Get Ready to Reap the DX, p. 98

Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

SEPTEMBER 2010

CQ

1945 — Our 65th Anniversary — 2010

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On the Cover: Jim Stone, WB7CQS, and grandson Kenny Stone, KE7GXX, in Jackson, Wyoming. Details on page 72.

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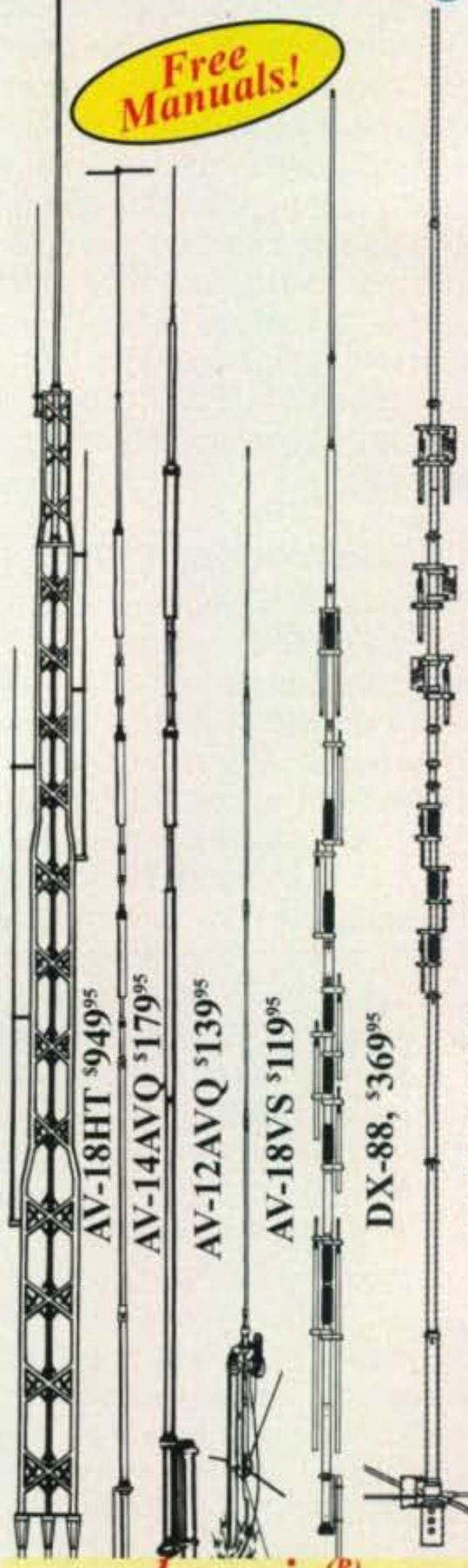

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AV-18HT, $949.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

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

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AV-12AVQ, $139.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $119.95 (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs.

All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $199.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

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

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

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$179.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$139.95	10,15,20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$119.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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Full 1500 Watts, 43 feet, includes base mount

New! AV-6160

$399.95 UPS SHIPPABLE

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

Exceptional Performance

The entire length radiates to provide exceptional low angle radiation 160-20 Meters and very good performance on 17-6 Meters. You can shorten it by telescoping it down for more effective low angle radiation on higher bands.

Just talk with automatic tuner!

A wide-range automatic or manual antenna tuner *at your rig* easily matches this antenna for all bands 160-6 Meters. There's no physical tuning adjustments on the antenna -- you simply put it up!

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than ½ dB 60-6 Meters and less than 1 dB 160-80 Meters with good quality, low-loss coax).

Extremely low wind loading

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

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

Assembles in an hour

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

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

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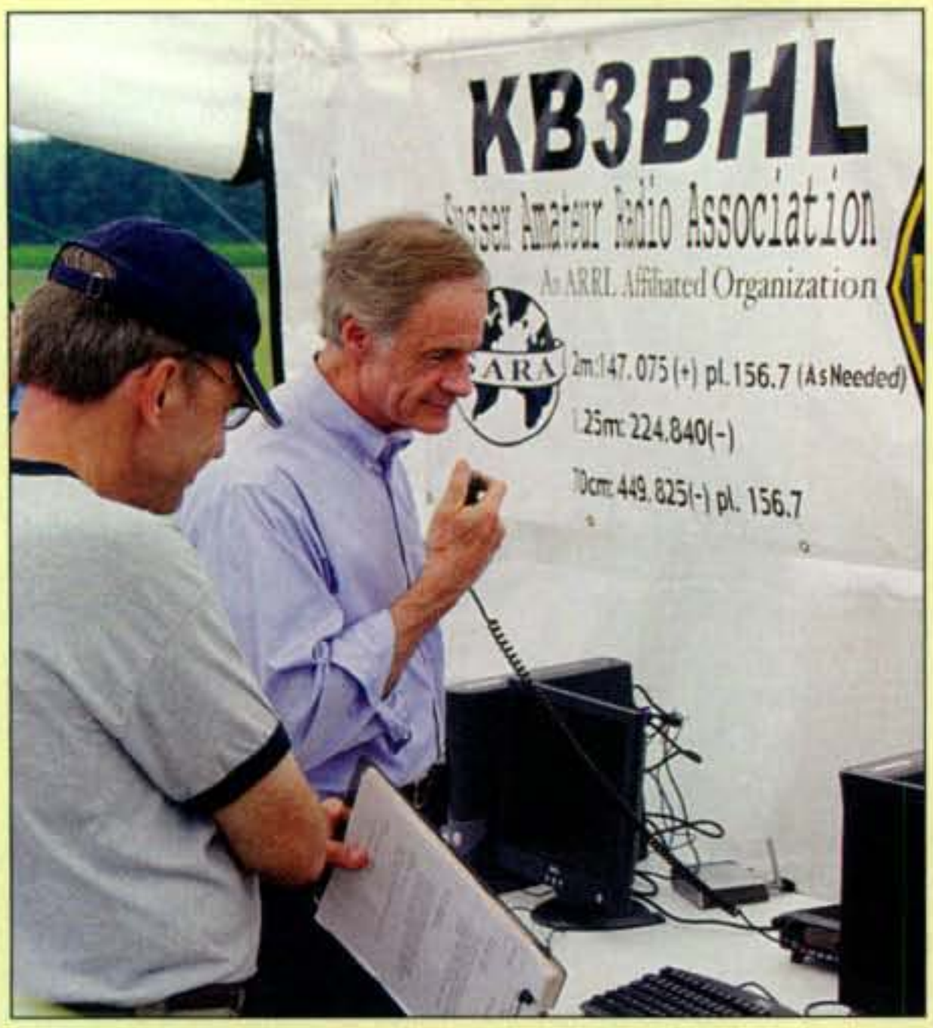
U.S. Senator Visits Field Day Site



U.S. Senator Tom Carper (D-DE) spent more than half an hour visiting the Field Day site of Delaware's Sussex Amateur Radio Association, and even briefly got on the air. According to club spokesman Walt Palmer, W4ALT, Carper spent time talking with everyone in attendance and made a contact on 2 meters with Lewes, Delaware, Mayor Jim Ford, who was at another Field Day site. Palmer also says the senator's late father, Wallace Carper, was a ham. In a related story, the Delaware state legislature passed a bill in July exempting amateur radio and other permanently installed mobile 2-way radios from the state's new handheld cellphone ban. *(Photo by Herb Quick, KB3BT)*

FCC Permits Ham-Employees to Operate in Drills

Moving with unaccustomed speed, the FCC adopted a Report and Order on July 14, allowing hams who are employed by both government agencies and non-government agencies such as hospitals, to participate in emergency and disaster drills on behalf of their employers. The ruling was based on a Notice of Proposed Rule Making, WP-10-72, issued this past March, in response to petitions arising from a strict interpretation by the FCC's Enforcement Bureau of the prohibition on amateurs communicating on behalf of their employers. The decision came just more than a month after the reply comment deadline. The ruling added a new paragraph to Section 97.113(a)(3) of the FCC rules, which reads as follows:

(i) A station licensee or control station operator may participate on behalf of an employer in an emergency preparedness or disaster readiness test or drill, limited to the duration and scope of such test or drill, and operational testing immediately prior to such test or drill. Tests or drills that are not government-sponsored are limited to a total time of one hour per week; except that no more than twice in any calendar year, they may be conducted for a period not to exceed 72 hours.

The new rule becomes effective upon publication in the *Federal Register*. The complete text of the report and order may be accessed online at <http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0714/FCC-10-124A1.pdf>.

Appeals Court Overturns FCC Indecency Rules

The FCC's indecency standards have been left in limbo by a federal appeals court. The U.S. Court of Appeals for the Second Circuit ruled unanimously in July that the FCC could not legally fine broadcasters for "fleeting expletives" that may make their way onto the air during live broadcasts. The FCC had tightened its rules after singer Janet Jackson's infamous "wardrobe malfunction" during the 2004 Super Bowl halftime show, and had issued fines to other broadcasters when various entertainers said naughty words during awards programs. The court ruled that the Commission's rules went too far and violated the First Amendment, creating a "chilling effect." The judges made a point of saying that they were not questioning the FCC's authority to regulate broadcast standards, only that the current regulations did not pass Constitutional muster. The ruling is significant for hams as well as broadcasters because the FCC generally applies its indecency standards for broadcasters in amateur enforcement cases as well.

Obama Promotes National Broadband Plan

President Obama has committed the federal government to finding and freeing up 500 MHz of government and commercial spectrum over the next ten years to help accommodate the anticipated growth of mobile broadband services. The President's plan, which is based on the FCC's National Broadband Plan, would require congressional approval. UHF and microwave amateur allocations could be affected, as most ham bands above 225 MHz are shared with, and secondary to, government users. *Newsline* reports that fierce opposition to the plan is expected from TV station owners, who feel that giving up any additional spectrum (they already gave up a lot in the switch to digital TV last year) would compromise their ability to transmit multiple programs simultaneously and to provide expanded mobile services themselves.

Number of New Hams Continues to Grow

The ARRL reports that more than 18,000 new amateur radio licenses were issued in the first half of 2010, an increase of nearly 8.5% over the same period last year. The number of new licenses issued has climbed significantly each year since 2006, when just over 21,000 newcomers joined our ranks. Last year saw more than 30,000 new licenses issued. Nearly 125,000 new ham licenses have been issued since the beginning of 2006. The total number of licensees as of the end of June, according to the ARRL, was 694,346.

Russian Team Wins WRTC

The 2010 running of the World Radiosport Team Championships (WRTC) has been won by Russian hams RW1AC and RA1AIP, operating R32F in the competition held in July in Moscow. According to the *ARRL Letter*, the two hams from the host country won the gold medal, with Estonian hams ES5TV and ES2RR, operating R3A, taking home the silver and Americans N6MJ and KL9A (R33M) taking bronze. Forty-eight teams competed in the event, which is held every four years.

France Rules D-STAR Illegal; New Zealand Investigating

The French government's telecommunications agency has ruled that hams in France and French territories may not use D-STAR, the digital voice and data

(Continued on page 10)

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HF 1.5kW Auto Tuner

HL-2.5KFX *Auto Band Set and QSK*

Solid-state HF 1.5kW Linear Amplifier

Photo : From 1eft HC-1.5KAT (HF 1.5kW Tuner with Auto Band Set Feature), HL-2.5KFX (HF 1.5kW MOSFET Linear) and IC-7700 Transceiver

For DXpeditioners

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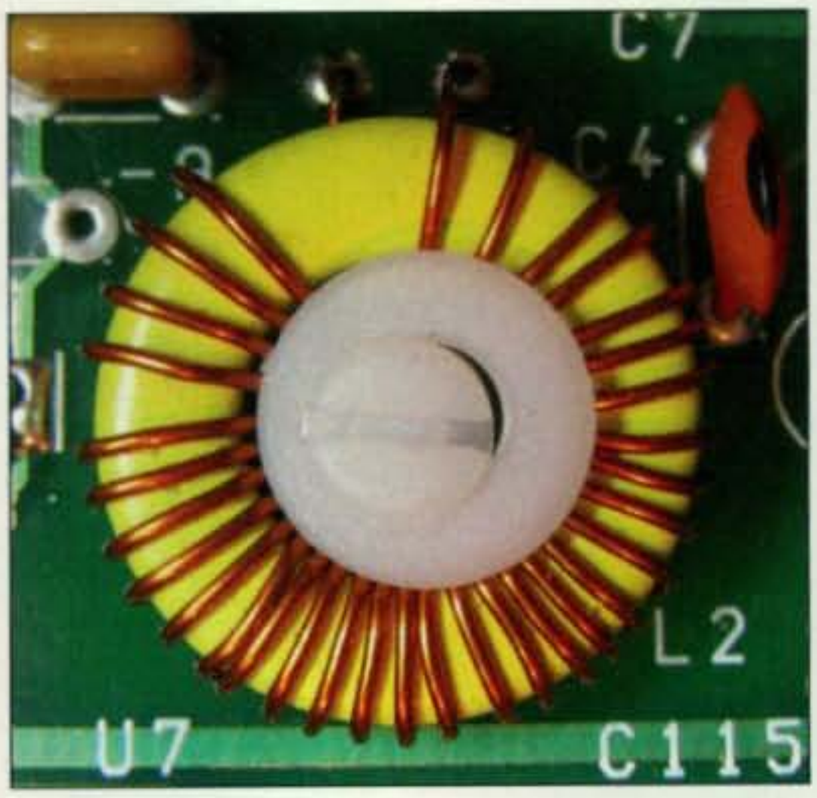

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departments

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HF/50 MHz 100 W All Mode Transceiver

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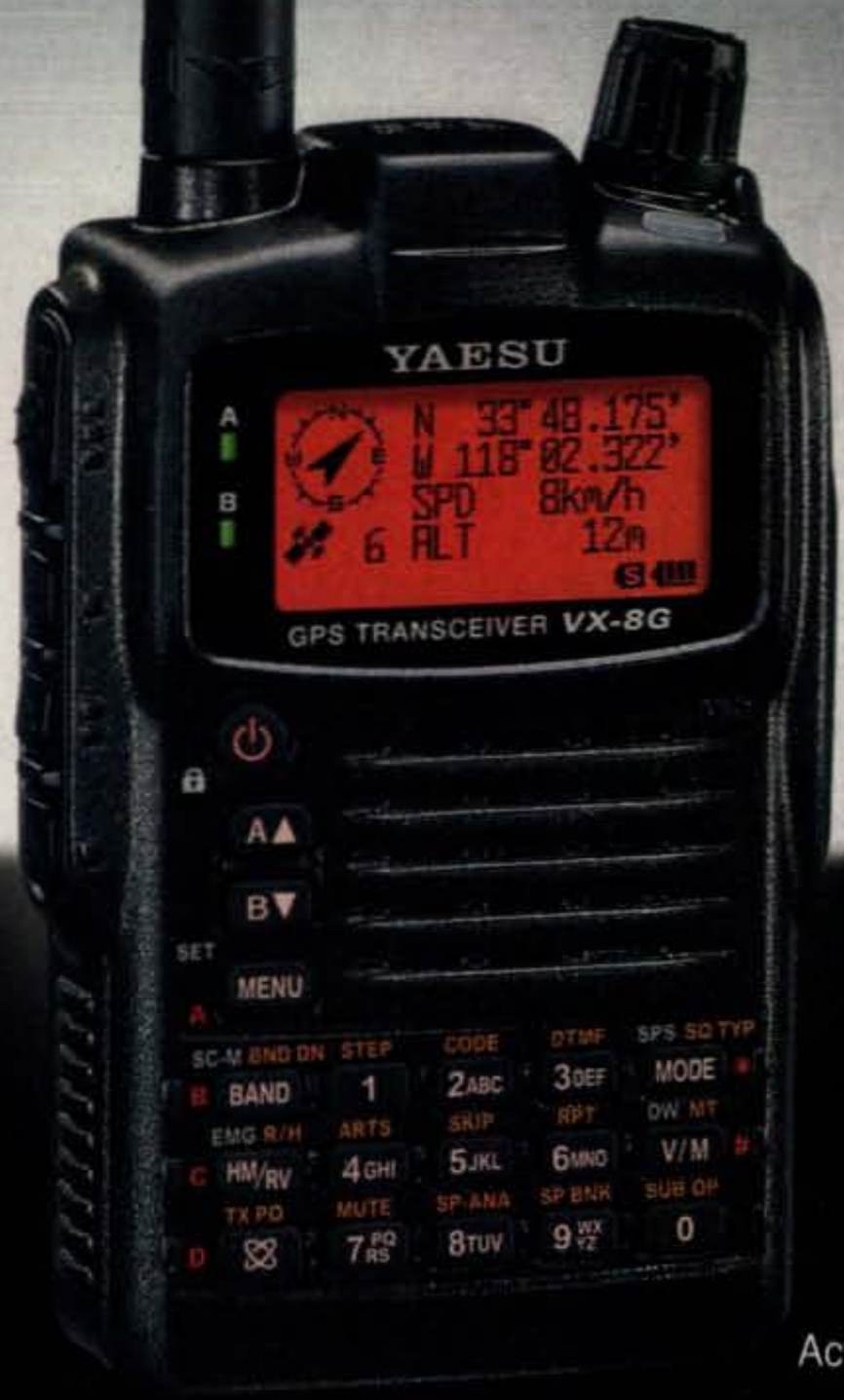

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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

Ham Radio Matters

Does the FCC care about amateur radio? A year ago, in our reader survey we asked where you believed amateur radio ranked among the FCC's priorities. Nearly three-quarters of the respondents felt that ham radio had a lower priority for the commissioners than other services, and one in five felt it had a very low priority. One recent FCC action, though, suggests that ham radio does *indeed* matter to the FCC, "particularly with respect to providing emergency communications" (to quote from the Basis and Purpose of the Amateur Radio Service in the FCC rules).

This was the Commission's very prompt—one might even be tempted to say quick—action on clearing up the question of whether licensed employees of emergency response agencies (both governmental and non-governmental) may use amateur radio during drills. The speed with which this action was taken reflects both on streamlined procedures at the FCC and on the importance that the Commission places on the ability of hams to be part of an organized response to an emergency or disaster, and to get through "when all else fails."

In case you've missed the discussions and debate over this issue, it all started about a year ago, when a ham who worked for a hospital wrote in an internet posting that he had set up an amateur station at his workplace and operated it during a disaster drill, representing the hospital. He was informed by the FCC that Section 97.113 of its rules prohibited him from operating that station on behalf of his employer, even during a drill. Large-scale confusion followed, as it became unclear exactly what was and was not allowed.

Hundreds (perhaps thousands) of hams work for emergency response or emergency management agencies and often are central players in seamlessly bringing together amateur radio and public safety communications during emergencies and disasters when time wasted waiting for a non-employee ham to arrive at a command center could cost lives. Hundreds more work for "critical infrastructure" agencies, such as hospitals, whose emergency plans may include having hams on staff who can link into amateur emergency networks when normal communications fail.

Until last year, the FCC has stayed silent on these arrangements, implicitly recognizing that they helped serve the public interest. Under closer examination, though, it became clear that they conflicted with the "letter of the law" in 97.113. The conclusion of the FCC's enforcement staff was that while such use was permitted during an actual emergency—when a ham may use "any means of radiocommunication at his/her disposal to provide essential communication needs in connection with the immediate safety of human life and immediate protection of property when normal communication systems are not available" (97.403), it was prohibited at all other times, including emergency drills.

Since training and practice are essential to effective communication during a real emergency, many organizations began reconsidering their relationships with amateur radio emcomm (emergency communications) groups. Suddenly, the vaunted ability of amateur radio to provide communications "when all else fails" came into question, not because of technology or operator skills but because of bureaucracy.

As the storm of controversy threatened to build to hurricane strength, the FCC moved to calm the waters by offering to issue waivers, on a case-by-case basis, for government-sponsored emergency drills. A steady stream of requests started coming in to Washington, doubtlessly straining the resources of FCC staff. To our knowledge, no legitimate waiver request was ever denied. At the same time, the American Hospital Association requested a blanket waiver on behalf of its members, since one element for ongoing hospital accreditation is having drills twice a year which include provisions for emergency communications. In addition, several petitions for rule making were filed, suggesting different approaches to solving the problem.

In March, only about six months after this problem surfaced, the FCC issued a Notice of Proposed Rule Making in which it proposed granting blanket authority for employee-hams to participate in emergency drills, but only those sponsored by government agencies. The comment deadline was set at April 24, with reply comments due by June 7. Barely a month after the June 7 comment cutoff, the FCC released its Report and Order, making it permissible for employees of both governmental and non-governmental agencies to use amateur radio in emergency drills. In explaining its decision, the FCC said that "(a)lthough public safety land mobile radio systems are the primary means of radio-based communications for emergency responders, experience has shown that amateur radio has played an important role in preparation for, during, and in the aftermath of natural and man-made emergencies and disasters."

The new paragraph of Section 97.113(a)(3)—which takes effect immediately upon publication in the *Federal Register*—reads as follows:

"(i) A station licensee or control station operator may participate on behalf of an employer in an emergency preparedness or disaster readiness test or drill, limited to the duration and scope of such test or drill, and operational testing immediately prior to such test or drill. Tests or drills that are not government-sponsored are limited to a total time of one hour per week; except that no more than twice in any calendar year, they may be conducted for a period not to exceed 72 hours."

It is clear, it is concise, and it sets limits to prevent abuses. Whether or not you agree with the decision, the important thing is that hams, emcomm groups and served agencies now have clear guidelines under which to operate. Perhaps equally important is the fact that the FCC clearly feels that amateur radio's role in emergency and disaster communications is just too significant to be left hanging in a cloud of uncertainty. We all can now get back to structuring plans and procedures that permit hams not only to provide emergency communications "when all else fails," but to conduct the necessary "self-training" that makes everything run much more smoothly when our help is needed. Our thanks to the Commissioners and the staff members behind the scenes, apparently in several bureaus, who made the wheels of government turn as quickly as possible in this case.

Young Ham of the Year

On page 63 in this issue, we have a brief profile of 2010's Newsline Young Ham of the Year, Cody Anderson, KI4FUV. In addition to congratulating Cody, we also want to congratulate *Newsline*'s Bill Pasternak, WA6ITF, and everyone else involved in the YHOTY program, on reaching its 25th anniversary. Cody, who is 17, was born eight years *after* the first YHOTY award was issued, in 1986. CQ is proud to have been a corporate co-sponsor of the program for many of those years, along with Yaesu (Vertex-Standard) and, more recently, Heil Sound.

The first awardee, Shawn Wakefield, WK5P, is now an electrical engineer who holds eight patents and runs his own software company. His wife and two of his children hold ham licenses as well! "Ham radio has been a fantastic hobby for me," he recently told WA6ITF ... more proof that whether we are talking about emergency communications or future leaders in technology, clearly ham radio matters. — *73, W2VU*

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

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

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

CD-45II

CD-45II
$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!*

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MSHD, $109.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
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AR-40

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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

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

Digital Automatic Controller

DCU-1
$749.95

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

AR-35 Rotator/Controller

AR-35
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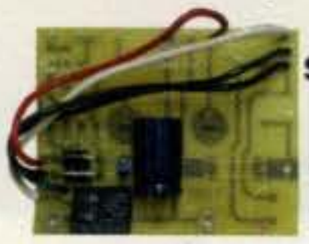

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announcements

The following Special Event stations will be on the air in September:

KA1KD, from commemoration of P.T. Barnum's 200th birthday, Bethel, Connecticut; BEARS/Bethel Office of Emergency Management; 1300–2100Z Sept. 25 on 7.265, 14.265, 21.365 MHz ±QRM. For certificate send SASE to J. Ritterbusch, KD1YV, 8B Kayview Ave., Bethel, CT 06891.

KC2RA, from Kings County Repeater Association's annual 9/11 Memorial Event, a short walk from Ground Zero, New York, NY; 1300–2300Z Sept. 10 on 14.295 USB, 14.070 PSK31, 7.250 LSB, D-Star REF020B, Echolink 64300. RF participants send card with SASE for commemorative QSL. KC2RA, P.O. Box 280288, Brooklyn, NY 11228. Details: <http://www.kc2ra.org>.

W2FHA, from Town of German Flatts Living History Weekend, Mohawk, NY; Ft. Herkimer ARA; 1600–2100Z Sept. 25 on 14.280 MHz (±20 kHz) and 7.280 MHz (±20 kHz). Send QSL and SASE for certificate to Christopher L. Bouck, KB4CMF, 28 West State St., Dolgeville, NY 13329 (www.fhara.net).

WA3COM, from West Alexander Fair, West Alexander, Pennsylvania; Washington Amateur Communications ARC; 1600–2300Z Sept. 9–12 on 14.227, 7.240–7.245, 3.810 MHz. QSL to Ed Oelschlager, 60 Carl Ave. B2, Eighty Four, PA 15330. <www.wacomarc.org>

K4MIA, commemorating National POW/MIA Recognition Day, Florida; 0000–2359Z Sept. 15–19 on 3.885, 7.185, 14.265, 21.300 MHz SSB, 14.070 PSK. For QSL, send QSL and SASE to Michael Bald, 6758 Hall Blvd, Loxahatchee, FL 33470. For information: <http://www.qrz.com/db/K4MIA>.

VC3M, celebrating Mississauga ARC's 25th anniversary, Mississauga, ON, Canada; 0000Z Sept. 18 to 0000Z Oct. 18 on all HF bands except no WARC bands. For certificate send QSL and $2US with return envelope to Michael Brickell, VE3TKI, 2801 Bucklepost Crescent, Mississauga, ON, Canada L5N 1X6. Information: <ve3tki@sympatico.ca>. Operating schedule information: VC3M on QRZ.com and <http://www.marc.on.ca>.

The following hamfests, etc., are slated for September:

Sept. 4–5, **Shelby Hamfest**, Dallas, North Carolina. Shelby ARC. Information: <www.shelbyhamfest.org>. (Exams)

Sept. 11, **58th Annual W9DXCC Convention**, Elk Grove Village, Illinois. Information: <www.W9DXCC.com>.

Sept. 11, **Virginia Beach Hamfest**, Virginia Beach Convention Center, Virginia Beach, Virginia.

Sept. 12, **Western Connnecticut Hamfes**t, Edmond Town Hall, Newton, Connecticut. Contact Joe de Groot, AB1DO, phone 203-938-4880; <www.danbury.org/cara/hamfest.html>. (Talk-in 147.30+ PL100)

Sept. 18, **Rhode Island Amateur FM Repeater Service Fall Flea Market & Auction**, VFW Post 6342, Forestdale (N. Smithfield), Rhode Island. Contact Rick Fairweather, K1KYI, e-mail: <k1kyi@arrl.net>, phone: 401-864-9611 from 7–8 PM only. (Talk-in 146.76)

Sept. 18, **MicroHams Ham Radio Digital Conference**, Microsoft Campus, Redmond, Washington. For details and registration go to <http://www.microhams.com/registration>.

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ham radio news

(from page 2)

mode that is becoming popular with amateurs worldwide. According to *Newsline,* the agency ruled the mode illegal because it can be used to connect ham stations to the internet, which is not permitted in France, and because it feels the proprietary digital voice encoder (codec) is in violation of the country's open standards policy. French hams say the ruling denies them "the fundamental right to access to the Internet" guaranteed by the European Union and plan to petition the European Parliament to go to bat on their behalf with the government of France.

Meanwhile, New Zealand's regulatory agency is looking into whether D-STAR and other internet-linked radio systems, such as IRLP and Echolink, fit into that country's current ham regulations. Apparently, the concerns there relate to unattended transmitters and unlicensed digipeaters (particularly regarding APRS), and whether these modes permit foreign amateurs to operate a New Zealand-based ham station without the agency's specific permission.

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

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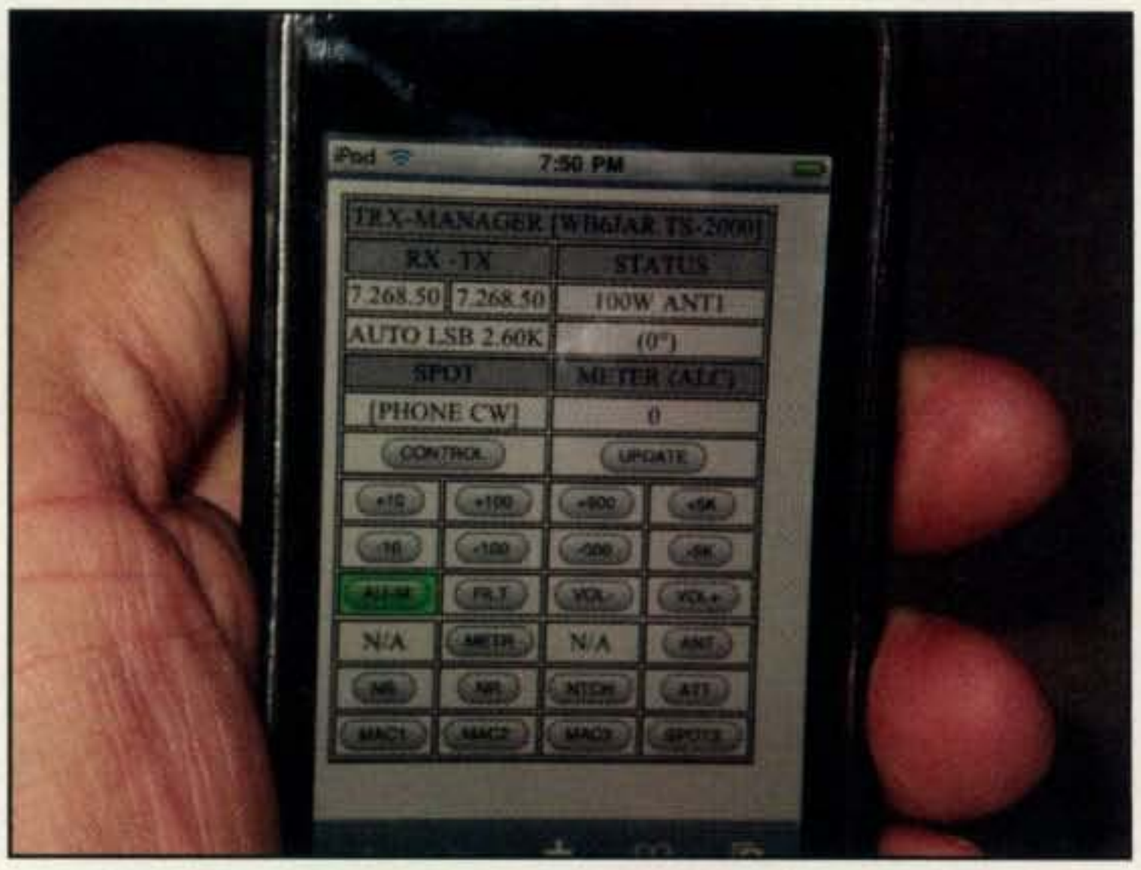
Last year WB6JAR showed us how to remotely control a ham rig with a cell phone and a laptop computer. Now he has it all together for complete remote control and operation with a single smart phone.

Operate Your HF Radio at Home From Anywhere With Your Smart Phone!

BY BILL KEARNS,* WB6JAR

This article is a follow-up to my piece published in the October 2009 issue of *CQ* entitled "Your Next HF Mobile Rig May Be Your Cell Phone." In that article I described how to use an ordinary cell phone to call and to access your HF radio at home (*Please refer to that article for details of how to set up things at the home ham shack end of the circuit.—ed.*). At that time, I was using a laptop to control all the radio functions. I only briefly touched on the smart phone aspect of remote radio control, because at that time there actually was only one application that did this and it was written for the Windows® Mobile platform. I am happy to inform you that this is no longer the case. Read on . . .

Try to imagine using your iPhone, iPod Touch, or almost any smart phone to access and operate your HF radio at your home, *while you are away from home*, just as if you were sitting right there in front of it! Wouldn't this be "the absolute ultimate?" Think of it! You can now carry your complete HF kilowatt home station around in your shirt pocket. Ham radio remote control and access such as this is now possible and it literally brings contesting, DXing, and general rag-chew hamming up to a whole new level.



The author's iPOD Touch smart phone with the TRX-Manager software installed and running . . . and remotely controlling his HF rig at home! (Photos courtesy of the author)

A Little History

Controlling amateur radios with computers has been with us for quite a long time now. It all started with a few simple DOS-based, one-page logging programs and has now grown to several full-featured total station rig-control programs that literally do it all (not excluding the software-defined radios). When the internet came along, remotely operating and controlling your amateur radio station from your computer at the office or from a hotel room while away on business became a viable option for many hams.

The next obvious, logical step is to operate mobile. When I say "operate mobile," I am not referring to vehicle-mounted, 100-watt HF mobile radios feeding large screwdriver antennas. I am really talking about remote-controlled mobile. In other words, literally controlling and operating the amateur radio station at your home while you are away from home and from your mobile! *And now you can do it using only your smart phone!*

Here's an example: Previously while driving my vehicle I had been doing remote radio control and full radio operation with a dash-mounted mini laptop with internet air-card while using my plain-vanilla cell phone for the bi-directional audio. However, I wanted more.

Carrying around the laptop with the air card seemed redundant when I already had full internet access on my Motorola i465 cell phone. Thus, I thought, "Why couldn't I just eliminate the laptop and do everything with my so-called 'smart phone'?" In essence, if this could be achieved, I would have the ultimate wireless mic!

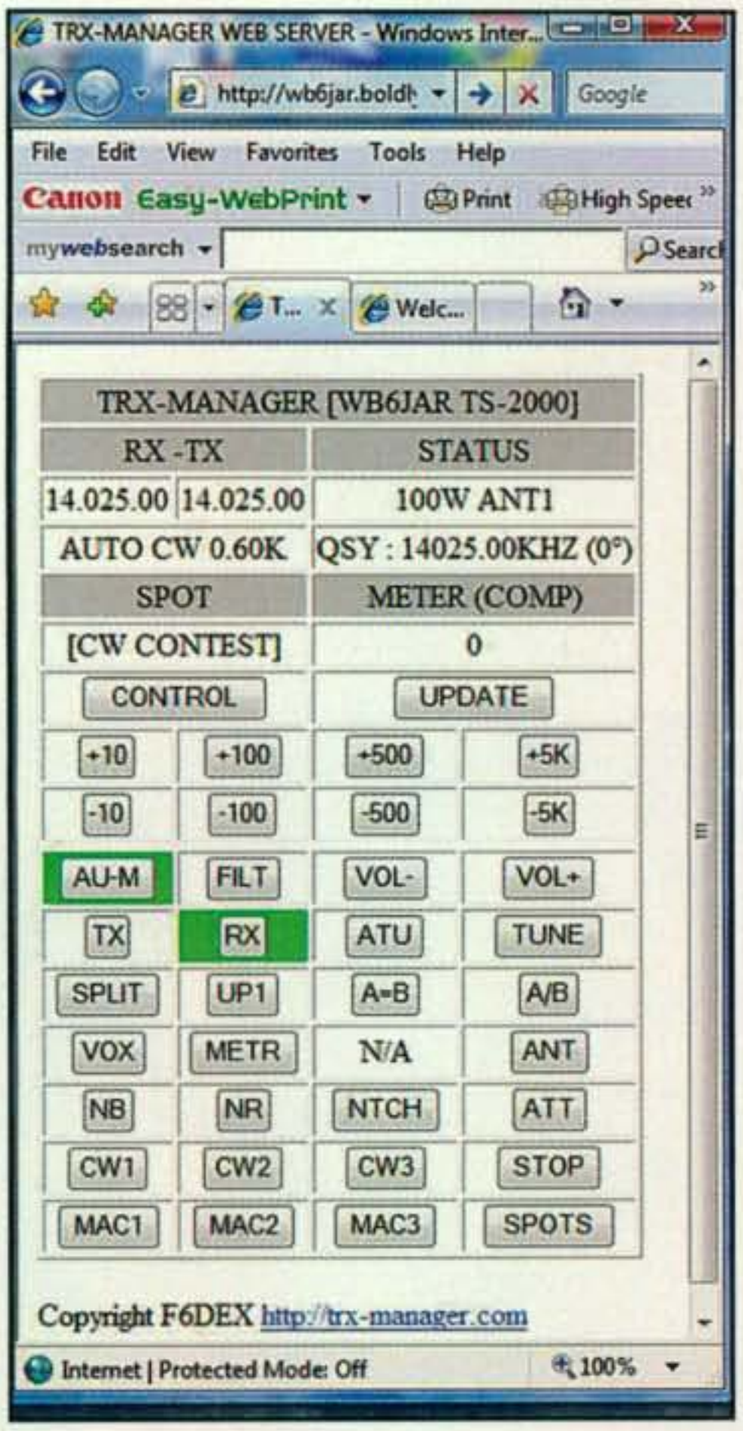
Searching for the Right "App"

Initially, I searched for existing applications, or "apps," that may already do this. I was ready to change phones and carriers if I had to. Any ham radio control apps for the iPhone or Android would have been ideal, but after a thorough investigation I found out they just didn't exist. Besides, I already had the Motorola i465 and I was happy with my unlimited-minutes/low-cost Boost Mobile account. In addition, I really needed the "Direct Connect" feature on my phone for my employer, so I really did not want to change phones and carriers. With smart phones becoming more and more popular, I figured someday, eventually, a programmer would write some

**e-mail: <wb6jar@yahoo.com>*

sort of radio-control program for the smart phone.

The real question was which smart phone? Which operating system or platform would he write for it? Which carrier? There are now a plethora of smart phones on the market, in addition to mine, with at least five or six different operating systems and several carriers. Writing a program that would only work on some smart phones and not all smart phones would not be cool.



Close-up view of the TRX Manager web-server status screen.

It was obvious to me that what was really needed was a program, or "app," that would work on *all* phones, *all* operating systems, and with *all* carriers. It just seemed to be an impossible task with no easy solution. I am not a code writer, but I had this great idea and really nowhere really to go with it.

Finding the Solution

I was about to throw in the towel and give up when I stumbled on the solution to this problem while using my EchoLink "link" station.

Johnathan Taylor, K1RFD (the author of EchoLink), has an EchoLink Web Control page built into the EchoLink program. This web control page can easily be accessed from any computer, anywhere. One of the key features of this web control page is "Send ID Now." The feature keys up the "link" radio and sends out your EchoLink ID string in CW or pre-recorded voice. Neat!

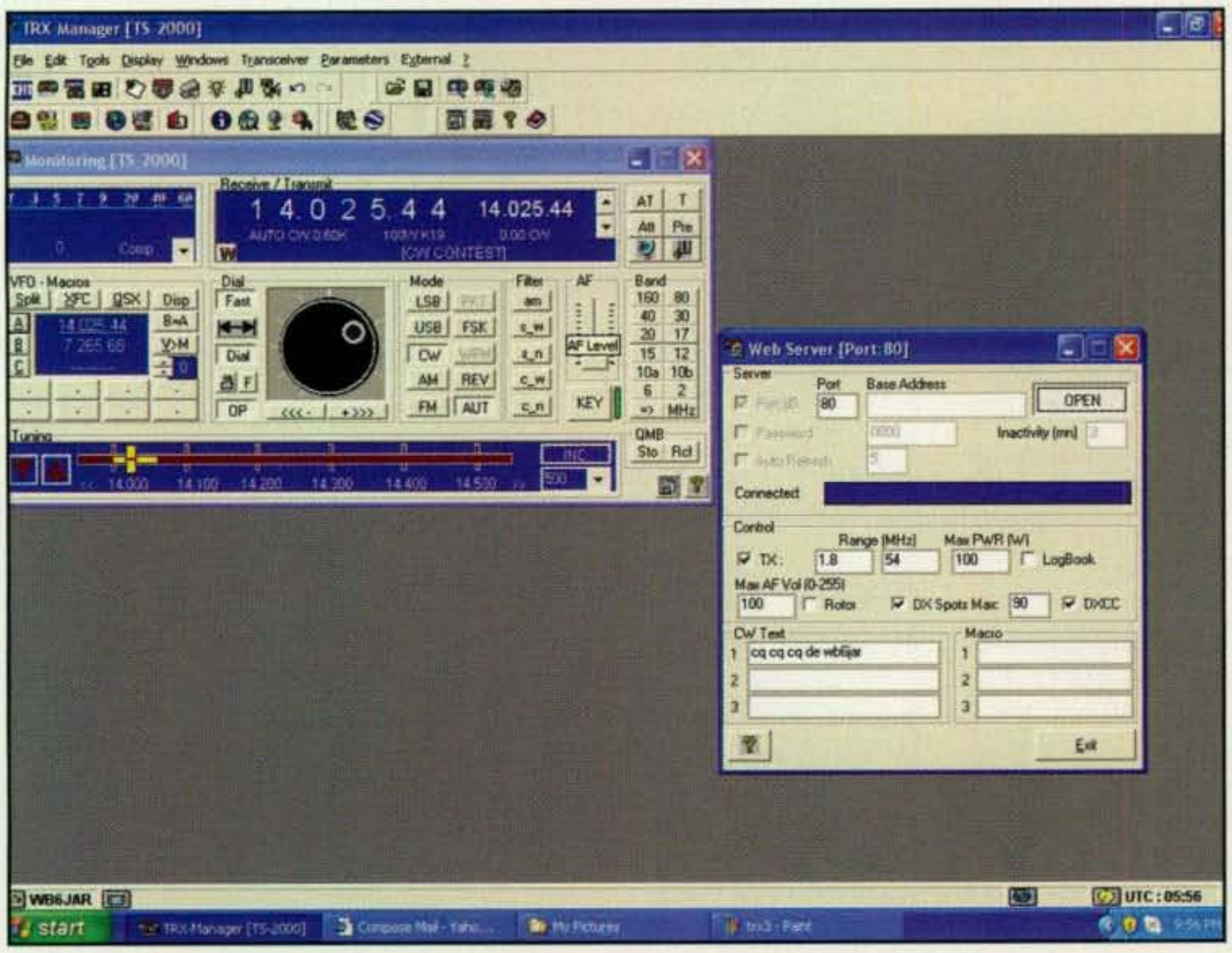
Therefore, I figured, if Jonathan's EchoLink software has a "Web Control Page" that can actually key up my radio on command, my question was, "...could a similar page be written for one of the total station control programs such as maybe TRX-Manager?" If this actually was the case, it means that one software "app" *could* do it all, and do it all with all phones, on all platforms or operating systems, and with all carriers. Apparently, all I had to do was to ask.

Laurent Labourie, F6DEX, the author of TRX-Manager, monitors and often posts on the TRX-Manager Yahoo group where he is easily accessible. Also, he is a very aggressive software author and is continuously striving to improve TRX-Manager. He listens to all suggestions from members of the Yahoo group for input and ideas on improving his software. It took Laurent just a few days from the time I first contacted him about modifying his software until he had released the final working version. I must admit that the result of Laurent's efforts was much more than I expected. The final web server he wrote into TRX-Manager works flawlessly.

With your smart phone linked to the new TRX-Manager Web Server, all frequencies and modes are easily changed. You can also easily compose and send CW macro, and among many other features, you also have access to the DX Cluster®. Any smart phone simply needs to have the ability to bring up a web browser to do all of this. In addition, you can easily program your favorite frequencies into your smart phone by editing and then saving the URL string as a bookmark. (See the TRX-Manager Yahoo group for more info.)

In conclusion, I should add that some newer cars have an "AUX" port on the AM/FM radio. This is the perfect connection for the iPhone, iPod, or other similar devices to make use of the built-in speakers in your car. Another side benefit to this unique mobile setup is that there is absolutely no RFI or other radio installation problems to be dealt with. To fully utilize these new features you must purchase the registered version of TRX-Manager. The TRX-Manager website can be found at: <http://www.trx-manager.com/>.

One final note: At present I am working on using the cell-phone DTMF tones for true push-to-talk as an alternative to totally relying on the radio's VOX feature to key and unkey the radio. To learn more about this, enter my callsign WB6JAR on <www.qrz.com> and then follow the instructions to get to my Facebook page for all the latest updates and improvements for cell-phone hamming.



Virtual control-panel window and setup screen for the link between the smart phone and the remotely-controlled ham rig.

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Results of the 2009 CQ WW DX CW Contest

BY BOB COX,* K3EST

Expanded Results on the Web

Editor's Note: Having more logs than ever before submitted for the CQ WW CW Contest is wonderful, but it does put a squeeze on space. In order to assure that the efforts of all entrants are recognized through the publication of complete line scores, certain other elements of our contest reporting have been moved to the CQ website. Please visit the CQWW DX Contest page (follow the links from <www.cq-amateur-radio.com>) for QRM, expanded top scores listings, and more. And thanks for being part of the world's largest participation sporting event!—*W2VU*

What happens when the sun just won't cooperate? Enter the CQ WW CW contest and help propagation improve. As PA6OI commented: "Great show again! I worked the world with a simple dipole and 40W. Sunspots or no sunspots, as long as the CQ WW is running we can have a lot of fun! Martin, VK7GN, had this to add: "Bands are dead and then the contest comes along and lots of signals! Do we make our own propagation?" Once you listen to the contest, you will be pulled into the fun. VA7HZ said: "Great contest. I started out just wanting to work a few stations but got caught up in the fun. Too bad it's over now; it was a lot of fun." The CQ WW contests are a sure way for new contesters to learn conditions and skills very rapidly. BG4EZU said: "It was my first ham contest and looks like some kind of rehearsal for more. I used my FT-817 with 4.5–5W output, a Buddipole set up at the edge of my balcony, and a retired straight key that used to be military equipment. The score is not exciting, but the experience really was! Finally, Nigel, G3TXF, sums up all our feelings: "Who would ever deliberately miss CQ WW CW, the best CW contest on the planet?"

As has been mentioned before, the CQ WW is a fantastic competition which brings out the best in amateur radio: teamwork, 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. CW is alive and well in contesting. Presented in these results are the efforts of the entrants. Read on to see how you and your friends ended up. Everyone who operated the CQ WW CW in 2009 was a winner.

High Power

Every year there is a great deal of competition to be the number one score in the world in this prestigious category, and 2009 was no different. Valery, RD3AF keyed EF8M to first place. Not far behind was Andy, N2NT, operating from V47NT. Jose, CT1BOH, operating from CR3E, put his considerable skill to work to take third place. Taking first place in the U.S. was Randy, K5ZD. Doug, K1DG, took second place in both the SSB and CW contests. Third place went to Alex, LZ4AX, operating at K3CR. Top honors in Europe again went to Toni, OH2UA, operating from CR2X. Toni has had the top European score for several years running. Second place Europe went to the efforts of Tine, S5ØA operating from the sunny side of the Alps. From Aaland, Tomi, OH6EI, took OHØZ to third place Europe. Other worthy efforts from propagationally challenged areas that should be recognized are W6YI (N6MJ), K6NA, K7GK, KO7AA, VU2PAI, VU2PTT, JF1NHD, JH4UYB, JA7DLE, JT1DA, EY7AF, HSØAC, XV1X, and 9V1YC.

The continental winners were: North America V47NT (N2NT), Africa EF8M (RD3AF), Asia ZC4T (G3AB), Europe CR2X (OH2UA), Oceania KH6ZN (N6TJ), South America P49Y (AE6Y), Japan JH4UYB, U.S. K5ZD/1.

Low Power

The most popular category in the CQ WW is the low power category. It is easy to understand why, as all contesters have a transceiver and an antenna. Winning any low power category is a real accomplishment. Ending up on top is very special. Finishing at the top was Joe, AA3B, operating at V26K. Joe is no stranger to winning. He has been number one in the world many times. Second place in the world went to Niko, S53A, who traveled down to 9J3A. Niko put double multipliers in many logs while watching crocodiles in the river next to his tent. Third place world went to HI3A. Julio makes HI a reliable multiplier in the contest. Here in the U.S. 2008's positions flipped. Ed , N1UR, took away the low power USA trophy while Art, K1BX, took second place. Third place in the U.S. again went to Marvin, N5AW, from Texas. Taking first place on both SSB and CW in Europe was Gedas, LY3BA, operating LY9A. This is quite an accomplishment, Gedas. Congratulations! Repeating his position from 2008, second place in Europe was Petr, OK2WTM, operating the club call OL6P. Third place Europe went to Ricardo, EA1RJ. N6RV, W7YAQ, N7VM, NØHR, KØDEQ, 9J3A, J28OO, V5/DJ4SO, 5NØOCH, RV9CX, BD1TCC, BA8BA, VU2BGS, XU7ACY, EX2A, VK2PN, TX3A, and FO8RZ all had big scores from challenging locations.

The continental winners were: North America V26K (AA3B), Africa 9J3A (S53A), Asia RV9CX, Europe LY9A (LY3BA), Oceania TX3A (HA7RY), South America P4ØW (W2GD), Japan JH8SLS, U.S. N1UR.

Maury, W3EF, finished 4th low power USA.

QRP

The CQ WW offers a contester a very good opportunity to work rare DX which otherwise would prove elusive. The QRP category sharpens your searching skills and the rewards are very satisfactory. You learn to avoid packet pile-ups. You learn to choose the right moment to call someone.

TOP SCORES IN MOST ACTIVE ZONES

Zone 3

W6YI	3,731,904
K7GK	2,397,520
K6NA	2,377,035
K6XX	1,831,500
KO7AA	1,610,631

Zone 4

VC3O	5,246,348
W9RE	4,350,170
N2IC/5	4,157,160
WXØB/5	2,768,790
K8GL	2,387,740

Zone 5

VY2TT	7,021,422
K5ZD/1	6,845,832
K1DG	6,614,634
K3CR	6,103,845
WC1M	3,975,309

Zone 14

CR2X	7,656,880
DL3YM	3,944,016
TM6X	3,663,242
GM7V	2,762,620
PA3AAV	2,643,680

Zone 15

S5ØA	4,874,784
OHØZ	4,097,945
9A5K	3,902,379
OH8X	3,484,635
IU1A	2,611,367

Zone 16

RG3K	2,554,040
RM3F	2,164,862
UA4WKW	2,040,084
UW1G	1,971,132
EV2A	1,832,055

Zone 20

ZC4T	7,051,440
C4W	6,041,604
LZ3FN	3,111,212
YO2DFA	1,699,720
4XØG	1,482,729

Zone 25

JH4UYB	4,589,165
JF1NHD	2,633,708
JA7DLE	2,154,444
JF1PJK	1,799,421
*JH8SLS	1,307,124

*Low Power

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TURNING RADIUS - 10.5ft (3.20m)
FREQUENCY COVERAGE - 13.9Mhz - 54 Mhz
BOOM LENGTH - 11 ft (3.35m)
LONGEST ELEMENT - 19 ft (5.79m)
POWER RATING - 3KW continuous

BAND	ACTIVE ELEMENTS
20m	2
17m	3
15m	3
12m	3
10m	3
6m	3

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Picture is an artistic rendition to show scale and portability of antenna.

You can work a lot of stations with 5 watts or less. Our world winner for 2009 was Didier, FY5FY, operating FY5KE. Second place world went to John, KK9A, operating as P40A. You had to travel to far western Siberia to find the QTH of third place world. It went to Yuri, UA9SP. Long-time QRPer Doug, KR2Q, took fourth place world and repeated as first place U.S. from northern New Jersey. Fifth place world and number one in Europe was Alec, US2IZ. Alec improved on his second-place finish in 2008. Second in Europe and seventh in the world was Steve, G4EDG. Third in Europe and eighth in the world was Antonin, OK7CM. Second place in the U.S. was Bill, N8ET. Third place U.S. went

TROPHY WINNERS AND DONORS

SINGLE OPERATOR
ALL BAND
World
EF8M (Opr.: Valery Komarov, RD3AF)
Donor: K4FW Memorial (Scott Robbins, W4PA)

World Low Power
V26K (Opr: Joseph Trench, AA3B)
Donor: Slovenia Contest Club

World QRPp
FY5KE (Opr.: Didier Birtonneau, FY5FY)
Donor: Gene Walsh, N2AA

World Assisted
4O3A (Opr.: Sergey Rebrov, UT5UDX)
Donor: Robert McGwier, N4HY

USA
Randall Thompson, K5ZD/1
Donor: Frankford Radio Club

USA Low Power
Edward Sawyer, N1UR
Donor: North Coast Contesters

USA QRP
Douglas Zwiebel, KR2Q
Donor: Gene Zimmerman, W3ZZ

USA Assisted
Charles Fulp, K3WW
Donor: John Rodgers, WE3C

USA - Zone 3
James Stevenson, W6YI
Donor: Central Arizona DX Association

USA - Zone 4
Michael Wetzel, W9RE
Donor: The Society of Midwest Contesters

Canada
VY2TT (Opr.: Kenneth Widelitz, K6LA)
Donor: John Sluymer, VE3EJ & Jim Roberts, VE7ZO

Carib./C.A.
V47NT (Opr.: Andrew Blank, N2NT)
Donor: Chuck Shinn, W7MAP

Europe
CR2X (Opr.: Toni Linden, OH2UA)
Donor: W3AU Memorial (Pete Raymond, N4KW)

Europe - Low Power
LY9A (Opr.: Gediminas Lucinskas, LY3BA)
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Scandinavia
OHØZ (Opr.: Tomi Ylinen, OH6EI)
Donor: W3FYS Memorial (Chas Weir, Jr., W6UM)

Russia
Vadim Ovsyannikov, UA9CLB
Donor: Roman Thomas, RZ3AA

Africa
CR3E (Opr,: Jose Carlos Cardoso Nunes, CT1BOH)*
Donor: CQ magazine

Asia
ZC4T (Opr.: Andy Chadwick, G3AB)
Donor: Chuck Shinn, W7MAP

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

Japan - Low Power
Nobuhiro Iwasa, JH8SLS
Donor: Western Washington DX Club

Oceania
KH6ZN (Opr.: James Neiger, N6TJ)
Donor: Chris Tran, ZL1CT

South America
P49Y (Opr.: Andrew Faber, AE6Y)
Donor: Venezuela DX Club

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

World - 21 MHz
PT5A (Opr.: Oliver Sweningsen, III, W6NV)
Donor: Lew Sayre, W7EW

World - 14 MHz
CW5W (Opr.: Jorge Diez Furest, CX6VM)
Donor: W2JT Memorial (North Jersey DX Assn.)

World - 7 MHz
CN3A (Opr.: Stefano Brioschi, IK2QEI)
Donor: Alex M. Kasevich, W1CDC

World - 3.5 MHz
Mauri Leppala, EA8CMX
Donor: Fred Capossela, K6SSS

World - 1.8 MHz
Nodir Tursoon-Zadeh, EY8MM
Donor: Kenneth Byers, Jr., K4TEA

USA - 28 MHz
Emil Pocock, W3EP/1
Donor: Wireless Institute of the Northeast

USA - 21 MHz
Steve Jarrett, K4FJ
Donor: CQ magazine

USA - 14 MHz
Michael Zak, W1MU
Donor: Northern Illinois DX Association

USA - 7 MHz
Brian Edward, N2MF
Donor: W6AM Memorial (Jan Perkins, N6AW)

USA - 3.5 MHz
Patrick Sonnier, W5WMU/1
Donor: Bill Feidt, NG3K

USA - 1.8 MHz
Robret March, N7UA
Donor: Jeff Briggs, K1ZM

Canada (14 MHz)
VE6JY (Opr.: Gary Caldwell, VA7RR)
Donor: John Sluymer, VE3EJ

Carib./C.A.(21 MHz)
TI5N (Opr.: Phil Krichbaum, NØKE)
Donor: CQ Magazine

Europe - 28 MHz
Jorma Saloranta,OH2KI
Donor: Jay Pryor, K4OGG

Europe - 21 MHz
YT5W (Opr.: Milan Strahinovic,YU8A)
Donor: Robert Naumann, W5OV

Europe - 14 MHz
CR6T (Opr.: Timo Klimoff, OH1NOA)
Donor: G3FXB Memorial (Maud Slater)

Europe - 7 MHz
CT1JLZ (Opr.: Jiri Pesta, OK1RF)
Donor: Ivo Pezer, 9A3A

Europe - 3.5 MHz
Matija Brodnik, S53MM
Donor: K3VW Memorial (Frankford Radio Club)

Europe - 1.8 MHz
Vojislav Kapun, YT3A
Donor: Pat Barkey, N9RV & Terry Zivney, N4TZ

Japan - 21 MHz
Akito Nagi, JA5DQH
Donor: CQ Magazine

Japan - 14 MHz*
Syuichi Sata, JA7FTR
Donor: Chris Terkla, N1XS

Asia – 21 MHz
Streve Hodgson, ZC4LI
Donor: Coconut Wireless Contest Club

Asia – 14 MHz
Akira Asai, JA8RWU
Donor: CQ Magaizne

MULTI-OPERATOR, SINGLE TRANSMITTER
World
P33W (Oprs.: RV1AW, RU4HP, RN4WA, RW4WR, RA3AUU)
Donor: Anthony Susen, W3AOH

U.S.A.
KT3Y/4 (Oprs.: KT3Y, K3EST, N2AA)
Donor: Douglas Zwiebel, KR2Q

Canada
VE3EJ (Oprs.: VE3EJ, VE3JM, VE3OI, VE3TA)
Donor: Eastern Canadian DX Assn.

Carib./C.A.
YS4U (Oprs.: DF7OGO, K3WT, NØAT, NØSTL, WØOR)
Donor: Kansas City DX Club

Africa
3V3S (Oprs.: 3V8SS, DF1LON, DJ7IK, DJ9CB, DL9USA)
Donor: Harry Booklan, RA3AUU

Asia
A73A (Oprs.: A71BX, K5GN)*
Donor: Steve Merchant, K6AW

Europe
OM8A (Oprs.: OM2VL, OM3BH, OM3GI, OM3RM, OM5KM, OM6AZ, OM7JG)
Donor: Bob Cox, K3EST

Japan
JAØQNJ (Oprs.: JAØQNJ, JHØUSD)
Donor: Madison Jones, W5MJ

Oceania - Pacific Rim
AH2R (Oprs.: JI3ERV, JR7OMD, JK3GAD, JE8KKX)
Donor: Junichi Tanaka, JH4RHF

South America
PJ4A (Oprs.: K4BAI, W4OC, PJ4LS)
Donor: Araucaria DX Group

MULTI-OPERATOR, TWO-TRANSMITTER
World
CR3L (Oprs.: DJ2YA, DJ6QT, DL1CW, DL2CC, DL5AXX, SV1RP)
Donor: Array Solutions

USA
WE3C (Oprs.: WE3C, W3FV, KQ3F, NN3Q, W8FJ, K3TUF)
Donor: Eric Scace, K3NA

Europe
OL4A (Oprs.: OK1RI, OM2TW, OK1FFU, OM5AW, OM6NM)
Donor: Aki Nagi, JA5DQH

MULTI-OPERATOR, MULTI-TRANSMITTER
World
HC8GR (Oprs.: HC8GR, W2VJN, W6NL, N3RD, W6RGG, N6GQ, K2SX, K6BL, N5KO)
Donor: K2GL Memorial (Doug Zwiebel, KR2Q)

USA
KC1XX (Oprs.: KC1XX, JA1BJI, K1GQ, K1QX, K1TR, KA1R, KM3T, N1KWF, W1FV, W2RQ, WA1Z)
Donor: N6RJ Memorial (Bob Ferrero, W6RJ)

Europe
DR1A (Oprs.: DB6JG, DF6JC, DJ6ET, DJ7EG, DK1BT, DK6WL, DL1DVE, DL1MGB, DL2HBX, DL4WG, DL5CW, DL6FBL, DL6LAU, DL8DYL, DL8WPX, DL9DRA, PC5A)
Donor: Finnish Amateur Radio League

Japan
JA3YBK (Oprs.: JG3KIV, JG3MRT, JG3WDN, JP3PZD, JF4FUF, JF4ETK, JH4NMT, JR4ISF, JS1PWV)
Donor: Masahiro Kitagawa, JH3PRR

WORLD – MULTI-MULTI SSB/CW COMBINED
K3LR (Operators)
36,999,947
Donor: WØID Alpha Award

USA - MULTI-MULTI SSB/CW COMBINED*
KC1XX (Operators)
34,243,296
Donor: N8SM Memorial (Operators of K3LR)

CONTEST EXPEDITIONS
World Single Operator
TX3A (Opr: Tamas Pekarik, HA7RY)
Donor: Friends of Phil Goetz, N6ZZ

World Multi-Op
VK9XW (Oprs.: DL2RMC, DL2JRM)
Donor: Carl Cook, AI6V

SPECIAL - SINGLE OPERATOR AWARD
World SSB/CW Combined
CN2R (Opr.: James Sullivan, W7EJ)
Donor: Hrane Milosevic, YT1AD

CLUB
World SSB/CW
Frankford Radio Club
271,685,415
Donor: W1WY Memorial (CQ magazine)

Non-USA SSB/CW
Bavarian Contest Club
241,524,006
Donor: N6AUV Memorial
(Northern California Contest Club)

** Second Place*

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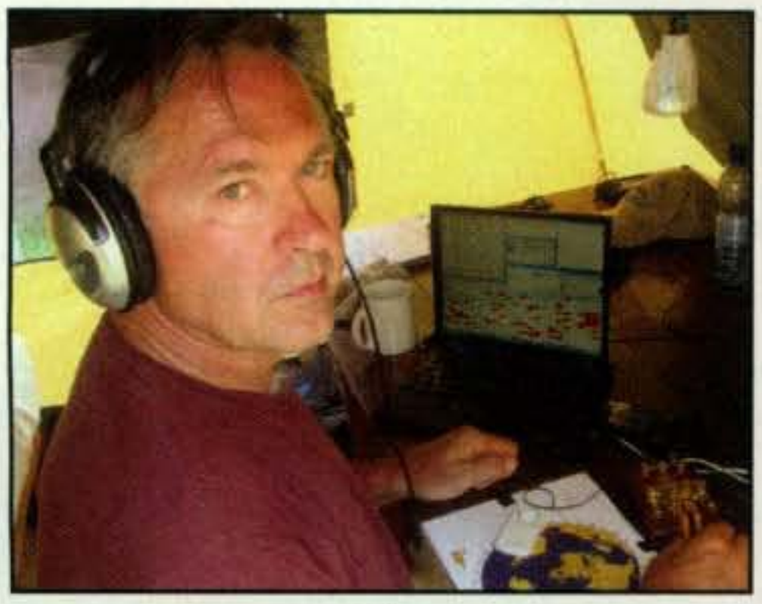
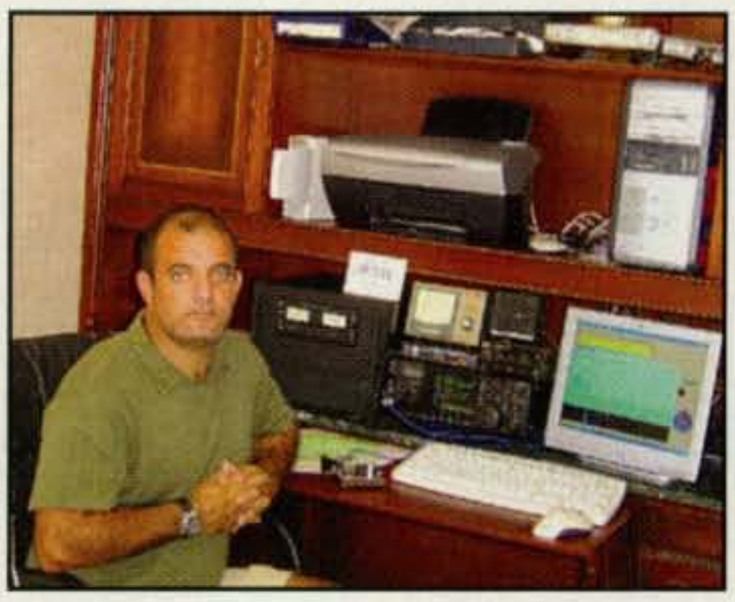


Niko, S53A, operated 9J3A.



Jorge, HK1KYR, worked low power 21 MHz.

Andy, DL3YM 4th Europe all band

to Tom, N1TM. Once again special mention must be made of the fine score of Izuno-san, JR4DAH, #13 in the world and #2 in Asia. RW9RN, UA9QA, JE1RZR, VK5MAV, W6JTI, W8QZA/Ø, N7IR, RV9AZ, W6AQ, RK9DO, W9IP, and JA1KEB are to be congratulated for their outstanding efforts.

The continental winners were: North America KR2Q, Africa EA8IK, Asia UA9SP, Europe US2IZ, Oceania VK5MAV, South America FY5KE (FY5FY), Japan JR4DAH, U.S. KR2Q.

Assisted

The use of any QSO spotting tool (Skimmer, any DX spotting help) places you in the assisted category. The world top assisted place went to Sergey, UT5UDX, operating from 4O3A. Second place world and number one in North America was K6AM operating from ZF2AM. Third place world and number one South America was LU5DX, putting LP1H in a lot of logs. Second place in Europe went to Emir, TK5EP. Third place Europe was taken by Boyan, LZ2BE, operating at LZ8E. First place in the U.S. was taken by someone who knows the assisted category very well: Charles, K3WW, took top honors. Sig keyed N3RS to second place in the U.S. To round out the top spots in the U.S., Ray, W2RE, took third place from the Hudson Valley of New York. The strong efforts of C91LW, IG9X, YM3A, BA1RB, 4L8A, 4X2M, 4Z4LA, 3W1M, XV2MDY, 9K2HN, UP4L, E21EIC, KG6DX, ZL1BYZ, PZ5X, and ZL1AZE, who gave nice multipliers to many contesters.

The continental winners were: North America ZF2AM, Africa C91LW (UY5LW), Asia RG9A (UA9AM), Europe 4O3A (UT5UDX), Oceania KG6DX, South America LP1H (LU5DX), Japan JS6RGY, U.S. K3WW.

Multi-Single

The muti-single category attracts a lot of interest—especially, the CQ WW MS, which allows the use of a skilled operator on a second band to work only multipliers. A really competitive MS is an excellent run operator plus a multiplier expert. Atop of the world standings was the effort of P33W manned by a fine Russian team.

TOP SCORES

WORLD
SINGLE OPERATOR
HIGH POWER
All Band

EF8M	11,142,327
V47NT	10,552,524
CR3E	10,363,860
8P5A	8,793,603
CN2R	8,678,109

28 MHz

LU1HF	226,730
YM2W	31,651
VK4KW	26,195

21 MHz

PT5A	1,723,680
ST2AR	1,397,200
3G3V	1,256,250

14 MHz

CW5W	1,409,628
P49V	1,071,140
CR6T	1,022,281

7 MHz

CN3A	2,156,652
4XØG	1,482,729
UPØL	1,400,672

3.5 MHz

EA8CMX	1,052,250
VY2ZM	844,146
4Z5J	746,994

1.8 MHz

EY8MM	341,202
YT3A	252,252
OHØV	190,365

LOW POWER
All Band

V26K	6,330,944
9J3A	5,436,816
HI3A	5,409,850
P4ØW	5,069,240
V31CW	4,103,896

28 MHz

LU5WW	117,162
PU2MTS	40,572
HK3CQ	37,600

21 MHz

CX9AU	584,441
YV1FM	478,500
LU3FID	406,575

14 MHz

UK9AA	555,520
9G5XA	418,482
HK3TU	403,380

7 MHz

EA7RM	402,230
PY1DX	385,696
LZ9R	312,420

3.5 MHz

4L2M	179,799
WP3C	156,420
YL3FX	146,490

1.8 MHz

HA8MT	102,432
YT1AD	77,900
HG8K	69,760

QRP
All Band

FY5KE	3,264,345
P4ØA	2,888,775
UA9SP	785,781
KR2Q	754,560
US2IZ	728,625

ASSISTED
All Band

4O3A	7,183,120
ZF2AM	6,987,057
LP1H	6,427,204
K3WW	5,495,166
RG 9A	5,231,569

MULTI-OPERATOR
SINGLE TRANSMITTER

P33W	17,506,412
PJ4A	12,903,562
A73A	10,329,216
VE3EJ	9,952,976
OM8A	9,634,380

MULTI-OPERATOR
TWO TRANSMITTER

CR3L	18,256,248
6Y1V	17,192,104
ZY7C	16,742,385
PJ2T	16,075,368
C4I	14,693,712

MULTI-OPERATOR
MULTI-TRANSMITTER

HC8GR	34,307,742
EA8URL	18,358,912
KC1XX	17,757,558
K3LR	17,488,408
W3LPL	17,328,545

UNITED STATES
SINGLE OPERATOR
HIGH POWER
All Band

K5ZD/1	6,845,832
K1DG	6,614,634
K3CR	6,103,845
W9RE	4,350,170
N2IC/5	4,157,160

28 MHz

W3EP/1	7,176
W2RR	3,584
W6SZN	988

21 MHz

K4FJ	224,910
W9XT	137,391
W6YA	110,896

14 MHz

W1MU	738,474
W6YX	591,056
K1IM	232,740

7 MHz

N2MF	632,277
W7WA	529,851
N3RR	421,652

3.5 MHz

W5WMU/1	140,920
K5NU	109,250
K6OY	72,865

1.8 MHz

N7UA	122,100
K4PI	53,053
WF2W	38,637

LOW POWER
All Band

N1UR	2,605,372
K1BX	2,252,322
N5AW	1,930,320
W3EF	1,773,006
N8AA	1,762,512

28 MHz

K4WI	8,316

21 MHz

N1NK	80,976
WB4TDH	79,739
K8AJS	76,705

14 MHz

W2AW	281,400
K4NO	260,626
N5ER	183,714

7 MHz

W2EG	139,008
NA8V	134,232
N3UA/4	75,194

3.5 MHz

K3TW	35,588
K9GS	23,828
NS3T	22,644

1.8 MHz

N7DF/5	6,768
NA4W	4,494
W7RH	3,404

QRP
All Band

KR2Q	754,560
N8ET	432,537
N1TM	375,255
K4LY	360,525
K4LTA	332,488

ASSISTED
All Band

K3WW	5,495,166
N3RS	4,381,650
W2RE	4,103,047
K2K	3,901,280
N3AD	3,744,480

MULTI-OPERATOR
SINGLE TRANSMITTER

KT3Y/4	6,200,920
K9RS/3	6,153,996
K8AZ	5,891,928
W3BGN	5,669,144
W3UA/1	5,657,499

MULTI-OPERATOR
TWO TRANSMITTER

WE3C	13,859,374
NY4A	9,366,320
K1AR	8,809,122
NZ1U	7,141,026
K1RX	6,914,644

MULTI-OPERATOR
MULTI-TRANSMITTER

KC1XX	17,757,558
K3LR	17,488,408
W3LPL	17,328,545
K1LZ	15,645,202
NQ4I	12,922,640

EUROPE
SINGLE OPERATOR
HIGH POWER
All Band

CR2X	7,656,880
S5ØA	4,874,784
OHØZ	4,097,945
DL3YM	3,944,016
9A5K	3,902,379

28 MHz

ZB2X	25,323
YU2A	10,388
LZ1NG	6,320

21 MHz

YT5W	303,364
YU1KX	270,544
G3PJT	194,832

14 MHz

CR6T	1,022,281
E73W	699,354
YT8A	637,875

7 MHz

CT1JLZ	1,253,020
LY8O	1,014,475
OH2BH	901,392

3.5 MHz

S53MM	554,268
E71A	522,732
YL3FT	378,432

1.8 MHz

YT3A	252,252
OHØV	190,365
DJØMDR	189,210

LOW POWER
All Band

LY9A	1,808,224
OL6P	1,648,962
EA1RJ	1,480,916
EA6UP	1,375,570
9H3HH	1,367,274

28 MHz

9A3VM	6,993
YO2AOB	3,486
9A5ST	3,234

21 MHz

YT2B	160,416
OK2HZ	57,116
OK2HBY	56,805

14 MHz

MD6V	398,706
PA7F	331,704
HG4F	282,510

7 MHz

EA7RM	402,230
LZ9R	312,420
SP6OJE	284,438

3.5 MHz

YL3FX	146,490
OK1CRM	135,892
YL5W	115,599

1.8 MHz

HA8MT	102,432
YT1AD	77,900
HG8K	69,760

QRP
All Band

US2IZ	728,625
OK7CM	630,960
G4EDG	630,758
HG6V	526,932
UR5LAM	456,165

ASSISTED
All Band

4O3A	7,183,120
TK5EP	5,181,772
LZ8E	4,936,755
ES5TV	4,629,878
YU1LA	4,446,889

MULTI-OPERATOR
SINGLE TRANSMITTER

OM8A	9,634,380
OM7M	9,206,716
RU1A	9,158,520
TM6M	9,129,411
IR4M	8,855,544

MULTI-OPERATOR
TWO TRANSMITTER

OL4A	12,023,792
IR4X	11,281,193
9A7A	9,966,119
HG1S	7,685,265
HB9CA	7,428,730

MULTI-OPERATOR
MULTI-TRANSMITTER

DR1A	15,740,928
LX7I	14,234,072
DFØHQ	13,910,292
EE2W	12,301,761
LZ9W	11,325,240

WORLD CLASS PRODUCTS

THE NEW 10-30LP12 LOG PERIODIC

The 10-30LP12 removes the concern many share regarding the complexity and cost of other multiband antennas. This Higher Performance log periodic covers every frequency..instantly, from 10 to 30 MHz ! Just one feedline is all you need to access this flawless feature. From moments after it was installed at the M2 test facility on the West Coast, U.S.A., stations in Europe were contacted using just 100W on 17M, 15M and yes, 12M. This antenna is definitely a band opener.

M2 has done everything possible to keep cost down and performance up. This standard version is built for 80 plus MPH winds and years of no maintenance, trouble free performance. For those who don't need 30M, we designed it without the rear element and boom section. It becomes the 13-30LP11 with the same specifications, less 30M on a 37 ft. boom. An optional kit will add the boom and rear element if you need the full coverage.

THE NEW 6M-1000 SOLID STATE AMP

The 6M-1000 represents the culmination of many years of solid state amplifiers designed by Ken Holladay, K6HCP (KLM, Mirage and RF Concepts). Physical size and weight are the smallest ever for this kW amp. When combined with a lightweight switching power supply at 7-10 lbs, the 6M-1000 is perfect for DXpeditions and field day operations. It will make a great addition to any home station as well. EME and Meteor scatter usage are capable with either CW or the very popular JT6M & JT65A. Full power output of 1 kW for 50 seconds using JT65A should be possible for hours. Two temperature controlled whisper fans cool the finned heat sink and will cycle on and off as needed. If external preamp and relays are used, the amp supplies 12VDC and also sequences a N.O. key line.

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Guido, HC8GR, hosted the winning multi-multi team.

2008's winner, PJ4A, took second place award. Taking third place world was the team of A73A. This was a remarkable accomplishment from Qatar. Very nice job! Multi-single is very competitive especially within Europe. Taking the top European honors was OM8A. Finishing second was RU1A. Third place went to another Slovakian team, OM7M. Making their first appearance at the top of the leader board in the U.S. was the team using all wire antennas, KT3Y/4. Phil's team took advantage of 40 and 20 meters to edge out the second-place finish of K9RS/3. Third place went to Tom's team, K8AZ. N7DD edged out W7VJ for top honors from west of the Mississippi river. Outstanding performances were turned in by many teams. A few of the calls appearing in many logs were: 3V3S, YS4U, B5A, VR2C, VU2RMS, JAØQNJ, UO1P, A73A, OY6A, 4U1ITU, TF4X, T7ØA, AH2R, YE1C, AHØ/AH2Y, A31A, and PJ4A.

The continental winners were: North America VE3EJ, Africa 3V3S, Asia P33W, Europe OM8A, Oceania AH2R, South America PJ4A, Japan JAØQNJ, U.S. KT3Y/4.

Multi-Two

The multi-two category needs two stations manned nearly all the time, and stations have to move skillfully as the propagation changes. Taking advantage of their location to find band openings to the U.S. and Europe, the multi-national team of CR3L ran away with world top honors. Taking second place in the world was the Voodoo contesters at 9L5A. Third place went to 6Y1V. First place in Europe went to long-time top finisher OL4A. Second place in Europe went to IR4X. Their signal sure was booming into the states. Reprising their finish on SSB, third place in Europe went to 9A7A. Repeating their win on SSB, WE3C's station in eastern Pennsylvania took the top U.S. honors. Second place went to NY4A. Third place in the U.S. went to K1AR operating from K1EA's QTH. In Japan the teams of JA6ZPR and JA1ZGP really had a good competition. Several stations put rare multipliers on the air and made big scores. When great operators activate tough places, they make contacts easy: 9L5A gave a lot of people a double multiplier, while B7M, C4I, HLØMBC, VK6AA, ZM1A, and ZM4T all added to the fun.

The continental winners were: North America 6Y1V, Africa CR3L, Asia C4I, Europe OL4A, Oceania VK6AA, South America ZY7C, Japan JA6ZPR, U.S. WE3C.

Multi-Multi

Going into the multi-multi category is a real challenge. Months of planning the station site, gathering operators together, and waiting to see what nature deals you make for a combination of satisfaction and excitement. Operating from just below the equator on the side of an extinct volcano, the number one score in the world was HC8GR. The world second high score was the EA8URL team. Third place in the world and repeating as the number one U.S. score was team KC1XX. Not far behind, K3LR took second place in the U.S. Third place went to Frank, W3LPL's fine team from central Maryland. From farther west, NR5M, K5GO, KØRF, and WØAIH/9 did fantastic jobs. The European crown was taken away by DR1A. Second place went to LX7I. Third place in Europe went to DFØHQ. Finishing number one in Japan was the Nara team of JA3YBK, just edging out JA5FDJ. Putting together a multi-multi from an interesting QTH is tough. The following stations ended up in a lot of logs: B7P and VK9XW.

The continental winners were: North America KC1XX, Africa EA8URL, Asia JA3YBK, Europe DR1A, Oceania VK9XW, South America HC8GR, Japan JA3YBK, U.S. KC1XX.

Team Contesting

A lot of planning goes into the top teams to make potentially make the top scores. Teams can be formed with members from anywhere in the world. You can submit your team list to <teams@cqww.com>. For 2009 CW, top honors went to team Neiger's Tigers, followed by Code Sharks and Contest Group du Quebec – 1. Great job! The results of team contesting are as follows:

1. Neiger's Tigers: 4LØA (N6AA), P4ØW (W2GD), KH6ZN (N6TJ), V47NT (N2NT), CR3E (CT1BOH): 37,229,591

2. Code Sharks: K5ZD/1, ZS4TX, V26K (AA3B), PZ5X (K5UN), P49Y (AE6Y): 32,362,380

3. Contest Group du Quebec – 1: VA2WDQ, VE2XAA, VE2EZD, VA2EW, VE2IM: 12,039,749

4. Florida Contest Group #1: HI3A, K1TO, N2NL, N6AR: 11, 931,593

5. Carolina DX Association: ISØ/K7QB, N2TU, N4ZC, W3GQ, W3OA: 9,281,847

6. KTU RC: LY3B, LY4T, LY5R, LY6A, LY9A: 8,653,165

7. Maritime Contest Club #1: VE1OP, VE1RGB, VA1MM, VY2SS, VE1DT: 5,950,088

8. Brazilian Friends Contest Team: PY1DX, PY1NB, PP5BZ, PY2SEX: 5,370,318

9. DXXE full calories: XE2WWW, XE2S, XE2GG, XE1EE, XE1MM: 4,714,770

10. Florida Contest Group #2: K2EK, K5RQ, N4UU, WK2G: 3,834,850

11. MONTeam: EA2LU, EA2BVV, EA4ZK, AN4A (EA4CWN), EA2IF: 3,675,387.

12. Florida Contest Group #3: KE1F, NA4CW, W4QM: 2,074,072

13. Florida Contest Group #5: KN4Y, N4BP, N4DXI: 2,016,106

14. PA Team: PA3GVI, PA4B, PA8F, PD2JAM, PE1MPA: 1,055,727

15. Florida Contest Group #6: K4PB, W4LT, WC4E: 979,937

16. Florida Contest Group #4: K8NZ, N4EK, N4WO, W4YA, WB4TDH: 818,071

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
EF8M	163/10/39	994/21/71	2464/31/98	1687/31/93	1935/24/83	36/9/19
V47NT	235/13/44	622/19/73	2267/31/107	2421/34/112	1676/27/103	81/11/15
CR3E	461/15/63	886/22/79	1822/30/86	1829/31/100	1399/30/92	7/4/7
8P5A	445/16/57	695/23/75	1720/30/101	2063/28/94	1533/28/89	144/11/15
CN2R	710/18/66	916/23/86	1474/29/85	1233/28/93	1084/29/77	33/8/19

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
K5ZD/1	94/15/45	479/21/88	1215/31/114	1444/33/117	696/23/99	29/9/17
K1DG	159/18/67	709/21/84	982/33/113	1504/32/112	483/23/101	14/7/8
K3CR	94/19/50	456/24/83	885/32/118	1406/35/113	631/26/101	33/10/16
W9RE	78/15/40	281/22/69	1107/35/105	1015/33/105	491/25/86	28/8/14
N2IC/5	49/18/26	221/26/66	901/35/106	1119/37/123	285/29/84	59/13/25

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

P33W	421/20/79	1365/33/114	2619/38/139	2223/39/133	1458/34/125	34/7/30
PJ4A	193/13/44	609/20/86	2047/35/133	1614/38/125	1591/33/123	353/18/38
A73A	76/13/47	507/25/90	2189/39/141	1303/36/133	1281/35/126	53/14/28

USA MULTI-OPERATOR SINGLE TRANSMITTER

KT3Y/4	49/16/43	213/25/96	1453/36/135	1506/36/132	126/26/108	17/10/17
K9RS/3	74/17/54	244/24/93	1014/35/135	1489/35/130	383/29/109	26/14/24
K8AZ	86/18/57	389/27/101	915/35/131	1524/37/133	157/29/102	31/14/30

WORLD MULTI-OPERATOR TWO TRANSMITTER

CR3L	495/14/61	1399/25/107	3929/35/124	2849/40/137	2247/34/112	27/11/20
9L5A	74/11/45	971/25/85	2051/33/100	3154/39/131	2780/34/126	229/15/37
6Y1V	508/19/70	1198/25/89	3013/39/128	3059/37/134	2057/33/116	243/13/21

USA MULTI-OPERATOR TWO TRANSMITTER

WE3C	138/20/72	679/31/111	2153/39/151	2016/37/149	1105/31/124	57/16/37
NY4A	54/16/43	676/24/101	1875/37/132	1299/36/135	974/31/125	49/11/19
K1AR	89/16/52	433/26/96	1533/35/130	1652/39/140	678/30/119	38/15/24

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

HC8GR	1160/26/87	1661/29/110	3296/36/133	3480/37/142	3130/39/137	1285/23/55
EA8URL	307/12/56	1133/24/103	2803/34/131	2429/37/133	1794/35/118	140/19/46
KC1XX	356/22/79	1343/32/121	2256/39/153	2324/39/153	1094/34/136	231/19/52

USA MULTI-OPERATOR MULTI-TRANSMITTER

KC1XX	356/22/79	1343/32/121	2256/39/153	2324/39/153	1094/34/136	231/19/52
K3LR	367/22/83	1224/34/124	2158/39/156	2446/39/160	1246/32/133	192/18/49
W3LPL	390/22/83	1322/32/120	1961/38/145	2501/39/156	1322/36/141	121/18/41

17. DXXE low calories 1: XE1R, XE1CT, XE1AY, LU8ADX, XE3RR: 575,932

18. Florida Contest Group #7: N4LZ, W4CU, W4ZW: 337,807

19. Maritime Contest Club #2: VE1JF, VE1ZA, VY2LI, VE1AL: 340,802

20. Contest Group du Quebec – 2: VE2DWA, VE2FK, VE2QV (VE2FFE): 236,281

21. DXXE low calories 2: XE2AU, XE2AI, XE2AUD: 104,334

22. EA5URV (Radio Club de Valencia): EA5ABH, EA5AIO, EA5HFW, EA5HKS, EA5LA: 61,997

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
CR2X	395/16/59	677/24/87	1589/31/101	1733/34/109	1791/32/102	33/10/11
S5ØA	155/15/57	812/28/85	1468/38/123	1239/31/101	318/34/83	15/9/14
OHØZ	518/11/49	1535/28/99	1453/34/101	968/31/87	218/28/74	32/6/17
DL3YM	336/13/53	566/20/68	1179/33/111	1192/33/98	326/29/77	14/3/11
9A5K	97/4/36	892/18/74	1181/33/100	1210/34/106	422/32/89	34/7/26

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

OM8A	486/24/90	1147/34/127	2083/39/137	1588/39/141	420/37/134	86/13/55
OM7M	412/26/93	1117/34/116	1944/40/154	1302/39/137	645/35/136	87/11/53
RU1A	303/25/84	1721/36/137	1620/40/155	1808/39/141	183/32/120	41/5/26

EUROPE MULTI-OPERATOR TWO TRANSMITTER

OL4A	920/26/91	1480/34/117	2570/38/136	1711/38/138	813/35/135	55/11/49
IR4X	565/22/79	1713/33/125	2189/40/151	1483/37/130	1053/36/128	78/14/52
9A7A	450/18/69	1474/31/107	2099/40/148	1624/38/139	750/37/138	73/11/45

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

DR1A	1357/23/83	2235/33/128	2892/40/159	2057/40/156	1044/37/135	166/12/50
LX7I	1521/22/81	2259/30/102	3144/37/132	2337/39/133	951/35/119	221/13/53
DFØHQ	1217/22/78	2380/35/128	3021/40/162	1766/39/151	710/35/128	255/14/59

Clubs

Many contesters belong to a club. The collective experience within a club has helped many contesters install equipment and learn how to increase their operating skills. You can help your club's final score by getting on the air and joining in the fun. This year the world top score went to the dedicated operators from the Frankford Radio Club (148 entries). They were followed closely by the Yankee Clipper Contest Club (228). Third place world and first place in Europe was the Bavarian Contest Club (263). Second place in Europe went to the Rhein-Ruhr DX Association (201).

Records

The records are maintained on the <cqww.com> website. Take a look at the record list. You may find one you can try to beat. Each country, continent, and zone has its own set of records. We ask you help in detecting errors within the records. If you discover an error, please document it and let us know at <questions@cqww.com>. The following stations used their skill to obtain new CW records. Congratulations! **World:** 7 CN3A (IK2QEI); A7 YM3A (LZ1NK). **U.S.** No Records. **North America:** No Records. **Africa**: 7 CN3A (IK2QEI); A21 IG9X (IK1QBT). **Asia**: A14 4L8A; A7 YM3A (LZ1NK); A3.5 9K2HN; A1.8 RA9FW. **Japan:** Q7 JA6GCE; A14 JH3AIU; A7 JS3CTQ. **Europe**: 7 CT1JLZ. **Oceania**: A21 ZL1BYZ; M2 VK6AA. **South America**: L3.5 HK1AA; A3.5 PV8DX.

Special Mention

If you want to work rare and interesting places over a weekend, the CQ WW is famous for many DXpeditions. This year why not plan a trip to an exotic QTH? You will be surprised how much fun you will have when you become the chased. Some of the DXpeditions that made the CQ WW CW more interesting for all of us were: V26K, 8P5A, 8P9SS, V31CW, VP2V/DL7VOG, TE1W, J79WE, J37T, J39BS, TO4D, HQ9R, TO5T, YN2GY, V47NT, VQ5V, VP5CM, IG9W, A25NW, EF8M, EA8/OH6L, EA9/OL8R, J28OO, SU9HP, 9G5XA, 5Z4/DL8NBE, 5R8ZO, CR3E, CN2R, CN3A, V5/DJ4SO, 6W1RW, 5H3EE, ST2AR, 9J3A, 5B/HA5PP, 4LØA, VR2EH, 4XØG, 4X/SM8A, BW3/DJ3KR, HSØAC, YM2W, ZC4T, 9M2CNC, OHØZ, OHØX, OHØV, OE9R, CR2X,

SSB & CW COMBINED CLUB SCORES

US Club Scores

FRANKFORD RADIO CLUB	271,685,415
YANKEE CLIPPER CONTEST CLUB	270,861,472
POTOMAC VALLEY RADIO CLUB	146,916,763
NORTHERN CALIFORNIA CONTEST CLUB	105,320,200
FLORIDA CONTEST GROUP	79,731,252
NORTH COAST CONTESTERS (W3/W8)	58,926,747
MINNESOTA WIRELESS ASSN	48,169,887
SOCIETY OF MIDWEST CONTESTERS	46,642,318
SOUTH EAST CONTEST CLUB	39,876,427
SOUTHERN CALIFORNIA CONTEST CLUB	539,869,219
MAD RIVER RADIO CLUB (W8)	33,002,104
CENTRAL TEXAS DX AND CONTEST CLUB	30,411,056
CAROLINA DX ASSOCIATION	424,942,122
HUDSON VALLEY CONTESTERS AND DXERS	23,216,583
ARIZONA OUTLAWS CONTEST CLUB	21,927,534
WESTERN WASHINGTON DX CLUB	17,403,730
TENNESSEE CONTEST GROUP	16,837,980
GRAND MESA CONTESTERS OF COLORADO	13,829,045
ROCHESTER (NY) DX ASSN	212,441,868
WILLAMETTE VALLEY DX CLUB (W7)	12,059,099
NORTH TEXAS CONTEST CLUB	111,747,255
IOWA DX AND CONTEST CLUB	9,639,897
ALABAMA CONTEST GROUP	9,563,825
LOUISIANA CONTEST CLUB	15,510,419
SOUTHWEST OHIO DX ASSOCIATION	5,443,076
CTRI CONTEST GROUP	4,878,650
CENTRAL ARIZONA DX ASSOCIATION	24,805,249
MOTHER LODE DX/CONTEST CLUB (W6)	4,539,730
OKLAHOMA DX ASSOCIATION	4,076,417
UTAH DX ASSOCIATION	3,679,653
WESTERN NEW YORK DX ASSOCIATION	2,418,586
SPOKANE DX ASSOCIATION	1,800,785
KANSAS CITY DX CLUB	1,593,858
SOUTHERN CALIFORNIA DX CLUB	1,560,027
NORTH CAROLINA DX AND CONTEST CLUB	1,521,501
TEXAS DX SOCIETY	1,410,435
CENTRAL OREGON DX CLUB	1,253,150
BERGEN ARA (W2)	1,073,893
SALT CITY DX ASSOCIATION (W2)	1,037,310
METRO DX CLUB (W9)	1,034,144
SOUTHEASTERN DX CLUB	956,763
NORTHEAST WISCONSIN DX ASSN	942,832
FALMOUTH ARA (W1)	905,682
MAGNOLIA DX ASSOCIATION (W5)	866,137
BORING AMATEUR RADIO CLUB (W7)	787,229
NORTHERN ROCKIES DX ASSOCIATION (W7)	658,488
MISSOURI DX/CONTEST CLUB	654,204
STERLING PARK AMATEUR RADIO CLUB (W4)	602,789
ALLEGHENY VALLEY RADIO ASSOCIATION (W3)	541,471
DELAWARE COUNTY AMATEUR RADIO ASSN	470,503
ALAMANCE AMATEUR RADIO CLUB (W4)	363,344
WEST PARK RADIOPS (W8)	331,990
KENTUCKY CONTEST GROUP	330,554
SKYVIEW RADIO SOCIETY (W3)	294,474
NORTHERN ARIZONA DX ASSN	283,095
PORTAGE COUNTY ARS (W8)	250,413
BLUE RIDGE AMATEUR RADIO CLUB (W4)	150,315
CENTRAL OHIO OPS KLUB EXTRA-NOVICE	91,139
ATHENS COUNTY ARA (W8)	67,626
LOW COUNTRY CONTEST CLUB (W4)	28,365
FOX RIVER RADIO LEAGUE (W9)	6,661

DX Club Scores

BAVARIAN CONTEST CLUB	241,524,006
RHEIN RUHR DX ASSOCIATION	161,679,642
CONTEST CLUB ONTARIO	96,019,128
ARAUCARIA DX GROUP (PY)	76,276,776
CROATIAN CONTEST CLUB	75,725,405
CONTEST CLUB FINLAND	74,710,950
SLOVENIA CONTEST CLUB	67,707,633
BLACK SEA CONTEST CLUB (UR/ER)	61,267,260
UKRAINIAN CONTEST CLUB	58,220,429
LZ CONTEST TEAM	51,907,432
KAUNAS UNIV. OF TECHNOLOGY RC	40,738,240
BOSNIA & HERZEGOVINA CONTEST CLUB	38,838,161
HUNGARIAN DX CLUB	38,129,925
LU CONTEST GROUP	37,698,950
URAL CONTEST GROUP	35,924,145
SP DX CLUB	33,056,641
YU CONTEST CLUB	25,460,909
*WORLD WIDE YOUNG CONTESTERS	24,018,747
SKY CONTEST CLUB (4O/YU)	23,374,072
RUSSIAN CONTEST CLUB	22,855,897
CHILTERN DX CLUB (G)	22,180,209
LATVIAN CONTEST CLUB	21,463,290
RADIO CLUB HENARES (EA)	20,036,661
UA2 CONTEST CLUB	18,986,870
SOUTH URAL CONTEST CLUB	16,868,755
CE CONTEST GROUP	16,781,057
LITHUANIAN CONTEST GROUP	16,760,308
CT3 MADEIRA CONTEST TEAM	16,390,722
BRITISH COLUMBIA DX CLUB	13,489,312
LA CONTEST CLUB	12,186,011
LYNX DX GROUP (EA)	11,220,558
MARITIME CONTEST CLUB (VE1)	11,166,618
BELARUS CONTEST CLUB	10,490,296
VYTAUTAS MAGNUS UNIV. RADIO CLUB (LY)	10,280,556
VRHNIKA CONTESTERS (S5)	10,115,556
TORRENT CONTEST CLUB (EA)	8,957,423
VK CONTEST CLUB	8,332,417
GRUPO DXXE (XE)	7,743,737
MICHURINSK CONTEST GROUP (UA3)	7,305,025
CONTEST GROUP DU QUEBEC	7,245,548
TARTU CONTEST TEAM (ES)	6,658,157
MEDITERRANEO DX CLUB (I)	6,647,404
RIO DX GROUP	6,565,641
DANISH DX GROUP	6,488,593
599 CONTEST CLUB (JA1)	6,463,443
LES NOUVELLES DX (F)	6,436,289
PERM RADIO CLUB	5,375,609
RADIO CLUB SPORADIC (UA3W)	5,077,711
SIAM DX GROUP	4,988,062
TEMIRTAU CONTEST CLUB (UN)	4,983,923
BEEMSTER CONTEST CLUB (PA)	4,875,876
KIEV CONTEST GROUP	4,861,309
DNEPR CONTEST GROUP	4,658,378
HONG KONG AMATEUR RADIO DX ASSN	4,601,756
CANTAREIRA DX GROUP (PY2)	4,525,231
AUSTRIAN CONTEST CLUB	3,895,016
VU CONTEST GROUP	3,733,218
CSTA BUCURESTI	3,719,529
LYON DX GANG (F)	3,598,834
BELOKRANJEC CONTEST CLUB (S5)	3,329,060
GMDX GROUP	3,247,593
YO DX CLUB	3,207,929
SAO PAULO CONTEST GROUP	3,190,371
FOX CONTEST CLUB	2,681,186
BRIMHAM CONTEST GROUP (G)	2,617,715
SERPUKHOV RADIO CLUB (UA3D)	2,507,024
SP CONTEST CLUB	2,421,474
RADIO CLUB PARMA	2,379,529
JAKARTA DX CONTEST TEAM	2,176,424
ARCK (UAØ)	2,120,768
SOUTH GERMAN DX GROUP	2,068,898
R4F-DX-G	2,055,168
SHAKHAN CONTEST CLUB	2,034,867
KIEL CANAL AKTIVITY GROUP (DL)	1,973,699
DOMODEDOVO (UA3)	1,839,014
RU-QRP CLUB	1,826,772
MOSCOW RADIO CLUB	1,771,535
ALRS ST PETERSBURG	1,738,281
NOVOSIBIRSK CONTEST CLUB	1,672,795
STAVROPOL REGIONAL CONTEST CLUB	1,654,824
NOVOKUZNETSK RADIO CLUB	1,649,811
CS PETROLUL PLOIESTI (YO)	1,581,778
ORENBURG CONTEST CLUB	1,543,864
BALKAN CONTEST CLUB (LZ)	1,532,606
INTERNATIONAL RADIO CONTEST GROUP (DL)	1,527,823
TOP OF EUROPE CONTESTERS (SM)	1,378,484
GRIMSBY AMATEUR RADIO SOCIETY (G)	1,319,708
GUARA DX GROUP (PY7)	1,310,439
SOUTHERN OSAKA CONTEST CLUB	1,297,481
ARKTIKA (UA9)	1,228,749
SASKATCHEWAN CONTEST CLUB	1,225,287
BEIJING SUNNY HAM CLUB	1,216,745
KIEV RADIO CLUB	1,148,641
WATERLAND (PA)	1,132,051
VLADIMIR RADIO CLUB	1,091,484
ALBERTA CLIPPERS	1,087,018
YAROSLAVL CONTEST CLUB	1,076,285
Z37M CONTEST TEAM	1,056,149
MAYCOPSKIJ RADIO CLUB (UA6Y)	1,018,431
AMSTERDAM DX CLUB	919,242
DONBASS	917,454
LOMA DEL TORO CONTEST CLUB (HI)	914,121
VK2AWA CONTEST GROUP INC.	901,578
ARGO (UR)	893,372
UNION FRANCAISE DES TELEGRAPHISTES	881,395
HAROS RADIO CLUB (HA)	869,500
GERMAN DX FOUNDATION	868,270
RADIOAMATOR (UR)	867,229
RADIOCLUBUL RADU BRATU (YO)	851,500
OMSK RADIO CLUB	783,896
IRKUTSK RADIO CLUB	774,540
WEY VALLEY AMATEUR RADIO GROUP (G)	771,587
ARUK(EX)	712,046
VOLYN CONTEST GROUP (UR)	684,436
SAMARA RADIO CLUB	673,387
STAVROPOL REGION RADIO CLUB	664,389
CSTA SUCEAVA (YO)	646,048
GIPANIS CONTEST GROUP (UR)	634,950
CSM BAIA MARE (YO)	610,707
HUANCAVILCA DX RADIO CLUB (HC)	603,756
OBNINSK QRU CLUB	598,374
STV RADIO CLUB (ES)	597,666
GRUPO ARGENTINO DE CW	589,326
ROSTOV	588,606
PODOLSK	553,601
LOW LAND CRAZY CONTESTERS (PA)	533,520
CS AEROSTAR BACAU (YO)	509,629
CZECH CONTEST CLUB	508,412
MARCONI CONTEST CLUB (I)	497,130
KKKK CONTEST CLUB KRASNODARSKOGO KRAYA	456,120
JIANGSU DX CLUB	428,280
BASHKORTOSTAN DX CLUB	423,268
NEWBURY AND DISTRICT ARS (G)	419,741
TIRAS(ER)	417,357
SAMOTLOR (UA9J)	411,019
CENTRAL SIBERIA DX CLUB	401,265
CSM CRAIOVA (YO)	269,024
UNITED DX CLUB (UA6)	265,870
SVARK (SM)	245,846
KEMEROVO RADIO CLUB	226,789
ESHANESS RADIO CLUB (G)	223,488
UR-QRP-CLUB	167,007
RADIOCLUBUL NOSTRU DIN CONSTANTA (YO)	134,948
BORISOV AMATEUR RADIO CLUB	126,913
CS SILVER FOX DEVA (YO)	125,914
VORONEZH RADIO CLUB	118,959
CWJF GROUP (PA)	94,448
UKRAINIAN DX CLUB	93,053
EAST COAST CANADA CONTEST CLUB	71,046
BRESCIA CONTEST GROUP	69,746
NANAIMO AMATEUR RADIO ASSOCIATION	63,130
KIROV RADIO CLUB	61,386
SK6AW HISINGENS RADIOKLUBB	53,167
SK2AT FORENINGEN UMEA RADIOAMATORER	50,375
ICELANDIC RADIO AMATEURS	36,497
KRISTIANSTADS RADIOAMATORER	34,706

** Does not comply with club rules.*

Mamuka, 4L2M ,was first in the world low power 3.5 MHz.

ZS4TX, Bernie, finished 6th world all band.

Courtney, K4WI. took on the challenge of 28 MHz.

EA6IB, M7A, R3/SM6LRR, ZB2X, J43J, MD6V, GJ2A, 9H3HH, ER0FEO, CR6T, CT1JLZ, GM0IIO, MZ5B, TX3A, 9M6LSC, 9M8YY, WH2D, KH6ZN, TX1B, ZL3TE, T88CI, P29CW, 5W0KH, P49Y, P49V, P40W, 3G3V, CE2/K0MD, CE0Y/SM6CUK, ZP0R, P40A, VP5/N5KW, EA8/OH2BEM, VP9I, ZF2AM, TI5A, YS1/W3MKT, IG9X, ED4R/8, EL8RI, C91LW, 5B/G4IRN, YM3A, MD4K, ER4DX, 4O3A, IS0/K7QB, ZL4NX, DP1POL, PZ5X, 3V3S, P33W, 4U1ITU, VK9XX, AH2R, AH0/AH2Y, A31A, PJ4A, 6Y1V, CR3L, 9L5A, C4I, PJ2T, VK9XW, VK9XX, HC8GR.

Comments

Conditions were far from excellent. The sun was just teasing us with the SSB weekend. Nevertheless, contesters found a way to extract the maximum CW fun. All the bands suffered. In spite of the conditions, the 2009 CQ WW CW Contest set an all time high! We received 5,966 CW contest logs, of which about 5,751 were electronic! Between SSB and CW 12,031 logs were received! That's a 16% increase in one year ... with 28 MHz on life support! Your continued submission of an electronic log allows the CQ WW Contest Committee to process the enormous amount of data received. We have again provided open logs so that you can learn about propagation and how the top scorers do their operating. Thanks to all the contesters around the world who sent in a log. *Please send in your log no matter how small.* Submitting an electronic log is easy. Send your CW log to <cw@cqww.com> (SSB logs go to <ssb@cqww.com>). Please send your log in Cabrillo format. If you did everything OK, you will get back an acknowledgment. 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 your radio has the capability, please submit a log with exact frequencies for each QSO.* Each year anyone who submitted an electronic log receives an UBN *report* of how their log was judged. The CQ WW CC provides many ways for an entrant to check his/her log for category, club, operator, and score accuracy. Long before the final results are published, logs received list, with your category and your *report* are posted on the CQ WW site. Double-check your Cabrillo submission. Please make sure the correct category is indicated and the call you used in the contest is shown. 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 at: <http://www.cqww.com>.

If you plan to try to make the Top Scores box, *you can count on your log being carefully checked.* Those contesters trying to win a top scoring position must realize the necessity of *honesty in their efforts.* In a perfect world we would not have to spend this extra effort to check potential top contenders; however, some entrants feel they must win even if it means not following the rules. Just as in other aspects of life, cheating will not be tolerated. Those few contenders who enter the top scores box are important because they set an example of what is possible in our sport.

In order to maintain separationn between the categories of single operator and single operator assisted, honesty in high-scoring logs must be the number one priority. The use of a QSO help—spotting network of *any kind*—places the entrant in the assisted category. The assisted category is fully competitive and fun. When you do use a spotting aid, please claim to be assist-

Xtreme Category

The new Xtreme category was introduced in 2009 as a way of allowing stations to use Internet connectivity to link multiple sites, both receiving and transmitting. The number of entries was small, but met the expectations of the Committee. After computing the CQWW scores, and normalizing them to other entrants in the category, and a careful review of the station descriptions, the winners are multi-site station B1Z in the Multi-Operator category with 147 out of a possible 200 points, and OL5Q (OK1HRA, opr.) in the Single-Operator category with 149 points. Honorable mentions are due LZ2NKM, who has crafted an outstanding remote station using a good deal of home-brew interface hardware, and NP2KW, who attempted an operation using multiple remote operators but suffered network problems and was forced to enter as a Single-Op station. We look forward to a growing number of entries in this category in the coming years. *—K3EST*

ed. The use of undeclared packet, the use of additional operators for a single operator entry, two signals at the same time on the same band or on separate bands at the same time, if you are single operator, is in violation of the CQ WW rules.

For 2009 we had to reclassify and issue red and yellow cards (see the CQ WW Rules on the CQ WW website, <http:// www.cqww.com>) to several stations. These few individuals take up hundreds of hours of work by the CQ WW CC to find what they are trying to hide. Our software and extensive data analysis suggested that some logs should probably be in the assisted category. After sending each of these contesters an inquiry asking them to verify their category of entry, the following entrants responded and confirmed their category as assisted. We wish to publicly thank each of them for their cooperation and honesty and for helping to maintain the high integrity of the Top Scores box: 5B4AIA, 9A0AA, 9A4W, CT3KN, DL1LH, DL4UL, DL7AU, EA3AR, EA9/OL8R, EI6DX, HG3M, IG9U, IK0XBX, K2MFY, LY2IJ, LZ2JA, LZ6W, LZ9X, M2X, N9BX, NI1L, OH8L, OK1NY, OK2ZO, OK3R, OM7CA, OT4A, PP5BZ, PY1KN, PY2SEX, RA9FTM, RC9O, RW6AH, RX9TL, S51FB, S52AW, S53O, SM5CEU, SN3A, SN7C, SP9W, SV2BFN, UA9UHN, UT2B, UT3L, UZ0U, W4UAT, YO9HP, YR9F, and YT1T.

It is an exciting time in contesting. There have been recent advances in remote radio-control and CW decoding software. Both of these interesting advancements will surely impact future contesting. CQ has developed a new Xtreme category, which allows for innovation and implementation of new technologies. The results of the Xtreme category can be found elsewhere in this article.

We would like to dedicate this CQ WW CW Contest to Andrey, RU1AO, who was riding on the train on November 27th to participate in the 2009 CQ WW CW Contest. The train was destroyed by terrorists and Andrey was killed.

Thanks

The final line scores you see here in *CQ* magazine are the product of a lot of work. With your help and our bookkeeping, we hope the results are as accurate as possible. We use many log-checking tools and data sources to certify the winners. The members of the Committee who provided insight into many contesting topics are: CT1BOH, EA3DU, ES5TV, F6BEE, G3SXW, JE1CKA, K1AR, K1DG, K1EA, K3LR, K3WW, K3ZO, K5TR, K5ZD, K6AW, KR2Q, KM3T, KT3Y, LY3BA, N2AA, N2NC, N2NT, N3ED, N5KO, N6AA, N6TR, N6TW, N8BJQ, N9RV, OH2MM, OH6LI, PA3AAV, PY5EG, S50A, VA7RR, VE7EJ, W3ZZ, W5GN, W5OV, W0YK, and W6OAT. A special thank you to Ken, K1EA, who spent countless hours making the CQ WW database the best in contesting. We want to thank Barry, W5GN. Barry has provided the machinery to send certificates to you in a timely manner. We also want to acknowledge two members who are leaving the CQ WW Contest Committee—Sergio, EA3DU, and Oms, PY5EG. The contest community owes a big "thank you" for all the help these two members have provided over many years. The expertise they brought to our group has been invaluable.

Congratulations to all the winners and entrants! CU in the 2010 contests! 73, Bob, K3EST

(Continued on page 101)

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If you think the "big guns" operating in the CW portion of the CQ World-Wide DX Contest send fast, check out the "QRQ" gang regularly chatting at 60–100 words per minute. W3GW introduces us and provides tips on how you can join in as well.

QRQ (High-Speed) CW

BY JOE GERRY,* KH6/W3GW

Perhaps you have heard them on the low ends of 40 or 80 meters, those signals that, at first listen, sound like a digital mode, but are not coming in on the usual PSK or RTTY frequencies. However, wait, as on further listening you may have found them to sound oddly familiar. Well, you just may have stumbled onto a high-speed CW QSO, or as practitioners of the art call the mode, "QRQ CW."

Just what are we talking about when we say, "QRQ CW"? Fred, W3NJZ, proposed the following definition in an article he wrote for the FISTS Newsletter, FISTS being a club dedicated to the care and feeding of Morse Code and CW operators.[1] Fred felt QRQ CW was Morse Code sent at speeds from 60 to over 100 wpm and comprehended by ear without the use of computers or code readers. We are not talking about CW operators sitting at their "mills" or keyboards making 100-percent copy of a Press Wireless transmission, as in the old days. No, QRQ CW is conversational Morse Code sent at high speed, read by ear, with QSK (full break-in), so that we approach a duplex conversation, similar to a conversation over the telephone.

History of QRQ

Samuel Morse and Alfred Vail saw the need to speed up things a bit early on while building their telegraph system in the 19th century. William Pierpont, NØHFF (SK), in his book *The Art and Skill of Radiotelegraphy*, describes how Morse and Vail went from reading by sight a complex number-based code written out on a moving slip of paper to "reading" by ear the clicks of a sounder responding to a distant key directly transmitting letters using the simpler American Morse Code.[2] The Morse telegraph system gave us words-per-minute speeds compared to the older "telegraphs" of the day which used semaphore links, such as the one built on Telegraph Hill in San Francisco, to send information at speeds best measured in letters per minute.

By 1860, good operators were able to copy American Morse Code by ear and get the message down in writing at speeds of 25 to 30 wpm. With the entry of the mechanical typewriter in the 1880s, copying speeds increased slightly, but operators of the time were limited more by their straight keys than by their ability to copy the code. Many operators at the dawn of the 20th century copied code much faster than they could send it.

This mechanical limitation on sending high-speed code prompted mechanical solutions. Bunnell came out with his sideswiper in 1880 and Horace Mann, in 1904, offered the first "bug." The sideswiper made sending more comfortable but did not greatly increase speeds. However, Mann's bug did allow a rare operator to approach sending speeds of 50 wpm.

Speed contests became popular in the early 20th century with operators now concentrating on receiving speeds rather than sending speeds. An article in *QST* in November of 1933 describes a speed contest in Chicago with hundreds of operators competing, including a 9-year-old girl who took the 25-wpm trophy. Ted McElroy lost this one but went on to establish the (still standing) record of 75.2 wpm in 1939. Mind you, these were copying contests, with the operators putting down five minutes of copy using a "mill," as typewriters were called in the day. Try it sometime using your computer keyboard and a W1AW code proficiency run. It's not easy! (*For those of you born after 1980, a typewriter is a primitive analog word processor with individual keys that impressed ink onto a sheet of paper in the shape of a letter or numeral.—ed.*)

Still, operators wanting to increase their sending speeds were limited by how fast they could comfortably push their straight keys and bugs. All this changed when Harry, W2IILE, captured the cover of *QST* for April of 1940 with his "electronic bug," which used, of all things, a *thyratron* to generate automatic dots and dashes! The next issue of *QST* contained a simpler and cheaper circuit that, once mastered, would allow operators to send code comfortably and accurately up to 40 wpm.

Electronic keyers made steady progress over the decades. The "T.O. keyer," designed by Jim Ricks, W9TO, and offered by Hallicrafters in 1960 as the HA-1, used a tube-based design that allowed code to be sent with paddles up to 65 wpm. Solid-state designs, such as those based on John Curtis's 8044 chip, carried the weight for those hams using keyers in the 1960s and '70s. Still, the electronic keyers available in the 1960s left those CW operators who could copy at higher speeds unable to send accurate code at speeds above 50 wpm.

Keyboards

There, I've said it. CW operators had to wait for the advent of the Morse Code generating keyboard before they could comfortably send code at speeds over 50 wpm. The early keyboards stirred controversy among those who felt "real" Morse Code should be sent by a straight key, bug, or elec-

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e-mail: <jliving2001@yahoo.com>
***Note:** A longer version of this article appears on the QRQ CW website, <http://qrqcwnet.ning.com/>.*

Photo A– The K4KN Morse keyboard from the 1970s had a single-character buffer but no space bar. Today it is still prized by many QRQ enthusiasts. (Photo courtesy of K8IF, via <qrqcwnet.ning.com>)

tronic keyer. The legendary George Hart, W1NJM, expressed his concern regarding keyboards in an article entitled "Whither CW," which he wrote for the May 1964 issue of *QST*. Bill Eitel, W6UF, the founder of Eimac, responded to George's article with a letter defending the use of keyboards.[3] The battle between keyboard and keys continues today, but the argument is moot for many of us who love high-speed CW. I use my J-38 straight key when I check out the Straight Key Century Club frequencies. My Vibroplex bug or K1EL PIC-based keyer does the honors when I am chasing those last few countries I need for DXCC, but when I check into the QRQ nets, it's my keyboard all the way.

The keyboards developed in the 1970s were self-contained gizmos that included the keyboard and the electronics needed to generate the code elements so that you just plugged the keyboard output into the key jack of your transmitter. K4KN's keyboard (photo A) was especially prized.[4] His unit had a one-character buffer, but no space bar. Your sending speed was equal to your typing speed, and the spacing between letters and words was up to you! Modern, self-contained keyboards such as the MFJ-451 (photo B) allow code to be generated directly and include a type-ahead buffer so you can type as fast as you want for any set code speed. Another keyboard approach uses the home computer to generate code. Programs such as Fldigi (photo C) and CW type put the modern computer between the keyboard and the rig and use the computer's serial port, or, even better, the rectified soundcard output to key the rig.

Growing Interest

The ease of generating QRQ CW on the early keyboards prompted CW operators eager to improve their code speeds to form clubs and nets in the 1970s. Bill Eitel, WA7LRU/W6UF/W6AY, mentioned earlier, started the Five Star Club in 1974. Perspective members had to show they could send and receive code at speeds over 80 wpm. Thom, K8IF, recently uploaded a tape made by Gene, W2KFA, in 1975 to the QRQ website confirming Thom's skills and leading to his becoming member #7 in the Five Star Club.[5] Jim Ricks, W9TO, founded the Chicken Fat Operators in the mid-1970s. Membership in the CFO required a love of CW and an interest in learning to "chew the rag" at speeds over 40 wpm. Members met on the air for "cluck-ins" and, according to the reminiscences of Mike, W8MW, rubbed chicken fat on their rigs, antennas, and keys to improve

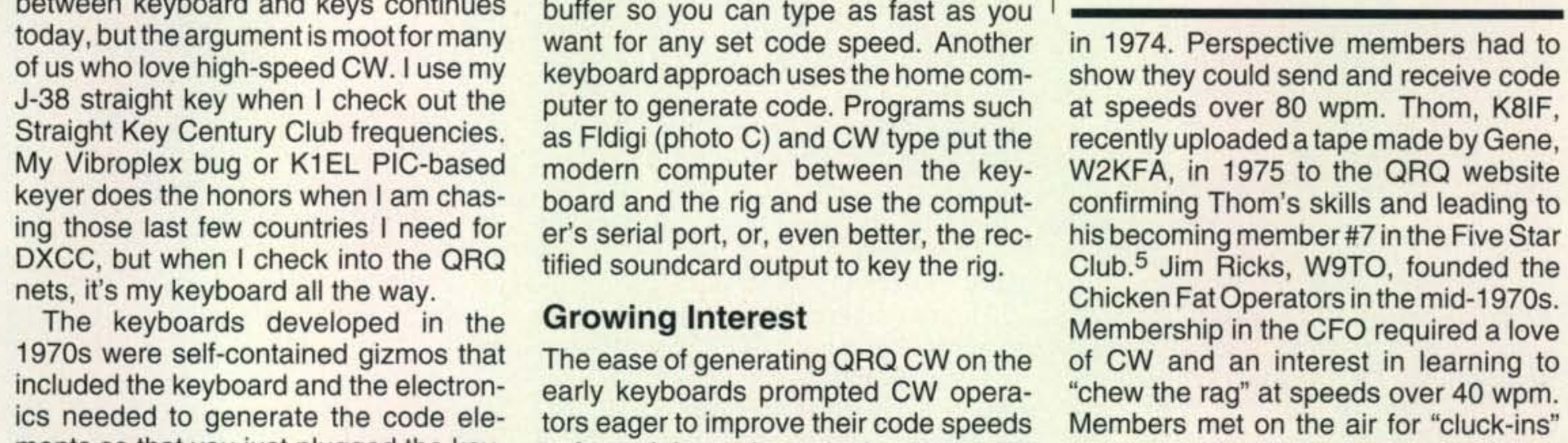

Photo B– One of the specialized CW keyboards on the market today is the MFJ-451, which comes either with or without the actual keyboard (for those who want to use a spare computer keyboard). (Photo courtesy of MFJ Enterprises)

performance![6] Needless to say, the spirit of the club tended to a less-serious nature. The CFO faded during the 1990s, but recently Andrew, NV1B, started work to revitalize the club.

More recently, other groups such as the Speed Operators Bunch, or SOB, with members interested in QSOs at speeds greater than 70 wpm, have been formed. I have not heard any activity fromm this group lately. The Fast Operators Group, or FOG, meets on 40 or 80 meters twice a week, inviting check-ins at speeds greater than 50 to 60 wpm. Another group meets on Saturdays on 7.106 MHz at 1830 UTC and shoots for speeds of 80 wpm or higher.

Learning QRQ CW

One hurdle I faced after getting interested in QRQ CW two years ago was how to get on-the-air practice out here on Maui, Hawaii during the sunspot minimum. I found it a challenge, to say the least, to check into the above-mentioned 40- and 80-meter nets during the daytime over a distance of 4000 to 5000 miles with no sunspots! Recently, Chuck, AAØHW, came up with a means of getting together those of us interested in QRQ CW using the internet. Chuck assembled free software, including a Morse Code generating program such as Fldigi or CWtype, a virtual soundcard, and a Skype-like program called "Mumble" to allow QRQ operators to meet in net fashion over the Internet. Internet CW, or iCW, is a lot of fun and has allowed me to get together with other QRQ operators without being at the mercy of fickle propagation or an antenna-hating condo board. Check out Chuck's site at <http://groups.google.com/group/i_cw?hl=en> for the details.

Those whose interest has been stirred by what we have been discussing here owe it to themselves to check out the QRQ CW website at <http://qrqcwnet.ning.com>. Chuck, AAØHW, has attracted a worldwide guest list for his site, which includes a trove of information for anyone interested in learning more about QRQ CW.

My favorite threads on the site include the discussions by Tom, W4BQF, Fred, W4NJZ, and Chuck, AAØHW, on learning how to copy code at speeds from 50 to 100 wpm. The key seems to be learning how to recognize word sounds, since at these speeds the individual letter sounds run together in a blur. One technique uses the freeware program RufzXP, which is loaded with common words rather than callsigns, to send single words over and over at high speed to learn their sounds.[7] Another approach uses a different freeware Morse Code generating program, Fldigi, to first translate text files into Morse Code and then record them in MP3 format. Fldigi allows for varying the speed, tone, and shaping of the Morse Code it generates, providing beautiful MP3 files that I then put on my portable MP3 player so I can practice while the XYL and I take our daily walks here on Maui.

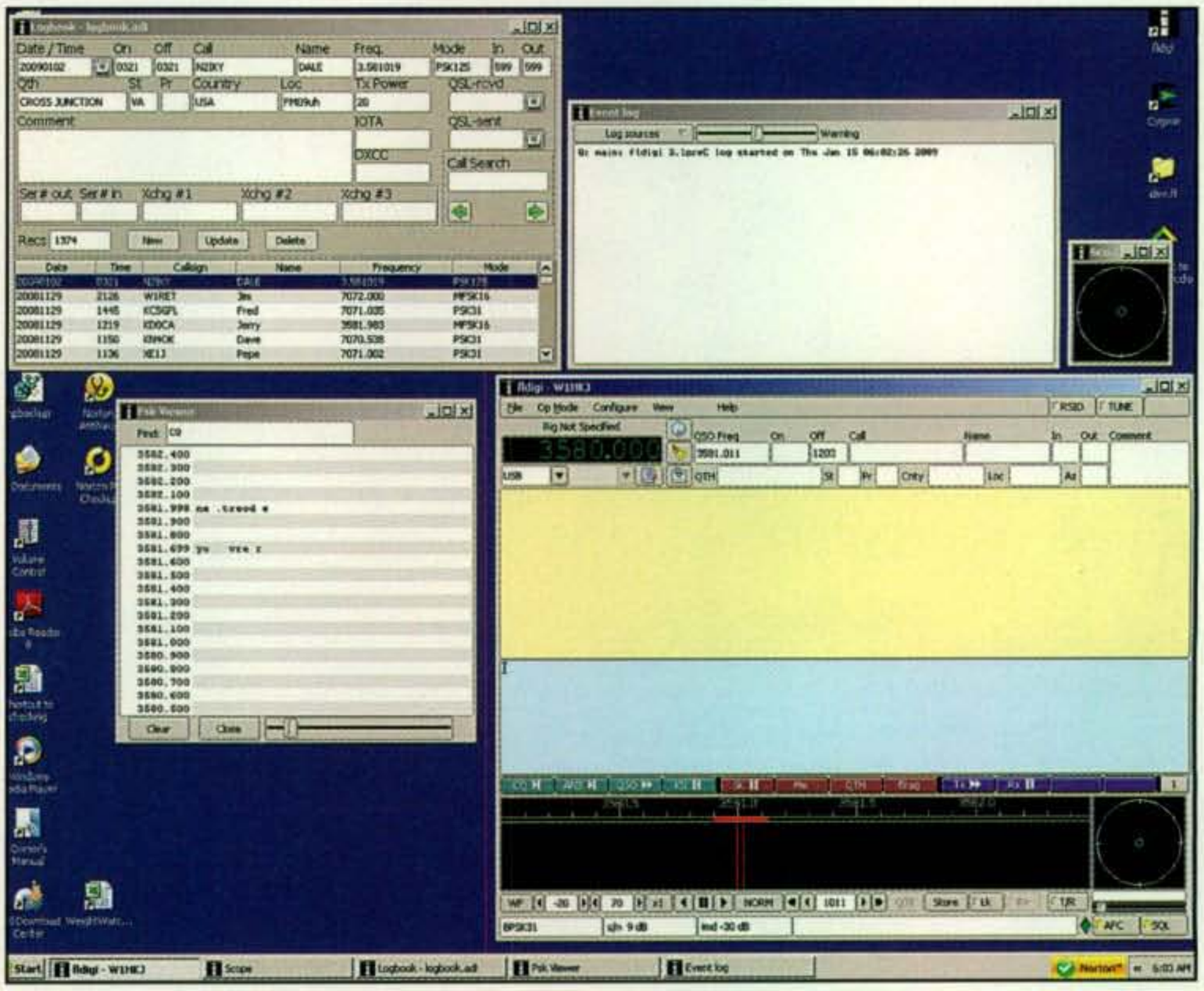

Photo C– The Fldigi program lets you use your computer keyboard, and your computer, to generate CW as fast as your fingers can fly! (Photo courtesy of <w1hkj.com>)

The experts on the website all seem to agree that it takes a lot of practice to get past the 50- to 60-wpm "brick wall" most will hit while ascending the QRQ ladder. Also, those operators who have been around for a while all agree on the need for a keyboard to send CW at QRQ speeds, as well as developing the ability to copy code in your head.

Conclusion

Not everyone will find QRQ CW his or her cup of tea. I personally found it took over a year of daily practice sessions to get from 35 wpm to 60 wpm, and still, I get derailed easily at high speeds. However, my efforts have given me a new appreciation for Morse Code as a language and have forced me to reconsider what I had previously thought were my personal limitations regarding code speed. I have also met some great operators while working on my QRQ skills. I can't emphasize enough how much help I have gotten from AAØHW's website and from my iCW net check-ins.

The epitaph for Morse code has been written many times over the years, but the mode is not going to die anytime soon. Not even the dropping of the code requirement for licensing has stopped the members of the ARRL, FISTS, QCWA, or SOWP from mentoring a new generation of amateurs interested in CW. The newer clubs such as SKCC attest to the continuing interest in Morse Code among the newcomers entering our ranks. QRQ CW is just one facet of what well may be a modern epiphany for Morse Code and CW among radio amateurs operating on our bands today.

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Panoramic view of Hara Arena's North Hall, one of five exhibit halls that made up the inside exhibits at the Dayton Hamvention®.

Our annual look at the new products introduced at this year's Dayton Hamvention® continues this month, covering antennas and accessories (see last month's issue for radios and amplifiers).

The 2010 Dayton Hamvention® Safari – Part II

BY JOHN WOOD,* WV5J

There obviously were many more new items first displayed at the 59th annual Dayton Hamvention® back in May than just the transceivers and amplifiers that we reported on last month in Part I of this article. That's why we're continuing this month with Part II, so we can take a look at all the rest—such as antennas and accessories—that also made their debut at this year's Hamvention, held again in the five arenas that comprise the Hara Arena complex.

Main Arena

Our tour begins with a talk to the rep at the Jetstream booth in Hara's main arena, where we found out that Jetstream decided to unveil three new power supplies at the show, each with its own unique features. Take, for example, the JTPS75BCMMKII, which supplies 75 amps maximum and 65 amps of continuous power and comes with its own built-in, low-current trickle charger to maintain a backup battery to power your 13.8-volt gear in case your AC mains are ever interrupted.

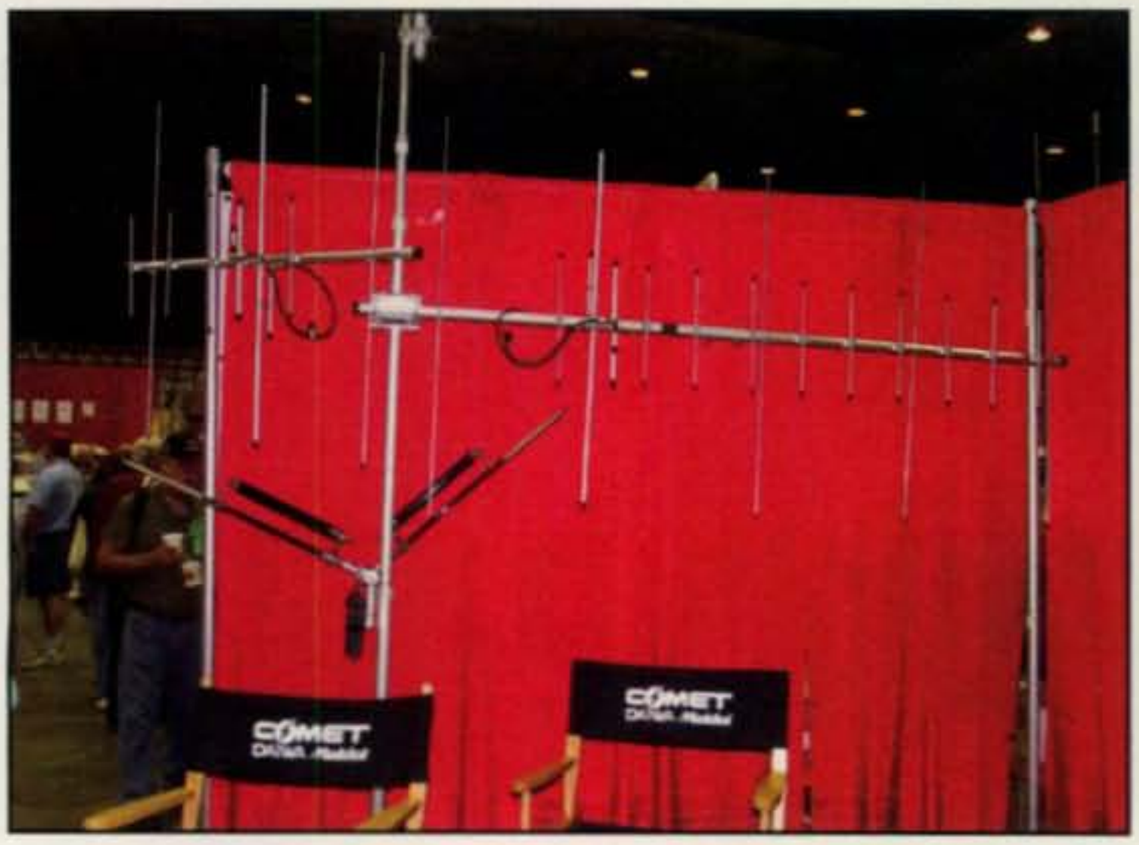
The second Jetstream power supply to make its first public appearance at Dayton this year was the JTPS35BCMA 35-amp maximum/27-amp continuous power provider that features Anderson power pole connectors and once again, its own trickle charger for a backup battery.

The third Jetstream unit, the JTPS30M switching power supply, does not come with a trickle charger like the other two, but it does provide for continuously variable power output from 9 to 15 volts or a fixed 13.8 volts out, a switchable meter to monitor both current and voltage, and the capability to provide 30 amps maximum and 25 amps continuous. For more information, visit <www.Jetstream-usa.com>.

Over at the Comet Antenna booth, there was a lot to peruse with Comet showing off its new line of low-profile HF mobile antennas and its new AA-170 antenna analyzer. Comet was also proudly displaying for the *first time its* CAT-300 1.8–60 MHz tuner; its two new dual-band (VHF/UHF) beam antennas, the CYA-2375 and CYA-A25711; and its new 3-kw HF wattmeter, the CMX-2300, which sells for $299. For more information on all the Comet products, visit <www.cometantenna.com>.

Two of Jetstream's three new power supplies, the 30-amp JTPS30M and the 35-amp JTPS35BCMA.

**New Products Editor*
1870 Alder Branch Lane, Germantown, TN 38139
e-mail: <wv5j@cq-amateur-radio.com>
(Note: This article replaces this month's "What's New" column)



Two new beams from Comet Antennas, the CYA-2375 and the CYA-A25711.

Hard to see against the ceiling, SteppIR's Dream Beam 11 is intended to be hard for your neighbors to see as well!

Three new "Rhino" antenna switches from MFJ promise high power-handling capacity and broad frequency ranges.

The Logitalker from Idiom Press is a 4-memory voice keyer, available either assembled or as a kit.

Moving beyond portable antennas, Buddipole this year introduced a high-capacity lithium-ion nanophosphate battery pack for extended portable operation.

MFJ Enterprises of Starkville, Mississippi had its typically impressive display in the main arena with lots of goodies to look at, but if you happened to ask "What's new?" while there, your gaze would be directed to the MFJ Rhinos—eight different models of tough two-, three-, and four-position antenna switches that come with gold-plated flanges and connector contacts. These Rhinos can handle frequencies from 800 MHz to 3 GHz and up to 2 kilowatts of RF power with prices ranging from $49.95 to $119.95. For more information, call 1-800-647-1800 or visit <www.MFJEnterprises.com>.

Continuing our turn around the main arena, the good folks at Idiom Press were proudly showing off their new front-panel overlay decals for Ameritron amps, along with two new radio accessories, the LogiKlipper and the LogiTalker. The LogiKlipper (LK-1) is an RF clipping speech processor that Idiom claims "provides maximum intelligibility of an SSB signal under challenging conditions," while the LogiTalker is a four-memory voice keyer that can be used with any transceiver with an eight-pin microphone plug (round or modular) and sells for $120 as a kit or $150 assembled. For more information about Idiom Press products, visit <www.idiompress.com>.

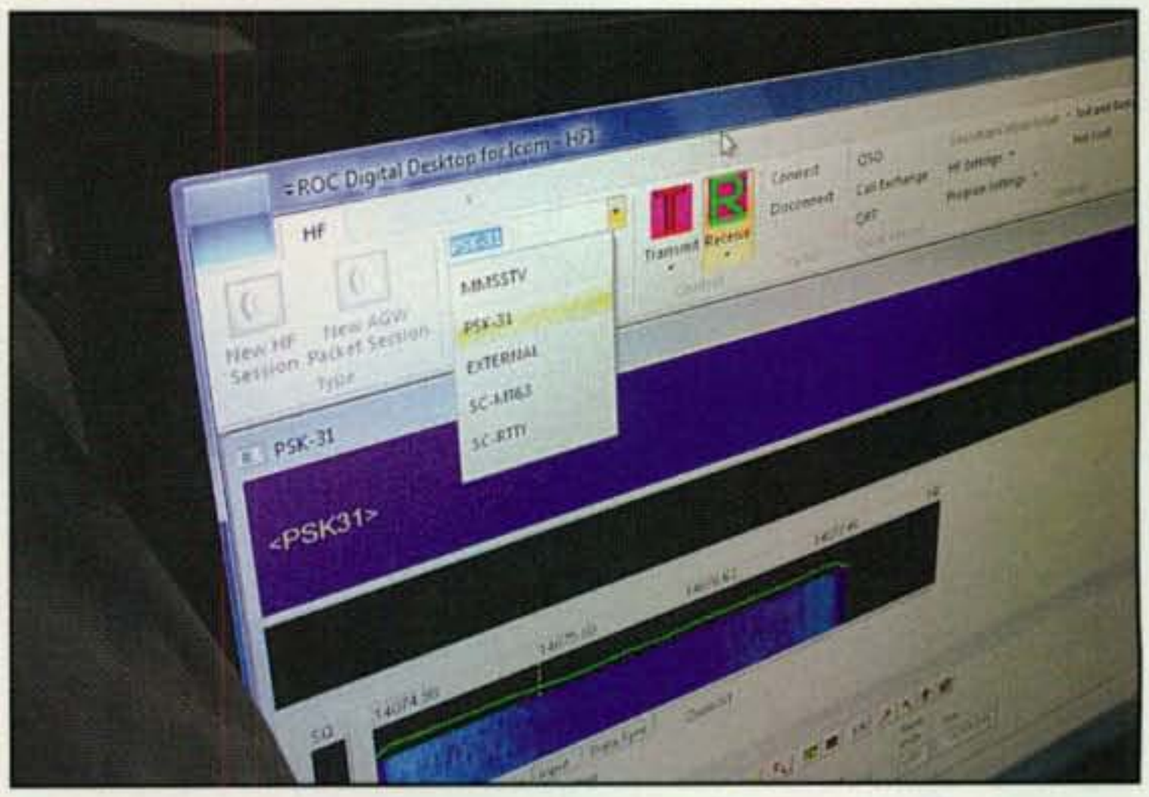
SteppIR Antenna Systems consistently drew crowds to its booth in the arena during Hamvention thanks to its new three-element Dream Beam 11 with its 11-foot boom set up in an overhead display that craned and strained the necks of interested hams. SteppIR folks let us know that this relatively small beam was designed with apartment dwellers in mind and comes with a price tag of $2195. For more information about the Dream Beam 11 and other SteppIR products, visit <www.steppir.com>.

Over at the Buddipole booth, the company's familiar portable antennas were forced to share the spotlight with a couple of new power-packed products, Buddipole's lithium-ion nanophosphate batteries. Made up of A123 cells, the packs feature Anderson® Power Pole connectors, a low-voltage alarm, and a three-color LED indicator that shows the battery's condition. The folks at Buddipole have even built a special battery pack just for the compact Yaesu FT-817 transceiver that supposedly provides the popular radio with six hours of run time. For more information about Buddipole antennas, battery packs, and other products, call 1-503-591-8001, or visit <www.Buddipole.com>.

A compact new 6-meter beam from Force 12 Antennas.

Bob Heil, K9EID, of Heil Sound, demonstrates his company's new Proset Elite boom mic/headset combo.

The MiniVNA and MiniVNA Pro antenna analyzers from W4RT Electronics.



Screen shot of the W4PC Digital Desktop from Creative Services Software (CSS).

During our last turn around the main arena, we spent a few minutes at the Force 12 booth, where they were unveiling a new six-element, 6-meter beam antenna. For more information about this unique antenna and other Force 12 products, visit <www.Force12inc.com>.

New to Dayton this year was a company that has long been making solar-energy products for the military, PowerFilm. Founded in 1988, PowerFilm is now venturing into the ham radio market—a natural move ,since two of the top people at PowerFilm are hams. PowerFilm had a number of its solar chargers on display at Hamvention, including its line of foldable and portable battery chargers that output 3.4 to 15.4 volts and 1.5 to 60 amps. For more information about PowerFilm products, visit <www.powerfilmsolar.com>.

"Audio Alley"

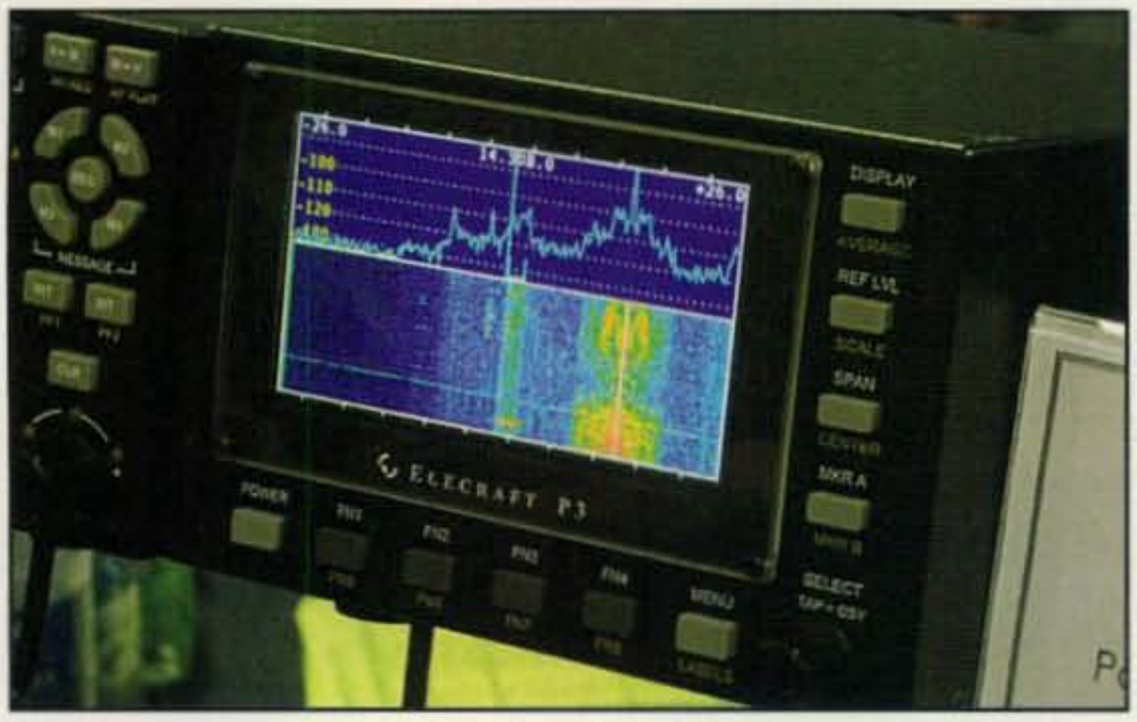
That wrapped up our visits in the main arena, so we next took a stroll down Hara's "Audio Alley." Our first stop was the W4RT Electronics booth, where they were showing the new mini VNA, an HF and VHF software-defined, PC-based antenna analyzer. By connecting the mini VNA to a computer via a supplied USB cable and an antenna, you get the resonant frequency of the antenna, its SWR per a preset frequency range, plus coax return loss, impedance, and phase. More information is available about the mini VNA at the W4RT Electronics website: <www.W4RT.com>.

Heil Sound also occupied a prominent position in Audio Alley, naturally, and there just across the aisle, Bob Heil could be seen holding court and packing in the onlookers by demonstrating an assortment of Heil Sound products. Some of the newest items being demoed were the Heil Sound Pro Set Elite Boomset (headset with boom microphone) which features the HC-6 Dynamic microphone element along with a

TimeWave Technology's Ham Link BT-BTH interfaces a laptop computer with a USB port to a ham transceiver through the MIC jack, allowing control of many radios via Bluetooth.

handheld mic also loaded with the HC-6 element. For more information on these units and other Heil Sound products, visit <www.heilsound.com> on the web.

Also drawing a crowd at times in the Audio area was the Creative Services Software booth, where Rick Ruhl, president of CSS, was telling anyone and everyone about his company's new Digital Desktop/SC for ICOM transceivers such as the IC-7200 and IC-7600. Priced at $39.95, the computer application handles RTTY, PSK-31, MT-63, SSTV, and



The Elecraft P3 panadapter was designed for the K3 but will work with most other radios as well.

The Vantage Vue weather station from Davis Instruments is wireless and solar-powered.

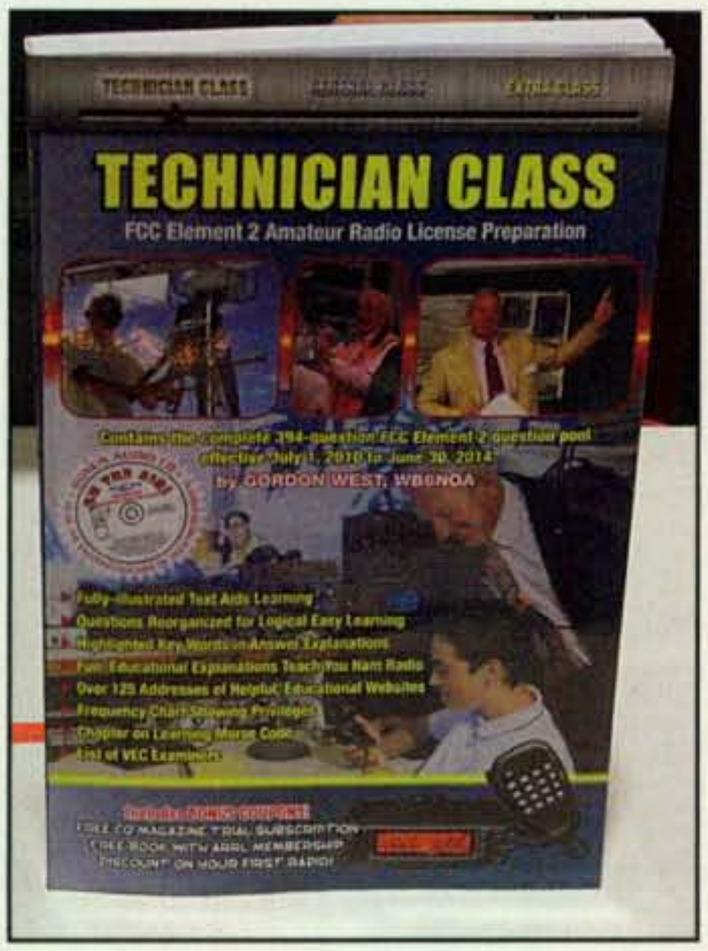
AGW packet modes. For more information, visit <www.cssincorp.com>.

At the very next booth, the Timewave Technology people were talking up their latest arrival, the HamLink BT-BTH+™ which interfaces your Bluetooth cellphone device with your ham transceiver for untethered remote operation. It can also interface with your PC via a USB or serial cable to provide rig control for supported transceivers from Kenwood, Yaesu, ICOM, Ten-Tec, Elecraft, Alinco, and others. More information can be obtained at the company's website: <www.timewave.com>.

North Hall

Our next series of visits took us to Hara's North Hall, where we encountered one of the more visually interesting accessories from the good people at Elecraft—the P3 Panadapter, a companion item to the Elecraft K3 transceiver that also works with most other popular ham-market transceivers. Among other features, it provides a 2- to 200-kHz window showing both spectrum and waterfall displays that are visually useful for SSB, CW, RTTY, and PSK-31 modes. Capable of interfacing with keyboards and VGA display monitors, this unit was a big draw at Hamvention, particularly when it was being put through its paces by Elecraft COO Eric Swartz, WA6HHQ. For more information, visit <www.elecraft.com>.

The North Hall was also where we encountered the Vantage Vue wireless weather station from Davis Instruments which features a solar-powered outdoor sensor array and an attractive LCD console that reports indoor and outdoor temperatures, humidity, barometric pressure, wind speed, wind direction, rainfall, and much more. Priced at $395, more information about this weather station and other



There's a new question pool in use for Technician exams, and Gordon West's updated license manual from W5YI.org has you covered.

products from Davis Instruments is available on the web at <www.vantagevue.com>.

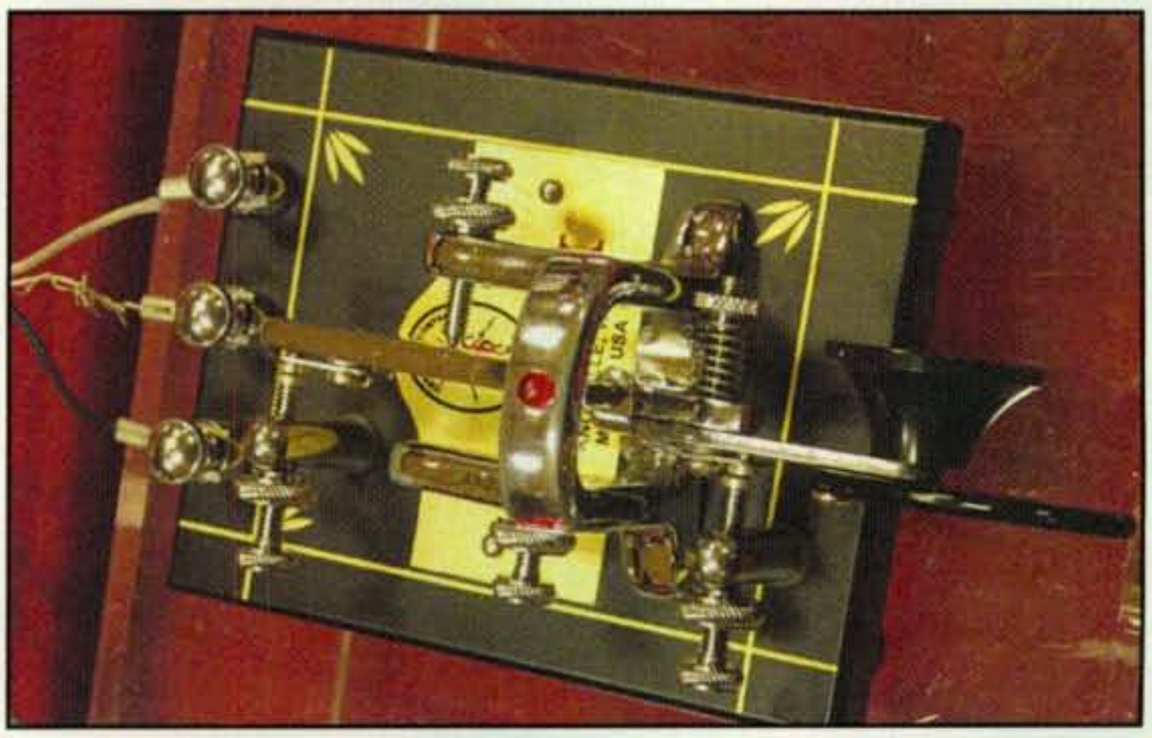
Still in the North Hall, we next dropped by the Byonics booth, a popular spot that seemed to draw a constant crowd. I thought first that it was the great location near the center of the North Hall that gave Byonics so many onlookers, but after talking briefly with the owner of the company, Allen Lord, I found out it was Byonics' release of a new product at Hamvention called the Micro-Trak RTG (Ready To Go) APRS transmitter. For $120, Byonics offers a turn-key, 10-watt APRS transmitter that draws power from the car cigarette lighter outlet and connects to an existing and compatible GPS receiver and SMA antenna. Byonics also offers a GPS receiver to go with the Micro-Trak RTG to make a complete ARPS package for only $190.

Our last stop before leaving the North Hall was the W5YI Group booth, where they've been busy publishing two new books—a General Radiotelephone Operator License (GROL) plus Radar study manual from Gordon West, WB6NOA, and for the aspiring hams, the seventh edition of the Technician Class license manual also from the pen of Gordon West. According to the author, the Technician Class study manual book contains "Everything you need to become a licensed ham radio operator the quick and easy way." What more could I add to that? How about if I tell you the Technician Class license manual lists for $20.95 and that both books are available on the web at <W5YI.org>.

Our Sunday tour did not venture into the outdoor flea market but I've been told that the DZ Co. had its booth setup out there and that its new DZ-3 Yagi HF antenna kit drew considerable attention with its telescoping boom, light weight, easy setup, and no-traps design. For the details on this antenna and all DZ products, visit <www.dxkit.com> or phone 1-877-HAM-SHACK.

Silver Arena

Next we sauntered over to the Silver Arena and visited with the Vibroplex folks, who were proudly showing their limited edition 50th anniversary Vibrokeyer which comes with jeweled components and your choice of red or black paddles for $199.95. The 50th anniversary model commemorates the introduction of the first VibroKeyer, which occurred in 1960. Vibroplex was scheduled to begin shipping the first run of 250 fiftieth anniversary Vibrokeyers in June. For more information about the 50th anniversary Vibrokeyer or any Vibroplex product, visit <www.vibroplex.com>.



Vibroplex introduced the limited-edition 50th anniversary Vibrokeyer, available with either red or black paddles.

If you have high-power needs, consider this 60-amp switching power supply from RF Parts.

Our last booth to visit in the Silver Arena was RF Parts, where most of the attention was focused on the company's new 60-amp switching power supply. For more information about this high-current supply or any RF Parts product, visit <www.rfparts.com>.

Ballarena

A few steps to the south over in Hara's Ballarena we arrived at the Officina Meccanica Begali keys booth where we got a first look at some of Pietro Begali's newest creations, his limited edition Stealth Keyers which are carved from a single block of stainless steel. Pietro plans to only make and sell 59 of the Stealth keyers "for a few discerning operators," so if you're interested, visit <www.i2rtf.com> or e-mail Pietro Begali, I2RTF, at <pibegali@tin.it>.

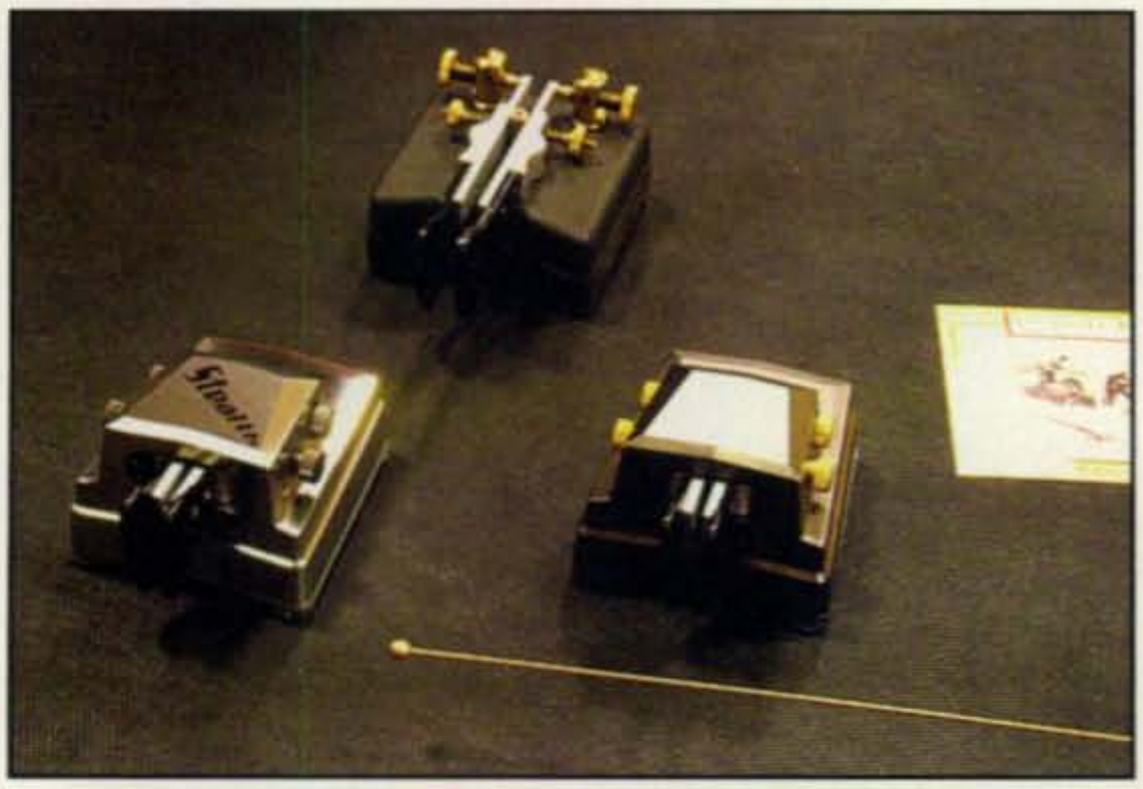
Also in the Ballarena was the Rig Expert booth, where the "experts" were actively displaying their new antenna analyzers—the AA-230,; the AA-520; and the all-new AA230 Pro, a powerful yet portable laboratory-grade antenna analyzer designed for testing, checking, tuning, or repairing antennas and antenna feedlines in the 0.3 to 230 MHz range. More information about the AA230 Pro can be found at the company's website, <www.rigexpert.net>.

East Hall

The final section of Hara Arena on our tour, the East Hall, gave us insight into some very interesting ham products such as those found at our first stop—Ten-Tec, which makes more

than radios. This year the folks there introduced two new microphones, the Regal desk mic and the Model 777 DX-Pro headset mic, as well as two new power supplies (one with a built-in speaker) and the Model 712 USB soundcard interface.

Next, we visited West Mountain Radio, where conversation centered on its new ISOpwr 12-volt auxiliary battery isolator. West Mountain Radio's John Kalotai, N1OLO, said the ISOpwr is handy for RVs, cars, or boats; charges lead acid, gelled, and AGM batteries; and handles up to 40 amps. For more information about the ISOpwr and other products from West Mountain Radio, visit <www.westmountainradio.com>.



Begali Stealth keyers (front) are made from a solid block of aluminum and will be made in very limited quantities.

Over at the Pixel Technologies booth, we met Doug Talley, who was making his first trip to Dayton to show off his new RF PRO-1 loop antenna. Talley said the loop antenna is based on a unique Moebius Loop architecture that gives it improved reception and improved noise rejection from 100 Hz to 30 MHz. For more details on this innovative antenna design, visit <www.pixelsatradio.com> or call 1-303-526-1965.

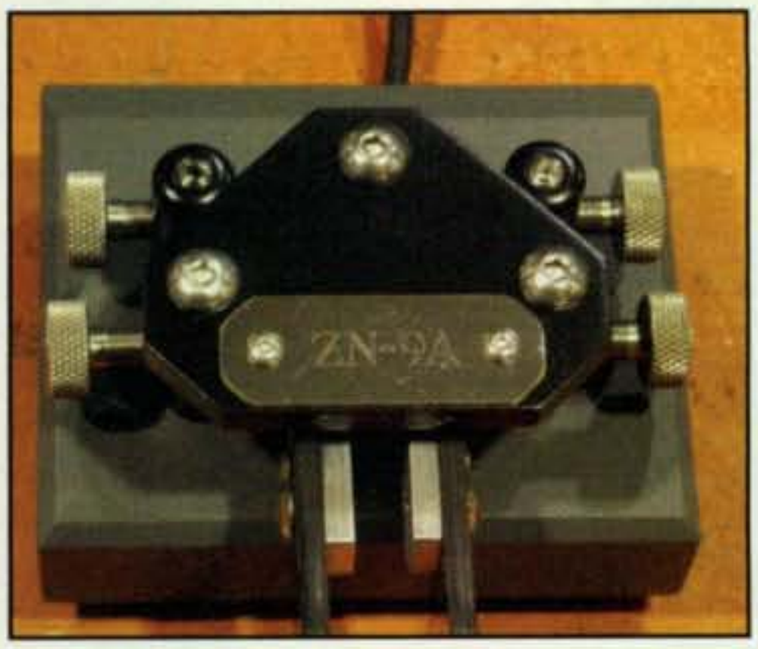
Tony Baleno, N3ZN, was the person who greeted us at the N3ZN Keys booth in the East Hall and told us about his company's new ZN series of high-end iambic paddle keyers. Tony explained that the ZN keyers incorporate old-school style with new-school technology and feature ball-bearing movement, magnetic lever return, and quick-adjusting contact and magnet screws, resulting in a highly responsive feel that make sQRQ operation a breeze. For more information on N3ZN Keys, visit the website at <www.N3ZNkeys.com>.

The AA-230 is one of three new antenna analyzers introduced at Dayton by RigExpert.

Ten-Tec debuted its Regal desk mic this year, along with a headset mic, USB soundcard interface, and two power supply models.

The RF-Pro 1 loop antenna from Pixel Technologies reportedly covers 100 Hz to 30 MHz.

Green Heron Engineering's booth may have been one of our last stops in the East Hall, but it was no less fascinating due to the Radio Boss USB unit which was making its first public appearance at Hamvention. Described as a universal radio interface, the Radio Boss USB is built to address the needs of multi-mode contest operators by providing serial radio control plus all of the other commonly needed computer interface requirements for ham radio operation—mobile, portable, and fixed—in one compact package. For more deials about the Radio Boss USB and other fine Green Heron products, visit <www.GreenHeronEngineering.com>.



N3ZN's ZN-9 keyer is said to combine old-school style with new-school technology.

West Mountain's ISOpwr auxiliary battery isolator will handle up to 40 amps of current draw.

The VNA-2180 vector network analyzer from Array Solutions.

Array Solutions also represented Germany's Hofi-Technik company at the show, bringing several products, including the motorized antenna switch seen here.

Array Solutions in the East Hall became our final stop on the Hamvention tour, where we were greeted by Jay Terleski, WXØB, who introduced us to a number of new products, including the new Vector Network Analyzer model VNA2180 which measures resistance, reactance, SWR, and impedance of antennas plus a whole lot more. To see the complete list of all the things the VNA2180 can do for you, visit <www.arraysolutions.com>. In addition to selling his own products, Jay is the U.S. representative for several overseas manufacturers. A newcomer to his booth this year was Germany's Hofi-Technik, which featured a motorized antenna switch and a military-grade lightning arrestor, the LP-1103. Information on Hofi-Technik products is also available on the Array Solutions website.

Please Watch Your Step as You Exit the Train ...

Well, that wraps up our annual tour of the new products unveiled at this year's Dayton Hamvention. For those of you who attended the 2010 show, maybe we let you in on a few things you didn't know were introduced at this year's exposition, and for those of you who did not attend, maybe we gave you an idea of what you missed.

I've been attending the Dayton Hamvention since 1975, and every year I find it to be a unique microcosm of all things that make up this great hobby we call amateur radio. So next year if you have the time, the funds, and you like to be in the know about what's new in the hobby, maybe you can plan on attending Hamvention 2011. And if I'm lucky enough to get to the Dayton Hamvention myself next year, maybe I'll see you there. Until then, 73 from WV5J.

What You've Told Us...

June's reader survey asked about your experiences with operating Field Day. Virtually everyone who responded (89%) has participated in Field Day at least once, and the majority participate regularly (35% every year + 23% most years). In addition, 16% participate sometimes, 15% rarely and 10% never. Two-thirds of you belong to a club that runs a Field Day operation, and your roles in those operations over the years have been many and varied. Nearly four in five of you (79%) have been operators, 66% helped with setup, 62% with tear-down; 52% have been involved in socializing and 45% in planning, while 25% have had support responsibilities and 24% have done public relations.

Most of you think your club has been either very effective or somewhat effective in most of Field Day's key goals, with the social aspects outpacing the others, and more of you felt that your club is "somewhat effective" in most areas vs. "very effective" or "not particularly effective." On scoring points, it was 30% very effective, 35% somewhat effective and 21% not particularly effective; building emergency preparedness came in at 33% very effective, 35% somewhat and 15% not particularly. Promoting amateur radio to the public was scored at 27%/ 42%/15%; promoting amateur radio to government officials was 25%/33%/ 27%; building social cohesion in your group was 48%/30%/7%, and welcoming new operators and visitors to your operation came in at 43%/35%/8%.

This month's free subscription winner is Mike Anascavage, KA8PTT, of Columbus, Ohio.

Reader Survey September 2010

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*.

The main topic of this month's DX column is 6 meters, the so-called "Magic Band." Twenty years ago, there wouldn't have been enough activity on 6 to justify a write-up in our main DXing column, but 50 MHz is now a mainstream DX band. So this month, we want to get a sense of your activity level on 6 meters.

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

1. Do you consider yourself a DXer?
Yes....1
No....2

2. Do you currently have a radio that is capable of operating on 6 meters?
Yes....3
No....4

3. Do you currently have an antenna that can be used on 6 meters?
Yes....5
No....6
Don't know....7

4. Do you operate on 6 meters?
Yes, currently....8
Not now, but in the past....9
No....10

5. How frequently do you operate on 6 meters?
Regularly....11
Occasionally....12
Rarely....13
Never....14

6. Do you know what grid square you are in?
Yes....15
No....16
What's a grid square?....17

7. Have you ever worked international DX on 6 meters?
Yes....18
No....19
Not sure....20

8. Have you earned any operating awards on 6 meters?
Yes, VUCC....21
Yes, DXCC....22
Yes, WAZ....23
Yes, other....24
No....25

9. If you are not currently active on 6 meters, are you interested in getting on the band?
Yes....26
No....27
Not sure....28

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

MFJ 160-6 Meter Antenna

Self-supporting 43 foot vertical -- no guy wires required . . . 1500 Watts . . . exceptional performance . . . low-profile . . . includes base mount and legal limit balun . . . assembles in an hour . . .

MFJ-2990
$359.95

New!

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

Exceptional Performance

The entire length radiates to provide exceptional low angle DX performance on 160 through 20 meters and very good performance on 17 through 6 Meters. You can shorten it by telescoping it down for more effective low angle radiation on higher bands if desired.

With an automatic antenna tuner there's no fuss -- just talk!

A wide-range automatic or manual antenna tuner *at your rig* easily matches this antenna for all bands 160-6 Meters. There's no physical tuning adjustments on the antenna -- you simply put it up!

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than ½ dB 60-6 Meters and less than 1 dB 160-80 M with good quality, low-loss coax).

Fully self-supporting, Extremely low wind loading, Very low visibility . . .

With just 2 square feet wind load, the fully self-supporting MFJ-2990 -- *no guy wires needed* -- has the lowest wind-loading and lowest visibility of any vertical antenna! The key is a six foot section of tapering diameter *stainless steel* whip that flexes in strong wind instead of stressing the bottom sections. Its 2-inch O.D. and .120 inch

thick walled tubing bottom section makes it incredibly strong -- it'll stay up!

Weighs just 20 pounds -- you can easily put it up by yourself because its corrosion resistant *6063 aircraft aluminum* tubing and stainless steel construction make it light *and* super-strong.

Assembles in an hour

You can easily assemble it in an hour! Ground mounting lets you completely hide its antenna base in shrubbery. Includes ATB-65 high-strength antenna mount. Requires ground system -- at least one radial. More extensive ground system will give much better performance.

Great for Stealth Operation in antenna restricted areas

This very low-profile antenna is perfect for stealth operation in antenna restricted areas. Hide it behind trees, fences, buildings, bushes. Use it as a flagpole. Telescope it down during the day. Put it up at night and take it down in the morning before the neighbors even notice!

Quick and easy installation makes it great for DXpeditions, field day and other portable and temporary operations.

MFJ *Automatic* Tuners

MFJ-998
$699.95

For legal limit 1500 Watt SSB/CW amplifiers. Auto-ranging LCD and Cross-Needle SWR/Wattmeter, antenna switch, amp bypass, matches 12-1600 Ohms, 1.8-30 MHz.

MFJ-993B
$259.95

Dual power range -- 300 Watt range matches 6-1600 Ohms. 150 Watt/6-3200 Ohms. Auto-ranging LCD and Cross-Needle SWR/Wattmeter, antenna switch, 1.8-30 MHz.

MFJ *Manual* Tuners

MFJ-989D
$389.95

1500 Watts SSB/CW, 1.8-30 MHz. Active peak-reading Cross-Needle SWR/Wattmeter, balun, dummy load, antenna switch, aircore roller inductor.

MFJ-949E
$179.95

World's most popular tuner! 300 Watts, 1.8-30 MHz. Peak/Average Cross-Needle SWR/Wattmeter, 8 pos. antenna switch, dummy load, 1kV capacitors.

Window Feedthru

MFJ-4602
$69.95

Bring 3 coaxes, balanced line, random wire, ground thru window. Connectors mounted on *stainless steel* panel. ¾" thick *pressure-treated* weather-proof wood.

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Announcing:

The 2010 CQ WW DX Contest

Phone: October 30–31 CW: November 27–28
Starts 0000 GMT Saturday Ends 2400 GMT Sunday

I. OBJECTIVE: For amateurs around the world to contact other amateurs in as many zones and countries as possible.

II. BANDS: All bands, 1.8 through 28 MHz, except for WARC bands.

III. TYPE OF COMPETITION (choose only one):

For all categories:

1. All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score.

2. All high power categories must not exceed 1500 watts total output power, or the output power of their country, whichever is less, on any band.

3. All transmitters and receivers used by the entrant must be located within a single 500-meter diameter circle or within the property limits of the station licensee's address, whichever is greater.

4. All antennas used by the entrant must be physically connected by wires to the transmitters and receivers used by the entrant.

5. Only the entrant's callsign can be used to aid the entrant's score.

6. A different callsign must be used for each CQ WW entry.

7. An entrant's remote station is determined by the physical location of the transmitters, receivers, and antennas. A remote station must obey all station and category limitations of Rule III.

8. A competitor who wishes to be judged for a top score in their category must agree to a potential visitation at any time during the contest by an observer appointed by the CQ WW Contest Committee (CQ WW CC). Failure of the entrant to respond to our correspondence or to allow an observer full access to the contest QTH may result in the competitor being removed from award eligibility for 3 years.

A. Single Operator categories: For all single operator categories, only one person (the operator) can contribute to the final score during the official contest period. **QSO alerting assistance of any kind (this includes, but is not limited to, packet, local or remote Skimmer and/or Skimmer-like technology, Internet) places the entrant in the Single Operator Assisted category.**

1. Single Operator High (All Band or Single Band): One person. One signal at any one time. QSO alerting assistance of any kind is not allowed. Self-spotting or asking to be spotted is not allowed. Total output power per band must not exceed 1500 watts or the output power regulations of the country in which the entrant is operating, whichever is less.

2. Single Operator Low (All Band or Single Band): One person. One signal at any one time. QSO alerting assistance of any kind is not allowed. Self-spotting or asking to be spotted is not allowed. Total output power per band must not exceed 100 watts.

3. Single Operator QRP (All Band or Single Band): One person. One signal at any one time. QSO alerting assistance of any kind is not allowed. Self-spotting or asking to be spotted is not allowed. Total output power per band must not exceed 5 watts.

4. Single Operator Assisted (All Band or Single Band): One person. One signal at any one time. QSO alerting assistance is allowed (this includes, but is not limited to, packet, local or remote Skimmer and/or Skimmer-like technology, Internet). Self-spotting or asking to be spotted is not allowed. Total output power per band must not exceed 1500 watts or the output power regulations of the country in which the entrant is operating, whichever is less.

B. Multi-Operator (all band operation only):

1. Single Transmitter (*MS*): Only one transmitter and one band permitted during any 10-minute period. Exception: One—and only one—other band may be used during any 10-minute period if—and only if—the station worked is a new multiplier. Ten-minute periods are defined as starting with the first logged QSO on a band. A multiplier station cannot call CQ. Logs found in violation of the 10-minute rule will automatically be reclassified as M2. If electronic logging is used (Cabrillo), for each QSO the run transmitter or multiplier transmitter must be indicated in the log.

2. Two Transmitter (*M2*): A maximum of two transmitted signals at any time on different bands. Both transmitters may work any and all stations. A station may only be worked once per band regardless of which transmitter is used. Each of the two transmitters used must keep a separate chronological log for the entire contest period, or if electronic logging is used, the electronic log submittal (Cabrillo) must indicate which transmitter made each QSO. Each transmitter may make a maximum of 8 band changes in any clock hour (00 through 59 minutes).

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

C. Xtreme Contesting: To encourage the development of new technologies in contesting. For the full rules, go to <http://www.cqww.com> and click on Xtreme category rules for 2010.

D. Team Contesting: A team consists of any five radio amateurs operating in the single operator category. A person may be on only one team per mode. Competing on a team will not prevent any team member from submitting his/her personal score for a radio club. A team score will be the sum of all the team member scores. SSB and CW teams are totally separate. That is, a member of an SSB team may be on a totally different CW team. A list of a team's members must be received at CQ Headquarters by the time the contest begins. E-mail to <teams@cqww.com>, or mail or fax the list to CQ, Att: Team Contest, 25 Newbridge Road, Hicksville, NY 11801 U.S.A.; fax 516-681-2926. Awards will be given to the top teams on each mode.

IV. NUMBER EXCHANGE: Phone: RS report plus zone (i.e., 5705). CW: RST report plus zone (i.e., 57905).

V. MULTIPLIER: Two types of multiplier will be used.

1. A multiplier of one (1) for each different zone contacted on each band.

2. A multiplier of one (1) for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The CQ Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards. Maritime mobile stations count only for a zone multiplier.

VI. POINTS:

1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North American boundaries count two (2) points.

3. Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero (0) point value.

VII. SCORING: All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multipliers. *Example:* 1000 QSO points × 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).

VIII. AWARDS: First-place certificates will be awarded in each category listed under Sec.III in every participating country and in each call area of the United States, Canada, European Russia, Spain, Poland, and Japan.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award only. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

All certificates/plaques will be issued to the licensee of the station used.

IX. TROPHIES AND PLAQUES:

Plaques and trophies are awarded for top performance in a number of categories. They are sponsored by individuals and organizations. For a current list of plaques and sponsors, or to learn how to become a sponsor, see the *CQ* website: <http://www.cq-amateur-radio.com/cqwwhome.html>. A station winning a World trophy will not be considered for a sub-area award; the trophy will be awarded to the runner-up in that area.

X. CLUB COMPETITION:

1. The club must be a local group and not a national organization.

2. Participation is limited to club members operating within a local geographic area defined as within a 275 km radius from center of club area (except for DXpeditions specially organized for operation in the contest; club contributions of DXpedition scores are percentaged to the number of club members on the DXpedition).

3. To be listed, a minimum of 3 logs must be received from a club, and an officer of the club must submit a list of participating members and their scores, both on phone and CW.

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.

2. All sent and received exchanges are to be logged.

3. Indicate zone and country multiplier only the FIRST TIME it is worked on each band.

4. **Electronic log submission:** We want your electronic log. The Committee ***requires*** an electronic log for any possible high-scoring log. By submitting a log to the CQ WW Contest, the entrant agrees to have the log open to the public. If possible, we would appreciate complete frequencies in the log.

E-mail Required Content: *Please submit your log in the Cabrillo file format created by all major logging programs.* Be sure to put the STATION CALLSIGN and the MODE in the "Subject:" line of each message. Your e-mail log will automatically be acknowledged by the server. You will also receive a personal access code from the server at a later time. Electronic submission implies a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed. Submit your CQ WW SSB log to **<ssb@cqww.com>** and your CQ WW CW log to **<cw@cqww.com>**.

5. **Paper log submission:** For paper logs, use a separate sheet for each band. Each paper log entry MUST be accompanied by a summary sheet showing all scoring information, category of competition, and contestant's name and address in BLOCK LETTERS. Sample log and summary sheets and zone maps are available from *CQ*. A large, self-addressed envelope with sufficient postage or IRCs must accompany your request. If official forms are not available, make up your own, 80 contacts to the page on $8^1/2$" × 11" paper. All paper log entrants are required to submit cross-check sheets (an alphabetical list of calls worked) for each band on which 200 or more QSOs were made.

6. Bad QSO: The bad QSO is removed and a penalty of three more equivalent QSOs is applied to the points only.

7. QRPp and Low Power stations must indicate their category on their summary sheets and state the actual maximum power output used, with a signed declaration.

XII. ACTIONS OF THE CQ WW CC

YELLOW card: Not eligible for an award in the entered contest. An entrant or operator issued a yellow card will be listed at the end of the published results.

Two YELLOW cards: An entrant or operator receiving two yellow cards in three consecutive CQ WW DX contests will be ineligible for any CQ-sponsored contest award for a period of two years beginning with the publication of the second violation in *CQ* magazine. If the entrant is in a multi-operator category, all listed operators are so affected.

RED card: Not eligible for an award in the entered contest. Entrants receiving a red card will be listed at the end of the published results. An entrant or operator receiving a red card will be ineligible for any CQ-sponsored contest award for a period of one year beginning with the publication of the violation in *CQ* magazine.

Two RED cards: An entry or operator receiving two red cards within five consecutive CQ WW DX contests will be ineligible for any CQ-sponsored contest award for a period of three years beginning with the month of publication of the second violation in *CQ* magazine. If the entrant is in a multi-operator category, all listed operators are so affected.

1. The CQ WW CC reserves the right to reject any entry for non-compliance with the rules.

2. Violation of the rules of the contest makes the entrant subject to either a red or yellow card at the discretion of the CQ WW CC.

3. Unsportsmanlike conduct can be grounds for either a red or yellow card at the discretion of the CQ WW CC. Unsportsmanlike conduct includes but is not limited to ANY use by an entrant of any non-amateur means in the contest including, but not limited to, telephones, Internet, instant messaging, chat rooms, VoIP, or the use of any DX cluster/reflector to SOLICIT, ARRANGE, or CONFIRM any contacts during the contest.

4. Taking credit for excessive unverifiable QSOs or unverifiable multipliers may result in a yellow or red card at the discretion of the CQ WW CC.

5. An entrant is free to withdraw his/her submitted log for any reason prior to receiving an official letter from the CQ WW CC. The log will then be handled per the entrant's request. If after receiving an official letter from the CQ WW CC, an entrant chooses to withdraw their log, the entrant's call will be listed at end of the results showing their log as having been withdrawn.

6. By submitting a CQ WW DX Contest log, an entrant agrees that the issuing of red cards, yellow cards, and other decisions of the CQ WW CC are official and final.

XIII. DEADLINE:

1. **All entries must be sent NO LATER than November 21, 2010 for the SSB section and December 21, 2010 for the CW section.**

2. An extension of up to one month may be given if requested by e-mail (questions@cqww.com). The granted extension must be confirmed by the Contest Director, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs postmarked after the extension deadline may be listed in the results but will be declared ineligible for an award.

Both Phone and CW mailed logs should be sent to CQ Magazine, 25 Newbridge Road, Suite 309, Hicksville, NY 11801. Please mark SSB or CW on the envelope.

BY FREDERICK O. MAIA,* W5YI

From the Mailbag: Answers to Readers' Questions

We save the letters, e-mail messages, and phone-call questions that we receive and every so often we try to answer some that are of general interest. The two subjects we get the most inquiries about by far concern the confusion surrounding amateur radio station callsigns and dealing with FCC procedures. This month, let's cover a few of these questions.

Q: How are U.S. station callsigns—including amateur radio—determined?

A: Station callsigns have a three-fold purpose. As an aid to enforcement of all radio regulations, they identify the nationality of the station, the type of station, and the individual station. Radio callsigns, in effect, are the "license plates" that identify communications traffic on the radio highways. Most transmitting stations of the world are required to identify themselves at regular intervals.

Before 1912, amateur station callsigns were just made up by the operator. It wasn't until the Radio Act of 1912 that the first licenses were issued. The first allotment of call letters was made at the 1912 London International Radiotelegraphic Convention, which provided that the call letters of stations had to be formed of different groups of three letters. Radio amateurs, however, did not qualify for these three-letter callsigns.

In 1913, the U.S. Dept. of Commerce provided that the call letters for amateur stations would be assigned by radio inspectors, each for his own district. Amateurs got callsigns beginning with a radio inspection district number (1 through 9) followed by two letters. The first letter was from A through W. X was reserved as the first letter for stations holding Experimental licenses (for example ,1XE); Y designated stations holding a Technical or Training School license (e.g., 5YI was the callsign of Rice Institute in Houston); Z went to qualified amateurs holding Special Amateur licenses which allowed them to legally operate on less congested wavelengths (e.g., 8ZZ).

Since 1927, and by international agreement, the first characters of all radio station callsigns indicate the country in which the station is authorized to operate. The callsign prefixes are coordinated by the International Telecommunication Union (ITU), Geneva, Switzerland, a specialized agency of the United Nations.

The ITU has assigned the United States three prefix letters—N, K, and W. The U.S. is also allocated AA through AL. (The balance of "A" prefixes are assigned to other countries: Spain is allocated AM–AO, Pakistan AP–AS, India AT–AW, Australia AX, and Argentina AY–AZ.) Some ITU countries, but not the United States, are allocated station callsigns that begin with a number.

The U.S. government in turn allocates three-letter callsign prefix blocks AAA through AEZ and ALA through ALZ to the Dept. of the Army. The Air Force uses AFA through AKZ prefixes, and the Navy and Coast Guard share NAA through NZZ. Civil aircraft in the U.S. with an N registration do not use the N prefix in their callsign. For identification purposes the aircraft manufacturer's name or model is stated instead.

Domestic stations (both government and non-government) utilize other station prefixes beginning with K and W. Some stations contain numerals, others (such as some ship, coast, aircraft ,and broadcasting stations) do not. Only U.S. amateur stations are allocated the single letter N, two-letter NA to NZ and two-letter AA to AL prefix blocks. The single prefix letter A may not be used by any U.S. station.

Part 2 of the FCC Rules details the required composition of all station callsigns and the blocks of letters that are assigned to each radio service. According to law, U.S. amateur station callsigns must consist of one or two prefix letters, one digit, and up to three suffix letters. The prefix letters may be K (or KA–KZ), N (or NA–NZ), W (or WA–WZ), or AA–AL. The numeral is 1 through Ø, and the suffix letter blocks are A–Z, AA–ZZ, and AAA–ZZZ.

Two-by-three format callsigns beginning with AA to AL and NA through NZ are currently not assigned to anyone even though the FCC rules (Part 2, Subpart D, Section §2.301) provide for them to be assigned to U.S. amateur stations.

The FCC implemented the new Group callsign Assignment System on March 24, 1978. The new system used all of the formats authorized by Section §2.301 except two: AA1AAA to ALØZZZ and NA1AAA to NZØZZZ. The reason given was that they were not needed since the other 2-by-3 formats (KA1AAA to KZØZZZ and WA1AAA to WZØZZZ) provided more than 9-million combinations.

Using the Part 2 guidelines, the FCC issues ham callsigns under three different programs. An amateur's first callsign will be assigned in strict sequence from an alphabetized list appropriate for his/her license class. This is known as the Sequential callsign System. There are four callsign groupings (A, B, C, and D), with the shortest callsigns being reserved for the higher class ham licenses.

Amateur radio operators are permitted to change their sequential callsigns without cost, but they may only request another sequential callsign appropriate for their callsign grouping. You may not choose a specific callsign under this program.

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

The Vanity callsign System permits amateurs to select an exact callsign of their choice—that is, as long as it contains a format appropriate for their license class and is not already assigned or otherwise unavailable (more on that later). Specific user-selected callsigns require an annually adjusted payment to the FCC. Beginning this month, this amount is $14.30.

The Special Event callsign System allows any ham operator to temporarily use a 1-by-1 format (example: K1A) callsign without cost for a short period of time to commemorate an "event" that the user defines.

Q: How do I know what callsigns are available for assignment to me under the vanity callsign program?

A: A simple and extremely common question, but the answer is complex! The fact is that more than half of all requested vanity callsigns are not issued for one reason or another. The most common reasons are that the callsign was applied for too late or early, was unavailable, or there was competition for the same callsign.

Just because one of the amateur databases (or an online vanity callsign service) shows a callsign to be unassigned does not mean it is available to you. The vanity callsign program is governed by Section 97.19 of the rules and other various FCC policies covered on the the FCC's amateur service website.

Ten important things you need to know about vanity callsigns:

1. A callsign is not available to the vanity callsign system for two years following an amateur's death, or for two years following the expiration or cancellation of the callsign, whichever is sooner. "Following" means at least one day plus two years after death, cancellation, or expiration of the callsign. A ham callsign remains active for 12 years. The additional two-year period beyond the 10-year license term exists primarily to provide a grace period for an expired license to be renewed. However, there are other reasons.

2. Former holders of a callsign and close relatives (family and in-laws) of a deceased amateur do not have to wait the two years. Ham clubs, with permission of a family member, may also immediately apply for a deceased member's callsign.

3. Just because an amateur died more than two years ago does not mean his or her callsign is available. Many callsigns of deceased radio amateurs are still listed as "active" in the FCC's amateur service database and must be

canceled before you can apply for them. You can cancel a callsign by sending an obituary or death certificate of the deceased radio amateur to the FCC in Gettysburg, Pennsylvania.

4. The callsigns you request must be selected from an appropriate callsign group. Extra Class hams may request any available callsign not excluded from assignment. Technician and General Class applicants are eligible only for (Group C) 1-by-3 and (Group D) 2-by-3 format callsigns. In short, the callsigns selected must correspond to an applicant's same or lower class of operator license.

5. You may select a callsign from any numerical radio district. You do not have to conform to your own (Ø through 9) area. For example, an applicant in New York (the number 2 in the callsign) can apply for a callsign with any number, Ø through 9.

6. Certain callsigns are not issued. These include certain 2-by-2 and a few 2-by-3 callsigns assigned to the military beginning with the prefix letter K. Callsigns having the suffix letters SOS or (Q-signals) QRA–QUZ are also never issued. Callsigns having the prefix letters AF, KF, NF, or WF and the suffix letters EMA are allocated to government FEMA stations. Also, a 2-by-3 format callsign having the letters WC, WK, WM, WR, or WT as the prefix were excluded as of March 24, 1978. These so-called Group X callsigns were set aside for certain types of stations. The Group X program was never implemented by the FCC. However, some of these prefixes were issued prior to this date, so you may recall a repeater with a WR-prefix callsign.

7. Certain callsign prefixes are reserved for applicants with a mailing address outside the continental (lower 48) states. These include Alaska, Hawaii, and certain Caribbean and South Pacific islands such as Puerto Rico, the U.S. Virgin Islands, Guam, and American Samoa. These restricted prefixes are AH, AL, KH, KL, KP, NH, NL, NP, WH, WL, and WP. You do not have to live in a restricted prefix area; only an address where you can receive mail is required.

8. There are several vanity callsign websites that offer information about currently available callsigns or ones that will be available sometime in the future. All have their shortcomings and should not be used as the final callsign selection criteria. For example, none show callsigns pending assignment. The final authority is the FCC's online amateur service database.

9. About fifty vanity callsign applications are filed with the FCC every day. That means the chances are that someone else could also apply for a callsign you want when it becomes available. This is especially true of 1-by-2 and 2-by-1 format callsigns, which are in short supply. Be aware that the FCC awards a callsign by lottery when more than one application is received for the same callsign during the first 24-hour day of availability. All applications received during a specific day (Eastern Time 00:00 to 24:00 hours) are lumped together and the FCC's computer randomly chooses one.

10. There is an 18-day "pending" period between vanity callsign application and assignment. This period exists to allow time for mailed-in paper applications to arrive at the FCC, where (using the postmarked date) they are combined with online-filed requests. (This eliminates the time advantage obtained by those filing online.) You can do an application search for vanity callsigns pending assignment at <http://wireless2.fcc.gov/UlsApp/ApplicationSearch/searchVanity.jsp>. Choose another callsign if the callsign you want is pending assignment to someone else.

Q: Why does a person have to pass lower class ham radio written license examinations if he can pass the Extra Class exam?

A: In a nutshell, because the written ham license examinations are "additive." That is, most of the question pools from which the written examinations are constructed relate to a specific class of license.

For example, the Technician (Element 2) questions cover beginning privileges, practices, and equipment and are oriented towards VHF operation, while the General Class (Element 3) has more HF questions. The Extra Class (Element 4) examination covers advanced operating and construction practices. Both the General and Extra exams include questions on examining others for ham tickets.

You need to know all of the subject matter included in the lower class tests, not just the material covered in the Extra Class exam. Thus, the question pools serve as an outline of what you need to know to advance up the ham radio ladder. You can't start at the top. You need to climb up one rung at a time, learning as you go.

Each written exam question pool is revised every four years. A new Element 2 (Technician) question pool was effective July 1, 2010. The 384 question pool will remain valid through June 30, 2014.

Q: I keep hearing that other services and industry want our frequencies. How can they get them if they are allocated to us?

A: The allocation of radio frequencies involves the setting aside of segments of the radio spectrum for the use of particular radio services. It is a very complex matter—especially since our government sells spectrum to accommodate new technology and to raise money for the U.S. Treasury. The band assignments are influenced by the behavior of radio waves at different frequencies and the needs of the user.

All frequency assignments must be performed within a framework of international agreements both regional and worldwide in scope. The worldwide governing body over telecommunications is the International Telecommunication Union. The ITU has more than 180 member countries.

There are different kinds of frequency allocations. The international plan calls for three different geographical regions. The United States, Canada, and Central and South America are located in ITU Region 2.

In the United States, radio spectrum may be allocated to either government or non-government use exclusively or shared by one or more radio services. These allocations must follow the international plan for ITU Region 2. The National Telecommunications and Information Administration (NTIA) oversees government spectrum, while the Federal Communications Commission (FCC) manages non-government frequencies.

Sometimes more than one service shares spectrum internationally, but our FCC only allows use in the U.S. by one of them. It is legal under international law for our FCC to extend use to additional radio services—or to exclusively reallocate spectrum to other uses—as long as the new use conforms to the international table of allocations.

When more than one radio service shares an allocation, the services are designated as "primary" or "secondary." Radio services that are designated as secondary may not interfere with primary services and are not protected from their interference.

Some ham bands are allocated to the Amateur Service exclusively in all three ITU Regions (such as the HF ham bands, 10 through 20 meters). Some bands are exclusive ham spectrum in ITU Region 2 and may used by other

services in other regions. For example, the 146 to 148 MHz segment of the Region 2 two-meter band is not allocated to the Amateur Service in Region 1 (Europe).

To make matters even more complicated, some countries (including the United States) have taken a "footnote" exception to the international spectrum allocation plan and are not bound to follow it.

All ham bands above 2 meters allocated by the FCC to the U.S. Amateur Service are also internationally allocated to other services. It is thus possible for the FCC to permit these other services to also share these frequencies, or to exclusively reallocate spectrum used by the Amateur Service to other internationally approved radio services.

The FCC is mandated by Congress to provide for the widest use of radio "in the public interest." It is not an easy job. The biggest problem facing the expanded use of radio is the scarcity of available frequencies. One of the ways that the Commission deals with the short supply of spectrum is through frequency sharing.

The number of fixed telephone lines worldwide continues to drop, but the drop has been massively more than compensated for by the growth in mobile cellular networks. There are now fewer wired telephone lines (which don't require spectrum) than wireless. In the four years ending in 2009, mobile broadband penetration has grown more than tenfold.

The most pressing spectrum problem nowadays is the explosive growth of mobile broadband. The FCC needs another 500 MHz to support it; the only way to get it is through reallocation. The ham bands from 222 MHz (the 1.25-meter band) to 2.45 GHz (13-cm band) are at the greatest risk of being reassigned.

While spectrum-hungry wireless broadband networks are taking over the telephone, the opposite is true with television broadcasting. Most (85%) of all households receive TV through wired cable or satellite delivery. The FCC is looking at reallocating the over-the-air television channels to wireless broadband. Frequency sharing among amateur radio, broadcasting, and the mobile community is not possible.

Do you have any questions that you would like answered? If so, send us an e-mail. We'll answer the general interest ones in an upcoming column. See you next month.

73, Fred, W5YI

A Fiber Optics Primer – Part I

BY IRWIN MATH,* WA2NDM

Our June 2010 column "touching on" the basics of fiber-optic technology struck a real note with our readers and resulted in numerous e-mails asking to please expand the discussion with more details. As the mail was overwhelming, we decided to give you the "long version," but in a form that the novice as well as "professional" would understand. We therefore proceeded to edit and simplify an abstract of a fiber-optic primer that I wrote several years ago. For all of those who asked, here is my offering. For those who didn't, you might want to read it anyway and possibly learn something.

As you may know, in the early part of the 20th century simple copper wire sufficed for any and all "hard-wired" data transmission. As technology matured, however, this soon gave way to coaxial cable, and currently fiber-optic cable has become the medium whereby high-density, long-distance signals are propagated. The almost unlimited bandwidth and unique advantages of fiber-optic cable compared to copper wire assures that this will be the preferred propagation media for the foreseeable future.

Low-loss, glass fiber-optic cable offers distinct advantages as a transmission medium over other methods for the following reasons:

1. The fiber will carry much more information and deliver it with greater fidelity than either copper wire or coaxial cable.

2. The fiber is totally immune to virtually all kinds of interference, including lightning, and will not conduct electricity. Therefore, it can come in direct contact with high-voltage electrical equipment or power lines. It also will not create ground loops of any kind between both ends of a transmission system.

*c/o CQ magazine

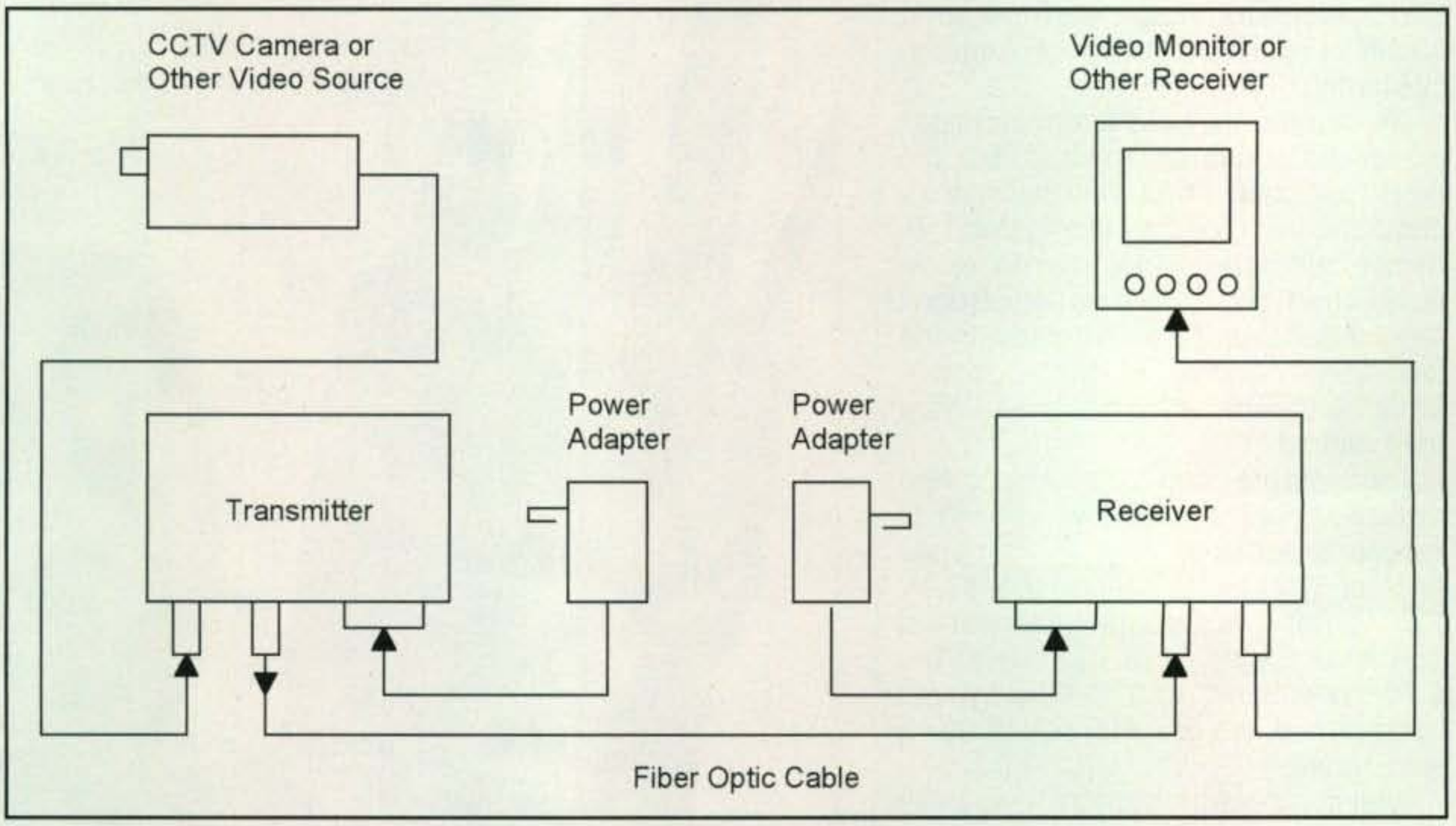

Fig. 1– Basic fiber-optic transmission system.

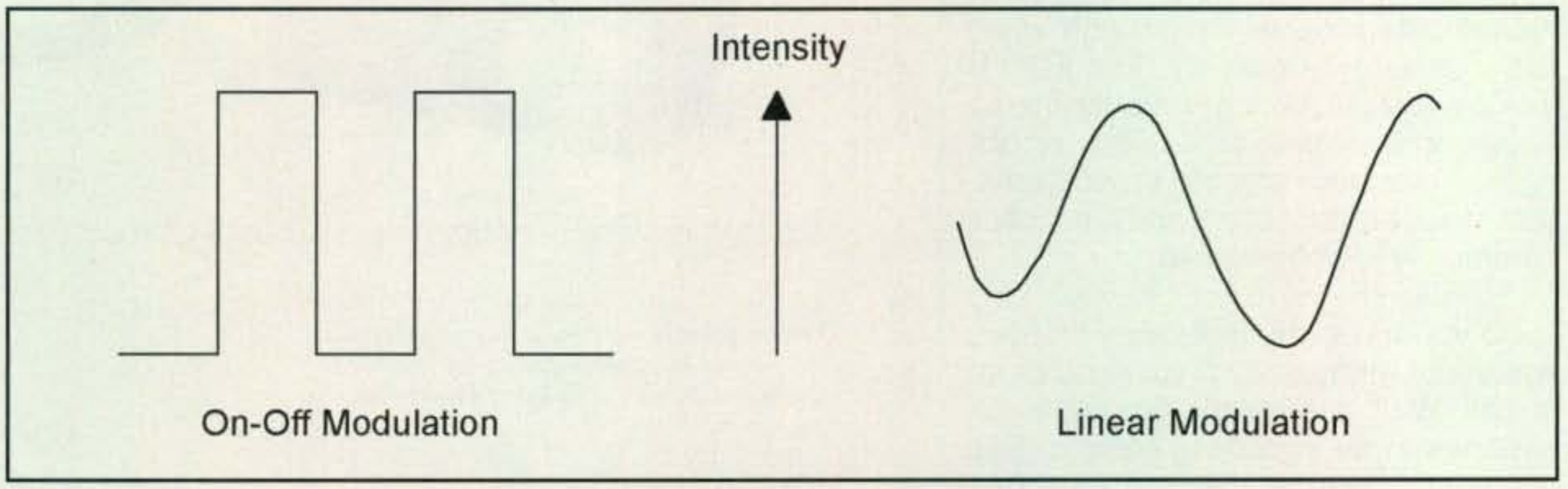

Fig. 2– Basic optical modulation methods.

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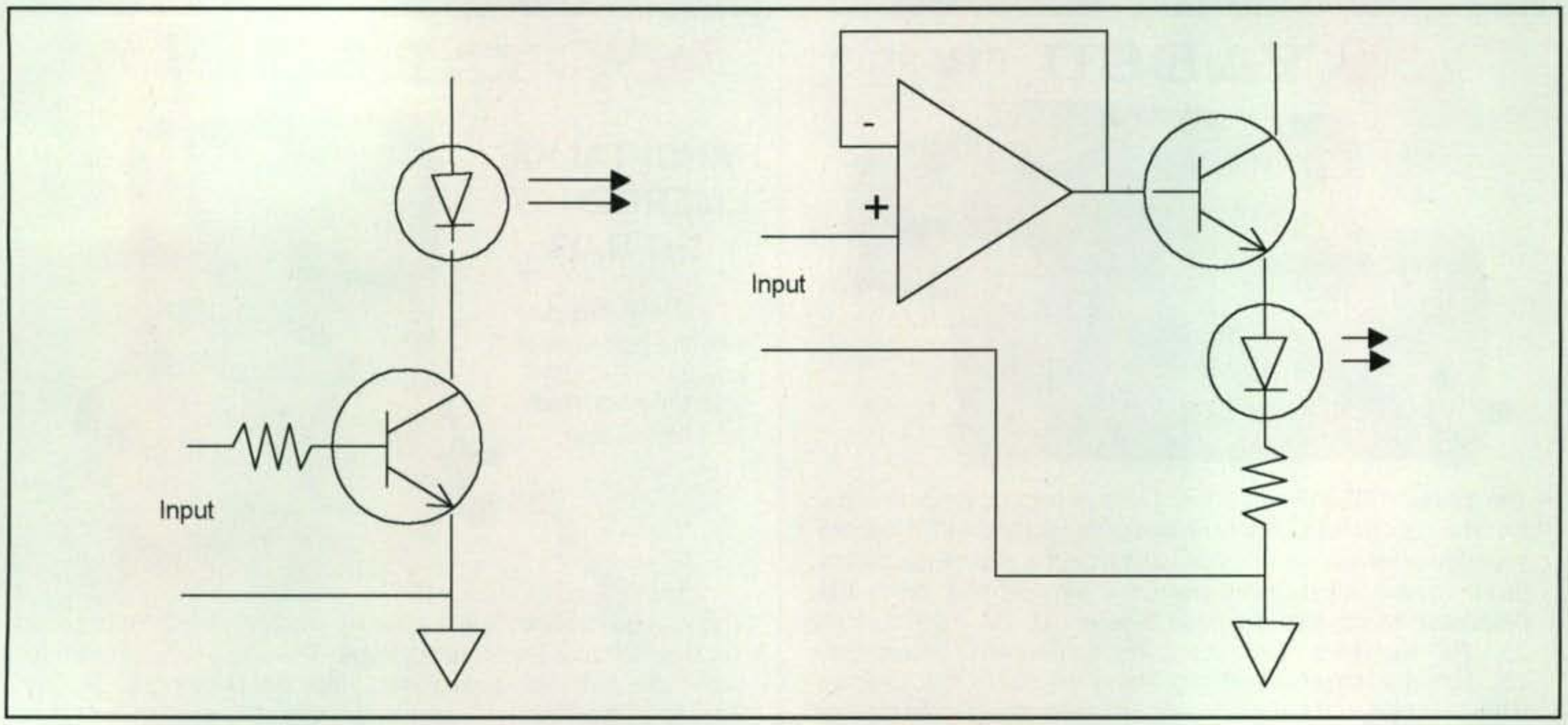

Fig. 3– Methods of modulating LEDs or laser modules.

3. As the basic fiber is made of glass, it will not corrode and is unaffected by most chemicals. It can be buried directly in most kinds of soil or exposed to most corrosive atmospheres in chemical plants without significant concern.

4. Since the only carrier in a fiber is light, there is no possibility of a spark from a broken fiber. Therefore, even in the most explosive of atmospheres, there is no fire hazard nor is there any danger of electrical shock to those repairing broken fibers.

5. Fiber-optic cables are virtually unaffected by outdoor atmospheric conditions and so can be lashed directly to telephone poles or existing electrical cables without concern for extraneous signal pickup.

6. A fiber optic cable, even one that contains many fibers, is usually much smaller and lighter in weight than a wire or coaxial cable with similar information-carrying capacity. It is easier to handle and install, and uses less duct space. In fact, frequently it can be installed without the need for protective ducts.

7. Fiber-optic cable is also very difficult to tap, but very easy to monitor for potential eavesdropping, making it ideal for secure communications systems. In addition, there is absolutely no electrical radiation from a fiber.

The Basic Fiber-Optic Transmission System

As shown in fig. 1, a basic fiber-optic transmission system consists of an optical transmitter, the fiber-optic cable, and an optical receiver.

The optical transmitter converts an electrical analog or digital signal into a corresponding optical signal. The source of the optical signal can be either a light-emitting diode or a solid-state laser diode. The most popular wavelengths of operation for optical transmitters are 850, 1310, and 1550 nanometers.

The fiber-optic cable consists of one or more glass fibers which act as waveguides for the optical signal. Fiber-optic cable is similar to electrical cable in its construction, but provides special protection for the optical fiber within. For systems requiring transmission over distances of many kilometers, or when two or more fiber-optic cables must be joined together, an optical splice is commonly used.

The optical receiver converts the optical signal back to a replica of the original electrical signal. The detector of the optical signal (in the receiver) is either a PIN-type photodiode or an avalanche-type photodiode. Most common fiber-optic receiving equipment uses PIN-type photodiodes.

We will now examine each of the elements of the basic system in some detail to gain a better understanding of what is occurring.

Optical Transmitters

The basic optical transmitter converts electrical input signals into modulated light for transmission over an optical fiber. Depending on the nature of the signal, the resulting modulated light may be turned on and off, or may be linearly varied in intensity between two predetermined levels. Fig. 2 shows a graphic representation of these two basic schemes.

The most common devices used as the light source in optical transmitters are the light-emitting diode (LED) and the laser diode (LD). In a fiber-optic system these devices are mounted in a package that enables an optical fiber to be placed in very close proximity to the light-emitting region in order to couple as much light as possible into the fiber. In some cases, a tiny spherical lens is mounted directly over the emitter to collect and focus "every last drop" of light onto the fiber, and in other cases a fiber is "pigtailed" directly onto the actual surface of the emitter.

In either case, it is obvious that the main goal is to couple as much light into the tiny optical fiber as possible. LEDs have relatively large emitting areas, and as a result are not as good light sources as LDs. They are widely used for short- to moderate-transmission distances. However, they are much more economical, quite linear in terms of light output versus electrical current input and stable in terms of light output versus ambient operating temperature. LDs, on the other hand, have very small light-emitting surfaces and can couple many times more power to the fiber than LEDs. LDs are also linear in terms of light output versus electrical current input, but unlike LEDs they are not stable over wide operating temperature ranges and require more elaborate circuitry to achieve acceptable stability. In addition, their added cost makes them

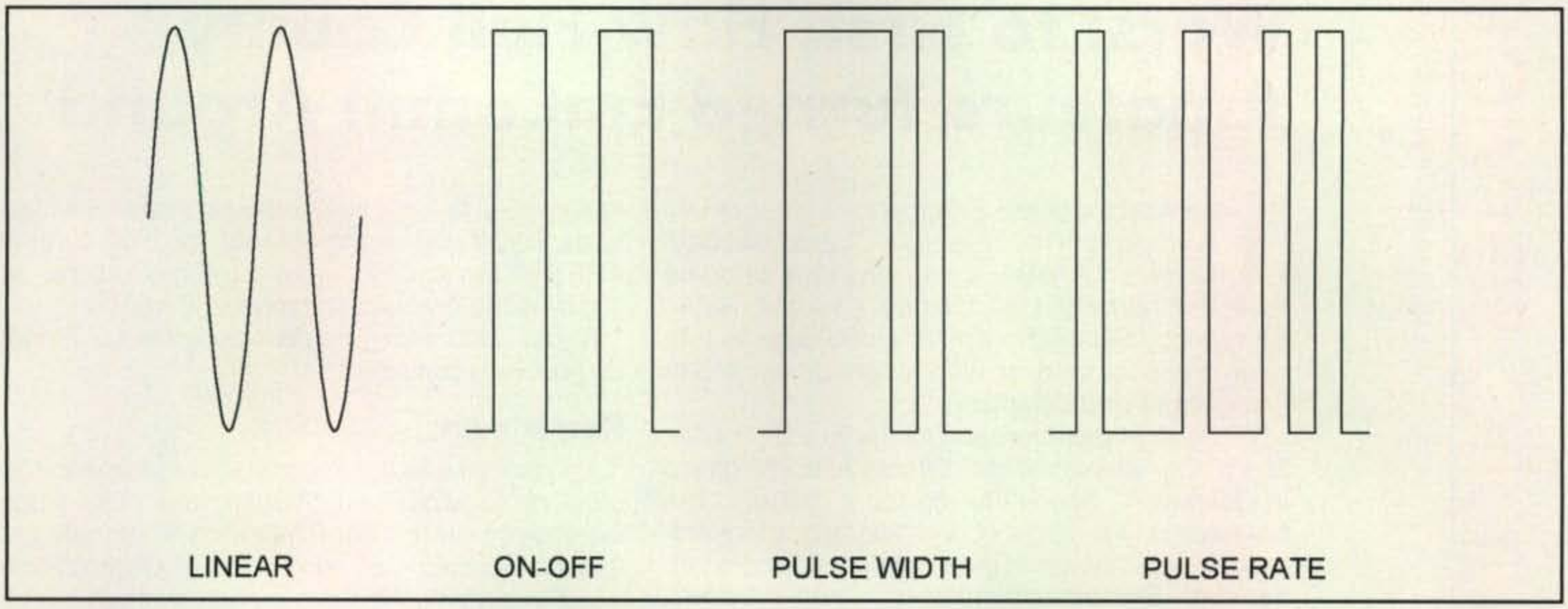

Fig. 4– Various methods to optically transmit optical signals.

primarily useful for applications that require the transmission of signals over long distances.

LEDs and LDs operate in the infrared portion of the electromagnetic spectrum so that their light output is usually invisible to the human eye. Their operating wavelengths are chosen to be compatible with the lowest transmission-loss wavelengths of glass fibers and highest sensitivity ranges of photodiodes. As we previously have mentioned, the most common wavelengths in use today are 850 nanometers, 1310 nanometers, and 1550 nanometers. Both LEDs and LDs are available in all three wavelengths.

LEDs and LDs, as previously stated, are modulated in one of two ways—on and off, or linearly. Fig. 3 shows simplified circuitry to achieve either method with an LED or LD. As can be seen in fig. 3A, a transistor is used to switch the LED or LD on and off in step with an input digital signal. This signal can be converted from almost any digital format (by the appropriate circuitry) into the correct base drive for the transistor. Overall speed is then determined by the circuitry and the inherent speed of the LED or LD. Used in this manner, speeds of several hundred megahertz are readily achieved for LEDs and thousands (to millions) of megahertz for LDs. Temperature stabilization circuitry for the LD has been omitted from this example for simplicity. LEDs, on the other hand, do not normally require any temperature stabilization.

Linear modulation of an LED or LD is accomplished by the operational amplifier circuit of fig. 3B (simplified). The inverting input is used to supply the modulating drive to the LED or LD, while the non-inverting input supplies a DC bias reference. Once again, temperature stabilization circuitry for the LD has been omitted from this example for simplicity.

Digital on/off modulation of an LED or LD can take a number of forms. The simplest, as we have already seen, is light-on for a logic "1," and light-off for logic "0." Two other common forms are pulse-width modulation and pulse-rate modulation. In the former, a constant stream of pulses is produced with one width signifying logic "1" and another width logic "0." In the latter, the pulses are all of the same width, but the pulse rate changes to differentiate between logic "1" and logic "0."

Analog modulation can also take a number of forms. The simplest is intensity modulation in which the brightness of an LED is varied in direct step with the variations of the transmitted signal. In other methods, an RF carrier is first frequency modulated with another signal, or, in some cases, several RF carriers are separately modulated with separate signals and then all are combined and transmitted as one complex waveform. Fig. 4 shows all of the above modulation methods as a function of light output.

The equivalent operating frequency of light, which is, after all, electromagnetic radiation, is extremely high—on the order of 1,000,000 GHz. The output bandwidth of the light produced by LEDs and laser diodes is quite wide. Unfortunately, today's technology does not allow this bandwidth to be selectively used in the way that conventional radio frequency transmissions are utilized. Rather, the entire optical bandwidth is turned on and off in the same way that early "spark transmitters" (in the early days of radio) turned wide portions of the RF spectrum on and off. In time, however, researchers will overcome this obstacle and "coherent transmissions," as they are called, will become the direction in which the fiber-optic field progresses.

In Part II we will cover the optical fiber, optical connectors, and optical receivers. 73, Irwin, WA2NDM

public service

BY RICHARD FISHER,* KI6SN

Worst to First: How Hall County Amateurs Turned EmComm Around

The director of the Emergency Management Association of Georgia gave Michael Crowder, AA4BA, a daunting task when he took the reins of Hall County Amateur Radio Emergency Service® : You have 90 days to turn your group around or we'll dissolve our Memorandum of Understanding.

With just 14 members and things "in a bit of a disarray," Crowder knew Hall County ARES®, based in Gainesville, needed to replace a lack of cohesiveness with a sense of direction and a forward-looking plan that would grow membership on a fundamental EmComm foundation . . . and in a hurry.

"A few months later," Crowder said, the EMAG director "nominated us for the (2009) Jack Hobbs Award for Excellence in Amateur Radio," an honor Hall County ARES® would go on to win, with Emergency Coordinator Crowder and Assistant Emergency Coordinator Marcus L. Shockley, KJ4EZQ, accepting the honor on behalf of the team at an EMAG awards banquet.

"I went from no active AECs (Assistant Emergency Coordinators) to five who work hard," Crowder said. "We went from about ten attendees at a monthly meeting to averaging more than 20 per meeting, and growing every month."

This "worst to first" scenario is not the stuff of fairy tales, though. Crowder's Biannual Report released earlier this year, reflecting on 2009, captures some of the ingredients for Hall County ARES's® remarkable turn-around and touches on goals as the organization moves ahead.

If your EmComm group is looking for a blueprint for success, consider this:

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Hall County ARES's® youngest member, Marcus R. Shockley, KJ4PCR, operates the WE4EOC Hall County EOC station. He has checked into the state ARES net "on multiple occasions, functioned as alternate net control on VHF nets, and helped deploy our mobile station," said EC Michael Crowder, AA4BA. "He can outwork most full-size hams, is 10 years old, and was recently licensed in a 'ham cram'-style licensing class taught by Hall County ARES." (Courtesy of KJ4EZQ)

Recruitment

"Last year we saw a tremendous increase in membership," Crowder said. "A better than three-times increase in manpower is significant, but still not enough according to our Tables of Organization and Equipment. We have a goal to reach a total of 100 operators by the end of the calendar year." They will come from the "existing ham community," Crowder said, "and by licensing new hams that we can encourage to become part of the EmComm community."

There are more than 600 licensed radio amateurs in Hall County, "and we are working on contacting each of them either through letters, e-mail or phone calls."

Hall County ARES® also sponsors "ham cram" classes, in which prospective radio amateurs and those wanting to upgrade undergo a quick course and obtain their license in short order. In 2009, the team brought in 38 new hams and upgraded six more to General Class.

"We also participated in special VE (Volunteer Examiner) sessions during which we licensed 22 Technicians and upgraded four additional Generals," Crowder said. "Sixty new Techs and 10 Generals are a significant addition to the ham community."

Several more "ham crams" were planned by the team in 2010.

"We have recruited and licensed a local meteorologist (Brian Willard, K4BCW) to run our SKYWARN (as AEC), the editor of the local newspaper has joined our group, and we are making inroads to all sorts of other organizations with which to network our group."

"Many of our members are newly licensed hams who have skills that apply to our mission. Tom Keith, KJ4FQT (AEC/Personnel), is a retired Army Sergeant Major who brings great motivation and organizational skills to the group. Marc Shockley, KJ4EZQ (AEC/Digital Modes and Equipment), is an electronics wizard.

"We just added an electronics engineer to our roster as well. We are looking outside of the box, finding folks with skills we need even if they are not hams. When we find these people, we license and train them for radio, and then integrate their life skills into our program," Crowder said.

Cooperation

"Communications is as much a relationship business as it is technical," Crowder said. In his Biannual Report, he noted that Mutual Aid Agreements

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Update: Depiction Introduces APRS Live Add-On

Product development officials from Depiction, Inc., say radio amateurs "can now achieve two-way, real-time *visual* communications from within a dynamic simulation scenario using the new APRS Live add-on for Depiction mapping and simulation software."

Featured in *CQ*'s January 2010 "Public Service" column, "Depiction is a powerful tool for the integration of multiple types of data, including images, spreadsheets, and GIS files," noted the add-on's creator, Brian Smucker, KF7GDY. Depiction has been used extensively in emergency communications for mapping, information recall, and many other functions.

"The ability to receive Automatic Packet Reporting System (APRS) data in real time via radio, and to visualize it using the advanced tools that Depiction provides, is a powerful new capability. Now hams can do things that used to only be available to big corporations and large government agencies."

The APRS Live software, produced by Smucker Data Solutions, "takes data received by a radio using APRS and visualizes it within any Depiction scenario the radio operator has created. Scenarios such as search and rescue, emergency response, marathons, and others can be depicted quickly and easily on an ordinary laptop," officials said.

"APRS is a digital communications protocol for exchanging data between multiple radio stations across a region, including position information, telemetry, weather data, short text messages, and more," Depiction said, and "is used by amateur radio users for position tracking, gaining situational awareness during emergencies, coordinating large-scale public service events such as bike races and marathons, and more."

Two-way, real-time visual *communications "from within a dynamic simulation scenario" is now possible during EmComm incidents using the new APRS Live add-on for mapping and simulation software by Depiction, Inc.*

The add-on "allows APRS packet information received by a radio and transmitted to a computer using a terminal node controller (TNC) connected to a serial port to be displayed within Depiction as simulation elements. For example, search-and-rescue workers can be tracked alongside a simulation of an 8-foot storm surge, or bike race volunteers can be tracked along race maps. APRS Live also enables the sending of short APRS messages from within Depiction.

Depiction and APRS Live both function without internet access, but if the internet is available, the add-on can bring in APRS data from any of the many public APRS-IS servers across the world."

For more information, go to <www.depiction.com>.

had been negotiated and signed with 12 other ARES® groups in the northeast Georgia region.

"We are actively sharing information and training with these groups. In the event of a disaster that activates us, these relationships and mutual training should help all of our groups perform to the highest standards. These agreements give us ready access to several hundred trained communicators."

In addition to other ARES® groups, Hall County has reached out to the Civil Air Patrol (CAP), Military Auxiliary Radio System (MARS) and others.

Inter- and Intra-Group Communication

Crowder cites as a "major achievement" the launching of Hall County ARES's® website:<http://www.HallCountyARES.com>.

"In just a few months (it) has created quite a stir in the regional EmComm community," he said. "Our site has more

A wide range of HF, VHF, and UHF frequencies communications modes can be utilized from Hall County ARES® mobile communications truck.

online tools and information than any other ARES® website in the state. We are creating a clearinghouse of information for EmComm operators throughout the region." Bob Drumm, N4YT, AEC/Training and Web, has oversight of Hall County ARES's® online component. Bill Sant, KJ4FVT, is AEC/Reports.

On-the-Job Training and Success

In 2009, Hall County ARES® took part in three field exercises. "Two were associated with the quarterly state-mandated tornado drills," Crowder said, "and the other was our participation in the American Radio Relay League Georgia Simulated Emergency Test (SET)."

"Hall County ARES has the highest recorded score in the state, southeast and the nation," Crowder wrote to the membership after 2009 SET scores were announced. "We want to thank all of our operators that helped . . . and encourage everyone to be ready to help with the 2010 SET."

The team had scored 861 points. "To put this in perspective," Crowder said, "a score of less than 400 points won the state and the southeast regional in 2008."

He added that the team has been "running a weekly digital net in which we practice (techniques) with our operators and other ARES® groups from around the state . . . the software and instructions on operating with this exciting mode are available on our website."

Technological Advancements

"Last year, Hall County ARES® adopted the use of the Narrow Beam Emergency Messaging System (NBEMS) for the transfer of digital data over the radio," Crowder said. "This system works with HF, VHF, and UHF systems. We can even send data through FM repeaters. We are now considered one of the leading ARES® groups in the state for digital communications. Due to our work with the software developers for this technology, we now have a software application for the easy transmission of ICS-213 (general message) forms from desktop to desktop through our radios."

Crowder said the group has "really pushed NBEMS and digital modes in the region-and a gazillion other projects."

"With the support of the Hall County EMA," Crowder said, "we added both D-STAR and digital modes capabilities" to the station at the region's Emergency Services Complex. "This gives us full HF, VHF, UHF analog, along with VHF and UHF digital capabilities. We have initiated specialized new training for our Emergency Operations Team. This will ensure a standard of excellence in the event we are called to support the EMA during a communications disaster."

For EmComm deployment, Hall County ARES® calls to duty its mobile communications unit, built around a 43-foot High Ranger bucket truck equipped with all-band/all-mode capabilities.

Broadening the Footprint

Crowder noted that Hall County ARES® has established an Official Emergency Station affiliated with the ARRL. "This station is an all-band/all-mode location with a 60-foot tower, battery backup and generators. We have also configured an emergency communications vehicle, based on a 43-foot High Ranger bucket truck, that has all-band/all-mode capabilities," with plans to obtain and equip a second mobile unit.

"In another long-fought battle," Crowder said, "we have received a $10,000 grant from the state to add amateur radio to the Northeast Georgia Medical Center, and the hospital is planning on matching that grant to ensure we have the proper equipment to serve their mission properly."

Hall County ARES® has acquired Memoranda of Understanding for five additional repeaters. "We now have priority emergency use of machines from Braselton to Wauka Mountain and over toward Baldwin," Crowder said. "We also have received coordination for three additional repeaters from SERA (SouthEast Repeater Association) and are on the cusp of getting our funding to install these machines."

Looking Back and Ahead

In closing his Biannual Report, Crowder told membership that "as Emergency Coordinator, I am proud of our progress in 2009 and look forward to an even better 2010. I hope that everyone in the amateur radio community will join us to see our local community served with the best communications capabilities possible."

EmComm in Action: Send Us Your Stories

The "worst-to-first" saga of Hall County (GA) ARES® is a great example of how radio amateurs take decisive action to fulfill our fraternity's obligation as public servants.

Do you know of other organizations or operators who have taken decisive action in the EmComm arena? Please let us know, and we'll feature their stories in an upcoming column. Please drop an e-mail to: <ki6sn@cq-amateur-radio.com>. 73, Richard, KI6SN

LDG ELECTRONICS

Did you know that we have tuner that will work for you?

Some people don't know that we make tuners that will work with any transceiver. Don't know which one is right for you? Give us a call and we can help!

NEW! YT-450

LDG's newest tuner is specially designed for Yaesu's newest 100 watt radios. The YT-450 interfaces directly with the Yaesu FT-450 and FT-950 radios, making integration easier than ever. Simply connect the tuner to the radio with the supplied cables and you are ready to operate. DC power and all control is done through the interface cable. Just press the tune button on the tuner and the rest happens automatically: mode and power are set, a tune cycle runs and the radio is returned to its original settings. It will quickly match nearly any kind of coax fed antenna with an SWR of up to 10:1. 2000 memories recall settings in an instant! An extra CAT port on the back allows seamless connection to a PC. You have the newest radio, now get the newest tuner to go with it! ***Suggested Price $249.99***

Z-11ProII

Meet the Z-11ProII, 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-11ProII 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. Includes Icom interface cable, DC power cable and coax jumper.
Suggested Price $179.99

radio not included

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.

radio not included

AT-897Plus

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-897Plus 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$199.99***

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-100ProII

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 with LEDs, allowing you to switch instantly between two antennas. The AT-100ProII requires just 1 watt for operation, but will handle up to 125 watts. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $229.99***

Z-100Plus

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. Includes Icom interface cable, DC power cable and coax jumper.
Suggested Price $159.99

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

www.ldgelectronics.com

AT-1000Pro

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. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $599***

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! AT-600Pro

The LDG AT-600Pro will handle up to 600 watts SSB and CW, 300 on RTTY (1.8 – 30 MHz), and 250 watts on 54 MHz. It will match virtually any kind of coax-fed antenna and will typically match a 10:1 SWR down to 1.5:1 in just a few seconds. You can also use the AT-600Pro with longwires, random wires and antennas fed with ladder line just by adding a balun. It has two antenna ports with a front-panel indicator, and separate memory banks for each antenna. Easy to read LED bar-graph meters showing RF power, SWR and tuner status, tactile feedback control buttons and an LED bypass indicator. Operates from 11 – 16 volts DC at 750 mA. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $359.99***

KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver (except TS-480HX). 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

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-200Pro

The AT-200Pro 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. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $249***

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

Meters!

FT Meter 2.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu. ***Still Only $49***

FTL Meter For Yaesu FT-857(D) and FT-897(D). 4.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu. ***Suggested Price $79.99***

NEW! M-7600 For IC-7600. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together.
Suggested Price $79.99

M-7700 For IC-7700. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together.
Suggested Price $79.99

The #1 Line of Autotuners!

LDG

BY BRITTANY DECKER,* KB1OGL

Field Day 2010: What Did You Do?

That time of year has come and gone again. The day looked forward to by young hams, individuals, parents and children, first timers, old timers, clubs, and those who happen to stumble upon ham radio through a Field Day open to the public. Field Day is a fun day with a serious purpose. This day of practice for emergency communications is made into a fun event for all ages and interests. There are some who get together with friends to do some operating, collaborate with their local club, participate individually, have their first Field Day with a parent or sibling, or find a local club at a park or other public place and get interested in ham radio through this event. There are many different things to do during Field Day, especially if you participate with a club. Cooking, setting up, tearing down, CW, phone, GOTA (Get On The Air), logging, etc. Many of the kids I've written about in Kid's Korner so far get involved in some way during Field Day and have shared with me what they did over this exciting weekend.

Paul Shirey, KC9QYB, had his first Field Day experience this year.

Paul Shirey, KC9QYB, relatively new to ham radio, describes his first Field Day:

"When I pictured Field Day, I did not picture anything of what I experienced. The first thing I did Field Day related was help set up the various towers and antennas that we had at our Field Day site. That means I spent 9 hours on Friday helping to set up for Field Day. Then I came back on Saturday and was there another 9 hours to operate, though I did not get in that much operating. I did manage to make 22 contacts at the GOTA station on Saturday, including contacting the legendary W1AW.

"When I was not working the GOTA station, I was talking to people or watching other people operate. Then I got the chance to log some of the contacts that we made at the 10-meter station. Ten meters was extremely open during the entire event and we made over 500 contacts. I was not able to stay during the entire Field Day. I left around 9:00 on Saturday evening and I thought that was going to be it, but then my parents brought me back Sunday after church at around 11:00 and I walked over to an unoccupied station. I picked up that magnificent Heil Pro Plus headset and began working stations on 20 meters using one of our club calls, W9PIA, and managed to rack up a good ten or so stations and that was pretty hard, considering band conditions and interference we were receiving from another station on 20 at the site. Next year I plan to do a lot more operating, since I won't have to worry about the GOTA station.

"As my first Field Day, I learned a few very important things, but one of the most important things I learned is that in order to be successful in contests or even operating events such as Field Day, you have to be willing to go out of your comfort zone and do new things such as call CQ, and when answering back to another station you have to be firm and quick to get it. I also learned many other operating skills that will help me for years to come, but the thing I will remember the most about my first Field Day was my first Field Day contact. I remember how great I felt when I made that first contact and that was the beginning of many I will make for years to come.

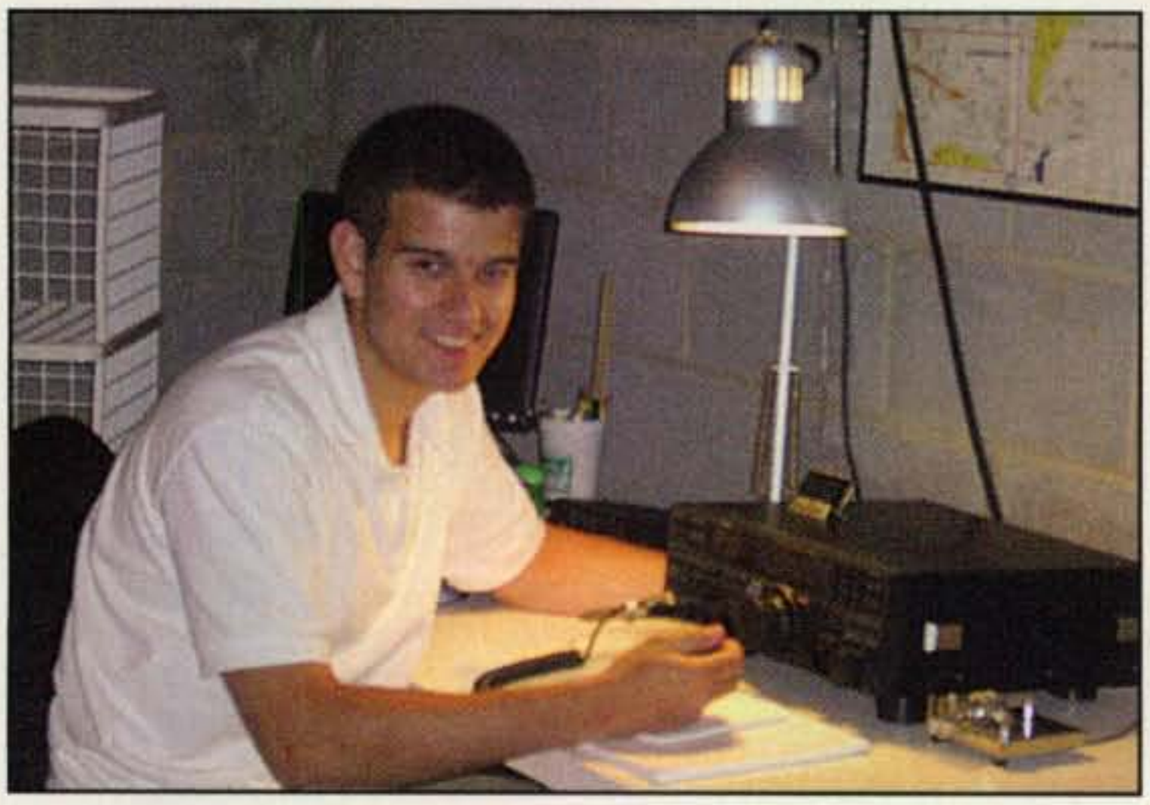
"At our Field Day we also got a lot of people using the GOTA station. We had over 60 visitors sign in (most of whom did not have a license) and got almost all of them on the GOTA station. We had eight Cub Scouts and two leaders there also, and one public official. With a demonstration station that was set up, we also racked up bonus points for education. But the thing that made me smile the biggest was seeing a 6-year-old at the GOTA station making his first-ever ham radio contact."

Megan McClellan, K5MEM:

"I did Field Day with my dad at home this year. In the past, though, I did Field Day on a steam-

A Field Day veteran, Megan McClellan, K5MEM, operated this year from home on emergency power.

*c/o CQ magazine



Nick Esposito, KC2ONP, operated this year with his club in New Jersey.

powered train. We were in a caboose on the end of the famous Texas State Railroad steam-powered train. Yes, we operated railroad mobile. A couple of years ago, I helped run the GOTA station with the Rockwall Amateur Radio Club.

"The year we operated on the railroad was one of the most fun years that I have participated in. My family and I always try to make Field Day a fun experience for everyone involved. We followed the railroad experience by operating with the Rockwall Amateur Radio Club. I helped operate the GOTA station that year. We had a lot of fun. I was able to get some new people interested in amateur radio, and I was also able to convince some people who ha"d not been on the air in some time.

This year was my 8th Field Day and we got 365 contacts operating as 1E NTX with an IC-7700 and a little generator. This year's Field Day was great! We had so much fun. Ten meters was surprisingly good at about 10 PM Central Time. I did a lot of operating. When we calculated the contacts, it came out that I made about half of the contacts, with the other half going to my mom, dad, and a friend."

Nick Esposito, KC2ONP:

"I am a member of the New Providence Amateur Radio Club (NPARC) and we have the club callsign N2XJ. This is not what we use for Field Day, though. We set up two stations at separate locations and use the main control operator's callsign. Our main station is set up at the top of the hill in our area at Governor Livingston High School in Berkeley Heights, New Jersey. This is a 3A class station, I believe. We have three tents (phone, CW, and VHF) set up on a field with antennas strung between the trees and a large tower in the center. This station is mainly recreational, because we are not strong enough to get the points necessary to contend for first place. We usually barbeque and grill all day and night. There is food aplenty and always people eating. I like to go up to this station at night around 8 PM, and last year I came home at 9 AM the next day. This year I won't get to spend as much time at Field Day, though, because I have to work the following day.

"There is another station that our club sets up that is a 1F class station we set up at our local Red Cross chapter. This is a serious contest station with an operator schedule. We have done as well as, I believe, second in our class at this station and we try to go for the number one spot. There is always someone operating and we rack up as many QSOs

as possible on all modes and bands (HF). I usually operate there, but I most likely will not be in a slotted schedule there this year. I always go there, though, and bring some friends so that they can get our bonus points for youth contacts. During past Field Days, I have operated the GOTA station that we set up before I was a ham. I have gotten the bonus points for an educational game that I created and demonstrated. I have logged for a CW operator with his help, even though I don't know Morse code very well.

"Field Day is my favorite day on the ham radio calendar because I always attend and have a lot of fun. This will be my second to last Field Day at home, because in the fall of 2011 I will be off to college, where I will continue ham radio."

From the **YACHT Radio Club/DAR Club in Michigan, Ed Engleman, KG8CX**, reports:

"We are now up to 67 youth members along with 20 coach/members, for a total of 87, from 17 states and 4 countries (including the U.S.) We had a FD in conjunction with the M&M ARC. Our call was W8PIF. We had several YACHT members and DAR kids on deck to help operate (see March 2009 'Kids' Korner').

"It was a very successful event, especially on Saturday, when over 40 people visited and about 15 actually got on the radio and made a contact(s).

"We also had a VE session on Saturday morning. A total of four took the General upgrade and three passed, including one of our young DAR/ YACHT members, Brett Borski, KD8NAZ. He made dozens of contacts throughout the rest of the day. Along with Derek Hockin, KD8LQB, and Tyler Lehman, KC9FKE, they are three of our best young contesters. All three accounted for well over a hundred of our total SSB contacts. Derek had the honor of starting out F.D. at 1 PM with several dozen contacts. The weather was fine, with only a short rain shower early Sunday morning.

"We owe our appreciation to the Kenneth Jones family, who gave us the use of their large grassy area for the weekend. As I call it, a bit of country within the city of Menominee. Dave Arnold, W8DXX, provided the Kubota diesel tractor for the source of our power. Many others contributed to erecting the antennas and tents. Eric Janssen, KG9GH, acted as antenna/ safety director for the weekend, and all went without a hitch. Food was served late Saturday afternoon. Nobody went home hungry. We even had two city/county officials stop by: the Menominee Co. Sheriff, and Menominee City Mayor. Several DAR Boys and Girls Club members also paid us a visit, along with a young fellow from the immediate area, who seemed very interested in ham radio.

Tyler Lehman, KC9FKE, helps Adam, who is new to ham radio, at the YACHT Radio Club/DAR Club Field Day operation in Michigan.

Field Day tower construction for N1FD, the Nashua Area Radio Club's Field Day station at Wasserman Park in Merrimack, New Hampshire.

"According to Jim Callow, K8IR, approximately 800 contacts were recorded, subject to revision in the coming days."

And ... KB1OGL!

To finish up this Field Day storytelling, I would like to describe my Field Day. It was not my first, and nothing new because I did the same thing last year. Operating-wise it was not the best, because of family events running head-on into one another, making it hard to work out something that worked for everyone. However, I did get to come to Wasserman Park in Merrimack, New Hampshire—where my local club, the Nashua Area Radio Club, operated under N1FD—and say hello to everyone. My family did not really operate, but they did help out the club in a big way by cooking! They shopped and cooked lunch, dinner, breakfast, and lunch again for 25–30 people. I helped out a bit with clean up and all that, and it was very fun to sit and socialize with the NARC. Next year I hope to get on the air, as well as stay the night and camp out like the club did.

One of the most amazing parts is watching the towers be set up and torn down. It takes bravery to go up that high! One of our members, Ed Deichler, was injured doing this (not at Field Day) but is healing slowly. One of his fingers was damaged, and it looked like some sort of freak Morse code keyer accident.

At the NARC Field Day event there is a GOTA station, which I have run before. This year I did not run it, but fortunately there was someone to take up the slack. Aaron Hill, KA1RON, ran it this year. A shy kid of 9 years old, he has a growing interest in amateur radio. His future plans include getting his General Class license and learning Morse code. He enjoyed GOTA and wants to operate the station again next year. He also wants to help set up the towers and climb them. The thing Aaron thinks will get kids interested in radio the most is DX, because as a kid he himself enjoys DX, specifically from Japan.

That's just some of the Field Day reports. I am sure there are many more stories out there. If you didn't participate this year, be sure to give it a try next June. It's a fun experience!

73, Brittany, KB1OGL

Cody Anderson, KI4FUV Named 25th Newsline Young Ham of the Year

A 17-year-old ham from Harriman, Tennessee, has been named the 2010 Young Ham of the Year by *Amateur Radio Newsline*. Cody Anderson, KI4FUV, is the 25th recipient of the award, which is co-sponsored by *CQ* magazine, Yaesu (Vertex-Standard), and Heil Sound. He was honored for combining his ham radio training and recent CPR training to help save a runner who had gone into cardiac arrest during a charity run.

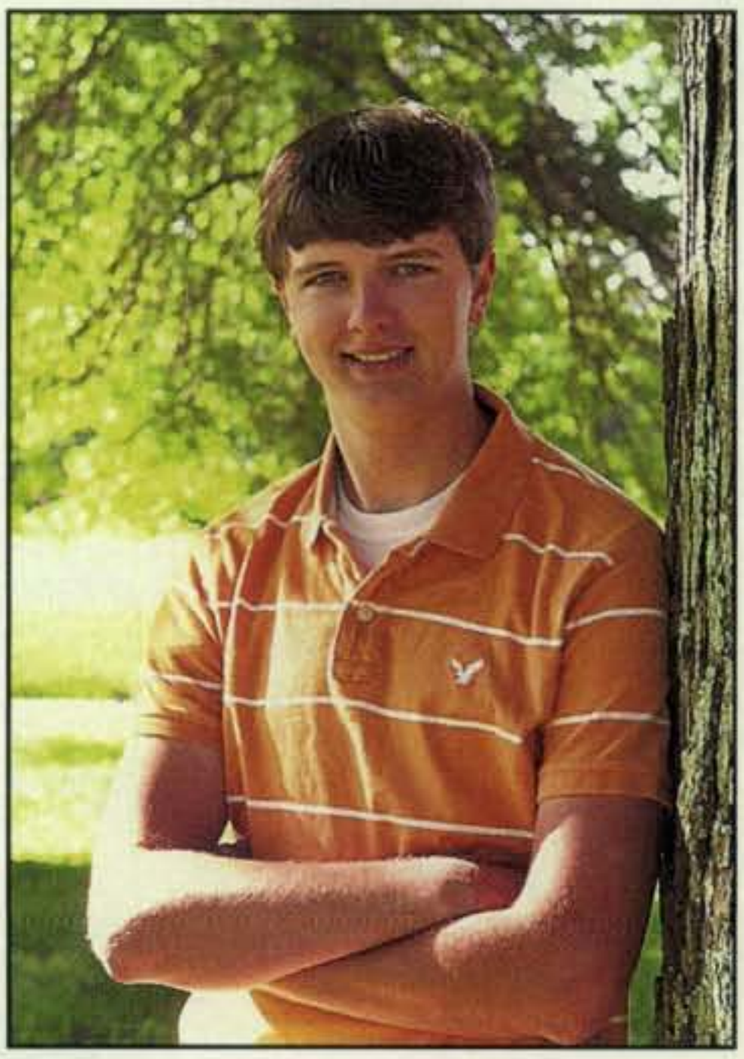
Anderson, who became an amateur at age 11 after listening to a VHF ham contact on a scanner and deciding to get his license, is active in public service communications as a member and Vice President of the Roane County Amateur Radio Club and the local Amateur Radio Emergency Service (ARES®) organization.

During one charity run last year, Cody was providing communications at a checkpoint when he saw a runner fall to the ground.

"One of the runners had (gone) past me and I noticed he fell," Cody told *Newsline*. "I waited just a second or two, you know, to see if he got back up. Maybe he just tripped."

But then, said Cody, "I noticed he didn't get back up, so I went over to him and by the time I got to him he had quit breathing and went into cardiac arrest." Cody radioed in the emergency and, along with a runner who had stopped to help, began doing CPR, a skill he had learned just a few months earlier through a course given by his radio club. Because of Cody's quick action, both on the radio and in providing first aid, the runner survived.

Cody is also active in scouting—where he helps teach merit badge courses and introduces scouts to ham radio— and in technology projects for his radio club and ARES group. A 2010 graduate of Rockwood High School in nearby Rockwood, Tennessee, Cody is planning this fall to attend his local community college and then go from there to Tennessee Tech, where he intends to major in computer science. He says he will always make room for ham radio, noting that Tennessee Tech has an active ham club.



Cody was scheduled to receive his Young Ham of the Year award at the Huntsville Hamfest in August. Along with a plaque provided by Dave Bell, W6AQ, president of DBA Entertainment in Hollywood, Cody will receive additional prizes from the award's corporate co-sponsors. *CQ* magazine provides each YHOTY winner with a week at Spacecamp in Huntsville and an invitation to write an article on a ham radio-related activity with which he/she is involved; Vertex-Standard pays for the winner's trip to Huntsville and provides a gift of Yaesu equipment; and Heil Sound provides a ham radio-related gift as well. *Newsline* hosts a dinner for the winner and his/her family, along with representatives of the sponsors and members of the selection committee who are present.

The Young Ham of the Year award recognizes outstanding service to the nation or community, or the betterment of the state of the art in communications through amateur radio, by a licensed ham age 18 or younger. The award was first presented in 1986 to Shawn Wakefield, WK5P. In recognition of the program's 25th anniversary this year, organizers were planning to collect and present updates on as many past winners as possible.

BY WAYNE YOSHIDA,* KH6WZ

Avoiding Injury: Station Ergonomics and Repetitive Motion Issues

Important Disclaimer

I am not a doctor, so if you are experiencing anything similar to my symptoms, please seek advice from your doctor. The information presented in this article comes from internet resources and personal experience. *—KH6WZ*

As I write this month's column, I am filled with trepidation about an upcoming operation to fix carpal tunnel syndrome on my right wrist and hand. Apparently, I have some nerve damage and after discussions with my doctors, I decided to use surgery to expand the carpal tunnel. Fortunately, my symptoms are not severe, and it looks like I managed to report this problem before major damage has occurred. Presently, the symptom is a continuous numbness and tingling in my fingers.

Now before anyone thinks this an indication that ham radio may be hazardous to one's health, let me say that this problem probably has been building over many years, and most likely caused by poor posture and poor mouse and keyboard operation at the computer, and not the radio.

However, based on hand and finger movements and the need for proper stability of positioning of the hand and wrist on a computer mouse, it might be a good idea to practice safe body positioning and even preventative exercises for certain hams who spend long sessions at the rig, such as contesters and DX chasers. Manipulating the VFO knob and front-panel controls is very similar to moving the mouse while working on a spreadsheet or other document on the computer.

Refer to photo 1. Maggie Batshoun, the Environmental, Health and Safety Engineers Assistant at my full-time job, shows us an improper way to operate a computer mouse. There is too much pressure on the wrist, and as I look at this picture, I recall my mouse placement and the slight pain in my wrist after a long day at the office.

In photo 2, Maggie shows us a better way to position your computer mouse and forearm for more efficient and safe "mousing" while on the internet and working on documents. Notice how

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Photo 2– Here the entire forearm rests on the desktop, minimizing stress on the wrist at the carpal tunnel area. Also notice the "computer users' brace" to help stabilize the wrist.

Photo 1– Operating a computer mouse like this places stress on the wrist area and could lead to carpal tunnel syndrome over time. Avoid placing the mouse too close to the edge of the desk.

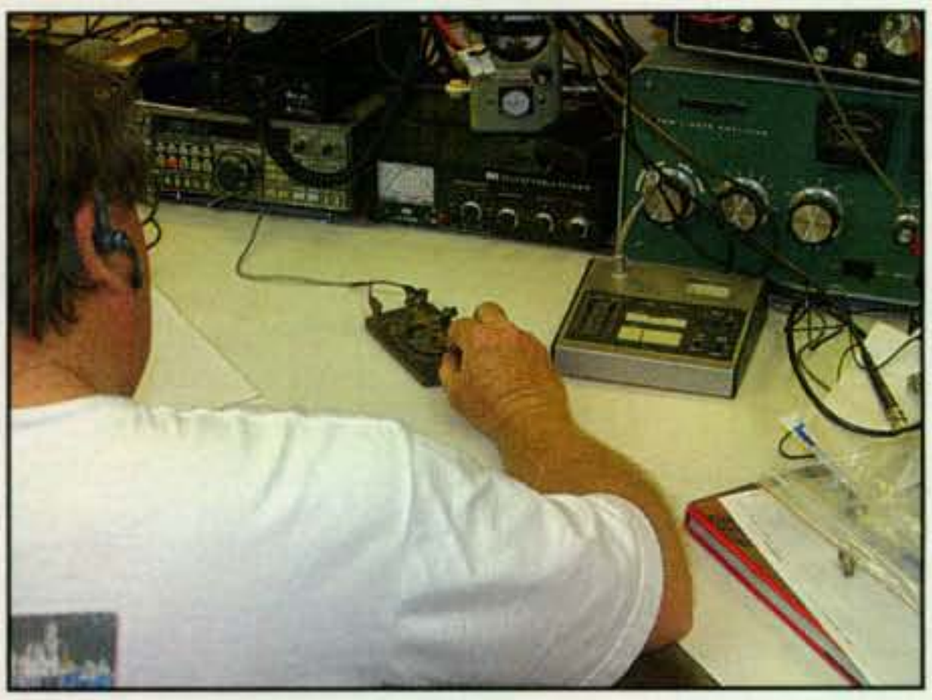

Photo 3– When sending Morse Code with either straight key or paddle, it is important to stabilize the hand and wrist for more efficient and clean sending, and to minimize repetitive motion stress at the same time.

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Photo 4– As you tune the band looking for contacts, the same ergonomic rules apply. Rest your forearm on the desk as you turn the dial.

Photo 5– My workbench has adjustable legs and can be set up so that I can either stand or sit in front of the desk to work on projects. This enables changes in working posture to reduce fatigue from sitting in one position for long work sessions.

Reverse Polarity Protection: Corrections and Comments

A few technical errors crept into the July "Ham Notebook" column on reverse polarity protection. Dave Moorman, K9SW, was the first to catch this oversight.

In fig. 1, the single diode will allow correct polarity through the rig, but will also drop the voltage going to the rig. The diode will get warm or hot, depending on its rating. However, when polarity is applied backwards, neither the fuse nor the diode will blow. The rig will just not turn on, since the diode is operating in the "reverse mode" and blocks voltage flowing through it. However, over time the diode may fail by blowing open. But I would hope the equipment operator would notice this failure mode (hey, I turned it on, but nothing happened), check the power leads going to the rig, and correct the reverse polarity condition.

In fig. 2, if power is applied in reverse polarity, it flows through the diode, shorts directly to ground, and fuse F1 pops. The entire current capability of the power supply will flow through this diode, so if your source of power is a car battery, this could be 100A or more. Thus, if a small 1A diode is used, both the diode and fuse will blow. The diode junction explodes, usually making a snapping sound, and a puff of smoke. I have experienced this situation. I suppose it is possible for the diode to fail shorted, but this is rare. It would be best to use a large-rated diode for this function to make the circuit more rugged.

Jon Titus, KZ1G, correctly points out that a single bridge rectifier module can be used instead of the four individual diodes shown in fig. 4. The current and voltage should match the equipment needs. In this case, the current will always pass through two diodes, so the output from a bridge used this way will drop about 1.4V, or 0.7V per diode. That means a 12V input produces 10.6V on the output. Also, the diodes each dissipate 0.7V times the current drawn (I × E), so the bridge module might need a heat sink for high-current loads.

Also in fig. 4, there is a missing connection between fuse F2 and diodes D3 and D4.

The circuit shown in fig. 5 is intended to power small 12V-operated devices such as a handie-talkie or a lightweight battery charger. Dennis Kidder, W6DQ, points out that most three-terminal regulators are rated for about an amp, so may have limited use and are not suitable to power a transceiver. A crowbar circuit, using a silicon controlled rectifier (SCR) and a Zener diode would be more suitable. Many AC-operated power supplies have this feature built-in. Here is a web page that describes a crowbar circuit: <http://www.radioelectronics.com/info/circuits/scr_overvoltage_crowbar/scr_over_voltage_crowbar.php>.

My apologies for this oversights, and I thank my eagle-eyed readers Dave Moorman, K9SW, Jon Titus, KZ1G, and Todd Roberts, WD4NGG, for catching this. Thanks also to Dennis Kidder, W6DQ, for his assistance. *—Wayne, KH6WZ*

the desk surface supports the forearm, hand, and wrist. This minimizes stress on the wrist and increases comfort. Also notice the computer users' brace on the hand and wrist to stabilize the carpal tunnel area.

Computers and Ham Rigs

Now take a look at photos 3 and 4, illustrating the ham radio counterparts to the computer hardware items. As shown in photo 3, your forearm should rest on the table or desktop when using a straight key or paddle when sending CW. Years ago, my ham radio mentor advised me to send Morse Code this way so that each character sent would be easy to understand by the receiving station. I guess the old timers knew something about repetitive motion problems a long time ago.

In photo 4, the rig VFO knob is positioned so that stress placed on the hand and wrist are minimized. Notice how the forearm rests comfortably on the desktop. This placement seems contrary to the trend on the rig shown (a classic Heathkit SB-102 from the 1970s), since many HF rigs, including this one, have "feet extenders" to tilt the front panel upward when facing the operator. This tilt may improve dial visibility, but it sacrifices ergonomics for the wrist and hand. I removed the extenders from this radio.

Speaking of the similarities between computers and radios, hams now have access to the software-defined radio (SDR). In effect, you operate an SDR sort of like a virtual radio, since you use the computer to make traditional adjustments such as frequency changes, filtering, and receiver volume. A computer monitor screen replaces the radio front panel. In this case, there in no VFO knob per se, but you use a mouse to point and click your way through the bands. Surrogate knobs exist as accessory items, and I hope SDR users consider

proper posture and body positioning when setting up their stations.

In the Shop

Working with power tools may also contribute to this condition. Portable, hand-held power tools with a lot of torque and vibration may contribute to carpal tunnel syndrome, so one must be careful of how the tool is held. When shopping for a

Photo 6– Maggie demonstrates a useful stretching exercise for carpal tunnel syndrome. (See text for details.)

Photo 7– Another conditioning exercise for carpal tunnel syndrome relief is the finger exercise shown here. (See text for details.)

References

The U.S. Department of Labor, Occupational Safety & Health Administration (OSHA) has some excellent information on safe practices in the workplace and many of these apply equally to your home, ham shack, and workshop, too. The section on computer workstations is especially good for ham station setups.

OSHA: <http://www.osha.gov/dts/osta/oshasoft/index.html>
Mailing Address: U.S. Department of Labor, Occupational Safety & Health Administration, 200 Constitution Avenue, Washington, D.C. 20210
Toll-free U.S. phone: 1-800-321-OSHA (6742)

Online Resources

"Guide to Setting Up an Ergonomic Computer Station," by Chris Adams
<http://ergonomics.about.com/od/office/ss/computer_setup.htm>

Cynergy Ergonomics, Inc.
<http://www.cynergyergonomics.com/ergonomic-workstations-adjustable.htm>
Mailing Address: 13144 Barrett Meadows Dr., Ballwin, MO 63021
Phone: 314-304-0221; fax: 314-984-9269

"Kid-Comfort and Computers At Home—Keeping Kids Healthy While Using the Home Computer": <http://www.childsoftpress.com/Whatsnewergo.htm>

Workbenches and Workstations

Pro Line Workbenches and Lab Furniture: <http://www.1proline.com/>
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new tool, it would be a very good idea to actually hold it in your hands and feel for any awkward hand or arm positioning that may exert pressure or torque on the wrist and forearm. These days, I try to use my stationary power tools (such as the drill press and sander) instead of their hand-held counterparts.

When working at your workbench, it is a good idea to maintain proper posture, just like working at a desk in the office. Keep your feet flat on the floor, and make sure you are not over-reaching anything you need to perform your task. My workbench is set up so that I can either sit or stand in front of it, as shown in photo 5. The workbench is actually an adjustable computer desk from Ikea called "Jerker." Unfortunately, it is no longer available. However, other workbenches, workstations, and desks are available that have an adjustable function. This enables anyone to customize table height for proper posture and comfort. An office or industrial furniture store would be a good place to look for ham station and workshop furniture.

Injury Prevention: Exercises and Breaks

I asked my doctors and physical therapists if my carpal tunnel syndrome condition could have been prevented. While I did not get a definitive answer, perhaps the best advice I can pass on is to first make sure furniture, posture, and body and hand positioning are stabilized and arranged to minimize stress. Also make sure you take frequent breaks while working and do some exercises to help improve and maintain flexibility.

Maggie shows some stretching exercises that will help reduce carpal tunnel syndrome. I do these regularly now. In photo 6, press and hold your hand against a wall, with your wrist facing upwards. Hold this position for about 20 seconds, then switch to the other side. Repeat this 10 times. Be careful when you do this. If it feels uncomfortable or is painful, reduce the amount of time and number of repetitions until you are able to do this easily.

Photo 7 shows a stretching exercise for the fingers. Basically, you press and hold one finger against another for about 10 seconds, and do this for each of your fingers on both hands. Like the wrist stretch, you may have to limit the pressure-hold cycle for only a few seconds, and increase the time as you build more strength, agility, and flexibility. Repeat this stretching cycle 10 times.

Other things to help prevent carpal tunnel syndrome include sleeping with your wrists straight or use a splint and avoid flexing and extending the wrists repeatedly.

I am going to take my own advice this month, and will close this installment of "The Ham Notebook" for now. In the meantime, it might be a good idea for all of you to make an ergonomic assessment of your station and workbench, and maybe even your office, to make sure you are not contributing to a possible injury.

73, Wayne, KH6WZ

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kit-building

BY JOE EISENBERG,* KØNEB

Building the Retro-75, plus the PAC-12 Antenna Kit

With so many kit radios primarily being CW, it is not often we see one that is full carrier AM. The Small Wonder Labs Retro-75 is just that—a 75-meter AM transceiver! When I first saw this kit, I could only wonder how it works and how they can produce a good-quality AM signal with a minimum of components? The answer on the transmit side of this kit is its Class C output amplifier. It is modulated by using an audio output transformer to vary the supply voltage to the power amplifier. This way the characteristic Class C nonlinearity is not in play, as the transformer allows a varying voltage to be supplied to the amplifier, which modulates it from a 2 watts carrier to 6–7 watts peak while modulated. It is similar to the method used in high-power AM broadcast transmitters, but without the huge transformer needed, as the power output level is low.

For the builder, this kit has just five toroids to wind, and reviewing my January 2010 column will give you many ideas about how to handle that task. One of the toroids is mounted flat onto the board to prevent it from moving and causing annoying microphonics. It is fastened in place using the supplied nylon screw, nut, and washer and stays secure to the board. The instructions don't really give much guidance as to the order in which you mount the components, so I adopted my own sequence in order to reduce any chance of mistakes.

The way I did it was to first mount all of the resistors in order of their value, starting from lowest to highest. Looking at the parts list, it is easy to work your way down the resistors and then take one value at a time and place all of those in their proper positions. By placing the resistors first, you get a roadmap to guide the next step I followed, and that is to do the same with the capacitors, also starting out with the lowest values up to the highest values. By mounting all of the resistors and capacitors first, you take care of the vast majority of the components, and now have narrowed down the empty spaces for the larger parts to follow, as well as the semiconductors. When mounting the crystals, be extra careful to keep them far enough above the board to prevent the crystal cases shorting against a lead on the top side of the board. Don't forget that one of them also has a wire that needs to be soldered from the case to a specific board point.

I mounted the semiconductors next, including the diodes, transistors, and other components, followed by mounting the transformers, IC sockets, and ICs, and lastly the toroids. I mounted the toroids last to prevent injury to them from the constant moving of the board to place the other components. There is an LED that is mounted on the main board to check the transmitted modulation that can also be mounted on the front panel of your chosen cabinet. It is used to show the peaks when modulating the transmitter, and I think it is probably best to mount it so it can be seen rather than hiding it on the main board.

To align the receiver, there is an IC installed that only performs signal generation/precision voltage generation tasks to allow you to place the receiver right on frequency using a digital voltmeter. It is not needed for the proper operation of the radio once completed and can cause problems if left in after alignment. Remove it from its socket and find a safe place to keep it for future use. I would suggest keeping it on a small piece of antistatic foam and taping it inside the case. It would be too easy to misplace it otherwise, if it is not kept inside the finished kit.

The kit itself is available from Small Wonder Labs at <http://www.smallwonderlabs.com>. Small Wonder Labs sells the board-only kit for $69 and a case and controls kit for $40, but keep in mind that if you just order the board kit, it will not come with any external switches, jacks, or pots needed to complete it. If you do not want to order the case and controls kit, check suppliers such as Mouser or Digikey for these parts, as well as RadioShack for the suggested microphone for the best-quality audio. RadioShack carries the pots and switches and jacks at most of

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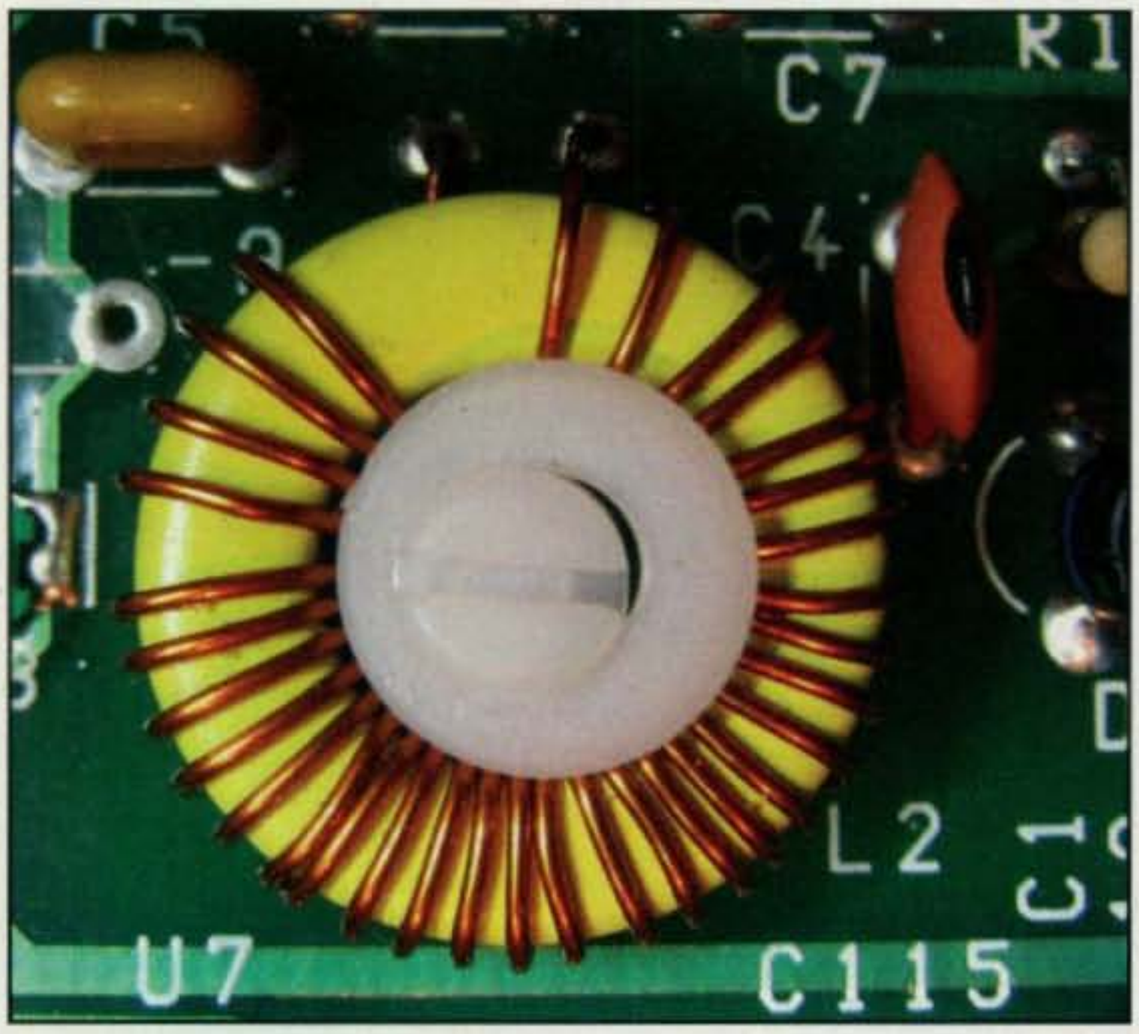


Closeup view of the large toroid inn the middle of the Retro-75 board. Notice that it is secured horizontally using a nylon screw.

Modulation transformer and modulaton transistor, and RF output stage of the Retro-75.

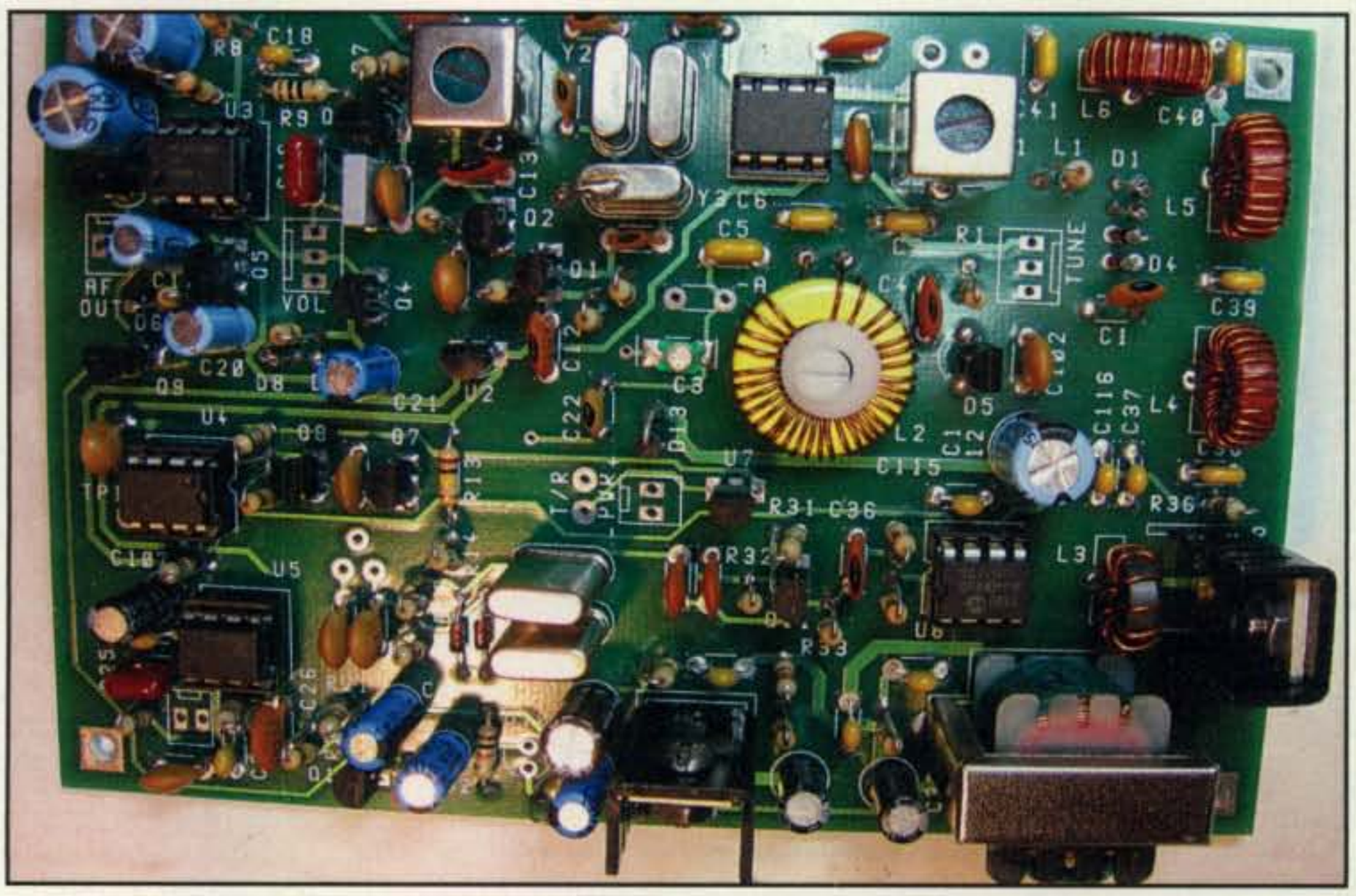
its stores. Ten-Tec makes a case that fits this board perfectly. The Ten-Tec TPC-43 is what Small Wonder Labs recommends and is already painted. To order Ten-Tec enclosures, go to <http://www.tentec.com>.

Pacific Antennna PAC-12 Kit

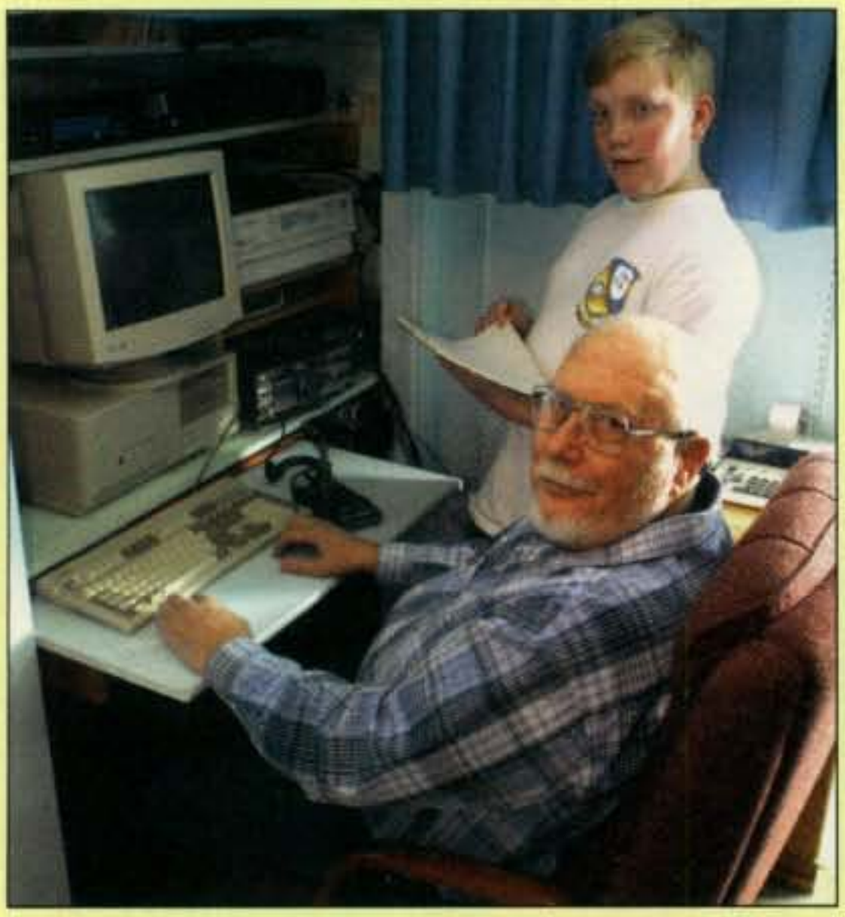
Before the weather gets too cold, let's look at the Pacific Antenna PAC-12 kit. The great thing about this kit is that all of the parts are already drilled and tapped, leaving you with only the task of making the coils for the different bands and putting it all together. The most complex part of the kit is the feedpoint assembly, which involves only making two wire jumpers and following the directions regarding the proper parts, screw, etc., needed. Just be sure you use the correct color wires in order to be able to recognize the ground and hot sides of the antenna. This part of the kit must be carefully done to be sure that the antenna will work properly and involves a lot of screws and washers.

The loading coils are very easy to wind, but I have a suggestion that will make them last longer and look better. I use a large-enough-diameter heat-shrink tubing to cover the coils, which protects them from coming loose or getting insulation scraped off their enameled wire. I used white heat-shrink tubing so I could write on them to indicate for which band the coil was made.

Amazingly, once this kit is built, it can be assembled in the field often in less than a minute and enjoyed on HF. It is very light weight, weighing in at just over a pound, making it ideal for backpack-



Retro-75 finished board without connections attached.



On the Cover

There are three generations of hams in the Stone family of Jackson, Wyoming. Fourteen-year-old Kenny is KE7GXX; his grandfather, Jim, in whose shack their photo was taken, is WB7CQS, and his parents are Scott, N7NHK, and Kathy, KB7QKH.

Jim has been licensed since the mid-1970s, motivated by an interest in electronics and some friends who were hams. He eventually got involved in RACES (Radio Amateur Civil Emergency Service), which led to his spending 12 years as Teton County (WY) Emergency Management Coordinator. He has since retired from that position to devote more time to the family western-wear business. Jim says emergency communications is still his primary ham radio interest, even though he hasn't been as active in it recently. "You may be able to retire from it," he notes, "but you don't get away from it."

Jim says he got his son, Scott, into emergency management, and then "he got his license—which surprised me—and then his wife got her license. … When Kenny got his Tech license (four years ago), Scott upgraded to General at the same time."

Kenny was nine years old when he earned his license and was the youngest ham in Wyoming at the time, according to Jim. He says his grandson is very interested in computers, but his interest in ham radio also caught him by surprise. "Just out of the blue, his dad said he was working on his license," Jim recalled.

Jim says that Kenny—who is starting 9th grade this fall—does some radio/control on ham frequencies, but mostly the family uses 2 meters for communicating between vehicles when off-roading and traveling together.

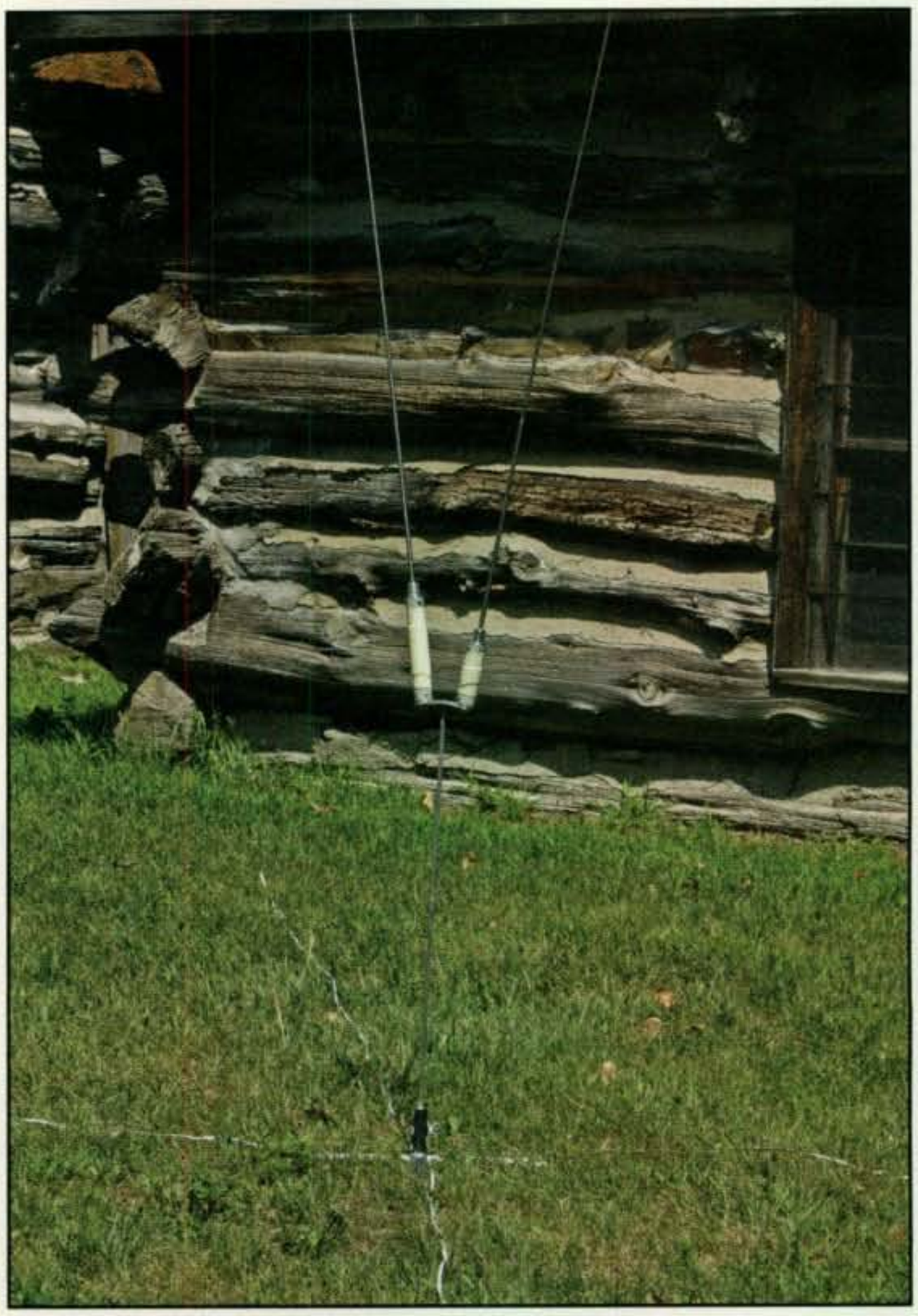
"I value my ham license immensely," Jim concluded. "It takes a lot of work to get it."

(Cover photo by Larry Mulvehill, WB2ZPI)

Oops…

We must have had our MP3 players up too loud while interviewing July "cover model" Rick Lagerstrom, KN6FR. Rick's antenna is a Super Antennas MP-1 portable antenna (not an MP3), mounted on a Super Antennas tripod base. For more information, see <http://www. superantennas.com/>.

Also, we had several questions and comments regarding the discussion of reverse polarity protection in July's "Ham Notebook" column. See this month's column for corrections and clarifications.



PAC-12 antenna with dual-band adapter.

ing and camping. I have worked a lot of stations with mine, and since the PAC-12 is a vertical, it enjoys a low angle of radiation, making for great DX opportunities. Be sure to follow the directions concerning assembling and using the radials, as the antenna will not function without the supplied radials being extended from the base. The PAC-12 cann be ordered at: <http://www.pacificantenna.com>, with a basic two-coil kit starting at $85.

Soldering

Finally, a few words about soldering. I have been reminded that a few suggestions are in order when it comes to soldering on PC boards. I have seen many kits handed to me that did not work, and the main reason was solder connections that were not made correctly. The connections often looked like a little round ball of solder standing on top of the board and not flowed into it. My rule of thumb is to look at it carefully through a lighted magnifier and see if it is ball shaped, or if it looks more like a Hershey's Kiss. The "Kiss" shape only comes about when solder has flowed into the hole and the wire is bonded effectively to the board. Using enough heat is the key, as the ball-shape connection is often due to inadequate heating, or a dirty soldering tip. If you are having trouble making it flow correctly, make sure your tip is clean and turn up the heat a little at a time until you find the temperature where the iron melts the solder and heats the board enough to let it flow and bond correctly.

Take your time to solder correctly and enjoy the experience!

Until next time . . . 73, Joe, KØNEB

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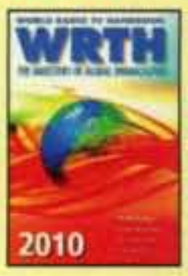

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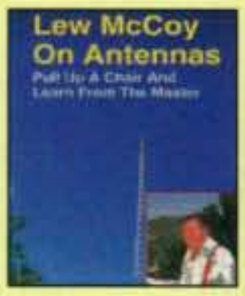
McCoy on Antennas



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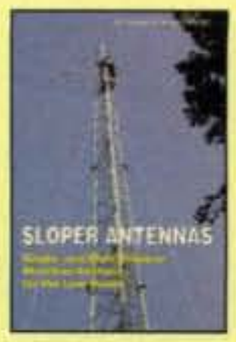

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learning curve

BY RICH ARLAND,* K7SZ

Angle of Radiation (and Why it Matters!)

Welcome back to "The Learning Curve." The summer months were an exciting time here at The Bent Dipole Ranch on the outskirts of beautiful Dacula, Georgia. Thanks to the Barrow (County) Amateur Radio Emergency Service (BARES) club, I was able to upgrade the HF antennas here at K7SZ. About mid-April, an "antenna eating tree" came down in my back yard and took out the end of my 40-meter EDZ dipole. It not only "ate" the end of the antenna, it managed to bend the 30-foot support mast that held up the center of the Zepp—hence the name "The Bent Dipole Ranch" (see photo).

I am very indebted to Bill Wilson, KJ4EX, the president of BARES, who braved my roof to erect a 40-foot push-up steel mast which now supports the center of the 40-meter EDZ, making the actual center of the antenna about 55–60 feet above ground level. I do notice a substantial difference in performance, also. Thanks "BARES"!

One bit of old business: Many, many thanks to all those readers—such as Will Dennis, W1WA, George Russo, W3TLB, Bill Wilson, W5VDM, "Van" Van Patten, W8ZHJ, and Bruce Biddlecome, WA7SQD (a fellow USAF Tech Controller), to name just a few—who responded to the first couple of "Learning Curve" columns. It seems that the column on learning CW resonated quite well among both new and old-time hams. That was some serious feedback! Keep it coming, gang! I cannot stress enough the need for all of us columnists to have a feedback loop regarding our column content. It keeps us on track and lets us know what *you* want to read about

In upcoming months we will dedicate this column to a couple of my favorite ham radio endeavors: DXing and contesting. Those are on tap for October and November, respectively. The timing of these columns is to take advantage of the coming upswing in band propagation (not to mention a flurry of sunspot activity over the last couple of months) and the "official" start of the 2010–2011 contest season. As usual, if you, the reader, want me to cover something special, or some area you are interested in, please don't hesitate to contact me via my e-mail: <k7sz@live.com>.

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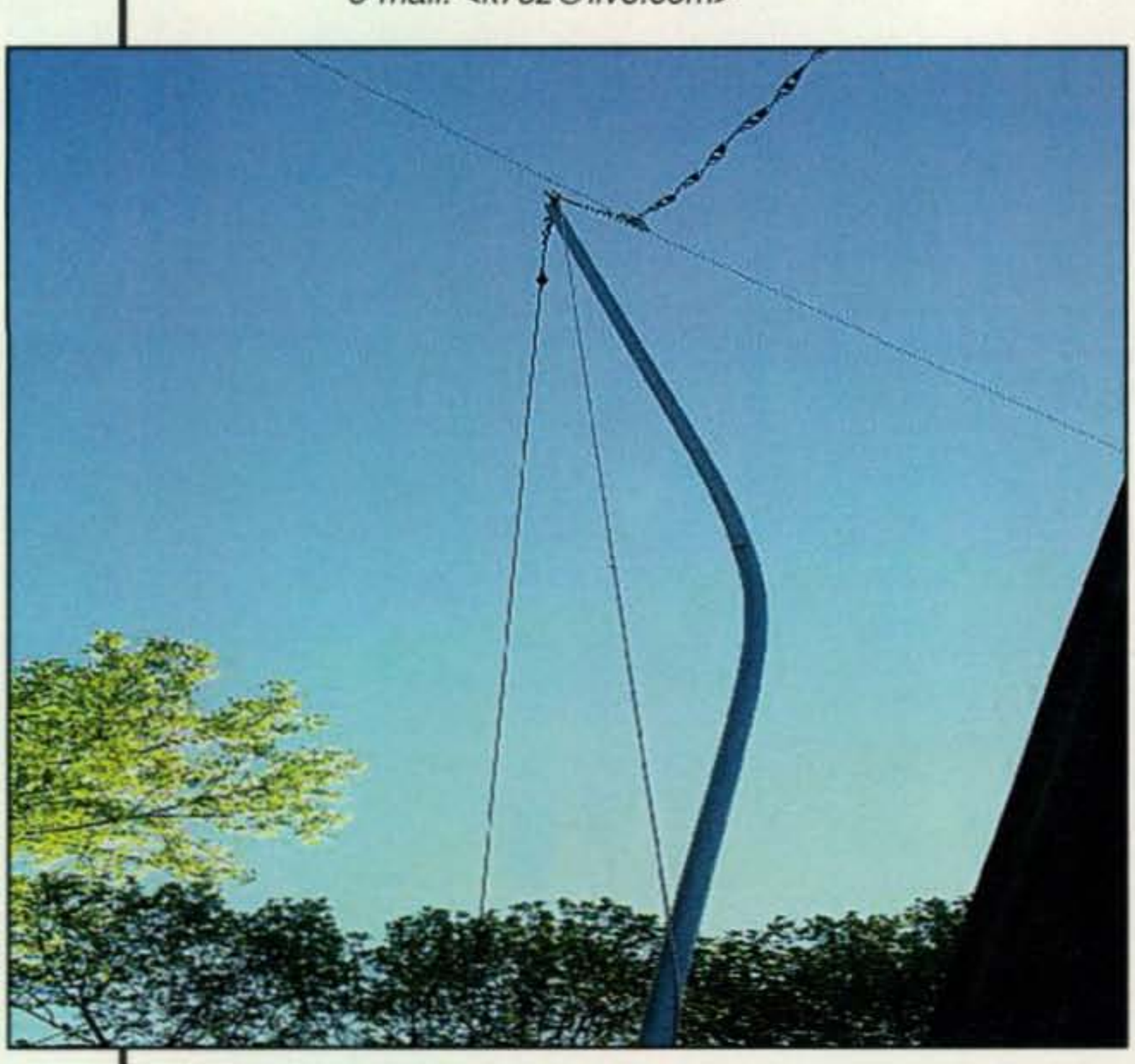
e-mail: <k7sz@live.com>



Here we witness the results of the "antenna eating tree" that bent my 40-meter Extended Double Zepp. Once the end was back up in a nearby tree, the dipole worked again, but it works a lot better now that it is up almost twice as high, as this shot shows!

Efficient Antennas

OK, gang, whadda think? Time for some more antenna theory/application? Sure, why not! One thing is certain; antennas offer the radio amateur the best chance to improve his/her on-the-air signal and increase station efficiency at reasonable cost. Adding efficient antennas is a sure-fire way to wring the most performance from your gear and greatly increase your enjoyment of the hobby.

Dipoles are the easiest and least complicated antennas to build and install, of that there is no question. However, getting a dipole to perform well as a DX antenna on 80 and 40 meters when it is relatively low to the ground is an almost impossible task. Setting aside the complicated mathematics and antenna-modeling software for a moment, let's just say that a dipole antenna at less than a half wavelength above ground will leave something to be desired when it comes to a killer DXing antenna. The lower to the ground, the more the RF signal is radiated vertically (affectionately known by hams as a "cloud heater") and the less effective the antenna is for DX.

Why is that? Glad you asked. Normally when we speak of antennas for DXing (hunting and bagging the elusive countries in the far corners of the world) we concur that they have a low angle of radiation. ARGHH! I can hear you now! OK, OK, too many terms, so let me back up a bit.

Angle of Radiation

We look at the angle of radiation of any antenna

as the *lowest* angle (referenced to nearby ground) that the RF signal takes as it leaves the radiating element (wire or aluminum tube) and heads for the ionosphere. The smaller this angle, the "lower" the angle of radiation. What this means, in effect, is that the smaller you can make this "take-off angle" the farther out into space the radio wave will travel before it encounters a reflective layer in the ionosphere and is bent back toward the surface of the Earth. This equates to longer "skip distance," which is the physical distance (in miles or kilometers) that the RF wave travels from the time it leaves the antenna until it returns to Earth. The longer this distance, the farther your signal travels and the farther you can make contacts. Ideally, if you can get a take-off angle of less than 12 degrees, you have a good DX antenna. However, beware, as this low take-off angle is a double-edged sword.

While a very low take-off angle is desirable for DX, it also leaves a huge area between the antenna and the first return of the RF wave to the Earth's surface where *no* signals will be present! Hence, you might want to consider having a mix of several antennas in order to maximize your chances of working both near and far DX.

Here's an example: Let's say you live on the West Coast, right outside Los Angeles, maybe somewhere such as Table Mountain (been there ... really beautiful). In order to take advantage of propagation on 40 meters you decide to erect a huge 40-meter wire beam antenna pointed east to work the rest of the U.S. and get into Europe and Africa, which are hard targets to hit on 40 meters from the West Coast.

After toiling in your workshop, you've fabricated a 4-element 40-meter Yagi and have suspended it in some of those huge 90-foot tall pine trees on Table Mountain. That's a *big* antenna! You're going to have a killer DX array, for sure. The 40-meter band opens up about sunset and "gets long" (communications distances lengthen out) towards midnight. Hot dang! Gonna work some DX tonight!

After firing up the rig and twisting the transmatch dials, you are ready for your big 40-meter debut. Hit the button on the keyer and out comes a string of "CQs" and your call. Sit back and wait for the pile-up. Hmm ... give it another try: "CQ." Nothing. Check the tuning. Everything's fine—low SWR, plenty of power output. Try it again: "CQ". Nothing. What's going on? This isn't fair. I did my homework!

Well, in all actuality you did your homework a little too well. Setting up a 4-element 40-meter Yagi approximately 80 to 90 feet in the air on a site such as Table Mountain, with its abrupt topographic dropoff to the east, you're going to have an excessively *low* angle of radiation, making your first skip zone somewhere around the Azores (CU2-land) out in the middle of the Atlantic. You have several choices: (1) lower the antenna, (2) reduce the elements by dropping the forward Yagi element (called a "director"), or (3) start over from scratch!

The aforementioned antenna on Table Mountain is a bit of an exaggeration—or is it? Only the Zuni Loop QRP Expeditionary Force knows for sure! Suffice it to say that there are a number of ways you can achieve DXCC and not go to the expense and Herculean effort of erecting a tower and beam antenna.

An Air-Cooled, Omni-Directional, Vertically Polarized Dummy Load

That's right, gang We're talking about vertical antennas! Of all the antennas that radio amateurs use, the 1/4-wavelength vertical is the one most maligned and misunderstood by all but a few stal-

wart users. In this column we are going to dissect the 1/4-wavelength vertical, and I'll offer a few hints and kinks on how to optimize a vertical installation to make it into a real DX-getter!

There are a myriad of vertical antennas to choose from on the commercial market. To be candid, there is very little difference in the majority of trapped 1/4-wavelength vertical antennas. They are short compared to the lowest bands that they cover, and they use "traps" to electrically isolate sections of the antenna to achieve an acceptable radiation pattern and feedpoint impedance. To be sure, there are vertical antennas out there that are a full 1/4-wavelength long, but the majority of the verticals in use are physically short to reduce their overall visual profile. This lower profile is a godsend to those antenna-challenged hams who have to deal with Draconian housing covenants. In some cases, a vertical antenna stealthily installed is the only way condo-dwelling hams can get on the air at all.

Without a doubt, the best 1/4-wave trapped vertical I have ever used was a Hustler 4BTV. No, I don't own stock in the company, and I don't have any freebies on the side. The 4BTV I used at Lajes Field, the Azores, was located on the flat roof of my on-base house. I had it elevated about 6 feet above the roof with four radials per band, which were also elevated. The 40-meter radials were tied off to nearby trees, but the rest fit nicely on the roof. I took my time tuning the vertical and it performed like gangbusters! While I have used other brands over the years, that 4BTV on my roof with elevated radials produced a lot of DX contacts. I worked DXCC in a little over 12 months using just that one antenna. I will begrudgingly admit that the CT2 callsign helped a little, but my antenna was the real hero from the middle of the Atlantic.

Does that mean that if you got a 4BTV you could do something similar? Yup. You could also do it with a Hy-Gain 14AVQ or 18AVQ, or any of a number of other brands. It's how much attention you pay to setting up the antenna, running an effective ground radial system (also called an RF counterpoise), feeding it properly with good, high-grade coaxial cable, and lastly . . . "it's location, location, location!"

Dissecting a 1/4-Wave Vertical Antenna

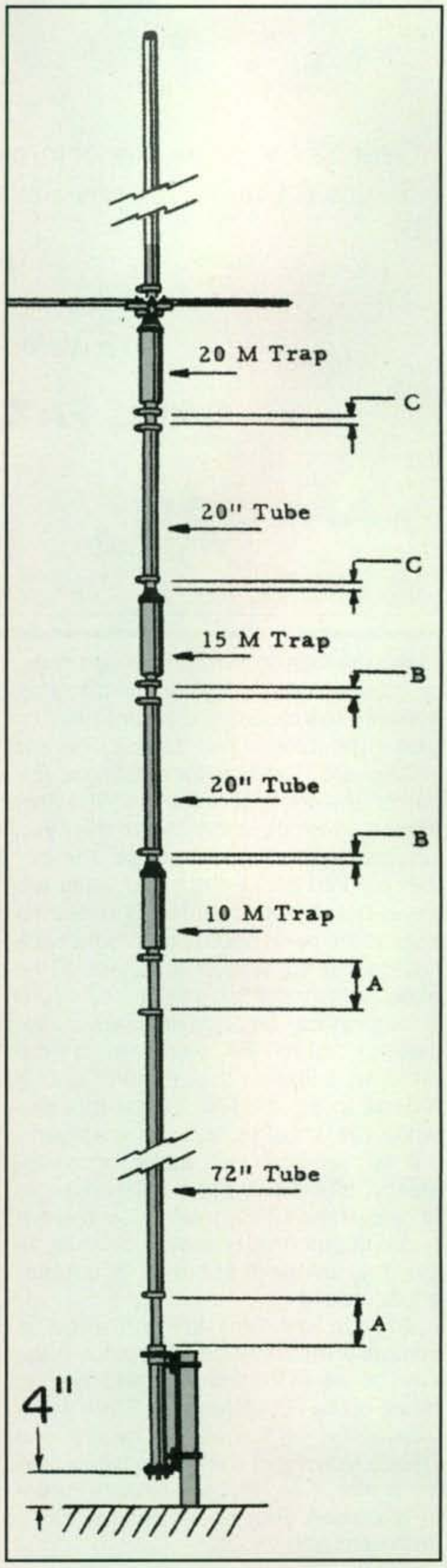
Think of a 1/4-wave vertical as only *one half* of a dipole. The other half will be the ground radial system that you will deploy at the base of the vertical. Once we look at the vertical itself as a part of an antenna system, it is easy to see how it all relates to performance.

The physical properties of the vertical portion of the antenna are composed of sections of aluminum tubing interconnected by "traps," capacitive and inductive elements, which act as an open circuit to radio frequency emissions, thereby making the rest of the antenna "invisible" to the RF. The first section is normally the highest frequency element, and the trap just above this first section of tubing keeps the RF from going any farther up the antenna. Let's say you go down in frequency and change bands from 10 meters to 15 meters. This first trap is now totally transparent to the RF, but the trap above the second section now acts to isolate the top sections of the antenna. When you go to 20 meters, that second trap now acts as a short circuit, allowing RF energy to travel farther up the antenna to the top of the 20-meter section.

I think you get the point by now. Unfortunately, by the time you get to 40 meters on one of these antennas the actual aluminum tubing tends to be a bit short for that band. Most 1/4-wave verticals are only about 22 feet long (plus or minus a bit). A quarter wavelength on 40 meters is about 33 feet, so you can see how the 20-foot vertical element is quite a bit on the short side. This is normally overcome by the addition of a "capacity hat" or a series of spokes at the very top of the antenna. This capacity hat adds a large quantity of electrical length to the antenna, allowing it to function on 40 meters. The Hustler 4BTV uses "top loading," whereby a coil of wire and tunable short whip are placed atop the last section (40 meters) and electrically lengthen the antenna. In either instance, the antenna is physically short for 40 meters but can be made to look full size.

I "Dig" What You're Saying, Man!

If the vertical element is one half of the dipole, where is the other half? Glad you asked! The other "half" is made up of the ground. That's right ... good old



A drawing of the Hustler 4BTV trapped vertical. Note the 10-meter radiating section is lowest to the ground (if ground mounted). The trap above this section acts like a switch to prevent any of the RF from going farther up the antenna. When we go to 15 meters (the section immediately above the 10-meter section), the 10-meter trap acts as a short circuit providing RF to go up to the top of the 15-meter portion. Note the capacity hat near the top of the 40-meter section. This adds "electrical length" to the vertical to make it look like a full-size 40-meter element.

Mother Earth. Unfortunately, Mother Earth is a rather poor conductor of electricity and RF energy. That is why when we use a 1/4-wavelength vertical antenna we also need to "plant" a bunch of radials at the base of the antenna extending out from the base like spokes in a wheel. Early on, in the beginning days of broadcasting, it was deemed good engineering practice to place 120 radials at the base of the antenna, each one a 1/4-wavelength long! Can you imagine trying to do that on a city lot?

There has been a lot of research done regarding vertical antennas and ground radial systems recently thanks to the efforts of Jerry Sevick, W2FMI (SK) in his outstanding book T*he Short Vertical Antenna and Ground Radial* (available from the CQ Bookstore) and Rudy Severns, N6LF, and his timely article "An Experimental Look At Ground Systems for HF Verticals" (March 2010 *QST*, page 30).

It boils down to the fact that you do need to plant a bunch of wire in/on the ground to make up the antenna segment, but you don't need to put down a huge amount of wire to accomplish the task. According to N6LF, the magic number of radials needed is 16, above which there is little improvement in performance. The nice part about this is that the radials only need to be approximately 25 feet in length, not 33 feet (for 40 meters) or 67 feet (for 80 meters). Thank you! I don't know about you, but I *have* planted a lot of radial wires over the years , and this back-breaking work is no fun, and even less fun in rock-hard Georgia clay!

A bit of time spent with an antenna analyzer (you can't get my MFJ Model 269 away from me) adjusting each element length to achieve proper resonance (the elements inter-react on a trapped vertical) will pay huge dividends in how your vertical antenna performs. You want a good, low angle of radiation—which verticals yield provided the ground radials are in place—to snag the DX. A combination of a good trapped vertical antenna with a multi-band dipole will yield a nice little inexpensive antenna system that will give you lots of DX contacts and hours of fun on the bands.

That's a wrap for this time, gang. We will revisit vertical antennas in the future, as we have just scratched the surface of these wonderful DX antennas. In the meantime, cruise the hamfest flea markets and pick up a used HF trapped vertical for your antenna farm. This is a great time to "plant" new antennas!

73, Rich, K7SZ

antennas

BY KENT BRITAIN,* WA5VJB

Stacking Dissimilar Antennas

Perhaps you have this common problem: 10 feet of mast sticking out the top of the rotator, and 63 antennas you would like to mount on that mast. Along with that comes the question of just how closely we can mount all these antennas before seriously damaging their gain and radiation patterns. I decided to find out.

In these tests, I took two commercial Yagis for 440 MHz and 915 MHz and tested both their gain and then their patterns at different spacings. In each case, the antenna not being tested was terminated with a 50-ohm load.

440 + 915

The test started with just the 440-MHz Yagi, measuring its gain and its pattern. Then the 915-MHz Yagi was mounted 16 inches above it, as shown in photo A, and forward gain was again measured. I lowered and lowered the 915-MHz Yagi, keeping the 440-MHz Yagi in the same spot (see photo B), until gain dropped 1/4 dB. That 1/4 dB was really determined by physical limits. As you can see in photo C, the mounting brackets were touching before I saw even a 1/4-dB degradation in forward gain of the 440-MHz Yagi.

Next we have the combined patterns for the two antennas in Plot 1. The pattern of the 440 MHz Yagi alone is in red, and the plot with both the 440-MHz Yagi and the 915-MHz Yagi as close as their hardware would permit is plotted in blue. There is some minor differences in the side lobes, but not much difference overall.

At this point, I would like to thank David, KF5FPA, for helping to bring my data into the polar formats. When I do antenna pattern measurements, I use a rotator that makes a full turn in almost exactly 60 seconds for 1 RPM. I then set the spectrum analyzer to zero span, 60-second sweep, one sweep only. I mount the antenna, start the rotator and the spectrum analyzer at the same time, and the spectrum analyzer displays a nice linear plot of the antenna and antenna side lobes. Linear plots are great for my work and have many advantages over polar plots, but most of you are more familiar with the polar-type antenna plots. So I saved the trace data and KF5FPA put the data into Excel and produced the polar plots in this column.

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Photo A– Measuring a 440-MHz Yagi and its interaction with a 915-MHz Yagi.

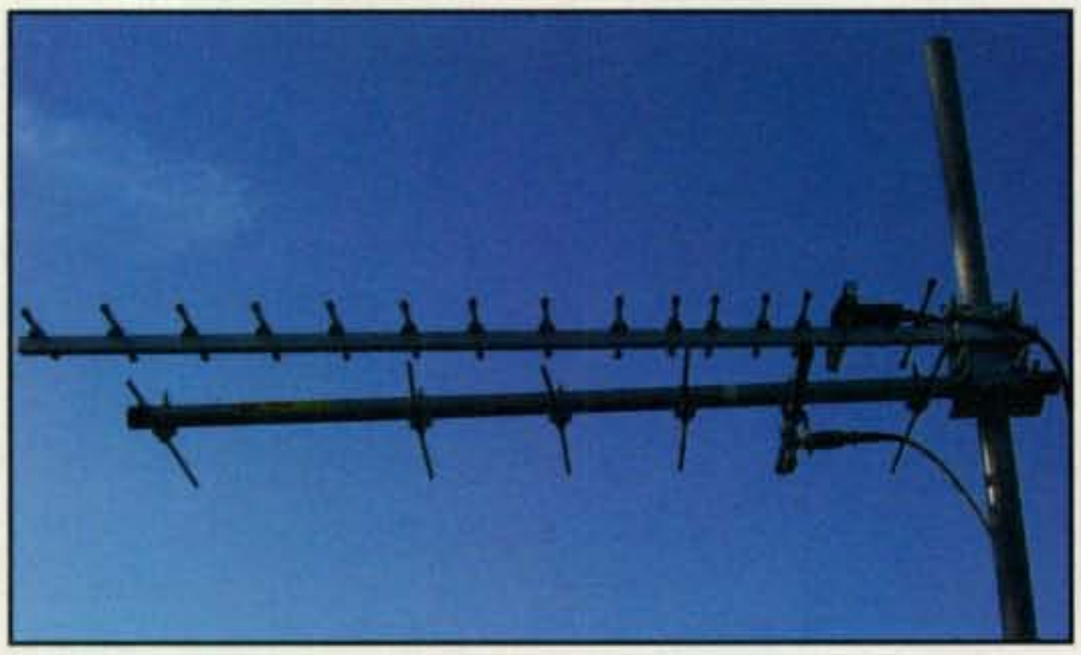

Photo B– Spacing before we saw 1/4-dB drop in forward gain.

915 + 440

Now we go the other way in photo D. In Plot 2, I have the plot of just the bare 915-MHz Yagi in red, and then mounted the 440-MHz Yagi above it. This time I kept the 915-MHz Yagi in the same place and slowly lowered the 440-MHz Yagi until I again got a 1/4-dB drop in forward gain. This time the spacing was 5.5 inches. The lower-frequency Yagi with its longer elements had far more effect on the 915-MHz antenna than the 915 MHz had on the 440 MHz, but again the effects were small.

Of course I went further. In photo E, you can see that I took the 440-MHz beam right down to where the driven elements were about to touch. In this setup, I saw –3.2 dB lower forward gain, but most of the loss in gain was really due to a higher SWR in the 915-MHz antenna. Therefore, the loss indi-

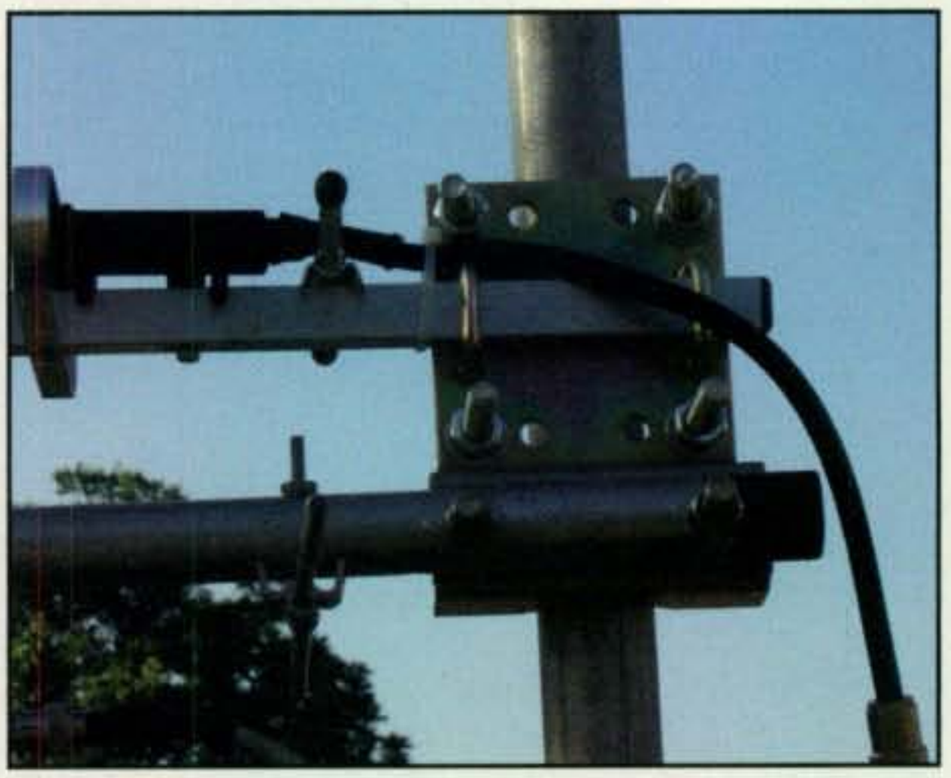

Photo C– It was really the mechanical limits of the mounts!

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1.375"	.058"	$2.05
1.500"	.058"	$2.25
1.625"	.058"	$2.55
1.750"	.058"	$2.80
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2.000"	.058"	$3.30
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Yaesu G-550	$329
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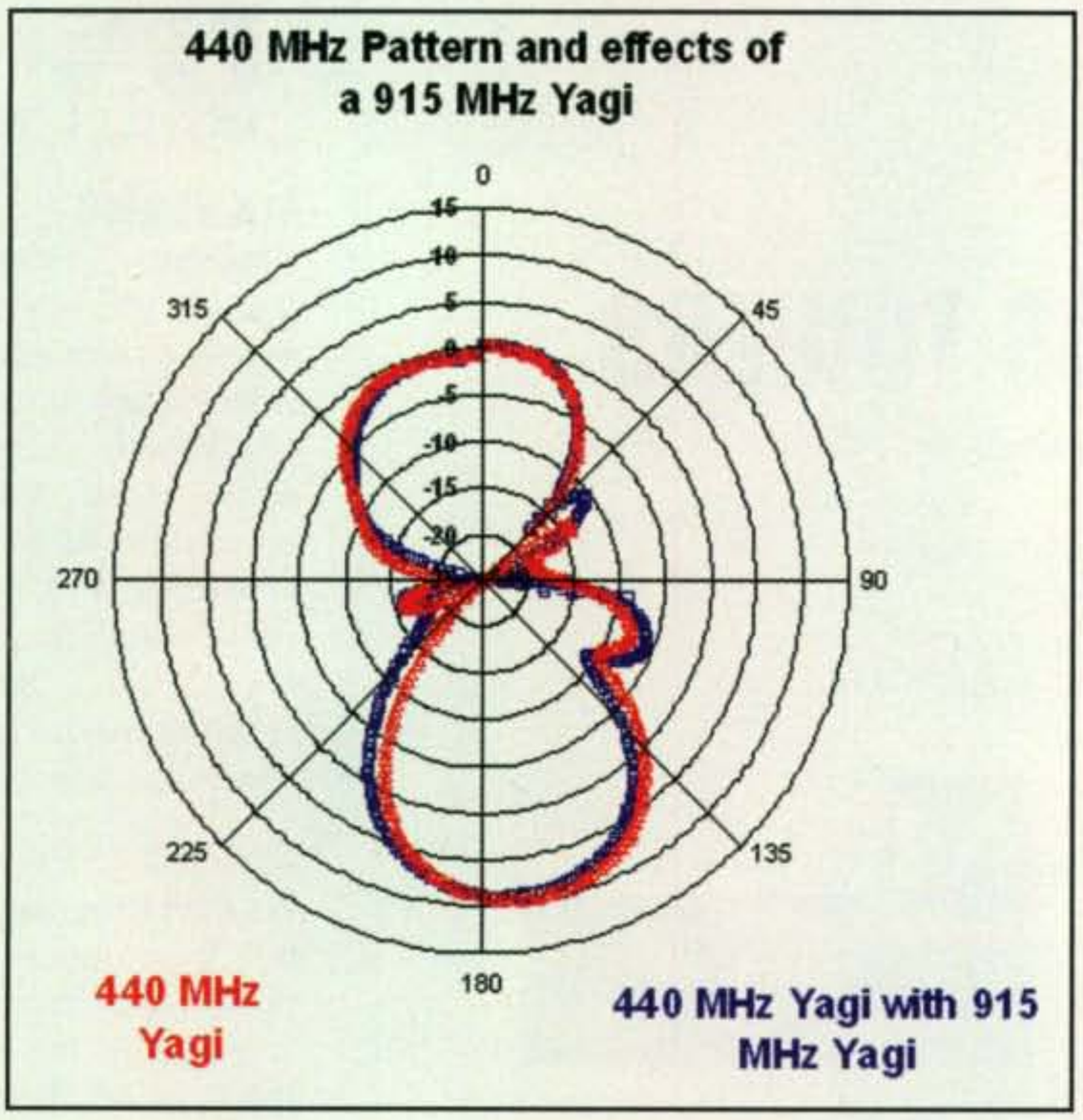
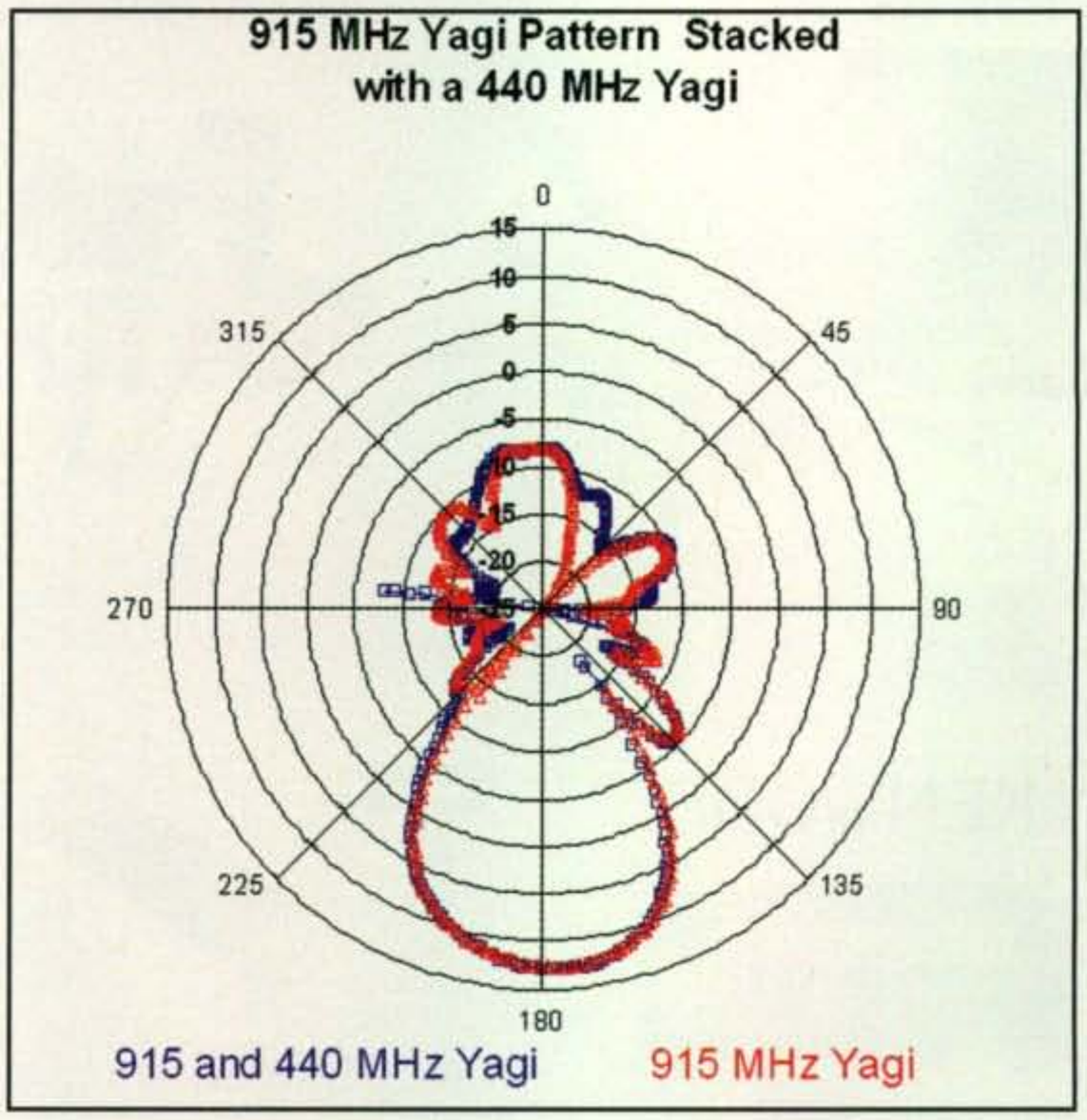


Plot 1– 440-MHz Yagi with and without a close-spaced 915-MHz Yagi (see text for details).



Plot 2– 915-MHz Yagi with a 440-MHz Yagi spaced at 5.5 inches.

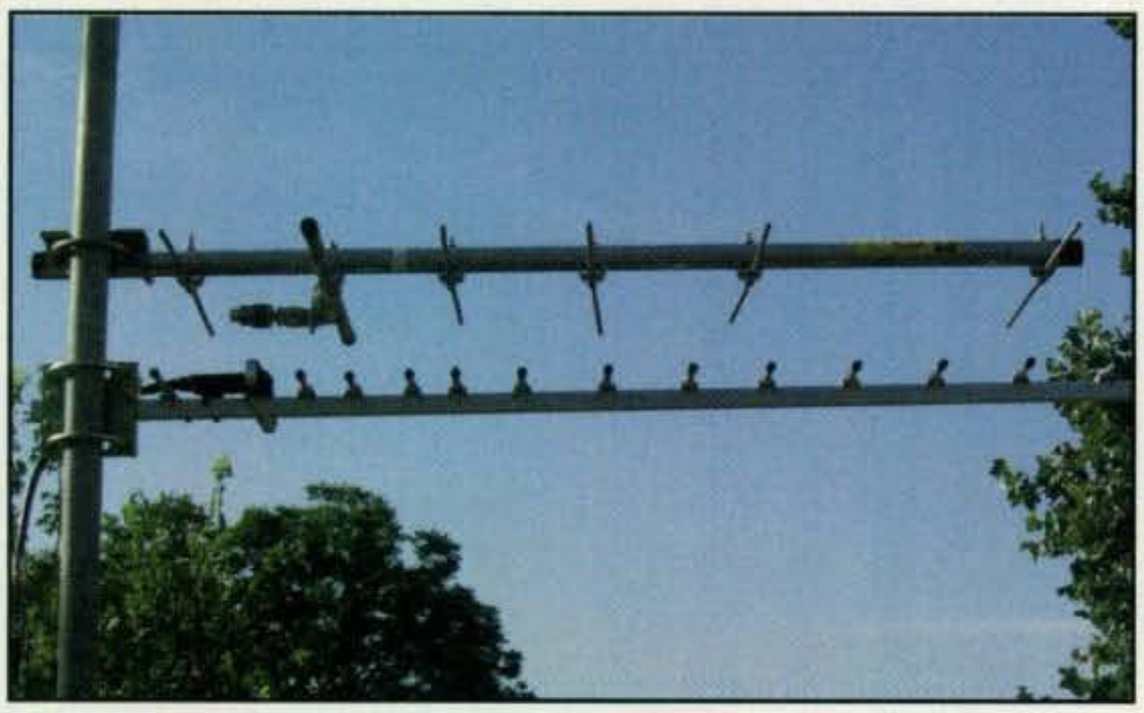


Photo D– Measuring a 915-MHz Yagi and its interaction with a 440-MHz Yagi.

Photo F– This Force 12 multiband HF Yagi has elements for different bands so close they're on the same boom! (Courtesy of Force 12 Antennas)

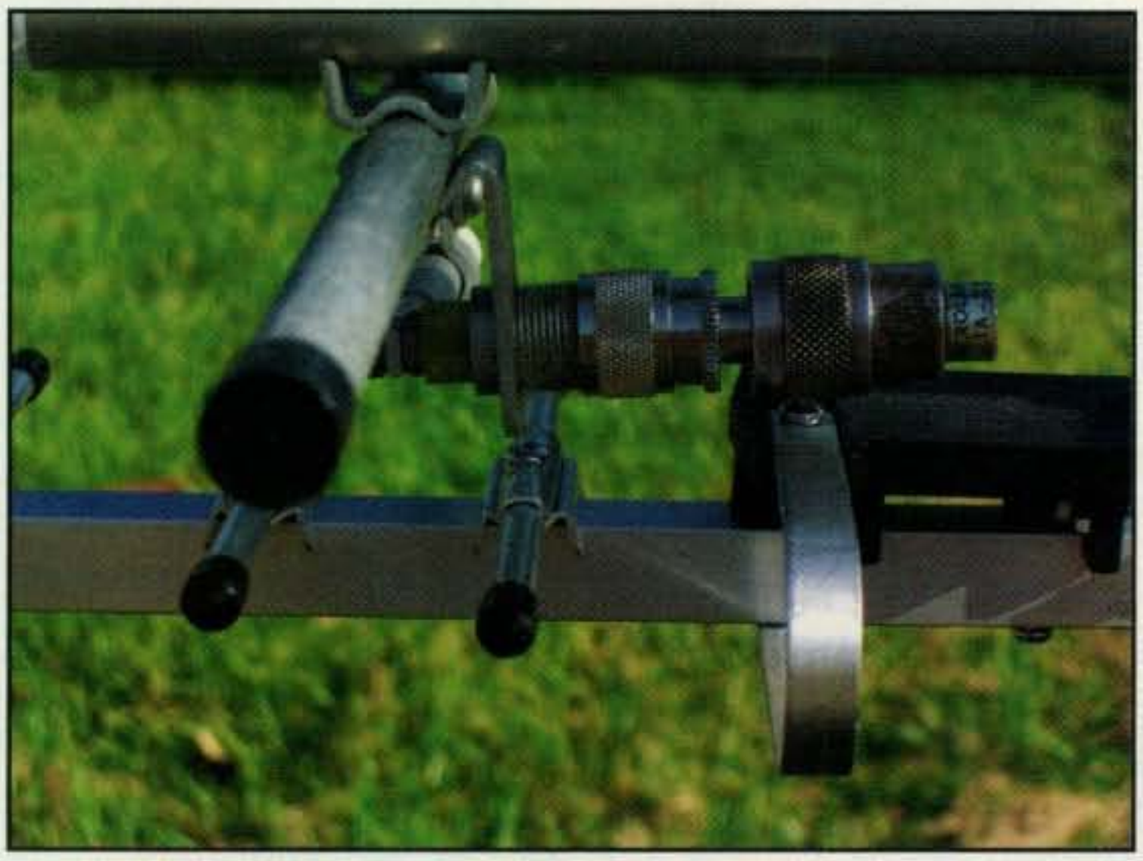


Photo E– Again, measuring to the mechanical limits.

cated that the power was being mismatched and reflected, not that there was a pattern change.

Bottom line: The higher-frequency Yagi has almost no measurable effect on the lower-frequency Yagi until the hardware is touching. The lower-frequency Yagi has more effect on the higher-frequency Yagi, but again, you have to get them pretty close. Yes, I have a virtually infinite number of antenna variations to look at, but antennas can be stacked much more closely than many pundits suggest!

Heck, just look at the multiband Yagis you see on HF where three, four, even five bands might be built onto one boom, such as the Yagi from Force 12 in photo F. Yes, when you look ahead in your design work, the interaction among elements for the different bands can be better allowed for, but it doesn't seem to be all that bad to begin with.

Coming Attractions...

Looking ahead, keep an eye out for old fiberglass whip antennas. Old CB whips such as the ones in photo G are perfect for this, and while you're at it, some heat-shrink tubing that

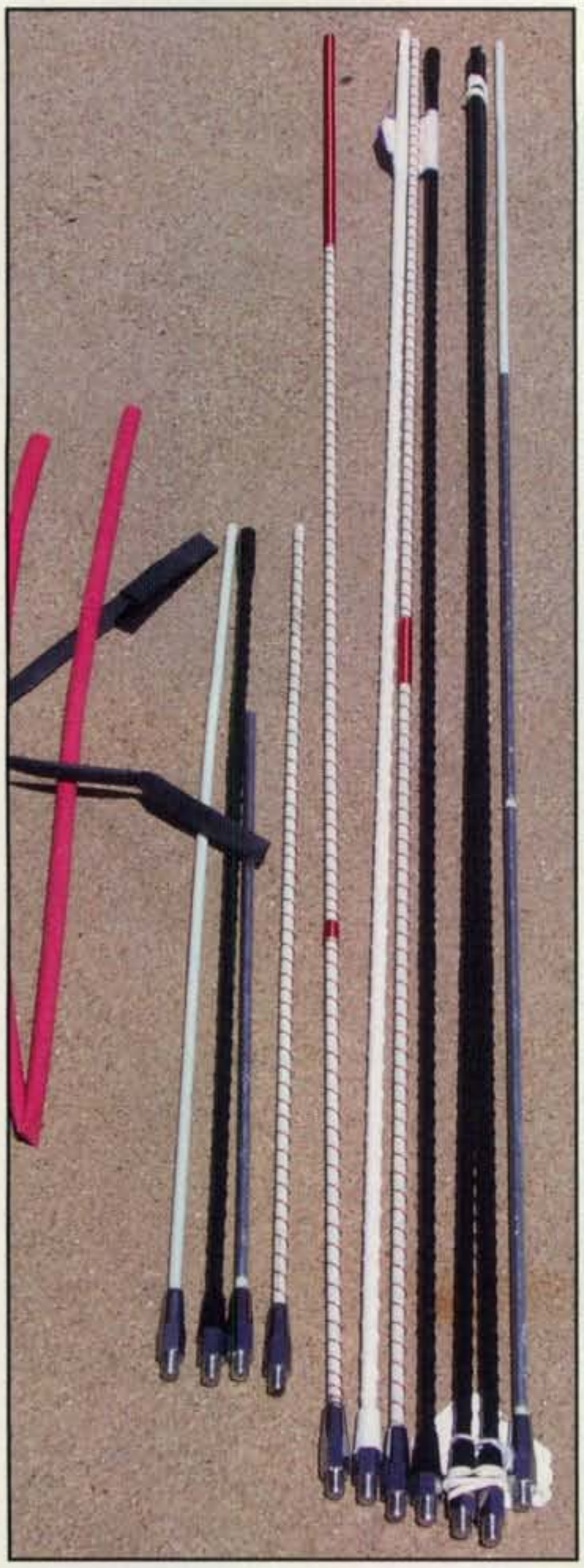


Photo G– Coming attractions, how to recycle that fiberglass CB whip.

will go over the fiberglass rod will be handy as well. I have been playing with some multiband versions for 10 and 2 meters and for 6 and 2 meters, as well as single-band versions and even a 2-meter 5/8-wave fiberglass whip made out of an old CB whip. Thus, if you see some old CB whips going for real cheap at a sale, you might want to get a head start on some of my future construction projects and pick up a few.

As always, we welcome your questions and suggestions for future topics. Just drop a snail mail to my address on the first page of this column or an e-mail to <wa5vjb@cq-amateur-radio.com>. For other antenna articles and projects, you are welcome to visit <www.wa5vjb.com>. 73, Kent, WA5VJB

vhf plus

BY JOE LYNCH,* N6CL

Fred Fish Memorial Award Number 2

On June 17, 2010 Pat Rose, W5OZI, became the second ham radio operator to work all U.S. grid squares, thus becoming the second person to be awarded the coveted Fred Fish Memorial Award. Pat contacted Russ Dwarshuis, KB8U, operating from CM79 (a triangle section of the northeast portion of this grid is in Mendocino County, California, and is accessible only by hiking or by boat.) at 1721 UTC. Russ commented on his contact with Pat: "My W5OZI QSO was definitely the highlight of the trip. Special thanks go to KB6NAN for alerting me that the band was open his way and that he was on frequency. It was a CW QSO, with low signal strengths."

Russ Answers Questions

The following is from Russ. First there is a final report on his operation, and second his responses to questions that Bill VanAlstyne, W5WVO, and Bob Brown, KR7O, asked about the trip:

The final QSO tally was 272 contacts logged, all but three on 6 meters. I'm guessing there were about 10% dupes. I counted 101 grids worked on 6 meters, plus maybe a few more (who just sent an RST or meteor-scatter report). I worked six FSK441 QSOs on the last day. There was plenty of double-hop QSOs made all over the USA, except for Florida. I heard 5JØBV but I couldn't work him. The highlight was working W5OZI for his last FFMA grid. The *E*-layer of the ionosphere must have gotten wrung out from the workout, since the last two days were completely dead.

Best DX on 2 meters was about 120 miles, not bad for a 6-meter antenna and 10 watts through 100 feet of coax.

I hiked a total of about 18 miles with 4800 feet of elevation gain. I got about six mosquito bites and a scratch on the back of my hand (that I don't know how I got) and some sore muscles, but I'm otherwise no worse for wear. I saw one elk up a lot closer than I liked, but he didn't seem to mind.

I operated from the grid corner at 40N 124W exclusively so if you contacted me, you worked four grids. I just sent CM79 to keep things simple.

Questions from W5WVO:

Did you run into any problems (or even contact) with the federal authorities? Rangers, etc.?

I read the rules (no generator outside of developed campground, no wheeled conveyances, no back-country camping or fires, etc.) and made sure no special permissions were required. The rules are clear that portable radios are allowed. Bureaucrats have nothing to risk and can avoid any possible problems for themselves by saying "no" when they don't know what they're talking about, so I didn't contact any.

How was the weather up there this time of year? Any rain? Temps? Humidity?

It was cool and windy for all but the last day, but there was no rain. It was about as warm when I went out there in January to scope out the area. I did not have enough warm clothes, so I got cold sitting on the ridge toward evening. I had to head down toward camp 30 minutes early one evening, even though the band was wide open, since I was starting to shiver. It got down into the mid-40s at night and my sleeping bag wasn't warm enough so I wore my clothes to bed, used the tent's rain fly as a blanket, and put the cardboard boxes (knocked down flat) in which I shipped the gear over me, then I was toasty warm. The cold and wind did keep the mosquitos from chowing down on me on the plus side.

Do you have any ideas for future activations? Anything you wish you would have or could have done differently?

I was planning on bringing my cell phone, but I misplaced it at the last minute. Internet access would be good to have, too. I'm not sure either is accessible from the ridge. I did try Wi-Fi on my netbook just for the heck of it and wasn't surprised there wasn't any. Another couple of operators would have surely increased the QSO total, too. There is a back-country campsite near the grid boundary ("Nick's camp") that could possibly be used as a second base camp by a larger group; some ops could stay there overnight and continue to operate, and others could hike up their supplies and charged batteries. I did not check out that site, unfortunately. It's just outside CM79, about one-third mile from the grid corner on a spur trail called Chinquapin loop and down the side of the ridge somewhat toward the ocean, so it's not ideal. By the way, the grid corner is more easily accessed from the Chinquapin loop trail than the Lost Coast trail. You don't have to scramble down a steep slope from the Chinquapin trail before heading off the trail toward the grid corner.

I had some technical issues with the front-panel extension cable and the batteries. More time to test and fix them would have been nice, but I just plain ran out of time. I also wish I had spent more time on FSK441 instead of fruitlessly calling endless CQs on CW when the band was dead. I was quite surprised how good the meteors were in the afternoon on the last day, once the word got out I was on that mode. I did try FSK-441 CQs for about a half hour on Friday morning without one call, so I think people just weren't aware I was on. I probably should have just ran FSK-441 on 50.145 during dead times, as someone may have heard a ping and fired up WSJT and then spotted me.

KR7O asked about the trail conditions and my batteries:

The trail is in excellent condition, and there was not any problem with thick brush or excessive undergrowth off the trail at the grid corner. There is loose gravel on a couple of steep sections coming down from the mountain, so extreme caution is necessary there, but otherwise the path surface is not a problem at all.

VHF Plus Calendar

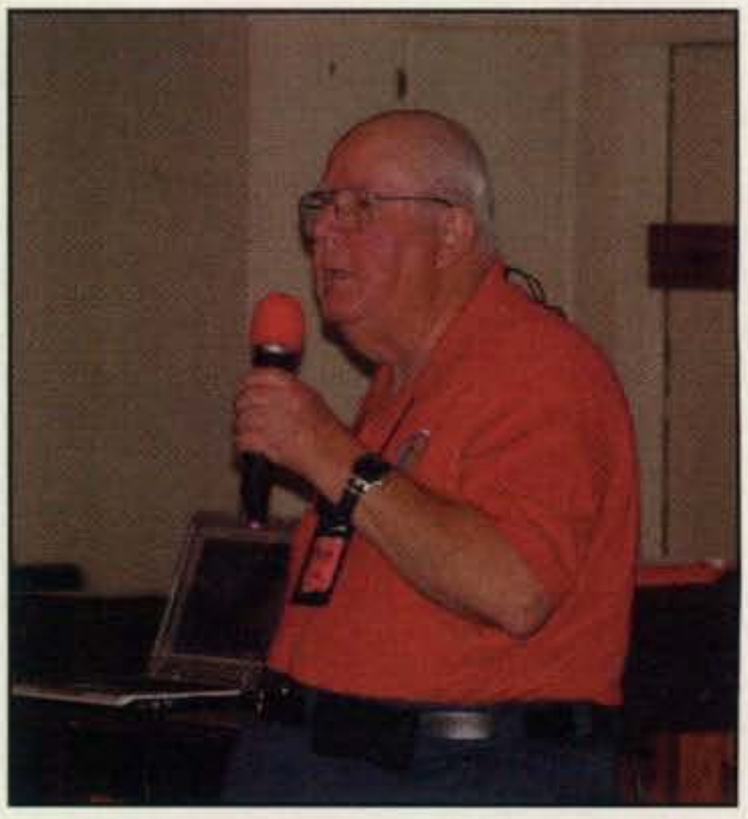
Sept. 1	Last quarter Moon
Sept. 4–5	ARRL EME 2.3 GHz and Up Contest
Sept. 5	Good EME conditions
Sept. 8	New Moon and Moon perigee
Sept. 11–13	ARRL Sept. VHF QSO Party
Sept. 12	Poor EME conditions
Sept. 15	First quarter Moon
Sept. 18–19	Second weekend of the ARRL 10 GHz and Above Cumulative Contest
Sept. 19	Poor EME conditions
Sept. 20	The 144 MHz Fall Sprint
Sept. 21	Moon apogee
Sept. 22	Fall equinox
Sept. 23	Full Moon
Sept. 24-26	TAPR/ARRL Digital Communications Conference
Sept. 26	Poor EME conditions
Sept. 28	The 222 MHz Fall Sprint

—EME conditions courtesy W5LUU

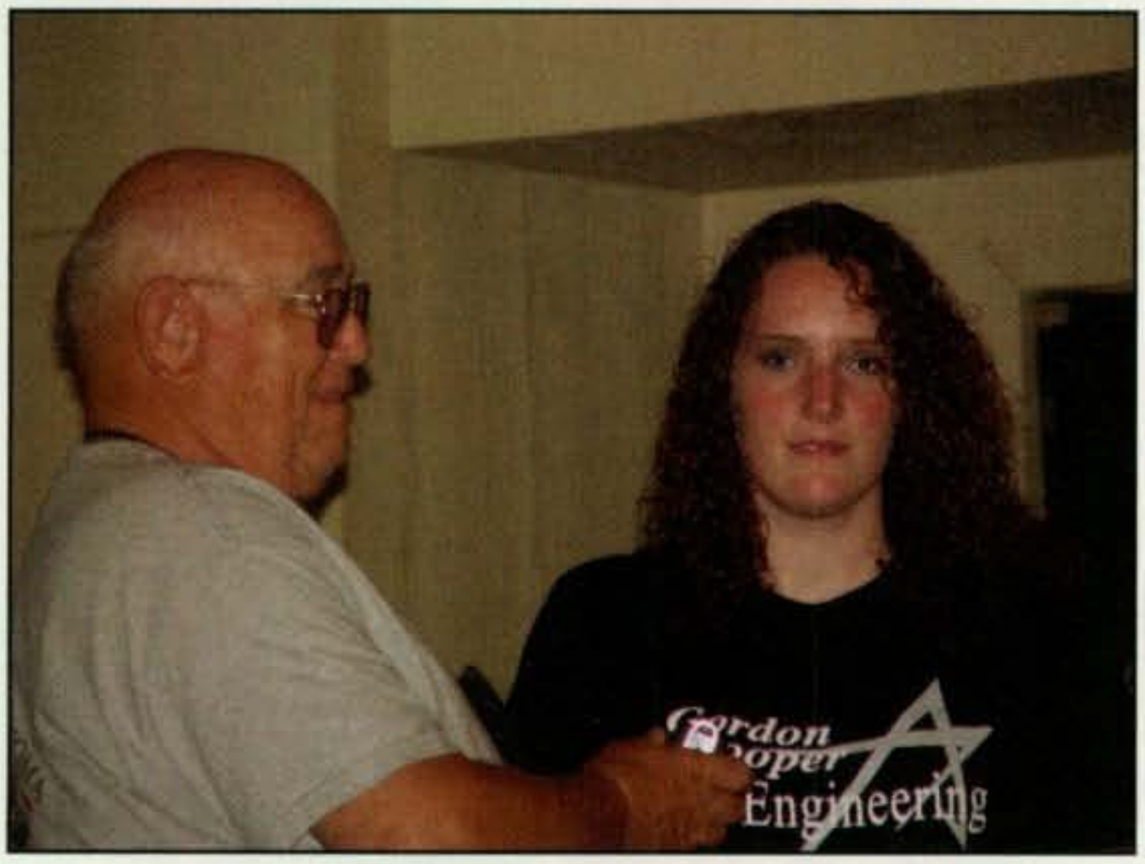
e-mail: <n6cl@sbcglobal.net>

I discovered right before I left that the lithium-ion polymer batteries are at 16.8V when fully charged. I wired up a bridge rectifier in series to drop the voltage, but I didn't have them on a heat sink the first day, so I had to operate SSB at reduced power for awhile until the battery voltage got to within the 706's maximum rating (15.9V), and then I took the diodes out. Subsequently, I brought an empty can with some water in it and dunked the diodes in that to keep them from overheating. Obviously, I could have used a proper voltage regulator. The batteries worked great. They have a protection circuit in them that keeps them from being over-discharged, so I didn't have to worry about that. I was getting about four hours out of each battery and that was more than I expected. They took all night to charge, though. I brought a small generator to charge them. I was going to use an inverter, but the cheap (square wave out) one I bought a few days before I left blew out my battery charger. Good thing I tested them together before I left. I had to buy another battery charger at the last minute and pay the $$$ for shipping the generator, but I think that worked out better anyway, since I didn't have to run the car motor that way.

Nearly twenty Cavett's Kids awaiting the opportunity to ask their questions of astronaut Douglas Wheelock, KF5BOC, on board the International Space Station (ISS) during a fly-by over Lake Texoma, while their friends watch. (Photo by N6CL)



Keith Pugh, W5IU, ARISS contact mentor, preparing the kids for the forthcoming contact. (Photo by N6CL)



Cavett Kid Morgan Garrison awaits the opportunity to ask her question while Randy Read, KE5NTH, holds the microphone. (Photo by N6CL)

Special thanks go to Len Gwinn, WA6KLK, who also made sure I was OK by calling me when things were slow to see how I was doing and to offer kind words of encouragement. He even offered to drive to my camp if I was in need of anything.

A Special ARISS QSO

Kids from Cavett Kid's Foundation, while at Camp Cavett on Lake Texoma, Oklahoma, were able to talk with astronaut Douglas Wheelock, KF5BOC, on board the International Space Station (ISS) during a fly-by over Lake Texoma.

At 3:37 PM CDT on Thursday, July 8, 2010, Danny Cavett's kids from Cavett Kid's Foundation, while attending Camp Cavett on Lake Texoma, had about eight minutes to have their questions answered live by Doug as the ISS flew near Lake Texoma at 17,500 miles per hour. The Cavett Kids prepared for this opportunity by learning about space, science, and related topics while intending to attend Camp Cavett. The students who actually got to ask their questions were selected by a competition based on the questions submitted.

The ground station was provided and installed by members of the Aeronautical Center Amateur Radio Club (W5PAA) from Oklahoma City. The hams from the Aeronautical Center ARC who participated in the event are: Matt Garcia, N5PTV; Gerry Taylor, KC5MWZ; Mike Rockey, KE5EQC; Randy Read, KE5NTH; and Bobby Duncan, KF5GTX. Keith Pugh, W5IU, provided the mentoring of the contact.

The special nature of this ARISS QSO is that the kids who attend Camp Cavett have either debilitating or life-threatening health conditions. Danny Cavett, who is the director of the organization, is also a children's chaplain at the University of Oklahoma's teaching hospital in Oklahoma City. Seeing a need to provide kids with major health issues an alternative and/or unique opportunity to continue to grow and develop character, Cavett started the Cavett Kids Foundation in 1997. More information on the organization can be found at its website: <http://www. cavetkidsfoundation.org>.

My wife Carol, W6CL, and I had the opportunity to witness this QSO and we were quite impressed with the activity. Once again, amateur radio played an important role in the development and education of our youth—in this case, our special youth who have special needs. For more information on NASA's efforts to use amateur radio to teach about space, see: <http://www.nasa.gov/audience/foreducators/teachingfromspace/students/ariss.html>.

Less Stringent ITAR Restrictions

The new International Traffic in Arms Regulations (ITAR) have eased restrictions on technology transfers between U.S. and non-U.S. citizens. In part, the regulations state:

The United States Government will consider the issuance of licenses for space-related exports on a case-by-case basis, pursuant to, and in accordance with, the International Traffic in Arms Regulations, the Export Administration Regulations, and other applicable laws, treaties, and regulations. Consistent with the foregoing space-related items that are determined to be generally available in the global marketplace shall be considered favorably with a view that such exports are usually in the national interests of the United States.

More information can be found at this website: <http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf>.

KH6HME Works XE2HWB, La Paz, Mexico

The following was relayed from WB6NOA: "A new record on 2 meters SSB: 2906 miles! KH6HME wrote: 'On the morning of June 24, 2010 Bernardo calls me. He is hearing the beacon. Can I drive up to the Mauna Loa Volcano beacon site and make a QSO? I make the drive, arrive, and switch out the beacon rig for my two-way rig. There he is calling me. We work nearly instantly with 5/5 copy both ways.' This is Paul's best DX via tropo ducting."

PJ4 2011 Activation

The following is from Ed Gray, WØSD: "The W7XU team of WØSD, W7XU, and XYLs WØOE and NØQJM, plus Johan, ON4IQ, are headed for Bonaire PJ4 for the '2011' 6-meter sporadic-*E* season DXpedition. It is expected this will be a new DXCC entity by then. The operation is scheduled from mid-June to July 5, 2011."

Current Contests

The **ARRL EME 2.3 GHz and Up Contest** is September 4–5. The **ARRL September VHF QSO Party** is September 11–13. The second weekend of the **ARRL 10 GHz and Above Cumulative Contest** is September 18-19. The following are the dates for the **Fall Sprints**. The **144 MHz Fall Sprint** is September 20, 7 PM to 11 PM local time. The **222 MHz Fall Sprint** is September 28, 7 PM to 11 PM local time.

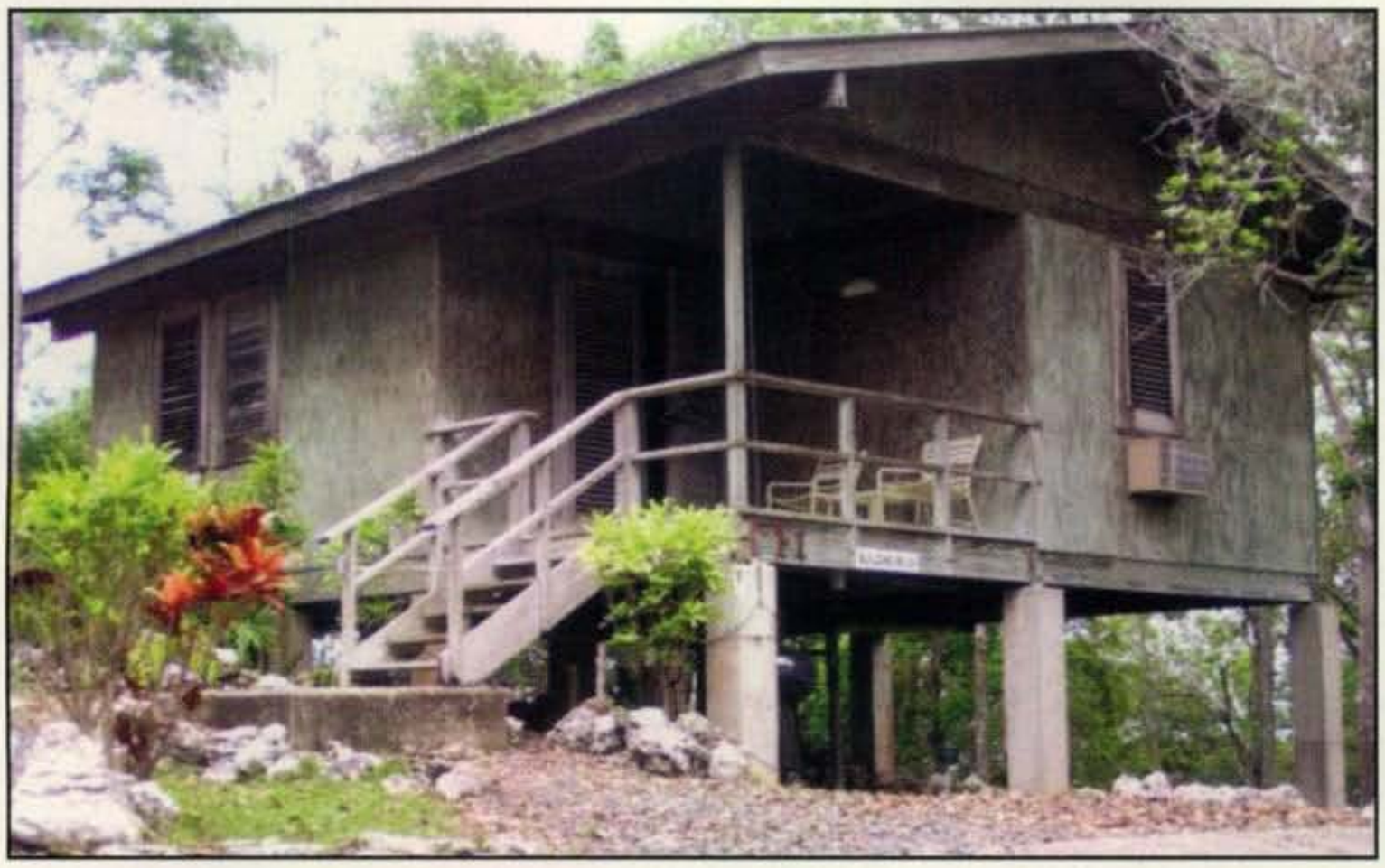
For ARRL contest rules, see the issue of *QST* prior to the month of the contest or its URL: <http://www.arrl.org>. For Fall Sprint contest rules, see the Southeast VHF Society Sprint Rules URL: <http://www.svhfs.org/2010fallsprintrules.pdf>.

Current Conference

September: The 2010 **TAPR/ARRL Digital Communications Conference** will be held September 24–26, 2010, in Vancouver, Washington, at the Heathman Lodge. For more information, see: <http://www.tapr.org/dcc.html>.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., please contact the person listed with the



The "Jodi Foster" cabin that Pat Barthelow, AA6EG, got to stay in during his trip to Arecibo. (Photo by AA6EG)

announcement. The following organization or conference organizers have announced a call for papers for its forthcoming conference:

Microwave Update: This **year's Microwave Update** conference will be held in Cerritos, California the weekend of October 21–24, at the Sheraton Cerritos. 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, and design modes, just to name a few. Frequency range is 900 MHz through LASER. They have already had quite a few early volunteers, which they always appreciate, but they are looking for more presenters. If you are interested in presenting please contact Frank Kelly, WB6CWN, via the website link listed below.

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 topics on any topic microwave related. If you are interested in making a contribution to the *Proceedings*, please contact Frank Kelly, WB6CWN at the website link on the conference website at: <http://www.microwaveupdate.org/>. The deadline for papers is Monday, August 31, 2010. The *Proceedings* Style Guidelines page can also be found on a link on the conference website.

AMSAT-NA 2010 Space Symposium: Technical papers are solicited for the 2010 AMSAT Space Symposium and Annual Meeting to be held October 8–10 in Elk Grove Village, Illinois. Proposals for papers, symposium presentations, and poster presentations are invited on any topic of interest to the amateur satellite program. Papers on the following topics are solicited: Students & Education, ARISS, AO-51, P3E, Eagle, and other satellite-related topics.

Camera-ready copy on paper or in electronic form is due by September 1 for inclusion in the printed symposium proceedings. Papers received after this date will not be included in the printed *Proceedings*. Abstracts and papers should be sent to Joanne Maenpaa, K9JKM, at e-mail: <k9jkm@amsat.org>. For more information see: <http://www.amsat.org>.

And Finally . . .

Sometimes things don't always work out the way we plan. Sometimes they work out better. Take, for instance, Pat Barthelow, AA6EG's trip to Arecibo. Describing his situation in his article in the Summer 2010 issue of *CQ VHF* magazine, he wrote the following:

I was on a severely limited budget. I arrived at San Juan Airport at 9 PM on Wednesday, April 14. I had contacted some academics and students at the University of Puerto Rico, Mayaguez, with an interest in space science, and of course some of them became interested in knowing more about EME at Arecibo.

Even so, I was still looking for overnight accommodations near Arecibo, an hour from San Juan, but not having much luck. Everything seemed booked and hotel prices were on the very high side for me. The observatory was about a 20-minute drive into the country, south of the City of Arecibo...

As luck would have it, there was a cancellation, and I was able to check in to VSQ F-1, a wonderful Family Cottage, "The Jodie Foster Suite" on the top of the highest hill adjacent to the dish.

The F-1 cottage is featured early in the movie *Contact,* which I had just watched from beginning to end. In the movie, Jodie Foster's character and Matthew McConaughey's character spent some quality time in the same F-1 cottage that I stayed in. Complete with kitchen (by the way, it had no microwave!), bath, master and guest bedrooms, living room, study, fiber-optic internet connectivity, and authentic tropical forest loud critter sounds outside—particularly the well-known tiny but loud frog called *El Coqui*. The tropical forest just outside made me feel like I was on the set of the Bogart movie *African Queen*.

Regarding the Arecibo article in *CQ VHF,* this article is accompanied by an historical account written by Mark Morrison, WA2VVA. Additionally, the August 2010 issue of *QST* has an excellent article co-authored by Joe Taylor, K1JT, Angel Vazquez, WP3R, and Jim Breakall, WA3FET.

If you have a story to tell, please contact me at: <n6cl@sbcglobal.net>.

Finally, please check out the new websites for the CQ family of magazines. We are making an effort to have current information on our websites as well as links to Facebook and Twitter.

Until next month . . .

73 de Joe, N6CL

dx

BY CARL SMITH,* N4AA

The "Magic Band" is Alive

What an interesting time for anyone who could get on 6 meters, the "Magic Band." The team that was active from Palestine as E4X made history, for sure. Look at the chart elsewhere in this column. Yes, it does show 6545 QSOs on 6 meters. A first-ever NA to Palestine contact was made between K4CIA, Bill McDowell in North Carolina, and E4X. Many others in North America also made contact with E4X on 6, but Bill was the first. Congratulations, Bill! With a total of over 80,000 Q's, Palestine should be well down on the next Most Wanted list published in *The DX Magazine* (http://www.dxpub.com). Literally hundreds of contacts between NA and Europe were reported during the June/July time frame. It seems 6 meters has taken the front-center spot away from the HF bands. There were more cluster DX spots for 6 meters than for 20 meters.

Six meters is getting a lot of attention around the world. A "primarily" 6-meter DXpedition to The Gambia, and special permission for Thailand amateurs to operate on 6 during the July CQ WW VHF Contest, plus what we have written above, are just a few examples of the interest in the "Magic Band." Dennis, K7BV, has been going on a 6-meter DXpedition to the Caribbean/Central America area the last few years, too.

One of the elder members of the Carolina DX Association, Tom, N4HN, EM95 Charlotte, North Carolina, offers some comments on his 6-meter activity. Perhaps you will find it interesting:

"On June 3 starting at 00:02 until 01:06 some great *E*-skip with many 5/9 +20 signals came through. I worked EM06, EM09, DN70, DM79, and DM98, with Colorado being a new state. I got four new grids. At 01:02 UTC my friend Gary, W2ZV, in EM94, reported he worked KØGU in DN70 Colorado on 144.210 MHz with 100 watts into a 2-element beam in the attic!

"During the June VHF contest I worked 159 grids on 6 meters with low power. It was my first time topping 100 grids! I got one 2-meter *E*-skip contact at 01:07 on June 13th with KØCIY in EM25. Conditions were so good that I got 11 new grids on 6 meters, including close-by grids such as EM99 and FM27. I could only hear the FM27 station when pointed towards the center point of the opening; no copy on the direct beam heading. I made just shy of 80K, my best score ever!

"On June 18/19 we had more *E*-skip starting at 23:48 and going on until 01:46. I worked DM69, DM79, EM04, EM17, EM29, EM39, EN04, EN10, EN21, EN13, EN24, and EN34. I worked three Nebraska stations and three South Dakota stations, which were new states for me. I got eight new grids. This opening was very spotty. I had to try to work W7XU three times before we completed a contact! Signals were not very strong. Copy the call and they would disappear before getting them in the log."

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

E4X STATISTICS - QSOs by band/mode

Band	CW	SSB	RTTY	Total
6M	3.408	2.882	255	6.545
10M	2.608	3.255	478	6.341
12M	3.354	2.686	499	6.539
15M	4.105	4.547	2.145	10.797
17M	7.838	4.979	1.921	14.738
20M	7.913	7.607	2.853	18.373
30M	7.296		1.482	8.778
40M	3.564	1.629	535	5.728
80M	1.562	690	0	2.252
160M	176	0	0	176
Total	41.824	28.275	10.168	80.267

E4X Palestine statistics, QSOs by band/mode.

Netherlands Antilles

As this is being written, the government of the Netherlands has made some progress toward creating two new counters for ham radio in the Netherlands Antilles. According to news reports in early July, the effective date will be October 10, 2010. If all goes as planned, the islands of Curacao and Sint Maarten will become the two "new ones" on the DXCC list. The other islands of Bonaire, St. Eustatius, and Saba will remain as "special municipalities." There is still some dis-

Providing QSLs at Dayton is not unusual. Here we find Herb, HB9BOU (right), the QSL Manager for 4U1UN, along with Berti, HB9SLO, assisting him. (Courtesy of Floyd, N5FG)

cussion about the status of Bonaire due its distance from the others. I won't speculate, and suggest that others not in the decision-making process also refrain from such. I have confidence in those who are in the decision-making process to decide in due time what should happen. However, in view of the almost certainty that Curacao and Sint Maarten will be new countries, many people have already announced their intention to conduct "first day" operations from there. It should prove interesting with that many stations on the air

The WAZ Program

20 Meter SSB

1193 ..... IW2FND

80 Meter CW

84 ..... 4Z5SG

20 Meter RTTY

65 ..... ONN3US

160 Meters

351 ..... RJ3AA (40 zones)
352 ..... OH3GD (40 zones)
353 .... IK7UFL (35 zones)

All Band WAZ

Diamond Jubilee

024 ..... KØJW
025 ..... N5TY
026 ..... WK4Y
027 ..... LA9BM
028 ..... VE7CV
029 ..... AC5O
030 ..... K7UA
031 ..... AA1VK
032 ..... N8DE
033 ..... IWØHOU
034 ..... G3WW
035 ..... DK2WM
036 ..... S53EO
037 ..... WB4MAK
048 ..... KQ8M
049 ..... SWL I1-12387
050 ..... K6FW
051 ..... GM3PPE
052 ..... DL1VJL

Mixed

8676 ..... VE8EV
8677 ..... G4PWA
8678 ..... AA4XA
8679 ..... K8LY
8680 ..... JA1SZN
8681 ..... HA5PT
8682 ..... LU4FPZ
8683 ..... DL8BED
8684 ..... WB8BPU
8685 ..... 9A2VJ
8711 ..... KQ8M
8712 ..... W3ABT
8713 ..... IZ8EKL
8714 ..... W4KVS
8715 ..... F8DHE
8716 ..... IKØUTM
8717 ..... 4Z5LX
8718 ..... CE1VCZ
8719 ..... HB9IQB
8720 ..... KT6LA
8721 ..... EA4LG
8722 ..... UA3EAY

SSB

5127 ..... G4PWA
5128 ..... AC5O
5129 ..... SM4YPH
5136 ..... KQ8M
5137 ..... IKØUTM
5138 ..... IK5BAF
5139 ..... K6IRD
5140 ..... IK8NWK

CW

591 ..... RA1QD
592 ..... G4PWA
597 ..... KQ8M
598 ..... HBØCNU

RTTY

206 ..... G4PWA
208 ..... EA3DW

Digital

007 ..... I3DUB

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, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WPX Program

CW

3249 ..... V51YJ

SSB

3076 ..... V51YJ

Mixed

2112 ..... V51YJ
2113 ..... N7QU
2114 ..... OK2JOW
2115 ..... G4FKA

CW: 350 V51YJ. 2350 VE6BF. 4550 N4NO. 5850 WA2HZR.
SSB: 550 V51YJ. 950 VE6BF. 3750 N4NO.
Mixed: 650 WT6X. 700 N7QU. 750 G4FKA, V51YJ. 850 OK2JOW. 1400 K7UA. 2500 VE6BF. 5100 N4NO.
Digital: 6600 WT6X.

80 Meters: OK2JOW
40 Meters: OK2JOW
20 Meters: V51YJ

Asia: OK2JOW
Europe: OK2JOW

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, N3XX, 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, NN1N, 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, OH3MKH, RA3CQ, UT3IZ, S55SL, RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE.

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, N3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, NN1N, 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, UT3IZ RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE.

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.

The South Jersey DX Association's K5D QSL Team received plaques for the service. John, W2GD, made the presentations at an SJDXA dinner on June 11th. (Photo courtesy of Bob, N2OO)

Pierre, ZS1HF/ZS8M, shown here at the radio operating desk on Marion Island. (Photo courtesy of Franz, DJ9ZB)

at the same time from the same relatively small area.

While the Netherlands Antilles will bring additions to the DXCC list, all indications are that we also will be losing one from the list. Malyj Vysotskij, R1MV, will no doubt be dropped due to a new lease arrangement between Finland and Russia signed on May 27th. According to Jarmo, OH2BN:

"On May 27, 2010 an agreement on the lease of the Russian part of the Saimaa Canal zone to Finland was signed in Lappeenranta, Finland by the Prime Ministers of the Republic of Finland and the Russian Federation. The new 50 year agreement supersedes the initial lease of 1963 which is due to expire in 2013. The new lease no longer includes Malyj Vysotskij Island, the present R1MV DXCC entity. The coming into effect of the agreement is subject to ratification by the parliament of Finland and the Russian duma later this year."

DXpeditions to Come

A few "down-the-line" DXpeditions have been announced that we can look for-

THE WPX HONOR ROLL

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

MIXED

6315 9A2AA	4146 N6JV	3688 W9OP	2936 N8BJQ	2440 K5UR	1891 VE9FX	1359 N3RC	781 V51YJ	600 IK1RKN
5788 K2VV	4118 S53EO	3522 ON4CAS	2873 W2ME	2428 N6QQ	1820 KX1A	1337 K6UXO	726 K5IC	600 KB9OWD
5426 W1CU	4082 I2MQP	3474 SM6DHU	2845 JN3SAC	2378 W3LL	1761 AG4W	1322 AA4FU	723 KØDAN	
5031 W2FXA	4034 N9AF	3305 JH8BOE	2752 K1BV	2358 I2EAY	1741 AB5C	1269 K5WAF	682 AI8P	
5012 9A2NA	4001 KØDEQ	3227 K9BG	2724 W2OO	2116 AE5B	1705 W2EZ	1116 YU7FW	662 JA7OXR	
4758 EA2IA	3937 WA5VGI	3207 W9IL	2704 K2XF	2192 N2SS	1662 SV1DPI	1016 RA1AOB	653 KK3Q	
4700 N4NO	3908 KF2O	3104 K9UQN	2530 YO9HP	2001 AB1J	1643 N1KC	982 IWØHOU	650 N3YZ	
4430 YU1AB	3798 IK2ILH	3091 9A4W	2511 W6OUL	2001 KØKG	1593 S55SL	976 KM6HB	649 RA9OO	
4232 VE3XN	3775 YU7BCD	3007 W2WC	2499 KC9ARR	1930 W2FKF	1512 WD9DZV	964 K8ZEE	644 KWØH	
4213 I2PJA	3735 WB2YQH	2965 OZ1ACB	2444 VE6BF	1905 W7CB	1446 DF3JO	815 KL7FAP	636 ZS2DL	

SSB

5065 IØZV	3536 N4NO	2734 YU7BCD	2333 W9IL	2093 W2WC	1891 W2FKF	1611 W2ME	1334 PT7ZT	883 WA5UA
4505 VE1YX	3323 OE2EGL	2711 LU8ESU	2326 CX6BZ	2076 K2XF	1844 YO9HP	1505 AG4W	1258 N1KC	875 K7SAM
4419 K2VV	3229 CT1AHU	2709 KF7RU	2210 SV3AQR	2072 K5UR	1795 KQ8D	1480 AB5C	1145 EA3EQT	741 WD9DZV
4371 F6DZU	3196 KF2O	2618 WA5VGI	2209 IK2QPR	1986 DL8AAV	1762 N8BJQ	1464 VE7SMP	1083 KX1A	717 KØDAN
4307 OZ5EV	3108 I4CSP	2595 EA1JG	2201 NQ3A	1945 KI7AO	1758 W6OUL	1463 I2EAY	1042 IZØBNR	637 K5WAF
4171 I2PJA	3022 I8KCI	2471 I3ZSX	2157 W2OO	1935 SV1EOS	1719 K9UQN	1410 S55SL	1031 IK8OZP	600 WA2BEV
4003 9A2NA	2957 KØDEQ	2451 EA3GHZ	2142 W3LL	1927 AE5B	1714 IK2DZN	1386 IK4HPU	1012 KU4BP	
3843 I2MQP	2857 4X6DK	2431 G4UOL	2107 N6FX	1889 N6QQ	1643 JN3SAC	1385 AE9DX	978 EA7HY	
3658 EA2IA	2817 IN3QCI	2417 SM6DHU	2094 I8LEL	1879 K3IXD	1623 VE9FX	1377 EA3NP	965 VE6BF	

CW

5353 K9QVB	3687 EA2IA	2838 I7PXV	2473 OZ5UR	2101 W9HR	1665 YO9HP	1223 KX1A	900 IT9ELD	
5327 WA2HZR	3506 9A2NA	2723 EA7AZA	2456 IØNNY	2089 K2XF	1445 EA2CIN	1220 AA4FU	824 VE9FX	
5141 K2VV	3401 WA5VGI	2721 K9UQN	2434 W9IL	1979 K5UR	1424 N6QQ	1147 WD9DZV	821 HB9DAX	
4215 N4NO	3308 KØDEQ	2632 W2ME	2415 W2WC	1961 W6OUL	1407 WO3Z	1125 IØWOK	753 F5PBL	
4146 N6JV	2923 KF2O	2647 KA7T	2342 N6FX	1918 W2OO	1403 AG4W	1109 VE1YX	749 AE5B	
3918 VE7DP	2923 YU7BCD	2529 IK3GER	2324 N8BJQ	1848 I2EAY	1334 RUØLL	1053 K5WAF	695 S55SL	
3878 LZ1XL	2914 SM6DHU	2502 JA9CWJ	2278 VE6BF	1804 EA7AAW	1327 WA2VQV	1030 AA5JG	615 JH6JMM	
3750 VE7CNE	2866 W8IQ	2483 JN3SAC	2101 I2MQP	1665 AC5K	1317 K6UXO	915 N1KC	608 IK2SGV	

DIGITAL

1284 W3LL	1133 N6QQ	1066 YO9HP	1037 N8BJQ	1009 GUØSUP	772 KØDEQ	769 AG4W	692 WD9DZV	629 W2OO

ward to working. The Microlite Penguins DXpedition Team will be going to South Orkney, VP8O, in January 2011. You might want to keep an eye on the team's website: <http://www/vp8o.com>.

Another DXpedition announced for January 2011 is the South Pacific Contest Club's trip to Spratly as DXØDX. This is another one to keep on your website "watch" list at <http://www.dx0dx.net>.

Both of the above are well below the #50 place on the Most Wanted list but should receive a lot of attention from DXers worldwide.

The once postponed CYØ Sable Island operation is now scheduled for the last week of October. Although not high on the Most Wanted list, CYØ seems to attract a lot of attention no matter when an operation takes place from there.

Stan, SQ8X, is putting together a group for a trip to Jan Mayen (JX) July 4–14, 2011. For the team of five or six hams it will not only be a DXpedition, but they will have the unique opportunity to climb Beerenberg, an active strato volcano, as well as a chance to visit many interesting sites on the island. The team will sail to the island on a 60-foot yacht (a two- to three-day trip) and then spend six to seven days on the island, depending on the weather. The plan is to have two or three stations on the air using small radios (706/PROIII). Since the trip is planned for summertime and due to the location (above 70ºN), 160–40 meters probably will be useless. Stan says, "Climbing the volcano is quite challenging. Getting to the top takes 10 to 12 hours." If you are interested in joining the team, please contact Stan via e-mail for more details: <stan.sq8x@gmail.com>.

IARU World Championship and WRTC 2010

The annual IARU HF World Championship and the WRTC-2010 activity were held on July 10th. Of course, as of

5 Band WAZ

As of July 1, 2010, 823 stations have attained the 200 zone level and 1689 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):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40)
IK1AOD, 199 (1)
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)
N5AW, 199 (17)
JH7CFX, 199 (2)
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)
G3NKC, 199 (31 on 10)
K8PT, 199 (26)
IN3ZNR, 199 (1)
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)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W7VJ, 198 (34, 37)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
IV3MUC, 198 (1&31 on 40)
UA4LY, 198 (6&2 on 10)
IK4CIE, 198 (1, 31)
JA7XBG, 198 (2 on 80&10)
HB9ALO, 198 (1, 31)

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

IK7UFL (170 zones)
SP6EQZ (176 zones)

5 Band WAZ updates:

K8PT (199 zones)
KU4BP (186 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, P.O. Box 449, Wiggins, MS 39577-0449. 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 CQ DX Field Award Program

Mixed

110.....IV3GOW
111.....HB9BOS
112.....HB9DRS

Mixed Endorsements

225.....W1CU/236
200.....N8PR/223
200.....W6OAT/212
200.....W4UM/200
175.....HB9DDZ/188
175.....IV3GOW/184
125.....HB9BOS/145
28 MHz.....NKØS
3.5/7 MHz.....NKØS

SSB Endorsements

200.....W1CU/213
175.....W4UM/183

CW Endorsements

225.....W1CU/229
175.....W4UM/195
175.....HB9DDZ/186

Digital Endorsements

150.....W1CU/155

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. Please make all checks payable to the award manager.

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll lisiting is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Billy F. Williams. Mail all updates to P.O. Box 9673, Jacksonville, FL 32208.

Mixed

K2TQC 265	9A5CY 219	KF8UN 205	BA4DW 188
HAØDU 240	HA1AG 218	OK1AOV 205	HB9DDZ 188
W1CU 235	KØDEQ 216	N4MM 202	RW4NH 187
VE3XN 234	W6OAT 212	W4UM 200	IV3GOW 184
VE7IG 232	VE3ZZ 207	K8OOK 195	K2SHZ 182
HA5AGS 228	HA5WA 206	N4NX 192	K1NU 180
N8PR 223	F6HMJ 206	ON4CAS 191	W5ODD 177
HA1RW 220	JN3SAC 206	HA9PP 190	NØFW 176

SSB

W1CU 213	VE7SMP 190	NØFW 176
W4ABW 202	N4MM 186	DL3DXX 175
KØDEQ 192	W4UM 183	JN3SAC 175

CW

W1CU 229	KØDEQ 207	OK1AOV 196	OK2PO 184
DL6KVA 225	DL3DXX 203	W4UM 195	N4MM 179
DL2DXA 209	JN3SAC 200	HB9DZZ 186	N4NX 177

this writing in early July, I don't have any details, but these events always spur a lot of activity across the bands. WRTC for 2010 was held in Russia with all the stations using R3 prefix callsigns. More on this perhaps next time.

New Website for NCDXF

The Northern California DX Foundation has a new website: <http://ncdxf.org/>. According to Glenn Johnson, WØGJ, Vice President of NCDXF:

"We hope this new interactive website will tell our story, provide resources for DXers, and enable everyone to follow past and future DXpeditions that NCDXF has sponsored. Visitors to the website will find it both informative and pleasant to explore.

"There are resources on the worldwide beacon system, an online store for NCDXF supplies, information about our scholarship program, our video library, and other resources.

"John Miller (K6MM) our Webmaster, and Doug Bender (WW6D) of Members Services have spent countless hours on this project.

"Have you listened to the beacon system lately? You can follow NCDXF on Facebook or Twitter. Also, joining or renewing membership has never been easier!"

Entities, Look to the Fall Contest Season

This being September, we can look forward to the upcoming contest season. Hopefully all those "improvements" we made to our stations and antenna systems will pay off in the months ahead. Will we have propagation on 10 meters? Only time will tell. Will 160 still be active enough to justify all the effort we put into those new low-band antennas, Beverages, etc.? We sure hope so!

Until next time, enjoy the chase, but please Have Fun! 73, Carl, N4AA

QSL Information

AM5HQ via EA4URE
AM5IY via EA5IY
AM7AL via EA4URE
AM7HQ via EA4URE
AM7LE via EA7URD
AM7NET via EA4URE
AM8RHG via EA8CNB
AN4URE via EA4URE
AO1ANT via EA1GHT
AO1I via EA1NT
AO3T via EA3AKY
AO4URE via EA4URE
AO5EH via EA5EH
AO5KB via EA5KB
AO5MB via EA5MB
AO5MGP via EA5FL
AO8EU via EA8CLR
AP2TN via DJ9ZB
AP5A via F2CW
AX8PDX via VK8PDX
BA4DW/4 via BA4DW
BA4TB/5 via BA4TB
BA6IV via BA4EG
BD4QH/5 via BD4QH
BD4TJ/5 via BD4TJ
BD4TQ/5 via BD4TQ
BD4TR/5 via BD4TR
BG4TMM/5 via BG4TMM
BG4TYQ/5 via BG4TYQ
BG7IBS via BA4EG
BH4QAK/5 via BH4QAK
BH4QAK/5 via BH4QAK
BT4EXPO via BA4EG
BT90HIT via BY2HIT
BVØPC via BV2DQ
BV2FA via DJ9ZB
BW1/K8QKY via K8QKY
BW2/JK2VOC via JK2VOC
BY1DX/IØSNY via IØSNY
BY1PK via DJ6QT
BY4QA via BH4QAK

(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/>.)

BY TED MELINOSKY,* K1BV

Short-Term Award from Poland

The year 2010 marks the 200th anniversary of the birth of the world-famous Polish pianist and composer Fryderyk (Frederick) Chopin. A special award is offered for contacting Polish stations using a commemorative prefix including "200" and/or all Polish stations during the year 2010.

The Fryderyk Chopin Award is offered for contacting Polish stations using a commemorative prefix including "200" and/or all Polish stations during the year 2010.

Fryderyk Chopin 2010 Award

The award may be earned by accumulating least 2010 points according to this point system:

1. The following special callsigns are worth 400 points for EU stations and 500 points for all others: SO200FCM, 3Z200CHOPIN, HF200CHOPIN, SO200CHOPIN, SP200CHOPIN, SQ200CHOPIN, 3Z200FC, HF200FC, SO200FC, SP200FC, SQ200FC, 3Z2010FC, HF2010FC, SO2010FC, SP2010FC, SQ2010FC, 3Z2010CY, HF2010CY, SO2010CY, SP2010CY, SQ2010CY, 3Z2010FCY, HF2010FCY, SO2010FCY, SP2010FCY, and SQ2010FCY.

2.Other special event stations not listed above with the number 200 in the callsign (e.g., SP200LM, SP200PSU, SP200ICQ) count 100 points for EU and 200 for DX.

3. All other SP stations count 50 points for EU and 100 for DX.

QSOs made over the entire calendar year 2010 are eligible for the award. Each SP station can be worked once per band (9 times), regardless of the emission mode.

Note: QSOs made during during the Fryderyk Chopin International Piano Competition (October 2–23, 2010) are valued at twice the points shown above. Contacts with previously worked and counted SP stations may be repeated during this period only. The once-per-band rule must be observed. Log extract and fee of 5 Euros should be sent by registered mail to the award manager: Piotr Brydak, SP5PB, Okólnik 9a m16, 00 368 Warszawa, Poland.

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

USA-CA Honor Roll

500		1000	
DL3XM	3505	DL3XM	179
DL3NM	3506		
IQ3UD	3507		
LU4DQ	3508		

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.

Worked All Belgian Provinces

This is the principal award offered by the Belgian Amateur Radio Society (Union Belge des Amateurs-Emetteurs; UBA). It is a handsome certificate that is generally considered fairly easy to earn due to the many active Belgian stations who are on the air in just about every DX contest. In addition, you can fill in any missing provinces during the annual UBA contest in February.

The award is available to amateurs and SWLs. Contacts after January 1, 1995 count for the award. All bands and modes accepted. Europeans must contact all 10 Belgian provinces and the city of Brussels on at least two bands—22 contacts in all.

The Worked All Belgian Provinces Award is the principal award offered by the Belgian Amateur Radio Society (Union Belge des Amateurs-Emetteurs).

Work 100 JA1 area amateurs operating in Saitama Prefecture to earn the Saitama 100 Stations Award.

DX stations (and Europeans on VHF/UHF) need one QSO in each province and Brussels for 11 contacts in all.

The provinces are: Antwerpen (AN), Vlaams Brabant (VB), Waals Brabant (BW), Oost-Vlaanderen (OV), West-Blaanderen (WV), Limburg (LB), Henegouwen (HT), Luxembourg (LU), Luik (LG), Namur (NM). The other needed is Brussels Hoofdstelijk Gewest (BR).

Send a GCR list and fee of 5 Euros, $US7, or 10 IRCs to: Egbert Hertsen, ON4CAS, Postbus 85, Mechelen 2, B-2800 Mechelen, Belgium. Internet: <http://www.uba.be/en/uba/awards>.

As an alternative, a PDF version of this award is now offered at no cost. Print the award in your own shack. When you apply for the award, request that the PDF file version be e-mailed to the address you supply. (PDFs are widely used for document distribution, and the software is available free at: <http://www.adobe.com/>.)

Saitama 100 Stations Award

Saitama is one of the 47 prefectures of Japan and is located on the island of Honshu. A prefecture is roughly equivalent to a U.S. state. Saitama is part of the greater Tokyo area, and most of its cities are suburbs of Tokyo. The area is densely populated, and working 100 stations from the prefecture should not be a major task. Your reward is a handsome award written entirely in Japanese.

Endorsement stickers are available for each additional group of 100. Contacts must be made on or after April 1, 1988. Fee for the award is $US5, 500 Euros, or the equivalent. Fee for endorsements is 200 Euros. GCR list accepted. Apply to: Keiichi Sato, JR1DHD, Oshikiri 2653-19 Konan-cho, Osato-gun, Saitama-ken, 360-0111 Japan.

Worked All Small European Countries Award

It may only be appropriate for one of the smallest European countries, the Principality of Monaco (2 square kilometers), to sponsor this next award. About half of the countries in the group are fairly easy to contact, but the other half will be a challenge. The certificate is awarded for having contacted eight (Class 1) or 3 (Class 2) of the following, plus Monaco.

The countries in order of size (largest to smallest) are: Luxembourg LX (2586 sq km), Andorra C31 (468 sq km), Malta

SUCH A HAM

Hello, I would like to enquire about your romantic getaway weekend resort. Do you have any antenna restrictions?

Monaco's Worked All Small Euopean Countries Award is issued for having contacted eight (Class 1) or three (Class 2) of the listed countries (see text), plus Monaco.

9H (316 sq km), Liechtenstein HBØ (160 sq km), San Marino T77 (61 sq km), Monaco 3A (2 sq km), Vatican City HV (110 acres), Sov. Order of Malta 1AØ (one building: Palace of Malta, Via Condotti 68, Rome, Italy).

SWL OK. No use of repeaters. Send GCR list and fee of $US6 or 10 IRCs to: Claude Passet, 3A2LF, 3 allée Guillaume Apollinaire, Monaco, Principality of Monaco.

Portuguese Prefix Award

Prefix hunters love those countries that permit the generous use of interesting prefixes for their amateurs to help celebrate special events and anniversaries. Portugal is one of these, and while the basic CTWPX Award requires only 10 different callsign prefixes assigned to the Portuguese territory or its possessions (including Madeira and Azores Archipelago), a handsome plaque is available for confirming 50.

The award may be endorsed for SSB, CW, Mixed, and RTTY, and for contacts made on one band. The plaque requires that you have already applied for the CTWPX Award. All bands and modes accepted. SWL OK. No time limitations.

The basic Portuguese Prefix Award Award (CTWPX) requires contacts with 10 different callsign prefixes assigned to the Portuguese territory or its possessions (including Madeira and Azores Archipelago).

Any difference in the letters and numbers in the first part of a call denotes a new prefix. For example, CT1, CT14, CT98, CT5ØØ all are different prefixes.

Portable operation will not affect the prefix claimed. Only the prefix of the assigned call may be counted. For stations operating from Madeira (CT3) or Azores (CU...), which count as separate DXCC entities, you may count either the prefix in the assigned call, or the prefix in the portable identifier. For example, CT1AAA/CT3 could be counted for either CT1 or CT3. Both prefixes may be claimed if a second contact is made on a different band or mode, or on the same band/mode but after a time period of at least 24 hours has passed. Contacts with stations outside the Portuguese territory and maritime mobiles outside territorial waters do not count for this award.

Some valid prefixes: CQ1, CQ2, CQ3, CQ4, CQ5, CQ6, CQ7, CQ8, CQ9, CQØ, CQ5ØØ, CR1, CR2, CR3, CR4, CR5, CR6, CR7, CR8, CR9, CRØ, CR5ØØ,CS1, CS2, CS3, CS4, CS5, CS6, CS7, CS8, CS9, CSØ, CS5ØØ, CT1, CT2, CT3, CT4, CT5, CT6, CT7, CT8, CT9, CTØ, CT14, CT25, CT5ØØ, CT98, CU1, CU2, CU3, CU4, CU5, CU6, CU7, CU8, CU9, CUØ.

Confirmations are not required for this award. Send a GCR list showing the prefixes claimed as follows: Call, Band, Mode in alphabetical order by prefix. Cost of the award is 5 Euros, 10 IRCs, or $US10. The cost of the plaque is 30 Euros or $US70 for all applicants. Send application, prefix list, certification statement, and payment to: Manuel Alberto C. Marques, CT1BWW, P.O. Box 41, 2781-901 Oeiras, Portugal.

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

73, Ted, K1BV

BY JOHN DORR,* K1AR

Hope for the Future

September's Contest Tip

Read the rules. Seems pretty simple doesn't it? In reality, every contest has its own personality as defined by its rules. Taking the time to study the rules of a given contest could significantly help your score, or more importantly, help you avoid violations that may result in unnecessary score reductions or disqualification. Whether you're a new contester or have been around for years, there's always something to be gained by taking a few minutes to check out the latest rules and ensuring that your contest effort is going "by the book"!

Is there hope for the future of contesting? After all, we lack meaningful solar activity, the infusion of active, new blood is waning at best, and the cost to implement a competitive contest station continues to rise above what most can afford. Indeed, what's in store for contesting's future?

There are a Few Realities

Before I embark on the challenge of writing an inspiring dissertation about the future of contesting, let's acknowledge some of issues that I've just mentioned above. In contesting circles, we've seen the average age of our peers creeping upward. Furthermore, the cost of entry into the world of competitive contesting has been a major impediment for adults, and an even great one for many financially challenged teenagers. Also, there is the competition from life's other attractions. In youthful terms, that is defined as the internet and video games. For adults, it's the ability to pick up a cell phone and be able to call a business associate in Sydney, Australia, from New York while eating sushi at your favorite Japanese restaurant. In other words, the draw of worldwide communications provided by ham radio just "ain't what it used to be."

With all of the above in mind, do we simply fold up our tents and accept the inevitable or is there another view? Read on and you'll get a perspective that I hope you can support.

Is the Glass Half Full or Half Empty?

If you're a charter member of the "sky is falling" club, the timing is probably right for you to sell your radios while you can still command a few pennies for them. However, there's reason for optimism, and that's going to be my focus for the rest of this month's column.

Did you operate in the 2009 CQ WW SSB and CW DX Contests? Even if you're not a contester, did you listen to the action? If you did, you had to marvel at the activity. While this is a subject for a separate column, like it or not, 20 meters was fully occupied across its entire spectrum! Record scores were made in a number of categories (as can be seen in last month's SSB results and this month's CW results). World-class single operators produced QSO rates that we could only dream about in previous years, here is the U.S. as well as in DX circles. If contesting is nearing extinction, you'd never know it by the WW weekends, both of which for the 2009 contests had more entries submitted than ever before. Also, for those who have rightful concerns over the intrusiveness of the contest activity on the bands we experienced those weekends, I think ham radio was well served by our demonstration of activity and interest in radio communications in general.

Another factor to consider is that contesting is not just the big guns "beating up" one another in a competition. The reality is that there are scores of other contests that can appeal to the interests of many hams, whether they enjoy domestic operating (or those whose stations are better suited for that kind of operating), VHF, or specialty modes such as RTTY, AMTOR, PACTOR, etc. I'd encourage you to check out the calendar of contest events that I assemble each month and consider participating in a few of them.

Finally, there are the intangible benefits. Maybe I'm a dying breed of competitor, but I have to admit that I enjoy contesting for a number of irreplaceable reasons: (1) the thrill of the competition, (2) the thrill of simply working interesting hams and interesting places, and (3) the camaraderie that comes from it all. Let's take a look at each of these topics in more detail.

The Thrill of the Competition

A wonderful attribute of contesting is that it allows for competition at whatever level you choose to define. The range can be from winning at the world-class level to beating your score of the prior year. It can mean exceeding a million points for the first time to working 100 countries on a single band. In today's culture competition surely exists. It's a significant component in the makeup of the person-

Calendar of Events

All year	**CQ DX Marathon**
Aug. 28–29	YO DX Contest
Aug. 28–29	SCC RTTY Championship
Aug. 28–29	Ohio QSO Party
Aug. 29	SARL HF CW Contest
Sept. 4–5	All Asian SSB Contest
Sept. 11–12	Worked All Europe SSB Contest
Sept. 11–13	ARRL Sept. VHF QSO Party
Sept. 12	North American CW Sprint
Sept 18–19	Scandinavian CW Activity Contest
Sept. 18–19	Washington State Salmon Run
Sept. 19	North American SSB Sprint
Sept. 25–26	**CQ WW RTTY DX Contest**
Sept. 25–26	Texas QSO Party
Oct. 2–3	California QSO Party (CQP)
Oct. 9–10	Pennsylvania QSO Party
Oct. 9–10	Scandinavian SSB Activity Contest
Oct. 10	North American RTTY Sprint
Oct. 30–31	**CQ WW DX SSB Contest**
Nov. 27–28	**CQ WW DX CW Contest**

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

alities of many of us, and contesting can and does feed off of that. That's an attribute that will most certainly drive the future of contesting forward in a positive way.

The Thrill of Working Interesting People and Places

OK, I'll admit another one this month: I still enjoy getting on the air and talking to far-away places. That's an aspect of ham radio that first attracted me to the hobby 40 years ago and is one that still interests me to this day. I'll often have a TELNET session running on my laptop while I work on other projects. Yes, while I was typing this very column, someone spotted FW5M on 80 meters. Did I keep typing? Nope. I ran downstairs and worked him. Maybe I'm unique, but that element of the chase provided by ham radio in general and contesting in particular cannot be replaced with cell phones and e-mail. It's an element of contest operating that will never go away and continue to drive the existence of contesting in the future. (Stand-by readers, as 5V7DX is on 14195)

Contest Camaraderie

Whether it's the Dayton Hamvention® or your local club, socialization of contesting has and will continue to drive interest into the future. Let's face it: As contesters we're like fisherman when we socially interact. The conversation ranges from how we bagged the big one to why the big one got away. For me, too, many of my contest friends have become my lifelong friends, not just to talk about contesting and ham radio, but to discuss career and life's issues in general. Without that aspect of contesting, my ham radio experience would dramatically be diminished.

Cheer Up!

Therefore, cheer up fellow contesters! If you have a "half-full glass" mindset, contest activity and the actual numbers speak for themselves. Contesting is alive and well. We have our challenges, but I'm in the camp that we also have a long legacy of success that is going to support our interests for a very long time. Now go pick yourself up by your bootstraps, find a new ham and get him/her get interested in contesting, and get going. There's a contest coming up this weekend, actually most weekends of the year!

Final Comments

As many of you know, the World Radio Team Championship (WRTC) took place in Russia this past July. There is significant coverage of the event on the amateur radio sites and magazines, but since I am writing this in mid-July, just after the event, it's fitting to acknowledge the top winners of the event as follows:

Gold Medal—R32F operated by Vladimir Aksenov, RW1AC, and Alexey Mikhailov, RA1AIP

Silver Medal—R33A operated by Tonno Vahk, ES5TV, and Toivo Hallikivi, ES2RR

Bronze Medal—R33M operated by Dan Craig, N6MJ, and Chris Hurlbut, KL9A.

Congratulation to these fine operators and all of the participants!

Lastly, I'd be remiss if I didn't acknowledge the 2010 inductees into the CQ Contest Hall of Fame in May. This year's deserving hams are Larry Weaver, N6TW, and Don Hill, AA5AU. For many years, Larry has been the glue behind the scenes in the CQ WW Contest Committee. Without his relentless efforts, there would be no CQ WW results. That combined with his operating skill and other contributions to the sport make him a worthy recipient. Don Hill, AA5AU, is widely known as the guru of RTTY operating. Digital operating and contesting in particular have been very successful in recent years, and Don's contributions have been a big part of that success. His mentoring of others, including his widely read website (http://www.aa5au.com/rtty.html) is incredible and makes Don stand out as a wonderful example of what the CQ Contest Hall of Fame is all about. Congratulations to Larry and Don!

Well, that's it for this month. As always, see you in the next contest!

73, John, K1AR

propagation

BY TOMAS HOOD,* NW7US

Get Ready to Reap the DX

A Quick Look at Current Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, June 2010: 14
Twelve-month smoothed, December 2009: 8

10.7 cm Flux
Observed Monthly, June 2010: 73
Twelve-month smoothed, December 2009: 75

***Ap* Index**
Observed Monthly, June 2010: 8
Twelve-month smoothed, December 2009: 5

One Year Ago: A Quick Look at Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, June 2009: 3
Twelve-month smoothed, December 2008: 2

10.7 cm Flux
Observed Monthly, June 2009: 69
Twelve-month smoothed, December 2008: 69

***Ap* Index**
Observed Monthly, June 2009: 5
Twelve-month smoothed, December 2008: 5

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for September 2010

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-6, 9-13, 24-30	A	A	B	C
High Normal: 8, 14-15, 18, 22-23	A	B	C	C-D
Low Normal: 7, 16-17, 19, 21	B	C-B	C-D	D-E
Below Normal: 20	C	C-D	D-E	E
Disturbed: N/A	C-D	D	E	E

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

HOW TO USE THIS FORECAST

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

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be good (B) onn Sept. 1st through the 6th, fair-to-poor (C-D) on the 7th, fair (C) on the 8th, 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.

September is a month of radical improvement in radio propagation conditions. On September 23, 2010 at 0309 UTC, the sun will be directly over the equator. This happens twice a year, in the spring and fall, and is called an "equinox." The fall, or "autumnal," equinox is the day on which the sun crosses the equator, as it appears to travel from northern to southern skies. On this day, over much of the Earth the hours of daylight are equal to the hours of darkness. Sunrise should take place at approximately 6 AM local time and the sun should set around 6 PM local time, except at the high latitudes.

This results in an ionosphere of similar characteristics over large areas of the world and is usually the best time of the year for long DX openings between the temperate regions of the Northern and Southern Hemispheres on all HF bands. Expect improvement on 20 meters, with more frequent openings from mid-September through mid-October between North America and South America, the South Pacific, South Asia, and southern Africa. The strongest openings will occur for a few hours after sunrise and during the sunset hours.

Long-path openings improve during the equinoctial periods. A variety of paths are opening up on 20 meters. Expect a path to southern Asia around sunset, and daily morning openings to southern Asia and the Middle East, expanding to Africa. Also look for Antarctic short path, and signals from the Indian Ocean region long path over the North Pole. Afternoons will fill with South Pacific long path and then extend to Russia and Europe. Look for possible long-path openings on 30, 40, and 80 meters for an hour or so before sunrise and just before sunset.

The winter DX season is about to open up, making for exciting DX conditions. While the weather is still warm and fair, tighten hardware on your antenna system, check coax cables, and fine-tune your radio station. Get ready to reap the DX.

The 15-meter band will supply day-path propagation even over the polar paths, although these polar openings are still somewhat rare this year with the low sunspot activity level. A considerable improvement is expected for DX propagation on 17 meters, opening shortly after sunrise and remaining open until after sundown. Openings will be best toward Europe and the northeast before noon, and to the rest of the world during the afternoon hours. Openings toward the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening. Remember, though, that openings are dependent on the strength of the ionosphere, which in turn is dependent upon an active sun. During this part of the solar cycle, activity is minimal. Openings may be rare and short-lived.

Twenty meters will be the best daytime DX band this month. Look for 20 to open for DX at sunrise and remain open in all directions for a few hours.

*e-mail: <nw7us@arrl.net>

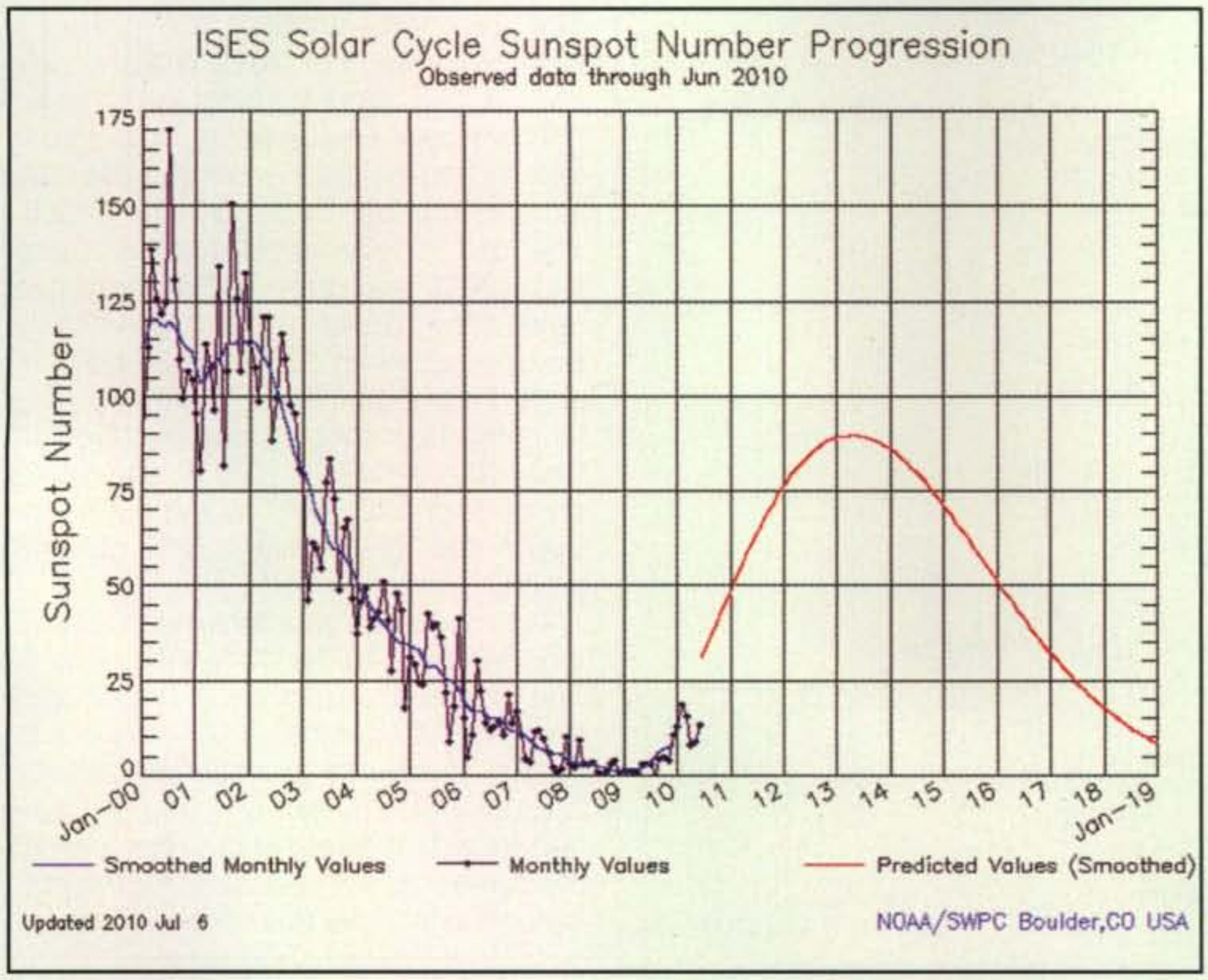


Fig. 1– Sunspot Cycle 24 progression chart (as of July 2010) plotting the smoothed monthly sunspot number and showing the definite rise, even with the expected dips that are typical in any cycle. (Source: Space Weather Prediction Center [SWPC]/The National Oceanic and Atmospheric Administration [NOAA])

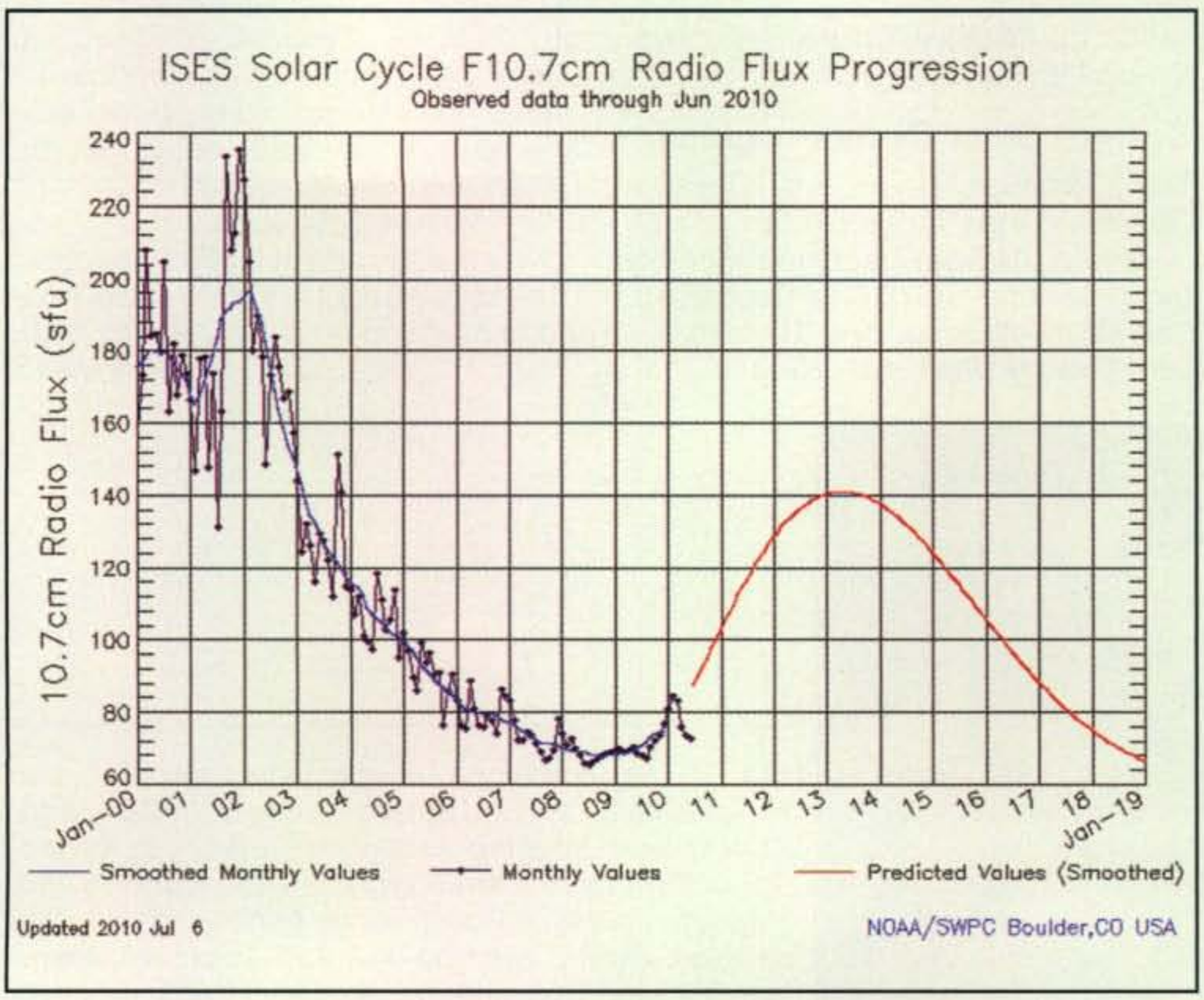


Fig. 2– Progression chart (as of July 2010) plotting the smoothed monthly 10.7-cm flux. Note that the 10.7-cm flux does not always track with the monthly smoothed sunspot count. This can occur when the energy of the sunspots during a particular month is low, as was the case in these months during the first part of 2010. (Source: SWPC/NOAA)

It should be possible to work into many areas of the world throughout the daylight hours, with a peak in the afternoon. Nighttime conditions will favor openings toward the south and to tropical areas, but some openings will also be possible to other areas, especially during High Normal or better days. Look for polar gray-line propagation into Asia. Long-path is common on 20 to southern Asia, the Middle East, and northeastern Africa as well as the Indian Ocean region via the north polar path.

Expect an improvement in nighttime DX conditions on 30 through 160 meters during September and October. This is due to the increasing hours of darkness and a seasonal decrease in the static level. Thirty and 40 meters should be best for worldwide DX from sunset to sunrise. Sixty meters should become more reliable for those farther contacts; working all states on 60 is very possible during this season. Eighty and 160 meters will become hot bands during the hours of darkness, especially for an hour or so before local sunrise.

For short-skip propagation during September and early October use 60 and 80 meters during the day for openings shorter than 250 miles, and either 80 or 160 at night. For distances between 250 and 750 miles try 30, 40, and possibly 60 meters during the day and 80 meters at night. For openings between 750 and 1300 miles 20 meters should work during the day, and 30, 40, and 60 from sundown to midnight, and 60 and 80 from midnight to sunrise. For openings greater than 1300 miles try 15, 17, or 20 meters during the day, and 30, 40, and even 60 during the hours of darkness. Check 10 and 12 meters for some fairly good openings beyond 1300 miles in the afternoon hours, especially when conditions are High Normal or better, and for paths into South America and the South Pacific.

VHF Conditions

The month of September statistically has the lowest amount of sporadic-*E* propagation activity. Toward the end of September trans-equatorial (TE) propagation will begin to occur between southern North America and northern South America. Openings generally will occur in the late afternoon to early evening.

Troposcatter conditions are generally very good for many of the VHF bands up to 440 MHz during September with the appearance of different weather fronts. This will be the primary mode for working up to 300 miles. A very useful Internet resource for viewing tropos-

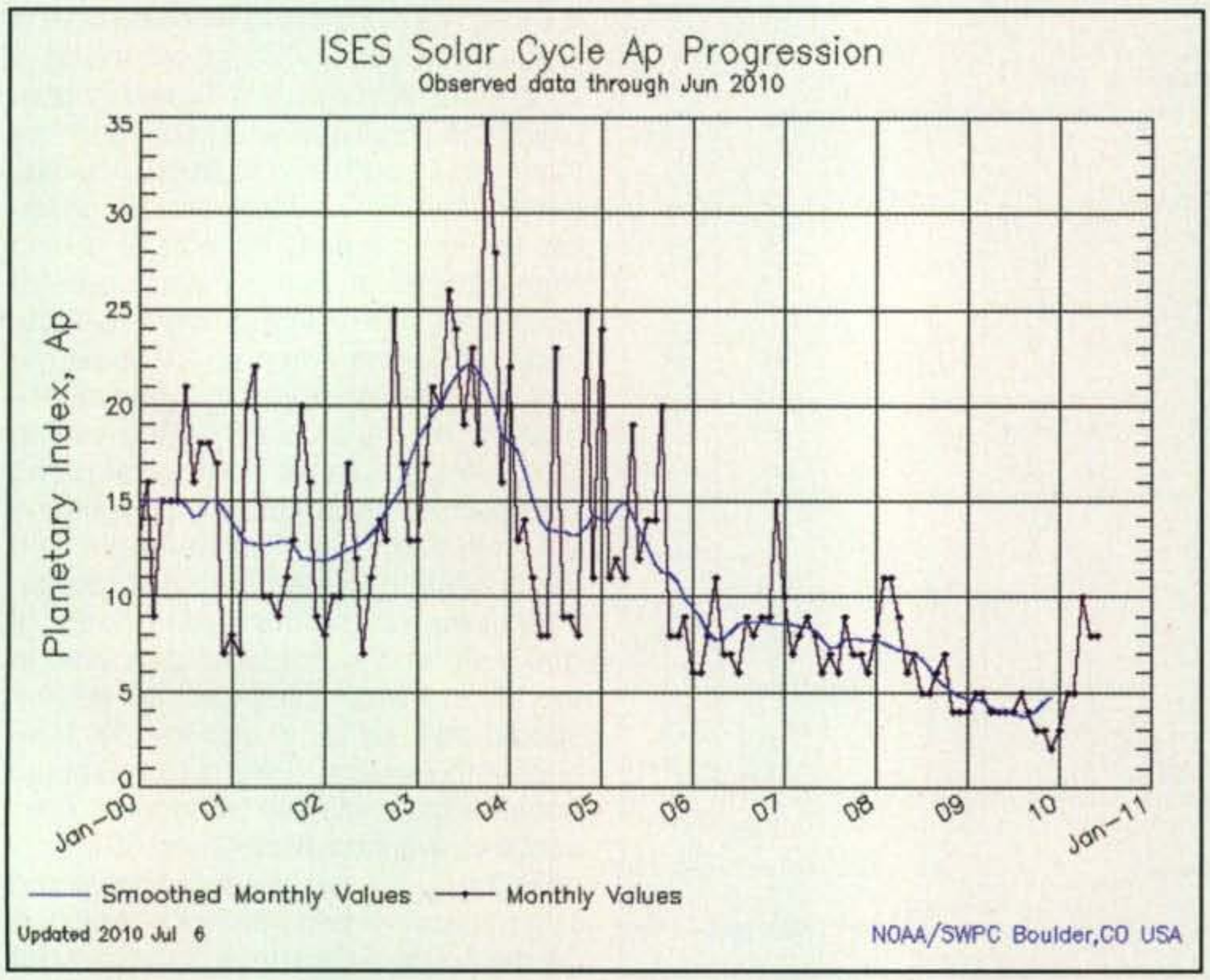


Fig. 3– This graph of the monthly and smoothed planetary A-index (Ap) reveals that we're now seeing more normal geomagnetic activity as expected during the start of a new sunspot cycle. As solar activity increases, it is typical to see the overall geomagnetic activity also increase. The higher the geomagnetic activity, the more the ionosphere will suffer, causing HF propagation also to suffer. (Source: SWPC/NOAA)

pheric conditions is available at William Hepburn's "VHF/UHF Tropospheric Ducting Forecast" site: <http://www.dxinfocentre.com/tropo.html>.

Don't forget to check out *CQ VHF* magazine as well as the VHF column in this issue for a more in-depth look at VHF propagation. However, no matter what, get on the radio and try working the many modes. The more people active on these bands, the more we can unlock the mysteries of VHF propagation.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 72.6 for June 2010. The 12-month smoothed 10.7-cm flux centered on December 2009 is 74.9. The predicted smoothed 10.7-cm solar flux for September 2010 is about 91, give or take about 7 points.

The Royal Observatory of Belgium reports that the mean monthly observed sunspot number for June 2010 is 13.5. The lowest daily sunspot value during June 2010 was zero (0) on only two days, June 15 and 16. The highest daily sunspot count for June was 33 on both June 11 and 12.The 12-month running smoothed sunspot number centered on December 2009 is 8.3. A smoothed sunspot count of 33 is expected for September 2010, give or take about 8 points.

The observed monthly mean planetary *A*-index (*Ap*) for June 2010 was 8. The 12-month smoothed *Ap* index centered on December 2009 was 4.8. Expect the overall geomagnetic activity to be unsettled to stormy during September. Refer to the Last-Minute Forecast at the beginning of this column for the outlook on what days this might occur.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. If you are on Facebook, check out <http://tinyurl.com/fbswx> and <http://tinyurl.com/fb-nw7us>. Speaking of Facebook, check out the CQ Amateur Radio Magazine fan page at <http://tinyurl.com/fb-cqm>.

Now that the new solar cycle is active, I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!

73, Tomas, NW7US

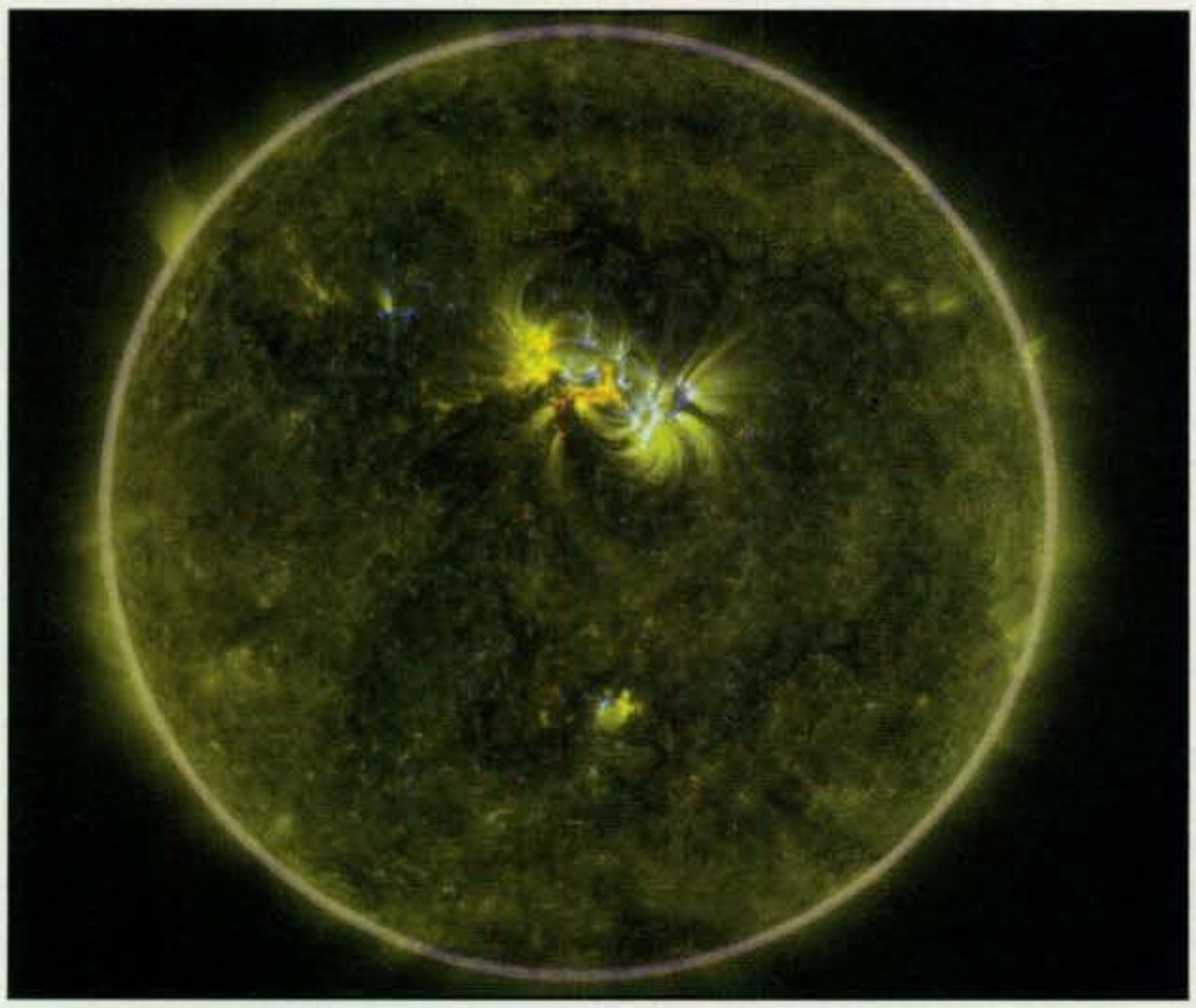


Fig. 4– A combined image composed of the Helioseismic and Magnetic Imager (HMI) and Atmospheric Imaging Assembly (AIA) both for the Solar Dynamics Observatory (SDO) showing the magnetic field in blue and orange (indicating opposite polarity) aligned with the AIA 171-Angstrom wavelength channel in extreme ultraviolet superimposed over it. These images of the active sunspot region NOAA AR 11087 were taken at 1059 UTC on July 15, 2010. The juxtaposition is especially effective at showing how the arcs that we observe in UV light emerge from regions of strong magnetic field. (Source: SDO/NASA)

Results of the 2009 CQ WW DX CW Contest *(from page 26)*

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.)

2009 CW RESULTS
SINGLE OPERATOR
NORTH AMERICA
United States

K5ZD/1	**A**	**6,845,832**	**3957**	**132**	**480**
K1DG	**"**	**6,614,634**	**3851**	**134**	**485**
WC1M	*	3,975,309	2650	127	422
W1WEF	*	3,560,648	2547	124	387
K8PO/1	*	3,378,816	2525	114	390
W1FJ	*	1,894,445	1462	115	364
KQ2M/1	*	1,516,841	1530	84	269
K1ZZ	*	1,481,594	1169	116	341
W1MK	*	975,792	1091	85	263
N1IX	*	841,680	948	77	257
K1BV	*	744,022	935	71	206
K1YT	*	646,415	618	97	288
W1EQ	*	605,456	713	83	233
K1ZE	*	508,690	558	81	257
W1HIS	*	406,840	545	73	207
AK1N	*	232,068	389	66	167
K1RM	*	230,574	513	37	129
N4XR/1	*	181,760	275	72	184
NN1N	*	126,117	193	64	179
WW3K/1	*	113,364	261	58	143
W2QQ/1	*	96,385	214	58	127
W1DDD	*	92,120	218	54	134
				(OP: W1YRC)	
K1KU	*	74,108	210	54	137
W1LWH	*	56,608	179	27	89
W1OHM	*	50,022	163	38	88
AD1L	*	14,080	73	27	53
KB1ODO	*	5,720	48	22	33
W3EP/1	**28**	**7,176**	**82**	**15**	**31**
W1MU	**14**	**738,474**	**1546**	**37**	**130**
K1IM	*	232,740	630	31	104
W1XX	**7**	**206,336**	**603**	**29**	**99**
WB1AEL	**3.5**	**37,296**	**166**	**20**	**64**
K1UO	**1.8**	**36,045**	**182**	**18**	**63**
***N1UR**	**A**	**2,605,372**	**1977**	**114**	**370**
***K1BX**	**"**	**2,252,322**	**1706**	**117**	**354**
*W1JQ	*	1,098,108	977	100	323
*KS1J	*	1,060,928	1114	88	264
*W2JU/1	*	747,999	722	98	285
*K1HT	*	617,967	623	89	268
*KB1T	*	497,991	574	88	251
*KG1E	*	469,650	590	78	225
*W1CCE	*	430,350	581	75	227
*K1VSJ	*	386,656	509	72	209
*K1VW	*	192,632	343	71	171
*W3SM/1	*	190,361	328	66	167
*N1JW	*	128,115	249	63	132
*K1PU	*	120,365	269	52	129
*N1NN	*	60,984	203	35	91
*N1LU	*	54,520	187	49	96
*K1EP	*	46,816	138	57	97
*K1DUQ	*	26,970	137	22	65
*W1PID	*	25,370	128	28	58
*K1NEF	*	24,475	132	29	60
*NJ1H	*	21,976	104	22	60
*WB1FJH	*	18,810	96	30	60
*W1FA	*	16,863	89	20	53
*K1SM	*	14,356	78	26	48
*KA1VMG	*	9,090	78	36	54
*K1YM	*	7,560	49	20	40
*N1IMW	*	6,636	109	25	54
*AA1M	*	1,050	18	6	15
*K1HI	*	792	16	11	11
*W1MJ	*	143	6	5	6
*KB1DQT	*	120	23	6	6
***N1NK**	**21**	**80,976**	**259**	**21**	**91**
*W1ZK	*	36,034	162	18	68
***KG1V**	**14**	**60,585**	**219**	**23**	**82**
***W1NK**	**7**	**53,760**	**199**	**23**	**82**
*AB1J	*	32,172	143	19	65
***W1WBB**	**1.8**	**1,380**	**36**	**10**	**13**
N2LT	**A**	**3,425,076**	**2273**	**123**	**411**
W2BC	**"**	**2,434,803**	**1809**	**119**	**378**
				(OP: @W2BC)	
W2XL	**"**	**1,966,660**	**1665**	**102**	**326**
K2NV	*	1,590,840	1176	125	366
AI2N	*	750,336	742	95	289
K2FU	*	715,125	711	99	276
N1RK/2	*	455,895	546	70	227
K2XF	*	446,682	505	80	247
KE2WY	*	396,924	498	80	211
KW2J	*	363,236	486	83	201
WS9M/2	*	188,256	412	60	152
KM2L	*	158,886	304	59	135
WB2SIH	*	129,280	261	59	143
W2FUI	*	79,426	192	48	103
N2CG	*	65,850	163	45	105
NQ3N/2	*	63,688	181	49	103
W2TB	*	60,384	166	48	100
N2EIK	*	51,984	175	32	82
K2YR	*	35,168	125	36	76
W2UDT	*	12,470	93	30	56
WA3AFS/2	*	266	7	7	7
W2RR	**28**	**3,584**	**50**	**11**	**17**
N2MF	**7**	**632,277**	**1433**	**36**	**127**
KR2AA	**14**	**161,720**	**463**	**28**	**102**
WF2W	**1.8**	**38,637**	**229**	**18**	**63**
W2VO	*	8,109	65	15	38
***K1TN/2**	**A**	**437,835**	**544**	**79**	**224**
***K2UF**	**"**	**431,550**	**546**	**81**	**234**
*K2ZC	*	268,167	461	50	163
*K2TWI	*	212,424	364	48	164
*KC2TA	*	181,930	321	65	161
*W2CVW	*	178,485	305	60	159
*WA2YSJ	*	157,248	269	66	158
*K2IY	*	103,116	258	43	113
*WA2JQK	*	101,360	291	70	210
*K2DAR	*	71,100	213	42	108
*AE2T	*	65,886	174	52	106
*N2RI	*	60,915	183	50	105
*K2TV	*	57,962	162	45	101
*KD2MX	*	52,070	164	40	87
*WA2MCR	*	49,842	142	50	92
*W2BEE	*	44,748	152	44	88
*K2SZ	*	33,274	151	33	94
*N3SY/2	*	26,445	127	38	85
*WD8CQB/2	*	19,656	111	38	79
*K2IZ	*	16,354	83	20	54
*WV2ZOW	*	16,065	82	29	56
*N2NF	*	11,778	59	29	49
*K2MEN	*	9,576	73	26	50
*W2LB	*	9,476	101	38	65
*WA2BMH	*	5,768	45	21	35
*K2ZR	*	3,462	79	37	53
*K2RNY	*	3,381	32	22	27
*WJ3P/2	*	2,891	39	23	26
*WY1H/2	*	1,972	27	15	19
*WA2ART	*	448	21	14	14
*KV2X	*	180	11	6	9
*KC2RXS	*	84	6	6	6
***W2AW**	**14**	**281,400**	**736**	**31**	**109**
*WA2ZSK	*	7,900	95	13	37
*W2XM	*	1,150	17	7	16
***W2EG**	**7**	**139,008**	**396**	**30**	**98**
*NK1N/2	*	3,388	53	8	20
K3CR	**A**	**6,103,845**	**3505**	**146**	**481**
				(OP: LZ4AX)	
AA1K/3	**"**	**3,890,164**	**2561**	**130**	**432**
K3ZO	**"**	**3,258,984**	**2179**	**129**	**412**
K3NK	*	1,620,780	1254	114	362
N1WR/3	*	1,615,700	1372	103	325
K3IPK	*	1,372,672	1120	109	339
N3UM	*	1,247,330	1311	89	257
K3TC	*	1,102,050	906	120	345
N3RJ	*	569,811	703	89	252
K3TM	*	357,750	507	67	203
W2TN/3	*	314,640	532	87	217
NA3F	*	137,904	261	65	139
N3RW	*	116,850	259	57	148
K3RMB	*	95,592	214	46	122
WE3E	*	76,500	211	45	105
KB3P	*	61,462	163	44	114
N3NZ	*	57,963	225	40	99
KN3A	*	44,069	128	39	88
N3XL	*	38,115	146	27	72
WC3O	*	27,225	133	33	66
K3ISH	21	5,687	48	17	30
N3RR	**7**	**421,652**	**1013**	**34**	**120**
NA3M	*	162,384	466	29	107
AD8J/3	*	14,790	102	13	38
W3GH	**1.8**	**29,760**	**169**	**17**	**63**
***W3EF**	**A**	**1,773,006**	**1535**	**114**	**347**
***K3AU**	**"**	**1,115,229**	**1019**	**98**	**323**
				(OP: K2YWE)	
*N3QE	*	387,549	518	68	221
*W3IUU	*	376,390	500	75	208
*WF3M	*	325,212	468	62	184
*KB3LIX	*	309,690	439	78	201
*K3GW	*	219,008	351	61	175
*N2US/3	*	211,122	358	61	161
*K3MRG	*	70,800	193	41	109
*ND3R	*	64,160	164	54	106
*K3KU	*	56,658	161	38	95
*W3KM	*	56,160	192	41	89
*NY3B	*	46,665	149	56	97
*WA1T/3	*	36,386	120	31	82
*AB3IC	*	32,200	143	29	71
*WA2VQV/3	*	24,600	121	19	56
*W3SFG	*	11,718	73	23	40
*KA3QLF	*	8,970	57	26	39
*KB3LVH	*	5,141	53	26	27
*N3JNX	*	4,320	47	19	29
*N3KR	*	3,200	34	8	24
*K3JHT	*	1,344	23	7	17
***W3DF**	**21**	**18,564**	**106**	**20**	**48**
***K1EFI/3**	**14**	**81,270**	**274**	**22**	**83**
*NK3U	*	73,575	256	26	83
*W3OD	*	21,402	101	22	60
***WI2E/3**	**7**	**62,916**	**220**	**26**	**81**
*K3STX	*	27,054	123	21	60
***K3TW**	**3.5**	**35,588**	**165**	**17**	**65**
*NS3T	*	22,644	134	16	58
K3ZM/4	**A**	**3,479,916**	**2690**	**116**	**376**
K1TO/4	**"**	**2,837,950**	**1972**	**128**	**410**
W4RX	*	1,828,584	1516	110	356
WO4O	*	1,790,752	1616	108	320
N6AR/4	*	1,568,450	1222	119	356
K4RO	*	1,501,485	1243	117	348
K1GU/4	*	1,310,088	1116	124	318
W4QM	*	1,160,423	949	113	338
N4RA	*	1,072,996	917	111	325
N4UU	*	973,080	1337	88	218
N1LN/4	*	625,944	887	68	196
N4MM	*	621,250	644	93	257
K4DJ	*	574,434	643	87	242
K4MF	*	527,244	604	84	234
K4SV	*	356,706	447	82	216
K2LS/4	*	347,445	449	90	225
N4AAI	*	314,025	475	73	192
N5WR/4	*	297,434	434	72	182
W4NZ	*	296,296	368	92	204
K4YR	*	282,540	509	50	154
KG4CUY	*	259,072	401	83	173
W6UB/4	*	246,016	419	74	174
NB4M	*	220,365	506	82	213
W4TVG	*	208,800	356	67	158
NE4M	*	202,275	352	69	156
W4EEH	*	195,328	347	65	153
N4LZ	*	181,662	313	61	160
N4ZI	*	162,260	356	56	134
K7CS/4	*	160,195	315	57	142
N4LV	*	147,356	306	56	141
N4BCB	*	146,931	280	61	140
W4YA	*	106,578	219	56	130
N4KZ	*	105,378	218	57	136
W4ZYT	*	102,627	239	56	125
AD4EB	*	96,096	266	43	100
AJ4MW	*	92,738	198	49	129
K4FX	*	82,593	198	60	111
AI4WW	*	74,360	205	34	96
W4SUL	*	47,840	145	39	91
NJ2F/4	*	42,441	124	47	82
NA4C	*	32,280	117	44	76
K4ZRJ	*	24,552	137	25	63
K4TP	*	24,543	122	30	71
W4LT	*	24,378	117	37	65
KK9O/4	*	24,304	112	42	70
NE8J/4	*	22,176	104	25	63
AJ4FM	*	21,560	122	27	61
K4DZR	*	19,684	102	19	55
W4BQF	*	16,758	103	17	46
AF1E/4	*	7,458	65	21	45
AE4EC	*	3,740	83	31	54
K4FYM	*	2,340	31	15	21
K4FJ	**21**	**224,910**	**550**	**33**	**114**
K4RDU	**14**	**59,670**	**206**	**27**	**75**
WØUCE/4	**3.5**	**60,200**	**271**	**22**	**78**
K4PI	**1.8**	**53,053**	**245**	**19**	**72**
W5MX/4	*	21,183	120	16	53
AB4IQ	*	8,480	69	17	36
***N4YDU**	**A**	**1,536,912**	**1270**	**111**	**357**
***W3AU/4**	**"**	**1,188,630**	**1033**	**109**	**314**
				(OP: K4GKD)	
*N4IG	*	858,753	826	96	291
*N2WN/4	*	815,150	757	118	307
*NA4K	*	722,424	715	99	273
*WK2G/4	*	720,200	1074	71	206
*NA4CW	*	679,899	696	97	266
*W4YE	*	492,660	576	82	233
*W4RQ	*	317,395	465	65	192
*N4WO	*	185,760	343	59	157
*K4IE	*	180,264	315	66	156
*K4HA	*	163,652	259	73	178
*K4LRP	*	157,527	327	64	143
*W4NBS	*	136,565	279	59	132
*KE4KY	*	131,950	276	56	126
*KN4QD	*	131,040	226	67	143
*AA4N	*	124,972	250	60	139
*K2SD/4	*	124,168	275	53	134
*W4UAL	*	114,924	245	56	127
				(OP: K4CWW)	
*W8KHP/4	*	111,972	252	58	128
*KN4Y	*	110,229	244	60	121
*N5VI/4	*	108,546	251	41	117
*N2AN/4	*	106,790	236	55	126
				(OP: WC4E)	
*W2OR/4	*	106,128	251	47	129
*N4GJ	*	95,840	261	47	113
*N4QVM	*	92,752	199	54	122
*K4CX	*	92,511	239	52	119
*K4LW	*	87,984	226	48	108
*NU4I	*	77,924	209	54	107
*K4UK	*	74,992	216	55	117
*KI3O/4	*	74,200	173	61	114
*WB4MSG	*	68,886	174	45	133
*N4LF	*	59,130	174	37	98
*KS4L	*	48,865	129	45	100
*KI4FIA	*	47,880	152	44	89
*WK4P	*	47,740	145	52	88
*K4AGT	*	44,278	150	44	87
*N4AU	*	38,688	130	44	80
*K4FTO	*	38,227	164	42	85
*W4PJW	*	36,359	146	29	74
*N4ARO	*	32,630	105	47	83
*KI4CBN	*	31,886	128	35	72
*N3TG/4	*	28,756	122	27	64
*K4FJW	*	28,676	122	34	73
*WA4EUL	*	26,471	106	31	72
*W4OV	*	21,582	90	32	67
*KJ4WD	*	16,275	94	34	59
*WF7T/4	*	15,747	87	32	55
*W4BK	*	12,390	74	28	42
*KJ4AOM	*	12,348	100	32	52
*K4PG	*	12,118	78	28	45
*K4AMW	*	11,781	119	31	68
*K3MZ/4	*	11,160	66	20	40
*W4DLZ	*	11,040	62	26	43
*W8OWS/4	*	10,200	58	29	39
*WD4PDZ	*	7,830	51	18	40
*K9IA/4	*	6,552	81	22	56
*KI4EZC	*	6,400	48	25	39
*WB4JJJ	*	6,363	51	20	43
*K6ETM/4	*	4,888	46	22	30
*NR4C	*	4,332	51	23	34
*N4DXI	*	2,808	40	14	22
*KI4NCX	*	2,479	25	16	21
*KT4MM	*	2,272	25	14	18
*AA4KD	*	1,798	26	14	17
*K4RST	*	1,485	21	16	17
*AL7HW/W4	*	1,456	40	22	30
*K4EOR	*	1,400	31	17	18
*AF6SY/4	*	246	14	3	3
***K4WI**	**28**	**8,316**	**142**	**14**	**30**
***WB4TDH**	**21**	**79,739**	**246**	**29**	**92**
*W4DL	*	5,096	72	16	33
***K4NO**	**14**	**260,626**	**634**	**33**	**118**
*N4MO	*	118,950	382	30	100
*K4NVJ	*	72,688	224	31	87
*WA2ASQ/4	*	13,195	95	16	49
***N3UA/4**	**7**	**75,194**	**223**	**30**	**101**
*N3GD/4	*	53,998	230	23	75
*N4FD	*	35,259	167	14	59
*NQ4K	*	27,812	147	16	52
*KI4EGT	*	5,490	79	15	30
*NN4X	*	2,584	29	13	21
***NA4W**	**1.8**	**4,494**	**53**	**14**	**28**
				(OP: K4WI)	
N2IC/5	**A**	**4,157,160**	**2634**	**158**	**430**
WXØB/5	**"**	**2,768,790**	**2022**	**142**	**392**
				(OP: AD5Q)	
K5WA	*	836,876	850	120	277
N5PO	*	667,242	746	97	245
KZ5D	*	376,584	583	99	213
W5VQ	*	353,580	480	104	228
K5EWJ	*	322,368	471	92	200
K7IA/5	*	239,166	399	83	175
W5PF	*	187,148	302	81	163
N5VU	*	146,248	320	67	135
N5DY	*	130,851	250	69	132
K5MV	*	129,024	291	60	132
KD5JAA	*	104,961	239	69	108
NK5Z	*	80,800	399	53	107
AB5I	*	48,430	143	54	91
WØZW/5	*	34,925	108	52	75
AB5C	*	28,672	101	53	75
WZ5H	*	8,890	48	33	37
W6PU/5	**7**	**95,356**	**337**	**31**	**93**
W5WMU	**3.5**	**140,920**	**530**	**21**	**83**
K5NU	*	109,250	313	30	95
K5RX	**1.8**	**32,554**	**181**	**21**	**61**
W5TM	*	17,670	141	17	45
WD5R	*	9,408	114	16	33
				(OP: N5ECT)	
***N5AW**	**A**	**1,930,320**	**1301**	**140**	**420**
***K5KLA**	**"**	**875,600**	**786**	**112**	**286**
*N4IJ/5	*	587,367	645	98	251
*AC5K	*	298,627	431	75	184
*WF5W	*	163,505	386	91	174
*KØGEO/5	*	142,107	279	64	137
*W5RYA	*	137,196	276	79	143
*WA5SOG	*	105,534	334	32	91
*AD5MN	*	99,648	224	66	126
*N5XE	*	97,836	228	67	119
*KE5AKL	*	83,850	231	58	92
*AE5X	*	79,191	212	68	121
*N7FF/5	*	54,990	171	46	84
*N5PU	*	52,020	149	52	101
*K5ICW	*	30,900	122	37	66
*K5BZH	*	25,123	126	39	58
*KD5JHE	*	23,205	98	32	59
*AA5AM	*	20,640	93	42	54
*NK5G	*	20,437	173	45	62
*N5TM	*	17,574	85	35	52
*N5KF	*	17,372	75	39	47
*AE5MM	*	10,437	71	31	40
*K5WW	*	9,315	59	29	40
*W5RZ	*	8,442	51	24	39
*W5MJ	*	6,834	60	16	35
*W5AG	*	4,400	46	22	33
*N5ZC	*	3,515	43	18	19
*KE5PWL	*	3,108	52	17	25
*N7KRT/5	*	1,798	22	11	18
*K5XA	*	767	31	7	6
*W5PQ	*	672	47	18	24
*KD5RSS	*	132	12	7	5
*N5ESA	*	88	4	4	4
*K3TD/5	21	1,421	30	12	17
*W5VDM	*	188	10	6	8
***N5ER**	**14**	**183,714**	**501**	**32**	**102**
*AA5JG	*	26,860	132	24	55
***N7DF/5**	**1.8**	**6,768**	**88**	**16**	**32**
W6YI	**A**	**3,731,904**	**2632**	**158**	**418**
				(OP: N6MJ)	
K6NA	**"**	**2,377,035**	**1732**	**148**	**357**
K6XX	*	1,831,500	1533	138	312
W6UM	*	506,220	531	107	247
W6RFF	*	283,777	443	99	164
WT6G	*	259,777	390	103	156
KF6A	*	226,284	397	75	143
WA6KHK	*	215,232	359	78	158
K6YK	*	168,498	304	72	135
K6AW	*	158,922	268	87	156
				(OP: @W6NL)	
W6SX	*	130,086	272	76	122
WW6D	*	94,500	234	60	90
K6RB	*	93,912	238	81	101
K9JM/6	*	93,708	200	69	102
W6AYC	*	84,882	247	59	82
AJ6V	*	75,544	203	66	86
K6SRZ	*	72,534	201	62	92
K6NV	*	60,400	187	61	90
WB6BFG	*	53,440	161	63	97
N6NF	*	41,783	144	51	76
K6ZB	*	20,088	102	39	54
KB6A	*	15,192	125	33	39
KG6ZHC	*	7,905	56	25	26
W6ONV	*	2,266	39	11	11
W6SZN	**28**	**988**	**21**	**8**	**11**
W6YA	**21**	**110,896**	**378**	**31**	**85**
W6YX	**14**	**591,056**	**1414**	**37**	**127**
				(OP: N7MH)	
W6DCC	*	79,344	312	32	82
W6PH	**7**	**255,357**	**631**	**37**	**116**
N6AW	*	105,417	241	37	116
K6OY	**3.5**	**72,865**	**318**	**28**	**67**
***N6RV**	**A**	**439,110**	**592**	**102**	**204**
*N6MU	*	167,890	315	73	133
*K6AAB	*	108,290	247	70	100
*AA6EE	*	72,912	201	62	85

*W6IYS	*	72,358	227	55	88
*WY6DX	*	48,224	150	48	89
*K6WSC	*	45,408	156	59	70
*KQ6X	*	33,522	210	47	64
*N6HE	*	21,984	188	44	52
*K6CSL	*	20,088	117	42	51
*W6JK	*	19,404	94	37	40
*W6BVB	*	11,376	68	34	38
*AF6EV	*	10,004	74	30	31
*KN6Y	*	9,870	85	40	54
*KA3DRR/6	*	9,490	64	32	33
*WA6RUS	*	4,830	38	21	25
*W6VAR	*	2,829	35	20	21
*WA6NOL	*	2,457	39	31	32
*KD6WKY	*	24	4	4	4
***AE9F/6**	**21**	**21,641**	**127**	**21**	**46**
*AC6VN	*	16,409	125	20	41
*K6CU	*	2,244	34	16	28
*NP4IW/W6	*	682	93	14	17
*W7XZ/6	7	14,945	99	26	35
*KU6T	*	468	23	7	6
K7GK	**A**	**2,397,520**	**2026**	**146**	**314**
KO7AA	**"**	**1,610,631**	**1360**	**132**	**327**
AB7E	*	889,014	1005	103	263
K4XU/7	*	663,518	708	102	259
KO7X	*	530,131	598	117	232
K7RL	*	489,294	746	85	161
K7ZA	*	487,760	548	112	223
K8BN/7	*	474,369	511	110	233
WA7LT	*	441,197	654	103	180
K7GQ	*	375,136	461	100	204
N7BV	*	333,900	455	113	187
KN7T	*	273,900	478	77	143
W6AEA/7	*	271,636	491	83	153
AB7R	*	210,128	467	78	106
W7YS	*	146,688	296	59	133
K7MS	*	130,851	375	75	126
NI7R	*	118,864	289	55	97
NN7ZZ	*	115,630	297	56	99
			(OP: N5LZ)		
KS7T	*	112,412	255	63	116
KI7Y	*	102,180	248	57	99
KN7K	*	96,714	239	63	99
N7RK	*	83,951	192	72	107
W7IIT	*	83,776	221	52	84
NE9Z/7	*	56,604	180	68	110
N6KW/7	*	47,672	148	50	68
KI7N	*	45,879	152	55	68
K7UN	*	41,580	182	47	79
K7DD	*	21,079	95	37	70
KØIP/7	*	19,796	113	40	58
K7EIQ	*	12,222	75	25	38
N7TL	*	10,788	109	42	51
W7BJB	*	7,980	70	35	35
KF7P	*	6,264	96	26	28
WAØKDS/7	*	96	4	4	4
KC7UP	14	7,847	59	21	38
W7WA	**7**	**529,851**	**1178**	**36**	**125**
N6MA/7	**3.5**	**40,590**	**217**	**26**	**56**
N7UA	**1.8**	**122,100**	**565**	**27**	**73**
K7UIR	*	16	2	2	2
***W7YAQ**	**A**	**797,568**	**804**	**120**	**252**
***N7VM**	**"**	**633,412**	**759**	**109**	**229**
*NC7M	*	441,932	681	94	174
*K7HP	*	431,585	622	100	195
*K7HBN	*	213,622	375	80	126
*W7QDM	*	206,787	365	80	149
*NE7D	*	172,674	361	72	109
*W7RV	*	155,524	262	95	141
*K2PO/7	*	112,030	263	65	105
*WAØWWW/7	*	85,169	220	67	94
*AE7CC	*	78,144	236	57	91
*W7VXS	*	71,029	240	50	89
*W9CF/7	*	59,354	191	48	70
*N7QS	*	54,684	189	55	69
*K7SS	*	45,200	154	49	64
*K7TR	*	39,312	164	49	68
*N7EIE	*	39,010	153	39	55
*AK9N/7	*	37,878	145	47	71
*K7TQ	*	36,652	142	46	52
*K6UM/7	*	33,820	134	38	57
*W7GT	*	31,992	145	44	49
*KS5A/7	*	27,166	110	45	49
*K7OVM	*	26,640	123	33	47
*WS7V	*	21,384	100	38	43
*W7GB	*	20,625	133	27	48
*N7VS	*	20,184	131	43	44
*WA2OCG/7	*	18,624	100	28	36
*W6RA/7	*	16,137	94	45	54
*W7POE	*	14,848	87	31	33
*K7AMS	*	14,365	138	32	33
*N7VPN	*	12,714	92	38	40
*WR7Q	*	11,210	142	46	49
*N7ZN	*	11,160	68	26	34
*KD7MSC	*	10,089	77	30	29
*WE6EZ/7	*	7,011	53	29	28
*W9PL/7	*	6,498	66	18	20
*NS7K	*	3,942	38	26	28
*K7GIM	*	2,754	74	27	24
*W7GH	*	1,860	24	15	16
*K7ARJ	*	1,470	27	17	18
*AD7BN	*	1,050	18	12	13
*WA7BME	*	936	36	14	12
***K7ACZ**	**14**	**61,366**	**209**	**32**	**90**
*K7WA	*	10,900	83	21	29
*WB7FJG	*	8,400	89	22	28
*N7MAL	7	11,000	72	21	34
*W7RIP	*	153	26	5	4
***W7RH**	**1.8**	**3,404**	**55**	**15**	**22**
*W6NF/7	*	1,518	31	11	11
K8GL	**A**	**2,387,740**	**1565**	**135**	**419**
W8TWA	*	688,576	683	104	267
NE8P	*	274,828	412	74	180
K8JQ	*	226,525	392	59	162
K8MP	*	165,126	350	46	128
W8KTQ	*	115,632	311	73	146
W9KB/8	*	51,830	217	43	99
K8MR	*	41,124	112	57	81
W8PN	*	36,047	128	39	74
NS8O	*	16,320	84	30	55
K8OQL	*	10,370	90	20	41
KG9Z/8	*	3,432	28	20	24
W8UD	**14**	**115,062**	**334**	**32**	**95**
W8ZA	*	38,285	187	26	69
W8JGU	**7**	**166,731**	**403**	**34**	**115**
W8GXT	*	56,710	229	29	78
KA8PTT	*	6,099	59	17	40
N8AGU	**3.5**	**26,702**	**131**	**20**	**59**
ND8DX	*	25,840	132	17	59
K1LT/8	**1.8**	**38,014**	**213**	**19**	**64**
***N8AA**	**A**	**1,762,512**	**1285**	**127**	**376**
*KV8Q	*	526,320	704	87	253
*WB8JUI	*	496,278	558	95	254
*N8VV	*	337,680	461	84	196
*N8DE	*	332,848	438	76	217
*W8IDM	*	159,400	303	60	140
*N9AUG/8	*	146,324	279	79	154
*W8TM	*	101,824	213	49	123
*WB8TLI	*	98,304	186	62	130
*AA8YN	*	92,140	233	53	117
*WB8TSD	*	76,437	205	47	102
*WB8LZA	*	56,064	181	44	84
*W8CDA	*	36,031	134	51	86
*NF8M	*	32,364	108	43	73
*W8AN	*	31,581	101	47	74
*W8HMK	*	26,510	115	38	72
*WB2DFC/8	*	17,836	132	32	59
*K8VUS	*	13,725	75	25	50
*K8RJW	*	6,321	57	17	32
*KC8WGA	*	6,148	69	26	32
*N8KV	*	2,808	35	17	22
*KB8M	*	216	23	12	12
*N8IW	*	48	3	3	3
***K8AJS**	**21**	**76,705**	**244**	**26**	**89**
*K8IR	*	42,816	176	22	74
*W8GOC	*	23,068	117	18	55
*KC8LTL	*	4	1	1	1
*N8BHL	14	35,552	172	24	64
*WB8MIW	*	35,490	153	25	66
*KA8WQL	*	26,435	147	24	61
***NA8V**	**7**	**134,232**	**373**	**32**	**104**
W9RE	**A**	**4,350,170**	**3000**	**138**	**419**
N9CK	**"**	**1,622,754**	**1283**	**121**	**356**
K9MA	*	954,404	892	106	292
W9OP	*	861,510	813	103	287
K9OM	*	427,035	493	96	247
AB9H	*	207,888	358	74	170
W3HDH/9	*	204,726	355	67	162
WT9U	*	190,670	354	73	157
WB9DLC	*	157,030	286	61	144
NJ9Z	*	126,210	250	73	137
N9FC	*	115,884	256	54	120
KY9KYO	*	113,796	307	51	123
K9MMS	*	87,204	213	64	105
K9OKK	*	30,996	115	38	85
K9FO	*	21,340	91	48	62
N9IJ	*	6,273	53	15	36
WB9AYW	*	2,596	26	20	24
KK9V	**28**	**392**	**13**	**5**	**9**
W9XT	**21**	**137,391**	**423**	**29**	**94**
K9UQN	**14**	**121,068**	**375**	**29**	**89**
KG9N	*	33,453	192	18	45
W9VA	**7**	**59,772**	**214**	**27**	**75**
AG9S	**3.5**	**33,015**	**145**	**24**	**69**
W9YYG	*	19,527	132	20	49
W9SE	*	15,183	108	18	45
N4TZ/9	**1.8**	**33,768**	**195**	**19**	**65**
***K9QVB**	**A**	**526,815**	**606**	**95**	**250**
***W9OA**	**"**	**357,995**	**489**	**84**	**199**
*KD9MS	*	300,384	407	84	204
*W9ILY	*	291,540	423	69	189
*W9LHG	*	177,242	523	71	150
*W9VQ	*	103,785	219	56	129
*N9TF	*	99,568	231	62	134
*WD9CIR	*	64,476	174	55	107
*W9MS	*	54,085	184	45	100
*N9XX	*	49,901	137	50	89
*N9CO	*	44,370	126	52	93
*AJ9C	*	40,250	123	36	89
*N9LYE	*	35,547	128	47	76
*W9SZ	*	33,350	109	36	79
*K9JWI	*	31,000	117	35	65
*KA9JAC	*	30,694	120	33	70
*KU8T/9	*	22,776	168	40	64
*W9FF	*	19,392	76	34	67
*WB9MDS	*	18,590	101	42	68
*N9TTX	*	17,484	92	41	53
*WR9Y	*	14,400	71	36	44
*W9UX	*	13,695	69	28	55
*KX9DX	*	11,180	66	34	52
*KC9MEA	*	10,854	79	34	47
*N9BT	*	10,001	60	31	42
*WB8BZK/9	*	9,324	66	21	42
*W9WLX	*	6,840	57	25	35
*N9NA	*	3,800	45	21	29
*AB9OS	*	2,989	37	21	28
*N9VN	*	2,040	30	12	22
*WQ9T	*	1,716	25	15	18
*K9KMD	*	1,131	26	15	24
*K9AIH	*	928	26	16	16
*K9JU	*	702	17	11	16
*WB9MII	*	247	9	7	5
*NV9X	*	140	9	7	7
*W9AEM	21	13,134	74	23	43
*N9GBB	14	10,208	59	19	39
*AB9LA	*	504	43	11	10
***K9UIY**	**7**	**49,875**	**215**	**27**	**78**
*KA9O	*	19,197	115	26	53
*N9XR	*	9,790	71	16	39
*N9LAH	*	1,292	33	12	26
***K9GS**	**3.5**	**23,828**	**131**	**19**	**55**
*AA9KH	*	190	8	5	5
*WO9S	1.8	160	20	3	2
KØEU	**A**	**2,195,331**	**1747**	**129**	**342**
KØSR	*	2,020,901	1657	123	356
K9DU/Ø	*	883,550	817	108	302
KØOU	*	868,566	840	111	290
K6XT/Ø	*	834,588	813	123	265
NEØU	*	778,414	904	101	237
KØFX	*	741,045	800	110	271
WY7I/Ø	*	698,880	863	102	234
KØPK	*	417,404	561	93	206
KØEA	*	263,200	474	69	155
KØJJR	*	129,480	270	64	131
WØZQ	*	108,110	247	67	123
WØHBH	*	97,572	219	67	121
KGØUA	*	84,456	209	51	102
WØZA	*	47,580	159	60	70
W3AMB/Ø	*	32,946	171	48	66
WØTY	*	31,472	144	39	73
ACØE	*	14,104	75	32	54
NRØE	*	8,385	66	20	45
KBØL	*	6,264	49	28	30
KØXE	*	5,915	39	31	34
KØXTR	*	4,770	54	26	27
WØBH	*	4,464	42	24	24
KSØAA	*	728	22	12	14
KØALT	**21**	**18,360**	**117**	**23**	**49**
KØEX	**14**	**16,074**	**114**	**18**	**39**
KØAV	**7**	**103,505**	**299**	**30**	**97**
WØRUN	*	25,010	125	25	57
WKØP	*	13,936	83	23	44
WØDD	**3.5**	**6,812**	**60**	**17**	**35**
KØIO	*	1,690	25	8	18
NØTT	**1.8**	**6,364**	**72**	**15**	**28**
WØHT	*	5,559	74	16	35
***NØHR**	**A**	**708,760**	**711**	**98**	**279**
*KØDEQ	*	604,540	661	94	240
*WØETT	*	510,384	589	106	230
*KØBJ	*	336,519	456	85	184
*NXØI	*	203,109	385	76	161
*WØQG	*	171,972	398	61	143
			(OP: WØQQG)		
*KNØV	*	149,040	274	72	144
*NØUY	*	137,385	315	73	140
*NGØT	*	120,379	236	67	136
*KIØJ	*	108,696	256	57	111
*WYØB	*	88,835	248	54	109
*NN7A/Ø	*	83,559	206	60	101
*NFØN	*	54,796	165	45	88
*KØCN	*	50,025	136	53	92
*WØRO	*	45,261	149	48	93
*KCØV	*	42,768	148	56	76
*KØKP	*	41,064	150	37	79
*KDØJLD	*	34,510	143	39	80
*NBØZ	*	26,214	93	35	67
*NØCKC	*	21,756	98	32	52
*KCØSTQ	*	17,550	88	30	60
*WIØWA	*	16,800	102	34	50
*N1WQ/Ø	*	16,368	159	42	51
*KØVBU	*	13,650	70	30	48
*KØLDS	*	13,433	95	43	58
*W7KU/Ø	*	12,467	75	39	52
*WØRAA	*	10,842	88	35	43
*NØKMA	*	10,452	74	35	43
*WØRU	*	10,108	75	33	43
*KØHNC	*	9,867	77	27	42
*K3OSO/Ø	*	9,288	107	35	37
*WSØZ	*	5,100	46	23	27
*NVØP	*	4,620	57	23	43
*KØITC	*	3,942	34	23	31
*NØBM	*	3,740	45	16	24
*NIØR	*	3,600	41	19	26
*NØBUI	*	2,695	30	17	18
*KBØVE	*	1,900	31	12	26
*NØIBT	*	1,890	35	14	13
*WB6TMV/Ø	*	275	26	6	5
***WØRT**	**21**	**2,028**	**28**	**9**	**17**
***KSØM**	**14**	**40,140**	**212**	**26**	**64**
*NØGOS	*	21,000	128	22	48
***N9HDE/Ø**	**7**	**560**	**15**	**9**	**11**

Alaska

AL1G	A	16,280	400	11	9
KL8DX	**14**	**351,820**	**1638**	**27**	**71**
*KL1JP	A	18,282	155	34	32
*KL7R	*	12,190	109	24	22
***KL2R**	**14**	**168,630**	**963**	**27**	**50**
				(OP: N1TX)	

Antigua & Barbuda

***V26K**	**A**	**6,330,944**	**5255**	**119**	**377**
				(OP: AA3B)	

Barbados

8P5A	**A**	**8,793,603**	**6600**	**136**	**431**
				(OP: W2SC)	
***8P9SS**	**A**	**3,638,963**	**3296**	**126**	**353**
				(OP: ND3F)	

Belize

***V31CW**	**A**	**4,103,896**	**4531**	**119**	**305**
				(OP: KU1CW)	

British Virgin Islands

***VP2V/DL7VOG**	**A**	**2,720,653**	**3094**	**104**	**299**

Canada

VY2TT	**A**	**7,021,422**	**5395**	**118**	**404**
				(OP: K6LA)	
VE1DT	*	896,071	1130	72	247
VA1MM	*	868,840	1319	75	215
VY2SS	*	627,264	957	75	213
VY2ZM	**3.5**	**844,146**	**2290**	**29**	**109**
				(OP: K1ZM)	
VO1TA	*	34,668	239	12	42
***VE1NB**	**A**	**1,162,560**	**1514**	**82**	**238**
***VE1RGB**	**"**	**1,051,608**	**1330**	**81**	**263**
*VE1AL	*	160,857	362	51	132
*VE1JS	*	70,213	218	48	95
*VO1GO	*	51,728	191	41	81
*VO1BQ	*	7,296	62	13	35
*VY2LI	*	54	6	5	4
***VE1GW**	**14**	**61,180**	**271**	**21**	**71**
*VE1AOE	7	9,700	98	15	35
VE2IM	**A**	**6,527,043**	**4913**	**131**	**442**
				(OP: VE3DZ)	
VE2DWA	**1.8**	**27,625**	**208**	**16**	**49**
				(OP: LU7DW)	
***VE2AWR**	**A**	**444,268**	**730**	**71**	**182**
*VE2FK	*	153,860	505	39	101
*VE2AXO	*	92,400	282	41	99
*VE2BWL	*	73,602	220	44	97
*VE2EZD	*	70,060	302	37	76
*VE2QV	*	54,796	255	37	66
*VE2QY	*	13,288	169	20	24
*VE2DC	*	2,278	36	18	16
***VE2HLS**	**14**	**42,579**	**208**	**21**	**62**
VC3O	**A**	**5,246,348**	**3882**	**136**	**435**
				(OP: VE3AT)	
VE3NE	*	1,977,376	1738	117	371
VE3CX	*	1,601,087	2215	95	242
VE3KF	*	1,203,576	1389	95	293
VE3XN	*	529,340	503	115	283
VA3EC	*	488,787	827	70	179
VE3CWU	*	132,480	343	59	125
VA3OBR	*	100,358	384	52	87
VE3KZ	**21**	**254,695**	**789**	**28**	**105**
VE3ZI	**1.8**	**132,300**	**651**	**22**	**76**
VE3PN	*	61,854	504	17	44
VE3CUI	*	8,075	233	10	9
***VE3FDT**	**A**	**642,642**	**995**	**84**	**202**
*VE3XB	*	262,912	601	76	132
*VE3FH	*	244,497	449	75	164
*VE3GFN	*	232,960	543	65	143
*VE3OBU	*	228,684	427	61	167
*VE3OM	*	181,332	311	56	163
*VE3TW	*	166,887	368	54	135
*VE3VO	*	65,163	295	34	73
*VE3KAO	*	61,104	205	46	88
*VA3ATT	*	60,750	220	39	86
*VE3OX	*	46,250	204	50	75
*VE3JI	*	36,297	161	42	67
*VE3LR	*	32,643	116	28	89
*VA3RNJ	*	13,275	94	34	41
*VA3HUN	*	7,770	99	21	21
*VE3SSR	*	5,640	82	22	25
***VA3PL**	**21**	**41,712**	**213**	**20**	**59**
*VE3FJ	*	22,350	129	19	56
*VA3RJ	14	3,627	40	14	25
*VE3EXW	7	459	11	7	10
*VE3RCN	3.5	7,155	139	10	17
*VE3GSI	*	5,662	162	9	10
***VE4YU**	**A**	**79,925**	**237**	**54**	**85**
***VE5ZX**	**A**	**775,587**	**1427**	**81**	**182**
*VE5SF	*	31,212	225	22	46
*VE5AAD	*	15,800	146	21	29
*VA5LF	*	84	8	3	3
VE6JY	**14**	**855,913**	**2187**	**36**	**127**
				(OP: VA7RR)	
VE6WQ	**3.5**	**189,283**	**857**	**29**	**78**
***VE6BF**	**A**	**225,600**	**523**	**71**	**121**
*VE6EX	7	11,532	190	16	15
VA7ST	**A**	**907,432**	**1761**	**91**	**157**
VE7JKZ	*	362,848	669	91	141
VE7VR	*	299,728	1022	61	82
***VA7KO**	**A**	**455,994**	**1115**	**75**	**123**
*VE7BZR	*	130,355	379	62	83
*VA7ND	*	112,197	355	56	93
			(OP: VE7ALN)		
*VE7IN	*	47,702	163	55	67
*VE7BGP	*	24,000	121	46	50
*VA7CPC	*	18,178	158	26	35
*VE7CA	*	3,486	37	19	23
*VA7HZ	*	2,754	48	17	17
*VA7ALK	*	1,020	22	8	9
*VE7NI	14	5,474	69	11	23

Costa Rica

***TI5N**	**21**	**339,360**	**1488**	**27**	**85**
				(OP: NØKE)	
***TE1W**	**3.5**	**43,677**	**299**	**17**	**52**
				(OP: NØKE)	

Cuba

***CO2JD**	**7**	**164,739**	**969**	**25**	**64**
***CM6YAC**	**"**	**142,854**	**898**	**21**	**66**
***CO6LP**	**"**	**133,308**	**893**	**20**	**64**

Dominica

***J79WE**	**A**	**733,359**	**1640**	**62**	**151**

Dominican Republic

***HI3A**	**A**	**5,409,850**	**4587**	**129**	**385**
*HI8A	*	364,896	851	74	150
*HI3K	14	31,644	306	17	37

Grenada

J37T	**A**	**189,141**	**395**	**60**	**141**
				(OP: VE3EBN)	
***J39BS**	**A**	**1,433,250**	**2513**	**84**	**189**

Guadeloupe

***TO4D**	**A**	**593,180**	**1101**	**76**	**190**
				(OP: F6AUS)	

Honduras

***HQ9R**	**21**	**141,648**	**884**	**22**	**56**
				(OP: WQ7R)	

Martinique

TO5T	**A**	**5,996,032**	**4887**	**128**	**384**
				(OP: JE1JKL)	

Mexico

XE2GG	**A**	**2,323,620**	**3249**	**116**	**215**
XE1MM	**"**	**1,080,960**	**2241**	**73**	**167**
XE2S	*	673,460	1476	86	137
XE1V	*	230,496	501	74	150
***XE1CT**	**A**	**239,768**	**698**	**65**	**107**
*XE2AU	*	86,966	379	47	71
*XE1AY	*	74,664	782	37	31
*XE2YWH	*	56,244	237	44	65
*XE2FGC	*	33,572	178	49	60
*XE2HUM	*	26,433	167	40	49
*XE1CQ	*	13,184	69	35	68
*XE2AUD	*	2,304	90	13	11
*XE1FZE	21	6,726	58	18	39
*XE2AI	7	14,952	303	11	17

Nicaragua

***YN2GY**	**A**	**4,024,512**	**4373**	**110**	**301**
				(OP: K9GY)	

Panama

*HP3FTD	A	6,360	69	22	18
*HP1RIS	28	6,272	93	12	16
*HP1DCP	7	2,652	46	12	27

Puerto Rico

NP4Z	**A**	**6,791,976**	**5370**	**128**	**409**
KP4JRS	14	5,655	53	13	26
KP4QY	7	18,648	133	12	44
*NP3CW	A	10,200	143	24	27
***WP3C**	**3.5**	**156,420**	**748**	**17**	**73**

St. Kitts & Nevis

V47NT	**A**	**10,552,524**	**7302**	**135**	**454**

Turks & Caicos

VQ5V	**A**	**3,412,998**	**4395**	**99**	**282**
				(OP: W5CW)	
***VP5CM**	**A**	**409,344**	**1310**	**51**	**105**
				(OP: K5CM)	

U.S. Virgin Islands

KV4FZ	**1.8**	**164,043**	**838**	**22**	**77**
***NP2KW**	**A**	**87,098**	**562**	**44**	**63**

AFRICA

African Italy

IG9W	**7**	**1,399,655**	**3090**	**37**	**120**
				(OP: IZ1GAR)	

Ascension Island

***ZD8RH**	**A**	**596,128**	**1004**	**59**	**149**

Botswana

A25NW	**A**	**7,280,456**	**4795**	**125**	**399**
				(OP: K9NW)	

Canary Islands

EF8M	**A**	**11,142,327**	**7279**	**126**	**403**
				(OP: RD3AF)	
EA8BMG	*	448,490	805	61	154
EA8/OH6L	**28**	**3,200**	**43**	**11**	**21**
				(OP: OH2BYS)	
EA8CMX	**3.5**	**1,052,250**	**2434**	**31**	**119**
***EA8BQM**	**A**	**132,311**	**281**	**51**	**130**
***EA8CQW**	**21**	**36,223**	**150**	**22**	**67**
***EA8AVK**	**14**	**146,672**	**592**	**21**	**68**
*EA8BGO	*	26,307	164	22	57
***EA8NQ**	**7**	**121,440**	**435**	**20**	**76**
*EA8RY	3.5	2,212	40	8	20

Ceuta and Melilla

***EA9PY**	**A**	**47,859**	**132**	**59**	**100**

Djibouti

***J28OO**	**A**	**1,204,480**	**1333**	**83**	**237**
				(OP: E7ØA)	

Egypt

***SU9HP**	**A**	**38,850**	**110**	**60**	**90**

Ghana

***9G5XA**	**14**	**418,482**	**1086**	**32**	**102**
				(OP: G3XAQ)	

Kenya

*5Z4/DL8NBEA		8,277	77	31	58

Madagascar

5R8ZO	**A**	**4,092,240**	**3086**	**120**	**352**
				(OP: N5ZO)	

Madeira Islands

CR3E	**A**	**10,363,860**	**6404**	**132**	**427**
				(OP: CT1BOH)	
CT3BD	*	29,318	111	46	91
***CT3AS**	**A**	**765,911**	**876**	**71**	**242**
***CT3KU**	**28**	**646**	**19**	**7**	**12**

Morocco

CN2R	**A**	**8,678,109**	**5450**	**135**	**426**
				(OP: W7EJ)	
CN3A	**7**	**2,156,652**	**4285**	**36**	**135**
				(OP: IK2QEI)	
***5C5W**	**A**	**81,420**	**324**	**27**	**65**
				(OP: CN8KD)	
*CN8YR	*	4,961	47	14	27

Namibia

***V5/DJ4SO**	**A**	**1,029,500**	**1257**	**86**	**204**
*V51YJ	*	388,559	500	87	196

Nigeria

5N7M	**A**	**2,784,656**	**2627**	**94**	**282**
***5NØOCH**	**A**	**1,440,

*UA9AFS	*	54,975	300	20	55
*UA9QF	*	25,016	200	18	41
*RN9RM	*	6,027	73	11	30
*UA9UX	*	3,569	38	18	25
*RU9CD	*	221	9	5	8
***RA9AP**	**14**	**327,500**	**971**	**28**	**97**
*RV9JR	*	207,552	861	22	72
*RA9UIV/9	*	181,764	771	20	79
*UA9CCL	*	93,888	383	23	73
*RW9SZ	*	75,308	417	13	54
*UA9OMT	*	70,028	402	21	61
*UA9XHT/9	*	51,000	323	17	58
*RA9XU	*	46,847	236	18	61
*RA9AFZ	*	31,992	203	13	49
*RZ9OP	*	7,500	76	11	39
*RX9SL	*	1,113	22	6	15
*RA9XV	*	180	11	3	9
***UA9OC**	**7**	**93,522**	**358**	**28**	**81**
***RZ9AE**	**3.5**	**71,946**	**411**	**11**	**52**
*RV9CQ	*	9,880	103	8	32
***UA9MW**	**1.8**	**9,272**	**128**	**9**	**29**
*UA9CL	*	924	19	8	14
RWØLT	**A**	**904,290**	**974**	**132**	**298**
UAØFAI	*	839,550	1363	92	198
UAØIDZ	*	827,475	1518	103	192
RAØQD	*	657,475	1122	84	205
UAØZAM	*	496,080	1184	81	131
RAØUF	*	257,260	639	61	129
UAØYAY	*	249,612	448	75	169
UAØAZ	*	225,576	434	64	170
RAØQQ	*	167,717	433	54	139
RKØSA	*	158,004	351	62	127
UAØUV	*	119,400	404	48	102
UAØANW	*	96,600	373	49	89
RWØBM	*	26,248	175	17	51
UAØBA	*	13,987	86	20	51
RAØAA	**21**	**152,689**	**643**	**27**	**80**
UAØSW	*	13,248	123	22	42
UAØDC	**14**	**209,660**	**948**	**31**	**79**
UAØYM	*	32,897	262	19	48
RWØBG	**7**	**190,876**	**656**	**29**	**90**
UAØACG	*	77,044	397	30	73
RAØWU	**3.5**	**45,075**	**281**	**18**	**57**
RZØSR	**1.8**	**1,925**	**46**	**9**	**16**
***RWØAJ**	**A**	**503,976**	**792**	**69**	**184**
*RVØAL	*	471,360	859	71	169
*UAØSDX	*	450,515	924	68	171
*UAØOD	*	274,275	651	66	159
*UAØCNX	*	246,558	1041	70	104
*UAØAPV	*	239,096	501	49	160
*RAØLG	*	127,466	307	55	108
*RUØUA	*	39,995	204	31	64
*UAØAKY	*	32,591	124	35	74
*UAØCS	*	23,634	175	27	51
*RNØCW	*	20,657	171	39	52
*RKØSP	*	15,808	115	24	52
*RAØCY	*	14,025	134	34	41
*UAØZC	*	13,172	63	33	56
*RWØAA	*	8,040	67	20	40
*UAØLNO	*	4,815	131	22	23
***RWØLZ**	**28**	**616**	**58**	**5**	**6**
***RAØCL**	**14**	**30,080**	**250**	**23**	**41**
***RKØAWQ**	**7**	**24**	**2**	**2**	**2**
***UAØABB**	**3.5**	**34,918**	**172**	**21**	**58**
***RWØLBM**	**1.8**	**2,499**	**128**	**10**	**11**

Asiatic Turkey

TA1C/2	**A**	**482,804**	**1110**	**42**	**130**
YM2W	**28**	**31,651**	**344**	**5**	**26**
			(OP: OK1MU)		
TC4X	**7**	**1,393,405**	**3034**	**36**	**133**
***TA3AX**	**A**	**945,423**	**1625**	**45**	**174**

Azerbaijan

4K8M	A	6,496	55	18	40
***4K9W**	**A**	**698,072**	**935**	**72**	**212**

China

BD4TU	A	564	33	19	28
BD2BT	**21**	**8,772**	**92**	**19**	**32**
BA5FB	*	16	2	2	2
BA4WW	**7**	**85,428**	**645**	**24**	**60**
B5TT	**3.5**	**48,544**	**351**	**21**	**53**
			(OP: BA5TT)		
***BD1TCC**	**A**	**306,440**	**1001**	**62**	**126**
***BA8BA**	**"**	**228,935**	**653**	**66**	**145**
*BD1RCR	*	115,500	503	53	101
*BD2SH/7	*	72,854	312	55	91
*BA1SN	*	70,070	275	55	99
*BD6QMY	*	32,946	134	44	70
*BG8IK	*	16,929	87	25	56
*BA6QH	*	15,744	96	40	56
*BG6QZZ	*	3,626	44	19	30
*BD3EO/1	*	3,120	82	29	36
*BD7RDC	*	1,520	38	17	23
***BA7MG**	**28**	**2,784**	**42**	**11**	**18**
***BA8AG**	**21**	**30,540**	**276**	**18**	**42**
*BA4SI	*	12,985	165	20	29
***BD1ISI**	**3.5**	**13,366**	**251**	**17**	**24**
***BA4T**	**1.8**	**5,530**	**157**	**14**	**21**
*BA4QO	*	780	69	6	6

Cyprus

C4W	**A**	**6,041,604**	**4610**	**113**	**361**
			(OP: 5B4WN)		
***H2E**	**A**	**983,367**	**1267**	**75**	**222**
			(OP: 5B4AGE)		
***C4Z**	**"**	**936,306**	**1019**	**95**	**283**
			(OP: 5B4AIZ)		
***5B/HA5PP**	**21**	**333,060**	**992**	**32**	**98**

Georgia

4LØA	**A**	**6,938,264**	**5080**	**122**	**386**
			(OP: N6AA)		
***4L2M**	**3.5**	**179,799**	**920**	**12**	**61**

Hong Kong

*VR2YYW	A	25,252	135	42	65
***VR2ZQZ**	**28**	**3,799**	**56**	**10**	**19**
***VR2EH**	**3.5**	**7,104**	**123**	**13**	**24**
			(OP: UA3QJC)		

India

VU2PAI	**A**	**2,424,067**	**1868**	**123**	**368**
VU2PTT	**"**	**1,132,531**	**1194**	**98**	**285**
VU2JOS	*	169,470	403	65	145
***VU2BGS**	**A**	**506,574**	**674**	**86**	**232**
***VU2CDP**	**14**	**4,455**	**47**	**14**	**31**

Israel

4XØG	**7**	**1,482,729**	**2997**	**37**	**140**
			(OP: RV2FW)		
4Z5J	**3.5**	**746,994**	**1976**	**34**	**104**
			(OP: 4Z5KJ)		
***4Z5TK**	**A**	**705,908**	**1124**	**53**	**185**
*4X/SM8A	28	36	3	2	2
***4Z5QQ**	**21**	**30,858**	**181**	**23**	**51**
*4Z4KX	1.8	10,492	95	6	37

Japan

JF1NHD	**A**	**2,633,708**	**2707**	**122**	**252**
JF1PJK	**"**	**1,799,421**	**1852**	**122**	**255**
JA1JKG	**"**	**932,670**	**1454**	**88**	**170**
JQ1ABC	*	682,290	997	100	166
JF1SQC	*	610,272	993	89	145
JR1CBC	*	557,615	1029	70	159
JH1FSF	*	476,073	637	106	207
JI1ALP	*	354,574	603	84	143
JE1LFX	*	335,014	671	76	115
JR1IJV	*	156,096	338	78	114
JH1HIC	*	141,531	328	72	119
JA1HP	*	134,532	396	53	95
JA1VRY	*	133,131	281	83	116
JA1HMK	*	127,737	307	63	108
JA1MJN	*	103,418	252	67	111
7J1ABD	*	94,180	245	70	100
JN1RQV	*	67,536	185	61	83
JA1IKA	*	60,916	205	67	90
JH1ACA	*	32,330	136	47	75
JO1SIM	*	30,199	162	43	58
JJ1WWL	*	22,470	109	42	63
JA1SJV	*	18,720	80	34	46
JA1FWY	*	12,032	106	25	22
JF1NZW	*	11,426	77	24	34
JL1LNC	*	11,045	89	19	28
JS1OYN	**14**	**250,380**	**903**	**28**	**79**
JK1LUY	*	7,488	71	18	30
7J1AAI	**7**	**503,438**	**1525**	**35**	**99**
				(OP: W1NN)	
JH1APK	*	36,892	159	31	61
JH1OGC	**3.5**	**356,096**	**1060**	**31**	**97**
JH1AEP	*	44,793	260	26	53
JK1GKG	**1.8**	**3,115**	**55**	**14**	**21**
JA1KVT	*	2,541	41	15	18
***JI1RXQ**	**A**	**1,033,632**	**1222**	**115**	**218**
***JH1RNI**	**"**	**892,440**	**1022**	**110**	**250**
***JE1CKA**	**"**	**639,288**	**815**	**103**	**209**
*JP1QDH	*	570,620	829	90	187
*JA1XMS	*	353,241	553	100	167
*JA1BNW	*	345,247	551	86	173
*JE1SGH	*	261,485	507	81	136
*JG1TVK	*	219,520	363	89	156
*JA1HNW	*	183,000	407	72	128
*7K1MAG	*	138,746	336	65	108
*JA1IZ	*	106,420	280	65	105
*JA1CP	*	85,550	260	63	82
*JP1SRG	*	73,780	198	70	100
*7K1EQG	*	65,596	231	54	70
*JA1IE	*	59,302	206	61	88
*JA1EMQ	*	56,550	193	51	79
*JM1KNI	*	56,375	199	53	72
*JE1REU	*	51,456	176	49	79
*JA1BFN	*	50,336	193	40	64
*JK1OXU	*	46,569	150	57	72
*JF1RYU	*	46,080	128	59	85
*JA1AZR	*	43,560	170	54	66
*JE1NVD	*	41,747	184	44	65
*7N4QCQ	*	41,697	169	46	67
*JP1EWY	*	38,775	132	61	80
*JA1CPZ	*	27,066	131	33	45
*JH1SVO	*	26,244	131	35	46
*JA1ANF	*	21,828	107	42	60
*JE1JAC	*	20,648	127	36	53
*7L1FFH	*	20,079	97	44	53
*JJ1MZH	*	20,076	126	41	43
*JF1QQK	*	19,680	117	38	58
*JJ1IVX	*	17,658	92	35	46
*JI1AQY	*	16,400	87	36	46
*JAØIND/1	*	15,862	80	31	46
*JK1NSR	*	13,629	95	34	43
*JO1VRV	*	11,656	86	28	34
*JH1OLB	*	9,072	75	29	34
*JA1HG	*	8,700	69	28	32
*JA1KEV	*	7,800	80	35	40
*JA5INF/1	*	7,056	77	20	29
*JQ1VDJ	*	6,954	48	25	32
*JK1SDQ	*	6,903	60	29	30
*JA1ANG	*	6,840	83	25	32
*JF1MAD	*	6,042	46	26	27
*JF1TEU	*	5,600	43	24	26
*JQ1DTT	*	5,150	46	22	28
*JF1HJX	*	4,880	52	18	22
*JA1WQX	*	4,860	64	27	27
*JK1GMB	*	4,418	52	24	23
*JL1CNY	*	3,510	38	20	25
*JM1ROS	*	2,535	50	21	18
*JA1FRQ	*	2,108	28	14	17
*JI1BDQ	*	1,290	17	14	16
*7N4CPT	*	1,100	20	10	12
*JA1UCC	*	468	16	9	9
*JP1HUJ	*	448	15	6	10
*JR1AHP	*	238	7	7	7
*JP1EHC	*	192	6	6	6
*JA1PKS	*	144	7	4	4
*7M2GCW	*	54	3	3	3
***JA1WWE**	**28**	**1,512**	**29**	**9**	**12**
***7K4XNN**	**21**	**56,952**	**295**	**30**	**54**
*JA1YAI	*	24,336	170	27	45
*JP1IXV	*	20,493	136	26	43
*JH1SBE	*	13,333	103	26	41
*JI1BBN	*	4,128	49	17	26
*JR1FVW	*	1,488	28	10	14
*JI1LAI	*	221	7	6	7
***JE1RRK**	**14**	**44,034**	**232**	**27**	**55**
*JR2TMB/1	*	19,778	145	22	40
*JF1AZQ	*	12,376	115	19	37
*7M1MCT	*	8,399	79	18	19
*JF1VRU	*	5,720	77	18	26
*JL7FBV/1	*	3,636	42	15	21
*JN1BBO	*	2,546	29	14	24
*7N2JNN	*	195	8	7	6
***JH1FNU**	**7**	**16,800**	**112**	**22**	**38**
*JA1DCL	*	2,294	26	12	19
*JH1AIL	*	396	16	5	4
*JM1KLO	*	12	4	3	3
***JH1APZ**	**3.5**	**22,116**	**140**	**27**	**49**
*JO1QZJ	*	7,636	71	17	29
*JF1KWG	*	3,503	50	13	18
*JA1SKE	*	1,298	24	8	14
***JE1SPY**	**1.8**	**1,495**	**53**	**11**	**12**
*JE1TSD	*	168	7	5	7
JA2IVK	**A**	**812,175**	**1001**	**123**	**234**
JF2QNM	**"**	**669,669**	**957**	**100**	**173**
JR2ECF	*	69,108	337	29	49
			(OP: JF1EQA)		
JA2HO	*	65,988	153	68	88
JA2CPD	*	54,936	194	52	74
JE2HCJ	*	22,785	122	33	60
JF2FIU	*	20,522	135	25	37
JE2OTM	**1.8**	**798**	**31**	**10**	**11**
***JA2AXB**	**A**	**802,815**	**929**	**118**	**227**
***JA2CUS**	**"**	**605,264**	**830**	**99**	**205**
*JA2KVB	*	395,129	487	106	223
*JJ2JQF	*	252,540	428	90	154
*JA2VZL	*	88,578	277	53	80
*JA2QVP	*	62,208	200	54	74
*JA2KPW	*	42,108	191	48	68
*JE2DJC	*	20,776	78	45	53
*JR2FJC	*	11,178	95	36	45
*JQ2EHD	*	10,595	68	26	39
*JE2XJW	*	4,428	50	19	22
*JQ2OUL	*	600	23	13	12
***JH2MYN**	**28**	**867**	**20**	**7**	**10**
***JA2KKA**	**21**	**14,421**	**119**	**23**	**34**
*JR2AAN	*	782	16	11	12
***JG2KKG**	**14**	**301,444**	**966**	**34**	**90**
*JL2LPX	*	93,564	316	32	81
***JE2UFF**	**7**	**178,922**	**499**	**33**	**104**
*JH1HTQ/2	*	31,126	181	25	54
*JA2TFU	*	26,910	166	19	46
*JA2PFO	*	22,165	158	21	34
*JG2CNS	*	336	14	8	8
*JI2VLM	*	319	14	6	5
*JF2WXS	*	40	4	2	2
JR3NZC	**A**	**600,544**	**1008**	**83**	**141**
JG3LGD	*	182,672	340	94	139
JA3AVO	*	111,033	274	72	97
JA3AA	*	74,880	263	64	96
JR3XEX	*	37,296	188	45	67
JA3BCT	*	10,750	95	56	66
JA3PCQ	**21**	**6,435**	**63**	**22**	**33**
JI3BFC	**14**	**196,625**	**645**	**33**	**92**
JA3DAY	*	66,785	270	29	66
JF3LOP	**3.5**	**35,520**	**199**	**25**	**55**
***JH3CUL**	**A**	**443,439**	**685**	**89**	**172**
***JF3NKA**	**"**	**321,492**	**604**	**72**	**147**
*JG3CQJ	*	244,732	496	88	156
*JA3JM	*	223,488	493	66	128
*JO3JYE	*	179,179	424	69	110
*JF3KQA	*	171,189	369	78	129
*JS3EOE	*	54,510	202	57	81
*JR3RIY	*	43,440	162	48	72
*JA4XHF/3	*	40,352	147	35	69
*JA3HIL	*	27,246	99	45	69
*JA3LKE	*	25,000	101	43	57
*JO3EVM	*	20,184	107	33	54
*JA3HBF	*	15,200	98	31	49
*JI3OGI	*	14,592	106	34	42
*JM3PLL	*	13,650	88	32	38
*JA3UWB	*	13,113	113	22	25
*JA3EOE	*	11,948	102	28	30
*JR3GVH	*	8,085	68	25	30
*JO3MXH	*	7,316	58	26	36
*JH3PTC	*	4,278	51	22	24
*JF3AYR	*	1,525	28	10	15
*JR3NDM	*	1,190	32	16	19
*JR7HOD/3	*	180	7	6	6
***JR3EOI**	**21**	**84,096**	**404**	**33**	**63**
*JF3IYW	*	19,527	136	25	44
*JA3RAZ	*	2,730	47	17	22
*JI3MCM	*	66	5	3	3
***JA5UBW/3**	**14**	**40,240**	**208**	**27**	**53**
*JA3GW	*	17,346	140	21	38
*JH3MSA	*	4,141	43	14	27
***JO3RCK**	**7**	**6,800**	**66**	**19**	**31**
*JG3EHD	*	273	13	4	3
***JF3BFS**	**3.5**	**14,994**	**143**	**20**	**29**
*JG3DOC	*	4,960	60	16	24
JH4UYB	**A**	**4,589,165**	**3700**	**139**	**330**
JA4CZM	*	60,489	199	59	84
JA4EE	*	16,171	59	47	56
JA4BXU	**14**	**1,155**	**19**	**19**	**16**
JA4AVO	7	352	29	11	11
JM4WUZ	**1.8**	**5,805**	**66**	**17**	**28**
***JE4MHL**	**A**	**338,496**	**550**	**90**	**168**
*JH1MTR/4	*	58,125	217	54	71
*JR4VEV	*	5,780	61	29	39
*JI4JGD	*	2,774	33	17	21
*JA4CBX	21	2,412	34	16	20
***JR4GPA**	**14**	**191,808**	**669**	**28**	**83**
*JA4AQR	*	36,162	184	26	56
***JR4URW**	**7**	**15,125**	**121**	**20**	**35**
JA5IVG	A	31,376	154	47	59
JA5DQH	**21**	**285,152**	**830**	**37**	**97**
JA5APU	**14**	**124,321**	**606**	**30**	**73**
JE5JHZ	3.5	11,408	85	21	41
JA5JGV	**1.8**	**493**	**22**	**9**	**8**
*JA5RB	A	5,661	62	23	28
*JA5IDV	*	192	8	5	7
*JR5YBH	21	1,230	46	14	16
***JG5DHX**	**14**	**50,316**	**244**	**23**	**61**
JA6BWH	**A**	**213,393**	**399**	**95**	**154**
JS6RRR	*	60,738	186	66	93
JR6AG	*	17,255	97	50	69
JA6SHL	**7**	**177,472**	**733**	**28**	**66**
JA6FGC	3.5	68	29	13	21
JA6LCJ	**1.8**	**22,908**	**147**	**21**	**48**
JE6UWU	*	5,772	67	14	25
***JA6WFM**	**A**	**582,552**	**948**	**94**	**167**
*JA6CYL/6	*	215,208	442	70	126
*JS6GIM	*	13,392	79	38	55
*JA6QHR	*	650	18	12	13
***JH6WHN**	**28**	**1,872**	**33**	**10**	**14**
***JR6GIM**	**14**	**145,148**	**481**	**33**	**98**
*JJ6TWQ	*	27,432	152	22	50
*JA6WW	*	3,822	47	15	24
***JA6FFK**	**7**	**11,520**	**98**	**18**	**30**
*JL6IPK	*	1,610	60	12	23
***JA6DIJ**	**3.5**	**9,504**	**94**	**19**	**35**
JA7DLE	**A**	**2,154,444**	**2384**	**115**	**243**
JA7IC	**"**	**1,109,296**	**1271**	**117**	**239**
JA7COI	*	838,724	1090	114	193
JA7ACM	*	585,300	796	105	195
JA7BME	*	398,970	673	99	135
JA7EU	*	194,523	435	70	107
JH7QXJ	*	118,338	314	57	106
JA7WQJ	*	46,636	148	54	77
JE7SOG	*	1,508	29	14	12
JA7NVF	**21**	**158,180**	**613**	**35**	**75**
JE7YSS	*	8,428	108	14	14
			(OP: 7N4TEN)		
JA7FTR	**14**	**651,924**	**1597**	**36**	**120**
JH7XMO	*	439,085	1272	34	103
JA7AKH	*	176,099	836	23	54
JA7DOT	*	14,839	79	28	43
JA7MJ	**7**	**110,200**	**377**	**32**	**84**
JA7KQC	**1.8**	**2,100**	**49**	**12**	**16**
***JA7VEI**	**A**	**162,810**	**325**	**71**	**130**
*JA7AEM	*	85,800	311	53	79
*JH7IXX	*	44,616	233	39	65
*JA7SSP	*	12,852	95	27	36
*JA7TJ	*	11,830	78	34	36
*JA7AXP	*	2,133	27	14	13
*JA7ARW	*	1,218	22	14	15
***JH7CUO**	**14**	**128,928**	**502**	**29**	**73**
*JF7GDF	*	7,056	75	19	23
*JA7EDZ	*	4,389	49	13	20
*JI7VBW	*	3,007	55	14	17
JA8DIV	**A**	**164,862**	**311**	**85**	**128**
JA8BNP	*	119,382	246	69	128
JA8RWU	**14**	**771,300**	**1888**	**38**	**112**
JA8JMG	*	105,203	370	29	84
JA8MXC	7	12,446	103	21	28
***JH8SLS**	**A**	**1,307,124**	**1311**	**124**	**275**
*JA8AJE	*	81,030	234	61	85
*JA8CEA	*	49,345	152	50	89
*JK8JIC	*	672	20	12	12
*JH8DBJ	14	620	19	9	11
*JA8HSC	*	408	20	8	9
JA9BGL	**A**	**78,986**	**220**	**54**	**92**
JF9KVT	*	67,276	230	47	74
JA9CWJ	**21**	**45,153**	**252**	**31**	**56**
JF9MJU	14	1,221	37	10	23
***JA9LX**	**A**	**120,073**	**303**	**62**	**105**
*JH1TXG/9	*	90,036	261	63	101
***JR9GMS**	**14**	**76,339**	**316**	**29**	**68**
***JR9NVB**	**7**	**120,902**	**360**	**34**	**88**
*JI2TNT/9	*	1,550	30	10	15
*JA9DOF	3.5	1,500	33	10	15
JAØUMV	**A**	**534,540**	**933**	**82**	**154**
JEØEHE	*	118,628	246	77	111
JAØDAI	**1.8**	**19,024**	**137**	**17**	**41**
***JHØNEC**	**A**	**537,878**	**837**	**88**	**165**
*JAØBJY	*	134,312	327	61	102
*JHØCCK	*	25,899	106	41	56
*JGØGGI	*	16,068	109	34	44
*JGØAXT	*	8,866	79	30	32
*JAØUPW	*	3,240	39	20	20
*JAØRCK	*	2,296	24	17	24
***JRØEQQ**	**21**	**23,256**	**137**	**27**	**49**
***JHØEPI**	**14**	**162,720**	**565**	**30**	**83**
*JAØIOF	*	8,517	86	19	32
***JAØDOW**	**7**	**2,100**	**32**	**13**	**15**
*JAØGZ	*	70	8	5	5
***JAØAOQ**	**3.5**	**8,400**	**93**	**24**	**32**

Jordan

***JY6HQ**	**A**	**795,570**	**1225**	**54**	**176**
			(OP: K1XM)		

Kampuchea

***XU7ACY**	**A**	**1,326,672**	**2050**	**94**	**239**

Kazakhstan

UN9L	**A**	**2,499,192**	**2344**	**104**	**308**
UN6P	*	1,361,948	1443	97	286
UN7QF	*	191,208	482	52	134
UN3GX	28	8	2	2	2
UN9GD	**21**	**220,915**	**883**	**27**	**86**
UN5J	*	182,382	743	27	86
UP2L	**14**	**768,196**	**2009**	**36**	**122**
				(OP: UN4L)	
UN2E	*	169,500	573	27	86
UPØL	**7**	**1,400,672**	**2991**	**39**	**143**
***UN7CN**	**A**	**488,195**	**756**	**59**	**192**
*UN3M	*	482,999	820	48	161
*UN7FW	*	139,784	342	47	126
*UN6G	*	78,684	207	52	106
***UN6LN**	**14**	**295,080**	**989**	**28**	**92**
*UN4PD	*	21,060	139	11	43
***UN7LAN**	**7**	**170,905**	**735**	**21**	**74**
*UN7EX	*	48,741	256	16	61
*UNØC	*	1,188	18	12	15
***UN5C**	**1.8**	**11,520**	**173**	**8**	**32**
*UN7CH	*	9,044	159	9	29
*UN7TW	*	2,610	42	7	22

Kyrgyzstan

EX8AB	**A**	**594,675**	**1100**	**56**	**169**
EX2X	**14**	**299,314**	**1090**	**25**	**84**
***EX2A**	**A**	**1,002,436**	**1428**	**71**	**221**

Mongolia

JT1DA	**A**	**795,300**	**1837**	**75**	**166**
JV1A	*	274,204	923	65	131
JT1CD	*	60,990	450	47	67
JT1C	**7**	**193,024**	**771**	**35**	**93**
				(OP: JT1CO)	

Saudi Arabia

***HZ1PS**	**A**	**211,276**	**429**	**64**	**157**
***7Z1SJ**	**7**	**145,542**	**427**	**32**	**95**

Singapore

9V1YC	**A**	**1,302,923**	**1752**	**102**	**251**
9V1UV	*	8,496	81	29	43

South Korea

HL2KV	**A**	**326,488**	**696**	**101**	**195**
HL5UOG	*	169,090	434	69	116
DS5QLJ	*	20,203	107	32	57
HL2FDW	**14**	**144,720**	**732**	**30**	**78**
***HL5YI**	**A**	**61,236**	**218**	**48**	**78**
*HL5JCB	*	11,016	77	25	43
*DS5DNO	*	2,370	30	12	18

Sri Lanka

*4S7NI	14	522	11	8	10

Taiwan

***BW3/DJ3KR**	**A**	**162,514**	**622**	**68**	**110**
*BV4VR	*	51,300	203	52	83
*BW2/DL5OB	*	3,402	41	19	23

Tajikistan

EY7AF	**14**	**452,328**	**1295**	**33**	**108**
EY8MM	**1.8**	**341,202**	**1187**	**26**	**88**
*EY7BJ	21	400	18	4	6

Thailand

HSØAC	**A**	**511,880**	**988**	**71**	**197**
			(OP: HSØ/OZ1HET)		
HSØZDR	**21**	**45,125**	**209**	**26**	**69**
HSØZEE	**3.5**	**34,265**	**297**	**23**	**66**
***E2ØYLM**	**21**	**17,784**	**116**	**25**	**51**
*E21IZC	14	5,120	98	13	27
***E2ØWXA**	**7**	**7,540**	**104**	**19**	**39**
				(OP: HS4DDQ)	

UK Bases on Cyprus

ZC4T	**A**	**7,051,440**	**4821**	**126**	**402**
				(OP: G3AB)	
ZC4LI	**21**	**648,432**	**1646**	**34**	**124**

United Arab Emirates

***A65CA**	**A**	**310,758**	**470**	**80**	**214**

Uzbekistan

*UK7F	A	2,376	24	20	24
***UK7AZ**	**21**	**25,506**	**166**	**23**	**55**
***UK9AA**	**14**	**555,520**	**1615**	**31**	**109**

Vietnam

XV1X	**A**	**818,048**	**1325**	**85**	**223**

West Malaysia

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Bulgaria

LZ3FN	**A**	**3,111,212**	**3954**	**121**	**373**
LZ1BJ	*	1,038,360	2052	83	257
LZ2JR	*	255,118	782	62	137
LZ1ZJ	*	18,240	118	35	60
LZ1NG	**28**	**6,320**	**164**	**9**	**31**
LZ5A	**21**	**124,470**	**512**	**34**	**101**
					(OP: LZ2PS)
LZ2HR	**14**	**158,984**	**873**	**30**	**89**
LZ2NG	**7**	**39,264**	**340**	**22**	**74**
LZ3YV	*	1,755	34	9	18
LZ1SDR	**3.5**	**25,200**	**397**	**13**	**47**
***LZ2SX**	**A**	**744,832**	**1254**	**83**	**269**
***LZ5XQ**	*	**682,506**	**1702**	**74**	**223**
*LZ1WJ	*	255,047	546	81	218
*LZ1IKY	*	230,010	738	57	198
*LZ1PJ	*	191,520	518	53	171
*LZ1FH	*	187,875	747	36	131
*LZ3ZZ	*	173,990	439	73	181
*LZ1ONK	*	100,130	432	39	131
*LZ4AE	*	97,461	430	38	109
*LZ1BP	*	91,584	396	32	112
*LZ1ØØSO	*	55,878	261	32	70
					(OP: LZ2VP)
*LZ1195IR	*	43,912	386	18	70
					(OP: LZ1ZF)
*LZ1HW	*	34,968	105	51	90
*LZ3TL	*	33,345	227	38	97
*LZ1ZM	*	32,342	251	23	80
*LZ2DF	*	31,625	233	23	92
*LZ1ZF/1	*	1,634	36	7	12
***LZ3PZ**	**21**	**3,332**	**44**	**13**	**21**
***LZ9R**	**7**	**312,420**	**1299**	**36**	**128**
					(OP: LZ3YY)
*LZ1DNY	*	69,690	396	27	88
*LZ2FM	*	34,310	214	21	73
*LZ1MC	*	7,752	83	10	41
***LZ2SC**	**1.8**	**20,904**	**281**	**12**	**55**

Crete

***SV9COL**	**A**	**310,068**	**488**	**93**	**226**

Croatia

9A5K	**A**	**3,902,379**	**3836**	**128**	**431**
9A4WY	*	1,463,332	1932	104	324
9A2VR	**3.5**	**192,270**	**1173**	**25**	**105**
***9A2EY**	**A**	**333,432**	**829**	**56**	**208**
*9A3QB	*	232,921	610	59	188
*9A2BW	*	182,284	554	54	175
*9A6Z	*	172,536	555	56	181
*9A2MF	*	78,754	265	42	127
*9A2HQ	*	69,576	280	42	114
*9A5V	*	24,634	131	36	73
*9A3ARN	*	18,480	142	29	81
*9A2WJ	*	18,084	117	22	44
*9A5BB	*	15,169	107	26	51
*9A5AX	*	13,230	111	30	60
*9A9R	*	7,424	61	24	34
*9A5YY	*	266	8	7	7
***9A3VM**	**28**	**6,993**	**218**	**6**	**31**
*9A5ST	*	3,234	57	10	32
*9A7B	14	1,476	45	5	7
*9A2FW	7	9,860	138	10	48

Czech Republic

OL5Q	**A**	**1,345,686**	**2169**	**92**	**242**
					(OP: OK1HRA)
OK2PDT	*	**1,007,983**	**1584**	**91**	**306**
OK1XC	*	695,040	1243	96	288
OK2ABU	*	444,714	1017	63	219
OL4M	*	388,110	1155	55	200
OK2QA	*	280,083	713	65	202
OK4BX	*	221,450	596	59	156
OK1AOU	*	104,904	410	46	142
OK1IC	**21**	**137,600**	**520**	**34**	**94**
OL9Z	**14**	**462,696**	**1498**	**36**	**120**
					(OP: OK2PVF)
OK1FRO	*	360	14	7	8
OLØW	**7**	**880,775**	**2735**	**40**	**135**
					(OP: OK1DSZ)
OK1Z	*	**670,395**	**2218**	**37**	**128**
					(OP: OK1DKZ)
OK1FDR	*	423,130	1421	38	132
OK7FL	*	173,040	941	28	92
OK1AOV	*	107,184	384	36	118
OK1FAV	*	83,160	432	25	95
OK2SAR	*	54,590	338	23	80
OK5MM	*	28,424	313	15	61
OL3X	**3.5**	**91,430**	**926**	**17**	**65**
					(OP: OK1FC)
OK1VD	**1.8**	**65,415**	**628**	**18**	**71**
OK1EP	*	**51,282**	**662**	**14**	**60**
OK1MCW	*	24,648	270	15	63
OK1DWJ	*	7,904	67	13	63
***OL6P**	**A**	**1,648,962**	**1894**	**114**	**369**
					(OP: OK2PP)
***OK6Y**	*	**1,107,597**	**1539**	**112**	**327**
					(OP: OK2PTZ)
***OK7U**	*	**1,049,895**	**1740**	**87**	**298**
					(OP: OK1HDU)
*OK2BXE	*	872,806	1252	97	312
*OK2QX	*	723,890	1183	88	294
*OK4N	*	697,200	1267	81	269
					(OP: OK1DNJ)
*OK1JOC	*	655,324	1161	79	267
*OK1DKR	*	640,395	940	98	301
*OK1HX	*	588,566	1091	76	265
*OK2BUT	*	468,600	860	78	222
*OK2PTS	*	390,784	978	66	218
*OK1AY	*	331,580	844	59	222
*OK1FLC	*	251,496	602	57	195
*OK5SA	*	240,759	632	56	185
*OK2TDM	*	212,114	807	40	178
*OK2SGY	*	202,948	761	45	181
*OK1HEH	*	199,500	722	45	183
*OK1SI	*	196,240	616	47	173
*OK1DUT	*	195,156	571	57	177
*OK2EA	*	185,330	548	47	168
*OK1DKO	*	184,032	507	50	166
*OK1LO	*	173,485	542	50	171
*OK1AXB	*	143,038	478	56	182
*OK2SGW	*	135,360	580	40	140
*OK1ABF	*	129,540	430	50	154
*OK1FCA	*	129,068	579	32	132
*OK2BRV	*	121,312	319	54	169
*OK2PBG	*	114,492	341	54	149
*OK2PQS	*	105,635	398	42	143
*OK2BTT	*	104,437	500	34	147
*OK1FGD	*	95,323	534	30	143
*OK1MZO	*	93,366	349	44	138
*OK2VX	*	92,073	397	36	105
*OK2EC	*	89,925	367	38	127
*OK2BND	*	87,892	414	39	133
*OK2BOB	*	79,077	256	39	90
*OK1UKV	*	69,056	340	36	130
*OK1BLU	*	68,971	346	35	132
*OK2PAD	*	67,734	392	29	130
*OK2DW	*	54,768	245	36	76
*OK2BNC	*	52,578	199	38	100
*OK1DC	*	46,284	208	34	80
*OK2KV	*	41,629	149	36	97
*OK1MV	*	38,481	222	27	100
*OK1DRX	*	37,506	216	40	101
*OK1AKB	*	30,988	190	30	92
*OK1NE	*	24,852	182	24	90
*OK2BME	*	24,638	390	23	74
*OK2AJ	*	22,248	160	19	53
*OK2SWD	*	22,078	194	19	64
*OK2TEO	*	21,525	207	24	81
*OK1MNV	*	15,554	85	31	46
*OK2KFK	*	13,800	122	27	65
*OK7N	*	11,775	112	20	55
*OK1PV	*	7,182	61	19	35
***OK1ARO**	**28**	**315**	**13**	**5**	**10**
*OLØA	*	24	6	3	5
					(OP: OK1CZ)
***OK2HZ**	**21**	**57,116**	**216**	**38**	**79**
*OK2HBY	*	56,805	216	31	74
*OK2BIU	*	6,384	83	16	32
***OK2YT**	**14**	**111,735**	**452**	**26**	**91**
*OK1FGE	*	43,092	274	22	59
*OK7SX	*	28,032	247	19	54
*OK1TFH	*	17,952	143	19	47
*OK2PHI	*	3,914	71	11	27
*OK5SWL	*	884	34	8	18
					(OP: OK2SWD)
***OK8DD**	**7**	**102,816**	**575**	**25**	**94**
*OK1KJA	*	58,050	444	15	75
					(OP: OK1GS)
*OK2BRS	*	48,504	434	18	68
*OK1HCG	*	35,787	362	15	64
*OK7MT	*	28,392	183	16	68
*OK2UQ	*	8,154	92	11	43
***OK1CRM**	**3.5**	**135,892**	**1114**	**21**	**85**
*OK1DDQ	*	35,843	472	11	62
*OK1IBP	*	15,840	233	10	50
*OK5OK	*	13,416	226	8	44
***OK1MNW**	**1.8**	**29,436**	**415**	**10**	**56**
*OK1JOK	*	21,945	384	8	47
*OK1KZ	*	4,134	113	5	34

Denmark

OZ1JTE	**A**	**485,520**	**994**	**79**	**261**
OZ8SW	*	267,408	702	56	160
OZ2BKK	*	202,520	550	61	183
OZ6EI	*	37,942	235	30	92
OZ7RQ	**7**	**210,654**	**836**	**38**	**128**
OZ7YL	*	22,356	172	18	63
***OZ7BQ**	**A**	**401,565**	**944**	**58**	**227**
*OU3A	*	159,467	561	44	165
					(OP: OZ5UR)
*OZ3SM	*	112,690	467	45	146
*OZ8PG	*	104,710	395	44	141
*OZ7TTT	*	88,025	352	40	135
					(OP: OZ5WQ)
*OZ1AAR	*	50,720	217	41	119
*OZ5RM	*	34,560	245	22	74
*OZ1NF	*	28,676	174	30	77
*OZ1JFK	*	5,684	73	19	39
*OZ3EN	*	4,312	74	16	33
*OZ1DGQ	*	4,142	75	10	28
***OZ4FF**	**7**	**11,840**	**132**	**12**	**52**
*OZ7AEI	*	1,961	41	9	28
*OZ1HX	1.8	899	45	5	26

England

G3RXP	**A**	**1,002,410**	**1857**	**68**	**227**
G3VMW	*	**933,888**	**1725**	**75**	**229**
G4BUO	*	844,076	1166	92	264
M3W	*	661,050	1421	77	248
					(OP: G4FAL)
G3LET	*	383,040	606	97	245
G4SGI	*	338,428	845	57	187
G4HZV	*	277,527	605	61	176
G3UFY	*	255,701	647	58	183
G4KFT	*	236,930	549	51	164
G3IAF	*	191,025	491	57	168
GØAZH	*	186,120	556	47	173
GØBNR	*	156,585	432	56	163
GØEFO	*	147,016	415	46	142
G3KLH	*	104,610	956	18	92
G3LUW	*	89,850	317	46	104
G3SJX	*	57,312	209	42	102
G3ZHE	*	50,808	381	32	114
MØAAC	*	27,639	169	31	80
G4IUF	*	7,693	86	20	29
G4RYV	*	4,182	140	20	62
G3PJT	**21**	**194,832**	**731**	**31**	**101**
G6MC	*	12,915	105	18	45
					(OP: G4MEM)
G4MEM	14	8,404	144	8	14
M7A	**7**	**517,068**	**2083**	**35**	**124**
					(OP: LY4Y)
G3YXX	*	12,505	165	12	49
G4RCD	**3.5**	**69,280**	**680**	**19**	**61**
GØVDZ	*	7,140	166	7	44
***G3WW**	**A**	**957,980**	**1613**	**80**	**300**
***G3ZRJ**	*	**750,460**	**1397**	**71**	**243**
*G3KKP	*	379,728	810	64	229
*G4WGE	*	373,760	918	54	202
*G4DDX	*	290,598	808	53	178
*GØHVQ	*	287,007	649	57	180
*G3LIK	*	236,670	594	54	176
*GØHDB	*	233,120	532	59	176
*G3RSD	*	224,378	684	46	171
*G3ZGC	*	219,509	631	48	179
*G4DDL	*	217,685	648	47	174
*MØRYB	*	197,757	643	53	166
*G4ENZ	*	186,060	547	52	158
*G3RLE	*	116,701	379	53	138
*G3VQO	*	111,228	471	39	147
*G3MPB	*	105,378	299	47	135
*G3RIK	*	94,696	418	32	146
*MØRTI	*	83,720	356	37	124
*G3WRR	*	80,104	300	35	117
*G3KNU	*	45,012	198	31	93
*MØNQN	*	41,690	171	33	77
*MØMDR	*	21,930	157	25	77
*M1SMH	*	19,184	114	28	60
*G3KMQ	*	16,936	85	29	44
*G2HDR	*	12,921	135	22	51
*GØTMX	*	8,280	95	19	53
*GØWHO	*	7,980	82	24	45
*GØDAY	*	5,891	106	12	31
***G4ZOB**	**21**	**18,060**	**128**	**18**	**42**
*G4EHT	*	2,035	33	15	22
***G3VDB**	**14**	**47,656**	**326**	**19**	**55**
***GØCKV**	**7**	**143,514**	**751**	**30**	**104**
*M/YO4RDW	*	62,916	447	19	79
***G4ERW**	**3.5**	**53,118**	**577**	**12**	**66**
*MØYOM	*	952	34	4	24
***M4T**	**1.8**	**11,925**	**280**	**6**	**39**
					(OP: GØVQR)
*G3VYI	*	4,972	112	7	37
*G3SNU	*	437	38	3	16

Estonia

ES7GM	**A**	**1,441,706**	**2454**	**103**	**366**
ES2MC	**21**	**91,590**	**415**	**33**	**96**
ES4RD	**14**	**71,520**	**418**	**27**	**69**
ES2EZ	**7**	**106,875**	**653**	**29**	**96**
ES5QX	**3.5**	**335,658**	**1824**	**30**	**99**
ES4RX	**1.8**	**18,571**	**417**	**8**	**41**
***ES3RF**	**A**	**222,588**	**662**	**48**	**195**
*ES5DB	*	202,872	529	50	187
*ES5EP	*	118,846	510	38	144
***ES4MM**	**21**	**19,505**	**128**	**23**	**60**
*ES1CN	*	5,891	70	12	31
***ES8DH**	**14**	**30,375**	**216**	**24**	**51**
***ES6KW**	**3.5**	**7,742**	**152**	**9**	**40**

European Russia

RG3K	**A**	**2,554,040**	**3149**	**121**	**415**
					(OP: UA3QDX)
RM3F	*	**2,164,862**	**2864**	**113**	**365**
					(OP: UA3DPX)
UA4WKW	*	**2,040,084**	**2539**	**123**	**426**
RU3UR	*	1,680,602	1948	118	421
RO4W	*	1,654,554	2536	106	367
					(OP: RD4WA)
RG6G	*	1,376,356	2188	115	331
					(OP: RW6HX)
RK3ZZ	*	1,145,540	1388	109	399
RK3DH	*	1,021,989	1298	114	379
UA1QM	*	974,160	1692	88	322
UA4PN	*	710,520	1470	80	292
RK4FM	*	657,412	1137	92	279
RA6GW	*	606,177	676	114	357
UA3AQB	*	547,428	841	80	263
RW4PY	*	503,355	1006	77	268
RA6MQ	*	498,639	985	82	265
RU3UN	*	498,348	615	102	334
RA3NC	*	467,145	1094	66	249
RX3AJ	*	367,548	878	73	208
RA3RN	*	348,395	788	66	229
RA6AX	*	348,062	780	86	200
RA4PO	*	345,280	874	74	246
RU3ZV	*	334,422	855	70	227
UA3TCJ	*	330,336	720	67	119
RW3DA	*	317,490	908	58	227
RW4HP	*	302,940	917	46	134
UA3DGG	*	274,666	718	82	240
UA3DFU	*	264,990	435	95	268
RU6MD	*	254,926	706	64	214
RV1CC	*	250,211	562	71	176
UA3EAA	*	242,780	685	49	195
UA4LU	*	236,288	719	48	160
UA3ICK	*	215,260	658	52	183
RV3WD	*	154,938	531	47	170
RW4FE	*	117,414	264	61	137
RU3MW	*	101,736	453	35	127
RZ3BY	*	97,680	210	65	157
RV4LC	*	93,744	352	43	146
UA3DAM	*	87,894	329	42	129
UA3RAG	*	79,862	205	59	87
RV6YB	*	74,970	504	22	76
UA3PPP	*	72,688	227	44	132
UA3QNS	*	62,878	194	61	150
RA3ZA	*	61,160	191	45	94
RV6ALI	*	55,942	181	58	108
RZ6AK	*	55,616	322	33	125
RZ3RM	*	50,976	318	28	116
RA3TT	*	50,264	177	39	83
RA3XA	*	40,740	132	51	89
UA6YW	*	38,502	132	52	86
UA3EAY	*	32,053	103	49	84
RA1OD	*	27,071	103	44	63
RN3FA	*	24,030	221	23	66
UA4NC	*	16,422	147	22	80
RA4UVK	*	14,798	94	30	68
UA4CCG	*	13,467	144	16	51
UA3TN	*	13,244	144	23	54
RV1AC	*	13,199	72	27	40
RA3UT	*	10,564	50	32	44
RZ4AO	*	9,100	50	32	38
UA1AUW	*	8,103	66	24	49
RZ3GU	*	5,593	55	17	30
RK3QS/3	*	3,600	67	12	36
RU6AI	*	1,716	22	19	20
UA1ORK	*	1,218	17	13	16
RX6AM	**21**	**129,024**	**499**	**32**	**112**
RV3FI	*	46,041	225	26	77
RW3AFY	**14**	**154,476**	**634**	**30**	**96**
RN6AT	*	123,765	689	25	86
UA4SAW	*	99,450	512	26	91
RN4HA	*	45,551	309	22	79
RA3GFG	*	34,500	203	23	77
RW6CF	**7**	**302,938**	**1165**	**38**	**129**
UA6EED	*	132,056	655	29	107
UA3KA	*	119,310	896	26	71
RA3DTN	*	63,210	303	28	101
RK3FQ	*	35,880	225	22	82
UA6LTI	*	32,060	208	22	48
RK3DK	*	25,232	249	17	66
RK4PA	*	24,360	204	21	66
UA4LY	*	6,102	74	13	41
RS3A	*	**226,240**	**1296**	**32**	**108**
					(OP: RA3CW)
RW4WM	*	129,132	1013	24	78
RK3FY	*	121,643	896	23	80
UA4WI	*	99,450	986	15	75
RX3OM	*	56,775	616	12	63
RA3AV	*	54,826	565	15	64
RK3ER	**1.8**	**55,875**	**685**	**17**	**58**
UA1ANA	*	55,204	666	13	61
RN1CC	*	31,020	430	12	54
UA3AP	*	27,390	335	12	54
***RK3IM**	**A**	**860,254**	**1143**	**109**	**354**
***RZ6BU**	*	**842,340**	**1234**	**91**	**326**
***RX3ZX**	*	**766,700**	**1213**	**96**	**278**
***RN3QP**	*	**595,608**	**1317**	**58**	**244**
RA4WC	*	531,060	1190	70	264
*RZ3VO	*	515,496	972	86	290
*RN4SS	*	414,475	1254	56	239
*RV3QX	*	377,572	994	61	213
*RW6AHO	*	373,868	975	64	229
*UA1CUR	*	368,700	879	62	238
*RZ6AW	*	356,883	677	98	255
*RL3FO	*	351,770	876	56	234
*UA3LIZ	*	349,270	943	54	211
*RU4SO	*	334,572	910	60	234
*UA4PCM	*	308,140	787	65	219
*UA4PAQ	*	302,742	808	60	218
*RA3ST	*	301,278	622	78	220
*RN4SN	*	299,466	465	93	288
*UA1CEC	*	289,440	1043	50	190
*RW4AD	*	277,695	803	55	200
*RW3TA	*	272,986	761	63	196
*RW6HP	*	266,310	649	64	205
*RA6FP	*	258,210	687	63	222
*RA3BQ	*	241,920	474	71	209
*RK6ASY	*	240,382	710	55	208
*RX3VF	*	232,584	648	53	211
*RA3MR	*	232,016	699	65	207
*RU4LM	*	229,457	488	64	205
*RK4YJ	*	222,666	490	59	163
*UA4AAC	*	221,991	696	45	186
*RK3AQW	*	221,850	654	60	195
*RA3LO	*	218,621	532	58	193
*RU3XY	*	217,728	632	57	186
*RA4WA	*	210,066	648	48	175
*UA6FZ	*	204,228	595	53	191
*UA6GX	*	176,596	499	57	155
*RX4CD	*	174,496	482	61	163
*RU3DM	*	173,396	309	69	199
*RW6MBC	*	170,178	449	50	176
*UA3DCW	*	164,318	491	44	150
*RK3FJ	*	163,618	581	44	159
*RA4ACX	*	163,592	498	56	186
*UA4FUW	*	158,884	452	60	193
*RA6ARI	*	155,400	705	35	133
*RZ1OK	*	153,164	500	50	186
*RL3DF	*	152,304	411	55	173
*UA3VLO	*	148,733	398	46	175
*UA3QAM	*	145,107	500	44	163
*RA6FUZ	*	144,320	473	47	158
*UA6YH	*	140,080	449	52	154
*UA3UDE	*	137,725	619	34	141
*UA4WAW	*	135,800	531	44	150
*UA1ORL	*	135,736	598	37	151
*RV3ZN	*	133,522	445	56	146
*RZ1AP	*	131,340	488	56	143
*RU4SM	*	129,355	505	39	166
*UA6GO	*	124,865	312	63	158
*UA4HIP	*	124,845	485	39	164
*RA3MB	*	123,305	281	66	205
*UA6GM	*	121,920	410	50	110
*RV3QO	*	108,070	349	56	158
*RN3ZR	*	104,160	351	48	162
*RK4PB	*	103,412	409	48	158
*RW4NQ	*	103,000	255	62	144
*UA4HAM	*	101,908	399	39	107
*RD3AB	*	101,314	414	43	136
*RA1TV	*	98,237	373	40	153
*RW1AM	*	91,304	248	57	145
*RV6LCI	*	91,155	326	44	133
*RU3XB	*	87,300	380	36	144
*RU3UW	*	86,506	357	32	167
*UA1TGQ	*	82,950	385	30	120
*UA4QK	*	82,025	252	63	142
*RV3YR	*	78,831	288	46	125
*UA3DFM	*	78,200	409	34	136
*RU3DU	*	72,756	342	40	132
*RZ3QS	*	70,975	312	36	131
*RN3AAB	*	69,960	312	37	122
*UA3DPM	*	69,810	257	46	133
*RN4SM	*	67,896	336	33	131
*RU3BU	*	63,037	211	49	120
*UA6HFI	*	59,502	318	37	104
*RL3KO	*	58,617	305	29	88
*RW3XZ	*	57,920	246	48	133
*RX3MM	*	54,636	218	44	113
*RW3DOX	*	54,389	331	28	109
*UA4NF	*	51,192	253	37	121
*RU3XF	*	51,034	178	32	126
*RA3XCZ	*	50,736	271	30	121
*UA3XAG	*	50,434	241	41	110
*RA3VE	*	48,326	300	30	116
*UA3DW	*	47,892	192	37	119
*UA6LJU	*	47,136	286	21	75
*RA1AGG	*	46,766	340	30	104
*RV3FU	*	46,698	287	25	104
*RA3QN	*	45,156	253	31	111
*RA4HO	*	44,144	322	28	96
*RA3DTH	*	43,860	191	36	136
*UA3UHZ	*	42,233	237	35	122
*RA3XI	*	39,024	294	35	109
*RW1AU	*	36,499	209	26	87
*UA3DKT	*	33,950	199	35	62
*RX6HT	*	31,668	179	29	87
*RV3DCZ	*	31,030	225	26	81
*RU4SW	*	29,876	214	31	123
*RW6BD	*	29,875	134	40	85
*UA3DUJ	*	29,325	172	30	85
*RD3DS	*	25,750	183	28	97
*UA4SBZ	*	25,194	221	24	78
*RX6LOL	*	24,684	197	25	96
*RV3IC	*	23,000	157	25	67
*UA3AKI	*	22,968	158	22	65
*RA6AAW	*	22,326	85	49	73
*RV3TG	*	22,090	171	21	73
*UA3DCI	*	21,988	201	27	65
*RD3AN	*	19,602	130	24	75
*RA3IS	*	19,488	140	28	68
*RZ3AIA	*	19,170	163	21	69
*UA3DSS	*	16,296	106	27	57
*RZ3DC	*	16,272	98	28	44
*UA3QIX	*	15,531	83	28	65
*UA4WAV	*	14,696	138	22	66
*RU3SD	*	14,364	61	35	49
*RZ3ATG	*	14,094	123	22	65
*RA6DT	*	13,778	121	20	63
*RA4LZ	*	13,616	85	28	64
*RW6CW	*	10,824	58	34	48
*RW3MA	*	10,368	132	23	73
*RW3FX	*	10,275	77	19	56
*RA1ALZ	*	10,164	81	20	46
*RU6BR	*	9,796	61	27	52
*RX3MX	*	9,656	60	31	40
*RA4NCC	*	9,490	101	22	51
*RN4SC	*	9,177	96	18	51
*RL3DX	*	8,449	103	19	52
*RA3WUG	*	7,906	102	17	50
*UA4CNJ	*	6,944	50	27	29
*RU4PN	*	6,527	120	17	44
*UA4AN	*	6,496	61	20	36
*RV3DHC	*	6,216	91	15	41
*RX1AP	*	4,455	33	22	33
*RK3FM	*	3,268	65	9	34
*UA3XGM	*	2,288	26	21	23
*RX6MR	*	2,280	64	9	29
*UA6LPY	*	891	19	15	18
*RN3DDR	*	70	11	5	9
***RV6LX**	**21**	**29,295**	**182**	**26**	**67**
***UA4LW**	*	**28,530**	**190**	**23**	**67**
*UA3ABJ	*	26,628	146	24	60
*UA3AO	*	20,907	165	21	48
*UA4PCA	*	14,384	165	14	48
*RA6YJ	*	11,175	64	23	52
*RA1OGP	*	10,317	112	16	41
*RN4AO	*	9,656	126	22	46
*UA1ZZ	*	7,473	110	12	35
*RW4LQ	*	4,968	36	19	27
*U3DI	*	4,173	72	12	27
*UA4PAY	*	2,840	38	12	28
*RA4LK	*	777	13	9	12
***RW6HA**	**14**	**219,778**	**798**	**36**	**122**
***RZ4AG**	*	**213,598**	**788**	**34**	**112**
*UA1AFT	*	189,895	586	37	126
*RW6FZ	*	130,788	890	26	82
*RA3UAG	*	117,683	511	34	103
*UA6LCN	*	112,464

*F6JOE	*	25,330	224	18	67	
*F8DYD	*	20,088	158	31	62	
*F4DTO	*	17,400	163	18	57	
*F1MLN	*	16,531	111	22	39	
*F8FWM	*	14,946	130	18	35	
*F5GGL	*	11,592	91	23	61	
*F2TA	*	7,350	128	24	51	
*F5BTH	*	2,760	114	18	51	
*F6KMX	*	2,250	32	18	27	
			(OP: F8BQQ)			
*F8FQJ	*	448	14	6	8	
*F5MPN	14	7,579	72	16	37	
*F6API	7	12,600	160	10	50	
Germany						
DL3YM	**A**	**3,944,016**	**3613**	**131**	**418**	
DK3KD	*****	**1,690,113**	**2014**	**117**	**382**	
DL8SCG	*****	**1,149,750**	**1552**	**111**	**327**	
DL2DX	*	1,087,565	1049	122	369	
DL2DXA	*	1,086,640	1114	118	352	
DL1DTC	*	889,746	1221	101	341	
DL5YM	*	688,390	1138	93	272	
DJ8QP	*	633,960	1003	99	310	
			(OP: DR77STMG)			
DL4ME	*	585,208	1215	76	255	
DL9GFB	*	546,692	788	90	298	
DL8KJ	*	477,375	751	82	253	
DL6UNF	*	476,364	927	77	244	
DD2ML	*	422,085	895	79	206	
DK1KC	*	418,332	1015	63	221	
DD1JN	*	363,825	812	73	224	
DL7JOM	*	362,940	847	63	213	
DL5WW	*	344,715	607	86	249	
DL4MCF	*	288,156	667	61	175	
DK9WI	*	283,353	677	72	237	
DF8AA	*	268,478	716	54	200	
DJ2SL	*	238,170	513	67	188	
DK7AN	*	208,495	486	54	191	
DL5ST	*	193,257	328	81	246	
DL1STG	*	192,474	315	81	225	
DD4DA	*	180,096	583	45	179	
DJ4FZ	*	143,112	325	66	201	
DK9HE	*	137,408	424	56	170	
DC9ZP	*	136,350	376	58	167	
DJ2IA	*	127,530	358	56	162	
DH6BH	*	121,520	438	47	149	
DL5RMH	*	106,428	347	43	104	
DL5MEV	*	98,430	243	68	187	
DL2MDU	*	95,355	246	53	142	
DG9MDM	*	88,389	261	43	140	
DF3HD	*	54,557	348	29	60	
DL1YFF	*	50,040	199	40	80	
DL2ZA	*	45,731	290	31	108	
DL9GTI	*	43,416	150	44	118	
DF2QZ	*	42,125	170	37	88	
DL1HCM	*	39,900	166	34	80	
DL1RYD	*	33,005	173	38	77	
DF8BB	*	32,461	165	36	107	
DK8EY	*	31,616	216	26	102	
DKØIW	*	28,100	234	31	69	
DJ2BC	*	22,386	121	31	60	
DK5DQ	*	21,112	100	34	70	
DLØWH	*	19,598	185	22	60	
			(OP: DM4IIM)			
DL2FK	*	19,552	122	25	69	
DL7BA	*	18,614	80	34	48	
DB3LO	*	17,150	122	25	73	
DKØSU	*	13,608	126	20	52	
			(OP: DF7SA)			
DL1VRL	*	11,584	65	24	40	
DF2HL	*	11,520	106	14	50	
DL6DVU	*	11,430	123	28	62	
DL4LBK	**21**	**95,914**	**349**	**30**	**89**	
DM3MM	**14**	**385,917**	**1146**	**37**	**124**	
DL9GTB	*	16,302	116	19	47	
DK3WW	**7**	**418,693**	**1309**	**40**	**147**	
DL1RG	*	256,608	971	37	125	
DK9PY	*	251,463	1303	28	81	
DL5JAN	*	97,028	489	27	100	
DJ5AN	*	8,062	118	12	46	
DJ6OI	*	6,396	117	10	42	
DR7T	**3.5**	**71,638**	**747**	**14**	**72**	
			(OP: DL1HCM)			
DJØMDR	**1.8**	**189,210**	**1359**	**24**	**78**	
DF3OL	*	25,393	308	12	55	
***DD5M**	**A**	**1,042,782**	**1768**	**89**	**288**	
			(OP: DJØZY)			
***DJ6BQ**	*****	**1,033,606**	**1602**	**92**	**306**	
*DH8BQA	*	890,931	1423	83	310	
*DL1NKS	*	792,480	1465	81	300	
*DJ6OZ	*	588,968	1142	70	262	
*DL3VZL	*	556,336	751	101	335	
*DJ8EW	*	537,864	987	68	239	
*DL7UMK	*	514,960	1085	67	247	
*DK3W	*	496,674	872	85	284	
			(OP: DL6MHW)			
*DL5ARM	*	407,238	975	63	236	
*DF5BM	*	405,444	930	63	236	
*DL5YL	*	337,824	788	65	223	
*DL1QW	*	320,661	503	86	283	
*DK3YD	*	319,032	849	59	193	
*DL4JYT	*	314,265	749	67	220	
*DL1VJL	*	302,186	597	70	208	
*DJ8UV	*	291,588	787	62	220	
*DL4ZA	*	279,531	775	57	204	
*DL3ZAI	*	270,912	623	59	190	
*DK3WN	*	258,774	703	55	203	
*DL1SAN	*	256,151	669	59	200	
*DJ9CN	*	240,156	577	58	194	
*DK3WJ	*	233,604	445	64	188	
*DF8UO	*	233,168	554	56	180	
*DL1TS	*	223,560	589	58	212	
*DL1KSE	*	215,264	669	49	168	
*DJ5IR	*	214,326	602	52	191	
*DF6QC	*	206,082	746	45	169	
*DL3KWF	*	201,894	770	40	169	
*DL1TRK	*	198,531	496	64	179	
*DL8ULO	*	181,374	613	47	175	
*DL7FCQ	*	177,625	496	54	149	
*DK4WF	*	176,176	364	69	173	
*DL1RTS	*	173,518	554	47	155	
*DL1TPY	*	171,841	586	50	189	
*DL5CD	*	171,675	598	47	178	
*DM3CW	*	160,398	453	43	158	
*DJ3KA	*	147,246	535	40	154	
*DL3KVR	*	147,132	342	66	202	
*DL2GBB	*	129,843	409	44	145	
*DL7BPM	*	129,234	506	43	138	
*DL2ANM	*	126,902	427	52	162	
*DL7RV	*	118,728	448	44	160	
*DJ2YE	*	117,180	494	38	148	
*DH2URF	*	114,982	312	40	151	
*DK2BJ	*	109,282	392	51	151	
*DL1THB	*	108,570	490	39	126	
*DL1EHR	*	105,265	454	46	139	
*DL3WKG	*	105,196	396	44	138	
*DL4SL	*	102,084	394	41	140	
*DM5AA	*	100,529	302	51	158	
*DL8UKE	*	99,548	308	52	112	
*DL9NDS	*	98,623	256	57	136	
*DL3KWR	*	98,022	430	40	146	
*DL1KUR	*	95,288	371	46	126	
*DF1DT	*	91,317	391	39	144	
*DM2RN	*	91,134	395	35	131	
*DL4HG	*	91,126	498	41	120	
*DL1EAL	*	81,855	321	40	113	
*DL8NBJ	*	80,214	381	35	139	
*DA3T	*	77,909	320	40	129	
*DJ3XD	*	77,677	345	41	132	
*DC4A	*	77,418	322	33	105	
			(OP: DL4NAC)			
*DL3EBX	*	74,866	340	30	136	
*DM3HZN	*	71,920	265	48	107	
*DL1ARJ	*	71,916	381	39	117	
*DL8UGF	*	70,215	321	36	115	
*DL1ET	*	70,015	189	64	145	
*DL7UXG	*	66,885	256	39	108	
*DL7FA	*	66,612	320	41	115	
*DF3EH	*	66,150	295	30	105	
*DL1NUX	*	64,972	298	33	115	
*DL5CL	*	63,720	302	40	140	
*DL4FDM	*	62,212	364	18	85	
*DL3YA	*	57,986	274	34	124	
*DF5AN	*	57,596	225	41	113	
*DL5HP	*	55,257	297	38	125	
*DL9UJF	*	54,670	288	37	105	
*DM3PKK	*	53,537	210	42	115	
*DL6UM	*	51,013	286	29	110	
*DL1ALN	*	46,020	154	46	110	
*DF6WE	*	44,763	269	32	97	
*DK8NI	*	41,904	245	33	111	
*DF7JC	*	41,741	197	27	62	
*DJ5QE	*	40,375	292	30	95	
*DL2NBY	*	37,572	302	24	77	
*DL2ASB	*	37,555	180	44	101	
*DK9BW	*	35,840	185	39	101	
*DJ6UP	*	35,700	205	31	88	
*DL3FBB	*	35,616	276	25	87	
*DL4SDW	*	33,449	156	34	49	
*DL2AL	*	32,431	193	31	82	
*DL1IA	*	31,889	173	36	107	
*DK4VY	*	31,806	201	30	84	
*DL9GMM	*	30,734	99	42	79	
*DJØACA	*	29,610	208	25	79	
*DJ7A	*	28,726	335	19	87	
*DL2AJB	*	28,438	193	27	91	
*DF6RJ	*	27,192	232	25	78	
*DL2AXM	*	25,080	212	23	97	
*DL6MWG	*	25,029	163	27	76	
*DL7VRG	*	24,125	156	34	91	
*DL5KUR	*	24,035	107	37	58	
*DL1DWR	*	23,130	175	22	68	
*DO6SR	*	22,736	270	22	76	
*DH7KU	*	19,779	153	18	39	
*DF3IS	*	16,767	114	23	46	
*DL4VQ	*	14,790	121	26	61	
*DJ3IW	*	13,157	75	23	36	
*DH8MS	*	12,948	126	21	57	
*DL5CK	*	12,927	98	26	67	
*DL6UAM	*	12,874	148	16	66	
*DL6DSA	*	12,690	114	20	74	
*DL3DXF	*	11,858	96	36	62	
*DF4ZL	*	10,675	83	21	40	
*DK5PF	*	9,328	121	14	30	
*DL6ATI	*	9,072	106	29	79	
*DL3SEM	*	6,550	51	23	27	
*DK1FT	*	6,500	48	23	42	
*DL2NBU	*	6,426	106	12	42	
*DL1AWM	*	5,922	81	16	47	
*DL5KMS	*	4,757	55	16	51	
*DL1AZA	*	4,125	74	18	37	
*DO2MS	*	3,619	99	19	58	
*DL1CJ	*	3,552	59	9	23	
*DL2DYL	*	3,441	36	17	20	
*DL4EAX	*	2,405	40	14	23	
*DL6NDW	*	2,240	49	12	28	
*DL5LWM	*	1,845	29	13	28	
*DO1SAJ	*	1,260	29	9	21	
*DF7TT	*	918	15	12	15	
*DK1AUP	*	850	24	12	22	
*DL8DWW	*	630	20	9	12	
*DL6UOF	*	424	61	14	39	
*DL7AT	*	375	18	6	9	
*DL1AZK	*	330	15	5	6	
*DK2ZO	*	272	11	5	11	
*DL6AP	*	135	12	7	8	
***DKØBM**	**21**	**26,376**	**155**	**25**	**59**	
***DL3DTH**	**14**	**182,920**	**639**	**32**	**104**	
***DL4AAE**	*****	**162,176**	**637**	**30**	**98**	
*DL9LM	*	107,350	485	26	87	
*DF3AX	*	75,116	454	23	66	
*DL1BA	*	35,224	219	18	56	
*DH3RB	*	18,360	202	13	38	
*DK3WM	*	18,036	153	14	40	
*DL4XU	*	14,053	153	13	34	
***DL5KUD**	**7**	**103,124**	**545**	**29**	**98**	
*DL7DZ	*	49,724	174	28	96	
*DF4TD	*	25,787	149	21	86	
*DM3F	*	9,840	125	11	49	
*DJØYI	*	8,250	148	8	42	
***DL1KLO**	**3.5**	**60,208**	**460**	**23**	**83**	
***DK3UA**	**1.8**	**25,392**	**343**	**10**	**59**	
*DL7VMM	*	14,580	299	8	46	
*DL8AKA	*	9,744	235	7	41	
*DL1HSI	*	3,822	106	5	34	
*DAØI	*	2,849	78	5	32	
					(OP: DK1II)	
Gibraltar						
ZB2X	**28**	**25,323**	**242**	**18**	**51**	
					(OP: OH2KI)	
Greece						
SV1JGX	**14**	**68,904**	**659**	**27**	**72**	
***SV1CQN**	**A**	**128,128**	**739**	**32**	**122**	
*SV2HWR	*	25,756	196	37	100	
*SV2FLQ	*	675	25	7	18	
***SVØXBA**	**21**	**23,040**	**140**	**27**	**45**	
***J43J**	**7**	**265,408**	**1216**	**33**	**110**	
					(OP: DJ5JH)	
*SV1JFT	*	16,401	122	20	51	
Guernsey						
***MUØFAL**	**A**	**381,600**	**980**	**47**	**193**	
***GU4YOX**	**14**	**243,164**	**999**	**30**	**94**	
Hungary						
HA8TP	**A**	**375,109**	**740**	**82**	**205**	
HA8LLK	*	33,027	192	29	72	
HA3OD	*	7,714	66	18	40	
HA8IH	**14**	**458,172**	**1517**	**35**	**121**	
HA1VE	*	157,200	811	26	64	
HA6FQ	**3.5**	**124,092**	**969**	**19**	**89**	
HA1YI	**1.8**	**68,832**	**913**	**13**	**59**	
HA8VK	*	31,059	496	10	53	
HA5PT	*	6,576	135	7	41	
***HA6NL**	**A**	**720,544**	**1446**	**84**	**272**	
***HA1BC**	*****	**610,470**	**969**	**95**	**283**	
					(OP: DL1MAJ)	
*HA6NW	*	85,648	425	24	82	
*HA2ESM	*	64,680	202	52	102	
*HA5AQ	*	41,912	125	47	77	
*HA7MI	*	13,612	100	28	54	
***HA2MN**	**21**	**7,960**	**81**	**17**	**23**	
***HG4F**	**14**	**282,510**	**1059**	**38**	**108**	
***HA3MU**	**7**	**125,874**	**699**	**25**	**101**	
*HA5LZ	*	103,610	493	29	101	
*HA5W	*	92,710	516	27	100	
					(OP: HA5BWW)	
*HA5BVG	*	56,056	315	24	74	
***HA1FF**	**3.5**	**79,464**	**880**	**17**	**67**	
***HA8MT**	**1.8**	**102,432**	**988**	**18**	**70**	
*HG8K	*	69,760	773	17	63	
*HA5UY	*	15,741	285	8	45	
*HA1ZH	*	8,880	195	6	42	
Iceland						
TF3CW	**7**	**287,880**	**1619**	**27**	**93**	
TF3DC	**1.8**	**3,655**	**81**	**8**	**35**	
***TF3GB**	**A**	**422,598**	**1061**	**47**	**162**	
*TF8SM	*	125,490	444	40	138	
*TF8GX	*	85,462	283	43	130	
Ireland						
EI2CN	**1.8**	**124,978**	**1197**	**17**	**62**	
***EI4II**	**A**	**116,424**	**522**	**48**	**150**	
*EI5DI	*	55,836	245	31	68	
***EI4HQ**	**7**	**75,715**	**536**	**17**	**78**	
*EI4JZ	*	2,730	93	6	36	
Isle of Man						
***MD6V**	**14**	**398,706**	**1568**	**35**	**119**	
					(OP: G3NKC)	
Italy						
IU1A	**A**	**2,611,367**	**2697**	**129**	**388**	
					(OP: IK1SPR)	
IY3XX	*****	**1,756,695**	**2484**	**104**	**311**	
					(OP: IV3ZXQ)	
I1EIS	*	472,780	981	78	229	
IK3SWB	*	325,752	489	95	297	
IK2UCK	*	283,910	612	68	222	
IK1JJM	*	153,090	463	57	132	
IV3APV	*	97,768	234	55	147	
IK5FKF	*	59,550	276	38	112	
I5JFG	*	30,464	166	35	84	
IK2SAU	*	26,296	153	36	116	
I7CSB	*	19,270	109	29	65	
IV3DYS	*	18,616	131	28	76	
IZ1CLA	*	17,538	127	24	50	
IZ5DKJ	*	7,680	71	20	44	
IZ1DFG	*	3,834	33	23	31	
IWØHEX	*	3,696	46	14	42	
IZØGXM	*	108	7	5	4	
IO3N	**14**	**134,589**	**711**	**24**	**67**	
					(OP: IV3RLB)	
IK4AUY	7	4,558	54	14	29	
IK3SSO	**3.5**	**107,963**	**990**	**20**	**87**	
***IK2HDF**	**A**	**709,527**	**1592**	**69**	**204**	
***IZ3KKE**	*****	**427,712**	**710**	**82**	**246**	
*IK4UNH	*	273,060	653	57	189	
*IK5AFJ	*	156,676	413	70	192	
*IK3ORD	*	149,853	492	50	159	
*IZ1JLN	*	115,221	377	55	144	
*IK1DPA	*	102,676	427	49	144	
*IZ4DYX	*	91,020	395	39	109	
*IK2CFD	*	89,040	334	35	105	
*IK5PVX	*	58,930	258	38	104	
*IØYQV	*	54,426	236	44	97	
*IZØFZM	*	52,925	231	43	102	
*IZ1DXS	*	48,384	237	41	103	
*IW1RAX	*	41,256	159	32	76	
*IK8YDP	*	36,811	154	41	90	
*IK8YJQ	*	36,040	159	35	101	
*IK2AIT	*	35,047	207	29	72	
*IW2MYH	*	31,365	240	33	90	
*IK7NXU	*	31,248	149	37	87	
*IK2NUX	*	29,376	125	41	67	
*IZ2FOB	*	28,197	227	20	97	
*IZ5GRS	*	24,380	146	25	81	
*IZ5EBL	*	23,478	116	29	57	
*IN3ZWF	*	23,040	212	19	71	
*IK2CZQ	*	22,466	137	27	67	
*IK3IUL	*	19,200	169	18	57	
*IZ1GJK	*	16,856	148	27	71	
*IK2NCF	*	16,198	102	29	62	
*IZ3CAR	*	15,974	159	21	77	
*IZ2DII	*	15,405	107	24	55	
*IZ8GBT	*	14,628	103	32	60	
*IK1CCS	*	14,536	99	29	63	
*IZ7KVM	*	13,861	86	29	54	
*IZ2LSC	*	11,346	78	23	39	
*IK1VEK	*	11,305	112	21	64	
*IN3MNS	*	9,516	103	22	56	
*IZ3KSO	*	9,261	119	13	50	
*IK3MLF	*	9,164	125	15	64	
*IN3AEF	*	7,320	56	21	39	
*IZ5HQB	*	6,486	76	16	30	
*IK2YXP	*	6,048	91	16	40	
*IK2IKW	*	4,785	49	19	36	
*IV3WJP	*	4,590	43	17	28	
*IKØXEZ	*	3,440	60	25	55	
*IZ7KHR	*	2,795	27	20	23	
*IK8GYQ	*	2,223	57	15	42	
*IZ3NVR	*	2,035	41	14	23	
*IK3SSJ	*	1,496	34	18	26	
*IK7FMQ	*	1,088	59	21	47	
*IWØGVG	*	903	17	10	11	
*IZ2CSX	*	775	22	12	19	
*IZØRRP	*	104	13	6	7	
*IW4EQI	*	24	4	4	4	
***IZ5OVP**	**28**	**90**	**12**	**4**	**6**	
*IO5MS	*	78	10	5	8	
***IZ3DBA**	**14**	**56,160**	**519**	**21**	**51**	
*IZ8EFD	*	39,494	229	25	73	
*IQ2CU	*	37,830	257	20	58	
*IZ3GHP	*	32,417	232	20	57	
*IK2EBP	*	3,100	53	10	21	
***IZ8FAV**	**7**	**78,383**	**466**	**24**	**79**	
*IV3AZV	*	56,529	491	19	80	
*I3MLU	*	29,133	257	17	66	
*I8JYK	*	9,971	132	11	48	
*IRØI	*	814	23	9	13	
					(OP: IKØVVE)	
***IZ3ALF**	**3.5**	**87,480**	**802**	**18**	**77**	
*IZ1GLX	*	14,238	271	13	50	
*IZ4GOL	*	4,600	132	7	39	
***IV3GOW**	**1.8**	**4,141**	**94**	**6**	**35**	
Jersey						
GJ2A	**A**	**1,272,630**	**2082**	**85**	**269**	
					(OP: K2WR)	
***MJØASP**	**3.5**	**21,692**	**287**	**9**	**59**	
Kaliningrad						
UA2CZ	**A**	**171,312**	**437**	**66**	**183**	
***RA2FAC**	**A**	**245,280**	**835**	**52**	**172**	
*RA2FN	*	174,624	543	43	171	
*RN2FQ	*	96,950	329	41	134	
*RA2FF	*	24	2	2	2	
***UA2FL**	**21**	**52,924**	**243**	**26**	**75**	
***RK2FWN**	**14**	**21,980**	**147**	**15**	**55**	
*UA2FGY	7	360	22	4	14	
***RA2FB**	**1.8**	**12,048**	**237**	**8**	**40**	
Latvia						
YL2PA	**A**	**418,236**	**594**	**90**	**293**	
YL2TD	**14**	**45,136**	**274**	**21**	**78**	
YL3FT	**3.5**	**378,432**	**1893**	**32**	**112**	
YL2SM	**1.8**	**162,240**	**1150**	**23**	**81**	
***YL2CV**	**A**	**698,784**	**1314**	**75**	**272**	
***YL5M**	*****	**612,799**	**1366**	**63**	**256**	
					(OP: YL2UZ)	
*YL2TQ	*	406,684	601	86	261	
*YL2IP	*	114,200	391	48	152	
*YL2QV	*	17,914	152	25	81	
*YL3DX	*	12,200	129	16	45	
*YL3GGX	*	11,154	136	18	60	
***YL2CR**	**14**	**17,030**	**189**	**13**	**52**	
*YL2II	*	3,784	65	13	31	
*YL1ZX	7	4,042	70	11	36	
					(OP: YL2INS)	
***YL3FX**	**3.5**	**146,490**	**1017**	**23**	**91**	
***YL5W**	*****	**115,599**	**1088**	**16**	**77**	
*YL2HK	*	26,532	373	12	54	
Lithuania						
LY6A	**A**	**2,376,891**	**3263**	**109**	**368**	
LY5R	*****	**2,366,520**	**2492**	**136**	**397**	
LY4T	*	1,283,139	1889	95	334	
LY4CW	*	698,618	1617	69	257	
LY2VA	*	554,125	1244	80	261	
LY2BKT	*	495,346	1386	62	227	
LY2MM	*	436,954	803	80	242	
LY2T	*	354,144	1000	61	187	
LY2F	*	191,386	439	53	168	
LY2OU	**21**	**24,628**	**145**	**28**	**66**	
LY8O	**7**	**1,014,475**	**3016**	**39**	**148**	
LY38G	**3.5**	**117,612**	**974**	**18**	**81**	
LY2X	*	80,344	792	16	72	
LY3IO	*	73,817	636	20	77	
***LY9A**	**A**	**1,808,224**	**2614**	**102**	**365**	
***LY3B**	*****	**835,506**	**1588**	**75**	**274**	
*LY1BA	*	299,700	617	70	254	
*LY2K	*	241,080	1022	39	171	
*LY2DV	*	194,421	593	52	177	
*LY3QA	*	118,816	696	30	128	
*LY1BX	*	106,665	414	49	146	
*LY1CT	*	49,140	317	28	107	
*LY2ND	*	39,750	306	32	118	
*LY6M	*	14,250	114	25	70	
*LY2BOS	*	13,351	110	24	55	
*LY2BBF	*	9,936	57	27	42	
***LY4G**	**14**	**120,294**	**464**	**31**	**92**	
*LY1CO	*	11,928	146	14	42	
***LY1M**	**7**	**43,354**	**296**	**22**	**84**	
*LY2AT	*	22,230	228	15	63	
*LY2LF	*	10,700	178	7	43	
***LY2GW**	**3.5**	**99,463**	**936**	**16**	**75**	
*LY2SA	*	32,844	308	15	69	
*LY2SQ	*	3,729	131	4	29	
Luxembourg						
LX3ØAK	**A**	**695,130**	**1677**	**66**	**224**	
					(OP: LX1NO)	
Macedonia						
***Z35F**	**A**	**387,056**	**1085**	**68**	**204**	
*Z35G	*	226,800	734	50	160	
Malta						
9H1XT	**A**	**32,235**	**292**	**23**	**82**	
***9H3HH**	**A**	**1,367,274**	**3033**	**76**	**286**	
					(OP: DJ9RR)	
Moldova						
ERØFEO	**A**	**282,725**	**679**	**58**	**205**	
					(OP: UR5FEO)	
***ER1DA**	**A**	**538,189**	**1023**	**74**	**263**	
*ER1RR	*	160,195	520	45	154	
*ER5AA	*	5,820	95	12	48	
*ER1NM	*	1,620	26	13	23	
***ER1OO**	**21**	**2,250**	**28**	**18**	**27**	
***ER3DX**	**7**	**282,680**	**1342**	**35**	**113**	
*ER5DX	*	29,029	205	18	73	
***ER3AU**	**3.5**	**37,575**	**447**	**12**	**63**	
***ER2RM**	**1.8**	**11,960**	**213**	**8**	**44**	
Netherlands						
PA3AAV	**A**	**2,643,680**	**2809**	**123**	**410**	
PF7M	*****	**1,154,712**	**2554**	**78**	**234**	
PE5T	*	1,100,337	1988	84	263	
PAØJNH	*	473,942	826	76	273	
PA1TX	*	401,850	792	71	214	
PG3N	*	299,265	641	62	219	
PA3C	*	286,395	489	76	237	
PAØCYW	*	208,800	691	47	153	
PAØABM	*	204,336	494	63	195	
PA2MRT	*	49,842	246	32	85	
PA1BX	*	31,906	186	29	77	
PA3EZC	*	28,688	162	30	58	
PA3CAL	21	432	9	7	9	
PA3S	**14**	**48,555**	**392**	**18**	**47**	
PA3EVY	**7**	**63,480**	**341**	**26**	**94**	
PF5X	*	12,411	83	18	45	
***PA3BFH**	**A**	**665,383**	**1285**	**68**	**249**	
***PA6OI**	*****	**487,043**	**1141**	**61**	**222**	
					(OP: PG2AA)	
*PA3ARM	*	459,221	1039	63	226	
*PA3GCV	*	311,538	685	66	208	
*PG7V	*	255,701	710	56	185	
*PA2W	*	232,324	613	57	184	
*PA3DBS	*	180,600	575	49	161	
*PD7BZ	*	136,080	526	40	122	
*PA3AIN	*	105,792	446	36	116	
*PA8F	*	104,814	447	38	124	
*PB7XYL	*	81,503	334	37	112	
*PE2JMR	*	79,092	374	31	138	
*PA5GU	*	76,076	325	32	101	
*PD1KSA	*	74,470	389	26	84	
*PA2ALF	*	72,372	314	38	110	
*PAØCOR	*	65,494	325	33	110	
*PAØGRU	*	61,500	328	35	115	
*PA3AQL	*	51,264	293	31	113	
*PAØRBA	*	44,133	213	37	104	
*PAØWLB	*	41,796	271	23	106	
*PA9CW	*	41,080	245	29	101	
*PA

*SQ9DXN	*	222,320	488	69	211
*SP6DNZ	*	211,684	462	65	218
*SP2AYC	*	207,936	699	49	179
*SN3B	*	185,383	598	45	164
			(OP: SQ3JPV)		
*SP6LV	*	165,658	523	52	174
*SP3DIK	*	140,049	378	55	134
*SP3DSC	*	133,000	487	43	147
*SP8EEX	*	128,380	441	45	151
*SP9MZH	*	119,856	413	42	134
*SP7JOA	*	119,700	396	44	166
*SP9FT	*	104,493	367	45	138
*SP8BAB	*	102,637	271	42	155
*SP3HC	*	65,992	327	33	113
*SP7TES	*	64,170	201	42	73
*SP2HMN	*	58,706	210	39	110
*SP2HXY	*	57,962	297	29	117
*SP9BGS	*	57,105	246	40	95
*SP2SWI	*	55,328	397	22	82
*SP6BEN	*	53,108	202	39	103
*SP9IBJ	*	46,870	288	26	83
*SP5BMU	*	45,150	328	27	102
*SP3IOE	*	43,776	287	36	108
*SP6BAA	*	43,210	161	45	104
*SP4AAZ	*	43,090	305	38	117
*SP3FYX	*	41,392	242	29	75
*SP3DOF	*	37,734	261	27	87
*SP9CXN	*	35,682	240	25	89
*SP5GRU	*	32,760	181	35	105
*SP5GDY	*	31,700	230	26	74
*SP8YB	*	29,744	131	35	69
*SP5CGN	*	25,098	148	29	65
*SP2AVE	*	21,984	117	29	67
*SQ3OGZ	*	21,681	181	28	71
*SP4AVG	*	19,520	135	22	58
*SP9WTN	*	16,492	140	20	56
*SP5ELW	*	15,980	75	30	55
*SP9IHP	*	15,006	86	26	35
*SQ8LEC	*	14,040	136	21	57
*SP3GRQ	*	14,016	86	28	45
*SP5BNB	*	10,366	72	24	49
*SP3CYY	*	8,432	96	17	51
*SN5B	*	7,980	124	18	52
			(OP: SP5SSB)		
*SQ1EIX	*	6,314	54	29	48
*3Z3ØC	*	3,680	69	16	24
			(OP: SP9OTE)		
*SN3Q	*	3,420	36	16	29
			(OP: SP3FLQ)		
*SQ9RPQ	*	930	27	11	19
*SP7FBQ	*	252	7	5	7
*SP7CCB	*	3	1	1	1
***SQ9IAU**	**28**	**88**	**5**	**3**	**5**
***SQ9BDN**	**21**	**45,900**	**198**	**30**	**72**
*SP2GCE	*	30,121	169	27	64
***SP8NR**	**14**	**198,156**	**657**	**36**	**111**
*SP8BVN	*	80,004	359	26	87
*SP2FAV	*	65,280	334	22	74
*SP9DNO	*	45,990	270	21	69
*SP8IOV	*	41,760	245	20	70
*SN9N	*	22,997	170	20	41
			(OP: SQ9ZM)		
*SN2U	*	2,387	35	10	21
			(OP: SP2UKB)		
***SP6OJE**	**7**	**284,438**	**1244**	**34**	**120**
***SP5CNA**	*****	**166,288**	**714**	**34**	**118**
*SP5AUY	*	130,086	425	37	125
*SP1PWP	*	71,968	524	20	84
			(OP: SP1IKK)		
*SP2KDS	*	57,420	660	19	71
*SP9EML	*	57,008	301	24	88
*SP5MBA	*	44,408	278	25	79
*SP9GKM	*	28,956	303	13	63
*SN9I	*	20,400	149	19	56
			(OP: SP9EMI)		
*SP3EQE	*	14,703	144	22	65
*SP3PL	*	13,662	167	14	55
*SP1ADY	*	12,376	144	14	54
*SP2IKP	*	6,720	67	11	53
*SP5NVX	*	6,419	86	12	37
*SP6JQC	*	3,492	60	6	30
*SP9CTS	*	3,198	68	8	33
*SP9GPW	*	1,008	28	9	9
*SP6TRH	*	748	32	5	17
*SP8HPW	*	323	12	8	9
*SP2MHC	*	54	3	3	3
***SP3LWP**	**3.5**	**97,188**	**993**	**15**	**76**
*SP6EIY	*	59,755	510	16	79
*SN5Q	*	39,223	614	9	52
			(OP: SQ5RDX)		
*SP4DZT	*	37,824	631	11	53
*SP9BNM	*	35,970	553	10	56
*SP5LS	*	7,889	207	8	41
*SP8AWL	*	7,446	58	19	32
***SP9JZT**	**1.8**	**21,175**	**391**	**7**	**48**
*SP4BEU	*	4,920	120	6	35
*SQ4HSS	*	2,233	90	4	25

Portugal

CR6T	**14**	**1,022,281**	**3162**	**38**	**131**
			(OP: OH1NOA)		
CT1JLZ	**7**	**1,253,020**	**3498**	**48**	**148**
			(OP: OK1RF)		
*CT7/CU8AS	A	6,745	77	25	46
			(OP: CU8AS)		
*CR5A	*	1,365	51	9	30
			(OP: CT1FFU)		
*CT1BNW	14	15,730	141	14	41
***CT1AOZ**	**7**	**54,656**	**238**	**25**	**97**
*CT1ANO	*	13,002	172	13	53
***CR5M**	**1.8**	**5,232**	**121**	**6**	**42**
			(OP: CT1DHM)		

Romania

YO2DFA	**A**	**1,699,720**	**2472**	**105**	**335**
YO8AXP	*	302,804	731	64	180
YO7LGI	*	196,473	592	57	180
YO7ARY	*	95,763	288	44	93
YO3FF	*	83,441	358	49	132
YO6AEI	*	42,340	295	37	109
YO3FN	*	23,520	111	54	93
YO2R	**21**	**82,336**	**284**	**32**	**92**
			(OP: YO2RR)		
YR8I	**7**	**318,087**	**1365**	**35**	**118**
YO3ND	*	108,256	453	33	103
YO2AQB	**1.8**	**13,878**	**303**	**7**	**47**
***YO3APJ**	**A**	**994,875**	**1014**	**125**	**400**
*YO4CAH	*	519,670	1035	55	276
*YO9OC	*	447,512	835	81	250
*YO5OHY	*	254,907	642	58	185
*YO2GL	*	245,970	649	66	204
*YO5DAS	*	218,757	715	45	186
*YO4SI	*	136,350	417	56	169
*YO9CB	*	118,668	434	42	144
*YO7AWZ	*	92,129	409	39	142
*YO5ODL	*	90,312	492	29	113
*YO2QY	*	87,987	310	55	156
*YO9FYP	*	81,458	328	47	122
*YO8BPY	*	81,361	285	50	147
*YO3BAP	*	80,256	268	55	137
*YO6HSU	*	77,035	253	51	104
*YR8D	*	75,096	208	63	86
*YO2ARV	*	66,586	242	44	125
*YO8RFS	*	41,888	278	30	106
*YO6EV	*	32,725	158	34	85
*YO4ASG	*	25,752	129	35	76
*YO5BXI	*	24,928	192	25	57
*YO9BPX	*	24,598	196	23	75
*YO4UQ	*	20,570	207	27	83
*YO9HG	*	17,205	170	22	71
*YO8AZQ	*	7,360	69	22	42
*YO4BTB	*	4,508	49	17	29
*YO7LTQ	*	1,701	103	24	57
***YO2AOB**	**28**	**3,486**	**69**	**10**	**32**
***YO4MM**	**21**	**32,760**	**192**	**24**	**54**
*YO9CXE	*	4,620	50	20	24
***YR8B**	**14**	**279,168**	**1233**	**30**	**98**
*YO9CWY	*	46,720	323	18	62
*YO9AGI	*	45,109	419	18	61
*YO4BEX	*	29,016	237	19	59
*YO3BL	*	23,025	156	19	56
*YO3ZA	*	19,320	129	20	49
*YO6EZ	*	912	59	11	27
*YO7BGB	*	120	7	3	5
***YQ5Q**	**7**	**198,006**	**1314**	**25**	**97**
			(OP: YO5OHO)		
*YP5Z	*	85,155	580	21	84
*YO5ODT	*	31,312	309	13	63
*YO6KNY	*	7,216	79	10	47
			(OP: YO6DBA)		
*YP2W	*	1,034	63	11	36
*YO8RIJ	*	240	11	6	9
***YO5KDX**	**1.8**	**47,640**	**808**	**10**	**50**
			(OP: YO5BRE)		
*YO2IS	*	18,312	346	9	47
*YO5BFJ	*	1,500	50	5	25
*YO2CJX	*	1,170	49	4	22

Sardinia

IS0AFM	**A**	**694,944**	**1545**	**72**	**216**
***IS0XDA**	**A**	**86,699**	**372**	**41**	**140**

Scotland

GM7V	**A**	**2,762,620**	**3649**	**107**	**383**
			(OP: GM3WOJ)		
GM0GAV	*	2,385,250	2689	114	356
GA3WUX	*****	**1,180,797**	**2473**	**72**	**255**
GM4SID	*	407,700	969	58	212
GM2T	*	500	21	5	15
			(OP: MM0CCC)		
GM7R	**7**	**526,400**	**2026**	**37**	**123**
			(OP: GM0NAJ)		
***GM0NBM**	**A**	**302,892**	**799**	**58**	**200**
*GM3NHQ	*	220,871	683	49	178
*MM0RKT	*	65,075	331	30	107
***MM3T**	**28**	**1,034**	**50**	**3**	**19**
			(OP: GM0ELP)		
***GM0IIO**	**14**	**141,703**	**913**	**28**	**73**
			(OP: K4IID)		
***GM4FAM**	**7**	**145,935**	**721**	**33**	**108**
*MA0BQI	1.8	4,214	89	8	35
			(OP: MM0BQI)		

Serbia

YU1KT	**A**	**579,989**	**1353**	**76**	**237**
YU1PJ	*	228,417	719	48	171
YU2A	**28**	**10,388**	**236**	**9**	**40**
YT5W	**21**	**303,364**	**960**	**34**	**115**
			(OP: YU8A)		
YU1KX	*****	**270,544**	**948**	**36**	**112**
			(OP: YU7KW)		
YT7Z	*	118,817	447	33	98
			(OP: YU7SK)		
YU1DW	**14**	**501,512**	**1804**	**35**	**104**
YT4T	**3.5**	**239,022**	**1516**	**30**	**96**
YT3A	**1.8**	**252,252**	**1490**	**27**	**90**
			(OP: YU7AV)		
***YT2RX**	**A**	**1,292,410**	**1601**	**121**	**378**
*YU1CC	*	243,445	558	58	211
*YU7AF	*	191,290	698	58	177
*YU1LS	*	188,480	605	49	141
*YT7IM	*	129,536	375	66	190
*YU1PC	*	84,730	350	44	141
*YU1JF	*	44,118	138	51	78
*YU7FN	*	11,778	82	26	52
***YT2B**	**21**	**160,416**	**582**	**36**	**108**
*YU7KM	*	21,560	135	26	51
*YU8NU	14	4,995	95	11	34
*YT1TA	7	109,620	780	28	88
*YU7RL	*	64,170	308	26	89
*YU3W	*	53,424	628	25	81
			(OP: YU2AA)		
*YT7T	*	42,262	247	26	87
*YT1AU	*	24,800	198	16	64
***YU5T**	**3.5**	**70,704**	**876**	**10**	**62**
			(OP: YU1JU)		
***YT2L**	*****	**69,454**	**874**	**12**	**65**
			(OP: YU1CF)		
*YT7DX	*	42,320	369	19	73
*YU5W	*	30,562	366	11	63
			(OP: YU1QW)		
***YT1AD**	**1.8**	**77,900**	**845**	**16**	**66**
			(OP: YT3W)		
*YU1AST	*	2,926	95	5	33

Shetland and Fair Isle

MZ5B	**7**	**526,510**	**2360**	**35**	**123**
			(OP: G3WVG)		
***MA0XAU**	**A**	**6,552**	**110**	**13**	**43**
			(OP: MM0XAU)		

Sicily

IT9INO	**A**	**477,996**	**1333**	**63**	**181**
IT9IMJ	3.5	1,240	49	6	25
***IT9ZAU**	**A**	**160,925**	**859**	**38**	**119**
*IW9HHB	*	103,200	521	35	137
***IT9LKX**	**28**	**2,664**	**44**	**12**	**25**
***IT9RKR**	**21**	**14,416**	**143**	**19**	**49**
***IT9EJW**	**14**	**53,872**	**493**	**19**	**55**

Slovakia

OM7PY	**A**	**370,905**	**711**	**77**	**236**
OM3IAG	*****	**364,932**	**902**	**62**	**217**
OM1II	*	110,745	248	57	150
OM8DO	**7**	**119,253**	**502**	**34**	**93**
***OM/SQ9UM**	**A**	**804,584**	**1896**	**69**	**259**
*OM7AG	*	439,175	1128	58	217
*OM8ON	*	435,735	607	90	255
*OM4KW	*	425,700	1372	51	207
*OM4DN	*	284,748	805	50	194
*OM3R	*	216,090	802	43	167
			(OP: OM3CFR)		
*OM3BA	*	202,692	603	45	183
*OM8AQ	*	122,100	405	47	138
*OM7AT	*	85,692	318	28	94
*OM5NA	*	48,556	303	21	101
*OM4AY	*	40,548	293	25	99
*OM8KW	*	35,934	250	26	80
*OM7SR	*	14,664	190	23	81
*OM4TW	*	4,081	58	18	35
***OM4XA**	**14**	**79,144**	**371**	**27**	**77**
***OM3TB**	*****	**55,332**	**377**	**21**	**66**
*OM1VA	*	19,800	171	18	42
***OMØWR**	**7**	**221,427**	**1136**	**31**	**108**
*OM2AK	*	40,753	398	15	68
*OM3SX	*	32,364	115	30	94
***OMØTT**	**1.8**	**42,344**	**598**	**10**	**57**

Slovenia

S50A	**A**	**4,874,784**	**4007**	**155**	**453**
S56A	*****	**1,760,448**	**2021**	**123**	**396**
S53XX	*	1,691,884	2410	106	322
S57S	*	132,492	512	51	132
S53DIJ	*	396	12	8	10
S59EIJ	21	312	11	6	7
S59T	14	234	12	5	8
S58Q	**7**	**277,683**	**1057**	**37**	**110**
S53MM	**3.5**	**554,268**	**2414**	**32**	**111**
S57C	*	157,500	1172	20	85
***S51F**	**A**	**1,323,736**	**1666**	**114**	**377**
***S59AA**	*****	**1,291,842**	**1380**	**126**	**383**
*S57U	*	869,584	1435	90	301
*S53AU	*	187,960	318	78	176
*S51MF	*	168,245	385	73	180
*S51W	*	163,680	763	33	127
*S58RU	*	52,982	441	22	96
*S56M	*	30,987	195	28	71
*S53QD	*	13,527	115	23	58
***S54A**	**21**	**45,900**	**238**	**28**	**72**
*S53AK	*	43,584	227	30	66
***S52GO**	**14**	**101,700**	**463**	**27**	**86**
***S57Q**	**7**	**279,900**	**1207**	**35**	**115**
*S52C	*	213,248	1082	30	106
***S57NAW**	**3.5**	**44,082**	**487**	**12**	**67**
*S58MU	*	13,585	216	9	46
*S57EA	1.8	3,096	89	5	31

Spain

EA5FV	**A**	**2,316,573**	**2848**	**109**	**350**
EA2IF	*	1,327,507	1855	86	287
EF1A	*****	**1,326,240**	**2129**	**74**	**233**
			(OP: EA1XT)		
EA7TG	*	1,213,807	1493	110	303
EA2LU	*	836,244	1674	72	189
EA5YU	*	624,954	1100	84	290
EA5KA	*	177,552	592	54	108
EA1FBU	*	128,651	494	35	92
EA5BWR	*	97,439	327	45	94
EA5LA	*	37,465	196	37	90
EA3CEC	*	30,008	114	48	76
EA5ABH	*	11,115	99	19	46
EA5HKS	*	7,006	103	13	49
EA5AX	*	5,550	54	28	46
EA5AIO	*	3,969	74	14	35
EA5HFW	*	2,442	81	18	48
EA5TD	21	13,505	99	25	48
AO3T	**7**	**697,632**	**2627**	**36**	**120**
			(OP: EA3AKY)		
EA7GSU	**3.5**	**60,516**	**466**	**18**	**80**
***EA1RJ**	**A**	**1,480,916**	**1989**	**100**	**331**
			(OP: EA1FAQ)		
***EA1JO**	*****	**554,368**	**1002**	**67**	**217**
*EF7A	*	522,327	1402	58	169
			(OP: EC7ABV)		
*EA7NW	*	431,830	799	78	232
*EA3KU	*	392,108	988	66	178
*EA1CP	*	383,040	816	64	216
*EA7OT	*	381,952	975	55	201
*EA5AWJ	*	353,000	796	59	191
*EA7WA	*	327,810	779	54	156
*AN4A	*	283,370	689	59	156
			(OP: EA4CWN)		
*EA3AVV	*	270,351	564	67	212
*EA2GP	*	114,642	338	46	147
*EA7AZA	*	107,055	336	49	134
*EA4/UY7CW	*	102,860	271	58	127
*EA4FLY	*	82,295	302	37	114
*EA4IP	*	75,264	350	38	109
*EA5VN	*	74,060	248	43	118
*EA5CP	*	73,950	228	48	102
*EA2KY	*	60,030	174	57	117
*EA5DCL	*	58,764	242	41	125
*EA2BVV	*	53,694	300	26	88
*EC7AMY	*	36,177	297	23	70
*EA5GIE	*	28,952	171	30	64
*EA3GHZ	*	28,684	148	34	67
*EA2SS	*	17,538	105	35	76
*EA7VJ	*	16,781	116	31	66
*AM3A	*	16,296	123	25	59
			(OP: EA3FHP)		
*EC5AGM	*	13,596	107	35	68
*EA1CJH	*	10,406	66	30	56
*EA4EN	*	9,636	122	15	51
*EA7CIX	*	9,300	99	15	47
*EA4WD	*	5,022	56	26	36
*EA3GLB	*	4,558	48	20	33
*EA4DEC	*	3,000	41	12	28
*EA1SB	*	2,808	26	16	20
*EA4BGM	*	1,649	40	8	9
*EA2AVM	*	1,548	47	12	24
*EA5DM	*	1,078	22	9	13
*EA7FR	*	567	12	9	12
*EA5ON	*	540	15	9	9
*EA2BHK	*	208	23	7	6
*EA3KT	*	22	10	5	6
*EA7CWA	21	4,522	54	13	21
*EA1CBX	*	580	38	6	14
***AO7T**	**14**	**111,343**	**758**	**26**	**77**
			(OP: EA7KJ)		
*EA1ND	*	77,015	562	20	53
*EB3EPR	*	17,940	258	13	39
*EA3EYD	*	297	11	4	5
***EA7RM**	**7**	**402,230**	**1652**	**31**	**115**
*EA3GXJ	*	243,945	1033	32	107
*AN3N	*	84,645	587	23	72
			(OP: EA3DU)		
*EA7GV	*	35,008	332	17	47
***EA7GYS**	**3.5**	**19,092**	**330**	**13**	**61**
***EA3AKA**	**1.8**	**6,837**	**201**	**8**	**45**
*EA2SW	*	1,118	49	4	22

Svalbard

***JW1CCA**	**A**	**98,208**	**367**	**37**	**62**

Sweden

SE8X	**A**	**625,320**	**1454**	**76**	**248**
			(OP: SMØMDG)		
SM5CIL	*****	**579,714**	**1010**	**72**	**246**
			(OP: SM7CIL)		
SM5QU	*	472,194	977	74	259
SM5Q	*	445,794	767	93	289
SM6NET	*	416,898	837	76	266
SE6Y	*	373,326	1036	59	199
SM5AOG	*	217,833	364	71	216
SMØBYD	*	210,366	496	55	206
SM3B	*	129,105	542	43	128
SMØBSO	*	118,340	454	41	153
SM7C	*	72,624	258	50	128
			(OP: SM7CFZ)		
SM7YEA	**21**	**92,759**	**389**	**26**	**83**
SLØW	**14**	**252,640**	**729**	**35**	**125**
			(OP: SMØAJU)		
SM6A	*	162,016	616	32	90
			(OP: SM6BGA)		
SM2JEB	*	30,537	220	23	58
SM2CVH	*	23,310	146	16	58
SM6DHU	**7**	**167,314**	**1003**	**31**	**88**
SM6NM	*	53,088	441	20	76
***SK6HD**	**A**	**102,396**	**423**	**41**	**118**
			(OP: SM6FKF)		
***SM7EH**	*****	**83,720**	**387**	**39**	**143**
*SE6W	*	79,180	484	35	113
			(OP: SM6XKB)		
*SM5CNQ	*	77,916	308	39	133
*SE6C	*	65,340	340	34	98
			(OP: SM6CDN)		
*SM7BVO	*	61,744	264	36	100
*SM7BJW	*	42,500	199	36	89
*SMØY	*	34,272	247	28	91
*SM7TZK	*	32,640	284	24	104
*SM6IQD	*	27,068	161	36	98
*SM2JUR	*	25,984	195	29	87
*SE6N	*	24,388	216	22	69
*SI7T	*	23,790	147	32	90
			(OP: SM7LZQ)		
*SM7CWI	*	19,530	125	25	65
*SD3D	*	15,006	119	23	59
			(OP: SM3DXC)		
*SF5X	*	8,040	108	13	54
			(OP: SM5EFX)		
*SMØBDS	*	5,460	70	18	42
*SM7BQX	*	5,332	68	16	27
*SM3RL	*	3,050	38	26	35
*SM4TU	*	2,520	29	18	27
*SM6Z	*	2,106	26	16	23
			(OP: SM6BZE)		
***SM6WZH**	**14**	**1,638**	**50**	**9**	**17**
*SM6V	*	108	8	3	3
			(OP: SM6VAO)		
***SMØS**	**7**	**66,080**	**269**	**29**	**89**
			(OP: SM5BAX)		
*SM2EKA	*	15,265	183	12	59
*SM7U	*	1,000	36	4	21
			(OP: SM7PAF)		
***SM3EAE**	**3.5**	**11,236**	**208**	**10**	**43**
*SM6C	*	7,128	107	12	42
*SM6LTO	*	25	5	2	3
***SM5MX**	**1.8**	**27,389**	**434**	**9**	**52**

Switzerland

HB9CIC	**A**	**410,112**	**953**	**66**	**222**
HB9DHG	21	13,992	147	18	35
***HB9ARF**	**A**	**564,260**	**1020**	**79**	**238**
*HB9BXE	*	254,644	820	58	178
*HE8DDE	*	43,300	256	31	69
*HB9SVT	*	34,865	361	19	76
*HB9RE	*	21,720	260	27	93
*HB9WDY	*	20,900	212	17	83
*HB9BGF	*	8,892	75	28	48
*HB9QA	*	7,474	88	22	52

Ukraine

UW1G	**A**	**1,971,132**	**2417**	**126**	**428**
			(OP: UY5HF)		
UV5U	*****	**1,565,892**	**1720**	**129**	**408**
			(OP: UX1UA)		
UYØZG	*	1,476,587	1993	116	381
UT7MA	*	1,348,776	2209	106	362
UR3IQO	*	973,401	1344	100	329
UW8SM	*	927,960	1426	97	310
UY1HY	*	786,849	1047	106	315
UT4EK	*	634,432	1057	86	282
URØIQ	*	597,276	1231	77	276
US7IA	*	460,275	1022	77	246
UY5BA	*	375,878	710	84	242
UT2UB	*	374,414	622	86	248
US7IID	*	286,396	911	51	202
UT3N	*	280,832	926	55	201
			(OP: UT3NK)		
UT6EE	*	261,396	587	68	206
UR4EI	*	194,120	606	46	184
UR8RF	*	191,970	578	64	173
UT1AB	*	168,896	612	41	162
UX3HA	*	168,420	709	47	163
US6EX	*	164,680	351	72	158
UR6EO	*	139,440	341	65	175
UR5VR	*	105,711	319	63	148
URØQX	*	100,672	309	52	124
UR4IOR	*	85,850	311	44	126
UT5SA	*	79,200	413	34	131
UR5EPG	*	44,800	175	47	93
UT3WX	*	39,712	187	39	97
US7IB	*	22,984	130	35	69
UR7VA	*	21,830	81	47	71
UR7EW	*	11,305	94	23	62
UT4UB	*	10,336	70	29	47
US4IXT	*	2,046	24	13	20
			(OP: USØITU)		
UR5E	*	912	16	10	14
			(OP: UR5EDX)		
USØITU	*	624	13	6	10
UR2P	**21**	**45,320**	**187**	**30**	**80**
UY3QW	**14**	**276,830**	**1017**	**37**	**118**
UY4WWA	*	245,100	774	36	114
			(OP: UT1WZ)		
UY5QO	*	105,400	301	36	119
UR5ZMK	*	24,255	212	14	49
UR7QM	*	11,025	100	18	45
UU5WW	**7**	**723,672**	**2493**	**37**	**147**
UX5D	*****	**556,920**	**2080**	**39**	**131**
			(OP: UT7DK)		
UR7QC	*	219,032	900	35	117
UT5IZ	*	173,518	1266	25	76
UY2ZZ	*	52,638	417	18	75
UT2VU	*	26,970	165	19	74
UU4JC	*	7,800	68	15	25
UT1S	**3.5**	**97,353**	**1025**	**15**	**72**
			(OP: UW5SW)		
UX6IR	*	68,646	495	22	80
UR7EQ	*	60,040	643	14	65
UR5AKU	*	39,105	353	15	64
UT5UGR	*	19,200	258	10	54
UY3AW	*	17,408	214	10	58
UT4VW	*	14,478	214	9	48
UV5QQ	*	7,182	81	14	49
UR5AS	**1.8**	**48,150**	**494**	**21**	**69**
UR8LV	*	20,328	334	9	47
UT1IR	*	19,722	307	10	47
UT2IW	*	5,719	110	8	35
***US5XD**	**A**	**827,030**	**1034**	**101**	**332**
*UT7NW	*	815,868	1306	92	301
*USØSY	*	731,724	1012	101	333
*USØHZ	*	680,680	1396	66	274
*UT2IO	*	522,016	1051	77	275
*UT5UN	*	418,134	912	70	237
*UW7M	*	409,224	1049	61	228
			(OP: UR3MP)		
*UT5UQN	*	388,885	973	59	228
*UT3UZ	*	373,725	920	52	223
*UR5IFB	*	310,905	491	88	241
*UTØL	*	305,868	751	66	218
*UR4U	*	298,297	649	72	245
			(OP: UR4UDI)		
*UT3EV	*	289,632	791	49	175
*UY5TE	*	252,240	783	48	192
*US7IVW	*	249,368	647	52	192
*UT2QQ	*	245,079	692	53	208
*UT4EN	*	241,266	688	57

*US5MUW	*	15,510	265	11	44	
*UR5AW	*	10,974	107	13	49	
*UX3MX	*	10,292	123	22	61	
*UR5EU	*	5,684	89	9	40	
***UZ5UA**	**3.5**	**94,342**	**1013**	**15**	**71**	
*UX5NQ	*	71,969	899	15	64	
*UR3LPM	*	66,600	609	14	76	
*UR5LJD	*	53,380	705	11	57	
*UT7NY	*	52,207	549	15	68	
*UY5VA	*	43,836	444	17	61	
*UT5KO	*	43,168	530	11	60	
*US2WU	*	41,990	537	14	71	
*UR8IDX	*	33,909	328	15	74	
*UR8IF	*	27,864	302	11	61	
*UT1XX	*	25,200	377	9	51	
*UT3SO	*	21,774	373	9	48	
*UR4CU	*	20,923	297	9	52	
*UT7XX	*	19,175	303	10	49	
*UR5IHQ	*	18,020	311	8	45	
*UR5UBR	*	6,144	134	8	40	
*UT4TA	*	4,484	123	9	50	
*UT7DU	*	696	36	6	18	
***UX7FC**	**1.8**	**11,760**	**226**	**8**	**40**	
*UX5TQ	*	8,170	173	7	36	
*US0QG	*	5,818	106	6	36	

Wales

GW6W	**A**	**201,422**	**772**	**35**	**92**
			(OP: GW0ETF)		
GW3YDX	**7**	**828,437**	**2893**	**39**	**142**
***MW0CWJ**	**A**	**12,710**	**127**	**13**	**49**
			(OP: MM0CWJ)		
*MW0RZC	*	378	30	8	10
***GW4MVA**	**7**	**64,337**	**456**	**20**	**81**
*GW4EVX	*	10,044	186	9	45
***GW7X**	**3.5**	**59,544**	**694**	**11**	**61**
			(OP: GW3SQX)		

OCEANIA

Australia

VK3TDX	**A**	**1,591,044**	**1718**	**96**	**233**
VK7GN	*	686,991	1045	87	180
VK4KW	**28**	**26,195**	**318**	**14**	**17**
			(OP: VK4BAA)		
***VK2PN**	**A**	**303,810**	**627**	**65**	**130**
*VK6HG	*	185,640	339	67	143
*VK2BJ	*	145,061	349	63	98
*VK4TT	*	130,077	330	60	89
*VK4EJ	*	106,568	271	58	96
*VK4XY	*	31,376	128	45	61
*VK5SW	*	2,262	44	13	13
*VK7AD	*	1,311	22	12	11
*VK3GDM	*	345	9	7	8
***VK2AYD**	**28**	**8,190**	**101**	**11**	**19**
***VK4SN**	**21**	**16,905**	**130**	**19**	**30**
***VK8AV**	**7**	**53,382**	**216**	**25**	**68**

Chesterfield Islands

***TX3A**	**A**	**2,570,562**	**2611**	**124**	**238**
			(OP: HA7RY)		

East Malaysia

9M6LSC	**A**	**2,649,725**	**2403**	**119**	**284**
			(OP: KM0O)		
9M8YY	**7**	**405,447**	**1116**	**32**	**97**
			(OP: JR3WXA)		
*9M6YBG	21	14,023	138	16	21

French Polynesia

***FO8RZ**	**A**	**1,632,171**	**2180**	**102**	**165**

Guam

WH2D	**A**	**557,473**	**953**	**76**	**141**
			(OP: K3UOC)		

Hawaii

KH6ZN	**A**	**4,131,435**	**3993**	**138**	**227**
			(OP: N6TJ)		
AH7C	*	2,908,124	2680	133	253
KH7B	**21**	**987,282**	**2403**	**37**	**104**
KH6NF	**14**	**982,955**	**2386**	**38**	**107**
			(OP: KH6SH)		
KH6MB	**3.5**	**221,536**	**941**	**31**	**55**
KH7U	**1.8**	**28,215**	**311**	**16**	**17**
***KH7T**	**A**	**141,137**	**496**	**50**	**63**
*KH6OO	*	46,436	198	44	50
*KH6WE	*	2,574	46	19	20
***NH6P**	**28**	**918**	**25**	**9**	**9**

Indonesia

YB4IR	**A**	**331,090**	**550**	**75**	**151**
YB1ALL	*	15,433	113	26	35
YB1KAR	**21**	**503,992**	**1196**	**37**	**109**
YB1CCF	**3.5**	**63,329**	**291**	**23**	**60**
***YC2LEV**	**A**	**48,248**	**159**	**54**	**94**
***YD1BJX**	**21**	**28,425**	**150**	**22**	**53**
*YB3BOA	*	2,323	39	10	13
***YB0ECT**	**14**	**160,782**	**450**	**32**	**95**
*YB3XM	*	53,020	202	30	80
*YC3TKH	*	8,040	82	19	41
*YC2WBF	*	4,136	51	15	32
*YB1MBA	*	925	27	10	15
***YB2UTX**	**7**	**73,629**	**298**	**30**	**71**
*YC2BG	*	7,248	65	17	31
***YB2EUZ**	**1.8**	**2,772**	**53**	**9**	**13**
*YC1COZ	*	49	5	3	4
*YC0LOW	*	12	2	2	2

New Caledonia

***TX1B**	**A**	**432,768**	**979**	**60**	**108**

New Zealand

ZL1T	A	10,206	73	37	44
*ZL4CR	A	1,035	21	11	12
***ZL3GA**	**28**	**792**	**20**	**9**	**9**
***ZL3TE**	**14**	**150,670**	**489**	**32**	**90**
			(OP: W3SE)		

Northern Mariana Islands

***WH8S**	**14**	**29,652**	**261**	**17**	**25**

Palau

T88CI	**A**	**1,194,700**	**1740**	**90**	**170**
			(OP: HA5AO)		

Papua New Guinea

***P29CW**	**A**	**284,292**	**551**	**85**	**127**
			(OP: VK2GR)		

Philippines

***DV1SDT**	**A**	**21,942**	**132**	**27**	**42**
*4D1N	*	7,560	94	27	33
			(OP: DV1UBY)		

Samoa

5W0KH	**A**	**363,860**	**660**	**87**	**143**
			(OP: DL2FAG)		

Tonga

***A35KL**	**A**	**368,203**	**1073**	**51**	**70**

SOUTH AMERICA

Antarctica

***R1ANB**	**A**	**345,384**	**533**	**69**	**177**
***R1ANC**	**14**	**136,530**	**481**	**30**	**81**

Argentina

LT1A	**A**	**413,876**	**766**	**80**	**134**
LT5X	*	196,047	558	47	112
			(OP: LU3XQ)		
LU9MDH	*	126,560	386	52	88
LU1HF	**28**	**226,730**	**1012**	**24**	**58**
L33M	**14**	**204,048**	**694**	**29**	**80**
			(OP: LU3MAM)		
***LW5EE**	**A**	**530,376**	**1027**	**69**	**127**
***LW1E**	*****	**448,350**	**1051**	**61**	**86**
			(OP: LU1EWL)		
*LU5YF	*	123,981	305	66	121
*LU7DSU	*	28,518	130	40	57
*LU2DGZ	*	11,315	84	31	42
*LW1EUD	*	1,092	61	23	23
*LU1IBL	*	84	8	7	7
***LU5WW**	**28**	**117,162**	**621**	**20**	**49**
*LU8ADX	*	21,148	242	14	20
***LU3FID**	**21**	**406,575**	**1253**	**30**	**87**
*LW3DG	*	85,100	444	26	48
*LU2FLN	*	78,110	480	25	48
*L73D	*	77,760	480	20	40
			(OP: LW6DW)		
*LU4EJS	14	6,040	98	18	22
***LQ0F**	**7**	**161,290**	**506**	**32**	**95**
			(OP: LU5FF)		

Aruba

P49Y	**A**	**8,016,288**	**5885**	**123**	**351**
			(OP: AE6Y)		
P43JB	*	558,705	685	83	230
P49V	**14**	**1,071,140**	**2773**	**34**	**106**
***P40W**	**A**	**5,069,240**	**3942**	**113**	**338**
			(OP: W2GD)		

Brazil

PY2EX	**A**	**1,362,336**	**1773**	**90**	**186**
PV8AA	*	165,200	532	49	69
			(OP: PV8DX)		
PY7GK	*	63,180	305	34	56
PP5JY	*	16,790	132	35	38
PY2LEI	*	16,235	108	38	47
PY3CAL	*	12,804	125	39	58
PP5BK	*	11,020	56	38	38
PY2KP	*	3,763	32	23	30
PT5A	**21**	**1,723,680**	**3427**	**40**	**148**
PY2ZXU	*****	**1,232,868**	**2397**	**40**	**142**
PR7AR	**14**	**156,845**	**701**	**24**	**71**
PY2KJ	*	137,370	547	28	67
PY3AU	*	46,893	212	27	60
PY2BK	**3.5**	**16,705**	**130**	**20**	**45**
***PS2T**	**A**	**2,668,810**	**2568**	**106**	**264**
			(OP: PY2NY)		
*PY5BLG	*	227,176	600	55	91
*PR7HR	*	166,212	402	54	117
*PS7DX	*	65,793	310	38	53
*PY3YD	*	25,756	120	47	47
*PU5AAD	*	14,694	103	33	46
*PY3UA	*	11,266	91	42	44
*PY2TI	*	7,625	57	28	33
*PY4ZF	*	4,815	77	18	27
***PU2MTS**	**28**	**40,572**	**315**	**18**	**31**
*PY1MK	*	250	17	5	5
*PU8TEP	21	2,418	57	13	18
*PP5KR	*	1,419	67	5	6
***PY7ZY**	**14**	**37,506**	**246**	**19**	**38**
*PP7LL	*	12,931	82	27	40
*PY4LH	*	12,825	127	18	39
*PY1CL	*	6,045	74	13	26
***PY1DX**	**7**	**385,696**	**1067**	**31**	**105**
*PY2ELG	*	38,258	206	21	53
*PV8ADI	*	1,147	35	10	21

Chile

3G3V	**21**	**1,256,250**	**2963**	**31**	**119**
			(OP: CE3/VE7SV)		
3G1X	**14**	**750,044**	**1910**	**34**	**108**
			(OP: XQ1IDM)		
CE4CT	**7**	**498,614**	**1355**	**32**	**102**
			(OP: XQ4CW)		
***CE2/K0MD**	**A**	**81,236**	**365**	**40**	**52**
			(OP: K0MD)		
***CE6VMO**	**28**	**8,323**	**124**	**12**	**17**
***CE3DNP**	**14**	**287,730**	**1029**	**31**	**84**
*CE3G	*	31,856	220	28	60
			(OP: CE3WDD)		

Colombia

HK3Q	**A**	**133,666**	**311**	**66**	**128**
HK1A	**7**	**353,640**	**1171**	**29**	**91**
*HK8EA	A	999	24	16	21
***HK3CQ**	**28**	**37,600**	**308**	**14**	**33**
***HK1KYR**	**21**	**187,356**	**903**	**24**	**54**
***HK3TU**	**14**	**403,380**	**1113**	**33**	**102**
***HK1AA**	**3.5**	**58,450**	**314**	**17**	**53**

Easter Island

***CE0Y/SM6CUK**	**A**	**69,444**	**237**	**48**	**60**

Ecuador

HC2SL	**21**	**480,284**	**1516**	**29**	**90**
HC2A	**7**	**54,786**	**409**	**18**	**51**

Paraguay

ZP0R	**A**	**3,133,844**	**2829**	**112**	**301**
				(OP: NT6X)	
***ZP9EH**	**A**	**47,730**	**199**	**42**	**69**

Peru

OA4SS	**A**	**1,609,647**	**2075**	**87**	**190**

Uruguay

CX1AA	**A**	**281,637**	**560**	**66**	**117**
			(OP: CX7CO)		
CW5W	**14**	**1,409,628**	**2744**	**38**	**143**
			(OP: CX6VM)		
***CX9AU**	**21**	**584,441**	**1448**	**36**	**107**

Venezuela

YV5JBI	**A**	**58,302**	**174**	**63**	**95**
YW4D	**7**	**1,336,414**	**2576**	**39**	**140**
***YV4BCD**	**A**	**66,591**	**190**	**41**	**106**
*YW7A	*	12,264	88	37	47
***YV1FM**	**21**	**478,500**	**1437**	**30**	**86**
***YV6BTF**	**14**	**67,687**	**284**	**29**	**84**
*YV5AAX	*	67,160	282	23	69

QRP

FY5KE	**A**	**3,264,345**	**2988**	**99**	**288**
				(OP: FY5FY)	
P4BA	*****	**2,888,775**	**3033**	**89**	**244**
				(OP: KK9A)	
UA9SP	*****	**785,781**	**878**	**69**	**258**
KR2Q	*****	**754,560**	**761**	**91**	**269**
US2IZ	*****	**728,625**	**1424**	**75**	**300**
RW9RN	*****	**669,308**	**900**	**72**	**226**
OK7CM	*****	**630,960**	**1281**	**78**	**252**
G4EDG	*****	**630,758**	**1006**	**73**	**273**
HG6V	*****	**526,932**	**980**	**84**	**285**
				(OP: HA6IAM)	
UR5LAM	*****	**456,165**	**908**	**78**	**249**
N8ET	*****	**432,537**	**572**	**87**	**214**
UA9QA	*****	**426,290**	**747**	**49**	**186**
JR4DAH	*****	**415,044**	**708**	**81**	**163**
DK1YY	*****	**413,322**	**998**	**62**	**211**
JE1RZR	*****	**394,940**	**614**	**93**	**167**
N1TM	*****	**375,255**	**530**	**70**	**209**
SP9NSV/7	*****	**373,184**	**991**	**57**	**215**
K4LY	*****	**360,525**	**539**	**80**	**205**
RW3AI	*****	**343,140**	**883**	**63**	**222**
RA3AN	*****	**341,275**	**927**	**57**	**218**
K4LTA	*****	**332,488**	**563**	**77**	**201**
DF1DX	*****	**321,678**	**822**	**51**	**171**
J38XJ	*****	**317,460**	**723**	**59**	**136**
RW6FO	*****	**315,524**	**834**	**60**	**224**
LZ7H	*****	**314,925**	**869**	**54**	**193**
W6JTI	*****	**307,536**	**459**	**91**	**167**
W8QZA/8	*****	**306,915**	**458**	**83**	**176**
YO8DDP	*****	**290,004**	**690**	**58**	**218**
F5VBT	*****	**288,405**	**1003**	**47**	**208**
YO5AIR	*****	**226,572**	**711**	**52**	**185**
RW4AA/9	*	214,230	468	49	144
YU1LM	*****	**212,926**	**775**	**47**	**180**
EI8FH	*****	**201,685**	**650**	**39**	**170**
SP2DNI	*****	**193,366**	**654**	**46**	**172**
K8CN/1	*****	**191,600**	**372**	**52**	**148**
HB9CBR	*****	**183,996**	**494**	**55**	**173**
N7IR	*****	**181,139**	**384**	**87**	**142**
UT1DX	*	175,225	560	50	165
LY2OM	*****	**173,026**	**620**	**49**	**189**
UT5UUV	*	169,222	646	41	170
RV9AZ	*	168,642	400	37	125
G3YMC	*****	**168,400**	**642**	**37**	**163**
I0ZUT	*****	**162,572**	**514**	**43**	**151**
UT5DJ	*	156,354	557	41	165
DF9TS	*	154,536	664	37	151
G3LHJ	*	148,088	489	37	136
YO6WW	*	147,500	426	73	177
UX8ZA	*	139,897	494	40	159
HB9OAX	*****	**126,720**	**493**	**41**	**157**
EA4BF	*****	**120,109**	**505**	**38**	**141**
W6AQ	*****	**114,098**	**272**	**66**	**112**
NU4B	*	110,250	203	65	145
VK5MAV	*****	**104,328**	**248**	**51**	**117**
DL4MAQ	*	102,600	429	37	115
AA1CA	*	101,291	268	68	131
KT8K	*****	**99,267**	**238**	**45**	**118**
KG4JGQ	*	99,255	208	65	130
YO6RIX	*	95,776	419	37	127
SM6CRM	*****	**94,696**	**380**	**41**	**137**
UT1AA	*	93,450	433	37	141
EA8IK	*****	**93,240**	**245**	**41**	**107**
RN4HAB	*	92,925	463	39	138
K4ORD	*	85,822	204	51	115
RK9DO	*	80,367	277	32	97
HB9AYZ	*	80,032	395	33	131
EA1GT	*****	**72,414**	**403**	**32**	**117**
SP9RQH	*	71,394	297	41	122
VE3QDR	*****	**70,686**	**446**	**35**	**64**
				(OP: VE3KQN)	
S59D	*****	**64,800**	**326**	**54**	**146**
JA1KEB	*	62,738	214	51	76
RK4FB	*	60,480	358	27	113
AO7AAW	*	59,163	319	24	87
OM3TLE	*****	**54,488**	**359**	**26**	**113**
DH0JAE	*	52,479	298	36	117
PA1B	*****	**52,324**	**318**	**24**	**103**
PD5CW	*	51,840	249	28	92
I2AZ	*	49,005	228	36	99
W9IP	*****	**47,488**	**221**	**41**	**87**
W7JI/0	*	46,540	157	46	84
IK2UZQ	*	45,141	221	34	89
RV3DBK	*	44,622	344	19	92
N5DO	*****	**43,306**	**138**	**51**	**67**
PY5MJ	*****	**42,054**	**148**	**51**	**78**
DL8ZAJ	*	40,590	218	29	94
KG3F	*****	**40,513**	**158**	**42**	**85**
JA9MAT	*****	**37,830**	**167**	**36**	**61**
HQ2W	*****	**37,238**	**281**	**39**	**47**
				(OP: HR2DMR)	
JL3SBE	*****	**35,640**	**139**	**53**	**67**
YU2CV	*	34,629	249	26	93
HS8KGG	*****	**31,740**	**140**	**40**	**75**
HA5OB	*	31,460	216	25	85
DL6ABB	*	30,212	219	21	70
LU8EHR	*****	**29,876**	**126**	**47**	**50**
YO4AAC	*	29,480	209	27	83
UA0SBQ	*****	**27,990**	**147**	**29**	**61**
BA4II	*****	**27,075**	**192**	**39**	**56**
ON7CC	*****	**26,790**	**263**	**23**	**91**
KE0G	*	25,573	112	41	66
K2JT	*****	**25,468**	**197**	**39**	**99**
OH3RF	*****	**24,534**	**157**	**28**	**59**
SP9AJM	*	23,940	172	27	78
K0CD/9	*	22,989	121	42	55
UU9JQ	*	22,236	140	28	74
NT4TS	*	21,528	107	35	69
EA5GVZ	*	20,790	140	28	71
UR4MCK	*	20,292	214	13	63
N0UR	*	20,286	84	35	63
VE3LC	*	19,971	173	26	37
SP6QKP	*	19,720	189	17	68
NC1C	*	19,436	118	23	63
DL1AQU	*	19,332	183	22	86
UA3LMR	*	18,662	104	38	48
G6CSY	*	17,385	137	22	73
DL1DXA	*	16,614	91	31	40
NO2D/0	*	15,910	87	34	52
PA0RBO	*	15,903	155	26	67
AI9K	*	15,824	89	39	53
SE6U	*	15,570	148	22	68
K5ND	*****	**15,521**	**133**	**37**	**46**
KW4JS	*	14,550	75	36	61
DL1JDQ	*	14,414	101	32	62
KG4HTT	*	14,260	84	33	59
OK2BLD	*	14,212	150	14	62
DL7GEM	*	14,000	162	16	64
VE3CW	*	13,601	97	28	39
KD0R	*	13,485	85	39	48
SM6AHU	*	13,248	148	21	71
EA7HCB	*	11,850	119	25	54
DL8TG	*	11,136	91	26	61
F5UKL	*	10,696	118	20	36
W0RSP/7	*	10,602	61	22	35
WB5NMZ/4	*	10,500	73	31	44
DF6FR	*	10,335	117	14	51
LA1ENA	*****	**10,318**	**123**	**19**	**48**
OK2NA	*	10,240	95	23	57
YV6BXN	*****	**10,030**	**76**	**18**	**41**
RK3TD	*	9,945	108	23	62
KD9B/4	*	9,882	60	31	50
WA5RML	*	9,581	77	30	37
VA3RKM	*	9,204	72	25	34
OK4JR	*	8,568	121	14	58
PY4ZO	*	7,040	69	29	35
VA7DZ	*****	**6,909**	**101**	**20**	**27**
F6DHE	*	6,887	87	18	53
SP4GHL	*	6,732	70	15	36
VP5/N5KW	*****	**6,615**	**56**	**21**	**28**
WA6L	*	6,213	51	18	39
JK1TCV	*	5,814	47	22	29
RX3PR	*	5,795	70	15	46
M0GBZ	*	5,600	65	18	52
N7OU	*	4,876	55	24	22
WD5IYT	*	4,704	41	23	33
RA0SMS	*	4,505	94	22	31
DF2OK	*	4,200	51	19	41
DM2LB	*	3,724	46	16	33
ON3AD	*	3,321	60	13	28
N5ZE/7	*	3,306	37	17	21
DL3BVA	*	3,185	55	15	20
K2QO	*	2,976	35	21	27
W2JEK	*	2,318	27	17	21
AE3J	*****	**2,257**	**29**	**13**	**24**
RD3AJB	*	2,112	56	6	27
YO3GLH	*	1,890	41	13	29
W1OH	*	1,674	25	13	18
DL2WJT	*	1,566	36	9	20
SQ5LNU	*	1,560	69	6	34
KE4WBO	*	1,248	30	13	13
KA8SYV	*	1,170	28	17	22
DF5SF	*	1,044	37	7	29
AC2N/4	*	990	21	15	15
M0SFR	*	783	39	9	18
N0RU	*	675	14	13	14
AA4SD	*	504	12	7	11
JA1POS	*	420	17	10	11
KI4FW	*	378	12	7	7
US0YA	*	273	7	6	7
OZ8A	*****	**242**	**10**	**5**	**6**
DM3OA	*	204	15	5	12
N0JK	*	168	7	7	7
YT7AO	**28**	**936**	**28**	**6**	**18**
VU2LYX	*****	**408**	**12**	**8**	**9**
JA4DQX	*****	**243**	**10**	**5**	**4**
WO2N	*****	**240**	**20**	**7**	**8**
IZ1DGG	*****	**10**	**8**	**3**	**7**
W1TY/2	*	4	1	1	1
YD1XUH	**21**	**98,490**	**385**	**31**	**74**
K4RV	*****	**93,525**	**275**	**27**	**102**
YB5AQB	*****	**56,238**	**225**	**28**	**75**
RZ6HX	*****	**51,409**	**336**	**27**	**74**
E21AOY	*****	**44,681**	**238**	**24**	**67**
JQ1NGT	*****	**33,150**	**200**	**36**	**42**
LZ1MG	*****	**32,490**	**186**	**26**	**64**
HA3JB	*****	**30,855**	**162**	**27**	**58**
OK1IR	*****	**29,325**	**176**	**19**	**50**
LZ2RS	*	28,980	182	24	60
JQ2UOZ	*****	**24,768**	**162**	**26**	**46**
RA9SC	*****	**24,552**	**156**	**21**	**51**
JR1NKN	*****	**11,742**	**106**	**23**	**34**
SP4GFG	*****	**11,200**	**92**	**18**	**32**
WA6FGV	*****	**7,488**	**63**	**17**	**31**
IV3AOL	*****	**6,930**	**65**	**16**	**26**
N3TL/4	*****	**5,544**	**56**	**15**	**29**
RA3XEV	*****	**3,348**	**64**	**8**	**23**
I2IAL	*****	**2,828**	**63**	**11**	**17**
DF3SM	*****	**2,600**	**56**	**8**	**15**
W5JBV/4	*	2,360	39	14	16
OK1AIJ	*****	**1,984**	**39**	**9**	**23**
SM7RPU	*****	**1,472**	**29**	**8**	**15**
JA1KPF	*	1,440	24	10	14
PU5ATX	*****	**1,248**	**36**	**12**	**14**
SN8M	*	819	28	8	13
AB8FJ	*****	**720**	**17**	**5**	**11**
SP4KDX	*	576	18	7	11
JL1PMH	*	496	19	8	8
SP2FMN	*	372	15	5	7
EA4DUT	*	190	17	7	12
JH3DMQ	*	55	6	5	6
JA4GNK	*	42	5	3	3
CT7/LZ3ND	**14**	**108,673**	**526**	**24**	**85**
S57AL	*****	**89,397**	**355**	**30**	**99**
K7ZD	*****	**71,338**	**275**	**31**	**75**
LZ1VB	*****	**70,875**	**409**	**25**	**80**
HG1X	*****	**70,176**	**407**	**25**	**71**
				(OP: HA1RS)	
RA9CEX	*****	**61,824**	**370**	**12**	**52**
I4KRF	*****	**61,680**	**399**	**19**	**61**
HA7MW	*****	**52,216**	**220**	**28**	**79**
US5VX	*****	**41,877**	**205**	**24**	**75**
G0DCK	*****	**36,852**	**358**	**17**	**57**
RA9MU	*****	**22,320**	**177**	**10**	**38**
JH8DBI	*****	**21,373**	**136**	**22**	**45**
JH8FAJ/1	*****	**18,166**	**138**	**21**	**41**
HA8JP	*	17,918	185	16	46
RW4AO	*****	**15,840**	**200**	**11**	**44**
LA8WG	*****	**15,677**	**168**	**14**	**47**
SM5BRG	*****	**12,168**	**115**	**14**	**38**
OK2ZAW	*****	**11,252**	**105**	**18**	**40**
GW0VSW	*****	**10,335**	**172**	**10**	**43**
FM5CW	*****	**10,300**	**101**	**14**	**36**
IZ2QKG	*****	**8,865**	**168**	**9**	**36**
YO8SAI	*****	**8,618**	**195**	**14**	**48**
JH1EVD	*****	**7,954**	**73**	**17**	**24**
PE2KP	*****	**6,591**	**100**	**10**	**29**
PP5VX	*****	**5,440**	**73**	**18**	**22**
W1IG	*****	**4,730**	**49**	**14**	**29**
W0NV/6	*****	**4,686**	**58**	**16**	**17**
WN4DX	*****	**4,140**	**42**	**15**	**30**
OK1FAO	*****	**3,660**	**84**	**11**	**19**
SP5DDJ	*****	**3,264**	**46**	**12**	**20**
JE1CAC	*	2,900	42	14	15
N6HI/7	*****	**2,640**	**39**	**17**	**23**
JR6HMJ/1	*	2,442	54	14	23
JK3AHS	*****	**1,458**	**30**	**10**	**17**
PY6KY	*	1,264	45	8	8
9M2MRS	*****	**1,189**	**25**	**10**	**19**
YO4TMB	*	1,026	30	6	13
EA8/OH2BEM	*	900	18	9	9
SQ4HRN	*	616	18	6	8
HS8JYX	*****	**504**	**21**	**5**	**7**
BG4EZU	*****	**176**	**9**	**5**	**6**
K6BBQ	*	130	19	7	6
PY1ZV	*	78	8	3	3

HG1DX	**7**	**147,275**	**707**	**32**	**105**
				(OP: HA1XR)	
DL1DQY	*****	**118,041**	**493**	**33**	**114**
OL4W	*****	**106,275**	**682**	**21**	**88**
JA6GCE	*****	**88,800**	**302**	**30**	**90**
LY5G	*****	**72,000**	**606**	**19**	**81**
S57T	*****	**54,609**	**289**	**24**	**85**
F5UL	*****	**52,407**	**520**	**16**	**65**
HB9CEY	*****	**41,055**	**347**	**14**	**71**
4L1FP	*****	**37,044**	**181**	**16**	**68**
HA0GK	*	35,840	354	14	66
SP7BCA	*****	**31,244**	**372**	**14**	**59**
RA0AY	*****	**28,084**	**167**	**20**	**48**
SP4TBM	*****	**24,790**	**249**	**13**	**61**
K5ZE	*****	**22,950**	**112**	**25**	**

N2ED	*	1,005,550	950	107	335
KA2D	*	974,580	806	102	342
N2WKS	*	821,284	724	108	344
W2GDJ	*	740,000	695	103	297
K2EP	*	620,000	569	105	295
K2CJ	*	593,325	737	78	215
N2FF	*	547,625	612	71	254
N1IBM/2	*	533,169	595	90	261
K2GN	*	506,880	529	94	266
W2YR	*	460,647	436	109	314
N2NI	*	424,728	517	77	229
K2MK	*	404,386	503	76	222
WK2H	*	282,653	399	72	199
K2SQS	*	251,160	386	67	193
K2DSL	*	211,500	363	62	163
K2DBK	*	196,812	332	67	164
KI2P	*	182,307	343	52	149
K2QPN	*	159,315	290	62	153
N2SS	*	113,520	198	69	146
K2PF	*	108,438	257	40	119
W2CCC	*	108,100	221	65	123
				(OP: K2CS)	
N2YBB	*	95,342	266	62	131
W2RZS	*	82,368	197	40	116
			(OP: WB2NVR)		
KC2NB	*	79,442	232	36	121
N2SQW	*	65,702	211	36	97
N2VM	*	55,152	147	45	99
N1JP/2	*	37,240	105	41	92
N2LQ	*	33,274	98	45	86
K2PAL	*	30,910	113	36	74
KS2G	*	29,645	100	38	83
N2SO	*	27,404	92	41	83
NJ1F/2	*	13,430	74	28	57
WF2B	*	2,408	27	21	22
KR2D	*	1,656	21	16	20
K2MFY	**14**	**196,232**	**474**	**32**	**120**
WB2AA	*	152,704	422	27	101
WR2G	*	137,904	361	29	107
N2RJ	7	9,071	71	10	37
K3WW	**A**	**5,495,166**	**3002**	**145**	**524**
N3RS	*	**4,381,650**	**2545**	**142**	**488**
N3AD	*	**3,744,480**	**2551**	**125**	**413**
K3PH	*	3,123,052	2055	122	426
K3QF	*	2,306,025	1531	129	426
N3AM	*	1,979,000	1432	115	385
K3MD	*	1,731,950	1397	128	389
K3ZZ	*	1,654,109	1540	108	313
K3WI	*	1,357,400	1130	101	339
K3PP	*	1,353,780	921	131	409
KF3B	*	1,331,056	1324	95	273
K3ND	*	1,312,465	972	118	369
N3NA	*	1,095,744	910	109	330
N3ZA	*	969,381	753	113	370
W3KL	*	960,570	949	109	281
W3GK	*	916,288	820	99	313
K3SV	*	816,232	749	94	303
K3OO	*	751,073	666	104	297
W3KB	*	688,090	646	106	289
K3TN	*	620,106	641	91	271
NE3H	*	523,912	609	87	257
W3OU	*	496,774	576	84	239
N3NR	*	487,179	539	87	246
N3GNW	*	374,286	475	88	233
N3MX	*	367,479	469	82	225
WB3FIZ	*	325,584	714	97	302
K3PG	*	311,548	439	70	214
NP3D/W2	*	213,108	295	80	221
				(OP: NP3D)	
AA3DF	*	166,014	314	46	161
W9GE/3	*	157,056	298	50	142
NG3K	*	135,090	273	55	135
W3EKT	*	134,780	296	65	165
W3AG	*	95,568	208	60	121
K3ATO	*	91,107	207	61	130
WM3O	*	80,850	198	39	108
N1SZ/3	*	74,872	146	51	145
K3II	*	48,763	156	38	83
W4EE/3	*	40,176	150	36	72
N3ST	*	39,600	139	23	76
N3WZR	*	37,170	121	43	83
NN3RP	*	36,375	144	38	87
K4JLD/3	*	23,712	112	44	70
K3NM	*	14,507	64	25	64
K3YDX	*	9,928	56	27	41
N3ME	*	5,796	40	24	39
K3GMT	*	5,032	74	26	48
W3GNQ	*	2,964	36	15	23
WX3B	*	108	6	3	3
N3QW	**21**	**29,928**	**134**	**20**	**67**
WR3L	*	15,042	83	19	50
WA3V	*	5,481	66	18	45
W2CDO/3	**7**	**118,500**	**357**	**29**	**96**
N2NL/4	**A**	**2,124,870**	**1198**	**157**	**528**
N4ZC	*	**2,084,968**	**1233**	**141**	**491**
N4BP	*	**1,910,731**	**1530**	**117**	**362**
W3GQ/4	*	1,807,224	1280	118	396
N2TU/4	*	1,611,863	1129	123	406
K1PT/4	*	1,524,573	1046	123	426
N4KG	*	1,415,640	920	142	422
W3OA/4	*	1,368,950	1057	114	361
K2EK/4	*	1,360,368	991	144	420
N4VV	*	1,272,645	955	113	382
KG4W	*	1,146,320	955	108	337
KR4F	*	986,832	738	125	379
N4DW	*	916,883	765	108	343
K4PB	*	878,469	750	119	324
K5RQ/4	*	820,304	978	88	246
K1ZZI/4	*	789,792	700	113	320
W4PM	*	763,092	653	99	324
N3CZ/4	*	752,184	779	103	269
K4UTE	*	702,297	553	120	393
NQ4U	*	701,974	846	101	276
W4PG	*	699,380	750	81	259
K1KO/4	*	696,255	665	99	300
K3IE/4	*	677,679	656	97	300
N4ZZ	*	669,392	905	67	205
N4RV	*	669,086	673	95	279
AA4V	*	638,352	666	87	285
AA4CF	*	634,816	675	98	266
NO9E/4	*	586,875	603	103	272
K9MUG/4	*	567,360	573	93	267
WA2BCK/4	*	543,705	609	82	253
WK5X/4	*	479,556	602	77	231
N4EEB	*	468,048	593	82	212
K4FPF	*	467,517	577	77	232
K5AUP/4	*	461,692	614	75	233
W4FDA	*	406,455	432	92	251
W2YE/4	*	363,488	441	82	225
W4JAM	*	351,312	420	80	232
NN3W/4	*	333,592	439	80	216
KZ2I/4	*	329,260	422	107	219
N4TB	*	325,523	404	88	205
K8NZ/4	*	315,560	415	79	201
N4GG	*	299,897	390	92	207
KE1F/4	*	274,281	419	71	188
N3JT/4	*	272,118	486	58	151
W2OO/4	*	268,062	405	71	187
K8KI/4	*	254,035	422	72	163
WB4MAK	*	249,823	318	104	297
N4EMG	*	231,420	407	51	159
N4CJ	*	198,912	294	64	195
WK4Y	*	186,440	237	90	226
K4MM	*	182,628	299	56	172
KD5M/4	*	175,956	263	89	169
K8YC/4	*	173,000	277	68	182
WX4MM	*	162,840	320	68	168
N4EK	*	142,614	296	44	127
WX4TM	*	141,204	305	68	178
N3MK/4	*	138,736	264	53	155
K4HAL	*	130,014	267	58	128
K4XD	*	127,065	244	62	135
KA1ARB/4	*	108,035	206	61	144
N3BM/4	*	96,712	230	43	114
AD4IE	*	94,932	236	47	115
N4NM	*	94,472	207	60	136
N4VA	*	91,224	198	50	118
K1GW/4	*	90,480	229	44	112
N2YO/4	*	89,441	201	51	122
W3ZL/4	*	89,100	203	48	117
KZ1X/4	*	82,432	188	48	136
K3KO/4	*	64,160	147	42	118
KØCOP/4	*	56,789	190	32	77
NT4D	*	56,430	129	54	111
WB2REM/4	*	50,625	171	37	98
WB4ZPF	*	48,396	195	48	100
N3KN/4	*	47,190	133	45	98
ND4V	*	45,120	123	52	89
K4DLI	*	42,444	129	42	89
AF4Z	*	42,008	148	25	93
NW4V	*	41,422	115	49	90
W1ES/4	*	29,700	107	36	74
K4APG	*	28,194	95	37	74
W4WNT	*	27,250	119	39	86
K4ADR	*	25,472	113	53	75
KK4R	*	21,525	80	41	64
AC6NN/4	*	18,706	96	35	59
WA4PGM	*	12,874	72	30	52
W4AEJ	*	11,398	58	29	53
K4BQP	*	9,576	66	20	52
KB4FB	*	7,777	54	33	44
W4GHD	*	2,666	29	19	24
K4EDI	*	2,360	26	17	23
K5VIP/4	*	350	20	8	6
W4BCG	*	84	8	7	7
KD7YZ/4	*	4	1	1	1
N4PN	**21**	**196,500**	**531**	**34**	**116**
N4PQX	*	26,117	108	24	67
K4WW	*	18,340	99	21	49
W1CRP/4	**14**	**59,024**	**205**	**30**	**89**
				(OP: K1RQ)	
W4MYA	**7**	**389,682**	**883**	**35**	**131**
WJ2D/4	*	120,498	325	31	102
W4CU	*	107,188	310	32	95
W4ZW	*	51,084	186	27	81
WW4LL	*	34,760	168	21	58
AA4VV	*	6,804	44	18	36
NX2PX/4	**1.8**	**11,956**	**80**	**14**	**47**
K9IL/4	*	1,058	23	10	13
K5NA	**A**	**2,411,864**	**1226**	**166**	**562**
W5GN	*	**1,081,075**	**990**	**109**	**306**
W5ZO	*	646,020	654	110	278
WØVX/5	*	622,050	615	108	282
AC4CA/5	*	568,632	658	101	243
N9MM/5	*	375,906	499	80	202
NM5Y	*	313,117	418	91	196
W5GAI	*	266,266	408	88	178
K5GM	*	211,000	340	83	167
K5UV	*	199,948	302	83	176
N1CC/5	*	166,828	298	79	154
K5LH	*	159,938	547	66	145
K5HDU	*	138,531	279	57	126
K5AM	*	84,194	174	61	117
N5MT	*	83,235	186	60	119
W5WZ	*	68,640	191	58	102
W5GZ	*	50,692	173	35	81
N7KA/5	*	41,396	132	51	80
KE5K	*	37,466	104	47	84
KA5M	*	35,796	110	40	74
AE5PW	*	27,258	212	49	69
WT5U	*	26,730	111	41	69
N5CRO	*	20,160	103	21	51
NA5Q	*	11,346	62	33	60
AE5OV	*	792	51	12	10
W5PR	**28**	**2,944**	**35**	**12**	**20**
N5ZK	**21**	**82,080**	**310**	**31**	**83**
W5KI	14	266	7	7	7
N5JB	**7**	**129,801**	**340**	**33**	**114**
K5UO	3.5	6,966	70	15	28
WA6O	**A**	**1,650,761**	**1567**	**132**	**281**
K6TA	*	**1,257,950**	**1043**	**140**	**334**
K9YC/6	*	**1,053,563**	**998**	**128**	**285**
KD6X	*	707,616	716	104	274
N6QQ	*	573,534	588	116	271
N6JV	*	500,480	585	103	237
K6RIM	*	490,245	538	99	246
W6TK	*	425,034	541	106	200
WN6K	*	374,920	513	96	184
K6LRN	*	268,804	409	95	173
N6XI	*	250,640	373	91	169
K6III	*	172,956	317	82	131
WX6V	*	169,929	265	77	160
N6PE	*	151,373	253	97	160
N6KI	*	129,684	256	72	130
WE6Z	*	105,640	277	49	103
NW6P	*	101,374	213	59	123
NE6I	*	87,516	223	58	95
N6PN	*	83,356	180	74	108
K6XN	*	81,600	232	57	93
K6GEP	*	80,136	199	66	93
N6NC	*	73,704	198	59	89
K6VVA	*	64,216	148	73	111
WB6JJJ	*	63,180	158	66	96
K6JS	*	56,722	168	61	97
KF6I	*	53,015	207	48	67
K6MI	*	46,240	151	57	79
W6DR	*	43,361	146	57	74
K6DGW	*	40,370	141	40	70
W6SC	*	40,120	165	31	54
K6JEB	*	36,888	157	48	58
K6LE	*	33,670	151	40	51
KM6I	*	32,200	130	45	55
NC6RJ	*	29,532	120	46	61
N6RK	*	26,760	91	47	73
KK4E/6	*	25,877	102	47	66
N6DW	*	13,692	65	38	46
W6TOG	*	6,804	51	24	39
N6XT	*	5,220	48	25	35
W8RSU/6	*	4,386	58	25	26
N6EF	*	4,107	43	16	21
K6OI	*	3,485	33	19	22
N6AJR	*	2,698	37	20	18
KE6QR	*	1,694	27	11	11
W6NRJ	*	1,408	31	7	25
AE6RF	*	1,323	25	11	10
KT7F/6	*	208	19	7	6
K6LRG	**28**	**990**	**23**	**7**	**11**
				(OP: N6WM)	
NK6A	**21**	**26,828**	**149**	**22**	**54**
W6GRV	*	17,024	105	21	43
W4UAT/6	**14**	**146,280**	**410**	**33**	**105**
K6GT	3.5	2,805	42	17	16
N2NS/6	1.8	4,826	54	17	21
KY7M	**A**	**1,295,580**	**1130**	**125**	**328**
W7RN	*	**1,074,567**	**908**	**142**	**325**
K7WP	*	968,200	903	117	295
K7AR	*	962,904	886	123	301
W7CT	*	695,928	806	91	230
K7UA	*	686,623	785	94	235
KG7H	*	656,625	686	116	259
KN5H/7	*	624,160	578	124	291
NQ7R	*	508,431	551	108	233
WA7LNW	*	443,220	516	103	253
W7SW	*	441,000	551	100	215
NG7Z	*	422,236	586	100	183
NW7E	*	350,560	415	105	208
W7IJ	*	316,234	478	88	174
K7ABV	*	308,992	455	78	178
N6TW/7	*	252,284	414	89	147
KØTO/7	*	223,590	309	95	195
WS7L	*	222,615	340	83	172
N7RT	*	207,944	288	95	183
K7EG	*	137,632	294	64	112
K7LV	*	122,385	304	70	129
K7RF	*	120,733	278	54	103
K7GS	*	106,785	213	64	125
K7VIT	*	102,378	260	60	91
W7WHY	*	99,532	260	59	90
KF7E	*	92,988	197	71	118
WU9B/7	*	63,468	165	64	100
N6MZ/7	*	45,793	99	87	94
K7MO	*	43,524	172	42	66
K6KR/7	*	41,776	145	42	70
ND8N/7	*	40,068	153	52	56
KT7G	*	38,124	135	49	59
K7KR	*	35,532	112	45	81
WX7P	*	34,932	159	39	43
K7RSM	*	26,288	112	45	61
KE7YF	*	24,099	103	37	50
W6SA/7	*	24,030	103	40	50
K7MY	*	22,842	115	36	58
K7EKM	*	19,936	91	37	52
KR7RK	*	17,819	67	46	57
KE7GYQ	*	15,360	100	35	45
K7RR	*	10,266	77	24	34
N6VR/7	*	4,410	39	23	26
NA2U/7	*	15	3	3	2
W7UT	**21**	**78,540**	**276**	**30**	**80**
W7ZR	*	60,270	273	27	71
K7XC	*	29,319	135	26	61
K7OX	*	15,028	99	22	46
N6SS/7	**3.5**	**56,048**	**205**	**30**	**83**
N6TR/7	**1.8**	**9,400**	**106**	**18**	**32**
W8MJ	**A**	**2,535,744**	**1725**	**139**	**425**
N8BJQ	*	**1,905,579**	**1264**	**133**	**416**
N8TR	*	1,208,806	726	150	476
W8HC	*	1,009,154	845	109	334
N8MZ	*	398,762	494	88	225
KA8HOK	*	386,100	450	92	233
AA8LL	*	361,456	445	87	217
W8TE	*	282,012	328	104	227
W8OHT	*	245,252	370	77	189
WI8A	*	215,712	332	79	173
KØAD/8	*	199,956	333	72	156
N4TX/8	*	192,066	331	70	168
W7PP/8	*	182,039	316	72	175
K8MEG	*	174,720	318	53	157
K8GT	*	105,468	208	64	140
N8KU	*	68,880	162	52	116
WD8S	*	45,360	135	43	92
AC8E	*	32,431	125	36	77
K8ESQ	*	15,015	65	33	58
NA8W	*	14,904	115	39	53
KD8GOX	*	9,396	53	40	47
W8EH	*	6,944	55	22	40
K8TJM	*	208	15	6	7
W8TK	*	24	2	2	2
N8LJ	**21**	**211,077**	**656**	**33**	**108**
K8DD	**14**	**456,374**	**1057**	**36**	**137**
AC8W	**7**	**184,190**	**503**	**37**	**126**
WZ8P	*	73,622	281	32	99
K8AQM	**3.5**	**111,104**	**362**	**27**	**97**
W8UVZ	**1.8**	**36,660**	**229**	**23**	**71**
N8EA	*	19,370	118	18	47
WB9Z	**A**	**2,019,966**	**1292**	**152**	**459**
WE9V	*	**1,734,603**	**1170**	**142**	**421**
K9IMM	*	**1,551,204**	**1196**	**115**	**362**
W9MU	*	1,122,344	890	121	357
WE9R	*	769,570	708	108	302
K9NR	*	690,336	704	111	321
K9IUQ	*	646,020	631	92	278
N2BJ/9	*	535,944	609	90	236
KI9A	*	466,640	488	106	274
ND9E	*	450,216	527	93	245
NS9I	*	225,336	386	68	161
NF9V	*	194,694	332	63	159
K9OR	*	194,300	263	82	208
N9UA	*	144,948	291	58	130
KB9S	*	140,765	231	80	155
WX9U	*	101,541	219	61	126
KS9W	*	99,264	208	68	124
N9FN	*	92,184	213	64	120
W9IL	*	80,160	185	48	112
W9ZV	*	61,456	163	56	111
KA9FOX	*	57,564	143	55	101
K9UH	*	55,611	135	69	98
WA9LEY	*	54,166	155	46	100
K9DUR	*	45,844	139	42	104
K9OZ	*	42,636	143	41	91
K9IJ	*	33,976	116	39	85
W9PDS	*	22,568	96	35	69
K9EN	*	13,838	86	26	48
N9GUN	*	9,450	55	25	45
K9ZT	*	840	16	13	15
N9WK	*	729	17	12	15
W9IIX	**14**	**15,561**	**118**	**25**	**66**
W9SN	**7**	**283,850**	**516**	**35**	**116**
N9AU	*	158,410	389	34	112
K9CJ	*	153,936	398	34	110
KM9M	*	36	3	3	3
N9BX	**3.5**	**42,790**	**170**	**26**	**84**
K9RO	**1.8**	**15,336**	**99**	**19**	**53**
KØKX	**A**	**2,062,753**	**1386**	**140**	**399**
WAØMHJ	*	888,750	741	117	333
N5IN/Ø	*	838,695	751	118	311
AD1C/Ø	*	560,790	630	92	243
KØPC	*	488,748	548	100	238
WØTT	*	392,275	471	91	234
KØOB	*	390,486	499	84	218
KØRC	*	213,855	314	88	177
KØYR	*	196,463	331	75	148
WØBM	*	187,530	303	60	175
WW2Y/Ø	*	171,380	322	66	154
WBØN	*	146,718	279	69	140
KSØT	*	134,865	230	79	164
NØEO	*	119,364	234	67	136
				(OP: AAØAW)	
KØUK	*	99,530	210	73	112
NØRN	*	95,570	191	67	123
KØJPL	*	95,275	186	63	122
NØAH	*	93,184	207	68	140
NØBK	*	67,095	193	45	90
K4IU/Ø	*	64,413	160	52	101
WGØM	*	58,432	161	58	118
NØKBD	*	54,288	146	61	95
KEØL	*	48,654	135	60	93
NRØL	*	42,598	141	41	77
NRØT	*	41,402	146	47	80
WBØRUR	*	38,052	127	42	84
NØHJZ	*	36,576	112	53	91
KØMPH	*	36,308	125	38	78
NØXM	*	33,930	118	42	75
WØLM	*	29,637	104	39	72
NØKQ	*	21,583	92	50	63
WØELT	*	16,800	87	34	46
NDØC	*	11,704	56	26	51
KBØR	*	7,896	101	29	65
KØKU	*	3,876	41	26	31
				(OP: NØRC)	
KCØRET	*	2,736	30	21	27
NUØJ	*	2,440	39	18	22
WB8ZRL/Ø	*	2,142	24	17	17
WØRSB	*	24	2	2	2
KØRI	**28**	**5,256**	**56**	**12**	**24**
NØHF	**21**	**3,740**	**36**	**13**	**31**
WØAD	**14**	**120,360**	**374**	**28**	**90**
KØBX	*	105,522	299	29	100
WT9Q/Ø	*	47,187	181	27	80
KVØQ	**7**	**557,601**	**1103**	**39**	**144**
WØGJ	*	63,535	218	35	96
KØKT	**3.5**	**109,740**	**354**	**29**	**95**
W7RF/Ø	*	41,915	162	26	75
NIØC	**1.8**	**943**	**18**	**10**	**13**
		Alaska			
AL9A	**A**	**170,170**	**411**	**67**	**183**
		Bermuda			
VP9I	**A**	**1,947,400**	**2476**	**92**	**258**
				(OP: KEØUI)	
		Canada			
VE1OP	**A**	**2,517,794**	**2362**	**109**	**354**
VE9HF/1	*	382,432	528	83	240
VE1ZA	*	178,192	460	49	123
VE1JF	1.8	7,701	70	14	37
VA2WDQ	**A**	**2,234,535**	**2011**	**114**	**365**
VA2EW	*	**2,150,793**	**1964**	**123**	**354**
				(OP: VE2TZT)	
VE2XAA	*	1,047,160	1194	97	279
VA2AM	*	449,223	571	95	316
VA2UP	*	36,296	158	36	68
VE3RZ	**A**	**1,778,590**	**1417**	**123**	**383**
VE3MMQ	*	**1,433,525**	**1446**	**97**	**328**
VE3MM	*	**1,306,407**	**1395**	**114**	**329**
VE3CFK	*	875,160	960	108	300
VA3DX	*	604,032	564	115	314
VE3XD	*	528,736	645	88	240
VE3XAT	*	263,520	395	85	203
VE3THX	*	26,980	124	31	64
VE3IQ	*	15,576	97	34	54
VE3MGY	**3.5**	**43,200**	**389**	**16**	**44**
VE4EAR	**A**	**290,019**	**464**	**89**	**188**
VE5MX	**A**	**125,136**	**303**	**64**	**112**
VE6TN	**A**	**389,322**	**648**	**89**	**169**
VE6LB	**7**	**61,182**	**304**	**30**	**69**
VE7KS	**A**	**335,703**	**431**	**112**	**205**
VE7IO	*	230,250	851	64	86
VE7GL	**14**	**614,508**	**1601**	**37**	**127**
				(OP: VA7AO)	
		Cayman Islands			
ZF2AM	**A**	**6,987,057**	**4956**	**146**	**463**
				(OP: K5AM)	
		Costa Rica			
TI5A	**14**	**712,746**	**2400**	**30**	**104**
				(OP: K2PLF)	
		El Salvador			
YS1/W3MKT	A	11,376	125	22	26
		Mexico			
XE1R	**A**	**213,904**	**440**	**79**	**153**
XE1EE	*	144,928	288	71	153
XE3RR	*	28,980	350	25	45
XE2WWW	**7**	**492,712**	**1821**	**32**	**89**
		Nicaragua			
H7A	**A**	**426,690**	**1195**	**60**	**105**
				(OP: YN4SU)	
		Puerto Rico			
NP4KT	**A**	**40,576**	**145**	**47**	**81**
		U.S. Virgin Islands			
KP2B	**A**	**233,512**	**555**	**58**	**144**
				(OP: WP3A)	
KP2DX	*	103,008	256	56	118
				(OP: KP2BH)	
		AFRICA			
		African Italy			
IG9X	**21**	**637,230**	**1335**	**35**	**130**
				(OP: IK1QBT)	
IG9U	**3.5**	**601,772**	**1670**	**28**	**96**
				(OP: I1NVU)	
		Canary Islands			
ED4R/8	**A**	**527,802**	**816**	**69**	**173**
EA8OM	28	121	7	5	6
		Ceuta and Melilla			
EA9/OL8R	**A**	**4,056,416**	**3476**	**87**	**329**
		Liberia			
EL8RI	**14**	**7,160**	**75**	**14**	**25**
				(OP: ZS6RI/EL8RI)	
		Madeira Islands			
CT3KN	**7**	**1,045,934**	**2361**	**34**	**123**
		Mozambique			
C91LW	**A**	**2,076,145**	**1751**	**113**	**306**
				(OP: UY5LW)	
		South Africa			
ZS4U	**21**	**337,212**	**1178**	**23**	**79**
		ASIA			
		Asiatic Russia			
RC9O	**A**	**5,714,709**	**4220**	**133**	**385**
				(OP: UA9PC)	
RG9A	**A**	**5,231,569**	**3681**	**125**	**398**
				(OP: UA9AM)	
RA9FTM	*	3,980,421	3035	117	354
UA9OG	*	1,937,066	1921	98	300
RX9SA	*	1,291,392	1078	104	352
UA9MC	*	1,231,172	1070	111	355
RM9RZ	*	972,762	1093	90	281
RX9AM	*	908,859	944	94	289
RZ9CJ	*	870,723	1235	61	210
RU9CK	*	819,805	1021	70	225
UA9MD	*	549,626	754	73	228
UA9XF	*	485,331	796	46	185
RU9DD	*	464,820	740	55	199
RA9DZ	*	333,558	602	58	155
RV9UF	*	323,136	814	55	137
RA9MX	*	279,870	411	73	212
RU9MU	*	234,228	400	76	186
RA9AC	*	192,276	305	66	186
UA9AGX	*	171,600	291	69	195
RU9HM	*	158,060	442	40	100
RW9WW	*	151,700	308	48	157
RU9TO	*	140,892	251	68	168
RV9XO	*	27,195	104	45	66
RU9CX	*	23,100	109	23	61
RW9OC	*	17,513	93	25	58
RA9UN	*	7,546	83	13	36
UA9LP	*	5,952	57	24	38
RN9AA	*	432	11	8	10
UA9MI	*	306	10	9	9
UA9XS	*	120	8	7	8
RX9TL/9	**21**	**304,566**	**912**	**30**	**108**
UA9TZ	*	**230,640**	**775**	**27**	**97**
RW9CD	*	76,092	320

JL1OXH	*	84,331	195	68	101
7K1CPT	*	59,100	177	67	83
JH1DYV	*	58,764	198	43	75
JH1OVY	*	56,516	167	53	89
JRØKVU/1	*	55,611	221	44	67
JA1PTJ	*	29,007	115	46	53
JS1KQQ	*	27,371	115	42	59
JO1WIZ	*	11,523	78	27	42
JA1WHG	*	10,725	77	32	33
JR1NHD	*	9,200	78	18	28
JI1CQA	*	6,902	53	24	34
JA1QGT	28	297	9	4	7
JA1CTB	**21**	**22,046**	**155**	**28**	**45**
7K4QOK	**14**	**159,125**	**486**	**31**	**94**
JO1WKO	**7**	**59,655**	**180**	**31**	**92**
JO1UHK	*	684	21	6	6
JA1OVD	3.5	5,394	47	22	36
JA2FJP	**A**	**1,520,510**	**1579**	**121**	**262**
JR2PMT	*	285,040	427	97	183
JA2VHO	*	272,811	511	74	157
JF2OZH	*	162,564	375	67	119
JA2FSM	*	159,212	345	88	124
JA2BQX	*	33,579	115	41	82
JA2KCY	*	9,730	68	32	38
JA2YKA	14	80	7	4	6
JR2ALA	**7**	**24,752**	**147**	**21**	**47**
JF2MBF	**3.5**	**20,860**	**125**	**23**	**47**
JH2FXK	**1.8**	**9,984**	**75**	**18**	**34**
JH3PRR	**A**	**1,656,807**	**1256**	**139**	**362**
JA3PYC	*	332,215	501	97	172
JN3SAC	*	273,600	496	74	151
JG3FEA	*	141,939	280	68	121
JA3VUI	*	57,888	161	62	82
JI3KXB	*	9,548	63	32	45
JK3GWT	**21**	**18,836**	**145**	**24**	**44**
JL3RDC	*	760	20	9	11
JH3AIU	**14**	**639,657**	**1522**	**37**	**122**
JN3DSH	*	79,788	313	29	80
JS3CTQ	**7**	**803,760**	**1729**	**38**	**132**
JH3GCN	*	78,810	224	36	106
JF3GKE	**3.5**	**44,604**	**238**	**23**	**61**
JH4UTP	**A**	**959,694**	**1131**	**110**	**244**
JH1GUO/4	*	120,990	307	72	113
JN4MMO	**1.8**	**25,080**	**175**	**20**	**40**
JS6RGY	**A**	**2,993,236**	**2392**	**134**	**344**
JA6BZI	*	710,318	698	135	314
JS6RTJ	*	221,760	402	85	146
JA6SRB	**3.5**	**45,056**	**222**	**25**	**63**
JA6VU	**1.8**	**4,872**	**65**	**14**	**28**
JA7ZP	**A**	**162,385**	**316**	**89**	**146**
JA7KY	*	116,640	192	92	178
JR7MAZ	*	3,149	25	24	23
JA7OWD	**28**	**2,565**	**37**	**11**	**16**
JH8CXW	**A**	**184,198**	**345**	**78**	**145**
JF9JTS	**A**	**96,580**	**337**	**48**	**62**
JH9KVF	**21**	**52,348**	**269**	**32**	**60**
JRØBUL	**A**	**1,360**	**19**	**15**	**19**
JJØMPI	**14**	**20,352**	**135**	**21**	**43**
JAØFVU	**1.8**	**5,360**	**72**	**16**	**24**

Kazakhstan

UP4L	**A**	**2,538,179**	**2011**	**115**	**382**
			(OP: UN7LZ)		
UN6T	*	571,142	804	75	211
UN4PG	**21**	**84,575**	**420**	**22**	**63**
UN8PT	*	55,854	296	25	62
UN7GCE	*	5,000	56	21	29
UNØL	**14**	**461,377**	**1304**	**31**	**102**
UN9LU	**7**	**191,760**	**756**	**25**	**77**
UN8FM	*	36,112	196	15	59

Kuwait

9K2HN	**3.5**	**676,260**	**1942**	**31**	**99**
			(OP: 9K2RR)		

South Korea

HL2AEJ	**14**	**144,072**	**619**	**29**	**79**

Taiwan

BX5AA	**A**	**31,089**	**109**	**49**	**80**

Tajikistan

EY7AB	21	5,265	109	16	29

Thailand

E21EIC	**A**	**2,479,380**	**2389**	**124**	**341**
E21YDP	*	10,575	99	32	43

Vietnam

3W1M	**21**	**306,084**	**1080**	**35**	**103**
XV2MDY	*	272,004	1363	30	84
XV2JR	**3.5**	**30,175**	**257**	**22**	**49**

EUROPE

Austria

OE2S	**A**	**2,570,225**	**2236**	**154**	**511**
			(OP: OE2VEL)		
OE3ZK	*	766,272	1129	106	310
OE6MDF	*	301,204	717	65	192
OE2GEN	*	19,872	97	36	72
OE4VIE	*	18,042	144	29	64
OE1H	*	12,900	104	22	53
			(OP: OE1TKW)		
OE5JKL	*	12,789	145	20	67
OE5OHO	**7**	**724,812**	**2116**	**40**	**147**
OE3I	*	587,290	1857	40	150
			(OP: OM3ED)		
OE3GSA	*	394,582	1427	37	129
OE3KAB	*	40,866	252	18	80
OE6IMD	**1.8**	**47,871**	**532**	**16**	**65**

Balearic Islands

EA6BF	**A**	**36,022**	**328**	**24**	**59**
EA6SX	**3.5**	**311,750**	**1503**	**32**	**113**

Belarus

EU1AZ	**A**	**1,209,552**	**1760**	**103**	**349**
EV8D	**"**	**1,186,955**	**2209**	**83**	**302**
			(OP: EW8CY)		
EV1R	*	1,154,872	1491	116	366
EW6CU	*	268,550	719	61	201
EW1NA	*	208,221	539	58	189
EW7DK	*	195,027	577	59	192
EW2AO	*	62,208	352	28	116
EU1CL	**7**	**159,355**	**814**	**35**	**110**

Belgium

OP4A	**A**	**705,329**	**1302**	**74**	**275**
0090	*	161,504	521	47	177
			(OP: ON7SS)		
OT4A	**7**	**716,975**	**2646**	**39**	**136**
OR2A	**3.5**	**152,145**	**1186**	**18**	**87**
			(OP: ON7YX)		
ON4WW	**1.8**	**210,748**	**1419**	**27**	**91**
			(OP: OM3TZZ)		

Bosnia-Herzegovina

E74AA	**A**	**118,854**	**275**	**64**	**215**
E72MM	*	6,930	56	24	53

Bulgaria

LZ8E	**A**	**4,936,755**	**4134**	**162**	**571**
			(OP: LZ2BE)		
LZ3SM	*	436,022	799	76	235
LZ2ZG	**28**	**378**	**16**	**5**	**13**
LZ2JA	**21**	**56,120**	**279**	**32**	**90**
LZ9X	**14**	**283,196**	**1008**	**37**	**129**
			(OP: LZ1RB)		
LZ6W	*	228,463	833	36	115
LZ5ZI	**7**	**86,478**	**359**	**35**	**107**
LZ1QV	*	49,680	239	27	88

Corsica

TK5EP	**A**	**5,181,772**	**4440**	**144**	**487**
TK5A	**7**	**861,050**	**3186**	**38**	**132**
			(OP: IZ8GCB)		

Croatia

9A4M	**A**	**4,246,280**	**3675**	**150**	**514**
9A4W	**28**	**13,140**	**207**	**13**	**47**
9A2U	**"**	**5,800**	**97**	**11**	**39**
			(OP: 9A3ZA)		
9A3ST	21	20,833	118	23	60
9A9A	**14**	**554,184**	**1581**	**38**	**134**
9A1AA	**"**	**524,628**	**1553**	**39**	**132**
9A5DU	*	234,954	1304	30	84
9A1O	**7**	**1,060,224**	**3113**	**40**	**152**
			(OP: 9A3IO)		
9A4D	**"**	**778,491**	**2545**	**40**	**149**
			(OP: 9A7DX)		
9A2VJ	*	229,200	1072	31	89
9A5Y	**3.5**	**681,340**	**2693**	**34**	**129**
			(OP: 9A3NM)		
9AØAA	*	294,712	1550	31	105
			(OP: 9A6M)		

Czech Republic

OK7Y	**A**	**1,568,060**	**1959**	**107**	**374**
			(OP: OK1FDY)		
OK1KT	**"**	**1,140,030**	**1433**	**117**	**360**
OK1DM	*	267,501	752	51	196
OL5Y	*	245,949	695	63	194
			(OP: OK1FUA)		
OK2CLW	*	190,755	397	67	176
OK1TD	*	139,092	326	52	149
OK1MKI	*	131,412	520	47	141
OK2BPU	*	84,360	228	63	127
OK1FHI	*	83,300	344	40	130
OK2BV	*	49,000	345	26	114
OK1DTC	*	41,715	134	47	88
OK6DJ	*	13,351	89	23	56
OL5M	**28**	**8,154**	**180**	**10**	**44**
			(OP: OK1GI)		
OK1CDJ	*	341	25	8	23
OL9R	**21**	**271,607**	**757**	**36**	**125**
			(OP: OK1WMV)		
OK3R	*	235,996	667	37	127
			(OP: OK1DVM)		
OK2ZI	*	175,808	540	35	129
OL8M	**14**	**594,872**	**1515**	**39**	**145**
OL3R	**"**	**488,520**	**1310**	**40**	**137**
			(OP: OK1VWK)		
OK1FZM	*	251,472	762	36	120
OK3MAD	*	76,436	410	27	70
OK3C	*	74,880	414	21	57
			(OP: OK2ZC)		
OK1DG	**7**	**291,078**	**1161**	**36**	**121**
OL1M	**"**	**256,176**	**1209**	**34**	**110**
			(OP: OK1EW)		
OK2ZO	*	157,410	631	39	126
OK1UG	*	63,855	558	19	80
OK2CMW	*	18,396	125	17	46
OK1NI	**3.5**	**69,024**	**624**	**18**	**78**
OK5AD	*	3,876	130	6	28
OL1A	**1.8**	**206,864**	**1312**	**26**	**86**
			(OP: OK1CW)		
OK1TN	*	142,782	1005	24	82
OK1NY	*	92,183	850	19	72
OK1T	*	65,764	788	15	67
			(OP: OK1TP)		
OK1IW	*	40,460	607	11	59

Denmark

OZ1IKY	**A**	**124,012**	**338**	**49**	**123**
OZ1AXG	*	87,718	680	28	94
OZ4RT	*	54,774	271	37	116
5Q2T	**3.5**	**13,554**	**254**	**12**	**42**
OZ4O	**1.8**	**12,996**	**198**	**9**	**48**

England

G5W	**A**	**2,702,960**	**2523**	**124**	**441**
			(OP: G3BJ)		
G4IIY	**"**	**1,927,006**	**2366**	**100**	**363**
G3XTT	*	840,480	1242	86	326
G4MKP	*	824,160	1384	75	265
G3LZQ	*	721,992	800	102	347
G4BJM	*	424,099	1121	62	185
G3ZQH	*	240,384	530	62	194
G4FSU	*	164,030	315	61	174
G4MKR	*	89,208	343	40	128
GØAZS	*	49,104	296	30	102
GØRPM	*	30,705	218	22	67
G6OKU	*	22,500	184	25	65
G4BYG	*	6,004	69	19	57
M2X	**14**	**469,238**	**1583**	**37**	**117**
			(OP: G4RCG)		
MØOKT	*	3,040	59	9	23
G3VPW	**7**	**138,985**	**754**	**28**	**105**
G3MZV	*	111,264	641	26	96
G4RQI	*	55,660	457	19	73
G3UHU	*	35,370	285	17	73
G3RTE	**3.5**	**61,256**	**410**	**20**	**84**
G3TXF	**1.8**	**76,626**	**730**	**17**	**69**
G3WPH	*	48,375	494	13	62

Estonia

ES5TV	**A**	**4,629,878**	**3690**	**170**	**608**
ES2DJ	*	805,581	1510	86	313
ES2MA	*	154,660	365	49	160
ES2BH	*	34,202	179	32	66
ES5TF	*	27,000	167	28	97
ES5RY	**7**	**368,562**	**1183**	**39**	**144**
ES5NC	**3.5**	**10,653**	**170**	**11**	**42**

European Russia

RT3T	**A**	**2,369,198**	**2672**	**142**	**480**
			(OP: UA3TU)		
RD3BW	**"**	**1,963,104**	**2624**	**118**	**410**
RX3AT	**"**	**1,046,931**	**1411**	**104**	**357**
RA1QD	*	802,222	1250	90	332
UA4ALI	*	576,602	1110	82	249
RN1ON	*	505,791	1015	75	222
RA3FO	*	473,445	1027	79	236
UA1NFA	*	463,080	850	86	254
RA3DNC	*	430,986	700	86	241
RU3PU	*	428,612	903	77	255
RX6DQ	*	427,020	984	77	253
RW1CX	*	415,191	682	81	276
RA6AR	*	320,108	653	71	245
RL6YXX	*	316,932	654	78	265
			(OP: RU6YJ)		
RU3UM	*	292,802	672	66	215
RZ3DA	*	289,813	482	90	263
RZ6HF	*	237,600	545	72	198
RN3BO	*	224,576	732	53	179
RA1QN	*	215,845	709	50	195
UA4LA	*	211,995	442	73	242
RV3NB	*	201,376	629	54	163
UA3SAQ	*	187,452	444	63	191
RX3AGD	*	181,704	282	85	183
UA3AMZ	*	176,040	668	44	172
UA1OAM	*	165,165	448	60	171
UA3LEO	*	165,044	266	83	258
RA3ID	*	158,530	585	44	147
UA3PW	*	130,020	329	60	160
RA3XE	*	127,998	452	55	179
RX3AEX	*	124,764	448	51	171
RN1NU	*	121,014	275	72	171
UA6AA	*	97,308	306	52	160
UA4RF	*	94,920	274	46	164
RV6LN	*	94,302	296	54	132
RA3ATX	*	88,387	406	38	131
RK6FZ	*	87,958	331	49	150
RX3RZ	*	75,166	306	47	135
RK6AQM	*	62,264	233	47	134
RN3ZIC	*	48,972	201	44	110
RU3ON	*	41,917	120	56	111
UA4FCO	*	37,710	356	21	69
RW4NN	*	33,227	110	52	97
UA3QR	*	31,886	247	24	83
UA6JCC	*	30,607	137	46	81
UA3VVB	*	26,576	123	31	57
UA3UCD	*	23,836	123	35	83
RU3AT	*	23,320	119	33	73
UA6FF	*	22,288	89	48	64
UA3TAO	*	22,110	89	46	64
RW4PK	*	21,504	106	41	87
RW4WZ	*	20,535	97	42	69
UA3XAC	*	18,507	141	21	72
RZ1AWZ	*	16,568	130	20	56
RL3AB	*	13,112	75	37	51
RA4PR	*	12,584	70	39	65
RN3AMF	*	8,704	112	12	52
RW3OD	*	4,620	30	26	29
RA3SS	*	4,590	36	21	33
UA3UBT	*	2,800	52	10	30
RU3OO	*	850	21	10	15
UA6IGI	*	104	8	5	8
RA3OE	21	13,056	109	20	48
UA6LV	**14**	**527,152**	**1536**	**40**	**148**
RN3QO	**"**	**385,605**	**1242**	**36**	**135**
RU4WD	*	150,837	794	33	104
RZ1OM	*	126,111	549	28	99
RW6AH	*	116,874	481	34	95
RD3BV	*	77,468	400	24	83
UA4WLI	*	64,530	490	20	70
RW6BN	*	50,200	384	23	77
RV3ZQ	*	49,551	341	18	65
UA3KM	*	34,800	207	24	76
UA6LUQ	*	27,336	315	13	54
RK3MWC	*	17,242	163	20	54
			(OP: UA3MSS)		
RL4R	**7**	**895,440**	**2821**	**40**	**155**
			(OP: RW4PL)		
UA3MNB	**"**	**467,020**	**1528**	**40**	**150**
RA3FD	*	103,168	523	27	97
UA6ATG	*	3,344	66	9	35
RK3SWS	**3.5**	**469,200**	**2001**	**33**	**117**
			(OP: RV3BA)		
UA1OMS	*	298,656	1459	31	113
UA3MIF	*	276,944	1214	34	118
UA4HOX	*	159,558	920	29	102
RA3SL	*	113,955	859	24	83
RV3MI	*	11,800	182	9	41
RU4PU	**1.8**	**130,804**	**856**	**24**	**82**
RZ3DJ	*	44,840	497	14	62
RU3DX	*	37,520	349	18	62
RU6FA	*	15,040	173	14	50
RU6YY	*	8,960	131	9	47

Faroe Islands

OY1CT	**A**	**298,800**	**815**	**54**	**195**

Finland

OH4A	**A**	**4,198,257**	**3663**	**155**	**532**
			(OP: OH6KZP)		
OH8L	**"**	**2,251,652**	**2592**	**126**	**368**
			(OP: OH8LQ)		
OH6MW	**"**	**1,121,456**	**2022**	**93**	**341**
OH1MM	*	1,034,930	1221	106	388
OH2XX	*	970,600	1203	105	355
OH6OS	*	414,540	496	94	329
OH6K	*	378,995	651	77	254
			(OP: OH6VIM)		
OH6RE	*	322,040	510	88	300
OH8DR	*	252,280	668	56	182
OH2KW	*	223,189	462	77	230
OH8FKU	*	221,067	582	53	208
OH2BEN	*	176,464	402	63	206
OH3FM	*	151,905	694	38	157
OH1KIO	*	113,004	422	39	133
OH8KVA	*	105,350	406	37	138
OH2CI	*	10,920	83	24	60
OH2FS	**21**	**2,451**	**26**	**17**	**26**
OH2BN	**14**	**49,792**	**187**	**28**	**100**
OH2PQ	**7**	**481,113**	**1679**	**39**	**134**
OH6M	*	466,832	1748	38	141
			(OP: OH6LBW)		
OG5B	**3.5**	**429,096**	**1869**	**33**	**119**
OH6CW	*	24,705	192	17	64
OH1RX	*	4,788	86	9	48
OG4T	**1.8**	**94,656**	**738**	**22**	**80**
OH2BO	*	44,560	364	17	63

France

F8BPN	**A**	**1,339,470**	**2038**	**105**	**305**
F8CRH	*	902,100	1200	101	271
F1JKJ	*	498,789	656	99	254
F5NBK	*	189,280	502	49	159
F4FDA	*	173,481	322	59	172
F5TSG	*	61,047	233	44	145
F8CRS	*	48,336	149	48	111
F6KPQ	*	38,610	232	25	74
			(OP: F6DZD)		
F6DZD	*	9,301	84	23	48
F4EIZ	*	2,226	22	20	22
F6IIT	**21**	**137,883**	**602**	**33**	**90**
F8CIL	**14**	**108,000**	**579**	**22**	**74**
F2DX	**3.5**	**401,250**	**1714**	**33**	**117**
F4DNW	*	128,282	974	19	79
F5IN	**1.8**	**149,646**	**1149**	**22**	**76**
TM4Q	**"**	**89,956**	**859**	**18**	**68**
			(OP: F6FYA)		
F6DDR	*	48,374	811	12	55

Germany

DJ5QV	**A**	**2,199,366**	**2231**	**119**	**363**
DK3GI	**"**	**1,707,430**	**1521**	**136**	**429**
DL1LH	**"**	**1,446,405**	**2002**	**110**	**347**
DL8OS	**"**	**1,227,915**	**1145**	**142**	**443**
DL6KVA	*	1,194,611	1407	113	374
DL5GAC	*	1,022,976	1524	105	339
DL4WA	*	865,600	1307	96	304
DL1EJA	*	839,415	797	113	410
DJ3WE	*	800,360	1158	109	331
DL5AWI	*	798,000	1209	105	315
DF2UU	*	770,955	870	109	390
DHØGHU	*	765,799	1033	95	326
DF5ZV	*	689,724	938	95	319
DJ8OG	*	608,946	789	104	318
DL3KUM	*	512,077	732	85	316
DF7GG	*	472,750	967	67	243
DL5XAT	*	408,408	813	70	242
DL6NCY	*	374,530	625	84	251
DM5JBN	*	355,110	766	65	220
DL5AN	*	333,450	490	93	249
DK6CQ	*	332,937	537	75	222
DK1FW	*	293,562	435	81	266
DK7ZH	*	266,485	743	50	189
DG7RO	*	237,448	562	60	208
DL7UIO	*	214,704	503	58	158
DK9DA	*	200,970	366	75	186
DF2LH	*	196,862	458	61	196
DK3DUA	*	177,788	351	71	192
DL8DH	*	173,441	436	57	194
DL4CF	*	171,312	639	41	125
DL1NEO	*	165,206	428	50	176
DL9NDV	*	155,848	344	62	191
DF1HF	*	145,790	402	55	184
DLØNG	*	139,500	534	42	144
			(OP: DK8NC)		
DF7ZS	*	131,040	317	52	172
DJØIF	*	129,574	427	53	153
DL6ZXG	*	125,216	556	46	126
DL4AC	*	118,116	485	43	150
DL5AYI	*	115,830	426	47	148
DL4RCK	*	104,910	262	70	199
DL2F	*	104,625	731	35	120
			(OP: DL2FDL)		
DL2SWN	*	92,082	202	60	146
DL1BUG	*	91,392	312	46	146
DL5ZL	*	90,800	331	47	153
DK2CX	*	81,797	298	39	118
DL2RTL	*	80,724	299	49	137
DL9NCR	*	78,440	251	51	134
DJ1AA	*	76,797	253	43	116
DKØAE	*	75,525	253	43	116
			(OP: DJ1AA)		
DL4KUG	*	66,360	294	30	128
DL1SBF	*	62,054	296	31	111
DL1DBR	*	55,461	271	32	107
DL3G	*	55,130	266	37	112
			(OP: DC3RJ)		
DF2RG	*	52,836	222	37	111
DF6QV	*	52,185	236	26	121
DL8CA	*	50,858	186	42	76
DL5SVB	*	48,400	229	30	80
DF2AP	*	47,970	248	30	100
DL6DH	*	47,517	265	33	108
DL4HRM	*	43,608	333	26	112
DL5ZB	*	37,101	108	62	87
DL8UNF	*	36,585	269	31	104
DL1RTL	*	35,960	148	44	80
DL3DRN	*	35,904	183	30	72
DL3ZM	*	33,480	138	39	69
DC9MA	*	31,540	237	20	63
DL1ECG	*	30,408	128	42	126
DL6AG	*	23,650	89	42	68
DL4GBA	*	22,446	125	42	87
DL7JAN	*	17,655	72	43	64
DM3VL	*	15,197	124	25	66
DL7VEE	*	12,512	55	41	51
DL1SWT	*	12,243	103	24	53
DL1DQW	*	10,530	70	27	54
DL5KUA	*	10,428	121	15	64
DL2AMD	*	9,880	60	36	40
DL8USA	*	5,922	40	28	35
DK1AX	*	2,976	28	21	27
DL2MLU	*	260	22	7	19
DL3YDY	*	225	11	5	10
DL/E71DX	*	66	9	5	6
DH8WE	**28**	**12,738**	**208**	**14**	**53**
DO4DXA	*	462	15	7	14
DK5QN	**21**	**255,824**	**727**	**35**	**119**
DF9ZP	**"**	**221,616**	**613**	**36**	**135**
DL7AU	*	154,720	408	35	125
DL9GS	*	82,680	316	34	86
DL4UL	*	61,585	238	32	81
DK8FD	**14**	**290,004**	**860**	**35**	**120**
DL6KO	*	91,000	375	24	80
DL4LAM	*	44,951	246	21	58
DL4FN	*	29,625	179	21	54
DL2QT	*	21,582	151	21	45
DD1IM	*	6,200	82	11	20
DK9IP	**7**	**904,256**	**2560**	**40**	**159**
DF9LJ	*	518,144	1443	40	144
DJ7SW	*	143,880	514	39	126
DK5XG	*	35,247	255	17	76
DL7URH	*	20,832	148	18	66
DH6DAO	*	18,426	221	13	61
DL7ON	**3.5**	**411,835**	**1768**	**34**	**121**
DM7C	**"**	**323,046**	**1891**	**29**	**108**
			(OP: DL7CX)		
DK2GZ	*	217,350	1189	28	107
DL5CF	*	99,120	737	24	88
DL9ZP	*	58,223	634	12	67
DB7MA	*	5,900	105	7	43
DJ4AX	**1.8**	**119,830**	**732**	**26**	**89**
DJ6TK	*	42,968	487	15	67
DL5MX	*	28,425	383	13	62
DJ8ES	*	3,666	85	7	40

Greece

J46J	**A**	**1,678,320**	**3304**	**92**	**278**
			(OP: SV1BJW)		
SV1ENG	*	846,336	1883	74	274
SV1BDO/3	*	124,218	382	51	150
SV1DPI	*	28,215	201	31	64
SX1L	**21**	**190,260**	**1091**	**32**	**108**
			(OP: SV2FWV)		
SV2BFN	**"**	**174,580**	**796**	**35**	**105**
SV2KBS	**7**	**87,279**	**430**	**34**	**107**
SV1GRD	**1.8**	**15,708**	**206**	**13**	**53**

Hungary

HG7T	**A**	**2,918,240**	**2705**	**141**	**469**
			(OP: HA7TM)		
HG1A	**"**	**1,561,068**	**2552**	**106**	**315**
HA7GN	*	702,660	1302	75	219
HG2W	*	613,120	1336	69	251
			(OP: HA2OW)		
HA3OU	*	553,344	982	88	264
HA5X	*	236,205	664	58	123
			(OP: HG5XA)		
HA8CQ	*	215,196	637	56	171
HA7VK	*	100,880	296	54	140
HA5NB	*	75,306	344	42	121
HA5JI	*	43,344	354	19	53
HAØHW	*	40,672	227	34	90
HA5OO	*	9,063	68	23	30
HG3M	**21**	**241,280**	**747**	**35**	**125**
			(OP: HA3MY)		
HAØNAR	*	139,365	440	35	128
HA3LI	*	83,678	300	34	105
HAØLC	*	44,304	172	30	74
HG3R	**14**	**844,155**	**2117**	**39**	**146**
			(OP: HA3NU)		
HG4I	*	275,633	864	37	126
HG8C	*	175,168	523	38	123
			(OP: HA8EK)		
HA8QZ	**7**	**316,983**	**1400**	**36**	**121**
HA5KDQ	**3.5**	**344,080**	**1885**	**29**	**107**
HA8BE	**1.8**	**127,500**	**1086**	**22**	**78**

Iceland

TF3IGN	**A**	**20,758**	**219**	**18**	**79**
TF3AO	*	504	20	9	15

Ireland

EI6IZ	**A**	**1,778,625**	**2301**	**96**	**369**
EI7CC	*	139,536	399	49	155
EI4GXB	*	12,033	78	25	38
**

Z35T	**7**	**752,928**	**2578**	**40**	**136**	
Z37M	**3.5**	**217,496**	**1269**	**26**	**98**	
Z31MM	*	25,600	419	9	55	
Z35X	**1.8**	**98,612**	**959**	**17**	**72**	
Moldova						
ER4DX	**A**	**3,255,816**	**3260**	**149**	**437**	
			(OP: RA4LW)			
ER5WU	*	150,150	552	52	143	
ER3ZZ	*	94,950	229	62	149	
Montenegro						
403A	**A**	**7,183,120**	**6013**	**164**	**543**	
			(OP: UT5UDX)			
Netherlands						
PA5KT	**A**	**1,803,605**	**1725**	**82**	**263**	
PA3GVI	*	**893,916**	**1619**	**93**	**279**	
PA1T	*	798,330	1688	67	232	
PA5WT	*	721,180	1172	75	262	
PA5TT	*	677,928	1007	85	291	
PAØLOU	*	558,204	908	88	274	
PAØMIR	*	473,026	921	76	250	
PA7RA	*	100,217	396	47	122	
PA4B	*	56,625	293	30	95	
PA3HGF	*	39,795	209	28	77	
PAØWRS	*	37,164	145	34	80	
PA3EMN	*	32,670	181	29	92	
PAØW	*	29,478	158	29	73	
PAØJED	**21**	**75,712**	**332**	**30**	**74**	
PA4AO	**7**	**194,810**	**834**	**34**	**120**	
PA1HEM	*	6,384	92	15	42	
Norway						
LA6IHA	**A**	**284,040**	**704**	**60**	**210**	
LA3ZA	*	102,705	346	43	162	
LA5HPA	*	64,944	270	36	128	
LB1KF	*	620	21	13	18	
LA2QM	**21**	**46,556**	**252**	**27**	**76**	
LA7GIA	**7**	**35,598**	**288**	**24**	**78**	
LA4RT	**3.5**	**66,960**	**605**	**18**	**75**	
Poland						
SP4Z	**A**	**3,766,000**	**3023**	**159**	**541**	
SN1I	*	**899,808**	**1307**	**102**	**314**	
SP9LAS	*	375,463	757	75	244	
SN9R	*	374,868	690	82	242	
			(OP: SP9BRP)			
SP3GXH	*	324,090	626	68	209	
SQ9FMU	*	180,400	477	53	167	
SP1RKR	*	144,256	443	50	134	
SP6T	*	119,680	171	107	165	
SP6FXY	*	47,652	185	44	88	
SP5CIB	*	19,888	109	28	60	
SP1MHZ	*	19,116	138	16	65	
SQ9IWT	*	15,708	96	26	51	
SQ1EUG	*	13,392	176	15	47	
SP5BB	*	12,513	109	31	66	
SP6IHE	*	6,572	73	22	31	
SP2CA	*	352	8	8	8	
SQ3VV	28	2	1	1	1	
SN7C	**21**	**124,944**	**371**	**33**	**119**	
			(OP: SP7CHS)			
SP5ADX	**21**	**59,622**	**234**	**29**	**85**	
SP9W	*	45,030	179	31	83	
SP1RKT	*	31,944	150	31	90	
SP5ES	*	4,920	51	18	23	
SN3R	**14**	**833,055**	**2100**	**39**	**146**	
			(OP: SP3RBR)			
SP1NY	*	250,838	752	36	125	
SP4JCQ	*	244,383	724	36	123	
SP6MQO	*	11,505	95	19	40	
SN2K	**7**	**731,668**	**2107**	**39**	**157**	
			(OP: SP2JKC)			
SP8LBK	*	75,392	350	27	101	
SQ7FPD	*	3,735	66	10	35	
SQ3WW	*	130	5	5	5	
SN3A	**3.5**	**669,837**	**2517**	**35**	**132**	
			(OP: SP3HLM)			
SP5ELA	*	129,785	1099	18	83	
SO6C	*	36,408	369	13	69	
			(OP: SP6CIK)			
SQ6IUO	*	5,104	99	7	37	
SP9DUX	*	4,136	98	7	37	
SN9Z	**1.8**	**60,445**	**747**	**13**	**64**	
SP4GL	*	10,340	242	6	41	
SP6GNJ	*	10,176	179	8	45	
Portugal						
CR6K	**A**	**1,450,820**	**1747**	**94**	**336**	
			(OP: CT1CJJ)			
CR6A	**28**	**2,720**	**38**	**12**	**22**	
			(OP: CT1IUA)			
Romania						
YQ9W	**A**	**3,497,518**	**3854**	**124**	**423**	
			(OP: YO9WF)			
YO9HP	*	**3,377,608**	**3322**	**145**	**466**	
YR9F	*	1,235,652	1716	108	336	
			(OP: YO9FNP)			
YO6BHN	*	893,365	1232	111	328	
YO3FRI	*	440,559	656	90	243	
YO9SW	*	202,860	477	63	182	
YO5OAG	*	178,772	499	53	186	
YO9OL	*	147,180	510	59	161	
YO5ØIF	*	54,375	279	36	109	
YO4CSL	*	26,429	171	27	80	
YO4RST	*	6,489	54	23	40	
YO9GVP	*	506	21	6	16	
YO9IIF	*	195	17	4	11	
YO5BBO	**21**	**32,852**	**184**	**26**	**60**	
YO7DAA	*	2,150	34	10	15	
YO7FB	**14**	**194,166**	**949**	**32**	**102**	
YR5T	*	191,760	693	34	107	
			(OP: YO5CBX)			
YR1C	**7**	**689,310**	**2365**	**40**	**145**	
			(OP: YO4NA)			
YO3JW	*	99,190	591	31	99	
YO5CUQ	*	2,496	39	11	28	
YR5N	**1.8**	**86,022**	**1000**	**15**	**66**	
			(OP: YO5PBF)			
YO5AJR	*	45,560	661	11	57	
Sardinia						
ISØ/K7QB	**A**	**2,475,795**	**2643**	**112**	**399**	
Scotland						
GM3YEH	**14**	**44,014**	**292**	**14**	**45**	
GM4UYZ	*	2,460	58	7	23	
Serbia						
YU1LA	**A**	**4,446,889**	**3563**	**159**	**508**	
YT3M	*	**2,825,277**	**3073**	**130**	**423**	
			(OP: YU1YV)			
YT1BB	*	382,876	1493	38	110	
YU1HFG	*	2,550	100	11	39	
YTØI	*	1,118	40	6	20	
YU5A	**21**	**359,535**	**1039**	**37**	**128**	
			(OP: YU1EW)			
YU6DX	**14**	**451,500**	**1379**	**38**	**137**	
YT1VP	**7**	**760,656**	**2467**	**39**	**145**	
YU9DX	*	**682,620**	**2324**	**40**	**146**	
YU7W	*	**667,709**	**2269**	**39**	**142**	
			(OP: YT7KM)			
YTØA	*	627,564	1954	40	146	
			(OP: YT1CI)			
***YT2T**	**7**	**386,880**	**1334**	**37**	**123**	
YU1EXY	**3.5**	**580,018**	**2361**	**33**	**125**	
			(OP: YT7AW)			
YU1UN	*	321,232	1747	33	103	
YT4A	*	96,152	630	25	94	
YU7U	*	91,131	673	22	89	
			(OP: YU7BH)			
YT1T	**1.8**	**19,437**	**401**	**8**	**49**	
YT2U	*	5,719	136	5	38	
Sicily						
IU9T	**A**	**2,704,800**	**2236**	**155**	**489**	
			(OP: IT9GSF)			
IT9LNH	*	336	13	9	12	
Slovakia						
OM7YC	**A**	**371,792**	**881**	**68**	**236**	
OM8LA	*	**311,392**	**865**	**51**	**212**	
OM6AL	*	201,189	971	36	163	
OM3NI	*	163,184	491	47	170	
OM5UM	*	97,336	403	38	146	
OM4DU	*	68,058	332	32	139	
OM6AC	*	47,520	299	36	99	
OM4EX	*	24,824	90	47	69	
OM3DX	14	14,518	142	20	41	
OM5M	**3.5**	**529,740**	**2225**	**33**	**129**	
			(OP: OM2IB)			
OM7CA	**1.8**	**64,467**	**603**	**18**	**69**	
Slovenia						
S59ABC	**A**	**3,818,664**	**2893**	**151**	**488**	
			(OP: S51DS)			
S57DX	*	**3,788,552**	**3386**	**154**	**472**	
S5ØR	*	3,039,904	2928	133	441	
S58M	*	1,952,134	2097	134	432	
S58P	*	748,980	1317	95	285	
S52AU	*	342,171	821	65	196	
S55ØO	*	179,064	592	59	157	
S51DX	*	164,822	744	48	145	
S57WJ	*	148,005	488	49	158	
S57AW	**28**	**26,149**	**296**	**16**	**53**	
S51FB	**21**	**279,725**	**815**	**37**	**130**	
S5ØK	**14**	**758,576**	**2120**	**38**	**144**	
S57SU	*	113,980	449	35	104	
S52AW	**7**	**1,043,647**	**3096**	**39**	**148**	
S57M	*	695,400	2030	40	150	
S57Z	*	**563,616**	**1820**	**40**	**131**	
S5ØB	*	520,566	1954	36	123	
S53F	*	322,164	1242	39	132	
S52W	**3.5**	**220,047**	**1426**	**25**	**98**	
S54X	*	141,928	1090	24	89	
S5ØX	*	16,640	263	12	52	
S53O	**1.8**	**179,515**	**1287**	**25**	**90**	
Spain						
EA4KA	**A**	**1,273,796**	**1865**	**78**	**238**	
EA4ZK	*	**1,214,352**	**1387**	**106**	**326**	
EE5I	*	810,509	1732	83	260	
			(OP: EA5DWS)			
EA7MT	*	597,042	986	79	290	
EA2BNU	*	573,093	950	81	252	
EA1OS	*	506,300	952	68	237	
EA5DKU	*	303,705	588	61	194	
EA3DTD	*	240,810	1131	40	98	
EA3NO	*	225,810	595	54	141	
EA4XT	*	215,586	470	67	194	
EC1KR	*	153,780	379	58	162	
EA3EJI	*	119,000	298	71	209	
EA1CS	*	115,050	555	38	112	
EB5CNK	*	114,080	425	41	119	
EA3DR	*	111,524	261	68	128	
AN2K	*	53,339	209	51	92	
EA7ZY	*	27,742	146	29	68	
EA5RM	*	12,330	68	37	53	
EA3KN	*	1,452	29	19	25	
EA5GS	**28**	**6,273**	**87**	**13**	**38**	
EA3AR	**14**	**553,520**	**1828**	**35**	**113**	
EA3ALV	**7**	**39,516**	**280**	**23**	**88**	
EA3JW	*	17,064	169	14	40	
AM5BM	**3.5**	**213,446**	**1105**	**31**	**106**	
			(OP: EA5BM)			
EA4KD	*	**183,488**	**1053**	**22**	**100**	
EA1DR	**1.8**	**33,184**	**397**	**13**	**55**	
EA5BM	*	6	1	1	1	
			(OP: EA5ZF)			
Sweden						
SM6CNN	**A**	**1,831,508**	**1819**	**127**	**469**	
SM6WET	*	508,624	795	85	298	
SMØQ	*	236,748	779	42	176	
			(OP: SMØOGQ)			
SM6M	*	209,993	483	72	157	
			(OP: SM6MCW)			
SM6EQO	*	93,796	370	37	142	
SM6E	*	82,950	338	45	130	
			(OP: SM6FUD)			
SM5FUG	*	46,242	316	31	95	
SM2ODB	*	31,262	160	30	124	
SA1A	*	7,840	81	21	49	
			(OP: SM1TDE)			
SM3D	*	2,660	42	12	23	
			(OP: SM3WMU)			
SIØM	**14**	**61,180**	**453**	**23**	**72**	
			(OP: SMØMXO)			
SM5CBM	**3.5**	**19,966**	**232**	**14**	**53**	
SM5CEU	**1.8**	**105,444**	**850**	**22**	**79**	
Switzerland						
HB9IQB	**A**	**1,093,455**	**1604**	**100**	**323**	
HB9LCW	*	**1,038,360**	**1202**	**134**	**375**	
HB9TSW	*	387,240	1030	48	162	
HB9CPS	*	103,356	351	40	134	
HB9CZF	**3.5**	**62,014**	**462**	**24**	**77**	
Ukraine						
UW1M	**A**	**3,182,058**	**3316**	**135**	**459**	
			(OP: UR5MW)			
UWØK	*	2,821,613	2408	146	507	
			(OP: USØKW)			
UW3U	*	1,172,880	1304	134	409	
			(OP: UT7UJ)			
UR5QA	*	833,514	1136	107	331	
UT8IM	*	578,120	1067	92	296	
US3IZ	*	564,456	1196	76	272	
UT2UZ	*	554,875	1602	40	153	
UXØFF	*	554,840	1034	96	292	
UU6JJ	*	493,162	898	94	288	
UT8LO	*	426,932	727	72	241	
UR5MM	*	402,570	666	92	286	
UR2VA	*	392,784	606	91	243	
UT5JAJ	*	309,738	797	67	219	
UY7C	*	308,880	863	59	181	
UX2MF	*	213,332	544	56	210	
UR8MH	*	203,056	561	63	196	
UTØRM	*	128,744	579	45	109	
UU9CW	*	127,765	312	70	183	
UY5AA	*	122,488	307	61	183	
UT5ID	*	86,697	288	42	129	
UZ5U	*	57,524	260	43	103	
US9PA	*	40,950	207	34	96	
US4IPQ	*	32,265	256	33	102	
UT5ERP	*	27,140	190	20	98	
USØZK	*	22,748	189	25	96	
UT4PZ	*	22,472	94	38	68	
UV2L	*	18,343	120	23	60	
UR7EZ	*	17,860	131	18	76	
UR3LTD	*	7,644	80	16	62	
US3IP	*	988	22	16	22	
UV6VA	*	507	27	14	25	
UT3IK	**21**	**71,190**	**376**	**29**	**84**	
UX4FC	*	60,495	244	31	80	
UX1UF	*	31,713	185	26	67	
UZØU	**14**	**410,760**	**1352**	**37**	**126**	
			(OP: UY5ZZ)			
UT4ZG	*	277,884	985	39	127	
UT8L	*	114,559	647	26	83	
			(OP: UY5LQ)			
UT1IA	*	78,000	418	26	99	
UR5IKN	*	48,732	174	32	99	
UT3EG	*	2,241	58	6	21	
US8IBS	**7**	**67,821**	**519**	**24**	**87**	
UR5MBA	*	57,462	289	30	92	
UU1CW	*	51,040	229	28	88	
UTØEA	*	41,736	164	30	111	
UR5EAF	*	93	41	9	22	
UT2II	**3.5**	**463,684**	**2121**	**33**	**115**	
UX2X	*	**434,826**	**1910**	**33**	**120**	
			(OP: UT2XQ)			
UW5U	*	335,404	1647	30	112	
UT2FA	*	108,490	1049	20	75	
UT3L	*	105,925	1024	19	76	
			(OP: UR5LO)			
UT1IZZ	*	1,352	46	6	20	
			(OP: UY5IY)			
UT2PX	**1.8**	**35,774**	**563**	**9**	**53**	
Wales						
GWØRYT	**A**	**198,875**	**524**	**45**	**140**	
GW4BLE	*	149,632	330	64	160	

OCEANIA

Australia						
VK3FM	**A**	**114,342**	**252**	**61**	**116**	
VK6DU	**21**	**117,810**	**431**	**27**	**72**	
VK6HZ	**14**	**129,360**	**361**	**33**	**99**	
VK2IM	**7**	**636,104**	**1549**	**35**	**113**	
VK4AN	*	136,320	398	34	94	
East Malaysia						
9M6XRO	**A**	**385,452**	**552**	**99**	**159**	
Guam						
KG6DX	**A**	**2,859,916**	**2474**	**132**	**272**	
Hawaii						
KH6ND	**A**	**1,122,975**	**2254**	**39**	**136**	
AH6NF	14	1,152	25	11	13	
Indonesia						
YB3MM	**A**	**24,500**	**111**	**38**	**62**	
YCØYTH	21	3,666	36	15	24	
YB3TD	**7**	**22,223**	**125**	**26**	**45**	
YC2WWW	**3.5**	**6,042**	**62**	**19**	**34**	
New Zealand						
ZL1AZE	**A**	**1,725,813**	**1700**	**117**	**252**	
ZM4M	*	405,820	730	77	129	
ZL4NX	*	83,538	244	50	76	
			(OP: JM1CAX)			
ZL1BYZ	**21**	**781,736**	**1969**	**32**	**107**	
Philippines						
DU1BP	**A**	**438,036**	**988**	**64**	**109**	

SOUTH AMERICA

Antarctica						
DP1POL	**A**	**236,250**	**628**	**40**	**95**	
			(OP: DL5XL)			
Argentina						
LP1H	**A**	**6,427,204**	**4628**	**124**	**373**	
			(OP: LU5OX)			
LU5OM	*	627,473	1160	68	135	
LU3JVO	*	349,164	719	60	123	
LW1DTZ	*	435	11	8	7	
LU6QI	*	198	9	3	8	
Brazil						
PP5BZ	**A**	**3,053,064**	**2762**	**115**	**293**	
PY2SEX	*	**1,895,436**	**1557**	**122**	**322**	
PW2B	*	646,923	1116	73	150	
			(OP: PY2HL)			
PR7AF	*	348,936	730	63	123	
PU9OSB	*	94,572	231	44	104	
PY4FQ	*	70,560	226	44	76	
PY2MR	*	44,581	191	50	59	
PY2AC	*	18,615	105	37	36	
PY2IQ	*	16,849	90	35	48	
PY2VM	*	4,366	50	35	39	
PY2NFE	*	4,275	64	20	25	
PY2LSM	**28**	**107,550**	**549**	**22**	**53**	
PY1NB	*	39,431	319	16	27	
PY2XC	*	16,360	182	17	23	
PY2WB	**21**	**667,590**	**1426**	**40**	**130**	
PY1KN	*	**547,404**	**1262**	**37**	**119**	
PY2MTV	*	246,975	887	34	77	
PY4XX	*	38,778	230	23	46	
PY1CMT	*	2,457	56	13	14	
PY4OG	**7**	**56,710**	**204**	**32**	**75**	
PV8DX	**3.5**	**79,376**	**342**	**19**	**69**	
Chile						
CE3FZ	**A**	**227,136**	**713**	**42**	**70**	
CE1TBN	7	2,244	38	12	22	
Colombia						
HK1X	**28**	**25,872**	**278**	**13**	**29**	
HK3O	**21**	**250,046**	**855**	**30**	**79**	
HK3UA	14	9,048	128	18	34	
Suriname						
PZ5X	**A**	**2,924,272**	**2395**	**111**	**331**	
			(OP: K5UN)			
Venezuela						
4M5IR	**21**	**140,490**	**820**	**25**	**65**	
			(OP: YV5KG)			

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

W3UA/1	**5,657,499**	**3133**	**144**	**517**	
K1KI	**3,298,304**	**2362**	**123**	**389**	
W1TM	542,166	655	81	245	
KA1IOR	328,680	391	87	243	
W1ZT	19,673	86	33	70	
K7W/1	5,852	78	18	26	
K2QMF	**658,442**	**605**	**99**	**302**	
WT4Q/2	358,440	466	90	219	
N2KPB	82,896	243	51	125	
K9RS/3	**6,153,996**	**3230**	**154**	**545**	
W3BGN	**5,669,144**	**2864**	**155**	**567**	
W3LJ	259,904	400	77	185	
KD3RF	87,106	217	56	138	
KT3Y/4	**6,200,920**	**3364**	**149**	**531**	
AD4ES	1,029,392	1026	98	306	
W4HYT	252,053	367	80	189	
K5MR	**3,642,806**	**2026**	**166**	**528**	
W5VX	**2,201,290**	**1504**	**144**	**430**	
W5RU	2,064,510	1437	140	425	
K5MDX	804,111	948	117	296	
W7DR/6	**932,829**	**886**	**133**	**284**	
N7DD	**2,515,320**	**1873**	**144**	**404**	
W7VJ	2,440,940	1922	143	365	
W7VV	1,588,699	1276	147	364	
N7ZG	1,070,746	1056	119	263	
NN7SS	597,550	836	103	267	
K8AZ	**5,891,928**	**3102**	**160**	**554**	
K8DO	743,040	812	98	286	
WN9O	**1,494,262**	**1324**	**114**	**320**	
K9SG	211,500	336	91	191	
KØKL	**1,206,330**	**1026**	**134**	**340**	
KTØR	583,862	627	98	255	
NØUV	6,300	48	29	34	

Canada

VE3EJ	**9,952,976**	**5284**	**171**	**605**	
VE3UTT	**5,498,184**	**4055**	**131**	**448**	
VE3YAA	3,464,134	3301	119	363	
VE3CR	2,194,182	1703	126	411	
VE6SV	**2,918,650**	**2540**	**152**	**386**	
VE6AO	361,050	974	53	121	

Cuba

T48K	**3,122,097**	**3620**	**100**	**387**	

El Salvador

YS4U	**6,974,750**	**5532**	**136**	**439**	

Martinique

FM5CD	**6,662,088**	**5581**	**139**	**413**	

AFRICA

Tunisia

3V3S	**6,637,529**	**4290**	**119**	**422**	

ASIA

Asiatic Russia

RK9CWA	**6,153,180**	**3644**	**150**	**510**	
RN9S	**5,217,100**	**3578**	**131**	**449**	
UA9UZZ	4,833,070	3300	138	445	
RK9JWV	1,142,400	1402	82	254	
RK9CYA	531,814	808	70	208	
RK9KWI	29,403	120	30	69	
RWØA	**6,218,400**	**4357**	**144**	**456**	
RWØCWA	4,705,324	3902	157	376	
RZØLWA	659,104	964	115	229	
RZØSZZ	45,948	218	27	57	

Asiatic Turkey

TA2KK	**482,400**	**989**	**54**	**186**	

China

B5A	**1,274,385**	**1803**	**112**	**259**	
BY1CW	**863,062**	**2026**	**63**	**151**	
B1C	474,468	1280	76	152	
BD4DVK	217,350	677	72	138	

Cyprus

P33W	**17,506,412**	**8120**	**171**	**629**	

Hong Kong

VR2C	**2,051,126**	**2557**	**112**	**386**	

India

VU2RMS	**160,765**	**419**	**46**	**139**	

Japan

JG1ZKO	20,468	136	38	48	
JQ1YWK	12,629	87	32	41	
JAØNJ	**4,100,281**	**3124**	**150**	**343**	

Kazakhstan

UO1P	**2,795,832**	**3113**	**86**	**262**	

Qatar

A73A	**10,329,216**	**5409**	**162**	**565**	

EUROPE

Belarus

EW2WW	4,386	58	14	37	
EW8ZZ	506	22	5	17	

Belgium

OT5P	**1,807,071**	**2581**	**97**	**302**	
ON6BR	911,550	1537	81	273	

Bosnia-Herzegovina

E7DX	**8,430,982**	**5803**	**182**	**644**	
E73M	**7,533,243**	**5266**	**167**	**616**	

Bulgaria

LZ7J	**4,720,666**	**5067**	**142**	**484**	

Croatia

9A1P	**7,718,474**	**5101**	**175**	**619**	
9A1A	**7,703,040**	**5200**	**174**	**594**	
9A7D	1,270,003	2055	101	296	

Czech Republic

OK5W	**7,519,381**	**4584**	**181**	**660**	
OL3Z	**7,365,258**	**5048**	**164**	**582**	
OL1C	3,996,875	3379	142	483	
OK6T	1,697,808	1966	117	379	
OL2U	598,448	1289	69	262	

Denmark

OV3X	**1,445,491**	**2064**	**116**	**341**	

England

G6PZ	**7,329,052**	**5196**	**154**	**570**	
M4A	67,710	206	55	130	

European Russia

RU1A	**9,158,520**	**5676**	**177**	**663**	
RT5A	**6,006,090**	**4716**	**165**	**606**	
RK4FWX	**5,567,705**	**4825**	**159**	**556**	
RT3F	3,977,568	3768	149	523	
UA3R	3,336,564	3761	139	489	
RK3GYM	2,728,296	2952	143	469	
RZ4CWW	2,132,484	2688	123	441	
RC3W	1,810,420	2436	111	413	
RZ3TZL	1,769,271	2364	120	399	
RM3Q	1,193,529	2274	109	352	
RZ6HWA	1,067,778	1919	100	311	
RZ3TZZ	881,426	1609	92	314	
RK3DZH	707,940	1477	79	263	
RK3RWA	683,280	1527	82	278	
RK3MWL	451,917	1017	76	261	
RK4HYT	180,312	559	62	202	
RK4CWQ	90,480	479	35	139	
RK4WWQ	21,774	201	26	88	
RK1QWX	20,298	202	22	80	
RK3WWM	5,980	132	13	39	

Faroe Islands

OY6A	**2,400,816**	**3716**	**108**	**420**	

Finland

OH5Z	**4,221,570**	**3897**	**146**	**508**	
OH7M	**3,333,996**	**3463**	**154**	**512**	
OH7N	1,971,915	1966	132	423	

France

TM6M	**9,129,411**	**5806**	**167**	**604**	
TMØR	5,802,192	4610	151	515	
TM2S	4,192,913	3545	152	501	
TM2T	3,049,698	3465	108	385	
F5KIN	441,090	1020	70	191	

Germany

DF3CB	**4,616,125**	**3274**	**155**	**579**	
DR4A	**4,110,666**	**3494**	**158**	**521**	
DP9A	3,534,571	3453	142	501	
DP7A	2,143,980	2342	123	393	
DA3A	1,450,425	1873	95	320	
DL2A	1,229,615	1788	100	341	
DKØIU	91,300	274	58	162	

Hungary

HG6N	**6,772,088**	**4564**	**172**	**630**	

ITU HQ Geneva

4U1ITU	**3,870,752**	**4290**	**104**	**360**	

Iceland

TF4X	**3,233,670**	**4410**	**106**	**345**	

Italy

IR4M	**8,855,544**	**5560**	**175**	**613**	
IR2C	**7,028,560**	**4845**	**170**	**600**	
IO5O	4,053,630	3512	133	449	

Kaliningrad

RW2F	**7,124,544**	**5116**	**172**	**626**	

Lithuania

LY5W	**86,320**	**607**	**31**	**99**	

Netherlands

PI4TUE	**2,288,838**	**3104**	**105**	**328**	
PI4KGL	939,840	2074	78	242	
PA6Z	239,568	1470	27	97	
PI4RCK	235,008	628	60	196	
PI4ZOD	8,346	122	24	54	

Norway

LN3Z	**5,238,896**	**4459**	**163**	**549**	
LN2T	544,852	1548	67	252	

Poland

SO9S	**5,416,215**	**4028**	**160**	**575**	
SO8A	**4,059,566**	**3563**	**

UW4E	2,799,567	3105	138	453
UTØAZA	1,138,800	2222	89	311
UWØL	467,062	941	78	269
UX4E	229,120	545	69	187
UU4JWC	92,700	443	46	160
UR6GWZ	78,588	347	43	134
UX8IX	48,184	291	32	120

OCEANIA

Australia

VK4TI	20,910	108	31	51

Christmas Island

VK9XX	2,688	27	20	22

Guam

AH2R	**8,027,760**	**4512**	**168**	**456**

Indonesia

YE1C	**408,969**	**760**	**76**	**167**

New Zealand

ZL2AGY	**595,884**	**862**	**84**	**170**

Northern Mariana Islands

AHØ/AH2Y	**2,224,068**	**2472**	**108**	**211**

Tonga

A31A	**2,012,940**	**2361**	**107**	**211**

SOUTH AMERICA

Argentina

LT1F	**4,704,576**	**3824**	**116**	**342**
LU9HP	557,496	1196	62	116

Brazil

ZW5UN	**6,434,400**	**4400**	**146**	**414**
PT5UN	785,628	726	126	345
PT2ZHA	610,701	971	84	189

Netherlands Antilles

PJ4A	**12,903,562**	**6407**	**157**	**549**

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States

K1AR	**8,809,122**	**4423**	**161**	**561**
NZ1U	**7,141,026**	**4280**	**144**	**510**
K1RX	**6,914,644**	**4082**	**142**	**496**
KØTV/1	5,653,800	3109	148	527
K2LE/1	5,382,168	3179	139	488
N8RA/1	2,141,931	1553	119	398
W2YC	**4,230,682**	**2487**	**140**	**494**
K2AX	**3,772,477**	**2341**	**133**	**468**
W2CG	3,730,914	2377	133	461
WQ2N	605,154	716	81	237
WE3C	**13,859,374**	**6148**	**174**	**644**
NY4A	**9,366,320**	**4927**	**155**	**555**
N4WW	**6,528,228**	**3588**	**162**	**551**
K4VV	3,504,895	2436	129	416
KZ5P	**340,561**	**615**	**91**	**208**
W6OAT	**4,077,774**	**2596**	**159**	**447**
N7AT	**2,859,456**	**2068**	**151**	**411**
W8BI	**190,008**	**355**	**83**	**178**
NØIJ/9	**2,507,517**	**1618**	**148**	**459**
NØNI	**5,682,201**	**3149**	**169**	**552**
KØIR	3,896,154	2419	155	466

Alaska

NL7Z	**2,608,016**	**3193**	**124**	**249**

Canada

VE9ML	**1,012,662**	**1138**	**87**	**291**
VE3FU	**5,084,340**	**3578**	**136**	**470**

Jamaica

6Y1V	**17,192,104**	**10078**	**166**	**558**

U.S. Virgin Islands

KP2M	**12,661,840**	**8183**	**151**	**501**

AFRICA

Canary Islands

AN8R	**4,721,541**	**4668**	**90**	**273**

Madeira Islands

CR3L	**23,156,640**	**10946**	**159**	**561**

Sierra Leone

9L5A	**18,256,248**	**9259**	**157**	**524**

ASIA

Asiatic Russia

RK9XWA	**1,921,764**	**2085**	**83**	**298**
RK9CWW	1,599,612	1126	128	428

China

B7M	**916,254**	**1659**	**102**	**225**

Cyprus

C4I	**14,693,712**	**7244**	**168**	**580**

Japan

JA1ZGP	**1,212,189**	**1566**	**108**	**219**
JA6ZPR	**1,247,232**	**1502**	**100**	**236**

South Korea

HLØMBC	**432,552**	**881**	**93**	**175**

EUROPE

Croatia

9A7A	**9,966,119**	**6470**	**175**	**646**

Czech Republic

OL4A	**12,023,792**	**7549**	**182**	**666**

Denmark

OZ5E	**2,345,424**	**3513**	**127**	**397**

England

G5O	**4,123,215**	**4487**	**113**	**418**

European Russia

RK3DXZ	**1,329,356**	**2380**	**112**	**370**

Finland

OH2U	**5,789,520**	**5064**	**162**	**558**
OH2BJ	431,288	1165	76	243

Germany

DL1A	**6,824,235**	**5224**	**155**	**546**
DLØAO	5,753,150	4368	150	539
DR5N	**5,568,520**	**4654**	**142**	**538**
DKØED	1,742,789	1964	115	412

Hungary

HG1S	**7,685,265**	**5878**	**173**	**622**

Italy

IR4X	**11,281,193**	**7081**	**182**	**665**

Latvia

YL4U	**7,251,489**	**6590**	**153**	**558**

Lithuania

LY7Z	**4,280,342**	**4049**	**143**	**495**
LY2W	**4,147,500**	**4392**	**144**	**481**

Netherlands

PI4COM	**5,422,760**	**4458**	**152**	**572**
PI4CC	**4,020,000**	**3942**	**141**	**484**
PI4WLD	21,000	149	19	51

Poland

SN3T	**1,107,792**	**1515**	**113**	**358**

Serbia

YT2W	**7,402,428**	**6530**	**152**	**530**

Slovenia

S52ZW	**6,895,929**	**5617**	**164**	**555**

Spain

EA5CW	**6,241,642**	**5905**	**151**	**520**

Switzerland

HB9CA	**7,428,730**	**5927**	**152**	**558**

Ukraine

UR3QXX	**463,752**	**1057**	**71**	**268**

OCEANIA

Australia

VK6AA	**12,331,144**	**6524**	**162**	**502**

Hawaii

KH6LC	**9,591,778**	**6752**	**153**	**346**

New Zealand

ZM1A	**6,847,680**	**5149**	**136**	**344**
ZM4T	2,899,740	3091	118	254

Philippines

DX1DBT	**214,081**	**691**	**54**	**65**

SOUTH AMERICA

Argentina

LU8YE	**3,502,648**	**3434**	**101**	**266**

Brazil

ZY7C	**16,742,385**	**7873**	**167**	**578**
PY1GE	4,095	37	16	29

Netherlands Antilles

PJ2T	**16,075,368**	**8278**	**152**	**532**

Uruguay

CW7T	**5,179,488**	**3937**	**124**	**365**

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

United States

KC1XX	**17,757,558**	**7604**	**185**	**694**
K3LR	**17,488,408**	**7633**	**184**	**705**
W3LPL	**17,328,545**	**7617**	**185**	**686**
K1LZ	**15,645,202**	**7024**	**178**	**664**
NQ4I	**12,922,640**	**6396**	**171**	**644**
NR4M	**11,049,660**	**5458**	**167**	**615**
K1TTT	10,903,992	5346	170	632
W2FU	**10,481,354**	**5477**	**164**	**590**
W1KM	10,274,565	5082	150	585
NR5M	**10,151,358**	**5343**	**179**	**619**
K5GO	**9,085,882**	**4757**	**171**	**596**
KØRF	**6,624,141**	**3868**	**178**	**575**
WØAIH/9	**4,991,217**	**3056**	**163**	**534**
W8AV	**4,738,816**	**2626**	**159**	**533**
K5KG/4	4,063,735	2446	145	474
NE3F	2,359,379	1784	123	404
K7RST	**240,536**	**520**	**97**	**184**
K7BTW	9,024	84	20	28

Canada

VG7V	**3,675,084**	**4407**	**126**	**276**

AFRICA

Canary Islands

EA8URL	**18,358,912**	**8606**	**161**	**587**

ASIA

Asiatic Russia

RA9A	**4,716,545**	**3155**	**131**	**456**

China

B7P	**7,549,440**	**5525**	**165**	**475**

Japan

JA3YBK	**11,707,080**	**6080**	**182**	**553**
JA5FDJ	**10,979,696**	**5818**	**185**	**543**
JA1YPA	**5,291,253**	**3832**	**156**	**395**

EUROPE

Bulgaria

LZ9W	**11,325,240**	**8801**	**177**	**638**

Croatia

9A7T	**2,750,115**	**2389**	**165**	**530**

Germany

DR1A	**15,740,928**	**9751**	**185**	**711**
DFØHQ	13,910,292	9349	185	706

Lithuania

LY7A	**6,715,034**	**6267**	**153**	**560**

Luxembourg

LX7I	**14,234,072**	**10433**	**176**	**620**

Spain

EE2W	**12,301,761**	**9719**	**168**	**585**

Sweden

SK3W	**9,892,844**	**7589**	**171**	**635**

Ukraine

UU7J	**10,486,896**	**7904**	**184**	**642**

OCEANIA

Christmas Island

VK9XW	**7,809,323**	**4924**	**139**	**412**

SOUTH AMERICA

Brazil

PY2ASS	11,473	126	34	43

Galapagos Islands

HC8GR	**34,307,742**	**14012**	**190**	**664**

CHECK LOGS

4Z5MU, 9L1BTB, A35A, AA5TB, AB1FY, D44AC, DD5KG, DFØWLG, DF9KF, DG1CMZ, DG8VE, DJ3RA, DK3RED, DL1BZA, DL1DXL, DL1LRA, DL2HRE, DL2MJ, DL2OE, DL2RUG, DL3HWD, DL3JON, DL5JAG, DM1LM, DM5DX, DM5JL, EA2OK, EA4/YO8DHC, EA5BY, EA7BJ, ES5JR, ES6CO, EW8CF, F5KAR, FM5LD, G3ORY, G3RAU, G3RWL, G3SWH, G4FKA, G6LUG, GM3CFS, HA1SN, HA5FQ, HA5LQ, HA6NN, HA8JV, HA8KW, HI3TEJ, IØKHP, IK8MYM, IW7ECJ, IZ2FOS, IZ4DZD, JA2KVD, JT1CS, K7BX, K9BO, LA2GH, LA3BO, LA4NE, LA7RRA, LA8AJA, LA8HGA, LA8UL, LU1XS, LU5FF, LU7KAT, LW2HBF, LY2BNL, LY2CO, LZ1AG, LZ1AQ, LZ1EO, LZ1MS, LZ2AG, MØCEF, MØNDZ, MØSKI, MWØIDX, NØRC, N9ADG, OHØJJS, OH4BEN, OH8HTG, OH8SE, OH8US, OK1BMW, OK1DI, OK1DMP, OK1DSU, OK1DVM, OK1FAI, OK1VKC, OK1ZE, OK2BHD, OK2CSU, OK2EQ, OK2OP, OK2PCL, OK2SG, OK4MM, OK4RQ, OK7RJ, OL3A, OZ2JI, PA3EBP, PH0AS, PY2MNL, PY2SD, PY7OJ, RAØSS, RA3CO, RA3QUA, RA3XDX, RA3ZOM, RA4ST, RA6EE, RA9MLX, RF4M, RJ3FJ, RK1AO, RK3BA, RK9DR, RK9UAC, RL3ZI, RNØJX, RN1AC, RN1AJ, RN6FK, RU3AA, RU3EJ, RU3SE, RU4CS, RV3ID, RV6ASU, RV6FG, RWØSD, RX3MA, RX9WN, RZ3AWM, RZ3FW, RZ4AZ, RZ9UO, RZ9UWZ, S51AY, S52QM, SF7WT, SKØTM, SK5PZ, SM3KIF, SM5APS, SM5CLE, SM5ENX, SM5GMZ, SM5NDI, SM7N, SM7PAF, SN4F, SN7F, SO1EKO, SP2FOV, SP3CGK, SP3EPG, SP3QYQ, SP3RNZ, SP4COU, SP4GDC, SP5BYC, SP6BSL, SP6CIK, SP6CZ, SP6NVN, SP7AWG, SP7CVW, SP7HOV, SP7MFQ, SP7MFR, SP7XK, SP8AJK, SP8BVO, SP8FNA, SP8HKT, SP8JMA, SP9CVY, SP9FMP, SP9FTJ, SP9WZS, SQ3AUA, SQ6NTE, SQ6OR, UAØCW, UA1AIR, UA1AJW, UA1AKE, UA3AGW, UA3QLC, UA3QQ, UA4AGO, UA4FTA, UA4NU, UA4PI, UA4UBW, UA6GK, UA6GU, UA9NP, UN7ECA, UR4WG, UR5QDM, UR5ZQV, UT2XX, UT3NF, UT4WA, UT5UY, UT7CL, UT7WZ, UT8IT, UW5QRP, UW7LL, UW7W, UX1AA, UX1IL, VE3HUR, VK7XX, VK7ZE, VP8NO, VR2XLN, VU2UR, W7ZI, WB9NMN, YL2CA, YL2PN, YL2TB, YO2CMI, YO3JR, YO6ADW, YO6EX, YO7BA, YO7DO, YO8DOH, YO8RAA, YO9BXC, YT3W, YY5LI, Z32ID, ZL2BR, ZX2B.

Violation of the Rules:
Red cards: YL/4L3A—unverifiable contacts and unclaimed assistance; HG5A (HA1CW)—unclaimed assistance and unverifiable contacts; RX4HZ—unclaimed assistance and unverifiable contacts.
Yellow card: YT8A—unclaimed assistance.
Withdrawn logs: DK2FG, HA8JV.

CQ 1945 Our 65th Anniversary 2010 CQ

Timeline of Ham Radio History 1945–2010

To help celebrate CQ's 65th anniversary, we've put together a timeline of significant events in ham radio history from 1945 to the present. Each month this year, we'll present five or six years' worth, and then put the whole list on our website when we're done. (Since this is a timeline and not a textbook, we had to be selective. We apologize in advance if we leave out something of importance to you.)

This month, we'll cover the years 1991–1995:

1991: FCC adopts QCWA licensing proposal, eliminating code requirement for Technician license as of February 14; 220–222 MHz reallocated to Land Mobile Service; hams get secondary access to 218–219 MHz for high-speed packet "backbone" networks, but two decades later, the primary user of the band has refused to approve a single application for amateur use.

1992: Heathkit leaves the amateur radio market; CQ introduces "Getting Started" video series with four VHS programs on different aspects of ham operating.

1993: FCC proposes vanity callsign system, allowing hams to choose their own calls; FCC enacts "pizza rule," modifying business communications prohibition to permit hams to use autopatch to do such things as ordering pizza, as long as the communication has no pecuniary benefit to the ham, or is made on behalf of his/her employer (a rule that is now coming under new scrutiny); Joe Taylor, K1JT, shares Nobel Prize in physics with Russell Hulse, ex-WB2LAV, for discovery of binary pulsars and proving Einstein's Theory of Relativity was correct.

1994: FCC grants Novices full privileges on the 222 MHz band; sets aside 222.00-222.15 MHz for weak-signal operation only; 1st joint US/Cuban ham operation (in Cuba); CQ introduces annual *Amateur Radio Almanac.*

1995: CQ celebrates 50th anniversary with special issue and on-air events. Digital signal processing (DSP) makes significant inroads into amateur radio; U.S. Coast Guard discontinues use of Morse code on maritime bands.

Next month, we'll look at 1996 through 2000, featuring a new sunspot cycle, vanity callsigns, and license restructuring.

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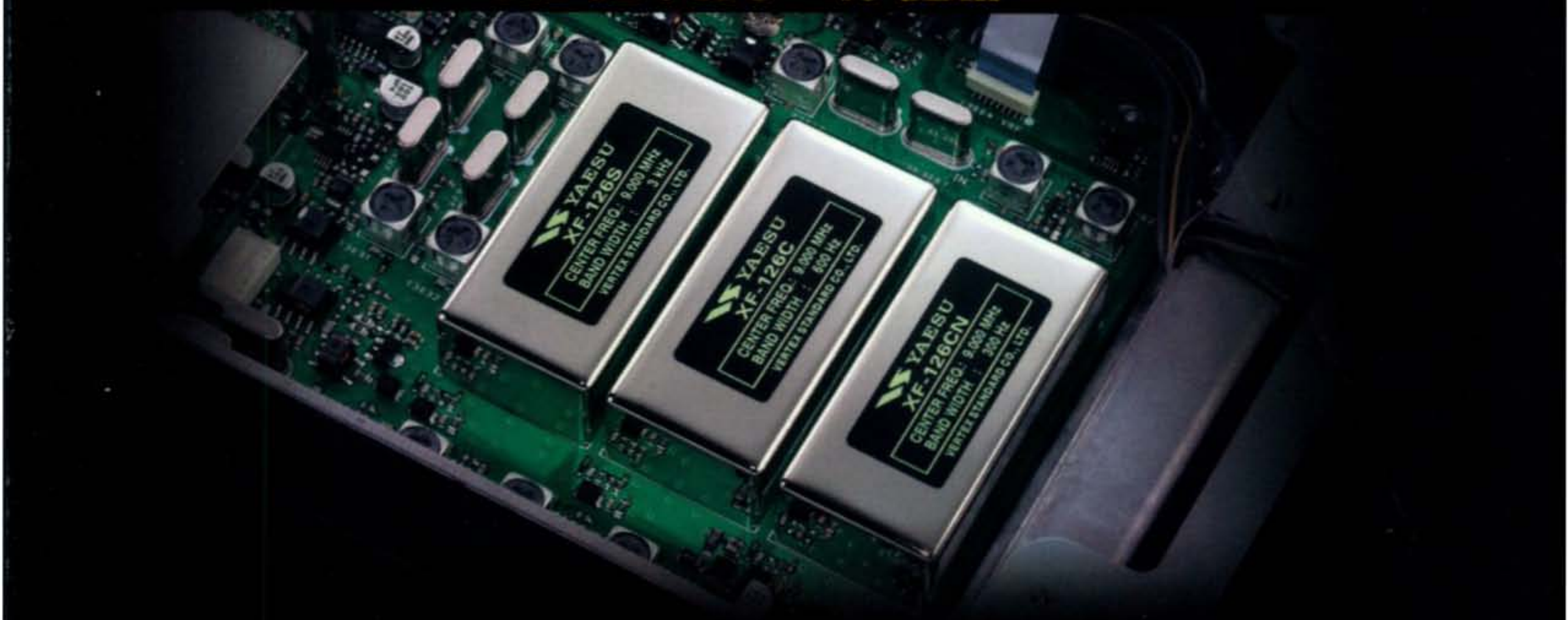

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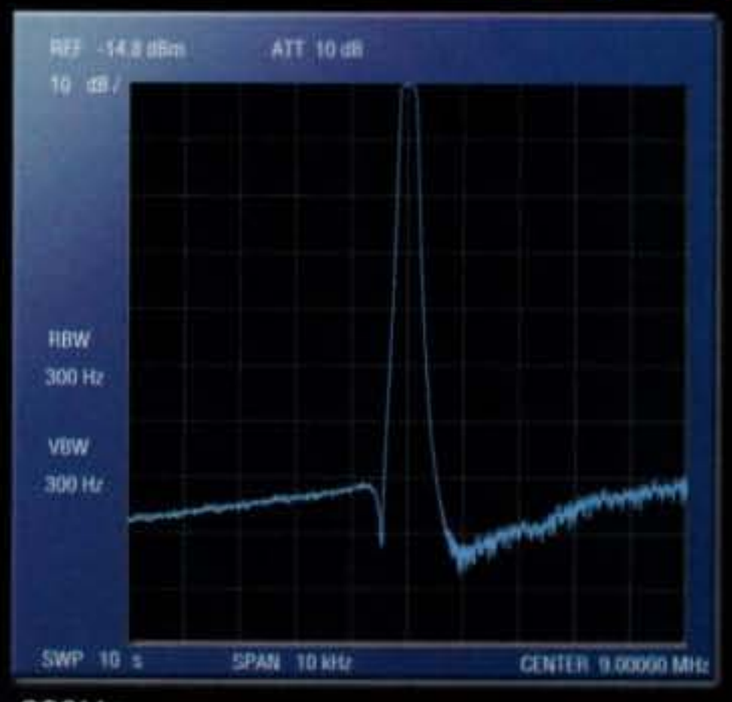

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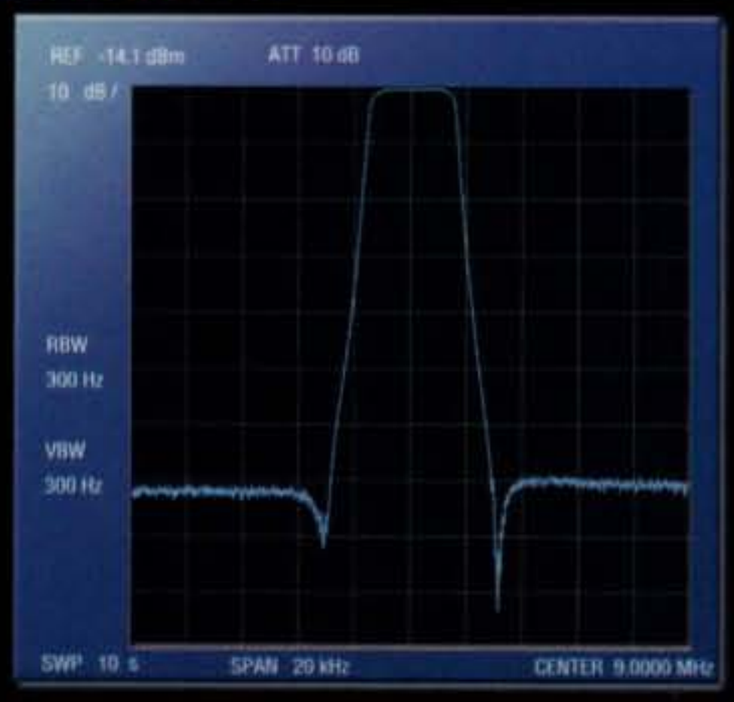

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