e.html>.

Antenna Tuners & Towers

With big amplifiers, you need high-power antenna tuners. The Palstar **AT5Kplus** is a 4500-watt antenna tuner. The AT5Kplus is a new spin on antenna tuners, a manual tuner with microprocessor-controlled operations. A front-panel knob controls the microprocessor-driven mode controller that switches additional capacitance and inductance in and out of the circuit using 10-KV rated vacuum relays. Turning a front-panel knob selects Coax 1, Coax 2, Balanced or Bypass outputs, and the status is then displayed on the large, backlit two-line LCD readout. Price: $1995. To order or for more details visit <www.palstar.com/at5k_plus.php>.

The Ten-Tec **Model 238C** high-power antenna tuner is an updated version of the tried and true "L" match design used in the earlier 238/238A/ 238B models with a new cosmetic design, larger heavy-duty tuning capacitor than the original, and backlit cross-needle SWR and peak power output metering. Price is $795. To order or for more information visit <http://radio.tentec.com>.

On the main floor of Hara Arena, the DX Engineering and MFJ Enterprises booths faced each other, so it was only fitting that we take a look at a product that combines components from both companies, the DX Engineering/MFJ-927 Remote IntelliTuner® Vertical Antenna Combo. According to the DX Engineering staff, "the **DXE-MBV-ATU-1** is the perfect solution for the modest power (200 watts maximum) DXer who wants maximum performance on a 43-foot tall multiband vertical antenna." The DXE-MBV-ATU-1 works on all DX Engineering, Zero-Five, MFJ, and Hy-Gain 43-foot vertical antennas or with your own homebrew vertical.

Putting the antenna matching system at the base of your antenna allows 80–10 meter operation with no coaxial-cable mismatch loss. Power to the tuner requires no extra cables, as a bias tee is included with this special package for supplying the 12-VDC power through the coaxial cable from your

radio shack to the remote tuner. Tuner operation is automatic, as it senses your transmitted signal and then adjusts the tuning.

The DXE-MBV-ATU-1 plug-and-play package includes: MFJ-927 Remote IntelliTuner™ (rated at 200 watts), DXE-FCC050-H05-A feedline current choke, DXE-SSVC-2P stainless-steel mounting V-clamp, custom laser-cut stainless-steel bracket for tuner and choke, MFJ-4117 bias tee power injector for 12 VDC, RG-8X 2-foot coaxial cable with PL-259 connectors, two 1-inch-wide tinned copper braids for connection to your radial system, and 14-gauge insulated stranded copper feedline wire with ring terminal attached. Price is $300. For more details visit <www.dxengineering.com>.

Surely the prize for the largest and heaviest item in the indoor exhibits goes to LUSO Tower's **LUSO150US** self-supporting crank-up tower. The sheer size became obvious when I tried to take a photo and had trouble stepping far enough back while still maintaining an unobstructed view. This 29,700 lb. (including base) self-supporting crank-up tower is 42 feet long *when collapsed* and can be extended to 145 feet! Once extended, it is rated for an antenna load of 660 lbs. and 140 sq. ft. The tower consists of five 36-foot sections. The bottom section is 65 inches wide on each side and the top section tapers to 18 inches.

Control of raising/lowering of the tower is fully automatic (with an indoor remote controller) with soft start/soft stop function. A winch with a single-phase 220V motor rated at 4 kW is used to raise and lower the tower. Price is $36,000. For more information visit <www.luso.us>.

Photo P– The proverbial 29,700 lb. gorilla in the corner was hard to miss during our safari. Luso Tower's LUSO150US self-supporting crank-up tower extends to 145 feet and can support over 600 lbs. of antenna!

The Amateur Radio Website of the Month

This month's site is the Dayton Hamvention® website. Sponsored by the Dayton Amateur Radio Association (DARA), the site at <www.hamvention.org> provides official information on the Hamvention®. Even though the 2009 event is already past, it is not too early to plan for next year. Be sure to bookmark or add the site to your favorites so you can return easily.

Continued Next Month

As usual, there was so much great stuff to see at this year's Dayton Hamvention® that you will have to wait until next month for part two of our Sunday Safari. We will focus on antennas, antenna accessories, station accessories, and some products for the ham on the go.

Attention: Former *WorldRadio* Subscribers

There still seems to be a fair amount of confusion among former *WorldRadio* subscribers about the status of that magazine and how to find and read current issues. In case you're one of those people, here is a rundown of the basics:

• *WorldRadio* is still being published, online only, as *WorldRadio Online*. A new edition is posted online every month, on or about the 20th of the month. Issues are currently free, with no subscription required.

• Virtually all *WorldRadio* columnists, including the Krusty one himself, Kurt N. Sterba, continue to write their columns and they continue to appear in *WorldRadio Online* (but not in *CQ*).

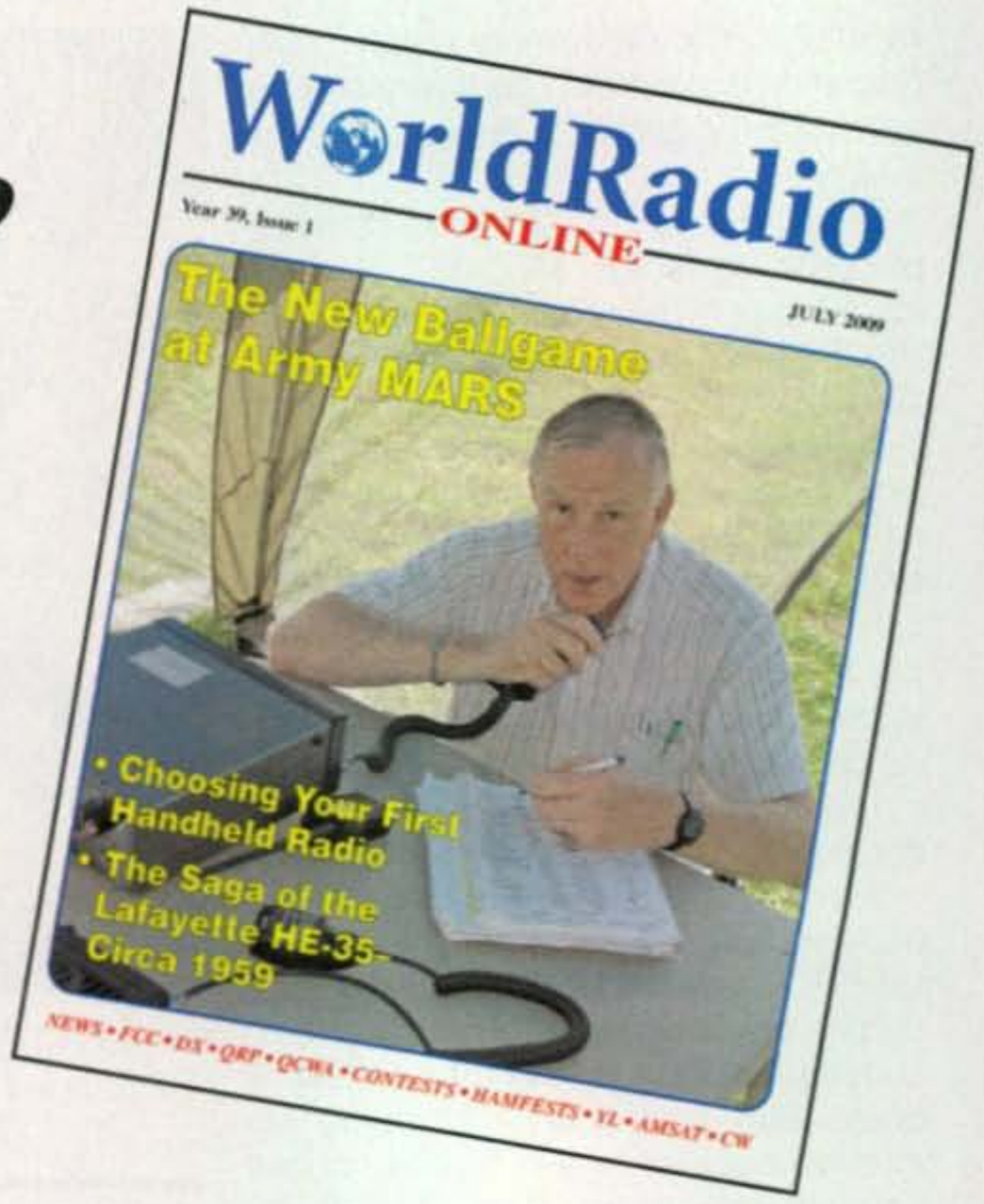
• Unless you gave us other instructions, all *WorldRadio* subscriptions were converted to *CQ* subscriptions of varying lengths, depending on the length and type of your *WorldRadio* subscription. If you were already a *CQ* subscriber, any additional issues were added to your *CQ* subscription. Several options were available for *WorldRadio* life subscribers and these were mailed to them early on. If you are uncertain of what became of your *WorldRadio* subscription, please contact our circulation department by phone at 516-681-2922 or by e-mail to <circulation@cq-amateur-radio.com>.

• *WorldRadio Online* is *not* delivered by e-mail. You must go to the *CQ* website and download each issue (see instructions below).

• There is a *WorldRadio Online* e-mail alert list to which you may "subscribe" at no cost, but this is for e-mail alerts only, and is not a "subscription" to the magazine, nor will it result in having the magazine e-mailed to you. If you sign up for this list, you will receive monthly alerts when each new issue is posted, as well as occasional other messages. When you sign up for the list, you will be given the option of receiving your messages in a daily digest form rather than individually. Please *do not* check this option. We are having trouble with it and you may not receive messages properly. Generally speaking, members of this list will receive no more than one to two e-mails a month. You *may not* send a message to this list. Questions regarding the list should be sent to <worldradio-l-owner@mailman.sunserver.com>. (More info on signing up for this list is below.)

Finding *WorldRadio Online*

To access the current issue of *WorldRadio Online* as well as past online issues, downloading tips and other information, you will need to go to the *WRO Welcome Page* on the *CQ* magazine website. Here's how to do it: (1) Go to the CQ homepage at <www.cq-amateur-radio.com>. (2) Find the *WorldRadio Online* logo to the left of the *CQ* magazine covers. Click on it. This will take you to the WRO Welcome Page. At this point, you have several options. There are links to a variety of informational pages. We recommend that you read the "Viewing and Downloading Tips" before doing anything else. The Back Issues link will take you to previous issues (beginning February 2009) to download and view.



There are several options for downloading and viewing the magazine. On the welcome page, you will see both the cover and the table of contents of the current issue. Clicking on the cover will download the complete issue (there are two options on how to do this, covered in the tips), and is the recommended route if you have a high-speed internet connection such as cable, DSL, or FiOS. If you have a slower (dial-up) connection, clicking on the table of contents will let you download the issue in smaller segments. Again, see the downloading tips for different options. Currently, we are recommending that you do not use Mozilla Firefox when downloading *WorldRadio Online*. We have received several reports of Firefox freezing up when trying to download an issue. Microsoft Internet Explorer and Apple Safari appear to work fine.

E-Mail Alert List

To sign up for the e-mail alert list, on which you will be notified when each new issue is posted, go to <http://mailman.sunserver.com/mailman/listinfo/WorldRadio-L>. You will find a form there to use for signing up for, or subscribing to, this list. One of the questions you will be asked is: "Would you like to receive list mail batched in a daily digest?" The default for this is no. Again, please *do not* check yes. The digest program is not behaving properly and you may not receive messages promptly or properly.

If you are already signed up with the digest selected, you may (a) go to the page above and unsubscribe, then resubscribe, without checking off the digest option, or (b) send a note to the list administrator (see above), asking him to uncheck the digest option for your account. Be sure to use include the e-mail address under which you are signed up.

We hope this will help clarify some confusing items and help you find, read, and enjoy each new issue of *WorldRadio Online*, just as we hope you are reading and enjoying each new issue of *CQ.—73, the Editors*

Alinco gives you Mobiles for all Seasons and for all Reasons!

Work the DX on 6 and 10 Meter FM

- **DR-03T** (pictured) 10 meters
- **DR-06T** 6 meters

- Same key-operations as DR-135-435 series mobile radios.
- EJ-41U internal TNC board is available as an option for 1200/9600bps packet (DR-06T only), no need to remove mic for packet operation.
- DR-03T 10 watts, H(10W)/M(5W)/L(2W) power settings.
- DR-06T 50 watts, H(50W)/M(20W)/L(5W) power settings.
- 100 memory channels
- Front panel data port
- Rear panel DSUB9 computer connection (DR-06T only)
- 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 / DR-03T is fixed for NFM)
- 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

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

Dual Band fun and versatility

- **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)
- 200 Memory channels
- H/M/L power output settings- VHF: 50/25/5W UHF: 35/20/5W
- Large 6 character alphanumeric display
- 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
- CTCSS & DCS encode and decode plus four different tone bursts
- CTCSS Tone and DCS scan
- Programmable VFO and Memory scan modes
- "Time Out" timer
- Cable Clone feature
- AM Aircraft band reception
- Temperature Compensated Crystal Oscillator
- Ignition key activated power on/off feature
- Optional Accessories
  - EJ-47U digital modulation unit
  - EJ-50U TNC unit
  - EDS-9 Front-control unit separation kit

Specifications subject to change without notice or obligation. Performance specification apply only to the amateur bands. Permit required for MARS use. APRS is a registered trademark of Bob Bruninga, WB4APR. Check regulations prior to operating full duplex in US.

Distributed in North America by Ham Distributors,
1775 North Loop 336 East, Suite 8, Conroe, Texas 77301
Phone: 936-649-1497 • Fax: 800-824-3128 • email: USrep@Hamdistributors.com

ALINCO

www.alinco.com

the weekender

BY PHIL SALAS,* AD5X

Static Bleeder for Any Antenna

Former "Weekender" Editor Phil Salas, AD5X, reports that he's "still tinkering" and pays us a return visit this month.—W2VU

Many antennas don't have a means of bleeding off static build-up. This includes the popular Hustler BTV-series of verticals, dipoles without transformer-type baluns, and many others. While typically this is not much of a problem, I am always concerned about possibly damaging my antenna analyzer when I first connect it to an antenna. How often have we heard that an analyzer has been blown by static on the antenna?

To minimize the possibility of damage, most analyzer manuals caution you to momentarily ground the antenna feed before connecting the antenna analyzer. Thus, because I am always experimenting with antennas and I have expensive AIM4170C and AA-200 analyzers, I wanted to always make sure there would be no static-related problems to worry about when measuring my antennas. My solution was to permanently connect a high-voltage, high-value resistor across the feedpoint of all my antennas. The high-voltage rating of the resistor is important, especially if you run high power. Also, of course, an antenna with a high SWR will also result in higher voltages than normal.

For the resistor, I use the Ohmite Maxi-Mox™ MOX-1-123004F thick-film resistor, which is perfect for this application. This resistor is rated at 10 KV and 3 megohms, and costs $5.30 in unit quantities. It is readily available from <www.mouser.com>, Mouser part number 588- MOX-1-123004F. Normally you'll just need a single resistor, but if you run high power to a highly reactive antenna (such as a 43-foot vertical on 160 meters), you might want to put two or three of these resistors in series. Photo A shows a single resistor ready for installation on my 20/15/10-meter dipole. Photo B shows three resistors in series, covered with liquid electrical tape, mounted at the base of my 43-foot vertical. Spend a few dollars and stop worrying about damaging your antenna analyzer.

73, Phil, AD5X

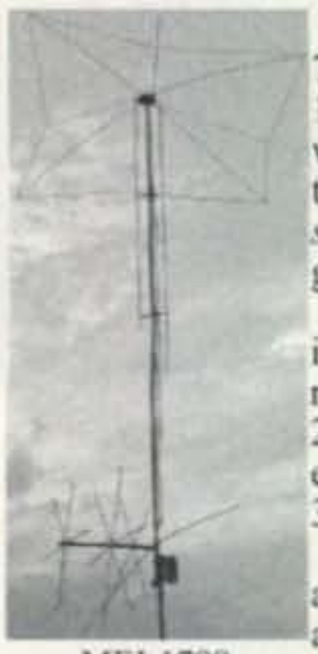
*1517 Creekside Drive, Richardson, TX 75081
e-mail: <ad5x@cq-amateur-radio.com>

Photo A– The 3-megohm resistor ready for mounting on the triband dipole.

Photo B– Three 3-megohm resistors in series on perfboard at the base of author's 43-foot vertical.

10 Bands -- 1 MFJ Antenna!

Full size performance...No ground or radials Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna . . . Separate full size radiators . . . End loading...Elevated top feed... Low Radiation Angle...Very wide bandwidth...Highest performance no ground vertical ever . . .



MFJ-1798
$299.95

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators. This forms a very large equivalent radiator and gives you incredible bandwidths. Radiator stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands. Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation. You can mount it from ground level to roof top and get awesome performance.

The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

MFJ *6-Band* Halfwave Vertical Antenna

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed

MFJ-1796
$229.95

MFJ-1796, is only 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments, small lots, trailers. Perfect for field day, DXpedition, camping.

Efficient end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting one band has minimum effect on other bands.

MFJ-1796W, $229.95. WARC Band version for 12, 17, 30, 60 Meters only.

MFJ-1792, $189.95. Full size ¼ wave radiator for 40 Meters. 33 ft., handles 1500 Watts PEP. Requires guying and radials.

MFJ-1793, $209.95. Like MFJ-1792 but has full size 20 Meter ¼ wave also.

6-Band, 40-2 Meters *Rotatable* Mini-Dipole

Low profile 14 feet . . .7 ft. turning radius . . . 40, 20, 15, 10, 6, 2 Meters...1500 Watts . . .

MFJ-1775
$249.95

MFJ-1775 is inconspicuous and low profile -- not much bigger than a TV antenna and is easily turned by a lightweight rotator like Hy-Gain's *AR-35*.

It's no Wimp! Its *directivity* reduces QRM/noise and lets you *focus* your signal in the direction you want -- work some *real* DX.

You can operate 6 bands -- 40, 20, 15, 10, 6 and 2 meters -- and run *full 1500 Watts* SSB/CW on all HF bands!

Features automatic band switching and uses highly efficient end-loading with its *entire length* always radiating. With 6 and 2 Meters thrown-in, you have ham radio's most versatile *rotatable* dipole!

Each HF band uses a separate, efficient end-loading coil wound on fiberglass forms with *Teflon*™ wire, and capacitance hats at each end (no lossy traps). 6 and 2 meters are *full-length* halfwave dipoles.

Built-to-last -- incredibly strong solid rod fiberglass center insulator and 6063 T-6 aircraft strength aluminum tubing radiator. Assembles in an afternoon. Adjusting one band has little effect on other bands.

MFJ-1775W, $249.95. WARC band version for 12, 17, 30, 60 Meters only.

MFJ *80/40/20* Meter *Rotatable* Dipole

MFJ-1785
$369.95

Now you can operate the *low bands* on 80, 40, and 20 Meters with a true rotatable dipole that'll blend in with the sky! Take advantage of excellent low band propagation during this low sunspot cycle. Handles 1500 Watts SSB/CW. 80/40 meter end-loading coils are wound on fiberglass forms with *Teflon*™ wire, and resonated with capacitance hats to ensure an extremely low-losses. Full-size on 20 Meters gives incredible DX. Balun included! 33 ft., low-profile, inconspicuous. Easily rotatable with a medium duty rotator like Hy-gain's AR-40.

MFJ's Super High-Q Loop™ Antennas

MFJ-1786
$419.95

MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes. Enjoy DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- *gives you the highest possible efficiency.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning. Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

Cover 40-15 Meters MFJ-1788, $469.95. Like MFJ-1786 but covers 40-15 Meters continuous. Includes remote control.

MFJ's G5RV Antenna

MFJ-1778
$44.95

Covers all bands,160-10 Meters with antenna tuner. 102 ft. long. Can use as inverted vee or sloper. Use on 160 M as Marconi.1500 Watts. Super-strong fiberglass center/feedpoint insulators. *Glazed ceramic* end insulators. All hand-soldered connections. Add coax, some rope and you're *on the air!*

MFJ-1778M, $39.95. G5RV Junior. Half-size, 52 ft. 40-10M with tuner, 1500 Watts.

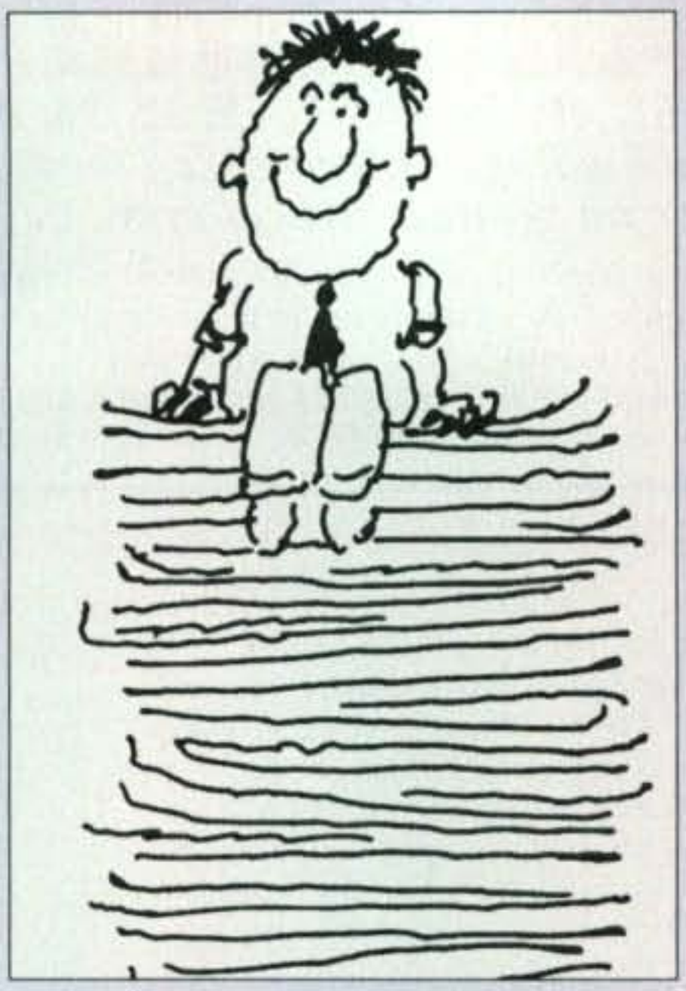
Free MFJ Catalog

Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

MFJ ENTERPRISES, INC.
300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

MFJ . . . the world leader in ham radio accessories!



What You've Told Us...

Our May survey asked about your involvement in various ham radio organizations. The results show that you are a very active, involved, group, with 96% of the respondents belonging to at least one national or international ham organization. The most popular, not surprisingly, was the ARRL (84%), followed by QCWA (32%), other (30%), 10-10 (27%), FISTS (24%), QRPARCI (13%), MARS (7%), Handi-Hams (4%), Radio Club of America (3%), and the Society for the Preservation of AM (SPAM) and Tucson Amateur Packet Radio (TAPR), at 1% each.

Your primary reason for joining these organizations, according to the results, is to support the group's broad objectives and goals (50%), followed by being part of a group of like-minded hams and receiving the group's newsletter or magazine (38% each), to take an active part in their programs and activities (23%) and to receive benefits available only to members (15%).

The majority of you (60%) also belong to a local radio club. In addition, 30% belong to ARES (Amateur Radio Emergency Service), followed by RACES (18%), a regional DX club (15%), other (12%), a regional contest club (10%), a regional VHF club (7%), and a church-based disaster communications group, such as SATERN (6%).

Finally, we asked about your leadership roles in these organizations, and fully two thirds of you hold or have held a leadership position in some ham radio organization, including 57% for local groups, 12% for regional groups and 9% for national/international groups.

This month's free subscription winner is Tim Connor, KA2VEG, of Syracuse, New York.

Reader Survey
August 2009

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

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

This month, we will again be helping to present the Newsline Young Ham of the Year Award at the Huntsville Hamfest, so we'd like to ask you about young people in ham radio today...

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

1. How old were you when you first got your ham license?
- Under 15 29
- 15–25 30
- 26–40 31
- 41–55 32
- Over 55 33

2. If you were that age again today (assuming that you're not), considering all the other options available, how likely would you be to consider becoming a ham?
- Very likely 34
- Somewhat likely 35
- Somewhat unlikely 36
- Very unlikely 37

3. Do you believe there are enough young people entering ham radio today?
- Yes 38
- No 39
- I don't know 40

4. Based on your personal experience, how would you rate the abilities of young hams (under age 25) today compared to those of the past?
- Greater than in the past 41
- About the same 42
- Less than in the past 43
- Abilities needed today are too different for valid comparison 44
- Don't know 45
- Don't know any young hams 46

5. What (if anything) have you done to help encourage young people to become hams?
- Invited young guests &/or family members to operate my station 47
- Talked about the fun and excitement of ham radio with young people 48
- Put on or helped with ham radio demonstrations for young people 49
- Helped with club activities aimed at young people 50
- Taught a licensing course which included young people 51
- Helped give license exams to young people 52
- Worked directly with young people to promote ham radio (e.g., being a Radio Merit Badge counselor; teaching about radio in a school) 53
- Other 54
- Nothing 55

6. How would you rate your club's attitude toward young people in ham radio?
- Excellent; young people are a major focus of our club 56
- Good; young people are welcome and encouraged at all of our activities 57
- Mediocre; we make no special efforts to attract young people 58
- Poor; young people are not encouraged to be active members or club leaders 59
- Very poor; our club discourages involvement by young people 60

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

ASTRON CORPORATION
9 Autry Irvine, CA 92618
(949) 458-7277 • (949) 458-0826
www.astroncorp.com

E151765 E151765

...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

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

OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅝ x 6 x 9	3.6
SS-25	20	25	2¼ 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	2¼ 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

math notes

BY IRWIN MATH,* WA2NDM

Miscellaneous Hints and Tips

This month I thought that we would treat you to some hints and tips we have picked up in the past for both your interest and your entertainment.

To begin with, the need arose in a project at the office: The seal of a user-adjustable potentiometer and loudspeaker. The pot, which was a volume control, was exposed to raindrops and occasional direct splashes of water, as was the speaker. The obvious solution was simply to use a so-called "environmentally sealed" pot, but the cost of this was quite high. The other method was to seal an "ordinary" pot with common, easily available parts (which we chose to do). Fig. 1 shows a cut-away section view of the results.

A trip to the plumbing section of the local home-improvement center turned up a series of O-rings normally designed for faucet repair. We found two suitable sizes, one that would fit on the body of the pot and another that would fit tightly on the 3/8-inch threaded mounting sleeve. We dropped the first O-ring on the pot and then threaded it through the panel. We then mounted the pot in the normal manner with the standard nut and lock washer. When tightening the mounting nut, we were careful to apply enough torque to securely hold everything. We then forced the second, smaller O-ring down over the portion of the remaining exposed mounting sleeve.

Next a knob with a small undercut was placed on the shaft until it squeezed the O-ring. The seal was now complete. The first O-ring protected any water leakage between the back of the panel and the pot, while the second O-ring sealed the shaft to mounting sleeve from water seepage. Note that depending on the amount of sleeve extending from the pot that you use, more than one O-ring in this location may be necessary. Spraying water from a hose on this seal did not result in any leakage whatsoever. Total cost was about $4.00 for enough O-rings to probably seal at least three or four pots.

Sealing the speaker was even easier. We simply cut a piece of common plastic wrap large enough to cover the holes in the speaker grille and

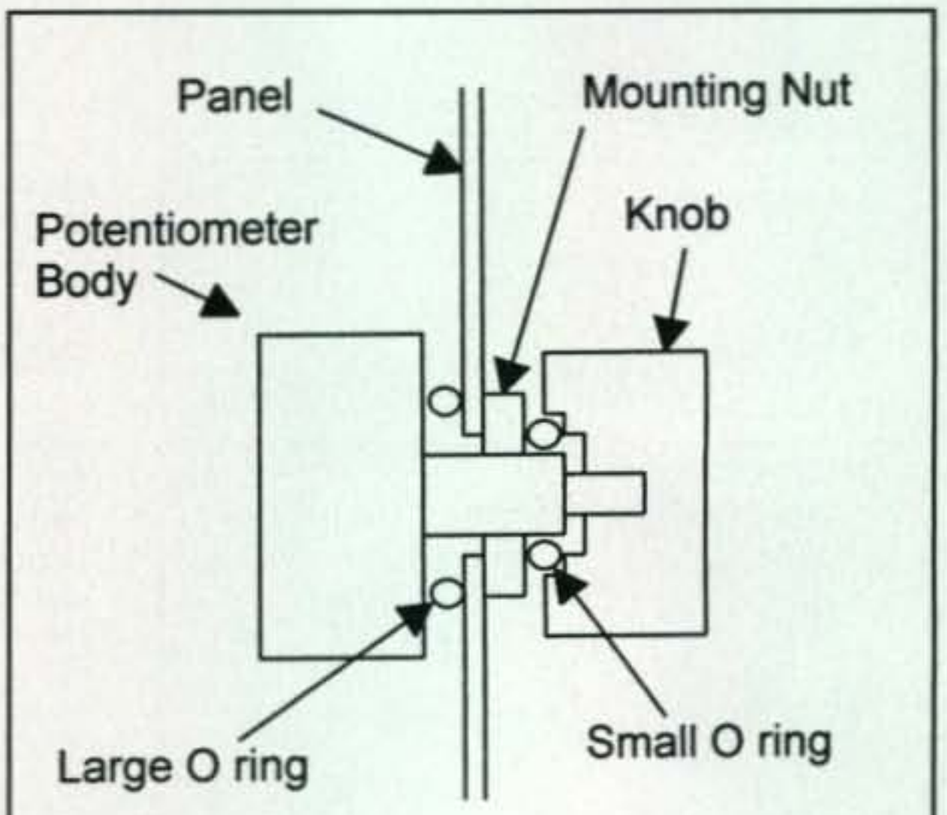


Fig. 1– Potentiometer sealing method (see text for details).

fit between the mounting holes of the speaker. We then sandwiched this wrap between the front of the speaker and the panel. Since the speaker grille had a series of small holes to allow sound to exit, the plastic wrap was protected. The amount of sound that passed through the plastic wrap was not noticeably decreased, and the arrangement easily passed the "hose test" as well.

Next, as I have previously mentioned, my home station consists of a Kenwood TS-830S (solid state plus vacuum tube) transceiver and all of the accompanying accessories that go with it. The only missing item was the MC-50 microphone, which, after looking at surplus websites for a number of weeks, we finally acquired. Although the mic worked, the output was a bit lower than the Shure 444 mic we had been using.

A search on the internet turned up the technique of placing a short section of toilet-paper tube over the sides of the mic enclosure to direct the sound directly into the front of the element. This worked, but looked pretty awful. The solution was to open the mic head by unscrewing the front portion. This

*c/o CQ magazine

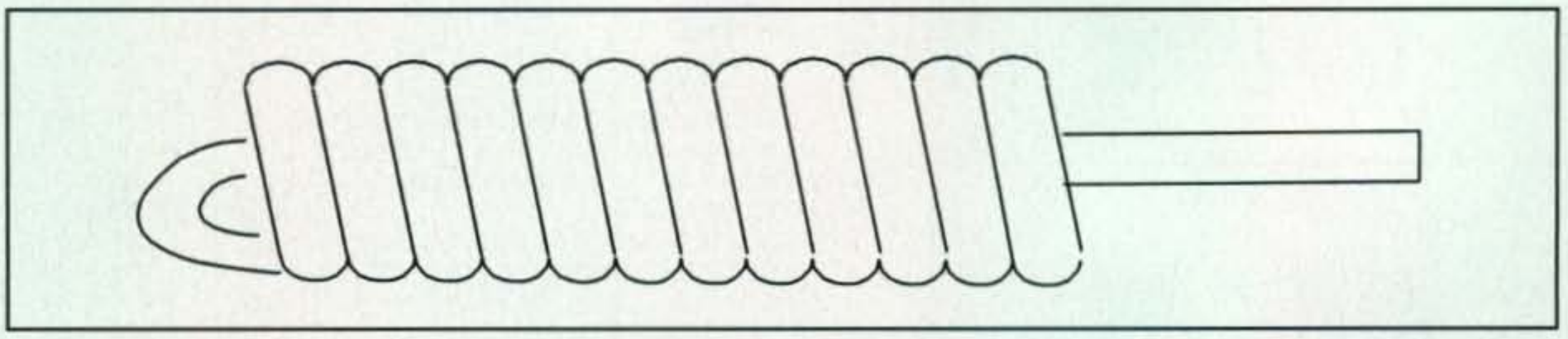


Fig. 2– Simple solder holder tool.

took a bit of effort, but a pair of gas pliers with masking tape on the jaws (to prevent scratches) did the job. The toilet-paper tube was carefully cut so that it would fit directly around the element inside the microphone head. The entire assembly was then gently placed back into the head, and the head screwed back on the mic body. The result was perfect. Now the MC-50 fully modulated the transmitter at just about the same level as the older microphone. As a footnote to this, replacements for both the 4-pin microphone plug and the transceiver-mounted jack are available at RadioShack in the CB/audio connector area.

The next tip, shown in fig. 2, shows a simple way to produce a very useful solder holder. Take a few feet of solder and close-wind it around a 1/4-inch dowel or pencil. Now slip the resulting solder coil off the dowel and thread one end of the solder through the center of the coil. You can now hold the coil by the body and pull as much solder as you need through the center. As simple as this is, for portable work it is great, as you do not have to have a *spool* of solder "hanging" onto you as you work.

We have received a number of inquiries on the proper way to use surface-mount components and plan to cover these in a future column. In the meanwhile, the experimenter should become familiar with these components, as they have many uses in older "leaded component" circuitry. To gain a bit of experience, it is a good idea to obtain some so-called "1206" components. These are available as both resistors and capacitors, and a glance though any Mouser, Digi-Key, Jamco, or similar catalog will show all of the versions. The 1206 size is also large enough to be handled easily by the novice, although with practice, 0604s are not really too much of a problem either. In an existing design, the small size of these parts will enable them to neatly fit between other components for both upgrading or modifying purposes. Just be sure of voltage and wattage ratings of the components you choose, since for the most part they are lower than you might be used to. By the way, a useful tool to have for this type of work is a precision tweezer. Two inexpensive ones that we use are available from Mouser Electronics. Both are less than $4.00 each and are very well worth it. Their part numbers are 578-EROPAASA for one with straight tips and 578-7SA for one with angled tips. I would obtain one of each.

73, Irwin, WA2NDM

public service

BY RICHARD FISHER,* KI6SN

"Sunset" for Navy MARS?

Specter of Shutting Down Mission Raises Questions, Speculation

A dispatch announcing the possible shutdown of the Navy-Marine Corps component of the Military Affiliate Radio System sent a shudder through MARS operations in mid-May. The message was sent to all members from Navy-Marine Corps MARS Chief Bo G. Lindfors, NNNØASA, reading, in part:

"Commander, Naval Network Warfare Command (NNWC) has decided to 'sunset' the MARS mission within Navy as of (September 30, 2009). NNWC has requested all military billets . . . be deleted and defunded after that date. OpNAV (Office of the Chief of Naval Operations) has not yet approved this request."

The announcement prompted speculation and questions on internet message boards and in chat rooms about the future of Navy MARS. Lindfors explained in his message that the decision was based on proposed updates to the 1998 Defense Department directive under which all three MARS programs (Navy-Marine Corps, Army, and Air Force) currently operate. These proposals, according to Lindfors, put additional demands on the service branches themselves to support their MARS programs. "Army and Air Force have agreed to the changes but Navy (OpNAV) has asked to be let out of this requirement," said Lindfors, adding, "This negotiation is still in process and we do not know when it will be resolved."

Nonetheless, Lindfors continued, "I am forced to initiate action to close down Navy-Marine Corps operations and facilities by 30 Sept. 2009." He added that if the decision is ultimately reversed, "there will be a Navy-Marine Corps MARS program, but it will not have area directors; they will have been transferred." In that case, he said, all membership correspondence will be handled directly between state directors and his office, and all operational matters will be handled by state and region directors.

Lindfors promised to keep members posted on the final resolution of the Navy's request to "sunset" Navy-Marine Corps MARS, and we will keep you updated as the story develops.

*1940 Wetherly Way, Riverside, CA 92506
e-mail: <ki6sn@cq-amateur-radio.com>

Julio Ripoll, WD4R, and Julio Henriquez, AD4Z, take to the airwaves during a test of the National Hurricane Center's WX4NHC in Miami in late May, just before the start of the 2009 hurricane season. (Photo courtesy of Julio Ripoll, WD4R)

Weather or Not, the Team at the National Hurricane Center's WX4NHC is Ready

In a nine-hour test of its mettle from Miami, the communications team at the National Hurricane Center's WX4NHC put the station on the air and on the internet two days before the official start of the 2009 hurricane season "to verify station equipment performance on many frequencies and modes that are used to communicate with stations in the affected area." Hurricane season lasts from June to November.

According to WX4NHC Assistant Coordinator Julio Ripoll, WD4R, more than 150 contacts were made May 30 with stations in the United States, around the Caribbean, Central America, Canada, Australia, Europe, and Africa. In addition to Ripoll, the team included: Mike Davis, AF4VJ; Julio Henriquez, AD4Z; Dr. Jim Hirschman, K4TCV; and Joe Schmidt, W4NKJ, who was visiting from Vermont.

While most contacts were made on the 20-meter SSB Hurricane Net frequency (14.325 MHz), and on 40 meters in cooperation with the Waterway Net (7.268 MHz), the team also used HF and VHF APRS (the Automatic Packet Reporting System) and local VHF and UHF repeaters in Miami-Dade and Broward Counties.

Internet links were also employed with activation of the VoIP Hurricane Net in a two-hour test on EchoLink (WX_TALK conference) and IRLP (node 9219) "using the same methods of collecting data and forwarding data to WX4NHC during hurricanes with great success," Ripoll said. Many stations that are active in Skywarn and emergency

management, including FEMA and NWS offices, were contacted via the internet portal.

"We extend special thanks to Rob Macedo, KD1CY, and the VoIP Hurricane Net Controls for their dedication and continued support," Ripoll said.

Among the "lessons learned" in the 2009 test was: "Always have back-up microphones or a repair kit handy," Ripoll said. "Microphone cords and plugs always seem to be a problem with heavy use.

"We found that the plastic end connectors (RJ-45) on our microphones (VHF and UHF transceivers) had become brittle and the little plastic locking tab broke off during our test event. Like all hams, we improvised on-the-fly and used a little tape and rubber bands to hold them in place to complete our tests.

"Now we have to make permanent repairs or order new mics. One of our HF mics also had an intermittent problem and was resolved by re-soldering one of the wires inside the end connector." Ripoll said. "Of course, when all microphones fail, use the CW key."

On the air, Ripoll said a contact with Eric Mackie, 9Z4CP, in Trinidad & Tobago constituted the test's best DX. Mackie "has been a very active supporter and has relayed many hurricane reports to and from his island neighbors during many past hurricanes, both on HF and EchoLink/IRLP.

"Eric sent a message of appreciation to Bill Read, KB5FYA, NHC Director, for the recent Hurricane Hunter tour to Trinidad," Ripoll said.

Julio Henriquez, AD4Z, well known in the DX and contesting arena, worked some CW during the test and "by coincidence contacted TI5N in Costa Rica, which was being operated by one our of regular WX4NHC operators, Fred Kleber, K9VV," a WX4NHC press release said. "Julio also made contact with 6W1SJ, the expedition station in Senegal, West Africa."

Ripoll said WX4NHC participated in two other exercises commemorating the beginning of Hurricane Season 2009—the Massachusetts Statewide Hurricane Exercise on June 1, and the 2009 Department of Defense Interop Communications Exercise "DICE '09" on June 3.

Radio amateurs have maintained an active station at the National Hurricane Center for 29 years.

ARES Operators Play Key Role in Santa Barbara's "Jesusita Fire"

Where there's smoke, there's fire. And

Mike Davis, AF4VJ, of the 2009 WX4NHC on-the-air pre-hurricane season team, makes one of the more the 150 contacts during the May 30 training exercise. (Photo courtesy of Julio Ripoll, WD4R)

as radio amateurs dedicated to public service well know, where's there's fire, there are likely to be emergency communications teams stepping in to connect the dots when so many others can't.

A devastating wildfire that ravaged a large area in and around Santa Barbara, California in May put the region's ARES team on high alert as flames ripped through nearly 9000 acres, destroying 80 homes, damaging dozens of other structures, injuring 30 firefighters, and causing an estimated $20 million in losses.

The Jesusita Fire, as it came to be known, was dangerous and unpredictable, grabbing headlines across the country and around the world. Firefighting teams from across California and around the West converged on the central coast area to battle the flames.

"After seeing the smoke plume, in my role as Emergency Coordinator I self-responded to the Santa Barbara County Emergency Operation Center (EOC) on the afternoon of May 5," William Tefft,

A friendly breeze caresses the American flag and communications antennas atop the National Hurricane Center in Miami during the 2009 WX4NHC hurricane season readiness test in late May. (Photo courtesy of Julio Ripoll, WD4R)

Amateur radio communications gear is neatly stored inside the van used by the Santa Barbara South Coast ARES team during a devastating wildfire that raged through the region. (Photo by Bruce Gordon, N6OLT)

KG6DHK, said. "It was there that I activated the Santa Barbara South Coast ARES team. Our role is to provide auxiliary communications and other technical support during these events."

Members of the ARES communications team included Tefft; Cliff Chabot, KI6WEL; Lou Dartanner, N6ZKJ; Bruce Gordon, N6OLT; and Dave Hackleman, K6VML. Tefft said that in all cases ARES "works closely with representatives from the Sheriff's Office, County Communications, Public Health, the County Office of Emergency Services, and other agencies to provide backup communication, as well as tactical technical support. Normally, and during this event, we used Santa Barbara Amateur Radio Club repeaters on 146.790 MHz and 224.080 MHz. As a courtesy, club activities moved to a repeater on 146.700 MHz."

During the Jesusita Fire, Tefft said, "The County EOC itself was evacuated (from a staging point between Santa Barbara and Goleta) to a temporary EOC located at the University of California, Santa Barbara campus, for two nights." Because of the fire's onslaught, "we had to pack up and move," deploying ARES' communications van and supporting "the interim EOC with auxiliary service for this period."

Tefft said that because of "more redundancies" in today's communications modes, EmComm teams may appear to be called upon less and less, but groups such as ARES are "still a powerful tool."

One area in which the team has played a significant role, Tefft said, has been in establishing resident-supported emergency communication operation centers at two of Santa Barbara's largest assisted-living communities—Samarkand and Valle Verde. There are tens-of-thousands of the elderly living in the Santa Barbara region.

During natural disasters, elderly communities sometimes have found themselves in relative isolation when it comes to communications. In the Santa Barbara area, "the news media simply isn't enough," Tefft said. The local TV station was "stretched to the max" during the fire, and the handful of area commercial radio stations were not geared for disaster coverage. "We don't have 'real time' news outlets," during events such as fires, he said. And when the internet goes down, "you're blind."

"The only way to get (reliable communications) to work, he added, is to have licensed operators who are trained and know how to operate the equipment."

In its EmComm role, the Santa Barbara South Coast ARES team provided a vital communications link between people living and working in these assisted-living communities and local authorities and the residents' extended families. Amateur radio is one of the best and sometimes only ways "to get information in and out," he said. "It made a big difference."

As a result, Tefft said, "during this latest and past fires, these (elderly) communities maintained constant communication when power failed and necessary questions needed to be exchanged with community administration and County Public Health. We are actively pursuing

The EmComm van used in conjunction with the Santa Barbara, California area "Jesusita Fire" at one point was forced to move with the EOC to the University of California, Santa Barbara campus when flames were coming too close. (Photo by Bruce Gordon, N6OLT)

the establishment of similar auxiliary communication sites at other residential communities in the area."

With the region's population of elderly communities already large, and growing, Tefft said, it's more important than ever to reach out to licensed radio amateurs already residing in assisted-living facilities and to encourage unlicensed residents to get their tickets.

Tefft said the Jesusita was the fourth fire to hit the area in recent years. For the Santa Barbara South Coast ARES team, past experience, emergency communications training, and being proactive in establishing communications links before disaster strikes have been keys to success.

SKYWARN Springs into Action During Southern Illinois Storms

Straight-line winds of 100 mph, tornadoes, and torrential rain ripped through a wide area of southern Illinois in early May, putting SKYWARN operators squarely in the thick of things over a couple of harrowing days.

Severe thunderstorms rained golf-ball-size hail on Jackson and Williamson counties late Thursday, May 7. However, they were only a prelude to even more severe weather that would pummel the region Friday.

According to Brad Pioveson, W9FX, ARRL Illinois Section Emergency Coordinator, the National Weather Service at Paducah, Kentucky had issued an ominous forecast for flash flooding and severe thunderstorm and tornado watches.

"But there was no indication of what was to come," he said. SKYWARN nets sprang into action in Franklin, Williamson, Jackson, and Perry counties. "Emergency managers also took to the roads, along with law enforcement and fire department observers," Pioveson said.

Funnel clouds and tornado sightings were reported to the NWS office by SKYWARN observers, "but this storm packed much more devastation than the EF0 and EF1 twisters that developed," Pioveson said. The storm's radar signature looked like a small hurricane —highly unusual.

"The NWS now calls the storm a meso cyclone," he said. Other experts say it was a Derecho. "Whatever it's called, it was a devastating weather system."

How devastating?

As the Illinois SEC, Pioveson said he tries "to set a good example in terms of emergency preparedness." However, even for him, May's storms presented some extraordinary challenges.

The majority of Pioveson's emergency supplies are on-the-ready in a 37-foot fifth-wheel camper "along with my field-deployable emergency communications gear. Ironically, on Thursday morning, my wife and I had pulled that camper to a dealership in the coun-

ty south of us—Williamson (where winds Friday were clocked at 106 mph) —for some minor repairs."

Pioveson said that Thursday's hail storm had "shattered all of the roof vents and opened the camper's roof to the rain . . . and then, the meso cyclone hit on Friday. Our 14,000-pound camper was pushed off its blocks and scooted across the dealer's yard like a kid's toy."

Meanwhile, at Pioveson's home "half of a 100-foot oak adjacent to our property" was knocked down by the storm. "The tree took out all of the primary AC mains feeding a three block area. Power poles snapped, and in our case, dropped our utility transformer, hardware, and wiring at the entrance to our driveway."

His electricity was not restored until late the following Tuesday. "Getting a generator to our house was impossible, as the roads were blocked, the ground too saturated to support moving my truck into position," he said. Also, like thousands of other residents in the area, Pioveson "suffered through the week with candles, flashlights, a propane-fired BBQ grill, and battery-powered radios, for the better part of five days."

Amateur radio support during the emergency focused on SKYWARN net activity, Pioveson said. "While the Franklin County ARES group was alerted to be ready for potential deployment to an American Red Cross shelter, that need never arose. Area cellular telephone sites survived, and within a few hours of the storm that service was available to customers," he said.

In the wake of the storms, "more than 70,000 residents of this mostly rural area found themselves without power," Pioveson said. Six southern Illinois counties were designated disaster areas by Governor Pat Quinn.

Key power lines across rough terrain—including the Shawnee National Forest—were wiped out, "leading to the use of helicopters and bulldozers to ferry tools and materials to electricians and line crews," who had to resort to "manual efforts to rebuild these HV towers and lines. Hundreds of thousands of trees were downed. Many homes and businesses were destroyed," and there was loss of life. And as is so often the case, amateur radio operators were on the scene to help make the best of a bad situation.

Doppler radar images, maps, photographs of storm damage, and other information have been posted on the internet by NWS at: <http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=pah&storyid=27320&source=0>.

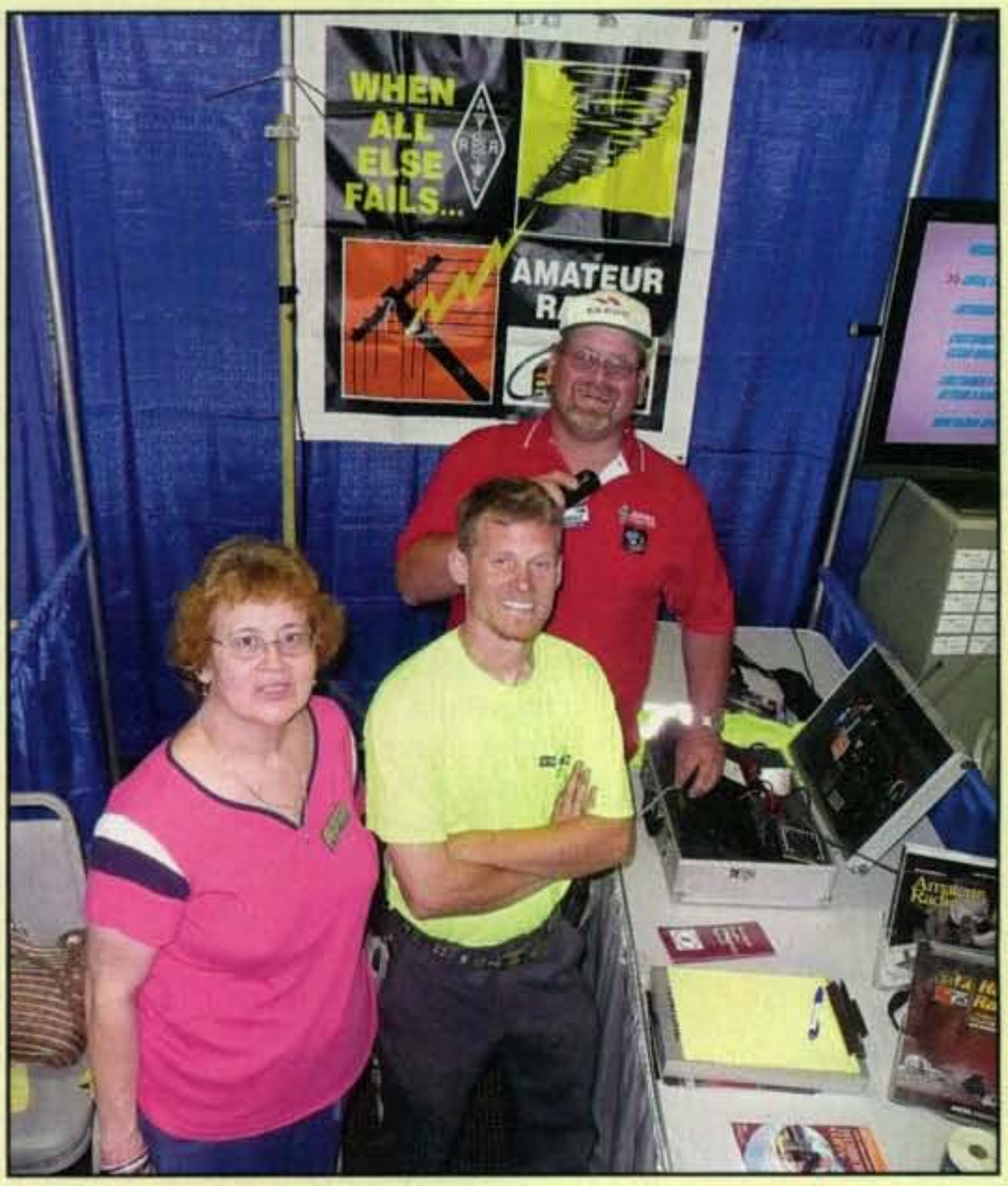
EmComm Op Cited for "Amateur of the Year" and OCRA Honors

A North Carolina radio amateur widely credited with helping create an emergency radio network for the state was named 2009 Amateur of the Year at the Dayton Hamvention®.

Danny Hampton, K4ITL, of Raleigh, received the honor in recognition of his work as an architect of the Piedmont Coastal Repeater Network. Developed in the early 1970s, the system today is populated by more than 40 machines.

Separately honored for his work by the Orange County (NC) Radio Amateurs, the organization said K4ITL's system "is heavily used for public-service work. (Hampton) has enhanced the network's utility with custom audio processing boards and RF components."

North Carolina Radio Amateurs Spread the Word at WECT Hurricane Expo in Wilmington



Many communities along the U.S. eastern seaboard and Gulf coast hold expositions to inform the public on how to prepare for the annual hurricane season. "Most of these events take place the last week in May or the first week in June to coincide with NOAA's official start date of the hurricane season on June 1," writes Bill Morine, N2COP, ARRL North Carolina Public Information Coodinator. "Hurricane expos are excellent opportunities to showcase facets of amateur radio that benefit the public in times of widespread disaster, such as ARES and SKYWARN." At the WECT Hurricane Expo held June 4 in Wilmington (from left) are: Martha Eason, KD4PSU; Capt. Mike Hamby, KG4SRW; and New Hanover County (Wilmington) ARESR Emergency Coordinator Stephen Russ, KI4RMZ. "In the accompanying photograph," Morine adds, "Assistant SKYWARN Coordinator Glenn Cox, KE4BMY, speaks with two women as to how SKYWARN provides ground truth weather data to the National Weather Service. Weather experts agree that North Carolina is the state with the second highest probability of hurricane landfall after Florida." – *Photos by Bill Morine, N2COP*

OCRA granted K4ITL the first-ever honorary lifetime membership to the organization.

The North Carolina Office of Emergency Management and SKYWARN have applauded the network's vital EmComm role.

Additionally, OCRA said, "Hampton (recently) helped coordinate the development of a local hospital-based amateur radio emergency repeater system (known as CARES) that ties 10 facilities together."

Hampton is Southeastern Repeater Association (SERA) technical committee chairman as well as ARRL North Carolina Section Technical Coordinator. He has been licensed since 1958.

"Danny's extensive knowledge of the two-way and broadcast radio industries in this state has enabled him to assist many repeater owners," former ARRL North Carolina Section Manager John Covington, W4CC, said in a statement posted on the League's website. "His advice in resolving RFI problems between repeater and commercial services, as well as other technical matters, has been extremely valuable to the section."

In a news release, OCRA said Hampton was presented a plaque and the honorary membership at RARSFest in Raleigh in April. "I've gotten plaques before, but never one in Braille," Hampton said, moving his fingers across the raised dots.

OCRA President Raymond "Woody" Woodward, K3VSA, said Hampton has "given freely of his time, expertise, and even his finances to further the cause of amateur radio in general and emergency communications in particular. I don't even want to think about the condition that ham radio would be in were it not for Danny's efforts."

Just hours after the OCRA RARSFest presentation, news spread that Hampton was to be named Dayton Hamvention® 2009 Amateur of the Year.

Homeland Security to Perhaps Study Ham's Role in EmComm

The U.S. House of Representatives is considering a bill that would "promote and encourage valuable public service, disaster relief, and emergency communications . . . by identifying unnecessary or unreasonable impediments to the deployment of amateur radio emergency and disaster relief communications" and seeking recommendations "for relief of such unreasonable restrictions."

Introduced by Rep. Sheila Jackson-Lee (D-TX), H.R. 2160, the "Amateur Radio Emergency Communications Enhancement Act of 2009," calls for the Department of Homeland Security to conduct a study and report its findings to Congress.

Benefits and liabilities of the legislation were weighed in *CQ* Editor Rich Moseson, W2VU's "Zero Bias" editorial last month under the headline "Antenna Restrictions and H.R. 2160."

In the study, Congress is seeking:

• "Recommendations for enhancements in the voluntary deployment of amateur radio licensees in disaster and emergency communications and disaster relief efforts.

• "Recommendations for improved integration of amateur radio operators in planning and in furtherance of the Department of Homeland Security initiatives.

• "Identification of unreasonable or unnecessary impediments to enhanced amateur radio communications—such as the effects of private land use regulations on residential antenna installations—and make recommendations regarding such impediments.

• "An evaluation of Section 207 of the Telecommunications Act of 1996.

• "A recommendation whether Section 207 should be modified to prevent unreasonable private land use restrictions that impair the ability of amateurs to conduct, or prepare to conduct, emergency communications by means of effective outdoor antennas and support structures at reasonable heights and dimensions for the purpose in residential areas."

Since its April introduction, H.R. 2160 has been referred to the U.S. House Energy and Commerce Committee for review and further action. Eight fellow Representatives joined Jackson-Lee in sponsoring the legislation.

Status of H.R. 2160 can be monitored at: <http://www.govtrack.us/congress/bill.xpd?bill=h111-2160>

73, Richard, KI6SN

BY FREDERICK O. MAIA,* W5YI

Responses to Questions from Readers

We get quite a bit of mail from readers, many of whom ask questions or want information on a specific topic. Since we haven't done this in a while, this month let's respond to some that are of general interest.

Q: *Since amateur radio is an international radio service, do ham operator applicants in all countries have to pass examinations similar to those in the United States?*

A: The guidelines for amateur radio that all countries must follow are contained in Article 25 of the International Radio Regulations. The last update to Article 25 took place at the 2003 World Radio Conference (see: <http://life.itu.ch/radioclub/rr/art25.htma>). Article 25.6 simply says "Administrations shall verify the operational and technical qualifications of any person wishing to operate an amateur station. Guidance for standards of competence may be found in the most recent version of ITU Recommendation: M.1544 Minimum qualifications of radio amateurs." This recommendation was approved August 2001 at the ITU in Geneva.

This ITU Recommendation states that "...certain minimum operator operational and technical qualifications are necessary for proper operation of an amateur or amateur-satellite station." It recommends "...that administrations take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate an amateur station."

It goes on to say, "Any person seeking a license to operate an amateur station should demonstrate theoretical knowledge of: Radio Regulations (International and domestic); Methods of radiocommunication (radiotelephony, radiotelegraphy, data and image); Radio system theory (transmitters, receivers, antennas, propagation and measurements); Radio emission safety; Electromagnetic compatibility ... and Avoidance and resolution of radio frequency interference." Article 25.5 states that "Administrations shall determine whether or not a person shall demonstrate the ability to send and receive texts in Morse code signals." See <http://life.itu.int/radioclub/rr/rec-1544.pdf>.

The bottom line is that it is up to the individual country to determine how the qualifications of ham operator applicants under their jurisdiction are verified. In the United States, a non-government panel (called the Question Pool Committee, QPC) develops multiple-choice questions to be used in examinations for the various license classes using ITU Recommendation M.1544 as a guideline.

The question pools are revised every four years on a staggered basis. The next new question pool to be introduced will be the Element 2 (Technician) pool on July 1, 2010.

Q: *Why do I have to pay a fee for a specific ("vanity") callsign when all other types of callsigns—special event, sequential, and club callsigns—are free?*

A: The short answer is because radio amateurs said in the early 1990s that they would be willing to pay for specific station call letters (even though they were not necessary for station operation) if the FCC would make them available. All amateur radio applications are fee-exempt except for vanity callsigns.

Vanity callsigns came into existence during the early 1990s at a time when President Clinton was working to reduce the deficit. The provision for paid vanity amateur radio callsigns was one of the many "Schedule of Regulatory Fees" inserted into his Deficit Reduction Plan (officially called the Omnibus Budget Reconciliation Act of 1993).

In 1994, a new Section 9(a) was added to the Communications Act authorizing the FCC to collect annual regulatory fees to recover the costs associated with the Commission's enforcement, policy and rulemaking, user information, and international activities. The idea was to make the FCC self-supporting.

Each year, as part of the passage of the federal budget, Congress establishes an amount that the FCC must collect in regulatory fees. For Fiscal Year 2009, the FCC must collect a total of $341,875,000 to fund its operations. This is an increase of 9.6% over last year's $312 million. Unlike tax receipts, which go to the General Treasury, regulatory fees go only to offset FCC costs.

In the spring of every year the FCC issues a Notice of Proposed Rulemaking alerting the public of the amount of these regulatory fees. Nearly every spectrum user group pays the fee, which is usually passed on to the public in higher costs. Interstate telecom (especially telephone and cellular) companies, land mobile (business radio), cable TV companies and broadcasters pay the most in total dollars.

The increased percentage in the FCC's annual budget is simply applied to all beneficiaries of their services, including vanity callsign applicants. The fee really has nothing to do with the actual costs involved in issuing the special call sign—just how much more the agency needs to operate.

The law allows the Commission the right to waive, reduce, or defer payment of a fee "for good cause shown, where such action would promote the public interest." The FCC has interpreted this to mean that regulatory fees will not be applied to non-commercial users such as state and local governments, amateur radio operator licensees (other than amateur vanity callsigns), and non-profit organizations.

The total increase in the Commission's FY-2009 operating budget is about $30 million, or 9.6%, more than FY-2008. By applying that percentage to the current $12.30 vanity callsign fee, you arrive at a new FY-2009 fee of $13.40 for ten years.

The FCC estimates that some 15,000 radio amateurs (the FCC calls them "payment units") will

*1020 Byron Lane, Arlington, TX 76012
e-mail: <w5yi@cq-amateur-radio.com>

MFJ tiny Travel Tuner

Tiny 4½x2¼x3 inch tuner handles full 150 Watts! Covers 80-10 Meters, has tuner bypass switch, tunes nearly anything!

MFJ brings you the *world's smallest* full power 150 Watt 80-10 Meter Antenna Tuner. Extra wide matching range lets you tune nearly any antenna.

It's no toy, its got guts! Built with real *air* variable capacitors (600 Volt, 322 pF) and *three* stacked powder iron toroids to handle real power -- not just QRP. Bypass switch lets you bypass tuner when you don't need it.

You can use nearly any transceiver at full power with nearly any coax fed or random wire antenna for portable, home or mobile operation.

It's perfect for compact rigs like Icom IC-706MKIIG, Yaesu FT-100D, Kenwood TS-50, QRP rigs and others with a built-in SWR meter.

Operate anywhere, anytime with a quick easy set-up! Tune out SWR on your mobile whip from inside your car. Operate in your apartment with a wall-to-wall antenna or from a motel room with a wire dropped from a window or from a mountain top with a wire over a tree limb. Great for DXpeditions or field day. Be prepared for emergencies.

MFJ-902 is so small and handy, you'll rely on it wherever you go! It's easy to pack away in your briefcase, suitcase, backpack, glove compartment or desk drawer. It's tiny enough to slide in your back hip pocket! 4½Wx2¼Hx3D inches.

MFJ-902
$99.95

Tiny Travel Tuner with 4:1 Balun

MFJ-902H, same as MFJ-902 *Tiny Travel Tuner* but has *4:1 balun* for balanced lines and 5-way binding posts for balanced lines and random wire. 5¾Wx2¼Hx 2¾D in.

MFJ-902H
$119.95

Tiny Travel Tuner with Cross-Needle SWR/Wattmeter

MFJ-904, same as MFJ-902 *Tiny Travel Tuner* but has *Cross-Needle SWR/Wattmeter.* Read SWR, forward and re-flected power all at a glance in 300/60 and 30/6 Watt ranges. 7¼Hx2¼Hx2¾D inches.

MFJ-904
$129.95

ALL-in-one Tiny Travel Tuner with 4:1 Balun *and* SWR/Wattmeter

ALL-in-one! MFJ-904H, same as MFJ-902 *Tiny Travel Tuner* but has *4:1 balun for balanced lines* and Cross-Needle SWR Wattmeter. Read SWR, forward and reflected power all at a glance in 300/60 and 30/6 Watt ranges. Has 5-way binding posts for balanced lines and random wire. 7¼Hx2¼Hx2¾D inches.

MFJ-904H
$149.95

Long 10/12 foot Telescoping Whips

MFJ-1954
$29.95
10 Feet

MFJ-1956
$34.95
12 Feet

10 foot extended, 19 inches collapsed, MFJ-1954, $22.95. 12 foot extended, 22.5 inches collapsed. MFJ-1956, $29.95. Standard 3/8 inch by 24 threaded stud for use with all standard mounts. Durable 1/2 inch diameter plated brass. Telescopes for full 1/4 wave operation 2 to 12/15 Meters. Cover 17, 20, 30, 40, 60, 80, 160 Meters with loading coil. Use two for multi-band dipoles. Replace screwdriver antenna whip for highly efficient *fixed* mobile operation.

MFJ RF Isolator

MFJ-915 *RF Isolator*

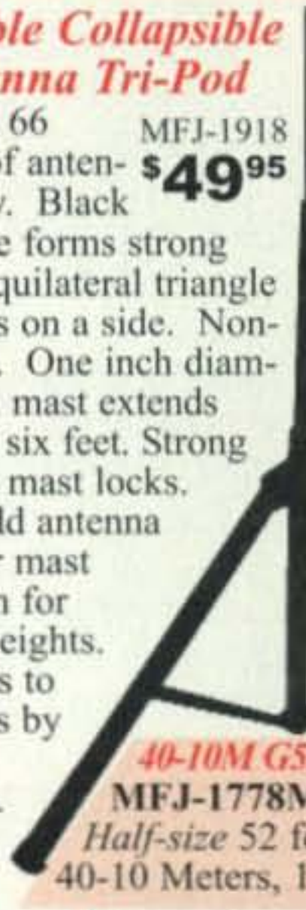
MFJ-915
$29.95

prevents unwanted RF from traveling on the outside of your coax shield into your transceiver. This unwanted stray RF can cause painful RF "bites" when you touch your microphone or volume control, cause your display or settings to go crazy, lock up your transceiver or turn off your power supply. In mobile installations, stray RF could cause your car to do funny things even blow your car computer. Clear up these problems, plug an MFJ-915 between your antenna and transceiver. *Don't operate without one!* 5x1½ inches. For 1.8 to 30 MHz.

Portable Collapsible Antenna Tri-Pod

Holds 66 pounds of antenna steady. Black *steel* base forms strong braced equilateral triangle 40 inches on a side. Non-skid feet. One inch diameter steel mast extends height to six feet. Strong base and mast locks. Easily add antenna mount or mast extension for greater heights. Collapses to 38 inches by 4 inch diameter. 6¾ pounds.

MFJ-1918
$49.95



40-10M G5RV Junior
MFJ-1778M, $39.95.
Half-size 52 foot *G5RV Jr* 40-10 Meters, 1500 Watts.

1500 Watt Lightning Surge Protector

MFJ-272
$39.95

Protect your expensive transceiver from static electricity and lightning induced surges with an ultra-fast gas discharge tube. Plug between rig and antenna, attach ground. DC to 1000 MHz. SO-239s.

All-Band G5RV Antenna

MFJ-1778
$44.95

Cover all bands, 160-10M with tuner. 102 ft. long, 1.5kW. Custom fiberglass insulator stress relieves 450 Ohm ladder line. Use horizontally, as inverted vee or sloper. Marconi on 160M.

Glazed Ceramic Antenna Insulator

MFJ-16C06
6-Pack
$4.56
(79 cents each)

Authentic *glazed ceramic* antenna insulator. Extra-strong -- will not break with long antennas and will not arc over or melt even under full legal power. Molded ridges give extra-long high voltage path to prevent high-voltage breakdown. Smooth wire holes prevent wire damage. Use as center or end insulator for dipoles, doublets, G5RVs, guy wires and others.

Current Balun/Center Insulator

True *1:1 Current Balun/Center Insulator* forces equal currents into dipole halves to reduce coax feedline radiation and field pattern distortion. Reduces TVI, RFI and RF hot spots in your shack. 50 ferrite beads on *Teflon*(R) coax. 1.5kW, 1.8-30 MHz. Stainless steel hardware. *Direct* antenna connection. 5x1½ in.

MFJ-918
$24.95

Free MFJ Catalog
and Nearest Dealer . . . 800-647-1800

http://www.mfjenterprises.com

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

MFJ ENTERPRISES, INC.
300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

MFJ . . . the world leader in ham radio accessories!

request and receive, or renew, a ten-year term vanity callsign during FY-2009—the same estimate as last year. This means that some $201,000 (15,000 times $13.40) in regulatory fees from vanity callsign recipients will be used to help offset the increase in the Commission's total FY-2009 operating budget. Last year (FY-2008) the FCC recovered about $184,500 (15,000 times $12.30) from the vanity callsign program.

You also have to pay another ten year's "rent" when you renew your vanity call for another ten years. Some radio amateurs question why a vanity callsign renewal fee should be assessed when the FCC has no cost involved, since the callsign is already issued. Again, the answer is that the renewal fee is not linked to FCC vanity callsign costs, but to the overall increase in the total FCC's operating budget. Application fees are based on cost to provide a service; regulatory fees are based on FCC budget fluctuations.

Q: *I am confused by all of the Amateur Service licensee databases on the internet? Which is the best to use?*

A: The best, most accurate, and timely is the FCC's own Universal Licensing System (ULS) database located on its website: <http://wireless.fcc.gov/uls/>. All others are merely a copy of it, most with additional information added. The primary reason it is better to use the ULS database is because the FCC indicates callsign cancellation dates, which are very helpful when determining if a callsign has been inactive for two or more years and therefore is available under the vanity callsign program. We do not know of any other ham database that incorporates this information.

The FCC updates the Amateur Service database every morning at 2 AM Eastern time. It also posts daily application and license transaction files and an updated ULS database weekly for use by the public. The daily transaction files are used to update every other site's database.

Some of the other popular radio amateur databases are <www.QRZ.com>, <www.WM7D.net> (direct link from the *CQ* homepage), and <www.arrl.org/ fcc/fcclook.php3>. One of their advantages is that they add additional information that is not on the FCC's version, such as maps, grid squares, counties, e-mail and website addresses, year of birth, previous callsigns, time zones, and more.

We understand that the Universal Licensing System is in the process of undergoing a major overhaul by the FCC and a new consolidated licensing system will come online sometime next year. Stay tuned.

Q: *I don't understand all the math associated with the Part 97 RF safety rules ... such as that pertaining to the Maximum Permissible Exposure (MPE) limits. How do I know if my station is safe?*

A: In 1990, officials from the Federal Communications Commission and the Environmental Protection Agency conducted a field survey of typical amateur radio stations in southern California. The general conclusion was that the majority of amateur operations do not produce electromagnetic fields strong enough to be a health hazard. However, there are certain isolated situations in which the RF safety standards may be exceeded and people could be exposed to potentially harmful levels of RF radiation.

Part §97.13(c) requires that an RF evaluation be conducted when more than 50 watts is radiated. This is easy to say, but there are many variables to take into consideration when completing the compliance evaluation. Among these factors are power levels, emission types, wavelength (the radiated frequency), type and gain of the antenna, height above ground, antenna patterns, and so forth. Furthermore, there are two types of exposure levels that apply to controlled and uncontrolled environments. (In a "controlled" RF environment people know that RF is present and can take steps to control their exposure.) There also are different time-averaging (duty cycle) constraints that apply to each.

There are three ways to determine RF exposure:

1. Use electronic instruments that measure field strength;
2. Perform complex mathematical calculations based on generic formulas provided by the FCC;
3. And use tabular charts and computer programs that determine "worst case" estimated distances to meet the RF power-density guidelines.

Amateurs should routinely minimize public exposure to RF energy. Ham radio is a hobby that can be pursued safely, provided a few simple precautions are followed. Here are some suggestions:

- You should radiate as little RF power as possible. Remember, Section 97.313(a) requires radio amateurs to use the least amount of transmitter power necessary to perform their communications.
- Make it a practice to operate without your linear amplifier whenever possible, and never use an amplifier that has its shielded metal cover removed. The cover keeps RF energy from escaping into the environment.
- Reduce the duty cycle. Keep transmissions short—especially when operating at the VHF/UHF/microwave level.
- Amateurs can minimize the amount of RF energy radiated into the surrounding environment by using lower duty-cycle emission types such as single sideband and CW.
- Transmitting antennas should be mounted as far away from residences and populated areas as possible, and the higher the antenna the better.
- Since feed lines can radiate, route open-wire line (or even coaxial cable if the standing-wave ratio is high) away from populated areas.
- Do not transmit when people are near a ground-mounted or mobile antenna. Vertical antennas are best installed on high monopoles, towers, or roofs, and not at ground level.
- A good rule-of-thumb is to allow at least 35 feet distance between the antenna and the public if 100 watts or more is being transmitted. Also, allow an even greater distance if high power and high-gain antennas are used.
- Automobile metal roofs shield the occupants from RF. Don't transmit if anyone is standing within five or six feet of a whip antenna.
- Be careful when using indoor antennas, including those mounted in attics, because they can generate substantial RF fields.
- Use low power (10 watts output or less whenever possible) and keep your transmissions short when someone might be near the antenna.
- In a residential environment it is best not to use high-power VHF/UHF/ microwave transmitters and high-gain directional antenna arrays such as used during moonbounce or weak-signal communications.
- Be certain no one is in front of a high-gain directional antenna array—especially one transmitting at the high-energy VHF/UHF/microwave level. Limit access to your antenna area. Install warning signs.
- Always use the lowest power level possible when using a hand-held transceiver and point the antenna as far away from your head—and especially your eyes—as possible.

Q: *All the good one-by-two format callsigns are assigned. Is there a way I can get one?*

A: Actually, new one-by-two callsigns are becoming available all the time, and it is possible to get one of them if you

know how. Callsigns become available two years plus one day following license expiration, cancellation, or death of the holder, whichever is sooner. An amateur callsign is listed in the FCC database for two years beyond expiration to provide for a two-year grace period during which the licensee may recoup the callsign or a close relative may apply for the call of a deceased licensee.

There are many—possibly hundreds—of available one-by-two callsigns currently listed in the FCC's Amateur Service active database where the licensee has died 2 to 12 years ago. Check the Silent Keys listing in *QST* for the period 1990 through 1997 to determine which callsigns may be available. (You can also enter the term "silent key" into the Google search engine.) Then check the FCC database to determine which callsigns are still being carried as active.

The FCC will remove (cancel) the amateur callsign of a deceased amateur from its data base if you provide it with either an obituary from a newspaper, a copy of the death certificate, or a printout from the Social Security Death Index (SSDI) located online at: <http://ssdi.rootsweb.ancestry.com>.

Mail your callsign deletion request and documentation to: FCC, Amateur Section, 1270 Fairfield Road, Gettysburg, PA 17325-7245. Then start checking the FCC's amateur radio database about two weeks after you submit the deletion request. Once the callsign is canceled from the database, you may apply for it, but work fast. Someone else could beat you to the callsign.

There are several excellent amateur vanity callsign help databases on the World Wide Web that can assist you in locating a desirable callsign. Among them are: <www.radioqth.net>, <www. vanityhq.com/> and <www.ae7q.com>.

Q: *I recently applied for a vanity callsign and noted the following entry: "Redlight Review Completed" when I checked the application in the FCC's Universal Licensing System (ULS) database. What is that all about?*

A: The "Red Light Rule" was adopted to facilitate collection of unpaid non-tax debts owed to the FCC. The Red Light Display (RLD) System began operation in December 2004. Triggered by an applicant's Taxpayer Identification Number (Social Security Number), it is a secure system that allows the public as well as the Commission to determine if the applicant is delinquent in the payment of any debts owed to the FCC. This debt might be, for example, failure to make installment payments on a fine assessed for an FCC rules violation.

If it is discovered that you owe the Commission money, you will receive a letter advising that you are ineligible for benefits (such as a license or vanity callsign) until the delinquent debts have been paid in full or other satisfactory arrangements have been made. Failure to resolve an outstanding delinquent debt within 30 days of being notified that a filing has triggered a "red light" will result in dismissal (rejection) of the application.

The rules provide that if you fail to pay money owed to the FCC, the debts will be referred to the Department of Treasury for collection. Your failure to pay will also be reported to credit reporting agencies. You can also check the RLD System yourself by entering your FCC Registration Number (FRN) and ULS password online at: <http:// www.fcc.gov/redlight>. Try it!

Q: *The FCC has been reducing its ham licensing qualifications in recent years. What effect has this had on amateur radio growth?*

A: The last four major Amateur Service rulemakings by the

LDG ELECTRONICS

The #1 Line of Autotuners

NEW! YT-100

An autotuner for several popular Yaesu Radios. An included cable interfaces with your FT-857, FT-897 and FT-100 (and all D models) making it an integrated tuner, powered by the interface. Just press the tune button on the tuner, and everything else happens automatically: mode and power are set, a tune cycle runs, and the radio is returned to its original settings. It's the perfect complement to your Yaesu radio.

Suggested Price $199.99

NEW! Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). Tuning is simple; one button push on the tuner is all that is needed - the Z-817 takes care of the rest. It will switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! 2000 memories cover 160 through 6 meters. The Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the tune button on the tuner. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required. A coax jumper cable is also induced for fast hook up. ***Suggested Price $129.99.***

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***

NEW! KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver. The KT-100 actually allows you to use the Tune button on the radio. The LEDs on the front panel indicate tuning status, and will show a match in seconds, or even less of you've tuned on or near that frequency before. Has 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. If you have an AT-300 compatible Kenwood radio, you can simply plug the KT-100 into your transceiver with the provided cable; the interface powers the tuner, and the Tune button on the radio begins a tuning cycle. The supplied interface cable makes the KT-100 a dedicated tuner for most modern Kenwood transceivers. ***Suggested Price $199.99***

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

AT-1000Pro

Building on the success of the AT-1000, LDG Electronics has refined and expanded its 1KW tuner. The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. All cables included. ***Suggested Price $599***

The #1 Line of Autotuners - Now With 2 Year Transferable Warranty!

A warranty is a promise, a promise of quality and service life. The #1 line of autotuners in the industry now comes standard with a no-questions-asked 2-Year Transferable Warranty.

When something is wrong with an autotuner, switch, or meter, LDG will fix it - period. LDG is the leader in tuner technology and now leads the industry in customer support as well.

Our customers tell us we do the right things to meet their support expectations. Customers feel good about owning LDG products because service life and support is something they can count on - even when they are ready to sell a unit to another ham.

Now With 2 Year Transferable Warranty!

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***

radio not included

AT-897 for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897 Autotuner mounts on the side of your FT-897 just like the original equipment and takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier. ***Suggested Price$199***

radio not included

FT Meter

LDG's new version of its popular FT-Meter presents a lush, highly readable 2.5" meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit. Each function is selectable from the radio's menu. On/Off switch for the light. ***Still Only $49***

NEW! FTL Meter For Yaesu's popular FT-857(D) and FT-897(D) transceivers, our FTL-Meter presents a lush, highly readable 4.5 inch meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit. Each function is selectable from the radio's menu. Best of all, it plugs into the meter jack on the bottom of the front panel. ***Suggested Price $79.99***

NEW! M-7700 The LDG M-7700 provides a lavish 4.5" meter for IC-7700. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the rig's setup menu. What's more, the M-7700 and the virtual meter on your radio can work together; for example, you can display SWR on the radio's meter and power output on the M-7700. ***Suggested Price $79.99***

Z-11Pro

Meet the Z-11Pro, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters. The Z-11Pro uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. All cables included. ***Suggested Price $179***

NEW! IT-100

Matched in size to the IC-7000 and IC-706, the new IT-100 sports a front panel push-button for either manual or automatic tunes, and status LEDs so you'll know what's going on inside. You can control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. It's the perfect complement to your Icom radio that is AH3 or AH-4 compatible. ***Suggested Price $179.99***

NEW! Z-100Plus

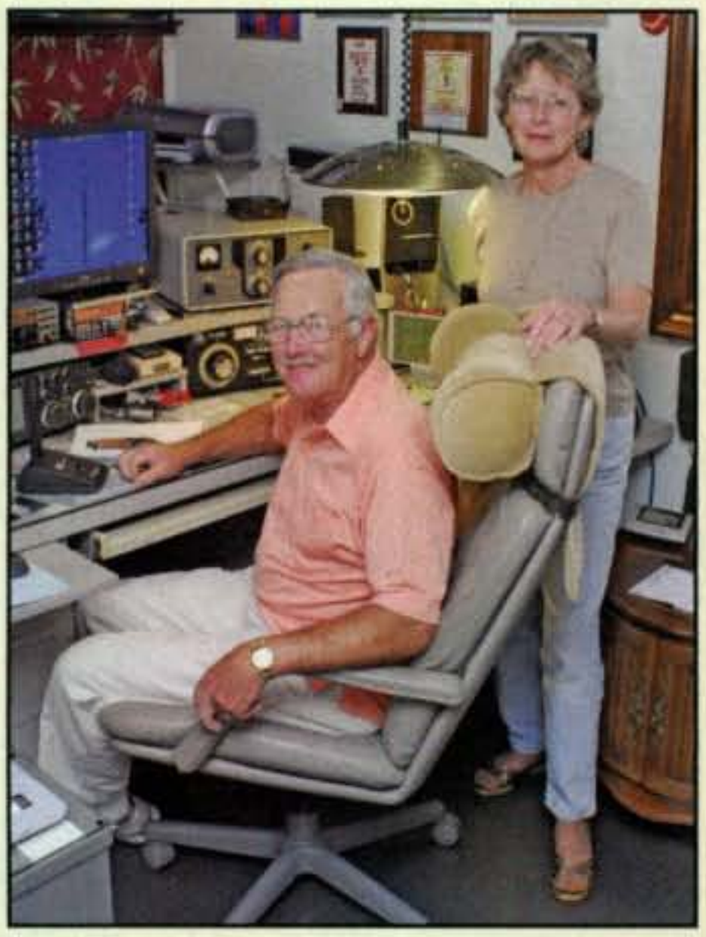
LDG's popular Z-100 economy tuner is now the Z-100Plus. Still small and simple to use, the Z-100Plus sports 2000 memories that store both frequency and tuning parameters. It will run on any voltage source from 7 to 18 volts; six AA batteries will run it for a year of normal use. Current draw while tuning is less than 100ma. The Z-100Plus now includes an internal frequency counter so the operating frequency is stored with tuning parameters to make memory tunes a blazingly fast 0.1 seconds; full tunes take an average of only 6 seconds. ***Suggested Price $159.99***

Call or visit your favorite dealer today!

Visit www.ldgelectronics.com for a complete dealer list.

LDG Electronics, Inc.
1445 Parran Road
St. Leonard, MD 20685
Phone 410-586-2177
Fax 410-586-8475

LDG



On The Cover

Lynn and Rosie Lamb of Maryville, Tennessee, are among the best-known DXing couples in ham radio today. Lynn, W4NL, has been at the Top of the Honor Roll since 1984, has DXCC on nine bands, including 228 countries confirmed on 160 meters; WAZ on eight bands, including 36 zones on 160; and 328 countries confirmed on QRP (10 watts). Rosie, KA4S, is just one confirmation away from Top of the Honor Roll recognition herself. Both Lynn and Rosie, along with George Dominick, W4UWC, founded SEDCO - the SouthEastern DX and Contesting Organization - five years ago and its annual convention in Pigeon Forge, Tennessee, has quickly become one of the major DX and contesting events of the year.

Rosie and Lynn have been married 52 years and both are retired from the Department of Defense, where they worked as civilian employees. Rosie was an executive secretary and Lynn held various positions in Navy weapons programs, spending his last three years before retirement as Weapons Director for the entire Navy. He was awarded the Superior Civilian Service Award -- the Navy's second-highest civilian honor -- for his work on weapons systems during Operation Desert Storm.

Lynn's current ham radio interests include QRP (low power), CW and digital modes, and he is now getting into 6-meter DXing as well. One of his favorite ham radio moments, though, was recently when he was talking on PSK 31 with his friend and digital mentor, Ted McDonald, K7OM. Lynn says his grandson, Dawson, and Ted's granddaughter, Sarah, each took over the respective keyboards to talk to each other on the radio. (Cover photo by Larry Mulvehill, WB2ZPI)

FCC provided for a code-free Technician Class license (PR Docket 90-55 in 1991); restructured the service to three license classes with one 5-wpm code exam (WT Docket 098-0143 in 2000); increased HF voice spectrum (WT Docket 04-140 in 2006); and then eliminated code testing (WT Docket 05-235 in 2007).

Despite these changes, amateur radio growth has been pretty much stagnant over the past ten years, and it appears that these changes have had no effect on the total number of radio amateurs. It has, however, rearranged the mix of radio amateurs in each license class. There are 40,000 more Extra Class and 40,000 more General Class radio amateurs than ten years ago—an amount about equal to the reduction in the Advanced and the Novice Classes, which are no longer issued. The result: No gain. The number of Technician Class hams has remained right around 330,000 during the past decade.

According to FCC statistics, ten years ago (1999) there was a total of 675,000 active radio amateurs with unexpired licenses. Today, there are about 670,000—not much change in total. The belief was that these Amateur Service rulemakings would substantially increase interest in ham radio, eliminate barriers to entry into the service, and that amateur radio would start growing again. Sadly, it has not happened.

The effect of reducing the number of license classes, examinations and code speed, increasing voice spectrum, and eventually eliminating code testing altogether seems only to be that amateurs find it easier to upgrade to the General and Extra Class. We suspect that the changes in code exams is the main reason. In any event, the total number of licensees has pretty much remained the same over the past decade.

The bottom line is that the advent of the no-code Technician (in 1991), restructuring (in 2000), more voice frequencies (in 2006), and ending code testing (in 2007) has not increased the total number of radio amateurs. There are, in fact, slightly fewer amateurs than five or ten years ago. What has happened is that the number of radio amateurs in each license class has simply been redistributed.

Not included in these figures are approximately 55,000 radio amateurs with expired licenses who are in the two-year "grace period." These amateurs are either deceased or have failed to renew their licenses. The number of new amateurs (about 29,000 annually) is pretty much matched by the number who are dropped from the database

The following countries have signed a reciprocal operating agreement with the U.S.: Antigua/Barbuda, Argentina, Australia, Austria, Bahamas, Barbados, Belgium, Belize, Bolivia, Bosnia-Herzegovina, Botswana, Brazil, Canada, Chile, Colombia, Costa Rica, Croatia, Cyprus, Denmark (including Greenland), Dominican Republic, Dominica, Ecuador, El Salvador, Federated States of Micronesia, Fiji, Finland, France (including possessions), Germany, Greece, Grenada, Guatemala, Guyana, Haiti, Honduras, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kiribati, Kuwait, Liberia, Luxembourg, Macedonia, Marshall Islands, Mexico, Monaco, Netherlands, Neth. Antilles, New Zealand, Nicaragua, Norway, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, St. Lucia, St. Vincent and the Grenadines, Seychelles, Sierra Leone, Solomon Island, South Africa, Spain, Suriname, Sweden, Switzerland, Thailand, Trinidad and Tobago, Turkey, Tuvalu, United States, Uruguay, Venezuela, and the United Kingdom including: Bermuda, British Virgin Islands, Cayman Islands, Channel Islands (including Guernsey and Jersey) Falkland Islands (including South Georgia Islands and South Sandwich Islands), Gibraltar, Isle of Man, Montserrat, St. Helena (including Ascension Island, Gough Island, Tristan Da Cunha Island), Northern Ireland, and Turks and Caicos Islands.

Participating CEPT countries: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France (and possessions), Germany, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Netherland Antilles, Norway, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United States, and the United Kingdom.

Participating IARP countries: Argentina, Brazil, El Salvador, Panama, Peru, Trinidad and Tobago, United States, Uruguay, and Venezuela.

If your country of citizenship is not named in the list above, then no reciprocal operating authority is in effect and amateur radio operation is not possible in the U.S. unless you first pass the appropriate FCC license examinations. Operating privileges while in the United States may not exceed those of an Amateur Extra Class operator.

Table I– The countries that have signed a reciprocal operating agreement with the U.S.; participating CEPT countries; and participating IARP countries.

after their grace period runs out. There are also another 11,000 amateur radio clubs with callsigns. *(Editor's note: This is a case where W5YI and I see things from a different prespective. While the total number of amateurs has remained roughly steady in recent years, it has been near all-time high levels and it is important to remember that we are still getting roughly 100,000 to 120,000 new people into the hobby every four years. —W2VU)*

Q: *I am a ham operator and citizen of a foreign country. May I operate amateur radio while on vacation in the United States?*

A: Currently, foreign amateur operators are authorized to operate stations in the U.S. under five circumstances.

1. Canadian amateurs may operate ham radio in the U.S. due to a bilateral U.S.-Canada1952 treaty that permits visiting amateurs to operate radio stations in the territory of the other country without further licensing. The visiting amateur simply identifies his station in the usual manner and appends the callsign with the prefix and area number being visited (e.g, VE1ABC/W1). The city and state in which the operation takes place must be announced on the amateur airwaves at least once during the communications exchange.

2. The FCC rules also provide operating privileges to radio amateurs who are citizens of countries whose governments have entered into bilateral reciprocal operating arrangements with the United States. The foreign amateur must carry two items when operating in the U.S.: (1) Proof of an amateur license issued by the country of citizenship, and (2) Proof of citizenship in that same country. Station identification: the U.S. call district identifier (e.g., W1) followed by the non-US callsign. (See Table I.) Note that is is the reverse of the ID for Canadian amateurs. Foreign hams from anywhere *except* Canada operating in the U.S. must identify with the U.S. call district *first*—e.g., W2/DL1ABC.

3. Holders of CEPT radio amateur license issued under recommendation T/R 61-01 (CEPT Agreement), by a country belonging to the European Conference of Postal and Telecommunications Administrations. CEPT license holders may operate an amateur station temporarily in any participating CEPT country without first obtaining another license or permit from the host country. CEPT license holders must also have their original amateur license in their possession, issued by their home country when visiting the U.S. Station identification: same as for countries with reciprocal operating arrangements. (See Table I.)

4. Holders of International Amateur Radio Permits from participating IARP countries are authorized to operate temporarily in the U.S. An IARP is issued pursuant to the terms of the Inter-American Convention on an International Amateur Radio Permit, often referred to as the CITEL/Amateur Convention. Station identification: same as for countries with reciprocal operating arrangements.

5. Non-U.S. citizens who pass the required FCC examinations are granted licenses in the same manner as U.S. citizens. This procedure is usually used by foreign operators who reside permanently in the U.S., by those who are here for lengthy stays, or when a reciprocal licensing arrangement does not exist between the foreign amateur's home country and the United States. U.S. amateur license examinations are available in several foreign countries and are usually staffed by U.S. volunteer examiners who are overseas workers, in the U.S. military, or foreign amateurs who hold senior-level FCC licenses.

73, Fred, W5YI

BY DAVE INGRAM,* K4TWJ

Lighthouses Brighten the Airwaves . . . but Fog is Rolling In

Have you noticed the increasing amount of on-the-air activity from lighthouses and lightships during recent times? There is a viable reason. Jim Weidner, K2JXW, founder of the Amateur Radio Lighthouse Society, and friends have diligently been promoting lighthouse activities since 1996. Plus, a second group based in Scotland has been promoting ham radio lighthouse operations on a worldwide basis even longer. They both have events scheduled for this month, and what used to be two distinct activities on two separate weekends are now overlapping, with the growing possibility of confusion for the average ham. We have no intention of taking sides here—except with you, the reader, who enjoys having fun on the air—so this month we're going to try to clear the air and shine some light on who is running what when.

The ARLHS has expanded its long-running National Lighthouse/Lightship Weekend (traditionally the first weekend in August) into an International Lighthouse/Lightship QSO Party and Special Event Operation between August 1 and 9, covering the first two weekends of the month. Plus, the European group has its annual International Lighthouse/Lightship Weekend scheduled for August 15 and 16, the third weekend. As I will explain later, joining on-the-air activities (QSO parties or contacting Special Event stations operating from lighthouse grounds) also earns credits for a variety of awards and certificates. First, however, let's discuss the unique roles of lighthouses and lightships themselves.

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>

Lighthouse History

A brief study of lighthouses reveals they are nautical/navigational aids typically used to mark haz-

Photo 1– The Hooper Strait Lighthouse and Museum at Chesapeake Bay, Maryland is one of the most well-known and easily accessible lighthouses on the U.S. East Coast. Here, ARLHS member Jim Elliott, KA3UNQ, passes out QSOs from the lighthouse grounds while alternate op Dan Hatcher, KD3CQ, handles photographic duties. (Lighthouse photos courtesy of ARLHS founder Jim Weidner, K2JXW)

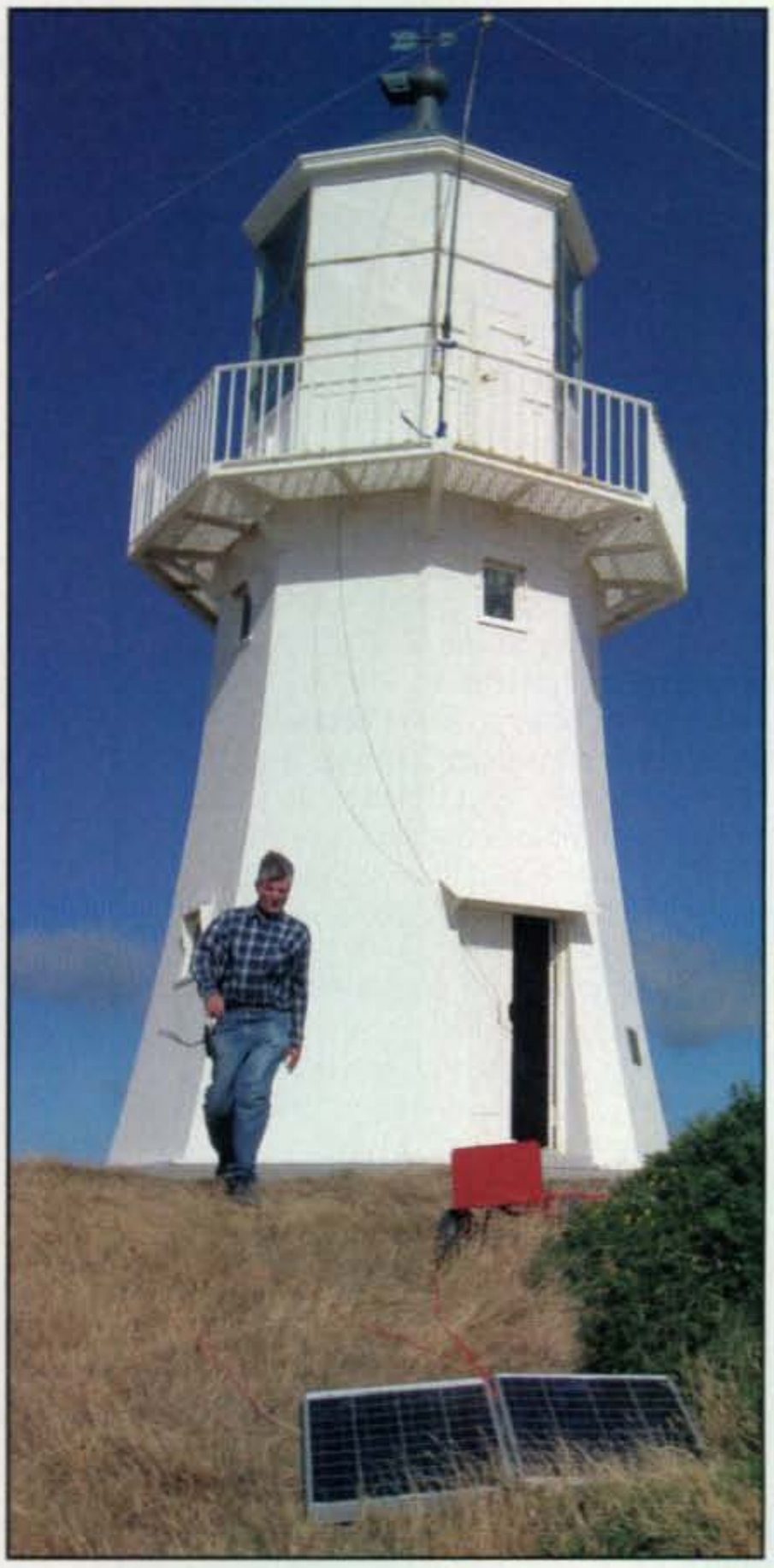


Photo 2– Lighthouses grace every corner of the world, and each one is unique in design and paint style. Here Nigel Goldstone, ZL2SEA, checks his solar panels supplying power for an on-the-air operation from Pencarrow Lighthouse "down under" in New Zealand.

AMERITRON 600 Watt *no tune* FET Amp

Four rugged MRF-150 FETs at 50 Volts give high efficiency . . . No deterioration with use

ALS-600 **$1499** Suggested Retail

Ameritron ALS-600 *Solid State FET* compact desktop station amplifier is only 4 dB below 1500 Watts -- less than an S-unit!

There are no tubes, no tube heat, no tuning, no worry rugged -- just turn on, select band and operate. 600 Watts PEP/500W CW -- lets you talk to anyone you can hear!

Covers 1.5-22 MHz, (10/12 Meters with $29.95 kit, requires FCC license), instant bandswitching, SWR/thermal protected, extremely quiet, lighted peak reading Cross-Needle SWR/Wattmeter, front panel ALC control, operate/standby switch. 12.5 lbs., 9½Wx7¼Hx12D in.

Includes ALS-600PS transformer AC power supply for 120/220 VAC, inrush current protected. 32 lbs., 9½Wx6Hx12D inches.

ALS-600 Amp with Switching Power Supply

***New!* ALS-600S, $1599.** ALS-600 amplifier with 10 lb. ALS-600SPS switching power supply combo.

Switching Power Supply

ALS-600SPS **$699** suggested retail

Works with all ALS-600 amplifiers. Extremely lightweight, just 10 lbs. Superb regulation, very low radiated noise. 9Wx6Hx14½D in.

From QST Magazine, March, 2005

". . . the ampifier faulted only when it was supposed to. It protected itself from our boneheaded, sleep-deprived band changing manuevers . . . "

"I found myself not worrying about damaging this amplifier. It seems quite capable of looking out for itself. . . . Kudos to Ameritron."

"I couldn't hear any noise at all from the SPS (*switching power supply*) on the vertical or quad…"

"I came to greatly appreciate the size, weight, reliability and simplicity of this amplifier."

"The ALS-600S makes it possible to pack a transceiver and a 600 Watt amplifier, that together weigh less than 30 pounds."

AMERITRON *mobile* 500 Watt *no tune* Solid State Amp

Instant bandswitching, no tuning, no warm-up, SWR protected, 1.5-22 MHz, quiet, compact

Ameritron's ALS-500M solid state *mobile* amp gives you 500 Watts PEP SSB or 400 Watts CW output! Just turn on and operate -- no warm-up, no tuning, instant bandswitching. Fits in very small spaces.

New ALS-500RC, $49 *Remote Head* lets you mount ALS-500M amplifier *anywhere* and gives you full control. Select desired band, turn On/Off and monitor current draw on its DC Current Meter. Has power, transmit and overload LEDs. RJ-45 cables plug into Amplifier/Remote Head.

ALS-500M **$849** Suggested Retail

Covers 1.5-22 MHz, (10/12 Meters with $29.95 kit, requires FCC license).

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

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

ALS-500M, $849, 500 Watt mobile amp.
ALS-500MR, $879, ALS-500M/Remote Head
ALS-500RC, $49, Remote head for ALS-500M (for serial # above 13049).
ARF-500K, $179.95, Remote kit for ALS-500M serial # lower than 13049. Includes AL-500RC Remote Head, filter/relay board for ALS-500M, cables, hardware, instructions.

Free online manuals! Ameritron brings you the finest high power accessories!

ARB-704 amp-to-rig interface. . . $59.95

Protects rig from damage by keying line transients and makes hook-up to your rig easy!

RCS-4 Remote Coax Switch . . . $159.95

Use 1 coax for **4** antennas. No control cable needed. SWR <1.25, 1.5 - 60 MHz. Useable to 100 MHz.

RCS-8V Remote Coax Switch. . . $169.95

Replace **5** coax with 1! 1.2 SWR at 250 MHz. Useable to 450 MHz.<.1 dB loss, 1kW@ 150MHz.

RCS-10 Remote Coax Switch. . . $179.95

Replace **8** coax with 1! SWR<1.3 to 60 MHz.**RCS-10L, $219.95** with lightning arrestors.

New! RCS-12C Fully Automatic Remote Coax Switch Controller. . . $239.95

Band data from transceiver auto selects antennas. Antenna memories. No hotswitching. Rig-to-amp interface. For 3/4 BCD, 1 of 8 relay boxes. **RCS-12, $309.95**, auto controller with 8 coax relay box, to 60 MHz. **RCS-12L, $349.95**, with lightning arrestors.

AWM-30 Precision SWR Wattmeter..$149.95

Active circuit gives *true* peak/average readings on lighted cross-needle meter.3000/ 300 Watt ranges, Remote sensor.

AWM-35 Flat Mobile SWR Wattmeter . . $159.95

1⅝ in. thin on dashboard. Remote sensor, 25' cable. True *peak*, Cross-Needle,1.5 kW, 1.8-30 MHz. *High-SWR* LED.

ATP-100 Tuning Pulser . . . $69.95

Safely tune up for full power, best linearity. Prevents overheating, tube damage, power supply stress, component failure.

ADL-1500 Dummy Load with oil . . . $74.95

Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

ADL-2500 fan-cooled Dry Dummy Load, $219.95

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

SDA-100 Mobile Screwdriver Antenna

$409.95 80-10M, fiberglass form, Pittman motor, CNC parts, magnetic sensors, #14 wire, 1.2 kW PEP. 6' whip, $24.95

800 Watts . . . $899
with four 811A tubes

AL-811H, $899. Plugs into 120 VAC outlet. All HF bands. Hi-silicon transformer, heavy duty tank coils, tuned input, operate/standby switch, Xmit LED, ALC, lighted meters, 32 lbs. 13¾Wx8Hx16D in.

AL-811, $749. Like AL-811H, but three 811A, 600 W.

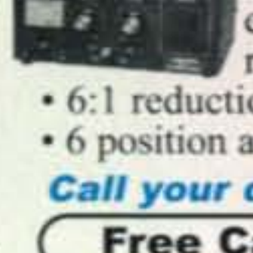
Desktop Kilowatt
with Classic 3-500G tube

AL-80B, $1449. Whisper quiet 3-500G desktop amp gives *full* kilowatt SSB PEP output. Plugs into 120 VAC. Ameritron's exclusive *DynamicALC*™ doubles average SSB power out and *Instantaneous RF Bias*™ gives cooler operation. All HF bands. 48 lbs. 14Wx8½Hx15½D in.

True Legal Limit™
with Eimac® 3CX1500/8877

AL-1500, $3495. Ameritron's *most powerful* amplifier uses the herculean *Eimac®* 3CX1500/8877 *ceramic* tube. 65 Watts input gives you full output power -- it's just loafing with a 2500 Watt power supply. All HF bands, all modes. 77 lbs.17Wx10Hx18½D inches.
AL-1500F, $3095, Import tube.

1500 Watt* True Legal Limit™ *Antenna Tuner



ATR-30, $599.95 • Super high current edge-wound silver plated roller inductor • 500pf capacitors • 6:1 reduction drives • 3 core current balun • 6 position antenna switch • True *peak* meter

Call your dealer for your best price!

Free Catalog: 800-713-3550

AMERITRON

. . . the world's high power leader!

116 Willow Road, Starkville, MS 39759
TECH (662) 323-8211 • **FAX** (662) 323-6551
8 a.m. - 4:30 p.m. CST Monday - Friday
For power amplifier components call (662) 323-8211
http://www.ameritron.com

ardous shorelines, reefs, and entrances to harbors. They often are built round to withstand harsh stormy weather and to minimize wind resistance, and many are painted with unique bands, spirals, and square or diamond patterns for easy recognition.

Lighthouses have been in existence for several thousand years. They are included in various marine charts, and many have been maintained in remarkably good condition. Lighthouses are also historically-significant landmarks, and a fair number are well-recognized tourist attractions complete with park areas, mini museums, and gift shops.

A lighthouse has a glass-enclosed lamp room that during early times was equipped with a large oil lantern rotated by a gravity-fed pulley/gear system. An adjoining building was used for storing supplies, spare parts, food, etc. A live-in lighthouse keeper added oil to the lantern and rewound the pulley every few hours to ensure continuous operation of the lamp.

Today, lighthouses are equipped with high-intensity electric lamps focused into a bright and long-range beam by a Fresnel lens. As a quick reference here, a somewhat similar Fresnel lens is used in an overhead projector to amplify light and "throw" images onto a screen in a meeting room or auditorium. Many lighthouses have their own power generators for emergency/standalone operation, and some also include radar beacons with transponders that appear on a ship's radar screen plus transmit their ID/QTH in Morse code.

Today, the majority of lighthouses in the United States are automated, with the U.S. Coast Guard maintaining the actual light and its support optics, while private/non-profit groups or local governments maintain lighthouse structures. As a result, some lighthouses 100 years or more old are in remarkably good condition and delightful to visit, while others (without this local support) beg for repairs and special care.

The lighthouse at the point of St. George Island off the west Florida coast is a good example of concerned people rescuing a historic lighthouse from extinction. It was quite old and beach erosion from hurricanes eventually took its toll on the foundation. The lighthouse toppled into the Gulf of Mexico in 2005. Then an admirable group of volunteers called the St. George Lighthouse Association plus a local salvage company retrieved the lamp and many of the original bricks/stones from the water. The items were cleaned, refurbished, and used in restoring and upgrading the lighthouse. The rebuilt lighthouse, complemented with a small museum and gift shop, opened to the public in early 2009 (see <www.stgeorgelight.org>). St. George Island sits a half-mile or so offshore a few miles east of Port St. Joe. It is a nice "old world" vacation area accessible by bridge. The beach is super clean and relatively quiet. The lighthouse sits at the end of the island's causeway, marking the island's shoreline. Thousands of other lighthouses grace shorelines, islands, waterways, and large lakes worldwide.

Lightships

Lightships were akin to floating lighthouses, and I say "were" because the last ones in service were retired or decommissioned by 1985. A lightship has a light and Fresnel-lens-type assembly mounted atop a tall mast or tripod, a foghorn or large bell, and a

Photo 3– Patty Martin, W5AZO, operates from the site of East Wharf Lighthouse in Oklahoma (yes, there is even a lighthouse in Oklahoma; it marks the edge of a large lake). Alternate op and OM Jim Martin, W5AZN, shot this photo.

Photo 4– Lightships are akin to floating lighthouses, and prior to the evolution of GPS for navigation, they marked dangerous waters, entrances to harbors, and more. Shown here is the retired-from-service Lightship Huron which now resides at Port Huron, Michigan.

radio beacon—all for making its presence known during good and bad weather alike. Lightships were usually permanently anchored, with a massive anchor to hold them firmly in place during storms. The ship's hull was very often marked with the name of its assigned location or post. The ships were used in waters too deep or otherwise unsuitable for supporting a conventional lighthouse.

A number of lightships were lost in hurricanes and replaced by automated oil derrick-type light towers or light buoys with high-intensity blinking lights like those utilized near airports and atop tall radio/TV towers. They lack the class, flash, and glamour of lightships, but that is the harsh reality of progress (sigh!). The lightships surviving today have been refurbished and are enjoying life as tourist attractions and museums. Why have I included details of lighthouses and lightships in this month's column? Because they are historical landmarks, and also many radio amateurs are or have been associated with ships or some form of ship-to-shore communications and many people enjoy investigating lighthouses. They are intriguing. Agree?

Photo 5– A popular tourist attraction in the Lewes, Delaware area is the Overfalls Lightship and museum. Jim Stormer, W3TL, is vice-president of the museum.

The ARLHS

The Amateur Radio LightHouse Society was founded by Jim Weidner, K2JXW, in 1996 and has grown to over 1600 members worldwide today. Its purpose, or mission, is to promote awareness of the role amateur radio and lighthouses play in assisting and assuring safety at sea. It is also dedicated to preserving the heritage, history, and continuing existence of lighthouses and lightships, plus fostering friendship among radio amateurs worldwide.

The society offers a variety of impressive-looking certificates for confirming

Photo 6– The Ebeltoft Lightship, Fyrskib 21 is often active on the amateur radio bands with its own call—OZ7DAL.

QSOs with stations operating from lighthouse-related sites in all U.S. call areas, all (31) states with lighthouses, all continents, 25 countries, and more. The full story here is quite extensive and easily overflows available column space. Check <www.arlhs.com> or send a large SASE to ARLHS, 114 Woodbine Avenue, Merchantville, NJ 08109 for more details and/or an application blank for joining ARLHS. New members, incidentally, receive a neat "welcome package" that includes a fancy membership certificate with lifetime

Photo 7– One of the collectable "Little Lights" offered to pre-registered ARLHS QSO party entrants reporting a qualifying number of QSOs.

member number, embroidered ARLHS shoulder patch, plus other special goodies.

ARLHS also sponsors an annual Spring Lights QSO Party held during April, a Lighthouse Christmas Lights QSO party held during the week between Christmas and New Years, and this month's (August) extensive on-the-air events. Remember to check <www.arlhs.com> for the latest news on lighthouse/lightship lists, activations, contests, and more.

Across the Atlantic

Over in Scotland, the Ayr Amateur Radio Group has been sponsoring the International Lighthouse/Lightship Weekend on the third weekend in August since beginning as the region-

	160m	80m	40m	20m	15m	10m
SSB	1.970 MHz	3.970 MHz	7.270 MHz	14.270 MHz	21.370 MHz	28.370 MHz
CW	1.830 MHz	3.530 MHz	7.030 MHz	14.030 MHz	21.030 MHz	28.030 MHz

Table I– Popular HF ARLHS gathering frequencies. Activity is usually within ±20 kHz of frequencies shown.

al Northern Lighthouse Activity Weekend in 1995. This weekend coincides with International Lighthouse Day (third Sunday in August), established by the International Association of Lighthouse Keepers. The ARLHS events in the U.S. initially were scheduled to match up with the Congressionally-created National Lighthouse Weekend on the *first* weekend in August. Apparently, there had been some discussion early on about merging the two events, but neither group wanted to abandon its chosen weekend, so they agreed to disagree and ran separate events, leading to some confusion among hams as to which was which and when.

Competition and Confusion

Unfortunately, the confusion over the two separate events has been compounded this year, as the ARLHS has expanded from the first weekend in August to a full week (longer, actually, in order to include two full weekends), and renamed its activity as the International Lighthouse/Lightship Week … the same initials as the long-running Scottish-sponsored International Lighthouse/Lightship Weekend on the third weekend. In addition, both groups are using ILLW to identify their events and even have competing websites: <http://illw.net> is the website of the Ayr group (third weekend), while ARLHS is using <http://illw.org> as the website for its events.

The ARLHS-sponsored event is a combination QSO party, complete with awards and prizes for all preregistered entrants, and a concurrently running Special Event promotion for amateurs just interested in having fun or pursuing ARLHS certificates. The ILLW event sponsored by the Ayr group is a non-competitive fun activity only.

Full rules and guidelines for each previously mentioned activity are posted on the following websites:

• <http://illw.org> and <www.arlhs.com> (click on "ILLW") for the ARLHS-sponsored activities. Preregistration is suggested for either/both activities. A list of ARLHS-related frequencies is included in Table I.

• <http://illw.net> for details on the Ayr Amateur Radio Group's International Lighthouse/Lightship Weekend (August 15–16). No competition or prizes here, just fun.

Conclusion

We hope that the two lighthouse groups will work things out in a friendly manner so that as many hams as possible can enjoy these activities, whether they are setting up stations at or near lighthouses or trying to work them. Meanwhile, there's a potential bonanza of lighthouse/lightship stations on the air this month. Whether you're listening on the first, second, or third weekend, or sometime in between, there should be plenty of lighthouse stations out there to be worked.

That overflows available space for this month, and we trust you have found the discussion interesting and informative. We look forward to hearing and contacting you during the upcoming lighthouse activities.

73, Dave, K4TWJ

digital connection

BY DON ROTOLO,* N2IRZ

APRS Isn't Just Tracking

"APRS was never intended to be an end in itself," says Bob Bruninga, WB4APR. "It's just a tool to get data between amateur radio operators." As he reminded the crowd in the APRS forum at the 2009 Dayton Hamvention®, APRS stands for Automatic *Packet* Reporting System, not *Position*. Although it seems that vehicle position tracking is seen as the most common use for APRS these days, that's not what it's intended for, being merely one of the myriad of things you can do with it.

To quote Bob from his article at <http://aprs.org/APRS-tactical.html>:

> APRS is not about *vehicle tracking*. It is a single **information resource** channel where everything that is going on in ham radio in the surrounding area can be announced and updated in real time. It presents to the viewer on his APRS radio front panel *all that is happening* right now, where it is, and all the info he needs to participate, whether it is an event, happening, net, activity, announcement, future activity, or situation. The APRS channel is his one-stop look at everything that could be going on in the local area, and his one-stop place to post what he might be doing that might be of interest to others. APRS is not about GPS positions, it is about a situational map display of everything that is happening, and most of that is *objects* containing *info* on the activity and how to contact other operators.

Therefore, look at a real-time APRS map. What do you see? Vehicles, mostly, updating their GPS position as they move about, and relay stations announcing their availability. Hamfest two towns over? Club meeting tomorrow night? *Anything* about what's going on in the area? Nope, sorry . . . but it could be.

*P.O. Box 114, Park Ridge, NJ 07656
e-mail: <n2irz@cq-amateur-radio.com>

Bob Bruninga, WB4APR, explaining the universal text messaging concept during the APRS forum at the 2009 Dayton Hamvention®.

Web 2.0?

Where I work, we're finding ways to incorporate what's called "Web 2.0" into the way we do business. Social networking and information-sharing sites such as Facebook, YouTube, Twitter, and even Wikipedia and the whole genre of blogs (short for web log) bring about a new connectivity to society, where the information you want or need is right there for the asking, devices are interoperable, and user-centered design is the rule.

I read a lot of science fiction, and one common "ability"' that we all will have in the future is to call up any kind of information, on any subject, anywhere we happen to be, in an instant, usually on a computer embedded in our body and linked directly to the brain. Science fiction indeed, but imagine the power of being able to actually do that! Trivia contests would be trivial, and you would finally win an argument with your brother-in-law.

The point is that Web 2.0 is not a new internet, but a new way of using the communication path that already exists, where relevant information is more easily available and you participate in that information. This is how I interpret Bob's *vision* for APRS today, which is somewhat broader than what I heard him first present when he introduced APRS in Teaneck, New Jersey at the 11th ARRL Computer Networking Conference (CNC) back in 1992. APRS has been refined since then, adding more efficient methods *and descriptive* data types and capabilities to allow for a truly advanced vision of how APRS should be used.

The Vision

I don't toss around the word *vision* lightly. I'm going to try to explain the future of APRS and how it could be used to become *everything amateur radio for everyone*. I feel as though this could be the start of a new age, much like the introduction of FM repeaters or packet networks were to the amateur community—a radical new way to communicate. For this to work, though, I'll need you to use your imagination for a few minutes.

OK, first imagine that we have a variety of transceivers from cell-phone size to base rig, from several manufacturers, in a rainbow of different sizes, styles, capabilities, and price ranges. However, they all talk to the well-developed APRS network that covers almost anywhere we might be. Now imagine that every ham is an information source as well as an information consumer; not only can you gather information about the local area, but you can (and are expected to) supply it as well.

All of this certainly is possible with today's technology, but imagine that it's been built and is well-used by all hams.

If all this was in place, you would be able to drive around and be aware—really aware—of what is happening in the area. You could find info on local repeaters or from local hams. Club meetings, hamfests, and other current or future events would be "advertised" as you entered a service area. Assets of interest to hams would be made known, including facilities (including hospitals, police stations, libraries) and even people. Almost like having super-vision and super-hearing, you would be able to know all that is going on around you, wherever you are.

It's not just limited to a small local area, either. APRS supports a global callsign-to-callsign amateur radio messaging system able to send a short message, bulletin, or object to any ham, anywhere, with just a callsign. It's not built yet, but there is nothing technical in the way. It just needs someone to integrate the more than two dozen amateur radio text-messaging systems that are in use today.

OK, what would it be like to have those capabilities at your fingertips? Imagine if an emergency occurs. The nature and location of the emergency would propagate almost instantly, letting those who can help know the facts, and those who need help can find exactly what they need immediately.

You see a car crash, and you change your icon from "mobile car" to "emergency" and get highest priority on your communications. You type in a few lines of text as to the situation—"Auto accident, medical help needed"—while your GPS tells the location. The people monitoring for such things are alerted automatically, and the whole system responds in an instant. The ham with EMS training driving two blocks away diverts to the scene, as does a volunteer fireman out getting groceries, both arriving and helping several minutes before the local ambulance arrives. Their messages alert the hospital of what they can expect in a few minutes, and it all quickly swings into action.

Perhaps this is a bit overdramatic, but surely realistic. The point is that the APRS channel is a transport mechanism for information, "whether it is an event, happening, net, activity, announcement, future activity, or situation" (according to <aprs.org>). "The APRS channel is [a] one-stop look at everything that could be going on in the local area, and [a] one-stop place to post what [one] might be doing that might be of interest to others. APRS is not about GPS positions, it is about a situational map display of everything that is happening, and most of that is *objects* containing *info* on the activity and how to contact other operators."

It's Already Started

This does not mean that we all need to start carrying laptop computers around either. APRStt (APRS-touchtone) allows any radio that has a touch-tone keyboard to send APRS messages and speaks APRS information back to users. This is available today with no need for a specialized APRS radio. The TinyTrak4 from Byonics is the latest generation of a series of simple, robust, and low-cost two-way APRS devices, serving not only as an APRS tracker and display system, but as a digipeater as well. Similar devices include the RTRAK-LP all-in-one APRS tracker from RPC Electronics, and the Tracker2 from Argent Data Systems. Several commercial radios from the major manufacturers are APRS-ready. Information on all of these (and more) can be had with a Google search, as well as a visit to the APRS home page at <http://aprs.oprg>.

This entire concept—universal messaging and situational awareness—is explained on the web page <http://aprs.org/aprs-messaging.html>, but without having Bob, WB4APR, in front of you explaining it all, it doesn't come across quite as exciting. Visit the site anyway, since I believe that it's not too far in the future when the several communication paths that Bob mentions will be tied together. Think about the potential of that concept.

Appalachian Trail Golden Packet

While I'm on the subject of APRS, at about the time you will be reading this there will be an attempt to send the Appalachian Train Golden Packet. On

July 26, 2009, a group of radio amateurs will attempt to send an APRS packet the length of the Appalachian Trail between Springer Mountain, Georgia and Mt. Katahdin, Maine using 15 mountaintop packet relay stations. If you are near the Appalachian Trail, tune in to listen or stop by one of the relay sites to say hello. Most sites are drive-up, and there are only a few where you would need to hike in. Check for the latest at <http://aprs.org/at-golden-packet.html>.

I mentioned before the ARRL Computer Networking Conference, where I heard Bob, WB4APR, first present a paper on APRS. Over the years, the name of the conference has changed to the ARRL/TAPR Digital Communications Conference (DCC), but every one I've attended has been full of cool new information.

DCC 2009 in Chicago

This year the DCC will be held in Chicago, same as last year. It has been a tradition since the beginning to hold the DCC (the successor to the CNC) in a different location around the USA to permit as many hams as possible to attend, rotating the event around the country, sometimes on the east coast, sometimes west, or south, or in the Midwest. Because of the outstanding success of last year's conference in Chicago, it was decided to repeat the location, for several excellent reasons.

First, you have an experienced group of volunteers to provide the support—

TAPR board member, former QST *Digital columnist, APRS Forum moderator, and all-around nice guy, Stan Horzepa, WA1LOU.*

no reinventing the wheel this year. Second, you have the outstanding audio-visual setup, which brought rave reviews. Third, the A/V setup allowed for the entire DCC to be archived on high-quality video DVDs available at <http://arvideonews.com/dcc2008/>. I spoke briefly at Dayton in May this year with Gary Pearce, KN4AQ, of Amateur Radio Video News, who recorded the 2008 DCC and saw the quality of his production. All I can say is that it's the next best thing to being there. And if that's not enough, Chicago is one of the least expensive places to get to from almost anywhere.

With all that going for it, Steve Bible, N7HPR, told me that it was an easy decision to repeat the Chicago location.

Go to Chicago This Year

Every year I insert a blurb about the DCC, so here's this year's: If you can make your way to Chicago September 25–27, 2009, *do it*. If you're within a few hours' driving distance, it would be almost criminal to not attend. From farther away, I can understand that time or finances may not permit it, but if you can break away just for one long weekend, this would be the one event to attend.

Although the highlight of the event is the technical sessions, some of the best in the world, there is plenty for beginners as well, with a full track of introductory sessions planned. If you've been doing something in the digital world, write a paper and submit it (but hurry, the deadline is July 31). Full details on the conference, hotel, and even paper submissions can be found at <http://www.tapr.org/dcc.html>, but make your reservations now, before it's too late.

That's all for this month. Dayton was, as usual, insanely satisfying. There were fewer people selling truckloads of junk this year, and more selling some really nice equipment. Prices seemed lower than in other years, I guess a sign of the current economic situation. I sincerely hope that you and your family are doing well in this economic climate. Thankfully, the signs of improvement are already evident. Until next time,

73, Don, N2IRZ

What a fun group to be around at Dayton! At the CQ Communications booth, from left to right: Dick Ross, K2MGA, Publisher CQ Communications; Laura Smith, Esq., FCC Special Counsel for Amateur Enforcement (the position formerly held by Riley Hollingsworth, K4ZDH); Bill Cross W3TN, Staff member in the FCC's Mobility Division; Rich Moseson, W2VU, Editor CQ *magazine; and Edith Lennon, N2ZRW, Editor* Popular Communications *magazine.*

GB50ATG: 50 Years of Digital in the UK

The British Amateur Radio Teledata Grou, BARTG, is celebrating its 50th anniversary this year. As one of the oldest digital radio groups in the world—far older than even the venerable TAPR—it has earned the right to be proud of its history. In celebration, the group will be running a special contest, the BARTG Golden Jubilee Award: Earn 500 contact points and get a nice certificate. It runs from July 1, 2009 to June 30, 2010. Contact special event station GB50ATG for a quick 10 points and a special QSL card. Details at <http://www.bartg.org.uk/>, or just wait for more coverage in an upcoming "Awards" column in *CQ*.

More Small Talk and Easy Dinking

BY DAVE INGRAM,* K4TWJ

As most of you will surely agree, experimenting with simple fun projects and communicating with small, energy-efficient equipment keeps life in the QRP lane exciting. These low-cost pursuits are right in step with our slow economic times, and they also encourage a liberal amount of personal expression in expanding, modifying, and using conventional QRP items and/or circuits in various ways. That "doing more with less" philosophy is the focus of this month's column. I will offer some general thoughts and ideas as starting points and your creative ingenuity can take it from there. We will begin with a simple receive converter, but first I would like to share some good-times notes with "unconvinced on QRP" readers.

While recently running only 50 watts to a vertical antenna on 20 meters, I was delighted to contact Ali, A71BX, in faraway Qatar. Listening on frequency after our QSO, W2WC/QRP called him while running only 1 watt. No reply. W2WC called again. "QRZ" came the response. Again and with persistent CW accuracy in timing, speed, and frequency, W2WC/QRP called—and received a reply with an RST of 339.

A few days later, I noticed the good CW fist of W3IK on 30 meters and was quite surprised to learn he was running a Yaesu FT-817 at a scant 500 milliwatts of output power to an end-fed wire up 35 feet. This was not simply a matter of copying John's name, QTH, and signal report buried in the noise, friends. It was a good "solid copy contact." John said he had Worked All States running 500 milliwatts, operating QRPp was rekindling the fun and excitement of his first days in amateur radio, and the difference in signal strength between 5 watts and 500 milliwatts is less than most folks think. We could not agree more, John. Who needs a big rig when you can have a ball—inexpensively—with a small rig?

Simple but Effective Receivers

If there is a single receiver circuit that requires minuscule introduction to QRPers, it is the famous G3RJV "Sudden" receiver. This gem has been adapted to QRPme's "Sudden Storm," the MRX, the 49er's receive section, and a host of other QRP rigs. The "Sudden" (and its many offspring) utilize two ICs: an NE612 serving as a combination front-end mixer and local oscillator, and an LM-380 or LM-386 serving as an audio amplifier. It was typically set up for direct conversion. In that case, and referring to the MRX receiver in fig. 1, the incoming frequency range is set by the tuned circuit located between pin 1 and 2 of the NE612, and specific frequencies within that range are tuned in by a crystal warping circuit between pin 6 and ground. If those two frequencies are within 500 to 3000 Hz of one another (such as using a 7.040-MHz crystal at pin 6 and receiving signals between 7.037 and 7.043 MHz), the difference/output at pin 4 is audio in the range of zero to 3000 Hz. Likewise, shifting the (crystal generated) frequency at pin 6 tunes the NE612 a few kHz either side of 7.040 MHz. Now consider the following points:

The audio output at pin 4 of the NE612 does not dictate using an LM-380 or LM-386 exclusively; any good high-gain and low-noise audio amplifier will serve quite nicely. If your late-model automobile has an MP3 player input socket on one of its radio's pushbuttons (they are becoming common), a single NE612 "front end" mixer/local-oscillator circuit can quickly convert it into a handy QRP receiver. Mate it with a small loop-type antenna (wound with No. 26, 28, or 32 wire so it does not obstruct views), tape it to a side or rear window, and you are good to go—in high style.

Do you have a table-model AM/FM radio or stereo sitting idle? They too make convenient QRP monitors when mated with an NE612 mini-converter as previously described. You connect the converter's output—preferably with a simple RF filter added between pin 4 of the NE612 and the wiper/center terminal of the radio's volume control (fig. 2). Be sure to include a third 0.1 µF capacitor to block any radio-associated DC from reaching the NE612 converter circuit. You may also wish to include an SPDT switch at the volume control if background noise in the radio overrides the converter's output. Otherwise, the procedure is a

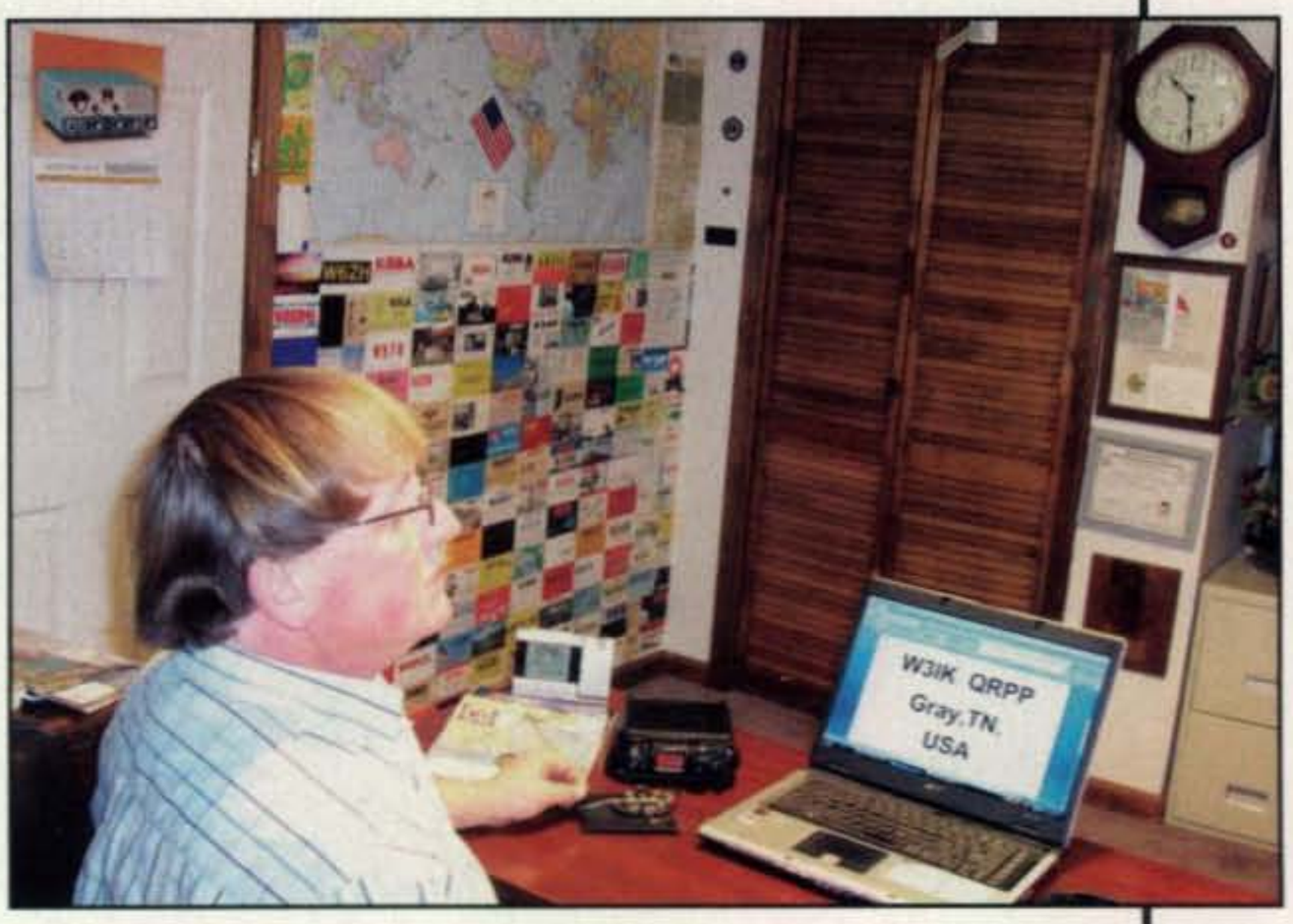


Photo A– While running only 500 milliwatts of power with a little Yaesu FT-817 and a 135-foot longwire antenna, John Kosmak, W3IK, Worked All States in a couple of months. Simple yet effective setups like this are affordable, quite enjoyable to use, and truly bring back the thrills of one's early days in amateur radio. (Photo via W3IK)

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>

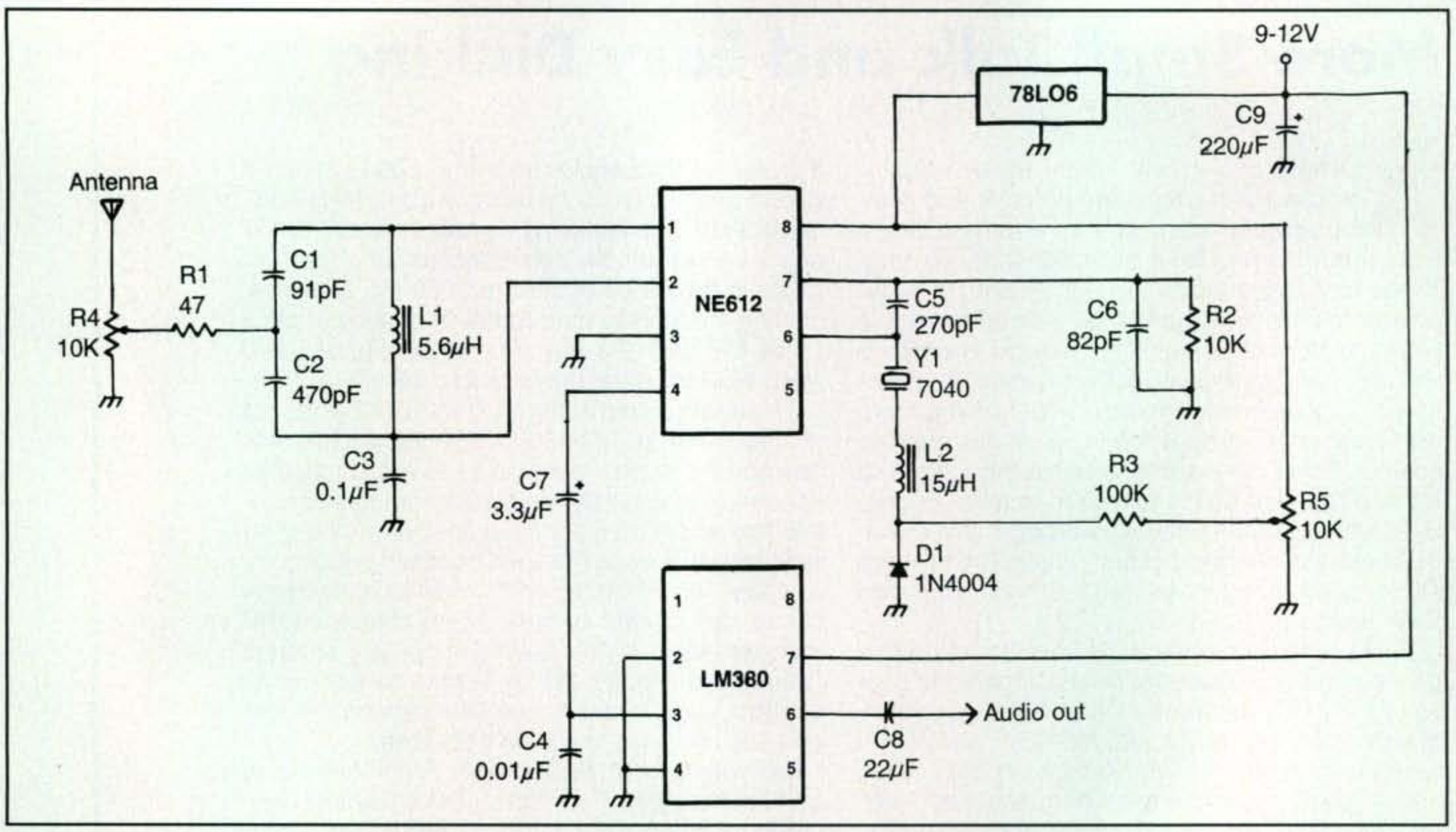


Fig. 1– Circuit diagram of the "MRX" receiver, which is a close offspring of the famous "Sudden" two-IC receiver. The text considers how an NE612 mixer/local oscillator section can be used as a converter and mated with almost any external audio amplifier.

snap—and it is a "terrific way to breathe new life into an unused radio.

If you would like to take the "NE612 converter and audio amplifier" idea a step further, consider slaving it with a homebrewed QRP transmitter to produce a mini-transceiver. Visualize the possibilities here, friends. You could put together a neat bedroom QRP rig disguised as a 1950s-style table-model radio. What a treat that would be! Need more guidance? Look back at fig. 1. If your QRP transmitter has a separate VFO/VXO/oscillator stage that can be set to run continuously, just couple a tiny amount of its output signal to pin 6 of the NE612. Disconnect the "top" wire of the crystal from pin 6 so the crystal, inductor, and VXO diode/varicap are disabled. Then the converter will track with the transmitter (assuming, naturally, that both units are set to work the same general frequency range).

This concept can also work in reverse. That is, you can connect the NE612 oscillator's output from pin 7 to the transmitter's crystal socket/input and then use the NE612's VXO circuit (crystal, inductor and diode/varicap) to simultaneously tune both units.

Another possibility warrants favorable mention at this point: using a passive mixer in lieu of the NE612 (fig. 3).

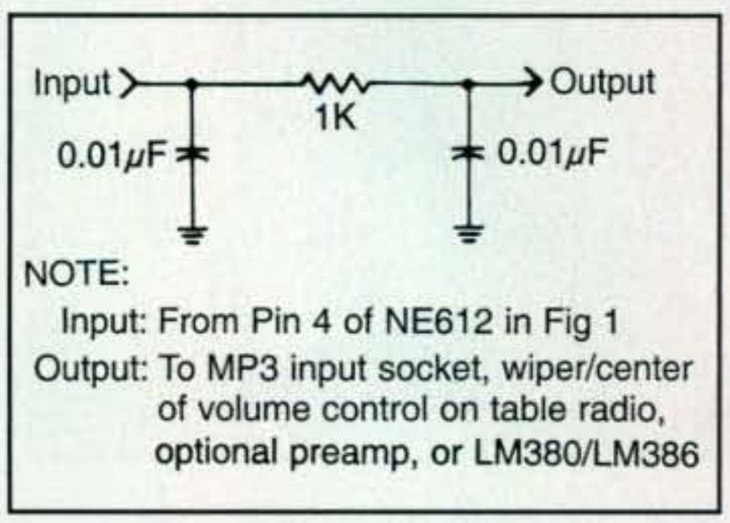


Fig. 2– A strictly basic and optional RF filter that may be included between output/pin 4 of NE612 and an audio amplifier as discussed in the text. Circuit compliments of QRP guru Rev. George Dobbs, G3RJV.

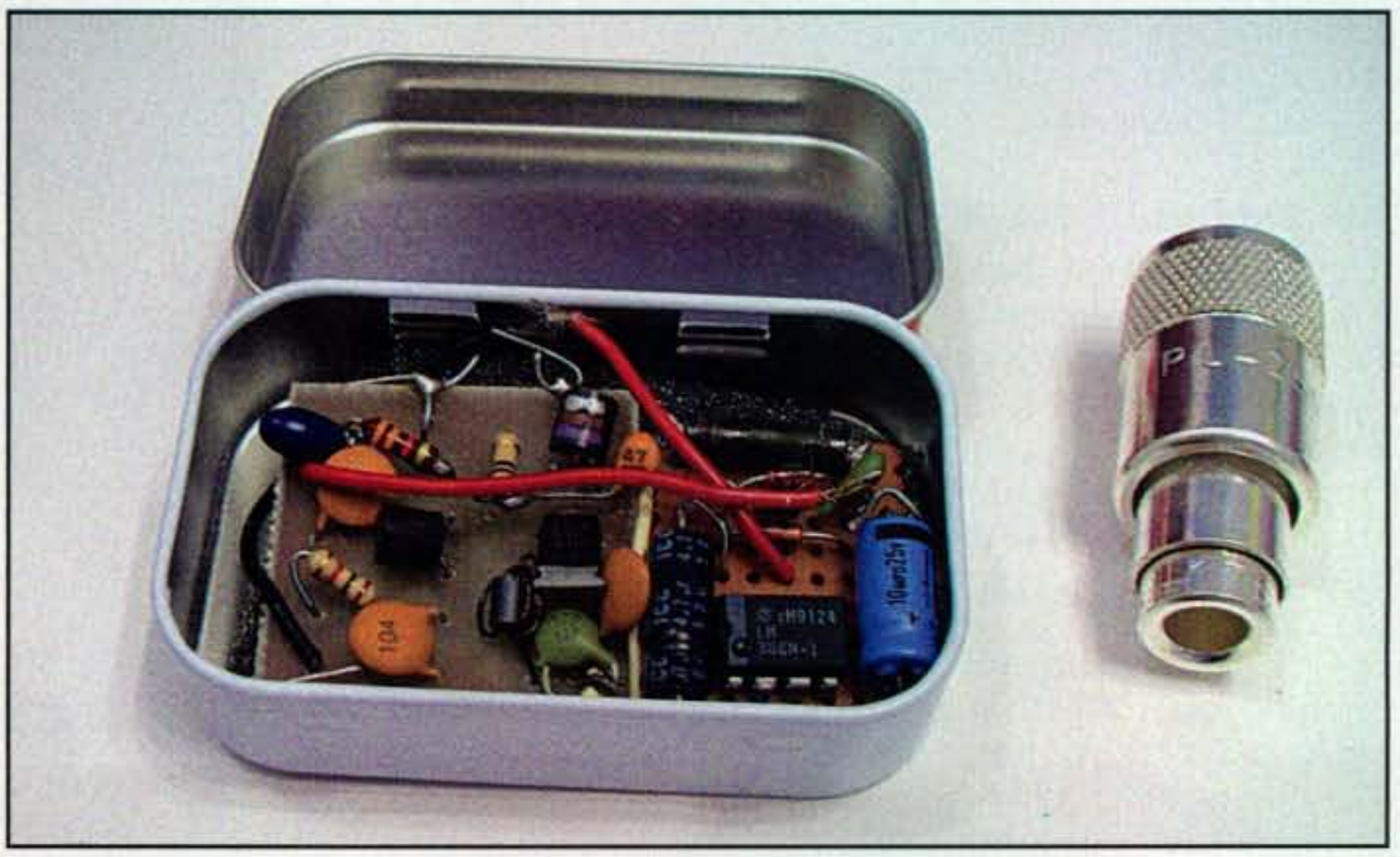
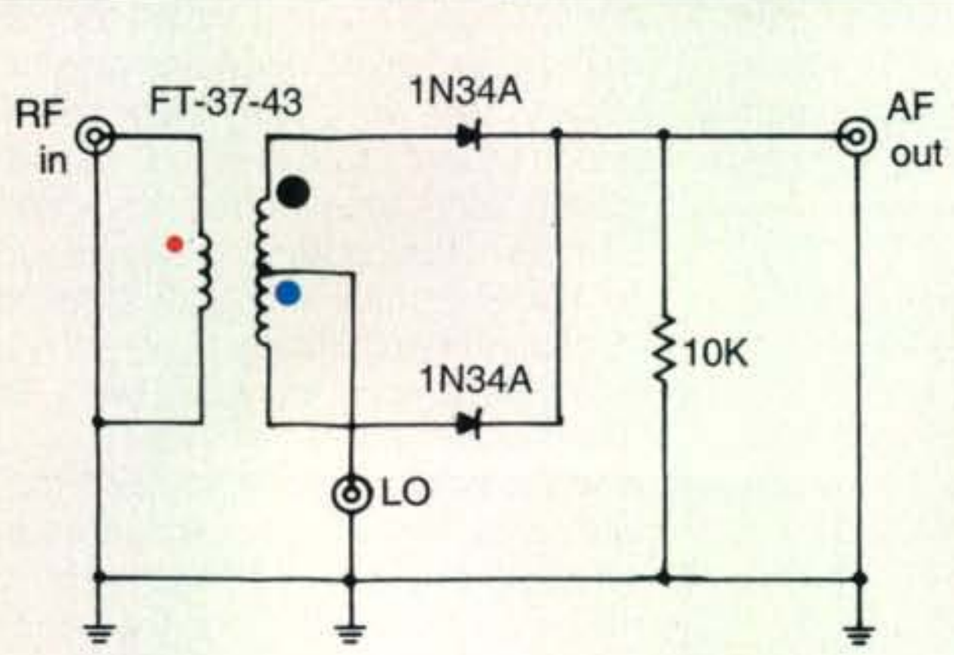


Photo B– My quick-brew mini-transceiver built around a Oner transmitter nestled in a 1.5 by 2.3 inch Altoids® "Tiny Tin." Receiver section (on perfboard) uses a basic diode mixer and LM-386 audio amp. It may not look like much, but it works, it is good for impromptu hamming, and it could prove a real asset during an emergency.



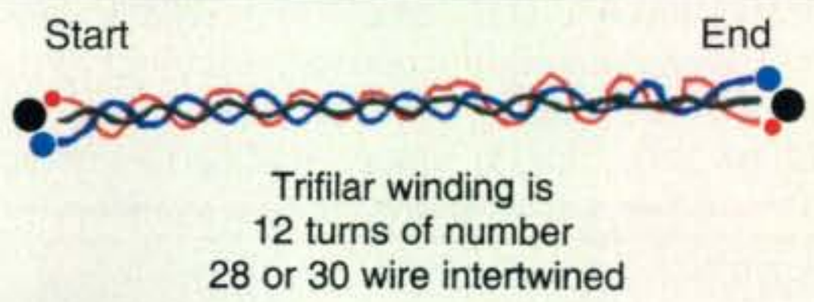


Fig. 3– A simple diode mixer circuit like this one devised by Rev. George Dobbs, G3RJV, may be used with a variety of low-noise and high-gain audio amplifier circuits to produce a small, energy-efficient receiver. The two circuits can also be combined with a simple two-transistor transmitter to produce a nice mini-transceiver. (Discussion in text.)

This mixer has the advantage of not requiring DC power for operation; it is very small and can even be fit into a key fob or pillbox. The tradeoff of using a passive mixer is less audio output (overcome by cranking up your associated audio amplifier's volume) and the need for an (externally-generated) local oscillator signal. A (two-stage) transmitter's crystal oscillator may be used here as previously described. Another good possibility is using my Hamfest Buddy—that wireless BFO/receive converter and QRPp transmitter described on <www.k4twj.blogspot.com> as a local oscillator. While almost any passive diode mixer circuit is a good candidate for this application, the one I highlighted in fig. 3 is compliments of our good friend and QRPer extraordinaire, Rev. George Dobbs, G3RJV. George, incidentally, wrote a couple of excellent books on Minimalist Radio and easy-brew rigs for beginners. You can e-mail him at <g3rjv@gqrp.com>.

Oner Reflections

Many of our readers will surely remember the neat little 1-inch-square, 1-watt output "Oner" transmitter kit designed by GM3OXX and offered for sale by the G-QRP Club a few years ago. The transmitter was comprised of a ZTX651 NPN transistor (similar to a 2N2222) driving a VN10KM MOSFET keyed by a ZTX751 PNP transistor (and I understand Radio Shack has generic equivalents of all three items today).

I wanted to expand my Oner into a car-key-size mini transceiver, so I began dinking. I devised a super-simple diode mixer comprised of a 1N34 Germanium diode plus 10K-ohm load resistor followed by a simple two-capacitor and one-resistor RF filter and an LM-380 audio amplifier circuit (fig. 4). The Oner needed an output filter, so I found

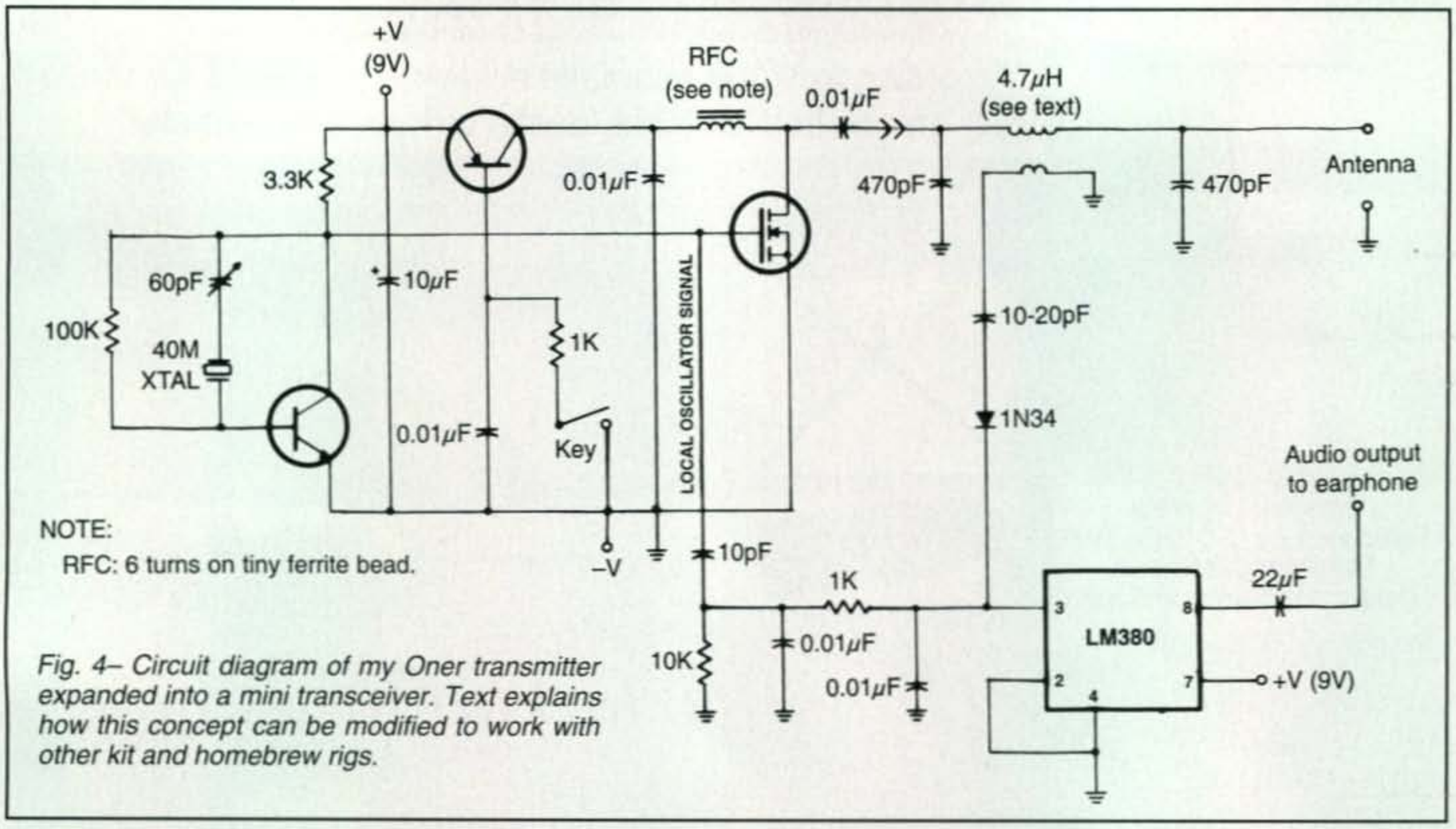


Fig. 4– Circuit diagram of my Oner transmitter expanded into a mini transceiver. Text explains how this concept can be modified to work with other kit and homebrew rigs.

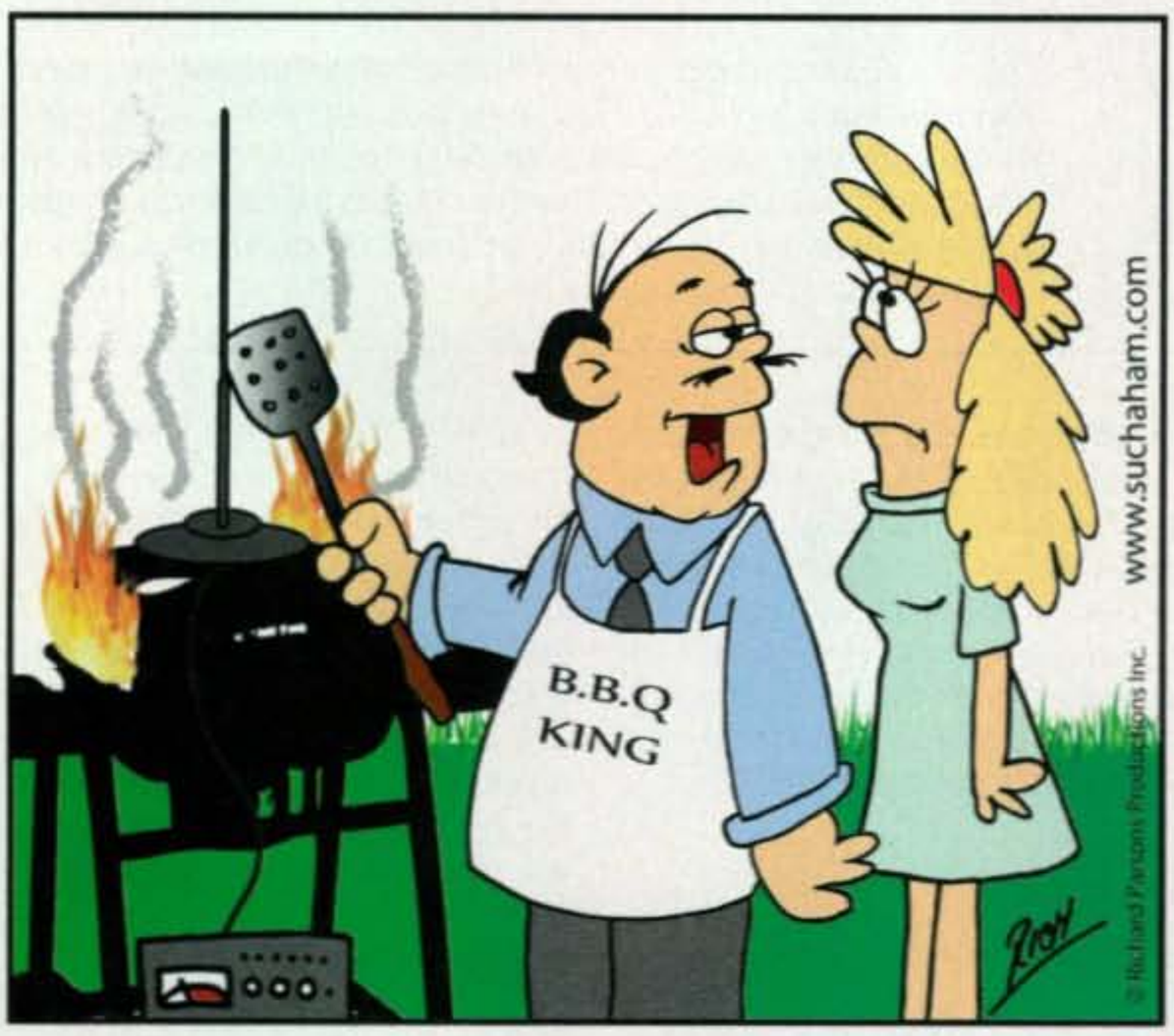
an unshielded 4.7-microHenry inductor and mated it with a pair of 470-pF capacitors. I wound three turns of hair-thin wire over the inductor to sample incoming signals and couple them to the 1N34 diode via a 10-pF capacitor. I also added a pair of back-to-back wired 1N914 diodes for T/R switching, but later realized they were unnecessary because I was powering the mini-rig from a 9-volt battery and output was only around 300 milliwatts. A local oscillator signal for the mixer was tapped off the Oner's oscillator transistor and directed to the diode mixer with another 10-pF capacitor. The overall arrangement was ridiculously simple (it was a one-night project and I was in a hurry), but it worked—and it proved a handy pocket rig until upstaged by my previously mentioned Hamfest Buddy mounted in a key-fob pillbox.

Now let's add more "dink notes" to the previous discussion. Although I built my mini transceiver around a Oner, almost any two-transistor transmitter that has a continuously running oscillator (or can be modified so its oscillator runs continuously) will work fine. Stay below two watts output, however, or use a T/R switch rather than diodes. You can tap a sample of the oscillator's signal with a 5- or 10-pF capacitor or with a "gimmick" capacitor made simply by wrapping two or three turns of insulated wire around the collector's wire—or the (1N34) diode mixer's output wire. The RF filter consisting of two .01-μF capacitors and a 1K-ohm resistor between the 1N34 mixer (and its 10K-ohm load resistor) and the LM-386 audio amplifier stage is nice, but not mandatory. Add or exclude it as your time/parts bin dictates. If you wish to go fancy, consider including a basic 2N2222 audio preamp stage between the filter and LM-386—and yes, an LM-380 stage could be substituted if pinouts were changed accordingly.

We could continue with more "mix and match" circuit discussions (they are both endless and fascinating), but we have overflowed column space and must now bow out rather quickly. Hopefully, this month's discussion gave you some useful ideas in "build it your way" rig design and kindled your "drive to dink"—and that is half the fun of QRP. Enjoy!

73, Dave, K4TWJ

SUCH A HAM



This grill makes a terrific ground plane.

BY JEFF REINHARDT,* AA6JR

Generating a Big Signal on a Limited Budget

Twice a week I invest in what I call "the six-digit retirement plan." Others call it the state lottery. While my dreams of wealth have not yet come true, I've taken a somewhat twisted path to riches. I may get a million dollars from the lottery by winning that cash a dollar at a time. Of course, my investment to get that return will at best meet, or most likely exceed, the winnings. Oh well, back to work!

The economy has dealt us a difficult poker hand. Maybe we can't go out and purchase a brand-new vehicle and stuff it with equally brand-new radios. While it may be nice to dream of what to do with those lottery winnings or that big poker pot, we still have the means to enjoy ham radio with a limited budget. Best of all, there's no limit to the fun or adventures you can have even with a low-cost mobile setup in a 10-year-old vehicle. One of the exciting features of ham radio is that the airwaves are a great equalizer. Like Kenny Rogers sang in *The Gambler,* "Every hand's a winner…" So let's start winning!

An economy car with a six-figure odometer can put out a great big signal on just about any band,

*5904 Lake Lindero Drive, Agoura Hills, CA 91301
e-mail: <aa6jr@cq-amateur-radio.com>

Photo A– N9YK puts out a big signal from a compact truck. Not real fancy but very effective!

Photo B– The "office" of N9YK's rig.

and remember, you have the mobility to go mountain-topping or drive right up to the edge of some body of water that will give your signals a great "launch pad." A used multi-band radio can be put to good use, along with some connecting wire and a decent antenna. I love those low-cost "stick" type antennas that can put out a good signal at a very reasonable price.

VHF and UHF enthusiasts aren't left out when it comes to mobile pleasure. A used HT is easy to connect to a cigarette-lighter power source; add a rooftop magnetic-mount antenna, and in less time than it takes to read this article your signal will be finding its way to repeaters just the same as that of anyone else.

Here's one more secret: Once you're on the air, your signal sounds like it could be coming from the newest European autobahn-burner and a hand-made six-figure radio, not that any of that matters. What's important is that the airwaves are a great playground where new friends await and you can meet them with a minimal investment.

Truckin'

Steve, N9YK, dropped a note to share some photos of his pickup truck that's ready for just about anything:

The vehicle is a 2000 Ford Ranger (photo A). The 2-meter transceiver is an ICOM 2100 mounted under the dash with a Larsen 5/8-wave antenna mount at the rear of the hood on a trunklid mount. The Yaesu FT-897D with LDG meter is mounted to the floor with a bracket made from 1.5-inch aluminum stock and connected to a Yaesu ATAS 100 with a Diamond Mount on the left rear door. The LDG meter is attached with ["hook-and-loop" fasteners] to the top of the FT-897D

Photo C– AD6AF shows you don't have to spend a lot to have a signal that sounds like a million dollars on the air! (Note the Folgers' rig mount; see text)

(photo B). I run ground straps from door to body, body to frame. I also have a Comet mag-mount on the roof for the FT-897D for 2 meters until I pickup a duplexer for the ATAS 100. The power for both transceivers is run directly to the battery with fused 10-gauge wire. I have Anderson PowerPole® connectors inline at the FT-897D so it can be removed very easily. All the coax is run behind trim panels. The setup wasn't very hard to install for me, as I am a Ford Senior Master Technician. My farthest QSO while mobile has been S48N in Slovenia on 20 meters with a 59 report.

Super report, Steve, and thanks for the quality photos. You get extra points for the Skywarn sticker on the truck as well. Now as far as being a Ford Senior Master Tech, do you make "house calls" to California?

The Minimalist

Right on time to illustrate the "less is more" position in mobiling comes Ray, AD6AF. Maybe Ray never thought I'd run his photo (photo C), but I give it a "10" for how it illustrates the point that mobiling doesn't require a big investment. His well-worn Chevy may have holes in the carpet, but I'll bet the signal it put out was full quieting into the repeater.

The photo shows my Kenwood TH-77A being used as a mobile rig. As is often the case with new hams, the HT served multiple roles.

Mine was my mobile, base, and occasionally even served as an HT as well! I cut a plastic lid from a Folgers' instant-coffee jar to slide the HT into the lid (sort of a combination of "instant" and "homebrewed" —grin), and then the lid would sit on the cross bar of the cup holder holding the radio where I could easily see the display and keep it from roaming around the vehicle. While I never had to collision-test the arrangement (thankfully), it did resolve many of the concerns encountered when operating HT mobile. I used the speaker mic so I would be holding something I would not hesitate to drop in an emergency (as might be the case if you were hold an expensive radio in your hand; I consider the speaker mic a must for safe operation while driving). The cup-holder arrangement kept the radio from migrating

Photo D– KØHL's pickup hauls around a LOT of signal.

Photo E– Phone or CW, KØHL can work the world. Note the well-constructed arm rest, and even with a lot of gear aboard, all the equipment is clear of the airbag deployment zones.

around the vehicle (my HT slid off the seat next to me a couple of times before I learned that lesson), it was positioned high enough on the dashboard so I could glance at the display without looking away from what was happening on the road, it was near a cigarette-lighter plug to supply power, and I had a trunk-lip-mounted antenna to get the RF outside the vehicle and improve reception (I sometimes operate with an HT and a magnet-mount antenna when visiting family out of state and riding in their vehicle). I use the Kenwood SMC-33 speaker mic, as it has programmable buttons allowing me to do frequently used adjustments without needing to touch the (small) buttons on the HT—much safer that way.

If you use this photo, it would provide a good excuse to address the various safely issues encountered when operating mobile using an HT.

I no longer have that particular vehicle, I have a real mobile rig now, and I have come a long way since I was a No Code Technician.

It's a great story, Ray. Thanks for sharing. I hope your first contact with the Folgers' mount was with Mrs. Olsen. (It would only seem right.)

Photo F– How many "right" things do you see in this photo? From the sturdy mount, ground straps, toroids, the carefully wound choke, and more, it should be no surprise when you hear a big signal coming from KØHL mobile!

Taking It to the Limit

At the other end of the spectrum is Ken, KØHL, with a rig that looks like it can warm the plains of North Dakota in January. Ken's Chevy pickup (photo D) provides a home for a setup any ham would be proud to operate. He sent over a dozen photos illustrating the detail devoted to his rig (among them, photo photo E). Unfortunately, space limitations keep me from sharing all of them, but suffice to say, Ken put a lot of time into creating solid mounts for his gear, especially the antennas (photo F), and he didn't hold back on tying everything together with ground braid, a most important element for successful mobile HF operations. Ken works a lot of CW, and from the look of his "shack," I'm guessing if he can hear 'em, he can work 'em.

Many thanks to this month's contributors for sharing their stories and the photos that go along with them. Please consider sending photos of your mobile setup, along with tips and tricks that make your mobile operations a success.

We'll wrap up this visit with the friendly advice to spend time planning and carefully installing your mobile to be safe, secure, and easy to operate.

Happy mobiling! 73, Jeff, AA6JR

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Uninstalling a Radio

There are many articles on installing a ham rig and antenna on a vehicle, but I have never seen anything on "uninstalling," or removing, a radio from a vehicle. At first this seemed to be a strange topic, but after seeing a friend go through a rushed, seemingly painful in-the-dealer-parking-lot hack job to remove various radios from his old truck, I decided this might not be a bad topic after all. Furthermore, the techniques presented here will allow you to re-use as many items as possible, such as the mobile antenna, the inter-connecting cables, and even the old radio, so you can save money when switching to a new vehicle.

Recently I had to get a new vehicle, and I decided to document some of the things I did in order to uninstall the radios in my old car. I had three mobile rigs and four antennas installed in my 1998 Honda Prelude.

Just like any construction—or in this case deconstruction—project, the proper tools and materials are important in order to do a good job. Some of these tools are shown in photo 1. Perhaps one of the most useful tools for radio installing or uninstalling are the plastic tire levers used to remove bicycle tires from their rims. This is a very handy and gentle tool to use when prying plastic and rubber trim and gasket parts from vehicle interiors.

*16428 Camino Canada Lane, Huntington Beach, CA 92649
e-mail: <kh6wz@cq-amateur-radio.com>

Removing Radios and Wires

Unfortunately I do not have a picture of my rig installed in the dash board, but I do have a picture of the hole where the radio used to be (see photo 2). When the rig was installed, the small plastic pocket was removed and saved rather than disposed of. The power cable went into and under the dash board, then under the carpet, and finally plugged into a small RigRunner DC power distribution unit under the driver's seat.

This radio unmounted easily, since it was held in place with servo tape, a kind of double-stick foam tape used by radio-control model builders.

Photo 2– The mobile radio was un-installed from the dashboard where a plastic pocket used to be. The radio came out easily because it was held in place with black paper mache and radio-control modeler's servo tape.

Photo 1– Tools for uninstalling a radio system are the same as those for installing a radio system. The strange-looking green objects on the left side of this photo are plastic bicycle-tire levers. Read the text to learn how to use them on your car or truck. (Photos by the author)

Photo 3– Radio, what radio? The original plastic pocket in the dash board was pressed back into place.

Photo 4– Plastic trim pieces were pried away from their fasteners using the tire levers and the wires were pulled out.

The plastic pocket went back into the original dashboard location, so no one can tell there used to be a two-way radio installed there (photo 3).

The antenna cable snaked its way from the passenger side front and to the antenna mounted on the hood, near the windshield.

Since the cable went through the firewall via an existing grommet-lined hole with an existing wiring harness, it would be difficult to pull the antenna cable out without damaging the automotive wiring. In addition, when I installed the rig I thought it would be a good idea to weatherproof the rubber boot, so I sealed the penetration on the engine compartment side with some silicone adhesive. This may not have been a good idea, because it made it very difficult to remove the antenna coax from this hole.

I decided to carefully cut the wires on the interior side of the firewall, and used some plastic cable ties to neatly stow the wires underneath the plastic trim and carpeting. I also had to remove a dual-band radio with a remote-mounted front panel. The main unit was installed under the driver's seat and the front panel was mounted just above the rear-view mirror. The control wires went under the plastic trim panels. Using the tire levers, the plastic trim pieces were carefully but forcefully pulled away from their mounting fasteners and the wires were removed (photo 4).

Power cables were removed next. However, before cutting or removing anything, it is always best to check the vehicle's owner's manual for any precautions when removing the battery. In my old car disconnecting the battery does two things:

First, it resets the microprocessor (the On-Board Diagnostic System, or ODB-II), and here in California, a smog check is needed before transfer of ownership. Disconnecting power and resetting the ODB computer indicates a "violation" of the smog equipment. The computer memory must be reset with data before the smog check is completed, and this means several minutes of engine run-time to fix, which may be an additional cost for getting the smog certificate.

Second, the car stereo has an anti-theft feature that renders the unit inoperable when power is removed. In order to

Photo 5– There were two antennas mounted on the trunk lid.

Photo 6– A package of plugs next to an NMO hole on the trunk lid.

restore stereo functionality, a numeric code must be entered into the unit when the power is reapplied. The radio station memory is also reset, so someone will have to reprogram those favorite broadcast stations.

With these precautions in mind, I unhooked the battery ground cable. Interestingly, almost all automotive service and maintenance books I have read advise you to disconnect the negative battery cable when working on the electrical system. I wondered why not the positive (red) wire and decided to check into this.

The Red Wire or the Black Wire?

I typed "why remove negative terminal on car?" into the Google search engine. There are 194,000 results in English about this topic. Many of these information sources are car-related chat rooms or bulletin boards, and it seems almost equally split between removing the positive wire or the ground wire when working on a vehicle. There are also many weird and strange entries that make no sense at all.

However, the *Popular Mechanics Complete Car Care Manual* says to always remove the negative terminal and explains that if you disconnect the negative wire and touch something grounded, such as the car body, nothing happens. However, if the ground is still connected to the battery and

Photo 7– The bare trunk lid and the antenna-hole plugs installed.

Photo 8– It might be a good idea to have a magnet-mount antenna on hand so you can get back on the air quickly.

you are working on the "positive side" of the electrical system and touch any metal, the tool will conduct several hundred amps of current, which will produce sparks and has enough power to weld metal. I am not sure if this is true, and quite honestly I have not tested this. However, I have always removed only the battery ground lead when I work on vehicle electrical systems. To be extra safe, maybe it would be best to disconnect both the ground wire and then the positive wire from the battery.

Getting Back to Work. . .

Since the radio power cord is a high-current line directly from the battery, it presents a potential hazard. There are at least three "clean" ways to remove old power cables from the battery:

The first way is to completely remove the wires from the vehicle.

The second way is to disconnect the cable from the battery terminal and carefully cut it where it enters the firewall and again as it enters the vehicle interior, leaving only a scrap section of wire between the engine compartment and the interior. This way the rubber grommet will retain its weather or moisture resistance under the hood.

The third and less preferred option would be to cut the wire off at the battery, leaving the rest of the wires in place but hidden from view.

It would never be acceptable to leave the wires in place with the battery connected.

Vehicle Exterior

Now the antenna and coax were removed. I had two 3/4-inch Larsen NMO mounts installed on the rear trunk lid, as you can see in photo 5. I decided to remove the mounts and the coax from the car, rather than leaving the antennas on the vehicle. Besides, I wanted to re-use the antennas and save some money.

I purchased a package of plugs at my local ham radio dealership to cover the holes after antenna removal (photo 6). I decided to add some black silicon sealant to the rubber plugs on the inside of the trunk lid to provide some additional weather-proofing. The "cleaned" trunk lid is shown in photo 7.

Since I wanted to get back on the air as quickly as possible, I used a magnet-mount antenna for temporary mobile operation use. The magnet-mount antenna will also come in handy for an almost instant installation when the new vehicle arrives (see photo 8).

Speaking of the new vehicle, we are about to come to a full circle, from uninstalling a radio and antenna system from one vehicle and installing a system in another vehicle (photo 9). This temporary station will come in handy, and can be put on the air without too much delay. The temporary setup will function until there is enough spare time to perform a final and permanent installation in the new vehicle.

Although this story focused on some ideas for uninstalling a radio, some of these hints can be used when installing a rig into a new vehicle. For example, one of the things I will do on my next car installation is to eliminate the silicone sealant under the hood, since it never got wet and eliminating the sticky goop will simplify the uninstallation when the time comes to replace the vehicle.

73, Wayne, KH6WZ

Reference

Popular Mechanics Complete Car Care Manual, by the editors of *Popular Mechanics*, ISBN-10: 1588167232

Photo 9– The old radio can be mounted on some sort of carrying platform for temporary use in the new vehicle. This "system" can also be used as a back-up station in any vehicle during an emergency.

BY JOE LYNCH,* N6CL

June VHF Contest and Digital TV Changeover

By an odd coincidence, the end of analog television occurred the day before the ARRL June VHF Contest. As a result of the convergence of these two events, several operators got on the air to find that both propagation conditions and RF interference cooperated to make for very good operating conditions. What follows are a number of stories that were posted on both the VHF and the FFMA reflectors.

Jacob Tennant, K8JWT, wrote:

My contesting effort was in no way spectacular but the 6-meter opening on Saturday evening was a pretty awesome boost to getting me moving to get ready for September's contest.

I only made about 30 QSOs, mainly on 6 meters but had a few 2 meters and two on 70 cm, both with semi-local stations. The big fun as I mentioned above was the 6 meter opening from Saturday night, as I made a bunch of contacts towards the Gulf Coast area with only 100 watts and a beat-up old MFJ 3-element beam at 12 feet, especially when my first 6-meter contact was EL96!

With wallet in hand, I have already started to plan out my activities for the CQ VHF, ARRL UHF, and ARRL September VHF contests.

Jay Morehouse, W9RM, wrote: "One big plus is that the Channel 2 audio spur from WBBM Chicago that used to trash the WSJT meteor scatter calling frequency on 6 meters (50.260 MHz) is gone!"

Bob Vaughan, KC6SXC, wrote:

W6YX operated from the club station in CM87wj, operating multi-op on 50, 144, 223 FM, 432, 927 FM, and 1.2. I operated on Saturday until ~2100 PDT, and then again on Sunday from 1100–2000 PDT. I was joined for several hours on Saturday by KG6NUB. W1VSL joined us for an hour or so to gain some contest experience.

We made 234 QSOs in 62 grids, for 19468 points. We are limited on 223 MHz FM with an old Midland crystal rig at 10 watts and a J-pole antenna. On 927 MHz we were running a converted Motorola Spectra at 35 watts, to 10 elements vertically polarized. Highlights: DM03, DM14 on 432 MHz; CM89 on 927 MHz FM (150 miles); CN80, CN90; and DM12 on 144 MHz. We also saw quite a bit of 6-meter activity to DM5x/6x/7x on Saturday afternoon. Also worked D041 in the early afternoon, but none of the multi-hop openings that we saw last year.

Matt Clauson, NØQXW, wrote:

Wow. My first time playing with 6 meters, and I can see why people say she's a fickle band. While on Saturday the bottom pretty much fell out (for a total of 5 contacts over about 10 hours of operating), I racked up 51 in about the same time, minus about an hour for cattle herding. Six dropped out about 2204 UTC, and never really returned, even though I called CQ until the very end.

Grids lit: DN55/56/57/66/67. I can light up those last four just running back and forth along about a 30-mile route, and I plan to do it again. Lots of fun.

Equipment: Yaesu FT-897, driving 50 watts to a RadioShack 5/8-wave 2-meter mag-mount. For such a "marginal" antenna, it did remarkably well ... especially with the fact I hadn't tuned it for 6 meters. I just grabbed it from the parts pile and slapped it on the car. When the radio reported almost flat SWR wherever I was transmitting, I couldn't believe it. But you know what they say about gift horses.

Wait a moment, did I say cattle herding? You betcha. I came across cattle near or on the highway at least twice during my circuits up there. My thanks to K2DRH for interrupting his run on 6 meters to relay a call to the Montana Highway Patrol for me. Luckily, everything turned out fine. With the assistance of a local rancher, we were able to herd the wayward critters back to the right side of the fence.

The funny part, however, is that the same situation recurred about 15 miles farther east, and 90 minutes later! The things that happen to me during contests, I swear.

All in all, for my first VHF contest and my first time really operating 6 meters, I am well impressed. I'm hoping to be able to put some of that talent to use during Field Day in a couple of weeks. Assuming the band holds out well in the fall, I'll probably go roving again then, too.

Al Goss, K2ERG (FN13fd), wrote:

At my location, I live in the NE part of the city. Channel 13 (TX is SW part of city) always wiped 45–60 degrees of bandwidth with a Mil 2-pole bandpass filter and low-gain pre-amp. Now today was the first time I took time to check (spent very little weekend time on 222 MHz or any other band). When I use the RF Concepts internal pre-amp there is a slight increase to S2 on the IC-375A with antenna toward TV station SW across the city. Who knows what is causing it now that Channel 13 is not wiping out my RX.

I installed an ARR high-gain GaAsFET pre-amp. The noise was S2 at most with bandpass filter; less bandpass filter S9 plus and approximately 20 degrees only bothered. Nice! Will run low-gain pre-amp, no bandpass filter, and for serious operating bandpass filter and high-gain pre-amp.

So, back to "building" GS36B/4CX400A or such 350-400W PA. I am hoping to work a few grids SW that I

VHF Plus Calendar

Aug. 1–2	ARRL UHF and Above Contest
Aug. 2	Very poor EME conditions
Aug. 4	Moon apogee
Aug. 6	Full Moon
Aug. 6	Lunar eclipse
Aug. 9	Moderate EME conditions
Aug. 12	*Perseids* meteor shower
Aug. 15–16	ARRL 10 GHz and Above Contest
Cumulative	
Aug. 16	Poor EME conditions
Aug. 19	Moon perigee
Aug. 20	New Moon
Aug. 23	Good EME conditions
Aug. 27	Moon first quarter
Aug. 30	Very poor EME conditions
Aug. 31	Moon apogee

—EME conditions courtesy W5LUU

e-mail: <n6cl@sbcglobal.net>

have never been able to do except via AU. Nice! It gives me encouragement for 1.25 meters again.

Still another new problem on 70 cm: Approximately 1800 local time on Sunday for approximately 3 hours I had 360-degree coverage of whining, pulsing, S9 level, multi-tone "something" that wiped Rovers and fixed stations nearby Rochester and even reported across the Lake Ontario in Canada. Similar sounding to PLL gone crazy and shut me down. I was unable to run the band at all, even locals during this period. Possibly PAVE PAWS radar. I don't know. I am still awaiting reports from others who heard it from WNY to southern Canada. Hope it is not some digi TV station gone berserk, heh heh. Doubtful. I have been listening all day and nil heard. Did somebody drop a 70-cm multi-vibrator near Rochester?

I got a late start in the contest this weekend, but overall I would give this weekend a good rating from a historical perspective.

Dave Bernhardt, N7DB (CN85uj), wrote:

Saturday was ho hum in the early part of the contest. Local reports of MS [meteor scatter] type contacts into VE5 and VE6. I could see a lot of activity in the eastern half of the country on 6 meters. Activity did pick up to the SW part of the country later on in the day for us. NM, AZ, CA were the main areas of activity. Not super strong signals, but adequate for a lot of QSOs.

Sunday, again not super-strong signals but 6 was open to many parts of the country. Somewhat spotty, but for the operator who kept tuning around, there were a lot of grids to be picked up . . .

Solar activity continues to be very low right now. I think this minimum period is providing a chance to see some unusual propagation modes/paths that we would not normally see due to higher solar radiation levels.

FYI: I did get a report of EU on 6 into the PNW this weekend that I need to follow up on. I did note 2-meter sporadic-*E* in EU Monday, interesting development. I did see a post Monday morning of a QSO from DN03 to EA on 10 meters with "strong signal" levels that might also signal a path in that direction for us on 6 meters.

Paul Kelley, N1BUG (FN55mf), wrote:

Wow! What a fun contest! This was the first time I had done any contesting on 6 meters with high power. I'm not much of a VHF contester really. Rather, I am more of an avid CW and weak-signal operator who is more than happy to take advantage of contest activity to have some major fun.

I love "running" stations on CW. Since I'm not sought-after DX, contests provide the primary opportunity to do that. I spent as much time as possible running 'em on CW during the single-hop *Es* Saturday. I knew I was doomed when shortly after I started my run the cat vacated the territory! When the shack temperature reached 110 degrees and I was gasping for air like a fish out of water it was time to reluctantly quit for a while. When this space had cooled sufficiently to re-enter it, my next move was to install the A/C in the shack window! It has been so cold this spring there hadn't been any need. ... until I started running CW with the 4CX1500B in a small, poorly ventilated space. Whew! Actually I'm very glad I had occasion to discover this "before" the first big Europe opening of the *Es* season! I would have been *seriously* bummed to have to take a break during one of those!

Sunday morning was typical, a lot of scatter and some marginal *Es* to the southeastern states. Then it occurred to me that I hadn't tried calling CQ on CW under these conditions. Since for the first time I had high power I figured it would be worth a try. I had no idea it was going to be so exciting! The stations who called on tropo were mostly very weak but workable. That was fine with me since I thoroughly enjoy weak-signal CW work. Then I started getting 3's, 8's, 9's, and VE3's on what I presume to have been ionospheric forward scatter. Signals were weak to very weak, peaked on a direct bearing, and exhibited mild to moderate flutter effect. This usually required repeating calls and grids 3 or 4 times, but contacts came easily. That was something I hadn't been able to experience with low to moderate power in the past, and it was great fun! I hope this is a fairly typical occurrence and not an isolated event that won't soon repeat.

Steve Rutledge, N4JQQ (EM55), wrote:

We have VHF channels 3, 5, 13 here in Memphis. VHF 3 went away, to UHF. Channels 5 and 13 remain transmitting a digital signal. I used to have incredible noise when pointed east towards the Channel 13 transmitter on 222. It is gone! In the past, it wiped out any signal from the east. I even had a bandpass filter at the tower top, ahead of my SSB preamp. It helped a little but not enough.

It appears that 6 meters might be a little quieter but I'm not sure about that one yet. Six meters has so much stuff on it anyway so it is hard to tell. Two meters is just as noisy as ever. The 70-cm band remains *very* quiet, which is unchanged. I'm using long boom antennas, hardline, and SSB preamps on all bands except 6 meters, which has no preamp.

Finally, thanks to whoever worked me in the contest. There was a great opening on 6 meters on Saturday. Not bad on Sunday either but it died early.

Jordan Arndt, VE6ZT, wrote: "Believe it or not, I can see the difference up here in DO-21, especially when the band is open."

Ray Grenier, K9KHW, wrote:

I'm located about 4.5 miles from a forest of VHF (Ch. 4, 6, and 12) and UHF TV towers in Milwaukee, WI. On 6 and 2 meters I had high noise floor, and a wide assortment of birdies, sync pulses, buzzes, and other garbage on HF. There was so much RF floating around that when I used my MFJ-269 analyzer to check a beam, it was impossible unless the array was first rotated for a null reading.

Friday, after the analog shut down, I found the bands so quiet that I actually checked to see if my antennas were connected. On 6 meters where the normal noise level was S-3 to S-4, it is now zero. HF is clean, and during the VHF contest I discovered I was copying signals that were barely flicking the meter, which was impossible before. Without the strong RF influence, the analyzer now functions normally and shows "better" readings on all of my antennas. Just wondering if others have noticed any similar improvements, especially where channel 2 was involved.

Sam Whitley, K5SW, operating the club station W5VHF, wrote: "I had a kind of laid back contest. On 50 MHz I didn't try any *E* skip. Even so, I worked 7 grids or so on ground wave. I played more on higher bands. On 144 MHz I worked 30 grids. The best was XE2OR DL98 on tropo, 597 miles. On 222 MHz I worked 9 grids. On 432 MHz I worked 15 grids. On 1296 MHz I worked 7 grids. I enjoyed it.

W5KWQ and W5LFL Dayton Featured Guests

Richard Garriott, W5KWQ, was the keynote speaker for the joint AMSAT-TAPR banquet on Friday night of Dayton Hamvention®. Accompanying him was his father, former astronaut Owen Garriott, W5LFL. Richard spoke for nearly an hour, keeping the audience spellbound with tales of his space adventure onboard the International Space Station this past October. Richard and Owen graciously made themselves available for picture-taking and autographs after the end of the banquet. The Garriotts also remained available for most of the duration of the weekend, making appearances at the AMSAT and ARRL booths and speaking at one forum.

More about Richard's ride in space, as well as his many other adventures, can be seen at his website: <http://www.richardinspace.com>.

Current Contests

There are two important contests this month: The **ARRL UHF and Above Contest** is scheduled for August 1–2. Complete rules can be found in the July issue of *QST*. The first weekend of the **ARRL 10 GHz** and above cumulative contest is scheduled for August 15–16. The second weekend is September 12–13. Complete rules for this contest also can be found in the July issue of *QST*.

Calls for Papers

Technical papers are solicited for presentation at the **28th Annual ARRL**

Richard Garriott, W5KWQ, was the keynote speaker for the joint AMSAT/TAPR banquet on Friday night of the Dayton Hamvention®. Accompanying him was his father, former astronaut Owen Garriott, W5LFL. Shown here left to right: Owen Garriott, W5LFL; CQ and CQ VHF *Managing Editor Gail Sheehan, K2RED; and Richard Garriott, W5KWQ. (Photo courtesy of Phil Karn, KA9Q)*

and TAPR Digital Communications Conference to be held September 25–27 in Chicago, Illinois and publication in the conference *Proceedings*. Presentation at the conference is not required for publication. Submission of papers is due by July 31 and should be submitted to: Maty Weinberg, KB1EIB, ARRL, 225 Main Street, Newington, CT 06111, or via e-mail to <maty@arrl.org>. For suitable topics and submission guidelines also contact Maty via e-mail and check <http://www.arrl.org>.

This year's **Microwave Update** conference will be held in Irving, Texas near the DFW airport the weekend of October 23–25. This is a call for papers and talks. They are looking for presentations on all aspects of microwave equipment and antenna construction, theory, propagation, operating, design modes, just to name a few. Frequency range is 900 MHz through laser. If you are interested in presenting please drop Al Ward, W5LUA, an e-mail at <w5lua@sbcglobal.net>. They are also looking for papers for the *Proceedings*. You do not have to be a presenter to have your paper included in the *Proceedings*. Papers for the *Proceedings* can also just be short on any topic microwave related. The *Proceedings* will again be published by the American Radio Relay League. If you are interested in making a contribution to the *Proceedings*, please contact Kent Britain, WA5VJB, at <wa5vjb@flash.net>. The deadline for papers is Monday, August 31. The ARRL asks that you refer to the *Proceedings* Style Guideline on the conference website at: <http://www.microwaveupdate.org/> .

Additional information on Microwave Update can also be found at: <http://www.ntms.org/>. Just click on the "Microwave Update" link on the left-hand side. The 2009 MUD Conference chair is Steve Hicks, N5AC, and he can be reached at <n5ac@n5ac.com>.

Meteor Showers

Beginning around July 17 and lasting until approximately August 24, you will see activity tied to the *Perseids* meteor shower. Its predicted peak is around 1730–2000 UTC on August 12. A possible tertiary peak may occur around 0900 UTC. The *κ-Cygnids* meteor shower is expected to peak on August 17. The visually-impossible *γ-Leonids* is expected to peak August 25, around 1000 UTC. The *α-Aurigids* is expected to peak on August 31.

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/calendar/2008>.

And Finally . . .

For my wife, Carol, W6CL, meeting the Garriotts at Dayton was especially meaningful, as Owen is from Enid, Oklahoma. Almost every time we went through Enid, Carol would mention that it was his hometown. I kind of figured that he was important to the locals, because it isn't everyone who has a street named after him or herself. Therefore, it was a delight for me to bring Owen over to our table at the banquet and say to Carol, "Meet Owen Garriott." As quickly as they met, they were talking about Enid and Drumright, Carol's hometown. It was as if the two of them had never left Oklahoma.

A short while after introducing Carol to Owen, I also introduced her to Richard. While Richard did not grow up in Enid, he nevertheless could identify with Carol's small hometown loyalty.

In short, I never met two more gracious gentlemen than the Garriotts. I, along with so many others at the Hamvention®, are so very grateful to the leadership of AMSAT-NA, ARISS, DARA, and the ARRL, for making the arrangements for them to be at the convention this year.

This month I expect to be at the Huntsville Hamfest. I hope to see you there. If you have a story to tell related to the wonderful world of VHF-plus, please look me up at the hamfest or e-mail me at: <n6cl@sbcglobal.net>.

Until next month . . .

73 de Joe, N6CL

dx

BY CARL SMITH,* N4AA

Upcoming Events and IOTAs

By now I just know all of you have done your antenna projects to get ready for the upcoming contest season, right? No?! What have you been doing? Better get busy, as time is running out.

We've already had the IARU HF Championship back in July, ARRL Field Day was the end of June, and the operating activities coming up are:

NA QSO Party CW, August 2–3; WAE DX Contest CW, August 9–10; NA QSO Party SSB, August 16-17.

Then there's the All Asian DX Contest SSB, September 6–7; Russian RTTY WW Contest, September 6; NA Sprint CW, September 7; WAE DX Contest SSB, September 13–14; ARRL September VHF QSO Party, the 13–15; NA Sprint SSB, September 14; CQ WW DX RTTY Contest, September 27–28, and a whole lot more in between. If you want to see the on-the-air activities in just the next two months, go to the WA7BNM website at <http://www.hornucopia.com/contestcal/contestcal.html>, where you will find all you want to know and possibly a lot you don't .

Sorry John, K1AR, I didn't mean to get into your "Contesting" column. I'm just trying to give a little heads up to the folks who read this column. Also, I have to tell the readers that you are going to find "something" going on the bands virtually every weekend of the year... no matter where you live in the world.

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

Dayton 2009

I can comment now on this year's Dayton Hamvention®. It was a really great event. As I had mentioned in my last column, I worked in the ICOM America booth and we had the folks from the K5D DXpedition for a while and several others, too. One of the presentations was made by Yuri Sushkin, N3QQ, on the IOTA trip to the Aleutian Islands as KL7DX with his friends Yuri, UA9OBA, and Sergey, RA3NAN, members of the Russian

Larry, K8UT, was on the air from Korea as HL9A in late May. If the photo is any indication, he had a lot of fun for a few days. (Photo courtesy of Rick, NE8Z)

Masa, JA1DM (left), and Denny, W3DRY, spent some time together during this year's Dayton Hamvention®. Denny said: One of the wonderful experiences of Dayton 2009 for me was meeting Masa, JA1DM. Masa, Hiro, JA1SLS, and I were "stranded" by a flight delay at Dulles Airport on Thursday. I had the opportunity to meet them and provide a small measure of assistance to smooth their travels. (Photo courtesy of Denny, W3DRY)

Jonas, TF2JB (left), accepts an application for a Mixed WAZ Award from Gulli, TF8GX. This was the first application for TF2JB to check since being appointed a checkpoint for CQ awards. (Photo by Erling, TF3EE, forwarded by Floyd, N5FG)

RSGB Books from CQ

View more RSGB books on our web site!

Guide to VHF/UHF Amateur Radio

By Ian Poole, G3YWX

RSGB 2000 Ed.,112 pgs. Everything you will need to help you enjoy VHF/UHF to the fullest. Choosing the right transmitter, receiver, antenna,utilizing the correct part of each band and more!

Order No. RSGVUAR $16.00

HF Antenna Collection

RSGB, 2nd Ed., 2002. 252 pages.

A collection of outstanding articles and short pieces which were published in *Radio Communication* magazine. Includes single- and multi-element, horizontal and vertical antennas, extremely small transceiving and receiving antennas, feeders, tuners and much much more!

Order: RSHFAC $33.00

IOTA Directory

Edited by Roger Balister, G3KMA

RSGB, 2007 Ed..

Fully updated, lists all islands that qualify for IOTA, grouped by continent, and indexed by prefix. Award rules and includes application forms.

Order: RSIOTA $18.00

Low Power Scrapbook

RSGB, 2001 Ed., 320 pages.

Choose from dozens of simple transmitter and receiver projects for the HF bands and 6m, including the tiny Oner transmitter and the White Rose Receiver. Ideal for the experimenter or anyone who likes the fun of building and operating their own radio equipment.

Order: RSLPS $18.00

Antenna Toolkit 2

By Joe Carr, K4IPV

RSGB & Newnes, 2002 Ed., 256 pgs. A definitive design guide for sending and receiving radio signals. Together with the powerful suite of CD software included with this book, the reader will have a complete solution for constructing or using an antenna; everything but the actual hardware!

Order: RSANTKIT2 $48.00

QRP Basics

By Rev. George Dobbs, G3RJV

RSGB, 2003 Edition, 208 pages

How to get the best results from a QRP station whether from home or outdoors. Explains how to construct your own station, including complete transmitters, receivers and some accessories. Other sections include toroidal coils, constuction techniques and equipping a workshop. You'll also find a listing of QRP contests and awards.

Order: RSQRPB $28.50

HF Amateur Radio

RSGB, 2007 Second Ed.

HF or shortwave bands are one of the most interesting areas of amateur radio. Guides you through setting up an efficient amateur radio station, equipment to choose, installation, the best antenna for your location and MUCH more.

Order: RSHFAR $23.00

Practical Wire Antennas 2

By Ian Poole, G3YWX

RSGB, 2005 Edition, 176 pages

This significantly expanded and fully revised edition includes designs for a wide range of practical wire antennas . You'll find just about every type of wire antenna you could possible imagine with complete and easy to understand designs.

Order: RSPWA2 $23.50

The Antenna Experimenter's Guide

RSGB, 2nd Ed., 1996. 160 pages.

Takes the guesswork out of adjusting any home-made or commercial antenna, and makes sure that it is working with maximum efficiency. Describes RF measuring equipment and its use, constructing your own antenna test range, computer modeling antennas. An invaluable companion for all those who wish to get the best results from antennas!

Order: RSTAEG $33.00

Technical Topics Scrapbook 1985-1989

by Pat Hawker, G3VA

RSGB, 1st Ed., 1993, 346 pages

A collection of popular 'Technical Topics' published in RadCom. Info, ideas, mods and tips for amateurs.

Order: RSVUDXB $18.00

Packet Radio Primer

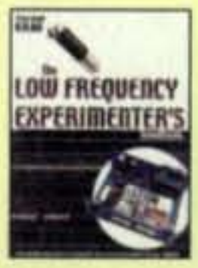
By Dave Coomber, G8UYZ & Martin Croft, G8NZU

RSGB, 2nd Ed., 1995, 266 pages

Detailed practical advise for beginners. Completely revised and greatly expanded to cover developments in this field and beyond bare basics into advanced areas such as satellite operations.

Order: RSPRP $16.00

The Low Frequency Experimenter's Hdbk



By Peter Dodd, G3LDO

RSGB, 2000 Ed., 296 pages.

An invaluable reference written to meet the needs of amateurs and experimenters interested in low power radio techniques below 200kHz.

Order: RSLFEH $33.00

Power Supply Handbook

By John Fielding, ZS5JF

RSGB, 2006 Edition, 288 pages

How power supplies work, selecting components, building and modifying supplies, measuring the finished supply, batteries, chargers, test equipment - it's all here!

Order: RSPSH $28.50

VHF/UHF Handbook

Edited by Andy Barter, G8ATD

RSGB, 2nd Ed., 320 pages.

This second edition guides you through the theory and practice of VHF/UHF operating and transmission lines. Includes info on getting started, antennas, constructing your own equipment, satellite ops, local nets and specialized modes.

Order: RXVUH $29.50

Technical Topics Scrapbook 1995-1999

By Pat Hawker, G3VA

RSGB, 2000 Ed., 314 pages.

This third compilation of 'Tech Topic' articles is a fascinating collection of circuit ideas, antenna lore, component news and more!

Order: RSTTC99 $27.50

HF Antennas for All Locations

By Les Moxon, G6XN

RSGB, 2nd Edition, 322 pages

Design and construction of hundreds of antennas. No matter what your location there's one for you!

Order: RSHFAAL $33.50

Shipping & Handling: U.S. & Possessions-add $7 for the first item, $3.50 for the second and $2 for each additional item. FREE shipping on orders over $100 shipping to one domestic address.

All Foreign Shipping & Handling - calculated by order weight and destination and added to your credit card charge.

CQ Communications, Inc., 25 Newbridge Rd., Hicksville, NY 11801

Call 800-853-9797 - Fax 516-681-2926 - www.cq-amateur-radio.com

CQ DX Awards Program

SSB

2528.....SV7CUD

CW

1092.....WK3N

SSB Endorsements

330.....WK3N/338 275 .....AE9DX/289

CW Endorsements

330.....WK3N/337 300 .....KØKG/303

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 WPX Program

CW

3224.....W6NWS
3225.....W4UCZ
3226.....JL4LWL
3227.....AG4W

SSB

3043.....W6NWS
3044.....NF5Z
3045.....ON7PM
3046.....KC3AK
3047.....IT9JCA

Mixed

2054.....W6NWS
2055.....WO5I
2056.....KC3AK
2057.....HA3DMF
2058.....AG4W

Digital

32.....AG4W

CW: 400 JL4WL. 500 HA3DMF, JH6JMM. 1500 W6NWS. 5400 K2VV. 5650 WA2HZR.
SSB: 350 KC3AK. 400 ON7PM. 1200 W6NWS. 1450 AG4W. 4700 K2VV.
Mixed: 450 WO5I. 500 KC3AK. 1100 DH5MM. 1650 AG4W. 1850 W6NWS. 6150 K2VV.
Digital: 650 AG4W.

160 Meters: W6NWS
80 Meters: W6NWS
40 Meters: W6NWS, WD9DZV
20 Meters: W6NWS, ON7PM, KC3AK
10 Meters: W6NWS

Asia: EW1KV
Oceania: AG4W
North America: NF5Z

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, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC.

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, UR5FEO, N3RC.

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

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

Robinson Club. I have to admit that I don't follow the IOTA operations perhaps as much as I should. I was taken aback by the story of this trip. Yuri has a great DVD of the whole trip, and if you are the least bit interested in DXpeditions, especially to dangerous places, you should contact Yuri and get one of the DVDs. Contact him by e-mail at: <n3qq@na-234.com>.

The rain drove a lot of folks inside a few times, so we had pretty good crowds for the DX presentations and also for the DX Quizzes. There are a lot of pretty smart folks out there! A few times it got very difficult to tell who yelled out the answer first. However, we got through it, and Ray Novak from ICOM even asked me to come back again next year to do a repeat. I had to ask myself if I really want to do this again? Well, OK, I will try it again for 2010, so get ready out there. I may be calling on you!

Islands On The Air

I'm going to comment further on the IOTA folks. Most of their operations are on islands that are part of a country you may already have "in the bag." That's OK. A lot of DXers out there have worked them all, or nearly so, and have started looking for another challenge. The IOTA operations are typically low key, with a few guys/gals. A lot of them just take a radio, no amplifier. Antennas run the list from simple wires to Yagis. Rarely do these folks go someplace where they can operate in a building. Most often they are in a tent, if that, on some rain-soaked or sun-baked piece of real estate. Much of the time they can only afford to go for a weekend or so.

None of this gets a lot of attention in the same way the big-gun DXpeditions do. The RSGB (Radio Society of Great Britain) sponsors the IOTA program, and as far as I know (which may not be totally accurate), the only organization (at least in the USA) that is organized to help fund this type of operation is the IREF (Island Radio Expedition Foundation). This non-profit group was formed not too many years ago because there was no other. A gentleman I met at the old New Orleans DX Convention started it (I hope that's right, as my memory from that long ago may be a bit fuzzy). That gentleman is Mike Crownover, AD5A. His whole family is licensed.

Check the IREF website at: <www.islandradio.org/>. You might get

I seriously doubt that this photo of Ivan, UR9IDX, was taken in Lesotho, where he was active as 7P8A. Ivan along with Alexander, UX4UL, as 7P8R, was active for a few weeks in early June. They worked mostly the low bands. They then went to Swaziland for a few days. (Photo courtesy of Bill, N2WB)

5 Band WAZ

As of June 1, 2009, 783 stations have attained the 200 zone level and 1637 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)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
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)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
N5AW, 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)
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)
I5KKW, 198 (31&23 on 20)
IV3MUC, 198 (1&31 on 40)
UA4LY, 198 (6&2 on 10)
UT9FJ (27, 29)

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

UA4LY (198 zones)
W6RLL (170 zones)
K8YTO (171 zones)
UT9FJ (198 zones)
HK3W (170 zones)
OH9MDV (200 zones)

5 Band WAZ updates:

G3WW (172 zones)
K8YC (188 zones)
LU2DKT (200 zones)
WØCP (200 zones)
W6RLL (200 zones)
JT1BV (200 zones)
IN3QCI (189 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>.

The WAZ Program

80 Meter SSB

91 .....9A2EU

10 Meter CW

198 .....N5AW

12 Meter CW

56 .....N5AW

15 Meter CW

333 .....N5AW

17 Meter CW

70 .....N5AW

20 Meter CW

582 .....N5AW
585 .....K8YTO
586 .....UU5WW
587 .....GØDEZ
588 .....YV1DIG
589 .....JP1QDH

30 Meter CW

87 .....N5AW
91 .....UA4LY

40 Meter CW

267 .....N5AW
271 .....AI6Z
272 .....9A2EU

160 Meters

308 .....F6BEE (37 zones)
309 .....GØJHC (38 zones)
310 ...JR7VHZ (39 zones)
311 .....VE7IG (30 zones)

All Band WAZ

Mixed

8578 .....W2QO
8579 .....DU1MGA
8580 .....IWØHOU
8581 .....KØXB
8582 .....N4YDU
8583 .....F1JKJ
8584 .....K4BYF
8585 .....W6NWS
8586 .....HK3W
8587 .....AF3Y

SSB

5103 .....MMØEAX
5104 .....IZ8LKL
5105 .....HK3W
5106 .....DL7VH
5107 .....WE2N

CW

569 .....N3RC

RTTY

200 .....DJ7UO
201 .....UU2JQ

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>.

an eye opener. Some of these folks write up their stories and get them published, but not enough considering the number of operations there are by IOTA devotees. All over the world, from Europe to South America to Asia and the Aleutian Islands of Alaska, these people pack up and away they go. They might make 100 Q's or 10,000 Q's, but they have fun doing it. And I have to ask, "What are any of us doing this for?" Whether it is DXing, chasing IOTAs, it should be because it is *fun*. Not for money, not for egos, *for fun*! All I ask is that you think about what these IOTA folks are doing and listen to and/or read their stories. You might be surprised at what you hear/see. I know I sure was and will be looking more carefully at these operations in the future.

DXpedition News

By now the French operation from Glorioso should be finished. Only a handful of French military personnel were allowed to go and "play radio" on this island. No civilians were allowed, and

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 339 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

NØFW 338	K2FL 338	W7OM 337	N5FG 336	HB9DDZ 335	G3KMQ 334	KA3S 328	CT1YH 320	N2LM 297
WB4UBD 338	K4MQG 338	W7CNL 337	K9OW 336	K3JGJ 335	K6LEB 333	K1FK 328	W9IL 319	N2VW 283
K3UA 338	W8XD 338	WØJLC 337	K8LJG 336	K2JLA 334	K5RT 332	IKØADY 328	EA3ALV 319	XE1MD 280
K9MM 338	K2TQC 338	K4CN 337	K9IW 336	F3AT 334	K8SIX 331	F6HMJ 328	RA1AOB 317	4Z5SG 279
W4OEL 338	N7RO 338	VE3XN 337	W4MPY 336	PA5PQ 334	W4UW 331	W1DF 328	W6YQ 316	W2JLK 277
EA2IA 338	F3TH 338	K4JLD 337	K5UO 336	NC9T 334	W7IIT 330	W4LI 325	WA4DOU 316	HA5LQ 277
OK1MP 338	DL3DXX 338	N5ZM 337	K7LAY 336	G4BWP 334	N7WO 330	IKØTUG 321	ON4CAS 304	
N7FU 338	WK3N 338	N4AH 337	N6AW 336	W1JR 334	W6OUL 329	W3II 320	WD9DZV 304	
N4JF 338	K9BWQ 337	N4CH 337	KA7T 336	I4LCK 334	KE3A 329	PY4WS 320	KT2C 304	
K4IQJ 338	N4MM 337	K2OWE 336	PY2YP 335	YU1AB 334	K6CU 329	OZ5UR 320	KØKG 303	

SSB

K4JLD 339	W4WX 339	EA3BMT 339	K4IQJ 338	W7FP 337	ZL1HY 335	K7HG 331	WØROB 320	JR4NUN 303
EA2IA 339	K5OVC 339	IKØAZG 339	VE2GHZ 338	YU3AA 337	K5UO 335	N5YY 331	LU3HBO 317	W4PGC 302
XE1AE 339	K4MQG 339	K5TVC 338	AA4S 338	W7BJN 337	JA7XBG 335	N1ALR 330	N8SHZ 316	EA8AYV 302
IN3DEI 339	N4MM 339	KZ2P 338	WK3N 338	AB4IQ 337	N7WR 335	K4DXA 328	XE2NLD 315	4X6DK 301
NØFW 339	K9MM 339	W6BCQ 338	XE1L 337	W4UNP 337	WØYDB 334	SV3AQR 328	W6NW 314	K7ZM 300
DU9RG 339	OZ5EV 339	W6EUF 338	OE3WWB 337	W4UW 337	K5RT 334	VE7EDZ 328	KA1LMR 312	XE1MEX 300
K3UA 339	VE2PJ 339	W7OM 338	K9OW 337	K8SIX 336	WA4WTG 334	XE1MD 327	ON4CAS 312	W4EJG 295
K6YRA 339	K3JGJ 339	K9BWQ 338	N5FG 337	KE3A 336	K3LC 334	YV4VN 326	RA1AOB 312	W9ACE 294
IK1GPG 339	N5ZM 339	W8AXI 338	PY2YP 337	K9IW 336	HB9DDZ 334	KD5ZD 326	N2LM 312	WD9DZV 292
DJ9ZB 339	N7RO 339	W9SS 338	N6AW 337	N2VW 336	VE4ACY 333	PY2DBU 325	KD2GC 311	W6MAC 292
N7BK 339	KE5K 339	VK4LC 338	IK8CNT 337	W2CC 336	K9PP 333	KE4SCY 325	RW9SG 310	W5PVE 288
4Z4DX 339	IØZV 339	K7LAY 338	EA4DO 337	PA5PQ 335	YV1KZ 333	W4MPY 325	IØYKN 310	AD7J 287
WB4UBD 339	OE2EGL 339	WS9V 338	CT3BM 337	XE1VIC 335	W9IL 333	W1DF 325	KU4BP 310	HB9DQD 286
OZ3SK 339	W4ABW 339	W6DPD 338	YU1AB 337	NC9T 335	F6HMJ 333	K6GFJ 324	XE1MW 309	VE7HAM 285
OK1MP 339	DL3DXX 339	K4CN 338	K8LJG 337	K1UO 335	YV1AJ 332	TI8II 324	AA1VX 308	N8LIQ 284
K2TQC 339	I8KCI 339	VE3XN 338	W3AZD 337	CT1EEB 335	KSØZ 332	W6OUL 322	4Z5FL/M 306	N3RC 280
K4MZU 339	VE1YX 339	K9HQM 338	KØKG 337	W1JR 335	VE4ROY 332	XE1RBV 321	K7SAM 305	HSØ/EA4BKA 276
N4JF 339	N4CH 339	K2FL 338	W2FKF 337	I4LCK 335	YV1JV 331	VE7SMP 320	I3ZSX 304	K9DXR 275

RTTY

WB4UBD 337	N5ZM 330	OK1MP 328	G4BWP 320	PA5PQ 311	K4CN 303	K8SIX 300
NI4H 336						
K3UA 332						
N5FG 331						

apparently there won't be any non-military personnel allowed on any of those French islands in the foreseeable future.

We can thank our lucky stars that there are some dedicated DXers in the French military who work diligently to gain permission to go to these places—*for us*! Try to remember that they spend a lot of their personal time, effort, and no doubt money to go to these places. A "thanks, guys" wouldn't hurt a bit and might just make them feel a bit better about trying to do it again, to go to another island—*for us!*

The Board of the Iceland Radio Association (I.R.A.) for 2009–2010. From the left: Erling Gudnason, TF3EE; Gudmundur Sveinsson, TF3SG; Jon Ingvar; Oskarsson, TF1JI; and Sveinn Bragi Sveinsson, TF3SNN. Sitting from left: Jonas Bjarnason, TF2JB; and Gudmundur Löve, TF3GL. Not in photo: Kjartan Bjarnason, TF3BJ. (Photo by Jon Svavarsson, TF3LMN, and forwarded by Floyd, N5FG)

There is another important DXpedition coming up in October… Midway, K4M. This is another one that has been in the works for a long, long time. Finally we are going to be blessed with a major operation from a pretty rare spot. Ranked at #24 worldwide and #13 in Europe, the 17 members of the team are sure to be kept quite busy. Those upper bands probably won't offer much, but that will only make it more difficult for all the other bands.

Also, *please* remember the principles that Mark, ON4WW, Uncle DX, and I have been pressing for the past few years. *Listen, listen,* and follow the instructions of the DX operator. He can hear things we can't. He is in charge and he can pull the plug any time he wishes if things get too far out of hand. Keep that in mind. Do you want to be responsible for the DX station going QRT before your buddy across town can work him? Or maybe it will be you who won't work him because you caused the QRM that caused him to go QRT. Whether it is a single-op DX station or a 25-op DXpedition, those on the other end can do whatever they want if you do something that offends them. After all, they are spending their time, money, and sometimes putting their health in jeopardy to be there. Please watch what you are doing in the pile-ups.

Propagation

Propagation? Now there's a hot subject. I just saw that *CQ* magazine's Propagation Editor, Tomas Hood, NW7US, is challenging the accuracy of the newest predictions for solar Cycle 24. The revised prediction, issued in late May by a

panel of solar experts, suggests a weak sunspot cycle with a peak in 2013. However, NW7US is asking, "How credible are these 'experts'?"

In an online commentary posted on the *CQ* magazine website, Tomas notes that this same group of so-called "experts" has already issued multiple predictions for this cycle, all of which they now say are wrong. Tomas asks why we should believe that they're right this time.

"How much credibility should we grant to the panel of solar researchers and scientists that again releases a speculative prediction of the new solar Cycle?" Hood asks, noting that NASA's lead representative on the panel says, "It turns out that none of our models were totally correct."

Tomas points out that while the sun itself is millions of years old, scientists have been tracking solar activity for just a few hundred years. "In my view," he says, "it is pretty arrogant to postulate that mankind has any real understanding and handle on what the sun might do next."

"No one can postulate with any credibility just how *intense* the new cycle will be, because there's no direct correlation between this solar minimum and any regular pattern of past minimums," Hood notes, adding, "If none of the models are totally correct, how are they making this current prediction with such dismal expectations? I'm not holding my breath in favor of supporting any of the predictions at this point."

He also points out that there are already signs of "an awakening solar Cycle 24," and encourages hams to "enjoy the unique propagation opportunities currently presenting themselves during this quiet phase," and to "prepare now for whatever the sun will do by honing your radio skills…"

Pardon me, but that kind of sounds like what I have been saying for quite a while. There were too many contradictions in all those predictions. What's that saying? "Best to keep one's mouth shut and be thought a fool than to open it and prove you are one."

Until next time, enjoy the chase, and Have Fun! 73, Carl, N4AA

QSL Information

9A/OE3ZK via OE3WGC
9A0CI via DE0MST
9A48IFATCA via 9A4WW
9A800VZ via 9A7A
9H3GA via DL5GA
9J2YO via YO4ATW
9M2TI via EA4ATI
9M8Z via M0URX
AA4VK/CY0 via AA4VK
AH0F/KH2 via JA2NQG
AH0S/KH2 via JH1DVG
AM7M via EC7ANC
AN9CNP via EA9CE
AO1K via EA1GVG
AP2ASHF via DL7UPN
AT9RS via W3HNK
AT9RS via DL4KQ
AX0BP via VK2CA
BY4RRR via DL2JRM
C21TI via EA4ATI
C56ETF via GW0ETF
C6AAA via N4AA/LoTW
C6AKU via K5WW
C6AMS via NA6M
C6AYL via W8GEX
C6DX via W8GEX
C91FC via ON4CJK
C91TX via W5PF
CE9XX via F5PFP
CN2BC via DL7BC
CN8VO via EA7FTR
CQ3T via CT3KN
CS9L via DJ6QT
CT7FFC via CT1GFK
CU2KG via OH2BH
CU2KH via OH8NC
CU2X via OH2BH
CX1AA via W3HNK

(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/>.)

awards

BY TED MELINOSKY,* K1BV

From Antarctic Ice to Silver Camels

This time we start off with an award from Argentina. DXers know that whenever they hear an Argentine station with the first letter of the suffix starting with "Z" that this is worthy DX. In Argentina, the first letter of the suffix identifies the province, and "Z" is one of the Antarctic bases located on largely uninhabited places such as South Georgia, South Shetland, South Orkney, and South Sandwich Islands. The award is especially colorful, including a montage of rare QSLs from these countries. Following are the details:

Worked Argentine Antarctic Bases

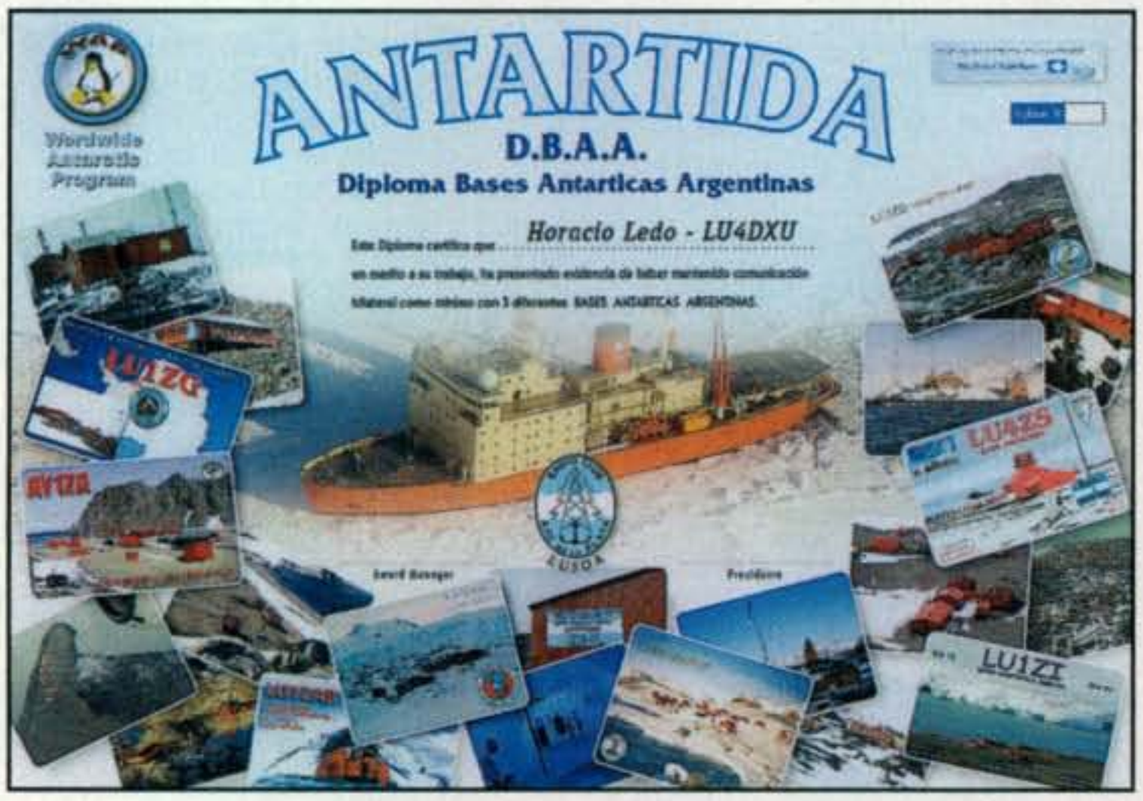
The WAAB award is sponsored by The Radio Club Rio de la Plata for confirming contacts since November 9, 2001 with stations located on at least three different Argentine Antarctic bases. SWL okay. All bands from 2 meters through 160 meters and modes SSB, CW, RTTY, and digital count for the award.

List of Argentine Antarctic Bases: LU1ZA S. Orkney, LU1ZAB Matienzo, LU1ZB Melchior, LU1ZC Deception, LU1ZD San Martin, LU1ZG Belgrano II, LU1ZI Jubany, LU1ZR Petrel, LU1ZS Camara, LU1ZV Esperanza, LU2ZD Primavera, and LU4ZS Marambio.

Any newly established Argentine Antarctic base will be automatically added to the list and will be valid for this award.

Send a GCR list of the contacts with QSO details including callsign and date, in alphabetical order by callsign, plus a photocopy of each of the cards. The sponsor reserves the right to request actual cards at its discretion. Include fee of Aus$3 US$17, or 13 Euros for large format certificate; or Aus$4, US$13, or 9 Euros for the smaller format certificate. This cost includes shipping inside a tube for protection. Apply to: Horacio Ledo, LU4DXU, P.O. Box 22, Martinez (1640) Buenos Aires, Argentina. Internet: <http://www.waponline.it/WapAwards/tabid/61/Default.aspx>. E-mail: <lu4dxu@hotmail.com>.

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



The Worked Argentine Antarctic Bases award is sponsored by The Radio Club Rio de la Plata for confirming contacts with stations located on at least three different Argentine Antarctic bases.

USA-CA Special Honor Roll

Leo C. Bingham, WY7LL
USA-CA All Counties #1184
April 27, 2009

USA-CA Honor Roll

500
WY7LL 3469
WD9EJN 3470
WQ9Z.....3471

1000
WY7LL 1777

1500
WY7LL 1493
LYR-794 1494

2000
WY7LL 1381

2500
WY7LL 1300

3000
WY7LL 1210

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.

Italy's Regio Insubrica Award

The following award is new starting in 2009 and is one of the first I've seen that specifically plans portable operations that count for several specialized awards of a similar nature. If you're hunting castles, churches, lakes, and mountain summits, one contact with the Insubria Radio Club's mini-expeditions may help you with four other awards.

The award is issued in order to promote the beauty of the landscape, historical and artistic heritage, and rural culture of Euroregion Regio Insubrica, which includes Ticino (Switzerland) and the Italian provinces of Como, Lecco, Novara, Verbano-Cusio-Ossola, and Varese.

The goal is to contact stations HB9IRC and/or IQ2IR on or after January 1, 2009 during their publicized portable activities, which concentrate on:

(1) Castles, towers, and defensive works, which may be counted for various castle awards of Italy and Switzerland;

(2) Churches, abbeys, and monasteries, valid for the Italian Abbeys Award;

(3) Lakes valid for the Italian Lakes Award and Worked All Swiss Lakes, and;

(4) Mountain summits, valid for Summits On The Air Italia.

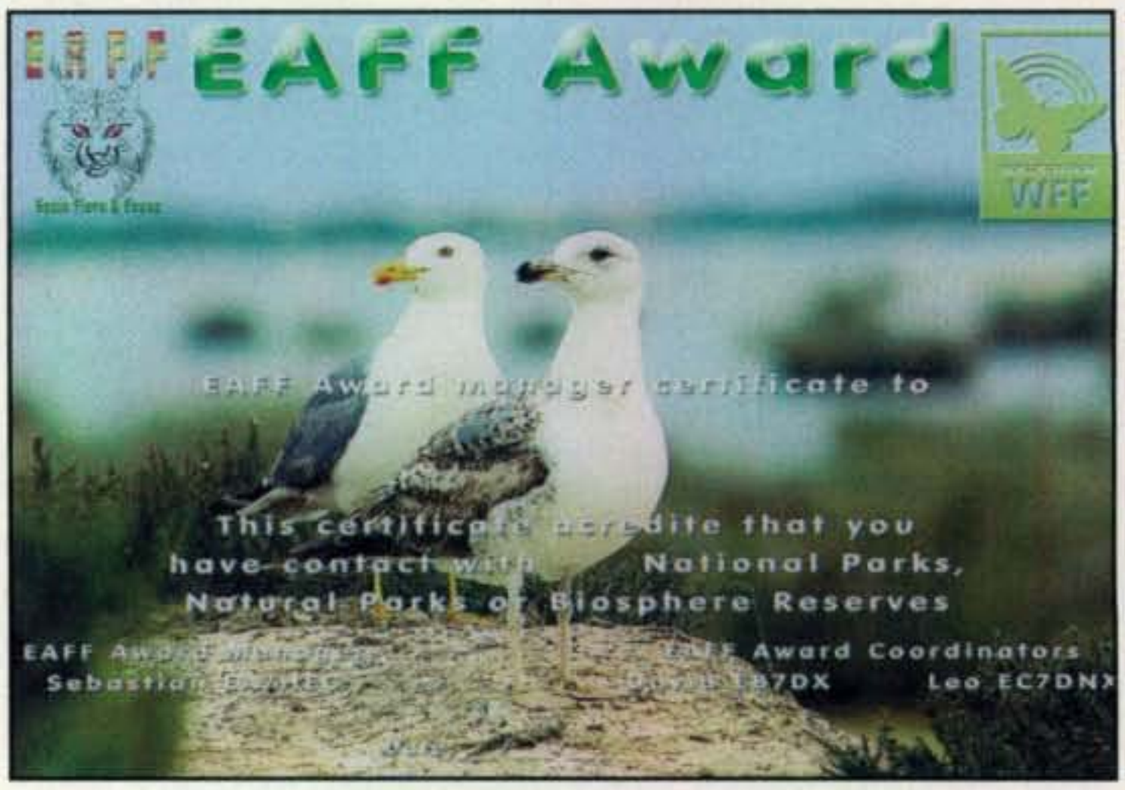
The basic award is given for contacting at least three of these categories. Send a log extract (including callsign, date, UTC, band/mode, DRI reference number) by e-mail to award manager Lucini Luciano, HB9FBI, at <hb9fbi@insubriaradio.org>. The award fee is US$20 or 10 Euros, which will be entirely devoted to charity purposes and may be paid by either of these electronic methods: PayPal (emanuela.trevisan@insubriaradio.org) or Banking Banco Posta, Paolicelli Mario and Ghiringhelli Fulvio IBAN: IT60 V076 0110 8000 0008 5673 614.

Endorsements are available for each additional five contacts (maximum of three such endorsements). Fee for each of these is US$10 or 5 Euros (fees again provided to charity). Additional Honor Roll and Top Honor Roll endorsements are available for higher levels of contacts. Refer to the website, which has detailed rules and will also list activation dates. Internet: <http://www.insubriaradio.org>.

EA Fauna Flora Award

This is a new addition to a growing number of awards for contacting national parks and nature reserves. Spain offers this brand new award, which provides vivid images of interesting wildlife in the respective countries.

Italy's Regio Insubrica Award is issued to promote the beauty of the landscape, historical and artistic heritage, and rural culture of Euroregion Regio Insubrica.



The EA Fauna Flora Award is one of the growing number of awards that are given for contacting national parks and nature reserves.

This "Natural Parks, National Parks, and Biosphere Reserve Award" is offered to all amateurs and SWLs for proof of contact (SWL) with at least 10 amateur radio stations operating from different territories of national parks, nature parks, and nature reserves within the Biosphere Reserve of Spain as recognized by Ministerio de Medio Ambiente. The award follows the general rules of the WFF—World Flora Fauna Award (Russia)—and is recognized by that organization (http://www.wff44.com). All HF bands, plus 50 MHz and 144 MHz are valid. All modes may be used, except no use of repeaters allowed. Contacts by mobile or portable stations may be counted at only one park per day. Contacts on or after May 1, 2009 count for the award. The QSL card must have an imprint showing official number and name of the park, reserve, or landscape.

Cards are not necessary, provided that the activation has previously been validated and activators have provided the sponsor with logs for the activity. The sponsor may ask any

Leo C. Bingham, WY7LL
USA-CA All Counties #1184, April 27, 2009

Leo C. Bingham, WY7LL, USA-CA All Counties #1184.

I became interested in radio at a very young age. I was in first or second grade (1968) in a small oil field community named Linch, Wyoming. My parents owned an interest in an oil field pipeline ditching and construction company there. My father ran the field operations while my mother ran the office, bookkeeping aspect of the company.

One day my father brought home a Johnson Messenger 223 base station for my mother's office, along with a couple of Johnson Mobile radios for the trucks. Oh how that base station caught my eye . . . the thought that you could push a button on that microphone and someone a world away could hear you. I was hooked from the start.

I watched my father struggle for years trying to get more range by using bigger antennas and amplifiers with little return for his effort. Over the years my folks always had two-way radios in their automobiles and homes. They became dependent on being able to communicate with them, as this was way before cell phones, and living in Wyoming it may be 60 miles or better to the next town, gas station, or even ranch house. Through the years I found that you could make long-distance contacts with those so-called "chicken band" radios.

By the time I was 16, I had worked my way through numerous radios and had graduated, or so I thought, to the big time. I had acquired a Tempo One ham radio that had a VFO and more power to make those elusive contacts. Finally at the age of 26 (1983) I met someone who would introduce me to ham radio. I joined the Novice classes that were being given, learning theory and code with new abandon. I took my Novice test and received my ticket in the mailbox on April 9, 1984. Now I really was in the big leagues!

I upgraded to Technician about six months later and to General on September 22, 1985. Best as I can recall on November 10, 1985 I was tearing up the 20-meter band making DX contacts left and right, tuning the VFO on the Yaesu FT-101EE and breaking pile-ups whenever I would tune into one. I tuned into a pile-up on 14.336 with calls being dumped in by the pound, so I put my call in, made my contact, and waited for the DX station's call. When it came back—KC3RY on the county line of Sussex and Warren, New Jersey—I thought there had to be a mistake, so I listened for a time until I surmised that I had stumbled onto the County Hunters Net. So off I went searching for more DX stations.

As time passed, I would return to 14.336 when DX conditions were not good. Soon I was out running counties for some folks who had asked for special contacts that they needed to finish up for a particular award.

My wife and I enjoyed the day trips and even some overnighters, and as time went on whenever we were traveling we made sure we had a radio to give out counties. In the 25 years I have run every county in Wyoming, Montana, North and South Dakota, Minnesota, Wisconsin, and Iowa and most in Nebraska. I had acquired a good number of counties just by giving out counties, but how many did I have? I spent weekends and evenings all of one winter typing contacts into a new computer-logging program, as the paper logs had become a paper tiger. Now I had to go back over years of logs and send cards. Luckily, I did get back a large number of cards from operators who still had their logs even years later.

Now to get serious about finishing up USA-CA. In January 2006 I was down to 350 counties. I decided it was time to meet some of the folks I had been working for years, and my wife and I set out for Appleton, Wisconsin in July. Without many people knowing, we were headed to the National County Hunters Convention. While running a county in Minnesota, a station called and wanted to know where I was. After confirming my location he said look in your rearview mirror. Cliff, ACØB, was only the second county hunter I had ever met face to face in my 22 years of county hunting, and he was going to the convention, too.

When I arrived at the convention I was shocked at the reception that this "Wyoming cowboy" received. Everyone treated us so well, like long lost family, and within minutes we had a dinner invitation for the evening. As the weekend progressed, I felt like I was right at home. It was great to put faces with names and calls. We attended the national in Denver in 2007 and the national in Michigan last year.

Finally, in February 2009 I was down to four counties to work. One was in Montana, one in Idaho, and two in Georgia. We had planned a week of vacation in the middle of February to go to a law enforcement convention in Florida. At the last minute our convention plans were canceled, so we were off to Montana and Idaho to get those confirmed from WY7ML on 2 meters. Then to start working on Georgia contacts. I sent an e-mail to a ham in Wheeler, GA, who agreed to a schedule. At 6:05 AM that Saturday we made a 40-meter contact, and I was now down to one to go . I had also made a schedule with Don, K3IMC, whom I had met at the two conventions I attended. Don was making a special trip for Upson, Georgia—my very last. At 9:21 AM I was mobile and heard KM9X trying to get Don and myself together. We made our contact on 40 meters SSB, although very weak copy. Then we iced it off by making a 5/9 contact on 20 SSB and a 30-meter CW contact.

After 25 years I had finally made that last county contact. As I looked over to my wife in the passenger seat, she had trickles of tears she was trying to conceal behind her sunglasses. I think she was happier for me than I was for myself. I must admit I enjoy being the hunted more than hunter. We still enjoy putting out counties when we travel.

We have met a fantastic group of people during our county hunting experiences. The list of people to thank is long and distinguished. My wife and driver, Chris, WY7ML, is at the very top of the list. She does the bulk of driving while I navigate and log on the computer. Thanks to the net control volunteers and the operators who run mobile. Without those folks, none of us would ever finish USA-CA All Counties. You all know who you are, and I thank and salute you, one and all.—*73, Leo WY7LL*

applicant for the actual cards. Send required fee and GCR list to: EAFF Award Manager, C/Egidos No. 1 Bajo, 21110 Aljaraque (Huelva), Spain.

Award Levels:

3rd class—10 different FF references worked (for activators, 5 activations).

2nd class—20 different FF (for activators, 10 activations).

1st class—50 different FF (for activators,15 activations).

Honor Roll Plaques:

3rd Honor class—more than 50 different FF references worked.

2nd Honor class—more than 100 different FF references worked.

1st Honor class—more than 150 different FF references worked.

Send your log with QSO information. The request can be made by e-mail sent to <eaff@ea7heg.es>. Contact the sponsor before sending any request by e-mail in case of rule changes. Cost for the the first three levels (paper certificate) is 5 Euros. Write for cost of the EAFF plaques, as the program is too new to have issued any of these yet. Activators who make at least 150 contacts from each park will receive the award at no cost. Activation must be inside the physical limit of the park. Provide copies of any license, pictures, or videos with stations and operators. Internet: <http://eaffen.netne.net/>; E-mail: <eaff@ea7heg.es>.

Russia's Silver Camel Award

The Russian oblast of Chelyabinskaya is situated on the mountainsides of the Southern Ural mountains in central Russia and has long been prized for its mineral wealth, especially for the types of metals used in heavy industry. Note that the award requires working different numbers of "RDA" numbers, which form the basis of the Russian District Award, issued by another group. A complete list of the the districts applicable to this award can be found at: <http://rdaward.org/>.

The award is sponsored by the radio amateurs of Magnitogorsk city and Chelyabinskaya oblast and the territories that are part of the Chelyabinskaya oblast. The award's design is taken from historical coats of arms and features a silver camel carrying a load of gold. Other symbols reflect the wealth of this area: the rich metallic heritage, metallurigists, machine engineers, foundry industry, and the power of an industrially developed region. The gold in the arms allegorically shows the unique southern Ural nature, inexhaustible riches of the earth.

The award is earned by contacting amateur radio stations of the Chelyabinskaya oblast on any band any mode since June, 29, 2008.

HF—Contact different territories of the Chelyabinskaya oblast under the list of Russian District Award (see website above).

3rd class diploma—15 territories of the Chelyabinskaya oblast.

2nd class diploma—30 territories of the Chelyabinskaya oblast.

1st class diploma—55 territories of the Chelyabinskaya oblast.

SWL okay. Send log extract and fee of 40 rubles for RA, 5 Euros or US$5 to: Vladimir Vitalyevich Krivoshapko, UA9AAG, Stroiteley str., 41-43, Magnitigorsk, 455004, Chelyabin skaya oblast, Russia. E-mail: <ua9aag@mail.ru>.

Russia's Silver Camel Awar is sponsored by the radio amateurs of Magnitogorsk city and Chelyabinskaya oblast and the territories that are part of the Chelyabinskaya oblast.

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

73, Ted, K1BV

contesting

BY JOHN DORR,* K1AR

Has Contesting Reached Its Peak?

August's Contest Tip

Many contesters, including myself, tend to limit their contesting experience to the mainstream modes of CW and SSB. Unless you've been hiding under a rock, digital modes, as well as VHF/UHF, have taken off, offering a new set of opportunities for contesting fun. Also, by trying out new modes of contesting, you broaden your personal experience as well as skill. Let's all get on the bandwagon and check them out. You may be surprised to learn there's a whole new world of contest operating at your fingertips that can make you a more rounded and skilled operator.

There are some cold, hard facts about our hobby, and contesting in particular, that we need to face. At this year's Dayton Hamvention® the continued aging of contesters (with the notable exception of a few such as KØDXC) was even more apparent to most of us. That fact—combined with all the other factors we keep hearing about (e.g., the internet, cell phones, computer games, etc.)—is dramatically impacting the availability of new radio hobbyists (young or old). Unlike the "old days" when many of us became hams, worldwide access to people and information is incredibly affordable and available right at our fingertips.

Have you walked through a consumer electronics store lately? It's particularly interesting to look at the computer gaming section of a typical store. This may not surprise you, but it sure doesn't look like the Contest Super Suite at the Dayton Hamvention®. The average age of the customers is probably 15 years old, dominated by a group of youngsters who have as least as much enthusiasm for their sport as we did for our ham radio sport in our youth. There are some kids who have as many internet friends around the world as we know hams. Yes, my fellow contester, we have serious competition indeed.

Well, now that I've gotten you to the point of wanting to sell your equipment while there's still a marginal market of buyers available, let's shift gears and focus on an attribute of contesting that's very curious—especially in light of my earlier comments. Why is it that, in a period of seemingly stagnant or declining growth, we continue to see contest scores and participation escalating? With this escalation, have we, in fact, seen the peak of contesting? After all, we have established by most popular measures that the population of available HF contesters is declining. With the average age of hams rising, isn't the number of "contest hours" operated by a typical competitor less than ever before?

It seems that we have all of the ingredients to witness a decline in overall scores, not an increase. That should translate into an overall decline in contest interest and perhaps the conclusion that we have seen the best days. However, all you need to do is flip on the radio in any reasonabe-size contest, and your receiver will be filled with operators across the band. Whether it's the CQ WW, a 160-meter contest, or the ARRL Sweepstakes, the bands are alive with the sounds of contesters, as Julie Andrews might have said had she been a ham.

Well, I believe there are a number of factors to consider, beginning with continuing improvements in and accessibility to modern ham gear—especially overseas. Certainly it can't hurt scores now that more operators have better equipment to use when operating. Indeed, the days of Eastern Europeans using 16-tune UW3DI designs largely are over. The result: higher scores. And, with higher scores comes increased interest in contest operating by everyone.

Another aspect of this discussion has to do with the number of available stations to work. Now this may seem contradictory to my opening comments, but while amateur radio growth is declining, there are pockets of seemingly dramatic increases. You can determine this in many ways, but an obvious one is to think about a country's newly issued callsigns. Consider what's happening in countries such as England (with the M block now nearly fully subscribed) or Germany (yes, there is a hoard of new callsigns out there). There are plenty of other examples around the world. To be fair, some of this callsign jockeying is a result of local "vanity" programs, but there's no denying that many countries are seeing an influx of new HF operators. For those competitors who benefit most from the availability of Europeans, these new fellows are a boon to contest scores. Also, when combined with other geographic hot spots, the picture may not be as bleak as we think.

It's apparent that the quality of operating is growing, too. There once was a day when I was concerned about setting my keyer speed too high. Would I miss out on stations calling me because I was sending too fast? Now, admittedly coming from an East Coast perspective, we can't send fast enough at peak-rate times during a DX contest. The volume of quality operators has markedly increased for sustainable periods. This translates into higher rates and higher scores. In fact, it's become a disappointment in my part of the world if your peak rates on CW are less than 150 per hour during a CQ WW contest. I would add that this is not just a CW issue. SSB rates have climbed to staggering levels as well. The fact is that there are just more stations to work on any mode, in any contest, at any time of the year. I would add that this is true for both DX and domestic contests (take a look at ARRL Sweepstakes results if you doubt the claim). As another example, the recently held 2009 CQ WPX contests have received a record number of logs. That's good

Calendar of Events

All year	**CQ DX Marathon**
July 25–26	RSGB IOTA Contest
Aug. 1–2	North American CW QSO Party
Aug. 1–2	ARRL UHF Contest
Aug. 2	SARL HF Phone Contest
Aug. 8–9	Worked All Europe CW Contest
Aug. 15–16	SARTG RTTY Contest
Aug. 15–16	North American SSB QSO Party
Aug. 15–17	New Jersey QSO Party
Aug. 22–23	Ohio QSO Party
Aug. 29–30	SCC RTTY Championship
Aug. 29–30	YO DX HF Contest
Aug. 29–30	SARL HF CW Contest
Sept. 5–6	All Asian SSB Contest
Sept. 12–13	Worked All Europe SSB Contest
Sept. 26–27	**CQ WW DX RTTY Contest**
Oct. 24–25	**CQ WW DX SSB Contest**
Nov. 28–29	**CQ WW DX CW Contest**

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Paul Bittner, WØAIH (left), receiving his CQ Contest Hall of Fame plaque from Bob Cox, K3EST (right), at the 2009 Contest Dinner in Dayton. (Tnx to K8CX and hamgallery.com)

for us and great for the hobby in general!

So what can be concluded here? As active participants in our hobby, we certainly have cause for concern about its future. Yet there's ways to measure activity and interest, and fortunately one of them is contest operating. Contesting has a lot of gusto and momentum. It's always been an aspect of amateur radio that many hams have enjoyed for a variety of reasons. Why? Because it's not hard and addresses the interests of many hams, whether their focus is on DXing, station performance, or just wanting to make an interesting QSO. Has contesting reached its peak? I don't think so. We may be in for a tough stretch as poor conditions continue, but I remain cautiously optimistic that we'll be back for another day. So don't miss out by folding up your contest tent. You'll regret the fact that you did!

Congrats to WØAIH!

It's always a privilege to acknowledge new inductees into CQ's Contest Hall of Fame and this year is no exception. Paul Bittner, WØAIH, is the 2009 inductee and deservedly so. As someone who has known Paul for a very long time, I can attest to his contributions both as an operator/ station builder, as well as a mentor to so many others. I would guess that Paul has lost count of the number of contest operators (new and experienced) who have enjoyed his hospitality (and that of his XYL, Mary) – all from the surprising, and propagationally hostile location of western Wisconsin. Congratulations, Paul. You are a first class contester and an even better person!

Reminder: New Xtreme Category for the CQ WW

As reported in the June issue of *CQ*, a new Xtreme category is being added to the CQ World-Wide DX Contest to encourage the development of new technologies in amateur radio communications in general and contesting in particular. This new category has been established to allow amateurs to participate in the CQ WW contest while experimenting creatively with internet-linked stations and other new technologies. Scoring for logs submitted in the new category will be a mix of standard CQ WW scoring plus a more subjective score for level of innovation and originality, as determined by a panel of judges on the CQ WW Contest Committee. The highest-scoring entries in the Single-Operator and Multi-Operator categories will win the John Kanzius, K3TUP, Memorial plaques, sponsored by Tim Duffy, K3LR.

The new category will take effect with the 2009 CQ World-Wide DX Contests this fall. Since the announcement at Dayton, the response has been overwhelmingly positive. You can find complete details of the Xtreme category at <http://www.cq-amateur-radio.com> or in the June issue of *CQ*.

Final Comments

Well, that's all for this month. I hope you enjoy reading the CQ WW DX SSB results in this month's copy of *CQ*. As always, there was a lot of sweat equity that went into producing the final results. With that being said, the 2009 fall contest season is nearly upon us. I hope to see you in my log. See you in the next contest!

73, John, K1AR

propagation

BY TOMAS HOOD,* NW7US

August Propagation

A Quick Look at Current Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, May 2009: 3
Twelve-month smoothed, November 2008: 2

10.7 cm Flux
Observed Monthly, May 2009: 71
Twelve-month smoothed, November 2008: 68

***Ap* Index**
Observed Monthly, May 2009: 4
Twelve-month smoothed, November 2008: 5

One Year Ago: A Quick Look at Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly,May 2008: 3
Twelve-month smoothed, November 2007: 6

10.7 cm Flux
Observed Monthly, May 2008: 68
Twelve-month smoothed, November 2007: 71

***Ap* Index**
Observed Monthly, May 2008: 6
Twelve-month smoothed, November 2007: 8

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for August 2009

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 6, 23	A	A	B	C
High Normal: 2-5, 9-17, 19-22, 24, 27, 29-31	A	B	C	C-D
Low Normal: 1, 8, 18, 25-26, 28	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 poor (D) to fair (C) on August 1st, fair (C) on the 2nd through the 5th, 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.

Late August and early September are a difficult time of year for which to make accurate band predictions because conditions can change drastically from day to day. On many days typical summertime conditions will continue much as they were during June and July. On the other days conditions may sound typically fall-like, with somewhat higher daytime usable frequencies and somewhat lower nighttime usable frequencies. When you add *equinoctial* conditions that can begin as early as late August, we often experience optimum openings between the Northern and Southern Hemispheres on the one hand, but periods of active to stormy conditions on the other.

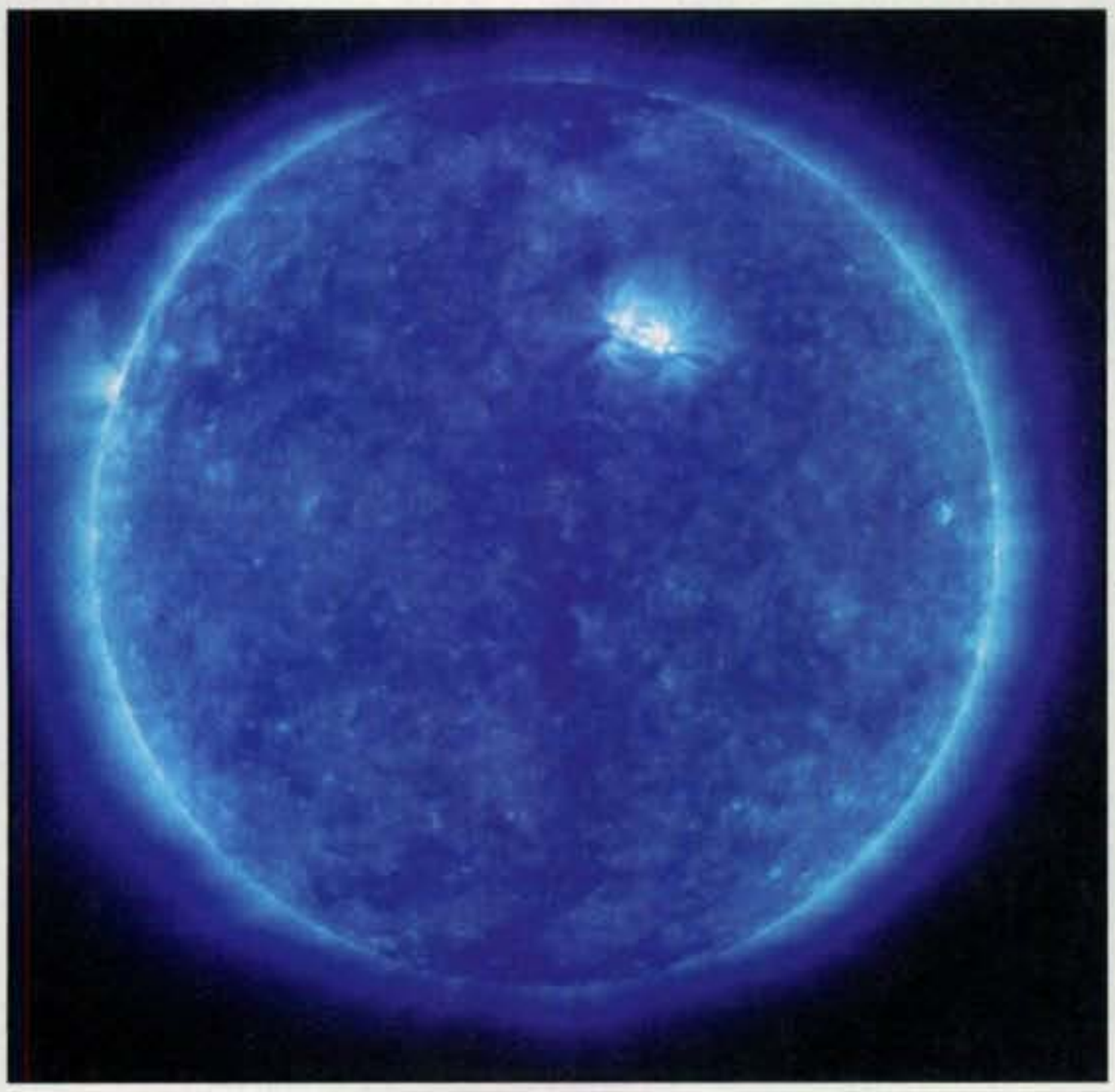
Despite being at the very bottom of the period between solar Cycles 23 and 24, during the daylight hours good DX conditions should be possible on several bands: 15, 17, and 20 meters. Expect signals on the 17- and 20-meter bands to peak approximately during the two-hour window immediately following sunrise and again during the late afternoon. These two bands, and to a lesser degree the 15-meter band, will see openings for DX throughout the daylight hours. Fairly good DX openings should occur along an arc extending across central Africa, Latin America, and into the far Pacific area. Peak conditions should occur during the afternoon hours, but an increasing number of earlier openings should be possible by early September.

Between sundown and sunrise 20 meters is expected to be the best DX band. However, with lower solar activity, the band in general will suffer compared with the past few years. Openings might be possible to many areas of the world, some with surprisingly strong signal levels. Until midnight good DX conditions should be found for openings toward Latin America, the far Pacific, and into Asia. You might even catch some activity on 17 or 15. Fairly good conditions are also expected on 30, 40, 60, and 80 meters despite the high static level at times. Openings should be possible before midnight along an arc extending from northern Europe, through Africa, and into Latin America, the far Pacific, and Asia after midnight.

By late August it should be possible to work some DX on 160 meters during the hours of darkness. Conditions on this band—as well as on 40, 60, and 80 meters—will tend to peak just as the sun begins to *rise* on the *light*, or easternmost, terminal of a path.

For *short-skip* openings during August and early September, try 80 meters during the day for distances less than 250 miles, with 60 and 40 meters also usable. During the hours of darkness both 80 and 160 meters should provide excellent communications over this distance. For openings between 250 and 750 miles use 30 and 40 meters during the day for distances up to 500 miles, and 20 and 17 meters between 500 and 750 miles. At night, 40 and 30 meters should be the best bands for this distance until midnight, with 80 meters optimum

*P.O. Box 9, Stevensville, Montana 59870-0009
e-mail: <nw7us@arrl.net>



The Extreme Ultraviolet Imaging Telescope look at the solar transition region and inner corona in the 171 wavelength (171 Â) bandpass in the extreme ultraviolet (EUV) spectrum. Note the magnetic field lines formed by plasma above the sunspots in this sunspot group, 11019, on June 5, 2009. (Source: NASA/SOHO [the Solar & Heliospheric Observatory])

from midnight to sunrise. Try 60 meters, as well. For openings between 750 and 1300 miles, try 20 and 17 meters, as they should provide optimum propagation during the hours of daylight. Optimum conditions should continue on these bands for this distance range after sundown and until midnight. Between midnight and sunrise the best band should be 40 meters, but check 60 meters, too. For openings between 1300 miles and the one-hop short-skip limit of approximately 2300 miles, try 20 and 17 meters during the day, with 15 meters also usable. After sundown try 30, 40, and 60 meters, with 80 meters also providing good propagation conditions for this distance range.

VHF Conditions

Sporadic-*E* propagation usually begins to taper off during August, but it should continue to occur fairly frequently. Some 6-meter sporadic-*E* openings are expected during the month over distances of approximately 750 to 1300 miles. During periods of intense and widespread sporadic-*E* ionization, two-hop openings may be possible considerably beyond this range. Also check the 2-meter band for an occasional sporadic-*E* short-skip opening between approximately 1200 and 1400 miles. While sporadic-*E* short-skip openings may occur at any time, there is a tendency for them to peak between 8 AM and noon, and again between 6 PM and 9 PM local daylight time.

The *Perseids* meteor shower starts during the beginning of August, and peaks the night of August 12. It is most observable in the Northern Hemisphere. The maximum hourly visual rate should reach 80.

For the very patient, check the 6-meter band for possible trans-equatorial (TE) openings between 8 and 11 PM local daylight time. This type of propagation favors openings from the southern tier states into deep South America, with the signal path crossing the magnetic equator at a right angle. TE openings during August are rare, but they can occur. Very weak signals and severe flutter fading usually characterize them.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for May 2009 is 2.9, up from April's 1.2. The lowest daily sunspot value recorded was zero (0) on May 1–3, 5–12, 20–21, and 24–30. The highest daily sunspot count was 11 on May 31. The 12-month running smoothed sunspot number centered on November 2008 is 1.7. A smoothed sunspot count of 8, give or take 8 points, is expected for August 2009.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 70.6 for May 2009, up from April's 69.7. The 12-month smoothed 10.7-cm flux centered on November 2008 is 68.3. The predicted smoothed 10.7-cm solar flux for August 2008 is 69, give or take about 7 points.

The observed monthly mean planetary *A*-index (*Ap*) for May 2009 is 4. The 12-month smoothed *Ap* index centered on November 2008 is 5.1. Expect the overall geomagnetic activity to vary between quiet to active during most days in August.

There is a new resource on the web for discussion of space weather and radio-wave propagation. If you are on Facebook, check out the Radio Propagation and Space Weather Group at <http://tinyurl.com/fb-spacewx>.

As always, I invite you to visit my online propagation resource at <http://propagation.hfradio.org/>, where you can get the latest space data, forecasts, and more, all in an organized manner. If you have a cell phone with internet capability, try <http://wap.hfradio.org/>.

Drop me an e-mail or send me a letter, if you have questions or topics you would like to see me explore in this column. Also, I'd love to hear any feedback you might have on what I have written. Until next month . . .

73, de Tomas, NW7US

CQ books...books...books & dvds!

Passport to World Band Radio

2009 Edition

The world's #1 selling shortwave guide! Have the world at your fingertips! You'll find in depth details on what to buy and where to tune.

Order No. PASS $22.95

The Complete DXer

Third Edition

The joy of the chase, the agony of defeat, the thrill of victory are the stuff of The Complete DXer, a book that is almost as seductive as the DX chase it describes. It excites, it entertains, it teaches!

Order No. COMPDXer $19.95

MIL SPEC Radio Gear

Korean War To Present Day
by Mark Francis, KIØPF

Detailed write-ups for many familiar sets: PRC-25/-77, RT-68, PRC-1099, GRC-106, GRR-5, R-392 and more Over 230 pages of operation, modification, and maintenance tips and information, including 200+ illustrations.

Order No. MILSPEC ~~$27.95~~ Now $25.00

Heathkit - A Guide to the AR Products

by Chuck Penson, WA7ZZE

This greatly expanded Second Edition is a must for collectors and Ham history buffs! Pick up this 328-page volume and you won't be able to put it down!

Order No. HEATHKIT $29.95

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

Inexpensive, practical antenna projects that work! Guides you through the building of wire, loop,Yagi & vertical antennas.

Order No. W6SAI $19.95

Understanding, Building & Using Baluns & Ununs

by Jerry Sevick, W2FMI

The successor to the popular and authoritative Baluns and Ununs. Great deal of new tutorial material, and designs not in previous book, with crystal clear explanations of how and why they work.

Order No. 2BU $19.95

Sloper Antennas

By Juergen A. Weigl, OE5CWL

Single- and Multi-Element Directive Antennas for the Low Bands

With calculations and practical experience, this book shows which basic concepts have to be considered for sloper antennas for the low bands. These fundamentals are supplemented by construction guidelines for directive antennas using a single element or several elements. You'll find all the information needed for successful home building of the antennas.

Order No. Sloper $24.95

2009 World Radio TV Handbook

Up-to-date information on mediumwave, shortwave, and FM broadcasts and broadcasters. Includes articles of interest to both listeners and DXers, reviews of the latest equipment, maps with SW transmitter sites and much, much more!

Order No. WRTH $29.95

The Vertical Antenna Handbook

by Paul Lee, N6PL

Learn basic theory and practice of the vertical antenna. Discover easy-to-build construction projects.

Order No. VAH $17.95

The Quad Antenna

by Bob Haviland, W4MB

A comprehensive guide to the construction, design and performance of Quad Antennas.

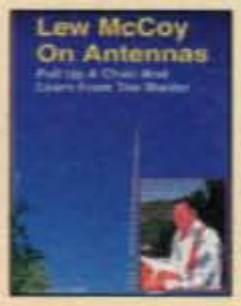
Order No. QUAD $19.95

The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

A comprehensive source of HF propagation principles, sunspots ionospheric predictions, with photos, charts and tables galore!

Order No. SWP $19.95



McCoy on Antennas

by Lew McCoy, W1ICP

Unlike many technical publications, Lew presents his invaluable antenna information in a casual, non-intimidating way for anyone!

Order No.MCCOY $19.95

The Short Vertical Antenna & Ground Radial

by Jerry Sevick, W2FMI

Small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. If antenna restrictions are a problem? This book could keep you on the air!

Order No. SVERT $10.00

33 Simple Weekend Projects

by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. You'll find: station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for $100. Also includes practical tips and techniques on how to create your own electronic projects.

Order No. 33PROJ $17.95

"Getting Started" DVD Paks

Our renowned Getting Started videos have been grouped together on DVDs!

CQ Ham Radio Welcome Pak
Includes 3 programs:
Ham Radio Horizons
Getting Started in Ham Radio
Getting Started in VHF
Order # DVDHR

CQ VHF Specialty Pak
Includes 3 programs:
Getting Started in Satellites
Getting Started in VHF
Getting Started in Packet
Order # DVDVHF

CQ HF Specialty Pak
Includes 2 programs:
Getting Started in DXing
Getting Started in Contesting
Order # DVDHF

1 - $24.95
2 - $45.95
3 - $65.95

1 Pak for $24.95; 2 Paks for $45.95; 3 Paks for $65.95
Buy any combination and save!

VHF Propagation

A Guide For Radio Amateurs

by Ken Neubeck, WB2AMU & Gordon West, WB6NOA

A comprehensive source-book on VHF propagation by two great authors! Here's a sampling of what you'll find inside:
- Tropo Ducting • Aurora
- Meteor Scatter • TEP
- Sporadic-E • Combo Modes

Order No. VHFProp $15.95

***Shipping & Handling: U.S. & Possessions-add $7 for the first item, $3.50 for the second and $2 for each additional item.**
FREE shipping on orders over $100.
All Foreign Shipping & Handling - calculated by order weight and destination and added to your credit card charge.

CQ Communications, Inc., 25 Newbridge Rd., Hicksville, NY 11801
Call 1-800-853-9797 - FAX your order to 516-681-2926 - www.cq-amateur-radio.com

Results of the 2008 CQ WW DX SSB Contest *(from page 29)*

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, and Countries. An asterisk (*) before a call indicates low power. Certificate winners are listed in bold. (All country terminology reflects the DXCC list at the time of the contest.)

2008 SSB RESULTS
SINGLE OPERATOR
NORTH AMERICA

United States

K5ZD/1	**A**	**6,121,516**	**3680**	**127**	**469**
K1LZ	*****	**4,915,323**	**3307**	**121**	**445**
K1DG	*****	**4,620,600**	**2839**	**126**	**486**
N2NT/1	*****	**4,584,160**	**2989**	**119**	**441**
W1HIS	*	638,050	687	82	268
W6PH/1	*	598,920	766	77	233
W1OP	*	584,168	695	77	251
			(OP: K1PLX)		
N1DO	*	524,901	639	74	239
W1FM	*	344,810	482	77	213
W1KQ	*	330,638	478	60	206
W1WEF	*	270,657	421	75	186
K1SND	*	201,480	335	61	169
W1BYH	*	187,824	258	77	224
W1ZS	*	184,569	374	45	142
N4XR/1	*	148,350	259	61	169
KB1W	*	118,140	257	40	139
KB1PAJ	*	60,760	177	33	91
K1KU	*	52,752	145	43	114
W1WQM	*	46,512	183	45	108
			(OP: WA1NH)		
AD5TJ/1	*	24,416	109	39	73
W1YRC	*	12,851	68	29	42
AI1O	*	12,441	86	27	60
W1MK	*	1,443	28	15	24
K1YM	*	840	24	10	18
NN1N	**21**	**146,433**	**413**	**29**	**104**
KQ2M/1	**14**	**1,242,150**	**2504**	**38**	**144**
W3UA/1	*	693,211	1488	35	138
K8PO/1	*	683,612	1744	30	118
K1IM	*	196,983	603	27	102
W1XX	**7**	**118,560**	**421**	**25**	**89**
W1CSM	*	900	17	5	13
AA1BU	**3.7**	**216,982**	**723**	**19**	**87**
W5WMU/1	*	168,498	626	20	91
K1HAP	1.8	8,832	77	11	37
***K1BX**	**A**	**1,655,738**	**1346**	**101**	**353**
***N1UR**	*****	**1,591,320**	**1337**	**101**	**346**
*N1PGA	*	684,070	752	75	260
*W1JQ	*	291,375	426	65	194
*N4CW/1	*	278,863	418	59	188
*K1BV	*	207,427	426	36	137
*K1SLB	*	180,297	355	52	149
*W1AO	*	155,792	278	55	153
*WB1EDI	*	117,018	229	53	144
*W1KT	*	116,610	243	40	129
*W1DAD	*	63,600	166	43	107
*AD1DX	*	51,770	170	53	102
*W1RPG	*	46,182	152	38	91
*KA1C	*	39,648	137	33	85
*K1HTJ	*	39,474	144	42	87
*K1HI	*	34,226	124	36	73
*KA1VMG	*	17,094	83	22	55
*N1HTS	*	16,511	77	22	57
*W1GXZ	*	16,500	90	23	52
*WR1Q	*	14,691	87	31	52
*KB1JDY	*	13,090	96	32	53
*K1VU	*	12,126	75	29	57
*K1KNJ	*	11,748	70	22	44
*WJ1B	*	11,455	70	30	49
*N1URA	*	7,680	61	19	41
*K1NKA	*	7,452	54	25	44
*AB1JB	*	5,865	48	26	43
*W2JU/1	*	5,832	42	21	33
*KB1FRK	*	5,551	48	20	41
*K1NPT	*	2,576	35	19	27
*N1NN	*	1,683	26	12	21
*W1QH	*	837	17	13	14
*N4QX/1	*	36	3	3	3
*KB1LXX	*	0	1	1	1
***N1NK**	**21**	**45,838**	**199**	**18**	**64**
*K1VSJ	*	36,465	156	19	66
*W1DYJ	14	4,116	39	13	29
W2GB	**A**	**565,950**	**752**	**66**	**228**
WA2NHA	*****	**560,196**	**777**	**67**	**206**
N2ED	*	498,582	631	94	284
W2LK	*	291,893	418	66	193
NE2I	*	255,195	452	72	193
K2NV	*	119,400	232	56	143
K2UT	*	95,864	200	54	130
W2FUI	*	73,712	188	38	98
KM2L	*	68,586	177	38	100
N2LT	*	65,554	157	43	103
W2TB	*	47,847	143	32	91
KI2P	*	47,376	157	35	91
N2CK	*	43,568	150	33	79
N2NI	*	19,350	87	24	66
N2EIK	*	17,082	110	18	60
KD2HE	*	11,680	65	23	50
K2MK	*	5,022	45	20	34
KC2KZJ	*	3,136	39	20	29
N2PP	**21**	**227,408**	**747**	**26**	**96**
W2RR	*	46,750	197	20	65
AB9OX/2	*	7,790	74	12	29
W2OSR	**14**	**42,630**	**206**	**20**	**78**
NT2A	**7**	**47,415**	**190**	**24**	**85**
N2GC	*	11,940	73	17	43
AB2IO	*	468	12	3	10
W2MF	**1.8**	**25,912**	**140**	**15**	**64**
***K2CS**	**A**	**510,190**	**595**	**78**	**248**
***N2RJ**	*****	**432,638**	**610**	**54**	**199**
*K3OX/2	*	244,223	342	71	180
*WA2JQK	*	235,470	391	71	211
*WB2WPM	*	223,660	398	48	163
*AB2TC	*	125,705	288	37	118
*N2MTG	*	90,712	216	54	130
*N2WSY	*	87,824	183	44	132
*WA2MCR	*	80,410	193	58	112
*WA3RHW/2	*	49,776	147	40	96
*KD2MU	*	29,854	129	34	84
*W2VU	*	25,440	97	29	67
*K2BBQ	*	22,892	103	35	62
*N2VM	*	16,568	90	35	74
*KC2QJB	*	13,244	82	21	65
*WS9M/2	*	10,584	93	21	42
*N2MCI	*	9,966	71	18	48
*WB2TPS	*	6,148	48	19	34
*W2GDJ	*	5,453	50	13	28
*K5GMT/2	*	3,854	40	14	27
*N2WLS	*	3,827	36	16	27
*KA2FHN	*	2,220	27	15	22
*W3TUA/2	*	1,702	23	16	21
*KB2URI	*	1,296	22	14	22
*K2DL	*	1,000	16	11	14
*K2RNY	*	480	11	10	10
*WB2AIV	*	190	11	8	11
*WA2ART	*	143	8	6	7
*KC2FOL	*	30	3	2	3
***K2MFY**	**14**	**162,426**	**439**	**27**	**111**
*KX2S	*	33,180	155	18	66
*W2AW	*	28,440	129	18	61
			(OP: N2GM)		
*WA2YSJ	*	7,696	56	14	38
*K2BQW	*	7,350	66	14	36
*W2LHL	7	2,475	26	11	22
***K2YEH**	**3.7**	**27,888**	**140**	**19**	**65**
*K2SZ	*	13,237	91	15	46
*AI2N	*	1,593	25	7	20
K3CR	**A**	**4,051,088**	**2738**	**112**	**424**
			(OP: LZ4AX)		
AA1K/3	*****	**3,005,836**	**2277**	**114**	**394**
W3BGN	*****	**2,729,251**	**1979**	**117**	**394**
K3ZO	*	2,667,024	2128	99	365
*N3AYY	*	26,656	103	36	76
*ND3R	*	26,500	106	34	72
*K3VED	*	21,948	104	28	65
*WB3CJU	*	20,898	98	23	58
*KA3JLW	*	7,564	58	21	40
*N3JNX	*	5,141	48	19	34
*N3DFK	*	2,730	38	17	25
*AI3G	*	1,802	27	10	24
*N3XLS	*	1,457	27	13	18
*KA3CUQ	*	1,131	28	13	26
*KB3LVH	*	567	24	11	16
*KB3NUQ	*	192	9	6	6
*W3TD	21	4,255	45	12	25
*NØMSB/3	*	396	13	7	11
*K4EET/3	14	3,854	46	14	33
*K3LAB	*	1,860	23	10	21
***AJ3T**	**3.7**	**29,498**	**153**	**19**	**67**
K4ZW	**A**	**4,601,575**	**2937**	**130**	**447**
K4SSU	*****	**1,909,978**	**1713**	**119**	**335**
			(OP: NA4BW)		
K4AB	*	1,478,880	1180	113	367
N4POX	*	1,259,225	963	115	360
K4PV	*	902,915	1093	94	283
K4FX	*	709,464	856	71	238
K3ZM/4	*	702,420	800	86	259
K5VIP/4	*	71,592	201	45	107
N4KZ	*	58,788	159	39	99
W4AEJ	*	50,862	139	44	103
W4SUL	*	46,545	211	20	67
W4RIS	*	41,375	154	45	80
K4CEB	*	38,532	150	32	82
WC2Z/4	*	34,055	116	52	87
AI4WW	*	33,915	135	23	72
N4MJ	*	33,550	132	40	82
AE4EC	*	33,499	144	42	97
NA4C	*	31,654	122	47	72
N4DXI	*	25,116	111	24	67
W2DD/4	*	23,571	115	24	57
KF4DNL	*	22,908	97	30	62
W4STB	*	21,728	87	31	81
K4DZR	*	21,335	99	22	63
W4NTI	*	13,962	75	29	49
K2EK/4	*	12,720	121	16	32
N4RI	*	5,808	49	18	48
W8DQ/4	*	4,758	61	23	38
N2XD/4	*	1,628	26	13	24
W4HJ	*	928	23	11	21
K4WI	**28**	**3,381**	**59**	**9**	**12**
N4BP	**21**	**161,000**	**498**	**28**	**97**
WA4MØBUE	**14**	**30,200**	**132**	**22**	**78**
KD4Y	*	26,675	109	21	76
*K4IE	*	60,760	173	40	100
*AD2H/4	*	58,797	188	38	101
*N4WO	*	56,154	170	40	107
*KR1ST/4	*	51,649	155	41	96
*K4CX	*	51,168	162	33	90
*AI4GR	*	50,126	147	44	98
*KM4OZ	*	45,486	146	41	92
*W4RQ	*	40,940	134	32	83
*W9NWY/4	*	35,937	151	31	90
*NV4B	*	35,464	109	44	80
*N3UA/4	*	33,176	107	35	81
*KB4ZMR	*	29,648	119	32	77
*N4LKE	*	28,560	124	37	82
*KJ4KQ	*	27,776	97	36	76
*KM4RK	*	26,760	114	43	77
*K4AOC	*	26,133	115	31	62
*WV4V	*	25,070	93	38	71
*N4MUH	*	24,612	117	20	64
*WA3GNW/4	*	24,464	114	26	62
*WF7T/4	*	24,200	95	38	83
*W7QF/4	*	23,114	97	24	67
*K7CS/4	*	22,990	107	29	66
*N1ADY/4	*	22,704	101	21	65
*W4PFM	*	22,407	97	31	66
*N4IOZ	*	21,660	118	27	68
*KN4DS	*	21,300	98	36	64
*AI4KM	*	19,968	125	31	65
*AA4D	*	18,758	97	26	57
*ND4X	*	17,204	75	33	59
*K4EJ	*	16,984	84	27	61
*AI4CJ	*	12,397	104	25	52
*K4FTO	*	11,096	70	24	52
*WD4R	*	10,240	64	21	43
*N4ARO	*	10,212	57	29	45
*K2EUH/4	*	9,856	55	31	46
*KY4J	*	9,039	60	27	42
*KU4MT	*	8,330	57	26	44
*WA3RGH/4	*	7,626	86	22	60
*N4RVM	*	6,273	48	16	35
*KX4O	*	5,704	49	24	38
*N4APR	*	5,656	50	22	34
*KJ4BIX	*	5,390	56	22	33
*K9RIM/4	*	5,246	56	22	39
*W1WTG/4	*	5,145	40	19	30
*WA4OSD	*	4,305	40	13	28
*K1MIJ/4	*	4,176	40	17	31
*K2TV/4	*	3,969	40	16	33
*KA5VZG/4	*	3,807	35	17	30
*KV1P/4	*	3,760	42	13	27
*KG4ZDM	*	3,234	36	18	24
*AA4KD	*	2,772	32	11	25
*NØVR/4	*	2,747	29	15	26
*K4DXV	*	2,501	29	16	25
*K2VX/4	*	1,932	30	16	26
*WD8RYC/4	*	1,508	27	10	16
*K4GOP	*	795	39	21	32
*KF4IRC	*	690	15	9	14
*KU4UV	*	672	15	9	12
*KD4MZM	*	384	12	5	11
*KJ4CNN	*	350	14	4	6
*K3MZ/4	*	315	9	7	8
*NR4C	*	24	6	3	3
***NO4K**	**21**	**8,040**	**73**	**13**	**27**
*K4TVO	*	7,987	64	16	33
*W4FRA	*	2,077	31	12	19
*W4OGG	*	1,300	27	7	13
*NN4RH	*	1,000	21	7	13
*N3AO/4	*	540	18	9	11
***W4LC**	**14**	**130,284**	**390**	**25**	**101**
***WA1FCN/4**	*****	**107,160**	**381**	**26**	**94**
***KZ5OH/4**	*****	**84,637**	**304**	**23**	**90**
***WB2TFM/4**	*****	**76,152**	**269**	**24**	**90**
*K4NVJ	*	38,223	160	20	73
*AG4PJ	*	6,148	50	14	39
*W8KHP/4	*	4,356	45	14	30
*KØRRP/4	*	1,372	29	9	19
*W4AAZ	*	253	19	8	15
***NA4W**	**1.8**	**1,508**	**27**	**9**	**17**
					(OP: K4WI)
N5DX	**A**	**3,199,983**	**2286**	**135**	**402**
N2IC/5	*****	**3,141,460**	**2244**	**137**	**395**
K5ER	*	482,205	627	82	223
WA5ZJP	*	272,118	508	54	155
K5LAD	*	260,268	435	73	173
K5ZCJ	*	123,959	273	55	136
KD5JGA	*	88,128	218	41	112
N1QXV/5	*	77,818	260	38	108
WN5V	*	66,576	215	39	107
K7IA/5	*	61,200	215	41	95
N5RGV	*	50,050	205	46	97
KA5BQM	*	49,432	143	54	94
KD5JAA	*	41,328	151	48	75
W5MIL	*	24,476	122	42	74
N5OT	*	11,115	89	46	71
N5ZK	**21**	**63,852**	**236**	**25**	**77**
W5OV	14	4	1	1	1
W6PU/5	**7**	**22,922**	**112**	**22**	**51**
W5ZZ	**3.7**	**8,140**	**122**	**10**	**34**
K5RX	**1.8**	**15,470**	**116**	**16**	**54**
***N5DO**	**A**	**508,625**	**584**	**96**	**229**
***WD5K**	*****	**503,132**	**622**	**82**	**220**
*W5GFI	*	95,190	253	47	120
*WS1L/5	*	76,160	204	40	100
*KE5LQ	*	54,864	152	49	95
*KD5ZEZ	*	50,700	146	58	92
*K3TD/5	*	47,847	161	45	78
*N1CC/5	*	47,388	155	45	87
*KC5YPU	*	26,300	109	39	61
*WA5JEC	*	19,686	92	35	67
					(OP: W5EX)
*KØGEO/5	*	18,584	83	32	60
*K5BZH	*	17,630	87	32	54
*WB5IZD	*	12,390	80	20	39
*W5OLF	*	10,281	61	28	41
*N5DTT	*	7,865	57	25	40
*KD5MMM	*	7,632	51	21	32
*K5DHY	*	5,605	41	23	36
*AA5TB	*	5,225	45	24	31
*WD5JNC	*	4,277	36	18	29
*W5RI	*	3,294	53	18	36
*N5AIU	*	3,060	34	18	27
*KX5RW	*	1,855	22	16	19
*AF5Q	*	1,680	38	25	31
*N5HMH	*	962	23	11	15
*AI5G	*	285	8	7	8
*KK5MR	*	195	17	8	7
*NW5R	*	90	5	5	5
*KE5TQA	28	18	5	1	2
***N4LJ/5**	**21**	**71,172**	**285**	**27**	**81**
*AA5JG	*	816	21	7	9
*AC5O	14	13,912	79	19	55
W6AAN/3	*	1,601,249	1286	105	376
N1WR/3	*	1,259,715	1136	91	320
K3WI	*	565,110	660	77	238
N3YW	*	517,120	613	71	249
N3UM	*	465,663	574	76	233
N3RJ	*	365,652	550	60	192
W3PVT	*	141,400	295	56	146
K3ATD	*	132,108	274	57	145
W3EKT	*	127,512	317	56	151
N3RW	*	98,580	239	39	120
K3ISH	*	72,494	202	36	98
K3RWN	*	71,231	197	46	117
AD8J/3	*	67,760	194	39	101
W3DF	*	49,476	166	47	86
W3GNO	*	47,908	169	35	83
K3ASK	*	39,852	161	31	77
W3SQ	*	29,624	140	23	69
N3ST	*	24,534	107	26	68
K3RMB	*	19,236	90	26	58
K3MRG	*	17,820	107	15	51
N3TIR	*	14,208	103	38	73
W3LDG	*	8,060	59	23	42
W3RCP	*	621	17	9	14
AK3E	*	528	11	8	8
KA1NCN/3	**14**	**667,322**	**1607**	**35**	**128**
WR3H	*	44,880	178	21	81
W3NO	**3.7**	**85,910**	**268**	**25**	**96**
W3GH	**1.8**	**12,420**	**91**	**17**	**52**
***N53T**	**A**	**126,276**	**252**	**61**	**143**
*W3IUU	*	107,046	239	48	123
*KB3LIX	*	106,200	227	48	132
*N3ALN	*	87,474	271	51	132
*N2US/3	*	36,188	129	28	81
KZ2I/4	*	667,131	680	90	291
W4KW	*	569,774	674	92	255
W4EEH	*	454,720	596	69	221
N4PSE	*	419,575	515	79	246
N4RA	*	365,211	511	68	211
N4MM	*	344,790	450	69	201
KF4VTT	*	301,126	440	68	206
W4PV	*	300,780	536	74	196
N1GC/4	*	275,436	404	64	188
N4KW	*	256,122	409	66	177
N4LV	*	241,080	402	62	184
K4PHE	*	237,524	409	57	181
WX4G	*	229,848	398	61	183
WA4DOU	*	228,250	352	66	184
K4QO	*	225,843	383	67	182
WO4O	*	217,740	446	48	143
K4EU	*	216,692	383	52	166
W4MAY	*	208,164	371	50	159
AK4JH	*	200,980	352	68	192
NE4M	*	163,313	322	49	148
NJ4F	*	140,910	310	48	135
N3FP/4	*	115,620	268	51	137
WK4P	*	114,465	238	53	142
W4VIC	*	112,200	275	44	121
AB4IQ	*	111,960	263	53	127
AF4DX	*	110,704	234	44	132
WØYR/4	*	104,394	298	28	109
K4FYM	*	101,913	242	43	118
NC4MI	*	99,188	229	46	135
KI4YY	*	89,739	217	47	122
KY4P	*	81,396	201	41	112
K4EDI	*	78,657	182	51	116
WA3OFC/4	*	75,250	179	48	127
N4PN	**7**	**493,041**	**1344**	**31**	**118**
KU8E/4	*	27,285	121	19	66
AA4NU	*	18,788	100	22	55
W8JU/4	**3.7**	**114,950**	**485**	**27**	**94**
			(OP: WW4LL)		
W4QNW	*	28,137	144	17	66
WØPV/4	*	6,864	60	10	34
AA4MM	**1.8**	**3,822**	**56**	**11**	**38**
***K9OM/4**	**A**	**499,565**	**579**	**78**	**263**
***NA4CW**	*****	**462,186**	**559**	**79**	**238**
***W4LT**	*****	**454,896**	**605**	**76**	**236**
*W4TMN	*	440,920	566	74	228
*NA4K	*	343,095	495	63	204
*AB4GG	*	337,740	489	64	196
*K4GKD	*	313,536	434	72	204
*KA8Q/4	*	246,633	397	56	173
*KI3O/4	*	222,630	345	58	188
*KS4X	*	148,478	300	45	142
*W3TB/4	*	145,642	281	60	142
*WB4JFS	*	141,620	304	52	142
*N2ESP/4	*	139,535	298	62	153
*K4DMH	*	125,064	286	53	140
*N4EK	*	121,604	266	40	132
*K4OD	*	109,710	266	64	143
*K4MF	*	103,740	222	48	134
*WØCN/4	*	98,644	214	47	135
*NB4M	*	97,218	275	63	135
*N4VA	*	90,211	232	35	104
*W9OHD/4	*	89,194	232	37	124
*N3CZ/4	*	84,788	176	61	127
*W4YE	*	80,864	221	35	98
*W4UEF	*	66,748	205	40	108

*WJ5DX	*	4,902	49	13	30	
			(OP: W5AJ)			
*W6HH/5	3.7	1,470	22	13	17	
N6TJ	**A**	**2,125,669**	**1650**	**137**	**360**	
WC6H	**	**1,544,018**	**1467**	**114**	**292**	
			(OP: NU6S)			
K6XX	**	**1,014,300**	**1145**	**105**	**240**	
KI6CG	*	356,900	634	68	147	
N6NF	*	324,399	569	77	136	
K6LRN	*	115,362	288	47	106	
KG6AO	*	75,922	202	63	91	
WB6JJJ	*	73,698	241	52	90	
NK6A	*	38,800	152	31	66	
K6UUW	*	37,752	144	37	67	
NR3Y/6	*	25,647	125	29	54	
KG6OJB	*	25,152	120	44	52	
AJ6V	*	22,881	108	31	56	
KG6ZHC	*	10,788	72	30	32	
K6ST	*	8,178	66	22	36	
KY6LA	*	5,130	52	23	22	
AD6KA	*	3,696	40	18	24	
K6JAT	**21**	**20,650**	**130**	**20**	**39**	
W6SZN	*	15,000	107	18	42	
WØYK/6	**14**	**269,360**	**807**	**31**	**99**	
K6HNZ	*	207,879	615	32	101	
W6AFA	*	153,289	483	30	97	
W6RBA	*	8,085	71	16	39	
W6MVW	*	2,772	37	15	29	
K6NA	**7**	**183,147**	**560**	**31**	**92**	
K5KT/6	*	31,150	134	23	66	
N6CCH	*	15,602	202	21	37	
N2NS/6	*	8,568	63	20	36	
***N6RV**	**A**	**173,250**	**357**	**69**	**141**	
***AA6K**	**	**127,050**	**293**	**56**	**119**	
*WN6K	*	96,922	238	61	100	
*AF6EV	*	75,010	221	48	82	
*K6TV	*	60,333	211	40	79	
*N6IEF	*	53,710	202	42	89	
*KD4HXT/6	*	49,980	172	45	74	
*KE6SHL	*	31,339	129	48	73	
*K6AAB	*	27,648	122	42	54	
*N6GEO	*	27,100	127	41	59	
*KN6Y	*	23,750	115	36	59	
*K6WSC	*	22,019	126	38	59	
*KE6LPO	*	20,140	102	36	59	
*WA6NHO	*	18,144	110	32	52	
*KQ6X	*	14,536	90	40	52	
*N6JV	*	14,400	76	27	45	
*AA6EE	*	12,920	87	29	47	
*N6RZR	*	11,685	89	24	33	
*K6DEX	*	9,234	72	22	35	
*N6SPB	*	7,182	51	24	30	
*AF7K/6	*	6,254	56	25	28	
*K6CSL	*	5,871	54	27	30	
*KI6QDB	*	5,824	62	29	35	
*AE6YB	*	5,246	55	19	24	
*KE6QET	*	4,320	44	23	25	
*KI6SYO	*	3,936	40	24	24	
*AF6ME	*	3,634	50	22	24	
*KI6LQE	*	2,898	51	18	24	
*K6RM	*	2,808	31	16	20	
*KI6GVM	*	2,580	48	14	16	
*NA6G	*	2,546	30	19	19	
*N5KO/6	*	2,320	34	14	15	
*N1KR/6	*	1,426	34	16	15	
*KK7GO/6	*	1,369	22	15	22	
*KF6JQC	*	880	24	11	11	
*N6PCD	*	437	26	12	11	
***AE9F/6**	**21**	**8,602**	**66**	**17**	**29**	
***W6EUF**	**14**	**61,268**	**203**	**30**	**76**	
*KM6Z	*	29,438	153	23	59	
*K6JRA	*	56	6	4	2	
***KI6LZ**	**7**	**35,720**	**147**	**25**	**69**	
K7RL	**A**	**2,394,040**	**2196**	**125**	**315**	
W7AT	**	**1,030,080**	**1141**	**118**	**252**	
			(OP: W7EW)			
NN7ZZ	*	523,008	698	82	206	
			(OP: N5LZ)			
K7VIC	*	496,920	732	89	214	
WA7LNW	*	495,618	580	91	248	
K7WP	*	478,290	637	96	225	
N7TT	*	466,650	625	90	215	
KØIP/7	*	176,904	359	63	126	
W6AEA/7	*	162,918	369	60	129	
KI7AO	*	148,390	271	65	144	
N6TW/7	*	141,722	288	65	126	
KO7X	*	134,816	317	50	126	
K7GQ	*	122,010	272	48	118	
NQ7R	*	118,110	255	64	122	
NF7E	*	106,377	249	60	117	
W7TSQ	*	104,006	307	50	111	
N7VF	*	103,812	259	62	102	
K7XV	*	84,645	206	50	115	
W7LB	*	47,060	163	49	81	
K9JDV/7	*	46,830	159	41	64	
AD7SI	*	46,472	140	64	93	
N8TV	*	30,855	146	33	52	
WG7X	*	27,560	119	43	61	
KC7UP	*	25,452	103	30	71	
N7DRK	*	21,280	112	35	45	
NW7O	*	19,024	91	29	53	
K6OP/7	*	18,315	96	34	65	
K7MM	*	7,581	55	18	39	
W7IJ	*	6,885	59	20	25	
KB7UJI	*	5,200	56	24	28	
W9PL/7	*	4,173	39	17	22	
W7VS	*	3,478	30	18	29	
KG7P	*	1,947	39	16	17	
KB7N	*	1,734	24	15	19	
W7WA	**14**	**816,452**	**1660**	**38**	**144**	
N7DD	**	**681,948**	**1546**	**37**	**134**	
N7BV	*	239,760	692	35	100	
K7MY	*	31,450	144	21	64	
W7KKR	*	29,440	136	26	54	
K7HP	7	5,687	51	19	28	
K7ZV	**3.7**	**117,564**	**600**	**29**	**68**	
W8AEF/7	*	22,052	134	23	51	
W7ACD	1.8	162	11	7	8	
***K7ACZ**	**A**	**277,672**	**443**	**72**	**172**	
***K7JE**	**	**262,240**	**447**	**56**	**164**	
*N7ZG	*	223,104	399	75	149	
*N7BK	*	171,482	371	54	125	
*N7IR	*	148,779	297	53	130	
*W7FYW	*	116,964	298	45	126	
*W7RV	*	109,800	239	61	119	
*K7SS	*	75,841	210	53	96	
*WA@WWW/7	*	73,584	211	48	96	
*W7TMT	*	63,339	214	49	80	
*K7TR	*	51,620	177	57	88	
*W7QN	*	38,610	158	34	65	
*KB7KLT	*	33,372	144	42	66	
*W3CP/7	*	33,165	153	35	64	
*KB7TJP	*	26,000	122	41	63	
*N7LQT	*	24,465	91	39	66	
*W7KAM	*	23,994	118	30	56	
*AA7DK	*	22,050	135	32	58	
*KB7ME	*	18,328	91	33	46	
*K7PWL	*	17,775	88	33	46	
*N7VS	*	16,416	105	31	41	
*KE7DX	*	12,118	77	31	42	
*N7QS	*	11,466	80	27	36	
*KI6WJ/7	*	10,080	69	24	46	
*W7AML	*	9,100	83	22	30	
*K7RFW	*	8,932	71	27	31	
*K6UM/7	*	8,415	63	21	30	
*N7UR	*	7,847	69	19	40	
*N7GMT	*	6,731	58	23	30	
*W7JAZ	*	6,280	67	21	19	
*WF7K	*	5,292	43	19	30	
*KN7K	*	4,563	45	20	19	
*W7SUR	*	4,343	57	17	26	
*KD7RHI	*	4,094	84	21	25	
*N7BAN	*	3,154	39	19	19	
*N7WI	*	2,916	33	17	19	
*KD7DCR	*	2,448	24	15	21	
*W7YVK	*	1,891	23	14	17	
*K7EIQ	*	1,519	45	14	17	
*W4LSC/7	*	1,488	20	14	17	
*K7QMM	*	1,210	22	14	16	
*W7GH	*	1,150	20	11	12	
*AD7OG	*	1,012	23	11	11	
*KD7RUS	*	775	28	17	14	
*N4LS/7	*	377	11	6	7	
*NB7N	*	360	21	11	9	
*KD9G/7	*	15	4	3	2	
***W7UPF**	**21**	**38,456**	**173**	**21**	**63**	
*KC7V	*	29,025	139	25	50	
***W7FP**	**14**	**96,432**	**306**	**30**	**93**	
*AD7KG	*	726	20	11	11	
*KC7H	*	713	37	12	11	
*N7AAM	*	315	17	8	7	
***N7WA**	**7**	**893**	**19**	**10**	**9**	
WA3C/8	**A**	**833,549**	**892**	**75**	**286**	
W8TWA	**	**708,711**	**768**	**92**	**245**	
K8FL	*	586,380	648	82	255	
W8OI	*	237,303	319	72	225	
W8TE	*	237,140	335	84	200	
W8OHT	*	182,268	327	71	173	
K1HT/8	*	157,874	304	53	140	
N9RC/8	*	147,492	296	53	151	
K8ESQ	*	108,585	254	41	130	
K8MR	*	76,464	179	50	112	
W8JMF	*	66,156	181	46	102	
K8TS	*	36,774	155	52	110	
K8GVK	*	26,058	119	25	61	
NX2PX/8	*	10,744	61	27	52	
W8MET	*	6,649	42	25	36	
N8VSI	*	20	6	5	5	
K8QF	14	6,116	56	10	34	
W8/T98T	**7**	**135,330**	**503**	**26**	**104**	
				(OP: T98T)		
W8JGU	*	61,854	190	28	94	
***WZ8T**	**A**	**344,211**	**530**	**64**	**195**	
***WB8TLI**	**	**320,045**	**470**	**64**	**189**	
*N8VV	*	152,277	309	53	140	
*K8LY	*	133,937	317	36	115	
*W8KNO	*	125,130	278	50	144	
*WB8JUI	*	109,228	224	57	131	
*KB8OCP	*	62,272	169	37	102	
*KD8GOX	*	62,133	160	44	105	
*KC8IMV	*	49,410	161	33	89	
*W8TM	*	42,500	133	37	88	
*KE8FO	*	39,772	125	37	85	
*K8CR	*	33,536	132	42	86	
*KB8UUZ	*	32,770	133	33	80	
*WB8DM	*	30,385	118	31	72	
*K4YJ/8	*	24,816	100	33	61	
*W8AKS	*	19,474	93	39	68	
*KD8ELX	*	13,680	104	37	58	
*AF8C	*	12,118	66	25	48	
*N8WAV	*	11,468	78	19	42	
*WO8VET	*	10,570	67	25	45	
*WF8P	*	9,170	62	26	44	
*KJ8O	*	8,162	64	14	39	
*N8NA	*	5,640	48	23	37	
*WA8SSQ	*	5,336	49	24	34	
*KD8HHG	*	2,444	35	17	30	
*AF8T	*	1,960	23	14	21	
*KD8JAM	*	1,120	20	13	15	
*AB8OJ	*	870	17	16	14	
*AA8DX	*	704	21	14	18	
*KD8GYH	*	700	21	12	16	
*KD8GRG	*	476	18	13	15	
*NF8M	*	270	10	7	8	
***K8IR**	**21**	**31,800**	**161**	**18**	**57**	
***NO8R**	**14**	**54,100**	**200**	**21**	**79**	
*W8GOC	*	29,652	135	18	66	
*KG9Z/8	*	2,325	27	9	22	
*WA3UAT/8	*	266	14	7	7	
*NR8U	7	456	12	8	11	
***K8DO**	**1.8**	**1,166**	**75**	**9**	**13**	
W9RE	**A**	**4,020,992**	**2696**	**129**	**427**	
AC9S	*	332,544	493	69	187	
W9NY	*	322,458	535	56	185	
K9BGL	*	239,430	403	66	164	
N9FC	*	191,386	341	61	160	
N7MB/9	*	172,912	382	55	147	
KF9TI	*	98,638	237	35	114	
N9UY	*	58,512	198	42	96	
W9/NP2I	*	31,590	140	36	81	
				(OP: NP2I)		
KG9N	*	19,000	102	31	45	
N9HZ	*	18,005	112	20	45	
KN6X/9	*	10,773	58	29	52	
N9NA	*	6,448	52	22	40	
N9WKW	*	4,508	40	18	31	
K9UQN	**14**	**78,435**	**270**	**21**	**84**	
W9IIX	**	**73,248**	**264**	**25**	**84**	
K9DN	*	28,552	136	20	63	
AG9S	**7**	**94,875**	**283**	**29**	**96**	
WØEAR/9	*	55,550	207	27	83	
W9SE	*	2,759	31	11	20	
***N4TZ/9**	**A**	**1,065,220**	**913**	**109**	**333**	
***KD9MS**	**	**309,692**	**442**	**75**	**203**	
*K9QVB	*	163,995	324	52	143	
*K9JE	*	97,580	229	39	125	
*K9OR	*	65,758	159	43	111	
*N9LYE	*	64,600	212	53	99	
*N9LAH	*	63,648	163	49	107	
*W9QL	*	62,580	173	49	100	
*W9VQ	*	59,092	162	51	107	
*K9PY	*	40,680	132	37	83	
*W9UM	*	40,480	138	36	79	
*N9MSG	*	31,080	118	37	68	
*NJ9Z	*	27,966	113	45	73	
*KC9CDW	*	16,884	83	29	55	
*N9OK	*	14,877	103	30	57	
*WI9M	*	14,444	91	34	58	
*K9SQL	*	10,608	65	28	50	
*N9ORD	*	8,118	57	25	41	
*KC9QQ	*	5,974	53	25	33	
*N9BT	*	3,600	40	18	22	
*N9WK	*	2,240	25	13	22	
*KC9GZB	*	1,920	28	13	19	
*K9AIH	*	1,178	25	5	14	
*WR9Y	*	1,118	29	13	13	
*N9VN	*	77	4	3	4	
*KB9YGD	*	8	2	2	2	
***W9ILY**	**21**	**30,877**	**149**	**19**	**58**	
*KJ9R	14	3,822	42	11	28	
KØRF	**A**	**1,883,056**	**1646**	**130**	**346**	
				(OP: WØUA)		
KØOU	**	**398,458**	**594**	**75**	**206**	
NØYO	*	338,938	477	72	202	
KØTG	*	290,604	522	68	176	
KØFX	*	233,481	465	59	164	
ABØRX	*	192,780	316	67	171	
NCØB	*	173,888	389	46	130	
NØKK	*	172,000	322	59	156	
WØBH	*	124,936	269	63	131	
KSØT	*	108,225	231	45	140	
K9MWM/Ø	*	107,730	269	56	115	
WØZQ	*	107,156	254	52	120	
WKØP	*	101,480	249	53	119	
KØHB	*	96,268	227	44	120	
KØBUD	*	49,362	191	31	83	
KØJJR	*	42,294	144	36	78	
WØCP	*	38,306	139	40	67	
KØGAS	*	32,214	132	38	80	
KØFG	*	17,226	77	31	68	
NØUU	*	16,800	84	29	51	
WWØAL	*	15,664	91	35	53	
KV6O/Ø	*	14,432	72	35	47	
KAØLL	*	12,160	102	17	47	
ABØUK	*	8,673	74	26	33	
NAØBR	*	6,720	54	21	35	
KØVH	*	3,774	43	14	20	
KØXE	*	2,088	28	14	22	
KØXTR	*	1,675	28	11	14	
KØIZ	**14**	**130,683**	**439**	**28**	**99**	
KØPK	*	92,773	300	26	87	
WØPPF	*	23,075	124	17	54	
WØGJ	**7**	**53,476**	**196**	**28**	**88**	
KØCS	**1.8**	**2,059**	**38**	**10**	**19**	
***KØCN**	**A**	**166,012**	**317**	**59**	**137**	
***WBØTSR**	**	**131,362**	**327**	**36**	**118**	
*KØJJM	*	65,224	204	40	84	
*WØRU	*	53,136	174	37	86	
*K2HT/Ø	*	29,808	122	39	69	
*WBØIEL	*	25,515	89	38	67	
*NYØT	*	19,474	82	28	63	
*KAØLDG	*	13,608	81	23	49	
*WØIS	*	11,659	102	39	50	
*WSØZ	*	10,780	79	24	46	
*WBØN	*	10,153	65	25	46	
*WØJEC	*	9,563	65	24	49	
*ADØH	*	8,357	56	29	32	
*KØKU	*	7,139	67	21	38	
				(OP: NØRC)		
*W7THY/Ø	*	5,376	56	21	35	
*KØGT	*	5,184	40	25	29	
*WBØGAG	*	4,836	65	21	31	
*KCØTPP	*	4,819	56	23	38	
*KCØRQH	*	3,740	41	21	23	
*KCØUUT	*	3,645	40	19	26	
*NØGOS	*	2,145	29	16	17	
*NØUJJ	*	1,456	45	12	16	
*KJØP	*	725	19	12	13	
*KØBJ	*	450	11	6	9	
*KBØPKL	*	122	15	11	11	
*KSØAA	*	10	12	5	5	
*WØETT	14	9,185	76	19	36	
KL7AF	**A**	**1,150,720**	**1916**	**84**	**172**	
				(OP: KH6SH)		
AL1G	*	209,456	1245	35	41	
KL7AA	*	23,800	141	32	36	
				(OP: KL2RG)		
NL7V	**14**	**490,657**	**1349**	**34**	**115**	
***WL7BDO**	**A**	**20,888**	**165**	**29**	**27**	
*KL1SF	14	9,660	103	19	23	
VP2EC	**A**	**1,681,623**	**1883**	**85**	**294**	
				(OP: N5AU)		
VP2E	**14**	**2,598,938**	**5205**	**39**	**154**	
				(OP: N5TJ)		
8P5A	**A**	**10,347,090**	**7047**	**138**	**479**	
				(OP: W2SC)		
***VP9/K3IRV**	**A**	**180,420**	**467**	**53**	**133**	
				(OP: K3IRV)		
VP2V/SP7VC	**A**	**1,220,066**	**1778**	**86**	**245**	
				(OP: SP7VC)		
***VP2V/K9NW**	**A**	**169,362**	**869**	**29**	**68**	
				(OP: K9NW)		
VY2ZM	**A**	**9,160,112**	**5945**	**128**	**483**	
				(OP: K1ZM)		
VO1KVT	**	**443,504**	**899**	**55**	**157**	
VO1TA	*	428,352	866	50	134	
VA1MM	*	355,957	874	63	148	
VE1DT	*	289,345	452	52	193	
VY2LI	*	134,300	342	42	116	
VO1BQ	*	1,680	21	9	19	
VO1HE	**14**	**93,002**	**353**	**22**	**69**	
***VE9CEH**	**A**	**333,489**	**621**	**57**	**164**	
***VE1MC**	**	**108,062**	**273**	**32**	**110**	
*VE1SD	*	63,707	194	33	100	
*VE1KY	*	60,400	168	45	106	
***VA1CHP**	**21**	**23,478**	**117**	**18**	**60**	
*VA1XBN	14	5,460	58	9	33	
VE2GSO	**A**	**964,241**	**1803**	**58**	**183**	
VE2DC	*	352,444	463	81	211	
***VE2XAA**	**A**	**778,312**	**895**	**85**	**274**	
*VA2WDQ	*	82,775	188	51	124	
*VA2RIO	*	42,665	153	38	77	
*CK2AWR	*	34,464	164	32	64	
			(OP: VE2AWR)			
*VE2AXO	*	1,350	29	11	16	
*VE2QAU	*	300	20	7	8	
***VA2SG**	**14**	**80,640**	**335**	**19**	**77**	
VE3EJ	**A**	**6,472,174**	**4230**	**139**	**475**	
CK3AT	**	**5,577,291**	**3996**	**123**	**426**	
				(OP: VE3AT)		
VE3CX	*	2,149,941	2391	106	305	
VE3XN	*	793,450	851	98	252	
VA3DX	*	676,863	700	109	278	
VA3YP	*	563,745	1137	71	174	
VE3TA	*	436,756	644	73	201	
VE3KZ	**21**	**307,457**	**937**	**29**	**102**	
VA3FP	*	34,350	160	18	57	
VE3RZ	**7**	**71,196**	**312**	**24**	**78**	
VA3XH	*	55,936	284	25	67	
VE3BDN	**3.7**	**25,330**	**447**	**13**	**21**	
VE3PN	**1.8**	**54,136**	**438**	**14**	**53**	
VE3CUI	*	1,673	133	4	3	
***VE3DZ**	**A**	**2,109,028**	**2049**	**92**	**320**	
***VE3NE**	**	**1,639,760**	**1820**	**93**	**305**	
*VE3FDT	*	521,280	746	74	214	
*VE3JAQ	*	432,456	867	62	160	
*VA3SWG	*	352,590	778	62	157	
*VE3TW	*	230,464	431	54	154	
*VE3KPP	*	166,284	488	40	109	
*VE3AD	*	161,964	327	56	142	
*VE3OX	*	154,836	333	59	139	
*VE3JM	*	142,200	351	40	110	
*VE3EL	*	86,592	270	48	116	
*VE3TU	*	64,764	288	40	86	
*VE3BVA	*	57,460	174	43	87	
*VE3XAT	*	52,716	156	43	95	
*VA3TPS	*	46,360	159	38	84	
*VE3NCQ	*	23,300	105	35	65	
*VE3IKT	*	22,304	122	31	51	
*VE3RCN	*	21,546	128	32	49	
*VA3GD	*	14,972	87	24	52	
*VE3OM	*	8,448	56	22	42	
*VA3WPV	*	7,068	55	21	36	
*VA3RNJ	*	5,550	53	18	32	
*VA3WWC	*	1,792	27	15	17	
*VE3OIL	*	1,475	24	10	15	
*VE3MCF	*	1,200	23	10	15	
*VE3AJ	*	209	10	6	5	
*VA3PL	21	13,000	99	15	35	
***VE3XD**	**14**	**386,400**	**1108**	**29**	**111**	
*VE3/W4TAA	*	103,808	336	27	101	
***VE3IAE**	**7**	**19,328**	**131**	**17**	**47**	
***VE3EDY**	**1.8**	**3,129**	**104**	**6**	**15**	
VE4EAR	**A**	**445,785**	**707**	**64**	**199**	
VE5CPU	**A**	**58,651**	**364**	**36**	**53**	
VE5UF	**21**	**24,912**	**168**	**22**	**50**	
VE5UA	**3.7**	**7,296**	**53**	**16**	**41**	
VA5DX	**1.8**	**4,641**	**48**	**13**	**38**	
***VE5SF**	**A**	**77,366**	**285**	**30**	**71**	
VE6EX	**A**	**808,056**	**1984**	**70**	**146**	
VE6CNU	*	609,834	1337	62	139	
VE6EPK	**14**	**24,710**	**141**	**18**	**52**	
***VE6BF**	**A**	**32,421**	**139**	**44**	**63**	
*VE6AID	*	7,987	80	23	26	
*VE6DJT	*	6,650	62	24	26	
*VE6ZC	*	5,134	87	18	16	
*VE6TD	*	4,983	91	16	17	
VA7ST	**A**	**541,270**	**1073**	**73**	**153**	
VE7XF	*	175,376	303	76	150	
VA7DM	*	83,662	302	42	76	
VE7FE	**14**	**178,200**	**961**	**27**	**63**	
VA7JW	*	121,095	508	30	85	
***VE7UQ**	**A**	**211,737**	**590**	**50**	**113**	
*VA7BEC	*	129,000	503	51	78	
*VE7HA	*	116,065	365	46	93	
*VE7IN	*	95,232	343	46	82	
*VA7CRZ	*	18,249	113	32	47	
*VE7CYY	*	11,172	120	21	28	
*VE7RSV	*	10,200	82	32	36	
*VA7CPC	*	7,014	103	22	20	
*VA7BS	*	4,173	66	18	21	
*VA7HZ	*	100	29	13	12	
***VE7URS**	**14**	**65,136**	**282**	**28**	**64**	
*VE7WEB	*	6,630	51	23	29	
VY1EI	**A**	**96,120**	**908**	**24**	**36**	
ZF2AH	**14**	**1,085,616**	**3582**	**32**	**112**	
*TI2WMP	14	2,610	44	9	21	
CO8ZZ	**14**	**331,316**	**1380**	**23**	**90**	
CM6RCR	**1.8**	**54,550**	**564**	**11**	**39**	
***CO6CAC**	**3.7**	**40,937**	**468**	**13**	**34**	
***HI3T**	**A**	**3,924,255**	**4096**	**102**	**329**	
				(OP: HI3TEJ)		
*HI8PJP	*	1,530	47	11	19	
***HI3K**	**21**	**475,904**	**1618**	**27**	**101**	
***HI3CCP**	**14**	**313,560**	**1347**	**29**	**88**	
TO4X	**A**	**4,094,216**	**3869**	**104**	**348**	
				(OP: K1XM)		
OX2A	**A**	**974,544**	**1502**	**58**	**199**	
				(OP: OX3KQ)		
J37T	**A**	**149,084**	**584**	**41**	**81**	
				(OP: VE3EBN)		
*FG1PP	A	4,898	55	25	37	
***TG9ANF**	**14**	**248,500**	**1185**	**24**	**76**	
***HR1RTF**	**A**	**28,764**	**140**	**33**	**61**	
***HQ9R**	**7**	**87,932**	**534**	**19**	**57**	
				(OP: WQ7R)		

Martinique

FM5AN	**A**	**554,990**	**1042**	**71**	**159**
***TO8Z**	**A**	**1,412,232**	**1848**	**91**	**270**
				(OP: VE3TG)	
***FM1HN**	**21**	**105,633**	**590**	**25**	**72**

Mexico

XE2S	**A**	**874,212**	**1650**	**86**	**177**
XE1YJS	*	392,229	1056	61	138
XE1YYD	*	18,414	93	35	58
XE1CWJ	**14**	**212,245**	**1363**	**24**	**61**
XE1MM	*	43,268	356	17	41
***XE1GRR**	**A**	**138,908**	**545**	**46**	**75**
*XE1NW	*	93,690	313	44	91
*XE2MX	*	75,032	238	55	111
*XE2AUB	*	51,450	229	42	63
*XE3N	*	43,022	195	30	68
***XE2HWB**	**28**	**1,926**	**40**	**7**	**11**
***XE1CT**	**21**	**38,955**	**352**	**19**	**34**
*XE2YWH	*	10,320	97	14	29
***XE1BY**	**14**	**188,180**	**962**	**24**	**73**
*XE1B	*	5,610	164	12	18
***XE1CQ**	**7**	**244,200**	**996**	**28**	**92**
*XE1AY	3.7	407	17	6	5

Panama

*HP3FTD	A	39,652	161	31	61
***HP1RIS**	**28**	**7,140**	**89**	**10**	**18**
*HP1DFV	*	450	16	5	5
*HP1GES	*	84	5	3	4
***HP1BYS**	**21**	**141,024**	**902**	**23**	**55**
*HP1AVS	*	131,400	743	24	66
*HP1ALX	14	13,056	107	14	37
*HP1DCP	*	3,042	61	12	27

Puerto Rico

KP3S	**A**	**23,851**	**215**	**25**	**36**
NP3HM	*	3,420	88	24	36
***KP4KE**	**A**	**3,786,911**	**3572**	**124**	**375**
				(OP: DK8ZB)	
*WP4BH	*	87,250	338	42	83
*WP3GW	*	80,556	218	45	102
*NP3CW	*	46,610	290	32	47
*NP4G	*	15,504	104	28	40
*KP4BT	*	780	28	14	16
*WP4NVK	28	90	9	2	3

St. Kit

Senegal

6W1RY	**A**	**5,294,072**	**4071**	**97**	**379**
			(OP: F5VHJ)		

South Africa

ZS1EL	**A**	**28,756**	**130**	**27**	**52**
ZS4BS	*	2,268	43	13	14
ZS9Z	**21**	**254,520**	**908**	**24**	**81**
			(OP: ZS1OIN)		
ZS1SR	**14**	**85,293**	**300**	**31**	**86**
***ZS2I**	**A**	**73,656**	**218**	**37**	**87**
*ZS1LL	*	11,448	45	25	29

Sudan

***ST2NH**	**A**	**189,203**	**484**	**39**	**112**

Tunisia

*3V8ST	A	8,742	77	13	34

ASIA

Andaman & Nicobar Islands

VU4RG	**A**	**371,504**	**794**	**58**	**156**

Armenia

EK6TA	**A**	**4,204,116**	**3958**	**87**	**315**
EK35A	**14**	**376,257**	**1045**	**32**	**101**

Asiatic Russia

UA9CLB	**A**	**3,888,964**	**3206**	**107**	**347**
UA9PC	*	**2,895,666**	**2526**	**110**	**364**
RX9JD	*	506,912	924	50	167
UA9JDP	*	468,050	807	57	173
RX9FW	*	128,343	282	46	133
UA9FM	*	52,056	205	26	82
RV9XD	*	32,571	138	37	62
UA9ONJ	*	17,920	128	26	54
RV9MA	*	6,099	48	19	38
RK9JWV	**21**	**104,748**	**602**	**23**	**63**
RV9LM	**14**	**466,343**	**1091**	**35**	**128**
RZ9UI	*	223,488	776	29	99
RA9JM	*	89,146	358	24	82
RZ9OJ	*	51,456	215	25	71
UA9QGS	*	3,774	50	7	27
RW9USA	**7**	**805,695**	**2003**	**35**	**130**
RA9CB	*	121,524	429	24	90
RA9AP	*	16,500	134	10	40
UA9CGL	*	2,214	33	7	20
UA9KAA	**1.8**	**43,155**	**268**	**11**	**52**
***UA9QA**	**A**	**811,824**	**1083**	**65**	**228**
***UA9ACJ**	*	**596,960**	**796**	**58**	**229**
*RA9AAA	*	510,034	887	60	178
*RX9AM	*	434,112	603	79	244
*RX9FR	*	404,010	732	41	160
*RW9RA	*	380,622	635	54	183
*RZ9AZ	*	362,970	627	52	170
*RV9AZ	*	246,510	589	37	128
*RA9FHL	*	201,736	517	33	118
*UA9CBM	*	159,485	421	46	145
*RK9UC	*	124,533	349	36	101
*UA9XTL	*	124,079	362	30	97
*RA9YAI	*	62,062	179	42	101
*RX9OJ	*	47,838	208	25	77
*RA9SAS	*	45,156	160	46	96
*RA9ULK	*	39,538	160	28	78
*RV9UP	*	38,186	143	41	81
*RU9UG	*	37,177	153	38	75
*RK9ABJ	*	36,380	131	29	78
*RA9AMO	*	31,920	163	19	65
*UA9TF	*	28,728	113	33	81
*RU9YF	*	20,335	94	23	60
*RW9SZ	*	15,282	118	13	41
*RA9AE	*	9,280	70	19	39
*RV9WB	*	8,268	60	13	39
*UA9YJI	*	6,030	59	23	44
*RW9UX	*	4,956	45	11	31
*RA9MLR	*	4,902	50	15	28
*UA9WZ	*	4,459	36	18	31
*UA9QCZ	*	3,458	36	10	28
*RV9UB	*	3,397	45	16	27
*UA9XF	*	1,634	26	16	22
*UA9AX	*	640	14	8	12
***UA9OW**	**28**	**348**	**18**	**5**	**7**
***UA9AB**	**21**	**95,064**	**355**	**20**	**82**
***RA9FEL**	*	**91,460**	**483**	**12**	**56**
*RU9CD	*	60,030	341	13	56
*UA9FGJ	*	49,210	269	15	55
*RA9UAG	*	31,720	230	15	50
*UA9QF	*	23,808	204	16	48
*RA9FEU	*	5,617	71	11	30
*RW9WW	*	340	12	10	10
***RV9YZ/9**	**14**	**307,004**	**948**	**31**	**111**
*RZ9OQ	*	234,780	746	28	101
*RW9RW	*	164,733	571	32	97
*RK9UN	*	73,623	364	22	75
*RA9UAD	*	51,120	276	22	68
*UA9OMT	*	45,828	223	16	60
*RW9TP	*	41,902	198	16	66
*RX9FG	*	38,190	257	12	55
*RV9CBW	*	30,384	174	18	54
*RK9QWZ	*	10,300	79	12	38
			(OP: RW9QA)		
*RA9QCE	*	6,116	68	10	34
***RK9AX**	**7**	**141,168**	**520**	**24**	**78**
*UA9JMB	*	37,536	244	15	54
*RK9CWB	*	1,035	19	7	16
			(OP: RW9DX)		
RV9AL	**A**	**834,921**	**1215**	**71**	**218**
RK9UT	*	**718,240**	**1480**	**75**	**193**
RA9AA	*	246,240	604	44	118
UA9ACG	*	233,398	496	68	138
RU9LL	*	92,160	243	60	100
RA9JBL	*	55,969	277	27	70
RZ9CQ	*	23,496	157	34	54
RA9QD	**21**	**83,440**	**612**	**16**	**54**
RA9UF	*	8,547	176	12	25
RA9QC	**14**	**321,558**	**1229**	**35**	**83**
RX9AW	*	236,640	695	28	108
RA9QQ	*	179,174	889	23	78
UA9YAY	*	156,742	599	24	85
RK9AB	*	104,559	480	21	70
RW9UU	*	67,405	404	23	62
UA9IBX	*	66,597	417	27	52
UA9SR	**3.7**	**54,832**	**322**	**23**	**69**
UA9ANW	*	4,356	59	15	21
RW9AR	1.8	144	6	6	6
***UA9SDX**	**A**	**220,660**	**476**	**55**	**165**
***UA9APV**	*	**158,460**	**329**	**46**	**144**
*UA9CNX	*	150,634	600	57	110
*UA9UV	*	141,069	375	53	124
*UA9AKY	*	125,280	331	52	122
*RN9SA	*	111,456	338	59	113
*RA9LE	*	45,279	209	47	70
*RZ9SB	*	24,064	136	27	67
*UA9SBQ	*	17,548	102	29	53
*RA9CAH	*	13,524	132	29	40
*UA9SOX	*	11,940	75	24	36
*RA9AY	*	11,550	80	23	47
***UA9WY/9**	**28**	**144**	**10**	**4**	**5**
***RU9SU**	**21**	**119,592**	**664**	**13**	**59**
*UA9AYA	*	98,346	486	14	60
***RN9CT**	**14**	**86,445**	**407**	**31**	**82**
*RW9CV	*	28,020	259	20	40
*UA9LGY	*	1,568	42	11	21

Asiatic Turkey

YM2W	**28**	**29,068**	**226**	**9**	**34**
			(OP: OK1MU)		
TC4X	**14**	**891,310**	**1884**	**38**	**132**
			(OP: OH2PM)		
***TA2/DL7BC**	**A**	**684,216**	**1056**	**42**	**192**
***TA2RC**	**1.8**	**11,427**	**107**	**5**	**33**

Azerbaijan

*4K9W	A	3,072	35	11	21

Bahrain

A92GR	**A**	**117,056**	**363**	**32**	**86**

China

BA4RF	**A**	**1,155,096**	**1550**	**110**	**256**
BA4ALC	*	**186,631**	**567**	**63**	**138**
BA5AP	*	117,568	366	56	120
BG2SHQ	*	34,830	237	33	53
BG5HST	*	12,975	125	30	45
BG5HSC	*	6,528	74	22	29
BG4BKU	**21**	**2,187**	**53**	**10**	**17**
BA3RJ	**14**	**22,110**	**314**	**18**	**49**
BA4KA	*	16,215	275	20	27
***BD1ND**	**A**	**28,080**	**280**	**32**	**45**
***BD1FBV**	*	**22,008**	**155**	**37**	**47**
***BG2RST**	*	**21,472**	**251**	**35**	**53**
*BA5BO	*	12,903	124	27	42
*BG4AHF	*	12,628	93	28	49
*BG1VCR	*	10,962	115	37	50
*BD1TCC	*	8,374	116	20	33
*BG5HII	*	7,560	80	22	38
*BD6AHP	*	5,490	77	24	37
*BG1HW	*	5,040	68	23	33
*BD4DGJ	*	3,431	55	22	25
*BD5CFB	*	2,800	31	17	23
*BG4CGZ	*	2,684	35	20	24
*BD3JC	*	2,028	82	23	29
*BD5HHU	*	1,652	36	13	15
*BG4EWJ	*	1,634	55	15	23
*BG4IKE	*	1,204	56	13	15
*BD5CFY	*	731	15	7	10
*BD3PCH	*	437	34	9	10
*BD4SX	*	416	12	6	10
*BG4JWU	*	400	19	7	9
*BG1VEA	*	396	19	11	11
*BG2IDR	*	190	19	5	5
*BG3EO/1	*	48	9	3	3
*BG2ION	*	24	12	2	2
***BG7NWF**	**28**	**98**	**9**	**3**	**4**
***BD4QO**	**21**	**28,535**	**247**	**20**	**45**
***BD7LDM**	*	**24,276**	**181**	**19**	**49**
*BD7IBN	*	6,664	58	17	32
*BG7IEU	*	6,468	100	15	29
*BA6IV	*	1,560	69	7	13
*BL7IN	*	1,512	34	10	18
***BD4JUU**	**14**	**19,136**	**235**	**21**	**43**
***BD4WZH**	*	**11,808**	**166**	**18**	**30**
*BD6QDR	*	6,437	99	15	26
*BG4JZY	*	6,240	94	17	31
*BG8BBP	*	1,674	41	9	18
*BY7KTO	*	624	24	10	16
*BG2IOF	*	28	14	1	1
*BG3GTQ	*	16	4	2	2
*BG4JNG	7	63	5	3	4
***BA7IO**	**3.7**	**3,220**	**60**	**13**	**22**

Cyprus

5B4AII	**A**	**8,770,736**	**5436**	**120**	**476**
			(OP: RW3QC)		
C4M	**3.7**	**77,996**	**407**	**12**	**62**
			(OP: 5B4AGM)		

Georgia

4L8A	**A**	**5,177,218**	**4160**	**102**	**376**

Hong Kong

VR2XMT	**A**	**220,160**	**759**	**49**	**111**
VR2PX	3.7	1,260	21	12	16
***VR2ZQZ**	**28**	**20,070**	**344**	**16**	**29**
***VR2PW**	**14**	**26,320**	**144**	**21**	**59**
*VR2EH	3.7	1,612	39	12	14
			(OP: UA3QJC)		

India

VU2PTT	**A**	**545,214**	**830**	**65**	**202**
VU2SWS	*	210,707	438	58	159
***AU2RSB**	**A**	**328,240**	**742**	**61**	**159**
			(OP: VU3RSB)		
***VU3DJQ**	**7**	**10,516**	**101**	**10**	**34**

Israel

***4Z5PJ**	**A**	**40,341**	**147**	**34**	**85**
*4Z5MY	*	18,005	109	15	50
*4Z5LX	*	5,724	58	22	31
***4Z5MV**	**21**	**26,791**	**157**	**18**	**55**

Japan

JF1SEK	**A**	**281,880**	**519**	**65**	**151**
JG1TVK	*	**250,954**	**410**	**88**	**162**
JO1WKO	*	**213,248**	**322**	**88**	**168**
JF1OPL	*	153,180	299	78	129
JH1EVD	*	126,036	320	55	107
JA1HGY	*	86,870	213	60	86
7J1ABD	*	57,456	191	52	74
JO1SIM	*	42,945	199	38	67
JE1UMG	*	15,960	73	33	62
JH1APK	*	10,944	55	33	39
7N2TRM	*	1,581	22	15	16
JA1IXY	*	805	13	11	12
JJ1RDX	**28**	**1,320**	**28**	**9**	**11**
JA1LZR	**21**	**161,280**	**649**	**27**	**69**
JN1NDY	*	**103,515**	**419**	**30**	**73**
JA1CTB	*	26,650	154	25	57
JH1ACA	**14**	**213,994**	**628**	**33**	**109**
JH1CML	*	25,830	154	23	40
JA1AYO	*	160	9	5	5
JS1OYN	7	792	22	6	6
JH1OGC	**3.7**	**196,620**	**671**	**30**	**86**
***JQ1ABC**	**A**	**189,700**	**426**	**75**	**109**
***JA1GYO**	*	**181,425**	**364**	**68**	**137**
*JA1XPU	*	72,900	217	59	91
*JH1UUT	*	63,888	226	42	79
*JA1KK	*	59,850	190	48	78
*JA1MZM	*	54,405	184	43	74
*7L2PDJ	*	51,620	180	44	72
*JA1MVK	*	46,428	176	39	67
*JA1BJI	*	43,798	153	47	75
*JA1OQ	*	42,834	179	45	73
*JA1VGV/1	*	32,017	135	40	61
*JJ1MZH	*	26,163	133	33	48
*JH1FNU	*	26,145	162	33	50
*7K1MAG	*	22,000	108	36	52
*JK1NSR	*	19,295	98	30	55
*JA1STY	*	18,260	104	34	49
*JA1IZ	*	15,768	99	34	38
*JA1HNW	*	15,147	105	33	48
*JA1BNW	*	11,289	80	24	47
*JH1OLB	*	9,604	84	21	28
*JA1PJS	*	9,328	75	24	29
*JA1AZR	*	8,437	74	25	34
*JR1MRG	*	7,598	62	25	33
*JF1AZO	*	5,562	48	23	31
*JA1TBX	*	3,680	46	18	28
*JF1HJX	*	3,390	45	12	18
*JA1MJN	*	2,900	36	14	15
*JA1HG	*	2,822	40	16	18
*JP1EWY	*	2,356	33	19	19
*JG1FGL	*	1,288	20	12	11
*JH1RMH	*	1,204	18	13	15
*JA1LBZ	*	1,118	21	12	14
*JN1DNV	*	814	17	9	13
*JA1YAI	*	748	14	11	11
*7L3DGP	*	336	14	6	8
***JA1WWE**	**28**	**2,461**	**44**	**8**	**15**
*JA1MYW	*	1,206	32	6	12
*JI1HFJ	*	576	20	5	11
*JA1AAT	*	370	13	3	7
***7K4XNN**	**21**	**75,852**	**319**	**28**	**70**
*JA1XMT	*	21,080	116	22	46
*JA1RYC	*	17,199	104	20	43
*JA1JLP	*	7,123	69	17	26
*JL7FBV/1	*	6,042	61	16	22
*JA1DBG	*	5,624	63	13	25
*JK1BII	*	4,224	52	14	19
*JI1DSO	*	675	27	10	15
*JA1LPQ	*	435	16	5	10
*JI1LAI	*	72	4	3	3
*JA1FO	*	5,296	40	14	23
***JI1FDF**	**14**	**114,513**	**393**	**32**	**91**
*JF1TEU	*	39,609	191	26	55
*JE1GZB	*	10,152	90	17	37
*JG1GCO	*	1,300	24	11	15
*JA1BFN	*	465	34	3	2
*7K1EQG	*	49	5	3	4
***JE4AEJ/1**	**7**	**5,662**	**66**	**16**	**22**
*JH1RDU	*	504	14	6	6
***JE1SPY**	**3.7**	**3,026**	**62**	**14**	**20**
*JG1OWV	*	1,680	33	10	14
JF2QNM	**A**	**1,153,081**	**1356**	**112**	**235**
JA2FSM	*	458,814	701	93	189
JJ2CJB	*	244,224	455	70	142
JE2DJC	*	166,920	369	62	133
JG2CNZ	*	98,452	261	70	93
JG2REJ	*	95,742	238	54	108
JH2BTM	**21**	**7,850**	**73**	**17**	**33**
JA2PAC	**14**	**700,942**	**1787**	**37**	**114**
JE2LPC	**7**	**29,889**	**153**	**25**	**56**
JE2OTM	3.7	4,902	54	16	27
***JA2PFO**	**A**	**229,596**	**448**	**69**	**143**
*JA2GHP	*	54,571	218	47	74
*JA2KPW	*	28,381	153	41	60
*JE2HXL	*	8,639	71	21	32
*JA2KKA	*	5,928	68	23	34
*JR2AAN	*	851	19	10	13
***JH2MYN**	**28**	**705**	**20**	**5**	**10**
***JF2WXS**	**7**	**18,228**	**103**	**26**	**58**
*JA3PYH/2	*	364	10	6	8
JA3AOP	**A**	**801,810**	**1065**	**97**	**205**
JA3USA	*	649,704	866	108	213
JN3SAC	*	181,302	376	66	135
JA3ETD	*	74,260	245	56	102
JA3LEZ	*	44,368	177	32	62
JS3CTQ	**21**	**396,706**	**1073**	**35**	**104**
JR3XEX	**14**	**20,160**	**153**	**22**	**42**
JG3WCZ	*	18	2	1	2
***JH3CUL**	**A**	**210,858**	**400**	**83**	**143**
*JL3RNZ	*	75,768	214	42	90
*JH3PTC	*	49,374	193	46	71
*JA3BLN	*	28,832	109	46	60
*JO3EVM	*	18,469	112	25	48
*JR3SZZ/3	*	4,794	52	19	28
***JL3MCM**	**28**	**1,596**	**35**	**6**	**15**
***JR3RIY**	**21**	**84,249**	**345**	**28**	**71**
***JF3BFS**	*	**81,328**	**325**	**29**	**75**
*JA3BBG	*	21,239	157	22	45
*JR3KAH	*	2,538	40	11	16
*JA5ND/3	*	1,007	23	8	11
*JI3MCM	*	207	25	9	14
*JA3IVU	*	204	13	7	10
*JK3AHS	*	42	3	3	3
***JA3UWB**	**14**	**28,500**	**183**	**25**	**50**
*JA3DAY	*	18,972	116	23	45
*JG2CNS/3	*	252	10	5	9
*JF3IYW	7	612	18	8	10
***JI3BFC**	**3.7**	**1,764**	**29**	**12**	**16**
JH4UYB	**A**	**4,577,027**	**3516**	**136**	**375**
JA4EZP	*	15,808	100	30	46
JH4UTP	**28**	**6,494**	**96**	**12**	**22**
JM4WUZ	**3.7**	**9,585**	**99**	**17**	**28**
*JA4EE	A	47,196	131	57	81
***JE4MHL**	*	**25,123**	**125**	**41**	**56**
*JA4CBX	*	868	18	12	16
***JI4UEN/4**	**21**	**22,896**	**142**	**21**	**51**
*JR4LRY	*	86	7720	17	23
***JR4GPA**	**14**	**36,852**	**189**	**24**	**59**
*JG4OOU	*	29,187	169	23	46
*JJ4CDW/4	*	11,640	79	19	41
*JA4AQR	*	11,186	102	18	29
***JR4URW**	**7**	**3,196**	**41**	**14**	**28**
JA5FBZ	**21**	**184,016**	**592**	**33**	**91**
***JA5SUD**	**A**	**295,900**	**444**	**87**	**188**
*JJ5ECZ	*	459	9	8	9
***JG5DHX**	**14**	**760**	**27**	**8**	**11**
*JR5YBH/5	*	204	11	5	7
			(OP: AE6JZ)		
JA6SRB	**A**	**171,140**	**361**	**80**	**135**
JA6WJL	**28**	**14,200**	**144**	**18**	**32**
JR6VIX	**21**	**7,181**	**74**	**17**	**26**
***JA6DIJ**	**A**	**118,026**	**323**	**57**	**109**
*JH6OFJ	*	96,792	254	63	85
*JR6GHN	*	59,040	199	44	79
*JH6FTJ	*	9,804	79	25	32
***JR6GIM**	**28**	**5,481**	**87**	**9**	**20**
*JH6WHN	*	1,320	27	7	15
*JA6AVT	*	810	24	6	12
***JH6AUS**	**14**	**128,478**	**362**	**35**	**103**
*JA6WW	*	1,242	36	12	15
*JS6RTJ	*	6	1	1	1
JA7NVF	**A**	**1,624,120**	**1806**	**115**	**265**
JR7WAB	*	**616,050**	**1119**	**76**	**149**
JA7COI	*	566,564	808	96	182
JE7YSS	*	299,943	554	71	136
			(OP: 7N4TEN)		
JA7KY	*	105,702	216	75	148
JA7JH	*	99,180	207	65	109
JH7DUM	*	42,900	150	45	65
JA7WQJ	*	13,035	71	35	44
JR7MAZ	*	8,142	45	27	42
JH7XMO	**21**	**188,672**	**605**	**34**	**94**
JA7YAA	**14**	**572,055**	**1335**	**35**	**130**
			(OP: JG7PSJ)		
JA7DOT	*	150,426	436	32	105
***JA7LMZ**	**A**	**356,349**	**602**	**77**	**162**
*JA7VEI	*	172,128	392	55	121
*JA7HYS	*	20,176	95	44	53
*JI7GYU	21	48	4	2	2
***JI7EMD**	**14**	**27,336**	**176**	**21**	**47**
*JA7YCQ	7	225	9	5	4
			(OP: JO7UEB)		
JA8ECS	**A**	**392,882**	**557**	**87**	**179**
JA8RWU	*	161,640	366	70	110
***JA8CSY**	**A**	**149,916**	**338**	**68**	**118**
*JL8M8F	*	19,096	142	34	43
*JH8DHV	21	19,328	117	26	38
*JA8IJI	14	6,532	73	18	28
*JK8NIP	7	375	9	8	7
JA9RRH	**A**	**141,194**	**382**	**84**	**143**
JF9JTS	*	61,360	190	46	72
JH9KVF	**21**	**143,232**	**457**	**33**	**95**
JA9CCG	*	21,909	126	21	46
JH9URT	**7**	**17,608**	**110**	**26**	**45**
***JA9TQY**	**A**	**97,446**	**262**	**48**	**101**
*JA9EJG	*	5,490	54	18	27
*JR9NVB	7	23,976	133	25	49
JA0UMV	**A**	**214,080**	**470**	**67**	**125**
JR0GUY	**21**	**26,862**	**156**	**25**	**49**
JJ0KRD	**14**	**217,764**	**674**	**33**	**105**
JA0GEY	*	5,734	53	17	30
JA0JHA	**7**	**512,596**	**1373**	**36**	**116**
***JH0NEC**	**A**	**325,496**	**529**	**84**	**160**
***JH0MXV**	**21**	**42,582**	**185**	**27**	**67**
*JR0BUL	*	280	8	7	7
***JH0EPI**	**14**	**158,178**	**507**	**31**	**92**
*JA0NFP	*	43,214	228	27	55
*JH0CCK	*	10,150	83	20	30
*JA0VHI	7	189	9	3	4

Kampuchea

XU7ADU	**A**	**214,704**	**547**	**39**	**129**
			(OP: DL2QT)		

Kazakhstan

UN9L	**A**	**1,470,933**	**1692**	**78**	**269**
UN7MMM	*	**1,030,185**	**1950**	**43**	**152**
UN2E	*	397,000	623	50	200
UN1O	*	155,005	490	30	115
UN6G	*	135,594	392	42	120
UN7QF	*	87,279	313	42	99
UN7PL	*	10,780	61	32	38
UN6P	**21**	**150,930**	**671**	**21**	**69**
UP0L	**14**	**808,614**	**1858**	**37**	**130**
			(OP: UN9LW)		
***UN4L**	**A**	**155,792**	**360**	**44**	**138**
*UN5C	*	61,712	304	40	112
*UN9GD	*	42,552	185	32	76
*UQ7QF	*	16,698	99	24	42
			(OP: UN8FM)		
*UN7TW	*	12,546	92	31	51
*UN7FW	*	9,030	76	27	43
*UN7ECA	*	304	9	7	9
***UN6LN**	**14**	**290,556**	**926**	**27**	**99**
*UN7JX	*	273,861	783	35	112
*UN7CN	*	3,770	51	6	23
***UO6P**	**7**	**97,371**	**476**	**24**	**69**
			(OP: UN7PBY)		
*UN7AL	*	68,256	353	15	64

Kuwait

9K2K	**14**	**1,126,626**	**2237**	**39**	**140**
			(OP: 9K2GS)		

Kyrgyzstan

EX8O	A	9,603	71	38	61
EX2X	**14**	**336,198**	**995**	**33**	**104**
EX8MAT	**7**	**19,845**	**144**	**16**	**47**
***EX7ML**	**21**	**37,740**	**301**	**14**	**46**

Laos

*XW1A	A	5,100	45	17	33

Lebanon

***OD5NJ**	**A**	**686,336**	**1089**	**45**	**179**

Macau

*XX9AU	21	6,552	120	14	22

Ogasawara

*JD1BIA	21	5,625	62	17	28

Oman

A45WG	**21**	**30,400**	**141**	**23**	**57**
***A41MX**	**A**	**71,200**	**276**	**25**	**75**

Saudi Arabia

***7Z1SJ**	**A**	**963,984**	**1212**	**75**	**229**

South Korea

DS5DNO	A	5,782	94	23	26
HL2FDW	**14**	**102,393**	**694**	**28**	**65**
DS5KJR	*	12,816	127	19	29
***HL1VAU**	**A**	**29,204**	**163**	**43**	**55**
*HL5YI	*	8,460	81	27	33
*DS5TOS	7	1,984	29	9	22

Sri Lanka

4S7NE	7	3,825	67	16	35

Taiwan

BX5AA	**A**	**661,545**	**1501**	**67**	**174**
***BU2AE**	**A**	**68,180**	**319**	**48**	**92**
*BV4VR	*	29,478	161	36	66
***BX4AQ**	**21**	**12,079**	**154**	**14**	**33**

Tajikistan

EY8MM	**1.8**	**96,596**	**447**	**14**	**68**
***EY8BA**	**21**	**29,580**	**213**	**19**	**49**
*EY7ZA	*	1,550	32	8	17
			(OP: EY7AJ)		

Thailand

HS0ZDY	**A**	**194,775**	**345**	**66**	**179**
HS0ZDR	**21**	**53,370**	**244**	**19**	**71**
***HS0ZHC**	**A**	**1,052,058**	**1875**	**73**	**186**
*HS1TEF	*	1,150	26	12	13
***HS0ZGD**	**14**	**529,936**	**1443**	**38**	**138**
*HS0ZCW	*	168,732	833	29	80
*E20WXA	*	23,364	347	20	39
*E20YLM	*	5,016	80	19	25

UK Bases on Cyprus

ZC4LI	**28**	**162**	**6**	**4**	**5**

United Arab Emirates

A61C	**21**	**126,054**	**521**	**21**	**73**

Uzbekistan

***UK8AKK**	**A**	**253,220**	**585**	**57**	**163**
***UK9AA**	**7**	**309,894**	**942**	**29**	**108**

West Malaysia

9M2MT	**A**	**126,204**	**312**	**43**	**113**

EUROPE

Aland Islands

OH8E	**A**	**2,060,300**	**2249**	**129**	**421**
			(OP: OH2MM)		

Albania

*ZA8/IK7JWX	1.8	6,566	194	6	43
			(OP: IK7JWX)		

Austria

E77XZ	*	**764,596**	**2485**	**36**	**130**	
			(OP: DK6XZ)			
***E74AA**	**A**	**873,445**	**1980**	**74**	**291**	
*E72U	*	74,094	353	36	123	
***E79D**	**7**	**74,130**	**552**	**21**	**84**	
***E74WN**	**3.7**	**7,280**	**125**	**8**	**44**	
		Bulgaria				
LZ3FN	**A**	**552,330**	**1088**	**82**	**279**	
LZ1BJ	*	**423,844**	**997**	**68**	**203**	
LZ1NK	*	352,458	952	73	248	
LZ2JR	*	109,395	308	58	129	
LZ9V	*	56,028	381	24	68	
LZ1NG	**28**	**2,840**	**43**	**13**	**27**	
LZ2ZG	14	522	13	8	10	
LZ5K	**7**	**250,905**	**1446**	**38**	**99**	
***LZ2HN**	**A**	**198,628**	**496**	**65**	**189**	
*LZ5XQ	*	128,472	384	50	152	
*LZ1ND	*	24,776	263	25	51	
*LZ3TL	*	4,810	81	19	46	
*LZ1ONK	*	748	22	9	13	
***LZ9X**	**14**	**299,452**	**1129**	**38**	**134**	
			(OP: LZ1UK)			
*LZ2JA	*	135,585	878	27	88	
*LZ2HR	*	108,108	634	27	90	
*LZ6W	*	59,488	372	24	80	
			(OP: LZ4UX)			
*LZ1PSH	*	1,763	91	9	34	
***LZ1DM**	**3.7**	**45,567**	**453**	**13**	**70**	
*LZ2DF	1.8	1,118	40	5	21	
		Crete				
SV9CVY	**A**	**6,784,912**	**6649**	**124**	**504**	
			(OP: DL6FBL)			
SV9GPV	**14**	**409,045**	**2324**	**38**	**107**	
***SV9COL**	**A**	**186,144**	**440**	**71**	**206**	
		Croatia				
9A3KS	**A**	**40,749**	**209**	**34**	**107**	
9A5D	**28**	**17,136**	**226**	**13**	**50**	
			(OP: 9A5DU)			
9A5W	**21**	**647,640**	**1619**	**38**	**142**	
9A5MT	*	290,450	858	34	123	
9A4D	**7**	**180,858**	**1094**	**26**	**103**	
			(OP: 9A7DX)			
9A8AW	*	18,032	386	7	49	
			(OP: S51D)			
9A5ØKDE	**3.7**	**143,055**	**1255**	**18**	**81**	
			(OP: 9A2VR)			
9A2DQ	**1.8**	**91,308**	**1005**	**16**	**68**	
***9A2EU**	**A**	**1,621,550**	**1623**	**129**	**436**	
*9A2EY	*	115,984	455	39	137	
*9A3QB	*	105,571	352	48	145	
*9A1CFR	*	97,650	237	62	163	
			(OP: 9A2NO)			
*9A1CVG	*	21,971	207	36	91	
			(OP: 9A2QF)			
*9A6NNS	*	18,354	74	48	66	
*9A6KTB	*	18,000	136	22	58	
*9A1DL	*	14,700	121	26	58	
*9A4J	*	9,063	97	19	34	
*9A7KDT	*	4,851	54	21	42	
*9A6C	*	2,596	52	14	30	
***9A3B**	**21**	**252,408**	**709**	**35**	**121**	
			(OP: 9A1AA)			
*9A4BB	14	11,704	142	14	42	
***9A2GA**	**3.7**	**5,796**	**133**	**6**	**40**	
		Czech Republic				
OLØL	**A**	**412,919**	**1337**	**65**	**234**	
			(OP: OK1FNJ)			
OK2ABU	*	**221,250**	**640**	**57**	**193**	
OK1FRO	*	80,661	383	38	129	
OK1DBE	*	44,982	209	36	83	
OK6MA	*	23,142	151	27	60	
OL9Z	**14**	**569,520**	**1618**	**38**	**142**	
OK1TFH	*	18,810	168	16	50	
OK1BN	**3.7**	**272,060**	**1932**	**23**	**99**	
***OL6P**	**A**	**411,654**	**841**	**71**	**243**	
			(OP: OK2WTM)			
***OK6Y**	*	**253,724**	**567**	**64**	**210**	
			(OP: OK2PTZ)			
*OK2BEN	*	242,540	652	57	211	
*OK1MKU	*	196,716	415	66	225	
*OK2SAR	*	172,080	567	53	186	
*OK1BA	*	168,345	521	48	167	
*OK1HEH	*	124,355	491	43	166	
*OK1LO	*	112,112	476	43	165	
*OL2T	*	97,734	398	40	139	
*OK4AS	*	62,062	294	43	111	
*OK4DZ	*	55,814	212	40	78	
*OK1TC	*	53,100	276	33	117	
*OK2WYK	*	48,645	316	29	112	
*OK1SMJ	*	42,275	176	38	57	
*OK1AY	*	29,988	182	32	94	
*OK2PBG	*	26,976	171	26	70	
*OK2KFK	*	24,408	177	31	82	
*OK2KG	*	21,412	140	30	76	
*OK1VHV	*	17,850	131	27	75	
*OK2SGY	*	17,716	147	25	78	
*OK7N	*	16,744	96	37	54	
			(OP: OK1CJN)			
*OK2PHI	*	15,960	166	21	63	
*OK1MNV	*	15,840	89	31	59	
*OK4AZ	*	10,560	114	21	67	
*OK5XX	*	1,518	35	8	15	
*OK5SWL	*	132	6	6	6	
			(OP: OK2SWD)			
***OK1FHI**	**21**	**123,956**	**391**	**33**	**100**	
*OK2HBY	*	29,520	160	25	57	
*OK1BLU	*	6,407	82	13	30	
*OK1KZ	*	2,484	45	9	18	
*OL9M	14	13,988	133	17	35	
			(OP: OK1MMN)			
*OK2SWD	*	690	29	7	16	
***OK2BRS**	**7**	**18,177**	**220**	**13**	**60**	
***OK1WCF**	**3.7**	**130,530**	**1313**	**16**	**79**	
*OL3X	*	29,718	318	13	65	
			(OP: OK1FC)			
*OL4W	*	4,454	146	4	30	
		Denmark				
OZ7AM	**A**	**1,065,780**	**1636**	**91**	**291**	
OZ5EV	*	210,516	368	78	240	
OV1A	*	36,673	135	44	125	
OZ4O	*	11,473	137	14	63	
OZ1AXG	*	6,290	56	26	48	
OZ7X	**7**	**355,069**	**1660**	**32**	**111**	
			(OP: OZ5KF)			
OZ2HT	**3.7**	**69,426**	**810**	**19**	**68**	
***OZ2DAN**	**A**	**93,150**	**556**	**35**	**127**	
*OZ1ACB	*	42,036	220	34	90	
*OZ1KKH	*	39,156	162	35	121	
*OZ5AGJ	*	14,104	108	25	57	
*OZ7DK	*	9,801	119	22	59	
*OZ3EN	*	4,230	74	13	32	
*OZ4RT	*	3,363	54	16	41	
*OZ1DGQ	*	529	18	9	14	
*OZ4MF	*	304	23	7	9	
*OZ1XV	14	9,792	143	13	38	
*OZ7ADZ	*	2,688	78	7	25	
*OZ1CJS	7	10,030	131	12	47	
*OZ1JVX	*	5,566	82	9	37	
*OZ7TTT	1.8	924	43	2	20	
		England				
M6T	**A**	**5,864,868**	**4718**	**137**	**469**	
			(OP: G4PIQ)			
G5W	*	**4,825,875**	**3713**	**119**	**416**	
			(OP: 5B4WN)			
G4MKP	*	382,782	993	62	200	
GØMTN	*	363,676	964	65	203	
MØWLF	*	307,802	811	46	141	
GØVXE	*	282,263	620	73	204	
MØGHQ	*	267,472	601	61	168	
GØVVE	*	115,478	411	50	131	
GØAZH	*	73,305	311	48	133	
G1MIE	*	69,774	245	47	127	
M1LMO	*	22,222	160	24	58	
MØMDR	*	20,130	159	25	85	
GØAEV	**28**	**6,850**	**156**	**10**	**40**	
G4ERW	**14**	**347,490**	**1256**	**33**	**102**	
G3TXF	*	163,324	631	30	103	
G4BXT	**7**	**37,332**	**272**	**19**	**83**	
M4T	*	2,628	53	8	28	
			(OP: GØVQR)			
***M1DDD**	**A**	**448,155**	**947**	**76**	**269**	
***G4LDL**	*	**301,176**	**730**	**64**	**218**	
*G3ZQH	*	294,250	764	64	211	
*GØHVQ	*	178,710	525	49	173	
*G4ADJ	*	166,595	512	51	182	
*G4WGE	*	124,574	457	44	155	
*GØKDS	*	82,236	231	51	180	
*G4DBW	*	68,688	278	37	122	
*G6UBM	*	63,428	287	41	116	
*2EØPLA	*	53,200	307	30	103	
*G4NXG	*	49,440	168	39	81	
*G7RTI	*	49,280	288	28	100	
*G8ZRE	*	43,250	297	24	101	
*G8MIA	*	38,220	222	32	98	
*MØRYB	*	32,482	181	29	80	
*G3RSD	*	30,130	195	27	88	
*G4FFN	*	18,685	146	23	78	
*G4DDL	*	15,040	140	20	74	
*MØSDY	*	14,160	139	16	64	
*G6CSY	*	12,629	126	21	52	
*G4RKO	*	12,324	133	18	60	
*GØCPA	*	12,180	149	11	59	
*G7WLL	*	10,080	109	18	52	
*M3TBV	*	8,073	110	18	51	
*GØPHY	*	6,882	57	21	41	
*G1ZON	*	5,859	79	17	46	
			(OP: MØTZO)			
*M3PHP	*	5,355	94	14	49	
*G4BRA	*	4,660	82	16	50	
			(OP: G7PVZ)			
*G/SP4BHD	*	2,451	59	9	34	
			(OP: SP4BHD)			
*GØRPM	*	2,107	60	13	30	
*G8YTC	*	992	32	7	24	
*M5DUO	*	336	21	10	18	
***MØBPQ**	**28**	**132**	**13**	**3**	**9**	
***GØRAH**	**21**	**10,123**	**111**	**16**	**37**	
*GØEYO	*	3,922	61	13	24	
*2EØFFQ	*	468	12	5	8	
***2EØTQR**	**14**	**9,487**	**152**	**10**	**43**	
*GØATG	*	6,811	107	10	39	
*G8RCK	*	5,150	99	13	37	
***G3WW**	**7**	**48,546**	**396**	**17**	**76**	
***G3SVL**	**3.7**	**18,023**	**215**	**12**	**55**	
		Estonia				
ES5TV	**A**	**6,860,712**	**5483**	**161**	**555**	
ES2BH	*	52,542	277	31	108	
ES6QZ	*	7,440	146	12	50	
ES5JR	**14**	**162,769**	**747**	**33**	**106**	
ES5MC	**1.8**	**81,000**	**903**	**14**	**67**	
***ES7GM**	**A**	**701,184**	**1307**	**81**	**271**	
*ES1IP	*	28,826	167	28	114	
*ES5RIM	*	26,329	187	24	89	
*ES1BA	*	96	4	4	4	
***ES1CN**	**21**	**34,104**	**190**	**27**	**57**	
***ES6TX**	**14**	**50,440**	**303**	**22**	**75**	
*ES4RD	*	17,835	122	22	65	
*ES6RMR	*	4,512	73	9	39	
***ES6PA**	**3.7**	**18,333**	**252**	**13**	**50**	
		European Russia				
RZ3AXX	**A**	**5,453,470**	**4703**	**143**	**462**	
			(OP: UA9BA)			
RM3F	*	**2,824,345**	**3692**	**120**	**383**	
			(OP: UA3DPX)			
RW1ZA	*	**2,377,771**	**2577**	**110**	**353**	
RD4WA	*	1,811,340	2465	109	413	
RA3CM	*	1,243,984	2291	91	315	
RN3ZC	*	1,015,872	1776	93	323	
RU3UR	*	635,376	958	78	294	
RA3AUM	*	516,384	1370	66	198	
RN3AHL	*	509,952	626	102	282	
RZ4PWL	*	495,929	833	79	270	
			(OP: UT5UDX)			
RU1AB	*	394,257	689	85	254	
RU4WD	*	350,405	936	67	210	
RA3RK	*	349,845	870	61	220	
RA1AGL	*	338,176	966	62	194	
UA3AGW	*	332,815	602	81	178	
RA3NC	*	279,604	699	62	221	
RU3FF	*	216,960	692	61	179	
RV4LC	*	183,513	497	58	191	
RN1ON	*	136,493	331	62	197	
RD3DT	*	108,570	281	60	150	
UA6HMM	*	96,915	204	67	128	
RV3NA	*	96,073	229	55	136	
UA4NC	*	90,036	441	39	144	
RU6YJ	*	86,828	234	57	139	
RA4ST	*	75,922	327	38	149	
RD3DS	*	72,150	263	51	144	
RZ3EM	*	53,380	223	45	125	
UA1AFZ	*	51,185	292	31	114	
RK3ZZ	*	26,784	87	54	70	
RZ3AV	*	18,905	85	37	58	
RA4PO	*	15,015	100	32	73	
RL6YXX	*	8,533	88	19	34	
			(OP: UA6YN)			
RZ3DA	*	3,240	38	18	27	
RK6CM	*	2,052	41	9	27	
UA3BM	*	1,887	29	14	23	
UA3DAM	*	1,720	39	13	30	
RA1QX	*	980	37	7	28	
UA1ORK	*	187	10	7	10	
RV6LJK	**21**	**130,782**	**618**	**32**	**110**	
RW6FO	*	59,431	439	26	77	
RU6MD	*	23,856	121	25	59	
RL3AF	*	20,940	168	20	40	
RZ1ZZ	**14**	**378,615**	**1686**	**30**	**99**	
RK3XWO	*	**288,029**	**1302**	**31**	**130**	
			(OP: RW3XZ)			
RN3QO	*	266,862	1244	32	126	
RN1NU	*	139,440	594	30	110	
RA1AW	*	107,730	606	24	81	
RU3FN	*	72,114	374	27	92	
UA3QBL	*	4,644	66	14	40	
RW6ATJ	**7**	**20,945**	**184**	**18**	**53**	
RA6EE	*	12,139	151	12	49	
RV1CC	*	11,786	105	17	54	
RX3MA	3.7	5,251	69	10	49	
UA3BS	**1.8**	**17,686**	**216**	**12**	**62**	
***RV4HC**	**A**	**754,062**	**1721**	**74**	**253**	
***UA4FRL**	*	**658,050**	**1035**	**90**	**320**	
***UA3BL**	*	**539,105**	**1024**	**81**	**284**	
*RV6LFE	*	486,513	989	74	259	
*RN4SN	*	421,296	542	101	301	
*RW1CW	*	337,716	564	87	267	
*RV3WT	*	333,402	754	68	239	
*RA6GW	*	282,040	794	56	164	
*UA3UNP	*	233,142	534	67	206	
*UA1CEI	*	196,588	690	50	186	
*UA1CUR	*	190,512	574	51	192	
*RU6HJ	*	182,979	557	56	187	
*RK4PB	*	176,594	450	60	193	
*RX6LD	*	170,258	511	48	170	
*RA4HFE	*	144,900	361	53	154	
*RU6YZ	*	141,303	538	49	152	
*UA6HHE	*	138,125	565	41	180	
*UA6LN	*	137,182	358	58	168	
*UA6MM	*	131,936	466	41	176	
*RW3WX	*	123,170	367	60	158	
*RA3MB	*	105,108	283	53	175	
*RA4ACX	*	95,744	395	40	147	
*U1BA	*	90,848	377	37	130	
*RN4NF	*	90,152	241	51	140	
*RD3DD	*	86,658	289	46	97	
*RV3YR	*	83,997	289	52	131	
*RU3WR	*	80,510	345	39	127	
*UA4PAN	*	80,105	367	40	145	
*RZ3QZ	*	79,475	206	59	128	
*UA3OQ	*	79,296	319	43	149	
*UA6GR	*	78,210	215	52	106	
*UA3DUJ	*	73,112	326	39	113	
*RA3XI	*	70,090	376	33	130	
*RA3RGQ	*	61,288	145	69	94	
*RK4FB	*	60,830	270	35	119	
*RD3BY	*	57,505	292	37	118	
*RU3XY	*	52,688	245	40	108	
*RU3XB	*	48,020	243	35	105	
*RA3LO	*	47,064	190	42	106	
*RA6DT	*	46,096	162	44	90	
*RW1CX	*	42,662	176	51	115	
*RA3LZ	*	40,920	188	40	115	
*UA6GF	*	40,504	243	26	96	
*UA4FUW	*	40,320	206	38	102	
*UA4AZ	*	39,444	178	35	79	
*RV1CB	*	37,515	225	33	90	
*UA3UBT	*	36,720	194	32	88	
*RW1AI	*	36,322	203	32	95	
*RA3RN	*	35,550	185	45	113	
*UA3ACL	*	34,892	264	32	111	
*RN4CA	*	33,744	162	37	77	
*RX3VF	*	33,488	209	26	86	
*RU3BU	*	32,487	171	41	106	
*RW6HJV	*	30,780	161	41	94	
*RN3DY	*	30,284	130	34	79	
*RW3VZ	*	29,232	152	38	88	
*UA3DSS	*	28,890	129	39	68	
*RA4SE	*	28,558	201	26	83	
*RZ3PS	*	28,248	121	34	73	
*RV3ZN	*	22,374	167	28	71	
*RV3LO	*	21,952	83	39	59	
*RA3OO	*	20,604	138	27	75	
*RA4FUN	*	19,158	105	32	61	
*RV1AE	*	17,935	199	16	69	
*RU1AT	*	17,922	152	27	76	
*RZ3VV	*	16,637	153	25	102	
*UA3MHG	*	15,030	131	20	70	
*RL3DR	*	14,274	76	32	46	
*RK3AQW	*	13,311	151	25	62	
*RU6BR	*	13,197	89	23	60	
*RW6AHO	*	12,702	86	28	59	
*RA4NCC	*	11,730	129	16	53	
*RW6BD	*	11,410	142	14	56	
*RK3TS	*	11,248	119	21	53	
*UA1WGV	*	10,176	100	18	46	
*UA4AN	*	10,032	110	13	53	
*RN4AAD	*	9,594	74	29	53	
*UA4NX	*	7,896	93	16	40	
*RV3ZL	*	6,248	70	23	48	
*RZ3AUL	*	5,915	98	14	51	
*RZ3VA	*	5,724	49	19	34	
*RN3ZIN	*	5,632	62	19	45	
*RA6AAW	*	4,182	34	23	28	
*RA3RVZ	*	4,125	35	23	32	
*UA6AGK	*	3,432	37	20	32	
*RL3FO	*	3,339	49	17	36	
*RZ1AU	*	3,136	39	22	27	
*RN3REA	*	3,127	67	17	36	
*RA3VLD	*	3,021	74	14	39	
*RA1QDP	*	2,898	62	11	35	
*RK6AQM	*	2,750	38	15	35	
*RV3IC	*	2,346	53	9	25	
*UA3SBW	*	1,976	30	12	26	
*UA6JFG	*	1,700	26	10	24	
*RA3TUT	*	1,692	21	16	20	
*RX3MX	*	1,612	22	11	15	
*UA4YJJ	*	1,610	37	9	26	
*RU3VD	*	1,265	19	8	15	
*UA6BQD	*	1,200	33	9	21	
*RN6DR	*	504	12	11	10	
*RA6XB	*	195	7	6	7	
*UA4WAG	*	42	4	3	4	
***UA3PW**	**21**	**31,906**	**171**	**23**	**63**	
*RU3OP	*	15,246	109	22	55	
*UA4LW	*	14,760	129	17	55	
*RW3DA	*	8,058	102	17	34	
*RA3DGH	*	7,544	93	14	27	
*RW4LO	*	7,400	56	19	31	
*RV3QO	*	3,315	39	15	24	
*RU3PU	*	2,982	42	15	27	
*UA3AAP	*	1,608	32	10	14	
***UA1AQA**	**14**	**186,864**	**886**	**31**	**105**	
***UA3ABJ**	*	**111,665**	**666**	**28**	**87**	
*RX6AH	*	77,376	491	23	81	
*UA4WCM	*	59,384	409	24	80	
*RU3SE	*	53,105	386	23	72	
*RN4HA	*	51,100	311	23	77	
*RW6AH	*	48,804	406	18	65	
*RU3TC	*	24,024	196	16	62	
*RV3AZ	*	22,572	222	15	51	
*RW3TA	*	11,210	163	10	49	
*RX3DBG	*	10,600	122	13	37	
*RV3TG	*	10,065	131	11	44	
*RA3TYL	*	3,276	65	9	33	
*RA3QG	*	2,178	57	8	25	
*RU4CS	*	180	6	5	5	
*RA4LKW	*	133	7	5	6	
***RA3DTN**	**7**	**15,600**	**150**	**16**	**59**	
*UA3RJH	*	4,332	107	12	45	
***RA3XM**	**3.7**	**24,494**	**312**	**12**	**62**	
*UA1OMS	*	20,060	224	11	57	
*RW6MN	*	17,085	220	10	57	
*RW3QHN	*	13,359	208	9	52	
*UA6YN	*	7,350	155	8	41	
*UA4UT	1.8	3,910	72	8	38	
*UA3LHL	*	225	19	3	12	
		European Turkey				
*TA1HZ	A	616	16	8	14	
***TA1CM**	**28**	**7,038**	**100**	**13**	**33**	
*TC85TC	7	8,742	71	11	36	
			(OP: TA1HZ)			
		Faroe Islands				
***OY9R**	**A**	**123,670**	**623**	**36**	**130**	
		Finland				
OH8X	**A**	**4,775,945**	**4475**	**136**	**429**	
			(OP: OH4JFN)			
OG5ØF	*	**1,907,145**	**2714**	**109**	**350**	
			(OP: OH1NOA)			
OH2CK	*	353,986	504	89	290	
OH1O	*	312,110	514	75	220	
			(OP: OH1TV)			
OH2XF	*	117,810	294	58	180	
OH1BV	*	101,160	391	45	135	
OH1TD	*	100,686	329	47	126	
OH2BAH	*	70,173	241	43	70	
OH1SIC	*	54,230	327	31	114	
OH5NE	*	52,438	294	33	124	
OH6XY	*	41,700	161	50	100	
OH6AC	**28**	**3,366**	**93**	**8**	**26**	
			(OP: OH6CS)			
OH5NZ	**21**	**24,138**	**118**	**29**	**52**	
OH2VZ	14	22,365	196	16	55	
OH1TX	**3.7**	**188,355**	**965**	**33**	**112**	
***OH1ZE**	**A**	**101,065**	**326**	**39**	**166**	
*OH2LP	*	85,668	339	43	134	
*OH1XY	*	58,072	189	42	80	
*OH3DP	*	36,043	268	26	107	
*OG5T	*	33,125	200	31	94	
*OH2MFE	*	13,502	123	21	65	
*OH2MDC	*	3,021	48	16	37	
*OH1BOI	*	1,280	23	13	19	
*OH6GFI	*	42	3	3	3	
***OG8A**	**21**	**59,143**	**215**	**32**	**87**	
			(OP: OH8VJ)			
*OH1JO	*	47,564	239	27	67	
*OH3WR	*	18,942	136	21	45	
***OH1LEG**	**7**	**35,245**	**247**	**23**	**72**	
		France				
F6DZU	**A**	**775,012**	**1367**	**85**	**226**	
F2JD	*	**655,564**	**961**	**84**	**280**	
F5BBD	*	388,994	1072	64	225	
F5PAL	*	139,475	444	46	129	
F5VHY	*	110,484	257	58	104	
F5PU	*	76,760	324	50	140	
F4CPF	*	66,310	196	56	134	
F5RDS	*	59,400	302	32	118	
F5RQQ	*	27,778	150	30	56	
F8DFP	*	26,136	161	32	76	
F8NAN	*	8,742	133	26	68	
F5CQ	*	3,430	42	15	34	
F6KCP	**21**	**166,446**	**569**	**32**	**94**	
			(OP: F5VHN)			
F6CTT	**1.8**	**153,510**	**1193**	**17**	**85**	
***F8AKS**	**A**	**315,756**	**667**	**65**	**229**	
***F6FTB**	*	**243,721**	**607**	**61**	**190**	
*F4FFH	*	197,775	497	49	176	
*F4ETG	*	181,575	550	51	174	
*F5DRD	*	170,430	504	52	195	
*F4FEP	*	150,228	389	53	161	
*F6CNM	*	121,888	359	52	156	
*F1UIJ	*	111,354	421	48	153	
*F2QH	*	106,210	403	47	143	
*F1UJS	*	84,214	228	50	108	
*F1ADG	*	70,179	307	39	118	
*F4FHI	*	60,264	251	40	84	
*F5LIW	*	51,729	214	39	90	
*F4DSK	*	44,652	242	31	91	
*F1ICS	*	37,200	200	40	84	
*F8CED	*	35,574	194	33	88	
*F4BIV	*	33,790	253	25	84	
*F1MKG	*	30,573	238	28	101	
*F4CUI	*	30,555	154	31	74	
*F5CDE	*	29,450	162	29	66	
*F5DHH	*	24,472	183	24	68	
*F1SMV	*	22,248	124	36	67	
*F1EPQ	*	19,053	187	16	71	
*F1BNT	*	17,992	190	24	80	
*F1HSW	*	15,456	119	27	65	
*F5MMB	*	14,453	102	30	67	
*F5KFL	*	12,688	90	23	38	
			(OP: F5GTW)			
*F1IWH	*	11,023	102	20	53	
*F6CYT	*	10,804	90	23	51	
*F8DYD	*	8,375	90	23	44	
*F8DHE	*	6,798	67	20	46	
*F4CGJ	*	5,688	97	17	55	
*F4EMN	*	5,353	47	22	31	
*F6CZV	*	690	20	6	9	
*F4FNT	*	250	15	4	11	
*F4FWN	*	18	3	3	3	
***F5JY**	**21**	**109,434**	**379**	**29**	**93**	
*F1UVN	*	15,142	103	23	44	
***F6DRP**	**14**	**65,706**	**401**	**21**	**73**	
***F8CGL**	**7**	**29,164**	**260**	**16**	**76**	
***F5VLV**	**1.8**	**8,772**	**211**	**5**	**46**	
		Germany				
DJ8OG	**A**	**3,488,496**	**3175**	**123**	**405**	
DJ4PT	*	**2,747,430**	**2371**	**129**	**405**	
DL5AWI	*	851,129	1065	101	308	
DL5AN	*	811,536	985	100	364	
DL2F	*	671,560	1458	80	246	
			(OP: DD8ZL)			
DK3W	*	625,356	1112	86	262	
			(OP: DL6MHW)			
DL9GWO	*	506,664	790	88	284	
DF1IAQ	*	469,892	931	73	243	
DJ3HJ	*	407,781	752	73	224	
DL1MAJ	*	390,634	597	79	267	
DL1RG	*	331,749	620	77	220	
DL1APW	*	309,036	410	96	268	
DL7DZ	*	287,352	625	75	232	
DF9OO	*	271,975	599	63	212	
DL9EO	*	268,804	577	66	202	
DJ9ZB	*	200,147	437	61	172	
DL5YM	*	171,572	453	59	177	
DL6RBO	*	145,400	487	50	150	
DL1NEO	*	143,208	440	54	167	
DL1Z	*	138,040	568	32	104	

*DK1TS	*	32,670	191	32	78
*DL1VJL	*	30,800	141	37	63
*DK9VA	*	30,500	159	32	90
*DJ6UP	*	30,210	196	32	82
*DO1CS	*	28,896	199	25	71
*DA6TEC	*	28,770	248	23	82
*DO9PL	*	28,662	246	18	84
*DG6OAG	*	28,167	194	30	93
*DL9GTB	*	27,880	179	26	56
*DM3KZN	*	27,178	186	37	90
*DL4AC	*	26,950	219	28	82
*DL5JH	*	26,883	205	26	77
*DF3IS	*	25,947	160	22	71
*DL6BQE	*	24,102	187	21	82
*DL3DBY	*	23,364	172	29	89
*DO1HGS	*	23,320	143	27	61
*DO3ME	*	22,842	196	22	72
*DO8TB	*	22,448	170	23	69
*DO9RE	*	22,200	198	26	94
			(OP: DL9RE)		
*DO5AWE	*	21,312	192	20	76
*DO7DU	*	21,070	206	17	81
*DF8TI	*	20,800	139	23	77
*DH0SP	*	19,412	198	20	72
*DL1DXF	*	18,832	127	31	76
*DL9ZWG	*	18,690	119	28	77
*DL7UXG	*	17,820	161	22	68
*DL4EBW	*	17,100	132	25	70
*DL7VRG	*	16,826	124	25	69
*DF2FM	*	16,740	112	28	80
*DM3PKK	*	16,038	99	24	42
*DL1EFD	*	15,688	102	23	51
*DO1SAJ	*	14,706	107	24	62
*DC0ASP	*	14,615	165	19	60
			(OP: DB1SMW)		
*DB7TF	*	14,529	145	17	70
*DO1MGN	*	13,206	171	15	56
*DL3SCN	*	13,090	113	21	64
*DL3YEE	*	13,083	108	31	58
*DJ6APA	*	12,879	111	26	55
*DC8QT	*	12,702	112	26	61
*DL5ALW	*	12,616	110	22	61
*DL1DBR	*	12,556	117	26	60
*DL6RBH	*	12,510	133	21	69
*DL8RDL	*	12,150	119	19	56
*DJ1FZ	*	10,496	108	25	57
*DL1DWL	*	10,428	133	22	57
*DF6WE	*	8,833	103	21	52
*DM2BPG	*	7,848	135	10	62
*DL1DTL	*	7,748	81	17	35
*DG5AAP	*	7,526	92	18	53
*DL7AU	*	7,248	70	17	31
*DG1RPU	*	7,139	87	17	42
*DL7ULM	*	7,020	51	25	35
*DL1LOD	*	6,984	73	21	51
*DF9FS	*	6,720	115	25	55
*DJ5KX	*	6,435	90	15	50
*DL2000BY	*	5,341	85	17	32
			(OP: DF6JF)		
*DO1DJJ	*	5,160	71	17	26
*DL6NWA	*	4,700	59	16	34
*DO1CDE	*	4,682	181	25	69
*DL6UAM	*	4,136	66	13	31
*DF5KT	*	3,906	84	15	47
*DO1KUB	*	3,840	63	12	36
*DL9FB	*	3,752	59	17	39
*DL6UMF	*	3,450	71	16	34
*DL5MO	*	2,898	45	14	28
*DC3HB	*	2,679	47	17	30
*DJ2GMS	*	2,491	57	11	36
*DL1PF	*	2,464	66	14	30
*DK9IP	*	2,200	23	21	23
*DA9L	*	1,998	47	13	24
			(OP: DO1BEN)		
*DL3OBQ	*	1,978	47	14	32
*DG3MR	*	1,638	34	12	30
*DC2CT	*	1,560	26	16	24
*DL1AZK	*	1,540	21	12	16
*DJ1HF	*	1,512	54	9	27
*DL8DXL	*	1,440	36	12	28
*DM2AJK	*	1,160	31	12	17
*DG6DAF	*	1,150	34	10	13
*DL7CU	*	1,118	23	11	15
*DD9PS	*	986	27	13	21
*DL7LZ	*	928	30	10	19
*DL8TL	*	891	28	10	23
*DO5TAN	*	600	25	6	19
*DL1JMS	*	532	14	7	12
*DL4HCF	*	450	15	5	10
*DO6TR	*	180	11	5	10
*DL4NT	*	140	12	6	8
*DO3HZ	*	100	10	2	8
*DC2IP	*	50	7	4	6
DO4DXA	**28**	**1,666**	**56**	**7**	**27**
DL3LE	**21**	**28,178**	**165**	**21**	**52**
DJ6TK	**"**	**20,440**	**158**	**18**	**52**
*DO1AYJ	*	5,805	70	13	30
*DL5KUD	*	1,430	21	11	15
*DO4TP	*	108	6	3	3
DL1LH	**14**	**165,704**	**551**	**33**	**121**
*DL9LM	*	36,498	329	18	61
*DL3BRA	*	28,290	252	17	52
*DJ4MH	*	11,284	172	9	43
*DG2BHB	*	8,112	126	14	38
*DL1STV	*	2,414	52	7	27
*DH5WB	*	1,012	37	7	16
DH8BQA	**7**	**106,112**	**602**	**23**	**105**
*DL8AAM	*	23,478	191	15	63
*DG0DM	*	5,593	102	8	39
*DC3FR	*	4,399	88	13	40
*DG1NI	*	2,130	61	6	24
*DC1DB	*	342	20	3	15
DL1A	**3.7**	**28,728**	**492**	**11**	**52**
			(OP: DO4DXA)		
*DO1LMM	*	600	31	3	17
DL2VSF	**1.8**	**4,687**	**112**	**5**	**38**
*OK8NI	*	224	17	2	12
		Greece			
SV1GRD	**A**	**56,110**	**261**	**48**	**133**
SV2FLQ	*	42,328	202	38	110
SV2KBE	1.8	2,242	56	5	33
SV0XBA	**21**	**37,931**	**230**	**23**	**60**
*J43J	1.8	5,952	122	6	42
			(OP: DJ5JH)		
		Guernsey			
MU0GSY	**A**	**237,318**	**664**	**43**	**179**
		Hungary			
HA8JV	**A**	**4,356,936**	**3942**	**131**	**490**
HA8TI	*	51,538	165	45	101
HA1YI	**21**	**155,375**	**554**	**33**	**92**
HA6FQ	*	49,959	227	30	87
HA1TNX	**3.7**	**60,204**	**594**	**16**	**71**
HA8BE	**1.8**	**81,506**	**915**	**13**	**70**
***HA8EV**	**A**	**199,892**	**661**	**53**	**183**
***HA7YS**	**"**	**118,734**	**456**	**50**	**181**
*HA8LLK	*	77,649	392	44	99
*HA3OU	*	66,750	242	44	134
*HG3FMZ	*	29,100	211	28	72
*HA2MN	*	8,246	96	18	44
***HG4F**	**14**	**214,953**	**1003**	**31**	**106**
				(OP: HA4FF)	
*HA1VE	*	14,592	160	18	39
*HA7MW	*	7,535	70	12	43
*HA5OFN	*	624	37	7	19
		Iceland			
TF3SG	**A**	**47,879**	**264**	**31**	**96**
TF3Y	**21**	**59,092**	**503**	**17**	**51**
TF3AM	**14**	**39,650**	**456**	**14**	**51**
***TF8GX**	**14**	**103,250**	**648**	**26**	**92**
		Ireland			
EI9FVB	**A**	**152,995**	**380**	**45**	**140**
EI4DJB	*	40,250	261	26	99
EI4DW	*	17,800	99	31	58
EI2CN	**21**	**389,504**	**1104**	**30**	**94**
EI9HX	**14**	**494,356**	**1712**	**34**	**112**
EI6JK	**7**	**145,537**	**860**	**24**	**95**
***EI4GXB**	**A**	**240,673**	**594**	**57**	**182**
*EI/ON4EI	*	121,792	520	34	139
				(OP: ON4EI)	
*EI7CC	*	105,092	438	40	132
*EI5GJB	*	59,792	357	31	117
*EI3ENB	*	55,404	252	39	123
*EI5GPB	*	9,184	106	22	60
*EI4GAB	*	8,833	103	18	55
***EI4CF**	**21**	**111,666**	**610**	**26**	**85**
		Italy			
II4A	**A**	**2,098,174**	**2371**	**100**	**342**
				(OP: IK4ADE)	
IZ7GWZ	**"**	**817,696**	**1999**	**79**	**174**
I1EIS	*	691,302	1039	87	324
IO2L	*	518,700	1111	74	192
				(OP: IZ2FFK)	
IZ5DKJ	*	436,900	657	91	249
I0LYO	*	376,390	799	70	213
IU1U	*	366,656	860	59	213
				(OP: IZ1GCZ)	
IK1JJM	*	280,596	549	68	200
IK2SND	*	243,408	550	70	194
IK8SEU	*	221,443	586	58	171
IZ0BVU	*	162,282	382	69	189
IW0GTA	*	151,440	392	61	179
I4XNN	*	142,545	273	67	154
IW0BCF	*	124,176	323	55	144
IZ2JCD	*	118,692	378	45	144
IW0HLZ	*	95,570	316	55	135
IK3AES	*	81,536	226	60	148
IZ3LJG	*	73,344	307	54	138
IZ1OSP	*	67,125	399	36	143
IZ3DVU	*	62,208	219	44	100
IZ5ILU	*	52,746	200	48	101
IZ6CLN	*	49,712	201	35	69
IZ5IJY	*	28,258	137	46	96
I5JFG	*	27,975	156	23	52
IZ8EDL	*	22,275	99	36	63
IK0UTM	*	16,867	112	28	73
IK4AUY	*	14,282	106	18	56
IZ1CQZ	*	10,200	80	21	39
IZ3KNK	*	1,548	22	16	20
IQ8OM	**28**	**7,488**	**97**	**13**	**35**
				(OP: IZ8EDJ)	
IW2MWZ	**21**	**61,388**	**272**	**30**	**73**
IR2M	**14**	**573,212**	**1699**	**39**	**149**
				(OP: IZ2FDU)	
IZ8DPL	**"**	**309,825**	**1012**	**36**	**117**
IO1T	*	206,141	720	36	121
				(OP: IK1RQT)	
IZ8EFD	*	43,956	245	27	81
IK0TUM	*	36,769	242	19	64
IK8LTB	*	24,010	359	18	52
II2A	*	7,304	134	9	13
				(OP: IW2EFG)	
IW1GGN	*	96	4	4	4
IO3J	**7**	**353,682**	**1652**	**30**	**117**
				(OP: IV3ZXQ)	
IK2DZN	*	77,744	506	22	91
IZ4NIC	**3.7**	**160,888**	**1104**	**21**	**98**
IV3RJT	*	23,217	310	14	57
IV3BKH	1.8	5,088	82	8	45
IZ0GYP	*	1,980	63	5	28
***IZ2FOS**	**A**	**1,338,988**	**1810**	**106**	**370**
***IK4TVP**	**"**	**482,752**	**715**	**90**	**307**
***IZ5ICH**	**"**	**401,016**	**860**	**69**	**195**
*IZ8FFA	*	362,208	693	79	229
*IK2QLX	*	295,475	634	63	202
*IK7NXU	*	253,800	501	72	210
*IW4EGX	*	165,788	488	53	164
*IZ1JLF	*	165,440	427	60	160
*IZ8DBJ	*	123,284	369	60	136
*IZ5ILF	*	104,414	325	46	120
*IK5AAB	*	91,443	376	46	141
*IK7RVY	*	80,522	342	40	123
*IK2YSJ	*	73,428	365	36	138
*IN3FHE	*	60,564	329	35	112
*IZ8FBU	*	51,084	245	35	97
*IZ5IMD	*	49,518	203	42	89
*IZ1JLN	*	44,436	262	29	109
*IZ3MSK	*	39,804	213	36	88
*IW0GBU	*	36,112	163	35	87
*IK2HLM	*	30,583	176	33	86
*IK6ZDE	*	27,972	177	28	83
*IZ2GTO	*	27,492	158	38	78
*IK1YLL	*	26,416	182	35	92
*IZ1JLP	*	24,442	176	28	93
*IZ2KRZ	*	24,428	117	38	86
*IZ3GNG	*	23,896	158	29	87
*IN3AEF	*	22,263	146	36	87
*IK2MLS	*	22,134	118	34	68
*IK7WPD	*	19,400	114	32	68
*IZ5IOS	*	17,088	75	40	49
*IW7BIM	*	16,830	147	30	72
*IK2CFD	*	16,745	100	29	56
*IK8JDH	*	16,560	136	25	55
*IZ3EOU	*	16,376	103	28	64
*IZ1NBX	*	15,111	177	14	59
*IK3MLF	*	15,048	98	30	46
*IN3ADW	*	14,696	133	22	66
*I2BZN	*	14,196	161	15	63
*IW4ENR	*	12,780	113	22	49
*IK2IKW	*	12,628	104	25	57
*IK5PVX	*	12,402	99	26	52
*IZ4HZA	*	12,024	100	23	49
*I1YGQ	*	11,550	124	20	57
*IK1WEG	*	11,392	96	23	41
*IZ2DII	*	10,864	82	23	33
*IX1ALR	*	10,005	128	12	57
*IZ0FVL	*	9,215	76	25	70
*IK8LXI	*	9,198	87	26	47
*IZ7GLL	*	7,007	60	20	29
*IZ1AOD	*	6,760	99	18	47
*IV3IDP	*	6,700	83	21	46
*IZ7EUB	*	6,699	51	33	44
*I6FDJ	*	5,022	73	16	38
*IN3IPY	*	4,131	78	14	37
			(OP: IN3UFW)		
*IC8SCI	*	3,572	37	20	27
*IZ3NVR	*	3,388	55	15	29
*IK4ZHH	*	3,162	51	11	20
*IK5YJK	*	3,096	40	15	28
*IZ0FVD	*	2,808	58	10	29
*IK4XQT	*	2,550	46	16	35
*IK2WFN	*	2,176	38	13	19
*IK5FKF	*	1,755	30	15	24
*IZ5BXF	*	1,519	20	14	17
*IZ5DKR	*	1,392	22	14	15
*IZ2GMT	*	1,225	35	9	26
*IW7EFJ	*	1,221	39	9	24
*I2ORX	*	399	29	10	11
*IW1FGA	*	312	21	8	18
*IZ6NQL	*	300	18	11	14
*I3YYY	*	112	9	7	7
*IK5ZQC	*	100	41	10	28
*IV3EFE	*	96	4	4	4
***IZ8IYX**	**28**	**6,760**	**84**	**11**	**41**
*IK4SPB	*	1,568	39	8	24
***IZ8CCW**	**21**	**101,140**	**518**	**29**	**101**
*IK8YFU	*	7,050	82	14	33
***IW1QN**	**14**	**139,624**	**644**	**31**	**93**
***IQ8EB**	**"**	**111,198**	**547**	**30**	**99**
*IW7EBE	*	85,269	400	28	101
*IZ2JQP	*	17,447	152	15	58
*I0TIC	*	6,050	107	14	41
*IW2NRI	*	4,464	77	13	35
*IW5EEP	*	2,345	55	10	25
*IK0VVE	*	504	18	5	13
*IK/DJ1AA	*	418	33	6	13
			(OP: DJ1AA)		
*IZ2CSX	*	150	17	5	10
*IK2RTK	*	24	2	2	2
***IZ1GLX**	**7**	**15,408**	**224**	**17**	**55**
*IZ3KKE	*	2,268	32	12	15
*IK3UMT	*	176	6	5	6
***IV3KFB**	**3.7**	**126,336**	**1233**	**16**	**78**
*IZ3FJZ	*	66,994	723	16	66
*IV3TQE	*	27,864	246	14	72
		Kaliningrad			
UA2CZ	**A**	**148,044**	**487**	**55**	**164**
***UA2FHZ**	**A**	**28,072**	**232**	**31**	**90**
*RU2FL	*	10,374	77	26	52
*UA2FGY	14	64	6	2	2
***RA2FB**	**1.8**	**1,891**	**70**	**4**	**27**
		Latvia			
YL7X	**A**	**674,856**	**1078**	**91**	**321**
				(OP: YL2LY)	
YL2PJ	*	213,060	594	54	211
YL2PP	*	12,580	53	38	47
YL2KO	**21**	**203,489**	**696**	**33**	**110**
YL2BJ	**14**	**181,470**	**1018**	**25**	**90**
YL3FT	**3.7**	**204,476**	**1345**	**26**	**98**
***YL2TQ**	**A**	**123,233**	**315**	**56**	**131**
***YL2TB**	**"**	**107,730**	**413**	**38**	**133**
*YL2NK	*	86,860	393	38	134
*YL2CR	*	55,384	302	36	125
*YL2IP	*	12,835	100	22	63
*YL2IS	*	7,590	124	14	41
***YL2GUV**	**28**	**20**	**10**	**4**	**6**
***YL3BZ**	**21**	**26,025**	**176**	**21**	**54**
*YL2II	*	3,648	49	13	25
***YL5W**	**3.7**	**36,850**	**536**	**9**	**58**
*YL/ES7AGW	*	2,886	71	6	33
			(OP: ES7AGW)		
		Lithuania			
LY5R	**A**	**1,452,056**	**1772**	**108**	**358**
LY4CW	**"**	**645,244**	**1130**	**87**	**301**
LY2TS	*	333,760	850	68	230
LY7BAE	*	189,420	553	54	177
			(OP: LY2AE)		
LY2T	*	132,927	499	41	136
LY1CM	*	38,086	283	32	107
LY3CY	*	6,328	100	14	42
LY7M	*	780	28	6	24
			(OP: LY2BW)		
LY2VA	*	500	14	11	14
LY7BBY	**14**	**35,380**	**267**	**16**	**42**
				(OP: LY3BY)	
LY2MM	**7**	**22,570**	**255**	**16**	**58**
LY1C	*	19,099	224	17	54
LY2CO	**3.7**	**25,500**	**302**	**13**	**62**
LY2IJ	**1.8**	**139,944**	**1207**	**17**	**85**
***LY6A**	**A**	**955,682**	**1472**	**92**	**321**
				(OP: LY2BM)	
***LY4T**	**"**	**549,440**	**1106**	**75**	**265**
*LY4D	*	361,620	823	69	218
*LY2OU	*	230,208	701	56	162
*LY1BA	*	44,880	164	41	135
*LY1DJ	*	39,102	239	25	89
*LY2OO	*	39,059	231	32	107
*LY2AT	*	38,171	216	34	99
*LY2OM	*	30,208	195	32	86
*LY2N	*	27,455	162	29	56
*LY7BQ	*	24,675	217	26	79
				(OP: LY4Q)	
*LY3S	*	19,758	219	21	68
***LY1G**	**21**	**45,178**	**220**	**28**	**70**
		Luxembourg			
LX1NO	**A**	**150,944**	**457**	**50**	**162**
		Macedonia			
Z32ID	**A**	**281,882**	**841**	**55**	**139**
Z36W	*	49,068	232	39	77
***Z33F**	**3.7**	**32,227**	**442**	**9**	**58**
		Moldova			
ER0WW	**A**	**5,517,720**	**5387**	**131**	**454**
				(OP: RL3FT)	
ER2KRT	*	448	163	32	80
				(OP: ER2BF)	
ER5GB	**14**	**36,207**	**314**	**20**	**61**
***ER3CT**	**A**	**68,182**	**295**	**40**	**106**
*ER5DX	*	9,984	58	28	50
***ER4LX**	**7**	**37,107**	**343**	**17**	**76**
***ER0FEO**	**3.7**	**15,296**	**223**	**9**	**55**
***ER2RM**	**1.8**	**22,400**	**313**	**9**	**55**
		Montenegro			
***4O3Z**	**A**	**70,686**	**486**	**29**	**125**
*4O7AMD	7	805	35	5	18
***4O4A**	**3.7**	**118,146**	**1046**	**18**	**79**
		Netherlands			
PA3AAV	**A**	**1,267,266**	**1772**	**97**	**365**
PA0IJM	**"**	**836,800**	**2156**	**75**	**245**
PA0JNH	*	446,188	830	73	264
PA8F	*	112,230	392	44	130
PA9DD	*	40,946	213	30	88
PA3ADJ	*	33,582	182	20	67
PA0LOU	*	26,677	110	33	70
PA5TT	*	23,856	119	26	58
PA0GRU	*	20,535	192	24	87
PA0LSK	*	12,567	97	27	44
PA3S	*	8,964	132	19	35
PA2ALF	*	7,616	100	14	54
PA3GVI	*	7,000	103	12	44
PA1JHP	*	5,518	94	13	49
PA0VST	*	4,740	89	9	51
PI4COM	**14**	**367,446**	**1213**	**34**	**107**
				(OP: PD2R)	
PE1MMZ	*	97,125	414	31	80
***PF9A**	**A**	**225,544**	**646**	**56**	**177**
***PA2C**	**"**	**147,702**	**504**	**47**	**159**
***PA8KW**	**"**	**147,609**	**435**	**55**	**176**
*PA0AGA	*	117,810	503	40	114
*PA2W	*	73,359	301	37	134
*PA4NIC	*	72,996	425	32	126
*PD1KSA	*	54,768	319	29	83
*PA0TCA	*	53,333	219	38	95
*PH0AS	*	47,328	179	41	95
*PA1PT	*	40,866	294	36	111
*PE1LTY	*	40,680	228	30	90
*PD5LO	*	38,160	290	22	84
*PD7BZ	*	37,584	230	28	80
*PG1R	*	37,504	217	30	98
*PE2JMR	*	32,830	233	28	106
*PA4N	*	30,988	164	37	90
*PA3AIN	*	29,892	197	29	77
*PA3ARM	*	27,846	201	29	90
*PE2KM	*	25,415	211	23	92
*PD0HM	*	22,816	189	23	69
*PA0RBO	*	21,528	153	25	79
*PA3JD	*	19,125	162	26	49
*PA2CVD	*	17,730	191	15	75
*PA3EWG	*	14,378	157	21	70
*PB7XYL	*	14,355	103	27	60
*PA0FEI	*	13,688	104	25	93
*PA9RD	*	12,420	96	24	45
*PA3DBS	*	11,088	137	19	58
*PD7RB	*	10,452	89	16	36
*PG2D	*	9,558	97	23	58
*PD3EM	*	8,712	97	17	49
*PA3HGF	*	8,288	101	20	54
*PD2LLS	*	8,037	75	20	37
*PA1W	*	7,597	76	17	54
*PH2A	*	7,326	96	19	47
*PA8TWN	*	7,038	97	17	52
*PA3CJP	*	7,002	413	36	162
*PA3GMM	*	5,800	76	14	36
*PA1PAT	*	4,836	72	15	37
*PA0B	*	4,263	69	12	37
*PD0GAB	*	3,658	99	15	47
*PA3HCD	*	2,950	55	13	37
*PA2CHM	*	2,747	60	11	30
*PA4SDV	*	2,478	71	7	35
			(OP: PI4RCK)		
*PG7V	*	2,142	35	14	28
*PA0FAW	*	2,120	38	12	28
*PA0CGB	*	1,886	59	8	33
*PE1RIK	*	1,760	54	10	34
*PH5T	*	230	21	11	12
*PA2MI	*	168	14	3	9
***PA0MIR**	**21**	**23,120**	**154**	**21**	**47**
*PE1KL	7	425	17	4	13
		Northern Ireland			
MI1SJM	**A**	**31,302**	**183**	**29**	**82**
GI5K	**14**	**1,050,120**	**2918**	**38**	**142**
				(OP: MI0LLL)	
GI8KOW	**3.7**	**414,392**	**2270**	**26**	**110**
***MI8JZZ**	**A**	**260,463**	**674**	**59**	**178**
***GI7AXB**	**"**	**259,119**	**833**	**46**	**143**
*GI4SJQ	*	121,004	336	48	131
*GI8KVQ	*	98,270	372	34	121
*GI4AAM	*	60,494	330	35	114
*GI8OUM	*	6,670	87	14	44
		Norway			
LN8W	**A**	**3,038,616**	**3604**	**116**	**388**
				(OP: LB8IB)	
LA2AB	*	633,696	1551	76	252
				(OP: SP2ASJ)	
LA9TJA	*	112,761	495	37	150
LA6KOA	*	72,631	382	34	117
LA9TY	*	45,264	238	36	102
LA1PHA	*	18,063	135	29	52
LA3S	**21**	**70,770**	**345**	**25**	**80**
				(OP: LA3BO)	
LA2OKA	14	988	20	8	11
LN9Z	**7**	**235,882**	**1651**	**24**	**94**
				(OP: LA5KO)	
LA9Z	**1.8**	**103,700**	**972**	**16**	**69**
				(OP: LA9HW)	
***LA7GNA**	**A**	**28,248**	**214**	**24**	**64**
*LA1YPA	*	20,800	158	29	75
*LA6CF	*	20,520	92	36	59
*LA1VNA	*	18,879	160	23	70
*LA7TN	*	18,387	175	22	59
*LA5PRA	*	17,460	94	35	62
*LA3ZPA	*	12,972	139	24	68
*LA3YU	*	5,200	102	17	48
*LA2QJA	*	234	11	8	10
*LA7IJA	7	2,412	51	8	28
*LA9QNA	3.7	36	23	4	14
		Poland			
SO6I	**A**	**761,915**	**1337**	**86**	**299**
				(OP: SP6JIU)	
SP3LPG	**"**	**552,770**	**1019**	**87**	**247**
SN5G	*	415,200	1025	74	226
				(OP: SP5JTF)	
SP1O	*	130,255	304	69	170
SP1MVG	*	122,640	275	65	145
SN3S	*	121,540	577	52	154
				(OP: SQ3LVO)	
SP6IEQ	*	114,642	295	54	144
SP5GMM	*	100,510	259	57	173
HF50OLS	*	55,131	338	31	110
				(OP: SP4ICP)	
SP3PJY	*	46,004	365	25	99
				(OP: 3Z3AHK)	
SP6RGC	*	33,782	194	31	96
SP3RBG	*	15,336	99	26	82
SP5UAR	*	6,555	88	17	52
SP2JMR	*	4,840	50	17	27
SP8YZZ	*	2,812	51	9	29
				(OP: SP9JPA)	
SP1GZF	**28**	**300**	**15**	**5**	**10**
SP9W	**21**	**147,822**	**496**	**35**	**107**
SP1QY	*	21,528	121	27	51
SN8B	**14**	**241,500**	**894**	**36**	**115**
				(OP: SP8CUR)	
SQ4MP	*	51,906	494	20	62
SP6FPY	*	612	12	6	11
SO6X	**7**	**480,600**	**2269**	**32**	**118**
				(OP: SP6IXF)	
SP4TKR	*	275,400	1336	32	121
HF20OC	*	151,032	1181	22	94
				(OP: SP2FAP)	
SP3GTS	*	14,952	175	16	68
SP5NN	*	1,428	45	7	21
SN2U	**3.7**	**59,410**	**873**	**10**	**55**
SN3R	**1.8**	**143,208**	**1170**	**18**	**84**
				(OP: SP6HEQ)	
SP7JQQ	*	9,918	149	7	51
***SP9NWN**	**A**	**430,950**	**830**	**73**	**252**
***SQ5WAA**	**"**	**355,166**	**750**	**74**	**248**
***SQ8JX**	**"**	**257,310**	**615**	**64**	**206**
*SP9OYB	*	219,207	501	61	206
*SP2GJI	*	150,525	412	54	169
*SP2OVQ	*	145,368	457	45	171
*SP9BGS	*	140,828	429	50	168
*SP3HZG	*	115,101	416

*SP9IBJ	*	7,938	102	12	42
*SP3YM	*	5,200	44	17	23
*SQ6LJA	*	2,201	69	7	24
*SP3DRM	*	1,364	29	9	22
***SO6V**	**7**	**147,576**	**961**	**24**	**105**
			(OP: SP6DVP)		
*SP1I	*	44,574	200	22	92
*SP9EML	*	21,315	167	21	66
*SP9RQH	*	15,840	146	16	64
*SP3VT	*	9,936	196	10	44
*SQ2GXO	*	5,940	83	11	43
*SP9DTE	*	2,627	53	9	28
***SN9P**	**3.7**	**54,777**	**457**	**16**	**77**
			(OP: SQ9GAI)		
***SP4DEU**	*****	**38,380**	**499**	**13**	**63**
*SP4SHD	*	35,945	371	13	66
*SP9JZT	*	30,733	414	10	63
*SN3B	*	24,128	393	8	56
			(OP: SQ3JPV)		
*SQ2RGB	*	10,887	195	7	50
*SP3CYY	*	10,140	142	12	53
*SQ9MEI	*	8,600	166	6	44
*SP8OOB	*	3,589	103	6	31
*SQ4INW	*	2,173	72	6	35
*SP7KKX	*	1,953	65	5	26
			(OP: SP8QJM)		
*SQ5IZX	*	1,922	65	7	24
*SP5CIB	*	1,260	36	4	26
*SP2AGA	*	532	30	3	16
***SP4XQN**	**1.8**	**52,591**	**647**	**13**	**64**
*SP5CJY	*	12,960	208	8	52
*SP5PSL	*	8,085	185	7	42
			(OP: SP5JXK)		

Portugal

CT1JLZ	**14**	**981,050**	**2907**	**38**	**137**
			(OP: OK1RF)		
CT1EWA	3.7	4,464	98	6	30
***CT8K**	**A**	**2,405,340**	**2766**	**92**	**328**
			(OP: CT1CJJ)		
*CT1ENQ	*	186,355	535	50	185
*CT1DIN	*	53,298	213	38	103
*CT1EGF	*	5,828	85	11	36
*CT1EGW	*	204	7	5	7
***CT1FUH**	**28**	**551**	**24**	**6**	**13**
***CT1ETX**	**14**	**125,622**	**667**	**26**	**100**
*CT/HB9AAP	*	35,672	243	20	71
*CT/SB6CD	*	1,682	52	6	23
***CT1CQK**	**7**	**26,664**	**197**	**19**	**69**
*CT2JRZ	*	570	27	5	14

Romania

YO3RU	**A**	**445,544**	**955**	**80**	**252**
YO7FB	*	104,372	403	44	150
YO9FWX	*	87,020	289	48	142
YO7LGI	*	14,670	123	22	68
YO2R	**21**	**67,023**	**387**	**29**	**70**
			(OP: YO2RR)		
YO9CWY	**14**	**30,342**	**242**	**17**	**61**
***YO3CZW**	**A**	**643,648**	**1346**	**84**	**272**
***YO3FRI**	*****	**580,992**	**1016**	**86**	**298**
*YO5OED	*	218,624	612	57	187
*YO8RFS	*	121,900	452	46	166
*YO7NW	*	114,570	336	51	139
*YO5FMT	*	101,871	428	46	143
*YO9AGI	*	92,928	492	34	142
*YO8BPY	*	92,732	347	43	151
*YO2MIL	*	84,513	275	54	143
*YO8DDP	*	72,890	207	55	130
*YO5DAS	*	68,730	326	34	124
*YO7LBX	*	68,138	357	33	124
*YO6HSU	*	47,596	229	33	113
*YO5DMB	*	45,500	270	28	102
*YO9IKW	*	34,048	111	44	68
*YO5OPH	*	28,890	236	21	86
*YO7BGB	*	28,300	218	27	73
*YO9IF	*	25,216	188	32	96
*YO5CZZ	*	23,520	129	31	65
*YO5TP	*	21,696	165	28	85
*YO3CCC	*	21,600	150	29	79
*YO4BEX	*	19,110	197	14	56
*YO2LXW	*	17,473	143	29	72
*YO8GF	*	17,220	119	27	57
*YO8THG	*	14,685	134	17	72
*YO8RAC	*	14,406	122	26	72
*YO9HG	*	13,590	166	15	75
*YO6ADW	*	11,473	86	23	44
*YO8OH	*	9,940	50	24	46
*YO6PEG	*	9,085	129	16	63
*YO3DLK	*	7,480	65	25	43
*YO9ION	*	5,428	62	21	38
*YO7MGG	*	3,910	34	17	29
*YO2MCK	*	3,168	75	10	38
*YO6QT	*	2,958	77	8	43
*YO9DFQ	*	2,150	34	15	28
***YO2AOB**	**28**	**3,915**	**74**	**10**	**35**
***YO9XC**	**21**	**15,774**	**140**	**21**	**45**
***YO5Q**	**14**	**52,400**	**337**	**25**	**75**
			(OP: YO5IP)		
*YO5OHY	*	21,420	206	17	51
*YO6EZ	*	2,622	63	9	29
*YO2QY	*	2,226	37	13	29
*YO3GW	*	910	34	7	19
*YO5OYR	*	126	7	3	3
*YO5OET	3.7	1,980	73	4	26
*YO2LIE	*	912	57	4	20
***YO6BZL**	**1.8**	**11,387**	**240**	**8**	**51**

Sardinia

IM0/IK0FMB	**A**	**577,584**	**1569**	**43**	**146**
			(OP: IK0FMB)		
IS0T	**14**	**579,600**	**1951**	**34**	**116**
			(OP: IN3ZNR)		

Scotland

GM7V	**A**	**4,089,600**	**4047**	**126**	**442**
			(OP: GM4YXI)		
MM0XDG	*	184,212	589	54	184
GM0TQJ	*	10,824	80	23	65
***GM4JYB**	**A**	**285,975**	**679**	**57**	**222**
*MM0RKT	*	950	35	10	28
*2M0BEC	*	100	36	8	26
***GM7TUD**	**21**	**60,717**	**242**	**29**	**82**
***GM0IIO**	**14**	**30,996**	**231**	**21**	**63**
***MM0DXH**	**7**	**7,810**	**130**	**14**	**41**

Serbia

YT7R	**A**	**793,641**	**1182**	**100**	**311**
YU2A	**28**	**8,772**	**187**	**10**	**41**
YT7Z	**21**	**368,125**	**1136**	**34**	**121**
			(OP: YT7EI)		
YU1EL	**14**	**1,012,044**	**2639**	**39**	**148**
YT1BB	*****	**663,425**	**2218**	**38**	**137**
YU5M	*	127,456	799	29	83
YU8NU	*	19,734	198	17	49
YT8A	**7**	**1,030,032**	**3279**	**37**	**147**
			(OP: YU1EA)		
YT1VP	*	253,735	1131	32	123
YT5Z	**1.8**	**14,755**	**233**	**10**	**55**
***YT1HA**	**A**	**963,553**	**1793**	**87**	**302**
*YU1QT	*	251,988	699	61	188
*YU1CC	*	139,375	442	47	176
*YT3AA	*	51,600	231	37	92
*YU1IV	*	20,025	139	26	63
*YU7ONE	*	11,550	142	17	53
*YU2DRA	*	8,584	98	21	53
***YT2ISM**	**21**	**9,650**	**134**	**12**	**38**
***YU7ZZ**	**14**	**331,100**	**1266**	**36**	**118**
*YU1ADO	*	42,416	354	22	66
*YT2SMS	*	8,684	107	12	40
*YU1NSK	*	5,220	97	10	35
*YU1SZ	*	3,738	42	18	24
***YT2T**	**7**	**178,750**	**921**	**32**	**111**
			(OP: 4N1JA)		
***YU7YZ**	**3.7**	**37,920**	**414**	**12**	**68**
*YU0A	*	19,593	283	8	55
			(OP: YU1RA)		

Shetland Islands

GZ0F	**A**	**1,152,872**	**2151**	**88**	**304**
			(OP: GM4AFF)		
***MS0ZCG**	**28**	**2**	**1**	**1**	**1**
			(OP: MM0XAU)		
***MZ8A**	**21**	**580**	**28**	**5**	**15**
			(OP: MM0XAU)		
***MM0XAU**	**14**	**2,760**	**56**	**11**	**29**
***MS0ZET**	**7**	**1,200**	**41**	**4**	**21**
			(OP: MM0XAU)		
***MM0ZCG**	**3.7**	**210**	**16**	**3**	**12**
			(OP: MM0XAU)		

Sicily

IU9A	**A**	**237,808**	**1081**	**43**	**124**
IT9ESW	**21**	**165,356**	**729**	**33**	**101**
IT9YHR	**14**	**39,804**	**269**	**21**	**72**
IT9IMJ	*	8,874	122	15	36
***IT9PQJ**	**A**	**151,032**	**382**	**64**	**184**
*IT9YAO	*	70,090	276	53	110
*IW9FI	*	54,720	286	40	112
*IT9WTY	*	44,030	274	32	87
*IW9GYL	*	1,920	28	17	23
*IT9RJQ	*	1,131	21	11	18
*IT9YSW	*	1,125	21	12	13
*IT9GCG	*	700	16	13	15
***IT9RYJ**	**21**	**75,260**	**424**	**27**	**79**
***IT9ICS**	**14**	**34,131**	**364**	**25**	**68**
***IR9Z**	*****	**33,880**	**395**	**15**	**55**
			(OP: IT9VCE)		
*IT9ZVJ	*	29,419	251	19	54
***IT9JOF**	**7**	**7,200**	**97**	**11**	**39**

Slovakia

OM7PY	**14**	**44,100**	**279**	**25**	**73**
OM3RRC	*	10,962	129	11	43
			(OP: OM4TQ)		
***OM4DN**	**A**	**139,536**	**549**	**41**	**163**
***OM7YC**	*****	**131,365**	**403**	**55**	**180**
*OM4TW	*	54,715	255	40	115
*OM5UM	*	43,680	299	25	115
*OM4DA	*	42,607	288	25	112
*OM6AL	*	37,697	302	27	122
*OM4DU	*	36,140	213	35	104
*OM7AG	*	30,414	193	33	104
*OM3TLE	*	13,366	157	19	63
*OM1PD	*	11,049	105	21	66
*OM1TD	*	1,216	36	9	23
***OM5FA**	**28**	**6,372**	**101**	**11**	**43**
*OM3PQ	14	10,229	109	14	39
***OM3RDX**	**3.7**	**95,190**	**883**	**15**	**80**
			(OP: OM6KW)		
*OM0TT	*	10,080	168	7	49
*OM6TX	*	8,544	182	5	43
*OM4JD	1.8	972	39	4	23

Slovenia

S59AA	A	22,644	97	43	68
S57S	**28**	**15,281**	**233**	**11**	**48**
S56DX	**21**	**144,840**	**507**	**32**	**110**
S56M	**14**	**760,331**	**2137**	**37**	**132**
S53S	*	592,196	1743	39	133
			(OP: S52X)		
S57RTH	*	315,392	1478	28	84
S57DX	*	1,185	27	7	8
S53DU	*	595	15	8	9
S57AL	**7**	**912,630**	**3048**	**37**	**137**
S53M	*	448,415	1706	36	119
			(OP: S51FB)		
S58M	**3.7**	**181,472**	**1580**	**19**	**87**
***S51F**	**A**	**991,440**	**1276**	**98**	**361**
***S57U**	*****	**595,900**	**939**	**91**	**313**
*S58RU	*	163,506	533	53	176
*S56B	*	105,740	401	47	123
*S56G	*	99,076	399	44	144
*S59TI	*	48,988	235	39	109
*S57NCP	*	24,610	110	34	81
*S57NTR	*	21,624	122	29	77
***S54W**	**21**	**119,210**	**441**	**34**	**96**
*S59EIJ	*	540	20	6	9
*S59T	14	416	15	7	6
***S57LR**	**3.7**	**17,280**	**323**	**9**	**51**
***S58P**	**1.8**	**29,673**	**470**	**10**	**53**
*S58MU	*	2,232	68	5	31

Spain

EA4KR	**A**	**3,829,224**	**3371**	**120**	**432**
EE3E	*****	**1,223,525**	**1565**	**100**	**349**
			(OP: EA3ELZ)		
EA4KD	*	893,916	1442	84	272
AN1A	*	694,280	1333	78	262
			(OP: EA1AST)		
EE3R	*	442,005	641	95	278
			(OP: EA3OR)		
EA4TG	*	269,401	981	51	158
EA3EIQ	*	93,264	349	43	131
EA4DLX	*	79,744	276	53	125
EA4LU	*	77,775	271	51	132
EA3CEC	*	36,720	150	39	81
EA4WW	*	32,079	195	29	82
EA5EV	*	12,510	97	31	59
EC7AKV	**28**	**14,688**	**174**	**11**	**37**
EA4EER	**21**	**198,424**	**728**	**33**	**103**
EE3Y	*	126,504	475	28	98
			(OP: EA3EYD)		
EA2RCF	*	33,936	286	21	63
EA3RR	**14**	**491,849**	**1806**	**35**	**114**
EA7TN	*****	**489,212**	**1974**	**32**	**125**
EA1VIC	*	6,576	92	11	37
AM1C	**7**	**54,560**	**362**	**23**	**87**
			(OP: EA1NT)		
EA5KA	**1.8**	**23,544**	**322**	**10**	**62**
EA1EUI	*	13,680	220	13	59
EA5BY	*	216	22	6	18
***EE7X**	**A**	**942,400**	**1569**	**87**	**313**
			(OP: EA7JX)		
***EF1W**	*****	**676,767**	**1314**	**67**	**192**
			(OP: EA1WS)		
*EC1AIJ	*	641,592	851	88	311
*EE7R	*	344,190	682	72	226
			(OP: EA7IA)		
*EA1EVR	*	340,322	901	55	208
*EA1AAW	*	266,724	634	57	182
*EA3AKA	*	255,117	906	58	219
*EA3EGB	*	242,471	534	64	225
*EA7OT	*	223,920	583	61	179
*EH1K	*	183,568	580	43	133
			(OP: EA1AJV)		
*EA1JO	*	145,842	353	55	163
*EC2AWD	*	129,948	425	50	154
*EA7HLU	*	119,116	572	50	144
*EA2ADO	*	113,071	274	53	150
*EA1BLI	*	74,245	363	40	115
*EA3DTD	*	71,272	274	40	111
*EA3NA	*	65,136	275	39	99
*EA4FLY	*	64,600	284	36	100
*EB3FLY	*	55,713	298	29	118
*AO2V	*	50,416	285	32	105
			(OP: EB2FJN)		
*EA7AA	*	49,932	217	43	128
*EB3JT	*	48,256	217	38	90
*AM3A	*	47,875	298	34	91
			(OP: EA3FHP)		
*EA2CE	*	43,076	207	33	88
*EB5CNK	*	40,579	185	32	87
*EA4BM	*	38,306	204	29	78
*EA7EYQ	*	32,184	138	34	74
*EA1ET	*	31,644	217	31	77
*EA7HYL	*	31,625	191	36	89
*EA7LU	*	30,240	147	36	76
*EA3WX	*	28,667	160	29	80
*EA2CNU	*	27,144	149	34	82
*EA7HE	*	27,132	145	30	71
*EA5GSW	*	24,648	118	35	69
*EC7DZZ	*	22,500	140	32	68
*EA1IT	*	22,256	157	29	75
*EA5FWW	*	21,360	111	30	50
*EA4CS	*	17,617	114	29	50
*EA5CRU	*	16,296	138	30	67
*EA7EN	*	15,392	104	28	46
*EA7CWA	*	15,228	86	33	48
*EA1AW	*	15,111	107	26	43
*EA3DWS	*	14,013	106	25	56
*EA1BGV	*	12,446	80	32	66
*EB5WC	*	12,150	105	31	59
*EA4ETW	*	12,087	80	31	48
*EA2AVM	*	10,545	86	20	37
*EA1OT	*	10,176	112	15	33
*EA4WD	*	9,912	104	26	58
*EA3CZM	*	9,500	68	30	46
*EA1GFT	*	9,480	138	22	57
*EA1SB	*	9,112	75	27	40
*EA5DT	*	8,190	81	19	46
*EA3FAR	*	7,808	93	18	46
*EB5GIV	*	7,008	67	26	47
*EA5GSD	*	5,795	62	20	41
*EA4ERZ	*	5,518	102	15	47
*EA5AWJ	*	5,474	60	16	30
*EA5GSY	*	4,128	51	16	27
*EA1NE	*	3,600	52	11	14
*EA1GWM	*	3,402	45	21	42
*EA2AOS	*	3,328	80	25	39
*EA5CZM	*	3,198	42	15	26
*AO5C	*	2,898	51	12	34
			(OP: EA5FCW)		
*EC5CWG	*	2,542	39	14	17
*EC1AQT	*	2,508	48	14	30
*EA7MT	*	2,457	29	16	23
*EA5GTQ	*	2,368	35	14	23
*EA1GPL	*	2,352	45	12	30
*EA5GXI	*	2,146	36	14	23
*EC7DDZ	*	2,109	34	15	22
*EA2CHL	*	2,088	10	33	0
*EA7NW	*	1,645	24	12	23
*EA5HRM	*	1,620	35	13	23
*EA7FIQ	*	1,334	22	14	15
*EA2CJ	*	1,147	25	15	22
*EA7IBK	*	1,015	26	7	22
*EA4FLH	*	952	49	11	23
*EA3GYK	*	600	19	9	15
			(OP: DK7TM)		
*EA3GOD	*	551	14	9	10
*EH3IMB	*	510	39	10	24
*EA1DFP	*	272	19	4	12
*EA4FJJ	*	231	19	6	15
*EA2BNU	*	4	2	2	2
***AO1B**	**28**	**5,904**	**118**	**10**	**31**
			(OP: EA1YB)		
*EB3EPR	*	4,953	108	9	30
*AN1K	*	1,152	70	4	14
			(OP: EA1YG)		
***AO1J**	**21**	**120,960**	**782**	**22**	**58**
			(OP: EA1JJ)		
*EA1ABS	*	43,350	221	23	62
*EA3KN	*	36,491	221	22	69
*EA7GSU	*	30,295	177	22	61
*EA7FRX	*	25,063	140	20	51
*EA7HHV	*	11,840	179	20	60
***EA7RM**	**14**	**276,276**	**1194**	**32**	**111**
***AO3K**	*****	**215,859**	**1170**	**31**	**102**
			(OP: EA3GHZ)		
*EA4UV	*	68,856	328	27	87
*AO7T	*	49,470	477	16	69
			(OP: EA7KJ)		
*EA1ASG	*	37,671	210	20	67
*EA3CT	*	32,058	246	18	60
*EA4YK	*	14,960	97	14	54
*EA3CZR	*	13,910	116	16	49
*EA5TN	*	8,736	116	11	45
*EA3DVJ	*	8,639	111	14	39
*EA4ESG	*	8,496	104	16	43
*EA5AVW	*	7,446	99	13	38
*EA5GVV	*	3,094	55	8	30
*EA3GLJ	*	819	26	6	15
***EA3KT**	**7**	**14,981**	**199**	**14**	**57**
*EA7CVF	*	2,268	218	17	64
*EA2MA	*	589	30	4	15
***EA4IS**	**3.7**	**18,864**	**200**	**11**	**61**
*EA5RU	1.8	1,520	43	9	29

Sweden

SM5Q	**A**	**1,076,325**	**1381**	**85**	**296**
SM6U	*****	**949,878**	**1326**	**81**	**258**
SM7CDY	*	138,600	408	47	151
SM6BGG	*	99,264	403	39	102
SI3A	*	81,480	303	41	127
			(OP: SM3LIV)		
SB6A	*	56,250	397	30	95
SM7BJW	*	21,978	129	30	44
SD3A	*	14,685	99	27	62
			(OP: SM3FJF)		
SM5QU	*	10,296	86	26	62
SE5T	*	4,620	44	23	32
			(OP: SM5NPV)		
SM5CEU	**21**	**46,953**	**171**	**28**	**83**
SM0KV	*	25,112	173	22	64
SM5AOG	*	12,258	99	17	37
SM7C	**14**	**23,352**	**126**	**23**	**61**
			(OP: SM7CFZ)		
7S5C	*	10,856	92	19	40
			(OP: SM5CBM)		
SM6AHU	*	4,032	59	12	24
***SM3C**	**A**	**327,148**	**765**	**67**	**216**
			(OP: SM5CCT)		
*SM6FJY	*	186,825	484	56	179
*SM3EAE	*	123,559	500	37	120
*SA5ACR	*	51,475	201	41	104
*SE5S	*	45,750	166	45	77
*SM7RPU	*	45,568	175	39	89
*SM0BSO	*	43,491	221	34	99
*SM3SJN	*	41,625	232	36	89
*SE6C	*	29,391	202	31	70
			(OP: SM6CDN)		
*SM3YBP	*	29,304	236	25	86
*SA0AQT	*	17,765	143	26	69
*SM0BDS	*	9,724	89	21	47
*SM7ATL	*	5,130	104	8	37
*SM5OSZ	*	2,542	41	14	27
*SM7BQX	*	1,456	41	9	19
*SK7AX	*	680	14	8	9
			(OP: SM6DER)		
*SA7AOI	*	459	9	9	8
*SM6BZE	*	2	1	1	1
***SM5MX**	**14**	**52,076**	**350**	**22**	**72**
*SM0FM	*	11,656	86	14	48
*SM0YRJ	*	2,077	61	6	25
*SM6DER	*	90	5	4	2
***7S7V**	**3.7**	**75,768**	**824**	**14**	**70**
			(OP: SM7VZX)		
*SM4FYX	*	18	8	3	6

Switzerland

HB9CPS	**A**	**49,984**	**309**	**30**	**112**
HB9EFJ	*	27,495	173	24	93
HB9FBS	**7**	**41,175**	**524**	**17**	**58**
***HB9AWS**	**A**	**162,316**	**591**	**47**	**191**
***HB9ARF**	*****	**152,382**	**394**	**57**	**161**
*HB9IQB	*	48,013	177	43	90
*HB9EKR	*	24,528	160	33	79
*HB9VID	*	15,753	114	25	64
*HB9TSU	*	13,650	100	24	54
*HB9TSA	*	10,998	87	26	52
*HB9TOC	*	5,368	64	19	42
*HB9CFU	*	2,812	46	11	27
*HB9QA	*	60	10	6	9

Ukraine

US5D	**A**	**2,923,250**	**3273**	**121**	**429**
			(OP: UT7DX)		
UX2X	*****	**563,808**	**1151**	**84**	**252**
			(OP: UT2XQ)		
EM9F	*	385,469	640	87	284
			(OP: UT9FJ)		
UR3IQO	*	327,849	641	70	239
UT6EE	*	274,050	589	63	207
UR6QS	*	268,422	628	63	231
UR2VA	*	221,950	543	55	175
UU2JQ	*	167,844	299	72	212
UR4IOR	*	136,323	428	43	144
UT3WX	*	69,438	343	35	128
UY5ZZ	*	69,207	242	53	124
UR0QX	*	67,989	309	34	97
UR4EI	*	49,319	246	35	114
UR5ZPV	*	34,465	295	27	86
UR5AKU	*	25,886	246	16	70
UR6IMF	*	18,928	178	18	73
UU2JG	*	13,640	67	28	60
UV7QA	*	12,482	140	19	60
UR5WKA	*	3,315	66	16	35
US5WDT	*	1,333	40	9	22
UR5MW	**21**	**154,944**	**542**	**33**	**111**
UT3IM	*	20,608	219	21	43
UX2IO	**14**	**765,762**	**2454**	**40**	**146**
UT5ID	*	119,316	634	30	92
US7IID	*	13,230	135	19	44
UZ7M	**7**	**410,870**	**1510**	**38**	**143**
			(OP: UT9MZ)		
UR5IFX	*	43,650	301	21	76
UT5ECZ	*	42,630	305	19	86
UW5U	**3.7**	**172,909**	**1246**	**23**	**98**
			(OP: UY2UA)		
UT7MW	**1.8**	**19,152**	**296**	**9**	**54**
***UR4U**	**A**	**812,019**	**1058**	**100**	**343**
			(OP: UR4UDI)		
***UT7NW**	*****	**610,929**	**1143**	**78**	**285**
***UW8SM**	*****	**476,800**	**979**	**74**	**246**
*US0HZ	*	424,806	1039	61	242
*UY7MM	*	404,700	916	77	278
*UT4EK	*	359,136	769	69	219
*UT3UZ	*	274,794	635	62	209
*UR7R	*	253,890	870	45	165
			(OP: UX1RX)		
*UR5ZSU	*	237,061	781	52	201
*UR8QR	*	231,819	600	53	196
*UR5ZVJ	*	174,232	524	54	178
*UR5EPG	*	128,968	386	52	136
*UT5UNZ	*	115,770	470	47	123
*US7LM	*	114,816	416	44	140
*UT5ERV	*	98,124	380	44	160
*UY5TE	*	93,195	429	39	132
*US7IA	*	86,184	279	49	119
*UT5UQN	*	79,713	251	46	107
*UT8IT	*	72,480	300	32	128
*UR4CWQ	*	72,004	223	55	133
*UT1UW	*	71,070	378	35	103
*UT3RN	*	67,165	376	34	99
*UR5XMM	*	36,456	214	30	94
*UT5UKY	*	30,000	151	35	85
*UR7HCX	*	26,355	217	25	80
*US5ISV	*	24,480	154	29	91
*UV5EEO	*	21,109	171	27	74
*UT4QV	*	20,502	190	35	99
*UY8LM	*	18,117	99	29	70
*US2YW	*	16,632	103	33	66
*UT2AB	*	13,230	110	31	74
*UR5WHT	*	13,167	132	26	73
*UR5WDQ	*	13,158	150	20	66
*UR5E	*	13,041	96	28	53
			(OP: UR5EDX)		
*UT5UIN	*	11,120	110	22	58
*US7ML	*	11,008	100	16	48
*UT0EO	*	9,628	244	27	89
*UR7CT	*	8,288	81	20	54
*UU4JC	*	5,680	53	19	21
*US6CQ	*	2,750	47	18	37
*UT7HM	*	180	32	13	23
***UR5ZRL**	**28**	**150**	**28**	**2**	**8**
*UT1IA	*	117	22	3	10
***UT0EA**	**21**	**72,136**	**292**	**32**	**95**
*UT2PX	*	31,008	108	31	83
*UR0VX	*	29,493	163	26	61
*UT4Q	*	3,690	76	13	28
*UX4LA	*	450	20	7	11
***UZ5UA**	**14**	**77,280**	**510**	**24**	**81**
*US1PM	*	31,992	233	20	66
*UX3HA	*	18,720	230	13	52
*UT0RM	*	5,734	79	10	37
***US8IBS**	**7**	**14,256**	**160**	**12**	**54**
*UT5ERP	*	10,089	190	10	47
***UT3L**	**3.7**	**29,877**	**425**	**10**	**59**
			(OP: UR5LO)		
*UY3AW	*	12,644	197	10	48
*UT5CB	1.8	2,088	62	6	30

Wales

GW4BLE	**A**	**4,405,968**	**3991**	**110**	**386**
MW0ZZK	**14**	**630,

*YBØMJY	*	79,275	216	46	105
*YC8FEF	*	76,329	305	32	67
*YBØEIN	*	67,942	176	63	98
*YBØJK	*	63,928	208	38	84
*YBØKYM	*	25,696	116	31	57
*YC2USJ	*	15,405	136	17	48
*YCØIEM	*	5,742	46	23	35
*YB2LSR	*	4,819	54	28	33
*YB1AQD	*	3,645	32	17	28
*YBØCOU	*	2,880	27	15	25
*YFØEEE	*	2,501	39	17	24
*YC2VRG	*	2,024	43	19	27
*YCØMWM	*	540	15	8	12
***YB1UUN**	**28**	**987**	**19**	**9**	**12**
***YC5OUB**	**21**	**69,144**	**292**	**24**	**62**
*YB2UTX	*	45,898	179	29	77
*YC5SY	*	12,291	100	15	36
*YC1URC	*	11,940	90	17	43
*YCØCOX	*	11,925	101	22	53
*YC1BRS	*	8,550	66	19	38
*YB1TC	*	182	16	6	7
*YB2ECG	14	2,352	50	9	15
*YC2USB	7	777	19	10	11
*YB7KNV	*	210	7	4	6

Mariana Islands

NHØDX	14	2,928	50	11	13
			(OP: JL3RDC)		

New Zealand

ZL2AJ	**A**	**80,997**	**227**	**60**	**87**
ZL2UO	*	43,276	140	44	80
ZL3A	**7**	**1,090,098**	**2432**	**35**	**127**
			(OP: ZM3A)		
ZL1KMN	3.7	3,360	37	14	21
***ZL4PW**	**A**	**151,606**	**350**	**70**	**112**
*ZL1AAO	*	30,100	142	44	56
*ZL3AB	*	11,766	65	34	40
*ZL2MM	*	8,745	65	25	30
*ZL1AAR	*	3,569	51	18	25
*ZL4JB	*	1,421	28	14	15
***ZL3TE**	**21**	**13,575**	**198**	**12**	**13**
			(OP: W3SE)		

Niue

***ZK2DF**	**A**	**75,466**	**348**	**40**	**57**
			(OP: N1EMC)		

Palau

T88AC	**A**	**134,537**	**622**	**33**	**46**
			(OP: JA2BNN)		

Philippines

DU9RG	**A**	**1,433,800**	**1555**	**99**	**236**
DX1J	*	539,964	1273	55	104
			(OP: DU1IST)		
DU1IVT	*	260,910	725	49	81
***DV1JM**	**A**	**445,770**	**880**	**69**	**126**
*DU1EG	*	164,220	504	43	76
***4F1AL**	**21**	**88,652**	**502**	**22**	**52**
*DV1UBY	*	28,288	217	20	44

SOUTH AMERICA

Argentina

LR4E	**A**	**1,628,395**	**2131**	**94**	**211**
			(OP: LW4EU)		
LT5H	*	827,631	1534	67	136
			(OP: LU2HF)		
LU7MCJ	*	522,110	994	61	157
LW9ETQ	*	92,555	359	40	67
LU1HF	**28**	**174,960**	**659**	**24**	**84**
LU2QC	**21**	**1,132,812**	**2505**	**36**	**117**
LU1NDC	*	250,535	1010	22	67
LU2DKT	**1.8**	**888**	**21**	**11**	**13**
***LU1HLH**	**A**	**1,342,215**	**1680**	**91**	**224**
*LU2EE	*	430,917	749	74	165
			(OP: LW5EE)		
*LU6FOV	*	303,480	687	55	125
*LW1HR	*	133,938	432	44	82
*LU5EVK	*	112,320	377	47	83
*LU9FFZ	*	62,775	270	31	62
*LU5CAB	*	57,155	317	41	74
*LU1ARV	*	51,084	178	54	78
*LR1A	*	35,343	193	39	60
			(OP: LU1AS)		
*LT1K	*	34,854	229	46	65
			(OP: LU6KA)		
*LU2EQF	*	22,525	175	36	49
*LU7FWV	*	3,362	58	20	21
*LS4DX	*	462	16	11	11
***LU2UE**	**28**	**53,576**	**323**	**21**	**53**
*LTØD	*	24,232	192	20	32
			(OP: LU6DU)		
*LW5EAE	*	8,554	96	17	30
*LO7D	*	3,172	59	9	17
			(OP: LW1DRH)		
***LU4WG**	**21**	**82,290**	**403**	**20**	**58**
*LU1QAH	*	32,886	257	18	36
*LW5ET	*	30,975	247	20	55
***LQ5H**	**14**	**178,240**	**733**	**25**	**70**
			(OP: LU3HS)		
*LR1H	*	162,564	604	29	85
			(OP: LU2HOD)		
***AYØDX**	**7**	**8,742**	**129**	**18**	**29**
			(OP: LU3DR)		

Aruba

***P4ØA**	**A**	**7,318,165**	**5270**	**118**	**367**
			(OP: KK9A)		

Bolivia

CP1FF	A	18,200	111	34	66

Brazil

PY2YU	**A**	**4,086,132**	**3322**	**115**	**329**
PS2T	**"**	**3,709,550**	**3017**	**118**	**321**
			(OP: PY2NY)		
PP1CZ	*	1,154,016	1593	81	207
PY7ZZ	*	77,103	234	39	78
PY7VI	*	57,360	318	28	52
PY1WS	*	57,310	233	40	70
PY5KA	*	32,800	206	35	45
PY2KP	*	20,025	115	36	53
PY5ZD	*	3,796	53	22	30
PY2BRC	*	1,829	31	12	19
PY2RDZ	*	440	28	10	12
PT5T	**28**	**162,519**	**640**	**24**	**85**
			(OP: PP5EG)		
PU1LSW	*	24	3	2	2
ZX5J	**21**	**1,944,696**	**3829**	**35**	**149**
			(OP: PP5JR)		

PY6HD	*	122,760	510	26	84
PY6PRS	*	39,800	243	28	72
PR7AR	**14**	**131,328**	**566**	**24**	**72**
PV8DX	**7**	**275,643**	**847**	**28**	**95**
PP5TR	*	28,786	225	24	50
PY5OW	*	6,118	100	14	32
PY2RDA	*	270	25	8	10
PY2WC	3.7	1,218	23	12	17
***PY3DX**	**A**	**1,039,896**	**1485**	**87**	**199**
***ZX7A**	**"**	**977,142**	**1256**	**77**	**221**
			(OP: PS7TKS)		
*PP5MQ	*	281,580	706	59	97
*PY3OL	*	200,560	404	64	154
*ZV2A	*	200,377	614	50	101
			(OP: PY2ZY)		
*PP5JY	*	113,230	318	50	119
*PY2EJ	*	90,720	336	42	66
*PY2MR	*	68,550	212	60	90
*PY2XAT	*	33,840	188	36	58
*PY2SEI	*	30,738	127	37	72
*PY1RY	*	28,245	147	41	64
*PY3SB	*	24,236	153	31	42
*PY2DXX	*	16,926	75	38	55
*PY4DEL	*	7,536	87	15	33
*PP2RON	*	5,984	80	16	16
*PY2SF	*	5,886	69	20	34
*PT9PA	*	5,382	105	19	27
*PV8DR	*	2,867	126	25	36
*PY3UA	*	1,920	36	15	15
*PY3ZZR	*	1,386	29	17	25
*PY2DU	*	935	48	23	32
*PY7ZY	*	117	13	2	1
*PV8AX	*	88	16	10	12
***ZV2C**	**28**	**43,190**	**288**	**21**	**49**
			(OP: PY2CX)		
*PU5OGE	*	36,960	251	22	44
*PU2MTS	*	26,820	195	20	40
*PU2LEP	*	18,252	167	19	35
*PU2UEO	*	12,480	121	16	32
*PU1KYC	*	3,528	59	10	18
*PY5WH	*	2,656	54	15	17
*PY2ARL	*	1,615	37	7	10
*PU2KLM	*	900	37	9	11
*PU1PJR	*	418	15	9	10
*PU1WMS	*	16	5	2	2
***PX2T**	**21**	**305,448**	**1076**	**23**	**81**
			(OP: PY2DN)		
*PY6KW	*	110,725	435	29	74
*PY1SX	*	41,031	185	22	75
*PY4XX	*	26,082	198	15	39
*PY5JO	*	4,930	185	5	5
*PY1TR	*	255	24	7	8
***PP5BI**	**14**	**93,946**	**377**	**31**	**76**
*PY2ZA	*	33,235	189	28	57
*PS8SP	*	6,630	57	16	35
*PY5KW	*	4,818	65	12	21
*PS8ET	*	4,550	39	16	34
***PY2SEX**	**7**	**32,538**	**146**	**27**	**75**
*PR7DZ	*	10,011	81	12	35
*PY2EQ	*	372	37	5	7
*PY2WLY	*	130	12	5	5

Chile

CE3BFZ	**A**	**528,262**	**1046**	**66**	**128**
CE4B	*	256,872	742	42	97
			(OP: CE4ETZ)		
***CE1KR**	**A**	**338,240**	**876**	**60**	**100**
*CE2WWF	*	27,768	178	39	50
*XQ4EM	*	24,794	115	39	59
***CE3DNP**	**21**	**101,011**	**452**	**21**	**62**
*CE1UGE	*	33,504	267	16	32
***CA6BMF**	**7**	**1,421**	**54**	**13**	**16**

Colombia

HK6P	**A**	**1,384,002**	**1364**	**100**	**314**
HK3Q	*	217,683	436	50	151
HK6R	*	1,786	52	19	28
***HK3JJH**	**A**	**1,301,655**	**1492**	**82**	**239**
***HK3O**	**"**	**1,224,324**	**1684**	**81**	**203**

Ecuador

HC2GT	**A**	**434,010**	**1090**	**61**	**109**
HC2SA	**14**	**264,325**	**975**	**25**	**84**
HC2GF	**7**	**58,473**	**378**	**20**	**53**
***HC5VF**	**A**	**82,215**	**281**	**45**	**90**
***HC1JQ**	**14**	**387,468**	**1004**	**31**	**110**

Galapagos Islands

HC8A	**A**	**14,140,854**	**7442**	**157**	**522**
			(OP: N6KT)		

Netherlands Antilles

***PJ2/OH2YY**	**A**	**34,944**	**207**	**38**	**66**

Paraguay

ZPØR	**A**	**582,156**	**1309**	**65**	**141**
			(OP: ZP5AZL)		

Peru

OA4WW	**A**	**2,646,000**	**2486**	**109**	**291**
			(OP: HP1WW)		
OA4SS	**"**	**1,588,210**	**2371**	**73**	**174**

Trinidad & Tobago

9Y4D	**14**	**1,263,536**	**2936**	**33**	**124**

Uruguay

CX9AU	**A**	**110,205**	**320**	**59**	**96**
CX4DX	**28**	**83,187**	**422**	**22**	**57**
CX8BBH	**21**	**154,909**	**688**	**22**	**75**
CX4BW	**14**	**289,089**	**930**	**31**	**98**
CW5W	**7**	**385,020**	**1039**	**32**	**106**
			(OP: CX6VM)		
***CX2ABP**	**A**	**89,930**	**344**	**44**	**71**
*CX1BP	*	700	32	9	11
***CX5TR**	**21**	**63,712**	**320**	**23**	**65**
*CX9DX	*	11,924	176	16	28
***CX1AV**	**14**	**122,010**	**470**	**27**	**78**
***CX2CC**	**"**	**113,448**	**446**	**28**	**88**

Venezuela

YY5CBK	**A**	**13,280**	**92**	**27**	**56**
***YV4BCD**	**A**	**28,860**	**162**	**42**	**69**
*YV5ER	*	4,558	45	21	32
*YW5NN	*	2,808	35	19	20
*YW7A	*	1,184	28	13	19
			(OP: YV7QP)		
***YY1ALC**	**28**	**2,328**	**78**	**9**	**15**
***YY1MTX**	**21**	**165,990**	**981**	**22**	**44**
*YY4RN	*	22,984	231	17	35

QRP

LY8O	**A**	**548,280**	**872**	**87**	**273**
KR2Q	**"**	**468,440**	**606**	**65**	**215**
F5BEG	**"**	**462,561**	**848**	**68**	**253**
OK2BYW	**"**	**363,216**	**712**	**72**	**250**
OM7DX	**"**	**320,390**	**645**	**79**	**243**
UA6LPY	**"**	**306,636**	**583**	**71**	**232**
JR4DAH	**"**	**256,510**	**506**	**77**	**150**
YO8WW	**"**	**249,980**	**545**	**80**	**210**
NØKE	**"**	**237,120**	**416**	**71**	**169**
EA3FF	**"**	**202,275**	**451**	**67**	**194**
JA2DLM	**"**	**169,845**	**348**	**75**	**126**
NDØC	**"**	**155,397**	**321**	**51**	**136**
KA1LMR	**"**	**148,630**	**313**	**57**	**148**
DF1DX	**"**	**133,574**	**457**	**43**	**160**
K8ZT	**"**	**127,853**	**267**	**56**	**141**
RW3AI	**"**	**123,000**	**474**	**37**	**163**
F5CYS	**"**	**115,464**	**414**	**44**	**160**
ON4MW	**"**	**84,216**	**343**	**45**	**129**
SQ1K	**"**	**80,178**	**336**	**40**	**121**
KB3TS	**"**	**77,006**	**287**	**39**	**100**
NN7SS	**"**	**69,440**	**215**	**48**	**92**
			(OP: K5UFO)		
PE2KP	**"**	**67,497**	**367**	**31**	**120**
W6QU	**"**	**67,404**	**191**	**51**	**86**
			(OP: W8QZA)		
EW7DK	**"**	**67,032**	**318**	**34**	**118**
IZ1ANK	**"**	**61,614**	**394**	**43**	**120**
G3UFY	**"**	**60,756**	**253**	**41**	**125**
JA2MWV	**"**	**54,208**	**193**	**45**	**76**
US5IND	**"**	**52,326**	**274**	**30**	**123**
UX8ZA	**"**	**50,132**	**286**	**36**	**115**
YB2OK	**"**	**43,928**	**143**	**49**	**87**
UT5UUV	*	40,848	267	28	110
US8ICM	*	37,180	139	46	97
FM5FJ	**"**	**31,702**	**125**	**44**	**77**
YO4AAC	*	29,640	223	25	95
WA8WV	**"**	**25,026**	**99**	**30**	**67**
VK4ATH	**"**	**22,272**	**119**	**42**	**45**
PY2BN	**"**	**20,370**	**117**	**41**	**56**
HA5BA	**"**	**19,065**	**194**	**20**	**73**
IT9PCU	**"**	**17,955**	**166**	**23**	**72**
UT5DJ	*	14,792	150	19	67
HA6VA	*	12,168	141	16	62
KT8K	*	10,380	63	18	42
N8VW	*	9,514	58	25	42
GM4ELV	**"**	**8,979**	**102**	**18**	**55**
IK1TWC	*	7,980	70	26	50
IW3SKX	*	7,935	43	31	38
USØYA	*	6,600	49	25	35
LY7BFE	**"**	**6,877**	**74**	**18**	**41**
			(OP: LY2FE)		
RNØJX	**"**	**5,964**	**102**	**16**	**26**
IZ1DBY	*	5,576	49	23	45
KIØOV	*	5,300	45	23	27
K6MI	**"**	**5,252**	**43**	**23**	**29**
LA5WNA	**"**	**4,544**	**64**	**16**	**55**
IK3XTY	*	3,619	58	14	33
EC4AIV	*	3,584	60	15	41
JA1KEB	**"**	**2,844**	**37**	**15**	**21**
US7IB	*	2,736	39	15	23
W1AMF	*	2,460	27	17	24
EC5APA	*	2,150	110	12	38
VK4BAA	**"**	**1,800**	**27**	**15**	**15**
VE3OWO	**"**	**1,700**	**26**	**15**	**19**
YU1LM	**"**	**1,634**	**52**	**9**	**34**
JK1TCV	*	1,428	19	11	17
KC5WA	**"**	**1,269**	**31**	**12**	**15**
N5PU	*	980	18	12	16
SP6PLH	*	868	21	10	18
EA1TI	*	812	18	12	16
F5IYJ	*	775	19	10	15
W2JEK	*	672	17	9	12
EA4CU	*	650	18	10	16
W7ARF/4	**"**	**297**	**9**	**4**	**7**
RN4AK	*	208	10	5	8
N8QE	*	180	7	6	6
F8BXI	*	24	2	2	2
YO5PCY	**28**	**544**	**19**	**5**	**11**
SQ3ET	**"**	**450**	**20**	**5**	**13**
JE1RZR	**"**	**385**	**13**	**5**	**6**
YT2RX	**"**	**242**	**16**	**5**	**6**
F4FEY	**"**	**64**	**6**	**2**	**6**
JH7RTQ	**21**	**66,120**	**287**	**30**	**65**
YT2B	**"**	**61,828**	**299**	**29**	**87**
IK5RUN	**"**	**41,877**	**175**	**31**	**68**
SN7C	**"**	**33,761**	**173**	**27**	**64**
			(OP: SP7CHS)		
SQ4HRN	**"**	**28,884**	**171**	**25**	**58**
JR1NKN	**"**	**12,954**	**105**	**18**	**33**
WA6FGV	**"**	**12,540**	**91**	**17**	**40**
RU3RM	**"**	**9,165**	**133**	**12**	**35**
OM2ASM	**"**	**5,200**	**85**	**14**	**26**
JH3DMQ	**"**	**4,692**	**49**	**14**	**20**
4L1FP	**"**	**4,256**	**53**	**8**	**24**
PY3FF	**"**	**3,848**	**59**	**13**	**24**
DO8CW	**"**	**2,592**	**40**	**11**	**16**
RA3XEV	*	2,538	57	7	20
VU2UR	**"**	**2,030**	**27**	**11**	**18**
GØDCK	**"**	**1,736**	**48**	**9**	**19**
JA1KPF	*	1,155	24	9	12
SP5DDJ	*	1,026	21	8	10
PS6T	*	24	9	4	4
			(OP: PY6KY)		
DL9ZP	**14**	**66,726**	**399**	**25**	**74**
CT/LZ3ND	**"**	**60,358**	**355**	**20**	**83**
			(OP: LZ3ND)		
US8ICA	**"**	**41,943**	**405**	**23**	**70**
EW5DX	**"**	**36,024**	**280**	**15**	**64**
RD4HD	**"**	**30,324**	**237**	**18**	**66**
YO2LYN	**"**	**25,060**	**247**	**15**	**55**
G4CWH	**"**	**21,842**	**239**	**15**	**52**
IZ5IIN	**"**	**19,162**	**190**	**18**	**49**
UA1CEC	**"**	**16,200**	**243**	**12**	**48**
IK3JBP	*	12,384	158	18	54
LA8WG	**"**	**11,770**	**161**	**10**	**45**
I4PZP	*	10,602	166	15	47
IZ1DGG	*	8,965	147	10	45
9A8MM	**"**	**7,392**	**128**	**8**	**36**
WA2ASQ/4	**"**	**5,264**	**45**	**16**	**31**
HC2AD	**"**	**5,206**	**76**	**13**	**25**
YO4AYE	*	2,405	53	8	29
KI4MUG	**"**	**1,920**	**32**	**9**	**21**
HS9JSQ	**"**	**1,683**	**34**	**12**	**21**
SA3ARK	**"**	**660**	**40**	**5**	**17**
KC9AMM	**"**	**375**	**11**	**8**	**7**
IK8YFW	*	2	1	1	1
4X/UU2JM	**7**	**43,492**	**255**	**16**	**67**
YO6VCB	**"**	**30,876**	**244**	**17**	**76**
SP4GFG	**"**	**25,340**	**317**	**13**	**57**
SP1HJK	*	12,033	182	12	51

ON3TO	**"**	**4,223**	**98**	**5**	**36**
DF7LS	**"**	**744**	**37**	**3**	**21**
E77J	**3.7**	**13,593**	**201**	**10**	**59**
			(OP: YU2EA)		
S59D	**"**	**13,393**	**200**	**10**	**49**
HA6IAM	**"**	**13,260**	**229**	**7**	**53**
M3RCV	**"**	**11,395**	**206**	**8**	**45**
IZ3IBL	**"**	**8,150**	**166**	**6**	**44**
SP2QOT	**"**	**6,164**	**153**	**5**	**41**
UA9UHN	**"**	**2,788**	**39**	**12**	**22**
UT5UPN	**"**	**2,324**	**77**	**6**	**22**
JF2MBF	**"**	**1,560**	**28**	**10**	**14**
DO3SH	**"**	**1,410**	**62**	**4**	**26**
SP5EWX	*	918	39	5	22
SP2BSD	*	315	27	4	17
BA5TT	**"**	**247**	**19**	**6**	**7**
F4FLQ	**1.8**	**10,505**	**215**	**6**	**49**
SQ2BXI	**"**	**2,348**	**82**	**4**	**30**
KE5WRS	*	4	1	1	1
			(OP: W5AJ)		

ASSISTED

NORTH AMERICA

United States

W1GUS	**A**	**914,928**	**895**	**86**	**306**
WB1DX	**"**	**904,176**	**949**	**81**	**287**
K2TE/1	*	859,884	836	94	299
KA2KON/1	*	706,498	689	83	294
W1STT	*	528,295	625	82	253
K1JB	*	480,000	487	91	284
W3IZ/1	*	478,790	613	69	221
K1LI	*	473,841	577	77	246
W1NR	*	446,748	464	88	266
W3OU/1	*	414,800	523	73	232
NE1B	*	405,120	456	79	241
K1LD	*	388,120	503	71	242
W1CTN	*	370,200	480	78	222
N1IW	*	336,050	442	71	215
KB1OWT	*	322,648	485	58	190
N1BCL	*	313,233	466	68	195
W1RZF	*	273,008	453	47	179
N1SW	*	239,774	465	48	154
K3IU/1	*	205,540	373	51	164
N1API	*	202,664	407	47	141
K1XV	*	191,540	315	67	177
KV1J	*	184,888	300	64	178
K1OA	*	163,608	284	47	157
W1QK	*	158,576	283	56	156
W2QQ/1	*	142,800	312	38	132
KG1D	*	138,638	272	49	157
W1NG	*	119,180	199	62	174
KG7HF/1	*	112,133	241	56	137
W1SRG	*	108,721	258	46	117
			(OP: AG1C)		
K1TC	*	108,324	206	51	153
AD1L	*	107,244	241	40	122
KE1V	*	100,719	264	49	122
K1TR	*	91,908	220	40	108
KS1J	*	91,522	249	26	108
KK1L	*	89,584	203	54	122
AA1QD	*	81,000	163	40	140
W1MAW	*	77,542	223	35	102
W1ZZ	*	51,192	126	46	112
W1LOZ	*	47,616	208	21	75
W1MAT	*	43,435	140	34	85
AB1DO	*	14,256	69	31	57
W1JR	*	13,578	55	39	54
K1TH	*	13,130	73	18	47
K1RV	*	12,636	61	30	48
K1TW	*	12,376	69	19	49
W1RM	*	4,399	33	21	32
N1BAA	**21**	**88,046**	**242**	**27**	**106**
K1SM	**14**	**69,720**	**232**	**23**	**82**
N1SV	**7**	**143,880**	**485**	**27**	**105**
W1NT	**3.7**	**23,590**	**132**	**16**	**54**
N2MM	**A**	**1,741,252**	**1324**	**116**	**408**
W1GD/2	**"**	**1,530,263**	**1111**	**106**	**391**
W2RE	**"**	**1,445,693**	**1481**	**84**	**275**
W2RD	*	1,420,986	1075	108	375
NA2U	*	1,318,028	1105	104	332
W2IRT	*	1,052,283	863	98	341
K2KQ	*	1,018,290	844	101	354
N2WKS	*	1,010,793	981	87	294
WC2L	*	996,200	880	89	336
N1EU/2	*	822,195	662	102	351
AB3CX/2	*	726,952	743	77	279
K2CJ	*	714,960	721	82	278
K2DM	*	686,070	668	99	279
W2YR	*	597,125	542	95	330
K2ONP	*	589,077	655	73	260
K2GN	*	565,880	660	84	260
N1IBM/2	*	480,806	592	76	235
W2LE	*	474,249	597	71	218
W2NY	*	424,410	512	67	234
			(OP: WT4Q)		
WA3AFS/2	*	403,200	480	84	252
N2MUN	*	384,356	545	57	202
KC2NB	*	378,852	587	62	200
N2FF	*	358,224	472	59	213
W6XR/2	*	287,390	383	73	217
K2XF	*	280,179	431	55	188
K2SQS	*	247,104	374	65	199
K2EP	*	219,350	365	49	165
K2DB	*	198,470	342	55	168
N2SS	*	125,178	245	51	135
K2QMF	*	111,320	218	46	138
AA2DC	*	108,402	217	51	152
N2SQW	*	87,156	207	41	121
WK2H	*	76,994	199	37	100
K2QPN	*	67,815	183	43	122
K2DSL	*	40,068	152	25	83
WF2B	*	28,404	113	32	76
KC2COB	*	18,837	88	29	62
K2SI	*	3,300	38	23	27
WR2G	**14**	**121,396**	**364**	**25**	**99**
N2ZX	**7**	**187,952**	**505**	**29**	**107**
NN3W	**A**	**5,076,422**	**3144**	**131**	**467**
K3WW	**"**	**3,149,984**	**2112**	**122**	**447**
N3AD	**"**	**2,594,780**	**1829**	**117**	**431**
AA3B	**"**	**2,241,198**	**1513**	**113**	**421**
K3OO	*	1,271,049	924	111	396
N3ZA	*	1,253,987	926	110	389
W3GM	*	1,018,884	870	97	334
			(OP: K3ND)		
W3KL	*	913,353	774	102	325
N3MK	*	820,315	951	77	282
W3EA	*	787,325	770	85	300
K2PLF/3	*	746,928	765	82	282

K3IPK	*	680,414	696	84	287
K3MD	*	624,393	803	92	279
W2UP/3	*	588,876	581	82	290
N3AM	*	527,405	624	72	241
W9GE/3	*	510,900	580	80	245
N3ME	*	355,680	579	59	188
K3FT	*	324,095	556	57	208
K1RH/3	*	297,801	432	58	203
W3GK	*	271,656	415	58	194
K3AU	*	258,552	433	59	184
			(OP: K2YWE)		
N3MX	*	174,498	299	59	170
W3FW	*	150,732	519	73	243
K3SV	*	136,620	249	51	147
N3NR	*	115,878	212	67	150
NA3M	*	89,436	197	43	131
K3TEJ	*	83,295	224	30	105
WA3G	*	82,302	206	51	123
WØBR/3	*	80,772	196	47	112
N3II	*	62,930	160	49	106
N3YIM	*	31,392	114	25	84
WB3FIZ	*	18,135	134	34	83
N3TR	*	14,256	64	28	60
K3YG	*	13,439	66	27	62
NG3K	*	2,415	28	11	24
K3QX	*	702	21	11	16
WM3O	*	255	10	7	8
K3TW	**7**	**30,396**	**118**	**25**	**77**
N4ZC	**A**	**2,024,760**	**1317**	**130**	**434**
N4WW	**"**	**1,521,058**	**1007**	**128**	**453**
W3OA/4	*	1,227,996	1020	104	339
AA4S	*	1,024,176	837	111	345
KI4TZ	*	991,067	874	100	327
N4KG	*	905,094	756	107	346
K1GU/4	*	811,926	757	90	297
N2QT/4	*	806,400	666	104	344
N2TU/4	*	800,173	757	95	294
KT4ZB	*	796,518	893	82	260
WD4IXD	*	635,368	689	81	263
W4MYA	*	618,436	645	85	279
W4QG	*	557,480	571	83	302
AJ3G/4	*	556,444	699	79	255
K2WK/4	*	549,222	584	88	295
N4ZZ	*	535,626	728	63	210
N8PR/4	*	513,132	526	87	279
WB4MSG

W6RKC	21	828	28	6	6
AB7E	**A**	**888,874**	**962**	**95**	**272**
AA7A	**"**	**619,450**	**727**	**89**	**236**
K7UA	"	479,550	653	74	204
N7XG	"	443,486	588	86	225
WU9B/7	"	413,412	553	82	200
W7YED	"	317,948	630	63	139
KI7M	"	312,373	662	90	149
K7KR	"	305,226	414	71	208
K7ABV	"	262,639	461	68	159
W7MD	"	223,098	432	52	154
K8BN/7	"	155,117	320	54	127
K7EG	"	123,880	302	46	117
KS7T	"	109,716	259	55	109
KR7RK	"	100,455	214	51	130
K7DSL	"	96,800	289	64	96
W7CT	"	78,650	208	45	98
N7RK	"	78,052	186	56	102
KG7C	"	48,895	207	44	83
N7MBL	"	45,021	137	41	88
KT7G	"	36,110	156	40	75
W7SW	"	34,056	132	33	55
WI7F	"	31,297	148	46	73
W7WHY	"	31,108	142	36	65
WBZU/7	"	27,270	123	30	60
N7CW	"	16,068	71	31	47
AK7S	"	11,970	74	29	34
KV7DX	"	11,152	62	26	42
				(OP: KN5H)	
K7EY	"	7,728	71	17	29
N1KEZ/7	"	2,552	36	20	24
W7CEG	"	2,380	34	16	18
KE7FBY	"	2,166	28	15	23
AC7UH	"	975	30	11	14
W7ZR	**21**	**76,824**	**309**	**27**	**72**
K7AWB	"	24,589	143	22	45
K7RI	**14**	**214,812**	**612**	**35**	**118**
W7SO	"	22,673	114	22	57
N7MAL	3.7	288	8	8	8
W8MJ	**A**	**1,622,684**	**1310**	**112**	**364**
N8BI	**"**	**1,028,580**	**891**	**100**	**334**
N8BJQ	"	772,065	733	95	292
AA8LL	"	455,775	574	69	226
W7PP/8	"	275,462	525	54	155
AJ1M/8	"	240,611	364	66	193
W8KEN	"	155,456	278	69	155
W8PG	"	71,260	204	36	104
NA8W	"	27,328	98	34	78
K8GT	"	13,175	66	32	53
N8KDJ	"	8,470	65	28	42
W8CZN	**14**	**384,579**	**917**	**36**	**135**
WB9Z	**A**	**2,895,712**	**2133**	**124**	**420**
K9CT	**"**	**1,134,815**	**997**	**105**	**334**
K9IMM	"	941,128	931	91	285
N2BJ/9	"	802,560	872	91	261
WE9R	"	658,702	676	92	287
N9ZM	"	494,912	609	73	231
K9SG	"	494,560	602	97	255
WE9V	"	415,114	398	94	304
NS9I	"	319,152	513	58	186
W9GIG	"	251,966	343	72	214
WD9Z	"	229,824	351	70	182
N9UA	"	136,040	294	49	130
W9IL	"	61,214	185	35	92
KA9O	"	28,000	104	31	81
W9RN	"	23,175	98	39	64
N9CO	"	14,175	70	26	49
AG3R/9	"	6,771	52	23	38
K9QLC	"	100	43	22	23
W9ZRX	**7**	**66,880**	**235**	**23**	**87**
KK9V	"	33,852	139	23	70
W9JA	"	12,390	72	21	49
KØKX	**A**	**1,778,084**	**1305**	**129**	**377**
WAØMHJ	**"**	**872,857**	**845**	**98**	**285**
NØAT	"	690,168	672	98	288
KØRC	"	564,276	608	92	262
KEØL	"	406,125	564	72	213
NØHR	"	396,738	529	71	208
KØAD	"	366,960	558	75	203
KØYR	"	323,334	496	64	189
WØBM	"	302,604	396	75	227
KEØUI	"	299,376	458	79	185
KIØF	"	244,490	397	57	173
KØOB	"	214,008	379	55	167
NRØL	"	168,080	301	61	159
KCØDEB	"	129,843	262	50	139
KNØR	"	101,268	219	38	136
KØPC	"	91,863	216	47	126
KØMD	"	71,919	193	66	117
WGØM	"	53,784	152	52	114
AD1C/Ø	"	53,692	184	41	83
KØMPH	"	44,022	151	38	100
AAØAW	"	17,347	81	27	56
KCØRET	"	13,148	67	26	50
WØTVD	"	5,777	64	18	35
NØKBO	"	1,650	35	18	32
WØLM	"	660	14	9	13
NØBK	"	42	3	3	3
KC6R/Ø	**21**	**39,508**	**185**	**21**	**62**
KØUK	"	522	13	8	10
KVØQ	**7**	**183,084**	**465**	**31**	**115**
KØKT	**3.7**	**31,365**	**151**	**21**	**64**
		Alaska			
AL9A	**A**	**616,975**	**1508**	**66**	**119**
NL7Z	"	112,420	321	60	94
		Canada			
VO1MP	**A**	**2,705,526**	**2480**	**93**	**333**
VE1OP	"	726,055	1121	80	227
VE1RAR	"	70,119	204	44	103
VE1SKY	**3.7**	**59,800**	**461**	**14**	**51**
VE2FXL	A	23,668	101	30	67
VE3MGY	**1.8**	**15,912**	**341**	**9**	**17**
VE5MX	**A**	**405,046**	**544**	**77**	**201**
VE6LE	A	2,680	29	18	22
VE6TR	14	8,350	62	15	35
CJ7FC	**A**	**628,958**	**1358**	**74**	**152**
				(OP: VA7FC)	
		Mexico			
XE2K	**A**	**1,012,704**	**1648**	**86**	**188**
XE1KK	**"**	**864,124**	**1069**	**100**	**249**
XE1ZVO	"	36,515	138	39	70
XE2YBG	7	247	13	8	11

AFRICA

African Italy

IG9S	**14**	**366,592**	**1053**	**28**	**100**
			(OP: IZ8GCE)		
IG9R	**7**	**475,814**	**1200**	**32**	**114**
			(OP: IK8HCG)		

Canary Islands

EC8AFM	**A**	**158,663**	**333**	**60**	**149**
EA8BZH	"	34,551	145	33	66
EA8/EA4SV	"	31,556	141	35	63
			(OP: EA4SV)		
EA8BQM	"	23,023	135	28	49
EC8ADW	**14**	**123,403**	**387**	**28**	**91**

South Africa

ZS5ZZ	**A**	**50,963**	**169**	**42**	**71**

ASIA

Asiatic Russia

RG9A	**A**	**5,578,665**	**3485**	**125**	**454**
			(OP: UA9AM)		
RO9O	**"**	**2,801,400**	**2474**	**109**	**374**
			(OP: RZ9OO)		
RU9AC	**"**	**1,964,626**	**2008**	**85**	**297**
UA9CDC	"	1,625,344	1403	96	352
RT9S	"	1,377,152	1228	95	329
			(OP: UA9SP)		
RW9DW	"	557,362	1025	49	172
UA9BS	"	464,736	655	61	221
RV9CM	"	355,762	691	47	159
RU9CC	"	237,006	590	38	124
UA9HR	"	187,320	571	49	119
RV9CX	"	182,672	377	53	143
RW9UU	"	120,496	377	33	103
RA9JBA	"	105,522	371	30	99
RA9DZ	"	90,228	267	42	104
RZ9UO	"	84,500	308	21	79
RV9YK	"	76,692	264	36	96
RK9KWI	"	36,890	120	36	83
RU9CI	"	2,940	38	13	36
UA9UR	**28**	**3,780**	**78**	**11**	**19**
RT9W	**21**	**660,625**	**1793**	**32**	**119**
			(OP: RX9WR)		
RV9CP	**14**	**310,665**	**850**	**32**	**107**
RK9UAC	"	12,556	112	10	33
RZØSR	**A**	**1,903,368**	**2010**	**110**	**316**
UAØSJ	"	363,987	834	45	138
UABAZ	"	239,200	460	66	164
RAØSU	"	15,753	129	17	42
RABACM	**21**	**34,410**	**222**	**14**	**48**
UABAGI	**14**	**348,160**	**994**	**36**	**124**

China

BA7NQ	**A**	**1,926,100**	**2172**	**109**	**383**
BA5DX	"	213,836	658	68	128
BG4CZX	"	152,484	393	67	127
BG9TX	"	19,250	161	26	51
BD5CEC	"	6,804	71	21	33
BG5HSV	"	5,824	79	24	32
BG5CGO	"	570	37	13	17
BG4DRS	"	1,132	14	11	11
BD4AGK	**14**	**7,560**	**135**	**18**	**27**
BG4MIH	"	990	65	9	13

Cyprus

5B4AHJ	**A**	**287,595**	**631**	**46**	**119**

Georgia

4L2M	**14**	**153,402**	**522**	**27**	**84**

Hong Kong

VR2YYW	**14**	**184,212**	**757**	**30**	**99**
VR2DS	**1.8**	**210**	**9**	**6**	**9**

Japan

JQ1BVI	**A**	**1,386,606**	**1617**	**120**	**257**
JA1XRH	"	152,073	343	69	114
JR1NHD	"	109,682	237	55	118
JS1KQQ	"	54,540	164	47	88
JA1XUY	"	33,372	148	40	63
JP1QDH	"	96	4	4	4
7N2UQC	**28**	**2,576**	**41**	**11**	**17**
JA1KVT	**21**	**111,982**	**382**	**32**	**86**
JO1WIZ	"	18	2	1	2
JA1BPA	**14**	**404,691**	**1034**	**37**	**110**
JE1LFX	"	126,678	554	28	58
JI1ALP	7	5,412	53	16	25
JM1NKT	"	5,282	68	16	22
JA2XCR	**A**	**552,570**	**655**	**104**	**235**
JR2PMT	"	344,850	543	87	188
JA2VHO	"	149,687	338	62	119
JH2FXK	"	65,780	195	50	80
JG2XKG	**14**	**238,235**	**621**	**35**	**120**
JH3PRR	**A**	**673,812**	**674**	**97**	**270**
JO3DOD	"	232,885	482	92	143
JA3PYC	"	62,909	179	47	86
JI3OGI	"	629	15	7	10
JI3KXB	"	55	8	6	5
JA3IKG	**14**	**43,680**	**207**	**25**	**59**
JN3DSH	"	25,752	152	24	50
JH1GUO/4	**A**	**80,652**	**274**	**53**	**88**
JA5GSG	14	2,387	25	13	16
JA7ZP	**A**	**113,004**	**254**	**59**	**113**
JG7AMD	"	21,406	106	32	45
JA7OWD	**28**	**11,968**	**126**	**16**	**28**
JA7FTR	**14**	**591,798**	**1421**	**37**	**122**
JAØFVU	**21**	**177,536**	**545**	**33**	**95**

Kazakhstan

UN4PG	**21**	**76,526**	**394**	**20**	**63**
UP2L	**14**	**846,216**	**2165**	**38**	**123**
				(OP: UN2L)	
UP4L	"	674,625	1486	36	139

Thailand

E21YDP	**21**	**78,960**	**381**	**29**	**83**
E21EIC	**14**	**129,409**	**535**	**34**	**99**

West Malaysia

9M2CCO	**14**	**19,027**	**259**	**20**	**33**

EUROPE

Austria

OE5T	**A**	**530,196**	**1048**	**65**	**211**
			(OP: OE5OHO)		
OE1H	"	21,836	119	37	69
			(OP: OE1TKW)		
OE1KDK	21	3,393	48	12	17

Balearic Islands

EA6/AA5UK	**A**	**107,400**	**342**	**46**	**154**
			(OP: AA5UK)		

Belarus

EW2AD	A	9,690	106	11	40
EW4DX	14	4,840	51	11	44

Belgium

OQ4B	**A**	**403,216**	**736**	**74**	**242**
			(OP: ON4BHQ)		
ON6FC	"	98,362	432	39	148
ON4CAS	"	81,375	259	47	108
ON4VDV	"	61,019	234	41	120

Bulgaria

LZ8A	**A**	**198,099**	**390**	**73**	**224**
			(OP: LZ2BE)		

Corsica

TK9R	**A**	**4,426,830**	**4135**	**130**	**476**
			(OP: IK8UND)		

Croatia

9A3ST	A	4,536	52	16	20
9A4W	**21**	**652,125**	**1605**	**39**	**146**
9A2R	"	58,316	228	32	90
9A2L	**7**	**398,310**	**1544**	**36**	**129**
			(OP: 9A3AG)		

Czech Republic

OL5T	**A**	**1,183,428**	**1525**	**109**	**354**
			(OP: OK1BOA)		
OK7Y	"	626,080	1228	79	265
			(OP: OK1FDY)		
OK1DO	"	324,044	624	72	212
OK2BXU	"	319,464	734	70	236
OK2VZE	"	180,400	508	56	164
OK1DTC	"	61,831	228	43	78
OK1TRA	"	21,312	195	22	74
OL5M	**28**	**11,648**	**241**	**9**	**43**
			(OP: OK1GI)		
OK1RS	**21**	**82,360**	**331**	**31**	**85**
OK2HZ	"	54,338	225	31	70
OK1CDJ	**14**	**221,712**	**842**	**32**	**117**
OK2ZAW	**3.7**	**190,518**	**1477**	**21**	**92**
OK1T	**1.8**	**63,760**	**746**	**13**	**67**
			(OP: OK1TP)		

Denmark

OZ1ADL	**A**	**1,857,834**	**1813**	**127**	**459**

England

G3RXQ	**A**	**466,851**	**1083**	**66**	**235**
G3UEG	"	164,220	408	63	192
G3YYD	"	95,931	500	30	141
MØITY	"	61,759	206	46	105
GØTSM	**28**	**1,175**	**44**	**4**	**21**
M7A	**14**	**253,370**	**1136**	**32**	**98**
				(OP: LY4Y)	
G3YBY	"	195,510	642	34	113
MØBJL	**7**	**121,828**	**699**	**26**	**107**
G4PWA	**1.8**	**72,030**	**459**	**17**	**81**
GØVDZ	"	8,721	207	6	45

Estonia

ES7ABD	A	270	8	7	8
ES1LBK	**7**	**95,108**	**589**	**27**	**97**
ES5MG	**3.7**	**49,152**	**412**	**18**	**78**

European Russia

RS3A	**A**	**2,413,424**	**2684**	**122**	**444**
			(OP: RA3CW)		
UA3SAQ	**"**	**2,334,038**	**2207**	**126**	**460**
UA6GP	**"**	**2,108,799**	**2606**	**121**	**440**
UA4WKW	"	2,069,365	2631	115	430
RV2FW/1	"	519,303	752	87	294
RW3DU	"	474,002	808	82	265
RV3MI	"	434,784	776	79	257
RA3DNC	"	434,313	764	78	243
RV4CT	"	401,632	790	76	250
RV3ZQ	"	255,972	580	63	194
UA4RZ	"	223,315	442	76	219
UA6AA	"	186,898	420	66	173
RZ6HF	"	142,064	492	58	150
RZ3DXR	"	93,000	297	55	131
			(OP: UN7JID)		
UA6ARR	"	77,345	279	47	108
UA3FX	"	76,857	312	43	144
RN6FA	"	58,480	292	41	131
RU6YY	"	53,998	148	70	133
RN3REY	"	30,090	110	43	75
RZ3ARO	"	29,321	195	28	81
RA3VE	"	23,544	198	27	82
RK6FZ	"	13,104	117	26	78
RK3FO	"	12,070	68	30	55
UA3MEJ	"	11,165	78	28	49
RA4FWA	"	6,762	100	18	51
RA3FD	"	3,280	50	12	29
UA3RW	"	2,205	38	14	31
RD3AB	"	2,200	41	16	28
UA3XAC	"	1,218	26	11	18
UA3TAC	"	897	27	4	19
RA1QIT	"	728	15	12	14
UA6LV	**28**	**7,599**	**106**	**12**	**39**
RA3OE	**21**	**27,573**	**163**	**26**	**65**
RT3T	**7**	**92,220**	**420**	**33**	**112**
				(OP: UA3TT)	
RK3QZ	"	15,732	180	11	58
RW4PL	**3.7**	**185,500**	**999**	**30**	**110**
RU6FA	"	13,400	151	12	55
RU6LA	**1.8**	**72,030**	**620**	**18**	**80**
RA6YDX	"	1,260	48	6	24
UA6YI	"	306	14	5	12

Faroe Islands

OY3JE	**A**	**51,816**	**337**	**28**	**108**

Finland

OG5B	**A**	**1,814,532**	**1954**	**129**	**405**
			(OP: OH5BM)		
OG6N	**"**	**1,546,796**	**1598**	**117**	**412**
OH8L	"	932,880	1202	99	291
OH4XX	"	584,474	1006	88	253
			(OP: OG7X)		
OH6DX	"	537,240	581	101	343
OH1RX	"	126,690	293	60	186
OH8GZN	"	41,866	228	33	88
OH2BO	"	23,124	231	14	68
OH3BU	**28**	**1,176**	**62**	**4**	**26**
OH6M	**14**	**392,630**	**1502**	**33**	**125**
			(OP: OH6LBW)		
OH6RE	"	130,568	444	34	118
OH2FS	"	14,016	74	26	70
OH2BEN	**1.8**	**34,732**	**414**	**13**	**63**

France

TM7F	**A**	**3,064,505**	**3002**	**119**	**408**
			(OP: F6GLH)		
F1RHS	**"**	**990,448**	**1175**	**101**	**311**
F6BNH	"	256,961	383	83	210
F4AGR	"	242,646	523	52	170
F8CRS	"	41,922	175	37	100
F6DZD	"	33,528	165	37	95
F8KHW	"	33,227	326	29	120
			(OP: F5NCU)		
F1IKD	"	6,767	79	19	48
F4EIZ	"	1,400	22	18	22
F4FDA	21	11,288	98	15	53
TM9R	**7**	**731,777**	**2962**	**34**	**123**
			(OP: F5FLN)		
F5BZB	"	410,277	1866	33	114
TM2B	**3.7**	**103,530**	**883**	**17**	**85**
			(OP: F4EGZ)		
F/TU5KG	"	91,708	736	19	82
F1EBN	"	87,660	907	17	73

Germany

DJ4AX	**A**	**3,596,224**	**2628**	**133**	**531**
DJ5MW	**"**	**3,402,688**	**2832**	**133**	**540**
DLØWW	**"**	**2,645,351**	**2168**	**121**	**430**
DJ2YA	"	2,289,209	1742	132	469
DL/NØHJZ	"	1,607,202	1706	108	378
			(OP: NØHJZ)		
DL1EJA	"	1,218,000	1033	110	390
DL7ON	"	873,234	959	109	362
DL2YL	"	832,195	1150	97	306
DL8DAZ	"	828,828	1017	101	361
DL9DRA	"	811,536	904	103	361
DL5GAC	"	707,840	894	98	350
DK7ZT	"	707,066	922	100	337
DB2B	"	655,603	1234	83	294
			(OP: DL8OBF)		
DL8SCG	"	650,528	735	105	359
DK5DQ	"	632,625	743	92	283
DLØGL	"	514,257	991	68	189
			(OP: DL3QQ)		
DK1KC	"	512,556	950	81	282
DJ8QP	"	504,152	886	83	291
DK1QH	"	494,379	1025	81	256
DL1QW	"	482,295	706	94	313
DK6CQ	"	422,792	693	76	252
DF2RG	"	349,673	610	70	237
DL4LAM	"	337,737	544	77	232
DL1DXA	"	305,208	533	83	241
DO2ML	"	297,360	1176	43	167
DJ9MH	"	272,310	484	66	224
DHØGHU	"	254,898	496	71	223
DL6EZ	"	249,839	566	64	165
DL1DTC	"	247,104	525	55	161
DG3FK	"	224,616	426	69	225
DF1LON	"	195,409	435	64	199
DK2CRN	"	191,632	370	61	175
DK7ZH	"	180,184	591	48	175
DH1PS	"	139,598	279	65	158
DL4YAO	"	126,688	311	61	153
DJ8EW	"	125,636	394	51	145
DL5MEV	"	124,992	290	75	173
DR1F	"	122,112	317	59	153
			(OP: DG3FK)		
DL4GBA	"	119,658	345	46	176
DD1LD	"	101,178	216	56	142
DK5AD	"	99,484	337	47	140
DL5XAT	"	99,475	332	43	130
DL1PT	"	83,660	320	49	139
DR7T	"	75,712	290	46	136
			(OP: DL1HCM)		
DJ6KS	"	75,240	381	34	118
DL3EBX	"	62,124	268	36	131
DL7UIO	"	48,280	246	30	106
DLØNG	"	46,440	216	37	98
			(OP: DK8NC)		
DO1YCL	"	43,684	257	29	105
DL9NCR	"	42,280	172	48	103
DL3VL	"	35,325	177	36	121
DL9HD	"	33,499	138	39	100
DK6AH	"	28,680	169	35	85
DL4KUG	"	25,986	180	28	94
DJ5OL	"	18,156	154	27	75
DM9KT	"	15,066	142	25	68
DJØZY	"	13,920	68	35	61
DL2RTL	"	8,142	71	22	37
DL8UAA	"	5,432	86	20	36
DH4PSG	"	5,151	40	22	29
DF2AP	"	3,649	46	15	26
DH6DAO	"	3,450	31	20	26
DL5XL	"	2,709	30	15	28
DL2LAR	"	2,072	31	14	23
DK4WF	"	1,862	37	13	25
DGØLFG	"	1,482	32	12	27
DK3AX	"	1,248	35	9	23
DL8UAT	"	1,140	18	12	18
DN2WW	"	418	20	7	15
DL5L	**28**	**6,944**	**190**	**11**	**45**
			(OP: DGØOKW)		
DJ8QN	**21**	**305,919**	**724**	**37**	**134**
DF9XV	"	132,928	402	33	101
DL9GS	"	67,348	266	28	85
DL4CF	"	56,551	231	27	70
DL2ARD	**14**	**1,097,440**	**2579**	**38**	**152**
DJ5GK	"	102,300	367	36	114
DK5TX	"	48,420	235	23	67
DL5JS	"	39,480	245	21	63
DK8JB	"	12,900	155	14	46
DL1GOR	"	3,724	59	13	25
DØ9EX	**7**	**52,152**	**359**	**21**	**85**
DL1ECG	**3.7**	**42,500**	**290**	**17**	**83**
DF1HF	"	4,992	101	6	42
DO5WW	"	4,002	111	6	40
DL8QS	**1.8**	**20,664**	**294**	**15**	**69**
DL4RCK	"	1,472	51	4	28

Greece

SV2GJV	**A**	**332,760**	**805**	**62**	**233**

Guernsey

MUØFAL	**A**	**86,700**	**341**	**34**	**116**

Hungary

HA8HW	**A**	**192,096**	**442**	**60**	**201**
HA5PT	"	9,620	61	25	40
HA5OO	"	2,584	42	13	25
HA6PX	**21**	**307,800**	**820**	**36**	**126**
HG3DX	**14**	**465,630**	**1651**	**38**	**127**
				(OP: HA3MY)	
HA8LNN	**3.7**	**83,520**	**1050**	**18**	**72**

Iceland

TF3DC	**A**	**59,072**	**249**	**33**	**109**

Ireland

EI9ES	**A**	**50,042**	**276**	**29**	**102**

Isle of Man

MDØCCE	**A**	**1,467,360**	**1472**	**111**	**369**

Italy

IZ1LBG	**A**	**1,966,425**	**2048**	**110**	**391**
IZ8FWN	**"**	**1,395,034**	**2019**	**108**	**430**
I2SVA	**"**	**1,221,944**	**1406**	**96**	**362**
IW2MZX	"	553,419	1416	63	246
IK2LTR	"	429,957	750	90	297
IZ4MJP	"	308,469	585	66	193
IZ8FDG	"	234,807	519	60	189
IK3SCB	"	148,827	604	32	101
IK8VZE	"	127,551	333	55	128
IK1DFH	"	113,278	410	48	161
IKØXBX	"	89,760	268	46	158
IW3HXR	"	81,951	228	55	122
IK2SAI	"	45,125	226	38	87
IZ1MHL	"	32,585	152	40	93
IZ2GNQ	"	18,450	127	39	84
IK2XYI	"	6,630	60	20	19
IZ5FFI	"	468	17	11	15
IW3SAR	"	54	3	3	3
IWØHBY	**28**	**7,906**	**116**	**12**	**47**
IZ8BGY	"	4,900	75	11	39
IK5AFJ	"	2,940	75	9	33
IZ8DVD	"	2,280	36	10	20
IKØEIE	"	1,484	40	7	21
IZ1DNJ	**21**	**190,280**	**558**	**33**	**109**
IZØEYP/8	**"**	**178,353**	**762**	**31**	**102**
IZ5DKG	"	115,056	332	34	107
IZ5ASZ	"	68,904	253	28	88
IR2C	**14**	**798,645**	**2025**	**38**	**147**
				(OP: IW2HAJ)	
IZ2ODM	"	43,845	219	27	84
IØQM	"	32,636	218	24	58
I1BAY	"	6,014	129	15	47
IZ1GAR	**7**	**124,581**	**866**	**26**	**105**
IC8POF	"	32,451	227	21	66
II2BCJ	**3.7**	**147,658**	**1118**	**19**	**87**
				(OP: IK2JUB)	
I1NVU	"	59,220	504	18	87

Kaliningrad

UA2FT	A	4,320	37	20	28

Latvia

YL6W	**A**	**3,121,266**	**3139**	**131**	**451**
				(OP: YL2GD)	
YL7A	**"**	**2,082,210**	**2098**	**117**	**445**
				(OP: YL2GM)	
YL8M	**"**	**1,401,930**	**1737**	**122**	**433**
				(OP: YL2KL)	
YL2KF	"	4,320	84	11	43
YL2SM	**1.8**	**96,210**	**957**	**15**	**75**

Lithuania

LY9Y	**A**	**2,340,837**	**2269**	**130**	**467**
LY1R	"	637,198	795	95	303
LY1CX	"	261,105	842	52	143
LY4BP	"	13,860	120	20	50
LY4K	**14**	**44,462**	**315**	**20**	**66**
LY5W	3.7	2,937	117	5	28

Luxembourg

LX7I	**A**	**7,300,332**	**5019**	**148**	**593**
				(OP: LX2A)	
LX1KC	**7**	**203,376**	**890**	**33**	**119**

Macedonia

Z35W	**14**	**37,582**	**298**	**20**	**66**
Z38A	**7**	**159,576**	**1063**	**27**	**95**

Netherlands

**

SP3J	*	83,700	302	33	75
SQ7IL	*	7,900	65	20	30
SN3C	**14**	**70,250**	**293**	**32**	**93**
SP4JTJ	*	40,221	178	30	79
SN3X	**7**	**35,506**	**384**	**14**	**68**
			(OP: SP3SLA)		
SO7O	*	13,179	150	13	56
			(OP: SP7DQR)		
SP5ES	*	408	13	8	9
SP4K	**3.7**	**307,530**	**1697**	**27**	**108**
SQ8JLA	**1.8**	**48,248**	**703**	**12**	**62**
Portugal					
CT2IVH	**A**	**132,352**	**471**	**44**	**144**
Romania					
YR9P	**A**	**4,241,682**	**3865**	**135**	**504**
			(OP: YO9HP)		
YR7M	*	**1,351,374**	**1796**	**109**	**365**
			(OP: YO9GZU)		
YO4RST	*	109,172	404	49	147
YQ6A	*	107,533	268	55	136
			(OP: YO6BHN)		
YO9BXE	*	21,625	120	37	88
YO4DW	*	14,580	127	22	59
YP3A	**21**	**145,600**	**610**	**32**	**108**
			(OP: YO3XX)		
YRØR	*	39,688	301	23	59
			(OP: YO3HKW)		
YO5BBO	*	33,072	205	24	54
YR8V	**14**	**248,930**	**1240**	**35**	**111**
			(OP: YO4RIU)		
YO4KCC	*	59,328	486	22	74
YO2MAX	*	39,039	320	23	68
YO5OAG	*	25,550	245	15	55
YO3JW	**7**	**100,348**	**739**	**21**	**95**
YO2LRH	3.7	3,800	99	7	31
Sardinia					
ISØ/K7QB	**A**	**1,349,600**	**1668**	**88**	**312**
			(OP: IN3QBR)		
Scotland					
GMØNAI	**A**	**192,816**	**363**	**55**	**179**
MM3T	*	156,415	585	50	155
			(OP: GMØELP)		
GMØEGI	*	30,000	117	39	86
MMØQ	14	1,932	36	9	12
			(OP: MMØBQI)		
GM2Z	7	3,840	93	5	35
			(OP: MMØDFV)		
Serbia					
YT9A	**A**	**2,904,450**	**2885**	**125**	**453**
YU5A	*	7,314	71	21	48
			(OP: YU1EW)		
YT2AAA	**21**	**14,112**	**109**	**20**	**52**
YT1R	**14**	**232,764**	**924**	**34**	**129**
			(OP: YU1UN)		
YU1WS	**7**	**136,002**	**798**	**28**	**86**
YT4A	**3.7**	**11,858**	**124**	**12**	**65**
			(OP: YT1AA)		
Sicily					
IT9GSF	**A**	**2,949,960**	**2088**	**139**	**471**
IW9FRA	*	110,745	234	70	137
IT9XTP	**21**	**15,504**	**120**	**22**	**54**
IR9P	**7**	**15,840**	**246**	**11**	**55**
			(OP: IW9HMQ)		
IT9EQO	**3.7**	**220,564**	**1209**	**28**	**106**
Slovakia					
OM6A	**14**	**327,564**	**1094**	**38**	**124**
			(OP: OM6NM)		
OMØM	**7**	**511,872**	**1876**	**36**	**136**
			(OP: OM3CGN)		
OM2VL	**3.7**	**381,168**	**1830**	**30**	**114**
OM5M	*	343,128	2001	26	110
			(OP: OM2IB)		
Slovenia					
S53MM	**A**	**3,166,112**	**3039**	**127**	**480**
S5ØR	*	**2,501,584**	**2433**	**119**	**422**
S56A	*	809,516	909	97	364
S5ØK	*	718,620	1040	72	223
S54O	*	159,222	409	57	166
S55OO	*	79,200	250	53	145
S53F	**14**	**343,519**	**1109**	**37**	**130**
S59ABC	*	12,915	123	15	26
S56X	**7**	**306,584**	**1387**	**33**	**119**
S51DX	3.7	5,076	149	4	32
Spain					
EA7RU	**A**	**2,601,230**	**2225**	**124**	**414**
EA1DR	*	**1,060,298**	**1714**	**87**	**275**
EF5J	*	383,400	934	69	215
			(OP: EA5YJ)		
EA5DM	*	60,760	242	45	110
EA5TT	*	57,564	218	44	112
EA5DKU	*	42,713	159	40	81
AN5L	*	35,203	186	30	77
			(OP: EA5OL)		
AO4M	*	26,650	132	30	100
			(OP: EA4DEC)		
EA5HAB	*	19,740	204	23	61
EA4BZ	*	13,300	115	23	72
EA5JC	*	9,408	95	32	64
EC1AJV	*	7,020	84	16	49
AN7K	*	2,520	56	10	32
EA4AFP	*	168	8	6	8
EA4ZK	**28**	**11,600**	**169**	**11**	**39**
EA1BFZ	*	1,586	52	6	20
EA5HT	**21**	**214,709**	**711**	**33**	**98**
EA1ACP	*	163,701	502	30	99
EA1FDI	**14**	**770,970**	**2281**	**40**	**146**
EA3ATM	**7**	**250,560**	**989**	**32**	**112**
AN2A	*	34,182	226	17	64
			(OP: EA2AYD)		
EA1DVY	*	8,640	81	15	49
Sweden					
7S3A	**A**	**345,999**	**752**	**68**	**223**
			(OP: SM3CER)		
SMØR	*	**330,624**	**893**	**63**	**161**
8SØC	*	264,660	425	73	257
			(OP: SMØMPV)		
SMØGYX	*	154,800	498	56	184
SMØEPO	*	24,742	220	21	68
8SØW	*	5,586	42	21	28
			(OP: SMØNJO)		
SK3W	**14**	**433,048**	**1492**	**35**	**117**
			(OP: SA3ARL)		
SA1A	1.8	24	6	3	5
			(OP: SM1TDE)		
Switzerland					
HB9DUR	**7**	**111,780**	**838**	**23**	**85**
Ukraine					
UR5AS	**A**	**638,745**	**1060**	**99**	**340**
US3IZ	*	304,824	678	78	234
UY7C	*	225,504	608	56	187
			(OP: UR3CMA)		
UR5ETN	*	203,112	624	48	200
UX2MF	*	154,318	334	68	194
UX7QV	*	103,964	359	44	144
UT2FA	*	89,046	199	62	132
UT8NT	*	60,204	325	39	134
UT5IZ	*	42,672	245	34	93
UT1CC	*	357	9	8	9
UR6IJ	**21**	**26,568**	**152**	**23**	**58**
EO3Q	**14**	**693,350**	**2331**	**38**	**137**
			(OP: UW5Q)		
UV8M	*	**565,018**	**2186**	**37**	**136**
			(OP: UX3MR)		
UT8IM	*	117,585	583	30	105
UT2II	**7**	**451,010**	**1764**	**35**	**135**
Wales					
GW1VDP	**28**	**846**	**45**	**3**	**15**
			(OP: G1VDP)		
GW4OH	**21**	**119,196**	**412**	**29**	**100**
MCØSHL	**7**	**133,680**	**885**	**24**	**96**
			(OP: MØURX)		
MWØX	*	**111,201**	**823**	**22**	**79**
			(OP: MØOXO)		
MWØJRX	**3.7**	**145,420**	**1001**	**19**	**91**
MW9W	**1.8**	**34,488**	**448**	**12**	**60**
			(OP: OMØAAO)		

OCEANIA

Australia					
VK6HZ	**A**	**94,464**	**256**	**46**	**98**
VK3KE	*	21,094	146	48	58
VK3MDX	*	2,142	41	17	25
VK6DU	**28**	**1,134**	**31**	**6**	**8**
Guam					
KG6DX	**A**	**1,626,675**	**1807**	**112**	**233**
Hawaii					
NH7FY	21	9,870	98	17	25
Indonesia					
YB1PC	A	3,139	36	18	25
YB3MM	**21**	**11,220**	**97**	**18**	**26**
New Zealand					
ZM1K	**A**	**780,690**	**984**	**101**	**217**
			(OP: VK2IA)		
ZL1BYZ	*	278,080	654	53	105
ZL2G	**14**	**27,181**	**167**	**28**	**49**
			(OP: ZL2HAM)		
Palau					
T8IC	**A**	**875,940**	**1603**	**73**	**122**
			(OP: JK2VOC)		

SOUTH AMERICA

Argentina					
AY4D	**A**	**3,517,792**	**3084**	**108**	**314**
			(OP: LU4DX)		
LU6QI	*	814	14	9	13
LU8EOT	**21**	**156,744**	**722**	**24**	**60**
LW3EWZ	**7**	**7,257**	**103**	**17**	**24**
Brazil					
ZX2B	**A**	**4,722,760**	**3304**	**122**	**383**
			(OP: PY2MNL)		
PY3PA	*	48,600	227	51	69
PY2EL	*	23,644	121	32	60
PY2IQ	*	18,700	125	36	49
PY2GMR	*	17,640	125	44	54
			(OP: PY2OMT)		
PY5TJ	*	3,760	69	16	24
PY2DEZ	*	1,400	51	16	19
PY4OG	**28**	**35,397**	**264**	**19**	**38**
PU1KGG	*	16,820	139	20	38
PY2XC	*	2,420	74	9	13
PY1KN	**21**	**543,438**	**1449**	**26**	**107**
PY3OPP	*	114,721	493	21	68
ZV5E	**14**	**866,574**	**1736**	**38**	**148**
			(OP: PP5KE)		
PY2HL	*	22,792	161	22	52
PY2BRZ	*	1,508	29	13	16
PY1ZV	**7**	**156,718**	**588**	**31**	**96**
PV2P	*	20,904	150	24	54
					(PY2DY)
Chile					
CE3PG	**A**	**722,891**	**1269**	**62**	**159**
Colombia					
HK1X	**A**	**648,268**	**1442**	**55**	**117**
HK3TU	*	198,740	501	57	133
Peru					
OA4AHW	**A**	**78,118**	**312**	**51**	**88**
Trinidad & Tobago					
9Y4W	**7**	**1,081,740**	**2278**	**34**	**131**
Uruguay					
CX7TT	**A**	**1,936,221**	**1738**	**107**	**304**
Venezuela					
4M4V	**A**	**168,810**	**297**	**81**	**174**
			(OP: YV4DYJ)		
YV6BXN	*	76,270	212	47	98
YY5LI	**7**	**67,965**	**233**	**26**	**89**

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States					
N1MM		**3,141,450**	**2099**	**127**	**458**
AK1Q		90,300	239	48	124
W2XL		**649,621**	**695**	**92**	**279**
W2VQ		246,356	400	65	177
W2RDX		106,664	346	38	96
K2OAK		94,672	218	61	133
N2NGW		29,268	132	37	71
WB2JSM		14,454	74	19	54
W2/PY2AAZ		2,438	48	22	24
K9RS/3		**3,735,160**	**2341**	**143**	**510**
W3MF		1,482,989	1193	101	362
W3LJ		85,260	207	52	122
K3EST/4		**2,487,967**	**1889**	**114**	**413**
K4HR		**1,215,134**	**996**	**103**	**364**
W4WS		**1,058,851**	**965**	**101**	**336**
AD4ES		849,578	910	94	327
KJ4BIW		155,358	301	49	140
AA4XA		119,130	339	53	156
W4NC		62,370	172	51	111
K5TR		**3,252,120**	**2211**	**150**	**511**
K5NA		**2,999,244**	**1871**	**150**	**504**
W5RU		1,314,495	1123	108	347
WXØB/5		28,224	120	33	65
W6PDX		**400,542**	**732**	**78**	**199**
K6DK		139,412	362	65	117
N6AJR		37,835	139	46	69
K6UD		30,847	172	40	69
NE6M		2,842	51	22	27
W7VJ		**1,596,868**	**1496**	**121**	**307**
N7AP		**1,334,398**	**1144**	**117**	**325**
K5RR/7		1,260,538	1206	108	301
WX7P		271,833	475	78	173
W7ED		217,210	409	51	152
W7DX		166,992	391	49	119
W7TVC		148,114	329	73	133
K8AZ		**3,730,370**	**2170**	**143**	**519**
K8AO		385,966	539	63	203
K8DAR		4,368	42	16	32
KD9ST		**1,308,530**	**1039**	**116**	**369**
K9CU		177,785	393	48	137
N9JZN		59,925	166	41	100
NØNI		**4,418,250**	**2608**	**143**	**502**
WØSV		99,007	244	58	123
KDØS		62,626	150	57	116
Alaska					
KL7CQ		**1,277,892**	**2341**	**70**	**161**
KL2R		131,316	499	53	71
KL7AIR		53,148	321	39	47
Belize					
V31MX		**272,250**	**902**	**55**	**95**
Bermuda					
VP9AD		24,192	173	15	48
Canada					
VY2TT		**1,403,425**	**1527**	**77**	**288**
VE9ML		**226,107**	**387**	**71**	**188**
VE9MY		56,024	156	40	109
VA2ZM		**1,700,256**	**1909**	**88**	**268**
VC2Z		870,808	1088	78	259
VA2TG		376,235	684	51	184
VE3UTT		**3,780,016**	**2964**	**110**	**386**
VE3RM		**2,670,202**	**2482**	**101**	**345**
VA3SK		2,425,650	2108	121	394
VE3CR		1,492,897	1421	99	320
VE3MIS		925,413	1112	99	274
VA3WR		272,796	424	68	186
VE3UZ		211,141	395	57	160
VC6R		**2,873,365**	**3138**	**118**	**327**
VE6AO		417,792	1001	53	139
VE7SCC		**27,120**	**423**	**14**	**26**
CK7HL		21,300	159	32	43
VE7NA		18,170	138	30	49
Costa Rica					
TI5N		**1,989,390**	**2643**	**109**	**281**
Guadeloupe					
FG5KC		14,952	166	24	32
Nicaragua					
HT2N		**5,102,505**	**5319**	**109**	**338**
St. Barthelemy					
TO5DX		**299,529**	**611**	**47**	**160**
Turks & Caicos					
VP5DX		**6,019,020**	**4679**	**128**	**434**
U.S. Virgin Islands					
NP2N		**1,852,138**	**2570**	**87**	**259**

AFRICA

Madeira Islands					
CQ9K		**14,025,696**	**6438**	**162**	**610**
CQ3T		**8,122,212**	**5034**	**129**	**450**
CS9A		8,296	95	20	41
Morocco					
CN3A		**16,138,616**	**7551**	**158**	**596**
Senegal					
6V7M		**9,818,508**	**5294**	**137**	**516**
Sierra Leone					
9LØW		21,854	117	43	55
South Africa					
ZS5NK		**302,075**	**541**	**61**	**154**
Swaziland					
3DAØDJ		**4,813,316**	**3249**	**108**	**336**
Tunisia					
3V8BB		**13,693,218**	**6480**	**152**	**597**
3V8SS		307,494	573	43	155

ASIA

Andaman & Nicobar					
VU4MY		**64,130**	**338**	**32**	**74**
Asiatic Russia					
RN9S		**3,777,823**	**3037**	**106**	**405**
UA9UZZ		**3,439,016**	**2609**	**125**	**441**
RA9A		2,978,619	2252	107	404
RK9SWM		1,315,120	1579	77	263
RK9XWO		693,156	984	59	223
RK9CYA		645,643	1171	54	179
RK9CWW		164,495	332	55	142
RK9CZO		27,412	131	15	62
RWØA		**5,700,240**	**4098**	**135**	**489**
RWØLT		944,198	1553	96	218
RKØAWQ		10,290	107	11	31
RXØLYP		1,120	26	7	9
Asiatic Turkey					
TC7KA		**2,463,175**	**3043**	**64**	**261**
TC3EC		1,638	28	5	16
China					
B7P		**1,743,240**	**1982**	**119**	**319**
B3C		**765,918**	**1276**	**90**	**216**
B4S		453,852	1188	82	170
B4X		172,725	646	43	104
BY7HL		40,896	249	53	91
BY1TTY		12,782	104	29	54
Cyprus					
P33W		**15,578,394**	**7591**	**153**	**601**
C49C		**6,807,944**	**4441**	**124**	**448**
India					
VU2PAI		**1,818,404**	**1747**	**96**	**308**
Israel					
4XØC		**1,417,884**	**1746**	**70**	**228**
Japan					
JI2ZJS		**2,322,972**	**2049**	**130**	**341**
JI2ZEY		1,566,215	1725	114	251
JA2ZJW		1,168,650	1451	93	222
JA3YKC		**441,378**	**710**	**94**	**185**
JA6ZPR		**3,318,280**	**2781**	**129**	**361**
JAØQNJ		**3,123,186**	**2576**	**129**	**345**
Kampuchea					
XU7MDY		**1,080,112**	**1980**	**87**	**217**
Kazakhstan					
UP9L		**1,165,833**	**1237**	**85**	**304**
Kuwait					
9K2HN		**6,418,830**	**4316**	**136**	**447**
Lakshadweep					
VU7SJ		**1,295,939**	**1777**	**76**	**217**
Qatar					
A73A		**5,957,406**	**4203**	**123**	**423**
Singapore					
9V1YC		**2,237,780**	**2436**	**101**	**309**
South Korea					
D8ØY		33,015	279	41	52
Thailand					
HSØAC		**794,112**	**1589**	**79**	**283**

EUROPE

Austria					
OE2S		**5,957,952**	**4199**	**155**	**589**
Belarus					
EW8ZO		7,375	122	14	45
EW2WW		6,350	70	17	33
Belgium					
OT2A		**3,812,688**	**3424**	**130**	**508**
ON4ANL		51,189	291	35	116
Bosnia-Herzegovina					
E73ESP		19,398	669	43	140
Bulgaria					
LZ7J		**935,100**	**1628**	**101**	**349**
Croatia					
9A8M		**2,634,624**	**2815**	**122**	**454**

9A6B	445,250	834	76	249
9A1VZD	16,353	116	29	50
Czech Republic				
OK5W	**7,423,416**	**4609**	**163**	**629**
OL7R	**5,931,492**	**4315**	**148**	**575**
OL3Z	5,119,023	4006	138	525
OL7C	1,438,931	2286	91	292
OK2KOJ	336,092	760	68	224
Denmark				
OZ2AR	**840,488**	**1345**	**85**	**303**
5Q1A	434,600	1186	53	152
England				
M4A	**3,904,283**	**3858**	**129**	**500**
G6MC	**1,513,152**	**2067**	**103**	**341**
G2F	1,477,330	1945	104	378
MØXXT	1,256,895	1886	103	374
G3B	762,008	1075	89	353
G6H	656,903	985	77	222
G6TW	578,289	1141	81	310
G1T	281,946	823	63	211
M4U	275,808	773	60	212
G8DYT	183,516	934	25	98
M8C	132,736	445	59	185
G4ARN	78,925	516	34	141
European Russia				
RT6A	**4,677,756**	**3914**	**147**	**561**
RK3DZB	**3,756,711**	**3834**	**128**	**491**
RK3QWW	3,078,360	3274	132	480
UA3R	2,236,860	3046	109	401
RT4D	1,443,082	2052	95	383
RZ3TZZ	811,372	1452	84	302
RK1OWZ	731,504	1441	73	276
RK3QWM	651,576	1299	93	315
RK3VWA	347,749	738	76	241
RK4WWQ	263,410	886	53	212
RK3AWA	168,829	587	46	151
RK3DXS	162,108	450	53	184
RK3DZH	115,668	611	55	188
RL3QWA	108,659	467	40	153
RK3AWK	68,856	277	47	104
RZ3DZI	1,462	37	10	24
Finland				
OH4A	**4,795,776**	**3786**	**155**	**569**
OG1M	1,595,550	2027	124	426
France				
TM6M	**10,858,952**	**6259**	**156**	**616**
TM2Y	**6,163,312**	**4142**	**147**	**571**
TM2S	2,065,878	1963	127	476
F5KEE	1,271,501	2351	85	252
F5KKD	474,591	1144	67	216
F5KAR	219,641	939	49	190
F5KEQ	167,097	618	51	168
F6PTT	92,400	321	43	97
F5OTZ	39,676	214	28	81
F6KFA	8,820	93	21	39
Germany				
DR5N	**3,505,824**	**2752**	**134**	**524**
DF3CB	**3,482,154**	**2508**	**132**	**515**
DFØAT	866,910	1185	98	328
DR2W	857,472	1938	85	299
DLØMB	662,853	877	93	308
DL1RYD	646,815	1023	89	314
DLØDEF	339,900	738	67	233
DKØMN	248,750	785	62	188
DKØALK	246,980	649	61	204
DO6HMA	223,440	1024	40	150
DKØHF	158,388	510	57	140
DM5A	85,845	319	46	131
Greece				
J48RT	**1,530,144**	**3249**	**88**	**326**
Hungary				
HG6N	**8,275,190**	**5724**	**153**	**617**
HA6D	209,840	553	57	158
HA8KCS	26,320	176	26	86
Iceland				
TF3W	**592,933**	**1636**	**51**	**158**
Ireland				
EI7M	**7,237,860**	**5169**	**138**	**527**
EIØW	933,933	1414	88	341
EI9E	539,580	908	71	274
Italy				
IR4M	**8,569,156**	**4940**	**160**	**622**
IO5O	**5,903,346**	**4157**	**136**	**542**
IO4T	4,061,673	3184	143	550
IW2LLH	3,249,350	2824	136	514
IR3Z	2,310,576	2324	128	464
IQ5MS	798,777	1478	95	314
IZ6FXP	734,916	2102	65	208
IQ8FT	125,500	517	45	206
IQ1TO	39,690	210	40	107
IQ2RD	600	19	10	14
Kaliningrad				
RK2FWA	**7,054,398**	**4755**	**159**	**614**
Latvia				
YL1S	**634,648**	**987**	**89**	**303**
Netherlands				
PI4Z	**796,323**	**1130**	**95**	**314**
PA6V	**690,522**	**1220**	**88**	**313**
PI4RCK	189,783	509	59	184
PG2AA	68,403	272	42	109
PI4ZOD	34,968	223	33	91
PI4AML	858	30	8	14
Norway				
LN3Z	**3,294,600**	**3326**	**120**	**480**
Poland				
SO9Q	**5,251,386**	**4053**	**132**	**547**
SN2K	**2,232,540**	**2201**	**135**	**493**
SP9KDA	822,339	1600	89	310
SN5T	432,180	916	79	264
SP6PCL	258,930	670	66	208
SP7MC	258,048	684	55	197
SP9KRT	134,018	566	50	176
SN9F	121,878	343	59	163
SP5KDK	69,344	356	40	136
SP1KZE	33,109	182	36	77
SP3KPN	7,875	86	20	55
Portugal				
CT7A	**3,925,525**	**3642**	**121**	**454**
CS2P	**2,484,155**	**3114**	**88**	**387**
CO4U	1,603,350	2258	100	350
CT6P	1,073,488	1829	76	262
CQ4T	477,687	1012	66	235
CT7R	224,750	512	75	235
Romania				
YR1C	**2,514,810**	**3320**	**108**	**402**
YO7KJX	538,376	992	82	264
YR2X	146,250	511	49	176
YR5S	99,450	420	44	151
Scotland				
GM3YS	**386,539**	**814**	**67**	**270**
Serbia				
YT9X	**3,451,420**	**3329**	**132**	**491**
YT5C	**2,221,020**	**2603**	**122**	**418**
YT6T	1,029,792	1800	93	315
Sicily				
IR9Y	**5,736,798**	**4293**	**143**	**570**
IF9A	1,219,668	1881	90	354
IQ9BF	640,798	1088	93	308
Slovakia				
OM7M	**7,882,633**	**4878**	**154**	**627**
OM3KFF	1,034,723	1476	88	351
Slovenia				
S56P	**2,822,025**	**3072**	**126**	**447**
S51A	**2,224,992**	**2497**	**124**	**464**
S5ØL	1,832,658	1929	110	391
Spain				
EE2W	**5,871,260**	**4452**	**139**	**513**
EA5KV	**5,559,900**	**4299**	**132**	**513**
EA1EEY	**5,214,284**	**4382**	**129**	**499**
EA5EA	2,979,568	3382	117	467
EE2K	2,441,874	2791	104	397
AO3A	2,380,224	2698	114	438
EA1FCI	863,469	1821	76	257
AM1W	801,383	1284	84	323
AO5A	413,127	947	70	227
EA1URO	305,287	760	54	169
EA4BHK	271,184	677	60	212
AM1T	256,194	623	65	193
ED4A	213,012	556	58	186
EA3MM	202,161	716	55	182
AO2W	196,219	591	64	175
EC7CUH	75,429	314	43	110
EA4RCT	13,230	118	18	45
Sweden				
SI9AM	**538,935**	**1490**	**60**	**225**
SG6T	430,404	738	88	284
SK7A	1,452	32	12	21
Switzerland				
HB1ØDX	**794,376**	**1400**	**92**	**282**
HB9AUS	520,713	626	100	323
HB9OK	433,177	1163	65	242
HB9CA	59,500	215	38	81
HB9LL	40,552	250	35	113
Ukraine				
UZ2M	**5,272,960**	**4353**	**156**	**593**
UT7L	**2,051,098**	**2127**	**131**	**482**
UR4Z	1,804,350	2242	115	408
UTØAZA	1,126,025	2385	81	284
UW4E	1,035,832	1723	89	335
UR6GWZ	156,100	557	48	175
UR4PWC	14,299	108	27	52
UT7AXA	7,140	96	14	46

OCEANIA

Australia				
VK4YN	**1,300,444**	**1489**	**105**	**227**
VK4WR	**1,083,530**	**1311**	**101**	**221**
VK7ZE	**1,001,820**	**1359**	**97**	**198**
VK6ANC	965,034	1254	98	224
Eastern Kiribati				
T32CXX	**641,170**	**1239**	**78**	**116**
Guam				
AH2R	**5,113,640**	**3733**	**134**	**356**
Hawaii				
KH6MB	**2,556,082**	**3026**	**113**	**194**
Indonesia				
YB8ZZ	**1,994,330**	**1997**	**108**	**269**
YE1ZAT	1,574,476	1761	92	242
Palau				
T88YB	**233,730**	**610**	**50**	**97**
Philippines				
DX1M	**797,904**	**1350**	**67**	**149**
DX1ARM	190,808	586	51	85

SOUTH AMERICA

Argentina				
LP1H	**6,161,822**	**4709**	**127**	**359**
LR2F	**5,753,786**	**4079**	**135**	**392**
LS1D	3,370,757	3347	97	280
LR1V	1,846,200	2081	109	231
LU8YE	1,095,956	1713	84	200
LV6D	492,898	919	69	149
LU9HP	282,568	776	54	89
LW6DW	281,860	684	56	114
LU4DQ	138,384	417	53	91
AY7X	73,569	310	44	93
Brazil				
ZY7C	**8,209,990**	**4824**	**139**	**471**
ZW5B	**7,896,942**	**5407**	**143**	**448**
PW2D	**6,267,364**	**4176**	**134**	**423**
PP5AR	3,161,235	3161	102	283
PR5Z	674,590	1186	67	163
PT2CM	660,726	1260	54	159
ZW5R	570,310	1152	64	150
PY3UEB	289,524	841	55	83
PY2ZR	59,136	267	37	59
Ecuador				
HD5J	**1,814,886**	**2266**	**81**	**225**
French Guiana				
FY5KE	**15,724,980**	**6922**	**168**	**628**
Netherlands Antilles				
PJ4/NØVD	**314,760**	**595**	**58**	**157**
Uruguay				
CX1CCC	**438,660**	**889**	**74**	**146**

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States				
K1RX	**5,489,676**	**3199**	**135**	**519**
KB1H	**3,695,052**	**2225**	**129**	**485**
KØTV/1	3,398,892	2220	126	476
K2LE/1	3,251,600	2348	120	430
W1DX	1,999,488	1679	103	389
K1KI	1,794,032	1316	115	381
K1KP	1,033,200	1154	83	253
N2RM	**2,433,516**	**2049**	**99**	**354**
W2CG	**1,628,775**	**1296**	**106**	**369**
W2YC	1,496,077	1265	107	384
WE3C	**11,075,915**	**5531**	**153**	**592**
N3RS	**7,072,868**	**4137**	**140**	**527**
NE3F	2,824,992	2008	127	450
W3CC	1,655,034	1139	118	419
K3DI	1,600,984	1333	104	348
WA3EKL	1,084,544	1007	108	350
N3NRN	362,695	497	72	217
W4RM	**4,825,515**	**3173**	**129**	**462**
N4T	**4,597,644**	**3276**	**136**	**500**
N1LN/4	3,512,228	2497	132	464
W3GQ/4	1,492,788	1207	109	364
K5BAT	**84,525**	**228**	**50**	**125**
K6IDX	**2,911,678**	**2139**	**140**	**399**
NK7U	**2,788,420**	**2527**	**138**	**397**
K7ZSD	1,932,732	1882	124	320
NØIJ/9	**1,514,409**	**1184**	**127**	**380**
K9LA	465,567	588	78	233
WBEF	**47,740**	**169**	**35**	**185**
Antigua & Barbuda				
V26B	**10,030,230**	**7321**	**134**	**476**
Bahamas				
C6APR	**3,780,480**	**3763**	**109**	**371**
Canada				
VE2DXY	**1,129,772**	**1863**	**78**	**236**
VE3DC	**341,600**	**861**	**68**	**156**
VE5RI	**919,336**	**1243**	**97**	**240**
VE6FI	**1,099,422**	**1729**	**87**	**222**
VE7SV	**3,813,984**	**4409**	**112**	**296**
VE8EV	**154,360**	**397**	**65**	**105**
Costa Rica				
TI1R	**3,523,936**	**4281**	**104**	**312**
Honduras				
HQ2W	**699,608**	**1595**	**72**	**145**
Jamaica				
6Y1V	**14,094,054**	**8840**	**147**	**555**
St. Kitts & Nevis				
V48M	**7,304,036**	**6237**	**114**	**410**

AFRICA

Canary Islands				
AO8A	**23,448,291**	**10406**	**165**	**624**
Madeira Islands				
CT9L	**13,798,850**	**7534**	**137**	**513**
South Africa				
ZS9X	**8,252,200**	**4776**	**140**	**480**

ASIA

China				
B1Z	**1,879,248**	**2626**	**107**	**269**
B7M	**1,014,707**	**1567**	**94**	**243**
B4B	443,870	1157	74	164
Cyprus				
C4I	**5,633,280**	**3405**	**136**	**504**
Hong Kong				
VR2C	**4,465,050**	**4578**	**132**	**378**
Israel				
4XØV	**8,135,913**	**5406**	**122**	**441**
Japan				
JA1YPA	**3,304,378**	**2670**	**134**	**365**
JA2YKA	2,236	35	19	24
Mongolia				
JU1DX	**556,320**	**1213**	**63**	**177**
Taiwan				
BVØJ	**1,010,688**	**2110**	**76**	**180**

EUROPE

Bulgaria				
LZ4UU	**380,380**	**953**	**57**	**229**
Czech Republic				
OL1X	**4,703,475**	**4247**	**130**	**521**
England				
G4IIY	**1,055,202**	**1590**	**91**	**335**
G5O	975,670	1498	89	341
European Russia				
RT4M	**3,970,401**	**4161**	**130**	**483**
France				
TM1O	**2,184,460**	**3803**	**106**	**351**
Germany				
DQ4W	**6,569,300**	**4918**	**143**	**591**
DL1QQ	**5,993,469**	**4589**	**153**	**578**
DR5Z	**5,019,912**	**3825**	**138**	**540**
DAØBCC	3,601,950	3186	127	463
DP4A	3,138,960	3122	125	490
DK1F	1,080,034	2032	95	348
DFØRW	991,007	1805	88	321
DL3G	583,296	966	87	297
Greece				
J42T	**2,595,351**	**4189**	**98**	**375**
Hungary				
HG1S	**6,572,328**	**5380**	**144**	**552**
Italy				
IR4X	**12,751,285**	**7141**	**167**	**668**
IQ5LU	982,488	1577	91	311
IQ3VE	585,224	1228	85	297
IQØEF	468,076	1085	66	226
Latvia				
YL4U	**2,260,524**	**3165**	**104**	**372**
Netherlands				
PA3EVY	**2,382,864**	**2870**	**118**	**410**
PD2EDR	14,560	156	18	62
Portugal				
CT7D	**408,375**	**885**	**61**	**214**
Sardinia				
ISØA	**238,654**	**753**	**58**	**216**
Slovenia				
S52ZW	**3,549,440**	**3414**	**127**	**463**
Spain				
AM3SSB	**6,752,412**	**5810**	**132**	**504**
EH7H	2,371,047	3022	108	375
EG5T	1,275,960	2042	95	339
AM1A	1,200,200	1849	92	333
Switzerland				
HB9H	**2,885,556**	**3324**	**128**	**454**

OCEANIA

Australia				
VK1CC	**1,960,513**	**2286**	**102**	**229**
VK4WIL	149,688	304	87	129
Guam				
WH2DX	**2,622,800**	**3029**	**107**	**225**
Indonesia				
YF1ZAL	8,241	62	32	35
Mariana Islands				
AHØBT	**2,938,068**	**3081**	**110**	**246**
New Zealand				
ZM2M	**2,374,515**	**2419**	**122**	**283**

SOUTH AMERICA

Argentina				
LS2D	**3,084,752**	**3298**	**101**	**273**
Brazil				
ZV2K	**334,719**	**687**	**62**	**145**
PR5D	330,096	810	62	122
Chile				
XR6T	**2,754,126**	**3186**	**91**	**251**
Netherlands Antilles				
PJ4E	**13,127,680**	**7531**	**138**	**503**
Suriname				
PZ5Z	**12,076,368**	**7107**	**148**	**488**
Uruguay				
CV5D	**1,555,776**	**2058**	**92**	**241**
CW2T	795,432	1527	82	180

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

United States				
K3LR	**16,096,850**	**8052**	**161**	**630**
W3LPL	**14,155,764**	**7070**	**160**	**622**
KC1XX	**12,279,496**	**6301**	**151**	**610**
NQ4I	**7,229,820**	**4360**	**152**	**561**
K3NA/1	**7,145,644**	**3924**	**140**	**557**
K1TTT	**6,618,708**	**4086**	**140**	**526**
NR5M	**5,435,408**	**3312**	**161**	**533**
WBAIH/9	**2,859,277**	**2113**	**138**	**449**
K2AX	**2,343,045**	**1737**	**117**	**426**
N6BV	**2,052,864**	**2018**	**134**	**352**
NX5M	1,946,200	1609	129	397
K1IR	1,469,324	1287	100	328
WX3B	737,040	731	97	318
K7RST	275,088	511	82	182
W9VT	46,252	175	39	85
Canada				
VE7FO	157,896	483	57	96
Honduras				
HQ3Z	**12,666,672**	**8905**	**148**	**506**
Turks & Caicos				
VP5T	**6,899,422**	**6047**	**113**	**401**
U.S Virgin Islands				
KP2M	**8,923,660**	**6371**	**138**	**482**

ASIA

China				
B4TB	**644,400**	**1136**	**92**	**208**
Japan				
JA3YBK	**6,904,326**	**4412**	**148**	**471**
JR5VHU	**7,351,328**	**4720**	**153**	**455**
JA7YRR	**4,259,790**	**3441**	**130**	**356**

EUROPE

Belgium				
OT5A	**10,231,340**	**8628**	**152**	**597**
Bulgaria				
LZ9W	**9,541,920**	**7683**	**156**	**616**
Czech Republic				
OK1OUE	**1,508,156**	**2921**	**86**	**302**
Dodecanese				
SX5P	**3,323,594**	**4309**	**118**	**469**
Finland				
OH5Z	**7,117,330**	**6043**	**153**	**574**
Germany				
DFØHQ	**12,510,120**	**9217**	**166**	**674**
DR1A	**8,084,048**	**6532**	**150**	**562**
DR2P	244,795	842	69	214
Liechtenstein				
HBØ/HB9AON	**5,288,396**	**5968**	**106**	**441**
Lithuania				
LY7A	**6,116,412**	**6504**	**131**	**521**
Netherlands				
PA6Z	**5,539,575**	**5642**	**138**	**561**
PI4ZI	**5,116,875**	**5924**	**131**	**494**
Norway				
LA1TPK	**16,748**	**195**	**24**	**82**
Romania				
YR8D	**741,703**	**1415**	**85**	**294**
YP2Y	28,560	203	31	89
YR2Y	5,100	64	22	46
Sardinia				
ISØC	6,716	129	19	73
Scotland				
GMØB	**5,423,000**	**5576**	**135**	**583**
GM2T	2,183,742	2832	116	422
GM6NX	361,788	831	66	226
Spain				
EB1WW	**3,626,304**	**4866**	**114**	**430**
AO5B	**3,373,208**	**4320**	**119**	**459**
EA3DUM	1,508,191	1949	98	351

OCEANIA

Philippines				
DX1DBT	**642,173**	**1266**	**70**	**129**
Willis Island				
VK9DWX	**3,505,090**	**3167**	**125**	**290**

SOUTH AMERICA

Argentina				
LT1F	**8,868,153**	**6171**	**131**	**388**
Brazil				
ZX2X	204,349	523	52	129
Chile				
CE1W	**3,734,980**	**3447**	**112**	**318**
Netherlands Antilles				
PJ2T	**8,677,503**	**5853**	**130**	**427**
Venezuela				
YV4A	**11,824,268**	**6739**	**147**	**521**

CHECK LOGS

The following submitted check logs, which are always appreciated: 4O3A, 5K3W, ADØNW, AD7UZ, AM7M, AN3N, BG4DVK, CE3/VE7BFN, DC9ZP, DF7GG, DG1BQC, DG8VE, DJ6BQ, DL2IH, DL2MIH, DL6GV, DL8UKE, DO3PKE, E71M, E74Y, E77C, EA1AS, EA1RCR, EA4EQF, EA8CER, EA9AM, EA9IE, EE9E, EF1A, EW1KV, F4CQK, F4UJU, G3RWL, G4AXX, GWØETF, HA1SN, HA5AZZ, HB9EGA, HK3W, I5KAP, IO9K, IV3JCC, IWØHOU, IZØEHL, IZ5MOQ, IZ7CRW, J39BS, JA2KVD, KØTOR, K6UW, KC2BEZ, KD1XX, KL8DX, KRØU, KU4BP, LA2GN, LA3BO, LA6PBA, LA8HGA, LA8OM, LA9NM, LT5Y, LY3BG, LZ1PJ, N1WQ, NP2L, OH1PY, OK1ABB, OK1DI, OK1FAI, OK1SJ, OK1SRD, OK1VKC, OK2BPU, OK2EQ, OK2VX, OM3KWZ, OP4B, PAØSDZ, PA7F, PY2UDX, RA2FIA, RA3XDX, RA6HSM, RA9AC, RA9CMO, RA9MX, RA9WW, RA9YN, RC4Q, RK4FWX, RL3BM, RM9RZ, RN3GM, RN4LL, RN6FK, RU3EJ, RW1AC, RX3AGD, RX9WN, SA6W, SMØQ, SM5CLE, SO8A, SP1DMD, SP2LOP, SP3CGK, SP3FUK, SP4LXC, SP5ANY, SP5EAQ, SP5ELW, SP5GDY, SP5HFS, SP5VYI, SP5XSD, SP6CIK, SP6CZ, SP6IHE, SP6M, SP6TGD, SP6XP, SP7AWG, SP7HOV, SP7IXT, SP7JLH, SP7TEP, SP8JMA, SP9BGL, SP9FTJ, SP9GKJ, SP9ODY, SQ3AUA, SQ4OLP, SQ5BB, SQ5TA, SQ9CWO, UAØBA, UAØFDX, UA1OMZ, UA4FTA, UA6HO, UA6UDV, UA9CEP, UN8PT, UN9FB, UR5WCQ, US5VX, US7IUF, UT7WZA, UUØJC, UX1AA, UX1UA, UX3IO, VA3NA, YBØDPO, YL1XN, YO3CVG, YO3JF, YO6KNE, YO6OAF, YO6OHS, YP2U, YT3A, ZL2ACG, ZL4CR.

Disqualified: D4C, E7DX, 9A1P, 9A7A, UU7J. Altering of QSL log times to conform with the 10-minute rule.

our readers say

Tribute to K3TUP

The following was written to Tim Duffy, K3LR, about his tribute to John Kanzius, K3TUP, which was printed in the June issue's "Contesting" column.

Dear Tim,

I just got done reading the article you wrote in June's *CQ* magazine about K3TUP. I never had the pleasure of working John before he passed and never realized he had such a passion for contesting until reading your article. Thank you for taking the time to write it for those of us who never had a chance to know some of the great "corner stones" of amateur radio, such as John. His legacy and a part of him will live on, thanks to your bringing your memories to the rest of us through your editorial contribution.

Neil, AE1P

Kudos for Dave

The following letters were sent to CQ *columnist Dave Ingram, K4TWJ:*

Hi Dave,

Just a quick mail to thank you for your articles in *CQ* magazine. I really enjoy the topics you cover and the style of writing. The "Hamming from the Shadows" (series) has been an eye-opener! For far too long (in the UK, at least) aerials that haven't been modeled with EZNEC or analyzed with the latest MFJ gizmo are seemingly classed as substandard, with the suggestion of "have a go and see what you get," usually leaving me with the feeling of "why should I bother?" This is probably the case with quite a few hams and hopefully this article will see a lot of hams dusting off their rigs and making QSOs and enjoying radio with the limited resources available. It left me wishing I had a drainpipe and a gutter system like K8CQ. Well almost!

Anyway, keep on with the good work and pass my compliments on to all the other contributors. Tell them they are all great, but I only had time to mail one and you got the short straw! HI

Martyn, GW6ITJ

Dave,

As a fairly new reader of *CQ* but an old-time ham, I must tell you that I have loved your Keys 2009 columns. Although I've never used a cootie and never even heard of it, it sure was interesting, and I'm tempted to build one. I did build a bug at one time, and I can still recall melting some fishing sinkers and pouring the molten lead into the aluminum base for weight. It worked just as well as my old Vibroflex Original, but was uglier. I sure wish I still had it. I now use a Vibro-Keyer and a homebrew electronic keyer using a Curtis chip.

Thank you for some fascinating columns, and I'm looking forward to your next ones.

Sumner Weisman, W1VIV

K4TWJ responds: Hello Sumner! Thanks for the kind words. The April and May Keys columns on sideswipers have really blown the doors in here. ... Seems everyone is interested in making sideswipers/cooties and Sumner, you, too, should give it a go. The big place everyone finds parts is Ace Hardware. I just keep reading in every e-mail: Ace, Ace, Ace. And remember the good part: You can always rewire the 'swiper to make a good single-lever paddle.

Let us know how you do on homebrewing your own.

—Dave, K4TWJ

zero bias *(from page 8)*

9:00 PM departure out of La Guardia, but was told it was full and had a huge waiting list. He put himself on the list anyway and kept calling to see if anything had opened up. At 7:00 PM, he was told he had a seat. He rushed to the airport, only to find the flight had been delayed until 11:30, when it finally did take off. He touched down at DFW at about 3 o'clock Friday morning.

And then there was my trip. ... I was scheduled on a 7:30 AM flight out of Newark Airport in New Jersey on Thursday, due into DFW at about 10:15 AM. When I arrived just before 6 AM, I found that my flight had been cancelled due to mechanical problems, and I was rebooked on a 9 AM flight out of La Guardia, on the other side of New York City. The airline provided a van to take us over there, but the driver didn't know how to get there! Luckily, I knew the route (everyone else on the van was from Texas) and we made it without a problem. My flight took off right on time, but the pilot told us we'd arrive about 45 minutes late because he was being routed around the line of storms that ended up shutting down DFW. About an hour and a half into the flight, he told us we were being diverted to Chicago in order to give connecting passengers a chance to make new connections from O'Hare, and that the rest of us would "take it from there." We spent three hours at a gate there (which I spent visiting with John Kalotai, N1OLO, and Ned Bassick, KA1CVV, from West Mountain Radio, who were on the same flight with me), and eventually arrived at DFW around 4:00 PM.

Since my chauffeur (Don) was already in Plano setting up our booth, John and Ned were nice enough to give me a ride, since they had plenty of room in their rental car because we were too late for them to pick up their stuff for the show from the UPS depot, where it was waiting for them! They had to go pick it up Friday morning before heading to the show to set up and be "open for business" when the doors opened at 9:00 AM.

So ... the next time you go to hamfest and you see folks there who traveled halfway across the country in order to be able to talk with you, please take a moment to think about the effort that has gone into getting them there—even without a mess on the scale of Dallas this June—and maybe take a minute to thank them for being there.

Therefore ... By the power vested in me by no one in particular, I hereby declare the month of August to be National Hamfest Vendor Appreciation Month. No applause, please. Just spend money!

73, W2VU

ham shop

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.
Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 25 Newbridge Road, Hicksville, NY 11801 (fax: 516-681-2926; e-mail: <hamshop @cq-amateur-radio.com>.

CB-TO-10M CONVERSIONS: Frequency modifications, FM, books, plans, kits, high-performance CB accessories. Catalog $3. CBCI, Box 30655CQ, Tucson, AZ 85751. <www.cbcintl.com>

At **www.HamRadioExpress.com** we know you can't afford to waste time looking for Ham Radio Antennas & Accessories. With **over 3,000 products in our four warehouses**, you can rely on **Ham Radio Express** to have the parts you need, in stock, especially those special, hard-to-find parts, fixed station antennas, baluns, mobile antennas, mobile antenna mounts, accessories, and RF connectors. **Custom Built Cable Assemblies** for your Packet TNC/KPC to radio interface devices. We stock interface cables for all amateur radio makes and models: AEA, Kantronics, MFJ, PacComm, and more Packet Controllers. All cables are in stock or can be built in one day. All cable assemblies are double-checked before they are shipped. Toll-Free Order Lines: M–F 9 AM to 4 PM: **1-800-726-2919** or **1-866-300-1969**; Fax **1-434-525-4919. Help and Tech Support:** *Not sure what model you need?* At **www.HamRadioExpress.com** our Technical Support staff (1-434-509-0617, 9 AM to 4 PM weekdays) can help you decide what you need, and all available for same-day shipment. On-line visit: **www.HamRadioExpress.com**

QSLing SUPPLIES. e-mail: <plumdx@msn.com>.

QSLs FOR DX STATIONS: Our new "International Division" was established to handle QSL needs of DX hams. We understand the problems of packaging, shipping, and dealing with the customs problems. You can trust us to deliver a quality QSL, usually much cheaper than you can find locally. Write, call, or FAX for free samples and ordering information. "The QSL Man—W4MPY," 682 Mount Pleasant Road, Monetta, SC 29105 USA. Phone or FAX 803-685-7117.

"QRZ DX"—since 1979: Available as an **Adobe PDF file** each Wednesday or by regular mail. Your best source for weekly DX information. Send #10 SASE for sample/rates. **"The DX Magazine"—since 1989:** Bi-monthly – Full of DXpedition reports, QSL Information, Awards, DX news, technical articles, and more. Send $3.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/Fax: 828-683-0709; e-mail: <DX@dxpub.com>; WEB PAGE: <http://www.dxpub.com>.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

TRYLON SELF-SUPPORTING TOWERS: Delivered **ANYWHERE** in the US for **ONLY** $261.00. This is the **BEST** tower value around – 96 feet for only $2451.00 **DELIVERED TO YOUR QTH!** Go to <www.championradio.com> or call 888-833-3104 for more information.

MAUI, HAWAII: vacation with a ham. Since 1990. <www.seaqmaui.com>, telephone 808-572-7914, or <kh6sq@seaqmaui.com>.

ALUMINUM CHASSIS AND CABINET KITS, UHF-VHF Antenna Parts, Catalog. E-mail: <k3iwk@flash.net> or <http://www.flash.net/~k3iwk>.

REAL HAMS DO CODE: Move up to CW with **CW Mental Block Buster III.** Succeed with hypnosis and NLP. Includes two (2) CDs and Manual. Only $29.95 plus $5.00 s/h US. FL add $2.14 tax. Success Easy, 160 West Camino Real #128, Boca Raton, FL 33432, 800-425-2552, <www.success-is-easy.com>.

NEAT STUFF! DWM Communications— <http://qth.com/dwm>

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 29th year of service. It is always easier to donate and usually more financially rewarding, BUT MOST IMPORTANT your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Make 2009 the year to help a child and yourself. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <crew@wb2jkj.org>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

HF VERTICAL COMPARISON REPORT: K7LXC and NØAX test Cushcraft, Butternut, MFJ, Force 12, Hustler, Gap, and Diamond verticals. 64-page report includes protocol, data sets, and summaries. $17 plus $4 s/h. <www.championradio.com>, 888-833-3104.

3200+ DIFFERENT AWARDS from 128 DXCC countries. Complete data online at <http://www.dxawards.com>. One year full access just $6. Ted Melinosky, K1BV, 12 Wells Wood Road, Columbia, CT 06237-1525.

CASH FOR COLLINS, HALLICRAFTERS SX-88, & DRAKE TR-6. Buy any Collins equipment. Leo, KJ6HI, phone/fax 310-670-6969, e-mail: <radioleo@earthlink.net>.

IT'S NEW AND HOT! "Keys III" features highly detailed views and photos of keys, bugs, and paddles like few people have ever seen! It's awesome and it's available on CD ($16 + $2.50 post) or as a full-size book ($18 + $4.05 Priority Mail). Also still available, "Keys II" ($16 + $2.50 post) and "QRP NOW!" ($16 + $2.50 post). Order direct from Dave Ingram, K4TWJ, 3994 Long Leaf Drive, Gardendale, AL 35071.

PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, working on Software Defined Radio technology. Benefits: newsletter, software, discounts on kits and publications. For membership prices see the TAPR website: <http://www.tapr.org>).

TRIBANDER COMPARISON REPORT: Find out the real story on tribander performance. K7LXC and NØAX test more than a dozen antennas, including Force 12, Hy-Gain, Mosley, Bencher, and Cushcraft. 84-page report includes protocol, data sets, and summaries. $17 plus $4 s/h. <www.championradio.com> or 888-833-3104.

TELEGRAPH KEY INFORMATION AND HISTORY MUSEUM: <http://w1tp.com>

advertisers' index

including website addresses

10-10 International Net, Inc.	113	www.10-10.org
Advanced Specialties Inc.	50	www.advancedspecialties.net
Alinco	37	www.alinco.com
Aluma Towers	112	www.alumatower.com
Ameritron	63	www.ameritron.com
Amidon Associates	33	www.amidon-inductive.com
Array Solutions	23	www.arraysolutions.com
Astron Corporation	43	www.astroncorp.com
bhi Ltd.	35	www.bhi-ltd.co.uk
BATTERIES AMERICA/Mr. Nicd.	115	www.batteriesamerica.com
Bilal Co./Isotron Antennas	109	www.isotronantennas.com
Butternut Antennas	14	www.bencher.com
CQ Bookstore	52,100	www.cq-amateur-radio.com
Cable X-PERTS, Inc.	67	www.cablexperts.com
CheapHam.com	91	www.CheapHam.com
Command Productions	17	www.LicenseTraining.com
Communication Concepts, Inc	35	www.communication-concepts.com
Cubex.Quad Antennas	91	www.tennadyne.com
Cutting Edge Enterprises	112	www.powerportstore.com
DZ Company	61	www.dzkit.com
Daiwa/NCG	27	www.natcommgroup.com
Diamond Antenna	16	www.diamondantenna.net
Dishtronix, Inc.	95	www.dishtronix.com
Elecraft	17	www.elecraft.com
Electric Radio Magazine	95	www.ermag.com
Electronic Products Design, Inc.	109	www.epd-inc.com
FlexRadio Systems	9	www.flex-radio.com
Force 12, Inc.	91	www.force12inc.com
Ham4Less.com	50	www.ham4less.com
Ham Radio Outlet	12,116	www.hamradio.com
HamTestOnline	111	www.hamtestonline.com
Hy-Gain	1,11	www.hy-gain.com
ICOM America, Inc	45,47,101,Cov IV	www.icomamerica.com
Jetstream	51	www.jetstream-usa.com
KJI Electronics, Inc.	95	www.kjielectronics.com
Kanga US	111	www.kangaus.com
Kenwood U.S.A. Corporation..	Cov. II	www.kenwoodusa.com
LDG Electronics, Inc.	58,59	www.ldgelectronics.com
LUSO Tower	21	www.luso.us
M² Antenna Systems, Inc.	5	www.m2inc.com
MFJ Enterprises, Inc.	39,55	www.mfjenterprises.com

SALE: CQ/Ham Radio/QST/73 magazines and binders. SASE brings data sheet. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

TOWER HARDWARE, SAFETY EQUIPMENT, weatherproofing, T-shirts, and **MORE**. Champion Radio Products, telephone 888-833-3104, or <www.championradio.com>.

WANTED: VACUUM TUBES – Commercial, industrial, amateur. Radio Daze, LLC, 7620 Omnitech Place, Victor, NY 14506 USA (phone 585-742-2020; fax 800-456-6494; e-mail: <info@radiodaze.com>).

WWW.PEIDXLODGE.COM

NEAT STUFF! DWM Communications—<http://qth.com/dwm>

HAWAII HAM STATION RENTAL: Beautiful Big Island location. Brochure: <KD4ML@juno.com>.

CALL-MASTER CALLSIGN DATABASE $25.00 SHIPPED. Complete US/VE/DX listings. Use with our Prolog2K Logger or stand-alone. Secure order on our website at <www.prolog2k.com> or call toll free 1-800-373-6564. DataMatrix

MicroLog by WAØH
Free download . . . www.wa0h.com

OVERSEAS AIRMAIL POSTAGE plus complete line of airmail envelopes. Order directly from our web site – James E. Mackey, proprietor.
www.net1plus.com/users/ryoung/index.htm

WWW.QSL.NET/KM5KG DXPEDITION

DVD VIDEOS: For full description and how to order . . . <www.k4uee.com/dvd/>.

LOOKING GREAT on the wall behind your equipment. <www.hamradioprints.com>

SMART BATTERY CHARGERS: 5A model for larger deep cycle down to 1/4A model for smaller QRP lead acid batteries. <www.a-aengineering.com>

SuperBertha.com CUSTOM ROTATING POLES: No guy wires, entire pole rotates, stack all your antennas, rotor at ground level, 50 ft to 300 ft high, EIA-TIA-222-G. Starting at $37,799.00. Scott, W3TX, 814-881-9258.

HAWAII DX Vacation Rental: 808-929-7101, <www.leilanibedandbreakfast.com>.

SuperBertha.com ULTIMATE LONG BOOM OWA YAGIS: Designed by WA3FET and K3LR. Scott, W3TX, 814-881-9258.

TOWER ACCESSORIES Gin Pole Kits – stand off brackets – antenna mounts – vehicle radio mounts – for 30 years. IIX Equipment Ltd., 708-337-8172, <http://www.w9iix.com/>.

RFI Filters <www.RFchoke.com>

<http://www.vintagehamshack.com>

UPGRADE TO RF NETWORK DESIGNER PRO PLUS for as little as $39. Many new features, including automatic project tracking documentation. **GrantBingeman@CS.COM**

HY POWER ANTENNA COMPANY <http://www.freewebs.com/hypower> Multiband dipoles, delta loops, half squares and QRP antennas.

HAM TRAVELERS Discount travel, tours, cruises, more. **www.GreatExpectationTravel.com**

www.SecondHandRadio.com Advertise your used radios and surplus electronics **FREE.** Upload up to 16 photos per ad **FREE.** No commissions, no fees. Dealers are welcome.

PROMOTIONAL VIDEO: 22-minute DVD showcases ham radio. Details: <www.neoham.org>.

DISPLAY YOUR CALL SIGN IN NEON. To order call toll free 1-866-287-9174, Duncan DeSigns

FOR SALE: DRAKE TR-7/TR-7A/R-7/R-7A Service kit. Includes 13 Extender Boards and Digital Jumper Card. $64.95 includes postage. See <http://wb4hfn.com/Services/W7AVK/tr7ext2.htm>. Bob, W7AVK, 5581 Panorama Drive, Moses Lake, WA 98837; <w7avk@arrl.net>; 509-750-7589.

ENIGMA GERMAN CIPHER MACHINES WANTED: Museum buying. Information and Repairs available: <http://w1tp.com/enigma>.

1987 FORD TV TOWER TRUCK with 55-foot extending mast. Interior stripped except for tower and compressor (12V and 110V) allowing usable 65 by 51 by 136 inches of space. Reworked 350 Ford XL engine ($1,000). Extended body with walk-on steel mesh grill on top. Heavy-duty trailer hitch. 121,488 mileage. Recent Virginia inspection sticker. $4,500, Norfolk, Virginia. Call 757-285-4504 and/or e-mail Ransom Harris at <zelahbh46@verizon.net> for pictures.

WANTED: OLD QSL CARD COLLECTIONS. Collector seeks US & DX cards. W2VRK, 9 Laird Terrace, Somerset, NJ 08873; e-mail: <tpllrs@comcast.net>.

WANTED: Old Clapp-Eastham Morse telegraph key on marble base. response by mail to David A. Johnson, 15514 Ensenada Drive, Houston, TX 77083 or e-mail to: <fullerphone7150@yahoo.com>.

WANTED: HAM EQUIPMENT and related items for BLIND OPERATOR. e-mail: <n3gdleo@yahoo.com>

FREE 100 ft. Rohn **FREE-STANDING** commercial tower, classic 33 antenna, and rotor. **ALL FREE.** You dismantle. Chicago area, Illinois. Call 630-968-5674.

advertiser's index

including website addresses

National RF, Inc.	113	www.NationalRF.com
Nemal Electronics International, Inc.	50	www.nemal.com
Nifty! Ham Accessories	61	www.niftyaccessories.com
Penny's Stitch n' Print	95	www.pennystitch.com
PowerPort	112	www.powerportstore.com
QCWA	112	www.qcwa.org
QSLs by W4MPY	91	www.qslman.com
R.F. Connection	109	www.therfc.com
RF Parts Company	49	www.rfparts.com
RSGB	87	www.cq-amateur-radio.com
Radio Club of J.H.S. 22	89	www.wb2jkj.org
Radio Works	53	www.radioworks.com
Rig Expert Canada	69	www.rigexpert.net
Ross Distributing Company	69	www.rossdist.com
Shelby Hamfest.	97	www.shelbyhamfest.com
SteppIR Antennas Inc.	25	www.steppir.com
TAK-tenna LLC	61	www.TAK-tenna.com
Tarheel Antennas	79	www.tarheelantennas.com
TEN-TEC, Inc.	15	www.tentec.com
Ten-Ten International Net, Inc.	113	www.ten-ten.org
TENNADYNE, L.L.C.	91	www.tennadyne.com
The Xtal Set Society	113	www.midnightscience.com
Timewave Technology Inc.	69	www.timewave.com
TOKYO HY-POWER LABS, INC.–USA	3	www.thp.co.jp
Traffie Technology	113	www.hexbeam.com
TransWorld Antennas	73	www.transworldantennas.com
Universal Radio, Inc.	85	www.universal-radio.com
Vibroplex	67	www.vibroplex.com
Virginia Beach Hamfest	91	www.vabeachhamfest.com
W2IHY Technologies	99	www.w2ihy.com
W4RT Electronics	57	www.w4rt.com
W5YI Group	61,93	www.w5yi.org
WBØW, Inc.	65	www.wbØw.com
West Mountain Radio	29	www.westmountainradio.com
Wireman, The	113	www.thewireman.com
Yaesu	6,7,Cov III	www.vxstdusa.com

It's easy to advertise in CQ. Let me know what I can do to help.
Don Allen, W9CW
(217) 344-4570 or FAX (217) 344-4575
e-mail:ads@cq-amateur-radio.com
Please direct editorial and subscription questions to (516) 681-2922

12 STORE BUYING POWER

HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, KL7MF, Mgr.
anaheim@hamradio.com

BURBANK, CA
1525 W. Magnolia Blvd, 91506
(818) 842-1786
(800) 854-6046
Eric, K6EJC, Mgr.
Magnolia between
S. Victory & Buena Vista
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102, 94085
(408) 736-9496
(800) 854-6046
Jon, K6WV, Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Jim, KJ3N, Mgr.
RT.13 1/4 mi., So. I-295
newcastle@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Leon, W7AD, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
John, WØIG, Mgr.
denver@hamradio.com

NEW LOCATION!

PHOENIX, AZ
10613 N. 43rd Ave, 85029
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
Corner of 43rd Ave & Peoria
phoenix@hamradio.com

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi. no. of I-285
atlanta@hamradio.com

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr. 22191
(703) 643-1063
(800) 444-4799
Steve, W4SHG, Mgr.
Exit 161, I-95, So. to US 1
woodbridge@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, N1UC, Mgr.
sales@hamradio.com
Exit 1, I-93;
28 mi. No. of Boston
salem@hamradio.com

Yaesu Summer Specials Good Thru 8-31-09

YAESU

FT-897D VHF/UHF/HF Transceiver

- HF/6M/2M/70CM • DSP Built-in
- HF 100W (20W battery)
- Optional P.S. + Tuner • TCXO Built-in

Call Now For Our Low Pricing!

FT-950 HF + 6M TCVR

- 100W HF/6M
- Auto Tuner built-in
- 3 roofing filters built-in
- DMU-2000 Compatible

NEW!

Call Now For Low Pricing!

FT-8800R 2M/440 Mobile

- V+U/V+V/U+U operation
- V+U full duplex • Cross Band repeater function
- 50W 2M 35W UHF
- 1000+ Memory channels
- WIRES ready

Call Now For Low Pricing!

Competitive pricing!

VX-3R 2M/440 HT

- Ultra-Compact Dual-Band HT w/ Wide band RX
- 1.5W RF out 2m/ 1w RF out 440
- WiRES Compatible
- 1000 Memory channels
- AA Battery compatible w/Optional FBA-37

NEW!

Call For Low Intro Price!

FT-60R

- 2m/440 HT
- 5W Wide-band receive
- CTCSS/DCS Built-in
- Emergency Auto ID

Low Price!

VX-7R/VX-7R Black

50/2M/220/440 HT

- Wideband RX - 900 Memories
- 5W TX (300mw 220Mhz)
- Li-Ion Battery
- Fully Submersible to 3 ft.
- Built-in CTCSS/DCS
- Internet WIRES compatible

Now available in Black!

VX-6R

2M/220/440HT

- wideband RX – 900 memories
- 5W 2/440 , 1.5W 220 MHz TX
- Li-ION Battery - EAI system
- Fully submersible to 3 ft.
- CW trainer built-in

NEW Low Price!

VX-8R

50/144/222/440 Handheld

- 5w (1W 222)
- Bluetooth optional
- waterproof/submersible 3 ft 30 mins
- GPS/APRS operation optional
- Li-ion Hi-capacity battery
- wide band Rx

NEW!

FT-857D

Ultra compact HF, VHF, UHF

- 100w HF/6M, 50w 2M, 20w UHF
- DSP included • 32 color display
- 200 mems • Detachable front panel (YSK-857 required)

Call for Low Price!

FT-7900R 2M/440 Mobile

FREE YSK-7800

- 50w 2m, 45w on 440mHz
- Weather Alert
- 1000+ Mems
- WIRES Capability
- Wideband Receiver (Cell Blocked)

Call Now For Your Low Price!

FT-2000/FT2000D HF + 6M tcvr

- 100 W w/ auto tuner • built-in Power supply
- DSP filters / Voice memory recorder
- 200W (FT-2000D)
- 3 Band Parametric Mic EQ • 3 IF roofing filters

Call For Low Pricing!

FT-450AT HF + 6M TCVR

- 100W HF/6M • Auto Tuner built-in • DSP Built-in
- 500 Memories • DNR, IF Notch, IF Shift

Call Now For Special Pricing

AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications, descriptions, subject to change without notice.

Look for the HRO Home Page on the World Wide Web
http://www.hamradio.com

#1 in Customer Service

COAST TO COAST FREE SHIPPING
UPS - Most Items Over $100
Rapid Deliveries From The Store Nearest To You!

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

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

- Large Backlit LCD Display for easy operation
- Stable RF Power (50 Watts VHF / 45 Watts UHF)
- Reliable performance in harsh environments
- 5 ppm Frequency Stability (-4° F to +140° F)
- 1000 Memory Channels for serious users
- Yaesu Unique Power Saving Circuit Design Minimizes Vehicle Battery Drain

Actual Size

NEW 2 m/70 cm DUAL BAND FM TRANSCEIVER

FT-7900R

2 m/70 cm DUAL BAND

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

- Separation Kit for Remote Mounting (optional separation kit YSK-7800 requires)

50 W 10 m/6 m/2 m/70 cm* Quad Band FM Mobile

FT-8900R

*70 cm 35 W

QUAD BAND DUAL RECEIVE

50 W 2 m/70 cm* Dual Band FM Mobile

FT-8800R

*70 cm 35 W

DUAL BAND DUAL RECEIVE

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

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

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

Uncork your favorite DX.

IC-7600 HF + 6M

- 100 Watt Output Power, Full Duty Cycle
- 3 Roofing Filters (15/6/3 kHz)
- USB Audio and Rig Control (Sound Card Interface Not Required)
- Two Independent DSP Units
- +30 dBm 3rd-order Intercept Point
- Selectable, "Build Your Own" IF Filter Shapes
- 5.8-inch LED Color Display with Dualwatch
- Built-in High-Speed Automatic Antenna Tuner

Contact an Authorized Icom Dealer
and plan your escape today!

ICOM